132 Platteview

SPR-2025XXXX-XXXX-S
PRELIMINARY
DRAINAGE STUDY & PCSMP CALCULATIONS

12/8/25

Project Engineer

Bradley Huyck, P.E.

Prepared by Connor Cloyed

TD2 File No. 2380-104

DRAINAGE STUDY & PCSMP CALCULATIONS
132 Platteview
SPR-2025XXXX-XXXX-S

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132 Platteview

EXECUTIVE SUMMARY

This drainage study was prepared for the Post-Construction Stormwater Management Plan for 132 Platteview located at the intersection of S 132nd Street and Platteview Road, Springfield, Sarpy County, Nebraska.

The total site is approximately 61.43 acres. The total disturbed area is approximately 61.43 acres. The proposed development will consist of 18 R30 Lots, 10 R50 Lots, 2 BG Lots, 100 R87 Lots, the necessary infrastructure, and two extended dry detention basins.

The Rational Method was used for pipe sizing calculations and the SCS Method was used for analysis of stormwater runoff and detention.

Two extended dry detention basins will be used for stormwater detention and treatment and were designed using the *Omaha Regional Stormwater Design Manual*, *Chapter 8: Stormwater Best Management Practices* and *Bioretention Gardens* by Ted Hartsig and Steven N. Rodie.

The intent of this drainage study is to demonstrate the proposed storm sewers have been designed to adequately convey stormwater runoff from this site, Best Management Practices (BMPs) utilized on this site will adequately treat the first half inch of runoff, and BMPs will adequately detain stormwater to meet pre- and post-construction stormwater runoff requirements.

I. Existing Conditions

The existing site is agricultural use consisting of row crops. Impact Point 1 is located along the western side of the site at Platteview Drive. Impact Point 2 is in the southeast corner of the site. Impact Point 3 is in the northeast corner of the site. There are 3 existing drainage areas on the site. The existing areas, shown on DM-1 in Section 2 of this report, consist of areas EX1, EX2, and EX3. Area EX1 is 48.5 acres of farmland and existing residential development that surface drain to Impact Point 1. Area EX2 Consists of 13.0 acres of farmland in the northeast corner of the site. Drainage EX2 surface flows to Impact point 2. Area EX3 Consists of 1.16 acres of farmland in the northeast corner of the site. The area flows offsite to the east via culvert underneath S132nd Street. The time of concentration for each area was calculated using the TR55 method.

Information for the existing area and impact point is included in the table below.

ID	Description	Total Area (Ac.)	Total Area (SF)	Impervious (SF)	Pervious (SF)	Composite CN	Composite C	Impact Point	Impact Point Description
EX-1	Western Portion of Site	48.5	2,110,935	25,225	2,085,710	77	0.37	1	Existing Storm Sewer
EX-2	Eastern Portion of Site	13.0	568,346	12,811	55,535	77	0.37	2	Existing Basin
EX-3	Northeastern Corner of Site	1.16	50,358	6,912	43,446	77	0.37	3	Existing Culvert
TOTAL EXISTING SITE		62.66	2,729,639	44,948	2,184,691	77	0.37		

II. Proposed Conditions

The proposed construction will consist of 18 R30 Lots, 10 R50 Lots, 2 BG Lots, 100 R87 Lots, the necessary infrastructure, and two extended dry detention basins.

Proposed grading and storm sewer configurations result in 3 drainage areas. Area A1, which will consist of the western portion of the site, area A2 which will consist of the eastern portion of the site, and area A3, which will consist of the northeastern corner of the site. Area A1 will be captured and treated by DB1 where it will then be discharged at IP1. Area A2 will be captured and treated by DB2 where it will then be discharged at IP2. Area A3 will not be captured and will discharge into the existing culvert under S132nd Street.

Further information for each proposed area is shown in the table below.

ID	Description	Total Area (Ac.)	Total Area (SF)	Comp. CN	Composite C	Impact Point	Impact Point Description
A1	Western portion of the Site	48.3	2,104,117	83	0.40	1	Existing Storm Sewer
A2	Eastern Portion of the Site	13.7	596,772	90	0.45	2	Existing Basin
A3	Northeastern Corner of Site	0.66	28,750	77	0.37	3	Existing Culvert
TOTAL PROPOSED SITE		62.66	2,729,639	81	0.43		

IV. Runoff Summary

Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2024 was used to calculate the pre- and post-construction stormwater runoff rates for the 2-, 10-, and 100-year storm events for Impact Point 1. The pre- and post-construction runoff rates for this development are shown in the table below. The proposed construction will decrease the flows for the 2-, 10-, and 100-year storm events.

	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Impact Point 1			
Pre-Construction	45	100	181
Post-Construction	19	37	109
Impact Point 2			
Pre-Construction	13	29	52
Post-Construction	9	16	51
Impact Point 3			
Pre-Construction	2	4	8
Post-Construction	1	2	4

SECTION 1

COMPUTATION FORM
STORM DRAINAGE SYSTEM DESIGN
BY THE RATIONAL METHOD

THOMPSON DREESSEN & DORNER
Consulting Engineers & Land Surveyors
Omaha, NE 68154 (402)330-8860

Calculated By: CNC
Date: 10-06-25
Checked By: BPH

Preliminary x
Final Design

Drainage Area
Project No. 2380-104
Design Storm: 10 yr.

Imp Pt. No.	Location	Conveyance		Direct Runoff										Travel Time (System Design)									Total Runoff					
														Conv Sys		Slope												
		From	To	W.S. or No.	O.F.L. ft.	W.C. Type *	S %	V fps	Ti min	i in/hr	A Ac.	C	q cfs	No.	Size	min %	des %	V des. fps	Cap. (all.) cfs	Lgth ft.	t min	TOC min	i	Comp. C	Total A Ac.	Des. Q cfs	Remarks
	A1								5	8.8	2.85	0.75	18.876		24	0.50	1.00	8.53	26.8013	45	0.09	5	8.8	0.75	2.85	18.88	
	A2								5	8.8	1.76	0.75	11.692		30	0.40	1.00	9.9	48.5977	50	0.08	5.09	8.8	0.75	4.62	30.57	
	A3								5	8.8	0.55	0.75	3.6447		15	0.23	1.00	6.24	7.65189	45	0.12	5	8.8	0.75	0.55	3.645	
	A4								5	8.8	0.49	0.75	3.2678		30	0.57	1.00	9.9	48.5977	264	0.44	5.17	8.6	0.75	5.66	36.63	
															30	0.54	1.00	9.9	48.5977	368	0.62	5.62	8.4	0.75	5.66	35.78	
															30	0.51	1.00	9.9	48.5977	168	0.28	6.24	8.1	0.75	5.66	34.5	
															30	0.49	1.00	9.9	48.5977	75	0.13	6.52	8	0.75	5.66	34.07	
	A5								5	8.8	1.13	0.65	6.4906		15	0.72	1.00	6.24	7.65189	25	0.07	5	8.8	0.65	1.13	6.491	
	A6								5	8.8	0.52	0.67	3.1105		18	0.60	1.00	7.04	12.4436	40	0.09	5.07	8.8	0.66	1.65	9.601	
	A7								5	8.8	0.53	0.61	2.8118		15	0.14	1.00	6.24	7.65189	25	0.07	5	8.8	0.61	0.53	2.812	
	A8								5	8.8	0.14	0.71	0.8693		24	0.24	1.00	8.53	26.8013	120	0.23	5.16	8.7	0.65	2.32	13.13	
	B1								5	8.8	0.34	0.69	2.1005		15	0.08	1.00	6.24	7.65189	25	0.07	5	8.8	0.69	0.34	2.101	
	B2								5	8.8	2.10	0.63	11.579		24	0.26	1.00	8.53	26.8013	370	0.72	5.07	8.8	0.64	2.45	13.68	
	B3								5	8.8	0.59	0.68	3.512		15	0.21	1.00	6.24	7.65189	25	0.07	5	8.8	0.68	0.59	3.512	
	B4								5	8.8	1.56	0.60	8.2203		24	0.80	1.00	8.53	26.8013	350	0.68	5.79	8.3	0.63	4.60	23.97	
	B5								5	8.8	0.28	0.75	1.8768		15	0.06	1.00	6.24	7.65189	25	0.07	5	8.8	0.75	0.28	1.877	
	B6								5	8.8	1.63	0.60	8.5167		30	0.45	1.00	9.9	48.5977	95	0.16	6.47	8	0.63	6.51	32.55	
	B7								5	8.8	0.29	0.77	1.9465		30	0.50	1.00	9.9	48.5977	127	0.21	6.63	8	0.63	6.79	34.32	
															30	0.49	1.00	9.9	48.5977	98	0.16	6.85	7.9	0.63	6.79	33.89	
															30	0.48	1.00	9.9	48.5977	125	0.21	7.01	7.8	0.63	6.79	33.46	
	B8								5	8.8	0.20	0.77	1.3742		15	0.03	1.00	6.24	7.65189	25	0.07	5	8.8	0.77	0.20	1.374	
	B9								5	8.8	0.96	0.61	5.1683		30	0.62	1.00	9.9	48.5977	57	0.1	7.22	7.6	0.63	7.96	38.25	
															30	0.62	1.00	9.9	48.5977	71	0.12	7.32	7.6	0.63	7.96	38.25	
															30	0.61	1.00	9.9	48.5977	145	0.24	7.44	7.5	0.63	7.96	37.75	
	B10								5	8.8	0.34	0.66	1.956		15	0.07	1.00	6.24	7.65189	25	0.07	5	8.8	0.66	0.34	1.956	
	B11								5	8.8	0.33	0.65	1.8985		30	0.72	1.00	9.9	48.5977	77	0.13	7.68	7.5	0.63	8.63	41.04	
	B12								5	8.8	0.12	0.71	0.7196		15	0.01	1.00	6.24	7.65189	25	0.07	5	8.8	0.71	0.12	0.72	
	B13								5	8.8	0.07	0.77	0.4821		18	0.01	1.00	7.04	12.4436	66	0.16	5.07	8.8	0.73	0.19	1.202	
	B14								5	8.8	2.58	0.59	13.326		24	0.25	1.00	8.53	26.8013	25	0.05	5	8.8	0.59	2.58	13.33	
	B15								5	8.8	0.63	0.64	3.5801		24	0.40	1.00	8.53	26.8013	30	0.06	5.05	8.8	0.60	3.21	16.91	
															24	0.39	1.00	8.53	26.8013	175	0.34	5.11	8.7	0.60	3.21	16.71	
															24	0.37	1.00	8.53	26.8013	131	0.26	5.45	8.5	0.60	3.21	16.33	
	B16								5	8.8	1.96	0.60	10.313		18	0.69	1.00	7.04	12.4436	25	0.06	5	8.8	0.60	1.96	10.31	
	B17								5	8.8	0.61	0.67	3.6163		30	0.36	1.00	9.9	48.5977	60	0.1	5.71	8.3	0.61	5.78	29.08	
	B18								5	8.8	3.50	0.59	18.124		24	0.46	1.00	8.53	26.8013	25	0.05	5	8.8	0.59	3.50	18.12	
	B19								5	8.8	0.89	0.64	5.0428		24	0.75	1.00	8.53	26.8013	30	0.06	5.05	8.8	0.60	4.39	23.17	
															36	0.42	1.00	11.2	79.03	139	0.21	5.81	8.3	0.60	10.17	50.93	
															36	0.41	1.00	11.2	79.03	160	0.24	6.01	8.2	0.60	10.17	50.32	
															36	0.40	1.00	11.2	79.03	103	0.15	6.25	8.1	0.60	10.17	49.71	
															36	0.40	1.00	11.2	79.03	68	0.1	6.41	8.1	0.60	10.17	49.71	
	B20								5	8.8	2.72	0.59	14.208		24	0.28	1.00	8.53	26.8013	25	0.05	5	8.8	0.59	2.72	14.21	
	B21								5	8.8	0.61	0.68	3.633		36	0.69	1.00	11.2	79.03	60	0.09	6.51	8	0.60	13.50	65.31	
	B22								5	8.8	0.62	0.63	3.417		15	0.20	1.00	6.24	7.65189	25	0.07	5	8.8	0.63	0.62	3.417	
	B23								5	8.8	0.53	0.63	2.9485		18	0.26	1.00	7.04	12.4436	56	0.13	5.07	8.8	0.63	1.15	6.366	
															36	0.79	1.00	11.2	79.03	241	0.36	6.6	7.9	0.61	14.65	70.21	
															36	0.77	1.00	11.2	79.03	166	0.25	6.96	7.8	0.61	14.65	69.32	
	B24								5	8.8	1.90	0.60	10.034		18	0.65	1.00	7.04	12.4436	25	0.06	5	8.8	0.60	1.90	10.03	

	B25								5	8.8	0.82	0.64	4.5981		42	0.45	1.00	12.4	119.217	55	0.07	7.2	7.6	0.61	17.37	80.18	
	B26								5	8.8	1.76	0.59	9.1132		18	0.54	1.00	7.04	12.4436	25	0.06	5	8.8	0.59	1.76	9.113	
	B27								5	8.8	0.43	0.65	2.4294		18	0.87	1.00	7.04	12.4436	168	0.4	5.06	8.8	0.60	2.18	11.54	
	B28								5	8.8	1.90	0.59	9.7958		18	0.62	1.00	7.04	12.4436	25	0.06	5	8.8	0.59	1.90	9.796	
	B29								5	8.8	0.31	0.65	1.7688		24	0.70	1.00	8.53	26.8013	47	0.09	5.46	8.5	0.60	4.39	22.32	
															42	0.71	1.00	12.4	119.217	135	0.18	7.28	7.6	0.61	21.76	100.1	
															42	0.69	1.00	12.4	119.217	120	0.16	7.46	7.5	0.61	21.76	98.82	
															42	0.67	1.00	12.4	119.217	131	0.18	7.62	7.4	0.61	21.76	97.5	
	B30								5	8.8	1.90	0.59	9.8835		18	0.63	1.00	7.04	12.4436	25	0.06	5	8.8	0.59	1.90	9.884	
	B31								5	8.8	1.25	0.60	6.6358		24	0.38	1.00	8.53	26.8013	229	0.45	5.06	8.8	0.59	3.16	16.52	
	B32								5	8.8	1.24	0.59	6.4765		15	0.72	1.00	6.24	7.65189	25	0.07	5	8.8	0.59	1.24	6.476	
	B33								5	8.8	0.90	0.60	4.7653		30	0.31	1.00	9.9	48.5977	50	0.08	5.51	8.5	0.59	5.30	26.81	
	B34								5	8.8	1.04	0.62	5.6281		15	0.54	1.00	6.24	7.65189	25	0.07	5	8.8	0.62	1.04	5.628	
	B35								5	8.8	1.00	0.62	5.4912		48	0.57	1.00	13.5	170.217	202	0.25	7.8	7.3	0.60	29.10	128.4	
															48	0.57	1.00	13.5	170.217	155	0.19	8.04	7.3	0.60	29.10	128.4	
															48	0.56	1.00	13.5	170.217	141	0.17	8.24	7.2	0.60	29.10	126.7	
	B36								5	8.8	3.55	0.58	18.209		24	0.46	1.00	8.53	26.8013	25	0.05	5	8.8	0.58	3.55	18.21	
	B37								5	8.8	0.54	0.65	3.1096		24	0.64	1.00	8.53	26.8013	70	0.14	5.05	8.8	0.59	4.10	21.32	
	B38								5	8.8	1.12	0.60	5.9039		24	0.05	1.00	8.53	26.8013	25	0.05	5	8.8	0.60	1.12	5.904	
	B39								5	8.8	0.51	0.63	2.8039		48	0.59	1.00	13.5	170.217	156	0.19	8.41	7	0.60	30.73	130.1	
															48	0.57	1.00	13.5	170.217	30	0.04	8.6	6.9	0.60	30.73	128.2	

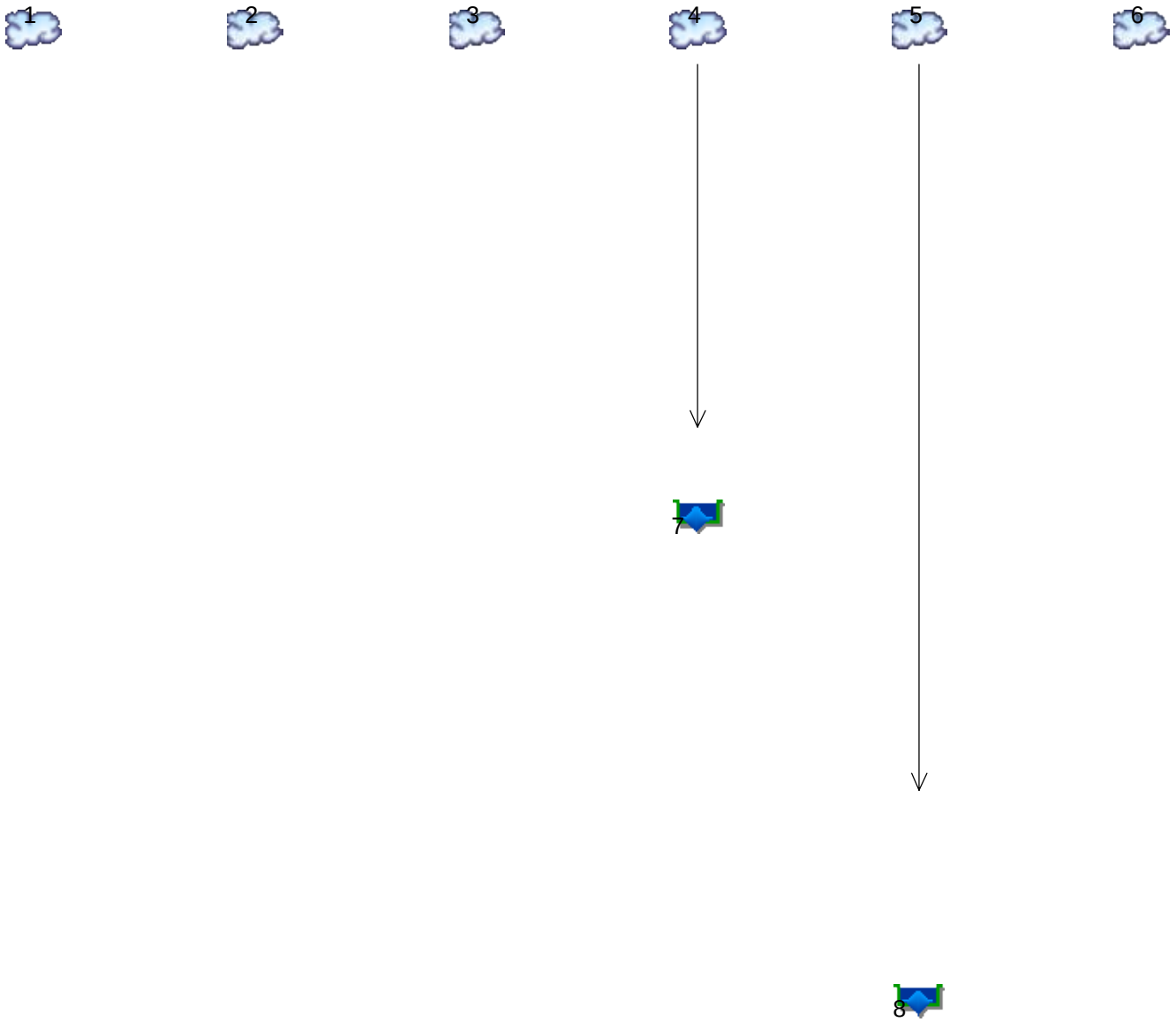
REMINDER: Check Storm Drain System for Major Storm Provisions.

