Bryant Admin Parking

Stormwater Management Report

City of Bryant, Saline County, Arkansas

Original Submittal:
February 20, 2023

Revised Submittal:
March 15, 2024

MINTON ENGINEERING, INC.
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Cabot, AR 72023
501.941.5559 phone
501.941.5557 fax

Revised Conditions:

It was brought to our attention that once this project was constructed flooding was occurring to the west behind the Library. We have determined that the existing pond behind the new administration building (previously Summerwood Petroleum) was handling the stormwater not only for this building, but also the gas station to the north. We are proposing to add an additional detention pond that will handle the north portion of our site, as well as the gas station.

I. Pre-Development Conditions

This project involves constructing a new parking lot on the west side of an existing building located at 1511 N. Reynolds Road in the city limits of Bryant, Arkansas. This is the old Summerwood Petro office that is being converted into the Bryant Schools Administration office.

The site currently has a detention pond on the west side, but this pond will be removed for the new parking lot. Considering this, the site detention will be designed as though the pre-development condition is undeveloped.

II. Post-Development Conditions

The project proposes to add a new parking lot on the west (back) side of the existing building. Since the existing detention pond is being removed, a new detention pond is proposed at the southwest corner of the site. Approximately 65% of the site will flow through the detention pond and 35% will drain through the northwest corner. Now 100% of this site as well as a portion of the gas station will flow through the new pond.

III. Design Considerations

The detention for this project was designed using the rational method. The pre-development flow, post development flow and detention volume were determined by the attached calculations are summarized below. The calculations were compiled using Autodesk Hydraflow, information used is attached to this report.

Summary Table:

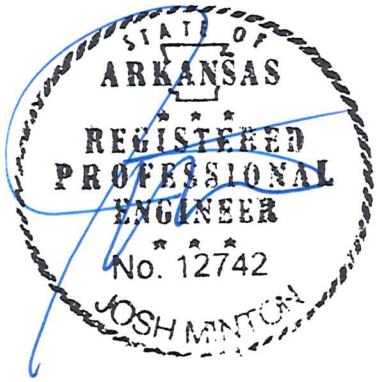
Description	Pre-Development	Post-Development	Pond Elev (new pond)
2-Year Storm	6.69 cfs	2.20 cfs	423.59
5-Year Storm	7.80 cfs	2.64 cfs	423.70
10-Year Storm	8.64 cfs	2.93 cfs	423.77
25-Year Storm	9.88 cfs	3.31 cfs	423.89
50-Year Storm	10.86 cfs	3.59 cfs	423.33
100-Year Storm	11.84 cfs	3.72 cfs	424.04

IV. Conclusion

Post-development flow will be less than the pre-development flow for the 2-100 year storm events. The pond will detain the 100-yr storm by utilizing a storage volume of 1,429 CF. The pond has an available volume of 9,266 CF and will store the 100-year storm w/ 1.96' of freeboard available. The outlet structure will utilize a 12" storm pipe.

Please consider this report and let me know if any additional information is required.

Sincerely,



Josh Minton, PE

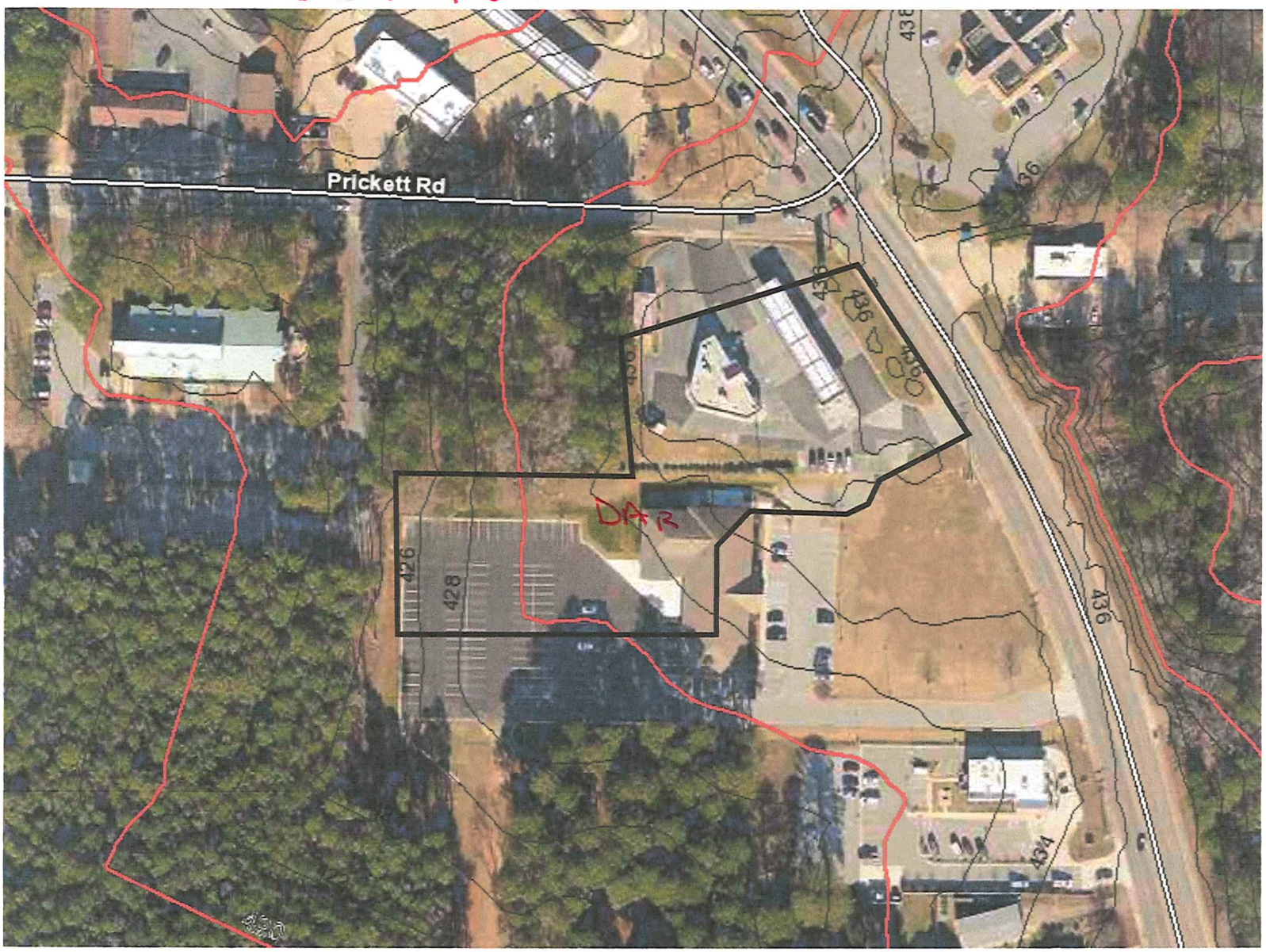
HYDRAULIC CALCULATIONS

Revised Condition MAP

DA_{REV} = 2.3 Ac

C = 0.25 Pre-Dev

C = 0.9 Post-Dev



Pre-Development MAP

Note: Consider entire site to be undeveloped since ex. Det. Pond will be removed.

SCALE: 1" = 100'

Post Development MAP

D.A. 1

$A_{TOTAL} = 1.2\ Ac$

$A_{HARD\ SURF} = 0.7\ Ac \quad C = 0.9$

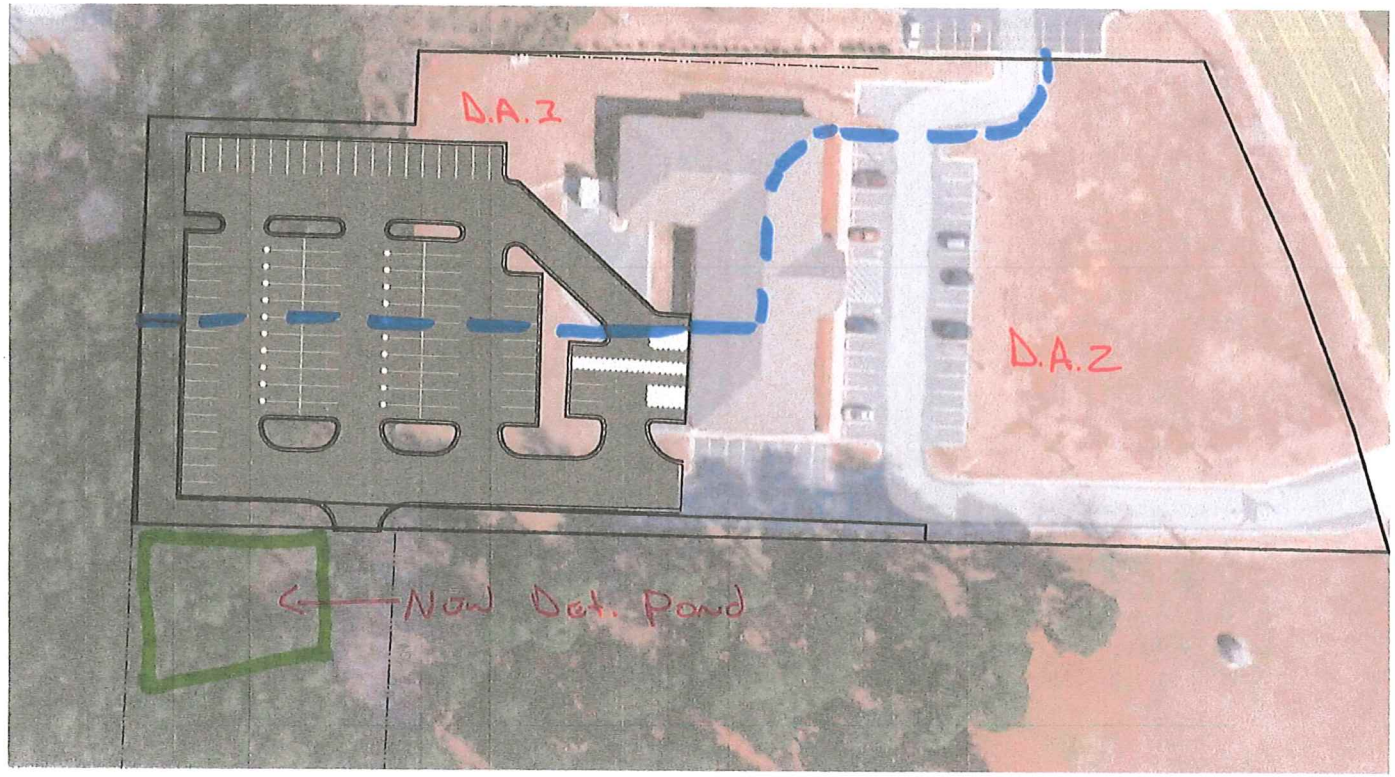
$A_{GREEN} = 0.5\ Ac \quad C = 0.25$

D.A. 2

$A_{TOTAL} = 2.4\ Ac$

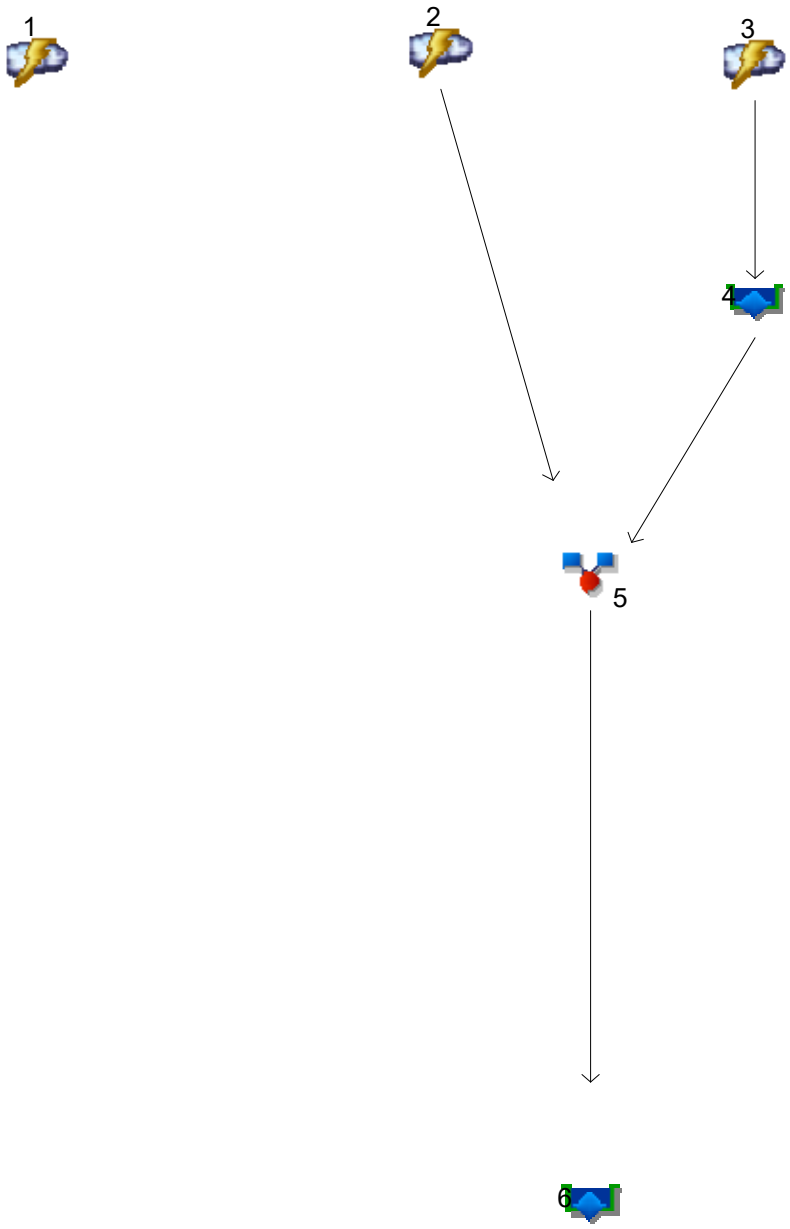
$A_{HS} = 1.2\ Ac \quad C = 0.9$

$A_{GREEN} = 1.2\ Ac \quad C = 0.25$



SCALE: 1" = 100'

Watershed Model Schematic



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	Rational	------	-------	6.693	-------	7.804	8.638	9.878	10.86	11.84	Pre-Development
2	Rational	------	-------	11.79	-------	13.75	15.22	17.40	19.13	20.86	Post Dev DA 1
3	Rational	------	-------	7.930	-------	9.245	10.23	11.70	12.86	14.02	Post Dev. DA 2
4	Reservoir	3	-------	0.817	-------	0.863	0.897	0.945	0.981	1.016	Detention Pond
5	Combine	2, 4	-------	4.953	-------	5.731	6.288	7.116	7.769	8.423	Total Post Dev
6	Reservoir	5	-------	2.199	-------	2.640	2.926	3.314	3.587	3.720	Additional Pond

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	6.693	1	5	2,008	------	------	------	Pre-Development
2	Rational	11.79	1	5	3,538	------	------	------	Post Dev DA 1
3	Rational	7.930	1	5	2,379	------	------	------	Post Dev. DA 2
4	Reservoir	0.817	1	9	2,375	3	426.22	2,087	Detention Pond
5	Combine	4.953	1	5	3,667	2, 4	------	------	Total Post Dev
6	Reservoir	2.199	1	8	3,666	5	423.59	812	Additional Pond

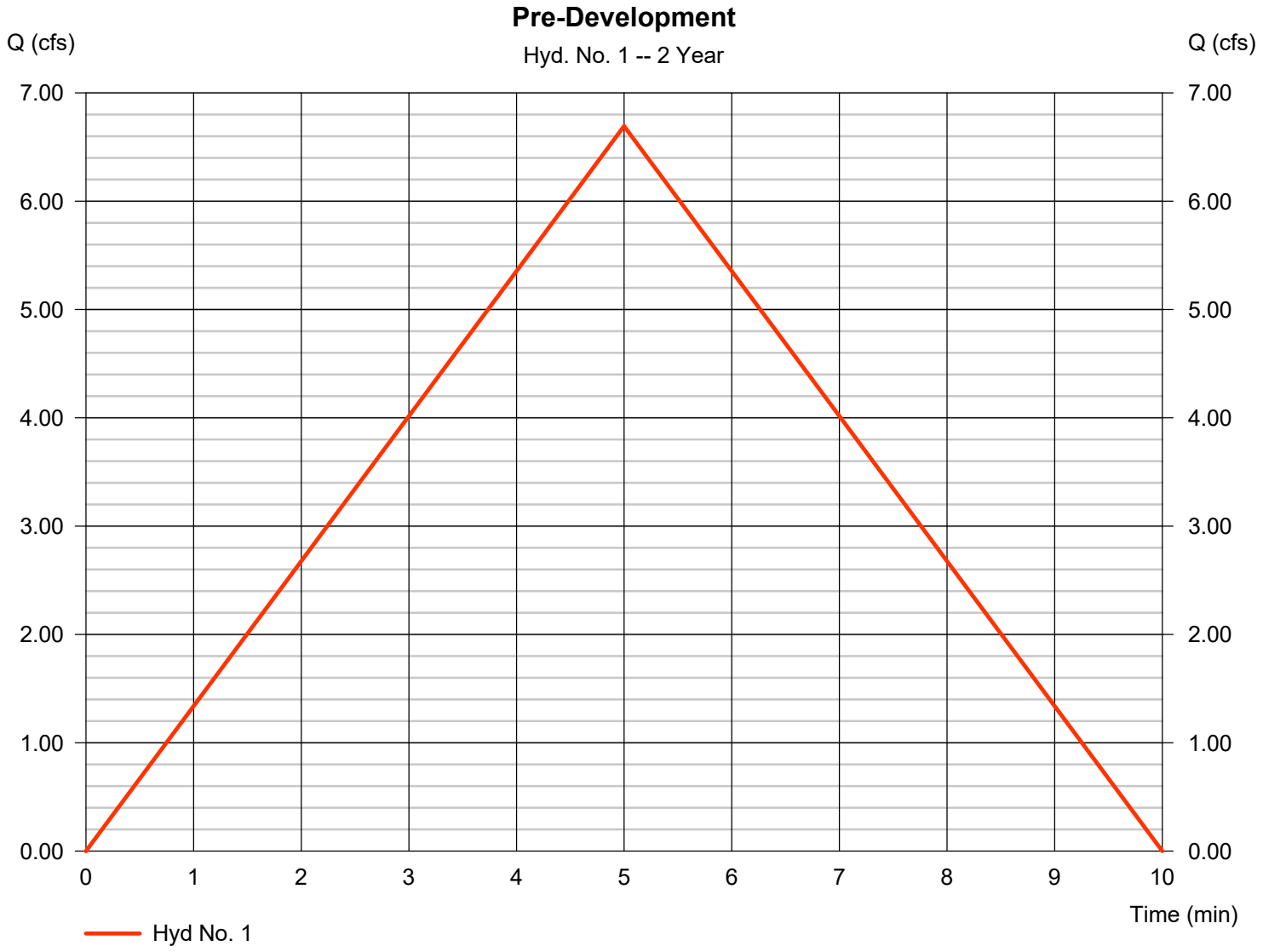
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	6.693 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,008 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	11.79 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,538 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300

