Drainage Report

For

Collective Church

Bryant, Saline County, Arkansas



May 2, 2025

Prepared by:

RICHARDSON ENGINEERING, PLLC

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

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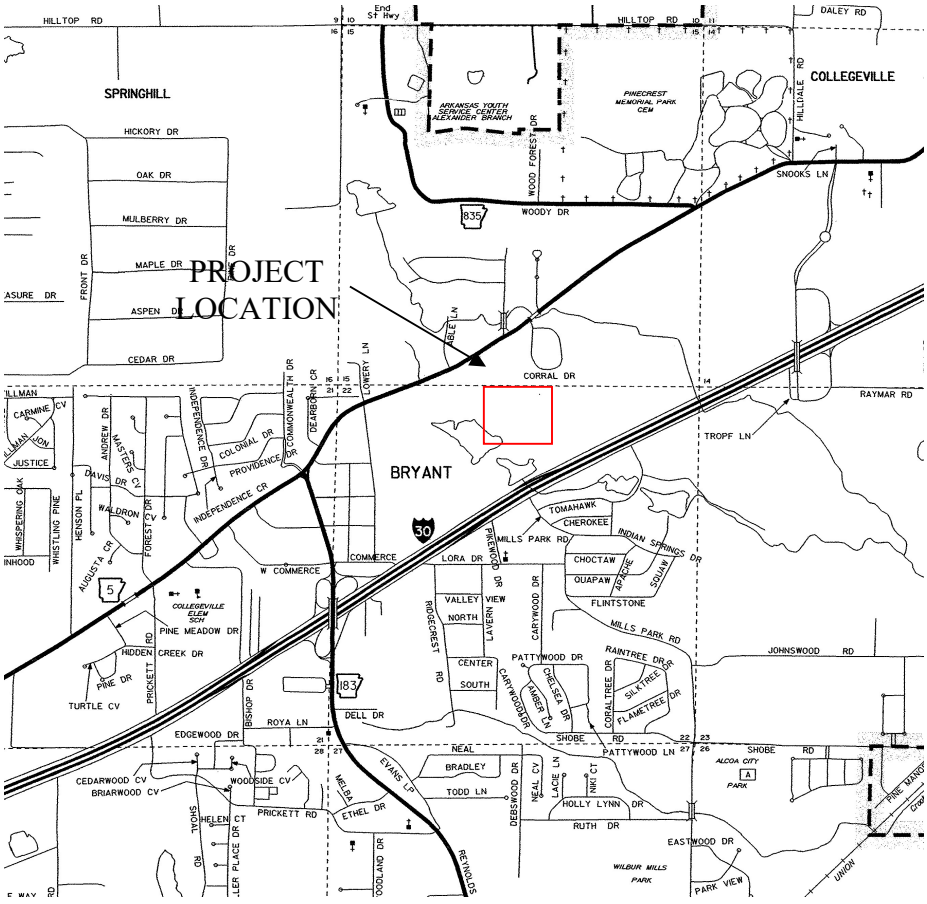
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Project Owner Information

Collective Church
3230 Markey Place Ave
Bryant, AR 72022

Project Location and Description

The project is located on Progress Way, part of the East Half of the Northwest Quarter, Section 22, Township 1-S, Range 14-W, Saline County, Arkansas.



Vicinity Map – N.T.S

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

Site Drainage

Pre-Development

The pre-developed runoff for the site flows to the South to a regional detention basin for the overall commercial development. The pre-development runoff condition is undeveloped/woods.

Post-Development

The site drainage starts on the North side of the project and flows to the East and West. The drainage is intercepted into a storm sewer system and is discharged into the existing regional detention basin to the South of the proposed project. The post-development runoff conditions changed from undeveloped/woods to commercial development.

Runoff Summary

Drainage Basin "A"
(West Side of Project/30" ADS Discharge Point)
Pre-Development Drainage Area = 0.81 Ac
Post-Development Drainage Area = 6.28 Ac
Existing Condition runoff Coefficient: C = 0.47
Proposed runoff Coefficient: C = 0.95
Tc Undeveloped = 16 Minutes (TR55 Method)
Tc Developed = 6 Minutes

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	1.38	33.73
10-yr	1.85	45.13
25-yr	2.13	51.84
50-yr	2.33	56.64
100-yr	2.53	61.57

Drainage Basin "B"
(West side of Project/12" ADS Discharge Point)
Pre-Development Drainage Area = 5.62 Ac
Post-Development Drainage Area = 0.20 Ac
Existing Condition runoff Coefficient: C = 0.47
Proposed runoff Coefficient: C = 0.95
Tc Undeveloped = 13 Minutes (TR55 Method)
Tc Developed = 5 Minutes

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	10.53	1.17
10-yr	14.12	1.56
25-yr	16.22	1.79
50-yr	17.74	1.96
100-yr	19.26	2.13

Drainage Basin "C"
(East Side of Project/18" ADS Discharge Point)
Pre-Development Drainage Area = 0.64 Ac
Post-Development Drainage Area = 0.45 Ac
Existing Condition runoff Coefficient: C = 0.47
Proposed runoff Coefficient: C = 0.95
Tc Undeveloped = 9 Minutes (TR55 Method)
Tc Developed = 6 Minutes

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	1.41	2.42
10-yr	1.89	3.23
25-yr	2.18	3.72
50-yr	2.38	4.06
100-yr	2.59	4.41

Drainage Basin "D"
(East Side of Project/24" ADS Discharge Point)
Pre-Development Drainage Area = 0.47 Ac
Post-Development Drainage Area = 3.90 Ac
Existing Condition runoff Coefficient: C = 0.47
Proposed runoff Coefficient: C = 0.95
Tc Undeveloped = 19 Minutes (TR55 Method)
Tc Developed = 10 Minutes

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	0.99	9.95
10-yr	1.33	13.36
25-yr	1.53	15.35
50-yr	1.67	16.80
100-yr	1.81	18.23

Recommendations/Summary

The proposed drainage improvements include a storm sewer system for the commercial development that will be discharged into the existing regional detention basin. The proposed storm system also catches water from the commercial lot to the North and Hunters Crossing subdivision and routes it to the existing regional detention basin.

Appendices

Site Drainage Map
Storm System Design (SSA)
Pond and Post Development Hydrographs (Hydrology Studio)

Drainage Ditch Design Calculations

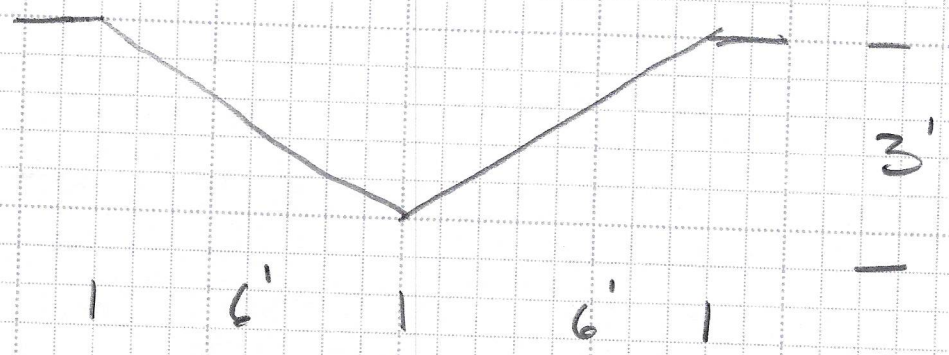
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(1/1)

PROJECT 023-065 COLLECTIVE CHURCH DATE 05/02/2025

DRAINAGE BASIN
3.7784 AC
$Q_{100} = 40.2$ CFS



$$Q = \frac{(1.49)}{N} * A * R_H^{(2/3)} \propto S^{1/2}$$

$N = 0.03$ (GRASS WATERWAY)

$A = 18\ FT^2$

$W_p = 13.41\ FT$

$S = 2.0\% = 0.02\ FT/FT$

$$Q = \frac{(1.49)}{0.03} * (18) * \left(\frac{18}{13.41}\right)^{(2/3)} * (0.02)^{1/2}$$

$= 153.8$ CFS ✓

Post-Development Tc Calculations

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POST-DEV BASIN "A" T_c

SUB FES-S : T_c = 5 MIN

PIPE 25 $T_{TRAV} = \frac{L}{V} = \frac{53}{(13.66)(60)} = 0.06$ MIN

PIPE 24 $\Rightarrow \frac{177}{(10.49)(60)} = 0.28$ MIN

PIPE 15 $\Rightarrow \frac{106}{(10.84)(60)} = 0.16$ MIN

T_c = 5.5 MIN

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POST-DEV BASIN "B"

SUB AD-24 T_c = 5 MIN

PIPE -16 $T_{FLOW} = \frac{L}{V} = \frac{105}{(6.4)(60)} = 0.27$ MIN

PIPE 17 $\Rightarrow \frac{61}{(10.37)(60)} = 0.10$ MIN

T_c = 5.37 MIN

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POST-DEV BASIN "C"

SUB AD-29 T_c = 5 MIN

PIPE 19 $T_{FLOW} = \frac{L}{V} = \frac{106}{(6.41)(60)} = 0.27$ MIN

PIPE 20 => $\frac{20}{(7.03)(60)} = 0.05$ MIN

PIPE 18 => $\frac{141}{(6.47)(60)} = 0.36$ MIN

PIPE 18(1) => $\frac{20}{(7.8)(60)} = 0.04$ MIN

T_c = 5.72 MIN

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POST-DEV BASIN "D"

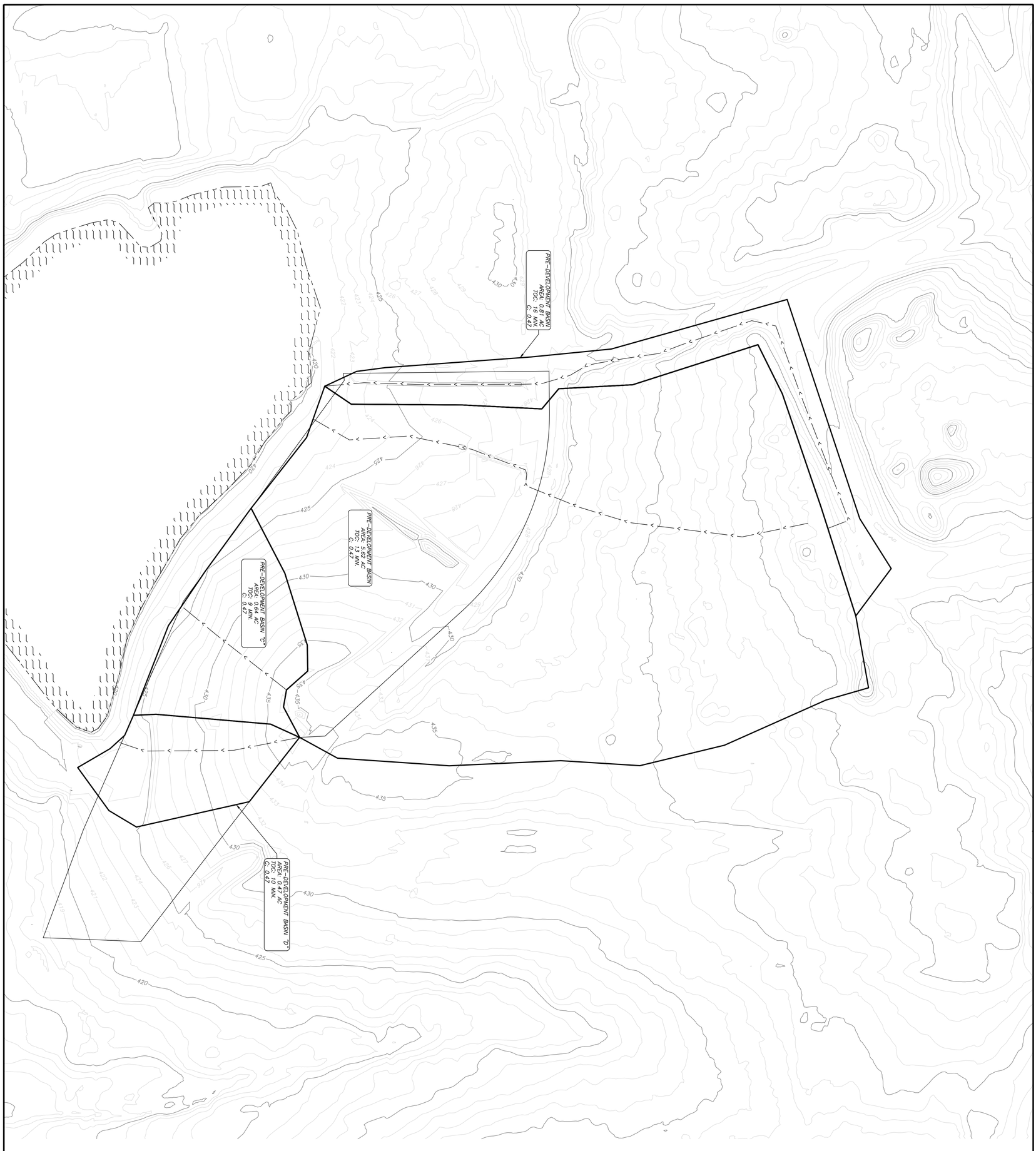
SUB FES-6 T_c = 18.23 min

PIPE 26 $T_{FLOW} = \frac{L}{V} = \frac{123}{(8.28)(60)}$ = 0.25 min

PIPE 21 => $\frac{63}{(9.38)(60)}$ = 0.11 min

T_c = 18.59 min

Site Drainage Basin Maps

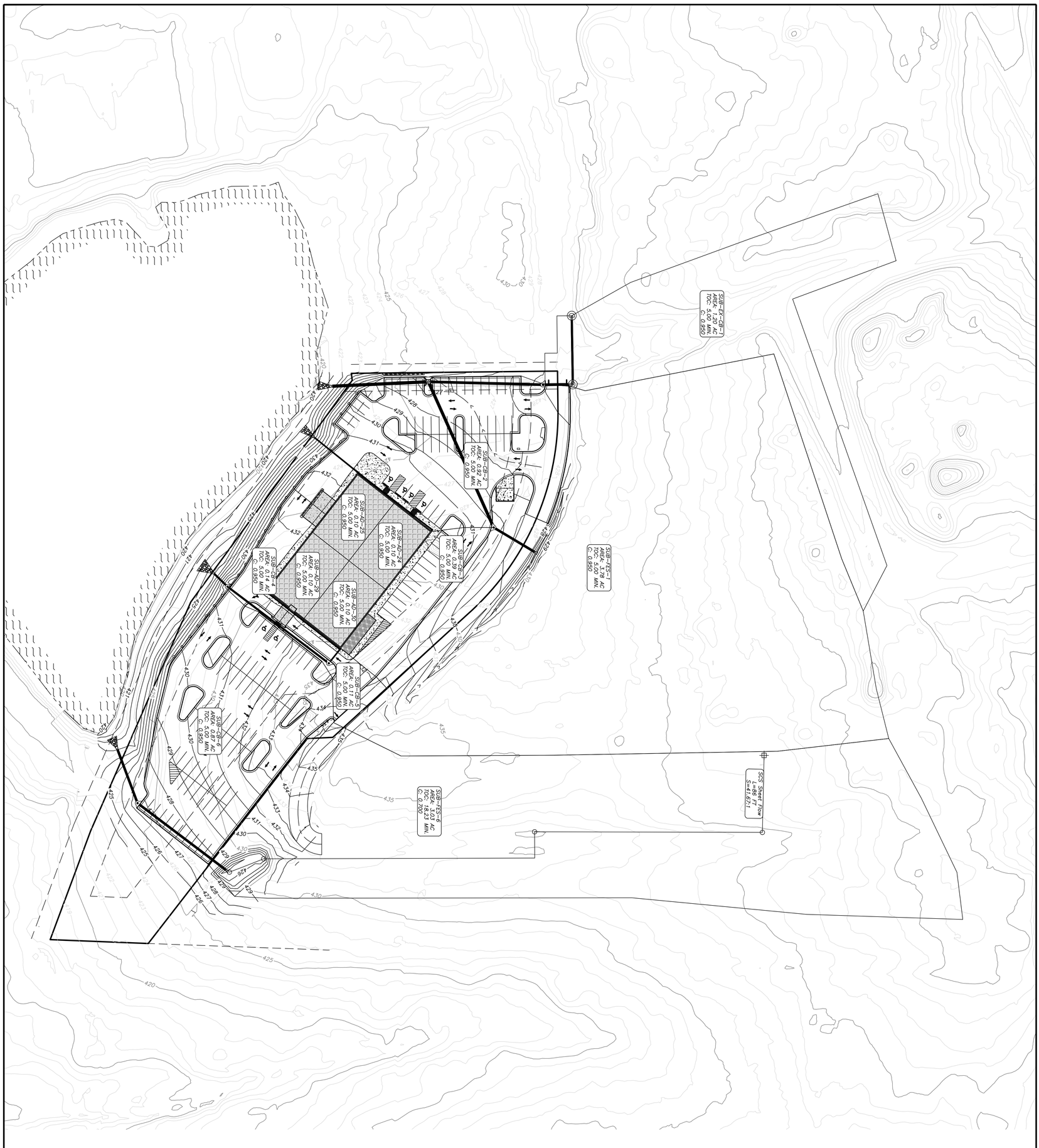


GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

PROJECT #: 023-065	No.	Revisions	Date	Prepared For: COLLECTIVE CHURCH 3230 MARKET PLACE AVE, SUITE 2 BRYANT, AR 72022	PRE-DEVELOPMENT DRAINAGE BASINS COLLECTIVE CHURCH PROPOSED BUILDING & PARKING BRYANT, ARKANSAS
Scale: 1" = 50' Date: 05/02/2025					
Sheet: 1 of 2					

CERTIFICATE OF AUTHORIZATION
Richardson Engineering, PLLC
No. 2519
ARKANSAS

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GRAPHIC SCALE

(IN FEET)

1 inch = 50 ft.

PROJECT #: 023-065		
Scale: 1" = 50'	Date: 05/02/2025	
Sheet: 2 of 2		

No.	Revisions	Date

Prepared For:

COLLECTIVE CHURCH

3230 MARKET PLACE AVE, SUITE 2

BRYANT, AR 72022

POST-DEVELOPMENT DRAINAGE BASINS
COLLECTIVE CHURCH

PROPOSED BUILDING & PARKING
BRYANT, ARKANSAS

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Storm System Design (SSA)

2 Year Design Storm

Project Description

File Name	Collective Church Drainage 5-2-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 02, 2025	00:00:00
End Analysis On	May 03, 2025	00:00:00
Start Reporting On	May 02, 2025	00:00:00
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	12
Nodes	16
Junctions	6
Outfalls	4
Flow Diversions	0
Inlets	6
Storage Nodes	0
Links	15
Channels	1
Pipes	14
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- (24)	0.10	0.9500	0.51	0.49	0.05	0.58	0 00:05:00
2	Sub-AD- (25)	0.10	0.9500	0.51	0.49	0.05	0.58	0 00:05:00
3	Sub-AD- (29)	0.10	0.9500	0.51	0.49	0.05	0.58	0 00:05:00
4	Sub-AD- (30)	0.10	0.9500	0.51	0.49	0.05	0.58	0 00:05:00
5	Sub-CB-1	1.20	0.9500	0.51	0.49	0.58	6.99	0 00:05:00
6	Sub-CB-2	0.92	0.9500	0.51	0.49	0.45	5.35	0 00:05:00
7	Sub-CB-3	0.39	0.9500	0.51	0.49	0.19	2.26	0 00:05:00
8	Sub-CB-4	0.14	0.9500	0.51	0.49	0.07	0.82	0 00:05:00
9	Sub-CB-5	0.11	0.9500	0.51	0.49	0.06	0.67	0 00:05:00
10	Sub-CB-6	0.87	0.9500	0.51	0.49	0.42	5.10	0 00:05:00
11	Sub-FES-5	3.78	0.9500	0.51	0.49	1.84	22.04	0 00:05:00
12	Sub-FES-6	3.03	0.7000	1.02	0.71	2.16	7.14	0 00:18:13

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Ma Surcharg Dept Attaine (f
1	AD- (24)	Junction	429.05	432.47	429.05	432.47	10.00	0.58	429.32	0.0
2	AD- (25)	Junction	428.00	432.46	428.00	432.46	10.00	1.13	428.26	0.0
3	AD- (29)	Junction	429.06	432.45	429.06	432.45	10.00	0.58	429.32	0.0
4	AD- (30)	Junction	428.00	432.46	428.00	432.46	10.00	1.12	428.29	0.0
5	FES-5	Junction	425.10	427.00	425.10	427.50	0.00	22.04	426.14	0.0
6	FES-6	Junction	424.75	426.99	424.75	426.99	0.00	7.14	425.49	0.0
7	Out-1SL - (15)	Outfall	421.25					35.49	422.94	
8	Out-1SL - (17)	Outfall	423.50					1.12	423.72	
9	Out-1SL - (18) (1)	Outfall	424.50					2.52	424.90	
10	Out-1SL - (21)	Outfall	422.50					7.11	423.15	

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	F
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	
1	L-SL - (24)	Pipe	CB-3	CB-2	199.68	430.66	426.94	1.8600	0.000	0.0320	0.36	0.00	0.00	0.00	
2	L-SL-14	Pipe	CB-1	CB-2	135.67	423.42	422.50	0.6800	0.000	0.0150	2.77	0.00	0.00	0.00	
3	SL - (14)	Pipe	CB-1	CB-2	127.66	423.42	422.80	0.4900	24.000	0.0130	4.16	15.77	0.26	7.45	
4	SL - (15)	Pipe	CB-2	Out-1SL - (15)	106.61	422.32	421.25	1.0000	30.000	0.0120	35.49	44.52	0.80	10.14	
5	SL - (16)	Pipe	AD- (24)	AD- (25)	105.49	429.05	428.00	1.0000	12.000	0.0120	0.57	3.86	0.15	5.59	
6	SL - (17)	Pipe	AD- (25)	Out-1SL - (17)	60.96	428.00	423.50	7.3800	12.000	0.0120	1.12	10.49	0.11	8.73	
7	SL - (18)	Pipe	CB-5	CB-4	141.40	427.00	424.90	1.4900	18.000	0.0120	1.76	13.88	0.13	5.45	
8	SL - (18) (1)	Pipe	CB-4	Out-1SL - (18) (1)	20.22	424.90	424.50	1.9700	18.000	0.0120	2.52	15.96	0.16	6.59	
9	SL - (19)	Pipe	AD- (29)	AD- (30)	106.07	429.06	428.00	1.0000	12.000	0.0120	0.57	3.86	0.15	5.60	
10	SL - (20)	Pipe	AD- (30)	CB-5	19.89	428.00	427.50	2.5100	12.000	0.0120	1.12	6.12	0.18	5.94	
11	SL - (21)	Pipe	CB-6	Out-1SL - (21)	63.64	423.50	422.50	1.5700	24.000	0.0120	7.11	30.72	0.23	7.96	
12	SL - (24)	Pipe	CB-3	CB-2	174.72	424.10	422.32	1.0200	30.000	0.0120	23.43	44.85	0.52	9.34	
13	SL - (25)	Pipe	FES-5	CB-3	52.99	425.10	424.10	1.8900	30.000	0.0120	21.93	61.04	0.36	11.83	
14	SL - (26)	Pipe	FES-6	CB-6	123.36	424.75	423.50	1.0100	24.000	0.0120	7.11	24.67	0.29	7.20	
15	L-SL - (18) (1)	Channel	CB-4	CB-6	272.73	431.93	427.30	1.7000	6.000	0.0150	0.00	7.95	0.00	0.00	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	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	CB-1	On Grade	1	423.42	429.56	423.42	N/A	6.99	4.21	2.77	60.33	10.00	14.61	429.85
2	CB-2	On Sag	1	422.32	426.95	422.32	10.00	8.48	N/A	N/A	N/A	10.00	9.70	427.49
3	CB-3	On Grade	1	424.10	430.66	424.10	N/A	2.26	1.90	0.36	84.14	10.00	5.89	430.82
4	CB-4	On Grade	1	424.90	431.93	424.90	N/A	0.82	0.82	0.00	100.00	10.00	5.89	432.05
5	CB-5	On Sag	1	427.00	432.00	427.00	10.00	0.67	N/A	N/A	N/A	10.00	2.33	432.32
6	CB-6	On Sag	1	423.50	427.34	423.50	10.00	5.10	N/A	N/A	N/A	10.00	7.76	427.86

Subbasin Hydrology

Subbasin : Sub-AD- (24)

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (25)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (29)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (30)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-1

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-2

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-3

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-4

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-6

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0.00	0.00
Flow Length (ft) :	85.71195638	0.00	0.00
Slope (%) :	2.4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.36	0.00	0.00
Velocity (ft/sec) :	0.12	0.00	0.00
Computed Flow Time (min) :	12.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	253.76684919	31.23398630	0.93388558
Slope (%) :	1.8	0.4	1.25
Surface Type :	Paved	Paved	Unpaved
Velocity (ft/sec) :	2.73	1.29	1.80
Computed Flow Time (min) :	1.55	4.29	0.38

Total TOC (min) 18.23

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	AD- (24)	429.05	432.47	3.41	429.05	0.00	432.47	0.00	10.00	0.00
2	AD- (25)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
3	AD- (29)	429.06	432.45	3.39	429.06	0.00	432.45	0.00	10.00	0.00
4	AD- (30)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
5	FES-5	425.10	427.00	1.90	425.10	0.00	427.50	0.50	0.00	0.00
6	FES-6	424.75	426.99	2.24	424.75	0.00	426.99	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time Max H Occurren (days hh:m
1	AD- (24)	0.58	0.58	429.32	0.27	0.00	3.15	429.06	0.01	0 00:
2	AD- (25)	1.13	0.58	428.26	0.26	0.00	4.21	428.00	0.00	0 00:
3	AD- (29)	0.58	0.58	429.32	0.26	0.00	3.13	429.06	0.00	0 00:
4	AD- (30)	1.12	0.58	428.29	0.29	0.00	4.17	428.00	0.00	0 00:
5	FES-5	22.04	22.04	426.14	1.04	0.00	1.46	425.10	0.00	0 00:
6	FES-6	7.14	7.14	425.49	0.74	0.00	1.50	424.76	0.01	0 00:

Channel 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 (%)	Shape	Height (ft)	Width (ft)	Manı Rougł
1	L-SL - (18) (1)	272.73	431.93	7.03	427.30	3.80	4.63	1.7000	User-Defined	0.500	17.000	0

Channel 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	T Si
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (18) (1)	0.00	0 00:00	7.95	0.00	0.00		0.00	0.00	

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)	Ma Rou
1	L-SL - (24)	199.68	430.66	6.56	426.94	4.62	3.72	1.8600	Dummy	0.000	0.000	
2	L-SL-14	135.67	423.42	0.00	422.50	0.18	0.92	0.6800	Dummy	0.000	0.000	
3	SL - (14)	127.66	423.42	0.00	422.80	0.48	0.62	0.4900	CIRCULAR	24.000	24.000	
4	SL - (15)	106.61	422.32	0.00	421.25	0.00	1.07	1.0000	CIRCULAR	30.000	30.000	
5	SL - (16)	105.49	429.05	0.00	428.00	0.00	1.05	1.0000	CIRCULAR	12.000	12.000	
6	SL - (17)	60.96	428.00	0.00	423.50	0.00	4.50	7.3800	CIRCULAR	12.000	12.000	
7	SL - (18)	141.40	427.00	0.00	424.90	0.00	2.10	1.4900	CIRCULAR	18.000	18.000	
8	SL - (18) (1)	20.22	424.90	0.00	424.50	0.00	0.40	1.9700	CIRCULAR	18.000	18.000	
9	SL - (19)	106.07	429.06	0.00	428.00	0.00	1.06	1.0000	CIRCULAR	12.000	12.000	
10	SL - (20)	19.89	428.00	0.00	427.50	0.50	0.50	2.5100	CIRCULAR	12.000	12.000	
11	SL - (21)	63.64	423.50	0.00	422.50	0.00	1.00	1.5700	CIRCULAR	24.000	24.000	
12	SL - (24)	174.72	424.10	0.00	422.32	0.00	1.78	1.0200	CIRCULAR	30.000	30.000	
13	SL - (25)	52.99	425.10	0.00	424.10	0.00	1.00	1.8900	CIRCULAR	30.000	30.000	
14	SL - (26)	123.36	424.75	0.00	423.50	0.00	1.25	1.0100	CIRCULAR	24.000	24.000	

No. of Barrels
1
1
1
1
1
1
1
1
1
1
1
1
1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	To Sur
1	L-SL - (24)	0.36	0 00:05	0.00	0.00	0.00		0.00	0.00	
2	L-SL-14	2.77	0 00:05	0.00	0.00	0.00		0.00	0.00	
3	SL - (14)	4.16	0 00:05	15.77	0.26	7.45	0.29	0.70	0.35	
4	SL - (15)	35.49	0 00:05	44.52	0.80	10.14	0.18	1.68	0.67	
5	SL - (16)	0.57	0 00:05	3.86	0.15	5.59	0.31	0.26	0.26	
6	SL - (17)	1.12	0 00:05	10.49	0.11	8.73	0.12	0.22	0.22	
7	SL - (18)	1.76	0 00:05	13.88	0.13	5.45	0.43	0.36	0.24	
8	SL - (18) (1)	2.52	0 00:05	15.96	0.16	6.59	0.05	0.40	0.27	
9	SL - (19)	0.57	0 00:05	3.86	0.15	5.60	0.32	0.26	0.26	
10	SL - (20)	1.12	0 00:05	6.12	0.18	5.94	0.06	0.29	0.29	
11	SL - (21)	7.11	0 00:18	30.72	0.23	7.96	0.13	0.65	0.33	
12	SL - (24)	23.43	0 00:05	44.85	0.52	9.34	0.31	1.28	0.51	
13	SL - (25)	21.93	0 00:05	61.04	0.36	11.83	0.07	1.04	0.41	
14	SL - (26)	7.11	0 00:18	24.67	0.29	7.20	0.29	0.73	0.37	

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	CB-1	On Grade	1	423.42	429.56	6.14	423.42	0.00	N/A	0.00
2	CB-2	On Sag	1	422.32	426.95	4.63	422.32	0.00	10.00	0.00
3	CB-3	On Grade	1	424.10	430.66	6.56	424.10	0.00	N/A	0.00
4	CB-4	On Grade	1	424.90	431.93	7.03	424.90	0.00	N/A	0.00
5	CB-5	On Sag	1	427.00	432.00	5.00	427.00	0.00	10.00	0.00
6	CB-6	On Sag	1	423.50	427.34	3.84	423.50	0.00	10.00	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	CB-1	0.0100	0.0200	0.0150	0.0200	1.50	0.1312	10.00
2	CB-2	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
3	CB-3	0.0380	0.0300	0.0150	0.0200	1.50	0.1312	10.00
4	CB-4	0.0175	0.0200	0.0150	0.0200	1.50	0.1312	10.00
5	CB-5	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
6	CB-6	N/A	0.0350	0.0150	0.0200	1.50	0.1312	10.00

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)	T Max Occu (days h
1	CB-1	6.99	6.99	4.21	2.77	60.33	14.61	429.85	0.29	(
2	CB-2	8.48	5.35	N/A	N/A	N/A	9.70	427.49	0.54	(
3	CB-3	2.26	2.26	1.90	0.36	84.14	5.89	430.82	0.16	(
4	CB-4	0.82	0.82	0.82	0.00	100.00	5.89	432.05	0.12	(
5	CB-5	0.67	0.67	N/A	N/A	N/A	2.33	432.32	0.32	(
6	CB-6	5.10	5.10	N/A	N/A	N/A	7.76	427.86	0.52	(

10 Year Design Storm

Project Description

File Name	Collective Church Drainage 5-2-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 02, 2025	00:00:00
End Analysis On	May 03, 2025	00:00:00
Start Reporting On	May 02, 2025	00:00:00
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	12
Nodes	16
Junctions	6
Outfalls	4
Flow Diversions	0
Inlets	6
Storage Nodes	0
Links	15
Channels	1
Pipes	14
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- (24)	0.10	0.9500	0.68	0.65	0.06	0.78	0 00:05:00
2	Sub-AD- (25)	0.10	0.9500	0.68	0.65	0.06	0.78	0 00:05:00
3	Sub-AD- (29)	0.10	0.9500	0.68	0.65	0.06	0.78	0 00:05:00
4	Sub-AD- (30)	0.10	0.9500	0.68	0.65	0.06	0.78	0 00:05:00
5	Sub-CB-1	1.20	0.9500	0.68	0.65	0.78	9.34	0 00:05:00
6	Sub-CB-2	0.92	0.9500	0.68	0.65	0.60	7.15	0 00:05:00
7	Sub-CB-3	0.39	0.9500	0.68	0.65	0.25	3.03	0 00:05:00
8	Sub-CB-4	0.14	0.9500	0.68	0.65	0.09	1.09	0 00:05:00
9	Sub-CB-5	0.11	0.9500	0.68	0.65	0.07	0.89	0 00:05:00
10	Sub-CB-6	0.87	0.9500	0.68	0.65	0.57	6.82	0 00:05:00
11	Sub-FES-5	3.78	0.9500	0.68	0.65	2.46	29.47	0 00:05:00
12	Sub-FES-6	3.03	0.7000	1.36	0.96	2.89	9.55	0 00:18:13

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Ma Surcharg Dept Attaine (f
1	AD- (24)	Junction	429.05	432.47	429.05	432.47	10.00	0.78	429.36	0.0
2	AD- (25)	Junction	428.00	432.46	428.00	432.46	10.00	1.50	428.30	0.0
3	AD- (29)	Junction	429.06	432.45	429.06	432.45	10.00	0.78	429.36	0.0
4	AD- (30)	Junction	428.00	432.46	428.00	432.46	10.00	1.51	428.34	0.0
5	FES-5	Junction	425.10	427.00	425.10	427.50	0.00	29.47	426.32	0.0
6	FES-6	Junction	424.75	426.99	424.75	426.99	0.00	9.55	425.61	0.0
7	Out-1SL - (15)	Outfall	421.25					48.16	423.54	
8	Out-1SL - (17)	Outfall	423.50					1.50	423.76	
9	Out-1SL - (18) (1)	Outfall	424.50					3.38	424.97	
10	Out-1SL - (21)	Outfall	422.50					9.51	423.26	

