SUMMARY OF DATA

Method of Hydrograph Development: TR-55

Software: Autodesk Storm and Sanitary Stand Alone

Design Criteria: Control the post development storms of a frequency between one year and the critical storm so as to be equal to or less than the pre-development peak runoff rate for a 24 hour-one year frequency storm. Control post development storms less frequent than the critical storm so as to be equal to or less than the pre-development peak runoff rate for the next most frequent storm event.

Drainage Area Descriptions	Drainage Area (Acres)	CN	Tc (Mins)	Q1 (cfs)	Q1 (ft^3)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
Pre Developed Areas								
HIX Site	2.03	73.6	14.85	0.93	3,115	5.64	6.36	7.36
Access Drive	0.34	72.8	19.11	0.13	502	0.84	0.95	1.10
Hyatt Site	3.46	65.0	16.50	0.38		6.49	7.54	8.99
Post Developed Areas								
HIX Site	2.03	92.0	12.00	4.12	10,773	10.93	11.82	13.01
Access Drive	0.34	98.0	12.00	0.88	2,511	1.97	2.12	2.31
Offsite Areas								
Lot 1 Offsite	7.00	76.0	23.25	3.37		17.97	20.18	23.18
HIX ODOT RW	0.11	65.0	12.00	0.01		0.24	0.28	0.33
Hyatt ODOT RW	0.28	65.0	12.00	0.04		0.61	0.71	0.84

HIX Critical Storm = 25 yr.

HIX Allowable Release Rate= **Q1 HIX Site Pre Developed +** **Q25 HIX ODOT RW**	**0.93 + 0.24 = 1.17 CFS**

Access Rd. Critical Storm = 50 yr.

Access Rd. Allowable Release Rate= **Q50 Hyatt Pre Developed +** **Q50 HIX +** **Q1 Access Drive Pre Developed + Q50 Lot 1 Offsite +** **Q50 Hyatt ODOT RW**	**7.54 + 1.02 + 0.13 + 20.18 + 0.71 = 29.58CFS**

no detention or WQ for proposed future development

- WQ$_v$ calculations not included
- current design does not allow for any additional development, basin will be required to be modified for any additional development - for both WQ & detention
- provide drawing showing the 72" ϕ pipe is included w/ the volume calc...

Project: The Fields at Liberty Way

Drainage Area Description:
HIX Site Pre-Developed

Job #: 15M040.000
Initials: BJS
Date: 9/13/2016
Revised:

Drainage Area = 2.03 Acres

Soil Types:

22 %	Type 'B'	*0.5 acres*
78 %	Type 'C'	*1.6 acres*

Land Use: Woods - Grass 2.0 Acres

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	CN*Soil %*Land %
Woods - Grass	B	65	22	100.0	14.41
Woods - Grass	C	76	78	100.0	59.15

Composite CN = 73.6

Time of Concentration:

Sheet Flow:

Tc

Length = 72 Slope(ft/ft) = 0.0108 Manning's, n = 0.24 **0.248** *hr*

Tc = 0.25 *hr*
15 min

Project: The Fields at Liberty Way

Drainage Area Description:
HIX Site Post-Developed

Job #: 15M040.000
Initials: BJS
Date: 9/13/2016
Revised:

Drainage Area = 2.03 Acres

Soil Types:

22 %	Type 'B'	*0.5 acres*
78 %	Type 'C'	*1.6 acres*

Land Use:

Impervious	1.6 Acres
Open Space - Good	0.4 Acres

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	CN*Soil %*Land %
Impervious	B	98	22	77.9	16.91
Impervious	C	98	78	77.9	59.39
Open Space - Good	B	61	22	22.1	2.99
Open Space - Good	C	74	78	22.1	12.75

Composite CN = 92.0

Time of Concentration:

Tc

Tc = 12.00 *min*
12 min

SUMMARY OF DATA

Method of Hydrograph Development: TR-55

Software: Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2011

Design Criteria: Control the post development storms of a frequency between one year and the critical storm so as to be equal to or less than the pre-development peak runoff rate for a 24 hour one year frequency storm.

HIX Basin **100YR=894.83** **T/Dike=898.00**		**Outlet: 24" Pipe @ 0.50%** **4" Orifice Inv=888.00** **T/Grate @ 895.00, Spillway = 896.00**			
Frequency	**Inflow**	**Outflow**	**Storage**		**Elevation**
(yr)	(cfs)	(cfs)	(ft^3)	(ac-ft)	(ft)
1	4.13	0.66	4,180	0.10	890.79
5	7.84	0.85	9,062	0.21	982.48
10	9.30	0.91	11,154	0.26	893.11
25	11.16	0.98	13,914	0.32	893.89
50	12.09	1.02	15,330	0.35	894.26
100	13.34	1.06	17,263	0.40	894.76

Release Rate - Basin		
Critical Storm = 25 yr		
Storm Frequency	**Pre-Developed Allowable Release Rate**	**Post-Developed Release Rate**
(yr)	(cfs)	(cfs)
1	1.17	0.66
5	1.17	0.85
10	1.17	0.91
25	1.17	0.98
50	11.16	1.02
100	12.09	1.06

Note: Water Quality to be provided by Hyatt House pond.

Spillway		$Q_{100}=CLH^{3/2}$	
Q_{100}=13.34	C=3.0	L=30	H=0.28
Spillway Invert		896.10	
100 Year Weir Flow		894.76	
Top of Dike Elevation		898.00	
Freeboard		1.62'	
Spillway Side Slope		3:1	
Velocity		1.58	

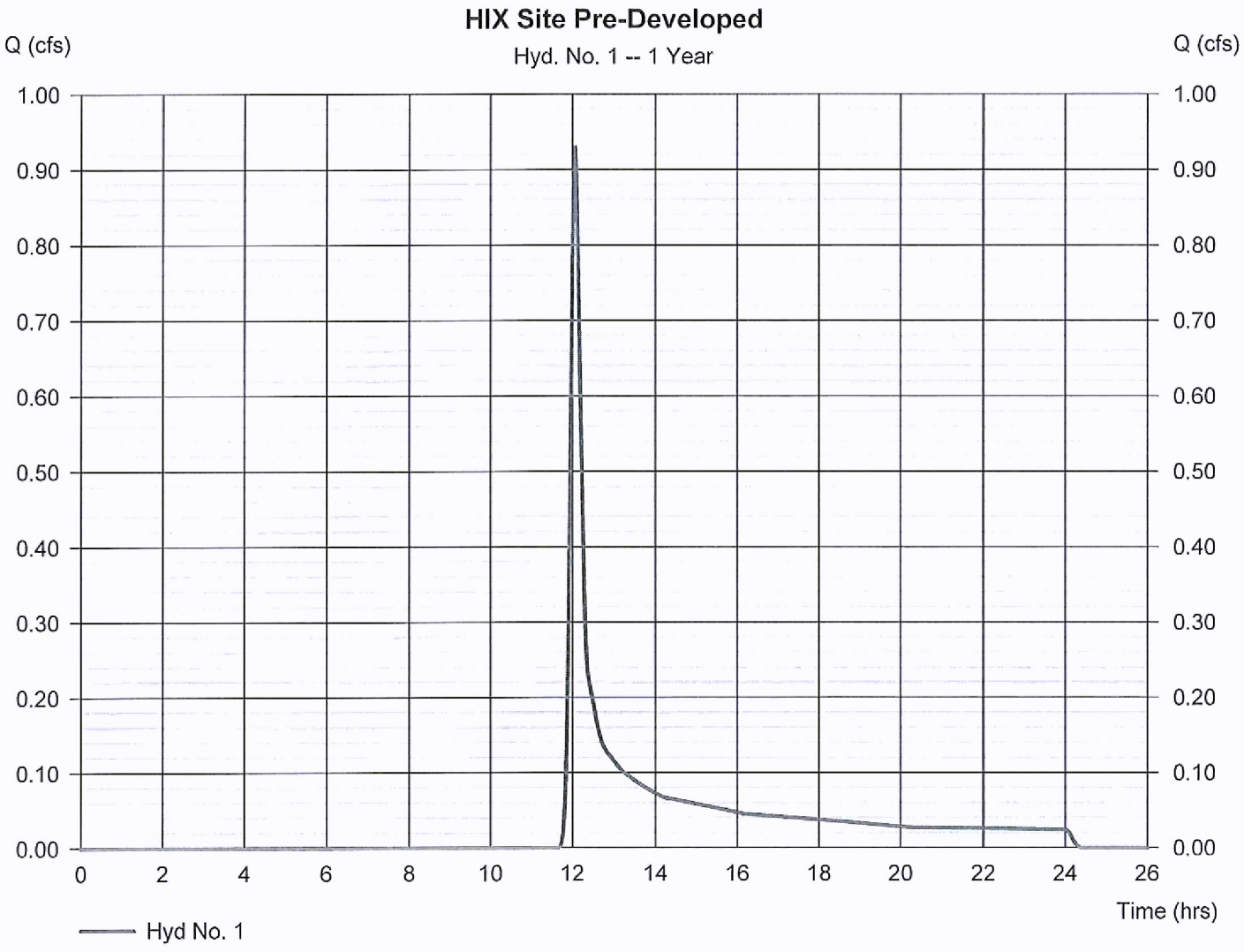
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 1

HIX Site Pre-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 0.932 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 3,115 cuft
Drainage area	= 2.030 ac	Curve number	= 73.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



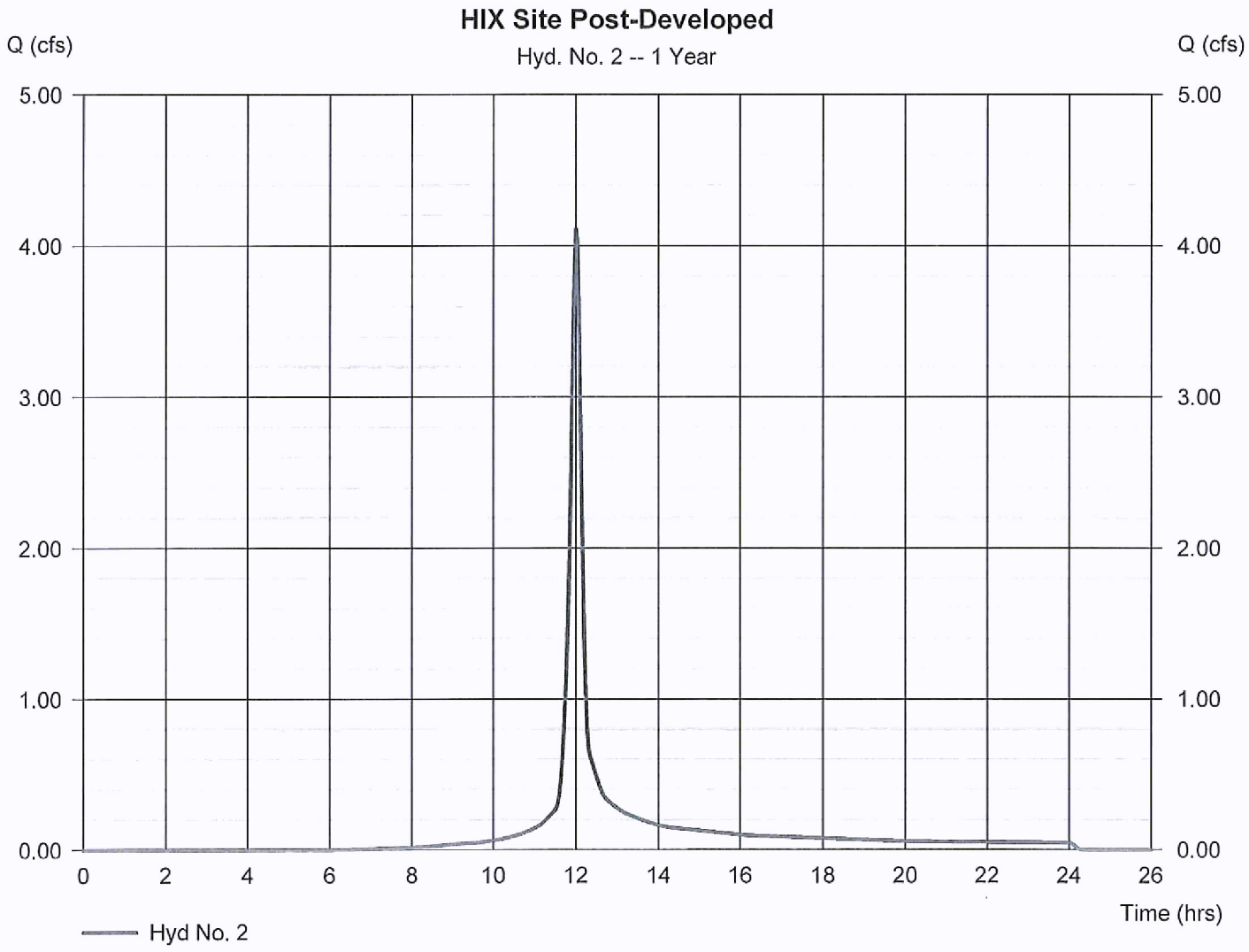
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 2

HIX Site Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 4.120 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 10,773 cuft
Drainage area	= 2.030 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Pond No. 2 - HIX Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 888.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	888.00	149	0	0
1.00	889.00	1,340	645	645
2.00	890.00	2,077	1,695	2,340
3.00	891.00	2,585	2,326	4,666
4.00	892.00	3,058	2,818	7,484
5.00	893.00	3,478	3,265	10,750
6.00	894.00	3,649	3,563	14,312
7.00	895.00	4,080	3,862	18,175
8.00	896.00	5,015	4,539	22,714
9.00	897.00	5,015	5,014	27,728
10.00	898.00	5,015	5,015	32,743

spillway @ 896.10

assuming 2' in under the 72" & 18" but flow via 72"

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	4.00	0.00
Span (in)	= 24.00	0.00	4.00	0.00
No. Barrels	= 1	0	1	0
Invert El. (ft)	= 888.00	0.00	888.00	0.00
Length (ft)	= 361.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.015	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	30.00	0.00	0.00
Crest El. (ft)	= 895.00	896.10	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
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	888.00	0.00	---	0.00	---	0.00	0.00	---	---	---	---	0.000
0.10	65	888.10	0.02 ic	---	0.02 ic	---	0.00	0.00	---	---	---	---	0.022
0.20	129	888.20	0.08 ic	---	0.08 ic	---	0.00	0.00	---	---	---	---	0.080
0.30	194	888.30	0.15 ic	---	0.15 ic	---	0.00	0.00	---	---	---	---	0.152
0.40	258	888.40	0.20 ic	---	0.20 ic	---	0.00	0.00	---	---	---	---	0.200
0.50	323	888.50	0.24 ic	---	0.23 ic	---	0.00	0.00	---	---	---	---	0.233
0.60	387	888.60	0.27 ic	---	0.27 ic	---	0.00	0.00	---	---	---	---	0.266
0.70	452	888.70	0.29 ic	---	0.29 ic	---	0.00	0.00	---	---	---	---	0.294
0.80	516	888.80	0.32 ic	---	0.32 ic	---	0.00	0.00	---	---	---	---	0.320
0.90	581	888.90	0.35 ic	---	0.34 ic	---	0.00	0.00	---	---	---	---	0.344
1.00	645	889.00	0.38 ic	---	0.37 ic	---	0.00	0.00	---	---	---	---	0.366
1.10	815	889.10	0.41 ic	---	0.39 ic	---	0.00	0.00	---	---	---	---	0.387
1.20	984	889.20	0.41 ic	---	0.41 ic	---	0.00	0.00	---	---	---	---	0.409
1.30	1,154	889.30	0.44 ic	---	0.43 ic	---	0.00	0.00	---	---	---	---	0.428
1.40	1,323	889.40	0.45 ic	---	0.45 ic	---	0.00	0.00	---	---	---	---	0.447
1.50	1,493	889.50	0.48 ic	---	0.47 ic	---	0.00	0.00	---	---	---	---	0.466
1.60	1,662	889.60	0.48 ic	---	0.48 ic	---	0.00	0.00	---	---	---	---	0.483
1.70	1,832	889.70	0.52 ic	---	0.50 ic	---	0.00	0.00	---	---	---	---	0.500
1.80	2,001	889.80	0.52 ic	---	0.52 ic	---	0.00	0.00	---	---	---	---	0.517
1.90	2,171	889.90	0.56 ic	---	0.53 ic	---	0.00	0.00	---	---	---	---	0.533
2.00	2,340	890.00	0.56 ic	---	0.55 ic	---	0.00	0.00	---	---	---	---	0.549
2.10	2,573	890.10	0.56 ic	---	0.56 ic	---	0.00	0.00	---	---	---	---	0.563
2.20	2,805	890.20	0.60 ic	---	0.58 ic	---	0.00	0.00	---	---	---	---	0.578
2.30	3,038	890.30	0.60 ic	---	0.59 ic	---	0.00	0.00	---	---	---	---	0.594
2.40	3,271	890.40	0.61 ic	---	0.61 ic	---	0.00	0.00	---	---	---	---	0.607
2.50	3,503	890.50	0.64 ic	---	0.62 ic	---	0.00	0.00	---	---	---	---	0.621
2.60	3,736	890.60	0.64 ic	---	0.63 ic	---	0.00	0.00	---	---	---	---	0.635
2.70	3,968	890.70	0.65 ic	---	0.65 ic	---	0.00	0.00	---	---	---	---	0.648
2.80	4,201	890.80	0.69 ic	---	0.66 ic	---	0.00	0.00	---	---	---	---	0.661
2.90	4,434	890.90	0.69 ic	---	0.67 ic	---	0.00	0.00	---	---	---	---	0.674
3.00	4,666	891.00	0.69 ic	---	0.69 ic	---	0.00	0.00	---	---	---	---	0.687
3.10	4,948	891.10	0.73 ic	---	0.70 ic	---	0.00	0.00	---	---	---	---	0.698

Continues on next page...

