Drainage Report

For

Bryant Pharmacy

Bryant, Saline County, Arkansas



November 7, 2025

Prepared by:

RICHARDSON ENGINEERING, PLLC

325 W. South St.
Benton, AR 72015
501-315-7225

TABLE OF CONTENTS

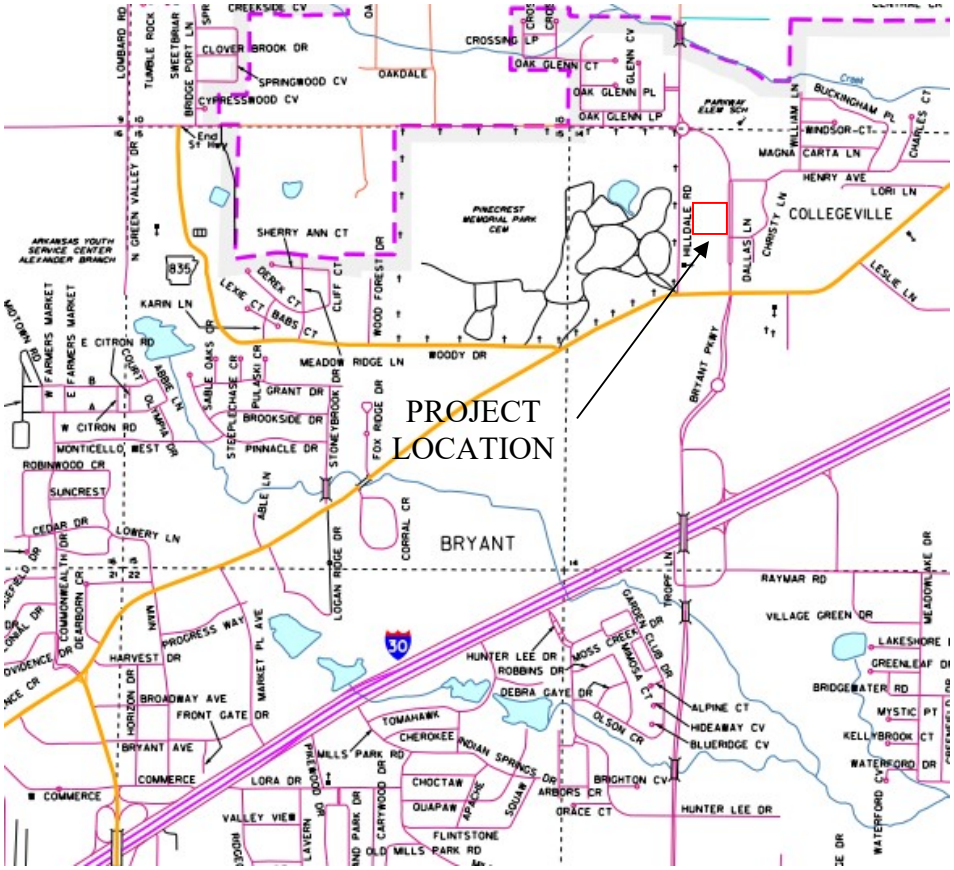
Title	Page Number
Project Owner Information	3
Project Location and Description	3
Site Drainage	4
Runoff Summary's	5
Pre- Development Drainage Basin Information	5
Overall Site Post- Development Drainage Basin Information	6
On-Site Drainage Inlet Basin Information	6
Site Discharge to the West	7
Site Discharge to the East	7
Site Discharge to the South	8
Recommendations/Summary	8
Appendices:	9
Runoff Coefficient Calculation	10
NRCS Soil Report	11
Site Drainage Basin Maps	12
Trickle Channel Velocity Calculation	13
Overflow Wier Blockage Calculation	14
SSA Design Layout	15
Storm System Design (SSA)	16
2 Year Design Storm	17
10 Year Design Storm	18
25 Year Design Storm	19
50 Year Design Storm	20
100 Year Design Storm	21
Pre and Post Development Hydrographs (Hydrology Studio)	22

Project Owner Information

Jon Martin
5501 Lombard Road
Alexander, AR 72002

Project Location and Description

The project is located on West side of the Bryant Parkway, part of the Southeast Quater of the Northwest Quarter, Section 14, Township 1-S, Range 14-W, Saline County, Arkansas.



Vicinity Map – N.T.S

This project is a proposed Commercial Development, located in the City of Bryant, Saline County.

Site Drainage

Pre-Development

The pre-developed runoff for the site flows to the East, West, and South. The on-site drainage basins have been broken down into five separate basins that discharge water off-site. Drainage Basins A and B discharge water to the West, Basin C discharges water to the South, and Basins D and E discharge water to the East. The pre-development drainage basin delineation can be found in the appendix of this report.

The pre-development runoff condition is undeveloped/woods.

Post-Development

The site drainage starts on the South side of the project and flows to the North. The drainage is sheet flows across the proposed parking lot and intercepted by the proposed storm sewer system and is discharged into a proposed detention basin on the Northwest corner of the project. There are also some small areas that discharge to the East and South from the site.

The City of Bryant Drainage Manual utilized different C values for each storm event. The C value for the 100-year design storm was utilized for all storm events for the drainage analysis for this site.

The time of concentration values for the storm inlets on this site were manually inputted into the Storm and Sanitary Analysis program to be 5 minutes. The drainage basins for CB-1, CB-2, CB-3 and AD-4 primarily consist of impervious areas. Drainage basins in this case typically produce time of concentration values that are less than 5 minutes. Per the City of Bryant Drainage manual, the minimum time of concentration value is 5 minutes; therefore, a time of concentration value of 5 minutes was utilized to analyze the on-site storm system.

The minimum required volume of the detention basin was found by comparing the pre-development rational method hydrograph for the area that the detention pond is being discharged, to the post-development modified rational method hydrograph for the area that the detention basin is receiving using the Hydrology Studio program. The minimum required volume was found to be 4,974 CF for the 100-year storm event. In order to meet the City of Bryants Stormwater Manual detention requirements, the detention pond has to be sized with at least a 25% factory of safety; therefore, the minimum size of the detention pond is 6,218 CF.

The proposed detention basin will utilize an orifice/riser/culvert discharge structure. Post-Development Basin “A” is the drainage basin that discharges water into the proposed detention basin. Post-development drainage basin “A” consists of all of the individual drainage basins for CB-1, CB-2, CB-3, AD-4, the proposed building areas for phase 2 (i.e. roof drains), and the detention pond area. Post-Development Basin B, C, and D

consist of the grass tie back slopes from the proposed pavement to existing grade and a small portion of the entrance drives that tie down to the existing grade on the Bryant Parkway. These areas are not routed through the detention basin, so they were calculated by themselves. The detention basin and post-development basin "B" will be discharged to the West, post-development basin "C" will be discharged to the East, and post-development basin "D" will be discharged to the South. A delineation for the drainage basins that were used in Hydrology Studio (for the overall site drainage basins), as well as a delineation of the basins that were used in Storm and Sanitary Analysis (on-site storm inlets) can be seen in the appendix of this report.

The post-development runoff conditions changed from undeveloped/woods to commercial development.

Runoff Summary's

Pre- Development Drainage Basin Information

Overall Site Area: 1.92 Acres

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
Basin A	0.86	0.56	9
Basin B	0.31	0.56	7
Basin C	0.20	0.56	16
Basin D	0.34	0.56	12
Basin E	0.21	0.56	10

Design Storm	Basin A (cfs)	Basin B (cfs)	Basin C (cfs)	Basin D (cfs)	Basin E (cfs)
2-yr	2.27	2.21	0.41	0.79	0.53
10-yr	3.04	2.96	0.55	1.06	0.71
25-yr	3.49	3.41	0.63	1.21	0.81
50-yr	3.81	3.72	0.69	1.33	0.89
100-yr	4.14	4.04	0.74	1.44	0.97

Overall Post-Development Drainage Study Area: 1.97 Acres

Overall Site Post- Development Drainage Basin Information

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
Basin A	1.50	0.95	5
Basin B	0.22	0.58	10
Basin C	0.237	0.68	5
Basin D	0.017	0.75	5

Design Storm	Basin A (cfs)	Basin B (cfs)	Basin C (cfs)	Basin D (cfs)
2-yr	8.75	0.57	0.99	0.08
10-yr	11.70	0.77	1.32	0.11
25-yr	13.44	0.88	1.52	0.12
50-yr	14.68	0.96	1.66	0.13
100-yr	15.96	1.05	1.81	0.14

On-Site Drainage Inlet Basin Information

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
CB-1	0.36	0.95	5
CB-2	0.16	0.95	5
CB-3	0.30	0.95	5
AD-4	0.35	0.95	5

Design Storm	CB-1 (cfs)	CB-2 (cfs)	CB-3 (cfs)	AD-4 (cfs)
2-yr	2.09	0.91	1.77	2.02
10-yr	2.80	1.22	2.37	2.70
25-yr	3.22	1.40	2.72	3.10
50-yr	3.51	1.53	2.98	3.83
100-yr	3.82	1.67	3.24	3.68

Site Discharge to the West to Include Detention Basin

Overall Development Area = 1.92 Ac
Pre-Development Drainage Study Area = 1.17
Post-Development Drainage Study Area = 1.72
Existing Condition runoff Coefficient: C = 0.56
Proposed runoff Coefficient: C = 0.95/0.58
Tc Undeveloped = 9/7 Minutes (TR55 Method)
Tc Developed = 5/10 Minutes (TR55 Method)
Detention Basin Required Volume: 6,218 CF
Detention Basin Volume: 9,802 CF
Maximum Storage: 3,842 CF
Discharge Structure: Orifice/Riser/Culvert

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)	Post-Development w/ Detention Flow Rate (cfs)	Maximum Water Elevation in Pond (ft)
2-yr	4.08	9.04	4.00	420.71
10-yr	5.46	12.08	5.03	421.46
25-yr	6.28	13.88	5.52	421.94
50-yr	6.86	15.16	5.87	422.24
100-yr	7.45	16.48	6.15	422.55

Site Discharge to the East

Pre-Development Drainage Study Area = 0.55
Post-Development Drainage Study Area = 0.237
Existing Condition runoff Coefficient: C = 0.56
Proposed runoff Coefficient: C = 0.68
Tc Undeveloped = 12/10 Minutes (TR55 Method)
Tc Developed = 5 Minutes (TR55 Method)

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	1.25	0.99
10-yr	1.67	1.32
25-yr	1.92	1.52
50-yr	2.10	1.66
100-yr	2.28	1.81

Site Discharge to the South

Pre-Development Drainage Study Area = 0.20
Post-Development Drainage Study Area = 0.017
Existing Condition runoff Coefficient: C = 0.56
Proposed runoff Coefficient: C = 0.75
Tc Undeveloped = 16 Minutes (TR55 Method)
Tc Developed = 5 Minutes (TR55 Method)

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	0.41	0.078
10-yr	0.55	0.11
25-yr	0.63	0.12
50-yr	0.69	0.13
100-yr	0.74	0.14

Recommendations/Summary

The proposed drainage improvements include a storm sewer system and a detention basin on the Northwest corner of the project. The proposed detention basin releases the post development runoff at a lower rate than the pre-development condition.

Appendices

Runoff Coefficient Calculations
NRCS Soil Report
Site Drainage Map
Trickle Channel Velocity Calculation
Overflow Wier Blockage Calculation
SSA Design Layout
Storm System Design
Pond and Post Development Hydrographs (Hydrology Studio)

Runoff Coefficient Calculations

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PROJECT 025-029 DRAINAGE ANALYSIS DATE 09/04/2025

PRE-DEVELOPMENT

DRAINAGE AREA : 1.92 AC

CLAY SOIL

50% - 2%-7% C = 0.50

50% - >7% C = 0.62

$$C = \frac{(0.960)(0.5) + (0.960)(0.62)}{1.92}$$

$$= 0.56$$

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PROJECT 025-029 DRAINAGE ANALYSIS DATE 11/05/2025

POST-DEVELOPMENT

BASIN "A"

AREA = 1.5 ACRE

C = 0.95 "

BASIN "B"

AREA = 0.22 ACRE (9661 SF)

PERVIOUS: 8092 SF C=0.51 (GRASS - GOOD CONDITION > 7%)

IMPERVIOUS: 1569 SF C=0.95

$$C = \frac{(8092)(0.51) + (1569)(0.95)}{9661} = 0.58$$ "

BASIN "C"

AREA = 0.237 AC (10348 SF)

PERVIOUS: 6452 SF C=0.51

IMPERVIOUS: 3896 SF C=0.95

$$C = \frac{(6452)(0.51) + (3896)(0.95)}{10348} = 0.68$$ "

BASIN "D"

AREA = 0.017 ACRE (722 SF)

PERVIOUS: C=0.51

IMPERVIOUS: C=0.95

$$C = \frac{(322)(0.51) + (400)(0.95)}{722} = 0.75$$ "

NRCS Soil Report



Map Scale: 1:748 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

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 1:20,000.

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: Saline County, Arkansas
Survey Area Data: Version 21, Sep 10, 2024

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

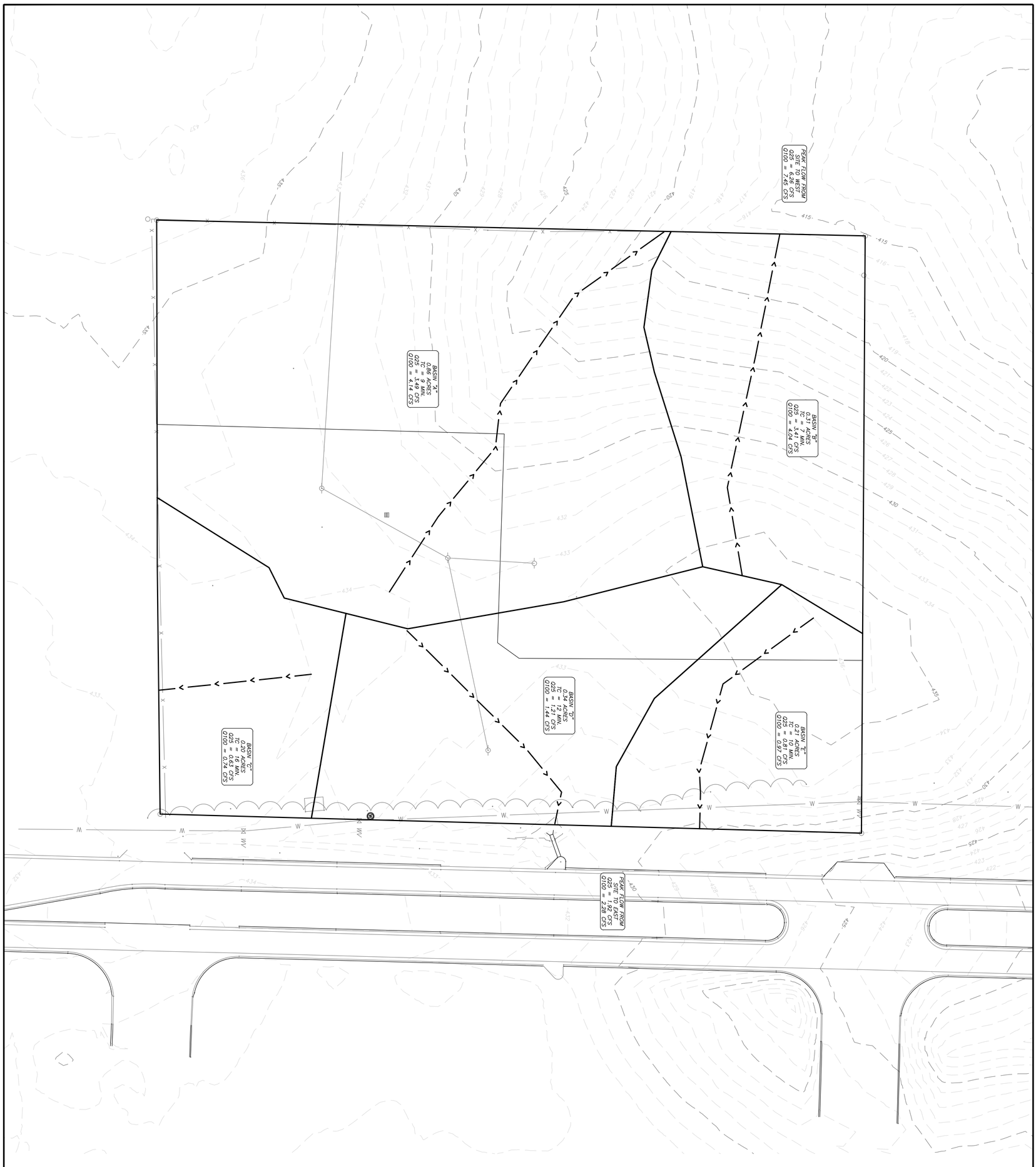
Date(s) aerial images were photographed: May 1, 2022—May 29, 2022

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
29	Tiak silt loam, 3 to 8 percent slopes	2.4	100.0%
Totals for Area of Interest		**2.4**	**100.0%**

Site Drainage Basin Maps



GRAPHIC SCALE

(IN FEET)

1 inch = 20 ft.

PROJECT #: 025-029			
Scale: 1" = 20'	Date: 11/07/2025		
Sheet: 1 of 3			

No.	Revisions	Date

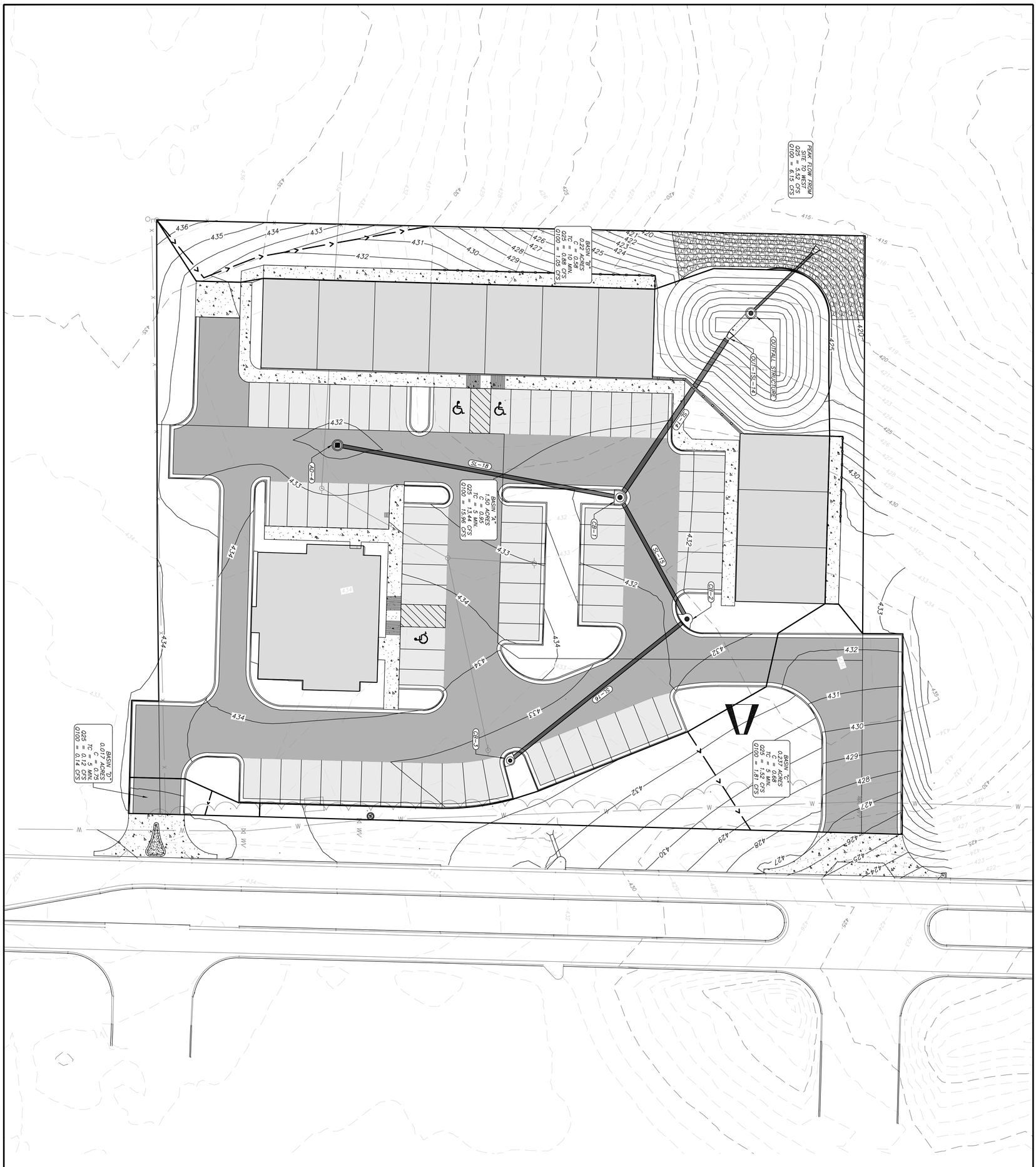
Prepared For:

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PRE-DEVELOPMENT DRAINAGE BASIN MAP
SHOPPES AT DOGWOOD SPRINGS
RETAIL DEVELOPMENT
BRYANT PARKWAY
BRYANT, ARKANSAS

CERTIFICATE OF AUTHORIZATION
Richardson Engineering, PLLC
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PROJECT #: 025-029

Scale: 1" = 20'

Date: 11/07/2025

Sheet: 2 of 3

No.	Revisions	Date

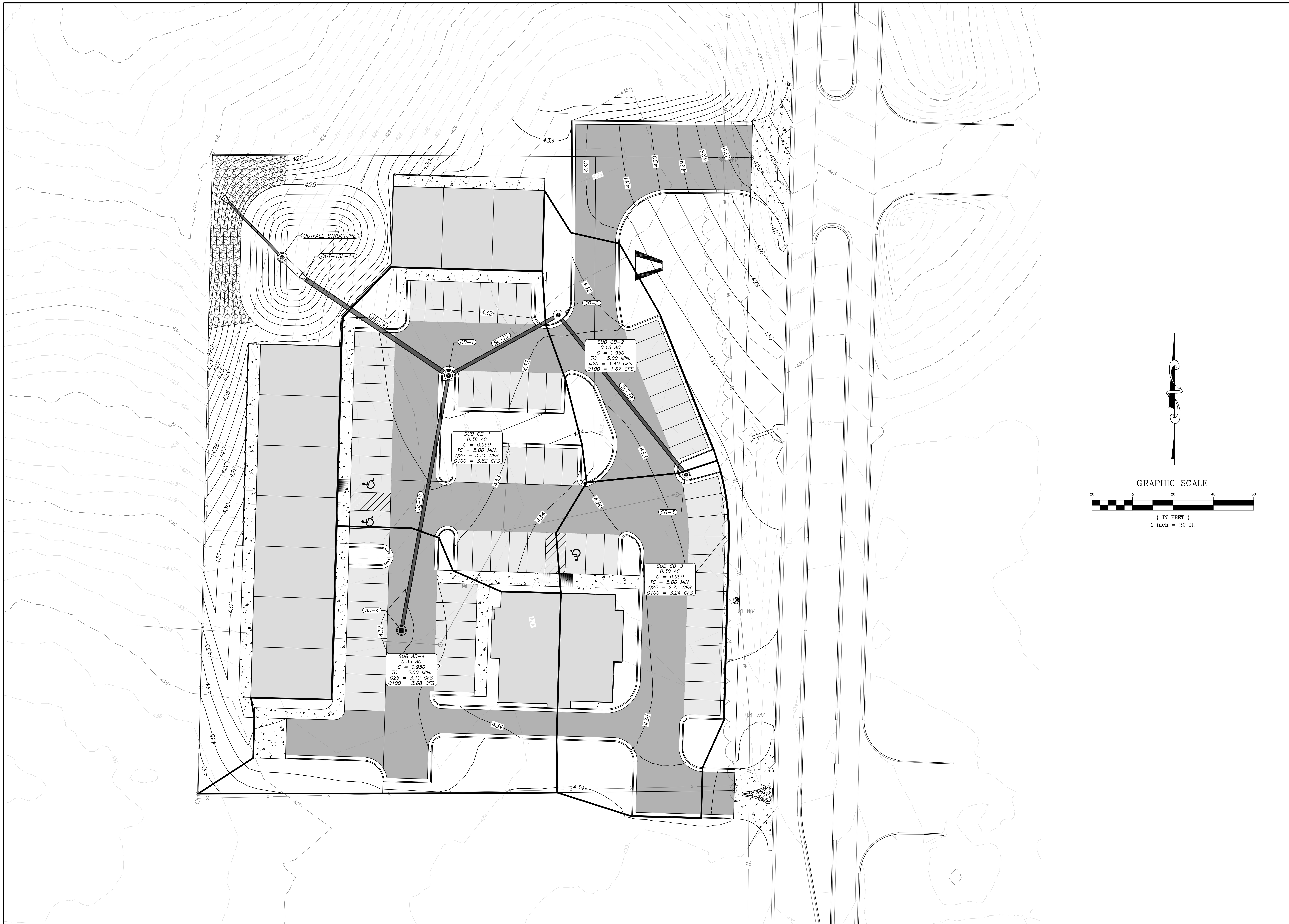
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POST-DEVELOPMENT DRAINAGE BASIN MAP
SHOPPES AT DOGWOOD SPRINGS
RETAIL DEVELOPMENT
BRYANT PARKWAY
BRYANT, ARKANSAS

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POST-DEVELOPMENT DRAINAGE BASIN MAP
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Sheet: 3 of 3

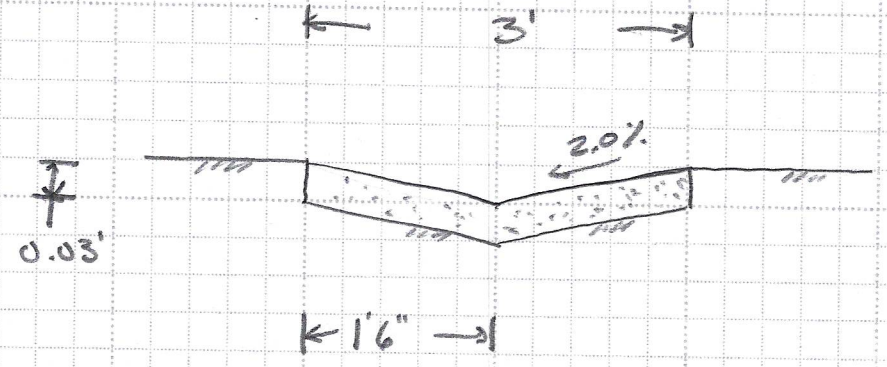
Trickle Channel Velocity Calculation

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PROJECT 025-029 TRICKLE CHANNEL VELOCITY DATE 11/05/2025



$A = 0.045\ FT^2$ $S = \frac{0.2}{10} = 0.02$ FT/FT

$W_p = 0.16$ FT

$$Q = \left(\frac{1.49}{0.013}\right)(0.045)\left(\frac{0.045}{0.16}\right)^{2/3}(0.02)^{1/2}$$

$= 0.313$ CFS

$$V = \frac{Q}{A} = \frac{0.313}{0.045} = 6.95\ FT/S > 2\ FT/S \checkmark$$

Overflow Wier Blockage Calculation

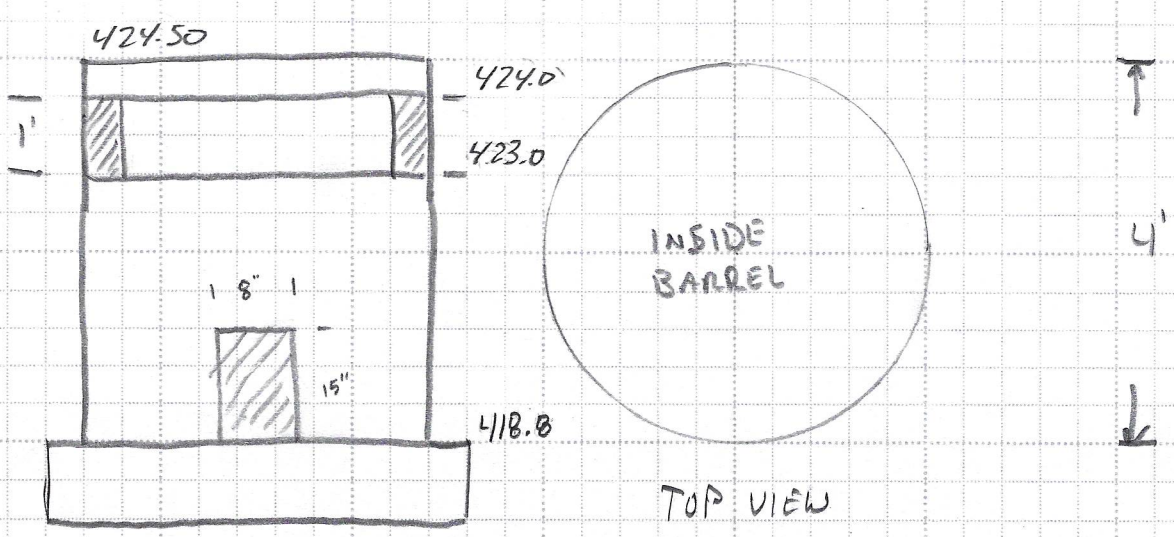
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PROJECT 025-029 OVER FLOW RISER WEIR CALCULATION DATE 11/05/2025

RISER IS 4' I.D. ROUND BARREL



$Q = C\ L\ H^{3/2}$

$C = 2.6$

$L = 2\pi R = (2)(\pi)(2) = 12.56'$

$H = 1.0'$

$Q = (2.6)(12.56)(1.0)^{3/2} = 32.65$ CFS

∴ ASSUMING THAT 50% OF THE WIER IS BLOCKED

$Q = \frac{32.65}{2} = 16.33$ CFS > Q_{100} WITH PAVED = 15.96 CFS ✓

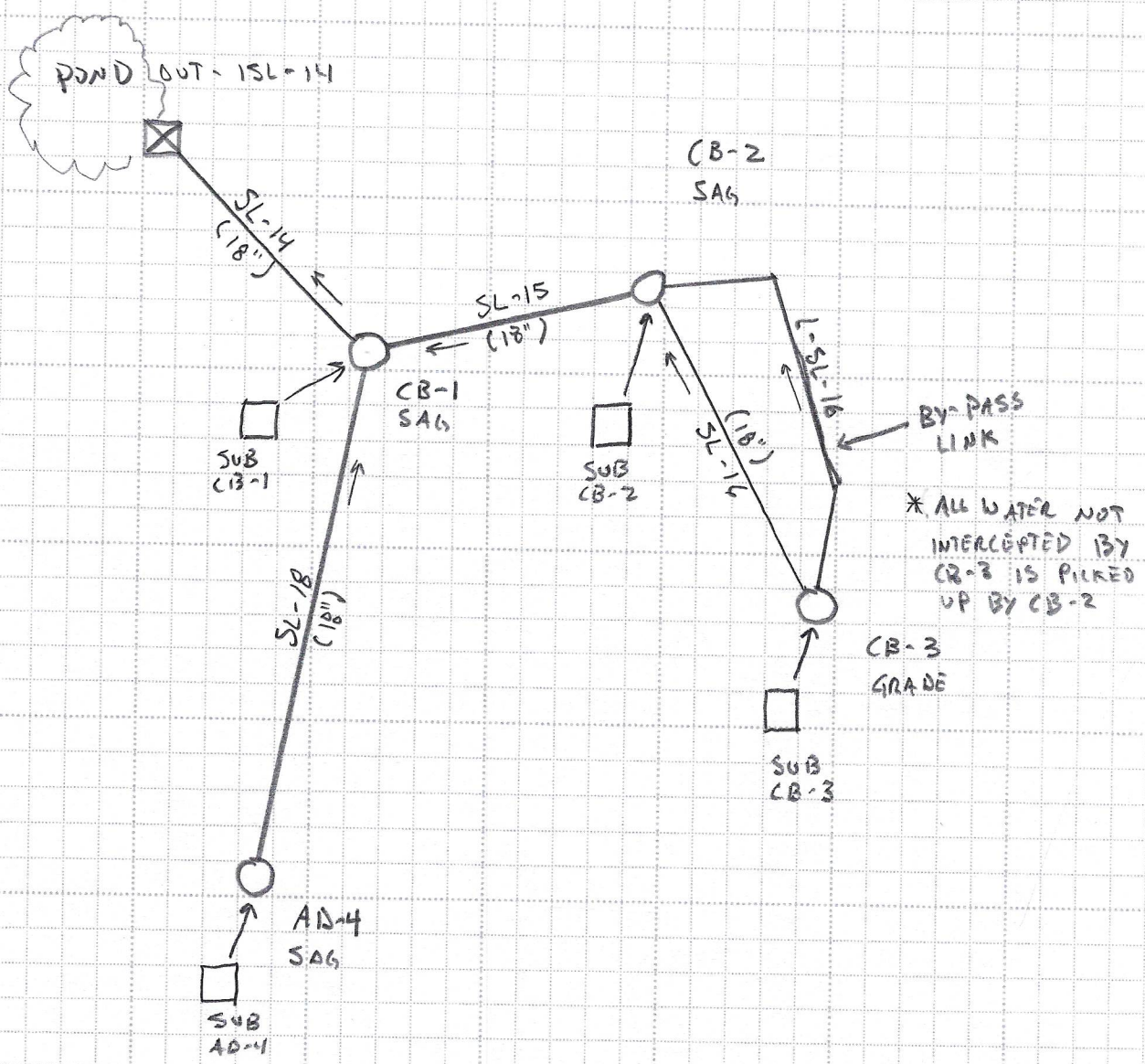
SSA Design Layout

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PROJECT 025-029 SSA DESIGN LAYOUT DATE 11/05/2025



Storm System Design (SSA)

2 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-7-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	2 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-AD-4	0.35	0.9500	0.51	0.49	0.17	2.02	0 00:05:00
2	Sub-CB-1	0.36	0.9500	0.51	0.49	0.17	2.09	0 00:05:00
3	Sub-CB-2	0.16	0.9500	0.51	0.49	0.08	0.91	0 00:05:00
4	Sub-CB-3	0.30	0.9500	0.51	0.49	0.15	1.77	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					6.66	419.58		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.07	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			6.66	21.35	0.31	10.71	0.58	0.38	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			2.65	28.90	0.09	10.23	0.31	0.20	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.69	19.60	0.09	9.23	0.30	0.20	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			1.99	21.31	0.09	8.25	0.31	0.21	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	2.02	N/A	N/A	N/A	10.00	8.74	432.16
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	2.09	N/A	N/A	N/A	10.00	5.00	432.01
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	0.98	N/A	N/A	N/A	10.00	3.01	432.59
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.77	1.72	0.06	96.75	10.00	6.07	433.28

Subbasin Hydrology

Subbasin : Sub-AD-4

Input Data

Area (ac)	0.35
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-2

Input Data

Area (ac)	0.16
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-3

Input Data

Area (ac)	0.3
Weighted Runoff Coefficient	0.95

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.07	0 00:05	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	6.66	0 00:05	21.35	0.31	10.71	0.13	0.58	0.38	0.00	
3	SL - (15)	2.65	0 00:05	28.90	0.09	10.23	0.10	0.31	0.20	0.00	
4	SL - (16)	1.69	0 00:05	19.60	0.09	9.23	0.18	0.30	0.20	0.00	
5	SL - (18)	1.99	0 00:05	21.31	0.09	8.25	0.26	0.31	0.21	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	2.02	2.02	N/A	N/A	N/A	8.74	432.16	0.36	0 00:05	0
2	CB-1	2.09	2.09	N/A	N/A	N/A	5.00	432.01	0.40	0 00:05	0
3	CB-2	0.98	0.91	N/A	N/A	N/A	3.01	432.59	0.34	0 00:05	0
4	CB-3	1.77	1.77	1.72	0.06	96.75	6.07	433.28	0.17	0 00:05	0

10 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-7-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	10 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-AD-4	0.35	0.9500	0.68	0.65	0.22	2.70	0 00:05:00
2	Sub-CB-1	0.36	0.9500	0.68	0.65	0.23	2.80	0 00:05:00
3	Sub-CB-2	0.16	0.9500	0.68	0.65	0.10	1.22	0 00:05:00
4	Sub-CB-3	0.30	0.9500	0.68	0.65	0.20	2.37	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					8.93	419.68		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.24	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			8.93	21.35	0.42	11.58	0.68	0.45	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			3.54	28.90	0.12	11.11	0.35	0.24	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			2.12	19.60	0.11	9.87	0.33	0.22	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			2.66	21.31	0.12	8.42	0.36	0.24	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	2.70	N/A	N/A	N/A	10.00	10.40	432.21
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	2.80	N/A	N/A	N/A	10.00	6.07	432.04
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	1.46	N/A	N/A	N/A	10.00	3.92	432.62
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	2.37	2.14	0.23	90.25	10.00	6.72	433.30

Subbasin Hydrology

Subbasin : Sub-AD-4

Input Data

Area (ac)	0.35
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-2

Input Data

Area (ac)	0.16
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-3

Input Data

Area (ac)	0.3
Weighted Runoff Coefficient	0.95

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.24	0 00:05	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	8.93	0 00:05	21.35	0.42	11.58	0.12	0.68	0.45	0.00	
3	SL - (15)	3.54	0 00:05	28.90	0.12	11.11	0.09	0.35	0.24	0.00	
4	SL - (16)	2.12	0 00:05	19.60	0.11	9.87	0.17	0.33	0.22	0.00	
5	SL - (18)	2.66	0 00:05	21.31	0.12	8.42	0.25	0.36	0.24	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	2.70	2.70	N/A	N/A	N/A	10.40	432.21	0.41	0 00:05	0
2	CB-1	2.80	2.80	N/A	N/A	N/A	6.07	432.04	0.43	0 00:05	0
3	CB-2	1.46	1.22	N/A	N/A	N/A	3.92	432.62	0.37	0 00:05	0
4	CB-3	2.37	2.37	2.14	0.23	90.25	6.72	433.30	0.19	0 00:05	0

25 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-7-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	25 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-AD-4	0.35	0.9500	0.79	0.75	0.26	3.10	0 00:05:00
2	Sub-CB-1	0.36	0.9500	0.79	0.75	0.27	3.22	0 00:05:00
3	Sub-CB-2	0.16	0.9500	0.79	0.75	0.12	1.40	0 00:05:00
4	Sub-CB-3	0.30	0.9500	0.79	0.75	0.23	2.72	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					10.24	419.73		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	T Su
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.37	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			10.24	21.35	0.48	11.99	0.73	0.49	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			4.07	28.90	0.14	11.57	0.38	0.25	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			2.34	19.60	0.12	10.19	0.35	0.23	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			3.06	21.31	0.14	8.63	0.38	0.26	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	3.10	N/A	N/A	N/A	10.00	11.31	432.24
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.22	N/A	N/A	N/A	10.00	6.66	432.06
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	1.77	N/A	N/A	N/A	10.00	4.47	432.64
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	2.72	2.36	0.37	86.54	10.00	7.08	433.31

Subbasin Hydrology

Subbasin : Sub-AD-4

Input Data

Area (ac)	0.35
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-2

Input Data

Area (ac)	0.16
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-3

Input Data

Area (ac)	0.3
Weighted Runoff Coefficient	0.95

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Fro Num
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.37	0 00:05	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	10.24	0 00:05	21.35	0.48	11.99	0.12	0.73	0.49	0.00	
3	SL - (15)	4.07	0 00:05	28.90	0.14	11.57	0.09	0.38	0.25	0.00	
4	SL - (16)	2.34	0 00:05	19.60	0.12	10.19	0.17	0.35	0.23	0.00	
5	SL - (18)	3.06	0 00:05	21.31	0.14	8.63	0.25	0.38	0.26	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	3.10	3.10	N/A	N/A	N/A	11.31	432.24	0.44	0 00:05	0
2	CB-1	3.22	3.22	N/A	N/A	N/A	6.66	432.06	0.45	0 00:05	0
3	CB-2	1.77	1.40	N/A	N/A	N/A	4.47	432.64	0.38	0 00:05	0
4	CB-3	2.72	2.72	2.36	0.37	86.54	7.08	433.31	0.20	0 00:05	0

50 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-7-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-AD-4	0.35	0.9500	0.86	0.82	0.28	3.38	0 00:05:00
2	Sub-CB-1	0.36	0.9500	0.86	0.82	0.29	3.51	0 00:05:00
3	Sub-CB-2	0.16	0.9500	0.86	0.82	0.13	1.53	0 00:05:00
4	Sub-CB-3	0.30	0.9500	0.86	0.82	0.25	2.98	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					11.21	419.77		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	T Su
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.47	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			11.21	21.35	0.53	12.26	0.77	0.51	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			4.45	28.90	0.15	11.88	0.40	0.27	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			2.48	19.60	0.13	10.41	0.36	0.24	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			3.34	21.31	0.16	8.85	0.40	0.27	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	3.38	N/A	N/A	N/A	10.00	11.93	432.26
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.51	N/A	N/A	N/A	10.00	7.06	432.07
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	2.01	N/A	N/A	N/A	10.00	4.86	432.65
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	2.98	2.50	0.47	84.09	10.00	7.31	433.31

