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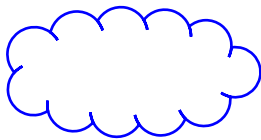
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Storm Sewer and Detention Report for Brate Farm

Project # 160651.004

West Chester Township
Butler County, OH

Prepared: August 9, 2019
Revised: September 25, 2019



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Reviewed by: Kevin Elliott & Josh Shaw, P.E.

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Project Summary

This detention report is for the Brate Farm development, which will be located directly west of 8341 Princeton Glendale Rd (also known as 747). The existing site is vacant and the proposed project will include a combination of 3 industrial buildings. The total size of the 3 proposed buildings are approximately 6414,570 total Square Feet. The Southwest corner of the site is within the existing flood zone; this project will involve some of fill material within the floodplain. Compensatory storage is provided as per Butler County's requirements.

Drainage Overview and Strategy

The proposed retention pond is designed to hold the critical year storm back to the 1 year pre-developed rate. Storms of less frequent occurrence than the critical storm are reduce flow rates by one storm event. The retention pond will also provide enough volume to maintain the existing floodplain storage.

The pre-developed and post-developed drainage maps can be found in the Appendix. Off-site drainage runs onto the site from the east. A proposed pond and storm sewers will route offsite runoff to the proposed retention pond. This report does not include any future development of this offsite area.

The critical storm for a specific development area is determined by calculating the total volume of runoff from a one-year frequency, 24 hour duration storm on the new development area before and after development. From the volumes calculated, the percentage increase in volume of the runoff due to the development is determined. Using this percentage, the 24-hour critical year storm is selected from the following table:

IF THE PERCENTAGE OF INCREASE IN VOLUME OF RUNOFF IS:		
Equal to or greater than	and less than	The critical storm for peak rate control will be
N/A	10	1 year
10	20	2 year
20	50	5 year
50	100	10 year
100	250	25 year
250	500	50 year
600	N/A	100 year

The volume and flows that were obtained for the pre-developed and post-developed 1-yr case is shown in the following tables:

PRE-DEVELOPMENT			POST-DEVELOPMENT EAST		
Storm Frequency (yr)	Hydrologic Volume (ac-ft)	Hydrologic Runoff Rate (cfs)	Storm Frequency (yr)	Hydrologic Volume (ac-ft)	Hydrologic Runoff Rate (cfs)
1-yr	3.36	16.39	1-yr	0.31	1.94

POST-DEVELOPMENT WEST			POST-DEVELOPMENT UNDETAINED		
Storm Frequency (yr)	Hydrologic Volume (ac-ft)	Hydrologic Runoff Rate (cfs)	Storm Frequency (yr)	Hydrologic Volume (ac-ft)	Hydrologic Runoff Rate (cfs)
1-yr	4.25	68.59	1-yr	0.06	0.913

$(4.62-3.36) / 3.36 = 0.375 = 38\%$ **Increase in Volume** therefore the Critical Year Storm is the 5-year frequency.

Water Quality

Water quality has been determined for this site per the requirements of the OEPA's permit OHC000005. For wet ponds, the water quality volume must be provided both above and below the normal water elevation. This site requires 2.22 ac-ft of water quality storage. With a NWE of 593, this retention pond has 8.885 ac-ft of storage below it, and 3.60 ac-ft of storage above it from elevation 593' to 594'. Water quality is being handled with a 10" orifice located on the modified ODOT 2-3 outlet structure. See the outlet structure detail and water quality calculations in the Appendix for more information.

Overland Detention and Structure

There are two basins designed for this site. The eastern basin is designed purely to route runoff on the east side along a flat slope to the storm network to the north. It connects to a 15" pipe at elevation 603'. It is not intended to provide detention or flood compensatory storage. Since flow from this basin enters the site's storm network, the area to the pond at the 15" pipe was modeled in the Stormwater Studio calculations. However, since that area goes into the basin and not directly to the 15" pipe, the HGL modeled through that pipe is vastly exaggerated. Instead, the Hydrology Studio model includes the area to the eastern basin and reports a more accurate flow to the 15" pipe. Both calculation reports can be found in the Appendix.

The second western basin has been designed to provide all detention and flood compensatory storage for the site. To ensure an allowable release rate, a control structure was designed to regulate the post developed outflow. The controlling outlet structure consists of the following: a 10" orifice at elevation 593' used for water quality, (3) 0.5'x2' windows at elevation 594, and a 12" outlet pipe. In addition, a flood spillway has been designed on the southwestern side of the basin at elevation 600', which will allow flood waters above that elevation to flow in and out of the site freely.

The proposed structure and detention facility details can be found in the Appendix.

Conclusion

The detention volume was checked by using the Hydrology Studio calculations included in the Appendix. A list of the regulated release rates and storage elevations of the detention structure are shown below.

Storm Frequency (yr)	Pre-Developed On-Site Release Rate (cfs)	Allowable On-Site Release Rate (cfs)
1	16.39	16.39
2	23.70	16.39
5	34.21	16.39
10	42.78	34.21
25	54.50	42.78
50	63.88	54.50
100	73.37	63.88

Storm Frequency (yr)	PostDev West Pond Release Rate (cfs)	Pond 2 Elevation (ft)	PostDev Undetained Release Rate (cfs)	Total PostDev Release Rate (cfs)
1	1.266	593.90	0.913	1.296
2	1.791	594.16	1.670	2.214
5	2.255	594.57	2.854	3.754
10	2.560	594.91	3.868	5.032
25	2.947	595.37	5.307	6.853
50	3.211	595.74	6.493	8.327
100	3.459	596.12	7.720	9.767

Based on the calculated findings, the total post-development release rate is below the allowable release rate. The post developed rates are much lower than the pre-developed conditions, this is due to the large detention size that accommodates for floodplain storage and low storm pipes. The large detention surface area means there is minimal head on the outlet structure which leads to a very low release rate.

As part of this report, the floodplain volume must be maintained from the pre-developed to post-developed conditions.

Total Volume of Pond @ 601.00: 33.074 Ac-ft (1,440,701 cf)

Volume of Ponds during 100-year storm event @ 596.12: 20.622 Ac-ft (898,292 cf)

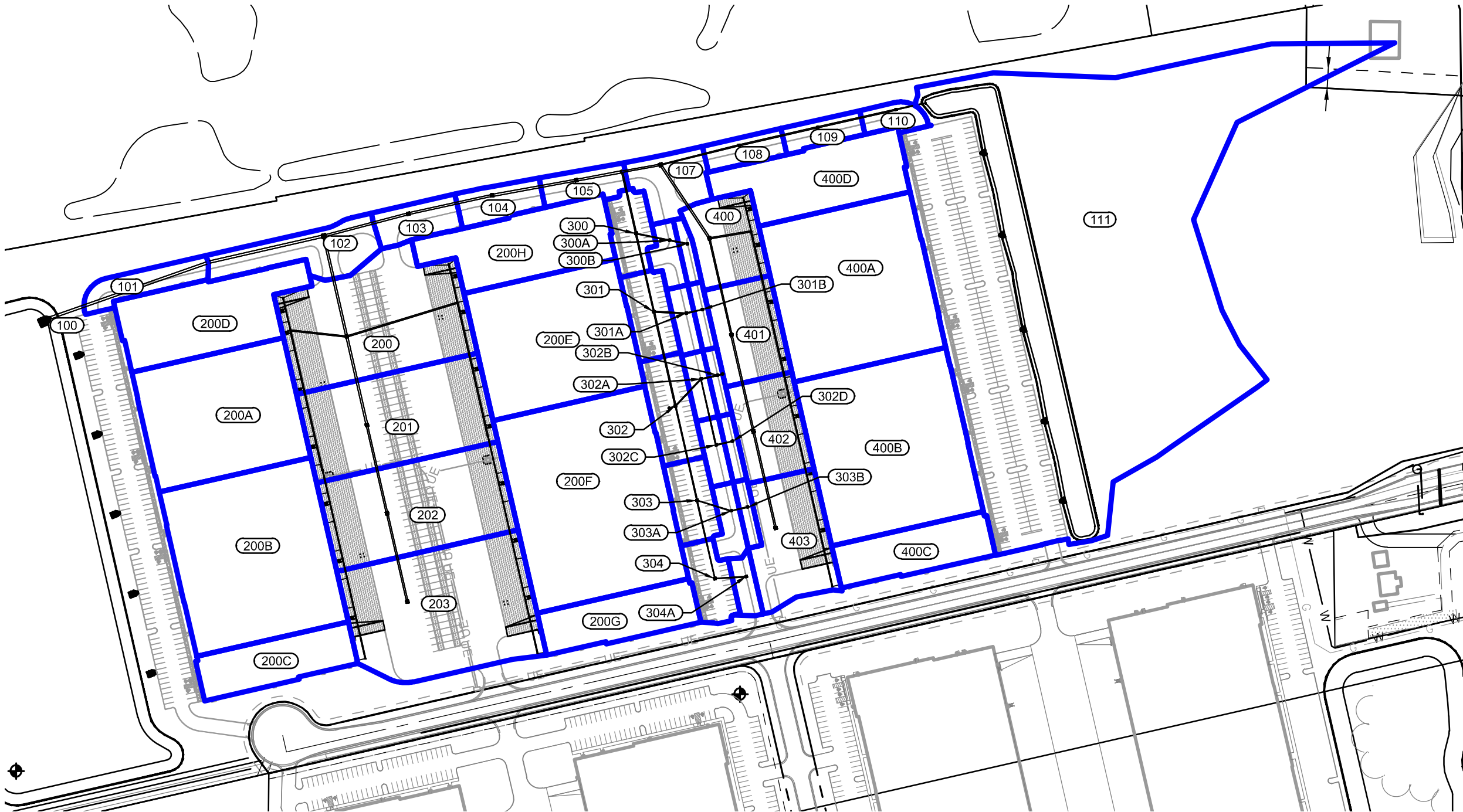
Volume of Ponds remaining for floodplain storage: $33.074 - 20.622 = 12.452$ Ac-ft

Existing Volume for floodplain = 3.925 Ac-ft

12.452 Ac-ft > 3.925 Ac-ft

The post-developed volume is sufficient to handle the detention and floodplain volumes.

APPENDIX



101 A=0.228 AC Tc=10 MIN C=0.90	105 A=0.182 AC Tc=10 MIN C=0.90	110 A=0.114 AC Tc=10 MIN C=0.90	200B A=1.897 AC Tc=10 MIN C=0.90	200F A=2.227 AC Tc=10 MIN C=0.90	202 A=1.221 AC Tc=10 MIN C=0.90	300B A=0.064 AC Tc=10 MIN C=0.90	302 A=0.330 AC Tc=10 MIN C=0.90	302D A=0.069 AC Tc=10 MIN C=0.90	304 A=0.230 AC Tc=10 MIN C=0.90	400B A=1.897 AC Tc=10 MIN C=0.90	402 A=0.487 AC Tc=10 MIN C=0.90
102 A=0.444 AC Tc=10 MIN C=0.90	107 A=0.317 AC Tc=10 MIN C=0.90	111 A=9.342 AC Tc=28 MIN C=0.44	200C A=0.506 AC Tc=10 MIN C=0.90	200G A=0.506 AC Tc=10 MIN C=0.90	203 A=1.642 AC Tc=10 MIN C=0.90	301 A=0.265 AC Tc=10 MIN C=0.90	302A A=0.107 AC Tc=10 MIN C=0.90	303 A=0.250 AC Tc=10 MIN C=0.90	304A A=0.097 AC Tc=10 MIN C=0.90	400C A=0.506 AC Tc=10 MIN C=0.90	403 A=0.674 AC Tc=10 MIN C=0.90
103 A=0.218 AC Tc=10 MIN C=0.90	108 A=0.155 AC Tc=10 MIN C=0.90	200 A=1.452 AC Tc=10 MIN C=0.90	200D A=0.899 AC Tc=10 MIN C=0.90	200H A=0.816 AC Tc=10 MIN C=0.90	300 A=0.228 AC Tc=10 MIN C=0.90	301A A=0.107 AC Tc=10 MIN C=0.90	302B A=0.069 AC Tc=10 MIN C=0.90	303A A=0.135 AC Tc=10 MIN C=0.90	400 A=0.432 AC Tc=10 MIN C=0.90	400D A=0.816 AC Tc=10 MIN C=0.90	
104 A=0.205 AC Tc=10 MIN C=0.90	109 A=0.146 AC Tc=10 MIN C=0.90	200A A=1.388 AC Tc=20 MIN C=0.90	200E A=1.471 AC Tc=20 MIN C=0.90	201 A=1.221 AC Tc=10 MIN C=0.90	300A A=0.124 AC Tc=10 MIN C=0.90	301B A=0.069 AC Tc=10 MIN C=0.90	302C A=0.107 AC Tc=10 MIN C=0.90	303B A=0.069 AC Tc=10 MIN C=0.90	400A A=1.800 AC Tc=20 MIN C=0.90	401 A=0.487 AC Tc=10 MIN C=0.90	



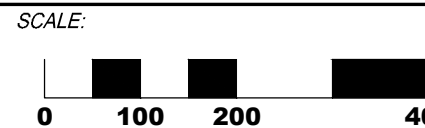
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**BRATE FARM
BUILDINGS 5, 6, & 7**
BRATE ROAD
WEST CHESTER TOWNSHIP
BUTLER COUNTY, OH

SEAL:

NO.	DATE	DESCRIPTION
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PROJECT NO: **160651.004**
DATE: **2019-08-08**



SHEET NAME:
LOCAL DRAINAGE MAP
SHEET NO.
1 OF 1

STM Sewer Report

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

Line No.	Line ID	Inlet ID	Drain Area	Total Area	Inlet Time	Pipe Travel	Tc System	i Inlet	i Syst	Runoff Coeff	Incr CxA	Total C x A	Flow Rate	n-value Pipe	Line Size	Line Length	Line Slope	Invert Up	Invert Dn	Vel Ave	Capac. Full	Sf Ave	HGL Up	Grnd/Rim Elev Up	Cover Up	Cover Dn	Grnd/Rim Elev Dn	HGL Dn	
			(ac)	(ac)	(min)	(min)	(min)	(in/hr)	(in/hr)	(C)			(cfs)		(in)	(ft)	(ft/ft)	(ft)	(ft)	(ft/s)	(cfs)	(ft/ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	101-100	101	0.228	36.015	10.0	0.84	32.7	5.47	2.92	0.90	0.20	28.12	82.06	0.013	48	297.17	0.0051	593.00	591.48	7.02	102.70	0.003	596.24	603.24	6.25	0.51	595.98	595.48	
2	102-101	102	0.444	35.787	10.0	0.58	32.2	5.47	2.95	0.90	0.40	27.91	82.38	0.013	48	210.42	0.0035	593.73	593.00	7.65	84.82	0.003	596.91	601.14	3.41	6.25	603.24	596.20	
3	103-102	103	0.218	20.098	10.0	0.65	31.5	5.47	2.99	0.90	0.20	13.79	41.22	0.013	42	155.40	0.0035	594.78	594.24	4.59	59.52	0.002	597.71	601.67	3.39	3.40	601.14	597.53	
4	104-103	104	0.205	19.879	10.0	0.63	30.9	5.47	3.03	0.90	0.18	13.59	41.15	0.013	42	152.00	0.0035	595.31	594.78	5.10	59.54	0.002	597.89	602.20	3.38	3.39	601.67	597.71	
5	105-104	105	0.182	19.675	10.0	0.63	30.2	5.47	3.07	0.90	0.16	13.41	41.10	0.013	42	152.00	0.0035	595.84	595.31	5.80	59.17	0.002	598.13	602.72	3.38	3.38	602.20	597.88	
6	106-105	106	0.000	19.493	0.0	0.34	29.9	0.00	3.09	0.00	0.00	13.25	40.89	0.013	42	82.42	0.0035	596.12	595.84	6.33	59.18	0.003	598.31	603.97	4.34	3.38	602.72	598.12	
7	107-106	107	0.317	17.173	10.0	0.25	29.6	5.47	3.10	0.90	0.29	11.16	34.62	0.013	36	69.58	0.0035	596.80	596.55	6.32	39.60	0.004	598.97	603.24	3.44	4.41	603.97	598.73	
8	108-107	108	0.155	9.757	10.0	0.55	29.1	5.47	3.14	0.90	0.14	4.48	14.07	0.013	24	144.03	0.0075	599.32	598.24	6.35	19.62	0.006	600.65	604.32	2.99	3.00	603.24	599.57	
9	109-108	109	0.146	9.602	10.0	0.55	28.5	5.47	3.17	0.90	0.13	4.34	13.79	0.013	24	143.00	0.0075	600.39	599.32	6.03	19.52	0.006	601.70	605.39	3.00	2.99	604.32	600.75	
10	110-109	110	0.114	9.457	10.0	0.56	28.0	5.47	3.21	0.90	0.10	4.21	13.54	0.013	24	143.00	0.0075	601.46	600.39	6.02	19.59	0.006	602.77	606.46	3.00	3.00	605.39	601.78	
11	111-110	111	9.342	9.342	27.9	0.08	27.9	3.22	3.22	0.44	4.11	4.11	13.23	0.013	15	53.19	0.0148	603.00	602.21	10.78	7.86	0.042	605.70	604.75	0.50	3.00	606.46	603.46	
12	300-106	300	0.228	2.320	10.0	0.64	16.5	5.47	4.32	0.90	0.21	2.09	9.02	0.013	24	112.48	0.005	597.19	596.62	2.95	16.07	0.001	598.98	607.09	7.90	5.34	603.97	598.83	
13	301-300	301	0.265	1.904	10.0	0.94	15.6	5.47	4.45	0.90	0.24	1.71	7.62	0.013	24	142.50	0.005	597.91	597.19	3.13	16.05	0.002	599.14	607.07	7.16	7.90	607.09	599.03	
14	302-301	302	0.330	1.462	10.0	0.79	14.8	5.47	4.57	0.90	0.30	1.32	6.01	0.013	18	172.00	0.005	599.27	598.41	4.67	7.41	0.005	600.29	606.80	6.03	7.16	607.07	599.44	
15	303-302	303	0.250	0.780	10.0	1.41	13.4	5.47	4.80	0.90	0.22	0.70	3.37	0.013	18	172.00	0.005	600.12	599.27	3.00	7.41	0.003	600.86	607.07	5.44	6.03	606.80	600.56	
16	304-303	304	0.230	0.327	10.0	1.85	11.5	5.47	5.14	0.90	0.21	0.29	1.51	0.013	15	142.50	0.0035	600.87	600.37	2.79	3.82	0.003	601.39	607.09	4.97	5.44	607.07	600.99	
17	304A-304	304A	0.097	0.097	10.0	1.52	10.0	5.47	5.47	0.90	0.09	0.09	0.48	0.013	12	55.24	0.0035	601.32	601.12	2.07	2.12	0.003	601.63	605.32	3.00	4.97	607.09	601.48	
18	303A-303	303A	0.135	0.204	10.0	0.83	11.2	5.47	5.21	0.90	0.12	0.18	0.96	0.013	12	62.94	0.0045	600.91	600.62	2.88	2.40	0.005	601.35	605.03	3.12	5.44	607.07	601.06	
19	303B-303A	303B	0.069	0.069	10.0	1.20	10.0	5.47	5.47	0.90	0.06	0.06	0.34	0.013	12	31.00	0.0045	601.05	600.91	0.91	2.40	0.000	601.47	605.01	2.96	3.12	605.03	601.47	
20	302A-302	302A	0.107	0.353	10.0	0.52	13.0	5.47	4.86	0.90	0.10	0.32	1.54	0.013	12	65.60	0.0045	600.06	599.77	2.69	2.38	0.003	600.68	604.45	3.40	6.03	606.80	600.54	
21	302C-302A	302C	0.107	0.176	10.0	1.83	11.2	5.47	5.21	0.90	0.10	0.16	0.83	0.013	12	120.00	0.0045	600.60	600.06	2.04	2.39	0.003	601.01	604.74	3.14	3.40	604.45	600.79	
22	302D-302C	302D	0.069	0.069	10.0	1.20	10.0	5.47	5.47	0.90	0.06	0.06	0.34	0.013	12	31.00	0.0044	600.74	600.60	1.02	2.35	0.001	601.12	604.72	2.99	3.14	604.74	601.11	
23	301A-301	301A	0.107	0.176	10.0	1.94	11.2	5.47	5.21	0.90	0.10	0.16	0.83	0.013	18	56.66	0.0045	599.66	599.41	2.65	7.04	0.004	600.01	604.17	3.00	6.16	607.07	599.76	
24	301B-301A	301B	0.069	0.069	10.0	1.20	10.0	5.47	5.47	0.90	0.06	0.06	0.34	0.013	12	31.00	0.0046	600.31	600.16	2.16	2.41	0.005	600.56	604.15	2.84	3.00	604.17	600.42	
25	302B-302A	302B	0.069	0.069	10.0	1.20	10.0	5.47	5.47	0.90	0.06	0.06	0.34	0.013	12	31.00	0.0044	600.20	600.06	0.60	2.37	0.000	600.82	604.43	3.24	3.40	604.45	600.81	
26	400-107	400	0.432	7.099	10.0	0.75	20.2	5.47	3.87	0.90	0.39	6.39	24.76	0.013	36	156.87	0.0036	597.36	596.80	4.21	39.91	0.002	599.51	603.32	2.96	3.44	603.24	599.36	
27	400A-400	400A	1.800	5.019	20.0	0.22	20.0	3.90	3.90	0.90	1.62	4.52	17.61	0.013	24	75.13	0.0075	597.93	597.36	5.80	19.63	0.006	599.69	605.03	5.10	3.96	603.32	599.35	
28	400B-400A	400B	1.897	2.403	10.0	1.50	14.1	5.47	4.68	0.90	1.71	2.16	10.12	0.013	24	303.67	0.0045	599.30	597.93	3.76	15.17	0.002	600.70	605.03	3.73	5.10	605.03	600.09	
29	400C-400B	400C	0.506	0.506	10.0	4.07	10.0	5.47	5.47	0.90	0.46	0.46	2.49	0.013	18	343.67	0.0045	601.35	599.80	2.74	7.04	0.003	601.95	607.55	4.71	3.73	605.03	600.94	
30	300A-300	300A	0.124	0.188	10.0	0.86	11.4	5.47	5.16	0.90	0.11	0.17	0.87	0.013	12	59.96	0.0045	599.46	599.19	2.80	2.38	0.004	599.88	603.93	3.47	6.90	607.09	599.61	
31	300B-300A	300B	0.064	0.064	10.0	1.40	10.0	5.47	5.47	0.90	0.06	0.06	0.32	0.013	12	33.81	0.0054	599.64	599.46	1.01	2.63	0.001	600.00	603.86	3.22	3.47	603.93	599.99	
32	200-102	200	1.452	15.245	10.0	0.57	20.6	5.47	3.83	0.90	1.31	13.72	52.61	0.013	42	183.08	0.0035	594.38	593.73	5.47	59.91	0.003	597.85	600.69	2.82	3.91	601.14	597.37	
33	200E-200	200E	1.471	5.019	20.0	0.61	20.0	3.90	3.90	0.90	1.32	4.52	17.61	0.013	24	205.55	0.0075	597.43	595.88	6.35	19.65	0.006	598.92	604.58	5.15	2.82	600.69	597.81	
34	200F-200E	200F	2.227	2.732	10.0	1.08	14.7	5.47	4.58	0.90	2.00	2.46	11.27	0.013	24	244.39	0.005	598.65	597.43	4.18	15.99	0.003	600.06	604.58	3.92	5.15	604.58	599.49	
Notes: IDF File = 160651.004.idf, Return Period = 10-yrs.																													
Project File: 004.STM.sw																													

STM Sewer Report

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

Line No.	Line ID	Inlet ID	Drain Area	Total Area	Inlet Time	Pipe Travel	Tc System	i Inlet	i Syst	Runoff Coeff	Incr CxA	Total C x A	Flow Rate	n-value Pipe	Line Size	Line Length	Line Slope	Invert Up	Invert Dn	Vel Ave	Capac. Full	Sf Ave	HGL Up	Grnd/Rim Elev Up	Cover Up	Cover Dn	Grnd/Rim Elev Dn	HGL Dn	
			(ac)	(ac)	(min)	(min)	(min)	(in/hr)	(in/hr)	(C)			(cfs)		(in)	(ft)	(ft/ft)	(ft)	(ft)	(ft/s)	(cfs)	(ft/ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
35	200G-200F	200G	0.506	0.506	10.0	4.69	10.0	5.47	5.47	0.90	0.46	0.46	2.49	0.013	18	395.94	0.005	601.13	599.15	2.68	7.43	0.003	601.73	607.27	4.64	3.92	604.58	600.37	
36	401-400	401	0.487	1.648	10.0	1.99	17.0	5.47	4.25	0.90	0.44	1.48	6.31	0.013	30	176.00	0.0035	597.98	597.36	1.45	24.30	0.000	599.84	603.32	2.84	3.46	603.32	599.81	
37	402-401	402	0.487	1.161	10.0	2.68	14.3	5.47	4.64	0.90	0.44	1.04	4.84	0.013	30	176.00	0.0035	598.59	597.98	1.56	24.10	0.000	599.88	603.32	2.23	2.84	603.32	599.86	
38	403-402	403	0.674	0.674	10.0	4.34	10.0	5.47	5.47	0.90	0.61	0.61	3.32	0.013	30	176.00	0.0035	599.20	598.59	1.88	24.11	0.001	599.98	603.32	1.62	2.23	603.32	599.91	
39	400D-400A	400D	0.816	0.816	10.0	0.31	10.0	5.47	5.47	0.90	0.73	0.73	4.02	0.013	15	61.50	0.01	599.30	598.68	3.60	6.46	0.004	600.26	608.03	7.48	5.10	605.03	600.09	
40	200H-200E	200H	0.816	0.816	10.0	0.35	10.0	5.47	5.47	0.90	0.73	0.73	4.02	0.013	15	68.50	0.01	598.87	598.18	3.93	6.46	0.005	599.70	607.58	7.46	5.15	604.58	599.52	
41	200A-200	200A	1.388	4.690	20.0	0.32	20.0	3.90	3.90	0.90	1.25	4.22	16.46	0.013	24	100.38	0.0075	595.96	595.21	5.24	19.57	0.005	598.42	602.93	4.96	3.49	600.69	597.89	
42	200B-200A	200B	1.897	2.403	10.0	1.26	14.1	5.47	4.68	0.90	1.71	2.16	10.12	0.013	24	254.00	0.005	597.23	595.96	3.24	15.99	0.002	599.16	602.93	3.70	4.96	602.93	598.68	
43	200C-200B	200C	0.506	0.506	10.0	4.07	10.0	5.47	5.47	0.90	0.46	0.46	2.49	0.013	18	343.67	0.005	599.45	597.73	2.57	7.43	0.003	600.05	606.10	5.15	3.70	602.93	599.29	
44	200D-200A	200D	0.899	0.899	10.0	0.27	10.0	5.47	5.47	0.90	0.81	0.81	4.42	0.013	15	59.17	0.01	597.30	596.71	3.60	6.46	0.005	598.92	605.93	7.37	4.96	602.93	598.64	
45	201-200	201	1.221	4.084	10.0	1.43	13.8	5.47	4.73	0.90	1.10	3.68	17.38	0.013	42	161.17	0.0035	594.94	594.38	1.82	59.49	0.000	598.30	600.69	2.25	2.82	600.69	598.26	
46	202-201	202	1.221	2.863	10.0	1.42	12.3	5.47	4.98	0.90	1.10	2.58	12.83	0.013	36	161.17	0.0035	595.51	594.94	1.83	39.44	0.000	598.36	600.69	2.19	2.75	600.69	598.31	
47	203-202	203	1.642	1.642	10.0	2.35	10.0	5.47	5.47	0.90	1.48	1.48	8.08	0.013	36	161.17	0.0035	596.07	595.51	1.26	39.44	0.000	598.41	600.69	1.62	2.19	600.69	598.39	
Notes: IDF File = 160651.004.idf, Return Period = 10-yrs.																													
Project File: 004 STM.sws																													

STM Sewer Report

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

Line No.	Line ID	Inlet ID	Drain Area	Total Area	Inlet Time	Pipe Travel	Tc System	i Inlet	i Syst	Runoff Coeff	Incr CxA	Total C x A	Flow Rate	n-value Pipe	Line Size	Line Length	Line Slope	Invert Up	Invert Dn	Vel Ave	Capac. Full	Sf Ave	HGL Up	Grnd/Rim Elev Up	Cover Up	Cover Dn	Grnd/Rim Elev Dn	HGL Dn	
			(ac)	(ac)	(min)	(min)	(min)	(in/hr)	(in/hr)	(C)			(cfs)		(in)	(ft)	(ft/ft)	(ft)	(ft)	(ft/s)	(cfs)	(ft/ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	101-100	101	0.228	36.015	10.0	0.74	32.1	6.14	3.36	0.90	0.20	28.12	94.45	0.013	48	297.17	0.0051	593.00	591.48	7.73	102.70	0.004	596.58	603.24	6.25	0.51	595.98	595.48	
2	102-101	102	0.444	35.787	10.0	0.51	31.6	6.14	3.39	0.90	0.40	27.91	94.66	0.013	48	210.42	0.0035	593.73	593.00	7.53	84.82	0.004	597.91	601.14	3.41	6.25	603.24	597.00	
3	103-102	103	0.218	20.098	10.0	0.57	31.1	6.14	3.43	0.90	0.20	13.79	47.28	0.013	42	155.40	0.0035	594.78	594.24	4.91	59.52	0.002	598.76	601.67	3.39	3.40	601.14	598.42	
4	104-103	104	0.205	19.879	10.0	0.56	30.5	6.14	3.47	0.90	0.18	13.59	47.11	0.013	42	152.00	0.0035	595.31	594.78	4.90	59.54	0.002	599.10	602.20	3.38	3.39	601.67	598.76	
5	105-104	105	0.182	19.675	10.0	0.55	30.0	6.14	3.50	0.90	0.16	13.41	46.98	0.013	42	152.00	0.0035	595.84	595.31	4.88	59.17	0.002	599.43	602.72	3.38	3.38	602.20	599.10	
6	106-105	106	0.000	19.493	0.0	0.30	29.7	0.00	3.52	0.00	0.00	13.25	46.68	0.013	42	82.42	0.0035	596.12	595.84	4.85	59.18	0.002	599.61	603.97	4.34	3.38	602.72	599.44	
7	107-106	107	0.317	17.173	10.0	0.22	29.4	6.14	3.54	0.90	0.29	11.16	39.49	0.013	36	69.58	0.0035	596.80	596.55	5.63	39.60	0.003	599.70	603.24	3.44	4.41	603.97	599.49	
8	108-107	108	0.155	9.757	10.0	0.49	29.0	6.14	3.57	0.90	0.14	4.48	16.02	0.013	24	144.03	0.0075	599.32	598.24	6.44	19.62	0.006	600.74	604.32	2.99	3.00	603.24	599.79	
9	109-108	109	0.146	9.602	10.0	0.49	28.5	6.14	3.61	0.90	0.13	4.34	15.68	0.013	24	143.00	0.0075	600.39	599.32	6.35	19.52	0.006	601.79	605.39	3.00	2.99	604.32	600.87	
10	110-109	110	0.114	9.457	10.0	0.49	28.0	6.14	3.65	0.90	0.10	4.21	15.36	0.013	24	143.00	0.0075	601.46	600.39	6.31	19.59	0.006	602.85	606.46	3.00	3.00	605.39	601.91	
11	111-110	111	9.342	9.342	27.9	0.07	27.9	3.65	3.65	0.44	4.11	4.11	15.01	0.013	15	53.19	0.0148	603.00	602.21	12.23	7.86	0.054	606.34	604.75	0.50	3.00	606.46	603.46	
12	300-106	300	0.228	2.320	10.0	0.57	15.8	6.14	4.97	0.90	0.21	2.09	10.38	0.013	24	112.48	0.005	597.19	596.62	3.30	16.07	0.002	600.04	607.09	7.90	5.34	603.97	599.80	
13	301-300	301	0.265	1.904	10.0	0.84	15.0	6.14	5.11	0.90	0.24	1.71	8.75	0.013	24	142.50	0.005	597.91	597.19	2.78	16.05	0.001	600.30	607.07	7.16	7.90	607.09	600.09	
14	302-301	302	0.330	1.462	10.0	0.71	14.3	6.14	5.23	0.90	0.30	1.32	6.88	0.013	18	172.00	0.005	599.27	598.41	3.89	7.41	0.004	600.93	606.80	6.03	7.16	607.07	600.19	
15	303-302	303	0.250	0.780	10.0	1.26	13.0	6.14	5.46	0.90	0.22	0.70	3.84	0.013	18	172.00	0.005	600.12	599.27	2.37	7.41	0.001	601.30	607.07	5.44	6.03	606.80	601.09	
16	304-303	304	0.230	0.327	10.0	1.65	11.4	6.14	5.81	0.90	0.21	0.29	1.71	0.013	15	142.50	0.0035	600.87	600.37	2.14	3.82	0.002	601.52	607.09	4.97	5.44	607.07	601.36	
17	304A-304	304A	0.097	0.097	10.0	1.35	10.0	6.14	6.14	0.90	0.09	0.09	0.54	0.013	12	55.24	0.0035	601.32	601.12	1.81	2.12	0.002	601.67	605.32	3.00	4.97	607.09	601.59	
18	303A-303	303A	0.135	0.204	10.0	0.74	11.1	6.14	5.87	0.90	0.12	0.18	1.08	0.013	12	62.94	0.0045	600.91	600.62	2.17	2.40	0.002	601.43	605.03	3.12	5.44	607.07	601.35	
19	303B-303A	303B	0.069	0.069	10.0	1.07	10.0	6.14	6.14	0.90	0.06	0.06	0.38	0.013	12	31.00	0.0045	601.05	600.91	0.88	2.40	0.000	601.53	605.01	2.96	3.12	605.03	601.53	
20	302A-302	302A	0.107	0.353	10.0	0.46	12.7	6.14	5.52	0.90	0.10	0.32	1.75	0.013	12	65.60	0.0045	600.06	599.77	2.23	2.38	0.002	601.24	604.45	3.40	6.03	606.80	601.08	
21	302C-302A	302C	0.107	0.176	10.0	1.63	11.1	6.14	5.87	0.90	0.10	0.16	0.93	0.013	12	120.00	0.0045	600.60	600.06	1.31	2.39	0.001	601.38	604.74	3.14	3.40	604.45	601.30	
22	302D-302C	302D	0.069	0.069	10.0	1.07	10.0	6.14	6.14	0.90	0.06	0.06	0.38	0.013	12	31.00	0.0044	600.74	600.60	0.62	2.35	0.000	601.40	604.72	2.99	3.14	604.74	601.40	
23	301A-301	301A	0.107	0.176	10.0	1.73	11.1	6.14	5.87	0.90	0.10	0.16	0.93	0.013	18	56.66	0.0045	599.66	599.41	0.89	7.04	0.000	600.42	604.17	3.00	6.16	607.07	600.41	
24	301B-301A	301B	0.069	0.069	10.0	1.07	10.0	6.14	6.14	0.90	0.06	0.06	0.38	0.013	12	31.00	0.0046	600.31	600.16	2.24	2.41	0.005	600.57	604.15	2.84	3.00	604.17	600.43	
25	302B-302A	302B	0.069	0.069	10.0	1.07	10.0	6.14	6.14	0.90	0.06	0.06	0.38	0.013	12	31.00	0.0044	600.20	600.06	0.48	2.37	0.000	601.32	604.43	3.24	3.40	604.45	601.32	
26	400-107	400	0.432	7.099	10.0	0.67	20.2	6.14	4.38	0.90	0.39	6.39	27.95	0.013	36	156.87	0.0036	597.36	596.80	4.00	39.91	0.002	600.20	603.32	2.96	3.44	603.24	599.95	
27	400A-400	400A	1.800	5.019	20.0	0.20	20.0	4.40	4.40	0.90	1.62	4.52	19.87	0.013	24	75.13	0.0075	597.93	597.36	6.33	19.63	0.008	600.41	605.03	5.10	3.96	603.32	599.83	
28	400B-400A	400B	1.897	2.403	10.0	1.34	13.6	6.14	5.34	0.90	1.71	2.16	11.55	0.013	24	303.67	0.0045	599.30	597.93	3.68	15.17	0.003	601.61	605.03	3.73	5.10	605.03	600.82	
29	400C-400B	400C	0.506	0.506	10.0	3.62	10.0	6.14	6.14	0.90	0.46	0.46	2.79	0.013	18	343.67	0.0045	601.35	599.80	2.19	7.04	0.001	602.18	607.55	4.71	3.73	605.03	601.79	
30	300A-300	300A	0.124	0.188	10.0	0.76	11.2	6.14	5.83	0.90	0.11	0.17	0.99	0.013	12	59.96	0.0045	599.46	599.19	1.40	2.38	0.001	600.22	603.93	3.47	6.90	607.09	600.19	
31	300B-300A	300B	0.064	0.064	10.0	1.25	10.0	6.14	6.14	0.90	0.06	0.06	0.35	0.013	12	33.81	0.0054	599.64	599.46	0.62	2.63	0.000	600.26	603.86	3.22	3.47	603.93	600.25	
32	200-102	200	1.452	15.245	10.0	0.51	20.5	6.14	4.34	0.90	1.31	13.72	59.49	0.013	42	183.08	0.0035	594.38	593.73	6.18	59.91	0.003	598.84	600.69	2.82	3.91	601.14	598.20	
33	200E-200	200E	1.471	5.019	20.0	0.54	20.0	4.40	4.40	0.90	1.32	4.52	19.87	0.013	24	205.55	0.0075	597.43	595.88	6.33	19.65	0.008	600.40	604.58	5.15	2.82	600.69	598.81	
34	200F-200E	200F	2.227	2.732	10.0	0.96	14.2	6.14	5.24	0.90	2.00	2.46	12.89	0.013	24	244.39	0.005	598.65	597.43	4.10	15.99	0.003	601.55	604.58	3.92	5.15	604.58	600.76	
Notes: IDF File = 160651.004.idf, Return Period = 25-ysr.																													
Project File: 004.STM.sws																													

