APPENDIX B

HYDROLOGY CALCULATIONS: Developed Conditions

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54951-DEV-10YR.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	28.72	1	11	21,798	------	------	------	OS-1
2	Rational	15.75	1	10	10,870	------	------	------	OS-2
3	Rational	2.028	1	12	1,680	------	------	------	OS-3
4	Rational	7.343	1	13	6,587	------	------	------	OS-4
5	Rational	13.07	1	11	9,923	------	------	------	OS-5
6	Rational	3.282	1	17	3,849	------	------	------	OS-6
7	Rational	3.799	1	11	2,883	------	------	------	OS-7
8	Rational	3.297	1	9	2,048	------	------	------	OS-8
9	Rational	13.87	1	25	23,932	------	------	------	OS-9
10	Rational	13.42	1	25	23,152	------	------	------	OS-10
11	Rational	4.230	1	35	10,216	------	------	------	DP 19: OS-11
13	Reach	28.42	1	12	21,714	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	41.55	1	12	32,111	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	36.85	1	14	32,903	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	40.41	1	14	36,525	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	20.20	1	14	18,262	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	20.20	1	14	18,262	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	13.48	1	20	19,674	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	19.37	1	16	18,581	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	20.24	1	16	28,912	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	10.12	1	16	14,456	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	10.12	1	16	14,456	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	8.670	1	22	15,129	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	17.33	1	11	24,934	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	28.57	1	17	42,305	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	27.89	1	20	42,709	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Combine	38.90	1	22	65,660	10, 33	------	------	DP10: Combine Hyd.32+OS-10
35	Diversion1	38.90	1	21	65,660	34	------	------	DP13: Split Flow to DCD Pipe
36	Diversion2	0.004	1	22	0	34	------	------	DP14: Split Flow to N.
38	Reach	0.000	1	22	0	36	------	------	Rt. DP14 to DP15 (Bioswale)
39	Reservoir	0.000	1	n/a	0	38	5316.00	0.001	DP16: Pond 2 Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reach	0.000	1	n/a	0	39	------	------	Rt. DP16 to DP17 (Bioswale)
42	Rational	3.815	1	19	5,001	------	------	------	A
43	Rational	26.43	1	26	47,407	------	------	------	B
44	Rational	0.547	1	5	189	------	------	------	C
45	Rational	0.297	1	22	451	------	------	------	DPH2: H-4
46	Rational	2.606	1	26	4,675	------	------	------	H-5
48	Combine	21.86	1	15	33,695	6, 30, 42,	------	------	DP11: Combine Hyd. 30+ OS-6+A
49	Reach	0.000	1	n/a	0	38	------	------	Rt. DP11 to DPH1 (Swale)
50	Reach	37.32	1	26	66,499	35	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
52	Combine	26.43	1	26	46,773	40, 43,	------	------	DP17: Hyd. 40+B
53	Reservoir	8.130	1	49	46,741	52	5314.30	32,061	DP18: Pond 1 Discharge
54	Combine	8.130	1	49	46,922	44, 53	------	------	DP12: DP18+C
56	Combine	43.33	1	27	113,421	49, 50, 54,	------	------	DPH1: Combine Hyd. 49+50+54
58	Reach	0.813	1	72	11,426	11	------	------	Rt. DP 19 to DP H3
59	Combine	2.909	1	26	16,039	46, 58	------	------	DP H3: Combine Hyd. 58+H-5

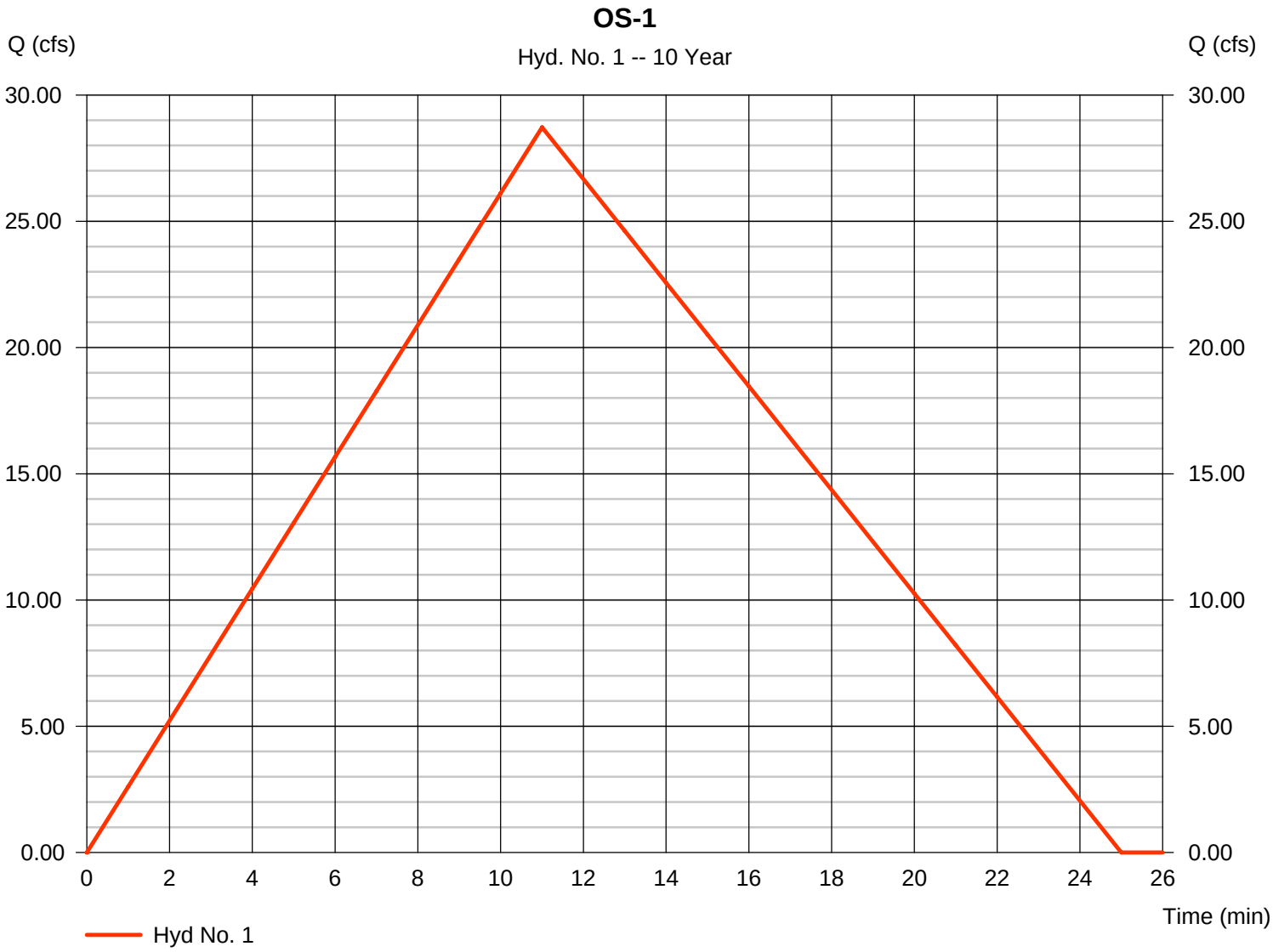
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	28.72 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	21,798 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.7
Intensity	=	5.240 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	15.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	10,870 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.89
Intensity	=	5.497 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	2.028 cfs
Storm frequency	=	10 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	1,680 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.5
Intensity	=	5.009 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	7.343 cfs
Storm frequency	=	10 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	6,587 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.5
Intensity	=	4.799 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	13.07 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	9,923 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.5
Intensity	=	5.240 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

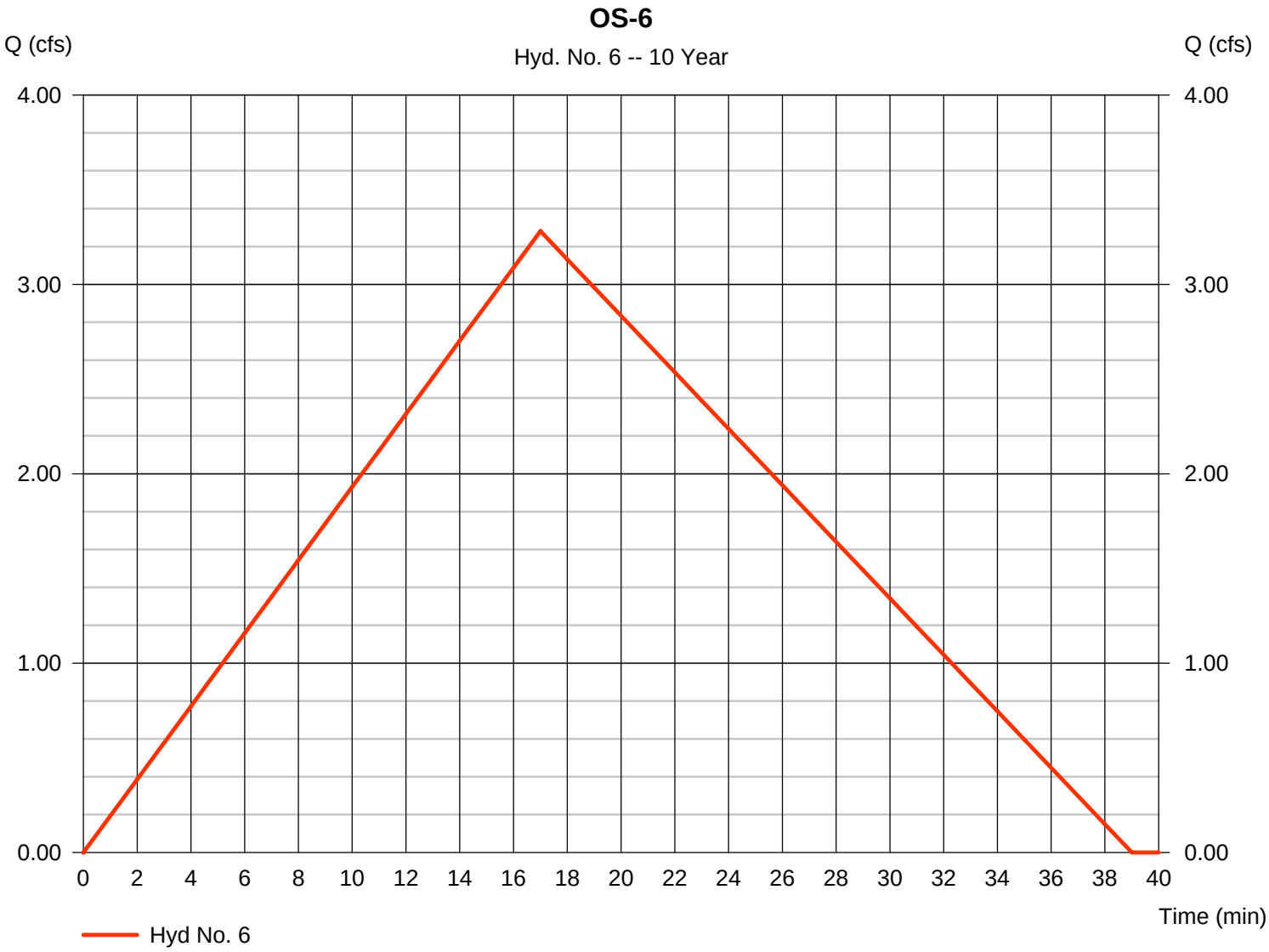
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	3.282 cfs
Storm frequency	=	10 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	3,849 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.5
Intensity	=	4.128 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



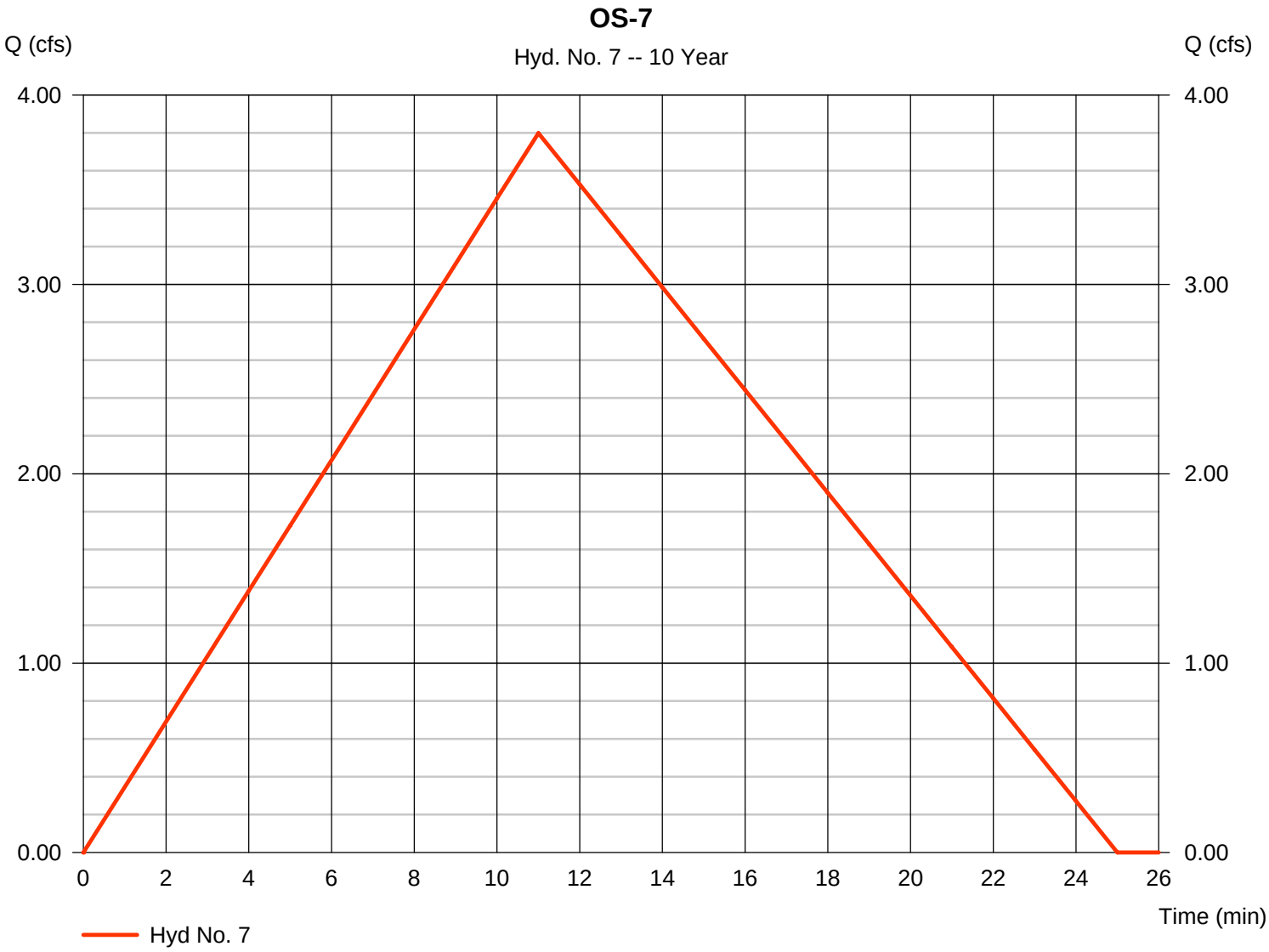
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	3.799 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	2,883 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.5
Intensity	=	5.240 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



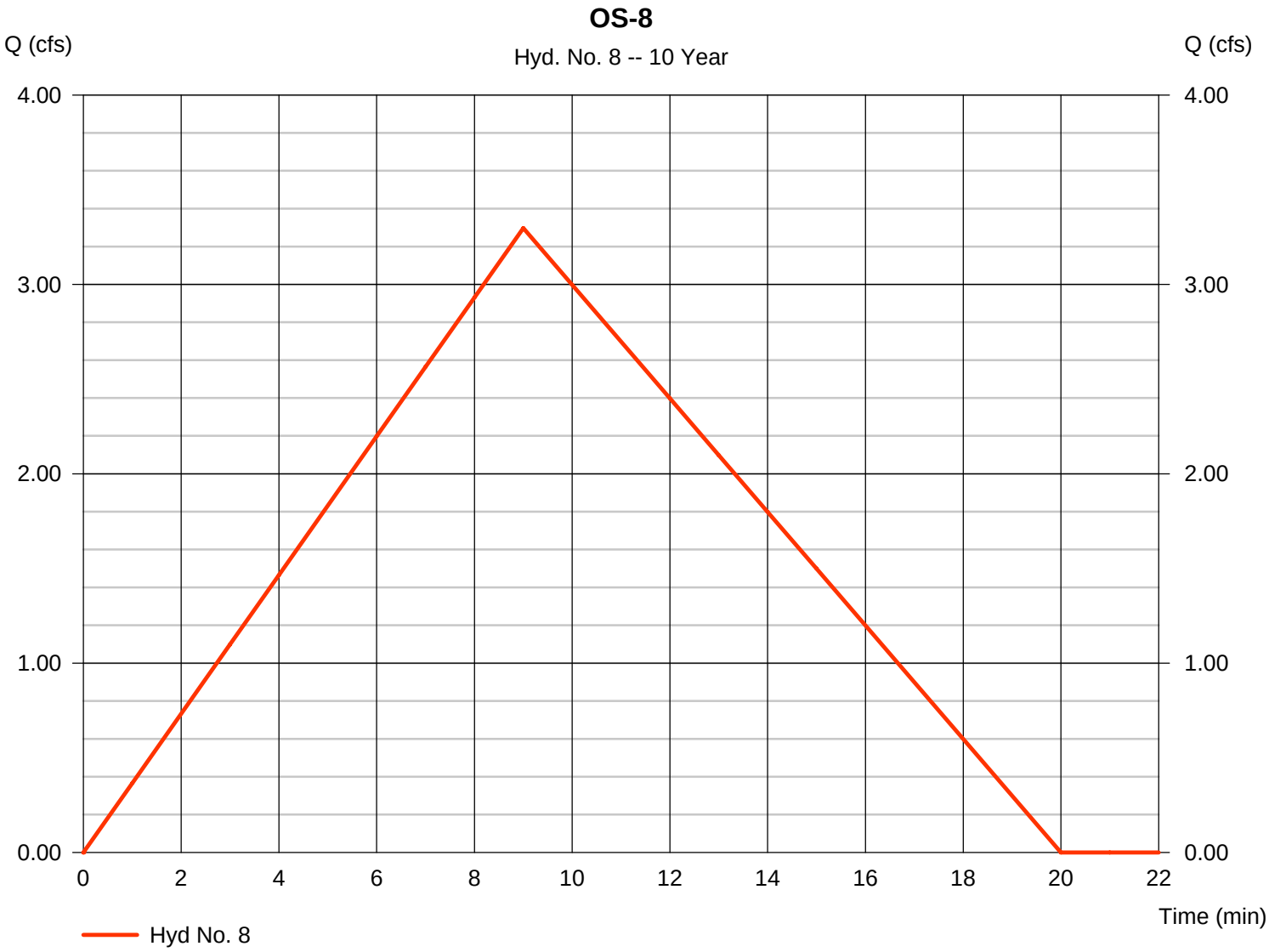
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	3.297 cfs
Storm frequency	=	10 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	2,048 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.5
Intensity	=	5.785 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



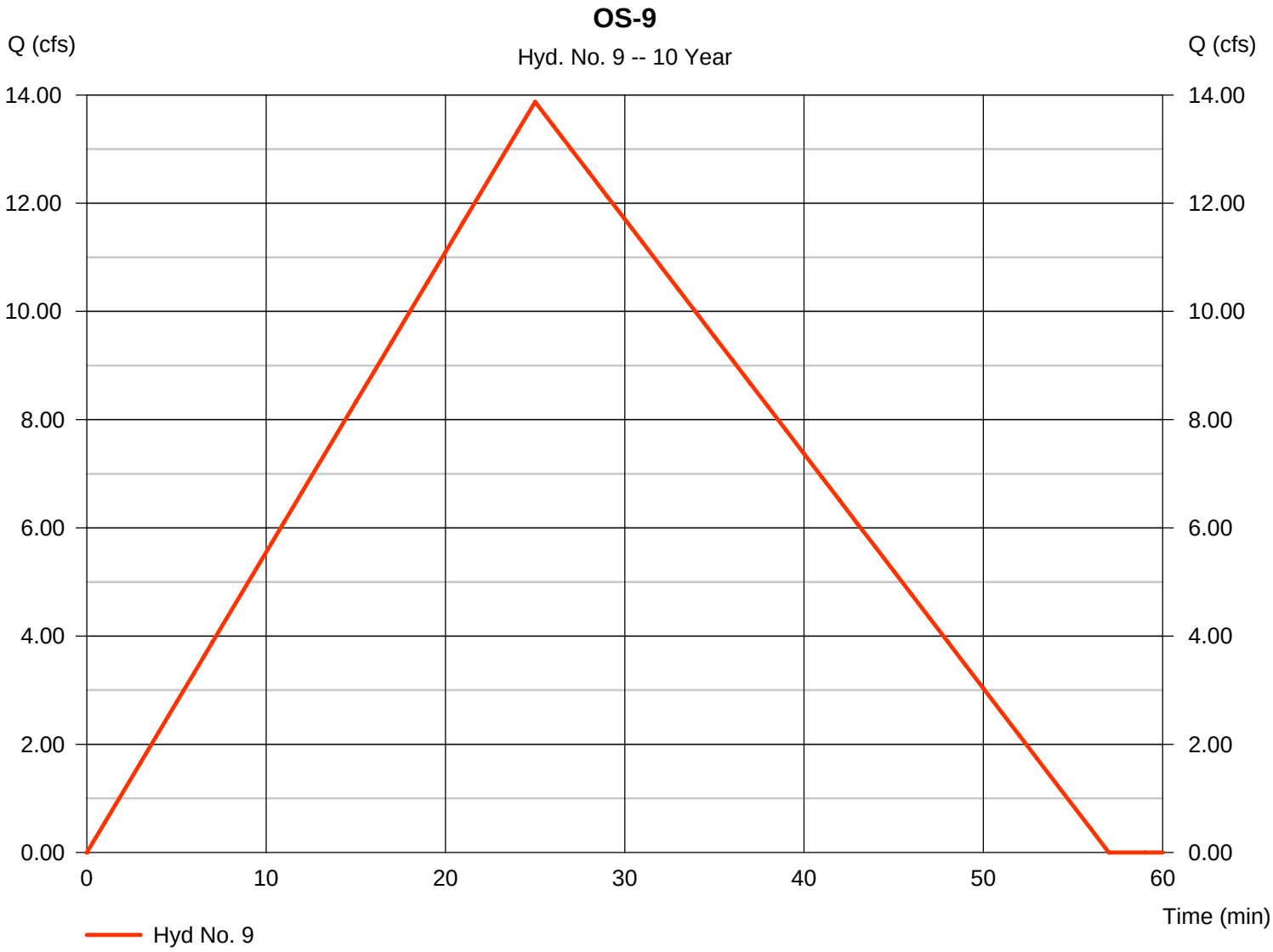
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	13.87 cfs
Storm frequency	=	10 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	23,932 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.45
Intensity	=	3.262 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



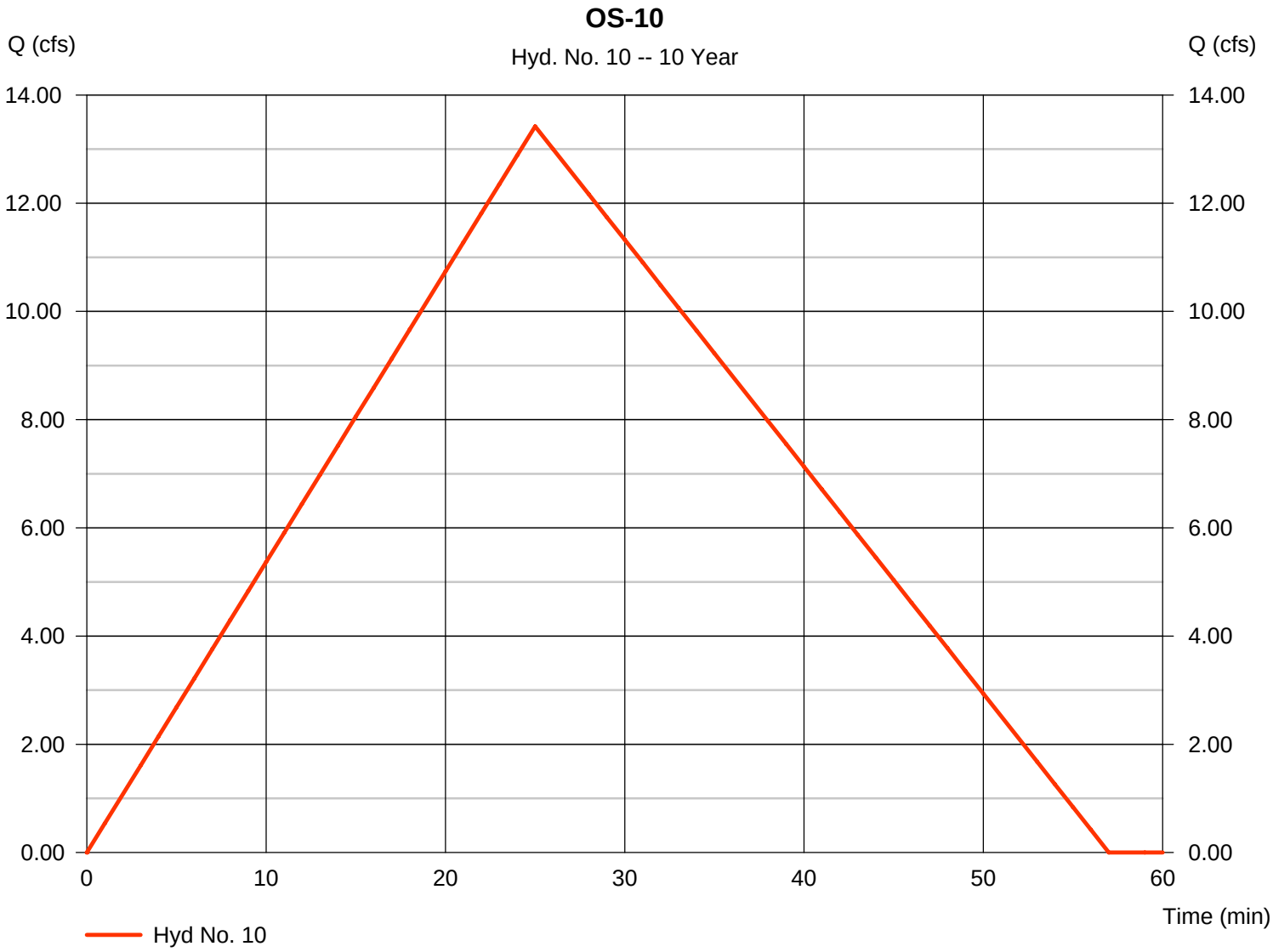
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	13.42 cfs
Storm frequency	=	10 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	23,152 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.44
Intensity	=	3.262 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



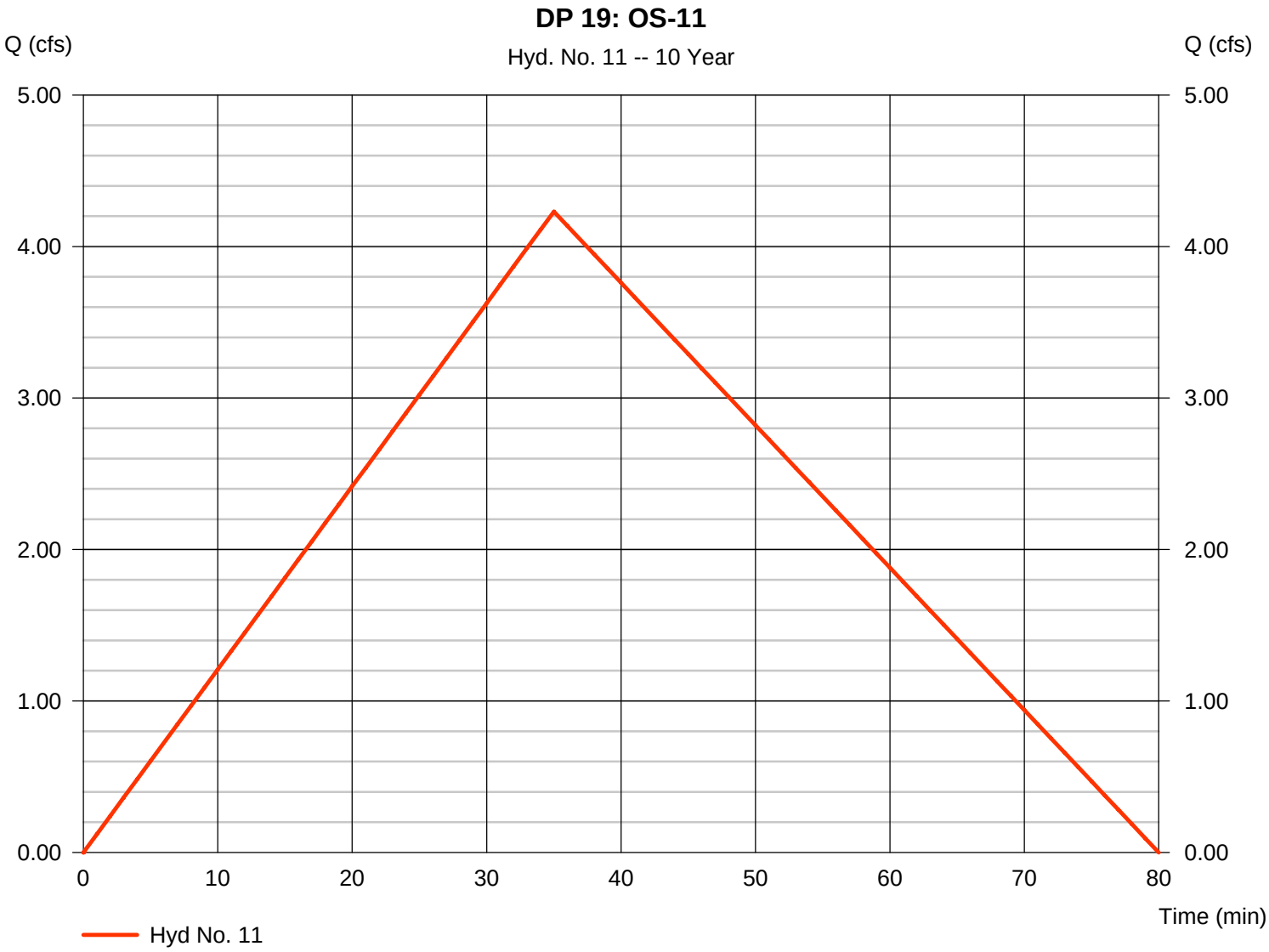
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	4.230 cfs
Storm frequency	=	10 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	10,216 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.32
Intensity	=	2.618 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

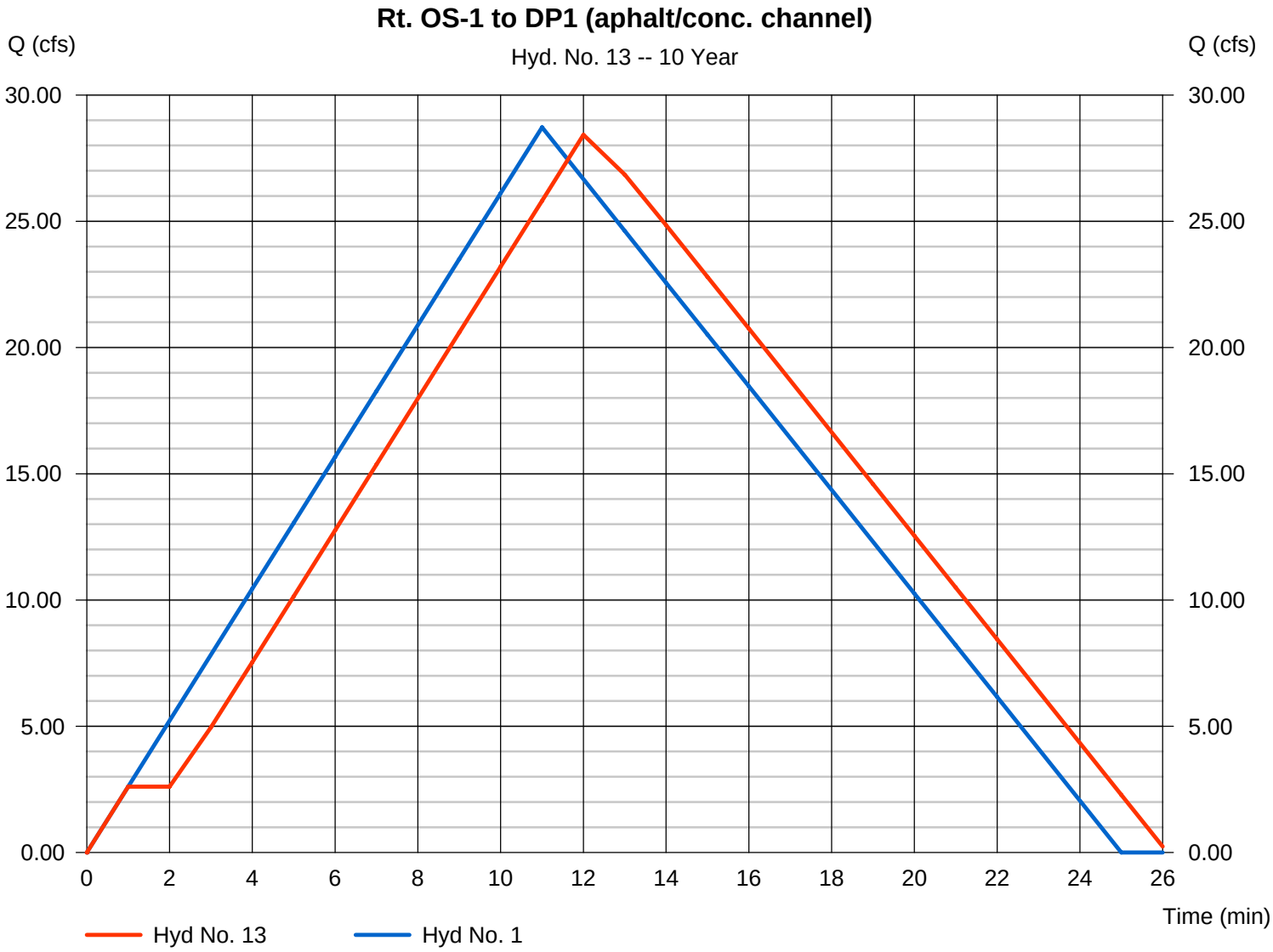
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	28.42 cfs
Storm frequency	=	10 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	21,714 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.21 ft/s	Routing coeff.	=	0.8979

Modified Att-Kin routing method used.



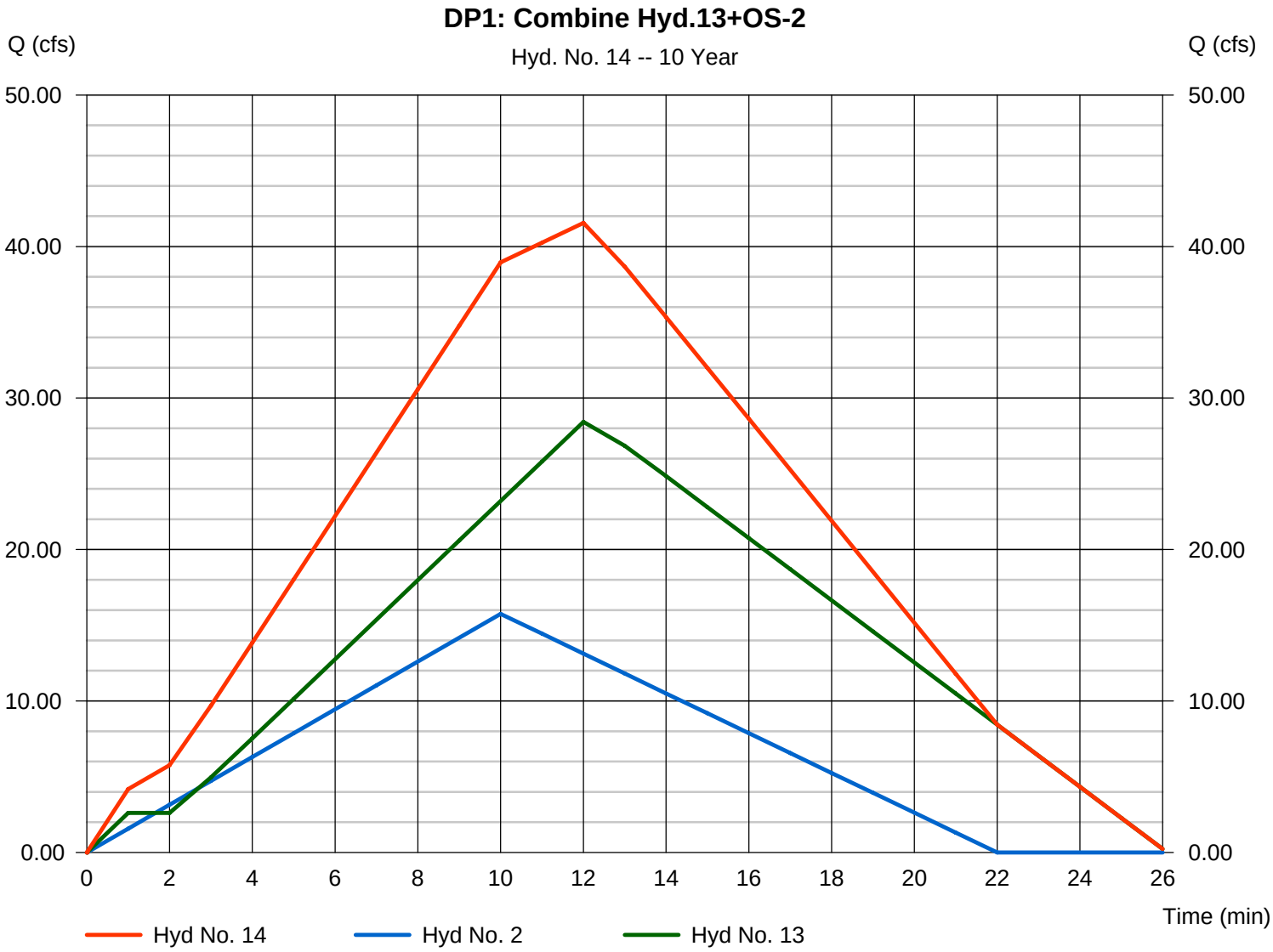
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	41.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	32,111 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

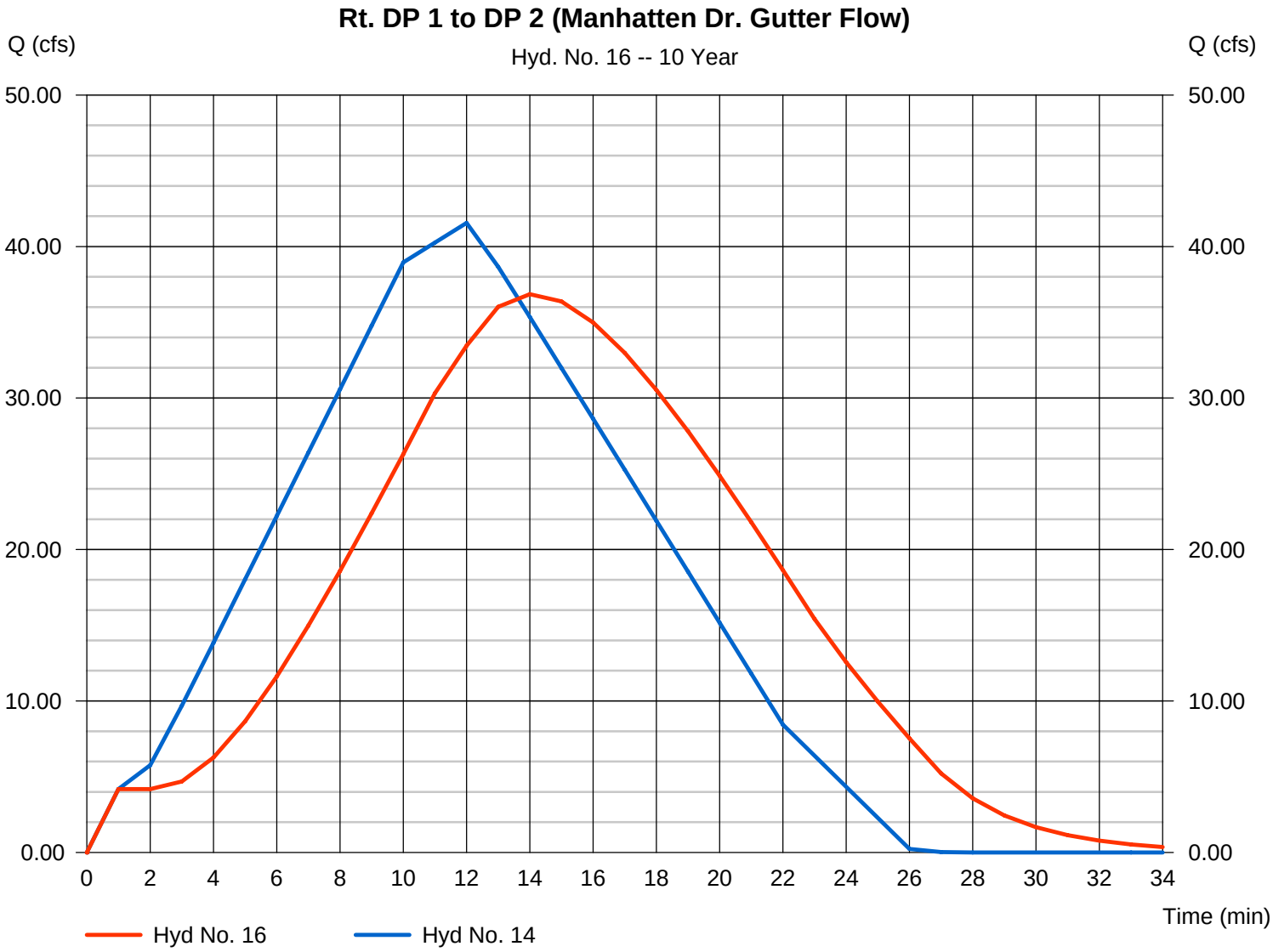
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	36.85 cfs
Storm frequency	=	10 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	32,903 cuft
Inflow hyd. No.	=	14 - DP1: Combine Hyd.13+OS-2	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.513	Rating curve m	=	0.659
Ave. velocity	=	1.43 ft/s	Routing coeff.	=	0.3164

Modified Att-Kin routing method used.



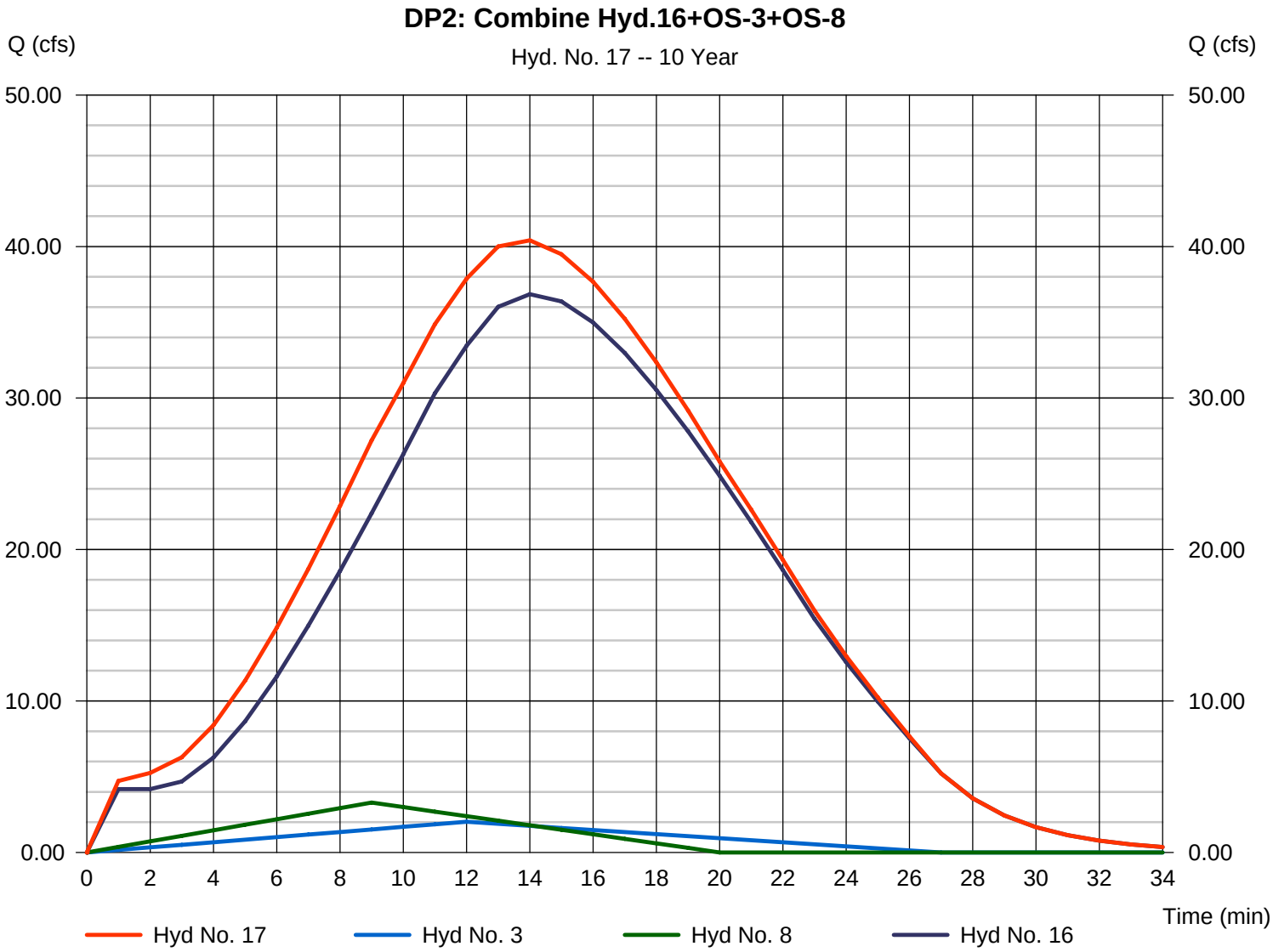
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	=	Combine	Peak discharge	=	40.41 cfs
Storm frequency	=	10 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	36,525 cuft
Inflow hyds.	=	3, 8, 16	Contrib. drain. area	=	1.950 ac



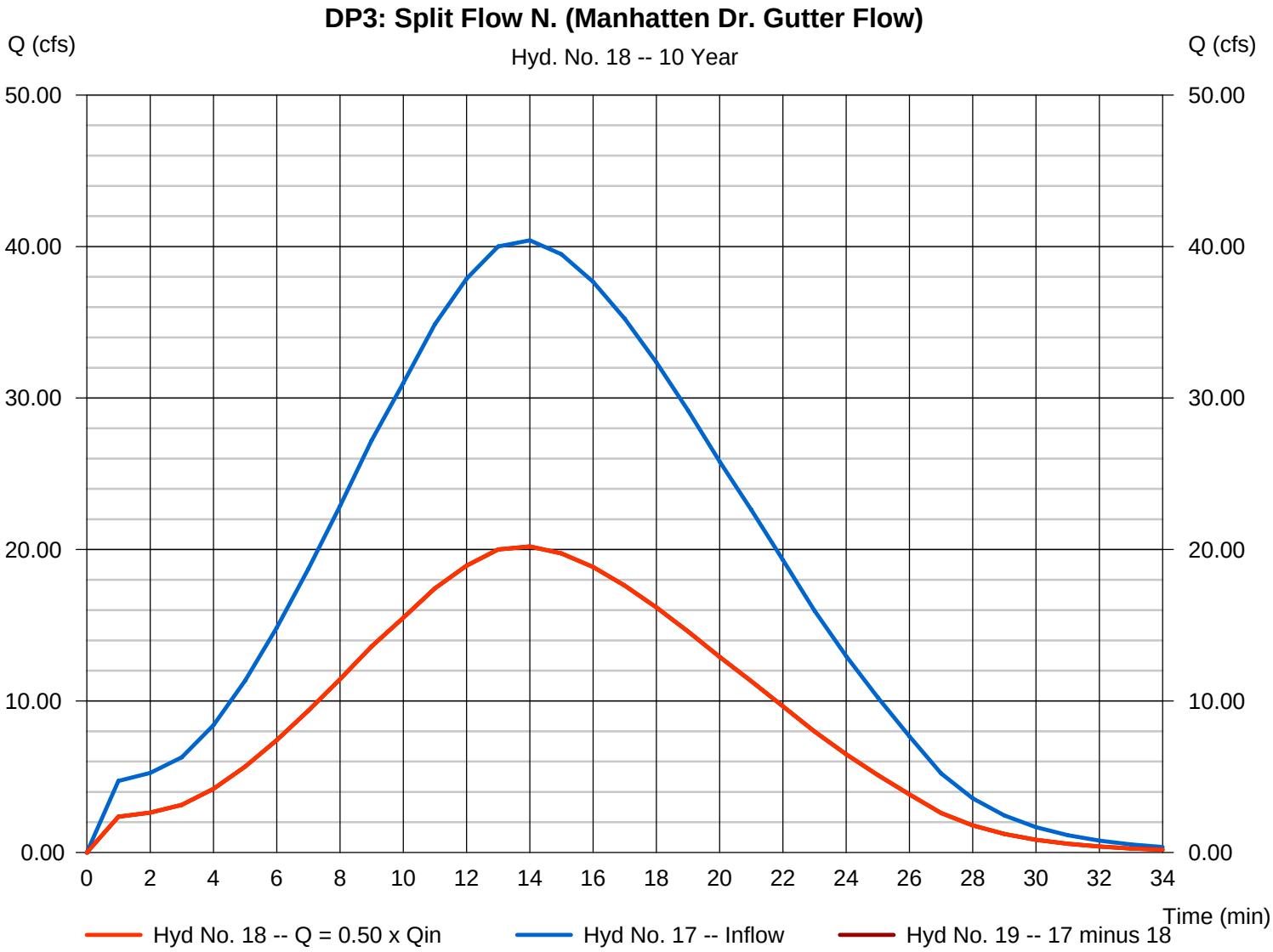
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	20.20 cfs
Storm frequency	=	10 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	18,262 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



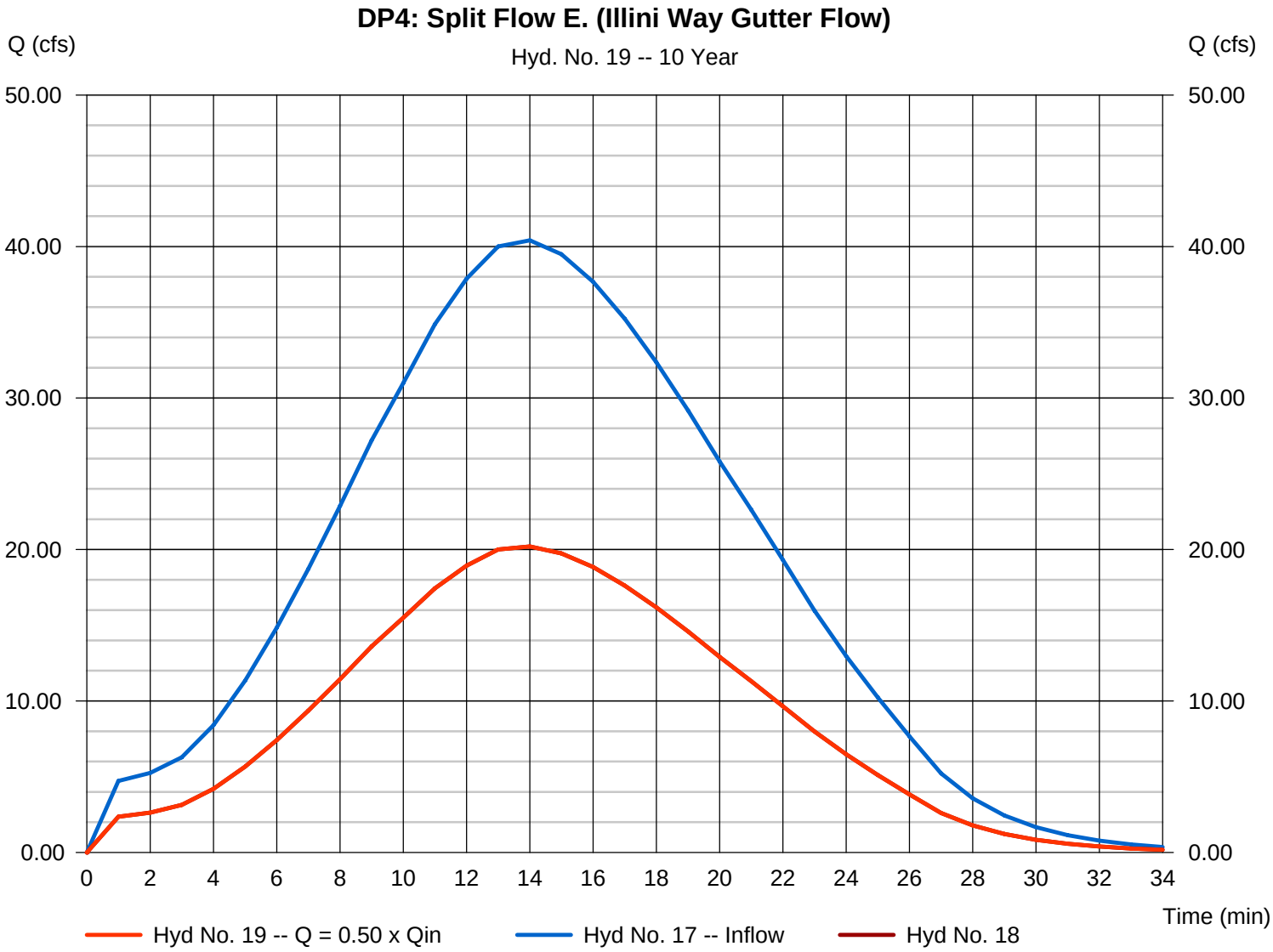
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	20.20 cfs
Storm frequency	=	10 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	18,262 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

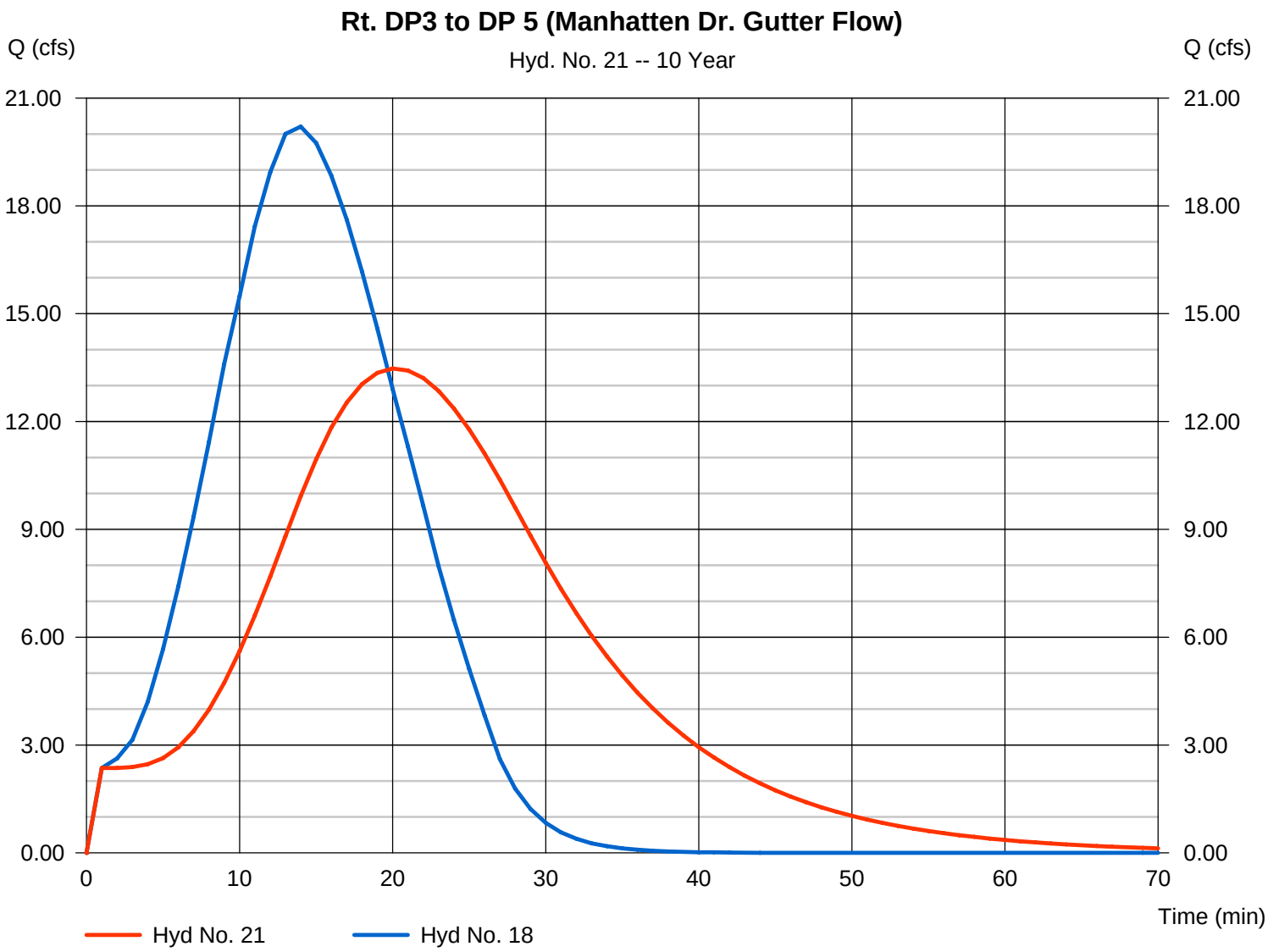
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	13.48 cfs
Storm frequency	=	10 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	19,674 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.16 ft/s	Routing coeff.	=	0.0999

Modified Att-Kin routing method used.



Hydrograph Report

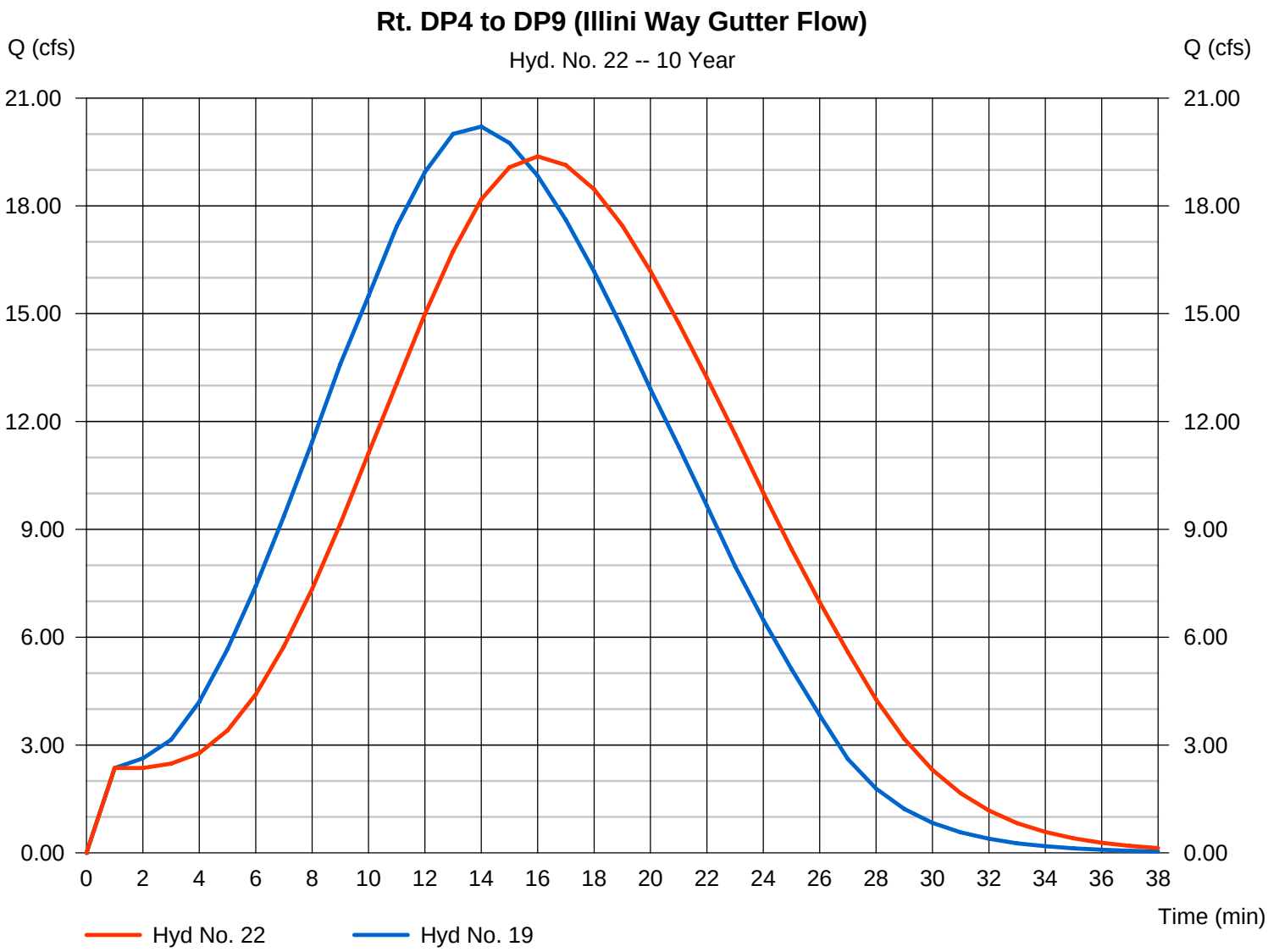
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	19.37 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	18,581 cuft
Inflow hyd. No.	=	19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.16 ft/s	Routing coeff.	=	0.4424

Modified Att-Kin routing method used.



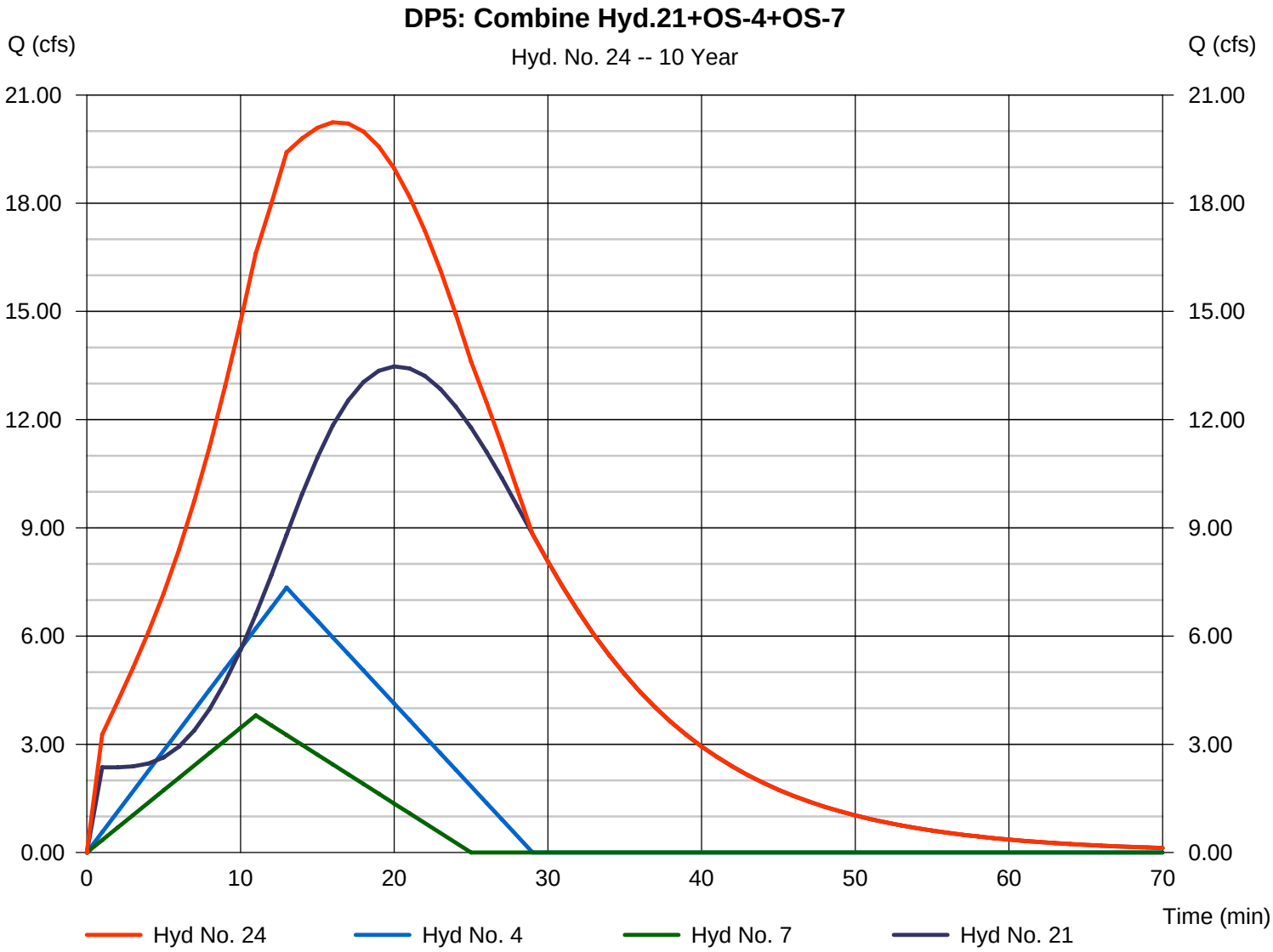
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	=	Combine	Peak discharge	=	20.24 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	28,912 cuft
Inflow hyds.	=	4, 7, 21	Contrib. drain. area	=	4.510 ac



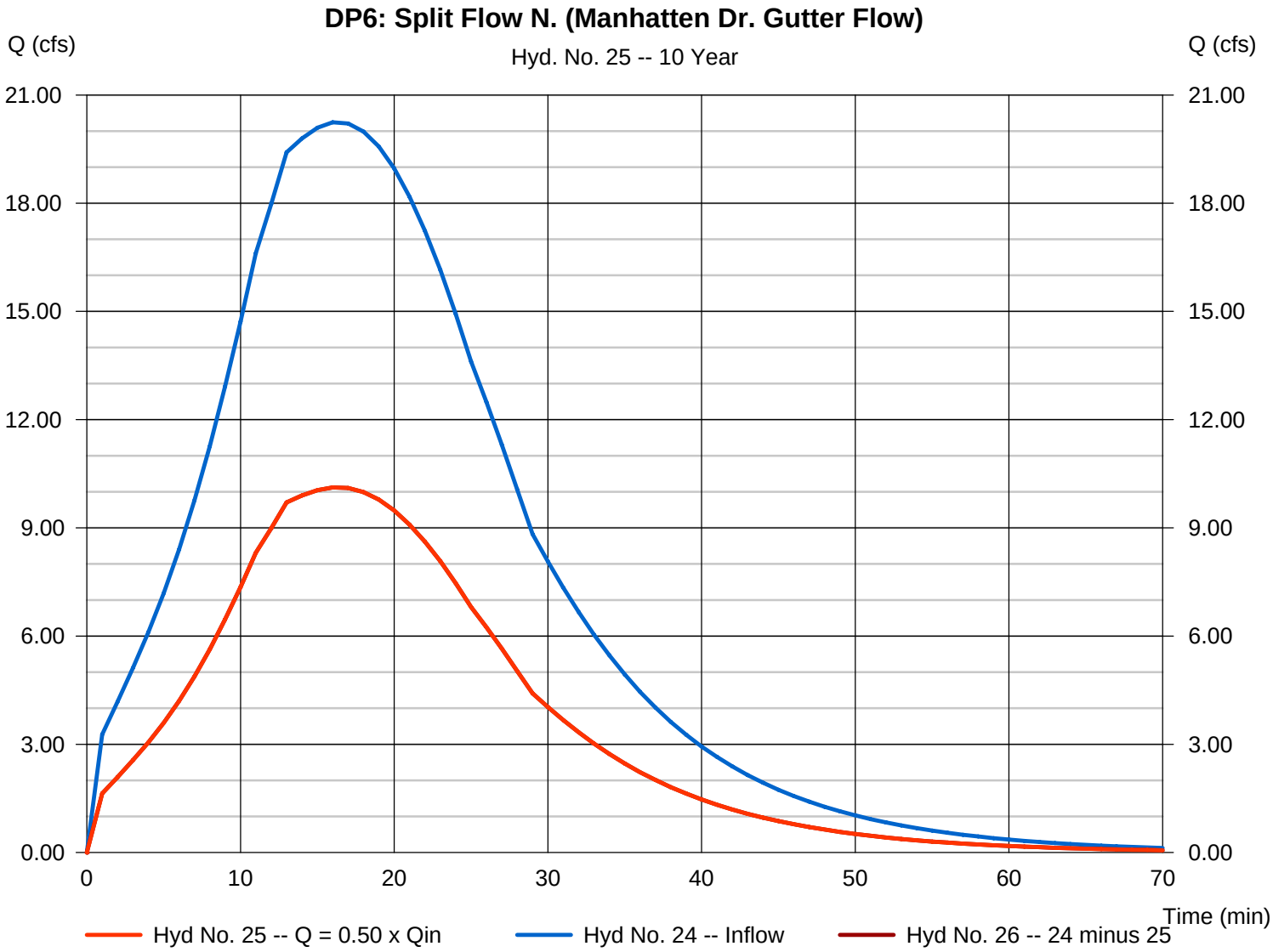
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	10.12 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	14,456 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



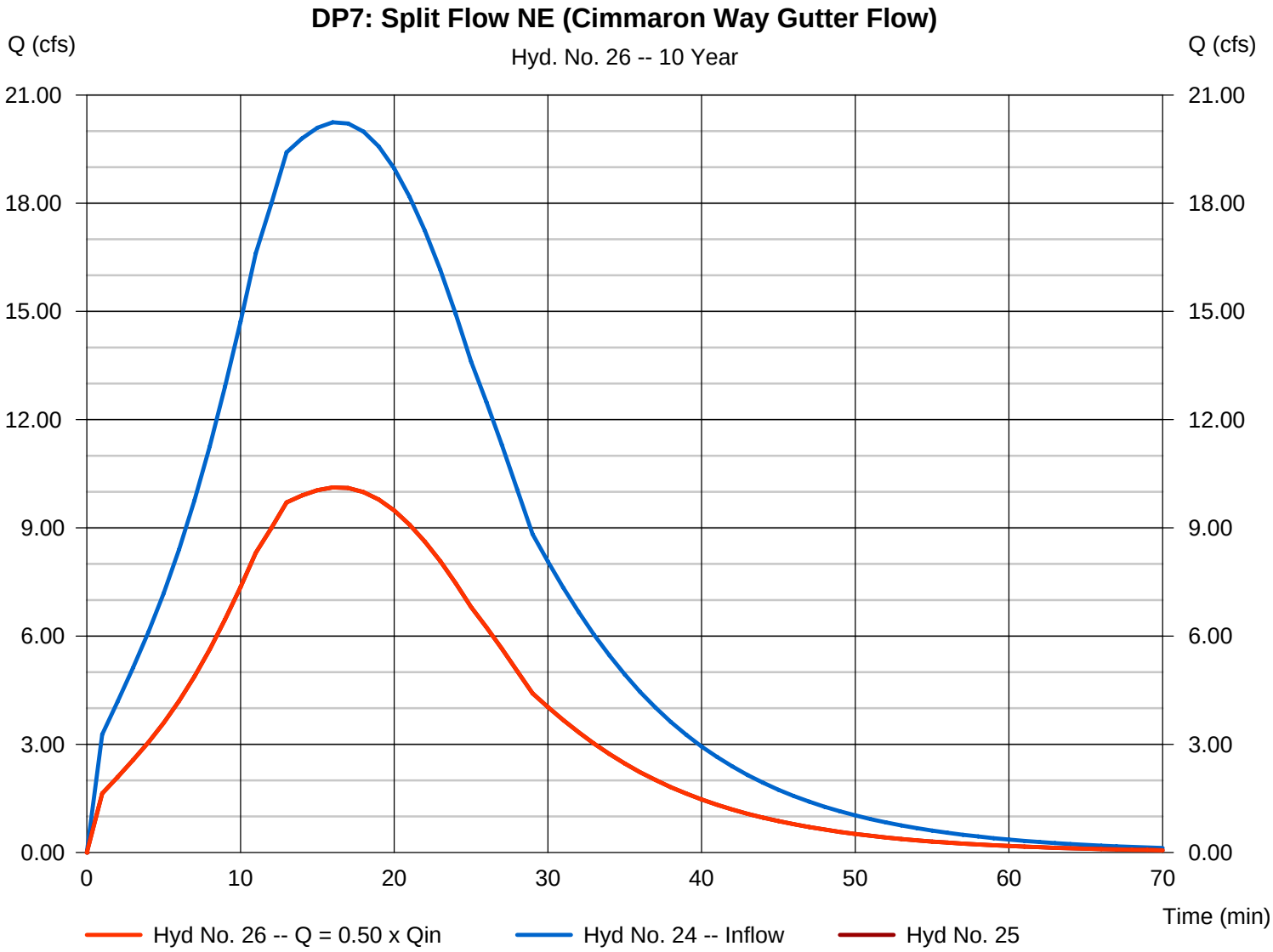
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	10.12 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	14,456 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

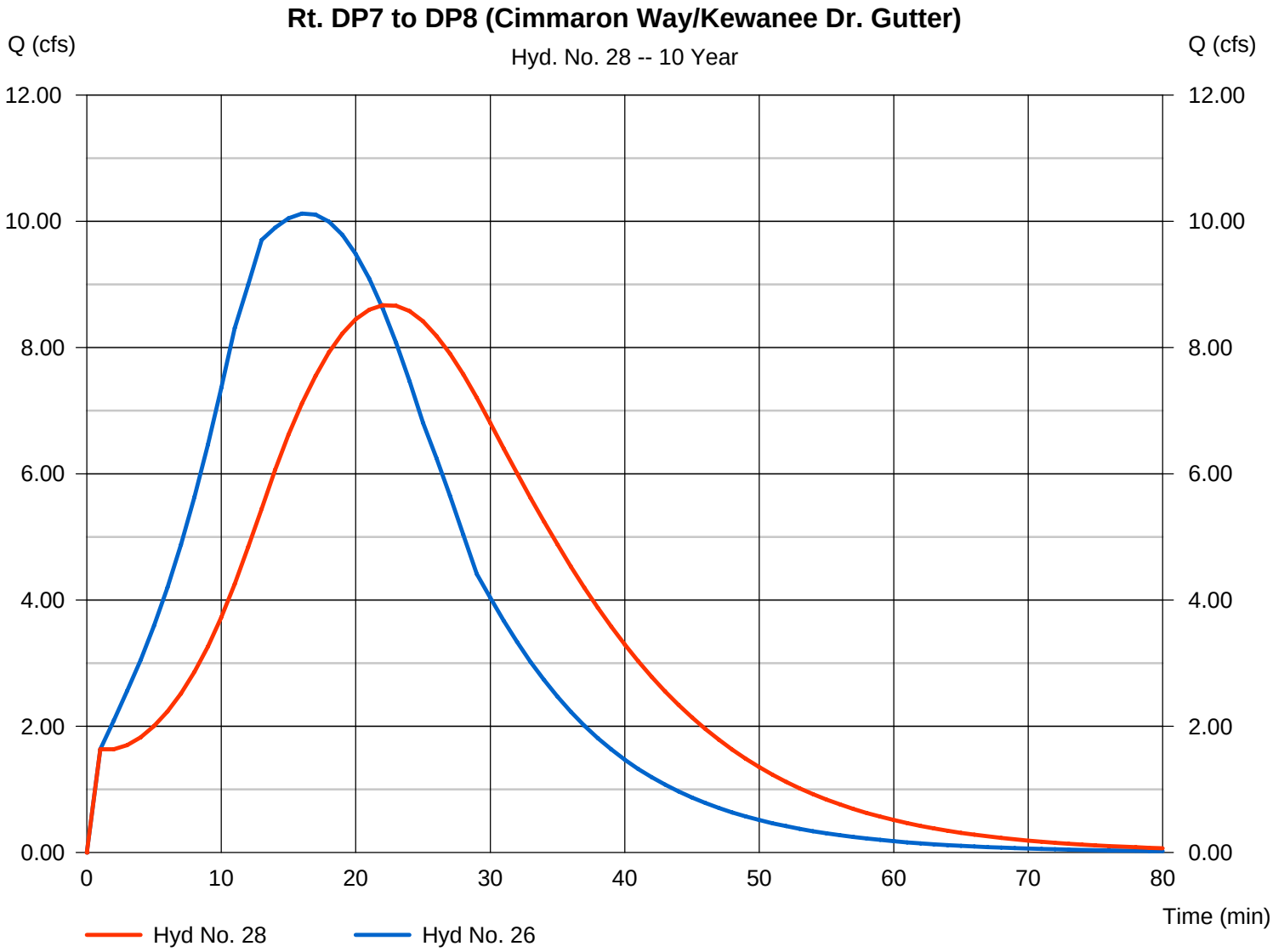
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	8.670 cfs
Storm frequency	=	10 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	15,129 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	3.09 ft/s	Routing coeff.	=	0.1450

Modified Att-Kin routing method used.



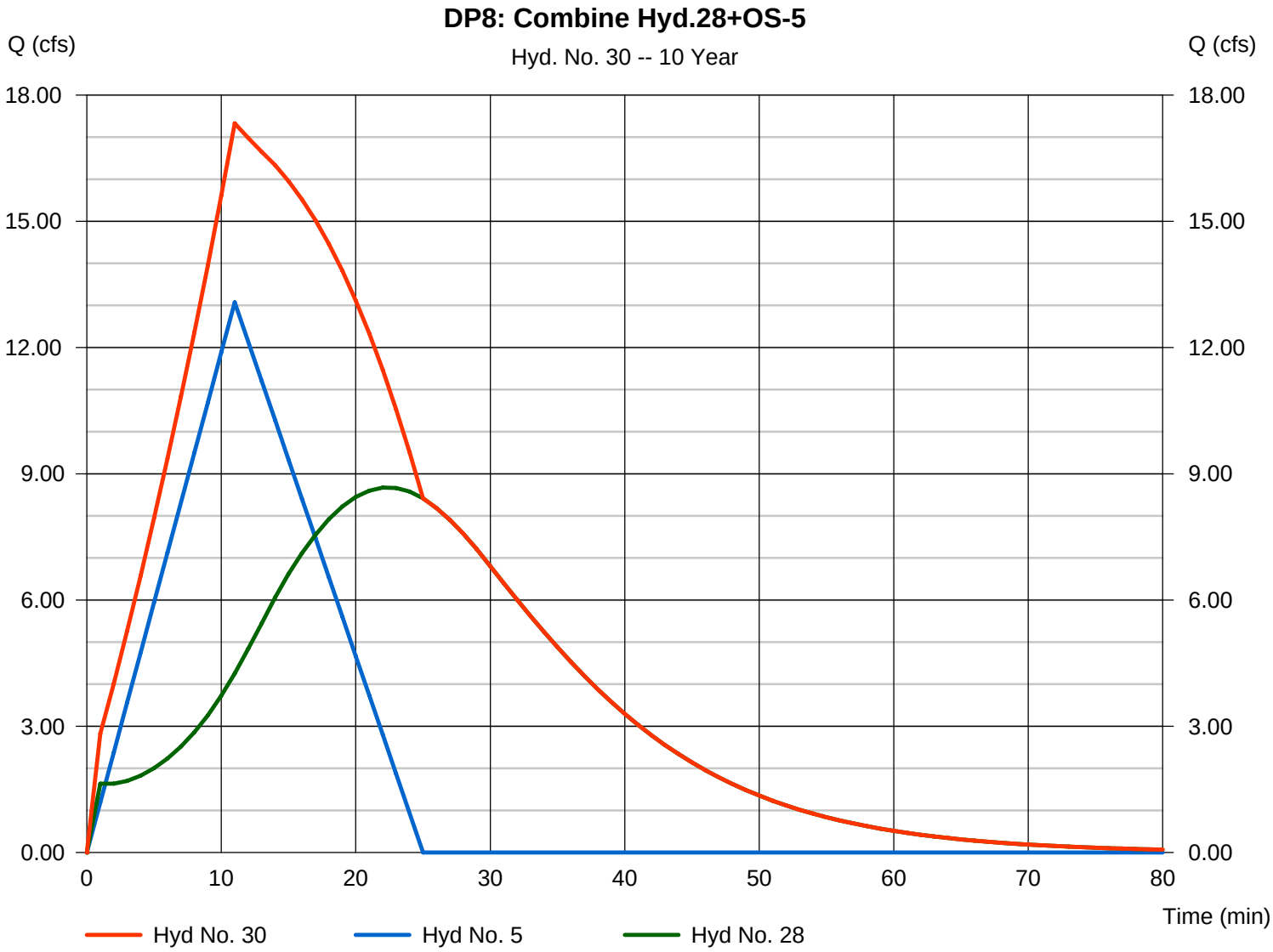
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	17.33 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	24,934 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



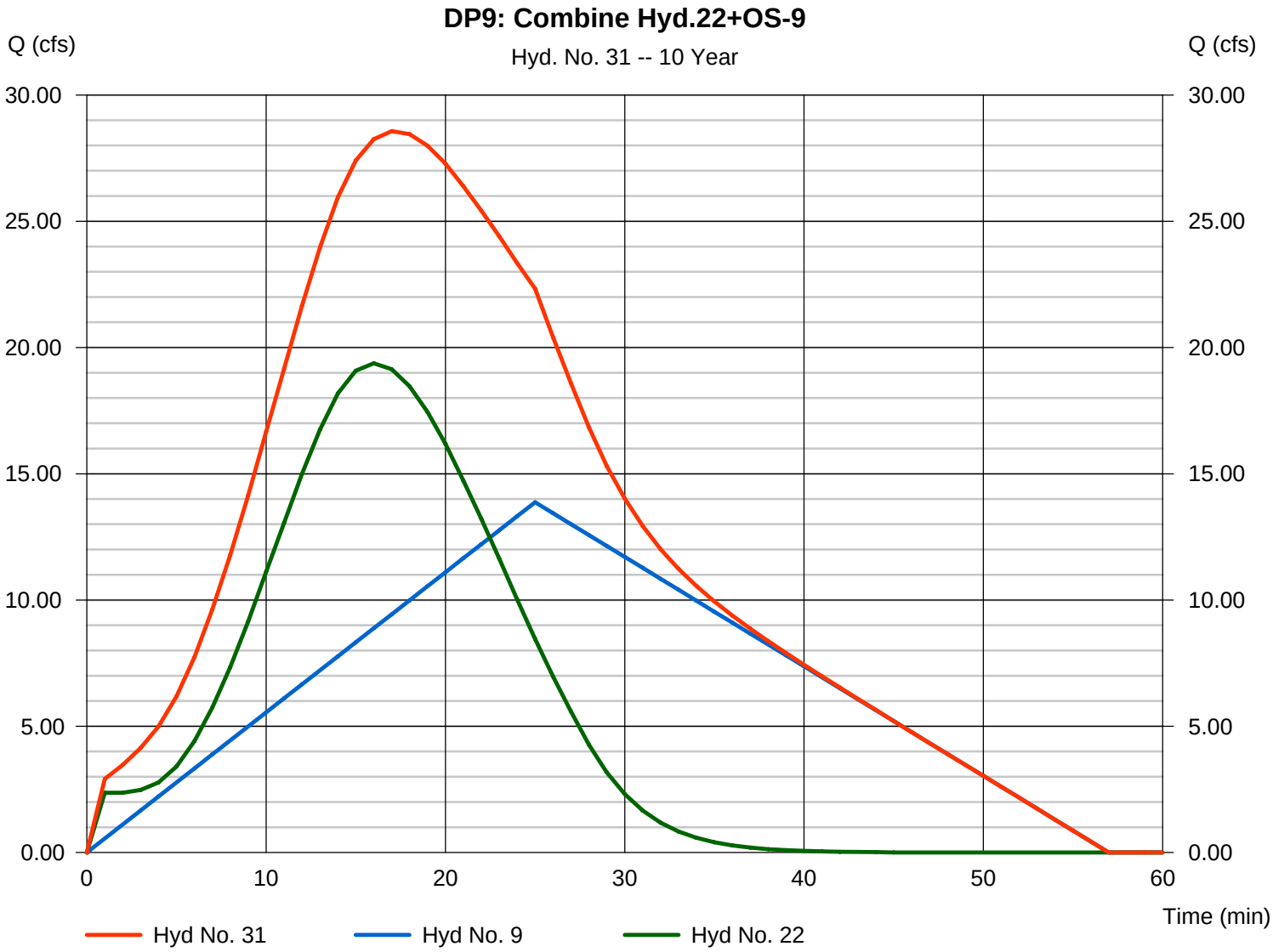
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	=	Combine	Peak discharge	=	28.57 cfs
Storm frequency	=	10 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	42,305 cuft
Inflow hyds.	=	9, 22	Contrib. drain. area	=	9.450 ac



Hydrograph Report

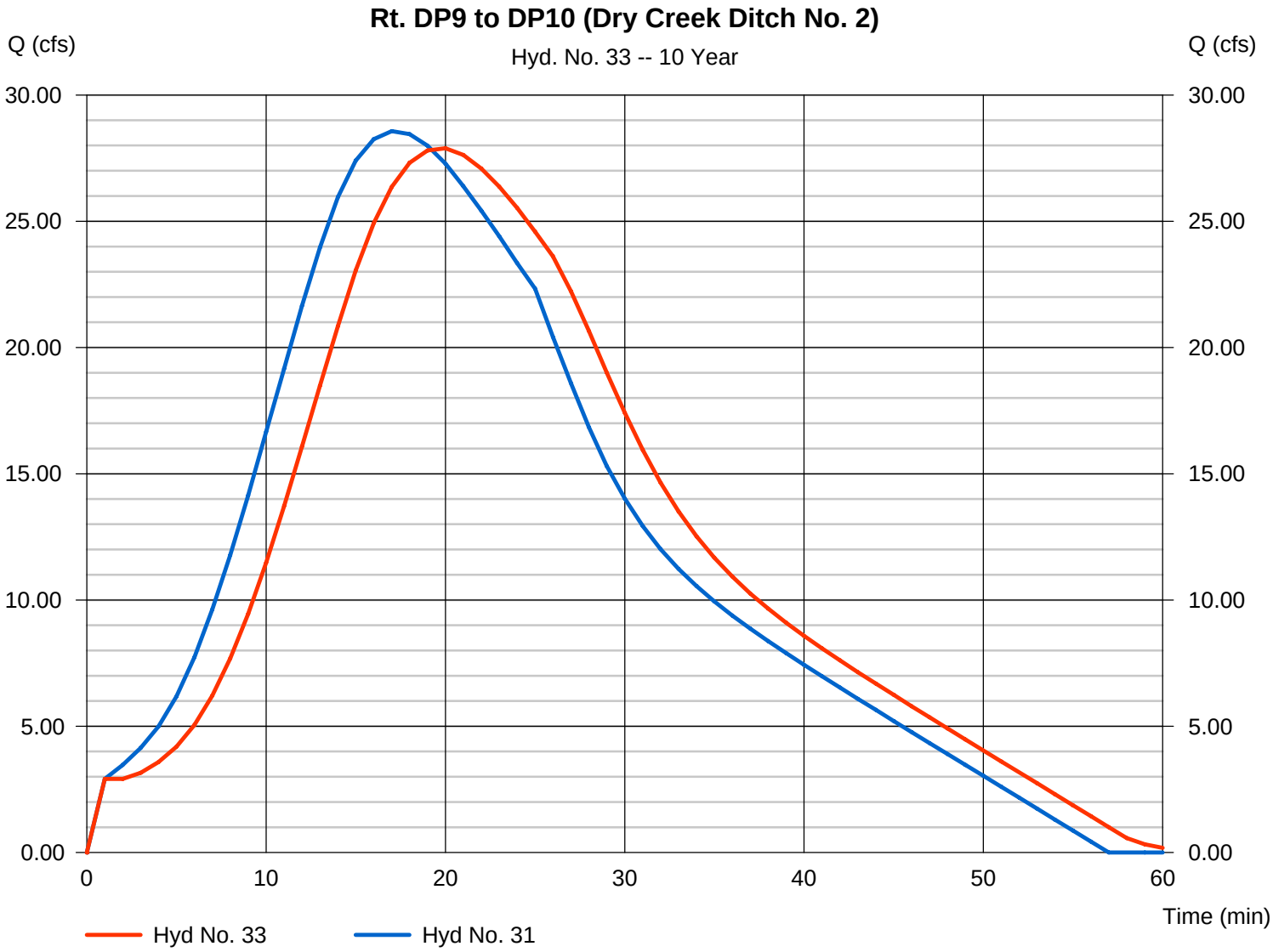
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	27.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	42,709 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.37 ft/s	Routing coeff.	=	0.4318

Modified Att-Kin routing method used.



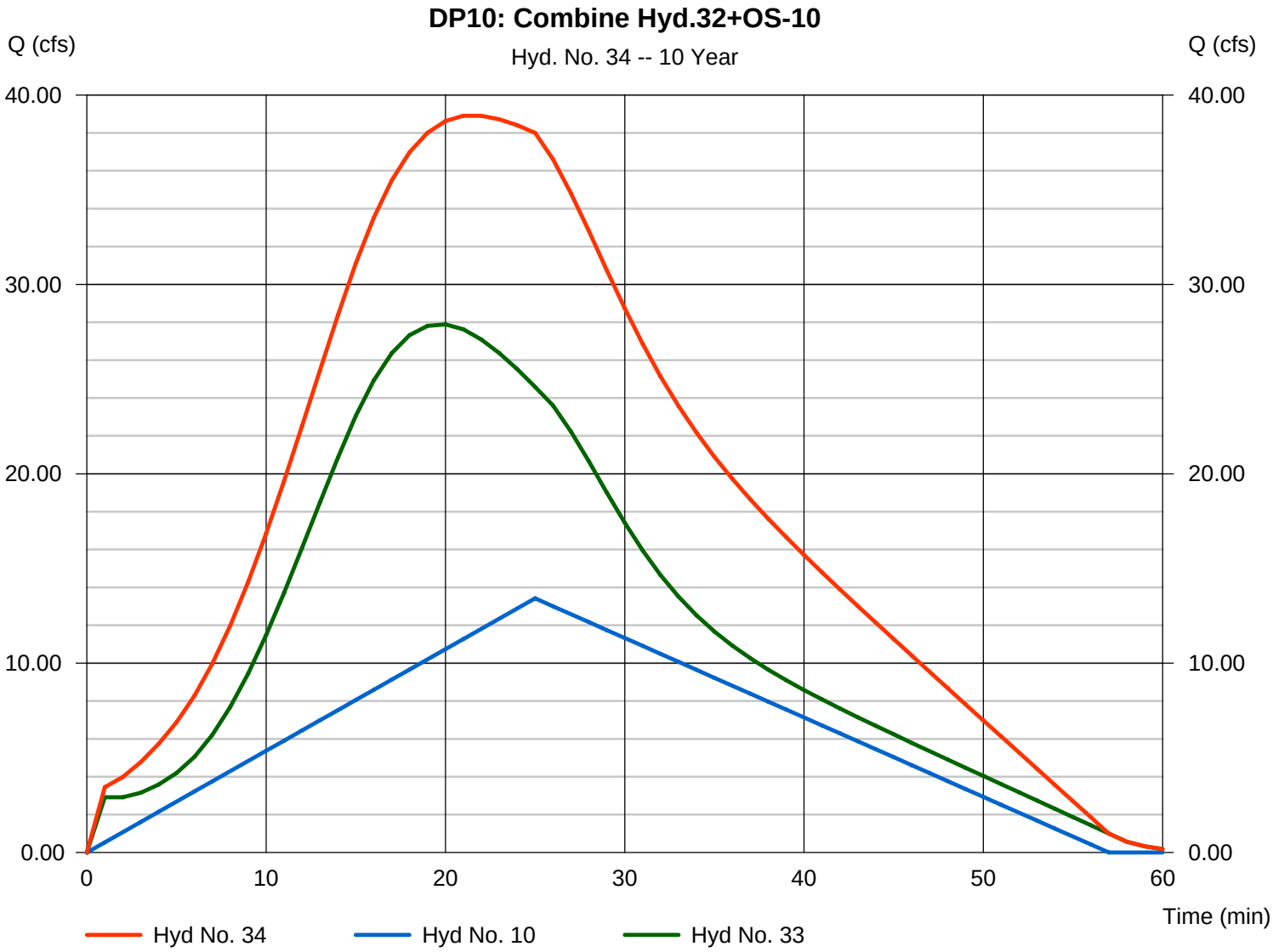
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 34

DP10: Combine Hyd.32+OS-10

Hydrograph type	=	Combine	Peak discharge	=	38.90 cfs
Storm frequency	=	10 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	65,660 cuft
Inflow hyds.	=	10, 33	Contrib. drain. area	=	9.350 ac



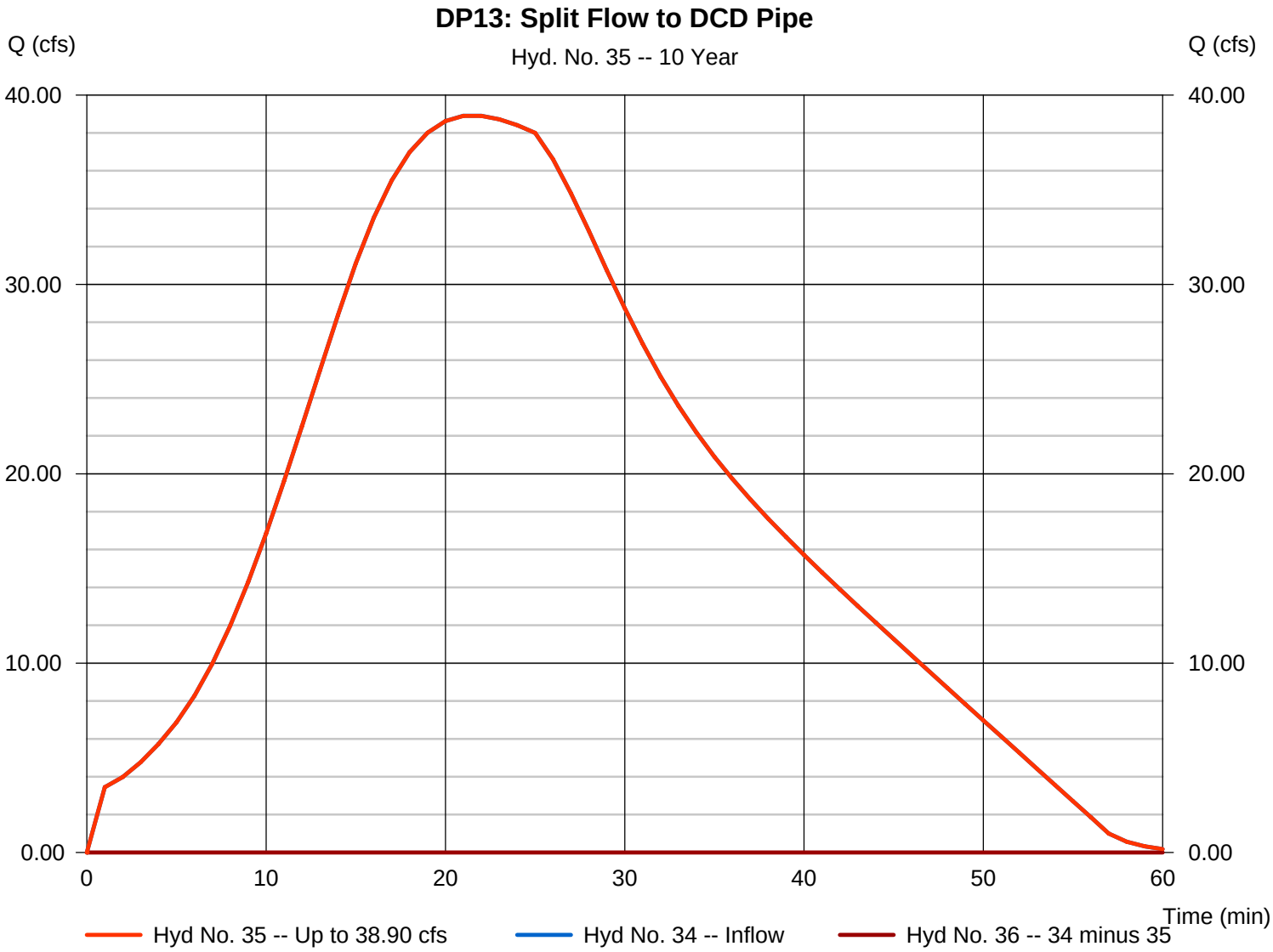
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 35

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	38.90 cfs
Storm frequency	=	10 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	65,660 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.32+OS-10	2nd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	38.90 cfs



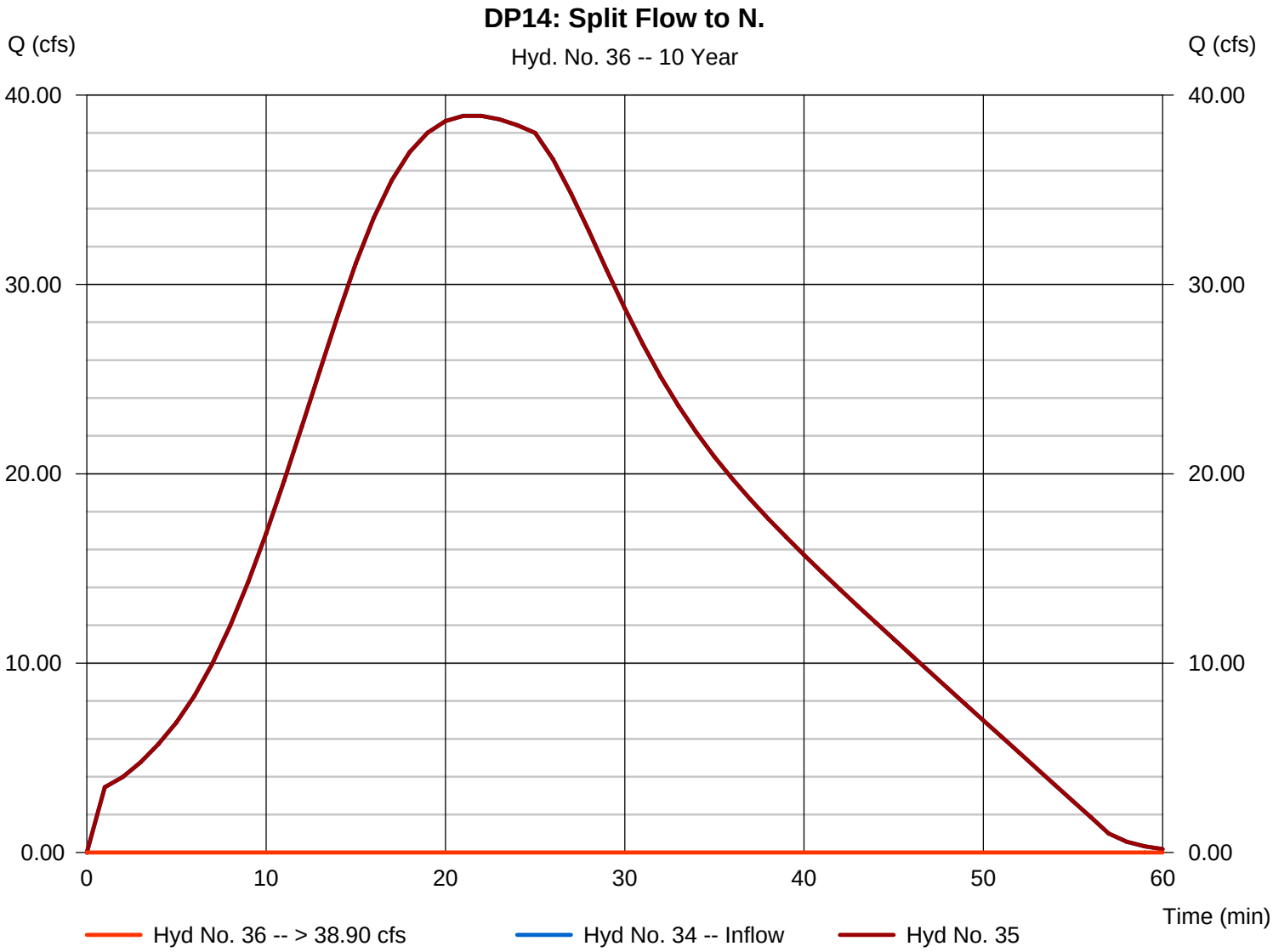
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 36

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	0.004 cfs
Storm frequency	=	10 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.32+OS-10	2nd diverted hyd.	=	35
Diversion method	=	Constant Q	Constant Q	=	38.90 cfs



Hydrograph Report

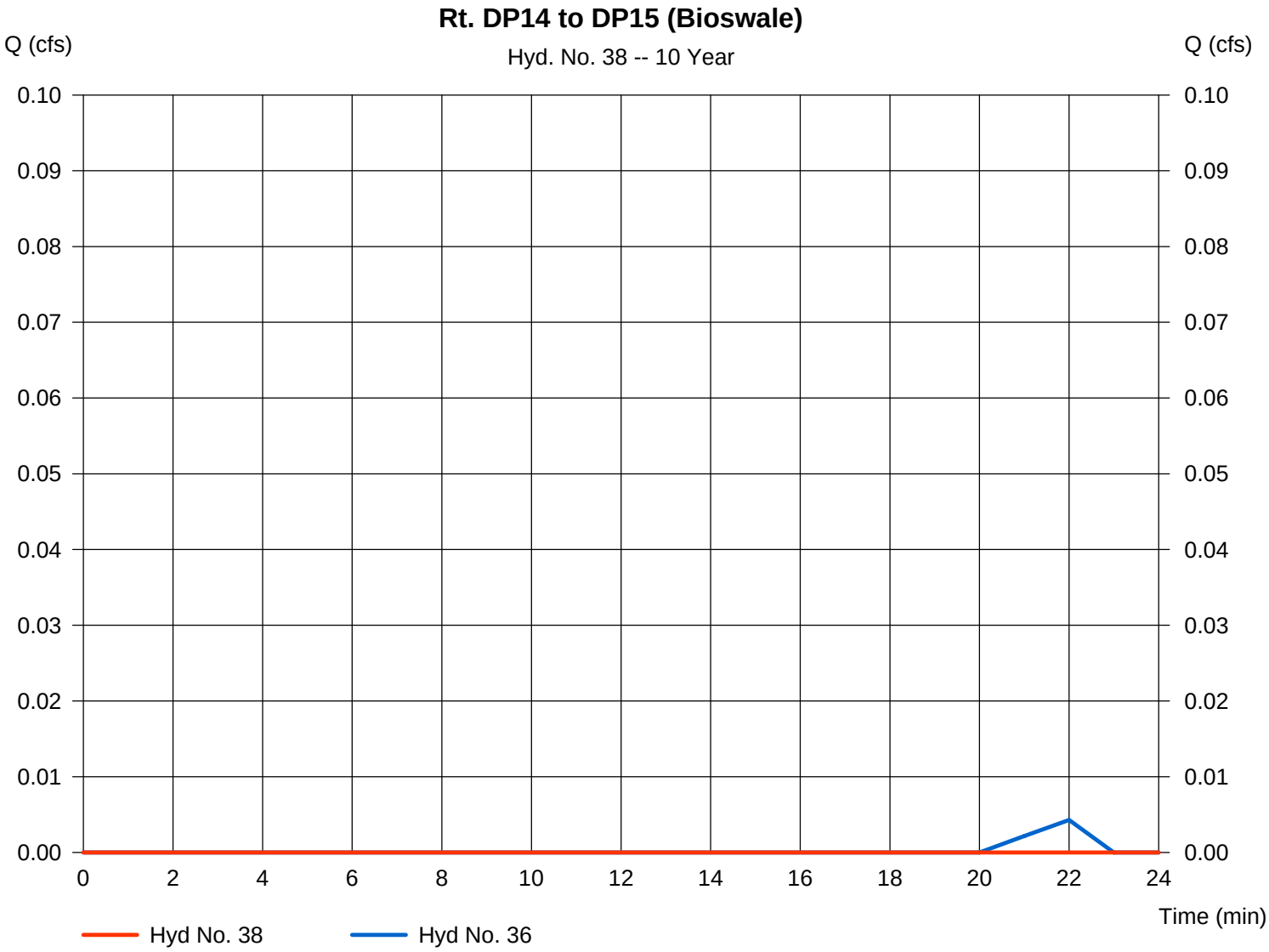
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 38

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	36 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	0.04 ft/s	Routing coeff.	=	0.0057

Modified Att-Kin routing method used.



Hydrograph Report

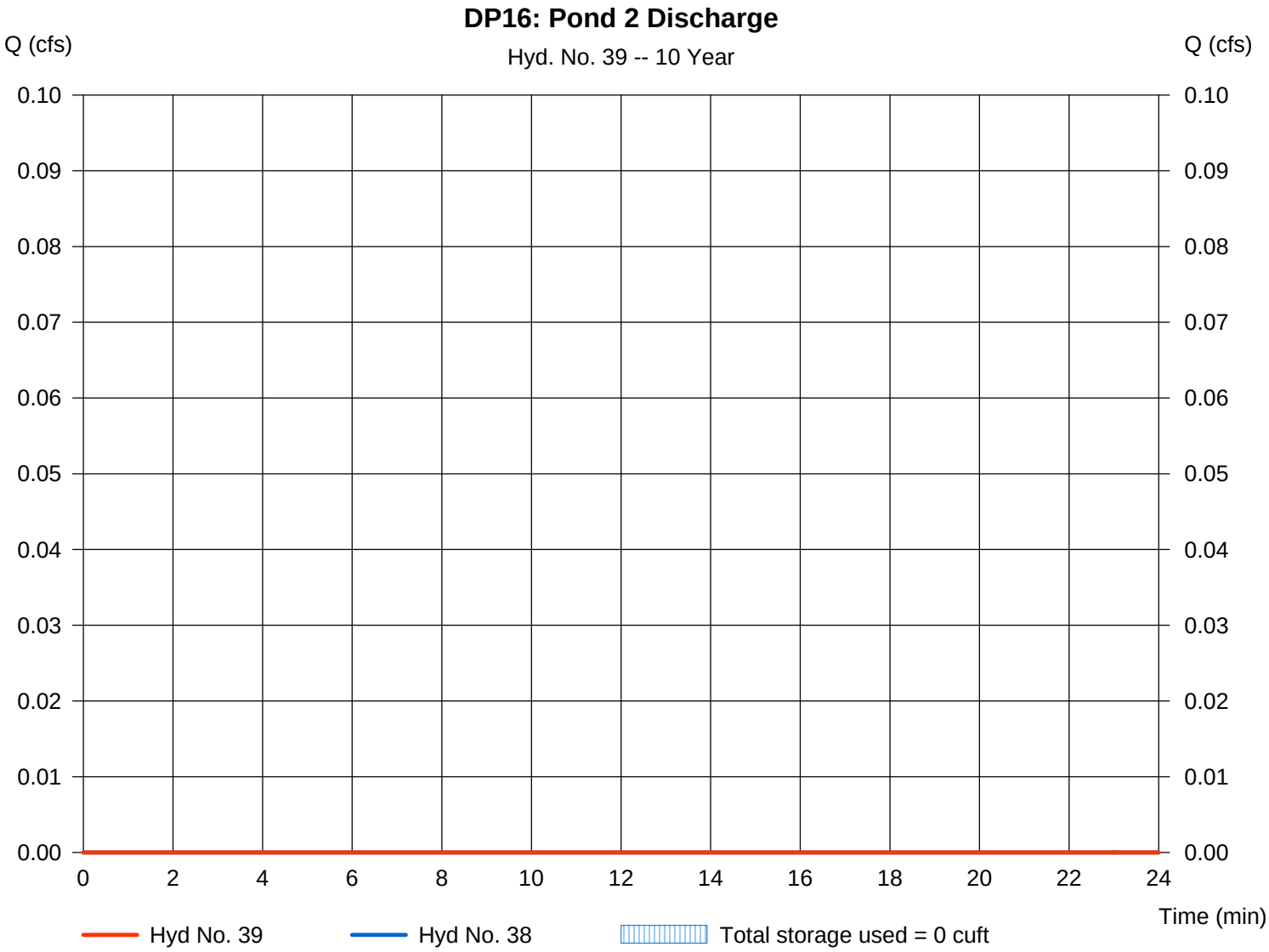
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 39

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5316.00 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	0 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,523	4,384	5,342
3.00	5319.00	20,244	13,368	18,710
4.00	5320.00	31,360	25,598	44,308
4.50	5320.50	36,454	16,936	61,244
5.00	5321.00	42,359	19,683	80,927

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

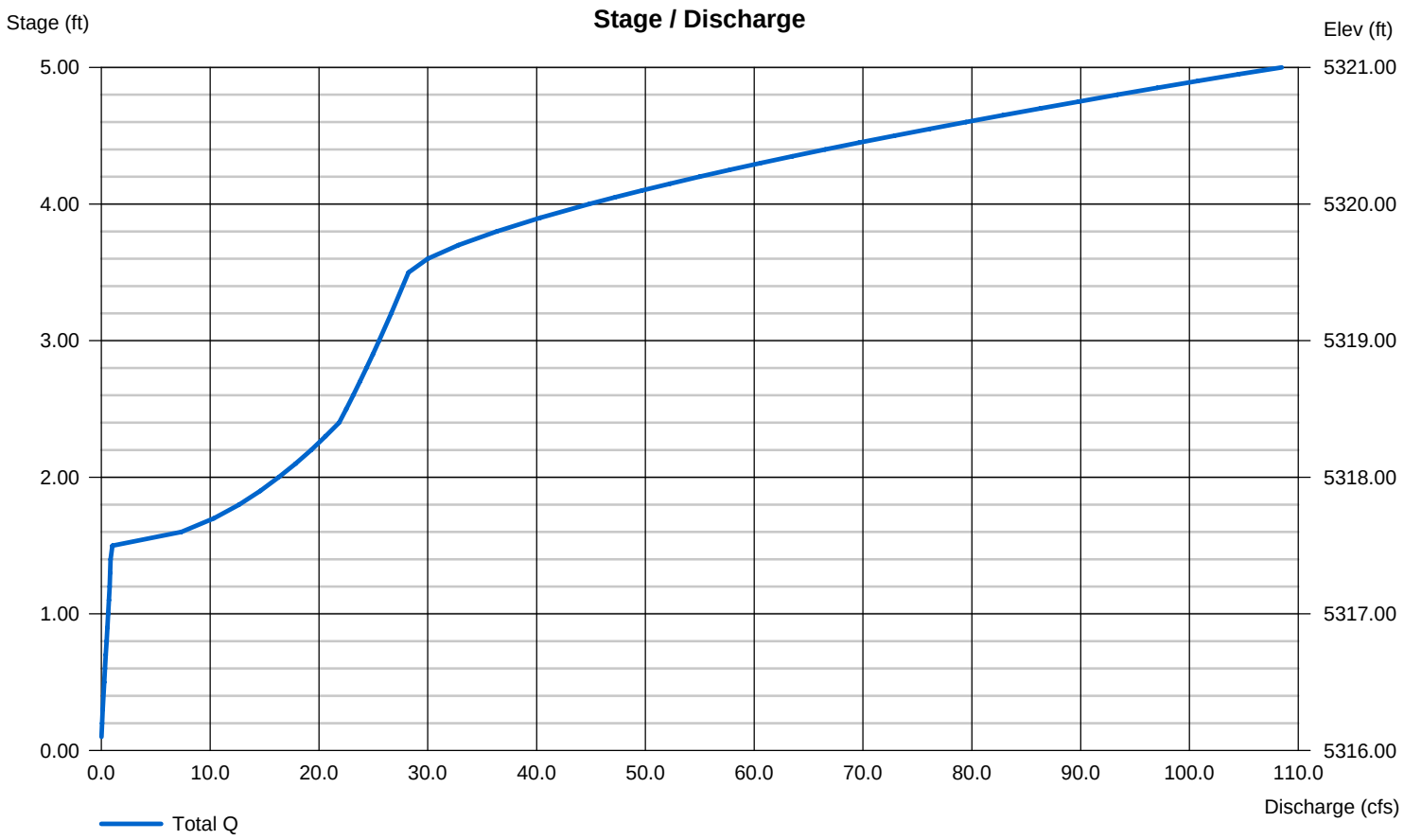
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	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).



Hydrograph Report

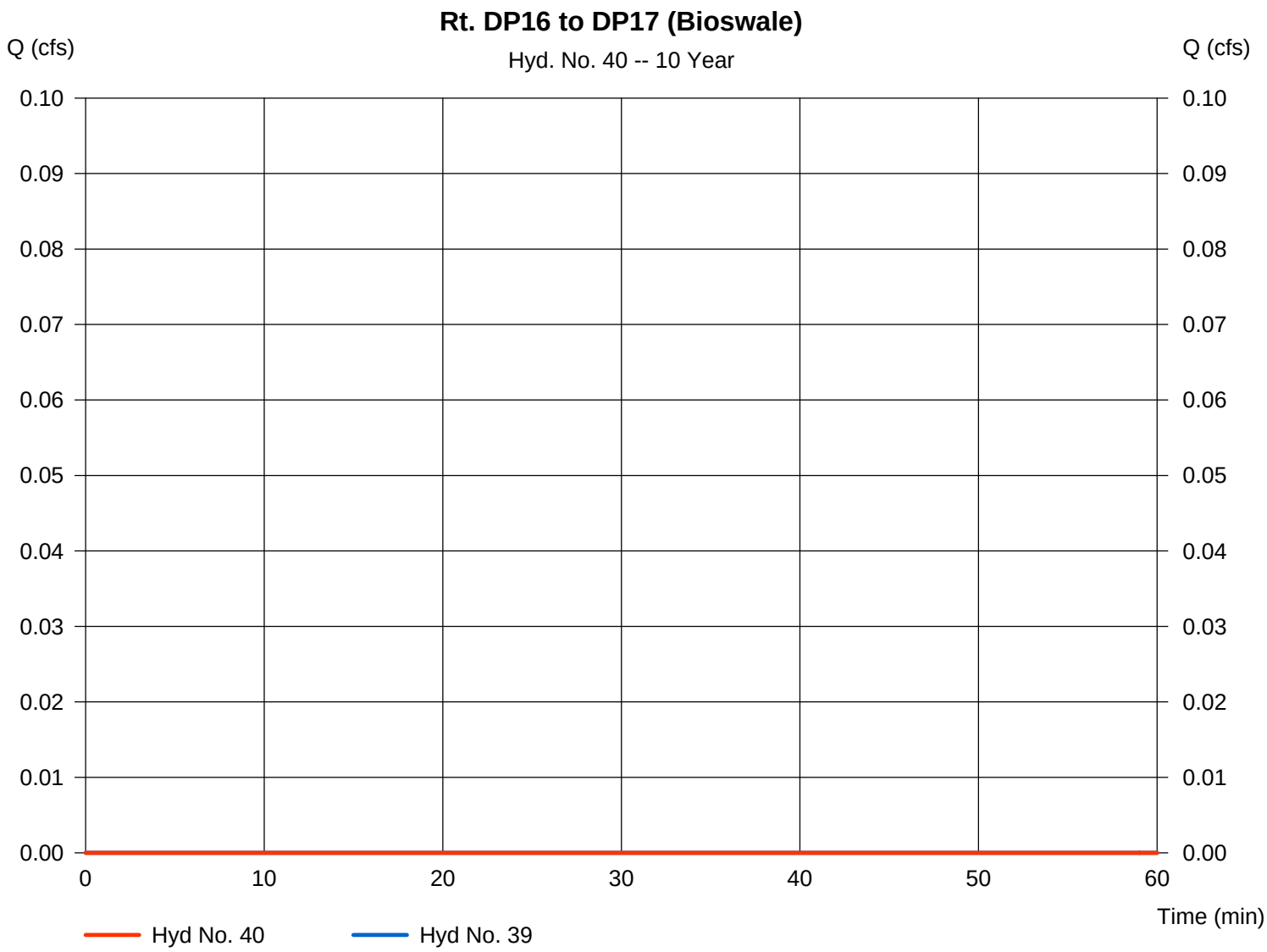
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 40

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	39 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0018

Modified Att-Kin routing method used.



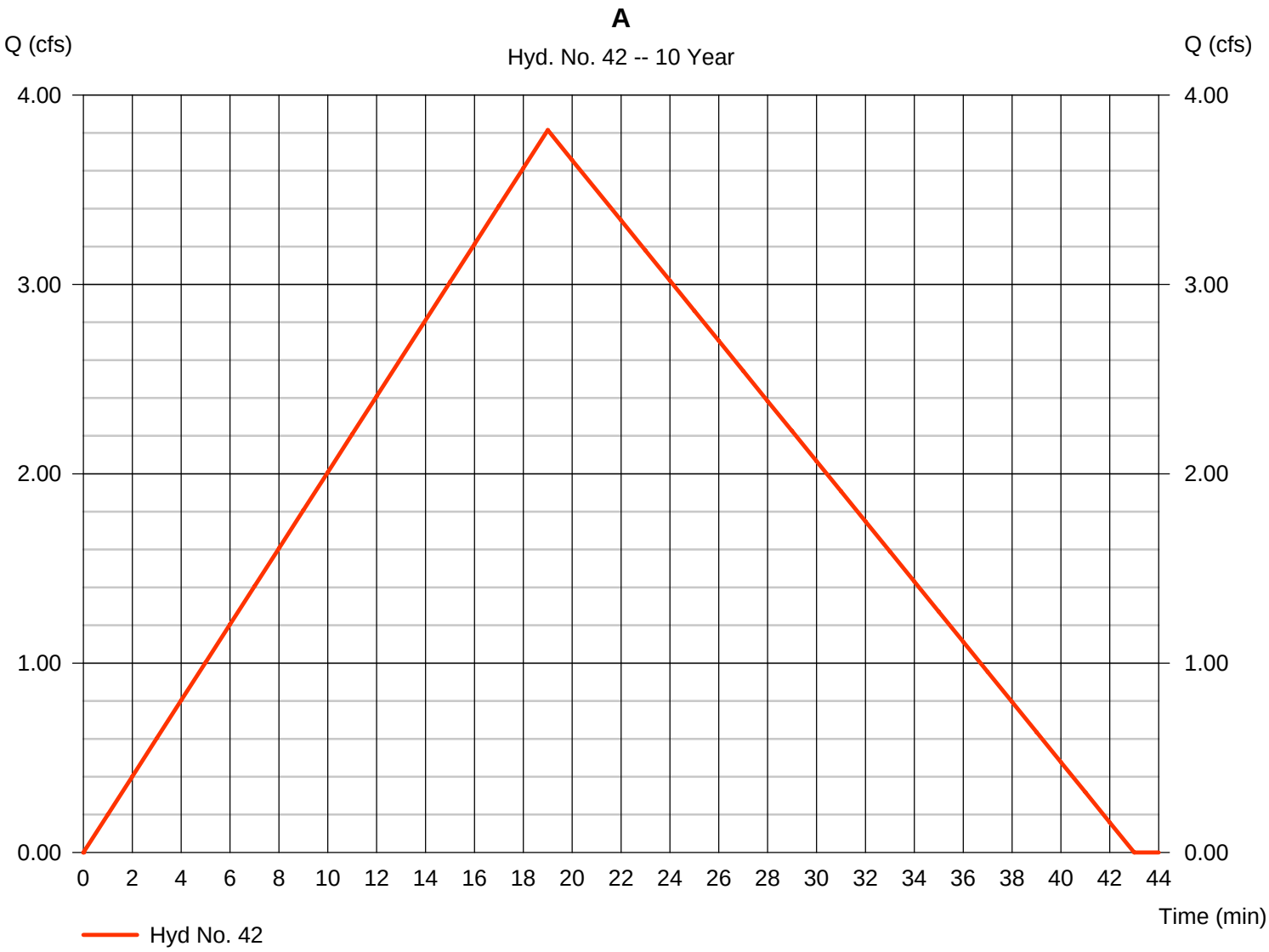
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 42

A

Hydrograph type	=	Rational	Peak discharge	=	3.815 cfs
Storm frequency	=	10 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	5,001 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.42
Intensity	=	3.865 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



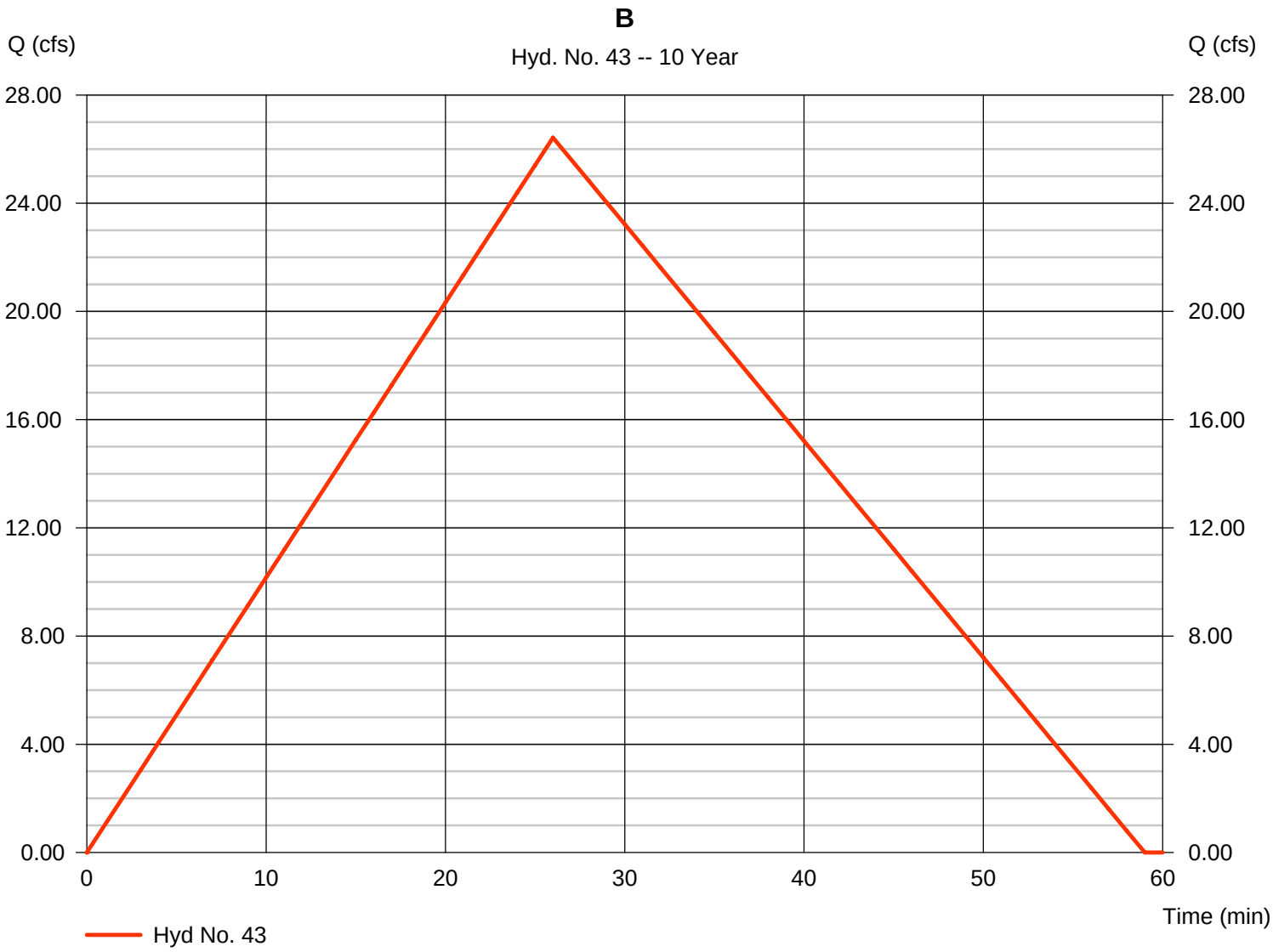
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 43

B

Hydrograph type	=	Rational	Peak discharge	=	26.43 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	47,407 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.5
Intensity	=	3.182 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



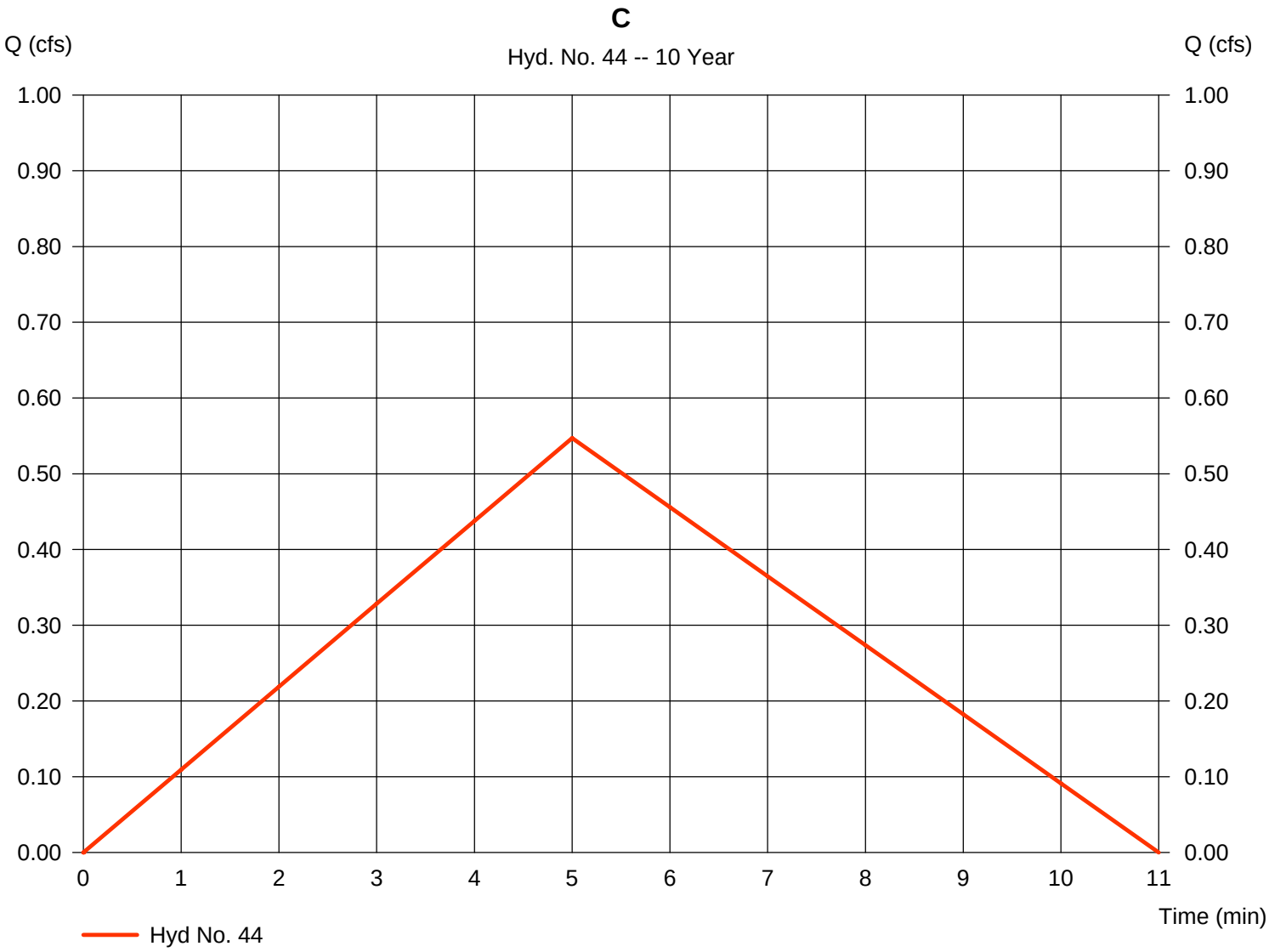
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 44

C

Hydrograph type	=	Rational	Peak discharge	=	0.547 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	189 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.37
Intensity	=	7.394 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 45

DPH2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.297 cfs
Storm frequency	=	10 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	451 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.3
Intensity	=	3.535 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

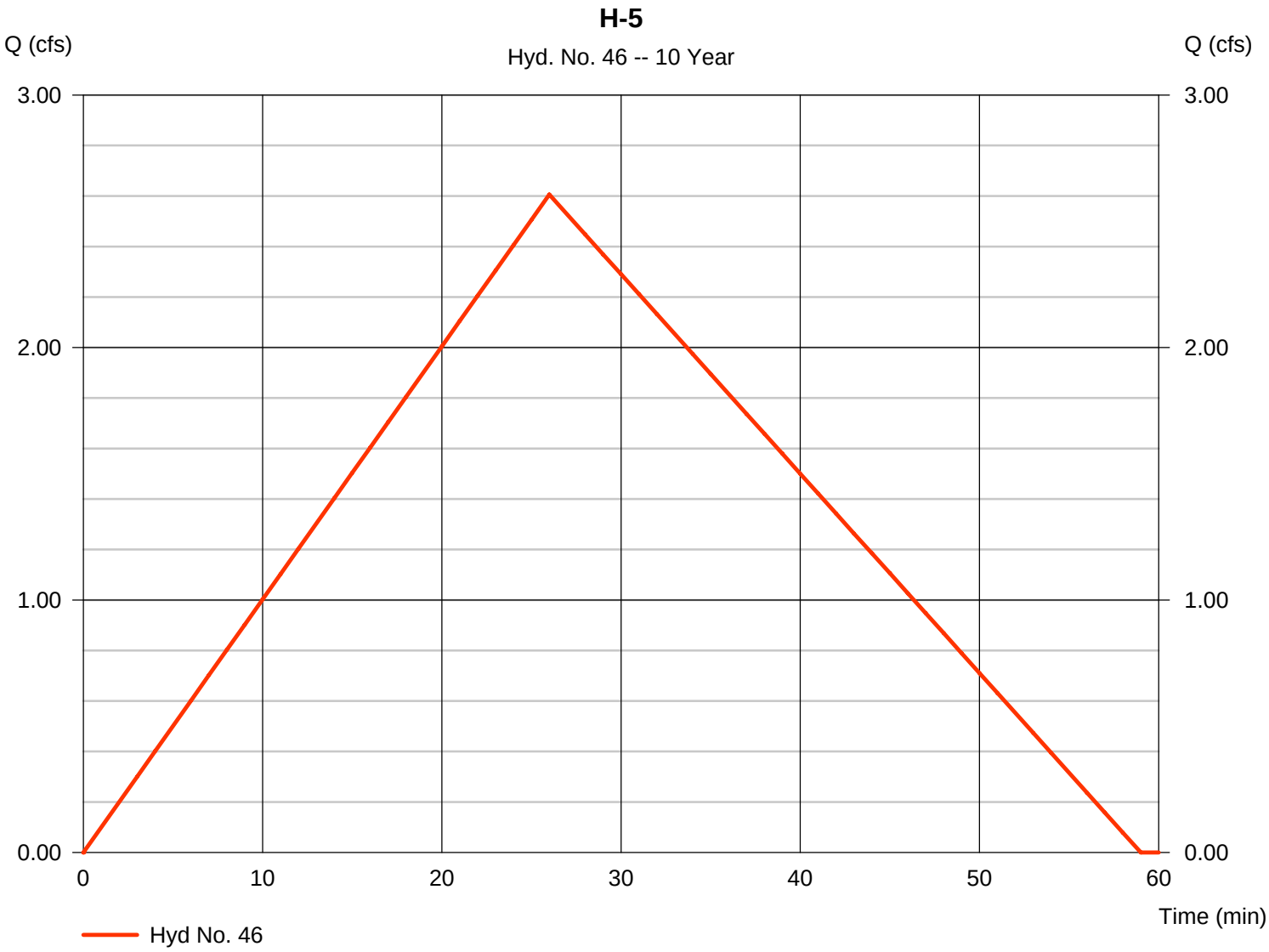
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 46

H-5

Hydrograph type	=	Rational	Peak discharge	=	2.606 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	4,675 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.3
Intensity	=	3.182 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



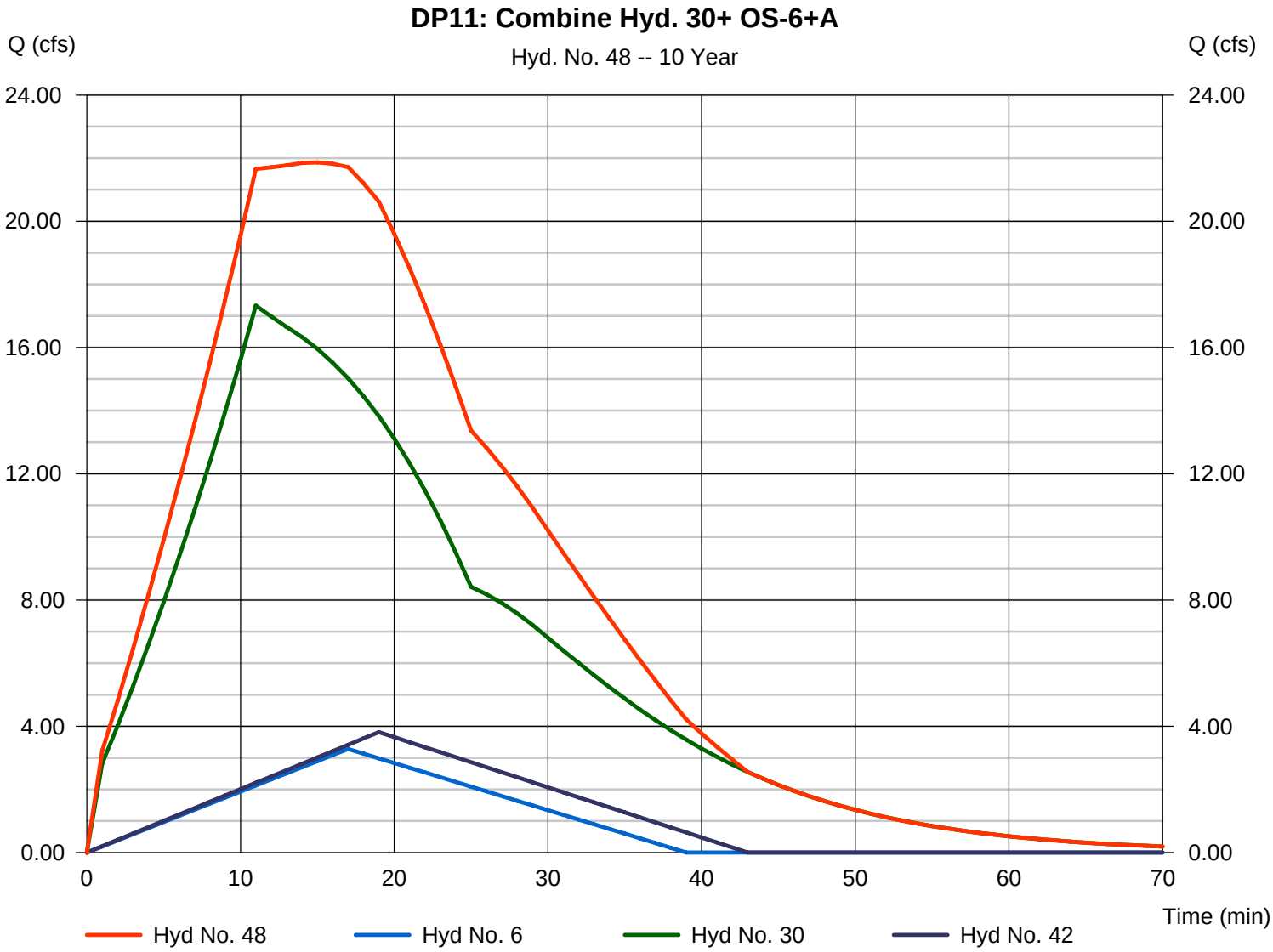
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 48

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	=	Combine	Peak discharge	=	21.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	33,695 cuft
Inflow hyds.	=	6, 30, 42	Contrib. drain. area	=	3.940 ac



Hydrograph Report

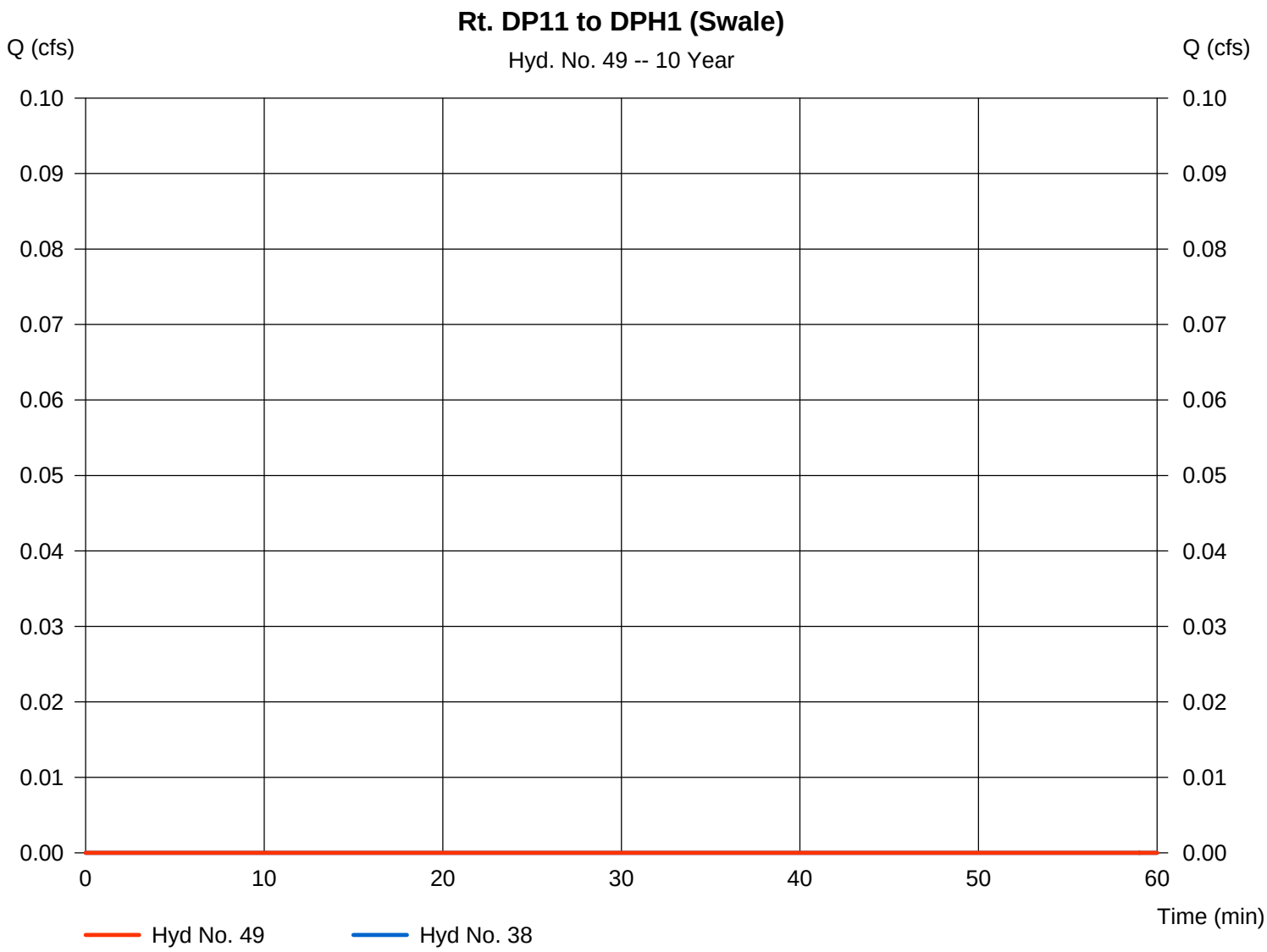
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 49

Rt. DP11 to DPH1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	0.04 ft/s	Routing coeff.	=	0.0134

Modified Att-Kin routing method used.