Subbasin Hydrology

Subbasin : Sub-AD-4

Input Data

Area (ac)	0.35
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-2

Input Data

Area (ac)	0.16
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-3

Input Data

Area (ac)	0.3
Weighted Runoff Coefficient	0.95

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Fro Num
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.47	0 00:05	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	11.21	0 00:05	21.35	0.53	12.26	0.12	0.77	0.51	0.00	
3	SL - (15)	4.45	0 00:05	28.90	0.15	11.88	0.09	0.40	0.27	0.00	
4	SL - (16)	2.48	0 00:05	19.60	0.13	10.41	0.16	0.36	0.24	0.00	
5	SL - (18)	3.34	0 00:05	21.31	0.16	8.85	0.24	0.40	0.27	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	3.38	3.38	N/A	N/A	N/A	11.93	432.26	0.46	0 00:05	0
2	CB-1	3.51	3.51	N/A	N/A	N/A	7.06	432.07	0.46	0 00:05	0
3	CB-2	2.01	1.53	N/A	N/A	N/A	4.86	432.65	0.40	0 00:05	0
4	CB-3	2.98	2.98	2.50	0.47	84.09	7.31	433.31	0.20	0 00:05	0

100 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-7-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-AD-4	0.35	0.9500	0.93	0.89	0.31	3.68	0 00:05:00
2	Sub-CB-1	0.36	0.9500	0.93	0.89	0.32	3.82	0 00:05:00
3	Sub-CB-2	0.16	0.9500	0.93	0.89	0.14	1.67	0 00:05:00
4	Sub-CB-3	0.30	0.9500	0.93	0.89	0.27	3.24	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					12.19	419.81		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	T Su
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.60	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			12.19	21.35	0.57	12.52	0.81	0.54	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			4.84	28.90	0.17	12.16	0.41	0.28	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			2.62	19.60	0.13	10.61	0.37	0.25	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			3.64	21.31	0.17	9.06	0.42	0.28	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	3.68	N/A	N/A	N/A	10.00	12.56	432.28
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.82	N/A	N/A	N/A	10.00	7.47	432.08
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	2.26	N/A	N/A	N/A	10.00	5.26	432.66
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	3.24	2.64	0.59	81.70	10.00	7.54	433.32

Subbasin Hydrology

Subbasin : Sub-AD-4

Input Data

Area (ac)	0.35
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-2

Input Data

Area (ac)	0.16
Weighted Runoff Coefficient	0.95

Subbasin : Sub-CB-3

Input Data

Area (ac)	0.3
Weighted Runoff Coefficient	0.95

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Fro Num
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.60	0 00:05	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	12.19	0 00:05	21.35	0.57	12.52	0.11	0.81	0.54	0.00	
3	SL - (15)	4.84	0 00:05	28.90	0.17	12.16	0.09	0.41	0.28	0.00	
4	SL - (16)	2.62	0 00:05	19.60	0.13	10.61	0.16	0.37	0.25	0.00	
5	SL - (18)	3.64	0 00:05	21.31	0.17	9.06	0.24	0.42	0.28	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	3.68	3.68	N/A	N/A	N/A	12.56	432.28	0.48	0 00:05	0
2	CB-1	3.82	3.82	N/A	N/A	N/A	7.47	432.08	0.47	0 00:05	0
3	CB-2	2.26	1.67	N/A	N/A	N/A	5.26	432.66	0.41	0 00:05	0
4	CB-3	3.24	3.24	2.64	0.59	81.70	7.54	433.32	0.21	0 00:05	0

Pre and Post Development Hydrographs (Hydrology Studio)

Report Help

Estimate Storage* > Create Pond > Add Outlet Structures

1-Yr 2-Yr 3-Yr 5-Yr 10-Yr 25-Yr 50-Yr 100-Yr

Post-dev Hyd = 8 - Mod Rational - Post-Dev Basin A

Pre-dev Hyd = 3 - Junction - Total Pre-Dev West

Freq (Yr)	Vol Pre (cuft)	Vol Post (cuft)	Qp Post (cfs)	Q Targ (cfs)	Req Stor (cuft)
1					
2	2,828	6,610	4.08	4.08	2,693
3					
5					
10	3,787	8,883	5.48	5.46	3,641
25	4,351	10,214	6.30	6.27	4,194
50	4,755	11,180	6.90	6.86	4,595
100	5,167	12,126	7.49	7.45	4,974

Clear Estimate Storage

	Extended Detention Storage (optional)	
Zone	Description	Volume (cuft)
1	WQv	
2	CPv	
3	Custom	
4	Custom	

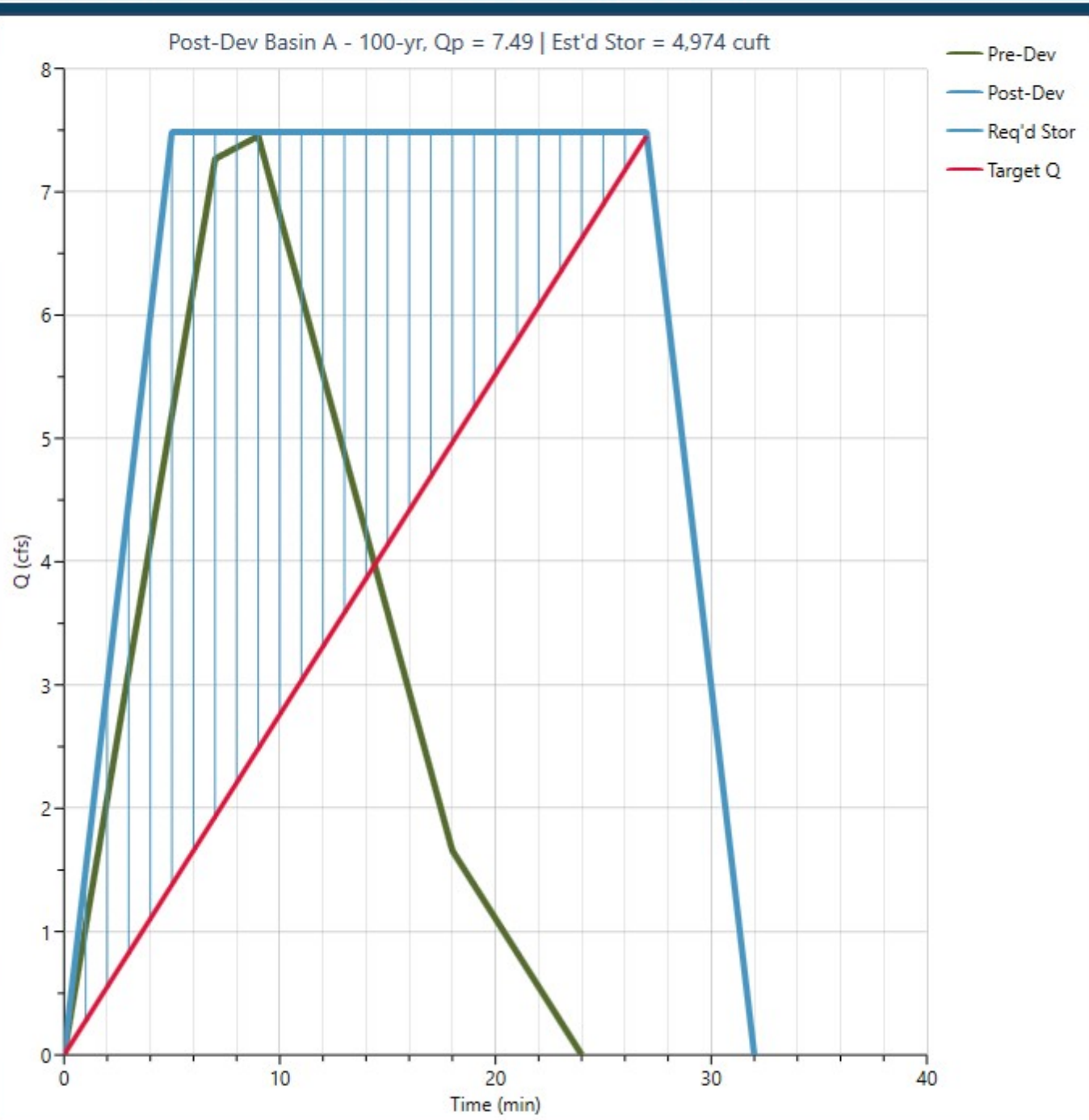


Table of Contents

Basin Model Schematic **1**

Hydrograph by Return Period **2**

2 - Year

Hydrograph Summary **3**

Hydrograph Reports

Hydrograph No. 1, Rational, Pre-Dev Basin "A" 4

Tc by TR55 Worksheet 5

Hydrograph No. 2, Rational, Pre-Dev Basin "B" 6

Tc by TR55 Worksheet 7

Hydrograph No. 3, Junction, Total Pre-Dev West 8

Hydrograph No. 4, Rational, Pre-Dev Basin "C" 9

Tc by TR55 Worksheet 10

Hydrograph No. 5, Rational, Pre-Dev Basin "D" 11

Tc by TR55 Worksheet 12

Hydrograph No. 6, Rational, Pre-Dev Basin "E" 13

Tc by TR55 Worksheet 14

Hydrograph No. 7, Junction, Total Pre-Dev East 15

Hydrograph No. 8, Mod Rational, Post-Dev Basin A 16

Hydrograph No. 9, Pond Route, Detention Basin 17

Detention Pond Reports - Bryant Pharmacy Detention Pond 18

Hydrograph No. 10, Rational, Post-Dev Basin B 22

Tc by TR55 Worksheet 23

Hydrograph No. 11, Rational, Post-Dev Basin "C" 24

Tc by TR55 Worksheet 25

Hydrograph No. 12, Junction, Total Post-Dev West 26

Hydrograph No. 13, Rational, Post-Dev Basin "D" 27

Tc by TR55 Worksheet 28

10 - Year

Hydrograph Summary **29**

Hydrograph Reports

Hydrograph No. 1, Rational, Pre-Dev Basin "A" 30

Hydrograph No. 2, Rational, Pre-Dev Basin "B" 31

Hydrograph No. 3, Junction, Total Pre-Dev West 32

Hydrograph No. 4, Rational, Pre-Dev Basin "C" 33

Hydrograph No. 5, Rational, Pre-Dev Basin "D" 34

Hydrograph No. 6, Rational, Pre-Dev Basin "E" 35

Contents continued...

Hydrograph No. 7, Junction, Total Pre-Dev East 36
Hydrograph No. 8, Mod Rational, Post-Dev Basin A 37
Hydrograph No. 9, Pond Route, Detention Basin 38
Hydrograph No. 10, Rational, Post-Dev Basin B 39
Hydrograph No. 11, Rational, Post-Dev Basin "C" 40
Hydrograph No. 12, Junction, Total Post-Dev West 41
Hydrograph No. 13, Rational, Post-Dev Basin "D" 42

25 - Year

Hydrograph Summary **43**

Hydrograph Reports

Hydrograph No. 1, Rational, Pre-Dev Basin "A" 44
Hydrograph No. 2, Rational, Pre-Dev Basin "B" 45
Hydrograph No. 3, Junction, Total Pre-Dev West 46
Hydrograph No. 4, Rational, Pre-Dev Basin "C" 47
Hydrograph No. 5, Rational, Pre-Dev Basin "D" 48
Hydrograph No. 6, Rational, Pre-Dev Basin "E" 49
Hydrograph No. 7, Junction, Total Pre-Dev East 50
Hydrograph No. 8, Mod Rational, Post-Dev Basin A 51
Hydrograph No. 9, Pond Route, Detention Basin 52
Hydrograph No. 10, Rational, Post-Dev Basin B 53
Hydrograph No. 11, Rational, Post-Dev Basin "C" 54
Hydrograph No. 12, Junction, Total Post-Dev West 55
Hydrograph No. 13, Rational, Post-Dev Basin "D" 56

50 - Year

Hydrograph Summary **57**

Hydrograph Reports

Hydrograph No. 1, Rational, Pre-Dev Basin "A" 58
Hydrograph No. 2, Rational, Pre-Dev Basin "B" 59
Hydrograph No. 3, Junction, Total Pre-Dev West 60
Hydrograph No. 4, Rational, Pre-Dev Basin "C" 61
Hydrograph No. 5, Rational, Pre-Dev Basin "D" 62
Hydrograph No. 6, Rational, Pre-Dev Basin "E" 63
Hydrograph No. 7, Junction, Total Pre-Dev East 64
Hydrograph No. 8, Mod Rational, Post-Dev Basin A 65
Hydrograph No. 9, Pond Route, Detention Basin 66
Hydrograph No. 10, Rational, Post-Dev Basin B 67

Contents continued...

Hydrograph No. 11, Rational, Post-Dev Basin "C" 68
Hydrograph No. 12, Junction, Total Post-Dev West 69
Hydrograph No. 13, Rational, Post-Dev Basin "D" 70

100 - Year

Hydrograph Summary **71**

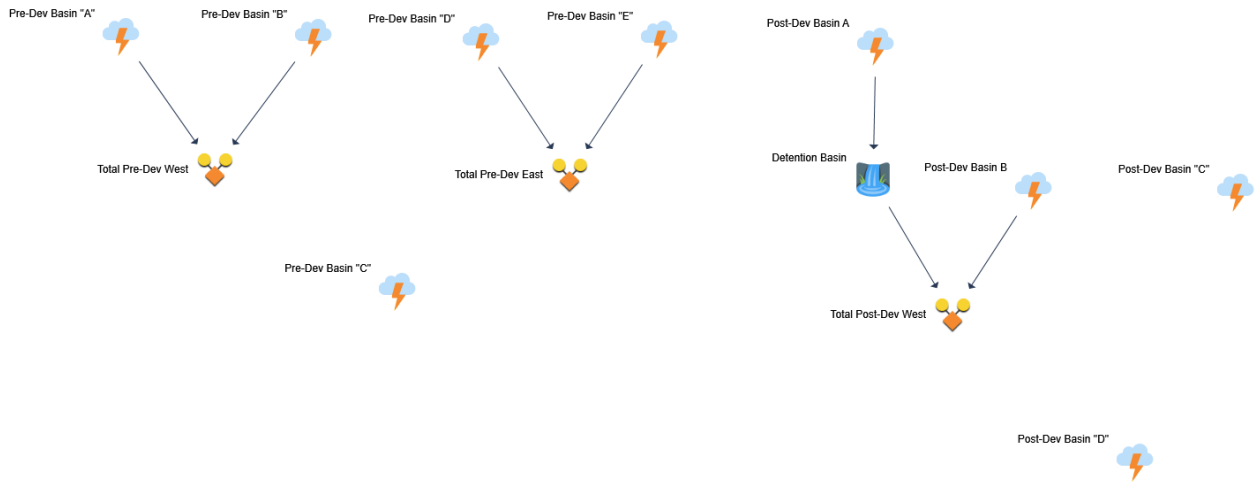
Hydrograph Reports

Hydrograph No. 1, Rational, Pre-Dev Basin "A" 72
Hydrograph No. 2, Rational, Pre-Dev Basin "B" 73
Hydrograph No. 3, Junction, Total Pre-Dev West 74
Hydrograph No. 4, Rational, Pre-Dev Basin "C" 75
Hydrograph No. 5, Rational, Pre-Dev Basin "D" 76
Hydrograph No. 6, Rational, Pre-Dev Basin "E" 77
Hydrograph No. 7, Junction, Total Pre-Dev East 78
Hydrograph No. 8, Mod Rational, Post-Dev Basin A 79
Hydrograph No. 9, Pond Route, Detention Basin 80
Hydrograph No. 10, Rational, Post-Dev Basin B 81
Hydrograph No. 11, Rational, Post-Dev Basin "C" 82
Hydrograph No. 12, Junction, Total Post-Dev West 83
Hydrograph No. 13, Rational, Post-Dev Basin "D" 84

Basin Model

Hydrology Studio v 3.0.0.39

Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025



Hydrograph by Return Period

Hydrology Studio v 3.0.0.39

Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	Rational	Pre-Dev Basin "A"		2.267			3.036	3.489	3.813	4.143
2	Rational	Pre-Dev Basin "B"		2.215			2.964	3.406	3.721	4.044
3	Junction	Total Pre-Dev West		4.079			5.461	6.275	6.858	7.452
4	Rational	Pre-Dev Basin "C"		0.406			0.545	0.627	0.686	0.744
5	Rational	Pre-Dev Basin "D"		0.787			1.055	1.212	1.325	1.439
6	Rational	Pre-Dev Basin "E"		0.528			0.707	0.813	0.888	0.965
7	Junction	Total Pre-Dev East		1.249			1.673	1.923	2.103	2.284
8	Mod Rational	Post-Dev Basin A		4.080			5.483	6.305	6.901	7.485
9	Pond Route	Detention Basin		3.938			4.978	5.521	5.825	6.052
10	Rational	Post-Dev Basin B		0.573			0.767	0.882	0.964	1.047
11	Rational	Post-Dev Basin "C"		0.990			1.323	1.520	1.660	1.805
12	Junction	Total Post-Dev West		4.000			5.026	5.521	5.867	6.147
13	Rational	Post-Dev Basin "D"		0.078			0.105	0.120	0.131	0.143

Hydrograph 2-yr Summary

Hydrology Studio v 3.0.0.39

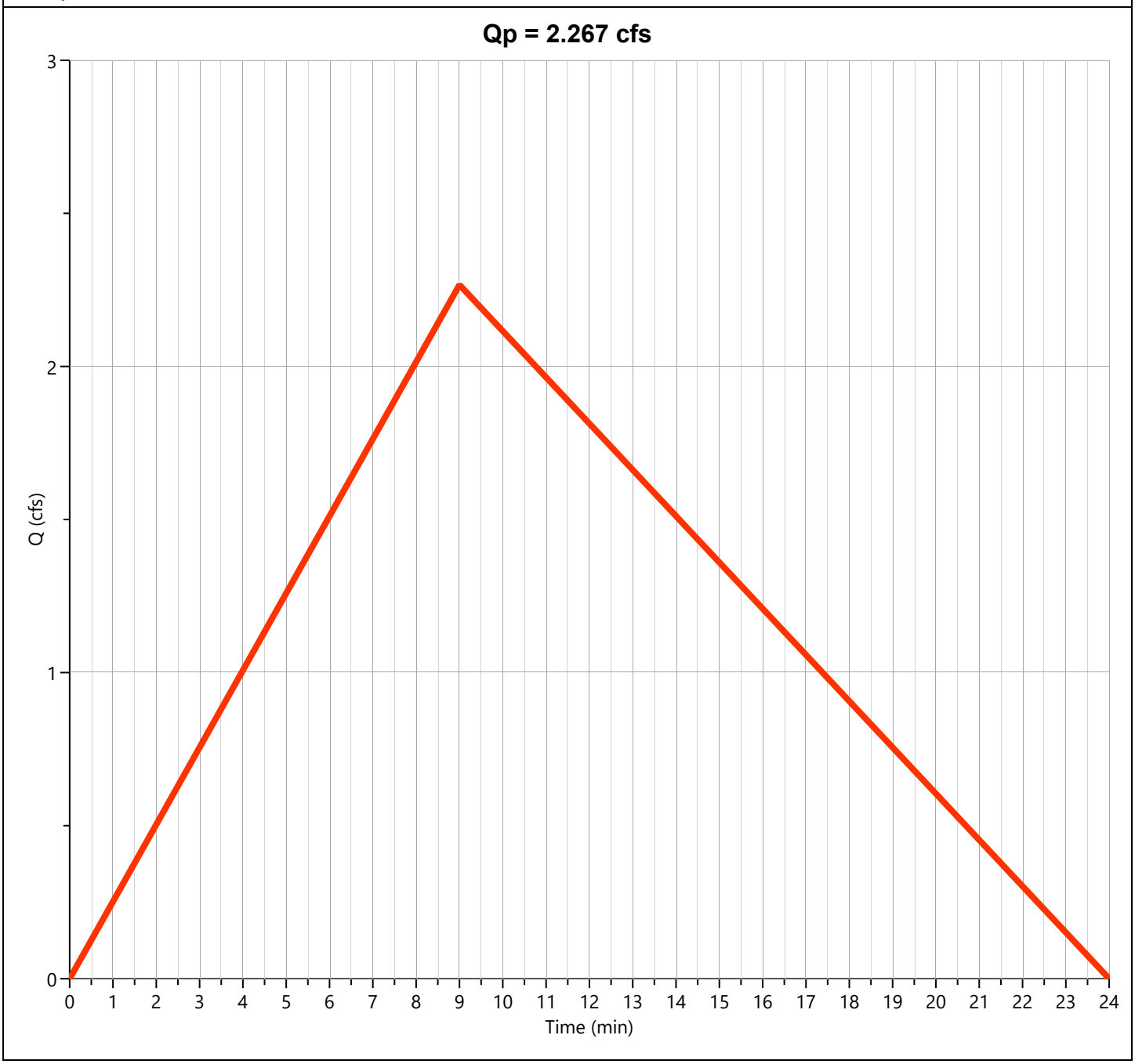
Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Rational	Pre-Dev Basin "A"	2.267	0.15	1,634	----		
2	Rational	Pre-Dev Basin "B"	2.215	0.12	1,242	----		
3	Junction	Total Pre-Dev West	4.079	0.15	2,828	1, 2		
4	Rational	Pre-Dev Basin "C"	0.406	0.27	521	----		
5	Rational	Pre-Dev Basin "D"	0.787	0.20	756	----		
6	Rational	Pre-Dev Basin "E"	0.528	0.17	423	----		
7	Junction	Total Pre-Dev East	1.249	0.20	1,167	5, 6		
8	Mod Rational	Post-Dev Basin A	4.080	0.08	6,610	----		
9	Pond Route	Detention Basin	3.938	0.45	6,608	8	420.72	1,272
10	Rational	Post-Dev Basin B	0.573	0.17	459	----		
11	Rational	Post-Dev Basin "C"	0.990	0.08	396	----		
12	Junction	Total Post-Dev West	4.000	0.32	7,055	9, 10		
13	Rational	Post-Dev Basin "D"	0.078	0.03	12.5	----		

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 2.267 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,634 cuft
Drainage Area	= 0.86 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 9.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.71 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "A"
Rational

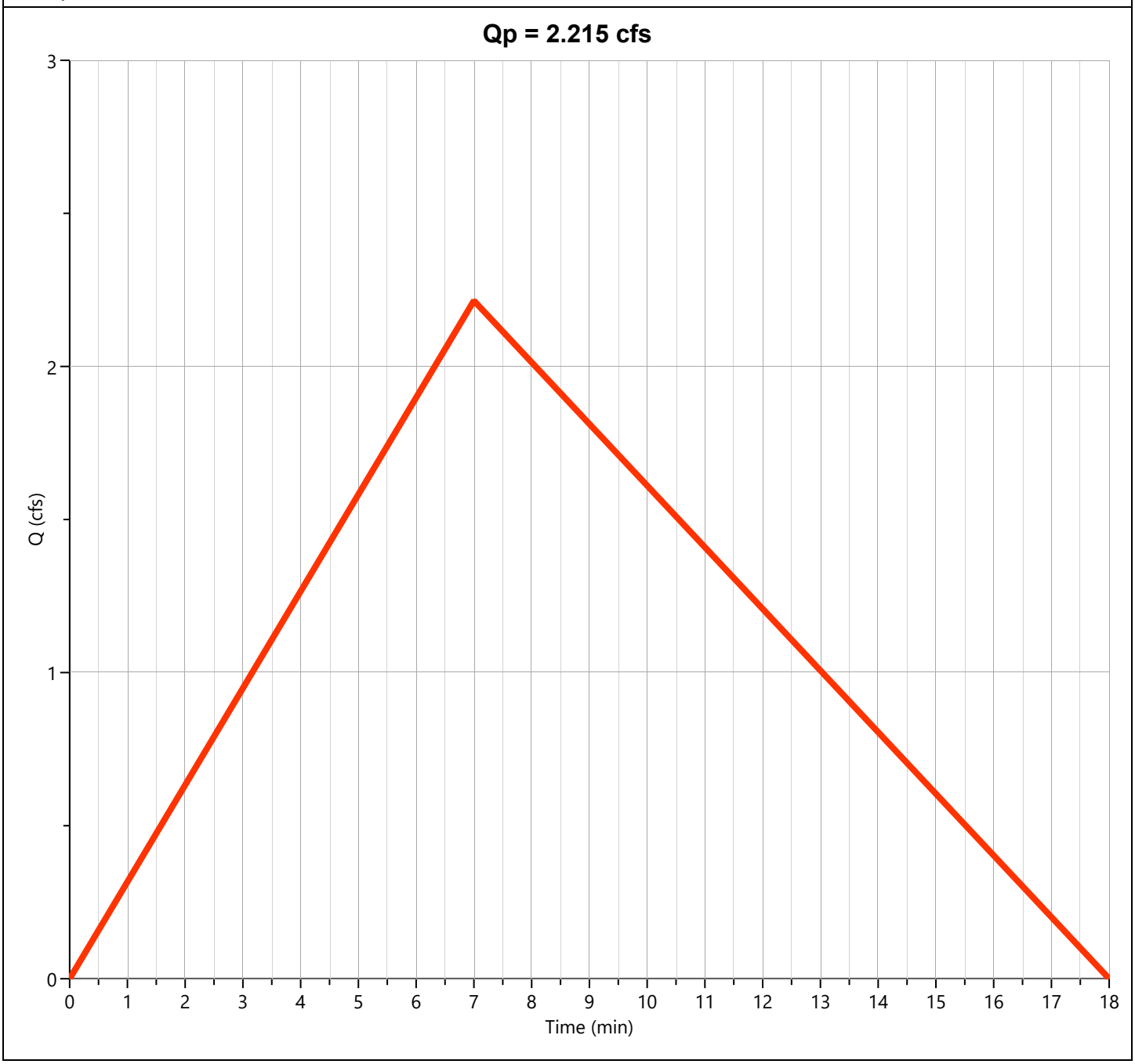
Hyd. No. 1

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	7			
Travel Time (min)	**8.85**	**0.00**	**0.00**	**8.85**
Shallow Concentrated Flow				
Flow Length (ft)	107			
Watercourse Slope (%)	7.47	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	4.41			
Travel Time (min)	**0.40**	**0.00**	**0.00**	**0.40**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**9 min**

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 2.215 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,242 cuft
Drainage Area	= 0.75 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.27 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"
Rational

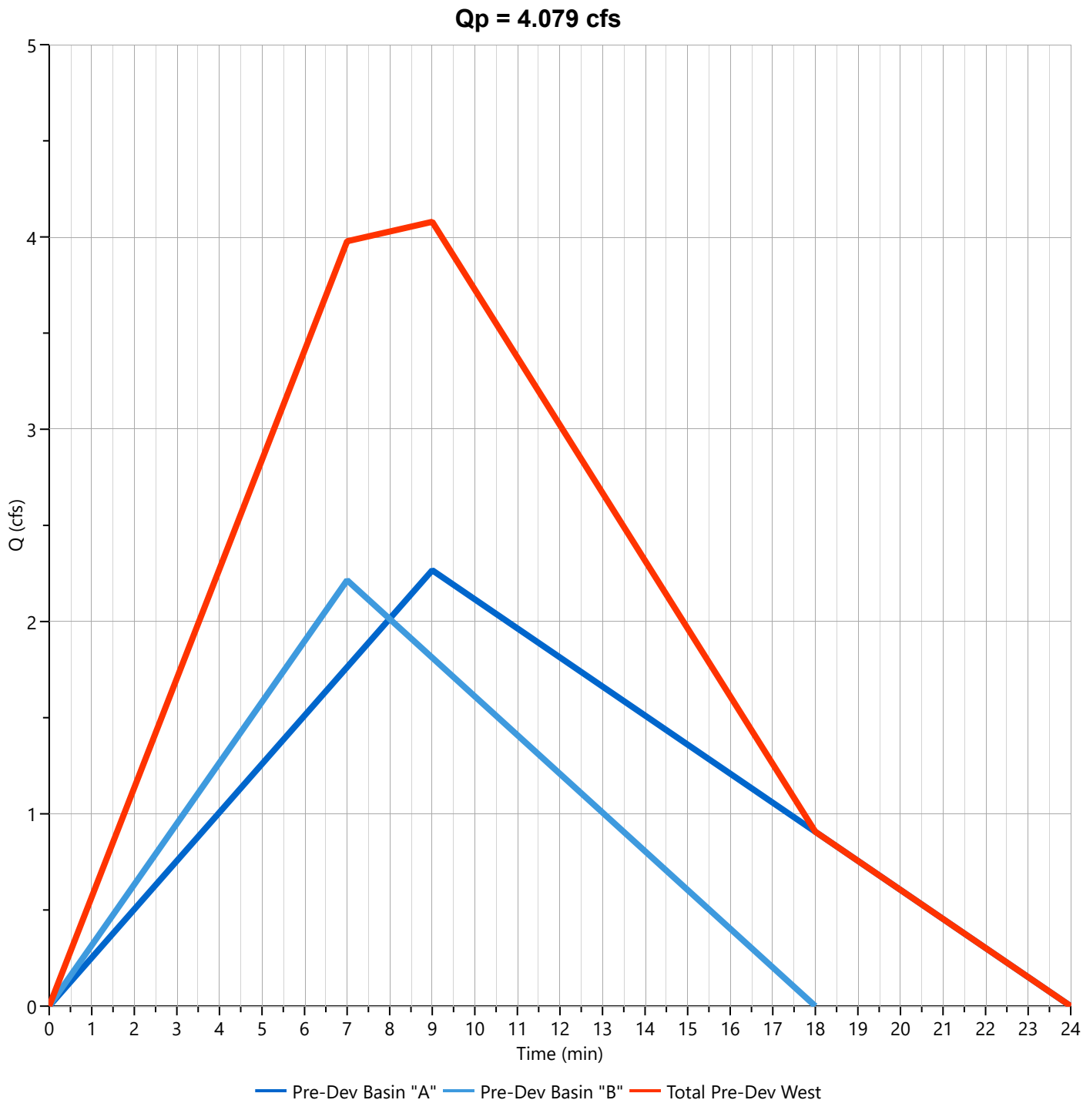
Hyd. No. 2

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	11.75			
Travel Time (min)	**7.20**	**0.00**	**0.00**	**7.20**
Shallow Concentrated Flow				
Flow Length (ft)	55			
Watercourse Slope (%)	14.25	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	6.09			
Travel Time (min)	**0.15**	**0.00**	**0.00**	**0.15**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**7 min**

Total Pre-Dev West

Hyd. No. 3

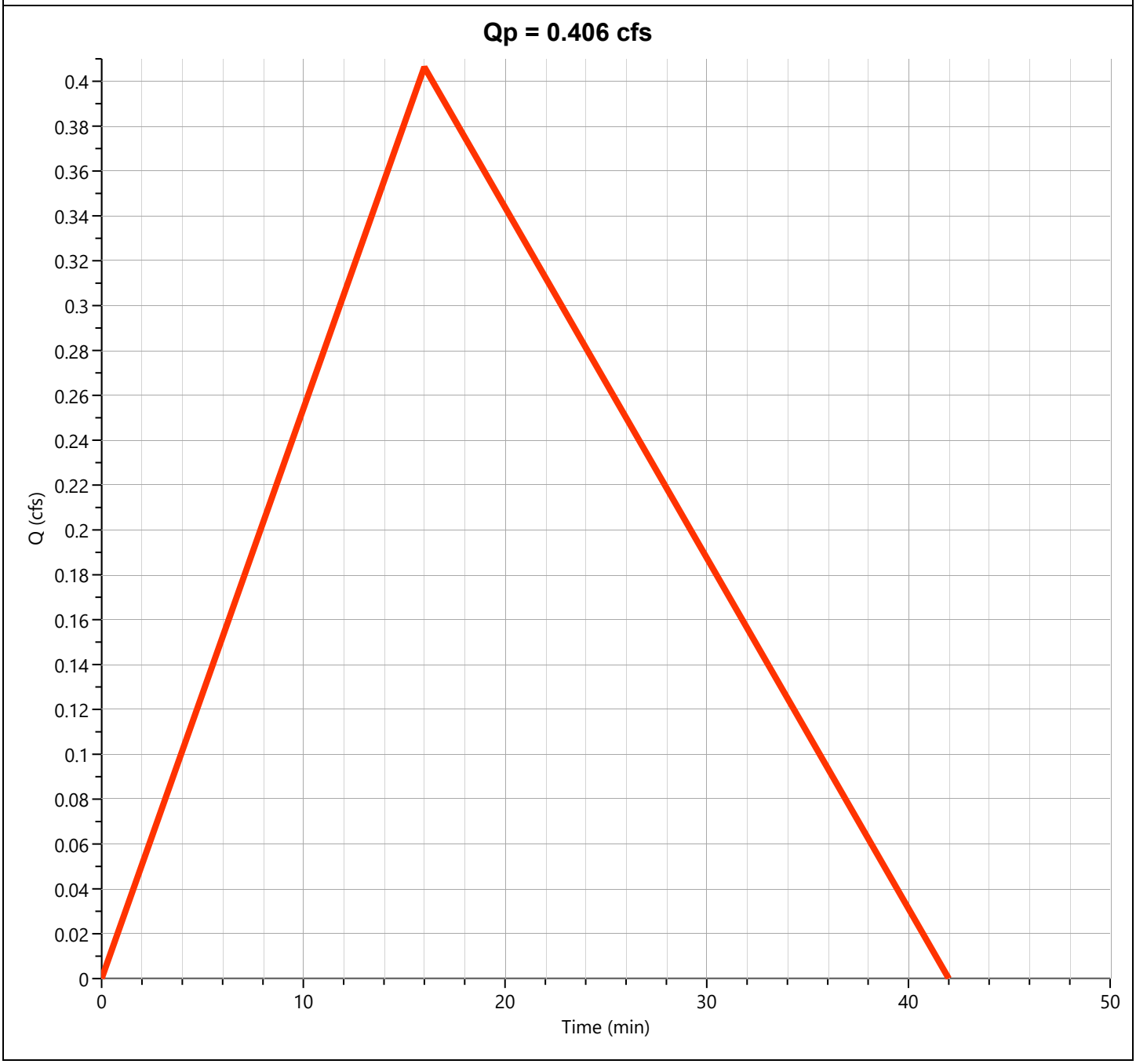
Hydrograph Type	= Junction	Peak Flow	= 4.079 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,828 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 1.61 ac



Pre-Dev Basin "C"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 0.406 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 521 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.63 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "C"
Rational

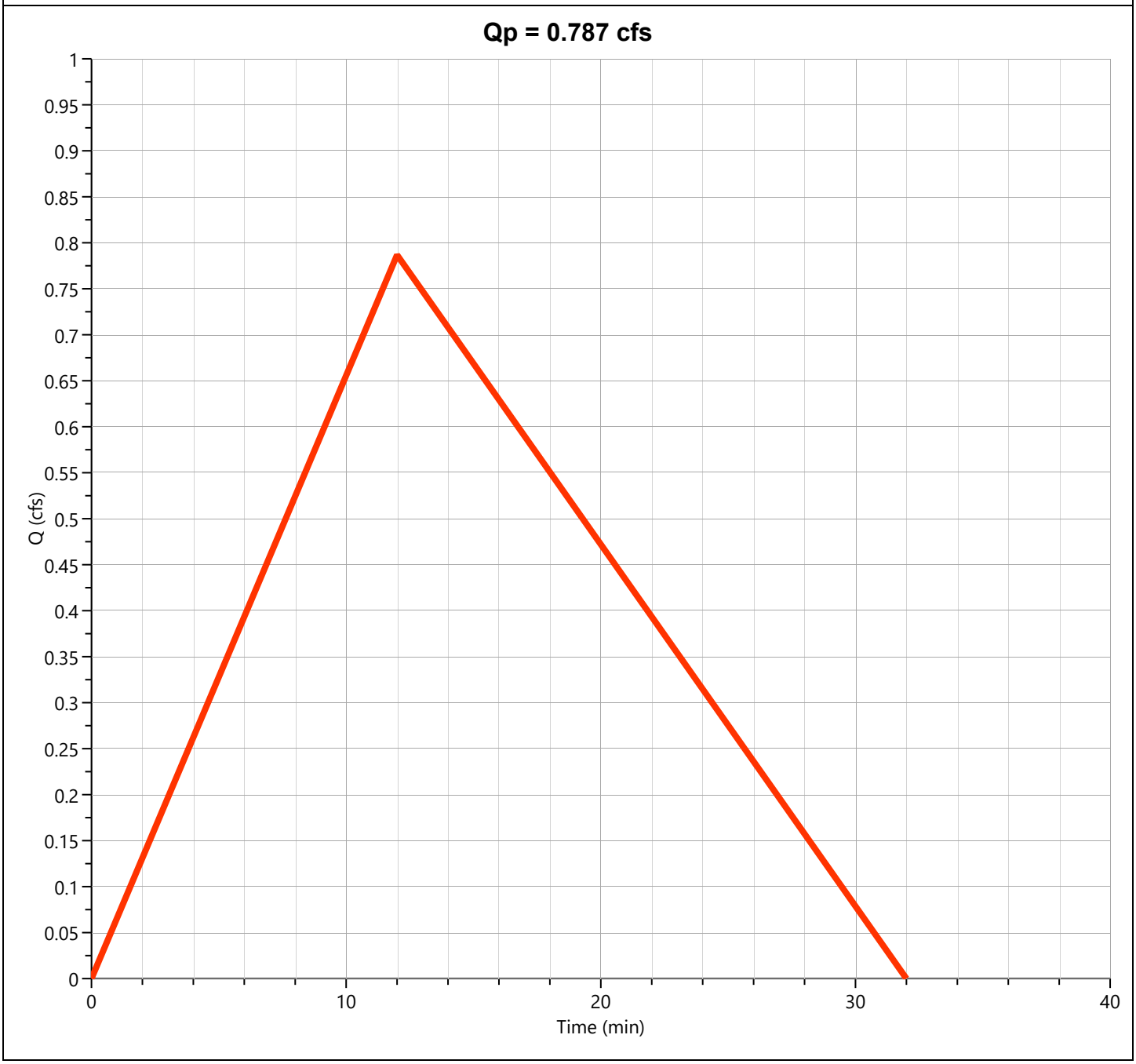
Hyd. No. 4

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	68			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	.7			
Travel Time (min)	**16.34**	**0.00**	**0.00**	**16.34**
Shallow Concentrated Flow				
Flow Length (ft)				
Watercourse Slope (%)	0.00	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**16 min**

Pre-Dev Basin "D"

Hyd. No. 5

Hydrograph Type	= Rational	Peak Flow	= 0.787 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 756 cuft
Drainage Area	= 0.34 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.13 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"
Rational

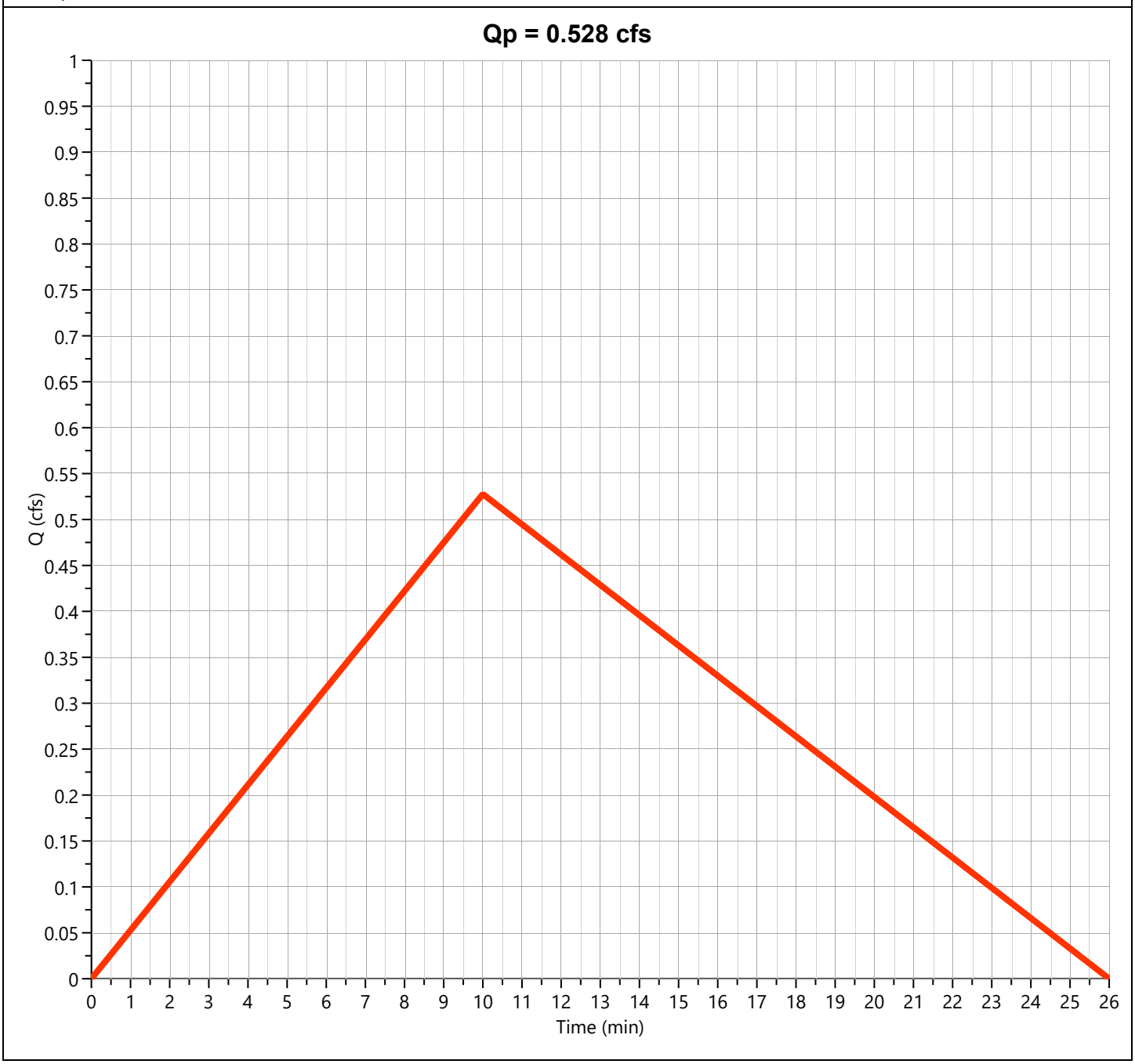
Hyd. No. 5

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	3			
Travel Time (min)	**12.43**	**0.00**	**0.00**	**12.43**
Shallow Concentrated Flow				
Flow Length (ft)	14			
Watercourse Slope (%)	7.00	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	4.27			
Travel Time (min)	**0.05**	**0.00**	**0.00**	**0.05**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**12 min**