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	F
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	
1	L-SL - (24)	Pipe	CB-3	CB-2	199.68	430.66	426.94	1.8600	0.000	0.0320	0.73	0.00	0.00	0.00	
2	L-SL-14	Pipe	CB-1	CB-2	135.67	423.42	422.50	0.6800	0.000	0.0150	4.42	0.00	0.00	0.00	
3	SL - (14)	Pipe	CB-1	CB-2	127.66	423.42	422.80	0.4900	24.000	0.0130	4.86	15.77	0.31	7.88	
4	SL - (15)	Pipe	CB-2	Out-1SL - (15)	106.61	422.32	421.25	1.0000	30.000	0.0120	48.16	44.52	1.08	10.66	
5	SL - (16)	Pipe	AD- (24)	AD- (25)	105.49	429.05	428.00	1.0000	12.000	0.0120	0.75	3.86	0.20	5.92	
6	SL - (17)	Pipe	AD- (25)	Out-1SL - (17)	60.96	428.00	423.50	7.3800	12.000	0.0120	1.50	10.49	0.14	9.47	
7	SL - (18)	Pipe	CB-5	CB-4	141.40	427.00	424.90	1.4900	18.000	0.0120	2.36	13.88	0.17	5.92	
8	SL - (18) (1)	Pipe	CB-4	Out-1SL - (18) (1)	20.22	424.90	424.50	1.9700	18.000	0.0120	3.38	15.96	0.21	7.17	
9	SL - (19)	Pipe	AD- (29)	AD- (30)	106.07	429.06	428.00	1.0000	12.000	0.0120	0.76	3.86	0.20	5.93	
10	SL - (20)	Pipe	AD- (30)	CB-5	19.89	428.00	427.50	2.5100	12.000	0.0120	1.50	6.12	0.25	6.45	
11	SL - (21)	Pipe	CB-6	Out-1SL - (21)	63.64	423.50	422.50	1.5700	24.000	0.0120	9.51	30.72	0.31	8.62	
12	SL - (24)	Pipe	CB-3	CB-2	174.72	424.10	422.32	1.0200	30.000	0.0120	31.14	44.85	0.69	9.98	
13	SL - (25)	Pipe	FES-5	CB-3	52.99	425.10	424.10	1.8900	30.000	0.0120	29.34	61.04	0.48	12.41	
14	SL - (26)	Pipe	FES-6	CB-6	123.36	424.75	423.50	1.0100	24.000	0.0120	9.51	24.67	0.39	7.69	
15	L-SL - (18) (1)	Channel	CB-4	CB-6	272.73	431.93	427.30	1.7000	6.000	0.0150	0.01	7.95	0.00	0.90	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	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	CB-1	On Grade	1	423.42	429.56	423.42	N/A	9.34	4.92	4.42	52.73	10.00	16.29	429.88
2	CB-2	On Sag	1	422.32	426.95	422.32	10.00	12.30	N/A	N/A	N/A	10.00	12.42	427.57
3	CB-3	On Grade	1	424.10	430.66	424.10	N/A	3.03	2.29	0.73	75.84	10.00	6.55	430.84
4	CB-4	On Grade	1	424.90	431.93	424.90	N/A	1.09	1.09	0.00	100.00	10.00	6.57	432.06
5	CB-5	On Sag	1	427.00	432.00	427.00	10.00	0.89	N/A	N/A	N/A	10.00	2.83	432.34
6	CB-6	On Sag	1	423.50	427.34	423.50	10.00	6.81	N/A	N/A	N/A	10.00	9.41	427.92

Subbasin Hydrology

Subbasin : Sub-AD- (24)

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (25)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (29)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (30)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-1

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-2

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-3

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-4

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-6

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0.00	0.00
Flow Length (ft) :	85.71195638	0.00	0.00
Slope (%) :	2.4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.36	0.00	0.00
Velocity (ft/sec) :	0.12	0.00	0.00
Computed Flow Time (min) :	12.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	253.76684919	31.23398630	0.93388558
Slope (%) :	1.8	0.4	1.25
Surface Type :	Paved	Paved	Unpaved
Velocity (ft/sec) :	2.73	1.29	1.80
Computed Flow Time (min) :	1.55	4.29	0.38

Total TOC (min) 18.23

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	AD- (24)	429.05	432.47	3.41	429.05	0.00	432.47	0.00	10.00	0.00
2	AD- (25)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
3	AD- (29)	429.06	432.45	3.39	429.06	0.00	432.45	0.00	10.00	0.00
4	AD- (30)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
5	FES-5	425.10	427.00	1.90	425.10	0.00	427.50	0.50	0.00	0.00
6	FES-6	424.75	426.99	2.24	424.75	0.00	426.99	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time Max H Occurren (days hh:m
1	AD- (24)	0.78	0.78	429.36	0.31	0.00	3.11	429.06	0.01	0 00:
2	AD- (25)	1.50	0.78	428.30	0.30	0.00	4.16	428.00	0.00	0 00:
3	AD- (29)	0.78	0.78	429.36	0.30	0.00	3.09	429.06	0.00	0 00:
4	AD- (30)	1.51	0.78	428.34	0.34	0.00	4.12	428.00	0.00	0 00:
5	FES-5	29.47	29.47	426.32	1.22	0.00	1.28	425.11	0.01	0 00:
6	FES-6	9.55	9.55	425.61	0.86	0.00	1.37	424.76	0.01	0 00:

Channel 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 (%)	Shape	Height (ft)	Width (ft)	Manı Rougł
1	L-SL - (18) (1)	272.73	431.93	7.03	427.30	3.80	4.63	1.7000	User-Defined	0.500	17.000	0

Channel 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	T Si
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (18) (1)	0.01	0 00:05	7.95	0.00	0.90	5.05	0.02	0.05	

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)	Ma Rou
1	L-SL - (24)	199.68	430.66	6.56	426.94	4.62	3.72	1.8600	Dummy	0.000	0.000	
2	L-SL-14	135.67	423.42	0.00	422.50	0.18	0.92	0.6800	Dummy	0.000	0.000	
3	SL - (14)	127.66	423.42	0.00	422.80	0.48	0.62	0.4900	CIRCULAR	24.000	24.000	
4	SL - (15)	106.61	422.32	0.00	421.25	0.00	1.07	1.0000	CIRCULAR	30.000	30.000	
5	SL - (16)	105.49	429.05	0.00	428.00	0.00	1.05	1.0000	CIRCULAR	12.000	12.000	
6	SL - (17)	60.96	428.00	0.00	423.50	0.00	4.50	7.3800	CIRCULAR	12.000	12.000	
7	SL - (18)	141.40	427.00	0.00	424.90	0.00	2.10	1.4900	CIRCULAR	18.000	18.000	
8	SL - (18) (1)	20.22	424.90	0.00	424.50	0.00	0.40	1.9700	CIRCULAR	18.000	18.000	
9	SL - (19)	106.07	429.06	0.00	428.00	0.00	1.06	1.0000	CIRCULAR	12.000	12.000	
10	SL - (20)	19.89	428.00	0.00	427.50	0.50	0.50	2.5100	CIRCULAR	12.000	12.000	
11	SL - (21)	63.64	423.50	0.00	422.50	0.00	1.00	1.5700	CIRCULAR	24.000	24.000	
12	SL - (24)	174.72	424.10	0.00	422.32	0.00	1.78	1.0200	CIRCULAR	30.000	30.000	
13	SL - (25)	52.99	425.10	0.00	424.10	0.00	1.00	1.8900	CIRCULAR	30.000	30.000	
14	SL - (26)	123.36	424.75	0.00	423.50	0.00	1.25	1.0100	CIRCULAR	24.000	24.000	

No. of Barrels
1
1
1
1
1
1
1
1
1
1
1
1
1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	To Sur
1	L-SL - (24)	0.73	0 00:05	0.00	0.00	0.00		0.02	0.05	
2	L-SL-14	4.42	0 00:05	0.00	0.00	0.00		0.02	0.05	
3	SL - (14)	4.86	0 00:05	15.77	0.31	7.88	0.27	0.76	0.38	
4	SL - (15)	48.16	0 00:05	44.52	1.08	10.66	0.17	2.32	0.93	
5	SL - (16)	0.75	0 00:05	3.86	0.20	5.92	0.30	0.30	0.30	
6	SL - (17)	1.50	0 00:05	10.49	0.14	9.47	0.11	0.26	0.26	
7	SL - (18)	2.36	0 00:05	13.88	0.17	5.92	0.40	0.42	0.28	
8	SL - (18) (1)	3.38	0 00:05	15.96	0.21	7.17	0.05	0.47	0.31	
9	SL - (19)	0.76	0 00:05	3.86	0.20	5.93	0.30	0.30	0.30	
10	SL - (20)	1.50	0 00:05	6.12	0.25	6.45	0.05	0.34	0.34	
11	SL - (21)	9.51	0 00:18	30.72	0.31	8.62	0.12	0.76	0.38	
12	SL - (24)	31.14	0 00:05	44.85	0.69	9.98	0.29	1.53	0.61	
13	SL - (25)	29.34	0 00:05	61.04	0.48	12.41	0.07	1.22	0.49	
14	SL - (26)	9.51	0 00:18	24.67	0.39	7.69	0.27	0.86	0.43	

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	CB-1	On Grade	1	423.42	429.56	6.14	423.42	0.00	N/A	0.00
2	CB-2	On Sag	1	422.32	426.95	4.63	422.32	0.00	10.00	0.00
3	CB-3	On Grade	1	424.10	430.66	6.56	424.10	0.00	N/A	0.00
4	CB-4	On Grade	1	424.90	431.93	7.03	424.90	0.00	N/A	0.00
5	CB-5	On Sag	1	427.00	432.00	5.00	427.00	0.00	10.00	0.00
6	CB-6	On Sag	1	423.50	427.34	3.84	423.50	0.00	10.00	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	CB-1	0.0100	0.0200	0.0150	0.0200	1.50	0.1312	10.00
2	CB-2	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
3	CB-3	0.0380	0.0300	0.0150	0.0200	1.50	0.1312	10.00
4	CB-4	0.0175	0.0200	0.0150	0.0200	1.50	0.1312	10.00
5	CB-5	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
6	CB-6	N/A	0.0350	0.0150	0.0200	1.50	0.1312	10.00

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)	Max Occu (days
1	CB-1	9.34	9.34	4.92	4.42	52.73	16.29	429.88	0.33	
2	CB-2	12.30	7.15	N/A	N/A	N/A	12.42	427.57	0.62	
3	CB-3	3.03	3.03	2.29	0.73	75.84	6.55	430.84	0.18	
4	CB-4	1.09	1.09	1.09	0.00	100.00	6.57	432.06	0.13	
5	CB-5	0.89	0.89	N/A	N/A	N/A	2.83	432.34	0.33	
6	CB-6	6.81	6.81	N/A	N/A	N/A	9.41	427.92	0.58	

25 Year Design Storm

Project Description

File Name	Collective Church Drainage 5-2-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 02, 2025	00:00:00
End Analysis On	May 03, 2025	00:00:00
Start Reporting On	May 02, 2025	00:00:00
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	12
Nodes	16
Junctions	6
Outfalls	4
Flow Diversions	0
Inlets	6
Storage Nodes	0
Links	15
Channels	1
Pipes	14
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- (24)	0.10	0.9500	0.79	0.75	0.07	0.89	0 00:05:00
2	Sub-AD- (25)	0.10	0.9500	0.79	0.75	0.07	0.89	0 00:05:00
3	Sub-AD- (29)	0.10	0.9500	0.79	0.75	0.07	0.89	0 00:05:00
4	Sub-AD- (30)	0.10	0.9500	0.79	0.75	0.07	0.89	0 00:05:00
5	Sub-CB-1	1.20	0.9500	0.79	0.75	0.89	10.73	0 00:05:00
6	Sub-CB-2	0.92	0.9500	0.79	0.75	0.68	8.21	0 00:05:00
7	Sub-CB-3	0.39	0.9500	0.79	0.75	0.29	3.48	0 00:05:00
8	Sub-CB-4	0.14	0.9500	0.79	0.75	0.10	1.26	0 00:05:00
9	Sub-CB-5	0.11	0.9500	0.79	0.75	0.09	1.03	0 00:05:00
10	Sub-CB-6	0.87	0.9500	0.79	0.75	0.65	7.83	0 00:05:00
11	Sub-FES-5	3.78	0.9500	0.79	0.75	2.82	33.85	0 00:05:00
12	Sub-FES-6	3.03	0.7000	1.57	1.10	3.32	10.98	0 00:18:13

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Ma Surcharg Dept Attaine (f
1	AD- (24)	Junction	429.05	432.47	429.05	432.47	10.00	0.89	429.38	0.0
2	AD- (25)	Junction	428.00	432.46	428.00	432.46	10.00	1.73	428.32	0.0
3	AD- (29)	Junction	429.06	432.45	429.06	432.45	10.00	0.89	429.39	0.0
4	AD- (30)	Junction	428.00	432.46	428.00	432.46	10.00	1.73	428.36	0.0
5	FES-5	Junction	425.10	427.00	425.10	427.50	0.00	33.85	426.43	0.0
6	FES-6	Junction	424.75	426.99	424.75	426.99	0.00	10.98	425.68	0.0
7	Out-1SL - (15)	Outfall	421.25					48.16	423.75	
8	Out-1SL - (17)	Outfall	423.50					1.73	423.77	
9	Out-1SL - (18) (1)	Outfall	424.50					3.86	425.00	
10	Out-1SL - (21)	Outfall	422.50					10.93	423.32	

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	F
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	
1	L-SL - (24)	Pipe	CB-3	CB-2	199.68	430.66	426.94	1.8600	0.000	0.0320	0.98	0.00	0.00	0.00	
2	L-SL-14	Pipe	CB-1	CB-2	135.67	423.42	422.50	0.6800	0.000	0.0150	5.43	0.00	0.00	0.00	
3	SL - (14)	Pipe	CB-1	CB-2	127.66	423.42	422.80	0.4900	24.000	0.0130	5.23	15.77	0.33	8.17	
4	SL - (15)	Pipe	CB-2	Out-1SL - (15)	106.61	422.32	421.25	1.0000	30.000	0.0120	48.16	44.52	1.08	10.82	
5	SL - (16)	Pipe	AD- (24)	AD- (25)	105.49	429.05	428.00	1.0000	12.000	0.0120	0.87	3.86	0.23	6.22	
6	SL - (17)	Pipe	AD- (25)	Out-1SL - (17)	60.96	428.00	423.50	7.3800	12.000	0.0120	1.73	10.49	0.16	9.88	
7	SL - (18)	Pipe	CB-5	CB-4	141.40	427.00	424.90	1.4900	18.000	0.0120	2.71	13.88	0.19	6.15	
8	SL - (18) (1)	Pipe	CB-4	Out-1SL - (18) (1)	20.22	424.90	424.50	1.9700	18.000	0.0120	3.86	15.96	0.24	7.44	
9	SL - (19)	Pipe	AD- (29)	AD- (30)	106.07	429.06	428.00	1.0000	12.000	0.0120	0.87	3.86	0.23	6.23	
10	SL - (20)	Pipe	AD- (30)	CB-5	19.89	428.00	427.50	2.5100	12.000	0.0120	1.73	6.12	0.28	6.70	
11	SL - (21)	Pipe	CB-6	Out-1SL - (21)	63.64	423.50	422.50	1.5700	24.000	0.0120	10.93	30.72	0.36	8.95	
12	SL - (24)	Pipe	CB-3	CB-2	174.72	424.10	422.32	1.0200	30.000	0.0120	35.74	44.85	0.80	10.29	
13	SL - (25)	Pipe	FES-5	CB-3	52.99	425.10	424.10	1.8900	30.000	0.0120	33.72	61.04	0.55	12.97	
14	SL - (26)	Pipe	FES-6	CB-6	123.36	424.75	423.50	1.0100	24.000	0.0120	10.94	24.67	0.44	7.91	
15	L-SL - (18) (1)	Channel	CB-4	CB-6	272.73	431.93	427.30	1.7000	6.000	0.0150	0.01	7.95	0.00	1.43	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	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	CB-1	On Grade	1	423.42	429.56	423.42	N/A	10.73	5.29	5.43	49.35	10.00	17.15	429.90
2	CB-2	On Sag	1	422.32	426.95	422.32	10.00	14.63	N/A	N/A	N/A	10.00	13.95	427.61
3	CB-3	On Grade	1	424.10	430.66	424.10	N/A	3.48	2.50	0.98	71.85	10.00	6.88	430.85
4	CB-4	On Grade	1	424.90	431.93	424.90	N/A	1.25	1.25	0.01	99.54	10.00	6.92	432.07
5	CB-5	On Sag	1	427.00	432.00	427.00	10.00	1.03	N/A	N/A	N/A	10.00	3.11	432.35
6	CB-6	On Sag	1	423.50	427.34	423.50	10.00	7.83	N/A	N/A	N/A	10.00	10.33	427.95

Subbasin Hydrology

Subbasin : Sub-AD- (24)

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (25)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (29)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (30)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-1

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-2

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-3

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-4

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-6

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0.00	0.00
Flow Length (ft) :	85.71195638	0.00	0.00
Slope (%) :	2.4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.36	0.00	0.00
Velocity (ft/sec) :	0.12	0.00	0.00
Computed Flow Time (min) :	12.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	253.76684919	31.23398630	0.93388558
Slope (%) :	1.8	0.4	1.25
Surface Type :	Paved	Paved	Unpaved
Velocity (ft/sec) :	2.73	1.29	1.80
Computed Flow Time (min) :	1.55	4.29	0.38

Total TOC (min) 18.23

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	AD- (24)	429.05	432.47	3.41	429.05	0.00	432.47	0.00	10.00	0.00
2	AD- (25)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
3	AD- (29)	429.06	432.45	3.39	429.06	0.00	432.45	0.00	10.00	0.00
4	AD- (30)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
5	FES-5	425.10	427.00	1.90	425.10	0.00	427.50	0.50	0.00	0.00
6	FES-6	424.75	426.99	2.24	424.75	0.00	426.99	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time Max H Occurren (days hh:m
1	AD- (24)	0.89	0.89	429.38	0.33	0.00	3.08	429.06	0.01	0 00:
2	AD- (25)	1.73	0.89	428.32	0.32	0.00	4.14	428.00	0.00	0 00:
3	AD- (29)	0.89	0.89	429.39	0.33	0.00	3.07	429.06	0.00	0 00:
4	AD- (30)	1.73	0.89	428.36	0.36	0.00	4.10	428.00	0.00	0 00:
5	FES-5	33.85	33.85	426.43	1.33	0.00	1.17	425.11	0.01	0 00:
6	FES-6	10.98	10.98	425.68	0.93	0.00	1.30	424.77	0.02	0 00:

Channel 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 (%)	Shape	Height (ft)	Width (ft)	Manı Rougł
1	L-SL - (18) (1)	272.73	431.93	7.03	427.30	3.80	4.63	1.7000	User-Defined	0.500	17.000	0

Channel 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	T Si
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (18) (1)	0.01	0 00:06	7.95	0.00	1.43	3.18	0.03	0.07	

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)	Ma Rou
1	L-SL - (24)	199.68	430.66	6.56	426.94	4.62	3.72	1.8600	Dummy	0.000	0.000	
2	L-SL-14	135.67	423.42	0.00	422.50	0.18	0.92	0.6800	Dummy	0.000	0.000	
3	SL - (14)	127.66	423.42	0.00	422.80	0.48	0.62	0.4900	CIRCULAR	24.000	24.000	
4	SL - (15)	106.61	422.32	0.00	421.25	0.00	1.07	1.0000	CIRCULAR	30.000	30.000	
5	SL - (16)	105.49	429.05	0.00	428.00	0.00	1.05	1.0000	CIRCULAR	12.000	12.000	
6	SL - (17)	60.96	428.00	0.00	423.50	0.00	4.50	7.3800	CIRCULAR	12.000	12.000	
7	SL - (18)	141.40	427.00	0.00	424.90	0.00	2.10	1.4900	CIRCULAR	18.000	18.000	
8	SL - (18) (1)	20.22	424.90	0.00	424.50	0.00	0.40	1.9700	CIRCULAR	18.000	18.000	
9	SL - (19)	106.07	429.06	0.00	428.00	0.00	1.06	1.0000	CIRCULAR	12.000	12.000	
10	SL - (20)	19.89	428.00	0.00	427.50	0.50	0.50	2.5100	CIRCULAR	12.000	12.000	
11	SL - (21)	63.64	423.50	0.00	422.50	0.00	1.00	1.5700	CIRCULAR	24.000	24.000	
12	SL - (24)	174.72	424.10	0.00	422.32	0.00	1.78	1.0200	CIRCULAR	30.000	30.000	
13	SL - (25)	52.99	425.10	0.00	424.10	0.00	1.00	1.8900	CIRCULAR	30.000	30.000	
14	SL - (26)	123.36	424.75	0.00	423.50	0.00	1.25	1.0100	CIRCULAR	24.000	24.000	

No. of Barrels
1
1
1
1
1
1
1
1
1
1
1
1
1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	To Sur
1	L-SL - (24)	0.98	0 00:05	0.00	0.00	0.00		0.03	0.07	
2	L-SL-14	5.43	0 00:05	0.00	0.00	0.00		0.03	0.07	
3	SL - (14)	5.23	0 00:05	15.77	0.33	8.17	0.26	0.79	0.40	
4	SL - (15)	48.16	0 00:05	44.52	1.08	10.82	0.16	2.50	1.00	
5	SL - (16)	0.87	0 00:05	3.86	0.23	6.22	0.28	0.32	0.32	
6	SL - (17)	1.73	0 00:05	10.49	0.16	9.88	0.10	0.27	0.27	
7	SL - (18)	2.71	0 00:05	13.88	0.19	6.15	0.38	0.45	0.30	
8	SL - (18) (1)	3.86	0 00:05	15.96	0.24	7.44	0.05	0.50	0.34	
9	SL - (19)	0.87	0 00:05	3.86	0.23	6.23	0.28	0.32	0.32	
10	SL - (20)	1.73	0 00:05	6.12	0.28	6.70	0.05	0.36	0.36	
11	SL - (21)	10.93	0 00:18	30.72	0.36	8.95	0.12	0.82	0.41	
12	SL - (24)	35.74	0 00:05	44.85	0.80	10.29	0.28	1.68	0.67	
13	SL - (25)	33.72	0 00:05	61.04	0.55	12.97	0.07	1.33	0.53	
14	SL - (26)	10.94	0 00:18	24.67	0.44	7.91	0.26	0.93	0.47	

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	CB-1	On Grade	1	423.42	429.56	6.14	423.42	0.00	N/A	0.00
2	CB-2	On Sag	1	422.32	426.95	4.63	422.32	0.00	10.00	0.00
3	CB-3	On Grade	1	424.10	430.66	6.56	424.10	0.00	N/A	0.00
4	CB-4	On Grade	1	424.90	431.93	7.03	424.90	0.00	N/A	0.00
5	CB-5	On Sag	1	427.00	432.00	5.00	427.00	0.00	10.00	0.00
6	CB-6	On Sag	1	423.50	427.34	3.84	423.50	0.00	10.00	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	CB-1	0.0100	0.0200	0.0150	0.0200	1.50	0.1312	10.00
2	CB-2	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
3	CB-3	0.0380	0.0300	0.0150	0.0200	1.50	0.1312	10.00
4	CB-4	0.0175	0.0200	0.0150	0.0200	1.50	0.1312	10.00
5	CB-5	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
6	CB-6	N/A	0.0350	0.0150	0.0200	1.50	0.1312	10.00

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)	Max Occu (days
1	CB-1	10.73	10.73	5.29	5.43	49.35	17.15	429.90	0.34	
2	CB-2	14.63	8.21	N/A	N/A	N/A	13.95	427.61	0.67	
3	CB-3	3.48	3.48	2.50	0.98	71.85	6.88	430.85	0.19	
4	CB-4	1.25	1.25	1.25	0.01	99.54	6.92	432.07	0.14	
5	CB-5	1.03	1.03	N/A	N/A	N/A	3.11	432.35	0.34	
6	CB-6	7.83	7.83	N/A	N/A	N/A	10.33	427.95	0.61	

50 Year Design Storm

Project Description

File Name	Collective Church Drainage 5-2-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 02, 2025	00:00:00
End Analysis On	May 03, 2025	00:00:00
Start Reporting On	May 02, 2025	00:00:00
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	12
Nodes	16
Junctions	6
Outfalls	4
Flow Diversions	0
Inlets	6
Storage Nodes	0
Links	15
Channels	1
Pipes	14
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- (24)	0.10	0.9500	0.86	0.82	0.08	0.97	0 00:05:00
2	Sub-AD- (25)	0.10	0.9500	0.86	0.82	0.08	0.97	0 00:05:00
3	Sub-AD- (29)	0.10	0.9500	0.86	0.82	0.08	0.97	0 00:05:00
4	Sub-AD- (30)	0.10	0.9500	0.86	0.82	0.08	0.97	0 00:05:00
5	Sub-CB-1	1.20	0.9500	0.86	0.82	0.98	11.72	0 00:05:00
6	Sub-CB-2	0.92	0.9500	0.86	0.82	0.75	8.97	0 00:05:00
7	Sub-CB-3	0.39	0.9500	0.86	0.82	0.32	3.80	0 00:05:00
8	Sub-CB-4	0.14	0.9500	0.86	0.82	0.11	1.37	0 00:05:00
9	Sub-CB-5	0.11	0.9500	0.86	0.82	0.09	1.12	0 00:05:00
10	Sub-CB-6	0.87	0.9500	0.86	0.82	0.71	8.55	0 00:05:00
11	Sub-FES-5	3.78	0.9500	0.86	0.82	3.08	36.97	0 00:05:00
12	Sub-FES-6	3.03	0.7000	1.72	1.20	3.64	12.03	0 00:18:13

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Ma Surcharg Dept Attaine (f
1	AD- (24)	Junction	429.05	432.47	429.05	432.47	10.00	0.97	429.40	0.0
2	AD- (25)	Junction	428.00	432.46	428.00	432.46	10.00	1.89	428.34	0.0
3	AD- (29)	Junction	429.06	432.45	429.06	432.45	10.00	0.97	429.40	0.0
4	AD- (30)	Junction	428.00	432.46	428.00	432.46	10.00	1.89	428.38	0.0
5	FES-5	Junction	425.10	427.00	425.10	427.50	0.00	36.97	426.50	0.0
6	FES-6	Junction	424.75	426.99	424.75	426.99	0.00	12.03	425.74	0.0
7	Out-1SL - (15)	Outfall	421.25					48.16	423.75	
8	Out-1SL - (17)	Outfall	423.50					1.89	423.79	
9	Out-1SL - (18) (1)	Outfall	424.50					4.23	425.03	
10	Out-1SL - (21)	Outfall	422.50					11.98	423.37	

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	F
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	
1	L-SL - (24)	Pipe	CB-3	CB-2	199.68	430.66	426.94	1.8600	0.000	0.0320	1.17	0.00	0.00	0.00	
2	L-SL-14	Pipe	CB-1	CB-2	135.67	423.42	422.50	0.6800	0.000	0.0150	6.18	0.00	0.00	0.00	
3	SL - (14)	Pipe	CB-1	CB-2	127.66	423.42	422.80	0.4900	24.000	0.0130	5.48	15.77	0.35	8.34	
4	SL - (15)	Pipe	CB-2	Out-1SL - (15)	106.61	422.32	421.25	1.0000	30.000	0.0120	48.16	44.52	1.08	10.82	
5	SL - (16)	Pipe	AD- (24)	AD- (25)	105.49	429.05	428.00	1.0000	12.000	0.0120	0.95	3.86	0.25	6.31	
6	SL - (17)	Pipe	AD- (25)	Out-1SL - (17)	60.96	428.00	423.50	7.3800	12.000	0.0120	1.89	10.49	0.18	10.12	
7	SL - (18)	Pipe	CB-5	CB-4	141.40	427.00	424.90	1.4900	18.000	0.0120	2.96	13.88	0.21	6.31	
8	SL - (18) (1)	Pipe	CB-4	Out-1SL - (18) (1)	20.22	424.90	424.50	1.9700	18.000	0.0120	4.23	15.96	0.26	7.63	
9	SL - (19)	Pipe	AD- (29)	AD- (30)	106.07	429.06	428.00	1.0000	12.000	0.0120	0.95	3.86	0.25	6.31	
10	SL - (20)	Pipe	AD- (30)	CB-5	19.89	428.00	427.50	2.5100	12.000	0.0120	1.89	6.12	0.31	6.86	
11	SL - (21)	Pipe	CB-6	Out-1SL - (21)	63.64	423.50	422.50	1.5700	24.000	0.0120	11.98	30.72	0.39	9.17	
12	SL - (24)	Pipe	CB-3	CB-2	174.72	424.10	422.32	1.0200	30.000	0.0120	38.93	44.85	0.87	10.44	
13	SL - (25)	Pipe	FES-5	CB-3	52.99	425.10	424.10	1.8900	30.000	0.0120	36.76	61.04	0.60	13.23	
14	SL - (26)	Pipe	FES-6	CB-6	123.36	424.75	423.50	1.0100	24.000	0.0120	11.98	24.67	0.49	8.11	
15	L-SL - (18) (1)	Channel	CB-4	CB-6	272.73	431.93	427.30	1.7000	6.000	0.0150	0.02	7.95	0.00	1.51	

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	CB-1	On Grade	1	423.42	429.56	423.42	N/A	11.72	5.54	6.18	47.29	10.00	17.73	429.91
2	CB-2	On Sag	1	422.32	426.95	422.32	10.00	16.31	N/A	N/A	N/A	10.00	15.00	427.65
3	CB-3	On Grade	1	424.10	430.66	424.10	N/A	3.80	2.63	1.16	69.34	10.00	7.11	430.86
4	CB-4	On Grade	1	424.90	431.93	424.90	N/A	1.37	1.35	0.02	98.50	10.00	7.15	432.07
5	CB-5	On Sag	1	427.00	432.00	427.00	10.00	1.12	N/A	N/A	N/A	10.00	3.29	432.35
6	CB-6	On Sag	1	423.50	427.34	423.50	10.00	8.55	N/A	N/A	N/A	10.00	10.95	427.97

Subbasin Hydrology

Subbasin : Sub-AD- (24)

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (25)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (29)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (30)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-1

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-2

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-3

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-4

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-6

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0.00	0.00
Flow Length (ft) :	85.71195638	0.00	0.00
Slope (%) :	2.4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.36	0.00	0.00
Velocity (ft/sec) :	0.12	0.00	0.00
Computed Flow Time (min) :	12.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	253.76684919	31.23398630	0.93388558
Slope (%) :	1.8	0.4	1.25
Surface Type :	Paved	Paved	Unpaved
Velocity (ft/sec) :	2.73	1.29	1.80
Computed Flow Time (min) :	1.55	4.29	0.38

Total TOC (min) 18.23

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	AD- (24)	429.05	432.47	3.41	429.05	0.00	432.47	0.00	10.00	0.00
2	AD- (25)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
3	AD- (29)	429.06	432.45	3.39	429.06	0.00	432.45	0.00	10.00	0.00
4	AD- (30)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
5	FES-5	425.10	427.00	1.90	425.10	0.00	427.50	0.50	0.00	0.00
6	FES-6	424.75	426.99	2.24	424.75	0.00	426.99	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time Max H Occurren (days hh:m
1	AD- (24)	0.97	0.97	429.40	0.35	0.00	3.07	429.06	0.01	0 00:
2	AD- (25)	1.89	0.97	428.34	0.34	0.00	4.13	428.00	0.00	0 00:
3	AD- (29)	0.97	0.97	429.40	0.34	0.00	3.05	429.06	0.00	0 00:
4	AD- (30)	1.89	0.97	428.38	0.38	0.00	4.08	428.00	0.00	0 00:
5	FES-5	36.97	36.97	426.50	1.40	0.00	1.10	425.11	0.01	0 00:
6	FES-6	12.03	12.03	425.74	0.99	0.00	1.25	424.77	0.02	0 00:

Channel 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 (%)	Shape	Height (ft)	Width (ft)	Manı Rougł
1	L-SL - (18) (1)	272.73	431.93	7.03	427.30	3.80	4.63	1.7000	User-Defined	0.500	17.000	0

Channel 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	T Si
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (18) (1)	0.02	0 00:06	7.95	0.00	1.51	3.01	0.04	0.08	

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)	Ma Rou
1	L-SL - (24)	199.68	430.66	6.56	426.94	4.62	3.72	1.8600	Dummy	0.000	0.000	
2	L-SL-14	135.67	423.42	0.00	422.50	0.18	0.92	0.6800	Dummy	0.000	0.000	
3	SL - (14)	127.66	423.42	0.00	422.80	0.48	0.62	0.4900	CIRCULAR	24.000	24.000	
4	SL - (15)	106.61	422.32	0.00	421.25	0.00	1.07	1.0000	CIRCULAR	30.000	30.000	
5	SL - (16)	105.49	429.05	0.00	428.00	0.00	1.05	1.0000	CIRCULAR	12.000	12.000	
6	SL - (17)	60.96	428.00	0.00	423.50	0.00	4.50	7.3800	CIRCULAR	12.000	12.000	
7	SL - (18)	141.40	427.00	0.00	424.90	0.00	2.10	1.4900	CIRCULAR	18.000	18.000	
8	SL - (18) (1)	20.22	424.90	0.00	424.50	0.00	0.40	1.9700	CIRCULAR	18.000	18.000	
9	SL - (19)	106.07	429.06	0.00	428.00	0.00	1.06	1.0000	CIRCULAR	12.000	12.000	
10	SL - (20)	19.89	428.00	0.00	427.50	0.50	0.50	2.5100	CIRCULAR	12.000	12.000	
11	SL - (21)	63.64	423.50	0.00	422.50	0.00	1.00	1.5700	CIRCULAR	24.000	24.000	
12	SL - (24)	174.72	424.10	0.00	422.32	0.00	1.78	1.0200	CIRCULAR	30.000	30.000	
13	SL - (25)	52.99	425.10	0.00	424.10	0.00	1.00	1.8900	CIRCULAR	30.000	30.000	
14	SL - (26)	123.36	424.75	0.00	423.50	0.00	1.25	1.0100	CIRCULAR	24.000	24.000	

No. of Barrels
1
1
1
1
1
1
1
1
1
1
1
1
1

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	To Sur
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (24)	1.17	0 00:05	0.00	0.00	0.00		0.04	0.08	
2	L-SL-14	6.18	0 00:05	0.00	0.00	0.00		0.04	0.08	
3	SL - (14)	5.48	0 00:05	15.77	0.35	8.34	0.26	0.81	0.41	
4	SL - (15)	48.16	0 00:04	44.52	1.08	10.82	0.16	2.50	1.00	
5	SL - (16)	0.95	0 00:05	3.86	0.25	6.31	0.28	0.34	0.34	
6	SL - (17)	1.89	0 00:05	10.49	0.18	10.12	0.10	0.29	0.29	
7	SL - (18)	2.96	0 00:05	13.88	0.21	6.31	0.37	0.47	0.31	
8	SL - (18) (1)	4.23	0 00:05	15.96	0.26	7.63	0.04	0.53	0.35	
9	SL - (19)	0.95	0 00:05	3.86	0.25	6.31	0.28	0.34	0.34	
10	SL - (20)	1.89	0 00:05	6.12	0.31	6.86	0.05	0.38	0.38	
11	SL - (21)	11.98	0 00:18	30.72	0.39	9.17	0.12	0.87	0.43	
12	SL - (24)	38.93	0 00:05	44.85	0.87	10.44	0.28	1.79	0.72	
13	SL - (25)	36.76	0 00:05	61.04	0.60	13.23	0.07	1.40	0.56	
14	SL - (26)	11.98	0 00:18	24.67	0.49	8.11	0.25	0.98	0.49	

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	CB-1	On Grade	1	423.42	429.56	6.14	423.42	0.00	N/A	0.00
2	CB-2	On Sag	1	422.32	426.95	4.63	422.32	0.00	10.00	0.00
3	CB-3	On Grade	1	424.10	430.66	6.56	424.10	0.00	N/A	0.00
4	CB-4	On Grade	1	424.90	431.93	7.03	424.90	0.00	N/A	0.00
5	CB-5	On Sag	1	427.00	432.00	5.00	427.00	0.00	10.00	0.00
6	CB-6	On Sag	1	423.50	427.34	3.84	423.50	0.00	10.00	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	CB-1	0.0100	0.0200	0.0150	0.0200	1.50	0.1312	10.00
2	CB-2	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
3	CB-3	0.0380	0.0300	0.0150	0.0200	1.50	0.1312	10.00
4	CB-4	0.0175	0.0200	0.0150	0.0200	1.50	0.1312	10.00
5	CB-5	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
6	CB-6	N/A	0.0350	0.0150	0.0200	1.50	0.1312	10.00