Hydrograph Report

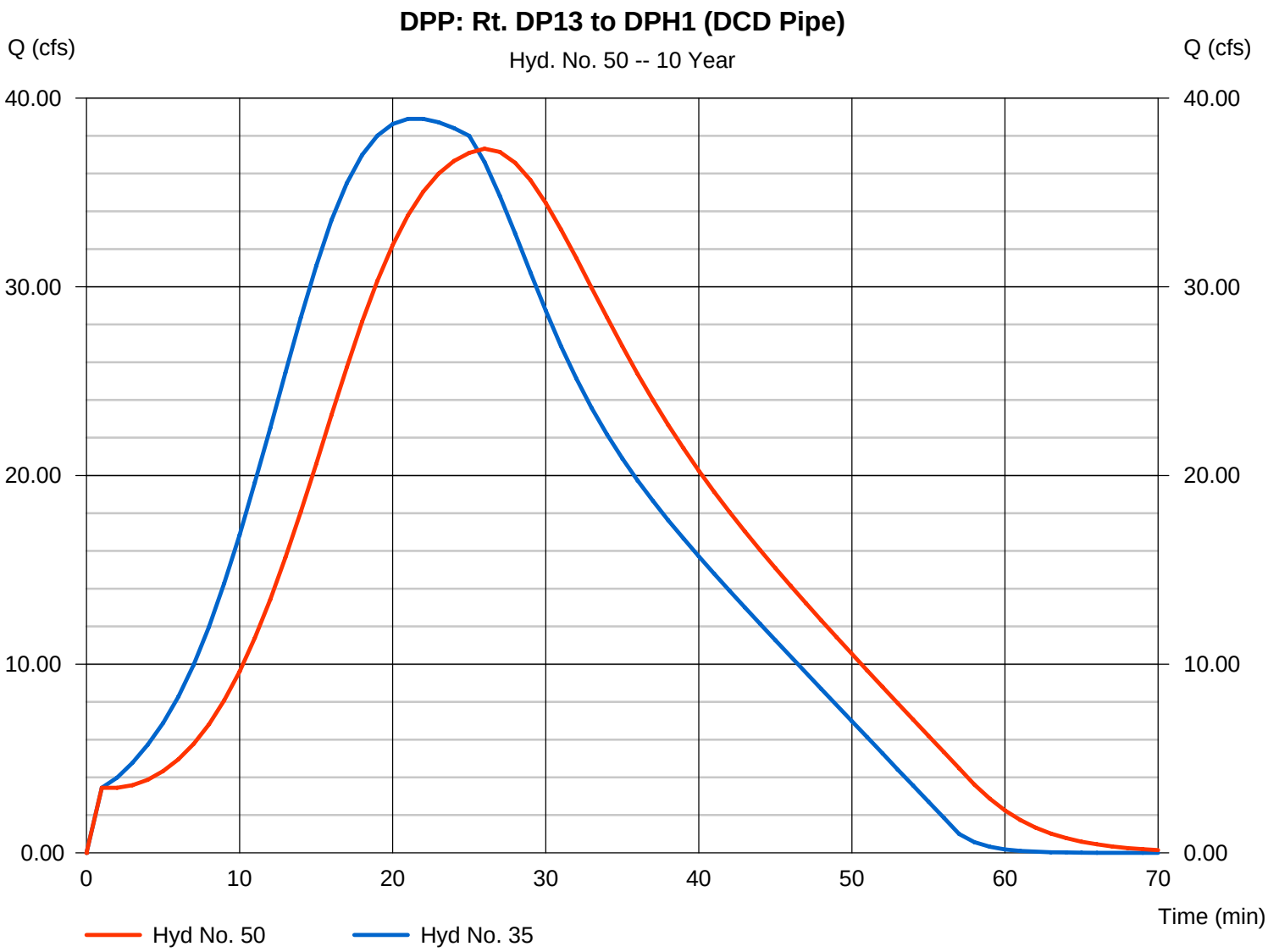
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 50

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	37.32 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	66,499 cuft
Inflow hyd. No.	=	35 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	4.04 ft/s	Routing coeff.	=	0.2462

Modified Att-Kin routing method used.



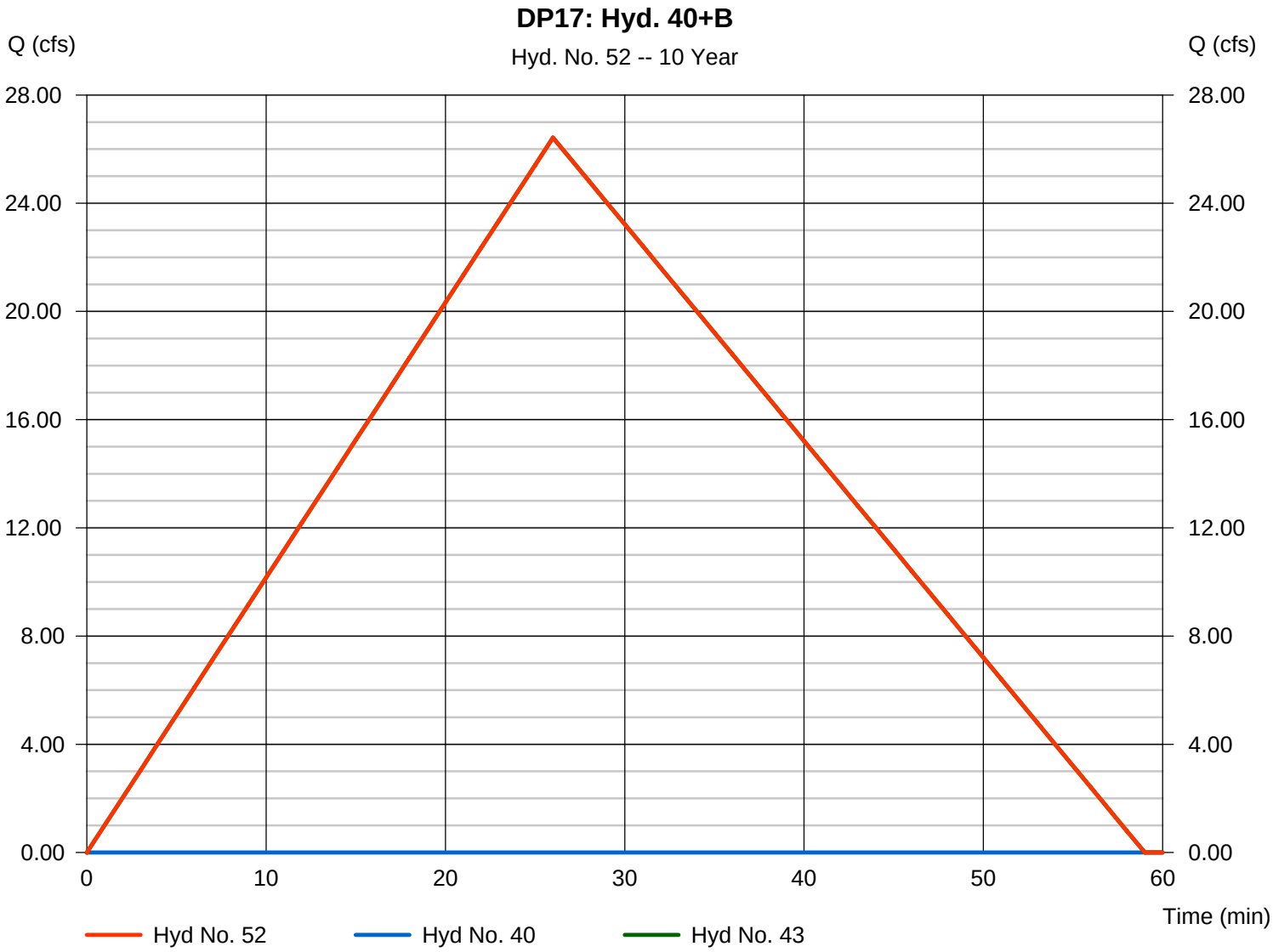
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 52

DP17: Hyd. 40+B

Hydrograph type	=	Combine	Peak discharge	=	26.43 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	46,773 cuft
Inflow hyds.	=	40, 43	Contrib. drain. area	=	16.610 ac



Hydrograph Report

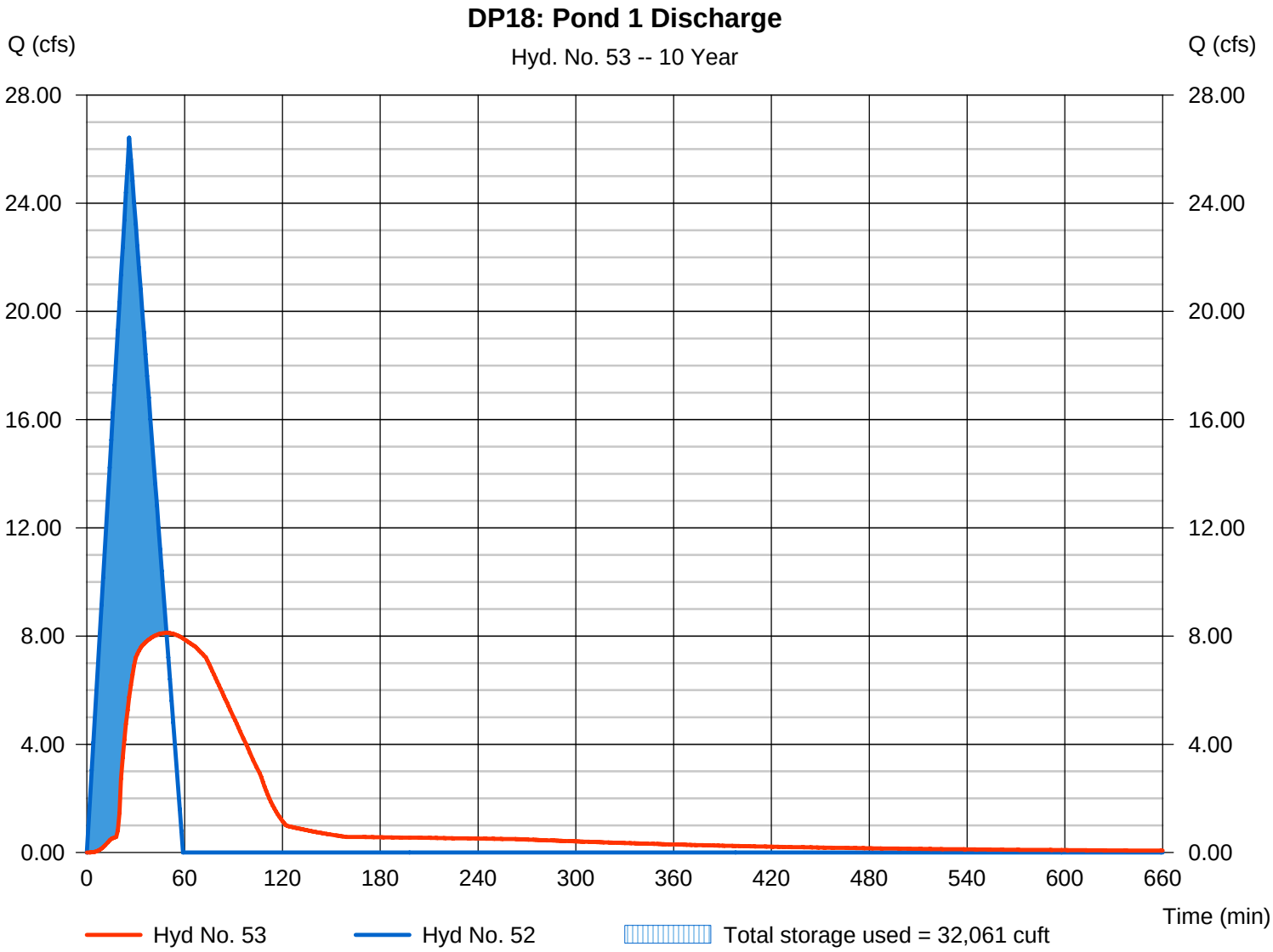
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 53

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	8.130 cfs
Storm frequency	=	10 yrs	Time to peak	=	49 min
Time interval	=	1 min	Hyd. volume	=	46,741 cuft
Inflow hyd. No.	=	52 - DP17: Hyd. 40+B	Max. Elevation	=	5314.30 ft
Reservoir name	=	Detention Pond 1	Max. Storage	=	32,061 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Pond No. 1 - Detention Pond 1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

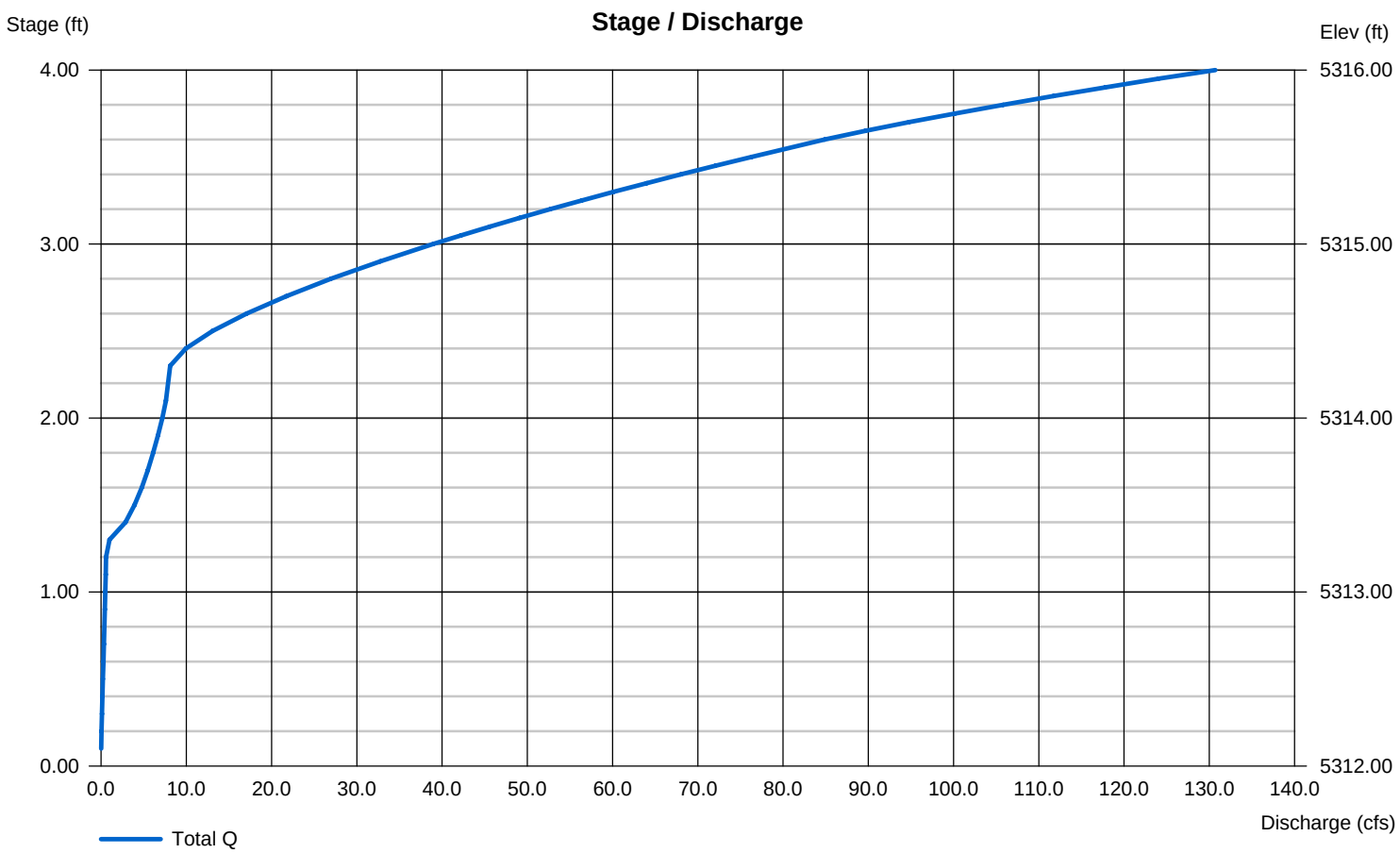
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



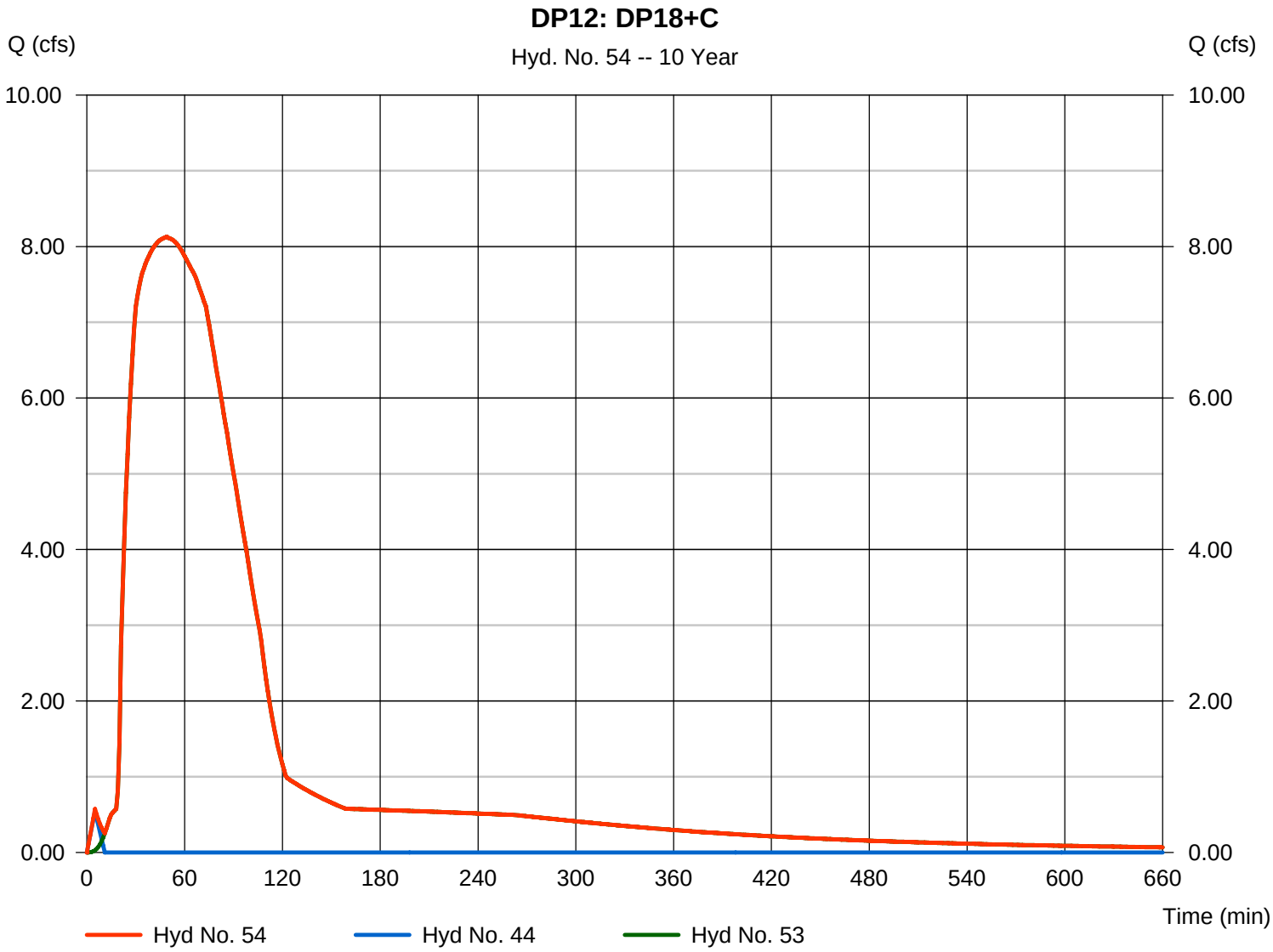
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 54

DP12: DP18+C

Hydrograph type	=	Combine	Peak discharge	=	8.130 cfs
Storm frequency	=	10 yrs	Time to peak	=	49 min
Time interval	=	1 min	Hyd. volume	=	46,922 cuft
Inflow hyds.	=	44, 53	Contrib. drain. area	=	0.200 ac



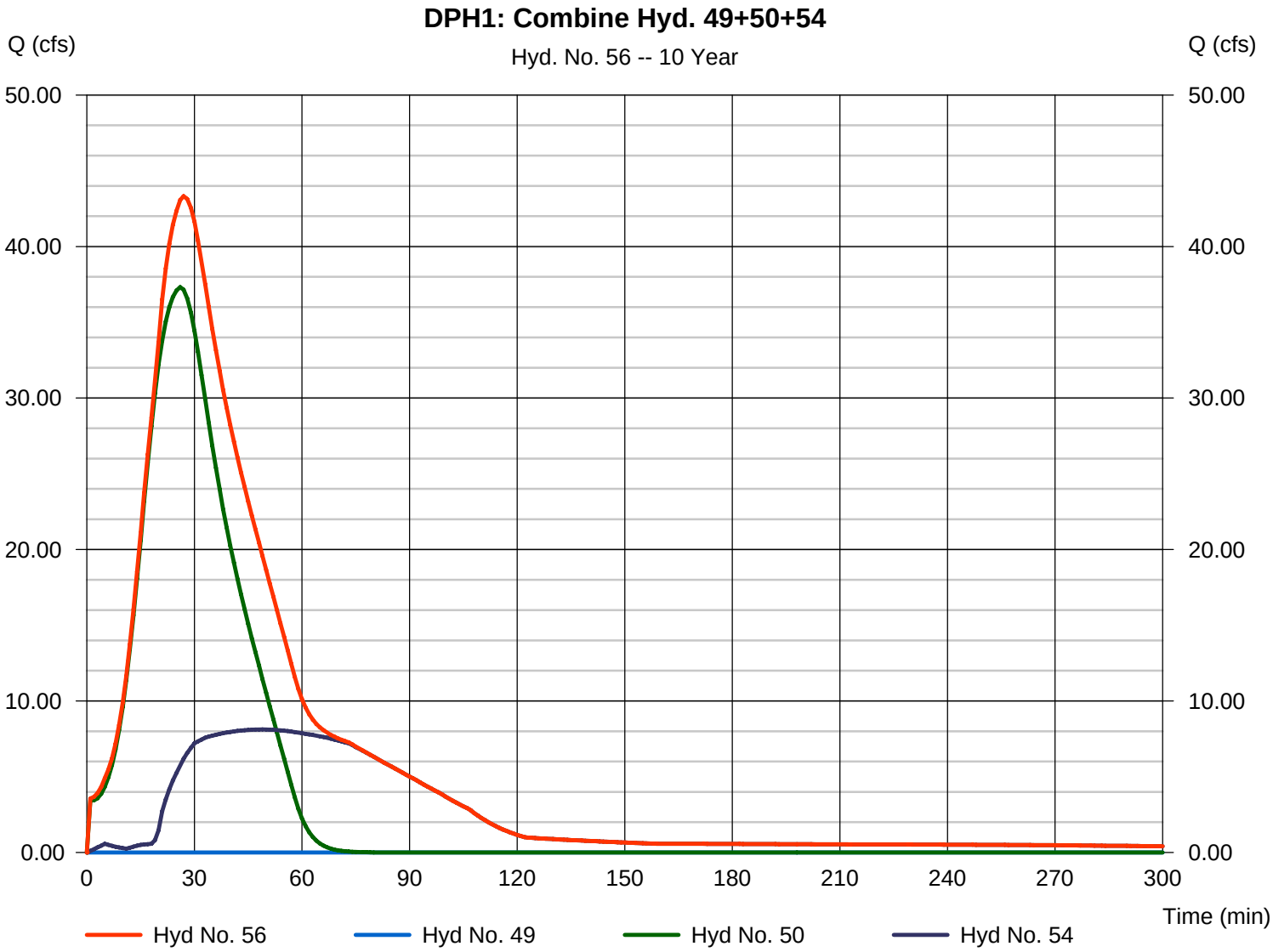
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 56

DPH1: Combine Hyd. 49+50+54

Hydrograph type	=	Combine	Peak discharge	=	43.33 cfs
Storm frequency	=	10 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	113,421 cuft
Inflow hyds.	=	49, 50, 54	Contrib. drain. area	=	0.000 ac



Hydrograph Report

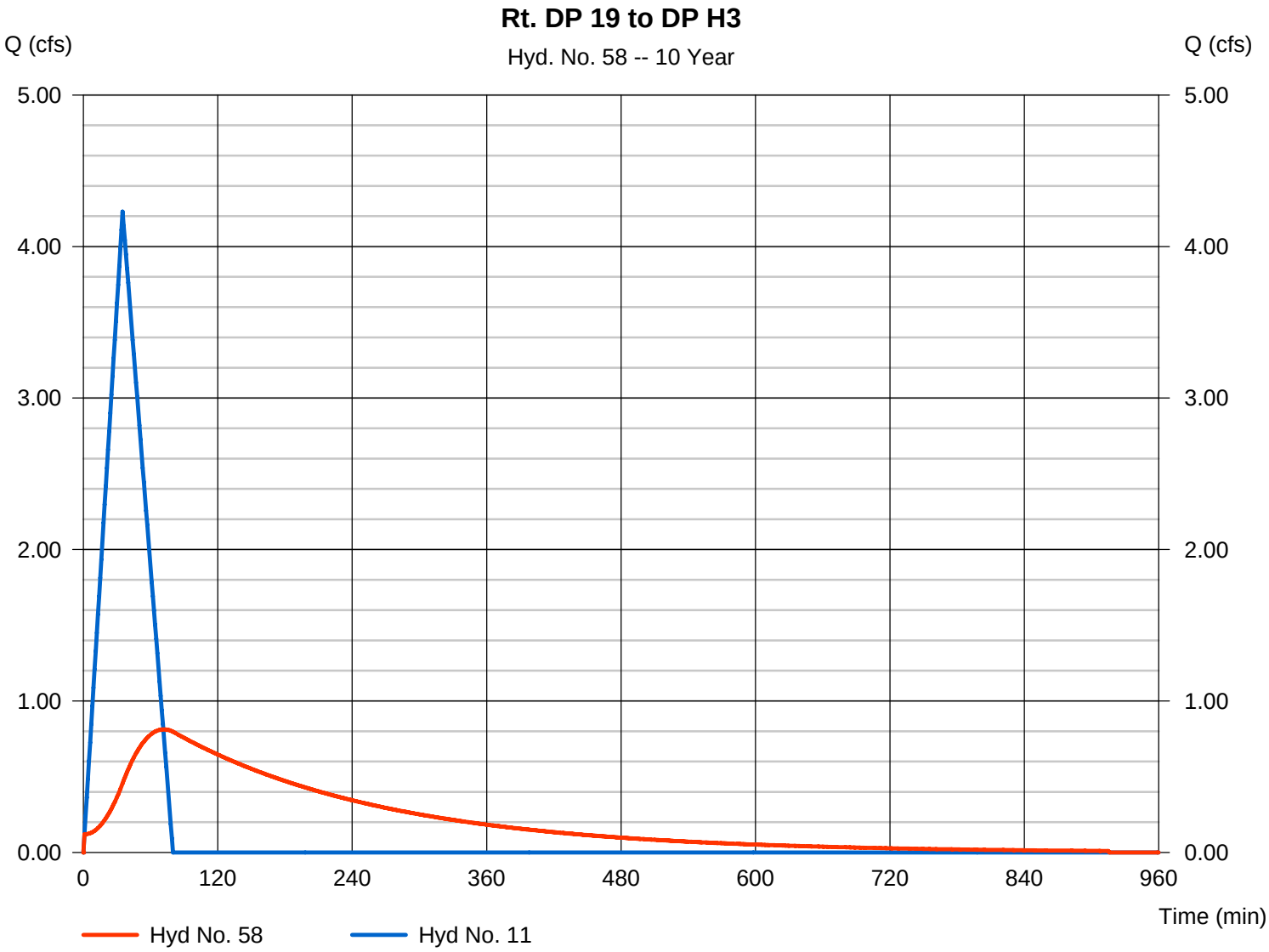
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 58

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	0.813 cfs
Storm frequency	=	10 yrs	Time to peak	=	72 min
Time interval	=	1 min	Hyd. volume	=	11,426 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.05 ft/s	Routing coeff.	=	0.0052

Modified Att-Kin routing method used.



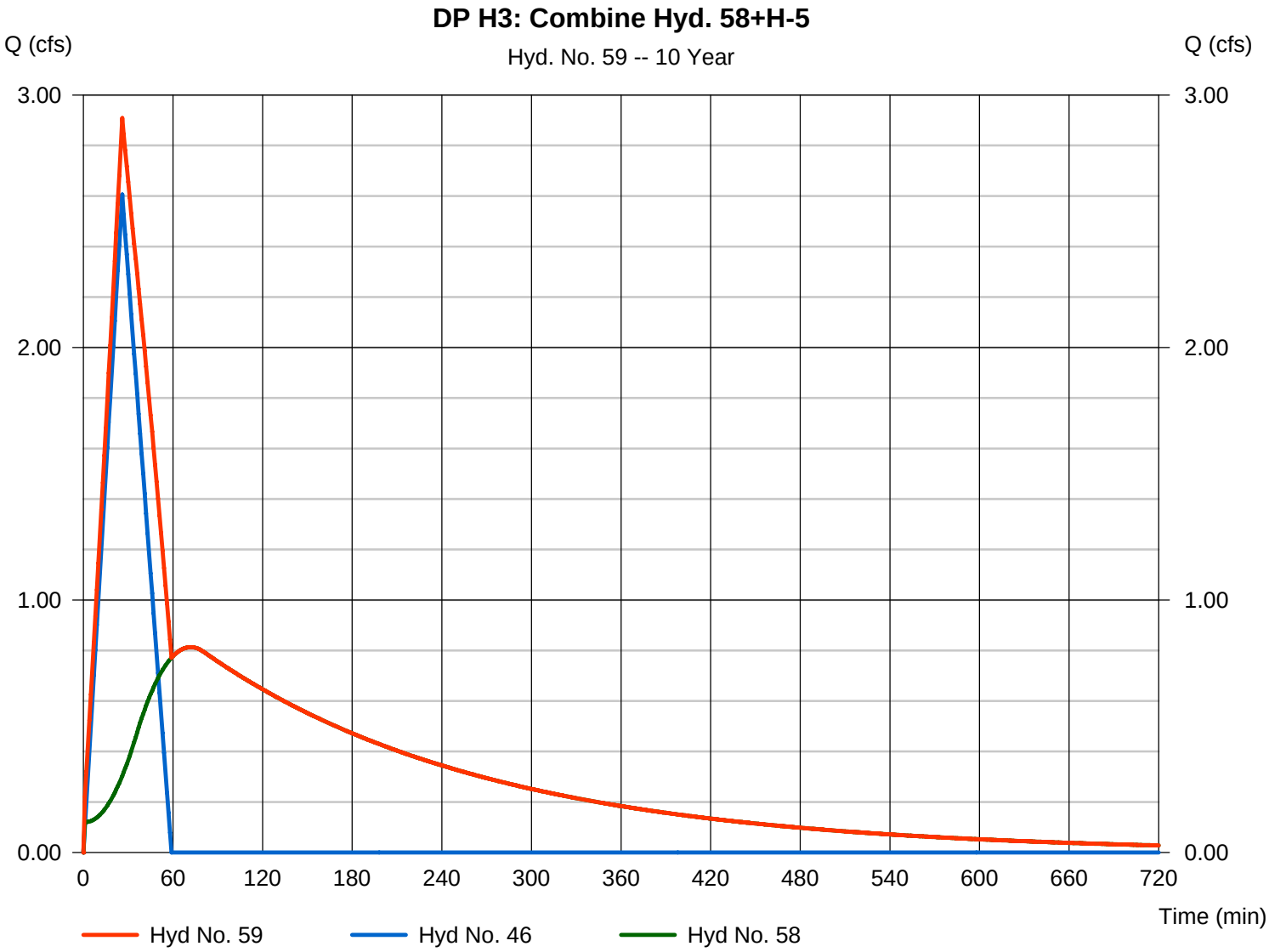
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 16, 2009

Hyd. No. 59

DP H3: Combine Hyd. 58+H-5

Hydrograph type	=	Combine	Peak discharge	=	2.909 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	16,039 cuft
Inflow hyds.	=	46, 58	Contrib. drain. area	=	2.730 ac



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54951-DEV-100YR.gpw

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	49.34	1	11	37,451	------	------	------	OS-1
2	Rational	24.60	1	10	16,975	------	------	------	OS-2
3	Rational	4.250	1	12	3,519	------	------	------	OS-3
4	Rational	15.32	1	13	13,744	------	------	------	OS-4
5	Rational	27.51	1	11	20,884	------	------	------	OS-5
6	Rational	6.755	1	17	7,924	------	------	------	OS-6
7	Rational	7.995	1	11	6,068	------	------	------	OS-7
8	Rational	7.012	1	9	4,355	------	------	------	OS-8
9	Rational	30.26	1	25	52,190	------	------	------	OS-9
10	Rational	29.49	1	25	50,878	------	------	------	OS-10
11	Rational	11.46	1	35	24,066	------	------	------	DP 19: OS-11
13	Reach	49.15	1	12	37,287	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	69.65	1	12	53,524	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	58.26	1	15	55,180	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	65.57	1	14	62,830	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	32.78	1	14	31,415	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	32.78	1	14	31,415	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	20.28	1	22	34,490	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	30.89	1	17	32,083	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	34.72	1	14	53,817	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	17.36	1	14	26,908	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	17.36	1	14	26,908	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	13.94	1	23	28,502	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	34.67	1	11	49,138	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	52.44	1	19	83,819	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	51.83	1	21	84,469	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Combine	78.93	1	25	134,905	10, 33	------	------	DP10: Combine Hyd.33+OS-10
35	Diversion1	71.00	1	19	131,900	34	------	------	DP13: Split Flow to DCD Pipe
36	Diversion2	7.928	1	25	3,005	34	------	------	DP14: Split Flow to N.
38	Reach	4.281	1	27	3,001	36	------	------	Rt. DP14 to DP15 (Bioswale)
39	Reservoir	0.785	1	40	2,997	38	5317.25	2,030	DP16: Pond 2 Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reach	0.581	1	74	2,964	39	------	------	Rt. DP16 to DP17 (Bioswale)
42	Rational	8.766	1	19	11,493	------	------	------	A
43	Rational	39.28	1	40	108,409	------	------	------	B
44	Rational	1.481	1	5	511	------	------	------	C
45	Rational	0.862	1	22	1,309	------	------	------	DP H2: H-4
46	Rational	7.508	1	26	13,469	------	------	------	H-5
48	Combine	44.12	1	11	68,350	6, 30, 42,	------	------	DP11: Combine Hyd. 30+ OS-6+A
49	Reach	4.076	1	29	3,001	38	------	------	Rt. DP11 to DP H1 (Swale)
50	Reach	70.94	1	28	132,844	35	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
53	Combine	39.58	1	40	110,195	40, 43,	------	------	DP17: Combine Hyd. 40+B
54	Reservoir	28.46	1	55	110,163	53	5314.83	47,601	DP18: Pond 1 Discharge
55	Combine	28.46	1	55	110,652	44, 54	------	------	DP12: DP18 + C
57	Combine	81.56	1	29	246,497	49, 50, 55,	------	------	DPH1: Combine Hyd. 49+DP P+ DP1
59	Reach	1.321	1	66	30,687	11	------	------	Rt. DP 19 to DP H3
60	Combine	8.112	1	26	43,976	46, 59	------	------	DP H3: Combine Hyd. 59+H-5

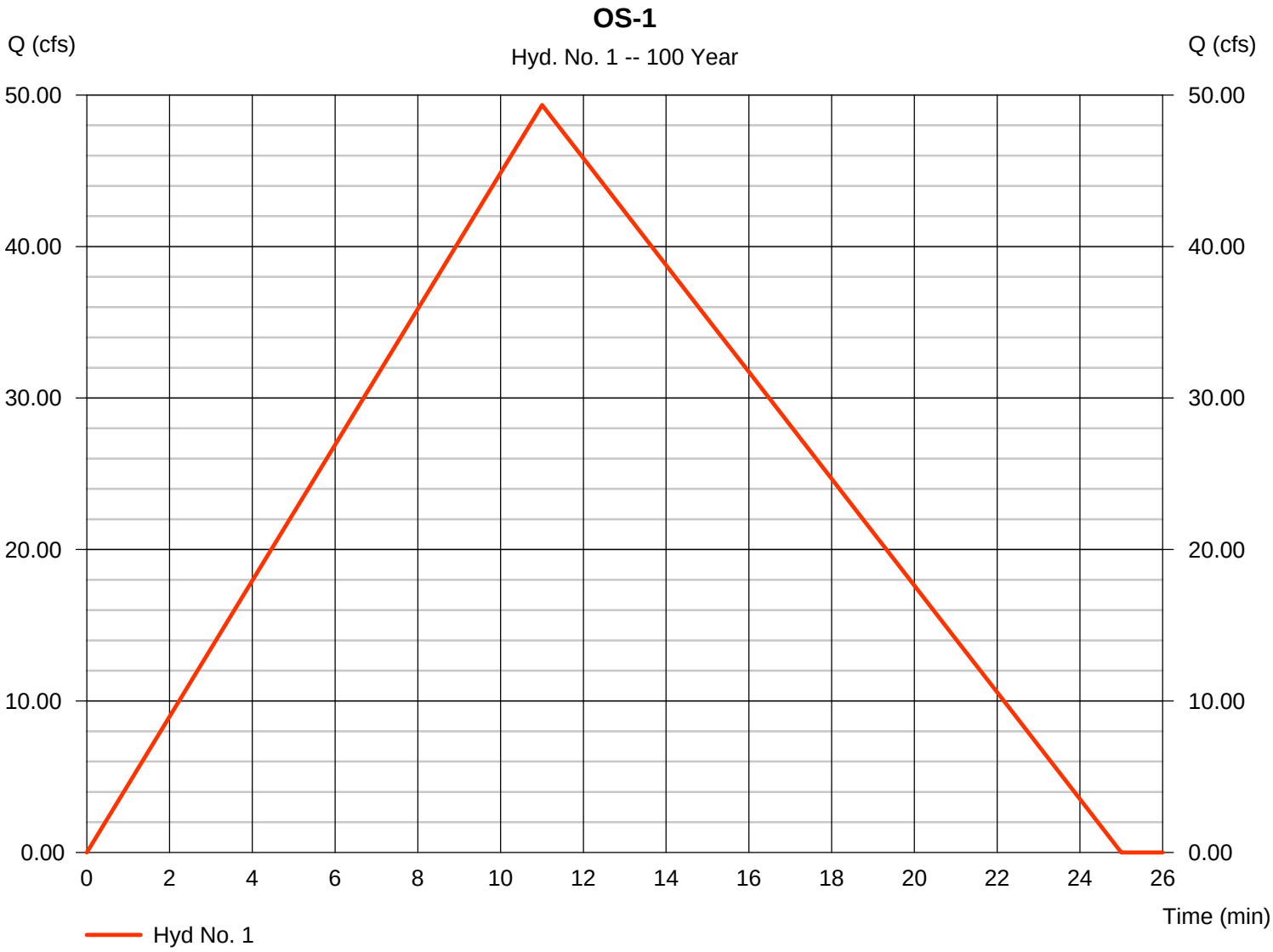
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	49.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	37,451 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.8
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



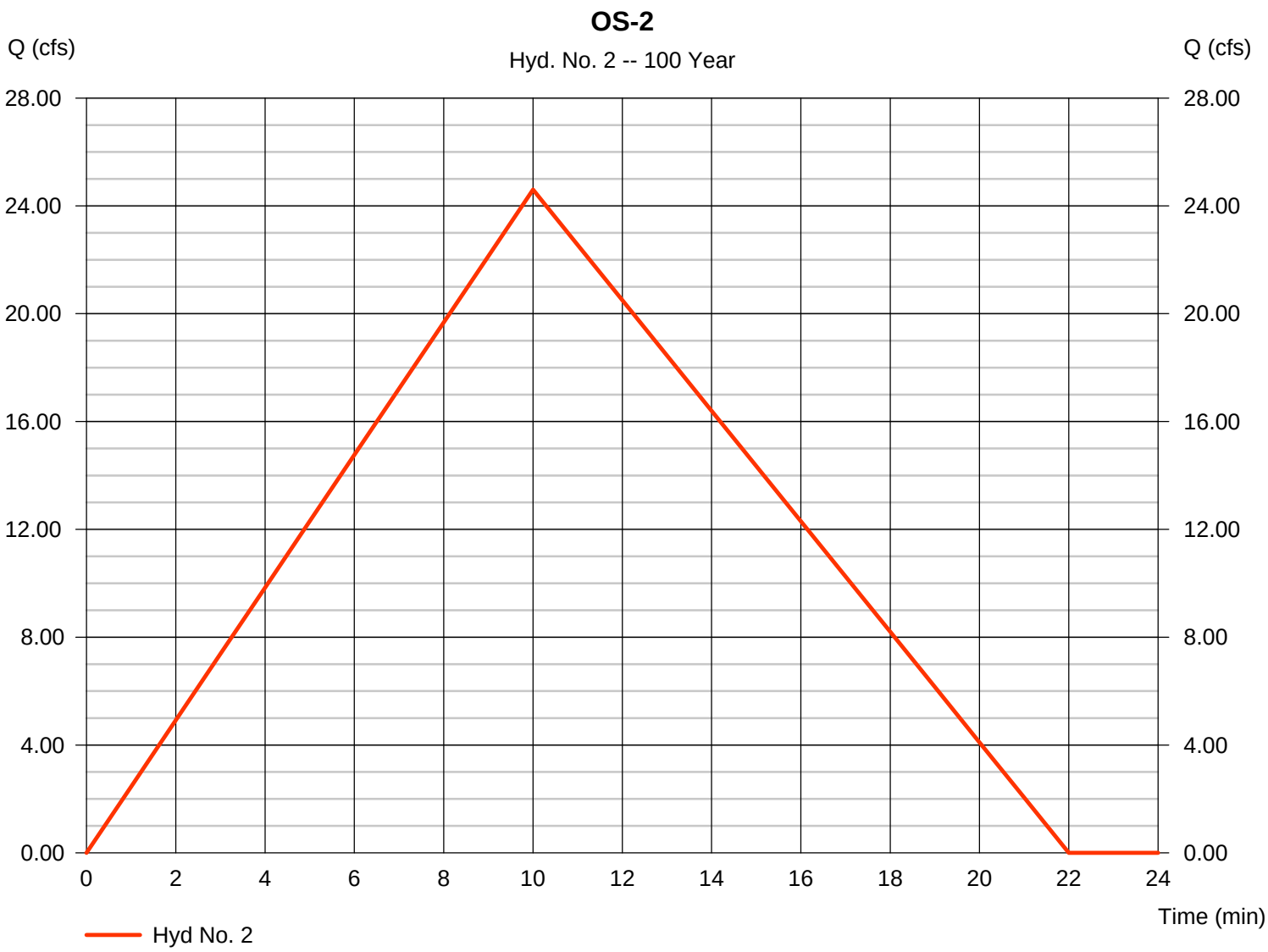
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	24.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	16,975 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.92
Intensity	=	8.305 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



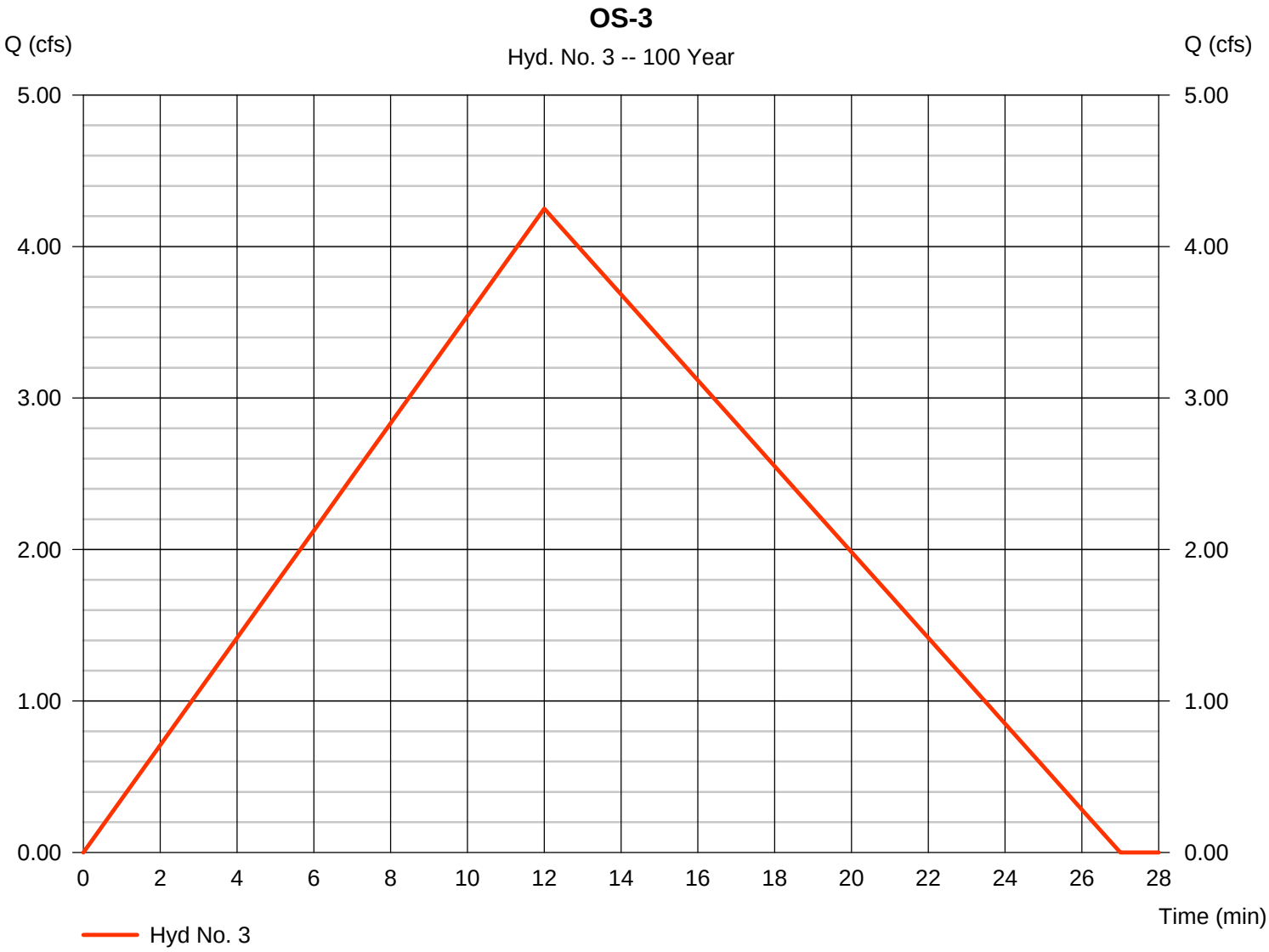
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	4.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,519 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.7
Intensity	=	7.496 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



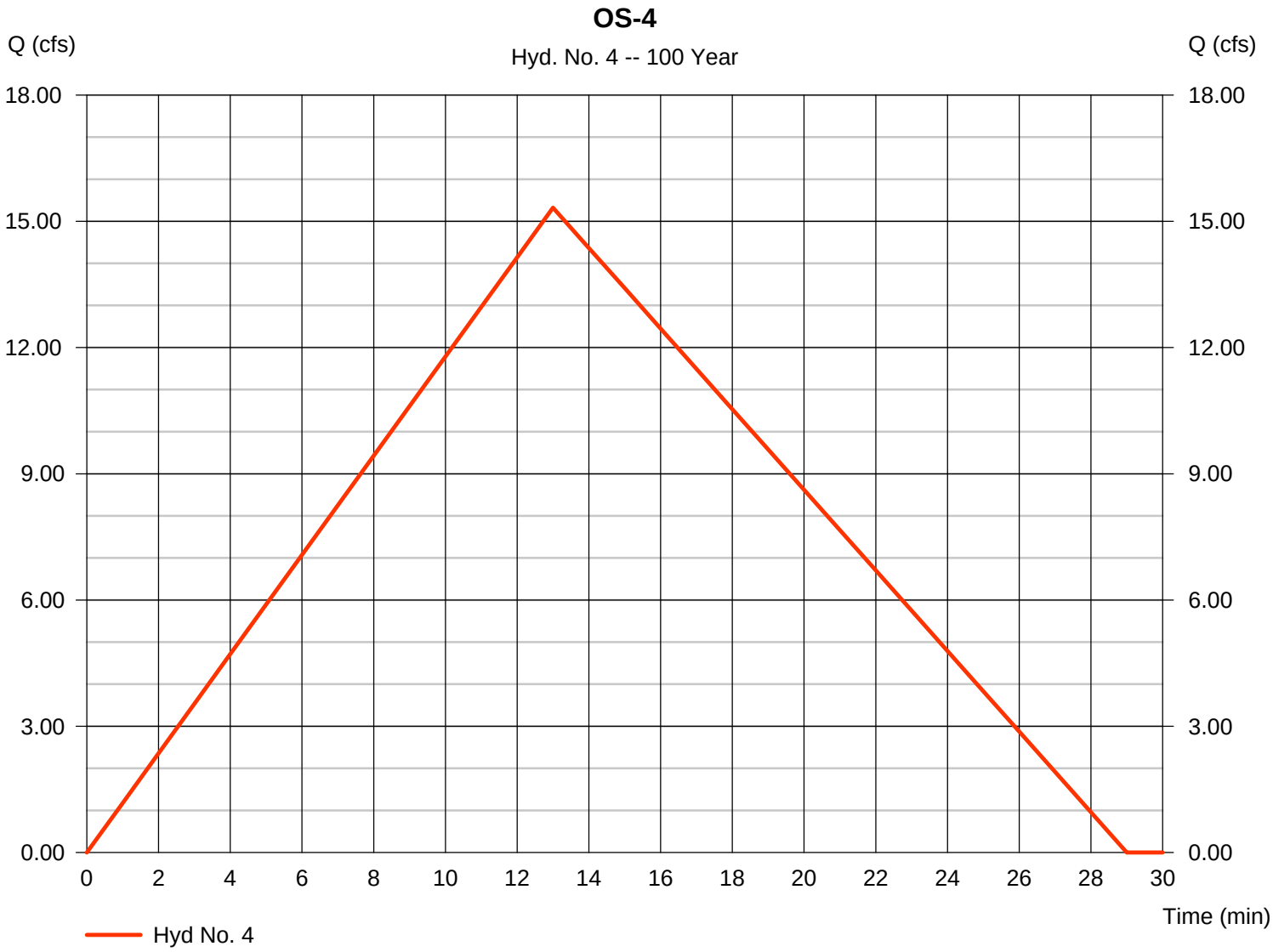
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	15.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	13,744 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.7
Intensity	=	7.153 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



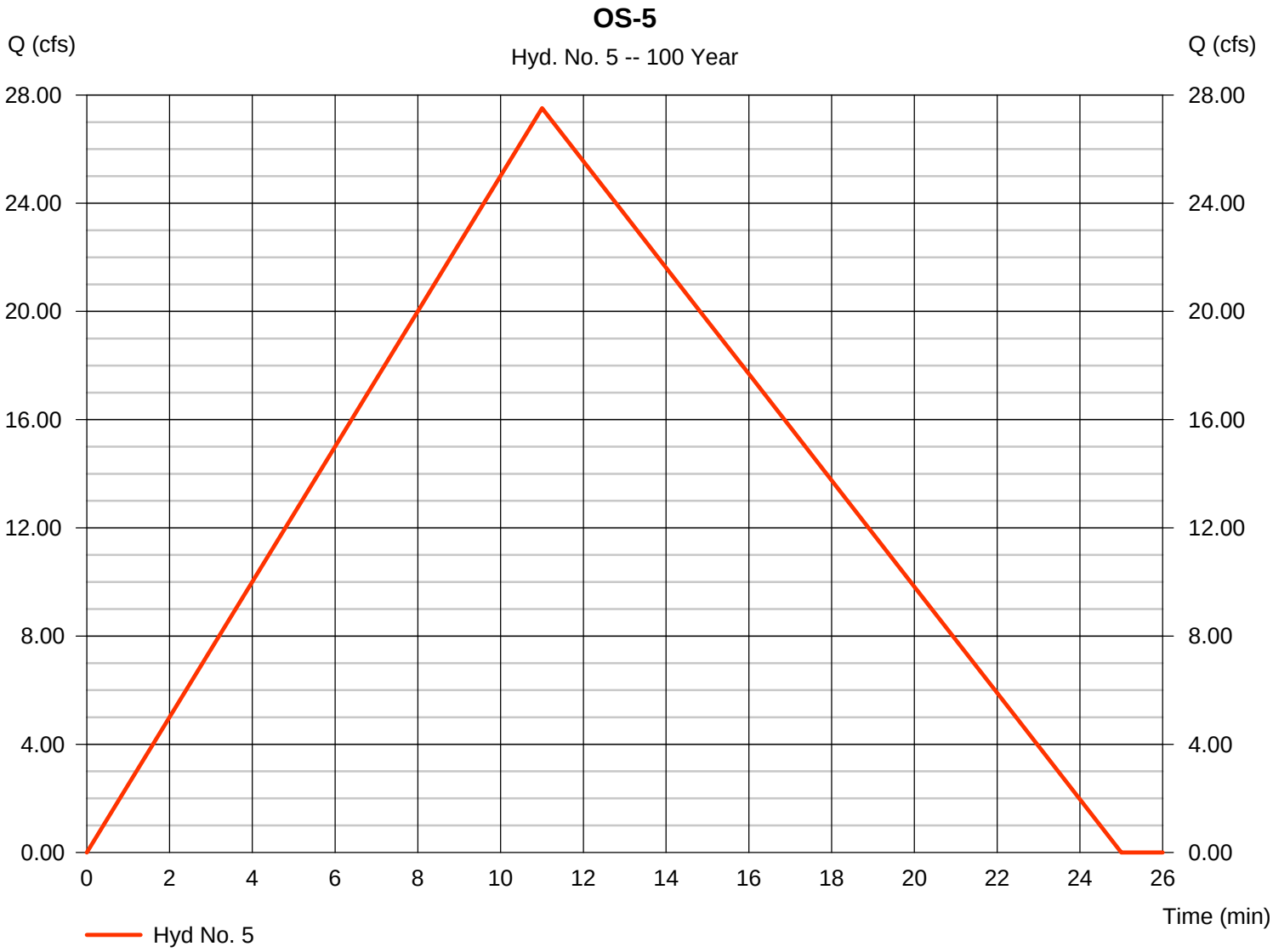
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	27.51 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	20,884 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



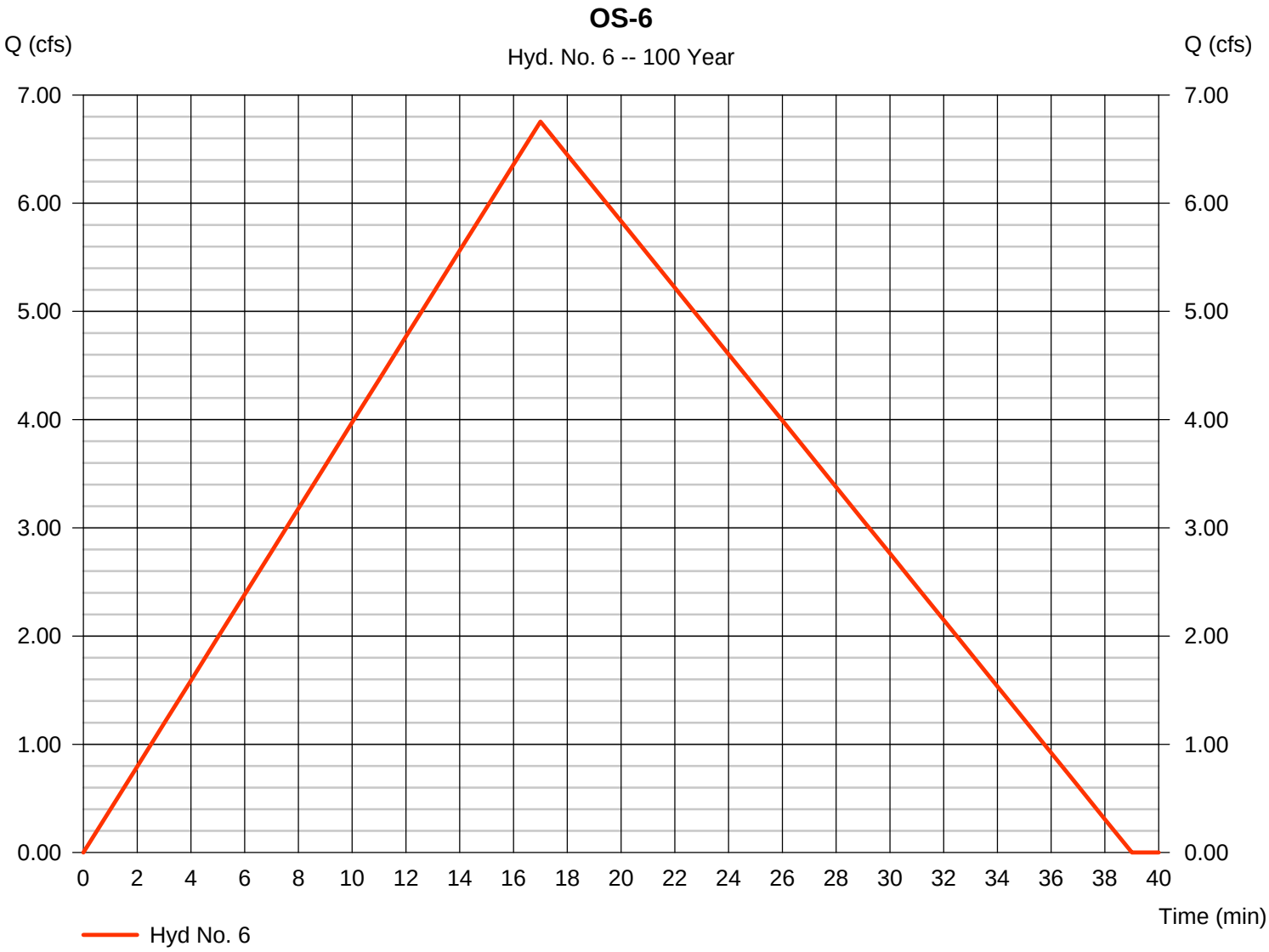
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	6.755 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	7,924 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.7
Intensity	=	6.069 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



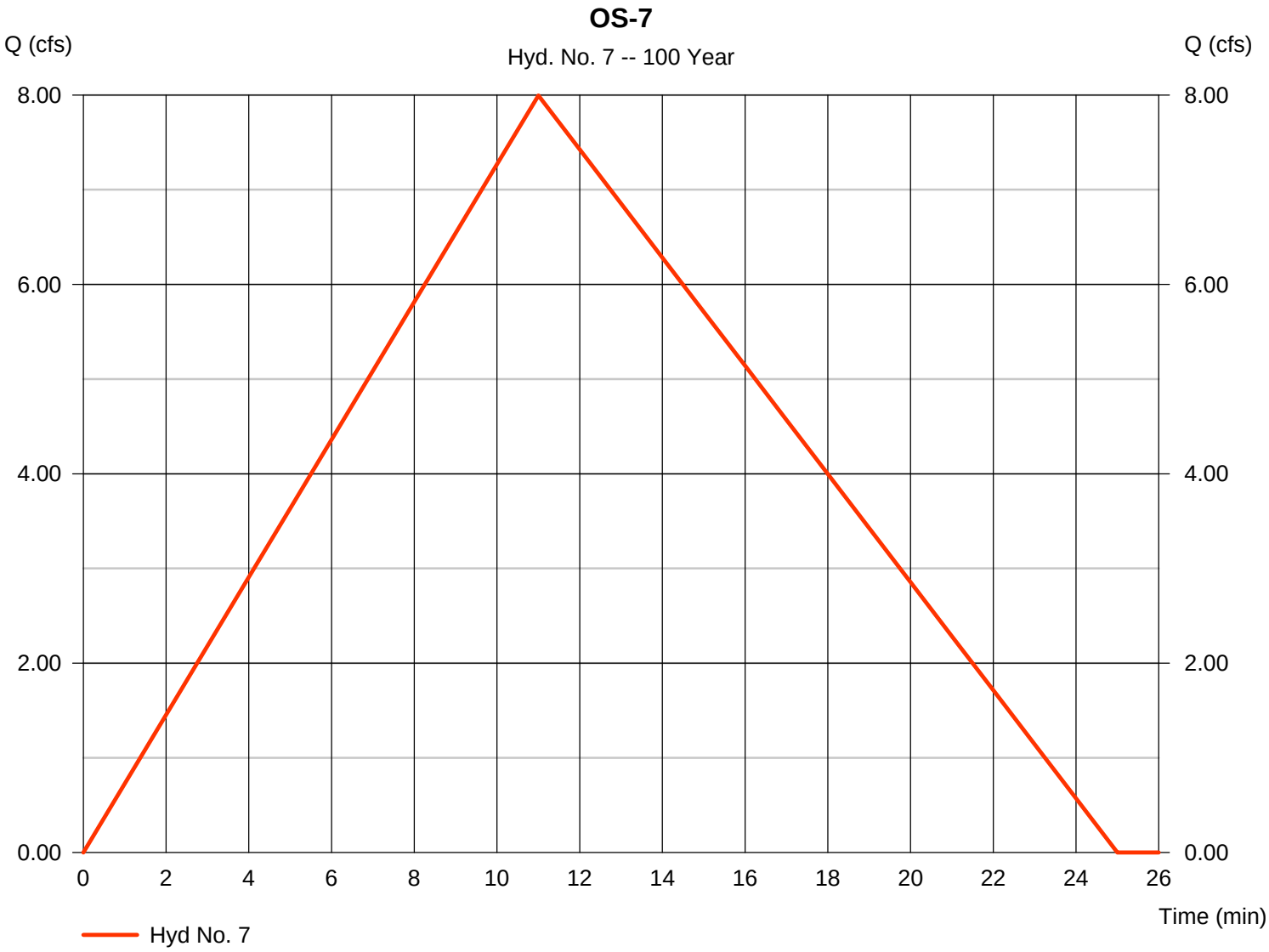
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	7.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	6,068 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



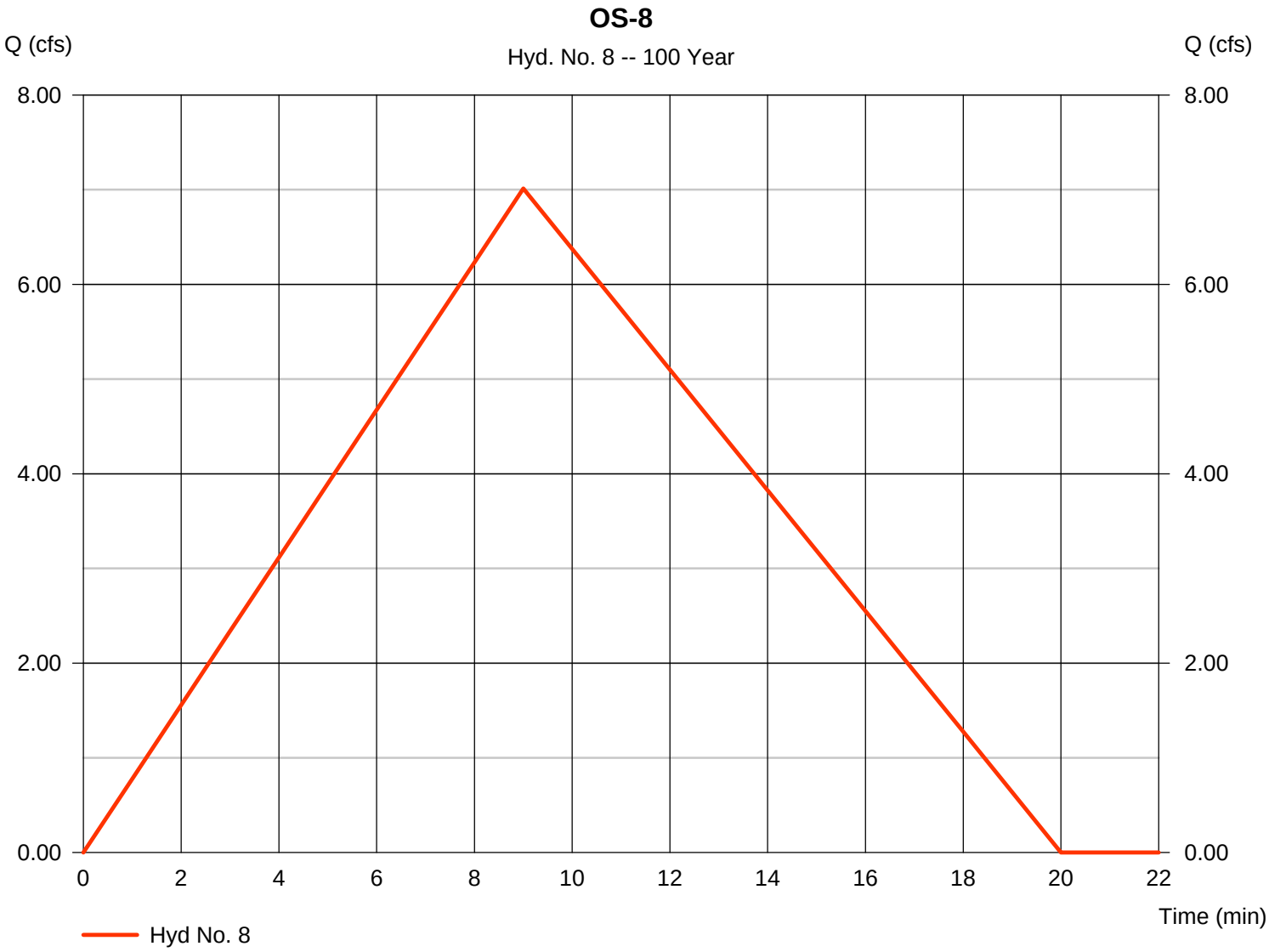
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	7.012 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	4,355 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.7
Intensity	=	8.787 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



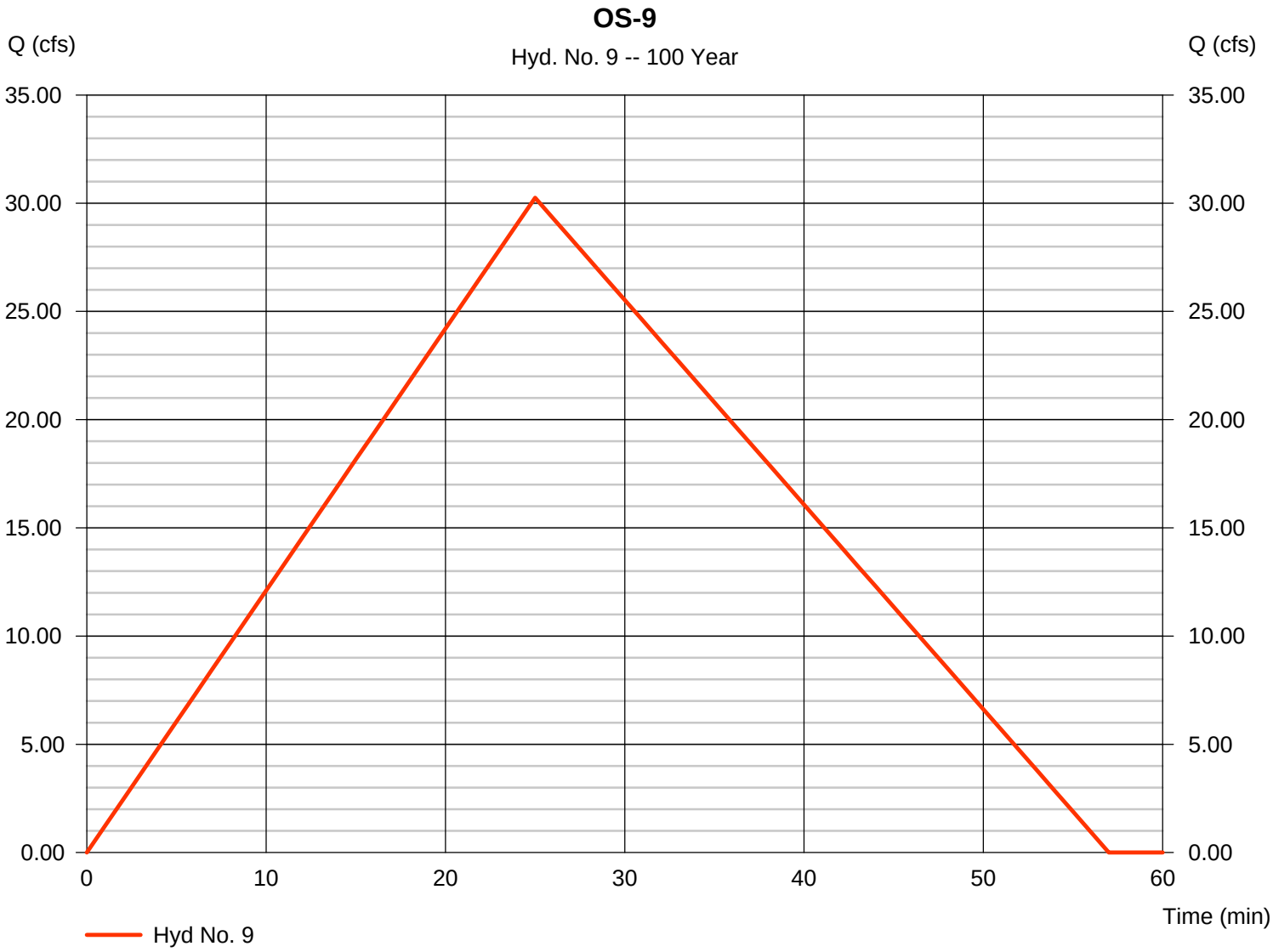
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	30.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	52,190 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.68
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



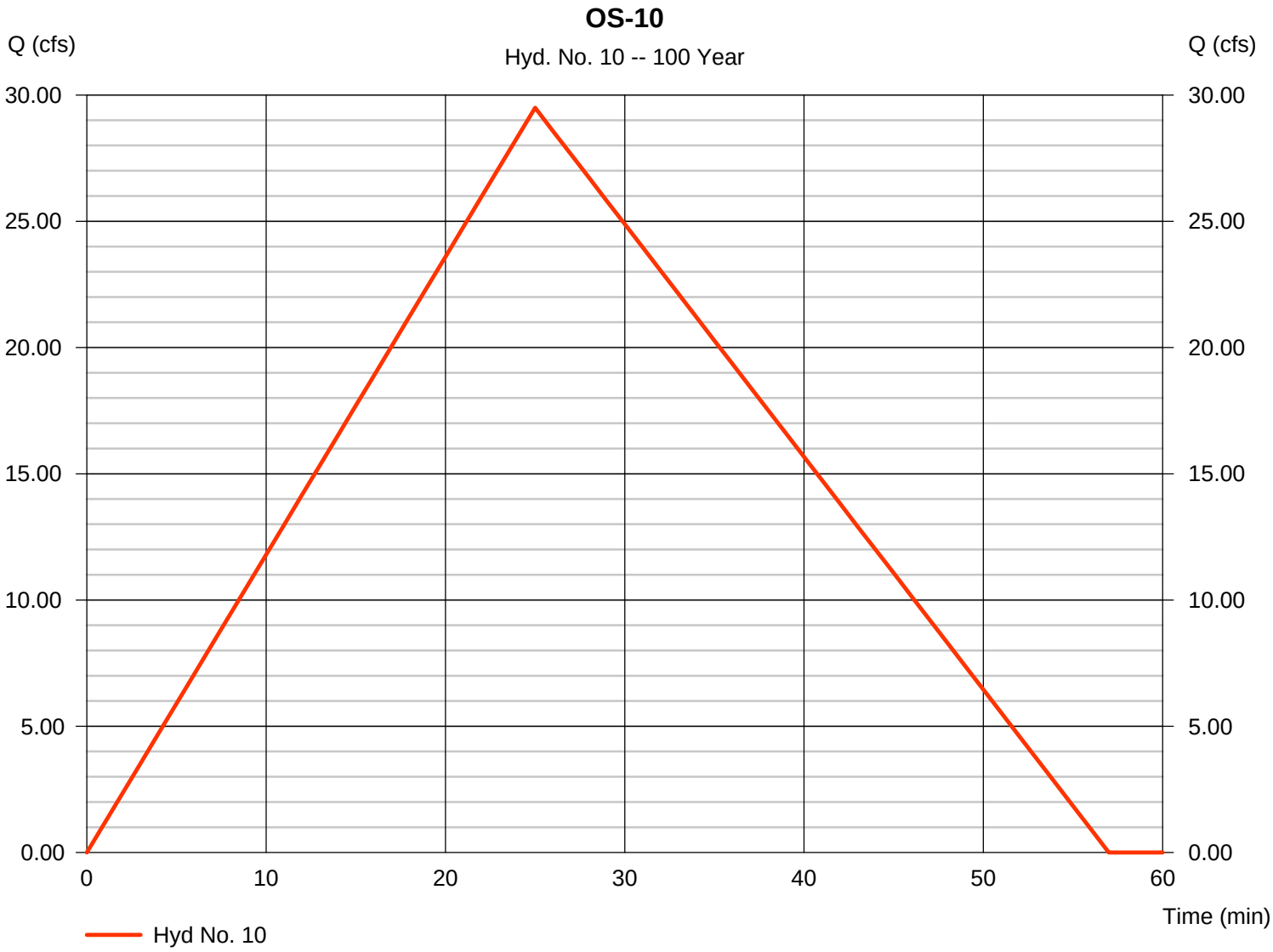
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	29.49 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	50,878 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.67
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



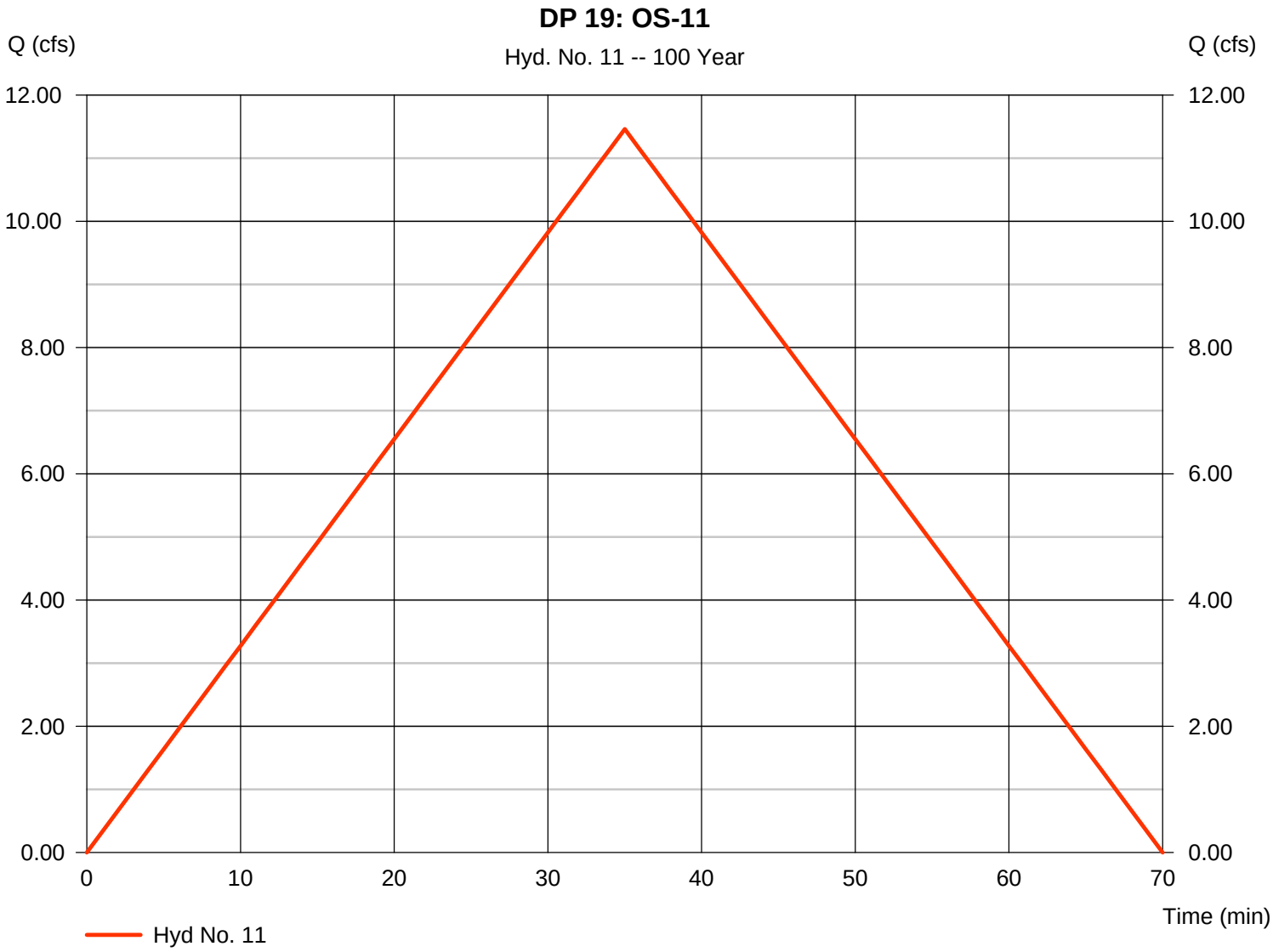
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	11.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	24,066 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.61
Intensity	=	3.720 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

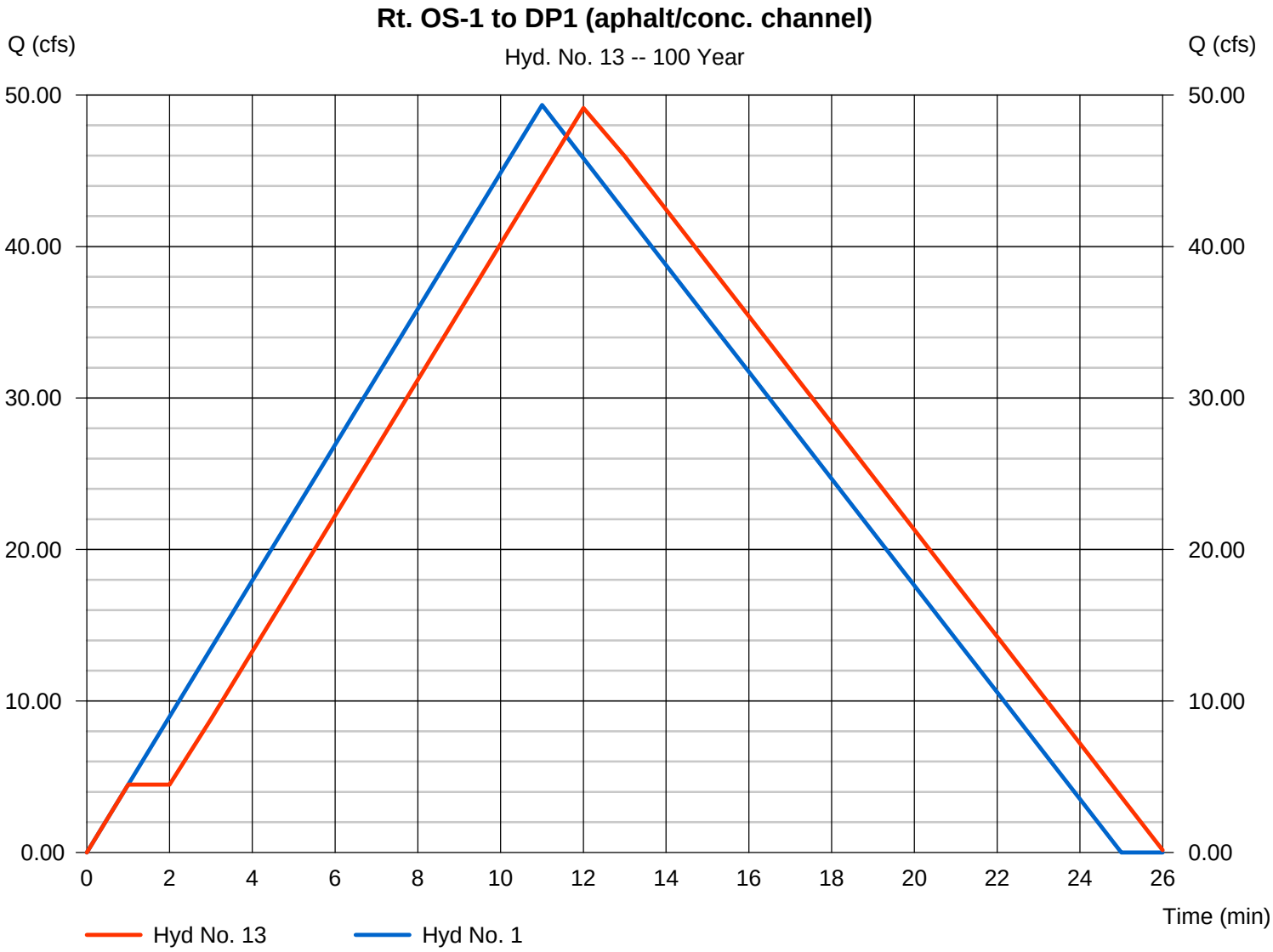
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	49.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	37,287 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.75 ft/s	Routing coeff.	=	0.9587

Modified Att-Kin routing method used.



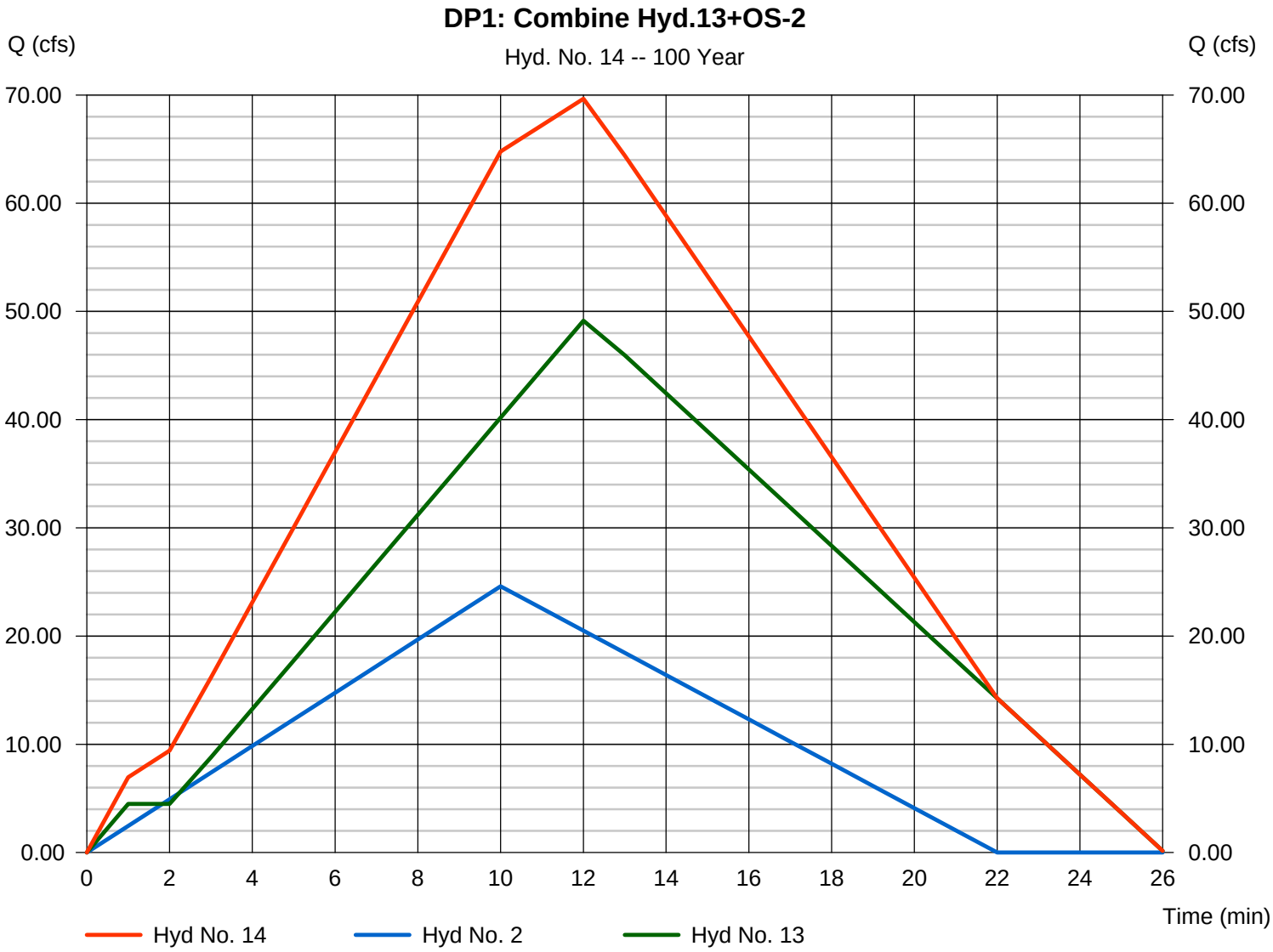
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	69.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	53,524 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

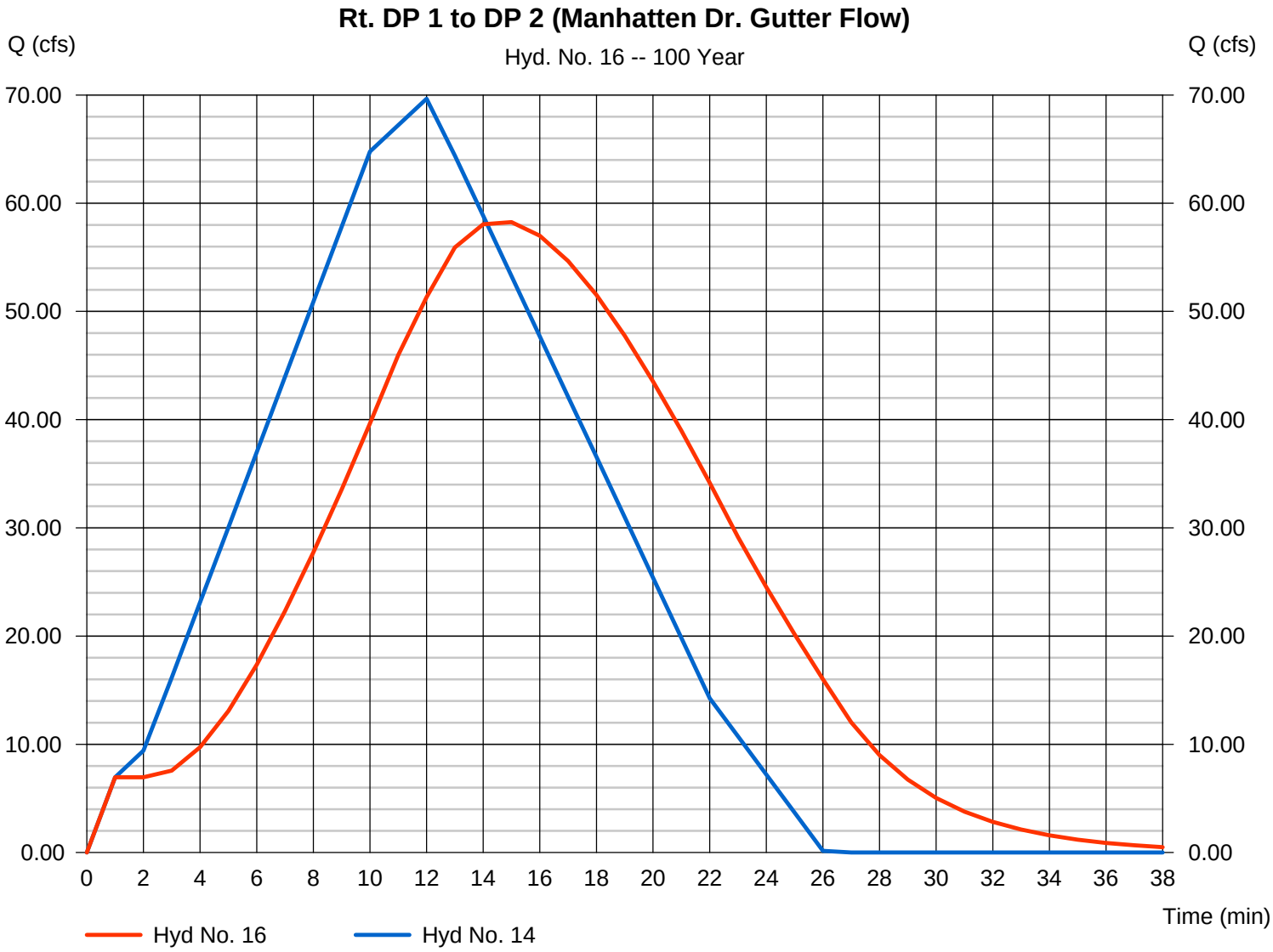
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	58.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	55,180 cuft
Inflow hyd. No.	=	14 - DP1: Combine Hyd.13+OS-2	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.513	Rating curve m	=	0.659
Ave. velocity	=	1.09 ft/s	Routing coeff.	=	0.2514

Modified Att-Kin routing method used.



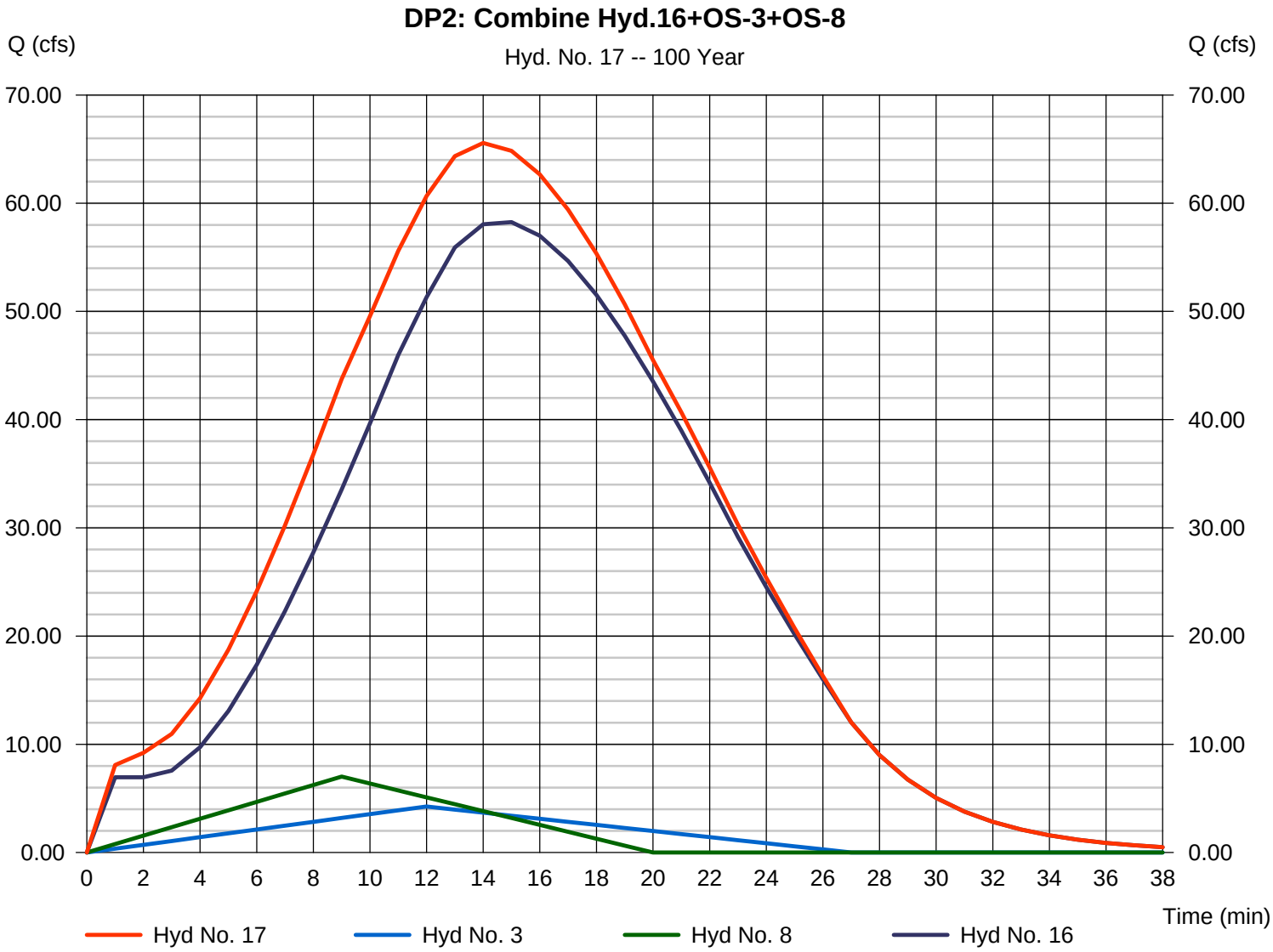
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	= Combine	Peak discharge	= 65.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 62,830 cuft
Inflow hyds.	= 3, 8, 16	Contrib. drain. area	= 1.950 ac



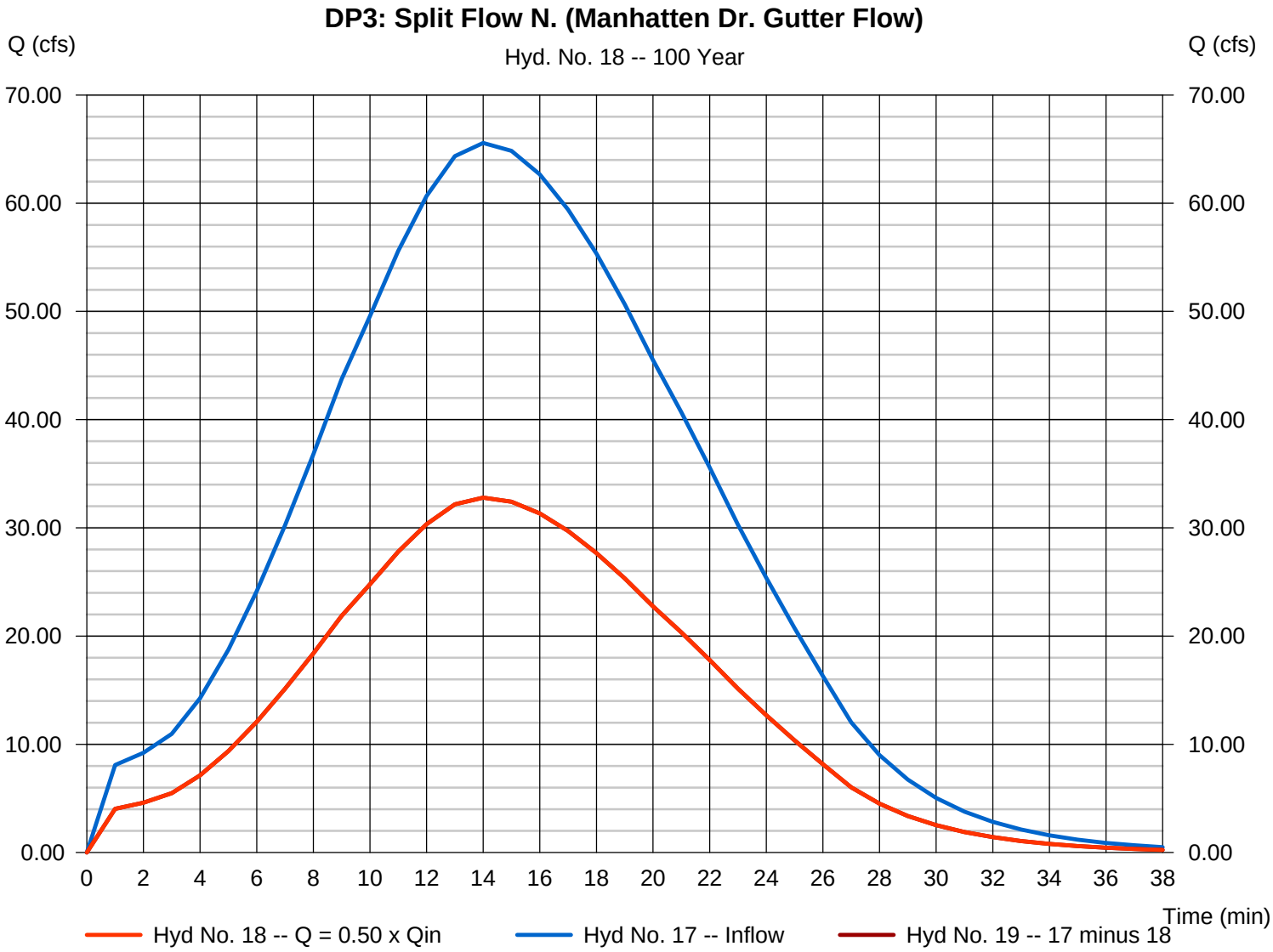
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



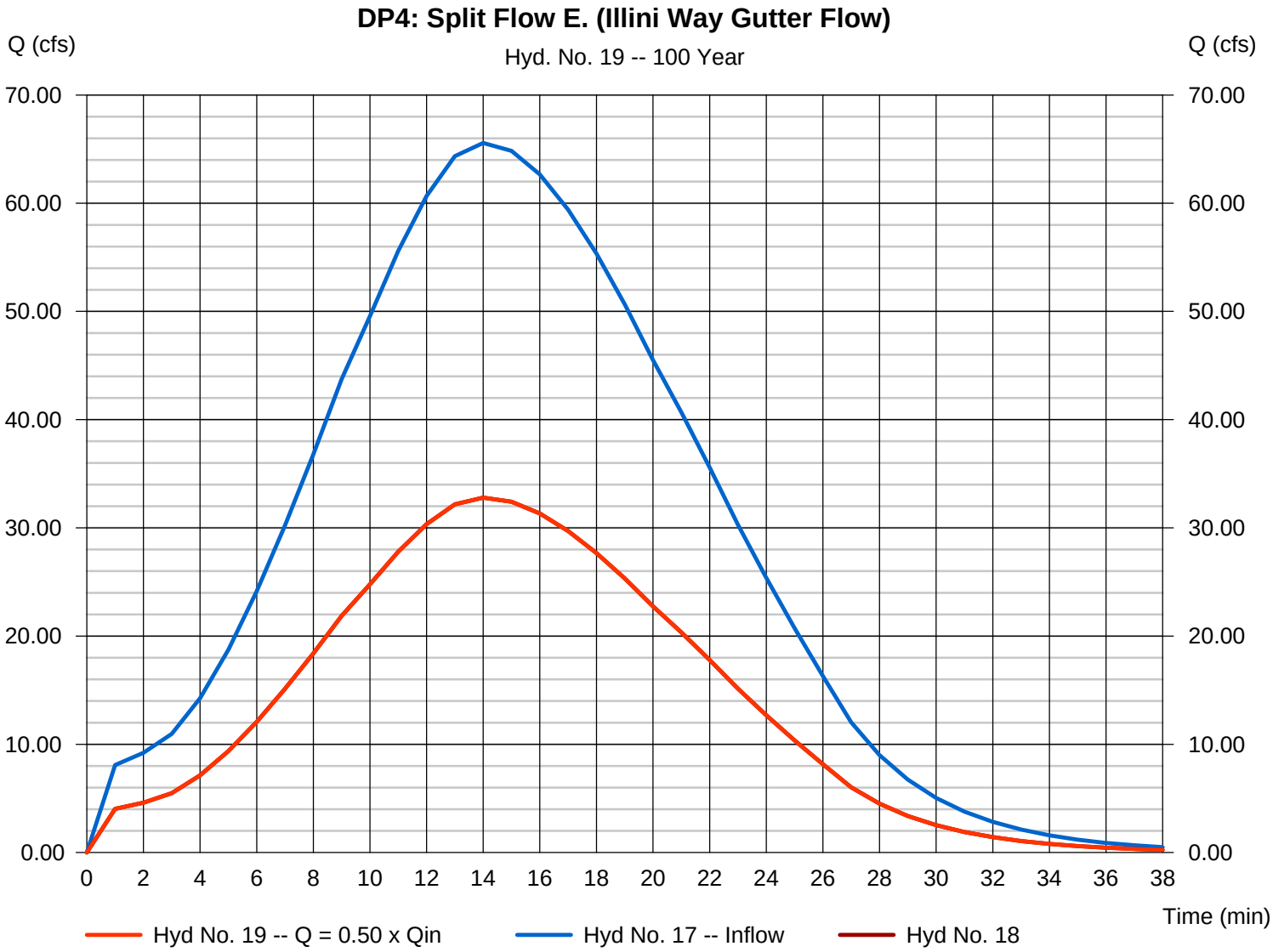
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

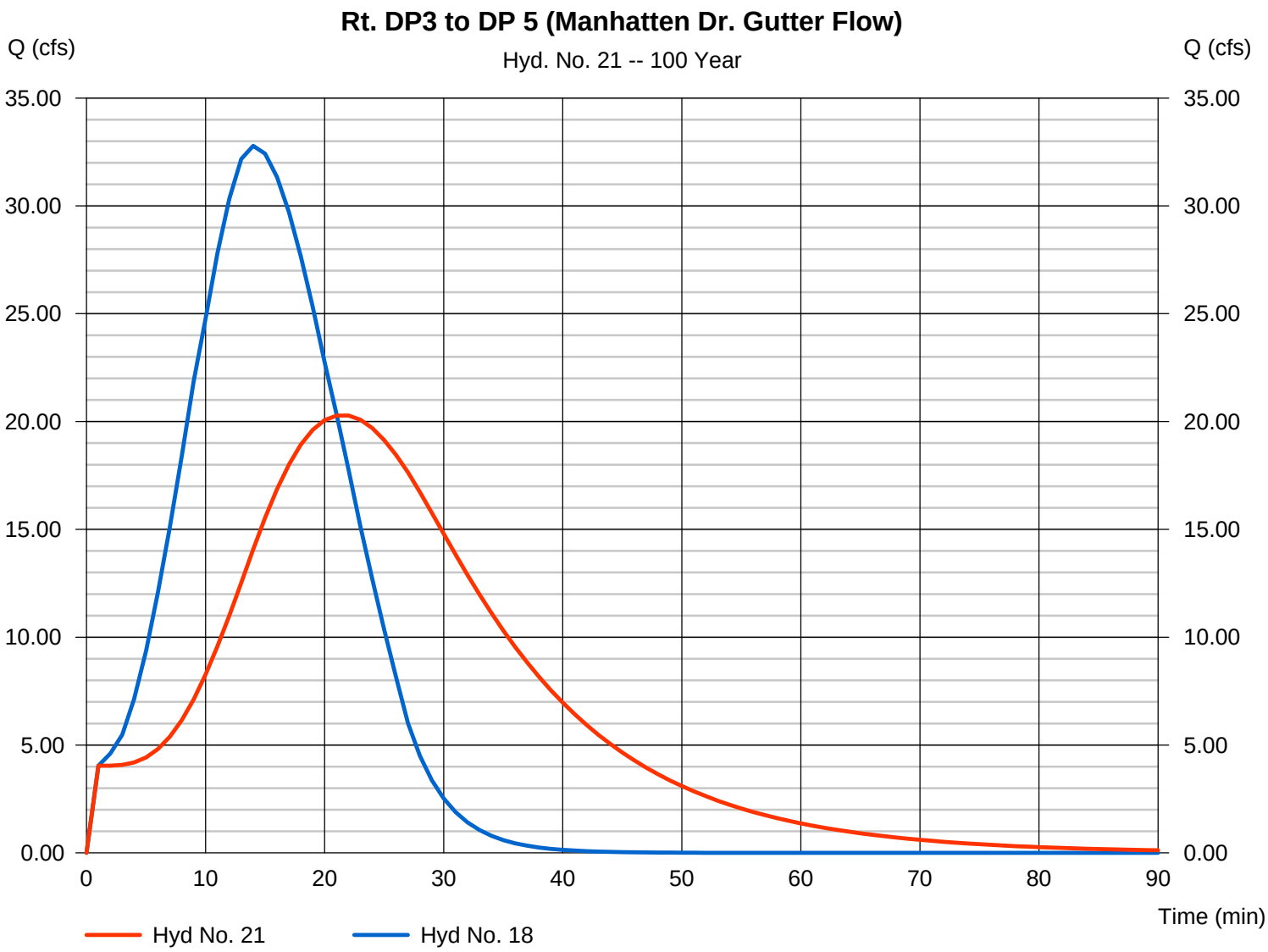
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	20.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	34,490 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.0786

Modified Att-Kin routing method used.



Hydrograph Report

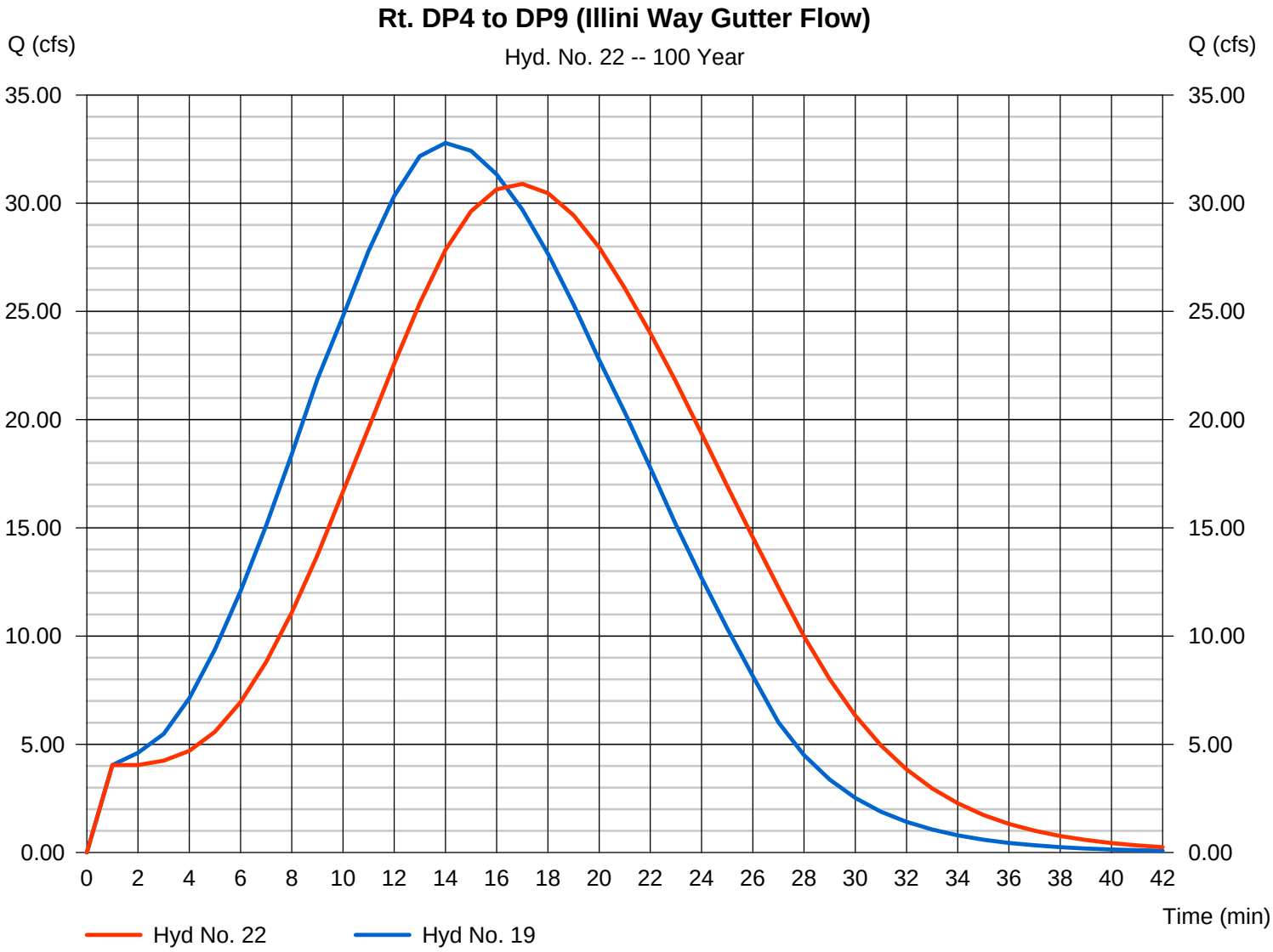
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 30.89 cfs
Storm frequency	= 100 yrs	Time to peak	= 17 min
Time interval	= 1 min	Hyd. volume	= 32,083 cuft
Inflow hyd. No.	= 19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.630	Rating curve m	= 0.659
Ave. velocity	= 1.68 ft/s	Routing coeff.	= 0.3620

Modified Att-Kin routing method used.



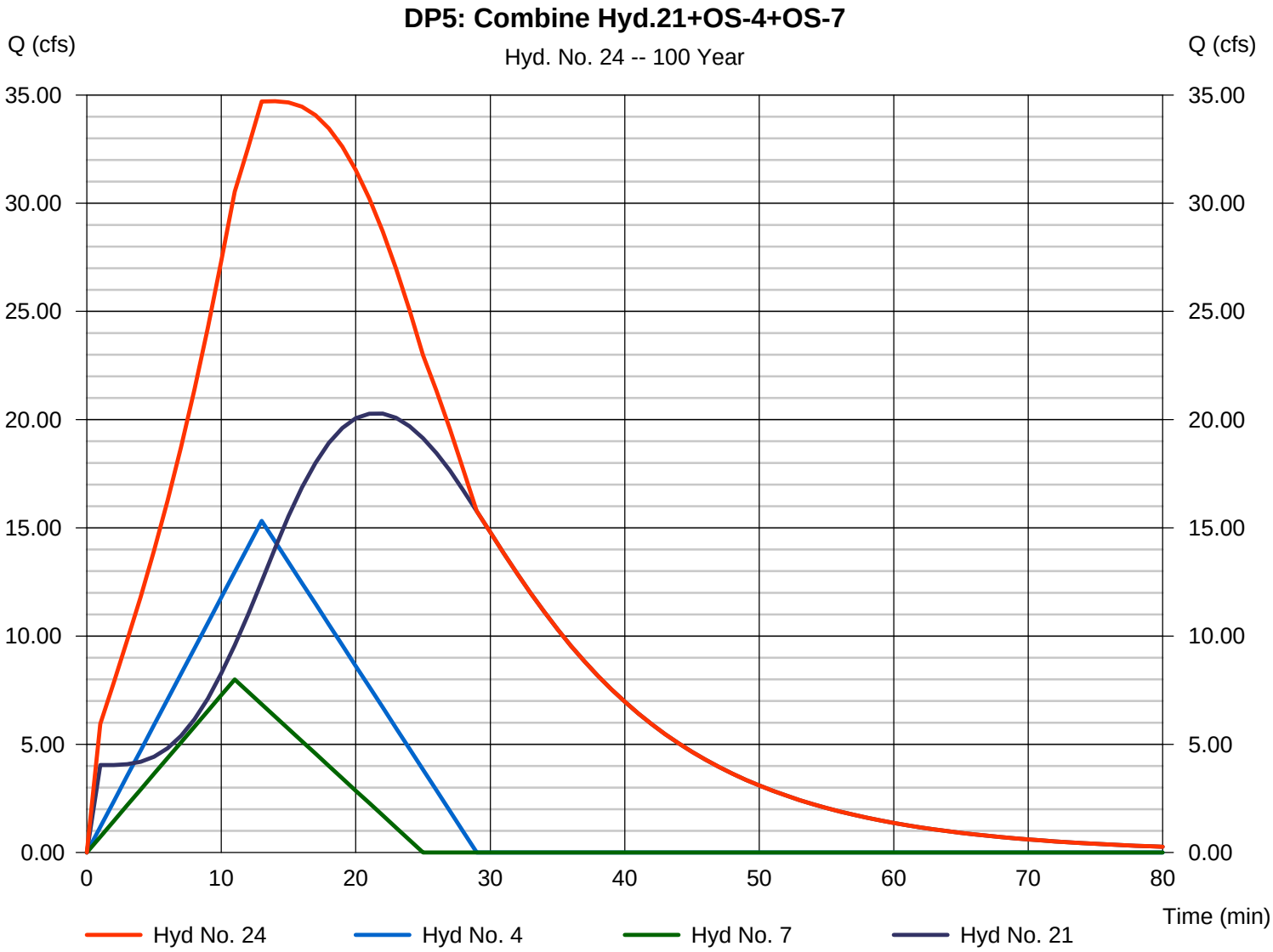
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	= Combine	Peak discharge	= 34.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 53,817 cuft
Inflow hyds.	= 4, 7, 21	Contrib. drain. area	= 4.510 ac



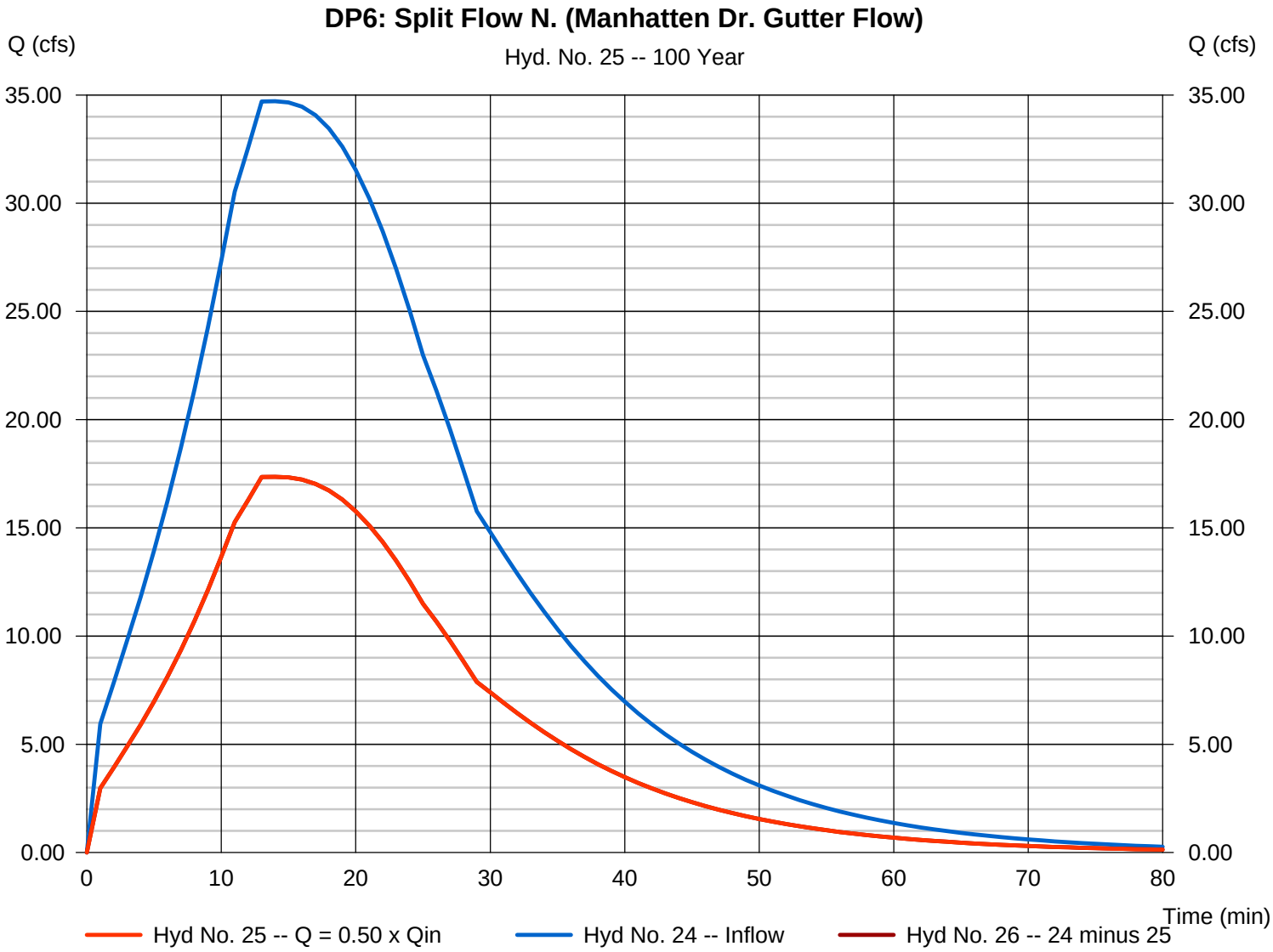
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



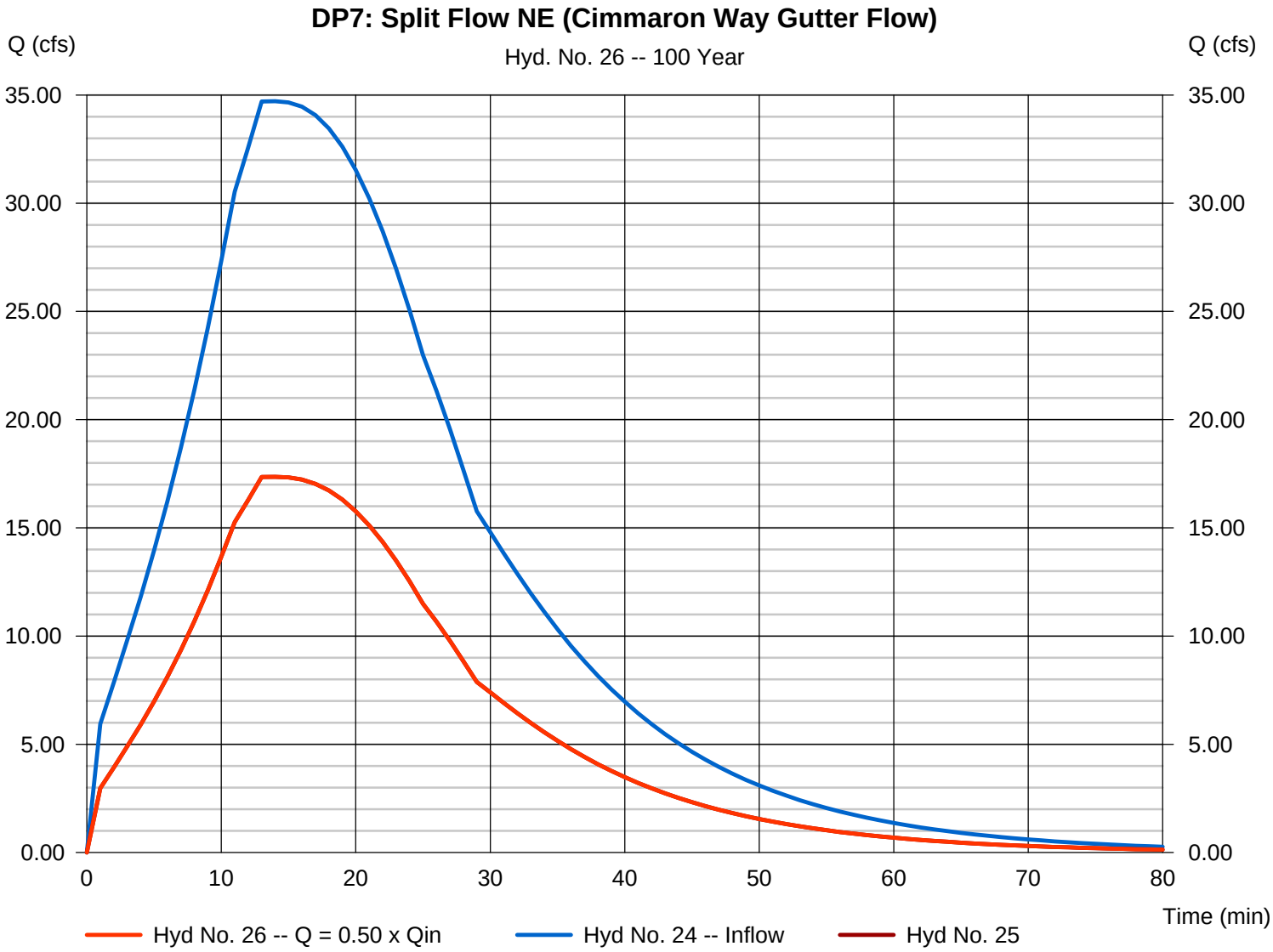
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

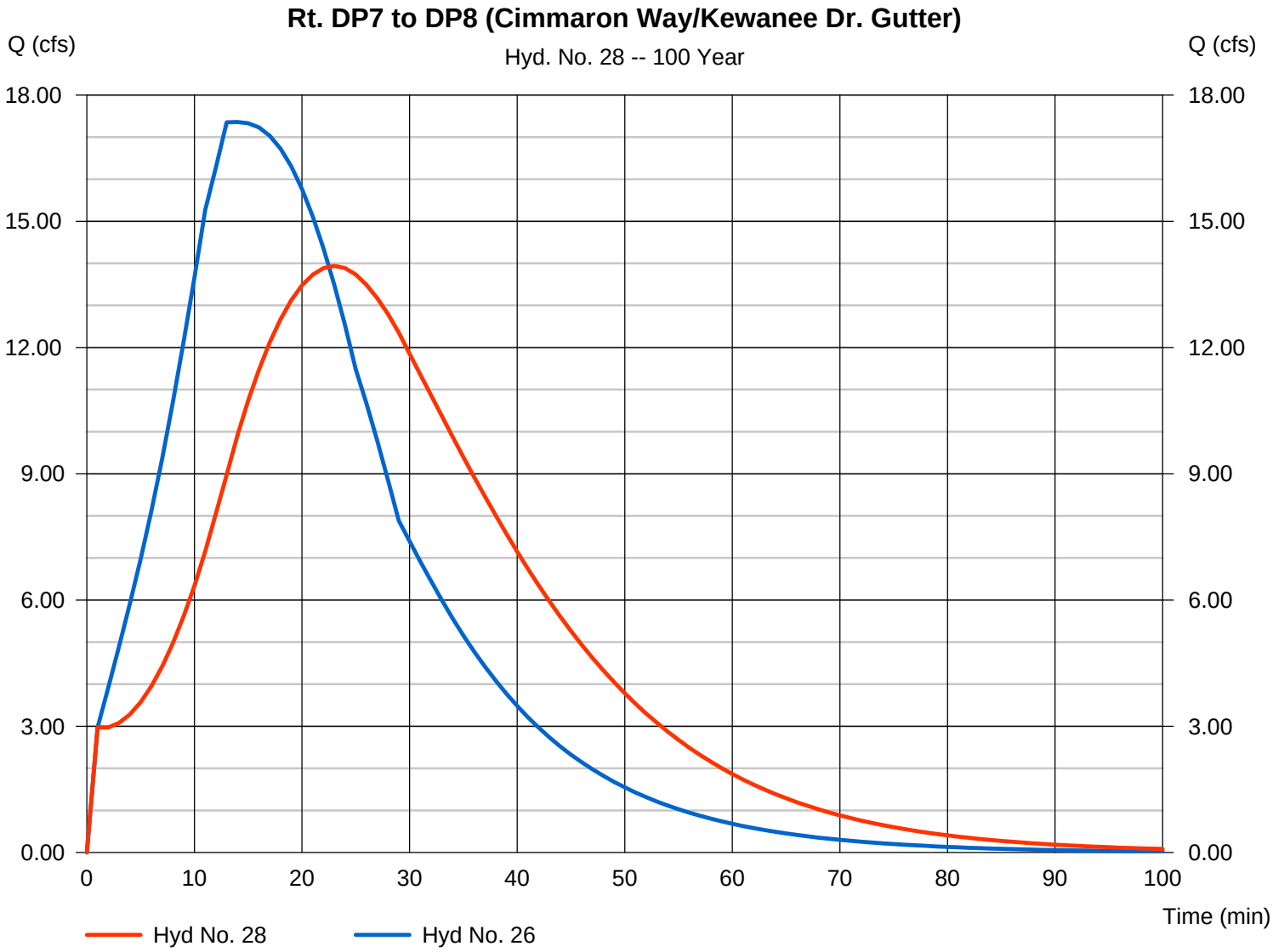
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	28,502 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.33 ft/s	Routing coeff.	=	0.1116

Modified Att-Kin routing method used.



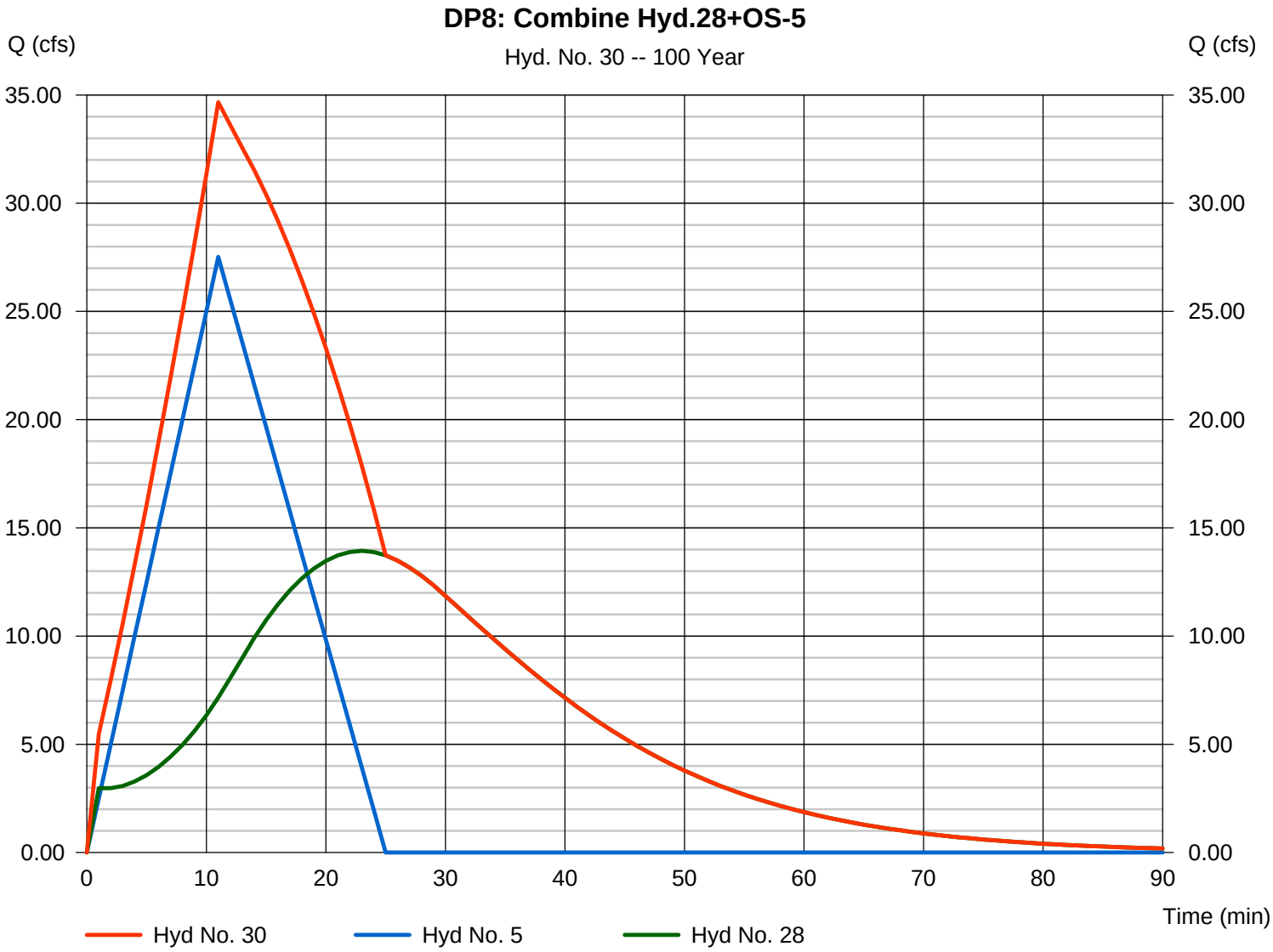
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	34.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	49,138 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



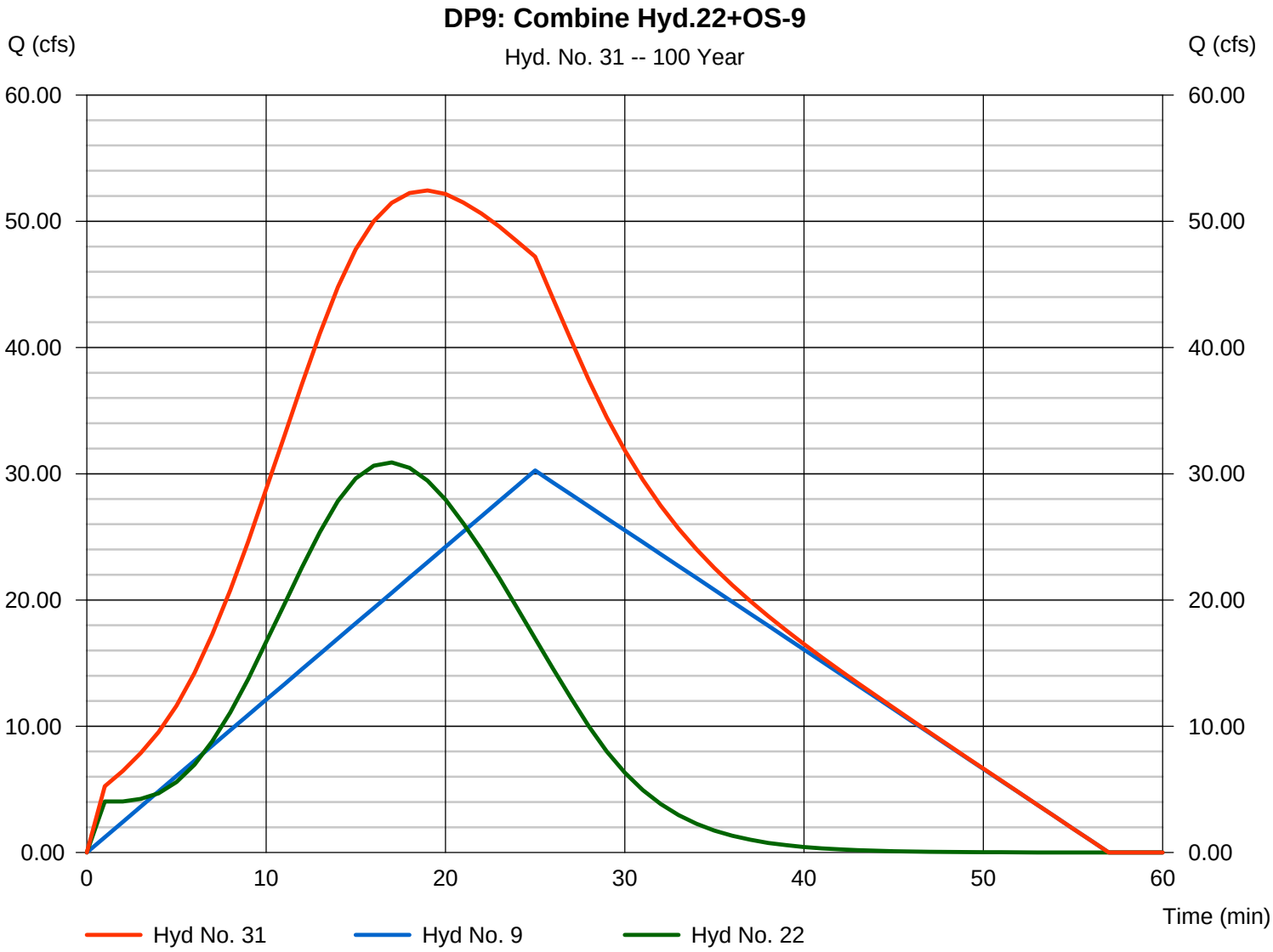
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	= Combine	Peak discharge	= 52.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 19 min
Time interval	= 1 min	Hyd. volume	= 83,819 cuft
Inflow hyds.	= 9, 22	Contrib. drain. area	= 9.450 ac



Hydrograph Report

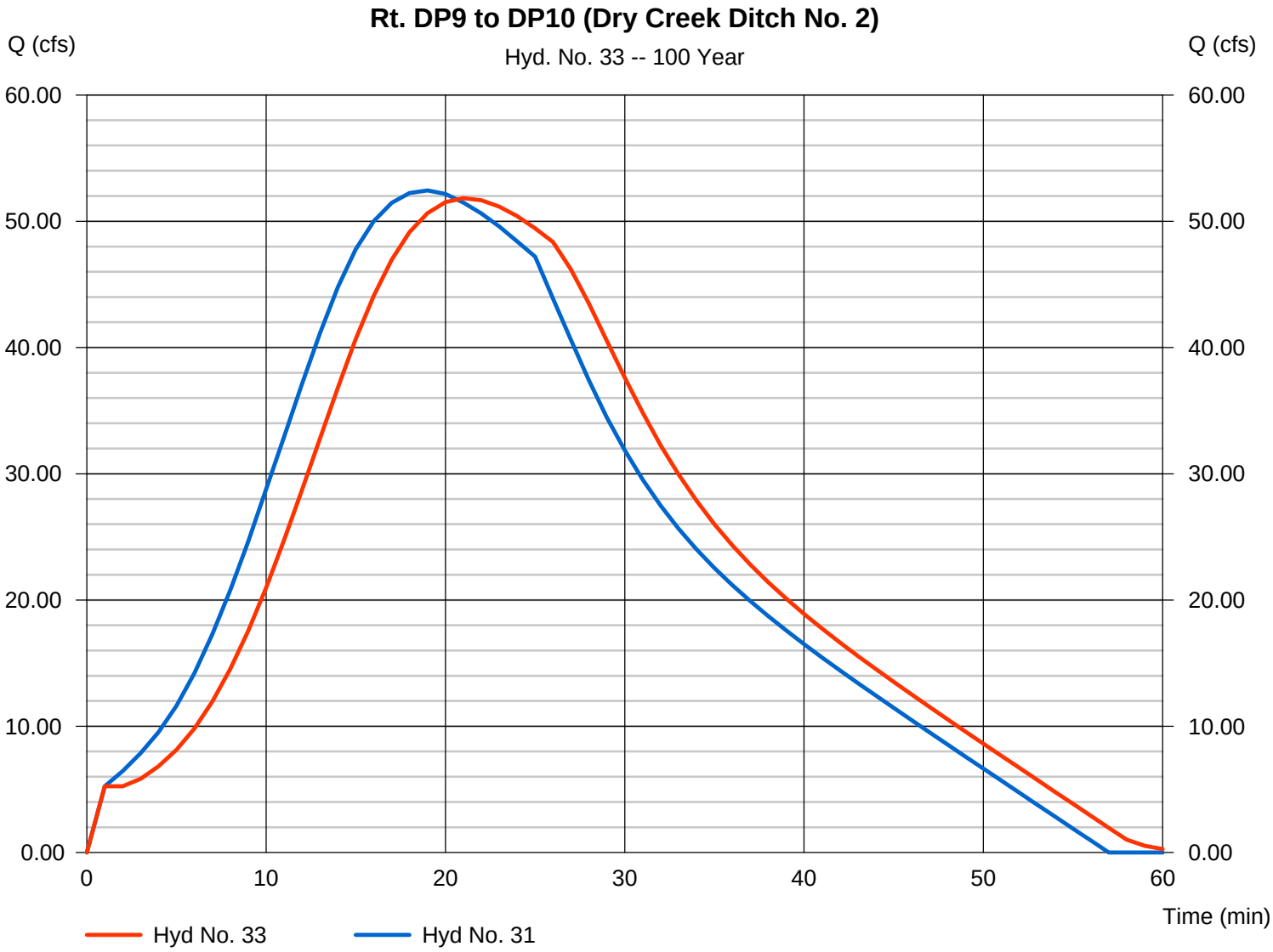
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	51.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	84,469 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.91 ft/s	Routing coeff.	=	0.4839

Modified Att-Kin routing method used.