Pre-Dev Basin "E"

Hyd. No. 6

Hydrograph Type	= Rational	Peak Flow	= 0.528 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 423 cuft
Drainage Area	= 0.21 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.49 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "E"
Rational

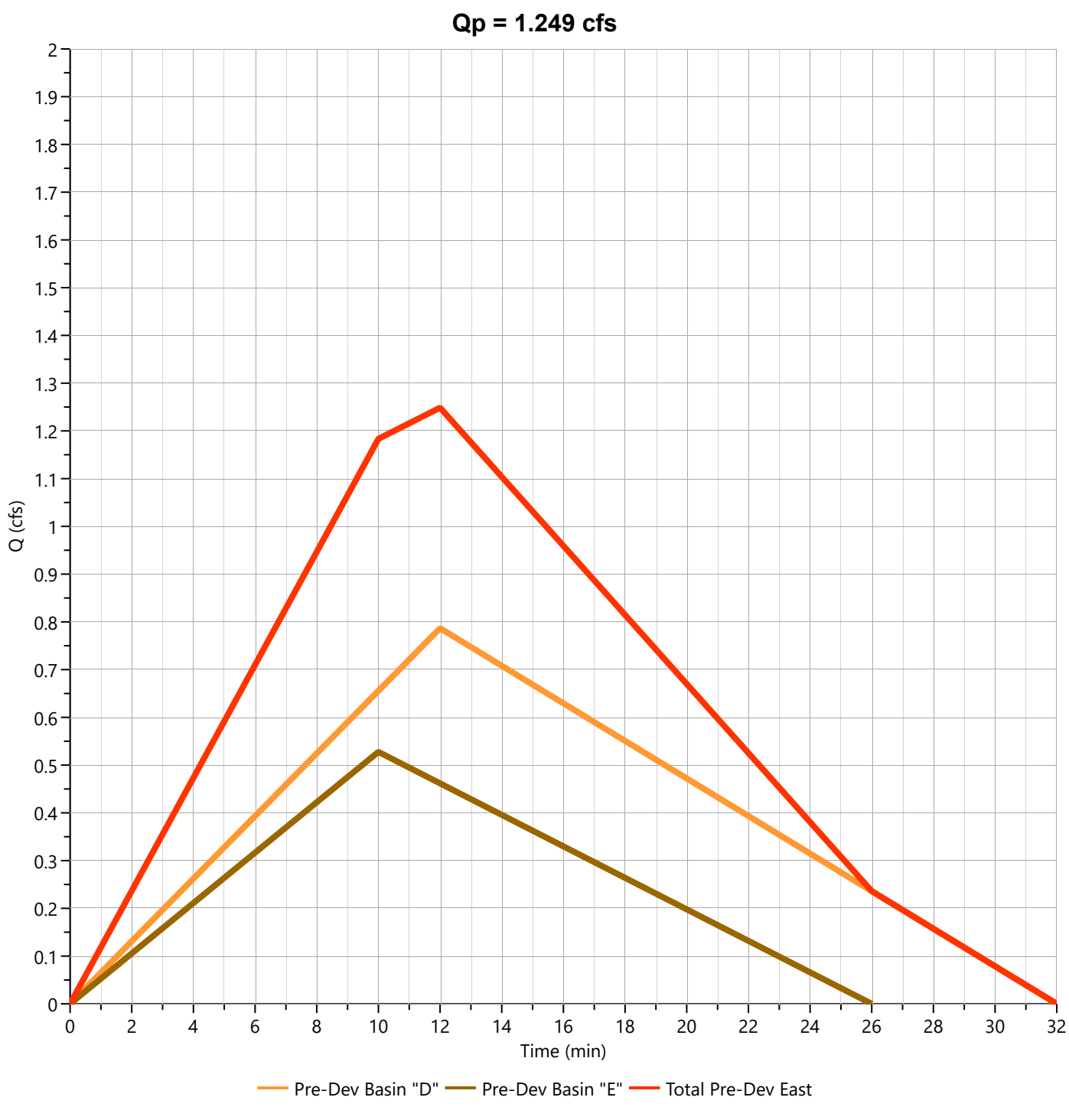
Hyd. No. 6

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	5			
Travel Time (min)	**10.13**	**0.00**	**0.00**	**10.13**
Shallow Concentrated Flow				
Flow Length (ft)	16			
Watercourse Slope (%)	8.00	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	4.56			
Travel Time (min)	**0.06**	**0.00**	**0.00**	**0.06**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**10 min**

Total Pre-Dev East

Hyd. No. 7

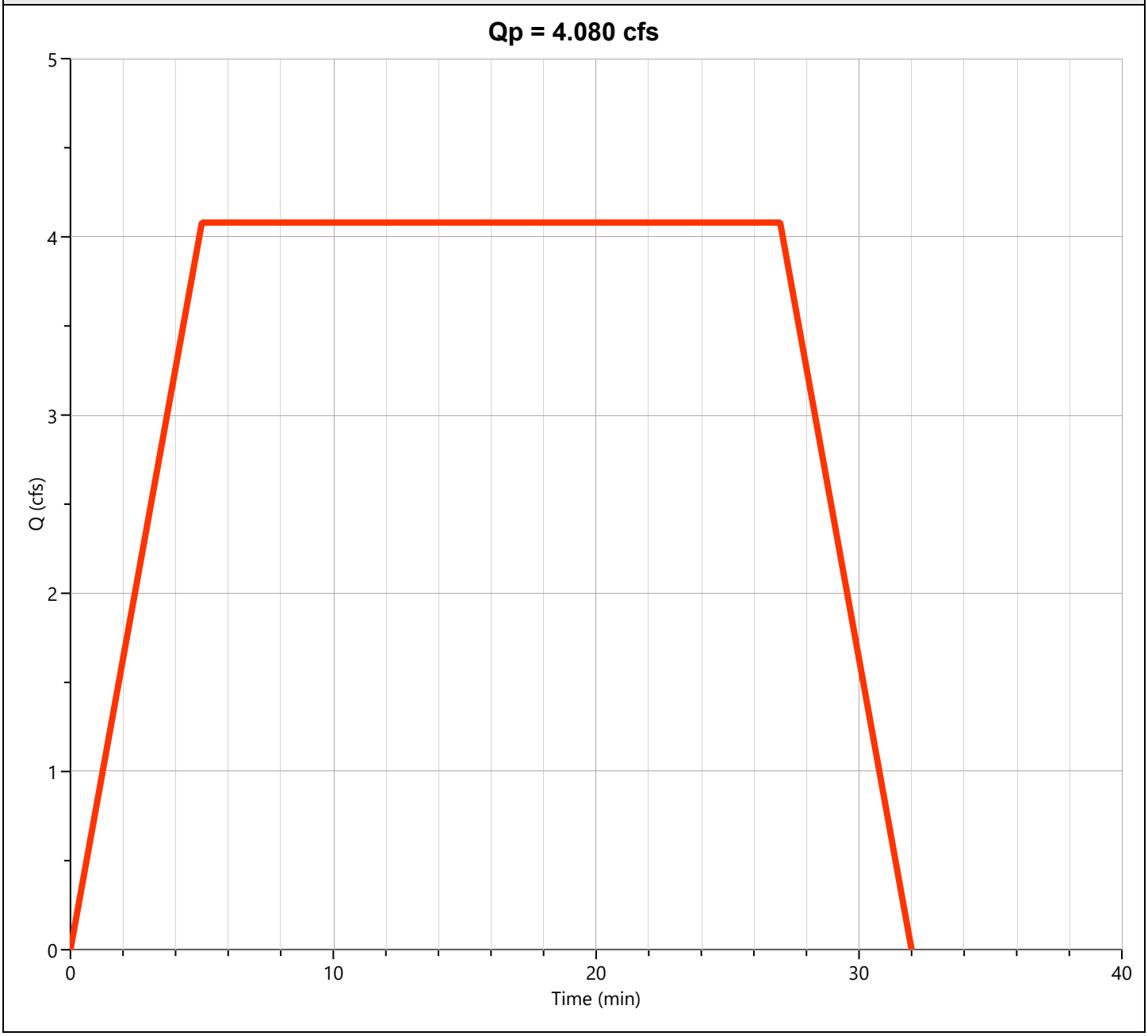
Hydrograph Type	= Junction	Peak Flow	= 1.249 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,167 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 0.55 ac



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 4.080 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 6,610 cuft
Drainage Area	= 1.5 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 2.86 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 5.4 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



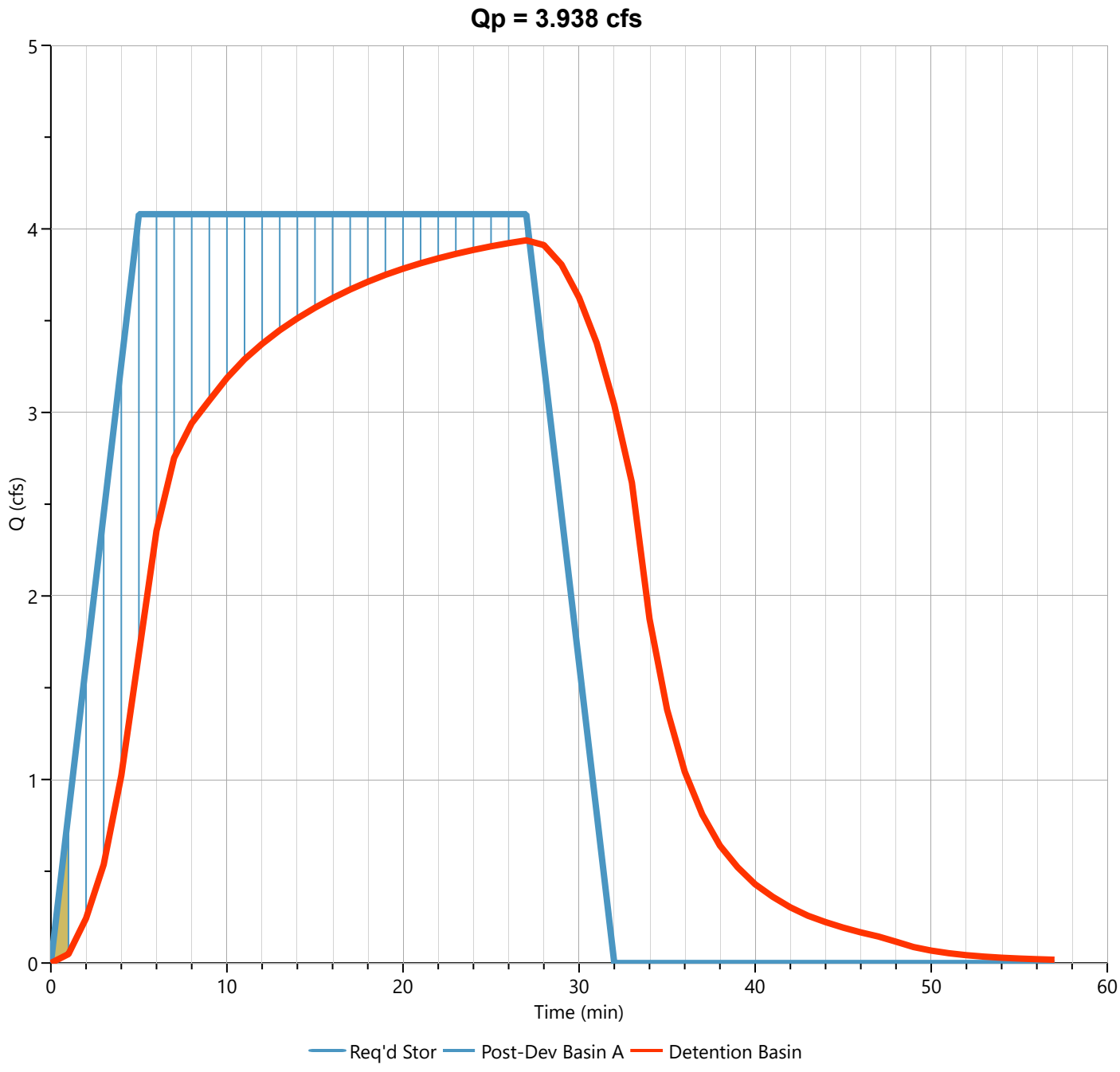
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 3.938 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.45 hrs
Time Interval	= 1 min	Hydrograph Volume	= 6,608 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 420.72 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 1,272 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 5 min



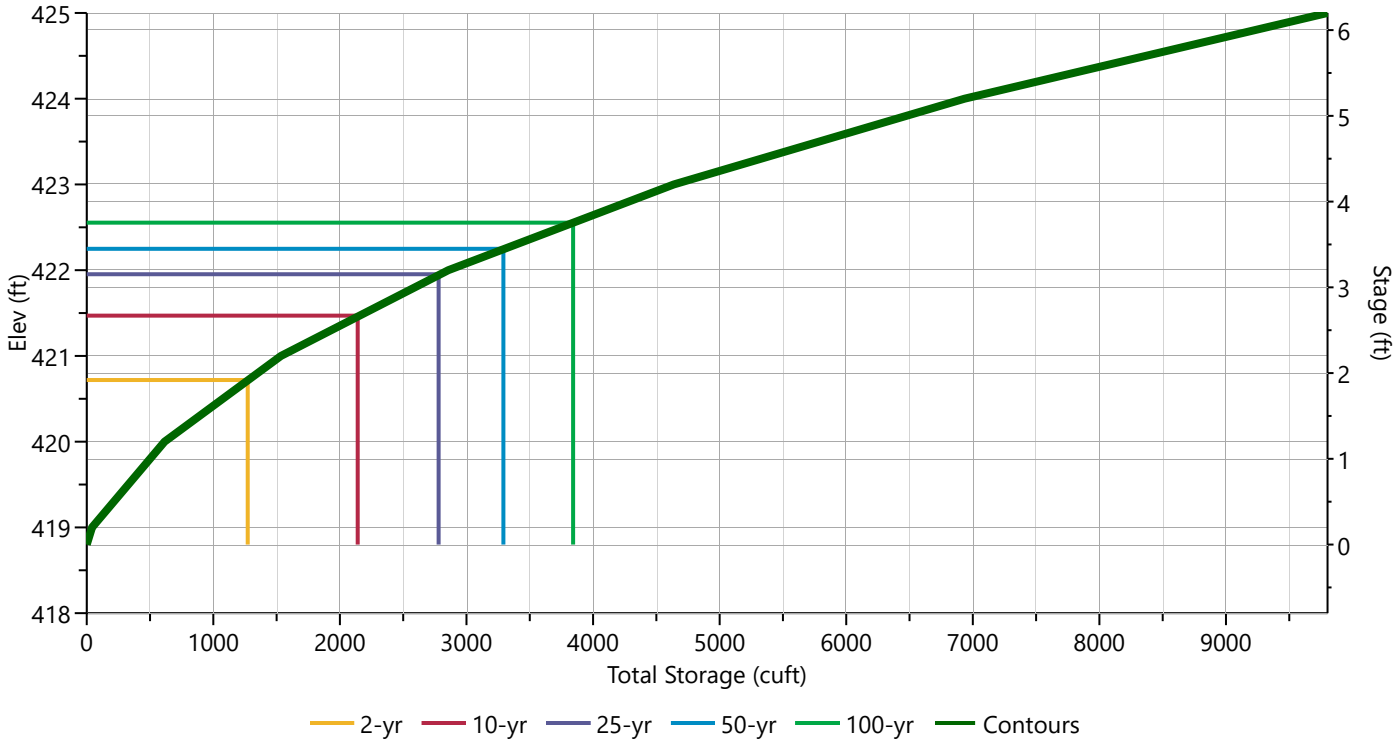
Bryant Pharmacy Detention Pond

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	418.80
Voids (%)	100.00
Volume Calc	Ave End Area

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	418.80	4	0.000	0.000
0.20	419.00	414	41.8	41.8
1.20	420.00	732	573	615
2.20	421.00	1,107	920	1,534
3.20	422.00	1,538	1,323	2,857
4.20	423.00	2,025	1,782	4,638
5.20	424.00	2,568	2,297	6,935
6.20	425.00	3,167	2,868	9,802

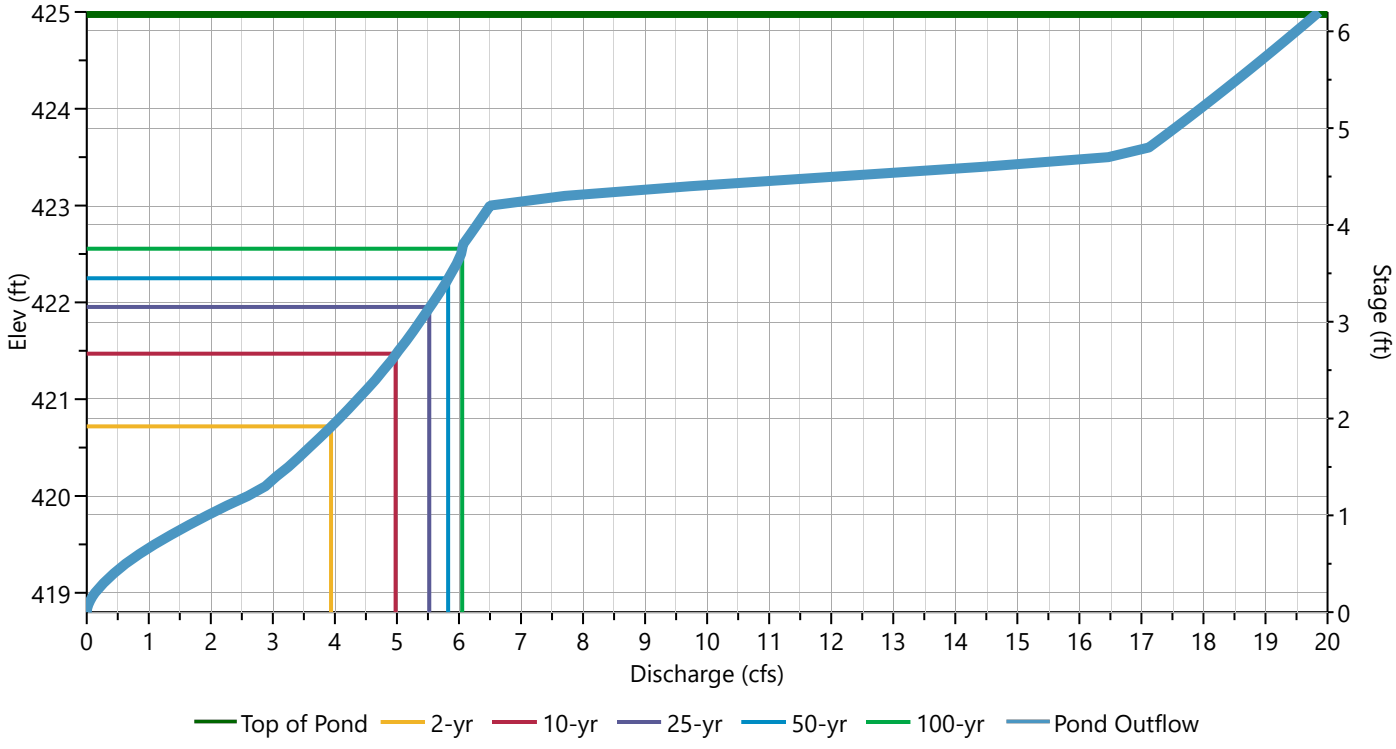


Bryant Pharmacy Detention Pond

Stage-Discharge

Culvert / Orifices	Cir Culvert	Orifice			Orifice Plate	
		1 (m)	2	3		
Rise, in	18	15			Orifice Dia, in	
Span, in	18	8			No. Orifices	
No. Barrels	1	1			Invert Elevation, ft	
Invert Elevation, ft	418.80	418.80			Height, ft	
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co	
Length, ft	39					
Barrel Slope, %	1					
N-Value, n	0.013					
Weirs	**Riser**	**Weir**			**Ancillary**	
		1	2	3		
Shape / Type	Circular				Exfiltration, in/hr	
Crest Elevation, ft	423					
Crest Length, ft	12.56					
Angle, deg						
Weir Coefficient, Cw	3.3					

m = Flows through Culvert, i = Independent



Bryant Pharmacy Detention Pond

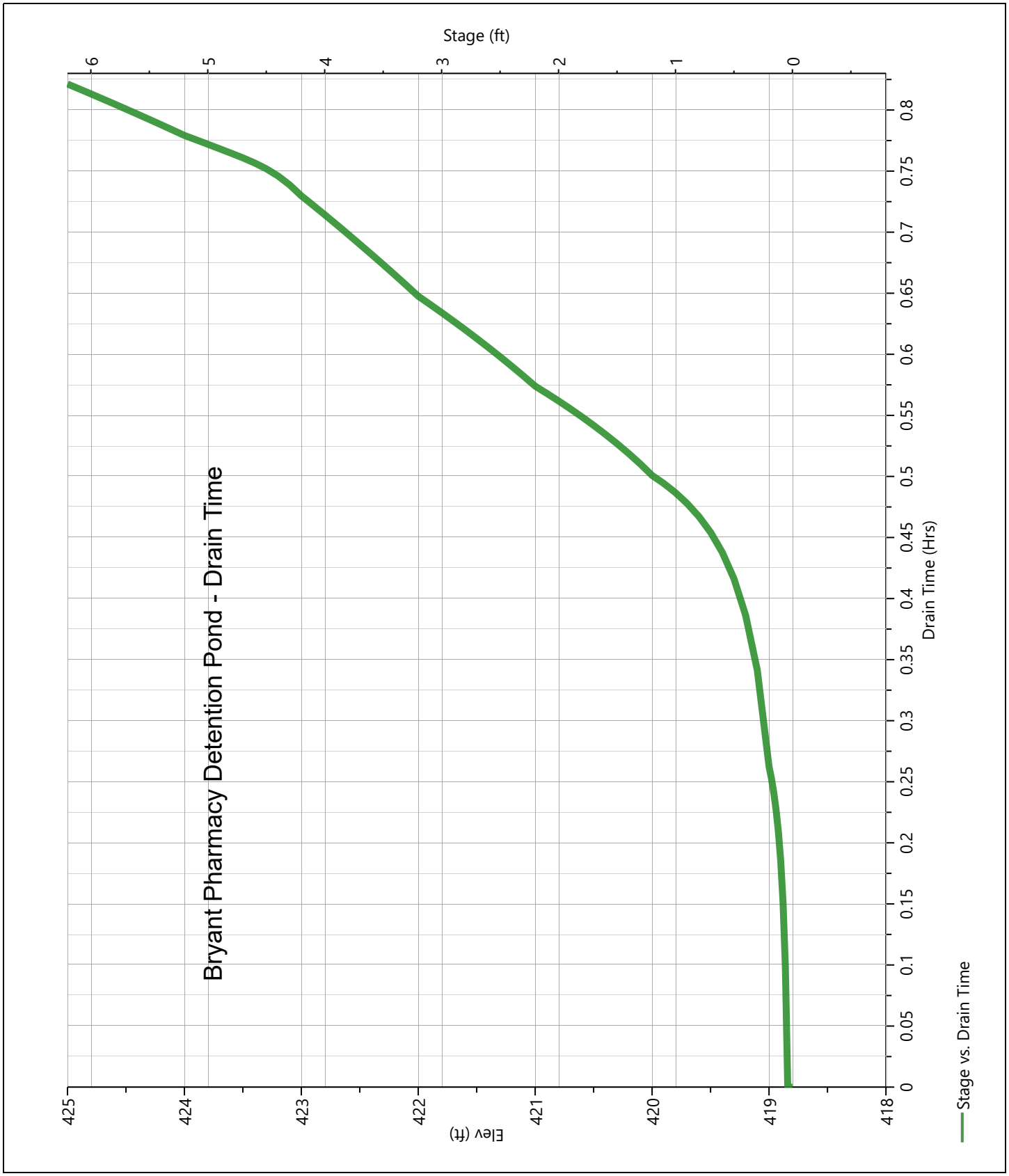
Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	418.80	0.000	0.000	0.000			0.000							0.000
0.20	419.00	41.8	0.133 ic	0.133			0.000							0.133
1.20	420.00	615	2.597 ic	2.597			0.000							2.597
2.20	421.00	1,534	4.368 ic	4.368			0.000							4.368
3.20	422.00	2,857	5.584 oc	5.584			0.000							5.584
4.20	423.00	4,638	6.503 oc	6.503			0.000							6.503
5.20	424.00	6,935	17.95 ic	0.000			0.000							17.95
6.20	425.00	9,802	19.86 ic	0.000			0.000							19.86

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Bryant Pharmacy Detention Pond

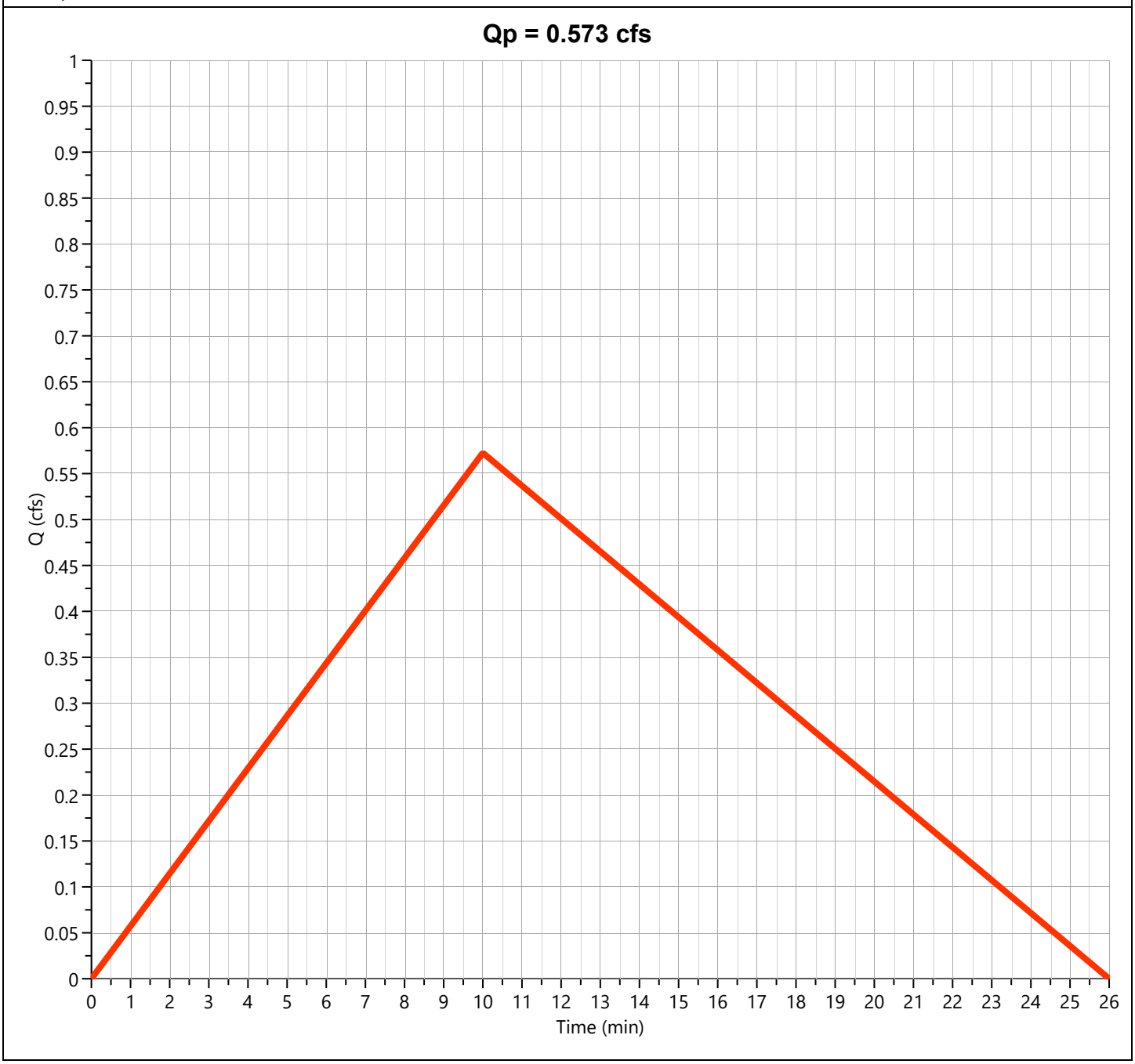
Pond Drawdown



Post-Dev Basin B

Hyd. No. 10

Hydrograph Type	= Rational	Peak Flow	= 0.573 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 459 cuft
Drainage Area	= 0.22 ac	Runoff Coeff.	= 0.58
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.49 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin B
Rational

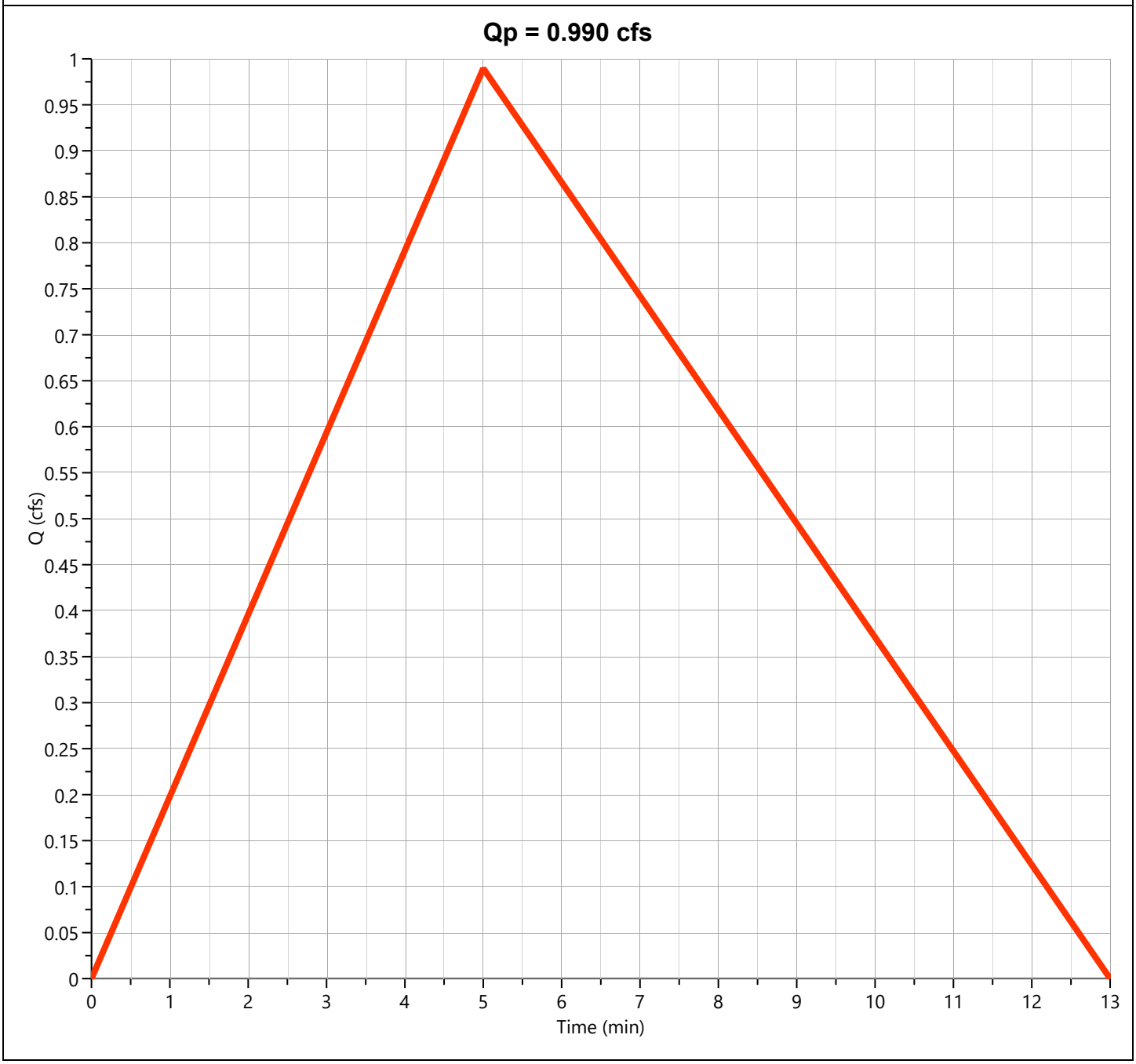
Hyd. No. 10

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	5.17			
Travel Time (min)	**10.00**	**0.00**	**0.00**	**10.00**
Shallow Concentrated Flow				
Flow Length (ft)	37			
Watercourse Slope (%)	3.29	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	2.93			
Travel Time (min)	**0.21**	**0.00**	**0.00**	**0.21**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**10 min**

Post-Dev Basin "C"

Hyd. No. 11

Hydrograph Type	= Rational	Peak Flow	= 0.990 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 396 cuft
Drainage Area	= 0.237 ac	Runoff Coeff.	= 0.68
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.14 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"
Rational

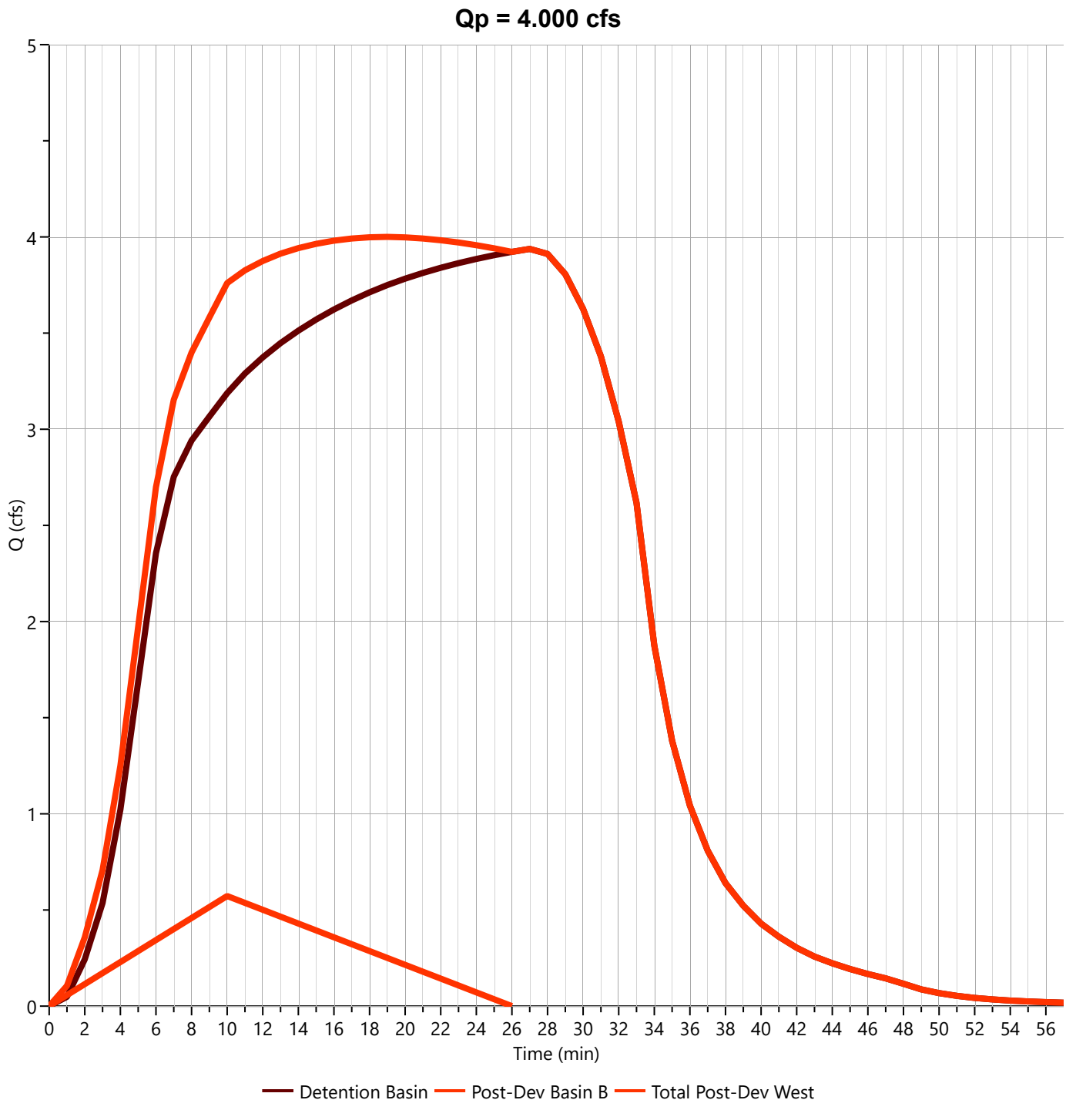
Hyd. No. 11

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	52			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	8			
Travel Time (min)	**4.97**	**0.00**	**0.00**	**4.97**
Shallow Concentrated Flow				
Flow Length (ft)				
Watercourse Slope (%)	0.00	0.00	0.00	
Surface Description	Paved	Paved	Paved	
Average Velocity (ft/s)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**5 min**

Total Post-Dev West

Hyd. No. 12

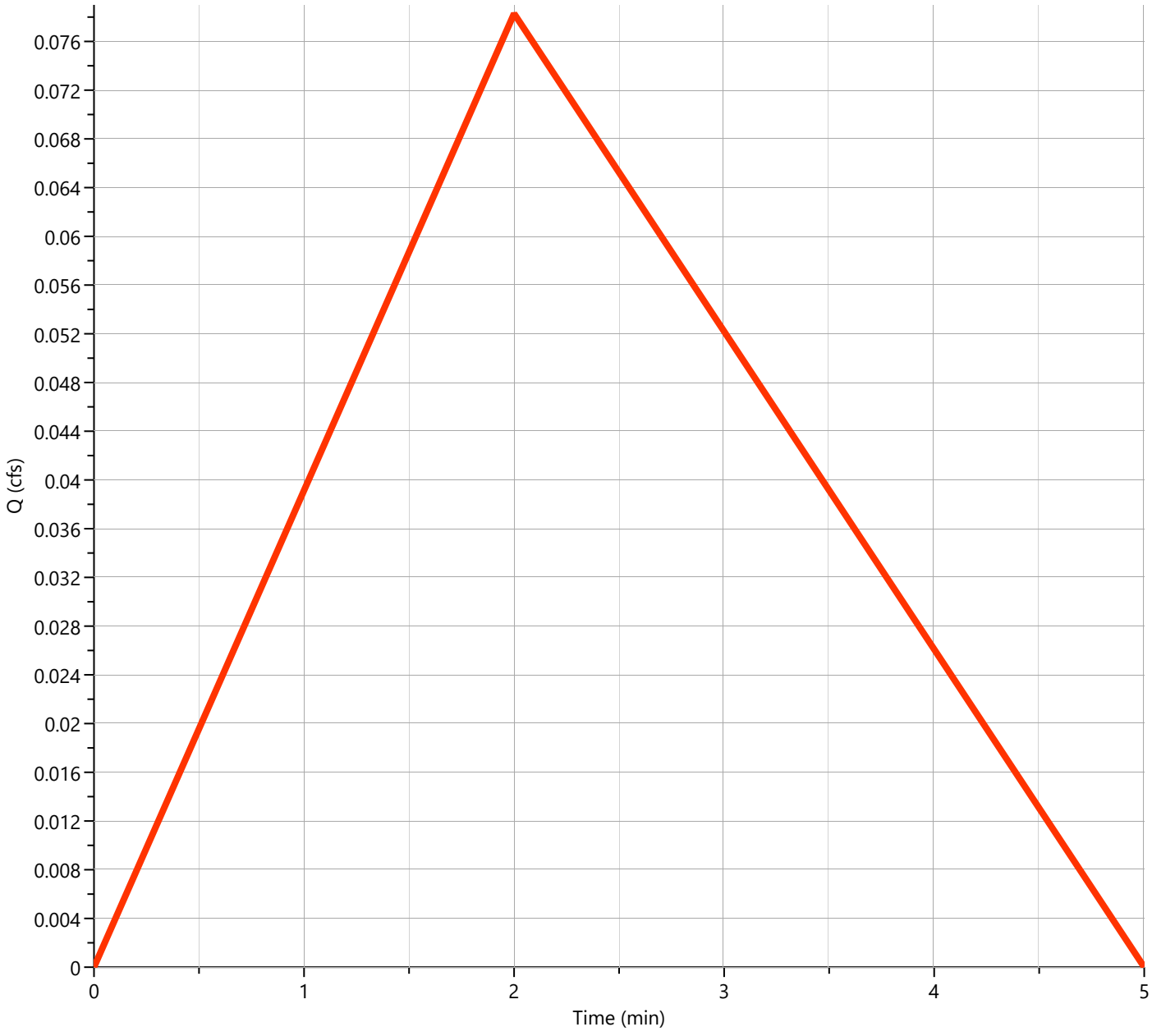
Hydrograph Type	= Junction	Peak Flow	= 4.000 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 7,055 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 0.22 ac



