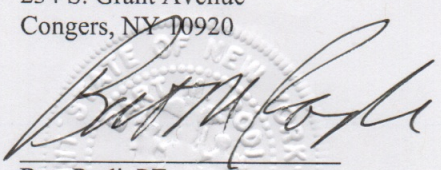


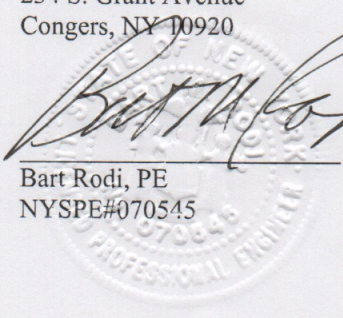
HYDRAULIC ANALYSIS AND STORMWATER DESIGN
CALCULATIONS

Prepared for
DIANA PLACE

HAMLET OF NYACK
TOWN OF CLARKSTOWN
ROCKLAND COUNTY, NEW YORK

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234 S. Grant Avenue
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NYSPE#070545



The Diana Place Site Plan, which is a 0.3834 acre site, located approximately 300 feet east of the intersection of South Highland Avenue and Main Street on the south side of Main Street in the Hamlet of Nyack, Town of Clarkstown, Rockland County, New York. The soils on site are Wethersfield (WuB), see enclosed map. The proposed site plan consists of construction of a apartment building with a parking deck. The existing site consisted of two buildings and a parking area which is approximately 8,277 square feet. The proposed impervious area is approximately 13,939 square feet. The net increase is approximately 5,662 square feet.

Under existing conditions, the run-off is carried northerly towards Main Street. An underground pipe detention system with an outlet structure will be utilized for the drainage area. It will outlet to the existing drainage system in Main Street as it previously did.

Hydroflow Hydrographs Extension 2019 software was utilized to route the various storms through the infiltration system. A hydrograph for the existing flow was determined. A hydrograph for the proposed flow was developed as well. The developed hydrograph was routed through an outlet structure located in the parking area as depicted on the plans. The HDPE system with an outlet structure was used. The water is directed to a Contech pre-treatment structure with a by-pass. The run-off reduction would be directed to a series of drywell located in the front of the property and the rest of the storms would be directed to the detention system. This system would be in full compliance with the latest NYS DEC Stormwater Manual for drywells(I-3). The

software routes the storms through the outlet structure and reduces the flow leaving the site. A copy of the calculations is provided to show the results of the routing.

Water quality and run-off reduction will be provided using infiltration below the the drywells in the front. There will be 2.0' of storage within the drywells will provide the RRv & the pre-treatment structure will provide 100% of the Water Quality Volume. Calculations have been provided.

PRETREATMENT & WATER QUALITY
CALCULATIONS

Water Quality Volume (WQv) & Runoff Reduction Volume (RRv) Calculations:

$$WQv = P \cdot Rv \cdot A / 12 \text{ (ac-ft)}$$

$$Rv = .05 + .009 \cdot I$$

$$P = 1.5 \text{ in}$$

$$A = 0.3834 \text{ acres} = 16,701 \text{ square feet}$$

$$\text{Existing Impervious Area} = 0.19109 \text{ acres} = 8,324 \text{ square feet}$$

$$\text{Proposed Impervious Area} = 0.32309 \text{ acres} = 14,074 \text{ square feet}$$

$$\text{Change in Impervious Area} = 0.1320 \text{ acres} = 5,750 \text{ square feet}$$

Water Quality Volume (WQv) and Runoff Reduction Volume (RRv) is required for the new proposed impervious area greater than what is currently existing at the site. Per Chapter 9 of the NYSDEC Stormwater Management Design Manual, 25% of the Water Quality Volume (WQv) for the existing impervious surfaces is required, while Runoff reduction volume (RRv) is not required for the existing impervious area.

Therefore, WQv is as follows:

25% WQv for Existing Impervious Area

$$I = \text{percent impervious} = 0.19109 / 0.3834 = 49.8\%$$

$$Rv = .05 + .009(49.8) = 0.498$$

$$WQv = (1.5)(0.498)(.3834) / 12 = 0.020 \text{ ac-ft} = 891 \text{ ft}^3$$

$$WQv = (25\%) \times 891 \text{ ft}^3 = 223 \text{ ft}^3$$

100% WQv for New Impervious Area = Required RRv

$$I = \text{percent impervious} = 0.132 / 0.3834 = 34.4\%$$

$$Rv = .05 + .009(34.4) = 0.360$$

$$100\% WQv = RRv = (1.5)(0.360)(0.3834) / 12 = 0.0173 \text{ ac-ft} = 752 \text{ ft}^3$$

$$100\% WQv = RRv = 752 \text{ ft}^3$$

$$\text{Total Required WQv} = 223 \text{ ft}^3 + 752 \text{ ft}^3 = 975 \text{ ft}^3$$

$$\text{Total Required RRv} = 752 \text{ ft}^3$$

Infiltration Rate = 1"· 6 min

Therefore, Pretreatment is 100% WQv; Pretreatment Volume = 975 ft³

Pretreatment handled through Contech structure, specified within report.

Drywell Design: Diana Place

Infiltration Rate = 1":6 min

Use drywell system, surrounded by 1 foot of stone between drywells and on bottom (rectangular envelope as shown on plan).

Volume within drywell (V_w):

$$D_i = 6 \text{ ft}$$

$$D_o = 7 \text{ ft}$$

$$d = 2 \text{ ft}$$

$$V_w = \pi * D_i^2 / 4 * 2 \text{ ft} = 56.5 \text{ ft}^3$$

$$V_w = 56.5 \text{ ft}^3$$

Volume within stone:

V = rectangular envelope – drywell space =

$$\text{Drywell space} = \pi * D_o^2 / 4 * 2 \text{ ft} = 77.0 \text{ ft}^3$$

$$\text{Rectangular stone envelope} = \text{Length} \times \text{width} \times \text{height} = 9 \text{ ft} \times 9 \text{ ft} \times 2 \text{ ft} = 162 \text{ ft}^3$$

$$V = 162 \text{ ft}^3 - 77.0 \text{ ft}^3 = 85 \text{ ft}^3$$

$$\text{Void Coefficient} = 0.4$$

$$V_{st} = 34.0 \text{ ft}^3$$

Soil Infiltration Calculations:

Area of Percolation (A_p):

$$d = 1 \text{ ft}, r = 0.5 \text{ ft}$$

$$\text{Surface Area of Cylinder (A}_c) = \pi \times d \times h_{avg} = 3.14159 \times 1 \text{ ft} \times 8.5 \text{ in}/12 \text{ in}/\text{ft} = 2.23 \text{ ft}^2$$

$$\text{Bottom Area} = A_b = \pi \times r^2 = 0.785 \text{ ft}^2$$

$$A_p = A_c + A_b = 2.23 + 0.785 = 3.01 \text{ ft}^2$$

Volume of Percolation (V_p):

$$V_p = A_b \times h = 0.785 \times 1 \text{ in}/12 \text{ in/ft} = 0.0654 \text{ ft}^3$$

$$\text{Soil Percolation Rate} = S_r = V_p/\text{area}/\text{time}$$

$$\text{Field Infiltration} = 1'':6 \text{ min}$$

$$S_r = 0.0654 \text{ ft}^3 / 3.01 \text{ ft}^2 / 6 \text{ min}$$

$$S_r = .00362 \text{ ft}^3/\text{ft}^2/\text{min} = .00362 \text{ ft}^3 / \text{min} \times 60 \text{ min/hr} \times 24 \text{ hr/day} = 5.21 \text{ ft}^3/\text{ft}^2/\text{day}$$

Use Clogging Factor of 25%

$$25\% \times 5.21 = 1.30 \text{ ft}^3/\text{ft}^2/\text{day}$$

$$S_r = 5.21 - 1.30 = 3.91 \text{ ft}^3/\text{ft}^2/\text{day}$$

$$V_p = S_r \times \text{Surface Area} = 3.91 \text{ ft}^3/\text{ft}^2/\text{day} \times 81 \text{ ft}^2$$

$$V_p = 316.71 \text{ ft}^3/\text{day per drywell}$$

Overall 24 hour volume per drywell (V_t):

$$V_t = V_w + V_{st} + V_p = 56.5 + 34.0 + 316.7 = 407.2 \text{ ft}^3$$

Required Storage Calculations:

Store entire Runoff Reduction Volume (RRv) within the drywell infiltration system

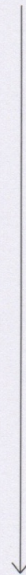
$$\text{RRv Storage Required} = V_s = 735 \text{ ft}^3$$

$$\text{Drywells Required} = V_s / V_t = 735 \text{ ft}^3 / 407.2 \text{ ft}^3 = 1.85 \text{ drywells}$$

Therefore, provide two (2) drywells, 6 ft inner diameter, 2 ft deep

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020



Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	SCS Runoff	Existing Condition
2	SCS Runoff	Proposed Condition
3	Reservoir	ROUTE

Hydrograph Return Period Recap

[illegible]

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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	0.689	1	725	2,123	-----	-----	-----	Existing Condition
2	SCS Runoff	0.960	1	724	3,068	-----	-----	-----	Proposed Condition
3	Reservoir	0.637	1	730	3,060	2	173.83	540	ROUTE
diana.gpw					Return Period: 1 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

