HYDROLOGICAL STUDY

FOR

WESTOVER SPORTING COMPLEX

WEST NORRITON TOWNSHIP
MONTGOMERY COUNTY, PA

PREPARED BY

EDWARD B. WALSH & ASSOCIATES, INC.
125 DOWLIN FORGE ROAD
EXTON, PA 19341
610-903-0060

DECEMBER 23, 2014

SECTION ONE

NARRATIVE REPORT

Project Narrative:

The owners of the Westover Gold Club are proposing to develop the tract into a sporting complex and banquet hall facility. The 90 acre tract of ground is located on the west side of South Schuylkill Avenue and the north side of Port Indian Road in West Norriton Township. The property is zoned RE-Recreation. The proposed use of the site is consistent with the permitted uses in the Recreation Zoning District. The proposed uses include; a 50,000 S.F. banquet hall, skate park, picnic area, outdoor swimming pools, five soccer fields, 9-hole golf course, football field with track, five baseball fields, five basketball courts and 10 tennis courts. To meet the parking requirements for the noted uses, it is proposed to construct 1,801 parking squares. Access to the site will be provided via three driveways to existing roads. The driveways will go to South Schuylkill Avenue, Port Indian Road and Hemlock Road. The proposed structures will utilize public sanitary sewer and water.

Existing Features:

The site is currently a maintained functioning 18 hole golf course. The existing cover consists of maintained lawn area with scattered trees throughout the sire. There are two ponds on the site. The site generally slopes in a southerly direction. The majority of the site has a mild slope with some areas around 15 percent near Port Indian Road. A Williams Gas Pipeline easement traverses the tract in an east-west direction. The current facilities has access via a driveway to South Schuylkill Avenue.

Stormwater Management:

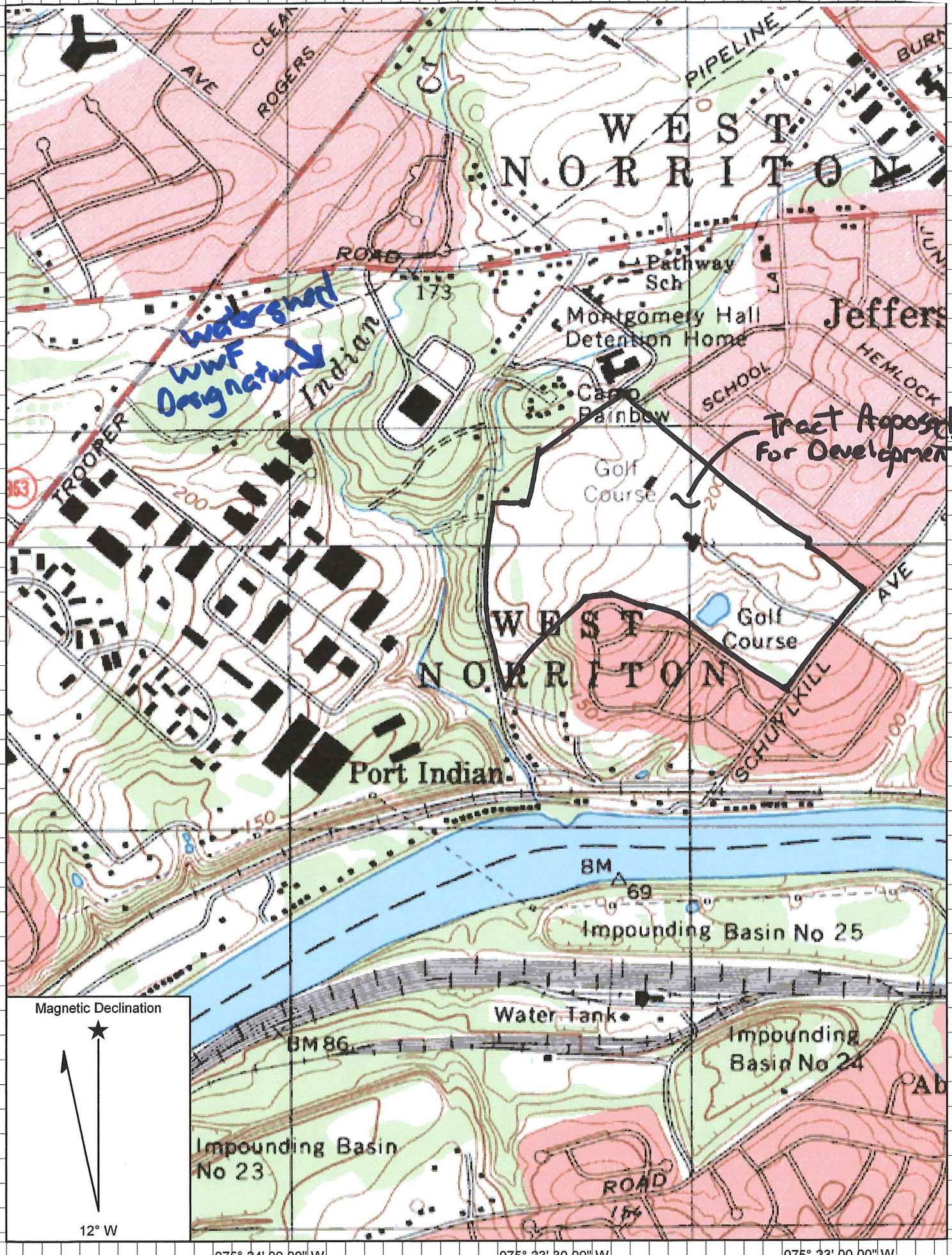
It is proposed to utilize multiple systems to ensure the rate of flow leaving the site does not increase and the volume of flow for storms up to and including the two year event does not increase. There are three separate watersheds on the site. One drains to the south and exits the site below the existing pond. The second watershed drains to Port Indian Road and the third one drains towards the western property line. To meet Township and DEP’s BMP regulations it is proposed to construct four new detention basins. Several of these basins will include forebays to

improve the water quality. In addition plunge pools will be installed at several of the basin outfalls. The existing pond will be modified to increase its storage capacity and to provide a forebay. To provide stormwater infiltration and the required volume reduction porous paving will be installed throughout the parking lots. The porous paving will encompass large areas to promote an even infiltration of water into the ground throughout the site. In addition the football field will be constructed with a subsurface to promote infiltration in the field area.

The hydrological analysis assumed a meadow cover for existing conditions for the entire fold course including the impervious areas associated with the cart paths, parking lots and existing building. To analyze the peak rate of flow the SCS method was utilized. The volume of runoff generated pre and post was analyzed with the DEP BMP worksheets. The flow rate leaving the site is decreased from existing conditions. Given the decrease in the rate of flow the stormwater systems and / or watercourses will have capacity to continue to convey the flow as it occurs in the current conditions.

Erosion and Sedimentation Control:

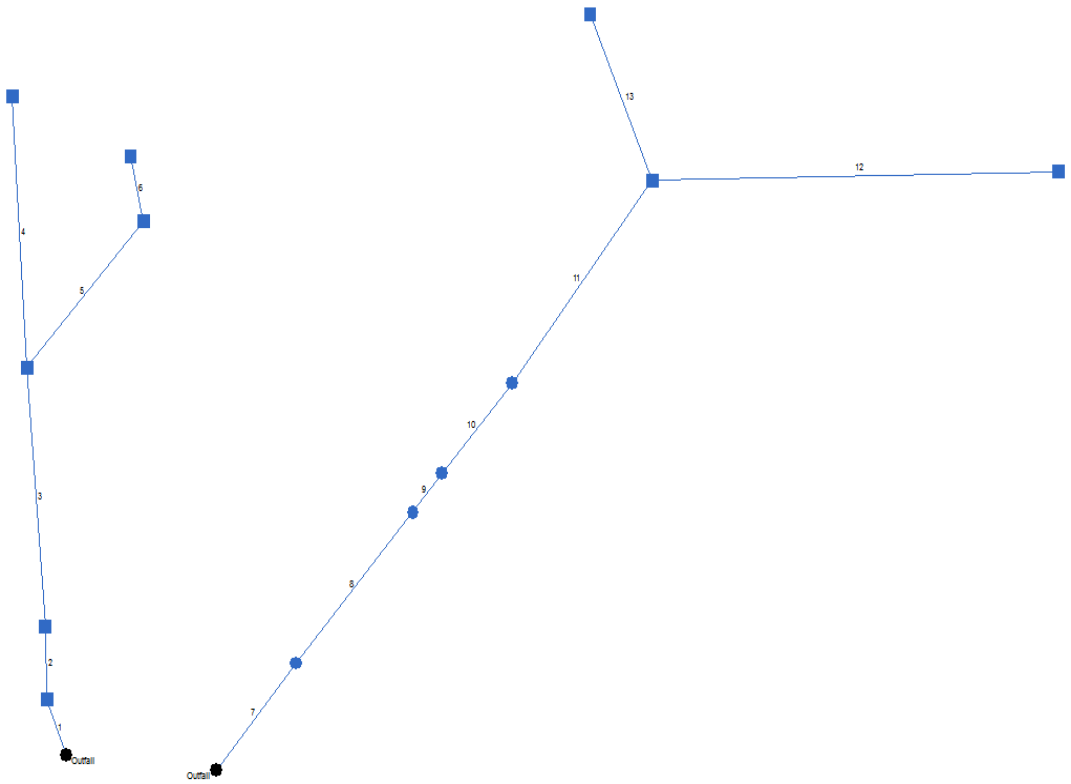
To ensure sediment does not leave the tract and enter waters of the Commonwealth, several different controls will be utilized on site during construction. Prior to disturbance for the proposed improvements sediment basins and diversion swales will be constructed to divert runoff from disturbed areas to the sediment basins. In addition rock construction entrances will be provided and silt fence and or filter sock will be installed where disturbed areas do not drain to a sediment basin. The controls will be inspected during construction to ensure they are functioning per DEP requirements. Site stabilization will occur as soon as possible after construction is completed to ensure erosion is avoided. The runoff is detained in the sediment basins and discharged at a reduced flow rate to ensure the downstream water courses do not have erosive conditions that would cause erosion of the stream banks.



SECTION TWO

STORMWATER CONVEYANCE DESIGN

Hydraflow Plan View



Project File: SWM#1V-2.stm	No. Lines: 13	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	47.0	-110.8	Comb	0.00	0.10	0.59	5.0	104.00	10.64	109.00	24	Cir	0.013	0.00	113.00	1 TO E1
2	1	58.0	19.5	Comb	0.00	0.62	0.66	5.0	109.50	5.45	112.66	18	Cir	0.013	0.00	116.56	2 TO 1
3	2	206.0	-3.2	Comb	0.00	0.82	0.57	5.0	112.86	6.52	126.30	18	Cir	0.013	0.00	130.00	3 TO 2
4	3	215.0	1.1	Comb	0.00	0.59	0.60	5.0	126.50	6.53	140.55	18	Cir	0.013	0.00	144.05	4 TO 3
5	3	154.0	45.7	DrGrt	0.00	2.43	0.35	5.0	126.50	6.82	137.00	18	Cir	0.013	0.00	143.50	5 TO 3
6	5	53.0	-53.3	DrGrt	0.00	1.21	0.44	5.0	140.00	3.77	142.00	18	Cir	0.013	0.00	145.50	6 TO 5
7	End	110.0	-50.6	MH	0.00	0.00	0.00	5.0	104.00	4.00	108.40	18	Cir	0.013	0.00	118.00	M1 TO E2
8	7	157.0	0.9	MH	0.00	0.00	0.00	5.0	114.00	11.85	132.60	18	Cir	0.013	0.00	142.67	M2 TO M1
9	8	40.0	-0.7	MH	0.00	0.00	0.00	5.0	139.25	11.15	143.71	18	Cir	0.013	0.00	153.78	M3 TO M2
10	9	94.0	1.0	MH	0.00	0.00	0.00	5.0	150.53	7.89	157.95	18	Cir	0.013	0.00	168.00	M4 TO M3
11	10	202.0	-3.4	Comb	0.00	1.50	0.59	5.0	158.15	1.42	161.02	18	Cir	0.013	0.00	176.20	7 TO M4
12	11	354.0	51.7	DrGrt	0.00	0.26	0.35	5.0	172.70	4.49	188.60	18	Cir	0.013	0.00	192.10	9 TO 7
13	11	142.7	-59.6	DrGrt	0.00	0.60	0.35	5.0	161.22	0.51	161.95	18	Cir	0.013	0.00	169.50	8 TO M9

Project File: SWM#1V-2.stm | Number of lines: 13 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	1 TO E1	20.64	24 c	47.0	104.00	109.00	10.638	104.81	110.61	n/a	110.61	End
2	2 TO 1	20.23	18 c	58.0	109.50	112.66	5.448	110.61*	116.68*	n/a	118.72 i	1
3	3 TO 2	17.27	18 c	206.0	112.86	126.30	6.524	118.72	127.74	n/a	127.74 j	2
4	4 TO 3	2.90	18 c	215.0	126.50	140.55	6.535	129.22	141.20	n/a	141.20 j	3
5	5 TO 3	11.28	18 c	154.0	126.50	137.00	6.818	128.63	138.29	n/a	138.29 j	3
6	6 TO 5	4.36	18 c	53.0	140.00	142.00	3.774	140.47	142.80	n/a	142.80 j	5
7	M1 TO E2	8.85	18 c	110.0	104.00	108.40	4.000	109.20	109.78	n/a	110.17 i	End
8	M2 TO M1	8.92	18 c	157.0	114.00	132.60	11.847	114.51	133.74	n/a	133.74 j	7
9	M3 TO M2	8.94	18 c	40.0	139.25	143.71	11.150	139.77*	146.00*	0.00	146.00	8
10	M4 TO M3	8.98	18 c	94.0	150.53	157.95	7.894	151.10	159.09	n/a	159.09 j	9
11	7 TO M4	9.14	18 c	202.0	158.15	161.02	1.421	159.28	162.17	n/a	162.17 j	10
12	9 TO 7	0.75	18 c	354.0	172.70	188.60	4.492	172.89	188.93	n/a	188.93 j	11
13	8 TO M9	1.72	18 c	142.7	161.22	161.95	0.512	162.72	162.76	0.00	162.76	11

Project File: SWM#1V-2.stm | Number of lines: 13 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	47.0	0.10	5.77	0.59	0.06	2.67	5.0	6.7	7.7	20.64	73.77	12.45	24	10.64	109.00	104.00	110.61	104.81	113.00	106.50	1 TO E1
2	1	58.0	0.62	5.67	0.66	0.41	2.61	5.0	6.6	7.7	20.23	24.51	12.95	18	5.45	112.66	109.50	116.68	110.61	116.56	113.00	2 TO 1
3	2	206.0	0.82	5.05	0.57	0.47	2.20	5.0	6.3	7.8	17.27	26.82	9.83	18	6.52	126.30	112.86	127.74	118.72	130.00	116.56	3 TO 2
4	3	215.0	0.59	0.59	0.60	0.35	0.35	5.0	5.0	8.2	2.90	26.84	2.80	18	6.53	140.55	126.50	141.20	129.22	144.05	130.00	4 TO 3
5	3	154.0	2.43	3.64	0.35	0.85	1.38	5.0	5.1	8.2	11.28	27.42	6.69	18	6.82	137.00	126.50	138.29	128.63	143.50	130.00	5 TO 3
6	5	53.0	1.21	1.21	0.44	0.53	0.53	5.0	5.0	8.2	4.36	20.40	6.88	18	3.77	142.00	140.00	142.80	140.47	145.50	143.50	6 TO 5
7	End	110.0	0.00	2.36	0.00	0.00	1.19	5.0	7.7	7.5	8.85	21.00	5.01	18	4.00	108.40	104.00	109.78	109.20	118.00	106.50	M1 TO E2
8	7	157.0	0.00	2.36	0.00	0.00	1.19	5.0	7.5	7.5	8.92	36.14	11.51	18	11.85	132.60	114.00	133.74	114.51	142.67	118.00	M2 TO M1
9	8	40.0	0.00	2.36	0.00	0.00	1.19	5.0	7.4	7.5	8.94	35.07	10.81	18	11.15	143.71	139.25	146.00	139.77	153.78	142.67	M3 TO M2
10	9	94.0	0.00	2.36	0.00	0.00	1.19	5.0	7.3	7.6	8.98	29.50	10.38	18	7.89	157.95	150.53	159.09	151.10	168.00	153.78	M4 TO M3
11	10	202.0	1.50	2.36	0.59	0.89	1.19	5.0	6.7	7.7	9.14	12.52	6.34	18	1.42	161.02	158.15	162.17	159.28	176.20	168.00	7 TO M4
12	11	354.0	0.26	0.26	0.35	0.09	0.09	5.0	5.0	8.2	0.75	22.26	4.20	18	4.49	188.60	172.70	188.93	172.89	192.10	176.20	9 TO 7
13	11	142.7	0.60	0.60	0.35	0.21	0.21	5.0	5.0	8.2	1.72	7.51	1.36	18	0.51	161.95	161.22	162.76	162.72	169.50	176.20	8 TO M9

Project File: SWM#1V-2.stm

Number of lines: 13

Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	1	0.48	0.00	0.44	0.04	Comb	6.0	4.00	0.00	4.00	2.00	0.050	2.00	0.020	0.020	0.013	0.08	4.00	0.08	3.80	0.00	Off
2	2	3.35	0.00	3.35	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.27	13.50	0.27	13.50	0.00	Off
3	3	3.83	0.00	3.83	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.30	15.00	0.30	15.00	0.00	Off
4	4	2.90	0.00	2.90	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.25	12.50	0.25	12.50	0.00	Off
5	5	6.97	0.00	6.97	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.44	45.84	0.44	45.84	0.00	Off
6	6	4.36	0.00	4.36	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.32	34.08	0.32	34.08	0.00	Off
7	M1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
8	M2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
9	M3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
10	M4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
11	7	7.25	0.00	7.25	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.45	22.50	0.45	22.50	0.00	Off
12	9	0.75	0.00	0.75	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.10	11.87	0.10	11.87	0.00	Off
13	8	1.72	0.00	1.72	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.17	19.25	0.17	19.25	0.00	Off

Project File: SWM#1V-2.stm | Number of lines: 13 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#1V-2.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	47.0	0.04 0.06 0.00	1.09 4.68 0.00	1.04 1.64 0.00	6.70	0.10	7.7	2.67	0.00 20.64	113.00	110.61 111.00 109.00	104.81 106.00 104.00	5.80 5.00	24 24 Cir	12.34 10.64	12.45 23.48	20.64 73.77	1 TO E1
2	1	Comb	0.013	58.0	0.32 0.30 0.00	1.05 4.62 0.00	1.00 1.62 0.00	6.63	0.07	7.7	2.61	0.00 20.23	116.56	116.68 114.16 112.66	110.61 111.00 109.50	6.07 3.16	18 18 Cir	10.46 5.45	12.95 13.87	20.23 24.51	2 TO 1
3	2	Comb	0.013	206.0	0.30 0.52 0.00	0.73 4.32 0.00	0.69 1.51 0.00	6.28	0.35	7.8	2.20	0.00 17.27	130.00	127.74 127.80 126.30	118.72 114.36 112.86	9.03 13.44	18 18 Cir	4.38 6.52	9.83 15.18	17.27 26.82	3 TO 2
4	3	Comb	0.013	215.0	0.25 0.34 0.00	0.25 0.34 0.00	0.24 0.12 0.00	5.00	1.28	8.2	0.35	0.00 2.90	144.05	141.20 142.05 140.55	129.22 128.00 126.50	11.98 14.05	18 18 Cir	5.57 6.53	2.80 15.19	2.90 26.84	4 TO 3
5	3	DrGrt	0.013	154.0	0.00 2.43 0.00	0.18 3.46 0.00	0.17 1.21 0.00	5.13	0.38	8.2	1.38	0.00 11.28	143.50	138.29 138.50 137.00	128.63 128.00 126.50	9.65 10.50	18 18 Cir	6.27 6.82	6.69 15.52	11.28 27.42	5 TO 3
6	5	DrGrt	0.013	53.0	0.18 1.03 0.00	0.18 1.03 0.00	0.17 0.36 0.00	5.00	0.13	8.2	0.53	0.00 4.36	145.50	142.80 143.50 142.00	140.47 141.50 140.00	2.33 2.00	18 18 Cir	4.39 3.77	6.88 11.54	4.36 20.40	6 TO 5
7	End	MH	0.013	110.0	0.00 0.00 0.00	0.43 1.69 0.24	0.41 0.59 0.19	7.72	0.37	7.5	1.19	0.00 8.85	118.00	109.78 109.90 108.40	109.20 105.50 104.00	0.58 4.40	18 18 Cir	0.52 4.00	5.01 11.88	8.85 21.00	M1 TO E2
8	7	MH	0.013	157.0	0.00 0.00 0.00	0.43 1.69 0.24	0.41 0.59 0.19	7.49	0.23	7.5	1.19	0.00 8.92	142.67	133.74 134.10 132.60	114.51 115.50 114.00	19.23 18.60	18 18 Cir	12.25 11.85	11.51 20.45	8.92 36.14	M2 TO M1
9	8	MH	0.013	40.0	0.00 0.00 0.00	0.43 1.69 0.24	0.41 0.59 0.19	7.43	0.06	7.5	1.19	0.00 8.94	153.78	146.00 145.21 143.71	139.77 140.75 139.25	6.23 4.46	18 18 Cir	15.57 11.15	10.81 19.84	8.94 35.07	M3 TO M2
10	9	MH	0.013	94.0	0.00 0.00 0.00	0.43 1.69 0.24	0.41 0.59 0.19	7.28	0.15	7.6	1.19	0.00 8.98	168.00	159.09 159.45 157.95	151.10 152.03 150.53	7.99 7.42	18 18 Cir	8.50 7.89	10.38 16.70	8.98 29.50	M4 TO M3

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#1V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#1V-2.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
11	10	Comb	0.013	202.0	0.43	0.43	0.41	6.75	0.53	7.7	1.19	0.00	176.20	162.17	159.28	2.90	18	1.43	6.34	9.14	7 TO M4
					0.83	1.69	0.59					9.14		162.52	159.65		18	1.42	7.08	12.52	
					0.24	0.24	0.19							161.02	158.15	2.87	Cir				
12	11	DrGrt	0.013	354.0	0.00	0.00	0.00	5.00	1.41	8.2	0.09	0.00	192.10	188.93	172.89	16.04	18	4.53	4.20	0.75	9 TO 7
					0.26	0.26	0.09					0.75		190.10	174.20		18	4.49	12.59	22.26	
					0.00	0.00	0.00							188.60	172.70	15.90	Cir				
13	11	DrGrt	0.013	142.7	0.00	0.00	0.00	5.00	1.75	8.2	0.21	0.00	169.50	162.76	162.72	0.04	18	0.03	1.36	1.72	8 TO M9
					0.60	0.60	0.21					1.72		163.45	162.72		18	0.51	4.25	7.51	
					0.00	0.00	0.00							161.95	161.22	0.73	Cir				