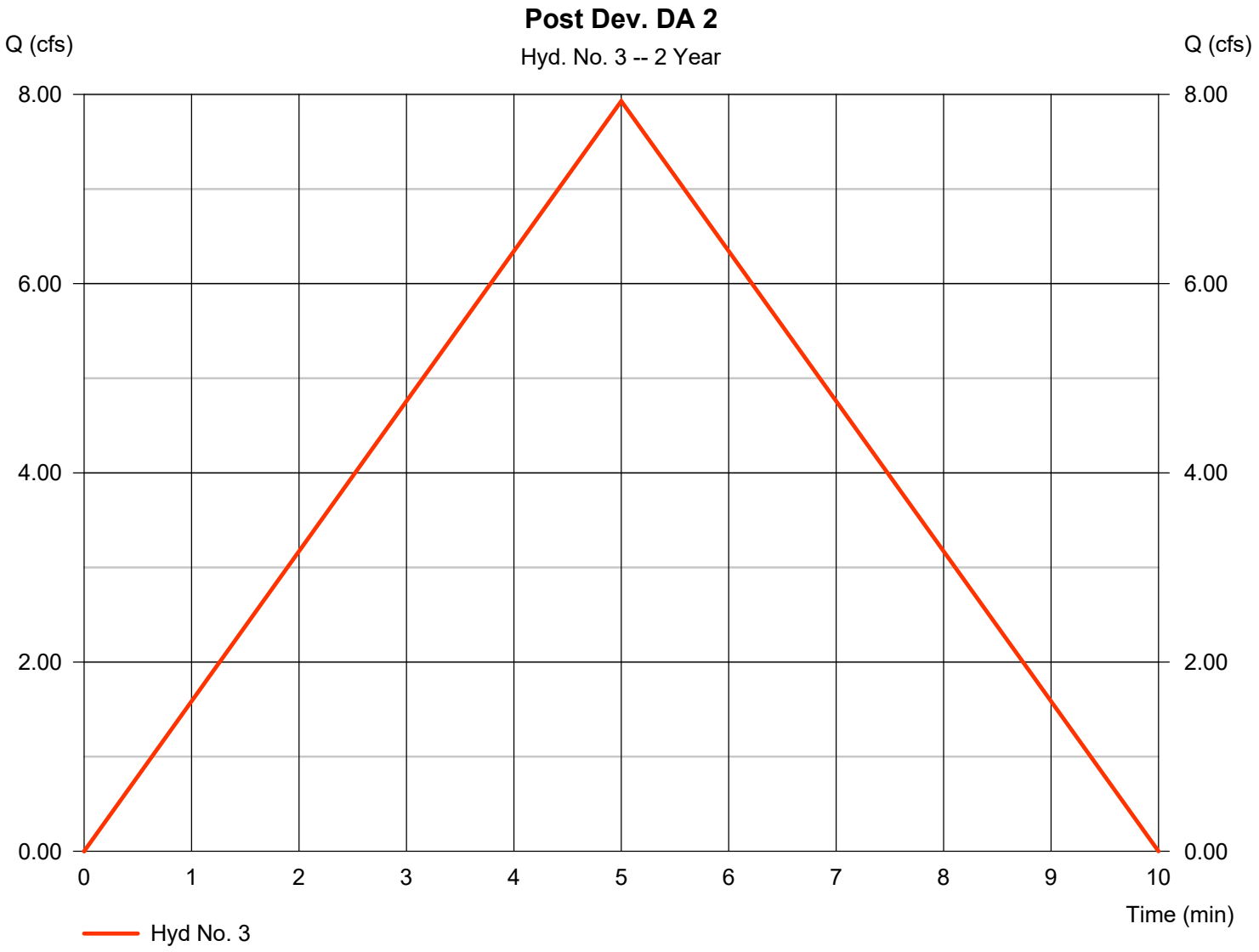
Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	7.930 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,379 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400



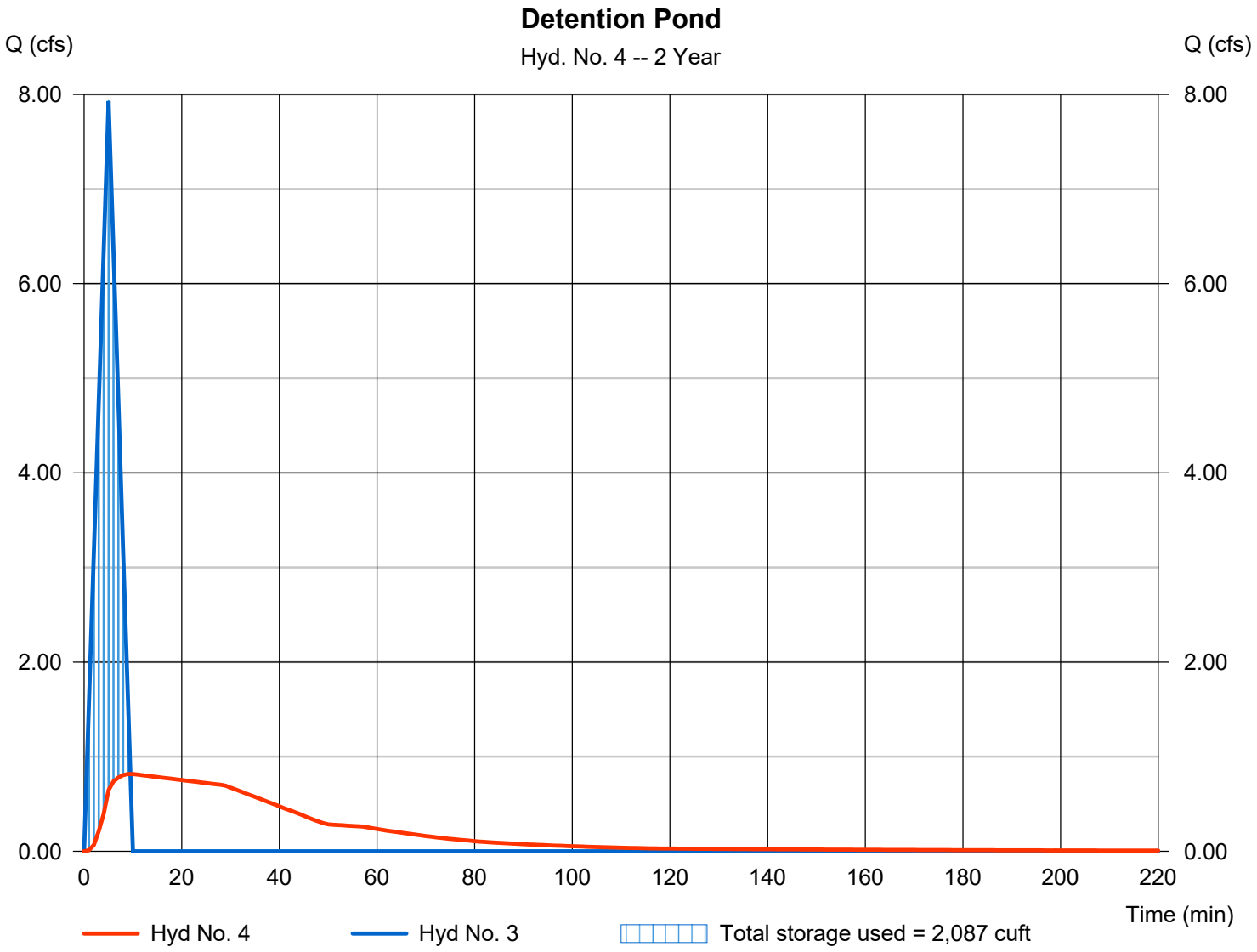
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.817 cfs
Storm frequency	=	2 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	2,375 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.22 ft
Reservoir name	=	Det. Pond	Max. Storage	=	2,087 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Det. Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 425.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	425.00	00	0	0
1.00	426.00	3,700	1,233	1,233
2.00	427.00	4,000	3,849	5,082
2.50	427.50	5,000	2,245	7,327

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 425.00	0.00	0.00	0.00
Length (ft)	= 20.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

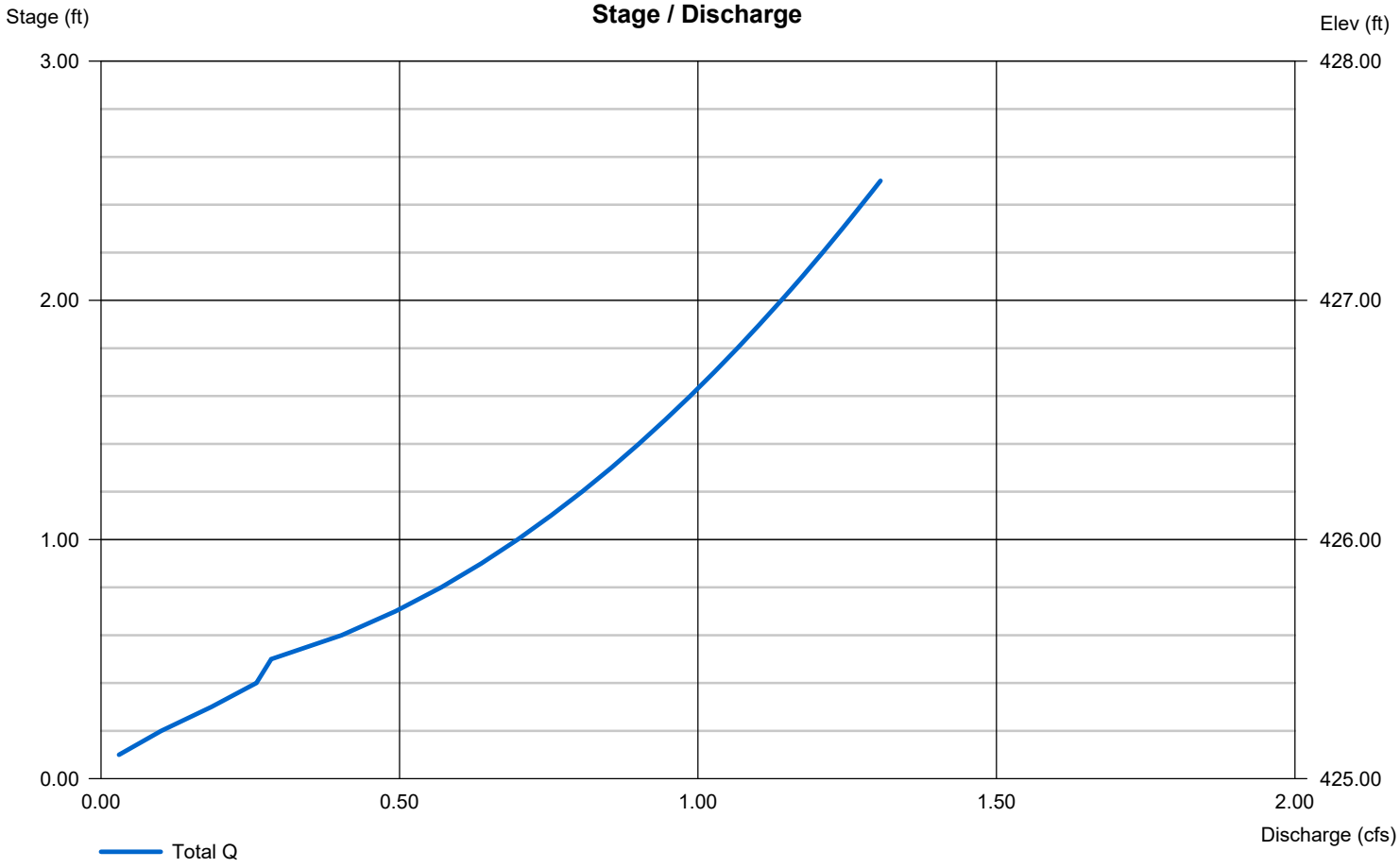
Weir Structures

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

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

TW Elev. (ft) = 0.00

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

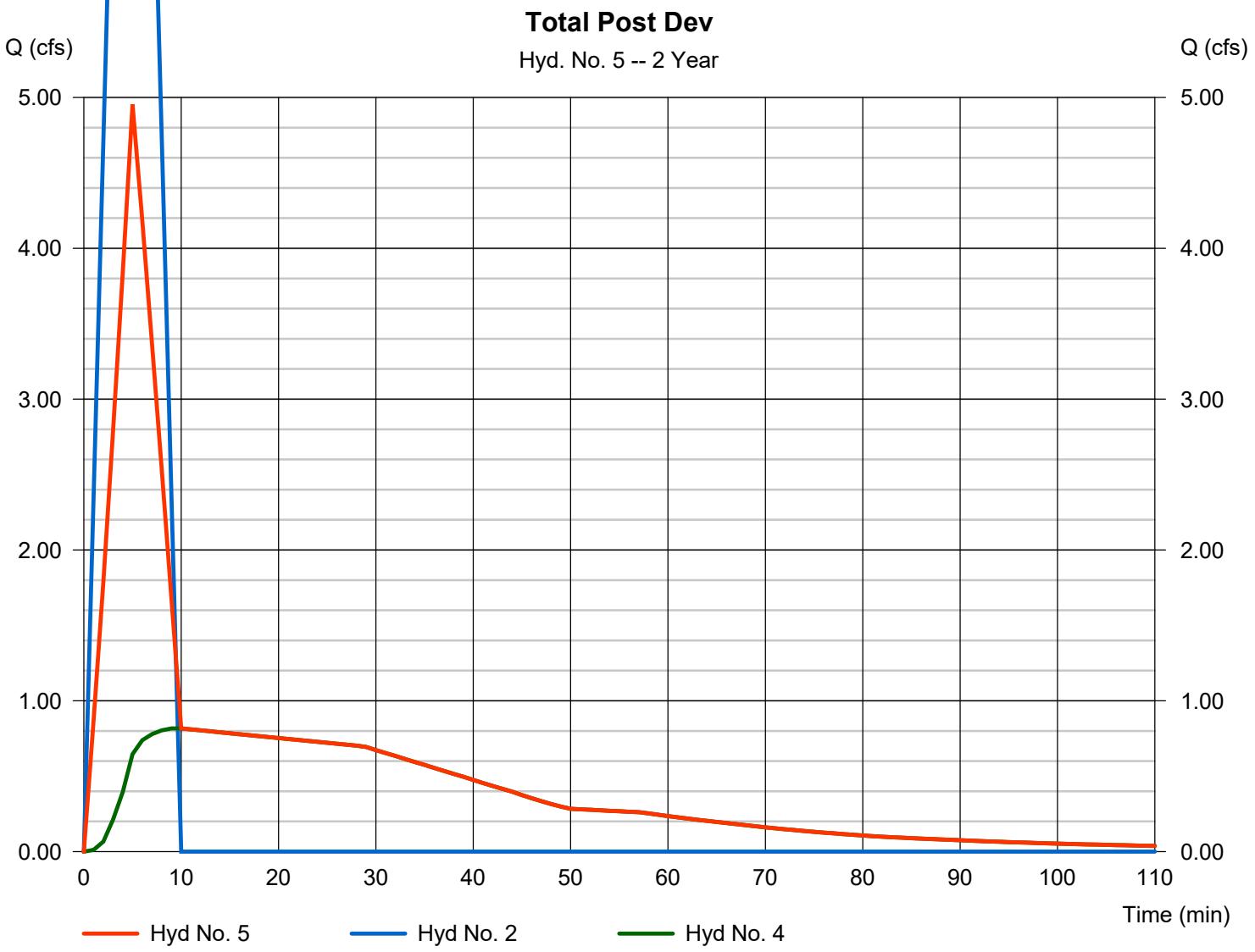


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 4.953 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 3,667 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 2.300 ac