*Water Course Legend Figure 2-2

FO - Forest
FA - Fallow
GR - Grass/Lawn
BG - Bare Ground
GW - Grass Waterway
SG - Shallow Gut. Flow

NOTES:

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX1 IP1
2	SCS Runoff	EX3 IP3
3	SCS Runoff	EX2 IP2
4	SCS Runoff	AI INTO DB1
5	SCS Runoff	A2 INTO DB2
6	SCS Runoff	A3 IP 3
7	Reservoir	DB1 IP1
8	Reservoir	DB2 IP2

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	------	-------	45.05	-------	-------	100.25	-------	-------	180.50	EX1 IP1
2	SCS Runoff	------	-------	2.114	-------	-------	4.480	-------	-------	7.909	EX3 IP3
3	SCS Runoff	------	-------	12.98	-------	-------	28.85	-------	-------	51.85	EX2 IP2
4	SCS Runoff	------	-------	108.40	-------	-------	210.42	-------	-------	348.78	AI INTO DB1
5	SCS Runoff	------	-------	31.35	-------	-------	54.04	-------	-------	83.60	A2 INTO DB2
6	SCS Runoff	------	-------	1.093	-------	-------	2.317	-------	-------	4.091	A3 IP 3
7	Reservoir	4	-------	19.36	-------	-------	37.41	-------	-------	109.26	DB1 IP1
8	Reservoir	5	-------	9.137	-------	-------	16.31	-------	-------	51.58	DB2 IP2

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

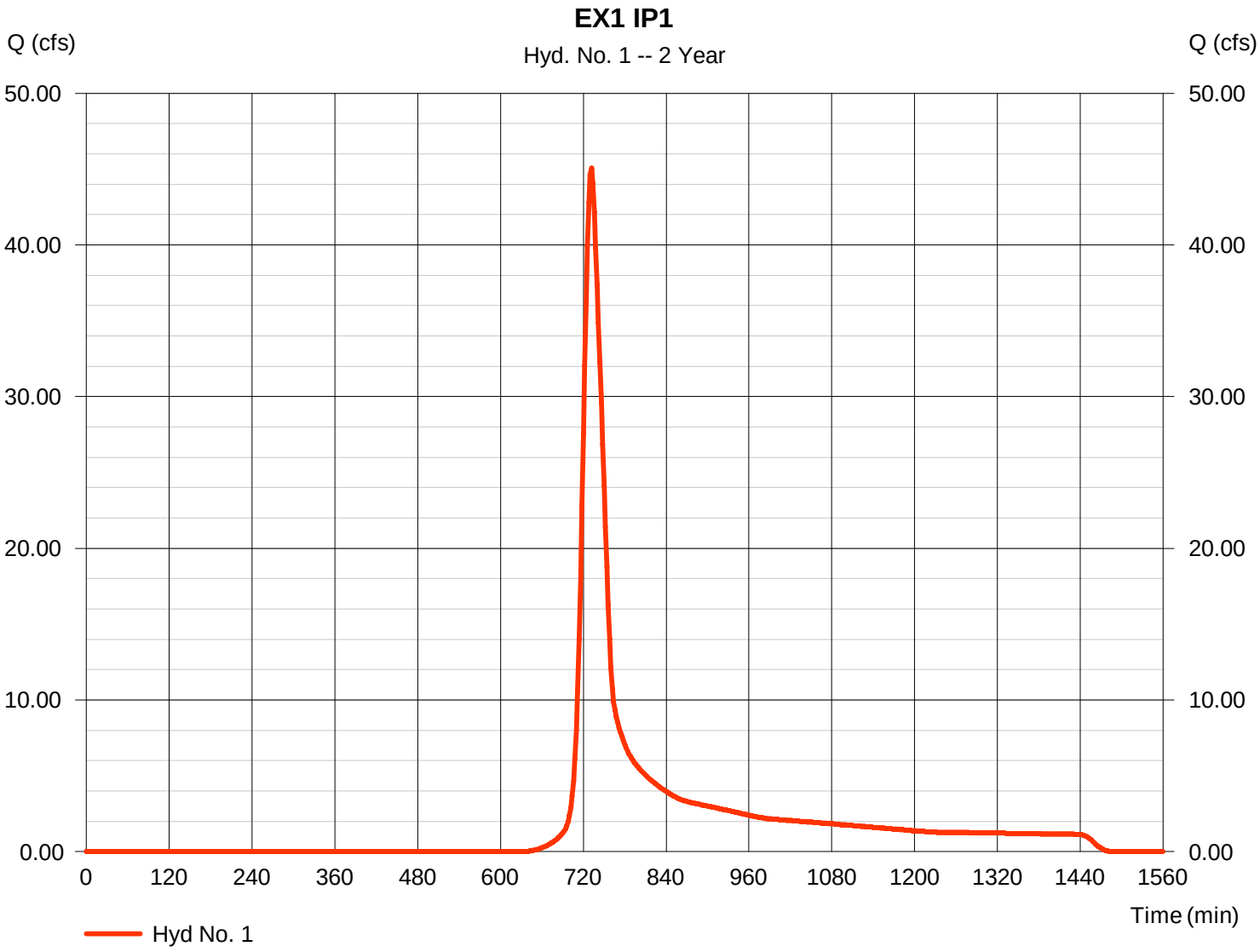
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	45.05	2	732	188,561	------	------	------	EX1 IP1
2	SCS Runoff	2.114	2	718	4,228	------	------	------	EX3 IP3
3	SCS Runoff	12.98	2	730	49,753	------	------	------	EX2 IP2
4	SCS Runoff	108.40	2	720	281,586	------	------	------	AI INTO DB1
5	SCS Runoff	31.35	2	724	98,673	------	------	------	A2 INTO DB2
6	SCS Runoff	1.093	2	718	2,187	------	------	------	A3 IP 3
7	Reservoir	19.36	2	738	281,569	4	1090.81	112,981	DB1 IP1
8	Reservoir	9.137	2	742	97,212	5	1140.59	33,235	DB2 IP2

Hydrograph Report

Hyd. No. 1

EX1 IP1

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.05 cfs
Storm frequency	=	2 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	188,561 cuft
Drainage area	=	48.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.50 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No. 1

EX1 IP1

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.170		0.011		0.011		
Flow length (ft)	= 250.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 17.64**	**+**	**0.00**	**+**	**0.00**	**=**	**17.64**
Shallow Concentrated Flow							
Flow length (ft)	= 1938.00		0.00		0.00		
Watercourse slope (%)	= 3.40		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.98		0.00		0.00		
Travel Time (min)	**= 10.86**	**+**	**0.00**	**+**	**0.00**	**=**	**10.86**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

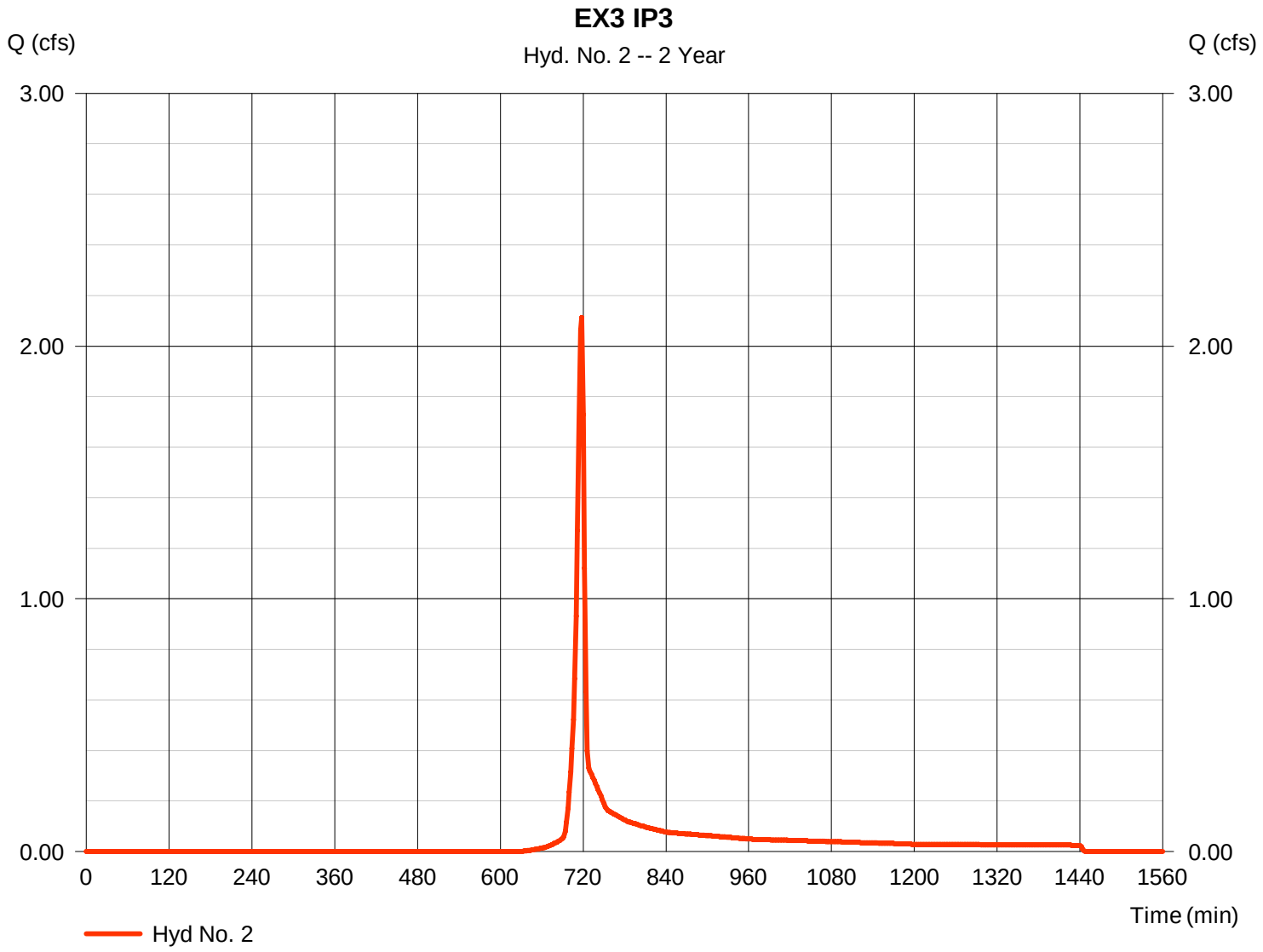
Total Travel Time, Tc ..... 28.50 min

Hydrograph Report

Hyd. No. 2

EX3 IP3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.114 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	4,228 cuft
Drainage area	=	1.160 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

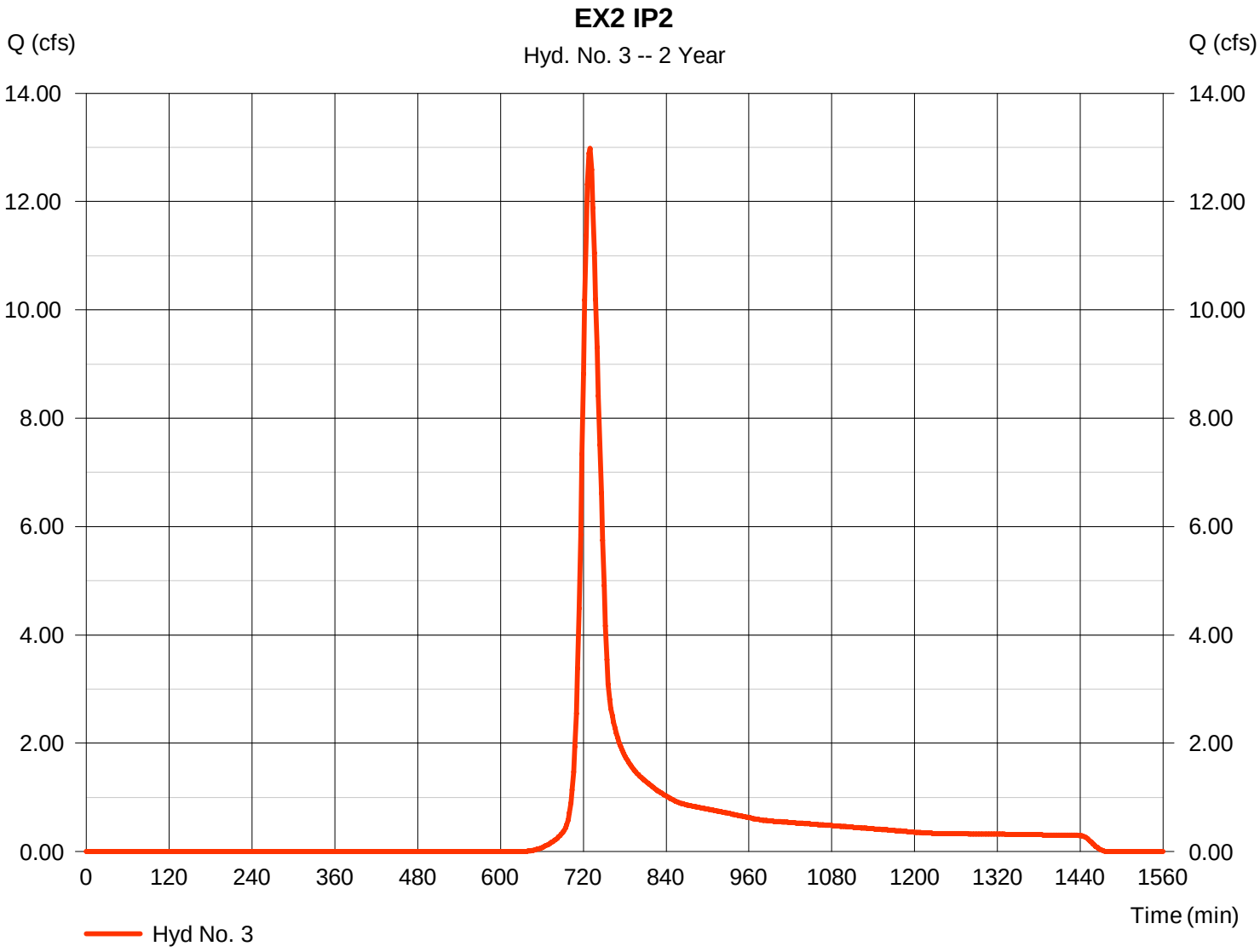


Hydrograph Report

Hyd. No. 3

EX2 IP2

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.98 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	49,753 cuft
Drainage area	=	13.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.20 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No. 3

EX2 IP2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.170		0.011		0.011		
Flow length (ft)	= 150.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 20.41**	**+**	**0.00**	**+**	**0.00**	**=**	**20.41**
Shallow Concentrated Flow							
Flow length (ft)	= 1048.00		0.00		0.00		
Watercourse slope (%)	= 3.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=3.02		0.00		0.00		
Travel Time (min)	**= 5.79**	**+**	**0.00**	**+**	**0.00**	**=**	**5.79**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

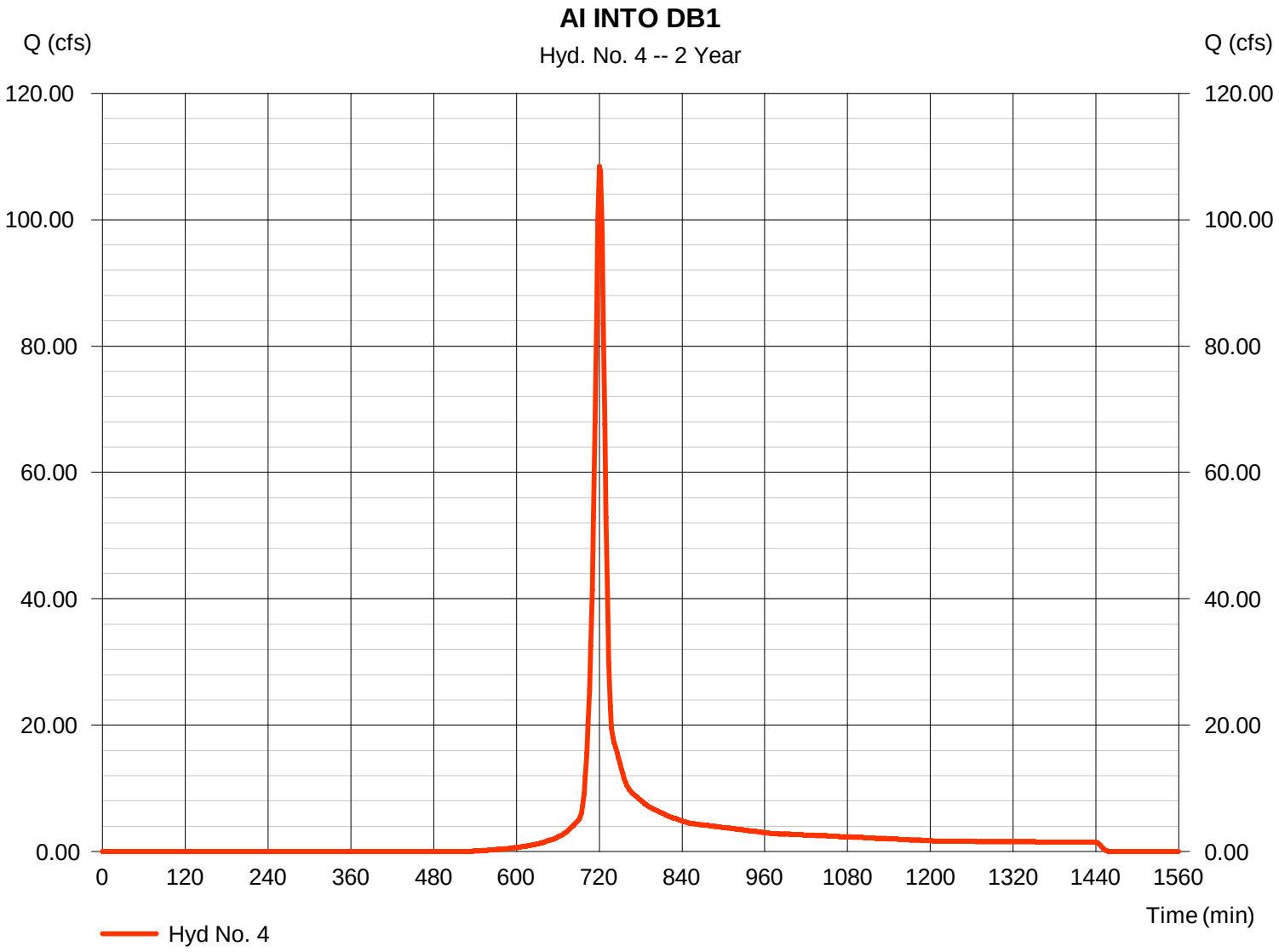
Total Travel Time, Tc ..... 26.20 min

Hydrograph Report

Hyd. No. 4

AI INTO DB1

Hydrograph type	= SCS Runoff	Peak discharge	= 108.40 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 281,586 cuft
Drainage area	= 52.000 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