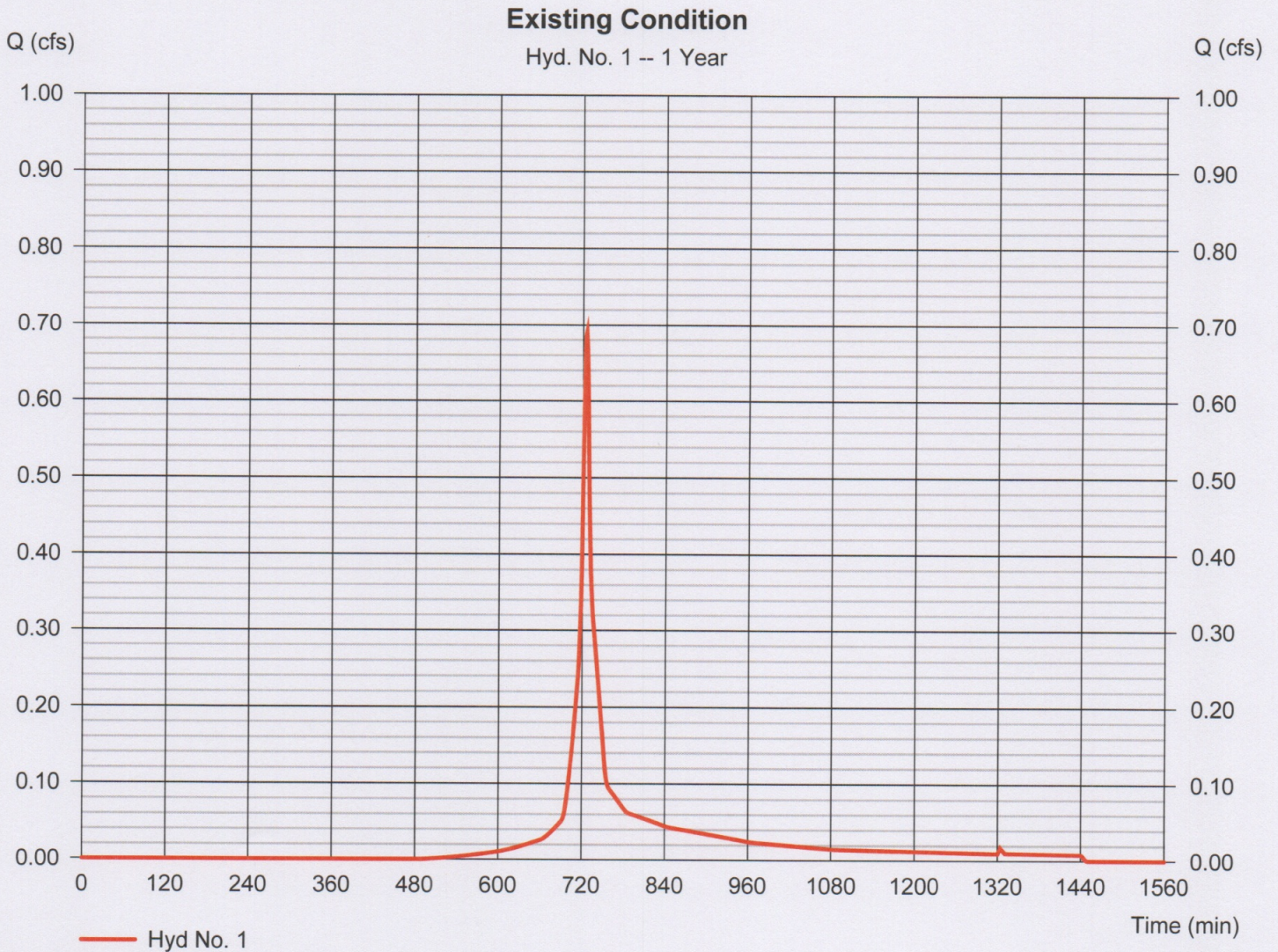
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 0.689 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,123 cuft
Drainage area	= 0.380 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

5

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

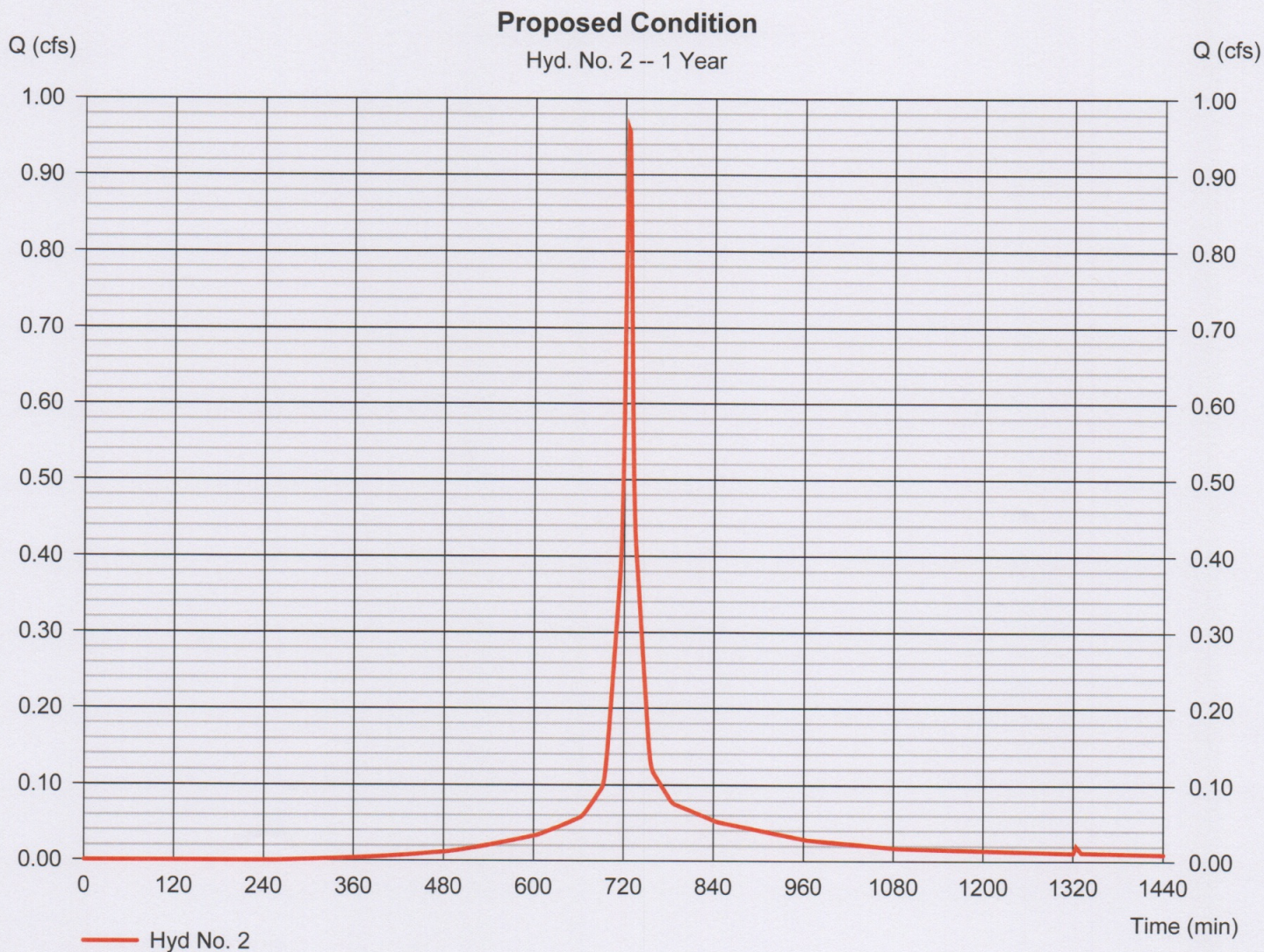
Hyd. No. 2

Proposed Condition

Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 2.80 in
Storm duration = 24 hrs

Peak discharge = 0.960 cfs
Time to peak = 724 min
Hyd. volume = 3,068 cuft
Curve number = 94*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

6

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

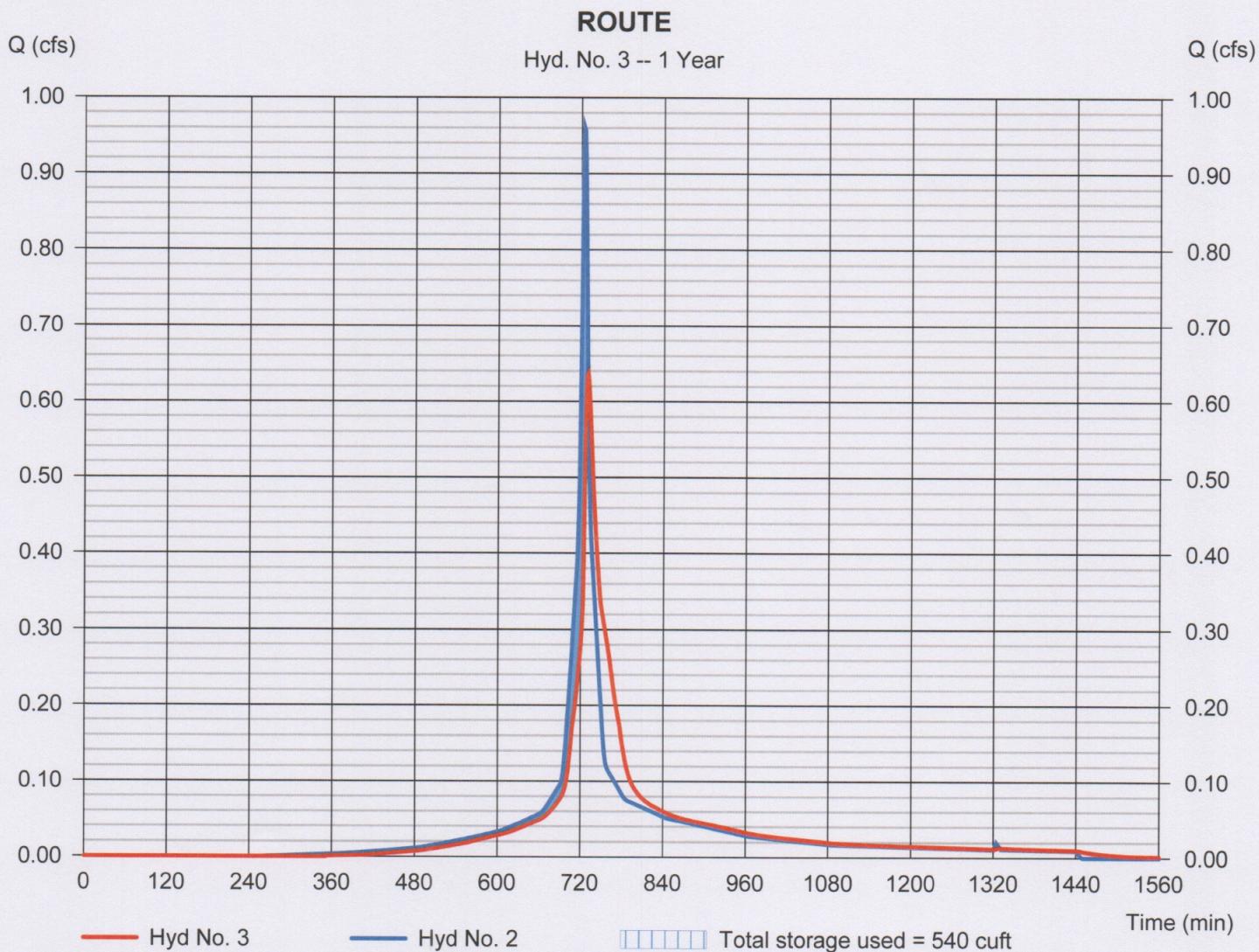
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 0.637 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 3,060 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 173.83 ft
Reservoir name	= <New Pond>	Max. Storage	= 540 cuft

Storage Indication method used.