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.078 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.03 hrs
Time Interval	= 1 min	Runoff Volume	= 12.5 cuft
Drainage Area	= 0.017 ac	Runoff Coeff.	= 0.75
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 2.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.14 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"
Rational

Hyd. No. 13

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	11			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	2			
Travel Time (min)	**2.50**	**0.00**	**0.00**	**2.50**
Shallow Concentrated Flow				
Flow Length (ft)				
Watercourse Slope (%)	0.00	0.00	0.00	
Surface Description	Paved	Paved	Paved	
Average Velocity (ft/s)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**2 min**

Hydrograph 10-yr Summary

Hydrology Studio v 3.0.0.39

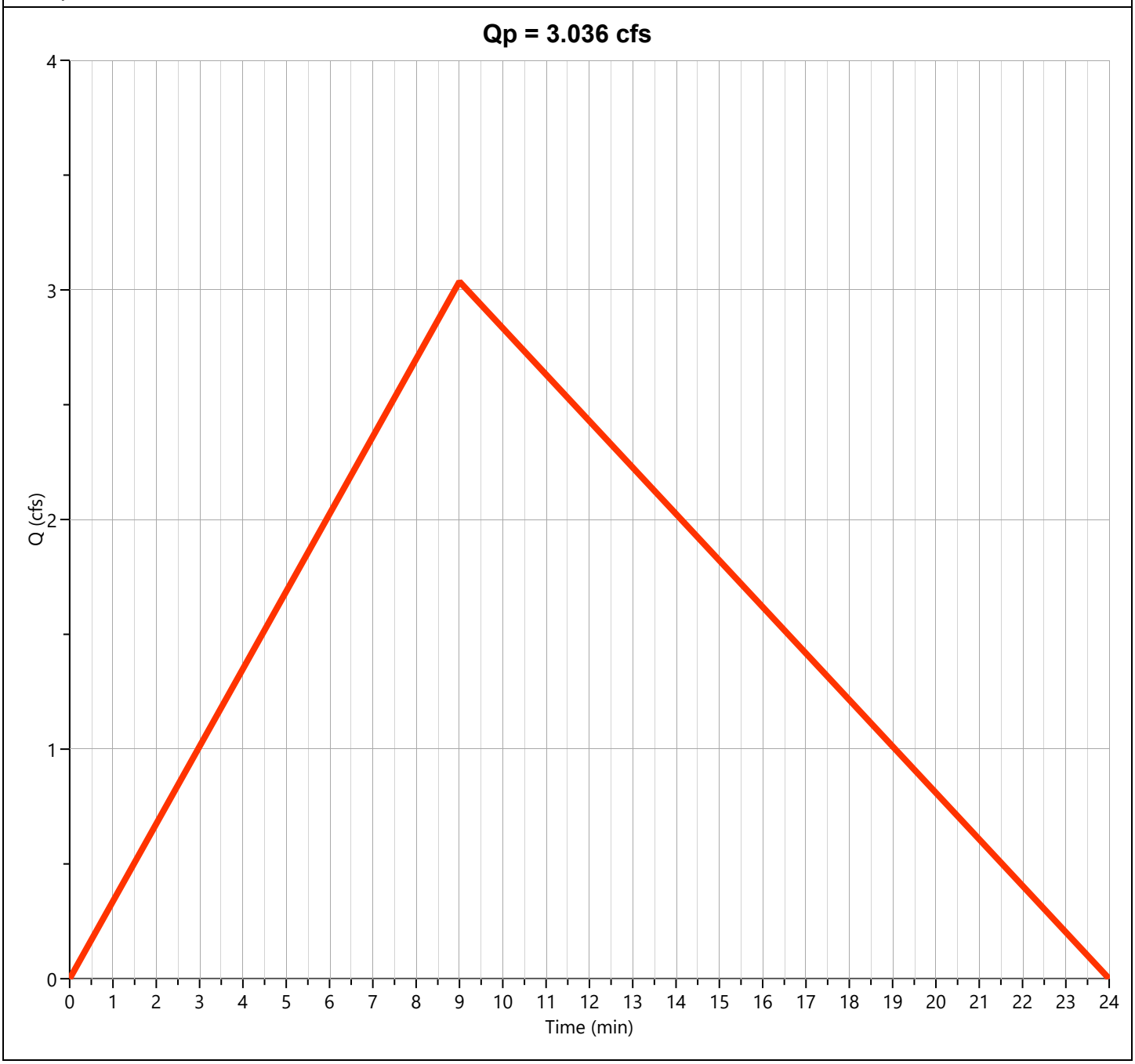
Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Rational	Pre-Dev Basin "A"	3.036	0.15	2,189	----		
2	Rational	Pre-Dev Basin "B"	2.964	0.12	1,662	----		
3	Junction	Total Pre-Dev West	5.461	0.15	3,787	1, 2		
4	Rational	Pre-Dev Basin "C"	0.545	0.27	699	----		
5	Rational	Pre-Dev Basin "D"	1.055	0.20	1,014	----		
6	Rational	Pre-Dev Basin "E"	0.707	0.17	566	----		
7	Junction	Total Pre-Dev East	1.673	0.20	1,564	5, 6		
8	Mod Rational	Post-Dev Basin A	5.483	0.08	8,883	----		
9	Pond Route	Detention Basin	4.978	0.45	8,881	8	421.47	2,141
10	Rational	Post-Dev Basin B	0.767	0.17	615	----		
11	Rational	Post-Dev Basin "C"	1.323	0.08	530	----		
12	Junction	Total Post-Dev West	5.026	0.32	9,480	9, 10		
13	Rational	Post-Dev Basin "D"	0.105	0.03	16.8	----		

Pre-Dev Basin "A"

Hyd. No. 1

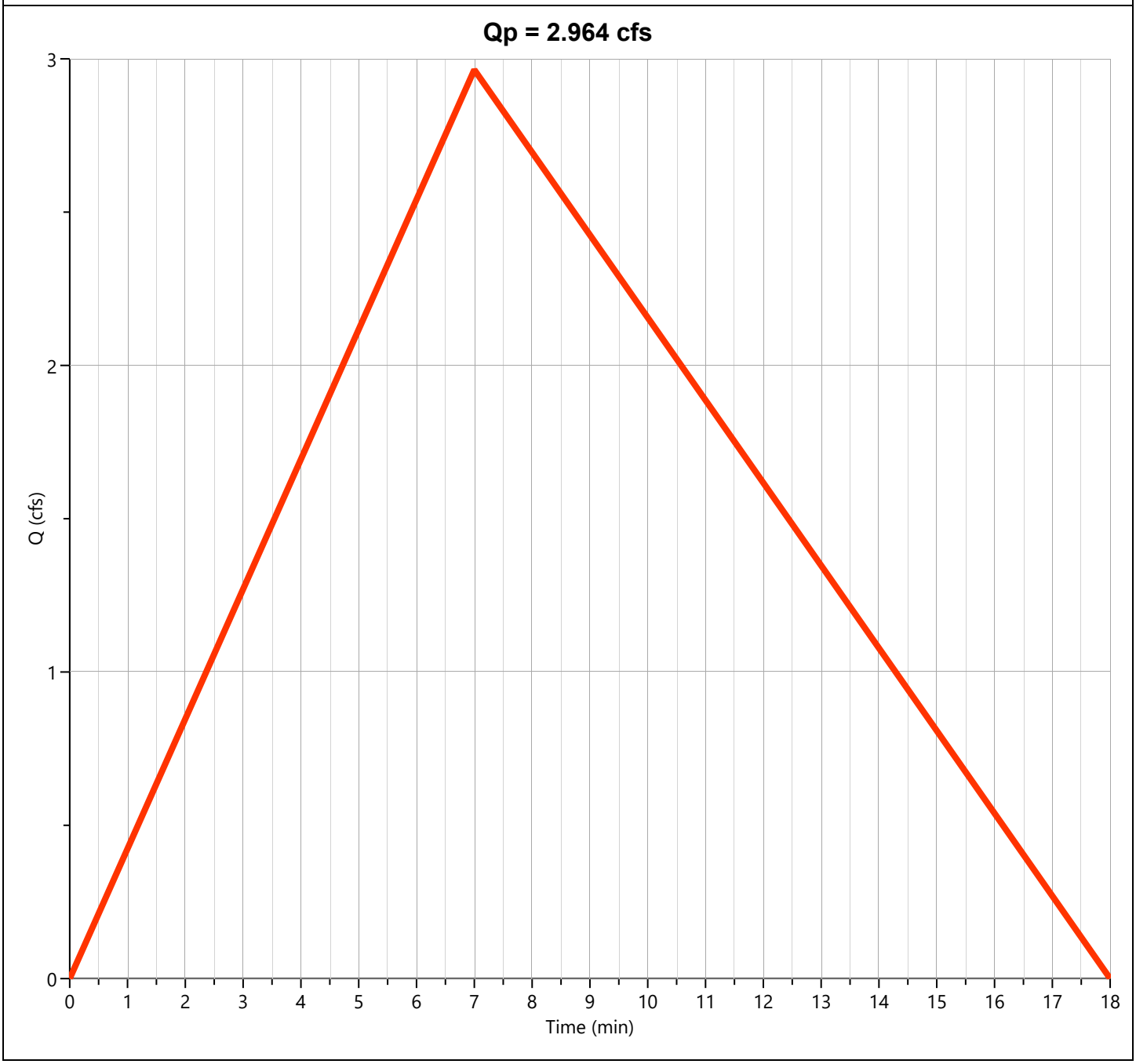
Hydrograph Type	= Rational	Peak Flow	= 3.036 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 2,189 cuft
Drainage Area	= 0.86 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 9.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

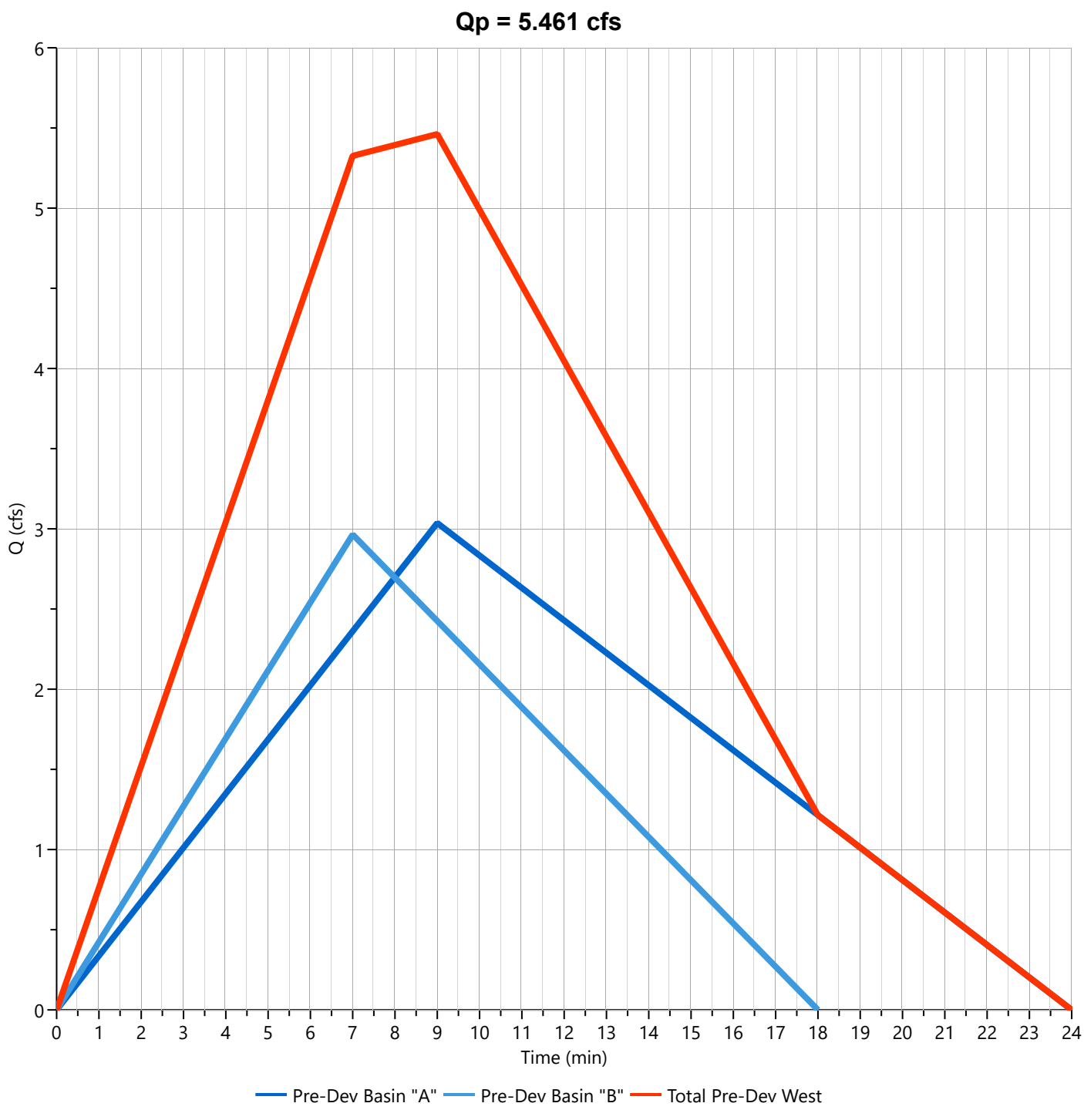
Hydrograph Type	= Rational	Peak Flow	= 2.964 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,662 cuft
Drainage Area	= 0.75 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.06 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

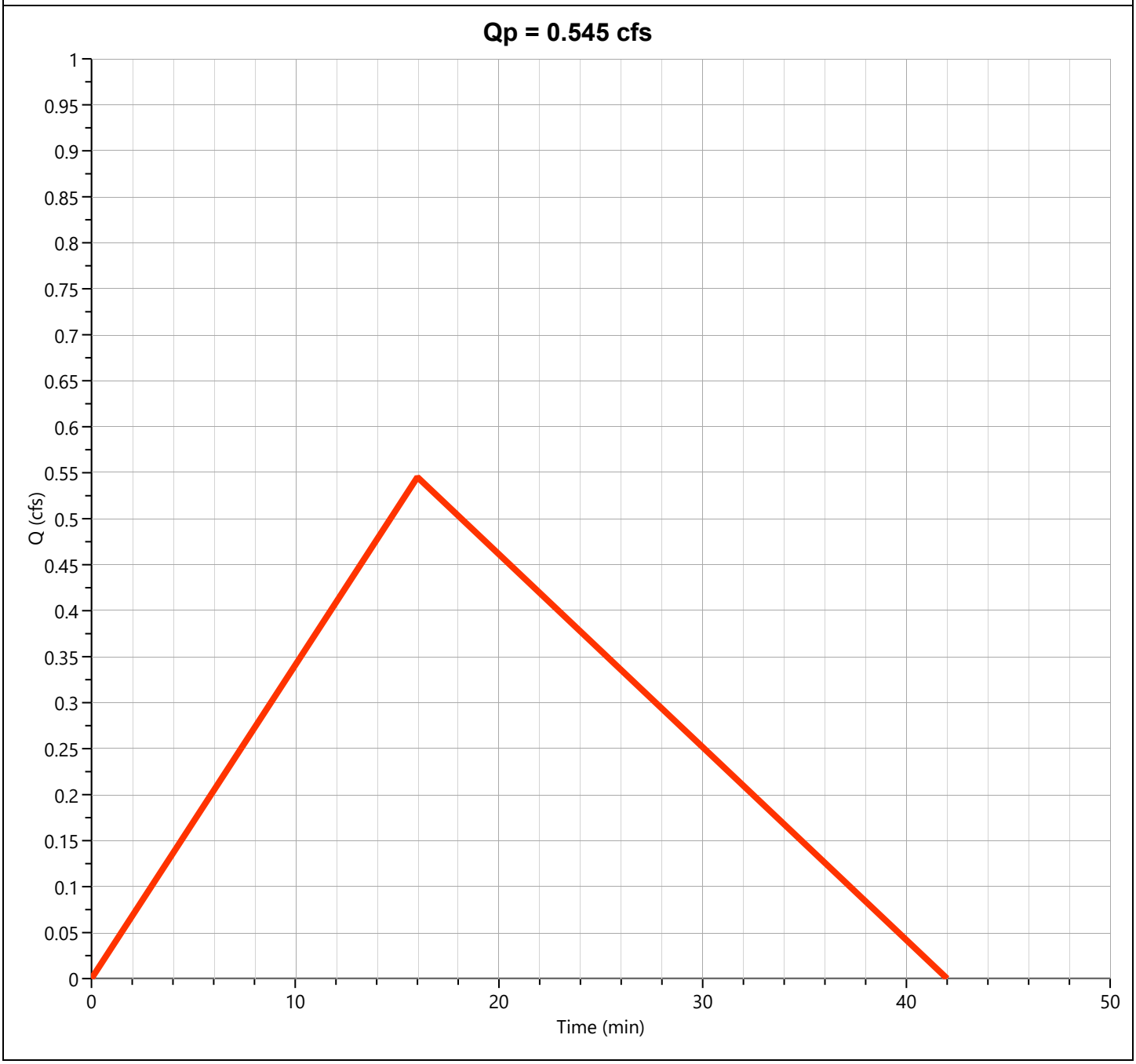
Hydrograph Type	= Junction	Peak Flow	= 5.461 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Hydrograph Volume	= 3,787 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 1.61 ac



Pre-Dev Basin "C"

Hyd. No. 4

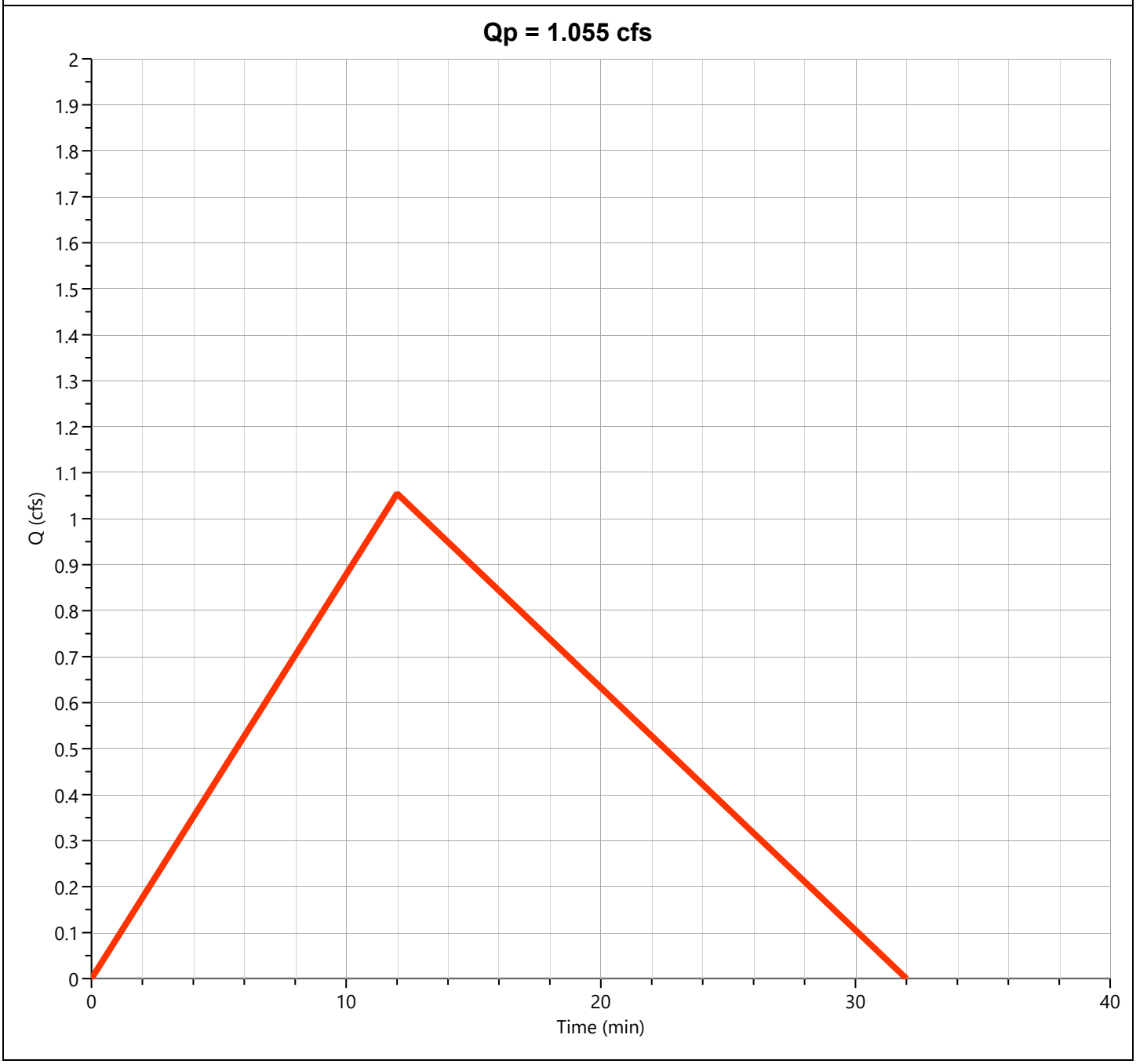
Hydrograph Type	= Rational	Peak Flow	= 0.545 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 699 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.87 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

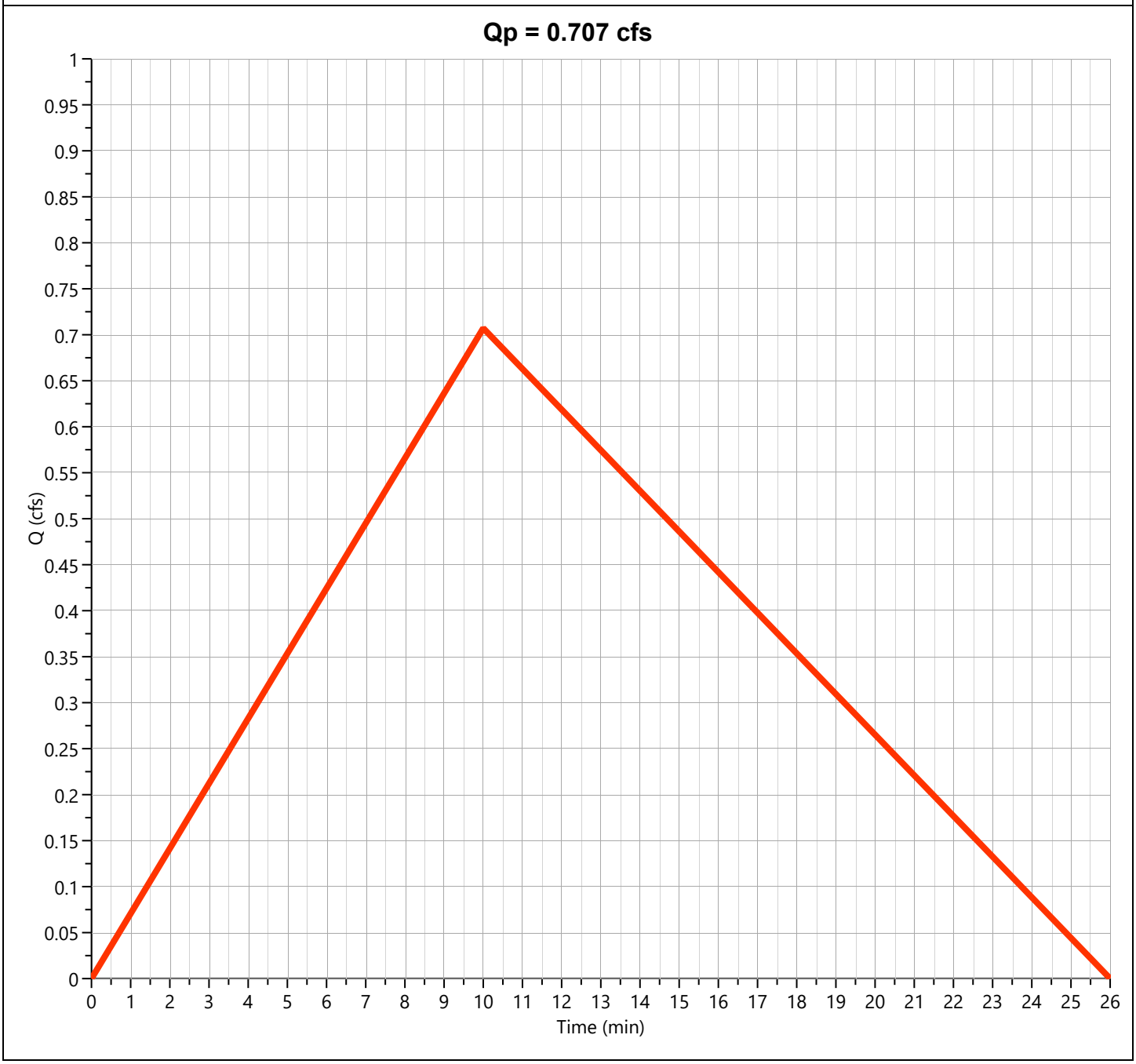
Hydrograph Type	= Rational	Peak Flow	= 1.055 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 1,014 cuft
Drainage Area	= 0.34 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.54 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "E"

Hyd. No. 6

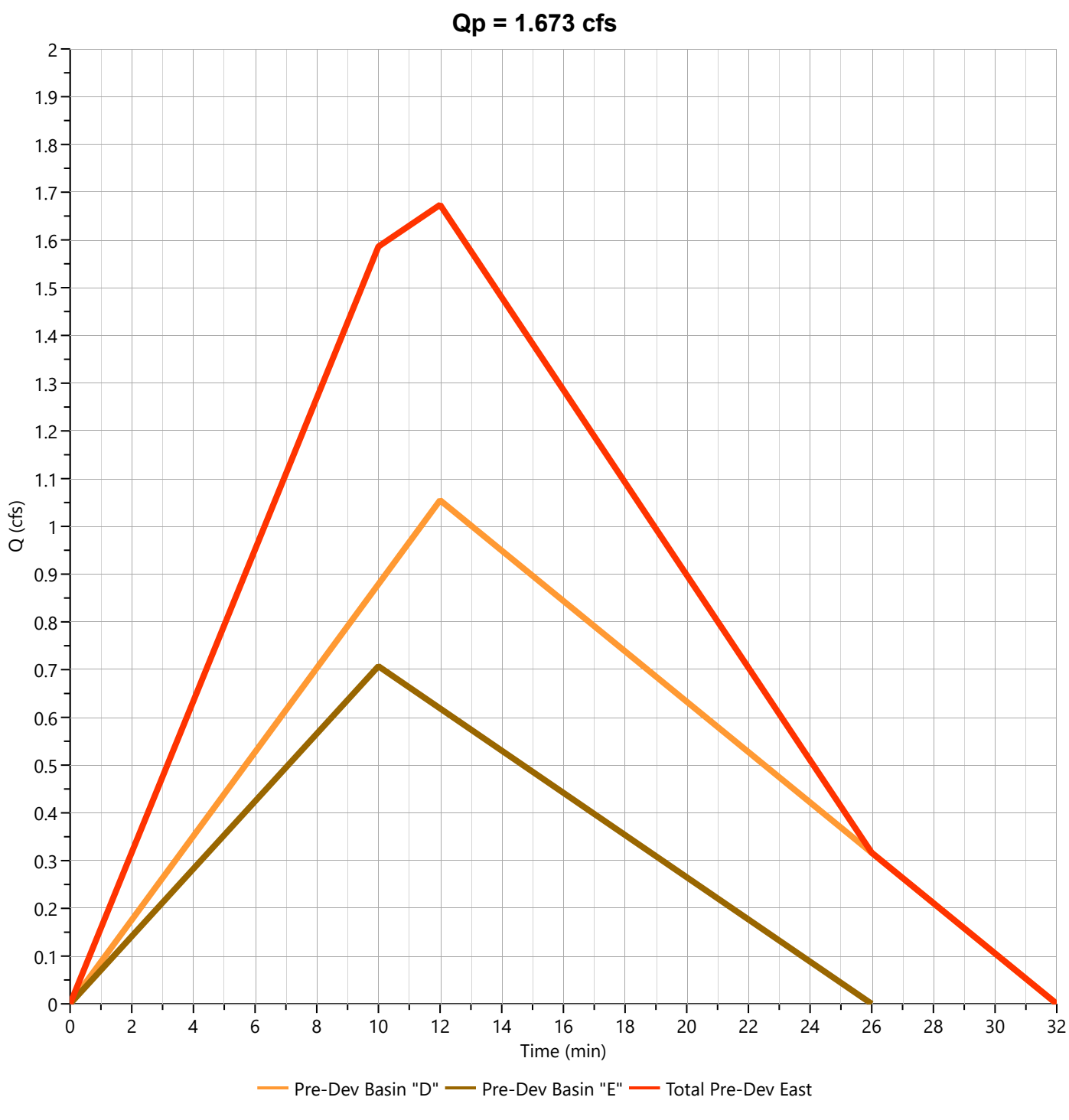
Hydrograph Type	= Rational	Peak Flow	= 0.707 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 566 cuft
Drainage Area	= 0.21 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.01 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 7

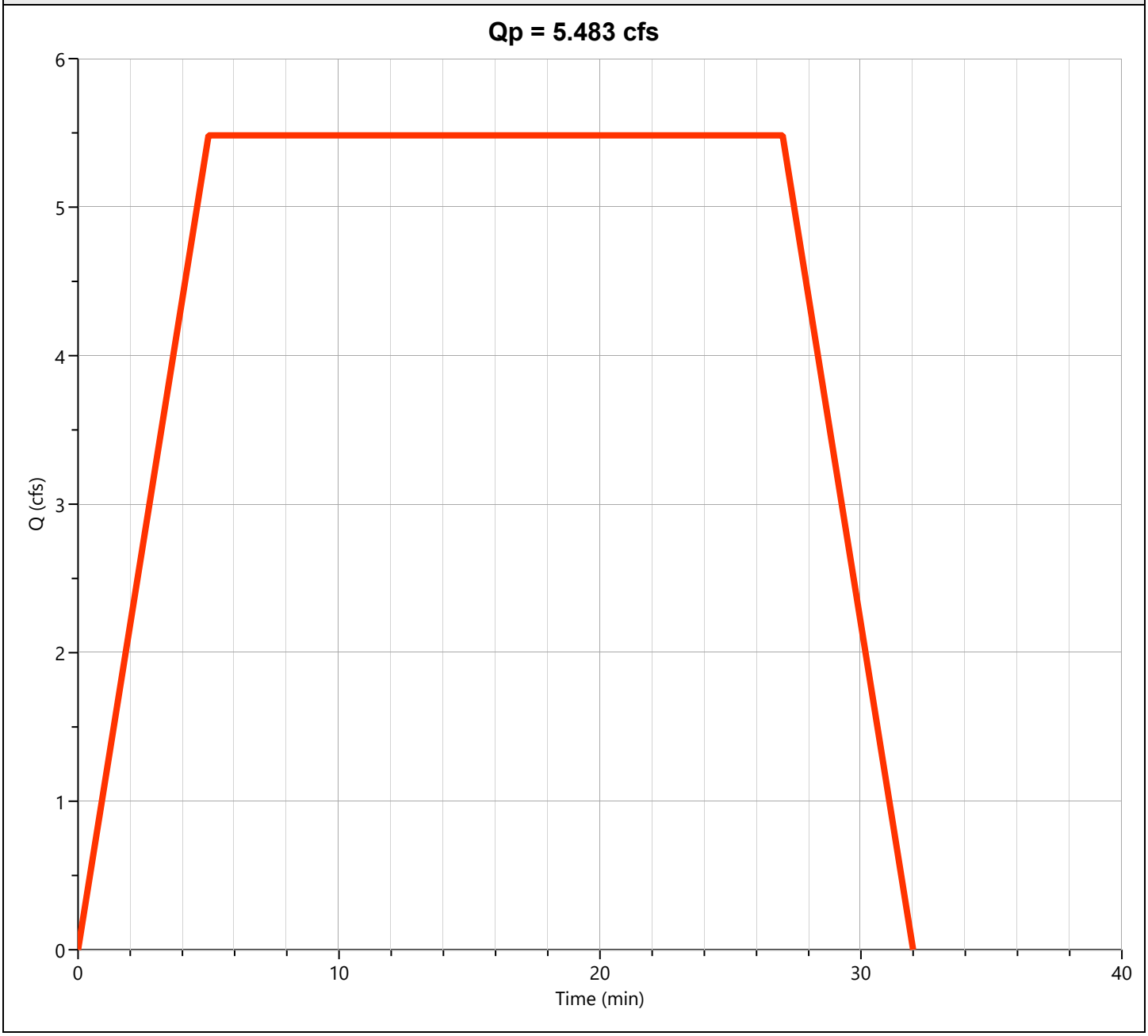
Hydrograph Type	= Junction	Peak Flow	= 1.673 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,564 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 0.55 ac



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 5.483 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 8,883 cuft
Drainage Area	= 1.5 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.85 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 5.4 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



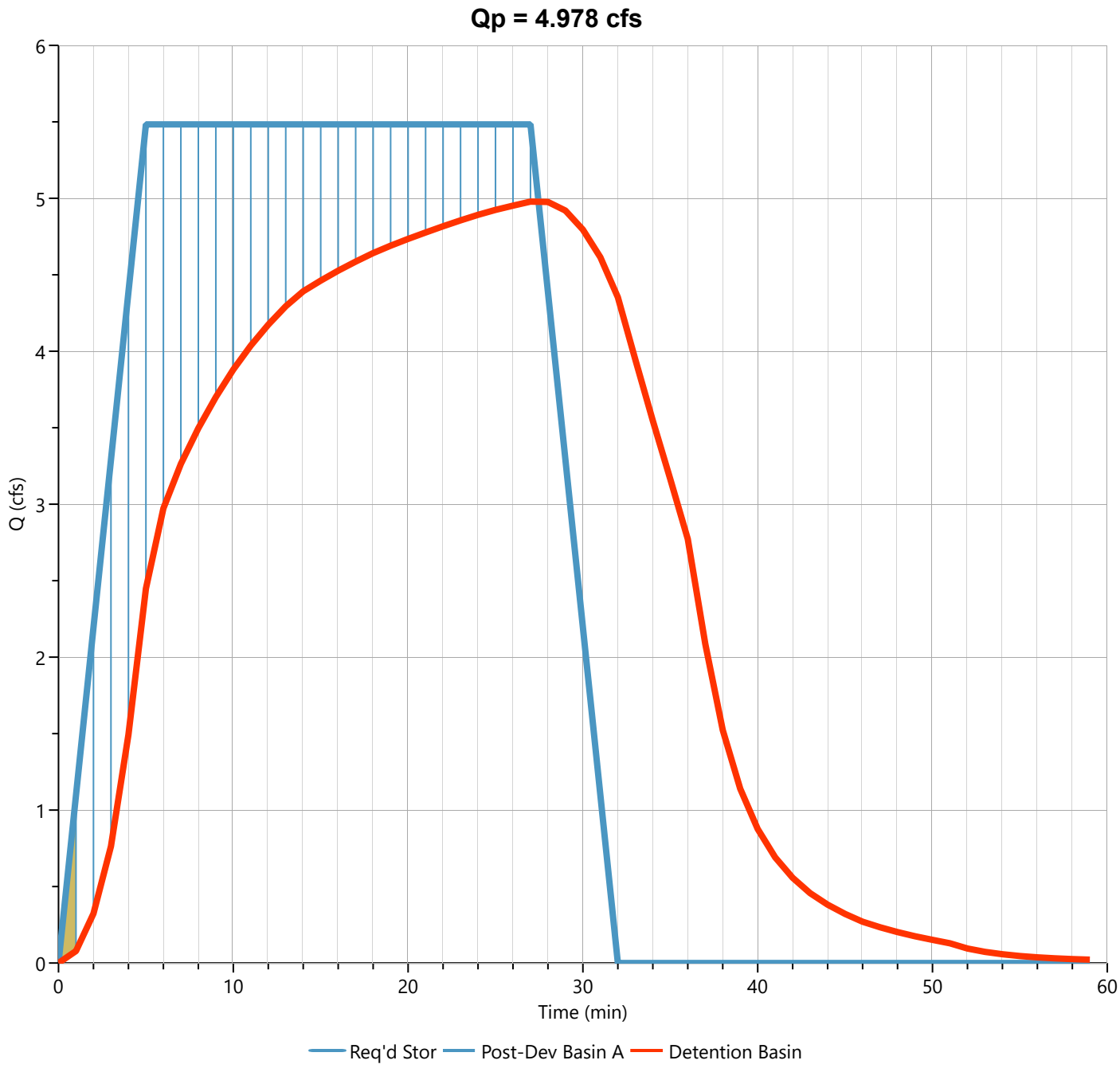
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 4.978 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.45 hrs
Time Interval	= 1 min	Hydrograph Volume	= 8,881 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 421.47 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 2,141 cuft