HIX 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
3.20	5,230	891.20	0.73 ic	---	0.71 ic	---	0.00	0.00	---	---	---	---	0.711
3.30	5,512	891.30	0.73 ic	---	0.72 ic	---	0.00	0.00	---	---	---	---	0.723
3.40	5,793	891.40	0.73 ic	---	0.73 ic	---	0.00	0.00	---	---	---	---	0.735
3.50	6,075	891.50	0.75 ic	---	0.75 ic	---	0.00	0.00	---	---	---	---	0.746
3.60	6,357	891.60	0.78 ic	---	0.76 ic	---	0.00	0.00	---	---	---	---	0.757
3.70	6,639	891.70	0.78 ic	---	0.77 ic	---	0.00	0.00	---	---	---	---	0.769
3.80	6,921	891.80	0.78 ic	---	0.78 ic	---	0.00	0.00	---	---	---	---	0.780
3.90	7,202	891.90	0.79 ic	---	0.79 ic	---	0.00	0.00	---	---	---	---	0.791
4.00	7,484	892.00	0.84 ic	---	0.80 ic	---	0.00	0.00	---	---	---	---	0.801
4.10	7,811	892.10	0.84 ic	---	0.81 ic	---	0.00	0.00	---	---	---	---	0.812
4.20	8,137	892.20	0.84 ic	---	0.82 ic	---	0.00	0.00	---	---	---	---	0.823
4.30	8,464	892.30	0.84 ic	---	0.83 ic	---	0.00	0.00	---	---	---	---	0.834
4.40	8,790	892.40	0.84 ic	---	0.84 ic	---	0.00	0.00	---	---	---	---	0.843
4.50	9,117	892.50	0.89 ic	---	0.85 ic	---	0.00	0.00	---	---	---	---	0.853
4.60	9,443	892.60	0.89 ic	---	0.86 ic	---	0.00	0.00	---	---	---	---	0.864
4.70	9,770	892.70	0.89 ic	---	0.87 ic	---	0.00	0.00	---	---	---	---	0.874
4.80	10,097	892.80	0.89 ic	---	0.88 ic	---	0.00	0.00	---	---	---	---	0.884
4.90	10,423	892.90	0.89 ic	---	0.89 ic	---	0.00	0.00	---	---	---	---	0.893
5.00	10,750	893.00	0.90 ic	---	0.90 ic	---	0.00	0.00	---	---	---	---	0.902
5.10	11,106	893.10	0.95 ic	---	0.91 ic	---	0.00	0.00	---	---	---	---	0.912
5.20	11,462	893.20	0.95 ic	---	0.92 ic	---	0.00	0.00	---	---	---	---	0.922
5.30	11,818	893.30	0.95 ic	---	0.93 ic	---	0.00	0.00	---	---	---	---	0.931
5.40	12,175	893.40	0.95 ic	---	0.94 ic	---	0.00	0.00	---	---	---	---	0.941
5.50	12,531	893.50	0.95 ic	---	0.95 ic	---	0.00	0.00	---	---	---	---	0.950
5.60	12,887	893.60	0.96 ic	---	0.96 ic	---	0.00	0.00	---	---	---	---	0.958
5.70	13,244	893.70	1.01 ic	---	0.97 ic	---	0.00	0.00	---	---	---	---	0.967
5.80	13,600	893.80	1.01 ic	---	0.98 ic	---	0.00	0.00	---	---	---	---	0.976
5.90	13,956	893.90	1.01 ic	---	0.99 ic	---	0.00	0.00	---	---	---	---	0.985
6.00	14,312	894.00	1.01 ic	---	0.99 ic	---	0.00	0.00	---	---	---	---	0.994
6.10	14,699	894.10	1.01 ic	---	1.00 ic	---	0.00	0.00	---	---	---	---	1.003
6.20	15,085	894.20	1.01 ic	---	1.01 ic	---	0.00	0.00	---	---	---	---	1.011
6.30	15,471	894.30	1.02 ic	---	1.02 ic	---	0.00	0.00	---	---	---	---	1.020
6.40	15,857	894.40	1.07 ic	---	1.03 ic	---	0.00	0.00	---	---	---	---	1.028
6.50	16,243	894.50	1.07 ic	---	1.04 ic	---	0.00	0.00	---	---	---	---	1.037
6.60	16,630	894.60	1.07 ic	---	1.05 ic	---	0.00	0.00	---	---	---	---	1.045
6.70	17,016	894.70	1.07 ic	---	1.05 ic	---	0.00	0.00	---	---	---	---	1.053
6.80	17,402	894.80	1.07 ic	---	1.06 ic	---	0.00	0.00	---	---	---	---	1.062
6.90	17,788	894.90	1.07 ic	---	1.07 ic	---	0.00	0.00	---	---	---	---	1.070
7.00	18,175	895.00	1.08 ic	---	1.08 ic	---	0.00	0.00	---	---	---	---	1.078
7.10	18,628	895.10	1.92 ic	---	1.07 ic	---	0.84	0.00	---	---	---	---	1.916
7.20	19,082	895.20	3.52 ic	---	1.06 ic	---	2.38	0.00	---	---	---	---	3.446
7.30	19,536	895.30	5.46 ic	---	1.05 ic	---	4.38	0.00	---	---	---	---	5.430
7.40	19,990	895.40	7.80 ic	---	1.04 ic	---	6.74	0.00	---	---	---	---	7.780
7.50	20,444	895.50	10.45 ic	---	1.03 ic	---	9.42	0.00	---	---	---	---	10.45
7.60	20,898	895.60	13.39 ic	---	1.01 ic	---	12.38	0.00	---	---	---	---	13.39
7.70	21,352	895.70	16.53 oc	---	0.93 ic	---	15.60	0.00	---	---	---	---	16.53
7.80	21,806	895.80	19.89 oc	---	0.83 ic	---	19.06	0.00	---	---	---	---	19.89
7.90	22,260	895.90	23.41 oc	---	0.67 ic	---	22.74	0.00	---	---	---	---	23.41
8.00	22,714	896.00	27.01 oc	---	0.41 ic	---	26.60 s	0.00	---	---	---	---	27.01
8.10	23,215	896.10	27.82 oc	---	0.34 ic	---	27.48 s	0.00	---	---	---	---	27.82
8.20	23,716	896.20	28.30 oc	---	0.30 ic	---	28.00 s	2.47	---	---	---	---	30.77
8.30	24,218	896.30	28.69 oc	---	0.27 ic	---	28.42 s	6.97	---	---	---	---	35.66
8.40	24,719	896.40	29.01 oc	---	0.24 ic	---	28.77 s	12.81	---	---	---	---	41.82
8.50	25,221	896.50	29.29 oc	---	0.22 ic	---	29.07 s	19.73	---	---	---	---	49.02
8.60	25,722	896.60	29.55 oc	---	0.20 ic	---	29.35 s	27.57	---	---	---	---	57.12
8.70	26,224	896.70	29.79 oc	---	0.19 ic	---	29.61 s	36.24	---	---	---	---	66.03
8.80	26,725	896.80	30.02 oc	---	0.17 ic	---	29.85 s	45.66	---	---	---	---	75.68
8.90	27,227	896.90	30.24 oc	---	0.16 ic	---	30.07 s	55.79	---	---	---	---	86.02
9.00	27,728	897.00	30.45 oc	---	0.15 ic	---	30.29 s	66.60	---	---	---	---	97.04
9.10	28,229	897.10	30.65 oc	---	0.14 ic	---	30.50 s	78.00	---	---	---	---	108.64
9.20	28,731	897.20	30.84 oc	---	0.13 ic	---	30.71 s	89.98	---	---	---	---	120.82
9.30	29,232	897.30	31.03 oc	---	0.13 ic	---	30.90 s	102.53	---	---	---	---	133.56
9.40	29,734	897.40	31.22 oc	---	0.12 ic	---	31.09 s	115.60	---	---	---	---	146.81
9.50	30,235	897.50	31.41 oc	---	0.11 ic	---	31.28 s	129.19	---	---	---	---	160.59
9.60	30,737	897.60	31.59 oc	---	0.11 ic	---	31.47 s	143.28	---	---	---	---	174.85
9.70	31,238	897.70	31.76 oc	---	0.10 ic	---	31.65 s	157.84	---	---	---	---	189.59
9.80	31,740	897.80	31.94 oc	---	0.10 ic	---	31.83 s	172.86	---	---	---	---	204.79
9.90	32,241	897.90	32.12 oc	---	0.09 ic	---	32.00 s	188.34	---	---	---	---	220.43
10.00	32,743	898.00	32.29 oc	---	0.09 ic	---	32.19 s	204.28	---	---	---	---	236.56

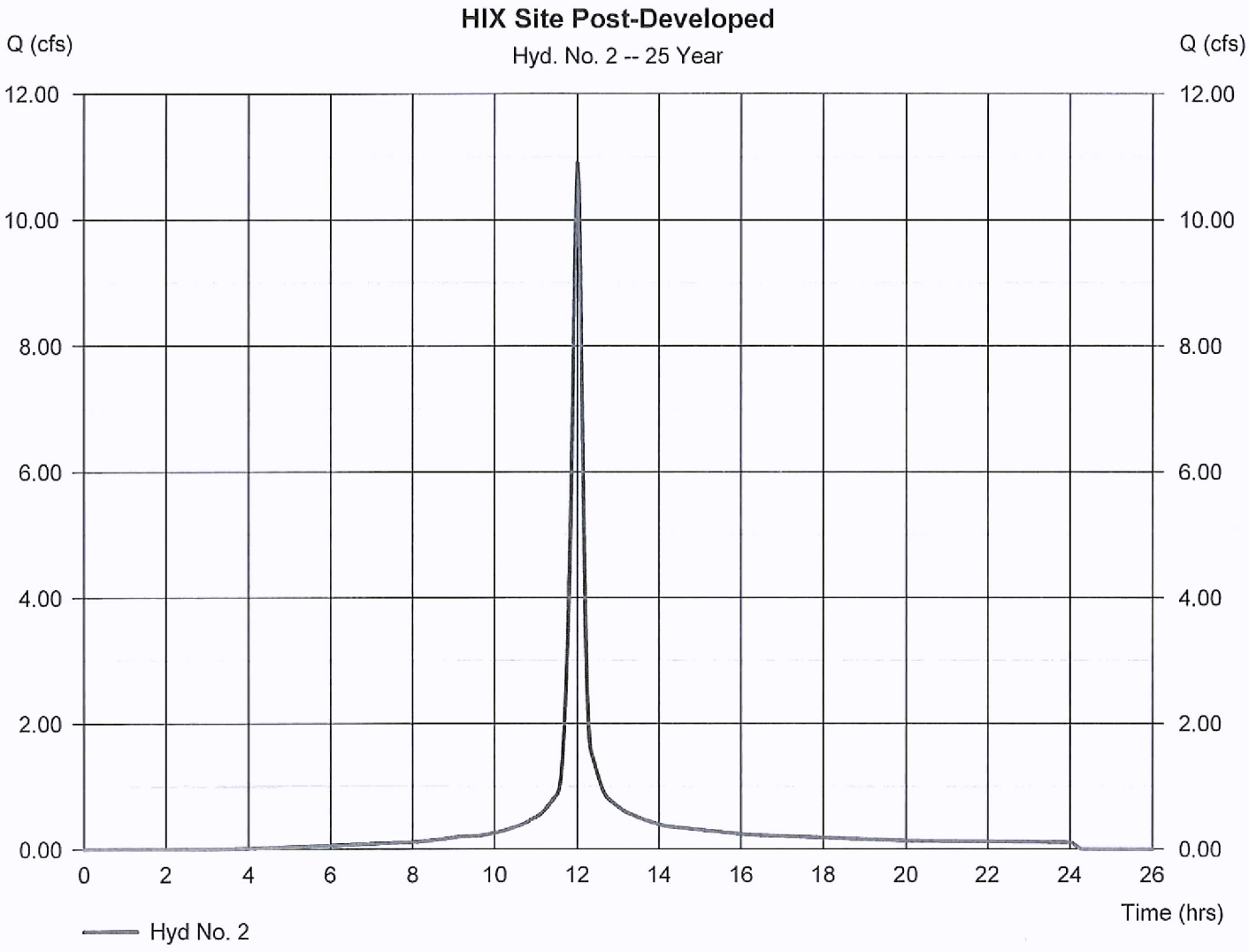
...End

Hydrograph Report

Hyd. No. 2

HIX Site Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 10.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 29,963 cuft
Drainage area	= 2.030 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



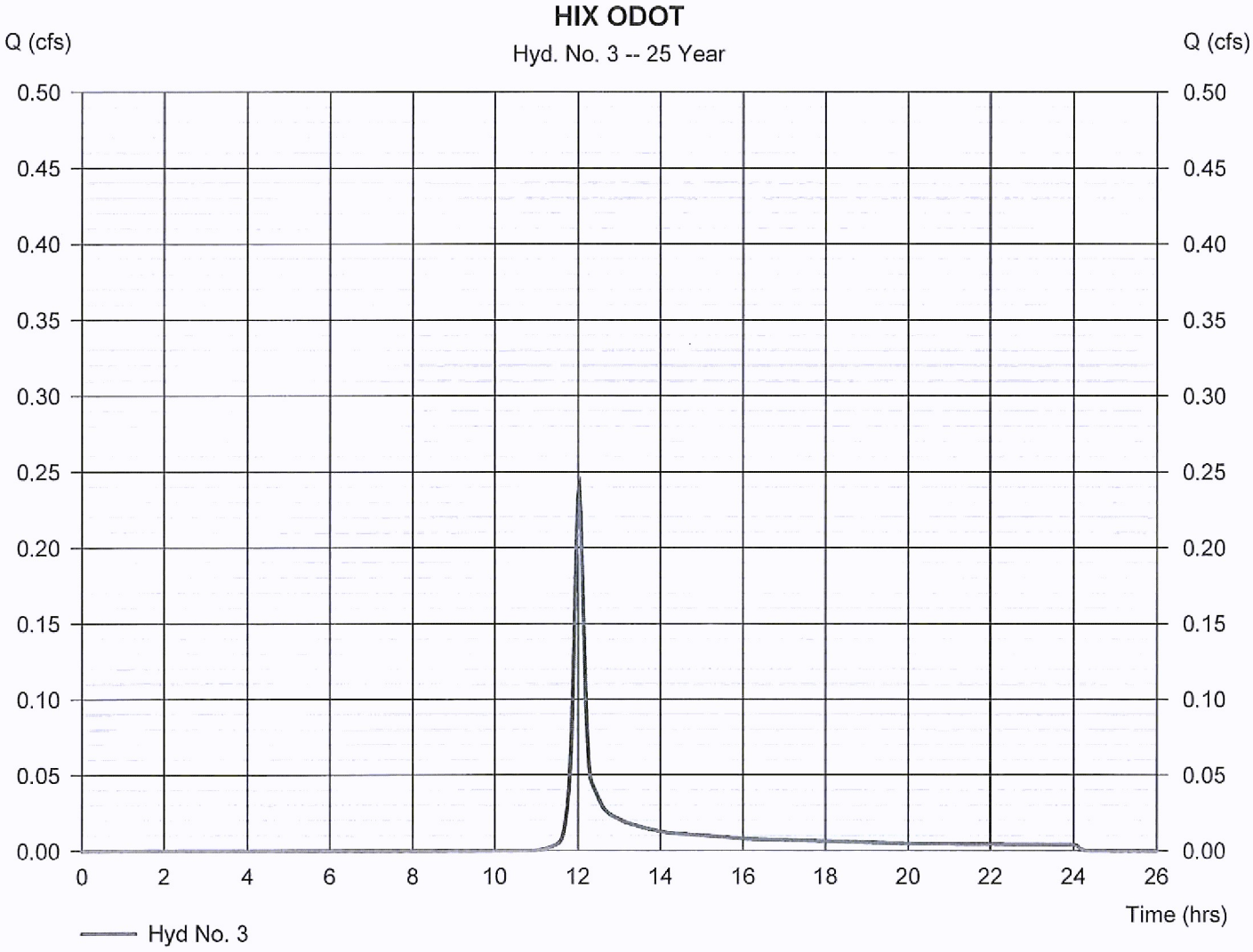
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 3

HIX ODOT

Hydrograph type	= SCS Runoff	Peak discharge	= 0.239 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 640 cuft
Drainage area	= 0.110 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



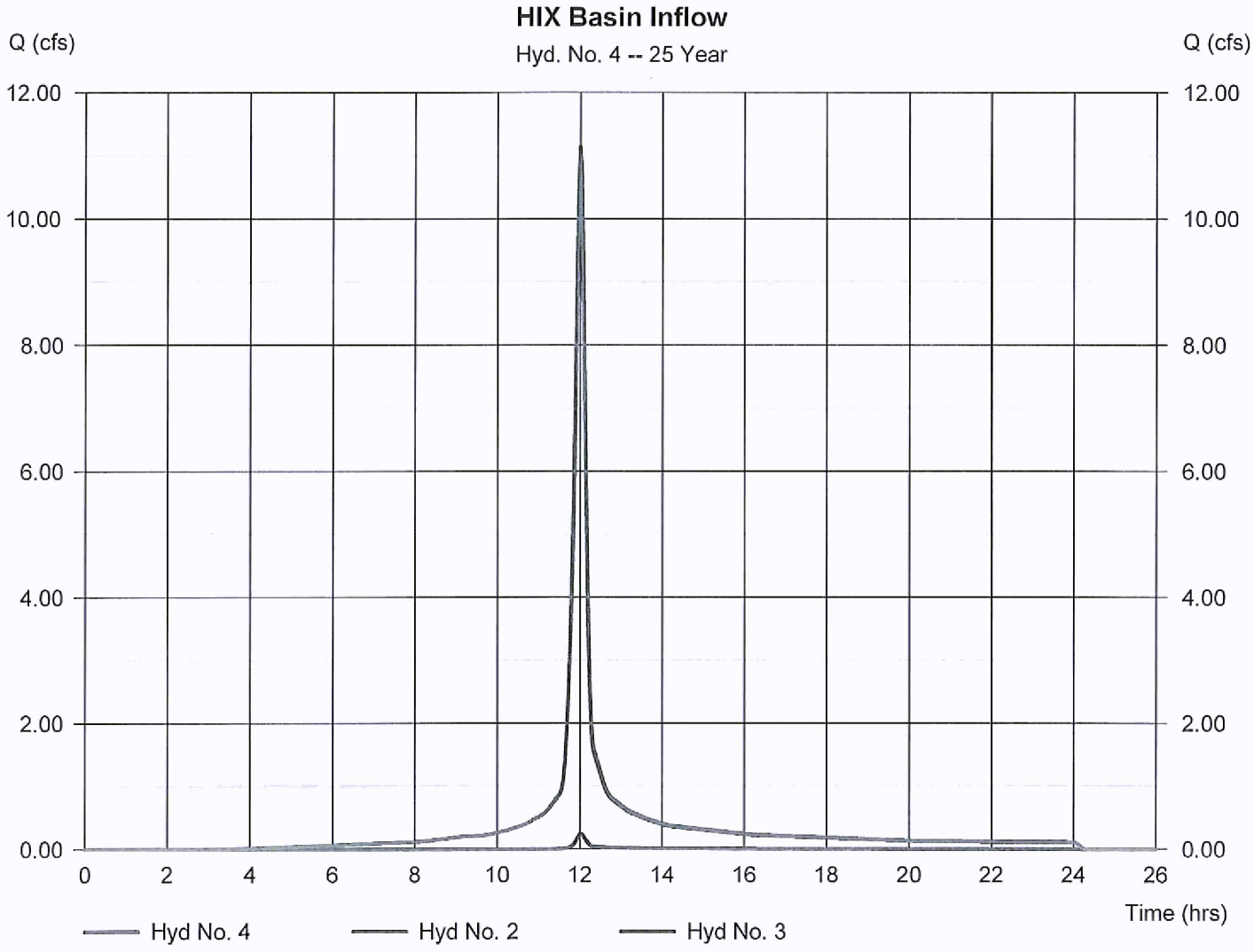
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 4