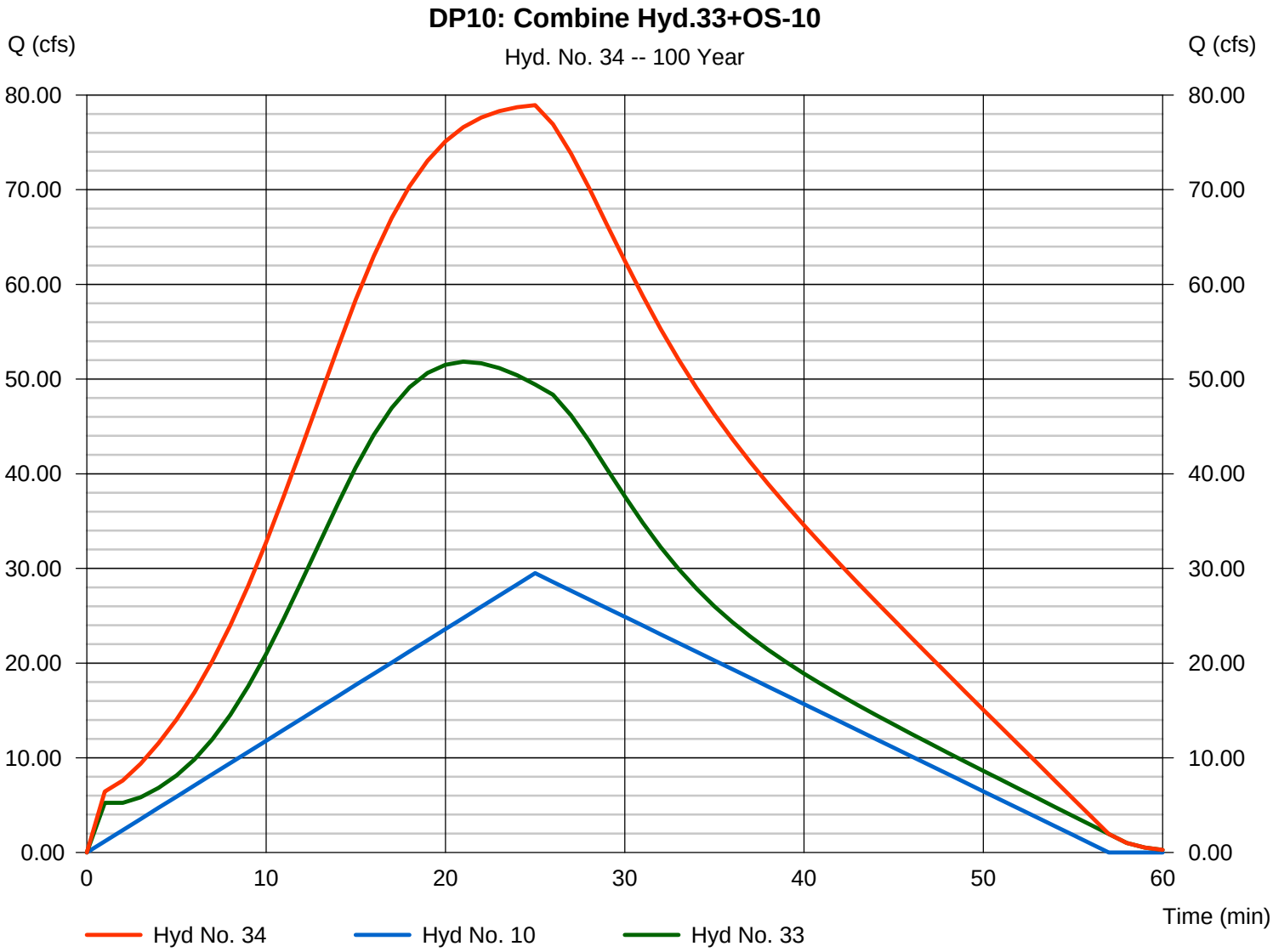
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 34

DP10: Combine Hyd.33+OS-10

Hydrograph type	=	Combine	Peak discharge	=	78.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	134,905 cuft
Inflow hyds.	=	10, 33	Contrib. drain. area	=	9.350 ac



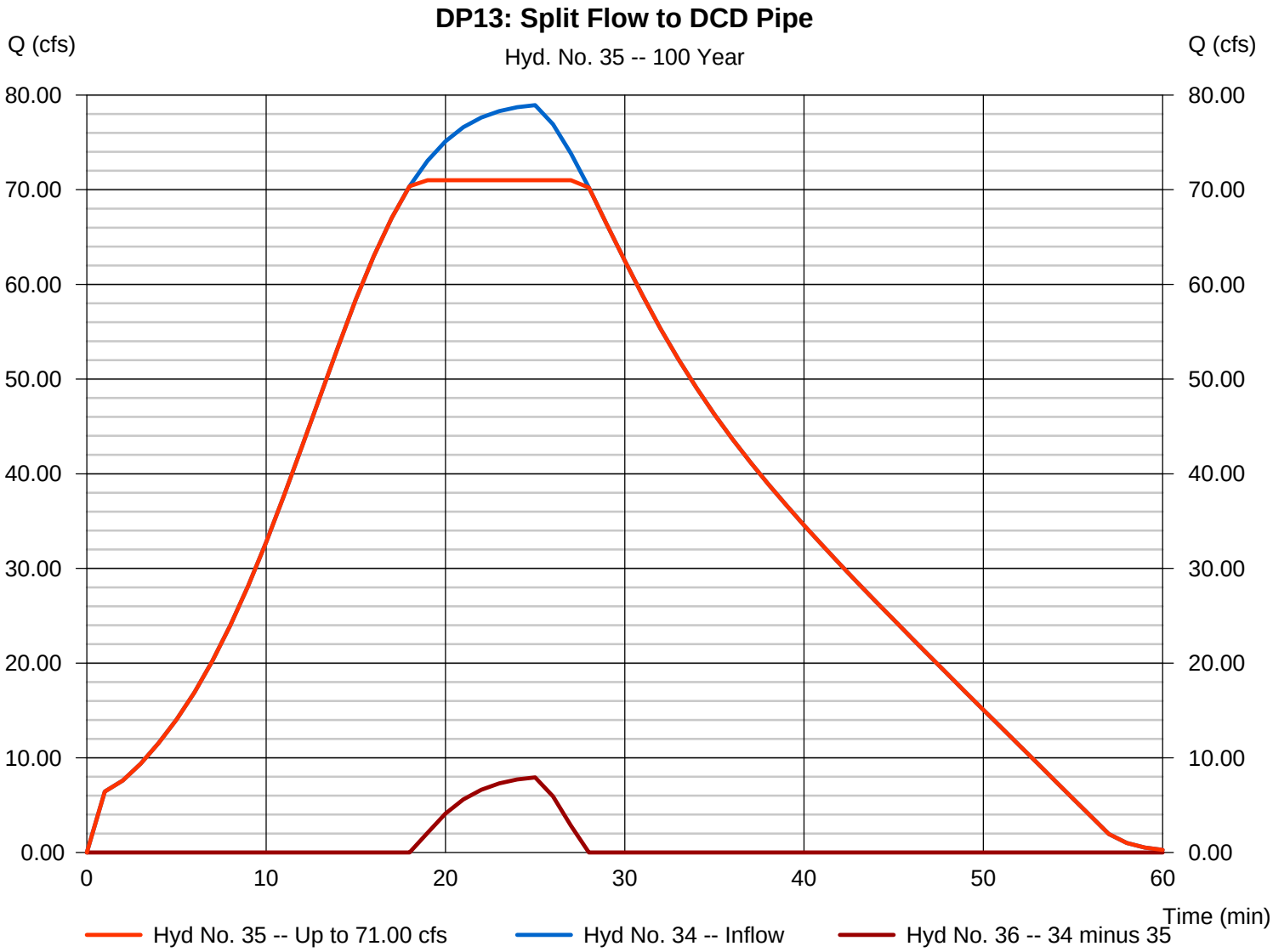
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 35

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	71.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	131,900 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	71.00 cfs



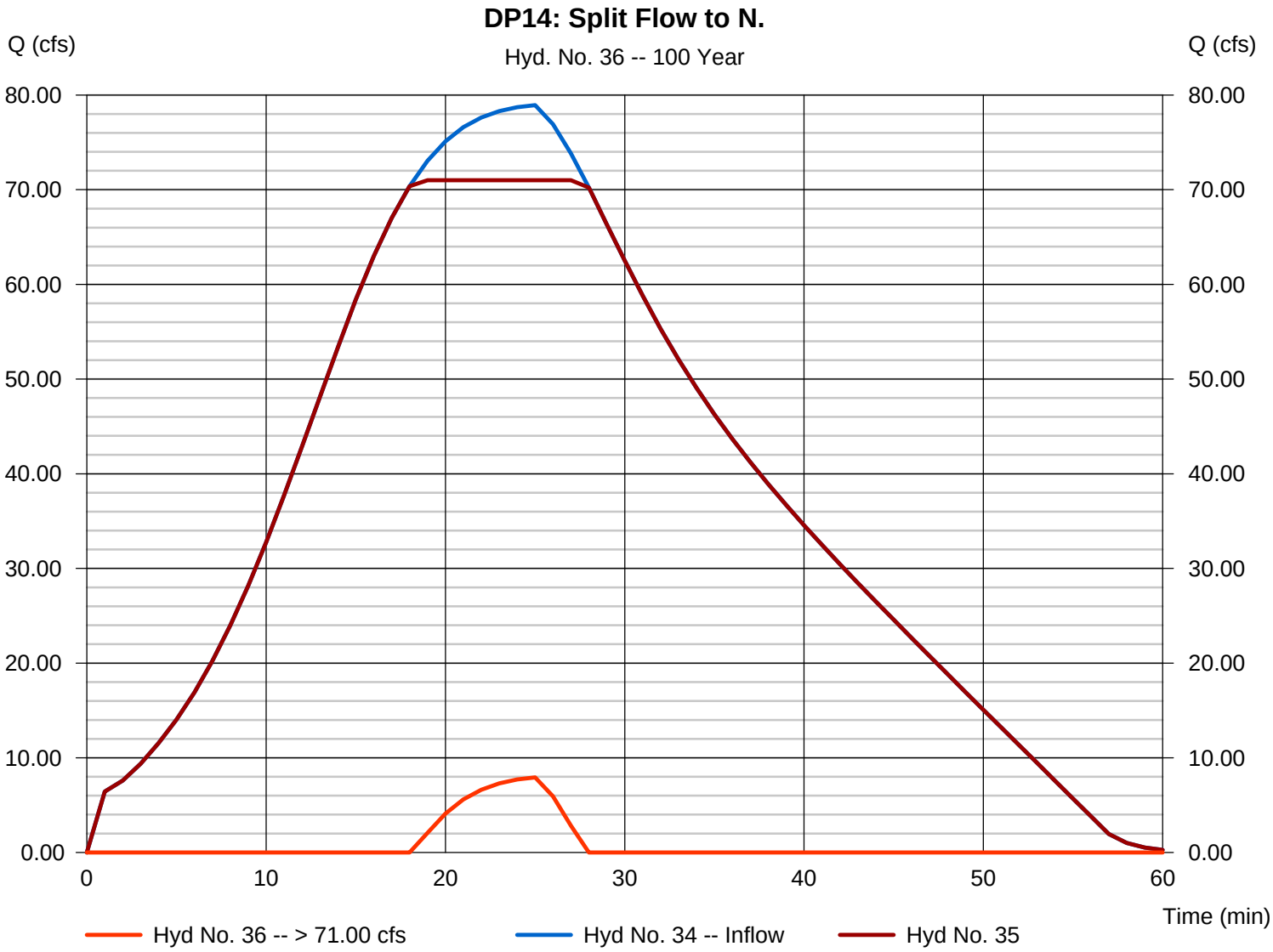
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 36

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	7.928 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	3,005 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	35
Diversion method	=	Constant Q	Constant Q	=	71.00 cfs



Hydrograph Report

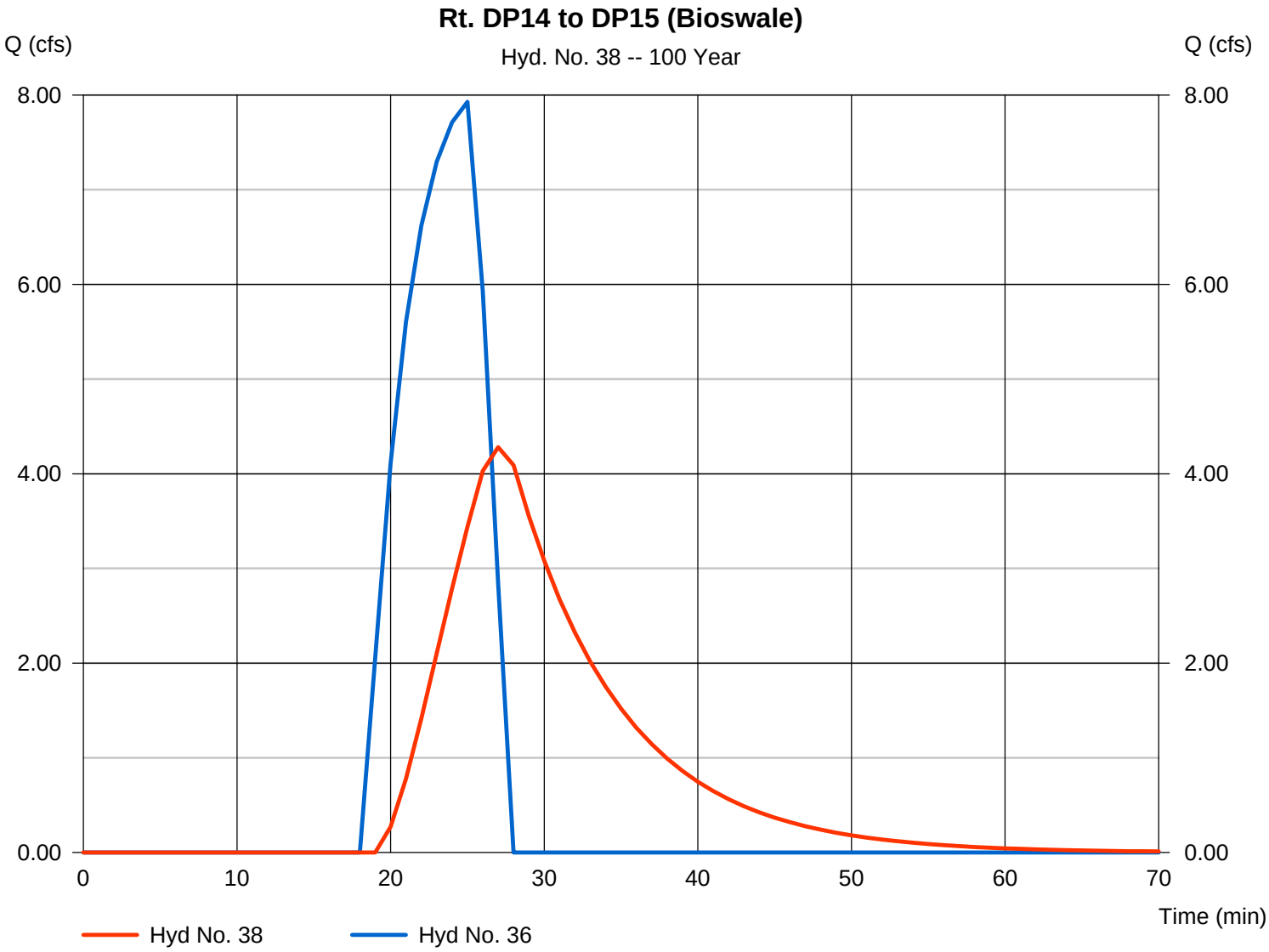
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 38

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	4.281 cfs
Storm frequency	=	100 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	3,001 cuft
Inflow hyd. No.	=	36 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	0.90 ft/s	Routing coeff.	=	0.1320

Modified Att-Kin routing method used.



Hydrograph Report

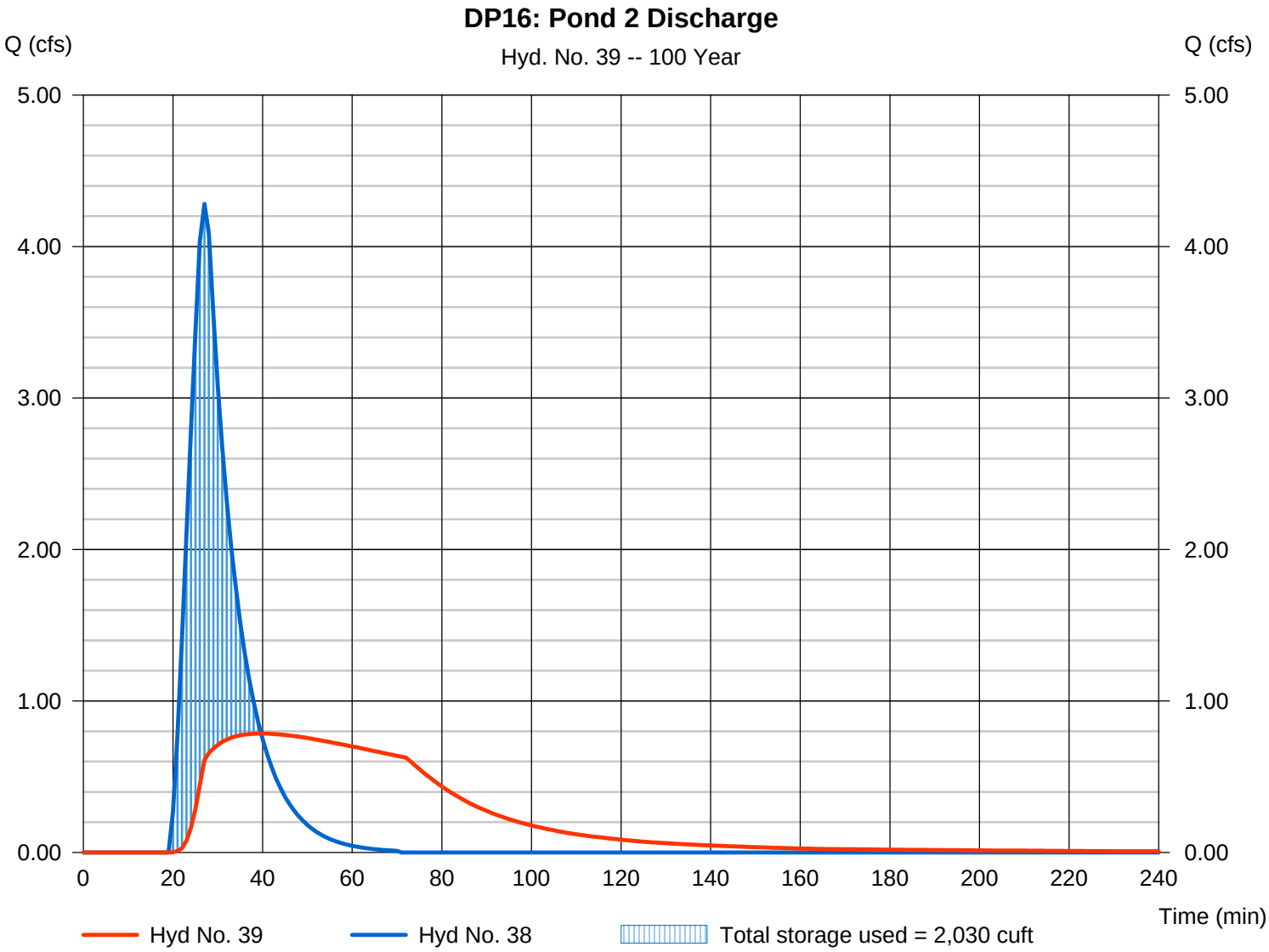
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 39

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.785 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	2,997 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5317.25 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	2,030 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,253	4,271	5,230
3.00	5319.00	20,244	13,203	18,433
4.00	5320.00	31,360	25,598	44,031
4.50	5320.50	36,454	16,936	60,967
5.00	5321.00	42,359	19,683	80,649

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

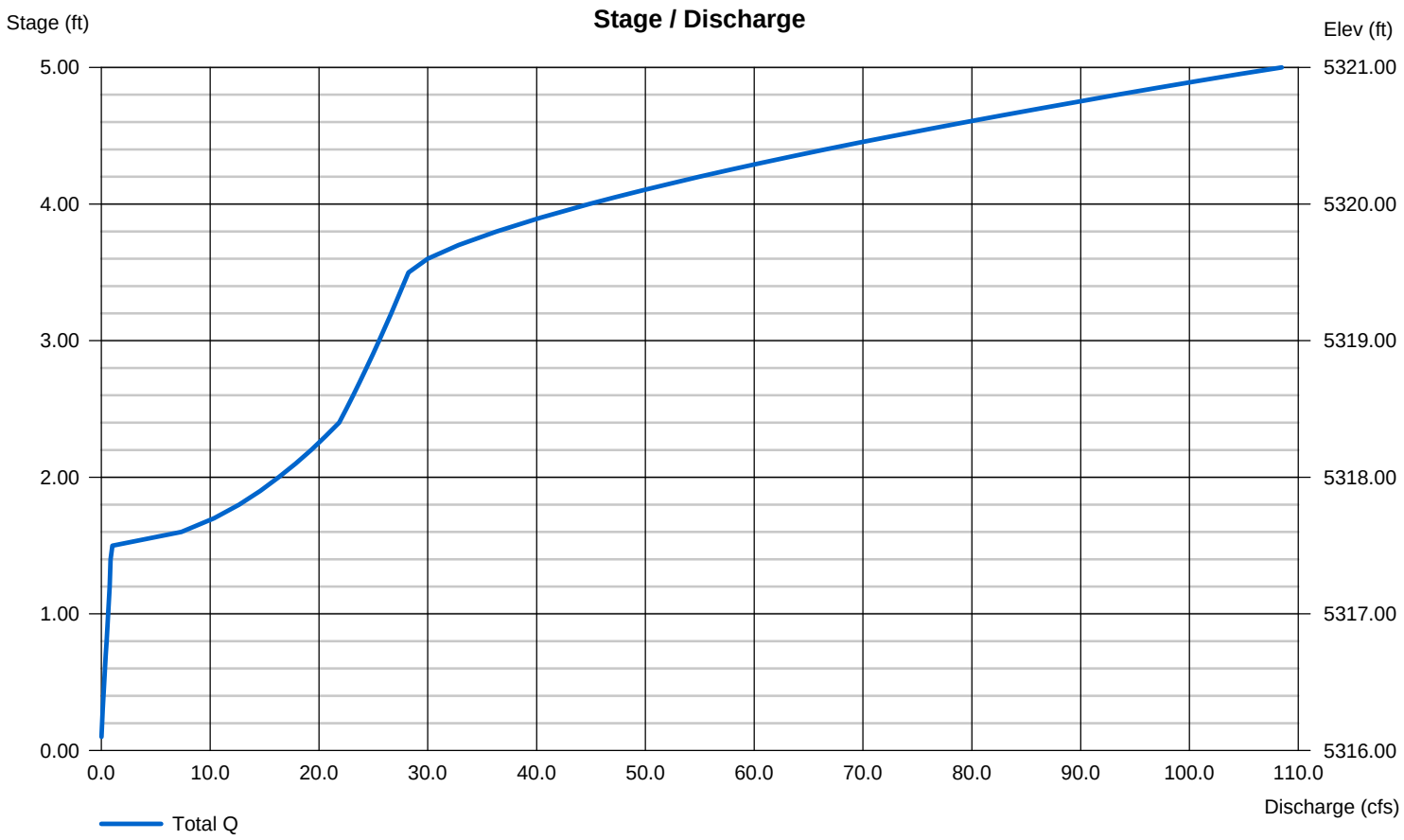
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	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).



Hydrograph Report

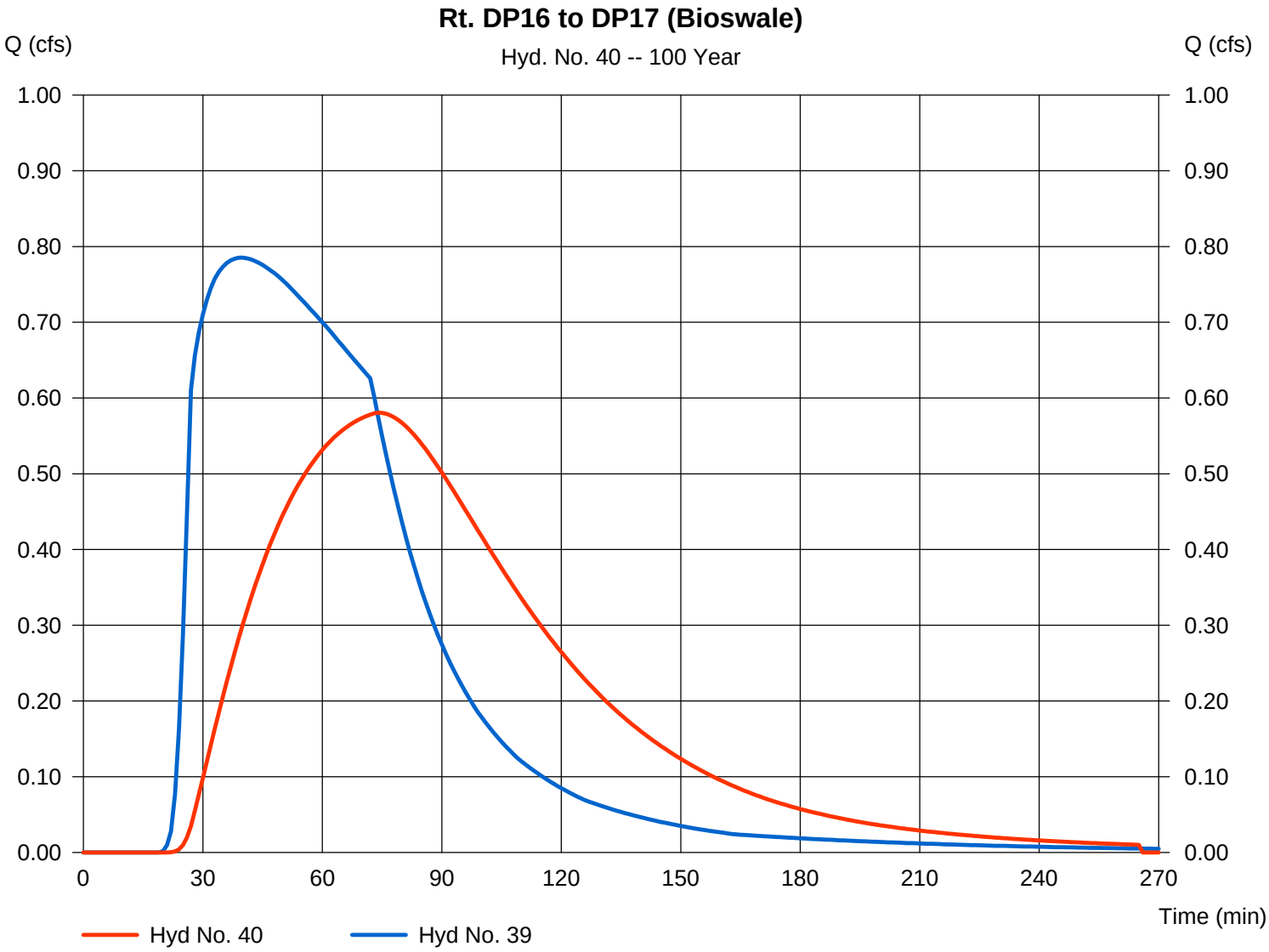
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 40

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	0.581 cfs
Storm frequency	=	100 yrs	Time to peak	=	74 min
Time interval	=	1 min	Hyd. volume	=	2,964 cuft
Inflow hyd. No.	=	39 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	0.55 ft/s	Routing coeff.	=	0.0356

Modified Att-Kin routing method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 42

A

Hydrograph type	=	Rational	Peak discharge	=	8.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	11,493 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.66
Intensity	=	5.652 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

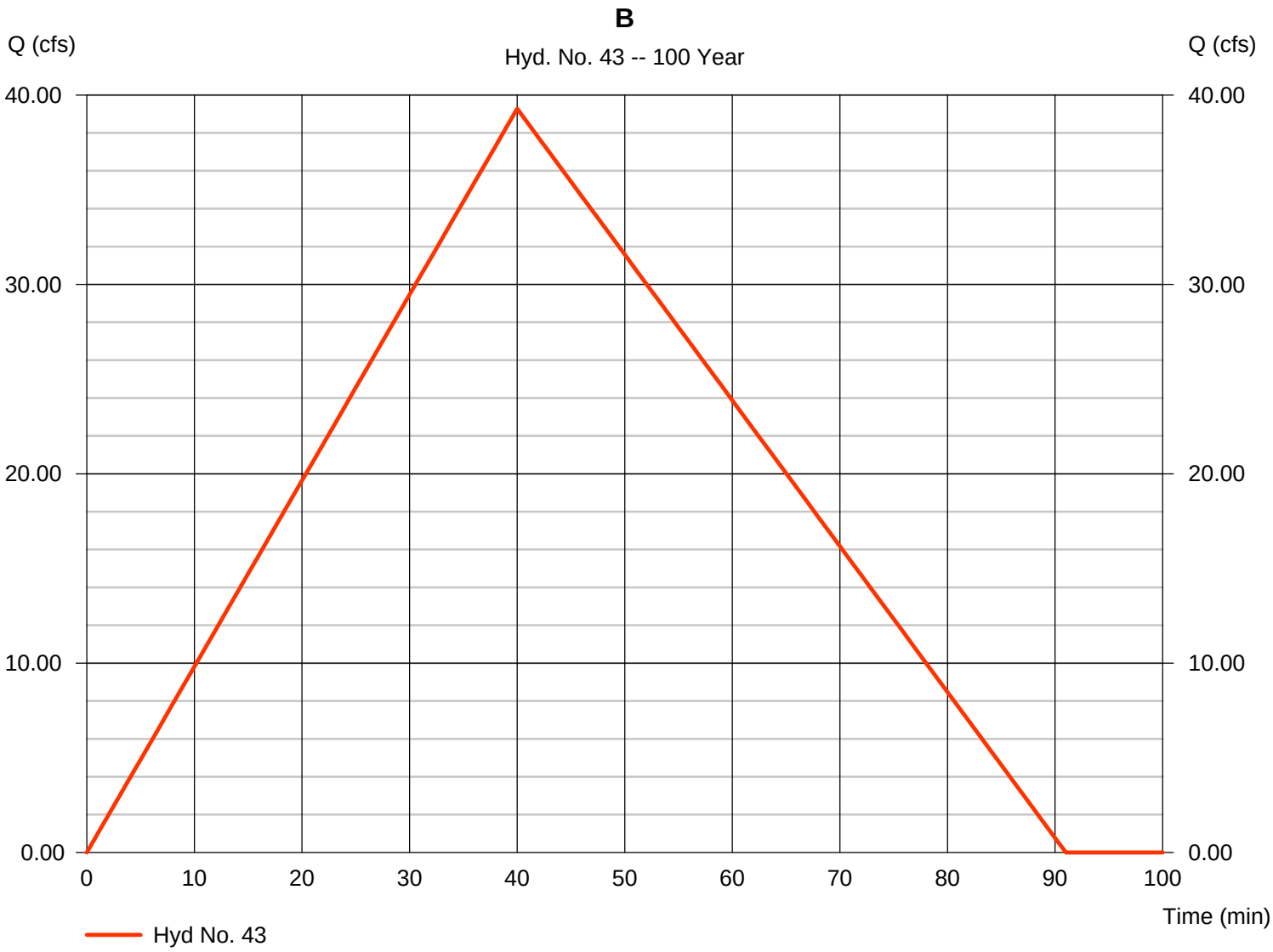
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 43

B

Hydrograph type	=	Rational	Peak discharge	=	39.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	108,409 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.7
Intensity	=	3.378 in/hr	Tc by User	=	40.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



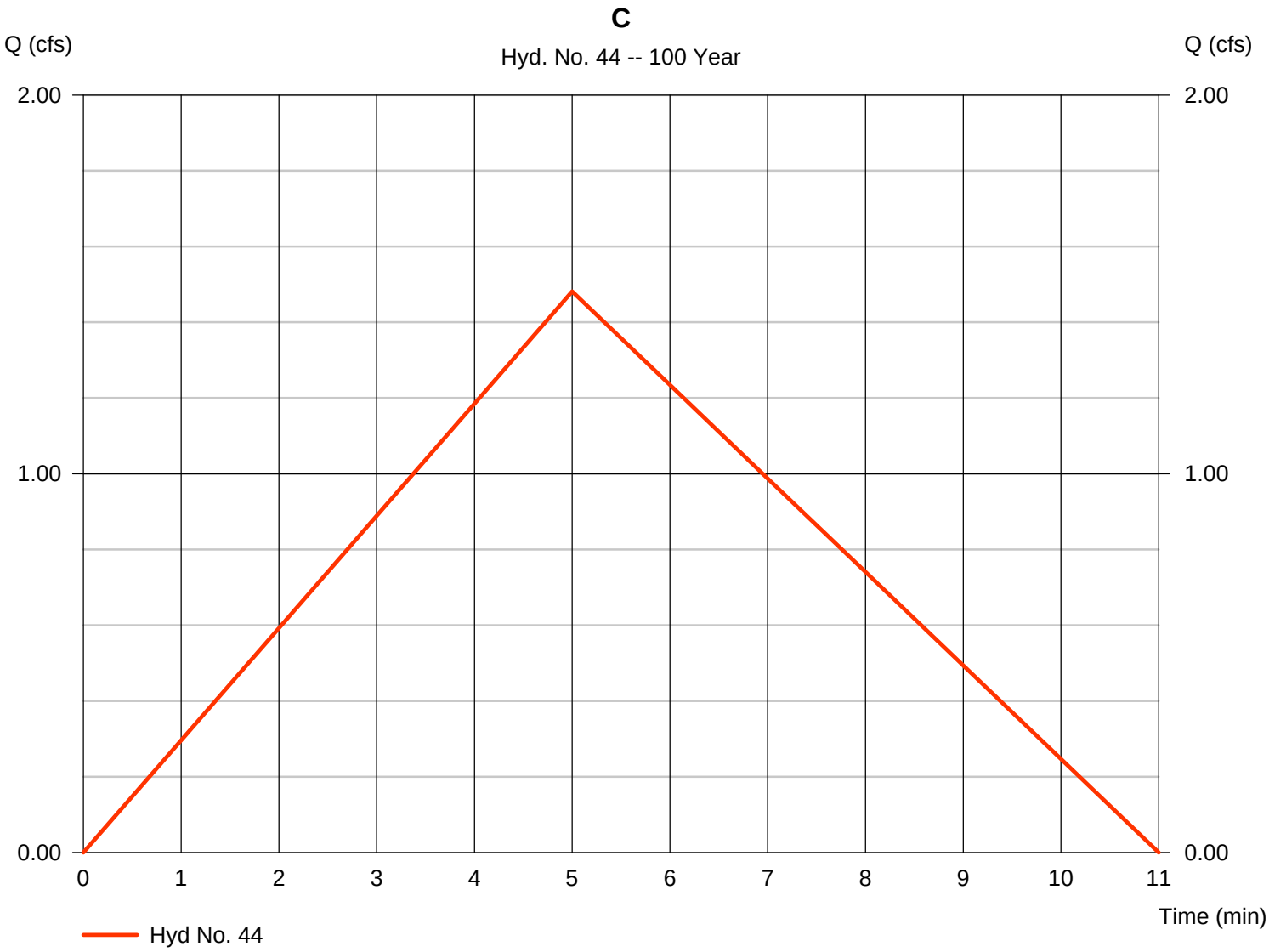
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 44

C

Hydrograph type	=	Rational	Peak discharge	=	1.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.64
Intensity	=	11.574 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



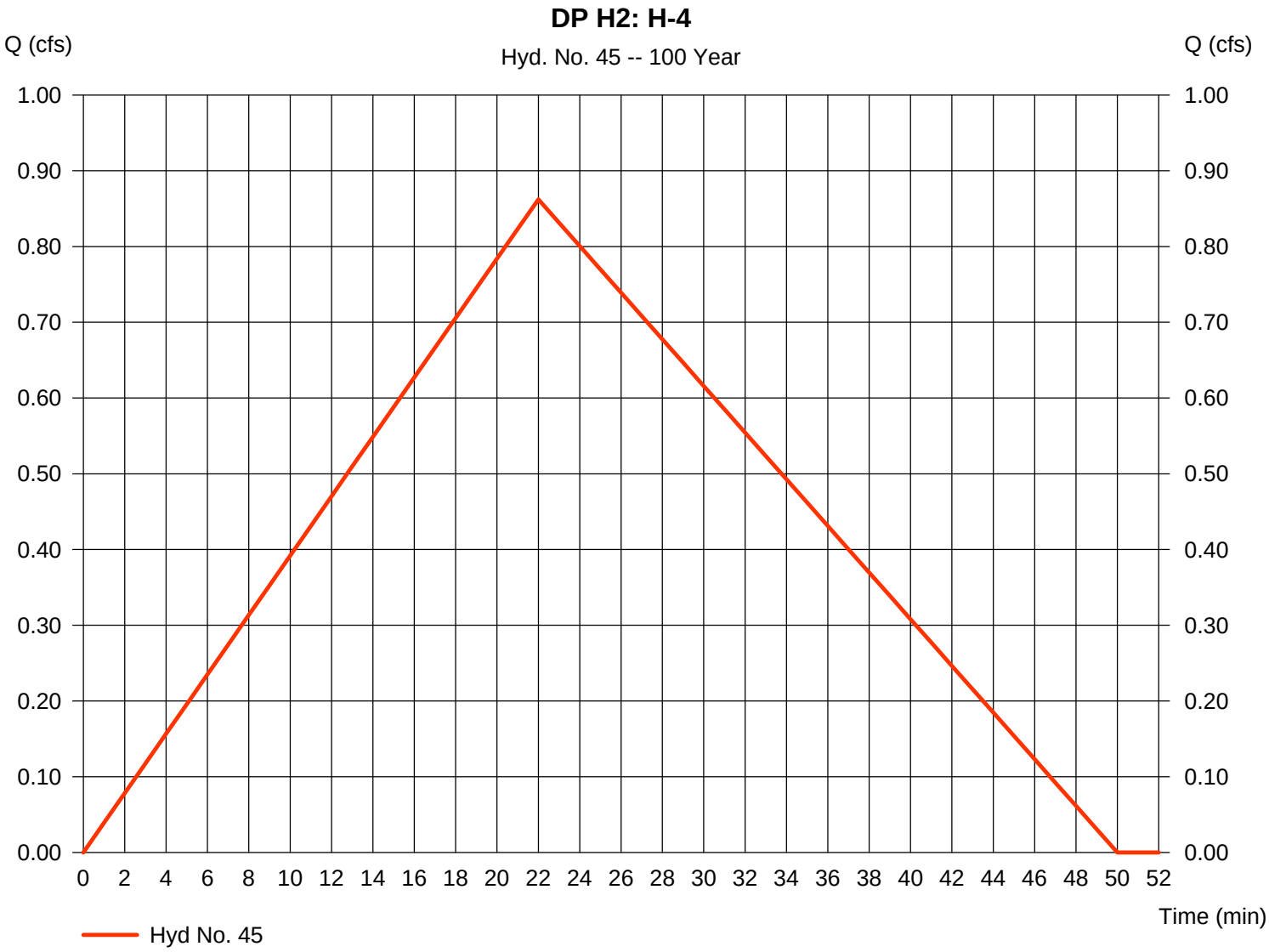
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 45

DP H2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	1,309 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.6
Intensity	=	5.132 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



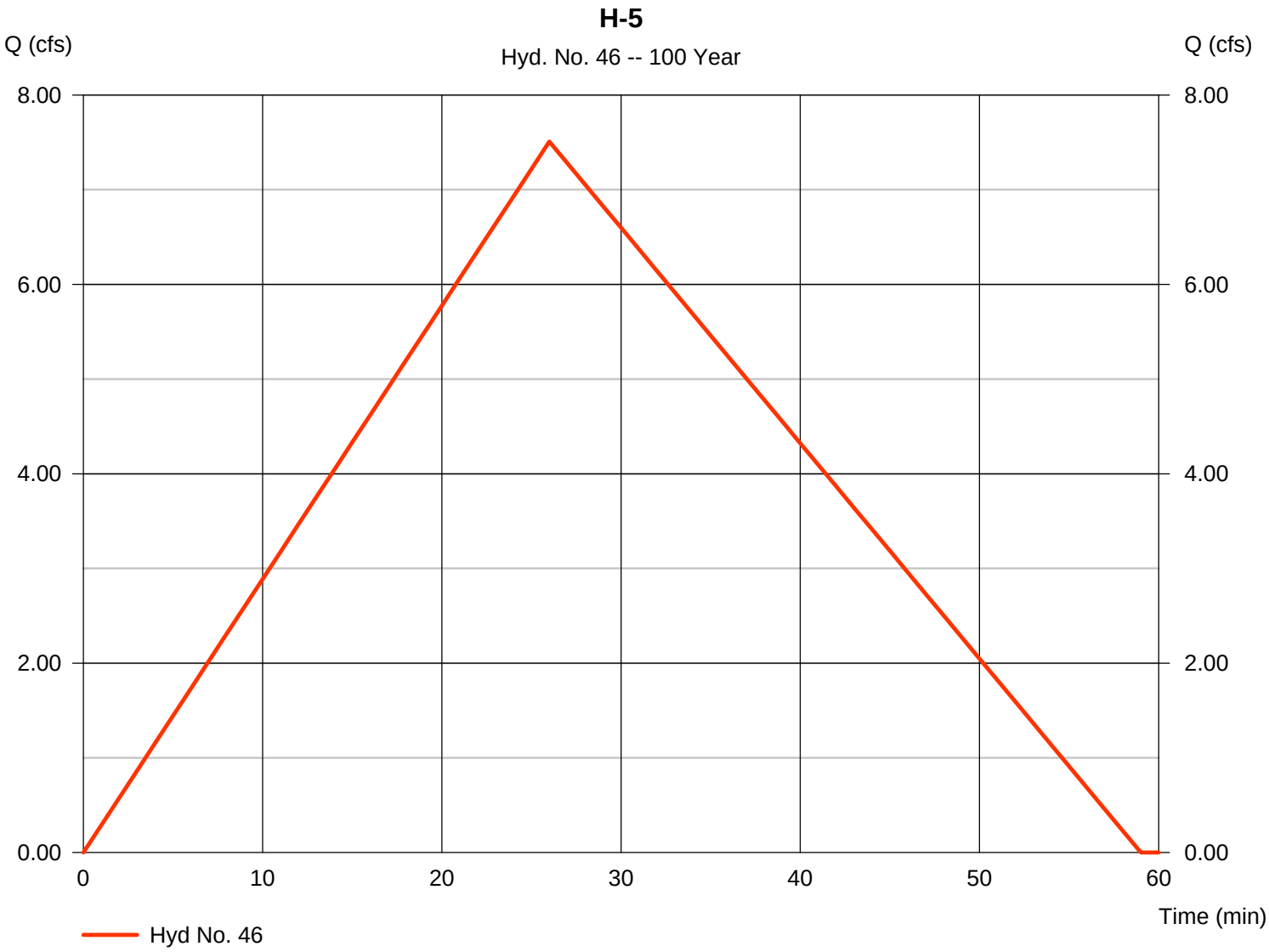
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 46

H-5

Hydrograph type	=	Rational	Peak discharge	=	7.508 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	13,469 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.6
Intensity	=	4.584 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



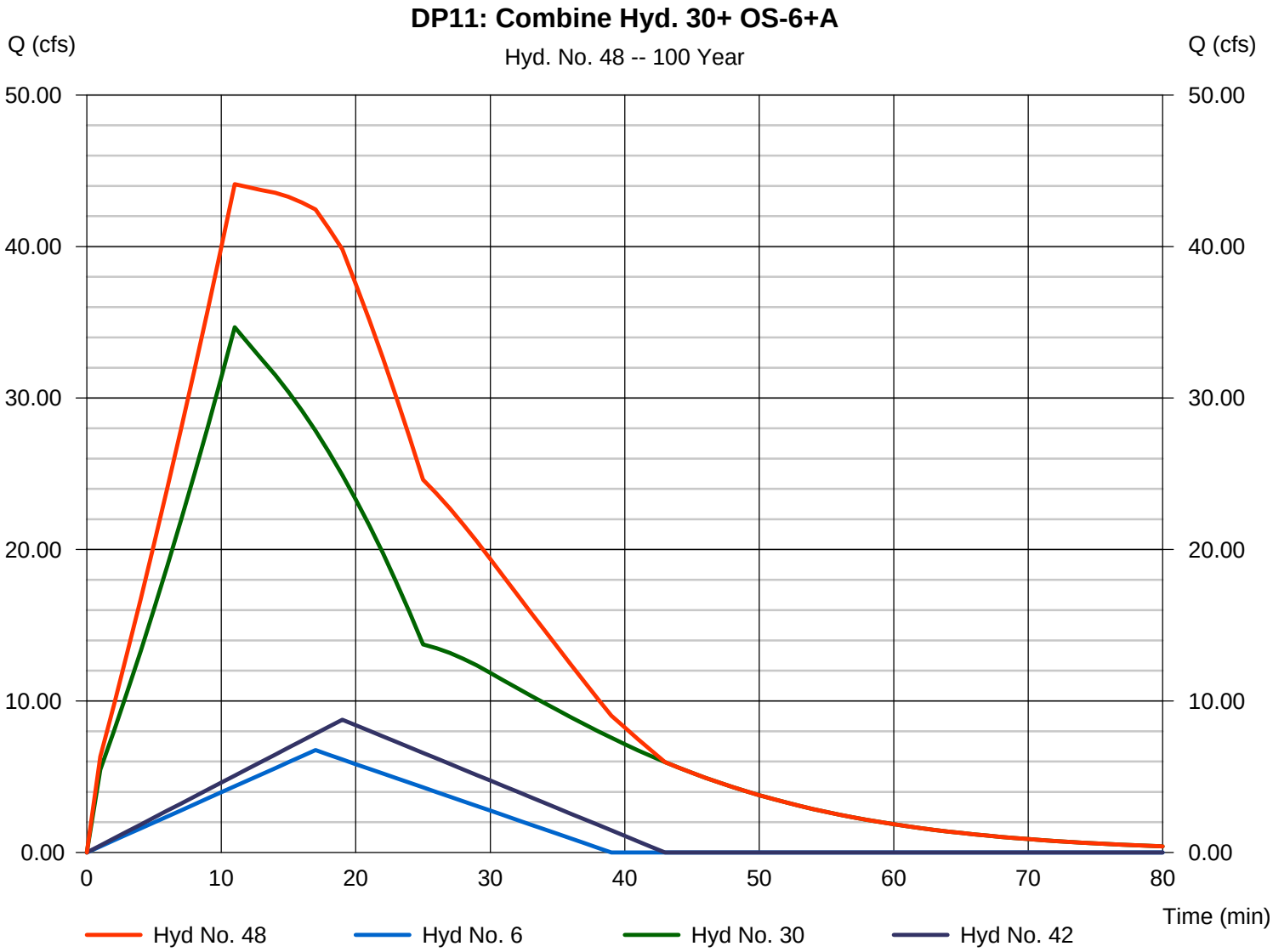
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 48

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	=	Combine	Peak discharge	=	44.12 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	68,350 cuft
Inflow hyds.	=	6, 30, 42	Contrib. drain. area	=	3.940 ac



Hydrograph Report

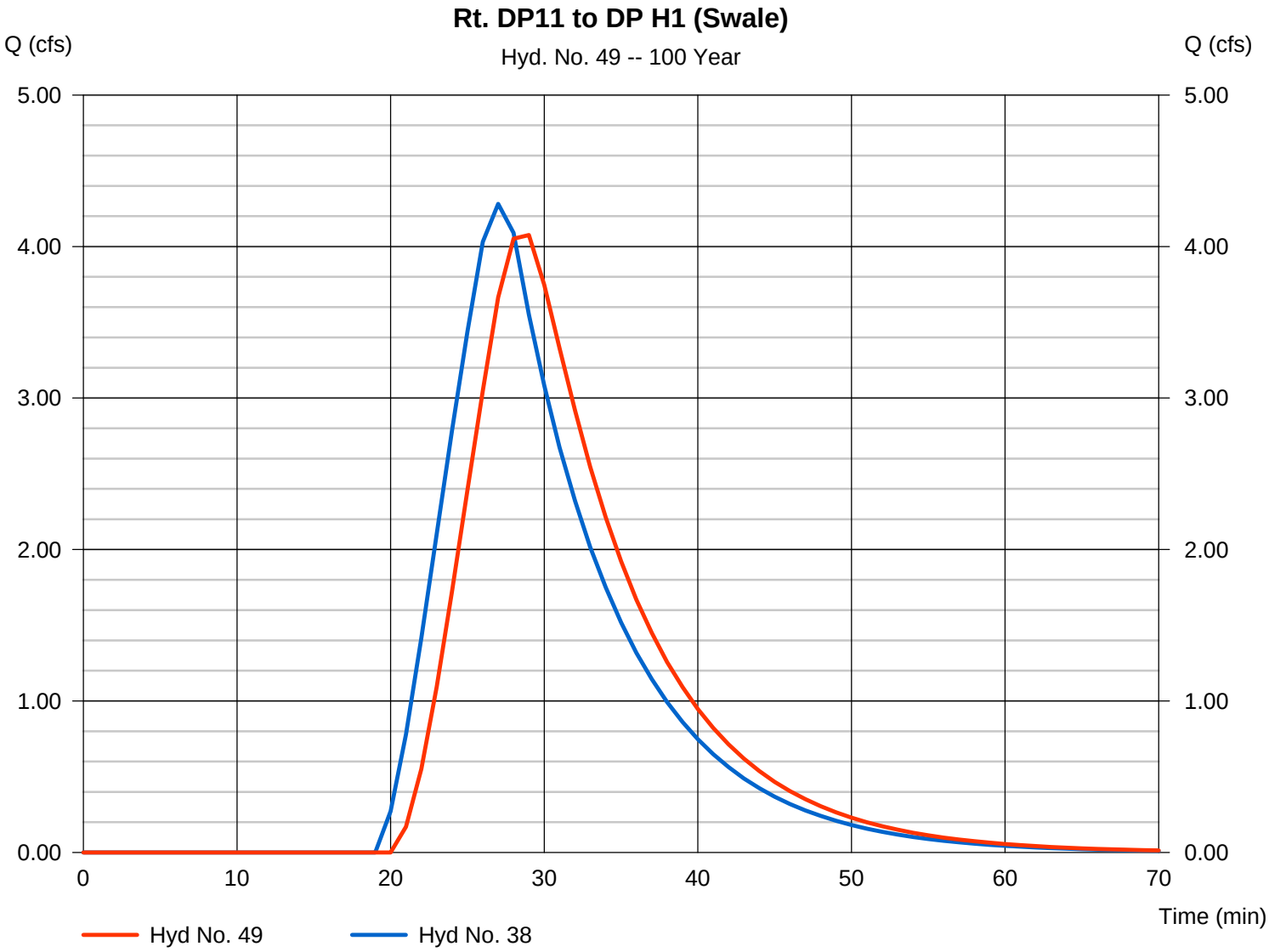
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 49

Rt. DP11 to DP H1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	4.076 cfs
Storm frequency	=	100 yrs	Time to peak	=	29 min
Time interval	=	1 min	Hyd. volume	=	3,001 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	2.48 ft/s	Routing coeff.	=	0.6270

Modified Att-Kin routing method used.



Hydrograph Report

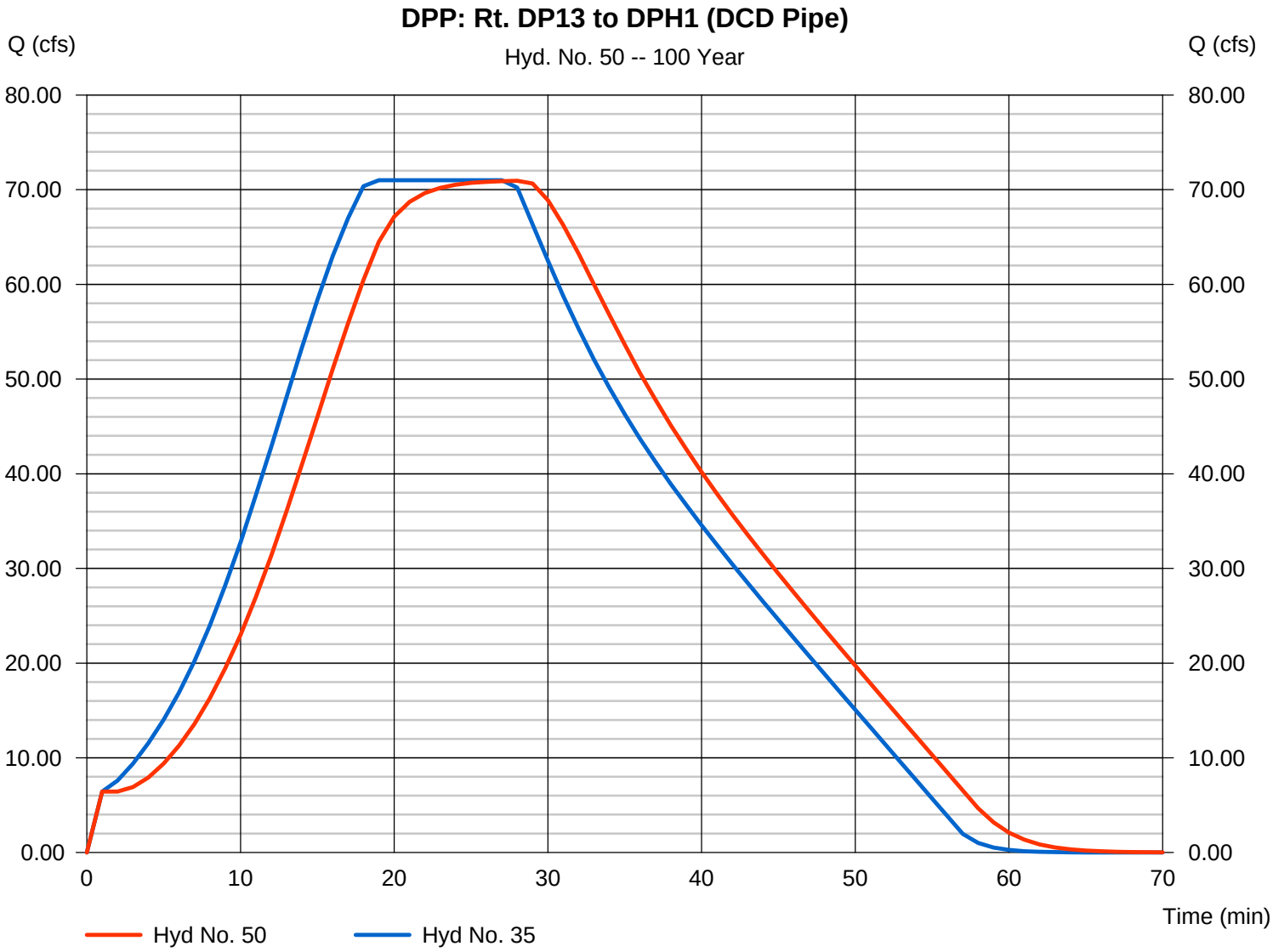
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 50

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	70.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	28 min
Time interval	=	1 min	Hyd. volume	=	132,844 cuft
Inflow hyd. No.	=	35 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	7.38 ft/s	Routing coeff.	=	0.4079

Modified Att-Kin routing method used.



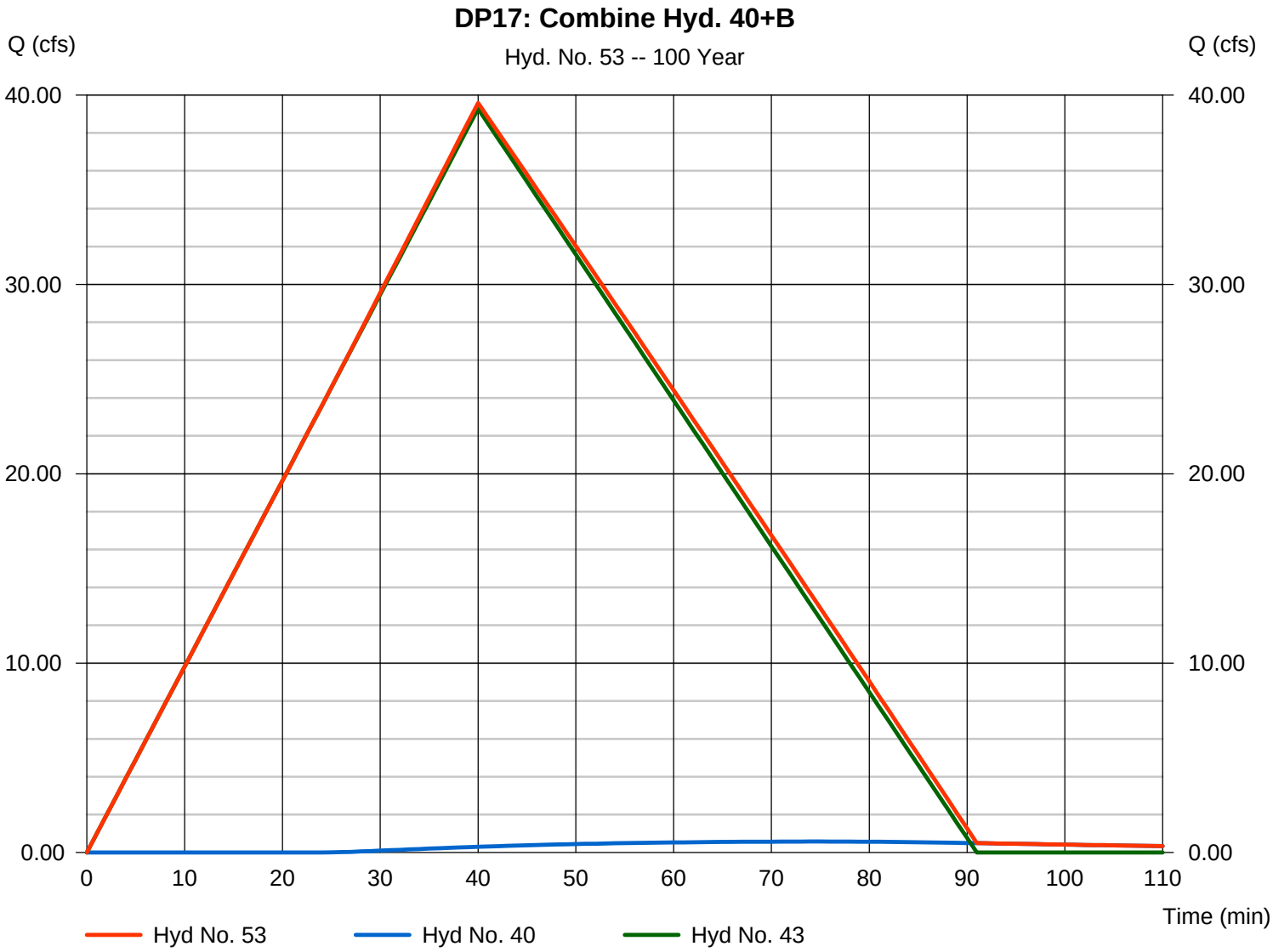
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 53

DP17: Combine Hyd. 40+B

Hydrograph type	=	Combine	Peak discharge	=	39.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	110,195 cuft
Inflow hyds.	=	40, 43	Contrib. drain. area	=	16.610 ac



Hydrograph Report

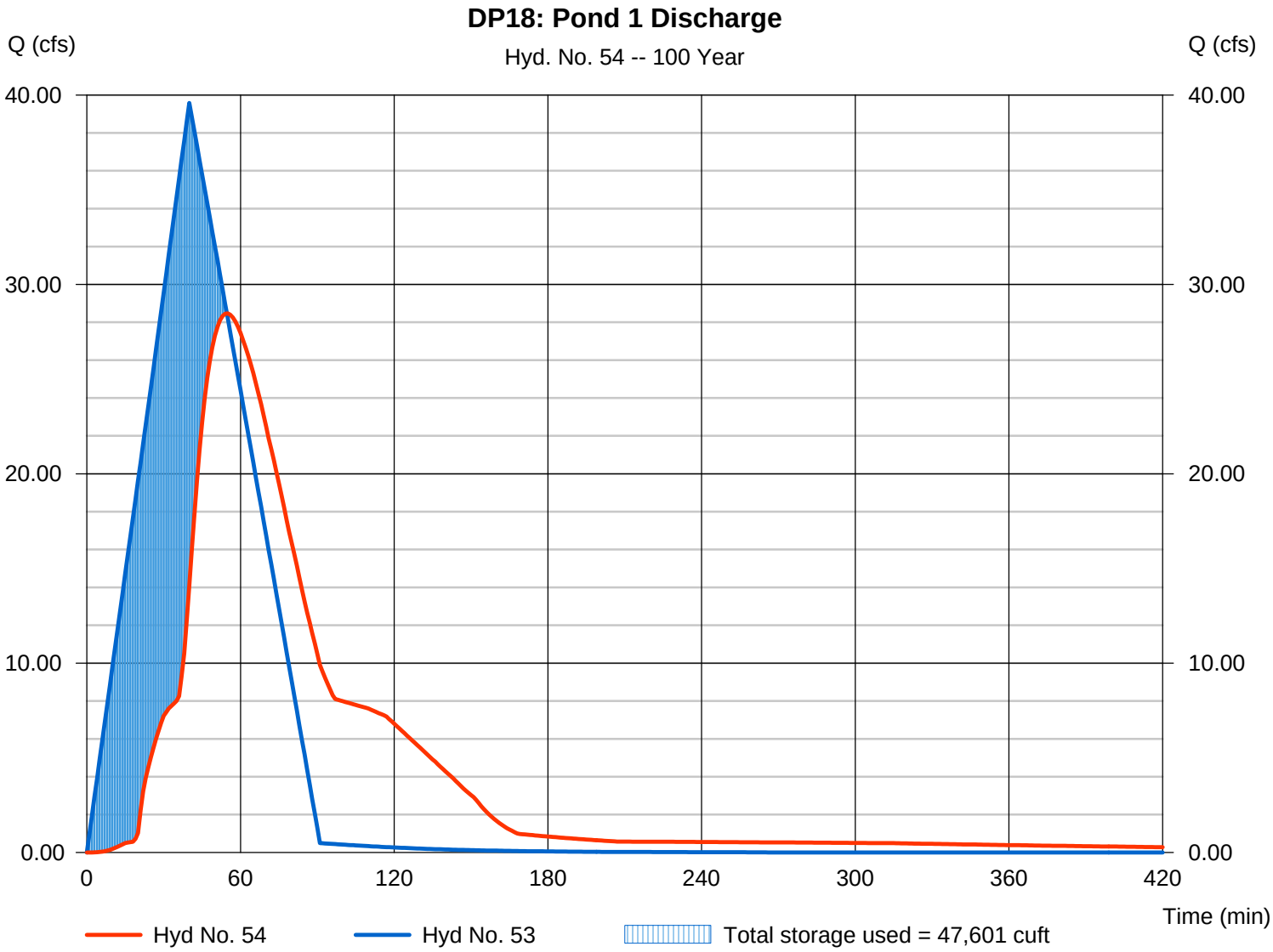
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 54

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	28.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	55 min
Time interval	=	1 min	Hyd. volume	=	110,163 cuft
Inflow hyd. No.	=	53 - DP17: Combine Hyd. 40+B	Max. Elevation	=	5314.83 ft
Reservoir name	=	Detention Pond	Max. Storage	=	47,601 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 1 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

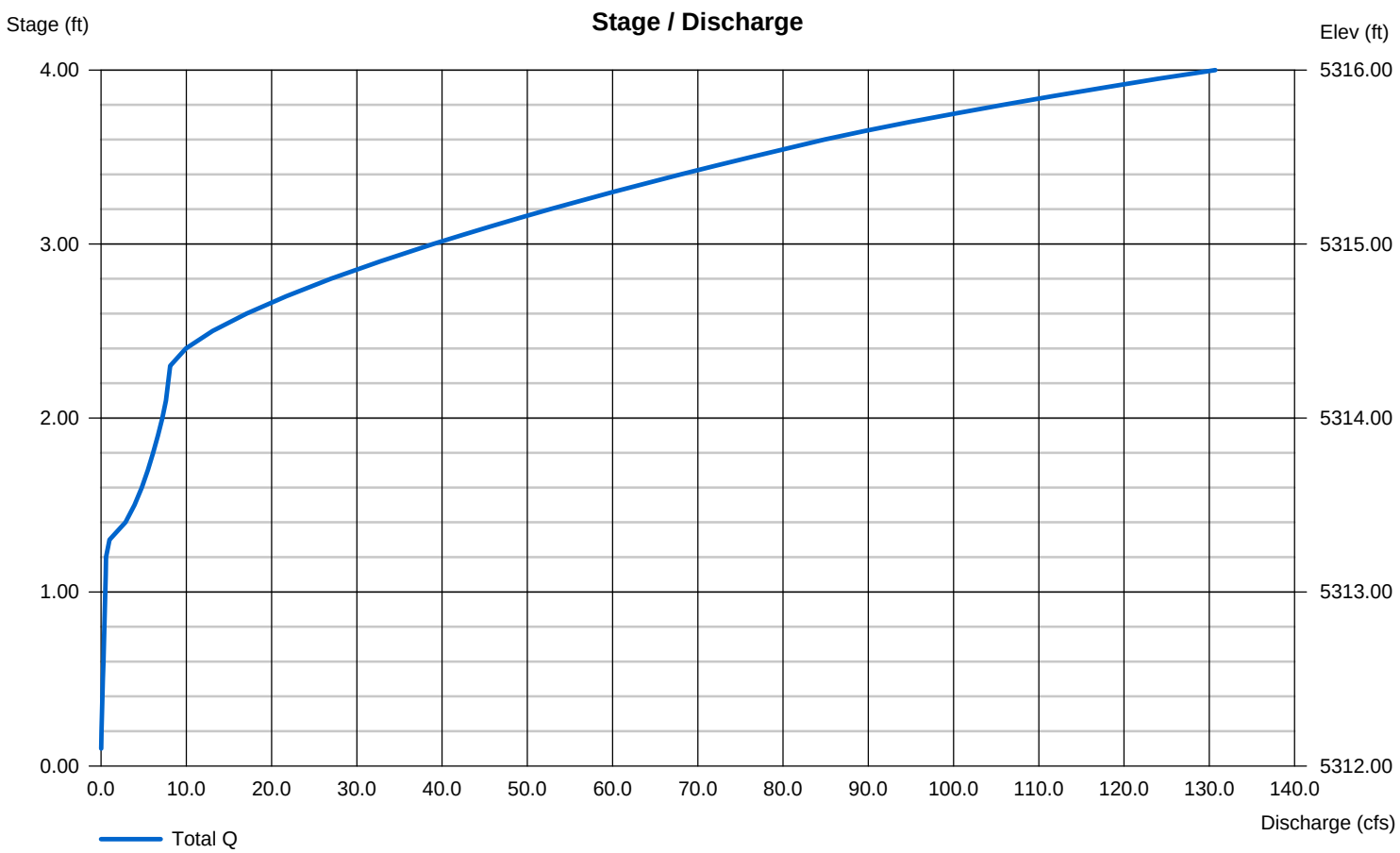
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



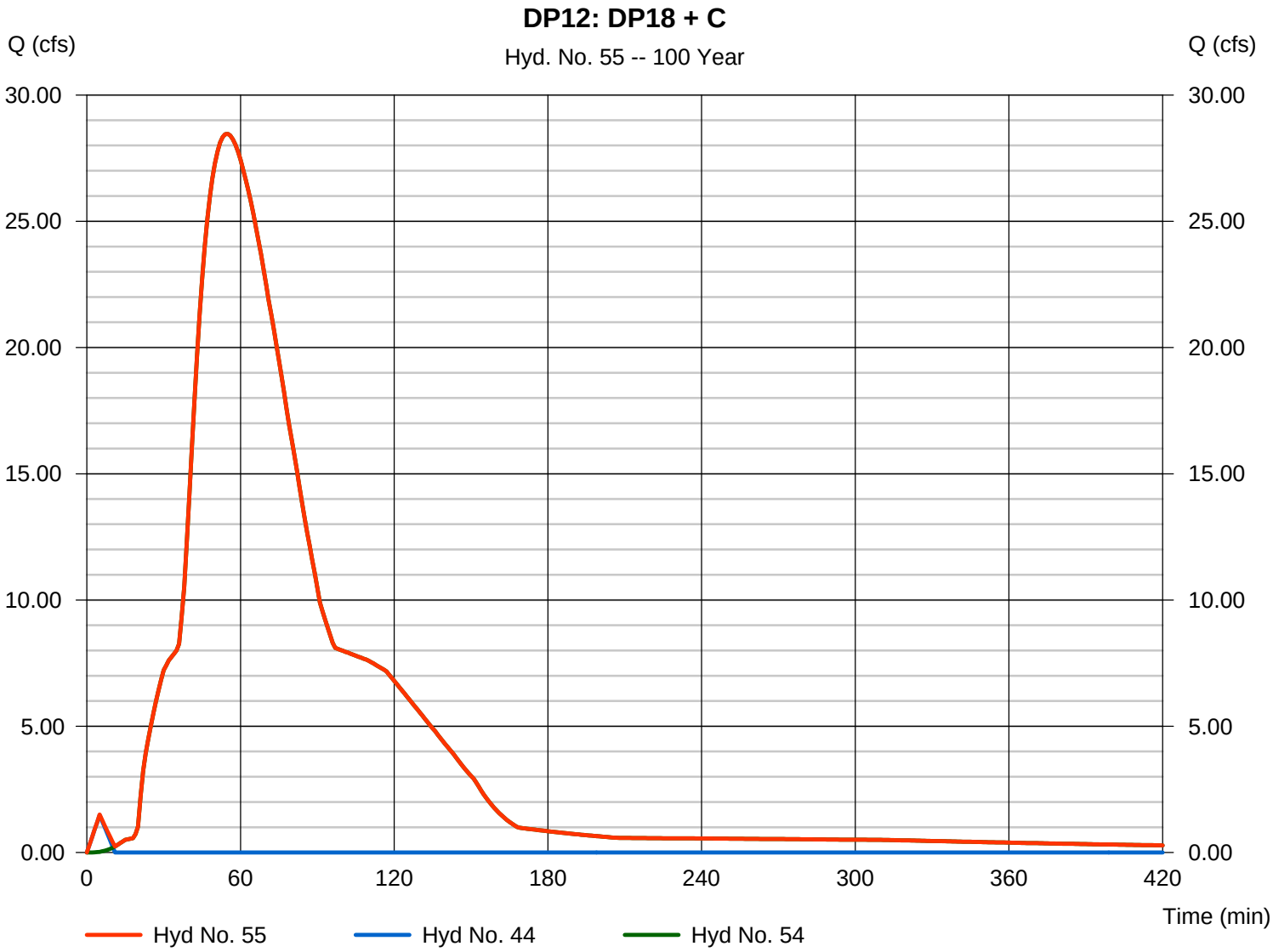
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 55

DP12: DP18 + C

Hydrograph type	=	Combine	Peak discharge	=	28.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	55 min
Time interval	=	1 min	Hyd. volume	=	110,652 cuft
Inflow hyds.	=	44, 54	Contrib. drain. area	=	0.200 ac



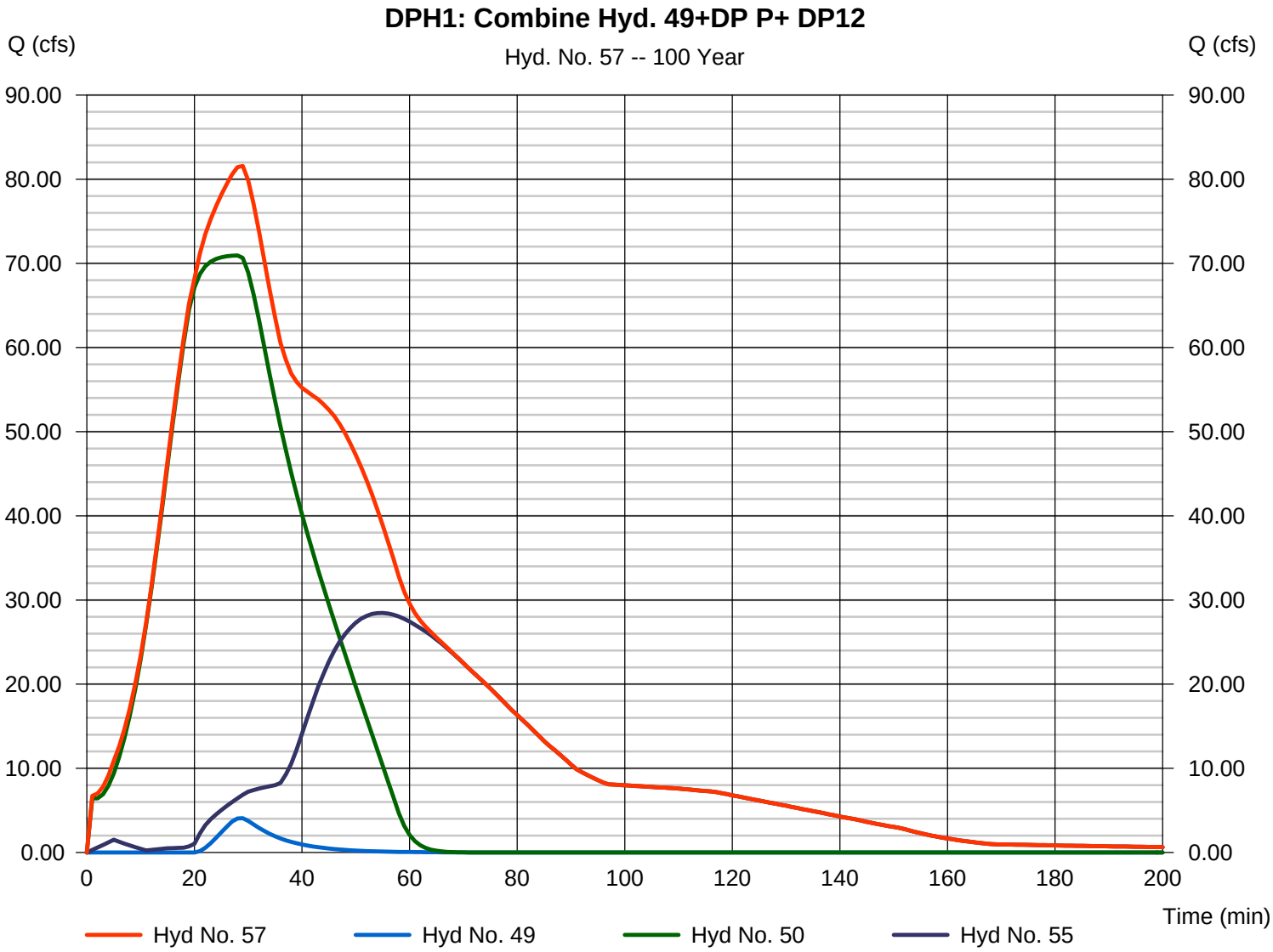
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 57

DPH1: Combine Hyd. 49+DP P+ DP12

Hydrograph type	= Combine	Peak discharge	= 81.56 cfs
Storm frequency	= 100 yrs	Time to peak	= 29 min
Time interval	= 1 min	Hyd. volume	= 246,497 cuft
Inflow hyds.	= 49, 50, 55	Contrib. drain. area	= 0.000 ac



Hydrograph Report

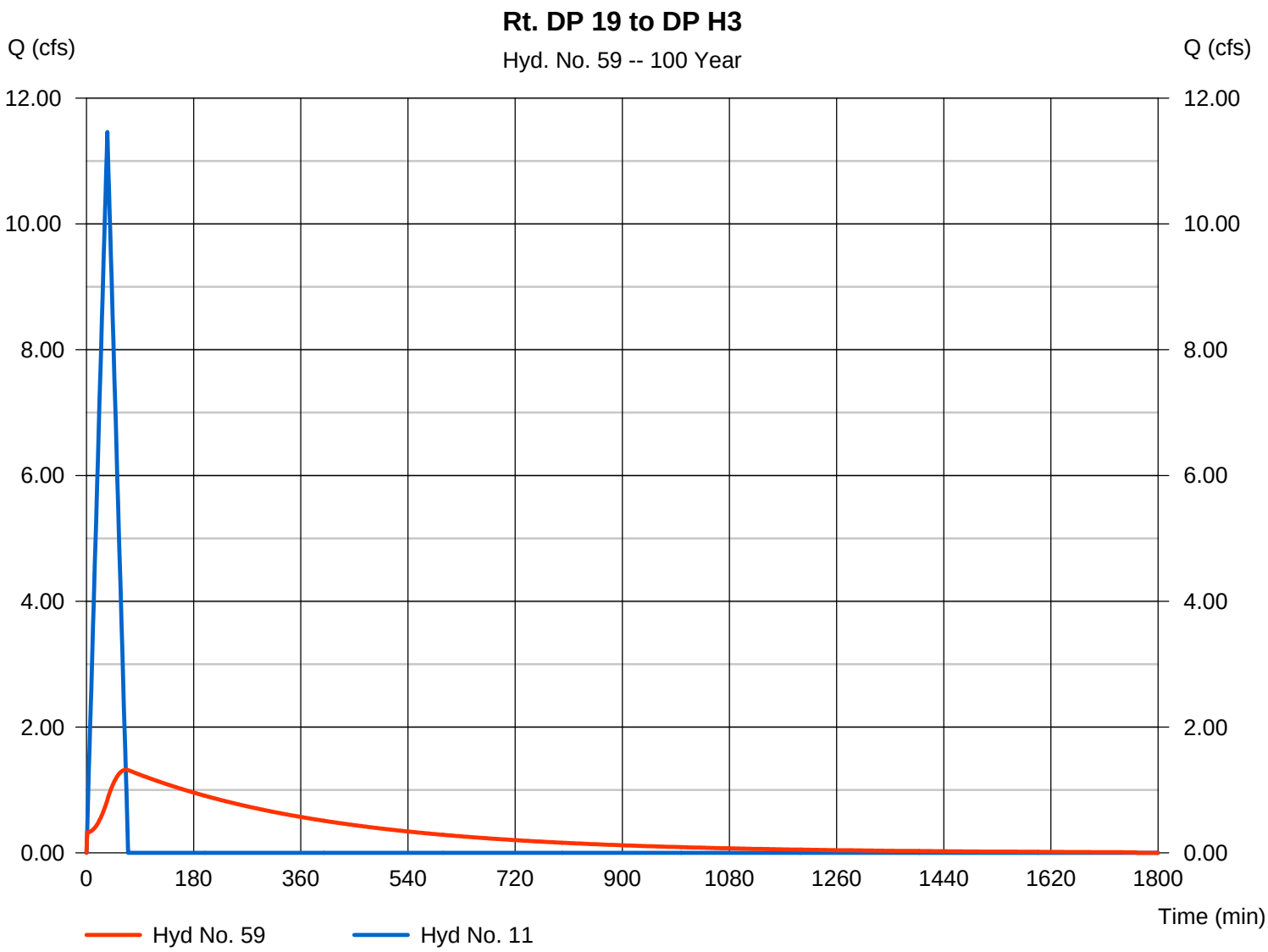
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 59

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	1.321 cfs
Storm frequency	=	100 yrs	Time to peak	=	66 min
Time interval	=	1 min	Hyd. volume	=	30,687 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.03 ft/s	Routing coeff.	=	0.0029

Modified Att-Kin routing method used.



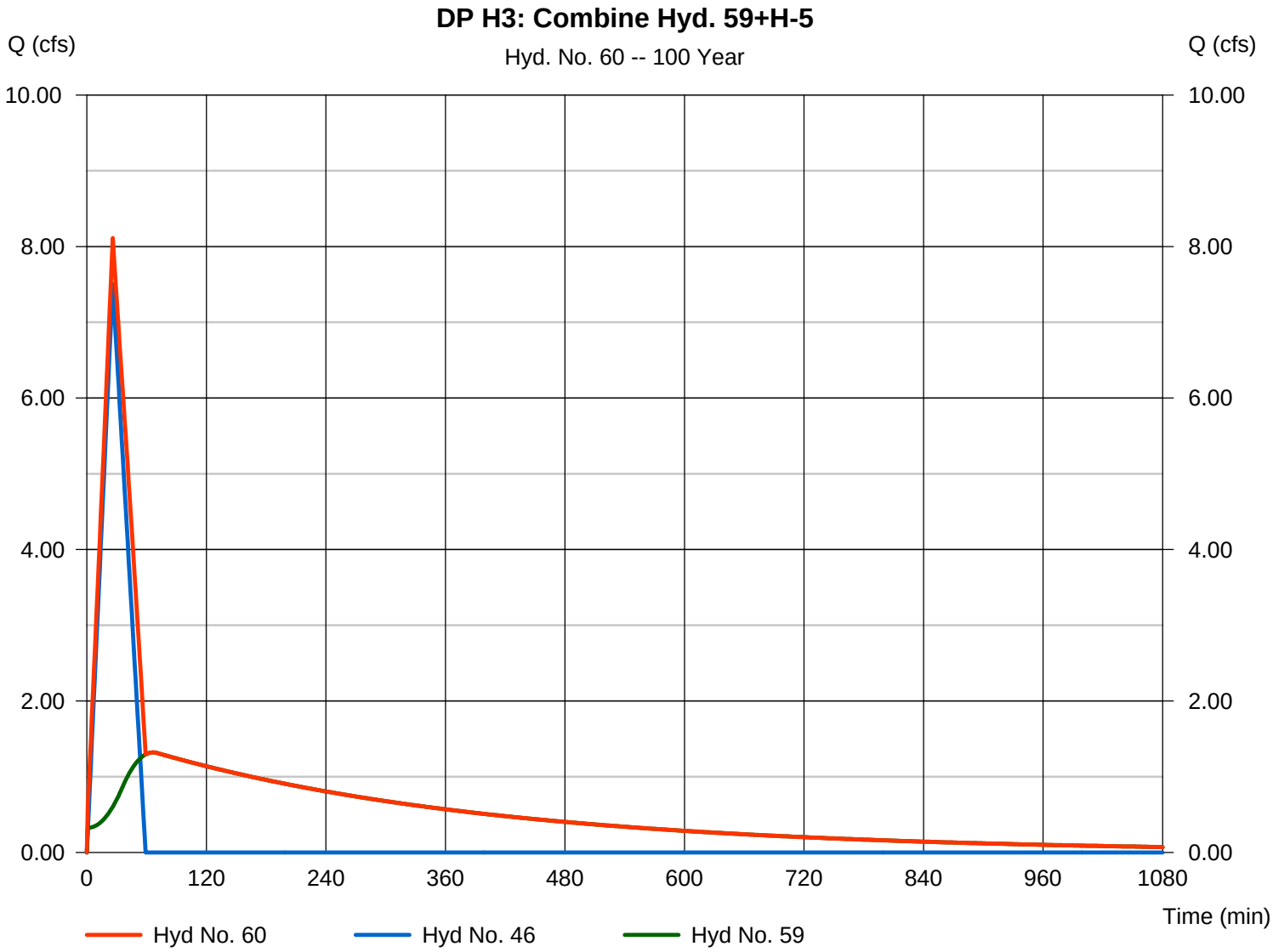
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 60

DP H3: Combine Hyd. 59+H-5

Hydrograph type	=	Combine	Peak discharge	=	8.112 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	43,976 cuft
Inflow hyds.	=	46, 59	Contrib. drain. area	=	2.730 ac



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54951-DEV-100YR(irr=25).gpw

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	49.34	1	11	37,451	------	------	------	OS-1
2	Rational	24.60	1	10	16,975	------	------	------	OS-2
3	Rational	4.250	1	12	3,519	------	------	------	OS-3
4	Rational	15.32	1	13	13,744	------	------	------	OS-4
5	Rational	27.51	1	11	20,884	------	------	------	OS-5
6	Rational	6.755	1	17	7,924	------	------	------	OS-6
7	Rational	7.995	1	11	6,068	------	------	------	OS-7
8	Rational	7.012	1	9	4,355	------	------	------	OS-8
9	Rational	30.26	1	25	52,190	------	------	------	OS-9
10	Rational	29.49	1	25	50,878	------	------	------	OS-10
11	Rational	11.46	1	35	24,066	------	------	------	DP 19: OS-11
13	Reach	49.15	1	12	37,287	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	69.65	1	12	53,524	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	58.26	1	15	55,180	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	65.57	1	14	62,830	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	32.78	1	14	31,415	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	32.78	1	14	31,415	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	20.28	1	22	34,490	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	30.89	1	17	32,083	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	34.72	1	14	53,817	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	17.36	1	14	26,908	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	17.36	1	14	26,908	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	13.94	1	23	28,502	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	34.67	1	11	49,138	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	52.44	1	19	83,819	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	51.83	1	21	84,469	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Combine	78.93	1	25	134,905	10, 33	------	------	DP10: Combine Hyd.33+OS-10
35	Diversion1	46.00	1	13	107,794	34	------	------	DP13: Split Flow to DCD Pipe
36	Diversion2	32.93	1	25	27,112	34	------	------	DP14: Split Flow to N.
38	Reach	28.54	1	27	27,109	36	------	------	Rt. DP14 to DP15 (Bioswale)
39	Reservoir	20.38	1	33	27,105	38	5318.29	8,960	DP16: Pond 2 Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reach	14.94	1	41	27,069	39	------	------	Rt. DP16 to DP17 (Bioswale)
42	Rational	8.766	1	19	11,493	------	------	------	A
43	Rational	39.28	1	40	108,409	------	------	------	B
44	Rational	1.481	1	5	511	------	------	------	C
45	Rational	0.862	1	22	1,309	------	------	------	DP H2: H-4
46	Rational	7.508	1	26	13,469	------	------	------	H-5
48	Combine	44.12	1	11	68,350	6, 30, 42,	------	------	DP11: Combine Hyd. 30+ OS-6+A
49	Reach	28.40	1	28	27,109	38	------	------	Rt. DP11 to DP H1 (Swale)
50	Reach	45.99	1	36	109,146	35	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
53	Combine	54.07	1	40	134,300	40, 43,	------	------	DP17: Combine Hyd. 40+B
54	Reservoir	40.20	1	50	134,268	53	5315.02	53,502	DP18: Pond 1 Discharge
55	Combine	40.20	1	50	134,757	44, 54	------	------	DP12: DP18 + C
57	Combine	81.60	1	29	271,013	49, 50, 55,	------	------	DPH1: Combine Hyd. 49+50+55
59	Reach	1.321	1	66	30,687	11	------	------	Rt. DP 19 to DP H3
60	Combine	8.112	1	26	43,976	46, 59	------	------	DP H3: Combine Hyd. 59+H-5

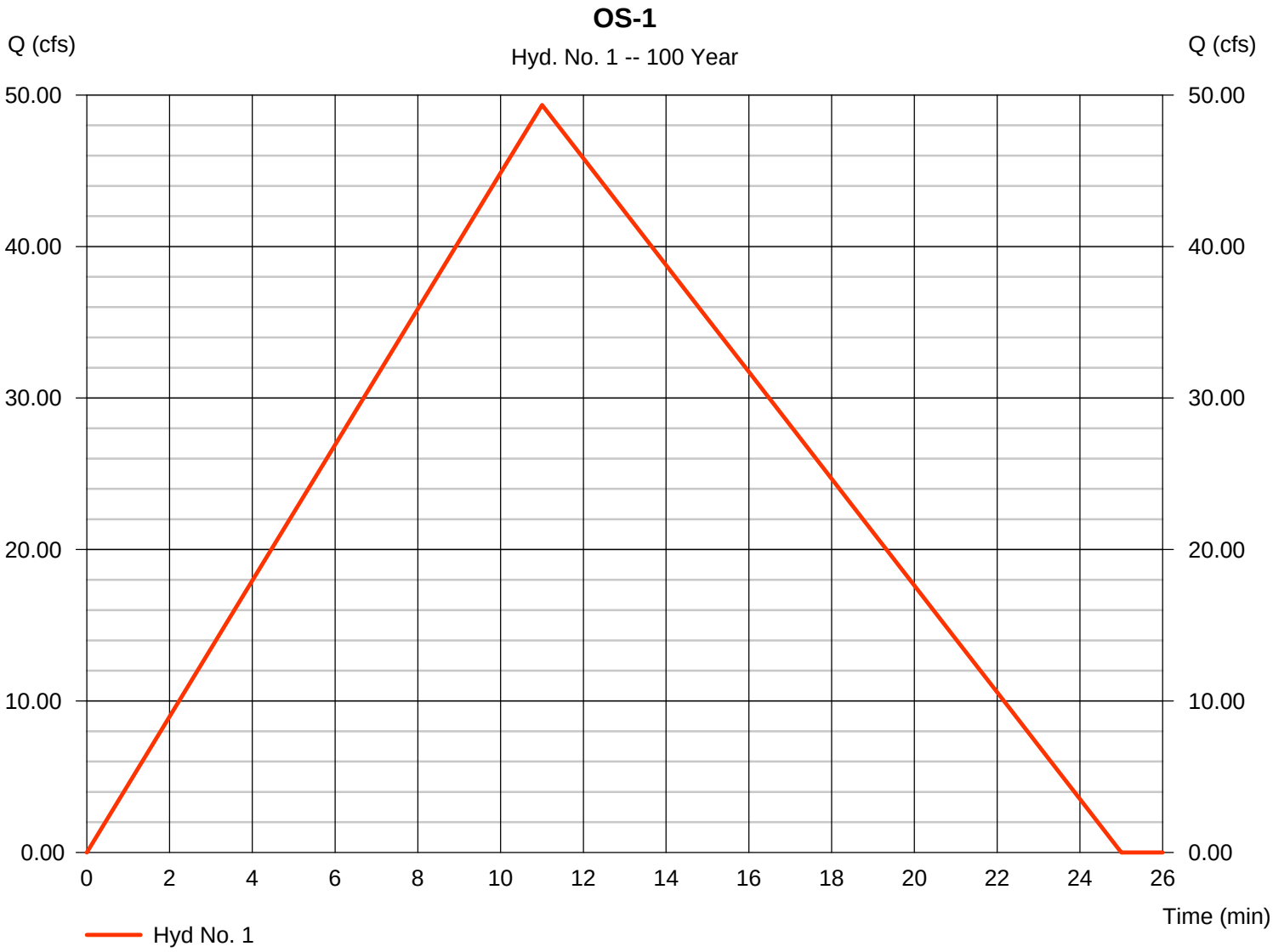
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	49.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	37,451 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.8
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



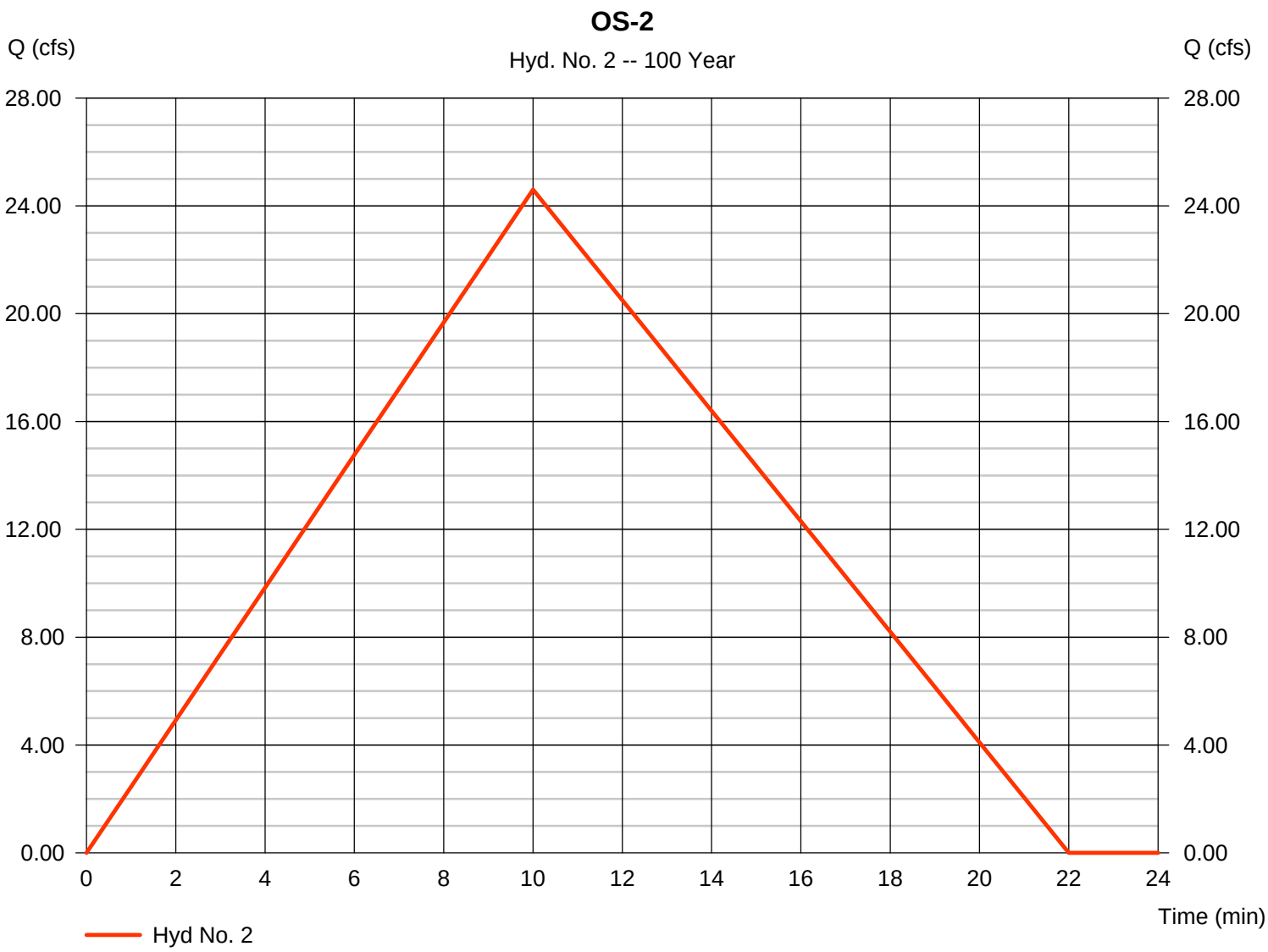
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	24.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	16,975 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.92
Intensity	=	8.305 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



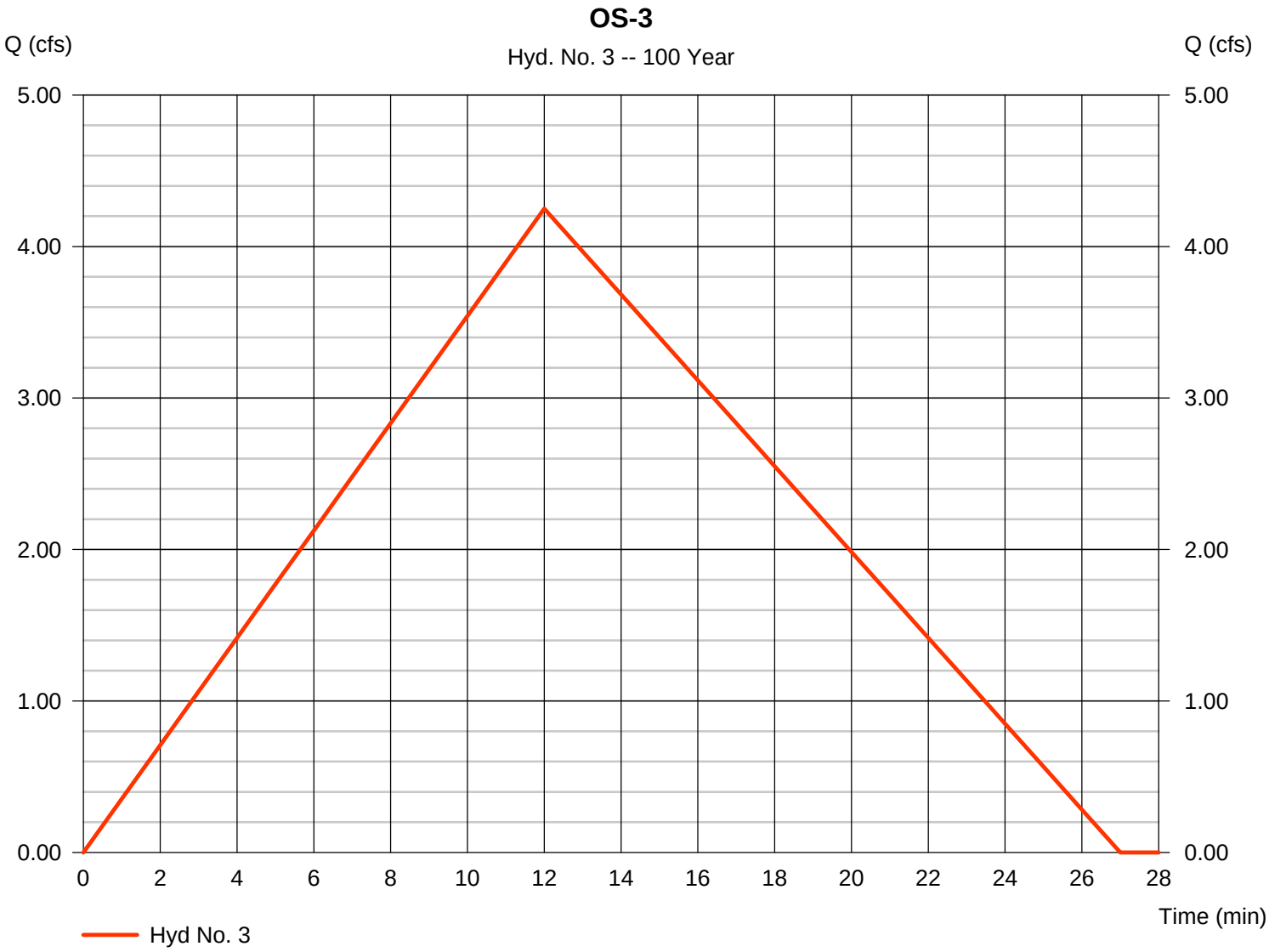
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	4.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,519 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.7
Intensity	=	7.496 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



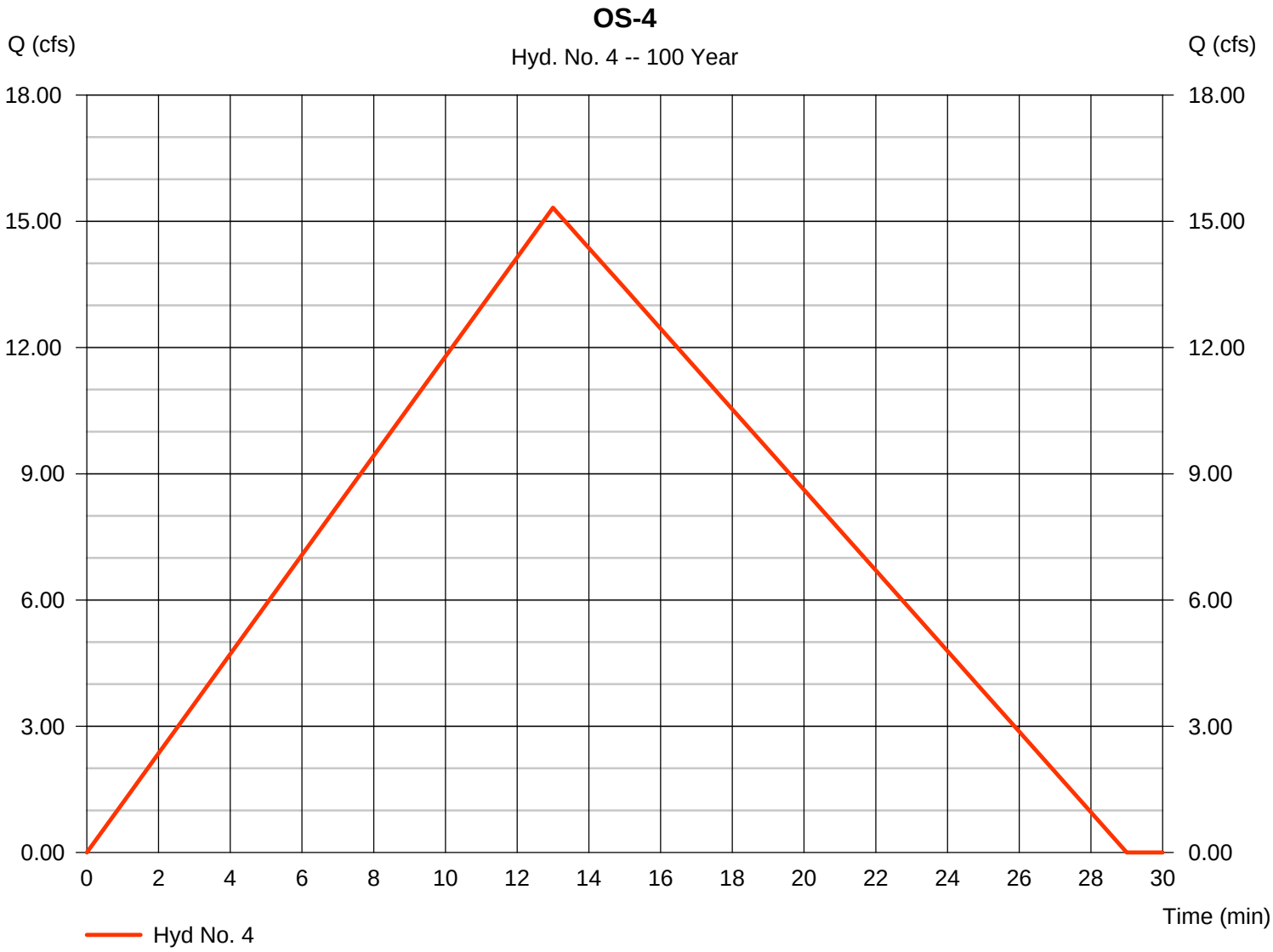
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	15.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	13,744 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.7
Intensity	=	7.153 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



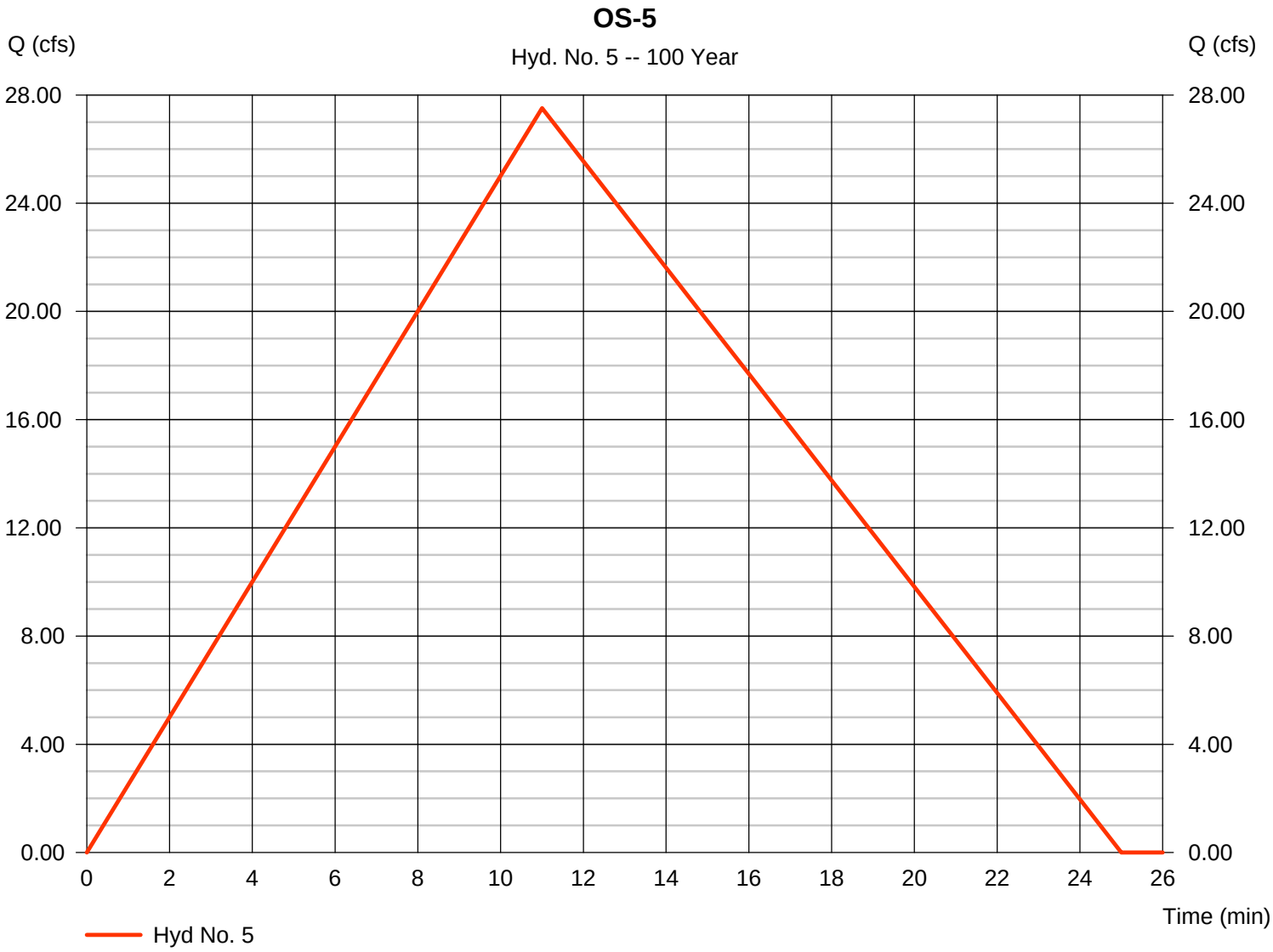
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	27.51 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	20,884 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



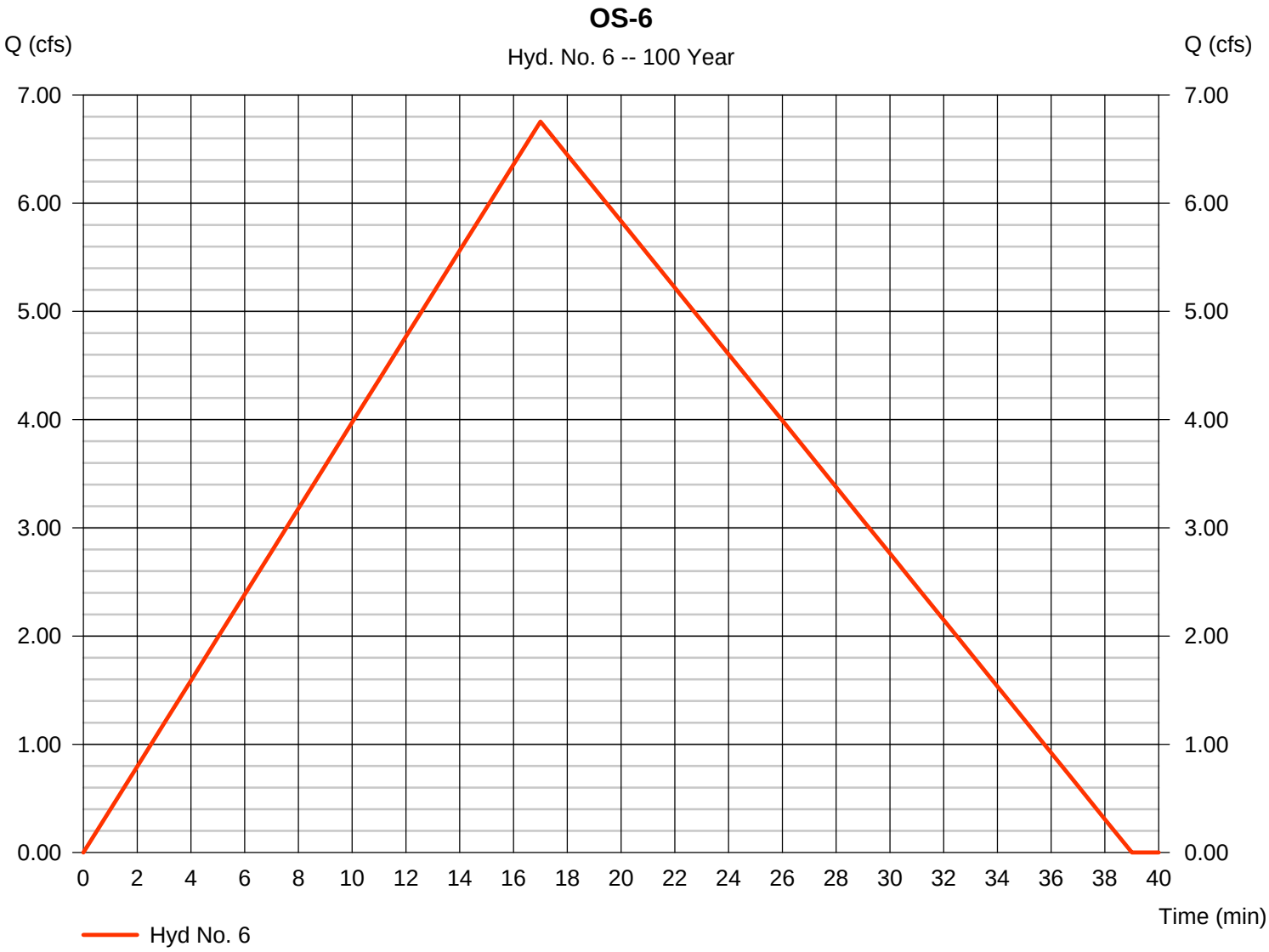
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	6.755 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	7,924 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.7
Intensity	=	6.069 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



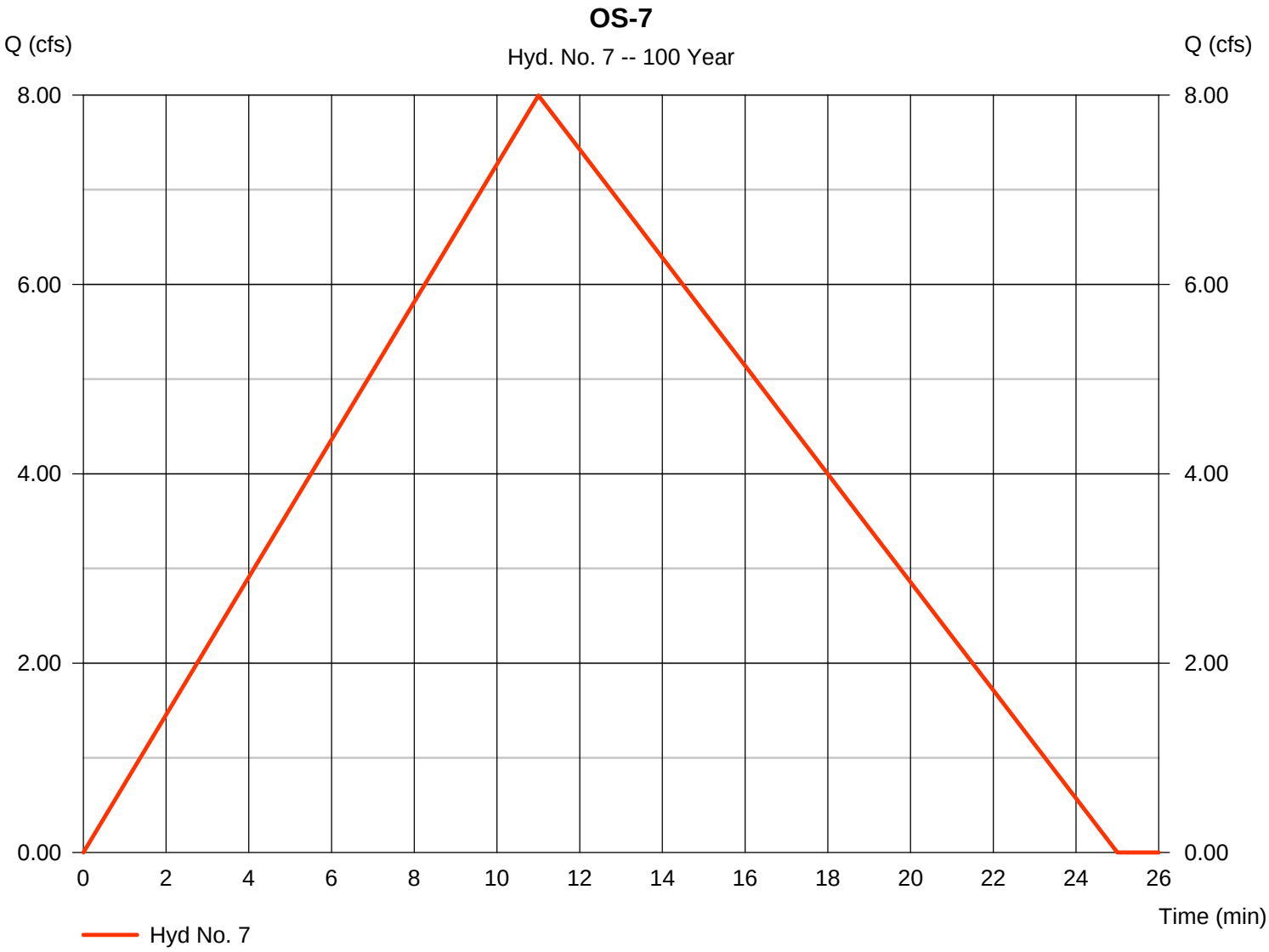
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	7.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	6,068 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



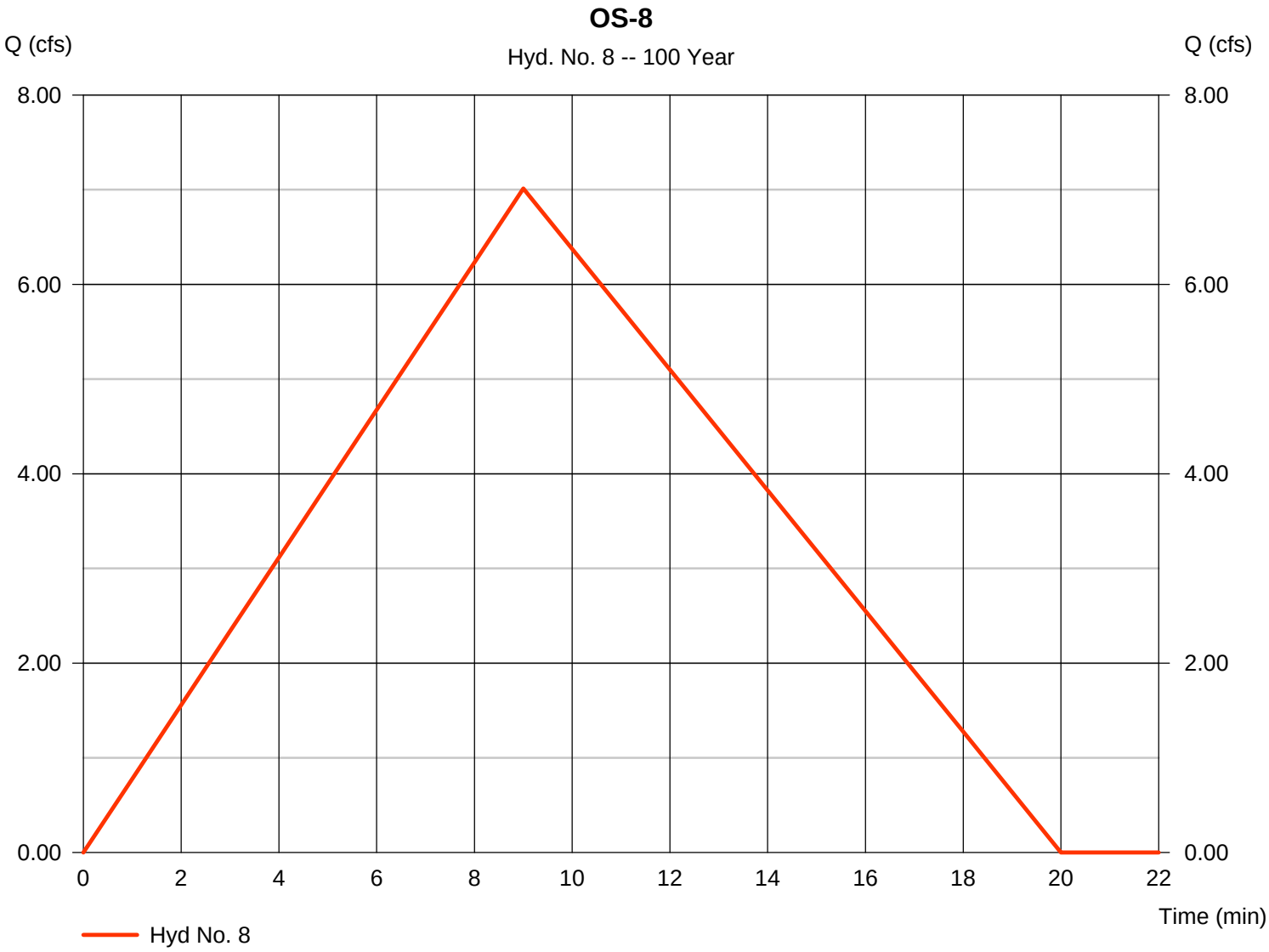
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	7.012 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	4,355 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.7
Intensity	=	8.787 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



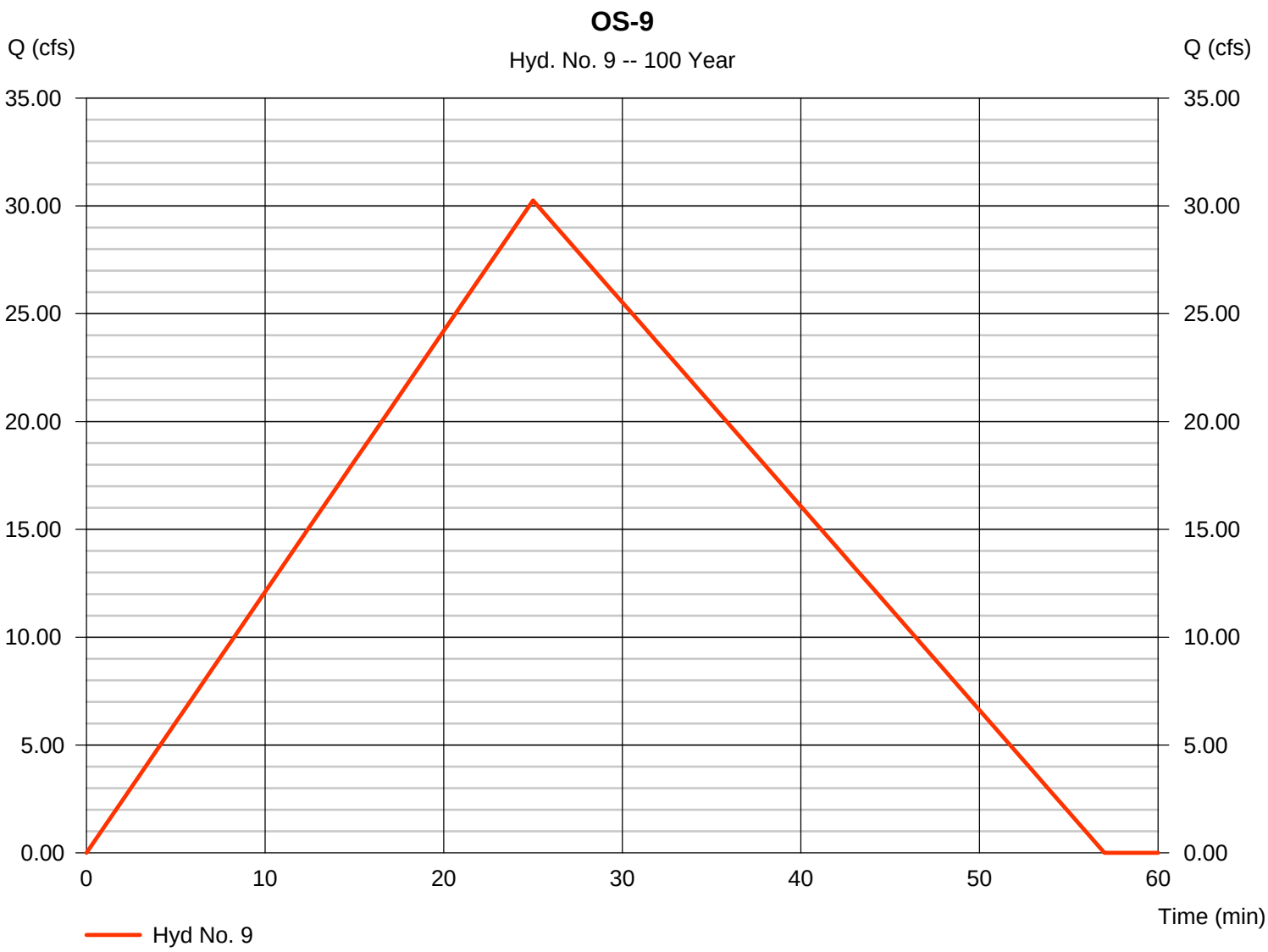
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	30.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	52,190 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.68
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



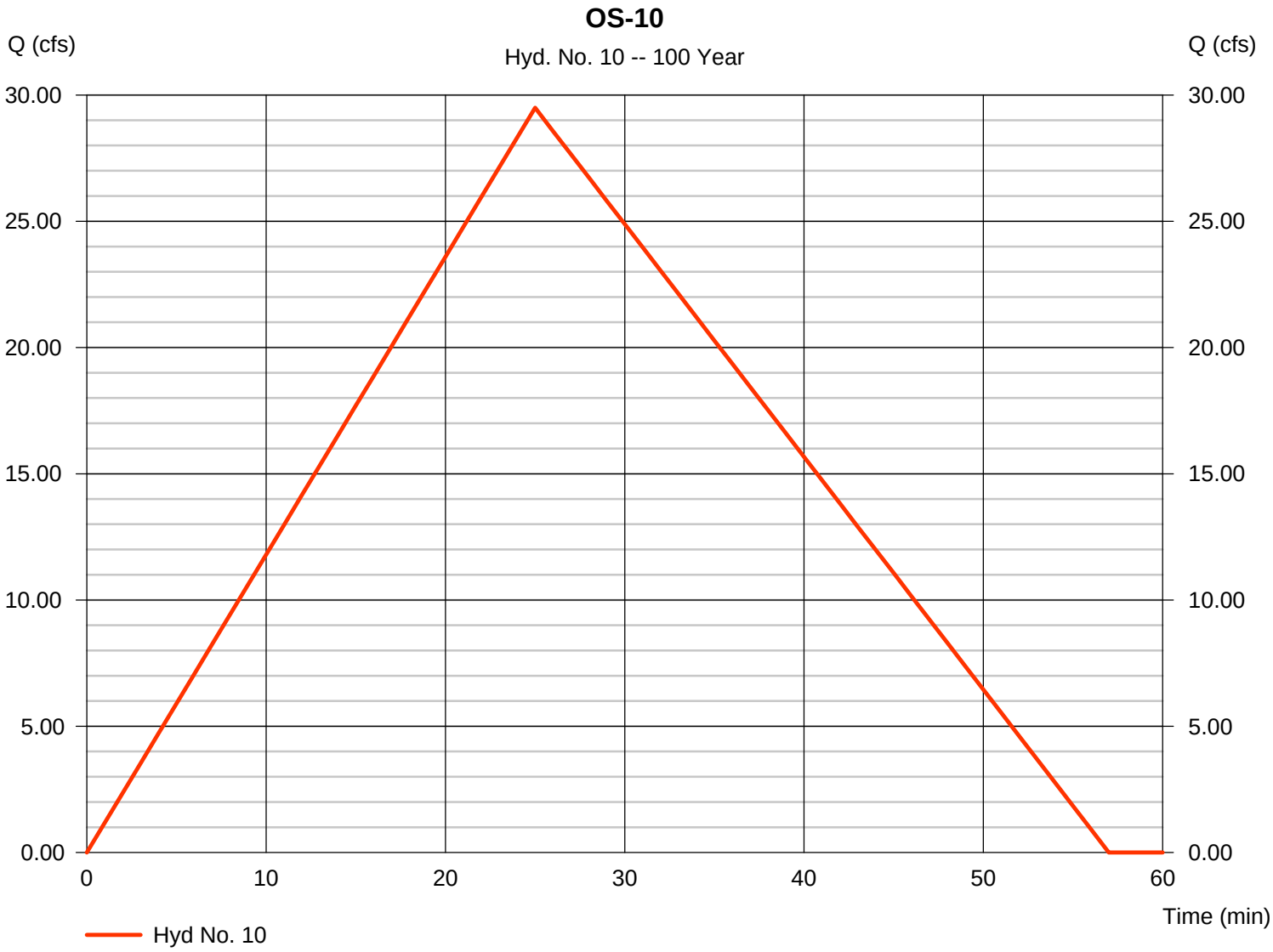
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	29.49 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	50,878 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.67
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



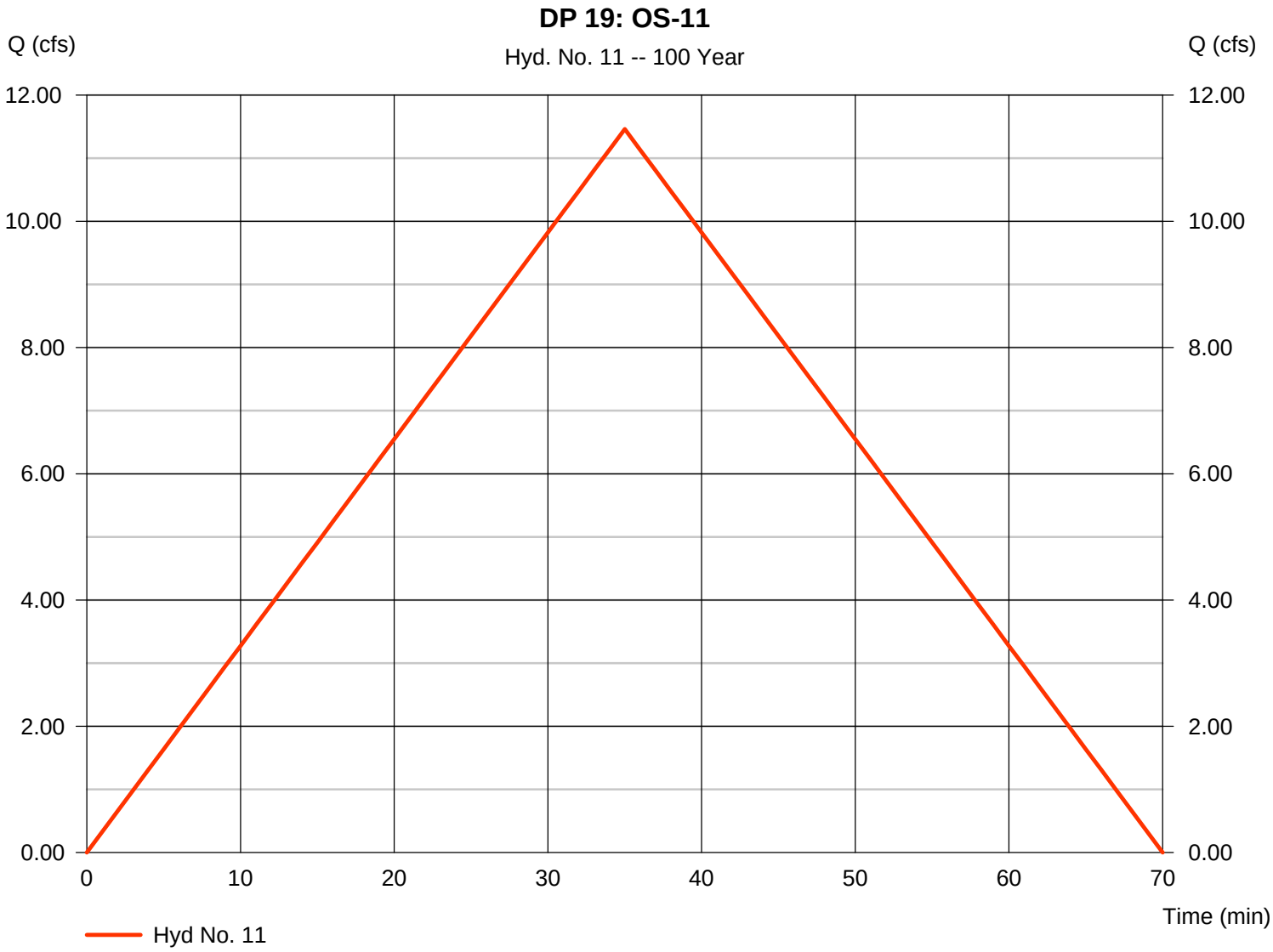
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	11.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	24,066 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.61
Intensity	=	3.720 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

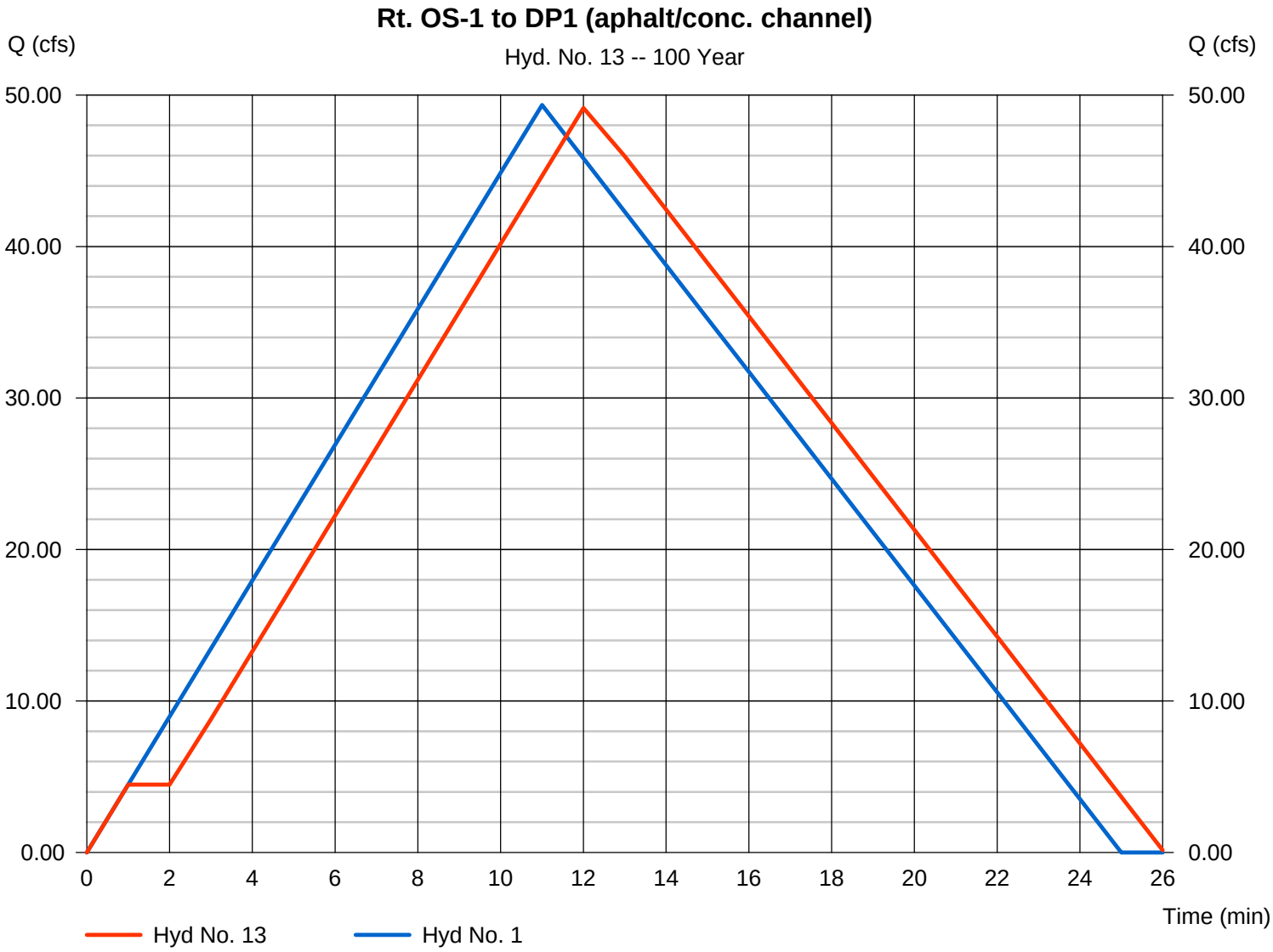
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	49.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	37,287 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.75 ft/s	Routing coeff.	=	0.9587

Modified Att-Kin routing method used.



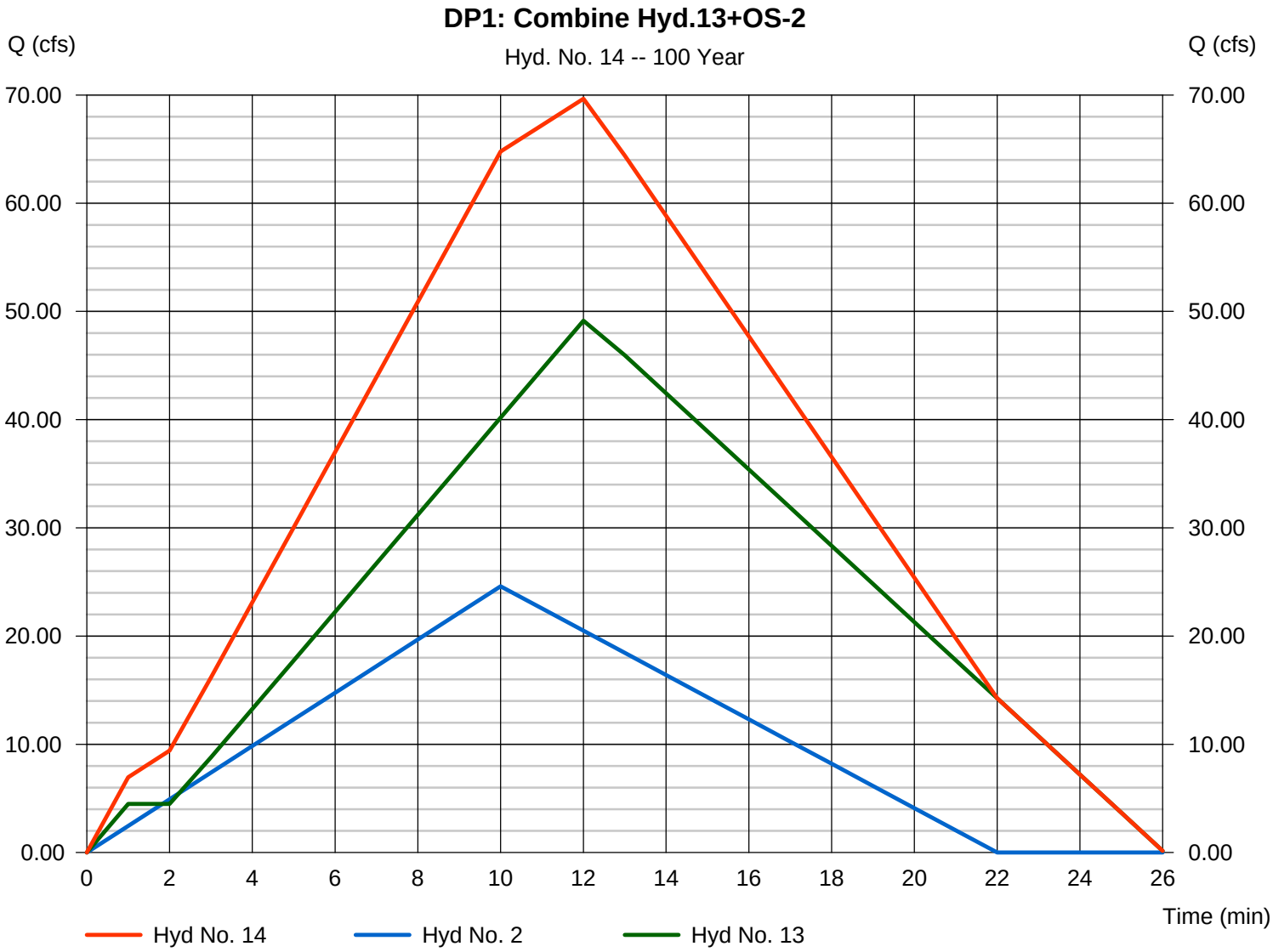
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	69.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	53,524 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

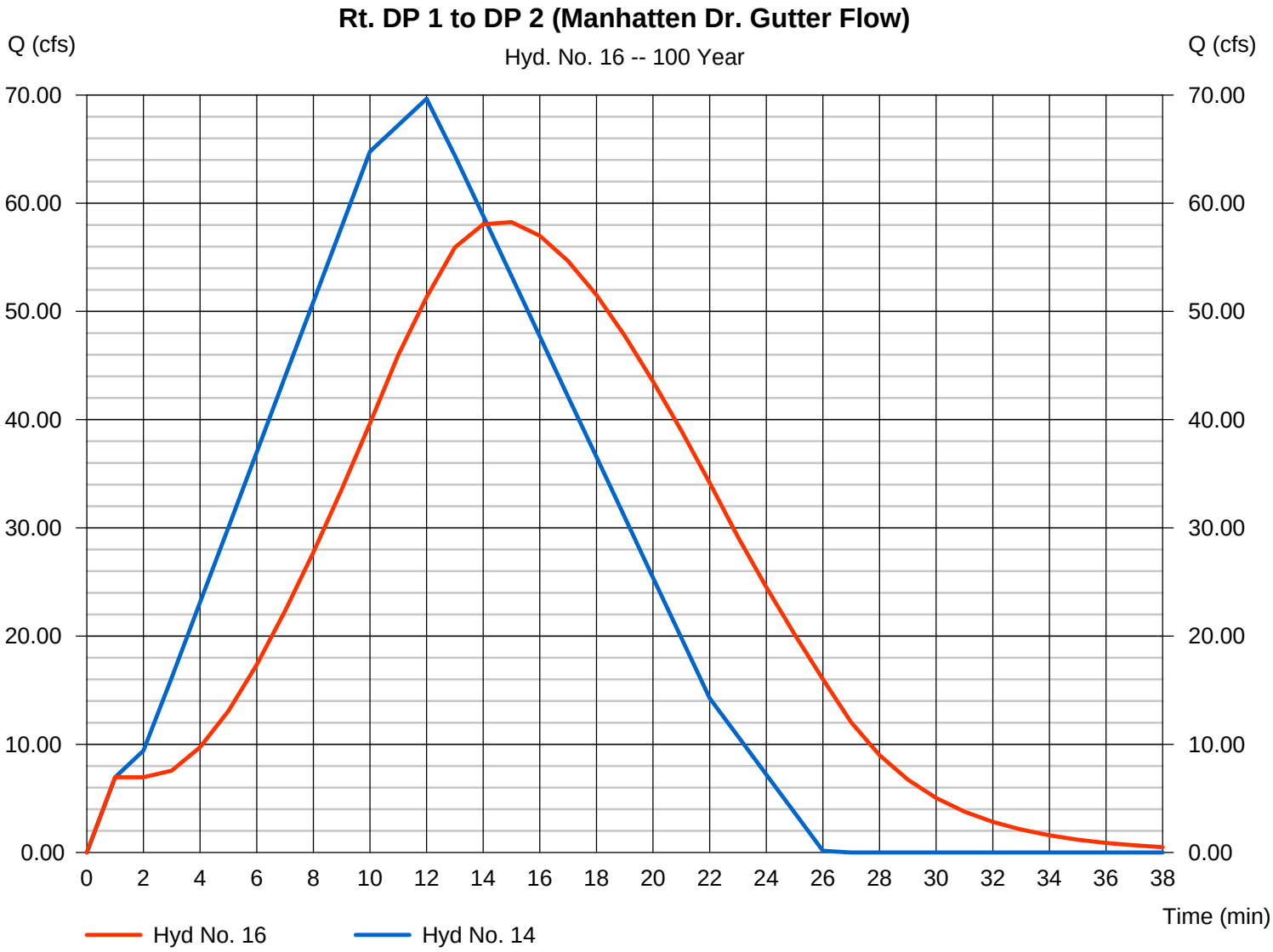
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 58.26 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 55,180 cuft
Inflow hyd. No.	= 14 - DP1: Combine Hyd.13+OS-2	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.513	Rating curve m	= 0.659
Ave. velocity	= 1.09 ft/s	Routing coeff.	= 0.2514

Modified Att-Kin routing method used.