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)	Max Occu (days
1	CB-1	11.72	11.72	5.54	6.18	47.29	17.73	429.91	0.35	
2	CB-2	16.31	8.97	N/A	N/A	N/A	15.00	427.65	0.70	
3	CB-3	3.80	3.80	2.63	1.16	69.34	7.11	430.86	0.20	
4	CB-4	1.37	1.37	1.35	0.02	98.50	7.15	432.07	0.14	
5	CB-5	1.12	1.12	N/A	N/A	N/A	3.29	432.35	0.35	
6	CB-6	8.55	8.55	N/A	N/A	N/A	10.95	427.97	0.63	

100 Year Design Storm

Project Description

File Name	Collective Church Drainage 5-2-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 02, 2025	00:00:00
End Analysis On	May 03, 2025	00:00:00
Start Reporting On	May 02, 2025	00:00:00
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	12
Nodes	16
Junctions	6
Outfalls	4
Flow Diversions	0
Inlets	6
Storage Nodes	0
Links	15
Channels	1
Pipes	14
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- (24)	0.10	0.9500	0.93	0.89	0.09	1.06	0 00:05:00
2	Sub-AD- (25)	0.10	0.9500	0.93	0.89	0.09	1.06	0 00:05:00
3	Sub-AD- (29)	0.10	0.9500	0.93	0.89	0.09	1.06	0 00:05:00
4	Sub-AD- (30)	0.10	0.9500	0.93	0.89	0.09	1.06	0 00:05:00
5	Sub-CB-1	1.20	0.9500	0.93	0.89	1.06	12.74	0 00:05:00
6	Sub-CB-2	0.92	0.9500	0.93	0.89	0.81	9.75	0 00:05:00
7	Sub-CB-3	0.39	0.9500	0.93	0.89	0.34	4.13	0 00:05:00
8	Sub-CB-4	0.14	0.9500	0.93	0.89	0.12	1.49	0 00:05:00
9	Sub-CB-5	0.11	0.9500	0.93	0.89	0.10	1.22	0 00:05:00
10	Sub-CB-6	0.87	0.9500	0.93	0.89	0.77	9.30	0 00:05:00
11	Sub-FES-5	3.78	0.9500	0.93	0.89	3.35	40.20	0 00:05:00
12	Sub-FES-6	3.03	0.7000	1.86	1.30	3.95	13.04	0 00:18:13

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Ma Surcharg Dept Attaine (f
1	AD- (24)	Junction	429.05	432.47	429.05	432.47	10.00	1.06	429.41	0.0
2	AD- (25)	Junction	428.00	432.46	428.00	432.46	10.00	2.05	428.35	0.0
3	AD- (29)	Junction	429.06	432.45	429.06	432.45	10.00	1.06	429.42	0.0
4	AD- (30)	Junction	428.00	432.46	428.00	432.46	10.00	2.06	428.40	0.0
5	FES-5	Junction	425.10	427.00	425.10	427.50	0.00	40.20	426.58	0.0
6	FES-6	Junction	424.75	426.99	424.75	426.99	0.00	13.04	425.78	0.0
7	Out-1SL - (15)	Outfall	421.25					48.15	423.75	
8	Out-1SL - (17)	Outfall	423.50					2.05	423.80	
9	Out-1SL - (18) (1)	Outfall	424.50					4.59	425.05	
10	Out-1SL - (21)	Outfall	422.50					12.99	423.41	

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	F
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	
1	L-SL - (24)	Pipe	CB-3	CB-2	199.68	430.66	426.94	1.8600	0.000	0.0320	1.36	0.00	0.00	0.00	
2	L-SL-14	Pipe	CB-1	CB-2	135.67	423.42	422.50	0.6800	0.000	0.0150	6.96	0.00	0.00	0.00	
3	SL - (14)	Pipe	CB-1	CB-2	127.66	423.42	422.80	0.4900	24.000	0.0130	5.71	15.77	0.36	8.46	
4	SL - (15)	Pipe	CB-2	Out-1SL - (15)	106.61	422.32	421.25	1.0000	30.000	0.0120	48.15	44.52	1.08	10.82	
5	SL - (16)	Pipe	AD- (24)	AD- (25)	105.49	429.05	428.00	1.0000	12.000	0.0120	1.03	3.86	0.27	6.40	
6	SL - (17)	Pipe	AD- (25)	Out-1SL - (17)	60.96	428.00	423.50	7.3800	12.000	0.0120	2.05	10.49	0.20	10.37	
7	SL - (18)	Pipe	CB-5	CB-4	141.40	427.00	424.90	1.4900	18.000	0.0120	3.22	13.88	0.23	6.47	
8	SL - (18) (1)	Pipe	CB-4	Out-1SL - (18) (1)	20.22	424.90	424.50	1.9700	18.000	0.0120	4.59	15.96	0.29	7.80	
9	SL - (19)	Pipe	AD- (29)	AD- (30)	106.07	429.06	428.00	1.0000	12.000	0.0120	1.03	3.86	0.27	6.41	
10	SL - (20)	Pipe	AD- (30)	CB-5	19.89	428.00	427.50	2.5100	12.000	0.0120	2.06	6.12	0.34	7.03	
11	SL - (21)	Pipe	CB-6	Out-1SL - (21)	63.64	423.50	422.50	1.5700	24.000	0.0120	12.99	30.72	0.42	9.38	
12	SL - (24)	Pipe	CB-3	CB-2	174.72	424.10	422.32	1.0200	30.000	0.0120	42.23	44.85	0.94	10.56	
13	SL - (25)	Pipe	FES-5	CB-3	52.99	425.10	424.10	1.8900	30.000	0.0120	40.05	61.04	0.66	13.66	
14	SL - (26)	Pipe	FES-6	CB-6	123.36	424.75	423.50	1.0100	24.000	0.0120	13.00	24.67	0.53	8.28	
15	L-SL - (18) (1)	Channel	CB-4	CB-6	272.73	431.93	427.30	1.7000	6.000	0.0150	0.03	7.95	0.00	1.61	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	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	CB-1	On Grade	1	423.42	429.56	423.42	N/A	12.74	5.79	6.96	45.40	10.00	18.29	429.92
2	CB-2	On Sag	1	422.32	426.95	422.32	10.00	18.08	N/A	N/A	N/A	10.00	16.06	427.68
3	CB-3	On Grade	1	424.10	430.66	424.10	N/A	4.13	2.76	1.36	66.97	10.00	7.33	430.87
4	CB-4	On Grade	1	424.90	431.93	424.90	N/A	1.49	1.45	0.04	97.12	10.00	7.38	432.08
5	CB-5	On Sag	1	427.00	432.00	427.00	10.00	1.22	N/A	N/A	N/A	10.00	3.48	432.36
6	CB-6	On Sag	1	423.50	427.34	423.50	10.00	9.30	N/A	N/A	N/A	10.00	11.58	427.99

Subbasin Hydrology

Subbasin : Sub-AD- (24)

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (25)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (29)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-AD- (30)

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-1

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-2

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-3

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-4

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-CB-6

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-5

Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin : Sub-FES-6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0.00	0.00
Flow Length (ft) :	85.71195638	0.00	0.00
Slope (%) :	2.4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.36	0.00	0.00
Velocity (ft/sec) :	0.12	0.00	0.00
Computed Flow Time (min) :	12.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	253.76684919	31.23398630	0.93388558
Slope (%) :	1.8	0.4	1.25
Surface Type :	Paved	Paved	Unpaved
Velocity (ft/sec) :	2.73	1.29	1.80
Computed Flow Time (min) :	1.55	4.29	0.38

Total TOC (min) 18.23

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	AD- (24)	429.05	432.47	3.41	429.05	0.00	432.47	0.00	10.00	0.00
2	AD- (25)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
3	AD- (29)	429.06	432.45	3.39	429.06	0.00	432.45	0.00	10.00	0.00
4	AD- (30)	428.00	432.46	4.46	428.00	0.00	432.46	0.00	10.00	0.00
5	FES-5	425.10	427.00	1.90	425.10	0.00	427.50	0.50	0.00	0.00
6	FES-6	424.75	426.99	2.24	424.75	0.00	426.99	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time Max H Occurren (days hh:m
1	AD- (24)	1.06	1.06	429.41	0.36	0.00	3.05	429.06	0.01	0 00:
2	AD- (25)	2.05	1.06	428.35	0.35	0.00	4.11	428.00	0.00	0 00:
3	AD- (29)	1.06	1.06	429.42	0.36	0.00	3.04	429.06	0.00	0 00:
4	AD- (30)	2.06	1.06	428.40	0.40	0.00	4.06	428.00	0.00	0 00:
5	FES-5	40.20	40.20	426.58	1.48	0.00	1.02	425.11	0.01	0 00:
6	FES-6	13.04	13.04	425.78	1.03	0.00	1.20	424.77	0.02	0 00:

Channel 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 (%)	Shape	Height (ft)	Width (ft)	Manı Rougł
1	L-SL - (18) (1)	272.73	431.93	7.03	427.30	3.80	4.63	1.7000	User-Defined	0.500	17.000	0

Channel 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	T Si
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (18) (1)	0.03	0 00:06	7.95	0.00	1.61	2.82	0.04	0.09	

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)	Ma Rou
1	L-SL - (24)	199.68	430.66	6.56	426.94	4.62	3.72	1.8600	Dummy	0.000	0.000	
2	L-SL-14	135.67	423.42	0.00	422.50	0.18	0.92	0.6800	Dummy	0.000	0.000	
3	SL - (14)	127.66	423.42	0.00	422.80	0.48	0.62	0.4900	CIRCULAR	24.000	24.000	
4	SL - (15)	106.61	422.32	0.00	421.25	0.00	1.07	1.0000	CIRCULAR	30.000	30.000	
5	SL - (16)	105.49	429.05	0.00	428.00	0.00	1.05	1.0000	CIRCULAR	12.000	12.000	
6	SL - (17)	60.96	428.00	0.00	423.50	0.00	4.50	7.3800	CIRCULAR	12.000	12.000	
7	SL - (18)	141.40	427.00	0.00	424.90	0.00	2.10	1.4900	CIRCULAR	18.000	18.000	
8	SL - (18) (1)	20.22	424.90	0.00	424.50	0.00	0.40	1.9700	CIRCULAR	18.000	18.000	
9	SL - (19)	106.07	429.06	0.00	428.00	0.00	1.06	1.0000	CIRCULAR	12.000	12.000	
10	SL - (20)	19.89	428.00	0.00	427.50	0.50	0.50	2.5100	CIRCULAR	12.000	12.000	
11	SL - (21)	63.64	423.50	0.00	422.50	0.00	1.00	1.5700	CIRCULAR	24.000	24.000	
12	SL - (24)	174.72	424.10	0.00	422.32	0.00	1.78	1.0200	CIRCULAR	30.000	30.000	
13	SL - (25)	52.99	425.10	0.00	424.10	0.00	1.00	1.8900	CIRCULAR	30.000	30.000	
14	SL - (26)	123.36	424.75	0.00	423.50	0.00	1.25	1.0100	CIRCULAR	24.000	24.000	

No. of Barrels
1
1
1
1
1
1
1
1
1
1
1
1
1

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	To Sur
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		
1	L-SL - (24)	1.36	0 00:05	0.00	0.00	0.00		0.04	0.09	
2	L-SL-14	6.96	0 00:05	0.00	0.00	0.00		0.04	0.09	
3	SL - (14)	5.71	0 00:05	15.77	0.36	8.46	0.25	0.83	0.42	
4	SL - (15)	48.15	0 00:04	44.52	1.08	10.82	0.16	2.50	1.00	
5	SL - (16)	1.03	0 00:05	3.86	0.27	6.40	0.27	0.35	0.35	
6	SL - (17)	2.05	0 00:05	10.49	0.20	10.37	0.10	0.30	0.30	
7	SL - (18)	3.22	0 00:05	13.88	0.23	6.47	0.36	0.49	0.33	
8	SL - (18) (1)	4.59	0 00:05	15.96	0.29	7.80	0.04	0.55	0.37	
9	SL - (19)	1.03	0 00:05	3.86	0.27	6.41	0.28	0.35	0.35	
10	SL - (20)	2.06	0 00:05	6.12	0.34	7.03	0.05	0.40	0.40	
11	SL - (21)	12.99	0 00:18	30.72	0.42	9.38	0.11	0.91	0.45	
12	SL - (24)	42.23	0 00:05	44.85	0.94	10.56	0.28	1.92	0.77	
13	SL - (25)	40.05	0 00:05	61.04	0.66	13.66	0.06	1.48	0.59	
14	SL - (26)	13.00	0 00:18	24.67	0.53	8.28	0.25	1.03	0.52	

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	CB-1	On Grade	1	423.42	429.56	6.14	423.42	0.00	N/A	0.00
2	CB-2	On Sag	1	422.32	426.95	4.63	422.32	0.00	10.00	0.00
3	CB-3	On Grade	1	424.10	430.66	6.56	424.10	0.00	N/A	0.00
4	CB-4	On Grade	1	424.90	431.93	7.03	424.90	0.00	N/A	0.00
5	CB-5	On Sag	1	427.00	432.00	5.00	427.00	0.00	10.00	0.00
6	CB-6	On Sag	1	423.50	427.34	3.84	423.50	0.00	10.00	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	CB-1	0.0100	0.0200	0.0150	0.0200	1.50	0.1312	10.00
2	CB-2	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
3	CB-3	0.0380	0.0300	0.0150	0.0200	1.50	0.1312	10.00
4	CB-4	0.0175	0.0200	0.0150	0.0200	1.50	0.1312	10.00
5	CB-5	N/A	0.0300	0.0150	0.0200	1.50	0.1312	10.00
6	CB-6	N/A	0.0350	0.0150	0.0200	1.50	0.1312	10.00

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)	Max Occu (days
1	CB-1	12.74	12.74	5.79	6.96	45.40	18.29	429.92	0.37	
2	CB-2	18.08	9.75	N/A	N/A	N/A	16.06	427.68	0.73	
3	CB-3	4.13	4.13	2.76	1.36	66.97	7.33	430.87	0.20	
4	CB-4	1.49	1.49	1.45	0.04	97.12	7.38	432.08	0.15	
5	CB-5	1.22	1.22	N/A	N/A	N/A	3.48	432.36	0.35	
6	CB-6	9.30	9.30	N/A	N/A	N/A	11.58	427.99	0.66	

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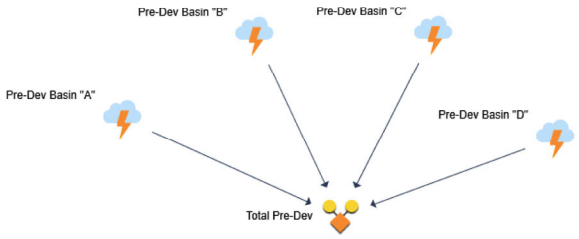
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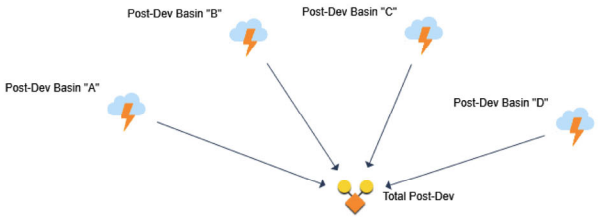
Basin Model

Hydrology Studio v 3.0.0.27

Project Name: Collective Church

05-02-2025





Hydrograph by Return Period

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"		1.381			1.853	2.130	2.330	2.529
2	Rational	Pre-Dev Basin "B"		10.53			14.12	16.22	17.74	19.26
3	Rational	Pre-Dev Basin "C"		1.416			1.896	2.179	2.382	2.588
4	Rational	Pre-Dev Basin "D"		0.991			1.328	1.526	1.669	1.812
5	Junction	Total Pre-Dev		13.49			18.09	20.79	22.74	24.69
6	Rational	Post-Dev Basin "A"		33.73			45.13	51.84	56.64	61.57
7	Rational	Post-Dev Basin "B"		1.167			1.560	1.792	1.957	2.128
8	Rational	Post-Dev Basin "C"		2.417			3.234	3.715	4.058	4.412
9	Rational	Post-Dev Basin "D"		9.949			13.36	15.35	16.80	18.23
10	Junction	Total Post-Dev		40.31			53.94	61.97	67.71	73.60

Hydrograph 2-yr Summary

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"	1.381	0.27	1,770	----		
2	Rational	Pre-Dev Basin "B"	10.53	0.22	10,961	----		
3	Rational	Pre-Dev Basin "C"	1.416	0.15	1,021	----		
4	Rational	Pre-Dev Basin "D"	0.991	0.17	794	----		
5	Junction	Total Pre-Dev	13.49	0.22	14,270	1, 2, 3, 4		
6	Rational	Post-Dev Basin "A"	33.73	0.10	16,211	----		
7	Rational	Post-Dev Basin "B"	1.167	0.08	467	----		
8	Rational	Post-Dev Basin "C"	2.417	0.10	1,162	----		
9	Rational	Post-Dev Basin "D"	9.949	0.32	15,141	----		
10	Junction	Total Post-Dev	40.31	0.10	32,730	6, 7, 8, 9		

Hydrograph Report

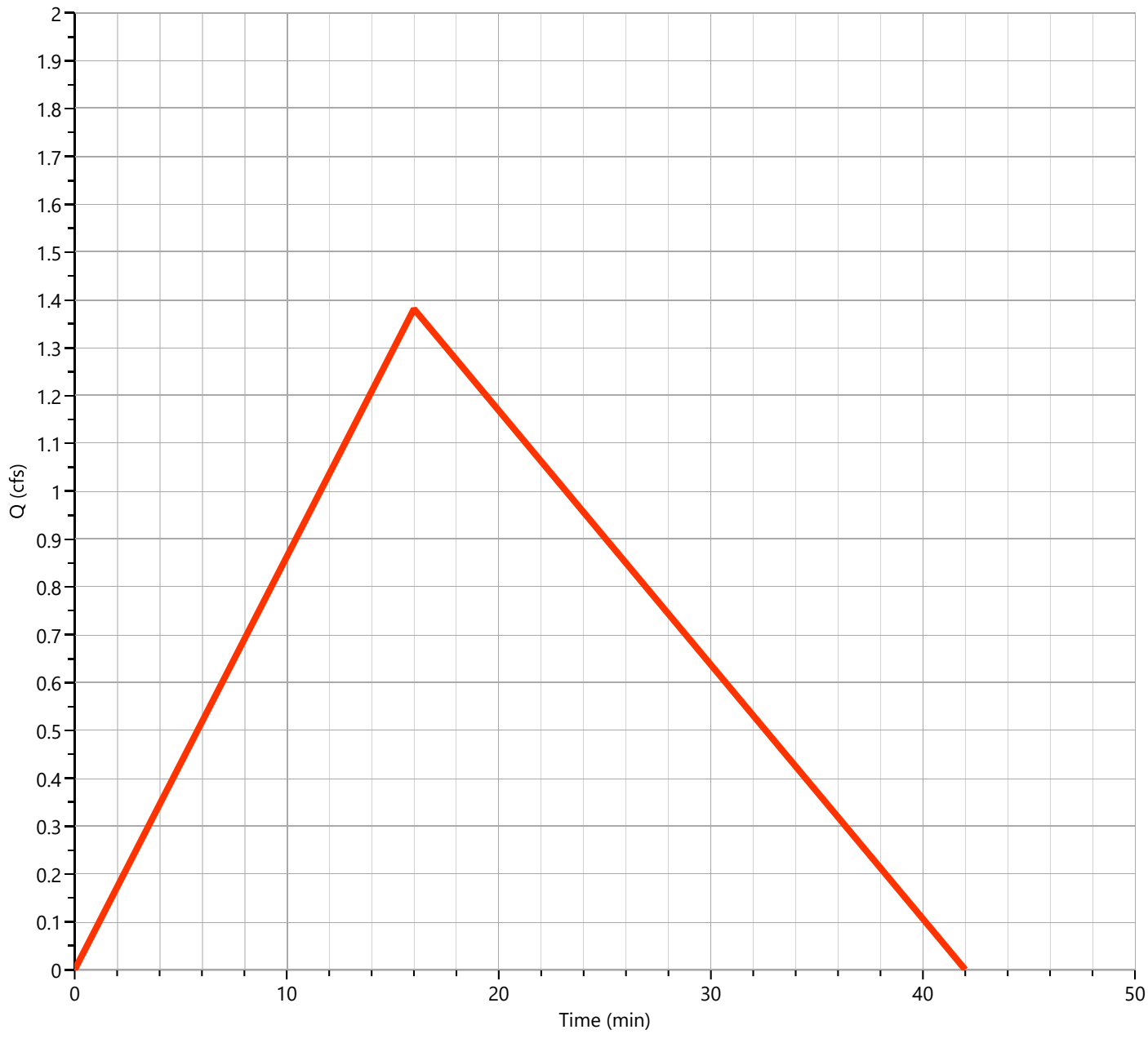
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 1.381 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 1,770 cuft
Drainage Area	= 0.81 ac	Runoff Coeff.	= 0.47
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



Tc by TR55 Worksheet

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

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 (%)	3.7			
Travel Time (min)	**11.43**	**0.00**	**0.00**	**11.43**
Shallow Concentrated Flow				
Flow Length (ft)	673			
Watercourse Slope (%)	2.70	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	2.65			
Travel Time (min)	**4.23**	**0.00**	**0.00**	**4.23**
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**

Hydrograph Report

Project Name: Collective Church

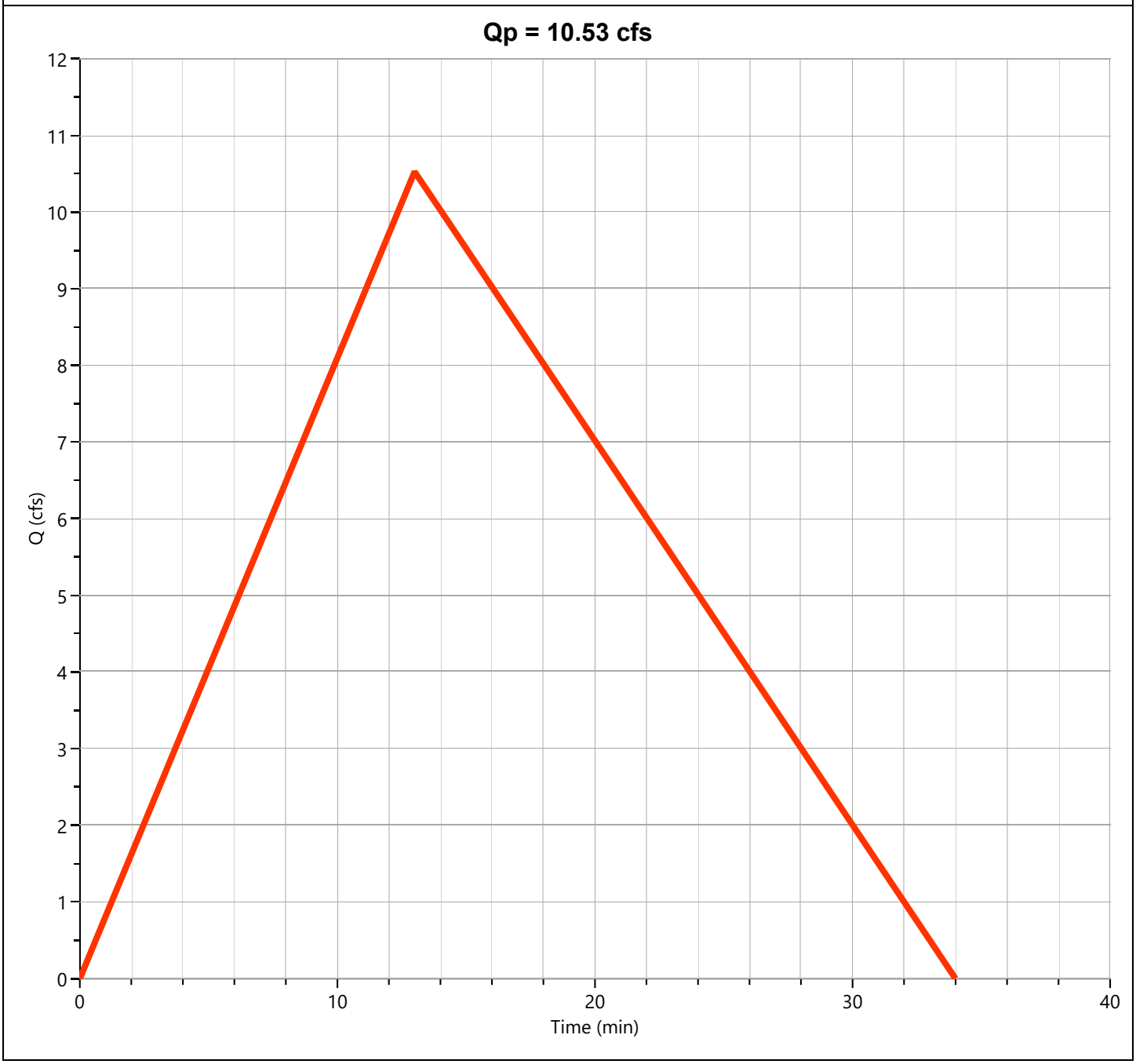
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 10.53 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Runoff Volume	= 10,961 cuft
Drainage Area	= 5.62 ac	Runoff Coeff.	= 0.47
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 13.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.99 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Tc by TR55 Worksheet

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

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 (%)	5			
Travel Time (min)	**10.13**	**0.00**	**0.00**	**10.13**
Shallow Concentrated Flow				
Flow Length (ft)	492			
Watercourse Slope (%)	2.85	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	2.72			
Travel Time (min)	**3.01**	**0.00**	**0.00**	**3.01**
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				**13 min**

Hydrograph Report

Project Name: Collective Church

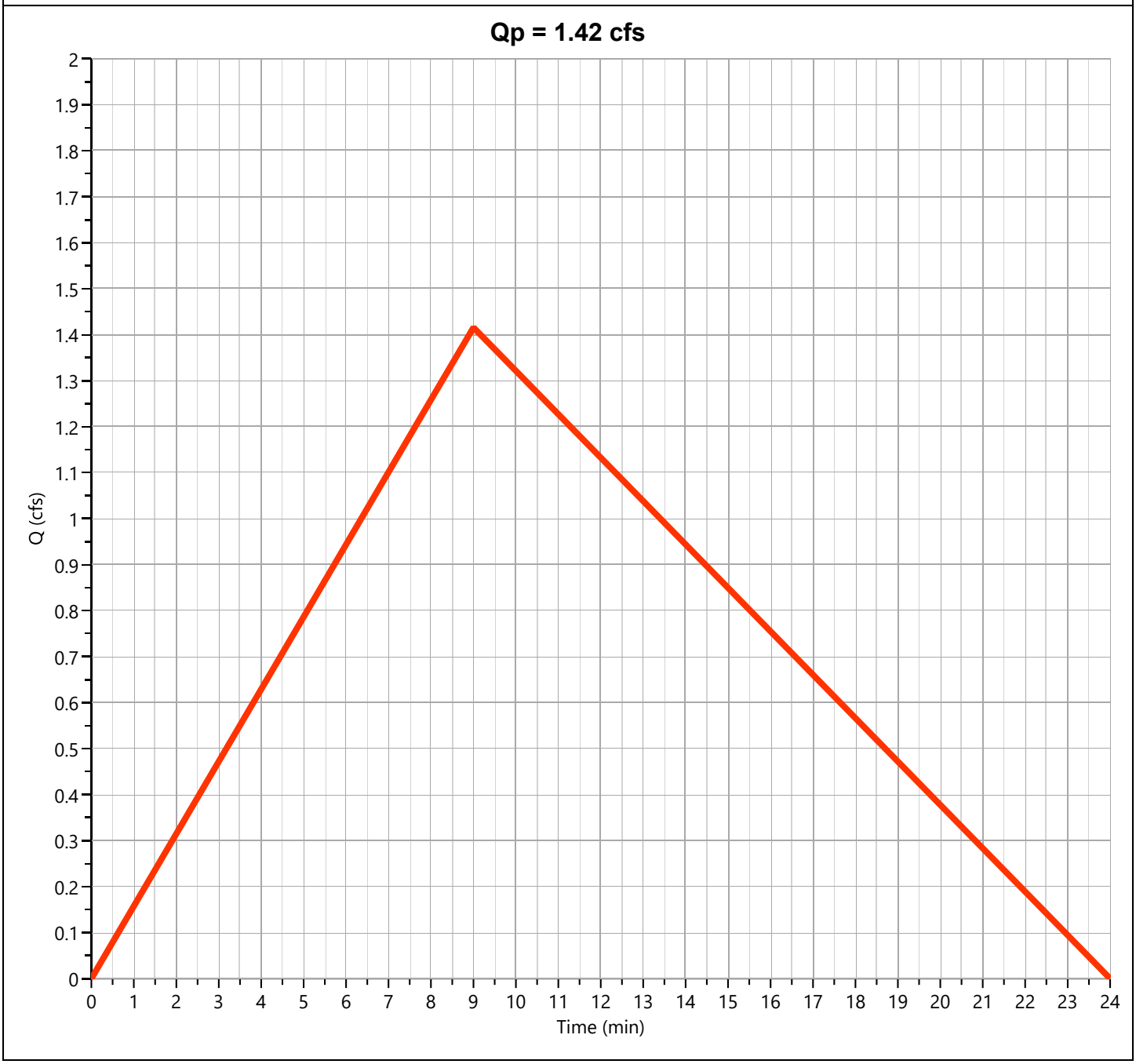
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "C"

Hyd. No. 3

Hydrograph Type	= Rational	Peak Flow	= 1.416 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,021 cuft
Drainage Area	= 0.64 ac	Runoff Coeff.	= 0.47
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



Tc by TR55 Worksheet

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "C"
Rational

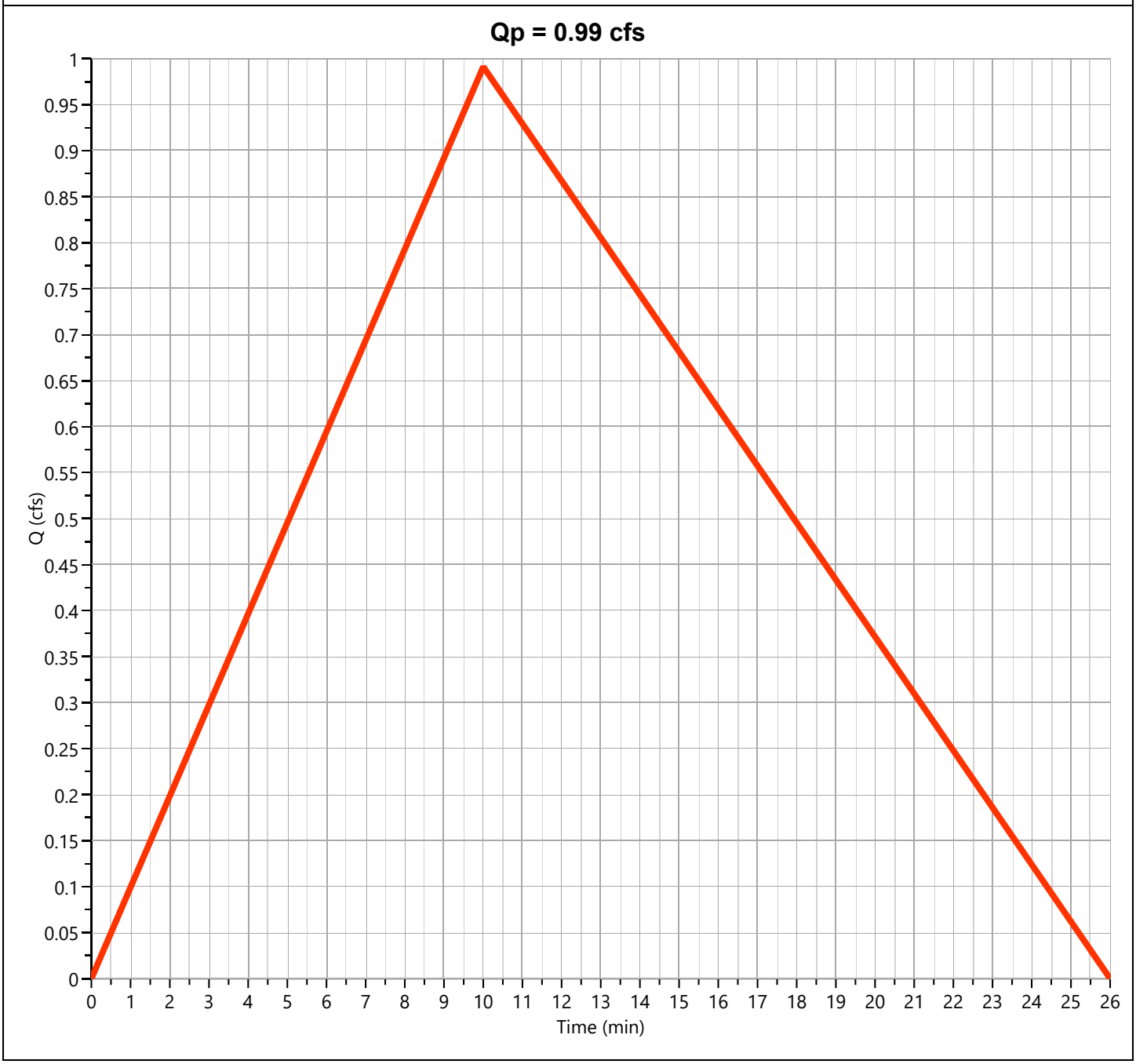
Hyd. No. 3

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 (%)	6.88			
Travel Time (min)	**8.92**	**0.00**	**0.00**	**8.92**
Shallow Concentrated Flow				
Flow Length (ft)	47			
Watercourse Slope (%)	10.00	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	5.1			
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				**9 min**

Pre-Dev Basin "D"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 0.991 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 794 cuft
Drainage Area	= 0.47 ac	Runoff Coeff.	= 0.47
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



