Carrigan Engineering, Inc.
CIVIL AND ENVIRONMENTAL ENGINEERING
86 Brook Farm Road South
Wakefield, RI 02879
(401) 789-6865 (Phone)

11 August 2020

Engineering Department
Town of South Kingstown
180 High Street
Wakefield, RI 02879

Re: North Woods

To Whom It May Concern:

Attached please find preliminary drainage calculations for the proposed North Woods subdivision. These calculations have been completed to demonstrate the potential for both water quality treatment as well as mitigation for the peak increase from the paved roadway. The depicted site and plans are based on Master Plan drawing only and do not have the benefit of final grading.

The model was completed to address the roadway runoff only. The individual house lots will be developed to compensate for the increase generated by construction. Soils in the area and water table depths are adequate to allow for infiltration of runoff from the proposed roof areas. The roadway was divided into 3 separate drainage areas identified as A, B, and C. The right of way runoff value was identified 83 based on TR-55 criteria for paved roadway with roadside ditches in a soil category A. (Soils are classified as 1M for the purposes of OWTS design) Pre-development curve number was identified as 43 for existing woods grass combination in fair condition. The model for the "ponds" was completed using existing grade conditions and modeling the area as a dry storage pond with a single 4-inch outlet. The water surface elevations are all below 9-inches above the base of the proposed areas and the minimum reduction in peak runoff from the 100 year is 50% in area B. A summary sheet is attached prior to the report pages.

Should you have any questions please contact this office.

Sincerely;

Craig R. Carrigan, P.E.

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.328	1	727	1,267	----	------	------	PRE A
2	SCS Runoff	0.360	2	750	2,369	----	------	------	PRE B
3	SCS Runoff	0.300	2	750	1,974	----	------	------	PRE C
4	SCS Runoff	1.563	1	722	4,394	----	------	------	POST A
5	SCS Runoff	2.212	2	728	8,700	----	------	------	POST B
6	SCS Runoff	1.843	2	728	7,250	----	------	------	POST C
7	Reservoir	0.091	1	742	770	4	145.21	1,530	FINAL A
8	Reservoir	0.179	2	750	1,770	5	145.41	2,967	POST B OUTFLOW
9	Reservoir	0.163	2	750	1,451	6	145.34	2,467	OUTFLOW FROM C

Hydrograph Report

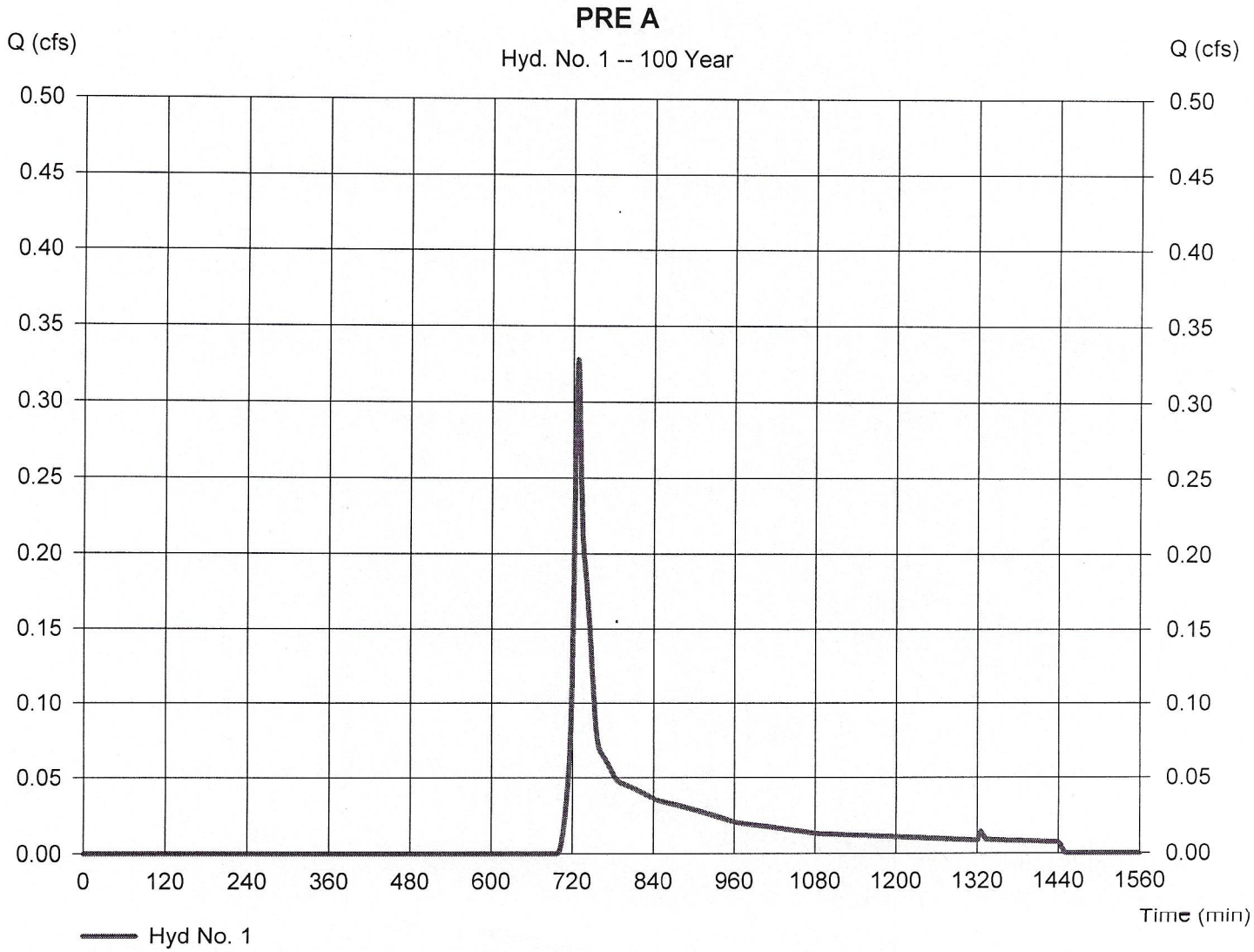
Hydraflow Hydrographs by Intelisolve v9.2