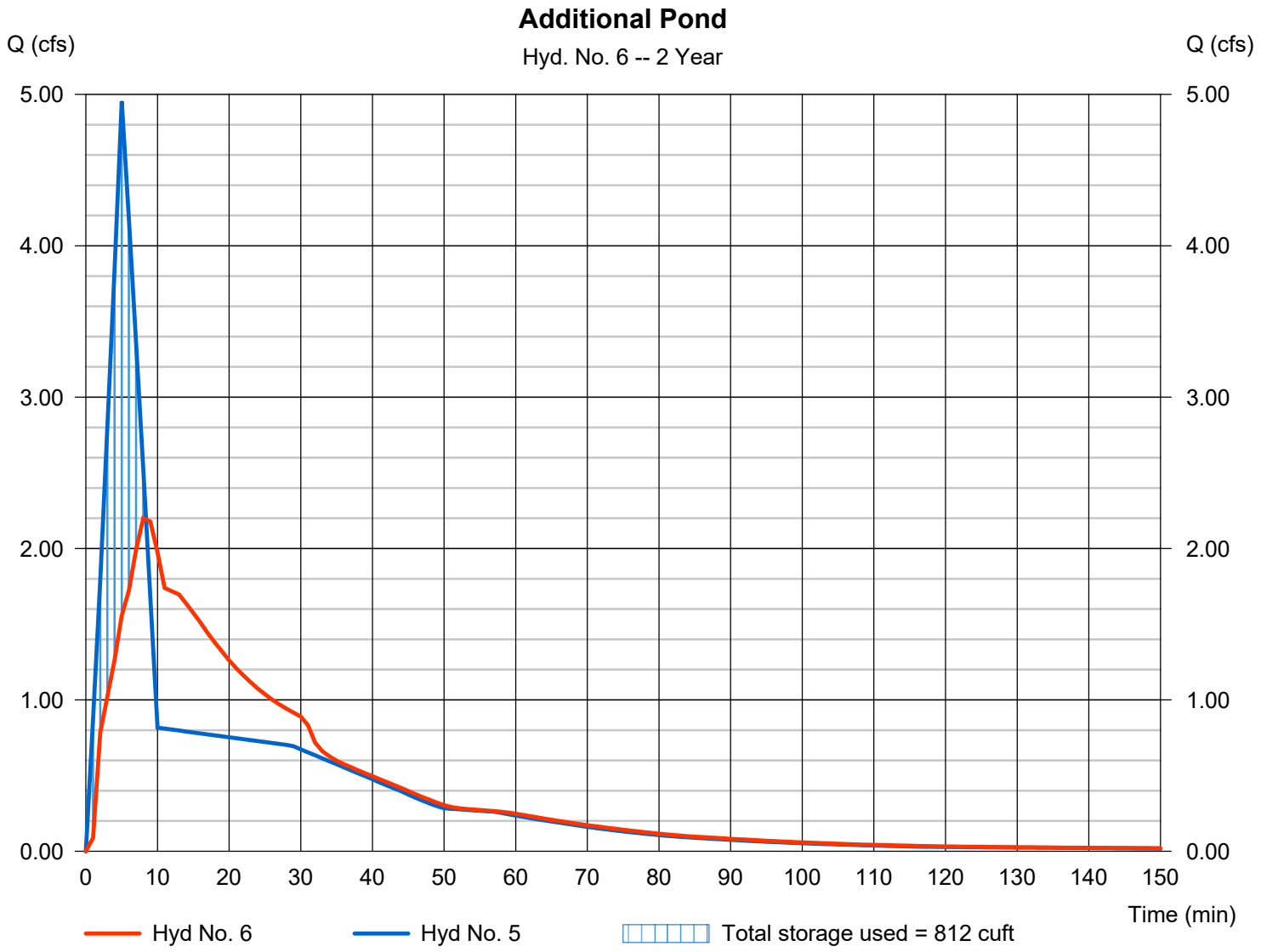
Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.199 cfs
Storm frequency	=	2 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	3,666 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	423.59 ft
Reservoir name	=	Additional Pond	Max. Storage	=	812 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Additional Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 422.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	422.50	00	0	0
0.50	423.00	500	83	83
1.50	424.00	2,165	1,235	1,318
2.50	425.00	4,200	3,127	4,445
3.50	426.00	5,471	4,821	9,266

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 422.50	0.00	0.00	0.00
Length (ft)	= 15.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

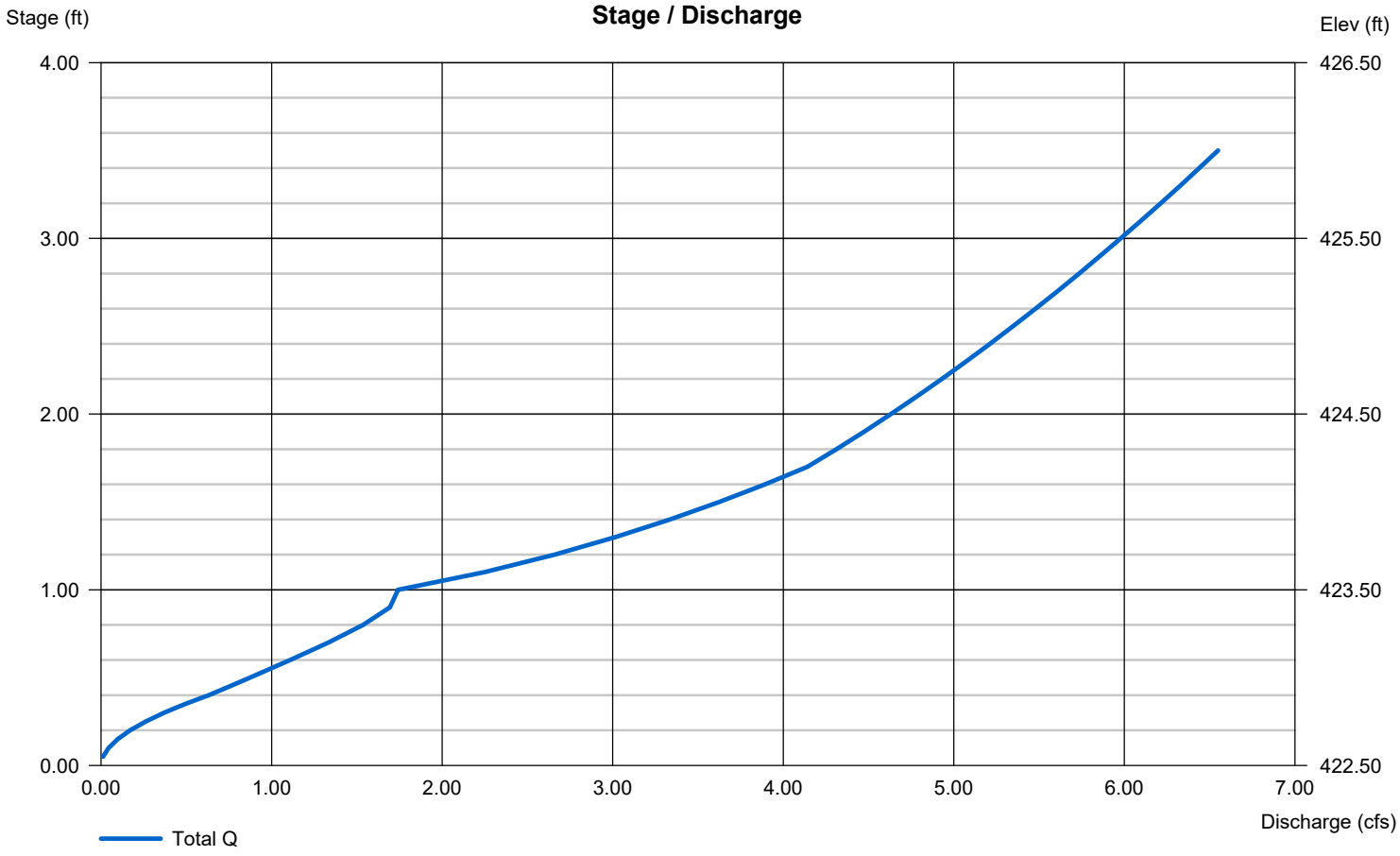
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 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 (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	7.804	1	5	2,341	------	------	------	Pre-Development
2	Rational	13.75	1	5	4,124	------	------	------	Post Dev DA 1
3	Rational	9.245	1	5	2,774	------	------	------	Post Dev. DA 2
4	Reservoir	0.863	1	10	2,769	3	426.32	2,456	Detention Pond
5	Combine	5.731	1	5	4,276	2, 4	------	------	Total Post Dev
6	Reservoir	2.640	1	8	4,275	5	423.70	942	Additional Pond

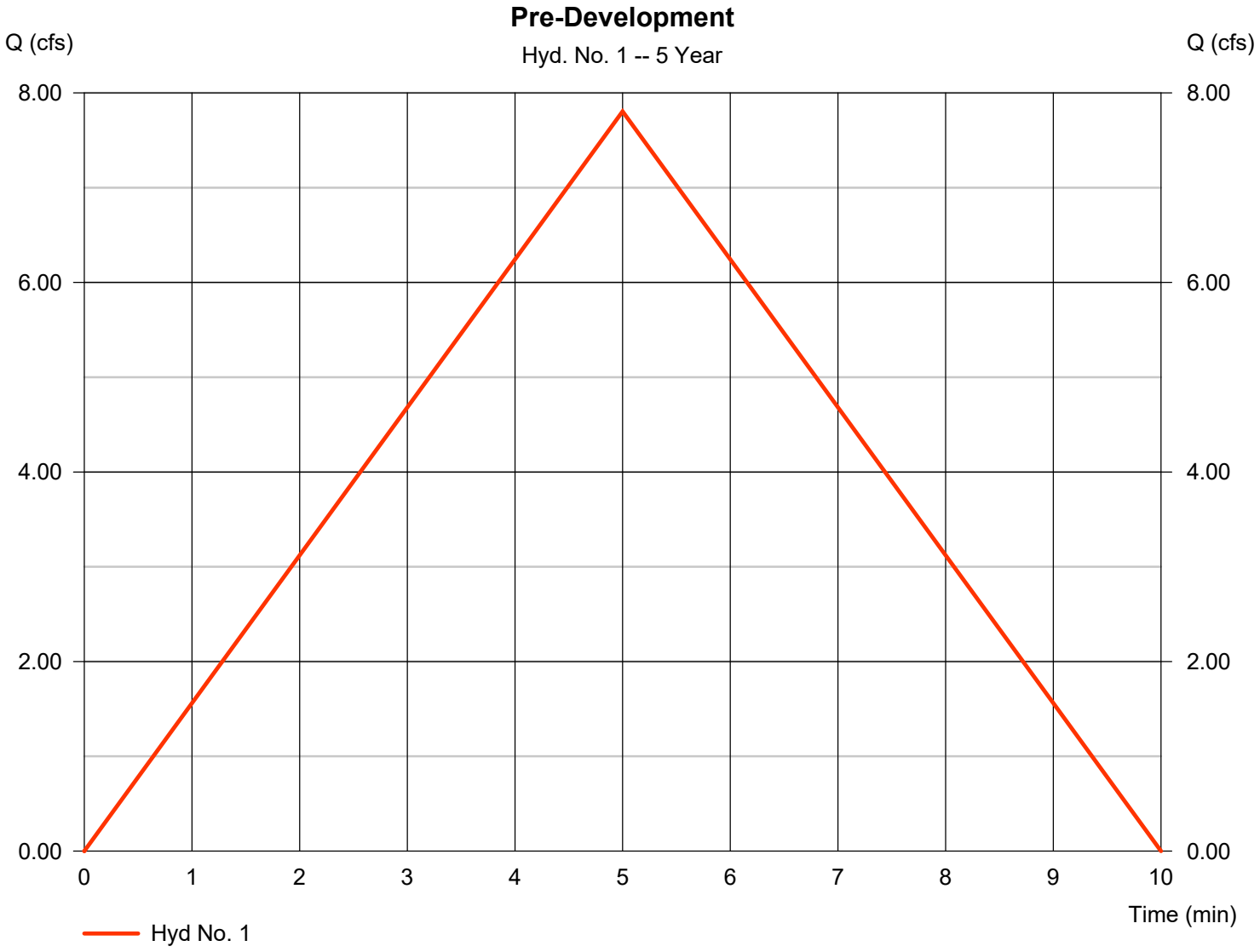
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	7.804 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,341 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



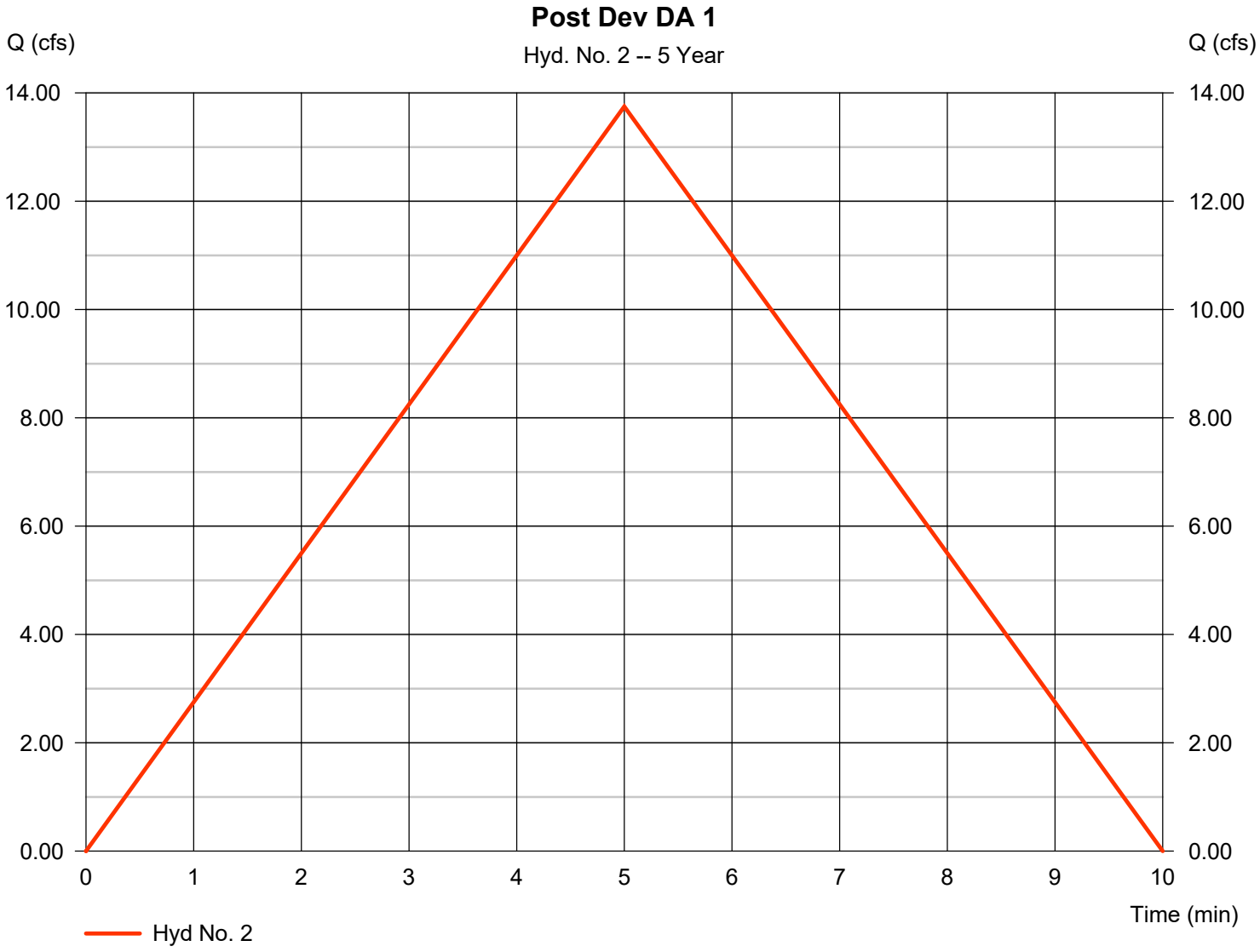
Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	13.75 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	4,124 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300



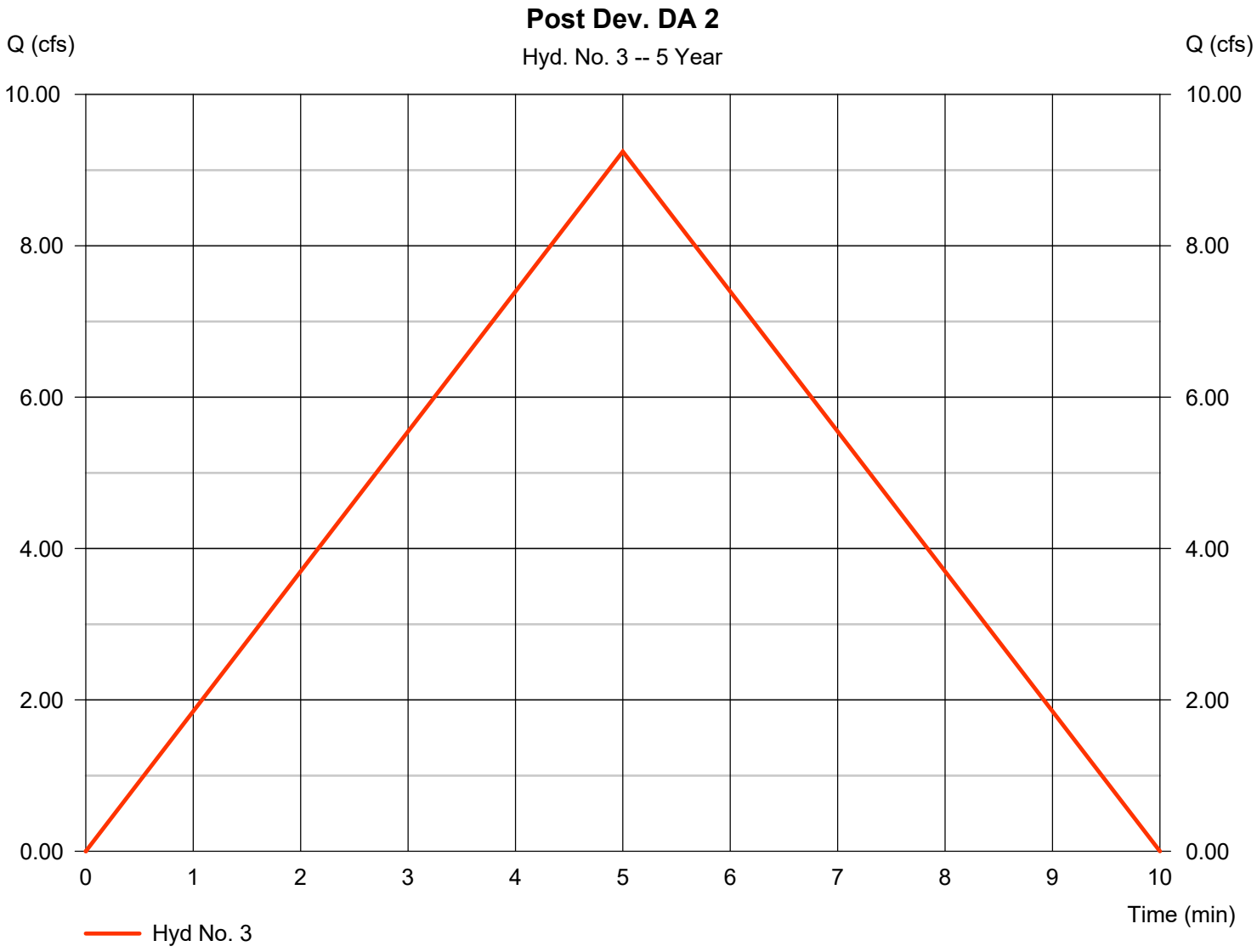
Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	9.245 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,774 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400