STM Sewer Report

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

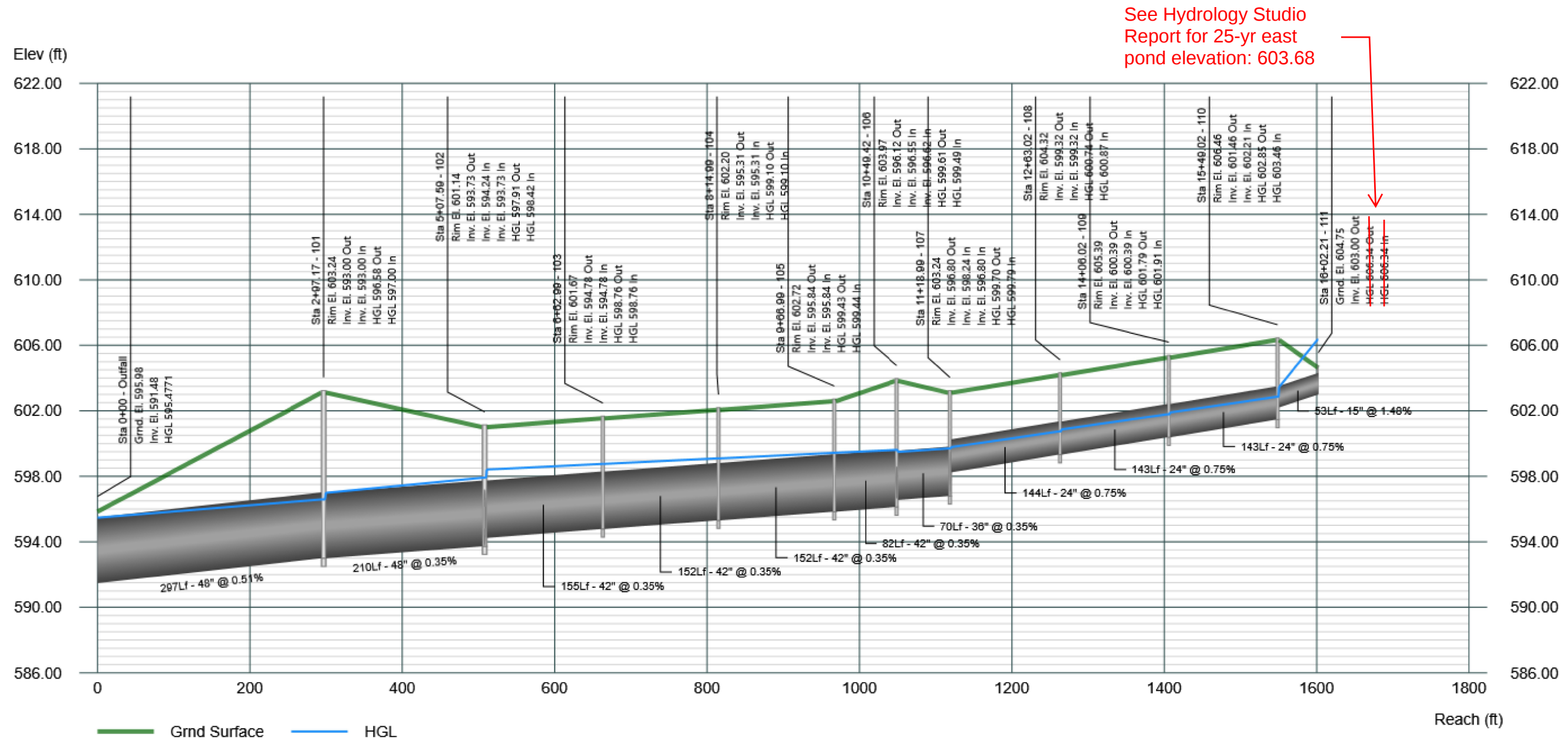
Line No.	Line ID	Inlet ID	Drain Area	Total Area	Inlet Time	Pipe Travel	Tc System	i Inlet	i Syst	Runoff Coeff	Incr CxA	Total C x A	Flow Rate	n-value Pipe	Line Size	Line Length	Line Slope	Invert Up	Invert Dn	Vel Ave	Capac. Full	Sf Ave	HGL Up	Grnd/Rim Elev Up	Cover Up	Cover Dn	Grnd/Rim Elev Dn	HGL Dn	
			(ac)	(ac)	(min)	(min)	(min)	(in/hr)	(in/hr)	(C)			(cfs)		(in)	(ft)	(ft/ft)	(ft)	(ft)	(ft/s)	(cfs)	(ft/ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
35	200G-200F	200G	0.506	0.506	10.0	4.18	10.0	6.14	6.14	0.90	0.46	0.46	2.79	0.013	18	395.94	0.005	601.13	599.15	1.93	7.43	0.001	602.11	607.27	4.64	3.92	604.58	601.78	
36	401-400	401	0.487	1.648	10.0	1.77	16.2	6.14	4.90	0.90	0.44	1.48	7.27	0.013	30	176.00	0.0035	597.98	597.36	1.48	24.30	0.000	600.47	603.32	2.84	3.46	603.32	600.42	
37	402-401	402	0.487	1.161	10.0	2.38	13.9	6.14	5.30	0.90	0.44	1.04	5.54	0.013	30	176.00	0.0035	598.59	597.98	1.25	24.10	0.000	600.51	603.32	2.23	2.84	603.32	600.49	
38	403-402	403	0.674	0.674	10.0	3.87	10.0	6.14	6.14	0.90	0.61	0.61	3.72	0.013	30	176.00	0.0035	599.20	598.59	1.15	24.11	0.000	600.54	603.32	1.62	2.23	603.32	600.53	
39	400D-400A	400D	0.816	0.816	10.0	0.28	10.0	6.14	6.14	0.90	0.73	0.73	4.51	0.013	15	61.50	0.01	599.30	598.68	3.67	6.46	0.005	601.12	608.03	7.48	5.10	605.03	600.82	
40	200H-200E	200H	0.816	0.816	10.0	0.31	10.0	6.14	6.14	0.90	0.73	0.73	4.51	0.013	15	68.50	0.01	598.87	598.18	3.67	6.46	0.005	601.14	607.58	7.46	5.15	604.58	600.81	
41	200A-200	200A	1.388	4.690	20.0	0.28	20.0	4.40	4.40	0.90	1.25	4.22	18.56	0.013	24	100.38	0.0075	595.96	595.21	5.91	19.57	0.007	599.57	602.93	4.96	3.49	600.69	598.89	
42	200B-200A	200B	1.897	2.403	10.0	1.12	13.6	6.14	5.34	0.90	1.71	2.16	11.55	0.013	24	254.00	0.005	597.23	595.96	3.68	15.99	0.003	600.56	602.93	3.70	4.96	602.93	599.90	
43	200C-200B	200C	0.506	0.506	10.0	3.62	10.0	6.14	6.14	0.90	0.46	0.46	2.79	0.013	18	343.67	0.005	599.45	597.73	1.58	7.43	0.001	600.95	606.10	5.15	3.70	602.93	600.73	
44	200D-200A	200D	0.899	0.899	10.0	0.24	10.0	6.14	6.14	0.90	0.81	0.81	4.96	0.013	15	59.17	0.01	597.30	596.71	4.04	6.46	0.006	600.21	605.93	7.37	4.96	602.93	599.86	
45	201-200	201	1.221	4.084	10.0	1.27	13.4	6.14	5.39	0.90	1.10	3.68	19.81	0.013	42	161.17	0.0035	594.94	594.38	2.06	59.49	0.000	599.43	600.69	2.25	2.82	600.69	599.37	
46	202-201	202	1.221	2.863	10.0	1.27	12.1	6.14	5.65	0.90	1.10	2.58	14.55	0.013	36	161.17	0.0035	595.51	594.94	2.06	39.44	0.000	599.51	600.69	2.19	2.75	600.69	599.43	
47	203-202	203	1.642	1.642	10.0	2.09	10.0	6.14	6.14	0.90	1.48	1.48	9.07	0.013	36	161.17	0.0035	596.07	595.51	1.28	39.44	0.000	599.58	600.69	1.62	2.19	600.69	599.55	
Notes: IDF File = 160651.004.idf, Return Period = 25-yr.																													
Project File: 004 STM.sws																													

Profile View

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

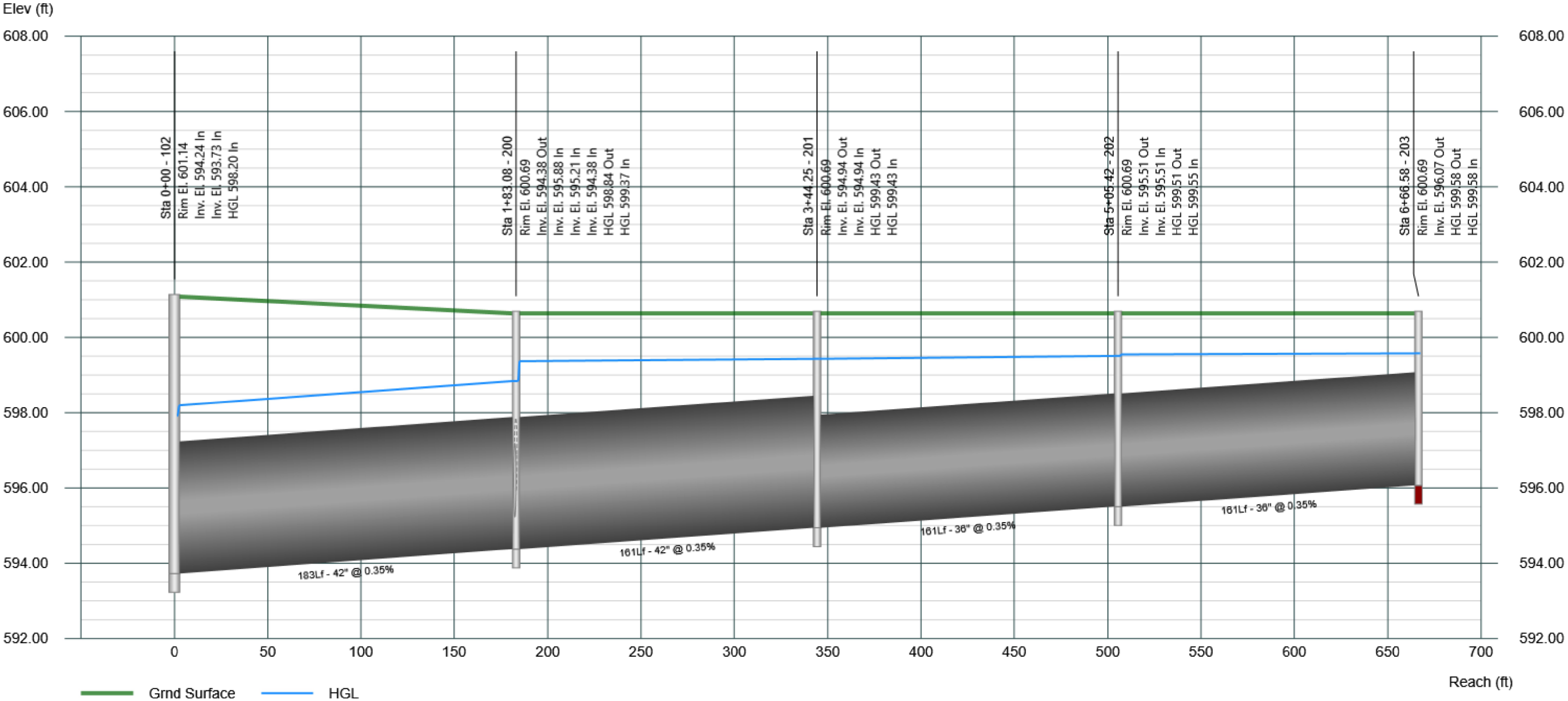


Profile View

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

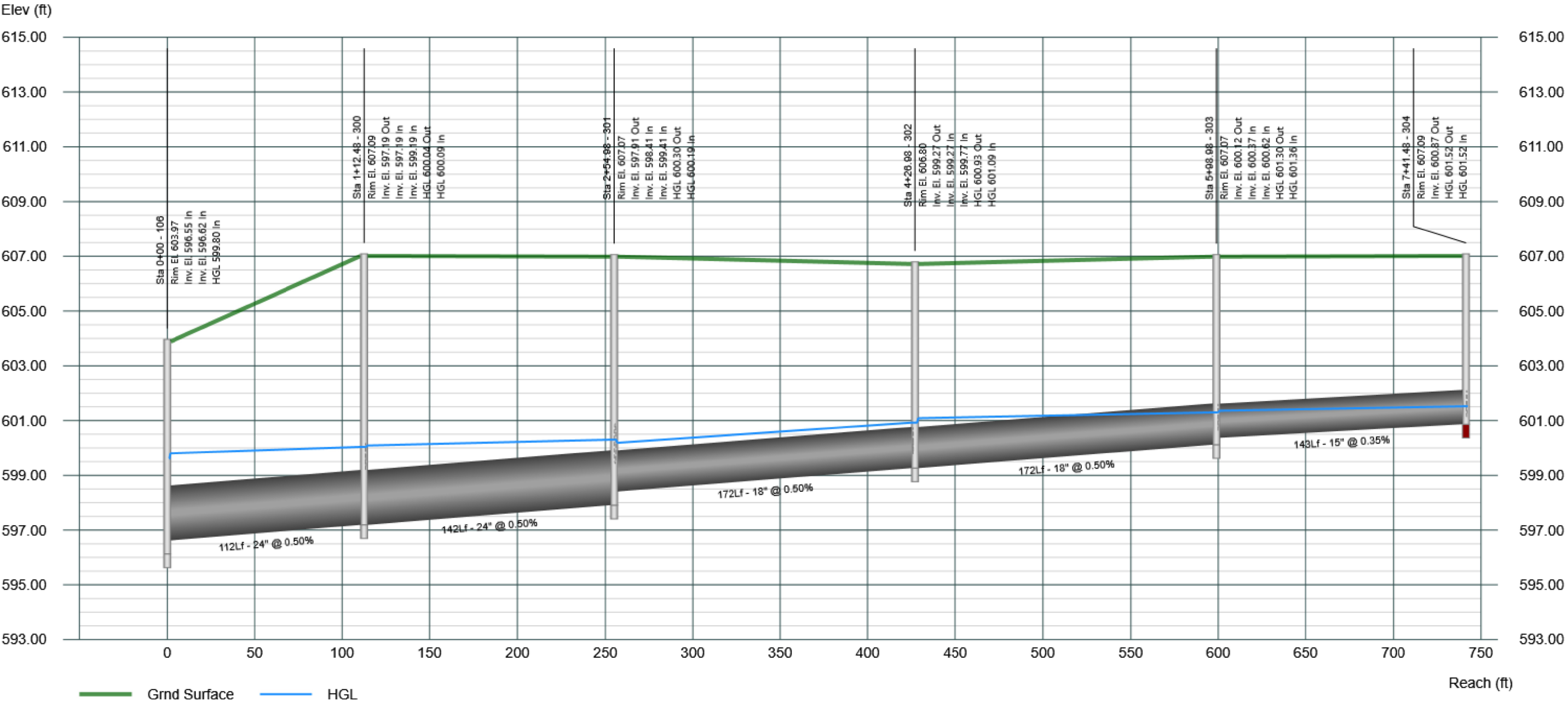


Profile View

Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019

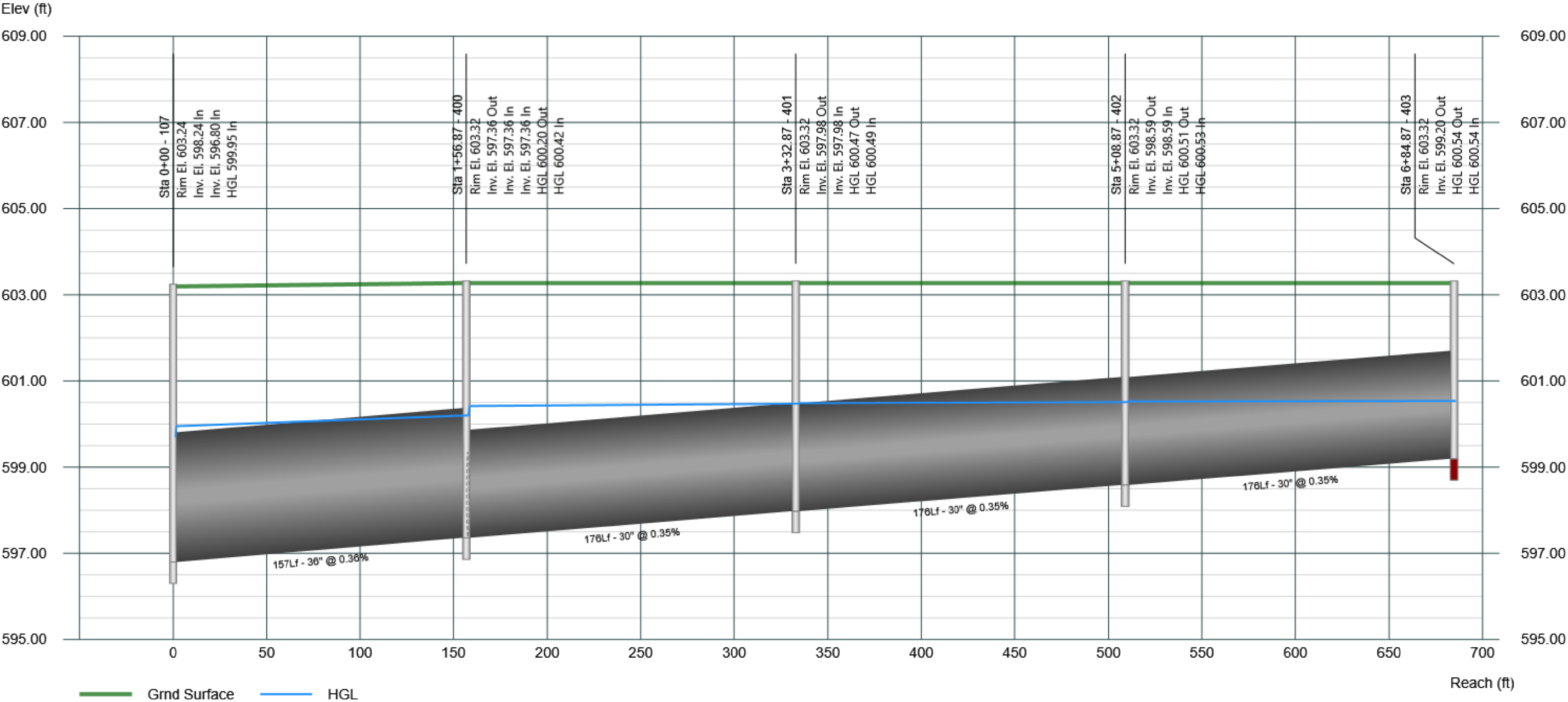


Profile View

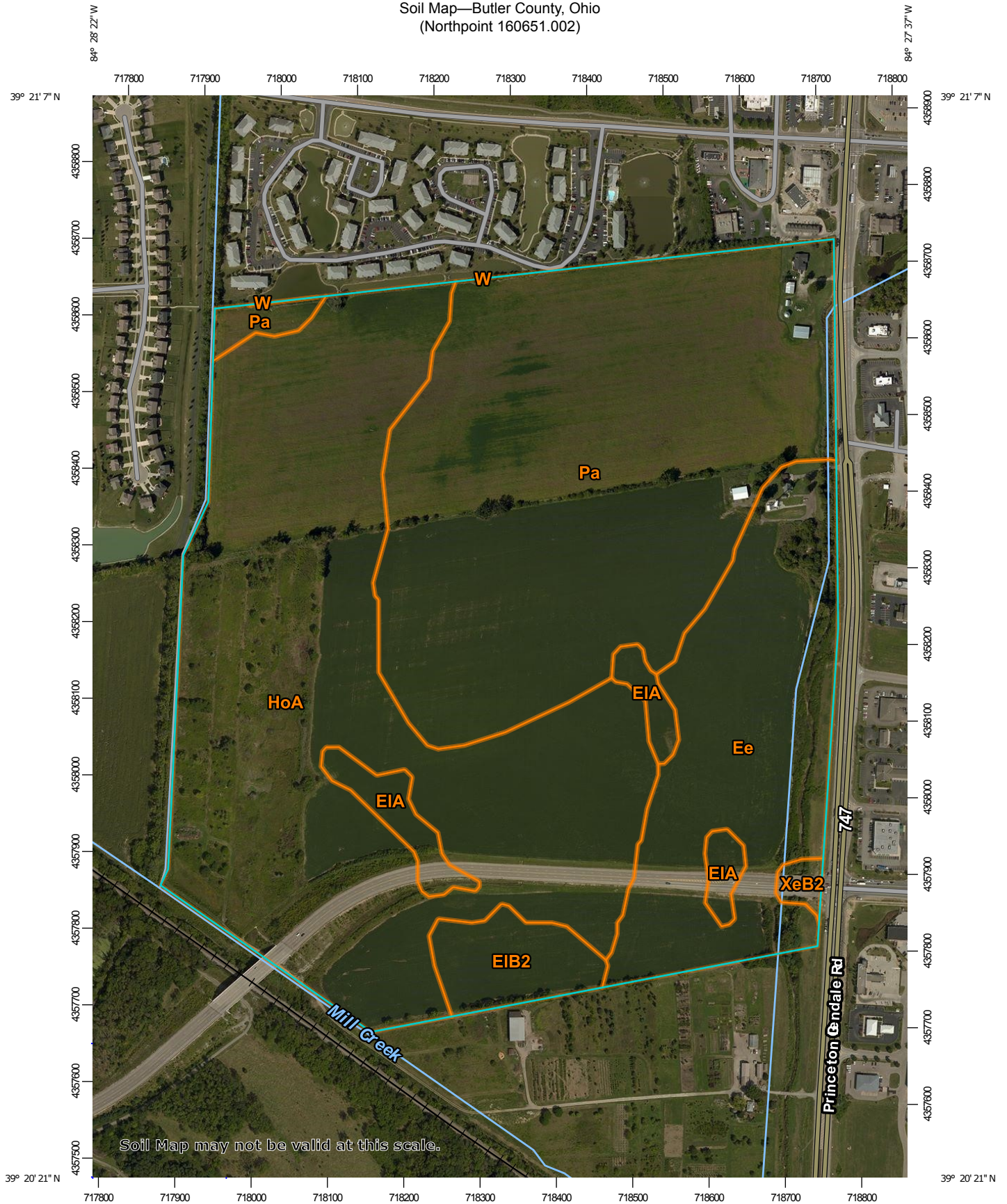
Stormwater Studio 2019 v 3.0.0.15

Project Name: 004 STM

09-25-2019



Soil Map—Butler County, Ohio
(Northpoint 160651.002)



Soil Map may not be valid at this scale.

Map Scale: 1:6,880 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/22/2018
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Butler County, Ohio

Survey Area Data: Version 16, Sep 26, 2017

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

Date(s) aerial images were photographed: Aug 26, 2014—Oct 26, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ee	Eel silt loam, 0 to 2 percent slopes, occasionally flooded	30.5	15.8%
EIA	Eldean loam, 0 to 2 percent slopes	5.4	2.8%
EIB2	Eldean loam, 2 to 6 percent slopes, eroded	5.6	2.9%
HoA	Henshaw silt loam, 0 to 2 percent slopes	79.1	41.0%
Pa	Patton silty clay loam, 0 to 2 percent slopes	71.3	37.0%
W	Water	0.0	0.0%
XeB2	Xenia silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes, eroded	0.8	0.4%
Totals for Area of Interest		192.8	100.0%



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West Chester, OH 45069
513.779.7851

**BRATE FARM
BUILDINGS 5, 6, & 7**
BRATE ROAD
WEST CHESTER TOWNSHIP
BUTLER COUNTY, OHIO

SEAL:

NO.	DATE	DESCRIPTION

PROJECT NO: 160651.004

DATE: 2019-08-08

SCALE:

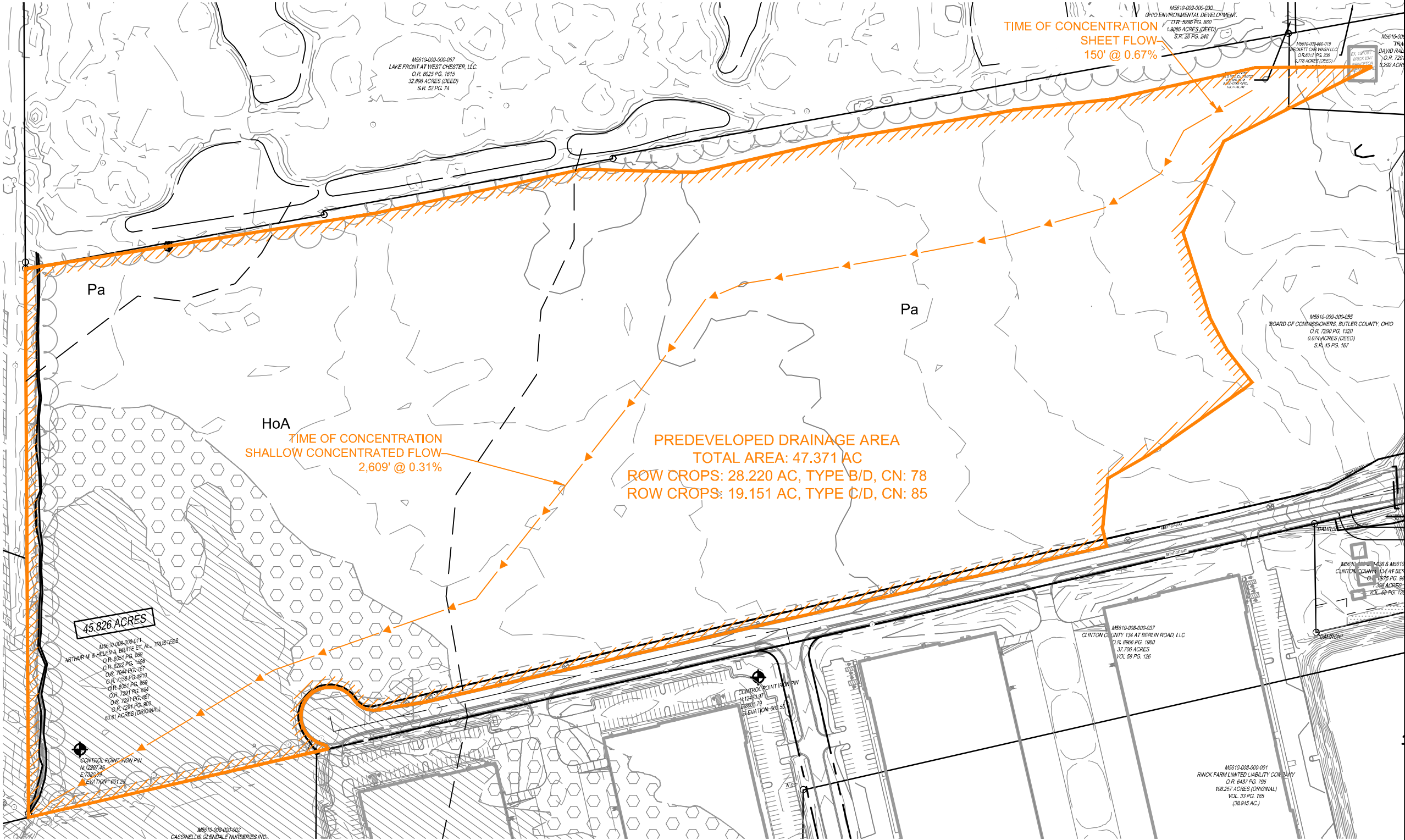


SHEET NAME:

EXISTING FLOODPLAIN

SHEET NO.

1 OF 3



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**BRATE FARM
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BRATE ROAD
WEST CHESTER TOWNSHIP
BUTLER COUNTY, OH

SEAL:

NO.	DATE	DESCRIPTION
-----	------	-------------

PROJECT NO:	160651.004
-------------	------------

DATE:	2019-08-08
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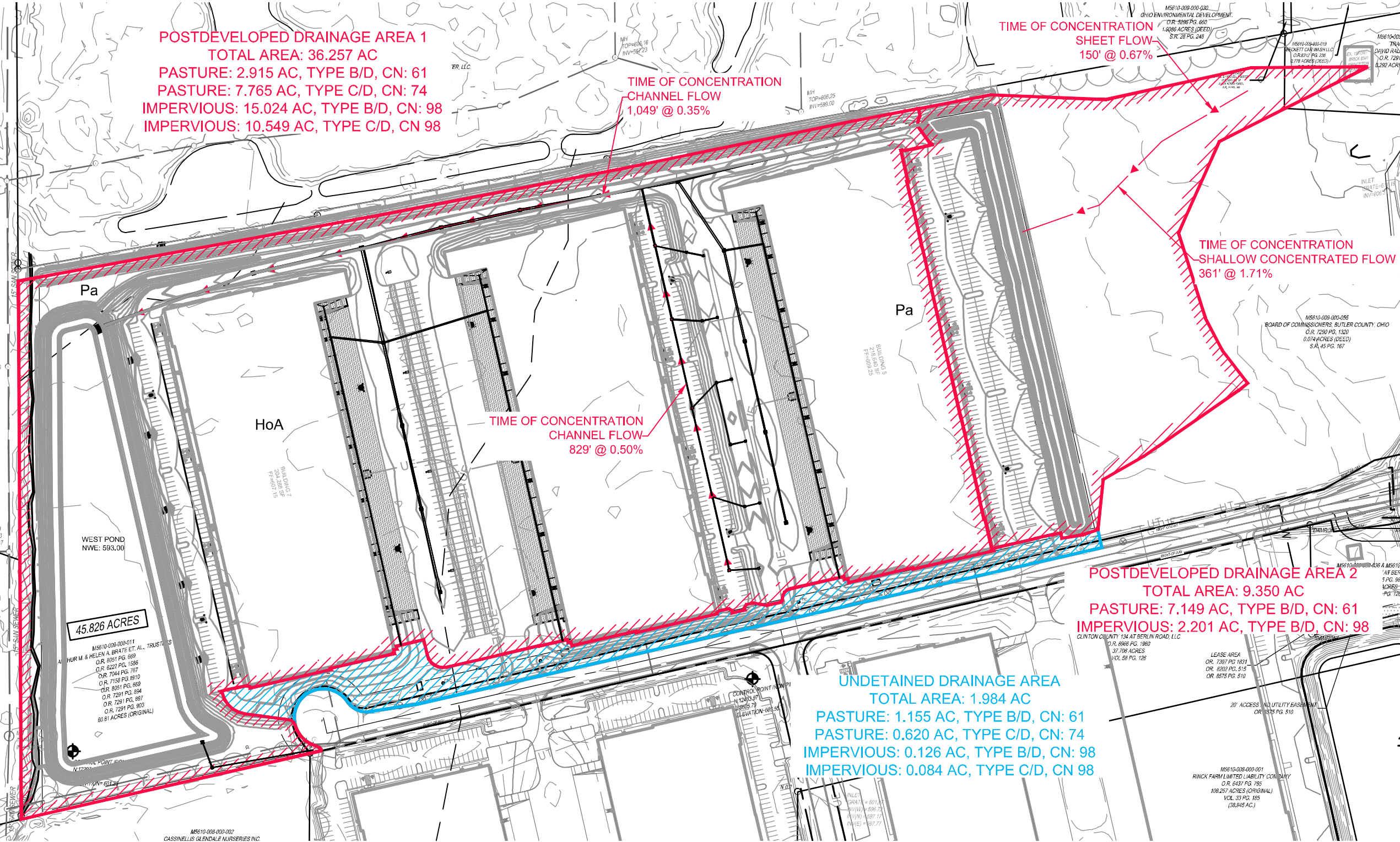
SCALE:



SHEET NAME:
**PREDEVELOPED DRAINAGE
MAP**

SHEET NO.
2 OF 3





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**BRATE FARM
BUILDINGS 5, 6, & 7**
BRATE ROAD
WEST CHESTER TOWNSHIP
BUTLER COUNTY, OH

SEAL:

NO.	DATE	DESCRIPTION
-----	------	-------------

PROJECT NO: 160651.004

DATE: 2019-08-08

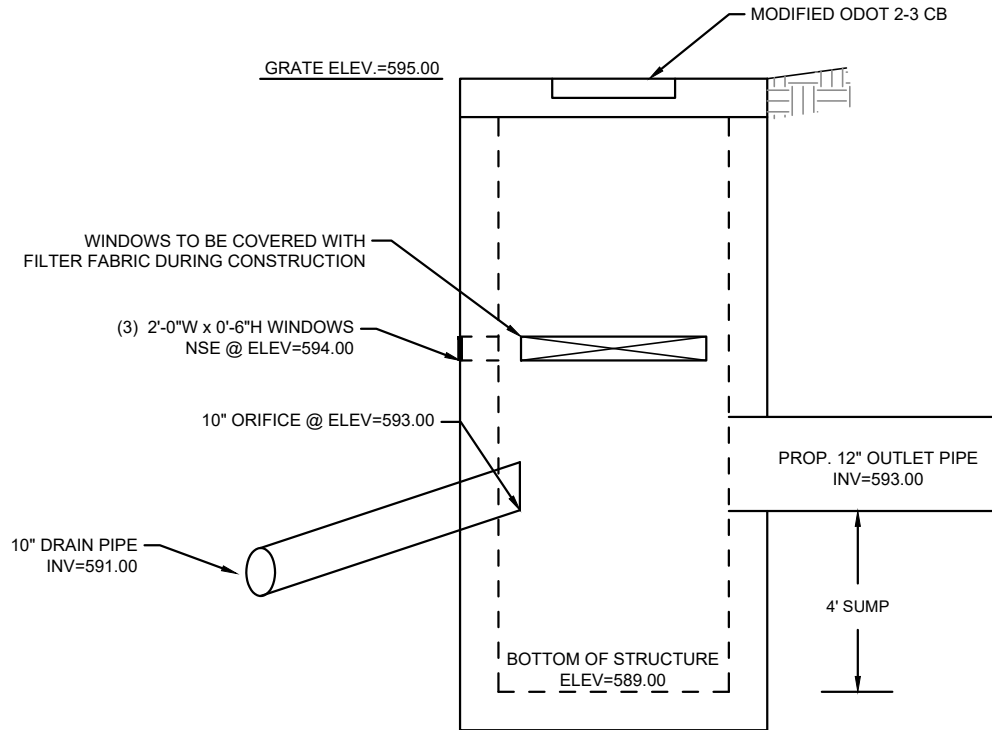
SCALE:



SHEET NAME:
**POSTDEVELOPED
DRAINAGE MAP**

SHEET NO.
3 OF 3





DETENTION OUTFALL STRUCTURE (001)

N.T.S.

 THE KLEINGERS GROUP CIVIL ENGINEERING SURVEYING LANDSCAPE ARCHITECTURE www.kleingers.com 6219 Centre Park Dr. West Chester, OH 45069 513.779.7851	BRATE INDUSTRIAL PARK (DETENTION OUTFALL STRUCTURE DETAIL) SECTION 11 TOWN 2 RANGE 2 WEST CHESTER TOWNSHIP BUTLER COUNTY, OHIO	PROJECT NO: 160651.004
		DATE: 2019-08-08
		SCALE: NOT TO SCALE
		SHEET NO. 1 OF 1

PROJECT	Brate Farm	DESIGN	JMH
JOB #	160651.004	CHECK	
DATE	8/12/2019		

WATER QUALITY VOLUME = INPUT FIELDS

Method 2

WQv = C * P * A / 12

C = 0.645577838
P = 0.9 IN
A = 45.826 ACRES *

WQv = 2.22 AC FT

RUNOFF COEFFICIENT
C = Rv = 0.05 + 0.9i
WHERE: i = IMPERVIOUS RATIO

IMPERVIOUS RATIO, i = IMPERVIOUS AREA / TOTAL AREA

IMPERVIOUS AREA =	30.3255
TOTAL AREA =	45.826
i =	0.661753

P = Precipitation Depth of 0.90- inches

***AREA TO INCLUDE OFFSITE DRAINAGE**

THEREFORE, WQv = 2.22 AC FT
OR, 96651.74 CF

BASIN STORAGE VOLUME

ELEV.	VOLUME
593	0.0000
594	3.6046

WQv ELEV
593.62

Bottom of Detention: 593

$$WQv \text{ ELEV} = (WQv * \Delta E / \Delta V) + \text{Bottom ELEV}$$

SIZE ORIFICE FOR DETENTION VOLUME DRAIN

**** DOUBLE CHECK UNITS ****

$$Q(\text{avg}) = WQv / T_d \quad Q(\text{max}) = 2 * Q(\text{avg})$$

Td = 48 HOURS FOR DRY
24 HOURS FOR WET

Q(avg) = 1.1187 CFS

WHERE:

Q(max) = 2.2373 CFS

WQv = WATER DETENTION VOLUME
Q_{avg} = AVERAGE FLOW RATE THROUGH THE ORIFICE
Q_{max} = MAXIMUM FLOW RATE THROUGH THE ORIFICE
T_d = WQv DRAIN TIME (24 TO 48 HOURS)

C = 0.6 ORIFICE COEFF.

g = 32.2 ft/sec²

H_{max} = MAXIMUM HYDRAULIC HEAD

(WQv ELEV - Bottom ELEV)

A = ORIFICE AREA (ft²)

(Q = CA(2gh)^{0.5})

D = ORIFICE DIAMETER (ft)

(A = R² * π)

$$A = Q(\text{max}) / C * (2 * g * H(\text{max}))^{0.5}$$

H(max) = 0.62 FT

A = 0.5922 SQ FT AREA OF REQUIRED ORIFICE

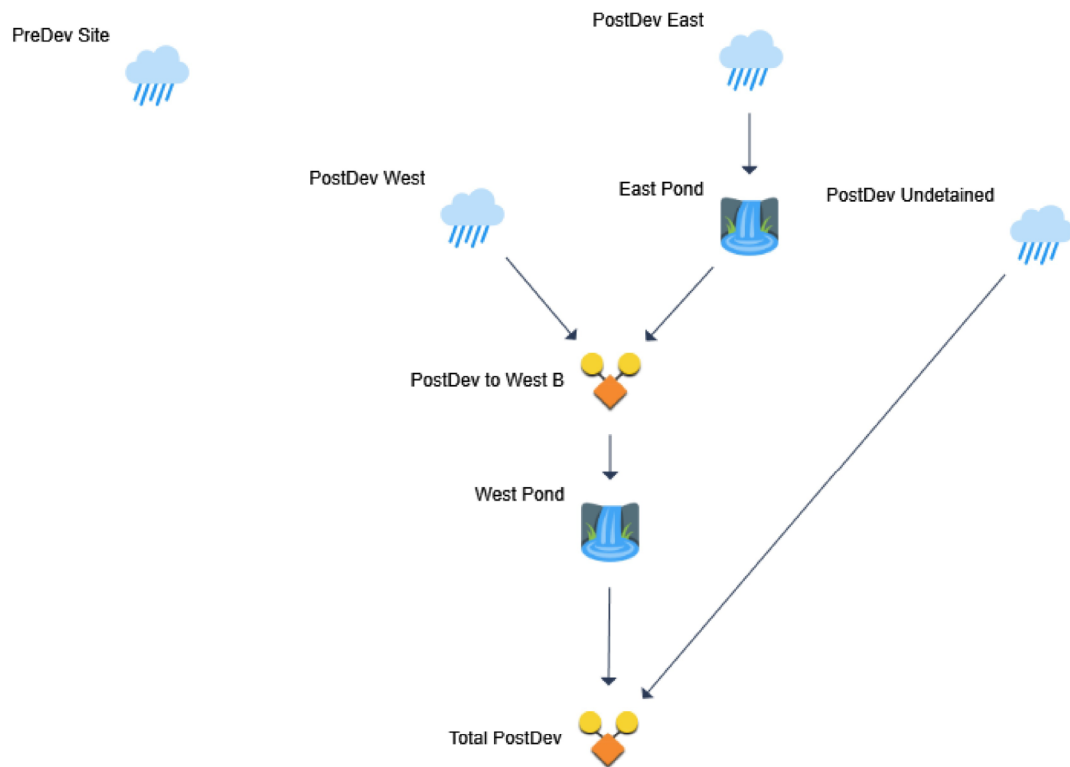
D = 10.42 IN 10" Circular

Basin Model

Hydrology Studio v 3.0.0.12

Project Name:

08-12-2019



Hydrograph by Return Period

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph 1-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