Monday, Aug 10, 2020

Hyd. No. 1

PRE A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.328 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,267 cuft
Drainage area	= 0.200 ac	Curve number	= 43
Basin Slope	= 5.0 %	Hydraulic length	= 150 ft
Tc method	= LAG	Time of conc. (Tc)	= 8.30 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

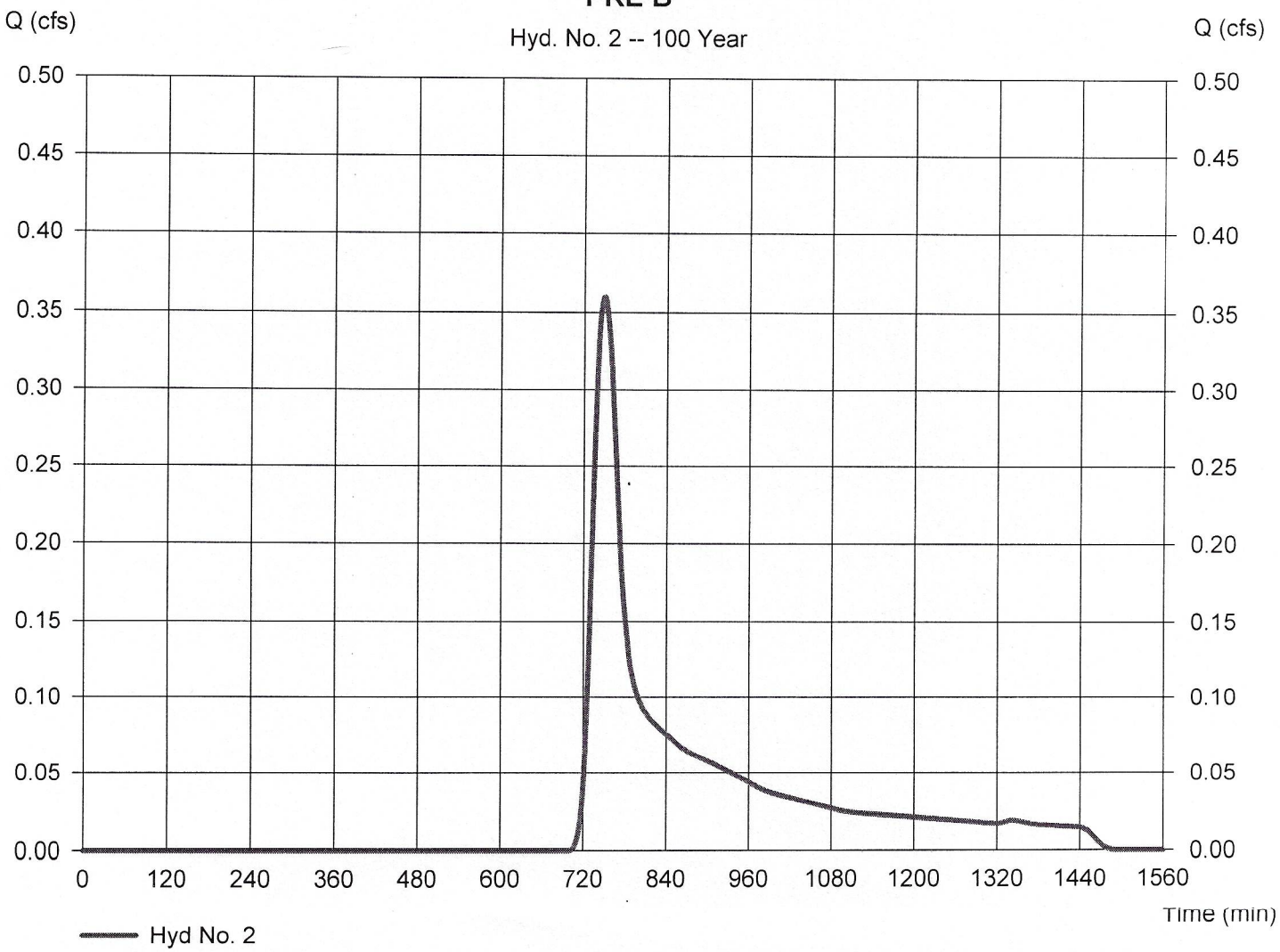
Hydraflow Hydrographs by Intelisolve v9.2