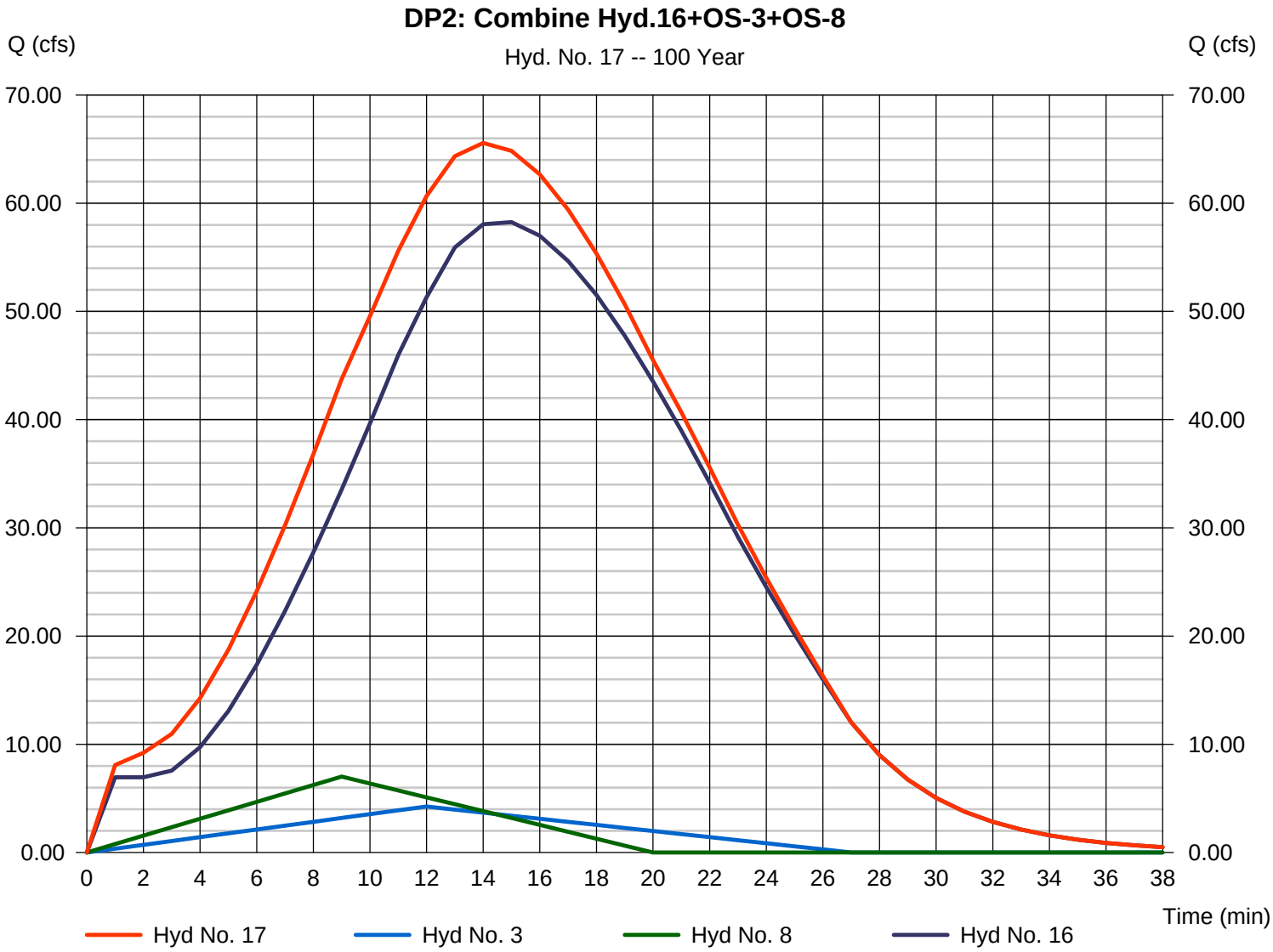
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	= Combine	Peak discharge	= 65.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 62,830 cuft
Inflow hyds.	= 3, 8, 16	Contrib. drain. area	= 1.950 ac



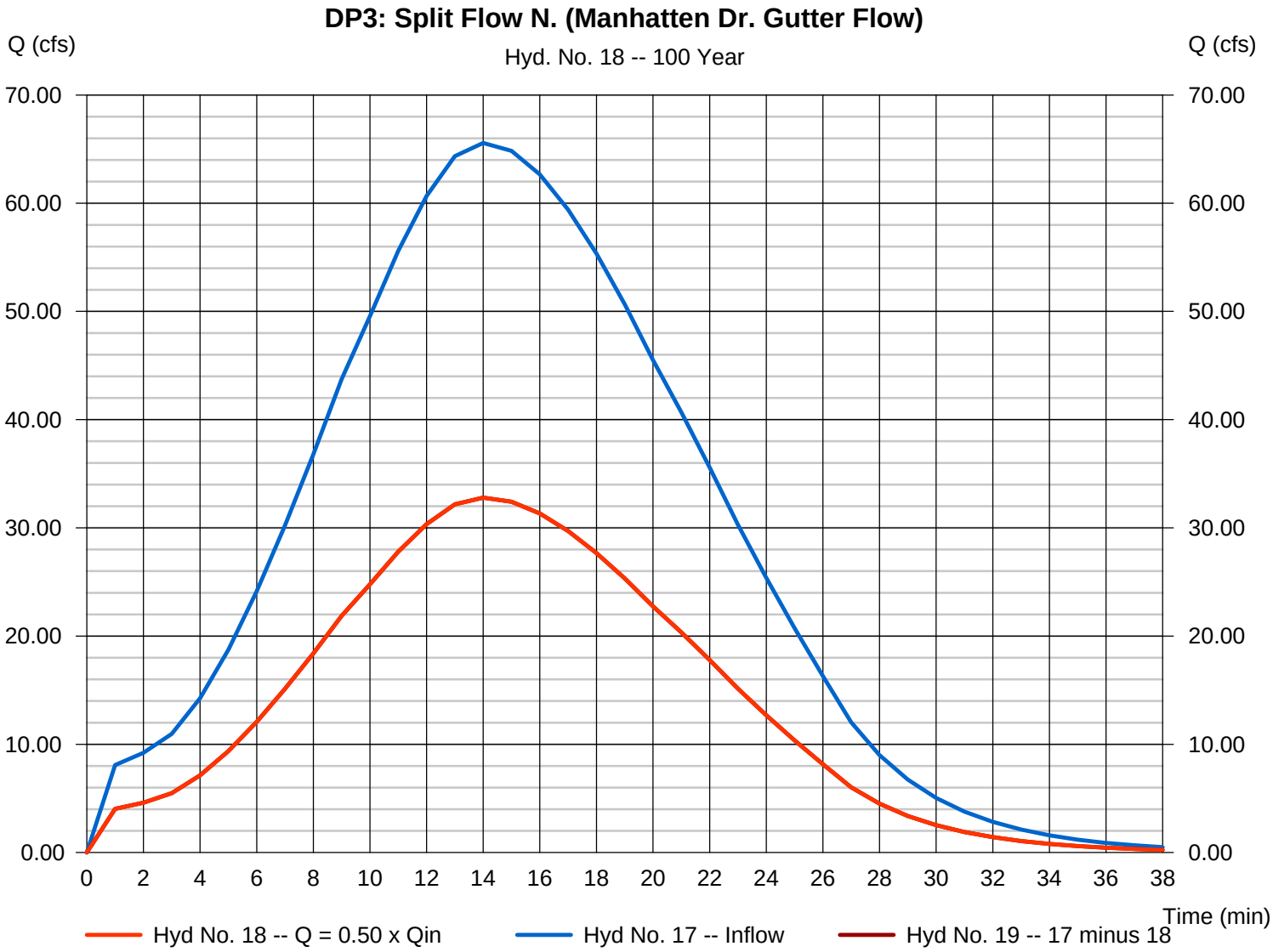
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



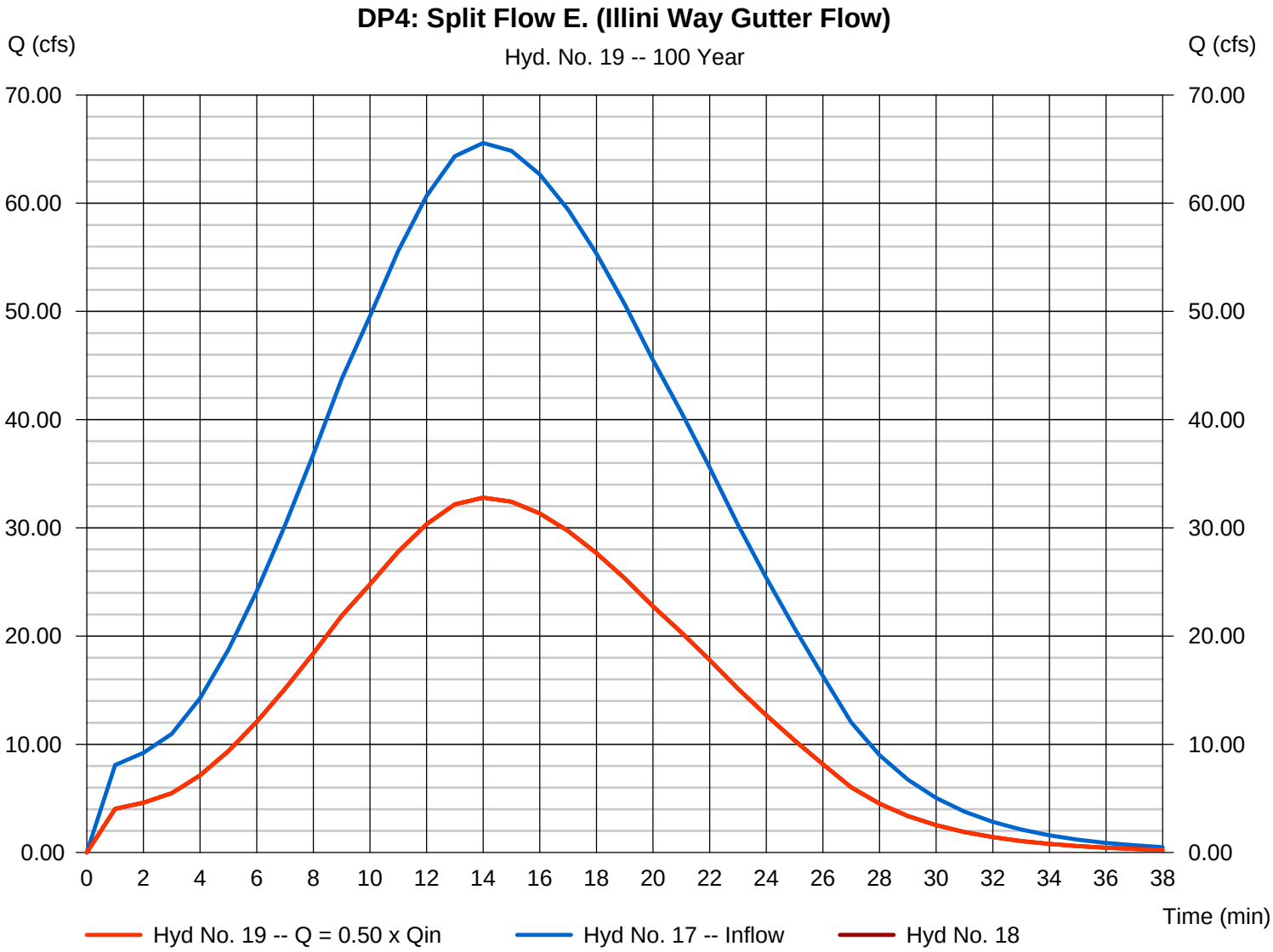
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

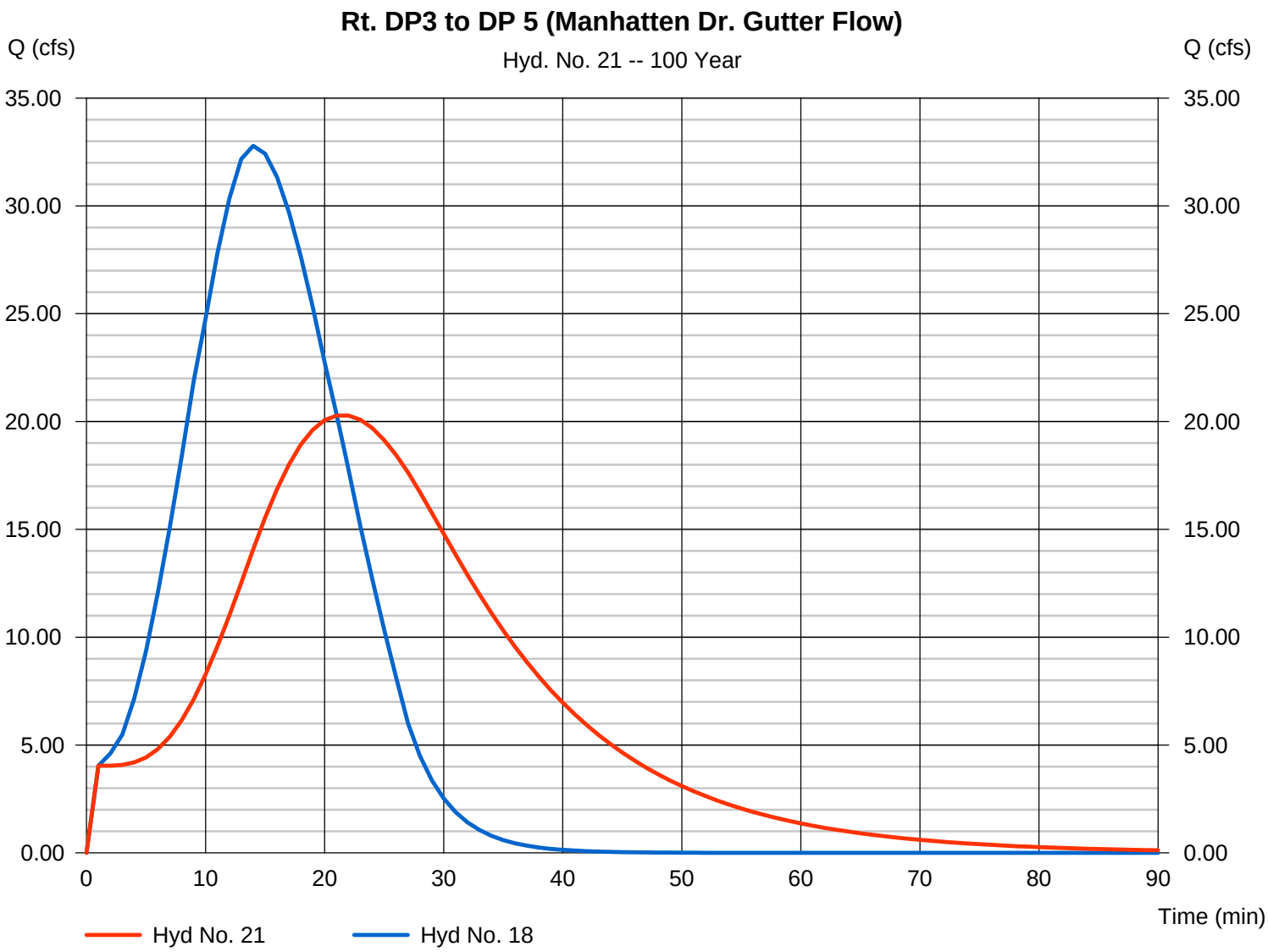
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	20.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	34,490 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.0786

Modified Att-Kin routing method used.



Hydrograph Report

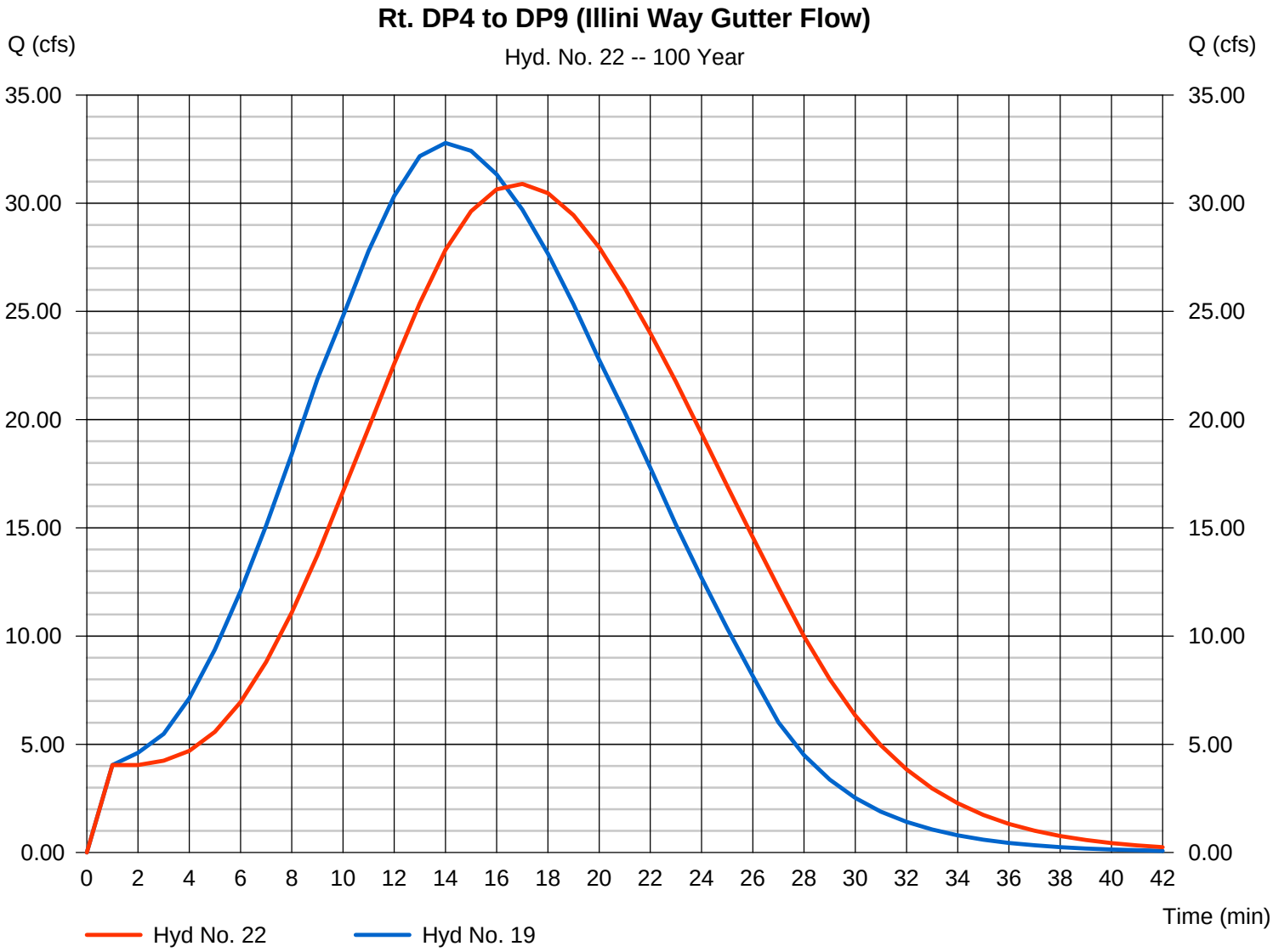
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 30.89 cfs
Storm frequency	= 100 yrs	Time to peak	= 17 min
Time interval	= 1 min	Hyd. volume	= 32,083 cuft
Inflow hyd. No.	= 19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.630	Rating curve m	= 0.659
Ave. velocity	= 1.68 ft/s	Routing coeff.	= 0.3620

Modified Att-Kin routing method used.



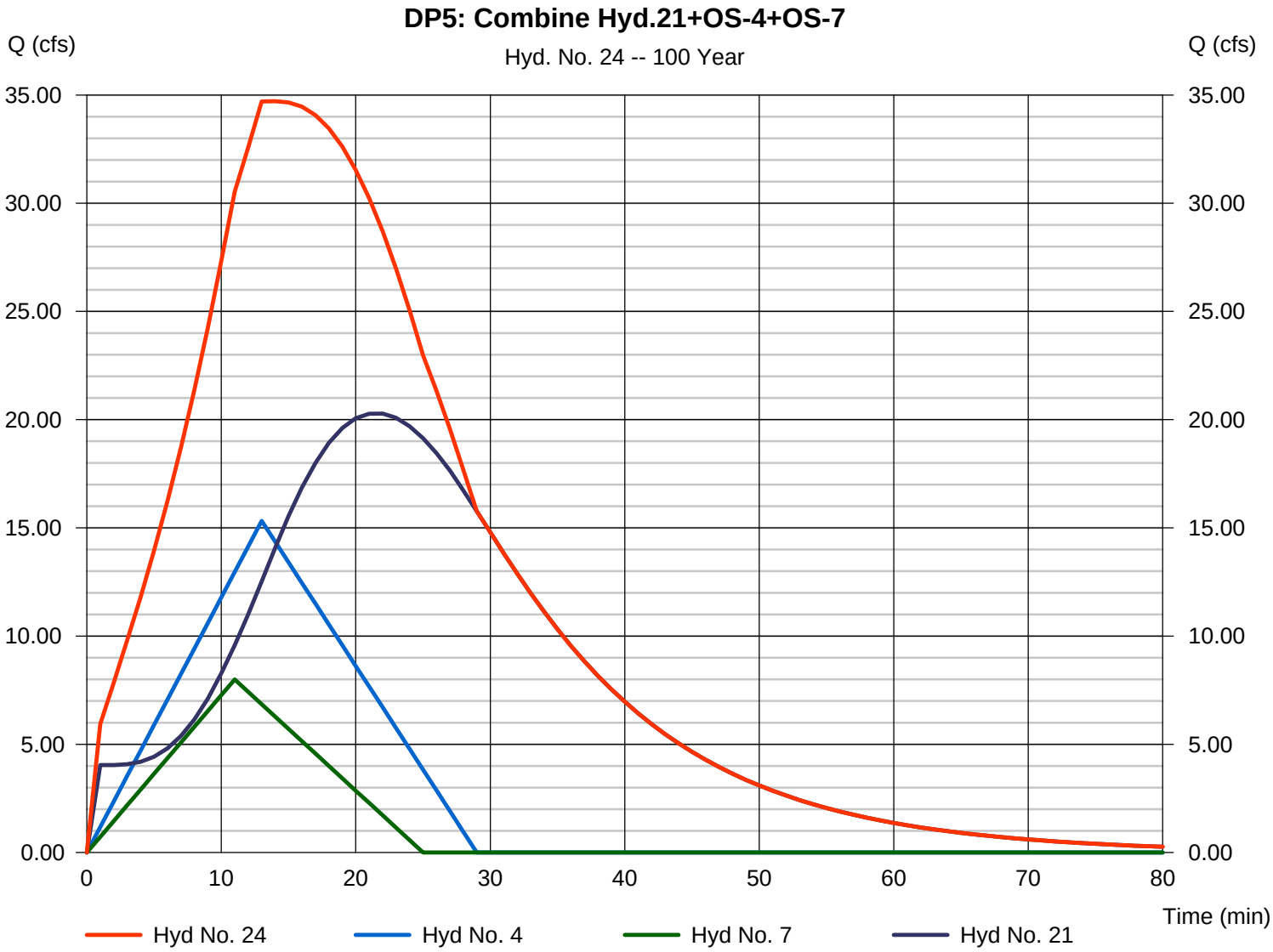
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	= Combine	Peak discharge	= 34.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 53,817 cuft
Inflow hyds.	= 4, 7, 21	Contrib. drain. area	= 4.510 ac



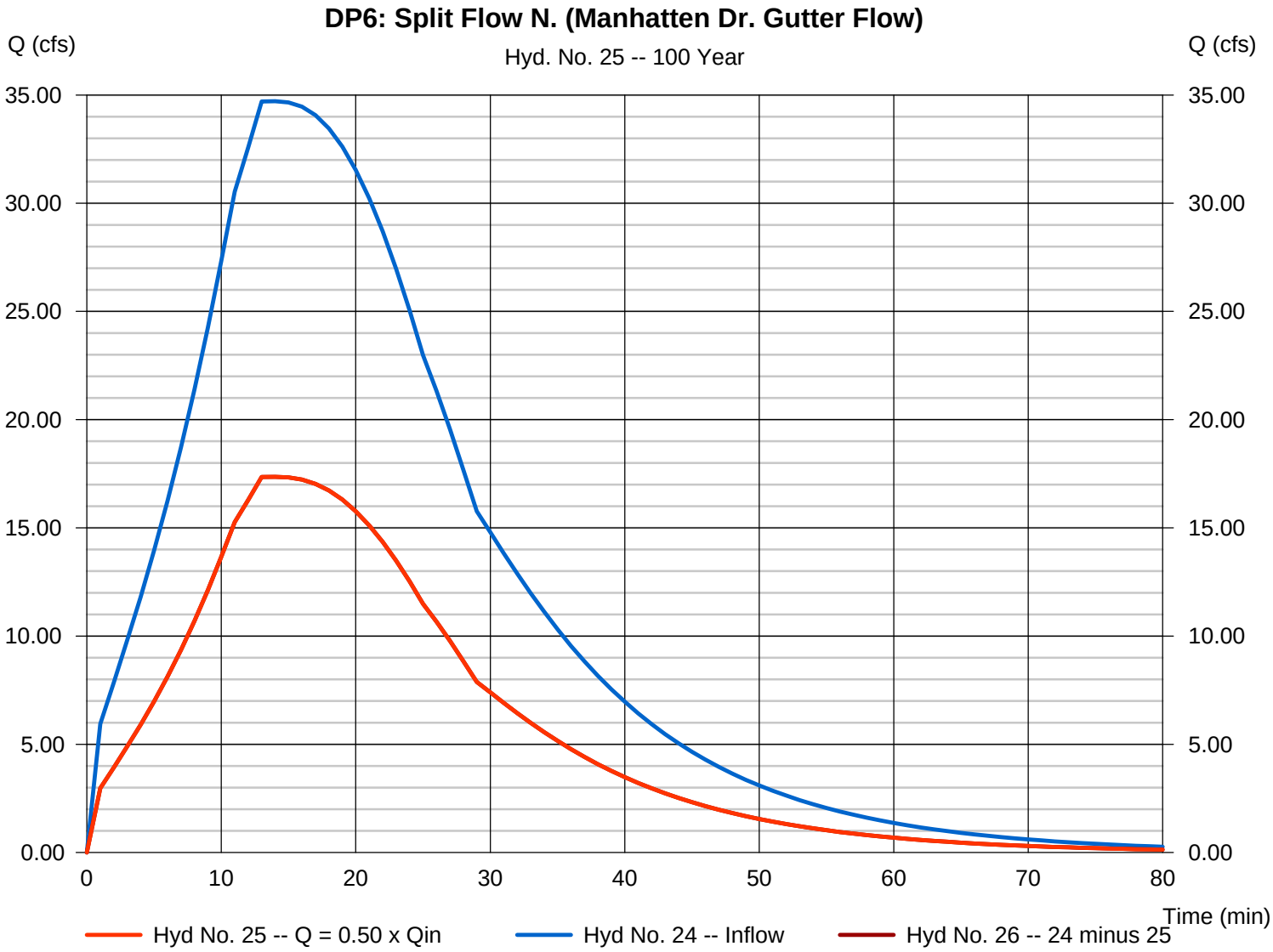
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



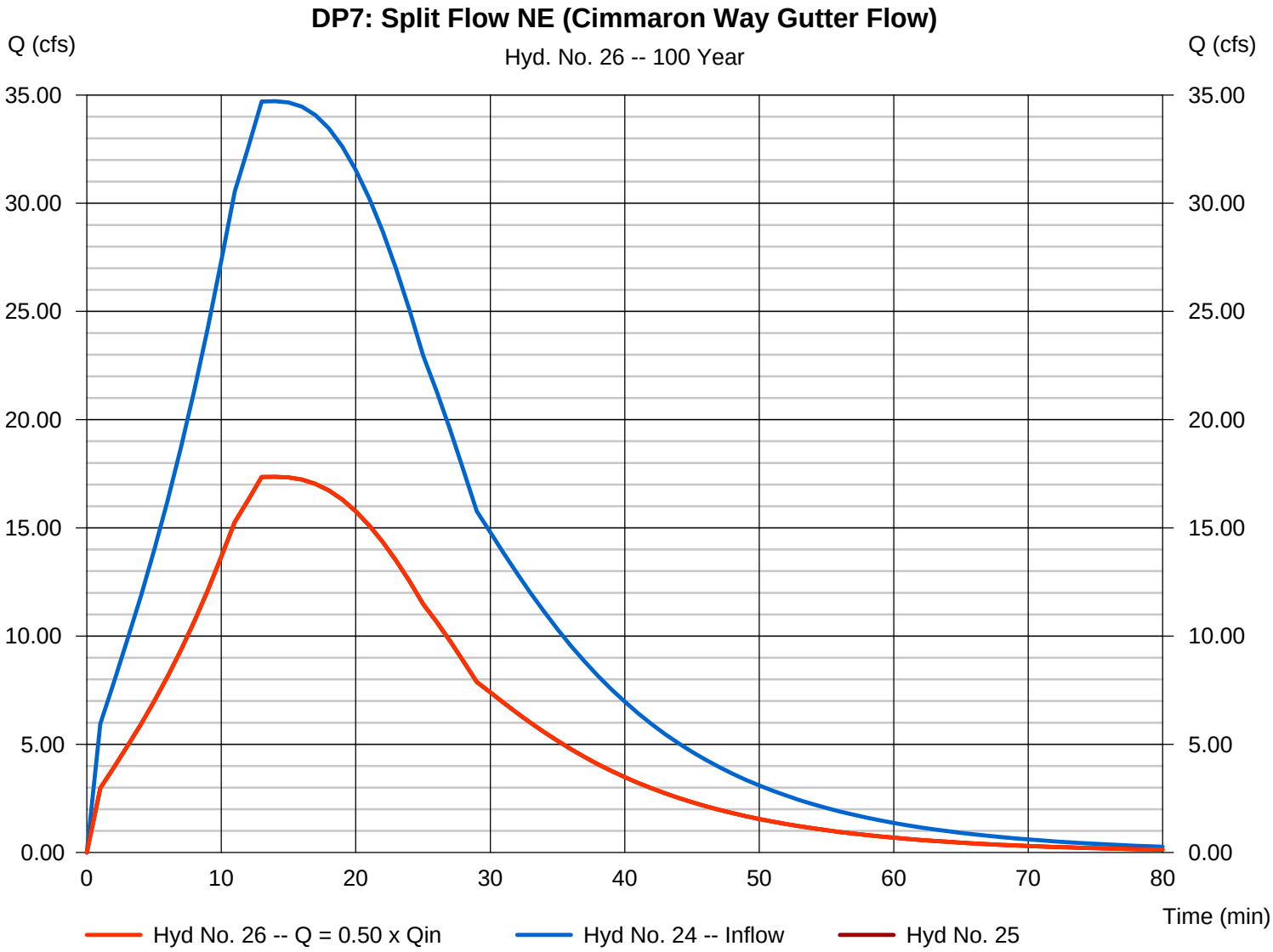
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

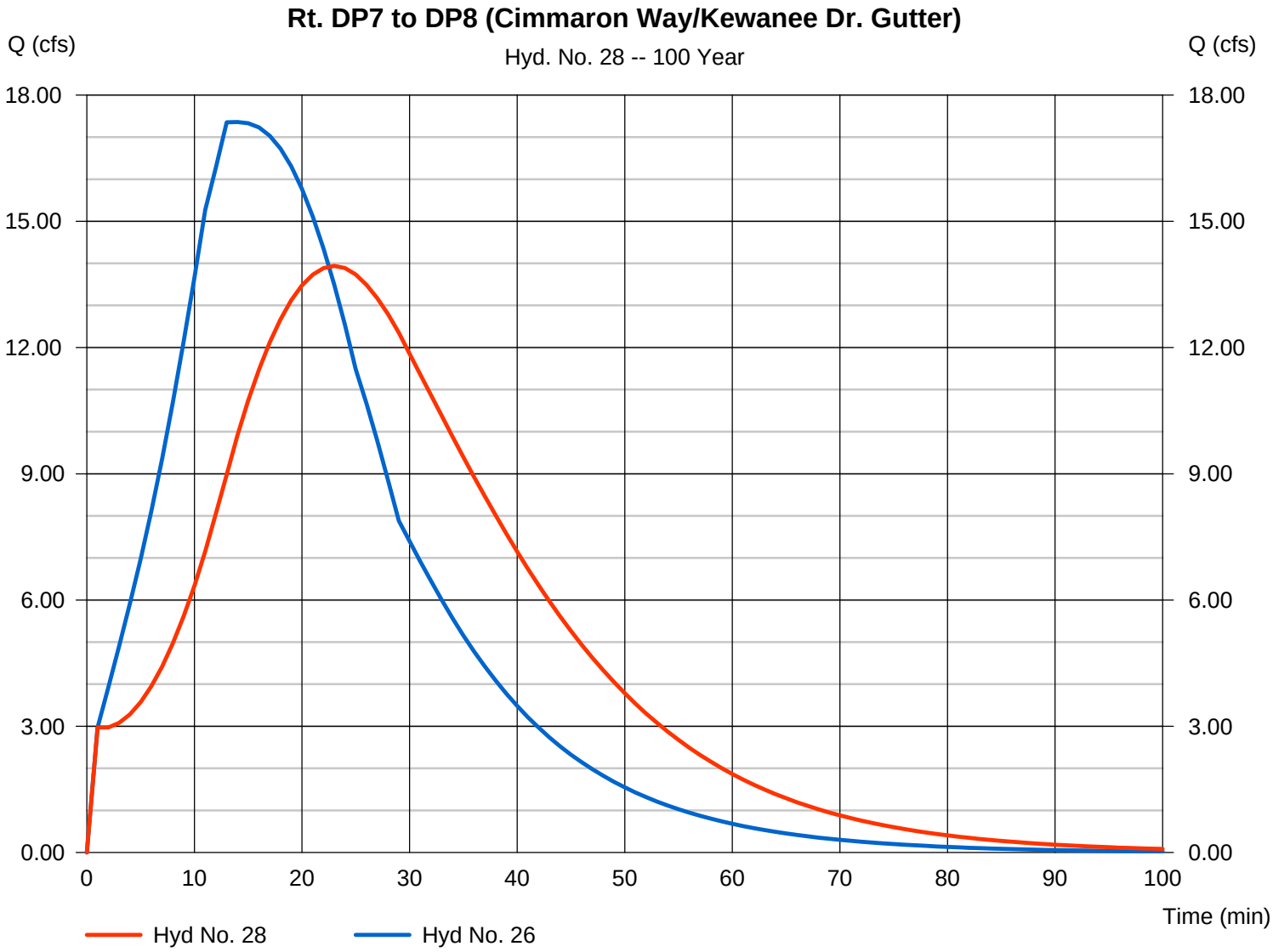
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	28,502 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.33 ft/s	Routing coeff.	=	0.1116

Modified Att-Kin routing method used.



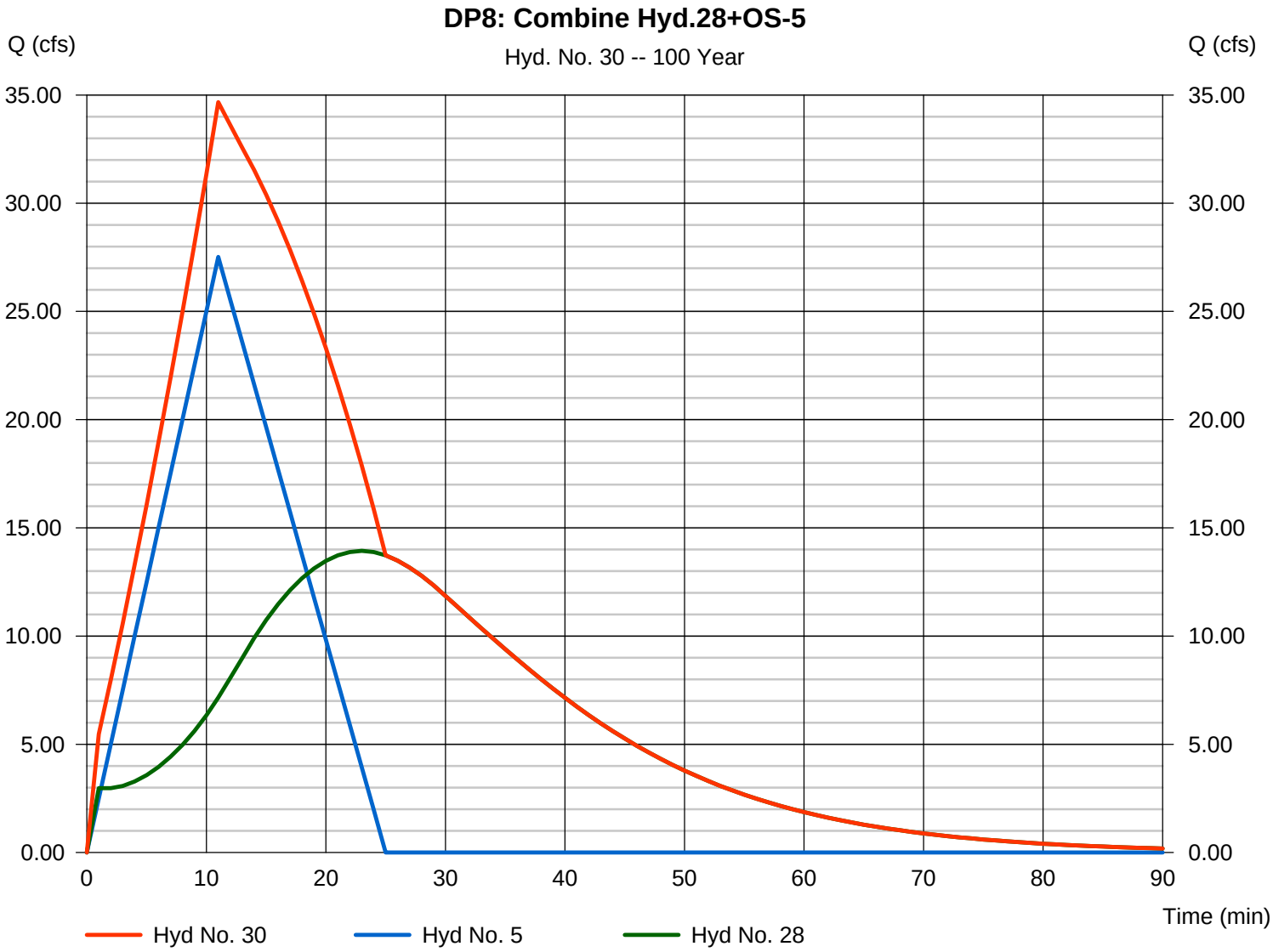
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	34.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	49,138 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



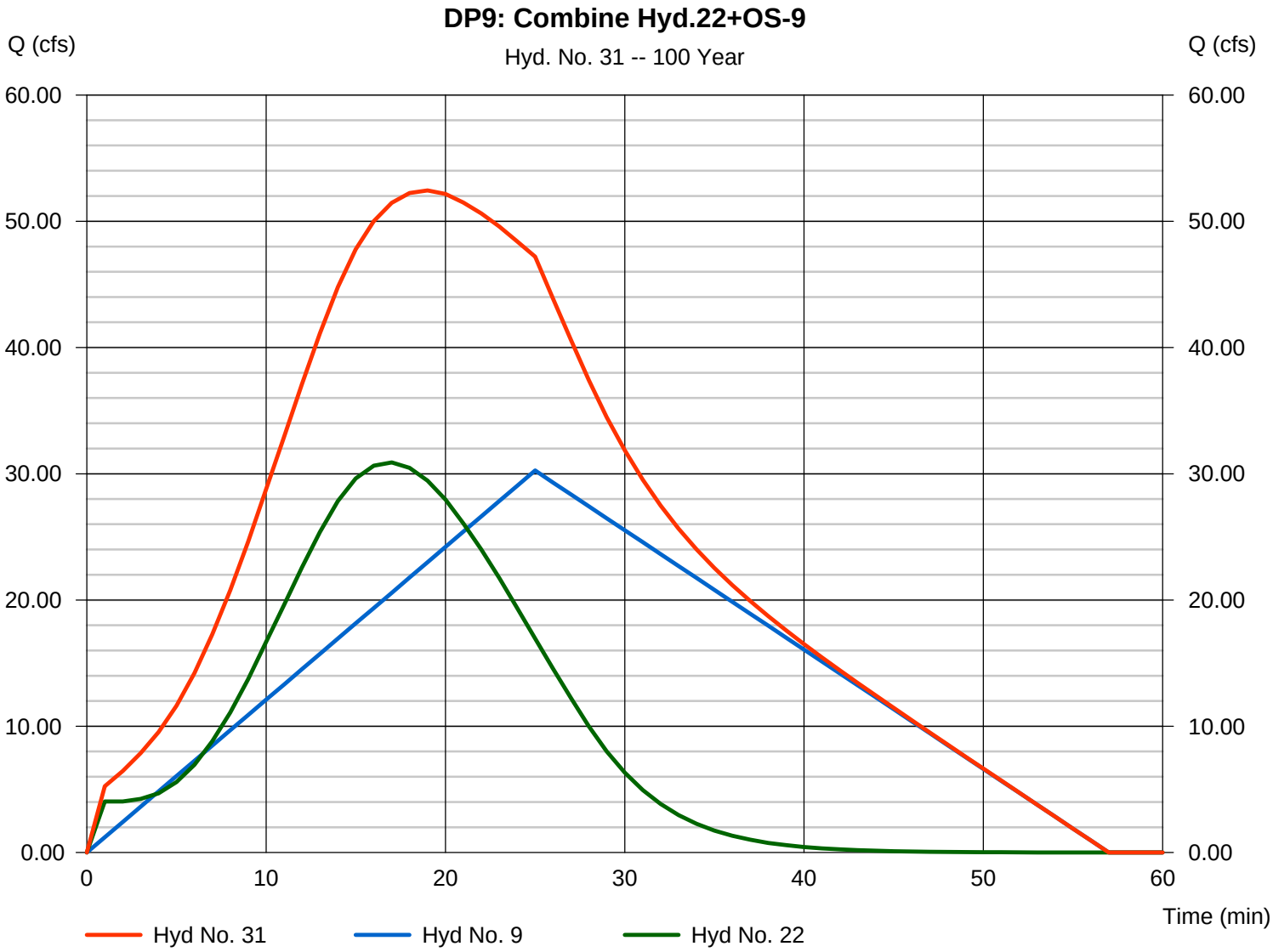
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	=	Combine	Peak discharge	=	52.44 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	83,819 cuft
Inflow hyds.	=	9, 22	Contrib. drain. area	=	9.450 ac



Hydrograph Report

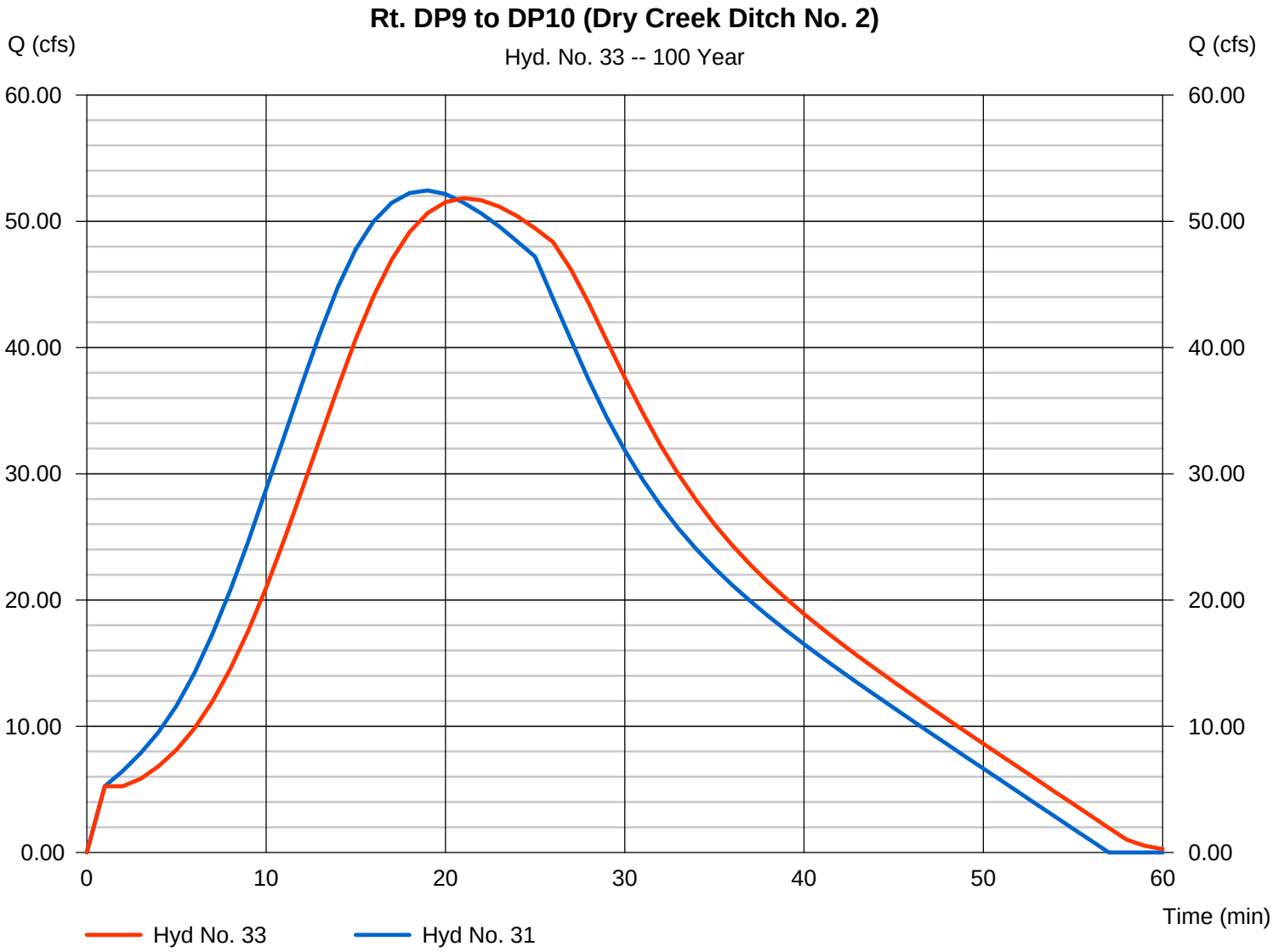
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	51.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	84,469 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.91 ft/s	Routing coeff.	=	0.4839

Modified Att-Kin routing method used.



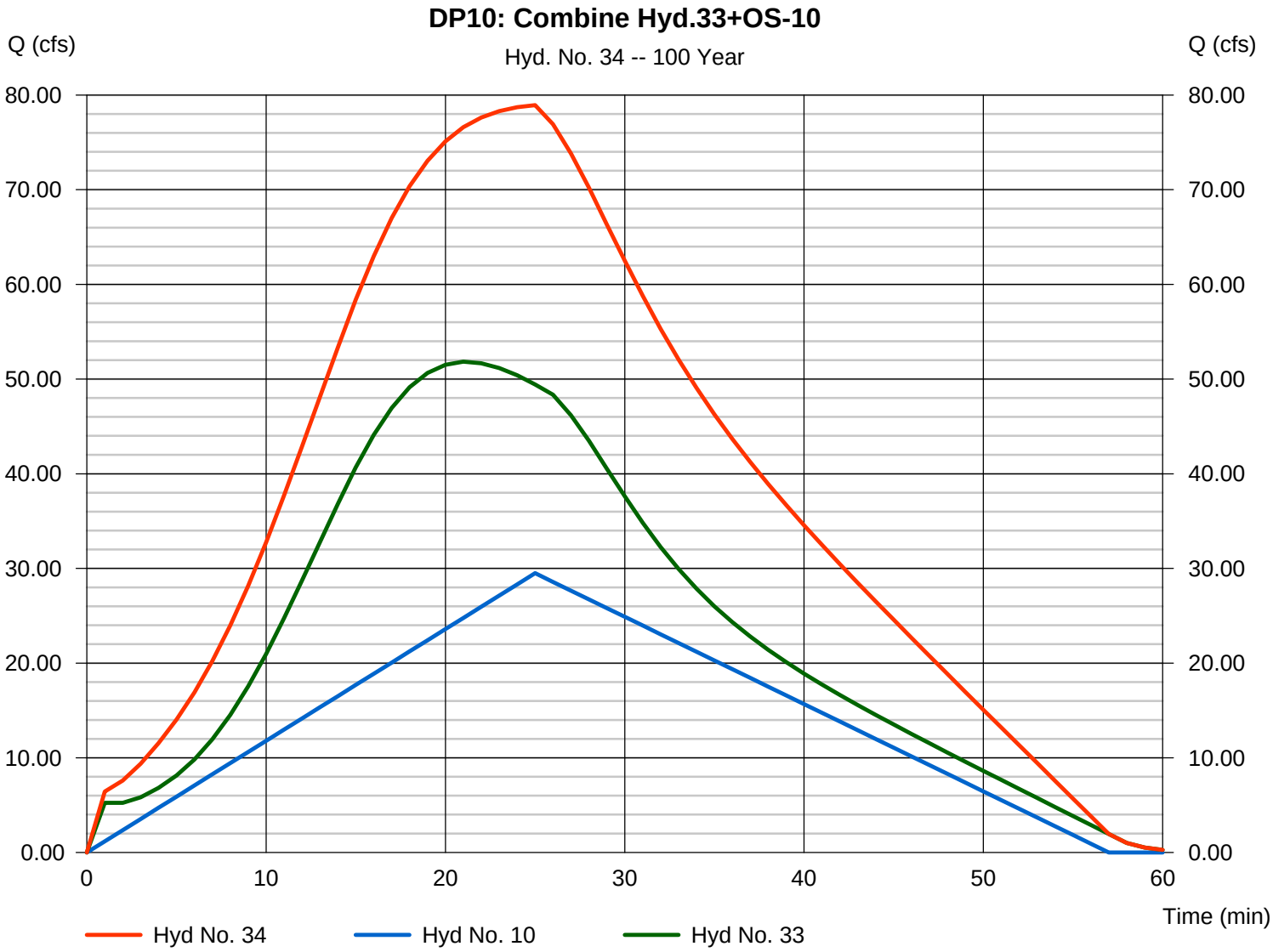
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 34

DP10: Combine Hyd.33+OS-10

Hydrograph type	=	Combine	Peak discharge	=	78.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	134,905 cuft
Inflow hyds.	=	10, 33	Contrib. drain. area	=	9.350 ac



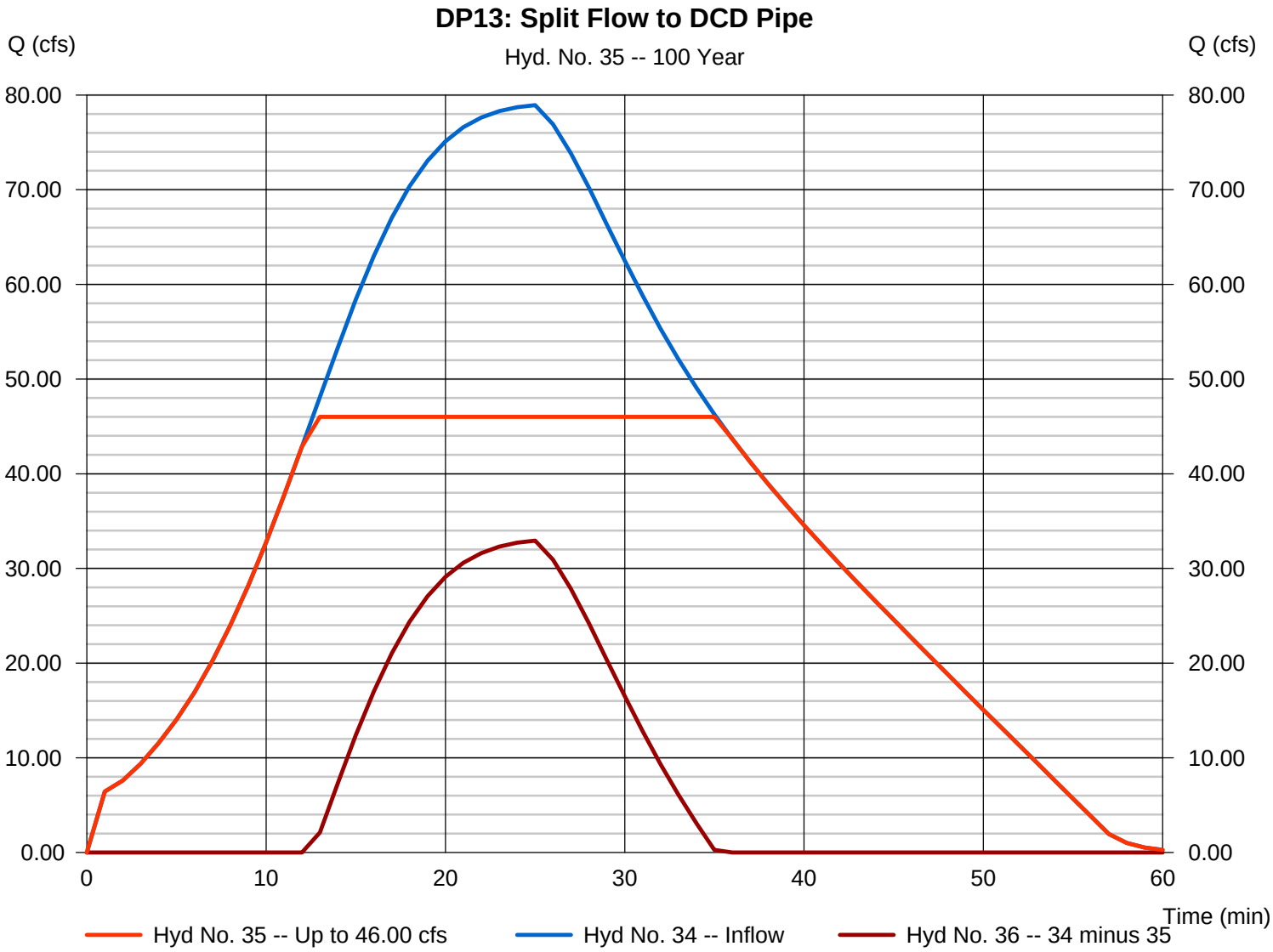
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 35

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	46.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	107,794 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	46.00 cfs



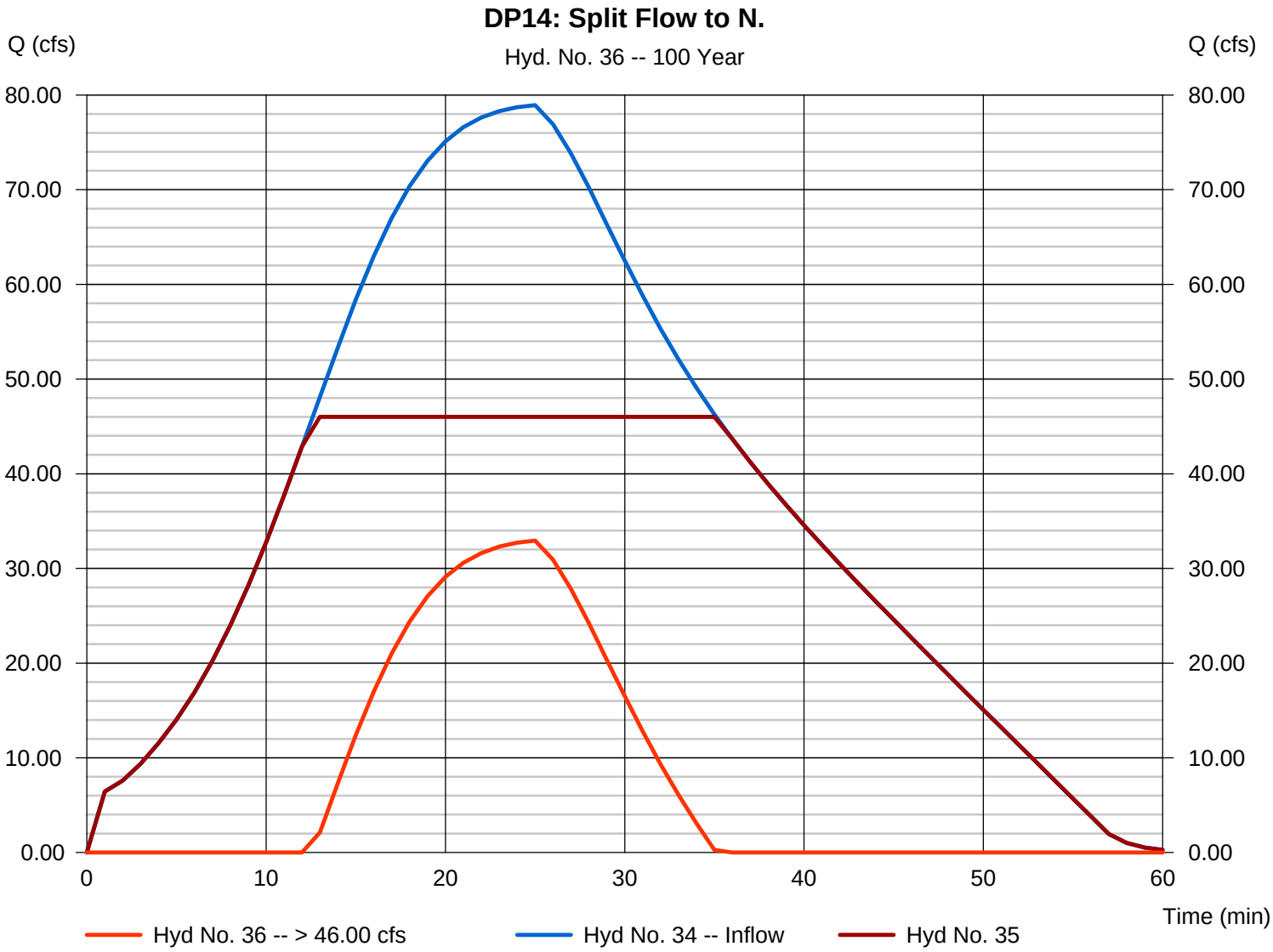
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 36

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	32.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	27,112 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	35
Diversion method	=	Constant Q	Constant Q	=	46.00 cfs



Hydrograph Report

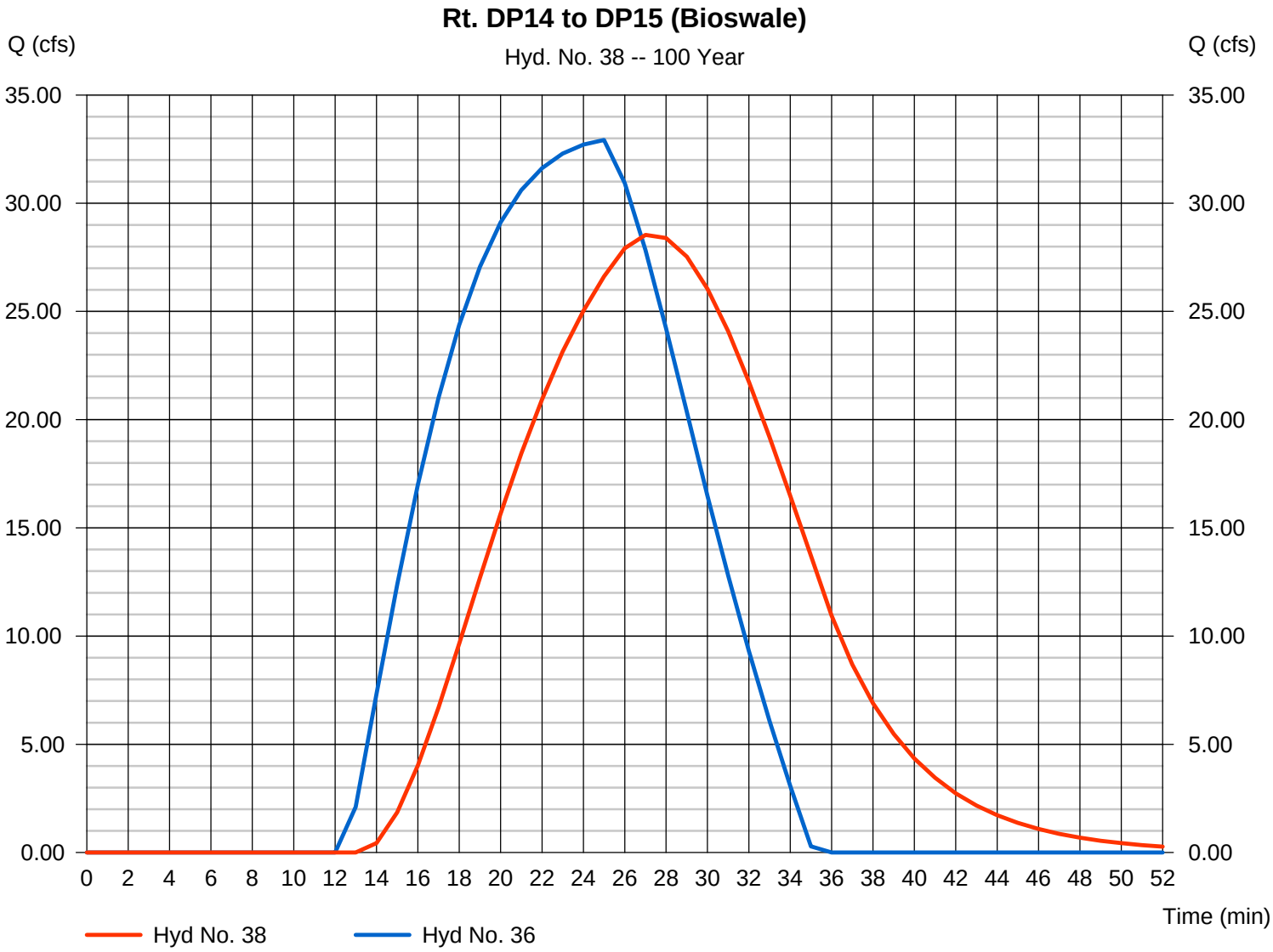
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 38

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	28.54 cfs
Storm frequency	=	100 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	27,109 cuft
Inflow hyd. No.	=	36 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.47 ft/s	Routing coeff.	=	0.2063

Modified Att-Kin routing method used.



Hydrograph Report

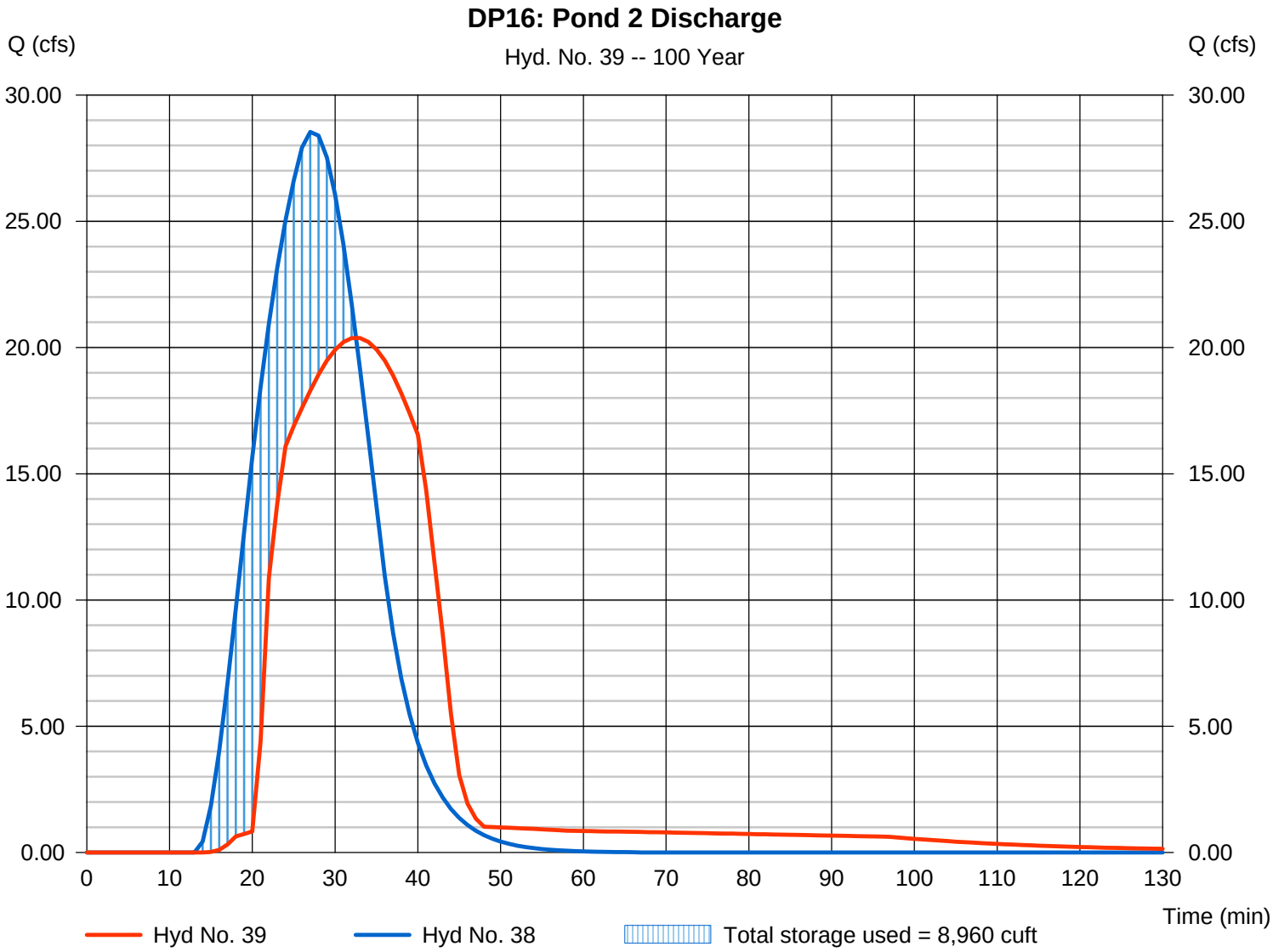
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 39

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	20.38 cfs
Storm frequency	=	100 yrs	Time to peak	=	33 min
Time interval	=	1 min	Hyd. volume	=	27,105 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5318.29 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	8,960 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,253	4,271	5,230
3.00	5319.00	20,244	13,203	18,433
4.00	5320.00	31,360	25,598	44,031
4.50	5320.50	36,454	16,936	60,967
5.00	5321.00	42,359	19,683	80,649

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

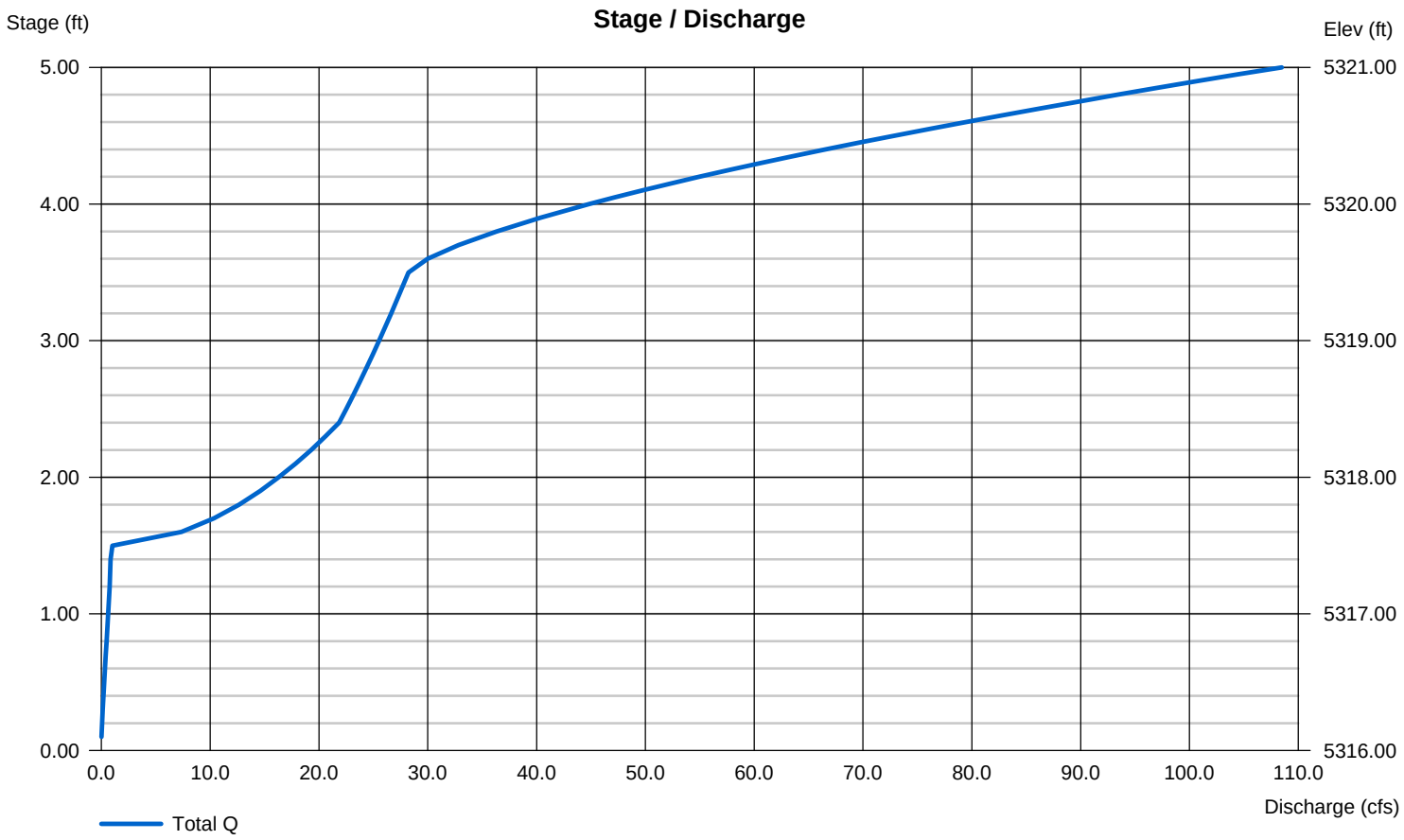
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	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).



Hydrograph Report

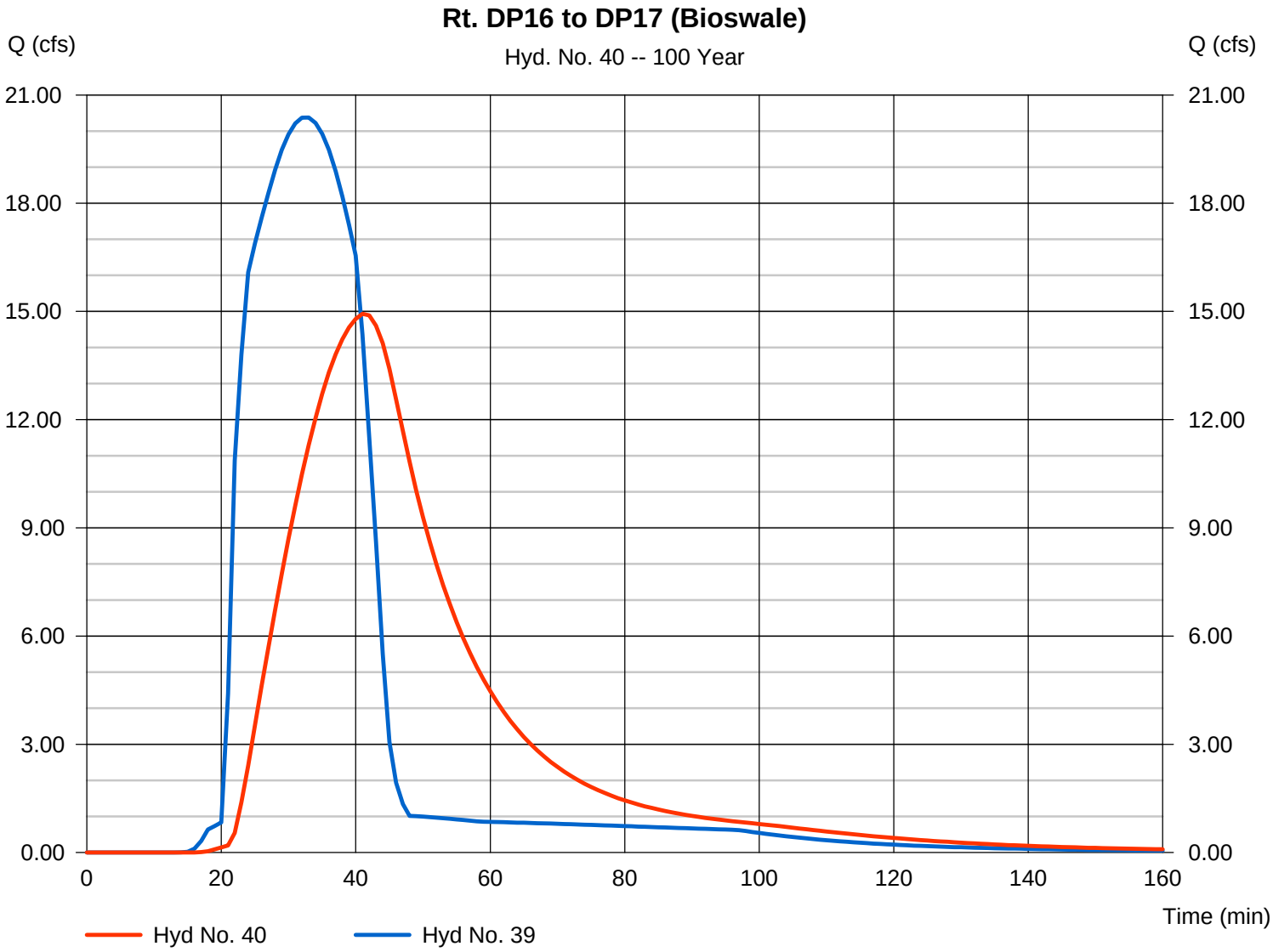
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 40

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	14.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	41 min
Time interval	=	1 min	Hyd. volume	=	27,069 cuft
Inflow hyd. No.	=	39 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.29 ft/s	Routing coeff.	=	0.0821

Modified Att-Kin routing method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 42

A

Hydrograph type	=	Rational	Peak discharge	=	8.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	11,493 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.66
Intensity	=	5.652 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

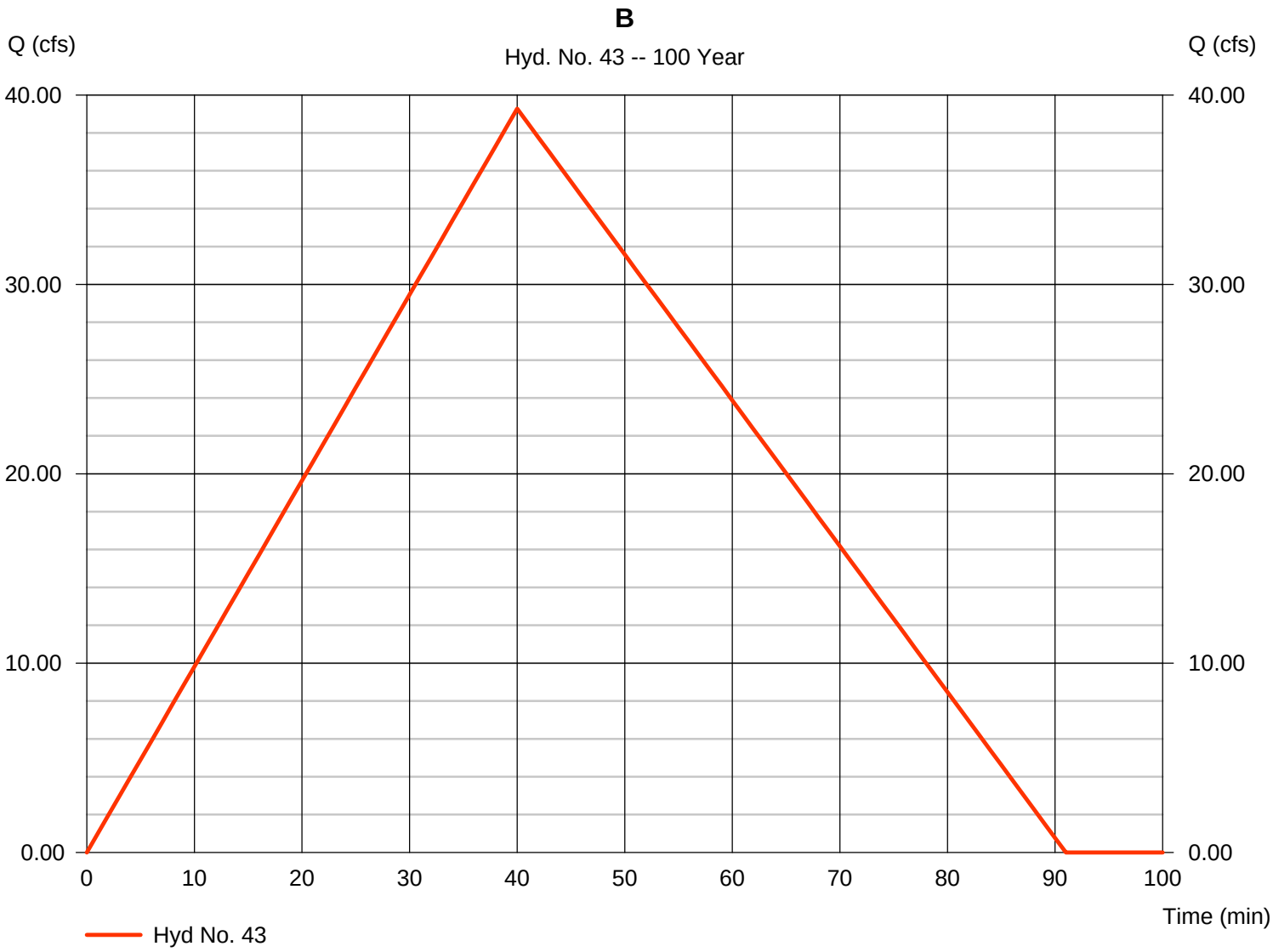
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 43

B

Hydrograph type	=	Rational	Peak discharge	=	39.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	108,409 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.7
Intensity	=	3.378 in/hr	Tc by User	=	40.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



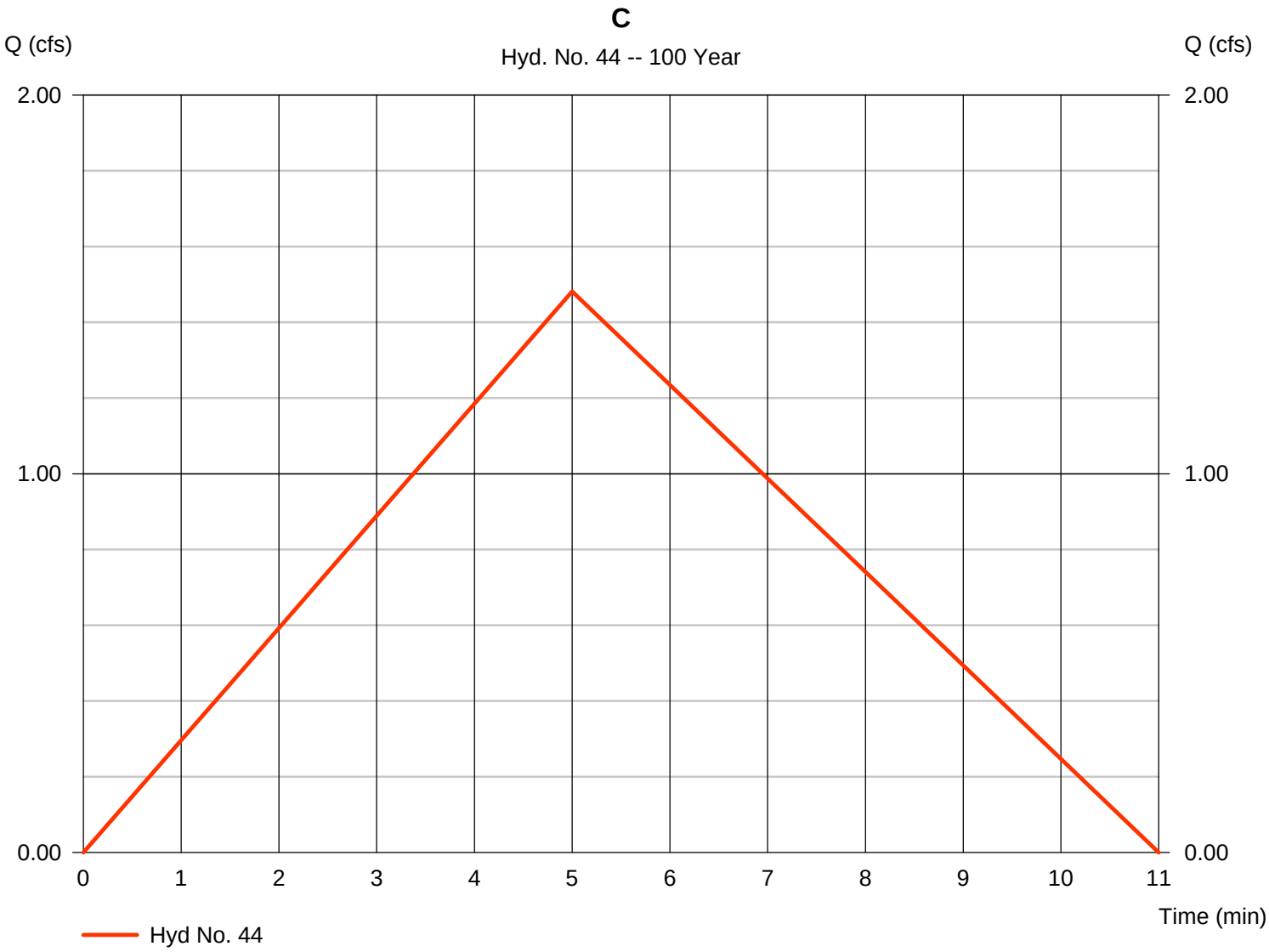
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 44

C

Hydrograph type	=	Rational	Peak discharge	=	1.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.64
Intensity	=	11.574 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



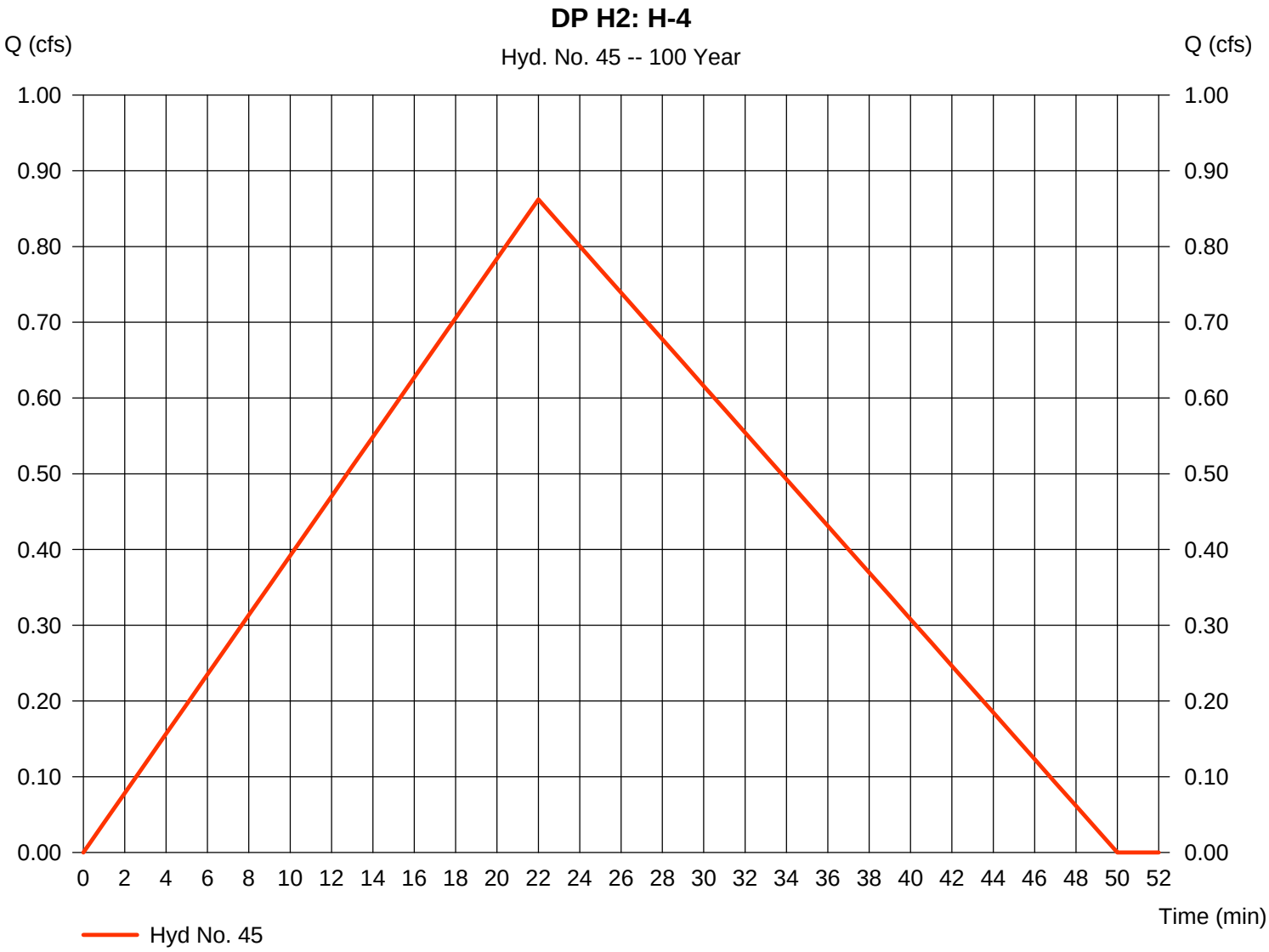
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 45

DP H2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	1,309 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.6
Intensity	=	5.132 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



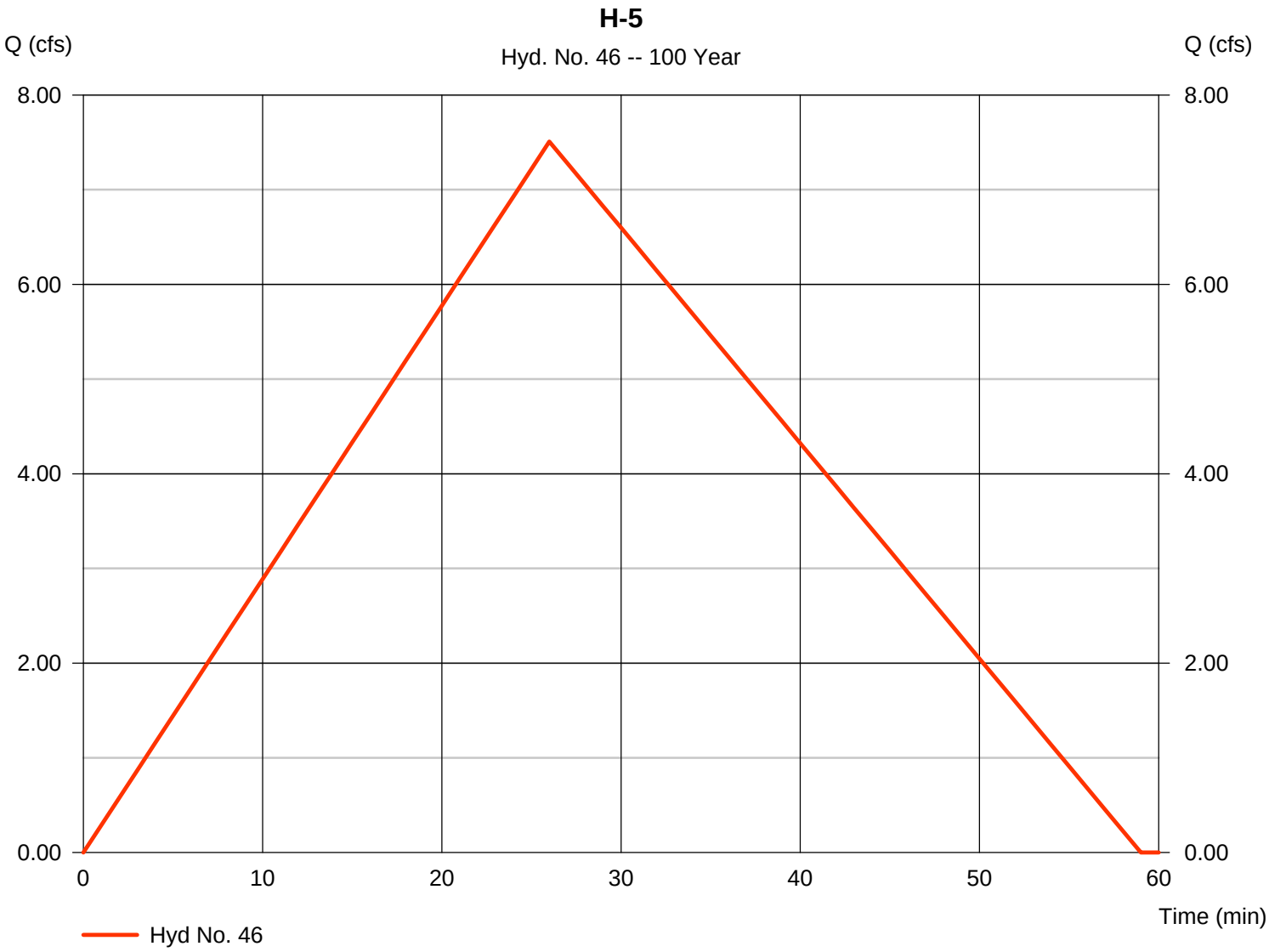
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 46

H-5

Hydrograph type	=	Rational	Peak discharge	=	7.508 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	13,469 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.6
Intensity	=	4.584 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



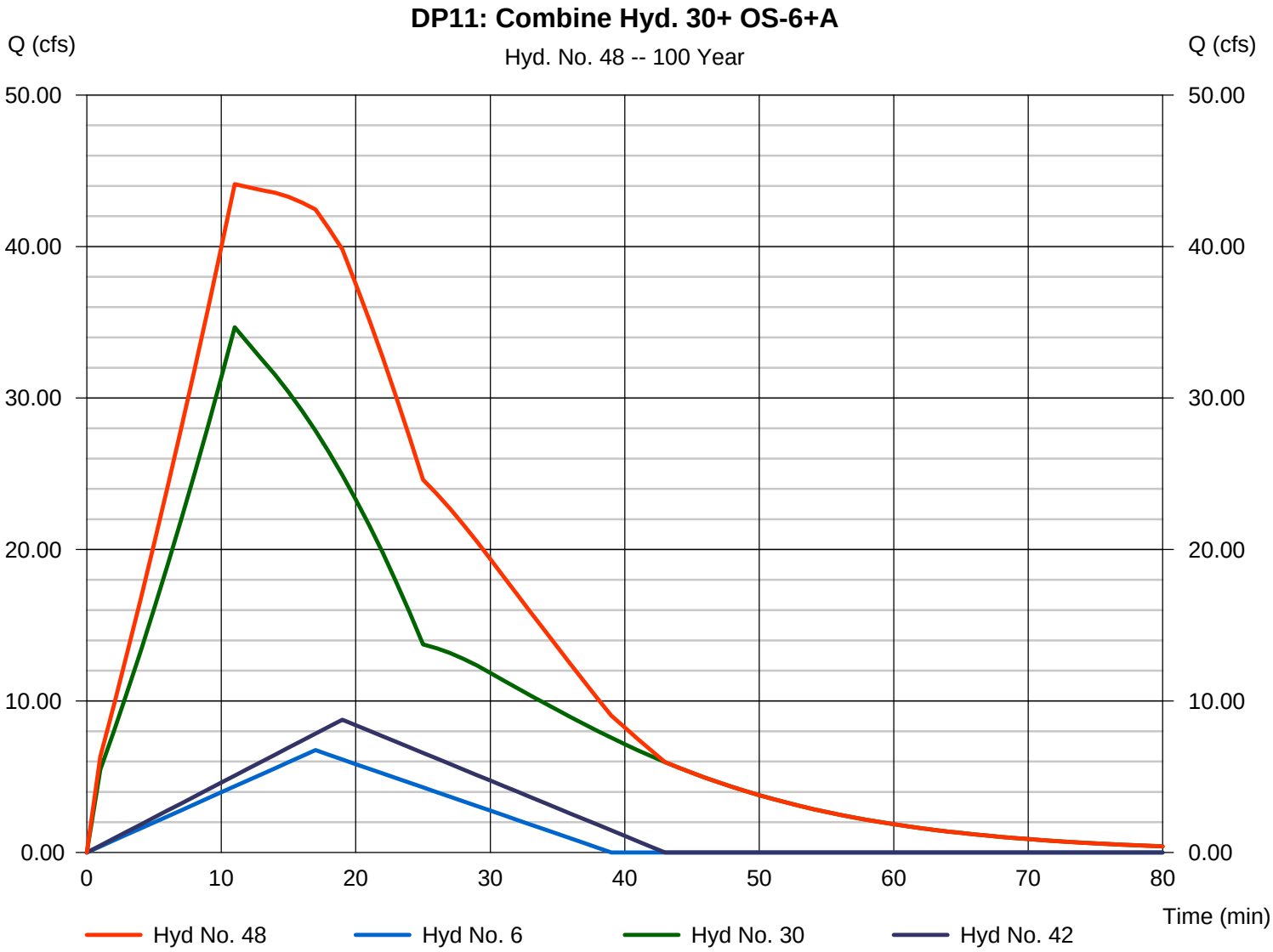
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 48

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	= Combine	Peak discharge	= 44.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 11 min
Time interval	= 1 min	Hyd. volume	= 68,350 cuft
Inflow hyds.	= 6, 30, 42	Contrib. drain. area	= 3.940 ac



Hydrograph Report

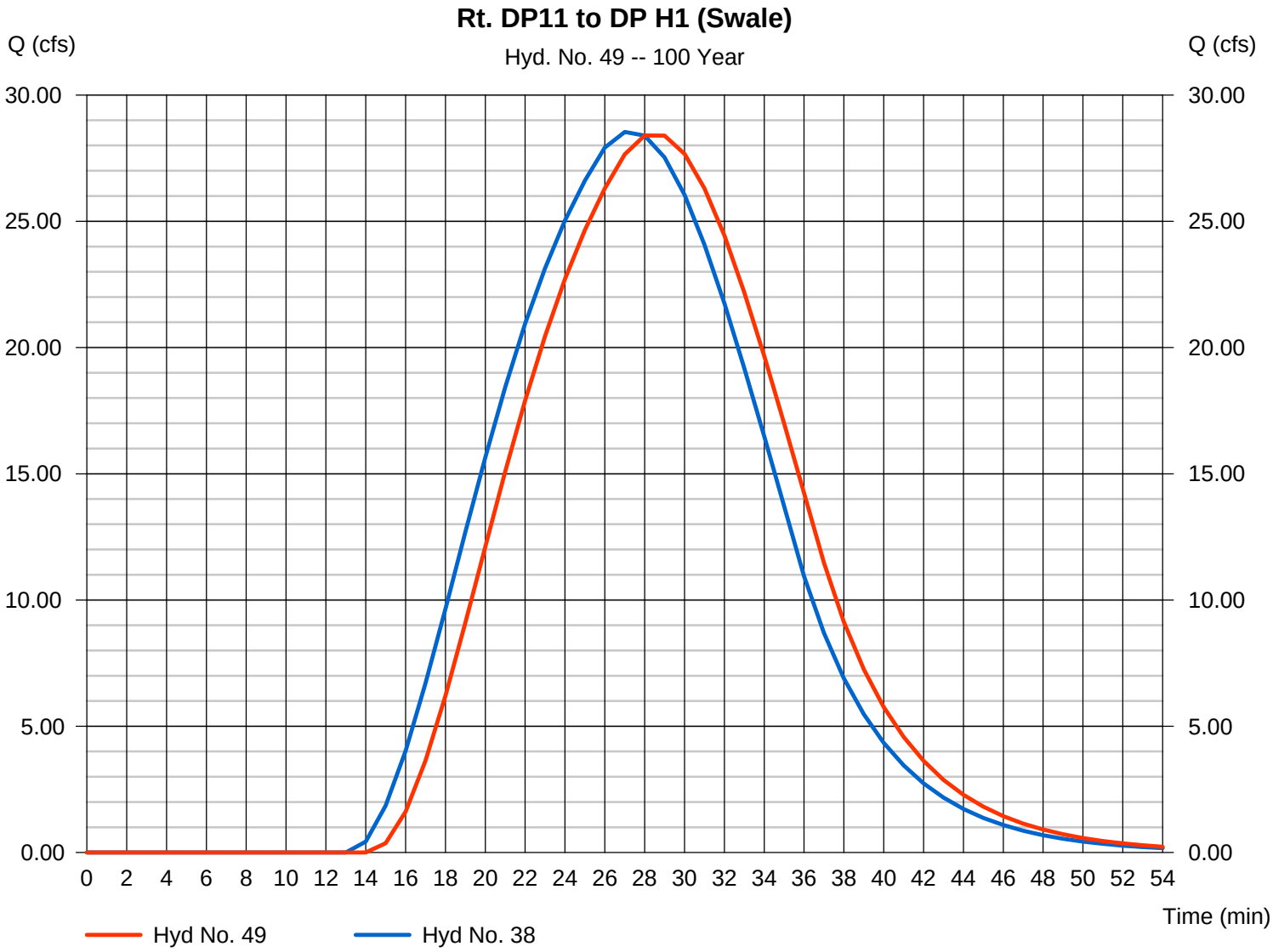
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 49

Rt. DP11 to DP H1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	28.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	28 min
Time interval	=	1 min	Hyd. volume	=	27,109 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	3.93 ft/s	Routing coeff.	=	0.8399

Modified Att-Kin routing method used.



Hydrograph Report

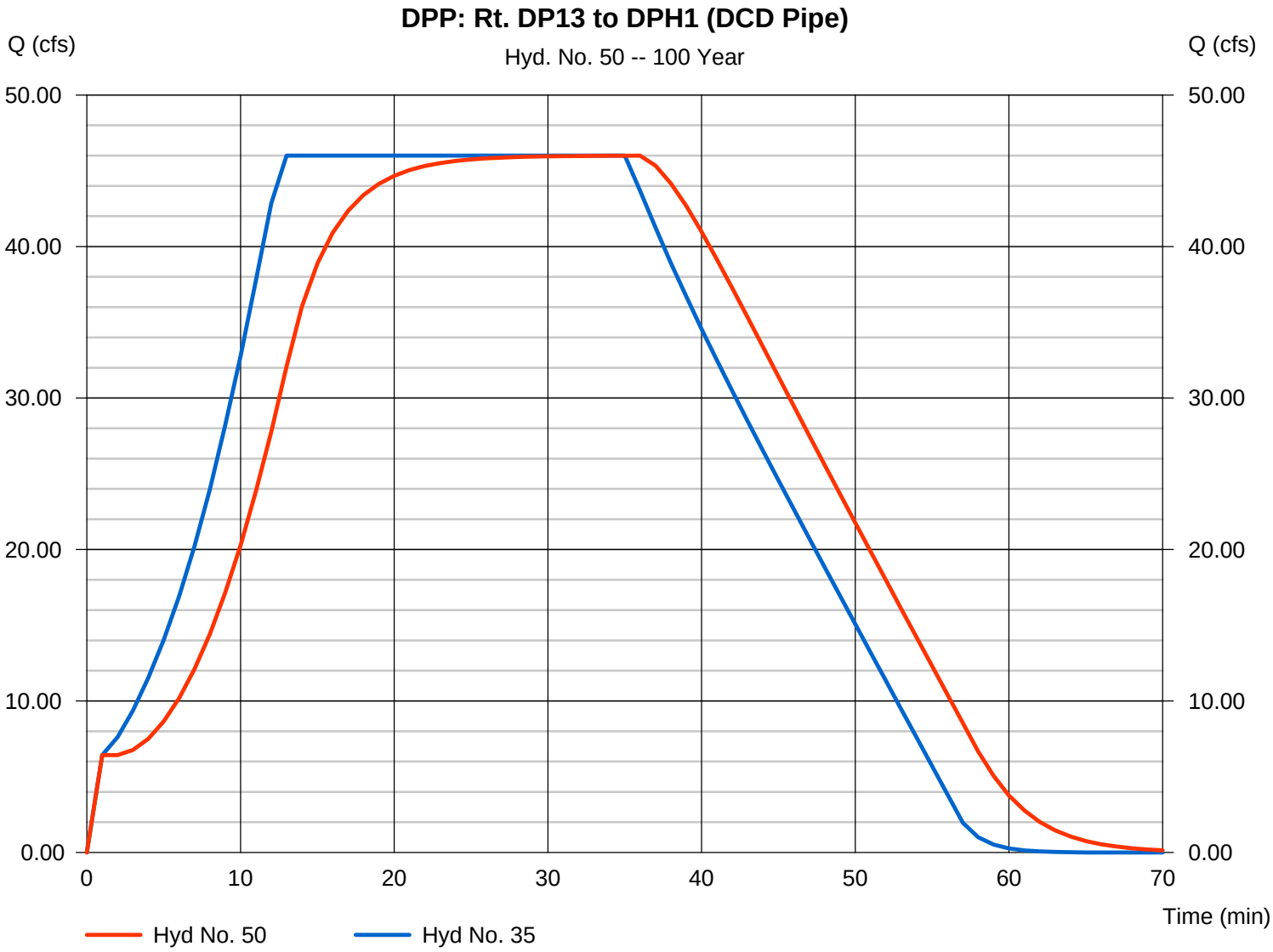
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 50

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	45.99 cfs
Storm frequency	=	100 yrs	Time to peak	=	36 min
Time interval	=	1 min	Hyd. volume	=	109,146 cuft
Inflow hyd. No.	=	35 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	4.78 ft/s	Routing coeff.	=	0.2848

Modified Att-Kin routing method used.



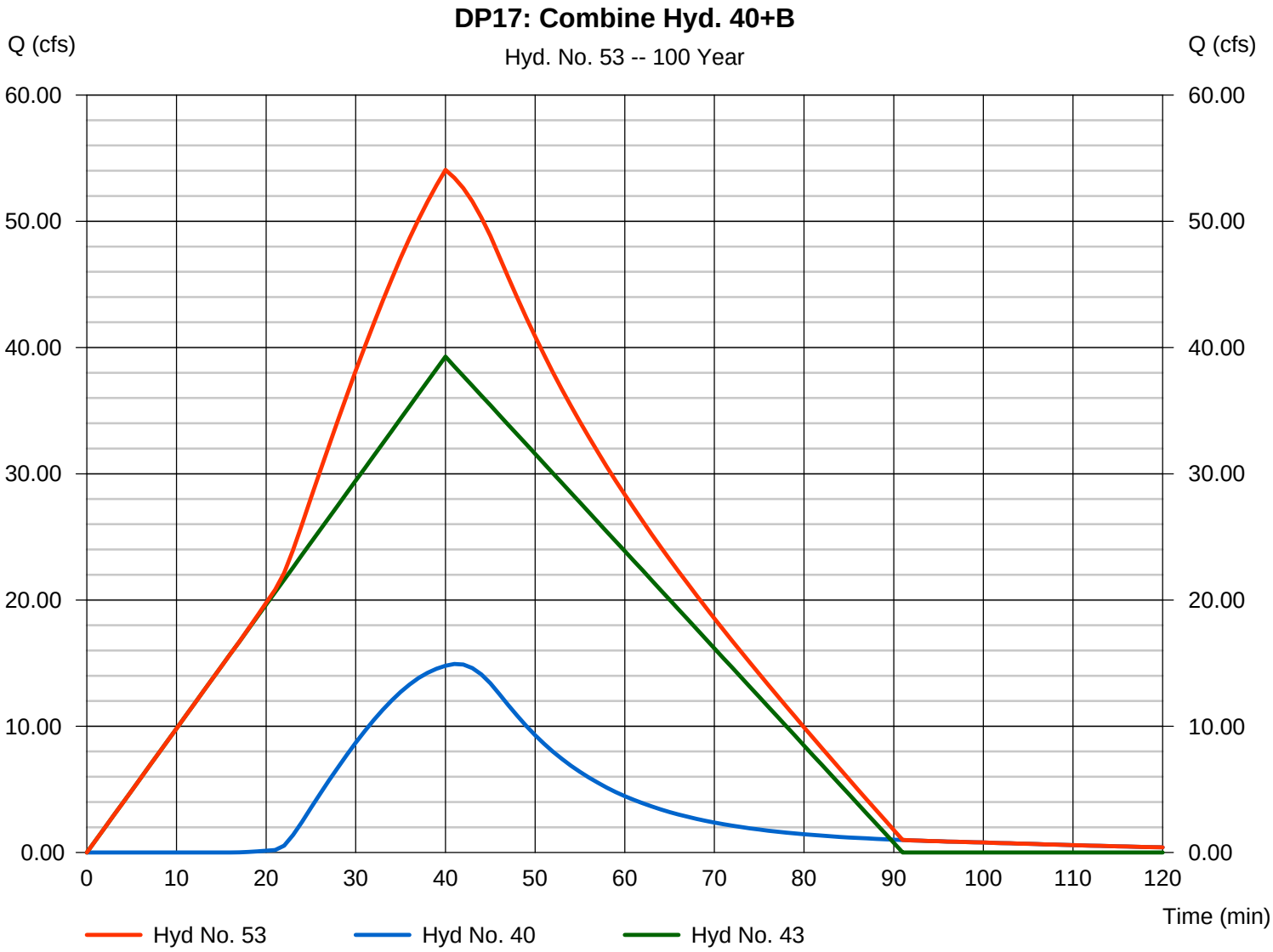
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 53

DP17: Combine Hyd. 40+B

Hydrograph type	=	Combine	Peak discharge	=	54.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	134,300 cuft
Inflow hyds.	=	40, 43	Contrib. drain. area	=	16.610 ac



Hydrograph Report

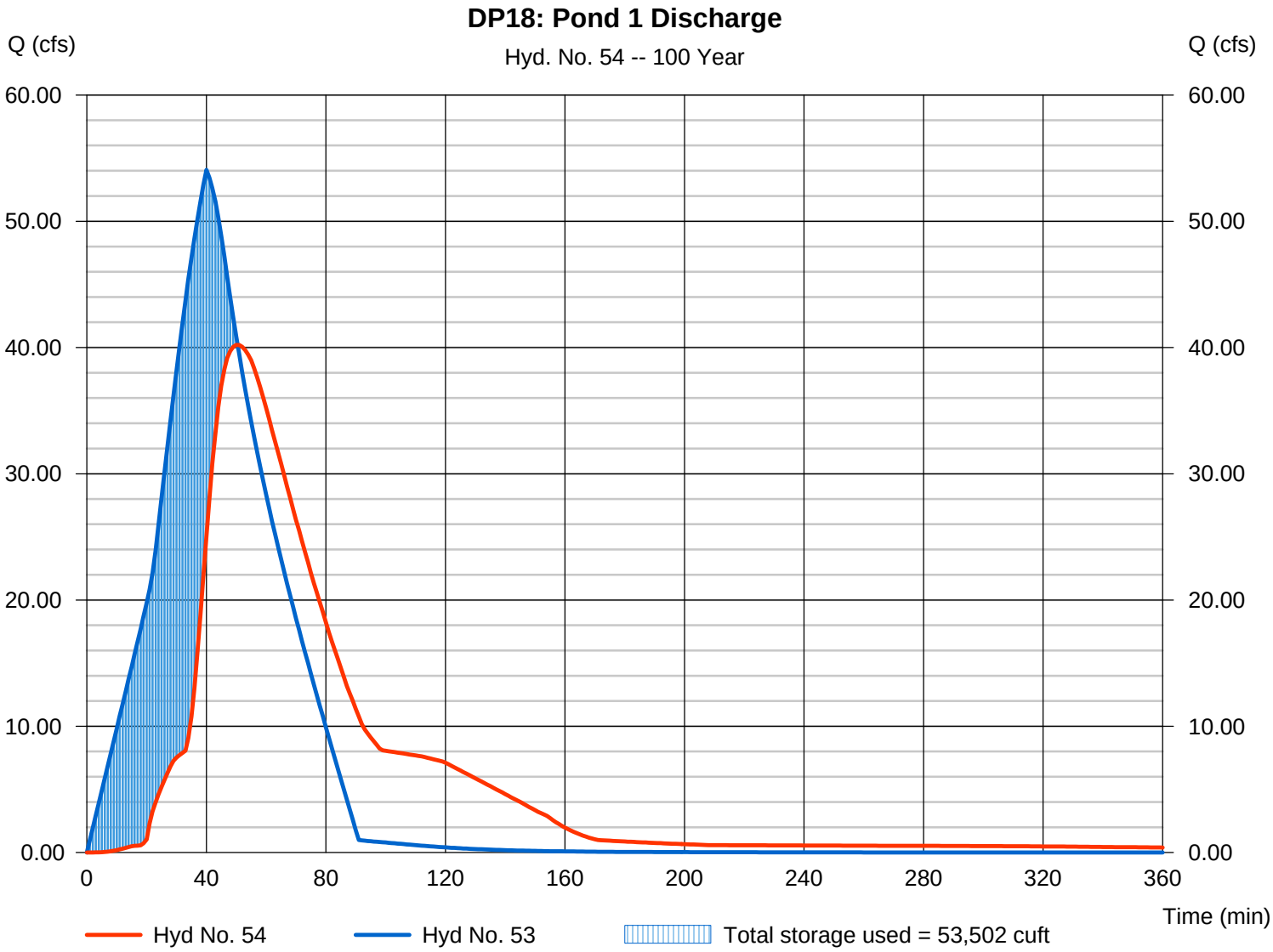
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 54

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	40.20 cfs
Storm frequency	=	100 yrs	Time to peak	=	50 min
Time interval	=	1 min	Hyd. volume	=	134,268 cuft
Inflow hyd. No.	=	53 - DP17: Combine Hyd. 40+B	Max. Elevation	=	5315.02 ft
Reservoir name	=	Detention Pond	Max. Storage	=	53,502 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 1 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

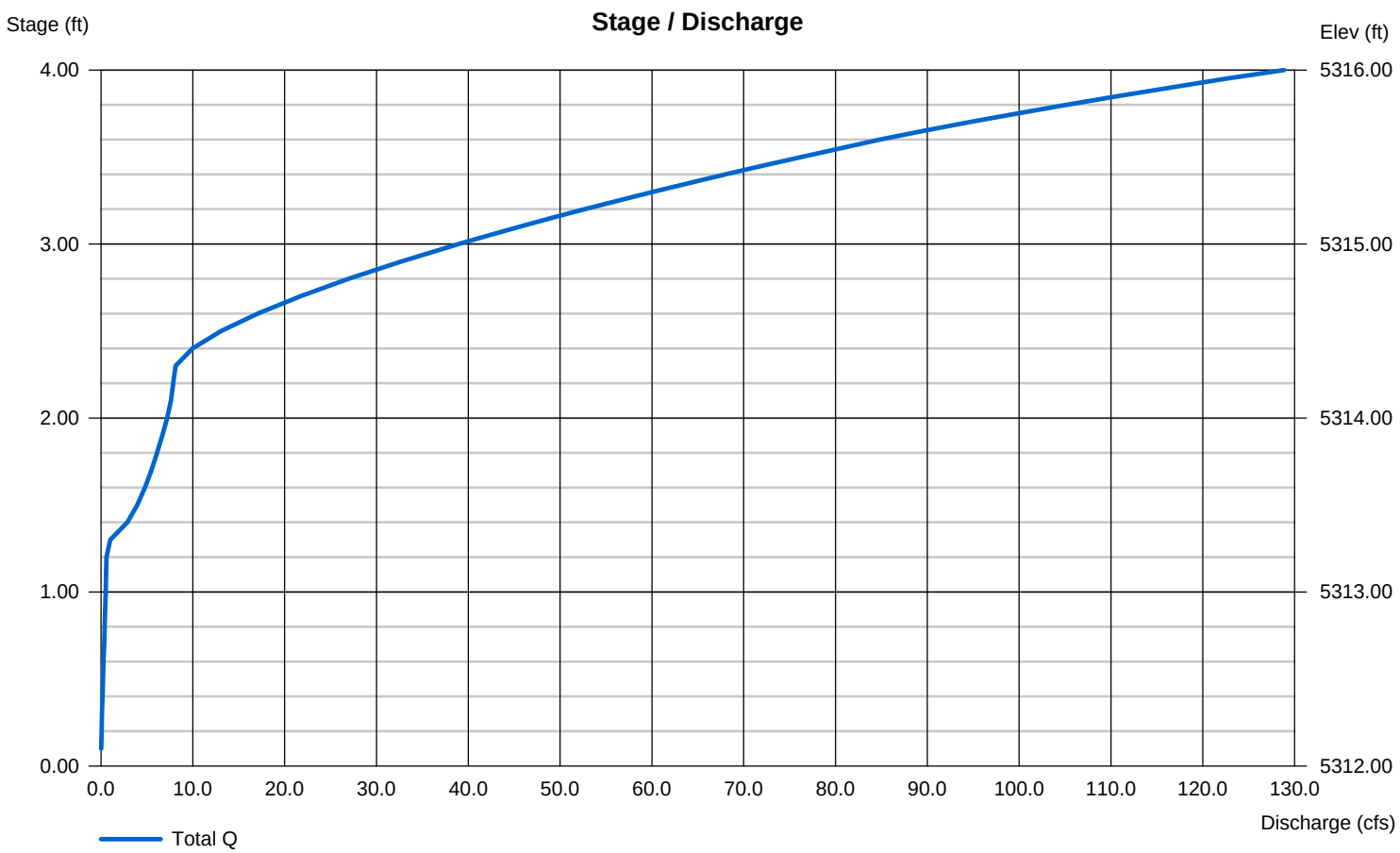
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



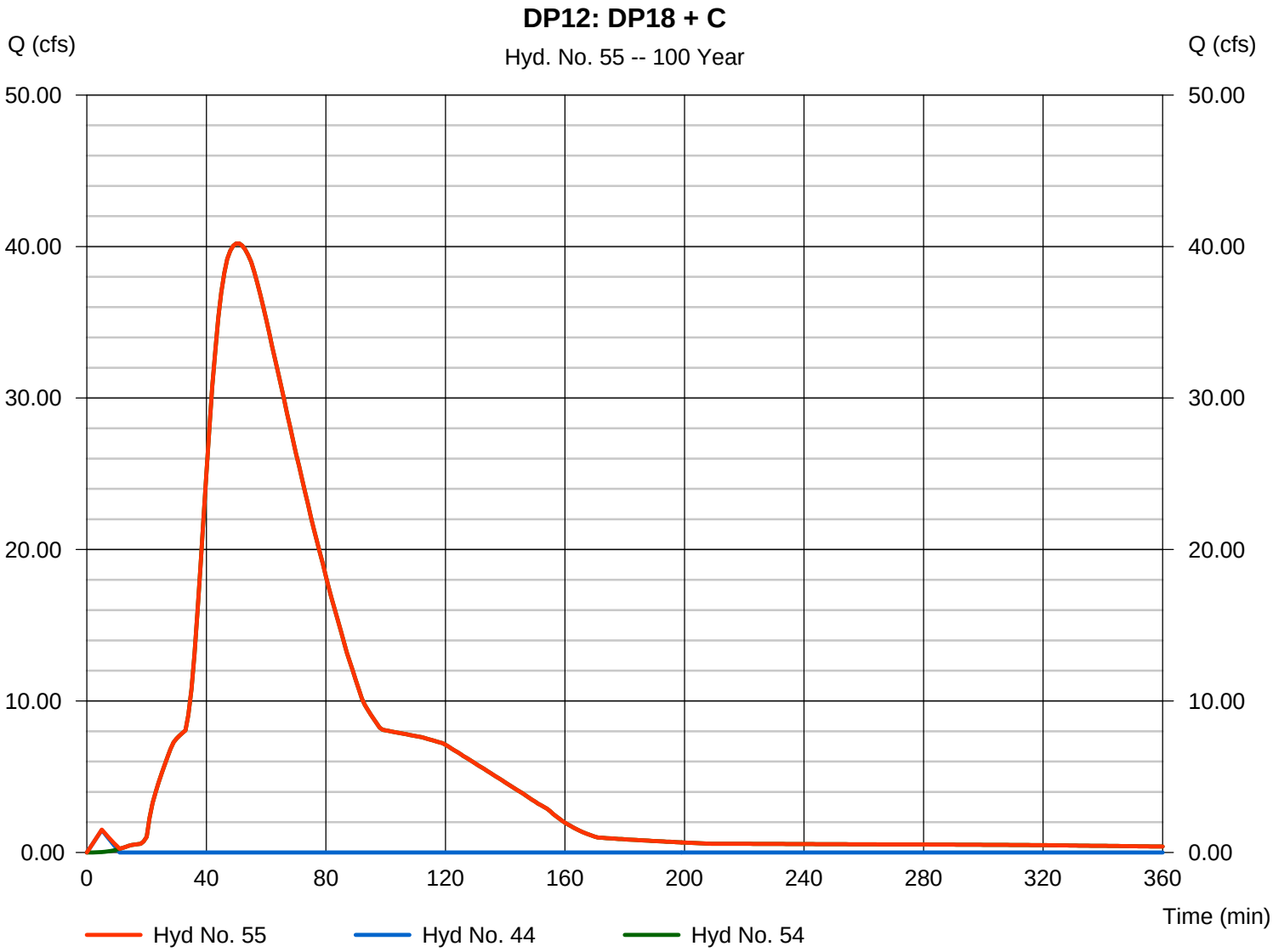
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 55

DP12: DP18 + C

Hydrograph type	=	Combine	Peak discharge	=	40.20 cfs
Storm frequency	=	100 yrs	Time to peak	=	50 min
Time interval	=	1 min	Hyd. volume	=	134,757 cuft
Inflow hyds.	=	44, 54	Contrib. drain. area	=	0.200 ac



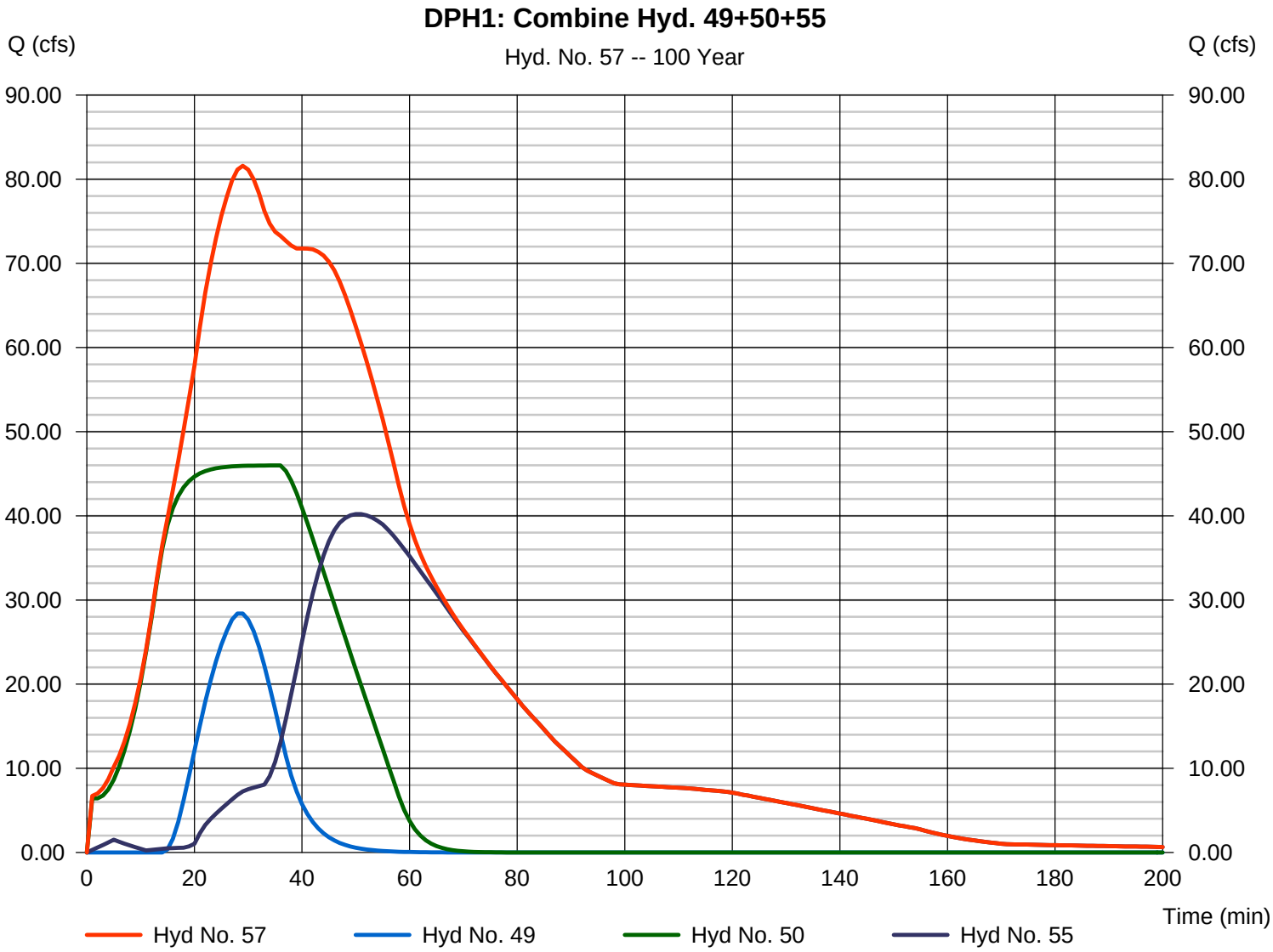
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 57

DPH1: Combine Hyd. 49+50+55

Hydrograph type	=	Combine	Peak discharge	=	81.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	29 min
Time interval	=	1 min	Hyd. volume	=	271,013 cuft
Inflow hyds.	=	49, 50, 55	Contrib. drain. area	=	0.000 ac



Hydrograph Report

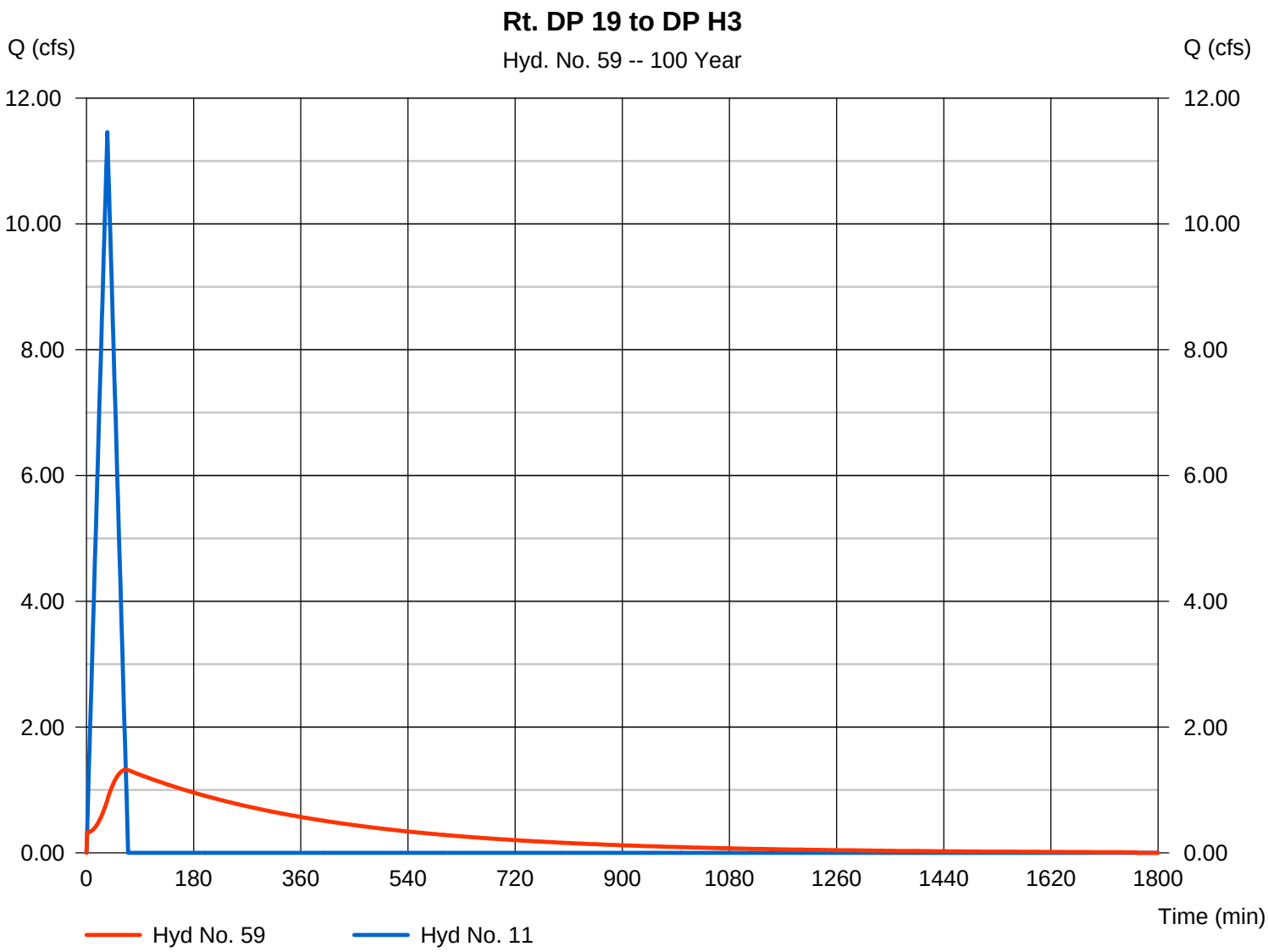
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 59

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	1.321 cfs
Storm frequency	=	100 yrs	Time to peak	=	66 min
Time interval	=	1 min	Hyd. volume	=	30,687 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.03 ft/s	Routing coeff.	=	0.0029

Modified Att-Kin routing method used.