Tc by TR55 Worksheet

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "D"
Rational

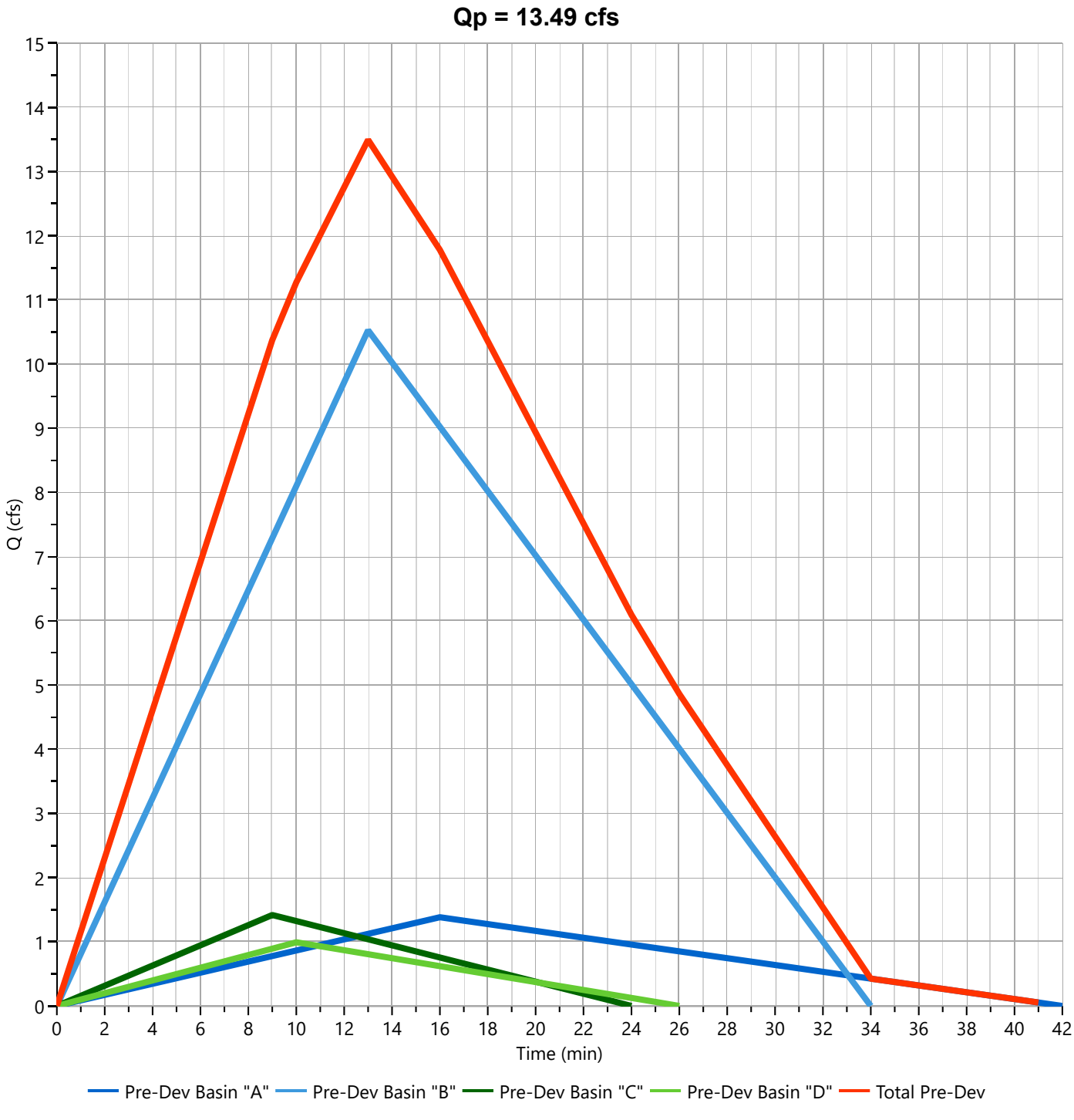
Hyd. No. 4

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.300	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	4.36	2.28	2.28	
Land Slope (%)	6.3			
Travel Time (min)	**9.24**	**0.00**	**0.00**	**9.24**
Shallow Concentrated Flow				
Flow Length (ft)	104			
Watercourse Slope (%)	7.60	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	4.45			
Travel Time (min)	**0.39**	**0.00**	**0.00**	**0.39**
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

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 13.49 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 14,270 cuft
Inflow Hydrographs	= 1, 2, 3, 4	Total Contrib. Area	= 7.54 ac



Hydrograph Report

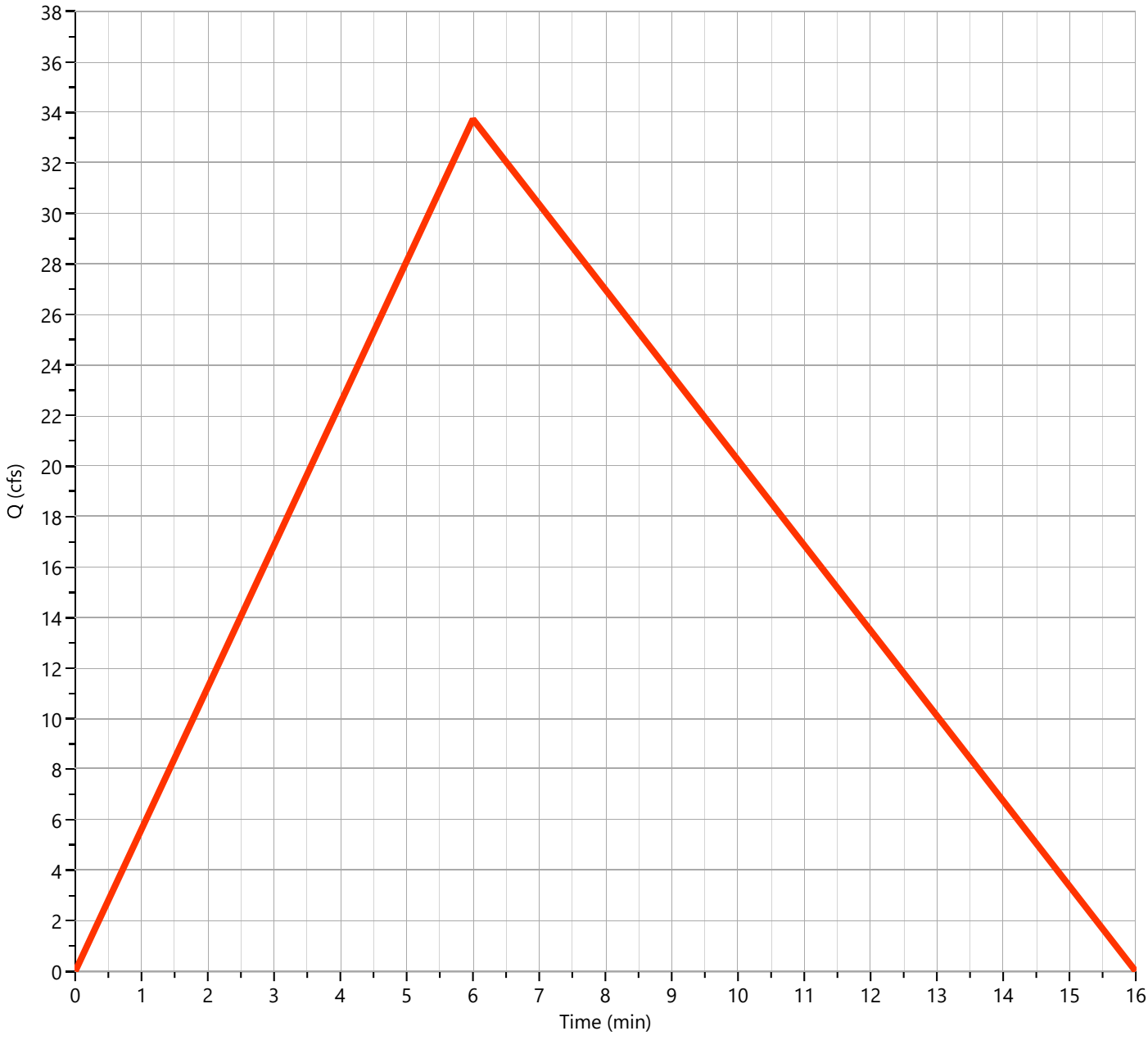
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "A"

Hyd. No. 6

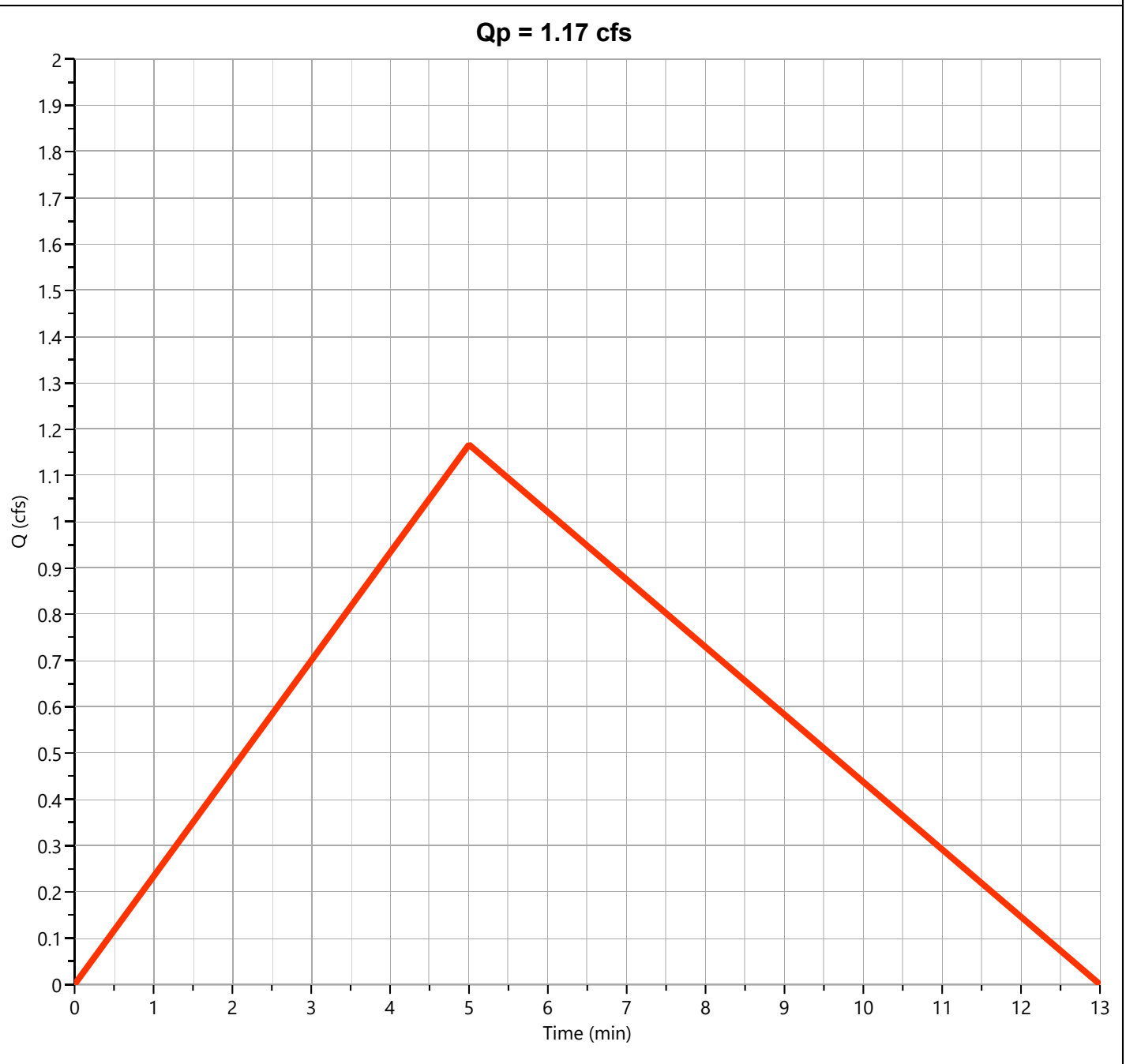
Hydrograph Type	= Rational	Peak Flow	= 33.73 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 16,211 cuft
Drainage Area	= 6.28 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.65 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "B"

Hyd. No. 7

Hydrograph Type	= Rational	Peak Flow	= 1.167 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 467 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.95
Tc Method	= User	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



Hydrograph Report

Project Name: Collective Church

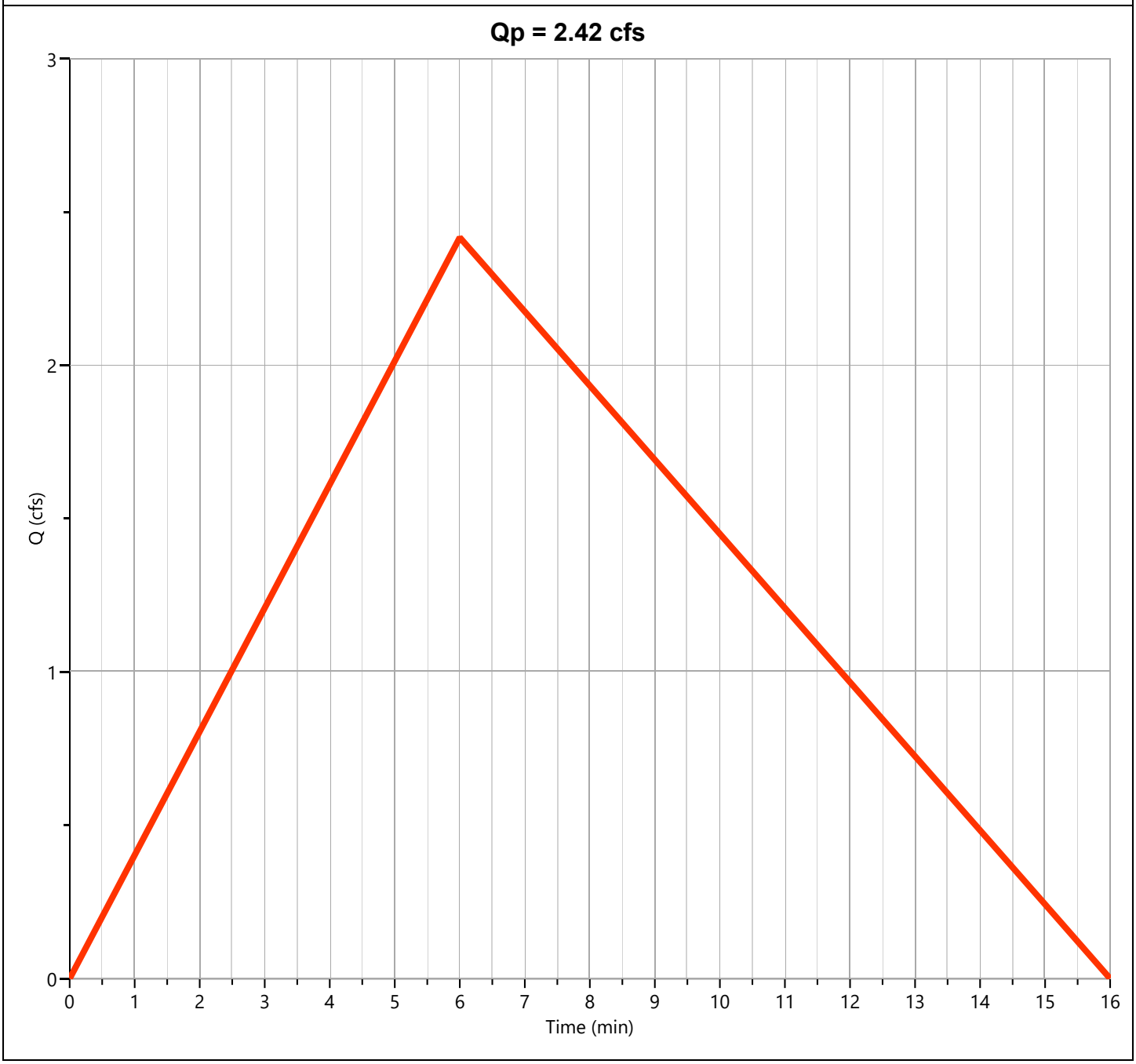
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "C"

Hyd. No. 8

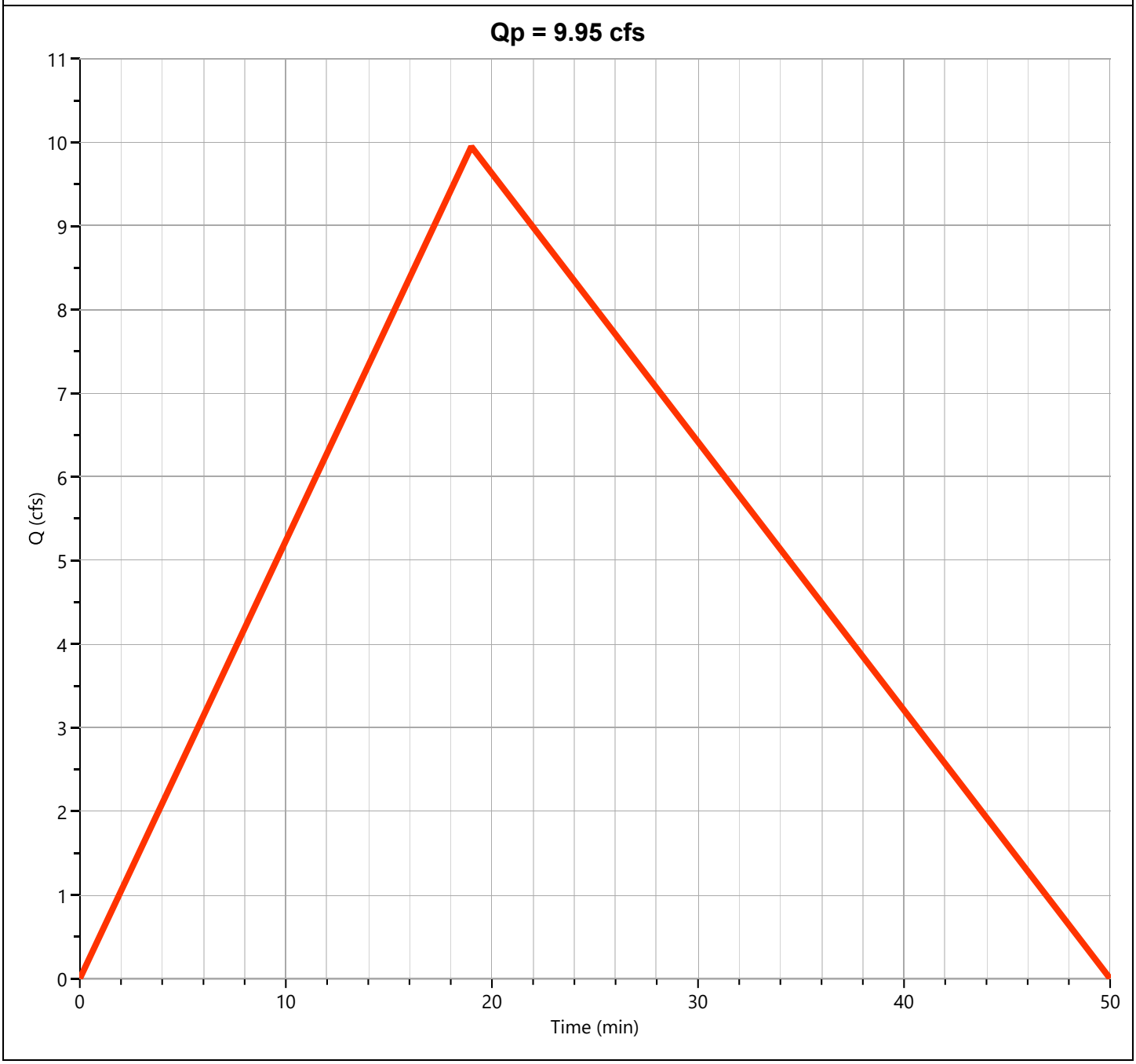
Hydrograph Type	= Rational	Peak Flow	= 2.417 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 1,162 cuft
Drainage Area	= 0.45 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.65 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 9

Hydrograph Type	= Rational	Peak Flow	= 9.949 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 15,141 cuft
Drainage Area	= 3.9 ac	Runoff Coeff.	= 0.76
Tc Method	= User	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.36 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

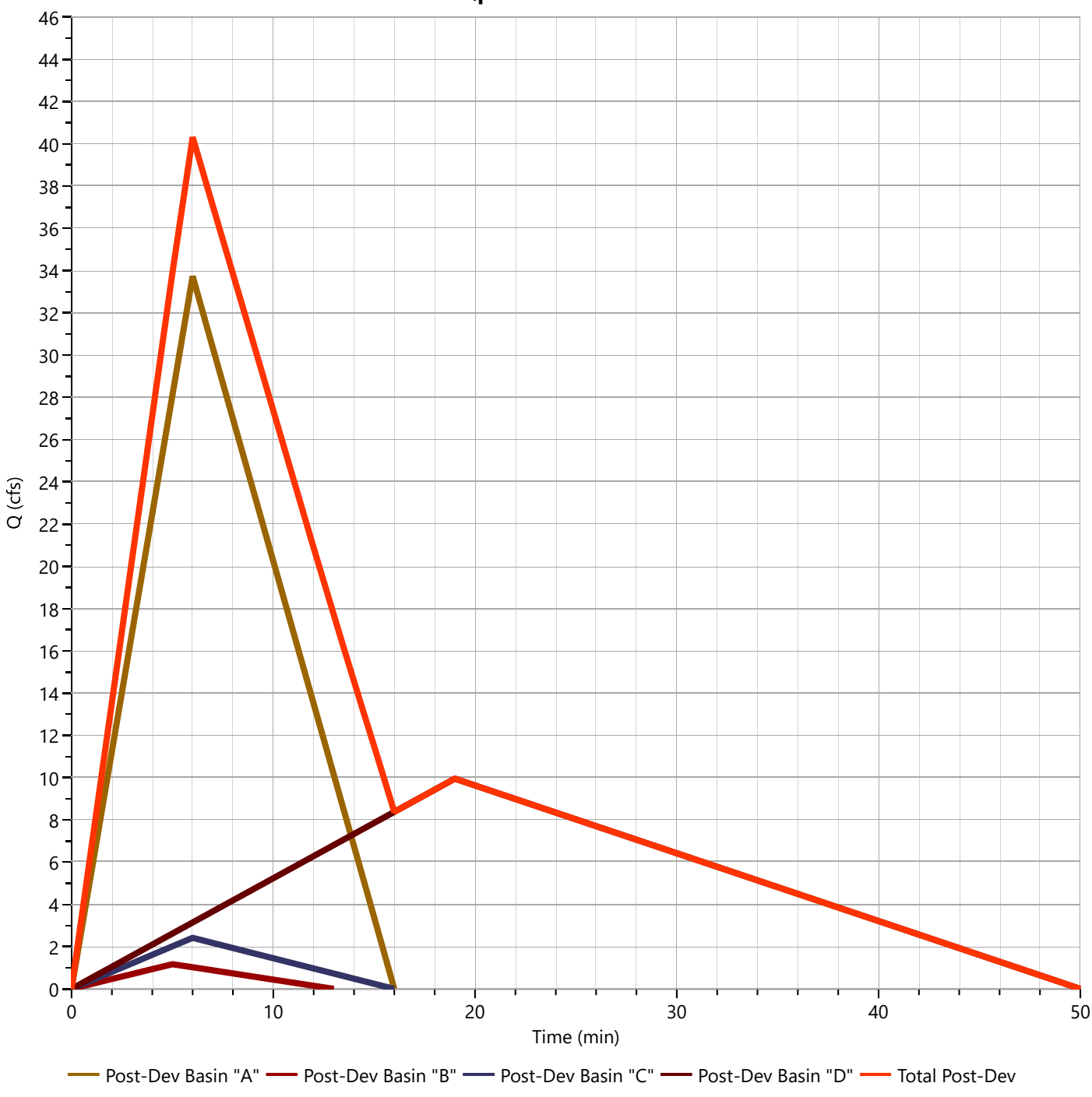
Hydrology Studio v 3.0.0.27

05-02-2025

Total Post-Dev

Hyd. No. 10

Hydrograph Type	= Junction	Peak Flow	= 40.31 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Hydrograph Volume	= 32,730 cuft
Inflow Hydrographs	= 6, 7, 8, 9	Total Contrib. Area	= 10.83 ac



Hydrograph 10-yr Summary

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"	1.853	0.27	2,375	----		
2	Rational	Pre-Dev Basin "B"	14.12	0.22	14,699	----		
3	Rational	Pre-Dev Basin "C"	1.896	0.15	1,367	----		
4	Rational	Pre-Dev Basin "D"	1.328	0.17	1,064	----		
5	Junction	Total Pre-Dev	18.09	0.22	19,134	1, 2, 3, 4		
6	Rational	Post-Dev Basin "A"	45.13	0.10	21,688	----		
7	Rational	Post-Dev Basin "B"	1.560	0.08	625	----		
8	Rational	Post-Dev Basin "C"	3.234	0.10	1,554	----		
9	Rational	Post-Dev Basin "D"	13.36	0.32	20,327	----		
10	Junction	Total Post-Dev	53.94	0.10	43,856	6, 7, 8, 9		

Hydrograph Report

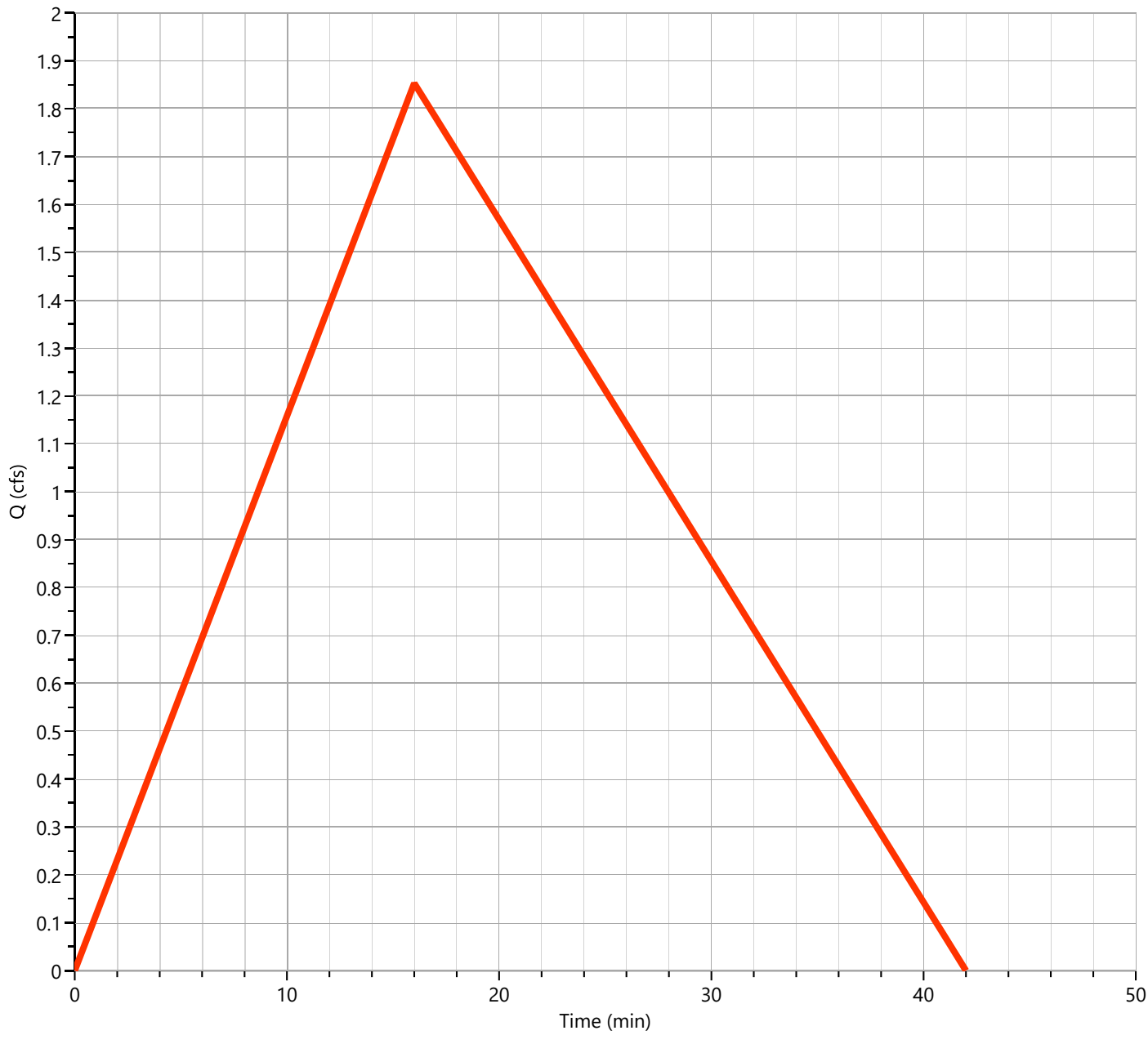
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 1.853 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 2,375 cuft
Drainage Area	= 0.81 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

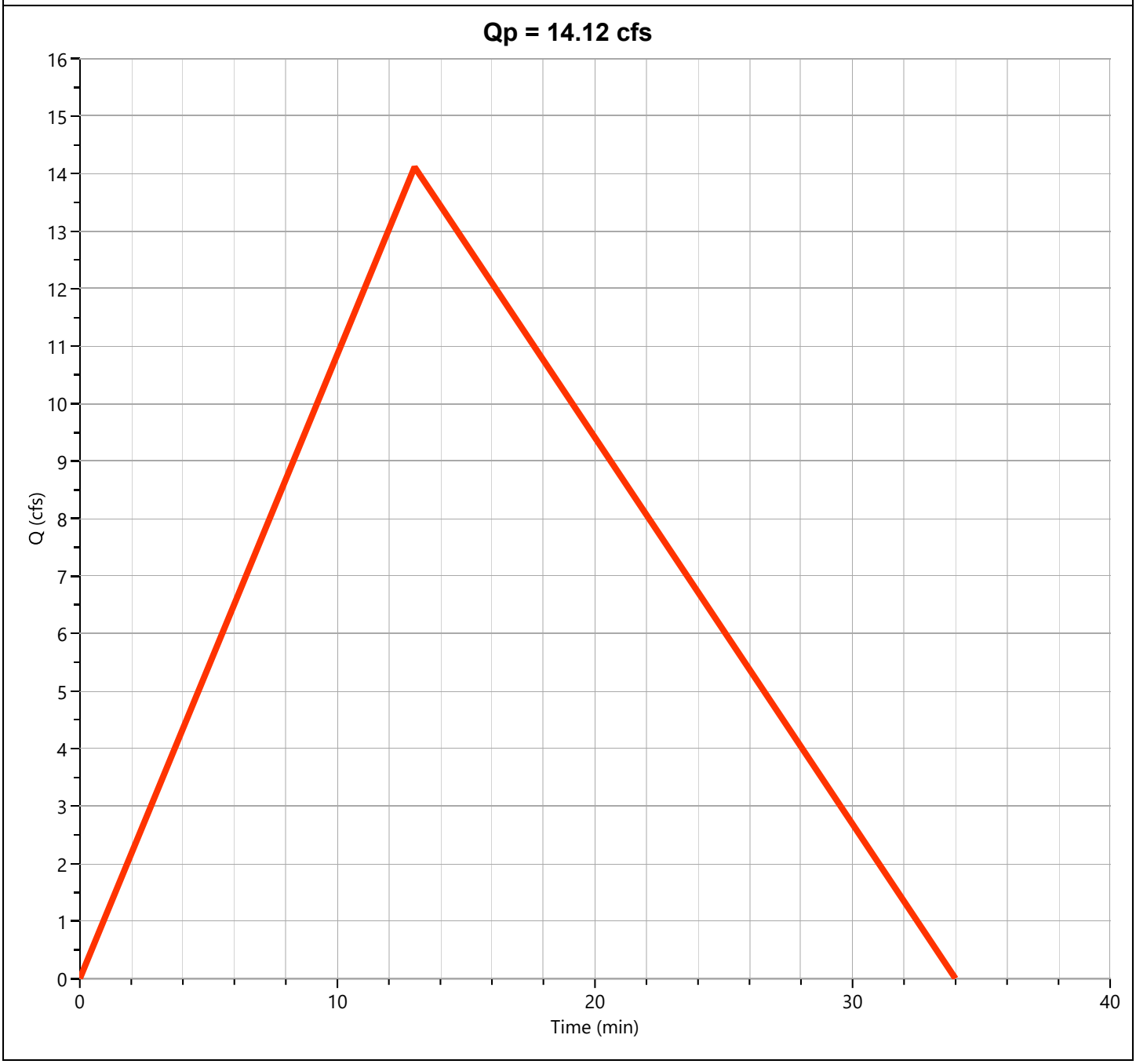
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 14.12 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Runoff Volume	= 14,699 cuft
Drainage Area	= 5.62 ac	Runoff Coeff.	= 0.47
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 13.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.34 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67

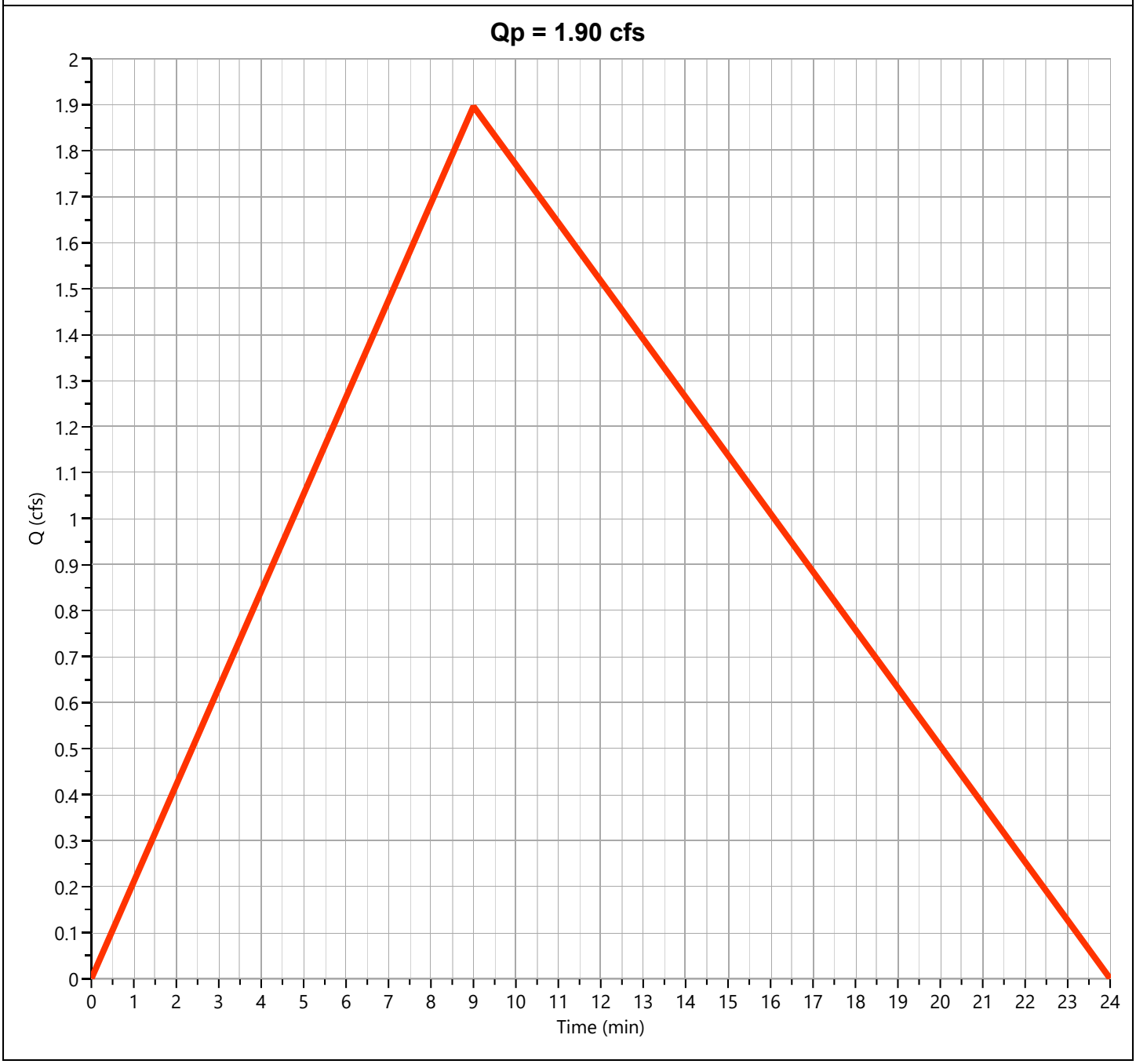


Hydrograph Report

Pre-Dev Basin "C"

Hyd. No. 3

Hydrograph Type	= Rational	Peak Flow	= 1.896 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,367 cuft
Drainage Area	= 0.64 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