Monday, Aug 10, 2020

Hyd. No. 2

PRE B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.360 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 2,369 cuft
Drainage area	= 0.360 ac	Curve number	= 43
Basin Slope	= 2.0 %	Hydraulic length	= 465 ft
Tc method	= LAG	Time of conc. (Tc)	= 32.60 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

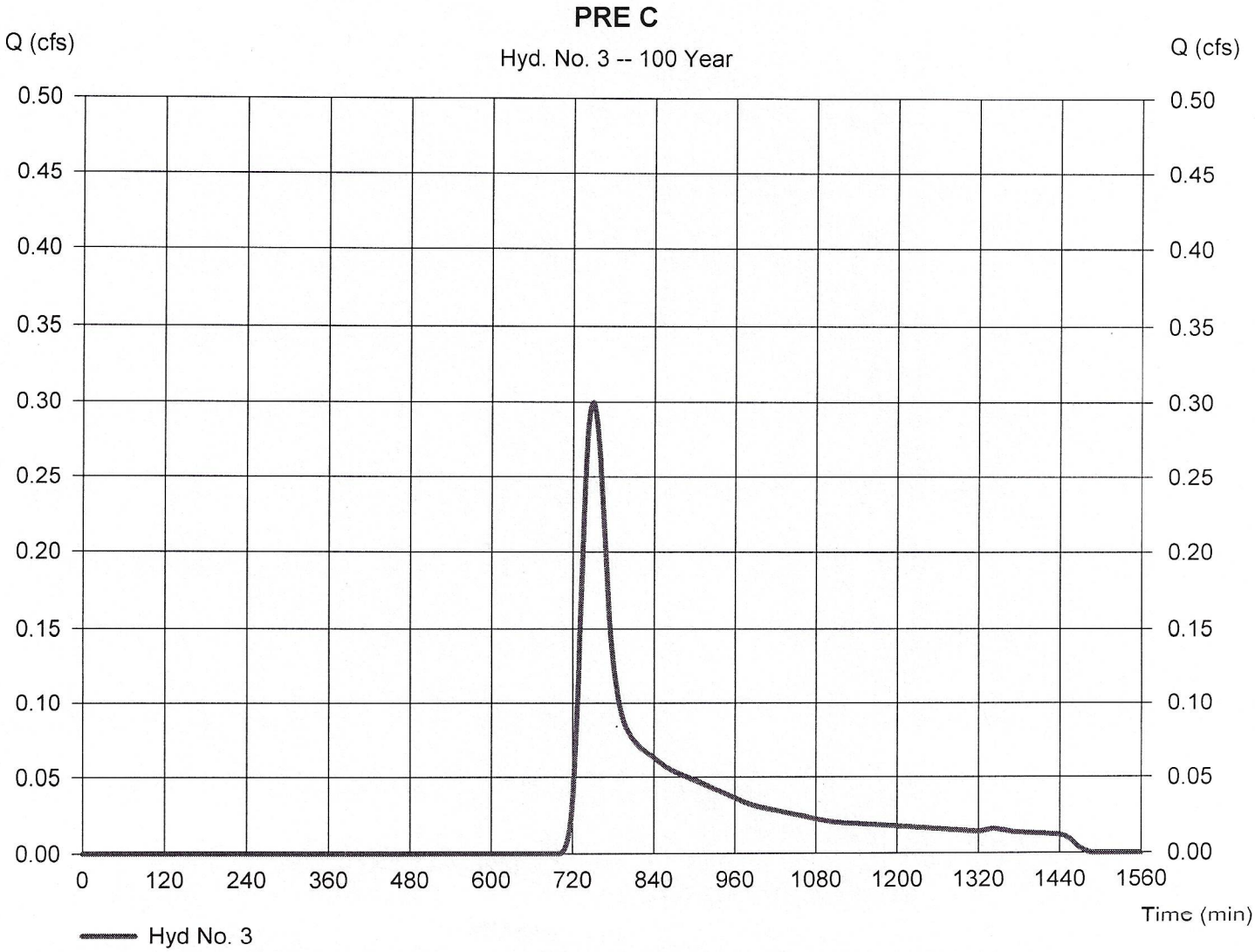


Hydrograph Report