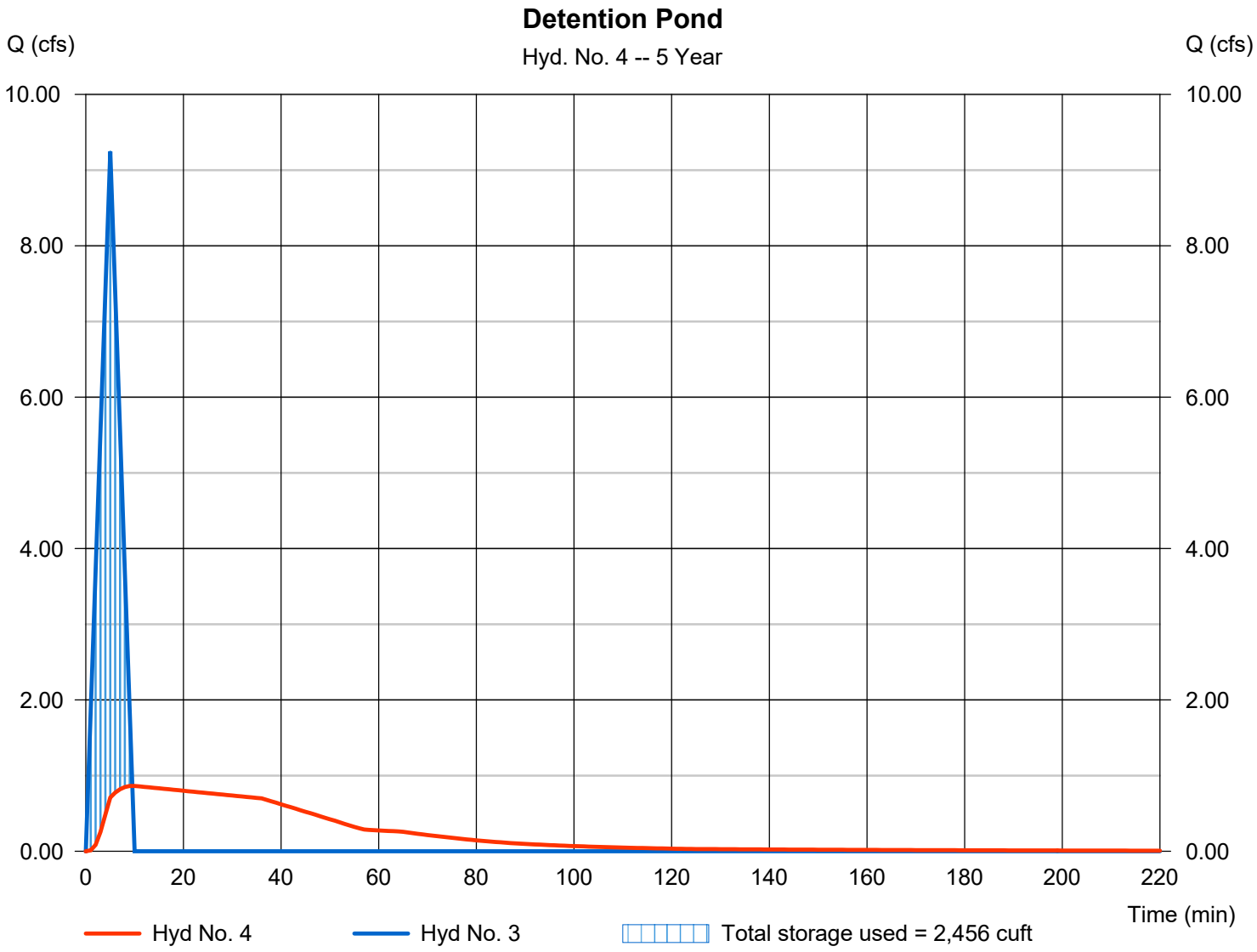
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.863 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,769 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.32 ft
Reservoir name	=	Det. Pond	Max. Storage	=	2,456 cuft

Storage Indication method used.

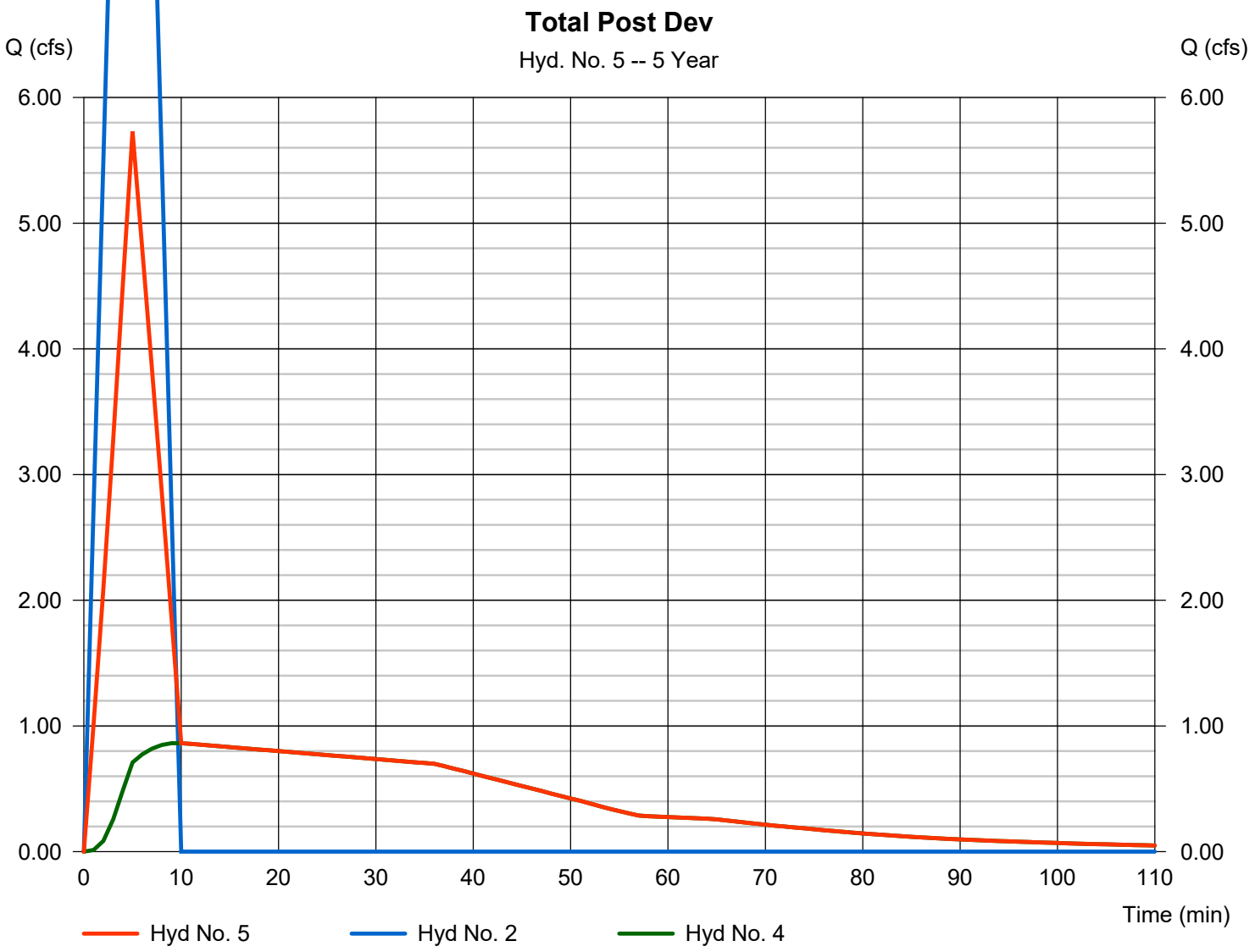


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 5.731 cfs
Storm frequency	= 5 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 4,276 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 2.300 ac



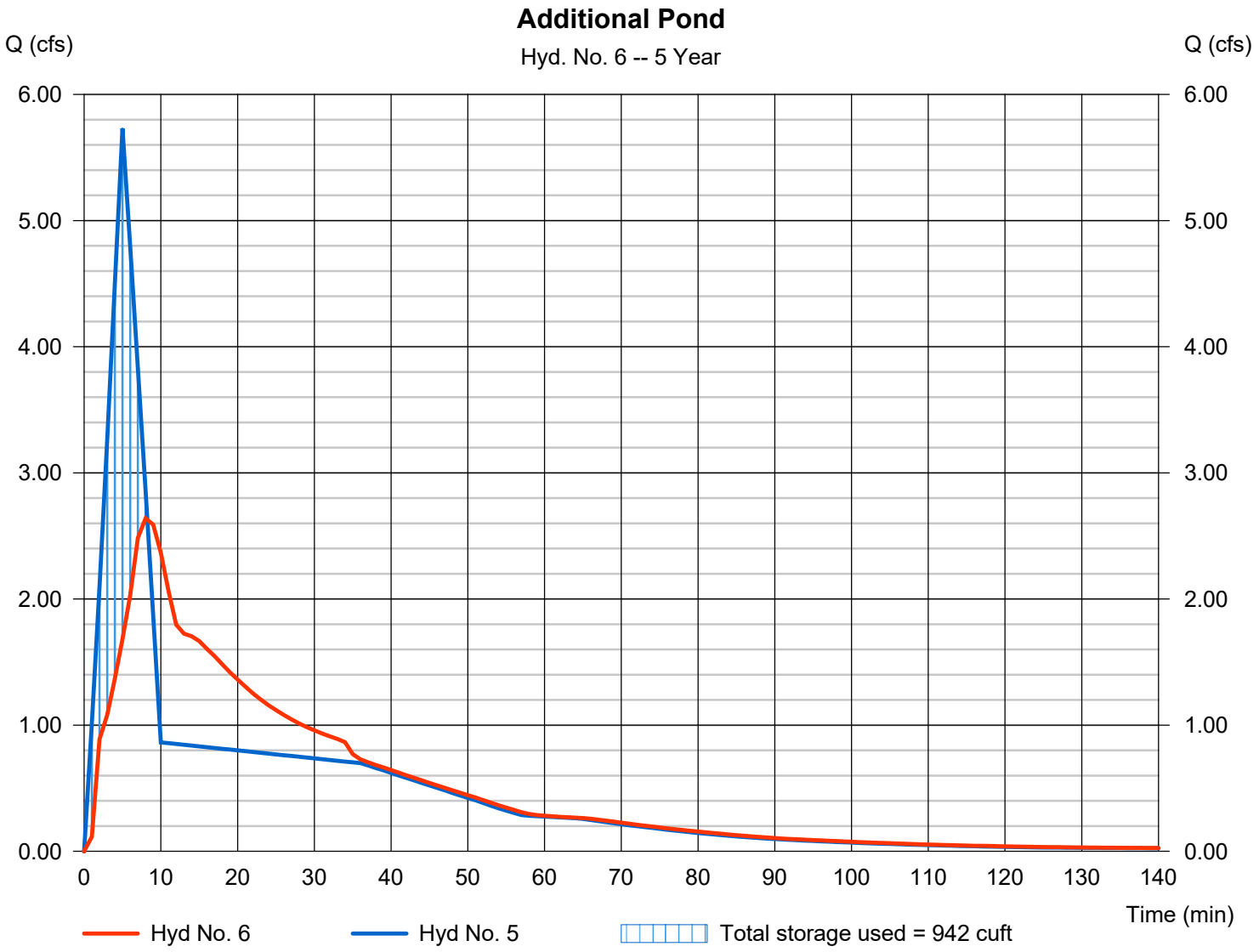
Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.640 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	4,275 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	423.70 ft
Reservoir name	=	Additional Pond	Max. Storage	=	942 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	8.638	1	5	2,591	------	------	------	Pre-Development
2	Rational	15.22	1	5	4,565	------	------	------	Post Dev DA 1
3	Rational	10.23	1	5	3,070	------	------	------	Post Dev. DA 2
4	Reservoir	0.897	1	10	3,066	3	426.39	2,738	Detention Pond
5	Combine	6.288	1	5	4,733	2, 4	------	------	Total Post Dev
6	Reservoir	2.926	1	8	4,732	5	423.77	1,040	Additional Pond

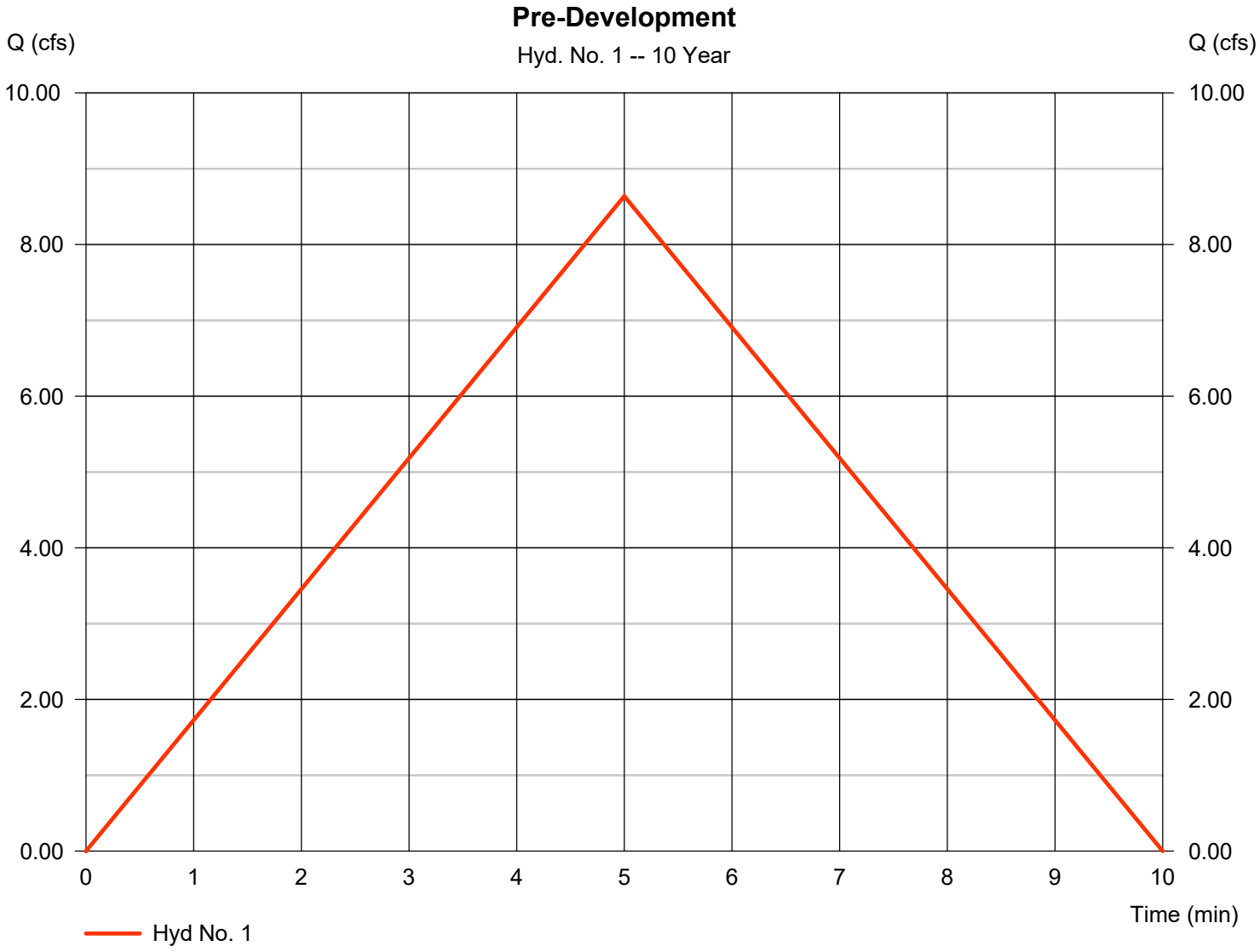
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	8.638 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,591 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	15.22 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	4,565 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300