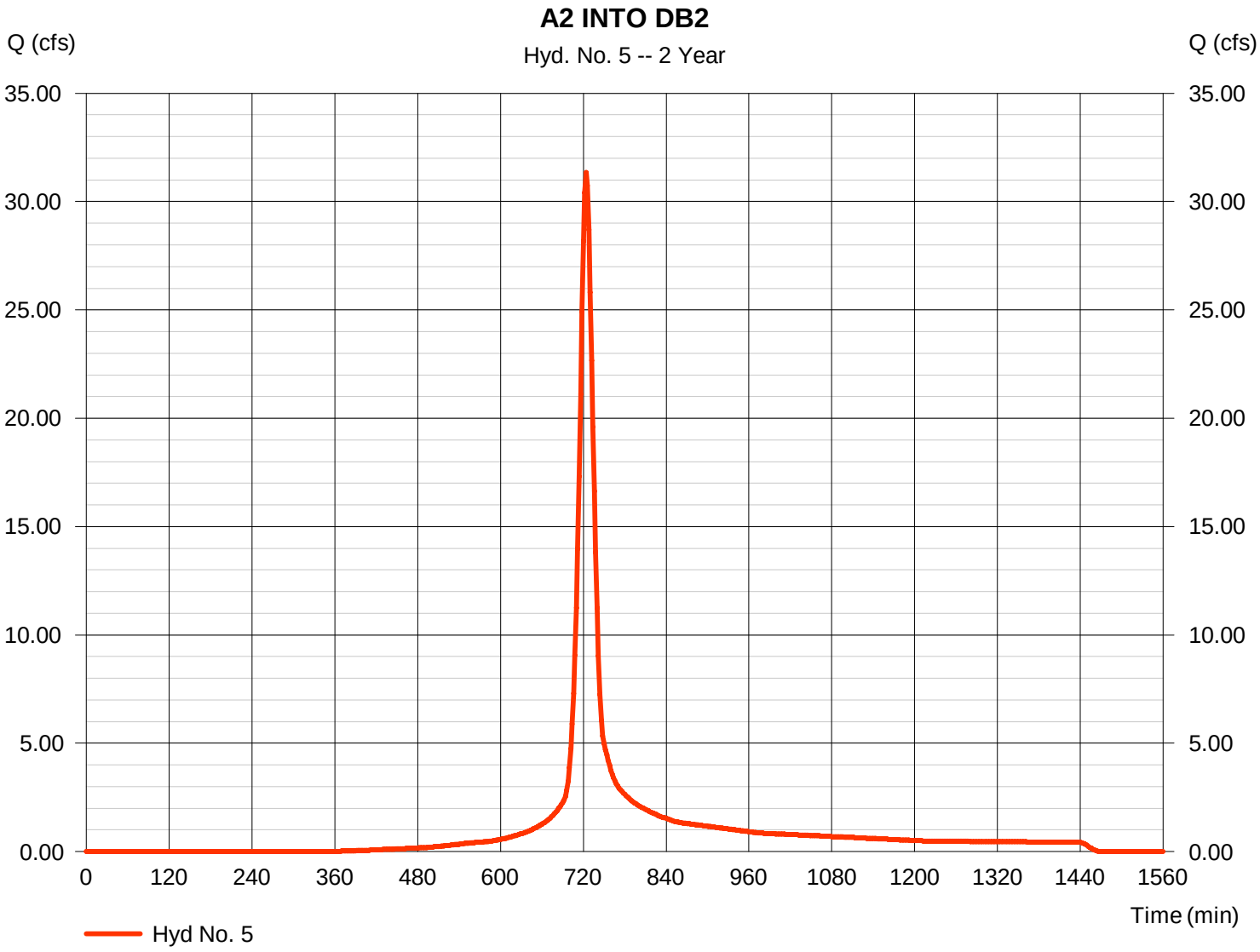


Hydrograph Report

Hyd. No. 5

A2 INTO DB2

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.35 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	98,673 cuft
Drainage area	=	13.700 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

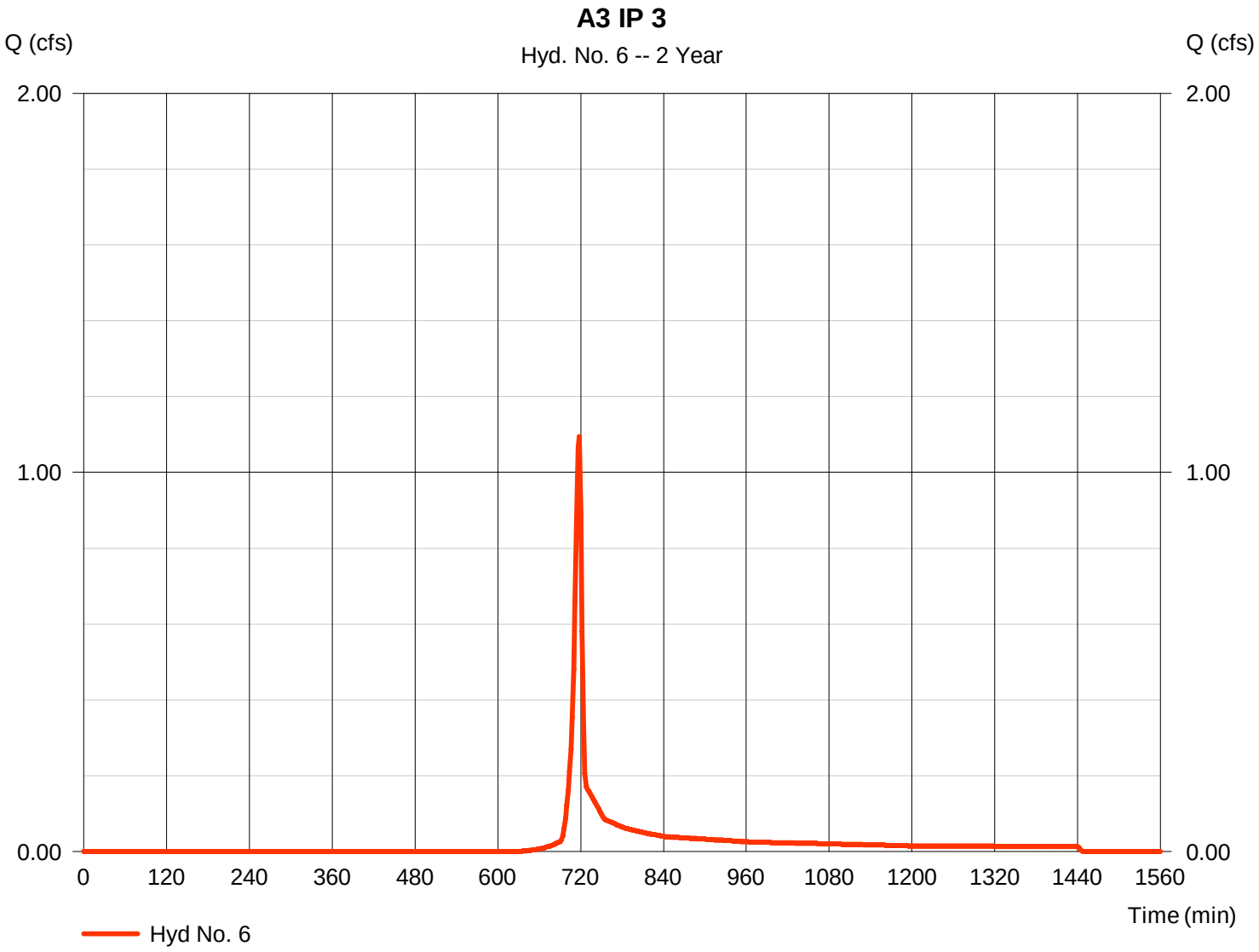


Hydrograph Report

Hyd. No. 6

A3 IP 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.093 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,187 cuft
Drainage area	=	0.600 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



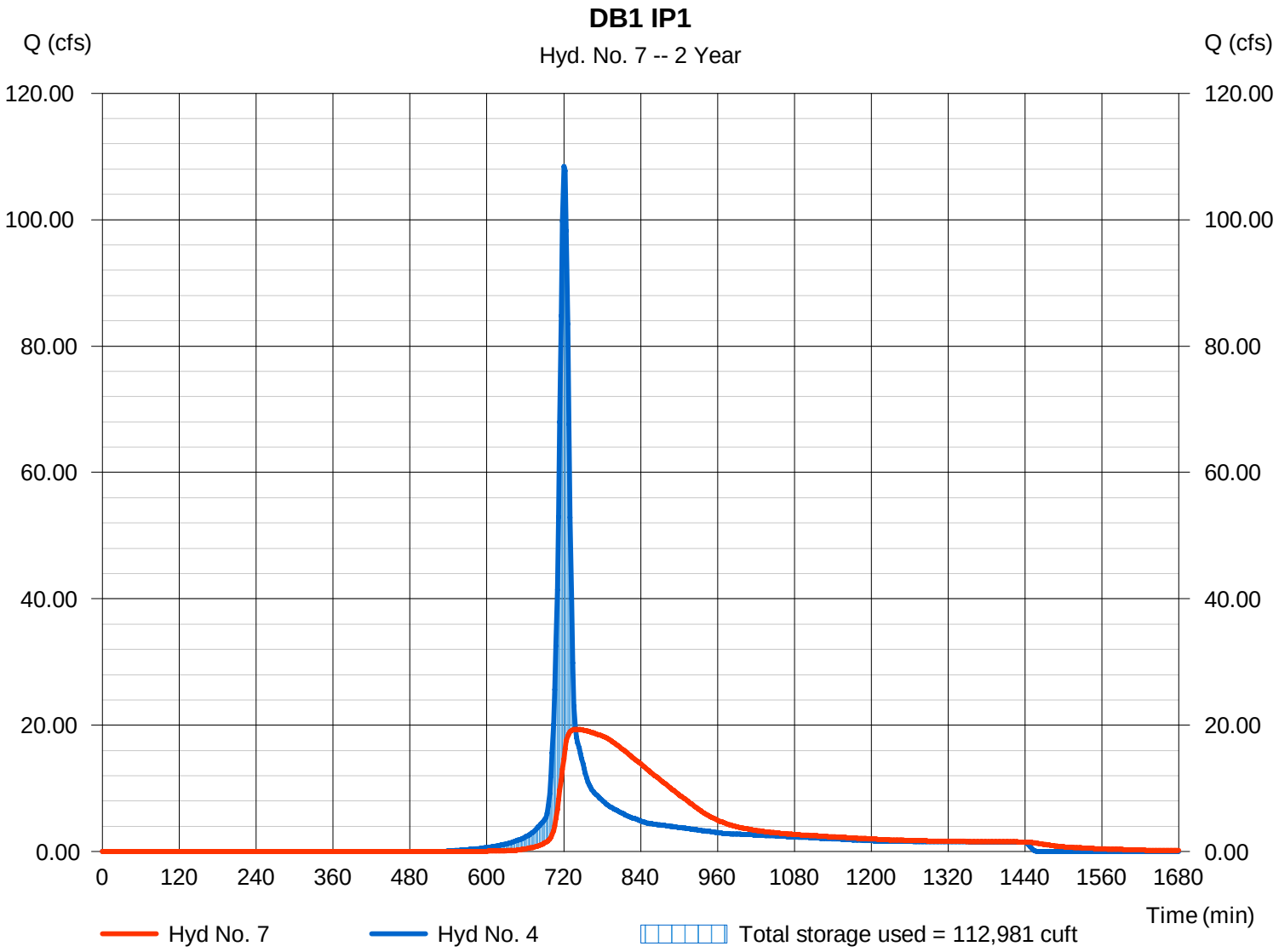
Hydrograph Report

Hyd. No. 7

DB1 IP1

Hydrograph type	=	Reservoir	Peak discharge	=	19.36 cfs
Storm frequency	=	2 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	281,569 cuft
Inflow hyd. No.	=	4 - AI INTO DB1	Max. Elevation	=	1090.81 ft
Reservoir name	=	DB1	Max. Storage	=	112,981 cuft

Storage Indication method used.



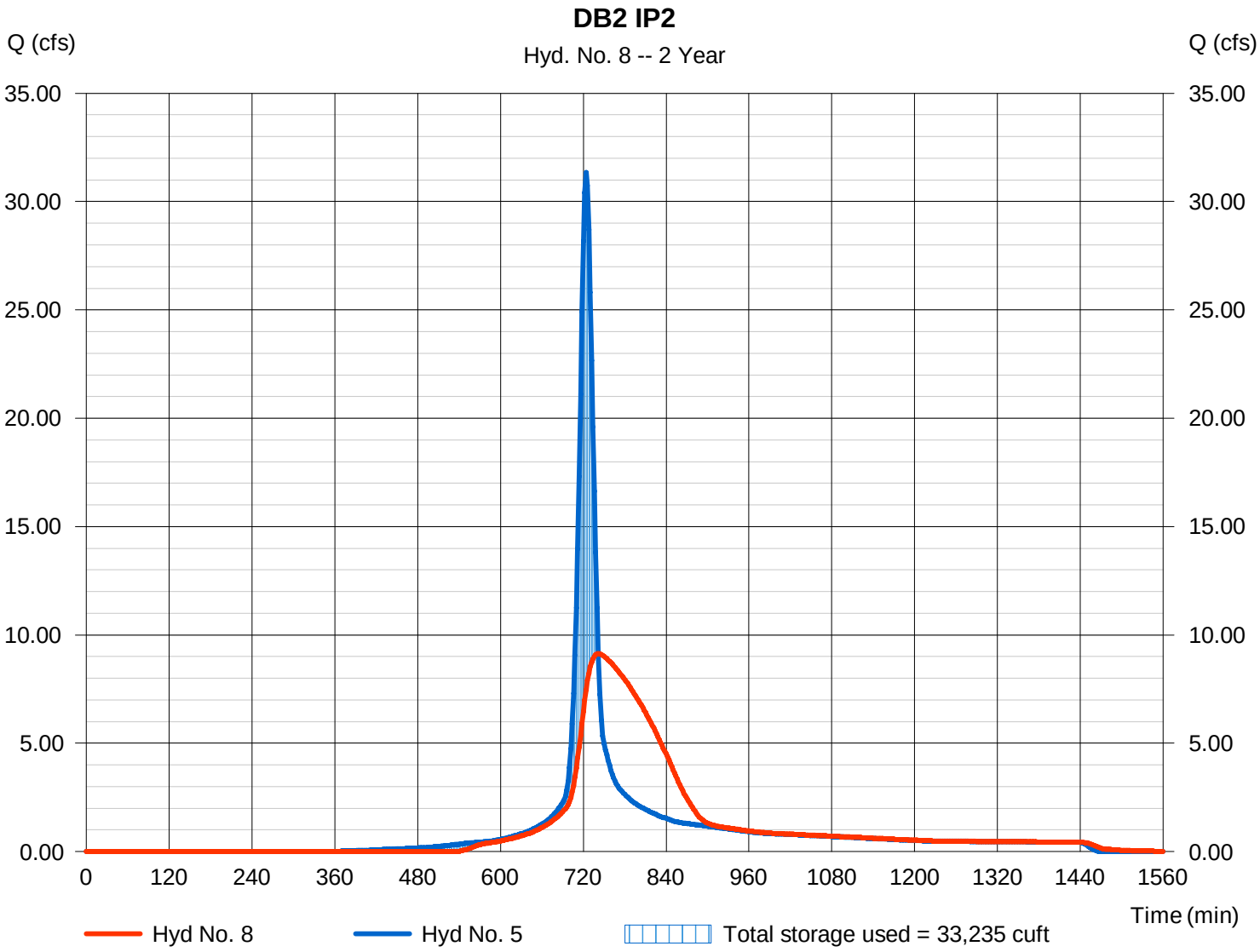
Hydrograph Report

Hyd. No. 8

DB2 IP2

Hydrograph type	= Reservoir	Peak discharge	= 9.137 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 97,212 cuft
Inflow hyd. No.	= 5 - A2 INTO DB2	Max. Elevation	= 1140.59 ft
Reservoir name	= DB2	Max. Storage	= 33,235 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

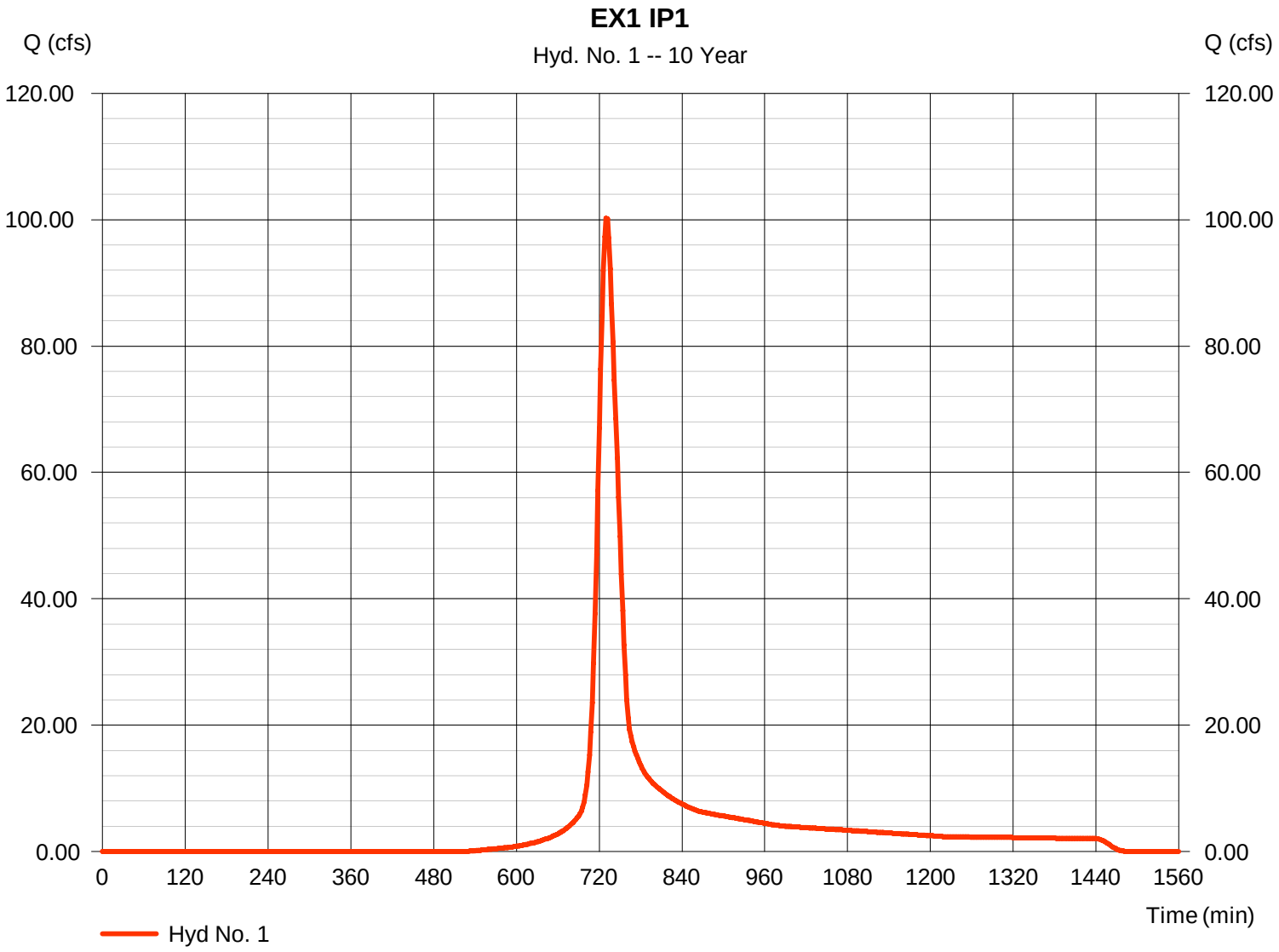
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	100.25	2	730	403,533	------	------	------	EX1 IP1
2	SCS Runoff	4.480	2	716	9,048	------	------	------	EX3 IP3
3	SCS Runoff	28.85	2	728	106,473	------	------	------	EX2 IP2
4	SCS Runoff	210.42	2	720	547,889	------	------	------	AI INTO DB1
5	SCS Runoff	54.04	2	724	173,640	------	------	------	A2 INTO DB2
6	SCS Runoff	2.317	2	716	4,680	------	------	------	A3 IP 3
7	Reservoir	37.41	2	738	547,872	4	1093.34	233,936	DB1 IP1
8	Reservoir	16.31	2	742	172,179	5	1143.75	63,282	DB2 IP2

Hydrograph Report

Hyd. No. 1

EX1 IP1

Hydrograph type	=	SCS Runoff	Peak discharge	=	100.25 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	403,533 cuft
Drainage area	=	48.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.50 min
Total precip.	=	4.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