Pond Report

7

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Pond No. 1 - <New Pond>

Pond Data

UG Chambers -Invert elev. = 173.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 75.00 ft, No. Barrels = 6, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	173.20	n/a	0	0
0.30	173.50	n/a	185	185
0.60	173.80	n/a	320	505
0.90	174.10	n/a	390	894
1.20	174.40	n/a	429	1,323
1.50	174.70	n/a	448	1,771
1.80	175.00	n/a	448	2,220
2.10	175.30	n/a	429	2,649
2.40	175.60	n/a	389	3,038
2.70	175.90	n/a	320	3,358
3.00	176.20	n/a	184	3,542

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	5.00	10.00	0.00
Span (in)	= 15.00	5.00	10.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 173.20	173.20	174.20	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	0.00	0.00	0.00
Crest El. (ft)	= 173.70	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	173.20	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	18	173.23	0.00 ic	0.00 ic	0.00	---	0.00	---	---	---	---	---	0.002
0.06	37	173.26	0.01 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.008
0.09	55	173.29	0.02 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.019
0.12	74	173.32	0.03 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.033
0.15	92	173.35	0.05 ic	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.049
0.18	111	173.38	0.07 ic	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.069
0.21	129	173.41	0.09 ic	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.092
0.24	148	173.44	0.12 ic	0.12 ic	0.00	---	0.00	---	---	---	---	---	0.117
0.27	166	173.47	0.15 ic	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.144
0.30	185	173.50	0.17 ic	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.173
0.33	217	173.53	0.20 ic	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.200
0.36	249	173.56	0.23 ic	0.23 ic	0.00	---	0.00	---	---	---	---	---	0.229
0.39	281	173.59	0.26 ic	0.26 ic	0.00	---	0.00	---	---	---	---	---	0.258
0.42	313	173.62	0.28 ic	0.28 ic	0.00	---	0.00	---	---	---	---	---	0.278
0.45	345	173.65	0.30 ic	0.30 ic	0.00	---	0.00	---	---	---	---	---	0.295
0.48	377	173.68	0.31 ic	0.31 ic	0.00	---	0.00	---	---	---	---	---	0.313
0.51	409	173.71	0.33 ic	0.33 ic	0.00	---	0.01	---	---	---	---	---	0.333
0.54	441	173.74	0.39 ic	0.33 ic	0.00	---	0.05	---	---	---	---	---	0.387
0.57	473	173.77	0.46 ic	0.34 ic	0.00	---	0.12	---	---	---	---	---	0.459
0.60	505	173.80	0.56 ic	0.33 ic	0.00	---	0.21	---	---	---	---	---	0.545
0.63	544	173.83	0.65 ic	0.33 ic	0.00	---	0.31	---	---	---	---	---	0.646
0.66	583	173.86	0.77 ic	0.33 ic	0.00	---	0.43	---	---	---	---	---	0.758
0.69	621	173.89	0.90 ic	0.33 ic	0.00	---	0.55	---	---	---	---	---	0.879
0.72	660	173.92	1.01 ic	0.33 ic	0.00	---	0.69	---	---	---	---	---	1.014
0.75	699	173.95	1.16 ic	0.32 ic	0.00	---	0.83 s	---	---	---	---	---	1.154
0.78	738	173.98	1.29 ic	0.32 ic	0.00	---	0.97 s	---	---	---	---	---	1.289
0.81	777	174.01	1.42 ic	0.32 ic	0.00	---	1.10 s	---	---	---	---	---	1.421
0.84	816	174.04	1.55 ic	0.32 ic	0.00	---	1.23 s	---	---	---	---	---	1.555
0.87	855	174.07	1.69 ic	0.32 ic	0.00	---	1.37 s	---	---	---	---	---	1.691
0.90	894	174.10	1.83 ic	0.32 ic	0.00	---	1.51 s	---	---	---	---	---	1.831
0.93	937	174.13	1.97 ic	0.32 ic	0.00	---	1.65 s	---	---	---	---	---	1.973

Continues on next page...

<New Pond>

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.96	980	174.16	2.12 ic	0.32 ic	0.00	---	1.79 s	---	---	---	---	---	2.117
0.99	1,023	174.19	2.26 ic	0.33 ic	0.00	---	1.94 s	---	---	---	---	---	2.262
1.02	1,066	174.22	2.41 ic	0.33 ic	0.00 ic	---	2.08 s	---	---	---	---	---	2.410
1.05	1,109	174.25	2.56 ic	0.33 ic	0.01 ic	---	2.22 s	---	---	---	---	---	2.560
1.08	1,152	174.28	2.71 ic	0.33 ic	0.03 ic	---	2.36 s	---	---	---	---	---	2.713
1.11	1,194	174.31	2.90 ic	0.33 ic	0.05 ic	---	2.50 s	---	---	---	---	---	2.876
1.14	1,237	174.34	3.05 ic	0.33 ic	0.08 ic	---	2.64 s	---	---	---	---	---	3.046
1.17	1,280	174.37	3.22 ic	0.32 ic	0.11 ic	---	2.78 s	---	---	---	---	---	3.219
1.20	1,323	174.40	3.40 ic	0.32 ic	0.16 ic	---	2.91 s	---	---	---	---	---	3.390
1.23	1,368	174.43	3.57 ic	0.32 ic	0.20 ic	---	3.04 s	---	---	---	---	---	3.568
1.26	1,413	174.46	3.74 ic	0.32 ic	0.26 ic	---	3.16 s	---	---	---	---	---	3.736
1.29	1,458	174.49	3.91 ic	0.31 ic	0.32 ic	---	3.29 s	---	---	---	---	---	3.915
1.32	1,502	174.52	4.08 ic	0.31 ic	0.38 ic	---	3.39 s	---	---	---	---	---	4.083
1.35	1,547	174.55	4.25 ic	0.30 ic	0.44 ic	---	3.50 s	---	---	---	---	---	4.248
1.38	1,592	174.58	4.35 oc	0.29 ic	0.52 ic	---	3.54 s	---	---	---	---	---	4.350
1.41	1,637	174.61	4.36 oc	0.28 ic	0.54 ic	---	3.54 s	---	---	---	---	---	4.355
1.44	1,682	174.64	4.39 oc	0.27 ic	0.57 ic	---	3.55 s	---	---	---	---	---	4.390
1.47	1,727	174.67	4.53 oc	0.26 ic	0.62 ic	---	3.65 s	---	---	---	---	---	4.527
1.50	1,771	174.70	4.66 oc	0.26 ic	0.65 ic	---	3.75 s	---	---	---	---	---	4.660
1.53	1,816	174.73	4.79 oc	0.26 ic	0.69 ic	---	3.84 s	---	---	---	---	---	4.790
1.56	1,861	174.76	4.92 oc	0.25 ic	0.73 ic	---	3.93 s	---	---	---	---	---	4.917
1.59	1,906	174.79	5.04 oc	0.25 ic	0.76 ic	---	4.03 s	---	---	---	---	---	5.039
1.62	1,951	174.82	5.16 oc	0.25 ic	0.79 ic	---	4.12 s	---	---	---	---	---	5.158
1.65	1,996	174.85	5.27 oc	0.24 ic	0.82 ic	---	4.21 s	---	---	---	---	---	5.273
1.68	2,040	174.88	5.39 oc	0.24 ic	0.85 ic	---	4.30 s	---	---	---	---	---	5.388
1.71	2,085	174.91	5.50 oc	0.24 ic	0.87 ic	---	4.39 s	---	---	---	---	---	5.497
1.74	2,130	174.94	5.61 oc	0.24 ic	0.89 ic	---	4.47 s	---	---	---	---	---	5.605
1.77	2,175	174.97	5.71 oc	0.24 ic	0.91 ic	---	4.56 s	---	---	---	---	---	5.710
1.80	2,220	175.00	5.81 oc	0.23 ic	0.92 ic	---	4.66 s	---	---	---	---	---	5.811
1.83	2,263	175.03	5.91 oc	0.23 ic	0.93 ic	---	4.75 s	---	---	---	---	---	5.911
1.86	2,305	175.06	6.01 oc	0.23 ic	0.92 ic	---	4.85 s	---	---	---	---	---	6.007
1.89	2,348	175.09	6.10 oc	0.23 ic	0.92 ic	---	4.96 s	---	---	---	---	---	6.101
1.92	2,391	175.12	6.20 oc	0.23 ic	0.91 ic	---	5.06 s	---	---	---	---	---	6.195
1.95	2,434	175.15	6.29 oc	0.23 ic	0.91 ic	---	5.15 s	---	---	---	---	---	6.286
1.98	2,477	175.18	6.38 oc	0.23 ic	0.90 ic	---	5.25 s	---	---	---	---	---	6.375
2.01	2,520	175.21	6.47 oc	0.22 ic	0.90 ic	---	5.35 s	---	---	---	---	---	6.466
2.04	2,563	175.24	6.56 oc	0.22 ic	0.89 ic	---	5.44 s	---	---	---	---	---	6.554
2.07	2,606	175.27	6.64 oc	0.22 ic	0.89 ic	---	5.53 s	---	---	---	---	---	6.640
2.10	2,649	175.30	6.73 oc	0.22 ic	0.88 ic	---	5.63 s	---	---	---	---	---	6.726
2.13	2,687	175.33	6.81 oc	0.22 ic	0.87 ic	---	5.72 s	---	---	---	---	---	6.811
2.16	2,726	175.36	6.90 oc	0.22 ic	0.87 ic	---	5.81 s	---	---	---	---	---	6.896
2.19	2,765	175.39	6.98 oc	0.22 ic	0.86 ic	---	5.90 s	---	---	---	---	---	6.978
2.22	2,804	175.42	7.06 oc	0.21 ic	0.86 ic	---	5.99 s	---	---	---	---	---	7.059
2.25	2,843	175.45	7.14 oc	0.21 ic	0.85 ic	---	6.08 s	---	---	---	---	---	7.141
2.28	2,882	175.48	7.22 oc	0.21 ic	0.85 ic	---	6.16 s	---	---	---	---	---	7.220
2.31	2,921	175.51	7.30 oc	0.21 ic	0.84 ic	---	6.25 s	---	---	---	---	---	7.300
2.34	2,960	175.54	7.38 oc	0.21 ic	0.84 ic	---	6.33 s	---	---	---	---	---	7.378
2.37	2,999	175.57	7.46 oc	0.21 ic	0.83 ic	---	6.41 s	---	---	---	---	---	7.453
2.40	3,038	175.60	7.53 oc	0.21 ic	0.83 ic	---	6.50 s	---	---	---	---	---	7.529
2.43	3,070	175.63	7.61 oc	0.21 ic	0.82 ic	---	6.58 s	---	---	---	---	---	7.607
2.46	3,102	175.66	7.68 oc	0.20 ic	0.81 ic	---	6.66 s	---	---	---	---	---	7.680
2.49	3,134	175.69	7.76 oc	0.20 ic	0.81 ic	---	6.74 s	---	---	---	---	---	7.756
2.52	3,166	175.72	7.83 oc	0.20 ic	0.80 ic	---	6.82 s	---	---	---	---	---	7.827
2.55	3,198	175.75	7.90 oc	0.20 ic	0.80 ic	---	6.90 s	---	---	---	---	---	7.900
2.58	3,230	175.78	7.97 oc	0.20 ic	0.79 ic	---	6.98 s	---	---	---	---	---	7.971
2.61	3,262	175.81	8.05 oc	0.20 ic	0.79 ic	---	7.06 s	---	---	---	---	---	8.042
2.64	3,294	175.84	8.12 oc	0.20 ic	0.78 ic	---	7.14 s	---	---	---	---	---	8.114
2.67	3,326	175.87	8.19 oc	0.19 ic	0.78 ic	---	7.21 s	---	---	---	---	---	8.183
2.70	3,358	175.90	8.25 oc	0.19 ic	0.77 ic	---	7.29 s	---	---	---	---	---	8.253
2.73	3,376	175.93	8.32 oc	0.19 ic	0.77 ic	---	7.36 s	---	---	---	---	---	8.322
2.76	3,395	175.96	8.39 oc	0.19 ic	0.76 ic	---	7.44 s	---	---	---	---	---	8.390
2.79	3,413	175.99	8.46 oc	0.19 ic	0.76 ic	---	7.51 s	---	---	---	---	---	8.456
2.82	3,432	176.02	8.53 oc	0.19 ic	0.75 ic	---	7.58 s	---	---	---	---	---	8.525
2.85	3,450	176.05	8.59 oc	0.19 ic	0.75 ic	---	7.65 s	---	---	---	---	---	8.589
2.88	3,468	176.08	8.66 oc	0.19 ic	0.74 ic	---	7.73 s	---	---	---	---	---	8.656
2.91	3,487	176.11	8.72 oc	0.18 ic	0.74 ic	---	7.80 s	---	---	---	---	---	8.721
2.94	3,505	176.14	8.79 oc	0.18 ic	0.73 ic	---	7.87 s	---	---	---	---	---	8.785
2.97	3,524	176.17	8.85 oc	0.18 ic	0.73 ic	---	7.94 s	---	---	---	---	---	8.848
3.00	3,542	176.20	8.92 oc	0.18 ic	0.73 ic	---	8.01 s	---	---	---	---	---	8.915