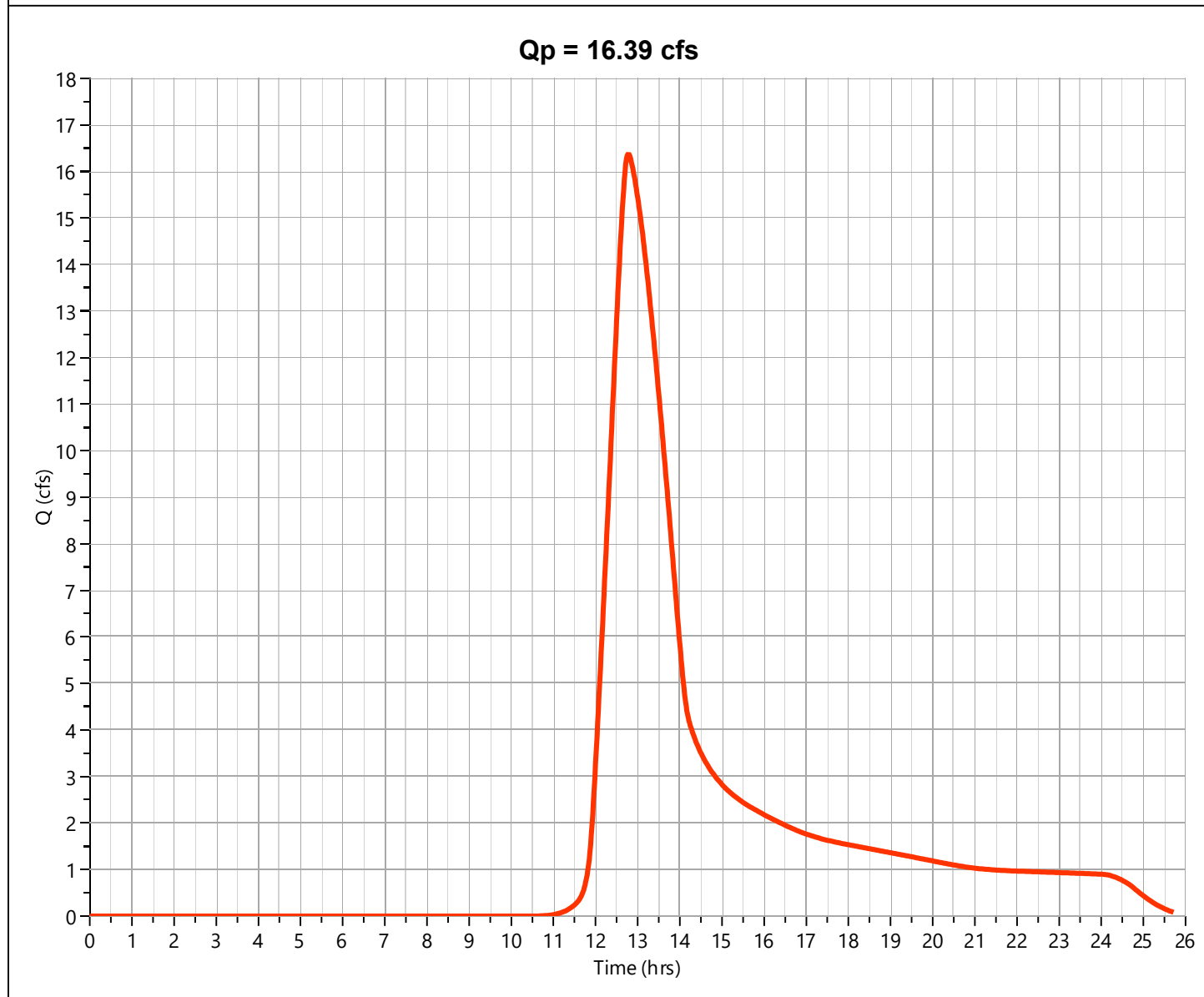
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 16.39 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.78 hrs
Time Interval	= 1 min	Runoff Volume	= 146,311 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 2.37 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Tc by TR55 Worksheet

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PreDev Site
NRCS Runoff

Hyd. No. 1

Description	Segments			Tc (min)
	A	B	C	
Sheet Flow				
Description				
Manning's n	0.240	0.240	0.013	
Flow Length (ft)	100	50		
2-yr, 24-hr Precip. (in)	2.840000	2.840000	2.840000	
Land Slope (%)	.67	.67		
Travel Time (min)	23.46	13.47	0.00	36.93
Shallow Concentrated Flow				
Flow Length (ft)	2609			
Watercourse Slope (%)	.31			
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	.9			
Travel Time (min)	48.40	0.00	0.00	48.40
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	0.00	0.00	0.00	0.00
Total Travel Time				85.34 min

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

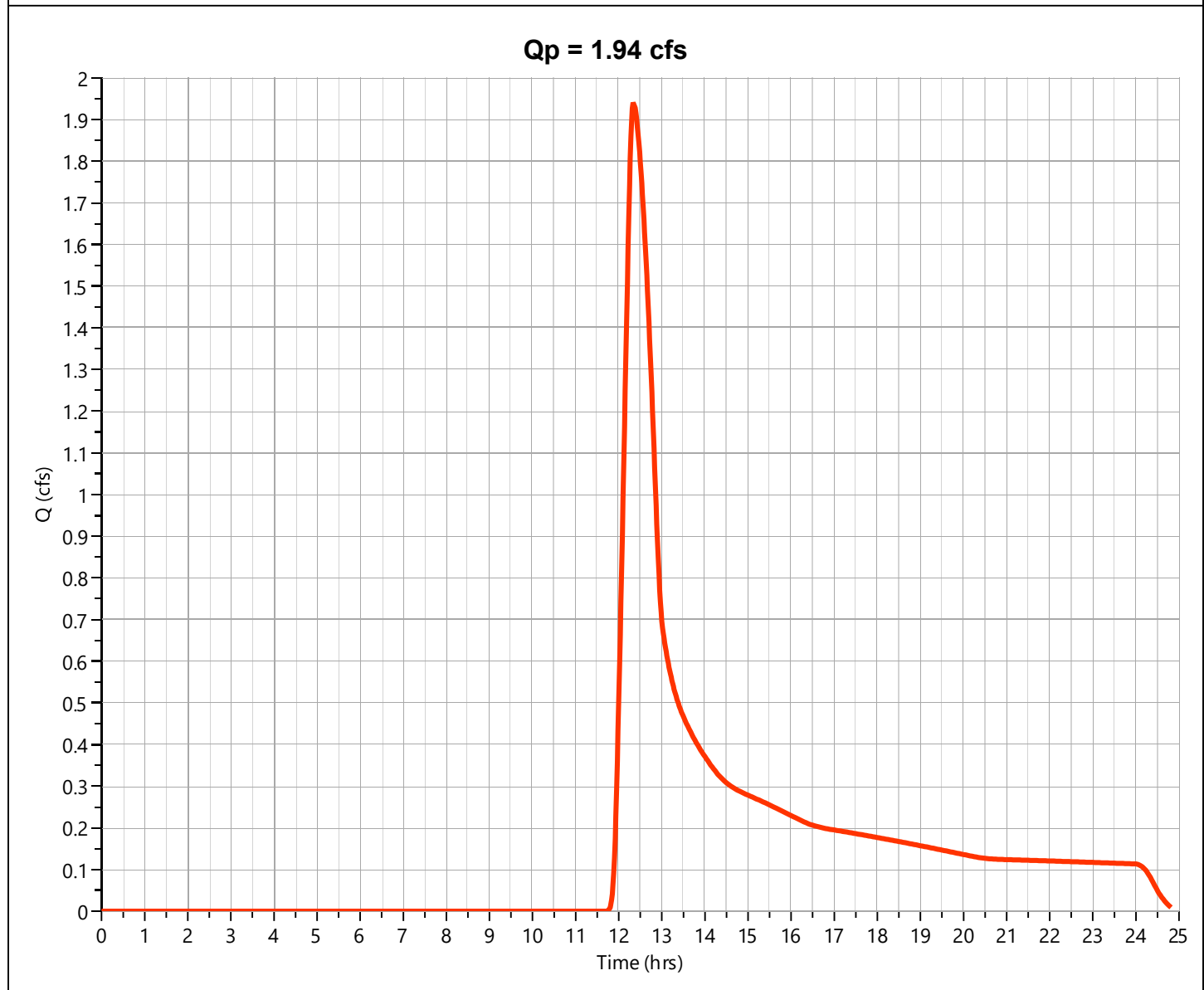
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.944 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.35 hrs
Time Interval	= 1 min	Runoff Volume	= 13,396 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 2.37 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Tc by TR55 Worksheet

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PostDev East NRCS Runoff

Hyd. No. 2

Description	Segments			Tc (min)
	A	B	C	
Sheet Flow				
Description				
Manning's n	0.240	0.240	0.013	
Flow Length (ft)	100	50		
2-yr, 24-hr Precip. (in)	2.840000	2.840000	2.840000	
Land Slope (%)	.67	.67		
Travel Time (min)	23.46	13.47	0.00	36.93
Shallow Concentrated Flow				
Flow Length (ft)	361			
Watercourse Slope (%)	1.71			
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	2.11			
Travel Time (min)	2.85	0.00	0.00	2.85
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				39.79 min

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

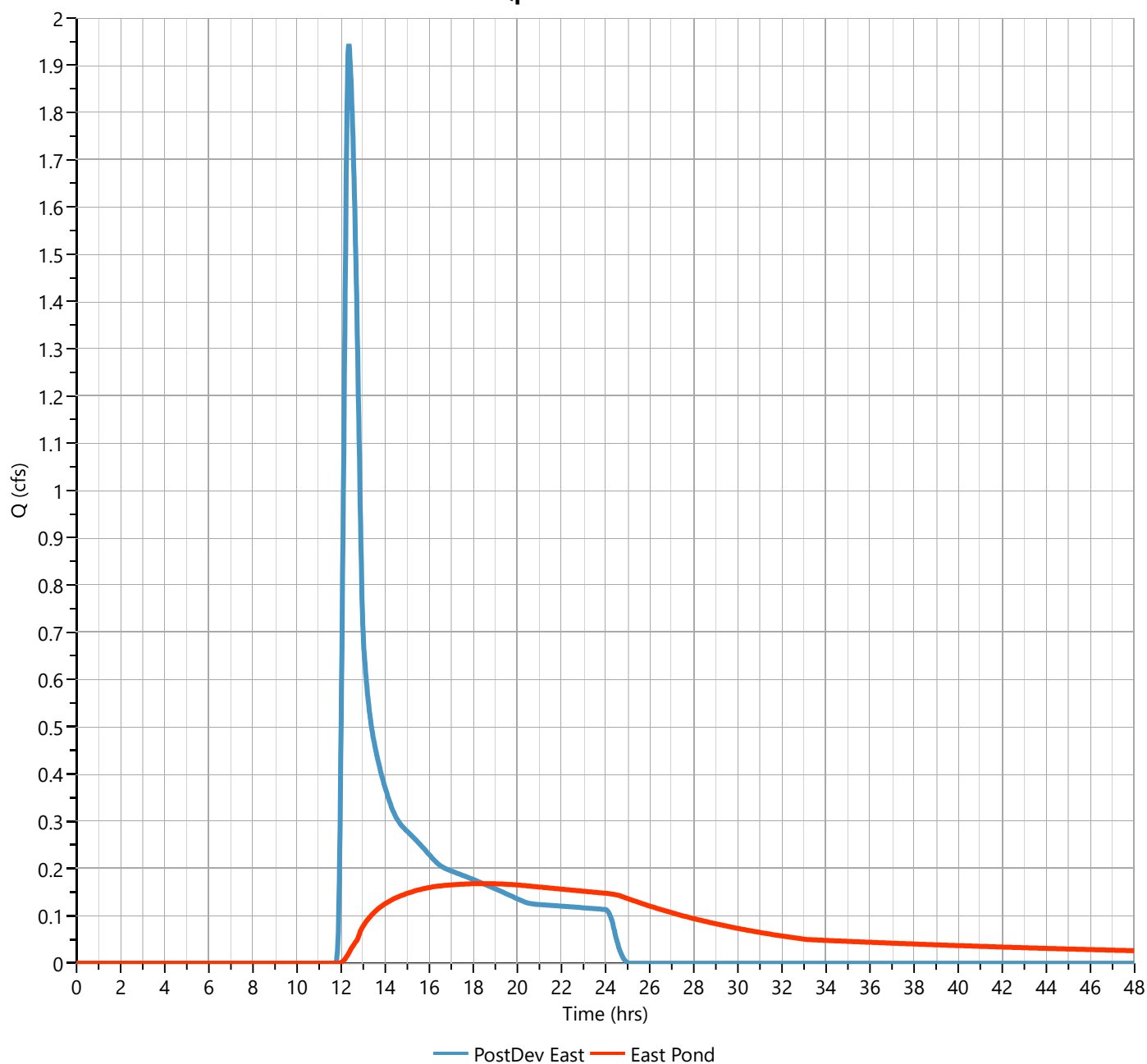
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.168 cfs
Storm Frequency	= 1-yr	Time to Peak	= 18.45 hrs
Time Interval	= 1 min	Hydrograph Volume	= 11,208 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.18 ft
Pond Name	= East pond	Max. Storage	= 7,592 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 9.38 hrs

Qp = 0.17 cfs



Pond Report

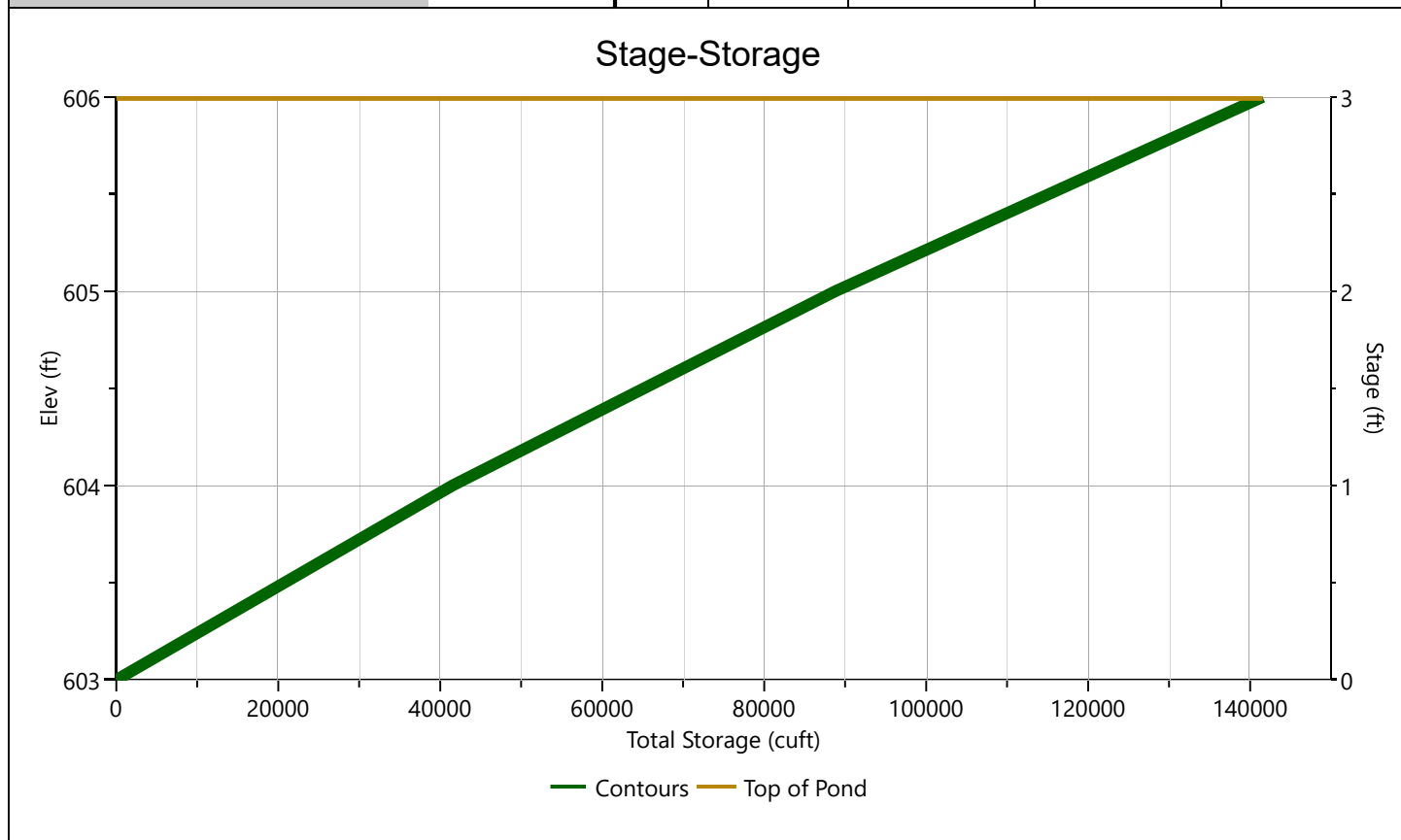
Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East pond

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 3.0.0.12

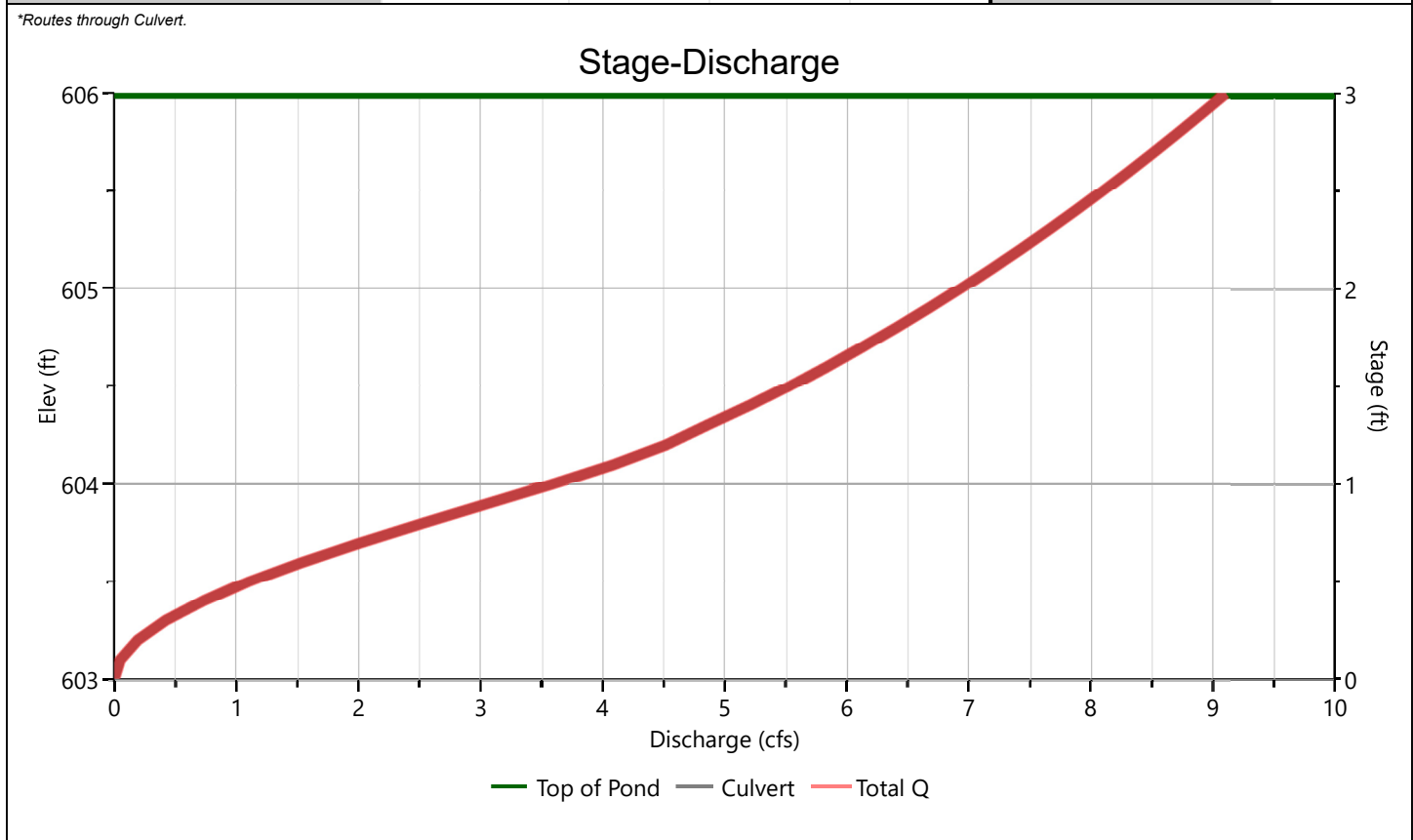
08-12-2019

East pond

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser
		1	2	3	
Rise, in	15				Perf. Rise, in
Span, in	15				Perf. Span, in
No. Barrels	1	1	1	1	No. Perforations
Invert Elevation, ft	603.00	603.01	603.01	603.01	Invert Elevation, ft
Orifice Coefficient, Co	.6	.6	.6	.6	Height, ft
Length, ft	53.25				Orifice Coefficient, Co
Barrel Slope, %	5				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Circular	Rectangular	Rectangular	Rectangular	Exfiltration, in/hr
Crest Elevation, ft					
Crest Length, ft					
Angle, deg					
Weir Coefficient, Cw					

*Routes through Culvert.



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

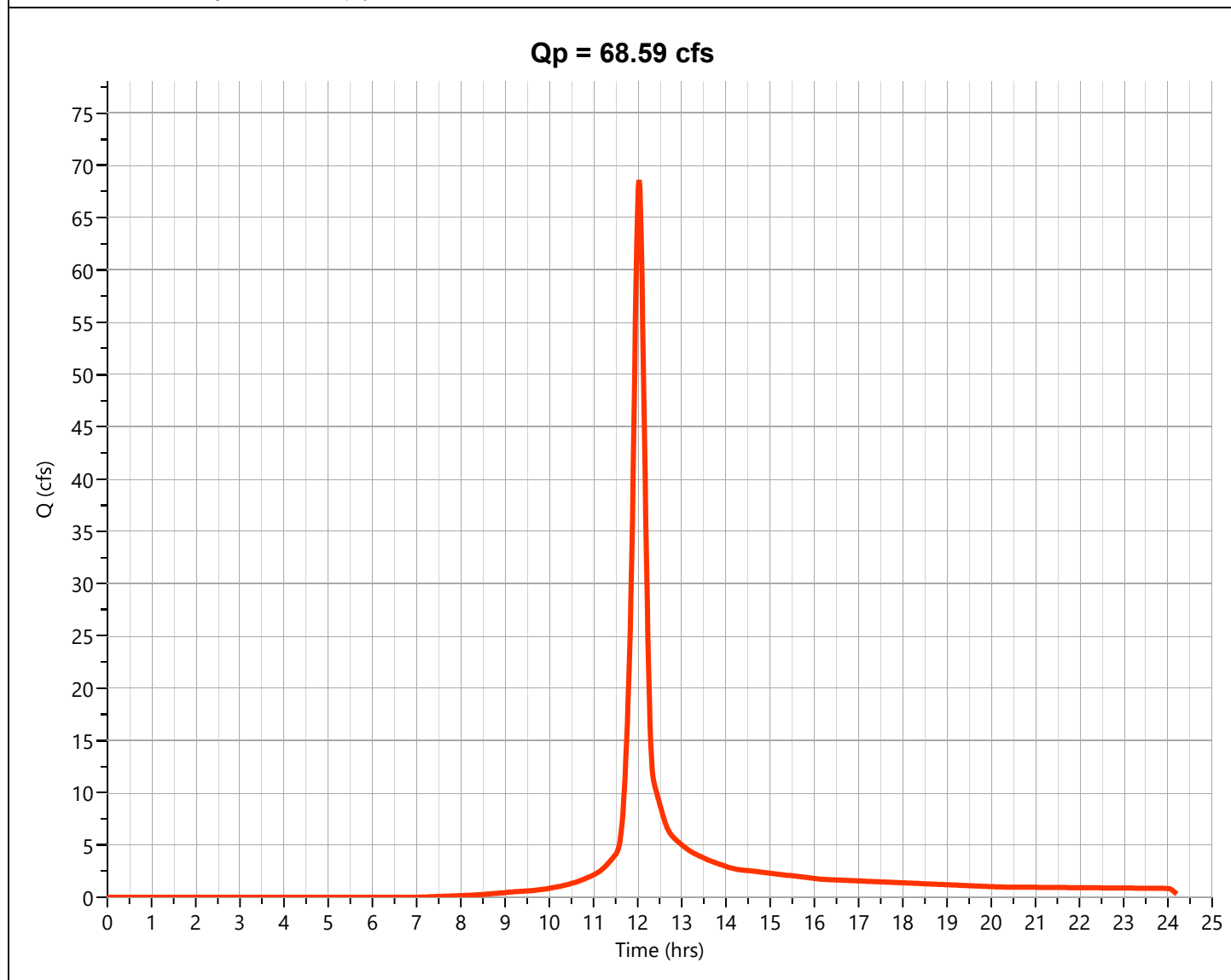
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 68.59 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 185,089 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 2.37 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

Project Name:

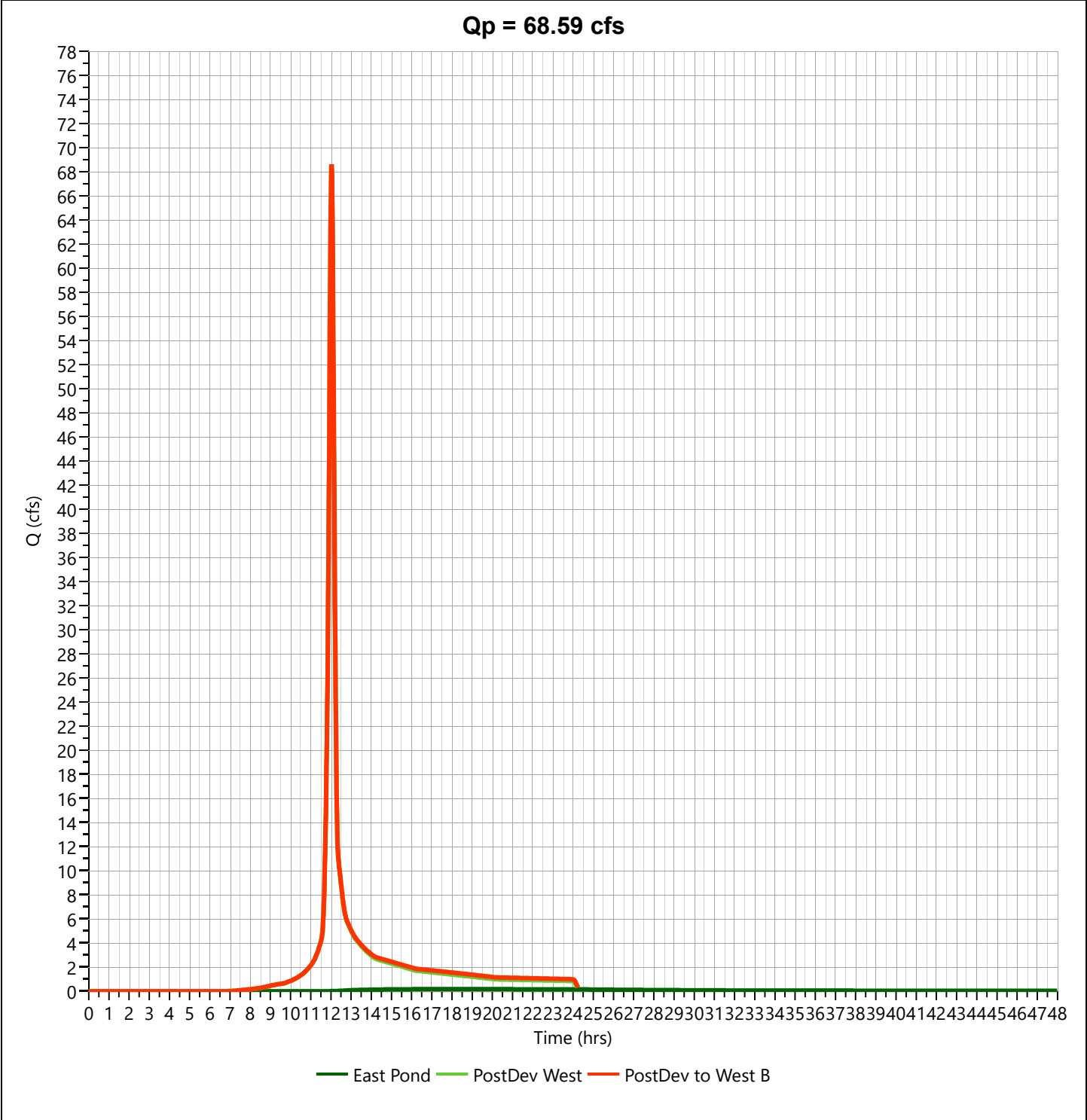
Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 68.59 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 196,297 cuft
Inflow Hydrographs	= 3, 4	Total Contrib. Area	= 36.253 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

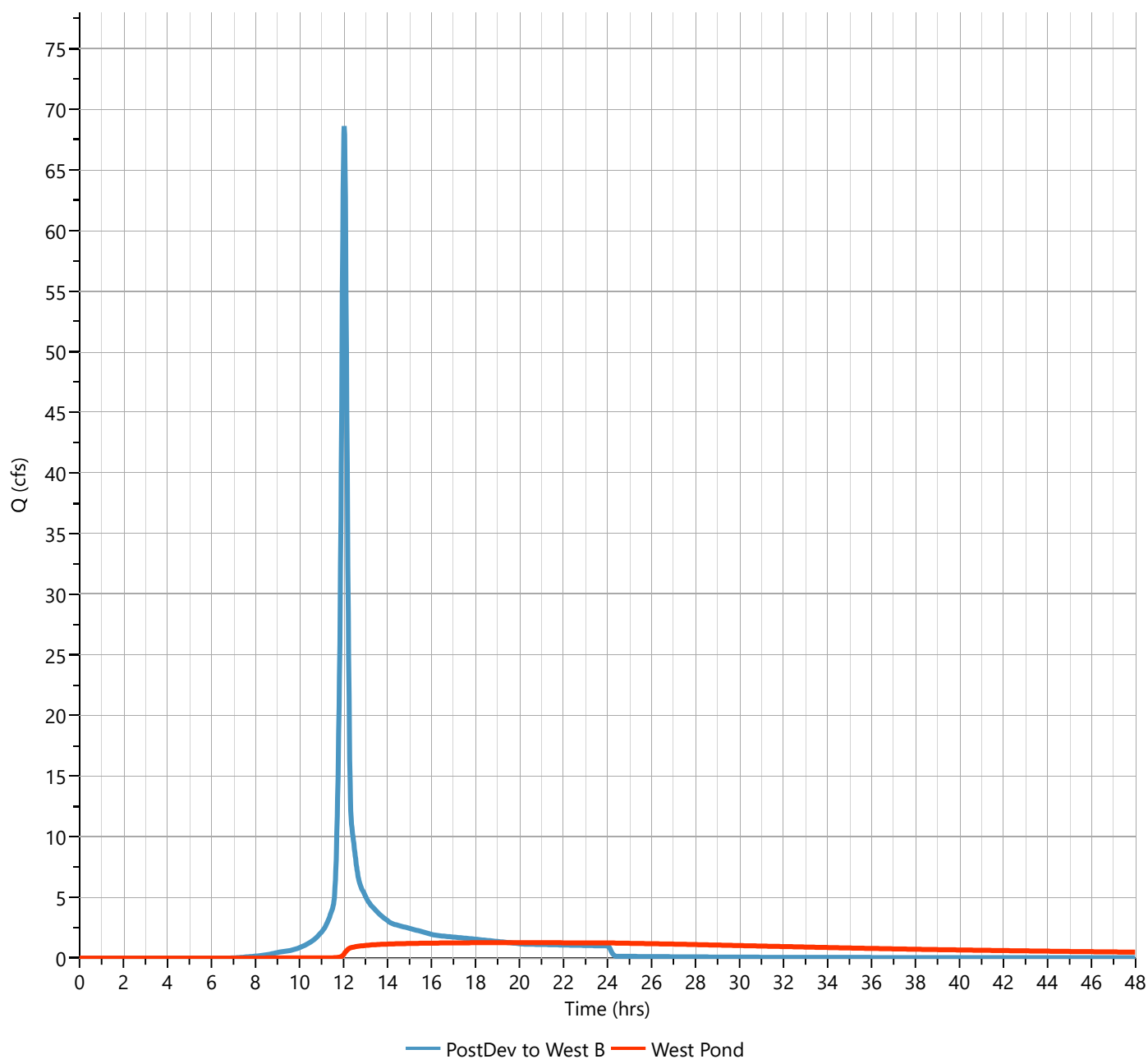
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 1.266 cfs
Storm Frequency	= 1-yr	Time to Peak	= 19.55 hrs
Time Interval	= 1 min	Hydrograph Volume	= 123,142 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 593.90 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 528,443 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 13.52 hrs

Qp = 1.27 cfs



Pond Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond-Full Depth

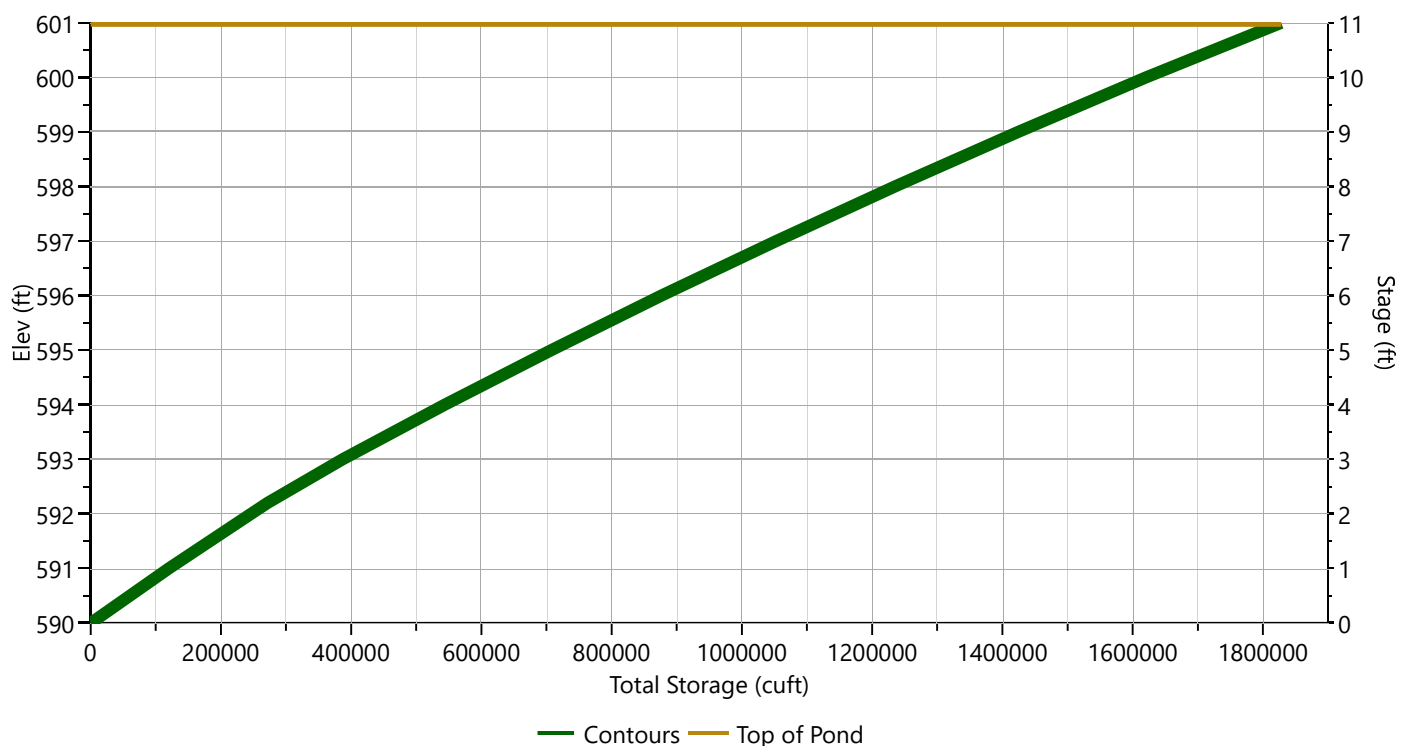
Stage-Storage

User Defined Contours		Stage / Storage Table				
Description	Input	Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
Bottom Elevation, ft	590.00	0.00	590.00	117,142	0.000	0.000
Voids (%)	100.00	1.00	591.00	122,949	120,022	120,022
Volume Calc	Conic	2.00	592.00	128,838	125,869	245,891
		2.20	592.20	133,599	26,240	272,130
		3.00	593.00	153,933	114,905	387,035
		4.00	594.00	160,154	157,018	544,053
		5.00	595.00	166,431	163,266	707,319
		6.00	596.00	172,765	169,571	876,890
		7.00	597.00	179,156	175,933	1,052,823
		8.00	598.00	185,602	182,351	1,235,174
		9.00	599.00	192,554	189,049	1,424,223
		10.00	600.00	201,212	196,847	1,621,070
		11.00	601.00	212,209	206,666	1,827,736

below NWE

1,827,736 - 387,035 =
1,440,701 cf above NWE

Stage-Storage



Pond Report

Project Name:

Hydrology Studio v 3.0.0.12

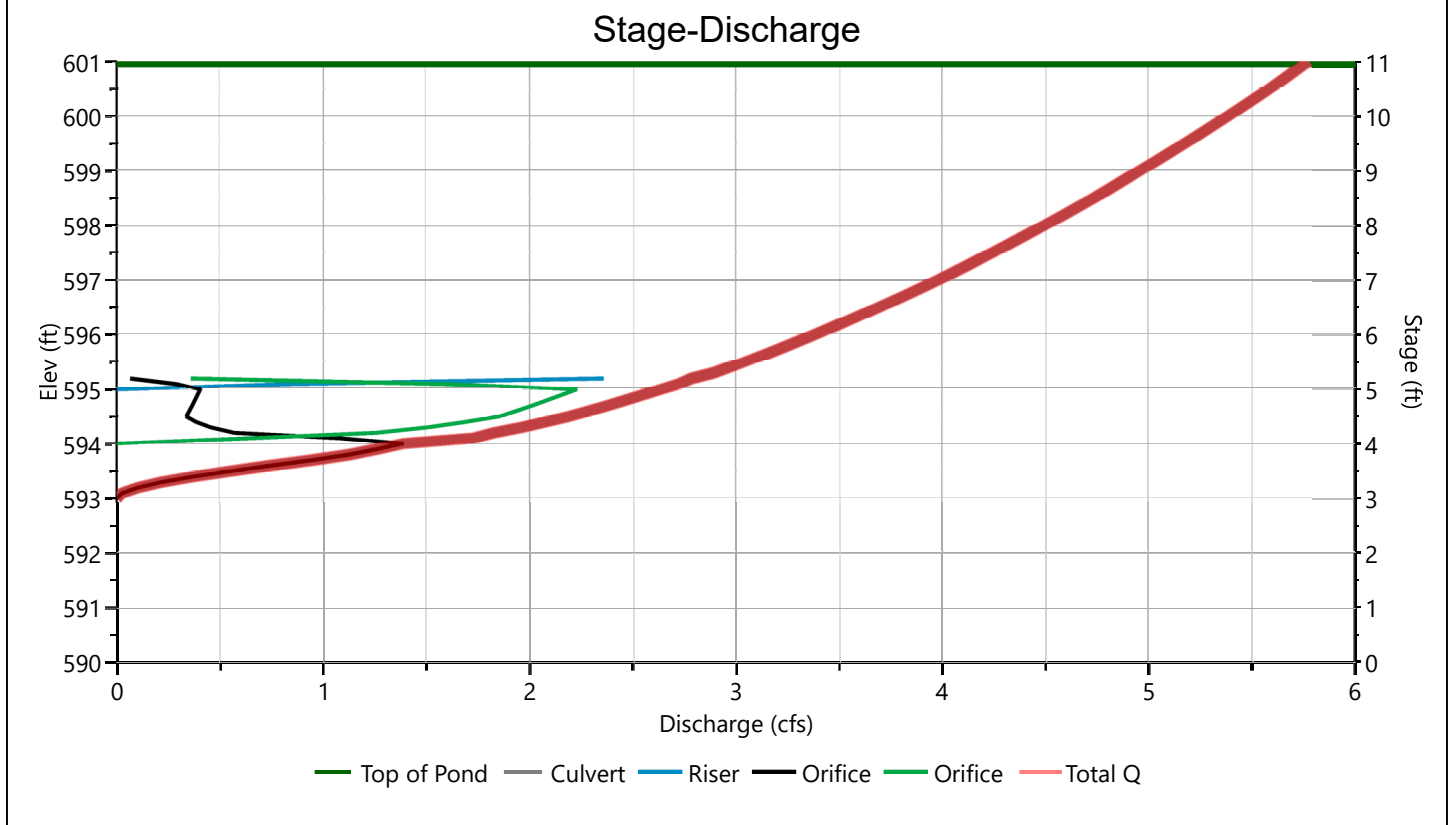
08-12-2019

West Pond-Full Depth

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate
		1*	2*	3	
Rise, in	12	10	6		Orifice Rise, in
Span, in	12	10	24		Orifice Span, in
No. Barrels	1	1	3		No. Orifices
Invert Elevation, ft	593.00	593.00	594.00	0.00	Invert Elevation, ft
Orifice Coefficient, Co	.6	.6	.6		Height, ft
Length, ft	244.29				Orifice Coefficient, Co
Barrel Slope, %	.25				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Box				Exfiltration, in/hr
Crest Elevation, ft	595				
Crest Length, ft	8				
Angle, deg					
Weir Coefficient, Cw	3.3				