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#1V-2.stm

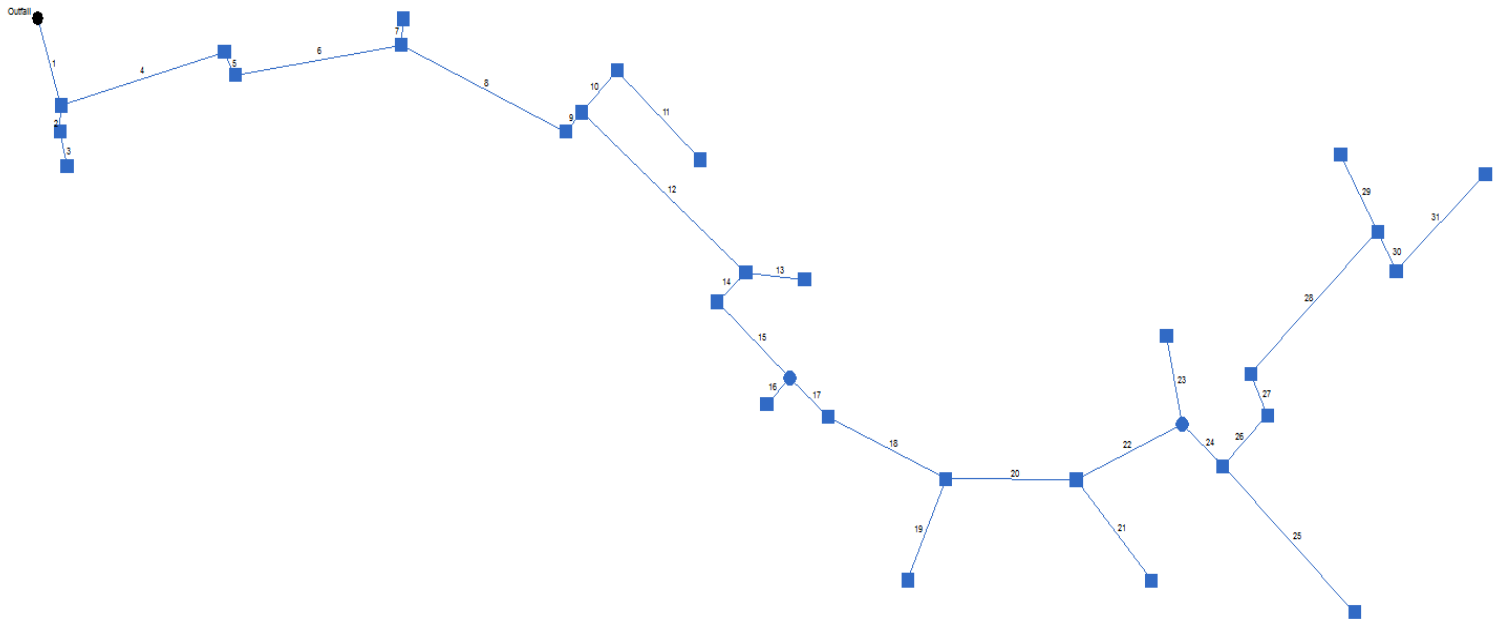
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	24	20.64	104.00	104.81	0.81	1.19	17.29	4.65	109.46	0.862	47.0	109.00	110.61	1.61**	2.71	7.62	0.90	111.51	0.862	0.862	n/a	0.00	n/a
2	18	20.23	109.50	110.61	1.11	1.40	14.44	3.24	113.85	n/a	58.0	112.66	116.68i	1.49	1.76	11.46	2.04	118.72i	n/a	n/a	2.823	0.00	n/a
3	18	17.27	112.86	118.72	1.50	1.75	9.77	1.49	120.20	2.705	206	126.30	127.74 j	1.44**	1.75	9.89	1.52	129.27	2.362	2.534	n/a	0.00	n/a
4	18	2.90	126.50	129.22	1.50	1.77	1.64	0.04	129.27	0.076	215	140.55	141.20 j	0.65**	0.73	3.95	0.24	141.44	0.503	0.290	n/a	0.00	0.00
5	18	11.28	126.50	128.63	1.50	1.61	6.39	0.63	129.27	1.155	154	137.00	138.29 j	1.28**	1.61	7.00	0.76	139.05	1.075	1.115	n/a	0.00	n/a
6	18	4.36	140.00	140.47	0.47*	0.48	9.18	1.31	141.78	3.770	53.0	142.00	142.80 j	0.80**	0.95	4.57	0.32	143.12	0.563	2.166	n/a	0.00	0.00
7	18	8.85	104.00	109.20	1.50	1.77	5.01	0.39	109.59	n/a	110	108.40	109.78i	1.50	1.77	5.01	0.39	110.17i	n/a	n/a	0.185	0.00	n/a
8	18	8.92	114.00	114.51	0.51*	0.53	16.84	4.41	118.92	11.653	157	132.60	133.74 j	1.14**	1.44	6.19	0.60	134.34	0.842	6.248	n/a	0.00	0.00
9	18	8.94	139.25	139.77	0.52*	0.54	16.56	4.26	144.03	11.102	40.0	143.71	146.00	1.50	1.77	5.06	0.40	146.39	0.725	5.913	2.365	0.00	0.00
10	18	8.98	150.53	151.10	0.57*	0.62	14.54	3.29	154.39	7.728	94.0	157.95	159.09 j	1.14**	1.45	6.21	0.60	159.69	0.847	4.287	n/a	0.00	n/a
11	18	9.14	158.15	159.28	1.13	1.42	6.42	0.64	159.92	0.907	202	161.02	162.17 j	1.15**	1.46	6.27	0.61	162.78	0.861	0.884	n/a	0.00	n/a
12	18	0.75	172.70	172.89	0.19*	0.13	5.80	0.52	173.41	4.441	354	188.60	188.93 j	0.33**	0.29	2.59	0.10	189.03	0.450	2.445	n/a	0.00	n/a
13	18	1.72	161.22	162.72	1.50	1.77	0.97	0.01	162.73	0.027	143	161.95	162.76	0.81	0.98	1.76	0.05	162.81	0.082	0.054	0.077	0.00	0.00

Project File: SWM#1V-2.stm | Number of lines: 13 | Run Date: 02-10-2015

Notes: * Normal depth assumed.; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#2V-2.stm	No. Lines: 31	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	70.0	73.7	Comb	0.00	0.59	0.39	5.0	143.50	2.21	145.05	48	Cir	0.013	0.00	151.05	10 TO E3
2	1	20.0	18.2	Comb	0.00	0.43	0.43	5.0	147.00	0.50	147.10	18	Cir	0.013	0.00	151.05	11 TO 10
3	2	27.0	-14.3	Comb	0.00	0.67	0.48	5.0	147.30	0.74	147.50	18	Cir	0.013	0.00	151.75	14 TO 11
4	1	144.0	-90.3	Comb	0.00	0.11	0.57	5.0	146.05	3.58	151.20	36	Cir	0.013	0.00	157.16	15 TO 10
5	4	20.0	79.7	Comb	0.00	1.44	0.42	5.0	151.40	2.00	151.80	36	Cir	0.013	0.00	157.16	16 TO 15
6	5	142.0	-72.5	Comb	0.00	0.07	0.86	5.0	152.00	4.08	157.80	36	Cir	0.013	0.00	163.21	17 TO 16
7	6	20.0	-76.7	Comb	0.00	0.37	0.69	5.0	159.30	0.80	159.46	18	Cir	0.013	0.00	163.21	18 TO 17
8	6	154.0	35.1	Comb	0.00	0.83	0.44	5.0	158.00	2.66	162.10	36	Cir	0.013	0.00	168.64	19 TO 17
9	8	20.0	-73.5	Comb	0.00	0.21	0.55	5.0	162.30	1.00	162.50	36	Cir	0.013	0.00	168.64	20 TO 19
10	9	44.0	0.5	Comb	0.00	0.67	0.82	5.0	163.80	1.05	164.26	18	Cir	0.013	0.00	168.56	21 TO 20
11	10	98.0	91.7	Comb	0.00	0.67	0.85	5.0	164.46	3.61	168.00	18	Cir	0.013	0.00	172.00	22 TO 21
12	9	185.0	89.4	Comb	0.00	0.21	0.86	5.0	163.00	3.14	168.80	30	Cir	0.013	0.00	174.71	23 TO 20
13	12	50.0	-35.4	Comb	0.00	0.52	0.88	5.0	169.80	4.40	172.00	18	Cir	0.013	0.00	176.00	24 TO 23
14	12	33.0	95.5	Comb	0.00	0.33	0.60	5.0	169.00	2.30	169.76	30	Cir	0.013	0.00	174.56	25 TO 23
15	14	85.0	-93.4	MH	0.00	0.00	0.00	5.0	169.96	3.19	172.67	30	Cir	0.013	0.00	177.37	M5 TO 25
16	15	28.0	90.6	Comb	0.00	0.52	0.61	5.0	173.67	1.18	174.00	18	Cir	0.013	0.00	178.00	27 TO M5
17	15	44.0	-0.8	Comb	0.00	0.23	0.64	5.0	172.87	2.80	174.10	30	Cir	0.013	0.00	178.80	26 TO M5
18	17	110.0	-17.3	Comb	0.00	0.50	0.50	5.0	174.30	2.90	177.49	30	Cir	0.013	0.00	182.19	28 TO 26
19	18	84.0	86.8	Comb	0.00	0.21	0.35	5.0	178.49	7.75	185.00	18	Cir	0.013	0.00	192.10	29 TO 28
20	18	110.0	-25.3	Comb	0.00	0.49	0.69	5.0	177.69	2.89	180.87	30	Cir	0.013	0.00	185.57	30 TO 28
21	20	100.0	50.3	Comb	0.00	0.28	0.35	5.0	181.87	6.13	188.00	18	Cir	0.013	0.00	192.10	31 TO 30

Project File: SWM#2V-2.stm | Number of lines: 31 | Date: 02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
22	20	99.0	-25.8	MH	0.00	0.00	0.00	5.0	181.07	1.81	182.86	30	Cir	0.013	0.00	188.55	M6 TO 30
23	22	69.0	-75.5	Comb	0.00	0.60	0.90	5.0	183.86	1.65	185.00	18	Cir	0.013	0.00	188.74	36 TO M6
24	22	47.0	68.5	Comb	0.00	1.01	0.75	5.0	183.06	0.74	183.41	30	Cir	0.013	0.00	189.63	32 TO M6
25	24	158.0	2.3	Comb	0.00	0.22	0.92	5.0	184.41	2.27	188.00	18	Cir	0.013	0.00	193.79	33 TO 32
26	24	54.0	-88.9	Comb	0.00	0.70	0.83	5.0	183.91	0.72	184.30	24	Cir	0.013	0.00	190.03	34 TO 32
27	26	35.0	-67.9	Comb	0.00	0.50	0.73	5.0	184.50	0.80	184.78	24	Cir	0.013	0.00	189.53	35 TO 34
28	27	153.0	68.3	Comb	0.00	0.24	0.57	5.0	185.28	1.48	187.55	18	Cir	0.013	0.00	191.73	37 TO 35
29	28	67.0	-72.5	Comb	0.00	0.15	0.51	5.0	187.75	0.60	188.15	18	Cir	0.013	0.00	191.65	38 TO 37
30	28	34.0	108.3	Comb	0.00	0.90	0.88	5.0	187.75	2.35	188.55	18	Cir	0.013	0.00	192.25	39 TO 37
31	30	106.0	-107.6	Comb	0.00	0.63	0.75	5.0	188.75	1.18	190.00	18	Cir	0.013	0.00	195.34	40 TO 39

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	10 TO E3	62.38	48 c	70.0	143.50	145.05	2.214	150.08*	150.21*	0.00	150.21	End
2	11 TO 10	4.11	18 c	20.0	147.00	147.10	0.500	150.51*	150.54*	0.00	150.54	1
3	14 TO 11	2.64	18 c	27.0	147.30	147.50	0.741	150.59*	150.61*	0.00	150.61	2
4	15 TO 10	57.89	36 c	144.0	146.05	151.20	3.576	150.21	153.63	n/a	153.63	1
5	16 TO 15	57.53	36 c	20.0	151.40	151.80	2.000	153.99	154.22	n/a	154.22	4
6	17 TO 16	53.87	36 c	142.0	152.00	157.80	4.085	154.70	160.14	0.00	160.14	5
7	18 TO 17	2.09	18 c	20.0	159.30	159.46	0.800	161.41*	161.42*	0.00	161.42	6
8	19 TO 17	52.18	36 c	154.0	158.00	162.10	2.662	160.58	164.40	0.00	164.40	6
9	20 TO 19	49.73	36 c	20.0	162.30	162.50	1.000	164.88*	165.52*	n/a	166.69 i	8
10	21 TO 20	9.03	18 c	44.0	163.80	164.26	1.045	166.69*	167.02*	0.00	167.02	9
11	22 TO 21	4.67	18 c	98.0	164.46	168.00	3.612	167.32	168.82	n/a	168.82 j	10
12	23 TO 20	41.66	30 c	185.0	163.00	168.80	3.135	166.69	170.97	0.00	170.97	9
13	24 TO 23	3.75	18 c	50.0	169.80	172.00	4.400	172.22	172.74	n/a	172.74 j	12
14	25 TO 23	37.29	30 c	33.0	169.00	169.76	2.303	171.39	171.80	n/a	171.80 j	12
15	M5 TO 25	36.10	30 c	85.0	169.96	172.67	3.188	172.13	174.68	n/a	174.68 j	14
16	27 TO M5	2.60	18 c	28.0	173.67	174.00	1.179	175.78*	175.80*	0.00	175.80	15
17	26 TO M5	33.97	30 c	44.0	172.87	174.10	2.795	175.07	176.05	n/a	176.05 j	15
18	28 TO 26	33.17	30 c	110.0	174.30	177.49	2.900	176.40	179.41	n/a	179.41 j	17
19	29 TO 28	0.60	18 c	84.0	178.49	185.00	7.750	180.45	185.30	n/a	185.30 j	18
20	30 TO 28	31.11	30 c	110.0	177.69	180.87	2.891	179.83	182.73	n/a	182.73 j	18
21	31 TO 30	0.80	18 c	100.0	181.87	188.00	6.130	183.71	188.34	n/a	188.34 j	20
22	M6 TO 30	28.21	30 c	99.0	181.07	182.86	1.808	183.20	184.64	n/a	184.64 j	20
23	36 TO M6	4.43	18 c	69.0	183.86	185.00	1.652	185.43	185.80	n/a	185.80 j	22
24	32 TO M6	24.42	30 c	47.0	183.06	183.41	0.745	185.14	185.48	n/a	186.25 i	22
25	33 TO 32	1.66	18 c	158.0	184.41	188.00	2.272	186.25	188.49	n/a	188.49 j	24
26	34 TO 32	17.58	24 c	54.0	183.91	184.30	0.722	186.25*	186.57*	0.00	186.57	24
27	35 TO 34	13.43	24 c	35.0	184.50	184.78	0.800	186.78*	186.90*	0.00	186.90	26
28	37 TO 35	10.90	18 c	153.0	185.28	187.55	1.484	186.90	188.81	n/a	188.81 j	27
29	38 TO 37	0.63	18 c	67.0	187.75	188.15	0.597	189.54	189.54	0.00	189.54	28
30	39 TO 37	10.17	18 c	34.0	187.75	188.55	2.353	189.03	189.77	n/a	189.77 j	28
31	40 TO 39	3.87	18 c	106.0	188.75	190.00	1.179	190.37	190.75	n/a	190.75 j	30

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	70.0	0.59	14.30	0.39	0.23	9.30	5.0	11.2	6.7	62.38	213.8	4.96	48	2.21	145.05	143.50	150.21	150.08	151.05	148.00	10 TO E3
2	1	20.0	0.43	1.10	0.43	0.18	0.51	5.0	5.3	8.1	4.11	7.43	2.32	18	0.50	147.10	147.00	150.54	150.51	151.05	151.05	11 TO 10
3	2	27.0	0.67	0.67	0.48	0.32	0.32	5.0	5.0	8.2	2.64	9.04	1.49	18	0.74	147.50	147.30	150.61	150.59	151.75	151.05	14 TO 11
4	1	144.0	0.11	12.61	0.57	0.06	8.57	5.0	11.0	6.8	57.89	126.1	8.82	36	3.58	151.20	146.05	153.63	150.21	157.16	151.05	15 TO 10
5	4	20.0	1.44	12.50	0.42	0.60	8.50	5.0	10.9	6.8	57.53	94.32	9.15	36	2.00	151.80	151.40	154.22	153.99	157.16	157.16	16 TO 15
6	5	142.0	0.07	11.06	0.86	0.06	7.90	5.0	10.6	6.8	53.87	134.8	8.58	36	4.08	157.80	152.00	160.14	154.70	163.21	157.16	17 TO 16
7	6	20.0	0.37	0.37	0.69	0.26	0.26	5.0	5.0	8.2	2.09	9.39	1.18	18	0.80	159.46	159.30	161.42	161.41	163.21	163.21	18 TO 17
8	6	154.0	0.83	10.62	0.44	0.37	7.58	5.0	10.3	6.9	52.18	108.8	8.51	36	2.66	162.10	158.00	164.40	160.58	168.64	163.21	19 TO 17
9	8	20.0	0.21	9.79	0.55	0.12	7.22	5.0	10.3	6.9	49.73	66.69	8.19	36	1.00	162.50	162.30	165.52	164.88	168.64	168.64	20 TO 19
10	9	44.0	0.67	1.34	0.82	0.55	1.12	5.0	5.4	8.1	9.03	10.74	5.11	18	1.05	164.26	163.80	167.02	166.69	168.56	168.64	21 TO 20
11	10	98.0	0.67	0.67	0.85	0.57	0.57	5.0	5.0	8.2	4.67	19.96	3.67	18	3.61	168.00	164.46	168.82	167.32	172.00	168.56	22 TO 21
12	9	185.0	0.21	8.24	0.86	0.18	5.98	5.0	10.0	7.0	41.66	72.62	8.85	30	3.14	168.80	163.00	170.97	166.69	174.71	168.64	23 TO 20
13	12	50.0	0.52	0.52	0.88	0.46	0.46	5.0	5.0	8.2	3.75	22.03	3.22	18	4.40	172.00	169.80	172.74	172.22	176.00	174.71	24 TO 23
14	12	33.0	0.33	7.51	0.60	0.20	5.35	5.0	9.9	7.0	37.29	62.24	8.20	30	2.30	169.76	169.00	171.80	171.39	174.56	174.71	25 TO 23
15	14	85.0	0.00	7.18	0.00	0.00	5.15	5.0	9.7	7.0	36.10	73.23	8.25	30	3.19	172.67	169.96	174.68	172.13	177.37	174.56	M5 TO 25
16	15	28.0	0.52	0.52	0.61	0.32	0.32	5.0	5.0	8.2	2.60	11.40	1.47	18	1.18	174.00	173.67	175.80	175.78	178.00	177.37	27 TO M5
17	15	44.0	0.23	6.66	0.64	0.15	4.83	5.0	9.6	7.0	33.97	68.57	7.85	30	2.80	174.10	172.87	176.05	175.07	178.80	177.37	26 TO M5
18	17	110.0	0.50	6.43	0.50	0.25	4.68	5.0	9.4	7.1	33.17	69.84	7.85	30	2.90	177.49	174.30	179.41	176.40	182.19	178.80	28 TO 26
19	18	84.0	0.21	0.21	0.35	0.07	0.07	5.0	5.0	8.2	0.60	29.23	1.39	18	7.75	185.00	178.49	185.30	180.45	192.10	182.19	29 TO 28
20	18	110.0	0.49	5.72	0.69	0.34	4.36	5.0	9.1	7.1	31.11	69.73	7.44	30	2.89	180.87	177.69	182.73	179.83	185.57	182.19	30 TO 28
21	20	100.0	0.28	0.28	0.35	0.10	0.10	5.0	5.0	8.2	0.80	26.00	1.55	18	6.13	188.00	181.87	188.34	183.71	192.10	185.57	31 TO 30

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
22	20	99.0	0.00	4.95	0.00	0.00	3.92	5.0	8.9	7.2	28.21	55.15	6.95	30	1.81	182.86	181.07	184.64	183.20	188.55	185.57	M6 TO 30
23	22	69.0	0.60	0.60	0.90	0.54	0.54	5.0	5.0	8.2	4.43	13.50	3.55	18	1.65	185.00	183.86	185.80	185.43	188.74	188.55	36 TO M6
24	22	47.0	1.01	4.35	0.75	0.76	3.38	5.0	8.8	7.2	24.42	35.39	6.32	30	0.74	183.41	183.06	185.48	185.14	189.63	188.55	32 TO M6
25	24	158.0	0.22	0.22	0.92	0.20	0.20	5.0	5.0	8.2	1.66	15.83	2.12	18	2.27	188.00	184.41	188.49	186.25	193.79	189.63	33 TO 32
26	24	54.0	0.70	3.12	0.83	0.58	2.42	5.0	8.6	7.3	17.58	19.22	5.60	24	0.72	184.30	183.91	186.57	186.25	190.03	189.63	34 TO 32
27	26	35.0	0.50	2.42	0.73	0.37	1.84	5.0	8.5	7.3	13.43	20.23	4.27	24	0.80	184.78	184.50	186.90	186.78	189.53	190.03	35 TO 34
28	27	153.0	0.24	1.92	0.57	0.14	1.48	5.0	8.1	7.4	10.90	12.79	6.52	18	1.48	187.55	185.28	188.81	186.90	191.73	189.53	37 TO 35
29	28	67.0	0.15	0.15	0.51	0.08	0.08	5.0	5.0	8.2	0.63	8.11	0.36	18	0.60	188.15	187.75	189.54	189.54	191.65	191.73	38 TO 37
30	28	34.0	0.90	1.53	0.88	0.79	1.26	5.0	5.5	8.0	10.17	16.11	6.47	18	2.35	188.55	187.75	189.77	189.03	192.25	191.73	39 TO 37
31	30	106.0	0.63	0.63	0.75	0.47	0.47	5.0	5.0	8.2	3.87	11.40	3.28	18	1.18	190.00	188.75	190.75	190.37	195.34	192.25	40 TO 39

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	10	1.89	0.35	1.50	0.74	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.14	7.00	0.14	7.00	0.00	Off
2	11	1.52	2.83	2.43	1.91	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.18	9.00	0.18	8.95	0.00	Off
3	14	2.64	0.00	2.64	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.23	11.50	0.23	11.50	0.00	Off
4	15	0.51	0.85	1.02	0.35	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.12	6.00	0.12	5.80	0.00	1
5	16	4.96	0.88	3.01	2.83	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.20	10.00	0.20	10.00	0.00	2
6	17	0.49	2.00	1.61	0.88	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.16	8.00	0.15	7.55	0.00	5
7	18	2.09	0.35	1.59	0.85	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.15	7.50	0.15	7.50	0.00	4
8	19	2.99	1.49	2.48	2.00	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.19	9.50	0.19	9.40	0.00	6
9	20	0.95	0.40	1.00	0.35	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.12	6.00	0.12	6.00	0.00	7
10	21	4.50	3.09	7.59	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.45	22.50	0.45	22.50	0.00	Off
11	22	4.67	1.57	3.15	3.09	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.22	11.00	0.21	10.65	0.00	10
12	23	1.48	0.00	1.08	0.40	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.13	6.50	0.12	6.20	0.00	9
13	24	3.75	0.00	2.18	1.57	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.18	9.00	0.18	8.80	0.00	11
14	25	1.62	1.99	2.13	1.49	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.18	9.00	0.17	8.70	0.00	8
15	M5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
16	27	2.60	0.00	1.65	0.95	Comb	6.0	4.00	0.00	4.00	2.00	0.032	2.00	0.020	0.020	0.013	0.16	8.00	0.15	7.70	0.00	14
17	26	1.21	1.60	1.76	1.05	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.16	8.00	0.16	7.90	0.00	14
18	28	2.05	1.76	2.20	1.60	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.18	9.00	0.18	8.85	0.00	17
19	29	0.60	0.00	0.60	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.09	4.50	0.09	4.50	0.00	Off
20	30	2.77	1.29	2.30	1.76	Comb	6.0	4.00	0.00	4.00	2.00	0.033	2.00	0.020	0.020	0.013	0.19	9.50	0.18	9.05	0.00	18
21	31	0.80	0.00	0.80	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.11	5.50	0.11	5.50	0.00	Off
22	M6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
23	36	4.43	0.00	4.43	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.33	16.50	0.33	16.50	0.00	Off
24	32	6.21	0.00	6.21	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.41	20.50	0.41	20.50	0.00	Off
25	33	1.66	0.00	1.66	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.17	8.50	0.17	8.50	0.00	Off
26	34	4.76	0.00	4.76	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.35	17.50	0.35	17.50	0.00	Off
27	35	2.99	0.26	1.96	1.29	Comb	6.0	4.00	0.00	4.00	2.00	0.014	2.00	0.020	0.020	0.013	0.20	10.00	0.20	9.80	0.00	20
28	37	1.12	0.00	0.86	0.26	Comb	6.0	4.00	0.00	4.00	2.00	0.014	2.00	0.020	0.020	0.013	0.14	7.00	0.13	6.60	0.00	27
29	38	0.63	0.00	0.63	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.09	4.50	0.09	4.50	0.00	Off
30	39	6.49	0.00	6.49	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.42	21.00	0.42	21.00	0.00	Off
31	40	3.87	0.00	3.87	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.30	15.00	0.30	15.00	0.00	Off