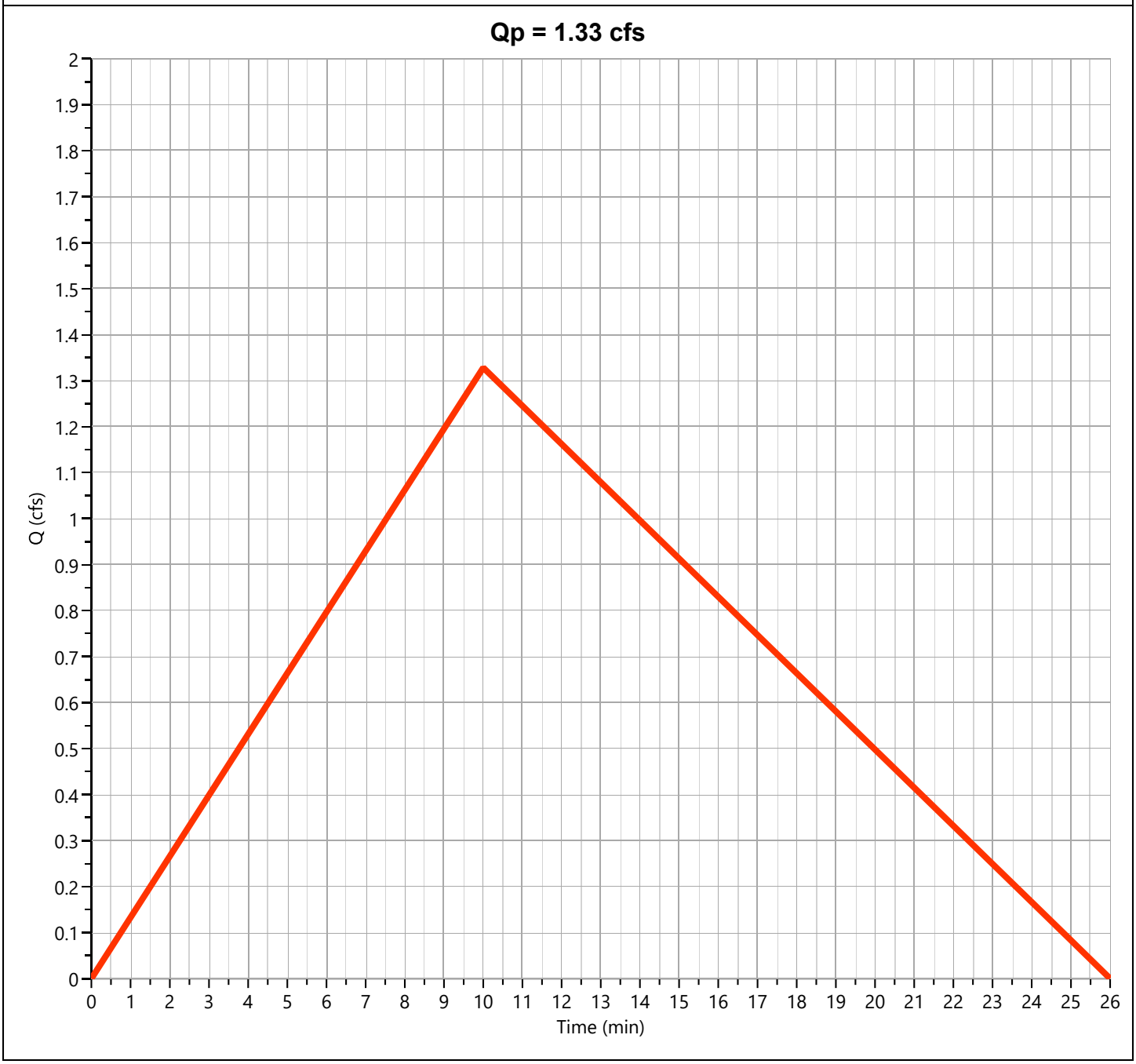
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "D"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 1.328 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 1,064 cuft
Drainage Area	= 0.47 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

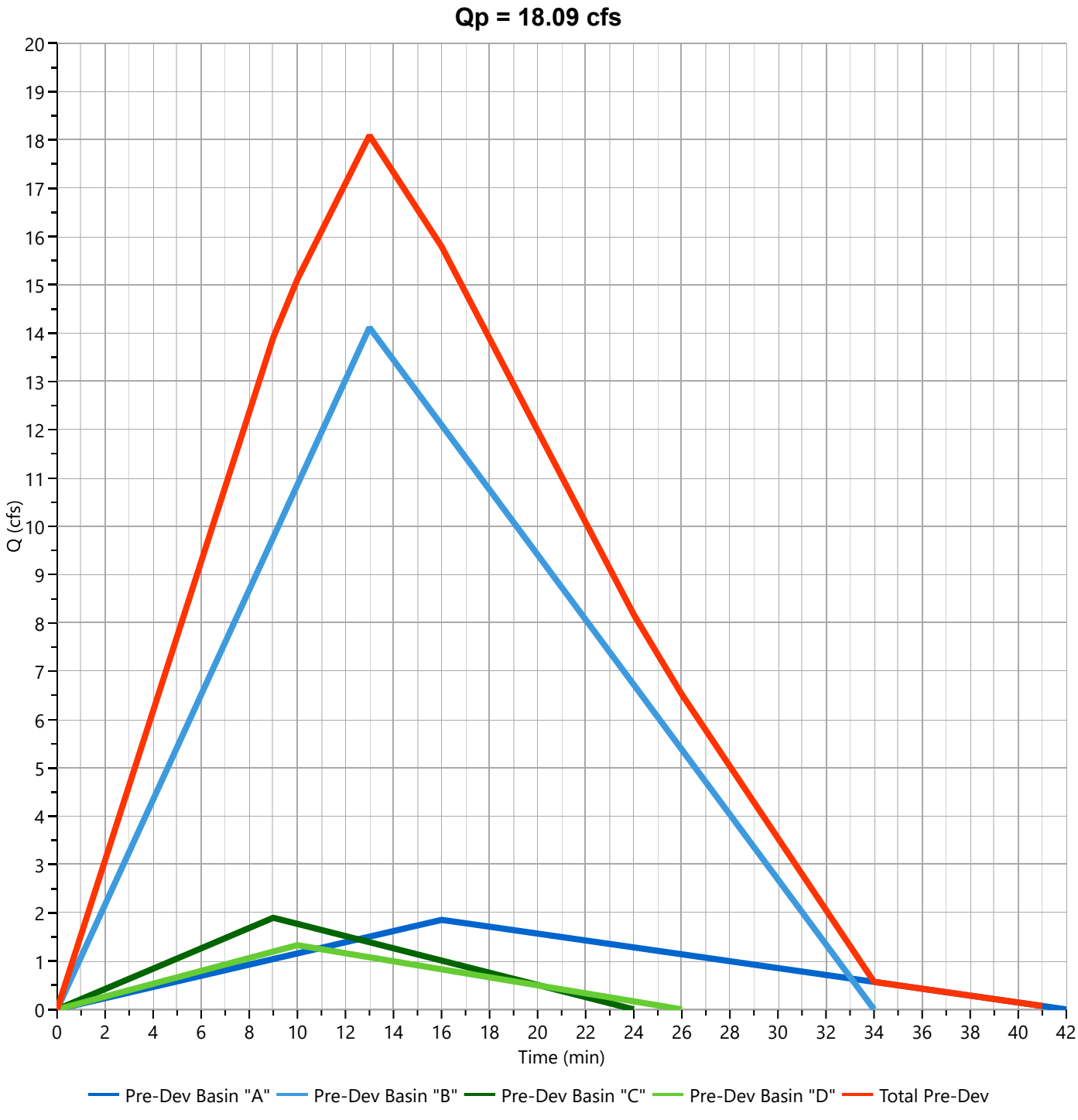
Hydrology Studio v 3.0.0.27

05-02-2025

Total Pre-Dev

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 18.09 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 19,134 cuft
Inflow Hydrographs	= 1, 2, 3, 4	Total Contrib. Area	= 7.54 ac



Hydrograph Report

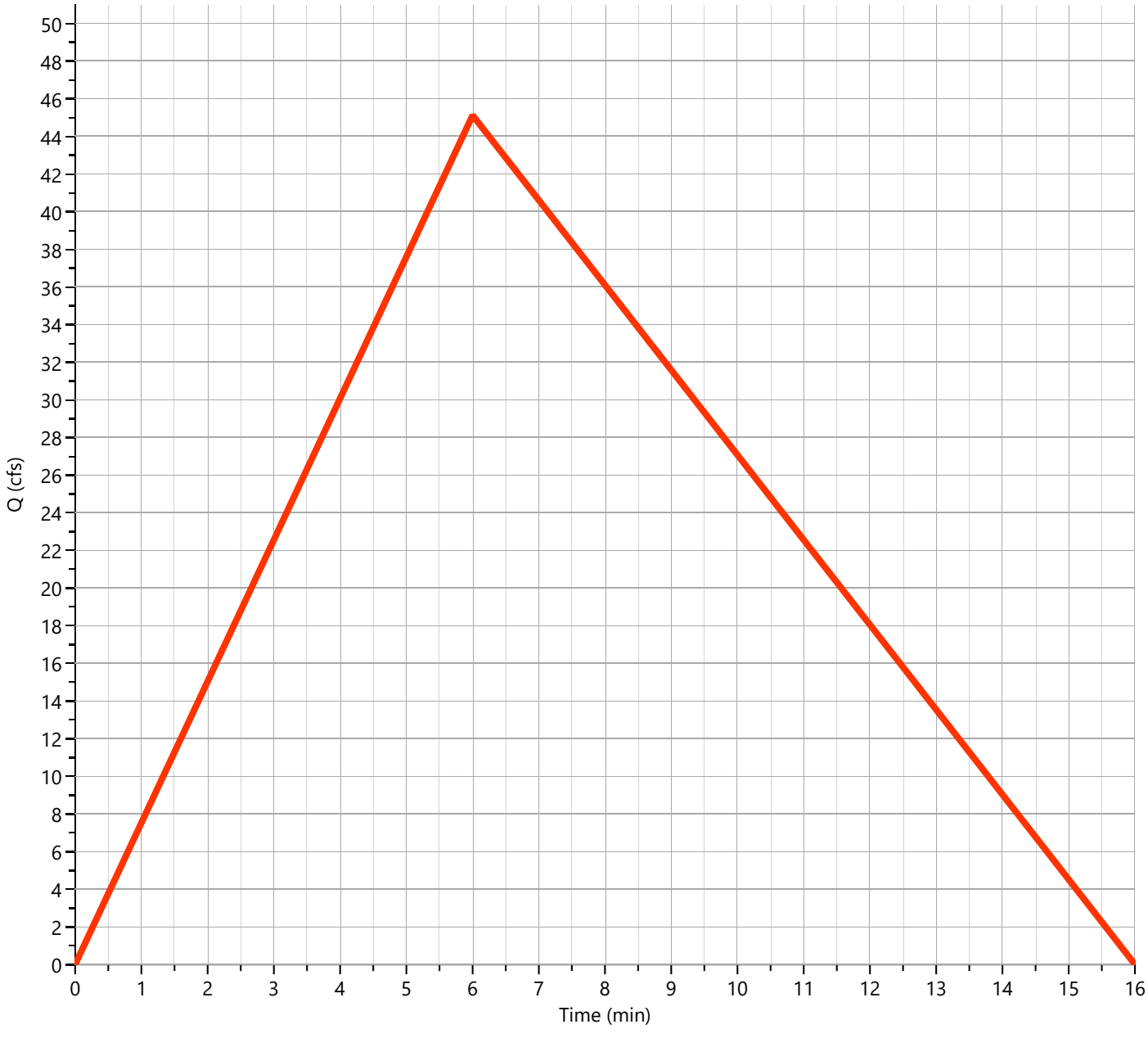
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "A"

Hyd. No. 6

Hydrograph Type	= Rational	Peak Flow	= 45.13 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 21,688 cuft
Drainage Area	= 6.28 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 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



Hydrograph Report

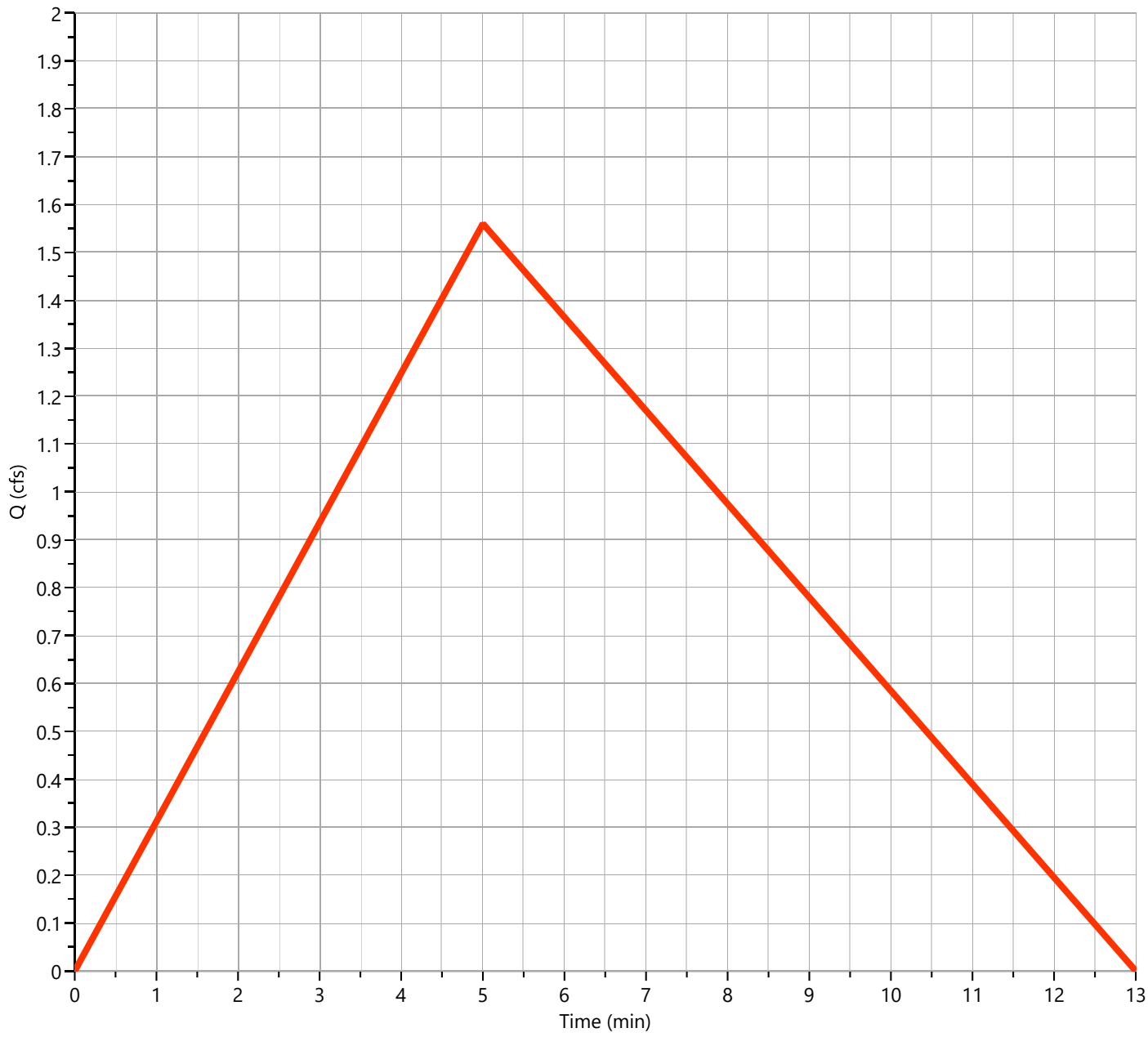
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "B"

Hyd. No. 7

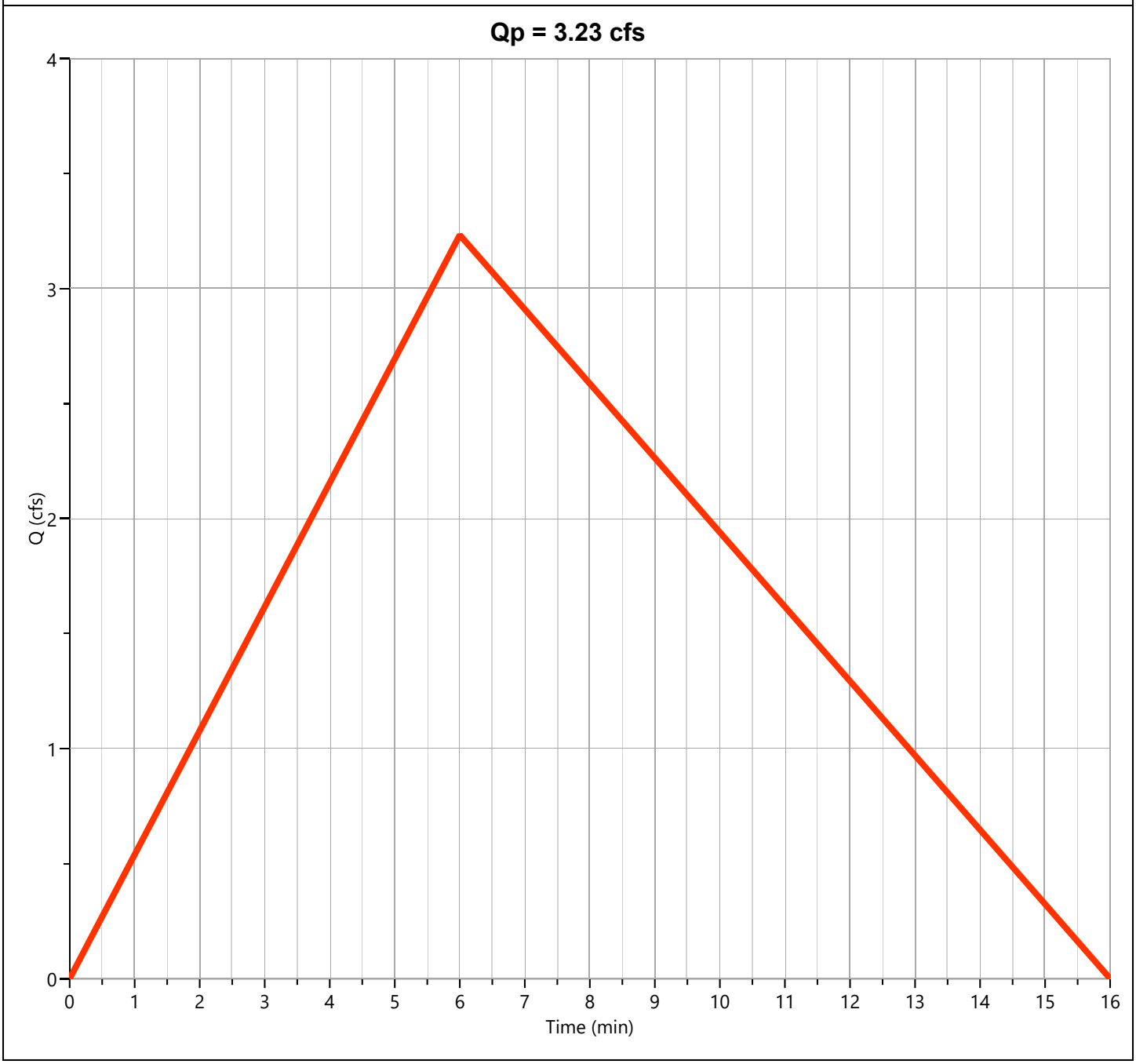
Hydrograph Type	= Rational	Peak Flow	= 1.560 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 625 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.21 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 8

Hydrograph Type	= Rational	Peak Flow	= 3.234 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 1,554 cuft
Drainage Area	= 0.45 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 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



Hydrograph Report

Project Name: Collective Church

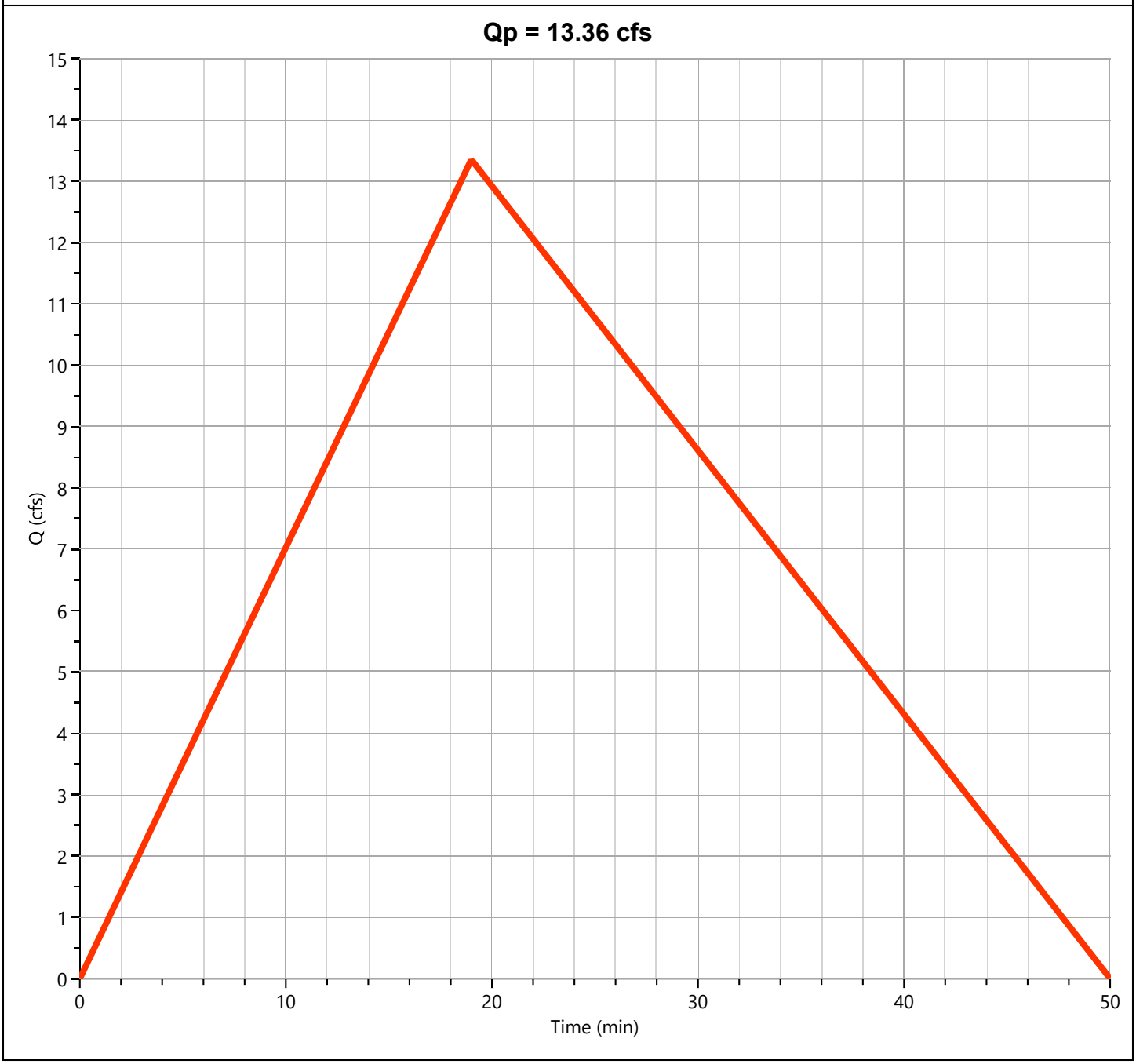
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "D"

Hyd. No. 9

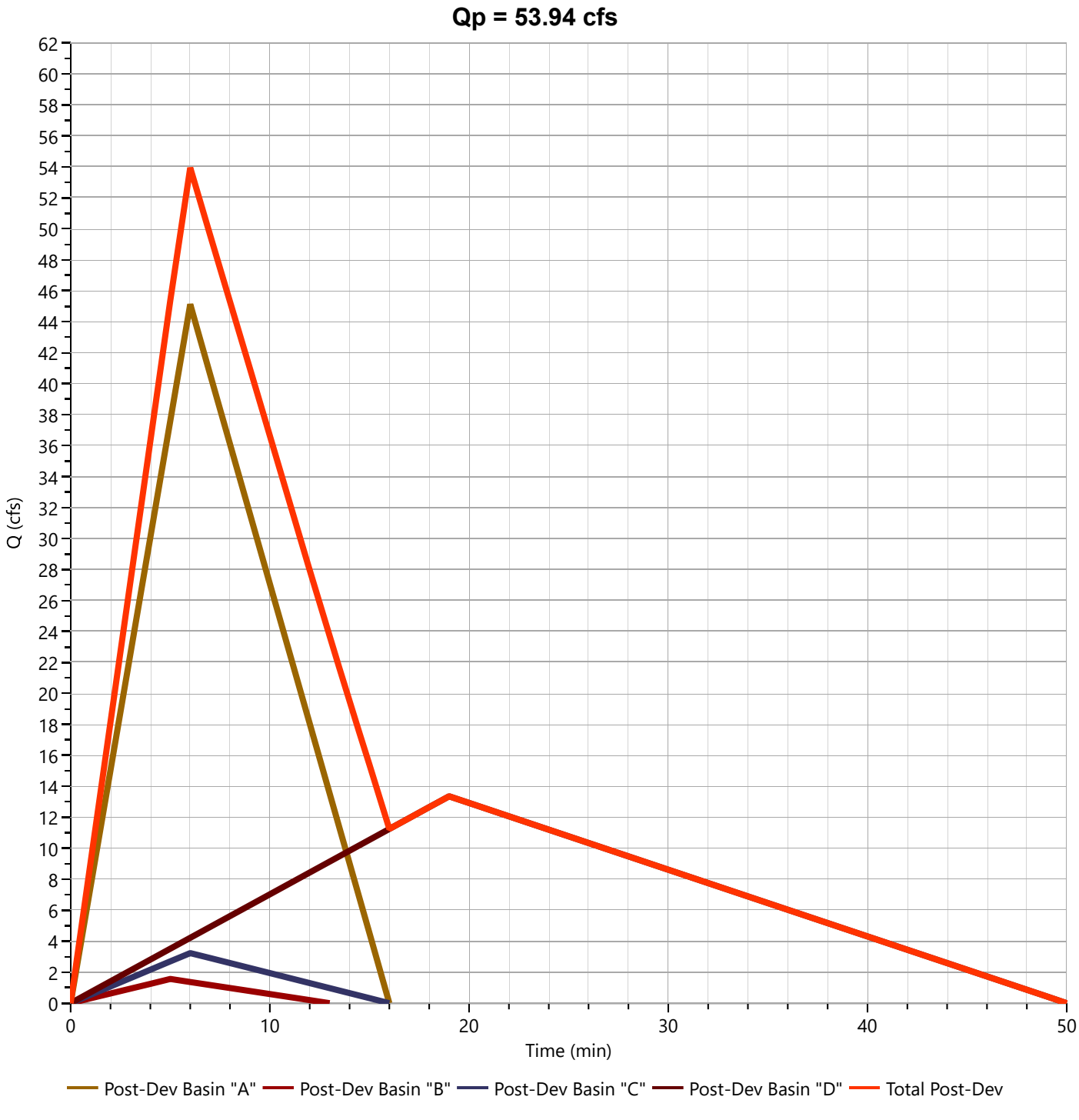
Hydrograph Type	= Rational	Peak Flow	= 13.36 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 20,327 cuft
Drainage Area	= 3.9 ac	Runoff Coeff.	= 0.76
Tc Method	= User	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.51 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev

Hyd. No. 10

Hydrograph Type	= Junction	Peak Flow	= 53.94 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Hydrograph Volume	= 43,856 cuft
Inflow Hydrographs	= 6, 7, 8, 9	Total Contrib. Area	= 10.83 ac



Hydrograph 25-yr Summary

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"	2.130	0.27	2,730	----		
2	Rational	Pre-Dev Basin "B"	16.22	0.22	16,893	----		
3	Rational	Pre-Dev Basin "C"	2.179	0.15	1,571	----		
4	Rational	Pre-Dev Basin "D"	1.526	0.17	1,223	----		
5	Junction	Total Pre-Dev	20.79	0.22	21,990	1, 2, 3, 4		
6	Rational	Post-Dev Basin "A"	51.84	0.10	24,914	----		
7	Rational	Post-Dev Basin "B"	1.792	0.08	718	----		
8	Rational	Post-Dev Basin "C"	3.715	0.10	1,785	----		
9	Rational	Post-Dev Basin "D"	15.35	0.32	23,367	----		
10	Junction	Total Post-Dev	61.97	0.10	50,395	6, 7, 8, 9		

Hydrograph Report

Project Name: Collective Church

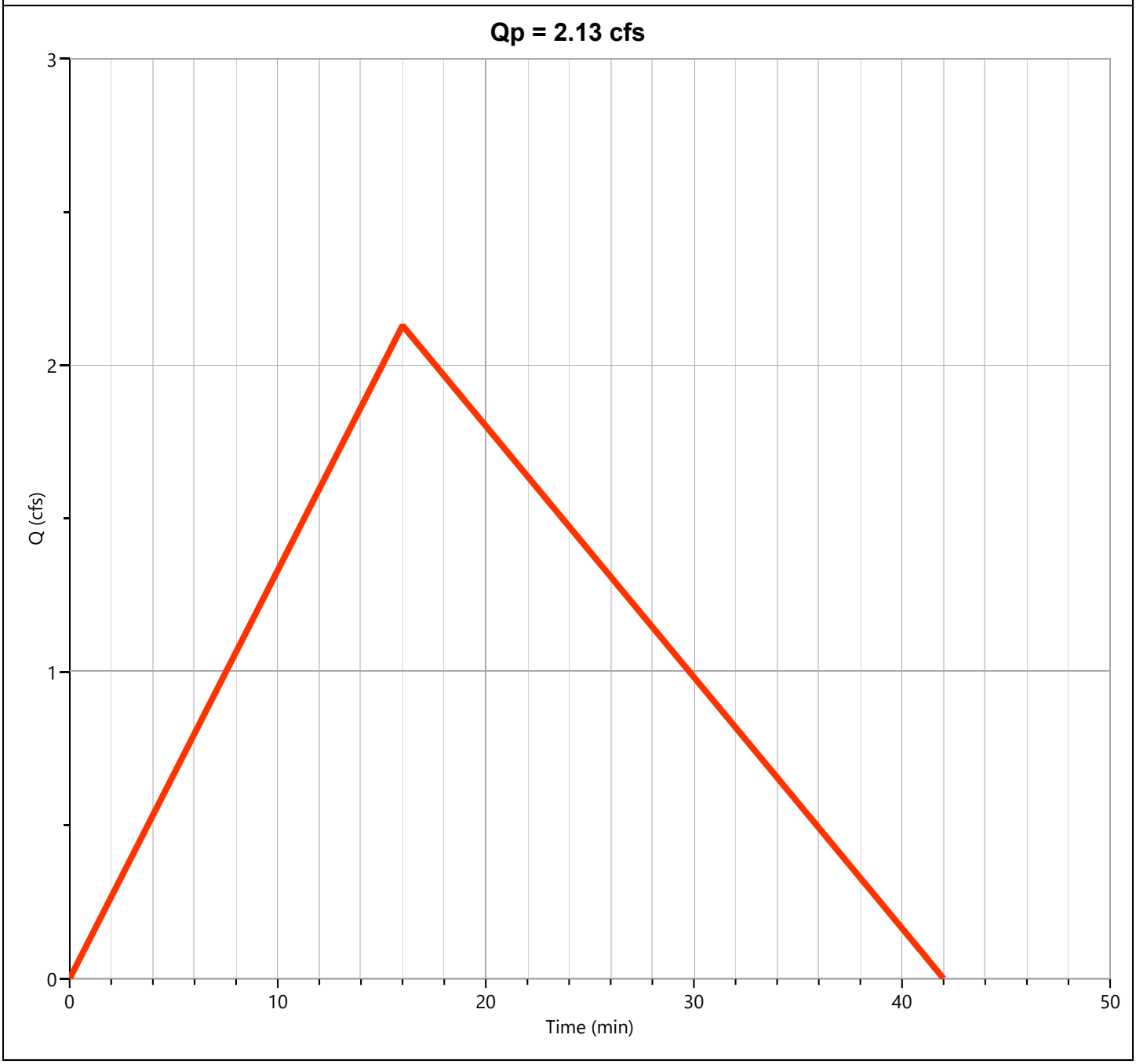
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 2.130 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 2,730 cuft
Drainage Area	= 0.81 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

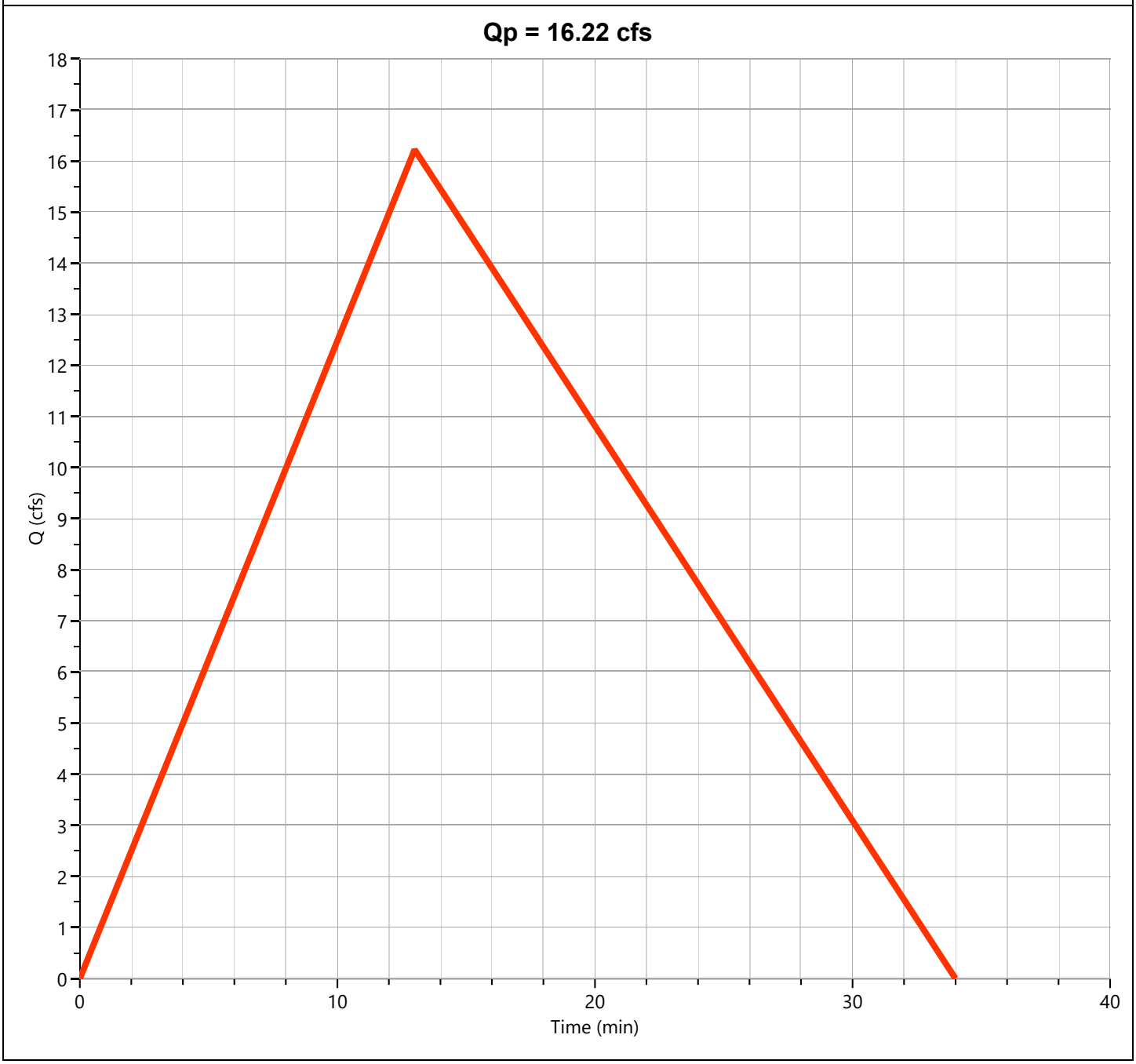
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 16.22 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Runoff Volume	= 16,893 cuft
Drainage Area	= 5.62 ac	Runoff Coeff.	= 0.47
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 13.0 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