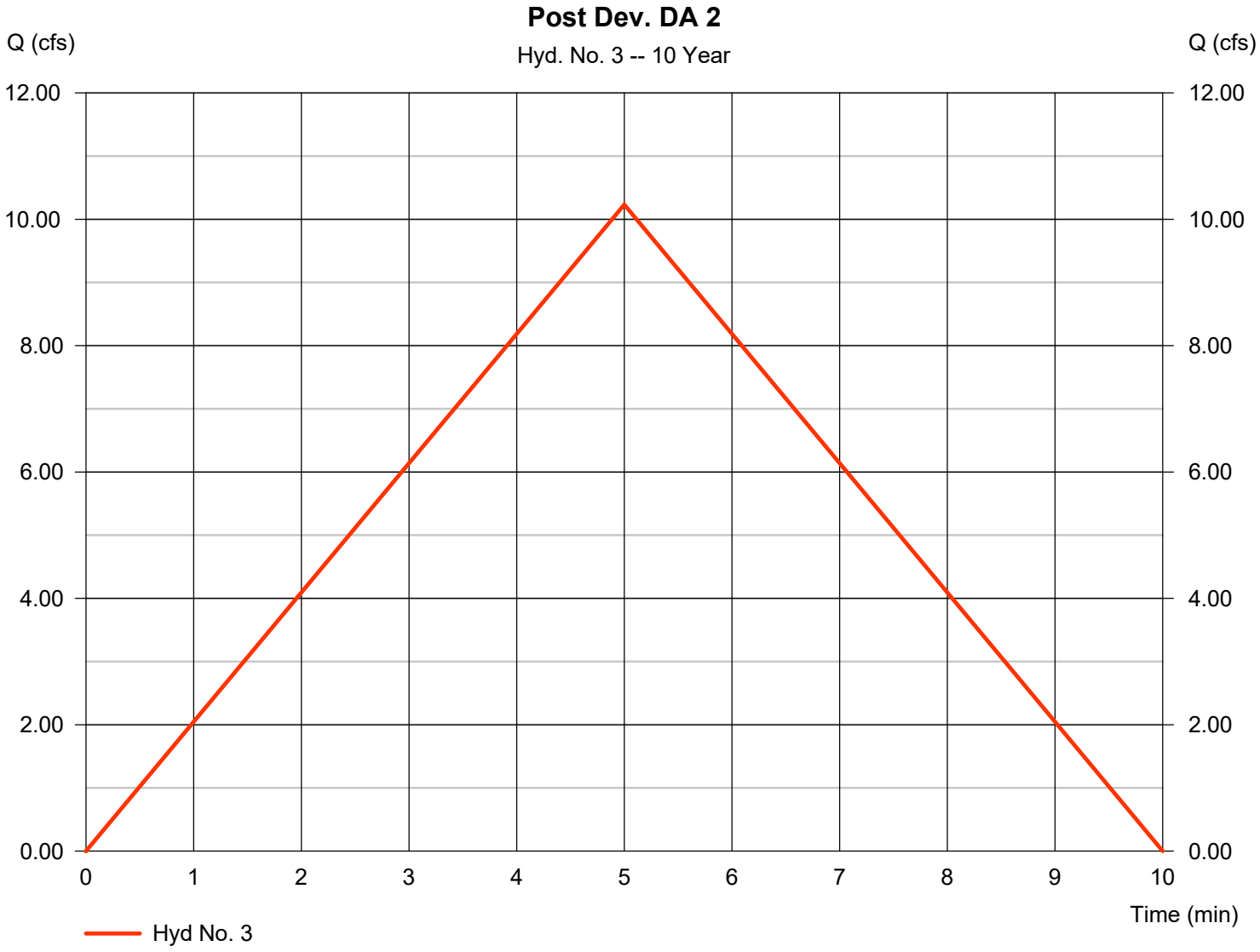
Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	10.23 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,070 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400



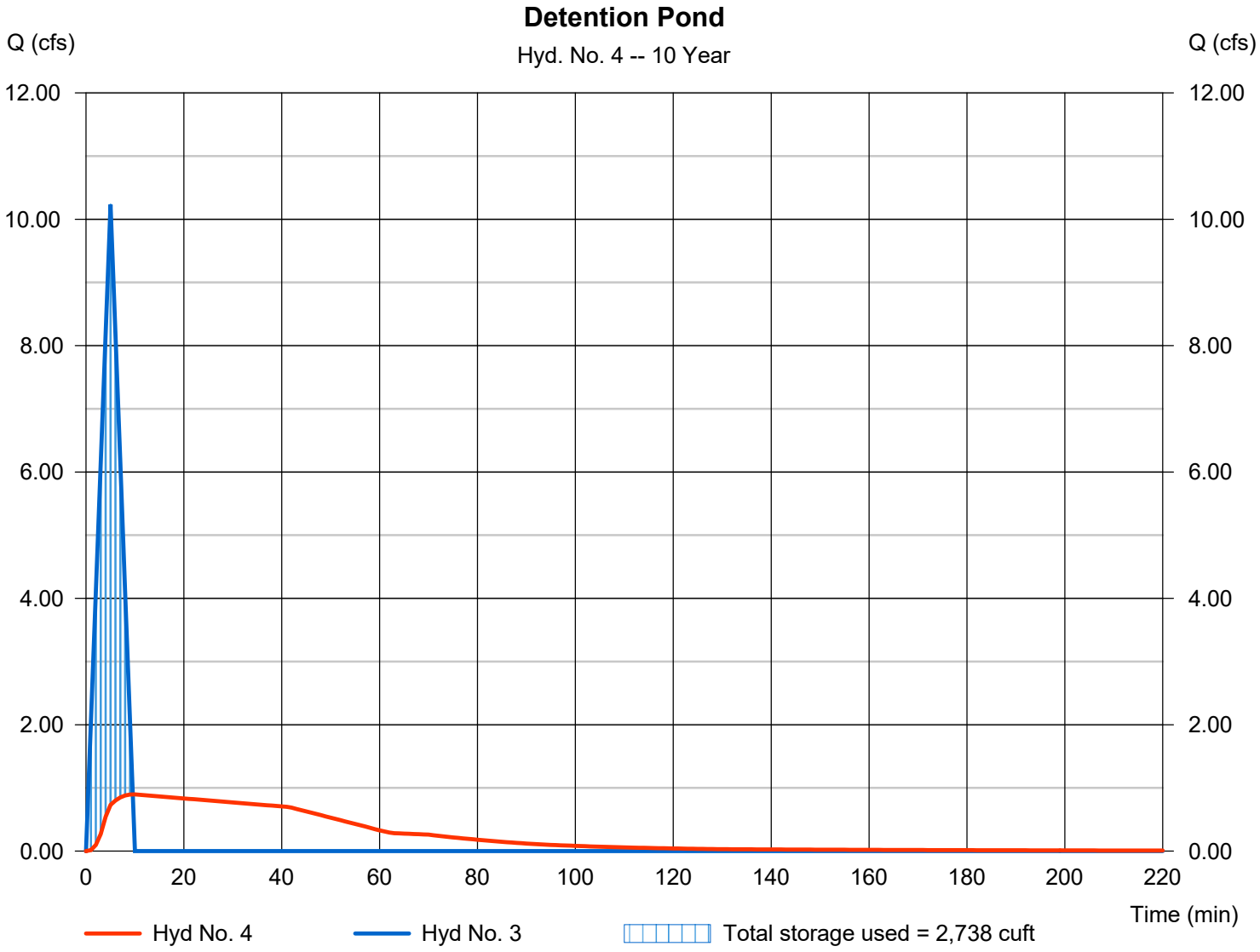
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.897 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	3,066 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.39 ft
Reservoir name	=	Det. Pond	Max. Storage	=	2,738 cuft

Storage Indication method used.

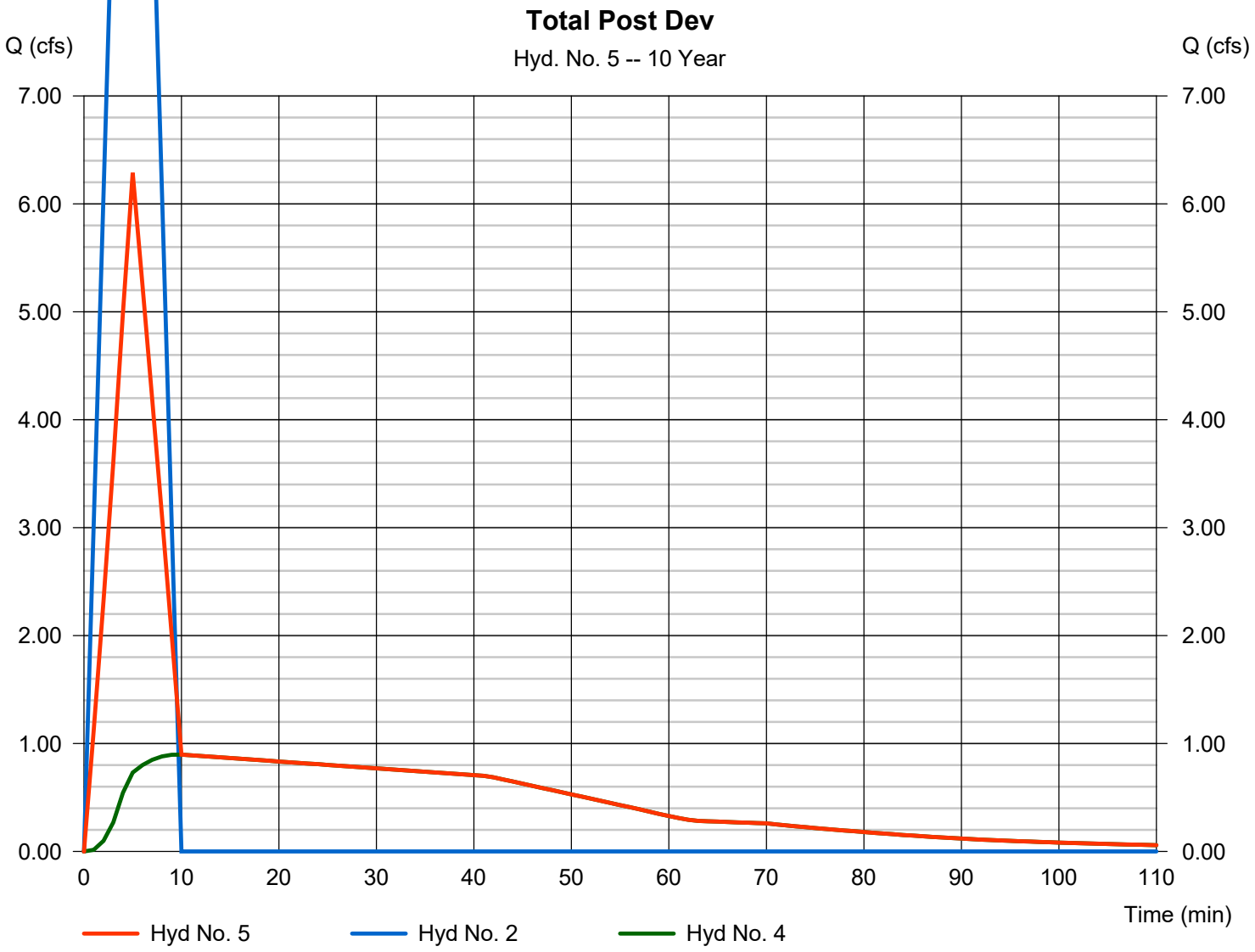


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 6.288 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 4,733 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 2.300 ac



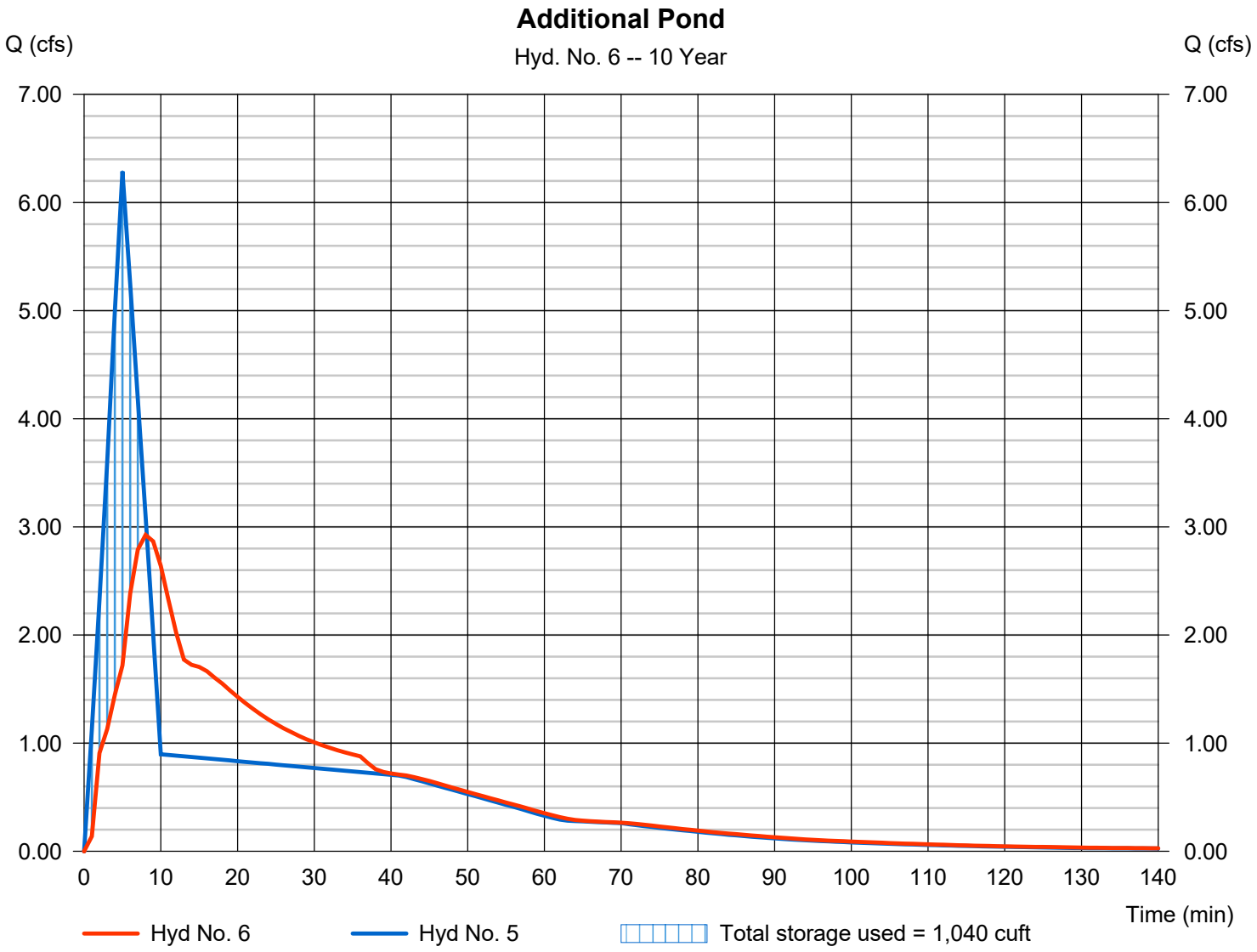
Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.926 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	4,732 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	423.77 ft
Reservoir name	=	Additional Pond	Max. Storage	=	1,040 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	9.878	1	5	2,963	------	------	------	Pre-Development
2	Rational	17.40	1	5	5,220	------	------	------	Post Dev DA 1
3	Rational	11.70	1	5	3,511	------	------	------	Post Dev. DA 2
4	Reservoir	0.945	1	10	3,506	3	426.50	3,158	Detention Pond
5	Combine	7.116	1	5	5,413	2, 4	------	------	Total Post Dev
6	Reservoir	3.314	1	8	5,412	5	423.89	1,187	Additional Pond

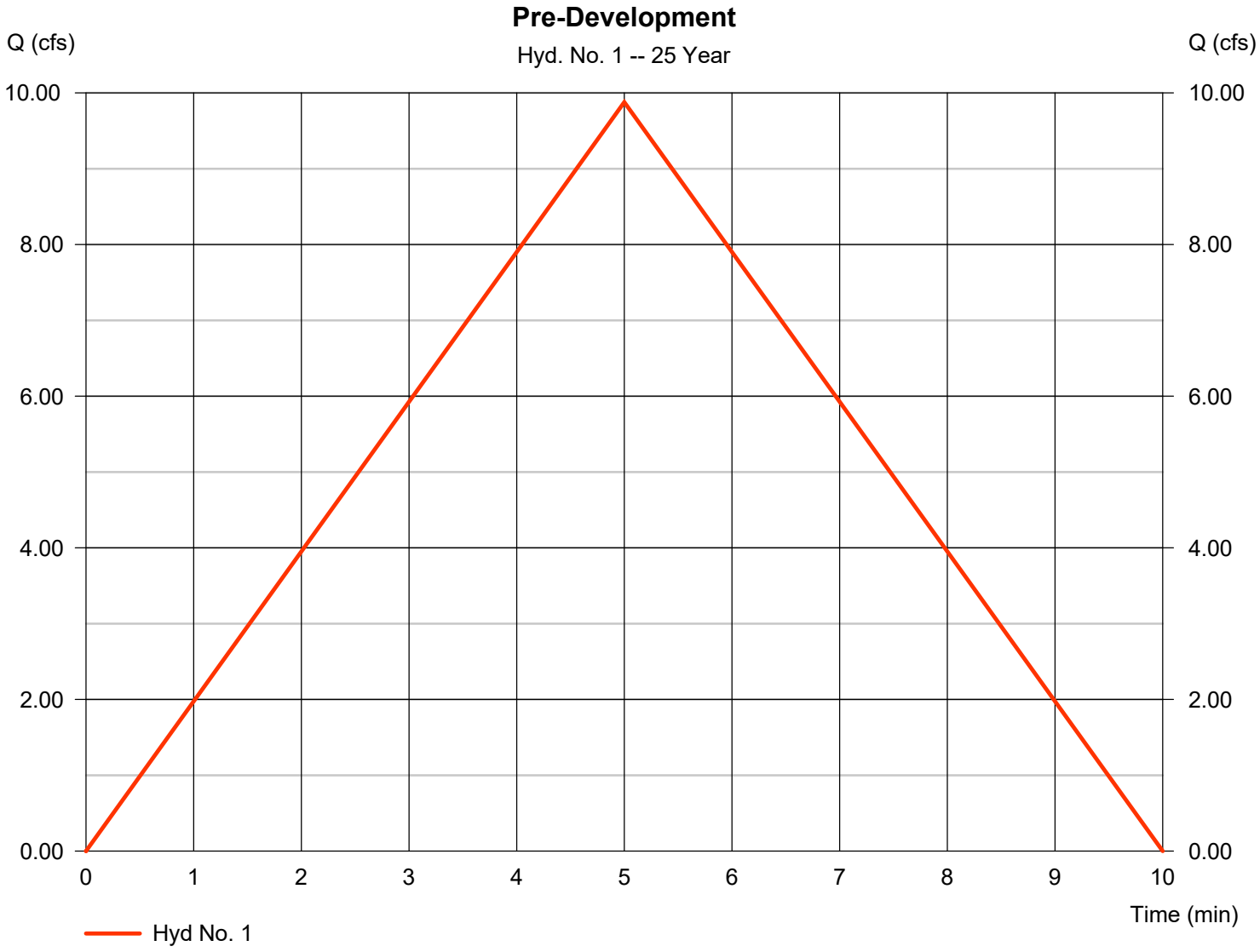
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	9.878 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,963 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	17.40 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	5,220 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300