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond-Full Depth

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	590.00	0.000	0.000	0.000	0.000		0.000							0.000
1.00	591.00	120,022	0.000	0.000	0.000		0.000							0.000
2.00	592.00	245,891	0.000	0.000	0.000		0.000							0.000
2.20	592.20	272,130	0.000	0.000	0.000		0.000							0.000
3.00	593.00	387,035	0.000	0.000	0.000		0.000							0.000
4.00	594.00	544,053	1.389 oc	1.389	0.000		0.000							1.389
5.00	595.00	707,319	2.635 oc	0.405	2.230		0.000							2.635
6.00	596.00	876,890	3.381 oc	0.000	0.000		0.000							3.381
7.00	597.00	1,052,823	3.977 oc	0.000	0.000		0.000							3.977
8.00	598.00	1,235,174	4.494 oc	0.000	0.000		0.000							4.494
9.00	599.00	1,424,223	4.957 oc	0.000	0.000		0.000							4.957
10.00	600.00	1,621,070	5.381 oc	0.000	0.000		0.000							5.381
11.00	601.00	1,827,736	5.773 oc	0.000	0.000		0.000							5.773

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

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

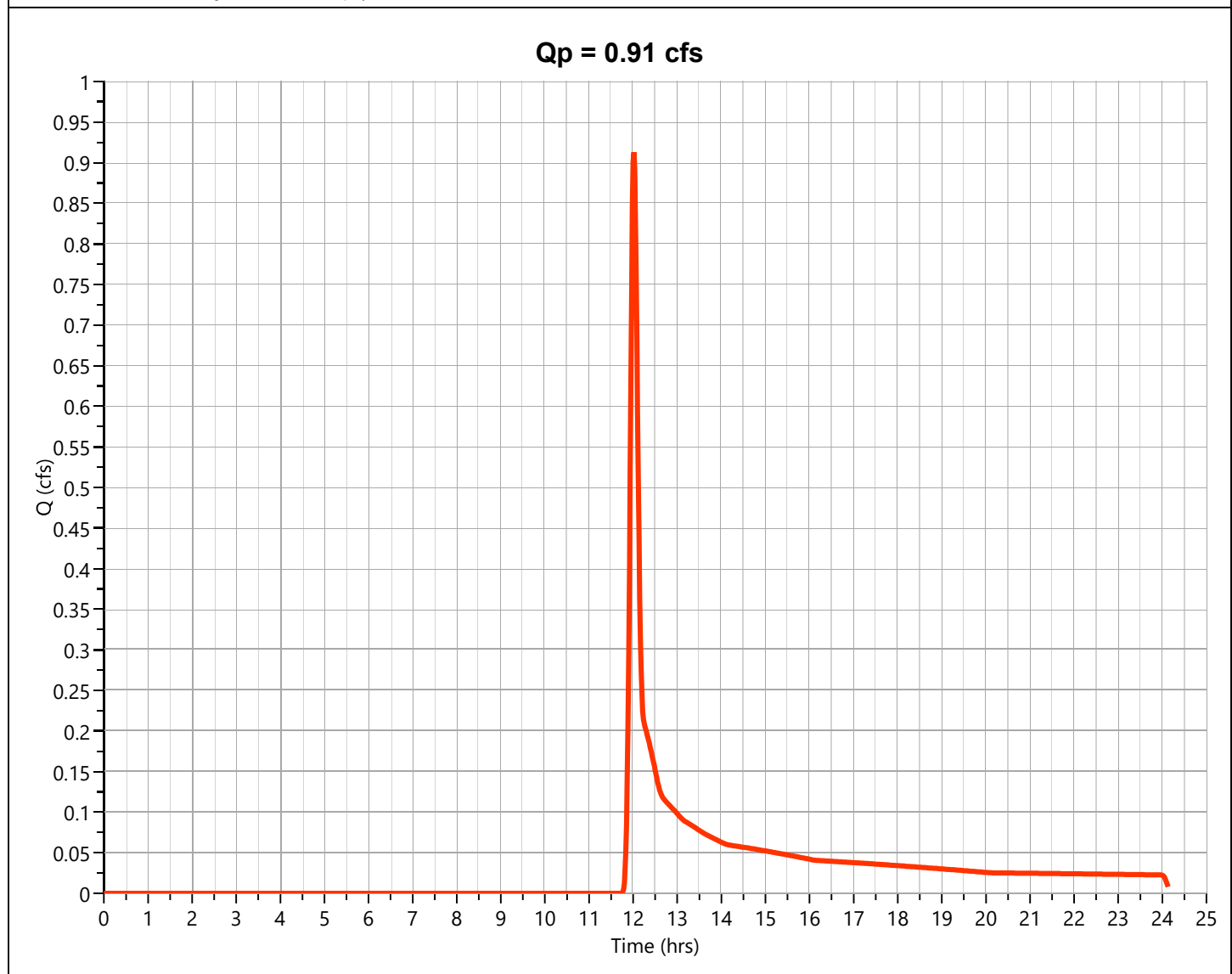
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.913 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.02 hrs
Time Interval	= 1 min	Runoff Volume	= 2,609 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.37 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

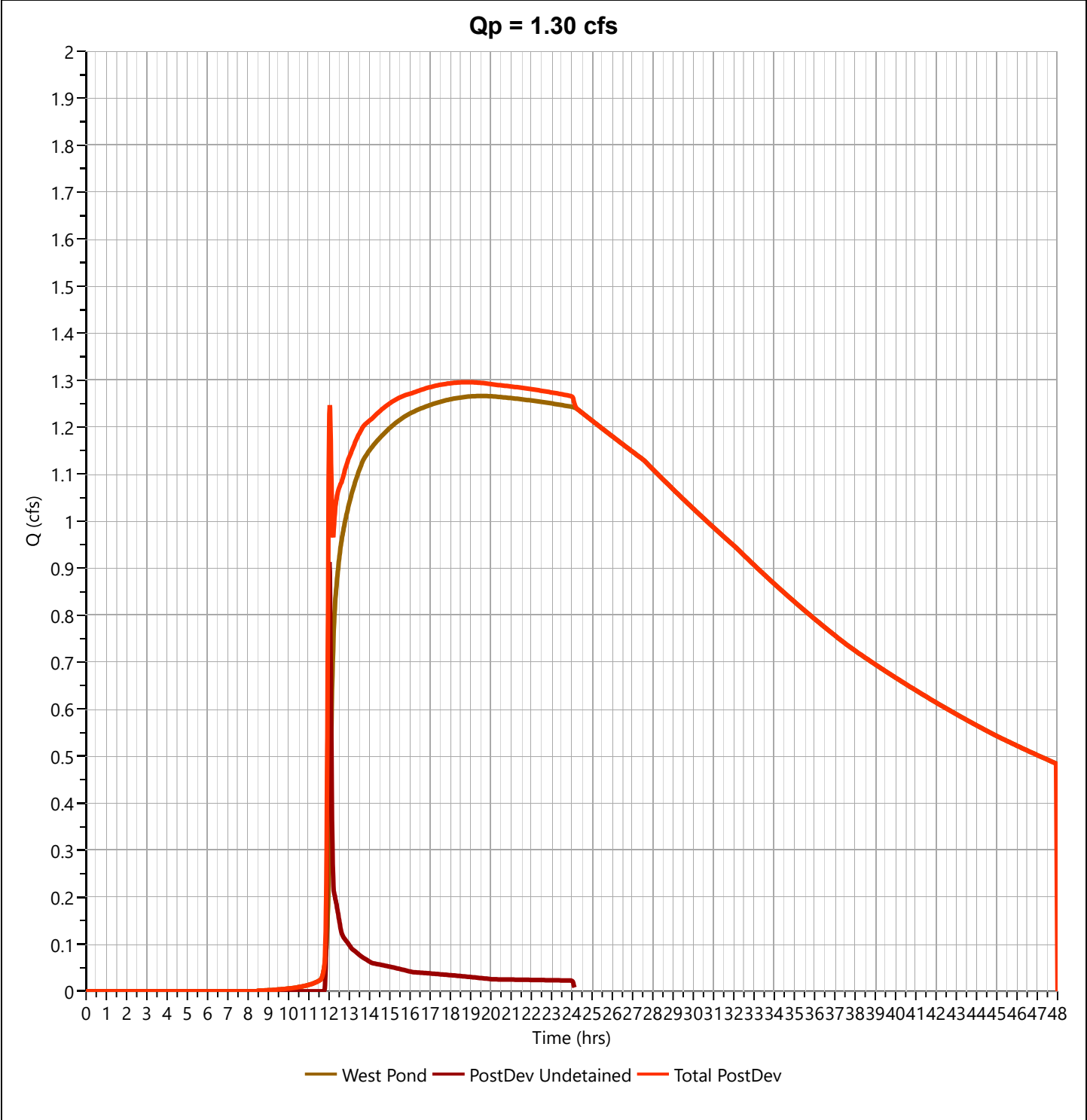
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 1.296 cfs
Storm Frequency	= 1-yr	Time to Peak	= 18.83 hrs
Time Interval	= 1 min	Hydrograph Volume	= 125,751 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 2-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

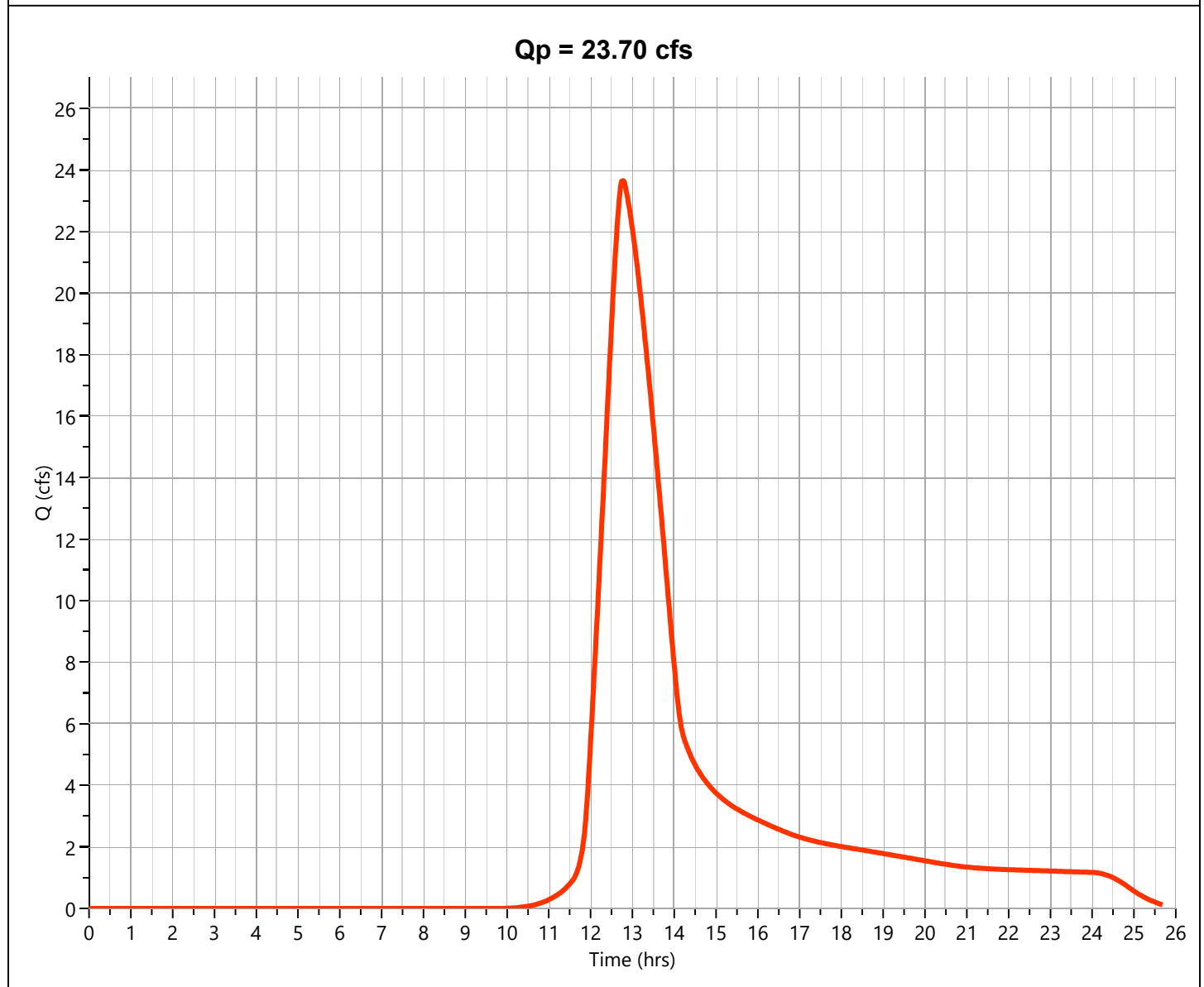
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 23.70 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.77 hrs
Time Interval	= 1 min	Runoff Volume	= 204,927 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 2.84 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

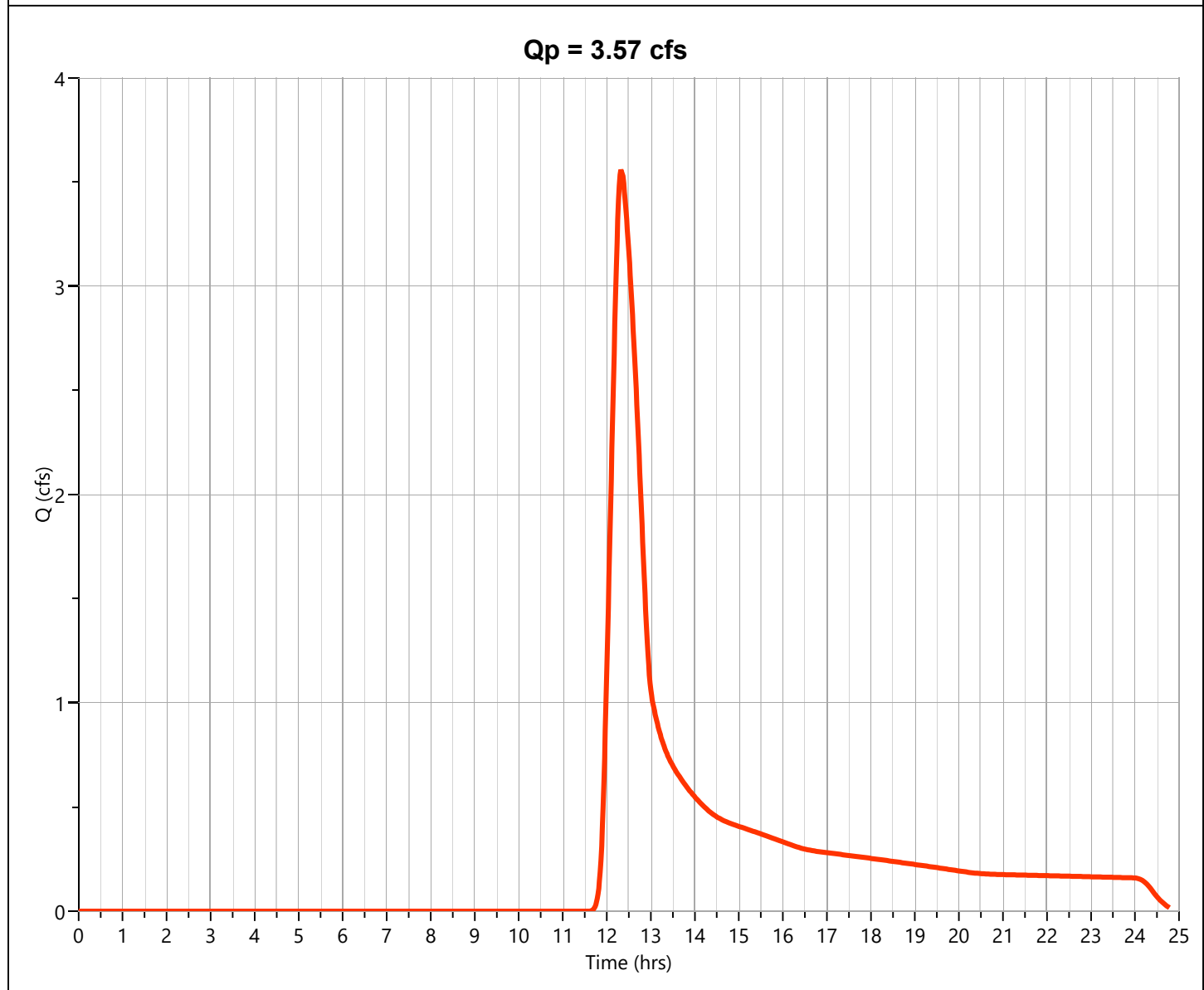
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.565 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 21,288 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 2.84 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

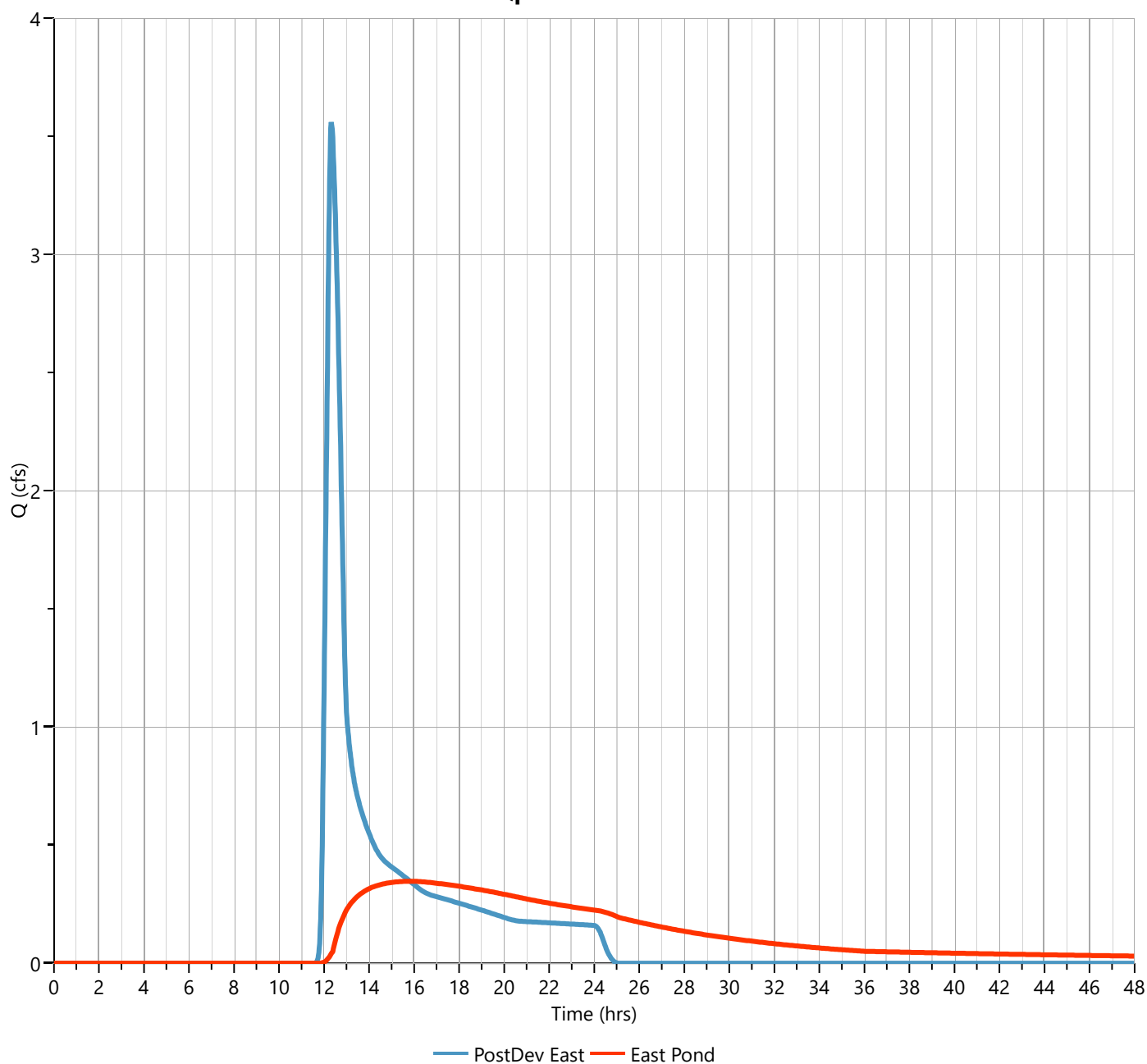
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.346 cfs
Storm Frequency	= 2-yr	Time to Peak	= 15.82 hrs
Time Interval	= 1 min	Hydrograph Volume	= 18,809 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.27 ft
Pond Name	= East pond	Max. Storage	= 11,091 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 7.84 hrs

Qp = 0.35 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

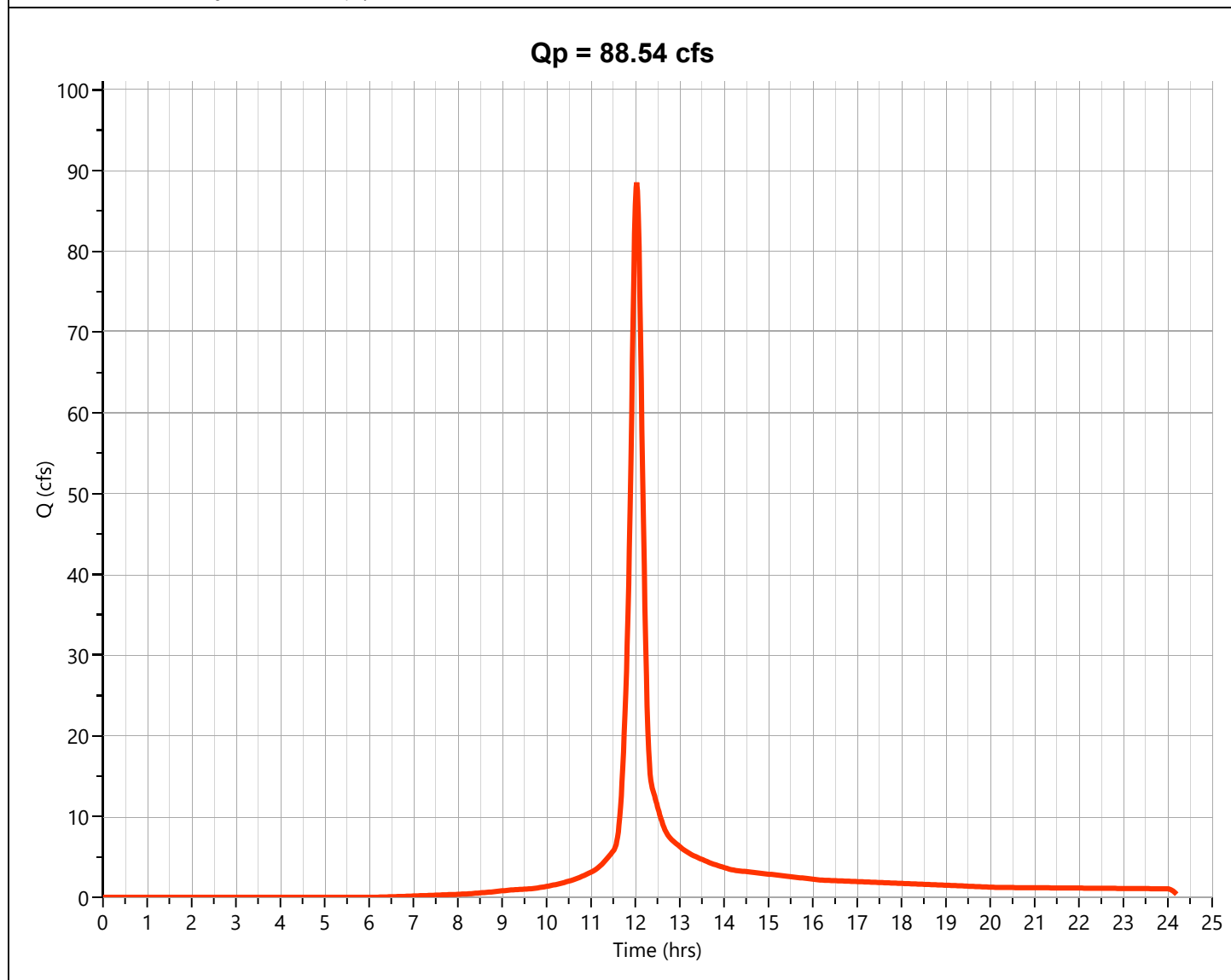
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 88.54 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 240,531 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 2.84 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

Project Name:

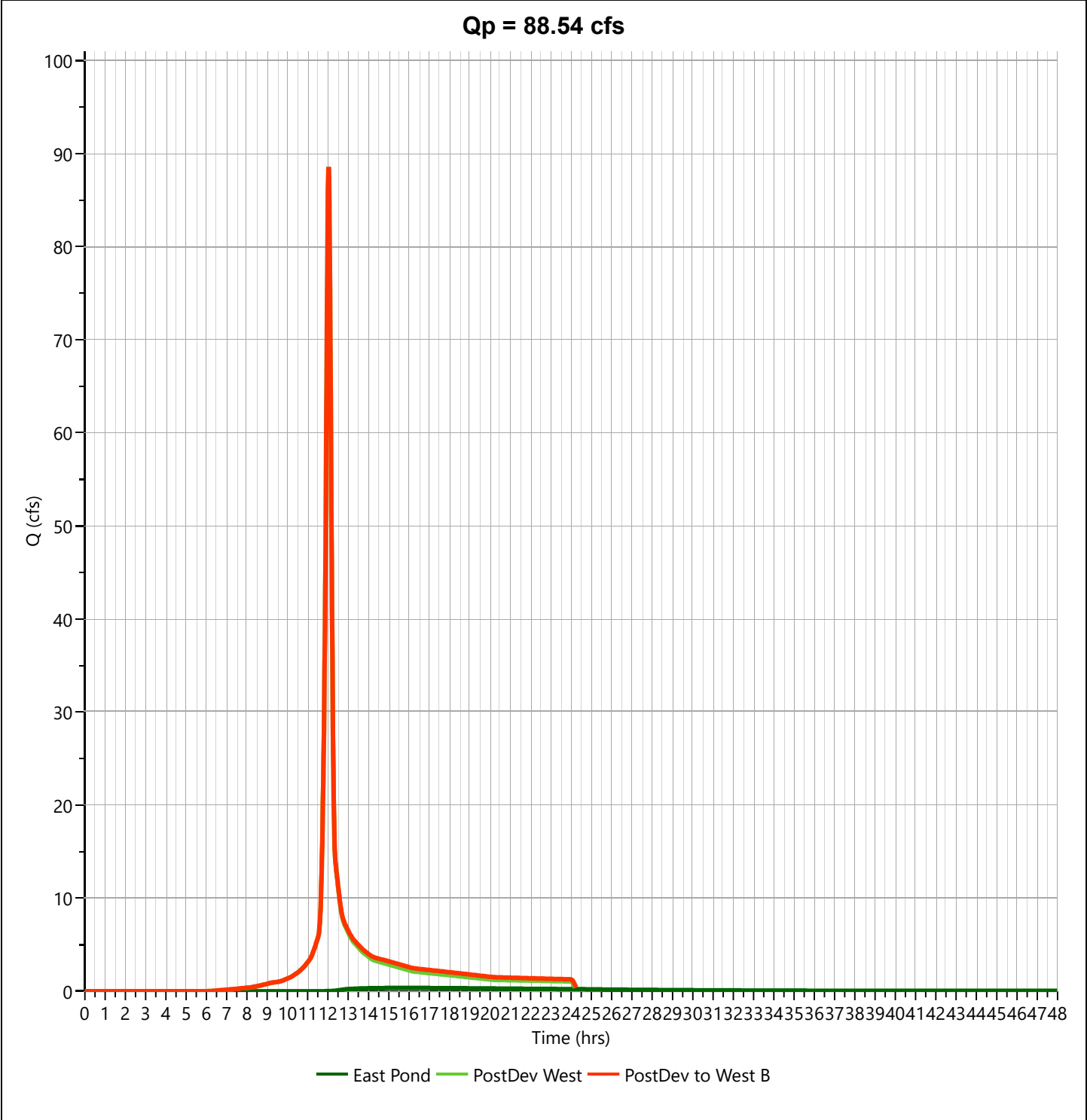
Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 88.54 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 259,340 cuft
Inflow Hydrographs	= 3, 4	Total Contrib. Area	= 36.253 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

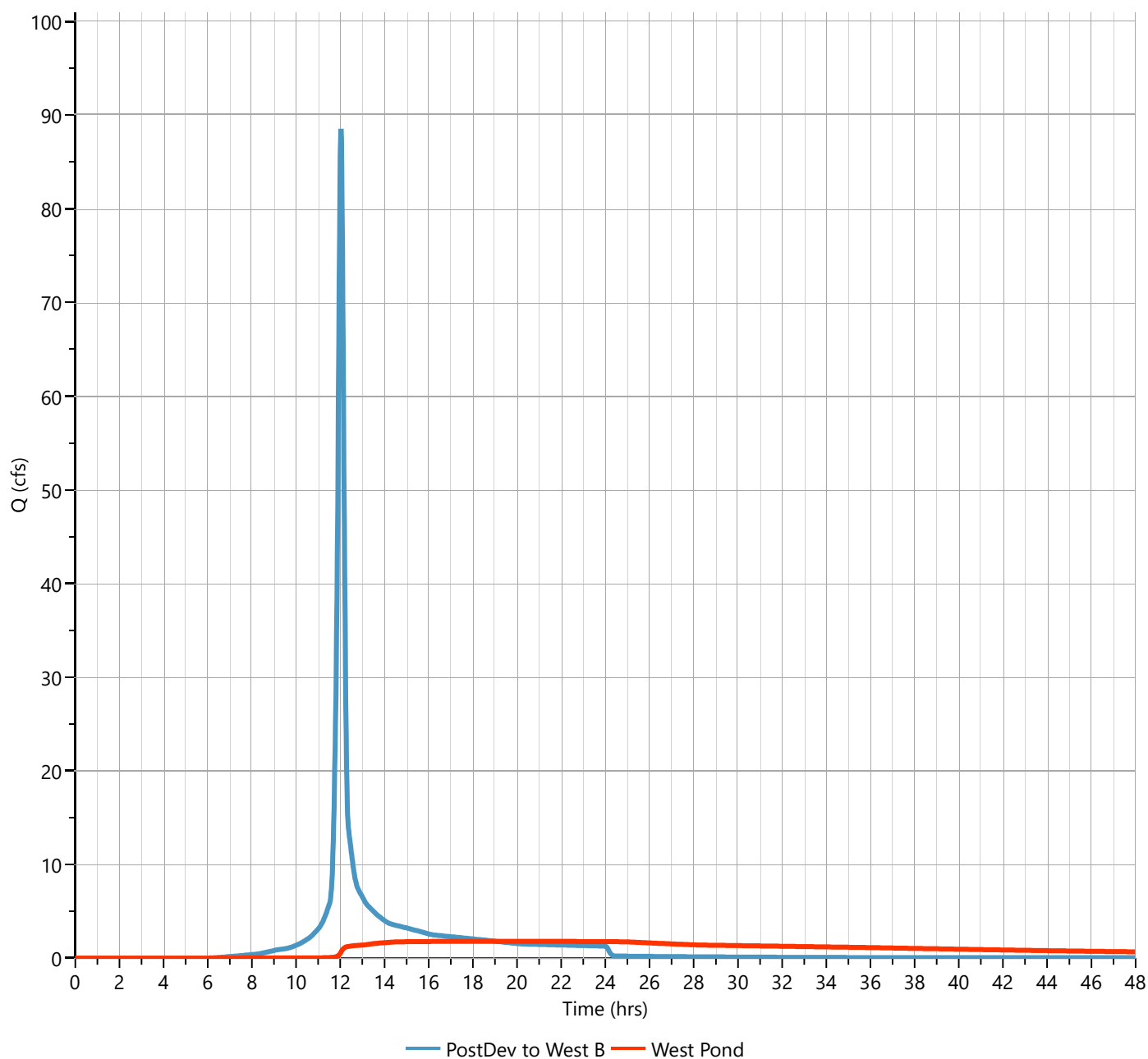
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 1.791 cfs
Storm Frequency	= 2-yr	Time to Peak	= 19.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 171,001 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 594.16 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 570,956 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 13.48 hrs

Qp = 1.79 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

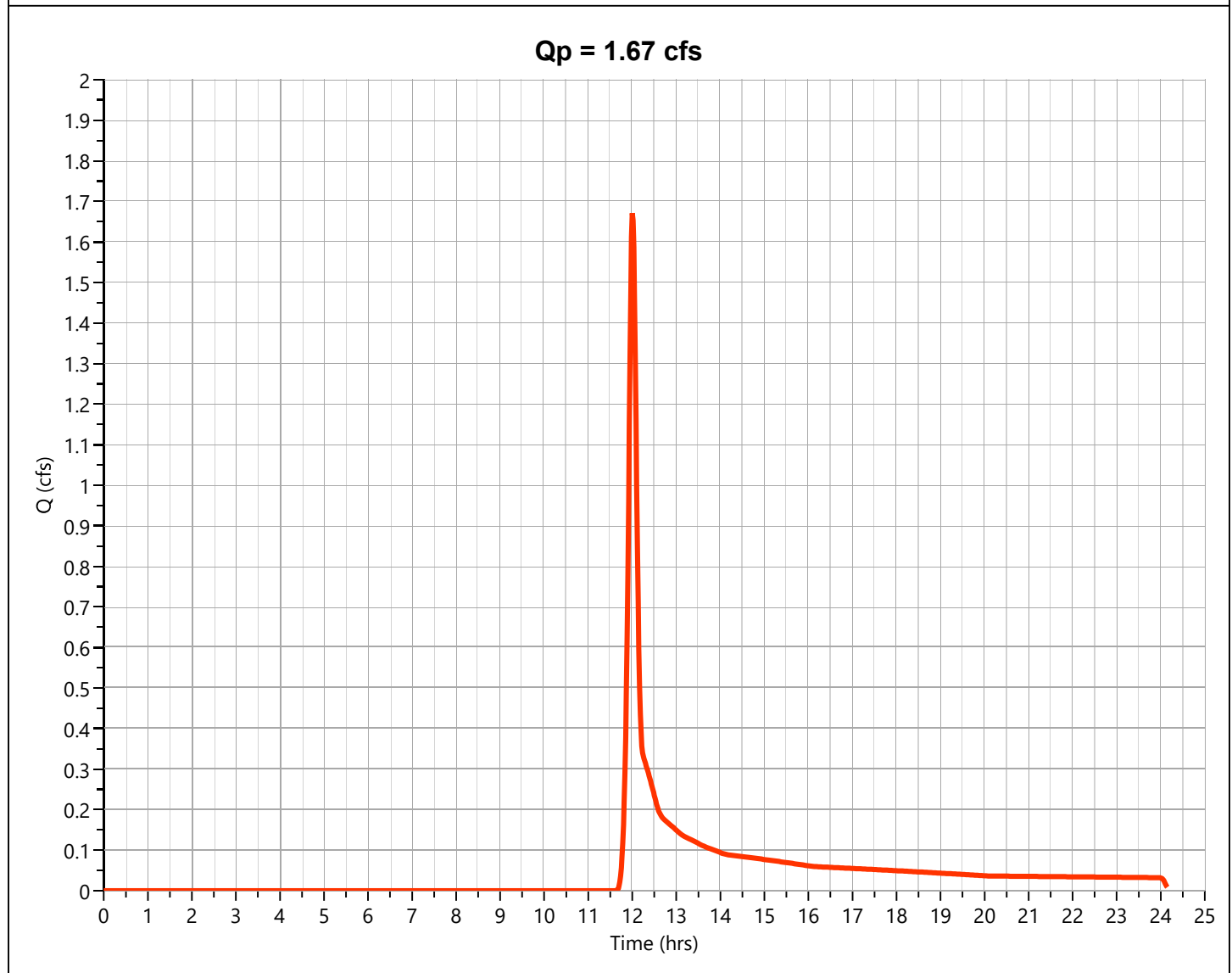
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.670 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 4,212 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.84 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

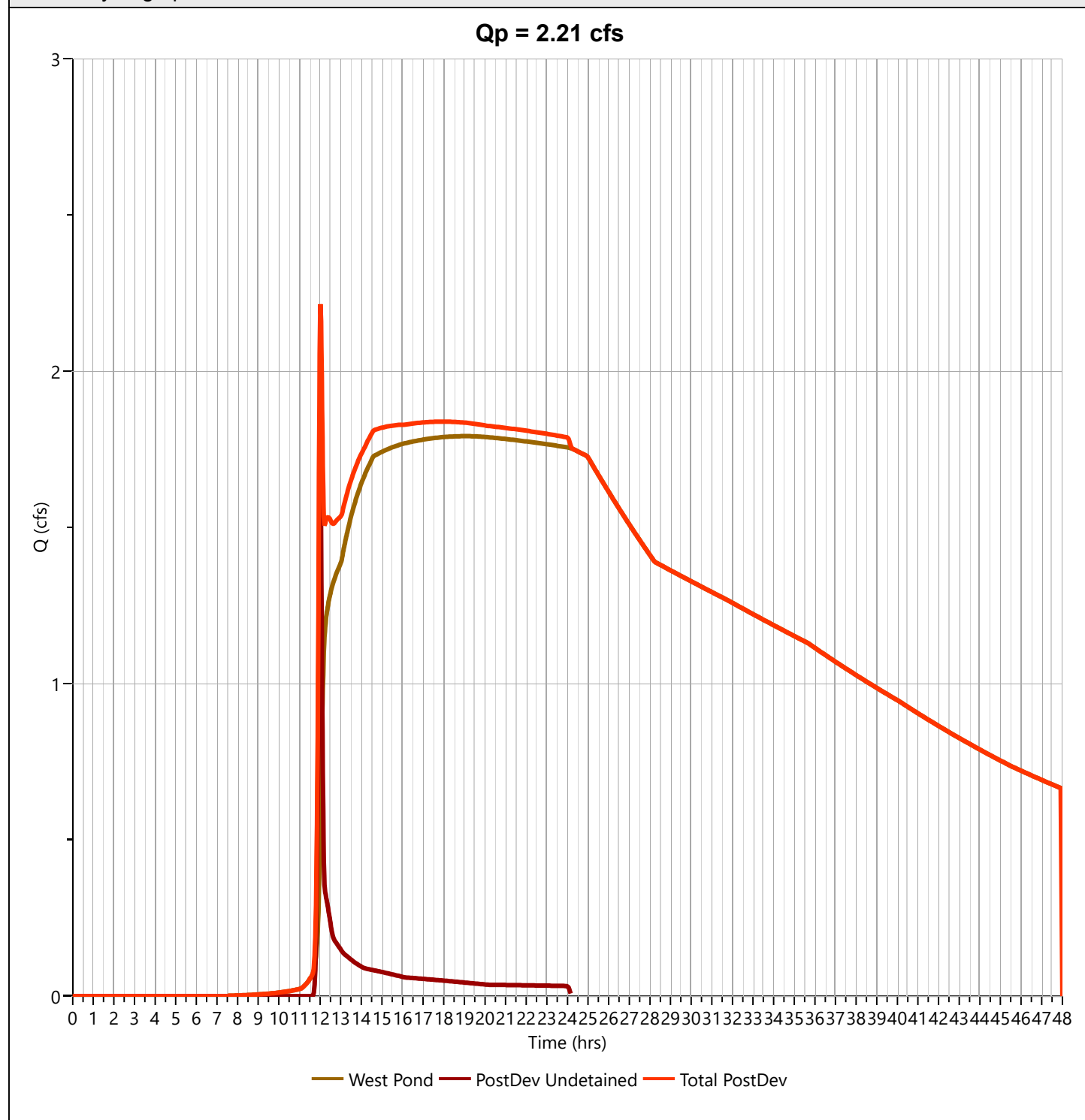
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 2.214 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.02 hrs
Time Interval	= 1 min	Hydrograph Volume	= 175,214 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 5-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