HIX Basin Inflow

Hydrograph type	= Combine	Peak discharge	= 11.16 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 30,603 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 2.140 ac



Hydrograph Report

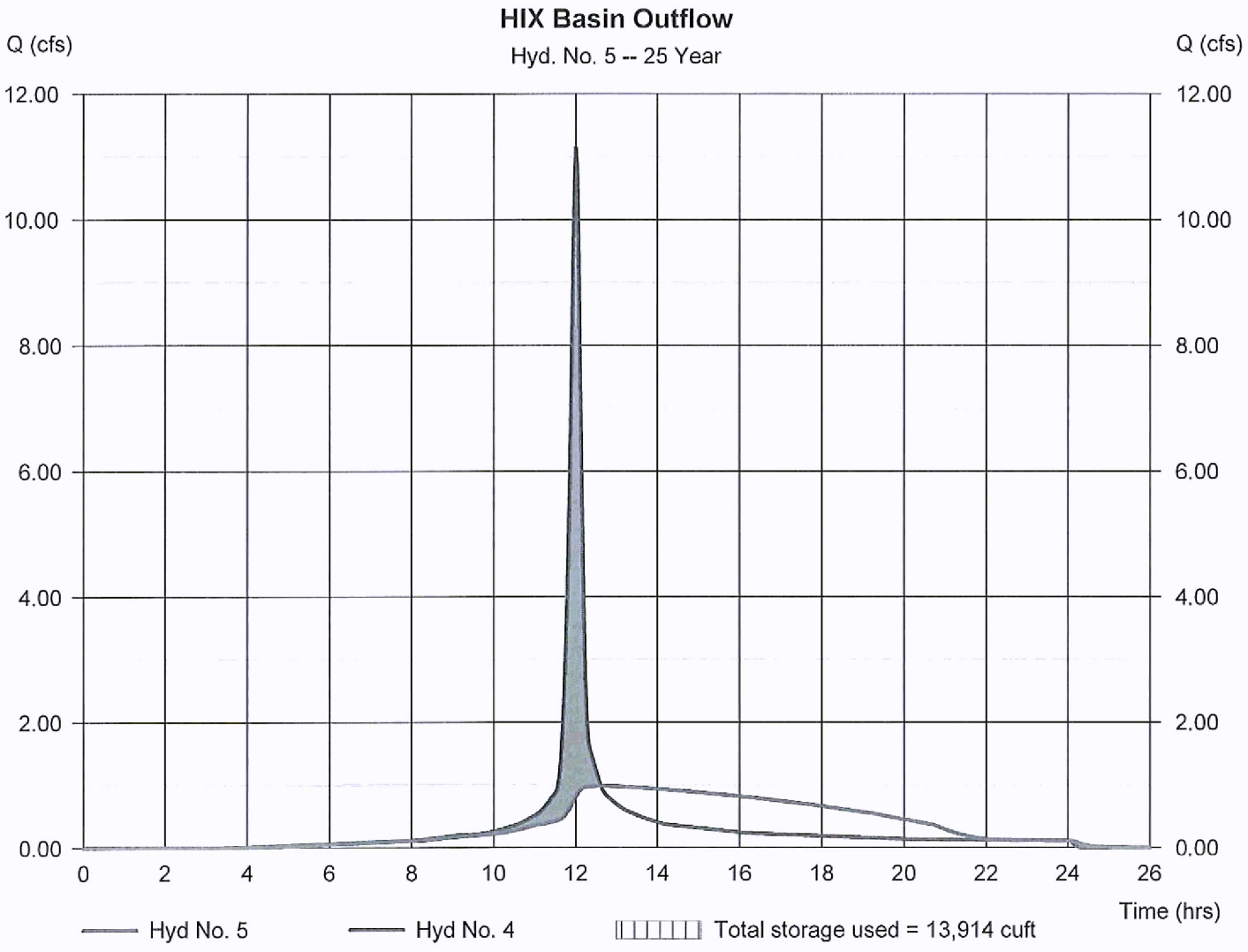
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 5

HIX Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 0.984 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 30,600 cuft
Inflow hyd. No.	= 4 - HIX Basin Inflow	Max. Elevation	= 893.89 ft
Reservoir name	= HIX Pond	Max. Storage	= 13,914 cuft

Storage Indication method used.



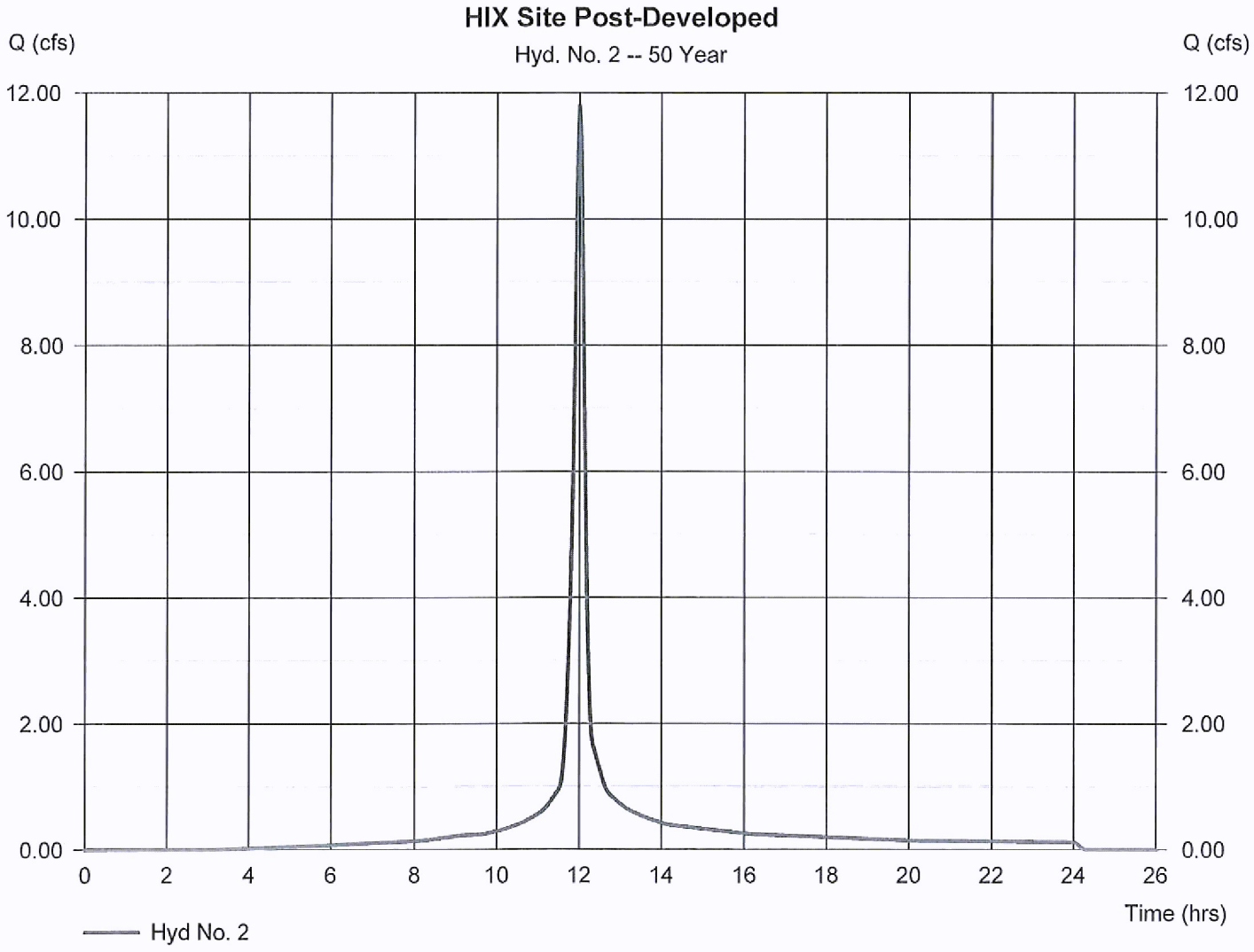
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 2

HIX Site Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 11.82 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 32,561 cuft
Drainage area	= 2.030 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



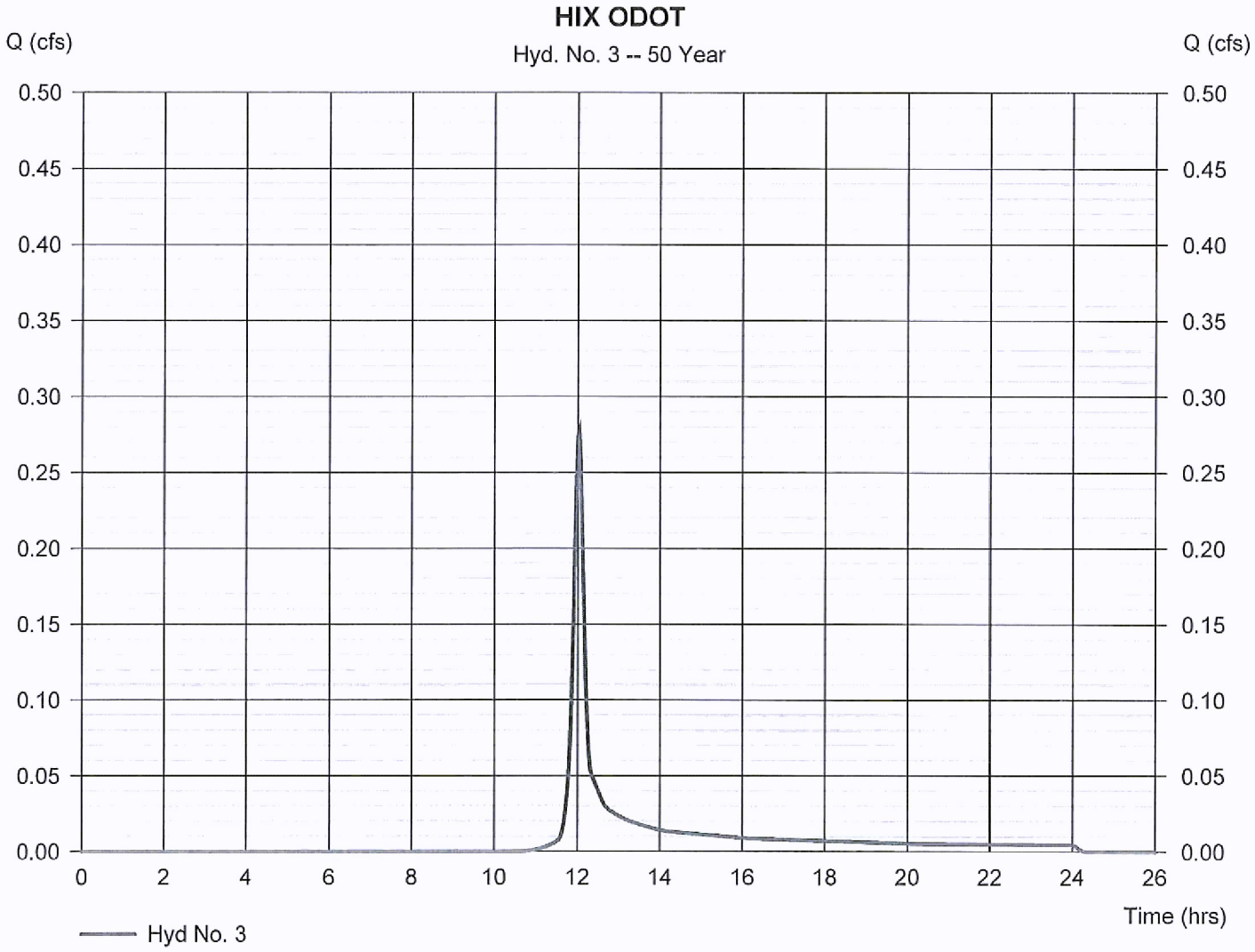
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 3

HIX ODOT

Hydrograph type	= SCS Runoff	Peak discharge	= 0.277 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 736 cuft
Drainage area	= 0.110 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



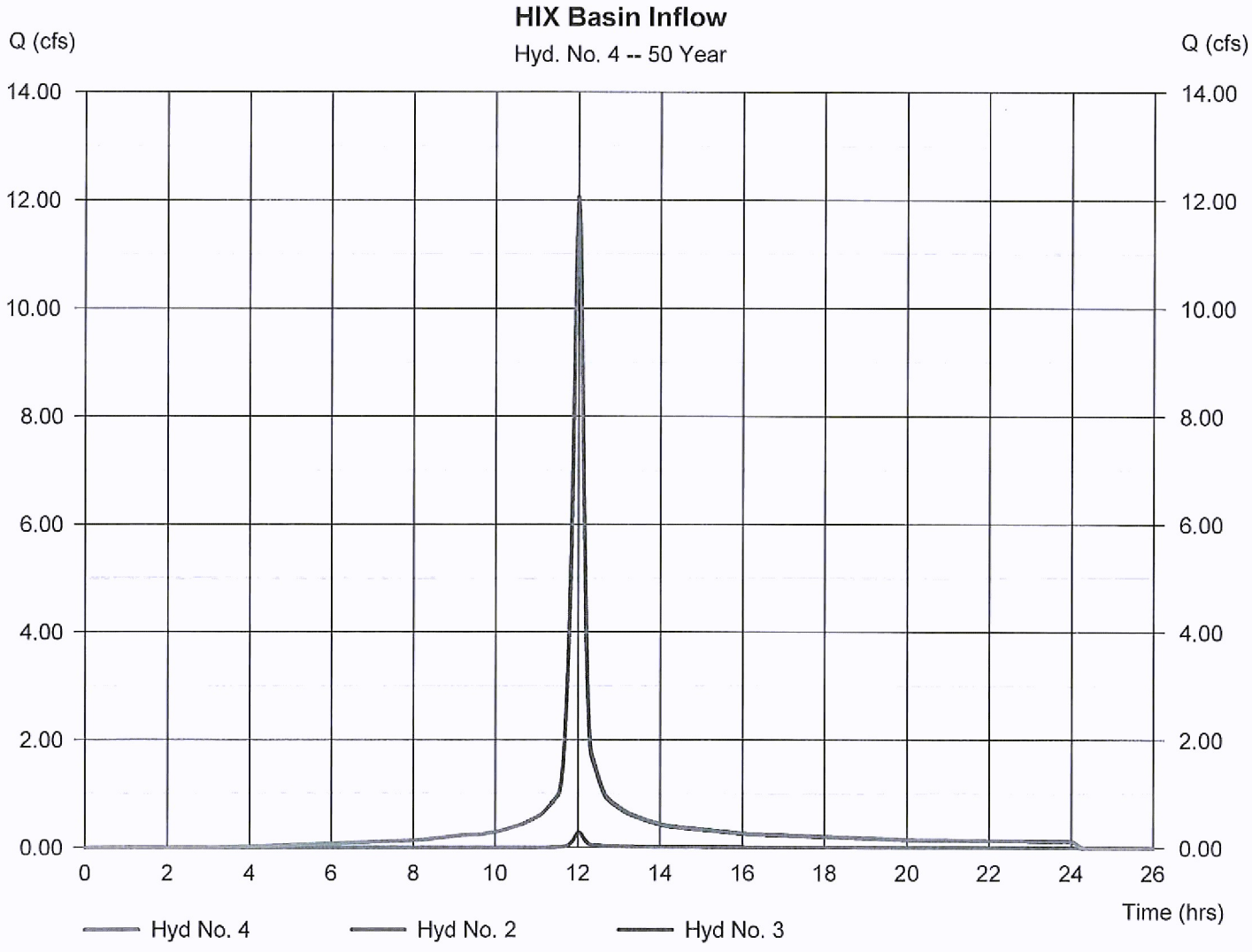
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 4

HIX Basin Inflow

Hydrograph type	= Combine	Peak discharge	= 12.09 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 33,297 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 2.140 ac