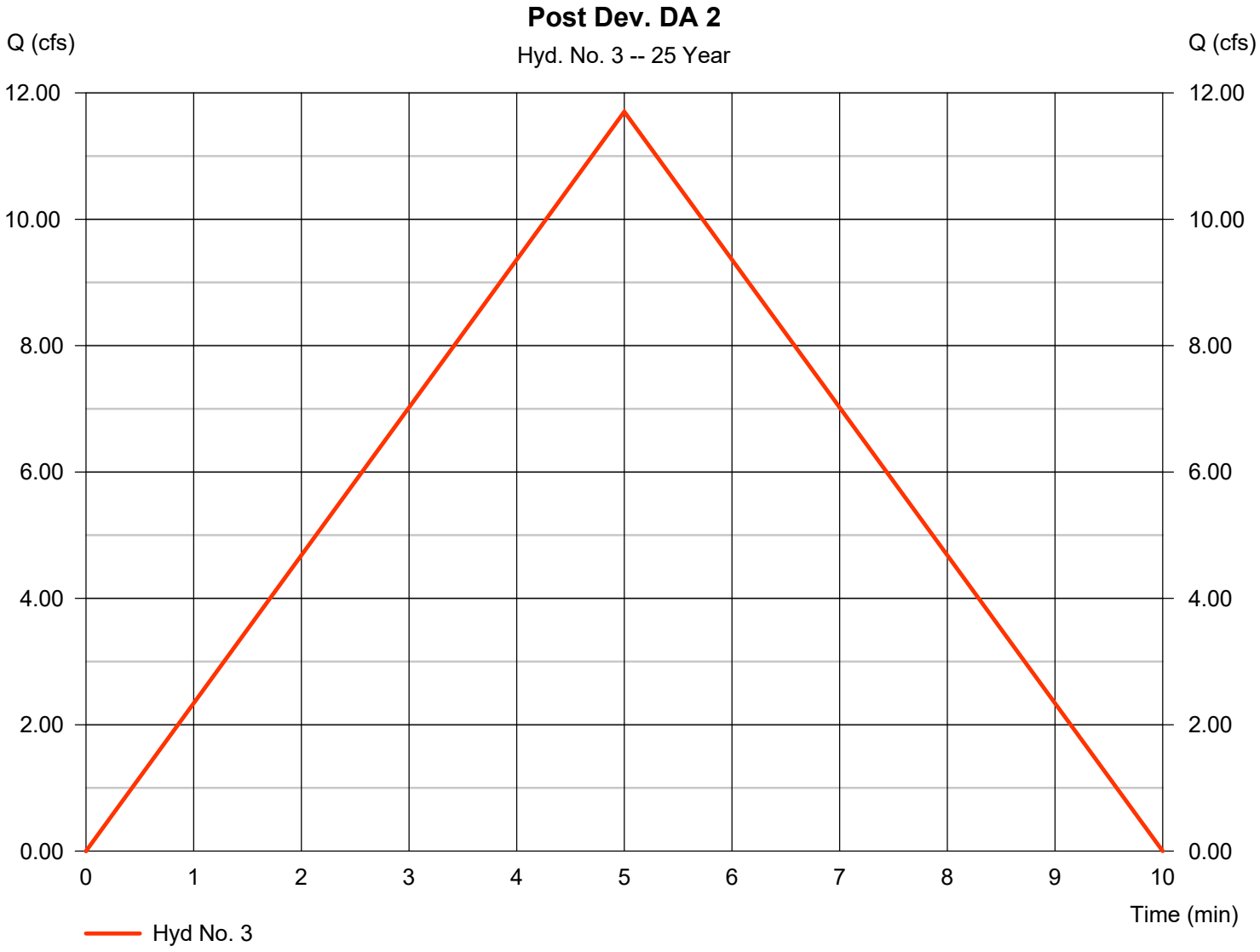
Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	11.70 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,511 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400



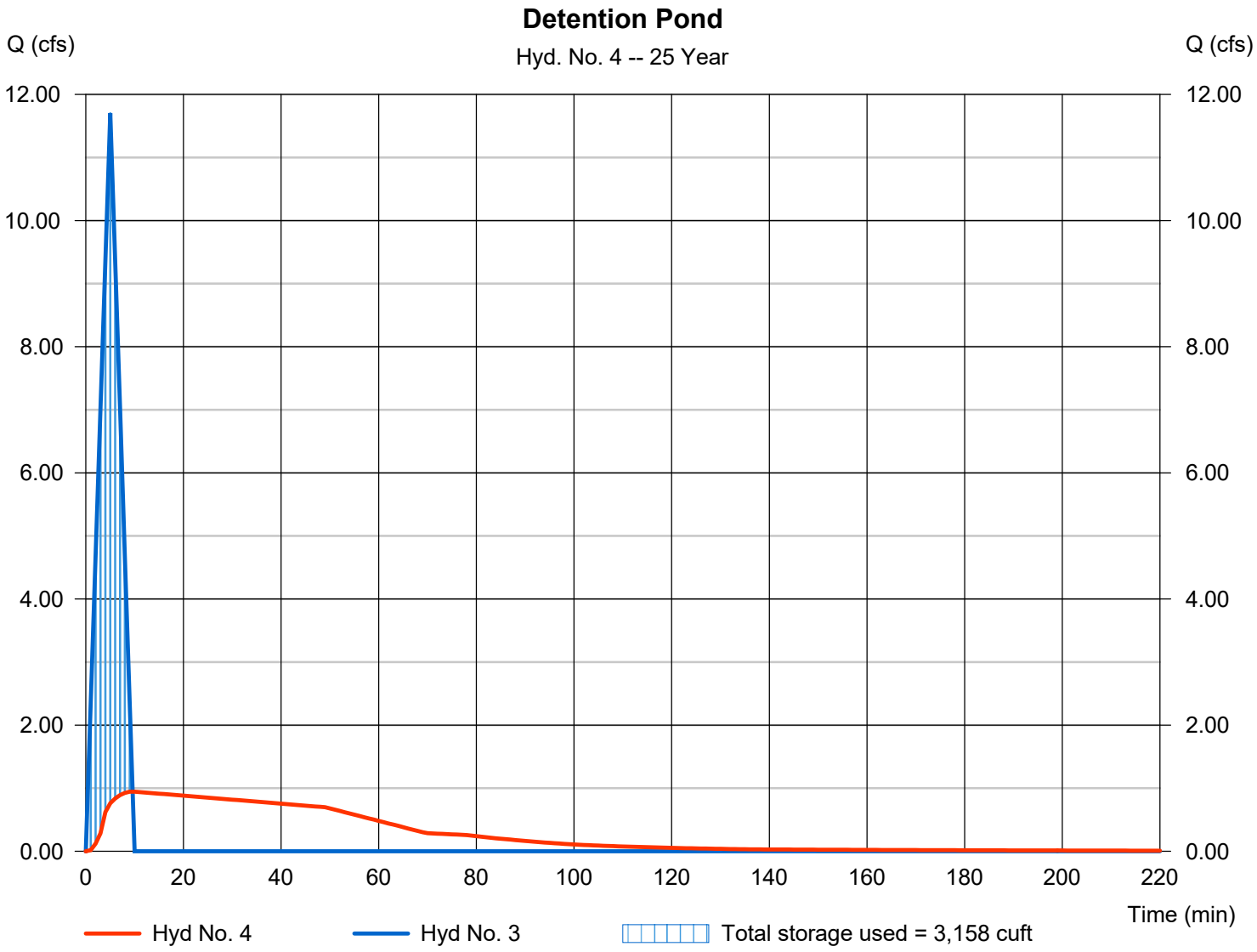
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.945 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	3,506 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.50 ft
Reservoir name	=	Det. Pond	Max. Storage	=	3,158 cuft

Storage Indication method used.

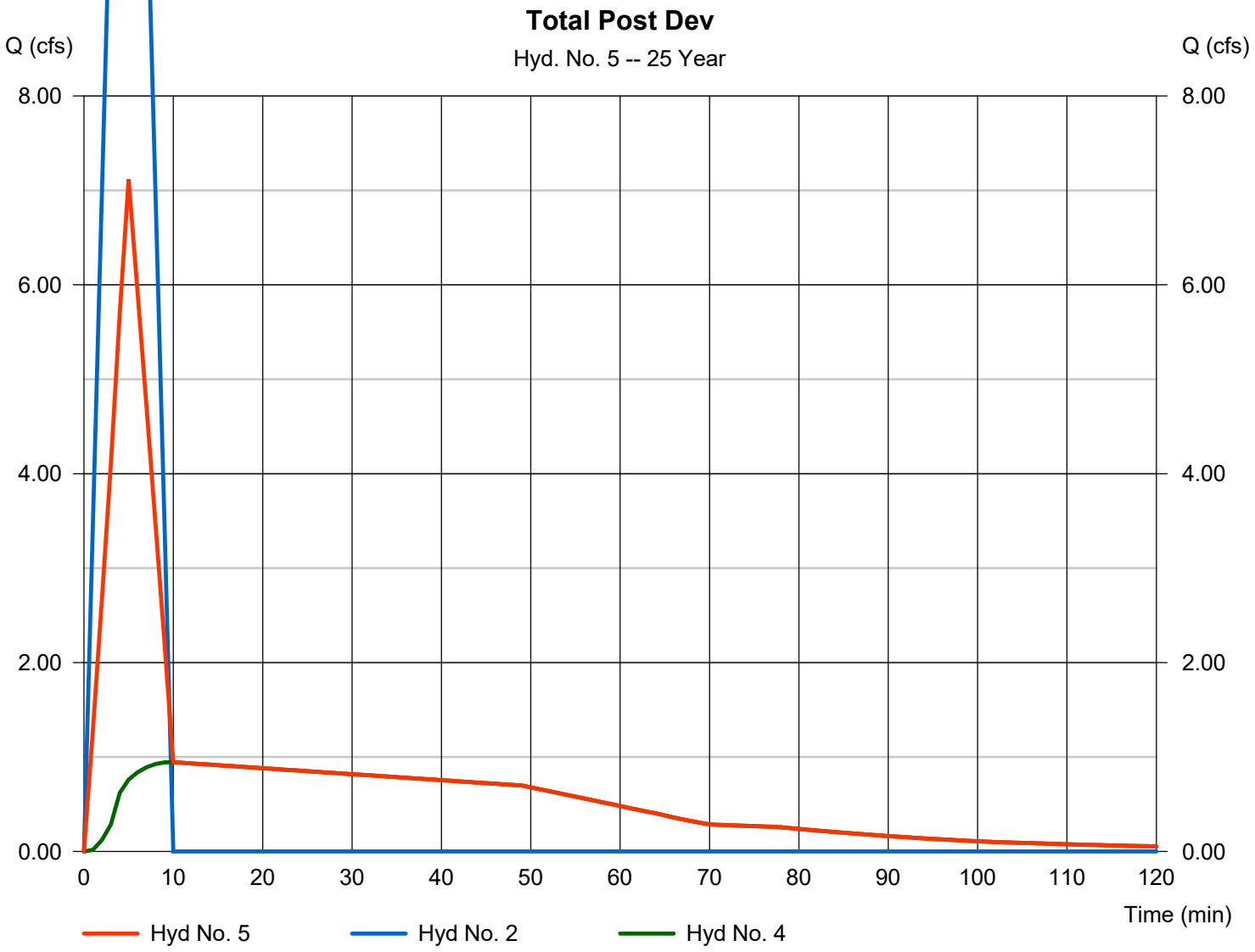


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 7.116 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 5,413 cuft
Inflow hyds	= 2, 4	Contrib. drain. area	= 2.300 ac



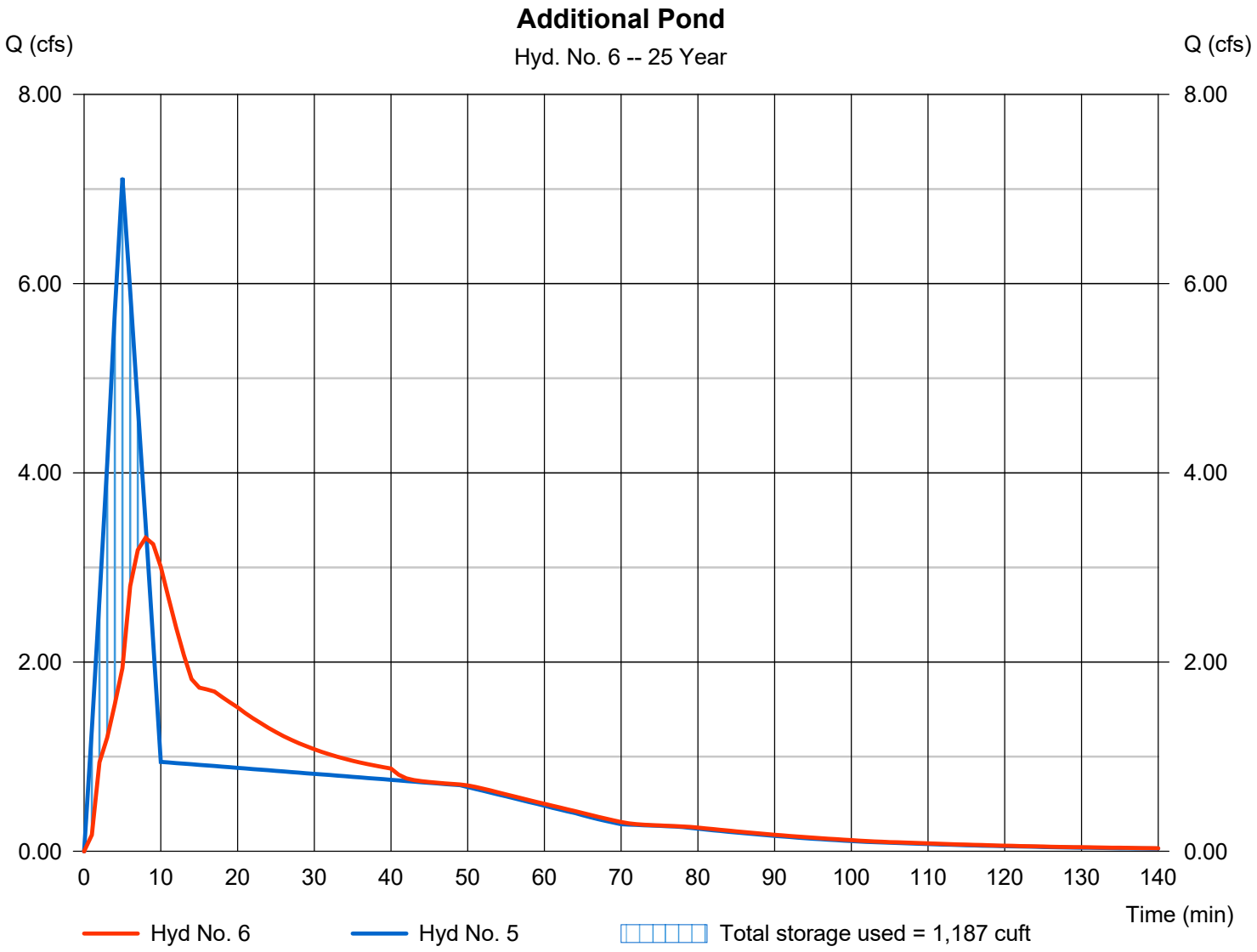
Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.314 cfs
Storm frequency	=	25 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	5,412 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	423.89 ft
Reservoir name	=	Additional Pond	Max. Storage	=	1,187 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	10.86	1	5	3,257	------	------	------	Pre-Development
2	Rational	19.13	1	5	5,738	------	------	------	Post Dev DA 1
3	Rational	12.86	1	5	3,859	------	------	------	Post Dev. DA 2
4	Reservoir	0.981	1	10	3,854	3	426.59	3,488	Detention Pond
5	Combine	7.769	1	5	5,950	2, 4	------	------	Total Post Dev
6	Reservoir	3.587	1	8	5,949	5	423.99	1,302	Additional Pond