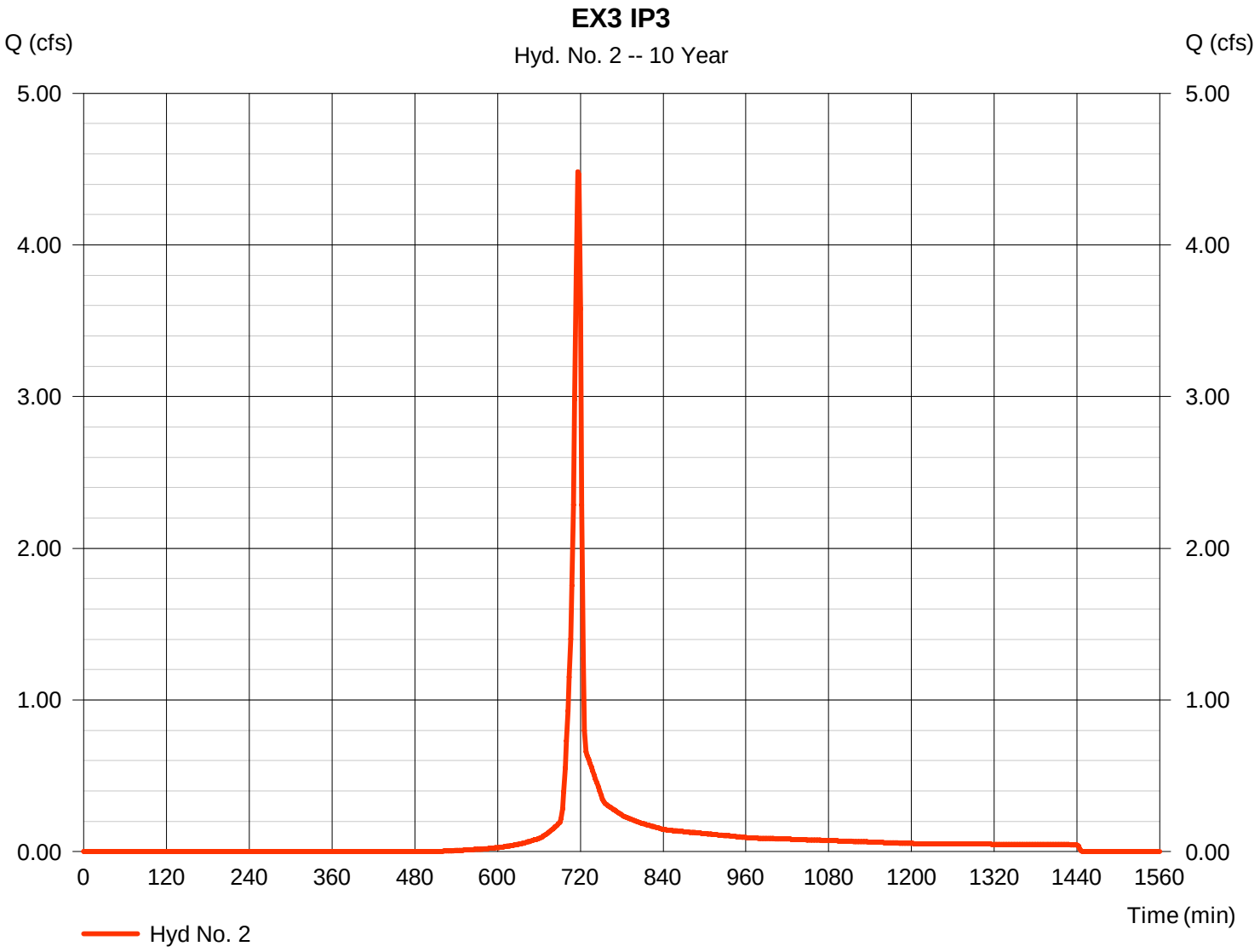


Hydrograph Report

Hyd. No. 2

EX3 IP3

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.480 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	9,048 cuft
Drainage area	=	1.160 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

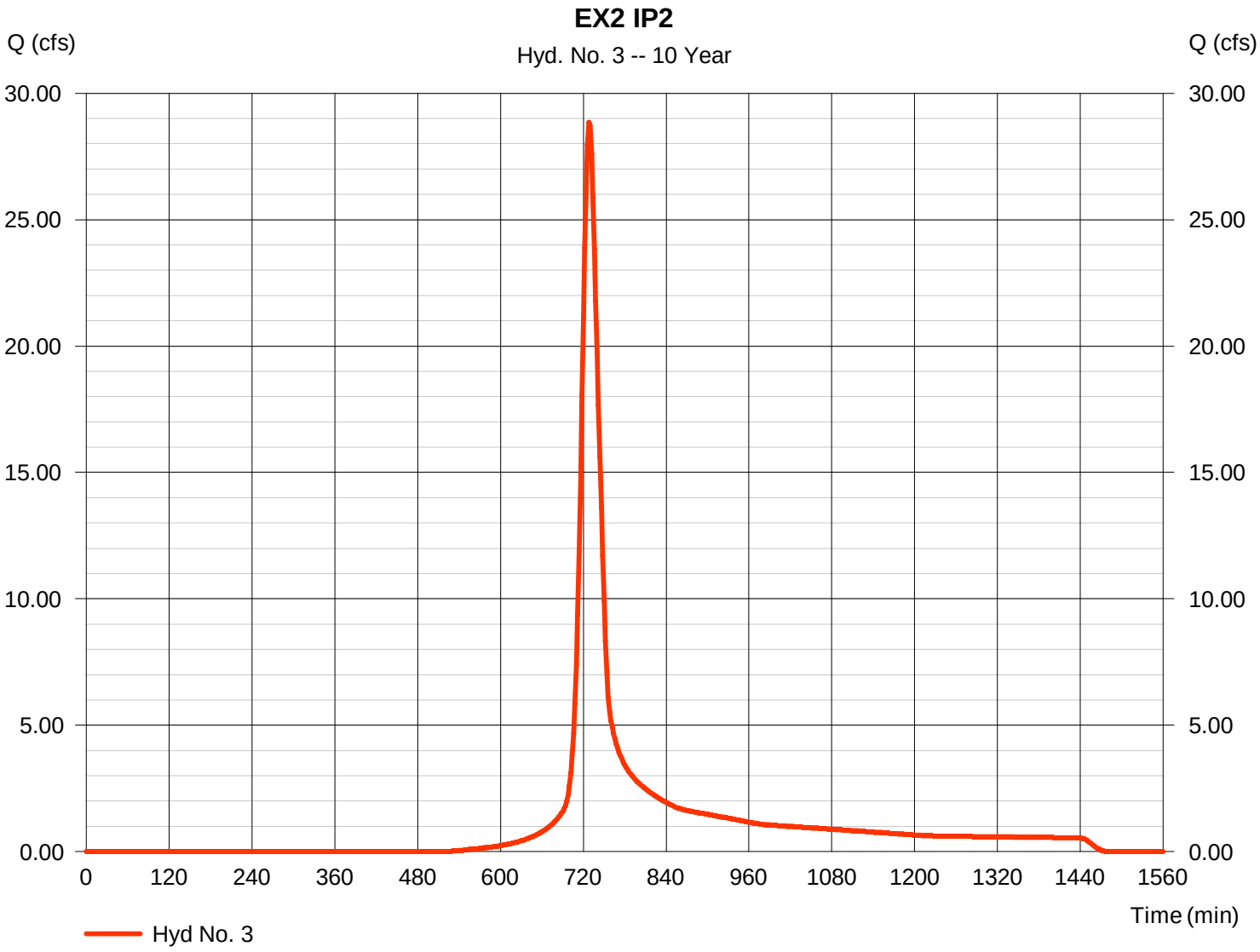


Hydrograph Report

Hyd. No. 3

EX2 IP2

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.85 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	106,473 cuft
Drainage area	=	13.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.20 min
Total precip.	=	4.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

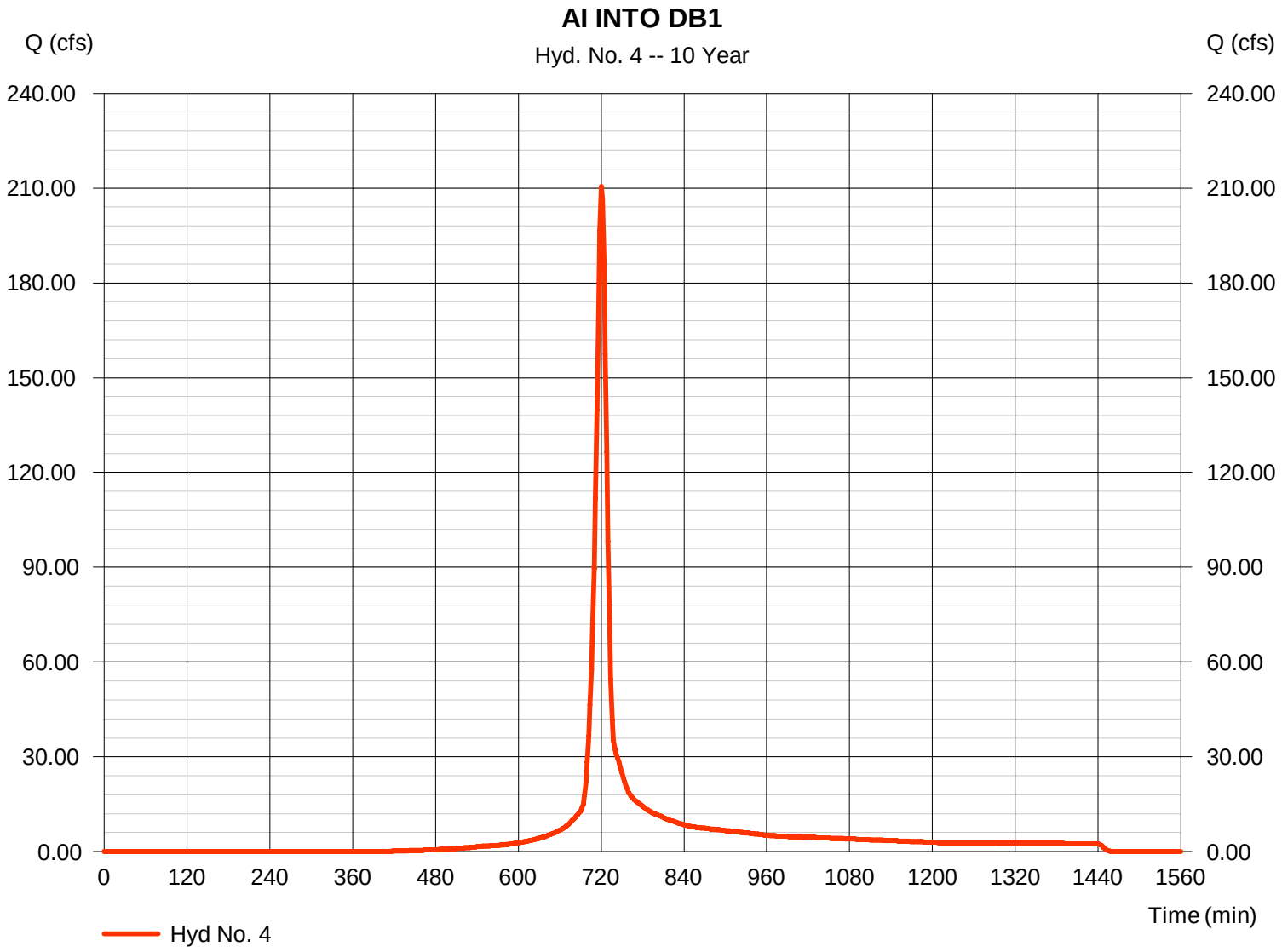


Hydrograph Report

Hyd. No. 4

AI INTO DB1

Hydrograph type	= SCS Runoff	Peak discharge	= 210.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 547,889 cuft
Drainage area	= 52.000 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

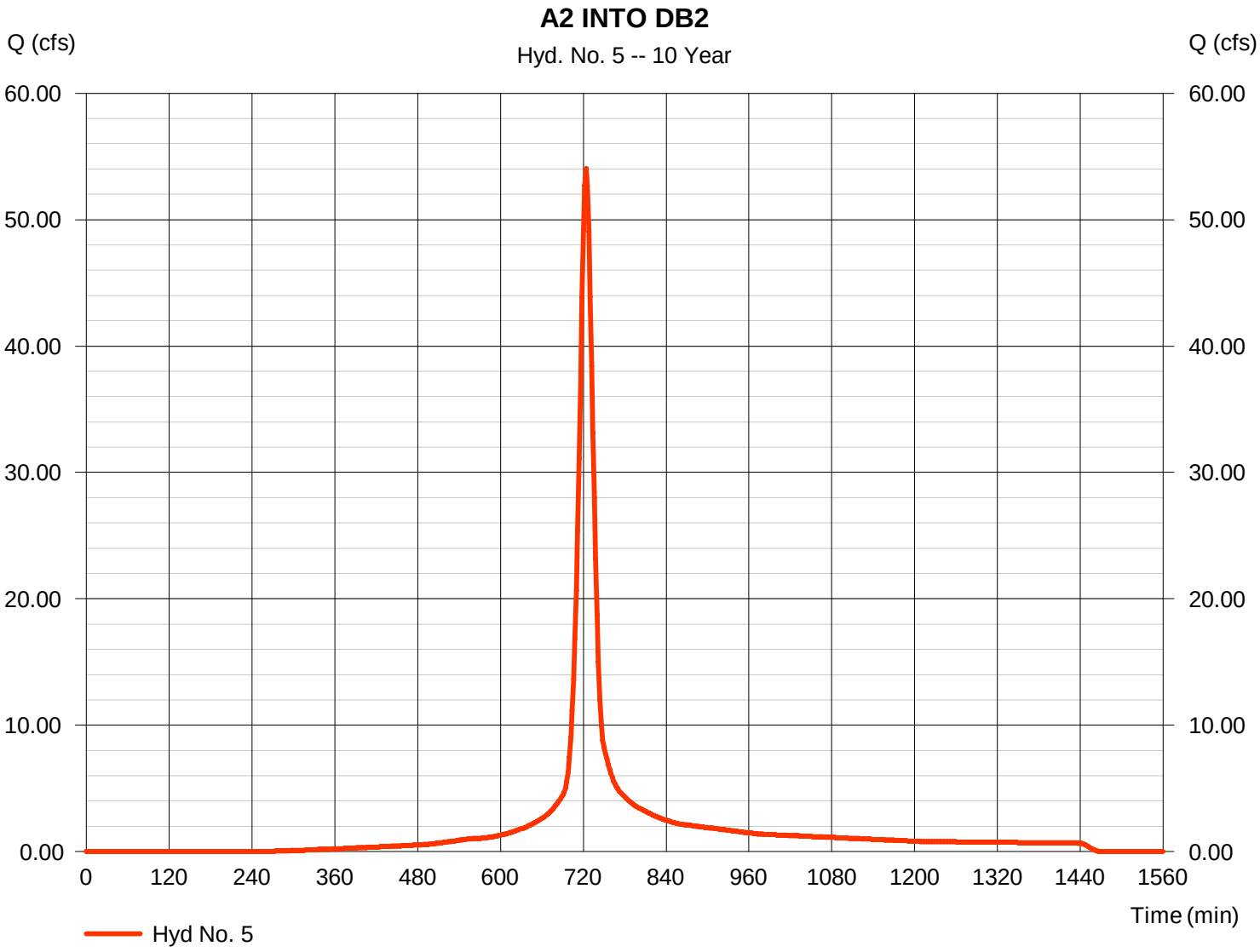


Hydrograph Report

Hyd. No. 5

A2 INTO DB2

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.04 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	173,640 cuft
Drainage area	=	13.700 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	4.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

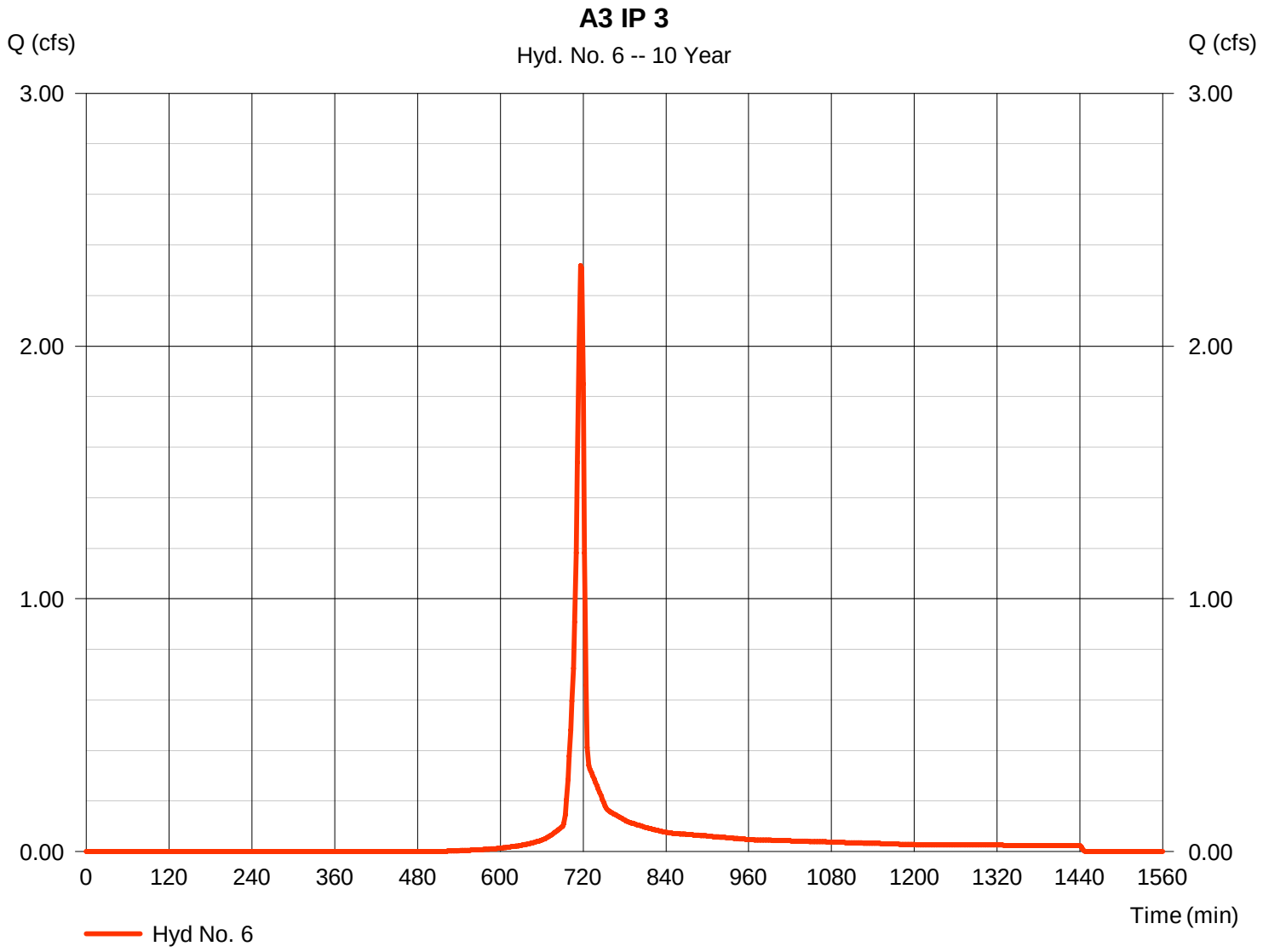


Hydrograph Report

Hyd. No. 6

A3 IP 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.317 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,680 cuft
Drainage area	=	0.600 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



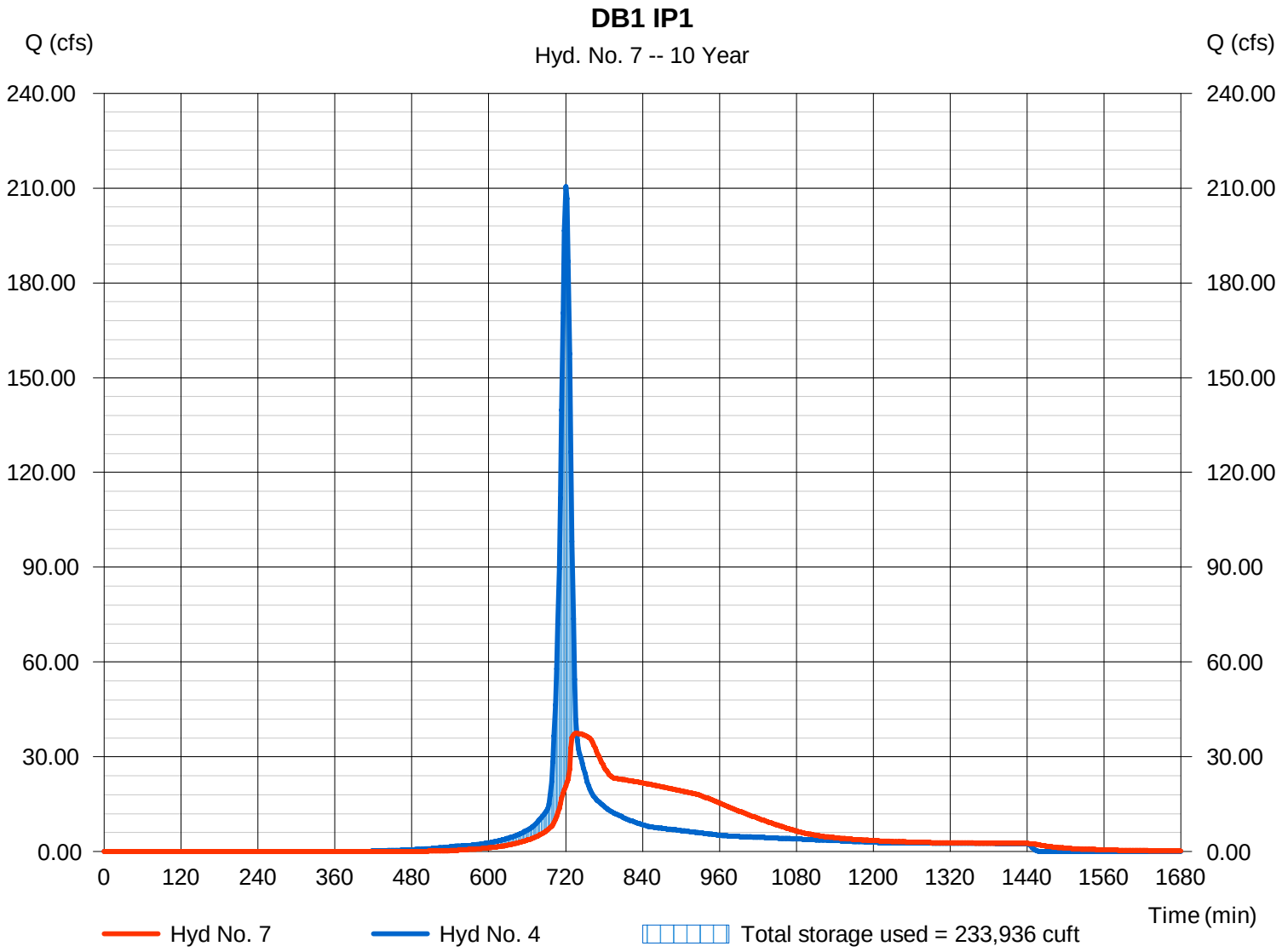
Hydrograph Report

Hyd. No. 7

DB1 IP1

Hydrograph type	=	Reservoir	Peak discharge	=	37.41 cfs
Storm frequency	=	10 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	547,872 cuft
Inflow hyd. No.	=	4 - AI INTO DB1	Max. Elevation	=	1093.34 ft
Reservoir name	=	DB1	Max. Storage	=	233,936 cuft

Storage Indication method used.