Hyd. No. 3

PRE C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.300 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 1,974 cuft
Drainage area	= 0.300 ac	Curve number	= 43
Basin Slope	= 1.0 %	Hydraulic length	= 310 ft
Tc method	= LAG	Time of conc. (Tc)	= 33.30 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

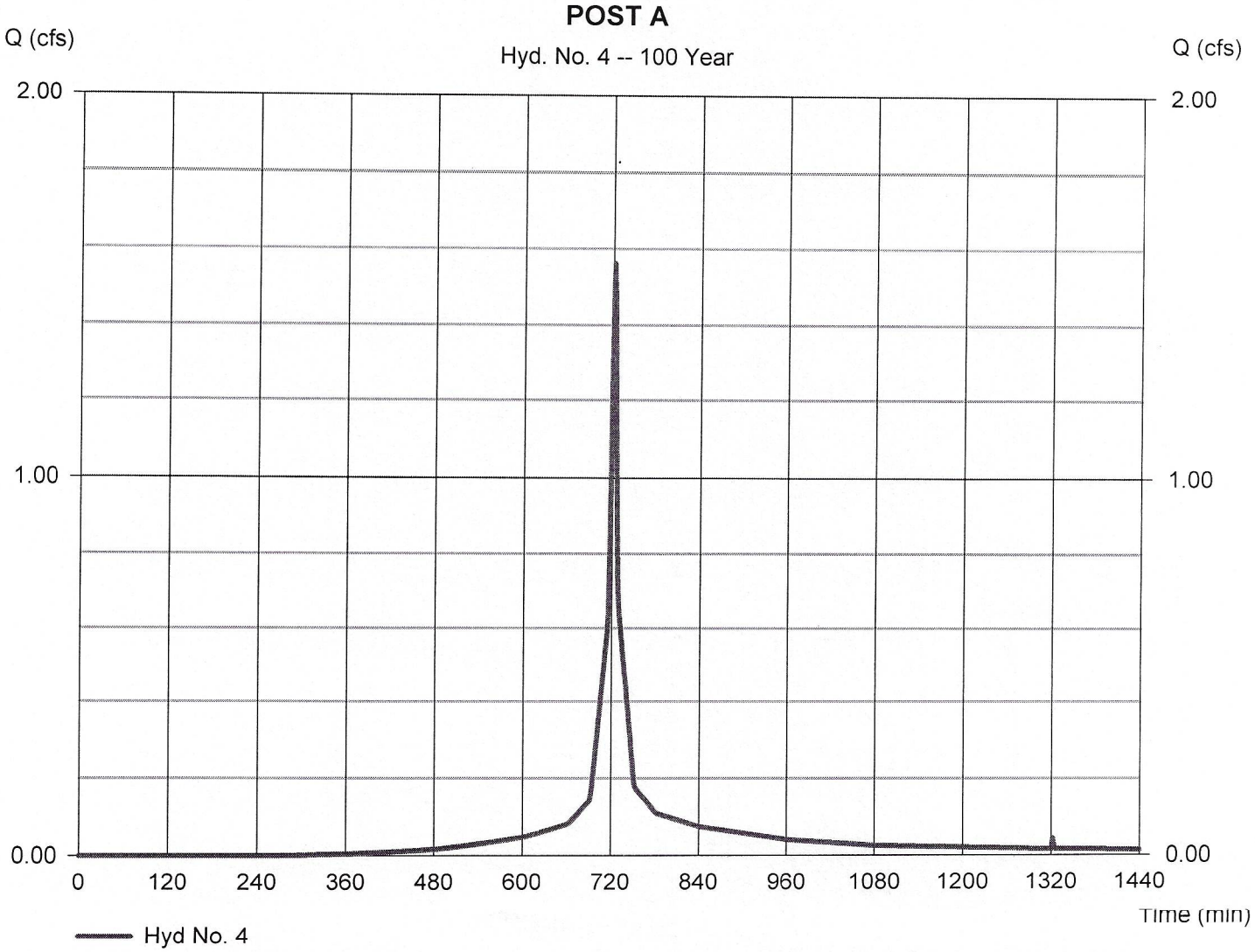
Hydraflow Hydrographs by Intelisolve v9.2