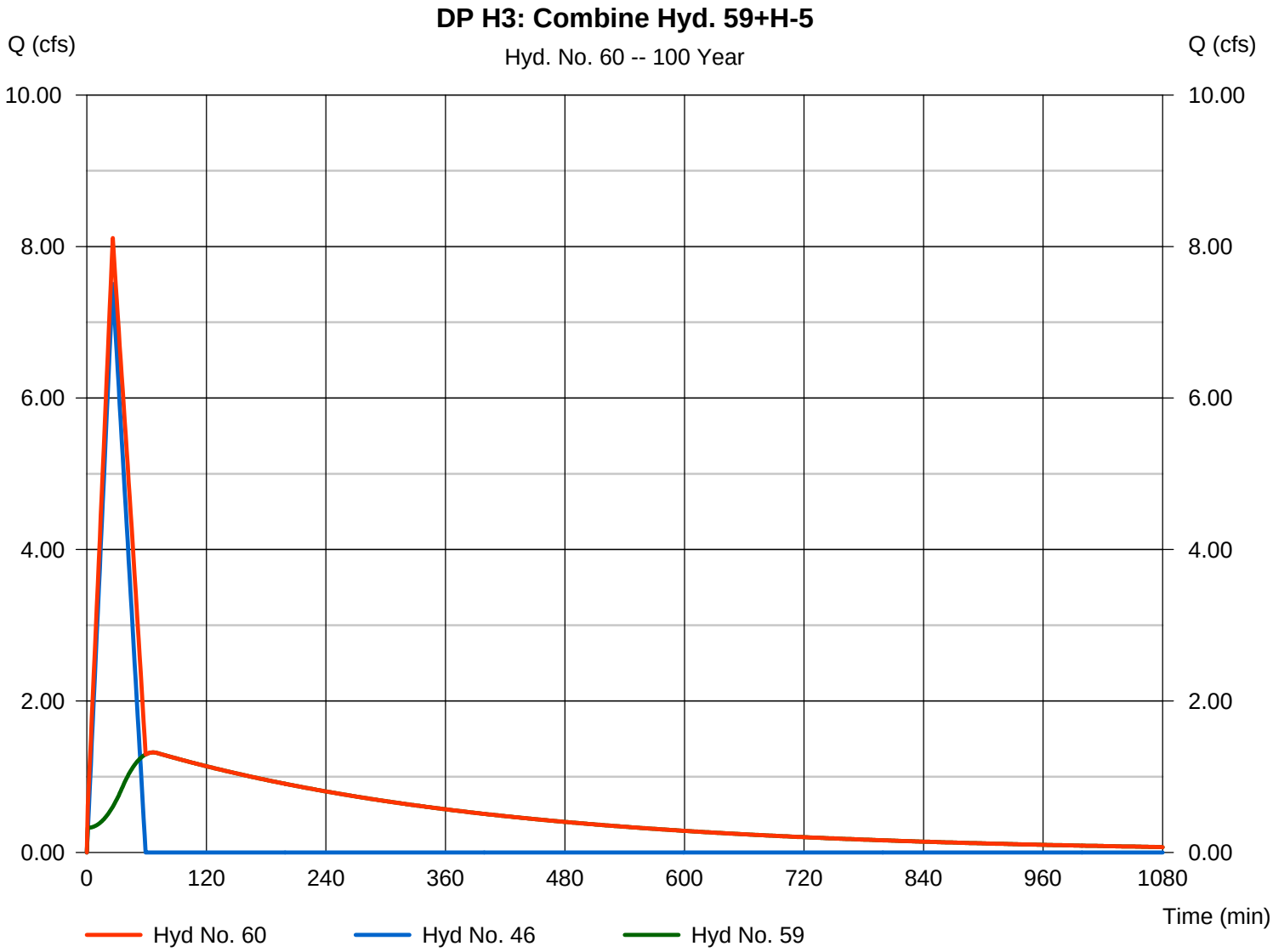
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 60

DP H3: Combine Hyd. 59+H-5

Hydrograph type	=	Combine	Peak discharge	=	8.112 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	43,976 cuft
Inflow hyds.	=	46, 59	Contrib. drain. area	=	2.730 ac



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54951-DEV-100YR(irr=71).gpw

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	49.34	1	11	37,451	------	------	------	OS-1
2	Rational	24.60	1	10	16,975	------	------	------	OS-2
3	Rational	4.250	1	12	3,519	------	------	------	OS-3
4	Rational	15.32	1	13	13,744	------	------	------	OS-4
5	Rational	27.51	1	11	20,884	------	------	------	OS-5
6	Rational	6.755	1	17	7,924	------	------	------	OS-6
7	Rational	7.995	1	11	6,068	------	------	------	OS-7
8	Rational	7.012	1	9	4,355	------	------	------	OS-8
9	Rational	30.26	1	25	52,190	------	------	------	OS-9
10	Rational	29.49	1	25	50,878	------	------	------	OS-10
11	Rational	11.46	1	35	24,066	------	------	------	DP 19: OS-11
13	Reach	49.15	1	12	37,287	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	69.65	1	12	53,524	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	58.26	1	15	55,180	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	65.57	1	14	62,830	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	32.78	1	14	31,415	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	32.78	1	14	31,415	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	20.28	1	22	34,490	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	30.89	1	17	32,083	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	34.72	1	14	53,817	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	17.36	1	14	26,908	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	17.36	1	14	26,908	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	13.94	1	23	28,502	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	34.67	1	11	49,138	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	52.44	1	19	83,819	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	51.83	1	21	84,469	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Combine	78.93	1	25	134,905	10, 33	------	------	DP10: Combine Hyd.33+OS-10
35	Diversion1	0.000	1	1	0	34	------	------	DP13: Split Flow to DCD Pipe
36	Diversion2	78.93	1	25	134,905	34	------	------	DP14: Split Flow to N.
38	Reach	75.68	1	27	136,428	36	------	------	Rt. DP14 to DP15 (Bioswale)
39	Reservoir	50.65	1	38	136,424	38	5320.12	48,042	DP16: Pond 2 Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reach	44.13	1	47	136,427	39	------	------	Rt. DP16 to DP17 (Bioswale)
42	Rational	8.766	1	19	11,493	------	------	------	A
43	Rational	39.28	1	40	108,409	------	------	------	B
44	Rational	1.481	1	5	511	------	------	------	C
45	Rational	0.862	1	22	1,309	------	------	------	DP H2: H-4
46	Rational	7.508	1	26	13,469	------	------	------	H-5
48	Combine	44.12	1	11	68,350	6, 30, 42,	------	------	DP11: Combine Hyd. 30+ OS-6+A
49	Reach	75.66	1	28	136,831	38	------	------	Rt. DP11 to DP H1 (Swale)
50	Reach	0.000	1	1	0	35	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
53	Combine	80.16	1	42	243,658	40, 43,	------	------	DP17: Combine Hyd. 40+B
54	Reservoir	70.62	1	53	243,627	53	5315.43	69,613	DP18: Pond 1 Discharge
55	Combine	70.62	1	53	244,116	44, 54	------	------	DP12: DP18 + C
57	Combine	98.35	1	44	380,946	49, 50, 55,	------	------	DPH1: Combine Hyd. 49+50+55
59	Reach	1.321	1	66	30,687	11	------	------	Rt. DP 19 to DP H3
60	Combine	8.112	1	26	43,976	46, 59	------	------	DP H3: Combine Hyd. 59+H-5

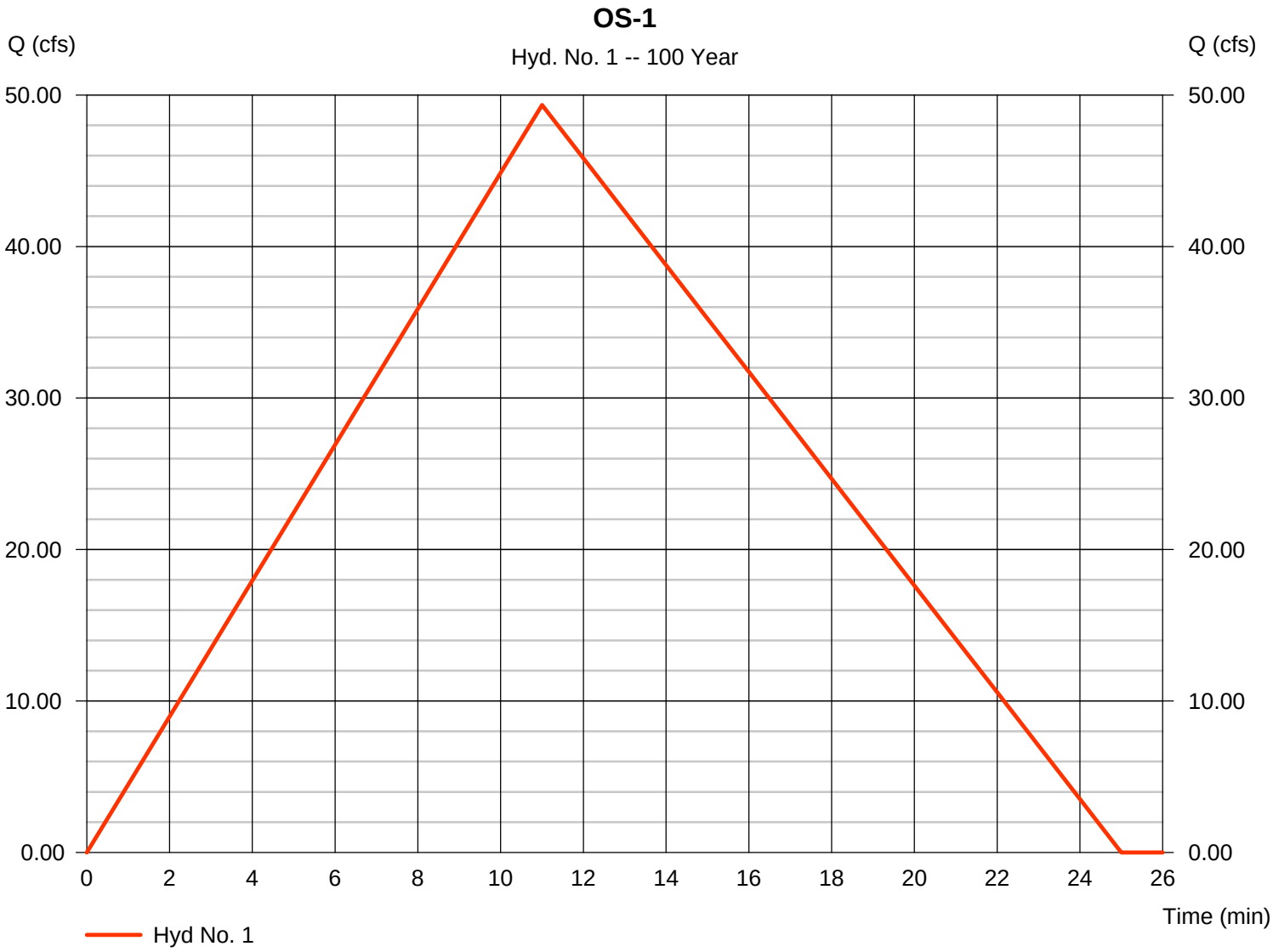
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	49.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	37,451 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.8
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	24.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	16,975 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.92
Intensity	=	8.305 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

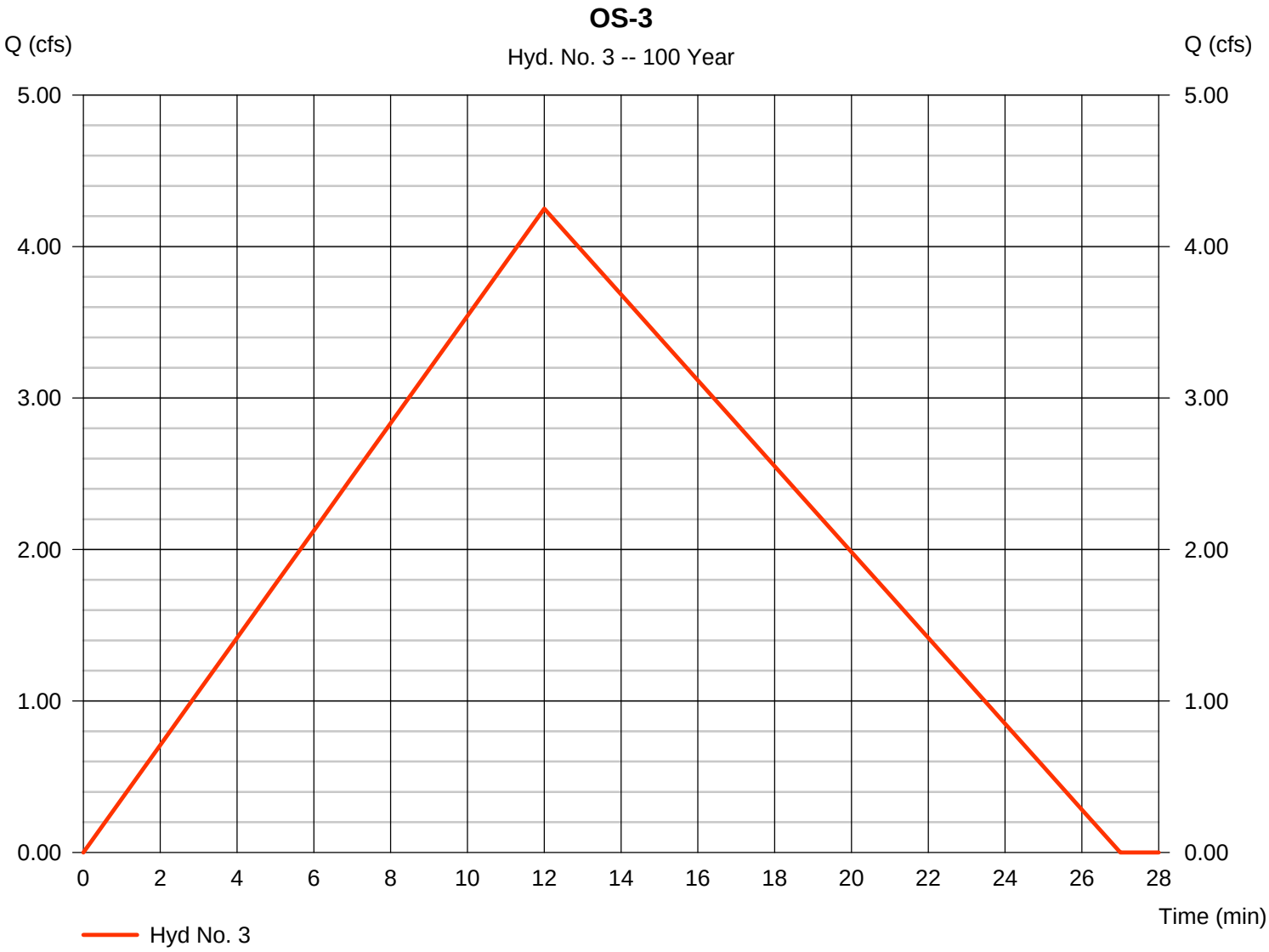
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	4.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,519 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.7
Intensity	=	7.496 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



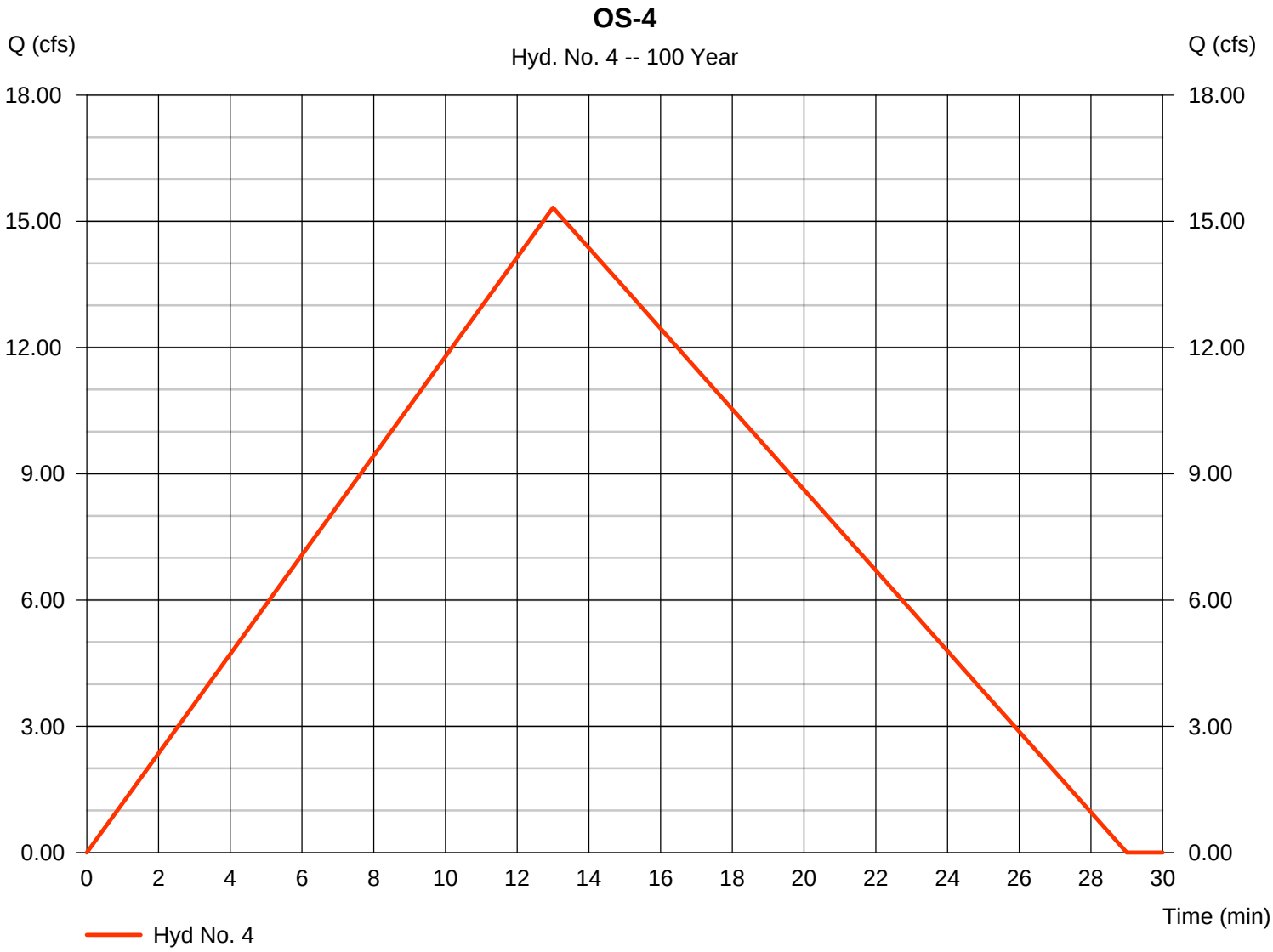
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	15.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	13,744 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.7
Intensity	=	7.153 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



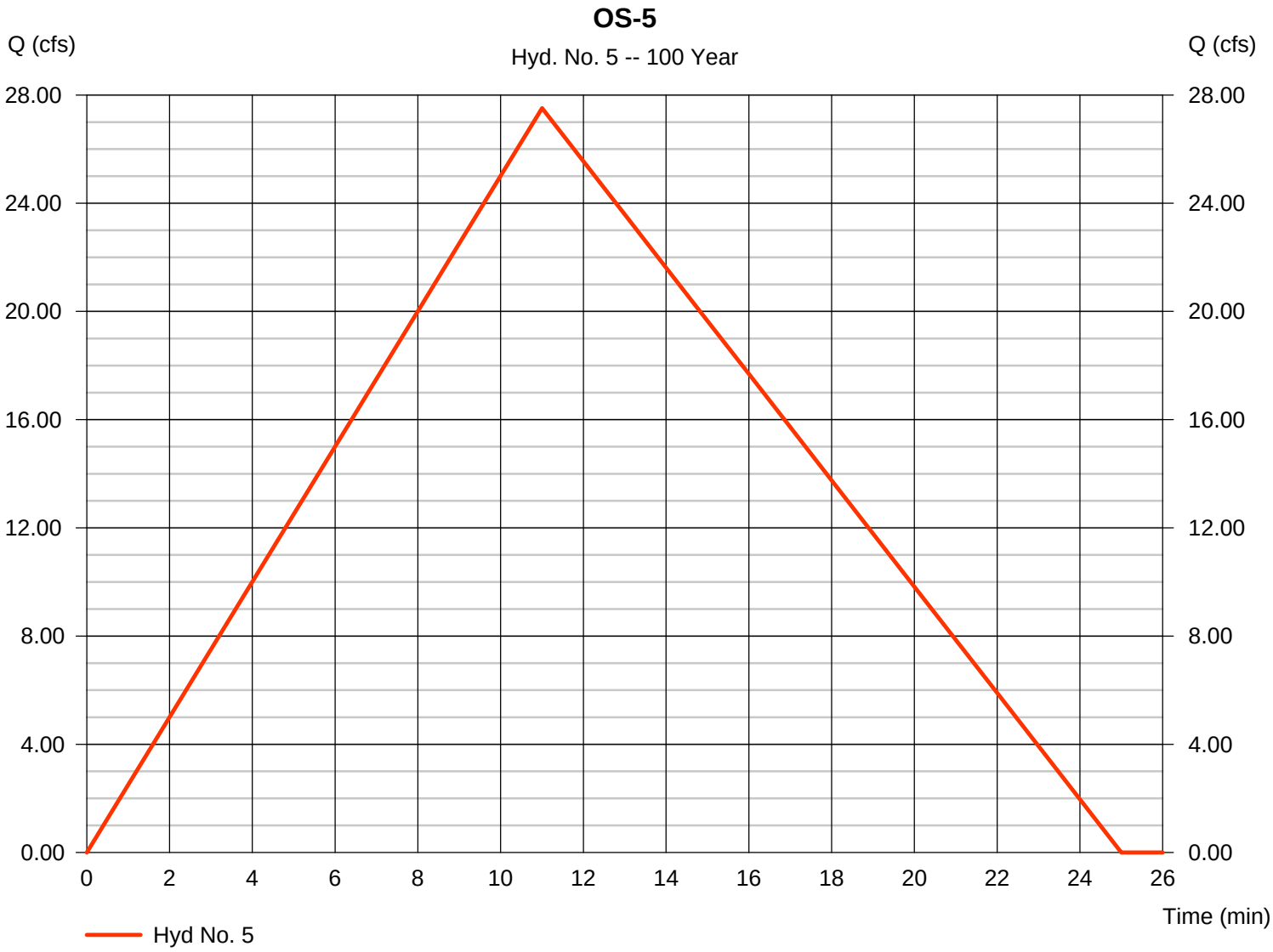
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	27.51 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	20,884 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



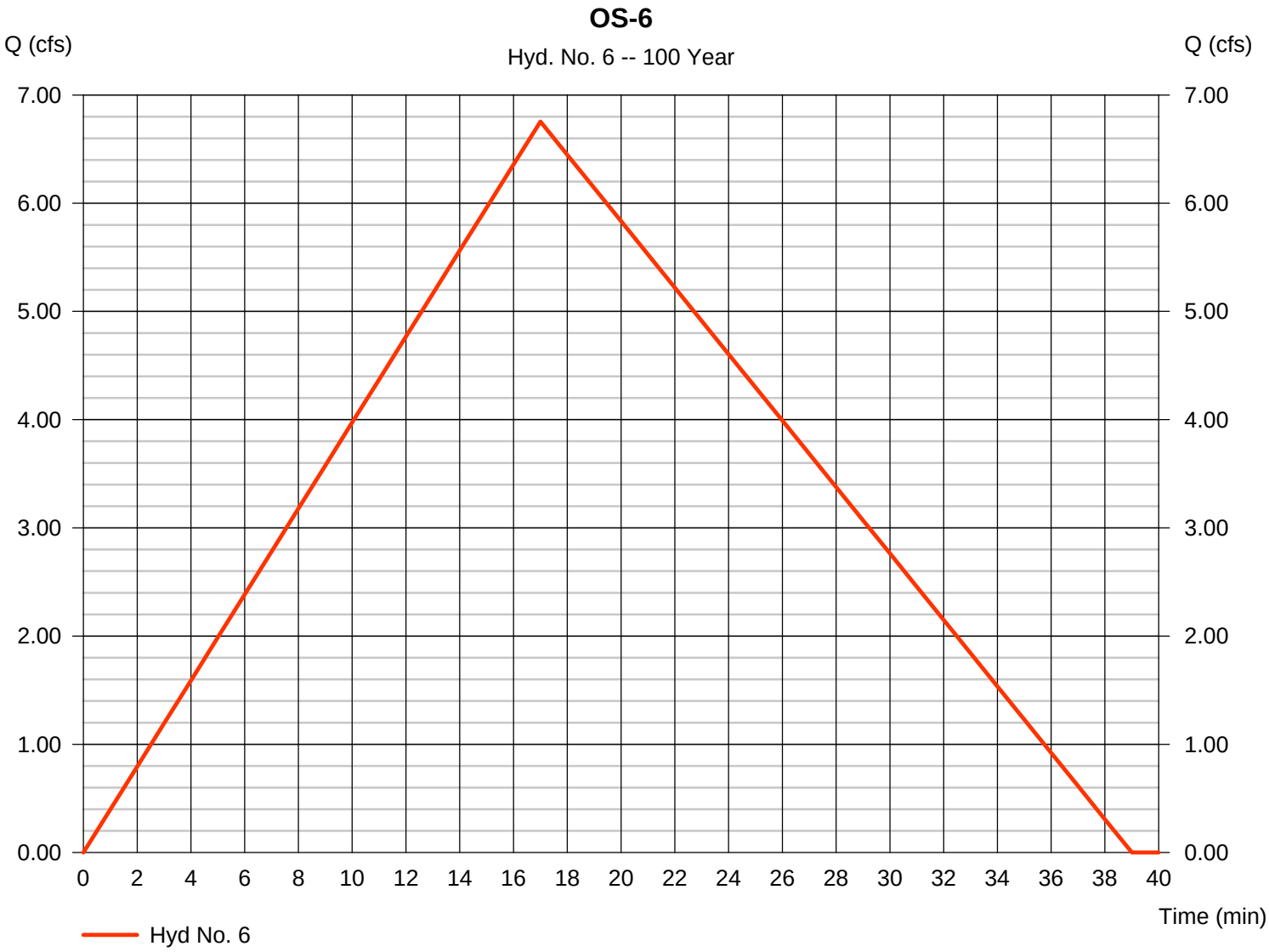
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	6.755 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	7,924 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.7
Intensity	=	6.069 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



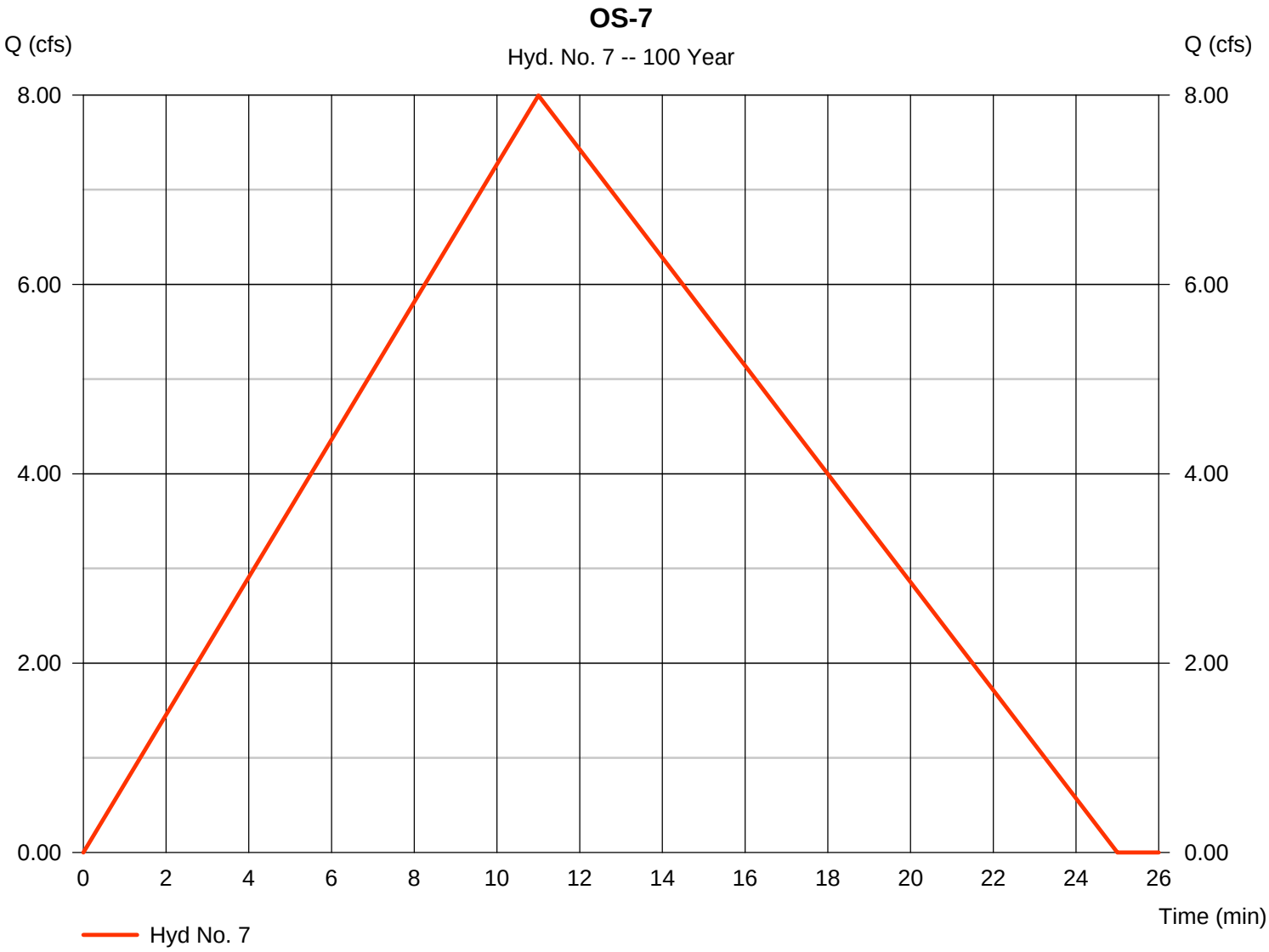
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	7.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	6,068 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



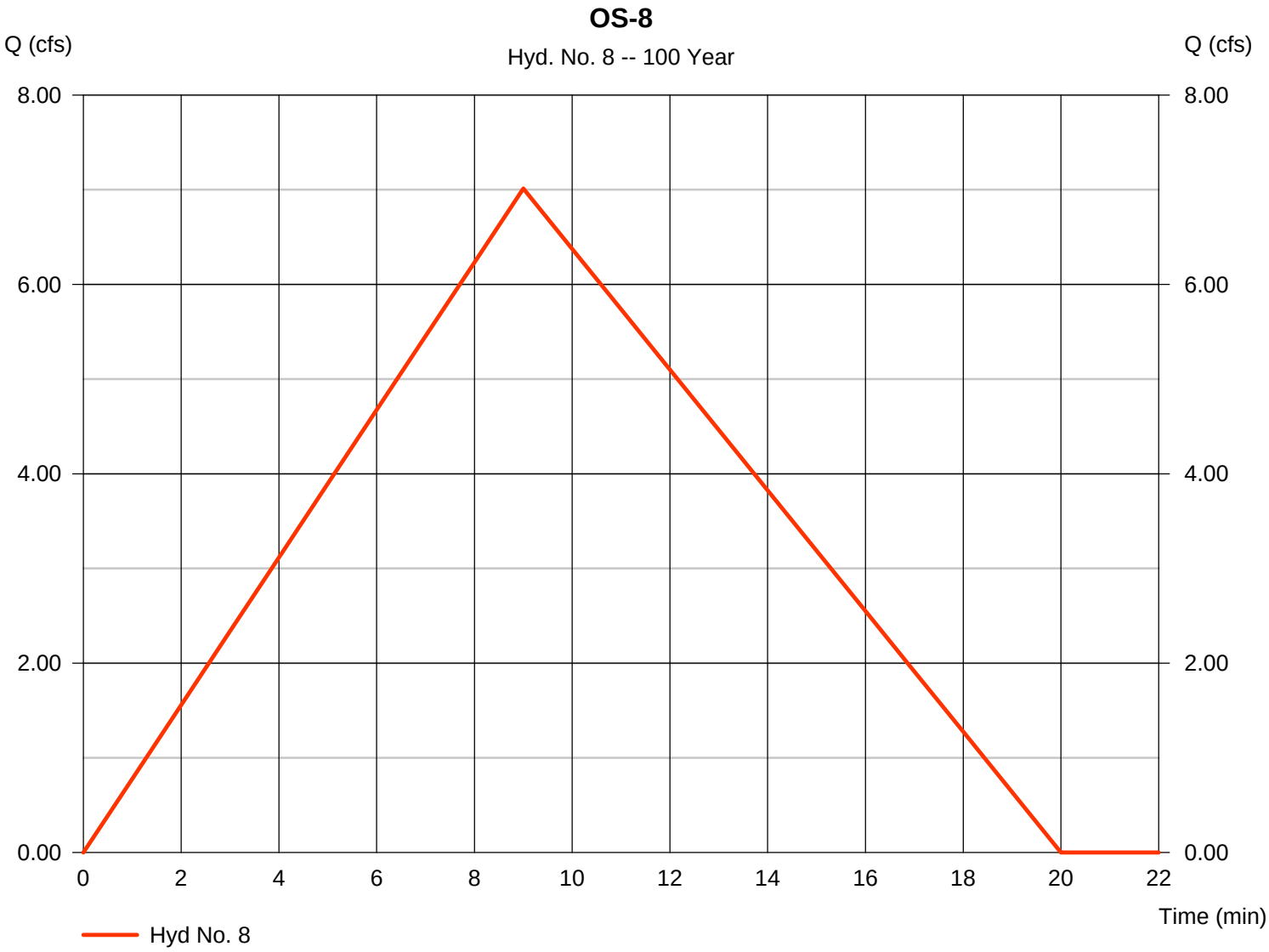
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	7.012 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	4,355 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.7
Intensity	=	8.787 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



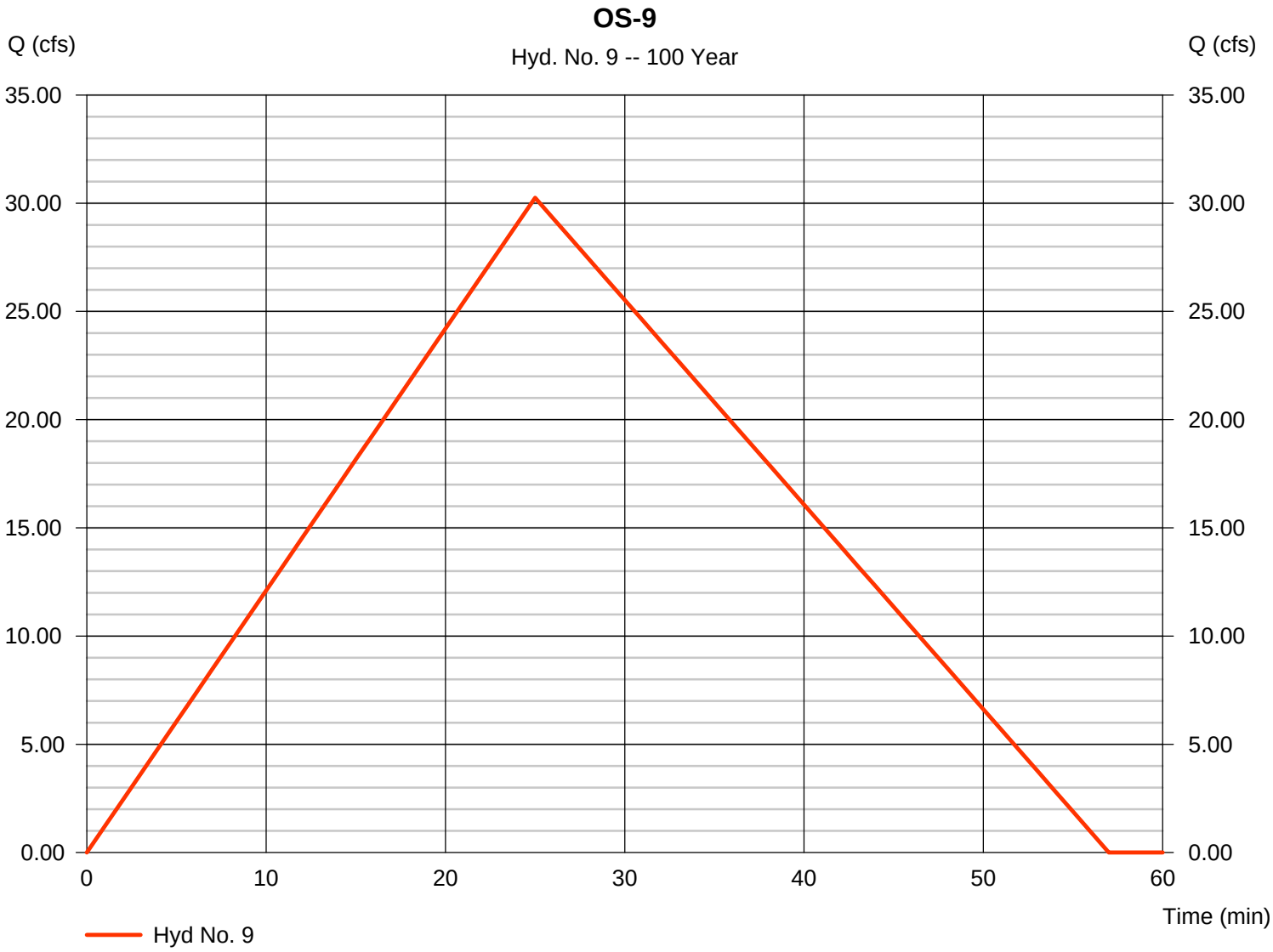
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	30.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	52,190 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.68
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



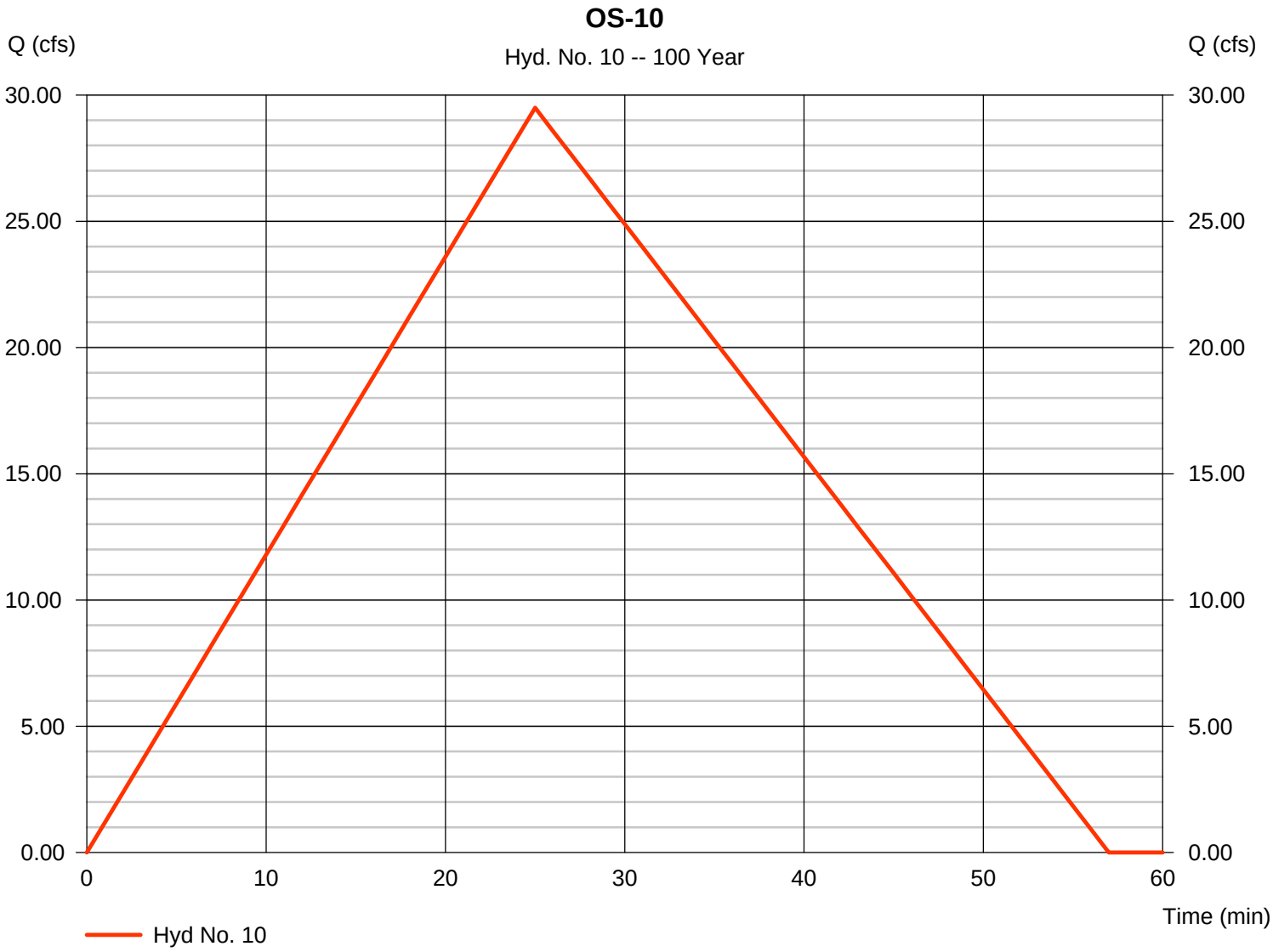
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	29.49 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	50,878 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.67
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



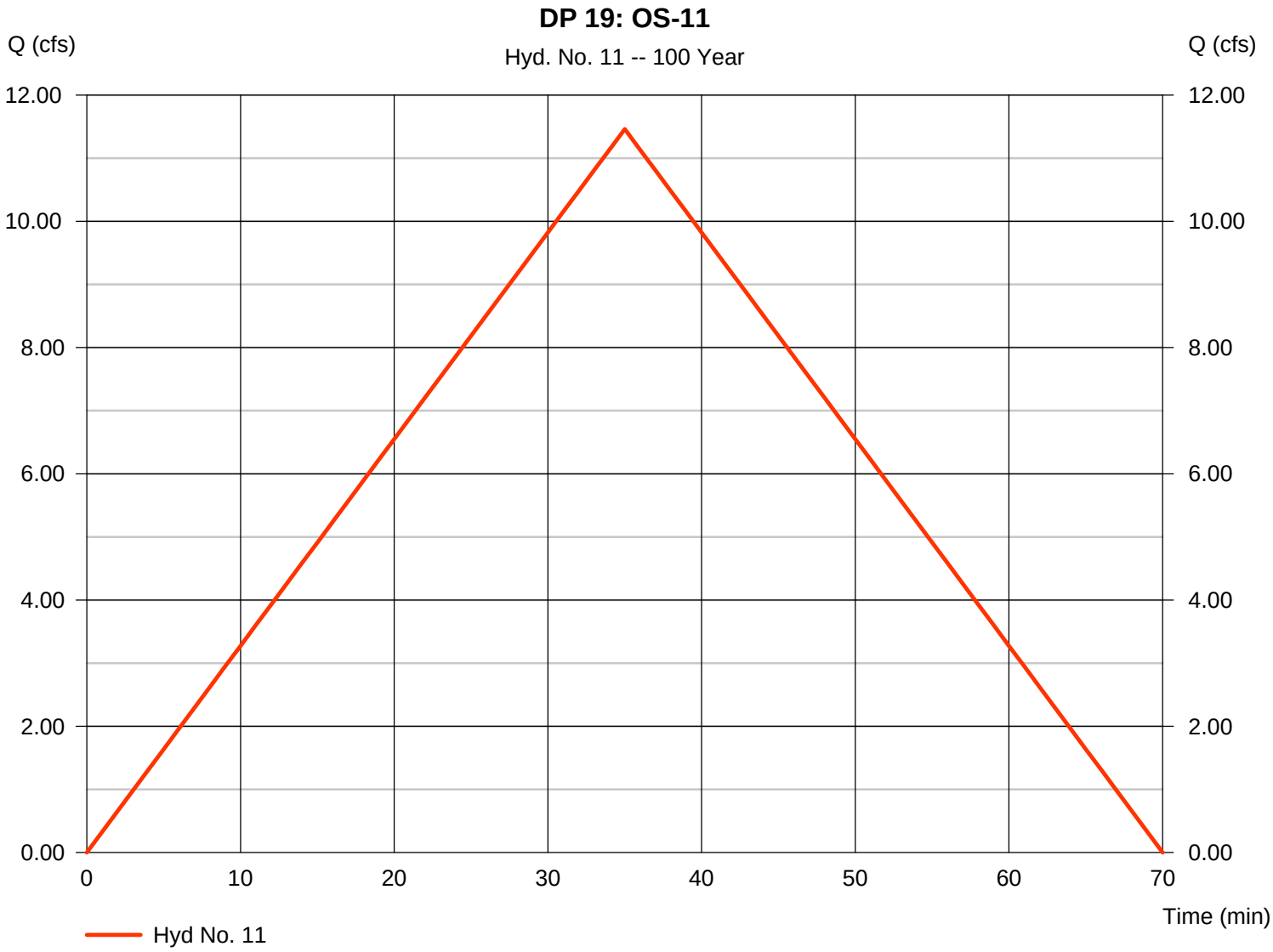
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	11.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	24,066 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.61
Intensity	=	3.720 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

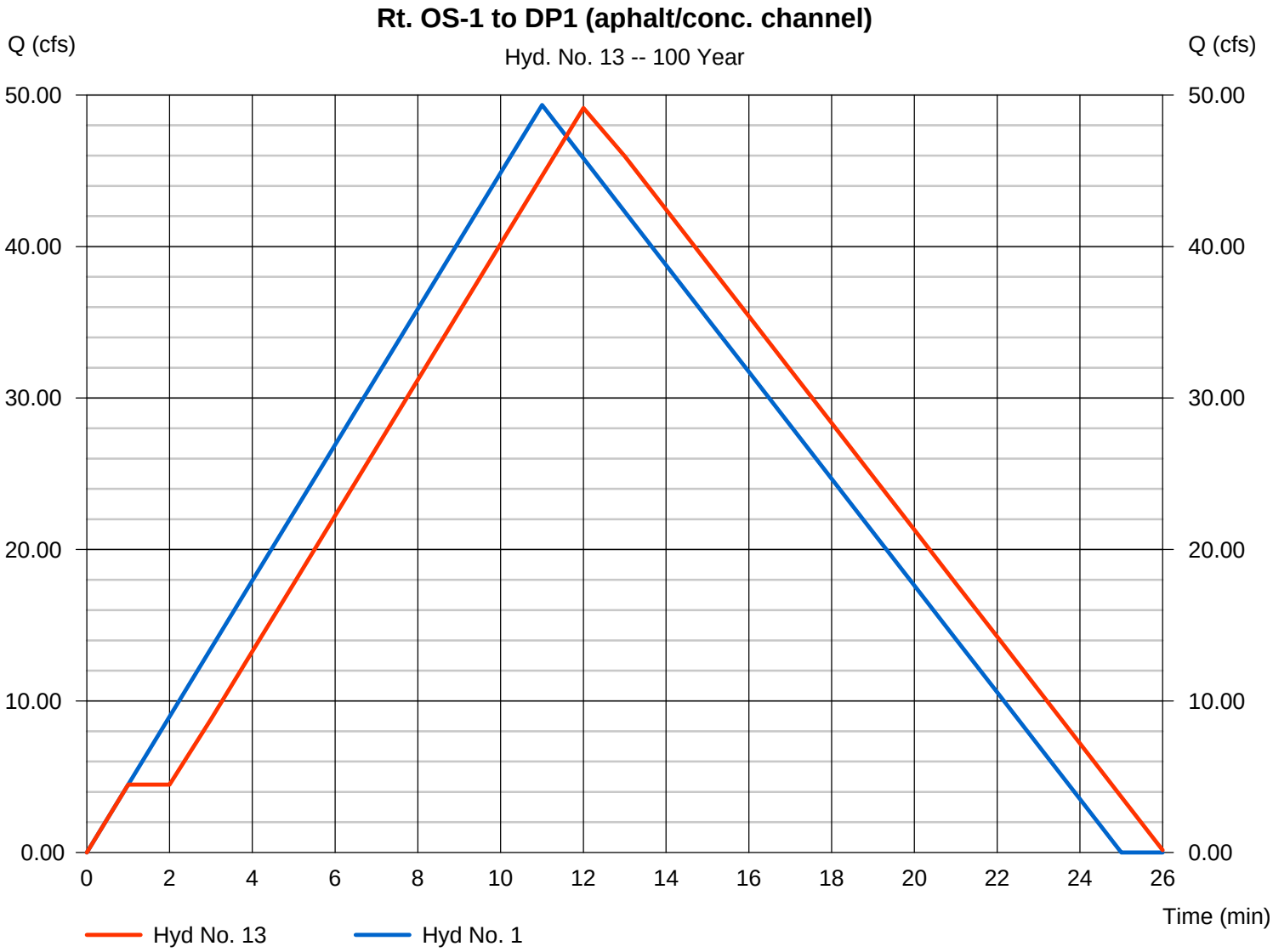
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	49.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	37,287 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.75 ft/s	Routing coeff.	=	0.9587

Modified Att-Kin routing method used.



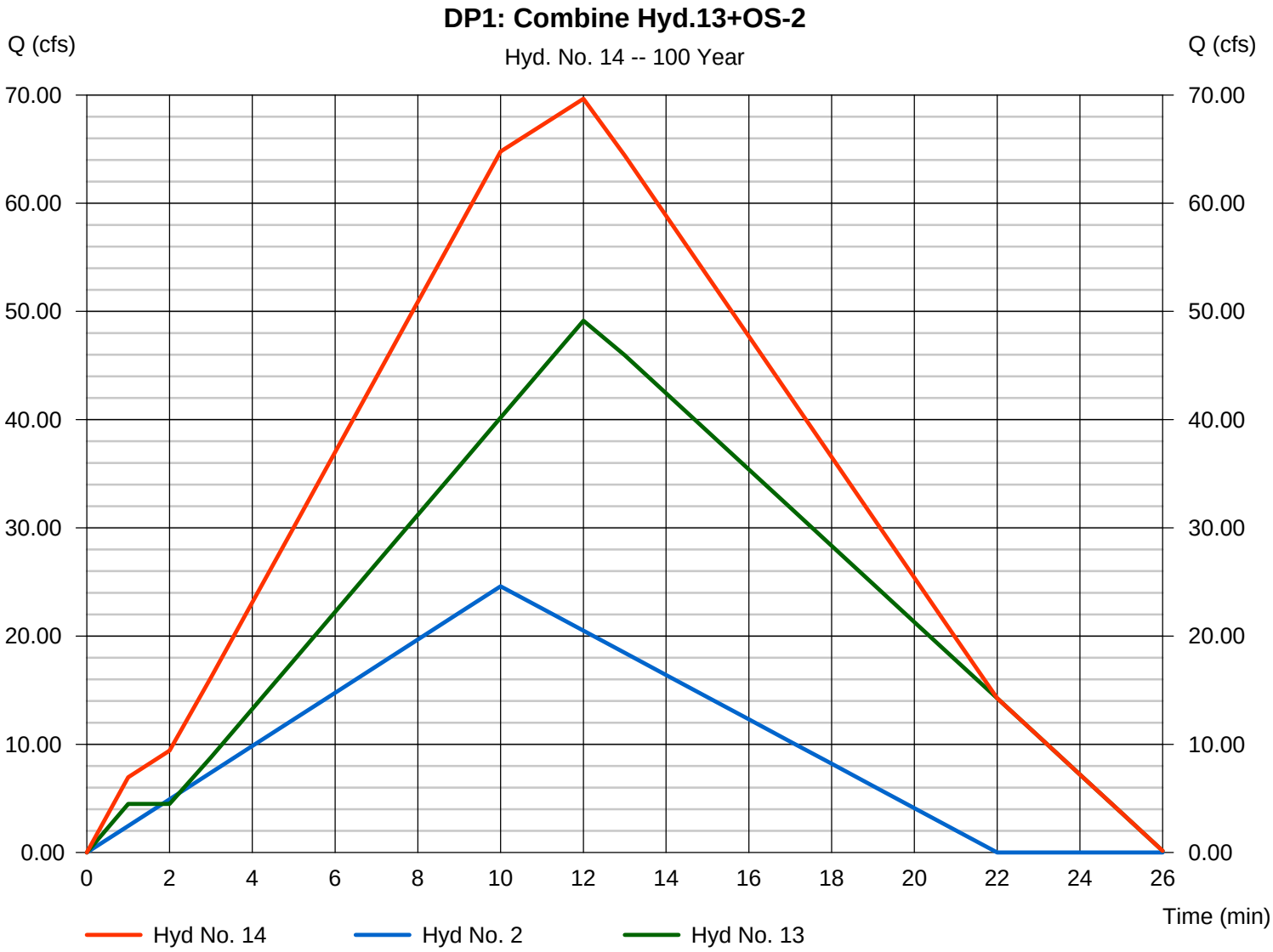
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	69.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	53,524 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

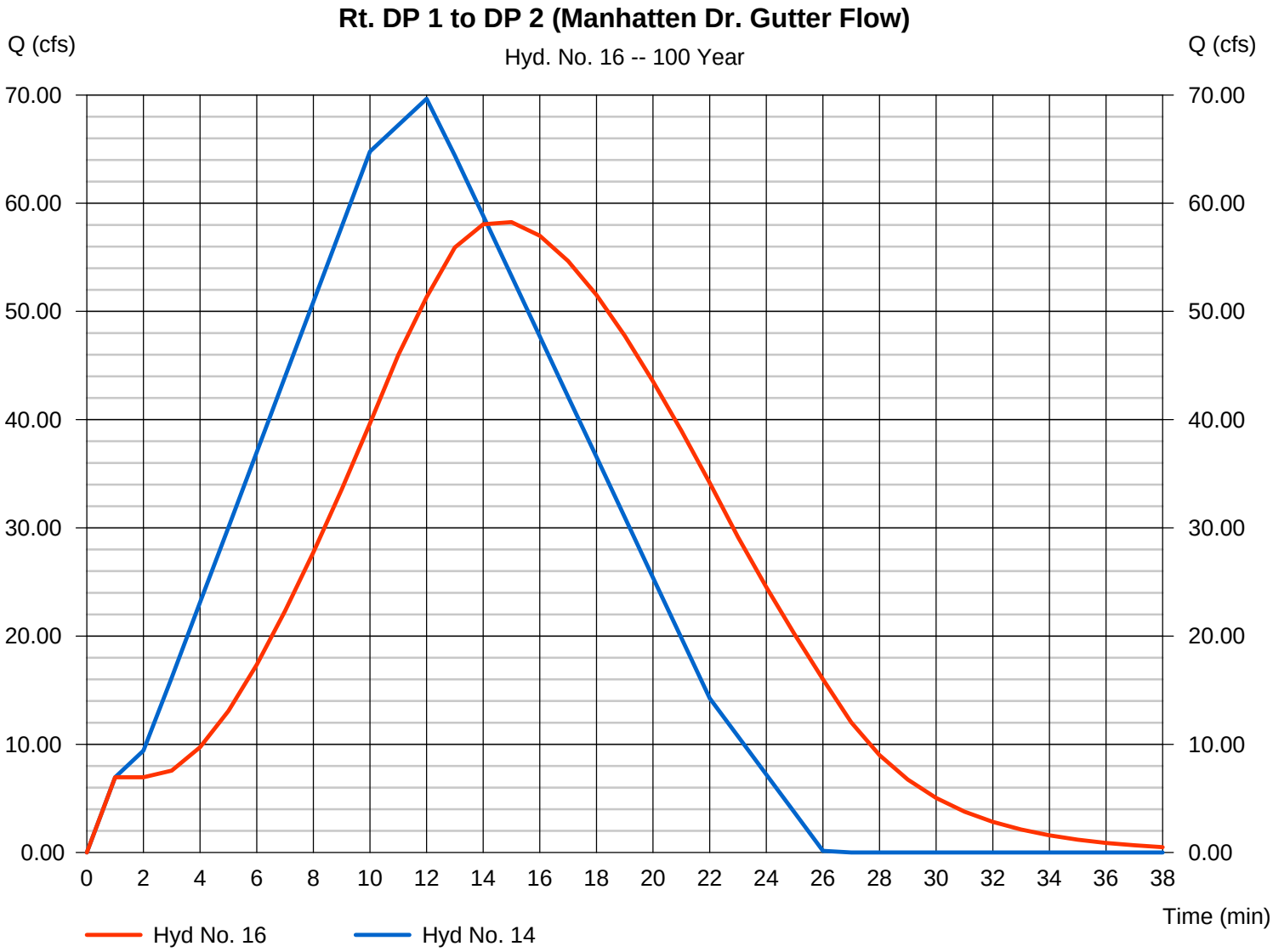
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	58.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	55,180 cuft
Inflow hyd. No.	=	14 - DP1: Combine Hyd.13+OS-2	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.513	Rating curve m	=	0.659
Ave. velocity	=	1.09 ft/s	Routing coeff.	=	0.2514

Modified Att-Kin routing method used.



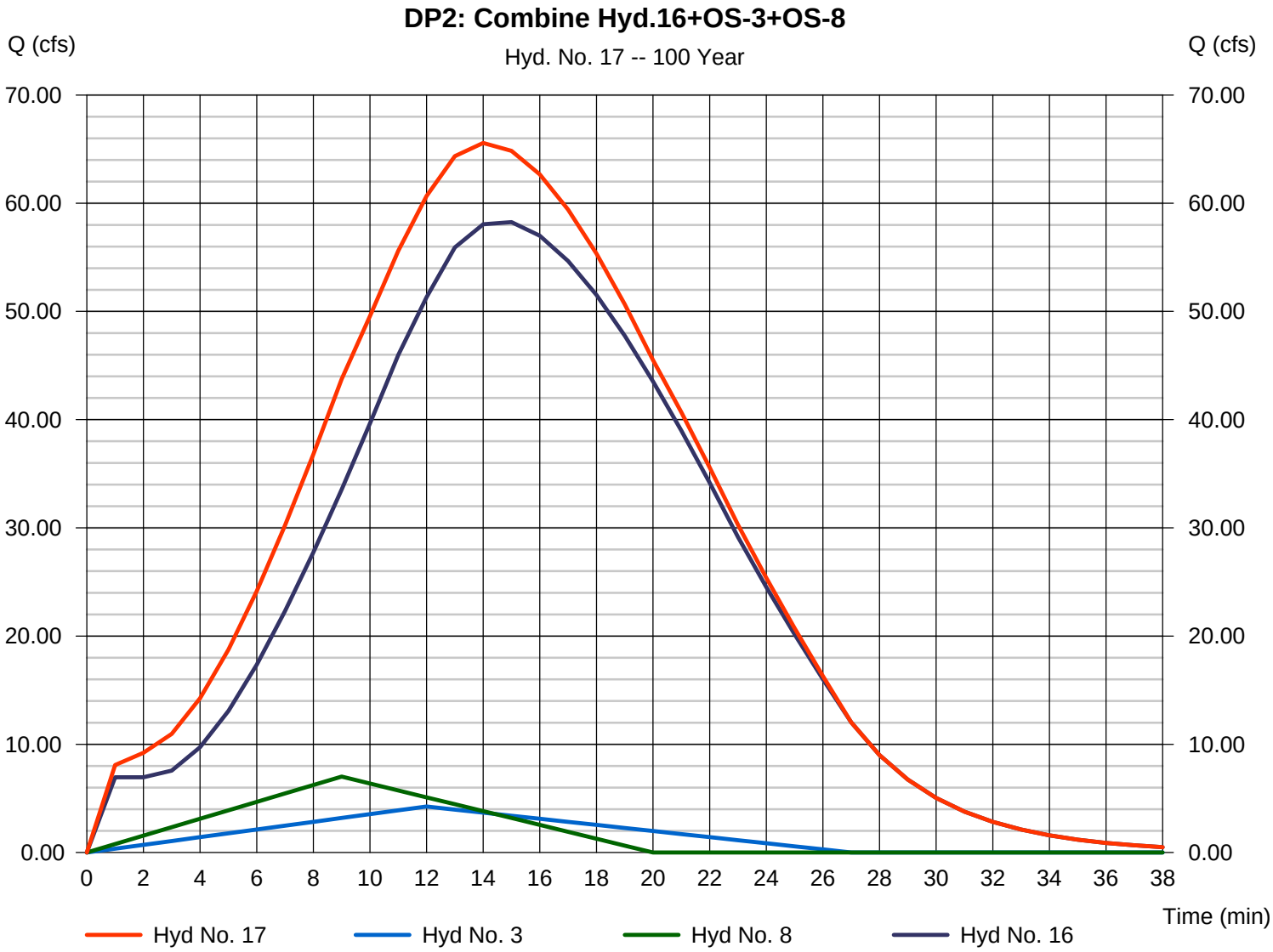
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	=	Combine	Peak discharge	=	65.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	62,830 cuft
Inflow hyds.	=	3, 8, 16	Contrib. drain. area	=	1.950 ac



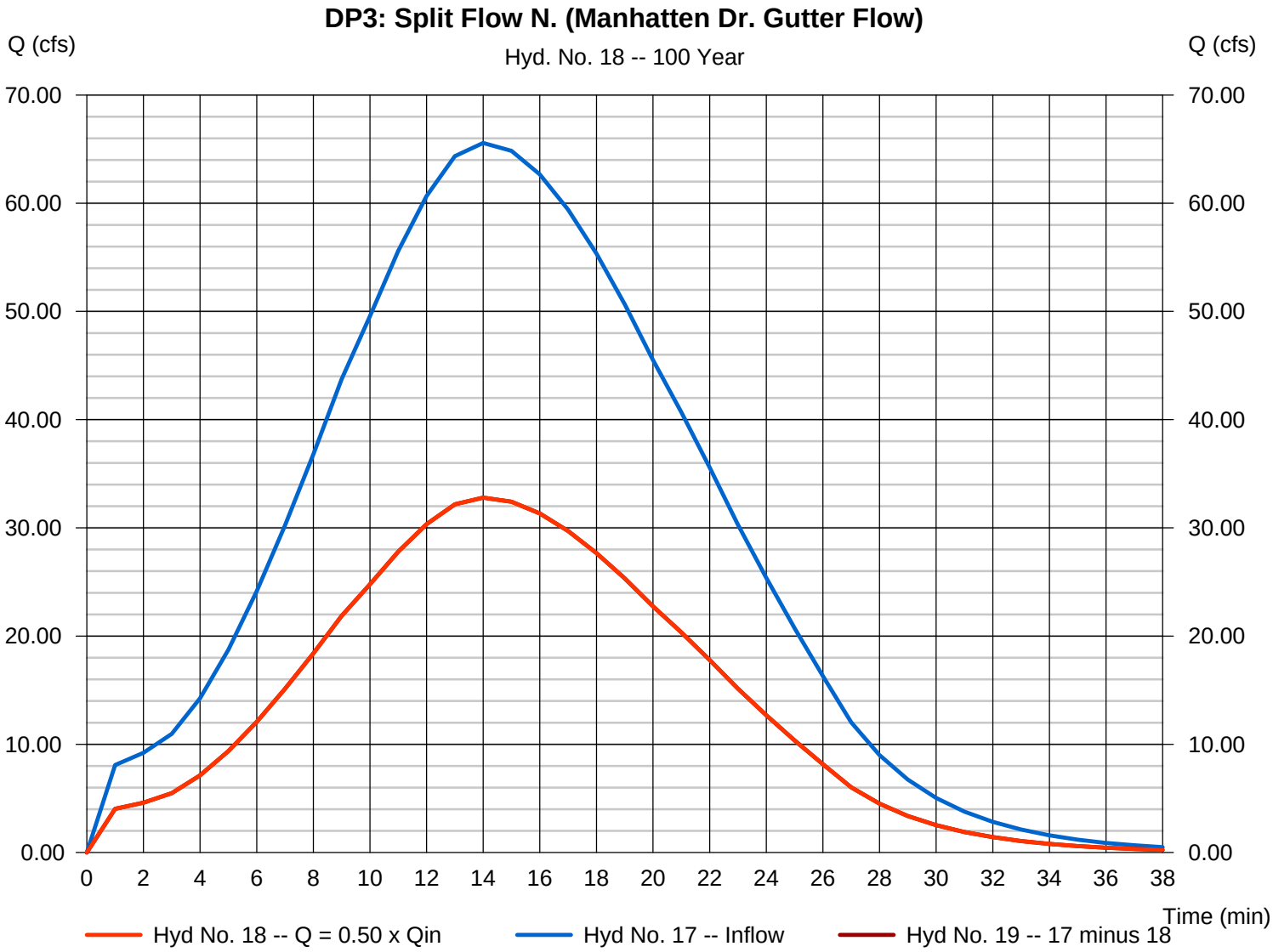
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



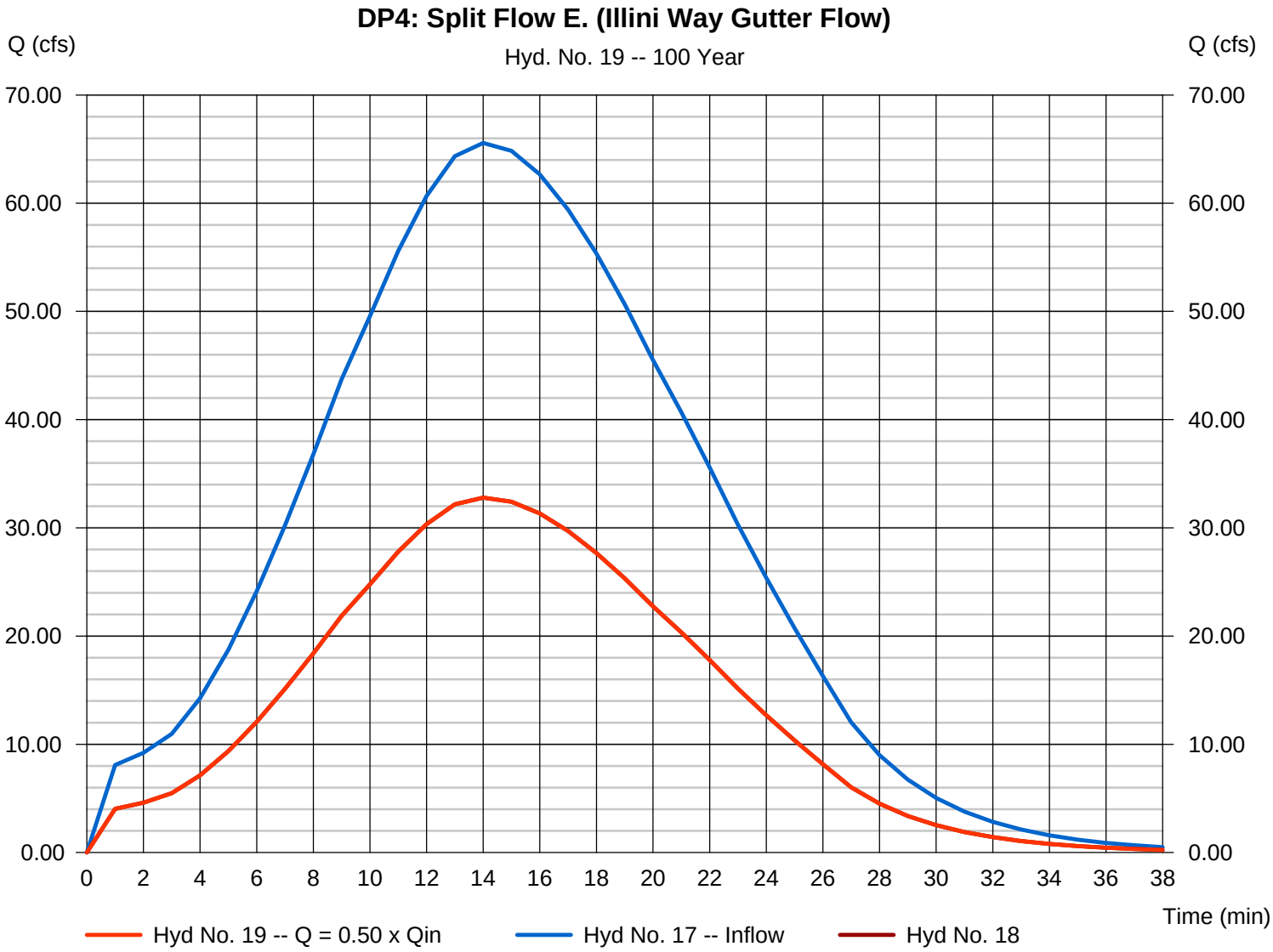
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

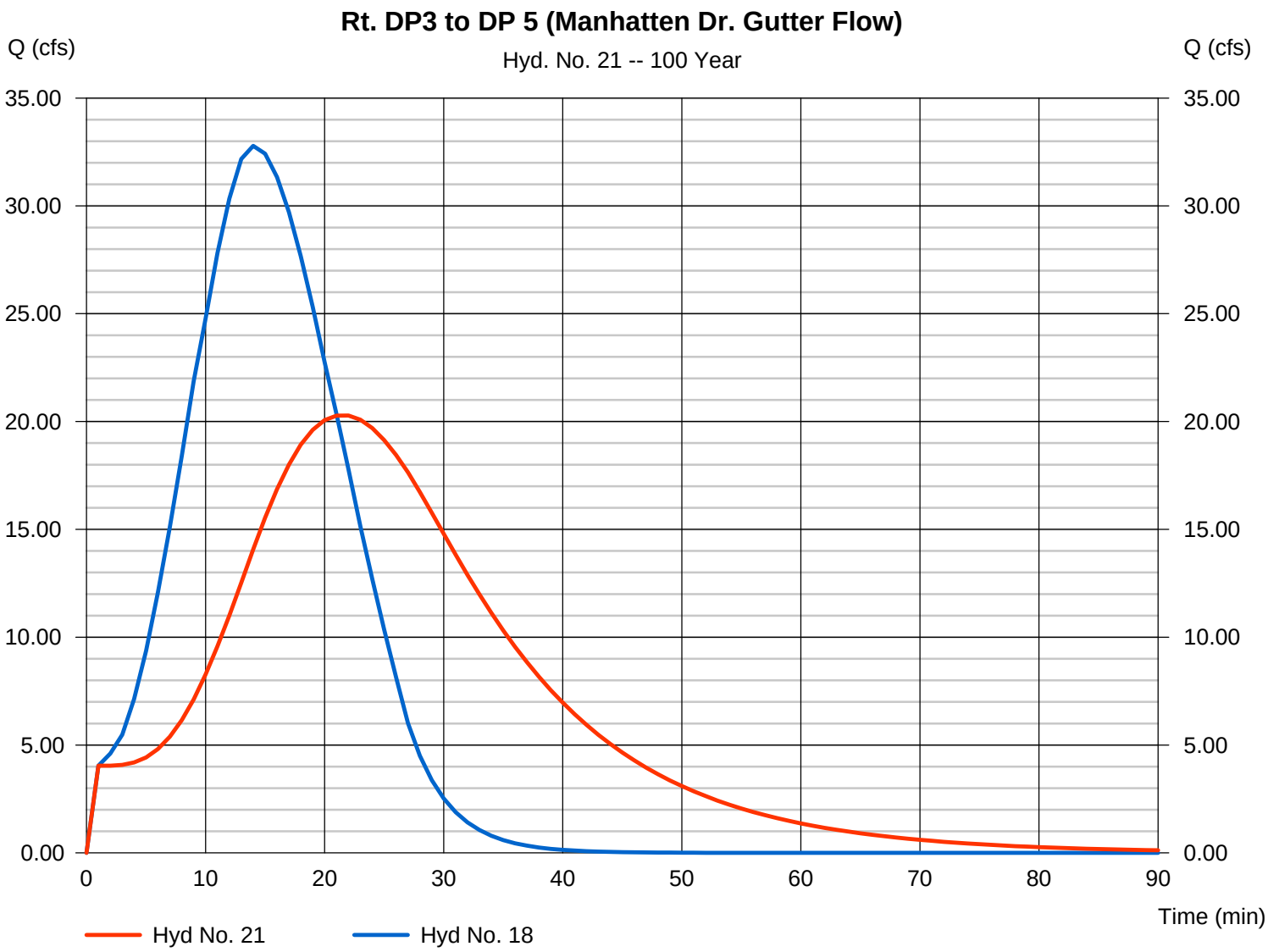
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	20.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	34,490 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.0786

Modified Att-Kin routing method used.



Hydrograph Report

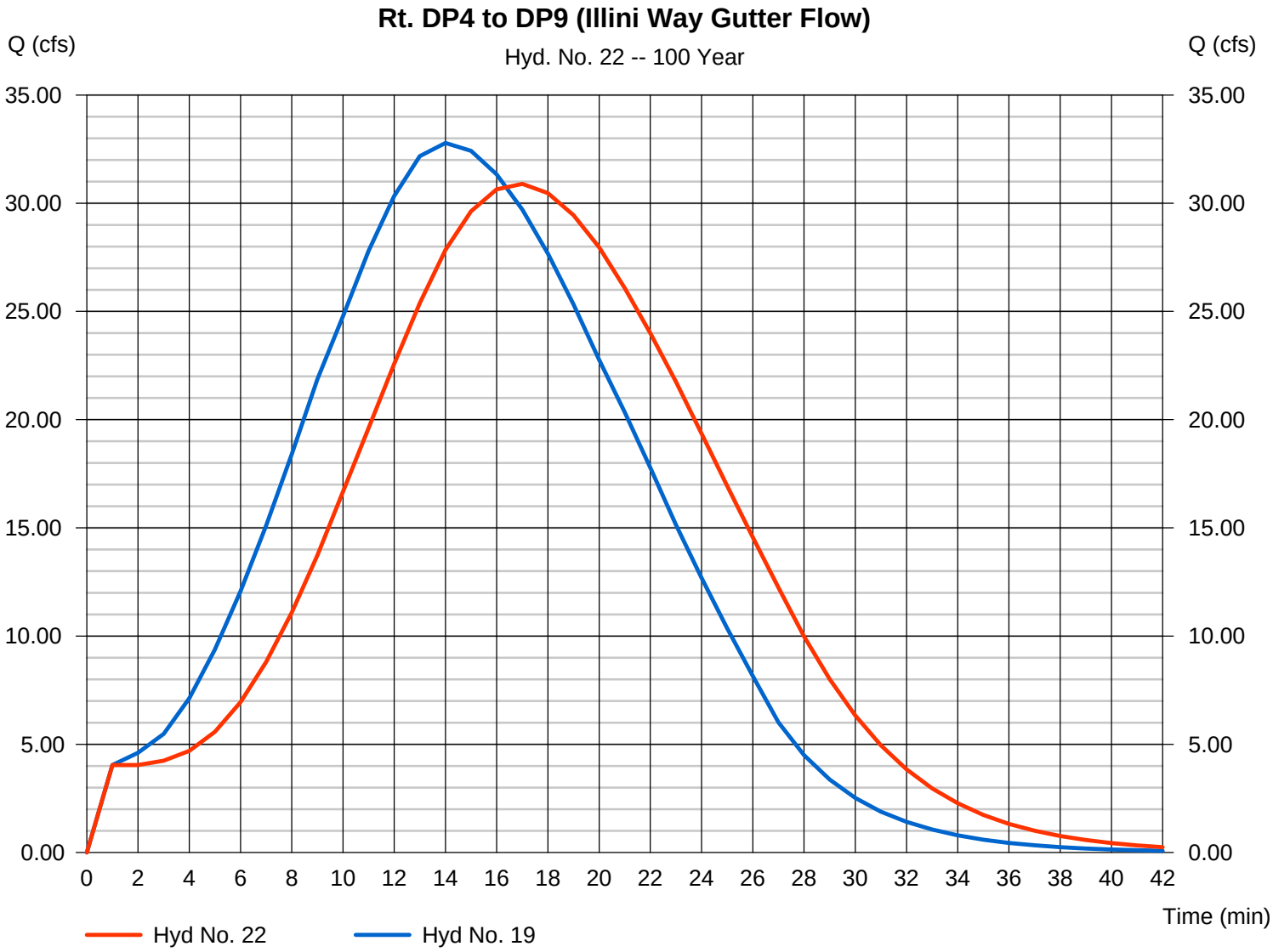
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	30.89 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	32,083 cuft
Inflow hyd. No.	=	19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.3620

Modified Att-Kin routing method used.



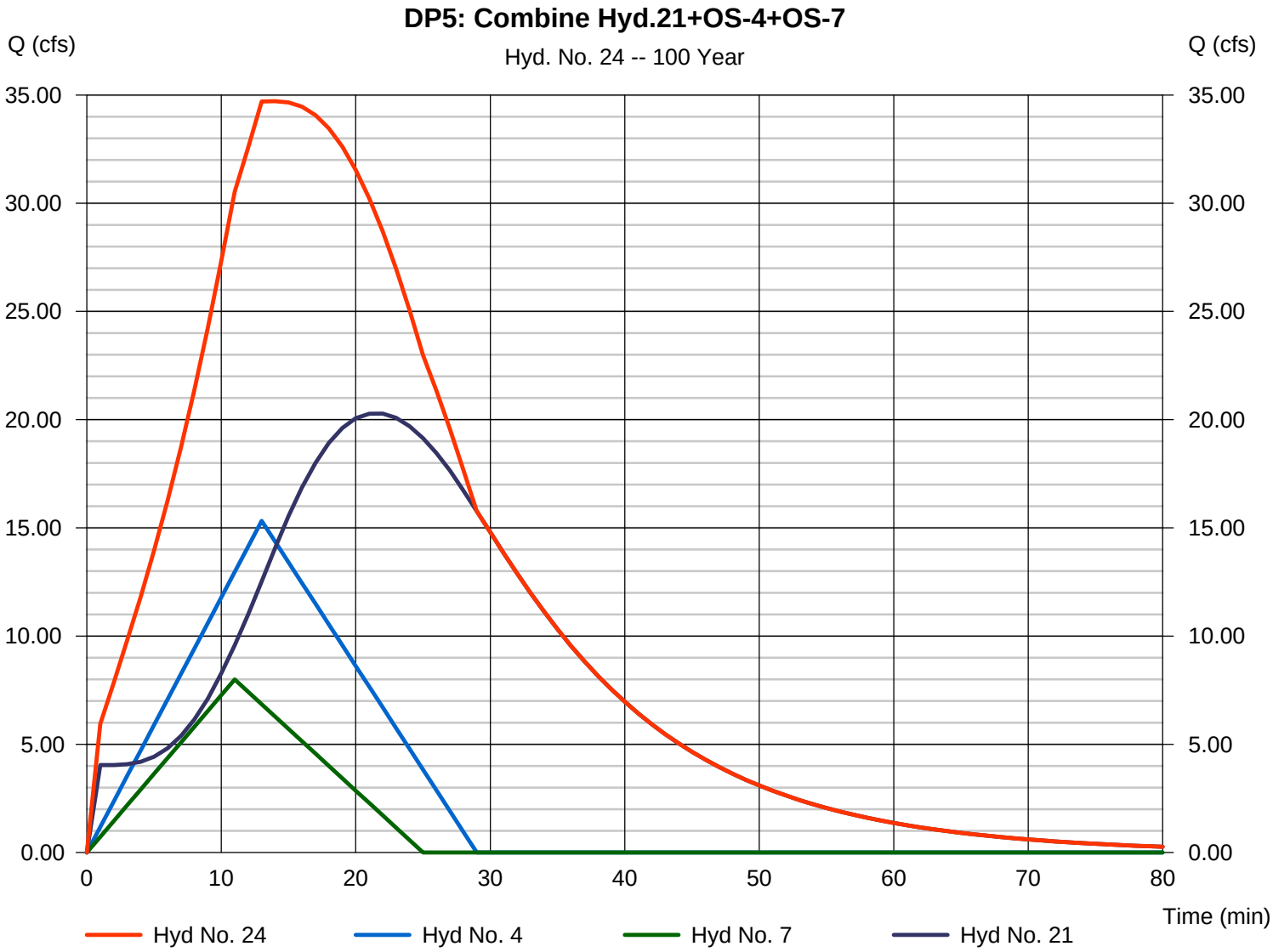
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	= Combine	Peak discharge	= 34.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 53,817 cuft
Inflow hyds.	= 4, 7, 21	Contrib. drain. area	= 4.510 ac



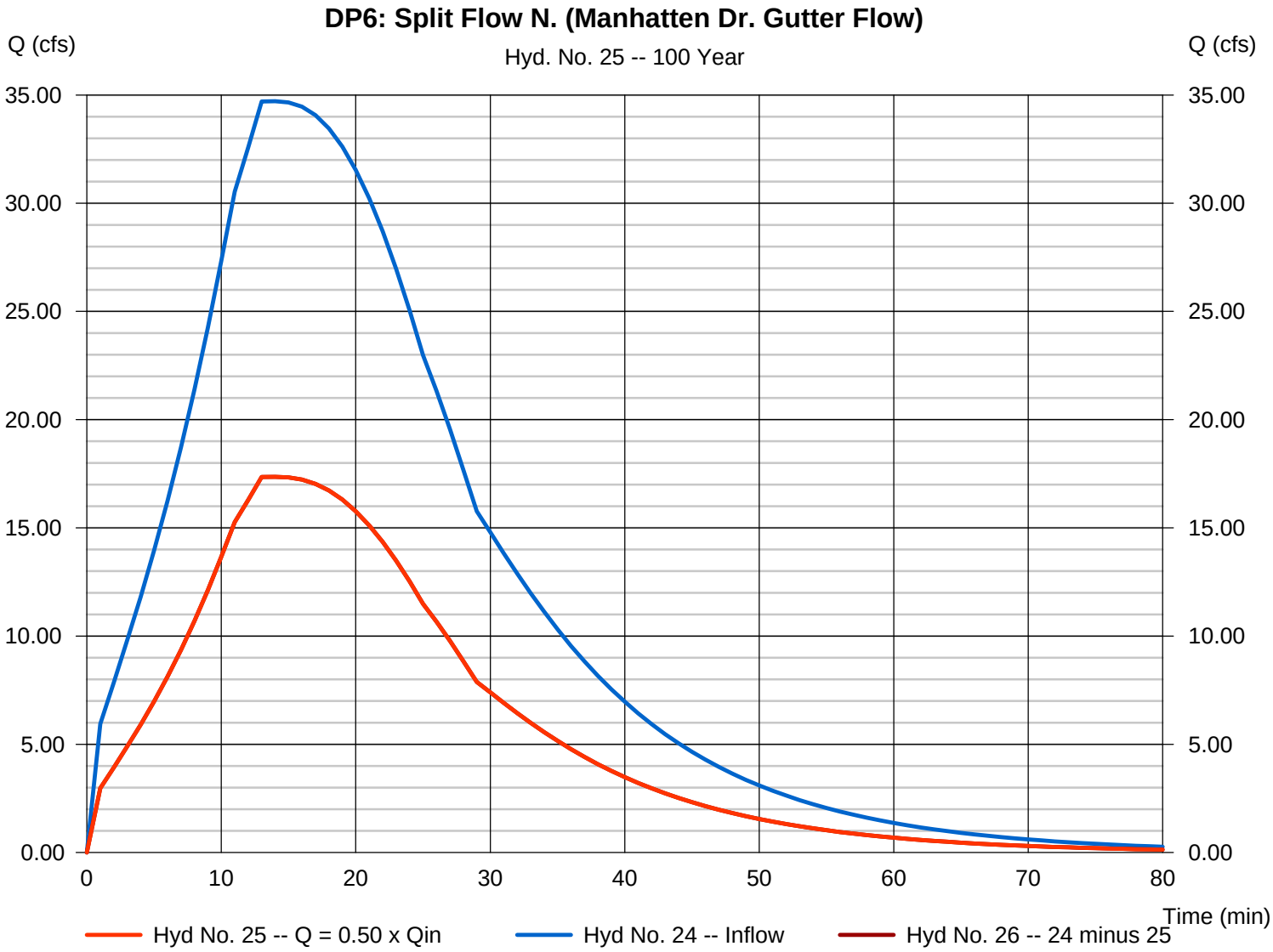
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



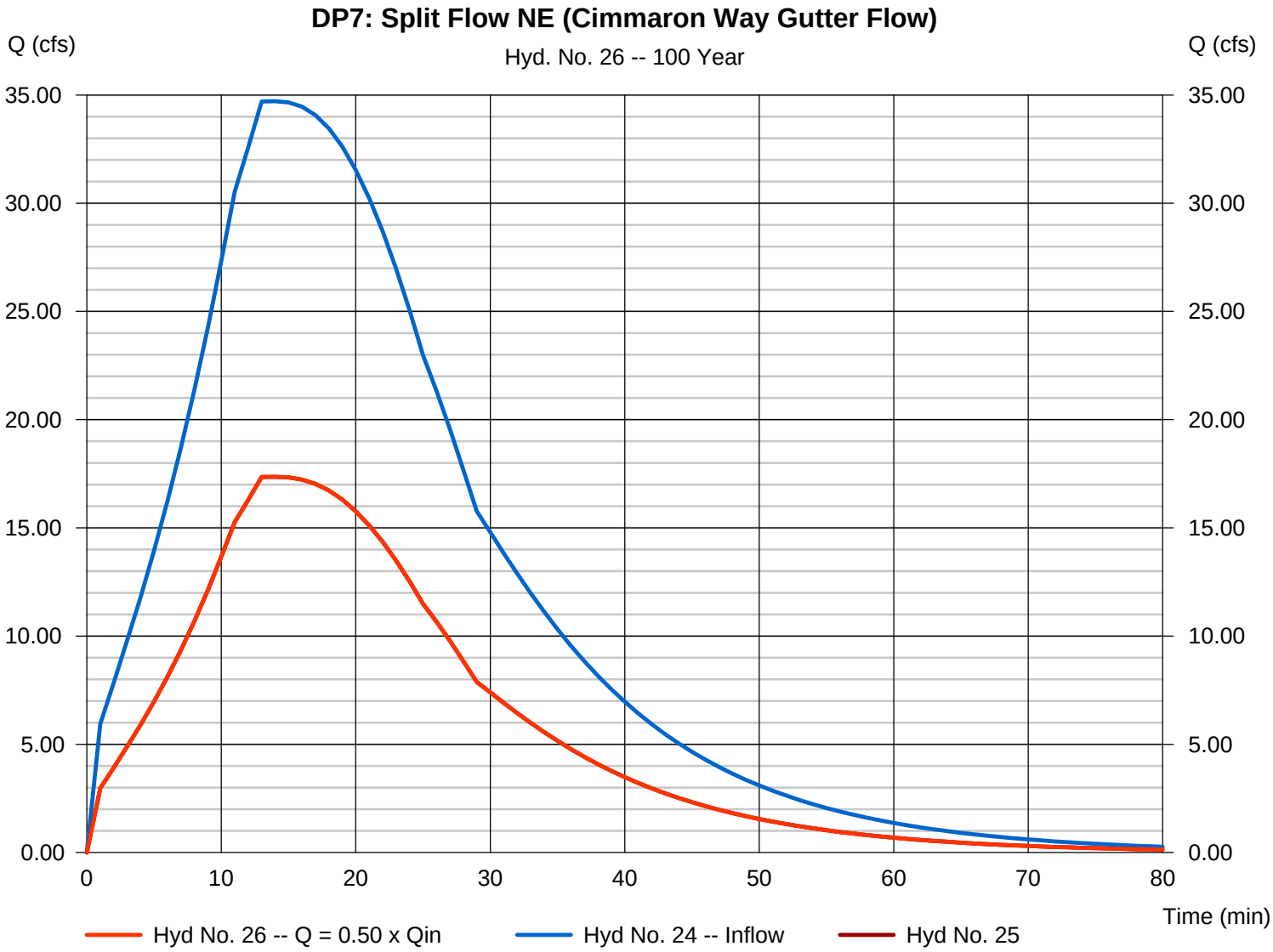
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

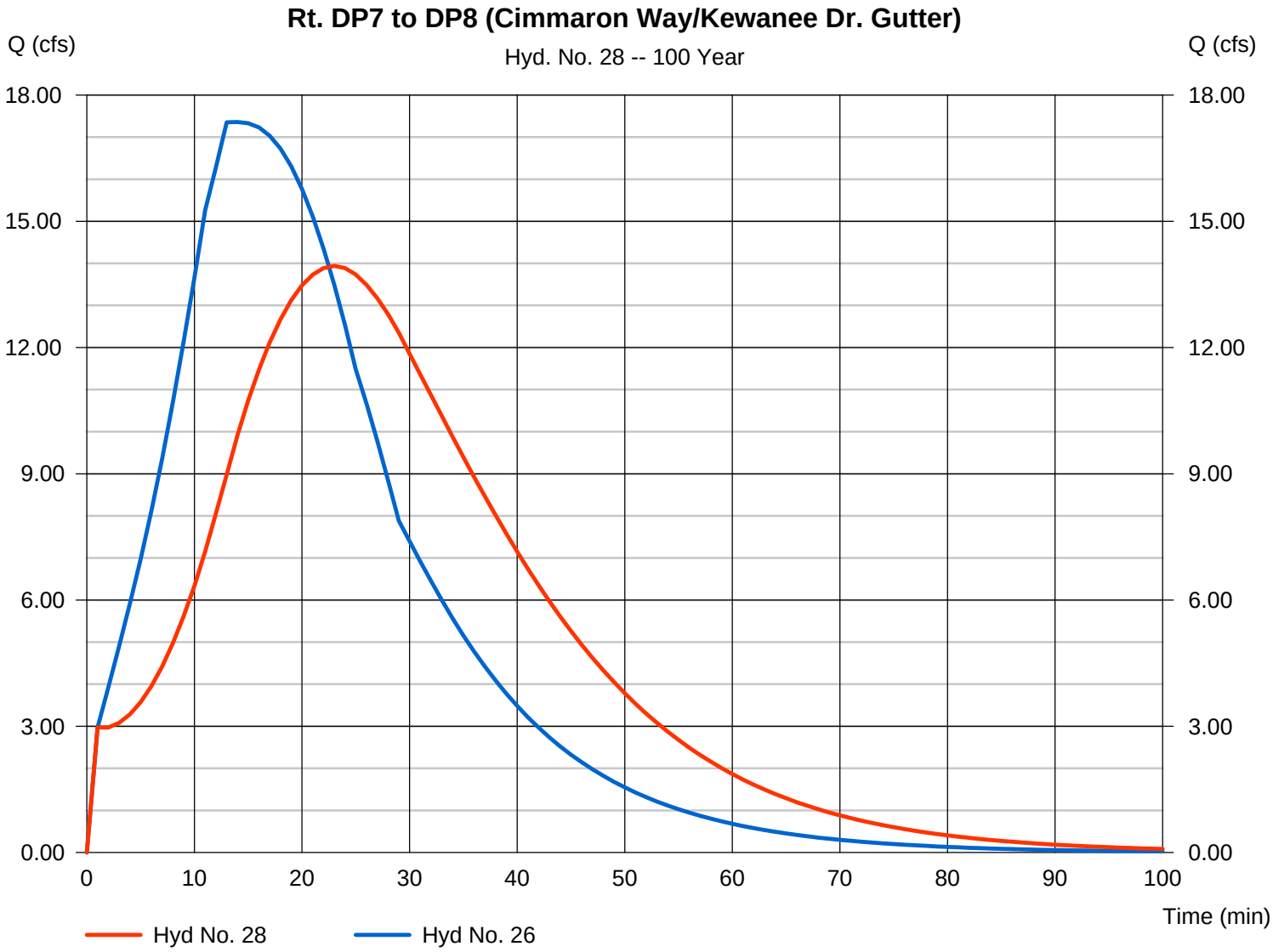
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	28,502 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.33 ft/s	Routing coeff.	=	0.1116

Modified Att-Kin routing method used.



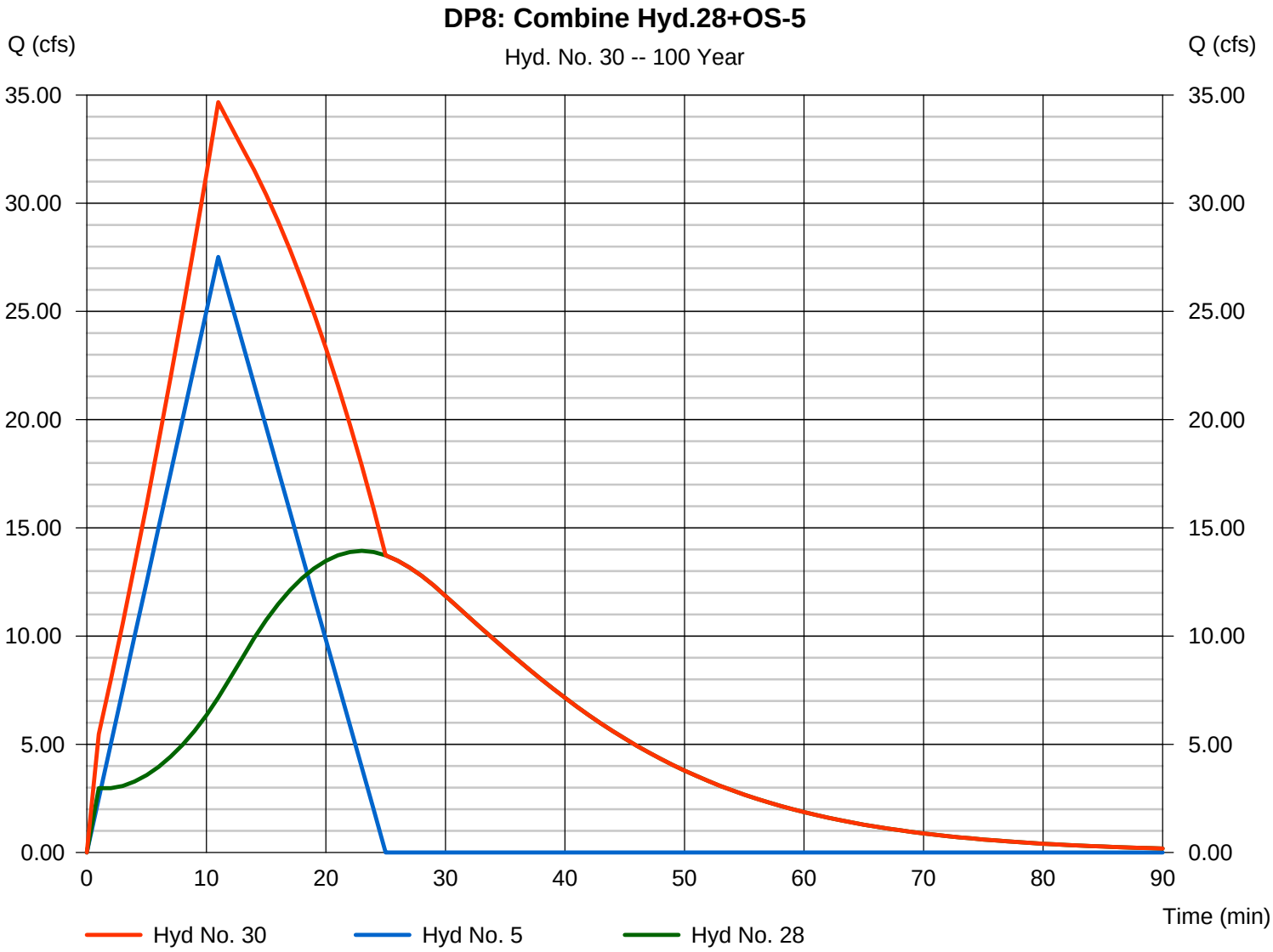
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	34.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	49,138 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



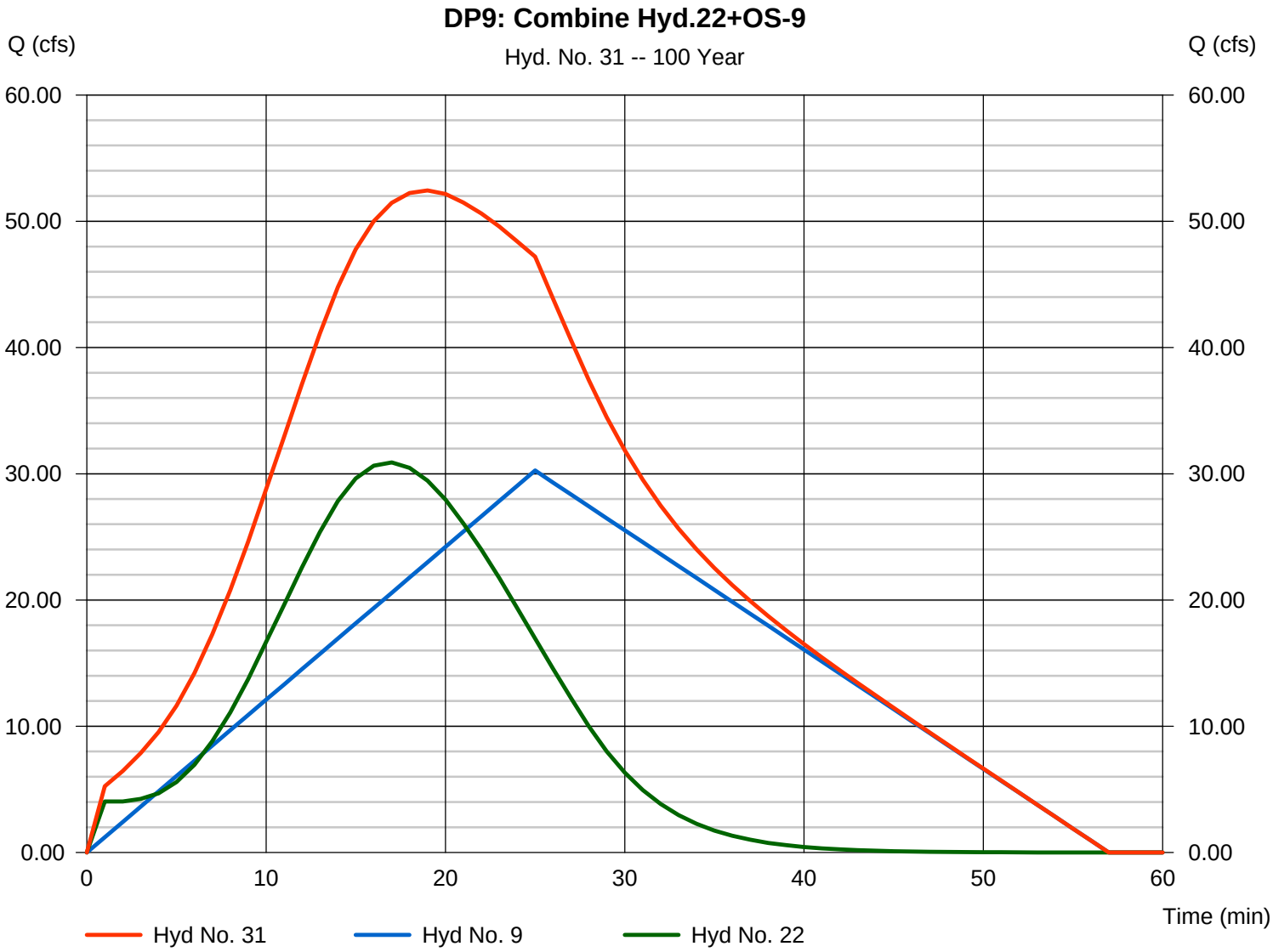
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	= Combine	Peak discharge	= 52.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 19 min
Time interval	= 1 min	Hyd. volume	= 83,819 cuft
Inflow hyds.	= 9, 22	Contrib. drain. area	= 9.450 ac



Hydrograph Report

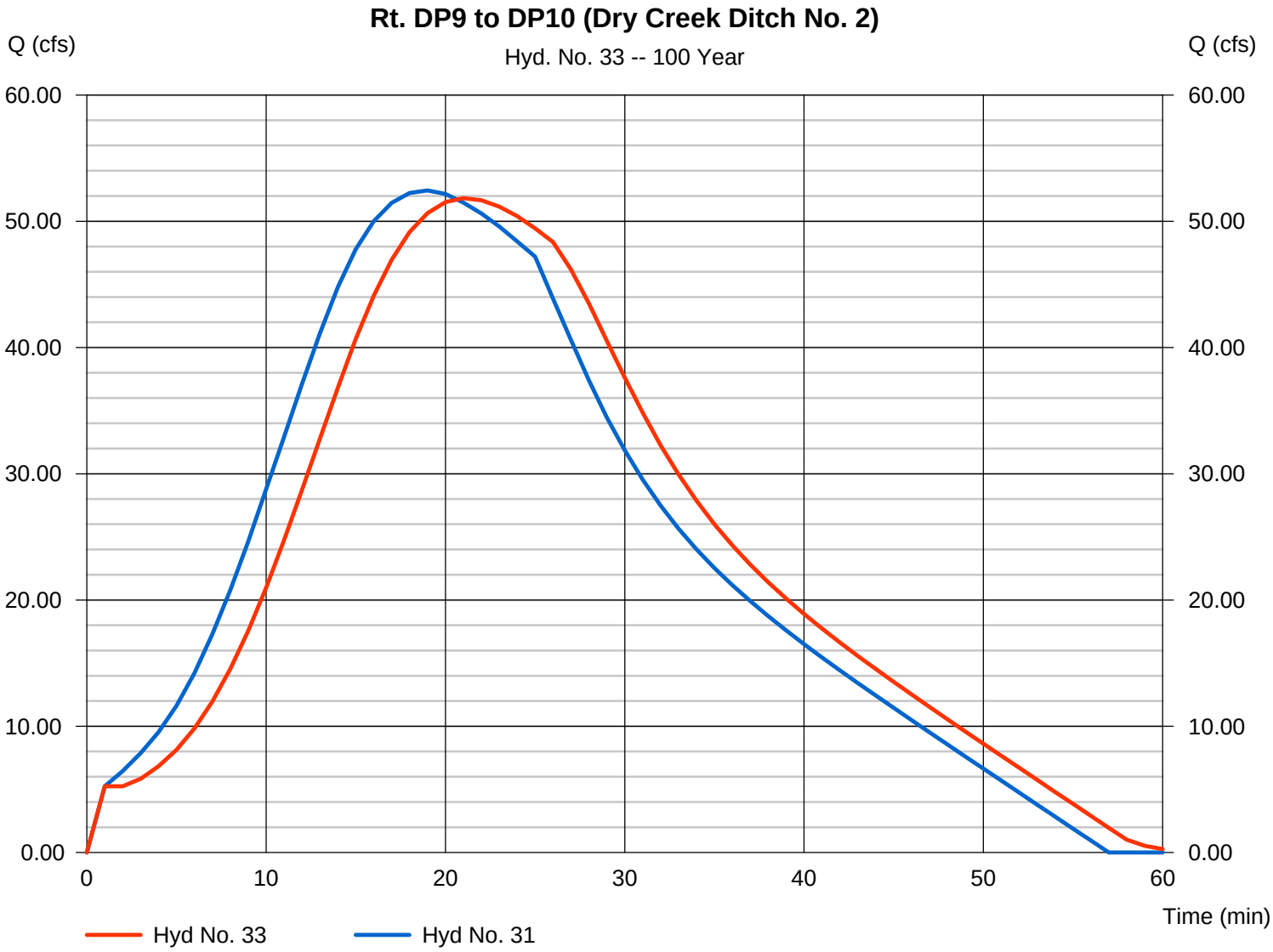
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	51.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	84,469 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.91 ft/s	Routing coeff.	=	0.4839

Modified Att-Kin routing method used.



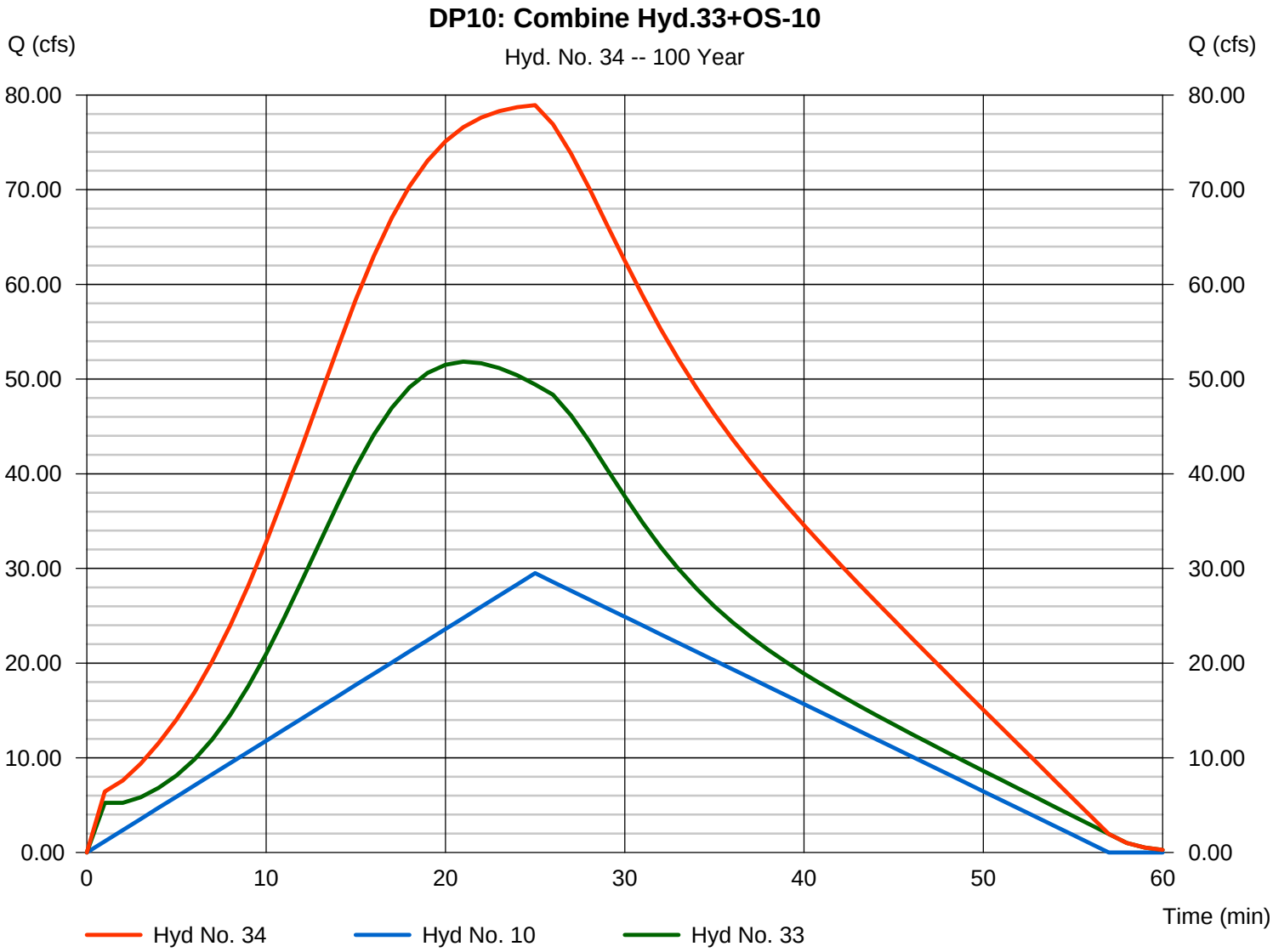
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 34

DP10: Combine Hyd.33+OS-10

Hydrograph type	=	Combine	Peak discharge	=	78.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	134,905 cuft
Inflow hyds.	=	10, 33	Contrib. drain. area	=	9.350 ac



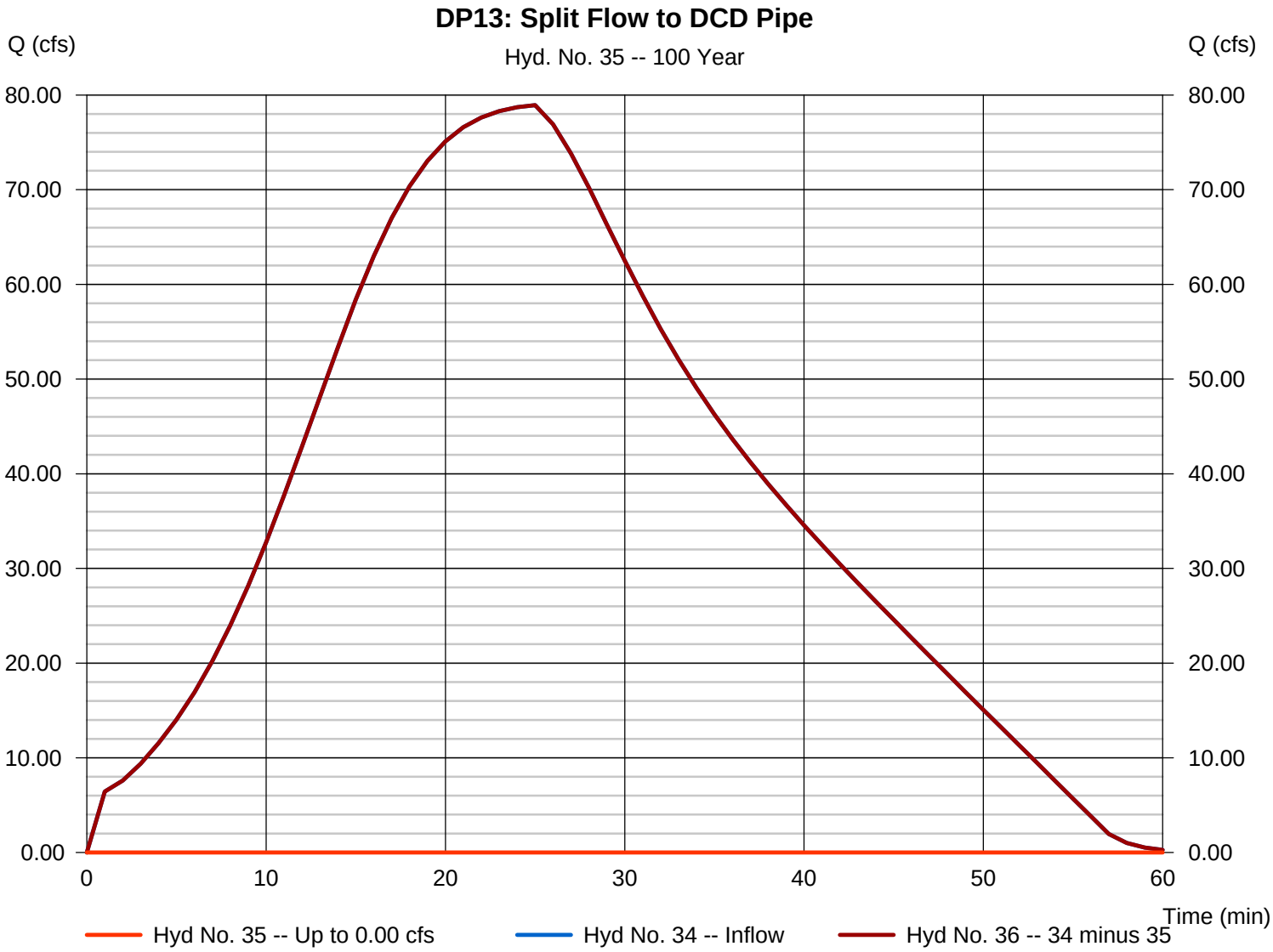
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 35

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	1 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	0.00 cfs



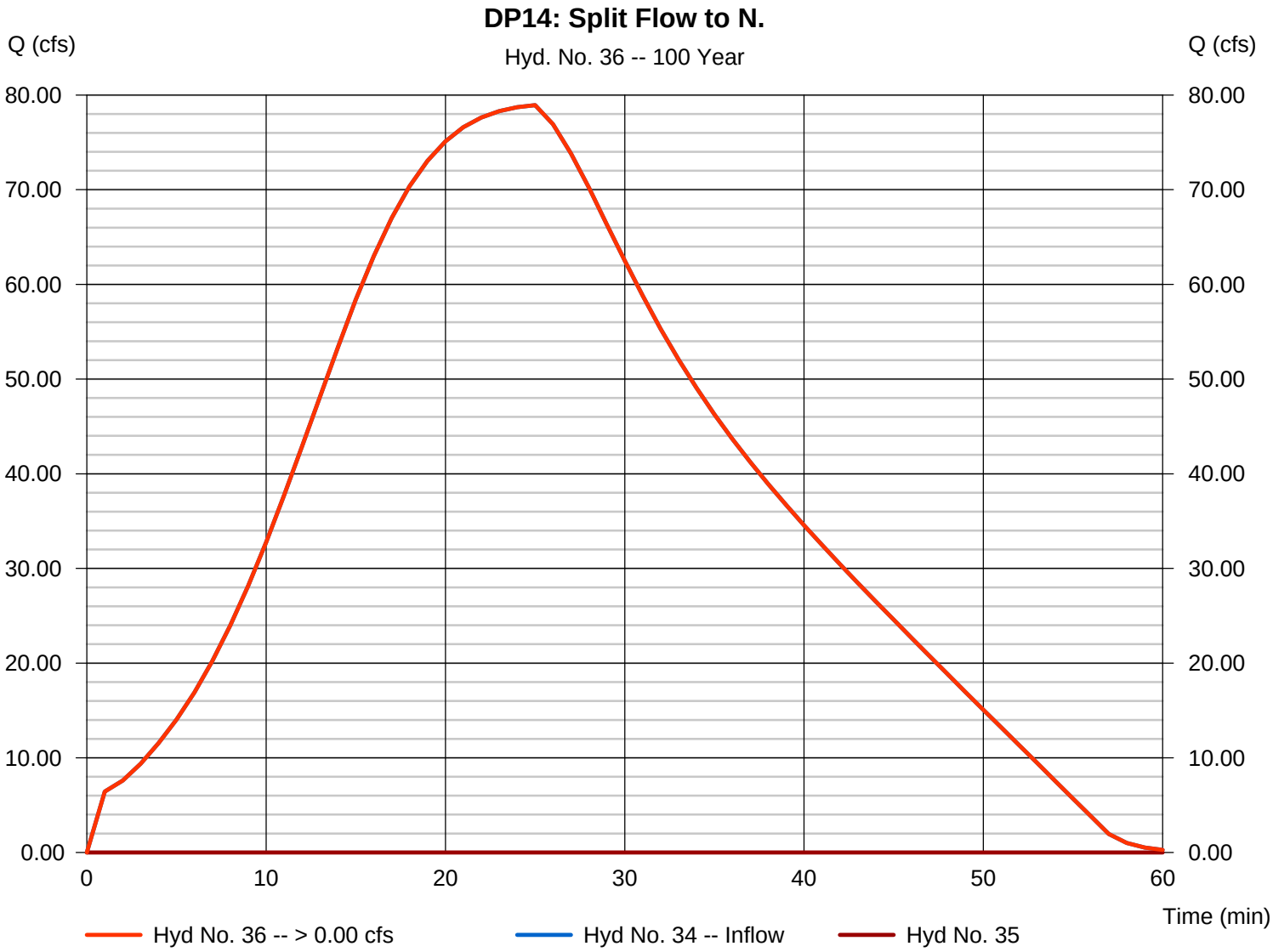
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 36

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	78.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	134,905 cuft
Inflow hydrograph	=	34 - DP10: Combine Hyd.33+OS-10	2nd diverted hyd.	=	35
Diversion method	=	Constant Q	Constant Q	=	0.00 cfs



Hydrograph Report

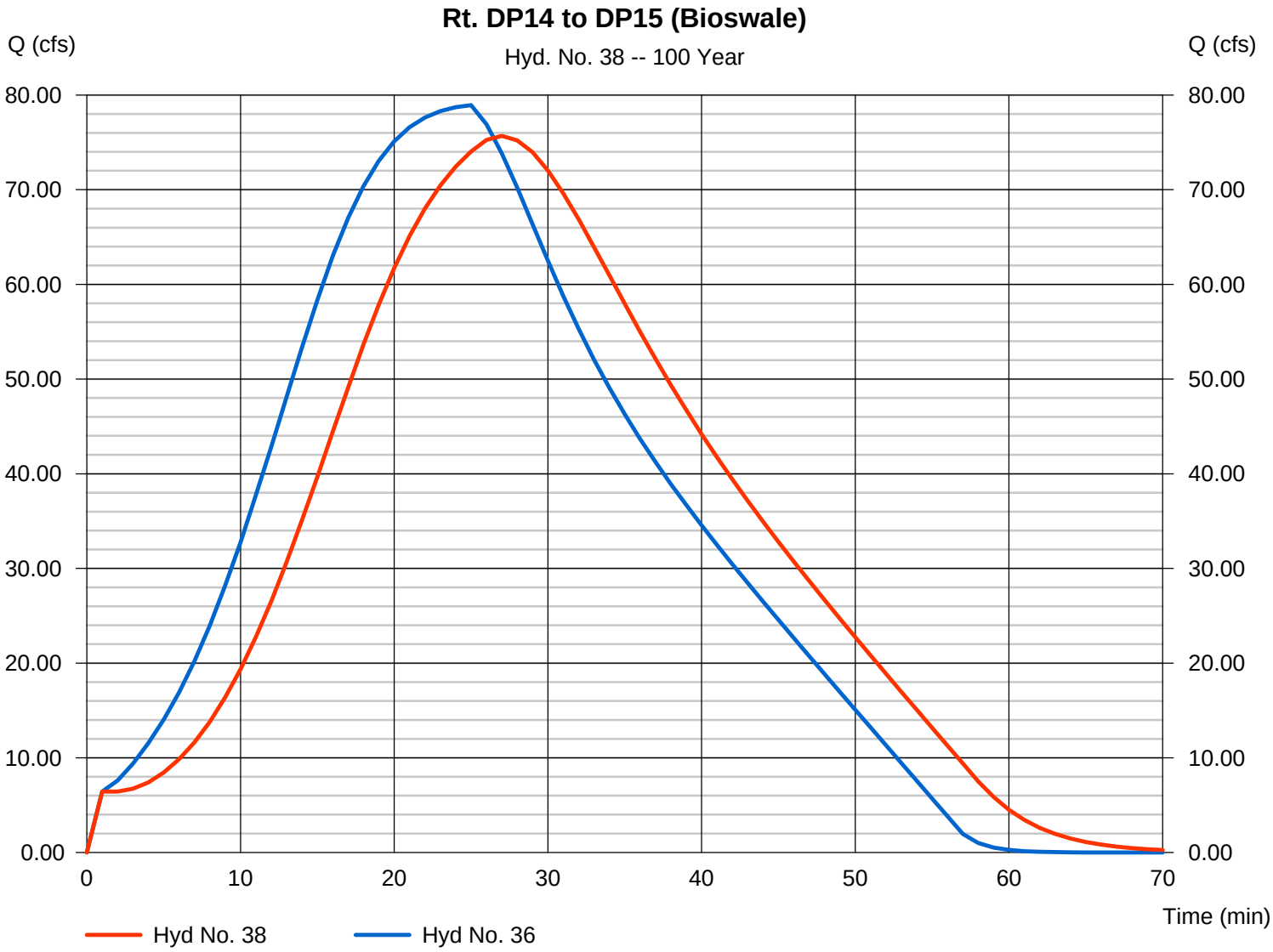
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 38

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	75.68 cfs
Storm frequency	=	100 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	136,428 cuft
Inflow hyd. No.	=	36 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.85 ft/s	Routing coeff.	=	0.2530

Modified Att-Kin routing method used.



Hydrograph Report

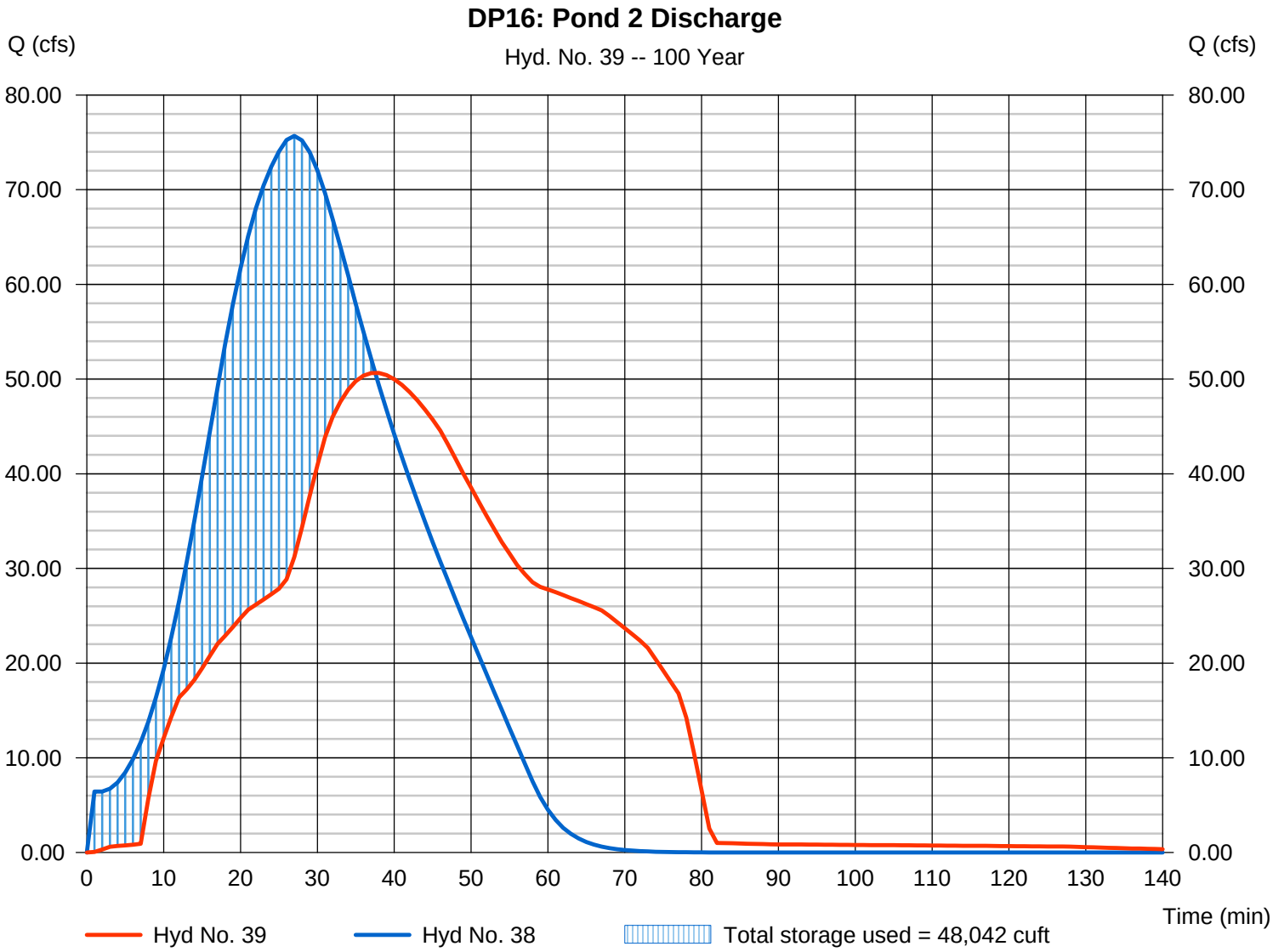
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 39

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	50.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	38 min
Time interval	=	1 min	Hyd. volume	=	136,424 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5320.12 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	48,042 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,253	4,271	5,230
3.00	5319.00	20,244	13,203	18,433
4.00	5320.00	31,360	25,598	44,031
4.50	5320.50	36,454	16,936	60,967
5.00	5321.00	42,359	19,683	80,649

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

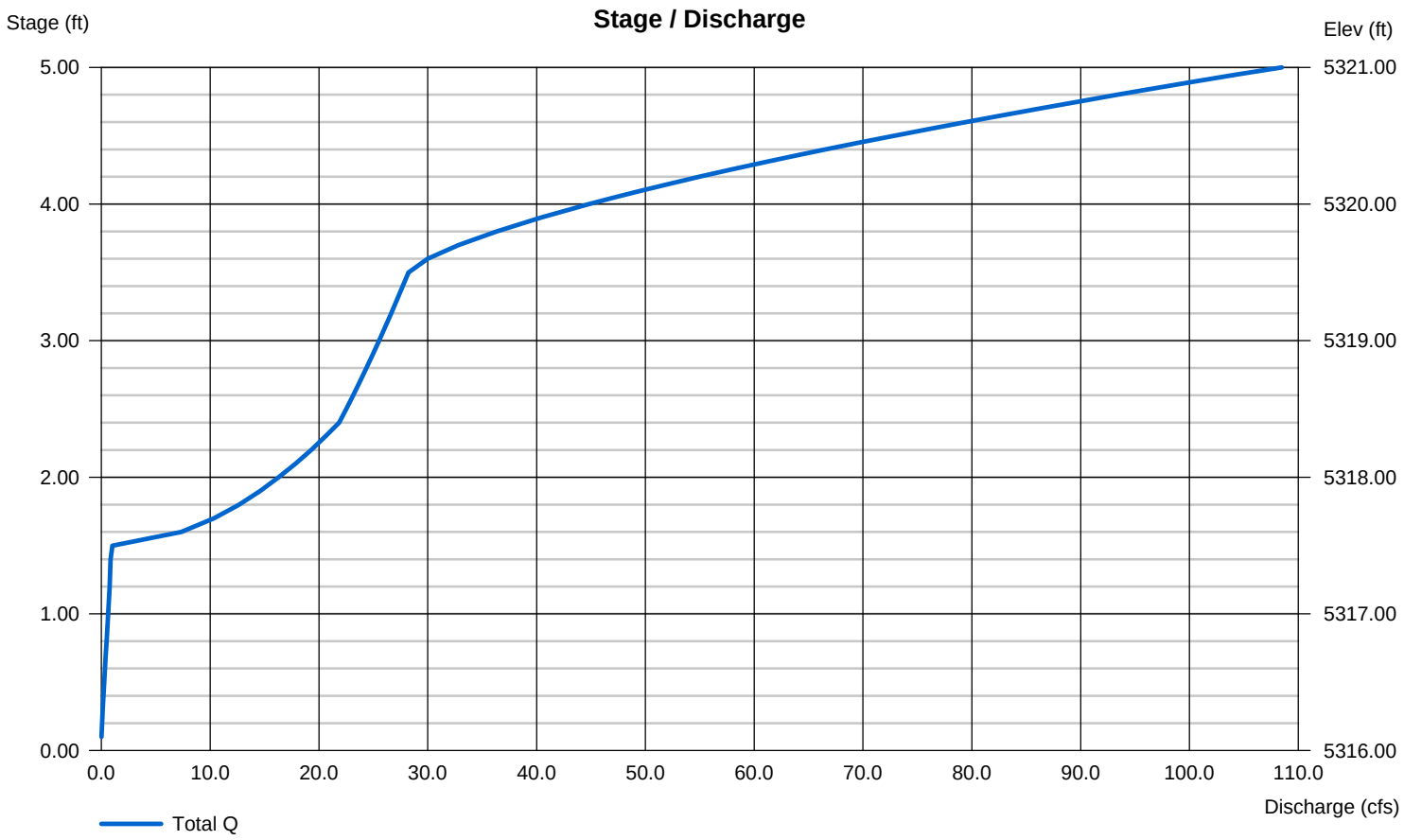
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	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).



Hydrograph Report

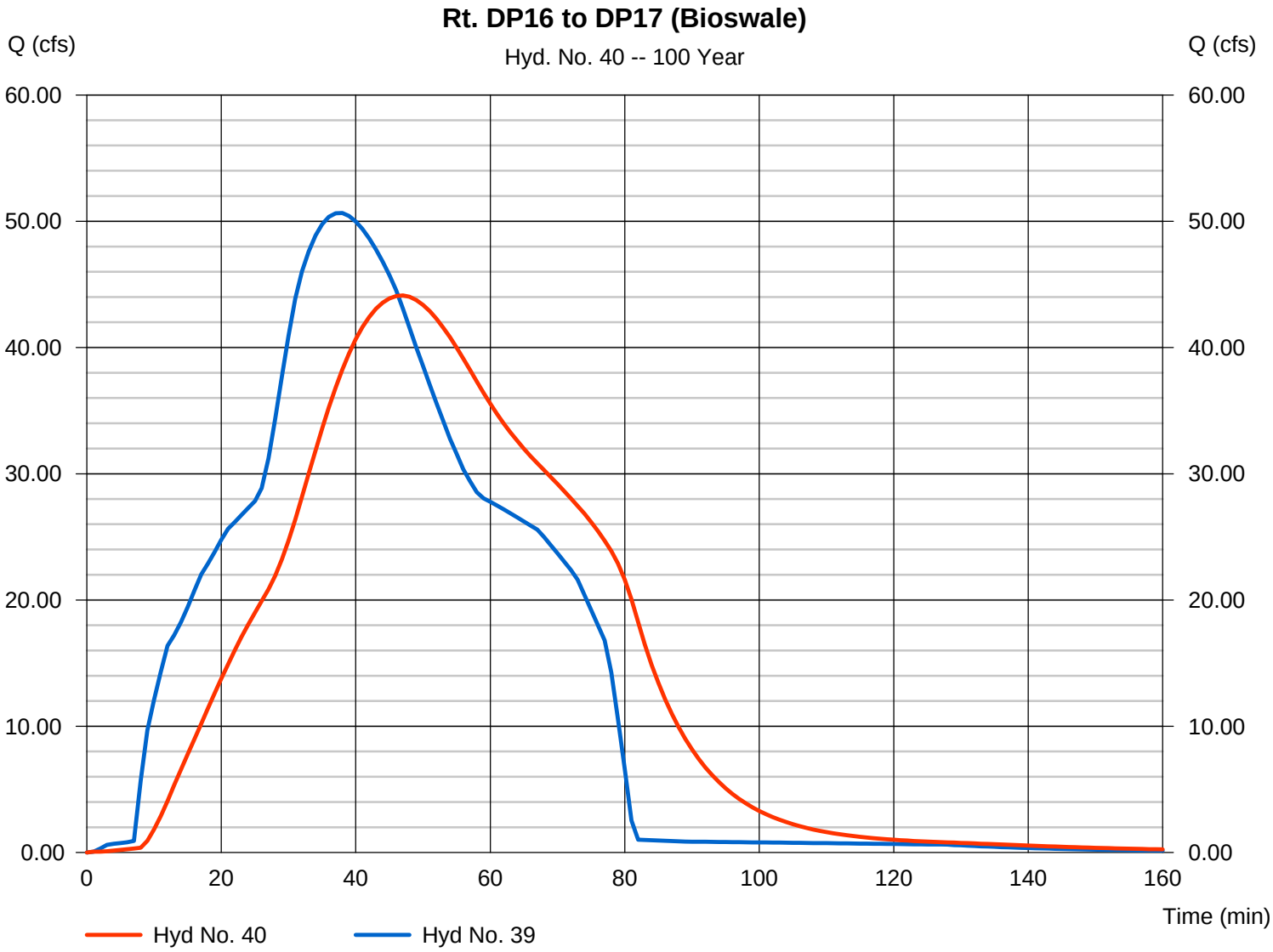
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 40

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	44.13 cfs
Storm frequency	=	100 yrs	Time to peak	=	47 min
Time interval	=	1 min	Hyd. volume	=	136,427 cuft
Inflow hyd. No.	=	39 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.64 ft/s	Routing coeff.	=	0.1033

Modified Att-Kin routing method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 42

A

Hydrograph type	=	Rational	Peak discharge	=	8.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	11,493 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.66
Intensity	=	5.652 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

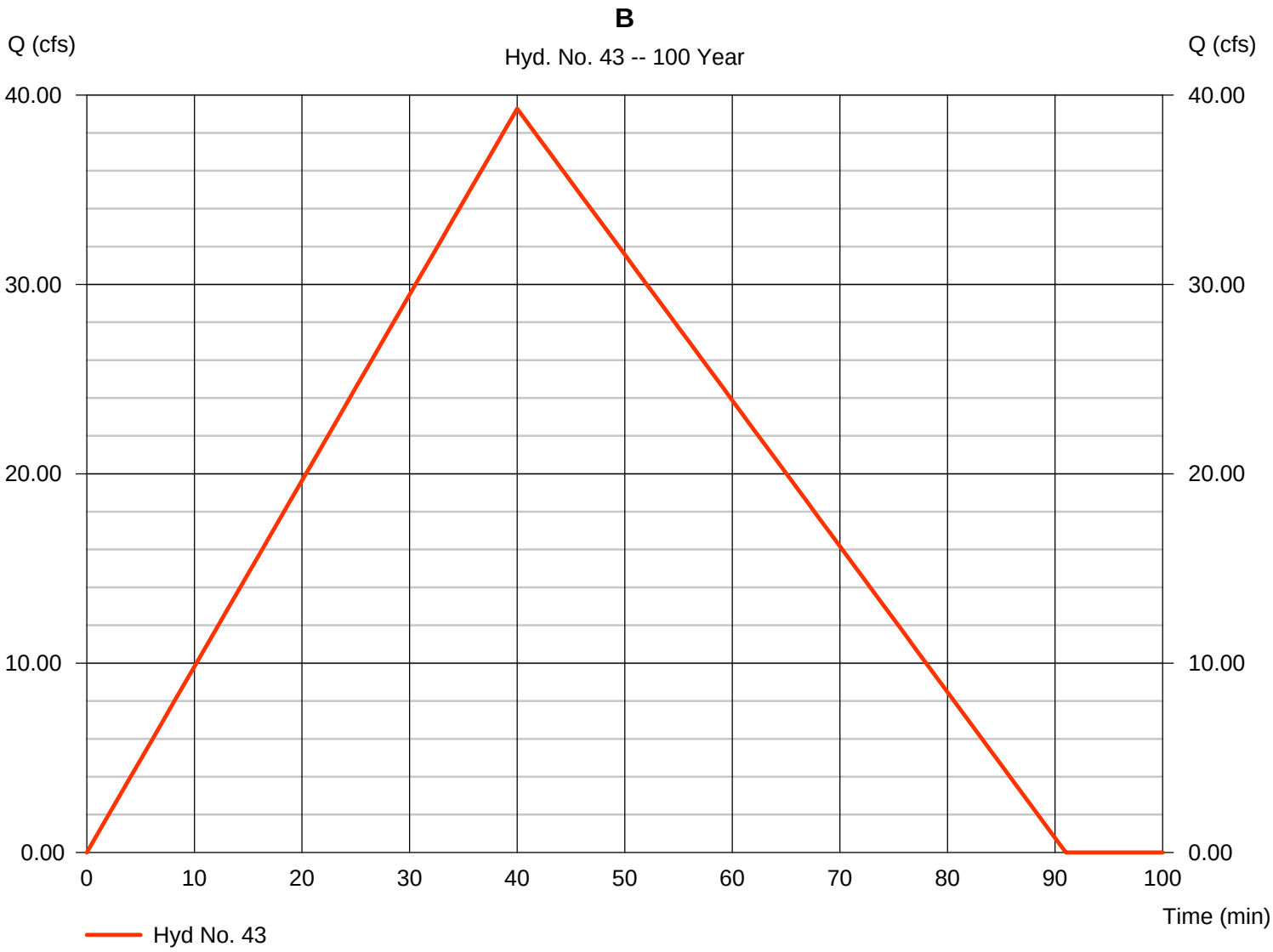
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 43

B

Hydrograph type	=	Rational	Peak discharge	=	39.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	108,409 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.7
Intensity	=	3.378 in/hr	Tc by User	=	40.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



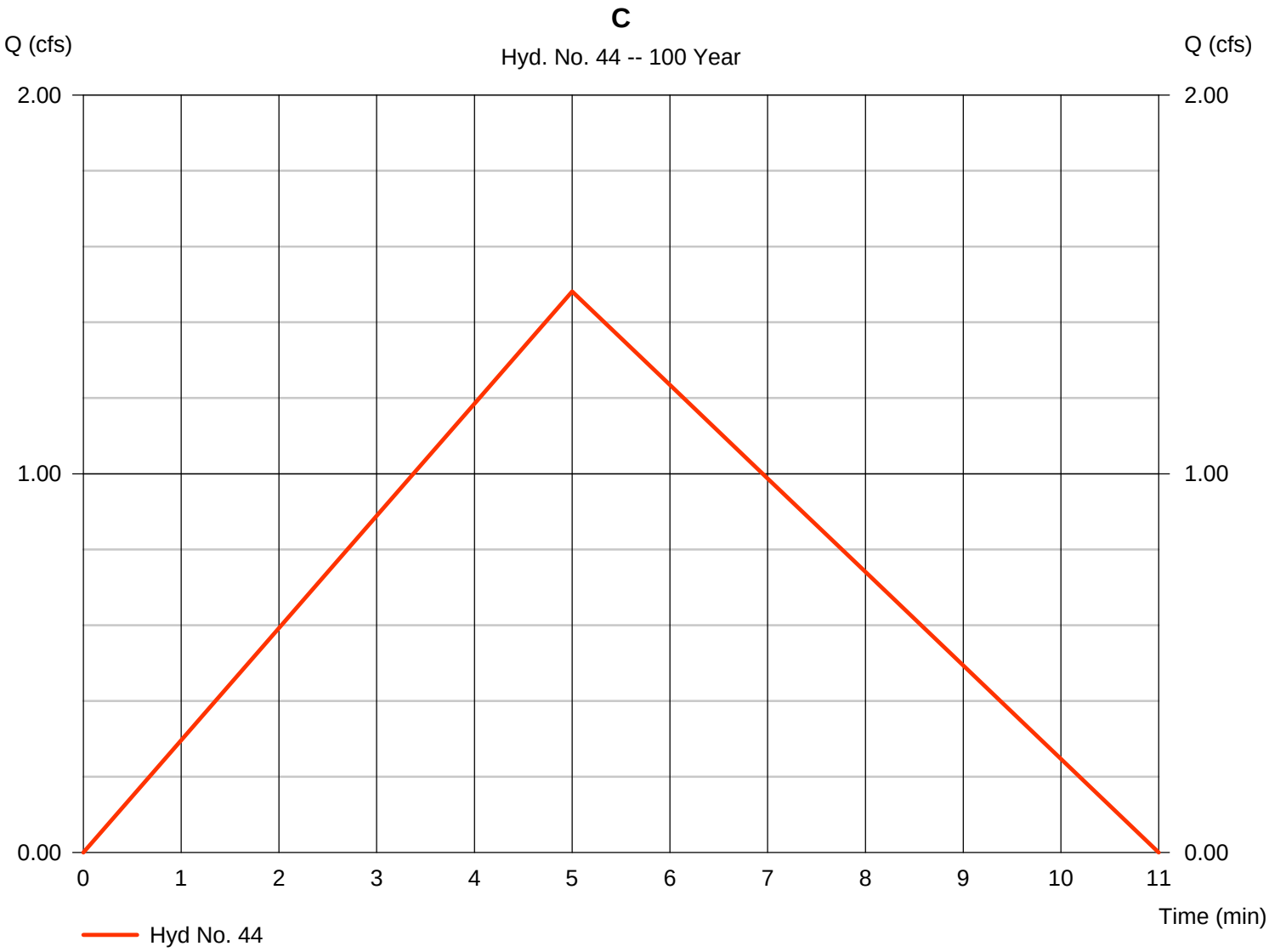
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 44

C

Hydrograph type	=	Rational	Peak discharge	=	1.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.64
Intensity	=	11.574 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



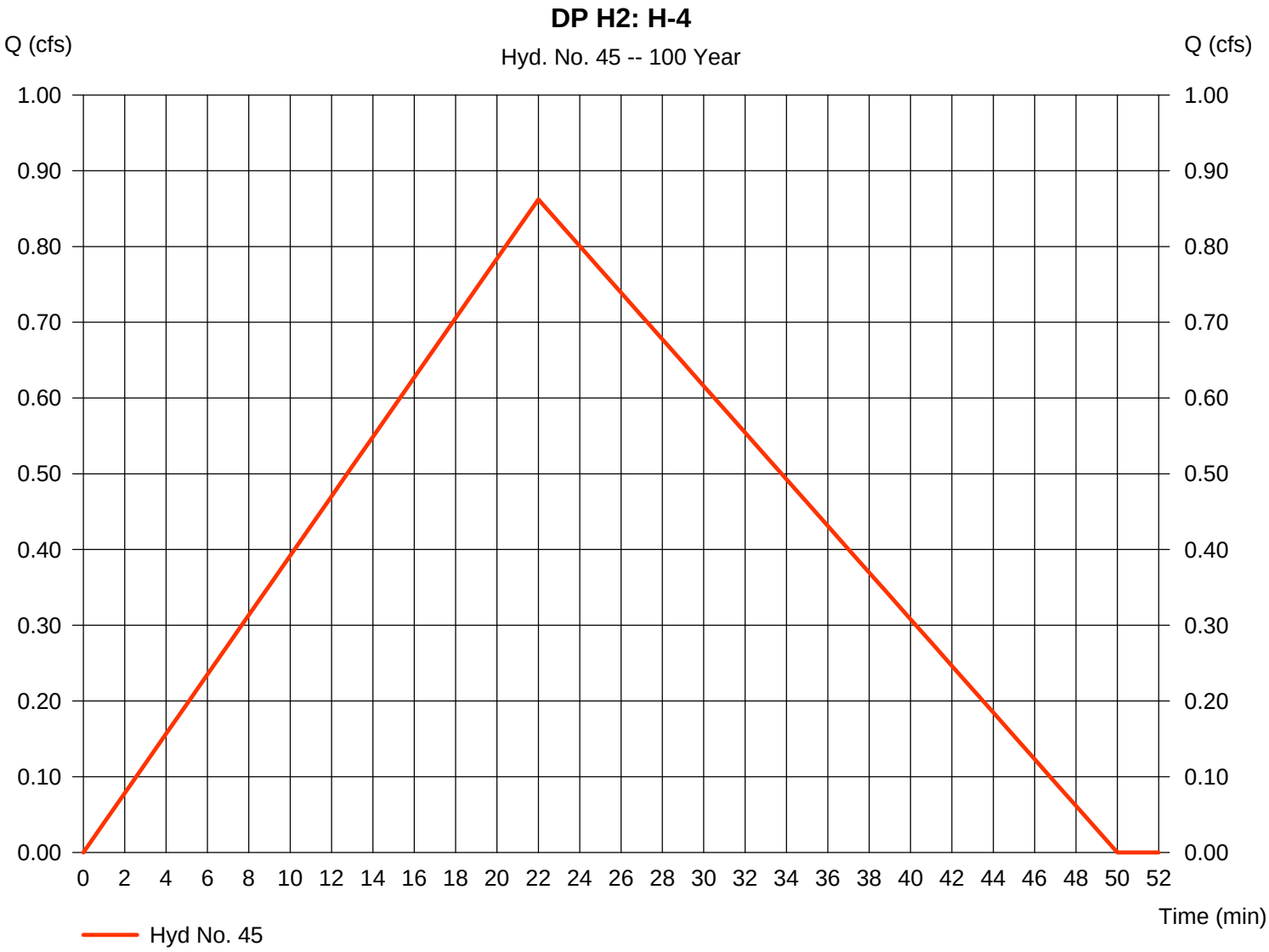
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 45

DP H2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	1,309 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.6
Intensity	=	5.132 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



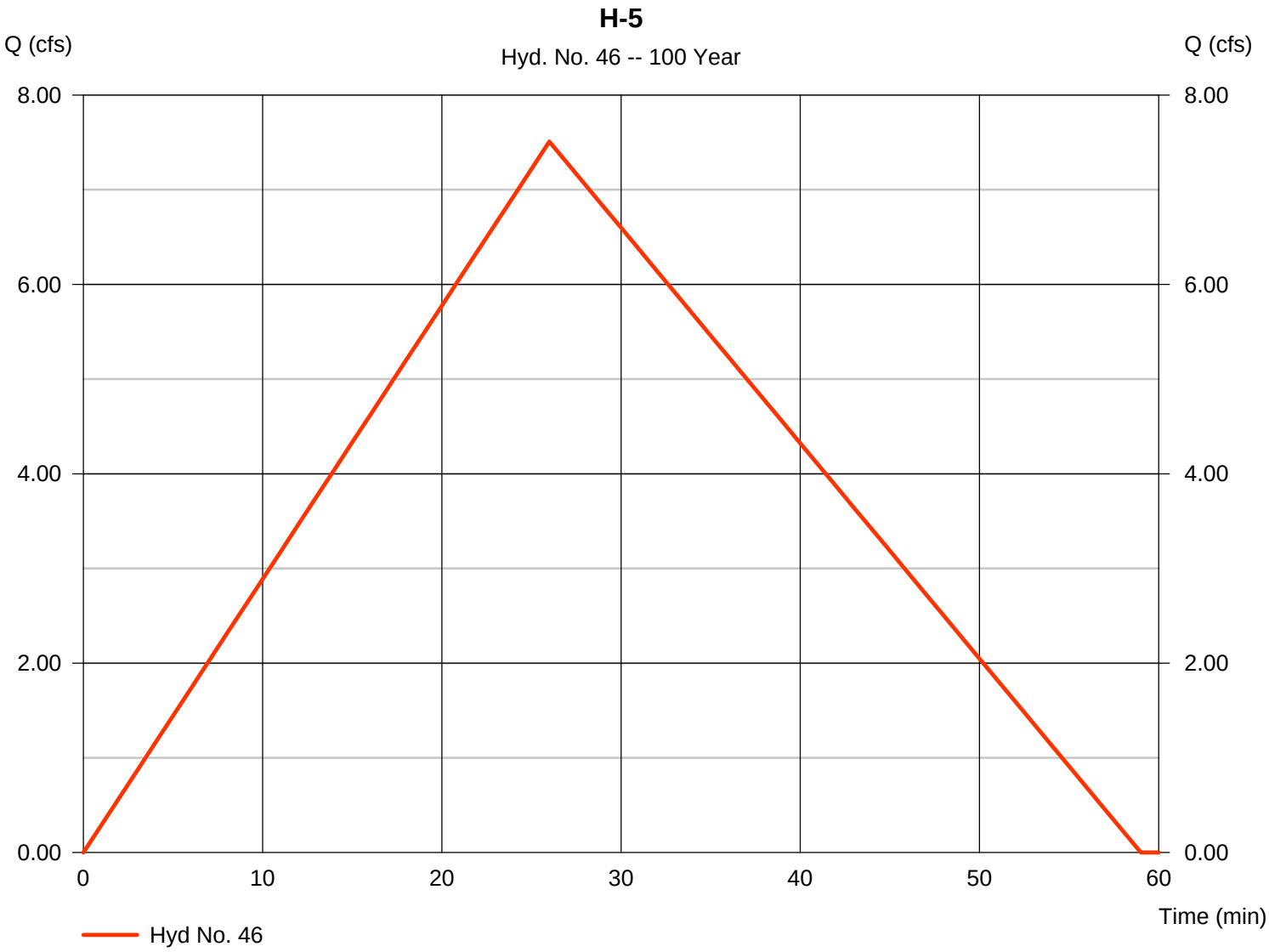
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 46

H-5

Hydrograph type	=	Rational	Peak discharge	=	7.508 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	13,469 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.6
Intensity	=	4.584 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



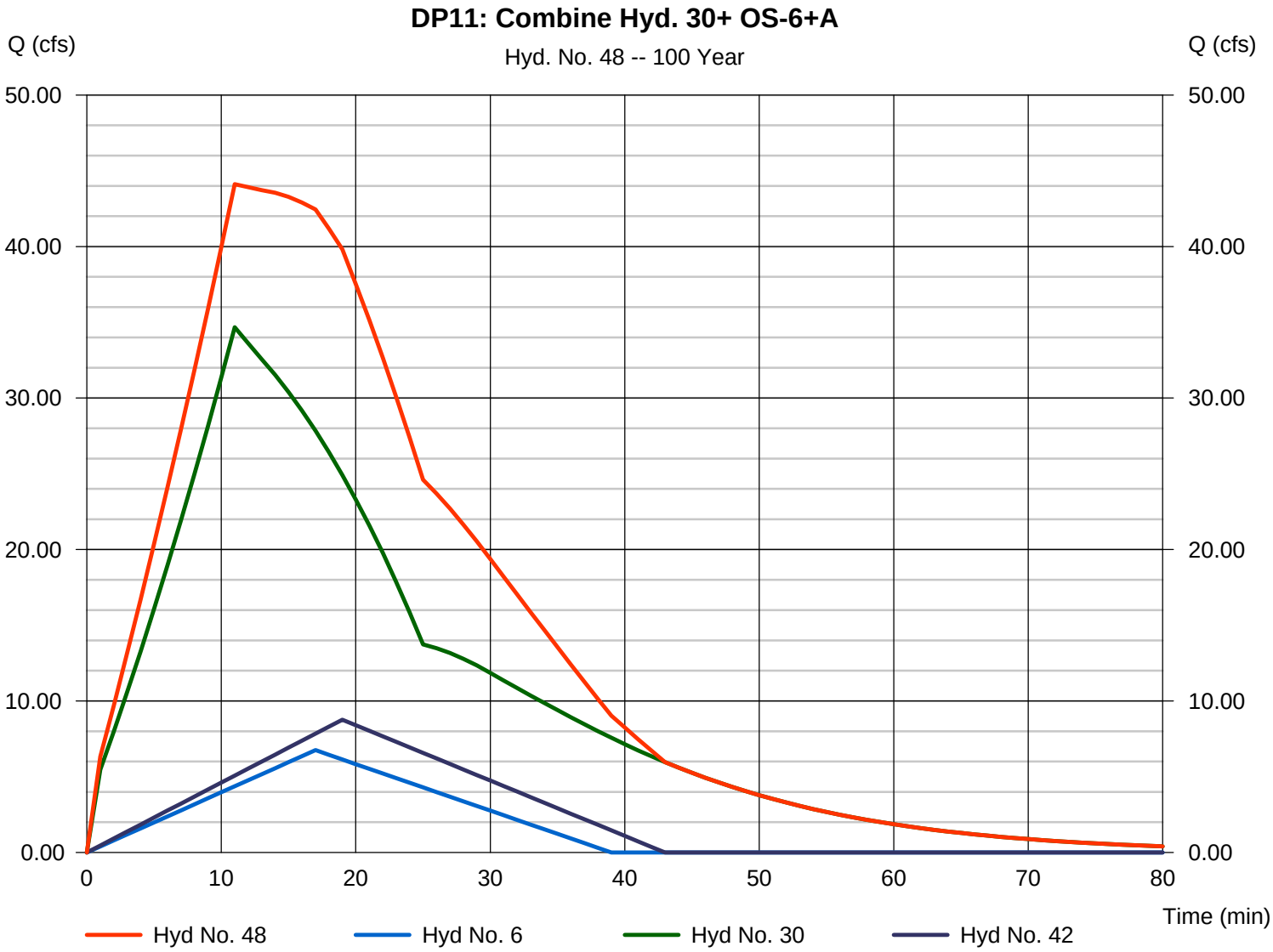
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 48

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	= Combine	Peak discharge	= 44.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 11 min
Time interval	= 1 min	Hyd. volume	= 68,350 cuft
Inflow hyds.	= 6, 30, 42	Contrib. drain. area	= 3.940 ac



Hydrograph Report

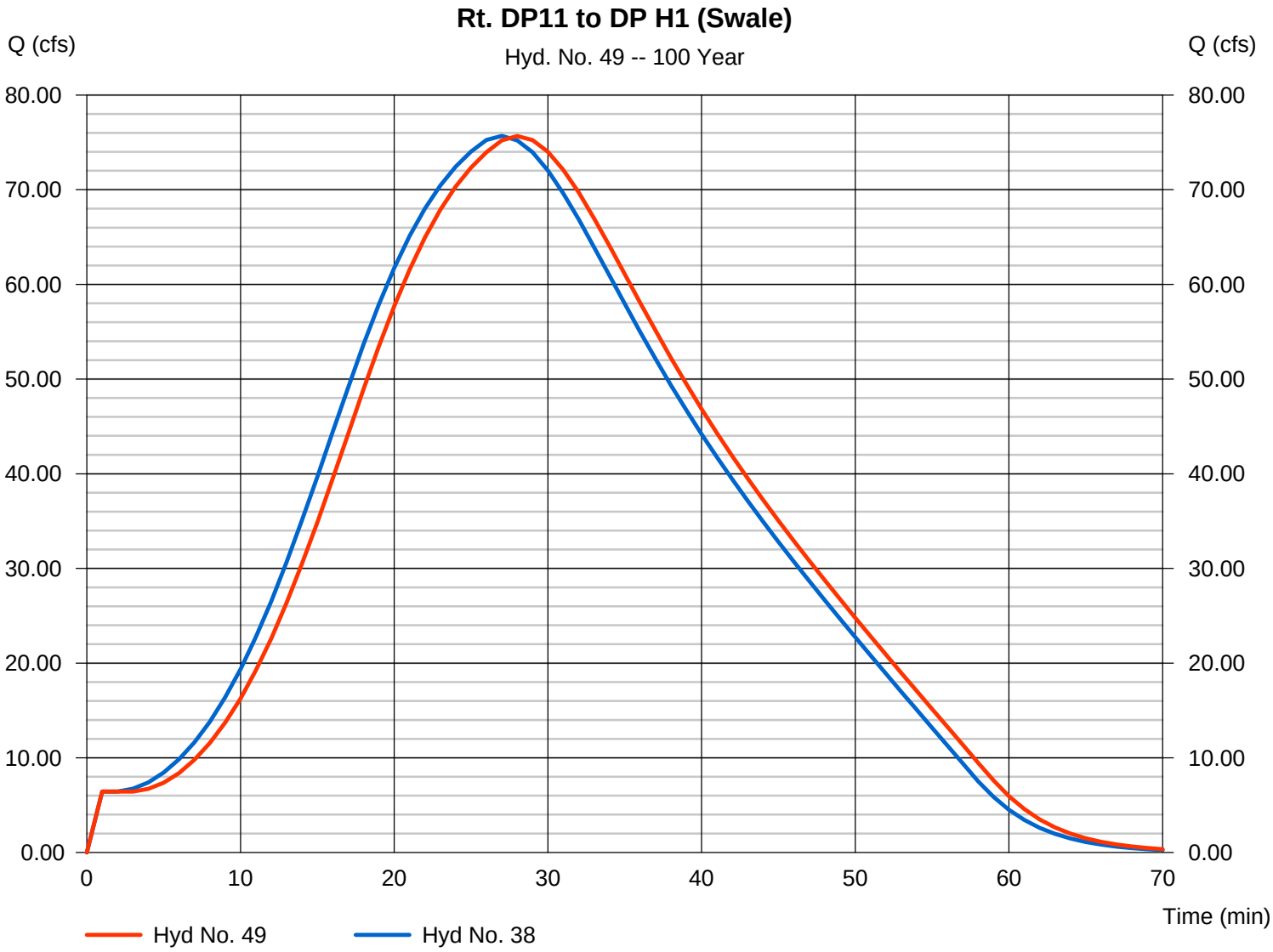
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 49

Rt. DP11 to DP H1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	75.66 cfs
Storm frequency	=	100 yrs	Time to peak	=	28 min
Time interval	=	1 min	Hyd. volume	=	136,831 cuft
Inflow hyd. No.	=	38 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	4.98 ft/s	Routing coeff.	=	0.9570

Modified Att-Kin routing method used.



Hydrograph Report

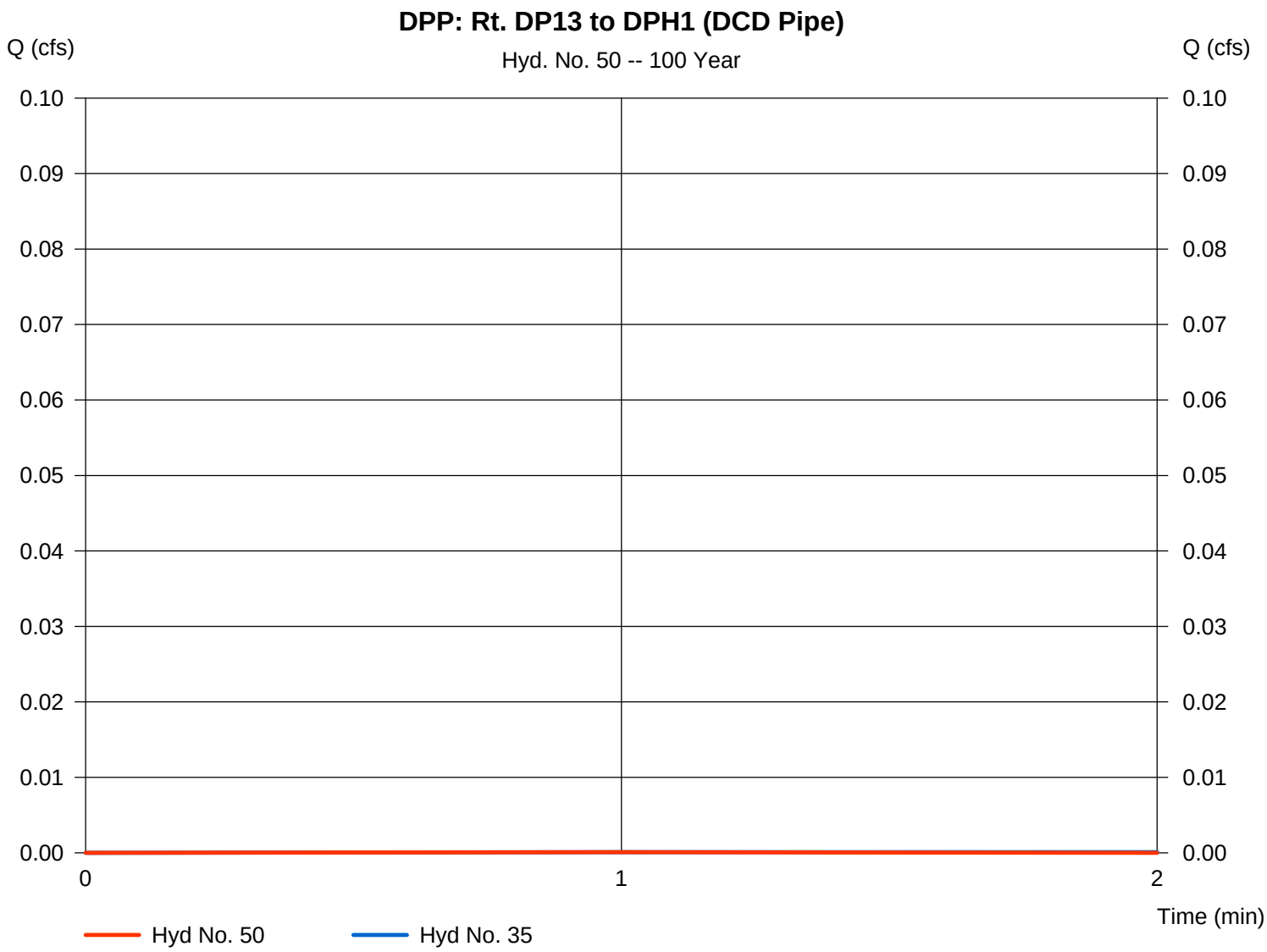
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 50

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	1 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	35 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0000

Modified Att-Kin routing method used.