Hydrograph Report

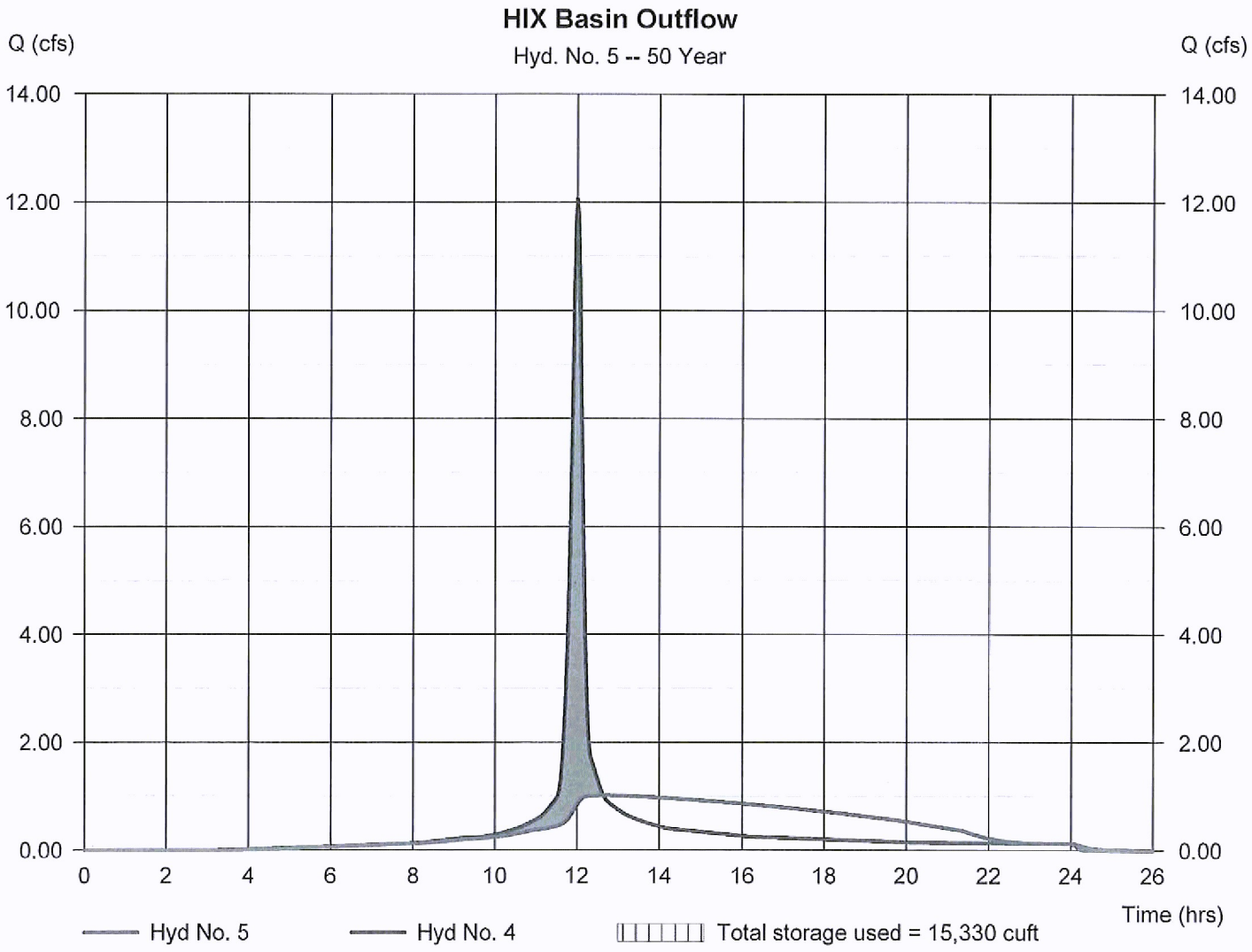
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 5

HIX Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 1.017 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 33,294 cuft
Inflow hyd. No.	= 4 - HIX Basin Inflow	Max. Elevation	= 894.26 ft
Reservoir name	= HIX Pond	Max. Storage	= 15,330 cuft

Storage Indication method used.



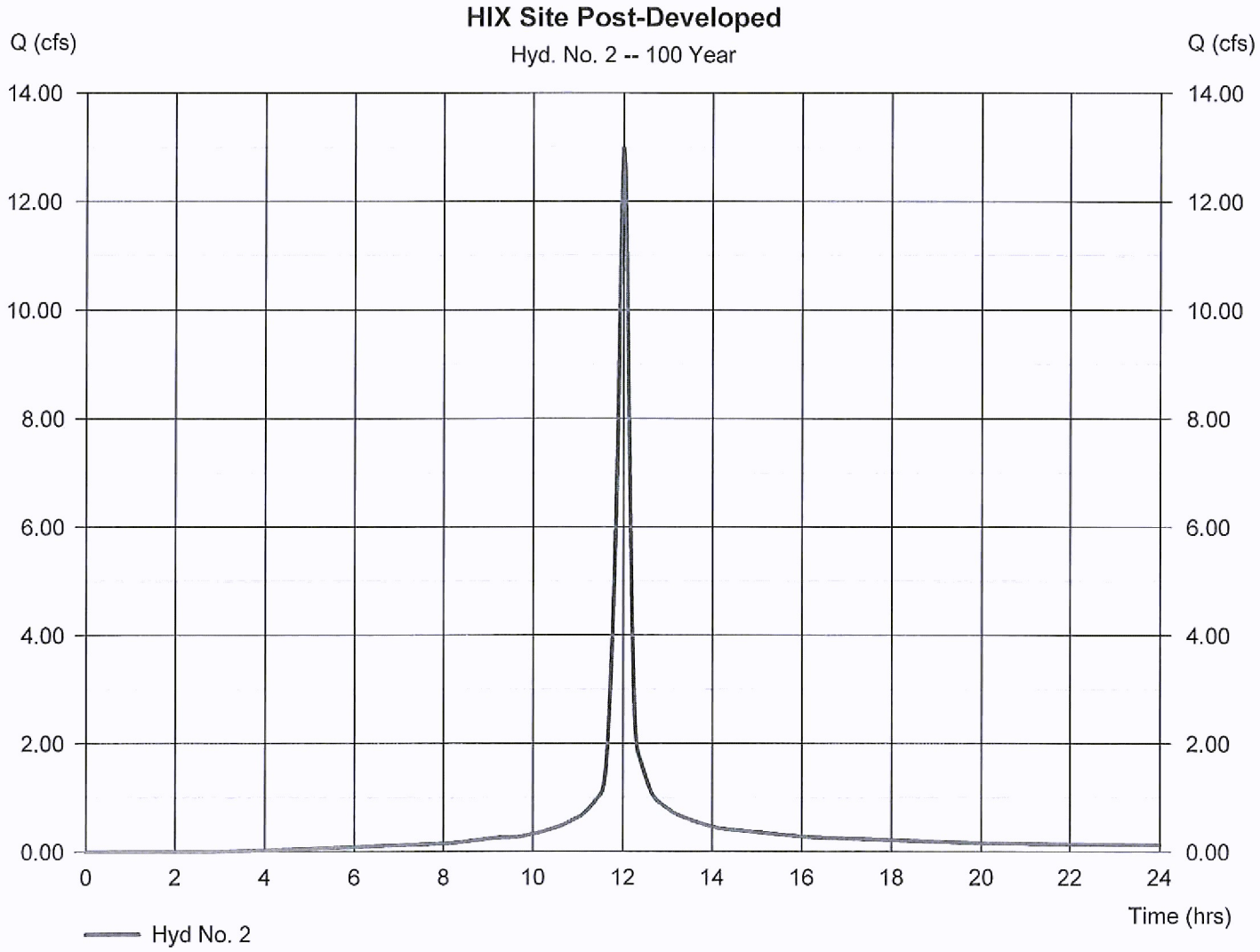
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 2

HIX Site Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 13.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 36,060 cuft
Drainage area	= 2.030 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



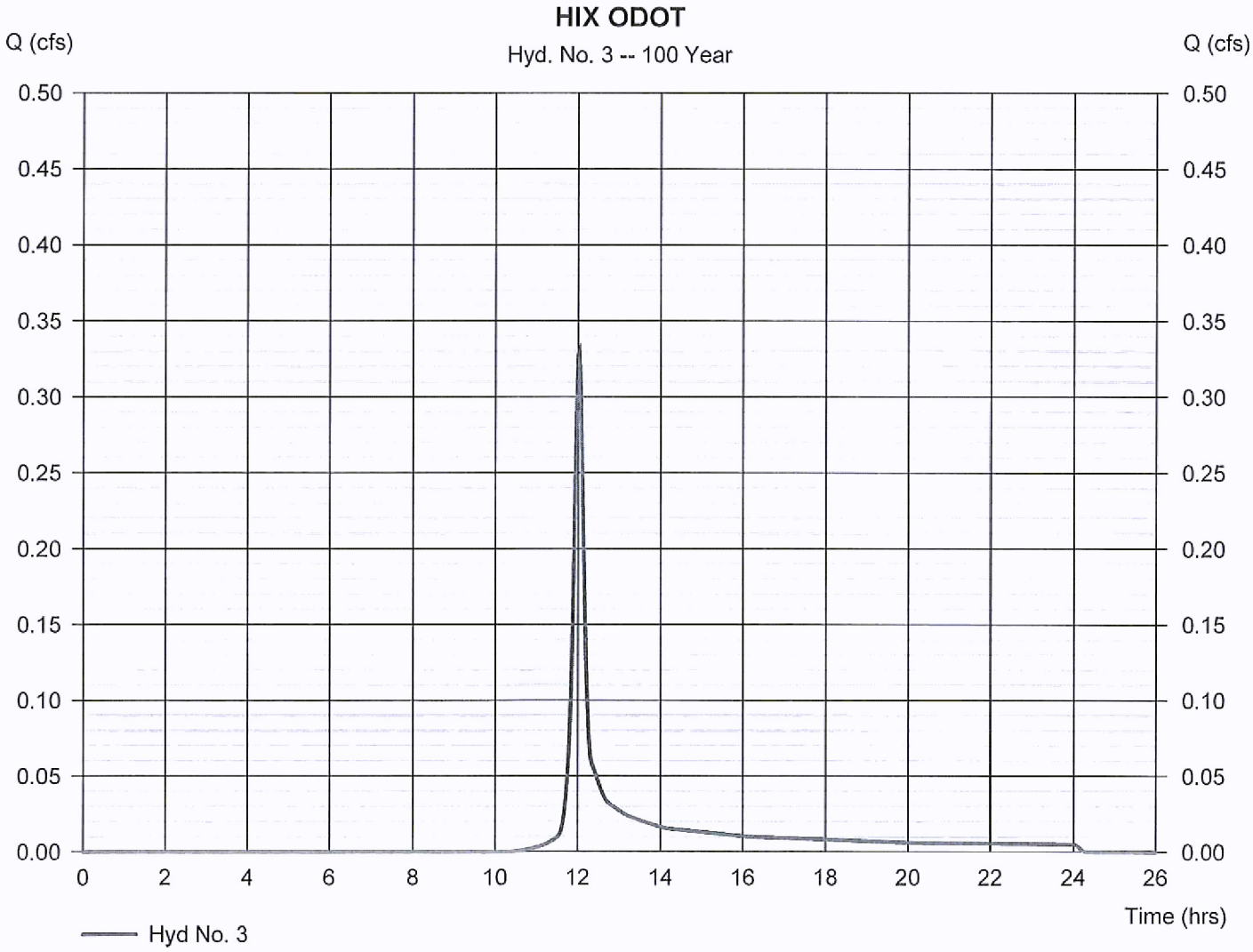
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 3

HIX ODOT

Hydrograph type	= SCS Runoff	Peak discharge	= 0.330 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 871 cuft
Drainage area	= 0.110 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



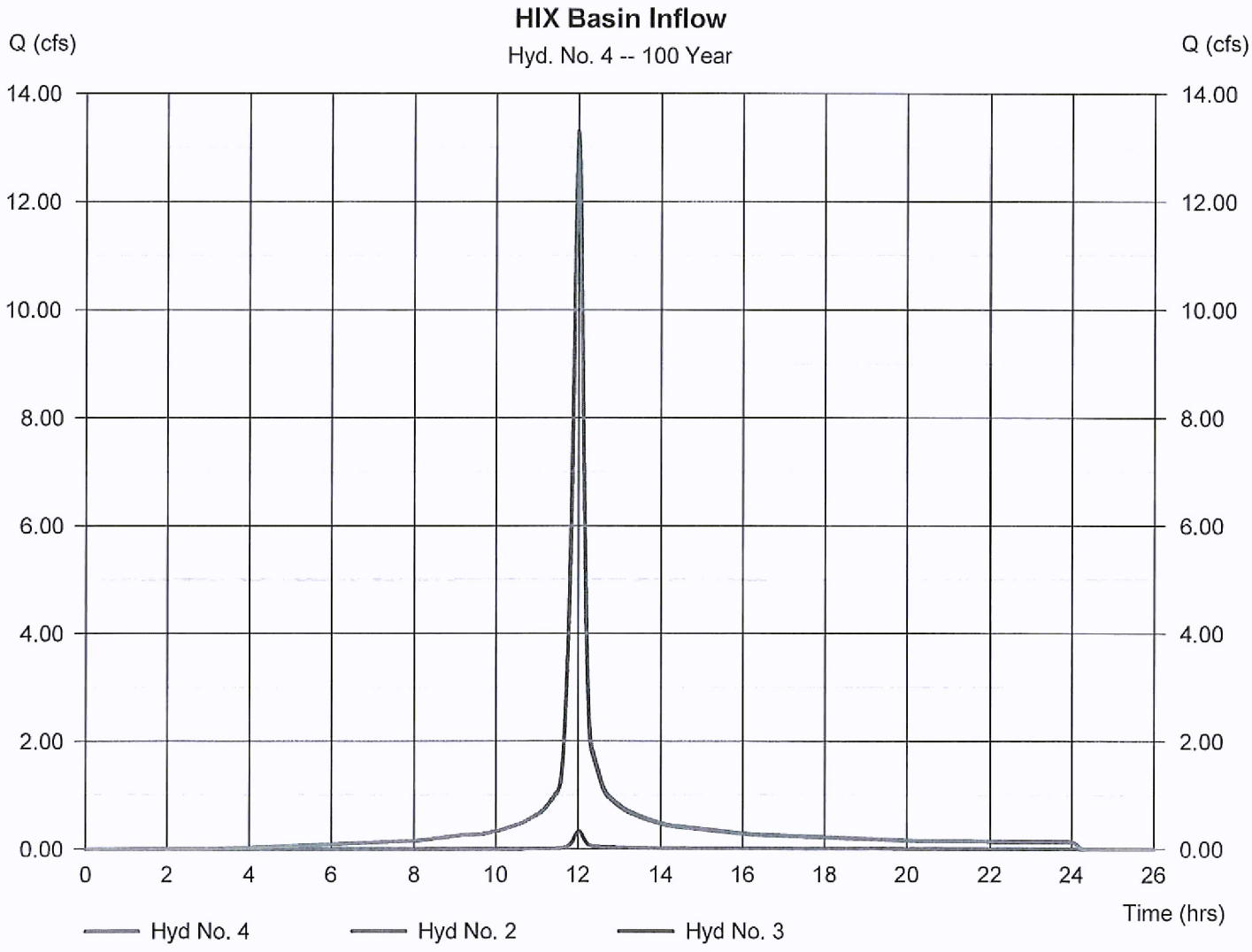
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 4

HIX Basin Inflow

Hydrograph type	= Combine	Peak discharge	= 13.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 36,931 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 2.140 ac



Hydrograph Report

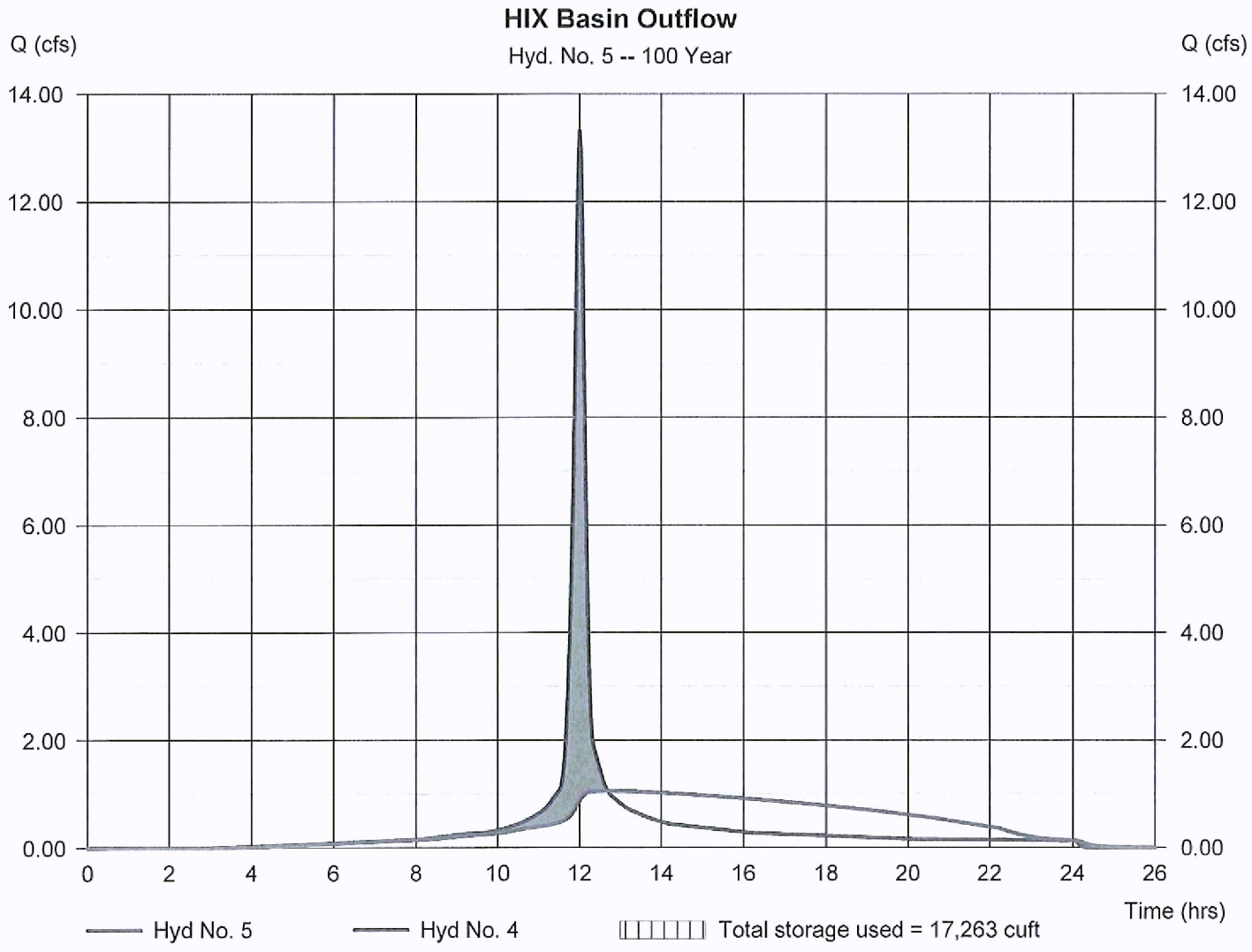
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 5

HIX Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 1.059 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.70 hrs
Time interval	= 2 min	Hyd. volume	= 36,928 cuft
Inflow hyd. No.	= 4 - HIX Basin Inflow	Max. Elevation	= 894.76 ft
Reservoir name	= HIX Pond	Max. Storage	= 17,263 cuft

Storage Indication method used.