Monday, Aug 10, 2020

Hyd. No. 4

POST A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.563 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 4,394 cuft
Drainage area	= 0.200 ac	Curve number	= 83
Basin Slope	= 5.0 %	Hydraulic length	= 150 ft
Tc method	= LAG	Time of conc. (Tc)	= 2.80 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

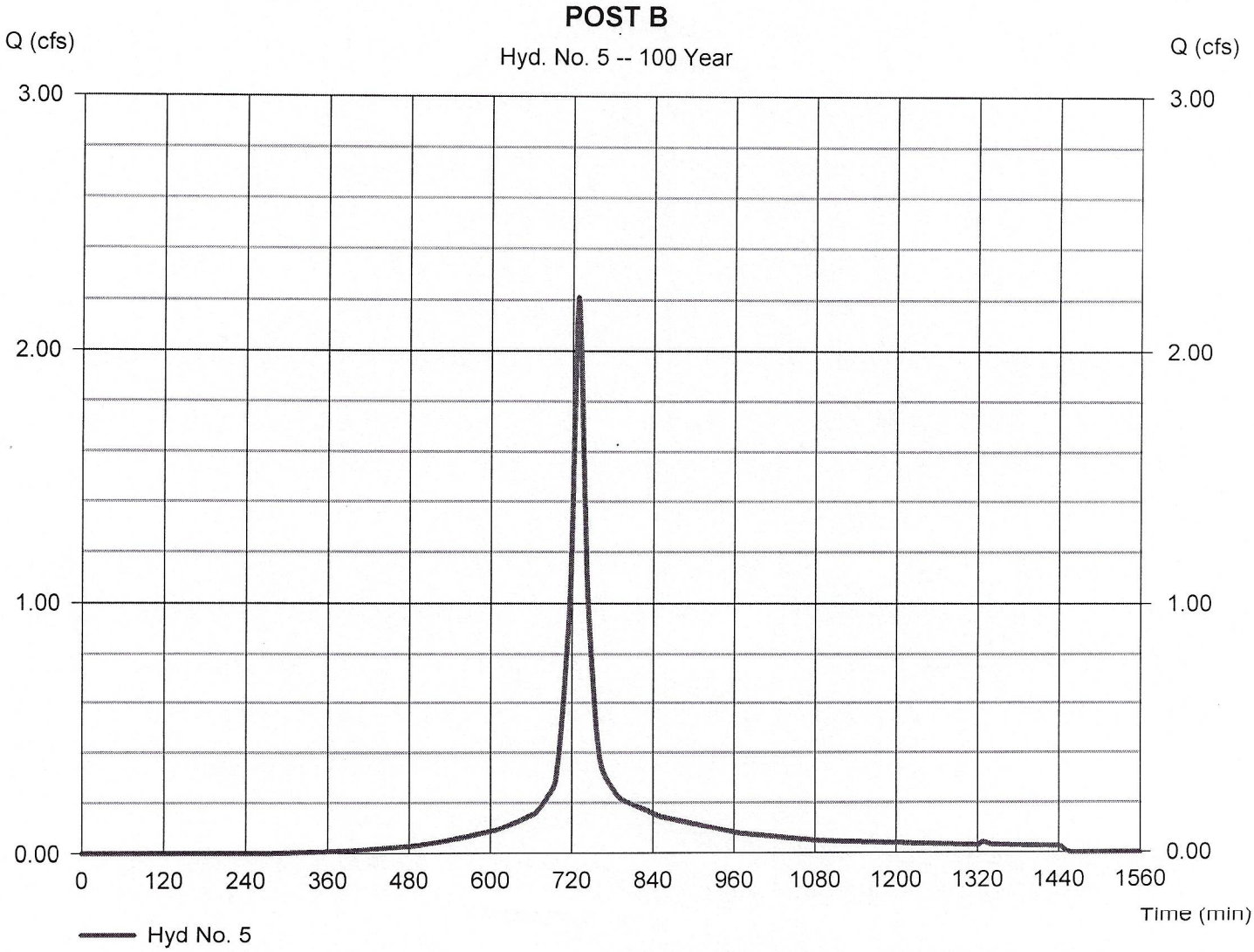
Hydraflow Hydrographs by Intelisolve v9.2