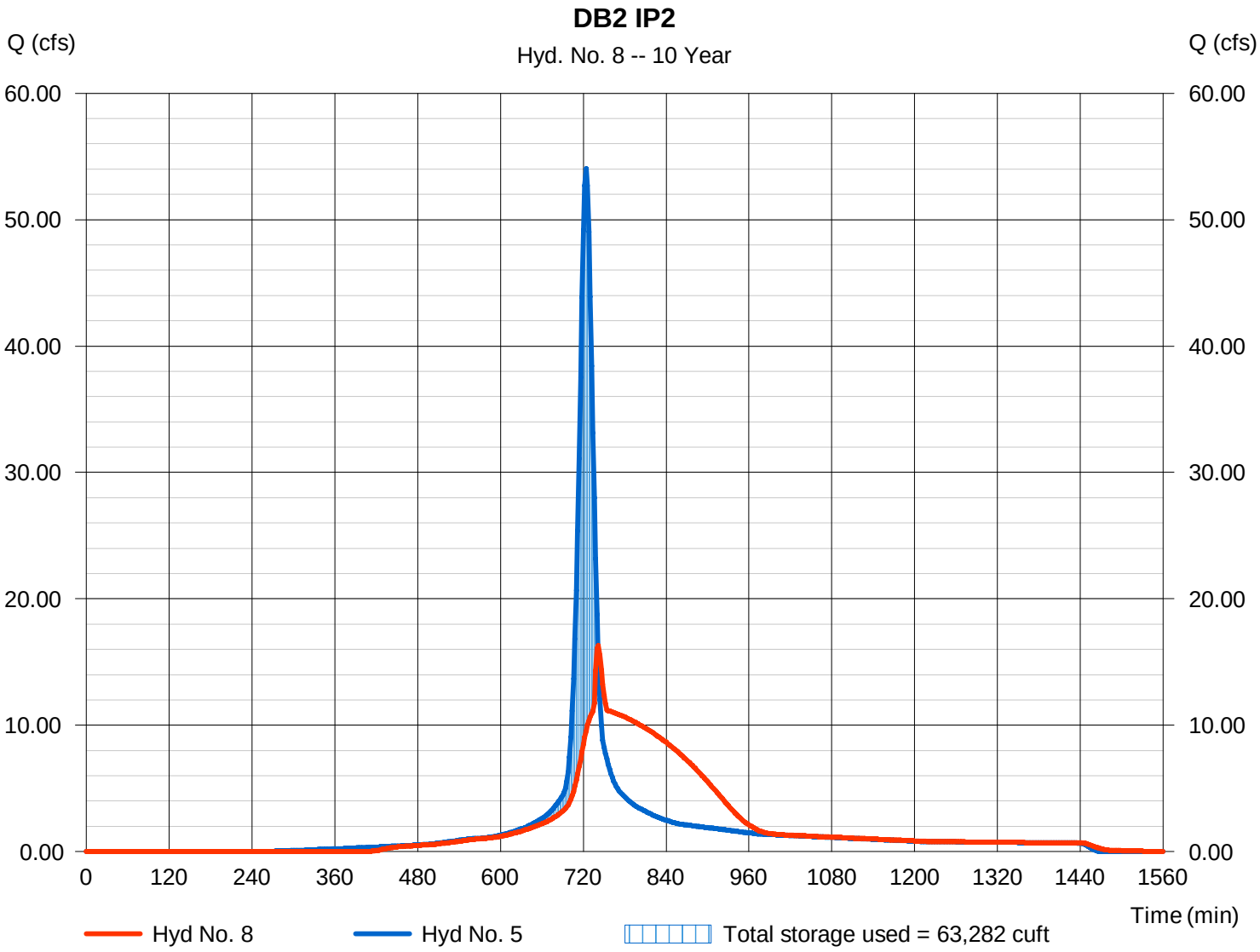
Hydrograph Report

Hyd. No. 8

DB2 IP2

Hydrograph type	= Reservoir	Peak discharge	= 16.31 cfs
Storm frequency	= 10 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 172,179 cuft
Inflow hyd. No.	= 5 - A2 INTO DB2	Max. Elevation	= 1143.75 ft
Reservoir name	= DB2	Max. Storage	= 63,282 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

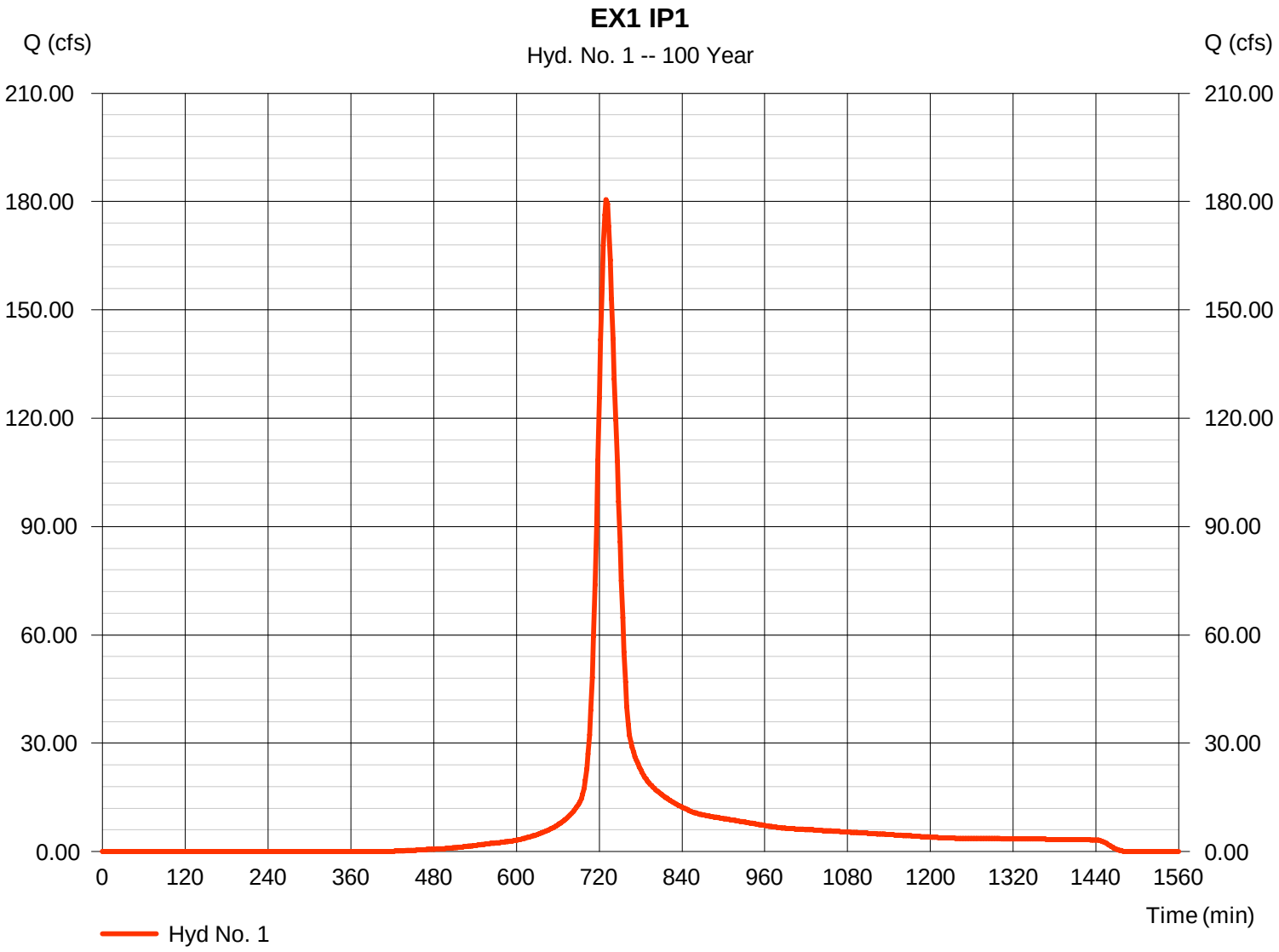
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	180.50	2	730	721,327	------	------	------	EX1 IP1
2	SCS Runoff	7.909	2	716	16,174	------	------	------	EX3 IP3
3	SCS Runoff	51.85	2	728	190,324	------	------	------	EX2 IP2
4	SCS Runoff	348.78	2	720	923,707	------	------	------	AI INTO DB1
5	SCS Runoff	83.60	2	724	274,980	------	------	------	A2 INTO DB2
6	SCS Runoff	4.091	2	716	8,366	------	------	------	A3 IP 3
7	Reservoir	109.26	2	732	923,689	4	1095.97	380,350	DB1 IP1
8	Reservoir	51.58	2	734	273,519	5	1145.02	78,449	DB2 IP2

Hydrograph Report

Hyd. No. 1

EX1 IP1

Hydrograph type	=	SCS Runoff	Peak discharge	=	180.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	721,327 cuft
Drainage area	=	48.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.50 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

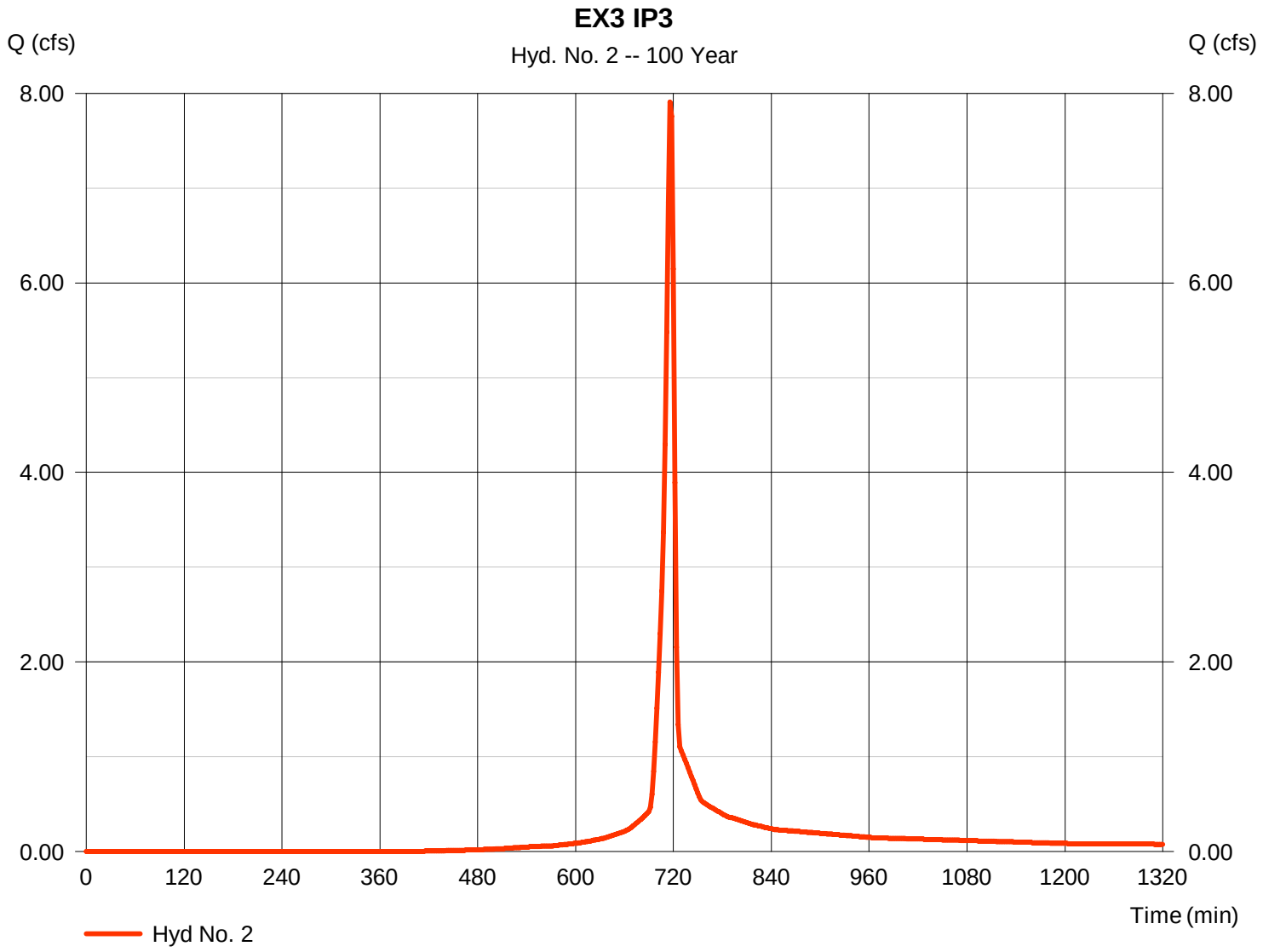


Hydrograph Report

Hyd. No. 2

EX3 IP3

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.909 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	16,174 cuft
Drainage area	=	1.160 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

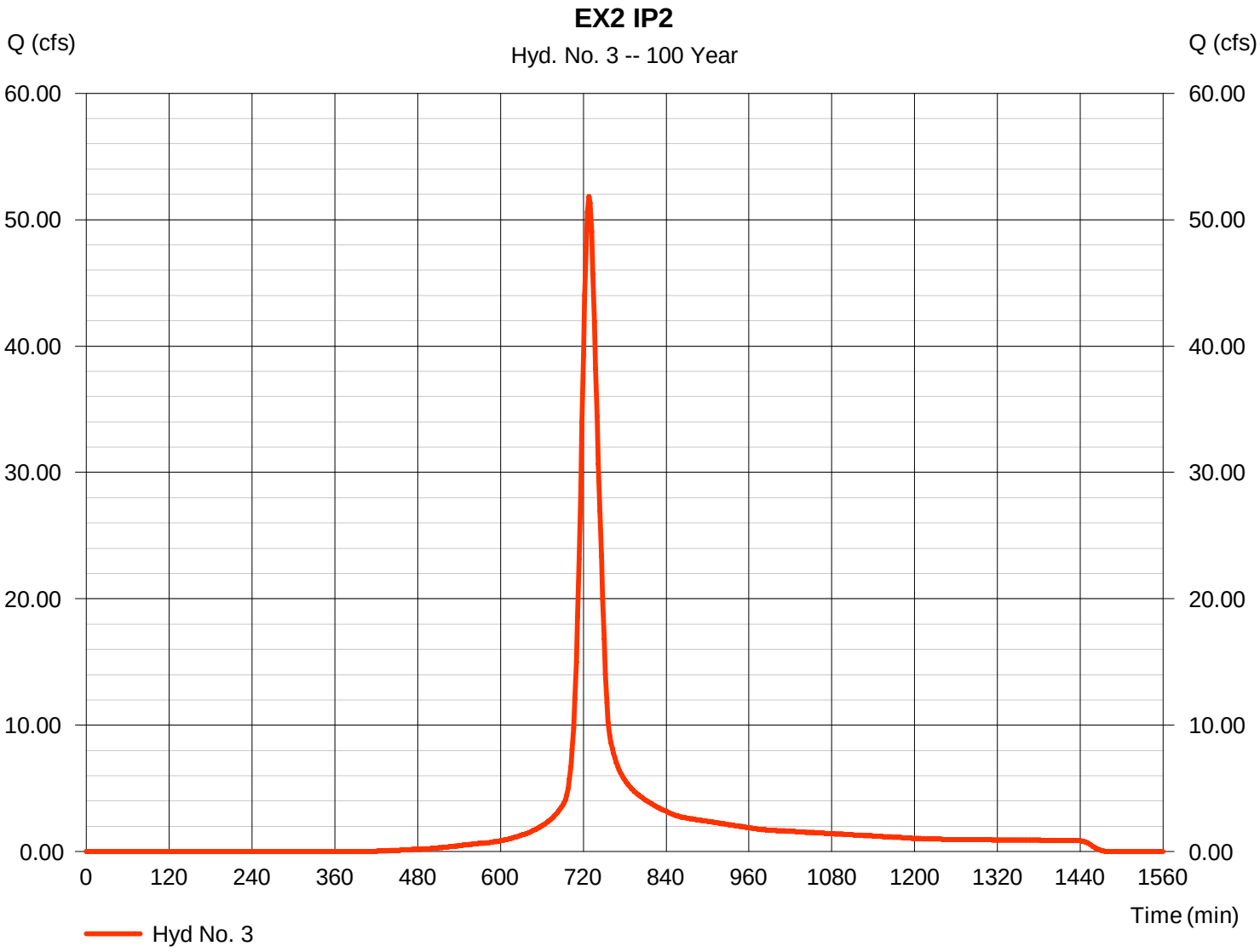


Hydrograph Report

Hyd. No. 3

EX2 IP2

Hydrograph type	=	SCS Runoff	Peak discharge	=	51.85 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	190,324 cuft
Drainage area	=	13.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.20 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