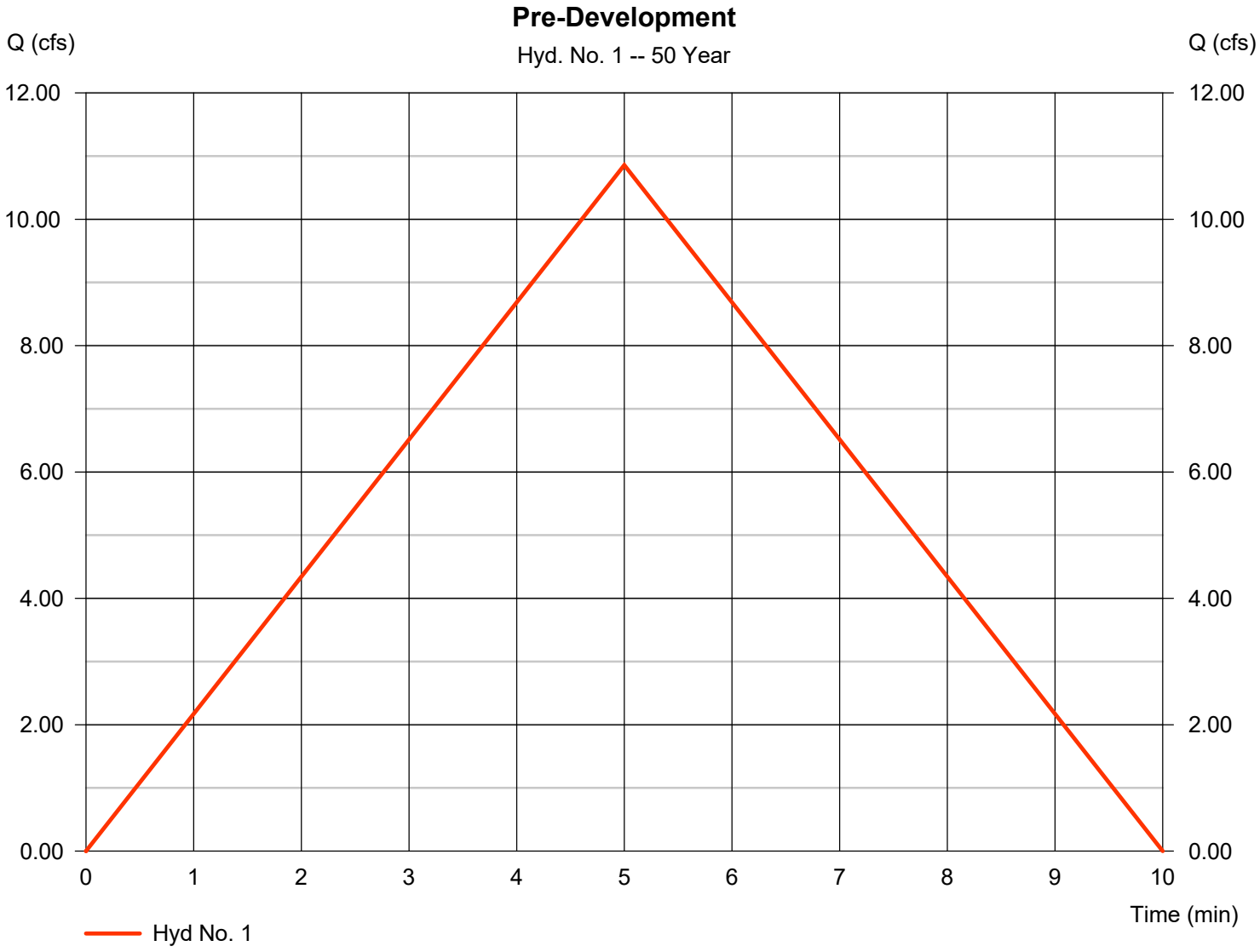
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	10.86 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,257 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



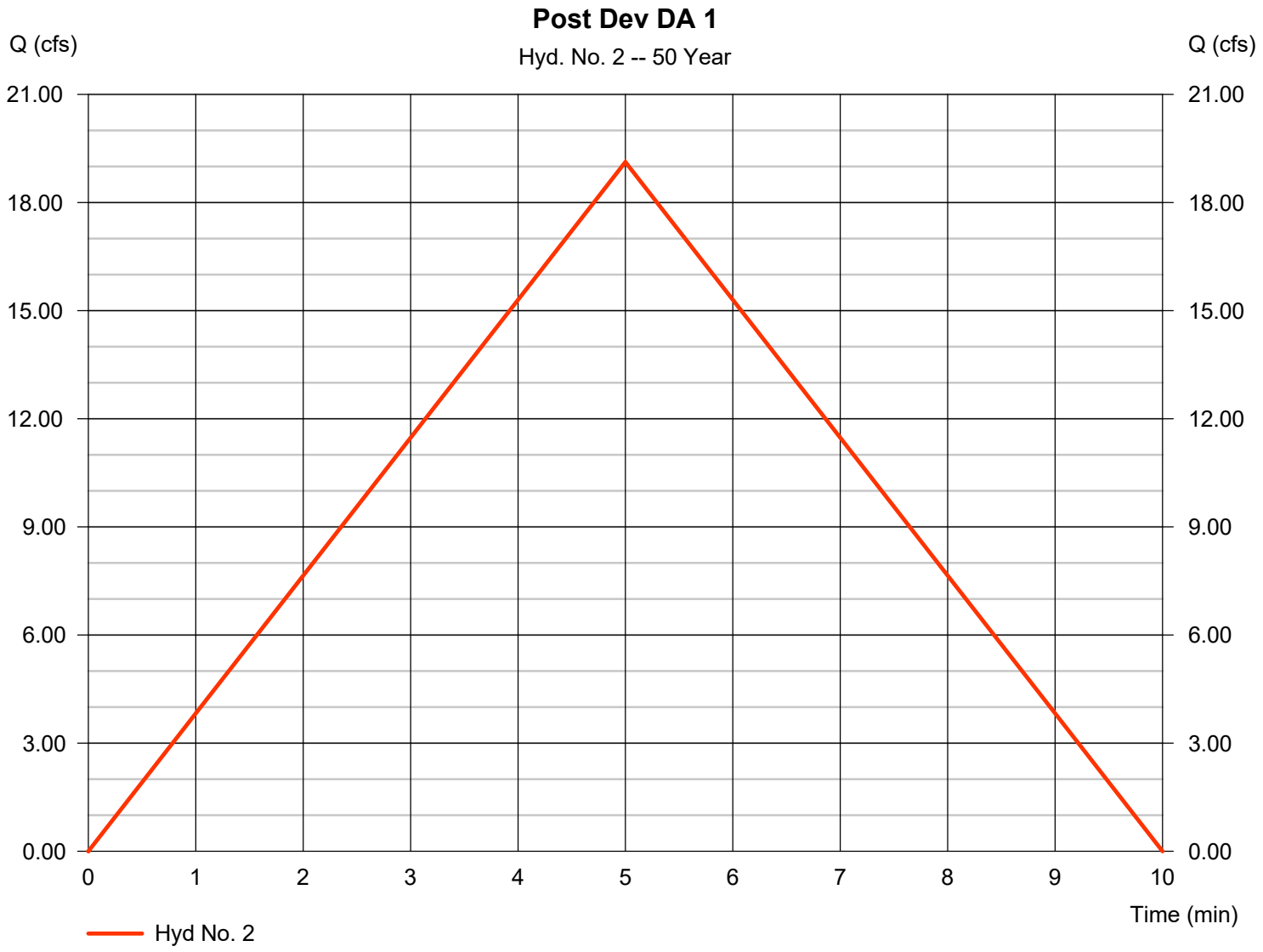
Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	19.13 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	5,738 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300



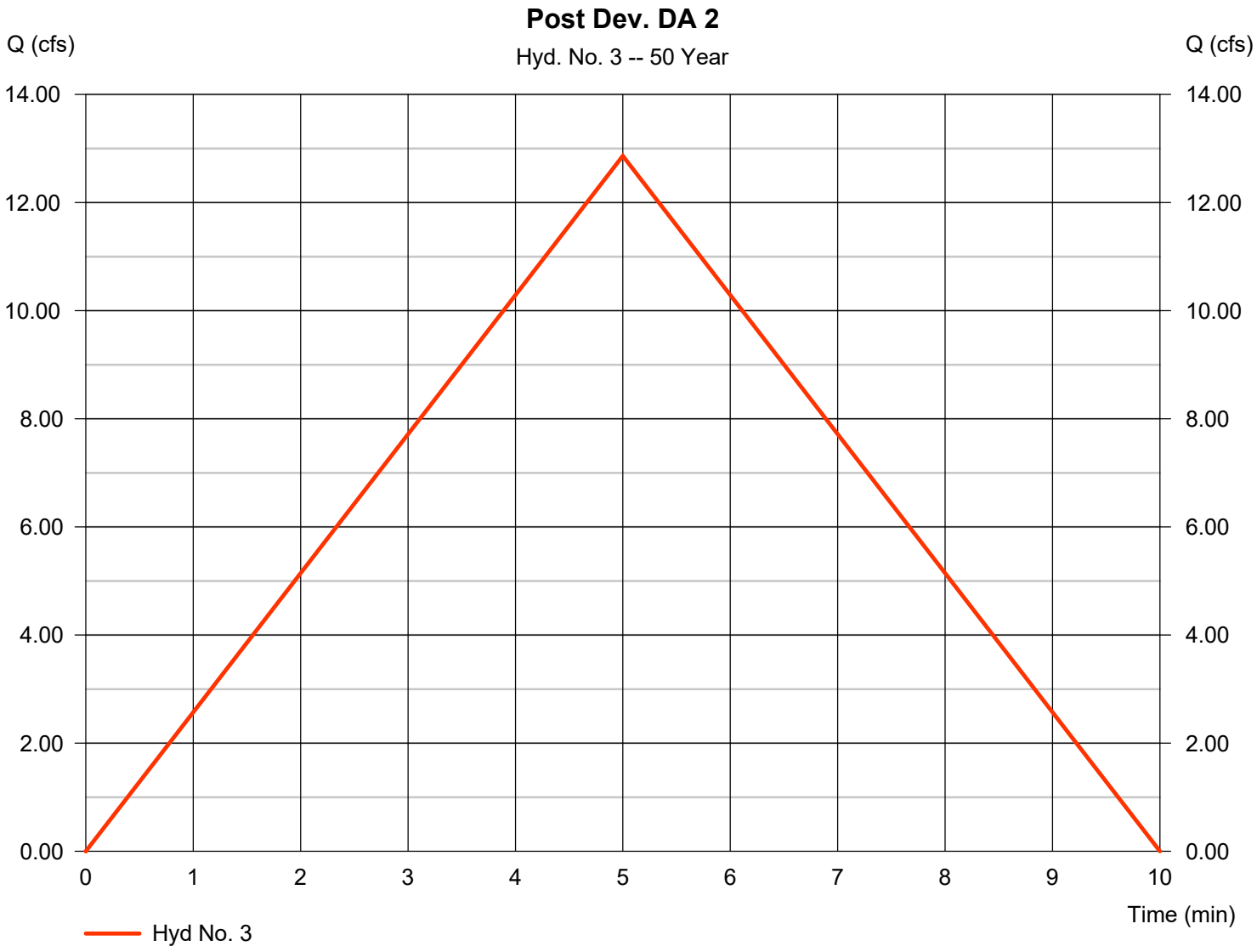
Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	12.86 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,859 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400



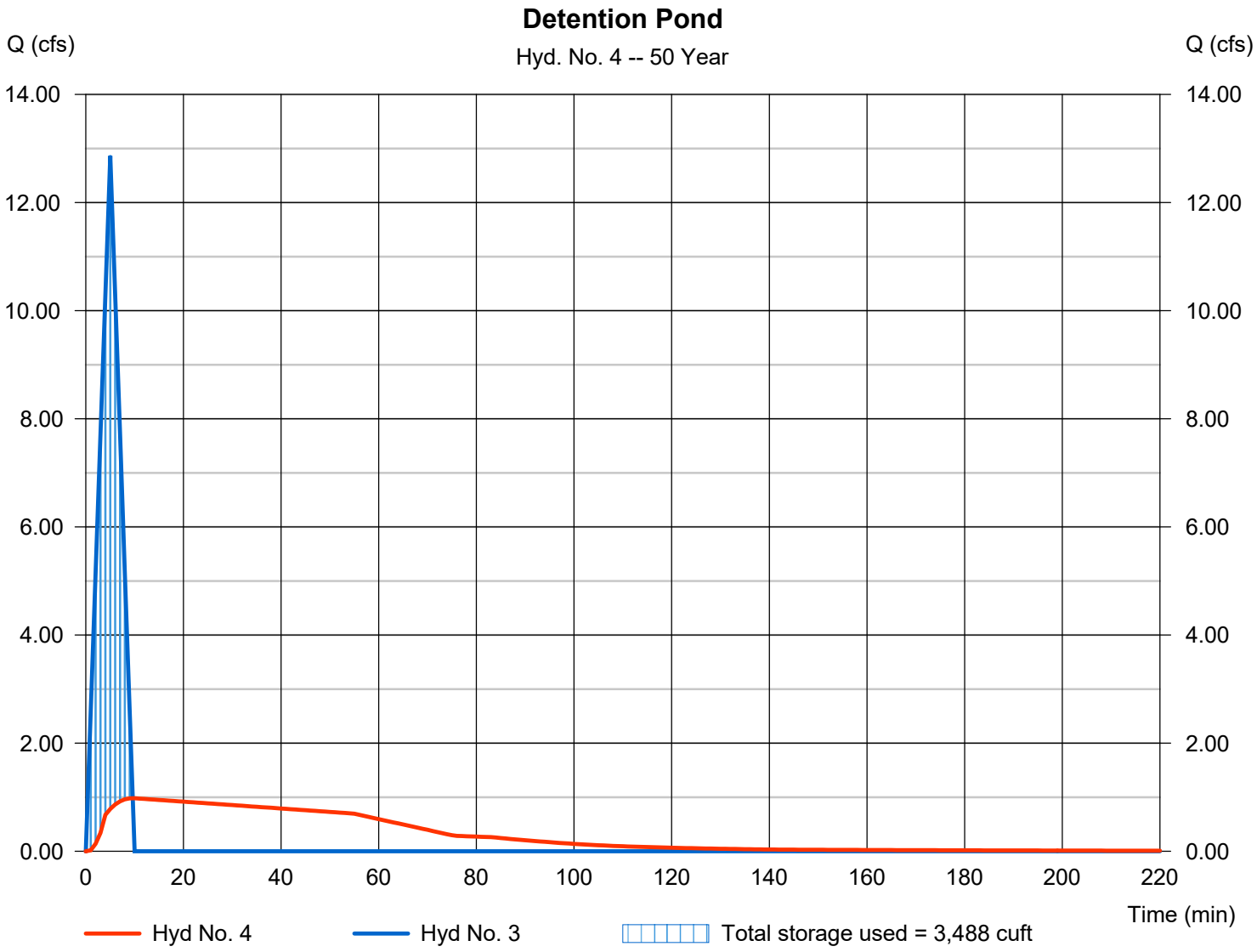
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.981 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	3,854 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.59 ft
Reservoir name	=	Det. Pond	Max. Storage	=	3,488 cuft

Storage Indication method used.

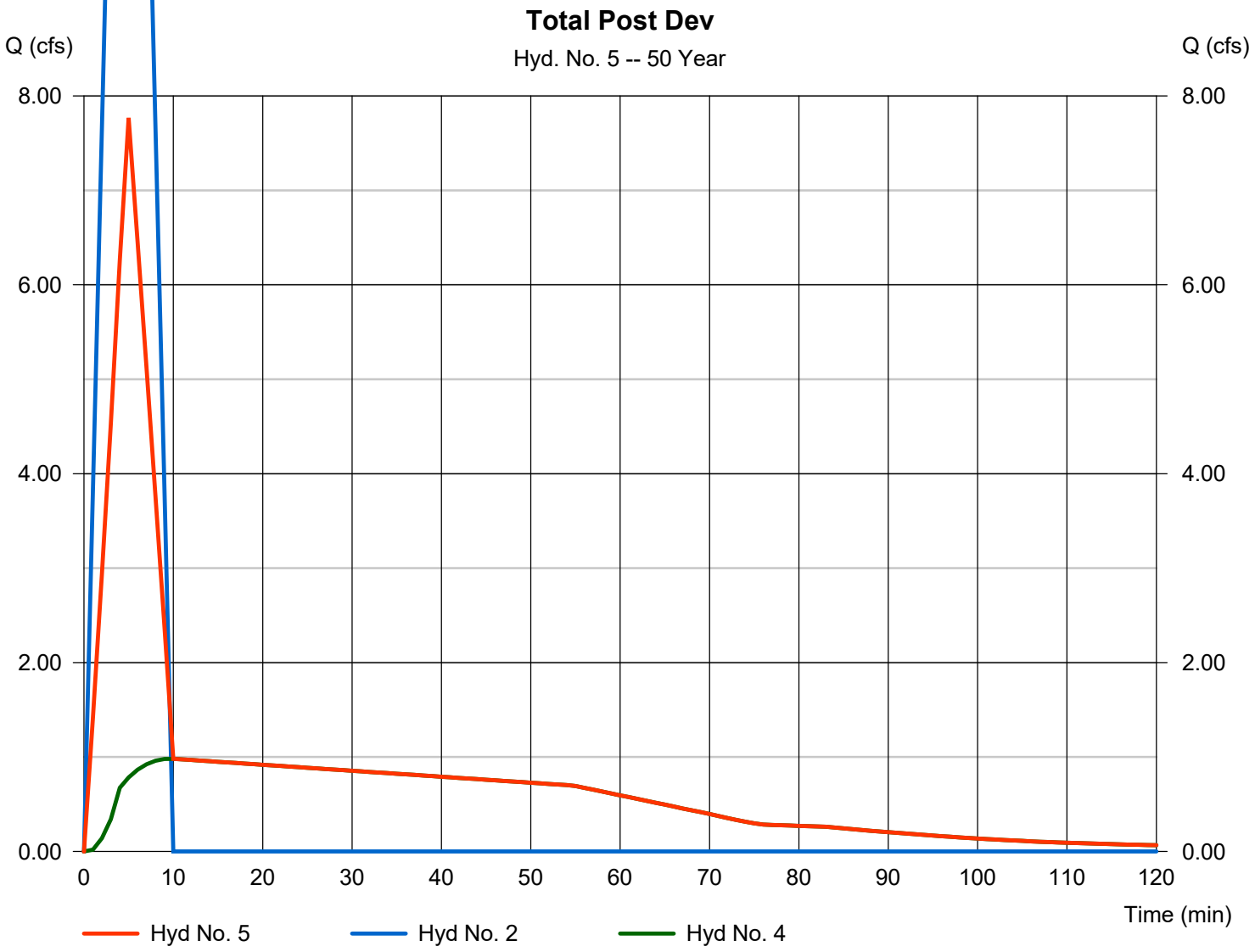


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 7.769 cfs
Storm frequency	= 50 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 5,950 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 2.300 ac