...End

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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	0.966	1	725	2,985	-----	-----	-----	Existing Condition
2	SCS Runoff	1.244	1	724	4,034	-----	-----	-----	Proposed Condition
3	Reservoir	0.932	1	729	4,025	2	173.90	637	ROUTE
diana.gpw					Return Period: 2 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

10

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

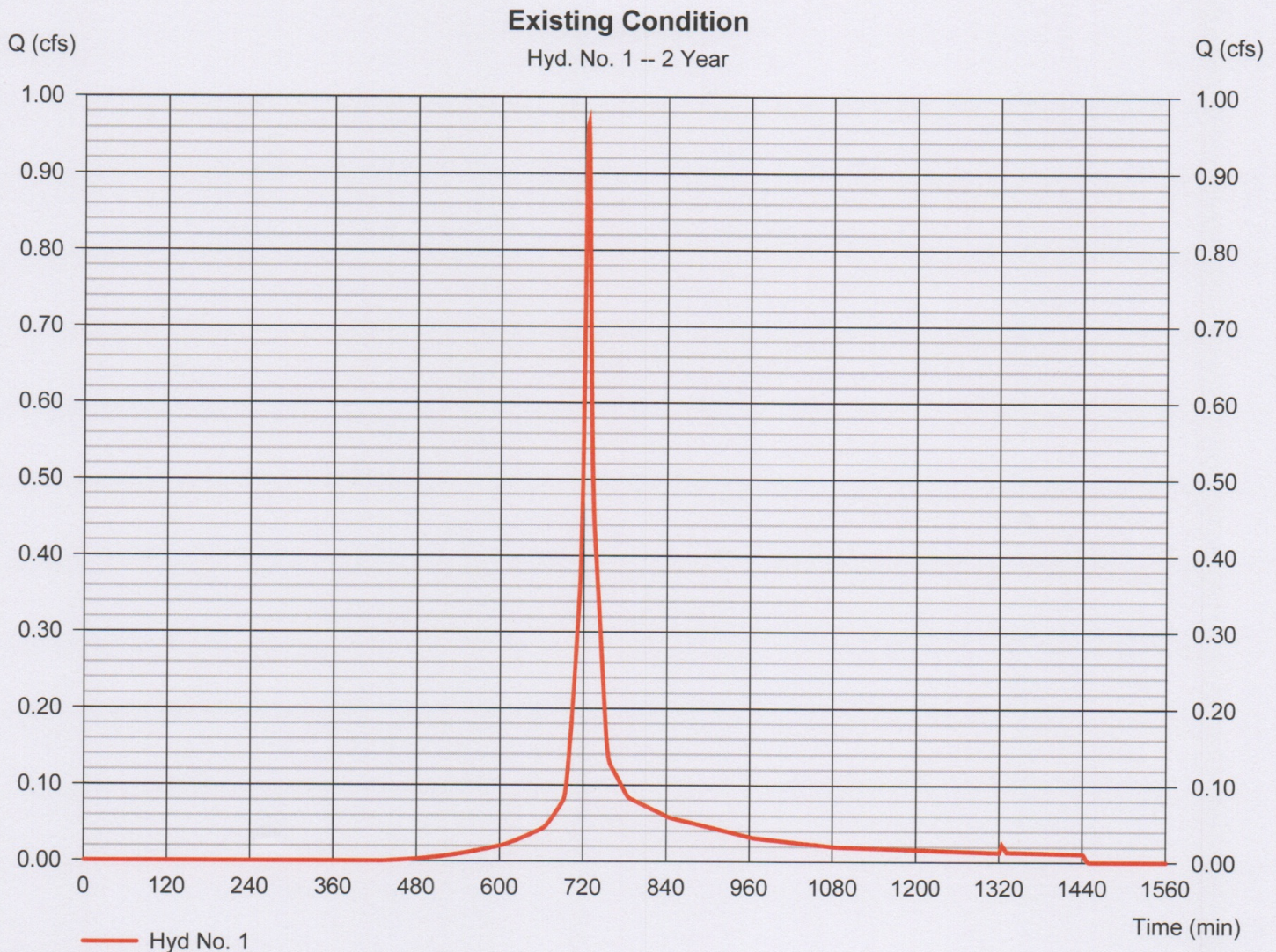
Hyd. No. 1

Existing Condition

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 3.50 in
Storm duration = 24 hrs

Peak discharge = 0.966 cfs
Time to peak = 725 min
Hyd. volume = 2,985 cuft
Curve number = 86*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

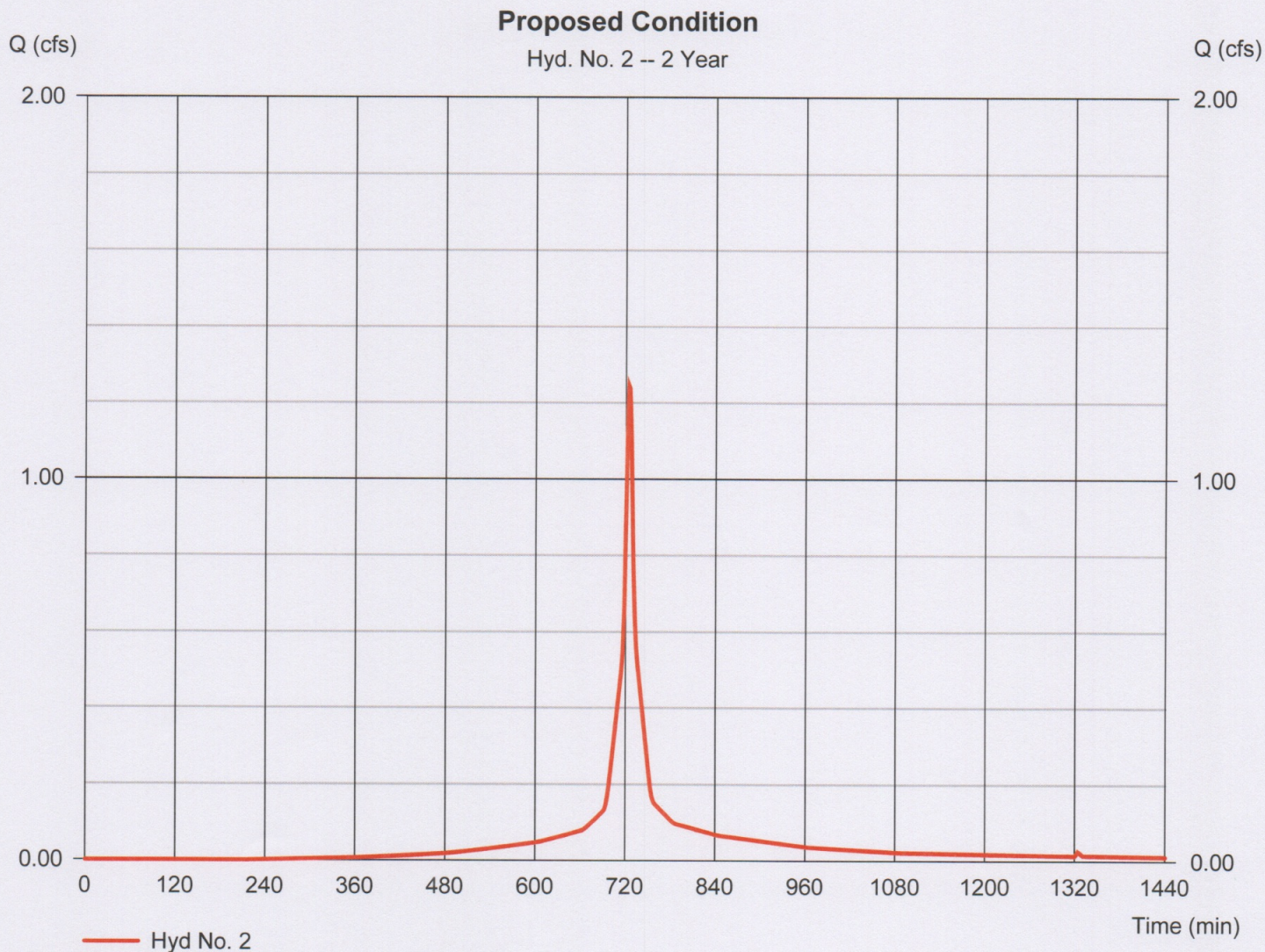
Hyd. No. 2

Proposed Condition

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 3.50 in
Storm duration = 24 hrs