Project: The Fields at Liberty Way

Drainage Area Description:
Access Drive Pre-Developed

Job #: 15M040.000
Initials: BJS
Date: 9/13/2016
Revised:

Drainage Area = 0.34 Acres

Soil Types:

29 %	Type 'B'	*0.1 acres*
71 %	Type 'C'	*0.2 acres*

Land Use: Woods - Grass 0.3 Acres

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	CN*Soil %*Land %
Woods - Grass	B	65	29	100.0	19.12
Woods - Grass	C	76	71	100.0	53.65

Composite CN = 72.8

Time of Concentration:

Sheet Flow: **Tc**

Length = 100 Slope(ft/ft) = 0.0175 Manning's, n = 0.24 **0.265** *hr*

Shallow Concentrated Flow:

Length = 191 Slope(ft/ft) = 0.042 Velocity (fps) = 1 **0.053** *hr*

Channel Flow:

Tc = 0.32 ***hr***
19 min

Project: The Fields at Liberty Way

Drainage Area Description:
Access Drive Post-Devloped

Job #: 15M040.000
Initials: BJS
Date: 9/13/2016
Revised:

Drainage Area = 0.34 Acres

Soil Types:

29 %	Type 'B'	*0.1 acres*
71 %	Type 'C'	*0.2 acres*

Land Use: Impervious 0.3 Acres

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	CN*Soil %*Land %
Impervious	B	98	29	100.0	28.82
Impervious	C	98	71	100.0	69.18

Composite CN = 98.0

Time of Concentration:

Tc

Tc = 12.00 *min*
12 min

Hyatt Basin 100YR=885.78 T/Dike=889.00		Outlet: 24" Pipe @ 0.50% 2" WQ Orifice Inv=882.00, 30" Orifice Inv=883.50 T/Grate @ 886.75, Spillway = 887.00			
Frequency	Inflow	Outflow	Storage		Elevation
(yr)	(cfs)	(cfs)	(ft^3)	(ac-ft)	(ft)
1	4.93	2.64	41,434	0.95	884.12
5	15.52	10.24	48,672	1.12	884.81
10	20.37	14.06	51,558	1.18	885.08
25	26.94	18.91	55,489	1.27	885.41
50	30.38	21.44	57,527	1.32	885.58
100	35.09	24.63	60,366	1.39	885.82

Release Rate - Basin		
Critical Storm = 50 yr		
Storm Frequency	Pre-Developed Allowable Release Rate	Post-Developed Release Rate
(yr)	(cfs)	(cfs)
1	4.93	2.64
5	15.52	10.24
10	20.37	14.06
25	26.94	18.91
50	30.38	21.44
100	35.09	24.63

Note: Pond to be expanded when Hyatt develops.

Spillway		$Q_{100}=CLH^{3/2}$	
Q_{100}=35.09	C=3.0	L=40	H=0.44
Spillway Invert		887.00	
100 Year Weir Flow		885.82	
Top of Dike Elevation		889.00	
Freeboard		1.56'	
Spillway Side Slope		3:1	
Velocity		1.99	

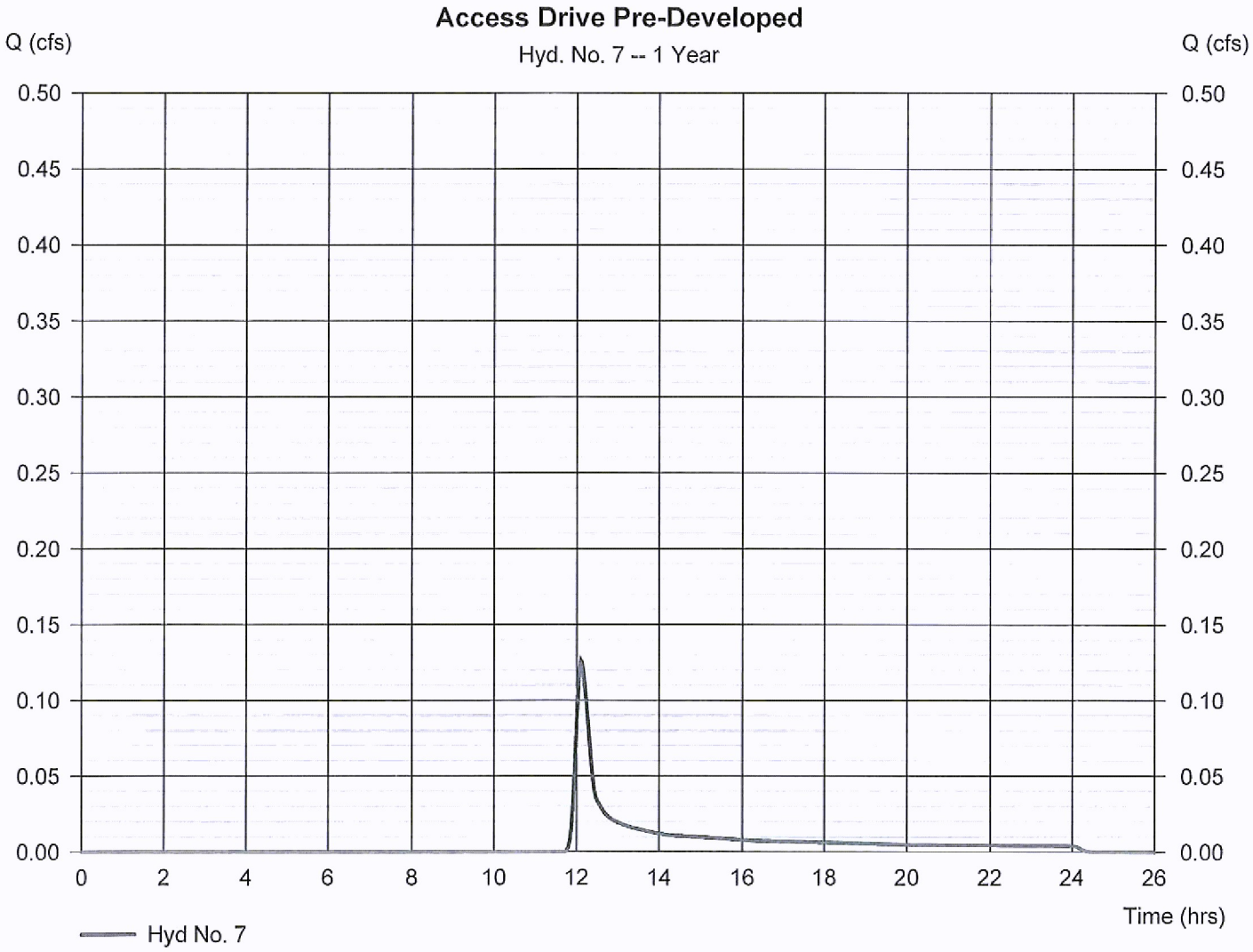
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 7

Access Drive Pre-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 0.126 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 502 cuft
Drainage area	= 0.340 ac	Curve number	= 72.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.00 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



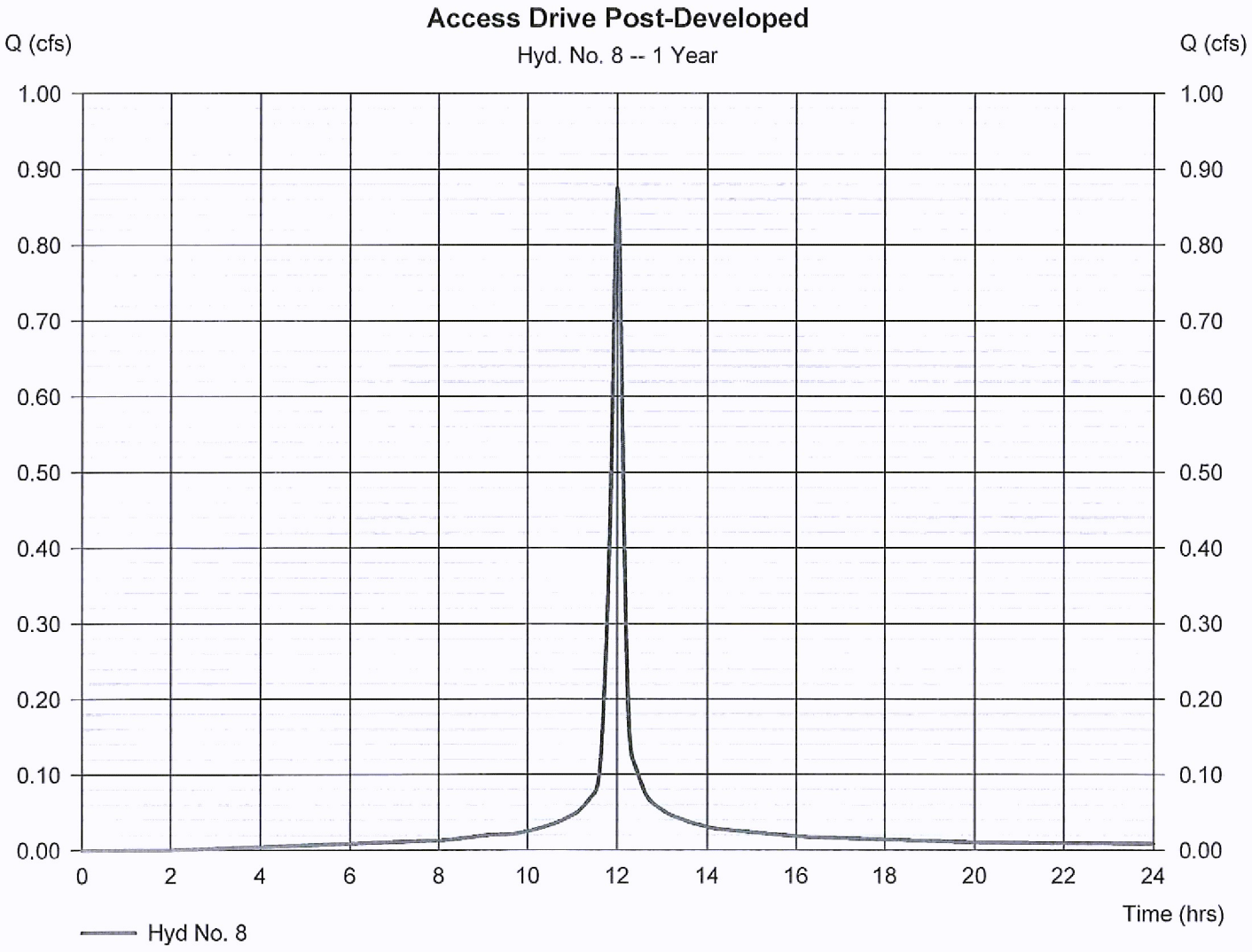
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 8

Access Drive Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 0.877 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 2,511 cuft
Drainage area	= 0.340 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Pond No. 1 - Hyatt House Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 875.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)	
0.00	875.00	1,551	0	0	
1.00	876.00	2,006	1,773	1,773	NO
2.00	877.00	2,509	2,253	4,026	STORAGE
3.00	878.00	3,063	2,781	6,807	
4.00	879.00	3,667	3,360	10,167	
5.00	880.00	4,320	3,989	14,156	
6.00	881.00	5,024	4,667	18,823	
7.00	882.00	5,776	5,395	24,218	0 outlet elev.
8.00	883.00	8,161	6,934	31,152	6,934 WQv - 883.5 11,425
9.00	884.00	9,832	8,983	40,134	15,976 21,961
10.00	885.00	11,257	10,535	50,670	26,452 33,829
11.00	886.00	12,491	11,867	62,537	38,320 56,870
12.00	887.00	13,481	12,982	75,519	61,301 60,228
13.00	888.00	13,359	13,419	88,937	64,719 top of 73,586
14.00	889.00	13,359	13,358	102,295	78,077 berm 86,944
15.00	890.00	13,359	13,358	115,653	91,435

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	30.00	0.00
Span (in)	= 24.00	1.13	30.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 875.00	882.00	883.50	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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)	= 8.00	40.00	0.00	0.00
Crest El. (ft)	= 886.75	887.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
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	875.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.10	177	875.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.20	355	875.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.30	532	875.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.40	709	875.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.50	887	875.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.60	1,064	875.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.70	1,241	875.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.80	1,419	875.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.90	1,596	875.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.00	1,773	876.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.10	1,999	876.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.20	2,224	876.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.30	2,449	876.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.40	2,674	876.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.50	2,900	876.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.60	3,125	876.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.70	3,350	876.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.80	3,576	876.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.90	3,801	876.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.00	4,026	877.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.10	4,304	877.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.20	4,582	877.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.30	4,860	877.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.40	5,138	877.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.50	5,417	877.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.60	5,695	877.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000

Continues on next page...

Hyatt House 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
2.70	5,973	877.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.80	6,251	877.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.90	6,529	877.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.00	6,807	878.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.10	7,143	878.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.20	7,479	878.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.30	7,815	878.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.40	8,151	878.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.50	8,487	878.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.60	8,823	878.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.70	9,159	878.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.80	9,495	878.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.90	9,831	878.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.00	10,167	879.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.10	10,566	879.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.20	10,965	879.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.30	11,364	879.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.40	11,763	879.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.50	12,162	879.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.60	12,560	879.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.70	12,959	879.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.80	13,358	879.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.90	13,757	879.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.00	14,156	880.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.10	14,623	880.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.20	15,089	880.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.30	15,556	880.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.40	16,023	880.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.50	16,490	880.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.60	16,956	880.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.70	17,423	880.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.80	17,890	880.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
5.90	18,356	880.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.00	18,823	881.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.10	19,363	881.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.20	19,902	881.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.30	20,442	881.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.40	20,981	881.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.50	21,521	881.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.60	22,060	881.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.70	22,600	881.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.80	23,139	881.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
6.90	23,679	881.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.00	24,218	882.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.10	24,912	882.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.20	25,605	882.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.30	26,298	882.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.40	26,992	882.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.50	27,685	882.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.60	28,378	882.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.70	29,072	882.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.80	29,765	882.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
7.90	30,458	882.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.00	31,152	883.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.10	32,050	883.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.20	32,948	883.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.30	33,846	883.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.40	34,745	883.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.50	35,643	883.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
8.60	36,541	883.60	0.07 ic	0.00	0.07 ic	---	0.00	0.00	---	---	---	---	0.074
8.70	37,440	883.70	0.29 ic	0.00	0.29 ic	---	0.00	0.00	---	---	---	---	0.291
8.80	38,338	883.80	0.69 ic	0.00	0.66 ic	---	0.00	0.00	---	---	---	---	0.660
8.90	39,236	883.90	1.13 ic	0.00	1.13 ic	---	0.00	0.00	---	---	---	---	1.126
9.00	40,134	884.00	1.79 oc	0.00	1.76 ic	---	0.00	0.00	---	---	---	---	1.757
9.10	41,188	884.10	2.51 oc	0.00	2.47 ic	---	0.00	0.00	---	---	---	---	2.467
9.20	42,241	884.20	3.21 oc	0.00	3.21 ic	---	0.00	0.00	---	---	---	---	3.206
9.30	43,295	884.30	4.24 oc	0.00	4.18 ic	---	0.00	0.00	---	---	---	---	4.182
9.40	44,349	884.40	5.18 oc	0.00	5.15 ic	---	0.00	0.00	---	---	---	---	5.148
9.50	45,402	884.50	6.42 oc	0.00	6.37 ic	---	0.00	0.00	---	---	---	---	6.374
9.60	46,456	884.60	7.58 oc	0.00	7.54 ic	---	0.00	0.00	---	---	---	---	7.542
9.70	47,509	884.70	8.79 oc	0.00	8.79 ic	---	0.00	0.00	---	---	---	---	8.787
9.80	48,563	884.80	10.10 oc	0.00	10.10 ic	---	0.00	0.00	---	---	---	---	10.10