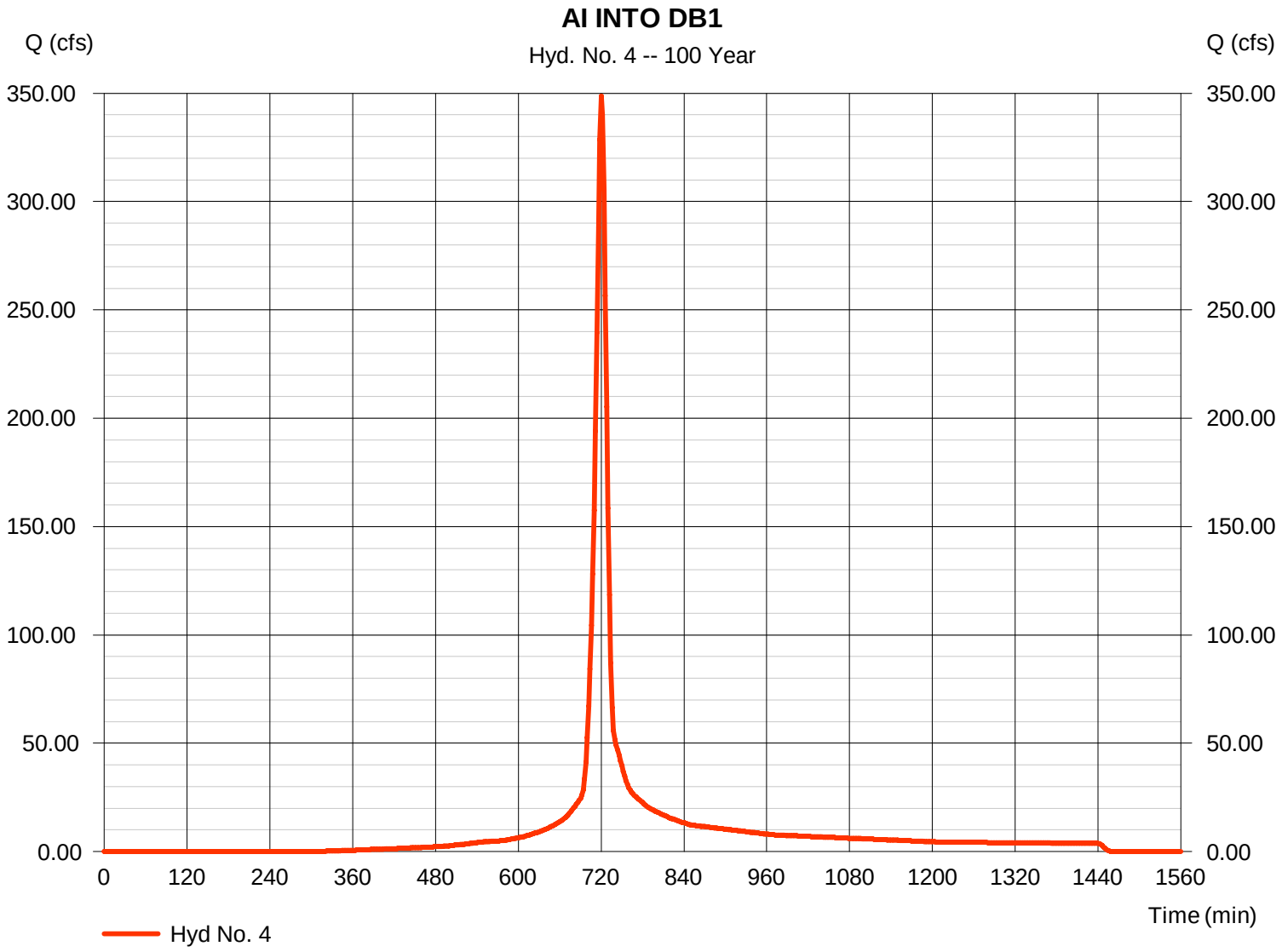


Hydrograph Report

Hyd. No. 4

AI INTO DB1

Hydrograph type	=	SCS Runoff	Peak discharge	=	348.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	923,707 cuft
Drainage area	=	52.000 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

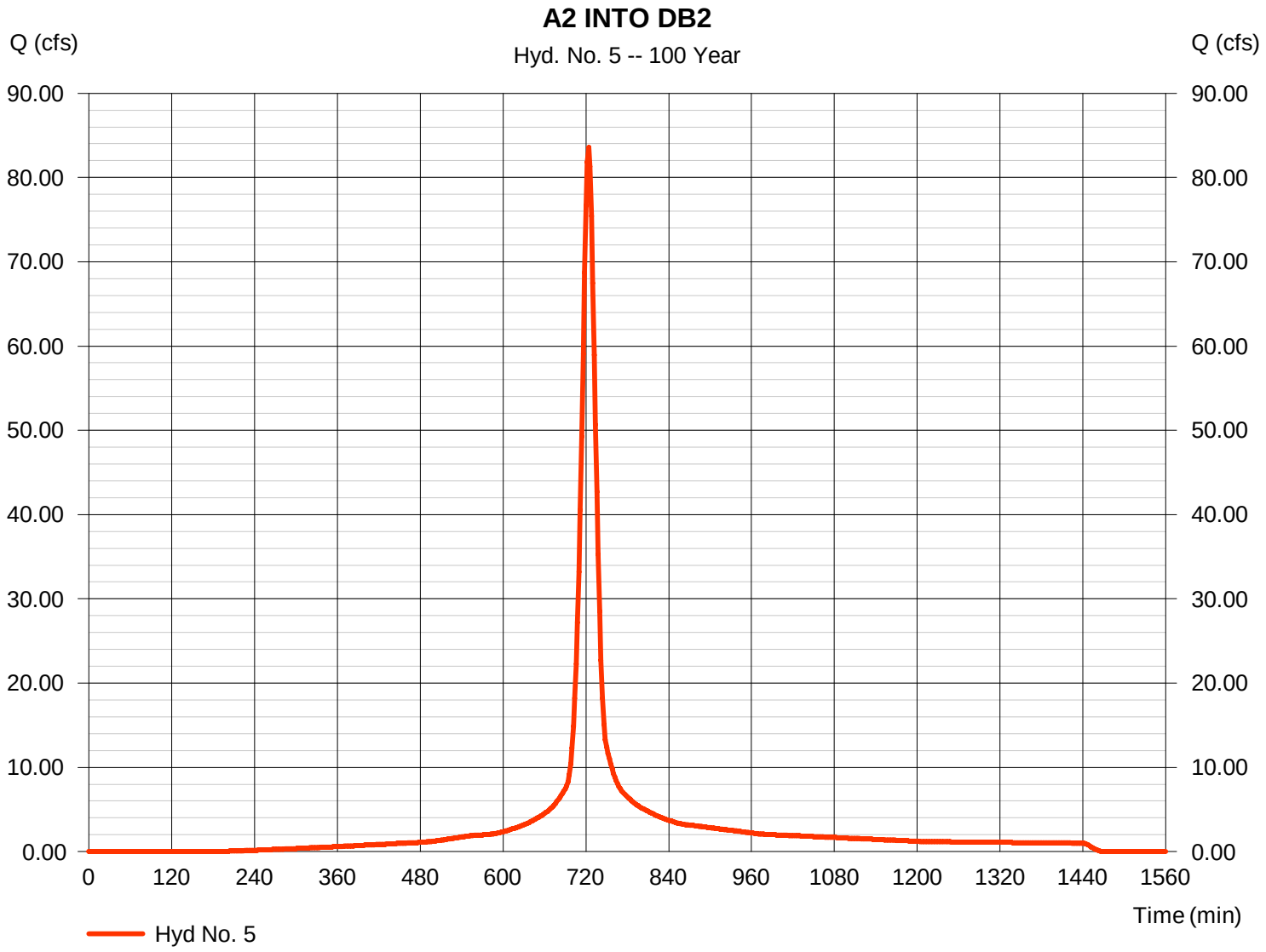


Hydrograph Report

Hyd. No. 5

A2 INTO DB2

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	274,980 cuft
Drainage area	=	13.700 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

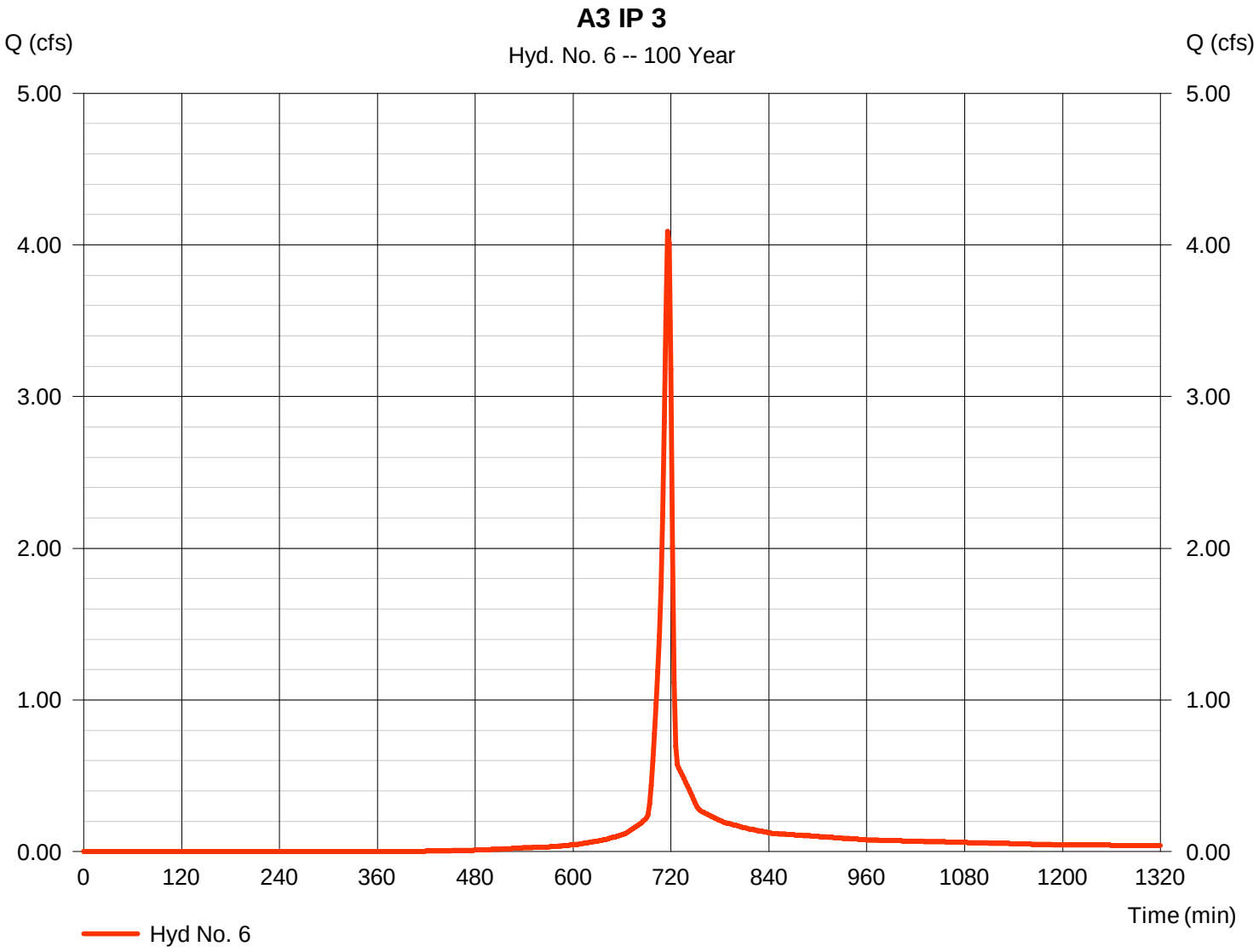


Hydrograph Report

Hyd. No. 6

A3 IP 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.091 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	8,366 cuft
Drainage area	=	0.600 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



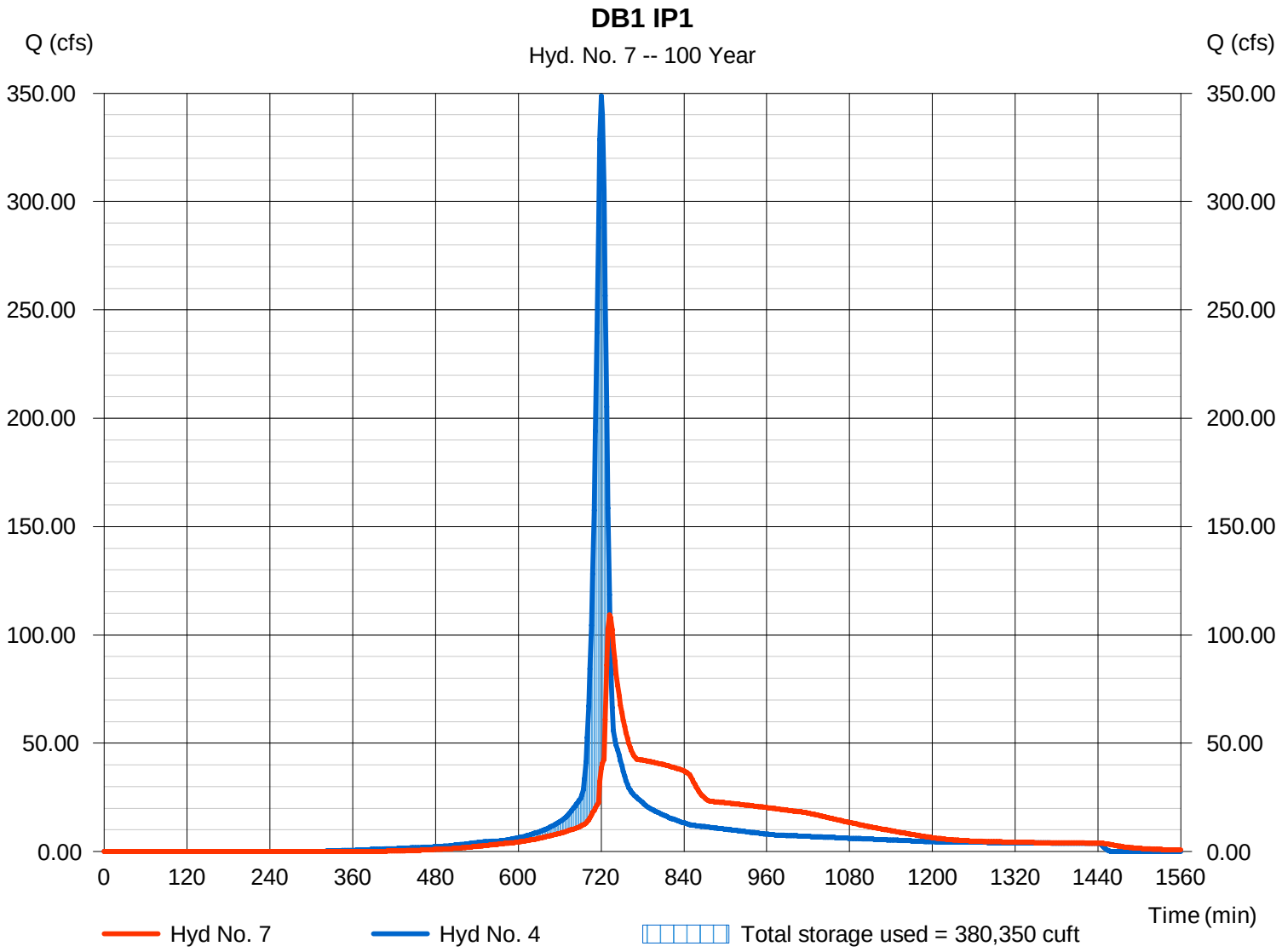
Hydrograph Report

Hyd. No. 7

DB1 IP1

Hydrograph type	=	Reservoir	Peak discharge	=	109.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	923,689 cuft
Inflow hyd. No.	=	4 - AI INTO DB1	Max. Elevation	=	1095.97 ft
Reservoir name	=	DB1	Max. Storage	=	380,350 cuft

Storage Indication method used.



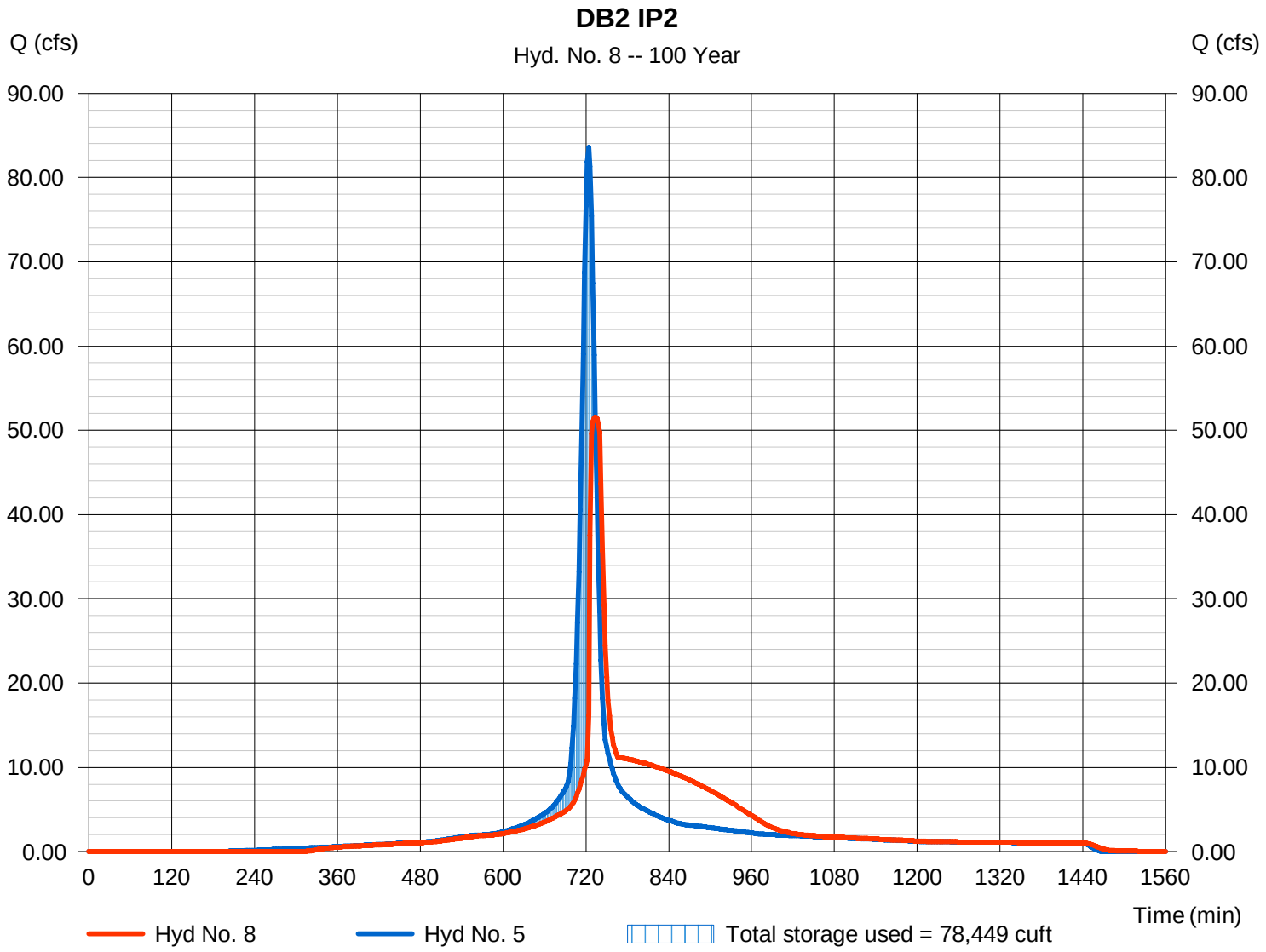
Hydrograph Report

Hyd. No. 8

DB2 IP2

Hydrograph type	=	Reservoir	Peak discharge	=	51.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	273,519 cuft
Inflow hyd. No.	=	5 - A2 INTO DB2	Max. Elevation	=	1145.02 ft
Reservoir name	=	DB2	Max. Storage	=	78,449 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	110.8217	18.3000	1.0108	--------
2	74.1125	11.8000	0.8974	--------
3	0.0000	0.0000	0.0000	--------
5	82.1212	10.1000	0.8627	--------
10	113.9855	12.1000	0.9024	--------
25	106.6791	11.3000	0.8449	--------
50	119.8696	11.8000	0.8406	--------
100	145.8254	12.7000	0.8636	--------