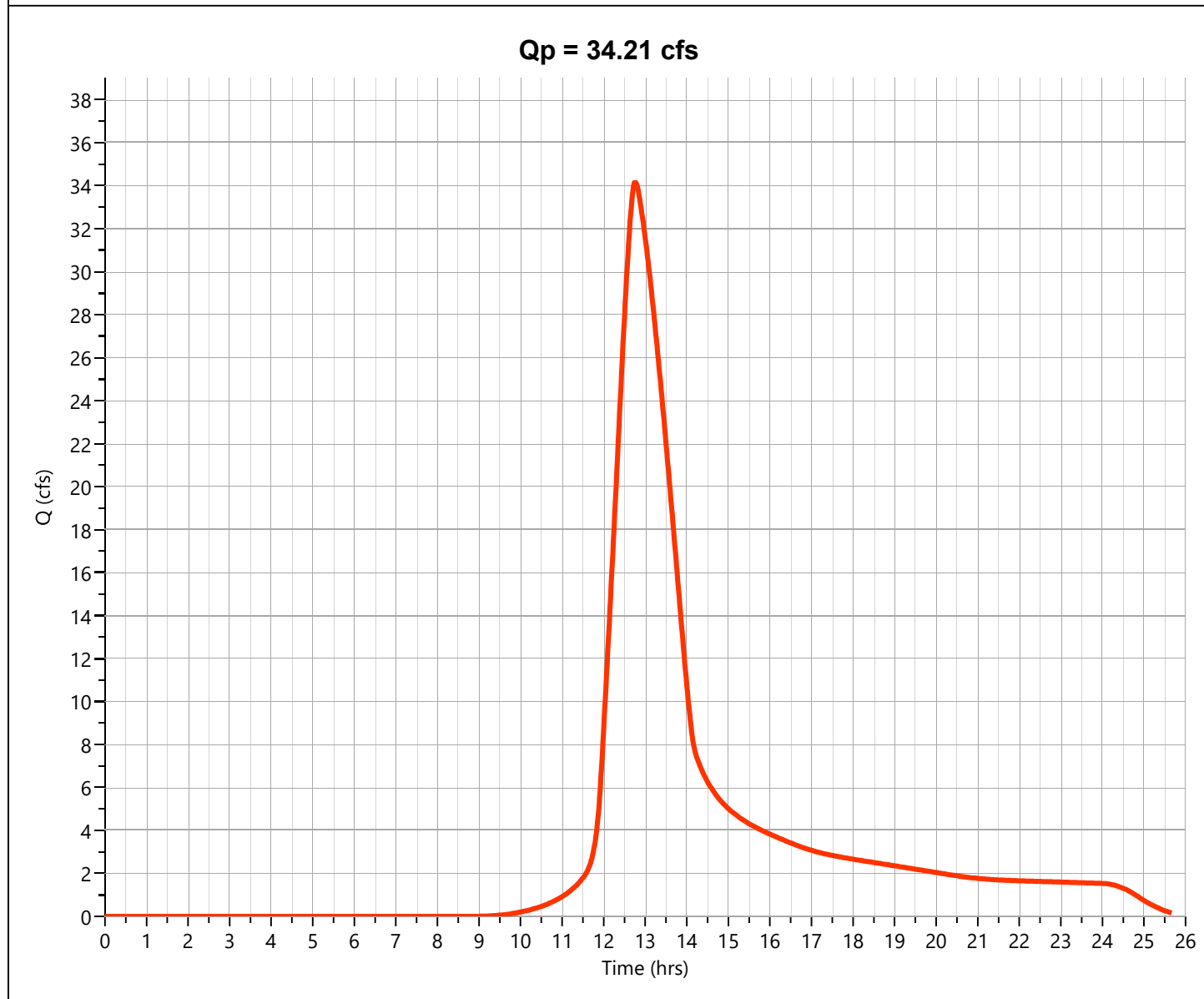
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 34.21 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.77 hrs
Time Interval	= 1 min	Runoff Volume	= 289,621 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 3.47 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

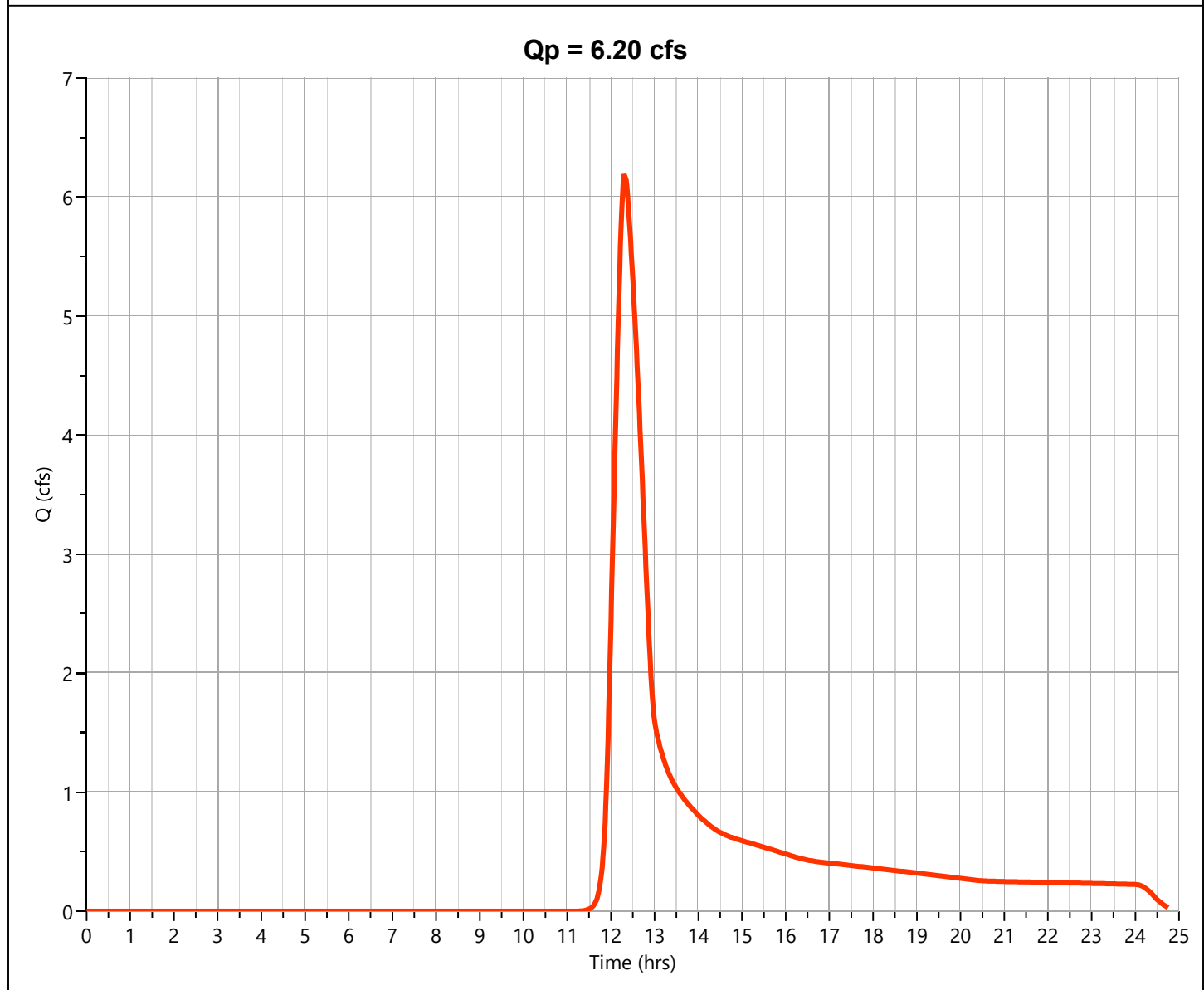
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.204 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 33,588 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 3.47 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

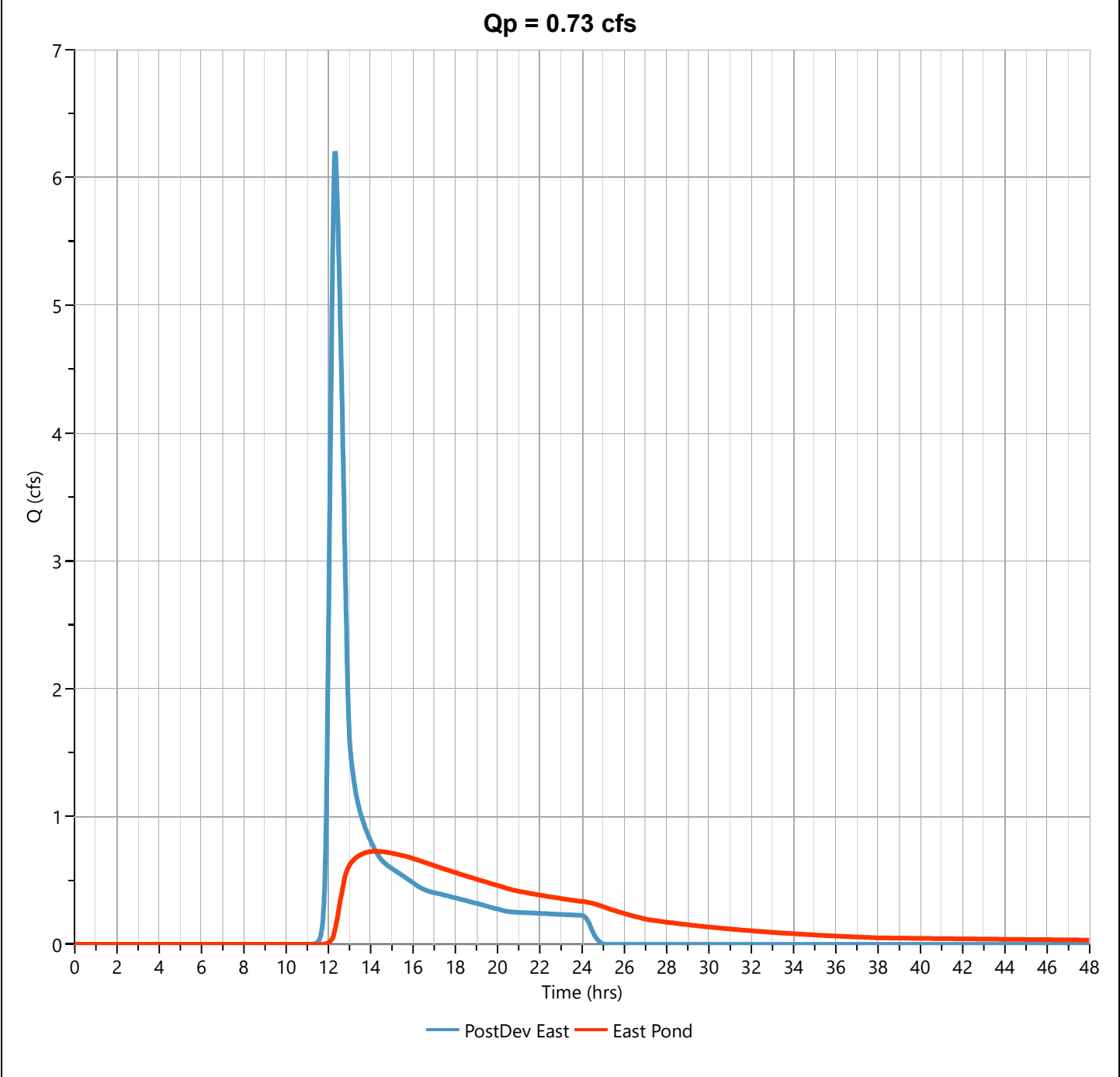
East Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.727 cfs
Storm Frequency	= 5-yr	Time to Peak	= 14.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 30,887 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.40 ft
Pond Name	= East pond	Max. Storage	= 16,593 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 6.48 hrs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

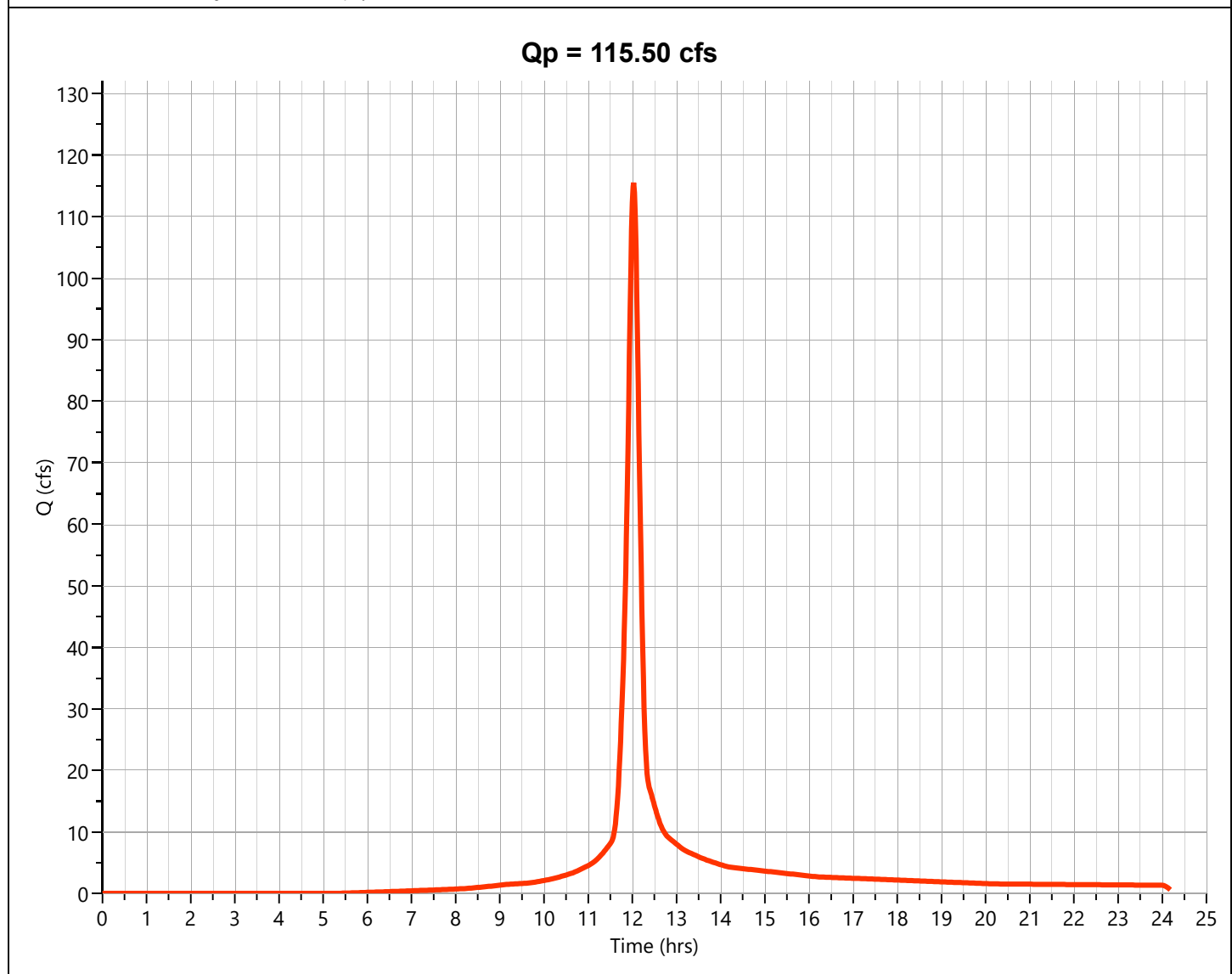
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 115.5 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 317,010 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 3.47 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

Project Name:

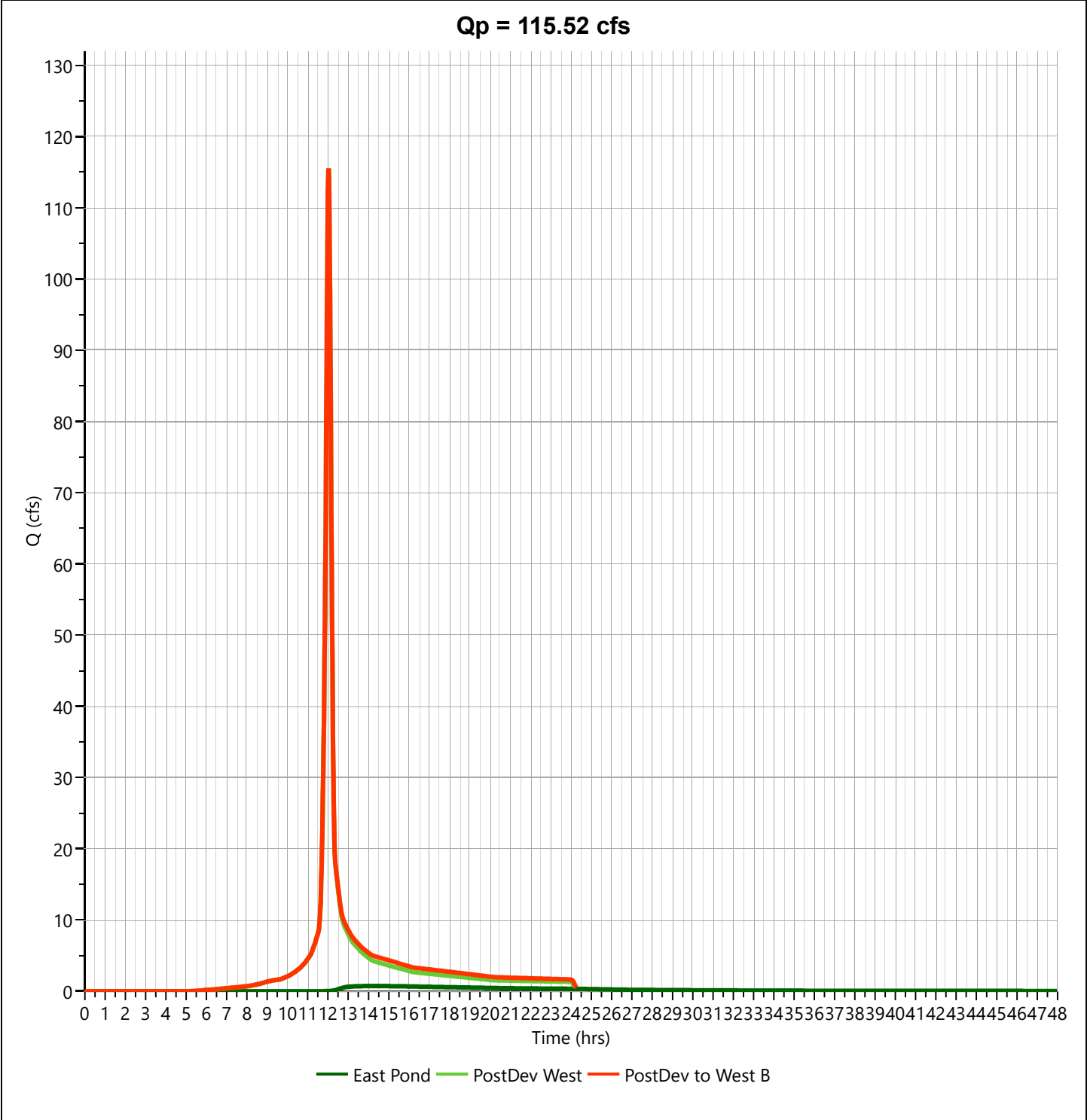
Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5

Hydrograph Type	= Junction	Peak Flow	= 115.5 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 347,897 cuft
Inflow Hydrographs	= 3, 4	Total Contrib. Area	= 36.253 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

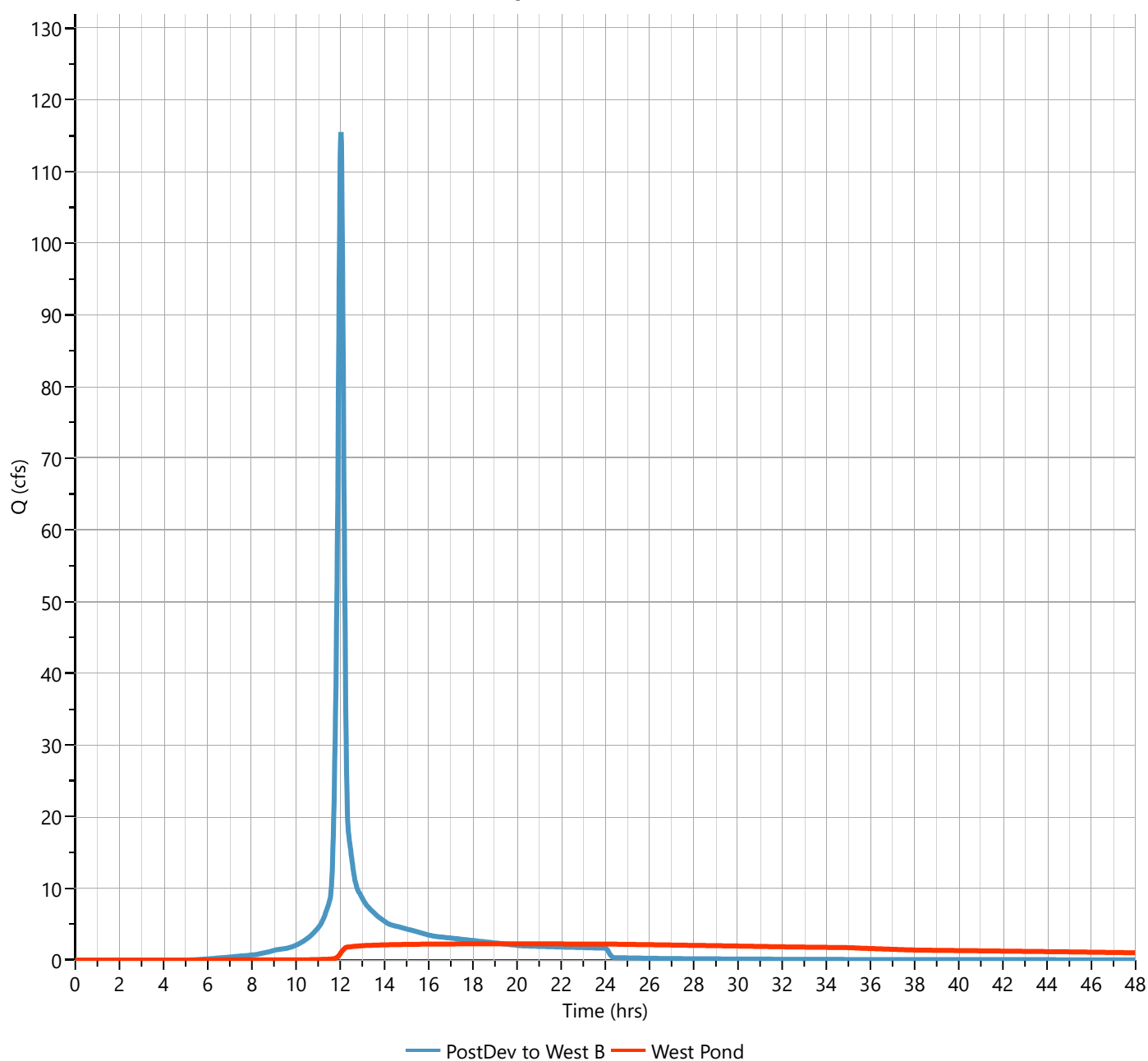
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 2.255 cfs
Storm Frequency	= 5-yr	Time to Peak	= 19.37 hrs
Time Interval	= 1 min	Hydrograph Volume	= 232,801 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 594.57 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 637,014 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 14.03 hrs

Qp = 2.25 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

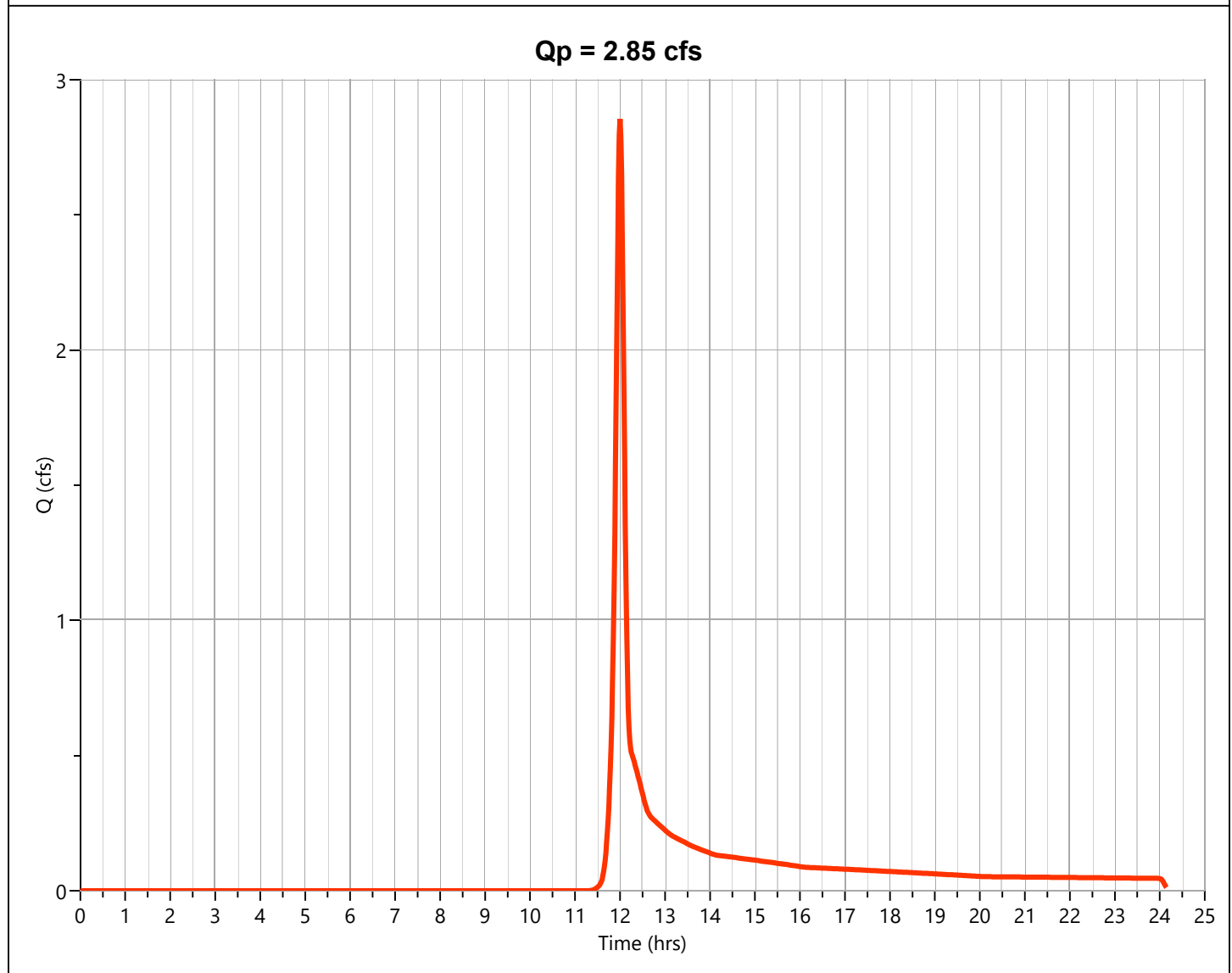
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.854 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 6,733 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.47 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

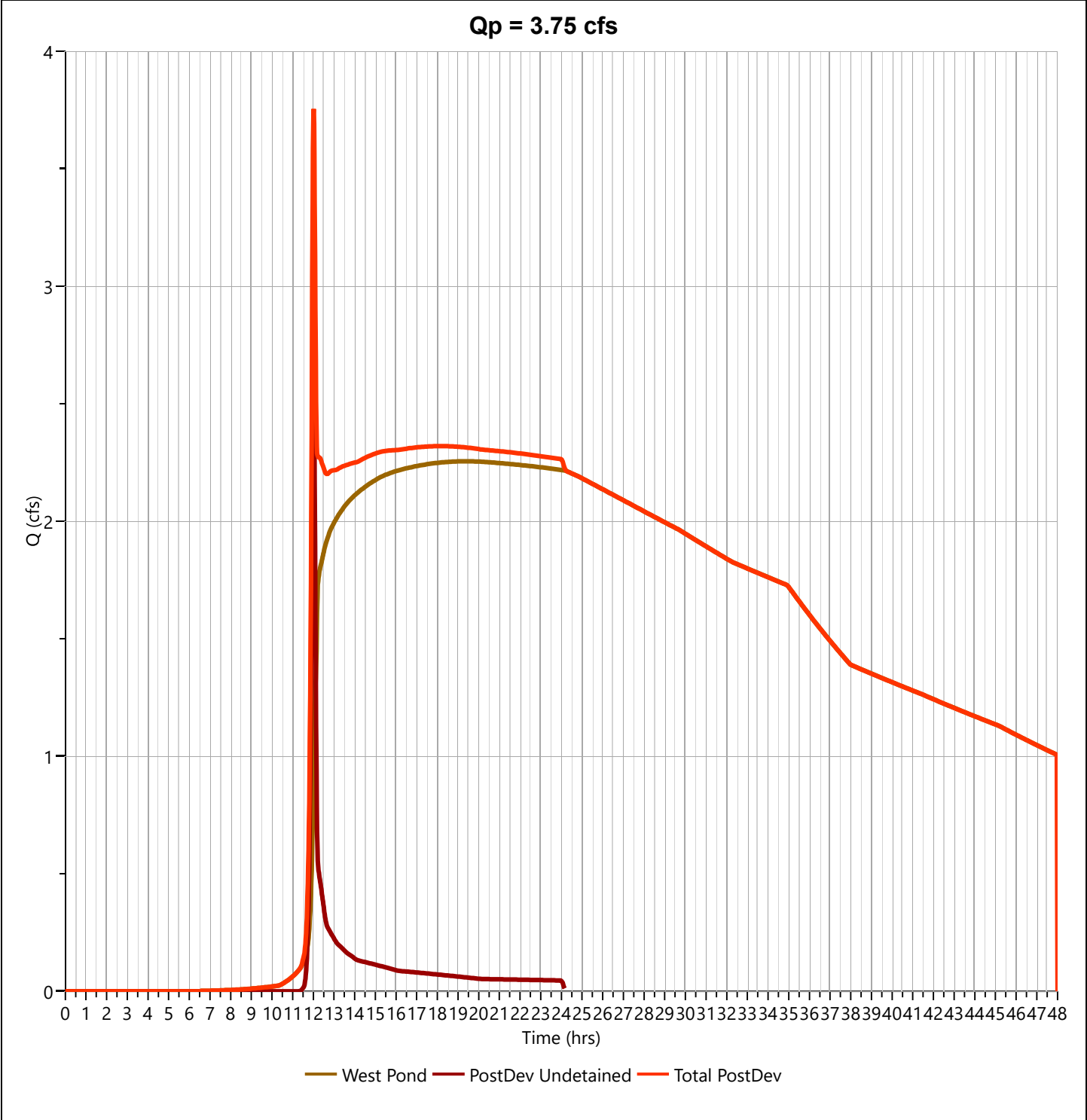
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 3.754 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.02 hrs
Time Interval	= 1 min	Hydrograph Volume	= 239,535 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 10-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

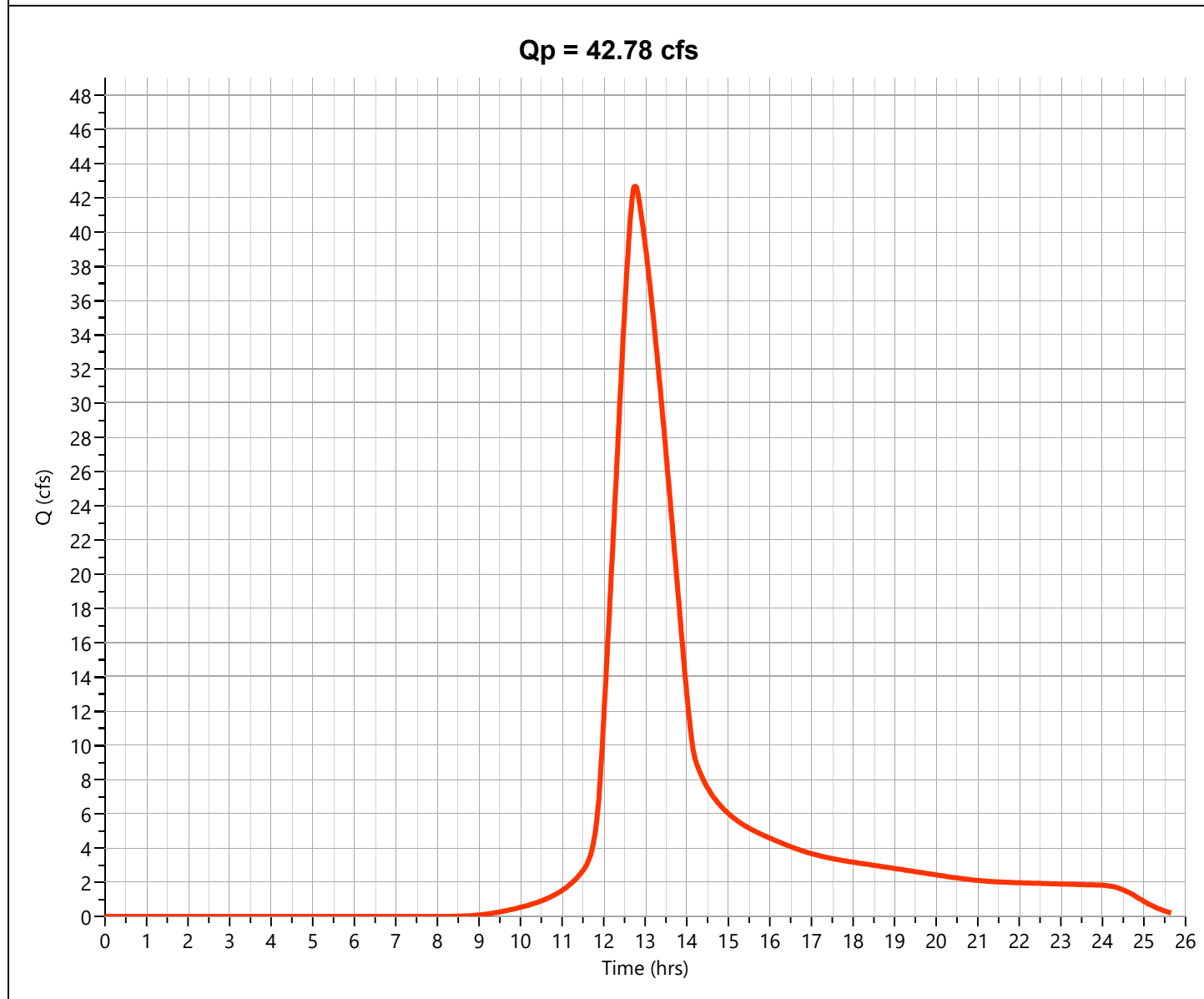
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 42.78 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.75 hrs
Time Interval	= 1 min	Runoff Volume	= 359,021 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 3.96 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

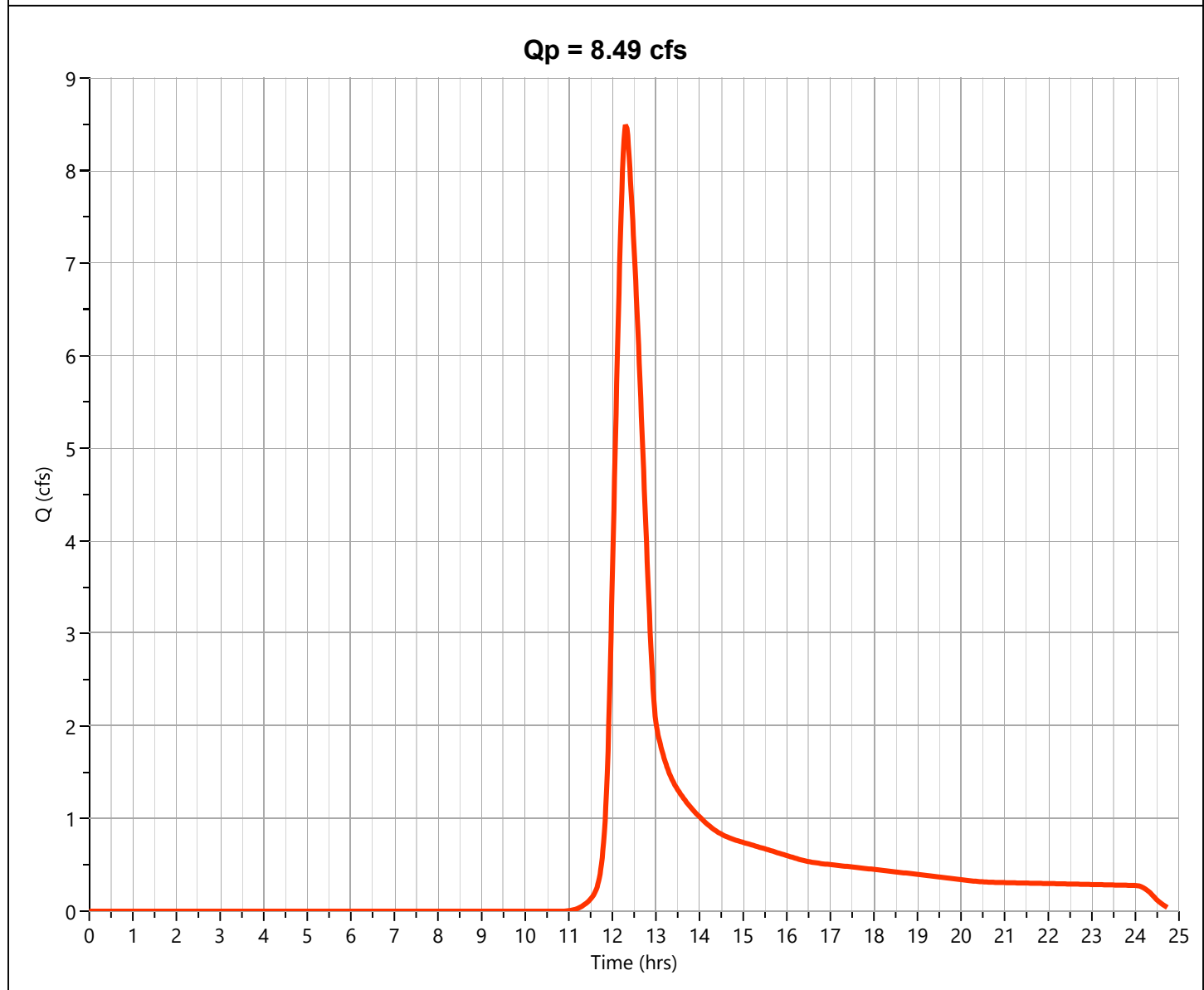
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 8.493 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.30 hrs
Time Interval	= 1 min	Runoff Volume	= 44,226 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 3.96 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