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Hyatt House 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
9.90	49,616	884.90	11.46 oc	0.00	11.46 ic	---	0.00	0.00	---	---	---	---	11.46
10.00	50,670	885.00	12.86 oc	0.00	12.86 ic	---	0.00	0.00	---	---	---	---	12.86
10.10	51,856	885.10	14.47 oc	0.00	14.47 ic	---	0.00	0.00	---	---	---	---	14.47
10.20	53,043	885.20	15.89 oc	0.00	15.88 ic	---	0.00	0.00	---	---	---	---	15.88
10.30	54,230	885.30	17.46 oc	0.00	17.46 ic	---	0.00	0.00	---	---	---	---	17.46
10.40	55,417	885.40	18.82 oc	0.00	18.82 ic	---	0.00	0.00	---	---	---	---	18.82
10.50	56,603	885.50	20.28 oc	0.00	20.27 ic	---	0.00	0.00	---	---	---	---	20.27
10.60	57,790	885.60	21.77 oc	0.00	21.77 ic	---	0.00	0.00	---	---	---	---	21.77
10.70	58,977	885.70	23.11 oc	0.00	23.11 ic	---	0.00	0.00	---	---	---	---	23.11
10.80	60,164	885.80	24.43 oc	0.00	24.43 ic	---	0.00	0.00	---	---	---	---	24.43
10.90	61,350	885.90	25.57 oc	0.00	25.57 ic	---	0.00	0.00	---	---	---	---	25.57
11.00	62,537	886.00	26.42 oc	0.00	26.42 ic	---	0.00	0.00	---	---	---	---	26.42
11.10	63,835	886.10	27.46 ic	0.00	27.46 ic	---	0.00	0.00	---	---	---	---	27.46
11.20	65,134	886.20	28.46 ic	0.00	28.46 ic	---	0.00	0.00	---	---	---	---	28.46
11.30	66,432	886.30	29.42 ic	0.00	29.42 ic	---	0.00	0.00	---	---	---	---	29.42
11.40	67,730	886.40	30.36 ic	0.00	30.36 ic	---	0.00	0.00	---	---	---	---	30.36
11.50	69,028	886.50	31.26 ic	0.00	31.26 ic	---	0.00	0.00	---	---	---	---	31.26
11.60	70,326	886.60	32.14 ic	0.00	32.14 ic	---	0.00	0.00	---	---	---	---	32.14
11.70	71,624	886.70	33.00 ic	0.00	33.00 ic	---	0.00	0.00	---	---	---	---	33.00
11.80	72,922	886.80	34.13 ic	0.00	33.83 ic	---	0.30	0.00	---	---	---	---	34.13
11.90	74,221	886.90	36.19 ic	0.00	34.65 ic	---	1.54	0.00	---	---	---	---	36.19
12.00	75,519	887.00	38.78 ic	0.00	35.45 ic	---	3.33	0.00	---	---	---	---	38.78
12.10	76,861	887.10	41.74 ic	0.00	36.23 ic	---	5.52	3.29	---	---	---	---	45.03
12.20	78,202	887.20	44.81 ic	0.00	36.77 ic	---	8.04	9.30	---	---	---	---	54.12
12.30	79,544	887.30	45.70 ic	0.00	34.83 ic	---	10.86	17.08	---	---	---	---	62.78
12.40	80,886	887.40	46.60 ic	0.00	32.64 ic	---	13.96	26.30	---	---	---	---	72.90
12.50	82,228	887.50	47.51 ic	0.00	30.21 ic	---	17.30	36.76	---	---	---	---	84.26
12.60	83,570	887.60	48.41 ic	0.00	27.53 ic	---	20.87	48.32	---	---	---	---	96.73
12.70	84,912	887.70	49.28 ic	0.00	24.62 ic	---	24.66	60.89	---	---	---	---	110.16
12.80	86,254	887.80	49.25 ic	0.00	25.85 ic	---	22.04 ic	74.39	---	---	---	---	122.28
12.90	87,596	887.90	49.38 ic	0.00	26.32 ic	---	23.06 ic	88.76	---	---	---	---	138.14
13.00	88,937	888.00	50.95 ic	0.00	19.07 ic	---	31.88 s	104.00	---	---	---	---	154.95
13.10	90,273	888.10	51.35 ic	0.00	17.87 ic	---	33.48 s	119.98	---	---	---	---	171.33
13.20	91,609	888.20	51.72 ic	0.00	16.81 ic	---	34.91 s	136.71	---	---	---	---	188.43
13.30	92,945	888.30	52.06 ic	0.00	15.86 ic	---	36.21 s	154.14	---	---	---	---	206.20
13.40	94,280	888.40	52.39 ic	0.00	15.00 ic	---	37.39 s	172.26	---	---	---	---	224.64
13.50	95,616	888.50	52.69 ic	0.00	14.22 ic	---	38.47 s	191.04	---	---	---	---	243.73
13.60	96,952	888.60	52.99 ic	0.00	13.51 ic	---	39.48 s	210.46	---	---	---	---	263.45
13.70	98,288	888.70	53.27 ic	0.00	12.86 ic	---	40.41 s	230.48	---	---	---	---	283.75
13.80	99,624	888.80	53.54 ic	0.00	12.26 ic	---	41.28 s	251.11	---	---	---	---	304.65
13.90	100,959	888.90	53.80 ic	0.00	11.71 ic	---	42.09 s	272.33	---	---	---	---	326.12
14.00	102,295	889.00	54.06 ic	0.00	11.20 ic	---	42.86 s	294.16	---	---	---	---	348.21
14.10	103,631	889.10	54.31 ic	0.00	10.73 ic	---	43.57 s	316.49	---	---	---	---	370.79
14.20	104,967	889.20	54.56 ic	0.00	10.29 ic	---	44.25 s	339.37	---	---	---	---	393.91
14.30	106,302	889.30	54.79 ic	0.00	9.89 ic	---	44.90 s	362.75	---	---	---	---	417.54
14.40	107,638	889.40	55.03 ic	0.00	9.51 ic	---	45.51 s	386.66	---	---	---	---	441.67
14.50	108,974	889.50	55.26 ic	0.00	9.15 ic	---	46.10 s	411.07	---	---	---	---	466.32
14.60	110,310	889.60	55.49 ic	0.00	8.82 ic	---	46.66 s	435.99	---	---	---	---	491.47
14.70	111,645	889.70	55.72 ic	0.00	8.51 ic	---	47.19 s	461.36	---	---	---	---	517.06
14.80	112,981	889.80	55.94 ic	0.00	8.22 ic	---	47.71 s	487.22	---	---	---	---	543.15
14.90	114,317	889.90	56.16 ic	0.00	7.95 ic	---	48.21 s	513.55	---	---	---	---	569.71
15.00	115,653	890.00	56.38 ic	0.00	7.69 ic	---	48.68 s	540.40	---	---	---	---	596.77

...End

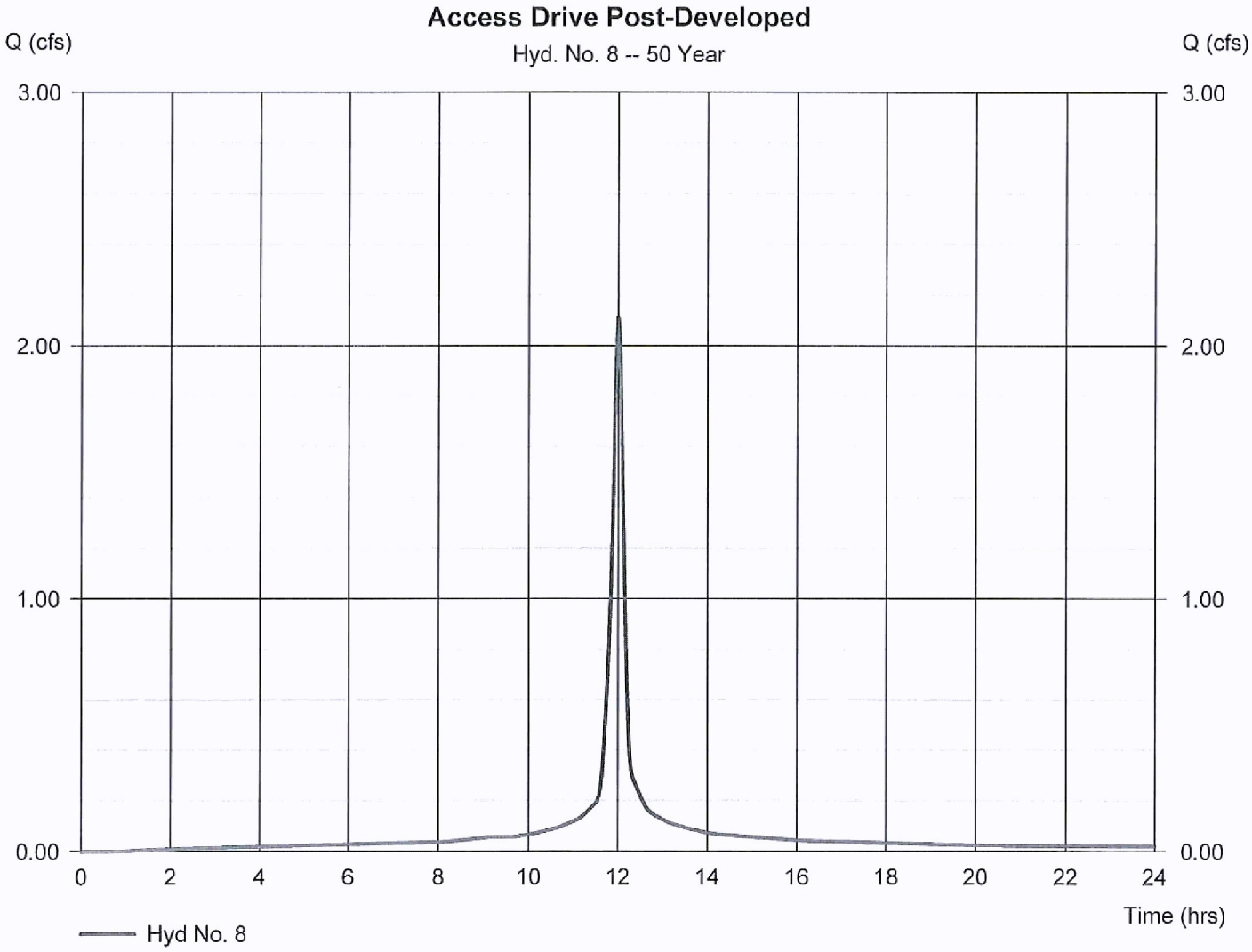
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 8

Access Drive Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 2.117 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 6,317 cuft
Drainage area	= 0.340 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



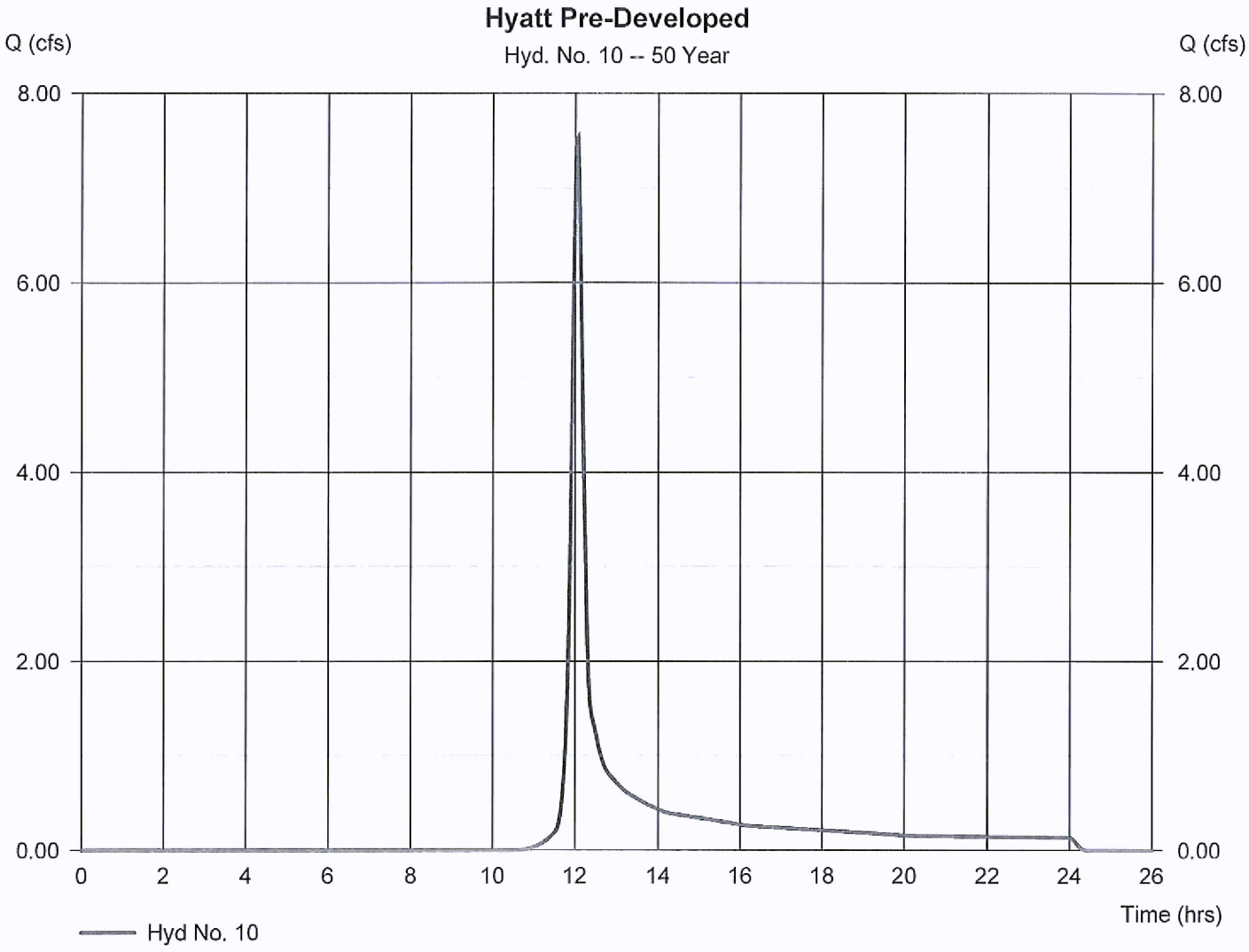
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 10

Hyatt Pre-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 7.535 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 21,896 cuft
Drainage area	= 3.460 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.50 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



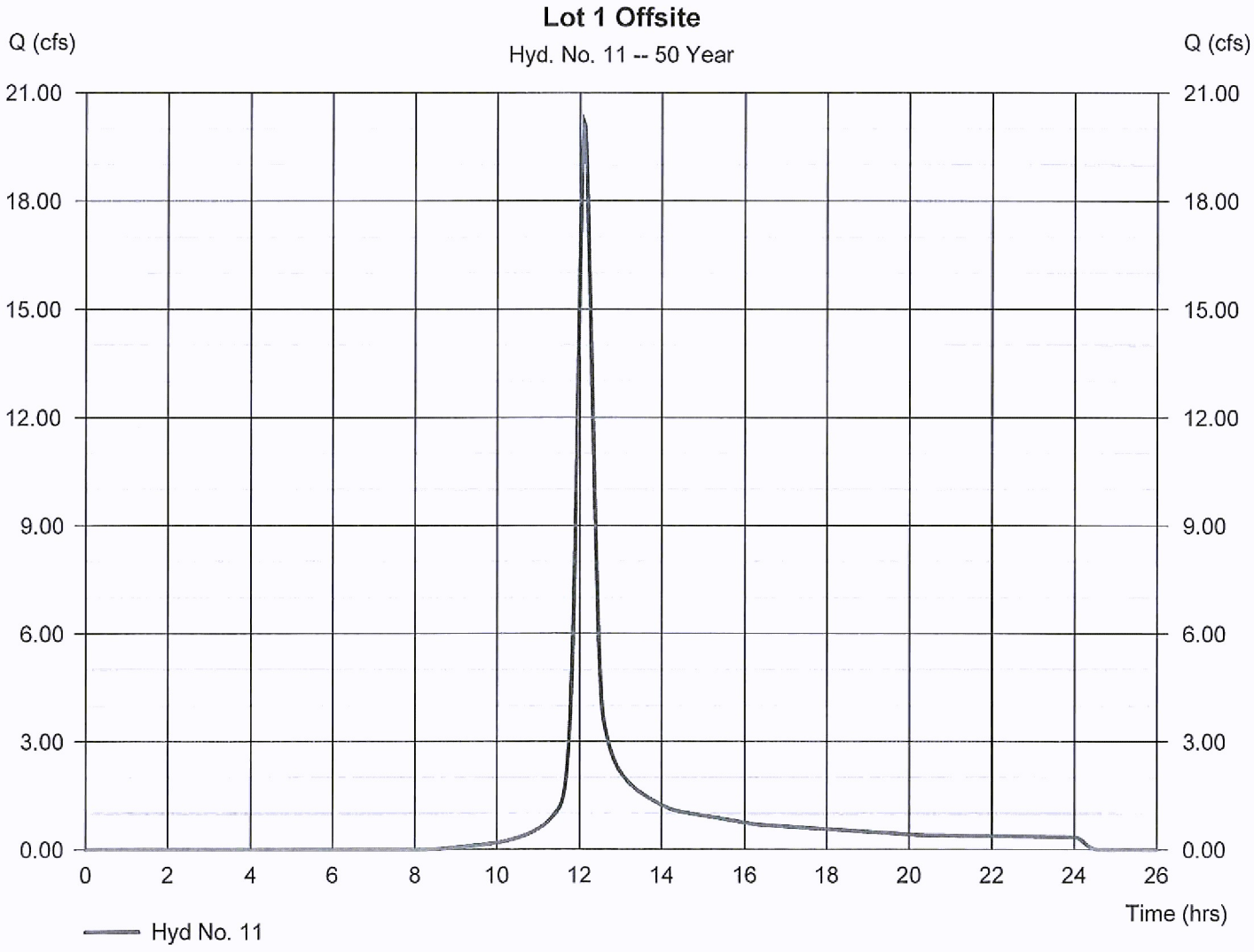
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 11

Lot 1 Offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 20.18 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 69,864 cuft
Drainage area	= 7.000 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.25 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