Hydrograph Report

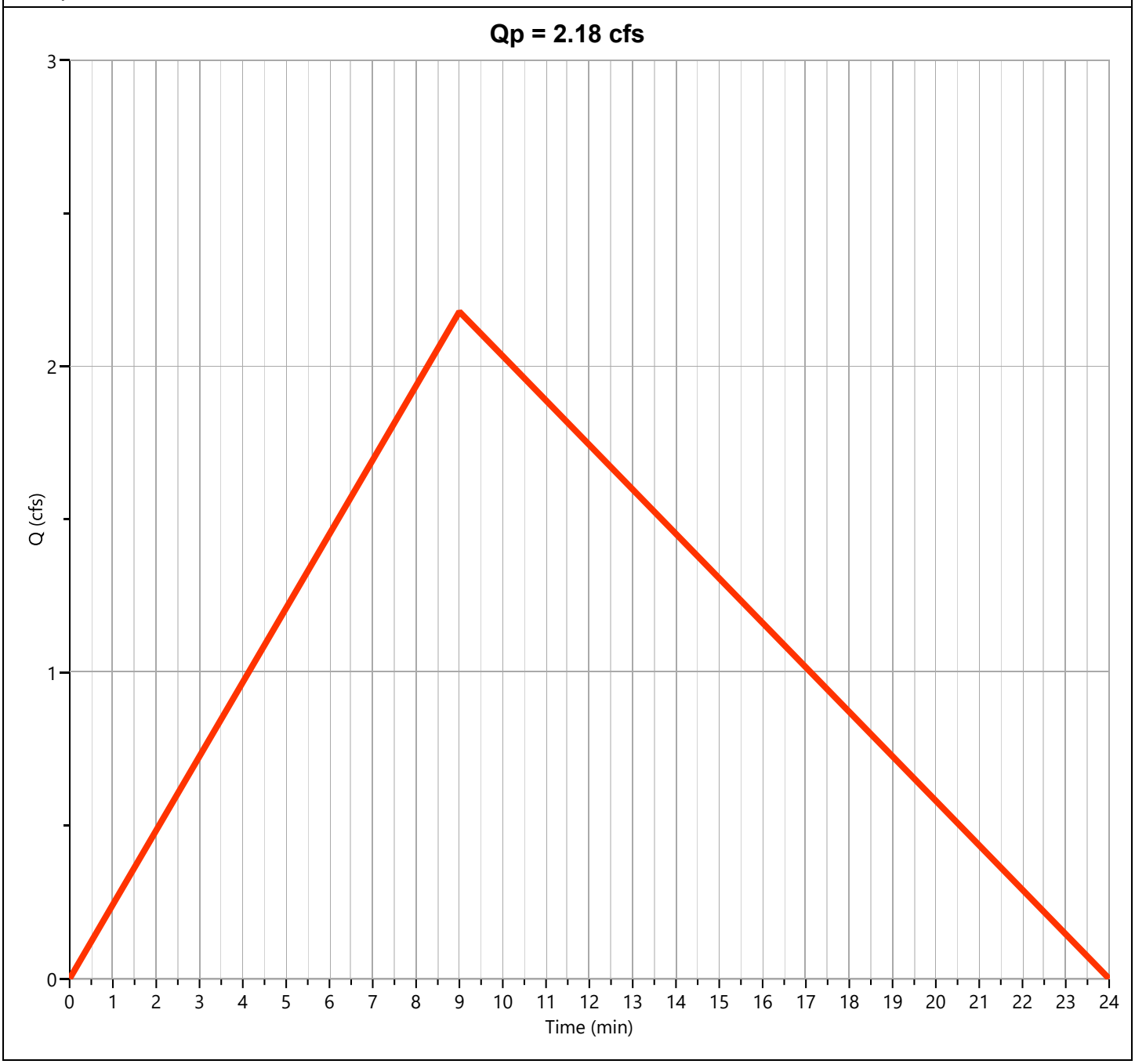
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "C"

Hyd. No. 3

Hydrograph Type	= Rational	Peak Flow	= 2.179 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,571 cuft
Drainage Area	= 0.64 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

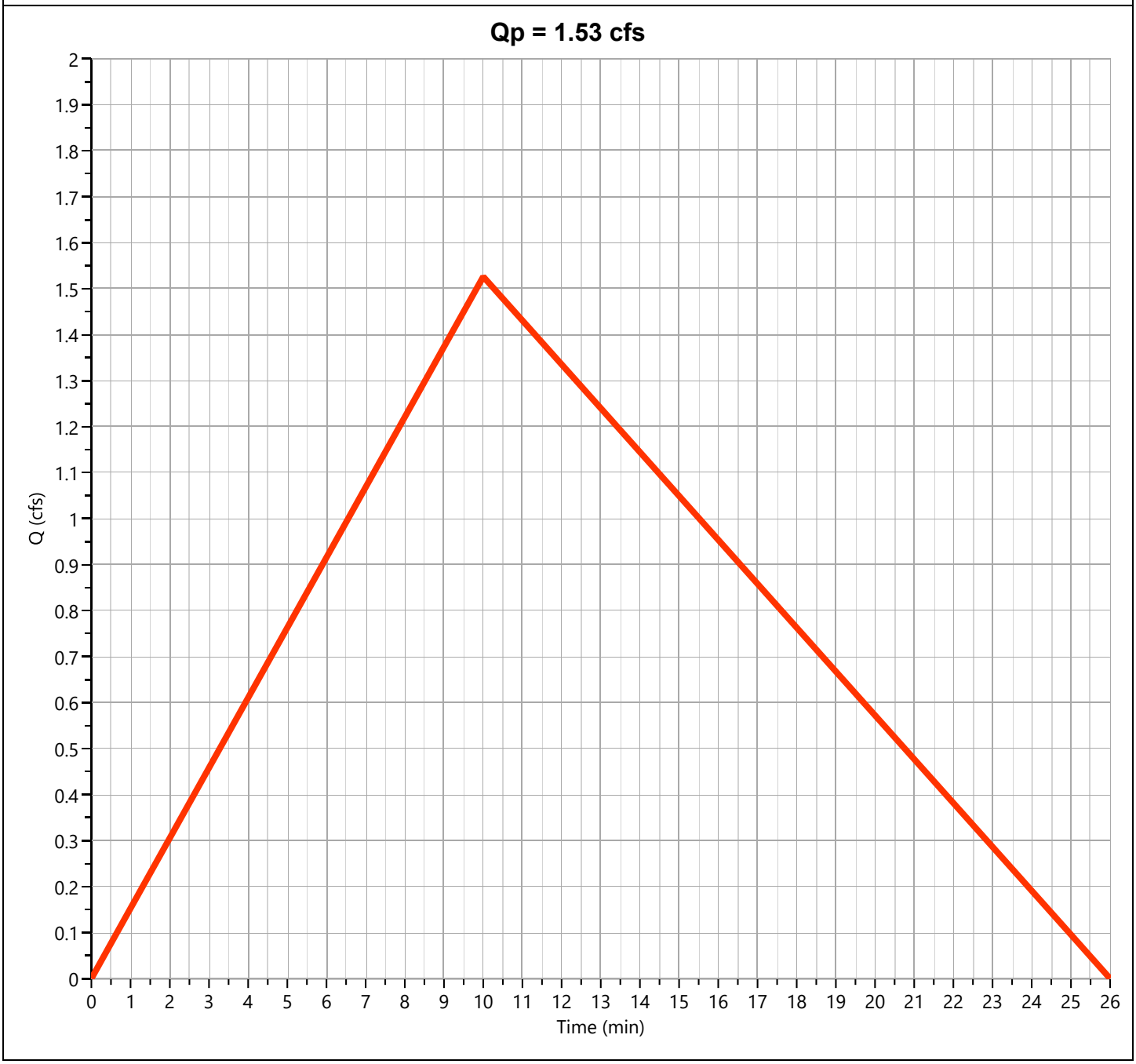
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "D"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 1.526 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 1,223 cuft
Drainage Area	= 0.47 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

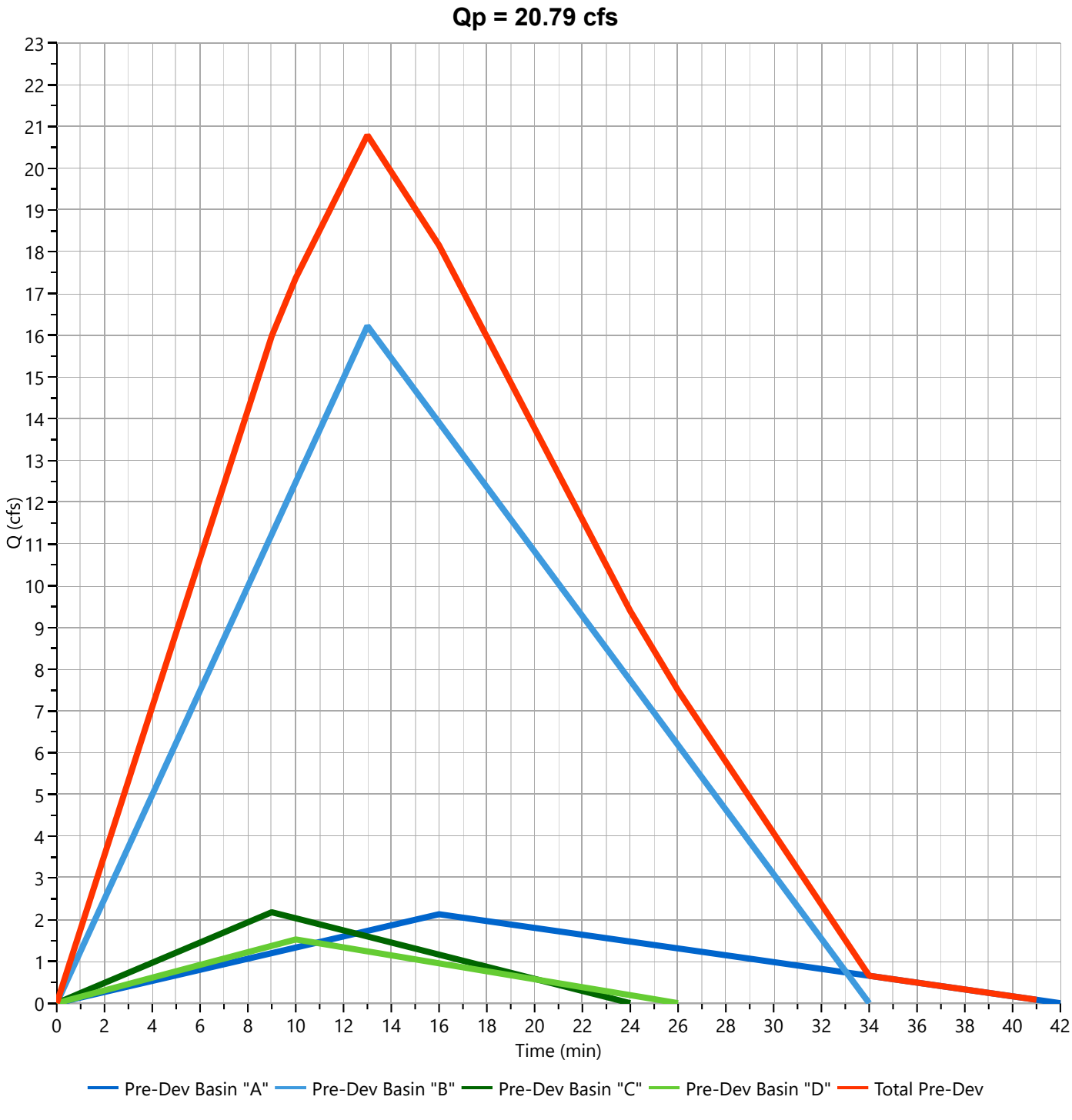
Hydrology Studio v 3.0.0.27

05-02-2025

Total Pre-Dev

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 20.79 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 21,990 cuft
Inflow Hydrographs	= 1, 2, 3, 4	Total Contrib. Area	= 7.54 ac



Hydrograph Report

Project Name: Collective Church

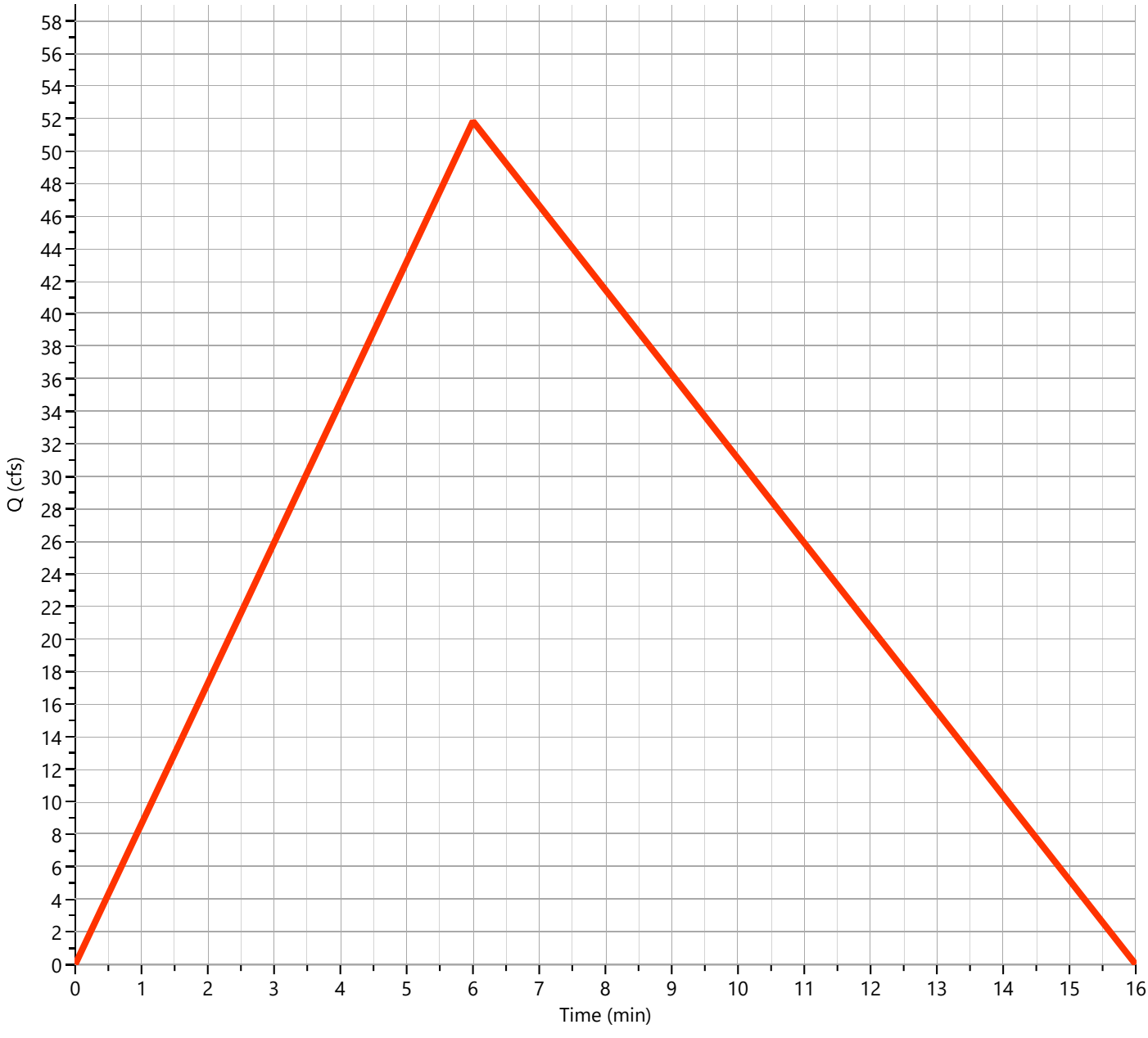
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "A"

Hyd. No. 6

Hydrograph Type	= Rational	Peak Flow	= 51.84 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 24,914 cuft
Drainage Area	= 6.28 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.69 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

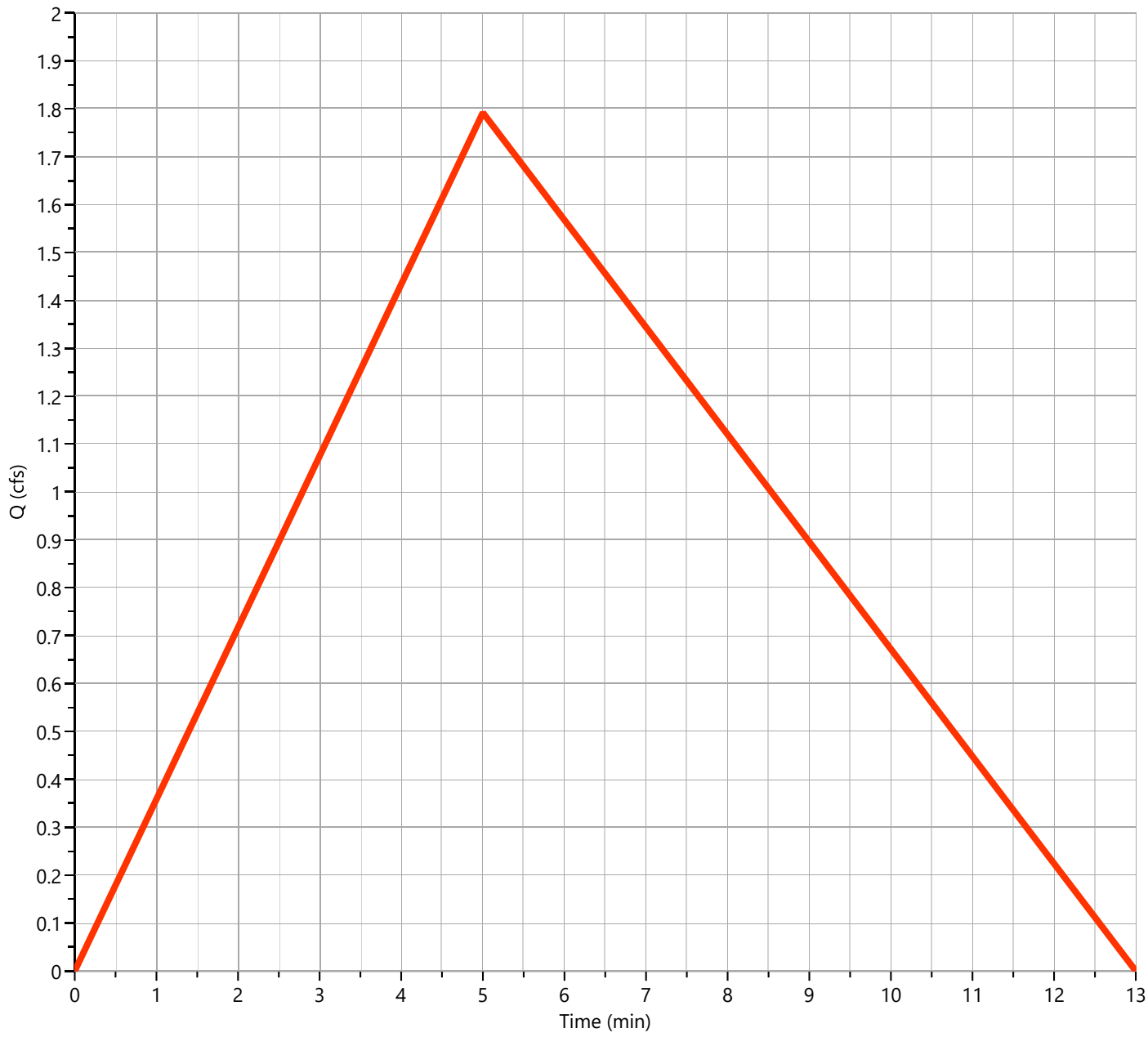
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "B"

Hyd. No. 7

Hydrograph Type	= Rational	Peak Flow	= 1.792 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 718 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.95
Tc Method	= User	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



Hydrograph Report

Project Name: Collective Church

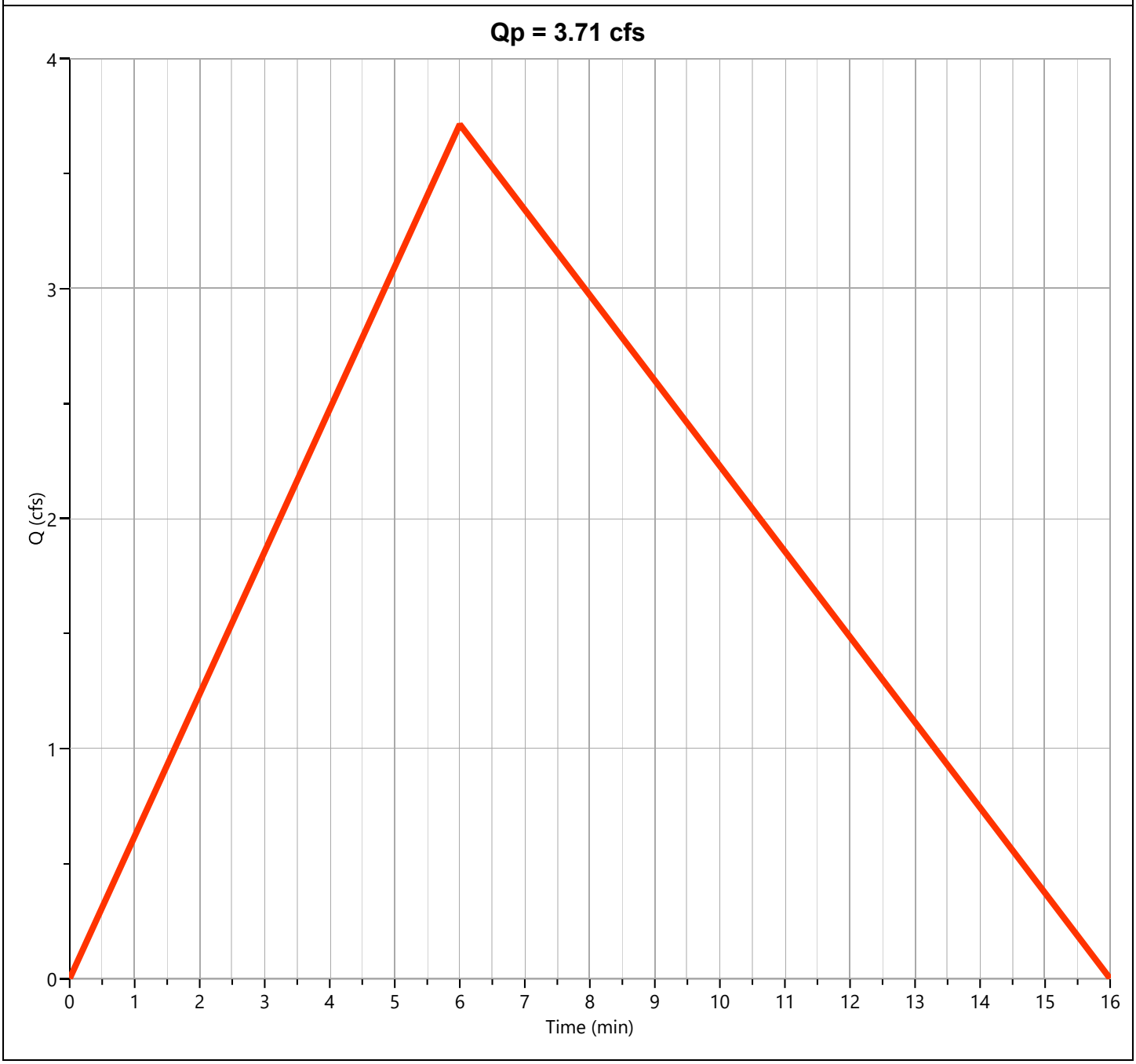
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "C"

Hyd. No. 8

Hydrograph Type	= Rational	Peak Flow	= 3.715 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 1,785 cuft
Drainage Area	= 0.45 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.69 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

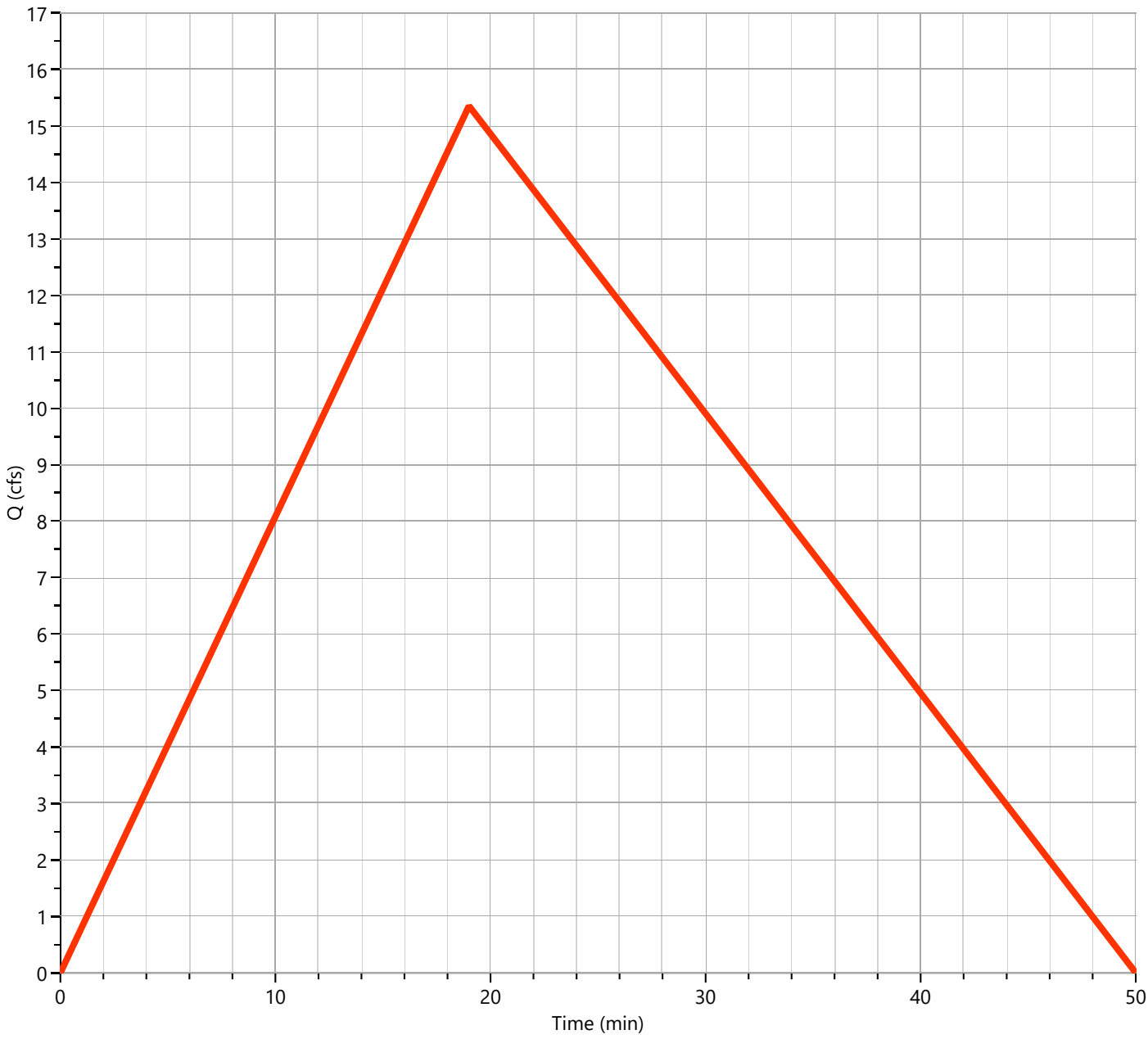
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "D"

Hyd. No. 9

Hydrograph Type	= Rational	Peak Flow	= 15.35 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 23,367 cuft
Drainage Area	= 3.9 ac	Runoff Coeff.	= 0.76
Tc Method	= User	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.18 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

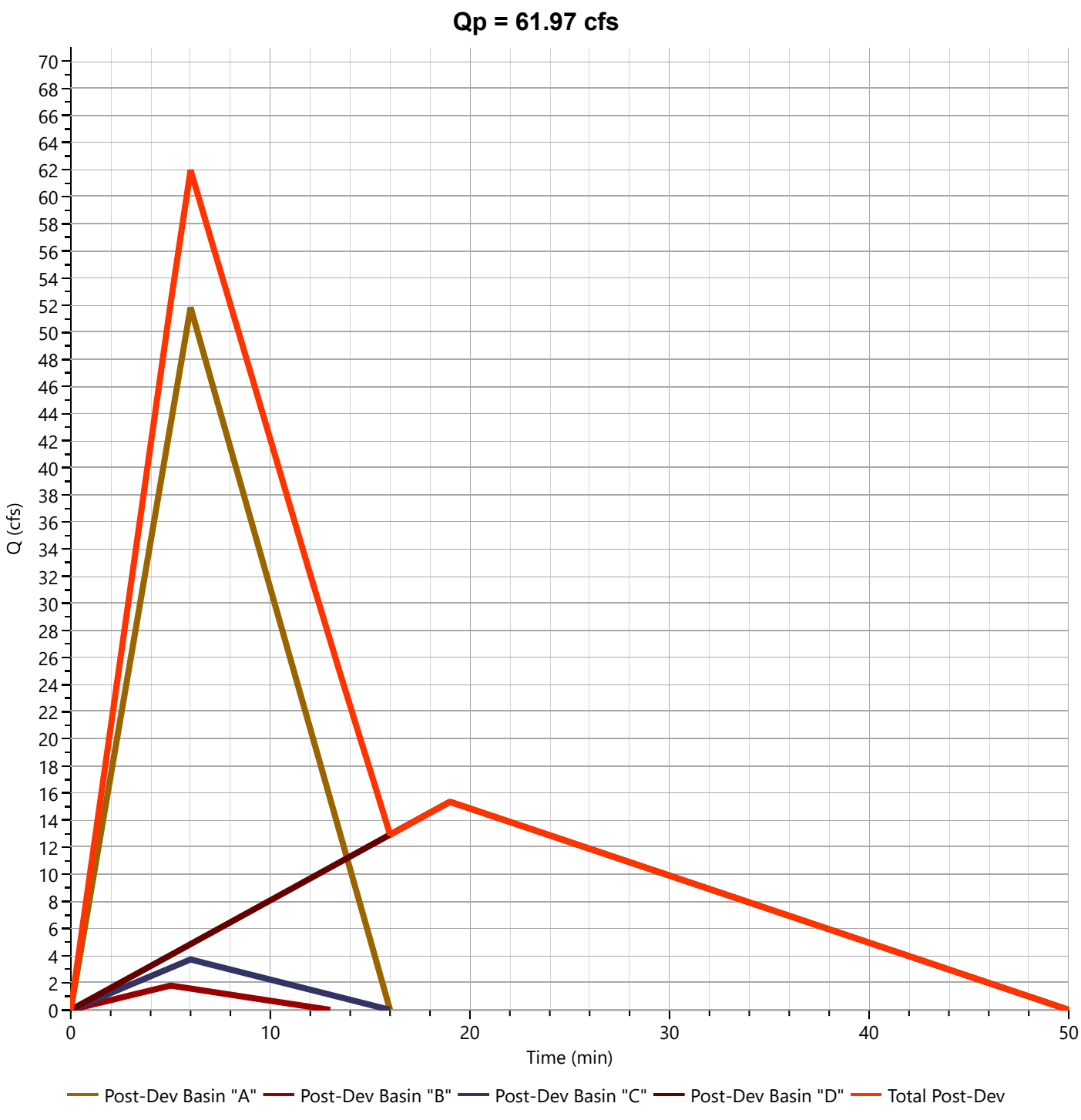
Hydrology Studio v 3.0.0.27

05-02-2025

Total Post-Dev

Hyd. No. 10

Hydrograph Type	= Junction	Peak Flow	= 61.97 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Hydrograph Volume	= 50,395 cuft
Inflow Hydrographs	= 6, 7, 8, 9	Total Contrib. Area	= 10.83 ac



Hydrograph 50-yr Summary

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"	2.330	0.27	2,986	----		
2	Rational	Pre-Dev Basin "B"	17.74	0.22	18,474	----		
3	Rational	Pre-Dev Basin "C"	2.382	0.15	1,717	----		
4	Rational	Pre-Dev Basin "D"	1.669	0.17	1,336	----		
5	Junction	Total Pre-Dev	22.74	0.22	24,048	1, 2, 3, 4		
6	Rational	Post-Dev Basin "A"	56.64	0.10	27,219	----		
7	Rational	Post-Dev Basin "B"	1.957	0.08	784	----		
8	Rational	Post-Dev Basin "C"	4.058	0.10	1,950	----		
9	Rational	Post-Dev Basin "D"	16.80	0.32	25,566	----		
10	Junction	Total Post-Dev	67.71	0.10	55,095	6, 7, 8, 9		

Hydrograph Report

Project Name: Collective Church

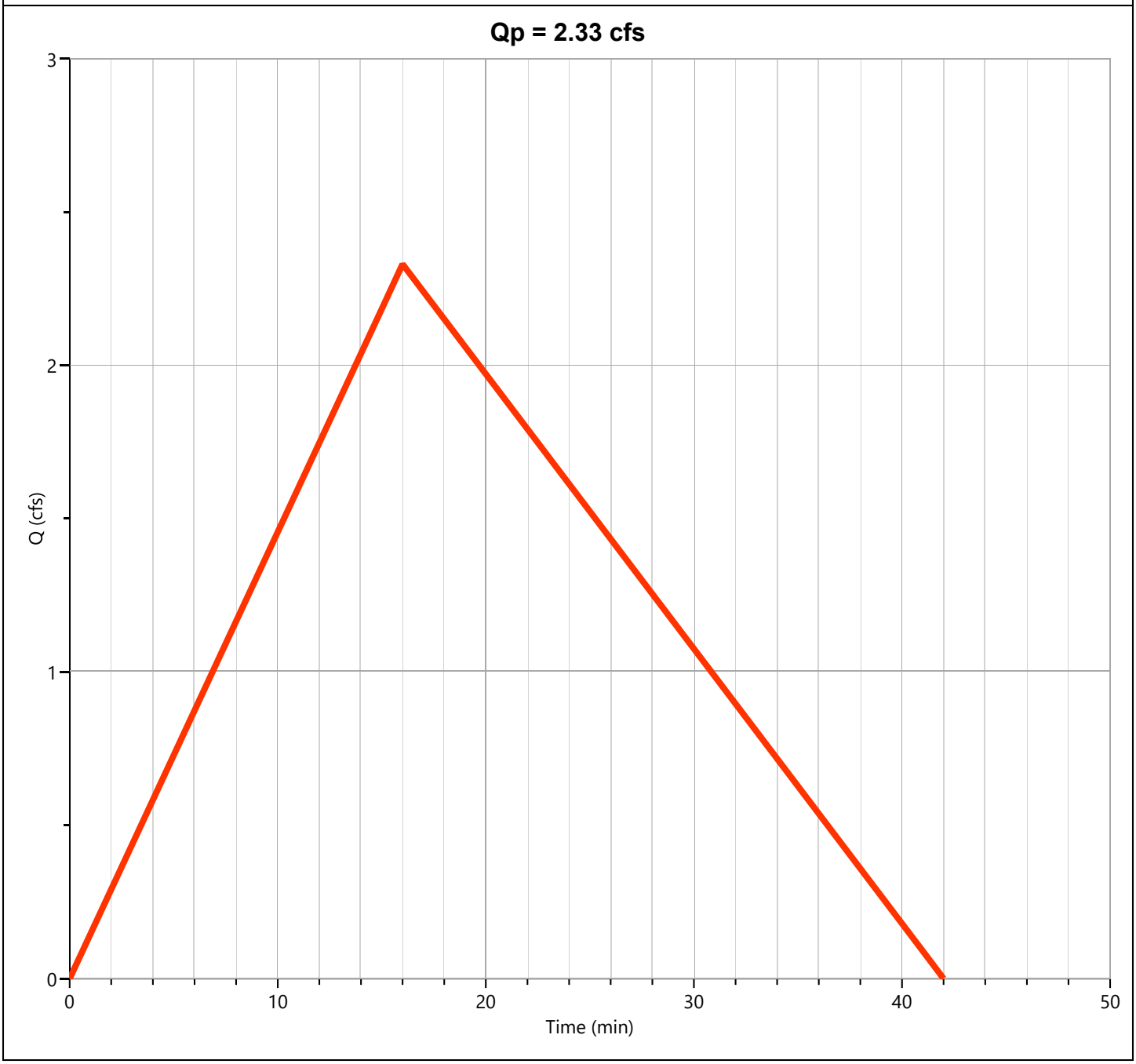
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 2.330 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 2,986 cuft
Drainage Area	= 0.81 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