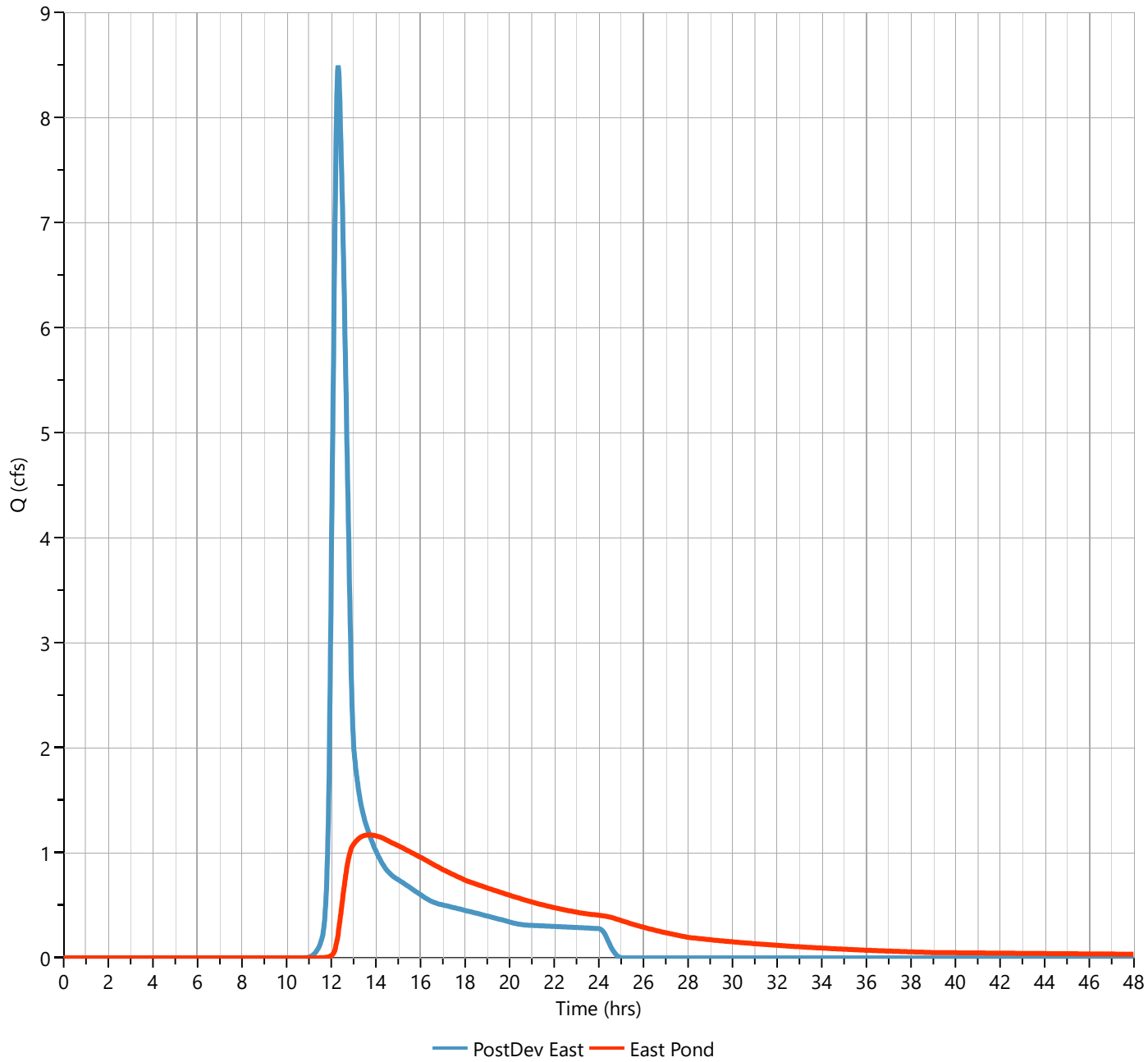
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 1.169 cfs
Storm Frequency	= 10-yr	Time to Peak	= 13.72 hrs
Time Interval	= 1 min	Hydrograph Volume	= 41,410 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.52 ft
Pond Name	= East pond	Max. Storage	= 21,410 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 5.74 hrs

Qp = 1.17 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

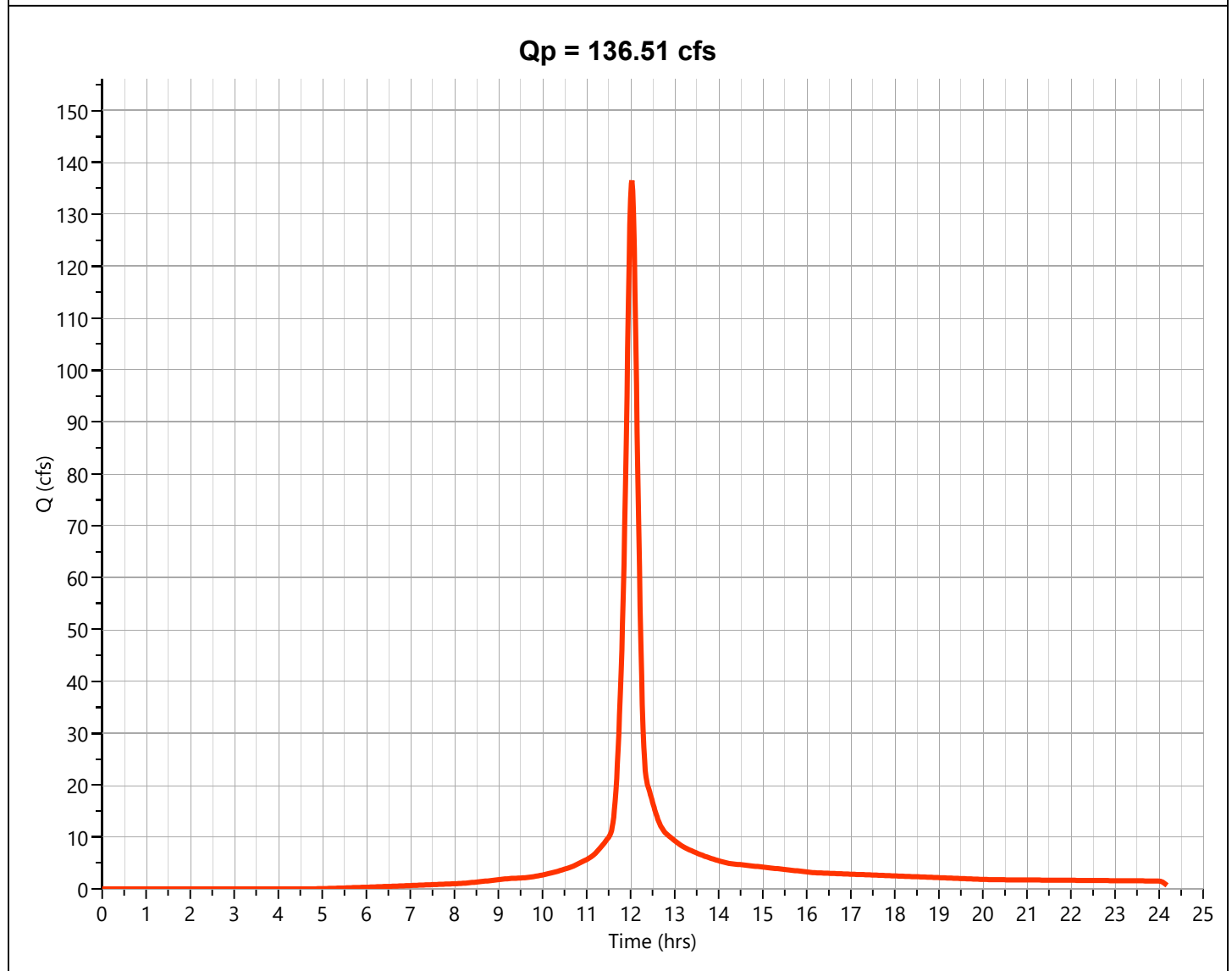
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 136.5 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 377,646 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 3.96 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

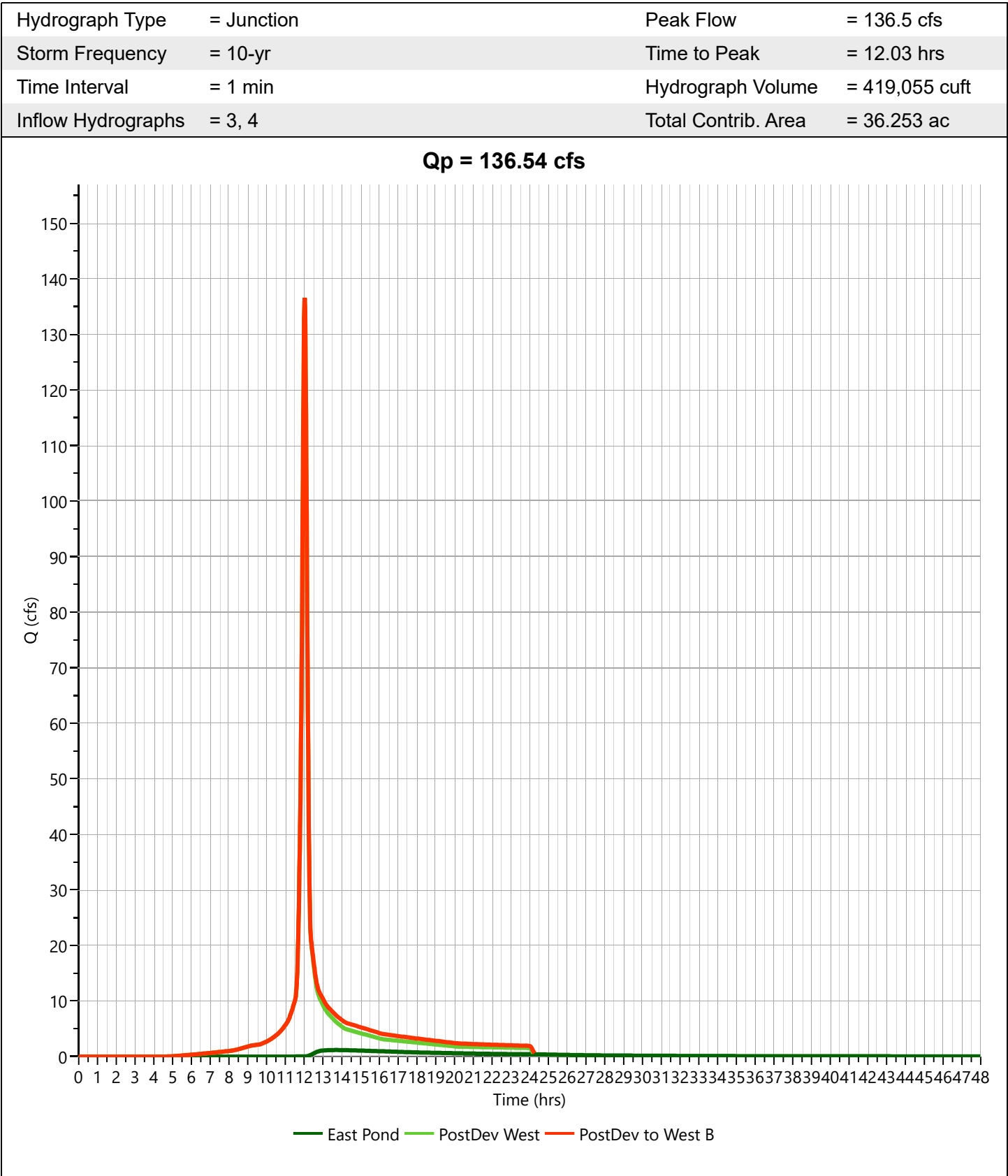
Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

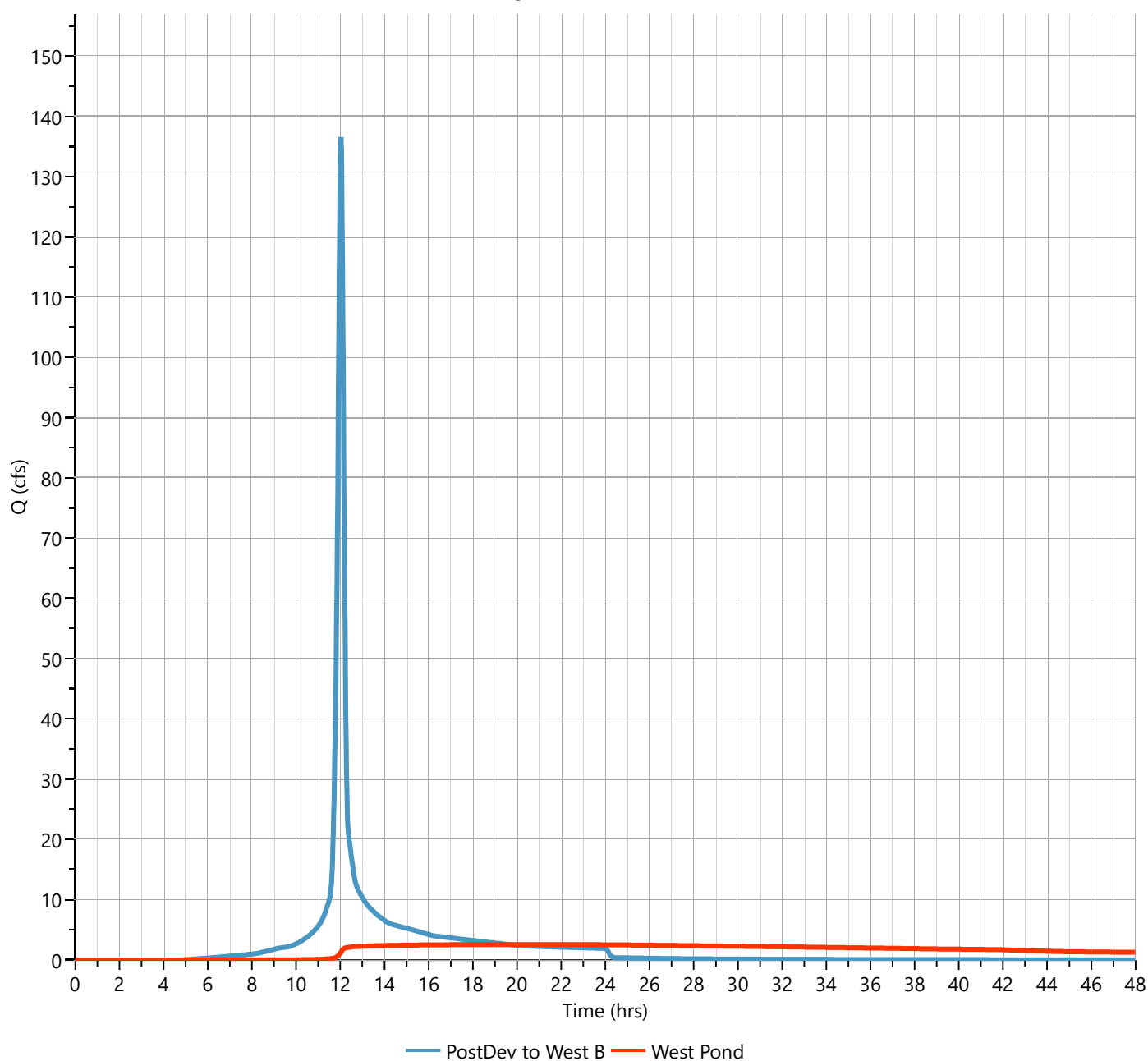
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 2.560 cfs
Storm Frequency	= 10-yr	Time to Peak	= 19.67 hrs
Time Interval	= 1 min	Hydrograph Volume	= 277,159 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 594.91 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 692,950 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 14.53 hrs

Qp = 2.56 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

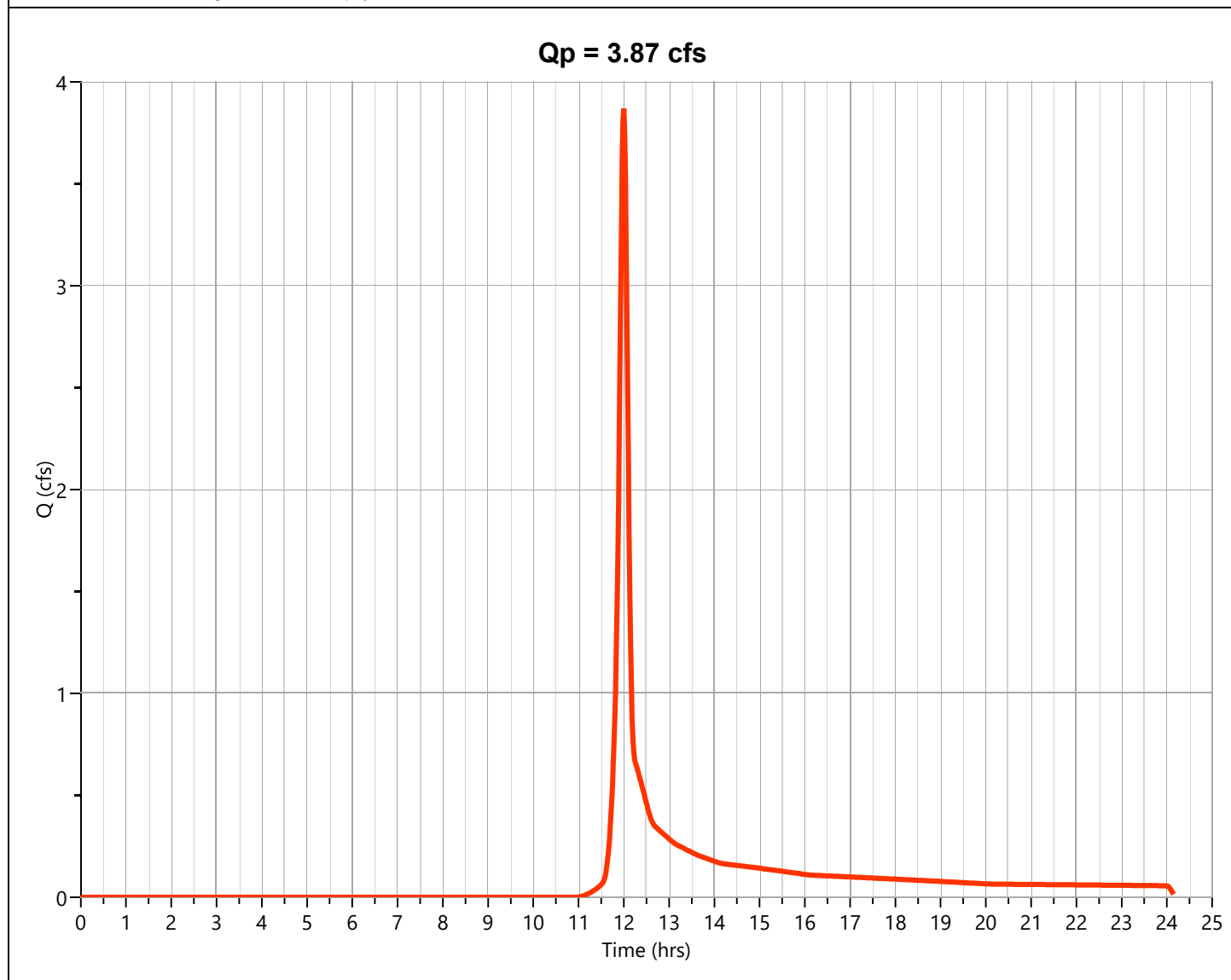
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.868 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 8,927 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.96 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

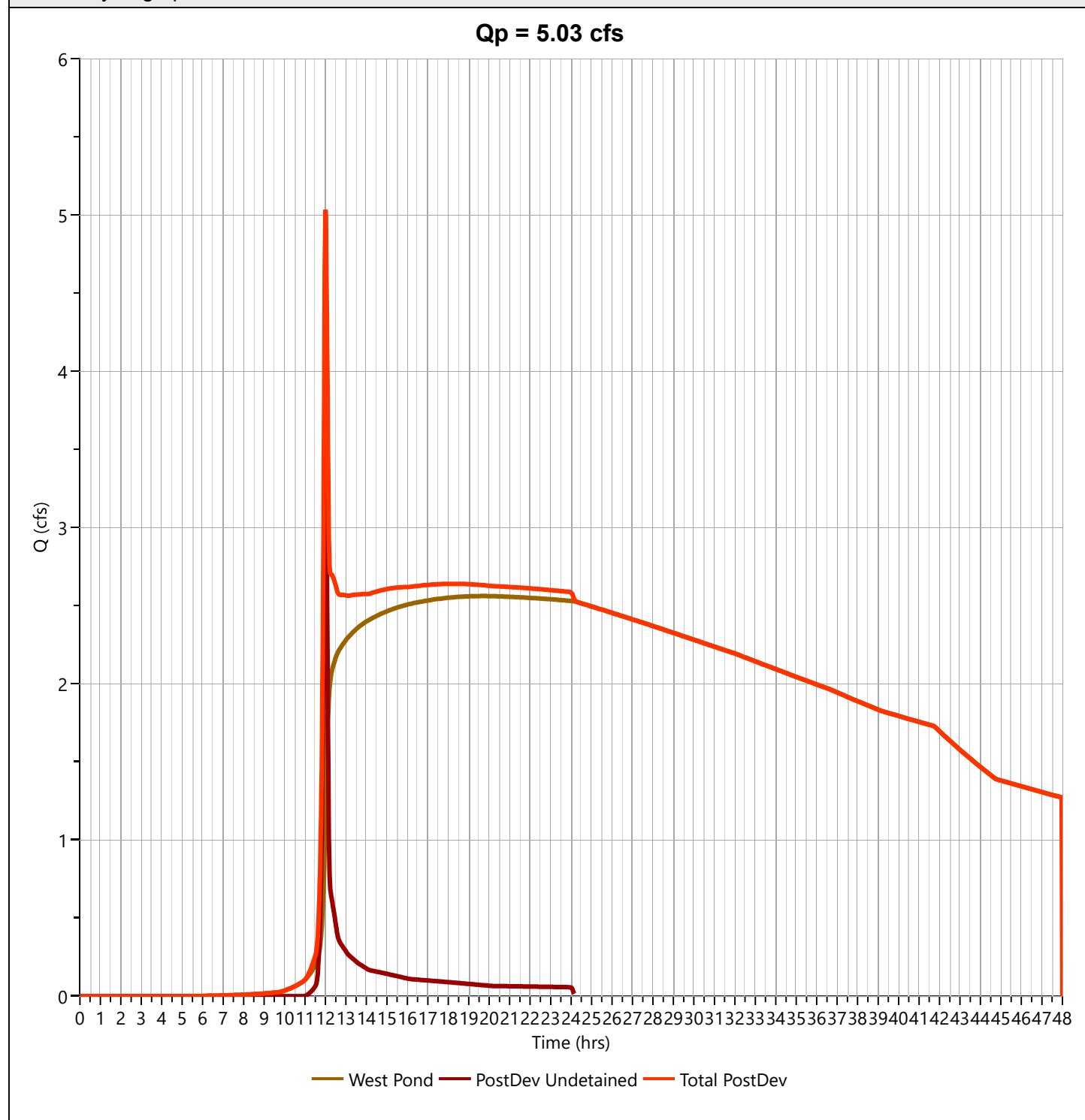
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 5.032 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 286,085 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 25-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

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Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

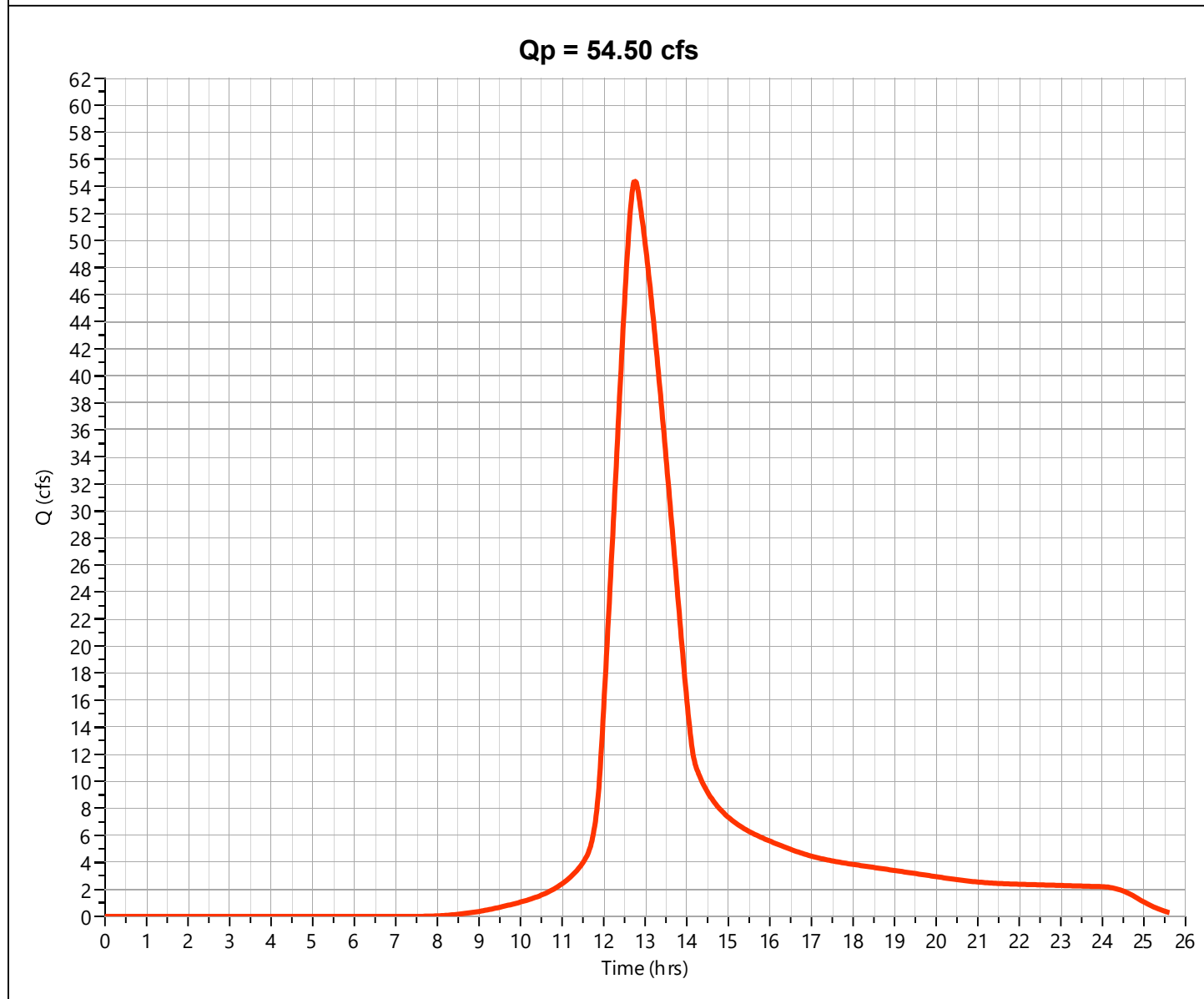
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 54.50 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.75 hrs
Time Interval	= 1 min	Runoff Volume	= 454,547 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 4.61 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

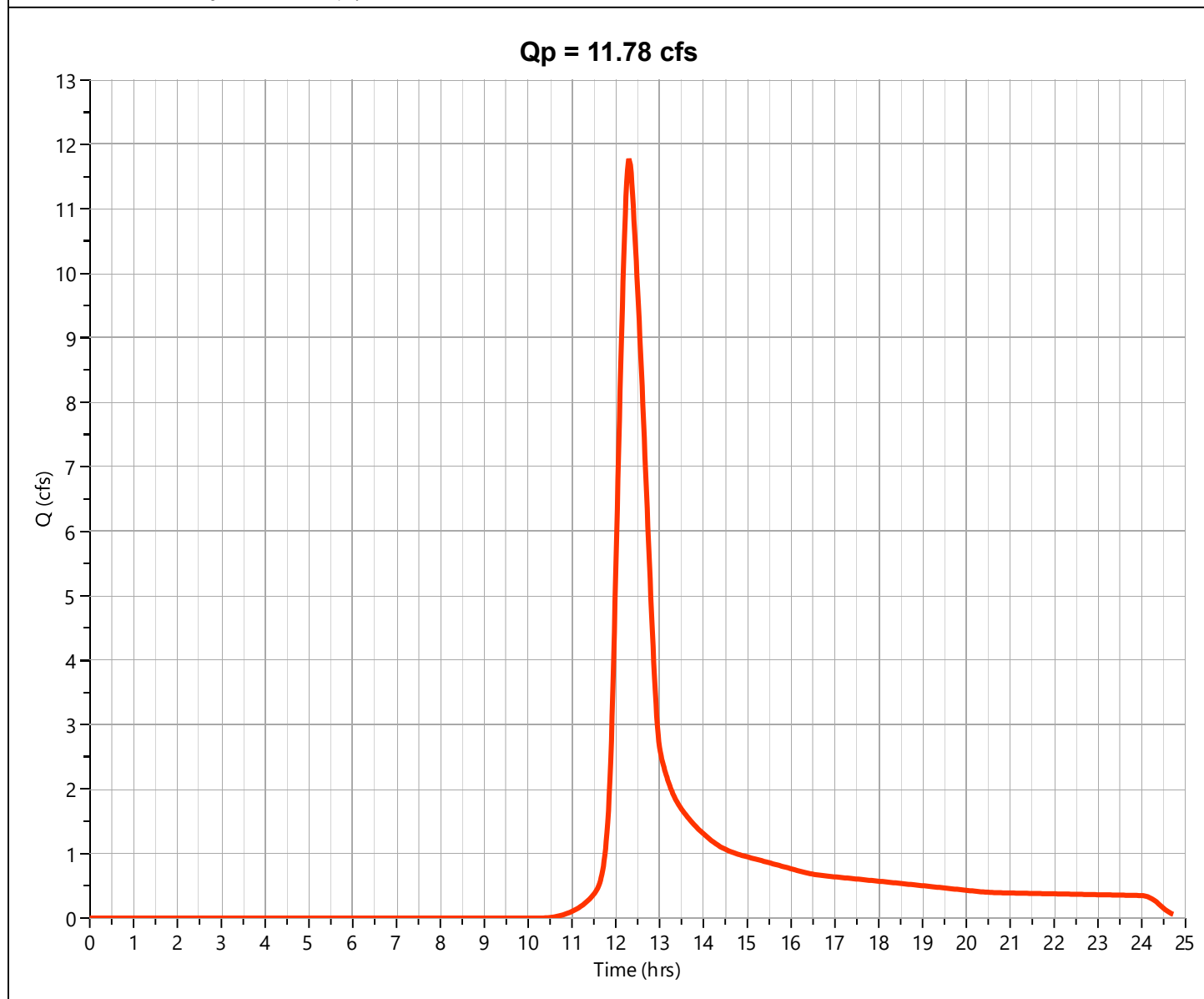
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 11.78 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.30 hrs
Time Interval	= 1 min	Runoff Volume	= 59,465 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 4.61 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

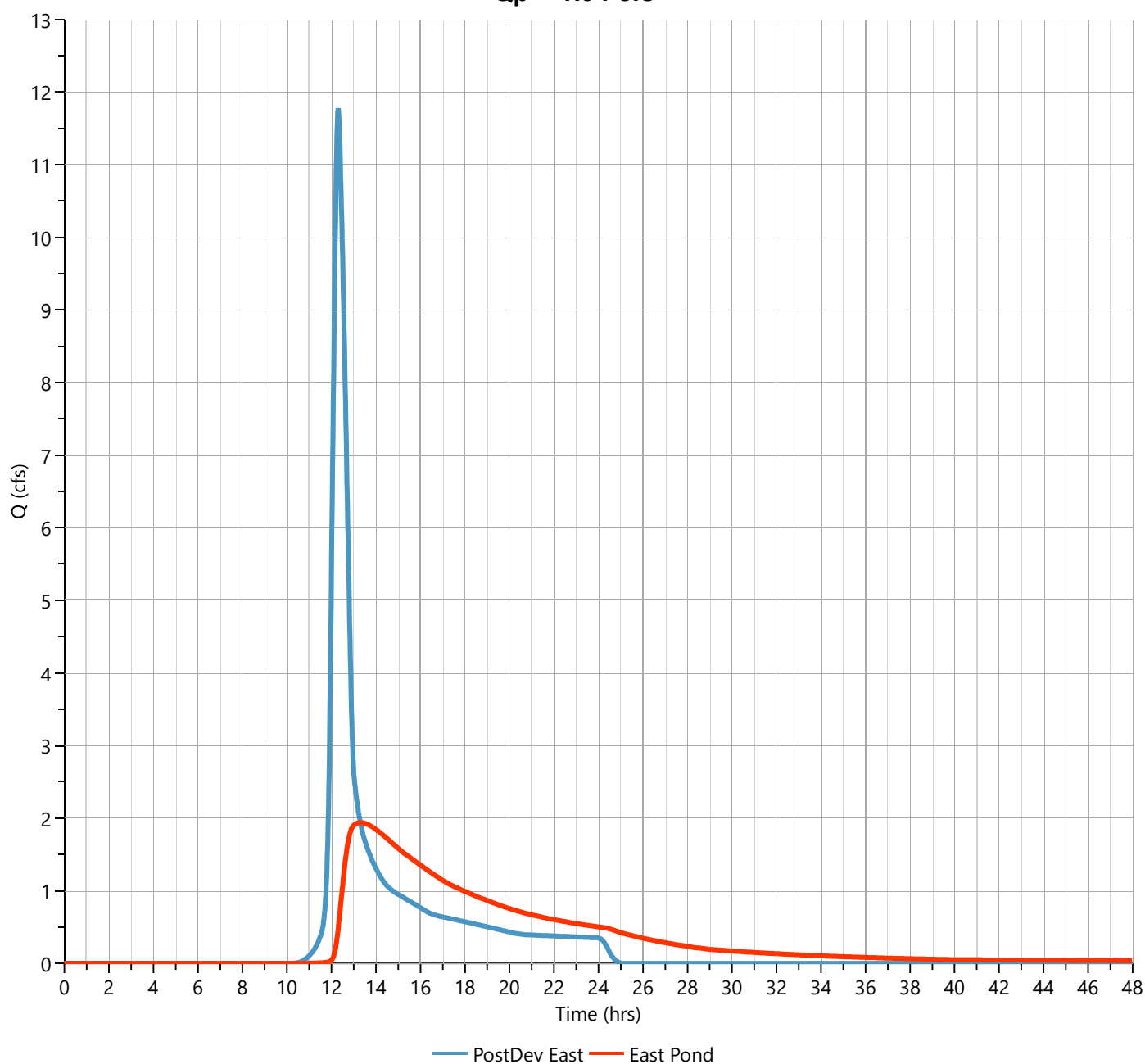
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 1.938 cfs
Storm Frequency	= 25-yr	Time to Peak	= 13.30 hrs
Time Interval	= 1 min	Hydrograph Volume	= 56,541 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.68 ft
Pond Name	= East pond	Max. Storage	= 28,425 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 5.03 hrs

Qp = 1.94 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

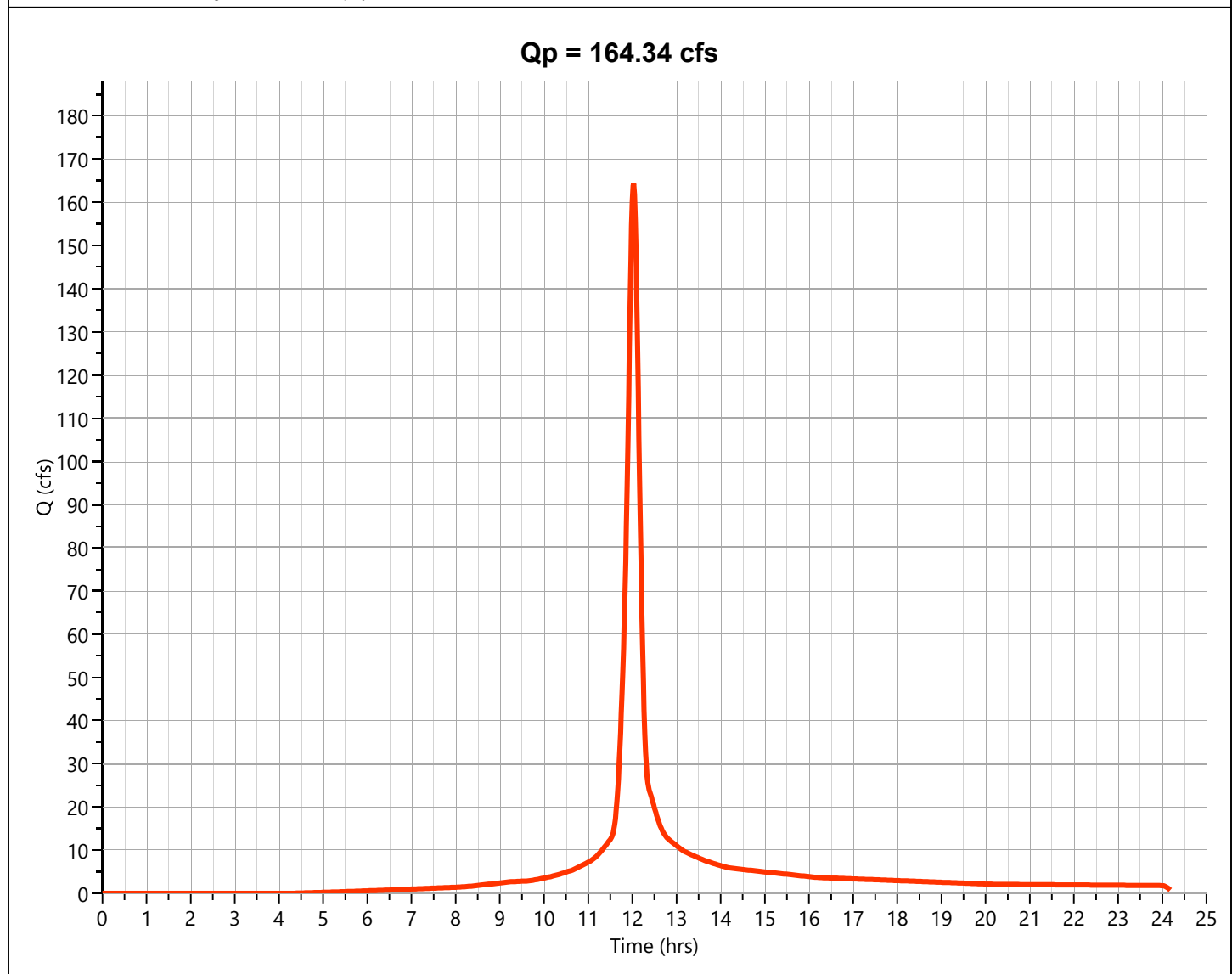
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 164.3 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 459,136 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 4.61 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