Peak discharge = 1.244 cfs
Time to peak = 724 min
Hyd. volume = 4,034 cuft
Curve number = 94*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

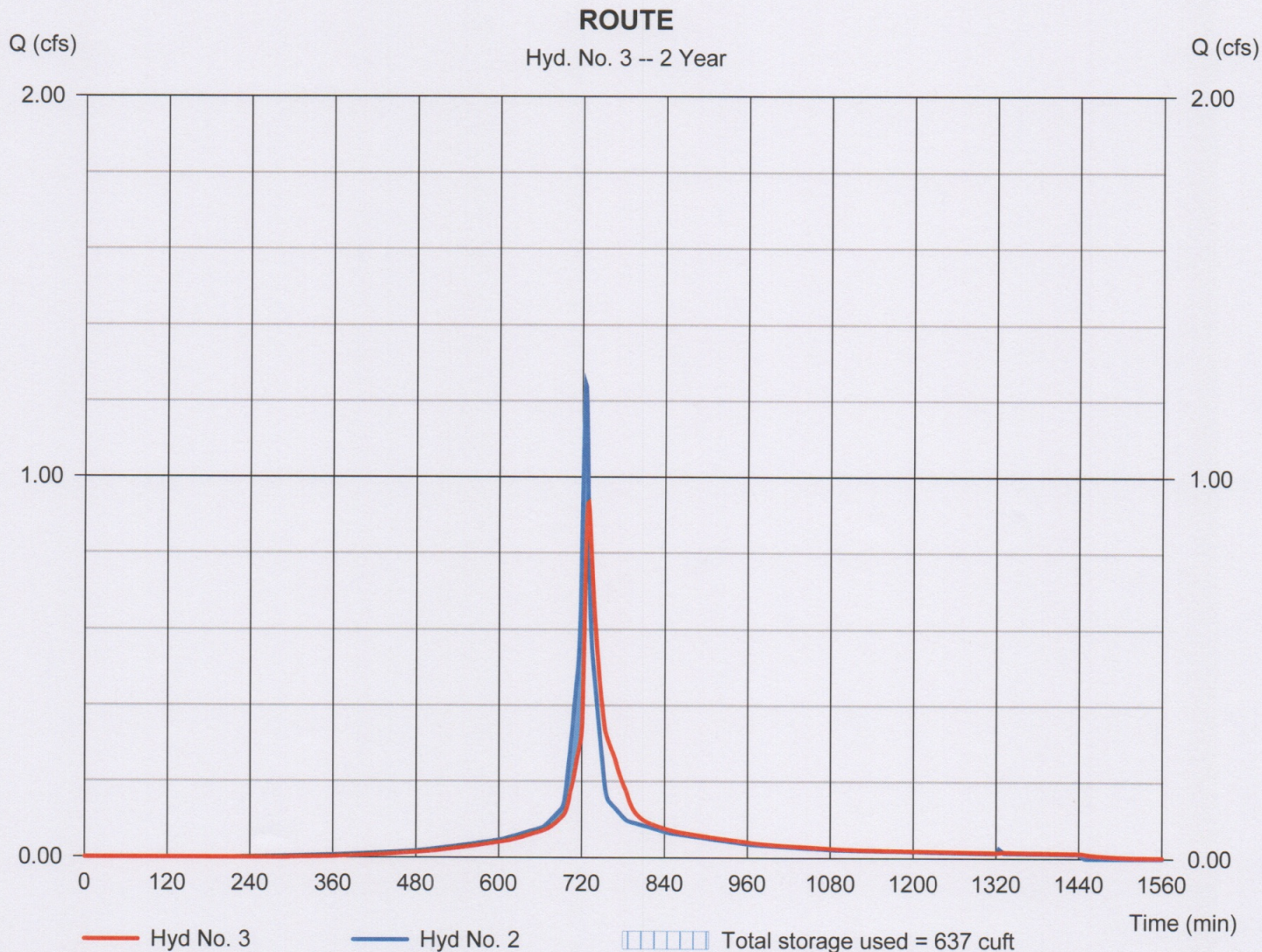
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 0.932 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,025 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 173.90 ft
Reservoir name	= <New Pond>	Max. Storage	= 637 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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	1.626	1	724	5,105	-----	-----	-----	Existing Condition
2	SCS Runoff	1.897	1	724	6,311	-----	-----	-----	Proposed Condition
3	Reservoir	1.553	1	728	6,302	2	174.04	816	ROUTE
diana.gpw					Return Period: 10 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

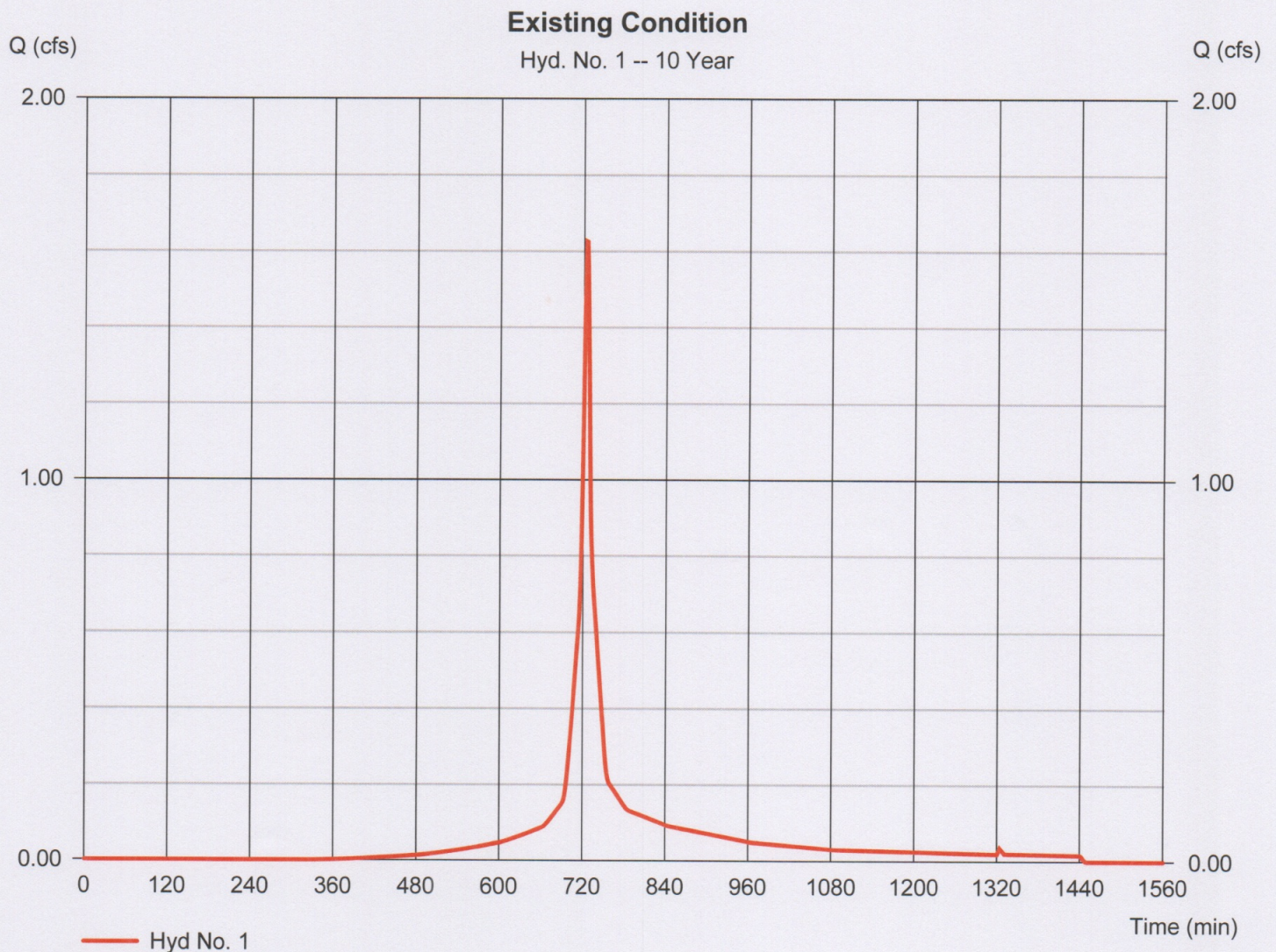
Hyd. No. 1

Existing Condition

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.13 in
Storm duration = 24 hrs

Peak discharge = 1.626 cfs
Time to peak = 724 min
Hyd. volume = 5,105 cuft
Curve number = 86*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