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#2V-2.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	70.0	0.04 0.55 0.00	6.83 7.00 0.47	6.49 2.45 0.38	11.23	0.24	6.7	9.30	0.00 62.38	151.05	150.21 149.05 145.05	150.08 147.50 143.50	0.13 1.55	48 48 Cir	0.19 2.21	4.96 17.01	62.38 213.8	10 TO E3
2	1	Comb	0.013	20.0	0.06 0.37 0.00	0.20 0.90 0.00	0.19 0.32 0.00	5.30	0.14	8.1	0.51	0.00 4.11	151.05	150.54 148.60 147.10	150.51 148.50 147.00	0.03 0.10	18 18 Cir	0.15 0.50	2.32 4.20	4.11 7.43	11 TO 10
3	2	Comb	0.013	27.0	0.14 0.53 0.00	0.14 0.53 0.00	0.13 0.19 0.00	5.00	0.30	8.2	0.32	0.00 2.64	151.75	150.61 149.00 147.50	150.59 148.80 147.30	0.02 0.20	18 18 Cir	0.06 0.74	1.49 5.11	2.64 9.04	14 TO 11
4	1	Comb	0.013	144.0	0.04 0.07 0.00	6.59 5.55 0.47	6.26 1.94 0.38	10.95	0.27	6.8	8.57	0.00 57.89	157.16	153.63 154.20 151.20	150.21 149.05 146.05	3.41 5.15	36 36 Cir	2.37 3.58	8.82 17.84	57.89 126.1	15 TO 10
5	4	Comb	0.013	20.0	0.18 1.26 0.00	6.55 5.48 0.47	6.22 1.92 0.38	10.92	0.04	6.8	8.50	0.00 57.53	157.16	154.22 154.80 151.80	153.99 154.40 151.40	0.23 0.40	36 36 Cir	1.16 2.00	9.15 13.34	57.53 94.32	16 TO 15
6	5	Comb	0.013	142.0	0.06 0.01 0.00	6.37 4.22 0.47	6.05 1.48 0.38	10.64	0.28	6.8	7.90	0.00 53.87	163.21	160.14 160.80 157.80	154.70 155.00 152.00	5.44 5.80	36 36 Cir	3.83 4.08	8.58 19.07	53.87 134.8	17 TO 16
7	6	Comb	0.013	20.0	0.21 0.16 0.00	0.21 0.16 0.00	0.20 0.06 0.00	5.00	0.28	8.2	0.26	0.00 2.09	163.21	161.42 160.96 159.46	161.41 160.80 159.30	0.01 0.16	18 18 Cir	0.04 0.80	1.18 5.32	2.09 9.39	18 TO 17
8	6	Comb	0.013	154.0	0.13 0.70 0.00	6.10 4.05 0.47	5.80 1.42 0.38	10.34	0.30	6.9	7.58	0.00 52.18	168.64	164.40 165.10 162.10	160.58 161.00 158.00	3.82 4.10	36 36 Cir	2.48 2.66	8.51 15.40	52.18 108.8	19 TO 17
9	8	Comb	0.013	20.0	0.07 0.14 0.00	5.97 3.35 0.47	5.67 1.17 0.38	10.30	0.04	6.9	7.22	0.00 49.73	168.64	165.52 165.50 162.50	164.88 165.30 162.30	0.63 0.20	36 36 Cir	3.17 1.00	8.19 9.44	49.73 66.69	20 TO 19
10	9	Comb	0.013	44.0	0.52 0.15 0.00	1.08 0.26 0.00	1.03 0.09 0.00	5.45	0.14	8.1	1.12	0.00 9.03	168.56	167.02 165.76 164.26	166.69 165.30 163.80	0.33 0.46	18 18 Cir	0.74 1.05	5.11 6.08	9.03 10.74	21 TO 20

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#2V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#2V-2.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
11	10	Comb	0.013	98.0	0.56 0.11 0.00	0.56 0.11 0.00	0.53 0.04 0.00	5.00	0.45	8.2	0.57	0.00 4.67	172.00	168.82 169.50 168.00	167.32 165.96 164.46	1.51 3.54	18 18 Cir	1.54 3.61	3.67 11.29	4.67 19.96	22 TO 21
12	9	Comb	0.013	185.0	0.18 0.03 0.00	4.82 2.95 0.47	4.58 1.03 0.38	9.95	0.35	7.0	5.98	0.00 41.66	174.71	170.97 171.30 168.80	166.69 165.50 163.00	4.27 5.80	30 30 Cir	2.31 3.14	8.85 14.79	41.66 72.62	23 TO 20
13	12	Comb	0.013	50.0	0.46 0.06 0.00	0.46 0.06 0.00	0.44 0.02 0.00	5.00	0.26	8.2	0.46	0.00 3.75	176.00	172.74 173.50 172.00	172.22 171.30 169.80	0.52 2.20	18 18 Cir	1.04 4.40	3.22 12.46	3.75 22.03	24 TO 23
14	12	Comb	0.013	33.0	0.12 0.19 0.02	4.18 2.86 0.47	3.97 1.00 0.38	9.88	0.07	7.0	5.35	0.00 37.29	174.56	171.80 172.26 169.76	171.39 171.50 169.00	0.41 0.76	30 30 Cir	1.25 2.30	8.20 12.68	37.29 62.24	25 TO 23
15	14	MH	0.013	85.0	0.00 0.00 0.00	4.06 2.67 0.45	3.86 0.93 0.36	9.71	0.17	7.0	5.15	0.00 36.10	177.37	174.68 175.17 172.67	172.13 172.46 169.96	2.54 2.71	30 30 Cir	2.99 3.19	8.25 14.92	36.10 73.23	M5 TO 25
16	15	Comb	0.013	28.0	0.16 0.27 0.09	0.16 0.27 0.09	0.15 0.09 0.07	5.00	0.32	8.2	0.32	0.00 2.60	178.00	175.80 175.50 174.00	175.78 175.17 173.67	0.02 0.33	18 18 Cir	0.06 1.18	1.47 6.45	2.60 11.40	27 TO M5
17	15	Comb	0.013	44.0	0.06 0.10 0.07	3.90 2.40 0.36	3.71 0.84 0.29	9.62	0.09	7.0	4.83	0.00 33.97	178.80	176.05 176.60 174.10	175.07 175.37 172.87	0.98 1.23	30 30 Cir	2.23 2.80	7.85 13.97	33.97 68.57	26 TO M5
18	17	Comb	0.013	110.0	0.06 0.35 0.09	3.84 2.30 0.29	3.65 0.80 0.23	9.39	0.23	7.1	4.68	0.00 33.17	182.19	179.41 179.99 177.49	176.40 176.80 174.30	3.01 3.19	30 30 Cir	2.74 2.90	7.85 14.23	33.17 69.84	28 TO 26
19	18	Comb	0.013	84.0	0.00 0.21 0.00	0.00 0.21 0.00	0.00 0.07 0.00	5.00	1.01	8.2	0.07	0.00 0.60	192.10	185.30 186.50 185.00	180.45 179.99 178.49	4.84 6.51	18 18 Cir	5.77 7.75	1.39 16.54	0.60 29.23	29 TO 28
20	18	Comb	0.013	110.0	0.22 0.19 0.08	3.78 1.74 0.20	3.59 0.61 0.16	9.14	0.25	7.1	4.36	0.00 31.11	185.57	182.73 183.37 180.87	179.83 180.19 177.69	2.90 3.18	30 30 Cir	2.64 2.89	7.44 14.21	31.11 69.73	30 TO 28

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#2V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#2V-2.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
21	20	Comb	0.013	100.0	0.00 0.28 0.00	0.00 0.28 0.00	0.00 0.10 0.00	5.00	1.07	8.2	0.10	0.00 0.80	192.10	188.34 189.50 188.00	183.71 183.37 181.87	4.63 6.13	18 18 Cir	4.63 6.13	1.55 14.71	0.80 26.00	31 TO 30
22	20	MH	0.013	99.0	0.00 0.00 0.00	3.56 1.27 0.12	3.38 0.44 0.10	8.90	0.24	7.2	3.92	0.00 28.21	188.55	184.64 185.36 182.86	183.20 183.57 181.07	1.44 1.79	30 30 Cir	1.45 1.81	6.95 11.23	28.21 55.15	M6 TO 30
23	22	Comb	0.013	69.0	0.55 0.05 0.00	0.55 0.05 0.00	0.52 0.02 0.00	5.00	0.32	8.2	0.54	0.00 4.43	188.74	185.80 186.50 185.00	185.43 185.36 183.86	0.38 1.14	18 18 Cir	0.54 1.65	3.55 7.64	4.43 13.50	36 TO M6
24	22	Comb	0.013	47.0	0.58 0.31 0.12	3.01 1.22 0.12	2.86 0.43 0.10	8.78	0.12	7.2	3.38	0.00 24.42	189.63	185.48 185.91 183.41	185.14 185.56 183.06	0.34 0.35	30 30 Cir	0.71 0.74	6.32 7.21	24.42 35.39	32 TO M6
25	24	Comb	0.013	158.0	0.21 0.01 0.00	0.21 0.01 0.00	0.20 0.00 0.00	5.00	1.24	8.2	0.20	0.00 1.66	193.79	188.49 189.50 188.00	186.25 185.91 184.41	2.25 3.59	18 18 Cir	1.42 2.27	2.12 8.96	1.66 15.83	33 TO 32
26	24	Comb	0.013	54.0	0.56 0.14 0.00	2.22 0.90 0.00	2.11 0.32 0.00	8.62	0.16	7.3	2.42	0.00 17.58	190.03	186.57 186.30 184.30	186.25 185.91 183.91	0.33 0.39	24 24 Cir	0.60 0.72	5.60 6.12	17.58 19.22	34 TO 32
27	26	Comb	0.013	35.0	0.32 0.18 0.00	1.66 0.76 0.00	1.58 0.27 0.00	8.48	0.14	7.3	1.84	0.00 13.43	189.53	186.90 186.78 184.78	186.78 186.50 184.50	0.12 0.28	24 24 Cir	0.35 0.80	4.27 6.44	13.43 20.23	35 TO 34
28	27	Comb	0.013	153.0	0.09 0.15 0.00	1.34 0.58 0.00	1.27 0.20 0.00	8.09	0.39	7.4	1.48	0.00 10.90	191.73	188.81 189.05 187.55	186.90 186.78 185.28	1.91 2.27	18 18 Cir	1.25 1.48	6.52 7.24	10.90 12.79	37 TO 35
29	28	Comb	0.013	67.0	0.04 0.11 0.00	0.04 0.11 0.00	0.04 0.04 0.00	5.00	3.09	8.2	0.08	0.00 0.63	191.65	189.54 189.65 188.15	189.54 189.25 187.75	0.00 0.40	18 18 Cir	0.00 0.60	0.36 4.59	0.63 8.11	38 TO 37
30	28	Comb	0.013	34.0	0.79 0.11 0.00	1.21 0.32 0.00	1.15 0.11 0.00	5.54	0.09	8.0	1.26	0.00 10.17	192.25	189.77 190.05 188.55	189.03 189.25 187.75	0.74 0.80	18 18 Cir	2.16 2.35	6.47 9.12	10.17 16.11	39 TO 37

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#2V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#2V-2.stm
				(ft)	Increment (ac)	Sub-total (ac)	Sum CA	(min)	(min)	(in/hr)		Q (cfs)	(ft)	Up (ft)	Down (ft)	Fall (ft)	Size (in)	Slope (%)	Vel (ft/s)	Cap (cfs)	Line description
31	30	Comb	0.013	106.0	0.42 0.21 0.00	0.42 0.21 0.00	0.40 0.07 0.00	5.00	0.54	8.2	0.47	0.00 3.87	195.34	190.75 191.50 190.00	190.37 190.25 188.75	0.38 1.25	18 18 Cir	0.36 1.18	3.28 6.45	3.87 11.40	40 TO 39

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#2V-2.stm

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	48	62.38	143.50	150.08	4.00	12.56	4.96	0.38	150.46	0.189	70.0	145.05	150.21	4.00	12.57	4.96	0.38	150.60	0.189	0.189	0.132	0.00	0.00
2	18	4.11	147.00	150.51	1.50	1.77	2.32	0.08	150.60	0.153	20.0	147.10	150.54	1.50	1.77	2.32	0.08	150.63	0.153	0.153	0.031	0.00	0.00
3	18	2.64	147.30	150.59	1.50	1.77	1.49	0.03	150.63	0.063	27.0	147.50	150.61	1.50	1.77	1.49	0.03	150.64	0.063	0.063	0.017	0.00	0.00
4	36	57.89	146.05	150.21	3.00	7.07	8.19	1.04	151.26	0.754	144	151.20	153.63	2.43**	6.12	9.46	1.39	155.02	0.773	0.763	n/a	0.00	n/a
5	36	57.53	151.40	153.99	2.59	6.48	8.88	1.23	155.21	0.687	20.0	151.80	154.22	2.42**	6.10	9.42	1.38	155.60	0.768	0.727	n/a	0.00	n/a
6	36	53.87	152.00	154.70	2.70	6.69	8.05	1.01	155.70	0.575	142	157.80	160.14	2.34**	5.91	9.11	1.29	161.43	0.719	0.647	n/a	0.00	0.00
7	18	2.09	159.30	161.41	1.50	1.77	1.18	0.02	161.43	0.040	20.0	159.46	161.42	1.50	1.77	1.18	0.02	161.44	0.040	0.040	0.008	0.00	0.00
8	36	52.18	158.00	160.58	2.58	6.47	8.06	1.01	161.59	0.566	154	162.10	164.40	2.30**	5.82	8.96	1.25	165.65	0.699	0.633	n/a	0.00	0.00
9	36	49.73	162.30	164.88	2.58	6.47	7.68	0.92	165.80	n/a	20.0	162.50	165.52i	2.26	5.71	8.70	1.18	166.69i	n/a	n/a	-0.284	0.00	n/a
10	18	9.03	163.80	166.69	1.50	1.77	5.11	0.41	167.10	0.739	44.0	164.26	167.02	1.50	1.77	5.11	0.41	167.42	0.739	0.739	0.325	0.00	0.00
11	18	4.67	164.46	167.32	1.50	1.77	2.64	0.11	167.42	0.198	98.0	168.00	168.82 j	0.82**	1.00	4.69	0.34	169.17	0.577	0.387	n/a	0.00	0.00
12	30	41.66	163.00	166.69	2.50	4.52	8.49	1.12	167.81	1.032	185	168.80	170.97	2.17**	4.52	9.21	1.32	172.29	0.945	0.989	n/a	0.00	0.00
13	18	3.75	169.80	172.22	1.50	1.77	2.12	0.07	172.29	0.128	50.0	172.00	172.74 j	0.74**	0.87	4.32	0.29	173.03	0.536	0.332	n/a	0.00	n/a
14	30	37.29	169.00	171.39	2.39	4.83	7.72	0.93	172.32	0.718	33.0	169.76	171.80 j	2.04**	4.29	8.69	1.17	172.98	0.833	0.775	n/a	0.00	n/a
15	30	36.10	169.96	172.13	2.17	4.53	7.96	0.99	173.12	0.707	85.0	172.67	174.68 j	2.01**	4.23	8.54	1.13	175.81	0.804	0.756	n/a	0.00	0.00
16	18	2.60	173.67	175.78	1.50	1.77	1.47	0.03	175.81	0.061	28.0	174.00	175.80	1.50	1.77	1.47	0.03	175.83	0.061	0.061	0.017	0.00	0.00
17	30	33.97	172.87	175.07	2.20	4.57	7.43	0.86	175.93	0.618	44.0	174.10	176.05 j	1.95**	4.10	8.28	1.07	177.11	0.758	0.688	n/a	0.00	0.00
18	30	33.17	174.30	176.40	2.10	4.41	7.53	0.88	177.28	0.626	110	177.49	179.41 j	1.92**	4.06	8.18	1.04	180.45	0.741	0.684	n/a	0.00	n/a
19	18	0.60	178.49	180.45	1.50	1.77	0.34	0.00	180.45	0.003	84.0	185.00	185.30 j	0.30**	0.25	2.44	0.09	185.39	0.452	0.228	n/a	0.00	0.00
20	30	31.11	177.69	179.83	2.14	4.47	6.95	0.75	180.58	0.536	110	180.87	182.73 j	1.86**	3.93	7.93	0.98	183.71	0.701	0.619	n/a	0.00	0.00
21	18	0.80	181.87	183.71	1.50	1.77	0.45	0.00	183.71	0.006	100	188.00	188.34 j	0.34**	0.30	2.65	0.11	188.45	0.450	0.228	n/a	0.00	0.00

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

Notes: ; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

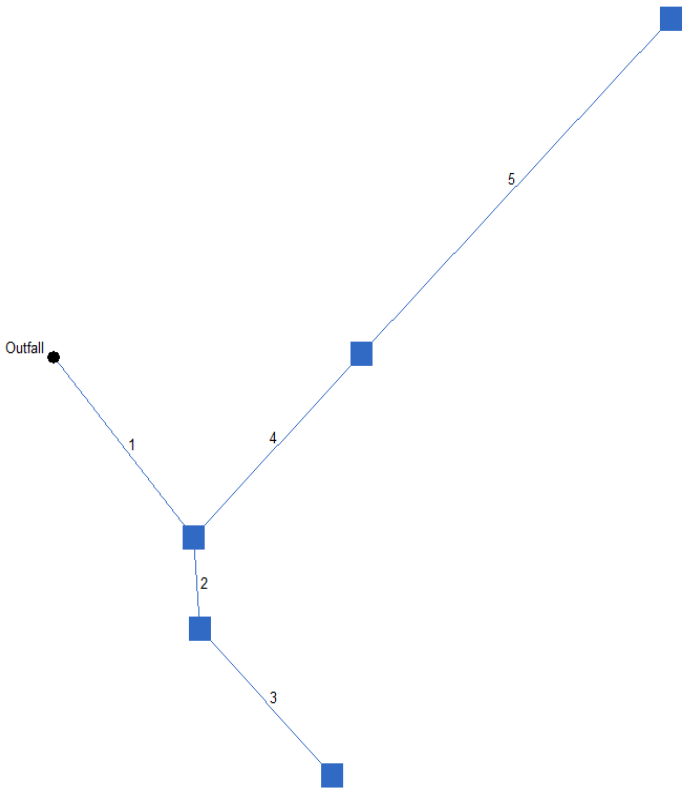
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
22	30	28.21	181.07	183.20	2.13	4.45	6.34	0.62	183.82	0.445	99.0	182.86	184.64 j	1.78**	3.73	7.57	0.89	185.53	0.650	0.548	n/a	0.00	0.00
23	18	4.43	183.86	185.43	1.50	1.77	2.51	0.10	185.53	0.178	69.0	185.00	185.80 j	0.80**	0.96	4.60	0.33	186.13	0.566	0.372	n/a	0.00	0.00
24	30	24.42	183.06	185.14	2.08	4.37	5.59	0.49	185.63	n/a	47.0	183.41	185.48i	1.66	3.47	7.04	0.77	186.25i	n/a	n/a	-0.151	0.00	n/a
25	18	1.66	184.41	186.25	1.50	1.77	0.94	0.01	186.26	0.025	158	188.00	188.49 j	0.49**	0.50	3.29	0.17	188.66	0.463	0.244	n/a	0.00	0.00
26	24	17.58	183.91	186.25	2.00	3.14	5.60	0.49	186.73	0.605	54.0	184.30	186.57	2.00	3.14	5.60	0.49	187.06	0.604	0.604	0.326	0.00	0.00
27	24	13.43	184.50	186.78	2.00	3.14	4.27	0.28	187.06	0.352	35.0	184.78	186.90	2.00	3.14	4.27	0.28	187.18	0.352	0.352	0.123	0.00	0.00
28	18	10.90	185.28	186.90	1.50	1.77	6.17	0.59	187.49	1.078	153	187.55	188.81 j	1.26**	1.58	6.88	0.74	189.55	1.033	1.056	n/a	0.00	n/a
29	18	0.63	187.75	189.54	1.50	1.77	0.35	0.00	189.54	0.004	67.0	188.15	189.54	1.39	1.71	0.37	0.00	189.54	0.003	0.003	0.002	0.00	0.00
30	18	10.17	187.75	189.03	1.28	1.61	6.33	0.62	189.65	0.877	34.0	188.55	189.77 j	1.22**	1.54	6.62	0.68	190.45	0.955	0.916	n/a	0.00	0.00
31	18	3.87	188.75	190.37	1.50	1.77	2.19	0.07	190.45	0.136	106	190.00	190.75 j	0.75**	0.89	4.37	0.30	191.05	0.541	0.339	n/a	0.00	0.00

Project File: SWM#2V-2.stm | Number of lines: 31 | Run Date: 02-10-2015

Notes: ; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#3.stm	No. Lines: 5	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	62.0	49.5	Comb	0.00	0.82	0.89	5.0	160.00	2.76	161.71	24	Cir	0.013	0.00	166.46	41 TO E5
2	1	24.0	36.3	Comb	0.00	0.55	0.91	5.0	162.21	2.46	162.80	18	Cir	0.013	0.00	166.66	42 TO 41
3	2	54.0	-40.6	Comb	0.00	0.92	0.88	5.0	163.00	0.93	163.50	18	Cir	0.013	0.00	167.23	43 TO 42
4	1	68.0	-94.5	Comb	0.00	0.47	0.87	5.0	162.21	2.34	163.80	18	Cir	0.013	0.00	167.62	44 TO 41
5	4	125.0	0.5	Comb	0.00	0.23	0.90	5.0	164.00	0.80	165.00	18	Cir	0.013	0.00	168.92	45 TO 44