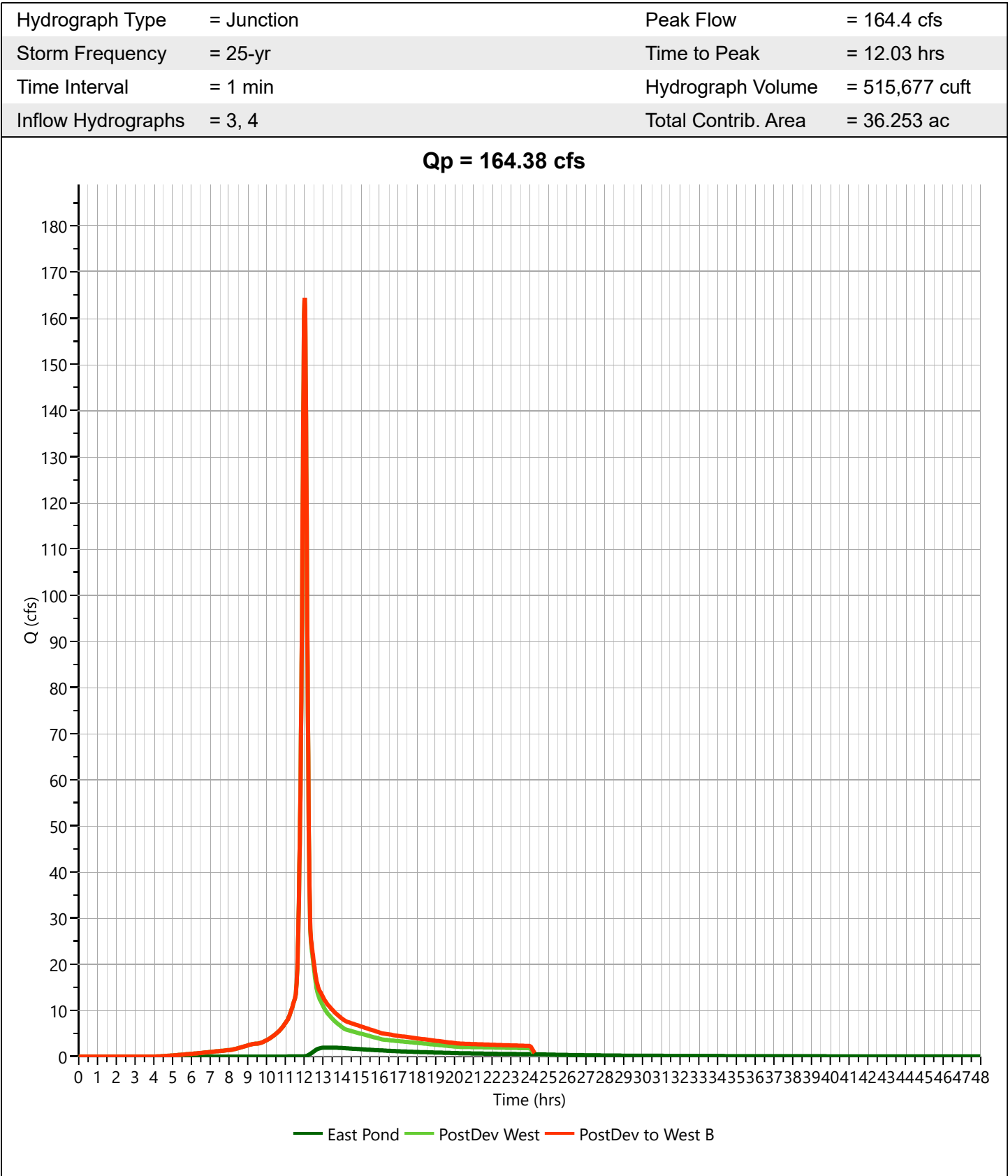
Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

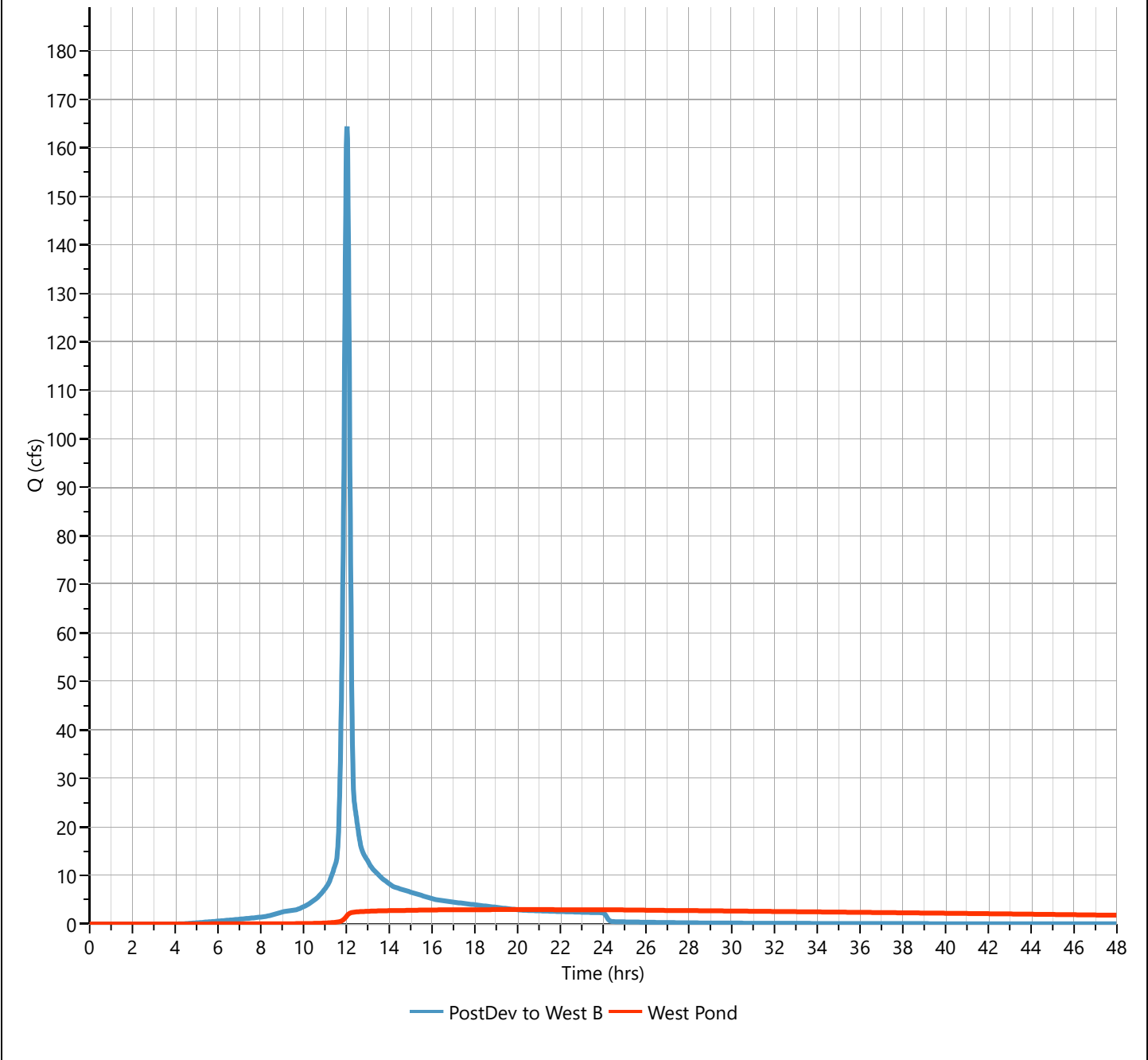
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 2.947 cfs
Storm Frequency	= 25-yr	Time to Peak	= 19.93 hrs
Time Interval	= 1 min	Hydrograph Volume	= 330,710 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 595.37 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 770,512 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 15.03 hrs

Qp = 2.95 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

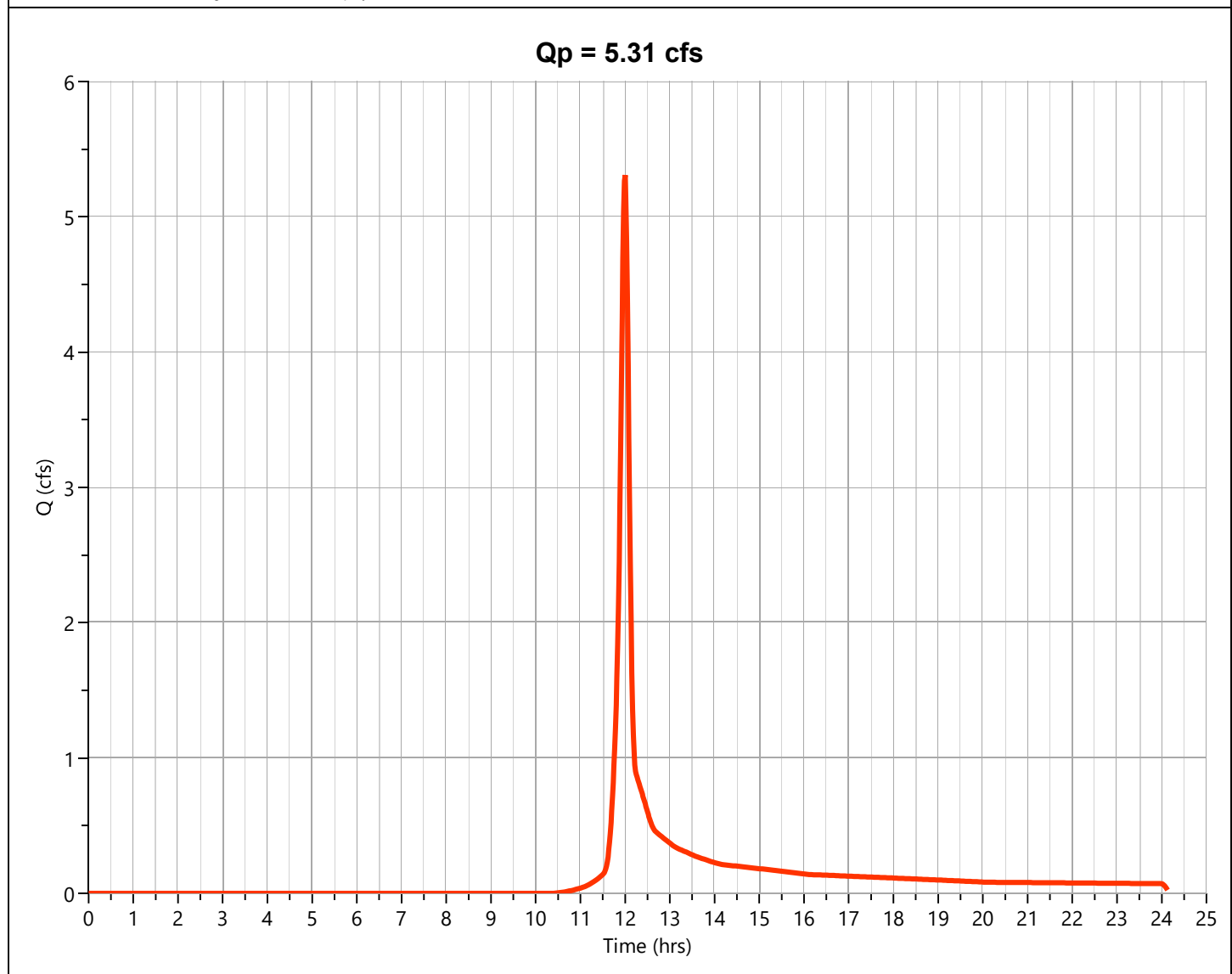
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.307 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 12,082 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.61 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

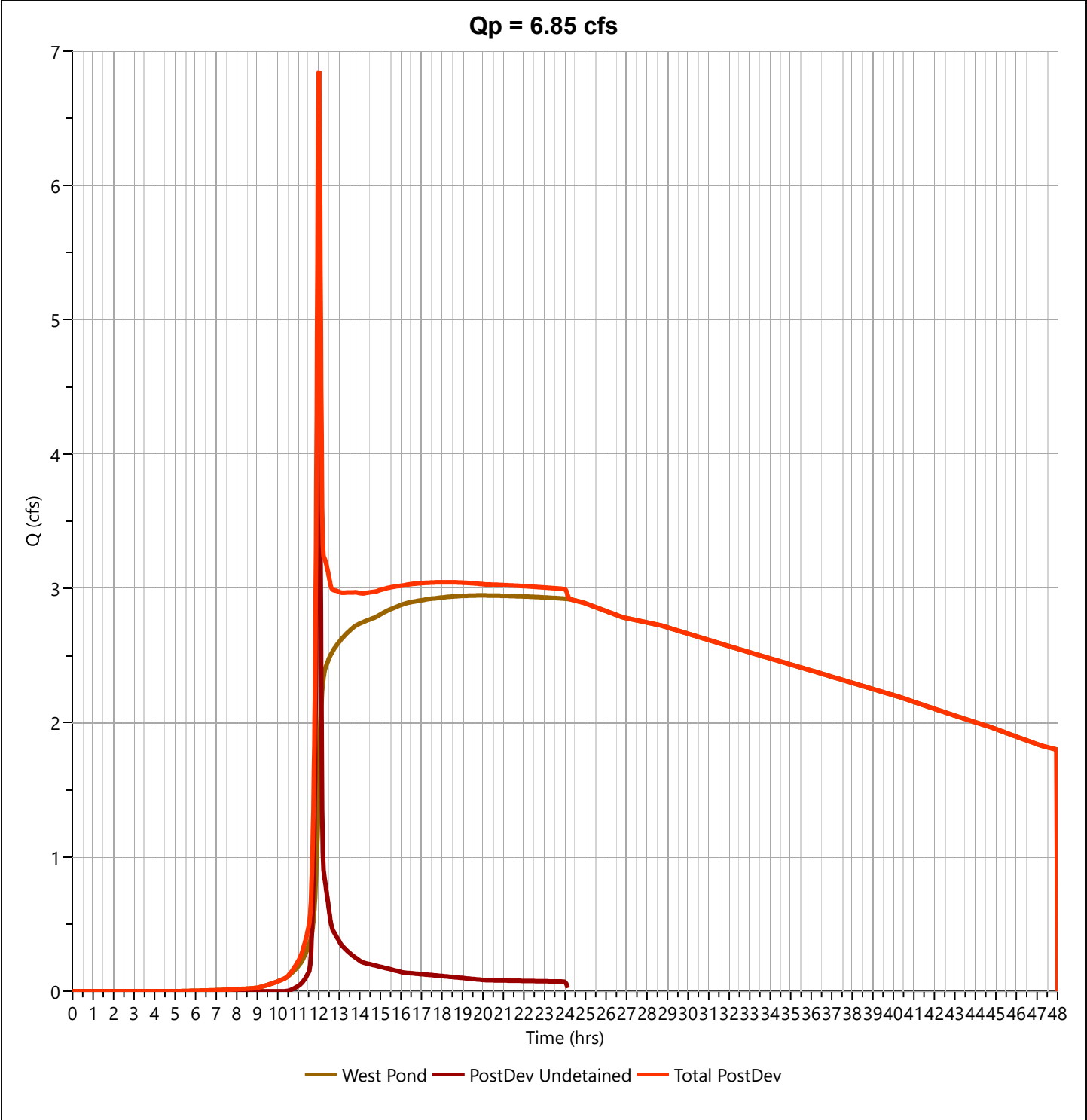
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 6.853 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.02 hrs
Time Interval	= 1 min	Hydrograph Volume	= 342,792 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 50-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

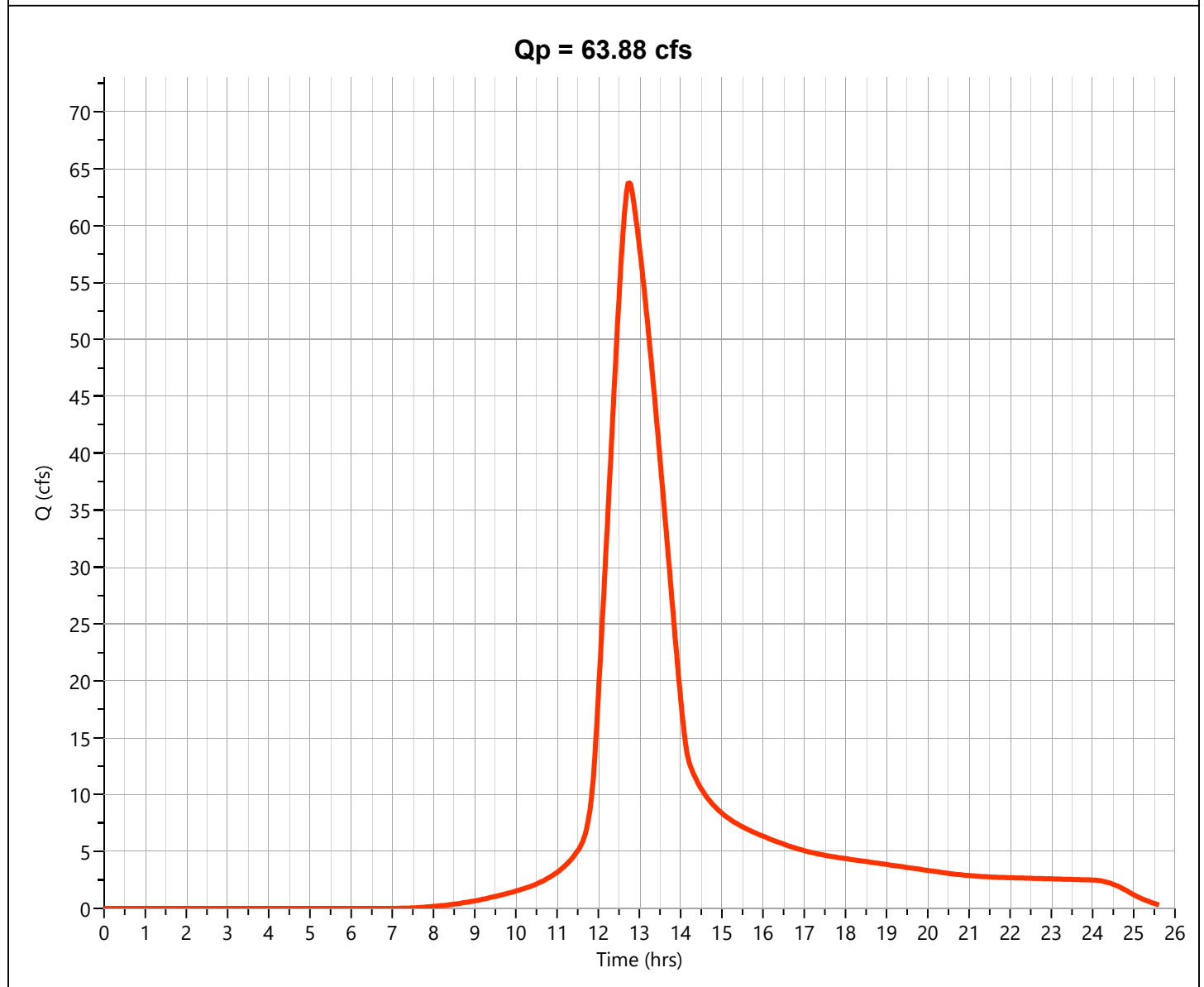
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 63.88 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.75 hrs
Time Interval	= 1 min	Runoff Volume	= 531,611 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 5.12 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

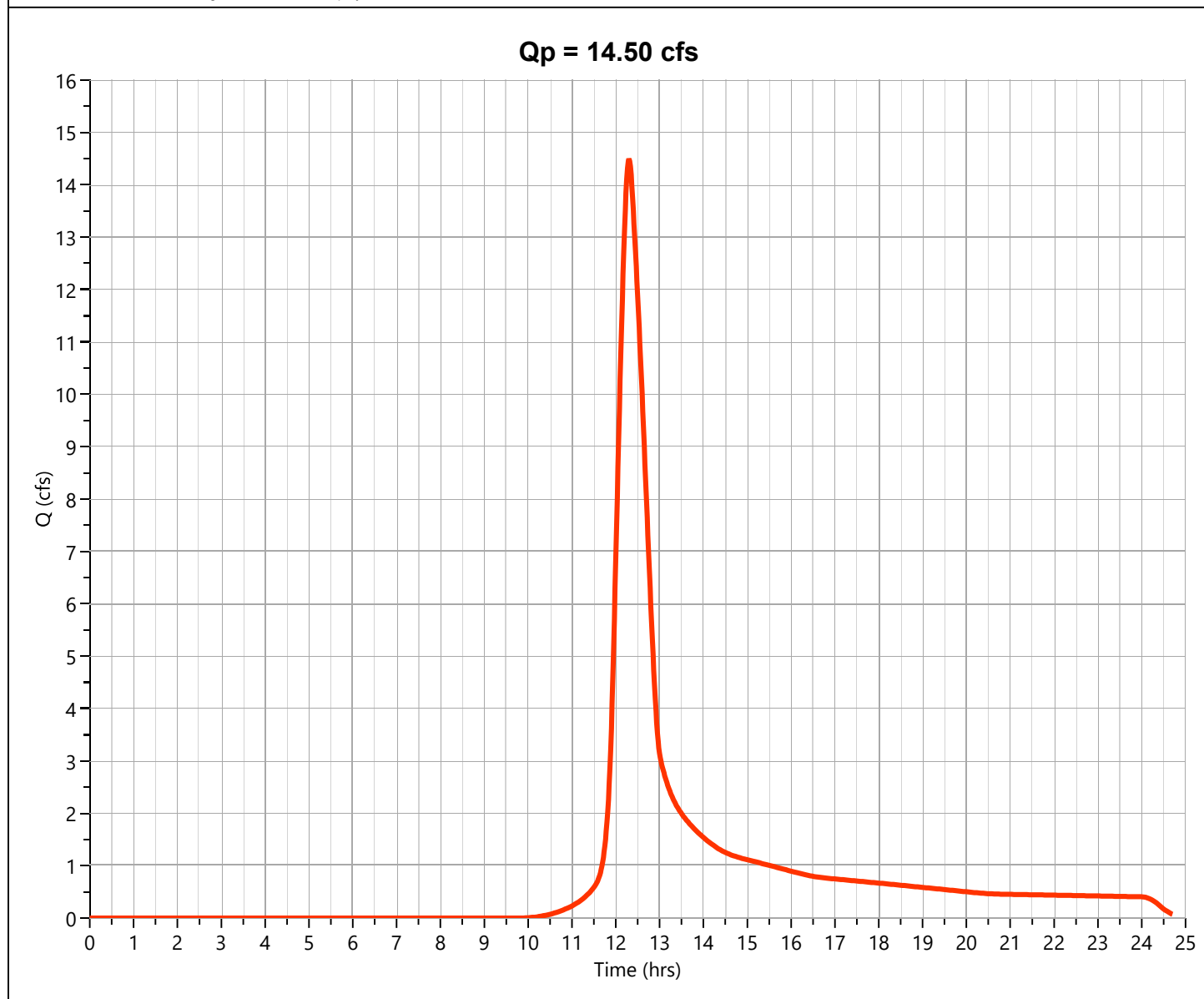
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 14.50 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.30 hrs
Time Interval	= 1 min	Runoff Volume	= 72,148 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 5.12 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

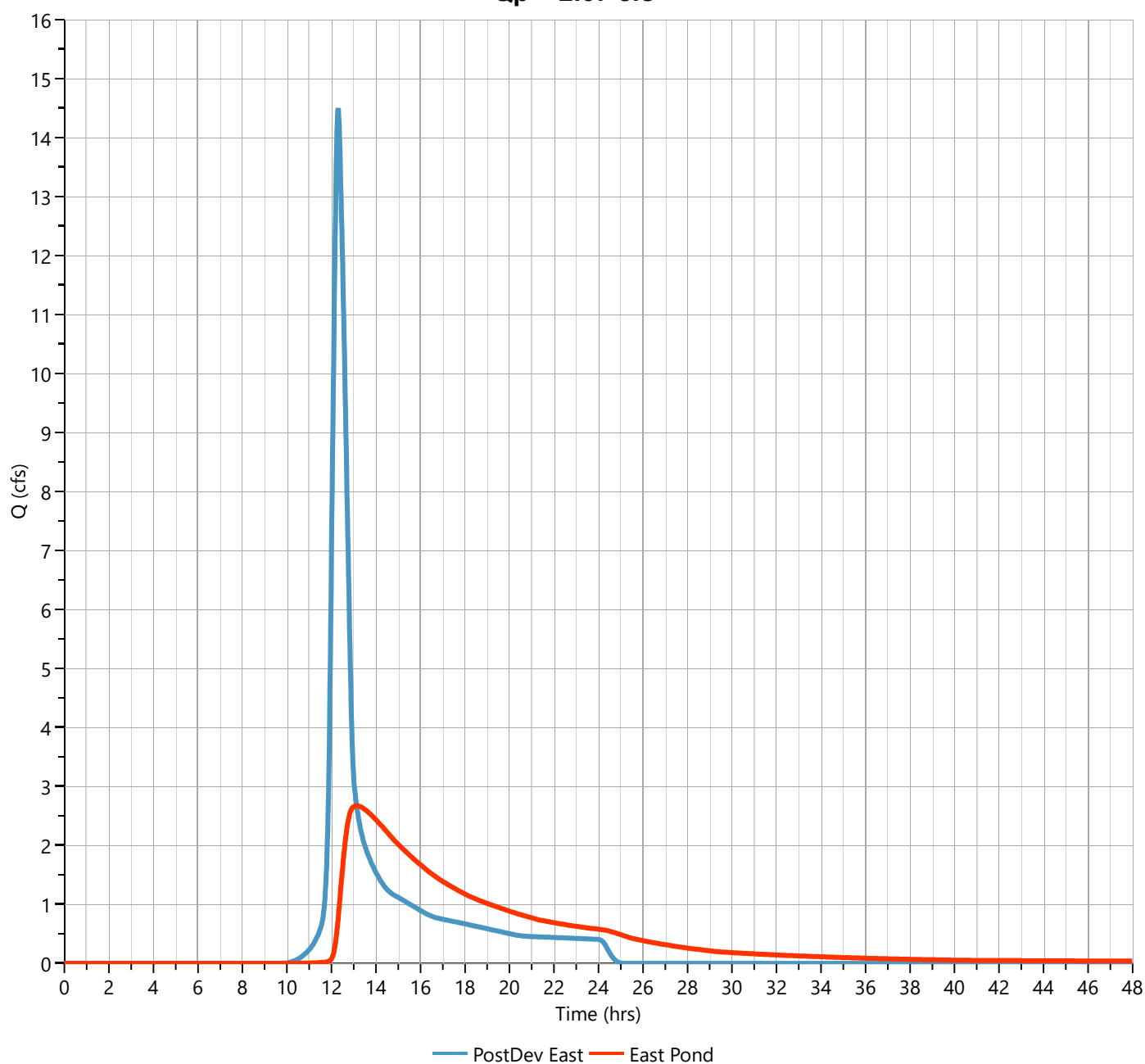
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 2.669 cfs
Storm Frequency	= 50-yr	Time to Peak	= 13.13 hrs
Time Interval	= 1 min	Hydrograph Volume	= 69,157 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.83 ft
Pond Name	= East pond	Max. Storage	= 34,373 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 4.62 hrs

Qp = 2.67 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

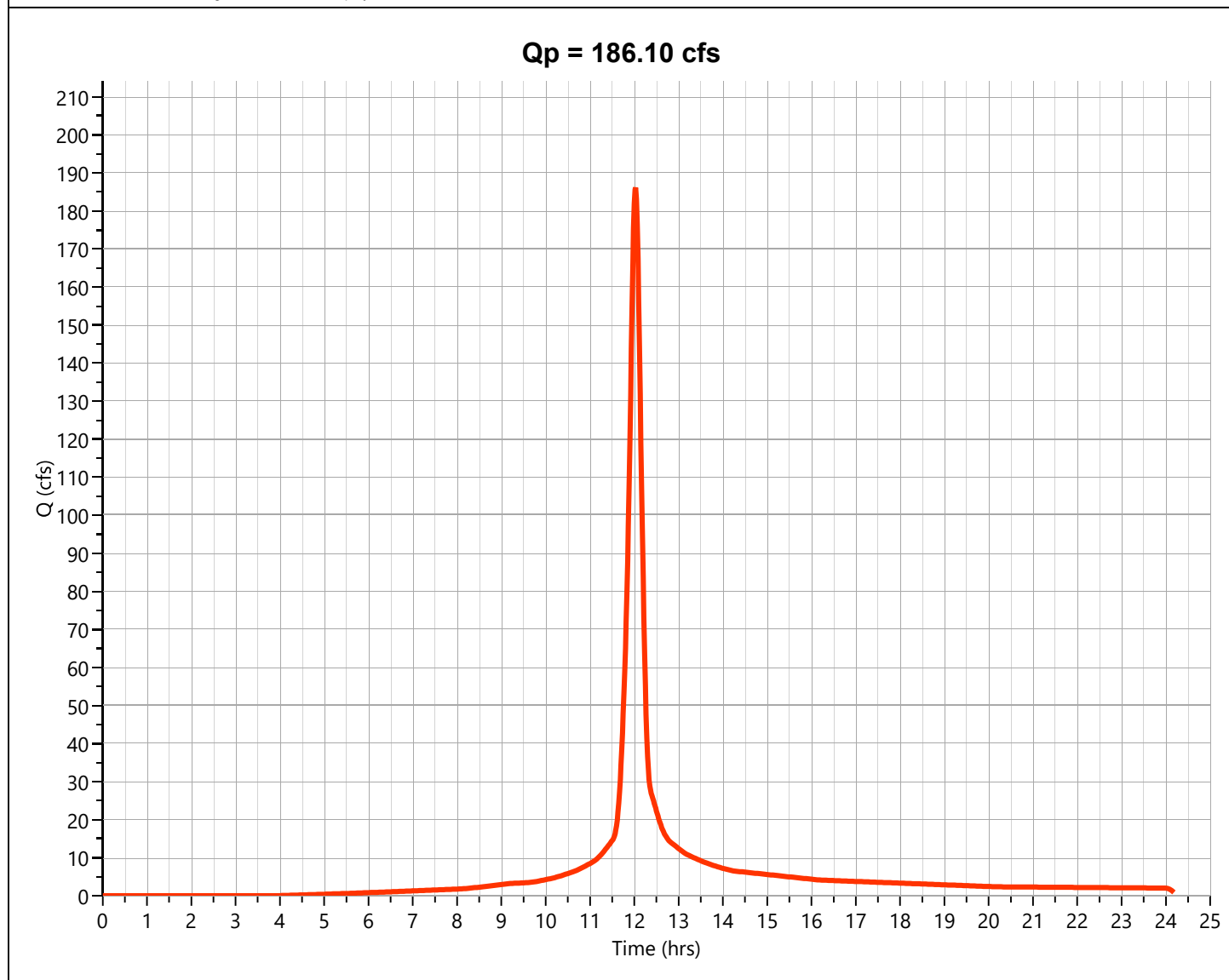
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 186.1 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 523,686 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 5.12 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

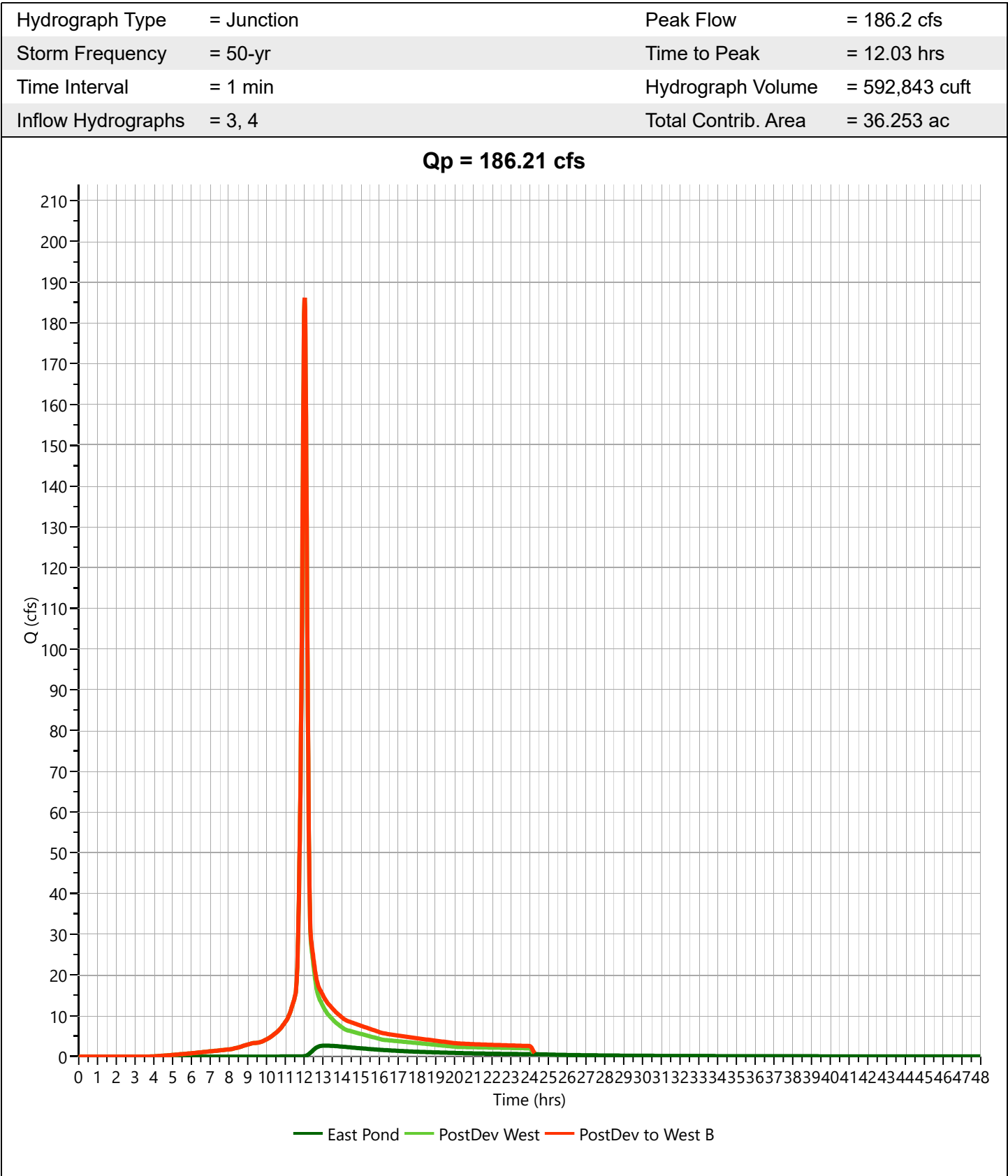
Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5



Hydrograph Report

Project Name:

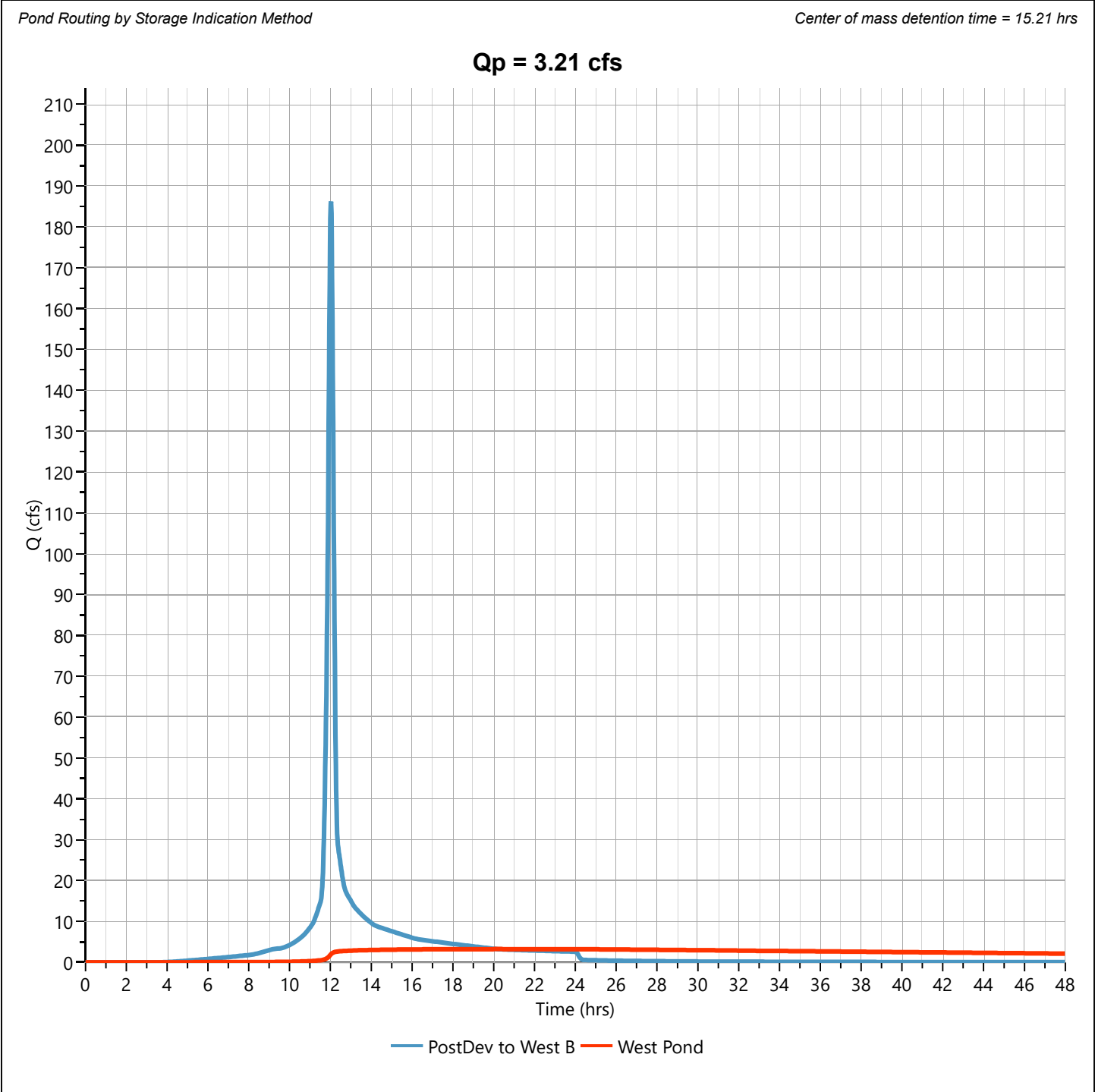
Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 3.211 cfs
Storm Frequency	= 50-yr	Time to Peak	= 20.18 hrs
Time Interval	= 1 min	Hydrograph Volume	= 367,372 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 595.74 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 833,581 cuft



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

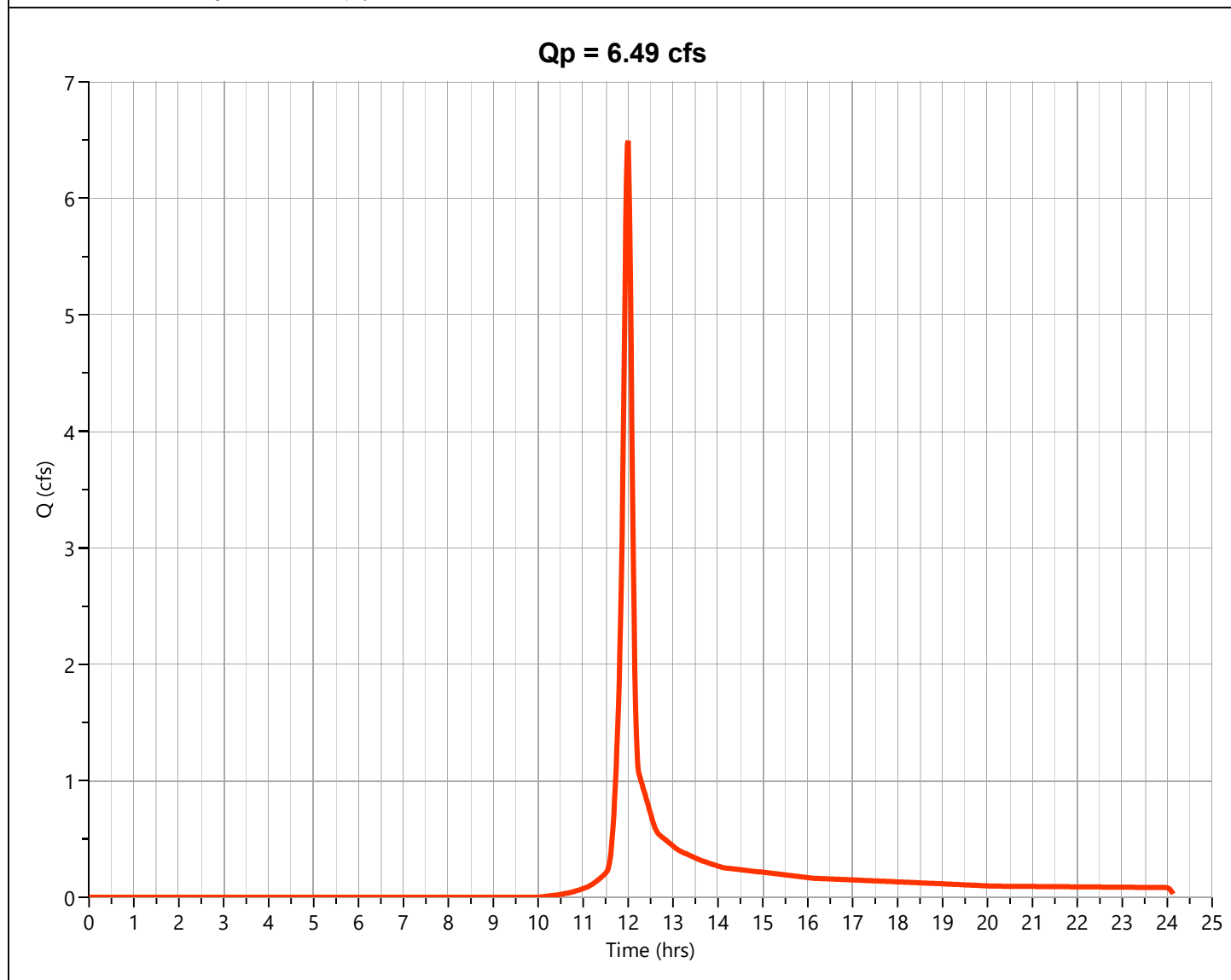
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.493 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 14,718 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.12 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