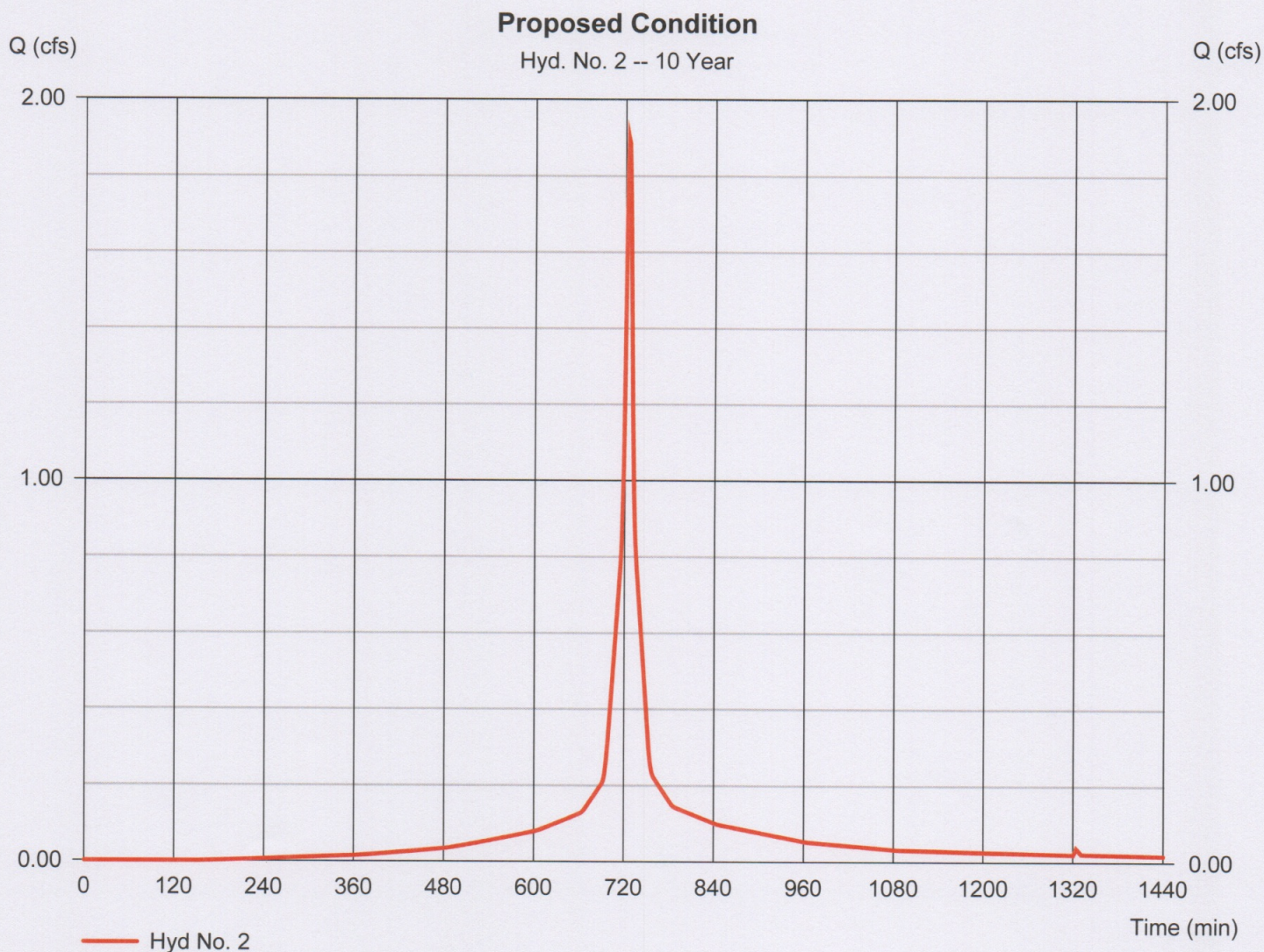
Hyd. No. 2

Proposed Condition

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.13 in
Storm duration = 24 hrs

Peak discharge = 1.897 cfs
Time to peak = 724 min
Hyd. volume = 6,311 cuft
Curve number = 94*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

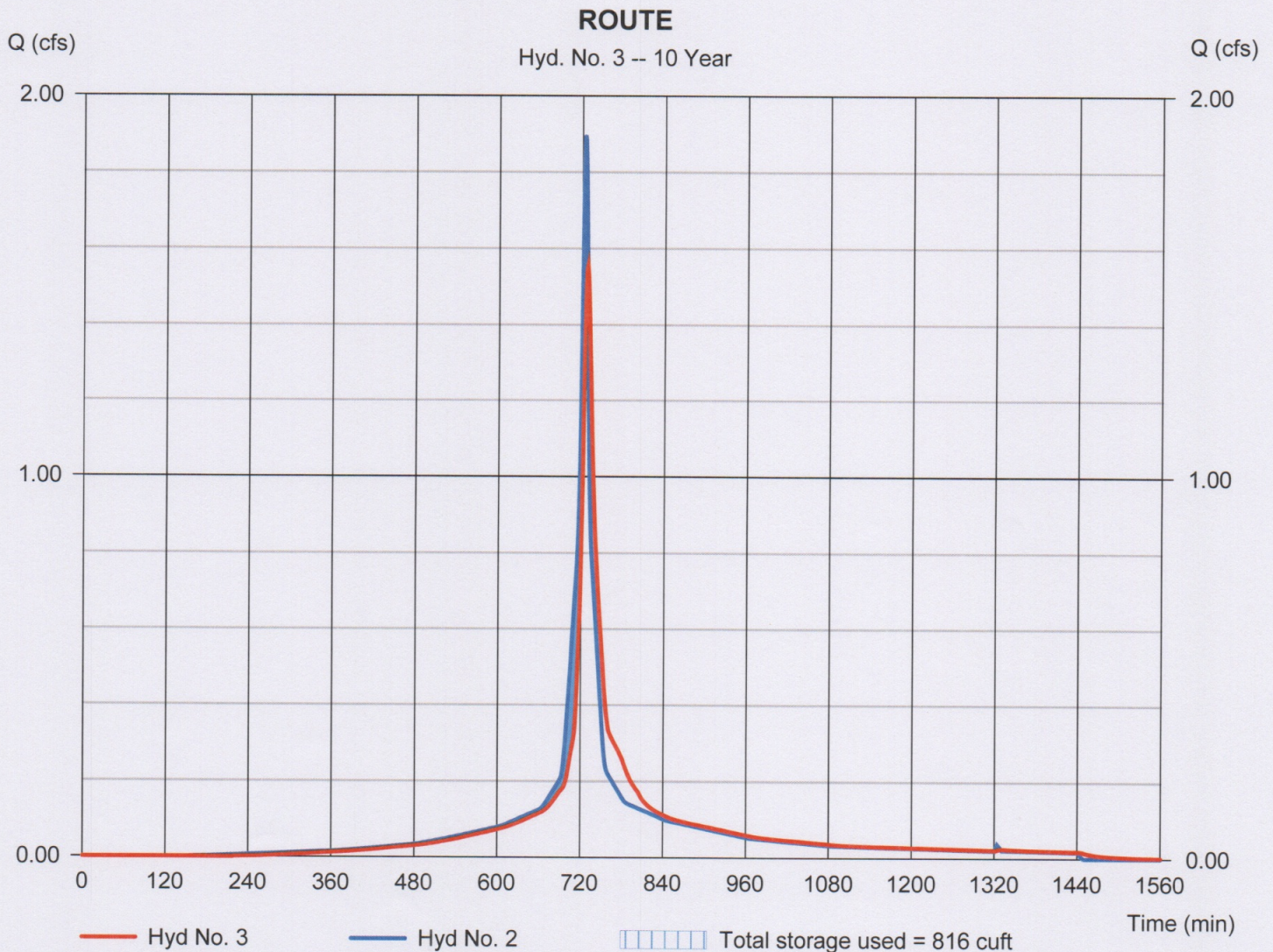
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 1.553 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 6,302 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.04 ft
Reservoir name	= <New Pond>	Max. Storage	= 816 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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	2.092	1	724	6,638	-----	-----	-----	Existing Condition
2	SCS Runoff	2.349	1	724	7,915	-----	-----	-----	Proposed Condition
3	Reservoir	1.942	1	728	7,907	2	174.12	928	ROUTE
diana.gpw					Return Period: 25 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

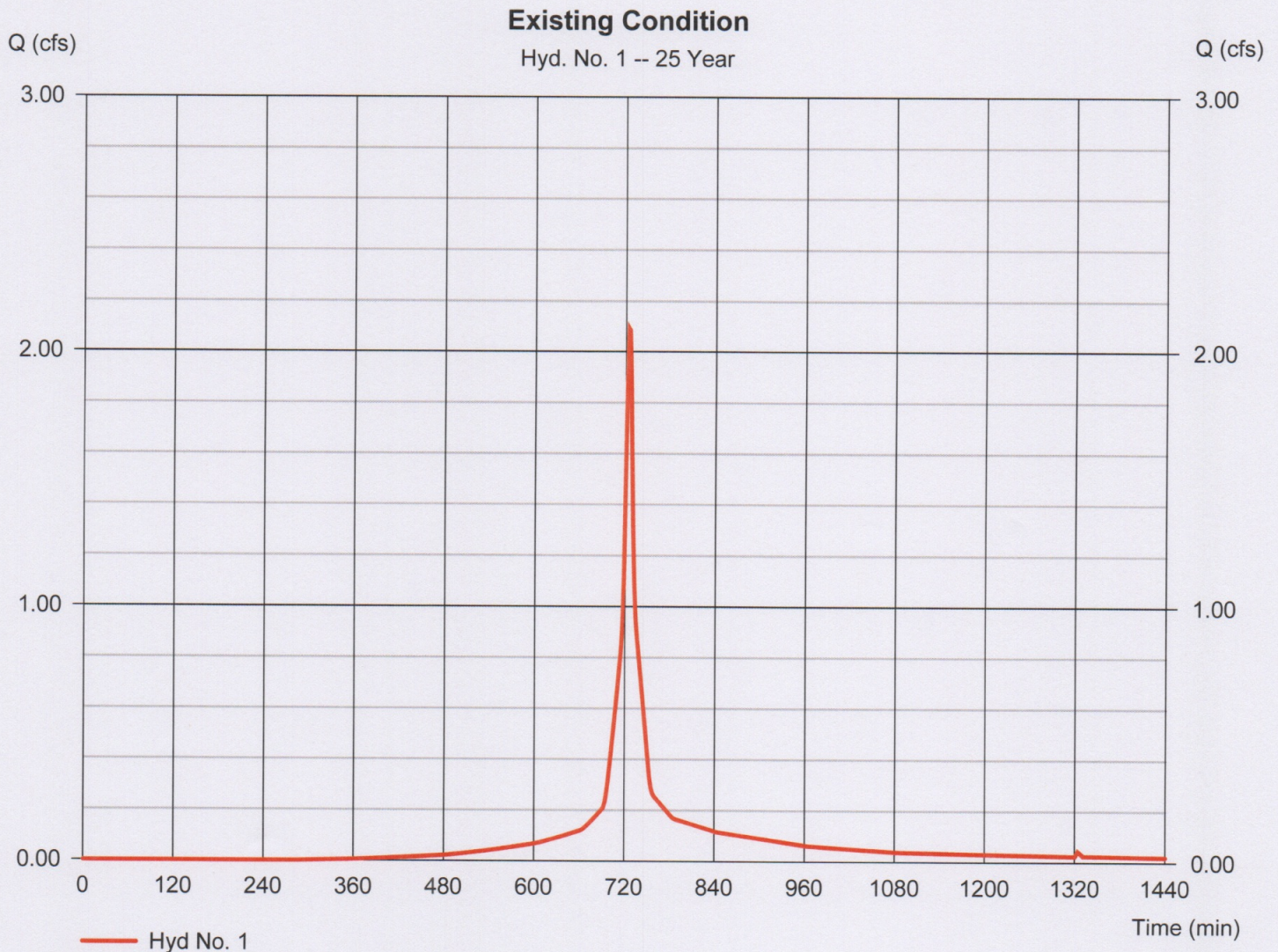
Hyd. No. 1

Existing Condition

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 6.27 in
Storm duration = 24 hrs