Monday, Aug 10, 2020

Hyd. No. 5

POST B

Hydrograph type	= SCS Runoff	Peak discharge	= 2.212 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 8,700 cuft
Drainage area	= 0.360 ac	Curve number	= 83
Basin Slope	= 2.0 %	Hydraulic length	= 465 ft
Tc method	= LAG	Time of conc. (Tc)	= 11.00 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2

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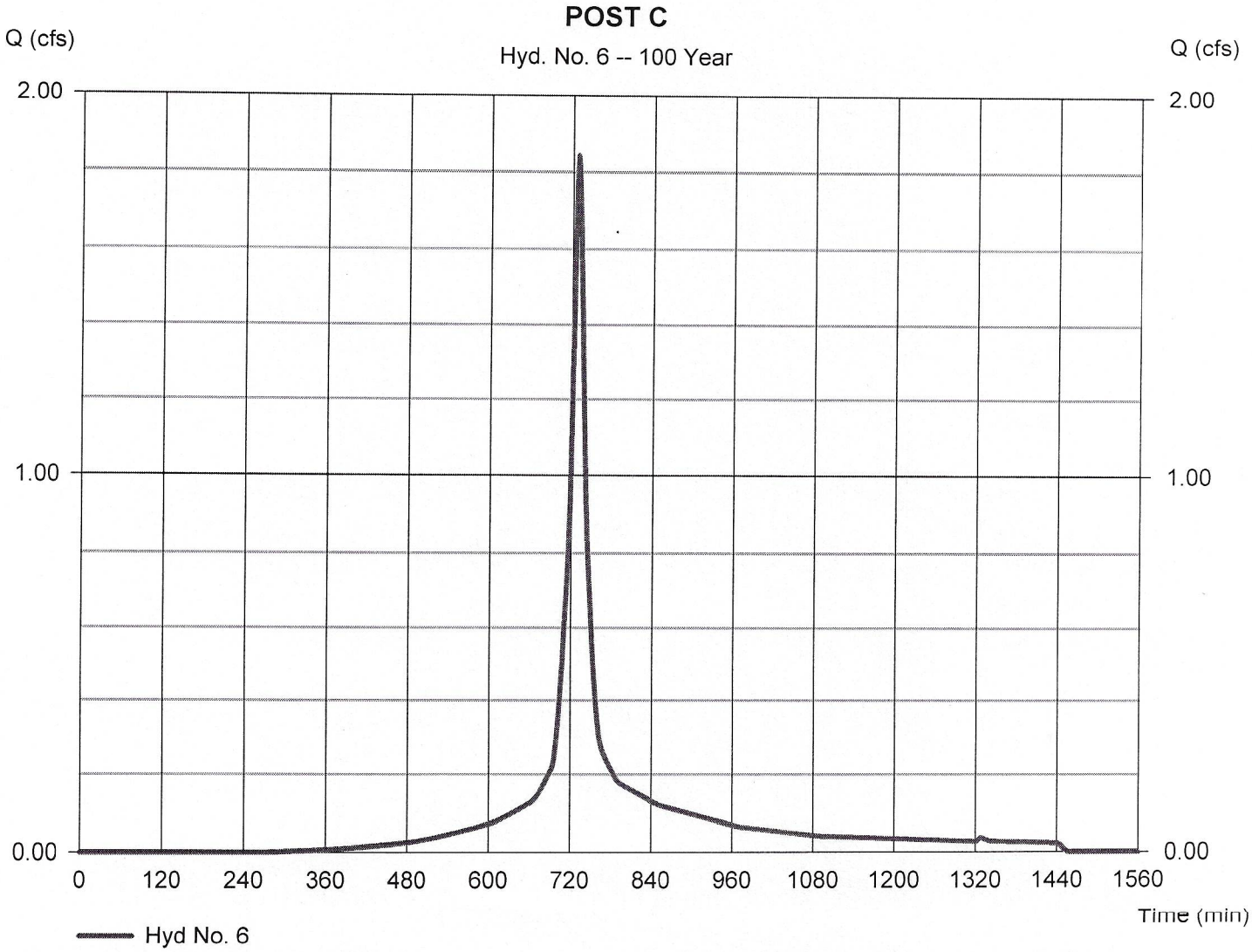
Hyd. No. 6