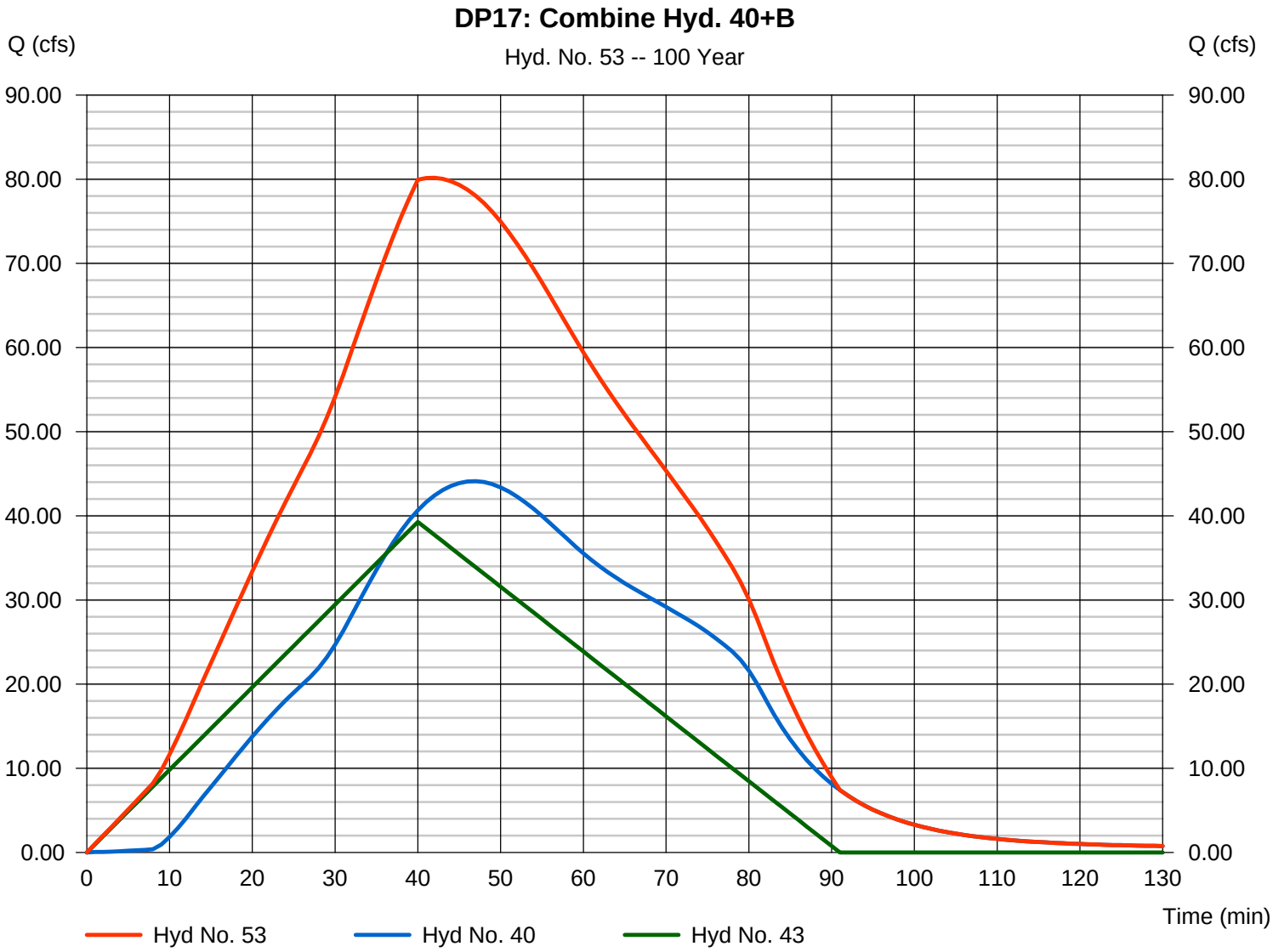
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 53

DP17: Combine Hyd. 40+B

Hydrograph type	=	Combine	Peak discharge	=	80.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	42 min
Time interval	=	1 min	Hyd. volume	=	243,658 cuft
Inflow hyds.	=	40, 43	Contrib. drain. area	=	16.610 ac



Hydrograph Report

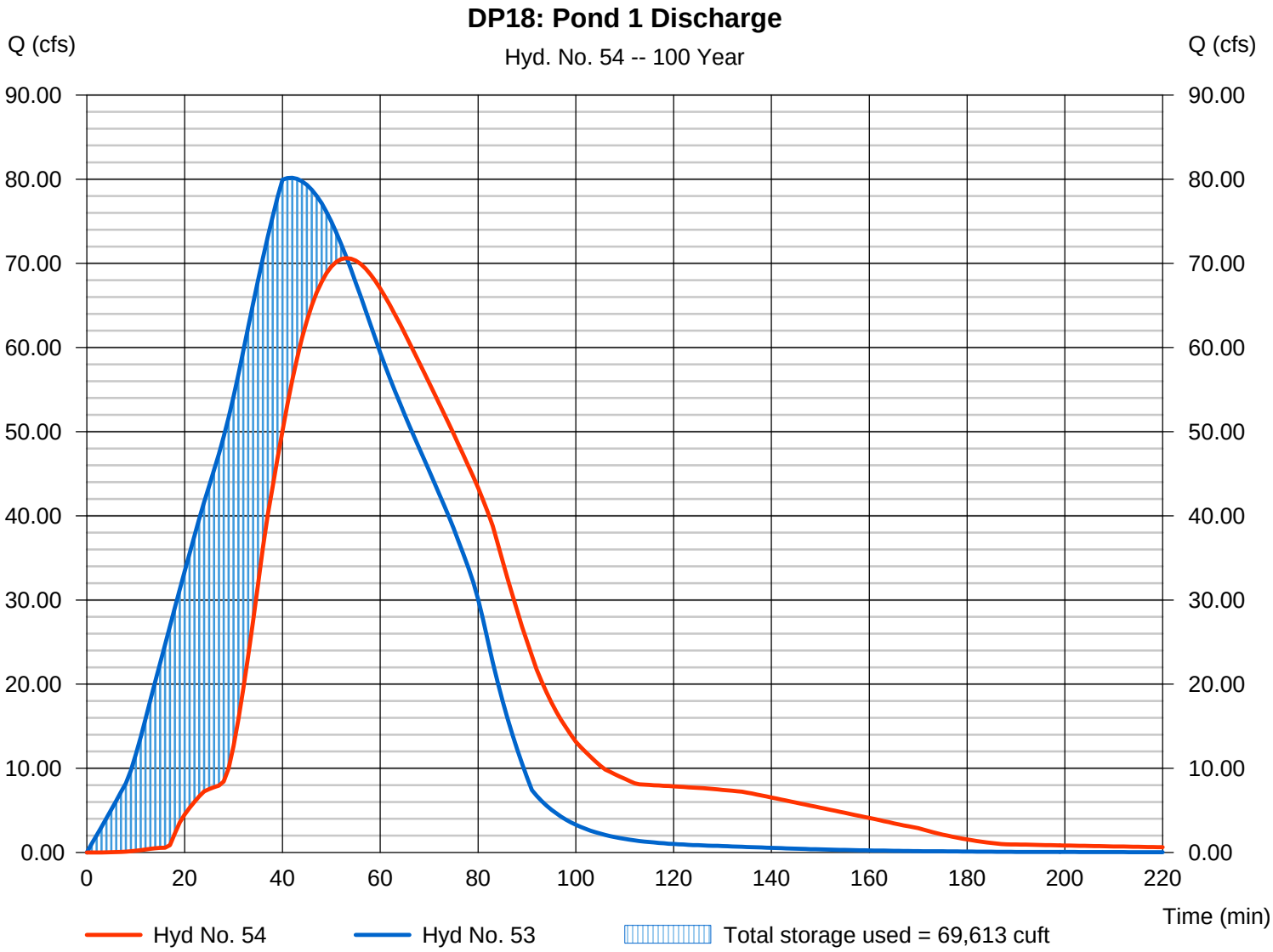
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 54

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	70.62 cfs
Storm frequency	=	100 yrs	Time to peak	=	53 min
Time interval	=	1 min	Hyd. volume	=	243,627 cuft
Inflow hyd. No.	=	53 - DP17: Combine Hyd. 40+B	Max. Elevation	=	5315.43 ft
Reservoir name	=	Detention Pond	Max. Storage	=	69,613 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 1 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

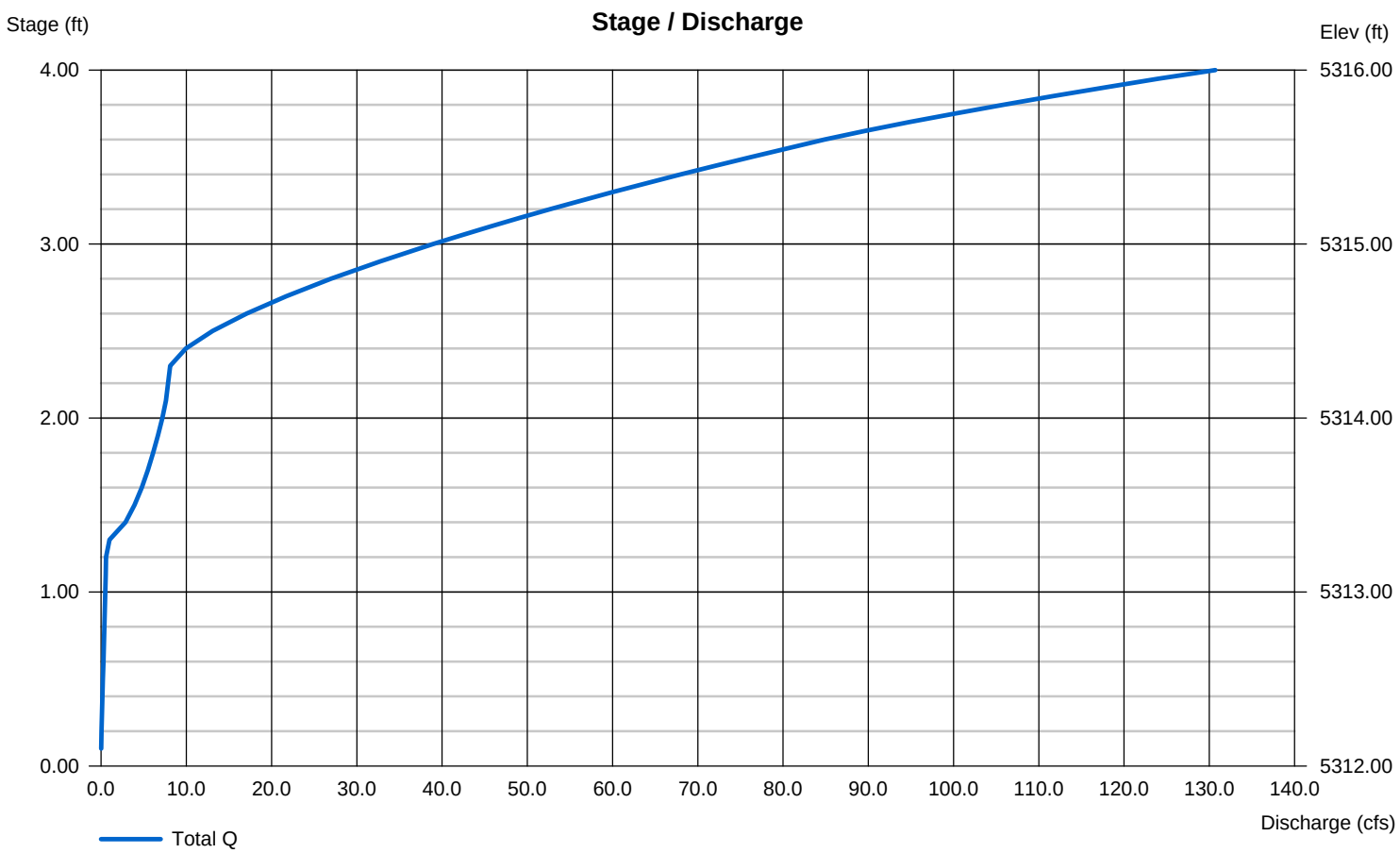
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



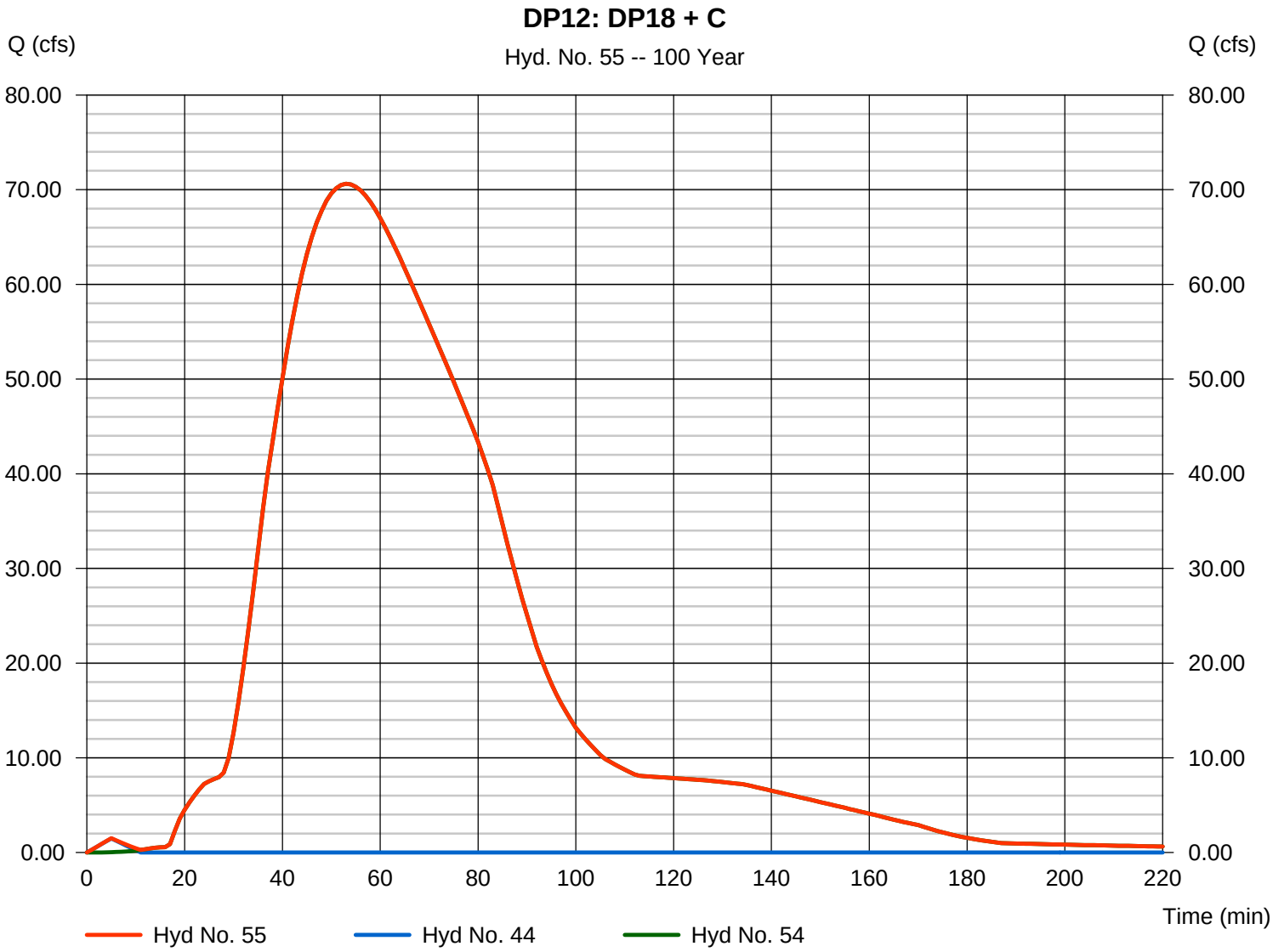
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 55

DP12: DP18 + C

Hydrograph type	=	Combine	Peak discharge	=	70.62 cfs
Storm frequency	=	100 yrs	Time to peak	=	53 min
Time interval	=	1 min	Hyd. volume	=	244,116 cuft
Inflow hyds.	=	44, 54	Contrib. drain. area	=	0.200 ac



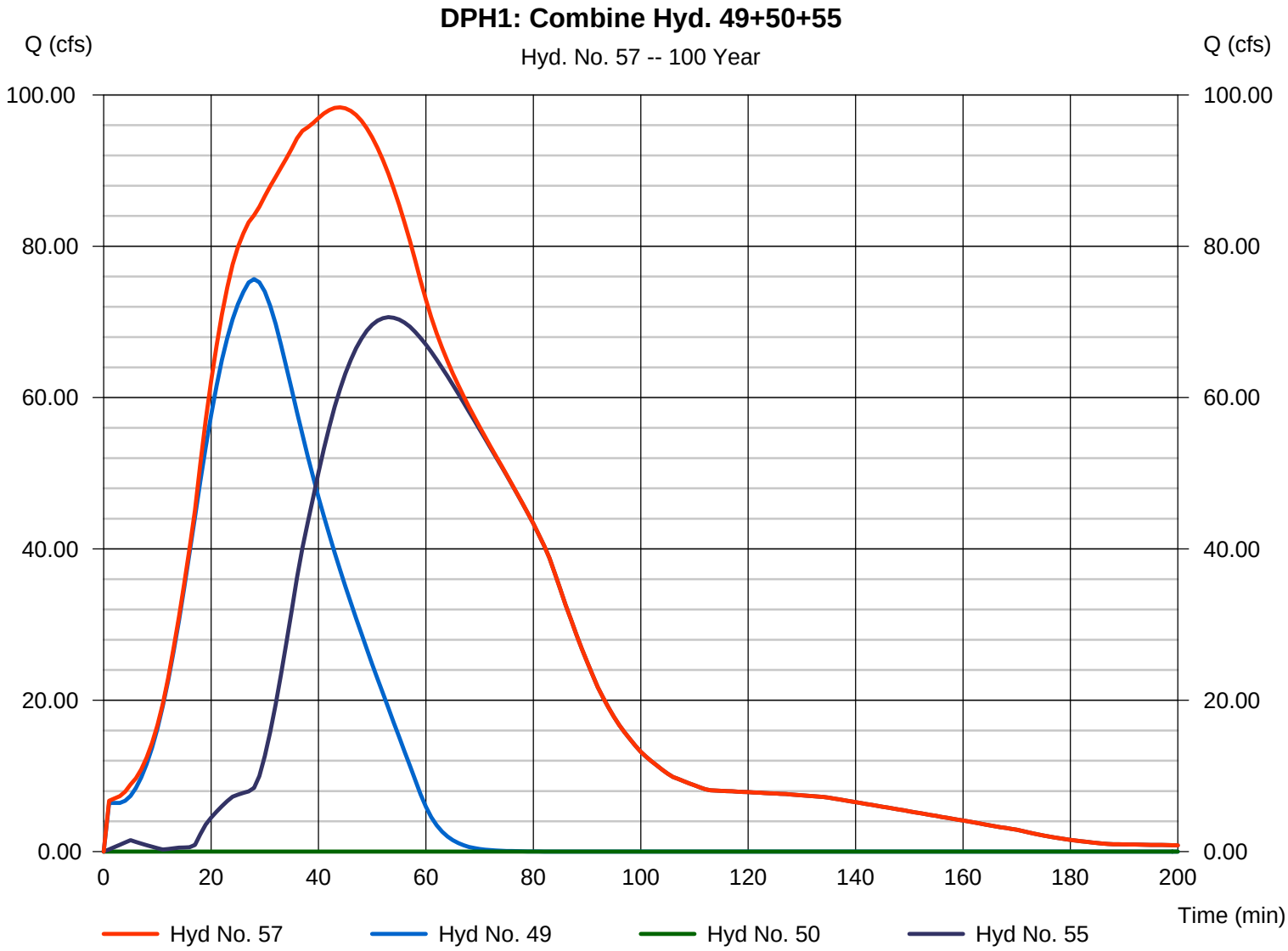
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 57

DPH1: Combine Hyd. 49+50+55

Hydrograph type	=	Combine	Peak discharge	=	98.35 cfs
Storm frequency	=	100 yrs	Time to peak	=	44 min
Time interval	=	1 min	Hyd. volume	=	380,946 cuft
Inflow hyds.	=	49, 50, 55	Contrib. drain. area	=	0.000 ac



Hydrograph Report

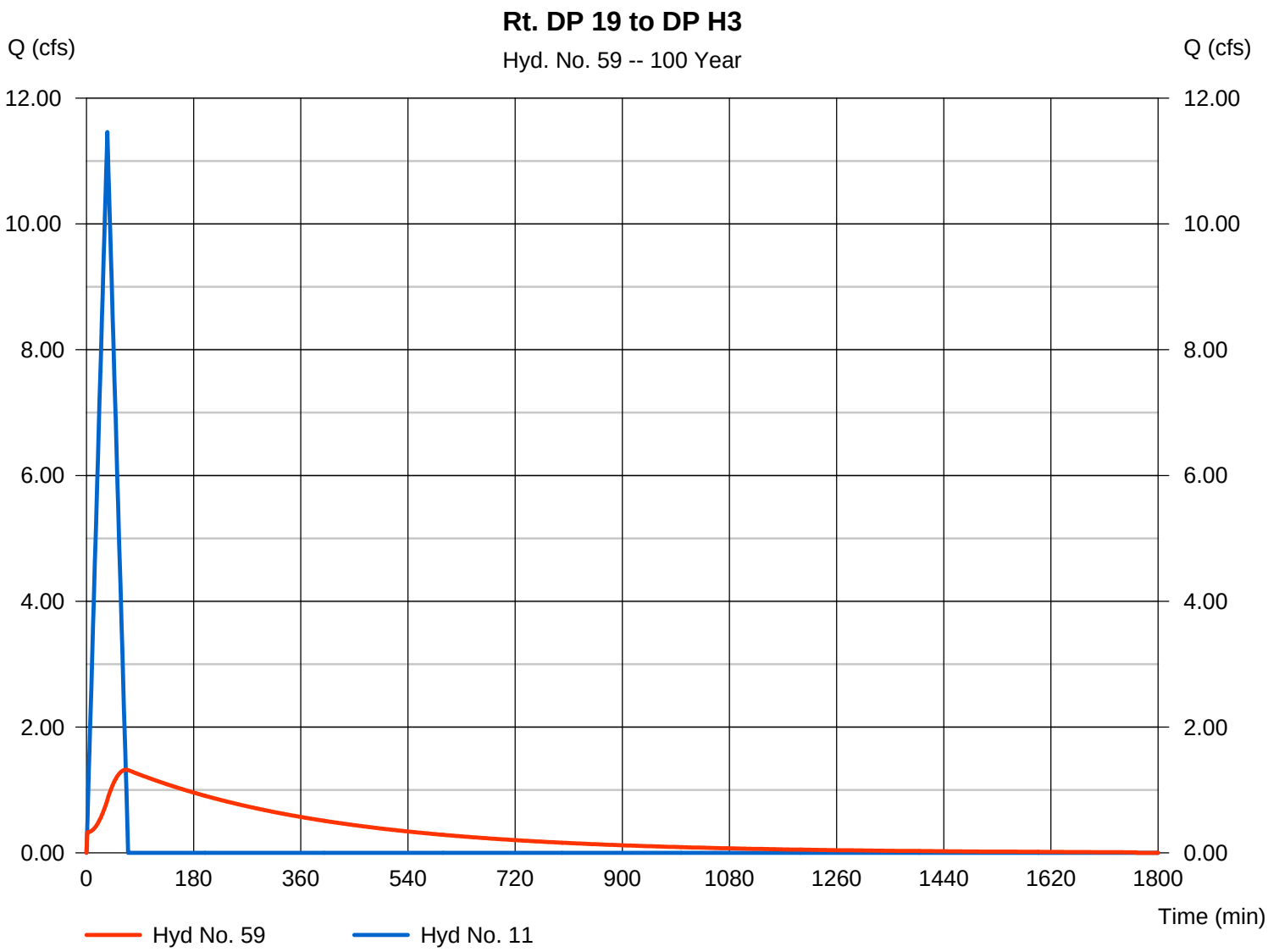
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 59

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	1.321 cfs
Storm frequency	=	100 yrs	Time to peak	=	66 min
Time interval	=	1 min	Hyd. volume	=	30,687 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.03 ft/s	Routing coeff.	=	0.0029

Modified Att-Kin routing method used.



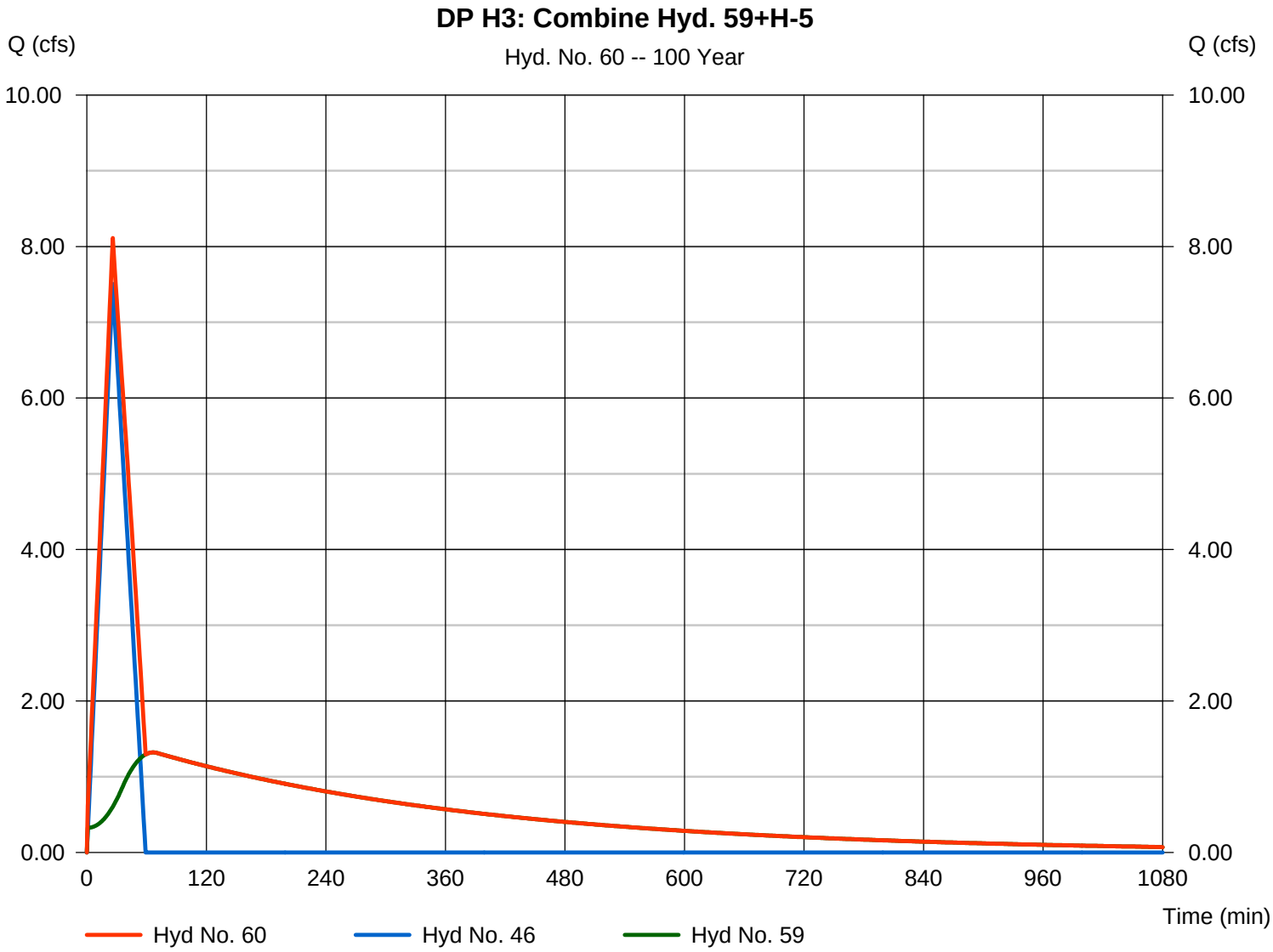
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 60

DP H3: Combine Hyd. 59+H-5

Hydrograph type	=	Combine	Peak discharge	=	8.112 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	43,976 cuft
Inflow hyds.	=	46, 59	Contrib. drain. area	=	2.730 ac



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54951-DEV-100YR(irr=25+fld).gpw

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	49.34	1	11	37,451	------	------	------	OS-1
2	Rational	24.60	1	10	16,975	------	------	------	OS-2
3	Rational	4.250	1	12	3,519	------	------	------	OS-3
4	Rational	15.32	1	13	13,744	------	------	------	OS-4
5	Rational	27.51	1	11	20,884	------	------	------	OS-5
6	Rational	6.755	1	17	7,924	------	------	------	OS-6
7	Rational	7.995	1	11	6,068	------	------	------	OS-7
8	Rational	7.012	1	9	4,355	------	------	------	OS-8
9	Rational	30.26	1	25	52,190	------	------	------	OS-9
10	Rational	29.49	1	25	50,878	------	------	------	OS-10
11	Rational	11.46	1	35	24,066	------	------	------	DP 19: OS-11
13	Reach	49.15	1	12	37,287	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	69.65	1	12	53,524	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	58.26	1	15	55,180	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	65.57	1	14	62,830	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	32.78	1	14	31,415	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	32.78	1	14	31,415	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	20.28	1	22	34,490	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	30.89	1	17	32,083	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	34.72	1	14	53,817	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	17.36	1	14	26,908	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	17.36	1	14	26,908	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	13.94	1	23	28,502	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	34.67	1	11	49,138	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	52.44	1	19	83,819	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	51.83	1	21	84,469	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Rational	23.00	1	25	39,666	------	------	------	FLOOD FLOW
35	Combine	101.92	1	25	174,227	10, 33, 34	------	------	DP10: Combine Hyd.33+OS-10+FLO
36	Diversion1	46.00	1	11	119,471	35	------	------	DP13: Split Flow to DCD Pipe
37	Diversion2	55.92	1	25	54,756	35	------	------	DP14: Split Flow to N.
39	Reach	49.82	1	27	54,754	37	------	------	Rt. DP14 to DP15 (Bioswale)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reservoir	26.46	1	36	54,750	39	5319.17	22,723	DP16: Pond 2 Discharge
41	Reach	23.11	1	48	54,714	40	------	------	Rt. DP16 to DP17 (Bioswale)
43	Rational	8.766	1	19	11,493	------	------	------	A
44	Rational	39.28	1	40	108,409	------	------	------	B
45	Rational	1.481	1	5	511	------	------	------	C
46	Rational	0.862	1	22	1,309	------	------	------	DP H2: H-4
47	Rational	7.508	1	26	13,469	------	------	------	H-5
49	Combine	44.12	1	11	68,350	6, 30, 43,	------	------	DP11: Combine Hyd. 30+ OS-6+A
50	Reach	49.72	1	29	54,754	39	------	------	Rt. DP11 to DP H1 (Swale)
51	Reach	46.00	1	41	121,017	36	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
54	Combine	60.50	1	40	161,945	41, 44,	------	------	DP17: Combine Hyd. 41+B
55	Reservoir	50.16	1	54	161,914	54	5315.16	59,180	DP18: Pond 1 Discharge
56	Combine	50.16	1	54	162,402	45, 55	------	------	DP12: DP18 + C
58	Combine	103.22	1	29	338,174	50, 51, 56,	------	------	DPH1: Combine Hyd. 50+51+56
60	Reach	1.321	1	66	30,687	11	------	------	Rt. DP 19 to DP H3
61	Combine	8.112	1	26	43,976	47, 60	------	------	DP H3: Combine Hyd. 60+H-5

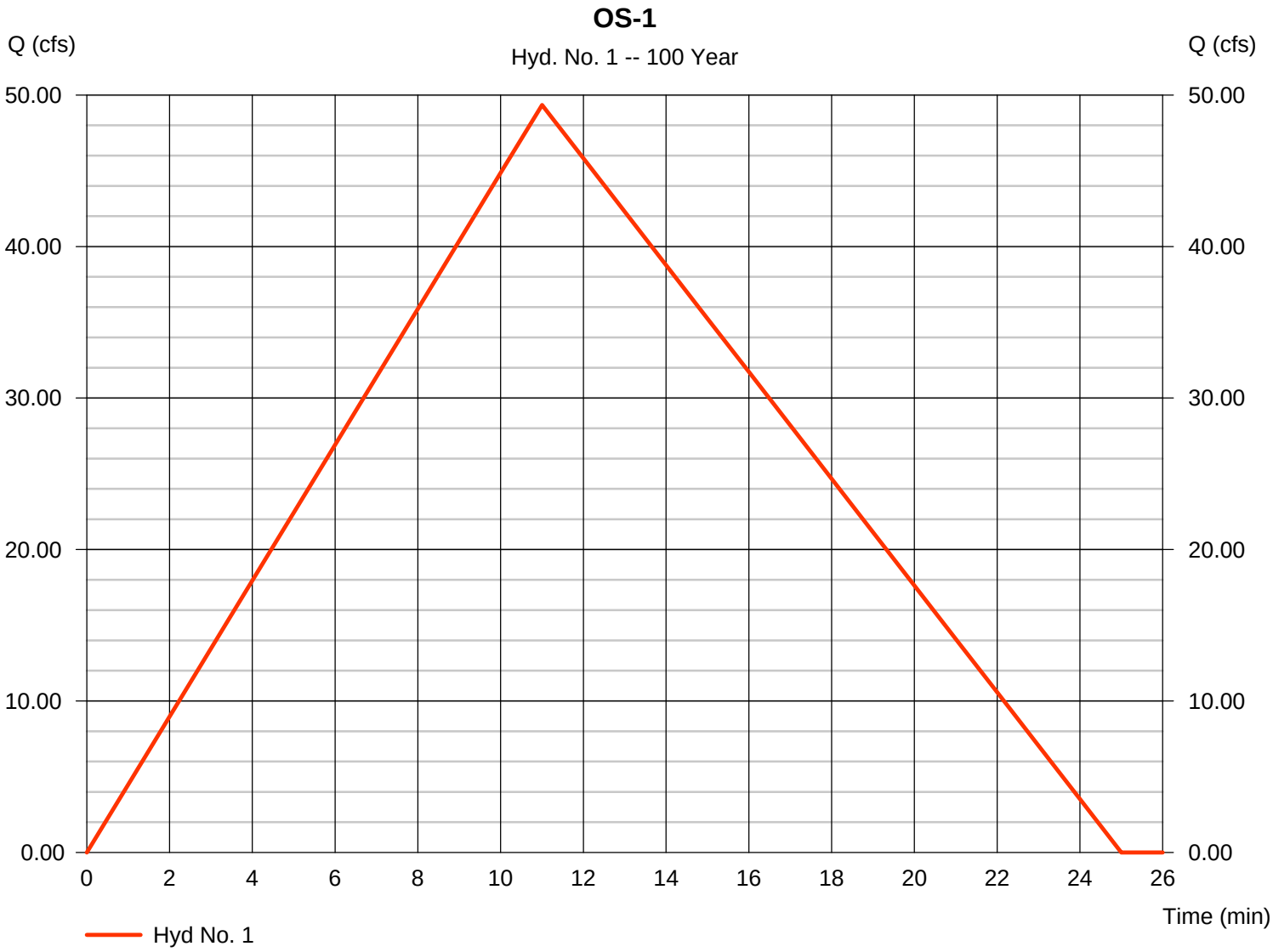
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	49.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	37,451 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.8
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	24.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	16,975 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.92
Intensity	=	8.305 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

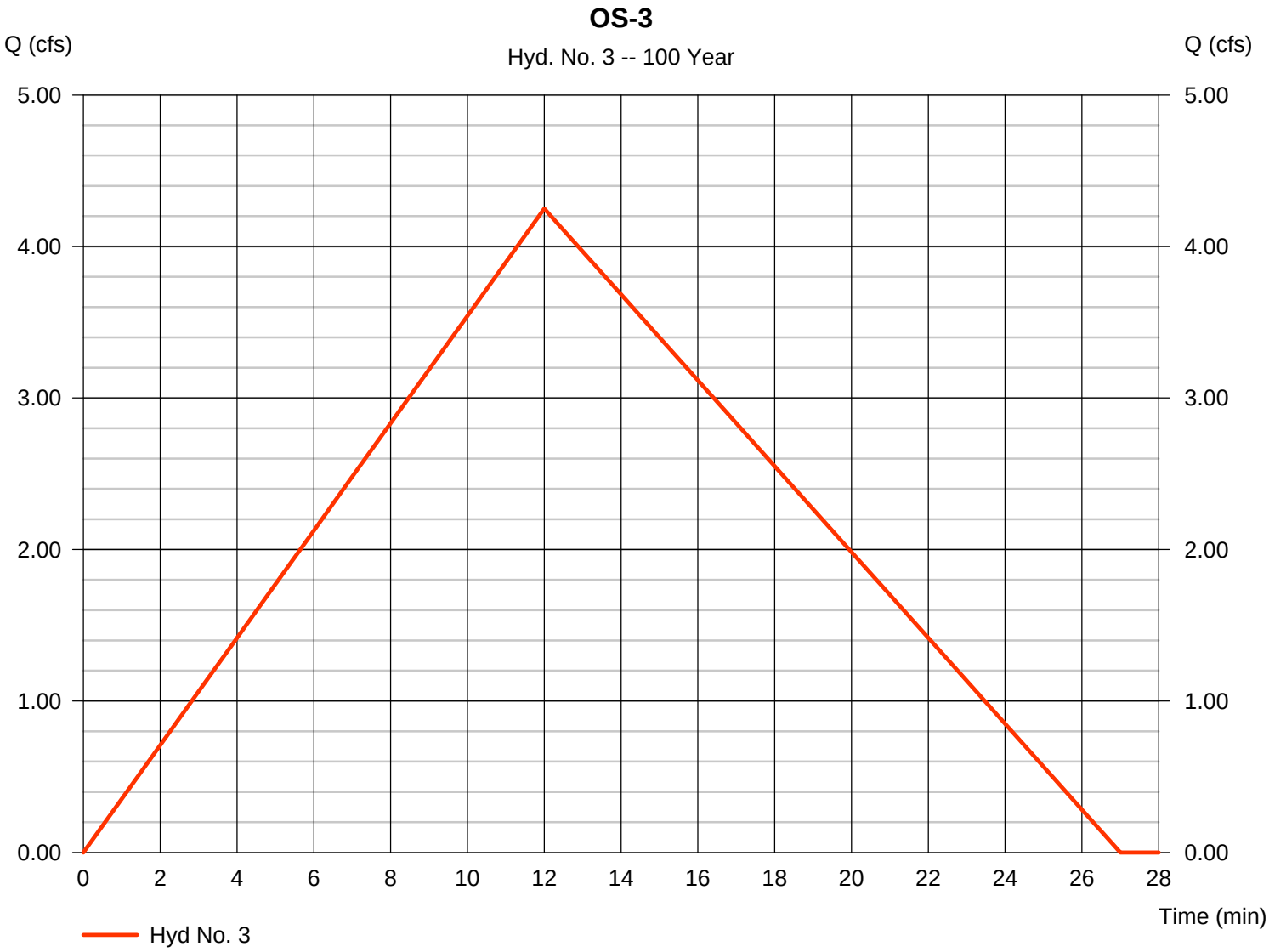
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	4.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,519 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.7
Intensity	=	7.496 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



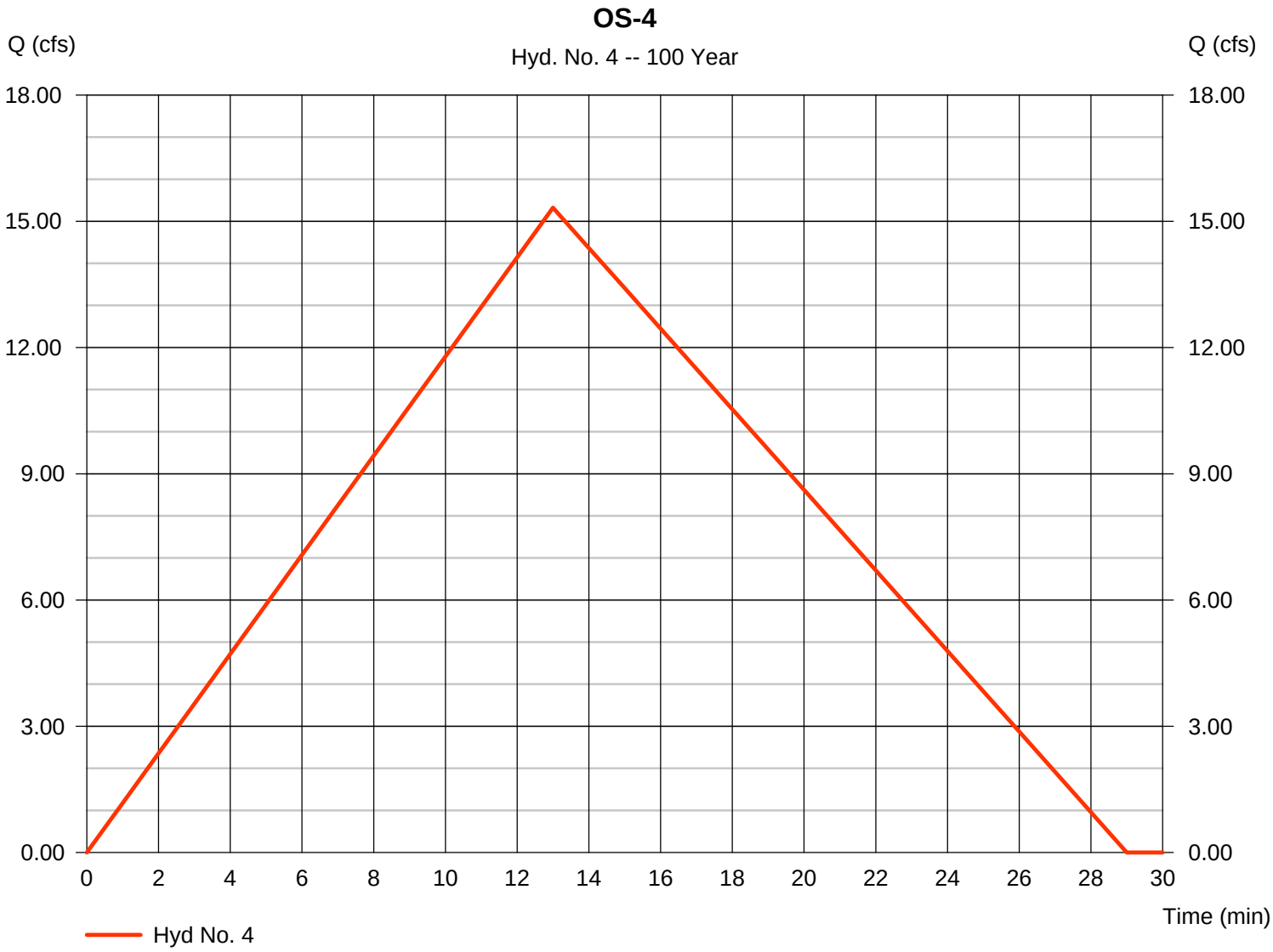
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	15.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	13,744 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.7
Intensity	=	7.153 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



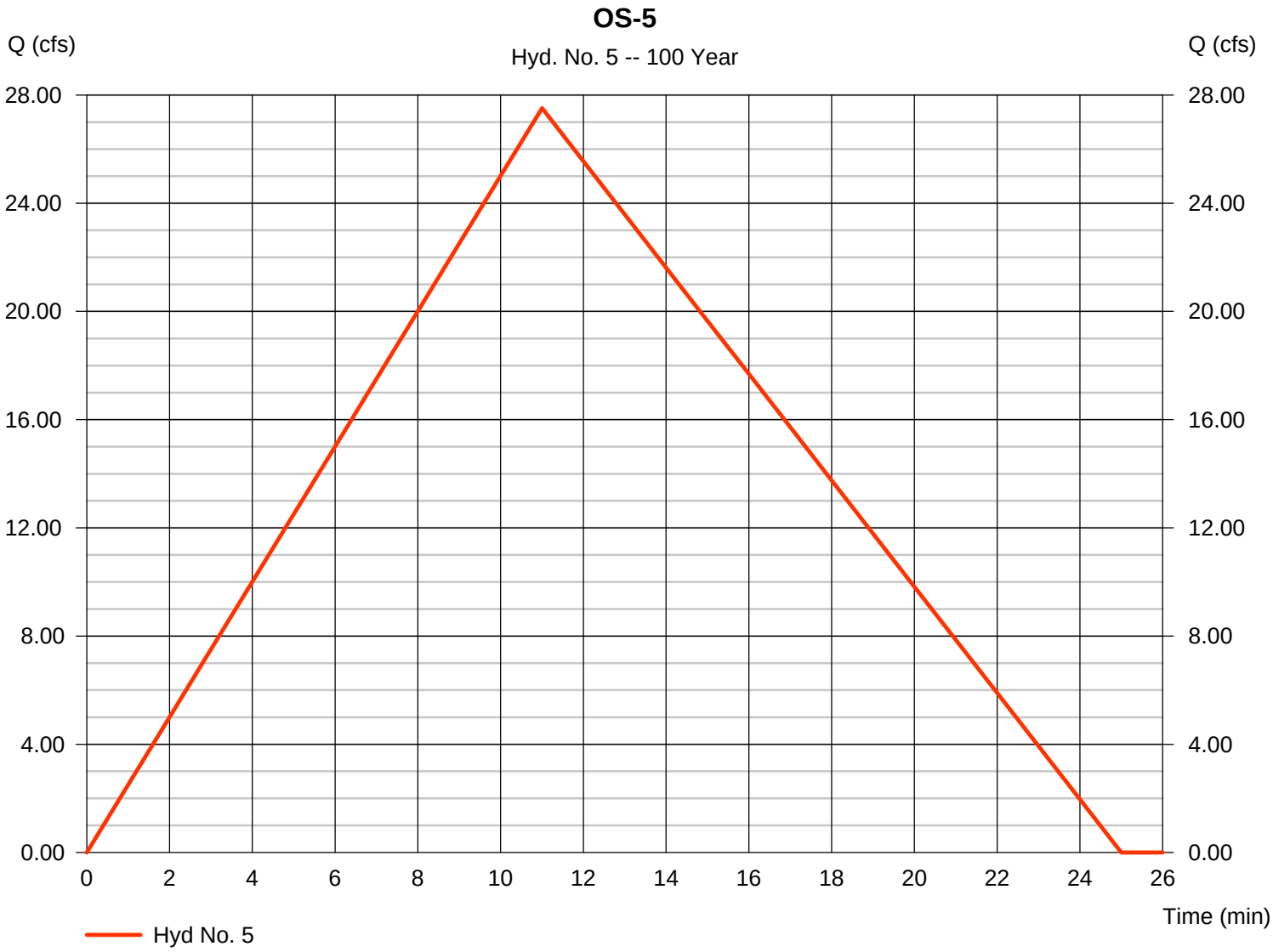
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	27.51 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	20,884 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



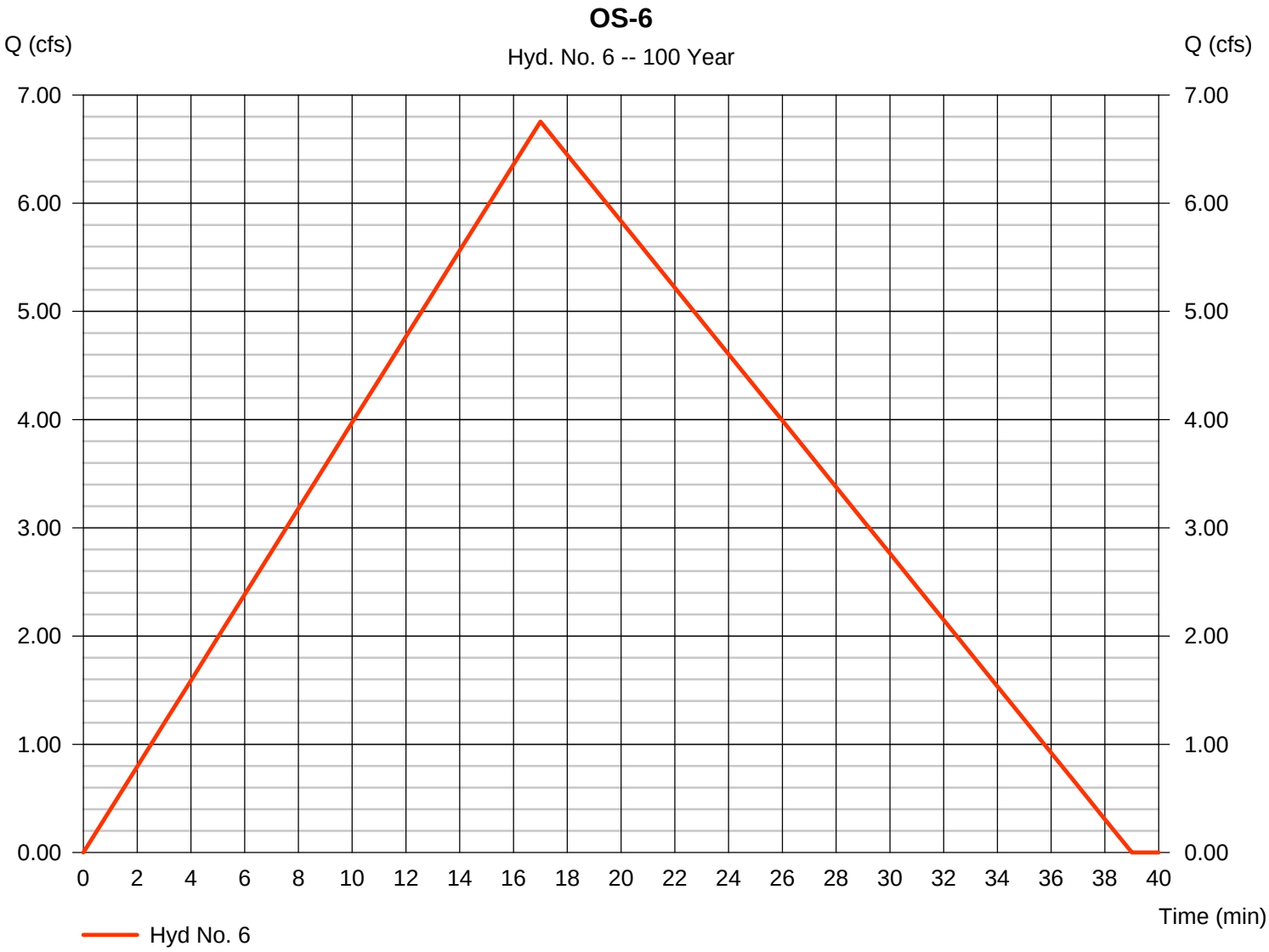
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	6.755 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	7,924 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.7
Intensity	=	6.069 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



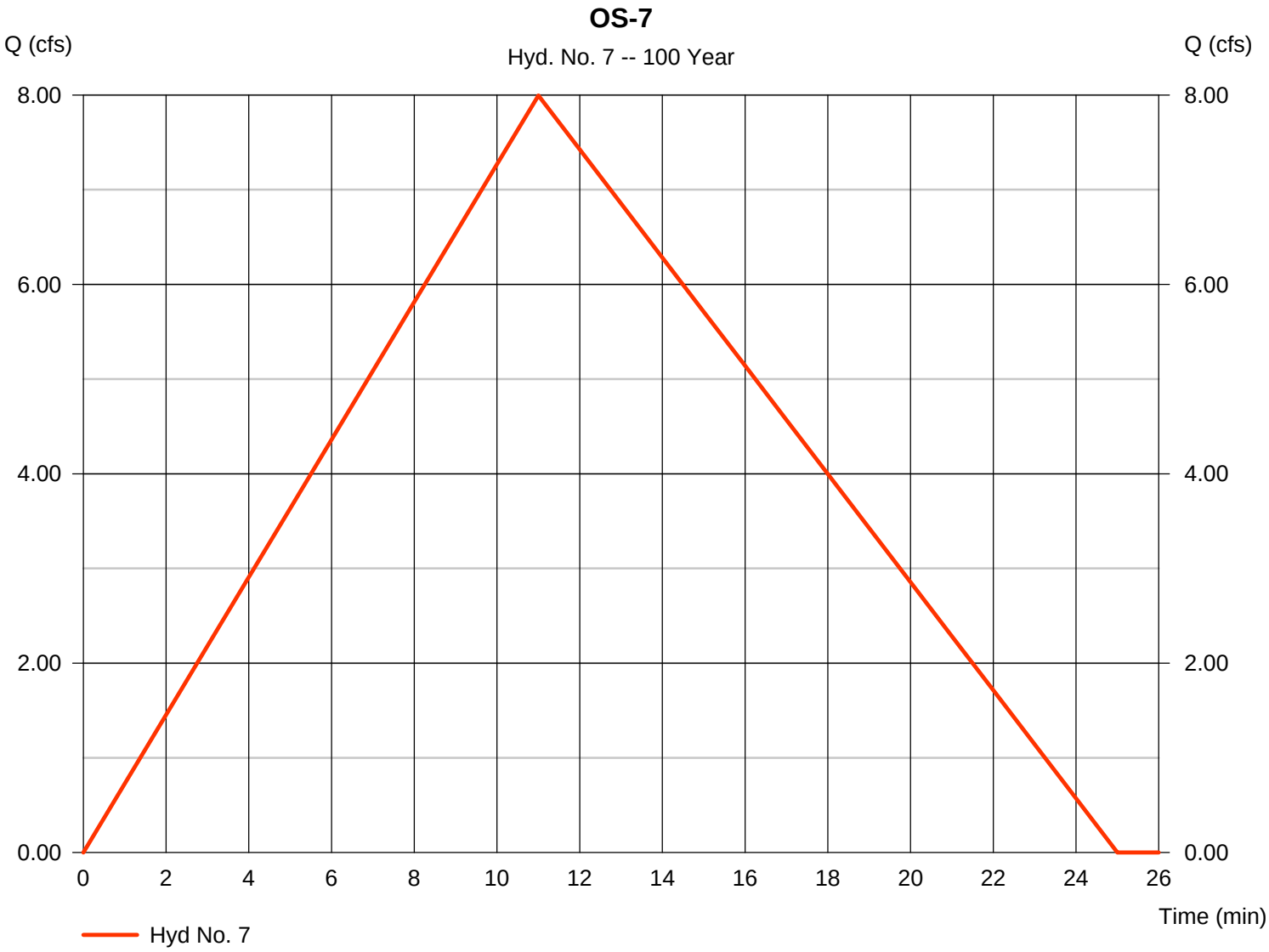
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	7.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	6,068 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



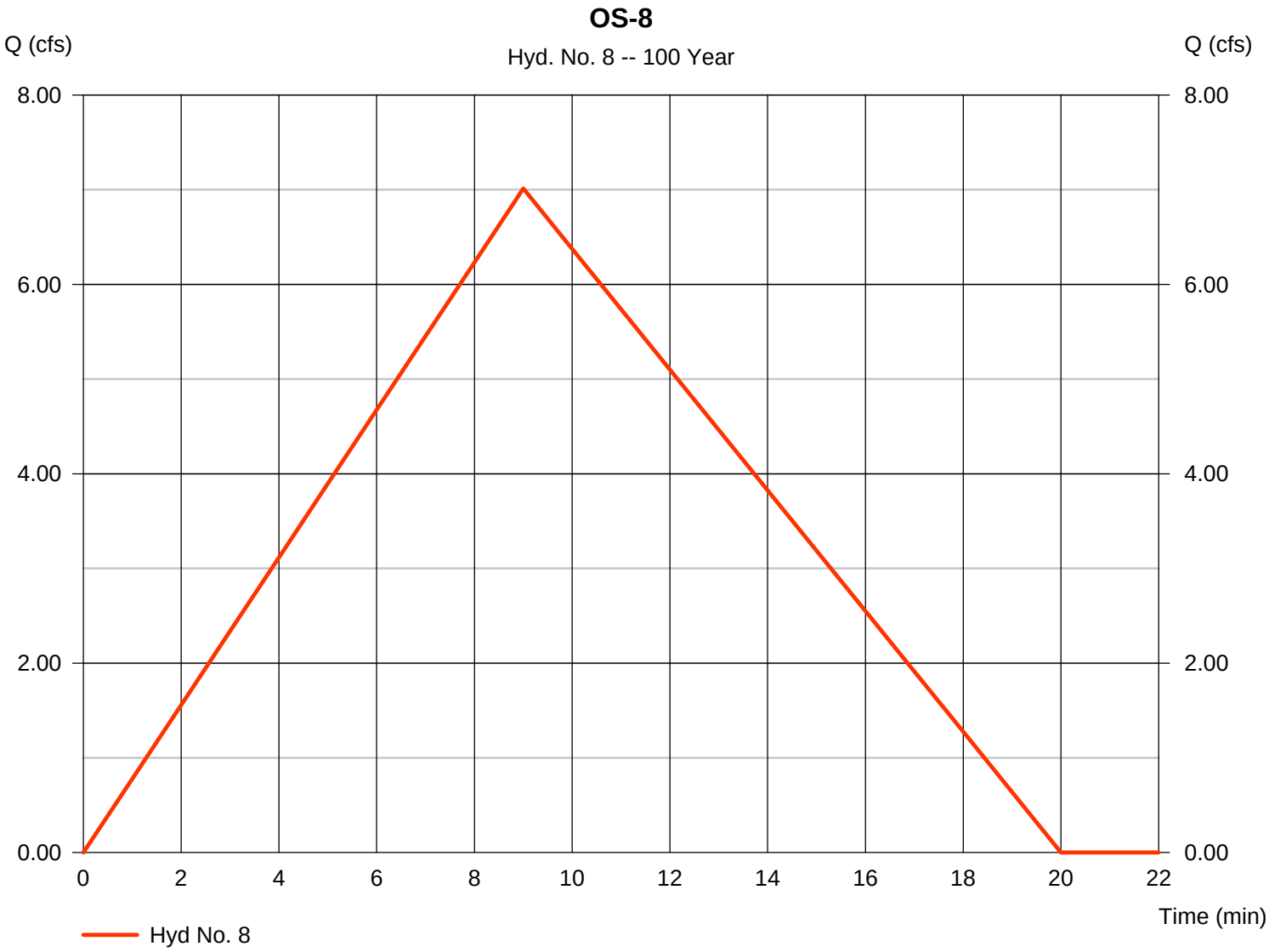
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	7.012 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	4,355 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.7
Intensity	=	8.787 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



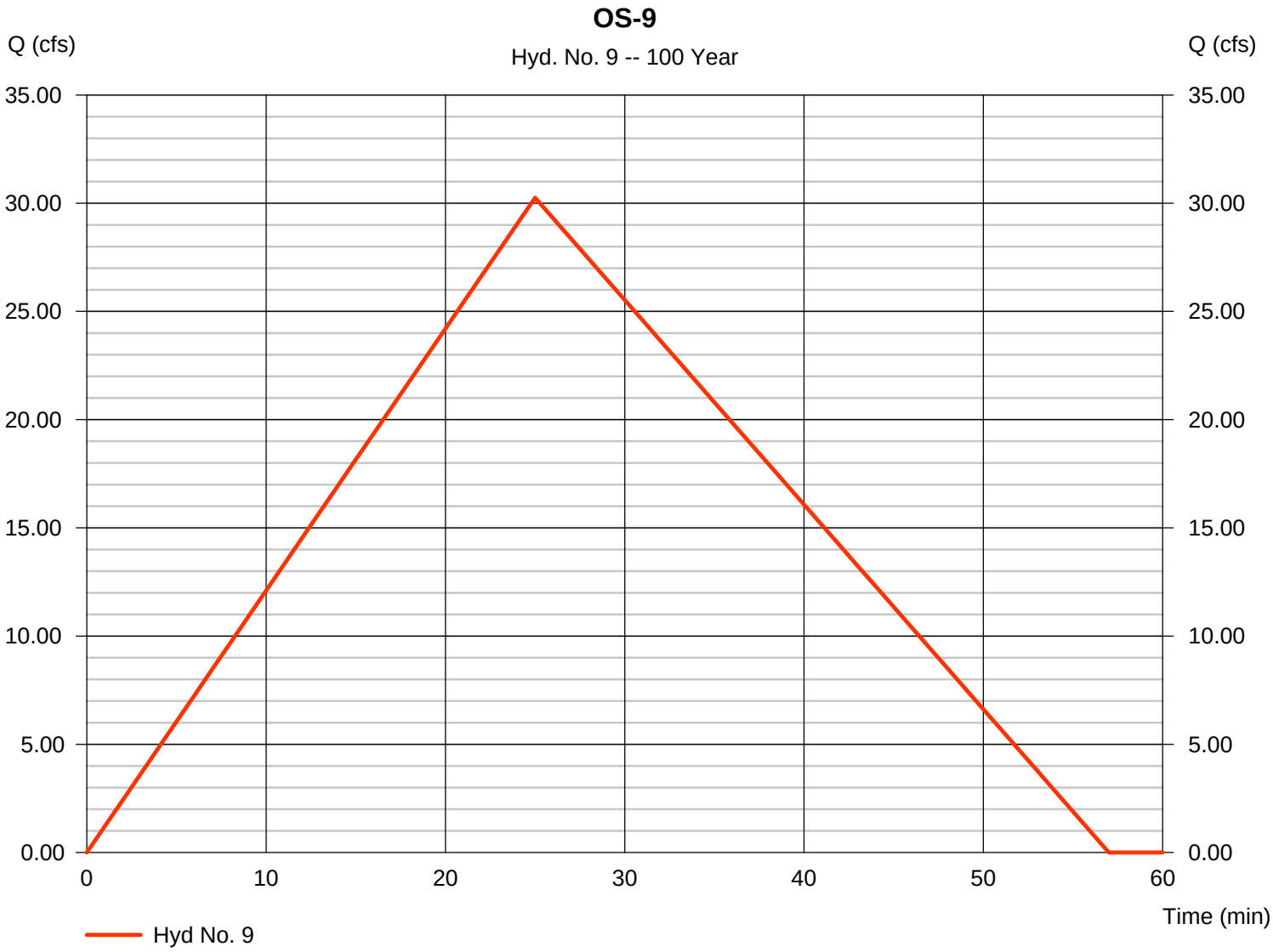
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	30.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	52,190 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.68
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



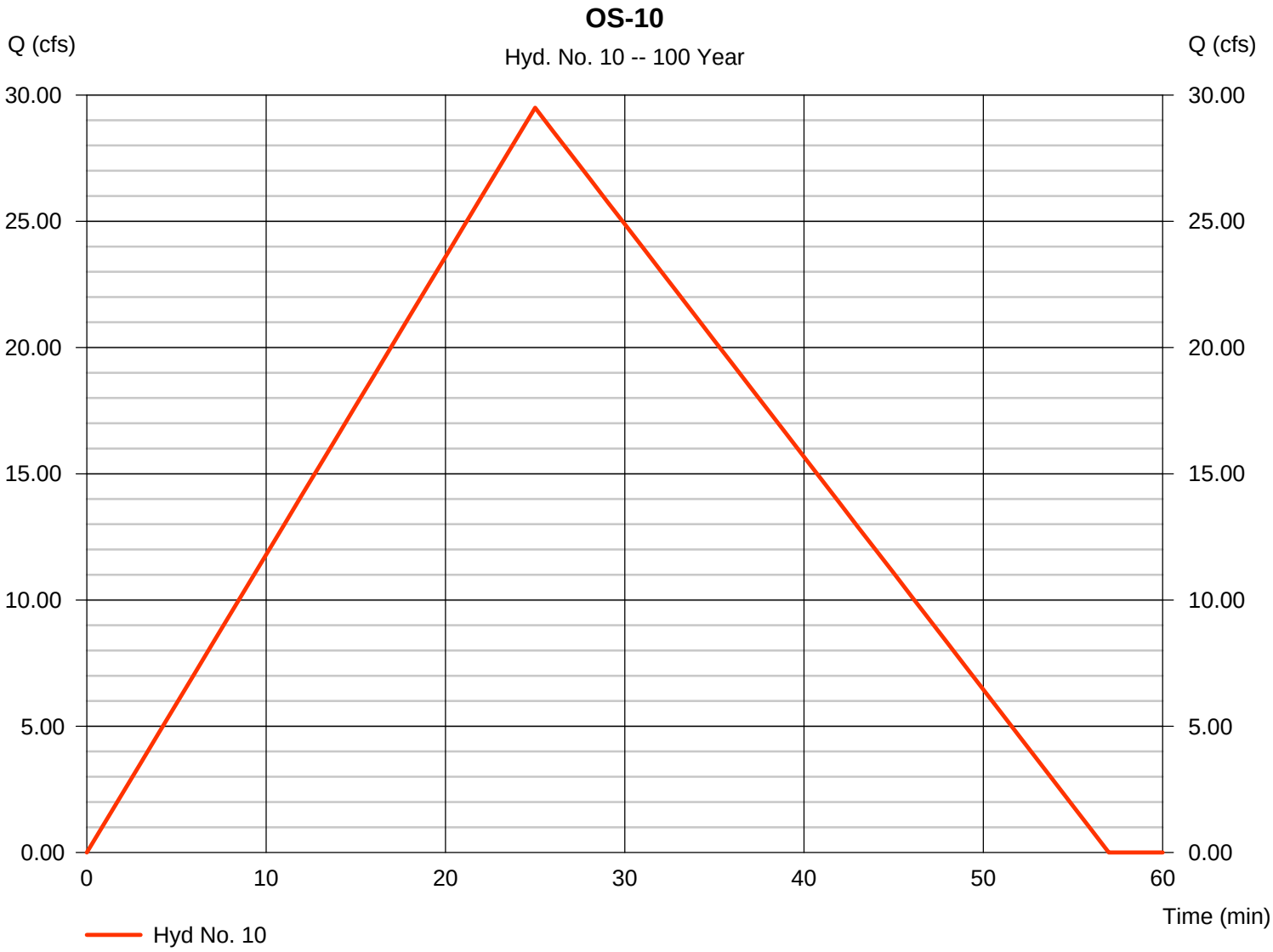
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	29.49 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	50,878 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.67
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



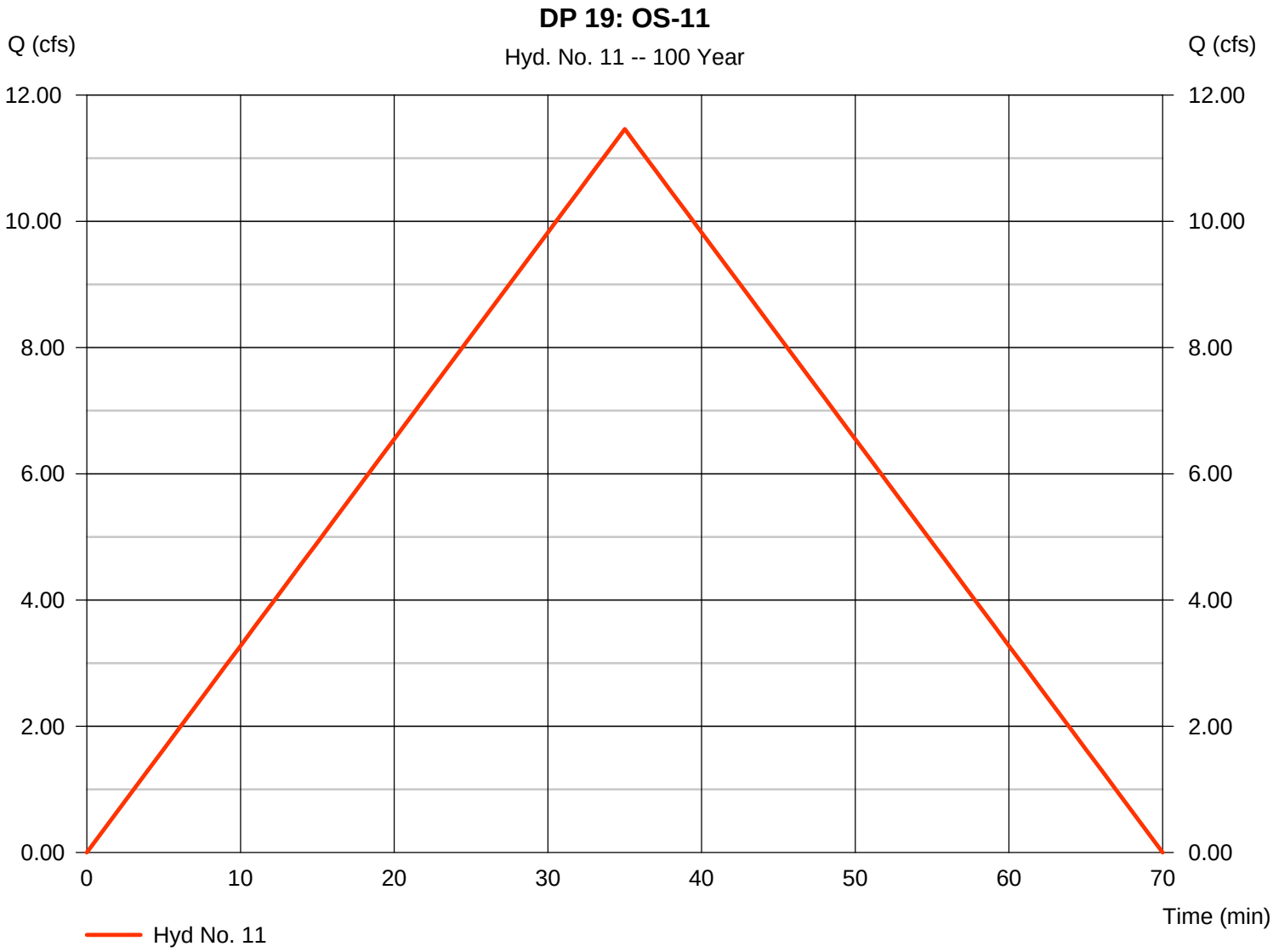
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	11.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	24,066 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.61
Intensity	=	3.720 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

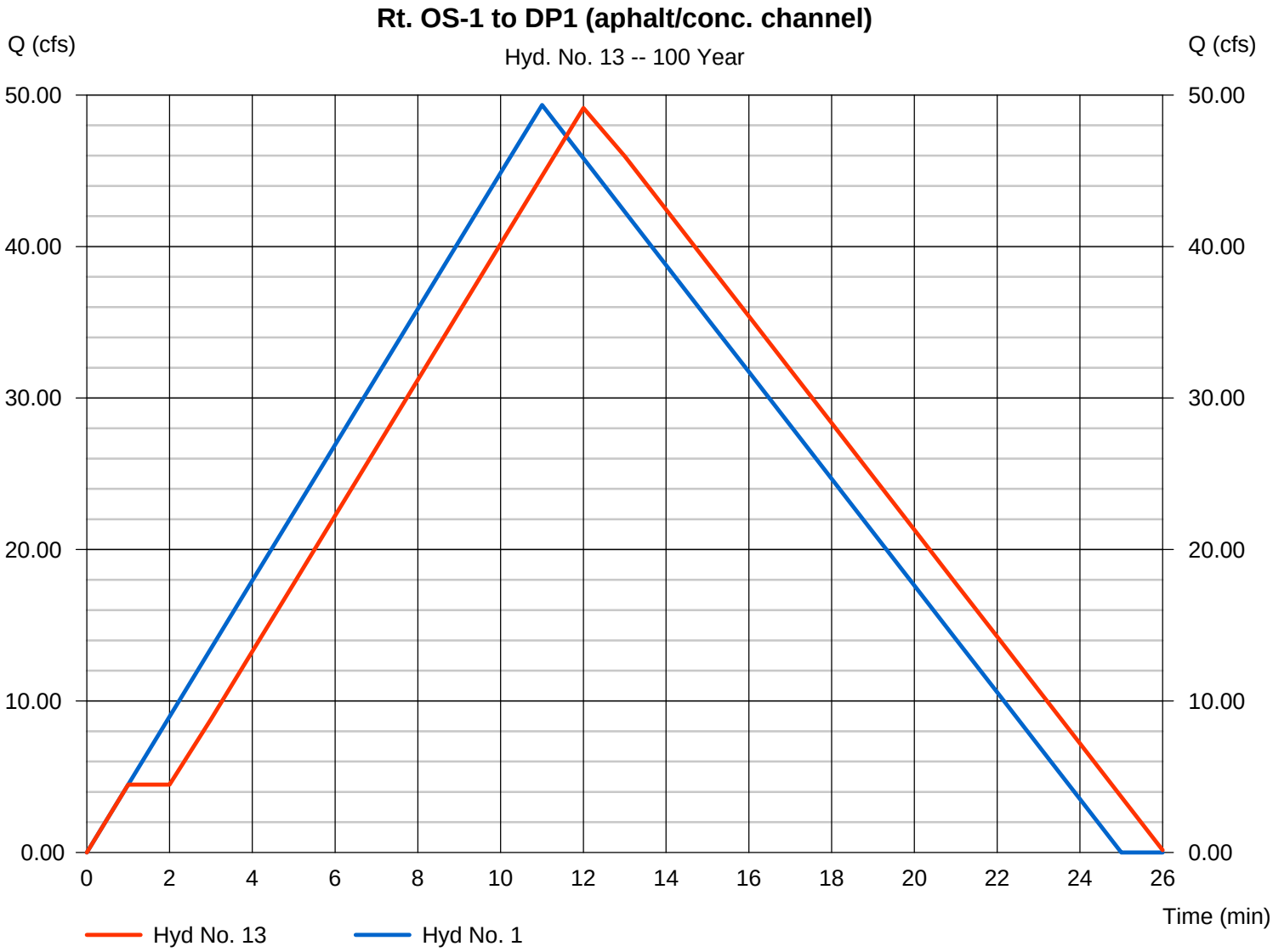
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	49.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	37,287 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.75 ft/s	Routing coeff.	=	0.9587

Modified Att-Kin routing method used.



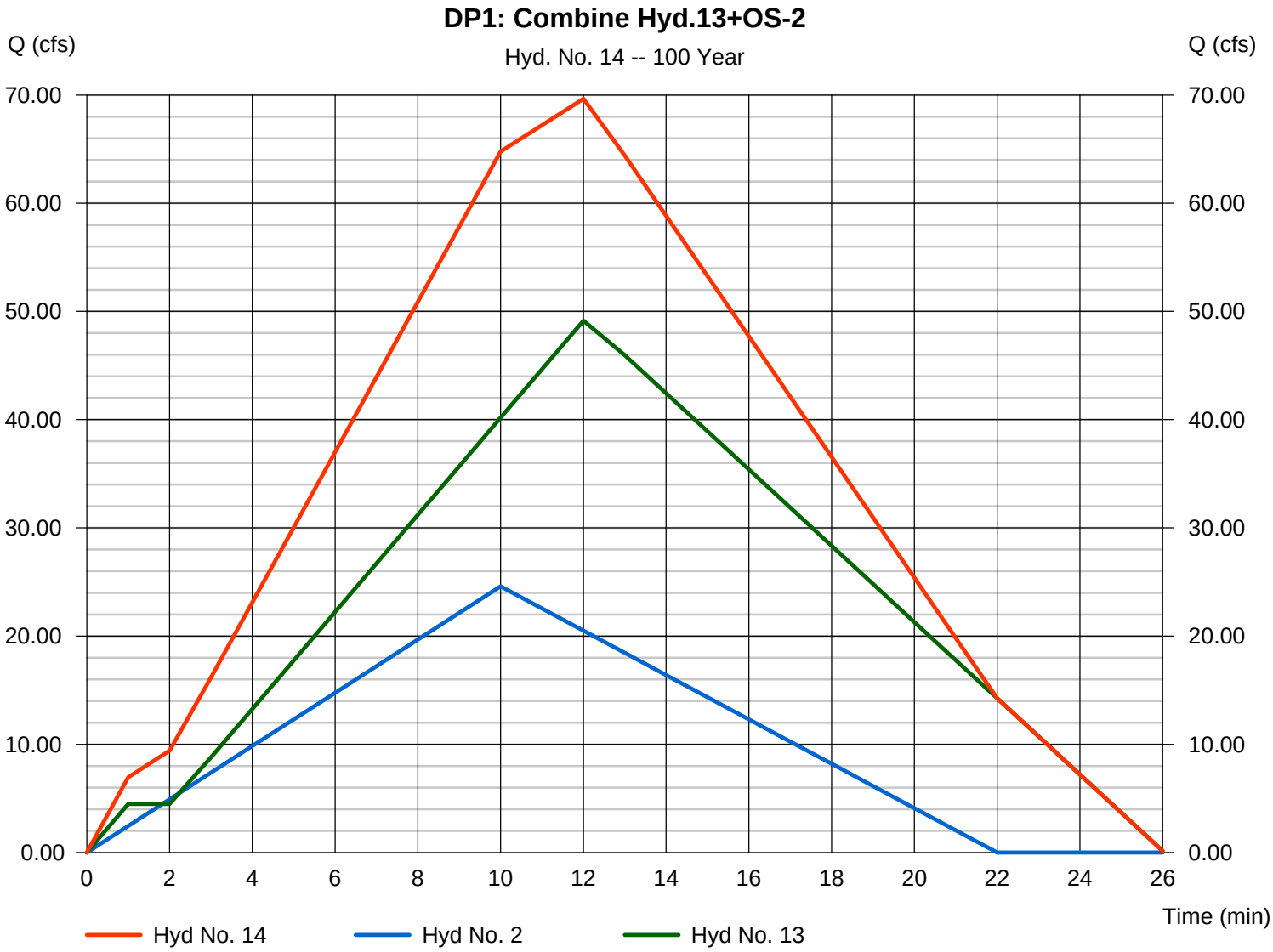
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	69.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	53,524 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

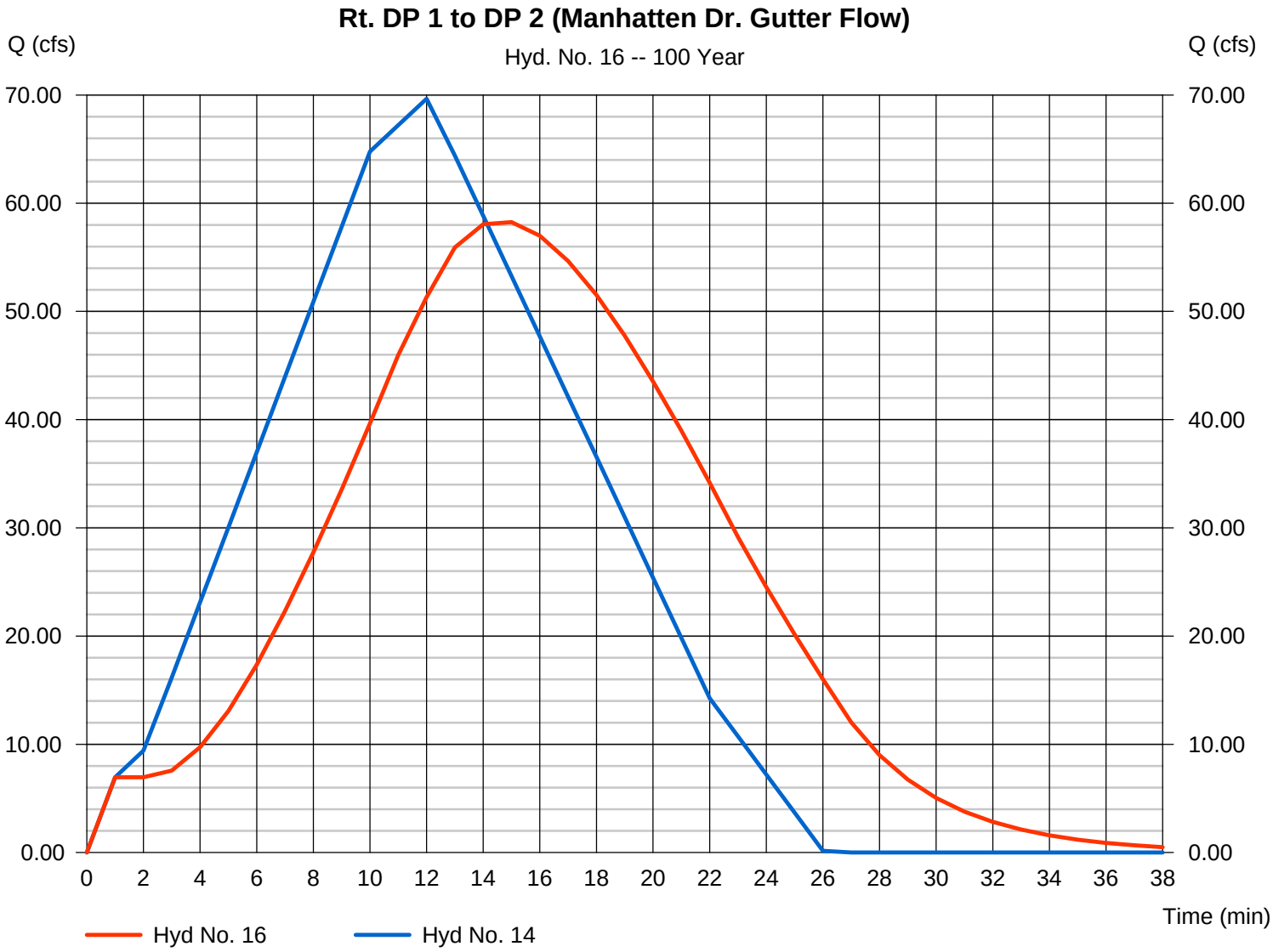
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 58.26 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 55,180 cuft
Inflow hyd. No.	= 14 - DP1: Combine Hyd.13+OS-2	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.513	Rating curve m	= 0.659
Ave. velocity	= 1.09 ft/s	Routing coeff.	= 0.2514

Modified Att-Kin routing method used.



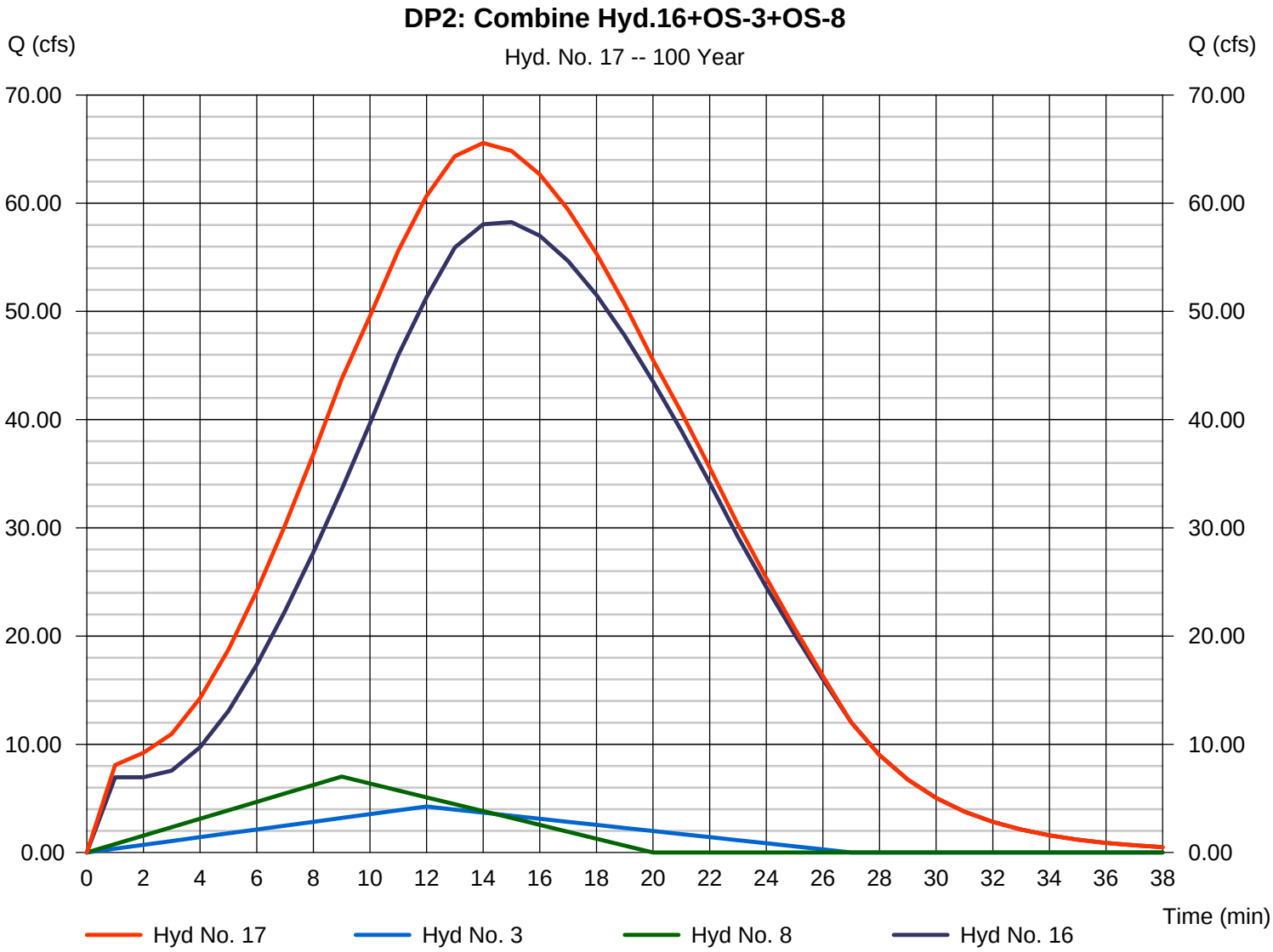
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	=	Combine	Peak discharge	=	65.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	62,830 cuft
Inflow hyds.	=	3, 8, 16	Contrib. drain. area	=	1.950 ac



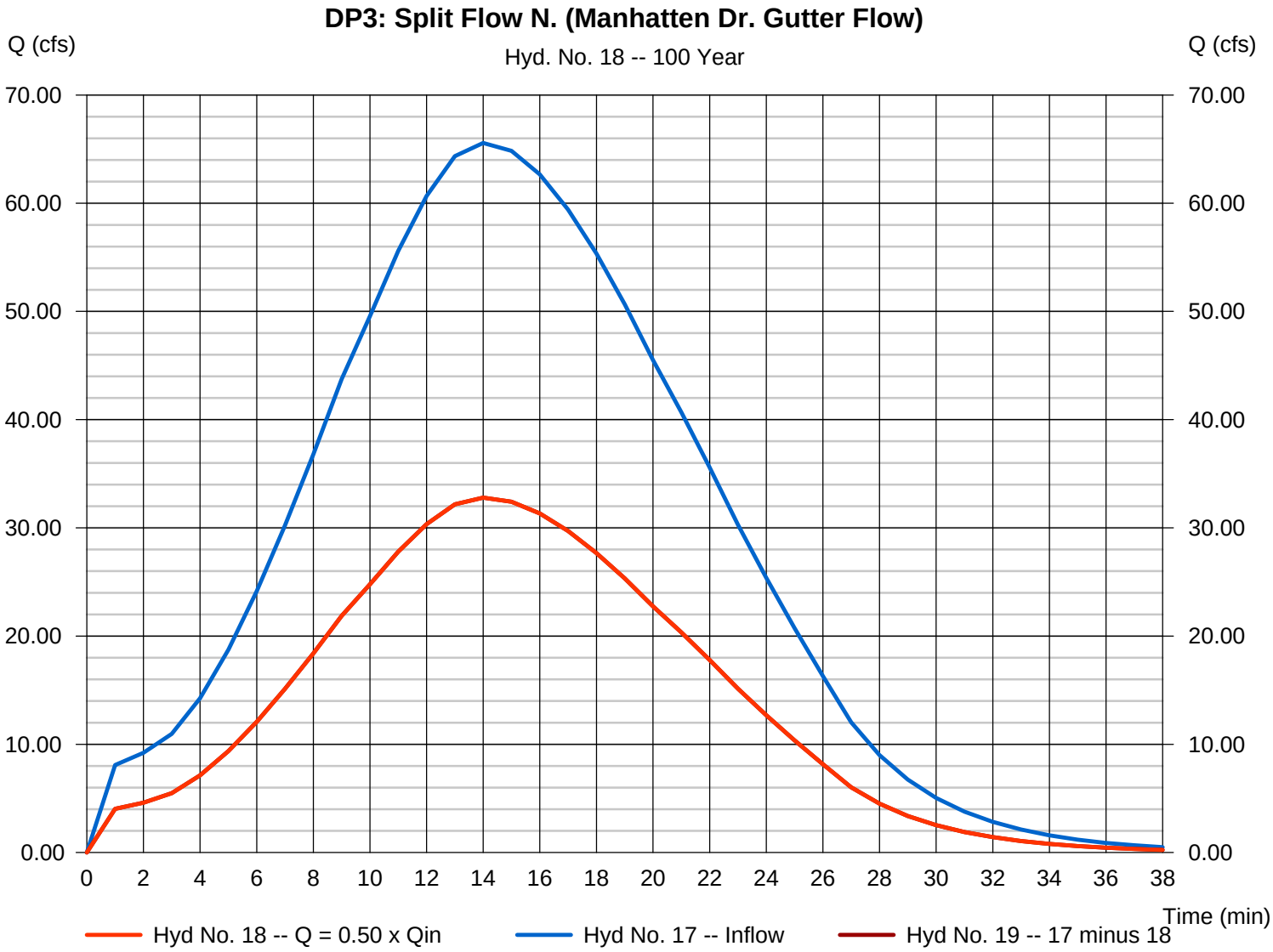
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



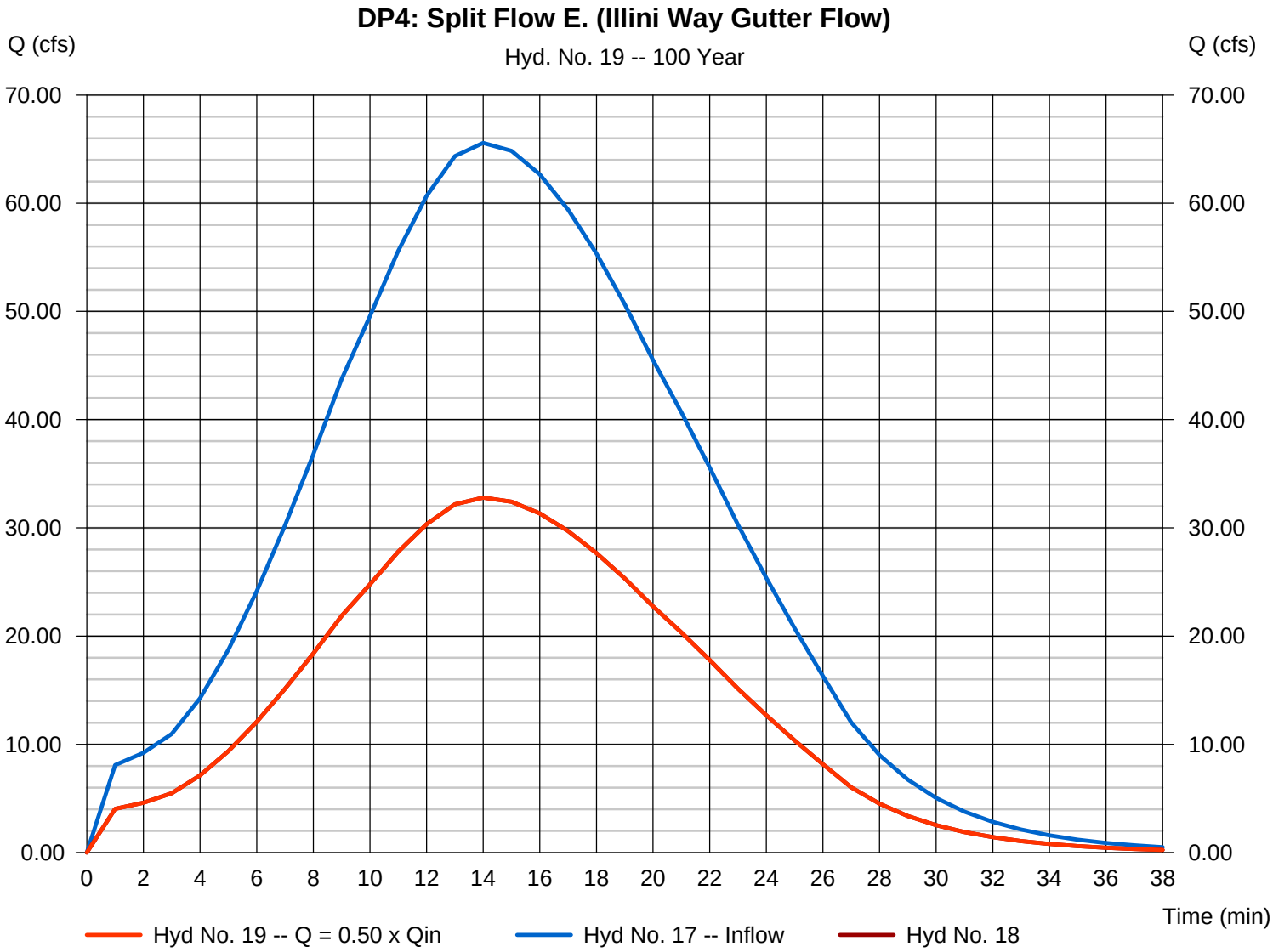
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

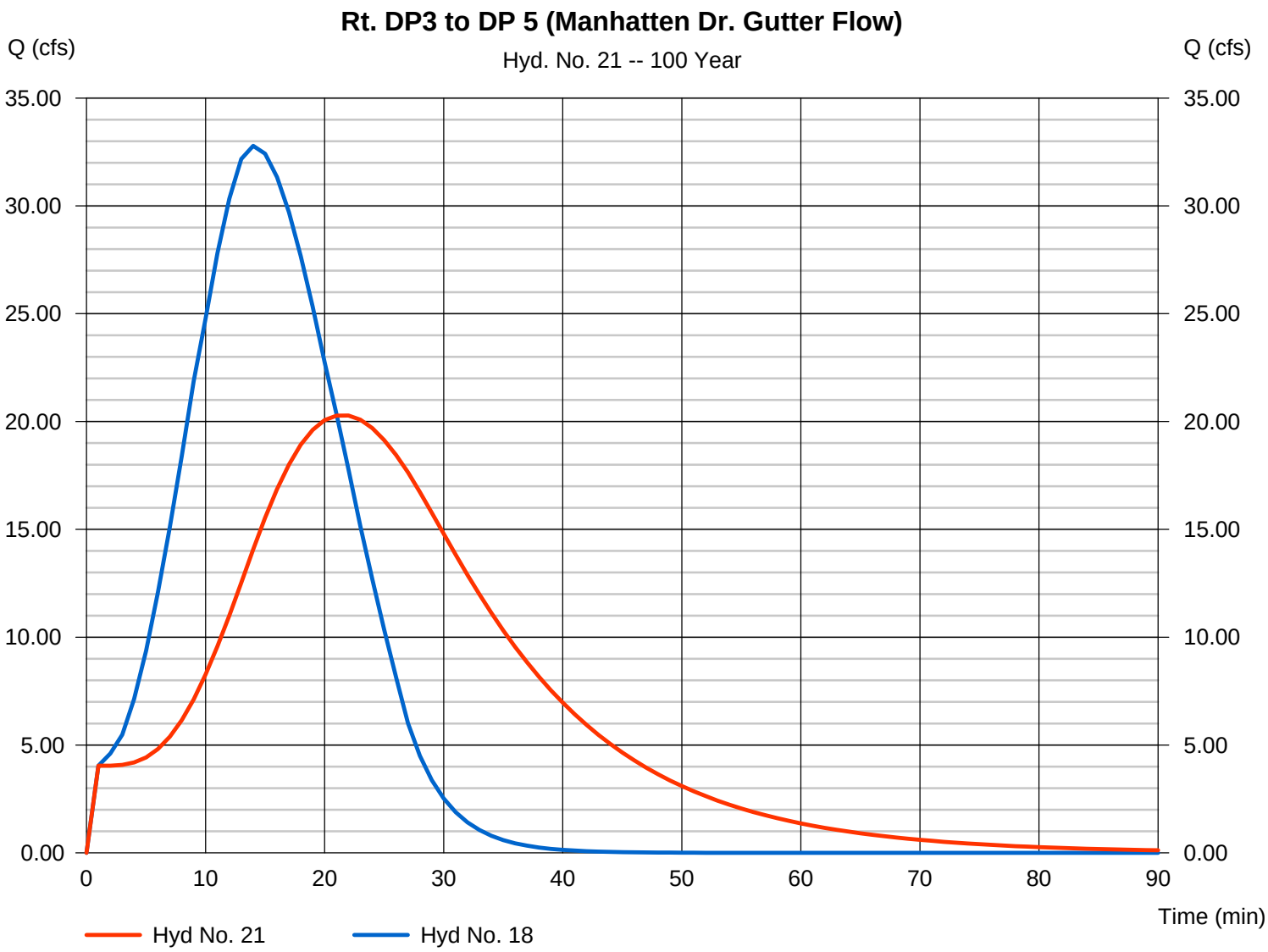
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	20.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	34,490 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.0786

Modified Att-Kin routing method used.



Hydrograph Report

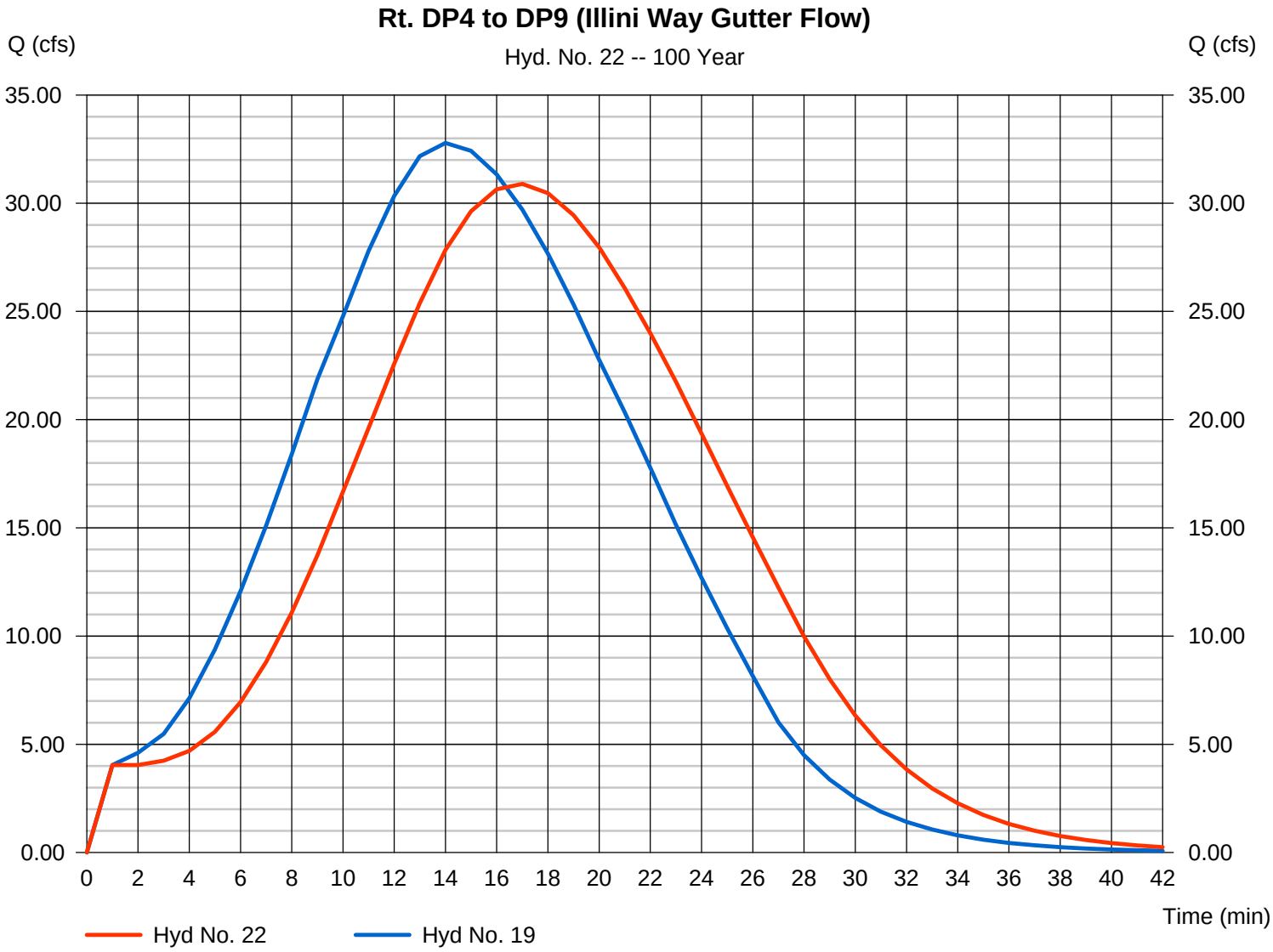
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 30.89 cfs
Storm frequency	= 100 yrs	Time to peak	= 17 min
Time interval	= 1 min	Hyd. volume	= 32,083 cuft
Inflow hyd. No.	= 19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.630	Rating curve m	= 0.659
Ave. velocity	= 1.68 ft/s	Routing coeff.	= 0.3620

Modified Att-Kin routing method used.



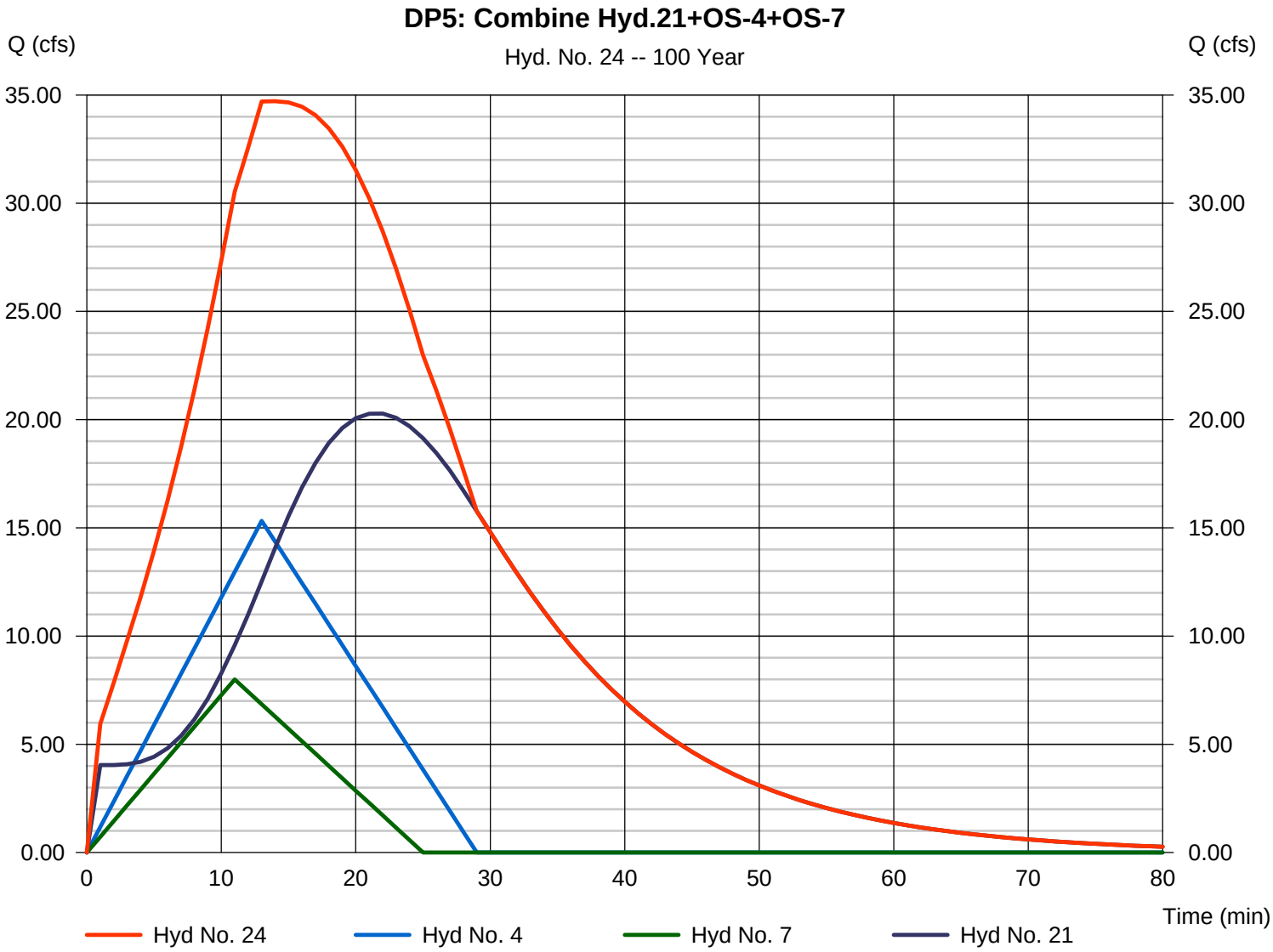
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	= Combine	Peak discharge	= 34.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 53,817 cuft
Inflow hyds.	= 4, 7, 21	Contrib. drain. area	= 4.510 ac



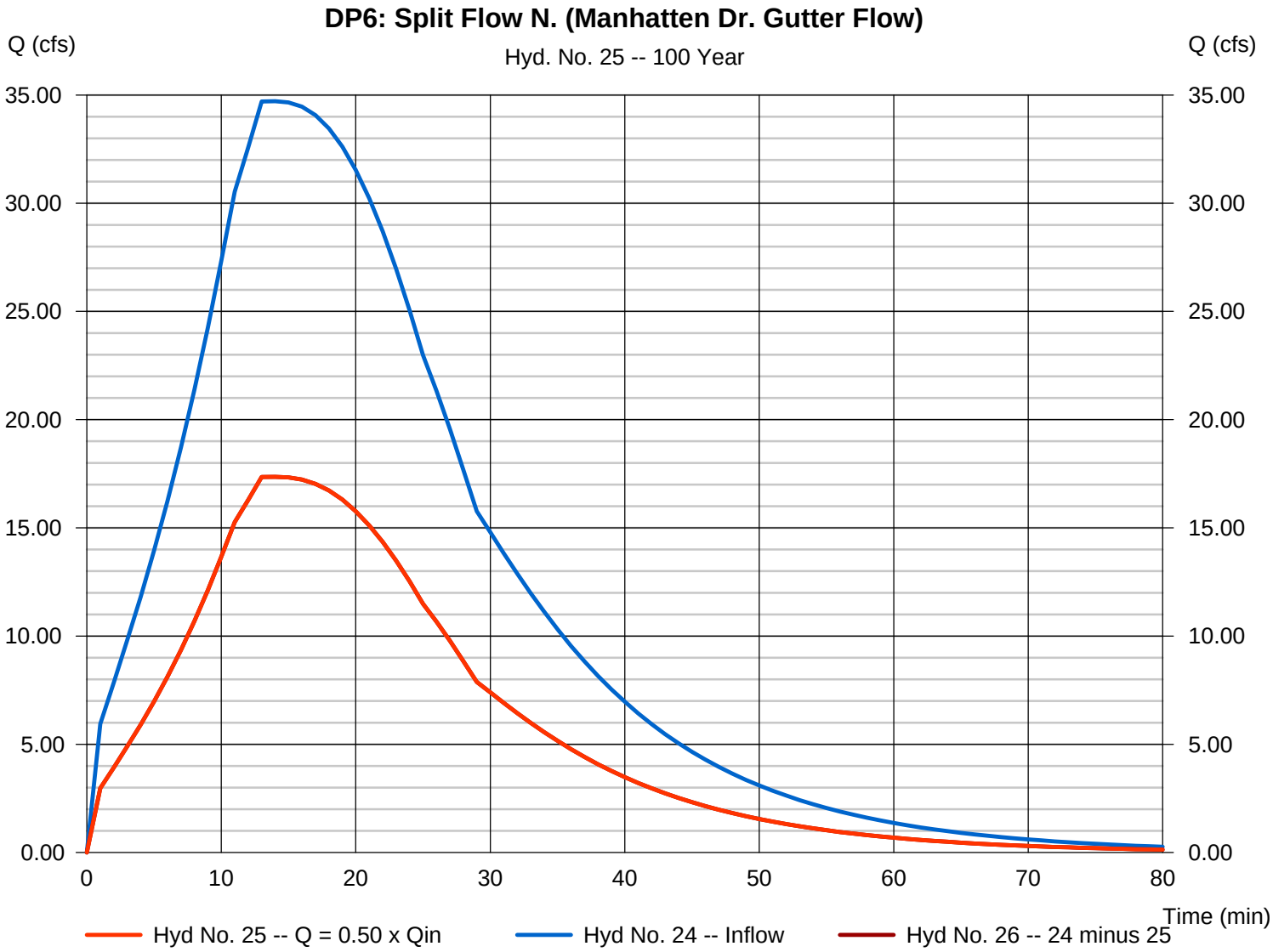
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



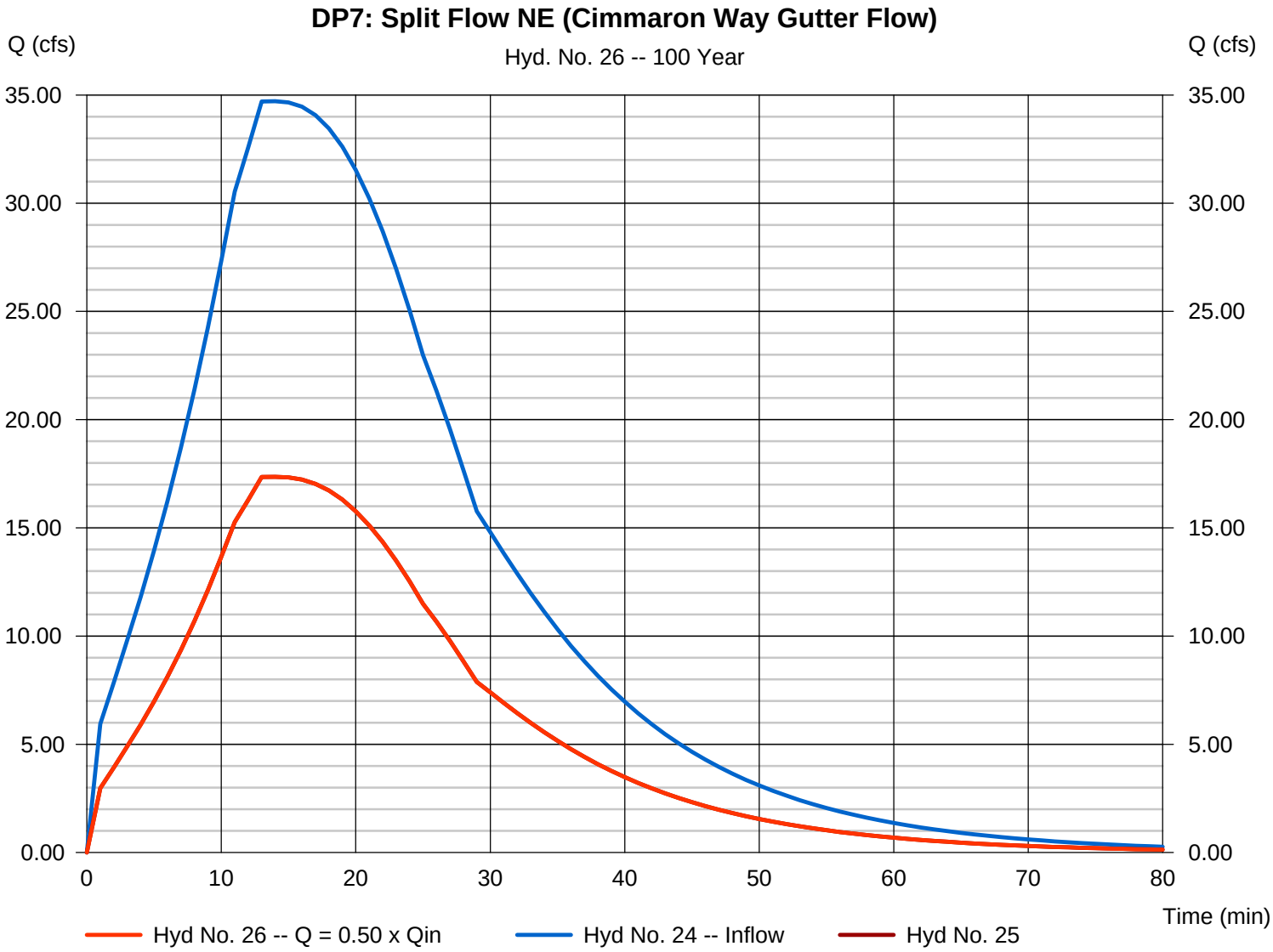
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

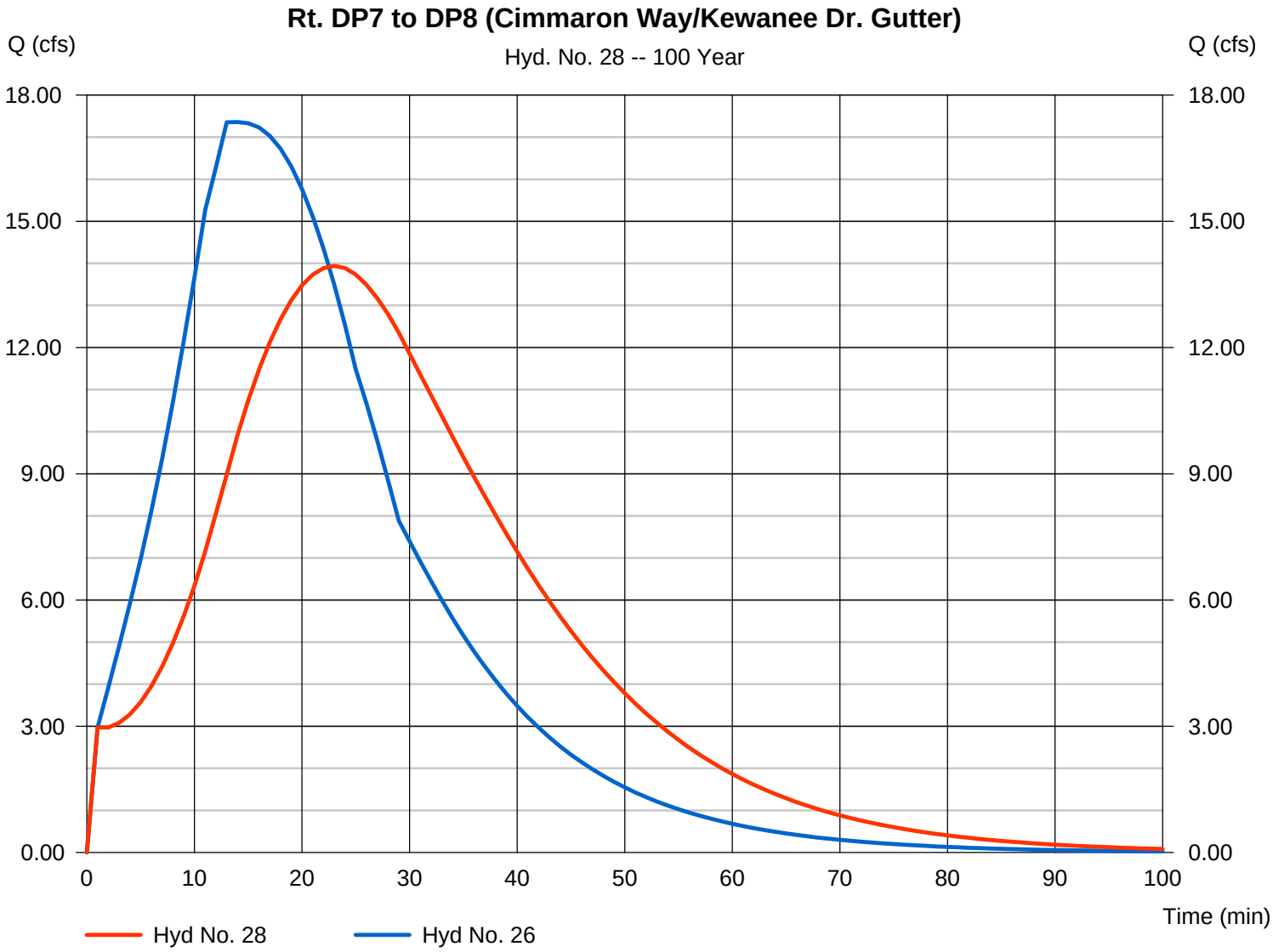
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	28,502 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.33 ft/s	Routing coeff.	=	0.1116

Modified Att-Kin routing method used.



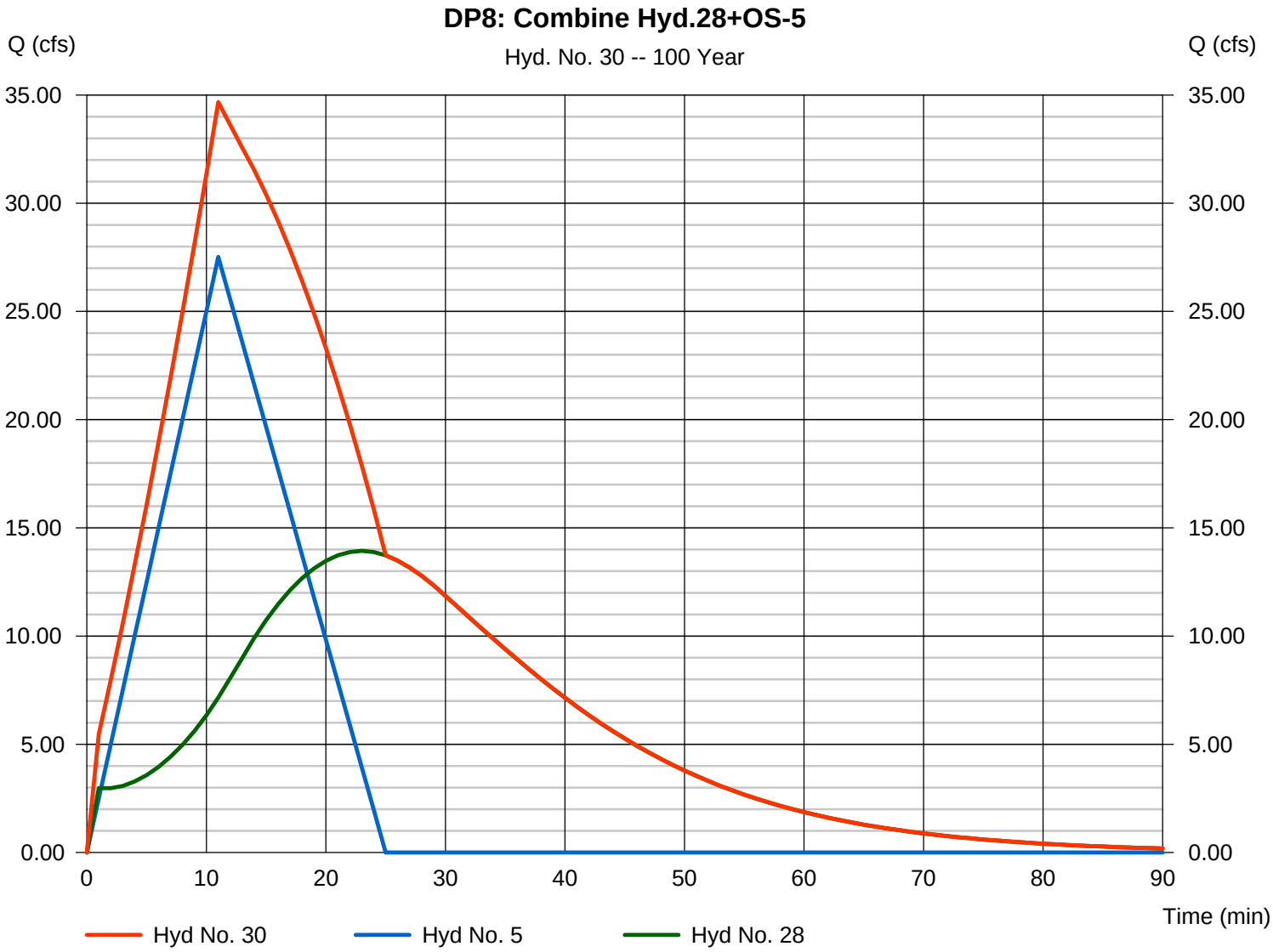
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	34.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	49,138 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



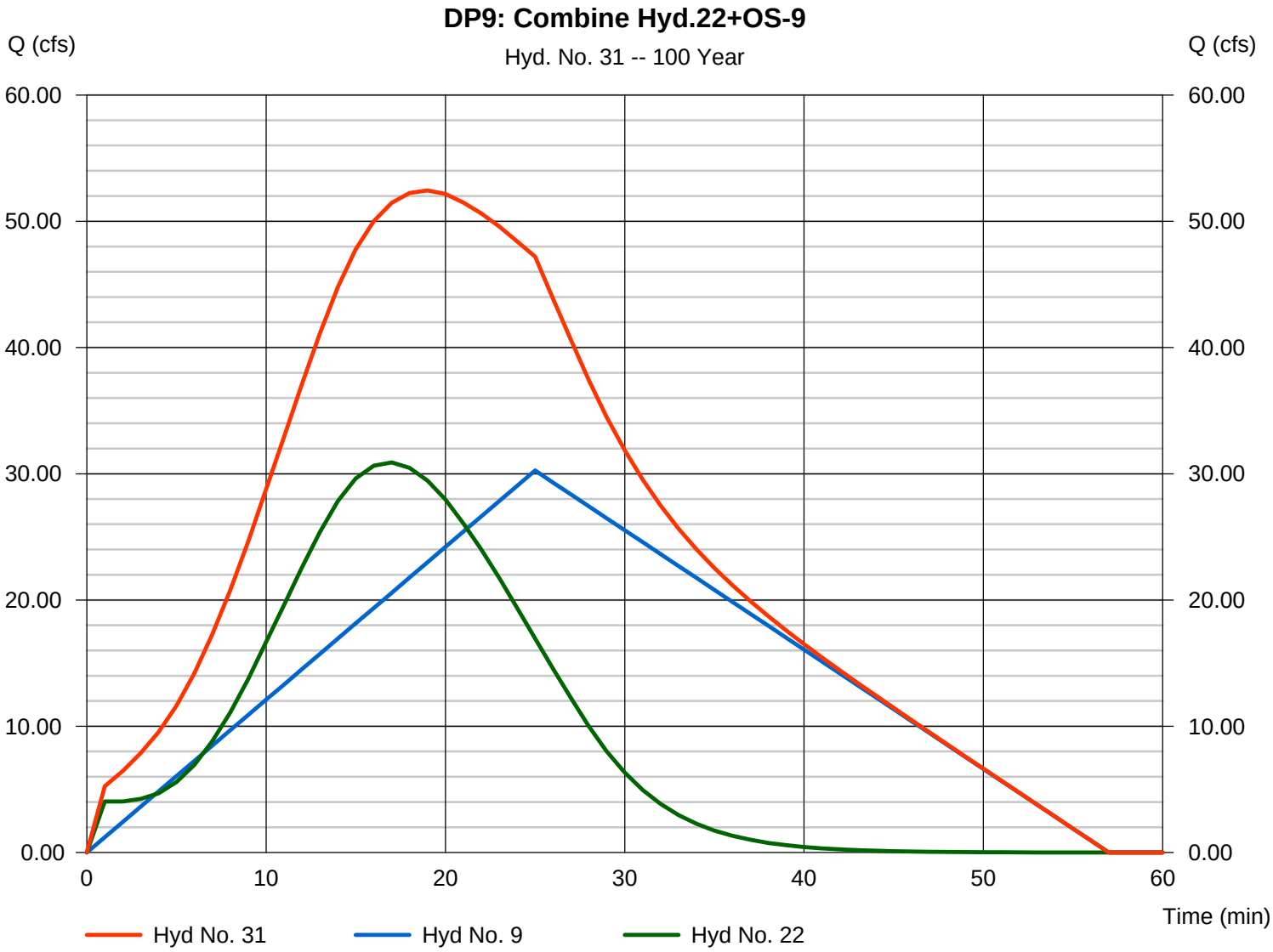
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	= Combine	Peak discharge	= 52.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 19 min
Time interval	= 1 min	Hyd. volume	= 83,819 cuft
Inflow hyds.	= 9, 22	Contrib. drain. area	= 9.450 ac



Hydrograph Report

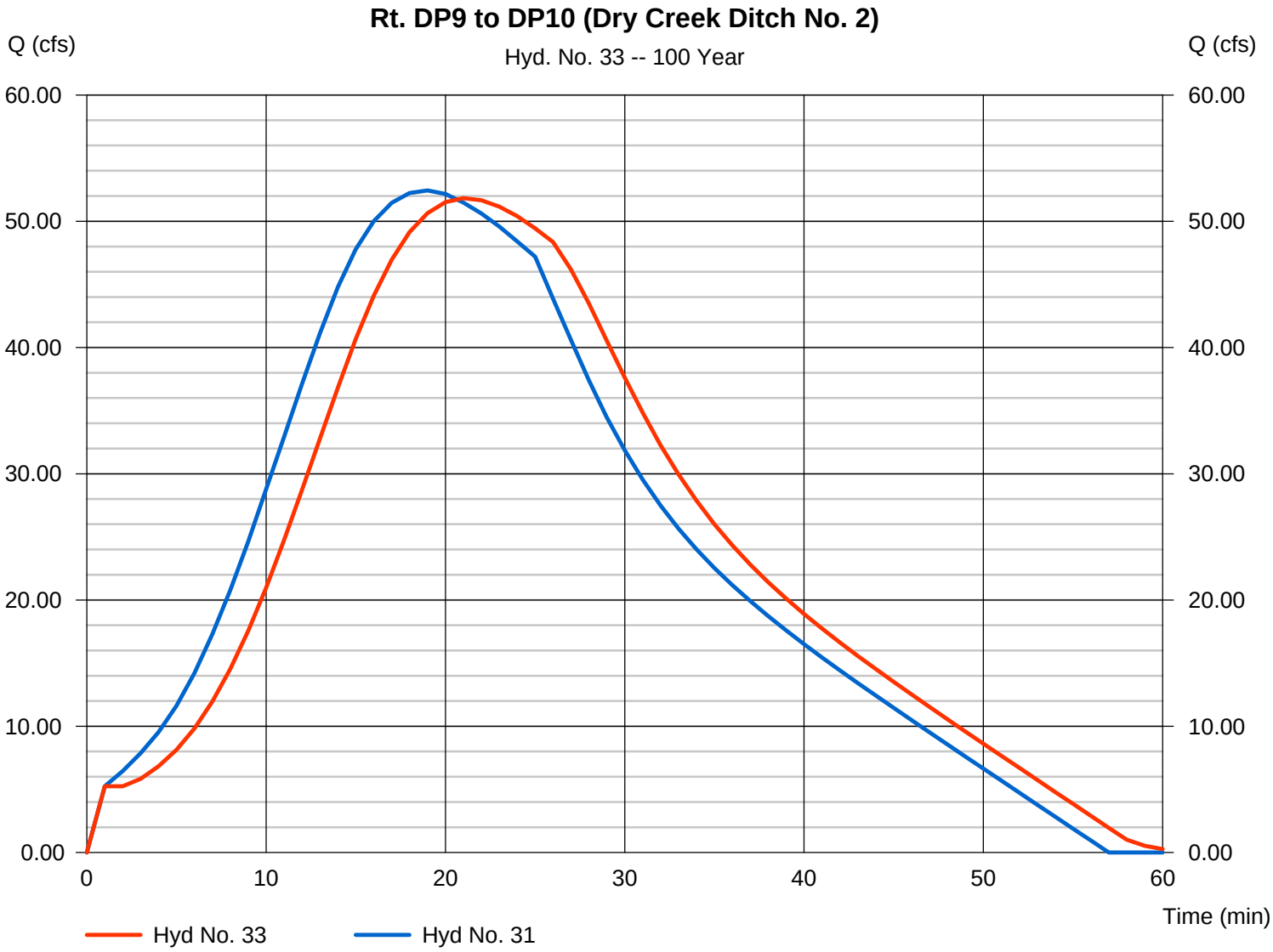
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	51.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	84,469 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.91 ft/s	Routing coeff.	=	0.4839

Modified Att-Kin routing method used.



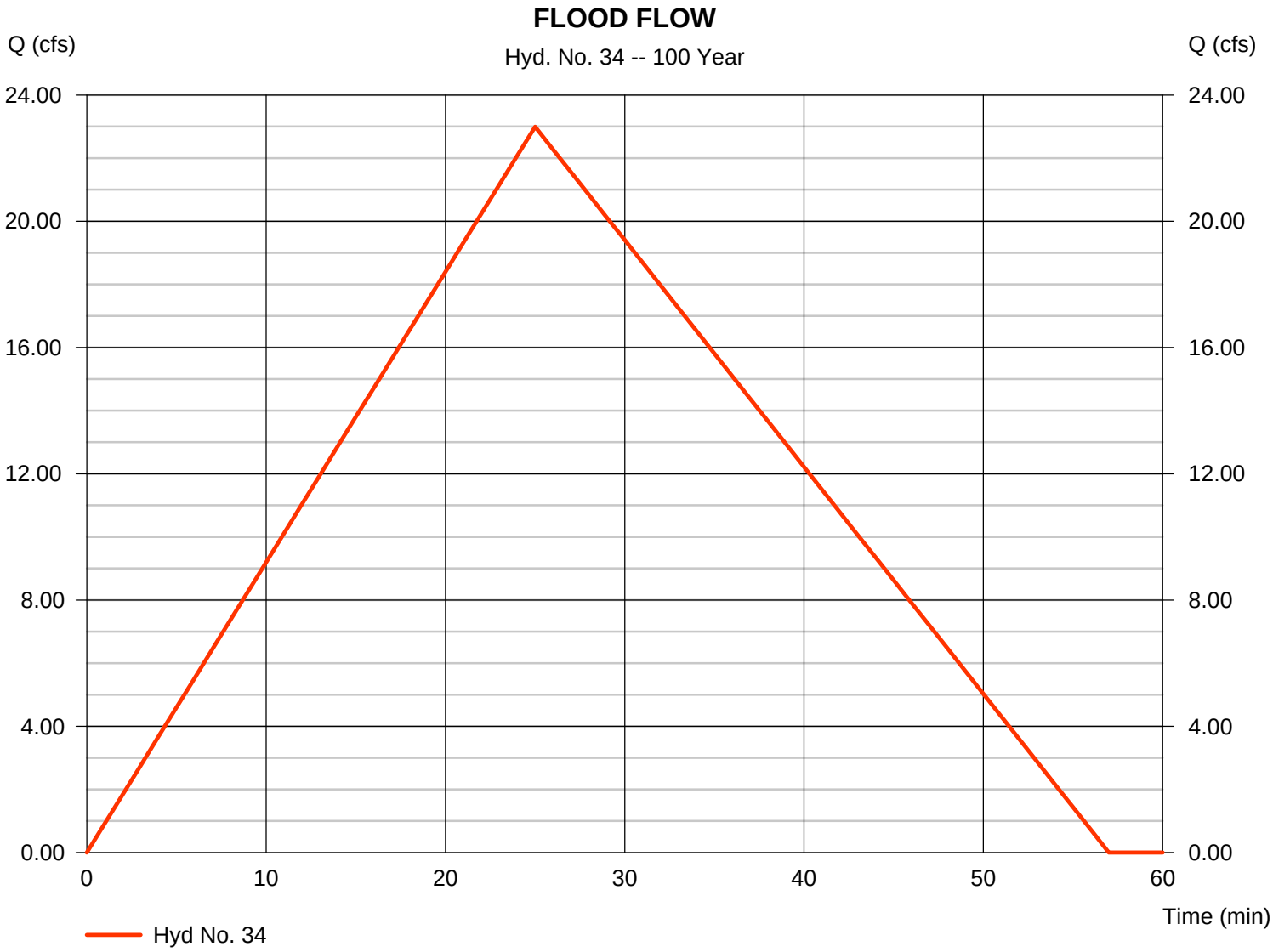
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 34

FLOOD FLOW

Hydrograph type	=	Rational	Peak discharge	=	23.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	39,666 cuft
Drainage area	=	8.140 ac	Runoff coeff.	=	0.6
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



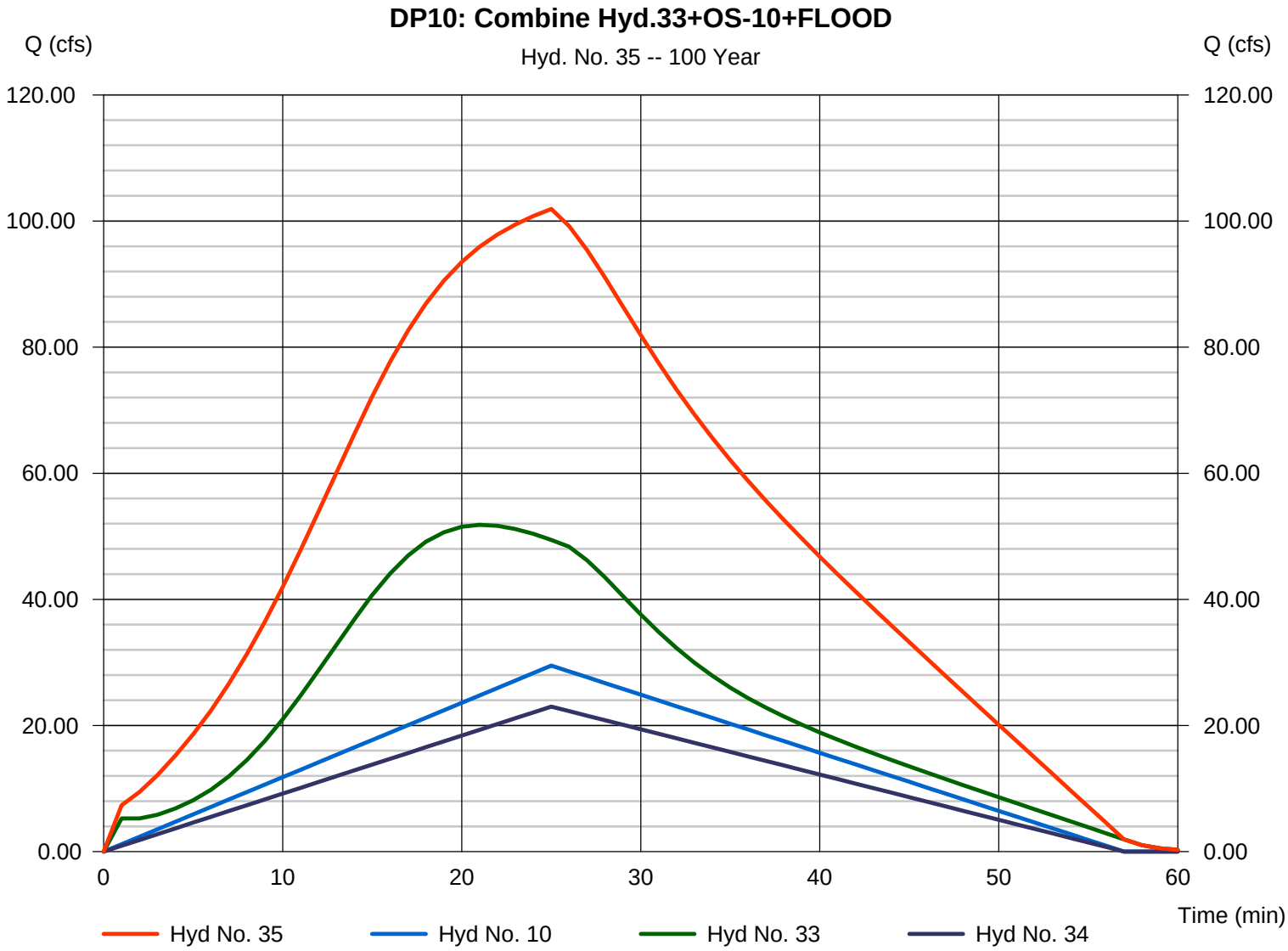
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 35

DP10: Combine Hyd.33+OS-10+FLOOD

Hydrograph type	=	Combine	Peak discharge	=	101.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	174,227 cuft
Inflow hyds.	=	10, 33, 34	Contrib. drain. area	=	17.490 ac



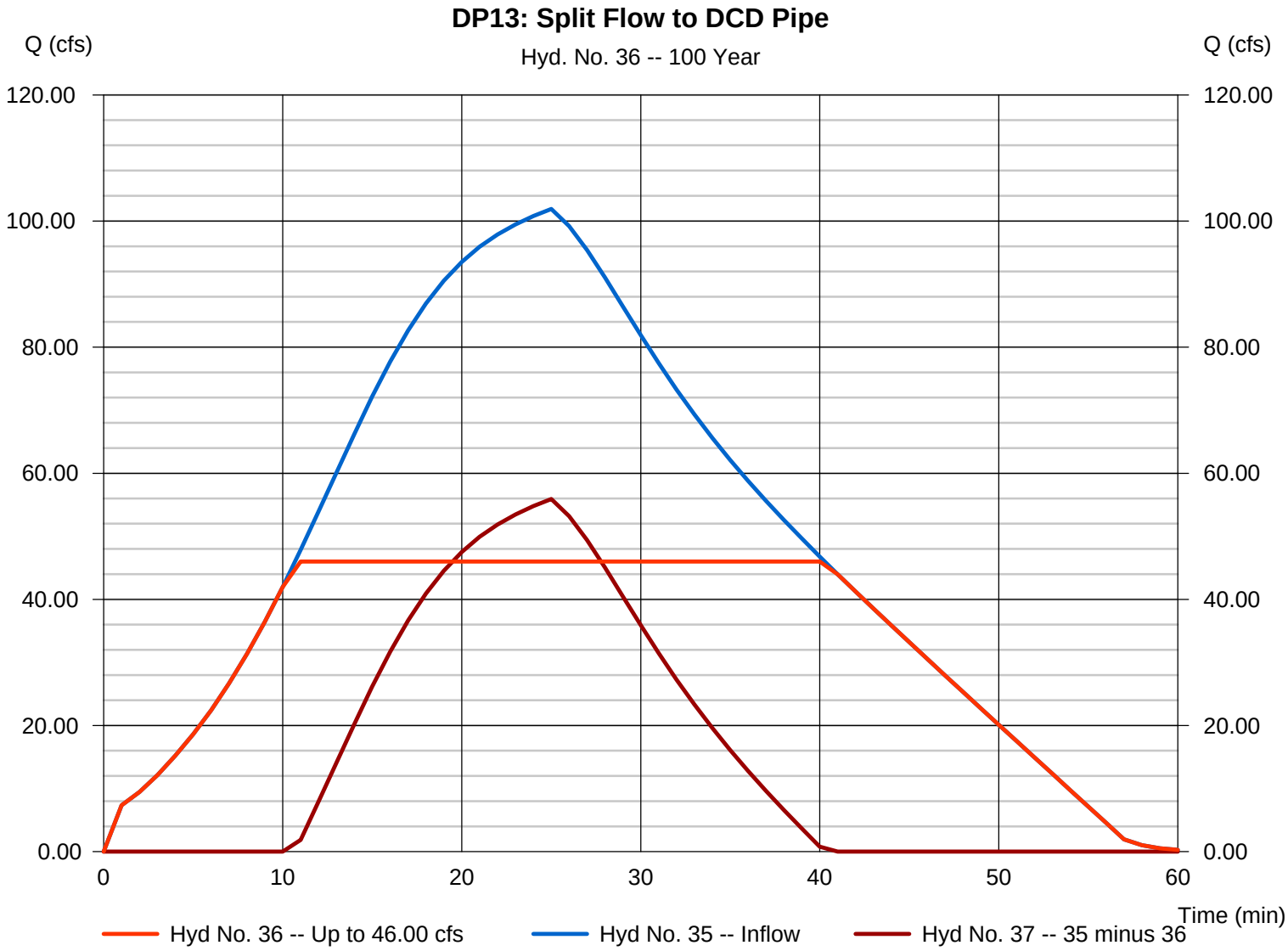
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 36

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	46.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	119,471 cuft
Inflow hydrograph	=	35 - DP10: Combine Hyd.33+OS-10+FLOW	2nd diverted hyd.	=	37
Diversion method	=	Constant Q	Constant Q	=	46.00 cfs



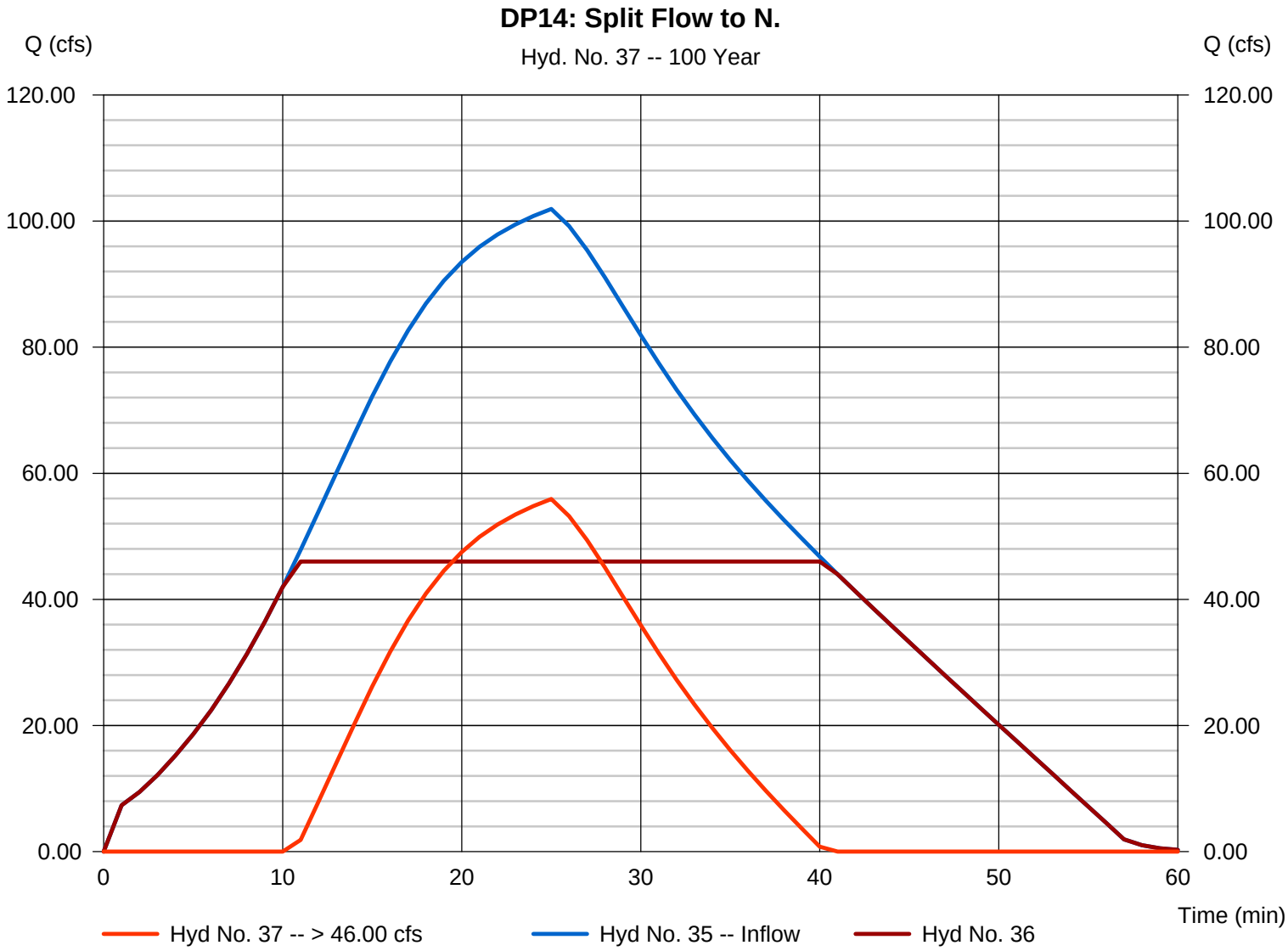
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 37

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	55.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	54,756 cuft
Inflow hydrograph	=	35 - DP10: Combine Hyd.33+OS-10+FLOW	Hyd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	46.00 cfs



Hydrograph Report

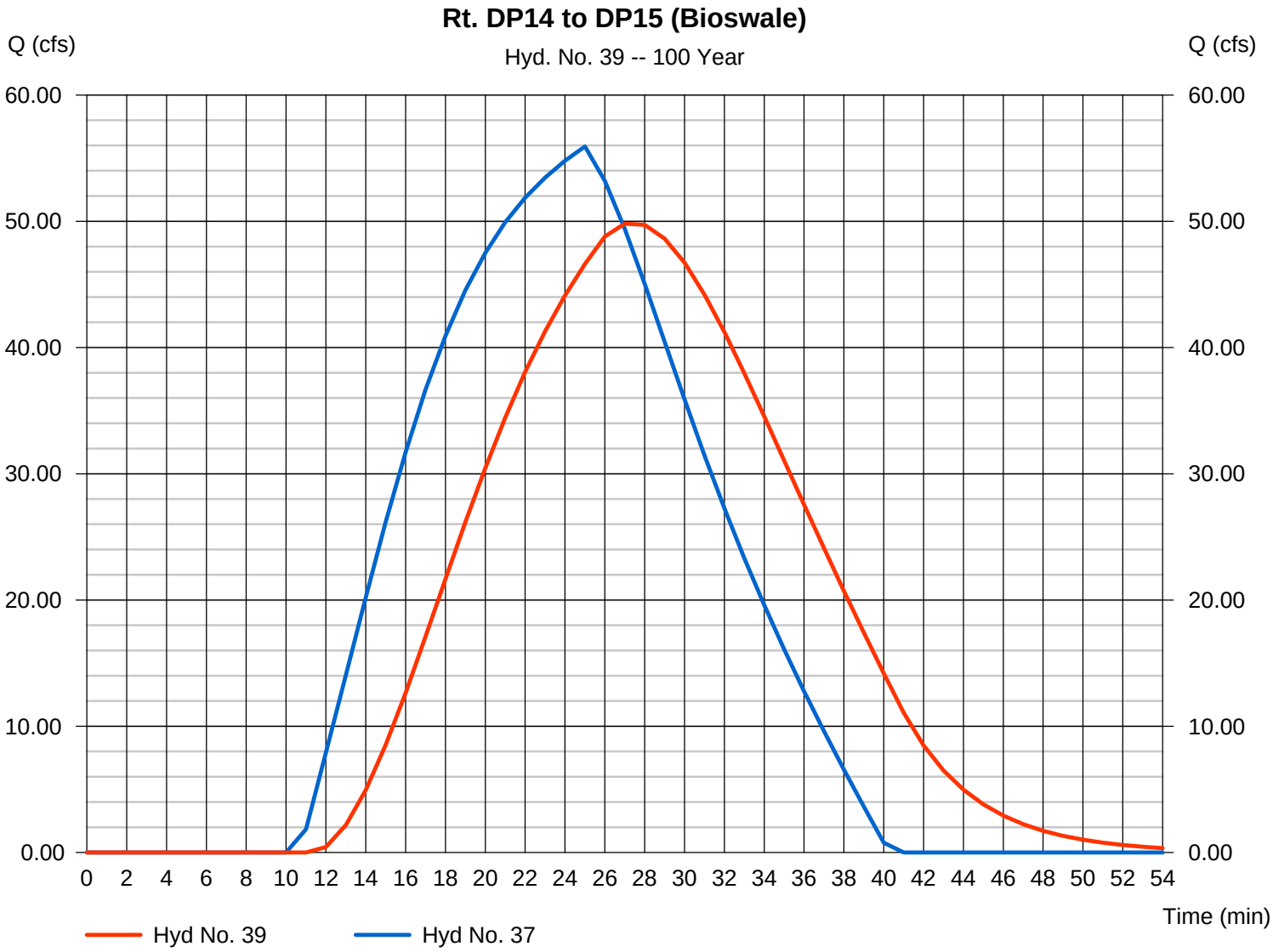
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 39

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	49.82 cfs
Storm frequency	=	100 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	54,754 cuft
Inflow hyd. No.	=	37 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.69 ft/s	Routing coeff.	=	0.2336

Modified Att-Kin routing method used.