Project File: SWM#3.stm | Number of lines: 5 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	41 TO E5	20.87	24 c	62.0	160.00	161.71	2.758	163.02	163.33	0.00	163.33	End
2	42 TO 41	10.65	18 c	24.0	162.21	162.80	2.458	163.68	164.05	n/a	164.05 j	1
3	43 TO 42	6.64	18 c	54.0	163.00	163.50	0.926	164.54	164.58	n/a	164.89 i	2
4	44 TO 41	4.89	18 c	68.0	162.21	163.80	2.338	164.12	164.64	n/a	164.64 j	1
5	45 TO 44	1.70	18 c	125.0	164.00	165.00	0.800	164.98	165.50	n/a	165.50 j	4

Project File: SWM#3.stm | Number of lines: 5 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	62.0	0.82	2.99	0.89	0.73	2.66	5.0	6.2	7.9	20.87	37.56	7.15	24	2.76	161.71	160.00	163.33	163.02	166.46	162.50	41 TO E5
2	1	24.0	0.55	1.47	0.91	0.50	1.31	5.0	5.2	8.1	10.65	16.46	6.43	18	2.46	162.80	162.21	164.05	163.68	166.66	166.46	42 TO 41
3	2	54.0	0.92	0.92	0.88	0.81	0.81	5.0	5.0	8.2	6.64	10.10	4.10	18	0.93	163.50	163.00	164.58	164.54	167.23	166.66	43 TO 42
4	1	68.0	0.47	0.70	0.87	0.41	0.62	5.0	5.9	7.9	4.89	16.06	3.77	18	2.34	163.80	162.21	164.64	164.12	167.62	166.46	44 TO 41
5	4	125.0	0.23	0.23	0.90	0.21	0.21	5.0	5.0	8.2	1.70	9.39	2.35	18	0.80	165.00	164.00	165.50	164.98	168.92	167.62	45 TO 44

Project File: SWM#3.stm

Number of lines: 5

Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1		5.98	1.34	7.32	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.45	22.50	0.45	22.50	0.00	Off
2		4.10	3.27	7.37	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.45	22.50	0.45	22.50	0.00	Off
3		6.64	0.00	3.37	3.27	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.28	14.00	0.27	13.60	0.00	2
4		3.35	0.00	2.01	1.34	Comb	6.0	4.00	0.00	4.00	2.00	0.013	2.00	0.020	0.020	0.013	0.21	10.50	0.20	10.05	0.00	1
5		1.70	0.00	1.70	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.18	9.00	0.18	9.00	0.00	Off

Project File: SWM#3.stm | Number of lines: 5 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#3.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	62.0	0.74 0.08 0.00	2.69 0.30 0.00	2.56 0.11 0.00	6.19	0.14	7.9	2.66	0.00 20.87	166.46	163.33 163.71 161.71	163.02 162.00 160.00	0.31 1.71	24 24 Cir	0.50 2.76	7.15 11.96	20.87 37.56	41 TO E5
2	1	Comb	0.013	24.0	0.51 0.04 0.00	1.33 0.14 0.00	1.26 0.05 0.00	5.22	0.06	8.1	1.31	0.00 10.65	166.66	164.05 164.30 162.80	163.68 163.71 162.21	0.37 0.59	18 18 Cir	1.54 2.46	6.43 9.32	10.65 16.46	42 TO 41
3	2	Comb	0.013	54.0	0.82 0.10 0.00	0.82 0.10 0.00	0.78 0.04 0.00	5.00	0.22	8.2	0.81	0.00 6.64	167.23	164.58 165.00 163.50	164.54 164.50 163.00	0.04 0.50	18 18 Cir	0.07 0.93	4.10 5.72	6.64 10.10	43 TO 42
4	1	Comb	0.013	68.0	0.41 0.06 0.00	0.62 0.08 0.00	0.59 0.03 0.00	5.89	0.30	7.9	0.62	0.00 4.89	167.62	164.64 165.30 163.80	164.12 163.71 162.21	0.52 1.59	18 18 Cir	0.77 2.34	3.77 9.09	4.89 16.06	44 TO 41
5	4	Comb	0.013	125.0	0.21 0.02 0.00	0.21 0.02 0.00	0.20 0.01 0.00	5.00	0.89	8.2	0.21	0.00 1.70	168.92	165.50 166.50 165.00	164.98 165.50 164.00	0.51 1.00	18 18 Cir	0.41 0.80	2.35 5.32	1.70 9.39	45 TO 44

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#3.stm

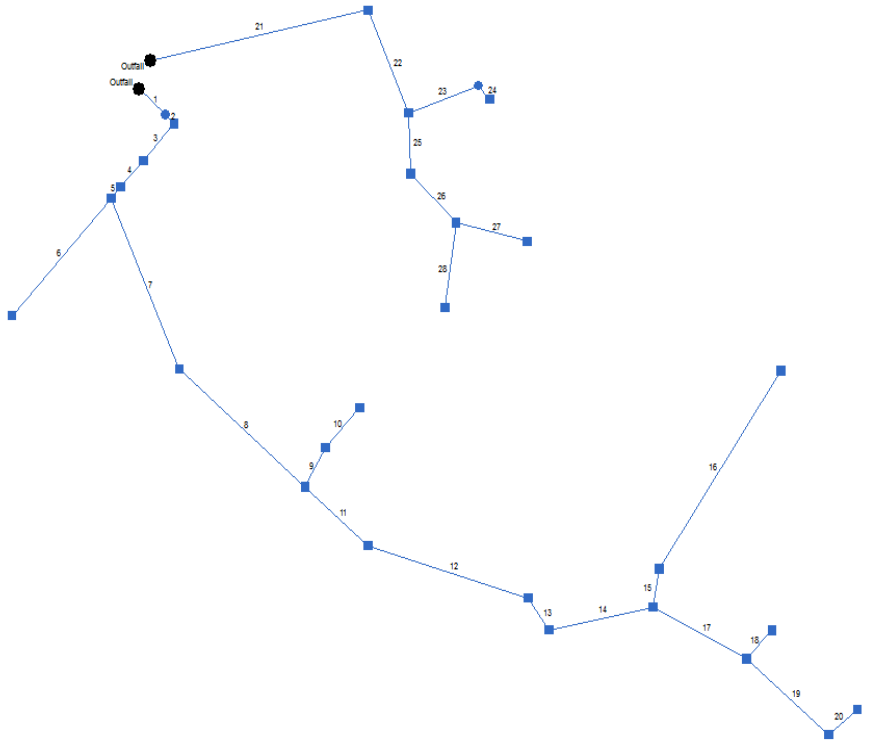
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	24	20.87	160.00	163.02	2.00	3.14	6.65	0.69	163.71	0.852	62.0	161.71	163.33	1.62**	2.73	7.65	0.91	164.24	0.868	0.860	0.533	0.00	0.00
2	18	10.65	162.21	163.68	1.47	1.76	6.06	0.57	164.25	0.917	24.0	162.80	164.05 j	1.25**	1.57	6.79	0.72	164.76	1.006	0.961	n/a	0.00	n/a
3	18	6.64	163.00	164.54	1.50	1.77	3.76	0.22	164.76	n/a	54.0	163.50	164.58i	1.18	1.49	4.45	0.31	164.89i	n/a	n/a	-0.180	0.00	n/a
4	18	4.89	162.21	164.12	1.50	1.77	2.77	0.12	164.24	0.217	68.0	163.80	164.64 j	0.84**	1.02	4.77	0.35	165.00	0.587	0.402	n/a	0.00	n/a
5	18	1.70	164.00	164.98	0.98	1.23	1.38	0.03	165.01	0.044	125	165.00	165.50 j	0.50**	0.51	3.32	0.17	165.67	0.464	0.254	n/a	0.00	0.00

Project File: SWM#3.stm | Number of lines: 5 | Run Date: 02-10-2015

Notes: ; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#4.stm	No. Lines: 28	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	45.0	43.3	MH	0.00	0.00	0.00	5.0	153.00	5.56	155.50	36	Cir	0.013	0.00	165.00	M7 TO E6
2	1	15.0	0.0	Comb	0.00	0.94	0.61	5.0	156.00	2.00	156.30	30	Cir	0.013	0.00	165.08	46A TO M7
3	2	58.0	87.4	Comb	0.00	0.47	0.86	5.0	156.50	2.24	157.80	30	Cir	0.013	0.00	164.55	46 TO 46A
4	3	42.0	2.1	Comb	0.00	1.78	0.89	5.0	158.00	2.62	159.10	30	Cir	0.013	0.00	164.00	47 TO 46
5	4	18.0	-2.4	Comb	0.00	0.86	0.87	5.0	159.30	2.22	159.70	30	Cir	0.013	0.00	164.46	48 TO 47
6	5	186.0	1.3	Comb	0.00	0.06	0.85	5.0	160.70	2.58	165.50	18	Cir	0.013	0.00	169.03	49 TO 48
7	5	219.0	-63.1	Comb	0.00	0.75	0.86	5.0	159.90	3.38	167.30	30	Cir	0.013	0.00	172.00	50 TO 48
8	7	210.0	-25.6	Comb	0.00	0.64	0.86	5.0	167.50	3.10	174.02	30	Cir	0.013	0.00	180.07	51 TO 50
9	8	53.0	-103.0	Comb	0.00	0.64	0.79	5.0	175.02	1.23	175.67	18	Cir	0.013	0.00	179.37	52 TO 51
10	9	64.0	13.2	Comb	0.00	0.42	0.85	5.0	175.87	1.77	177.00	18	Cir	0.013	0.00	180.65	53 TO 52
11	8	105.0	-0.2	Comb	0.00	0.45	0.50	5.0	174.22	6.15	180.68	30	Cir	0.013	0.00	185.63	54 TO 51
12	11	209.0	-24.3	Comb	0.00	0.11	0.84	5.0	180.88	2.83	186.80	30	Cir	0.013	0.00	196.60	55 TO 54
13	12	46.0	38.7	Comb	0.00	0.14	0.61	5.0	187.00	0.87	187.40	30	Cir	0.013	0.00	196.60	56 TO 55
14	13	132.0	-67.8	Comb	0.00	0.12	0.60	5.0	187.90	0.76	188.90	24	Cir	0.013	0.00	200.31	57 TO 56
15	14	46.0	-68.8	Comb	0.00	0.54	0.46	5.0	189.10	0.87	189.50	24	Cir	0.013	0.00	200.31	58 TO 57
16	15	279.0	23.6	Comb	0.00	2.76	0.43	5.0	190.00	0.72	192.00	18	Cir	0.013	0.00	195.50	59 TO 58
17	14	132.0	39.5	Comb	0.00	0.16	0.69	5.0	189.40	6.59	198.10	18	Cir	0.013	0.00	202.12	60 TO 57
18	17	46.0	-74.7	Comb	0.00	0.65	0.42	5.0	198.30	0.70	198.62	18	Cir	0.013	0.00	202.12	61 TO 60
19	17	136.0	13.7	Comb	0.00	0.19	0.60	5.0	198.30	3.42	202.95	18	Cir	0.013	0.00	207.09	62 TO 60
20	19	46.0	-81.2	Comb	0.00	1.05	0.39	5.0	203.15	0.76	203.50	18	Cir	0.013	0.00	207.09	63 TO 62
21	End	278.0	-12.4	Comb	0.00	4.00	0.42	5.0	153.00	3.99	164.10	36	Cir	0.013	0.00	169.30	64 TO E7

Project File: SWM#4.stm | Number of lines: 28 | Date: 02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
22	21	132.0	79.6	Comb	0.00	0.21	0.86	5.0	164.30	1.67	166.50	36	Cir	0.013	0.00	172.72	65 TO 64
23	22	92.0	-87.9	MH	0.00	0.00	0.00	5.0	168.00	2.88	170.65	18	Cir	0.013	0.00	174.60	M8 TO 65
24	23	22.0	68.4	Comb	0.00	0.36	0.42	5.0	170.85	2.95	171.50	18	Cir	0.013	0.00	175.10	66 TO M8
25	22	72.0	21.0	Comb	0.00	0.21	0.84	5.0	167.00	2.50	168.80	24	Cir	0.013	0.00	173.00	67 TO 65
26	25	81.0	-42.4	Comb	0.00	2.19	0.60	5.0	169.00	1.85	170.50	24	Cir	0.013	0.00	174.50	68 TO 67
27	26	91.0	-31.9	Comb	0.00	1.04	0.78	5.0	171.00	2.20	173.00	18	Cir	0.013	0.00	176.73	69 TO 68
28	26	101.0	51.8	Comb	0.00	0.75	0.74	5.0	171.00	2.97	174.00	18	Cir	0.013	0.00	177.50	70 TO 68

Project File: SWM#4.stm | Number of lines: 28 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	M7 TO E6	45.96	36 c	45.0	153.00	155.50	5.556	160.41*	160.62*	0.00	160.62	End
2	46A TO M7	45.98	30 c	15.0	156.00	156.30	2.000	160.62*	159.74*	n/a	161.10 i	1
3	46 TO 46A	42.87	30 c	58.0	156.50	157.80	2.241	161.10*	160.95*	n/a	162.13 i	2
4	47 TO 46	40.67	30 c	42.0	158.00	159.10	2.619	162.13*	162.06*	n/a	163.13 i	3
5	48 TO 47	31.82	30 c	18.0	159.30	159.70	2.222	163.13*	163.24*	0.00	163.24	4
6	49 TO 48	0.42	18 c	186.0	160.70	165.50	2.581	163.89	165.75	n/a	165.75 j	5
7	50 TO 48	35.95	30 c	219.0	159.90	167.30	3.379	163.24	169.30	n/a	169.30 j	5
8	51 TO 50	31.68	30 c	210.0	167.50	174.02	3.105	169.79	175.90	n/a	175.90 j	7
9	52 TO 51	6.98	18 c	53.0	175.02	175.67	1.226	176.65	176.85	n/a	177.24 i	8
10	53 TO 52	2.93	18 c	64.0	175.87	177.00	1.766	177.24	177.65	n/a	177.65 j	9
11	54 TO 51	21.32	30 c	105.0	174.22	180.68	6.152	176.60	182.22	n/a	182.22 j	8
12	55 TO 54	20.00	30 c	209.0	180.88	186.80	2.833	182.66	188.29	n/a	188.29 j	11
13	56 TO 55	19.37	30 c	46.0	187.00	187.40	0.870	188.72	188.87	n/a	188.87	12
14	57 TO 56	18.91	24 c	132.0	187.90	188.90	0.758	189.48*	190.96*	n/a	191.75 i	13
15	58 TO 57	11.42	24 c	46.0	189.10	189.50	0.870	191.75*	191.87*	0.00	191.87	14
16	59 TO 58	9.73	18 c	279.0	190.00	192.00	0.717	191.87*	194.27*	0.00	194.27	15
17	60 TO 57	7.22	18 c	132.0	189.40	198.10	6.591	191.75	199.13	n/a	199.13 j	14
18	61 TO 60	2.24	18 c	46.0	198.30	198.62	0.696	199.55	199.55	0.00	199.55	17
19	62 TO 60	4.26	18 c	136.0	198.30	202.95	3.419	199.52	203.74	n/a	203.74 j	17
20	63 TO 62	3.36	18 c	46.0	203.15	203.50	0.761	204.00	204.20	n/a	204.20 j	19
21	64 TO E7	38.21	36 c	278.0	153.00	164.10	3.993	160.41	166.07	n/a	166.07 j	End
22	65 TO 64	25.39	36 c	132.0	164.30	166.50	1.667	166.81	168.11	n/a	168.11 j	21
23	M8 TO 65	1.23	18 c	92.0	168.00	170.65	2.880	168.77	171.07	n/a	171.07 j	22
24	66 TO M8	1.24	18 c	22.0	170.85	171.50	2.955	171.21	171.92	n/a	171.92 j	23
25	67 TO 65	22.87	24 c	72.0	167.00	168.80	2.500	168.16*	171.12*	n/a	171.94 i	22
26	68 TO 67	21.60	24 c	81.0	169.00	170.50	1.852	171.94*	172.68*	n/a	173.41 i	25
27	69 TO 68	6.65	18 c	91.0	171.00	173.00	2.198	173.41	173.98	n/a	173.98 j	26
28	70 TO 68	4.55	18 c	101.0	171.00	174.00	2.970	173.41	174.81	n/a	174.81 j	26

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	45.0	0.00	12.73	0.00	0.00	8.24	5.0	18.3	5.6	45.96	157.2	6.50	36	5.56	155.50	153.00	160.62	160.41	165.00	156.50	M7 TO E6
2	1	15.0	0.94	12.73	0.61	0.57	8.24	5.0	18.3	5.6	45.98	58.00	9.37	30	2.00	156.30	156.00	159.74	160.62	165.08	165.00	46A TO M7
3	2	58.0	0.47	11.79	0.86	0.40	7.66	5.0	18.2	5.6	42.87	61.40	8.73	30	2.24	157.80	156.50	160.95	161.10	164.55	165.08	46 TO 46A
4	3	42.0	1.78	11.32	0.89	1.58	7.26	5.0	18.1	5.6	40.67	66.37	8.29	30	2.62	159.10	158.00	162.06	162.13	164.00	164.55	47 TO 46
5	4	18.0	0.86	9.54	0.87	0.75	5.67	5.0	18.1	5.6	31.82	61.14	6.48	30	2.22	159.70	159.30	163.24	163.13	164.46	164.00	48 TO 47
6	5	186.0	0.06	0.06	0.85	0.05	0.05	5.0	5.0	8.2	0.42	16.87	1.22	18	2.58	165.50	160.70	165.75	163.89	169.03	164.46	49 TO 48
7	5	219.0	0.75	8.62	0.86	0.65	4.87	5.0	8.1	7.4	35.95	75.39	7.92	30	3.38	167.30	159.90	169.30	163.24	172.00	164.46	50 TO 48
8	7	210.0	0.64	7.87	0.86	0.55	4.23	5.0	7.6	7.5	31.68	72.26	7.36	30	3.10	174.02	167.50	175.90	169.79	180.07	172.00	51 TO 50
9	8	53.0	0.64	1.06	0.79	0.51	0.86	5.0	5.4	8.1	6.98	11.63	4.49	18	1.23	175.67	175.02	176.85	176.65	179.37	180.07	52 TO 51
10	9	64.0	0.42	0.42	0.85	0.36	0.36	5.0	5.0	8.2	2.93	13.95	2.84	18	1.77	177.00	175.87	177.65	177.24	180.65	179.37	53 TO 52
11	8	105.0	0.45	6.17	0.50	0.23	2.82	5.0	7.3	7.6	21.32	101.7	5.56	30	6.15	180.68	174.22	182.22	176.60	185.63	180.07	54 TO 51
12	11	209.0	0.11	5.72	0.84	0.09	2.59	5.0	6.7	7.7	20.00	69.02	5.94	30	2.83	186.80	180.88	188.29	182.66	196.60	185.63	55 TO 54
13	12	46.0	0.14	5.61	0.61	0.09	2.50	5.0	6.6	7.8	19.37	38.24	5.92	30	0.87	187.40	187.00	188.87	188.72	196.60	196.60	56 TO 55
14	13	132.0	0.12	5.47	0.60	0.07	2.41	5.0	6.3	7.8	18.91	19.69	7.14	24	0.76	188.90	187.90	190.96	189.48	200.31	196.60	57 TO 56
15	14	46.0	0.54	3.30	0.46	0.25	1.44	5.0	5.8	8.0	11.42	21.09	3.63	24	0.87	189.50	189.10	191.87	191.75	200.31	200.31	58 TO 57
16	15	279.0	2.76	2.76	0.43	1.19	1.19	5.0	5.0	8.2	9.73	8.89	5.51	18	0.72	192.00	190.00	194.27	191.87	195.50	200.31	59 TO 58
17	14	132.0	0.16	2.05	0.69	0.11	0.91	5.0	5.8	8.0	7.22	26.96	4.85	18	6.59	198.10	189.40	199.13	191.75	202.12	200.31	60 TO 57
18	17	46.0	0.65	0.65	0.42	0.27	0.27	5.0	5.0	8.2	2.24	8.76	1.68	18	0.70	198.62	198.30	199.55	199.55	202.12	202.12	61 TO 60
19	17	136.0	0.19	1.24	0.60	0.11	0.52	5.0	5.2	8.1	4.26	19.42	3.64	18	3.42	202.95	198.30	203.74	199.52	207.09	202.12	62 TO 60
20	19	46.0	1.05	1.05	0.39	0.41	0.41	5.0	5.0	8.2	3.36	9.16	3.70	18	0.76	203.50	203.15	204.20	204.00	207.09	207.09	63 TO 62
21	End	278.0	4.00	8.76	0.42	1.68	4.87	5.0	6.2	7.8	38.21	133.3	6.59	36	3.99	164.10	153.00	166.07	160.41	169.30	156.50	64 TO E7

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
22	21	132.0	0.21	4.76	0.86	0.18	3.19	5.0	5.8	8.0	25.39	86.10	5.31	36	1.67	166.50	164.30	168.11	166.81	172.72	169.30	65 TO 64
23	22	92.0	0.00	0.36	0.00	0.00	0.15	5.0	5.1	8.2	1.23	17.82	2.17	18	2.88	170.65	168.00	171.07	168.77	174.60	172.72	M8 TO 65
24	23	22.0	0.36	0.36	0.42	0.15	0.15	5.0	5.0	8.2	1.24	18.05	3.43	18	2.95	171.50	170.85	171.92	171.21	175.10	174.60	66 TO M8
25	22	72.0	0.21	4.19	0.84	0.18	2.86	5.0	5.7	8.0	22.87	35.76	9.67	24	2.50	168.80	167.00	171.12	168.16	173.00	172.72	67 TO 65
26	25	81.0	2.19	3.98	0.60	1.31	2.68	5.0	5.5	8.1	21.60	30.78	6.88	24	1.85	170.50	169.00	172.68	171.94	174.50	173.00	68 TO 67
27	26	91.0	1.04	1.04	0.78	0.81	0.81	5.0	5.0	8.2	6.65	15.57	4.59	18	2.20	173.00	171.00	173.98	173.41	176.73	174.50	69 TO 68
28	26	101.0	0.75	0.75	0.74	0.56	0.56	5.0	5.0	8.2	4.55	18.10	3.61	18	2.97	174.00	171.00	174.81	173.41	177.50	174.50	70 TO 68