POST C

Hydrograph type	= SCS Runoff	Peak discharge	= 1.843 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 7,250 cuft
Drainage area	= 0.300 ac	Curve number	= 83
Basin Slope	= 1.0 %	Hydraulic length	= 310 ft
Tc method	= LAG	Time of conc. (Tc)	= 11.30 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2

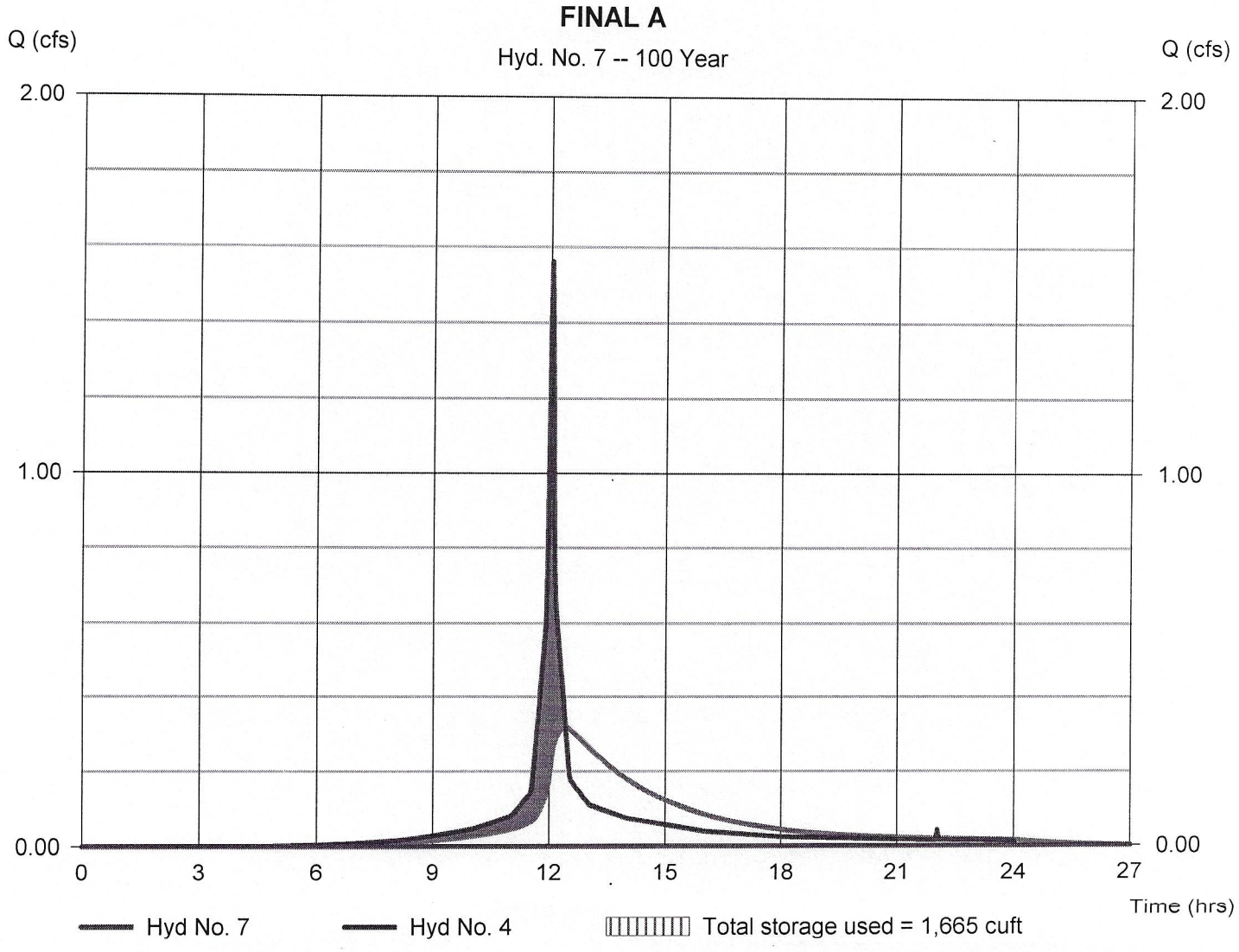
Monday, Aug 10, 2020

Hyd. No. 7

FINAL A

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - POST A	Max. Elevation	= 147.27 ft
Reservoir name	= AREA A	Max. Storage	= 1,665 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2