Hydrograph Report

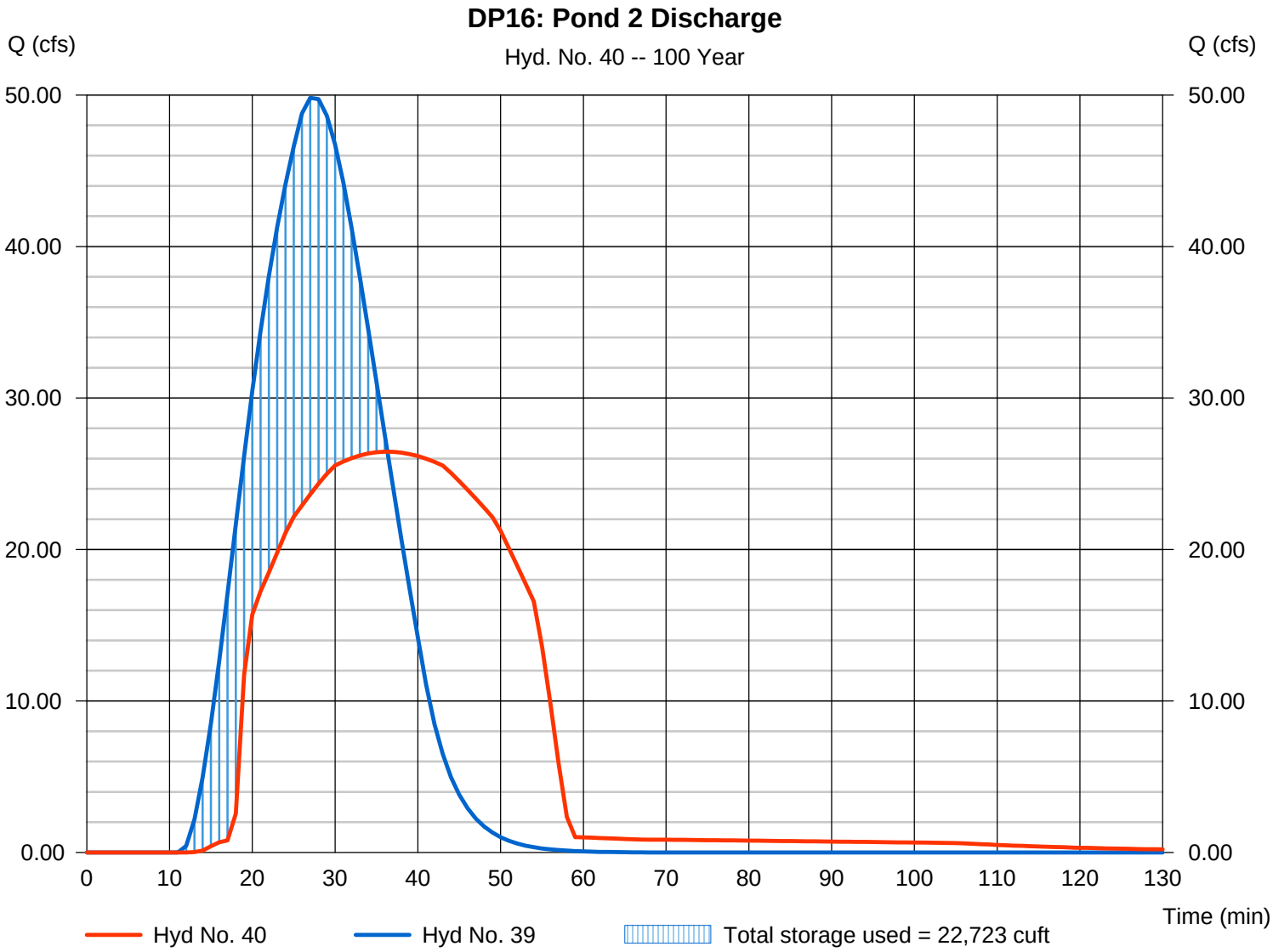
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 40

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	26.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	36 min
Time interval	=	1 min	Hyd. volume	=	54,750 cuft
Inflow hyd. No.	=	39 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5319.17 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	22,723 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,253	4,271	5,230
3.00	5319.00	20,244	13,203	18,433
4.00	5320.00	31,360	25,598	44,031
4.50	5320.50	36,454	16,936	60,967
5.00	5321.00	42,359	19,683	80,649

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

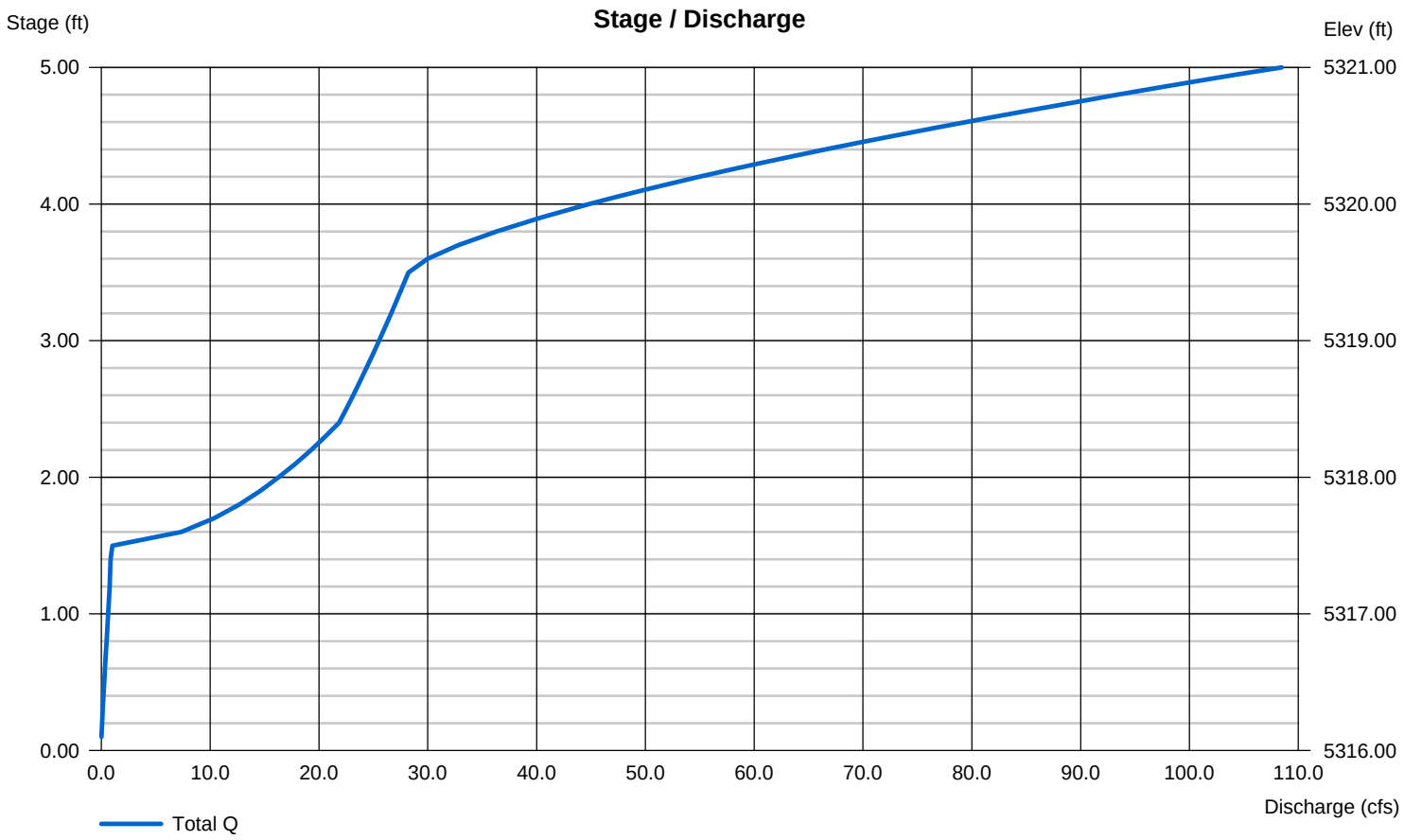
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	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).



Hydrograph Report

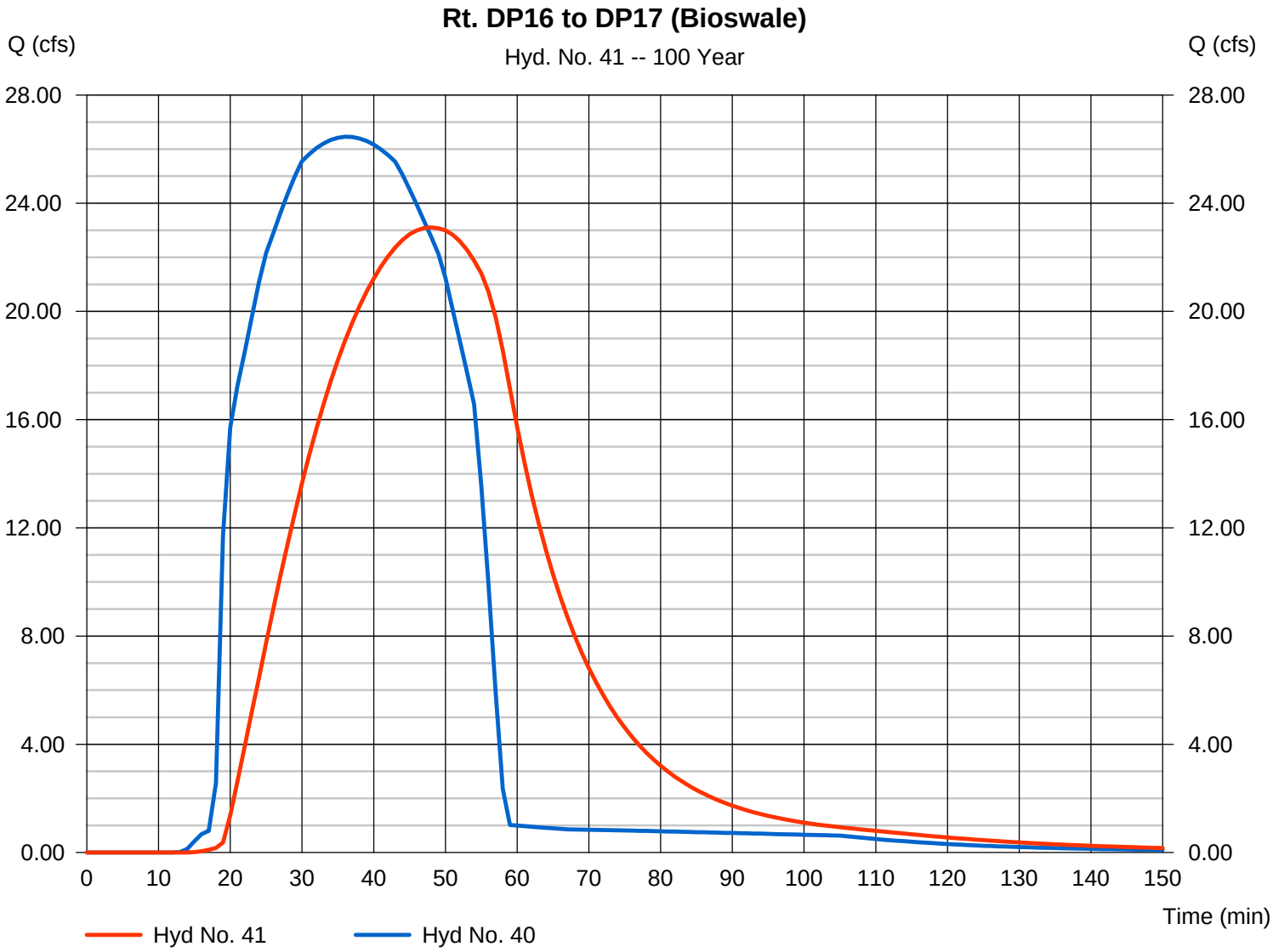
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 41

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	23.11 cfs
Storm frequency	=	100 yrs	Time to peak	=	48 min
Time interval	=	1 min	Hyd. volume	=	54,714 cuft
Inflow hyd. No.	=	40 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.38 ft/s	Routing coeff.	=	0.0877

Modified Att-Kin routing method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 43

A

Hydrograph type	=	Rational	Peak discharge	=	8.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	11,493 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.66
Intensity	=	5.652 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

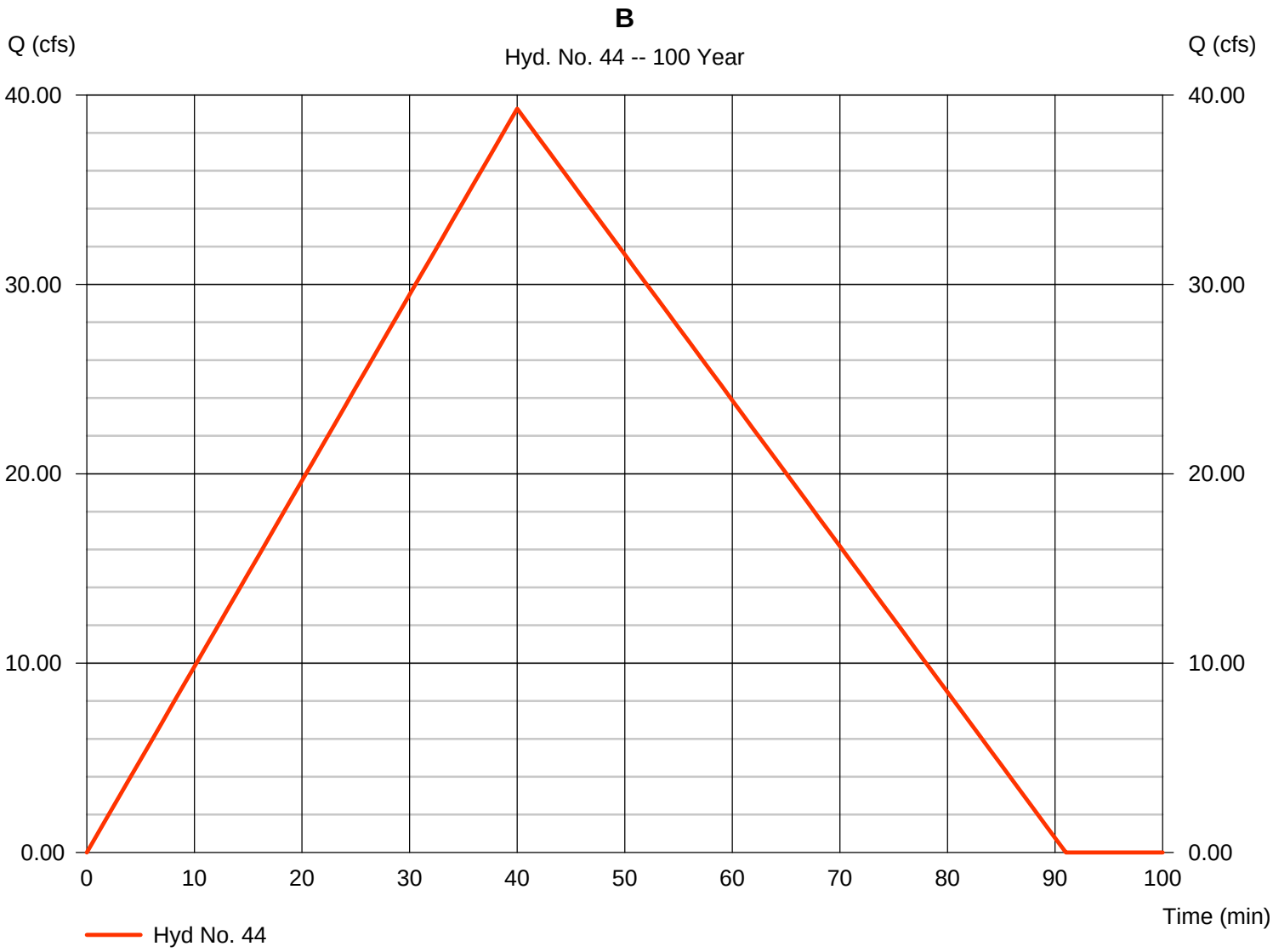
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 44

B

Hydrograph type	=	Rational	Peak discharge	=	39.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	108,409 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.7
Intensity	=	3.378 in/hr	Tc by User	=	40.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



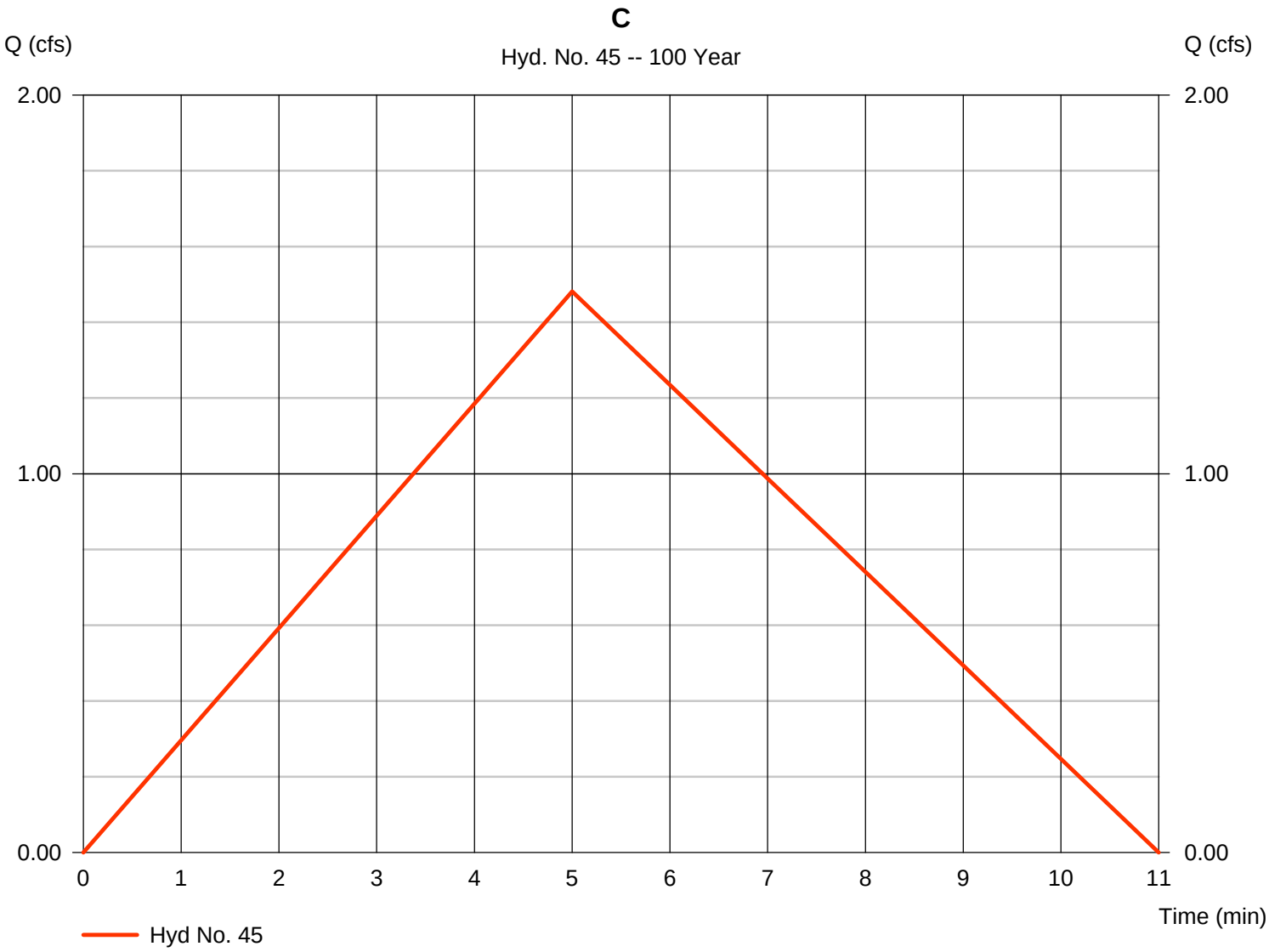
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 45

C

Hydrograph type	=	Rational	Peak discharge	=	1.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.64
Intensity	=	11.574 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



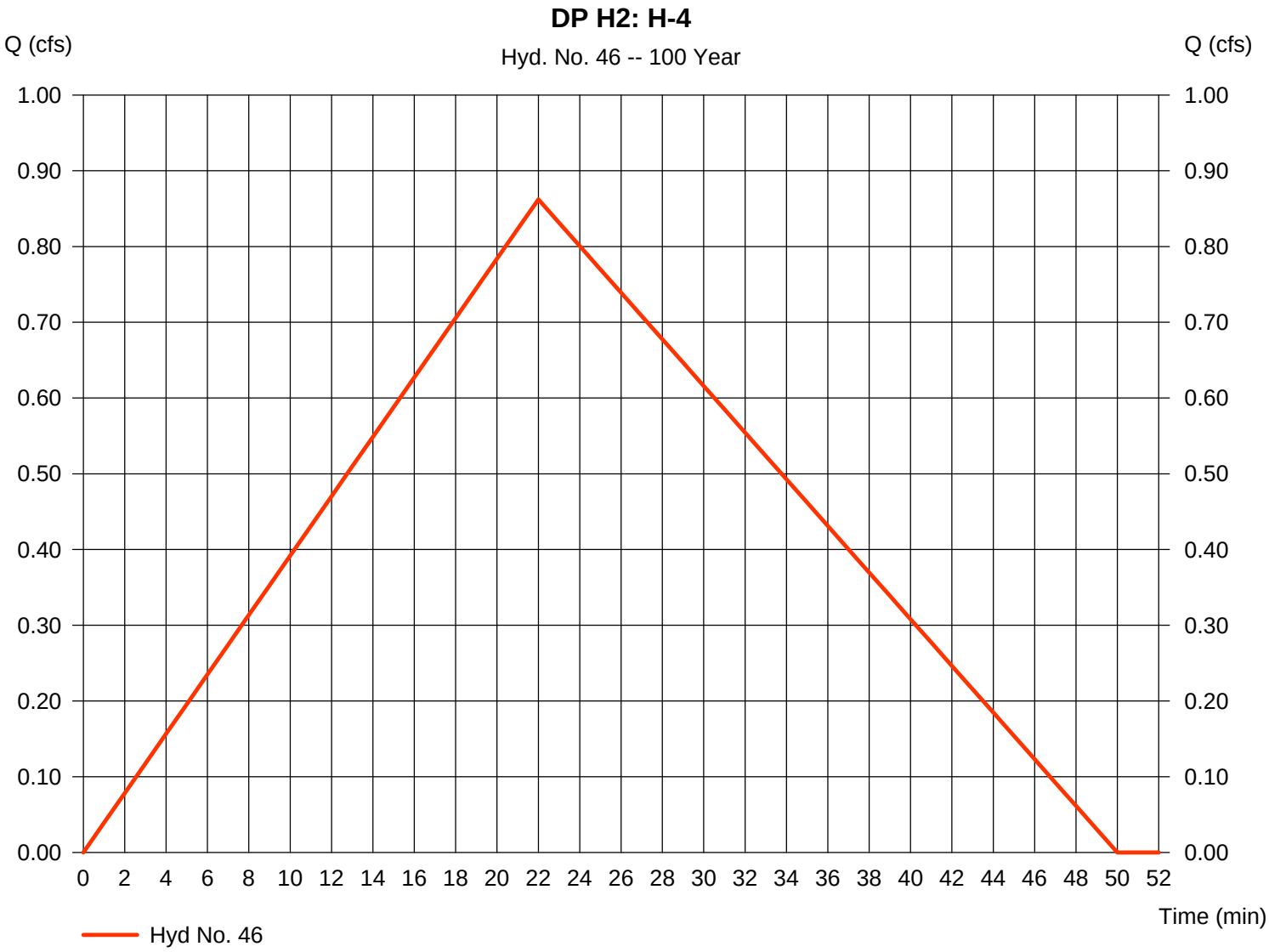
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 46

DP H2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	1,309 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.6
Intensity	=	5.132 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



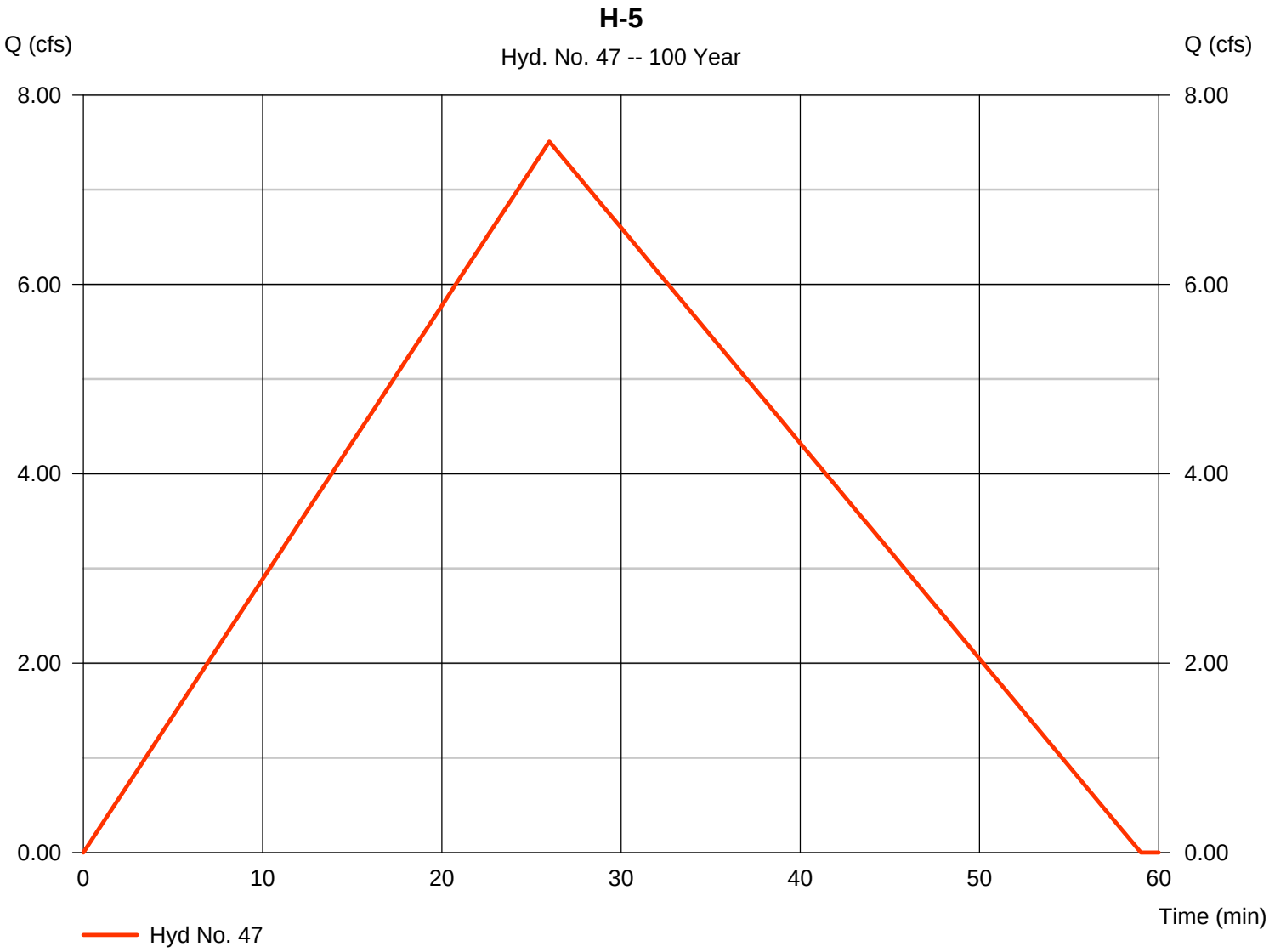
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 47

H-5

Hydrograph type	=	Rational	Peak discharge	=	7.508 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	13,469 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.6
Intensity	=	4.584 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



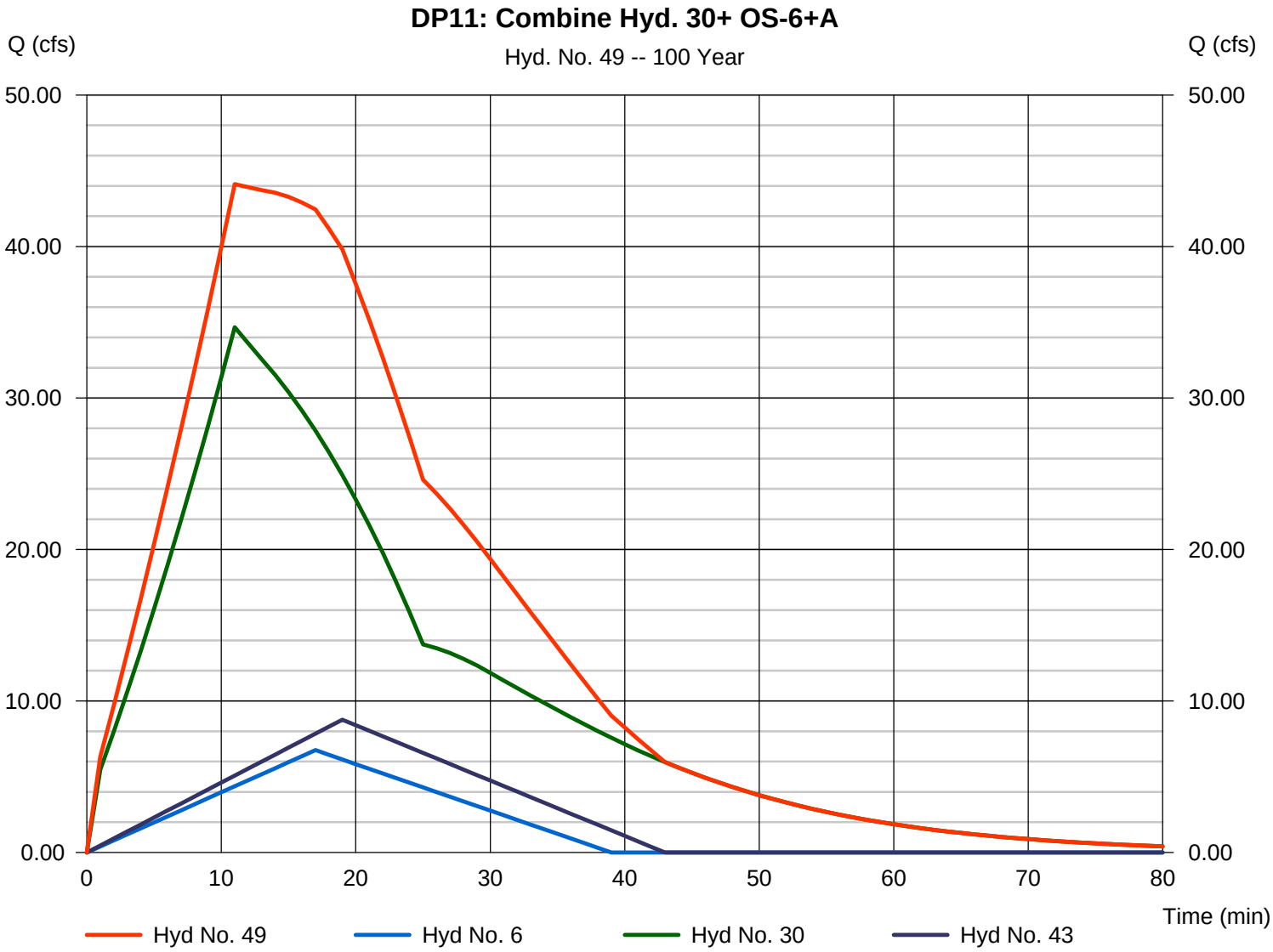
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 49

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	= Combine	Peak discharge	= 44.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 11 min
Time interval	= 1 min	Hyd. volume	= 68,350 cuft
Inflow hyds.	= 6, 30, 43	Contrib. drain. area	= 3.940 ac



Hydrograph Report

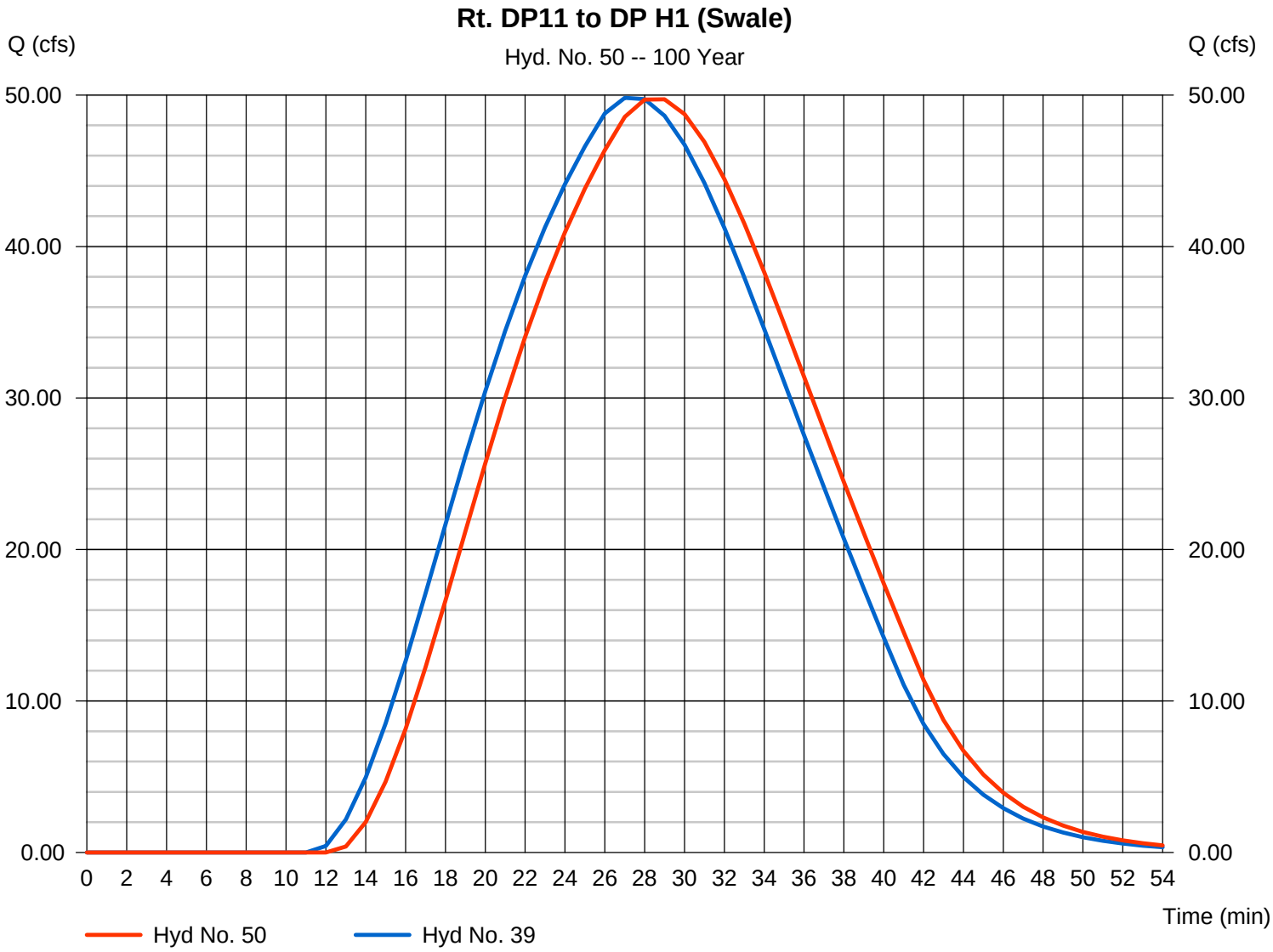
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 50

Rt. DP11 to DP H1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	49.72 cfs
Storm frequency	=	100 yrs	Time to peak	=	29 min
Time interval	=	1 min	Hyd. volume	=	54,754 cuft
Inflow hyd. No.	=	39 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	4.50 ft/s	Routing coeff.	=	0.9065

Modified Att-Kin routing method used.



Hydrograph Report

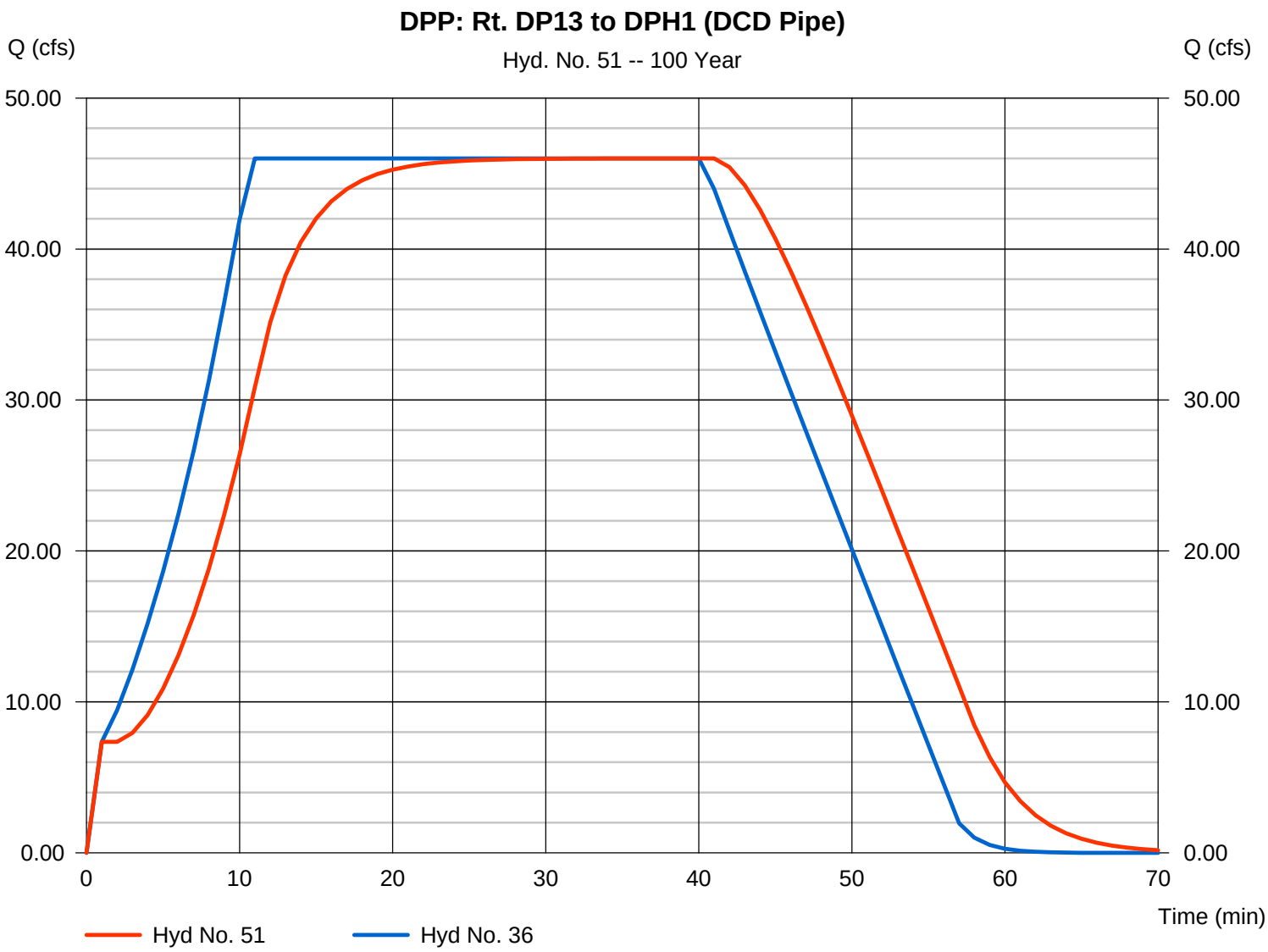
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 51

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	46.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	41 min
Time interval	=	1 min	Hyd. volume	=	121,017 cuft
Inflow hyd. No.	=	36 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	4.78 ft/s	Routing coeff.	=	0.2848

Modified Att-Kin routing method used.



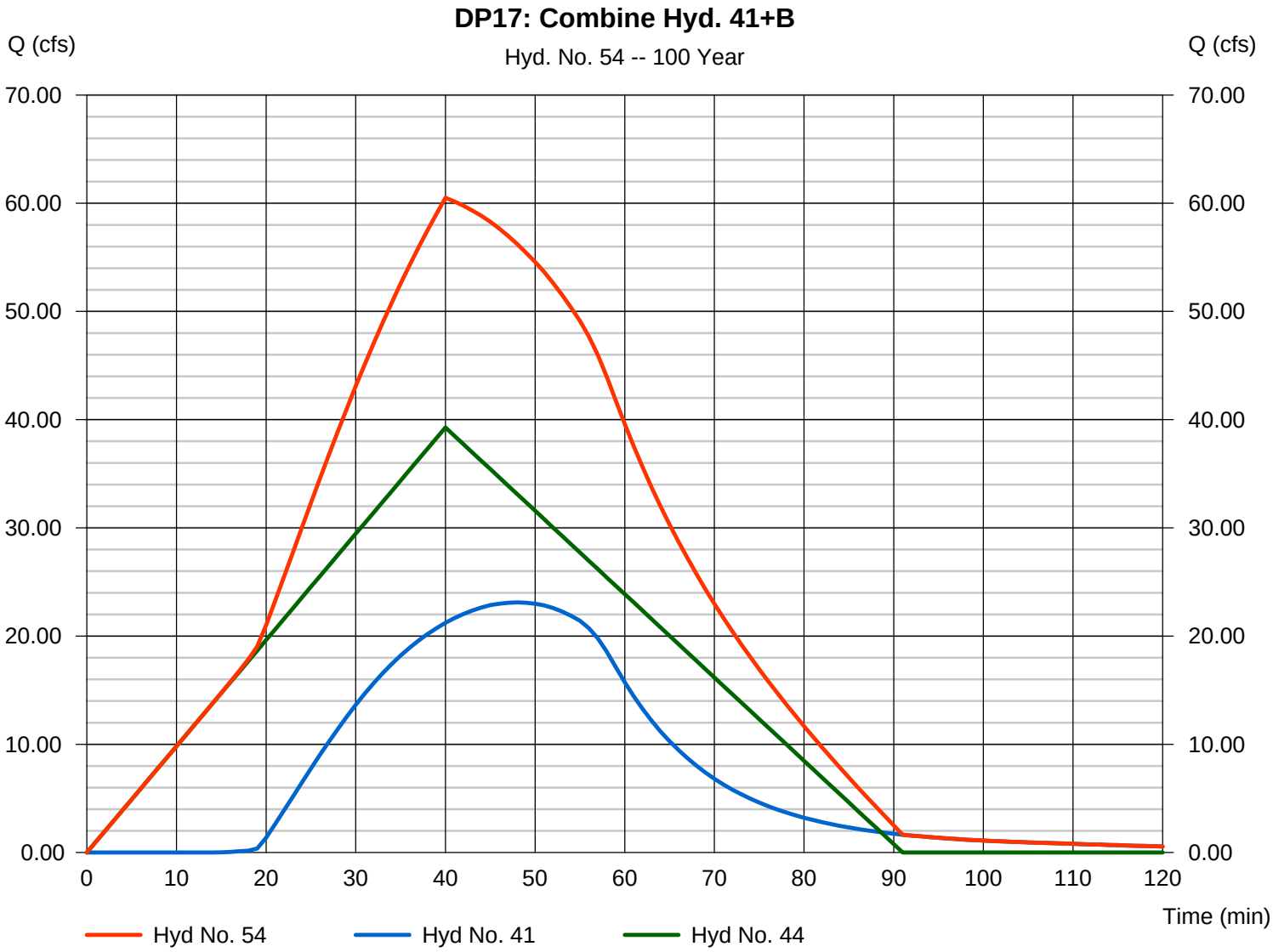
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 54

DP17: Combine Hyd. 41+B

Hydrograph type	=	Combine	Peak discharge	=	60.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	161,945 cuft
Inflow hyds.	=	41, 44	Contrib. drain. area	=	16.610 ac



Hydrograph Report

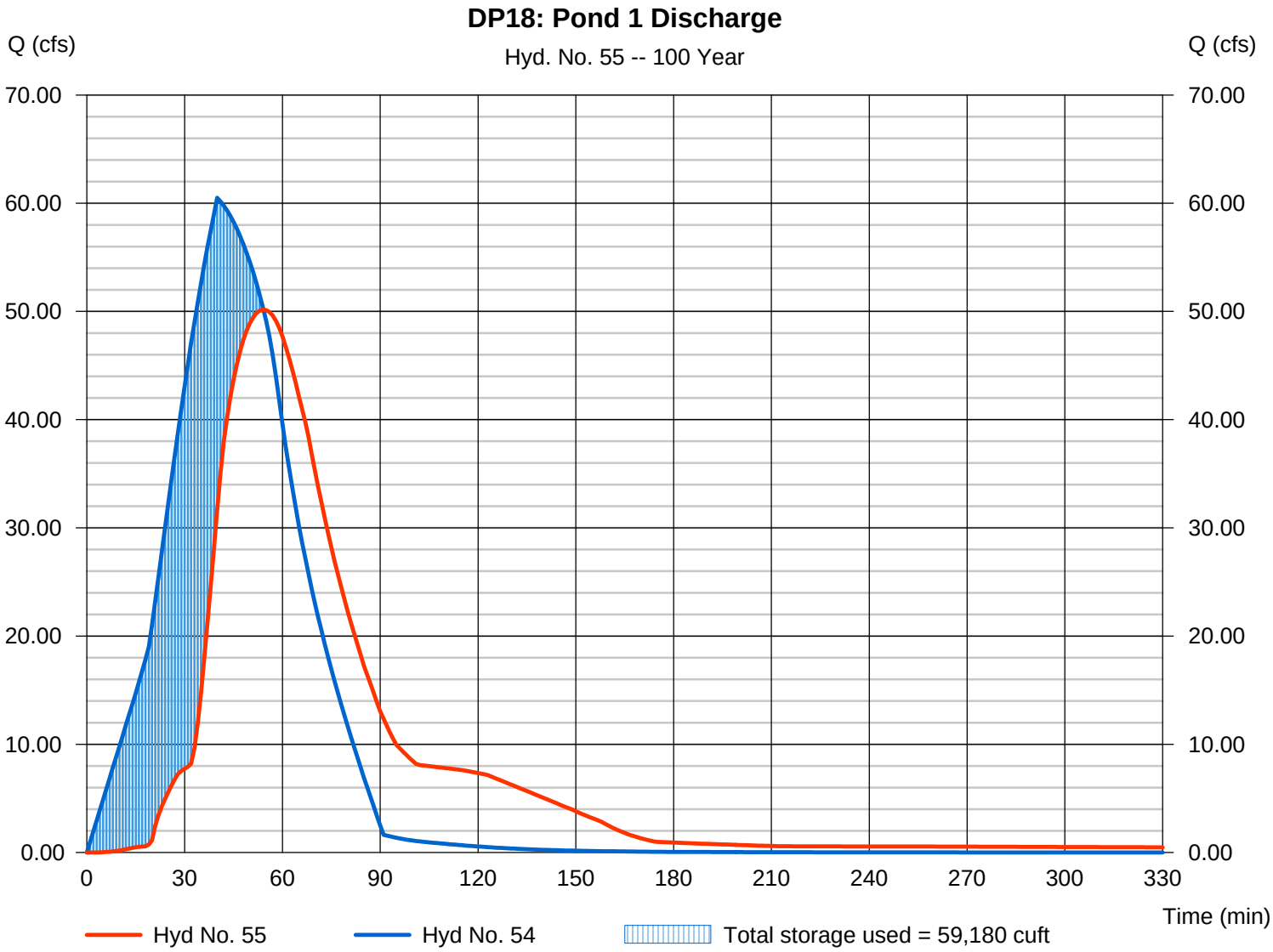
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 55

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	50.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	54 min
Time interval	=	1 min	Hyd. volume	=	161,914 cuft
Inflow hyd. No.	=	54 - DP17: Combine Hyd. 41+B	Max. Elevation	=	5315.16 ft
Reservoir name	=	Detention Pond	Max. Storage	=	59,180 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 1 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

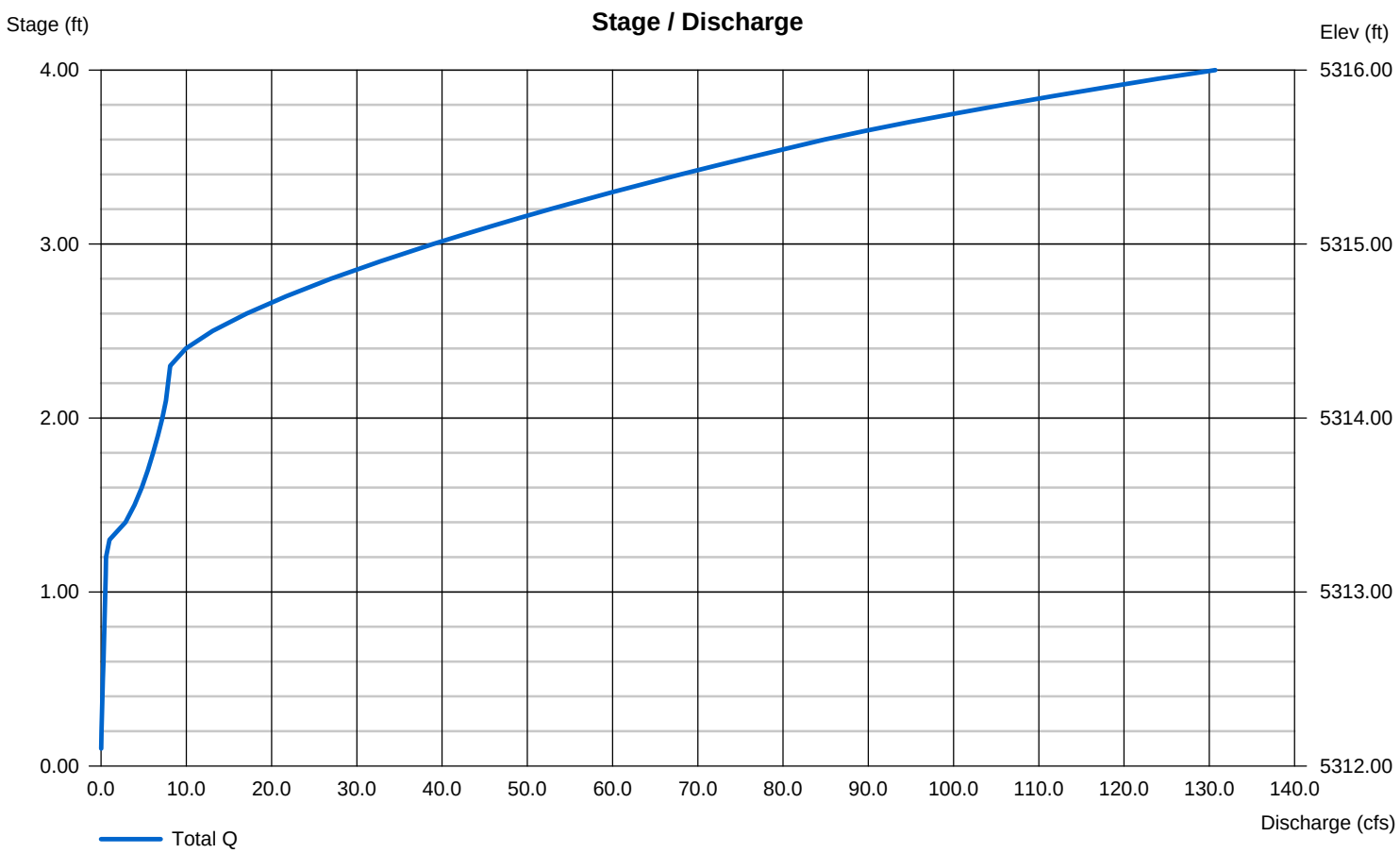
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



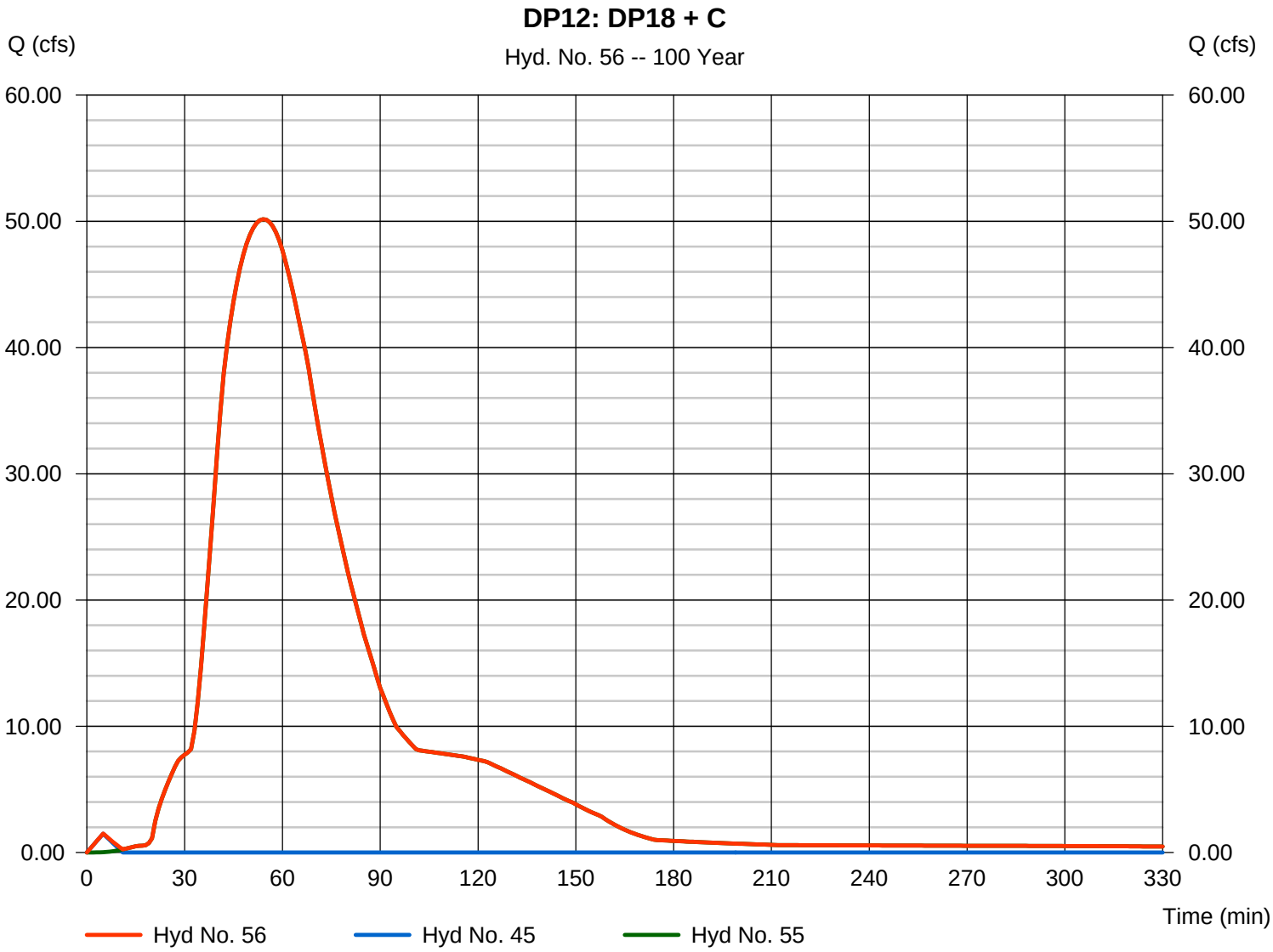
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 56

DP12: DP18 + C

Hydrograph type	=	Combine	Peak discharge	=	50.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	54 min
Time interval	=	1 min	Hyd. volume	=	162,402 cuft
Inflow hyds.	=	45, 55	Contrib. drain. area	=	0.200 ac



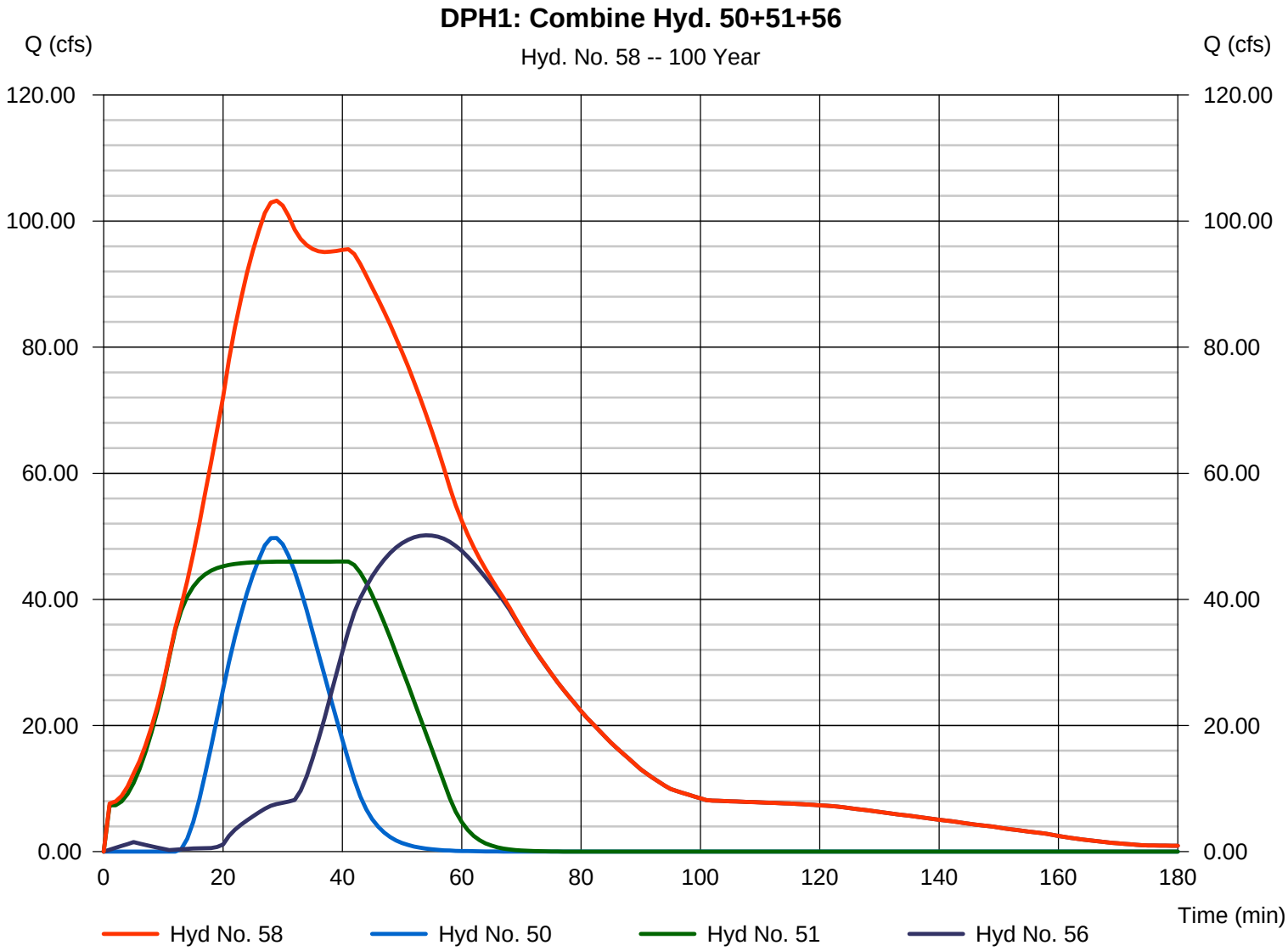
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 58

DPH1: Combine Hyd. 50+51+56

Hydrograph type	=	Combine	Peak discharge	=	103.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	29 min
Time interval	=	1 min	Hyd. volume	=	338,174 cuft
Inflow hyds.	=	50, 51, 56	Contrib. drain. area	=	0.000 ac



Hydrograph Report

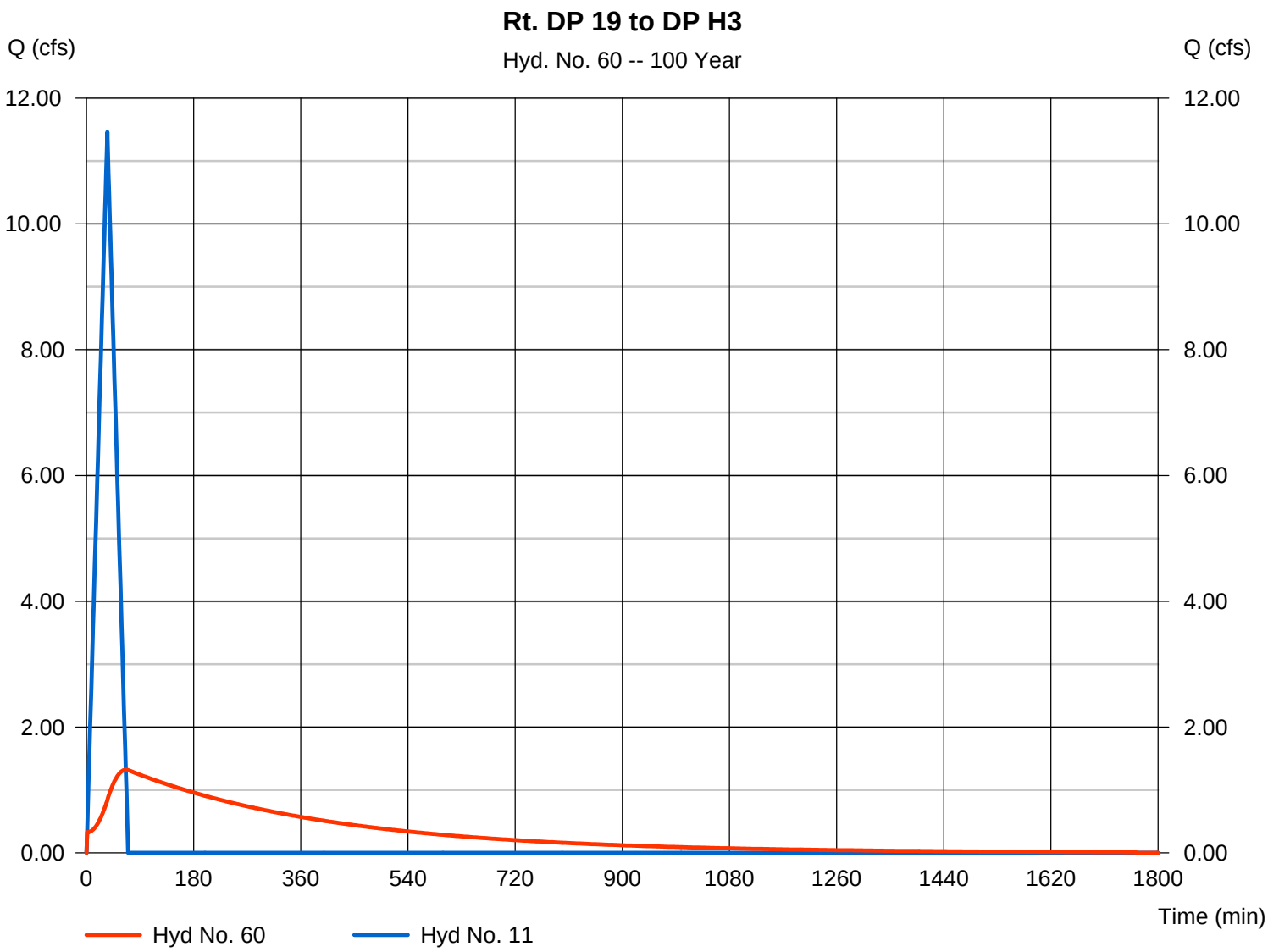
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 60

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	1.321 cfs
Storm frequency	=	100 yrs	Time to peak	=	66 min
Time interval	=	1 min	Hyd. volume	=	30,687 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.03 ft/s	Routing coeff.	=	0.0029

Modified Att-Kin routing method used.



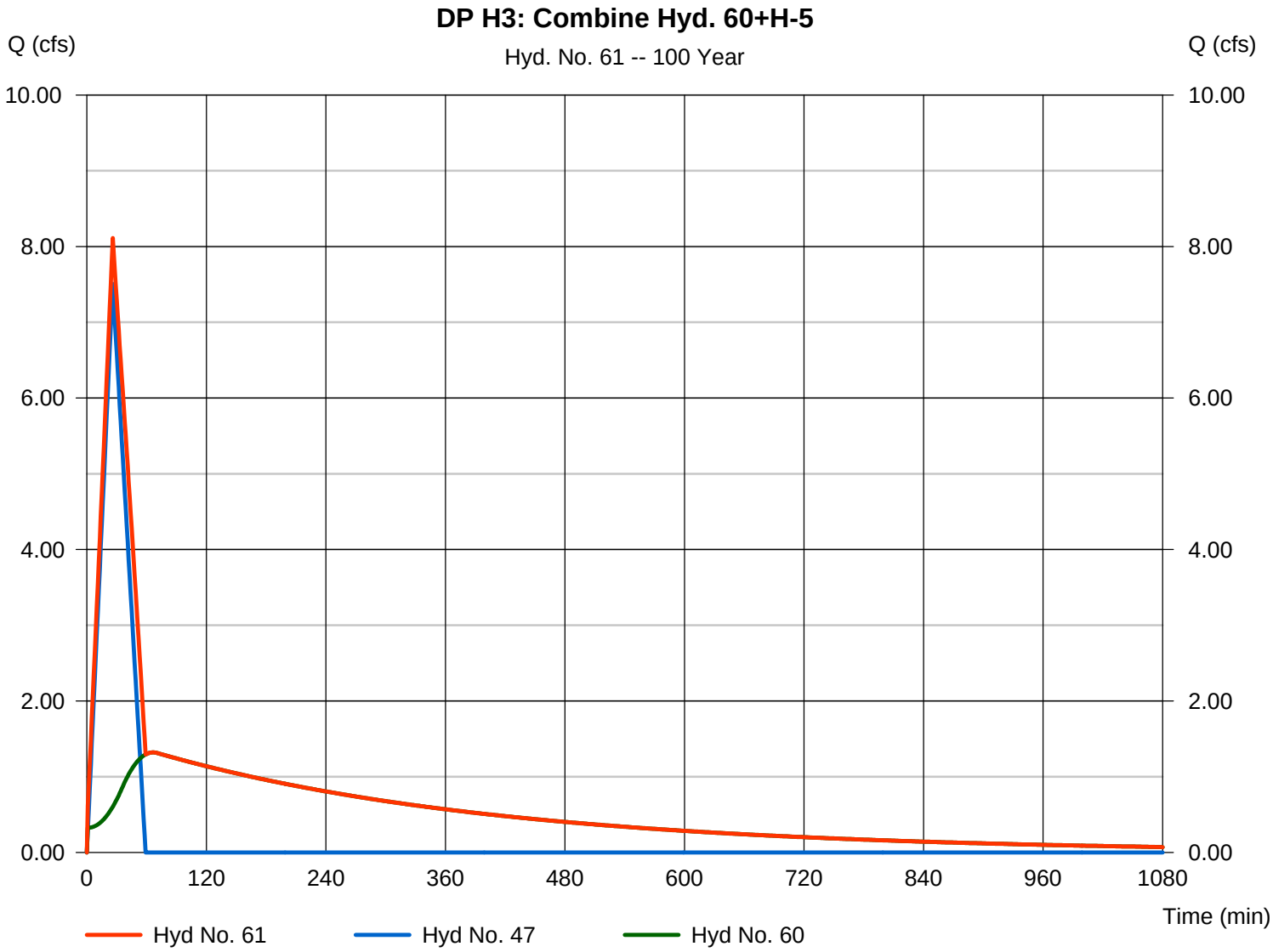
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 61

DP H3: Combine Hyd. 60+H-5

Hydrograph type	=	Combine	Peak discharge	=	8.112 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	43,976 cuft
Inflow hyds.	=	47, 60	Contrib. drain. area	=	2.730 ac



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54951-DEV-100YR(irr=71+fld).gpw

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	Rational	49.34	1	11	37,451	------	------	------	OS-1
2	Rational	24.60	1	10	16,975	------	------	------	OS-2
3	Rational	4.250	1	12	3,519	------	------	------	OS-3
4	Rational	15.32	1	13	13,744	------	------	------	OS-4
5	Rational	27.51	1	11	20,884	------	------	------	OS-5
6	Rational	6.755	1	17	7,924	------	------	------	OS-6
7	Rational	7.995	1	11	6,068	------	------	------	OS-7
8	Rational	7.012	1	9	4,355	------	------	------	OS-8
9	Rational	30.26	1	25	52,190	------	------	------	OS-9
10	Rational	29.49	1	25	50,878	------	------	------	OS-10
11	Rational	11.46	1	35	27,676	------	------	------	DP 19: OS-11
13	Reach	49.15	1	12	37,287	1	------	------	Rt. OS-1 to DP1 (aphalt/conc. channe
14	Combine	69.65	1	12	53,524	2, 13	------	------	DP1: Combine Hyd.13+OS-2
16	Reach	58.26	1	15	55,180	14	------	------	Rt. DP 1 to DP 2 (Manhatten Dr. Gutt
17	Combine	65.57	1	14	62,830	3, 8, 16	------	------	DP2: Combine Hyd.16+OS-3+OS-8
18	Diversion1	32.78	1	14	31,415	17	------	------	DP3: Split Flow N. (Manhatten Dr. Gu
19	Diversion2	32.78	1	14	31,415	17	------	------	DP4: Split Flow E. (Illini Way Gutter Fl
21	Reach	20.28	1	22	34,490	18	------	------	Rt. DP3 to DP 5 (Manhatten Dr. Gutte
22	Reach	30.89	1	17	32,083	19	------	------	Rt. DP4 to DP9 (Illini Way Gutter Flo
24	Combine	34.72	1	14	53,817	4, 7, 21,	------	------	DP5: Combine Hyd.21+OS-4+OS-7
25	Diversion1	17.36	1	14	26,908	24	------	------	DP6: Split Flow N. (Manhatten Dr. Gu
26	Diversion2	17.36	1	14	26,908	24	------	------	DP7: Split Flow NE (Cimmaron Way
28	Reach	13.94	1	23	28,502	26	------	------	Rt. DP7 to DP8 (Cimmaron Way/Kew
30	Combine	34.67	1	11	49,138	5, 28,	------	------	DP8: Combine Hyd.28+OS-5
31	Combine	52.44	1	19	83,819	9, 22,	------	------	DP9: Combine Hyd.22+OS-9
33	Reach	51.83	1	21	84,469	31	------	------	Rt. DP9 to DP10 (Dry Creek Ditch No
34	Rational	23.00	1	25	39,666	------	------	------	FLOOD
35	Combine	101.92	1	25	174,227	10, 33, 34	------	------	DP10: Combine Hyd.33+OS-10+FLO
36	Diversion1	0.000	1	1	0	35	------	------	DP13: Split Flow to DCD Pipe
37	Diversion2	101.92	1	25	174,226	35	------	------	DP14: Split Flow to N.
39	Reach	97.05	1	27	175,868	37	------	------	Rt. DP14 to DP15 (Bioswale)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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
40	Reservoir	70.20	1	37	175,864	39	5320.46	59,574	DP16: Pond 2 Discharge
41	Reach	61.10	1	45	175,873	40	------	------	Rt. DP16 to DP17 (Bioswale)
43	Rational	8.766	1	19	11,493	------	------	------	A
44	Rational	39.28	1	40	108,409	------	------	------	B
45	Rational	1.481	1	5	511	------	------	------	C
46	Rational	0.862	1	22	1,309	------	------	------	DP H2: H-4
47	Rational	7.508	1	26	13,469	------	------	------	H-5
49	Combine	44.12	1	11	68,350	6, 30, 43,	------	------	DP11: Combine Hyd. 30+ OS-6+A
50	Reach	97.04	1	28	176,315	39	------	------	Rt. DP11 to DP H1 (Swale)
51	Reach	0.000	1	1	0	36	------	------	DPP: Rt. DP13 to DPH1 (DCD Pipe)
53	Combine	97.60	1	42	283,104	41, 44,	------	------	DP17: Combine Hyd. 41+B
54	Reservoir	86.41	1	52	283,072	53	5315.62	77,111	DP18: Pond 1 Discharge
55	Combine	86.41	1	52	283,561	45, 54	------	------	DP12: DP18 + C
57	Combine	125.66	1	44	459,875	50, 51, 55,	------	------	DPH1: Combine Hyd. 50+51+55
59	Reach	1.351	1	75	34,803	11	------	------	Rt. DP 19 to DP H3
60	Combine	8.087	1	26	48,092	47, 59	------	------	DP H3: Combine Hyd. 59+H5

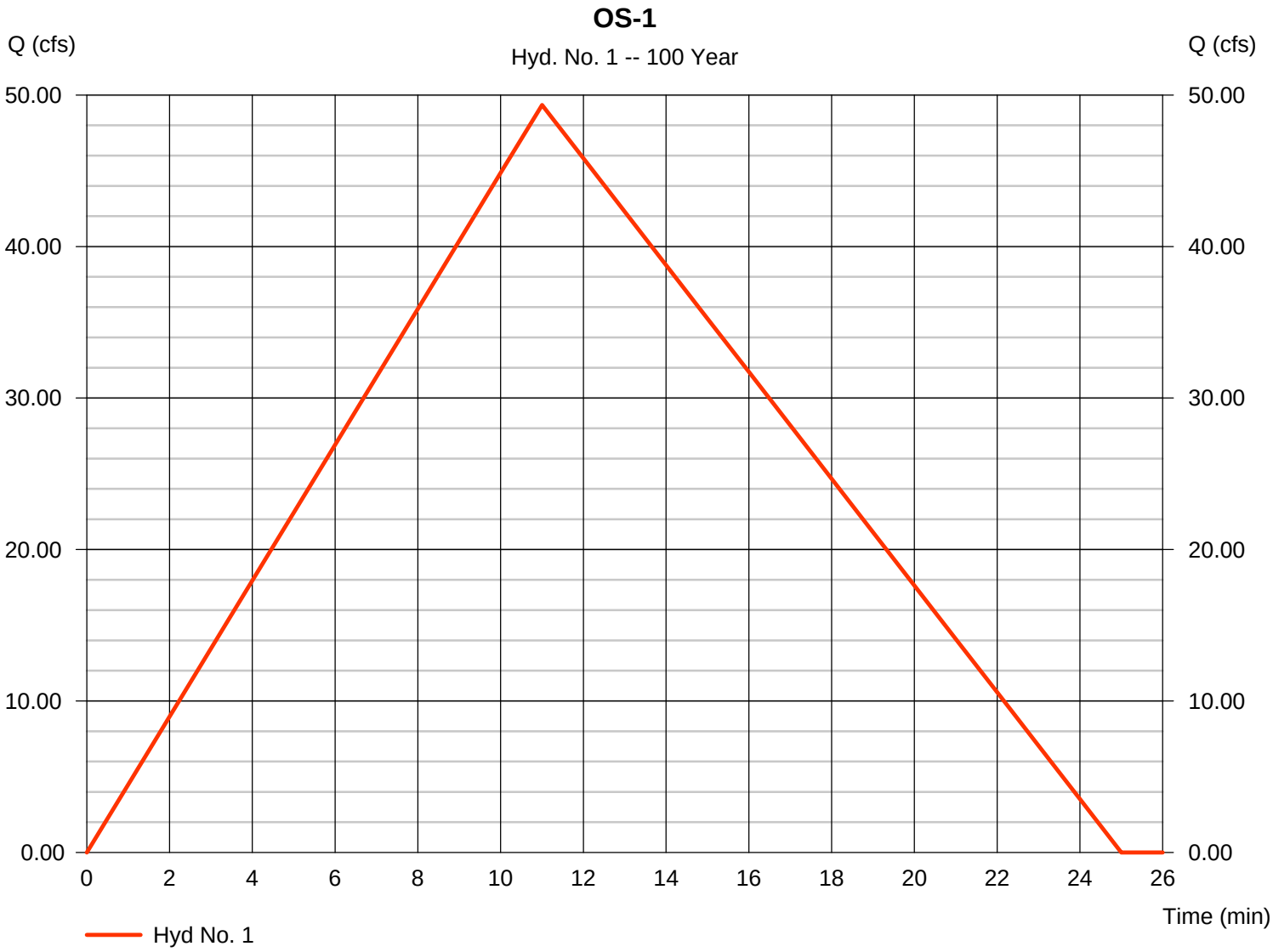
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 1

OS-1

Hydrograph type	=	Rational	Peak discharge	=	49.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	37,451 cuft
Drainage area	=	7.830 ac	Runoff coeff.	=	0.8
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 2

OS-2

Hydrograph type	=	Rational	Peak discharge	=	24.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	16,975 cuft
Drainage area	=	3.220 ac	Runoff coeff.	=	0.92
Intensity	=	8.305 in/hr	Tc by User	=	10.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

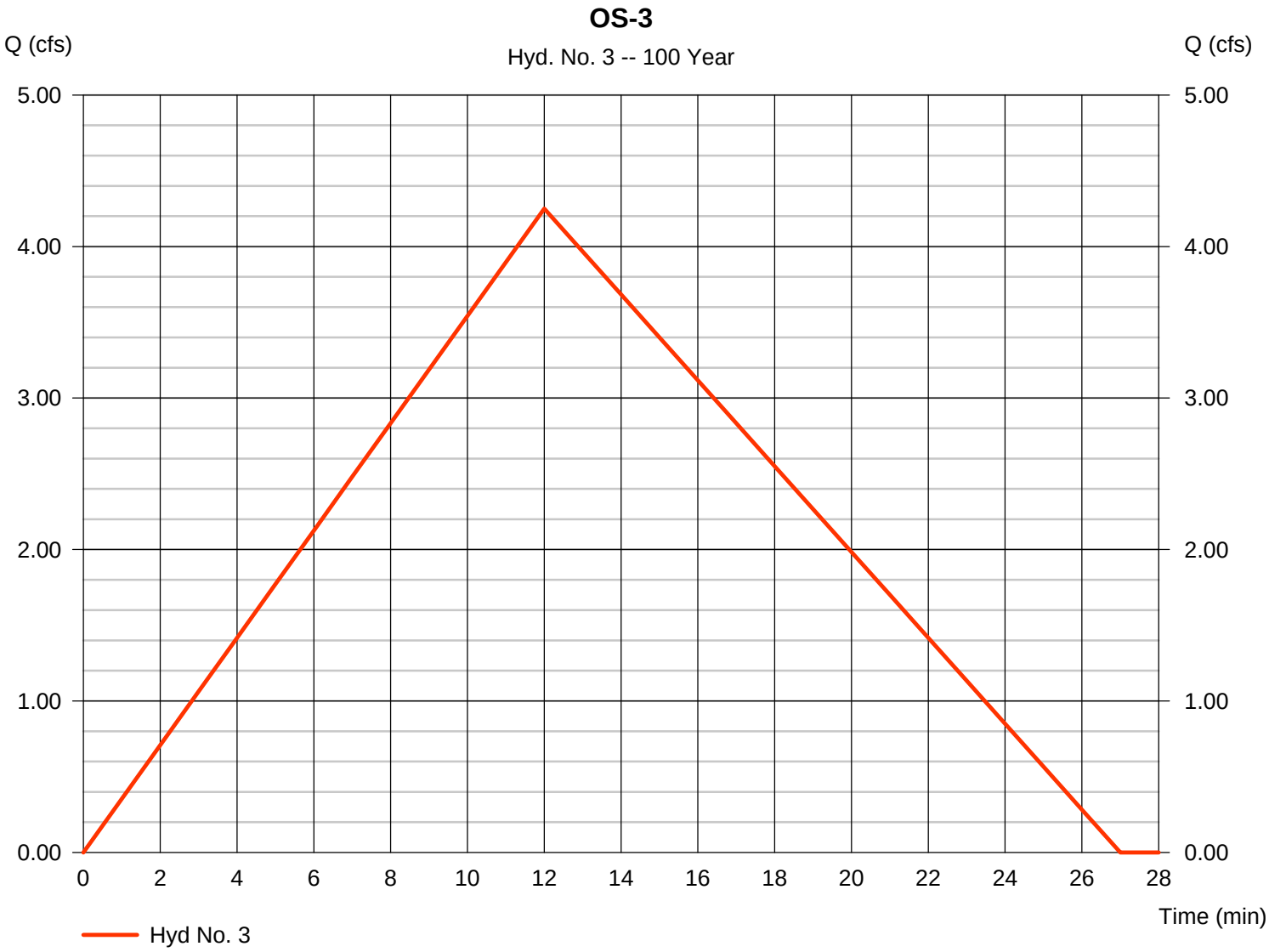
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 3

OS-3

Hydrograph type	=	Rational	Peak discharge	=	4.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,519 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.7
Intensity	=	7.496 in/hr	Tc by User	=	12.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



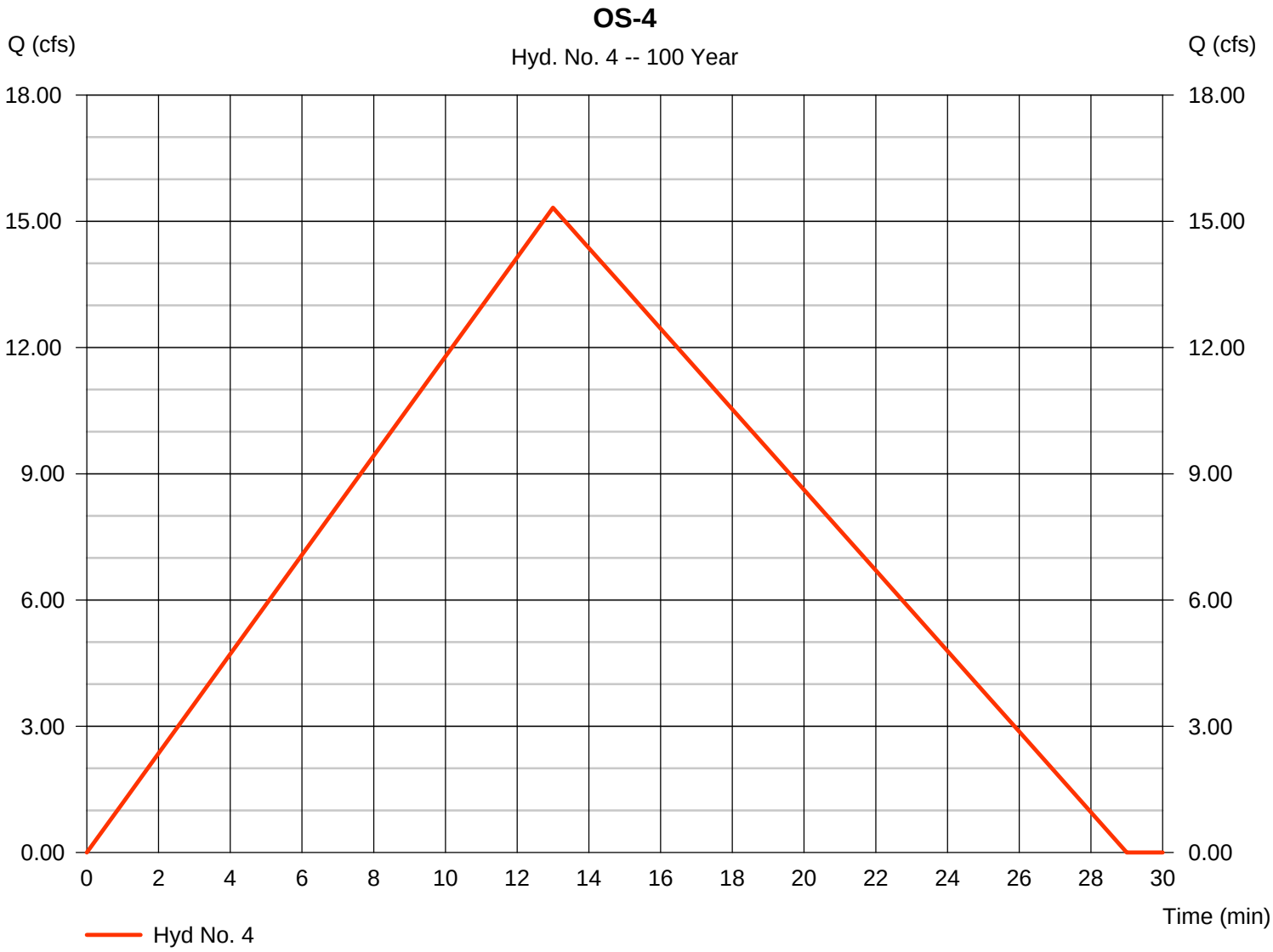
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 4

OS-4

Hydrograph type	=	Rational	Peak discharge	=	15.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	13,744 cuft
Drainage area	=	3.060 ac	Runoff coeff.	=	0.7
Intensity	=	7.153 in/hr	Tc by User	=	13.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



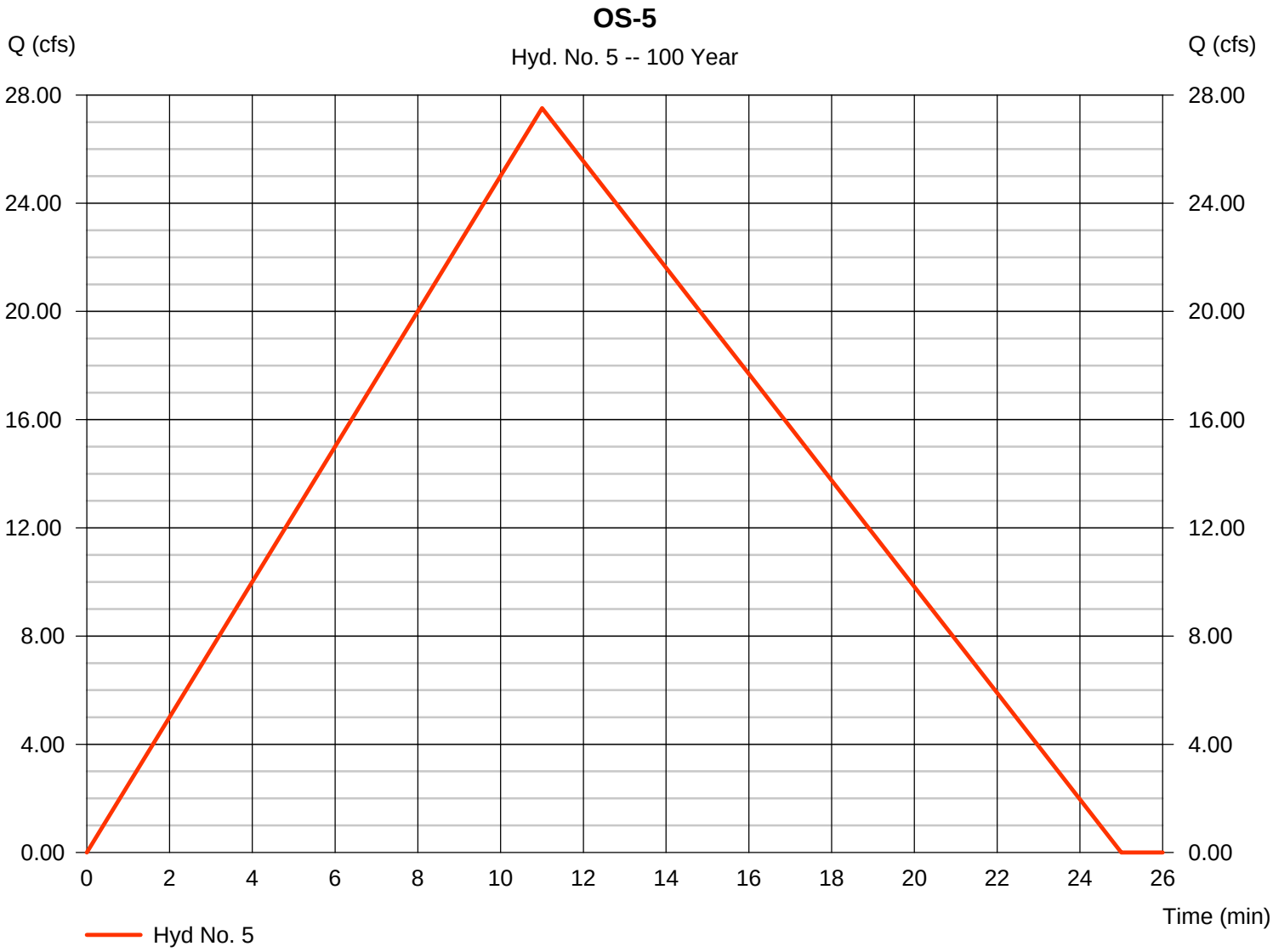
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 5

OS-5

Hydrograph type	=	Rational	Peak discharge	=	27.51 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	20,884 cuft
Drainage area	=	4.990 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



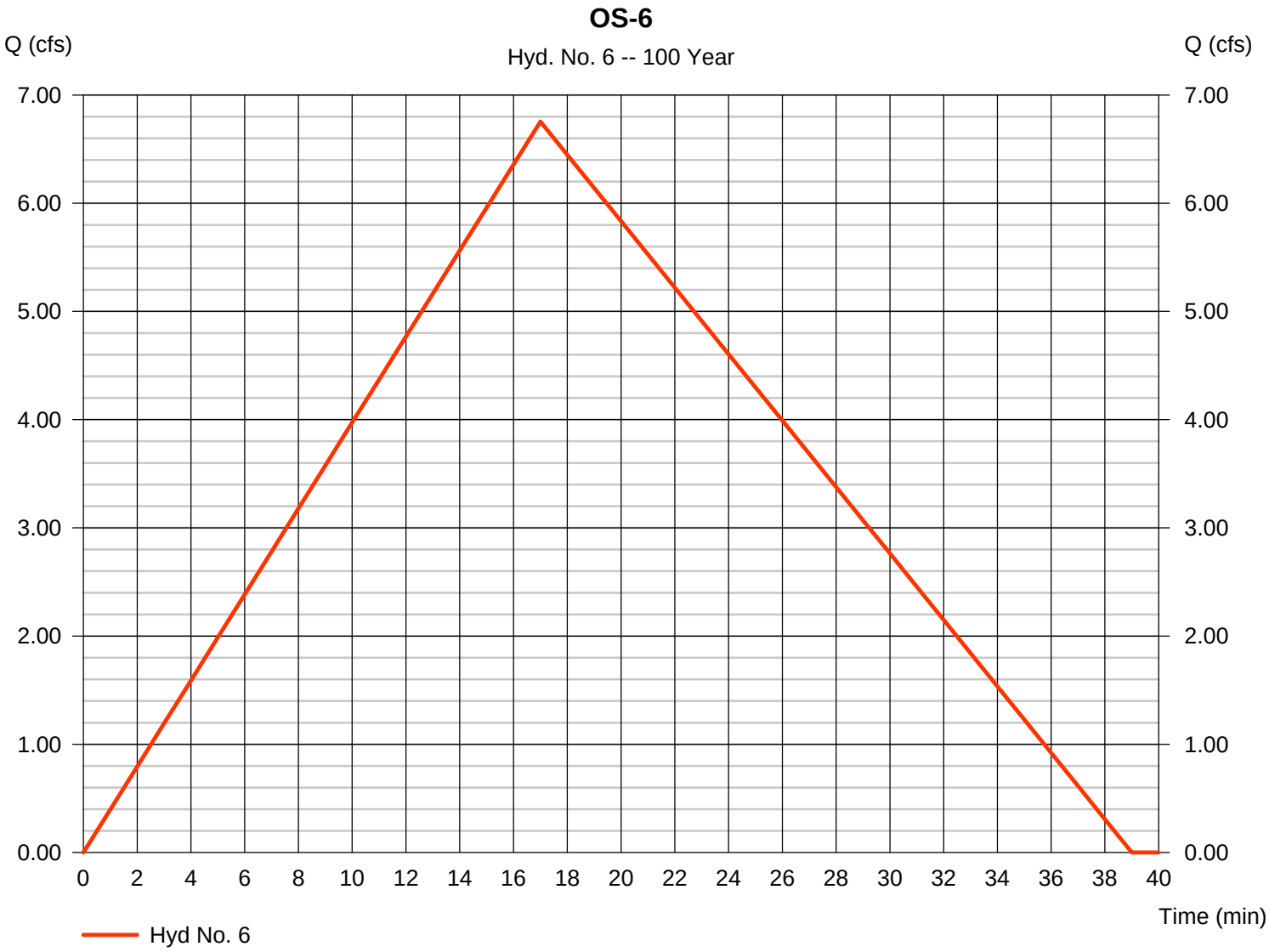
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 6

OS-6

Hydrograph type	=	Rational	Peak discharge	=	6.755 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	7,924 cuft
Drainage area	=	1.590 ac	Runoff coeff.	=	0.7
Intensity	=	6.069 in/hr	Tc by User	=	17.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



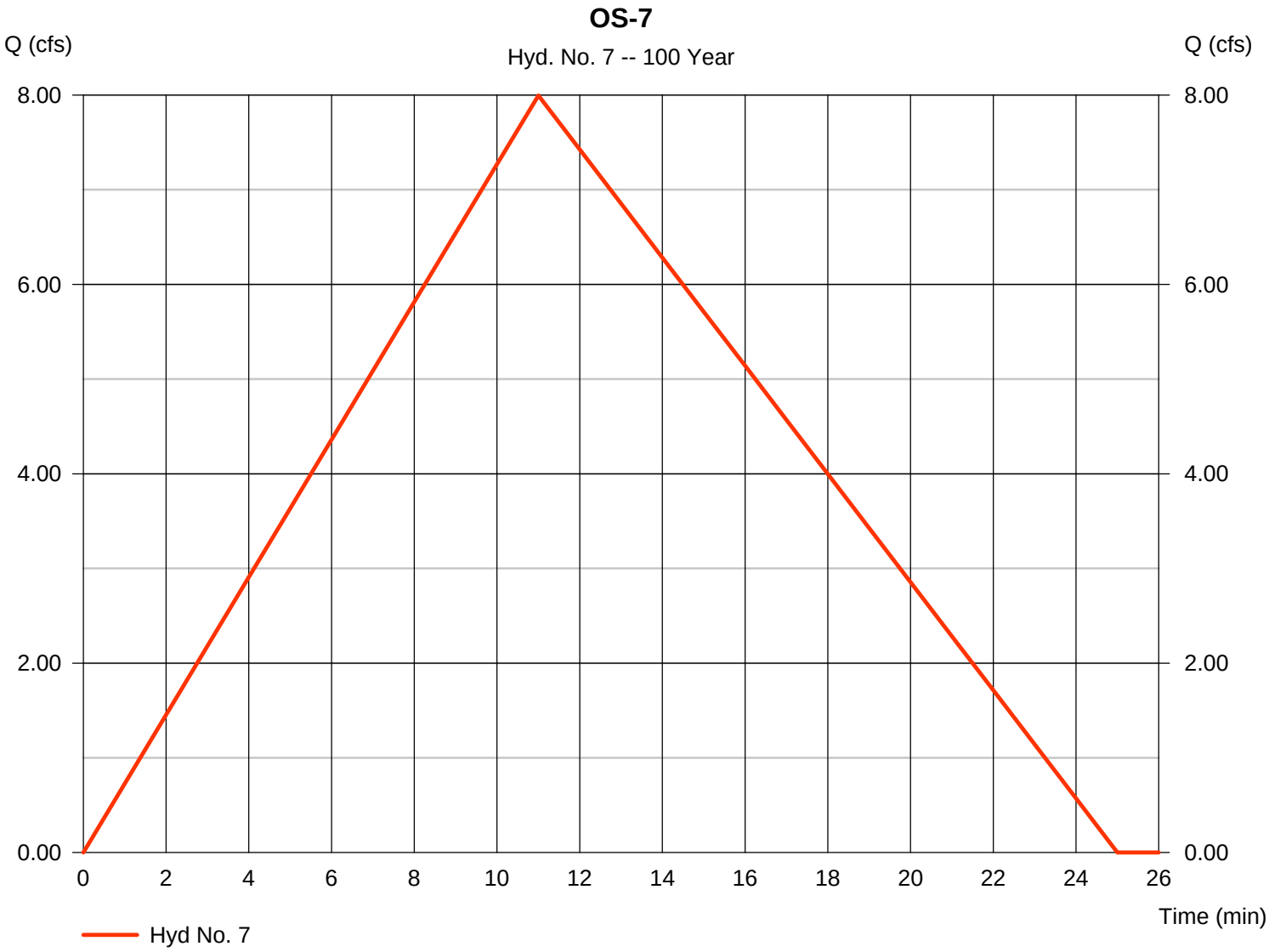
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 7

OS-7

Hydrograph type	=	Rational	Peak discharge	=	7.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	6,068 cuft
Drainage area	=	1.450 ac	Runoff coeff.	=	0.7
Intensity	=	7.877 in/hr	Tc by User	=	11.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



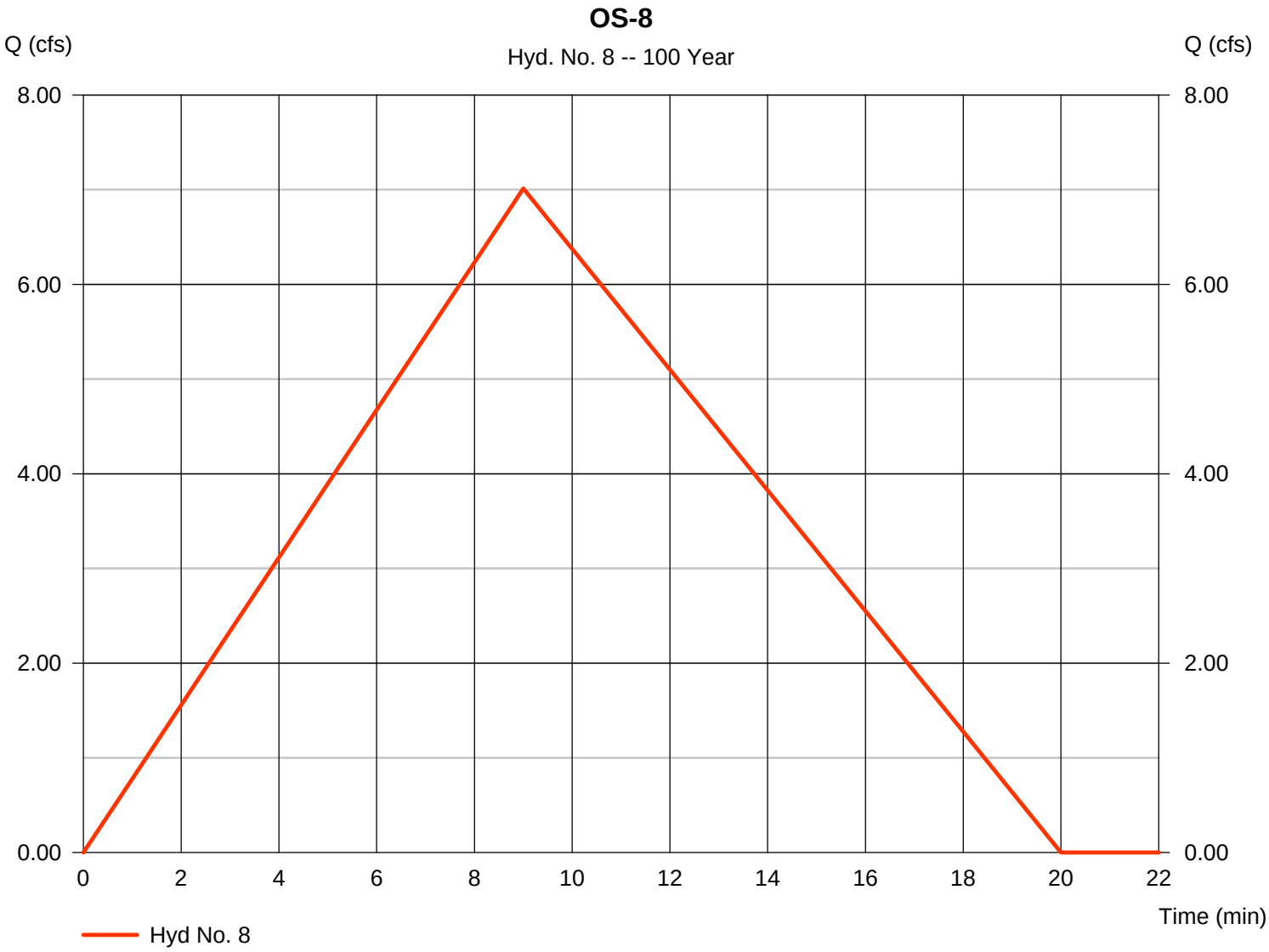
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 8

OS-8

Hydrograph type	=	Rational	Peak discharge	=	7.012 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	4,355 cuft
Drainage area	=	1.140 ac	Runoff coeff.	=	0.7
Intensity	=	8.787 in/hr	Tc by User	=	9.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



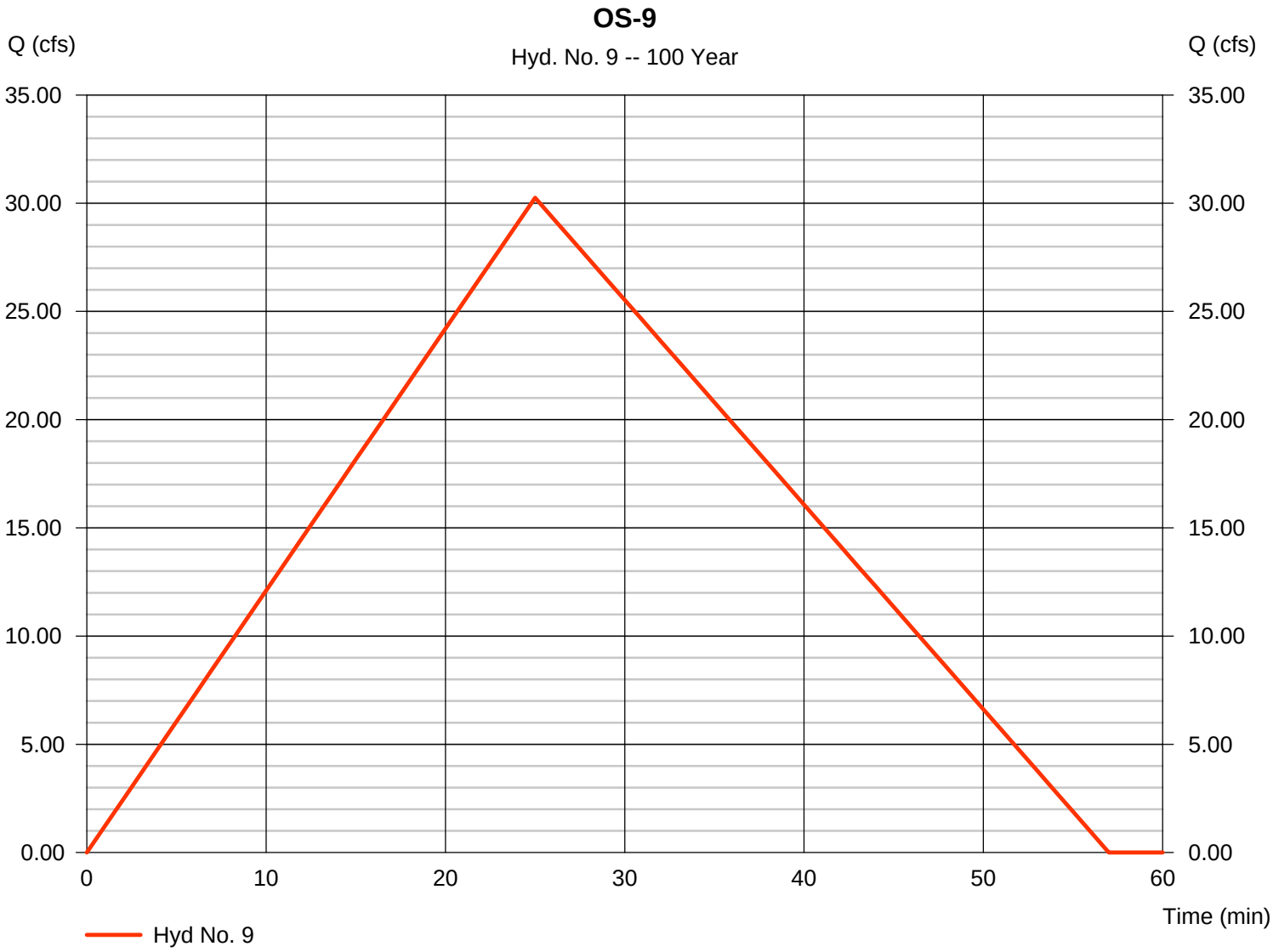
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 9

OS-9

Hydrograph type	=	Rational	Peak discharge	=	30.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	52,190 cuft
Drainage area	=	9.450 ac	Runoff coeff.	=	0.68
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



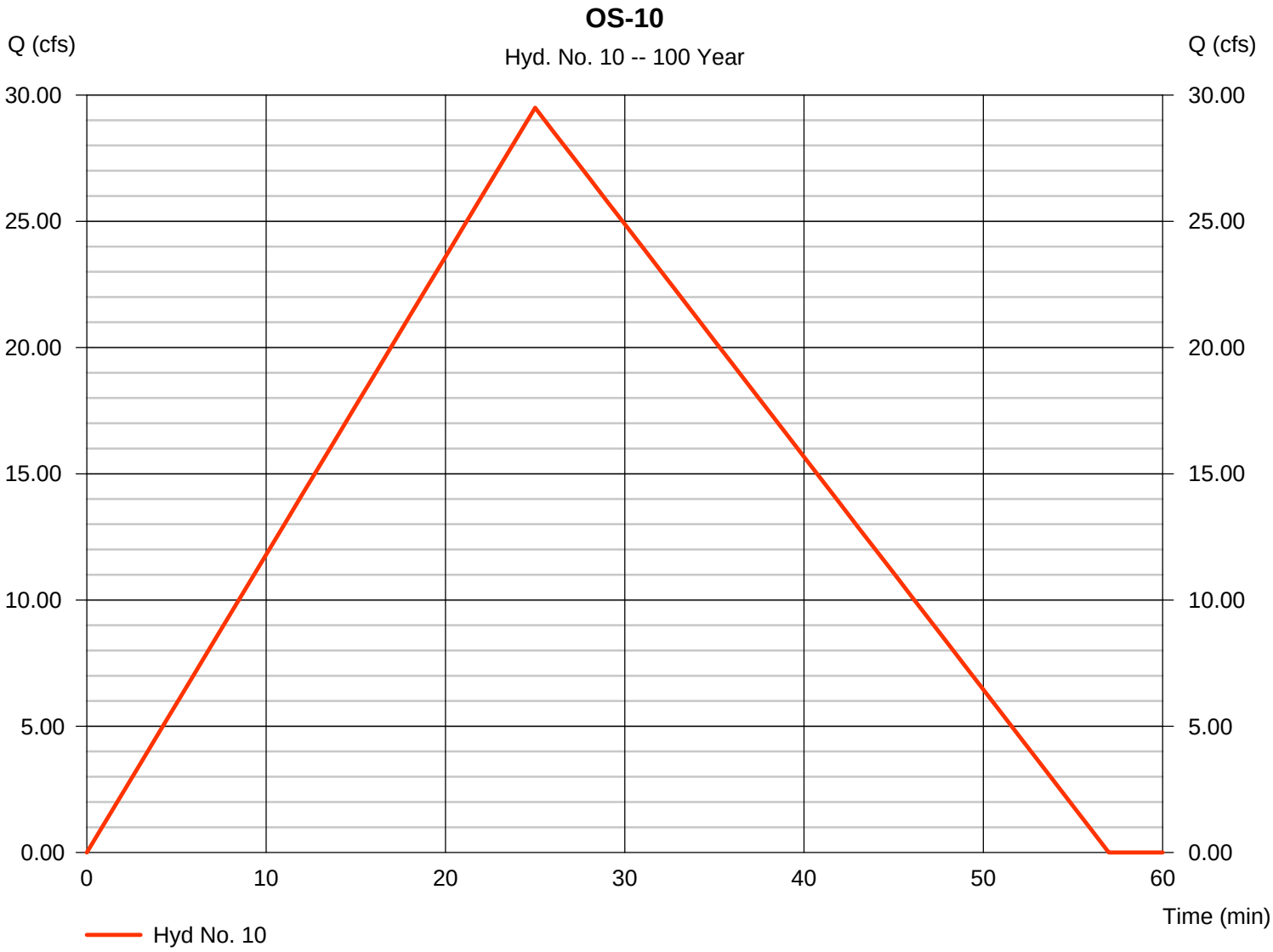
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 10

OS-10

Hydrograph type	=	Rational	Peak discharge	=	29.49 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	50,878 cuft
Drainage area	=	9.350 ac	Runoff coeff.	=	0.67
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



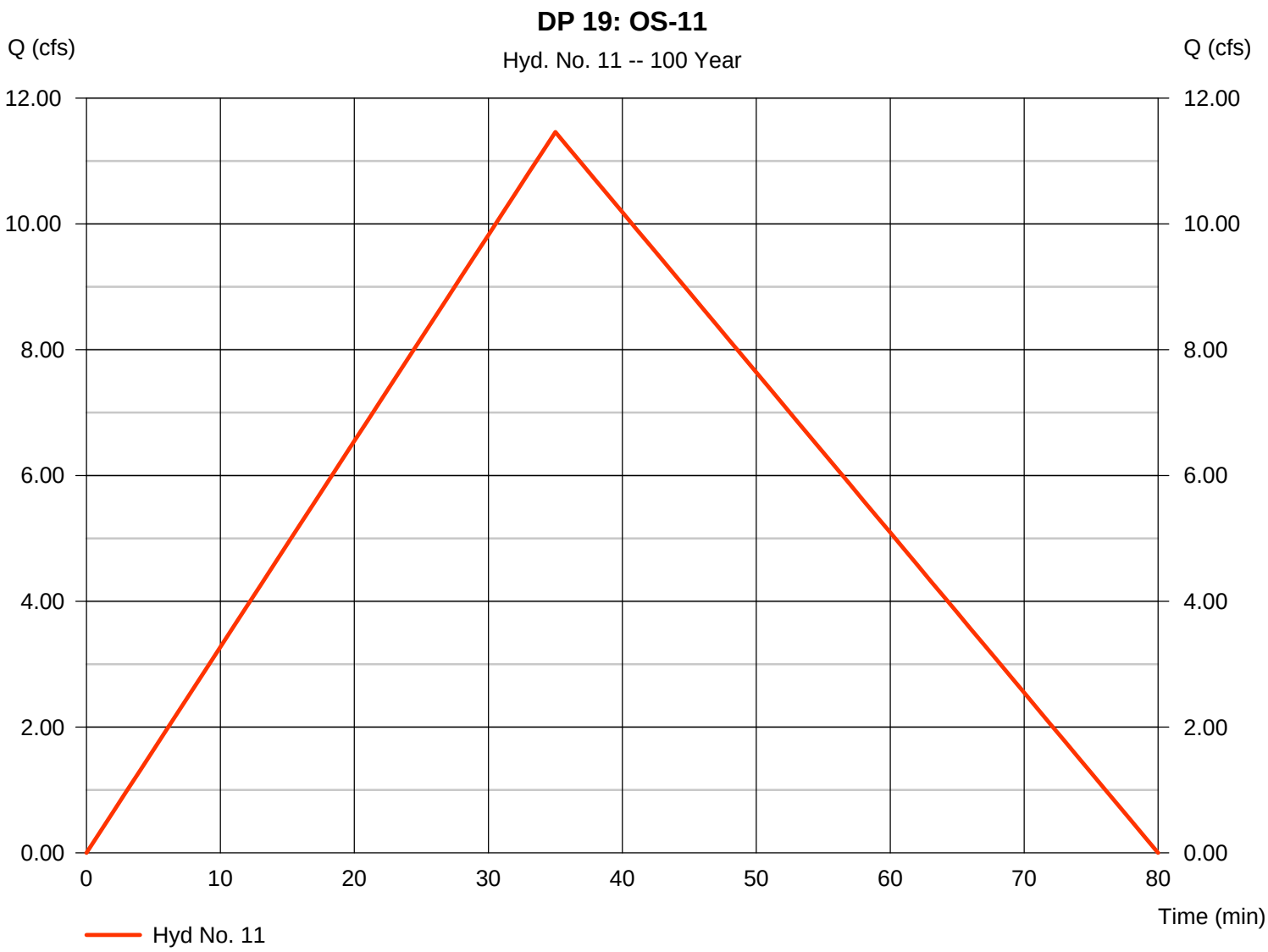
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 11

DP 19: OS-11

Hydrograph type	=	Rational	Peak discharge	=	11.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	27,676 cuft
Drainage area	=	5.050 ac	Runoff coeff.	=	0.61
Intensity	=	3.720 in/hr	Tc by User	=	35.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



Hydrograph Report

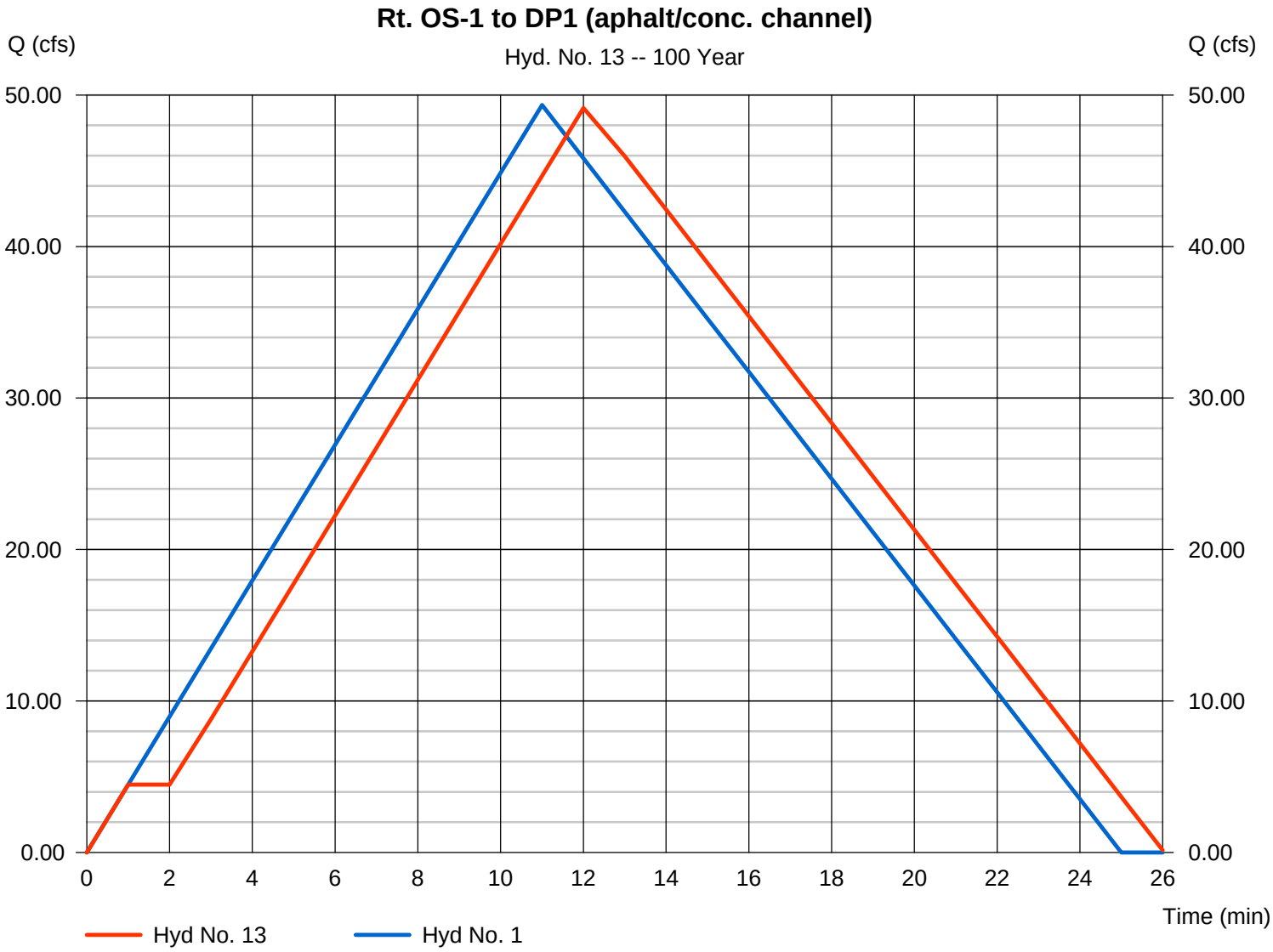
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 13

Rt. OS-1 to DP1 (aphalt/conc. channel)

Hydrograph type	=	Reach	Peak discharge	=	49.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	37,287 cuft
Inflow hyd. No.	=	1 - OS-1	Section type	=	Trapezoidal
Reach length	=	200.0 ft	Channel slope	=	0.5 %
Manning's n	=	0.015	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	2.0 ft
Rating curve x	=	2.401	Rating curve m	=	1.292
Ave. velocity	=	4.75 ft/s	Routing coeff.	=	0.9587

Modified Att-Kin routing method used.



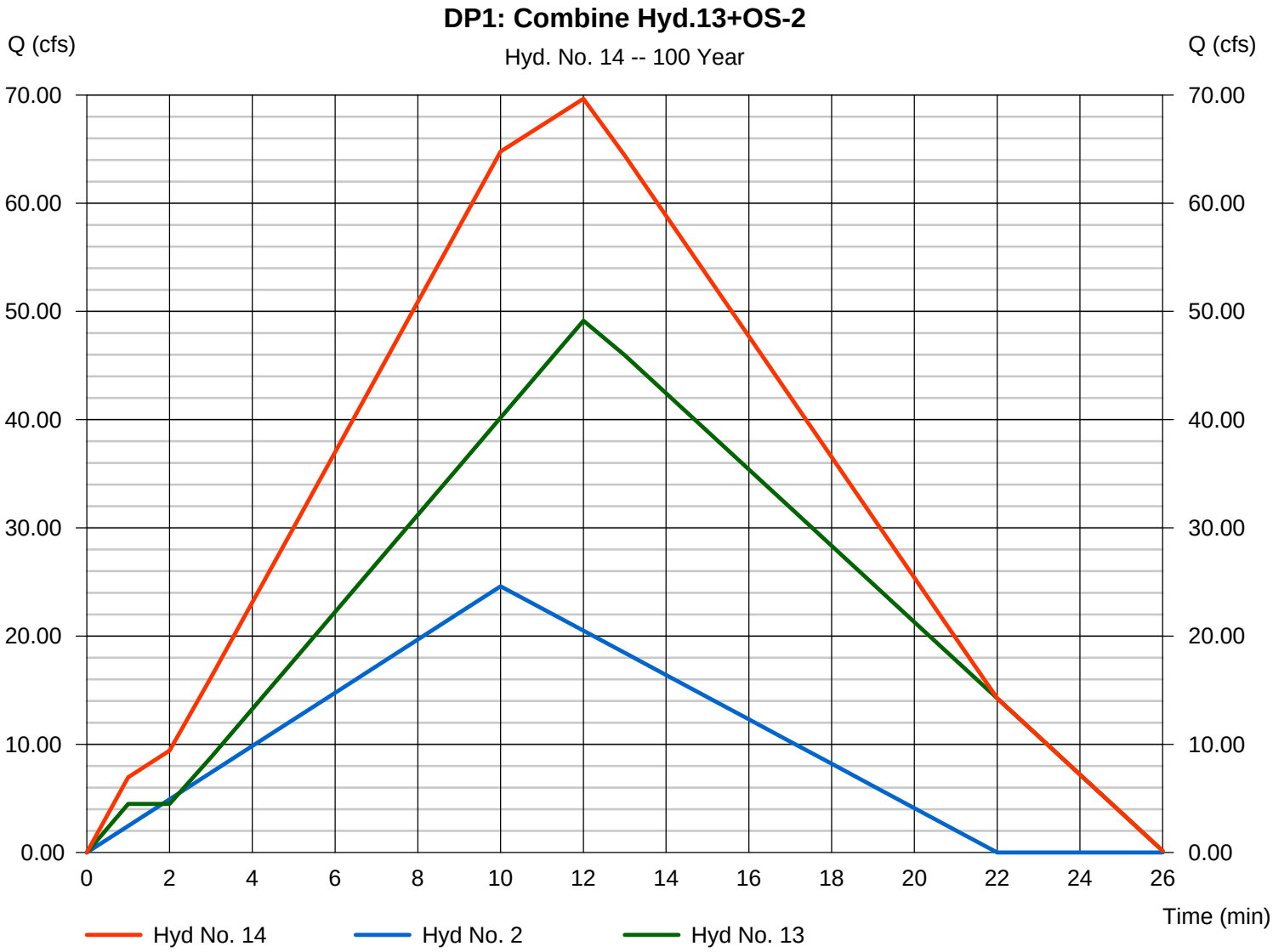
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 14

DP1: Combine Hyd.13+OS-2

Hydrograph type	=	Combine	Peak discharge	=	69.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	53,524 cuft
Inflow hyds.	=	2, 13	Contrib. drain. area	=	3.220 ac



Hydrograph Report

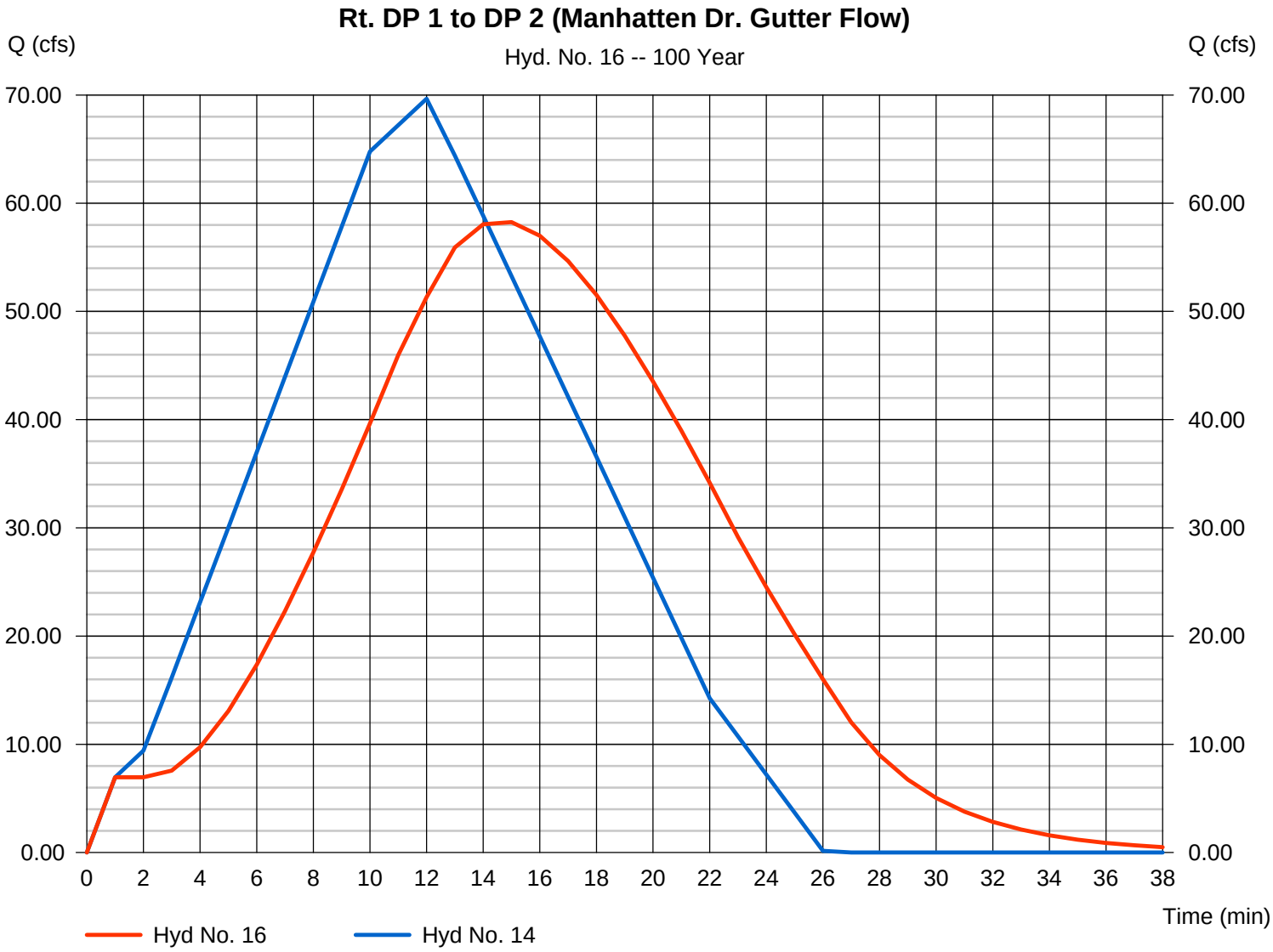
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 16

Rt. DP 1 to DP 2 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	58.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	55,180 cuft
Inflow hyd. No.	=	14 - DP1: Combine Hyd.13+OS-2	Section type	=	Trapezoidal
Reach length	=	150.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.513	Rating curve m	=	0.659
Ave. velocity	=	1.09 ft/s	Routing coeff.	=	0.2514

Modified Att-Kin routing method used.