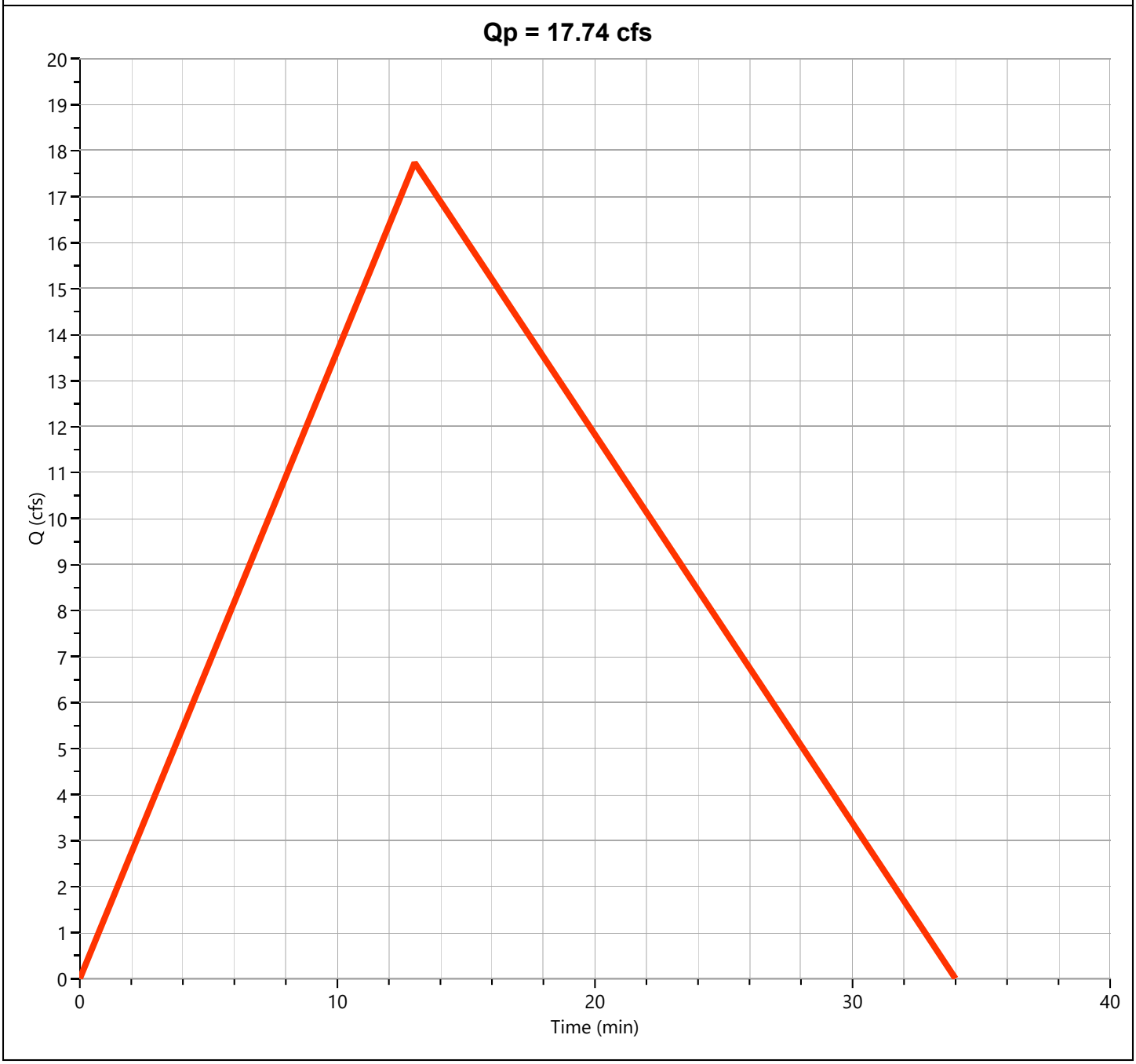
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 17.74 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Runoff Volume	= 18,474 cuft
Drainage Area	= 5.62 ac	Runoff Coeff.	= 0.47
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 13.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.72 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

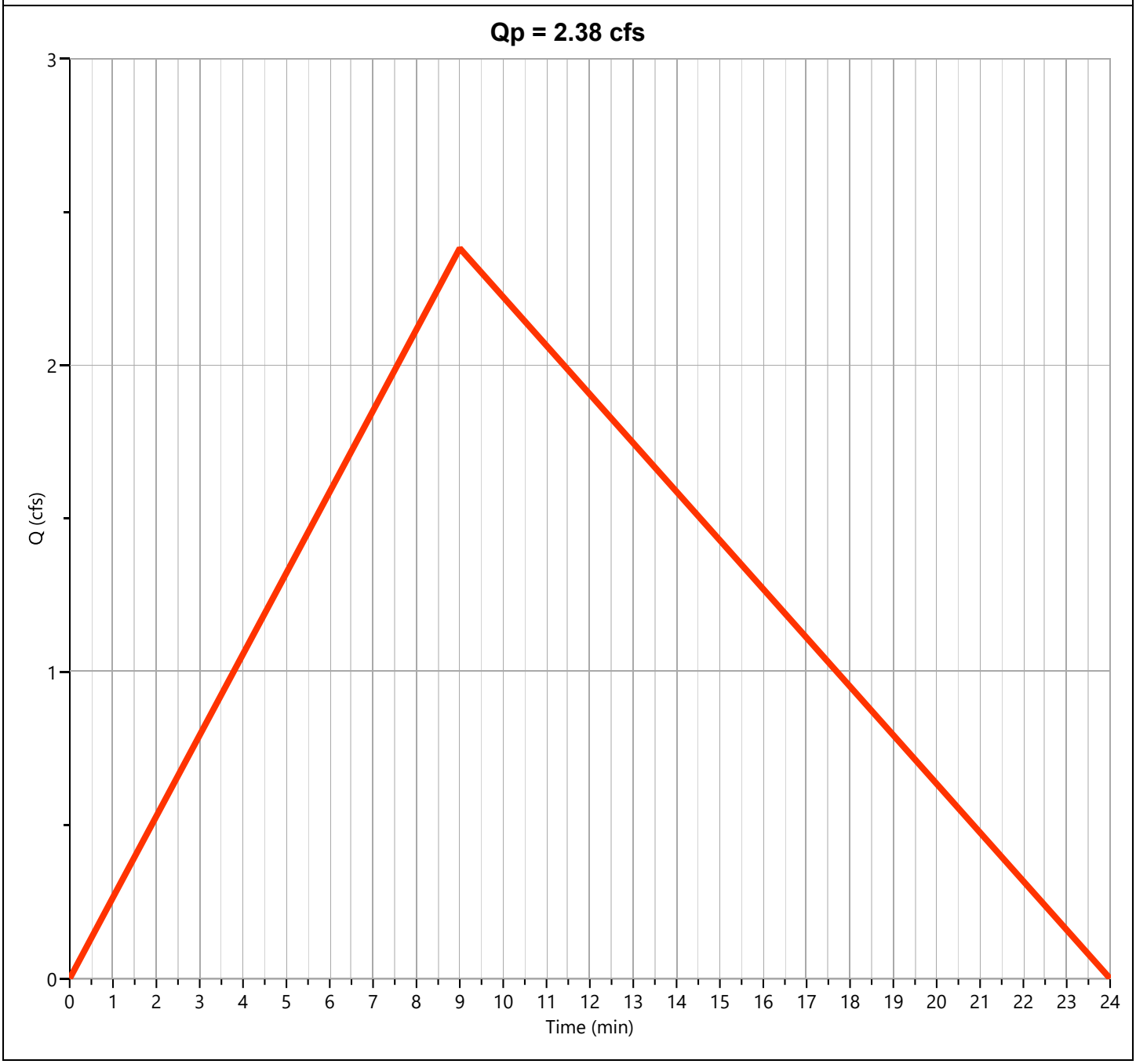
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "C"

Hyd. No. 3

Hydrograph Type	= Rational	Peak Flow	= 2.382 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,717 cuft
Drainage Area	= 0.64 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

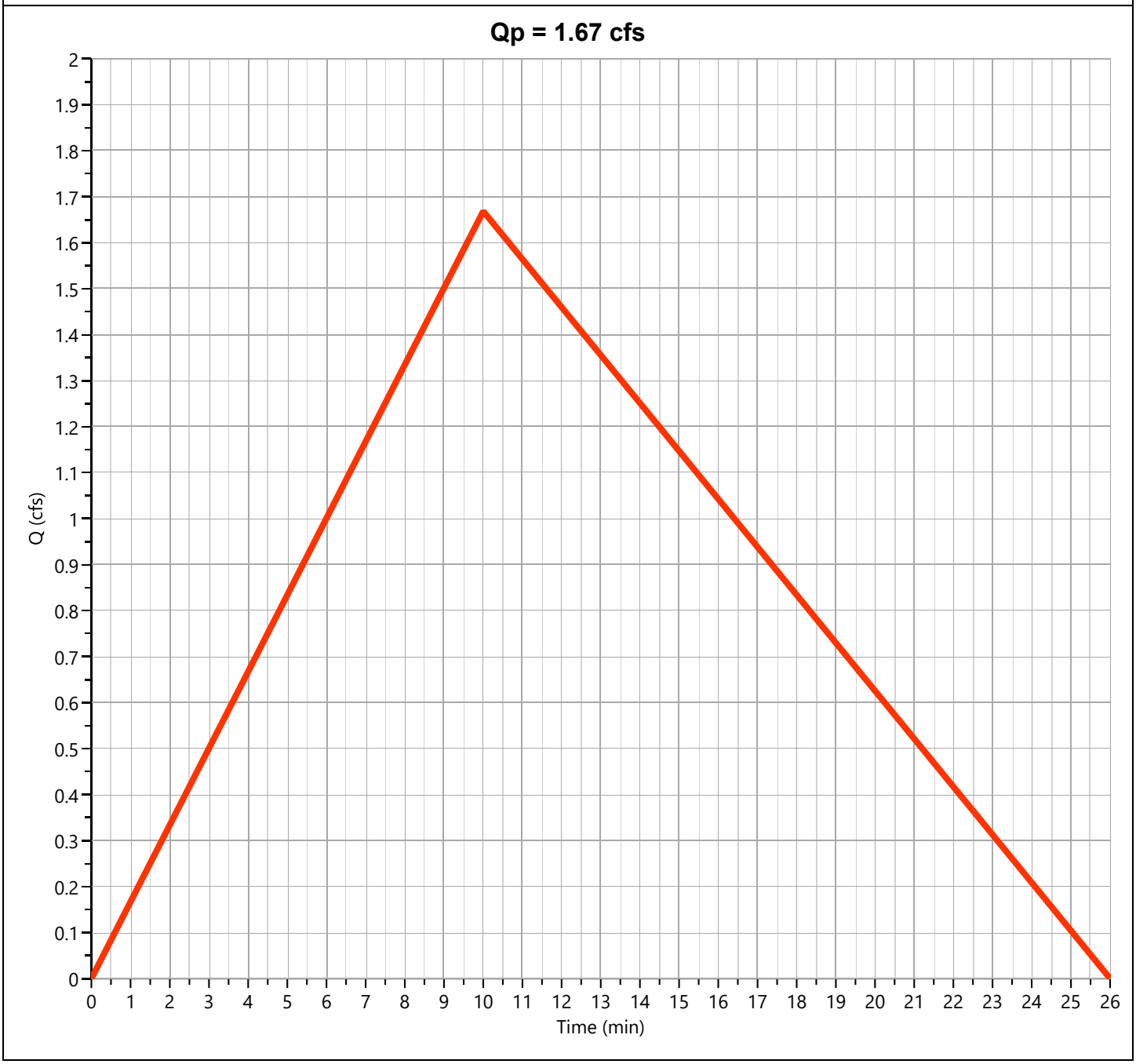
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "D"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 1.669 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 1,336 cuft
Drainage Area	= 0.47 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

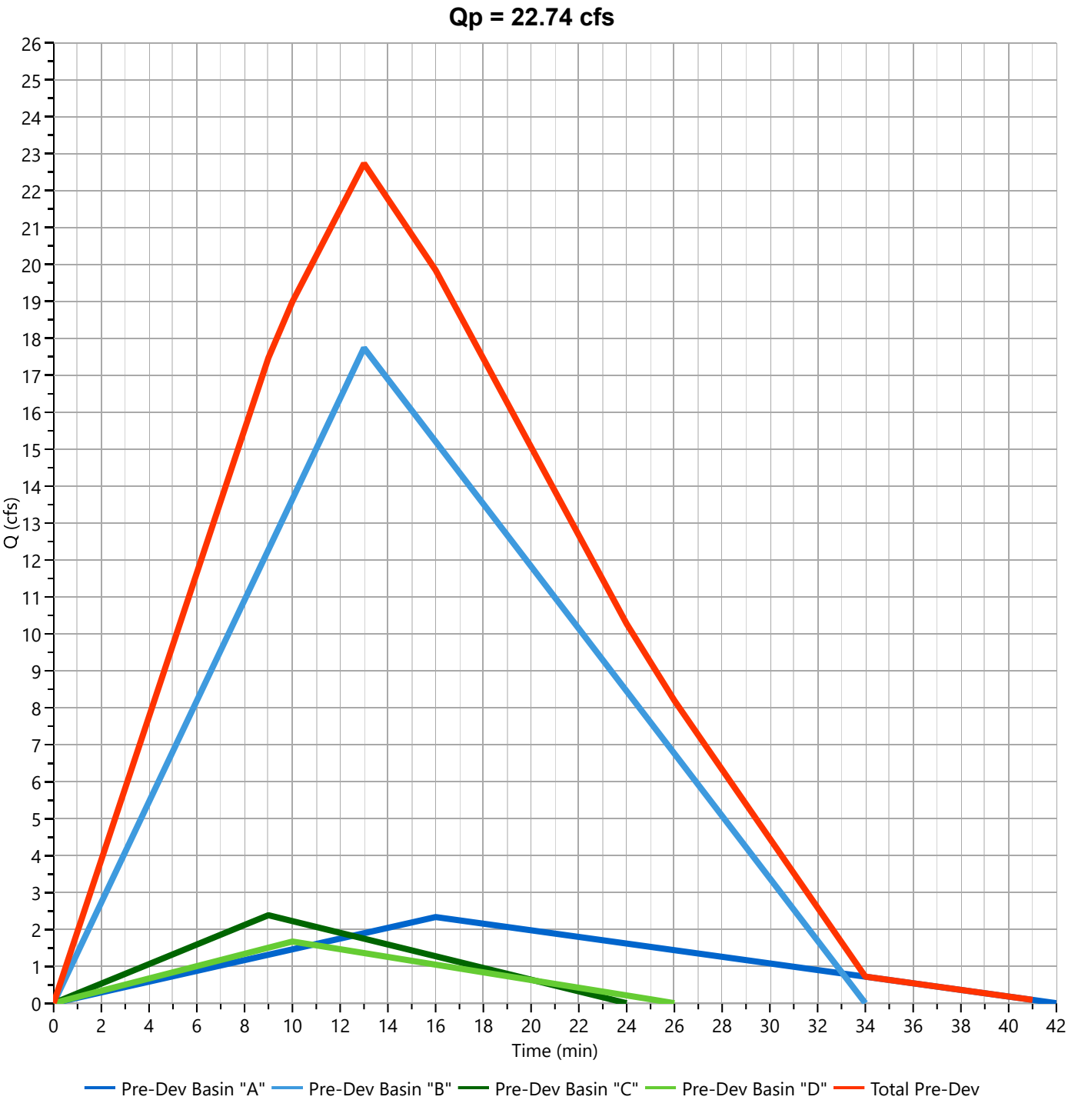
Hydrology Studio v 3.0.0.27

05-02-2025

Total Pre-Dev

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 22.74 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 24,048 cuft
Inflow Hydrographs	= 1, 2, 3, 4	Total Contrib. Area	= 7.54 ac



Hydrograph Report

Project Name: Collective Church

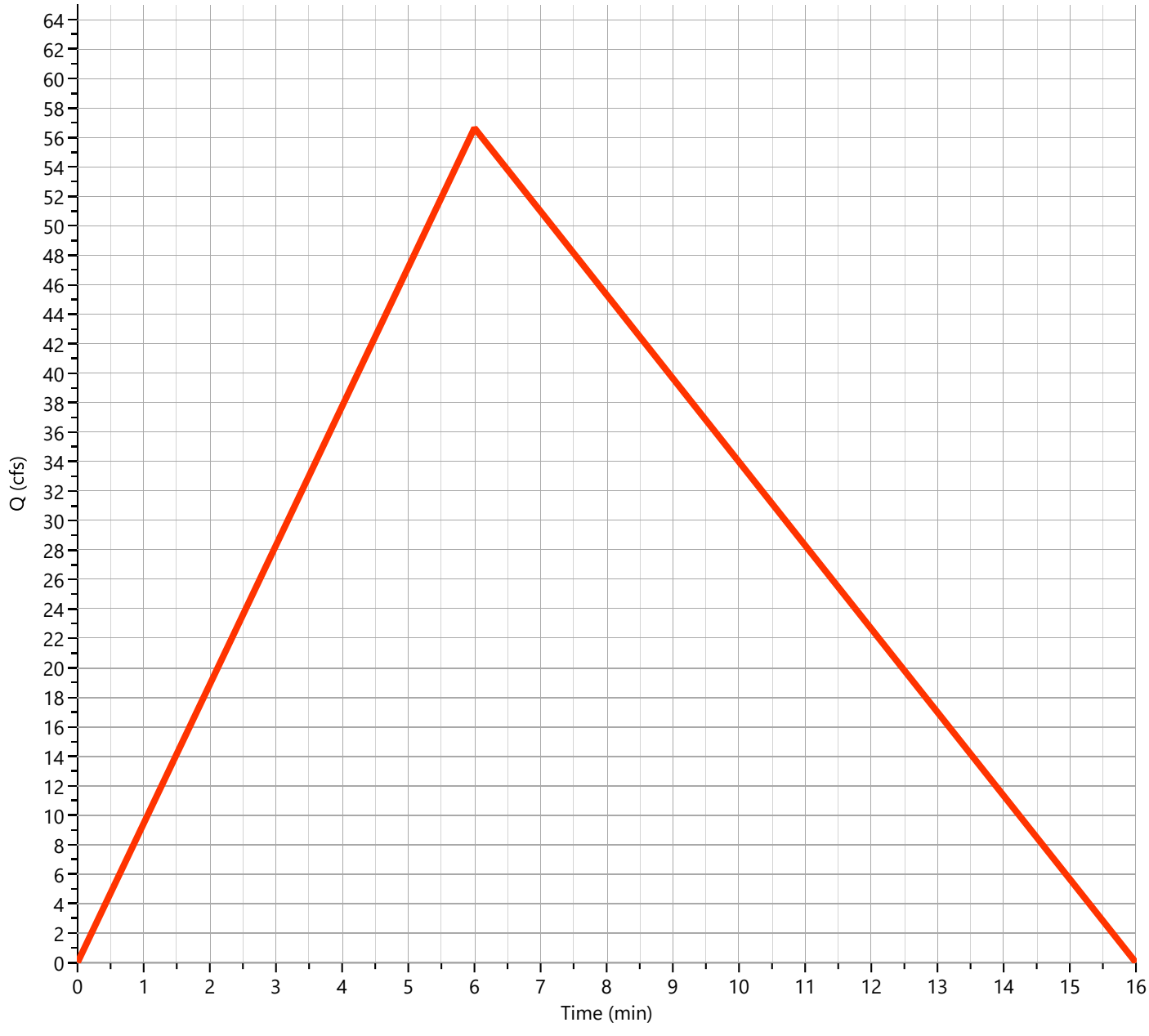
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "A"

Hyd. No. 6

Hydrograph Type	= Rational	Peak Flow	= 56.64 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 27,219 cuft
Drainage Area	= 6.28 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.49 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67

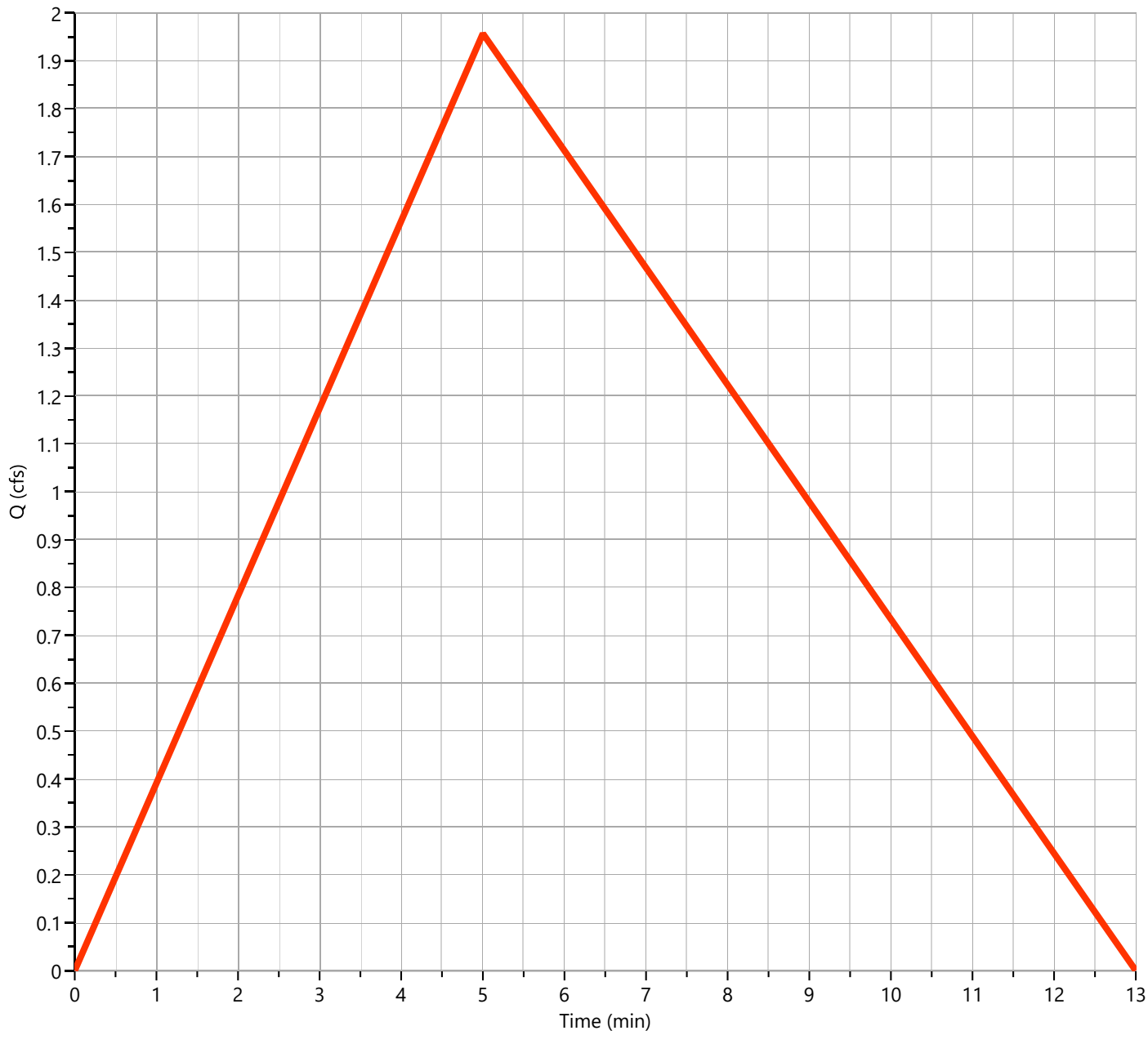


Hydrograph Report

Post-Dev Basin "B"

Hyd. No. 7

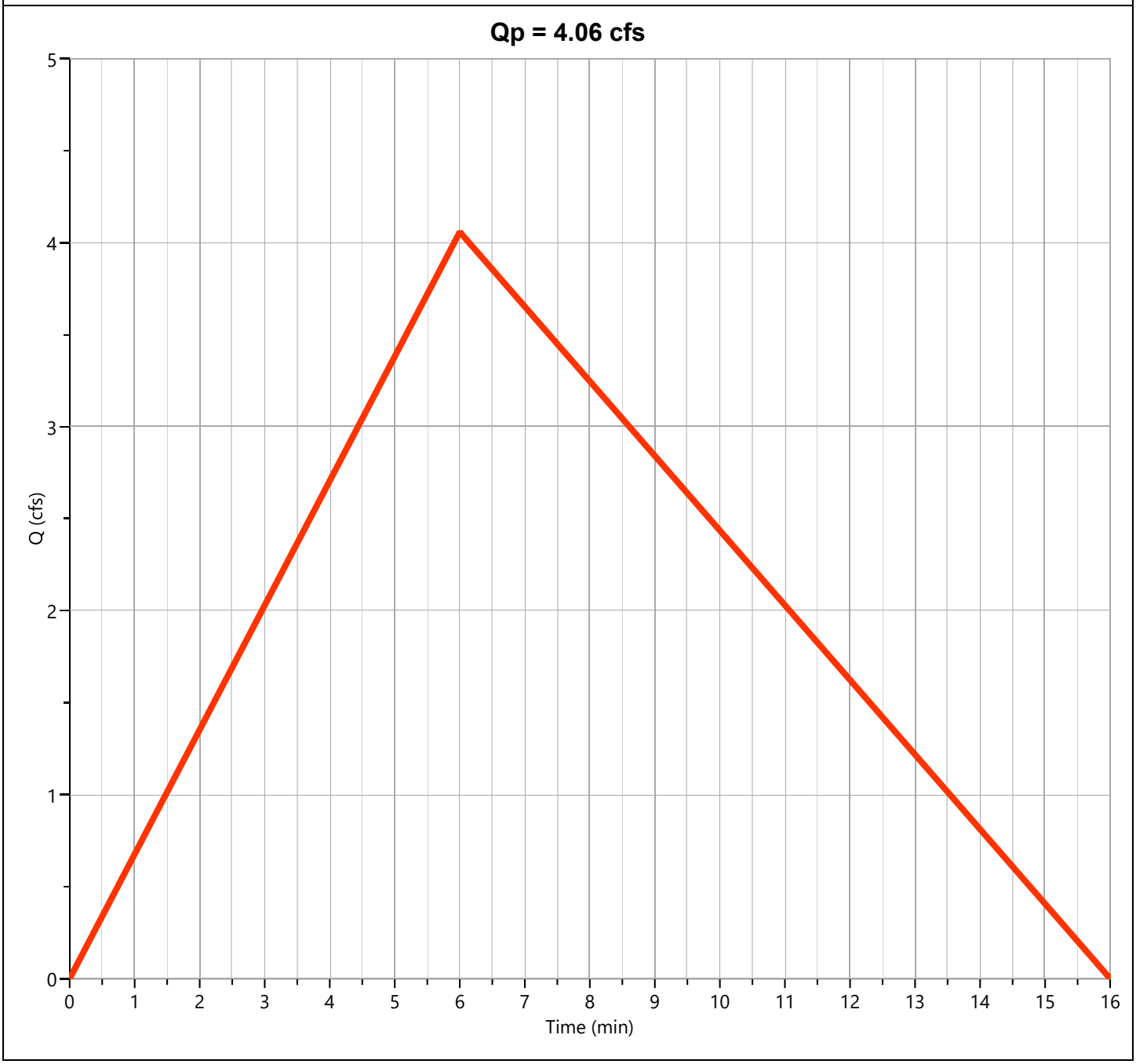
Hydrograph Type	= Rational	Peak Flow	= 1.957 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 784 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 10.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "C"

Hyd. No. 8

Hydrograph Type	= Rational	Peak Flow	= 4.058 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 1,950 cuft
Drainage Area	= 0.45 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.49 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

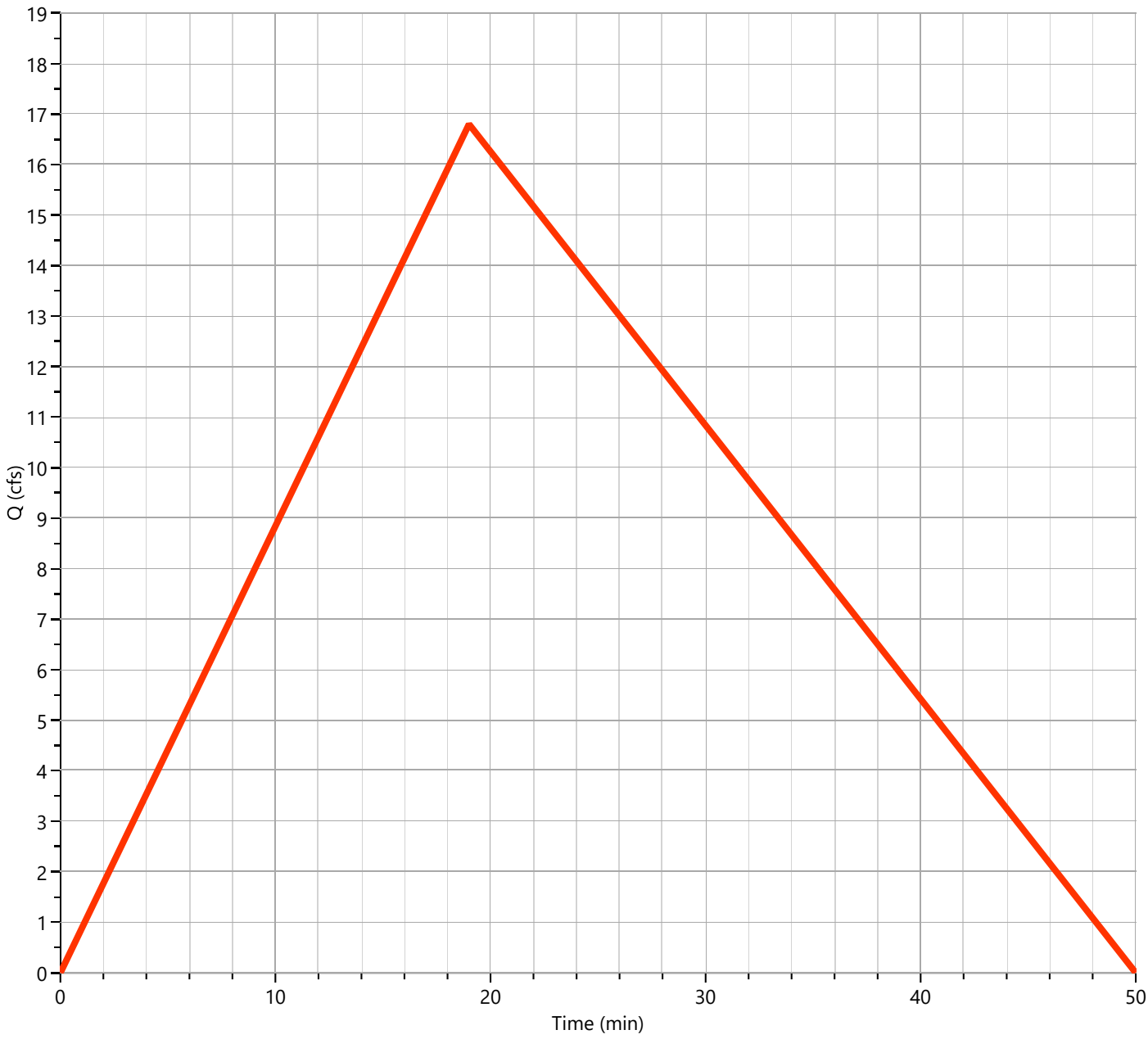
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "D"

Hyd. No. 9

Hydrograph Type	= Rational	Peak Flow	= 16.80 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 25,566 cuft
Drainage Area	= 3.9 ac	Runoff Coeff.	= 0.76
Tc Method	= User	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.67 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

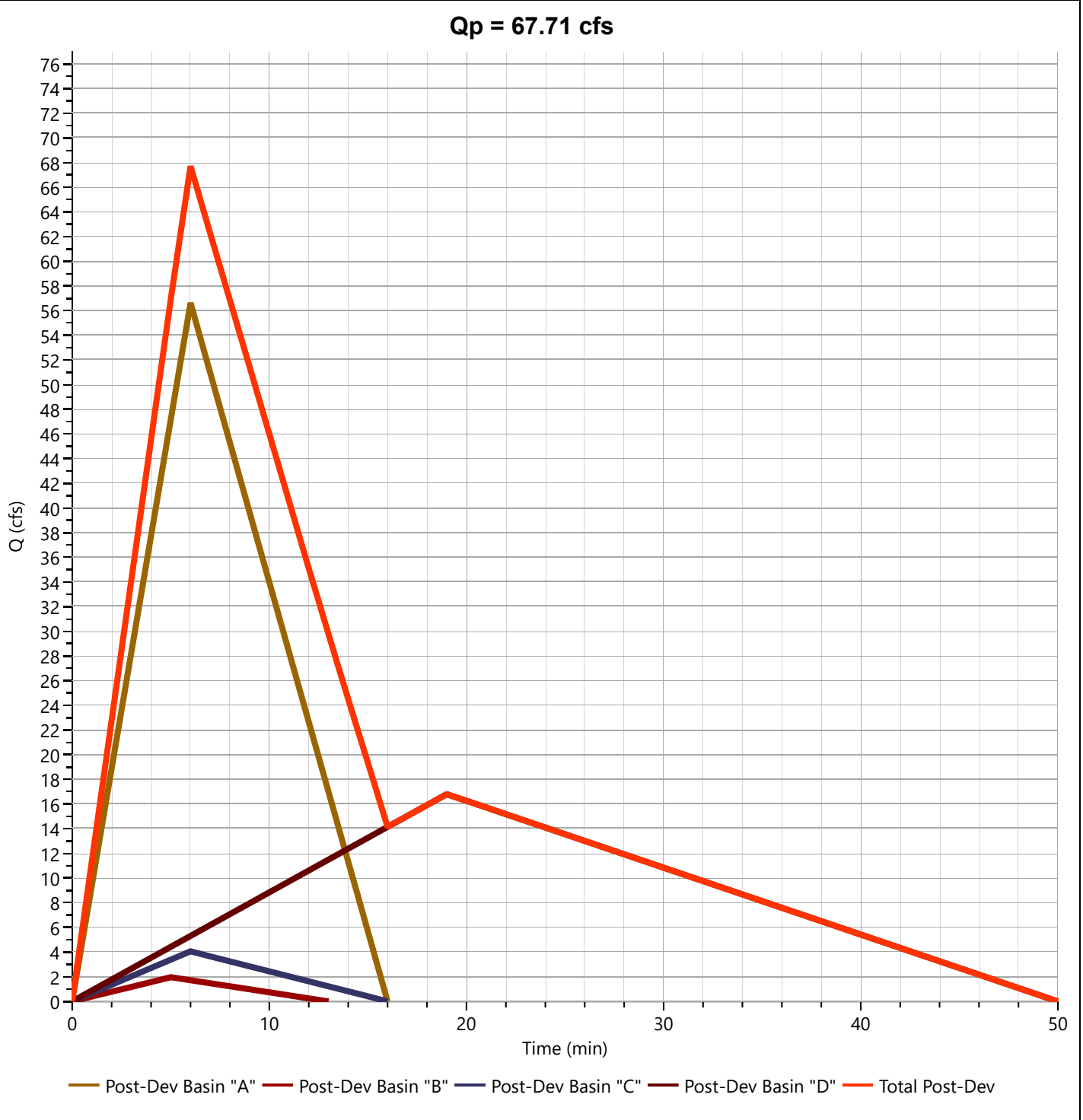
Hydrology Studio v 3.0.0.27

05-02-2025

Total Post-Dev

Hyd. No. 10

Hydrograph Type	= Junction	Peak Flow	= 67.71 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Hydrograph Volume	= 55,095 cuft
Inflow Hydrographs	= 6, 7, 8, 9	Total Contrib. Area	= 10.83 ac