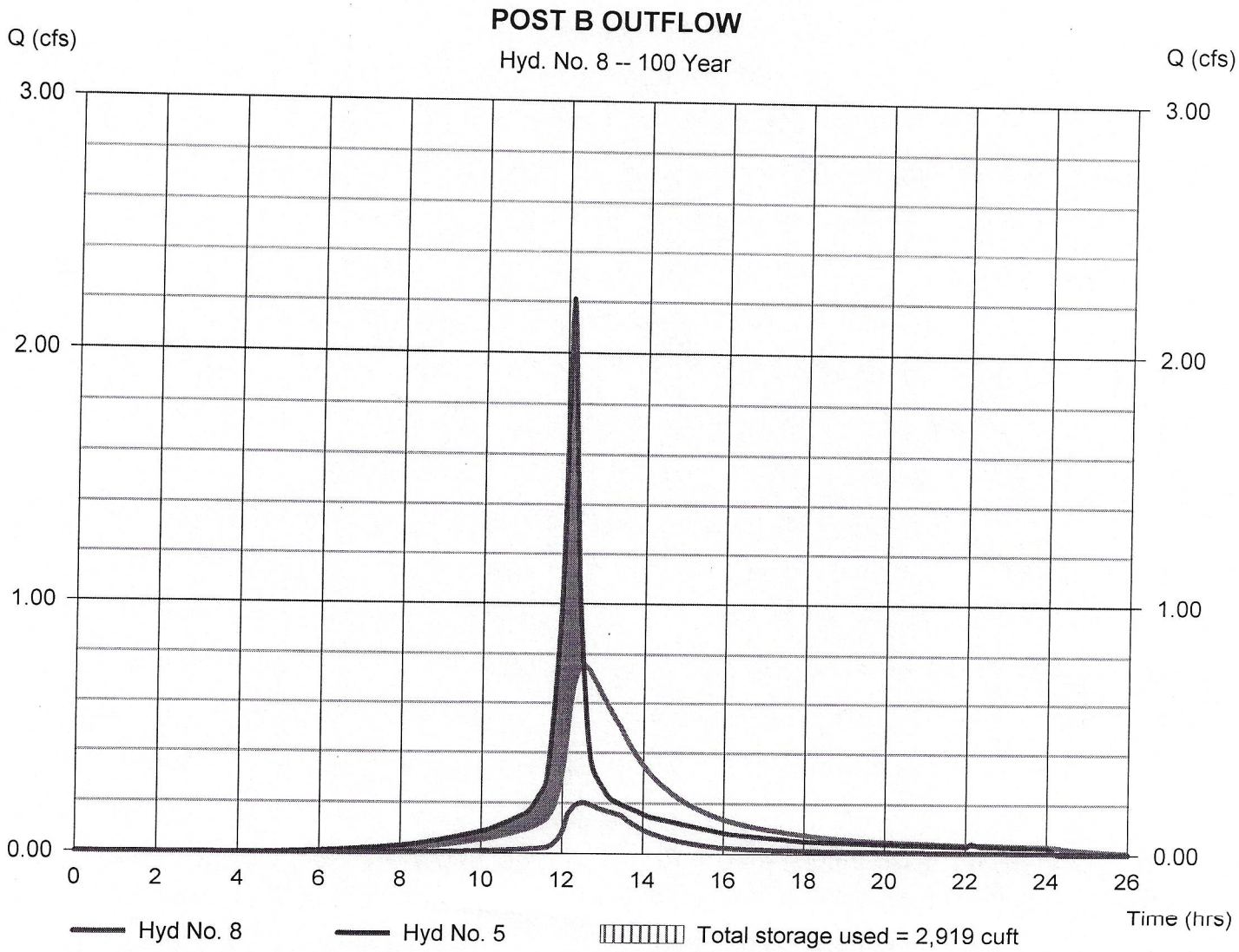
Monday, Aug 10, 2020

Hyd. No. 8

POST B OUTFLOW

Hydrograph type	= Reservoir	Peak discharge	= 0.202 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 2,051 cuft
Inflow hyd. No.	= 5 - POST B	Max. Elevation	= 147.48 ft
Reservoir name	= AREA B	Max. Storage	= 2,919 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2

Monday, Aug 10, 2020

Hyd. No. 9

OUTFLOW FROM C

Hydrograph type	= Reservoir	Peak discharge	= 0.163 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 1,451 cuft
Inflow hyd. No.	= 6 - POST C	Max. Elevation	= 145.34 ft
Reservoir name	= AREA C	Max. Storage	= 2,467 cuft

Storage Indication method used. Exfiltration extracted from Outflow.