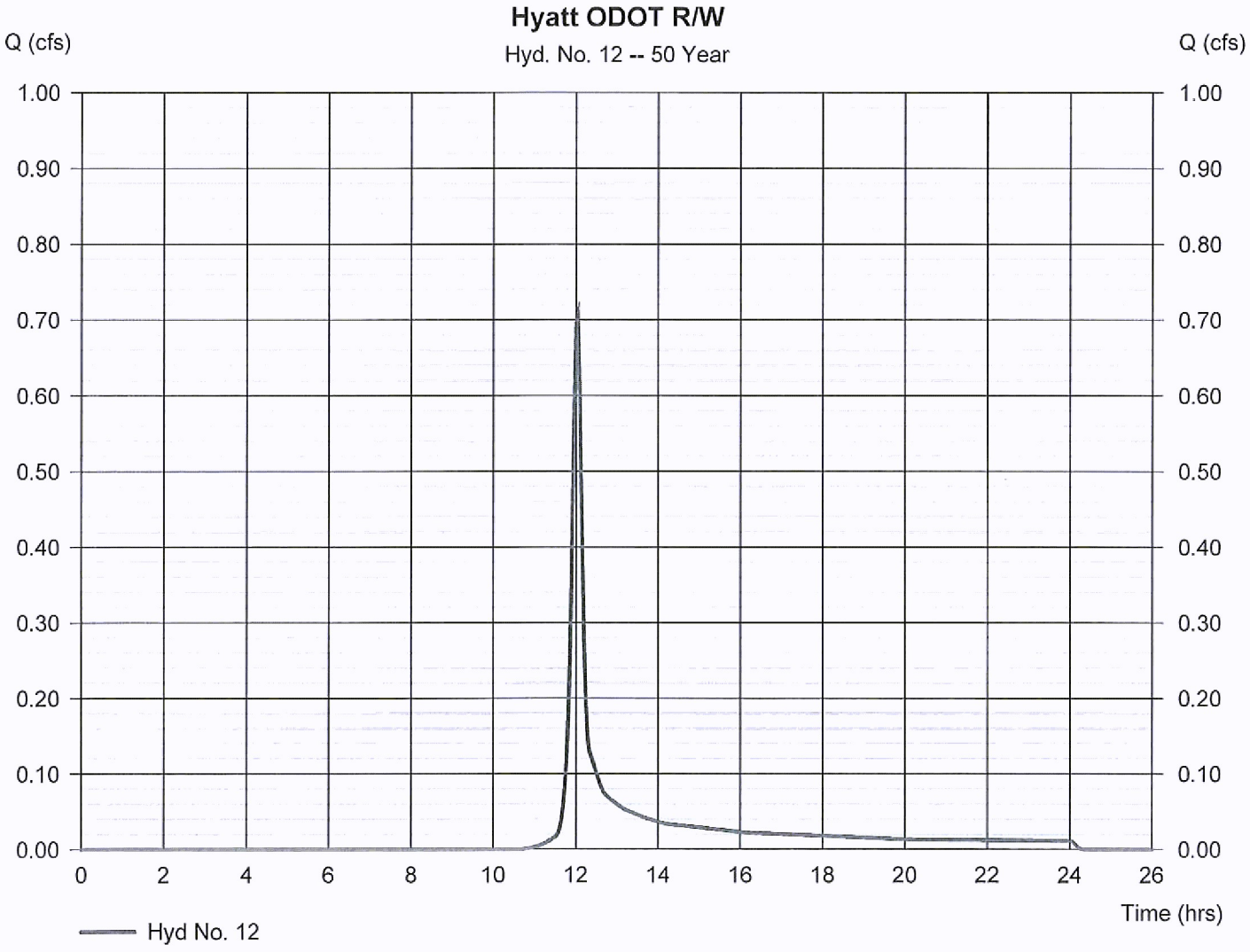
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 12

Hyatt ODOT R/W

Hydrograph type	= SCS Runoff	Peak discharge	= 0.706 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 1,874 cuft
Drainage area	= 0.280 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



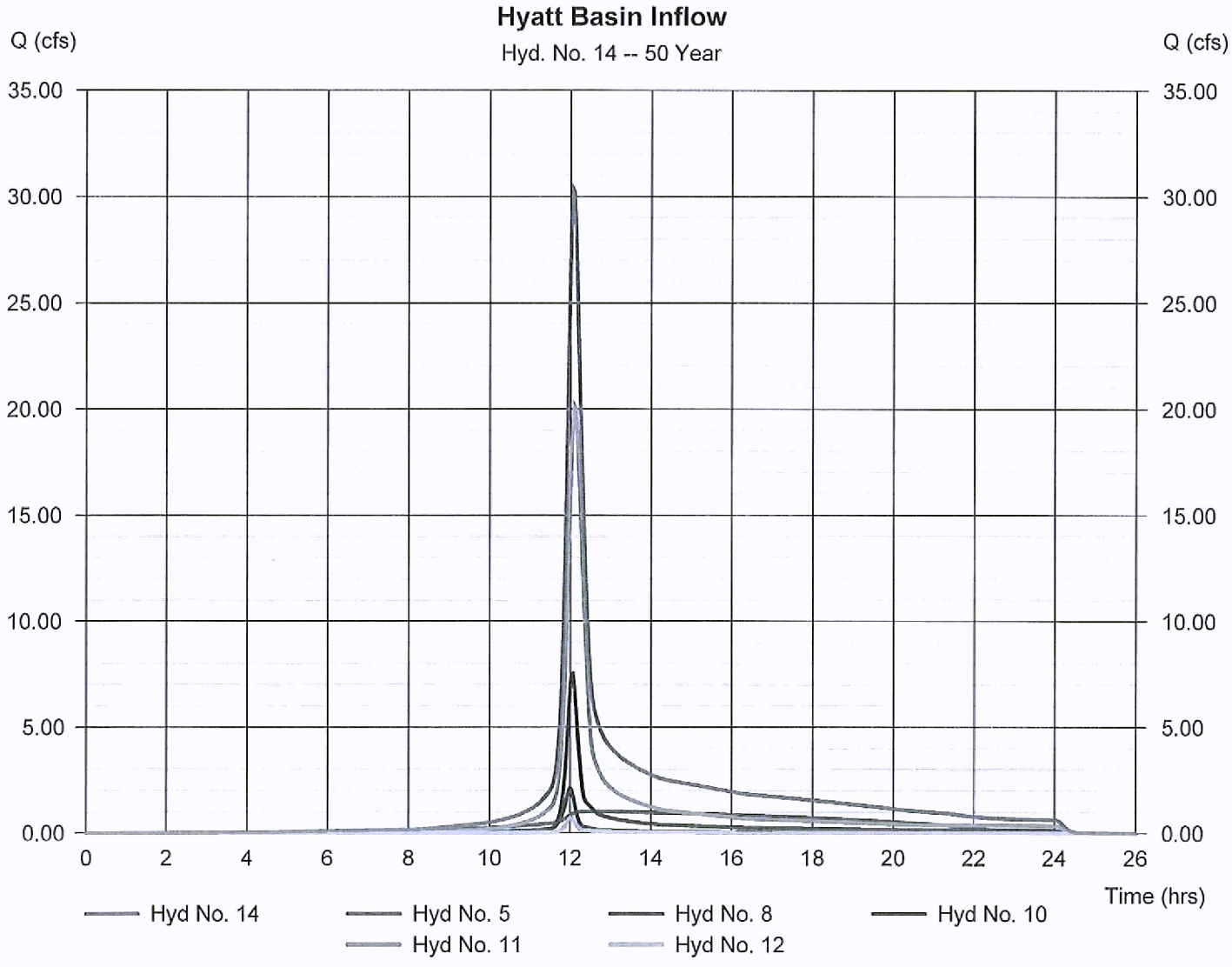
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 14

Hyatt Basin Inflow

Hydrograph type	= Combine	Peak discharge	= 30.37 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 133,244 cuft
Inflow hyds.	= 5, 8, 10, 11, 12	Contrib. drain. area	= 11.080 ac



Hydrograph Report

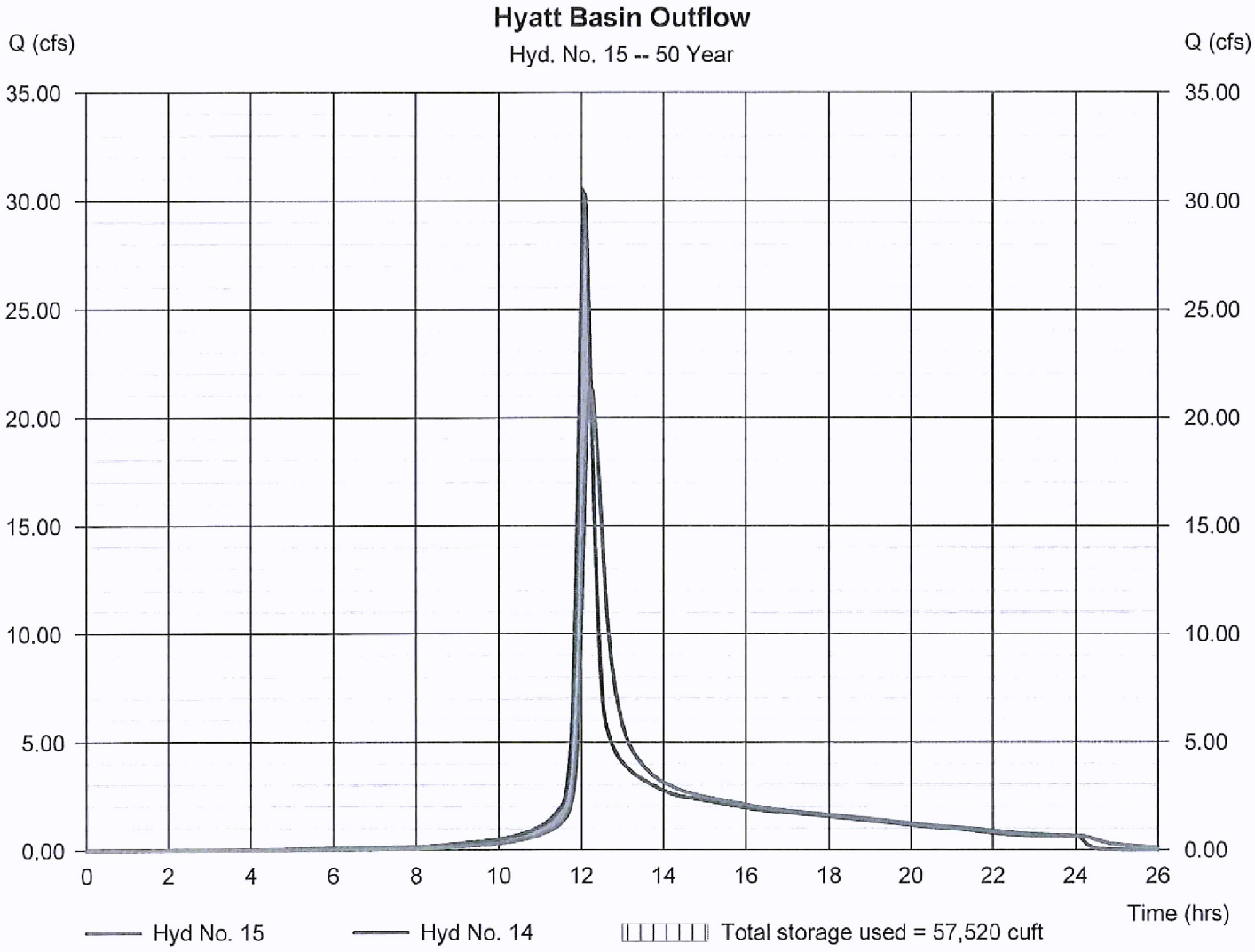
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 15

Hyatt Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 21.43 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 133,232 cuft
Inflow hyd. No.	= 14 - Hyatt Basin Inflow	Max. Elevation	= 885.58 ft
Reservoir name	= Hyatt House Pond	Max. Storage	= 57,520 cuft

Storage Indication method used. Wet pond routing start elevation = 883.50 ft.



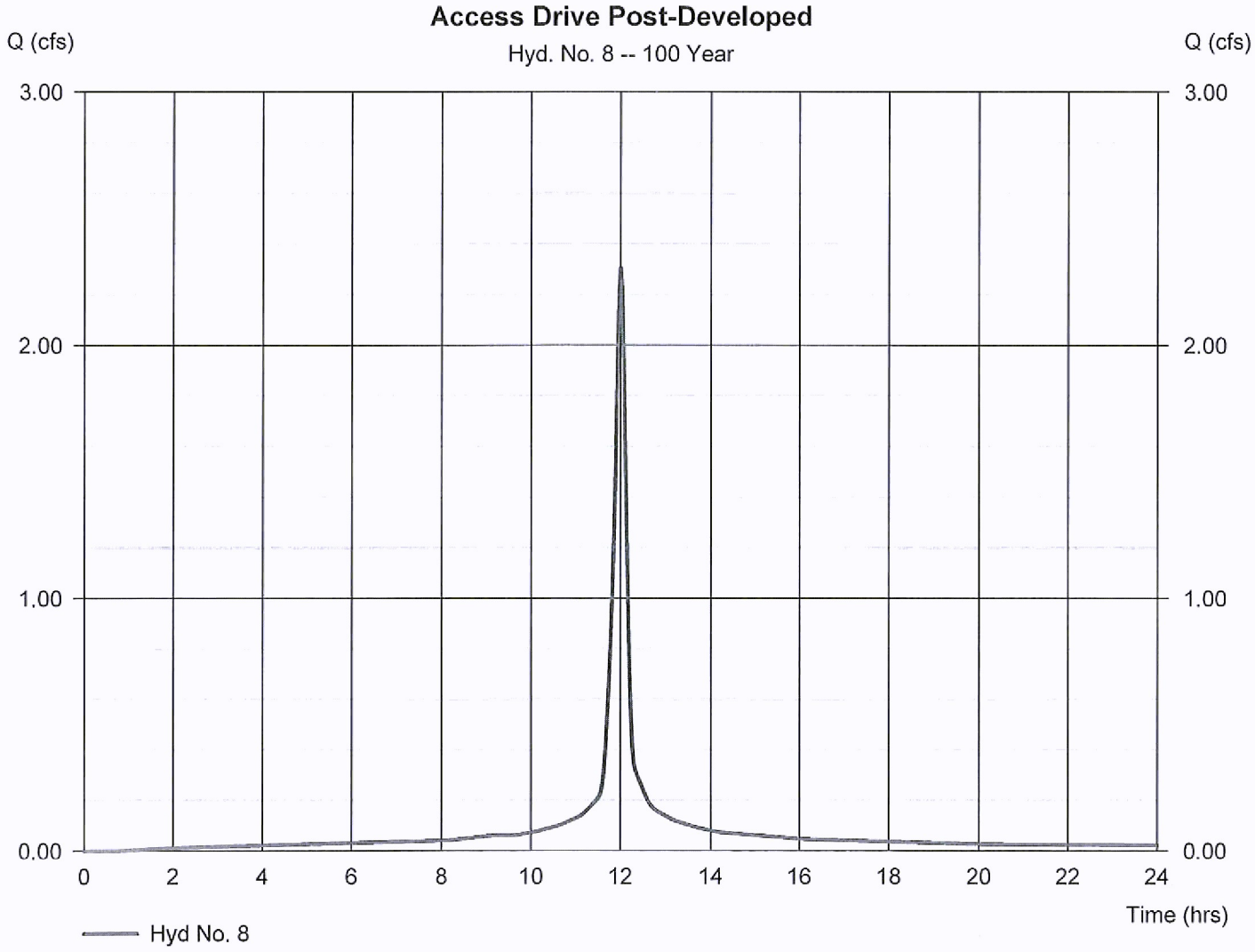
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 8

Access Drive Post-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 2.310 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 6,914 cuft
Drainage area	= 0.340 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



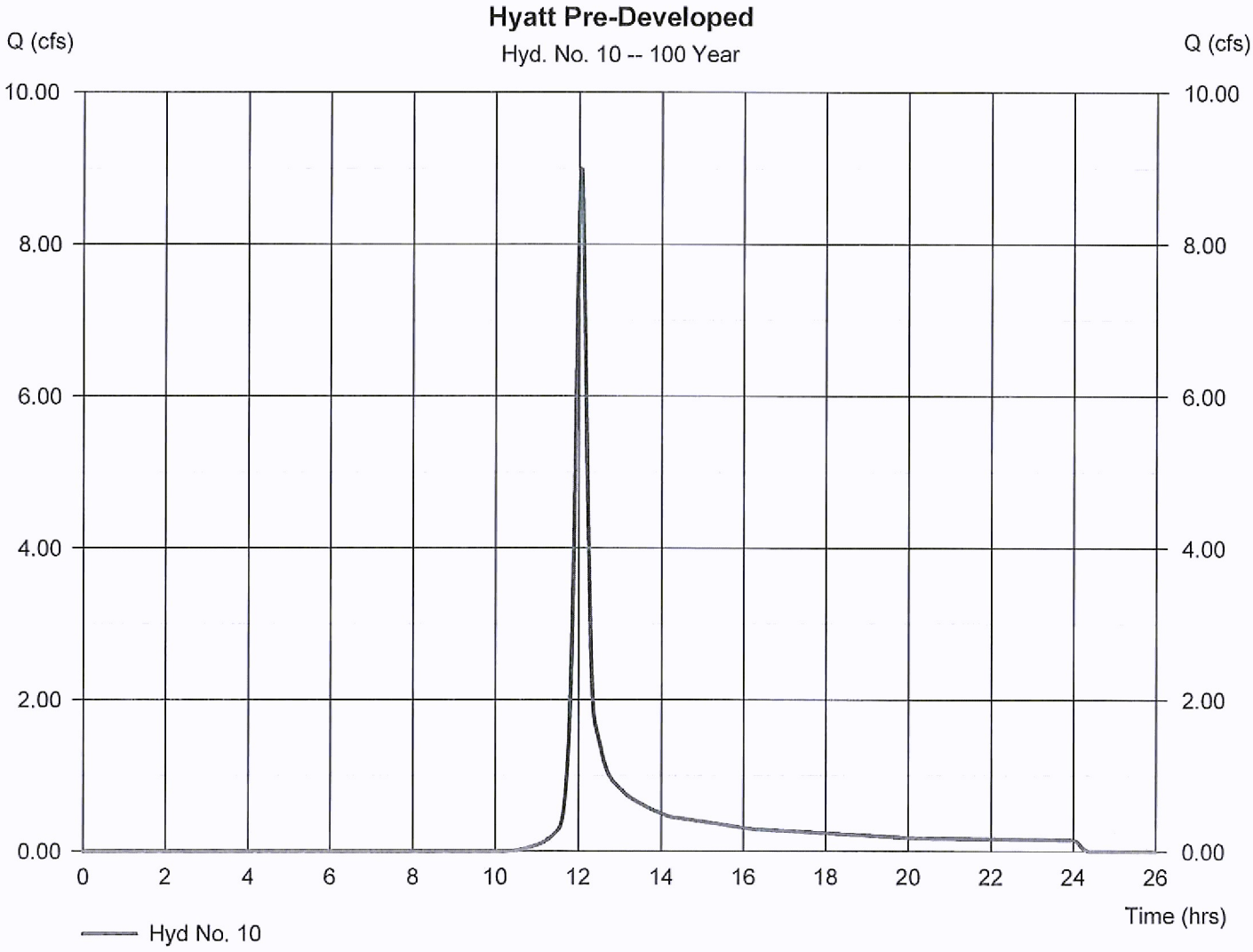
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 10