Hydrograph 100-yr Summary

Project Name: Collective Church

05-02-2025

Hydrology Studio v 3.0.0.27

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"	2.529	0.27	3,242	----		
2	Rational	Pre-Dev Basin "B"	19.26	0.22	20,059	----		
3	Rational	Pre-Dev Basin "C"	2.588	0.15	1,865	----		
4	Rational	Pre-Dev Basin "D"	1.812	0.17	1,452	----		
5	Junction	Total Pre-Dev	24.69	0.22	26,112	1, 2, 3, 4		
6	Rational	Post-Dev Basin "A"	61.57	0.10	29,589	----		
7	Rational	Post-Dev Basin "B"	2.128	0.08	852	----		
8	Rational	Post-Dev Basin "C"	4.412	0.10	2,120	----		
9	Rational	Post-Dev Basin "D"	18.23	0.32	27,744	----		
10	Junction	Total Post-Dev	73.60	0.10	59,844	6, 7, 8, 9		

Hydrograph Report

Project Name: Collective Church

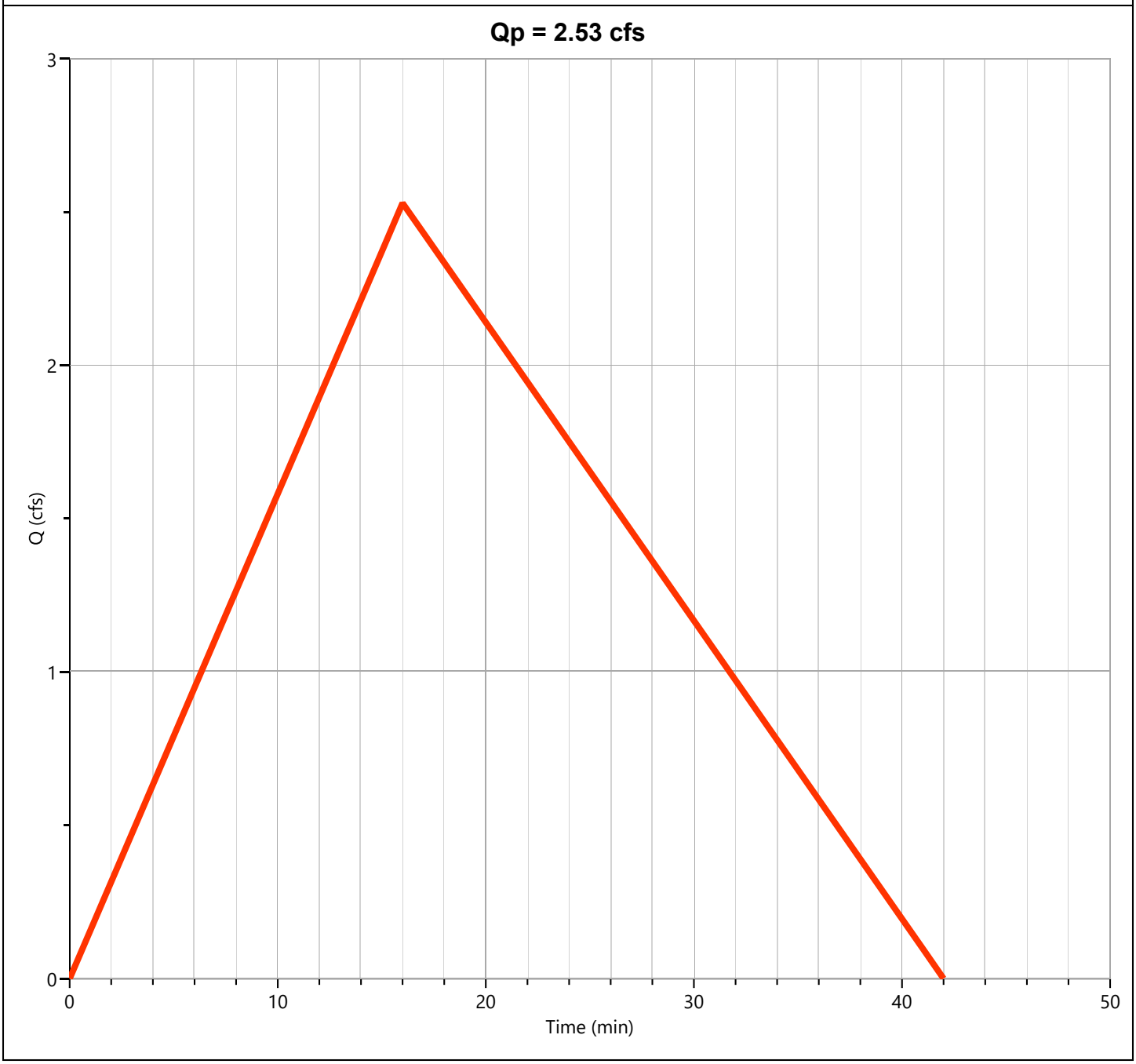
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "A"

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 2.529 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 3,242 cuft
Drainage Area	= 0.81 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

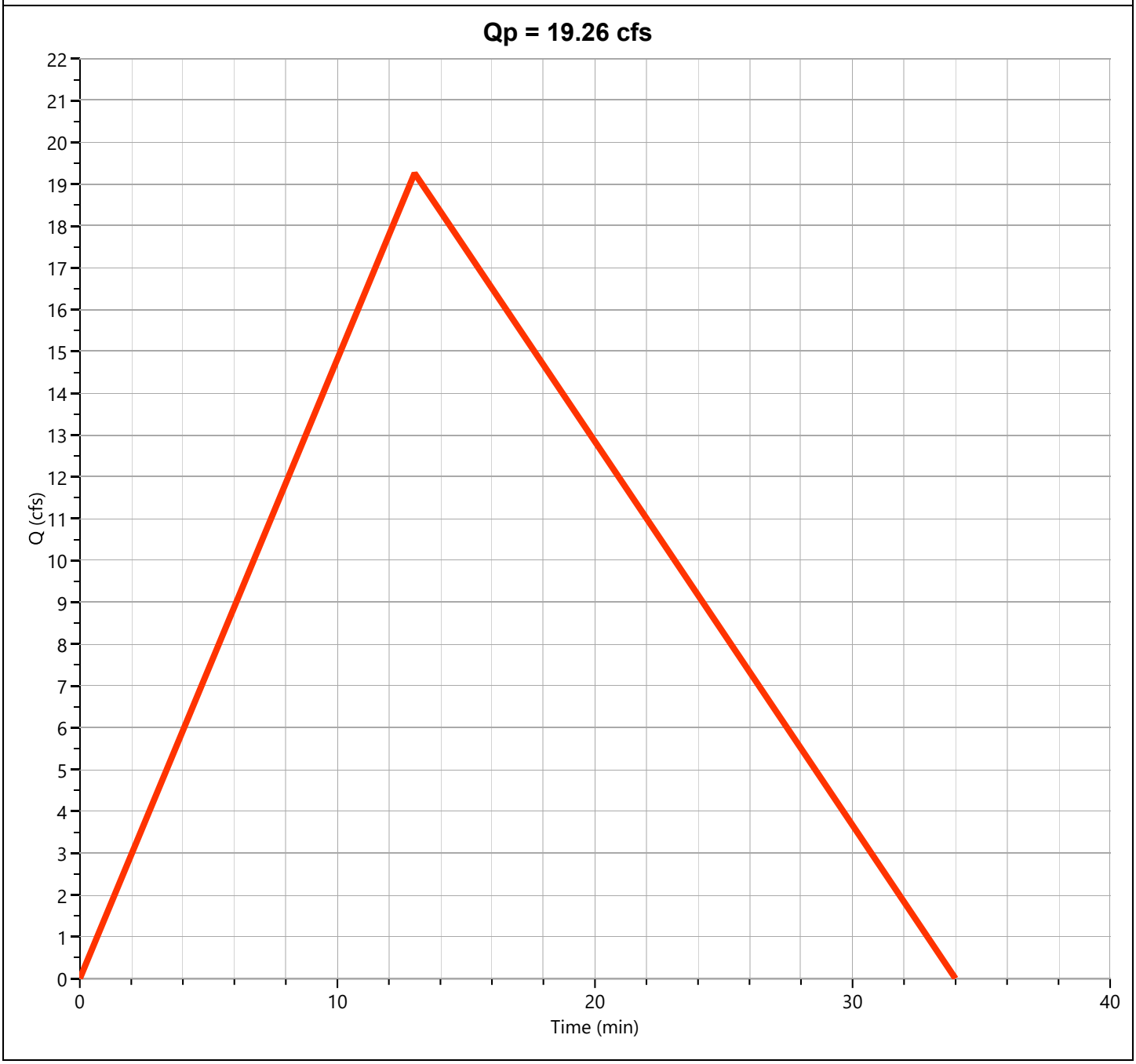
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "B"

Hyd. No. 2

Hydrograph Type	= Rational	Peak Flow	= 19.26 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Runoff Volume	= 20,059 cuft
Drainage Area	= 5.62 ac	Runoff Coeff.	= 0.47
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 13.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.29 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

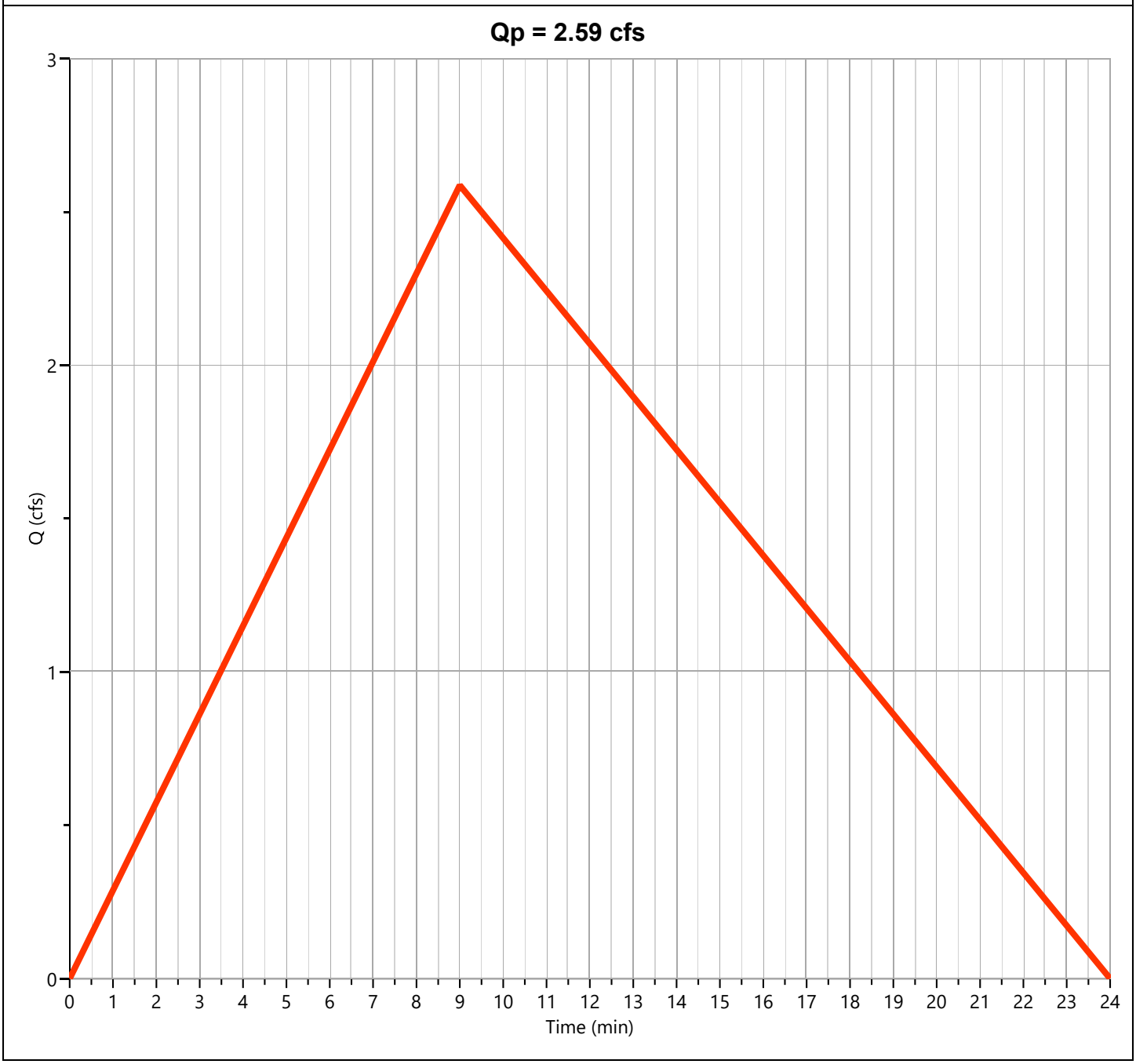
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "C"

Hyd. No. 3

Hydrograph Type	= Rational	Peak Flow	= 2.588 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.15 hrs
Time Interval	= 1 min	Runoff Volume	= 1,865 cuft
Drainage Area	= 0.64 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

Project Name: Collective Church

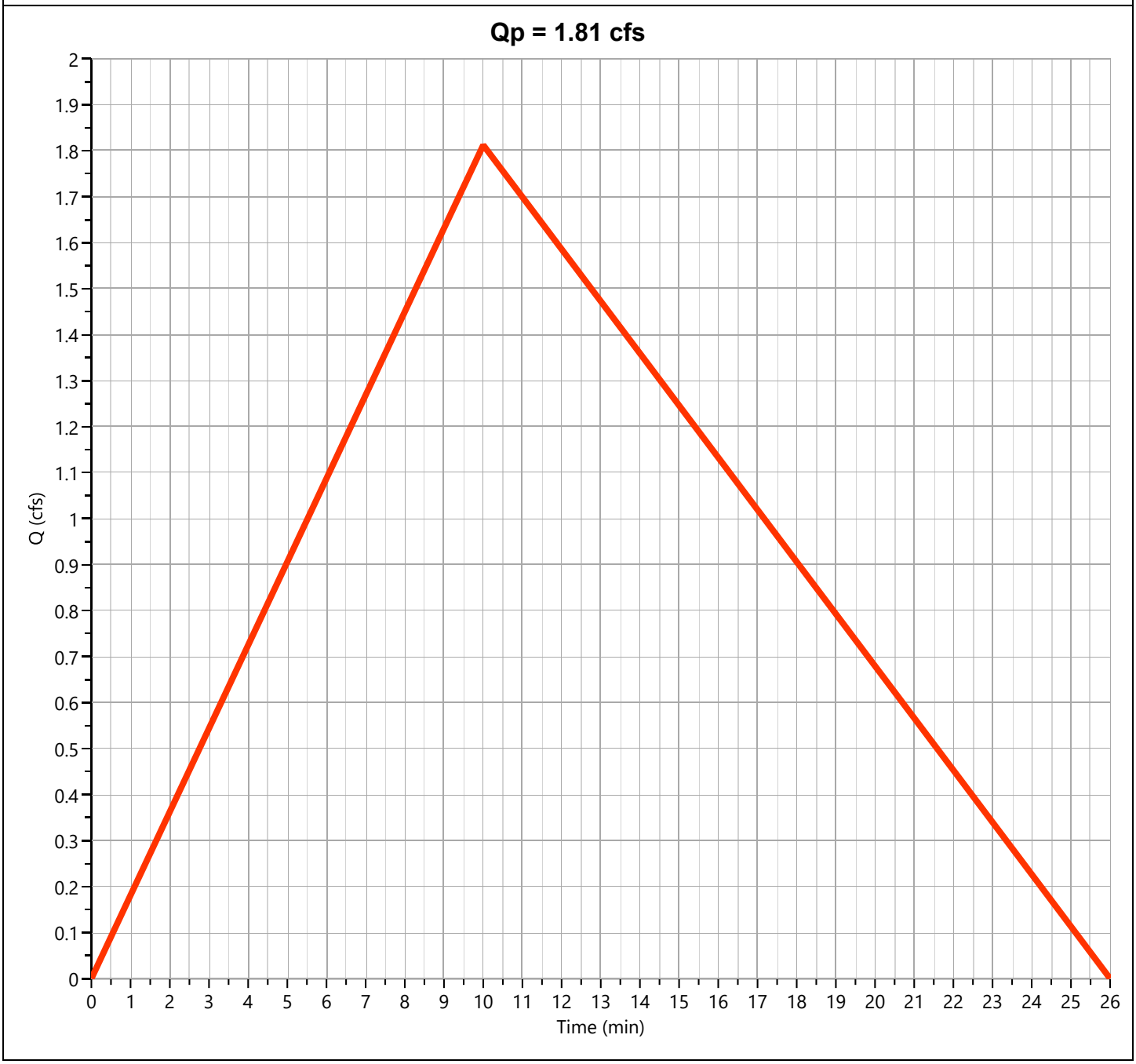
Hydrology Studio v 3.0.0.27

05-02-2025

Pre-Dev Basin "D"

Hyd. No. 4

Hydrograph Type	= Rational	Peak Flow	= 1.812 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.17 hrs
Time Interval	= 1 min	Runoff Volume	= 1,452 cuft
Drainage Area	= 0.47 ac	Runoff Coeff.	= 0.47
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



Hydrograph Report

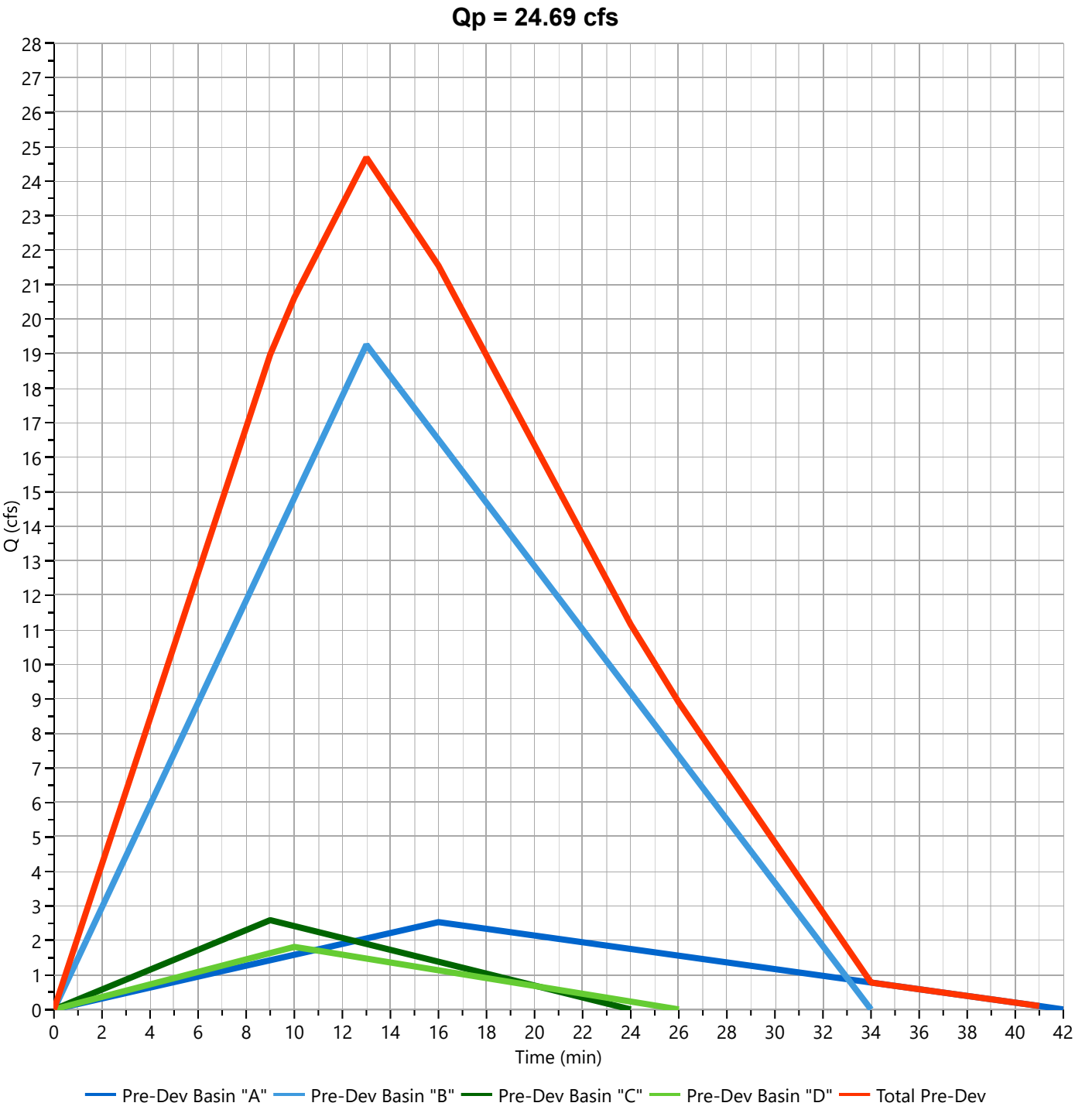
Hydrology Studio v 3.0.0.27

05-02-2025

Total Pre-Dev

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 24.69 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 26,112 cuft
Inflow Hydrographs	= 1, 2, 3, 4	Total Contrib. Area	= 7.54 ac



Hydrograph Report

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "A"

Hyd. No. 6

Hydrograph Type	= Rational	Peak Flow	= 61.57 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 29,589 cuft
Drainage Area	= 6.28 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 10.32 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

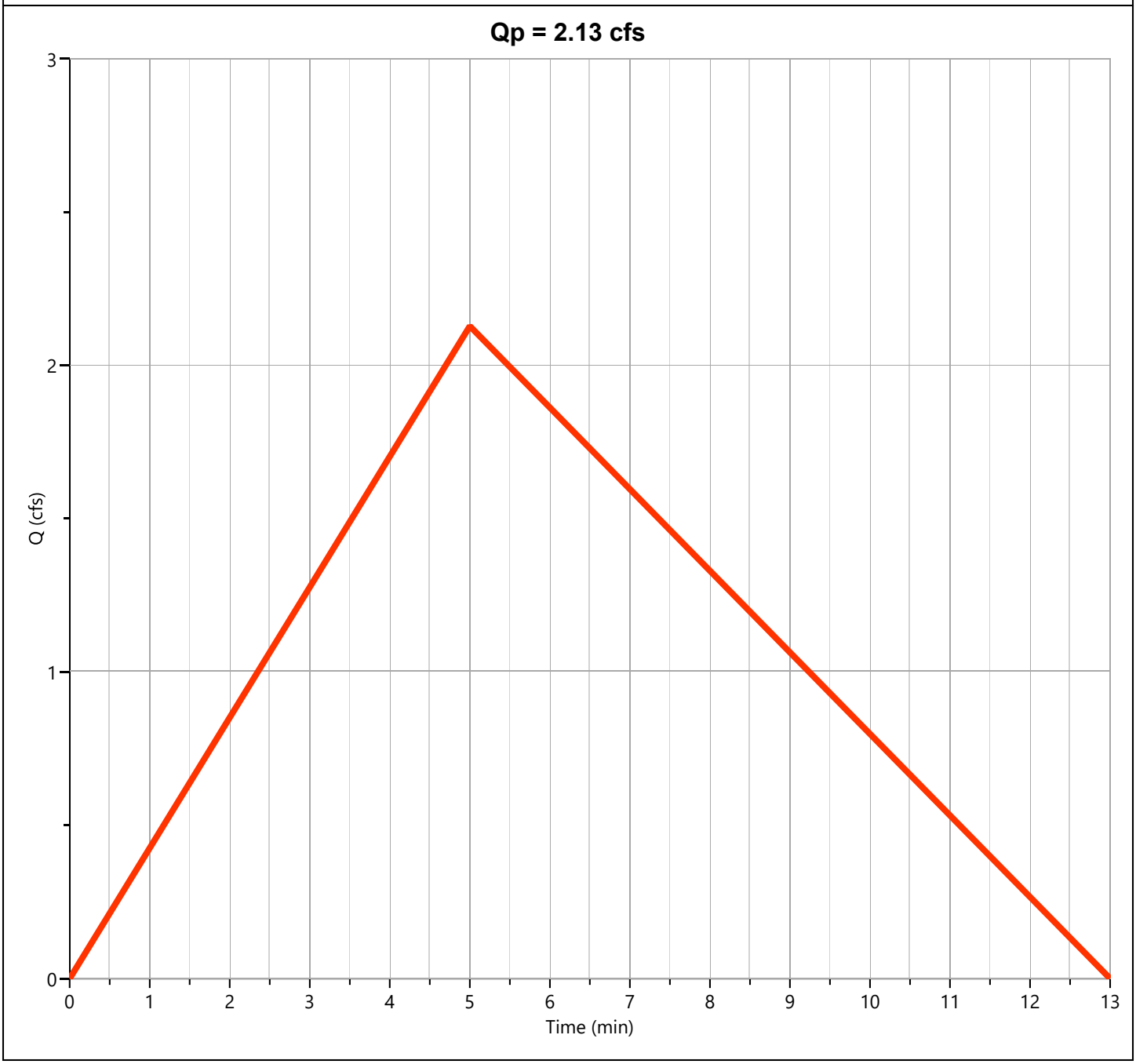
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "B"

Hyd. No. 7

Hydrograph Type	= Rational	Peak Flow	= 2.128 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Runoff Volume	= 852 cuft
Drainage Area	= 0.2 ac	Runoff Coeff.	= 0.95
Tc Method	= User	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



Hydrograph Report

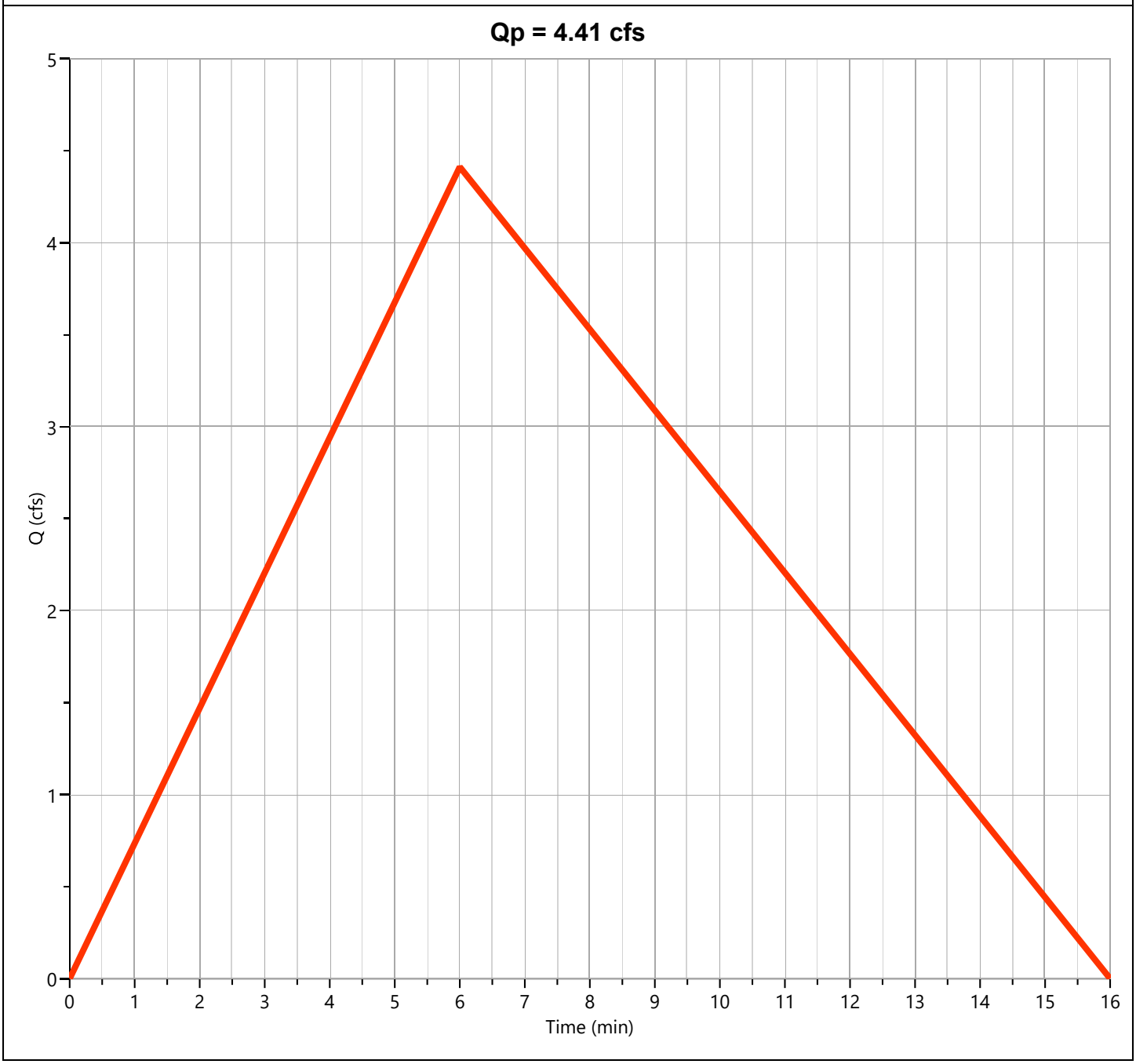
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "C"

Hyd. No. 8

Hydrograph Type	= Rational	Peak Flow	= 4.412 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Runoff Volume	= 2,120 cuft
Drainage Area	= 0.45 ac	Runoff Coeff.	= 0.95
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 10.32 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

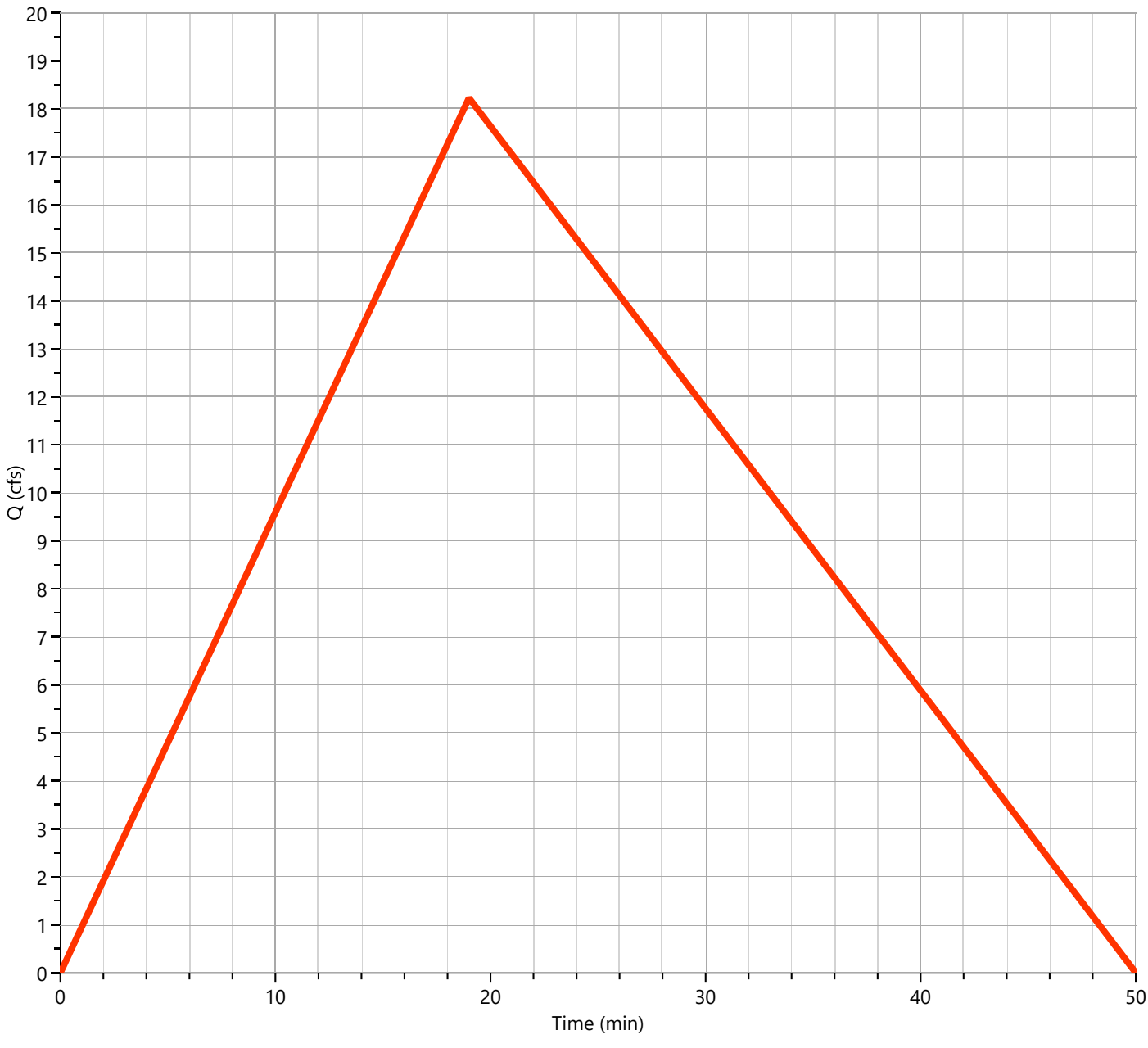
Hydrology Studio v 3.0.0.27

05-02-2025

Post-Dev Basin "D"

Hyd. No. 9

Hydrograph Type	= Rational	Peak Flow	= 18.23 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 27,744 cuft
Drainage Area	= 3.9 ac	Runoff Coeff.	= 0.76
Tc Method	= User	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.15 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

Project Name: Collective Church

Hydrology Studio v 3.0.0.27

05-02-2025

Total Post-Dev

Hyd. No. 10

Hydrograph Type	= Junction	Peak Flow	= 73.60 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.10 hrs
Time Interval	= 1 min	Hydrograph Volume	= 59,844 cuft
Inflow Hydrographs	= 6, 7, 8, 9	Total Contrib. Area	= 10.83 ac