Pond Routing by Storage Indication Method

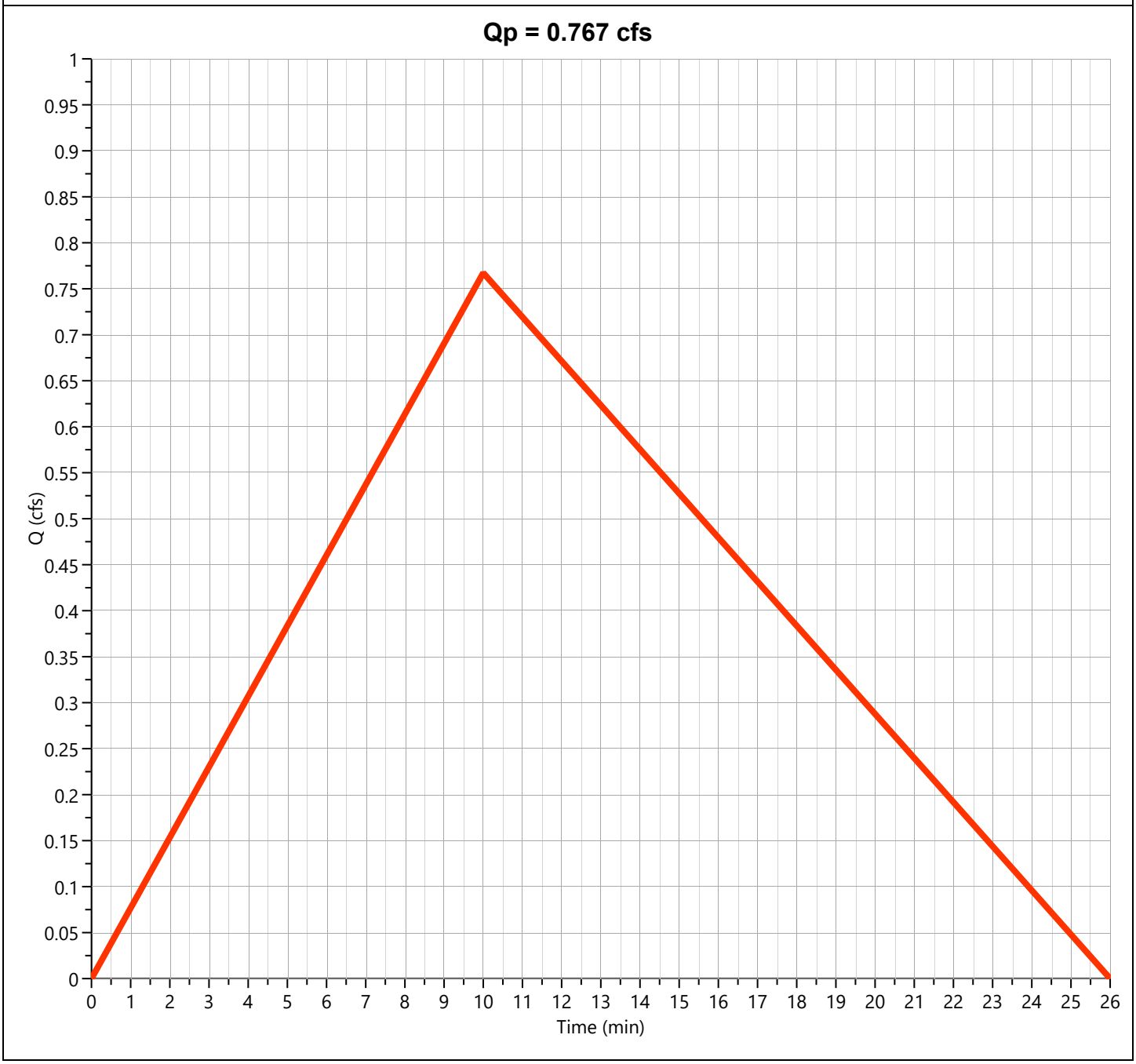
Center of mass detention time = 6 min



Post-Dev Basin B

Hyd. No. 10

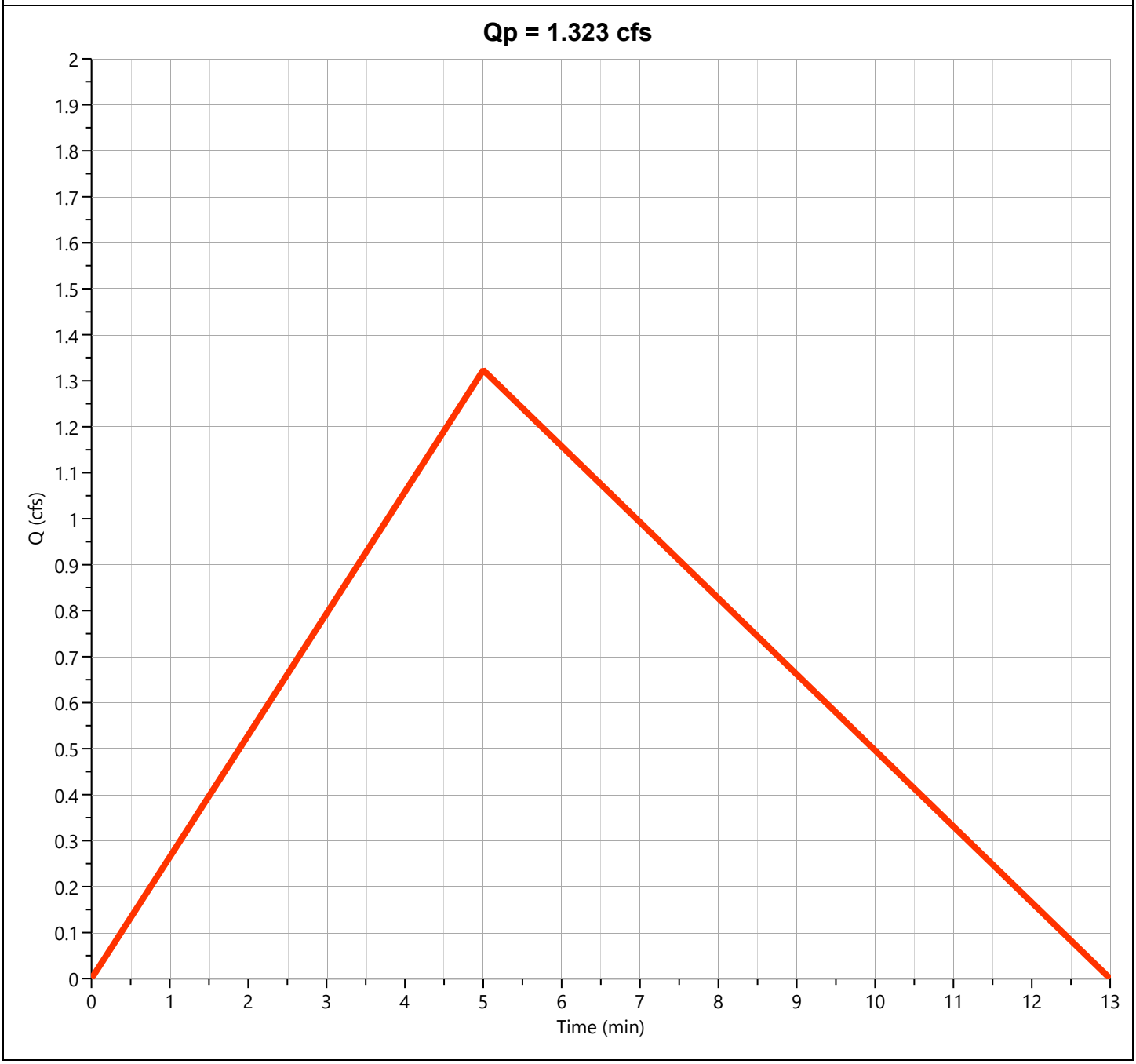
Hydrograph Type	= Rational	Peak Flow	= 0.767 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 615 cuft
Drainage Area	= 0.22 ac	Runoff Coeff.	= 0.58
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.01 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 11

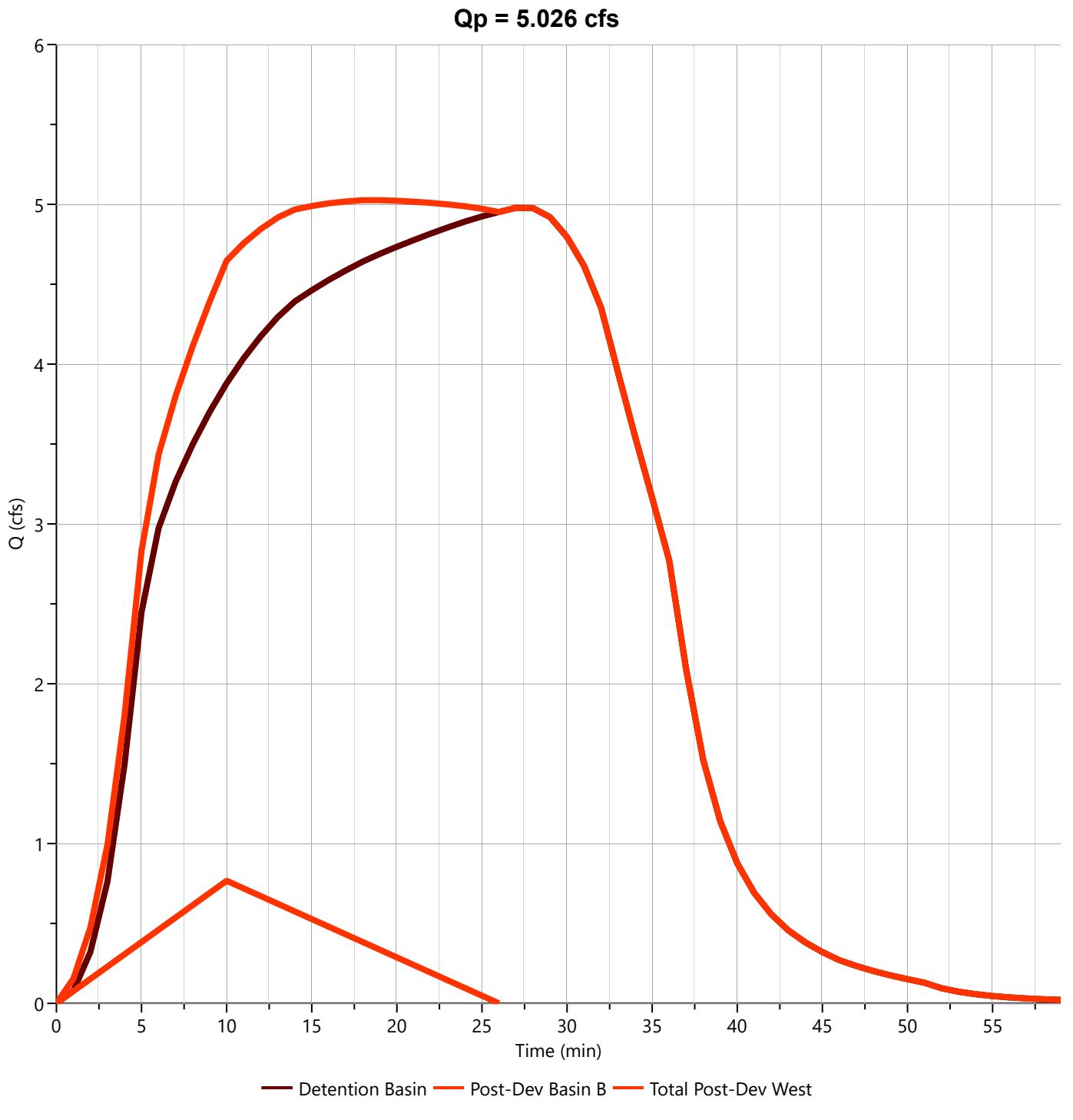
Hydrograph Type	= Rational	Peak Flow	= 1.323 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 530 cuft
Drainage Area	= 0.237 ac	Runoff Coeff.	= 0.68
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.21 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 12

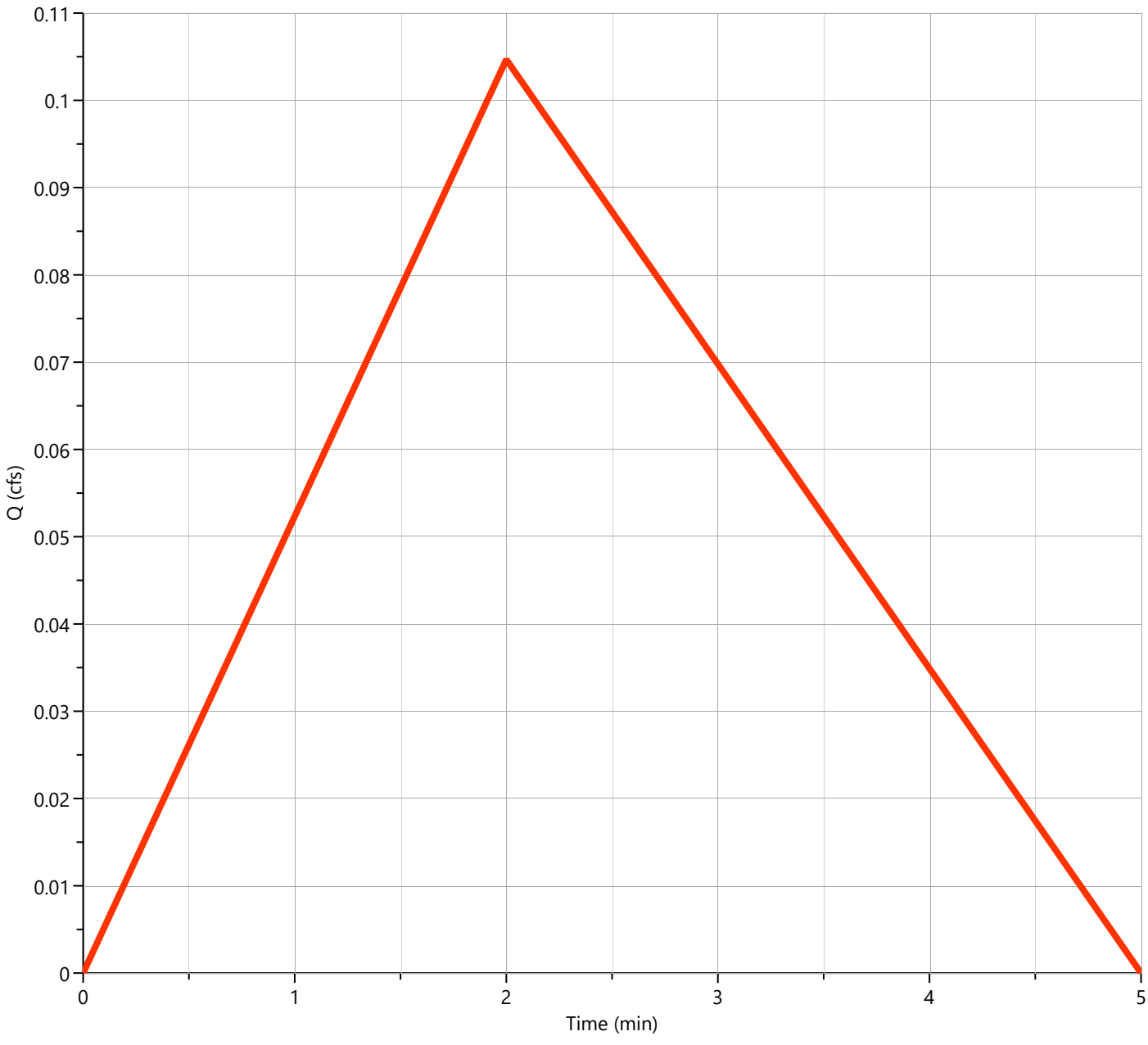
Hydrograph Type	= Junction	Peak Flow	= 5.026 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 9,480 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 0.22 ac



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.105 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.03 hrs
Time Interval	= 1 min	Runoff Volume	= 16.8 cuft
Drainage Area	= 0.017 ac	Runoff Coeff.	= 0.75
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 2.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.21 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 25-yr Summary

Hydrology Studio v 3.0.0.39

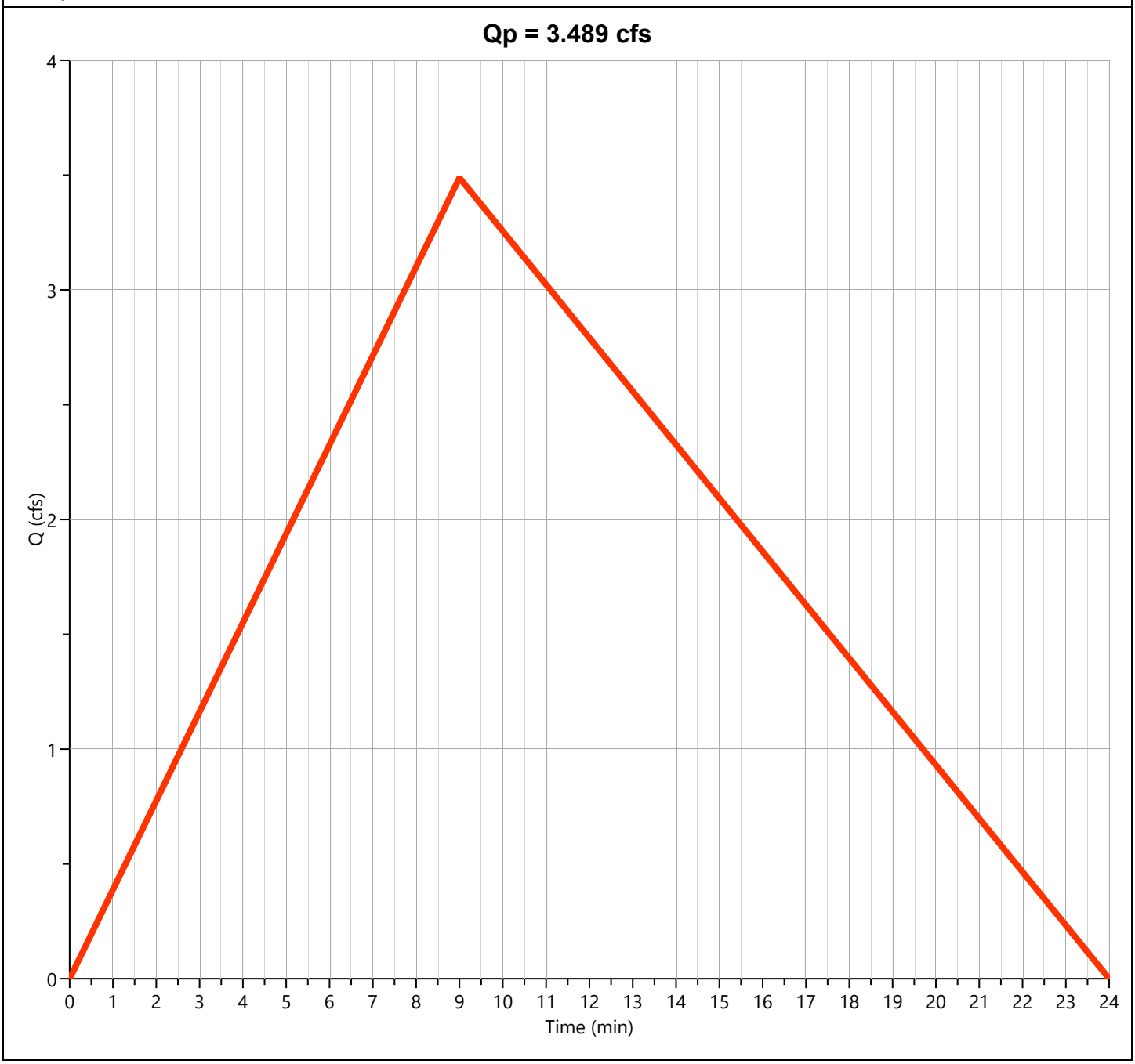
Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Rational	Pre-Dev Basin "A"	3.489	0.15	2,515	----		
2	Rational	Pre-Dev Basin "B"	3.406	0.12	1,909	----		
3	Junction	Total Pre-Dev West	6.275	0.15	4,351	1, 2		
4	Rational	Pre-Dev Basin "C"	0.627	0.27	803	----		
5	Rational	Pre-Dev Basin "D"	1.212	0.20	1,165	----		
6	Rational	Pre-Dev Basin "E"	0.813	0.17	651	----		
7	Junction	Total Pre-Dev East	1.923	0.20	1,797	5, 6		
8	Mod Rational	Post-Dev Basin A	6.305	0.08	10,214	----		
9	Pond Route	Detention Basin	5.521	0.47	10,212	8	421.95	2,780
10	Rational	Post-Dev Basin B	0.882	0.17	706	----		
11	Rational	Post-Dev Basin "C"	1.520	0.08	609	----		
12	Junction	Total Post-Dev West	5.521	0.47	10,899	9, 10		
13	Rational	Post-Dev Basin "D"	0.120	0.03	19.3	----		

Pre-Dev Basin "A"

Hyd. No. 1

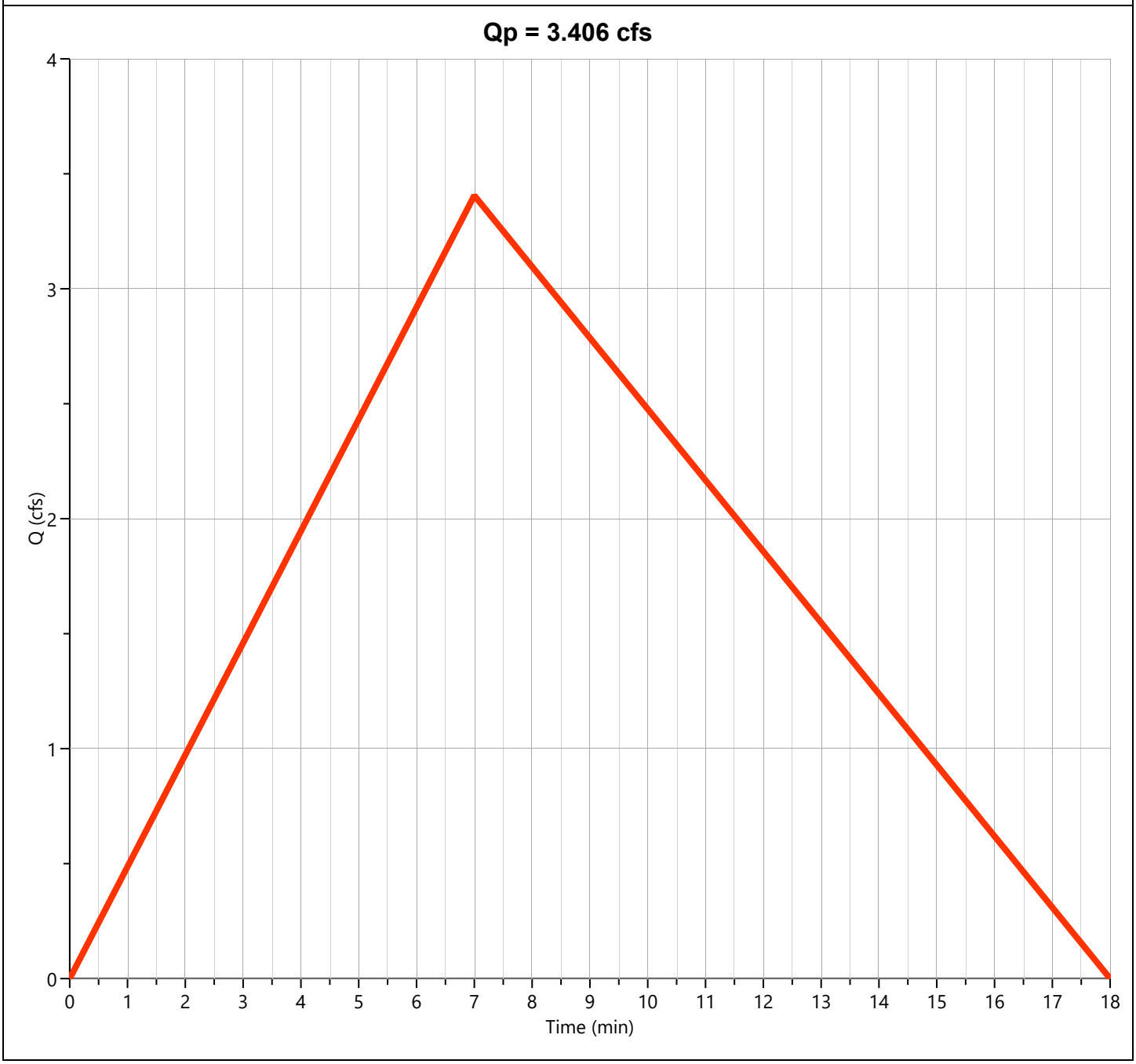
Hydrograph Type	= Rational	Peak Flow	= 3.489 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 2,515 cuft
Drainage Area	= 0.86 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 9.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.24 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

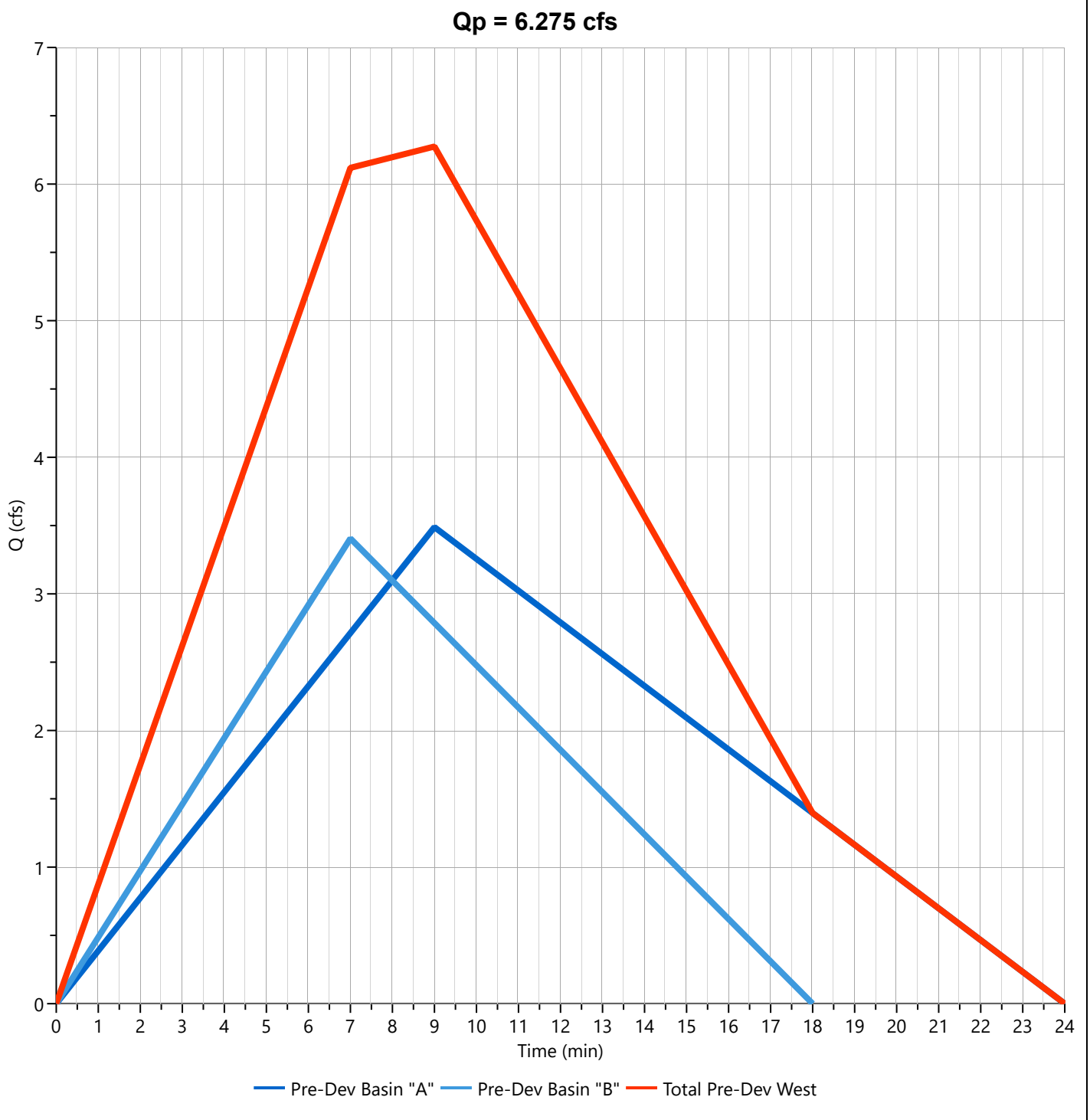
Hydrograph Type	= Rational	Peak Flow	= 3.406 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,909 cuft
Drainage Area	= 0.75 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.11 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

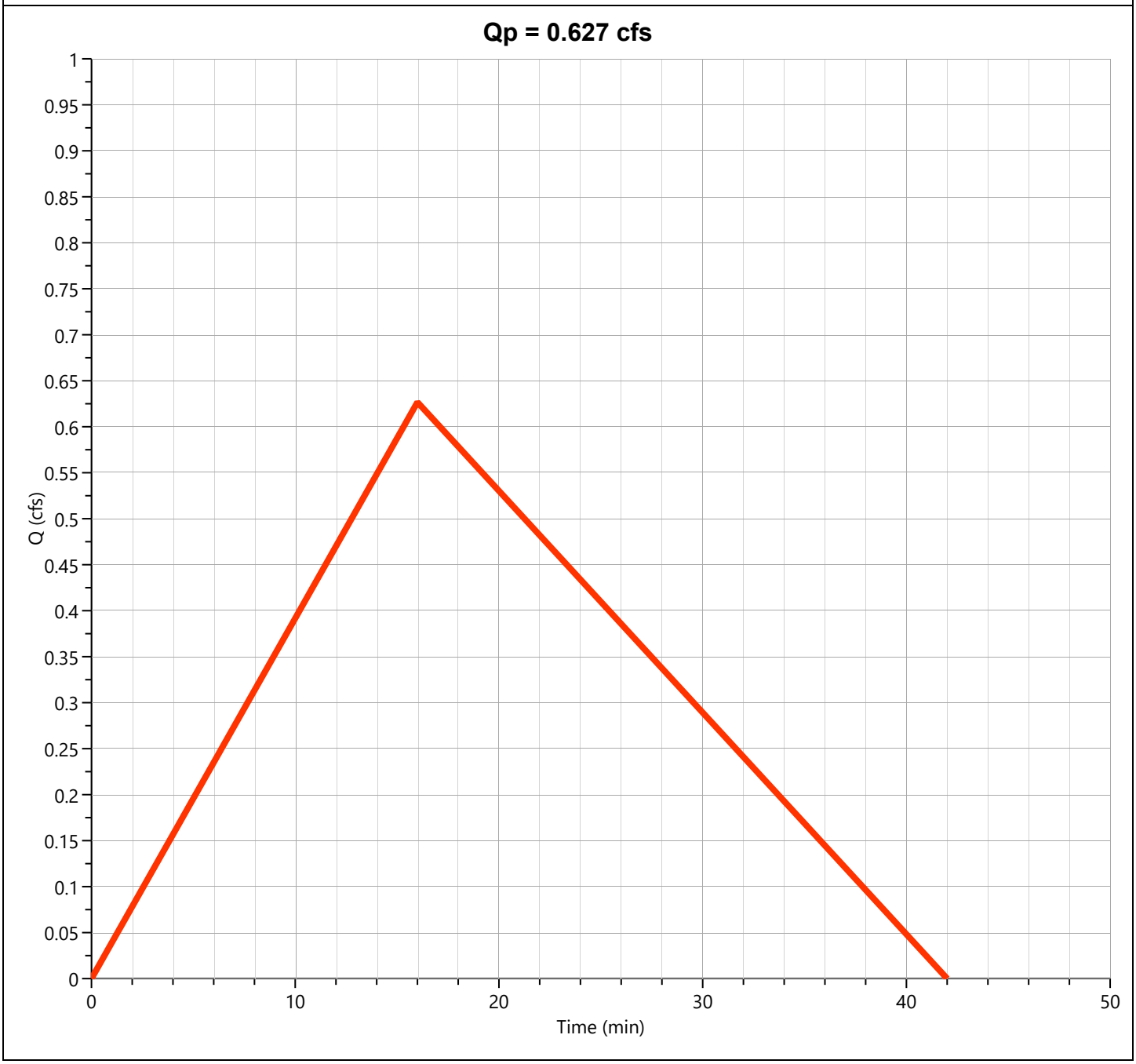
Hydrograph Type	= Junction	Peak Flow	= 6.275 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Hydrograph Volume	= 4,351 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 1.61 ac



Pre-Dev Basin "C"

Hyd. No. 4

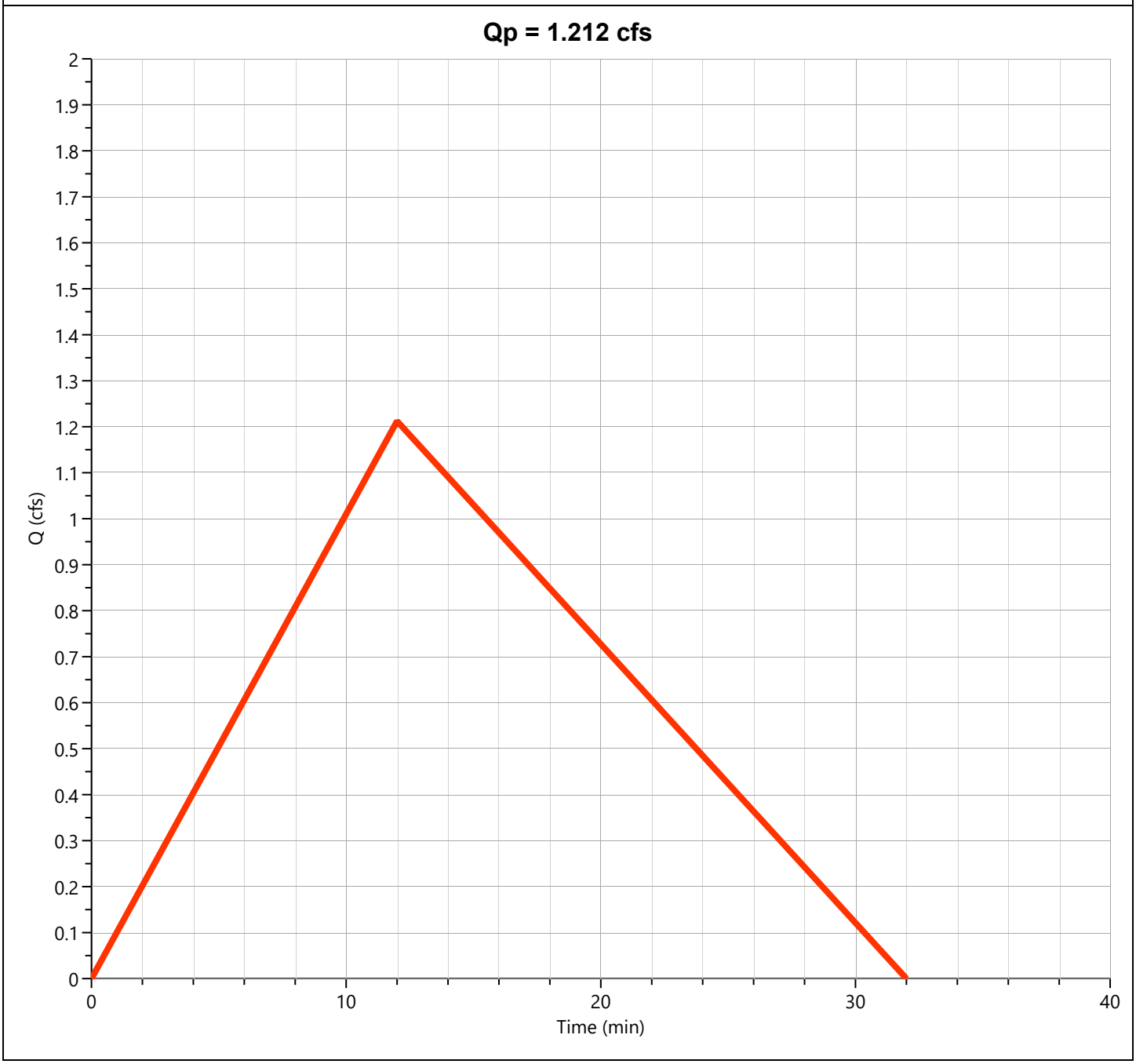
Hydrograph Type	= Rational	Peak Flow	= 0.627 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 803 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.60 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

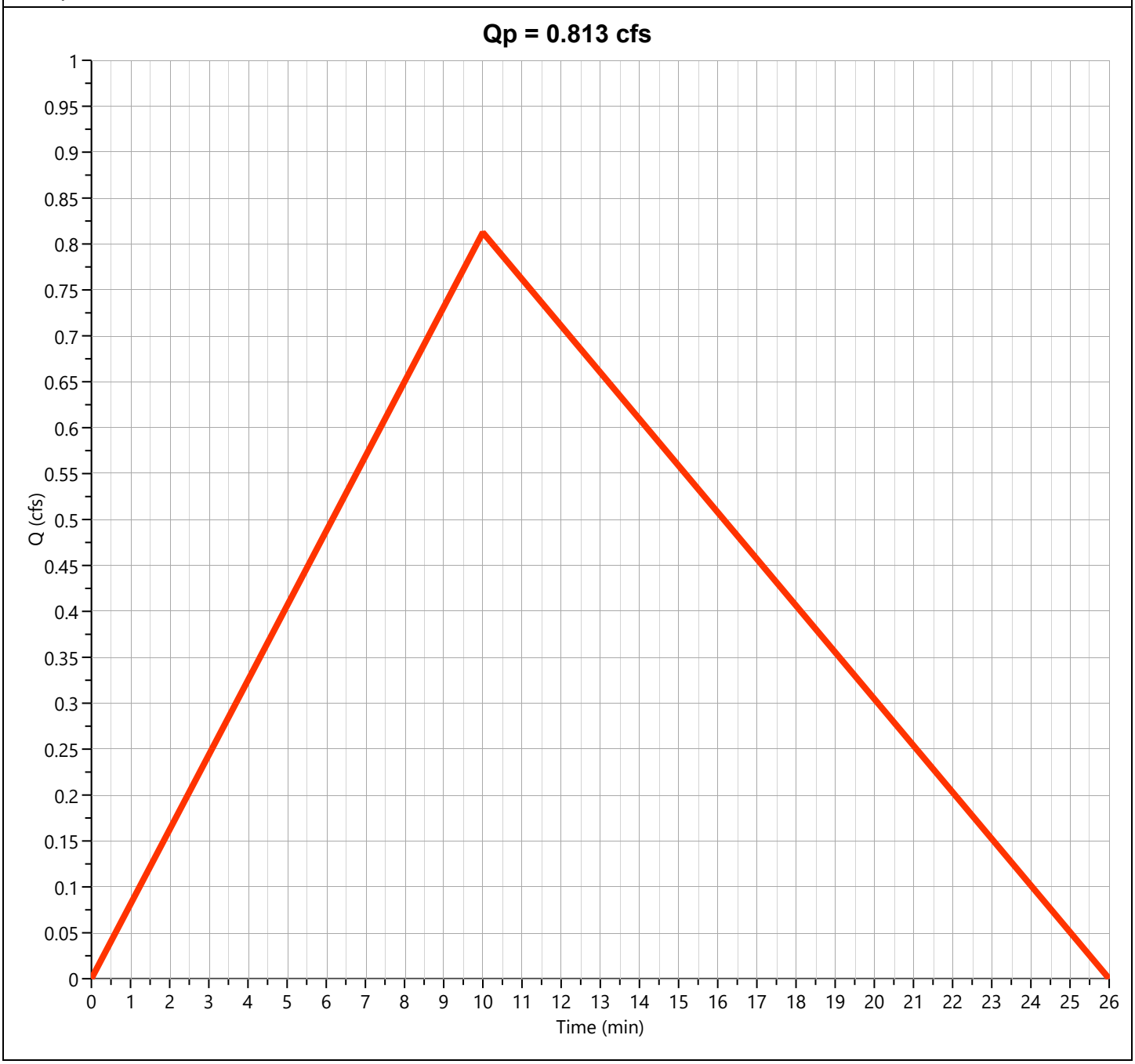
Hydrograph Type	= Rational	Peak Flow	= 1.212 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 1,165 cuft
Drainage Area	= 0.34 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.37 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "E"

Hyd. No. 6

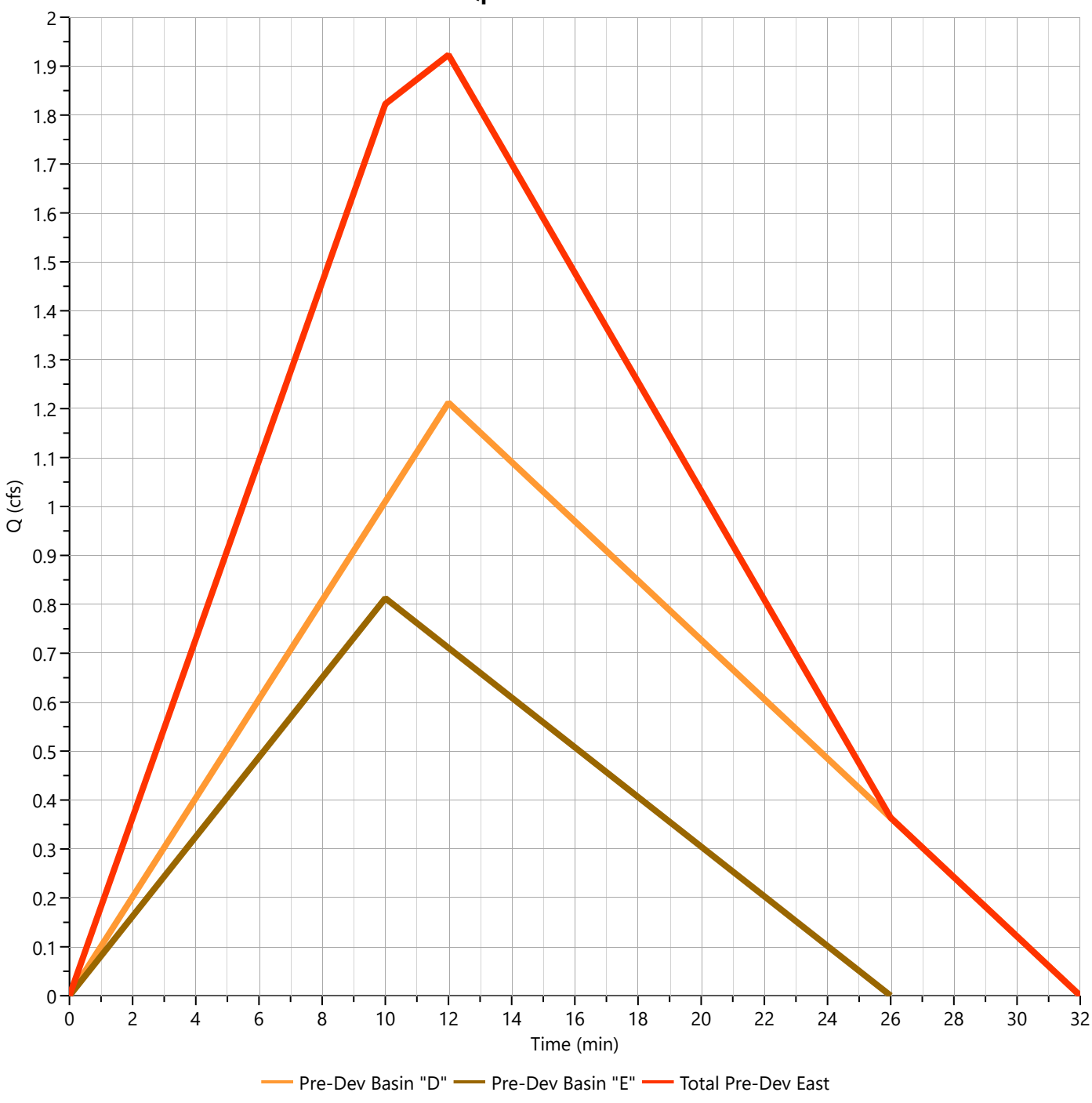
Hydrograph Type	= Rational	Peak Flow	= 0.813 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 651 cuft
Drainage Area	= 0.21 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.91 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 7