Peak discharge = 2.092 cfs
Time to peak = 724 min
Hyd. volume = 6,638 cuft
Curve number = 86*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

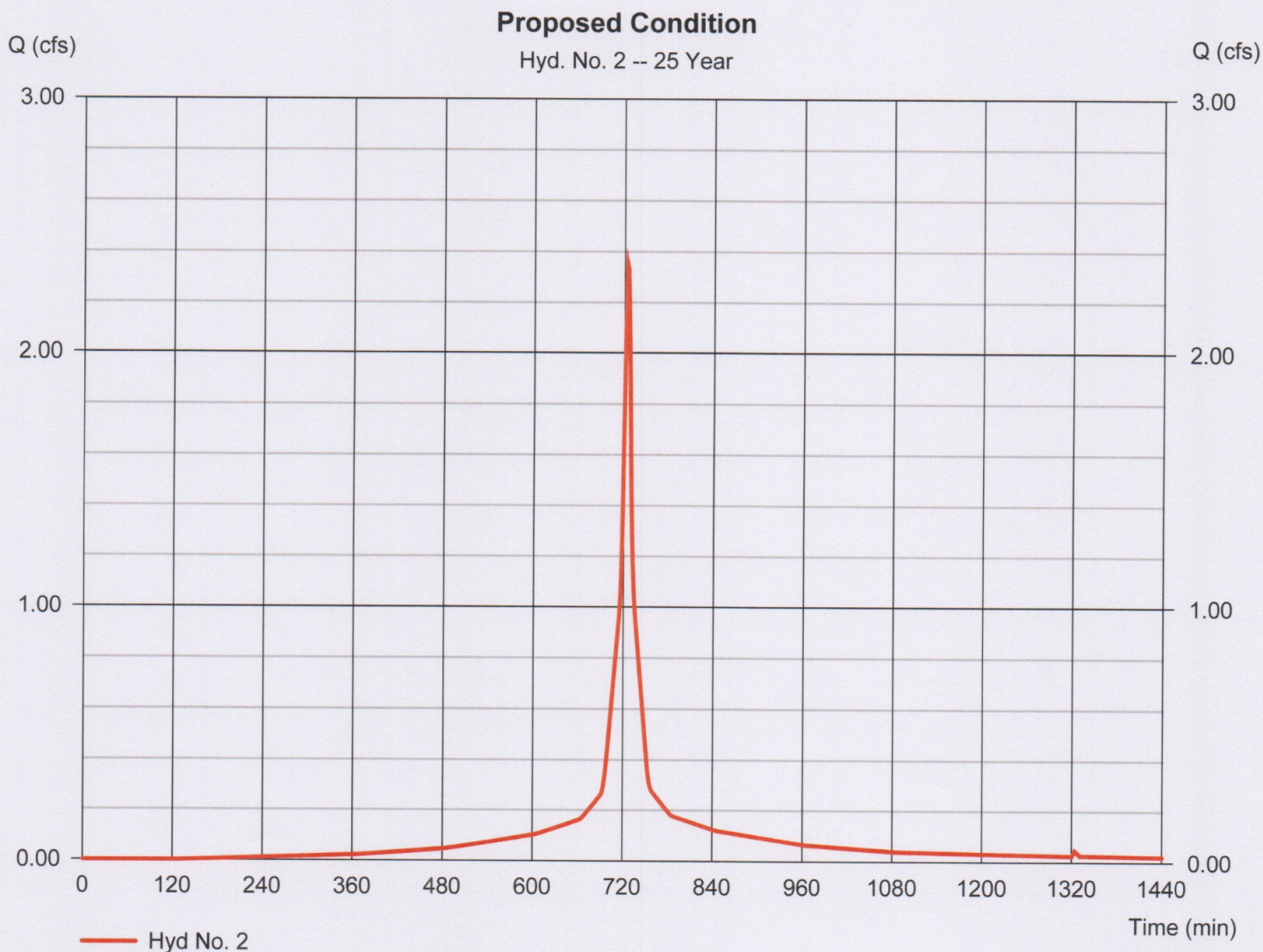
Hyd. No. 2

Proposed Condition

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 6.27 in
Storm duration = 24 hrs

Peak discharge = 2.349 cfs
Time to peak = 724 min
Hyd. volume = 7,915 cuft
Curve number = 94*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

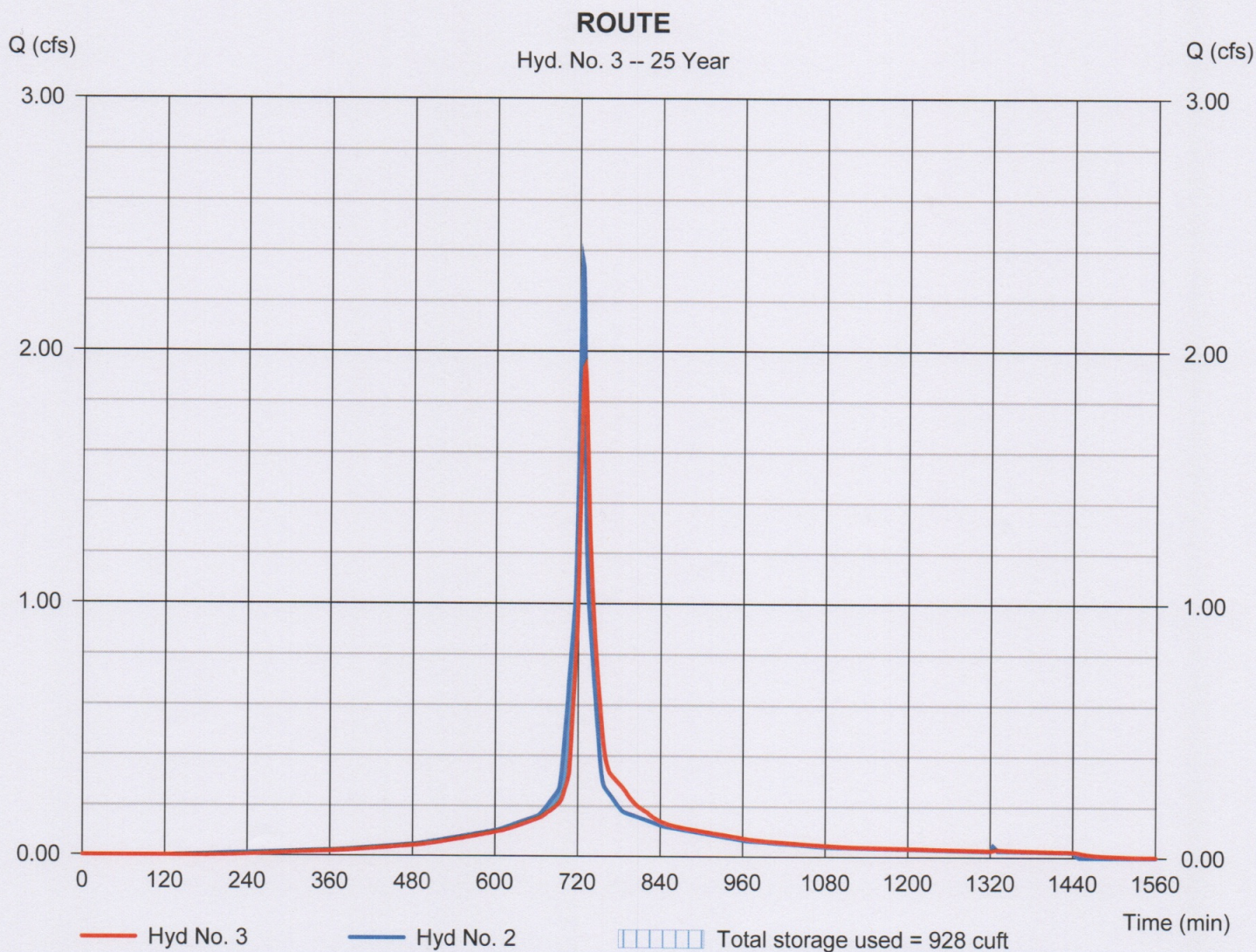
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 1.942 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 7,907 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.12 ft
Reservoir name	= <New Pond>	Max. Storage	= 928 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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	3.201	1	724	10,390	-----	-----	-----	Existing Condition
2	SCS Runoff	3.424	1	724	11,774	-----	-----	-----	Proposed Condition
3	Reservoir	2.852	1	728	11,766	2	174.31	1,188	ROUTE
diana.gpw					Return Period: 100 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