Project File: SWM#4.stm

Number of lines: 28

Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	M7	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
2	46A	4.70	0.00	2.61	2.09	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.24	12.00	0.24	11.95	0.00	3
3	46	3.31	2.09	2.90	2.50	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.26	13.00	0.25	12.60	0.00	4
4	47	12.99	2.50	15.48	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.68	34.00	0.68	34.00	0.00	Off
5	48	6.13	0.00	6.13	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.41	20.50	0.41	20.50	0.00	Off
6	49	0.42	0.00	0.42	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.07	3.50	0.07	3.50	0.00	Off
7	50	5.29	0.00	5.29	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.37	18.50	0.37	18.50	0.00	Off
8	51	4.51	0.55	5.06	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.36	18.00	0.36	18.00	0.00	Off
9	52	4.14	1.10	5.24	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.37	18.50	0.37	18.50	0.00	Off
10	53	2.93	0.00	1.83	1.10	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.20	10.00	0.20	10.00	0.00	9
11	54	1.84	0.00	1.30	0.55	Comb	6.0	4.00	0.00	4.00	2.00	0.049	2.00	0.020	0.020	0.013	0.13	6.50	0.13	6.25	0.00	8
12	55	0.76	1.43	1.46	0.73	Comb	6.0	4.00	0.00	4.00	2.00	0.034	2.00	0.020	0.020	0.013	0.15	7.50	0.14	7.15	0.00	Off
13	56	0.70	0.16	0.70	0.16	Comb	6.0	4.00	0.00	4.00	2.00	0.034	2.00	0.020	0.020	0.013	0.11	5.50	0.10	5.05	0.00	Off
14	57	0.59	0.24	0.67	0.16	Comb	6.0	4.00	0.00	4.00	2.00	0.012	2.00	0.020	0.020	0.013	0.13	6.50	0.12	6.05	0.00	13
15	58	2.04	1.49	2.10	1.43	Comb	6.0	4.00	0.00	4.00	2.00	0.012	2.00	0.020	0.020	0.013	0.21	10.50	0.21	10.40	0.00	12
16	59	9.73	0.00	9.73	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.45	22.50	0.45	22.50	0.00	Off
17	60	0.90	0.17	0.83	0.24	Comb	6.0	4.00	0.00	4.00	2.00	0.018	2.00	0.020	0.020	0.013	0.13	6.50	0.12	6.20	0.00	14
18	61	2.24	1.33	2.08	1.49	Comb	6.0	4.00	0.00	4.00	2.00	0.018	2.00	0.020	0.020	0.013	0.20	10.00	0.19	9.65	0.00	15
19	62	0.93	0.00	0.76	0.17	Comb	6.0	4.00	0.00	4.00	2.00	0.041	2.00	0.020	0.020	0.013	0.11	5.50	0.10	5.05	0.00	17
20	63	3.36	0.00	2.02	1.33	Comb	6.0	4.00	0.00	4.00	2.00	0.041	2.00	0.020	0.020	0.013	0.17	8.50	0.16	8.10	0.00	18
21	64	13.77	0.00	13.77	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.60	30.00	0.60	30.00	0.00	Off
22	65	1.48	0.00	1.48	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.16	8.00	0.16	8.00	0.00	Off

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
23	M8	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
24	66	1.24	0.00	1.24	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.14	7.00	0.14	7.00	0.00	Off
25	67	1.45	8.58	4.37	5.65	Comb	6.0	4.00	0.00	4.00	2.00	0.017	2.00	0.020	0.020	0.013	0.29	14.50	0.29	14.35	0.00	Off
26	68	10.77	3.37	5.57	8.58	Comb	6.0	4.00	0.00	4.00	2.00	0.018	2.00	0.020	0.020	0.013	0.33	16.50	0.32	16.20	0.00	25
27	69	6.65	0.00	3.28	3.37	Comb	6.0	4.00	0.00	4.00	2.00	0.018	2.00	0.020	0.020	0.013	0.25	12.50	0.24	12.20	0.00	26
28	70	4.55	0.00	4.55	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.33	16.50	0.33	16.50	0.00	Off

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#4.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	MH	0.013	45.0	0.00 0.00 0.00	6.31 6.42 0.00	5.99 2.25 0.00	18.31	0.09	5.6	8.24	0.00 45.96	165.00	160.62 158.50 155.50	160.41 156.00 153.00	0.21 2.50	36 36 Cir	0.48 5.56	6.50 22.24	45.96 157.2	M7 TO E6
2	1	Comb	0.013	15.0	0.41 0.53 0.00	6.31 6.42 0.00	5.99 2.25 0.00	18.29	0.02	5.6	8.24	0.00 45.98	165.08	159.74 158.80 156.30	160.62 158.50 156.00	-0.89 0.30	30 30 Cir	-5.93 2.00	9.37 11.82	45.98 58.00	46A TO M7
3	2	Comb	0.013	58.0	0.40 0.07 0.00	5.90 5.89 0.00	5.61 2.06 0.00	18.20	0.09	5.6	7.66	0.00 42.87	164.55	160.95 160.30 157.80	161.10 159.00 156.50	-0.15 1.30	30 30 Cir	-0.26 2.24	8.73 12.51	42.87 61.40	46 TO 46A
4	3	Comb	0.013	42.0	1.61 0.17 0.00	5.50 5.82 0.00	5.23 2.04 0.00	18.14	0.07	5.6	7.26	0.00 40.67	164.00	162.06 161.60 159.10	162.13 160.50 158.00	-0.08 1.10	30 30 Cir	-0.18 2.62	8.29 13.52	40.67 66.37	47 TO 46
5	4	Comb	0.013	18.0	0.75 0.11 0.00	3.89 5.65 0.00	3.70 1.98 0.00	18.10	0.04	5.6	5.67	0.00 31.82	164.46	163.24 162.20 159.70	163.13 161.80 159.30	0.11 0.40	30 30 Cir	0.60 2.22	6.48 12.45	31.82 61.14	48 TO 47
6	5	Comb	0.013	186.0	0.05 0.01 0.00	0.05 0.01 0.00	0.05 0.00 0.00	5.00	13.10	8.2	0.05	0.00 0.42	169.03	165.75 167.00 165.50	163.89 162.20 160.70	1.86 4.80	18 18 Cir	1.00 2.58	1.22 9.55	0.42 16.87	49 TO 48
7	5	Comb	0.013	219.0	0.64 0.11 0.00	3.09 5.53 0.00	2.94 1.94 0.00	8.10	0.46	7.4	4.87	0.00 35.95	172.00	169.30 169.80 167.30	163.24 162.40 159.90	6.07 7.40	30 30 Cir	2.77 3.38	7.92 15.36	35.95 75.39	50 TO 48
8	7	Comb	0.013	210.0	0.54 0.10 0.00	2.45 5.42 0.00	2.33 1.90 0.00	7.62	0.48	7.5	4.23	0.00 31.68	180.07	175.90 176.52 174.02	169.79 170.00 167.50	6.12 6.52	30 30 Cir	2.91 3.10	7.36 14.72	31.68 72.26	51 TO 50
9	8	Comb	0.013	53.0	0.47 0.17 0.00	0.82 0.24 0.00	0.78 0.08 0.00	5.38	0.20	8.1	0.86	0.00 6.98	179.37	176.85 177.17 175.67	176.65 176.52 175.02	0.20 0.65	18 18 Cir	0.37 1.23	4.49 6.58	6.98 11.63	52 TO 51
10	9	Comb	0.013	64.0	0.35 0.07 0.00	0.35 0.07 0.00	0.33 0.02 0.00	5.00	0.38	8.2	0.36	0.00 2.93	180.65	177.65 178.50 177.00	177.24 177.37 175.87	0.41 1.13	18 18 Cir	0.64 1.77	2.84 7.90	2.93 13.95	53 TO 52

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#4.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#4.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
11	8	Comb	0.013	105.0	0.11 0.34 0.00	1.09 5.08 0.00	1.04 1.78 0.00	7.31	0.31	7.6	2.82	0.00 21.32	185.63	182.22 183.18 180.68	176.60 176.72 174.22	5.62 6.46	30 30 Cir	5.35 6.15	5.56 20.72	21.32 101.7	54 TO 51
12	11	Comb	0.013	209.0	0.09 0.02 0.00	0.98 4.74 0.00	0.93 1.66 0.00	6.72	0.59	7.7	2.59	0.00 20.00	196.60	188.29 189.30 186.80	182.66 183.38 180.88	5.63 5.92	30 30 Cir	2.69 2.83	5.94 14.06	20.00 69.02	55 TO 54
13	12	Comb	0.013	46.0	0.06 0.08 0.00	0.89 4.72 0.00	0.85 1.65 0.00	6.59	0.13	7.8	2.50	0.00 19.37	196.60	188.87 189.90 187.40	188.72 189.50 187.00	0.16 0.40	30 30 Cir	0.34 0.87	5.92 7.79	19.37 38.24	56 TO 55
14	13	Comb	0.013	132.0	0.05 0.07 0.00	0.83 4.64 0.00	0.79 1.62 0.00	6.28	0.31	7.8	2.41	0.00 18.91	200.31	190.96 190.90 188.90	189.48 189.90 187.90	1.48 1.00	24 24 Cir	1.12 0.76	7.14 6.27	18.91 19.69	57 TO 56
15	14	Comb	0.013	46.0	0.10 0.44 0.00	0.46 2.84 0.00	0.44 0.99 0.00	5.84	0.21	8.0	1.44	0.00 11.42	200.31	191.87 191.50 189.50	191.75 191.10 189.10	0.12 0.40	24 24 Cir	0.25 0.87	3.63 6.71	11.42 21.09	58 TO 57
16	15	Comb	0.013	279.0	0.36 2.40 0.00	0.36 2.40 0.00	0.34 0.84 0.00	5.00	0.84	8.2	1.19	0.00 9.73	195.50	194.27 193.50 192.00	191.87 191.50 190.00	2.40 2.00	18 18 Cir	0.86 0.72	5.51 5.03	9.73 8.89	59 TO 58
17	14	Comb	0.013	132.0	0.09 0.07 0.00	0.32 1.73 0.00	0.30 0.61 0.00	5.83	0.45	8.0	0.91	0.00 7.22	202.12	199.13 199.60 198.10	191.75 190.90 189.40	7.37 8.70	18 18 Cir	5.59 6.59	4.85 15.26	7.22 26.96	60 TO 57
18	17	Comb	0.013	46.0	0.08 0.57 0.00	0.08 0.57 0.00	0.08 0.20 0.00	5.00	0.46	8.2	0.27	0.00 2.24	202.12	199.55 200.12 198.62	199.55 199.80 198.30	0.00 0.32	18 18 Cir	0.01 0.70	1.68 4.96	2.24 8.76	61 TO 60
19	17	Comb	0.013	136.0	0.08 0.11 0.00	0.15 1.09 0.00	0.14 0.38 0.00	5.21	0.62	8.1	0.52	0.00 4.26	207.09	203.74 204.45 202.95	199.52 199.80 198.30	4.21 4.65	18 18 Cir	3.10 3.42	3.64 10.99	4.26 19.42	62 TO 60
20	19	Comb	0.013	46.0	0.07 0.98 0.00	0.07 0.98 0.00	0.07 0.34 0.00	5.00	0.21	8.2	0.41	0.00 3.36	207.09	204.20 205.00 203.50	204.00 204.65 203.15	0.20 0.35	18 18 Cir	0.43 0.76	3.70 5.18	3.36 9.16	63 TO 62

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#4.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#4.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
21	End	Comb	0.013	278.0	0.45 3.55 0.00	2.98 5.78 0.00	2.83 2.02 0.00	6.23	0.70	7.8	4.87	0.00 38.21	169.30	166.07 167.10 164.10	160.41 156.00 153.00	5.66 11.10	36 36 Cir	2.04 3.99	6.59 18.85	38.21 133.3	64 TO E7
22	21	Comb	0.013	132.0	0.18 0.03 0.00	2.53 2.23 0.00	2.40 0.78 0.00	5.81	0.41	8.0	3.19	0.00 25.39	172.72	168.11 169.50 166.50	166.81 167.30 164.30	1.30 2.20	36 36 Cir	0.98 1.67	5.31 12.18	25.39 86.10	65 TO 64
23	22	MH	0.013	92.0	0.00 0.00 0.00	0.04 0.32 0.00	0.04 0.11 0.00	5.11	0.71	8.2	0.15	0.00 1.23	174.60	171.07 172.15 170.65	168.77 169.50 168.00	2.30 2.65	18 18 Cir	2.50 2.88	2.17 10.09	1.23 17.82	M8 TO 65
24	23	Comb	0.013	22.0	0.04 0.32 0.00	0.04 0.32 0.00	0.04 0.11 0.00	5.00	0.11	8.2	0.15	0.00 1.24	175.10	171.92 173.00 171.50	171.21 172.35 170.85	0.72 0.65	18 18 Cir	3.26 2.95	3.43 10.21	1.24 18.05	66 TO M8
25	22	Comb	0.013	72.0	0.17 0.04 0.00	2.31 1.88 0.00	2.19 0.66 0.00	5.66	0.12	8.0	2.86	0.00 22.87	173.00	171.12 170.80 168.80	168.16 169.00 167.00	2.96 1.80	24 24 Cir	4.11 2.50	9.67 11.38	22.87 35.76	67 TO 65
26	25	Comb	0.013	81.0	0.91 1.28 0.00	2.14 1.84 0.00	2.03 0.64 0.00	5.47	0.20	8.1	2.68	0.00 21.60	174.50	172.68 172.50 170.50	171.94 171.00 169.00	0.73 1.50	24 24 Cir	0.91 1.85	6.88 9.80	21.60 30.78	68 TO 67
27	26	Comb	0.013	91.0	0.74 0.30 0.00	0.74 0.30 0.00	0.70 0.11 0.00	5.00	0.33	8.2	0.81	0.00 6.65	176.73	173.98 174.50 173.00	173.41 172.50 171.00	0.57 2.00	18 18 Cir	0.63 2.20	4.59 8.81	6.65 15.57	69 TO 68
28	26	Comb	0.013	101.0	0.49 0.26 0.00	0.49 0.26 0.00	0.47 0.09 0.00	5.00	0.47	8.2	0.56	0.00 4.55	177.50	174.81 175.50 174.00	173.41 172.50 171.00	1.40 3.00	18 18 Cir	1.39 2.97	3.61 10.24	4.55 18.10	70 TO 68

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#4.stm

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	45.96	153.00	160.41	3.00	7.07	6.50	0.66	161.07	0.475	45.0	155.50	160.62	3.00	7.07	6.50	0.66	161.28	0.475	0.475	0.214	0.00	0.00
2	30	45.98	156.00	160.62	2.50	4.91	9.37	1.36	161.99	n/a	15.0	156.30	159.74i	2.50	4.91	9.37	1.36	161.10i	n/a	n/a	-2.254	0.00	n/a
3	30	42.87	156.50	161.10	2.50	4.91	8.73	1.19	162.29	n/a	58.0	157.80	160.95i	2.50	4.91	8.73	1.19	162.13i	n/a	n/a	-1.337	0.00	n/a
4	30	40.67	158.00	162.13	2.50	4.91	8.29	1.07	163.20	n/a	42.0	159.10	162.06i	2.50	4.91	8.29	1.07	163.13i	n/a	n/a	-1.143	0.00	n/a
5	30	31.82	159.30	163.13	2.50	4.91	6.48	0.65	163.78	0.602	18.0	159.70	163.24	2.50	4.91	6.48	0.65	163.89	0.602	0.602	0.108	0.00	0.00
6	18	0.42	160.70	163.89	1.50	1.77	0.24	0.00	163.89	0.002	186	165.50	165.75 j	0.25**	0.19	2.20	0.08	165.82	0.459	0.230	n/a	0.00	n/a
7	30	35.95	159.90	163.24	2.50	4.91	7.33	0.83	164.07	0.769	219	167.30	169.30 j	2.00**	4.22	8.52	1.13	170.43	0.801	0.785	n/a	0.00	n/a
8	30	31.68	167.50	169.79	2.29	4.71	6.73	0.70	170.49	0.520	210	174.02	175.90 j	1.88**	3.96	8.00	0.99	176.89	0.712	0.616	n/a	0.00	0.00
9	18	6.98	175.02	176.65	1.50	1.77	3.95	0.24	176.89	n/a	53.0	175.67	176.85i	1.10	1.39	5.04	0.39	177.24i	n/a	n/a	-0.045	0.00	n/a
10	18	2.93	175.87	177.24	1.37	1.70	1.73	0.05	177.29	0.068	64.0	177.00	177.65 j	0.65**	0.74	3.96	0.24	177.90	0.504	0.286	n/a	0.00	0.00
11	30	21.32	174.22	176.60	2.38	4.82	4.42	0.30	176.91	0.234	105	180.68	182.22 j	1.54**	3.18	6.70	0.70	182.92	0.549	0.392	n/a	0.00	0.00
12	30	20.00	180.88	182.66	1.78	3.75	5.34	0.44	183.11	0.323	209	186.80	188.29 j	1.49**	3.06	6.53	0.66	188.96	0.533	0.428	n/a	0.00	0.00
13	30	19.37	187.00	188.72	1.72	3.59	5.39	0.45	189.17	0.335	46.0	187.40	188.87	1.47**	3.00	6.45	0.65	189.52	0.525	0.430	n/a	0.00	n/a
14	24	18.91	187.90	189.48	1.58*	2.66	7.12	0.79	190.26	n/a	132	188.90	190.96i	1.57	2.64	7.15	0.80	191.75i	n/a	n/a	0.693	0.00	n/a
15	24	11.42	189.10	191.75	2.00	3.14	3.63	0.21	191.96	0.255	46.0	189.50	191.87	2.00	3.14	3.63	0.21	192.08	0.255	0.255	0.117	0.00	0.00
16	18	9.73	190.00	191.87	1.50	1.77	5.51	0.47	192.34	0.859	279	192.00	194.27	1.50	1.77	5.51	0.47	194.74	0.858	0.858	2.395	0.00	0.00
17	18	7.22	189.40	191.75	1.50	1.77	4.08	0.26	192.01	0.473	132	198.10	199.13 j	1.03**	1.29	5.61	0.49	199.61	0.718	0.595	n/a	0.00	0.00
18	18	2.24	198.30	199.55	1.25	1.57	1.42	0.03	199.58	0.044	46.0	198.62	199.55	0.93	1.15	1.94	0.06	199.61	0.091	0.068	0.031	0.00	0.00
19	18	4.26	198.30	199.52	1.22	1.54	2.76	0.12	199.64	0.166	136	202.95	203.74 j	0.79**	0.94	4.53	0.32	204.06	0.558	0.362	n/a	0.00	0.00
20	18	3.36	203.15	204.00	0.85	1.03	3.25	0.16	204.16	0.270	46.0	203.50	204.20 j	0.70**	0.81	4.16	0.27	204.47	0.520	0.395	n/a	0.00	n/a
21	36	38.21	153.00	160.41	3.00	7.07	5.41	0.45	160.86	0.328	278	164.10	166.07 j	1.97**	4.92	7.76	0.94	167.01	0.557	0.443	n/a	0.00	n/a

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

Notes: * Normal depth assumed.; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

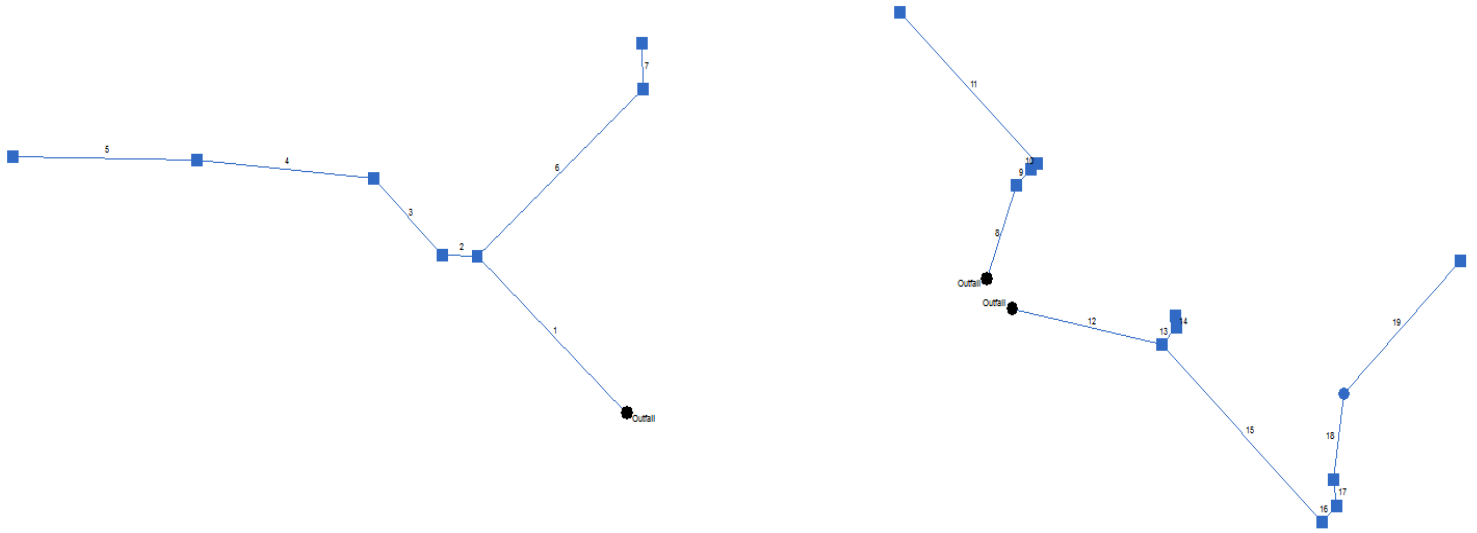
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
22	36	25.39	164.30	166.81	2.51	6.31	4.02	0.25	167.06	0.140	132	166.50	168.11 j	1.61**	3.85	6.59	0.68	168.78	0.461	0.301	n/a	0.00	n/a
23	18	1.23	168.00	168.77	0.77	0.92	1.34	0.03	168.80	0.050	92.0	170.65	171.07 j	0.42**	0.41	3.01	0.14	171.21	0.454	0.252	n/a	0.00	n/a
24	18	1.24	170.85	171.21	0.36	0.32	3.85	0.23	171.44	0.903	22.0	171.50	171.92 j	0.42**	0.41	3.01	0.14	172.07	0.454	0.678	n/a	0.00	0.00
25	24	22.87	167.00	168.16	1.16*	1.90	12.06	2.26	170.42	n/a	72.0	168.80	171.12i	2.00	3.14	7.28	0.82	171.94i	n/a	n/a	0.695	0.00	n/a
26	24	21.60	169.00	171.94	2.00	3.14	6.88	0.74	172.68	n/a	81.0	170.50	172.68i	2.00	3.14	6.88	0.74	173.41i	n/a	n/a	-0.001	0.00	n/a
27	18	6.65	171.00	173.41	1.50	1.77	3.76	0.22	173.63	0.401	91.0	173.00	173.98 j	0.98**	1.23	5.41	0.46	174.44	0.682	0.542	n/a	0.00	n/a
28	18	4.55	171.00	173.41	1.50	1.77	2.57	0.10	173.52	0.188	101	174.00	174.81 j	0.81**	0.98	4.64	0.34	175.15	0.571	0.380	n/a	0.00	n/a