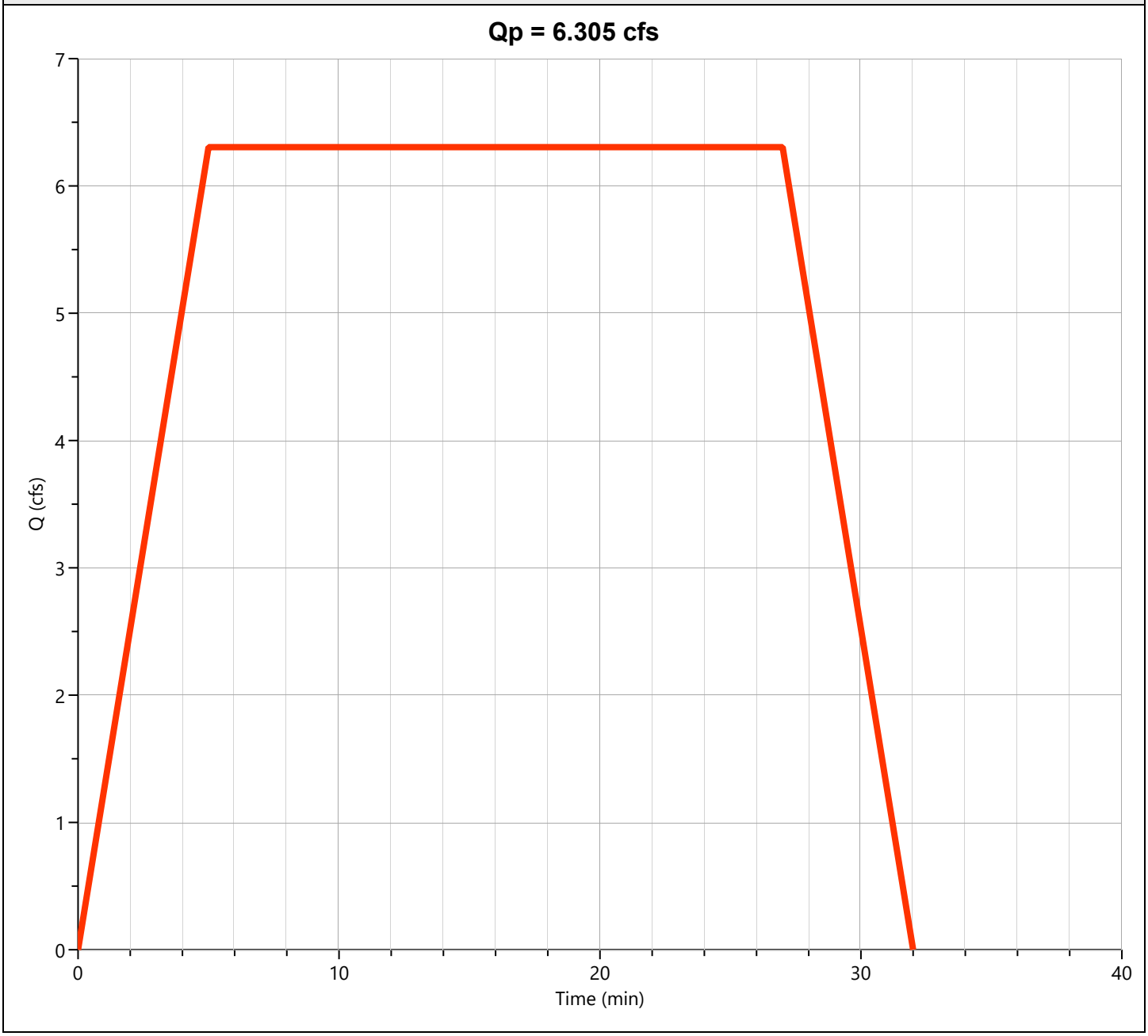
Hydrograph Type	= Junction	Peak Flow	= 1.923 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,797 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 0.55 ac



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 6.305 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 10,214 cuft
Drainage Area	= 1.5 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.42 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 5.4 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



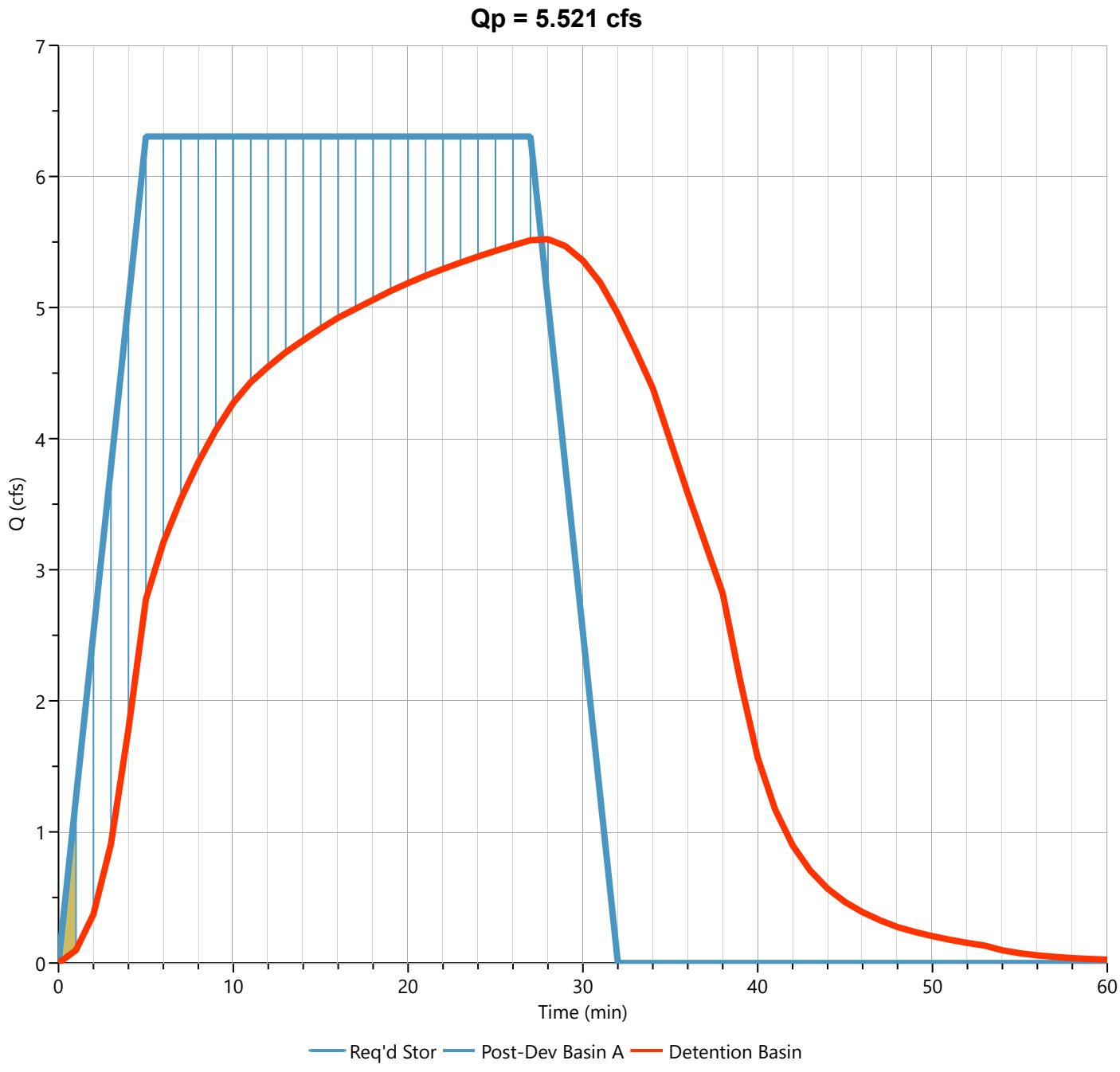
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 5.521 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Hydrograph Volume	= 10,212 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 421.95 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 2,780 cuft

Pond Routing by Storage Indication Method

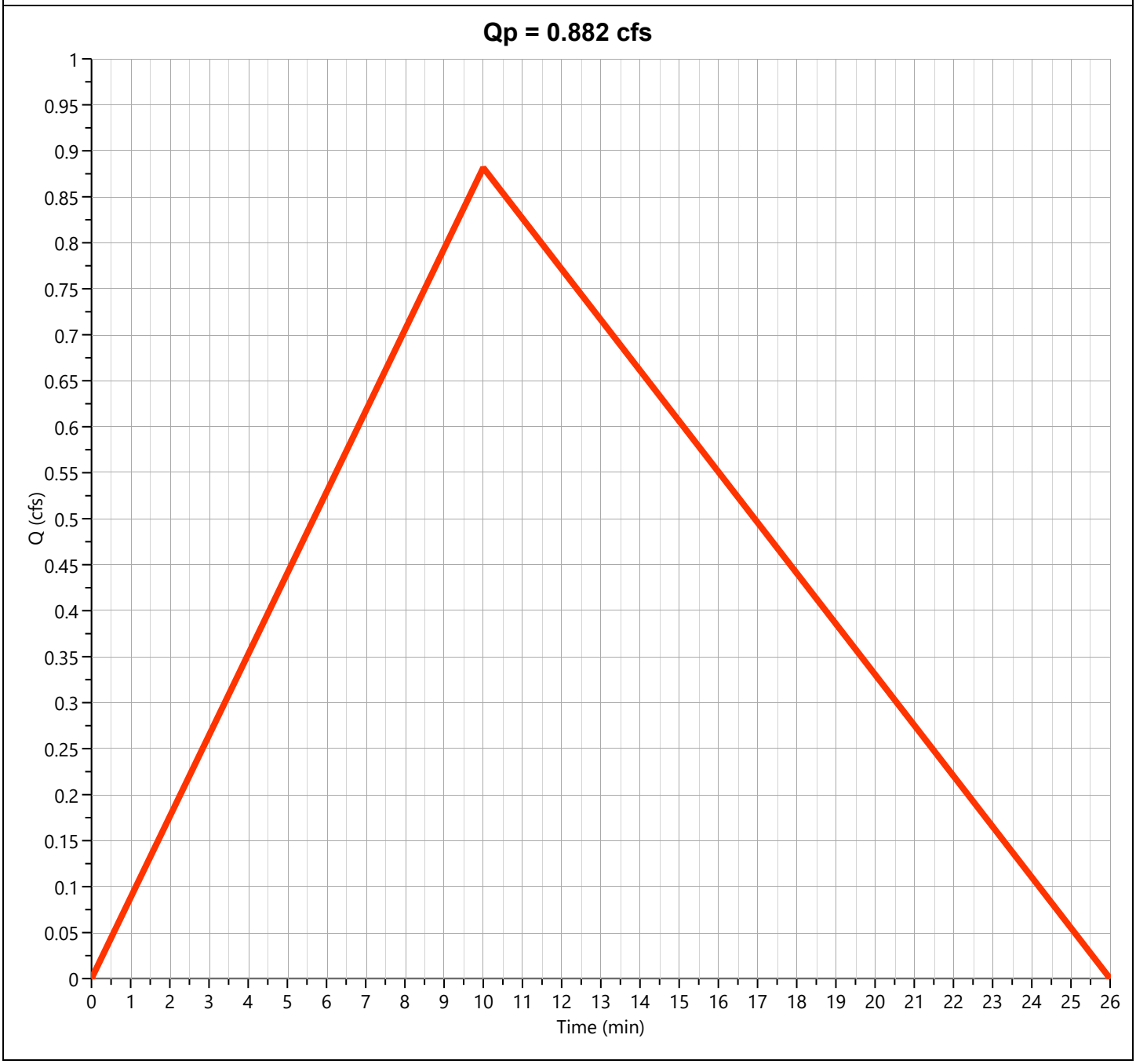
Center of mass detention time = 7 min



Post-Dev Basin B

Hyd. No. 10

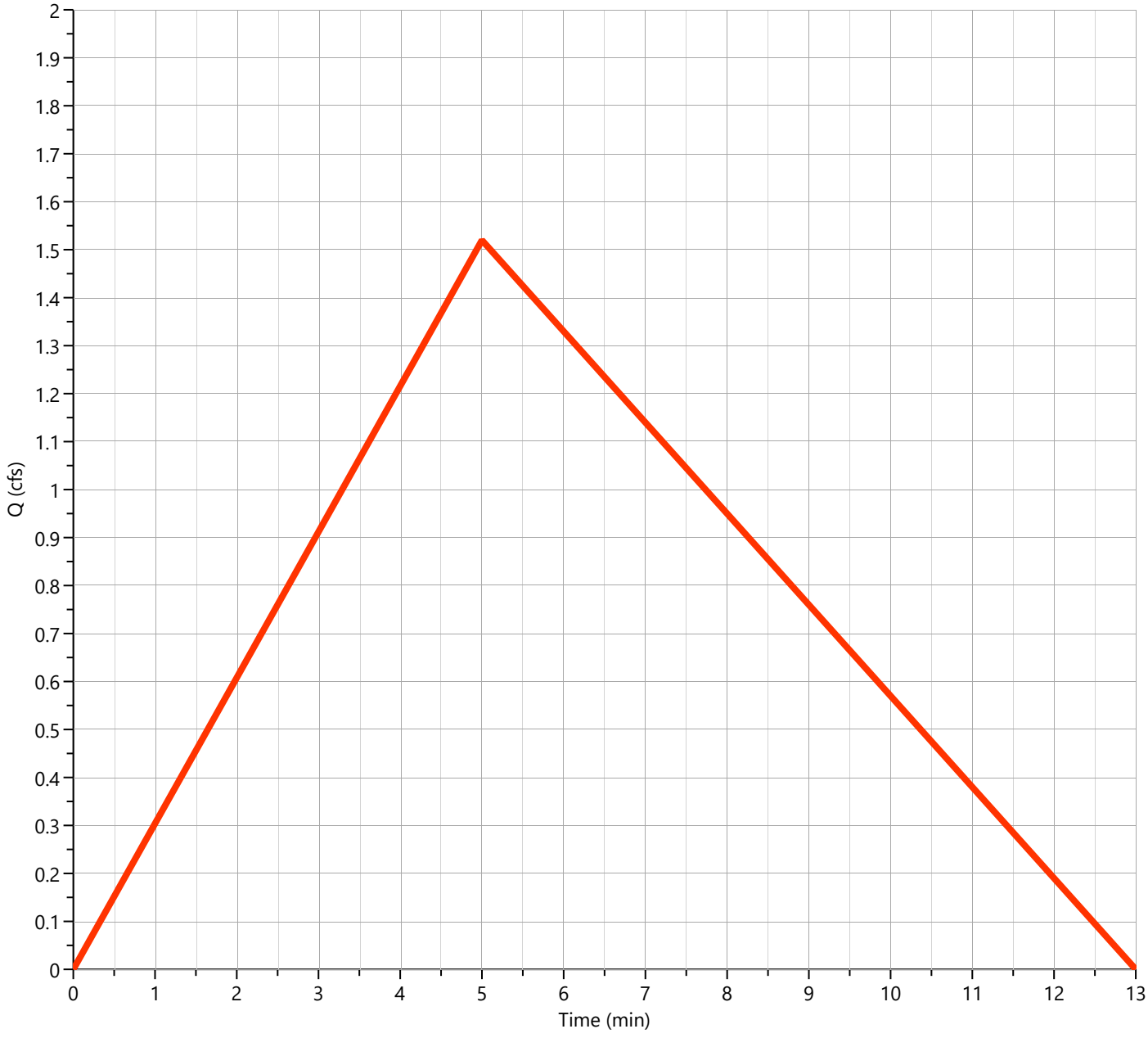
Hydrograph Type	= Rational	Peak Flow	= 0.882 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 706 cuft
Drainage Area	= 0.22 ac	Runoff Coeff.	= 0.58
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.91 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 11

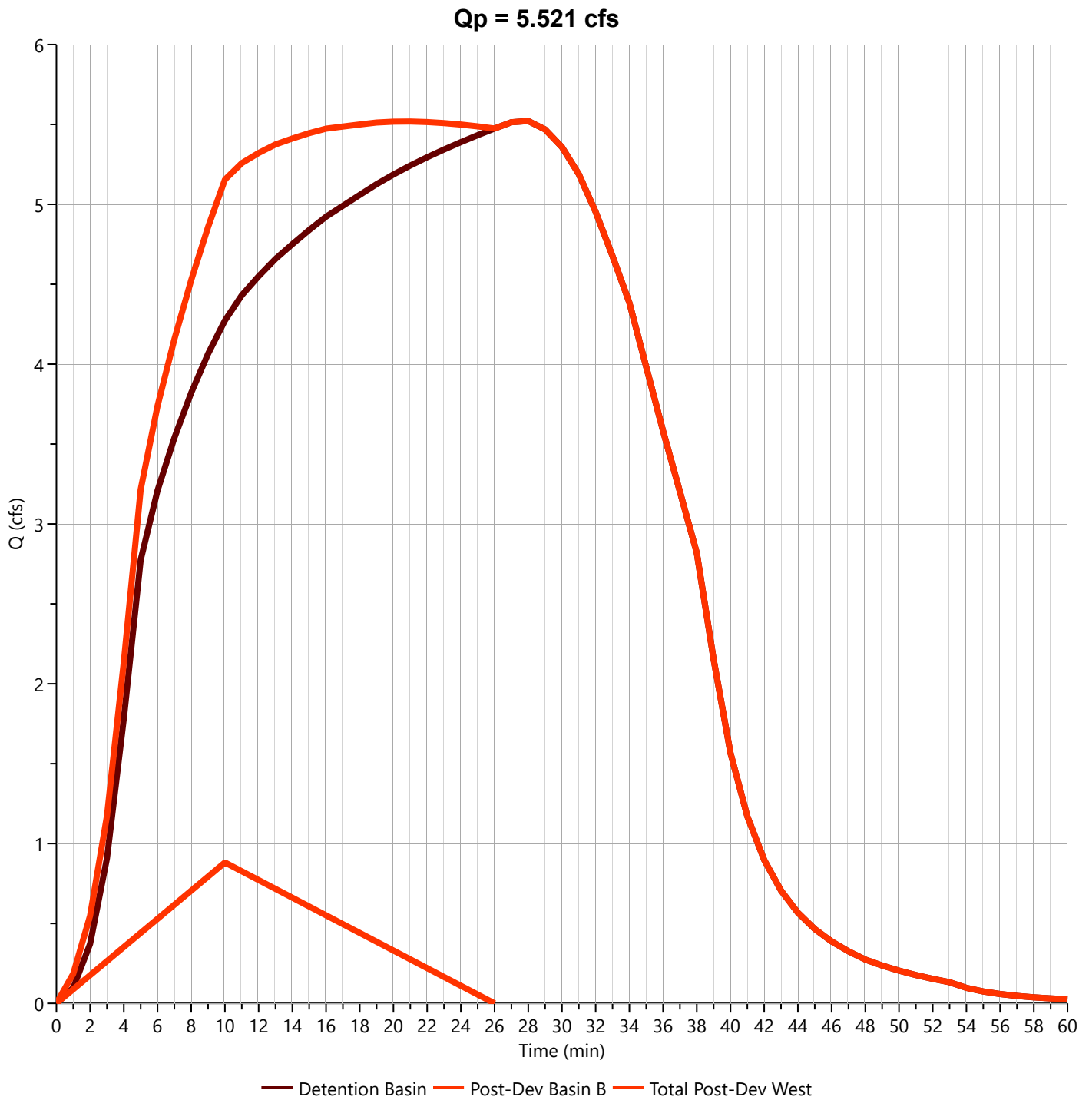
Hydrograph Type	= Rational	Peak Flow	= 1.520 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 609 cuft
Drainage Area	= 0.237 ac	Runoff Coeff.	= 0.68
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.43 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 12

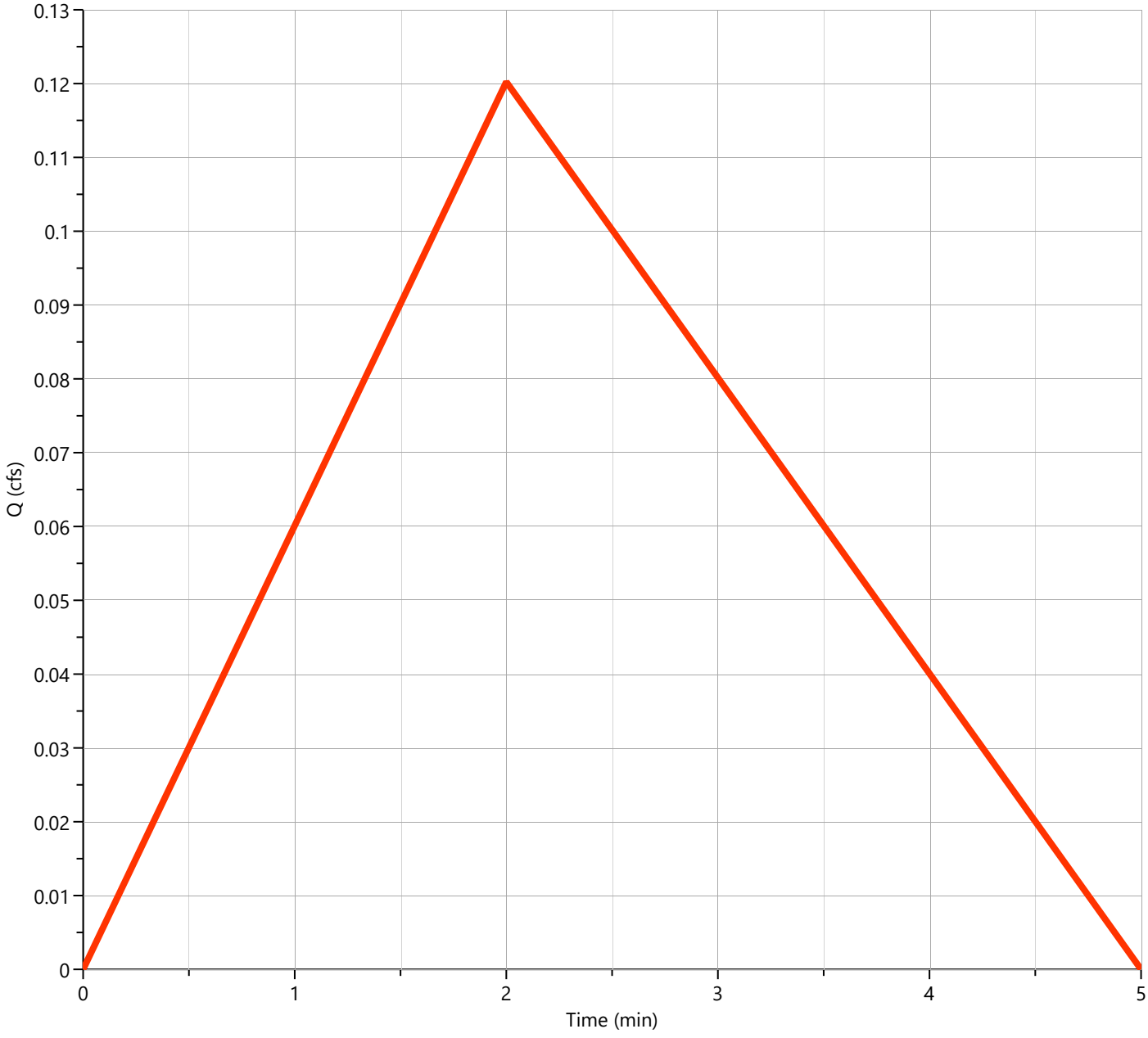
Hydrograph Type	= Junction	Peak Flow	= 5.521 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Hydrograph Volume	= 10,899 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 0.22 ac



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.120 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.03 hrs
Time Interval	= 1 min	Runoff Volume	= 19.3 cuft
Drainage Area	= 0.017 ac	Runoff Coeff.	= 0.75
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 2.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.43 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 50-yr Summary

Hydrology Studio v 3.0.0.39

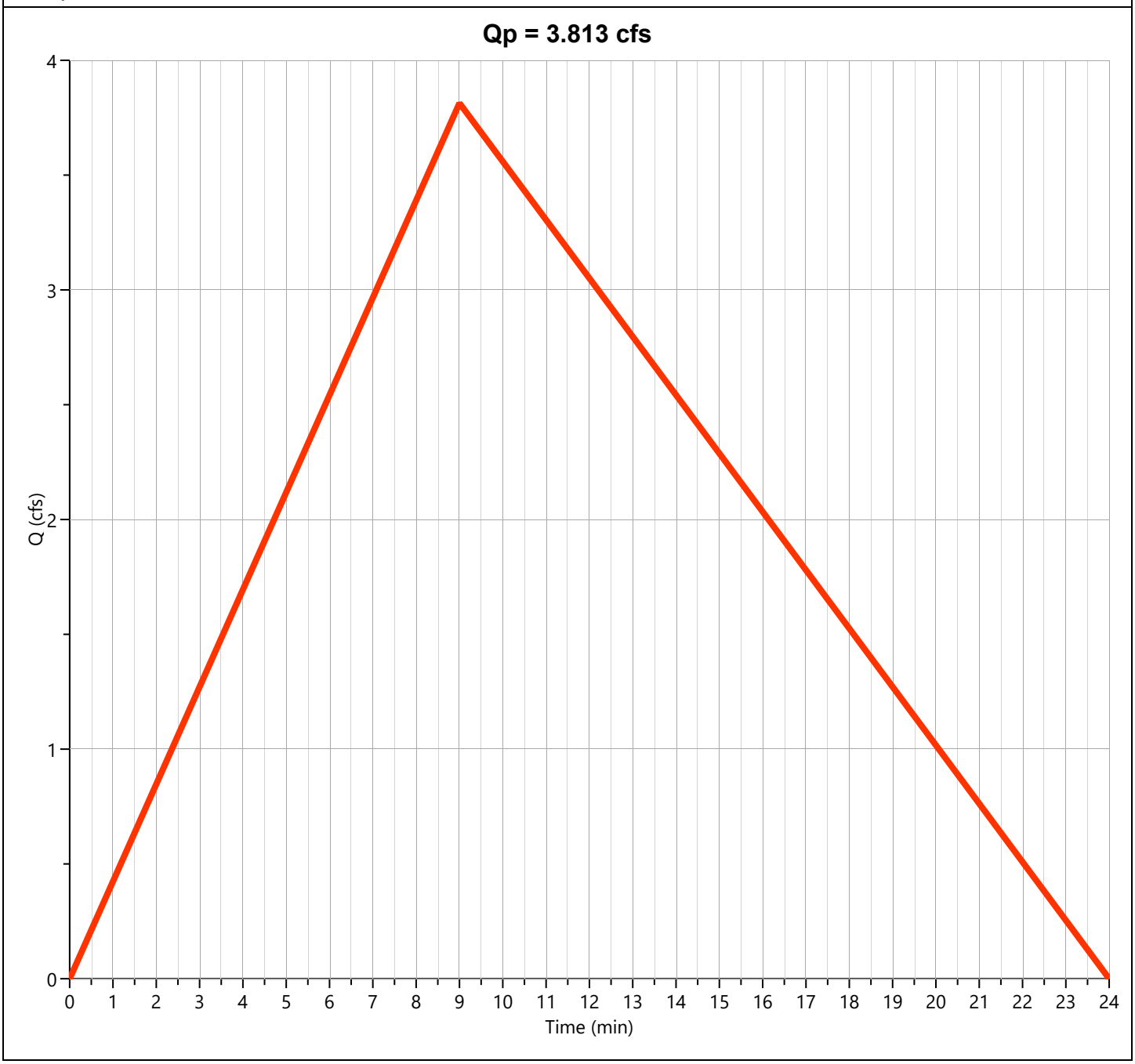
Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Rational	Pre-Dev Basin "A"	3.813	0.15	2,749	----		
2	Rational	Pre-Dev Basin "B"	3.721	0.12	2,087	----		
3	Junction	Total Pre-Dev West	6.858	0.15	4,755	1, 2		
4	Rational	Pre-Dev Basin "C"	0.686	0.27	879	----		
5	Rational	Pre-Dev Basin "D"	1.325	0.20	1,274	----		
6	Rational	Pre-Dev Basin "E"	0.888	0.17	712	----		
7	Junction	Total Pre-Dev East	2.103	0.20	1,965	5, 6		
8	Mod Rational	Post-Dev Basin A	6.901	0.08	11,180	----		
9	Pond Route	Detention Basin	5.825	0.47	11,178	8	422.25	3,292
10	Rational	Post-Dev Basin B	0.964	0.17	772	----		
11	Rational	Post-Dev Basin "C"	1.660	0.08	665	----		
12	Junction	Total Post-Dev West	5.867	0.35	11,930	9, 10		
13	Rational	Post-Dev Basin "D"	0.131	0.03	21.0	----		

Pre-Dev Basin "A"

Hyd. No. 1

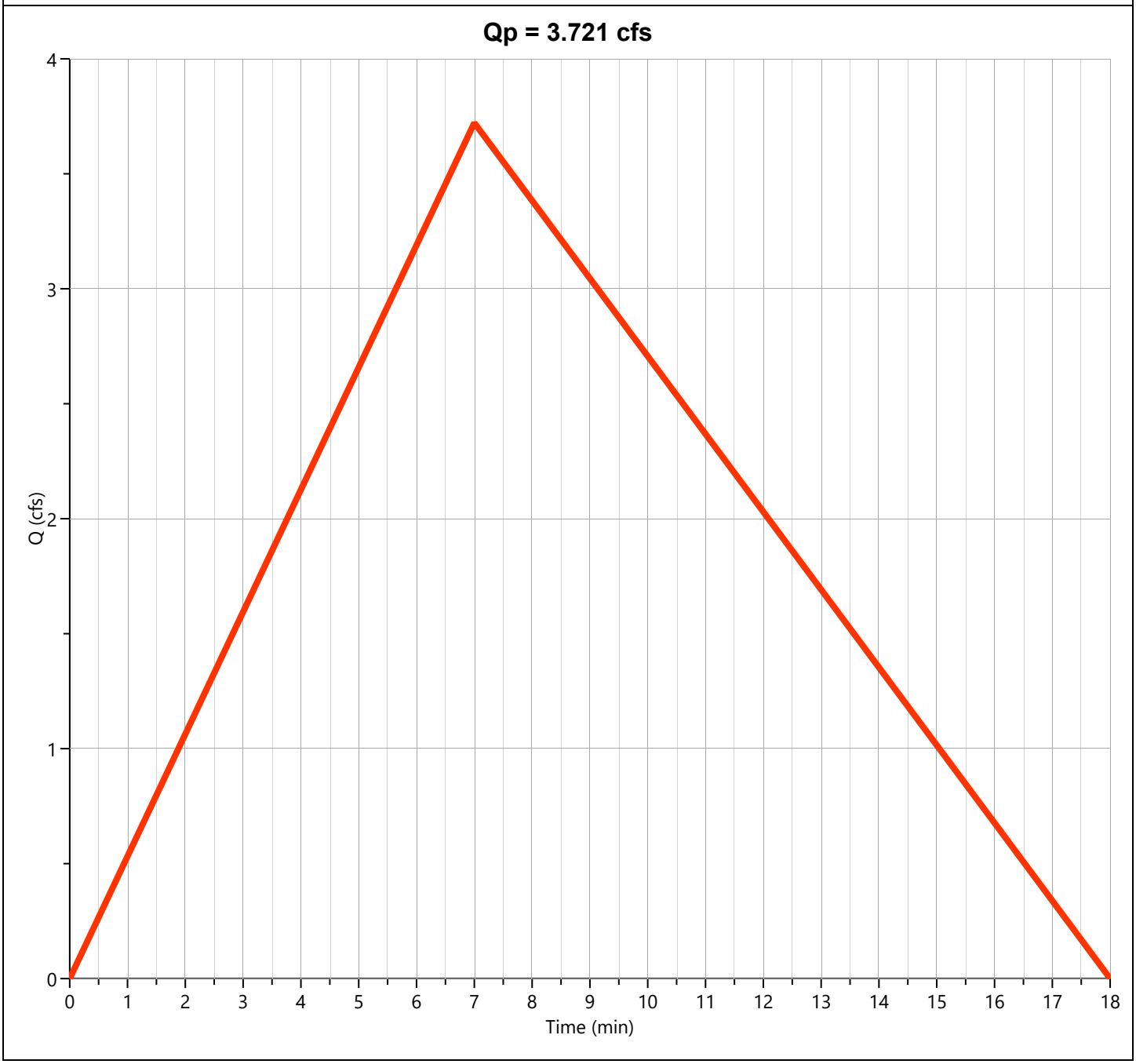
Hydrograph Type	= Rational	Peak Flow	= 3.813 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 2,749 cuft
Drainage Area	= 0.86 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 9.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.92 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

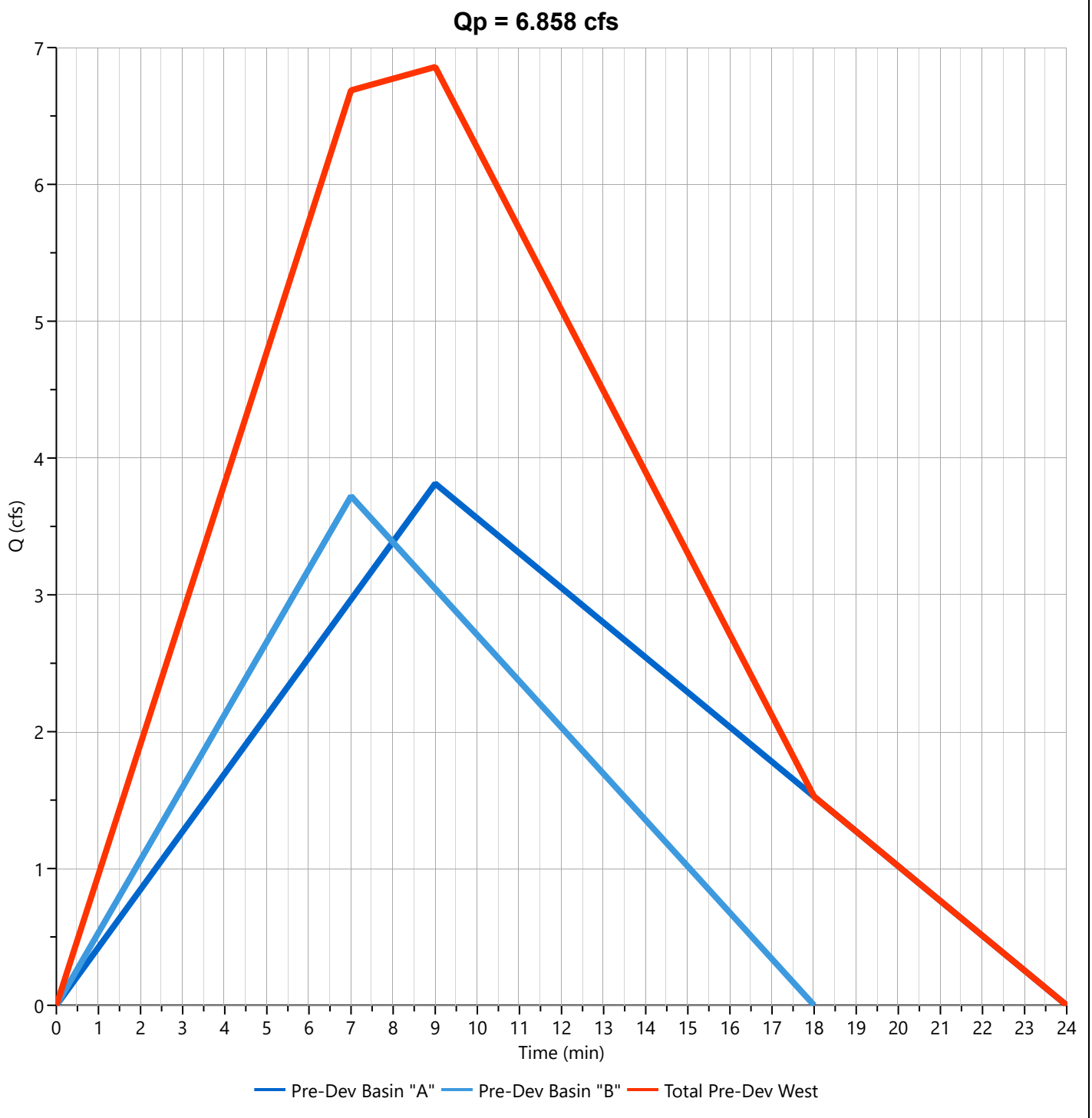
Hydrograph Type	= Rational	Peak Flow	= 3.721 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 2,087 cuft
Drainage Area	= 0.75 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.86 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

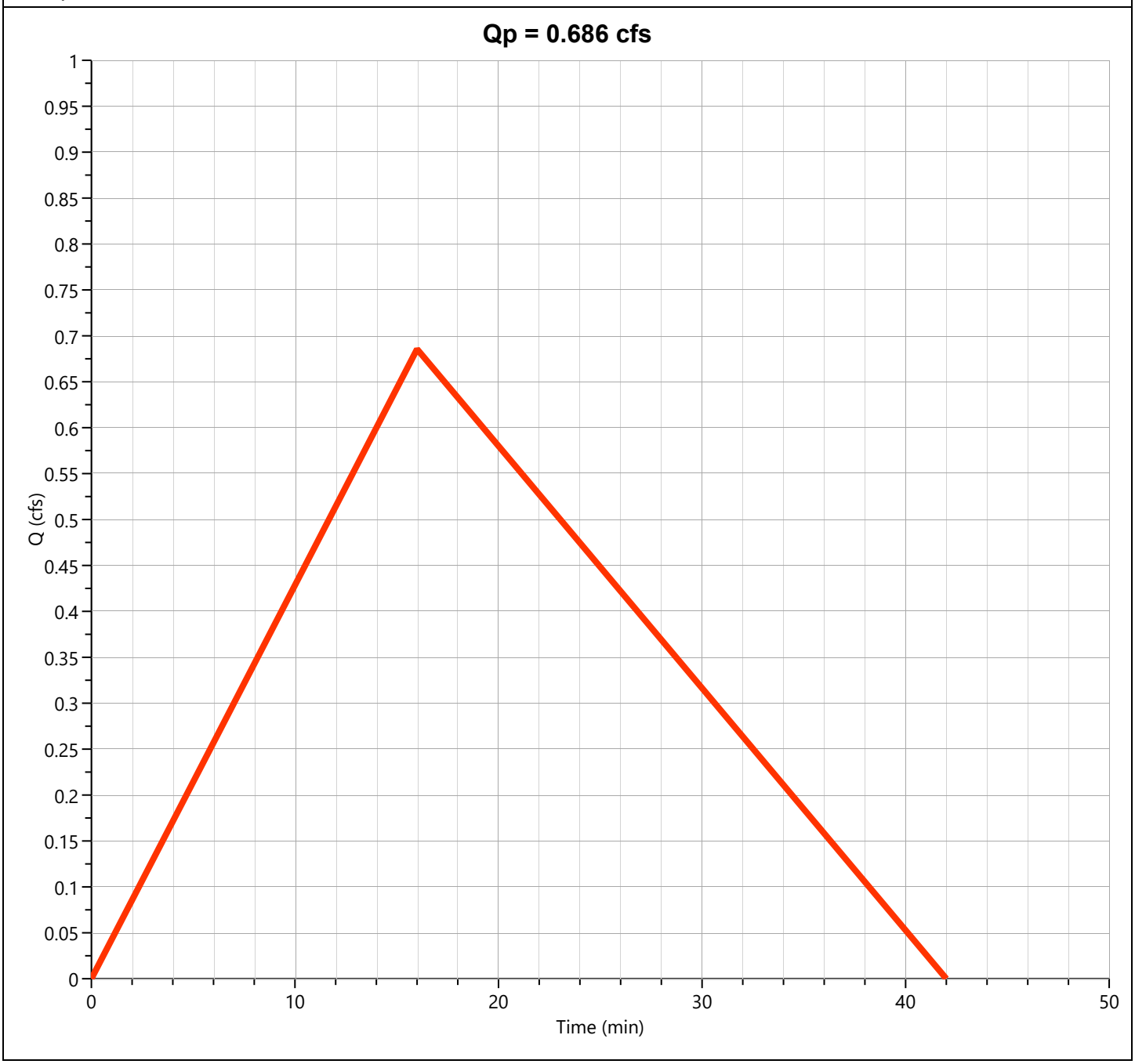
Hydrograph Type	= Junction	Peak Flow	= 6.858 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Hydrograph Volume	= 4,755 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 1.61 ac



Pre-Dev Basin "C"