Hyatt Pre-Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 8.994 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 25,892 cuft
Drainage area	= 3.460 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.50 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



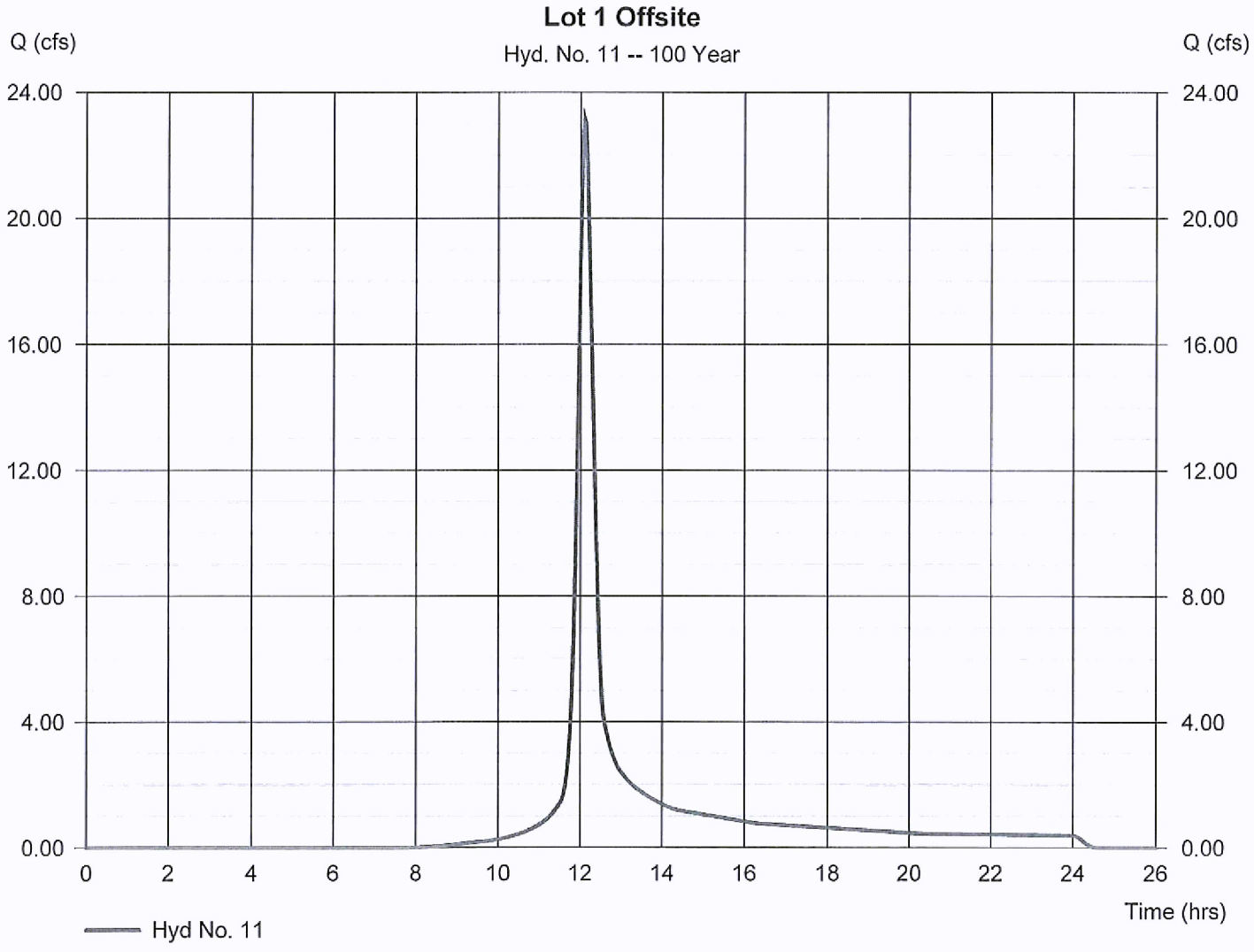
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 11

Lot 1 Offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 23.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 80,105 cuft
Drainage area	= 7.000 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.25 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



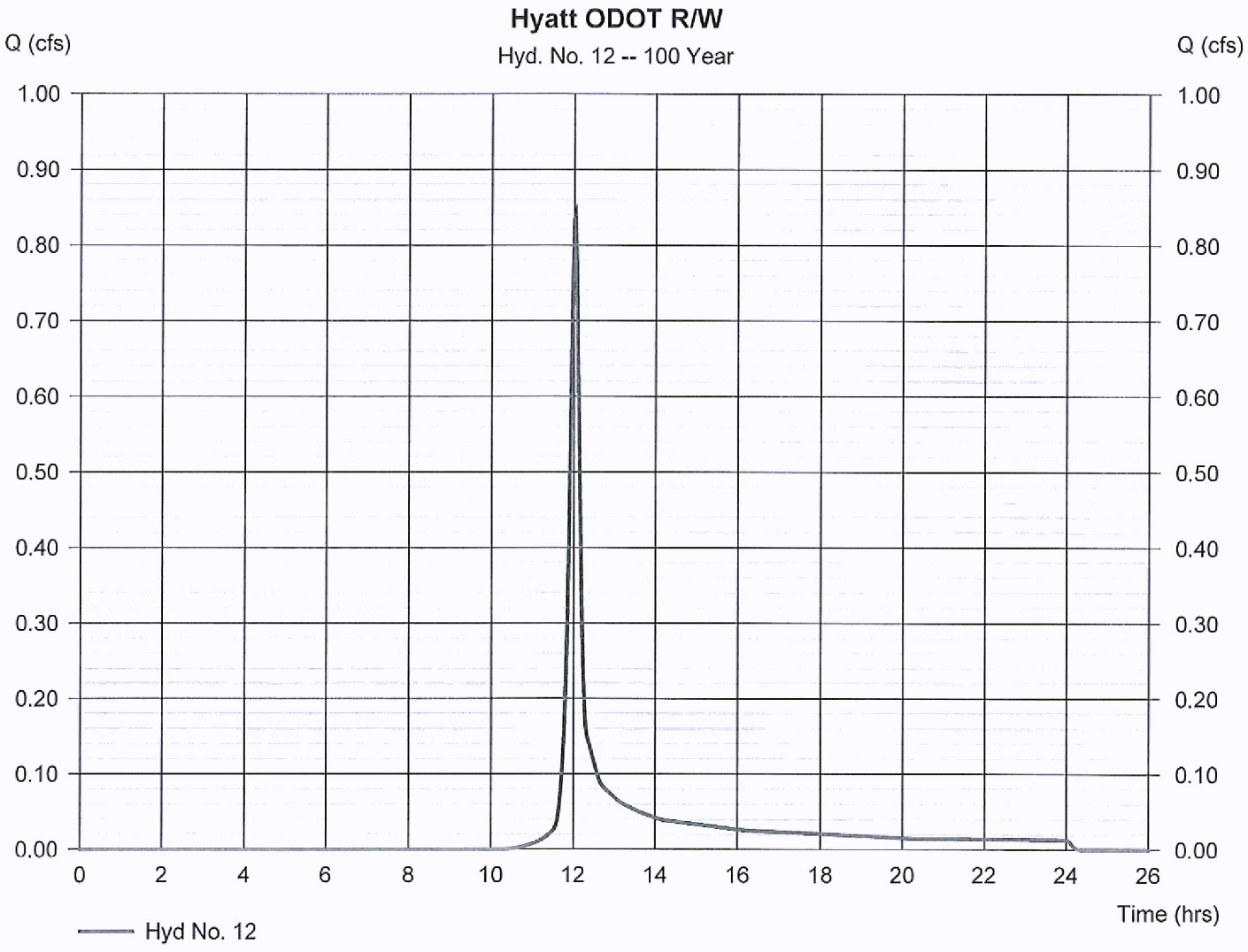
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

Hyd. No. 12

Hyatt ODOT R/W

Hydrograph type	= SCS Runoff	Peak discharge	= 0.841 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 2,216 cuft
Drainage area	= 0.280 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



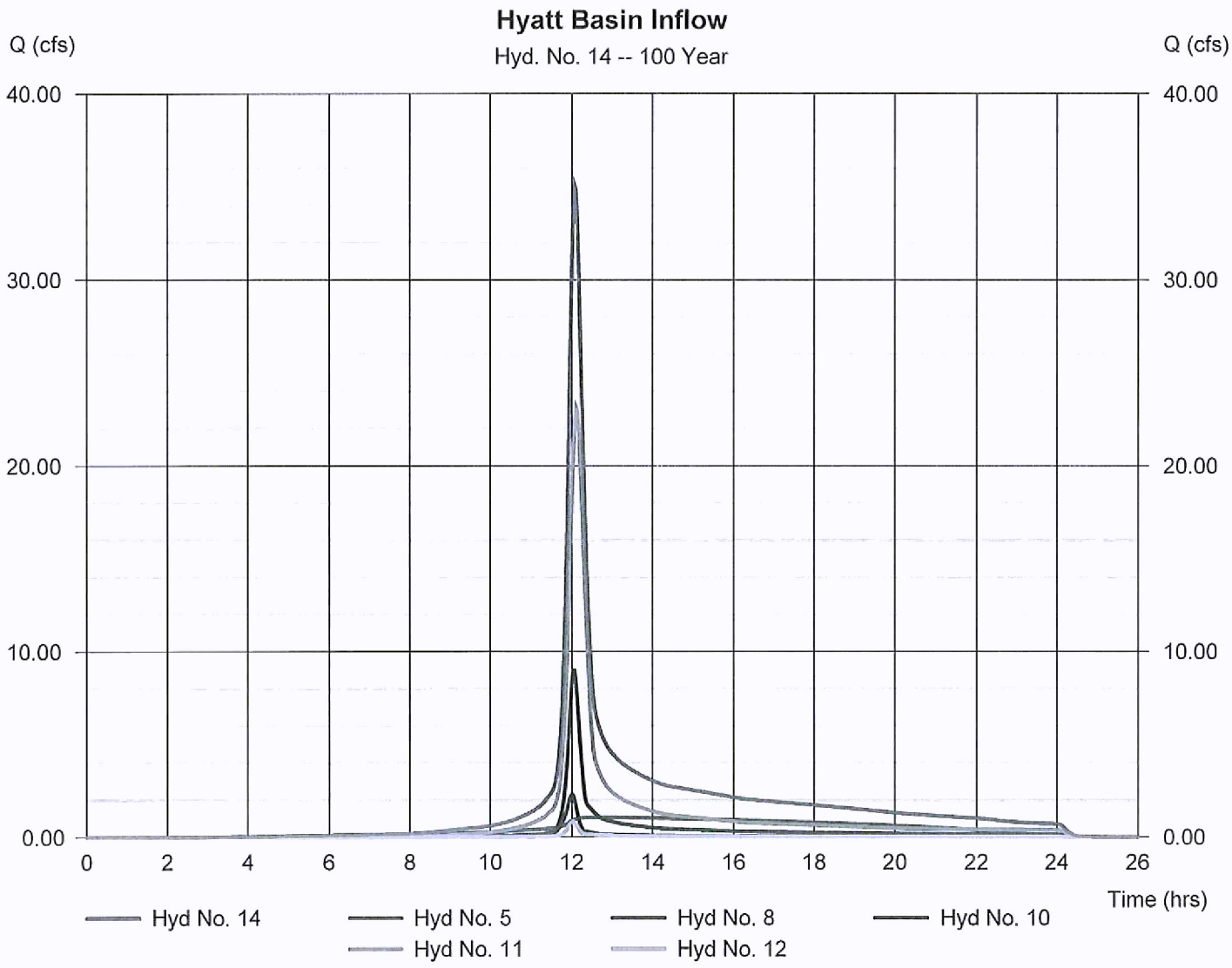
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 09 / 13 / 2016

Hyd. No. 14

Hyatt Basin Inflow

Hydrograph type	= Combine	Peak discharge	= 35.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 152,056 cuft
Inflow hyds.	= 5, 8, 10, 11, 12	Contrib. drain. area	= 11.080 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Tuesday, 09 / 13 / 2016

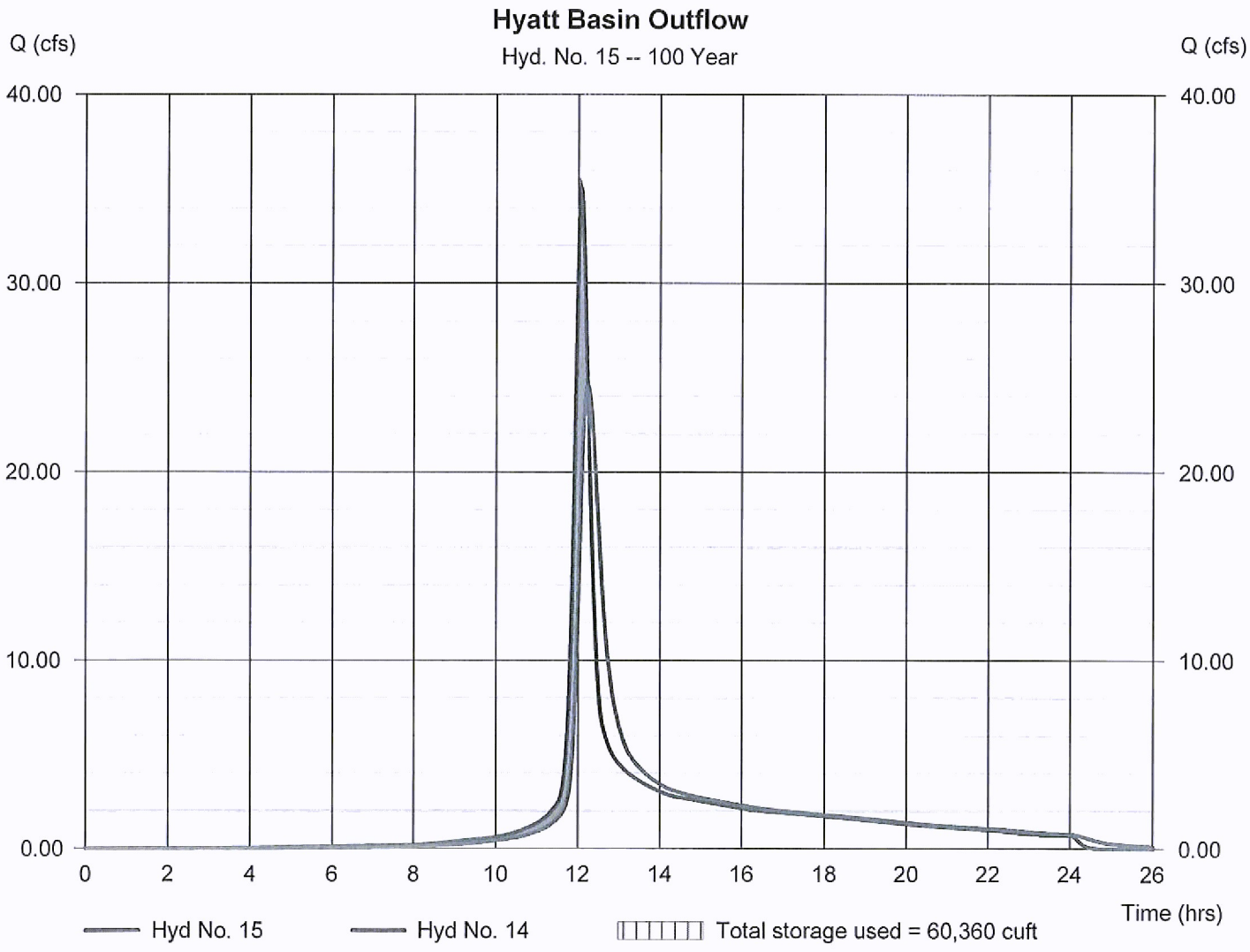
Hyd. No. 15

Hyatt Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 24.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 152,043 cuft
Inflow hyd. No.	= 14 - Hyatt Basin Inflow	Max. Elevation	= 885.82 ft
Reservoir name	= Hyatt House Pond	Max. Storage	= 60,360 cuft

Storage Indication method used. Wet pond routing start elevation = 883.50 ft. - but ~60,228 cu ft provided @ elev 888.0

∴ NO freeboard



I-75 NORTHBOUND

OFFSITE AREA
=7.00AC

HIX AREA
=2.03AC

HIX ODOT RW
=0.11AC

ACCESS ROAD
PRE/POST
=0.34AC

HYATT PRE
AREA =3.46AC

HYATT ODOT
RW =0.28AC

LIBERTY WAY

COX ROAD

FcB
C

Ra
B/D

WyB
C

Basis of Bearing:
State Plane NAD83 (2011)

0 50 75
SCALE: 1" = 50'

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Item	Revision Description	Date	Drwn.	Chk.
1				
2				
3				
4				
5				
6				
7				
8				
9				

THE FIELDS AT LIBERTY WAY
PRELIMINARY DEVELOPMENT PLAN

COX ROAD & LIBERTY WAY
WEST CHESTER TOWNSHIP
BUTLER COUNTY, OH
SECTION 12, 18, TOWN 3, RANGE 2

DRAINAGE PLAN

bayer becker
www.bayerbecker.com
8900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Drawing: 15M040-000 CD HIX
Drawn by: MJL
Checked By:
Issue Date: 09-13-16
Sheet: DR1

Plot time - Sep 12, 2016 - 8:33pm
Drawing name - J:\2015\15M040-000\CIVIL\DWGS\15M040-000 CD HIX.dwg - Layout Tab: DR1