Project File: SWM#4.stm | Number of lines: 28 | Run Date: 02-10-2015

Notes: * Normal depth assumed.; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#5V-2.stm	No. Lines: 19	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	199.0	-136.4	Comb	0.00	0.54	0.82	5.0	171.50	6.03	183.50	24	Cir	0.013	0.00	190.47	71 TO E9
2	1	34.0	-41.0	Comb	0.00	1.32	0.74	5.0	184.00	2.35	184.80	18	Cir	0.013	0.00	190.14	72 TO 71
3	2	94.0	42.8	Comb	0.00	0.24	0.93	5.0	185.00	0.85	185.80	18	Cir	0.013	0.00	193.34	73 TO 72
4	3	171.0	-40.0	DrGrt	0.00	1.28	0.43	5.0	186.00	0.76	187.30	18	Cir	0.013	0.00	191.50	74 TO 73
5	4	178.0	-4.4	DrGrt	0.00	0.26	0.35	5.0	187.50	0.56	188.50	18	Cir	0.013	0.00	192.10	75 TO 74
6	1	218.0	93.8	Comb	0.00	0.16	0.95	5.0	184.00	6.02	197.12	18	Cir	0.013	0.00	201.07	76 TO 71
7	6	40.0	-49.5	Comb	0.00	0.77	0.82	5.0	197.32	4.20	199.00	18	Cir	0.013	0.00	203.00	77 TO 76
8	End	87.0	-70.6	Comb	0.00	0.10	0.95	5.0	173.50	10.92	183.00	18	Cir	0.013	0.00	193.58	78 TO E10
9	8	20.0	24.9	Comb	0.00	0.21	0.81	5.0	189.50	1.50	189.80	18	Cir	0.013	0.00	193.58	79 TO 78
10	9	7.0	6.7	Comb	0.00	0.31	0.91	5.0	190.00	4.29	190.30	18	Cir	0.013	0.00	194.00	80 TO 79
11	10	187.0	-95.8	Comb	0.00	0.33	0.64	5.0	190.50	3.48	197.00	18	Cir	0.013	0.00	200.63	81 TO 80
12	End	148.0	12.2	Comb	0.00	0.11	0.95	5.0	172.00	1.35	174.00	36	Cir	0.013	0.00	188.00	82 TO E11
13	12	20.0	-59.7	Comb	0.00	0.22	0.81	5.0	183.90	0.75	184.05	18	Cir	0.013	0.00	188.00	83 TO 82
14	13	10.0	-44.2	Comb	0.00	0.23	0.95	5.0	184.25	7.50	185.00	18	Cir	0.013	0.00	191.00	84 TO 83
15	12	219.0	33.1	Comb	0.00	0.03	0.75	5.0	181.40	0.73	183.00	36	Cir	0.013	0.00	188.84	85 TO 82
16	15	20.0	-90.2	Comb	0.00	0.03	0.75	5.0	184.00	1.10	184.22	24	Cir	0.013	0.00	188.84	86 TO 85
17	16	23.0	-51.4	Comb	0.00	7.88	0.38	5.0	184.42	0.78	184.60	24	Cir	0.013	0.00	189.00	87 TO 86
18	17	76.0	13.4	MH	0.00	0.00	0.00	5.0	185.60	2.50	187.50	12	Cir	0.013	0.00	199.54	M11 TO 87
19	18	162.0	37.1	DrGrt	0.00	1.20	0.35	5.0	195.00	0.62	196.00	12	Cir	0.013	0.00	199.00	94 TO M11

Project File: SWM#5V-2.stm | Number of lines: 19 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	71 TO E9	22.61	24 c	199.0	171.50	183.50	6.030	174.49	185.18	n/a	185.18 j	End
2	72 TO 71	13.60	18 c	34.0	184.00	184.80	2.353	185.26	186.17	n/a	186.17 j	1
3	73 TO 72	6.47	18 c	94.0	185.00	185.80	0.851	186.96	187.30	0.00	187.30	2
4	74 TO 73	4.92	18 c	171.0	186.00	187.30	0.760	187.38	188.15	n/a	188.15 j	3
5	75 TO 74	0.75	18 c	178.0	187.50	188.50	0.562	188.50	188.83	n/a	188.83 j	4
6	76 TO 71	6.39	18 c	218.0	184.00	197.12	6.018	185.98	198.08	n/a	198.08 j	1
7	77 TO 76	5.18	18 c	40.0	197.32	199.00	4.200	198.39	199.87	n/a	199.87 j	6
8	78 TO E10	5.93	18 c	87.0	173.50	183.00	10.920	174.49	183.93	n/a	183.93 j	End
9	79 TO 78	5.20	18 c	20.0	189.50	189.80	1.500	190.17	190.72	n/a	190.97 i	8
10	80 TO 79	3.87	18 c	7.0	190.00	190.30	4.286	190.97	191.05	n/a	191.05 j	9
11	81 TO 80	1.73	18 c	187.0	190.50	197.00	3.476	191.33	197.50	n/a	197.50 j	10
12	82 TO E11	30.81	36 c	148.0	172.00	174.00	1.351	173.77	175.77	n/a	175.77 j	End
13	83 TO 82	3.24	18 c	20.0	183.90	184.05	0.750	184.52	184.74	n/a	184.74 j	12
14	84 TO 83	1.79	18 c	10.0	184.25	185.00	7.500	184.98	185.51	n/a	185.51 j	13
15	85 TO 82	27.37	36 c	219.0	181.40	183.00	0.731	182.87	184.67	n/a	184.67 j	12
16	86 TO 85	27.23	24 c	20.0	184.00	184.22	1.100	186.00*	187.09*	n/a	188.26 i	15
17	87 TO 86	27.09	24 c	23.0	184.42	184.60	0.783	188.26*	187.45*	n/a	188.61 i	16
18	M11 TO 87	3.37	12 c	76.0	185.60	187.50	2.500	188.61*	189.29*	0.00	189.29	17
19	94 TO M11	3.44	12 c	162.0	195.00	196.00	0.617	196.00*	197.51*	0.00	197.51	18

Project File: SWM#5V-2.stm | Number of lines: 19 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	199.0	0.54	4.57	0.82	0.44	3.07	5.0	8.1	7.4	22.61	55.54	7.60	24	6.03	183.50	171.50	185.18	174.49	190.47	174.00	71 TO E9
2	1	34.0	1.32	3.10	0.74	0.98	1.84	5.0	8.1	7.4	13.60	16.11	8.30	18	2.35	184.80	184.00	186.17	185.26	190.14	190.47	72 TO 71
3	2	94.0	0.24	1.78	0.93	0.22	0.86	5.0	7.6	7.5	6.47	9.69	3.66	18	0.85	185.80	185.00	187.30	186.96	193.34	190.14	73 TO 72
4	3	171.0	1.28	1.54	0.43	0.55	0.64	5.0	6.9	7.7	4.92	9.16	3.84	18	0.76	187.30	186.00	188.15	187.38	191.50	193.34	74 TO 73
5	4	178.0	0.26	0.26	0.35	0.09	0.09	5.0	5.0	8.2	0.75	7.87	1.58	18	0.56	188.50	187.50	188.83	188.50	192.10	191.50	75 TO 74
6	1	218.0	0.16	0.93	0.95	0.15	0.78	5.0	5.2	8.2	6.39	25.76	4.47	18	6.02	197.12	184.00	198.08	185.98	201.07	190.47	76 TO 71
7	6	40.0	0.77	0.77	0.82	0.63	0.63	5.0	5.0	8.2	5.18	21.52	4.36	18	4.20	199.00	197.32	199.87	198.39	203.00	201.07	77 TO 76
8	End	87.0	0.10	0.95	0.95	0.10	0.76	5.0	6.3	7.8	5.93	34.70	4.98	18	10.92	183.00	173.50	183.93	174.49	193.58	176.00	78 TO E10
9	8	20.0	0.21	0.85	0.81	0.17	0.66	5.0	6.3	7.8	5.20	12.86	5.44	18	1.50	189.80	189.50	190.72	190.17	193.58	193.58	79 TO 78
10	9	7.0	0.31	0.64	0.91	0.28	0.49	5.0	6.2	7.8	3.87	21.74	3.79	18	4.29	190.30	190.00	191.05	190.97	194.00	193.58	80 TO 79
11	10	187.0	0.33	0.33	0.64	0.21	0.21	5.0	5.0	8.2	1.73	19.58	2.53	18	3.48	197.00	190.50	197.50	191.33	200.63	194.00	81 TO 80
12	End	148.0	0.11	9.70	0.95	0.10	3.96	5.0	6.5	7.8	30.81	77.53	7.10	36	1.35	174.00	172.00	175.77	173.77	188.00	176.00	82 TO E11
13	12	20.0	0.22	0.45	0.81	0.18	0.40	5.0	5.1	8.2	3.24	9.09	4.38	18	0.75	184.05	183.90	184.74	184.52	188.00	188.00	83 TO 82
14	13	10.0	0.23	0.23	0.95	0.22	0.22	5.0	5.0	8.2	1.79	28.76	2.73	18	7.50	185.00	184.25	185.51	184.98	191.00	188.00	84 TO 83
15	12	219.0	0.03	9.14	0.75	0.02	3.46	5.0	6.0	7.9	27.37	57.01	7.37	36	0.73	183.00	181.40	184.67	182.87	188.84	188.00	85 TO 82
16	15	20.0	0.03	9.11	0.75	0.02	3.44	5.0	6.0	7.9	27.23	23.72	8.67	24	1.10	184.22	184.00	187.09	186.00	188.84	188.84	86 TO 85
17	16	23.0	7.88	9.08	0.38	2.99	3.41	5.0	5.9	7.9	27.09	20.01	8.63	24	0.78	184.60	184.42	187.45	188.26	189.00	188.84	87 TO 86
18	17	76.0	0.00	1.20	0.00	0.00	0.42	5.0	5.6	8.0	3.37	5.63	4.29	12	2.50	187.50	185.60	189.29	188.61	199.54	189.00	M11 TO 87
19	18	162.0	1.20	1.20	0.35	0.42	0.42	5.0	5.0	8.2	3.44	2.80	4.38	12	0.62	196.00	195.00	197.51	196.00	199.00	199.54	94 TO M11

Project File: SWM#5V-2.stm

Number of lines: 19

Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	71	3.63	1.45	5.08	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.36	18.00	0.36	18.00	0.00	Off
2	72	8.01	0.55	8.56	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.45	22.50	0.45	22.50	0.00	Off
3	73	1.83	0.00	1.28	0.55	Comb	6.0	4.00	0.00	4.00	2.00	0.034	2.00	0.020	0.020	0.013	0.14	7.00	0.13	6.70	0.00	2
4	74	4.51	0.00	4.51	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.33	34.80	0.33	34.80	0.00	Off
5	75	0.75	0.00	0.75	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.10	11.87	0.10	11.87	0.00	Off
6	76	1.25	2.39	2.18	1.45	Comb	6.0	4.00	0.00	4.00	2.00	0.055	2.00	0.020	0.020	0.013	0.16	8.00	0.16	7.90	0.00	1
7	77	5.18	0.00	2.79	2.39	Comb	6.0	4.00	0.00	4.00	2.00	0.049	2.00	0.020	0.020	0.013	0.19	9.50	0.18	9.20	0.00	6
8	78	0.78	0.00	0.66	0.12	Comb	6.0	4.00	0.00	4.00	2.00	0.042	2.00	0.020	0.020	0.013	0.10	5.00	0.09	4.70	0.00	12
9	79	1.39	0.00	1.04	0.36	Comb	6.0	4.00	0.00	4.00	2.00	0.042	2.00	0.020	0.020	0.013	0.12	6.00	0.12	5.80	0.00	13
10	80	2.31	0.00	2.31	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.22	11.00	0.22	11.00	0.00	Off
11	81	1.73	0.00	1.73	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.18	9.00	0.18	9.00	0.00	Off
12	82	0.86	0.12	0.98	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.12	6.00	0.12	6.00	0.00	Off
13	83	1.46	0.36	1.82	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.18	9.00	0.18	9.00	0.00	Off
14	84	1.79	0.00	1.79	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	0.18	9.00	0.18	9.00	0.00	Off
15	85	0.18	0.00	0.18	0.00	Comb	6.0	4.00	0.00	4.00	2.00	0.021	2.00	0.020	0.020	0.013	0.07	3.50	0.06	3.10	0.00	Off
16	86	0.18	0.00	0.18	0.00	Comb	6.0	4.00	0.00	4.00	2.00	0.021	2.00	0.020	0.020	0.013	0.07	3.50	0.06	3.10	0.00	Off
17	87	24.55	0.00	24.55	0.00	Comb	6.0	4.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.013	1.44	72.00	1.44	72.00	0.00	Off
18		0.00	0.00	0.00	0.00	MH	6.0	6.00	2.00	4.00	2.00	Sag	2.00	0.080	0.050	0.013	0.00	0.00	0.00	0.00	0.00	17
19		3.44	0.00	3.44	0.00	DrGrt	6.0	6.00	2.00	4.00	2.00	Sag	2.00	0.050	0.050	0.013	0.27	12.95	0.27	12.95	0.00	18

Project File: SWM#5V-2.stm | Number of lines: 19 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#5V-2.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	199.0	0.42 0.12 0.00	2.26 2.08 0.23	2.15 0.73 0.18	8.12	0.44	7.4	3.07	0.00 22.61	190.47	185.18 185.50 183.50	174.49 173.50 171.50	10.69 12.00	24 24 Cir	5.37 6.03	7.60 17.68	22.61 55.54	71 TO E9
2	1	Comb	0.013	34.0	0.85 0.47 0.00	1.08 1.79 0.23	1.03 0.63 0.18	8.05	0.07	7.4	1.84	0.00 13.60	190.14	186.17 186.30 184.80	185.26 185.50 184.00	0.91 0.80	18 18 Cir	2.68 2.35	8.30 9.12	13.60 16.11	72 TO 71
3	2	Comb	0.013	94.0	0.23 0.01 0.00	0.23 1.32 0.23	0.22 0.46 0.18	7.62	0.43	7.5	0.86	0.00 6.47	193.34	187.30 187.30 185.80	186.96 186.50 185.00	0.33 0.80	18 18 Cir	0.35 0.85	3.66 5.48	6.47 9.69	73 TO 72
4	3	DrGrt	0.013	171.0	0.00 1.05 0.23	0.00 1.31 0.23	0.00 0.46 0.18	6.88	0.74	7.7	0.64	0.00 4.92	191.50	188.15 188.80 187.30	187.38 187.50 186.00	0.76 1.30	18 18 Cir	0.45 0.76	3.84 5.18	4.92 9.16	74 TO 73
5	4	DrGrt	0.013	178.0	0.00 0.26 0.00	0.00 0.26 0.00	0.00 0.09 0.00	5.00	1.88	8.2	0.09	0.00 0.75	192.10	188.83 190.00 188.50	188.50 189.00 187.50	0.33 1.00	18 18 Cir	0.19 0.56	1.58 4.45	0.75 7.87	75 TO 74
6	1	Comb	0.013	218.0	0.16 0.00 0.00	0.76 0.17 0.00	0.72 0.06 0.00	5.15	0.81	8.2	0.78	0.00 6.39	201.07	198.08 198.62 197.12	185.98 185.50 184.00	12.11 13.12	18 18 Cir	5.55 6.02	4.47 14.58	6.39 25.76	76 TO 71
7	6	Comb	0.013	40.0	0.60 0.17 0.00	0.60 0.17 0.00	0.57 0.06 0.00	5.00	0.15	8.2	0.63	0.00 5.18	203.00	199.87 200.50 199.00	198.39 198.82 197.32	1.48 1.68	18 18 Cir	3.69 4.20	4.36 12.18	5.18 21.52	77 TO 76
8	End	Comb	0.013	87.0	0.10 0.00 0.00	0.71 0.24 0.00	0.67 0.08 0.00	6.33	0.29	7.8	0.76	0.00 5.93	193.58	183.93 184.50 183.00	174.49 175.00 173.50	9.44 9.50	18 18 Cir	10.85 10.92	4.98 19.64	5.93 34.70	78 TO E10
9	8	Comb	0.013	20.0	0.16 0.05 0.00	0.61 0.24 0.00	0.58 0.08 0.00	6.26	0.06	7.8	0.66	0.00 5.20	193.58	190.72 191.30 189.80	190.17 191.00 189.50	0.55 0.30	18 18 Cir	2.75 1.50	5.44 7.28	5.20 12.86	79 TO 78
10	9	Comb	0.013	7.0	0.29 0.02 0.00	0.45 0.19 0.00	0.43 0.07 0.00	6.23	0.03	7.8	0.49	0.00 3.87	194.00	191.05 191.80 190.30	190.97 191.50 190.00	0.08 0.30	18 18 Cir	1.16 4.29	3.79 12.30	3.87 21.74	80 TO 79

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#5V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#5V-2.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
11	10	Comb	0.013	187.0	0.16 0.17 0.00	0.16 0.17 0.00	0.15 0.06 0.00	5.00	1.23	8.2	0.21	0.00 1.73	200.63	197.50 198.50 197.00	191.33 192.00 190.50	6.17 6.50	18 18 Cir	3.30 3.48	2.53 11.08	1.73 19.58	81 TO 80
12	End	Comb	0.013	148.0	0.11 0.00 0.00	0.99 8.71 0.00	0.94 3.05 0.00	6.49	0.35	7.8	3.96	0.00 30.81	188.00	175.77 177.00 174.00	173.77 175.00 172.00	2.00 2.00	36 36 Cir	1.35 1.35	7.10 10.97	30.81 77.53	82 TO E11
13	12	Comb	0.013	20.0	0.17 0.05 0.00	0.40 0.05 0.00	0.38 0.02 0.00	5.06	0.08	8.2	0.40	0.00 3.24	188.00	184.74 185.55 184.05	184.52 185.40 183.90	0.22 0.15	18 18 Cir	1.09 0.75	4.38 5.15	3.24 9.09	83 TO 82
14	13	Comb	0.013	10.0	0.23 0.00 0.00	0.23 0.00 0.00	0.22 0.00 0.00	5.00	0.06	8.2	0.22	0.00 1.79	191.00	185.51 186.50 185.00	184.98 185.75 184.25	0.53 0.75	18 18 Cir	5.27 7.50	2.73 16.27	1.79 28.76	84 TO 83
15	12	Comb	0.013	219.0	0.02 0.01 0.00	0.48 8.66 0.00	0.46 3.03 0.00	5.99	0.50	7.9	3.46	0.00 27.37	188.84	184.67 186.00 183.00	182.87 184.40 181.40	1.80 1.60	36 36 Cir	0.82 0.73	7.37 8.06	27.37 57.01	85 TO 82
16	15	Comb	0.013	20.0	0.02 0.01 0.00	0.46 8.65 0.00	0.44 3.03 0.00	5.96	0.04	7.9	3.44	0.00 27.23	188.84	187.09 186.22 184.22	186.00 186.00 184.00	1.09 0.22	24 24 Cir	5.45 1.10	8.67 7.55	27.23 23.72	86 TO 85
17	16	Comb	0.013	23.0	0.44 7.44 0.00	0.44 8.64 0.00	0.42 3.02 0.00	5.91	0.04	7.9	3.41	0.00 27.09	189.00	187.45 186.60 184.60	188.26 186.42 184.42	-0.81 0.18	24 24 Cir	-3.51 0.78	8.63 6.37	27.09 20.01	87 TO 86
18	17	MH	0.013	76.0	0.00 0.00 0.00	0.00 1.20 0.00	0.00 0.42 0.00	5.62	0.30	8.0	0.42	0.00 3.37	199.54	189.29 188.50 187.50	188.61 186.60 185.60	0.68 1.90	12 12 Cir	0.89 2.50	4.29 7.17	3.37 5.63	M11 TO 87
19	18	DrGrt	0.013	162.0	0.00 1.20 0.00	0.00 1.20 0.00	0.00 0.42 0.00	5.00	0.62	8.2	0.42	0.00 3.44	199.00	197.51 197.00 196.00	196.00 196.00 195.00	1.51 1.00	12 12 Cir	0.93 0.62	4.38 3.56	3.44 2.80	94 TO M11

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#5V-2.stm

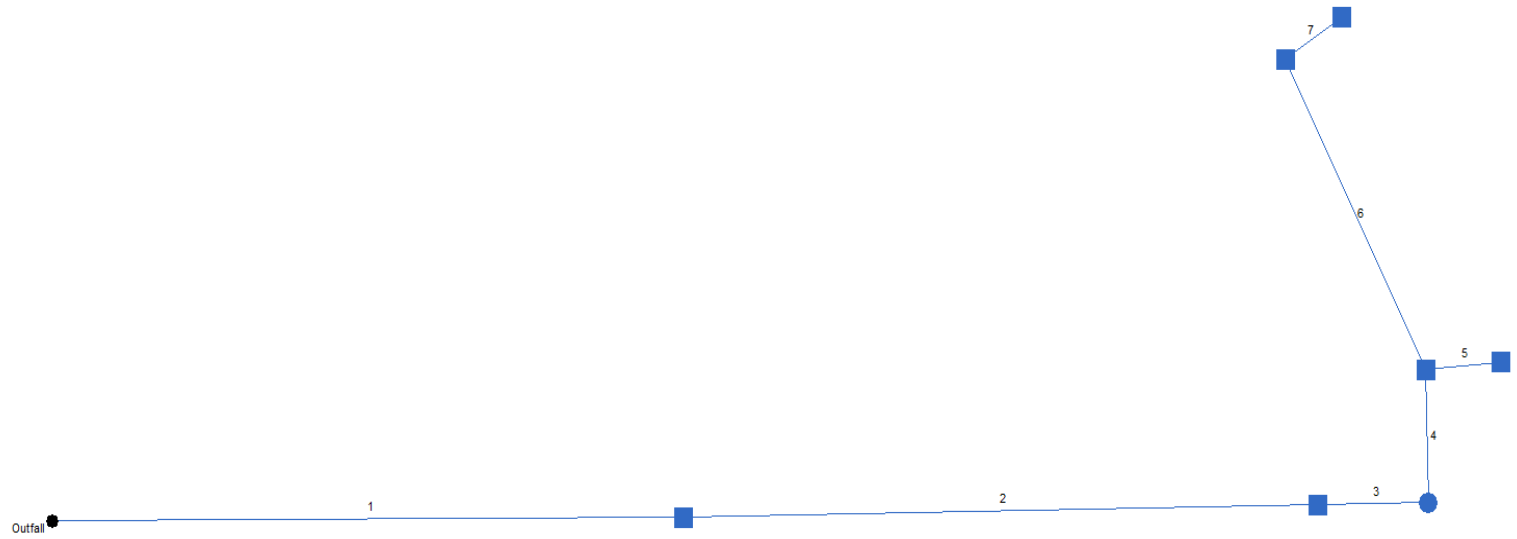
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	24	22.61	171.50	174.49	2.00	3.14	7.20	0.81	175.30	0.999	199	183.50	185.18 j	1.68**	2.82	8.01	1.00	186.18	0.955	0.977	1.944	0.00	n/a
2	18	13.60	184.00	185.26	1.26	1.69	8.58	1.15	186.41	1.609	34.0	184.80	186.17 j	1.37**	1.69	8.02	1.00	187.17	1.460	1.534	n/a	0.00	0.00
3	18	6.47	185.00	186.96	1.50	1.77	3.66	0.21	187.17	0.380	94.0	185.80	187.30	1.50	1.77	3.66	0.21	187.51	0.365	0.373	0.350	0.00	0.00
4	18	4.92	186.00	187.38	1.38	1.70	2.89	0.13	187.51	0.191	171	187.30	188.15 j	0.85**	1.03	4.79	0.36	188.50	0.589	0.390	n/a	0.00	0.00
5	18	0.75	187.50	188.50	1.00	1.25	0.60	0.01	188.51	0.008	178	188.50	188.83 j	0.33**	0.29	2.56	0.10	188.93	0.433	0.221	0.393	0.00	0.00
6	18	6.39	184.00	185.98	1.50	1.77	3.61	0.20	186.18	0.370	218	197.12	198.08 j	0.96**	1.20	5.32	0.44	198.52	0.667	0.518	n/a	0.00	n/a
7	18	5.18	197.32	198.39	1.07	1.35	3.83	0.23	198.62	0.329	40.0	199.00	199.87 j	0.87**	1.06	4.88	0.37	200.24	0.601	0.465	n/a	0.00	n/a
8	18	5.93	173.50	174.49	0.99	1.24	4.79	0.36	174.85	0.534	87.0	183.00	183.93 j	0.93**	1.15	5.16	0.41	184.34	0.641	0.588	n/a	0.00	0.00
9	18	5.20	189.50	190.17	0.67*	0.76	6.85	0.73	190.90	n/a	20.0	189.80	190.72i	1.03	1.29	4.02	0.25	190.97i	n/a	n/a	-0.178	0.00	n/a
10	18	3.87	190.00	190.97	0.97	1.21	3.20	0.16	191.13	0.241	7.0	190.30	191.05 j	0.75**	0.89	4.37	0.30	191.35	0.541	0.391	n/a	0.00	0.00
11	18	1.73	190.50	191.33	0.83	1.01	1.72	0.05	191.38	0.077	187	197.00	197.50 j	0.50**	0.52	3.34	0.17	197.68	0.465	0.271	n/a	0.00	0.00
12	36	30.81	172.00	173.77	1.77	4.34	7.10	0.78	174.55	0.498	148	174.00	175.77 j	1.77**	4.34	7.10	0.78	176.55	0.499	0.498	n/a	0.00	0.00
13	18	3.24	183.90	184.52	0.62*	0.69	4.68	0.34	184.86	0.735	20.0	184.05	184.74 j	0.69**	0.80	4.08	0.26	185.00	0.506	0.621	0.124	0.00	0.00
14	18	1.79	184.25	184.98	0.73	0.86	2.08	0.07	185.05	0.125	10.0	185.00	185.51 j	0.51**	0.53	3.37	0.18	185.69	0.467	0.296	n/a	0.00	0.00
15	36	27.37	181.40	182.87	1.47*	3.44	7.96	0.98	183.85	0.724	219	183.00	184.67 j	1.67**	4.04	6.78	0.72	185.38	0.474	0.599	n/a	0.00	n/a
16	24	27.23	184.00	186.00	2.00*	3.14	8.67	1.17	187.17	n/a	20.0	184.22	187.09i	2.00	3.14	8.67	1.17	188.26i	n/a	n/a	-0.078	0.00	n/a
17	24	27.09	184.42	188.26	2.00	3.14	8.63	1.16	189.42	n/a	23.0	184.60	187.45i	2.00	3.14	8.62	1.16	188.61i	n/a	n/a	-1.964	0.00	n/a
18	12	3.37	185.60	188.61	1.00	0.79	4.29	0.29	188.89	0.895	76.0	187.50	189.29	1.00	0.79	4.29	0.29	189.57	0.894	0.894	0.680	0.00	0.00
19	12	3.44	195.00	196.00	1.00*	0.79	4.38	0.30	196.30	0.935	162	196.00	197.51	1.00	0.79	4.38	0.30	197.81	0.935	0.935	1.514	0.00	0.00