File name: Omaha.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.60	3.78	3.20	2.78	2.46	2.20	1.99	1.82	1.67	1.55	1.44	1.35
2	5.89	4.66	3.87	3.32	2.91	2.60	2.35	2.14	1.97	1.83	1.71	1.60
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	7.90	6.17	5.09	4.35	3.81	3.40	3.07	2.81	2.58	2.40	2.24	2.10
10	8.79	6.98	5.80	4.98	4.37	3.90	3.52	3.22	2.96	2.75	2.56	2.40
25	10.09	8.05	6.74	5.81	5.13	4.60	4.18	3.83	3.54	3.29	3.08	2.90
50	11.19	8.99	7.56	6.54	5.79	5.20	4.73	4.34	4.02	3.74	3.51	3.30
100	12.19	9.84	8.28	7.18	6.35	5.70	5.18	4.75	4.40	4.09	3.83	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: H:\Hydroflow Data\Omaha 24-hr Precip SCS.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	3.00	0.00	3.90	4.60	5.30	6.00	6.70
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	1.25	0.00	2.80	3.90	5.25	6.00	7.10

Pond Report

Pond No. 1 - DB1

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1088.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1088.00	36,183	0	0
1.00	1089.00	38,934	37,559	37,559
2.00	1090.00	41,746	40,340	77,899
3.00	1091.00	44,621	43,184	121,082
4.00	1092.00	47,557	46,089	167,171
5.00	1093.00	50,555	49,056	216,227
6.00	1094.00	53,615	52,085	268,312
7.00	1095.00	56,737	55,176	323,488
8.00	1096.00	59,921	58,329	381,817

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	10.00	0.00	0.00
Span (in)	= 24.00	10.00	0.00	0.00
No. Barrels	= 1	5	0	0
Invert El. (ft)	= 1086.00	1088.00	0.00	0.00
Length (ft)	= 50.00	0.10	0.00	0.00
Slope (%)	= 2.00	0.10	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 18.00	20.00	0.00	0.00
Crest El. (ft)	= 1092.50	1095.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

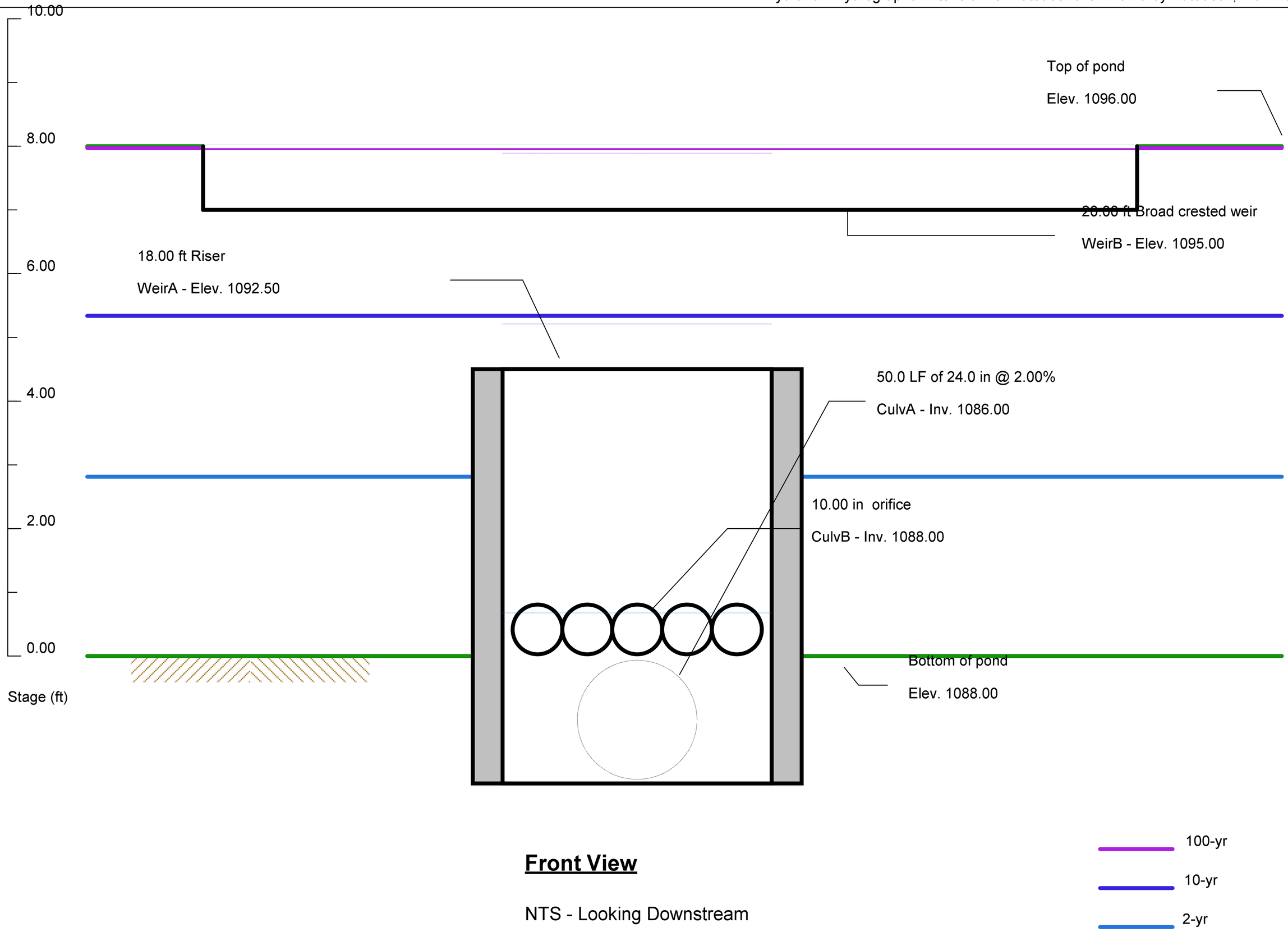
TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1088.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.00	37,559	1089.00	15.12 ic	10.03 ic	---	---	0.00	0.00	---	---	---	---	10.03
2.00	77,899	1090.00	16.52 ic	16.52 ic	---	---	0.00	0.00	---	---	---	---	16.52
3.00	121,082	1091.00	19.83 ic	19.83 ic	---	---	0.00	0.00	---	---	---	---	19.83
4.00	167,171	1092.00	22.17 ic	22.17 ic	---	---	0.00	0.00	---	---	---	---	22.17
5.00	216,227	1093.00	33.99 ic	12.80 ic	---	---	21.19	0.00	---	---	---	---	33.99
6.00	268,312	1094.00	39.85 ic	3.17 ic	---	---	36.68 s	0.00	---	---	---	---	39.85
7.00	323,488	1095.00	42.73 ic	1.73 ic	---	---	40.92 s	0.00	---	---	---	---	42.66
8.00	381,817	1096.00	45.35 ic	1.17 ic	---	---	43.97 s	66.60	---	---	---	---	111.74

Pond No. 1 - DB1



Front View

NTS - Looking Downstream

Inflow hydrograph = 5. SCS Runoff - AI INTO DB1

Pond Report

Pond No. 2 - DB2

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1134.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1134.00	2,597	0	0
1.00	1135.00	3,237	2,917	2,917
2.00	1136.00	3,933	3,585	6,502
3.00	1137.00	4,686	4,310	10,812
4.00	1138.00	5,495	5,091	15,902
5.00	1139.00	6,361	5,928	21,830
6.00	1140.00	7,284	6,823	28,653
7.00	1141.00	8,263	7,774	36,426
8.00	1142.00	9,298	8,781	45,207
9.00	1143.00	10,390	9,844	55,051
10.00	1144.00	11,539	10,965	66,015
11.00	1145.00	12,744	12,142	78,157
12.00	1146.00	14,006	13,375	91,532

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	6.00	Inactive	0.00
Span (in)	= 24.00	6.00	10.00	0.00
No. Barrels	= 1	4	4	0
Invert El. (ft)	= 1132.00	1134.50	1138.00	0.00
Length (ft)	= 50.00	0.10	0.10	0.00
Slope (%)	= 1.00	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.70	Inactive	0.00	0.00
Crest El. (ft)	= 1143.50	1145.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

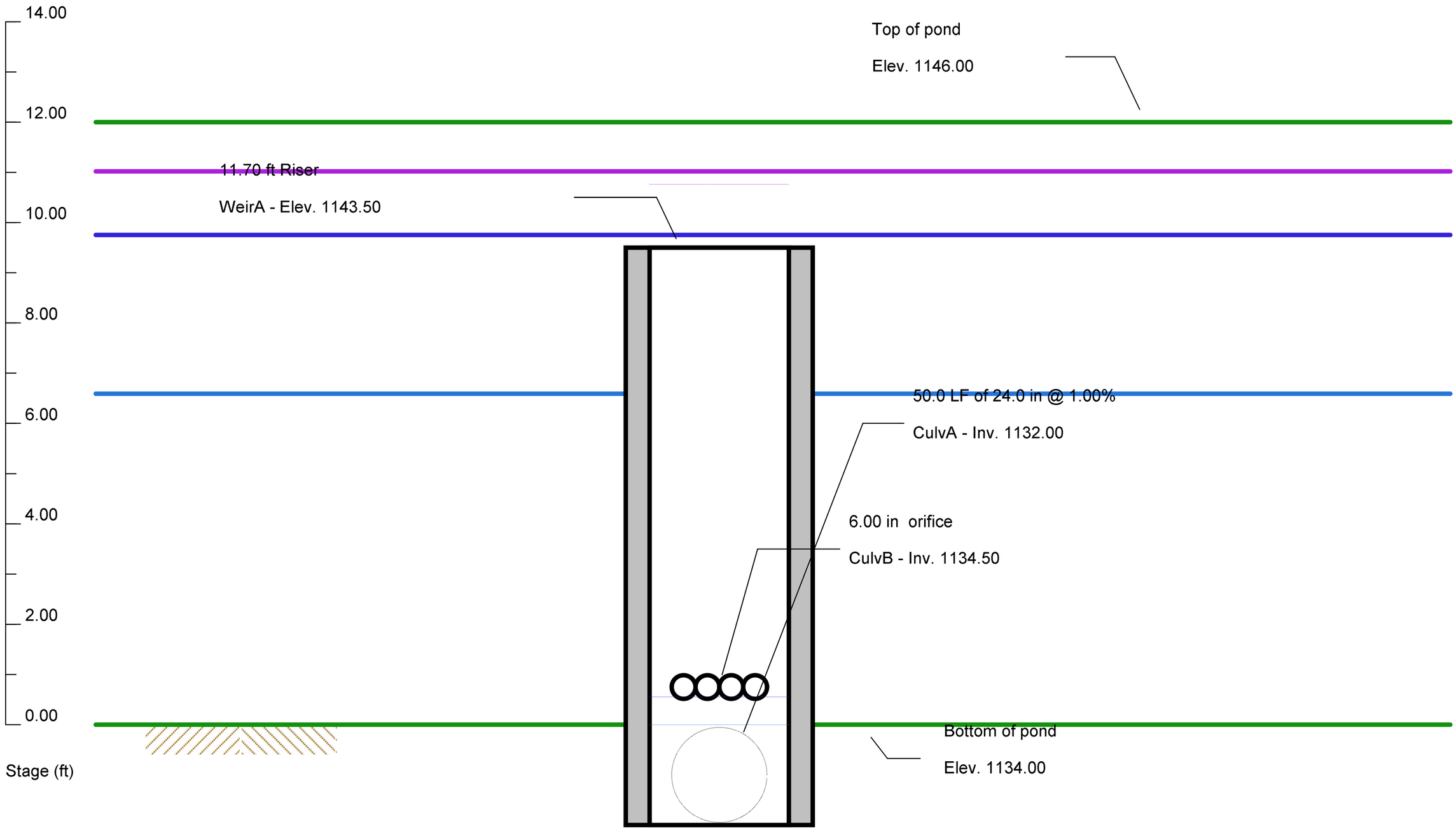
TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1134.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.00	2,917	1135.00	12.25 oc	1.89 ic	0.00	---	0.00	0.00	---	---	---	---	1.891
2.00	6,502	1136.00	12.25 oc	4.23 ic	0.00	---	0.00	0.00	---	---	---	---	4.228
3.00	10,812	1137.00	12.25 oc	5.67 ic	0.00	---	0.00	0.00	---	---	---	---	5.672
4.00	15,902	1138.00	12.25 oc	6.82 ic	0.00	---	0.00	0.00	---	---	---	---	6.817
5.00	21,830	1139.00	12.25 oc	7.80 ic	0.00	---	0.00	0.00	---	---	---	---	7.795
6.00	28,653	1140.00	12.25 oc	8.66 ic	0.00	---	0.00	0.00	---	---	---	---	8.664
7.00	36,426	1141.00	12.25 oc	9.45 ic	0.00	---	0.00	0.00	---	---	---	---	9.453
8.00	45,207	1142.00	12.25 oc	10.18 ic	0.00	---	0.00	0.00	---	---	---	---	10.18
9.00	55,051	1143.00	12.25 oc	10.86 ic	0.00	---	0.00	0.00	---	---	---	---	10.86
10.00	66,015	1144.00	24.69 ic	10.92 ic	0.00	---	13.77	0.00	---	---	---	---	24.69
11.00	78,157	1145.00	51.50 ic	2.40 ic	0.00	---	49.10 s	0.00	---	---	---	---	51.50
12.00	91,532	1146.00	54.31 ic	1.23 ic	0.00	---	53.07 s	0.00	---	---	---	---	54.30

Pond No. 2 - DB2



Front View

NTS - Looking Downstream

Inflow hydrograph = 5. SCS Runoff - A2 INTO DB2

Hydrograph Report

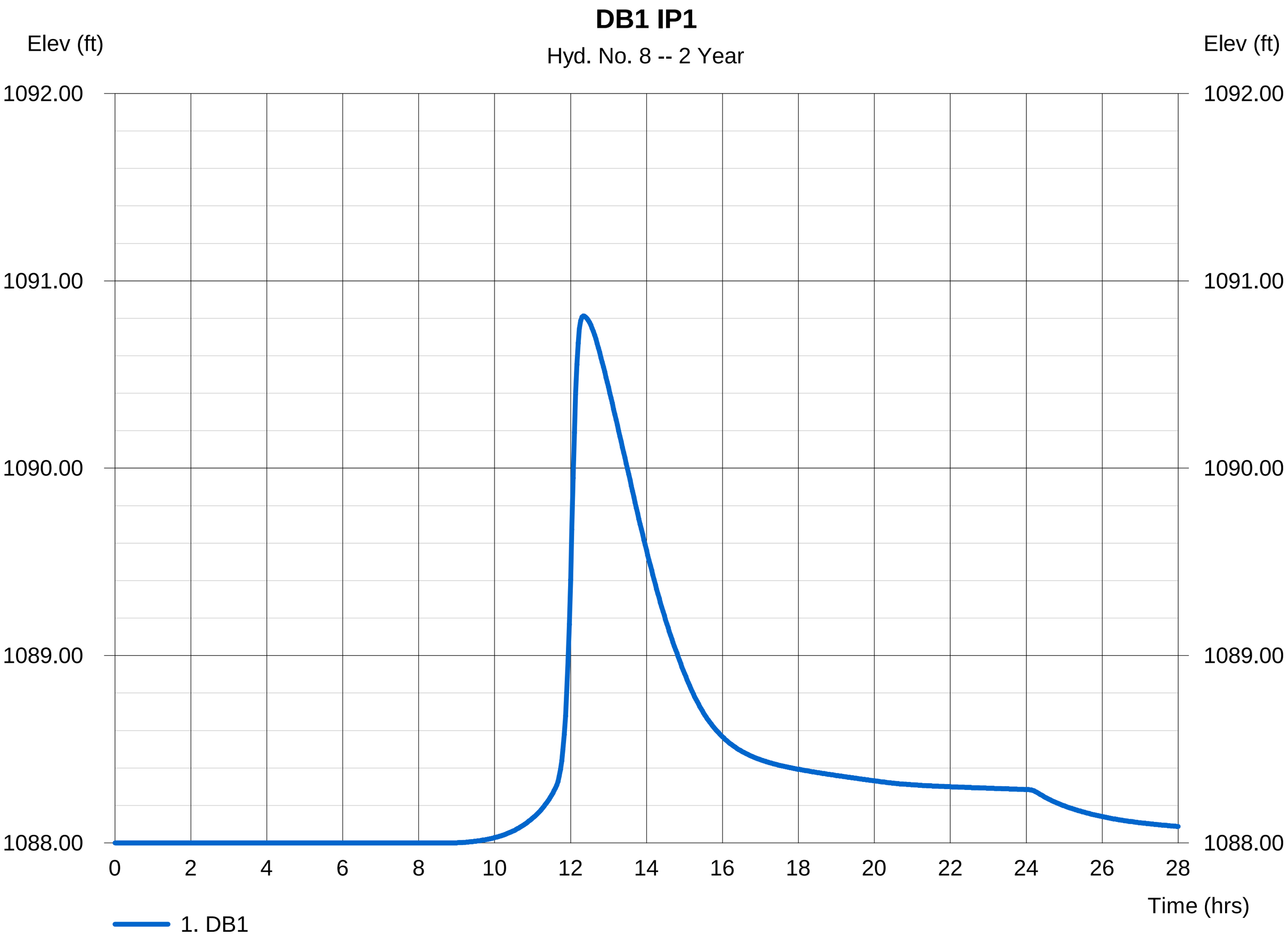
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Thursday, 10 / 16 / 2025

Hyd. No. 8

DB1 IP1

Hydrograph type	=	Reservoir	Peak discharge	=	19.36 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.30 hrs
Time interval	=	2 min	Hyd. volume	=	281,569 cuft
Inflow hyd. No.	=	5 - AI INTO DB1	Max. Elevation	=	1090.81 ft
Reservoir name	=	DB1	Max. Storage	=	112,981 cuft

Storage Indication method used.