Hyd. No. 4

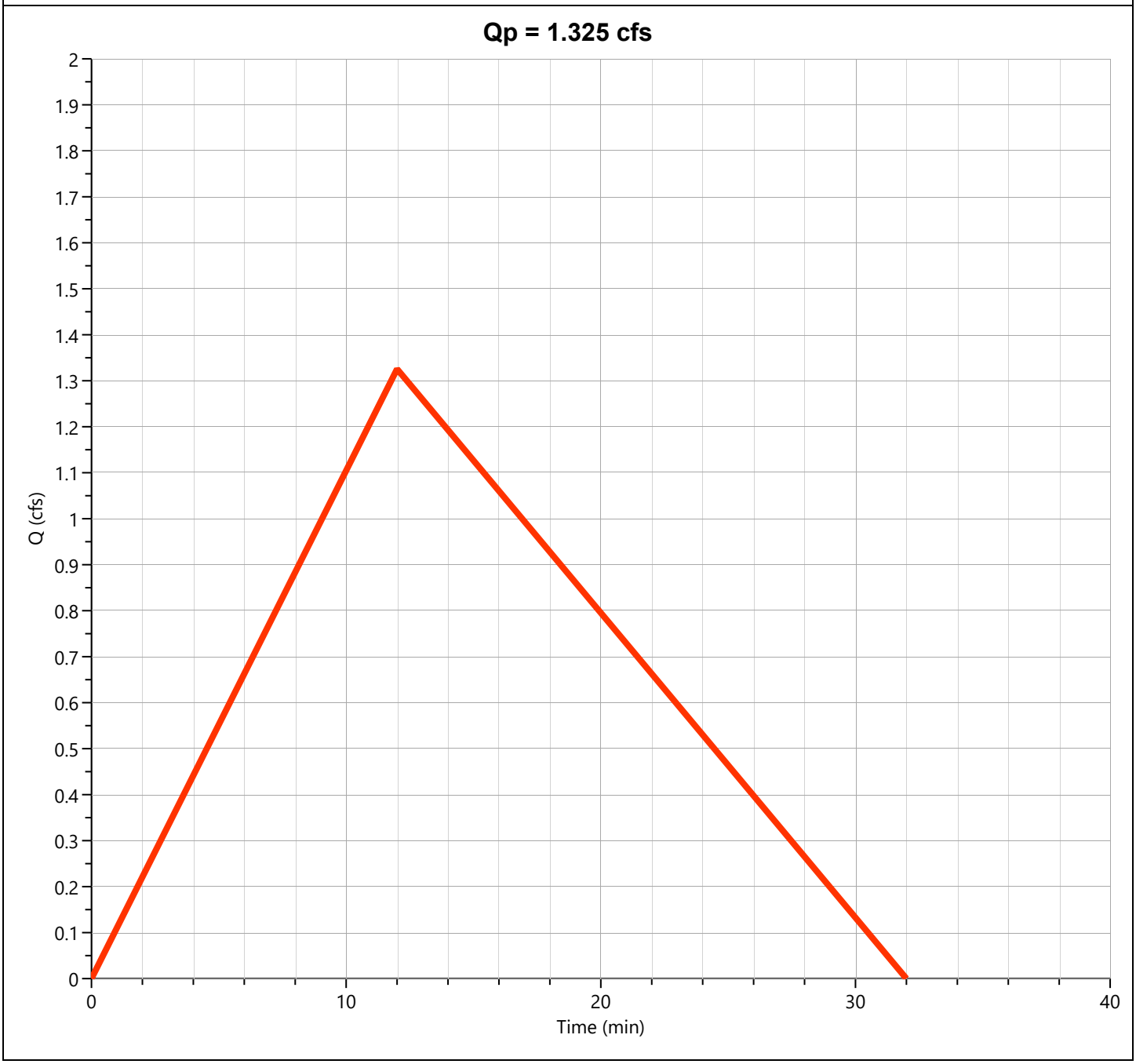
Hydrograph Type	= Rational	Peak Flow	= 0.686 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 879 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.12 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

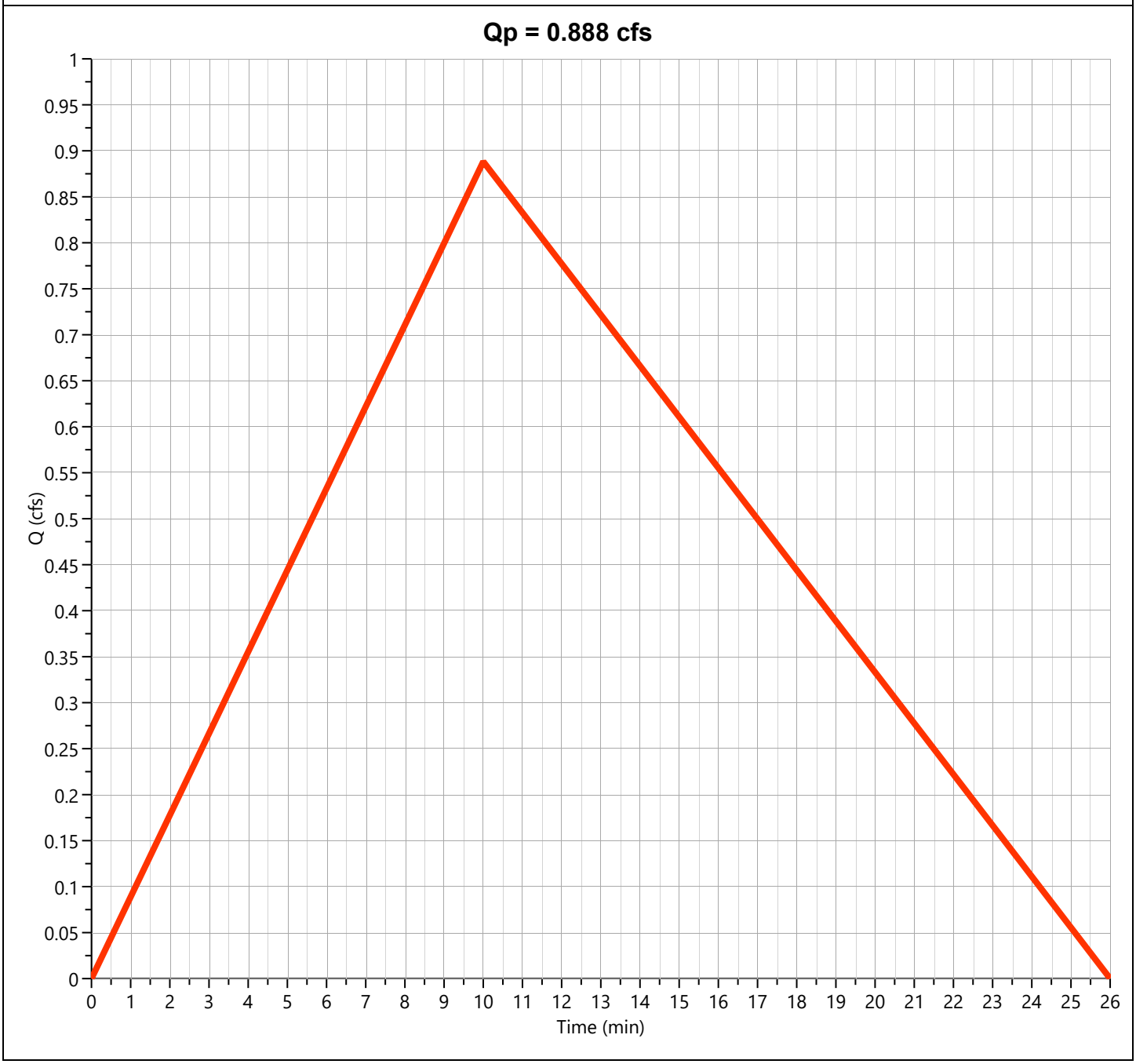
Hydrograph Type	= Rational	Peak Flow	= 1.325 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 1,274 cuft
Drainage Area	= 0.34 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.96 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "E"

Hyd. No. 6

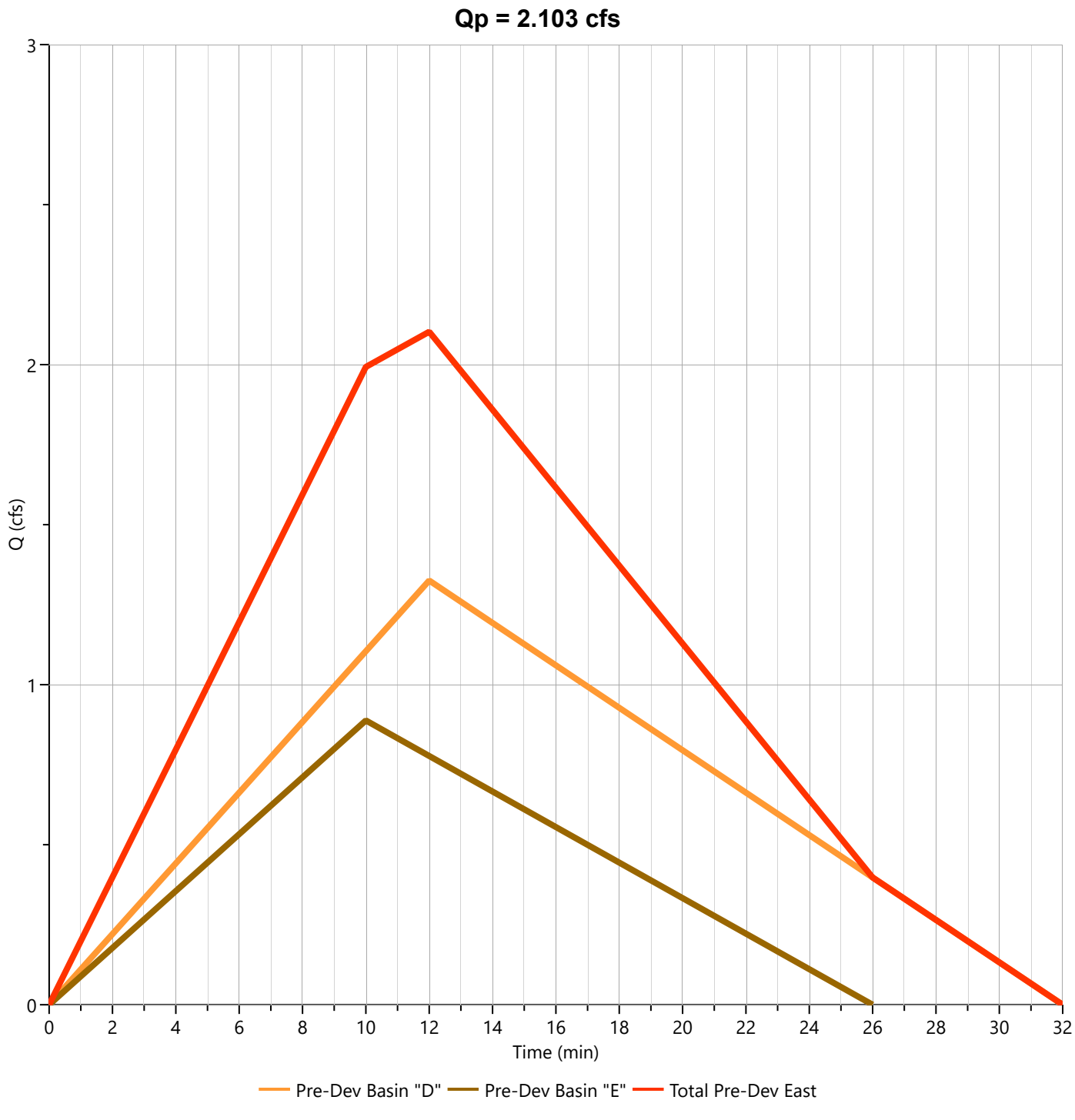
Hydrograph Type	= Rational	Peak Flow	= 0.888 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 712 cuft
Drainage Area	= 0.21 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.55 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 7

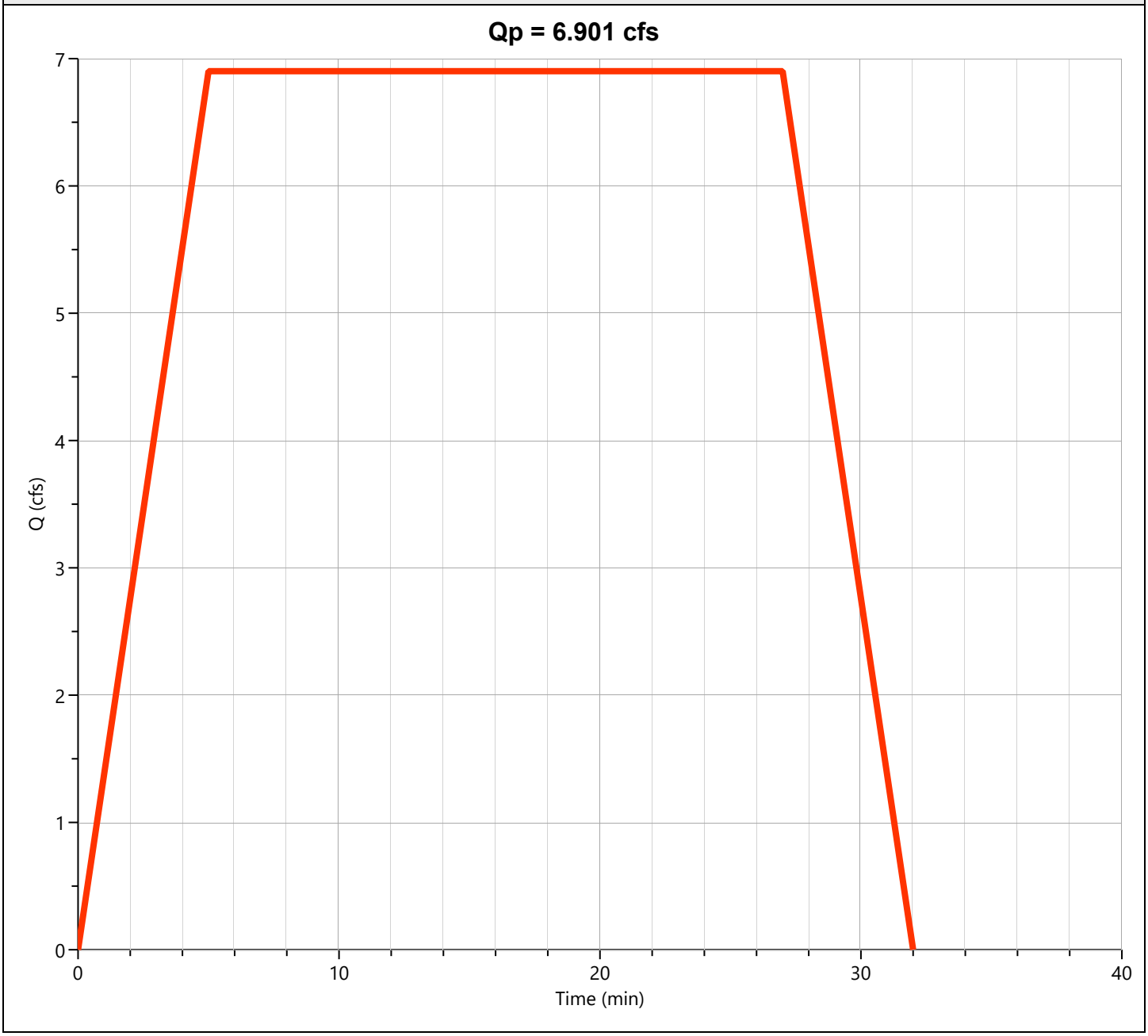
Hydrograph Type	= Junction	Peak Flow	= 2.103 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,965 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 0.55 ac



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 6.901 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 11,180 cuft
Drainage Area	= 1.5 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.84 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 5.4 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



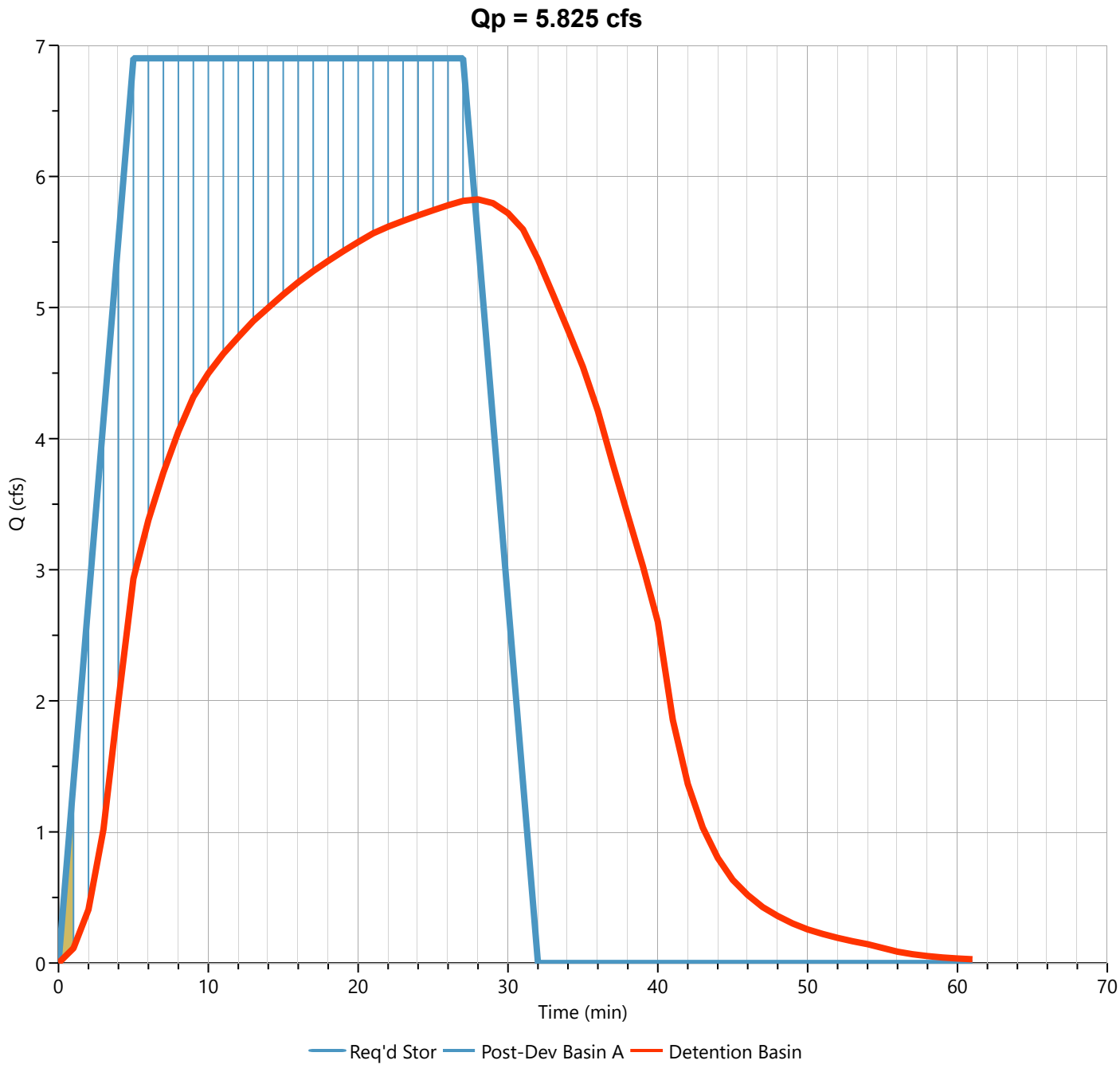
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 5.825 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Hydrograph Volume	= 11,178 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.25 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 3,292 cuft

Pond Routing by Storage Indication Method

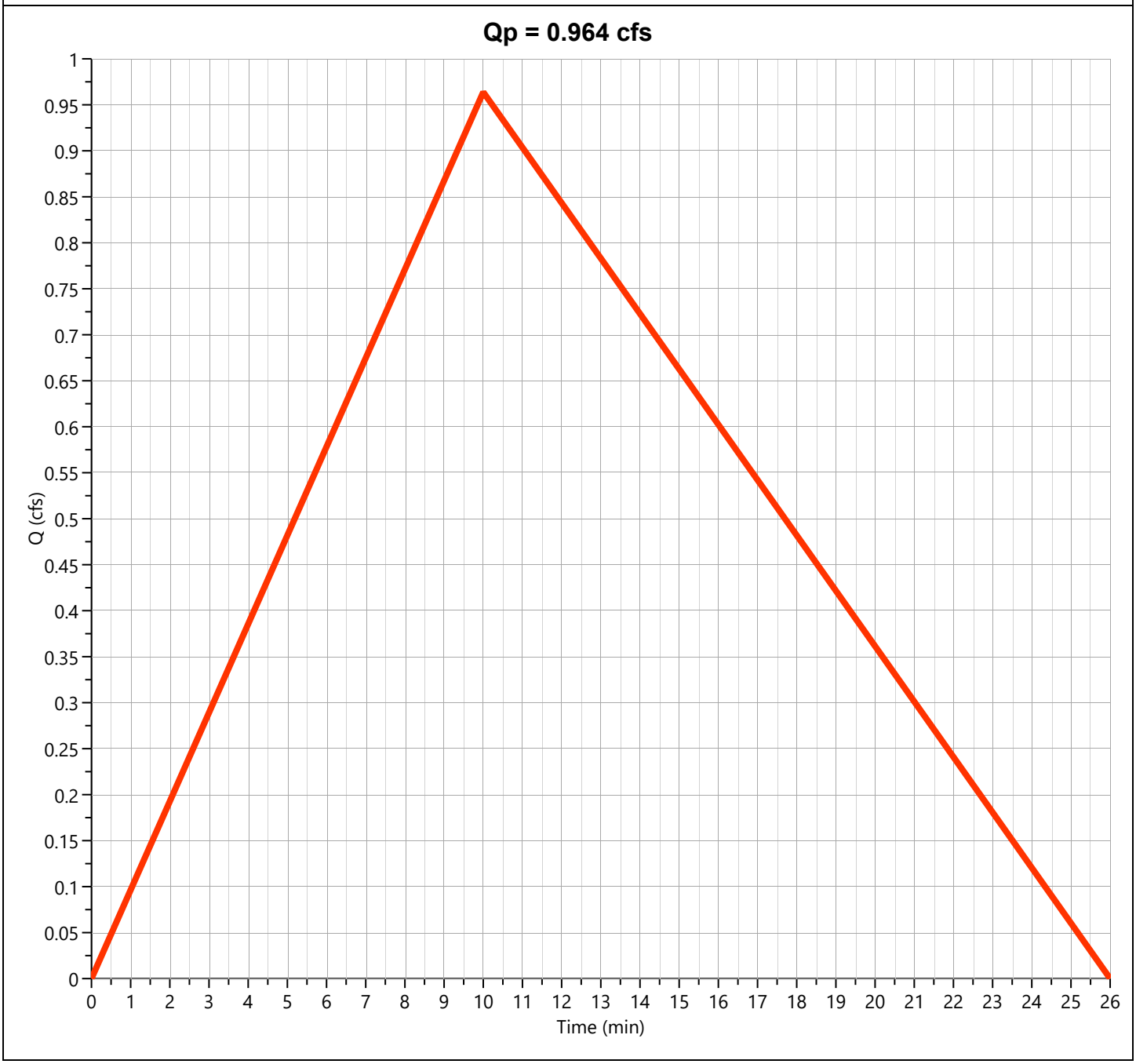
Center of mass detention time = 7 min



Post-Dev Basin B

Hyd. No. 10

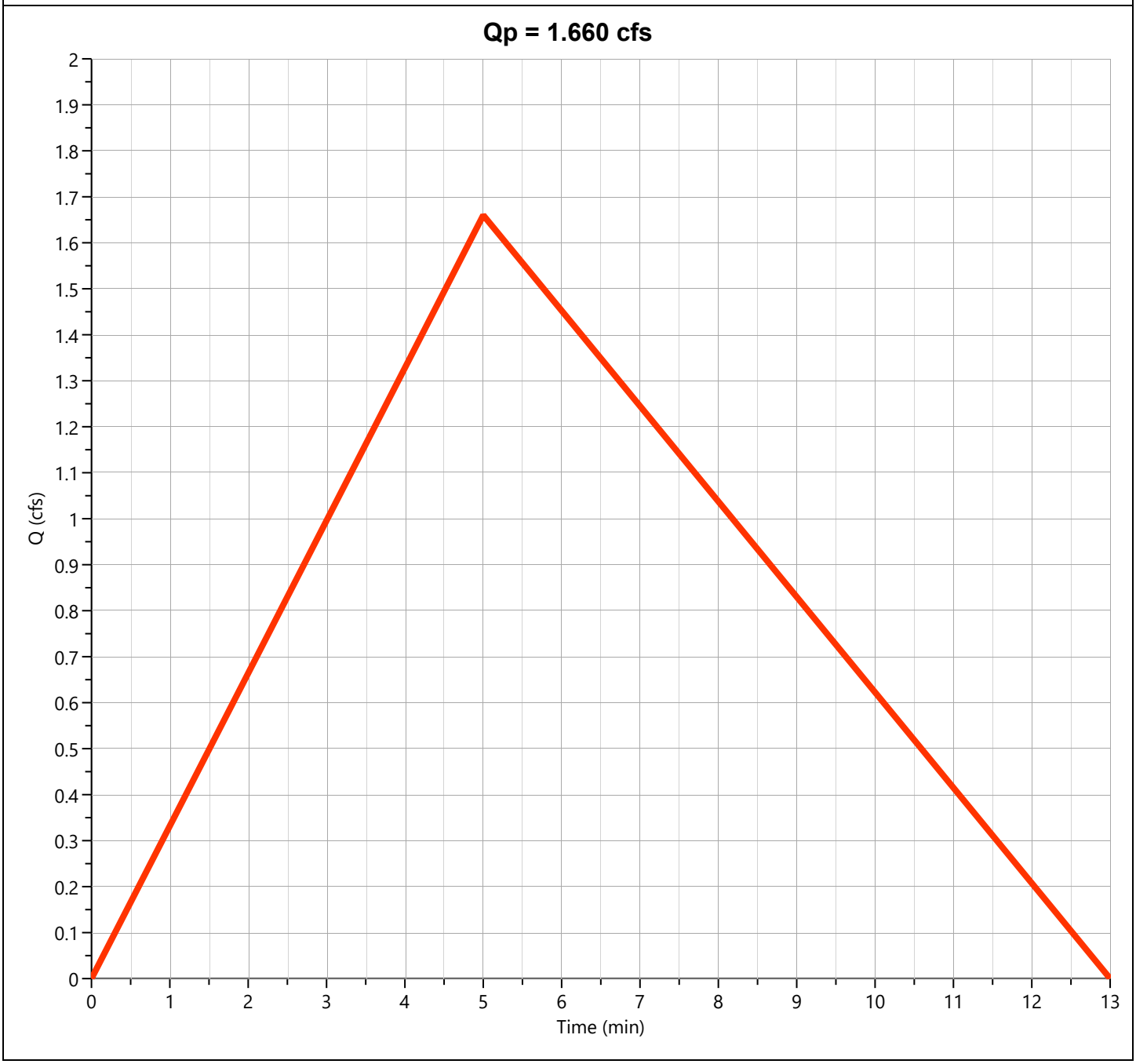
Hydrograph Type	= Rational	Peak Flow	= 0.964 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 772 cuft
Drainage Area	= 0.22 ac	Runoff Coeff.	= 0.58
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.55 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 11

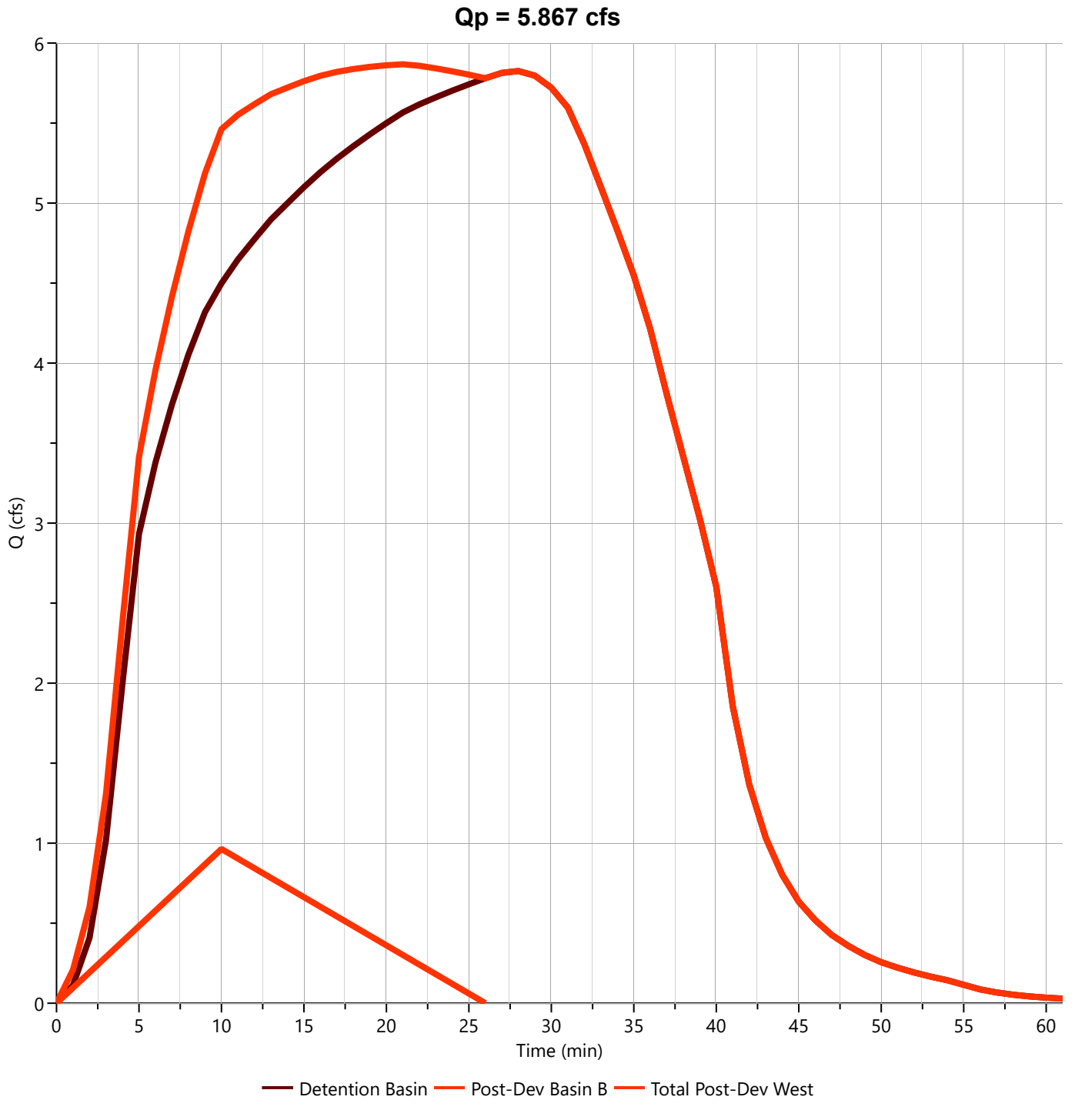
Hydrograph Type	= Rational	Peak Flow	= 1.660 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 665 cuft
Drainage Area	= 0.237 ac	Runoff Coeff.	= 0.68
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 10.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 12

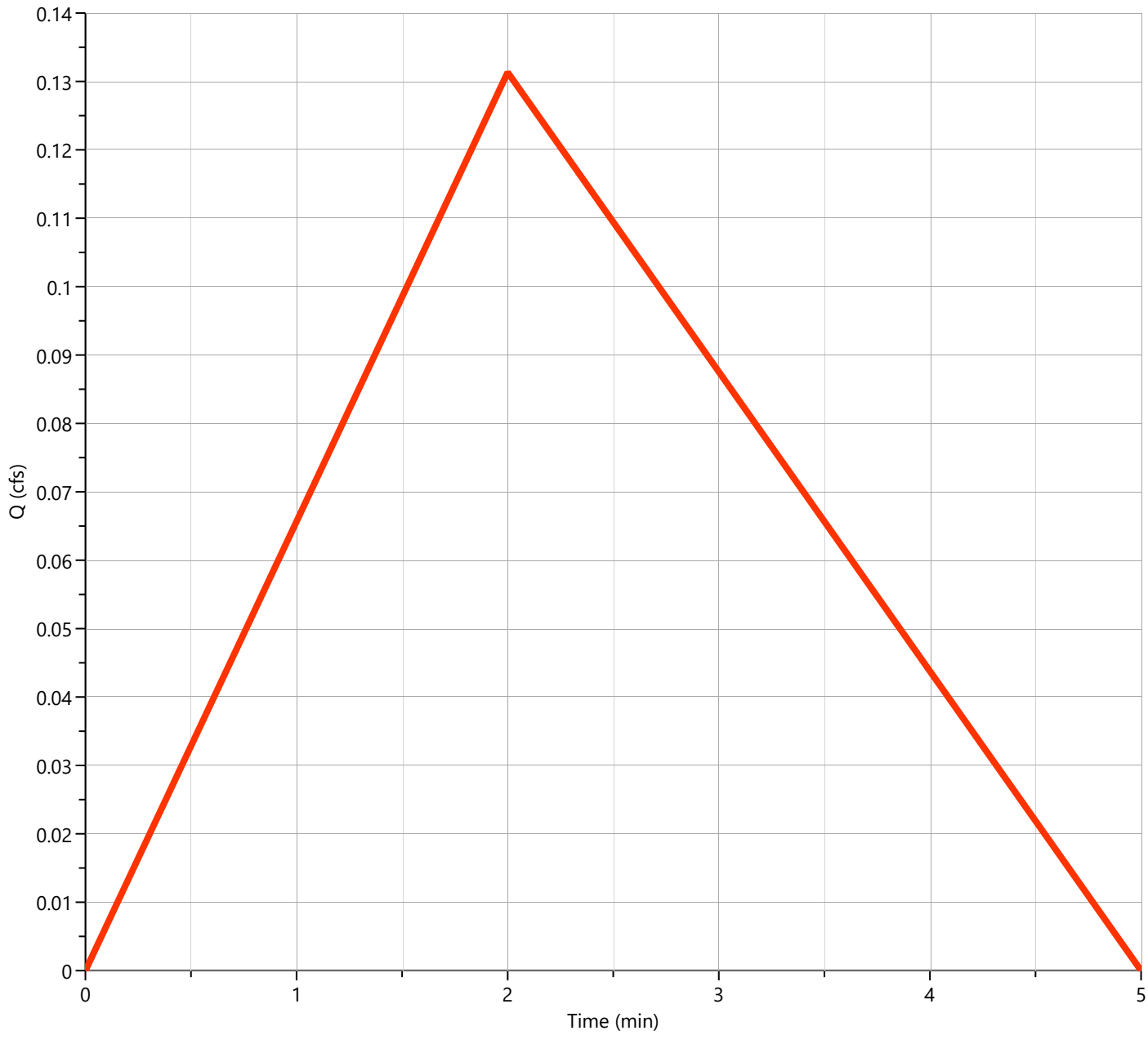
Hydrograph Type	= Junction	Peak Flow	= 5.867 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.35 hrs
Time Interval	= 1 min	Hydrograph Volume	= 11,930 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 0.22 ac



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.131 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.03 hrs
Time Interval	= 1 min	Runoff Volume	= 21.0 cuft
Drainage Area	= 0.017 ac	Runoff Coeff.	= 0.75
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 2.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 10.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 100-yr Summary

Hydrology Studio v 3.0.0.39

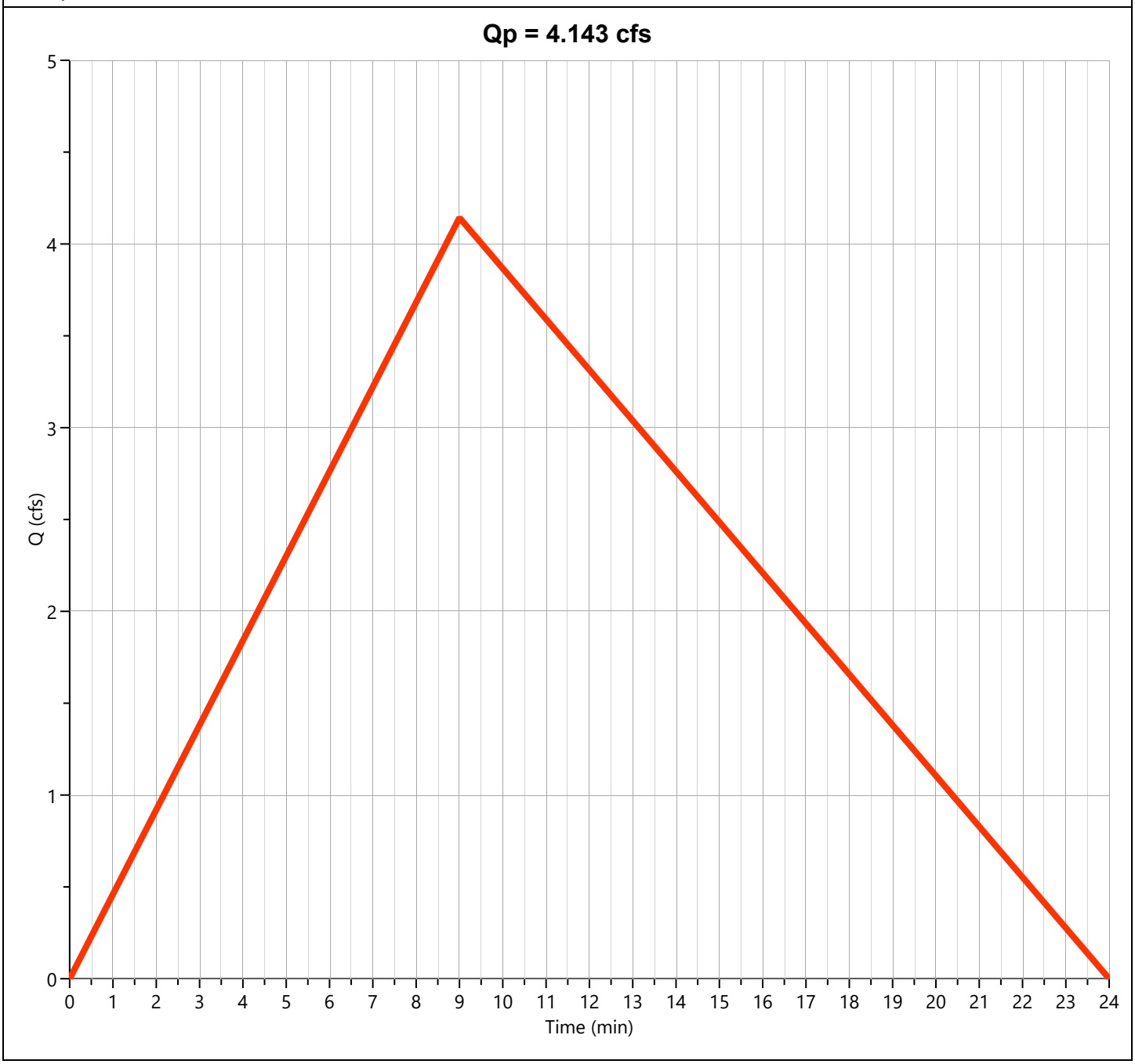
Project Name: Bryant Pharmacy
File: Detention Calculation 11-7-25.hys
11-07-2025

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Rational	Pre-Dev Basin "A"	4.143	0.15	2,987	----		
2	Rational	Pre-Dev Basin "B"	4.044	0.12	2,268	----		
3	Junction	Total Pre-Dev West	7.452	0.15	5,167	1, 2		
4	Rational	Pre-Dev Basin "C"	0.744	0.27	954	----		
5	Rational	Pre-Dev Basin "D"	1.439	0.20	1,384	----		
6	Rational	Pre-Dev Basin "E"	0.965	0.17	773	----		
7	Junction	Total Pre-Dev East	2.284	0.20	2,134	5, 6		
8	Mod Rational	Post-Dev Basin A	7.485	0.08	12,126	----		
9	Pond Route	Detention Basin	6.052	0.47	12,124	8	422.55	3,842
10	Rational	Post-Dev Basin B	1.047	0.17	839	----		
11	Rational	Post-Dev Basin "C"	1.805	0.08	723	----		
12	Junction	Total Post-Dev West	6.147	0.30	12,941	9, 10		
13	Rational	Post-Dev Basin "D"	0.143	0.03	22.9	----		

Pre-Dev Basin "A"

Hyd. No. 1

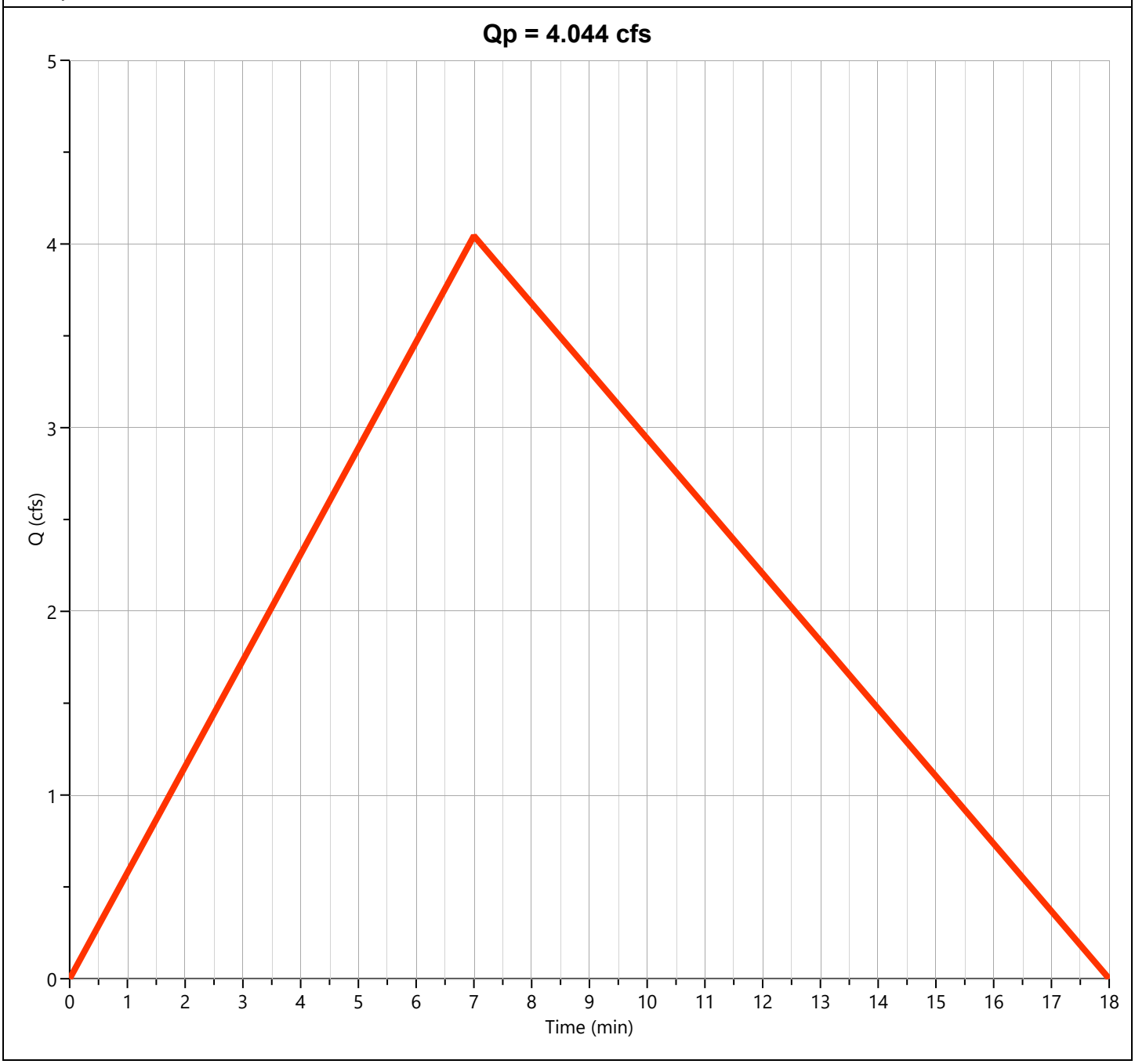
Hydrograph Type	= Rational	Peak Flow	= 4.143 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 2,987 cuft
Drainage Area	= 0.86 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 9.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.60 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