Project File: SWM#5V-2.stm | Number of lines: 19 | Run Date: 02-10-2015

Notes: * Normal depth assumed.; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#6.stm	No. Lines: 7	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	286.0	-0.3	Comb	0.00	0.25	0.59	5.0	154.69	3.27	164.05	18	Cir	0.013	0.00	168.50	88 TO EXIST
2	1	288.0	-0.7	Comb	0.00	2.39	0.43	5.0	164.25	1.84	169.55	18	Cir	0.013	0.00	173.50	89 TO 88
3	2	50.0	-0.1	MH	0.00	0.00	0.00	5.0	169.75	3.60	171.55	18	Cir	0.013	0.00	175.50	M10 TO 89
4	3	55.0	-90.1	Comb	0.00	0.14	0.65	5.0	171.75	3.18	173.50	18	Cir	0.013	0.00	177.59	90 TO M10
5	4	34.0	86.0	Comb	0.00	0.90	0.40	5.0	173.70	0.88	174.00	18	Cir	0.013	0.00	177.59	91 TO 90
6	4	143.0	-25.3	Comb	0.00	0.11	0.73	5.0	173.70	4.37	179.95	18	Cir	0.013	0.00	183.94	92 TO 90
7	6	31.0	82.4	Comb	0.00	0.33	0.51	5.0	180.15	0.81	180.40	18	Cir	0.013	0.00	183.94	93 TO 92

Project File: SWM#6.stm | Number of lines: 7 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	88 TO EXIST	14.27	18 c	286.0	154.69	164.05	3.273	156.08	165.44	n/a	165.44 j	End
2	89 TO 88	13.42	18 c	288.0	164.25	169.55	1.840	165.63	170.92	n/a	170.92 j	1
3	M10 TO 89	5.47	18 c	50.0	169.75	171.55	3.600	171.75	172.44	n/a	172.44 j	2
4	90 TO M10	5.51	18 c	55.0	171.75	173.50	3.182	172.68	174.40	n/a	174.40 j	3
5	91 TO 90	2.95	18 c	34.0	173.70	174.00	0.882	174.74	174.68	n/a	174.89 i	4
6	92 TO 90	2.02	18 c	143.0	173.70	179.95	4.371	174.76	180.49	n/a	180.49 j	4
7	93 TO 92	1.38	18 c	31.0	180.15	180.40	0.806	180.67	180.85	n/a	180.85 j	6

Project File: SWM#6.stm | Number of lines: 7 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	286.0	0.25	4.12	0.59	0.15	1.87	5.0	7.1	7.6	14.27	19.00	8.35	18	3.27	164.05	154.69	165.44	156.08	168.50	158.24	88 TO EXIST
2	1	288.0	2.39	3.87	0.43	1.03	1.73	5.0	6.5	7.8	13.42	14.25	7.92	18	1.84	169.55	164.25	170.92	165.63	173.50	168.50	89 TO 88
3	2	50.0	0.00	1.48	0.00	0.00	0.70	5.0	6.3	7.8	5.47	19.92	4.04	18	3.60	171.55	169.75	172.44	171.75	175.50	173.50	M10 TO 89
4	3	55.0	0.14	1.48	0.65	0.09	0.70	5.0	6.1	7.9	5.51	18.73	4.90	18	3.18	173.50	171.75	174.40	172.68	177.59	175.50	90 TO M10
5	4	34.0	0.90	0.90	0.40	0.36	0.36	5.0	5.0	8.2	2.95	9.86	2.95	18	0.88	174.00	173.70	174.68	174.74	177.59	177.59	91 TO 90
6	4	143.0	0.11	0.44	0.73	0.08	0.25	5.0	5.2	8.1	2.02	21.95	2.51	18	4.37	179.95	173.70	180.49	174.76	183.94	177.59	92 TO 90
7	6	31.0	0.33	0.33	0.51	0.17	0.17	5.0	5.0	8.2	1.38	9.43	2.81	18	0.81	180.40	180.15	180.85	180.67	183.94	183.94	93 TO 92

Project File: SWM#6.stm | Number of lines: 7 | Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	88	1.21	5.52	3.33	3.40	Comb	6.0	4.00	0.00	4.00	2.00	0.016	2.00	0.020	0.020	0.013	0.26	13.00	0.25	12.55	0.00	Off
2	89	8.42	1.44	4.34	5.52	Comb	6.0	4.00	0.00	4.00	2.00	0.016	2.00	0.020	0.020	0.013	0.29	14.50	0.29	14.45	0.00	1
3	M10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
4	90	0.75	0.09	0.69	0.14	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.10	5.00	0.10	4.85	0.00	2
5	91	2.95	0.35	2.00	1.30	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.17	8.50	0.16	8.10	0.00	2
6	92	0.66	0.00	0.57	0.09	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.09	4.50	0.09	4.45	0.00	4
7	93	1.38	0.00	1.03	0.35	Comb	6.0	4.00	0.00	4.00	2.00	0.040	2.00	0.020	0.020	0.013	0.12	6.00	0.12	5.85	0.00	5

Project File: SWM#6.stm | Number of lines: 7 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#6.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	286.0	0.10 0.15 0.00	0.72 3.40 0.00	0.68 1.19 0.00	7.13	0.57	7.6	1.87	0.00 14.27	168.50	165.44 165.55 164.05	156.08 156.19 154.69	9.36 9.36	18 18 Cir	3.27 3.27	8.35 10.75	14.27 19.00	88 TO EXIST
2	1	Comb	0.013	288.0	0.32 2.07 0.00	0.62 3.25 0.00	0.59 1.14 0.00	6.53	0.61	7.8	1.73	0.00 13.42	173.50	170.92 171.05 169.55	165.63 165.75 164.25	5.29 5.30	18 18 Cir	1.84 1.84	7.92 8.06	13.42 14.25	89 TO 88
3	2	MH	0.013	50.0	0.00 0.00 0.00	0.30 1.18 0.00	0.29 0.41 0.00	6.32	0.21	7.8	0.70	0.00 5.47	175.50	172.44 173.05 171.55	171.75 171.25 169.75	0.70 1.80	18 18 Cir	1.39 3.60	4.04 11.28	5.47 19.92	M10 TO 89
4	3	Comb	0.013	55.0	0.07 0.07 0.00	0.30 1.18 0.00	0.29 0.41 0.00	6.13	0.19	7.9	0.70	0.00 5.51	177.59	174.40 175.00 173.50	172.68 173.25 171.75	1.72 1.75	18 18 Cir	3.12 3.18	4.90 10.60	5.51 18.73	90 TO M10
5	4	Comb	0.013	34.0	0.07 0.83 0.00	0.07 0.83 0.00	0.07 0.29 0.00	5.00	0.19	8.2	0.36	0.00 2.95	177.59	174.68 175.50 174.00	174.74 175.20 173.70	-0.06 0.30	18 18 Cir	-0.18 0.88	2.95 5.58	2.95 9.86	91 TO 90
6	4	Comb	0.013	143.0	0.07 0.04 0.00	0.16 0.28 0.00	0.15 0.10 0.00	5.18	0.95	8.1	0.25	0.00 2.02	183.94	180.49 181.45 179.95	174.76 175.20 173.70	5.73 6.25	18 18 Cir	4.01 4.37	2.51 12.42	2.02 21.95	92 TO 90
7	6	Comb	0.013	31.0	0.09 0.24 0.00	0.09 0.24 0.00	0.09 0.08 0.00	5.00	0.18	8.2	0.17	0.00 1.38	183.94	180.85 181.90 180.40	180.67 181.65 180.15	0.17 0.25	18 18 Cir	0.56 0.81	2.81 5.34	1.38 9.43	93 TO 92

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#6.stm

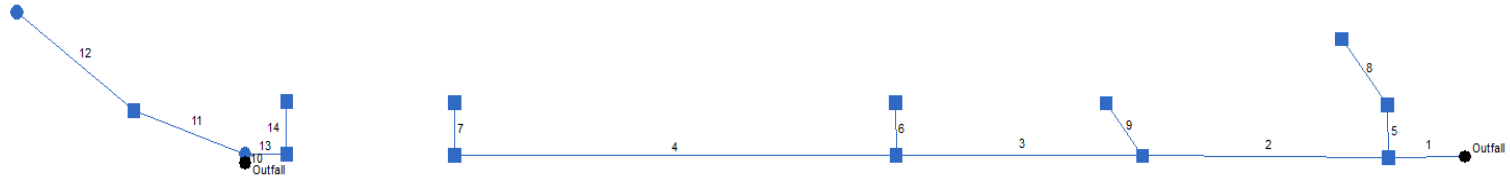
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	14.27	154.69	156.08	1.39	1.71	8.35	1.08	157.16	1.598	286	164.05	165.44 j	1.39**	1.71	8.35	1.08	166.52	1.598	1.598	n/a	0.00	0.00
2	18	13.42	164.25	165.63	1.38	1.69	7.90	0.97	166.60	1.419	288	169.55	170.92 j	1.37**	1.69	7.94	0.98	171.90	1.425	1.422	n/a	0.00	n/a
3	18	5.47	169.75	171.75	1.50	1.77	3.10	0.15	171.90	0.272	50.0	171.55	172.44 j	0.89**	1.10	4.99	0.39	172.83	0.617	0.444	n/a	0.00	n/a
4	18	5.51	171.75	172.68	0.93	1.15	4.79	0.36	173.04	0.554	55.0	173.50	174.40 j	0.90**	1.10	5.00	0.39	174.79	0.618	0.586	n/a	0.00	0.00
5	18	2.95	173.70	174.74	1.04	1.31	2.25	0.08	174.82	n/a	34.0	174.00	174.68i	0.70	0.81	3.65	0.21	174.89i	n/a	n/a	-0.139	0.00	n/a
6	18	2.02	173.70	174.76	1.06	1.34	1.51	0.04	174.80	0.051	143	179.95	180.49 j	0.54**	0.58	3.51	0.19	180.68	0.473	0.262	n/a	0.00	0.00
7	18	1.38	180.15	180.67	0.52	0.55	2.50	0.10	180.77	0.250	31.0	180.40	180.85 j	0.45**	0.44	3.11	0.15	181.00	0.457	0.353	n/a	0.00	n/a

Project File: SWM#6.stm | Number of lines: 7 | Run Date: 02-10-2015

Notes: ; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

Hydraflow Plan View



Project File: SWM#7V-2.stm	No. Lines: 14	02-10-2015

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	51.0	179.3	Comb	0.00	0.10	0.83	5.0	88.25	3.92	90.25	18	Cir	0.013	0.00	94.50	106 TO EX
2	1	165.0	1.1	Comb	0.00	0.11	0.73	5.0	90.50	5.64	99.80	15	Cir	0.013	0.00	104.00	108 TO 106
3	2	165.0	-0.3	Comb	0.00	0.20	0.74	5.0	100.00	5.76	109.50	15	Cir	0.013	0.00	114.48	109 TO 108
4	3	296.0	-0.1	Comb	0.00	0.24	0.68	5.0	109.70	7.97	133.30	15	Cir	0.013	0.00	138.00	111 TO 109
5	1	32.0	89.7	Comb	0.00	0.25	0.69	5.0	90.50	1.56	91.00	15	Cir	0.013	0.00	95.00	107 TO 106
6	3	32.0	89.1	Comb	0.00	0.18	0.68	5.0	109.70	0.78	109.95	15	Cir	0.013	0.00	114.48	110 TO 109
7	4	32.0	89.9	Comb	0.00	0.14	0.74	5.0	133.50	1.41	133.95	15	Cir	0.013	0.00	138.45	112 TO 111
8	5	51.0	-36.4	DrGrt	6.31	0.00	0.00	5.0	91.20	9.41	96.00	15	Cir	0.013	0.00	101.75	107A TO 107
9	2	40.0	52.5	Comb	0.00	0.26	0.79	5.0	100.00	4.25	101.70	15	Cir	0.013	0.00	105.45	108A TO 108
10	End	5.0	-92.0	MH	0.00	0.00	0.00	5.0	140.25	0.60	140.28	30	Cir	0.013	0.00	146.50	M16 TO EX
11	10	79.0	-68.3	Comb	0.00	0.68	0.45	5.0	140.48	0.51	140.88	30	Cir	0.013	0.00	148.00	113 TO M16
12	11	99.0	17.7	MH	31.00	0.00	0.00	5.0	141.38	0.63	142.00	24	Cir	0.013	0.00	149.00	SWM2 TO 113
13	10	28.0	92.0	Comb	0.00	0.46	0.74	5.0	141.53	0.96	141.80	15	Cir	0.013	0.00	146.00	114 TO M16
14	13	32.0	-90.0	Comb	0.00	0.68	0.60	5.0	142.00	1.56	142.50	15	Cir	0.013	0.00	146.00	115 TO 114

Project File: SWM#7V-2.stm | Number of lines: 14 | Date: 02-10-2015

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	106 TO EX	14.27	18 c	51.0	88.25	90.25	3.922	89.64	91.64	n/a	91.64 j	End
2	108 TO 106	6.18	15 c	165.0	90.50	99.80	5.636	92.33	100.79	n/a	100.79 j	1
3	109 TO 108	4.12	15 c	165.0	100.00	109.50	5.758	101.16	110.31	n/a	110.31 j	2
4	111 TO 109	2.17	15 c	296.0	109.70	133.30	7.973	110.63	133.89	n/a	133.89 j	3
5	107 TO 106	7.72	15 c	32.0	90.50	91.00	1.563	92.11*	92.61*	n/a	93.22 i	1
6	110 TO 109	1.00	15 c	32.0	109.70	109.95	0.781	110.64	110.64	0.00	110.64	3
7	112 TO 111	0.85	15 c	32.0	133.50	133.95	1.406	134.11	134.32	n/a	134.32 j	4
8	107A TO 107	6.31	15 c	51.0	91.20	96.00	9.412	93.22	97.01	n/a	97.01 j	5
9	108A TO 108	1.68	15 c	40.0	100.00	101.70	4.250	101.31	102.22	n/a	102.22 j	2
10	M16 TO EX	39.53	30 c	5.0	140.25	140.28	0.600	144.59*	144.64*	0.00	144.64	End
11	113 TO M16	33.49	30 c	79.0	140.48	140.88	0.506	144.92*	145.45*	0.00	145.45	10
12	SWM2 TO 113	31.00	24 c	99.0	141.38	142.00	0.626	145.45*	147.31*	0.00	147.31	11
13	114 TO M16	6.09	15 c	28.0	141.53	141.80	0.964	145.26*	145.51*	0.00	145.51	10
14	115 TO 114	3.34	15 c	32.0	142.00	142.50	1.563	145.78*	145.86*	0.00	145.86	13

Project File: SWM#7V-2.stm | Number of lines: 14 | Run Date: 02-10-2015

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	51.0	0.10	1.48	0.83	0.08	1.08	5.0	8.1	7.4	14.27	20.80	8.35	18	3.92	90.25	88.25	91.64	89.64	94.50	92.00	106 TO EX
2	1	165.0	0.11	1.13	0.73	0.08	0.82	5.0	7.6	7.5	6.18	15.33	5.47	15	5.64	99.80	90.50	100.79	92.33	104.00	94.50	108 TO 106
3	2	165.0	0.20	0.76	0.74	0.15	0.54	5.0	6.9	7.7	4.12	15.49	4.18	15	5.76	109.50	100.00	110.31	101.16	114.48	104.00	109 TO 108
4	3	296.0	0.24	0.38	0.68	0.16	0.27	5.0	5.3	8.1	2.17	18.23	3.01	15	7.97	133.30	109.70	133.89	110.63	138.00	114.48	111 TO 109
5	1	32.0	0.25	0.25	0.69	0.17	0.17	5.0	5.2	8.2	7.72	8.07	6.29	15	1.56	91.00	90.50	92.61	92.11	95.00	94.50	107 TO 106
6	3	32.0	0.18	0.18	0.68	0.12	0.12	5.0	5.0	8.2	1.00	5.71	1.22	15	0.78	109.95	109.70	110.64	110.64	114.48	114.48	110 TO 109
7	4	32.0	0.14	0.14	0.74	0.10	0.10	5.0	5.0	8.2	0.85	7.66	2.12	15	1.41	133.95	133.50	134.32	134.11	138.45	138.00	112 TO 111
8	5	51.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	6.31	19.81	5.55	15	9.41	96.00	91.20	97.01	93.22	101.75	95.00	107A TO 107
9	2	40.0	0.26	0.26	0.79	0.21	0.21	5.0	5.0	8.2	1.68	13.31	2.43	15	4.25	101.70	100.00	102.22	101.31	105.45	104.00	108A TO 108
10	End	5.0	0.00	1.82	0.00	0.00	1.05	5.0	5.4	8.1	39.53	31.77	8.05	30	0.60	140.28	140.25	144.64	144.59	146.50	146.13	M16 TO EX
11	10	79.0	0.68	0.68	0.45	0.31	0.31	5.0	5.2	8.1	33.49	29.18	6.82	30	0.51	140.88	140.48	145.45	144.92	148.00	146.50	113 TO M16
12	11	99.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	31.00	17.90	9.87	24	0.63	142.00	141.38	147.31	145.45	149.00	148.00	SWM2 TO 113
13	10	28.0	0.46	1.14	0.74	0.34	0.75	5.0	5.2	8.1	6.09	6.34	4.96	15	0.96	141.80	141.53	145.51	145.26	146.00	146.50	114 TO M16
14	13	32.0	0.68	0.68	0.60	0.41	0.41	5.0	5.0	8.2	3.34	8.07	2.73	15	1.56	142.50	142.00	145.86	145.78	146.00	146.00	115 TO 114

Project File: SWM#7V-2.stm | Number of lines: 14 | Run Date: 02-10-2015

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	106	0.68	0.15	0.72	0.11	Comb	6.0	6.00	0.00	4.00	2.00	0.053	2.00	0.020	0.020	0.013	0.10	5.00	0.09	4.60	0.00	Off
2	108	0.66	0.32	0.83	0.15	Comb	6.0	6.00	0.00	4.00	2.00	0.050	2.00	0.020	0.020	0.013	0.10	5.00	0.10	4.95	0.00	1
3	109	1.21	0.26	1.15	0.32	Comb	6.0	6.00	0.00	4.00	2.00	0.060	2.00	0.020	0.020	0.013	0.12	6.00	0.11	5.55	0.00	2
4	111	1.34	0.00	1.08	0.26	Comb	6.0	6.00	0.00	4.00	2.00	0.080	2.00	0.020	0.020	0.013	0.11	5.50	0.10	5.10	0.00	3
5	107	1.41	0.18	1.22	0.37	Comb	6.0	6.00	0.00	4.00	2.00	0.053	2.00	0.020	0.020	0.013	0.12	6.00	0.12	5.85	0.00	Off
6	110	1.00	0.09	0.92	0.18	Comb	6.0	6.00	0.00	4.00	2.00	0.060	2.00	0.020	0.020	0.013	0.10	5.00	0.10	4.95	0.00	5
7	112	0.85	0.00	0.76	0.09	Comb	6.0	6.00	0.00	4.00	2.00	0.080	2.00	0.020	0.020	0.013	0.09	4.50	0.09	4.30	0.00	6
8	107A	6.31*	0.00	6.31	0.00	DrGrt	0.0	0.00	2.00	4.00	2.00	Sag	2.00	0.050	0.050	0.000	0.41	18.41	0.41	18.41	0.00	Off
9	108A	1.68	0.00	1.68	0.00	Comb	6.0	6.00	0.00	4.00	2.00	0.048	2.00	0.080	0.050	0.013	0.21	3.00	0.20	2.86	0.00	2
10	M16	0.00	0.75	0.00	0.75	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
11	113	2.51	0.00	1.76	0.75	Comb	6.0	6.00	0.00	4.00	2.00	0.011	2.00	0.020	0.020	0.013	0.19	9.50	0.19	9.30	0.00	10
12	SWM2	31.00*	0.00	0.00	31.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
13	114	2.79	0.00	2.79	0.00	Comb	6.0	6.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.24	12.00	0.24	12.00	0.00	Off
14	115	3.34	0.00	3.34	0.00	Comb	6.0	6.00	2.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.27	13.50	0.27	13.50	0.00	Off

Project File: SWM#7V-2.stm | Number of lines: 14 | Run Date: 02-10-2015

NOTES: Inlet N-Values = 0.013 ; Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87; Return period = 100 Yrs. ; * Indicates Known Q added