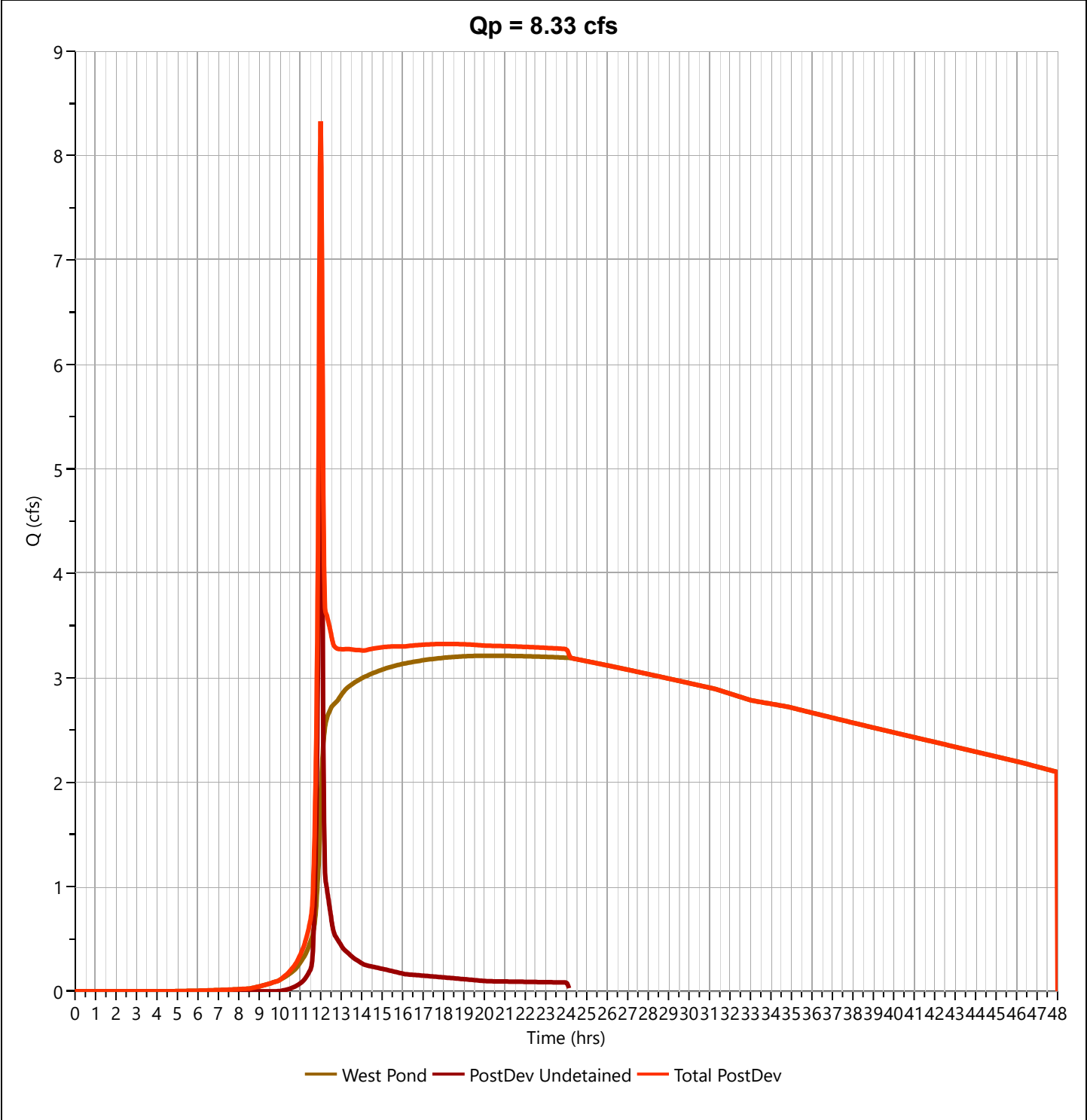
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 8.327 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 382,090 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Hydrograph 100-yr Summary

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

[illegible]

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

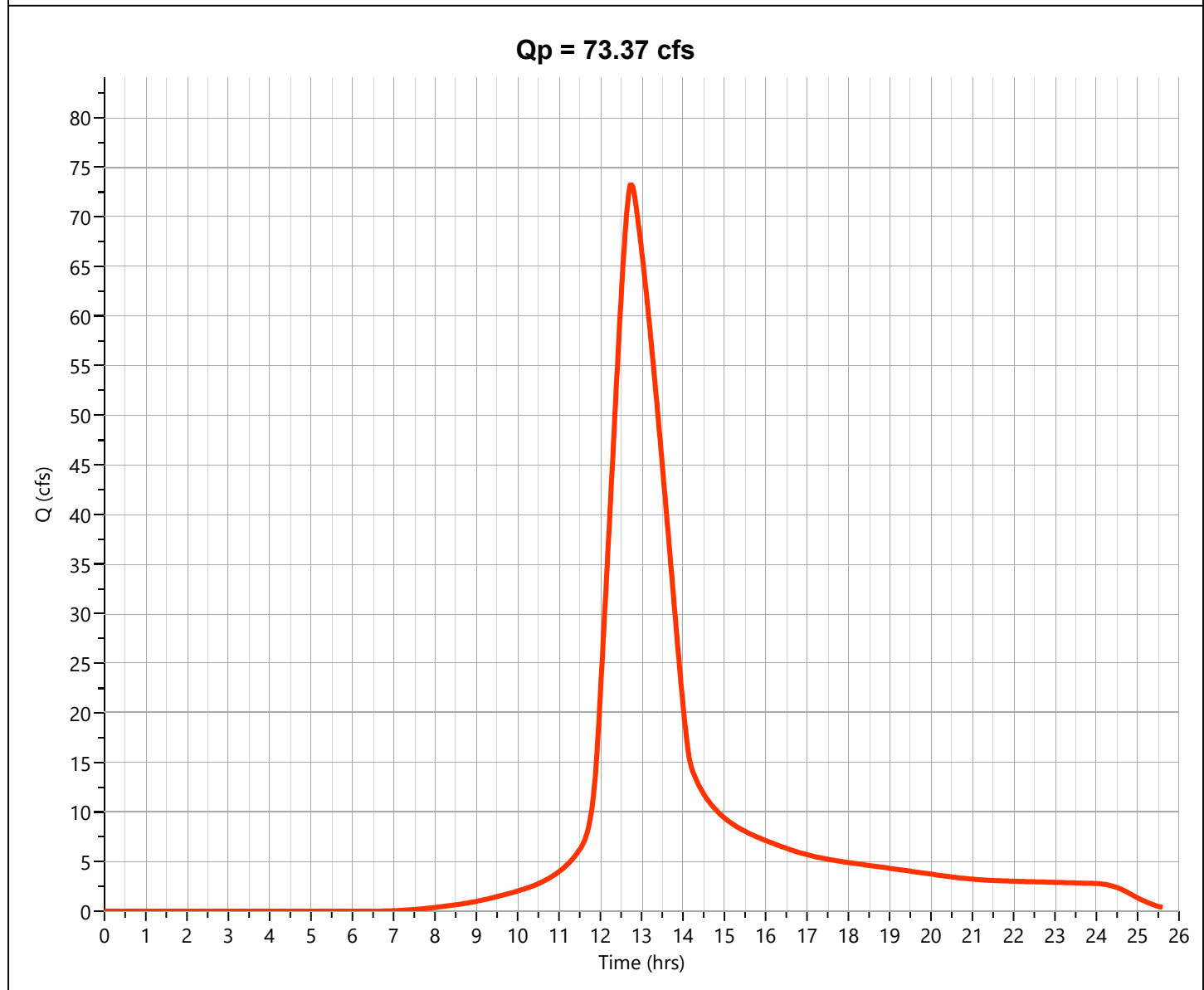
PreDev Site

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 73.37 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.75 hrs
Time Interval	= 1 min	Runoff Volume	= 610,119 cuft
Drainage Area	= 47.37 ac	Curve Number	= 81*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 85.34 min
Total Rainfall	= 5.63 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
28.22	78	Row Crops Type B/D
19.151	85	Row Crops Type C/D
47.37	81	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

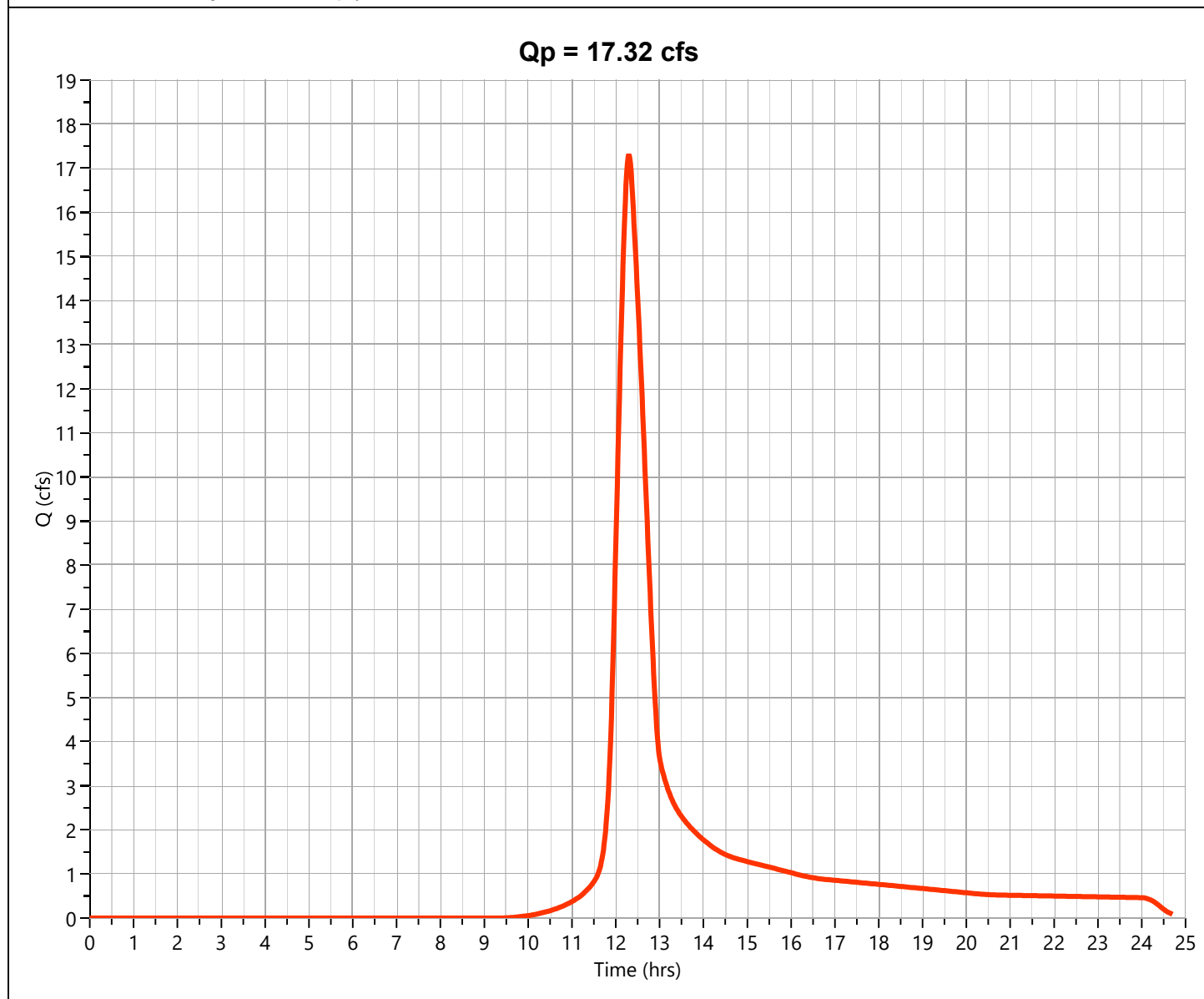
PostDev East

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 17.32 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.30 hrs
Time Interval	= 1 min	Runoff Volume	= 85,352 cuft
Drainage Area	= 9.35 ac	Curve Number	= 70*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 39.79 min
Total Rainfall	= 5.63 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
7.149	61	Pasture Type B/D
2.201	98	Impervious
9.35	70	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

East Pond

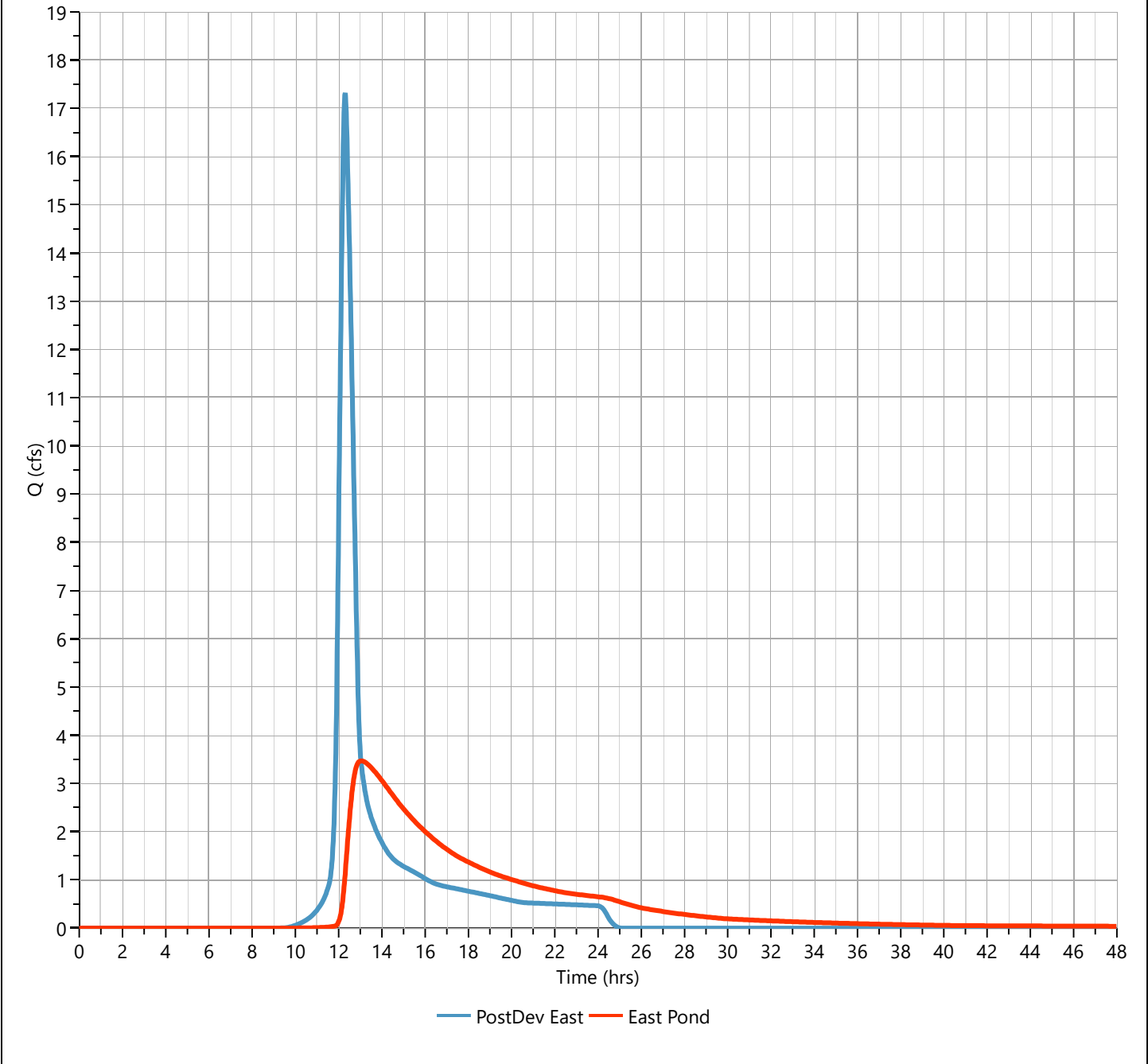
Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 3.468 cfs
Storm Frequency	= 100-yr	Time to Peak	= 13.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 82,304 cuft
Inflow Hydrograph	= 2 - PostDev East	Max. Elevation	= 603.98 ft
Pond Name	= East pond	Max. Storage	= 40,650 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 4.30 hrs

Qp = 3.47 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

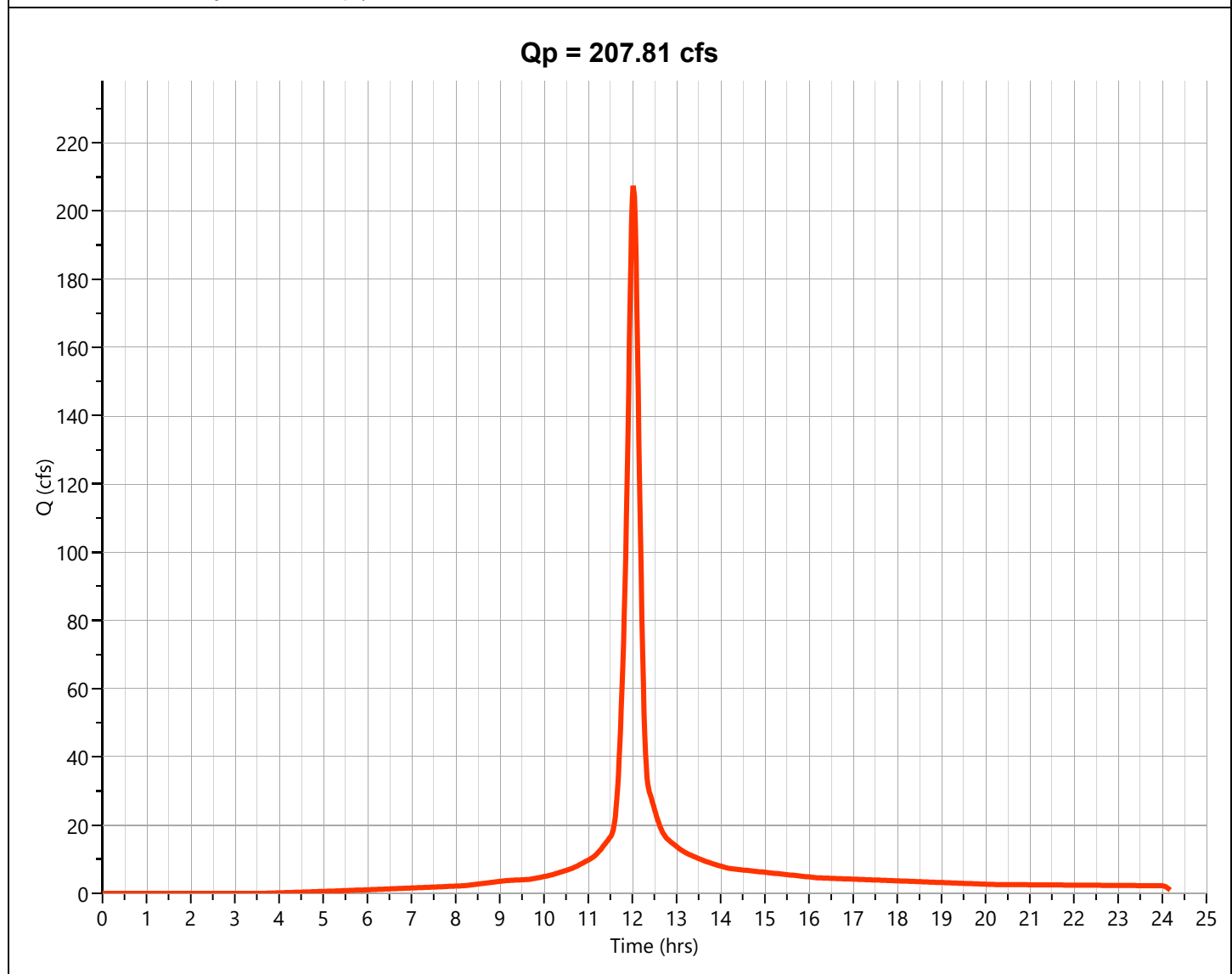
PostDev West

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 207.8 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 588,638 cuft
Drainage Area	= 36.253 ac	Curve Number	= 89.88*
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 5.63 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
2.915	61	Pasture Type B/D
7.765	74	Pasture Type C/D
15.024	98	Impervious C/D
10.549	98	Impervious C/D
36.253	90	Weighted CN Method Employed



Hydrograph Report

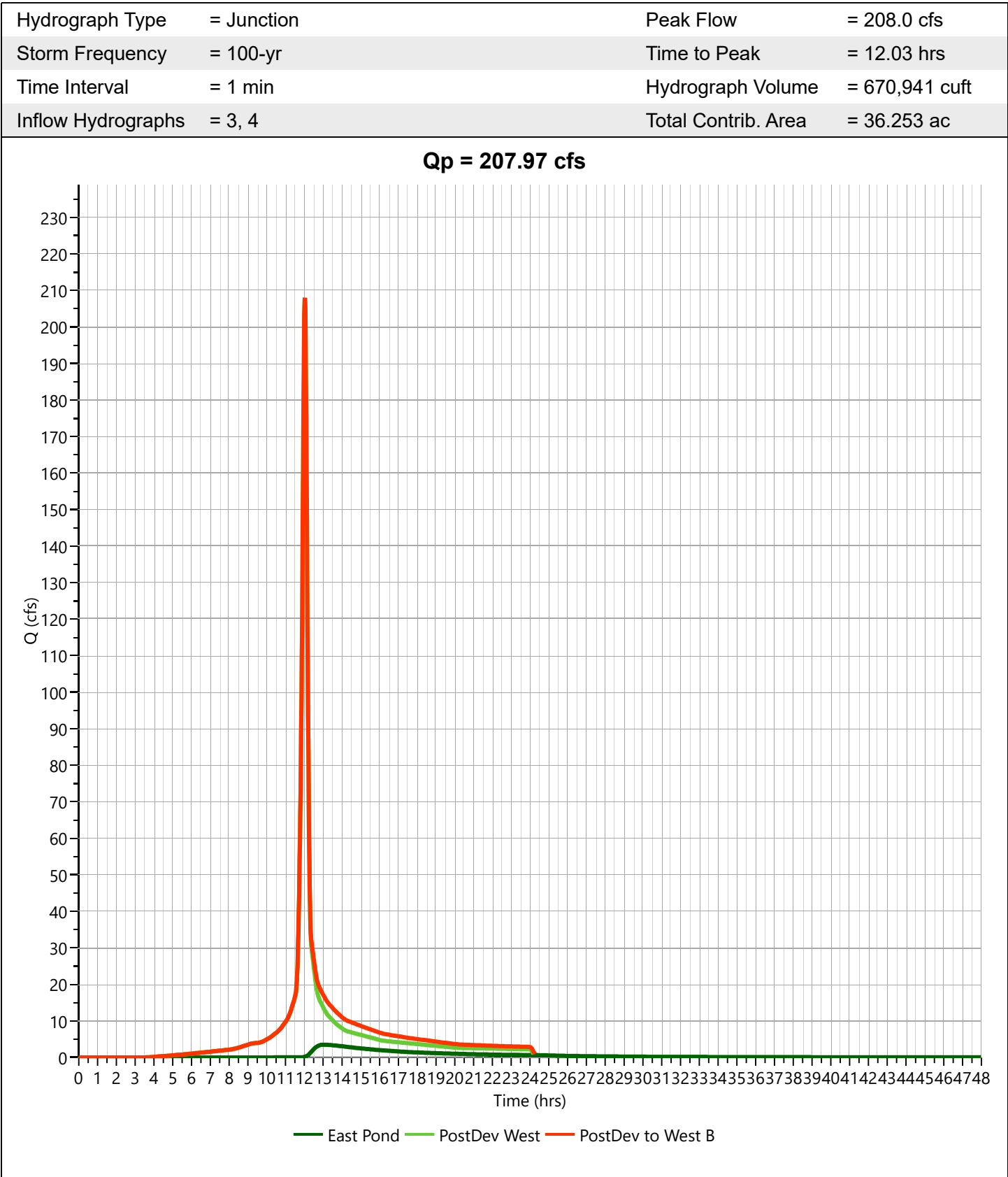
Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

PostDev to West B

Hyd. No. 5



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

West Pond

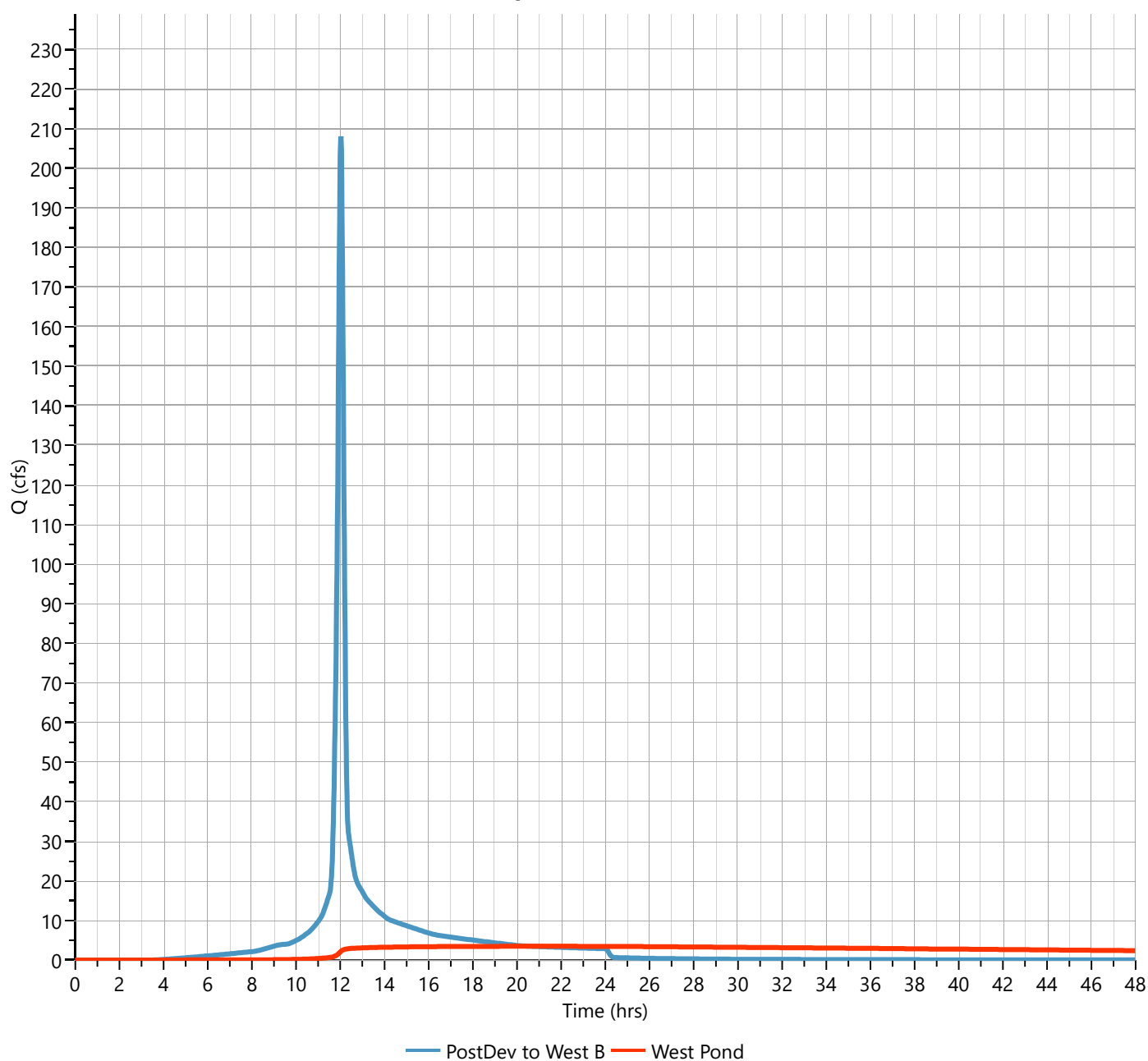
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 3.459 cfs
Storm Frequency	= 100-yr	Time to Peak	= 20.65 hrs
Time Interval	= 1 min	Hydrograph Volume	= 401,421 cuft
Inflow Hydrograph	= 5 - PostDev to West B	Max. Elevation	= 596.12 ft
Pond Name	= West Pond-Full Depth	Max. Storage	= 898,292 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 15.34 hrs

Qp = 3.46 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.12

08-12-2019

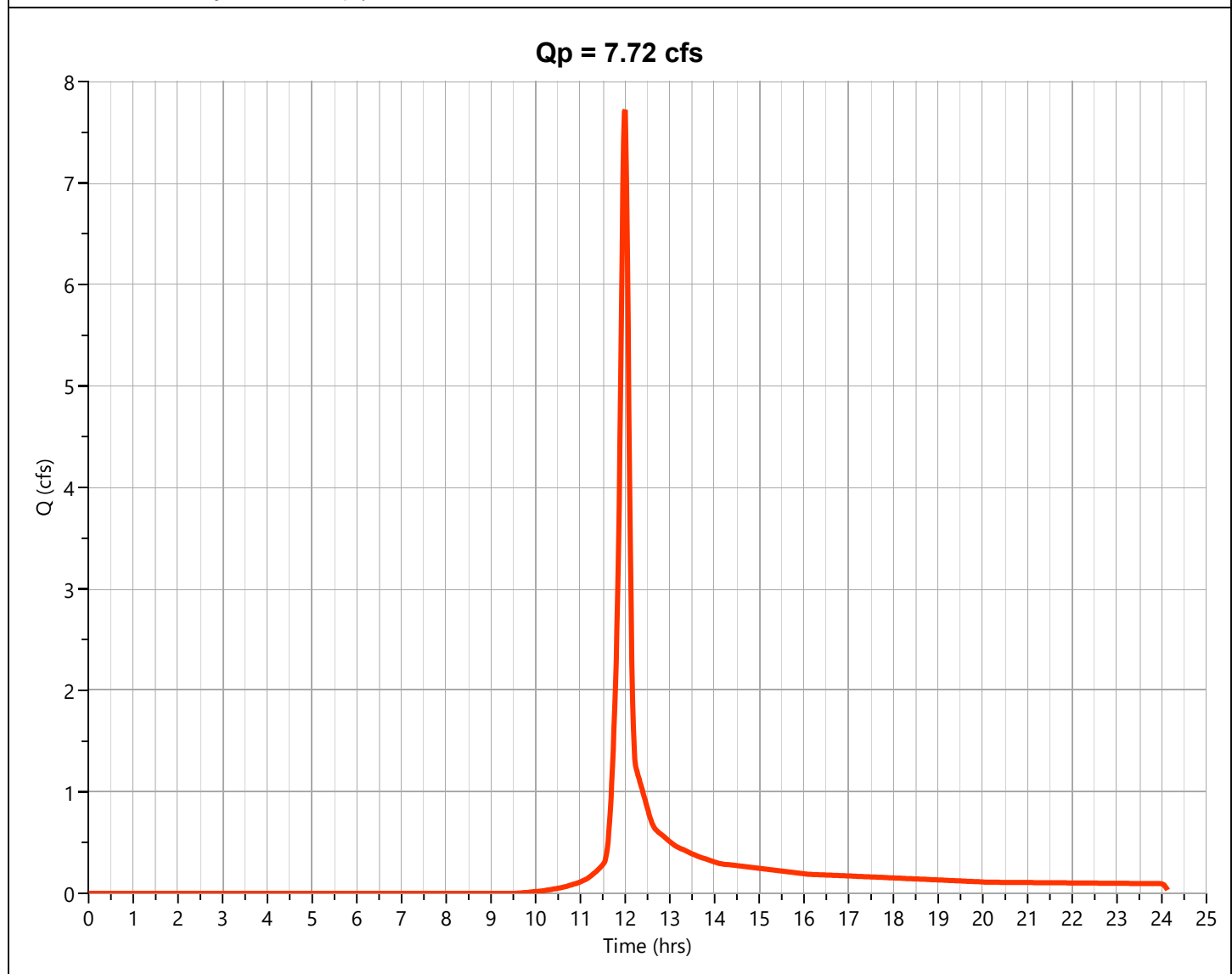
PostDev Undetained

Hyd. No. 7

Hydrograph Type	= NRCS Runoff	Peak Flow	= 7.720 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 17,469 cuft
Drainage Area	= 1.985 ac	Curve Number	= 68.97*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.63 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

* Composite CN Worksheet

AREA (ac)	CN	DESCRIPTION
1.155	61	Pasture Type B/D
0.62	74	Pasture Type C/D
0.126	98	Impervious B/D
0.084	98	Impervious C/D
1.985	69	Weighted CN Method Employed



Hydrograph Report

Project Name:

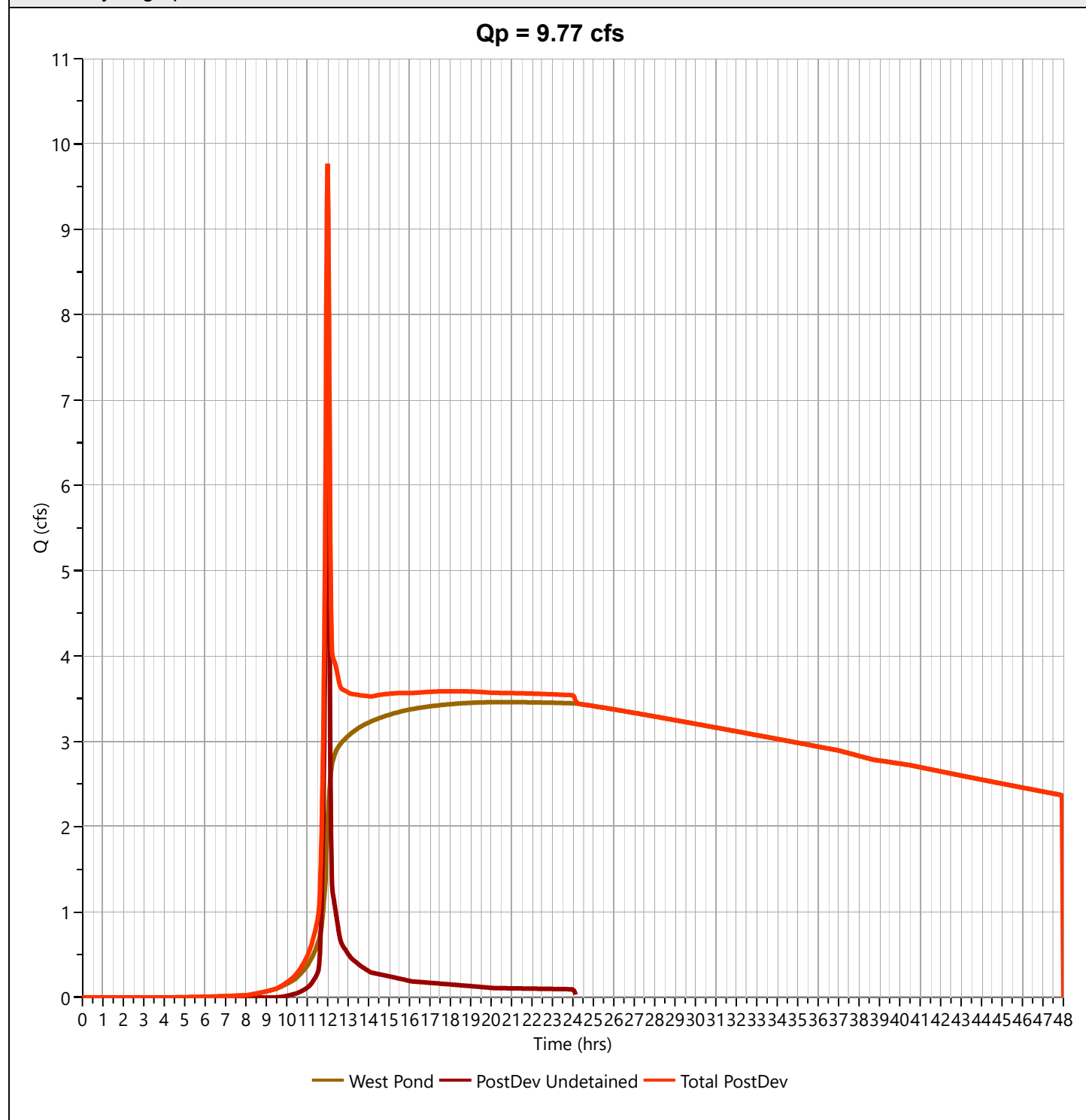
Hydrology Studio v 3.0.0.12

08-12-2019

Total PostDev

Hyd. No. 8

Hydrograph Type	= Junction	Peak Flow	= 9.767 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 418,889 cuft
Inflow Hydrographs	= 6, 7	Total Contrib. Area	= 1.985 ac



Precipitation Report

Precipitation filename: 160651.004.pcp

Hydrology Studio v 3.0.0.12

08-12-2019

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active		✓	✓		✓	✓	✓	✓	✓
SCS Storms	> SCS Dimensionless Storms								
SCS 6hr		1.73	2.08	0	2.56	2.93	3.43	3.84	4.24
Type I, 24-hr		2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Type IA, 24-hr		2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Type II, 24-hr	✓	2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Type II FL, 24-hr		2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Type III, 24-hr		2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Synthetic Storms	> IDF-Based Synthetic Storms								
1-hr		1.16	1.40	0	1.72	1.96	2.27	2.51	2.74
2-hr		1.34	1.64	0	2.06	2.39	2.84	3.21	3.57
3-hr		1.44	1.78	0	2.26	2.66	3.21	3.67	4.14
6-hr		1.60	2.01	0	2.61	3.14	3.91	4.59	5.30
12-hr		1.76	2.24	0	2.98	3.67	4.73	5.71	6.74
24-hr		1.92	2.49	0	3.39	4.28	5.70	7.07	8.56
Huff Distribution	> 1st Quartile (0 to 6 hrs)								
1-hr		1.16	1.39	0	1.71	1.95	2.27	2.50	2.74
2-hr		1.35	1.63	0	2.01	2.30	2.68	2.98	3.27
3-hr		1.44	1.74	0	2.14	2.46	2.88	3.22	3.56
6-hr		1.73	2.08	0	2.56	2.93	3.43	3.84	4.24
Huff Distribution	> 2nd Quartile (>6 to 12 hrs)								
8-hr		0	0	0	0	0	0	0	0
12-hr		2.05	2.46	0	3.01	3.44	4.00	4.45	4.90
Huff Distribution	> 3rd Quartile (>12 to 24 hrs)								
18-hr		0	0	0	0	0	0	0	0
24-hr		2.37	2.84	0	3.47	3.96	4.61	5.12	5.63
Custom Storms	> Custom Storm Distributions								
WQ Storm		0.90	0	0	0	0	0	0	0
Clermont Co Table I		2.40	2.90	0	3.60	4.10	4.70	5.10	5.60
My Custom Storm 3		0	0	0	0	0	0	0	0
My Custom Storm 4		0	0	0	0	0	0	0	0
My Custom Storm 5		0	0	0	0	0	0	0	0
My Custom Storm 6		0	0	0	0	0	0	0	0
My Custom Storm 7		0	0	0	0	0	0	0	0
My Custom Storm 8		0	0	0	0	0	0	0	0
My Custom Storm 9		0	0	0	0	0	0	0	0
My Custom Storm 10		0	0	0	0	0	0	0	0