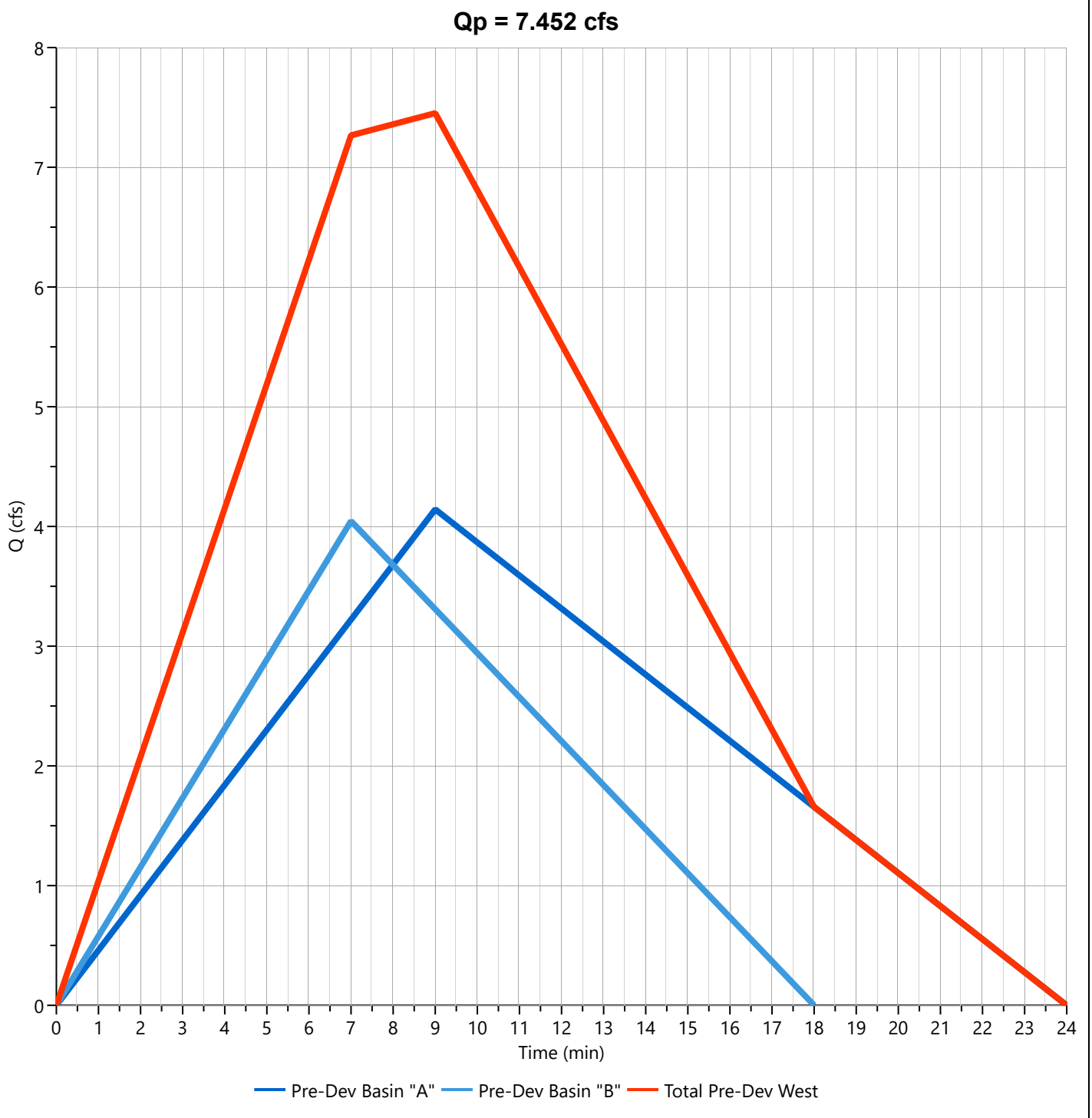
Hydrograph Type	= Rational	Peak Flow	= 4.044 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 2,268 cuft
Drainage Area	= 0.75 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.63 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

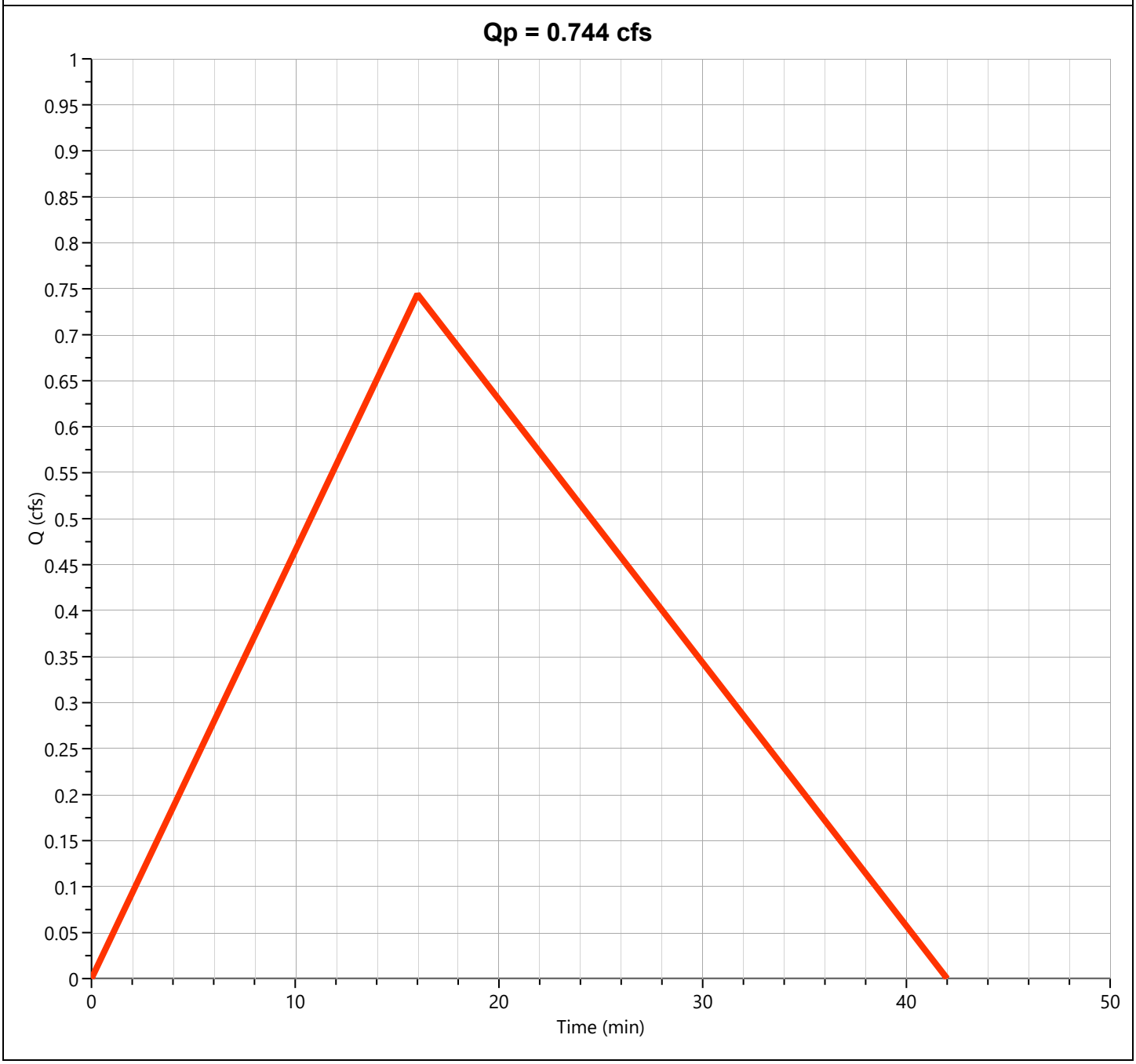
Hydrograph Type	= Junction	Peak Flow	= 7.452 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Hydrograph Volume	= 5,167 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 1.61 ac



Pre-Dev Basin "C"

Hyd. No. 4

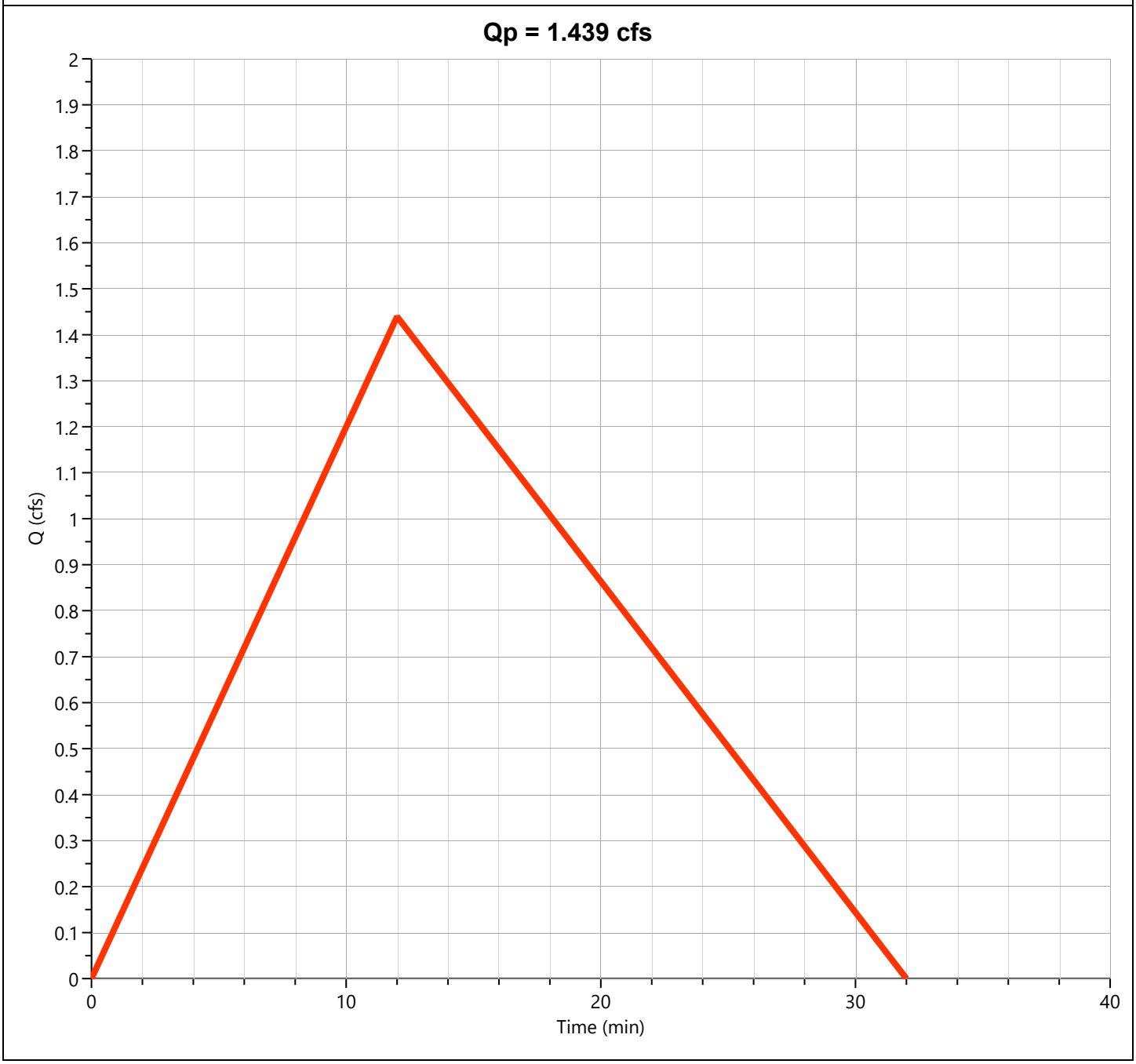
Hydrograph Type	= Rational	Peak Flow	= 0.744 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 954 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.64 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

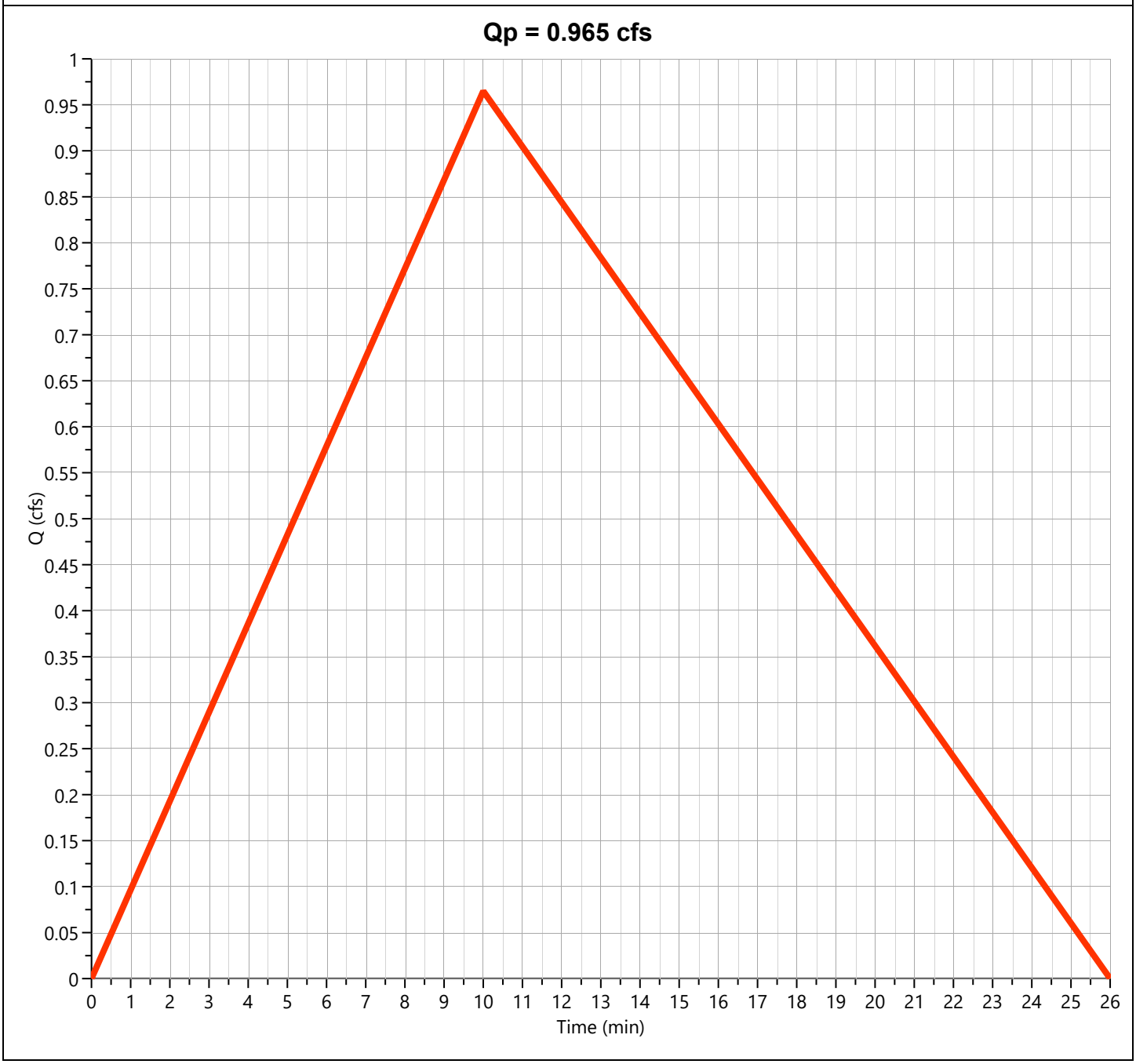
Hydrograph Type	= Rational	Peak Flow	= 1.439 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 1,384 cuft
Drainage Area	= 0.34 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.56 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "E"

Hyd. No. 6

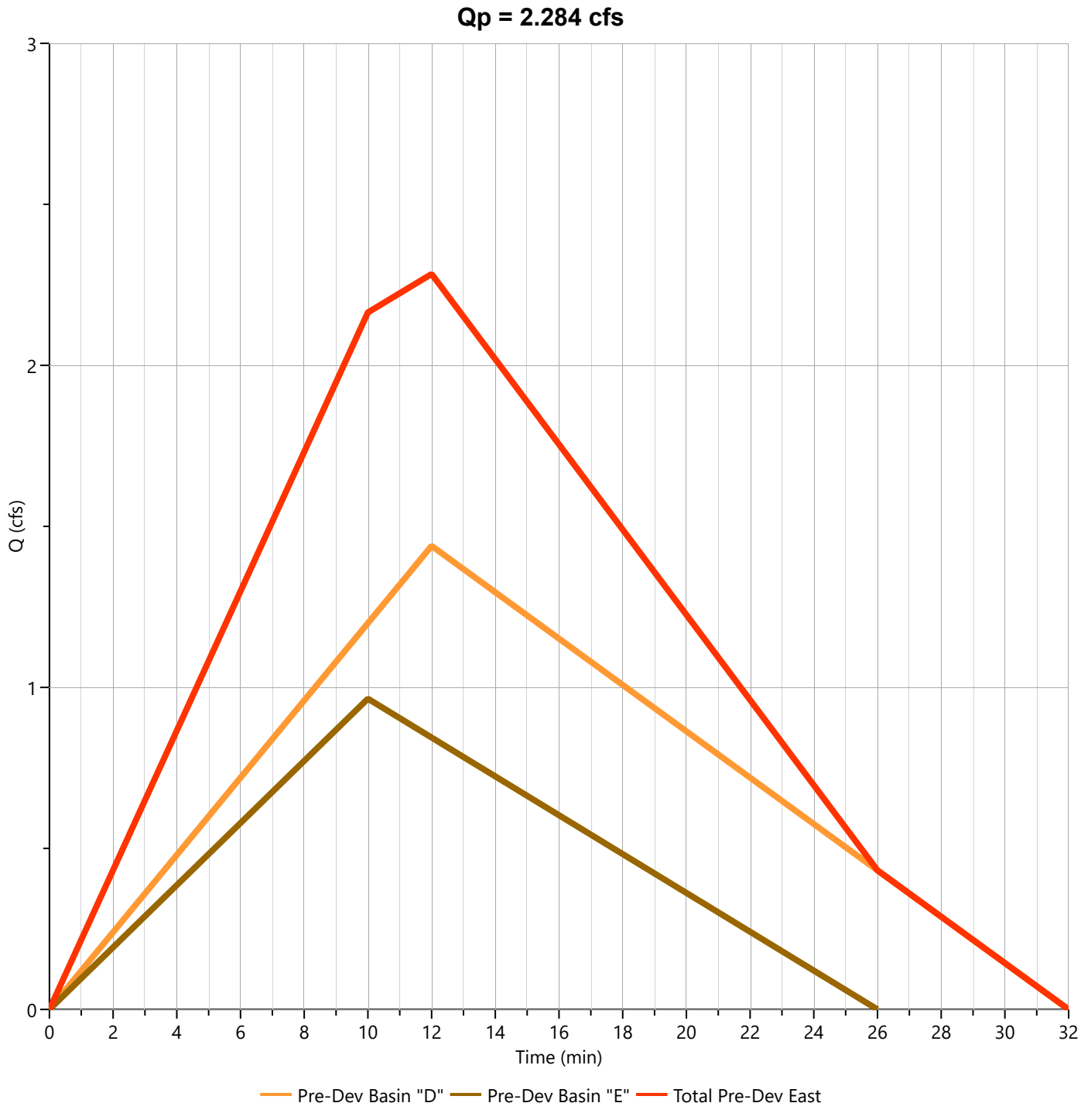
Hydrograph Type	= Rational	Peak Flow	= 0.965 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 773 cuft
Drainage Area	= 0.21 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.20 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 7

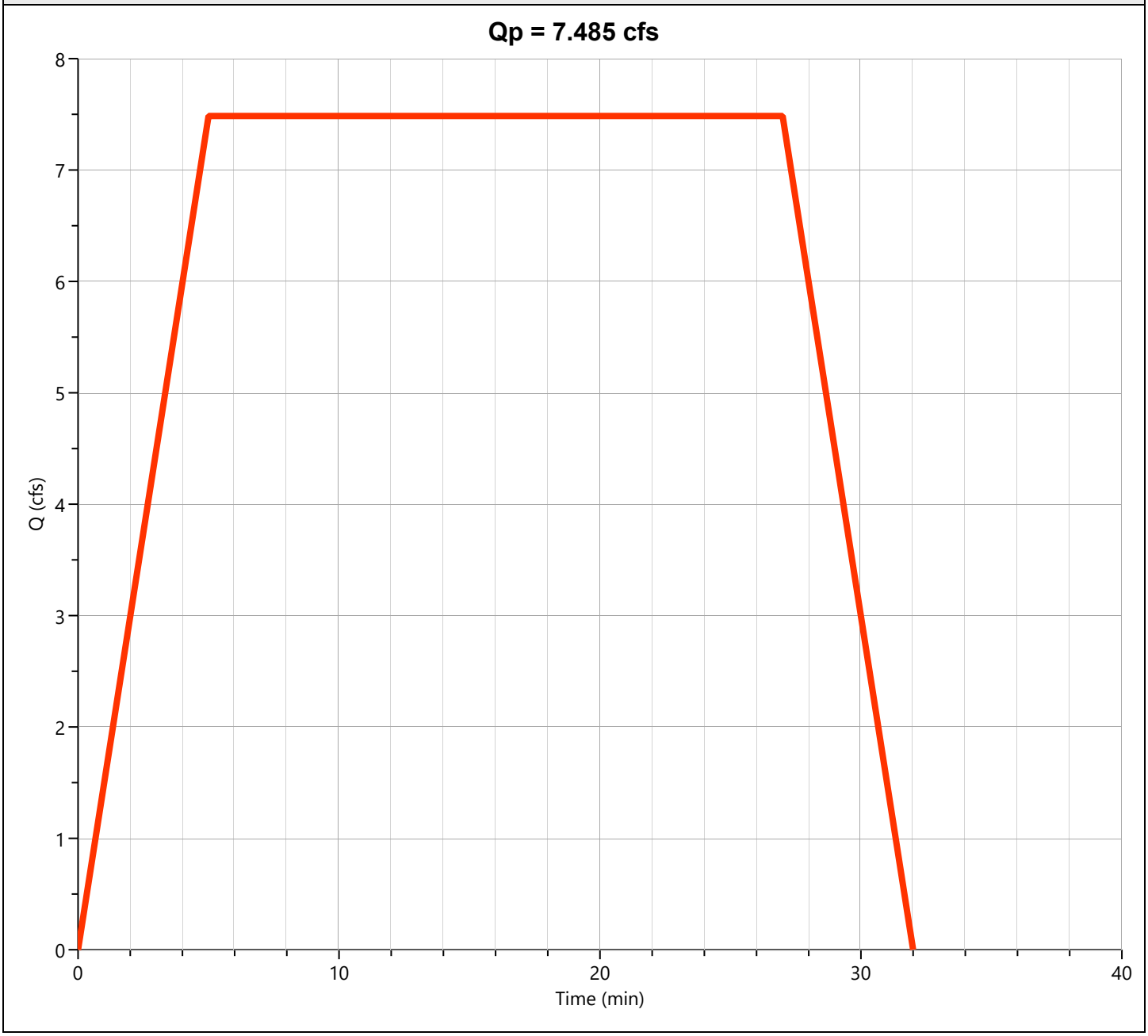
Hydrograph Type	= Junction	Peak Flow	= 2.284 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,134 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 0.55 ac



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 7.485 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 12,126 cuft
Drainage Area	= 1.5 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.25 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 5.4 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



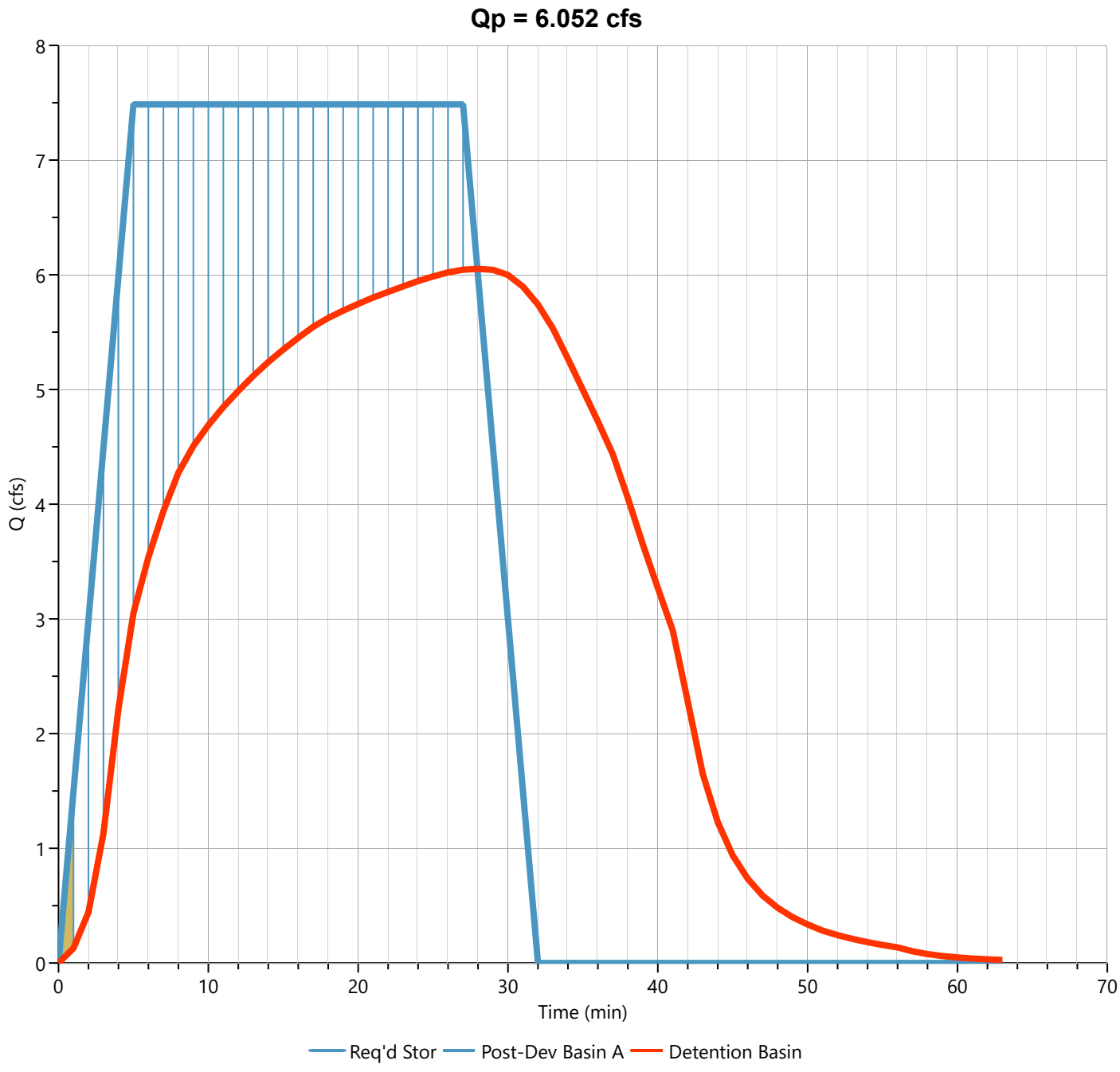
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 6.052 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Hydrograph Volume	= 12,124 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.55 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 3,842 cuft

Pond Routing by Storage Indication Method

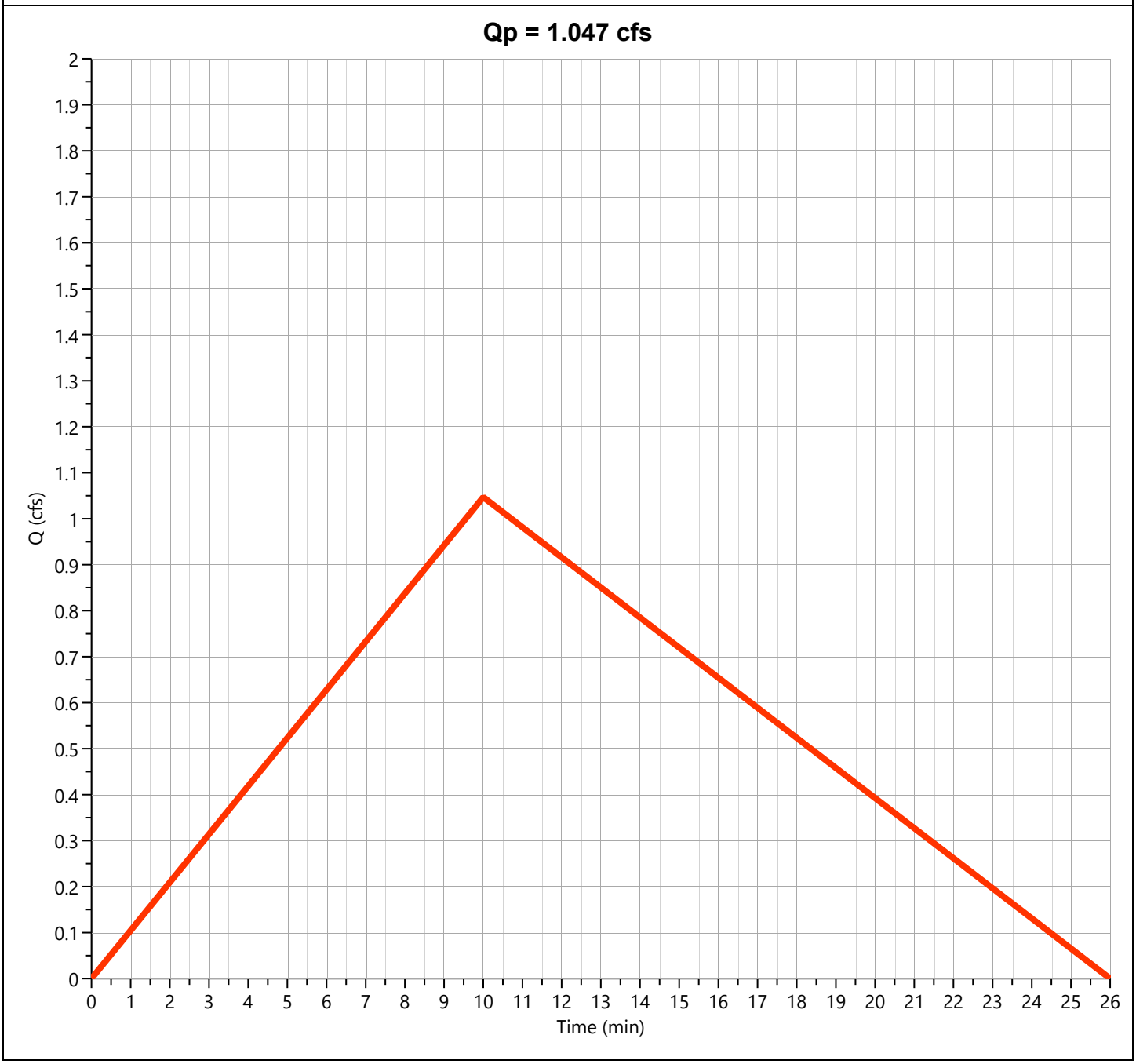
Center of mass detention time = 8 min



Post-Dev Basin B

Hyd. No. 10

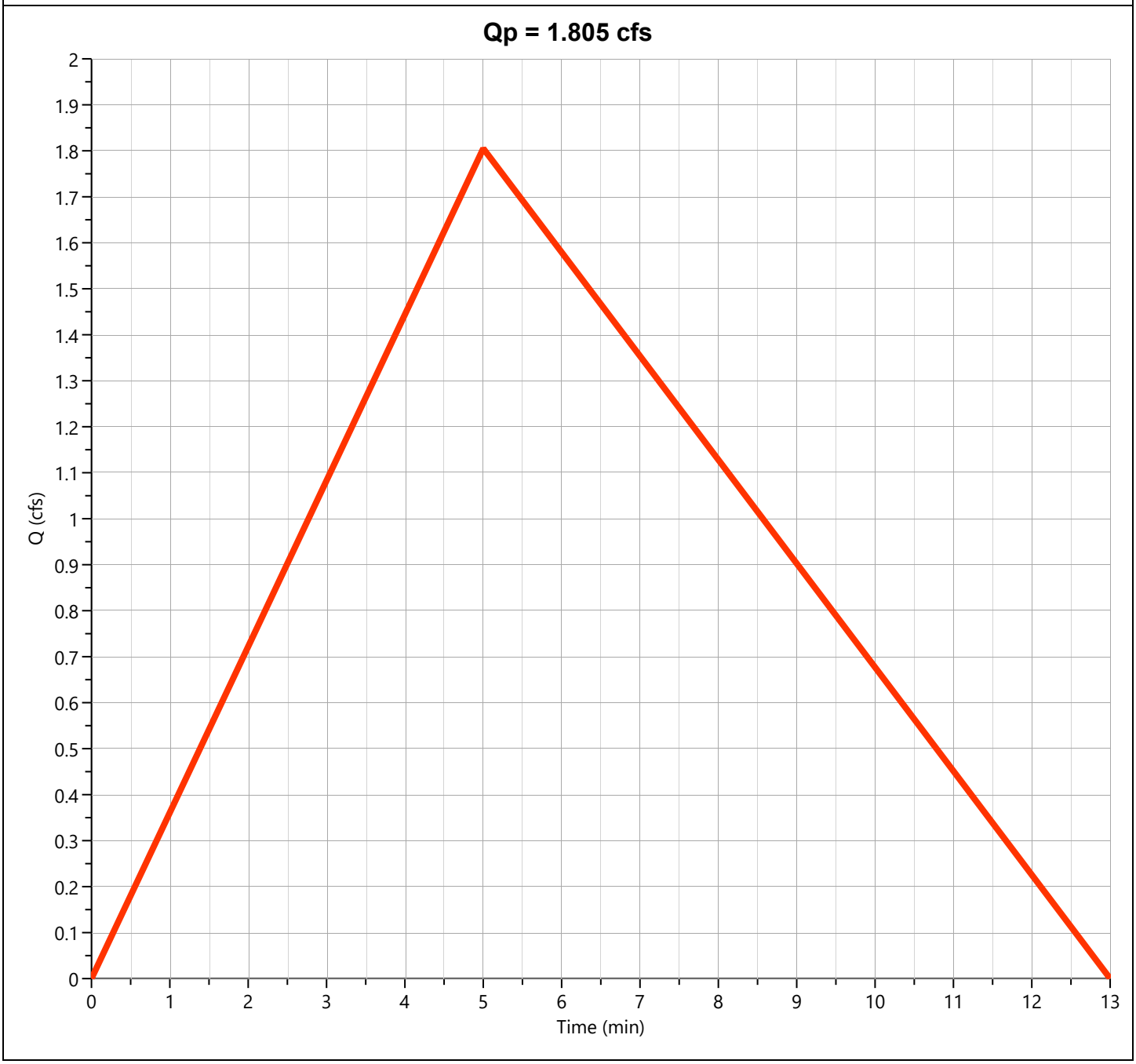
Hydrograph Type	= Rational	Peak Flow	= 1.047 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 839 cuft
Drainage Area	= 0.22 ac	Runoff Coeff.	= 0.58
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 10.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.20 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 11

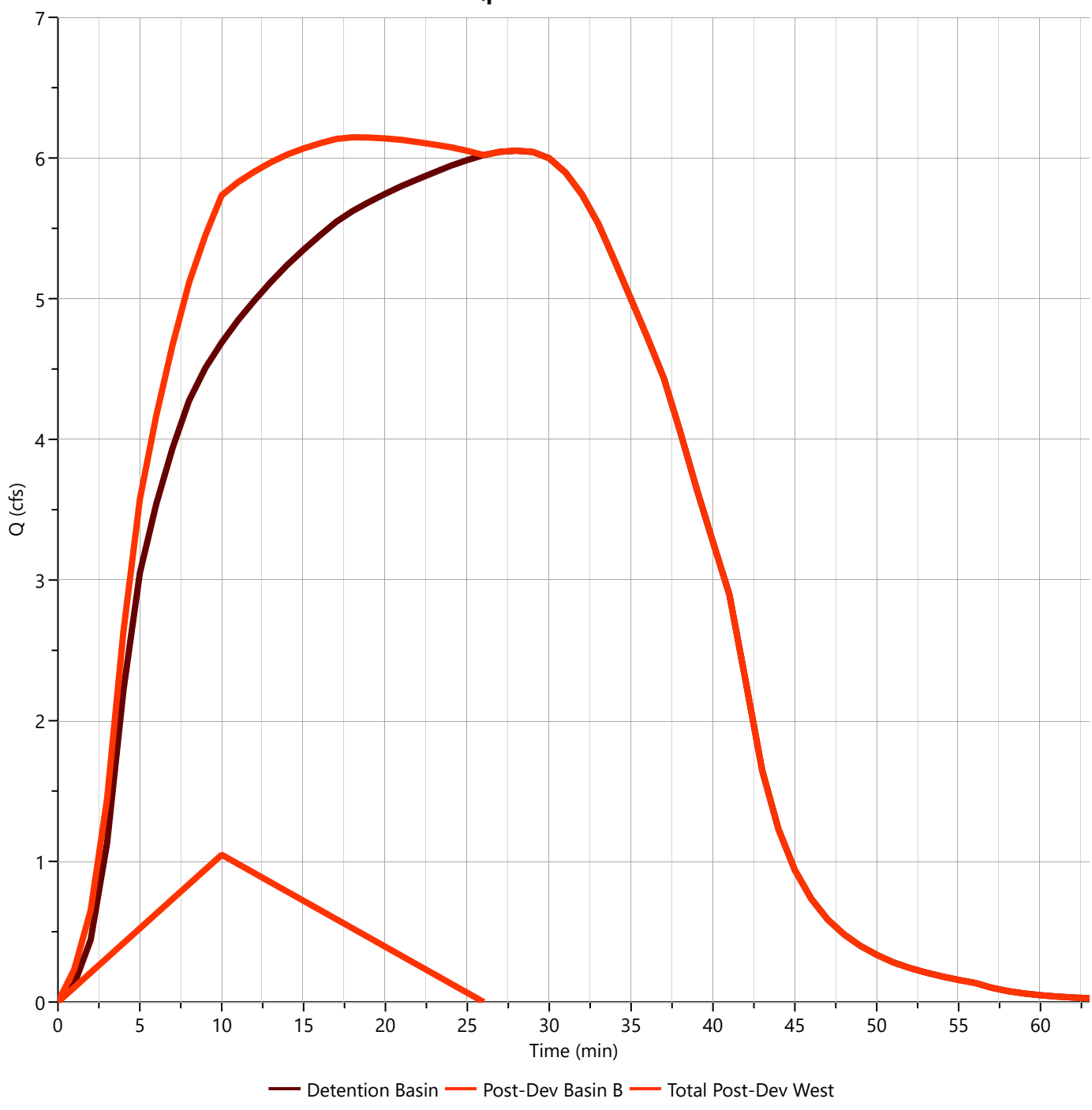
Hydrograph Type	= Rational	Peak Flow	= 1.805 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 723 cuft
Drainage Area	= 0.237 ac	Runoff Coeff.	= 0.68
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 11.20 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 6.147 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.30 hrs
Time Interval	= 1 min	Hydrograph Volume	= 12,941 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 0.22 ac



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.143 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.03 hrs
Time Interval	= 1 min	Runoff Volume	= 22.9 cuft
Drainage Area	= 0.017 ac	Runoff Coeff.	= 0.75
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 2.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 11.20 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67