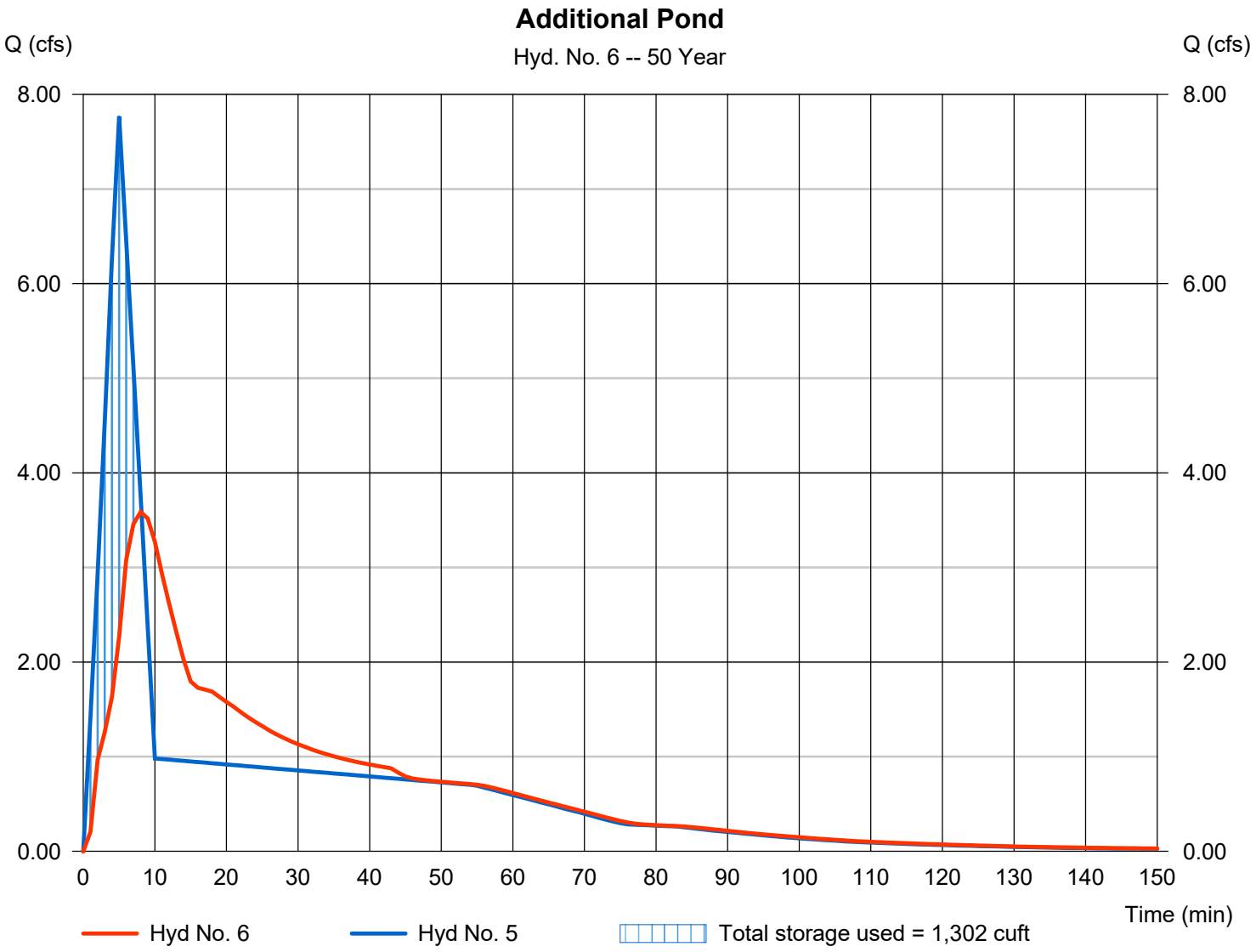
Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.587 cfs
Storm frequency	=	50 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	5,949 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	423.99 ft
Reservoir name	=	Additional Pond	Max. Storage	=	1,302 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	11.84	1	5	3,552	------	------	------	Pre-Development
2	Rational	20.86	1	5	6,257	------	------	------	Post Dev DA 1
3	Rational	14.02	1	5	4,207	------	------	------	Post Dev. DA 2
4	Reservoir	1.016	1	10	4,203	3	426.67	3,820	Detention Pond
5	Combine	8.423	1	5	6,488	2, 4	------	------	Total Post Dev
6	Reservoir	3.720	1	8	6,488	5	424.04	1,429	Additional Pond

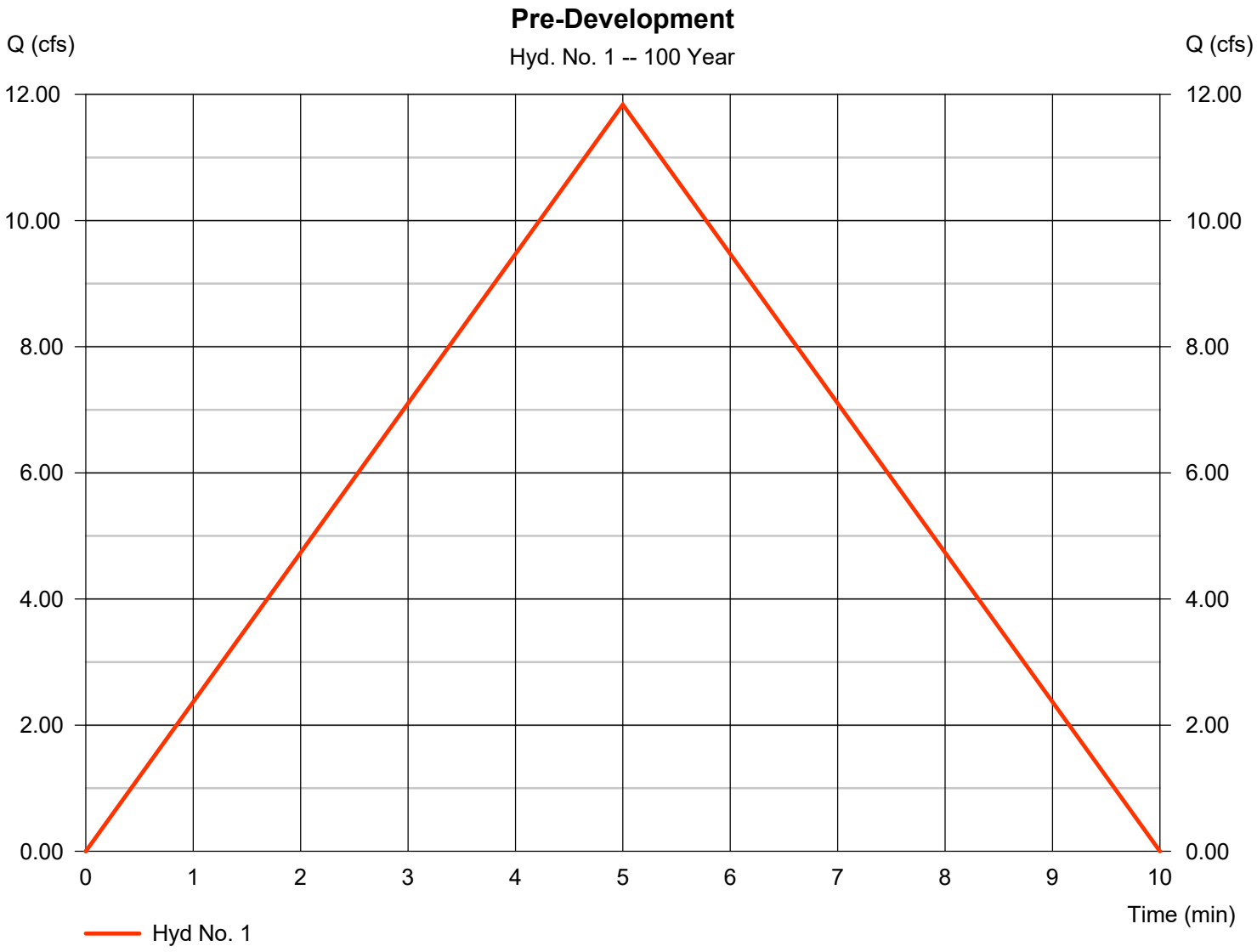
Hydrograph Report

Hyd. No. 1

Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	11.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,552 cuft
Drainage area	=	4.700 ac	Runoff coeff.	=	0.25*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(5.900 x 0.25) + (5.200 x 0.90)] / 4.700



Hydrograph Report

Hyd. No. 2

Post Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	20.86 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	6,257 cuft
Drainage area	=	2.300 ac	Runoff coeff.	=	0.9*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.700 x 0.90) + (0.500 x 0.25)] / 2.300

Hydrograph Report

Hyd. No. 3

Post Dev. DA 2

Hydrograph type	=	Rational	Peak discharge	=	14.02 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	4,207 cuft
Drainage area	=	2.400 ac	Runoff coeff.	=	0.58*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.200 x 0.90) + (1.200 x 0.25)] / 2.400

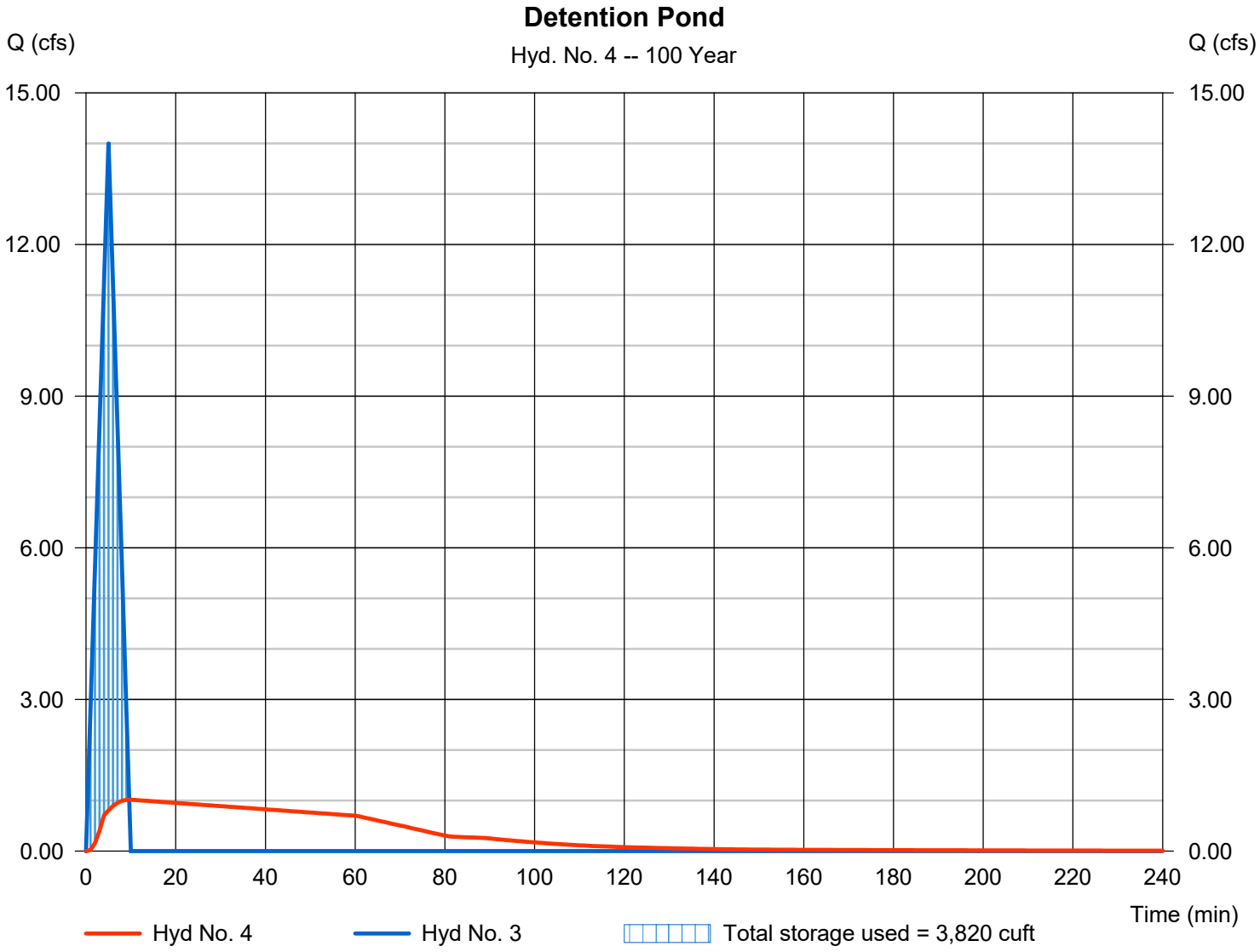
Hydrograph Report

Hyd. No. 4

Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	1.016 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	4,203 cuft
Inflow hyd. No.	=	3 - Post Dev. DA 2	Max. Elevation	=	426.67 ft
Reservoir name	=	Det. Pond	Max. Storage	=	3,820 cuft

Storage Indication method used.

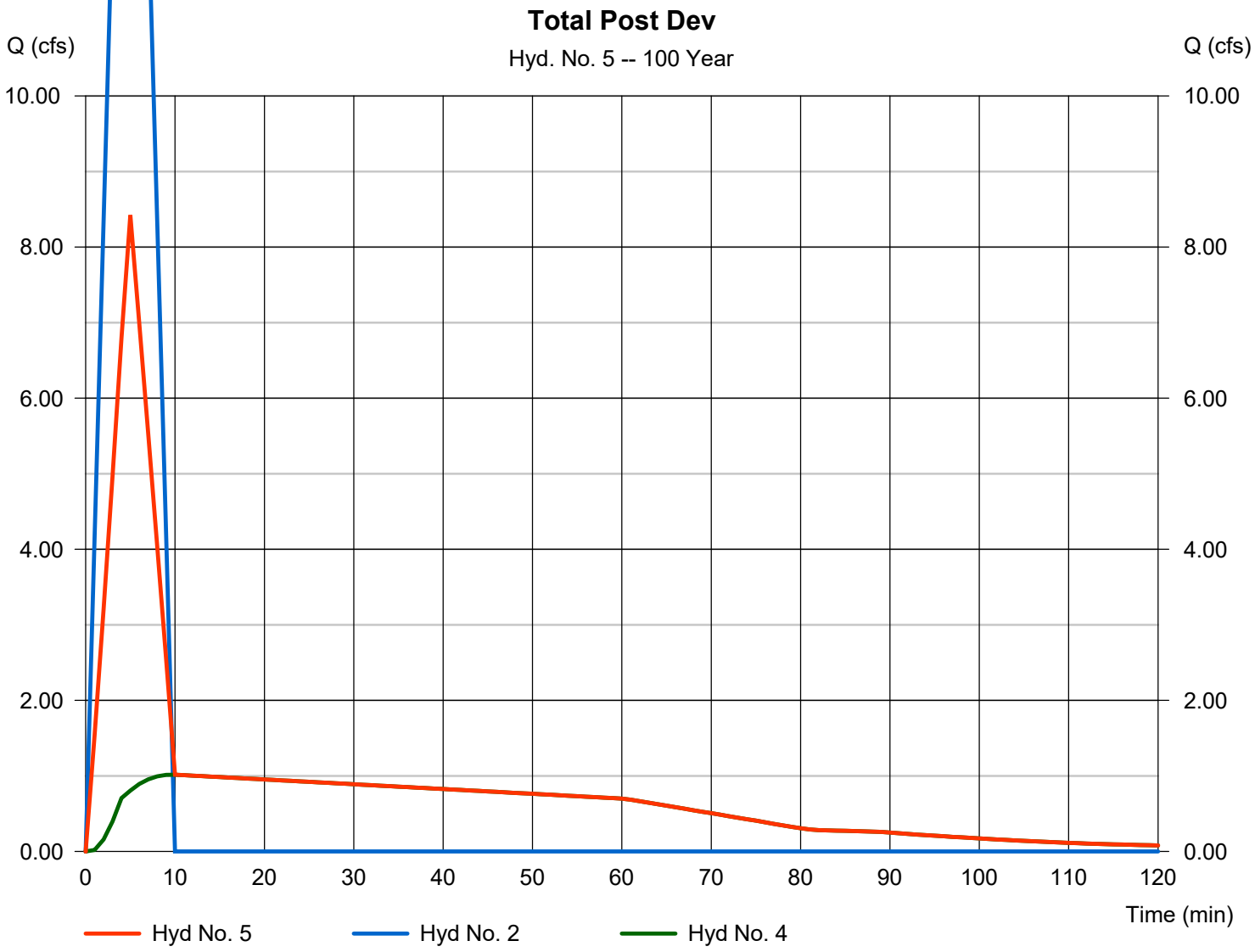


Hydrograph Report

Hyd. No. 5

Total Post Dev

Hydrograph type	= Combine	Peak discharge	= 8.423 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,488 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 2.300 ac



Hydrograph Report

Hyd. No. 6

Additional Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.720 cfs
Storm frequency	=	100 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	6,488 cuft
Inflow hyd. No.	=	5 - Total Post Dev	Max. Elevation	=	424.04 ft
Reservoir name	=	Additional Pond	Max. Storage	=	1,429 cuft

Storage Indication method used.