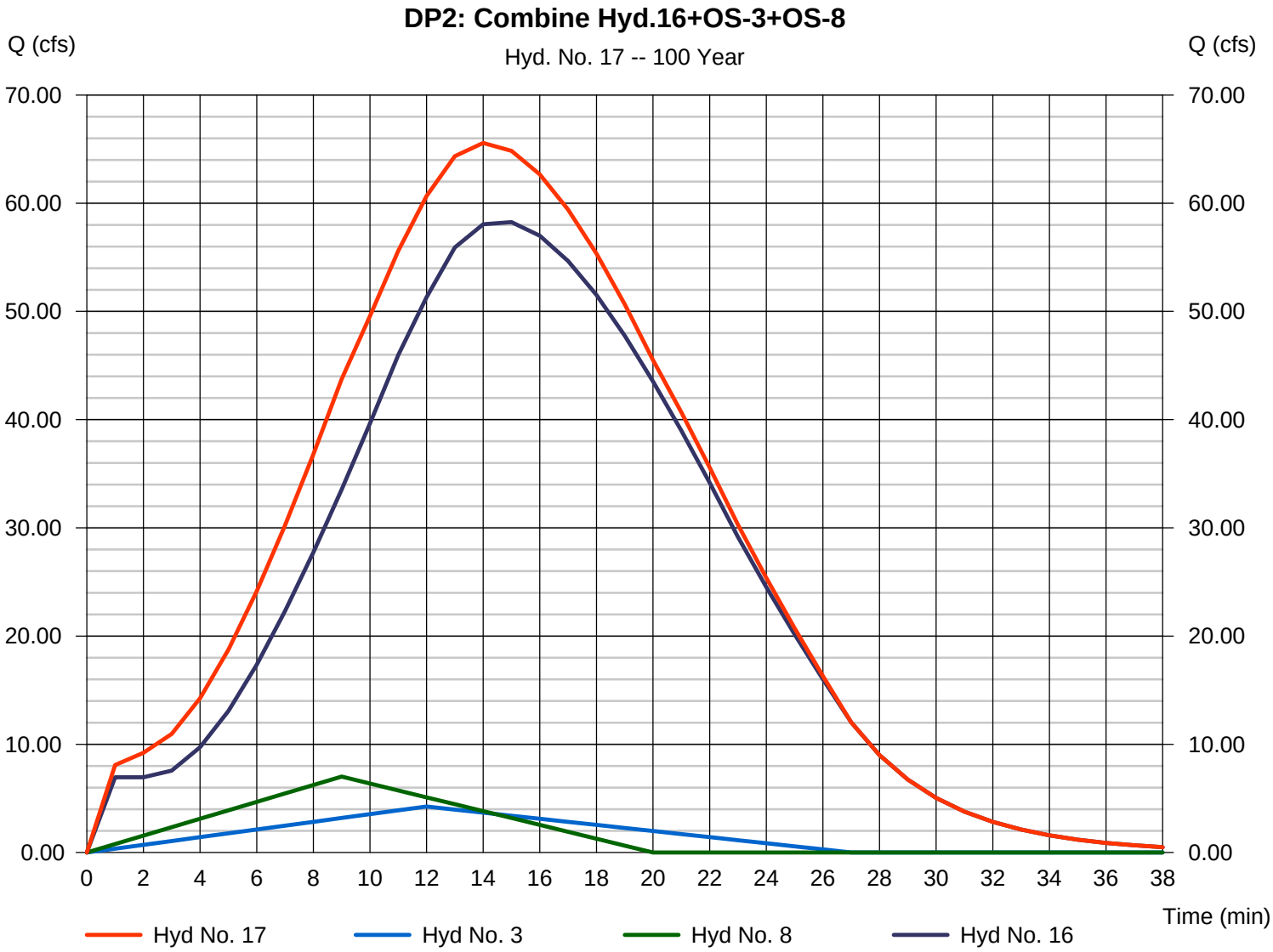
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 17

DP2: Combine Hyd.16+OS-3+OS-8

Hydrograph type	=	Combine	Peak discharge	=	65.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	62,830 cuft
Inflow hyds.	=	3, 8, 16	Contrib. drain. area	=	1.950 ac



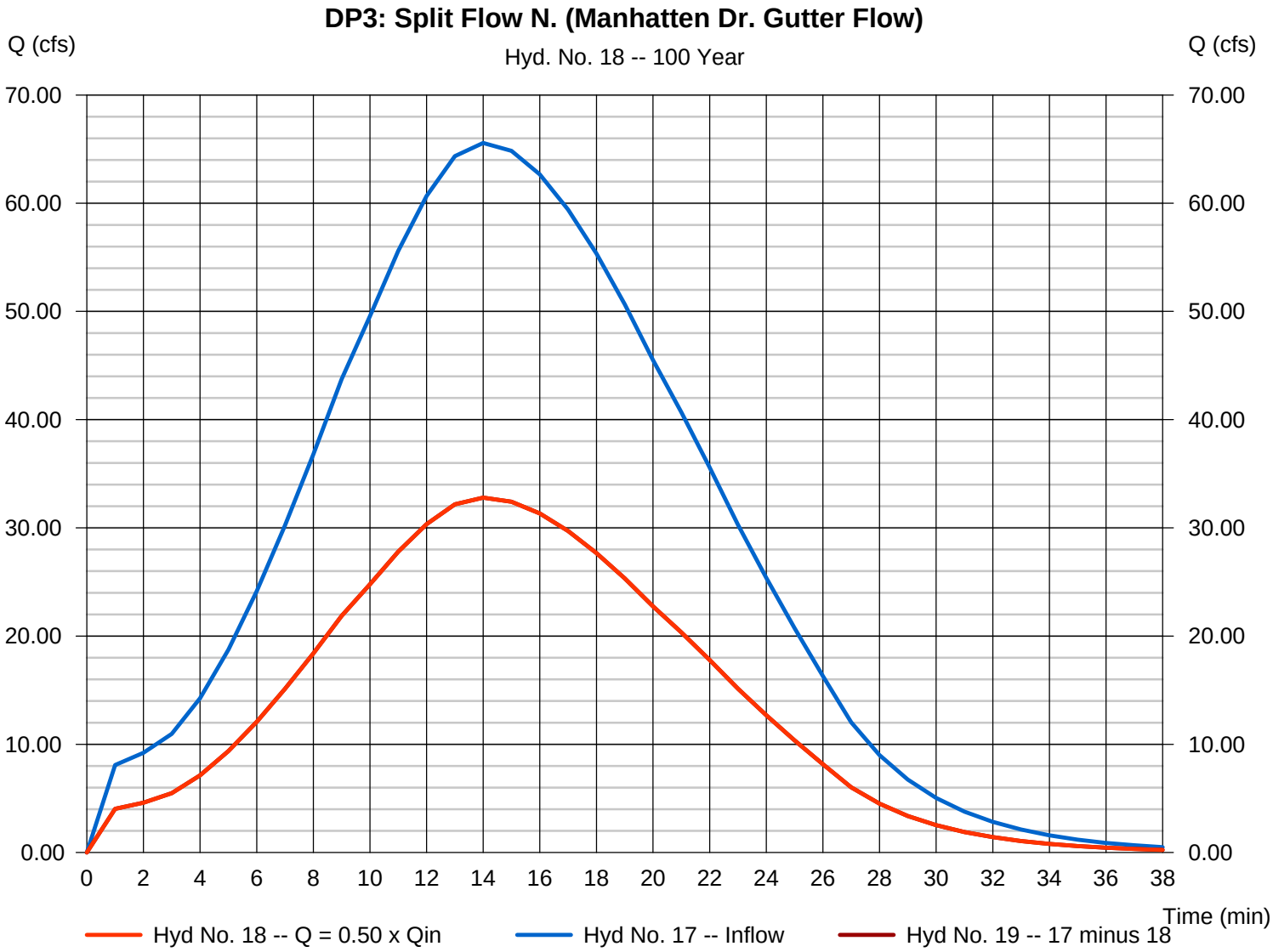
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 18

DP3: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	19
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



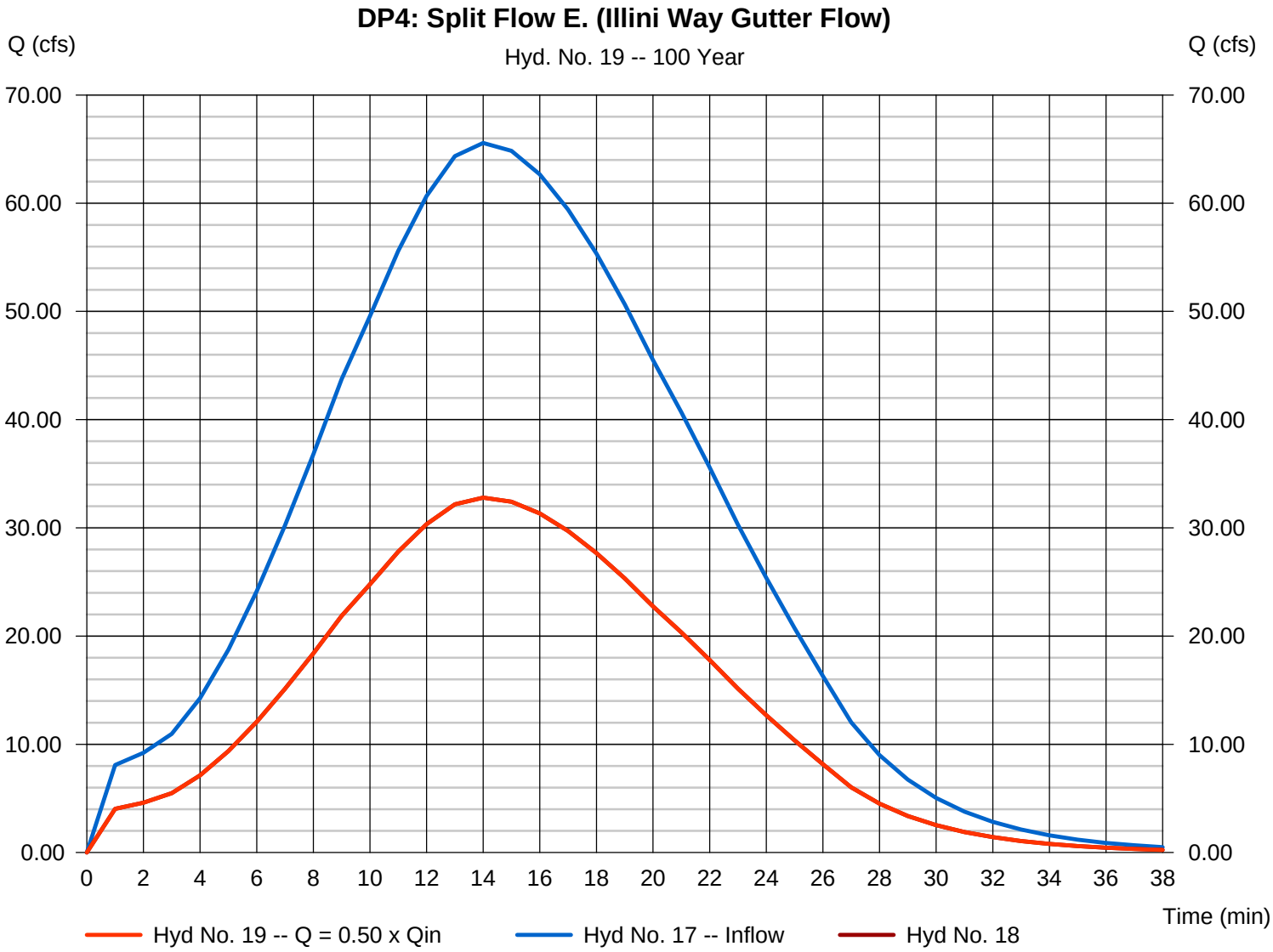
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 19

DP4: Split Flow E. (Illini Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	32.78 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	31,415 cuft
Inflow hydrograph	=	17 - DP2: Combine Hyd.16+OS-3+OS-8	2nd diverted hyd.	=	18
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

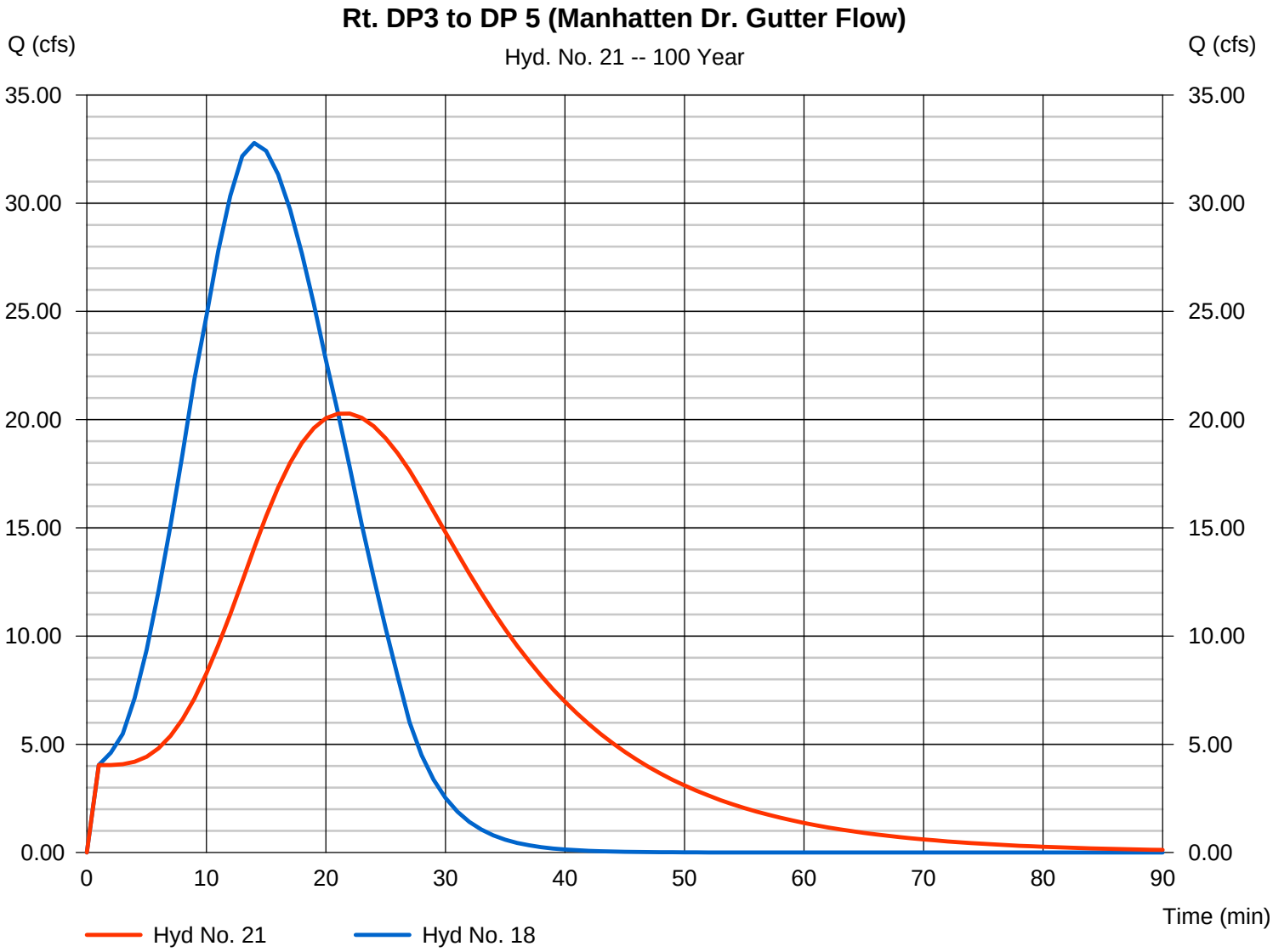
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 21

Rt. DP3 to DP 5 (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Reach	Peak discharge	=	20.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	34,490 cuft
Inflow hyd. No.	=	18 - DP3: Split Flow N. (Manhatten Dr. Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	810.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	1.68 ft/s	Routing coeff.	=	0.0786

Modified Att-Kin routing method used.



Hydrograph Report

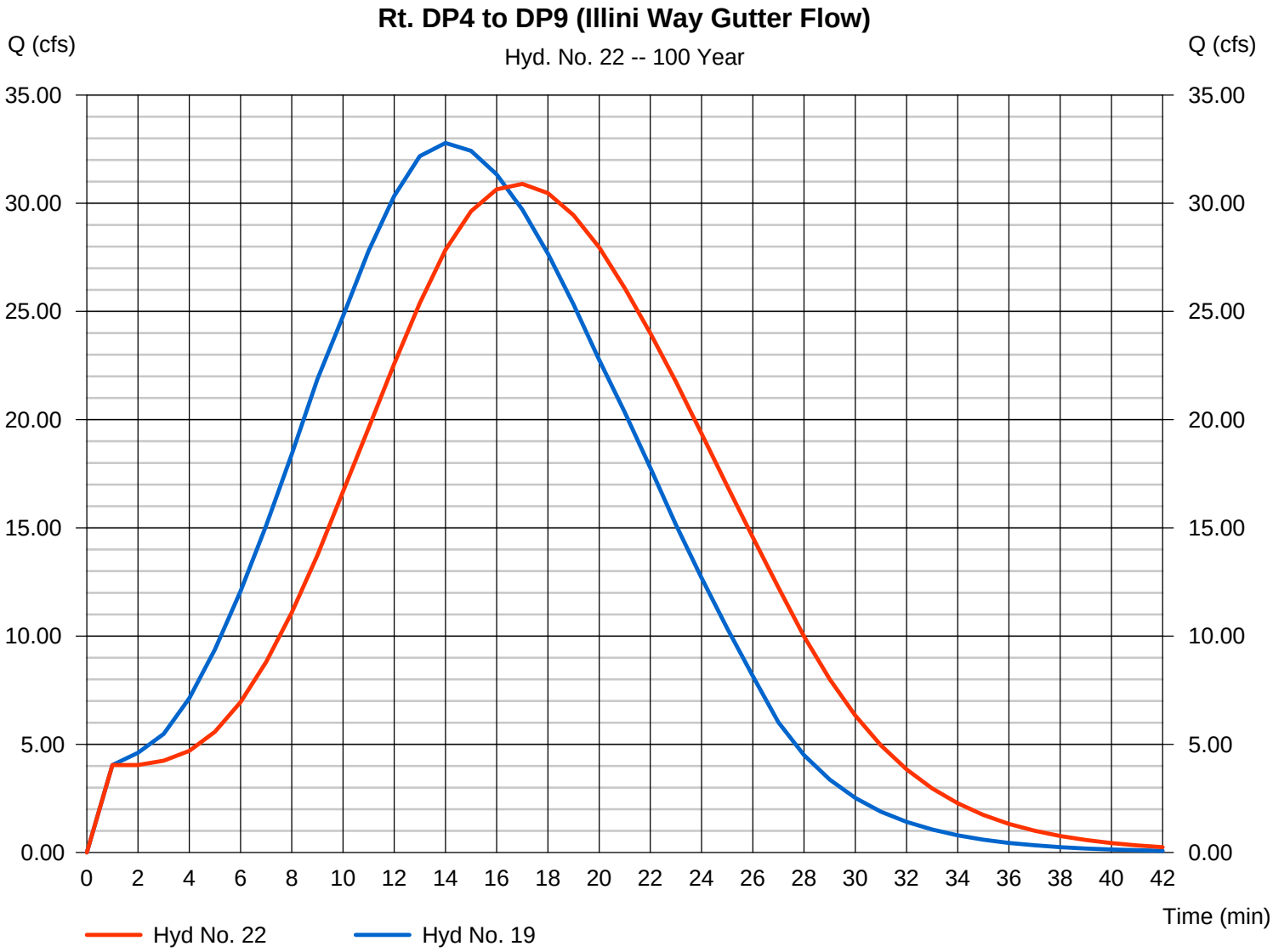
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 22

Rt. DP4 to DP9 (Illini Way Gutter Flow)

Hydrograph type	= Reach	Peak discharge	= 30.89 cfs
Storm frequency	= 100 yrs	Time to peak	= 17 min
Time interval	= 1 min	Hyd. volume	= 32,083 cuft
Inflow hyd. No.	= 19 - DP4: Split Flow E. (Illini Way Gutter Flow)	Section type	= Trapezoidal
Reach length	= 150.0 ft	Channel slope	= 1.0 %
Manning's n	= 0.011	Bottom width	= 5.0 ft
Side slope	= 50.0:1	Max. depth	= 0.5 ft
Rating curve x	= 4.630	Rating curve m	= 0.659
Ave. velocity	= 1.68 ft/s	Routing coeff.	= 0.3620

Modified Att-Kin routing method used.



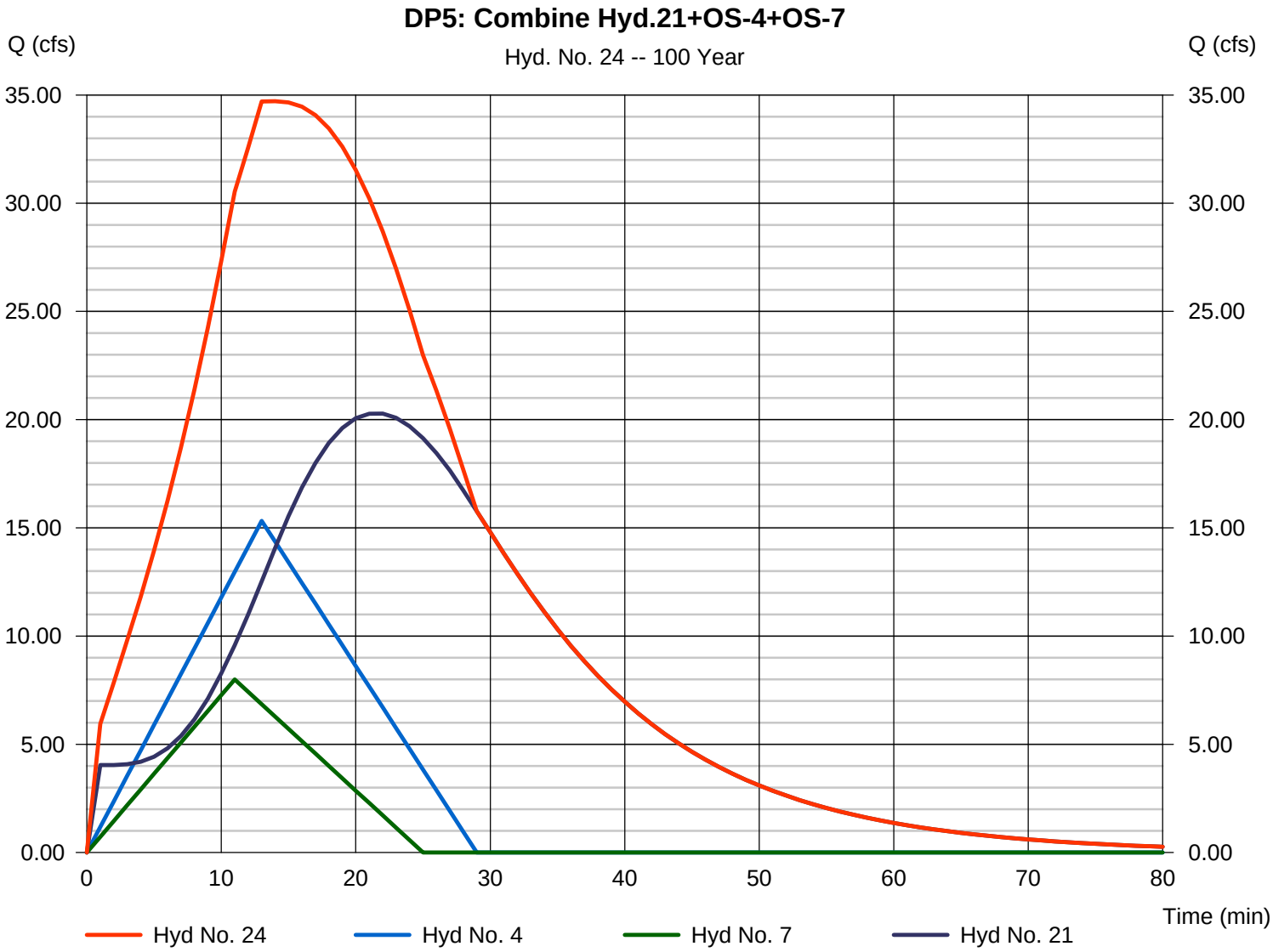
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 24

DP5: Combine Hyd.21+OS-4+OS-7

Hydrograph type	= Combine	Peak discharge	= 34.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 53,817 cuft
Inflow hyds.	= 4, 7, 21	Contrib. drain. area	= 4.510 ac



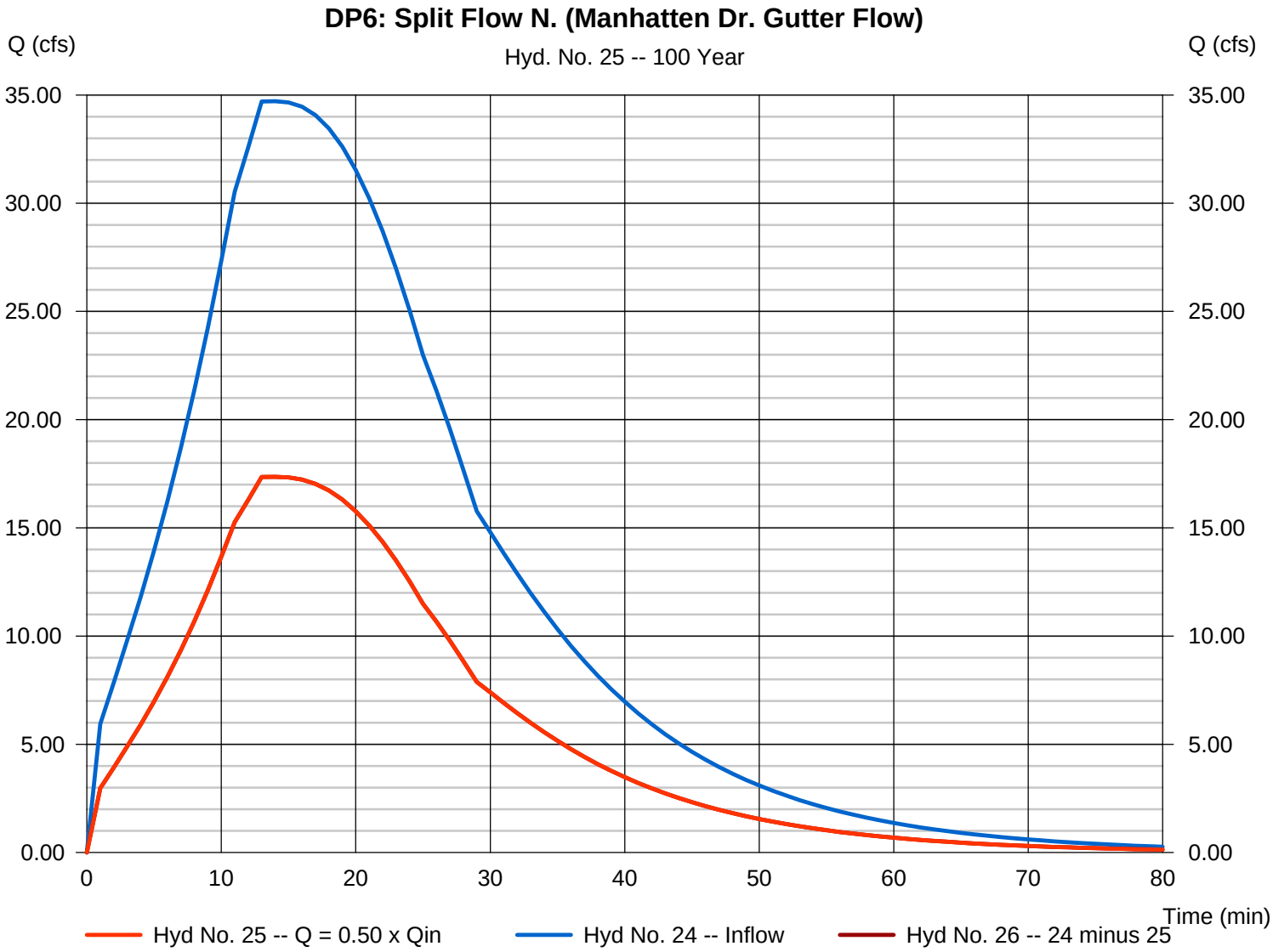
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 25

DP6: Split Flow N. (Manhatten Dr. Gutter Flow)

Hydrograph type	=	Diversion1	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	26
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



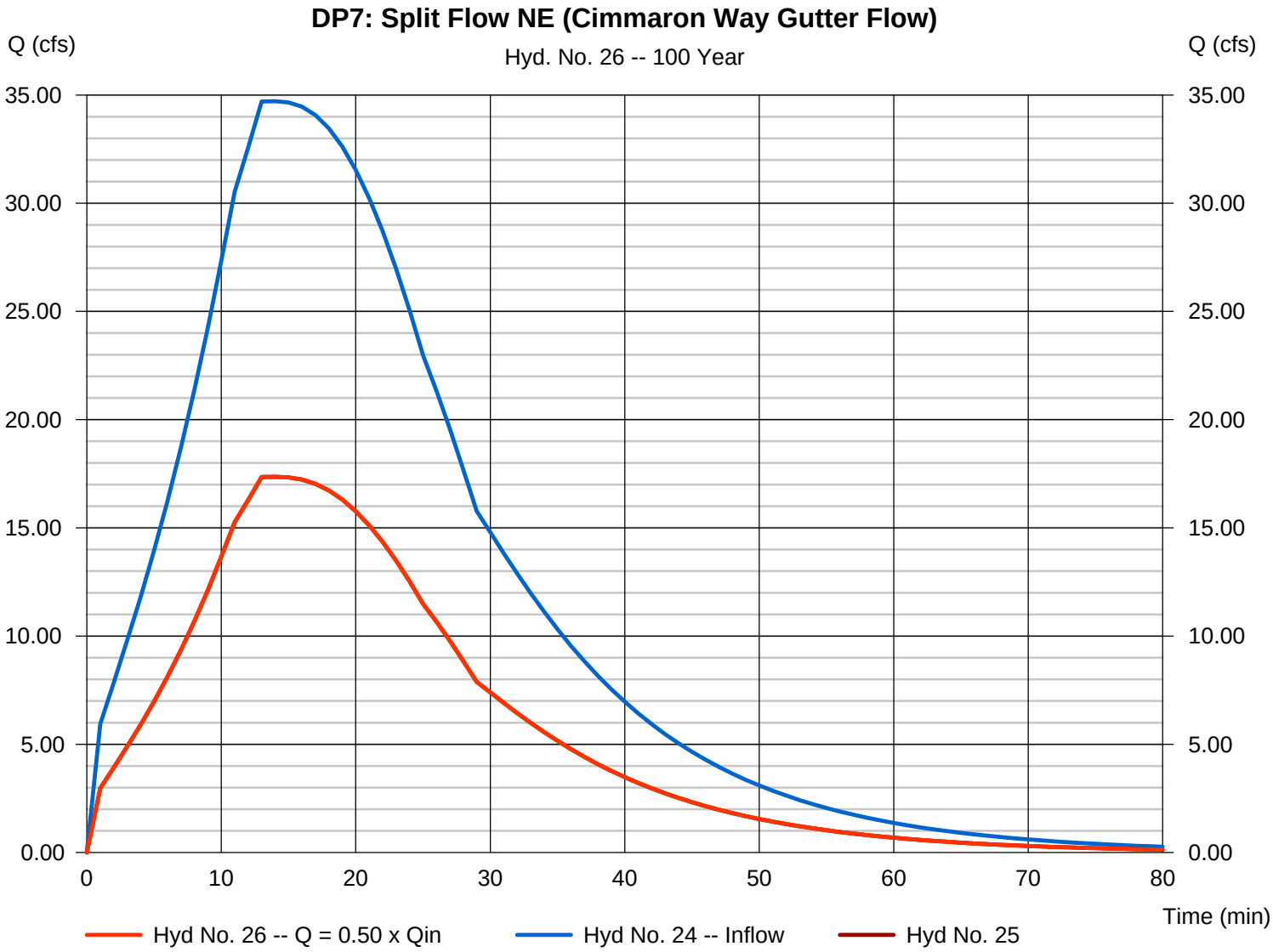
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 26

DP7: Split Flow NE (Cimmaron Way Gutter Flow)

Hydrograph type	=	Diversion2	Peak discharge	=	17.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	26,908 cuft
Inflow hydrograph	=	24 - DP5: Combine Hyd.21+OS-4+OS-7	2nd diverted hyd.	=	25
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

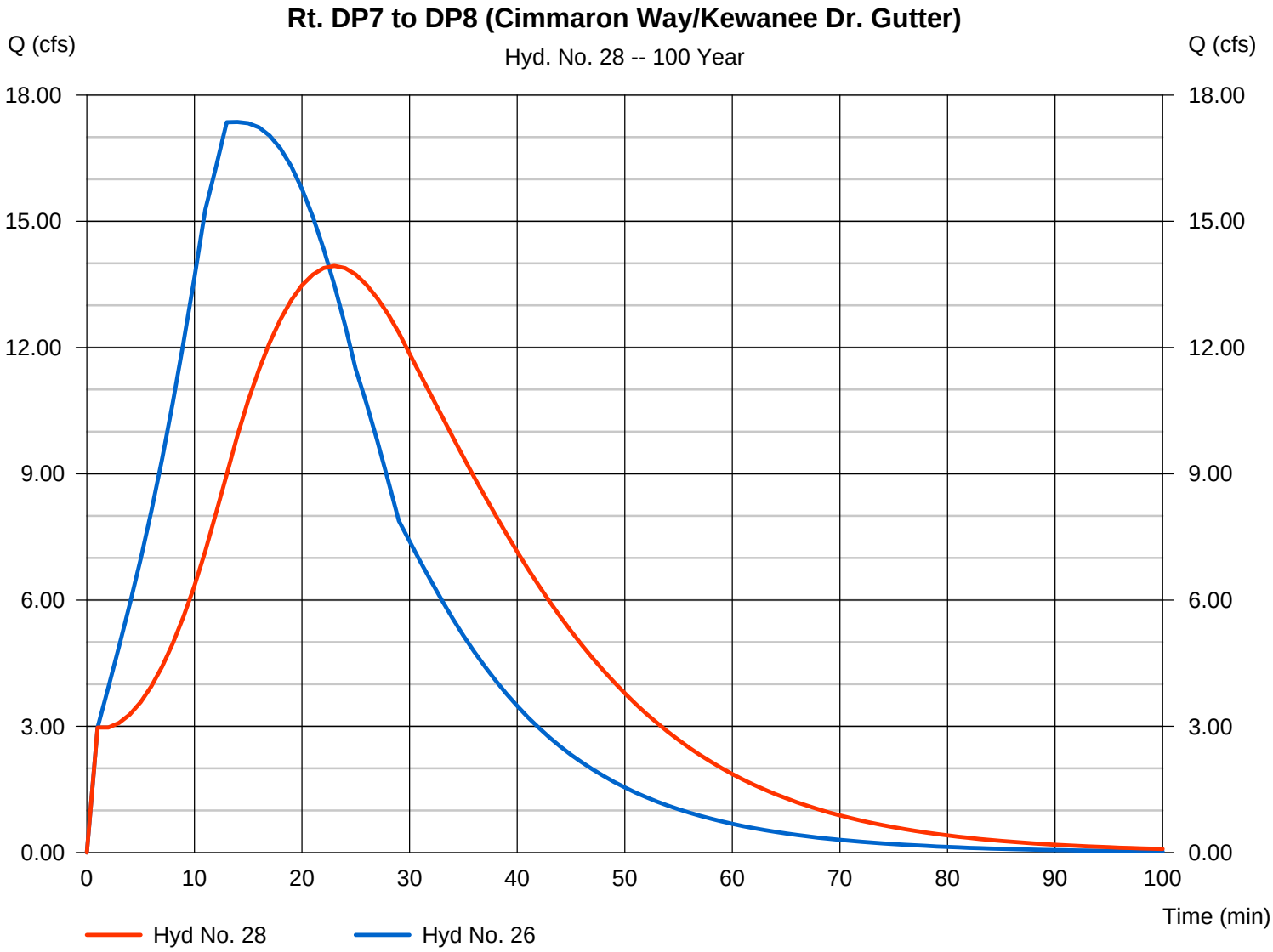
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 28

Rt. DP7 to DP8 (Cimmaron Way/Kewanee Dr. Gutter)

Hydrograph type	=	Reach	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	28,502 cuft
Inflow hyd. No.	=	26 - DP7: Split Flow NE (Cimmaron Way Gutter Flow)	Section type	=	Trapezoidal
Reach length	=	780.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.011	Bottom width	=	5.0 ft
Side slope	=	50.0:1	Max. depth	=	0.5 ft
Rating curve x	=	4.630	Rating curve m	=	0.659
Ave. velocity	=	2.33 ft/s	Routing coeff.	=	0.1116

Modified Att-Kin routing method used.



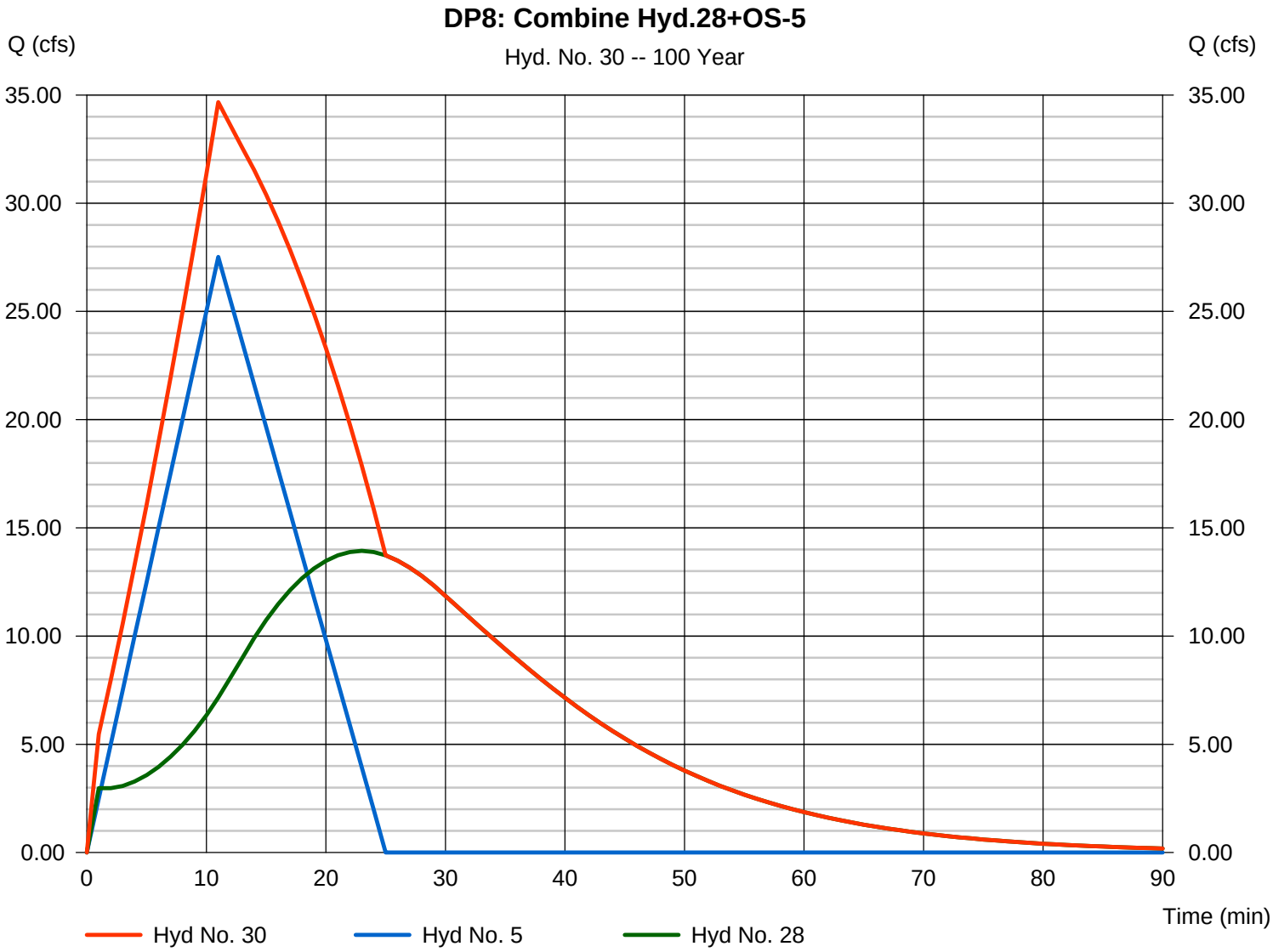
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 30

DP8: Combine Hyd.28+OS-5

Hydrograph type	=	Combine	Peak discharge	=	34.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	49,138 cuft
Inflow hyds.	=	5, 28	Contrib. drain. area	=	4.990 ac



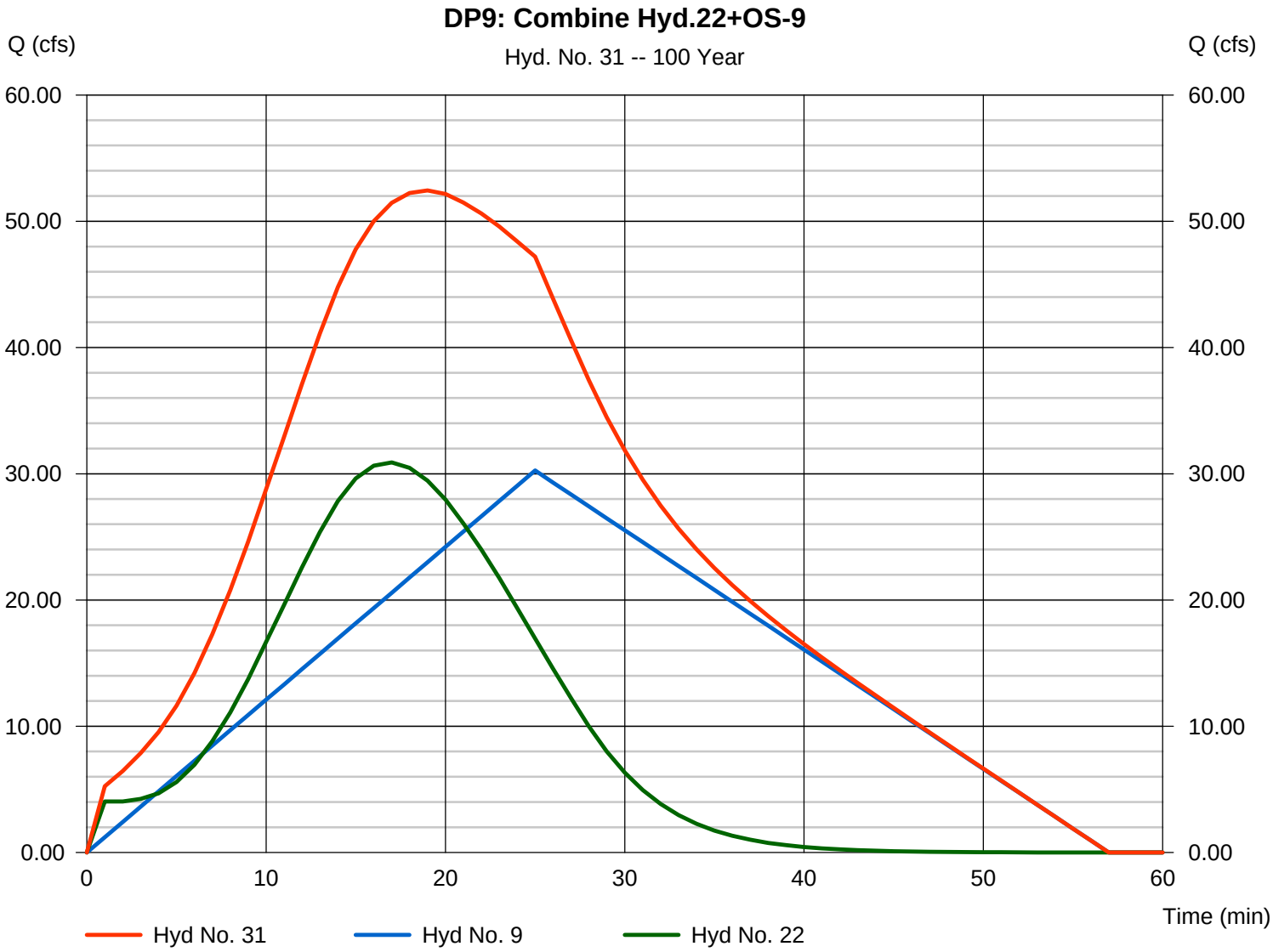
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 31

DP9: Combine Hyd.22+OS-9

Hydrograph type	= Combine	Peak discharge	= 52.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 19 min
Time interval	= 1 min	Hyd. volume	= 83,819 cuft
Inflow hyds.	= 9, 22	Contrib. drain. area	= 9.450 ac



Hydrograph Report

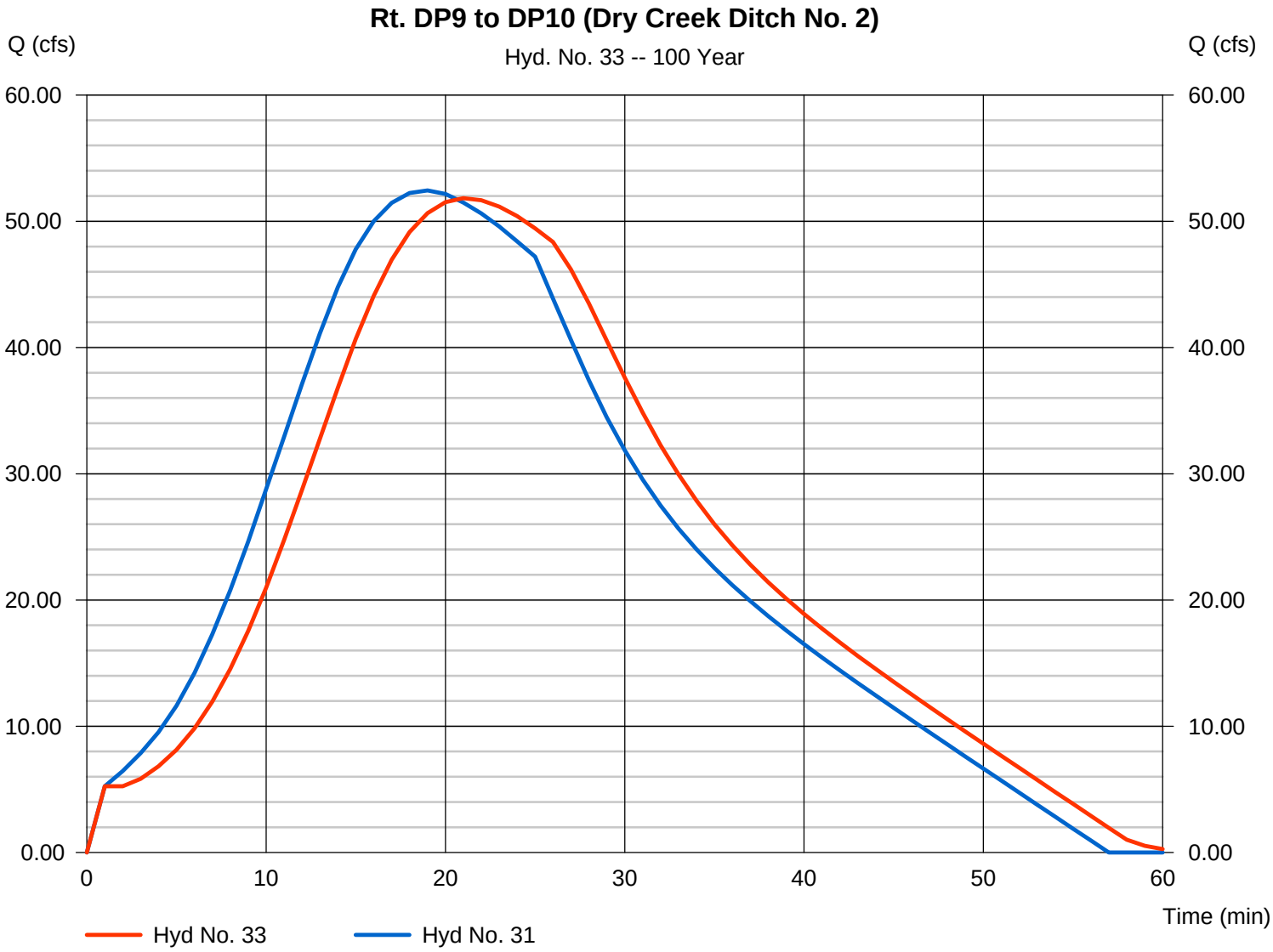
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 33

Rt. DP9 to DP10 (Dry Creek Ditch No. 2)

Hydrograph type	=	Reach	Peak discharge	=	51.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	84,469 cuft
Inflow hyd. No.	=	31 - DP9: Combine Hyd.22+OS-9	Section type	=	Trapezoidal
Reach length	=	485.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	1.698	Rating curve m	=	1.321
Ave. velocity	=	3.91 ft/s	Routing coeff.	=	0.4839

Modified Att-Kin routing method used.



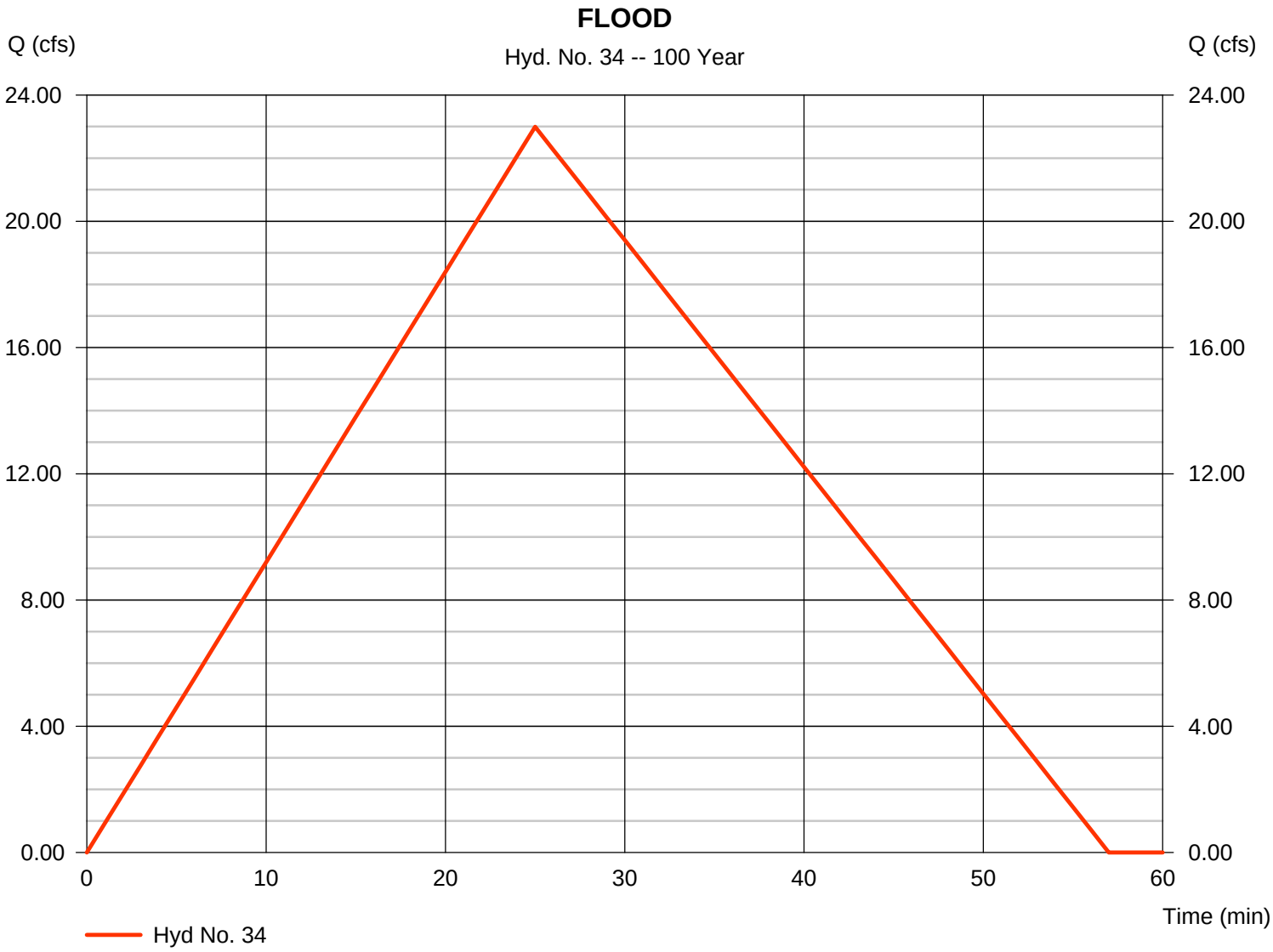
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 34

FLOOD

Hydrograph type	=	Rational	Peak discharge	=	23.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	39,666 cuft
Drainage area	=	8.140 ac	Runoff coeff.	=	0.6
Intensity	=	4.708 in/hr	Tc by User	=	25.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



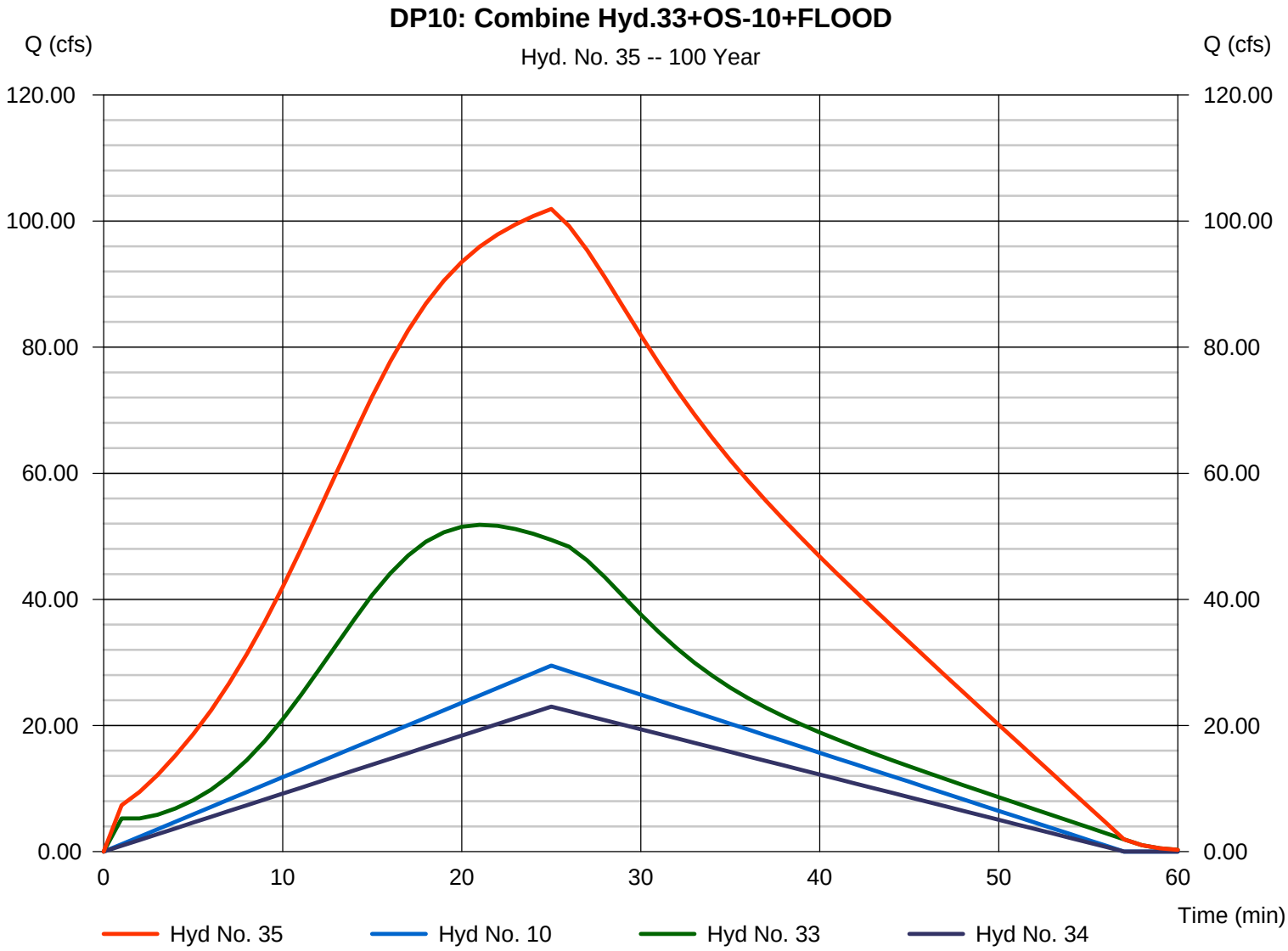
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 35

DP10: Combine Hyd.33+OS-10+FLOOD

Hydrograph type	=	Combine	Peak discharge	=	101.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	174,227 cuft
Inflow hyds.	=	10, 33, 34	Contrib. drain. area	=	17.490 ac



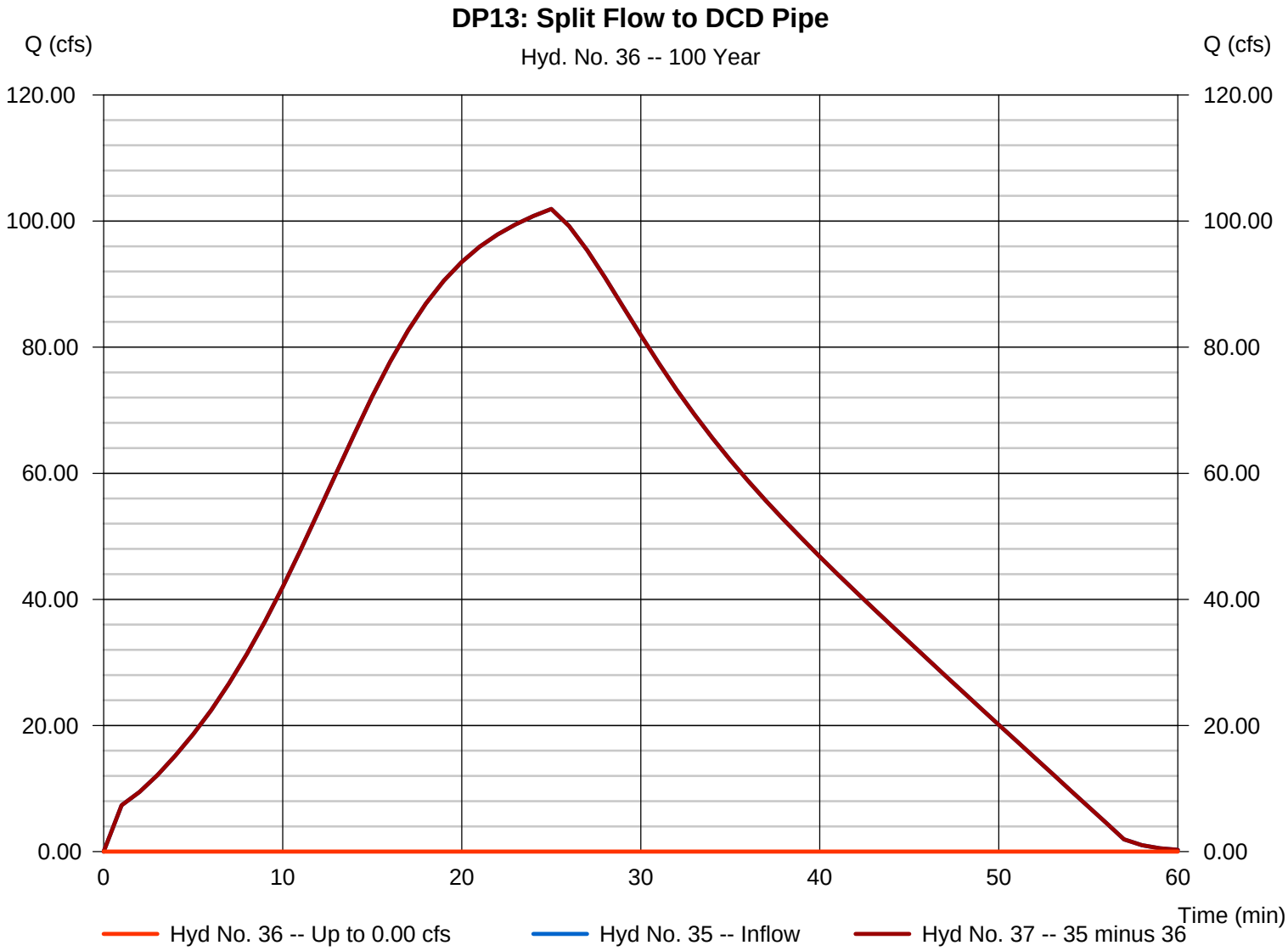
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 36

DP13: Split Flow to DCD Pipe

Hydrograph type	=	Diversion1	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	1 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hydrograph	=	35 - DP10: Combine Hyd.33+OS-10+FLOW	Total diverted hyd.	=	37
Diversion method	=	Constant Q	Constant Q	=	0.00 cfs



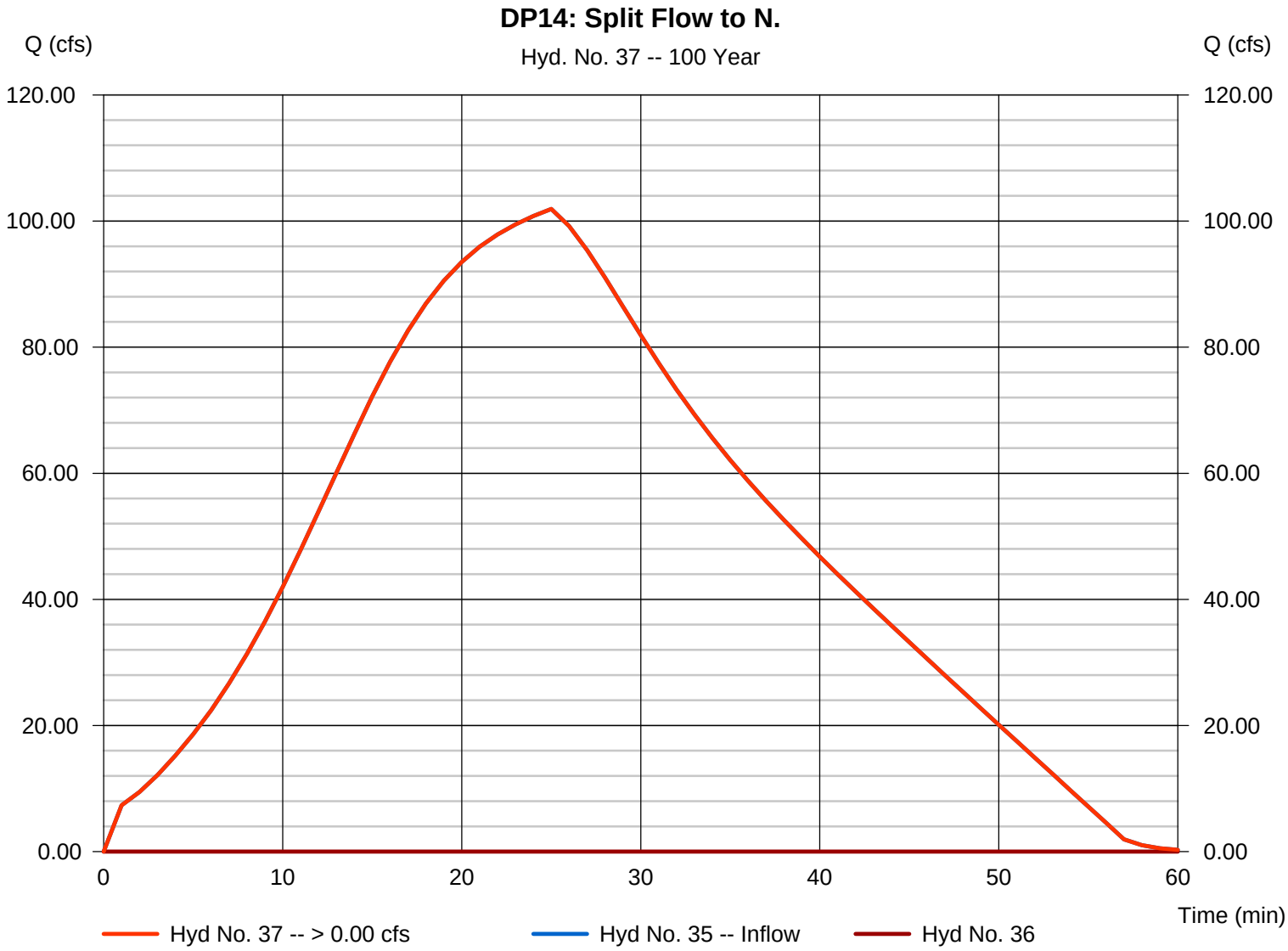
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 37

DP14: Split Flow to N.

Hydrograph type	=	Diversion2	Peak discharge	=	101.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	25 min
Time interval	=	1 min	Hyd. volume	=	174,226 cuft
Inflow hydrograph	=	35 - DP10: Combine Hyd.33+OS-10+FLOW	2nd diverted hyd.	=	36
Diversion method	=	Constant Q	Constant Q	=	0.00 cfs



Hydrograph Report

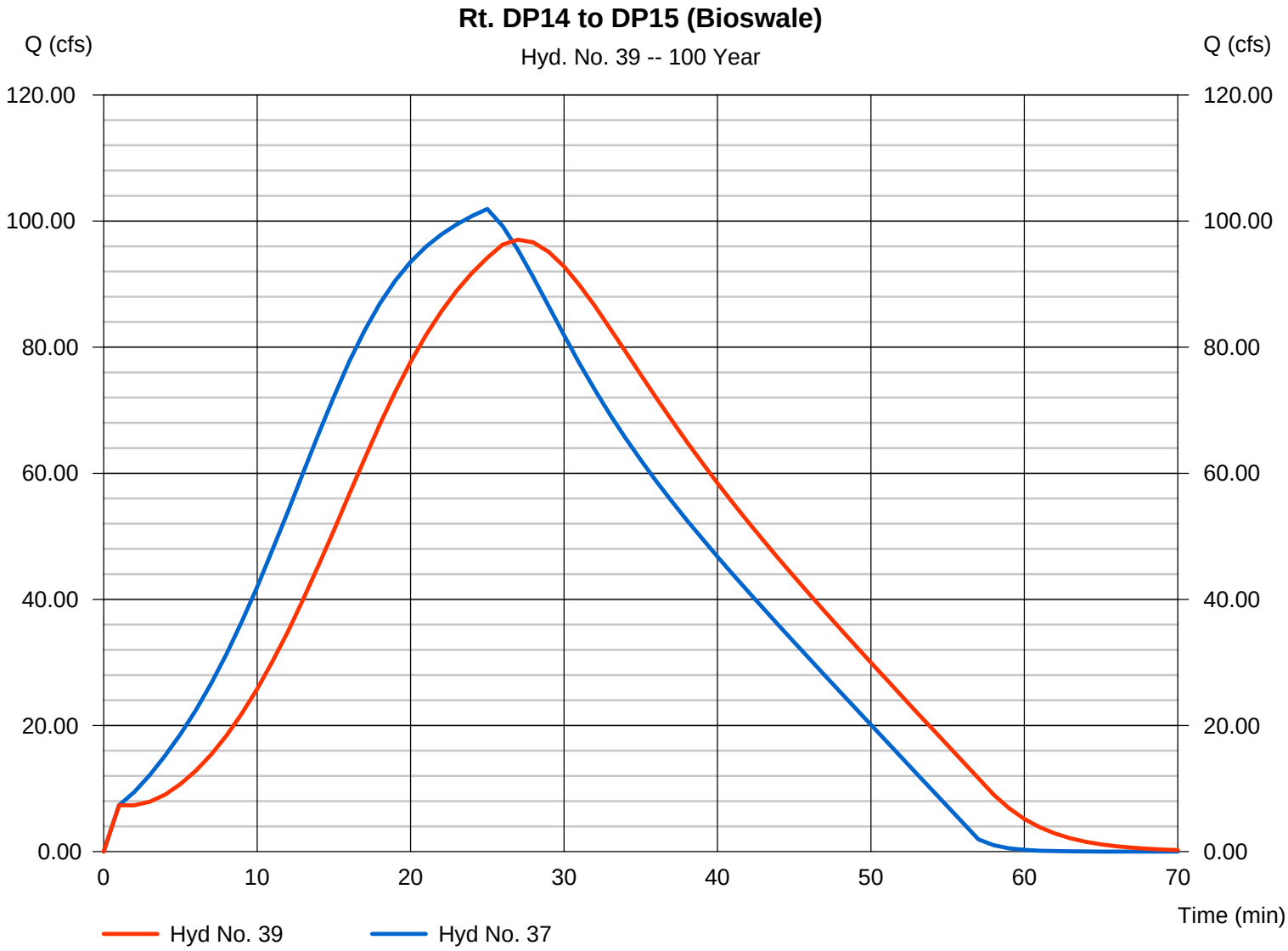
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 39

Rt. DP14 to DP15 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	97.05 cfs
Storm frequency	=	100 yrs	Time to peak	=	27 min
Time interval	=	1 min	Hyd. volume	=	175,868 cuft
Inflow hyd. No.	=	37 - DP14: Split Flow to N.	Section type	=	Trapezoidal
Reach length	=	520.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.98 ft/s	Routing coeff.	=	0.2683

Modified Att-Kin routing method used.



Hydrograph Report

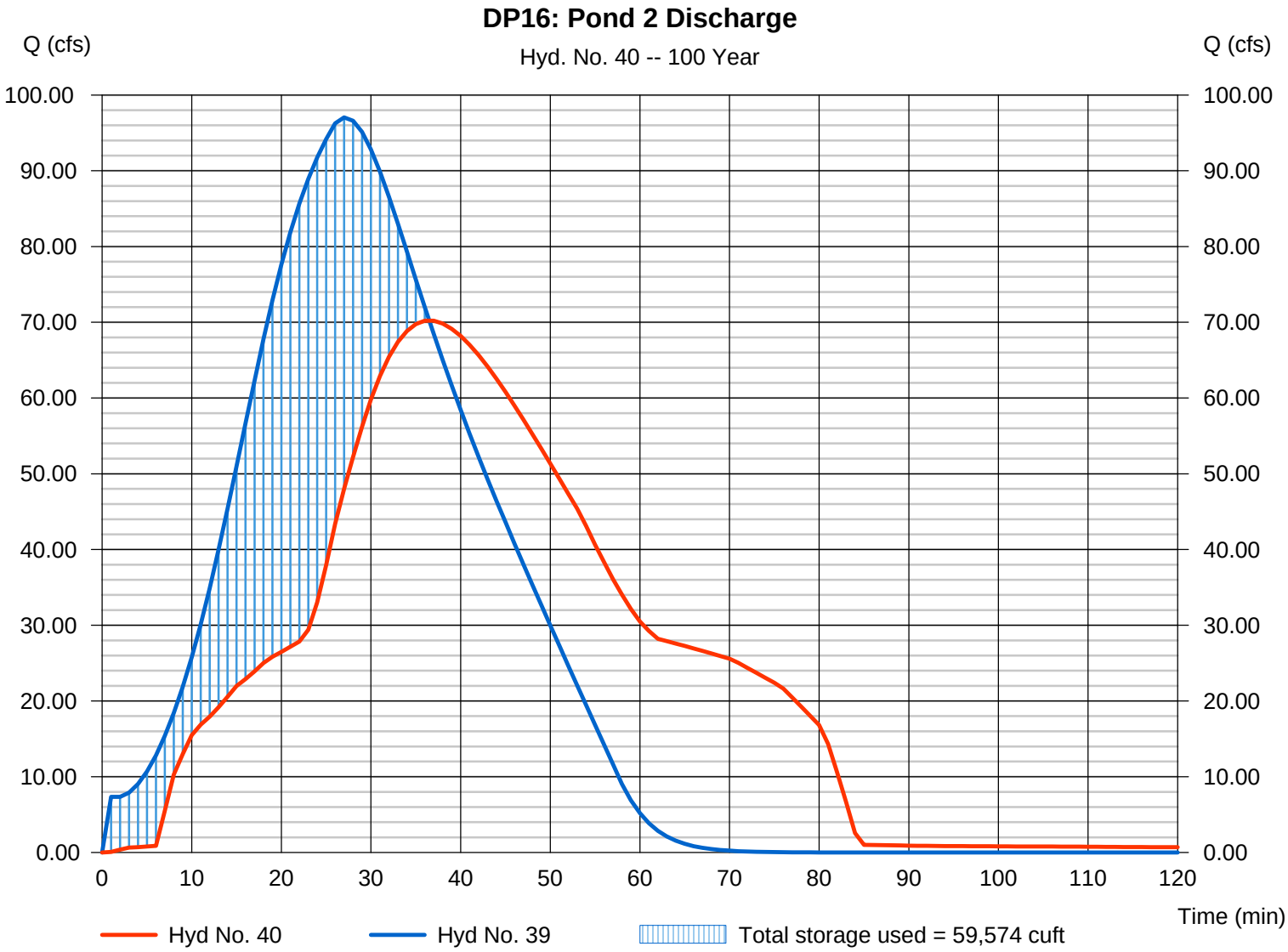
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 40

DP16: Pond 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	70.20 cfs
Storm frequency	=	100 yrs	Time to peak	=	37 min
Time interval	=	1 min	Hyd. volume	=	175,864 cuft
Inflow hyd. No.	=	39 - Rt. DP14 to DP15 (Bioswale)	Max. Elevation	=	5320.46 ft
Reservoir name	=	Detention Pond 2	Max. Storage	=	59,574 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 2 - Detention Pond 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5316.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5316.00	278	0	0
1.00	5317.00	1,875	958	958
2.00	5318.00	7,253	4,271	5,230
3.00	5319.00	20,244	13,203	18,433
4.00	5320.00	31,360	25,598	44,031
4.50	5320.50	36,454	16,936	60,967
5.00	5321.00	42,359	19,683	80,649

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 5316.00	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.15	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	No	No	No

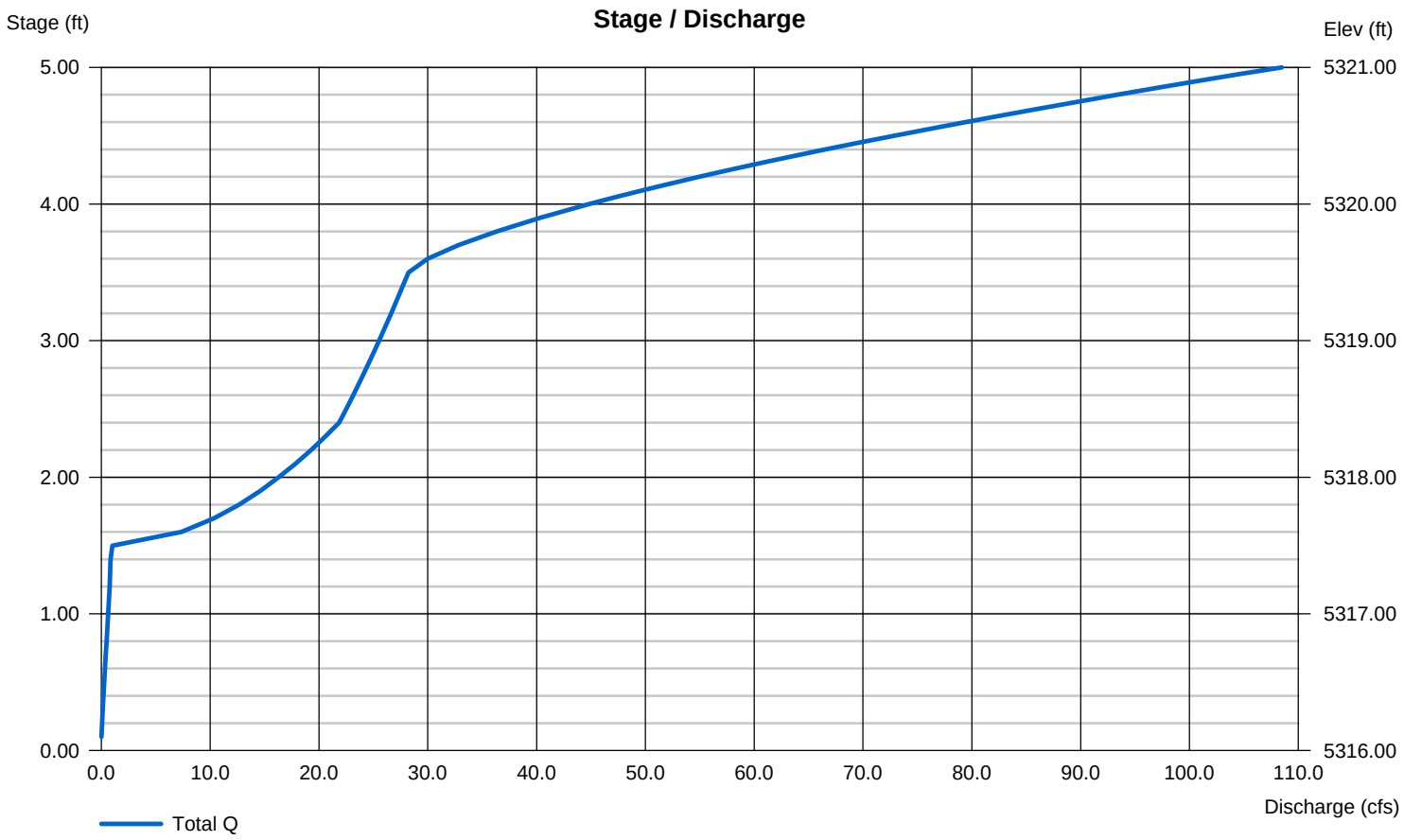
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 5319.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Broad	---	Broad	---
Multi-Stage	= No	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).



Hydrograph Report

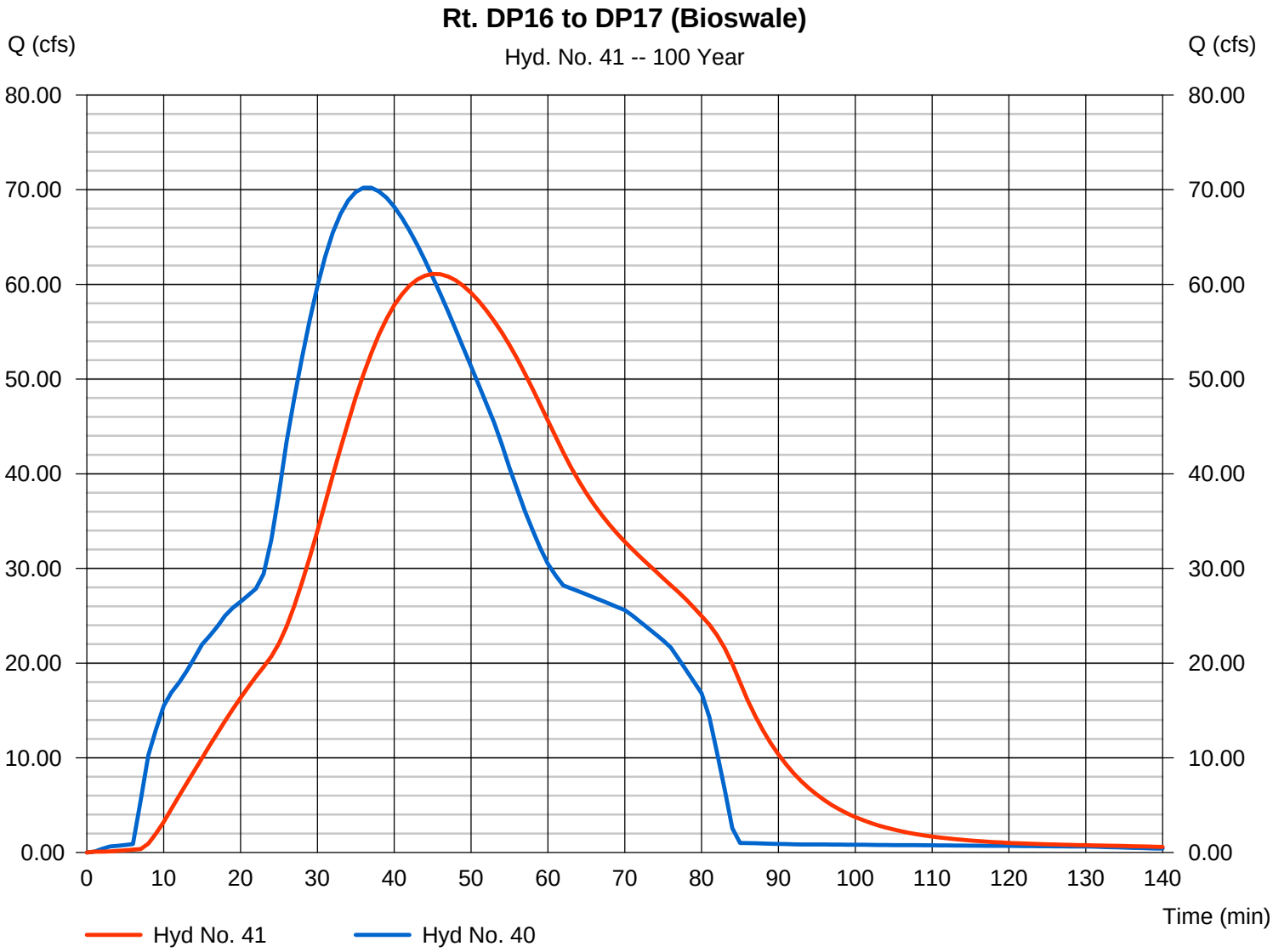
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 41

Rt. DP16 to DP17 (Bioswale)

Hydrograph type	=	Reach	Peak discharge	=	61.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	45 min
Time interval	=	1 min	Hyd. volume	=	175,873 cuft
Inflow hyd. No.	=	40 - DP16: Pond 2 Discharge	Section type	=	Trapezoidal
Reach length	=	1230.0 ft	Channel slope	=	0.2 %
Manning's n	=	0.030	Bottom width	=	8.0 ft
Side slope	=	4.0:1	Max. depth	=	4.0 ft
Rating curve x	=	0.481	Rating curve m	=	1.359
Ave. velocity	=	1.79 ft/s	Routing coeff.	=	0.1121

Modified Att-Kin routing method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 43

A

Hydrograph type	=	Rational	Peak discharge	=	8.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	11,493 cuft
Drainage area	=	2.350 ac	Runoff coeff.	=	0.66
Intensity	=	5.652 in/hr	Tc by User	=	19.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3

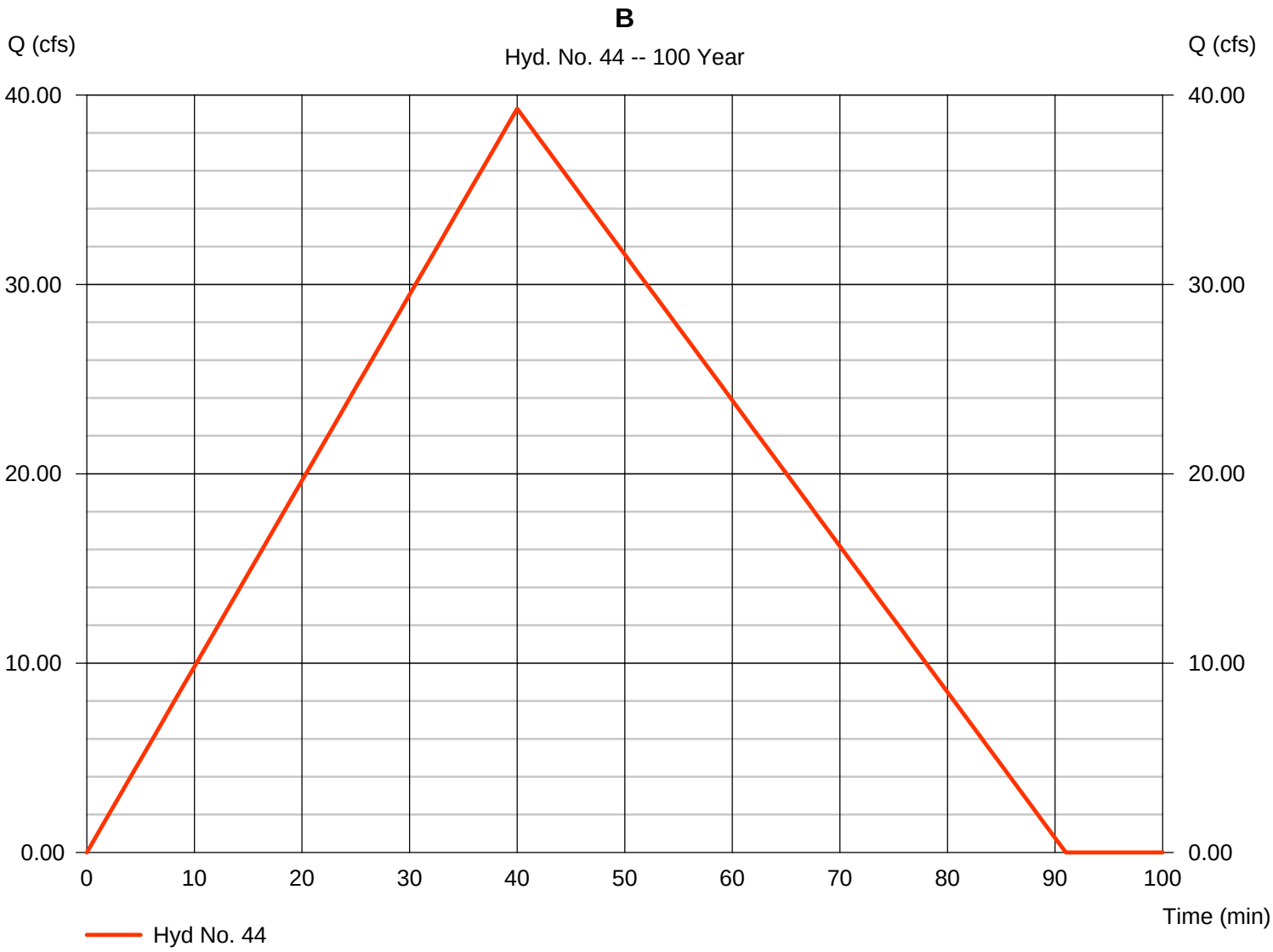
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 44

B

Hydrograph type	=	Rational	Peak discharge	=	39.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	40 min
Time interval	=	1 min	Hyd. volume	=	108,409 cuft
Drainage area	=	16.610 ac	Runoff coeff.	=	0.7
Intensity	=	3.378 in/hr	Tc by User	=	40.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



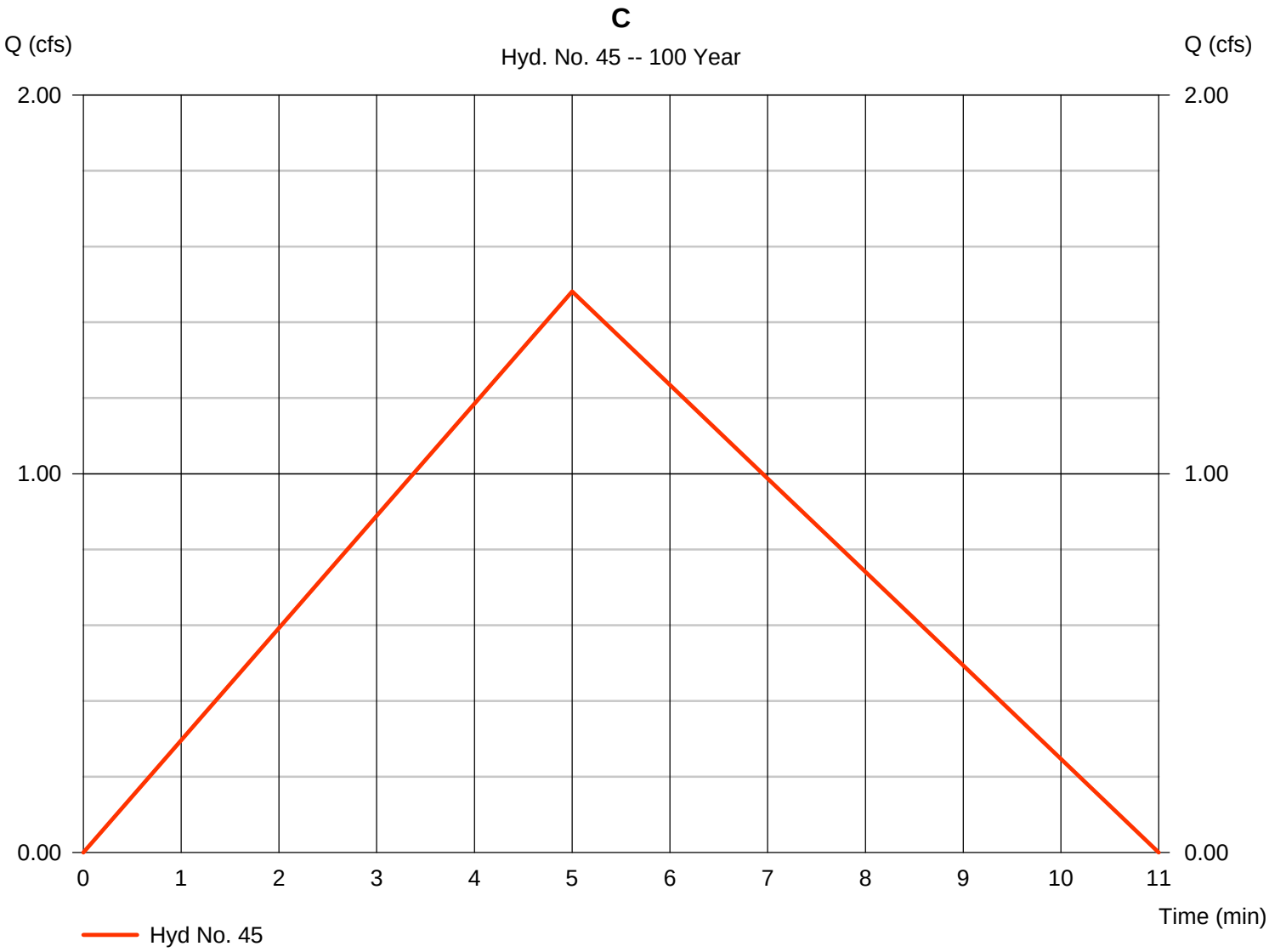
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 45

C

Hydrograph type	=	Rational	Peak discharge	=	1.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.64
Intensity	=	11.574 in/hr	Tc by User	=	5.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



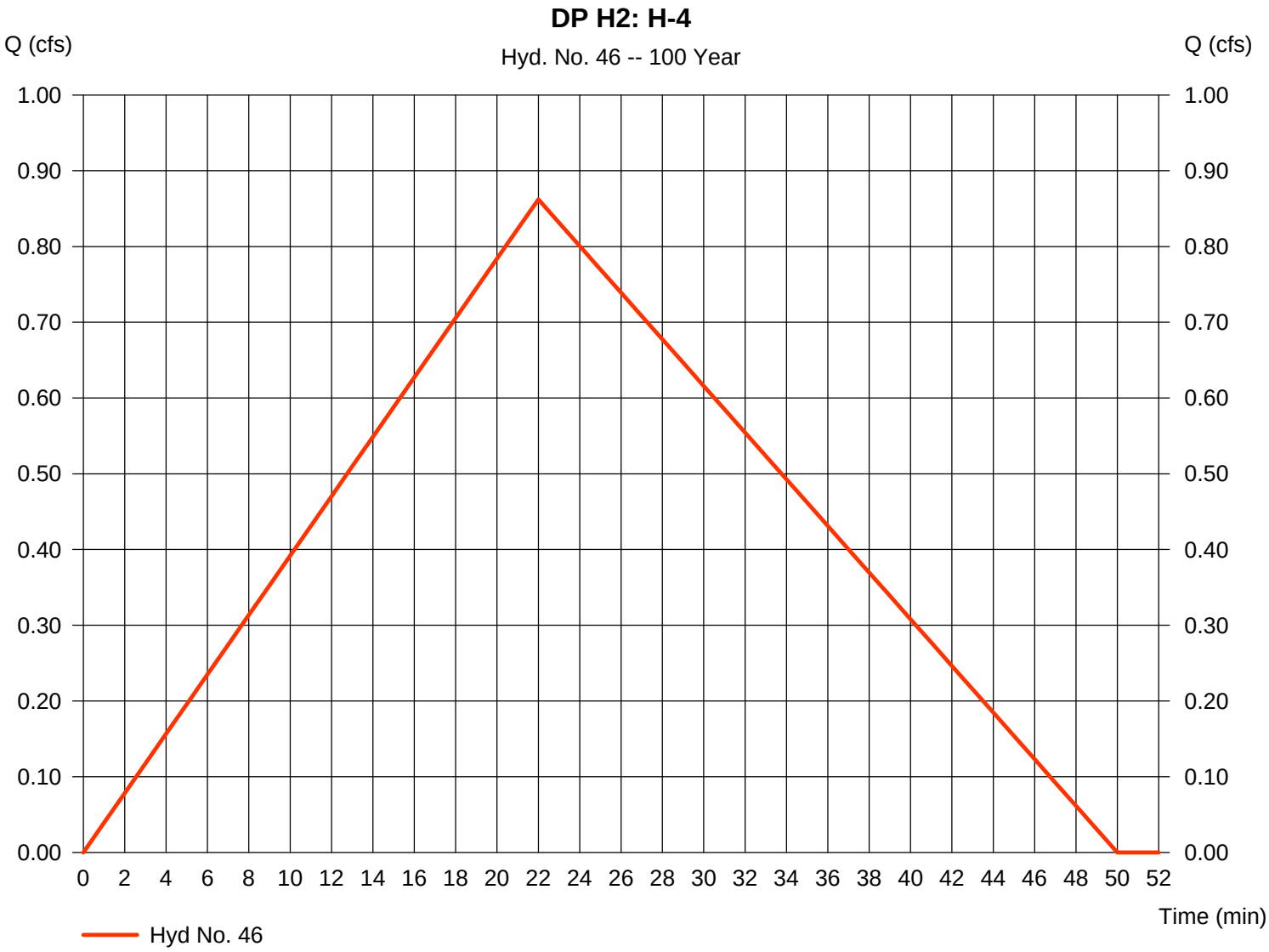
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 46

DP H2: H-4

Hydrograph type	=	Rational	Peak discharge	=	0.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	22 min
Time interval	=	1 min	Hyd. volume	=	1,309 cuft
Drainage area	=	0.280 ac	Runoff coeff.	=	0.6
Intensity	=	5.132 in/hr	Tc by User	=	22.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



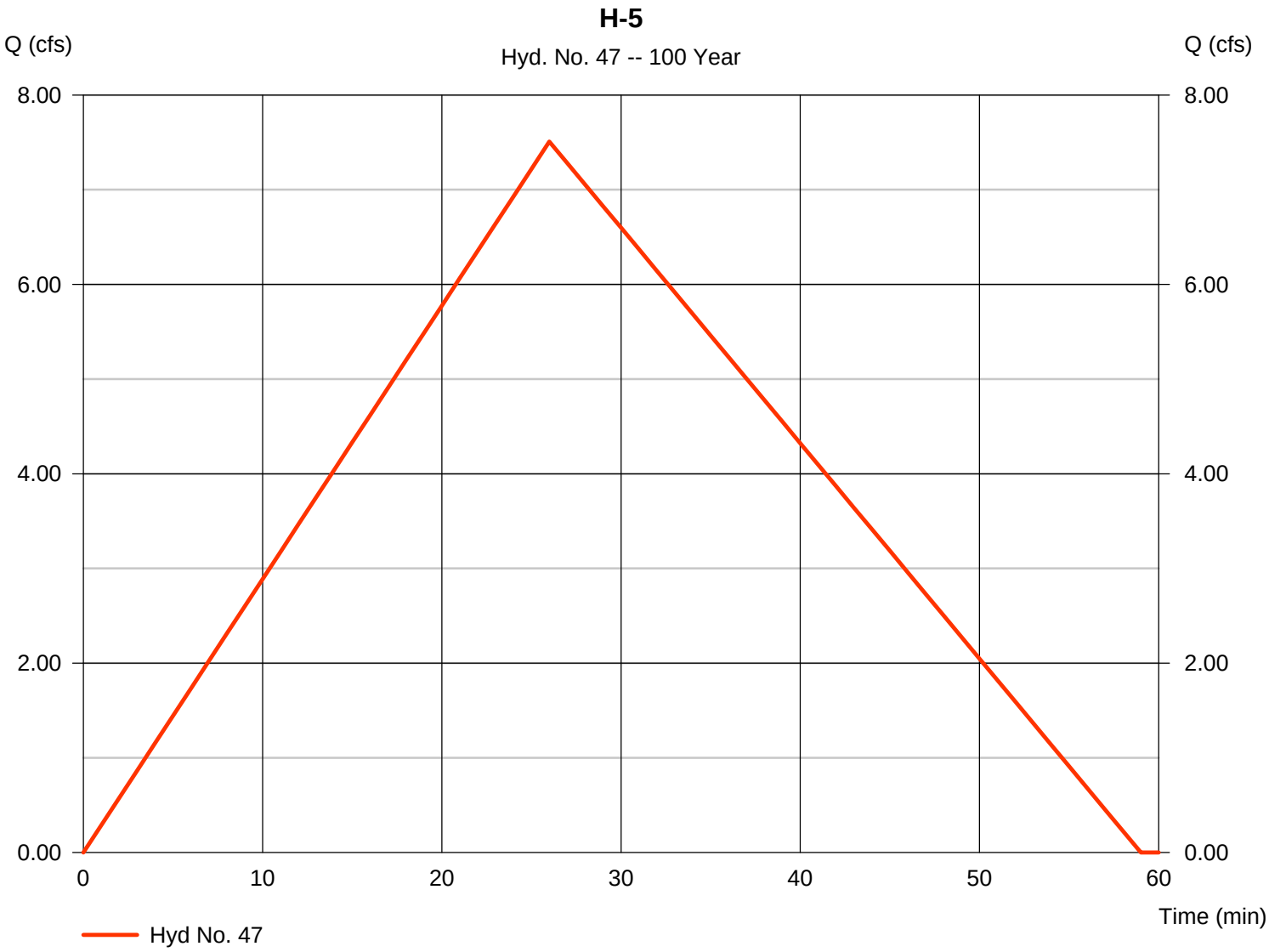
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 47

H-5

Hydrograph type	=	Rational	Peak discharge	=	7.508 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	13,469 cuft
Drainage area	=	2.730 ac	Runoff coeff.	=	0.6
Intensity	=	4.584 in/hr	Tc by User	=	26.00 min
IDF Curve	=	boulder.idf	Asc/Rec limb fact	=	1/1.3



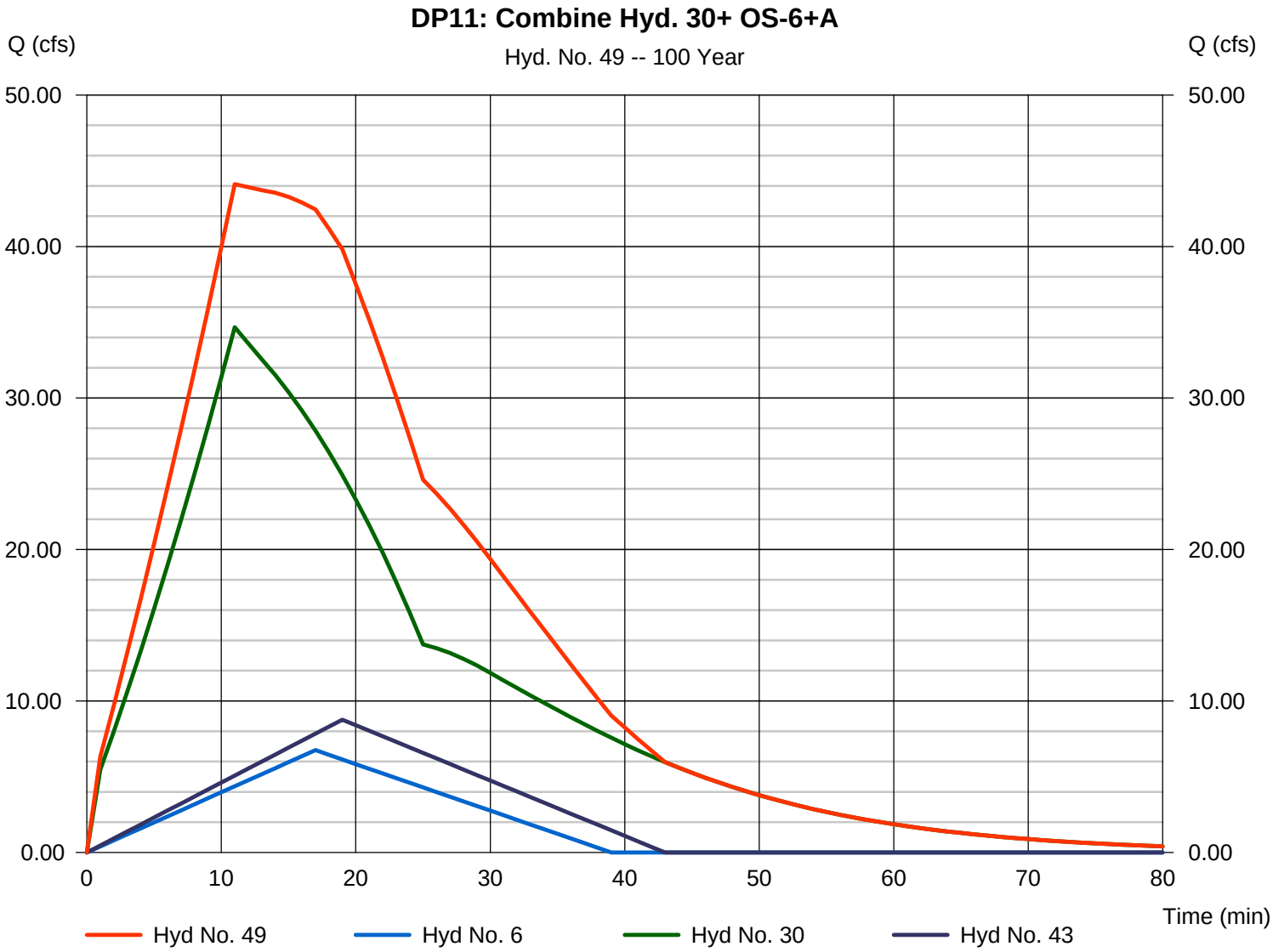
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 49

DP11: Combine Hyd. 30+ OS-6+A

Hydrograph type	= Combine	Peak discharge	= 44.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 11 min
Time interval	= 1 min	Hyd. volume	= 68,350 cuft
Inflow hyds.	= 6, 30, 43	Contrib. drain. area	= 3.940 ac



Hydrograph Report

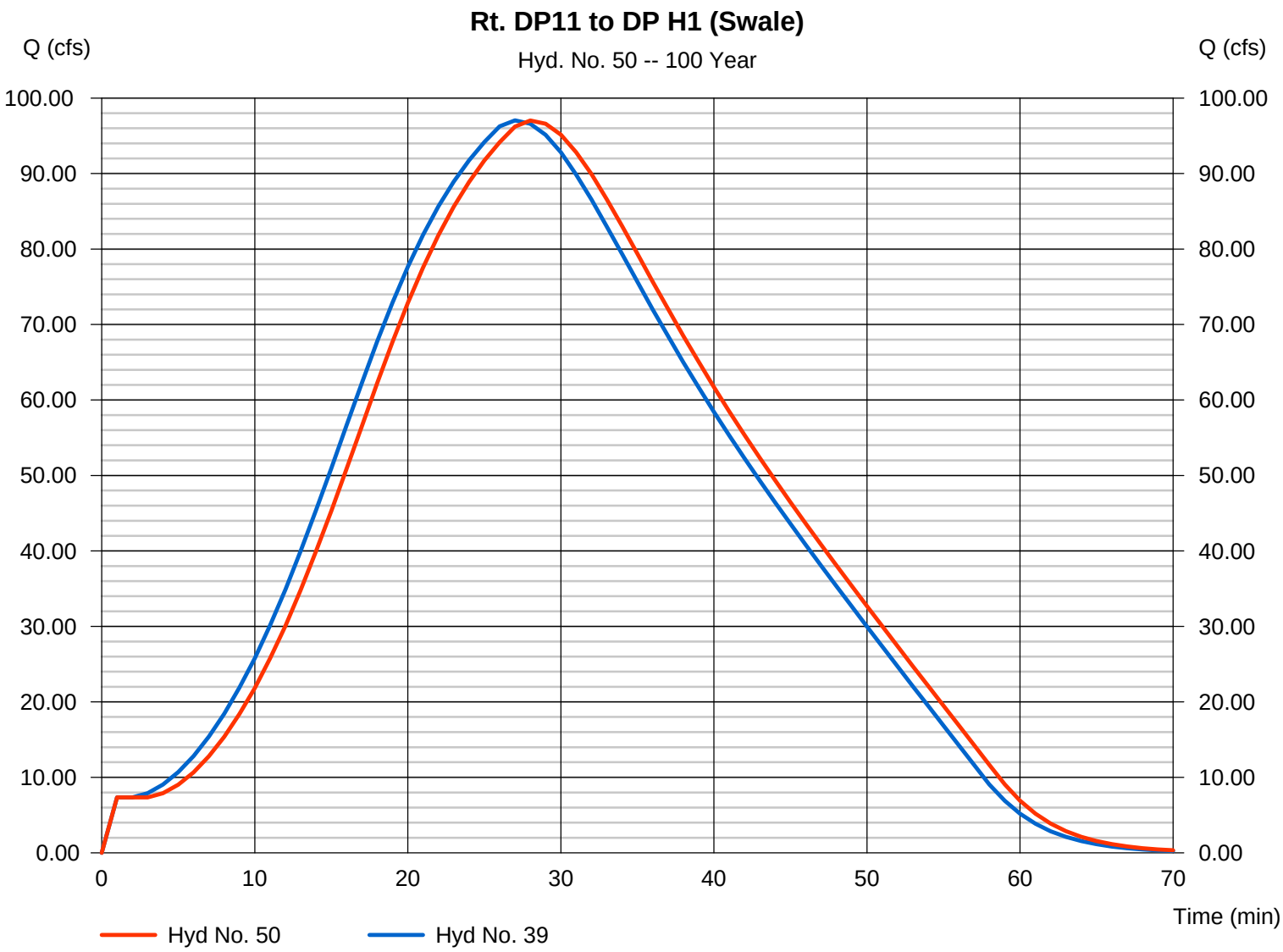
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 50

Rt. DP11 to DP H1 (Swale)

Hydrograph type	=	Reach	Peak discharge	=	97.04 cfs
Storm frequency	=	100 yrs	Time to peak	=	28 min
Time interval	=	1 min	Hyd. volume	=	176,315 cuft
Inflow hyd. No.	=	39 - Rt. DP14 to DP15 (Bioswale)	Section type	=	Trapezoidal
Reach length	=	215.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	3.0:1	Max. depth	=	3.0 ft
Rating curve x	=	2.079	Rating curve m	=	1.321
Ave. velocity	=	5.29 ft/s	Routing coeff.	=	0.9872

Modified Att-Kin routing method used.



Hydrograph Report

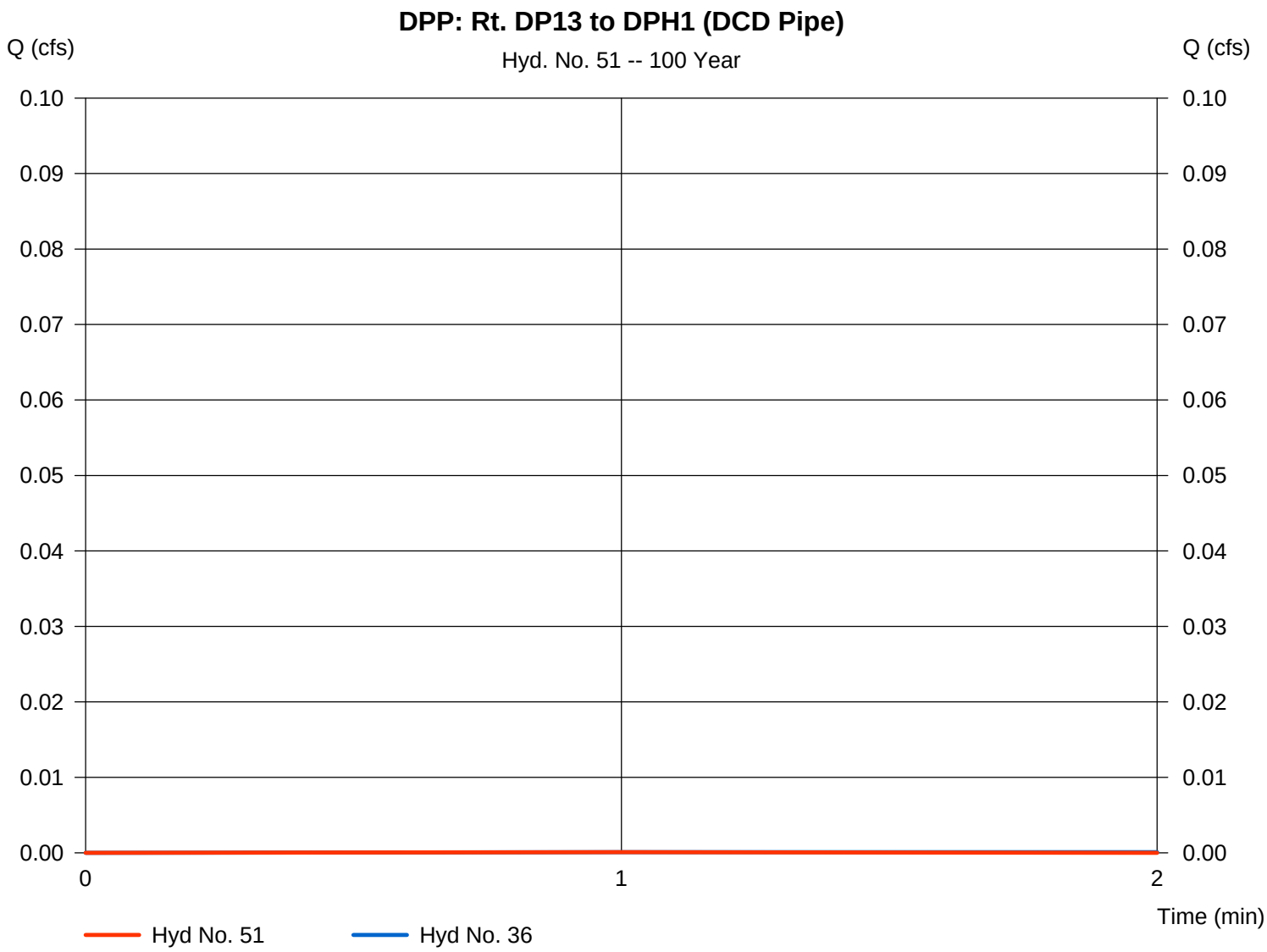
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 51

DPP: Rt. DP13 to DPH1 (DCD Pipe)

Hydrograph type	=	Reach	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	1 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	36 - DP13: Split Flow to DCD Pipe	Section type	=	Circular
Reach length	=	1080.0 ft	Channel slope	=	0.3 %
Manning's n	=	0.013	Bottom width	=	3.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.810	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0000

Modified Att-Kin routing method used.



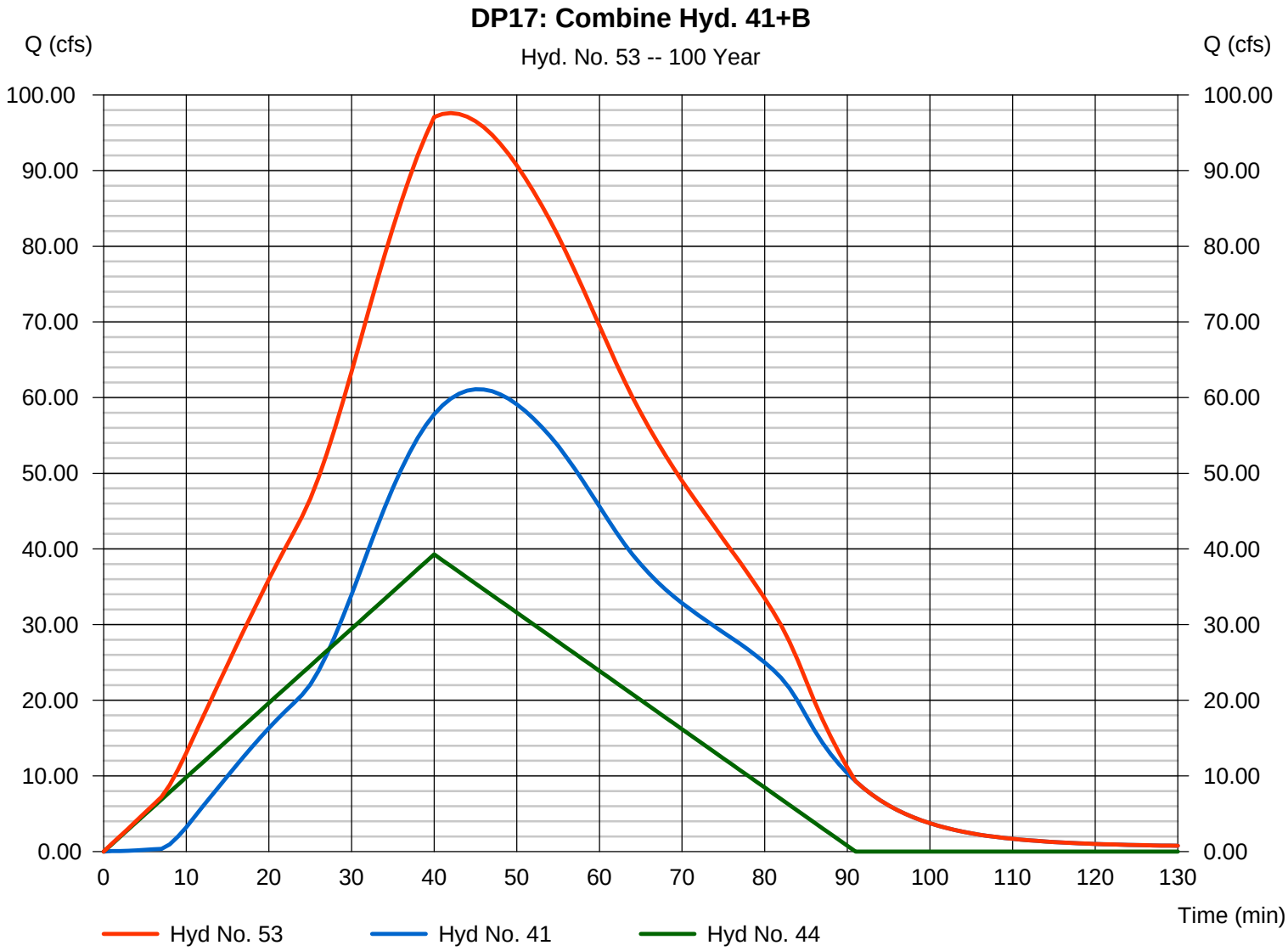
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 53

DP17: Combine Hyd. 41+B

Hydrograph type	=	Combine	Peak discharge	=	97.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	42 min
Time interval	=	1 min	Hyd. volume	=	283,104 cuft
Inflow hyds.	=	41, 44	Contrib. drain. area	=	16.610 ac



Hydrograph Report

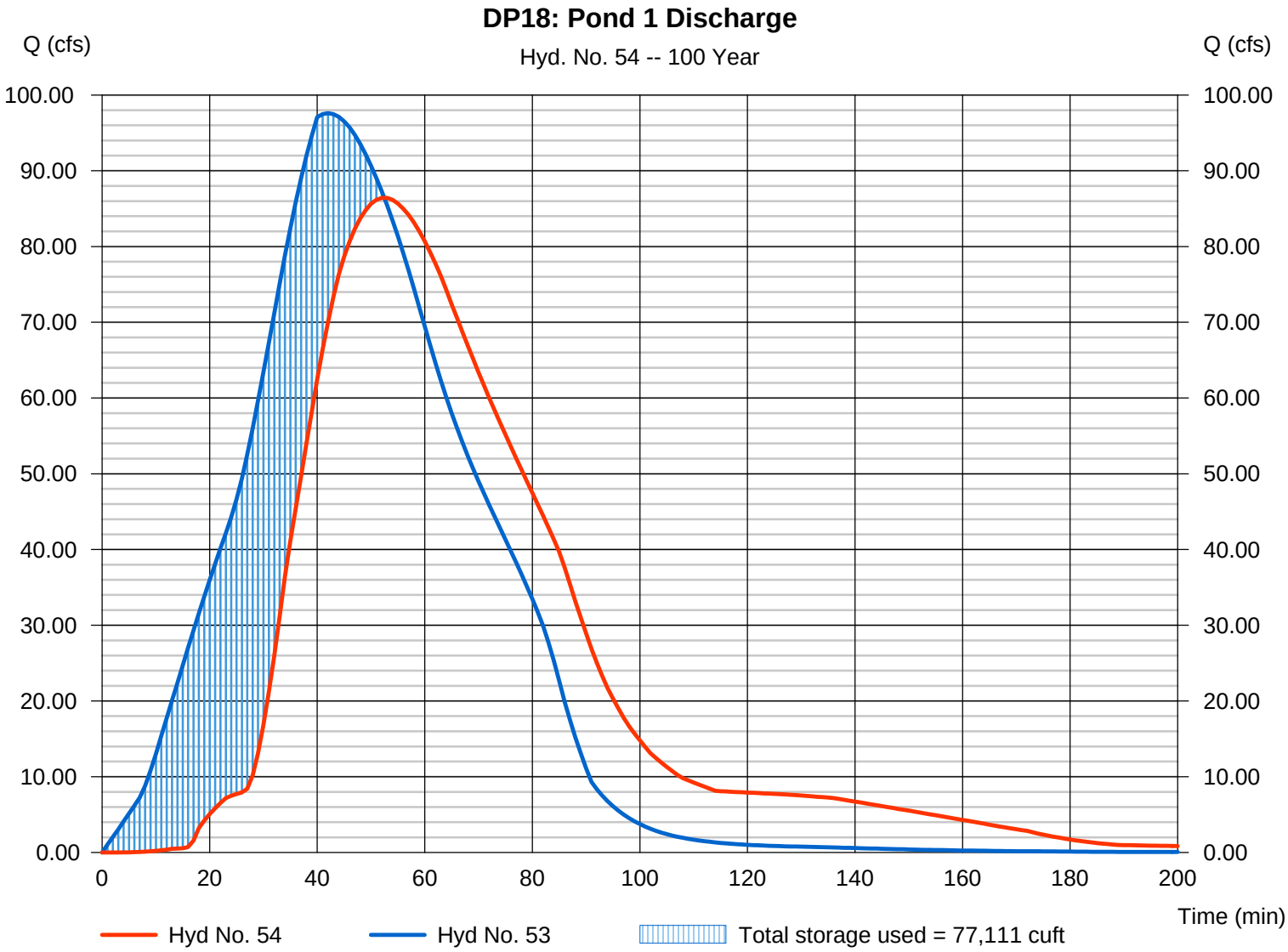
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 54

DP18: Pond 1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	86.41 cfs
Storm frequency	=	100 yrs	Time to peak	=	52 min
Time interval	=	1 min	Hyd. volume	=	283,072 cuft
Inflow hyd. No.	=	53 - DP17: Combine Hyd. 41+B	Max. Elevation	=	5315.62 ft
Reservoir name	=	Detention Pond	Max. Storage	=	77,111 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Pond No. 1 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 5312.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5312.00	2,863	0	0
1.00	5313.00	10,803	6,408	6,408
2.00	5314.00	23,511	16,749	23,157
3.00	5315.00	36,144	29,599	52,756
3.50	5315.50	41,872	19,485	72,241
4.00	5316.00	41,872	20,934	93,175

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.50	0.00	0.00	0.00
Span (in)	= 15.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 5312.00	0.00	0.00	0.00
Length (ft)	= 1.00	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	No	No	No

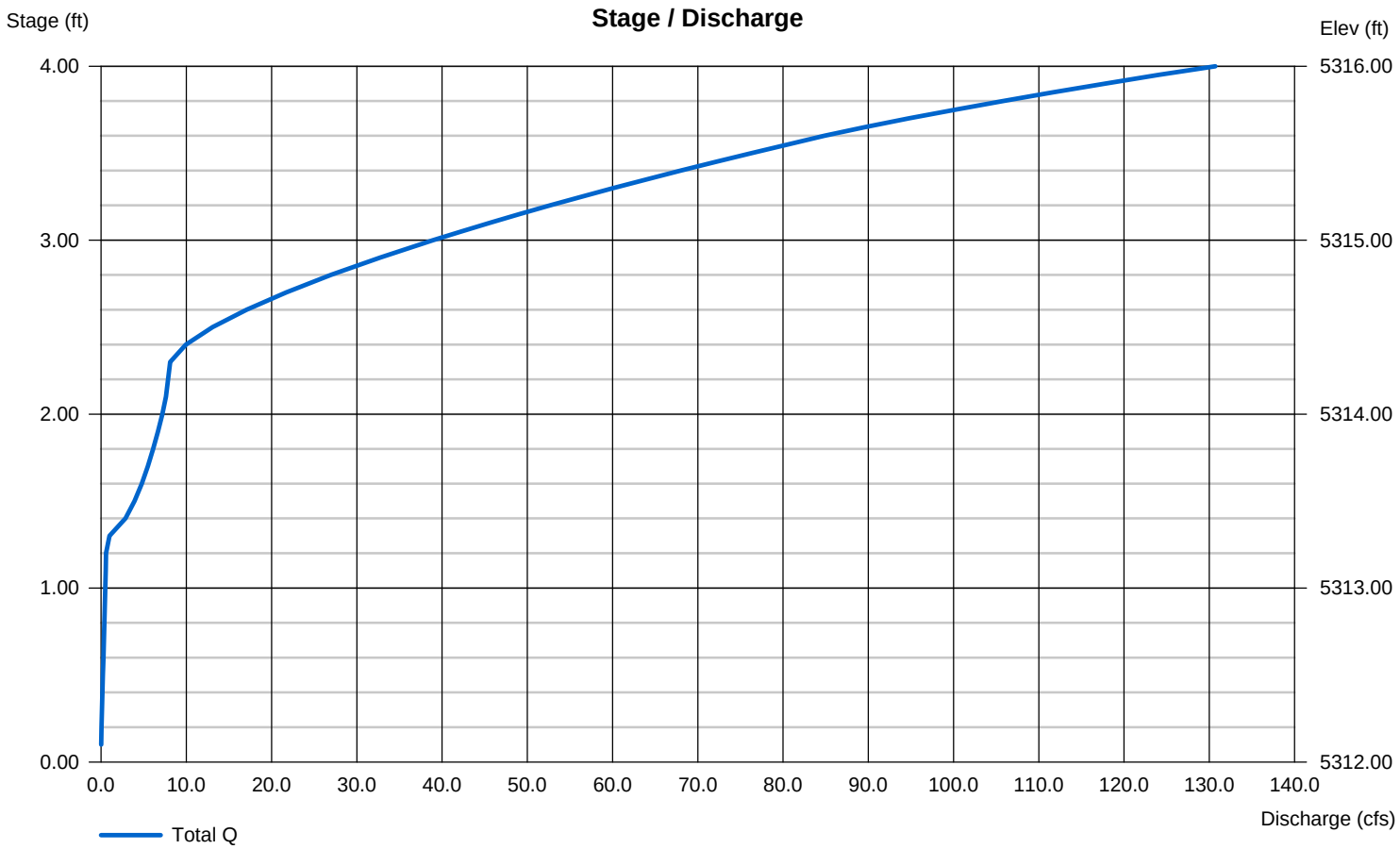
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	10.00	0.00	0.00
Crest El. (ft)	= 5314.30	5315.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	Broad	---	---
Multi-Stage	= No	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).



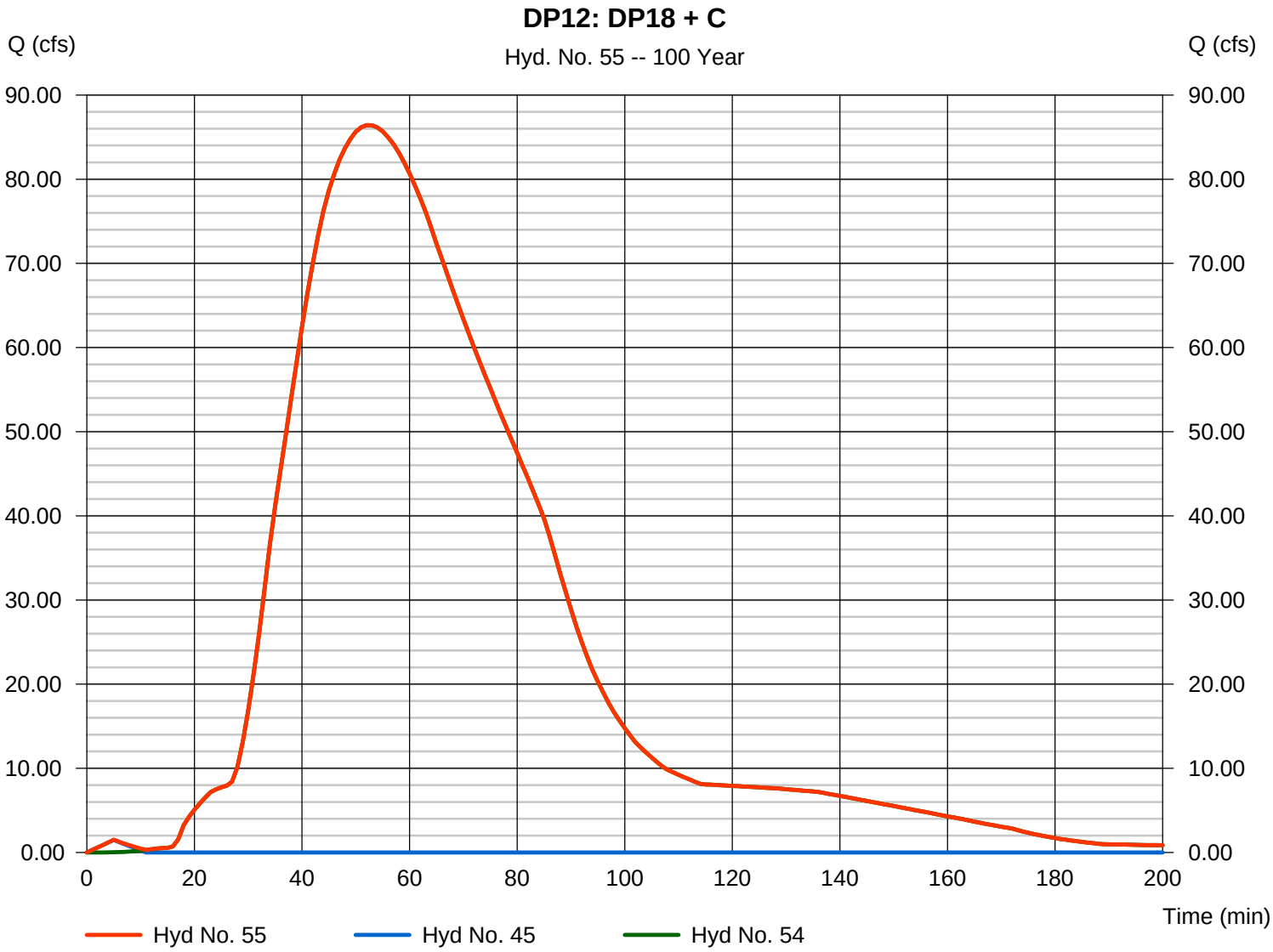
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 55

DP12: DP18 + C

Hydrograph type	= Combine	Peak discharge	= 86.41 cfs
Storm frequency	= 100 yrs	Time to peak	= 52 min
Time interval	= 1 min	Hyd. volume	= 283,561 cuft
Inflow hyds.	= 45, 54	Contrib. drain. area	= 0.200 ac



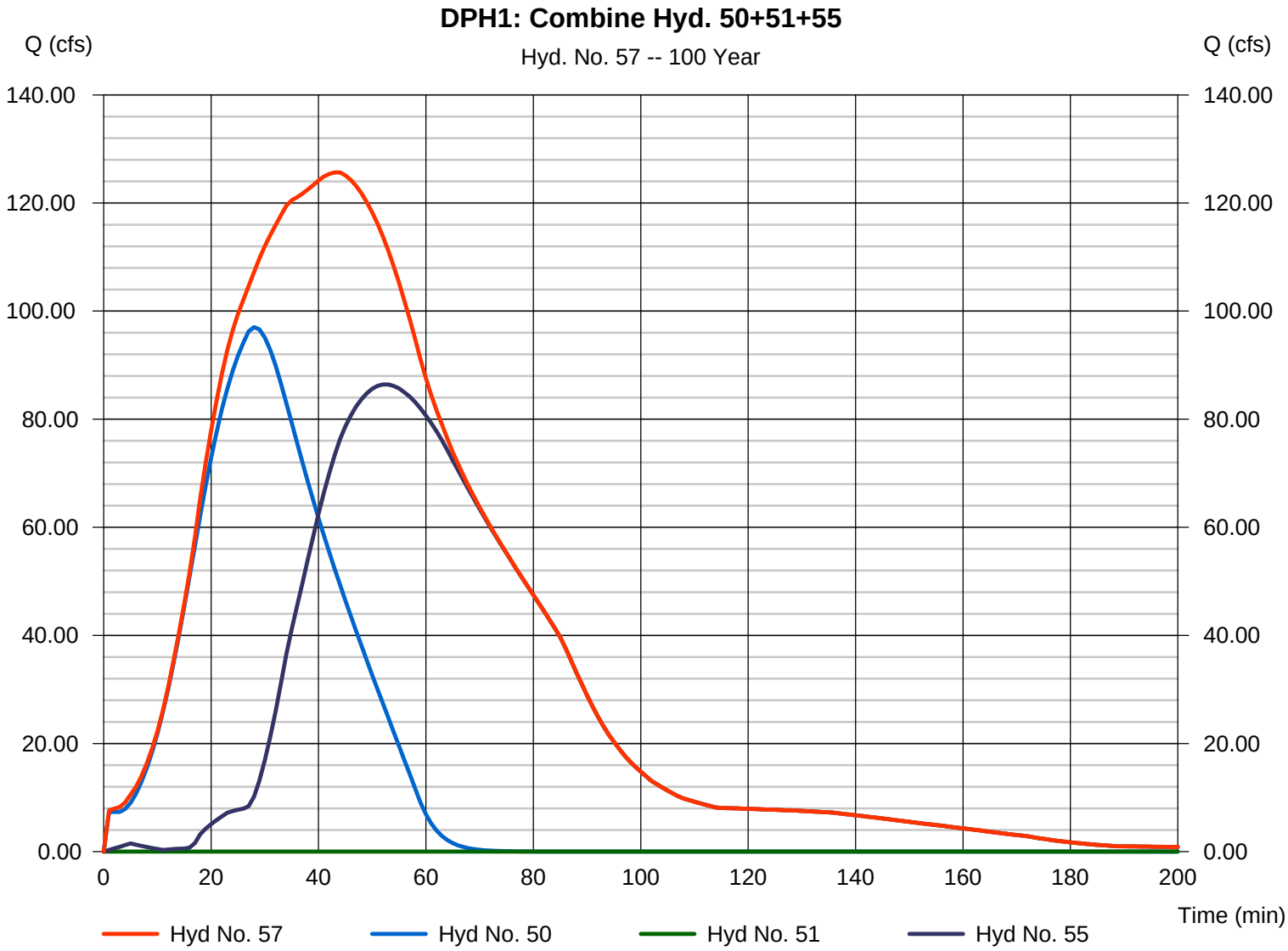
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 57

DPH1: Combine Hyd. 50+51+55

Hydrograph type	= Combine	Peak discharge	= 125.66 cfs
Storm frequency	= 100 yrs	Time to peak	= 44 min
Time interval	= 1 min	Hyd. volume	= 459,875 cuft
Inflow hyds.	= 50, 51, 55	Contrib. drain. area	= 0.000 ac



Hydrograph Report

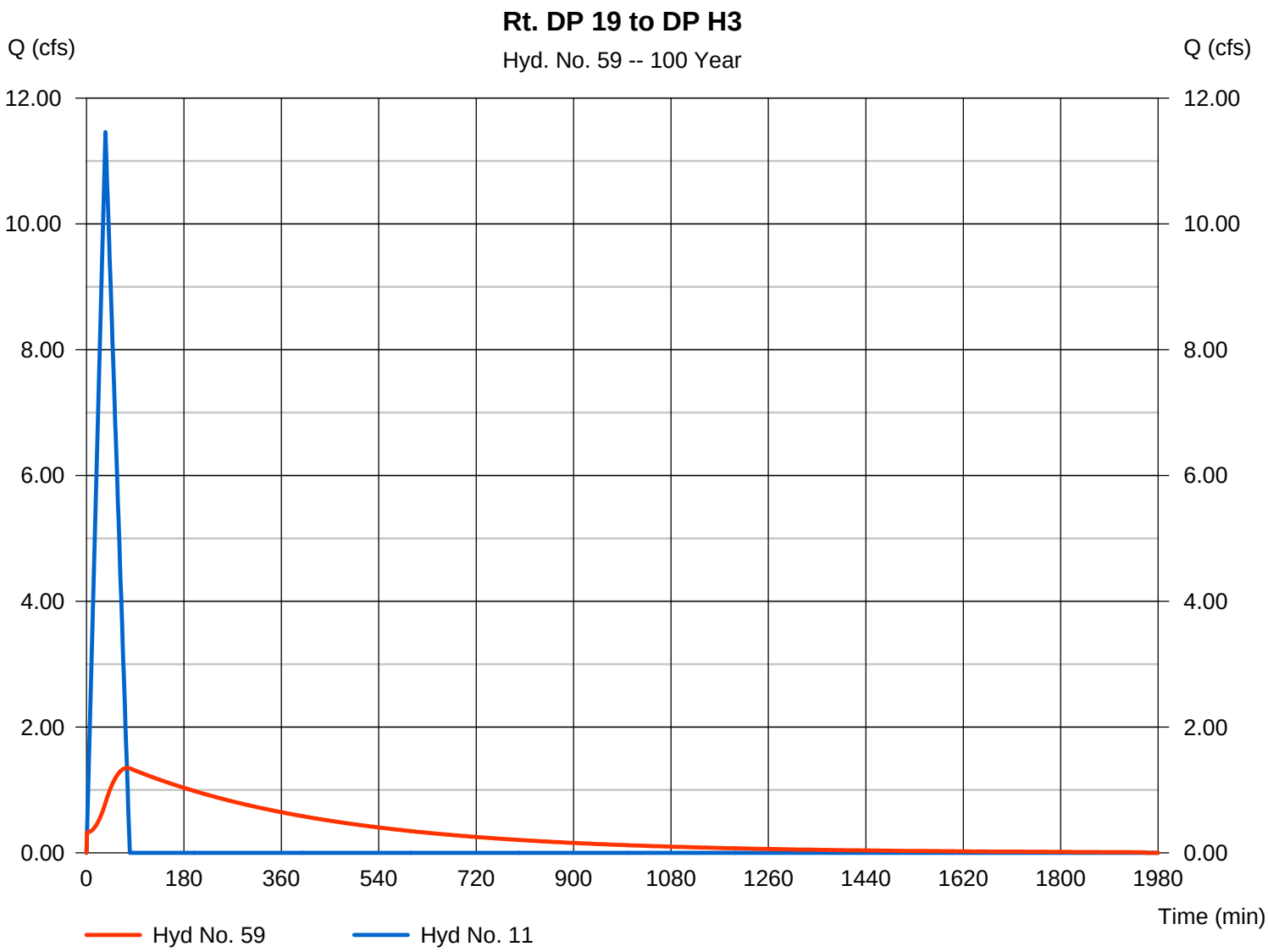
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 59

Rt. DP 19 to DP H3

Hydrograph type	=	Reach	Peak discharge	=	1.351 cfs
Storm frequency	=	100 yrs	Time to peak	=	75 min
Time interval	=	1 min	Hyd. volume	=	34,803 cuft
Inflow hyd. No.	=	11 - DP 19: OS-11	Section type	=	Trapezoidal
Reach length	=	170.0 ft	Channel slope	=	1.5 %
Manning's n	=	0.035	Bottom width	=	15.0 ft
Side slope	=	50.0:1	Max. depth	=	0.3 ft
Rating curve x	=	0.856	Rating curve m	=	0.302
Ave. velocity	=	0.02 ft/s	Routing coeff.	=	0.0026

Modified Att-Kin routing method used.



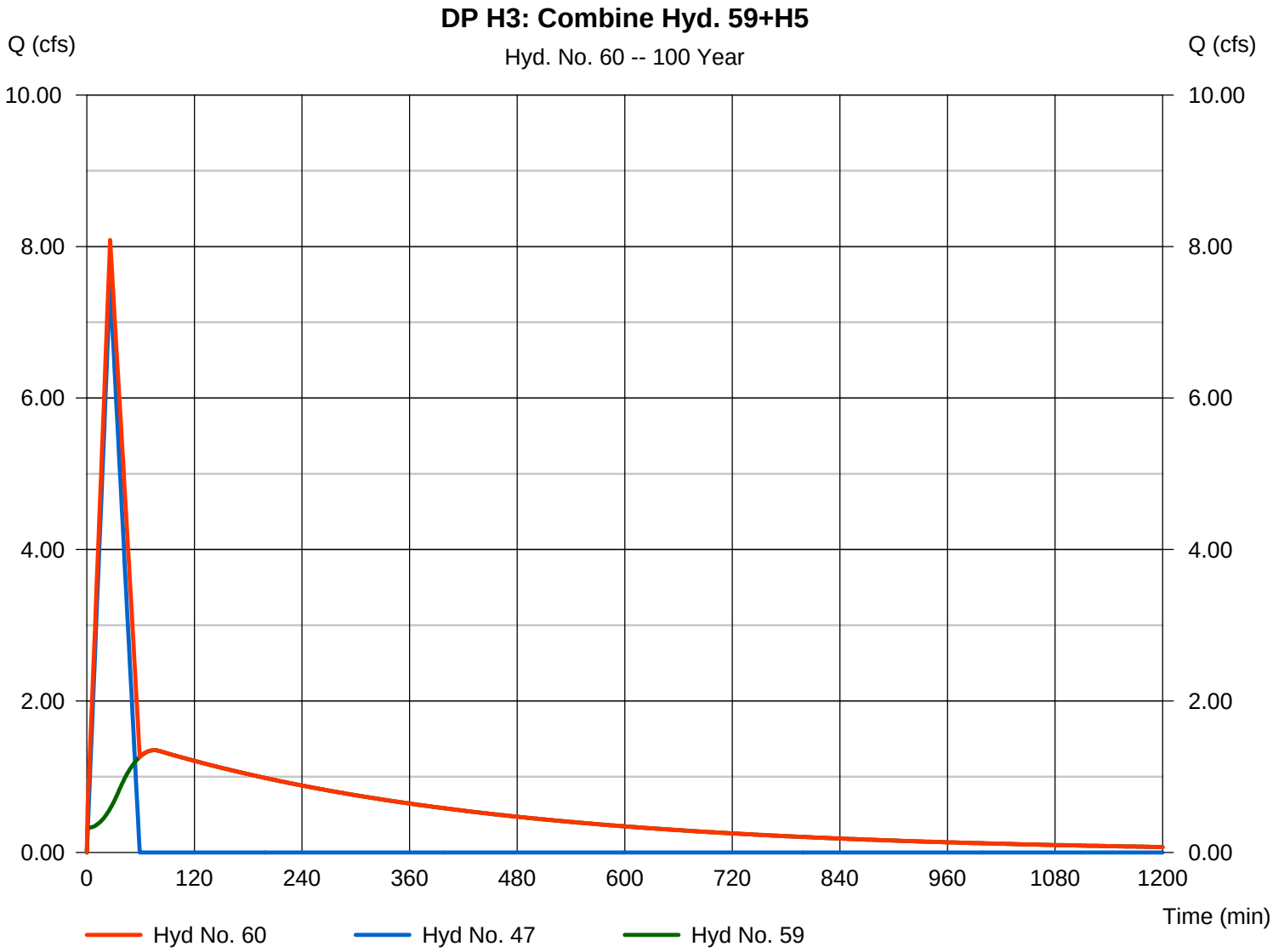
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 20, 2009

Hyd. No. 60

DP H3: Combine Hyd. 59+H5

Hydrograph type	=	Combine	Peak discharge	=	8.087 cfs
Storm frequency	=	100 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	48,092 cuft
Inflow hyds.	=	47, 59	Contrib. drain. area	=	2.730 ac



Basin Characteristics

Run-off Analysis

Developed Conditions

A

Drexel, Barrell & Co.

Project: Hogan Pancost Property **Date:** 11/04/08
Project No: E5495.1 **Calculated By:** MLM

Basin: **A**

Area [acres] = 2.35

Description:

Catchment Composition:

Surface Characteristic[1]	Sub-Area [acres]	I [%]	Runoff Coefficients			
			C_2	C_5	C_{10}	C_{100}
Streets/Parking Areas: Asphalt	0.00	100	0.87	0.88	0.90	0.93
Concrete Drives and Walks	0.00	96	0.85	0.87	0.90	0.92
Residential: Single Family	1.45	40	0.40	0.45	0.50	0.70
Residential: Multi-Unit (attached)	0.00	70	0.65	0.70	0.70	0.80
Residential: Multi-Unit (detached)	0.00	50	0.5	0.55	0.60	0.75
Landscape Areas	0.90	0	0.1	0.20	0.30	0.60

[1] *Table 7-2, City of Boulder "Design and Construction Standards"*

Weighted Percent Imperviousness [%]: **24.68**

Weighted Runoff Coefficients:

C_2	C_5	C_{10}	C_{100}
0.29	**0.35**	**0.42**	**0.66**

Sheet Flow:

L_i [ft] = 95
S_i [%] = 4.70

t_i [min] = 7.81
$t_i=L_i/180+10$ [min] = 10.53

Concentrated Flow:

L_{t1} [FT] = 935 L_{t2} [FT] =
S_{t1} [%] = 0.90 S_{t2} [%] =
V_{t1} [fps] = 1.40 V_{t2} [fps] =

Total Concentrated Flow Length: L_t [ft] = 935
Weighted Average Flow Velocity: V_t [fps] = 1.40
t_t [min] = 11.13

Time of Concentration:

$t_c=t_i+t_t$ [min] = 18.94 **t_c [min] =** **18.94**
t_c=5 min = 5.00

Basin Characteristics

Run-off Analysis

Developed Conditions

B

Drexel, Barrell & Co.

Project: Hogan Pancost Property **Date:** 11/04/08
Project No: E5495.1 **Calculated By:** MLM

Basin: **B**

Area [acres] = 16.61

Description:

Catchment Composition:

Surface Characteristic[1]	Sub-Area [acres]	I [%]	Runoff Coefficients			
			C_2	C_5	C_{10}	C_{100}
Streets/Parking Areas: Asphalt	0.00	100	0.87	0.88	0.90	0.93
Concrete Drives and Walks	0.00	96	0.85	0.87	0.90	0.92
Residential: Single Family	10.85	40	0.4	0.45	0.50	0.70
Residential: Multi-Unit (attached)	3.07	70	0.65	0.70	0.70	0.80
Residential: Multi-Unit (detached)	0.00	50	0.5	0.55	0.60	0.75
Landscape Areas	2.69	0	0.1	0.20	0.30	0.60

[1] *Table 7-2, City of Boulder "Design and Construction Standards"*

Weighted Percent Imperviousness [%]: **39.07**

Weighted Runoff Coefficients:

C_2	C_5	C_{10}	C_{100}
0.40	**0.46**	**0.50**	**0.70**

Sheet Flow:

L_i [ft] = 140
S_i [%] = 1.00

t_i [min] = 13.72
$t_i=L_i/180+10$ [min] = 10.78

Concentrated Flow:

L_{t1} [FT] = 1570 L_{t2} [FT] =
S_{t1} [%] = 0.40 S_{t2} [%] =
V_{t1} [fps] = 1.00 V_{t2} [fps] =

Total Concentrated Flow Length: L_t [ft] = 1570
Weighted Average Flow Velocity: V_t [fps] = 1.00
t_t [min] = 26.17

Time of Concentration:

$t_c=t_i+t_t$ [min] = 39.89 **t_c [min] = 39.89**
t_c=5 min = 5.00

Basin Characteristics

Run-off Analysis

Developed Conditions

C

Drexel, Barrell & Co.

Project: Hogan Pancost Property **Date:** 11/04/08
Project No: E5495.1 **Calculated By:** MLM

Basin: **C**

Area [acres] = 0.20

Description:

Catchment Composition:

Surface Characteristic[1]	Sub-Area [acres]	I [%]	Runoff Coefficients			
			C_2	C_5	C_{10}	C_{100}
Streets/Parking Areas: Asphalt	0.00	100	0.87	0.88	0.90	0.93
Concrete Drives and Walks	0.00	96	0.85	0.87	0.90	0.92
Residential: Single Family	0.07	40	0.4	0.45	0.50	0.70
Residential: Multi-Unit (attached)	0.00	70	0.65	0.70	0.70	0.80
Residential: Multi-Unit (detached)	0.00	50	0.5	0.55	0.60	0.75
Landscape Areas	0.13	0	0.1	0.20	0.30	0.60

[1] *Table 7-2, City of Boulder "Design and Construction Standards"*

Weighted Percent Imperviousness [%]: **14.00**

Weighted Runoff Coefficients:

C_2	C_5	C_{10}	C_{100}
0.21	**0.29**	**0.37**	**0.64**

Sheet Flow:

L_i [ft] = 43
S_i [%] = 7.50

t_i [min] = 4.90
$t_i=L_i/180+10$ [min] = 10.24

Concentrated Flow:

L_{t1} [FT] = 1 L_{t2} [FT] =
S_{t1} [%] = 1.00 S_{t2} [%] =
V_{t1} [fps] = 1.00 V_{t2} [fps] =

Total Concentrated Flow Length: L_t [ft] = 1
Weighted Average Flow Velocity: V_t [fps] = 1.00
t_t [min] = 0.02

Time of Concentration:

$t_c=t_i+t_t$ [min] = 4.92 **t_c [min] =** **4.92**
t_c=5 min = 5.00