Hydrograph Report

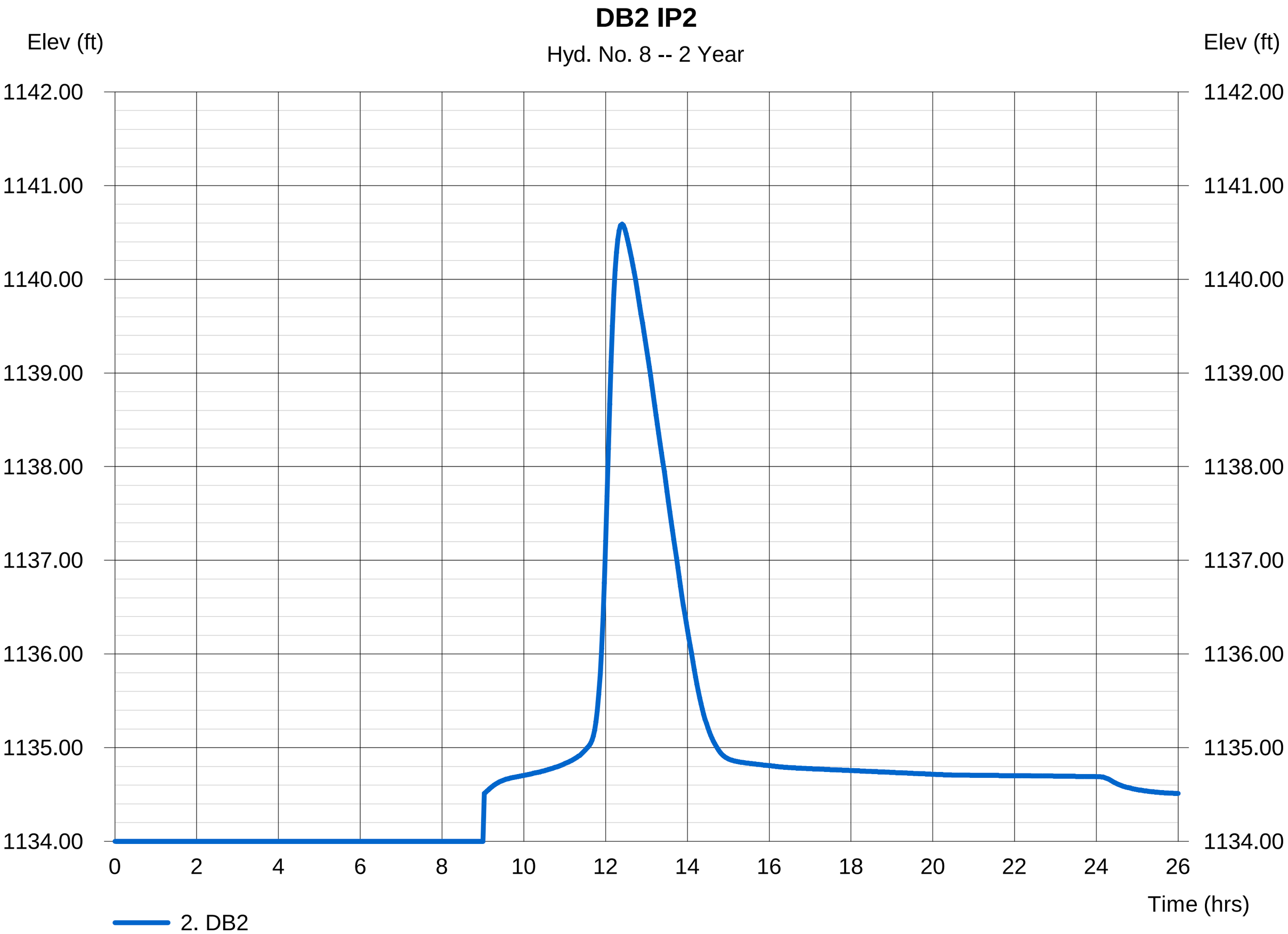
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Monday, 12 / 8 / 2025

Hyd. No. 8

DB2 IP2

Hydrograph type	=	Reservoir	Peak discharge	=	9.137 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.37 hrs
Time interval	=	2 min	Hyd. volume	=	97,212 cuft
Inflow hyd. No.	=	5 - A2 INTO DB2	Max. Elevation	=	1140.59 ft
Reservoir name	=	DB2	Max. Storage	=	33,235 cuft

Storage Indication method used.



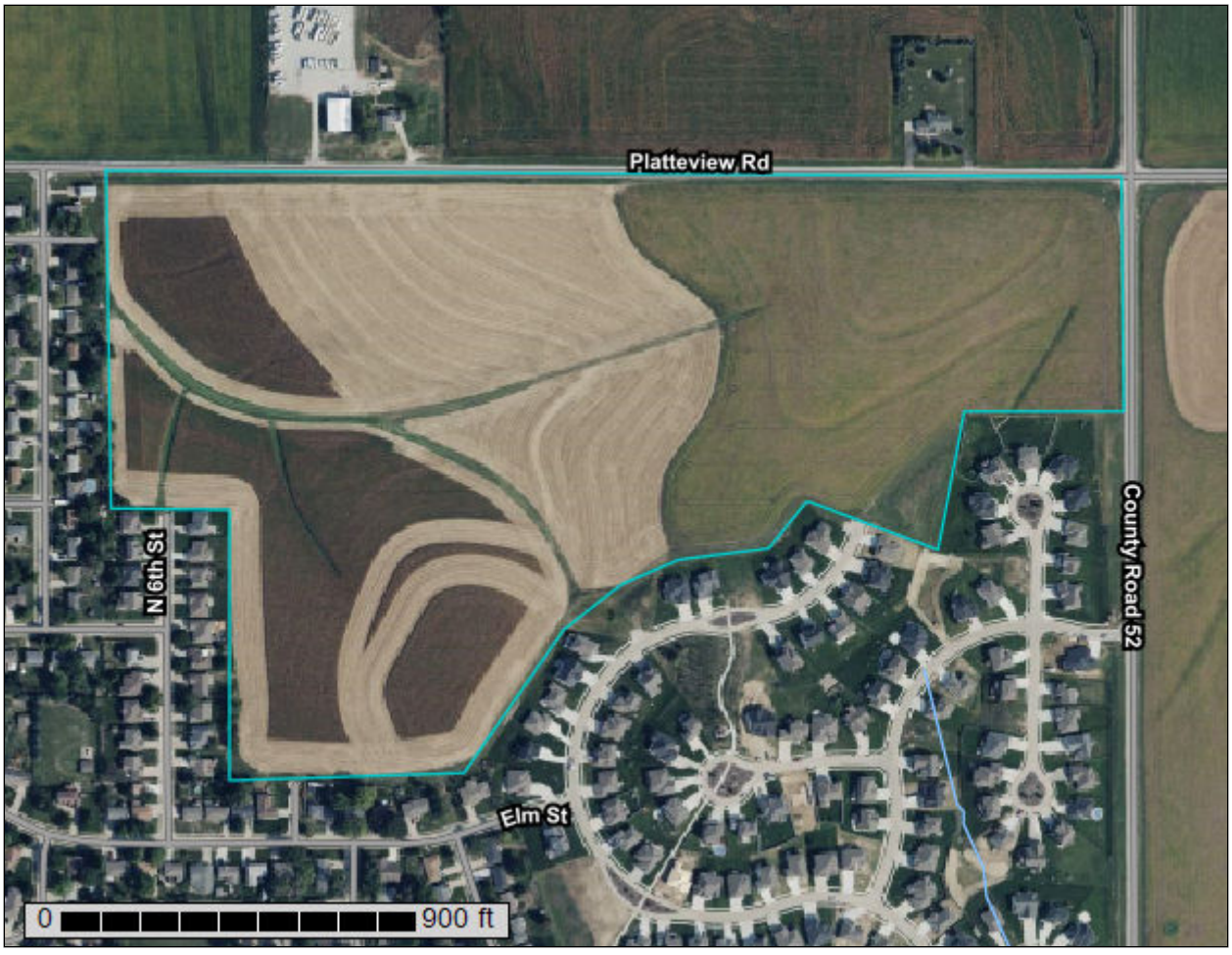
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sarpy County, Nebraska



October 6, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Sarpy County, Nebraska
Survey Area Data: Version 19, Sep 8, 2025

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

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7234	Judson silty clay loam, 2 to 6 percent slopes	0.0	0.0%
8035	Marshall-Contrary silty clay loams, 2 to 7 percent slopes	27.4	44.0%
8153	Contrary-Marshall silty clay loams, 6 to 11 percent slopes	35.0	56.0%
Totals for Area of Interest		**62.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sarpy County, Nebraska

7234—Judson silty clay loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2sy70
Elevation: 960 to 1,350 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 50 to 51 degrees F
Frost-free period: 160 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Judson

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty colluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam
A - 9 to 22 inches: silty clay loam
AB - 22 to 28 inches: silty clay loam
Bt - 28 to 35 inches: silty clay loam
BC - 35 to 52 inches: silty clay loam
C - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Kennebec, occasionally flooded
Percent of map unit: 14 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

Ackmore, occasionally flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Kezan, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

8035—Marshall-Contrary silty clay loams, 2 to 7 percent slopes

Map Unit Setting
National map unit symbol: 1vfg4
Elevation: 800 to 1,300 feet
Mean annual precipitation: 24 to 36 inches
Mean annual air temperature: 39 to 61 degrees F
Frost-free period: 155 to 175 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Marshall and similar soils: 59 percent
Contrary and similar soils: 41 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall

Setting
Landform: Loess hills

Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-silty noncalcareous loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 18 inches: silty clay loam
Bw - 18 to 47 inches: silty clay loam
C - 47 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Description of Contrary

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bw - 7 to 55 inches: silty clay loam
C - 55 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

8153—Contrary-Marshall silty clay loams, 6 to 11 percent slopes

Map Unit Setting

National map unit symbol: 1vfgk
Elevation: 800 to 1,300 feet
Mean annual precipitation: 24 to 36 inches
Mean annual air temperature: 39 to 61 degrees F
Frost-free period: 155 to 175 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Contrary and similar soils: 55 percent
Marshall and similar soils: 39 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Contrary

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bw - 7 to 55 inches: silty clay loam
C - 55 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Description of Marshall

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-silty noncalcareous loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 18 inches: silty clay loam
Bw - 18 to 47 inches: silty clay loam
C - 47 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Ida

Percent of map unit: 6 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

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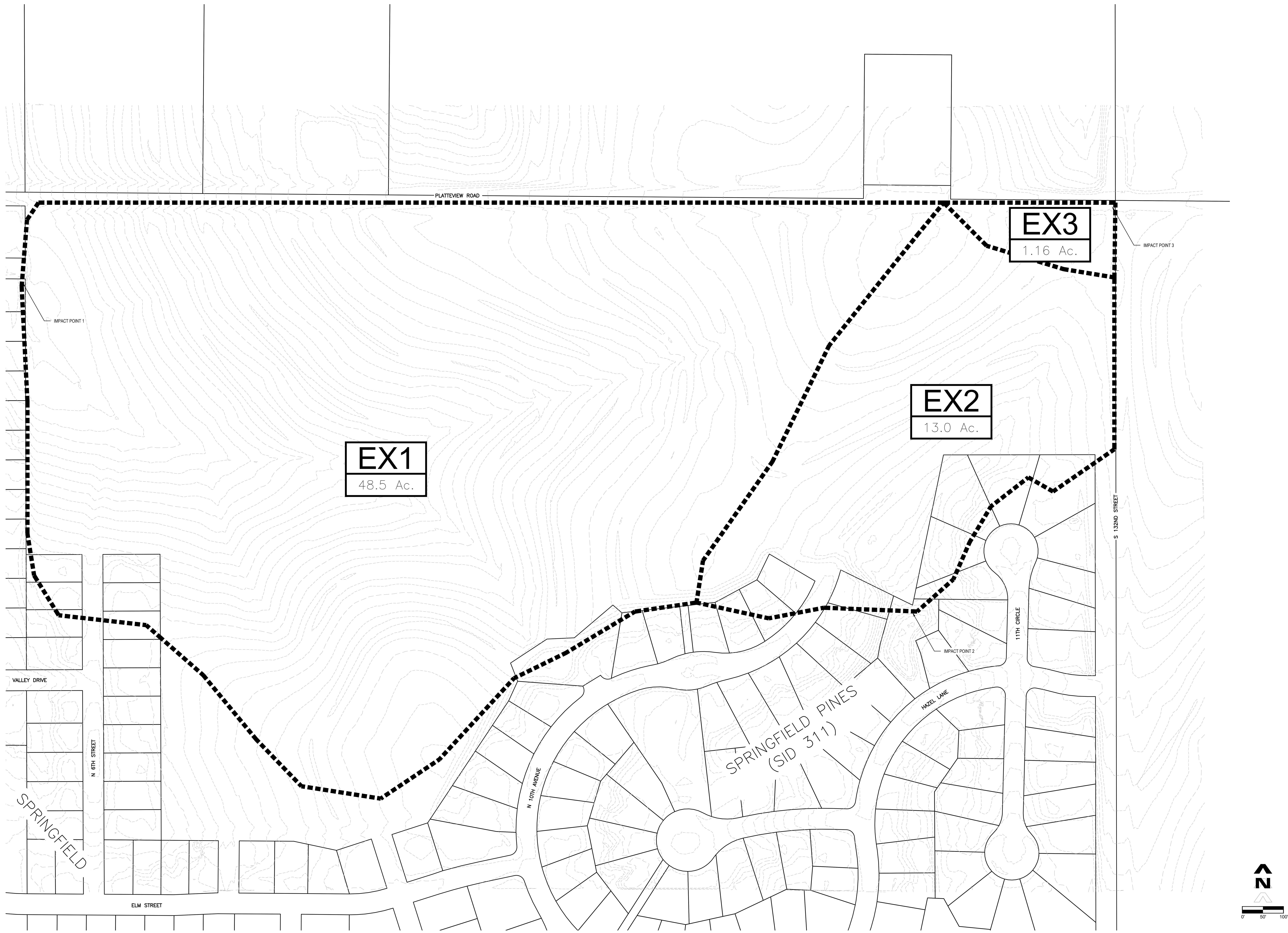
SECTION 2



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NE CA-0199

Project Name

132 Platteview

Project Location

South 132nd Street and
Platteview Road

Springfield NE, 68059

Client Name

Belcaro Companies

Professional Seal

Revision Dates

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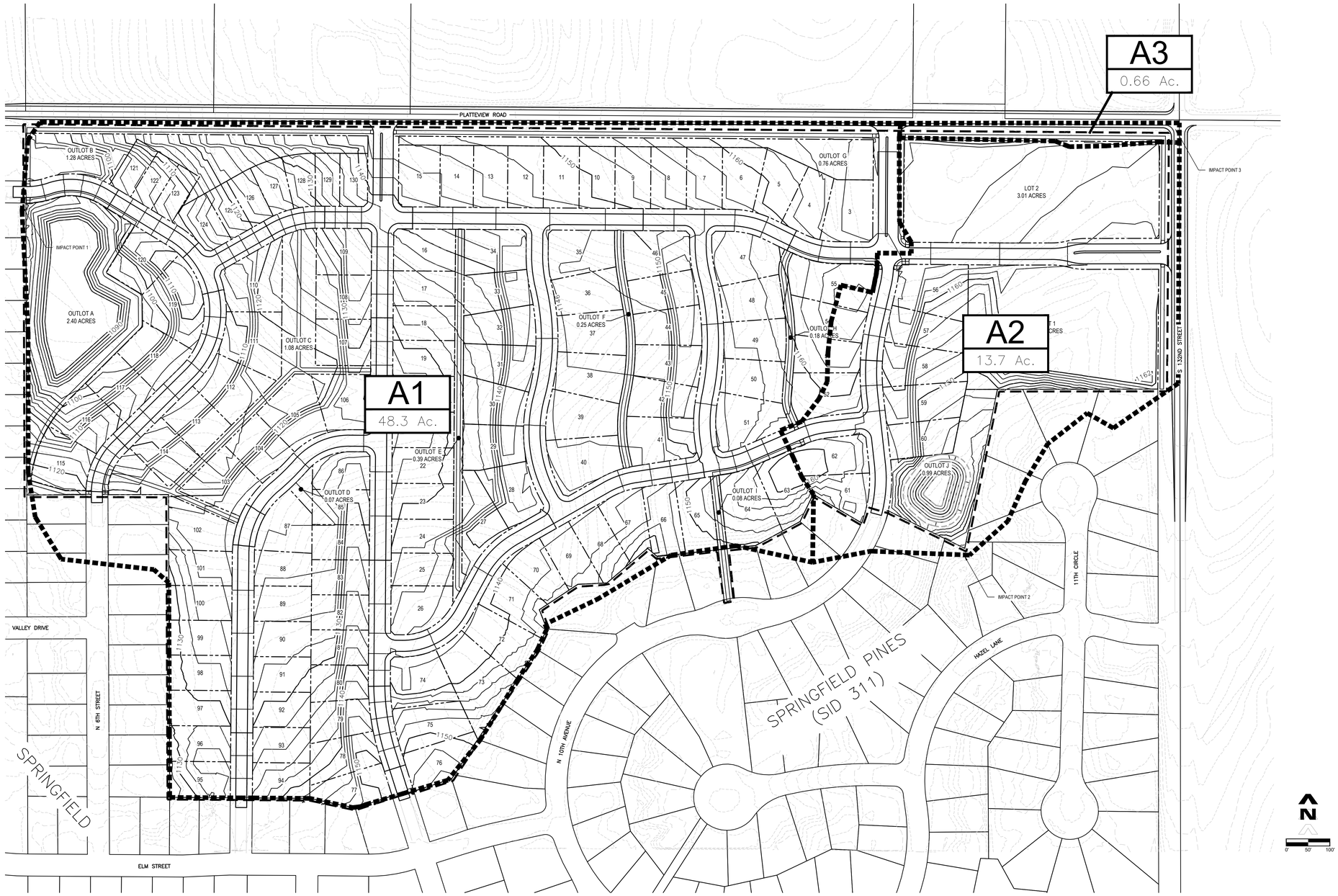
Job No.: 2380-104 Date: 12-08-2025

Sheet Title

Existing Drainage Map

Sheet Number

DM-1



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Project Location

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Client Name

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Professional Seal

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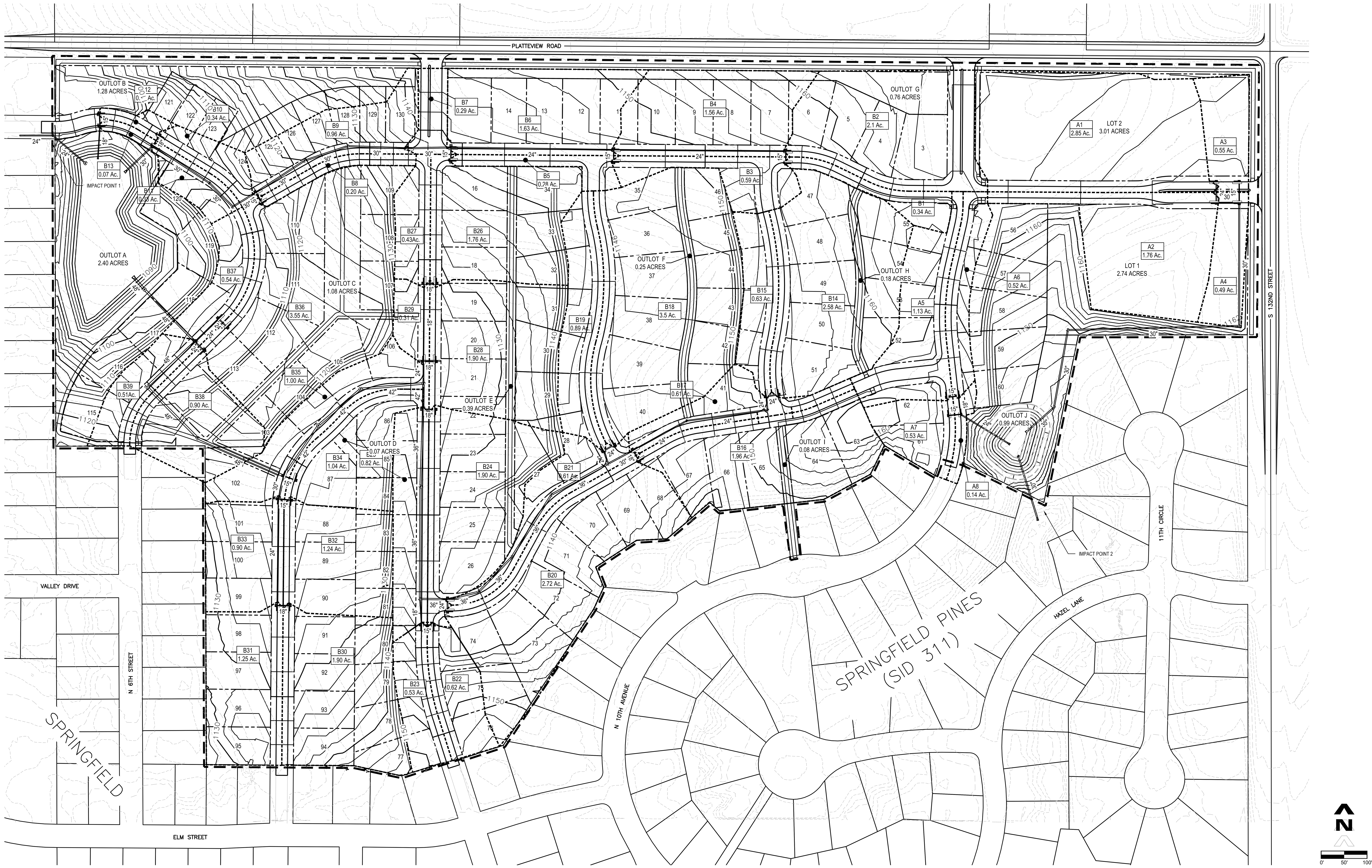
Sheet Title

Proposed Drainage Map

Sheet Number

DM-2



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Sheet Title
Proposed Drainage Areas

Sheet Number
DM-3