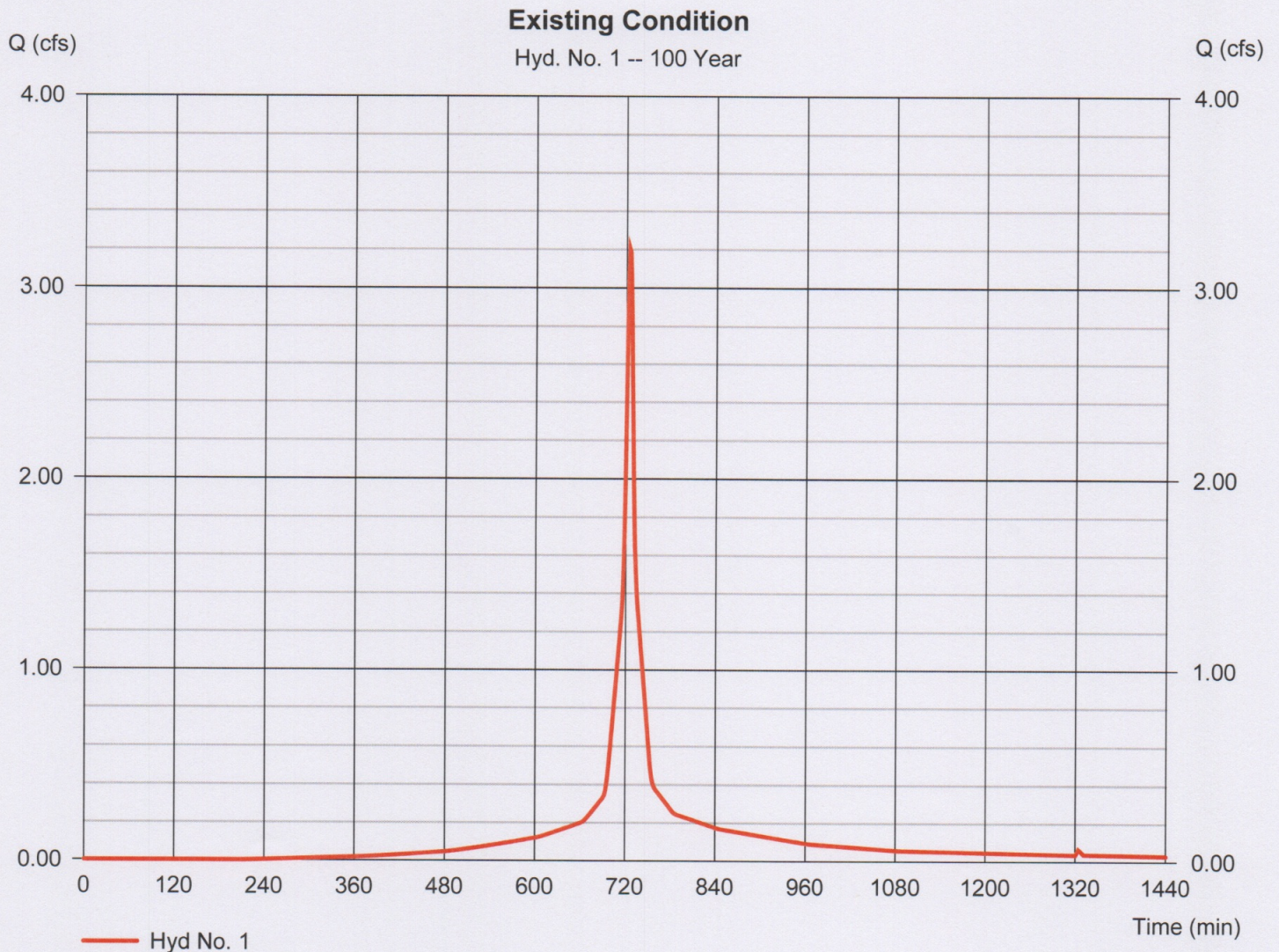
Hyd. No. 1

Existing Condition

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 9.00 in
Storm duration = 24 hrs

Peak discharge = 3.201 cfs
Time to peak = 724 min
Hyd. volume = 10,390 cuft
Curve number = 86*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

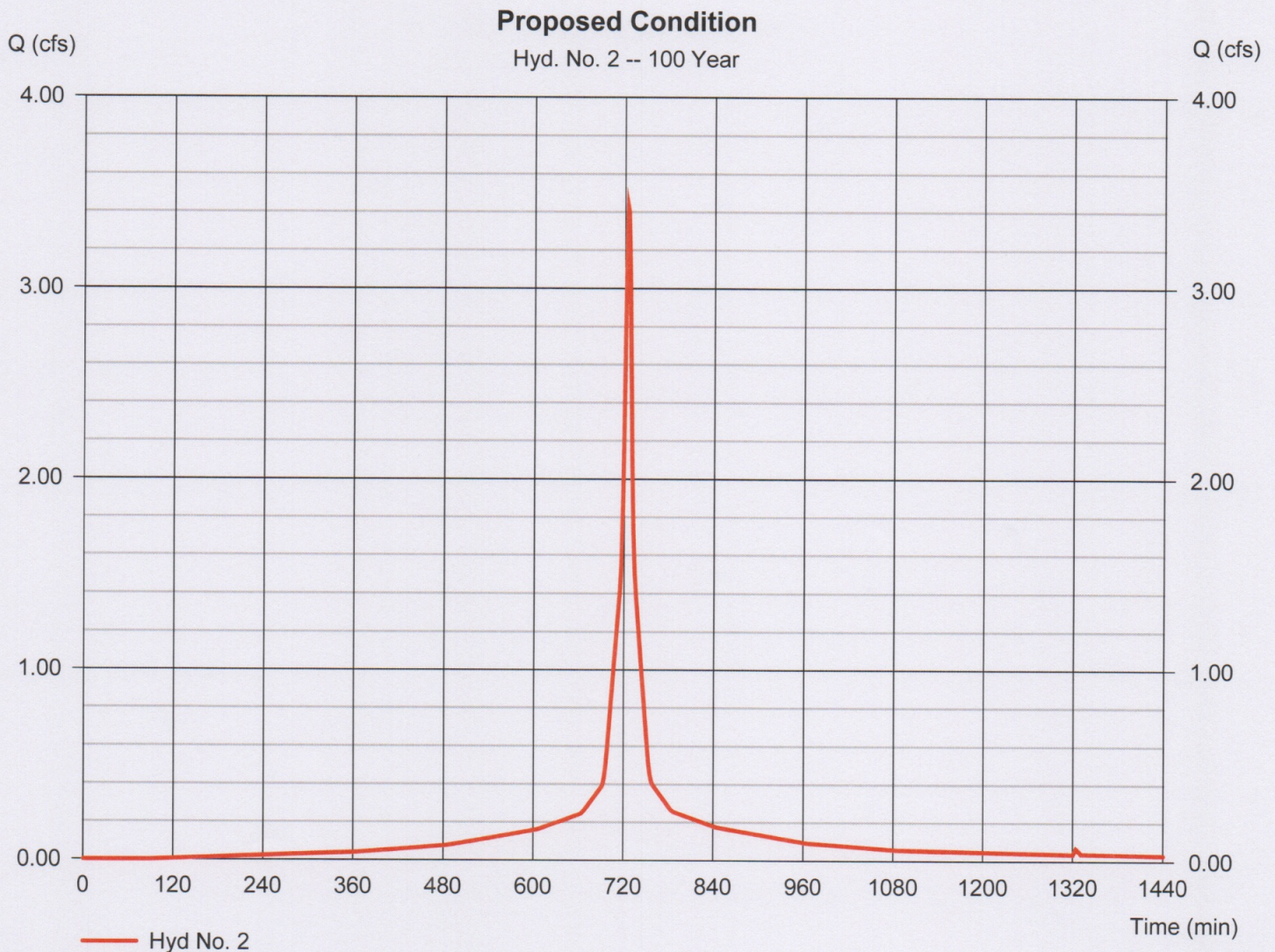
Hyd. No. 2

Proposed Condition

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.380 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 9.00 in
Storm duration = 24 hrs

Peak discharge = 3.424 cfs
Time to peak = 724 min
Hyd. volume = 11,774 cuft
Curve number = 94*
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

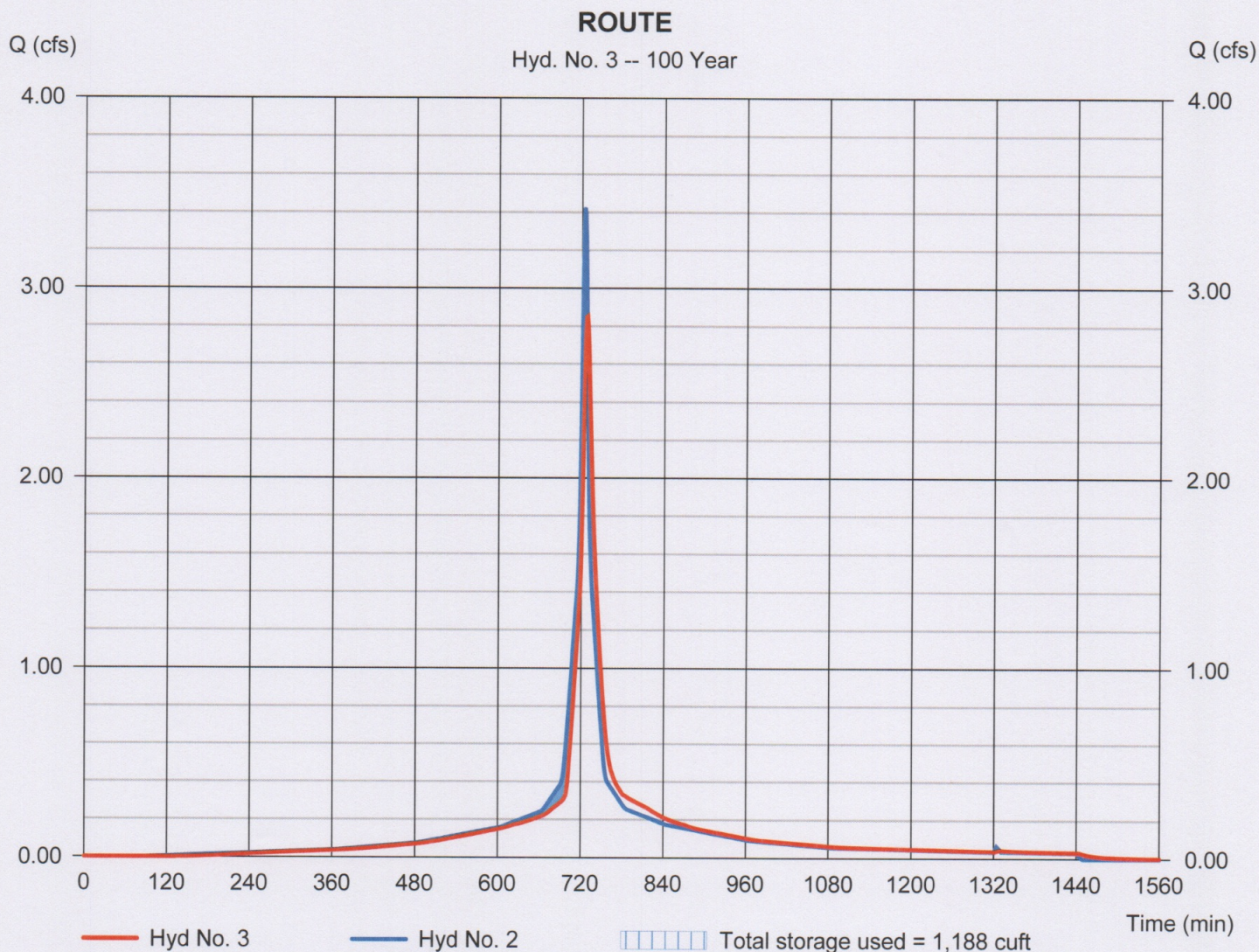
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 2.852 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 11,766 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.31 ft
Reservoir name	= <New Pond>	Max. Storage	= 1,188 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	69.8703	13.1000	0.8658	-----
3	0.0000	0.0000	0.0000	-----
5	79.2597	14.6000	0.8369	-----
10	88.2351	15.5000	0.8279	-----
25	102.6072	16.5000	0.8217	-----
50	114.8193	17.2000	0.8199	-----
100	127.1596	17.8000	0.8186	-----

File name: SampleFHA.idf

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.50	0.00	3.30	5.13	6.27	6.80	9.00
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Hydraflow Table of Contents

diana.gpw

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