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#7V-2.stm
					Increment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	51.0	0.08 0.02 0.00	0.93 0.55 0.00	0.88 0.19 0.00	8.05	0.10	7.4	1.08	0.00 14.27	94.50	91.64 91.75 90.25	89.64 89.75 88.25	2.00 2.00	18 18 Cir	3.92 3.92	8.35 11.77	14.27 20.80	106 TO EX
2	1	Comb	0.013	165.0	0.07 0.04 0.00	0.71 0.42 0.00	0.67 0.15 0.00	7.55	0.50	7.5	0.82	0.00 6.18	104.00	100.79 101.05 99.80	92.33 91.75 90.50	8.46 9.30	15 15 Cir	5.13 5.64	5.47 12.49	6.18 15.33	108 TO 106
3	2	Comb	0.013	165.0	0.13 0.07 0.00	0.45 0.31 0.00	0.43 0.11 0.00	6.89	0.66	7.7	0.54	0.00 4.12	114.48	110.31 110.75 109.50	101.16 101.25 100.00	9.15 9.50	15 15 Cir	5.55 5.76	4.18 12.63	4.12 15.49	109 TO 108
4	3	Comb	0.013	296.0	0.13 0.11 0.00	0.22 0.16 0.00	0.21 0.06 0.00	5.25	1.64	8.1	0.27	0.00 2.17	138.00	133.89 134.55 133.30	110.63 110.95 109.70	23.25 23.60	15 15 Cir	7.86 7.97	3.01 14.86	2.17 18.23	111 TO 109
5	1	Comb	0.013	32.0	0.14 0.11 0.00	0.14 0.11 0.00	0.13 0.04 0.00	5.15	0.08	8.2	0.17	0.00 7.72	95.00	92.61 92.25 91.00	92.11 91.75 90.50	0.50 0.50	15 15 Cir	1.56 1.56	6.29 6.58	7.72 8.07	107 TO 106
6	3	Comb	0.013	32.0	0.10 0.08 0.00	0.10 0.08 0.00	0.10 0.03 0.00	5.00	0.44	8.2	0.12	0.00 1.00	114.48	110.64 111.20 109.95	110.64 110.95 109.70	0.00 0.25	15 15 Cir	0.00 0.78	1.22 4.65	1.00 5.71	110 TO 109
7	4	Comb	0.013	32.0	0.09 0.05 0.00	0.09 0.05 0.00	0.09 0.02 0.00	5.00	0.25	8.2	0.10	0.00 0.85	138.45	134.32 135.20 133.95	134.11 134.75 133.50	0.21 0.45	15 15 Cir	0.66 1.41	2.12 6.24	0.85 7.66	112 TO 111
8	5	DrGrt	0.013	51.0	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	5.00	0.15	0.0	0.00	6.31 6.31	101.75	97.01 97.25 96.00	93.22 92.45 91.20	3.78 4.80	15 15 Cir	7.41 9.41	5.55 16.14	6.31 19.81	107A TO 107
9	2	Comb	0.013	40.0	0.19 0.07 0.00	0.19 0.07 0.00	0.18 0.02 0.00	5.00	0.27	8.2	0.21	0.00 1.68	105.45	102.22 102.95 101.70	101.31 101.25 100.00	0.91 1.70	15 15 Cir	2.28 4.25	2.43 10.85	1.68 13.31	108A TO 108
10	End	MH	0.013	5.0	0.00 0.00 0.00	0.69 1.13 0.00	0.66 0.40 0.00	5.36	0.01	8.1	1.05	0.00 39.53	146.50	144.64 142.78 140.28	144.59 142.75 140.25	0.05 0.03	30 30 Cir	0.94 0.60	8.05 6.47	39.53 31.77	M16 TO EX

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#7V-2.stm

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len	Drainage Area			Time of conc	Time of flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	Actual		Date: 02-10-2015
					C1 = 0.95 C2 = 0.35 C3 = 0.8							Total flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: SWM#7V-2.stm
					Incre-ment (ac)	Sub-total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
11	10	Comb	0.013	79.0	0.11 0.57 0.00	0.11 0.57 0.00	0.10 0.20 0.00	5.17	0.19	8.1	0.31	0.00 33.49	148.00	145.45 143.38 140.88	144.92 142.98 140.48	0.53 0.40	30 30 Cir	0.67 0.51	6.82 5.95	33.49 29.18	113 TO M16
12	11	MH	0.013	99.0	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	5.00	0.17	0.0	0.00	31.00 31.00	149.00	147.31 144.00 142.00	145.45 143.38 141.38	1.86 0.62	24 24 Cir	1.88 0.63	9.87 5.70	31.00 17.90	SWM2 TO 113
13	10	Comb	0.013	28.0	0.30 0.16 0.00	0.58 0.56 0.00	0.55 0.20 0.00	5.20	0.09	8.1	0.75	0.00 6.09	146.00	145.51 143.05 141.80	145.26 142.78 141.53	0.25 0.27	15 15 Cir	0.89 0.96	4.96 5.17	6.09 6.34	114 TO M16
14	13	Comb	0.013	32.0	0.28 0.40 0.00	0.28 0.40 0.00	0.27 0.14 0.00	5.00	0.20	8.2	0.41	0.00 3.34	146.00	145.86 143.75 142.50	145.78 143.25 142.00	0.09 0.50	15 15 Cir	0.27 1.56	2.73 6.58	3.34 8.07	115 TO 114

NOTES: Intensity = 132.40 / (Inlet time + 19.10) ^ 0.87 (in/hr)

Project File: SWM#7V-2.stm

Hydraulic Grade Line Computations

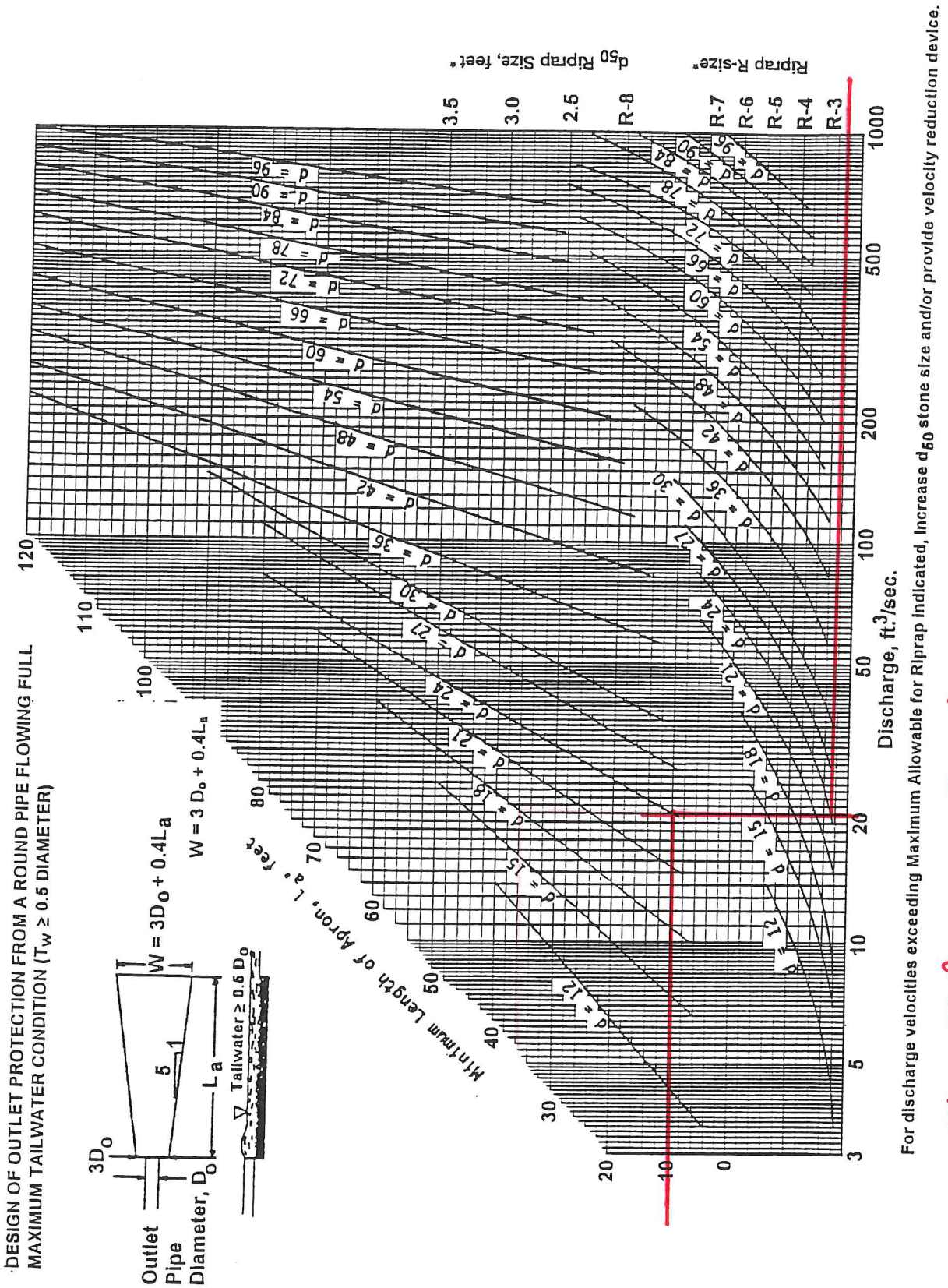
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	14.27	88.25	89.64	1.39	1.71	8.35	1.08	90.72	1.599	51.0	90.25	91.64 j	1.39**	1.71	8.35	1.08	92.72	1.599	1.599	n/a	0.00	n/a
2	15	6.18	90.50	92.33	1.25	1.23	5.03	0.39	92.72	0.916	165	99.80	100.79 j	0.99**	1.05	5.90	0.54	101.34	0.968	0.942	n/a	0.00	n/a
3	15	4.12	100.00	101.16	1.16	1.19	3.47	0.19	101.35	0.353	165	109.50	110.31 j	0.81**	0.84	4.88	0.37	110.68	0.712	0.532	n/a	0.00	0.00
4	15	2.17	109.70	110.63	0.93	0.98	2.20	0.08	110.71	0.136	296	133.30	133.89 j	0.59**	0.57	3.81	0.23	134.11	0.552	0.344	n/a	0.00	n/a
5	15	7.72	90.50	92.11	1.25	1.23	6.29	0.61	92.72	n/a	32.0	91.00	92.61i	1.25	1.23	6.29	0.61	93.22i	n/a	n/a	-0.115	0.00	n/a
6	15	1.00	109.70	110.64	0.94	0.99	1.01	0.02	110.66	0.029	32.0	109.95	110.64	0.69	0.70	1.44	0.03	110.67	0.069	0.049	0.016	0.00	0.00
7	15	0.85	133.50	134.11	0.61	0.59	1.44	0.03	134.14	0.076	32.0	133.95	134.32 j	0.37**	0.30	2.81	0.12	134.44	0.481	0.279	n/a	0.00	n/a
8	15	6.31	91.20	93.22	1.25	1.23	5.14	0.41	93.64	0.955	51.0	96.00	97.01 j	1.01**	1.06	5.97	0.55	97.56	0.989	0.972	n/a	0.00	n/a
9	15	1.68	100.00	101.31	1.25	1.23	1.37	0.03	101.34	0.068	40.0	101.70	102.22 j	0.52**	0.48	3.49	0.19	102.41	0.522	0.295	n/a	0.00	n/a
10	30	39.53	140.25	144.59	2.50	4.91	8.05	1.01	145.60	0.930	5.0	140.28	144.64	2.50	4.91	8.05	1.01	145.65	0.929	0.929	0.046	0.00	0.00
11	30	33.49	140.48	144.92	2.50	4.91	6.82	0.72	145.65	0.667	79.0	140.88	145.45	2.50	4.91	6.82	0.72	146.17	0.667	0.667	0.527	0.00	0.00
12	24	31.00	141.38	145.45	2.00	3.14	9.87	1.51	146.96	1.879	99.0	142.00	147.31	2.00	3.14	9.87	1.51	148.82	1.879	1.879	1.860	0.00	0.00
13	15	6.09	141.53	145.26	1.25	1.23	4.96	0.38	145.65	0.890	28.0	141.80	145.51	1.25	1.23	4.96	0.38	145.89	0.890	0.890	0.249	0.00	0.00
14	15	3.34	142.00	145.78	1.25	1.23	2.73	0.12	145.89	0.268	32.0	142.50	145.86	1.25	1.23	2.73	0.12	145.98	0.268	0.268	0.086	0.00	0.00

Project File: SWM#7V-2.stm | Number of lines: 14 | Run Date: 02-10-2015

Notes: ; ** Critical depth.; j-Line contains hyd. jump.; i-Inlet control.

E1

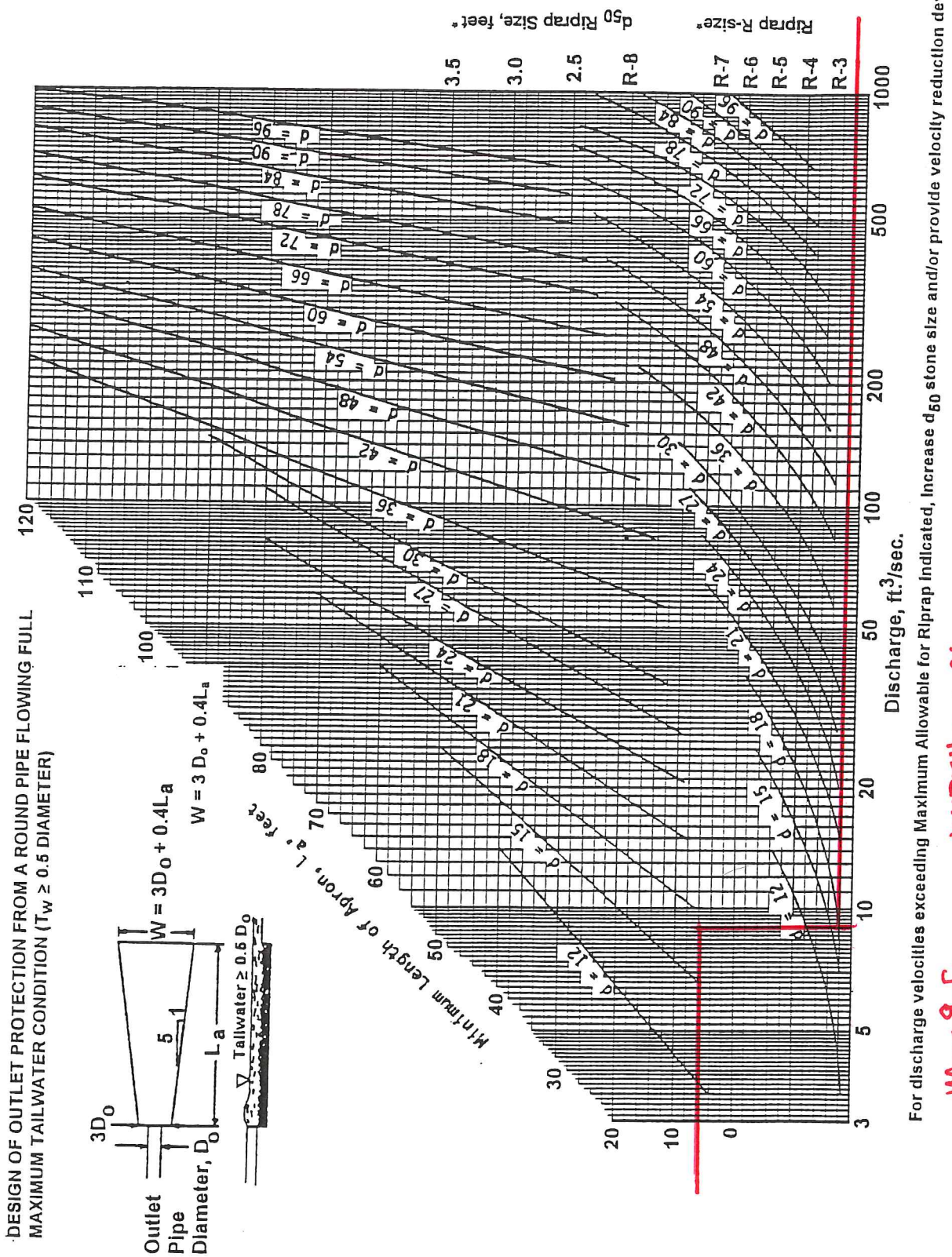
FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



100yr = 21 cfs WIDTH = 10'
PIPE = 24"
Length = 10'

#E2

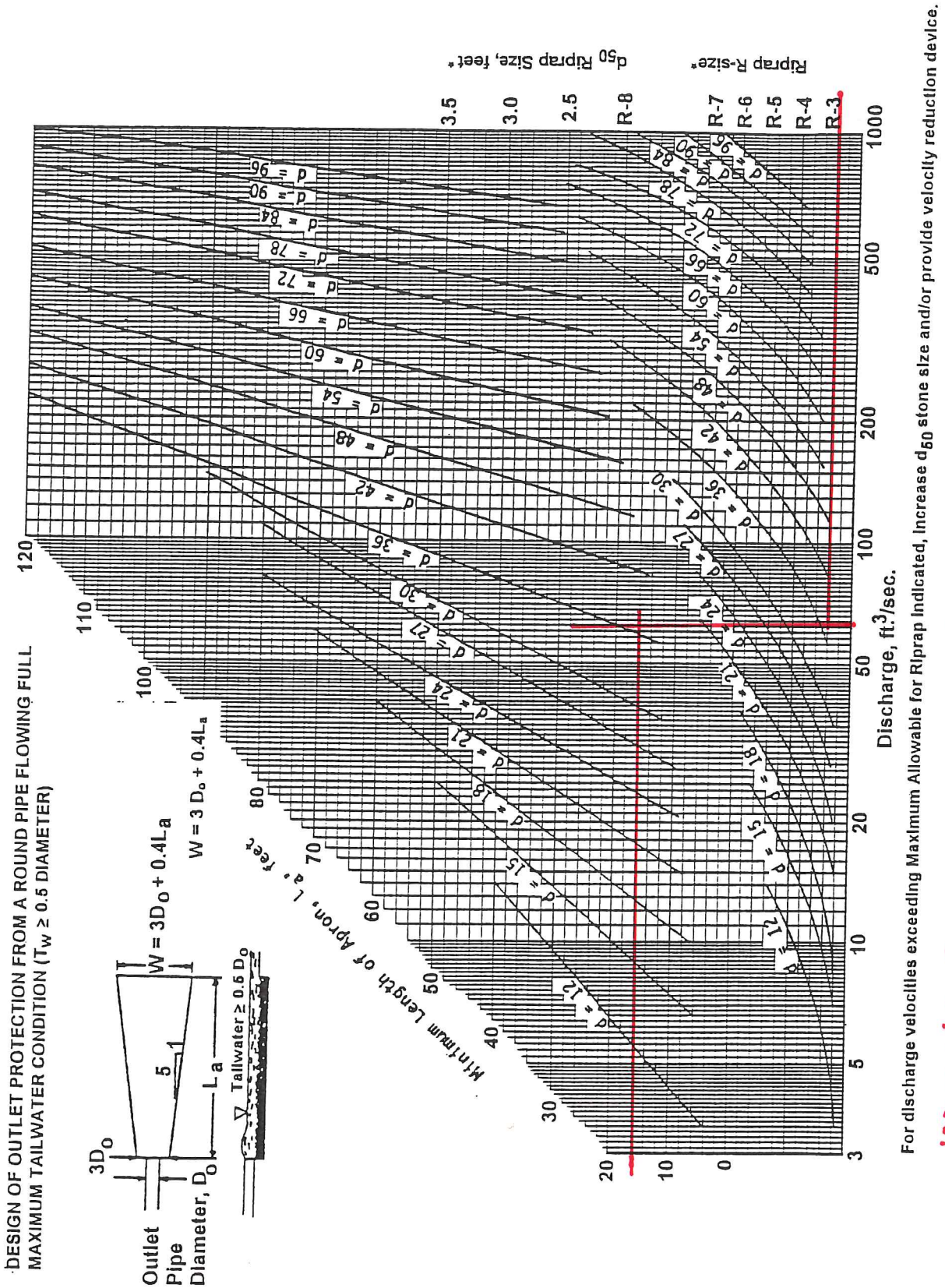
FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



100 yr = 9 cfs
WIDTH = 6.9'
PIPE = 18'
Length = 6'

#E3

FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



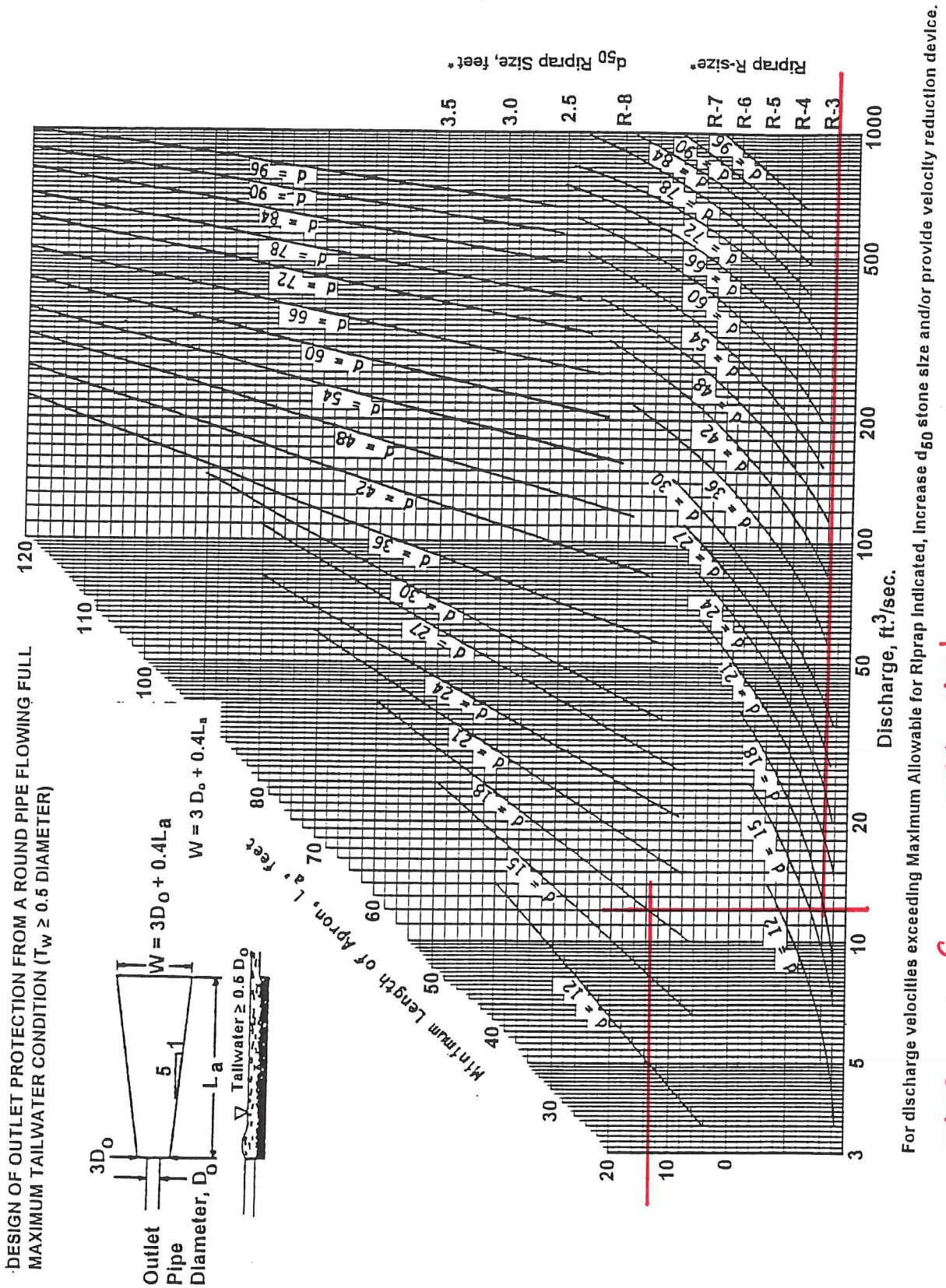
100yr = 63 cfs WIDTH = 19.2'

PIPE = 48"

Length = 18'

#E4

FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition

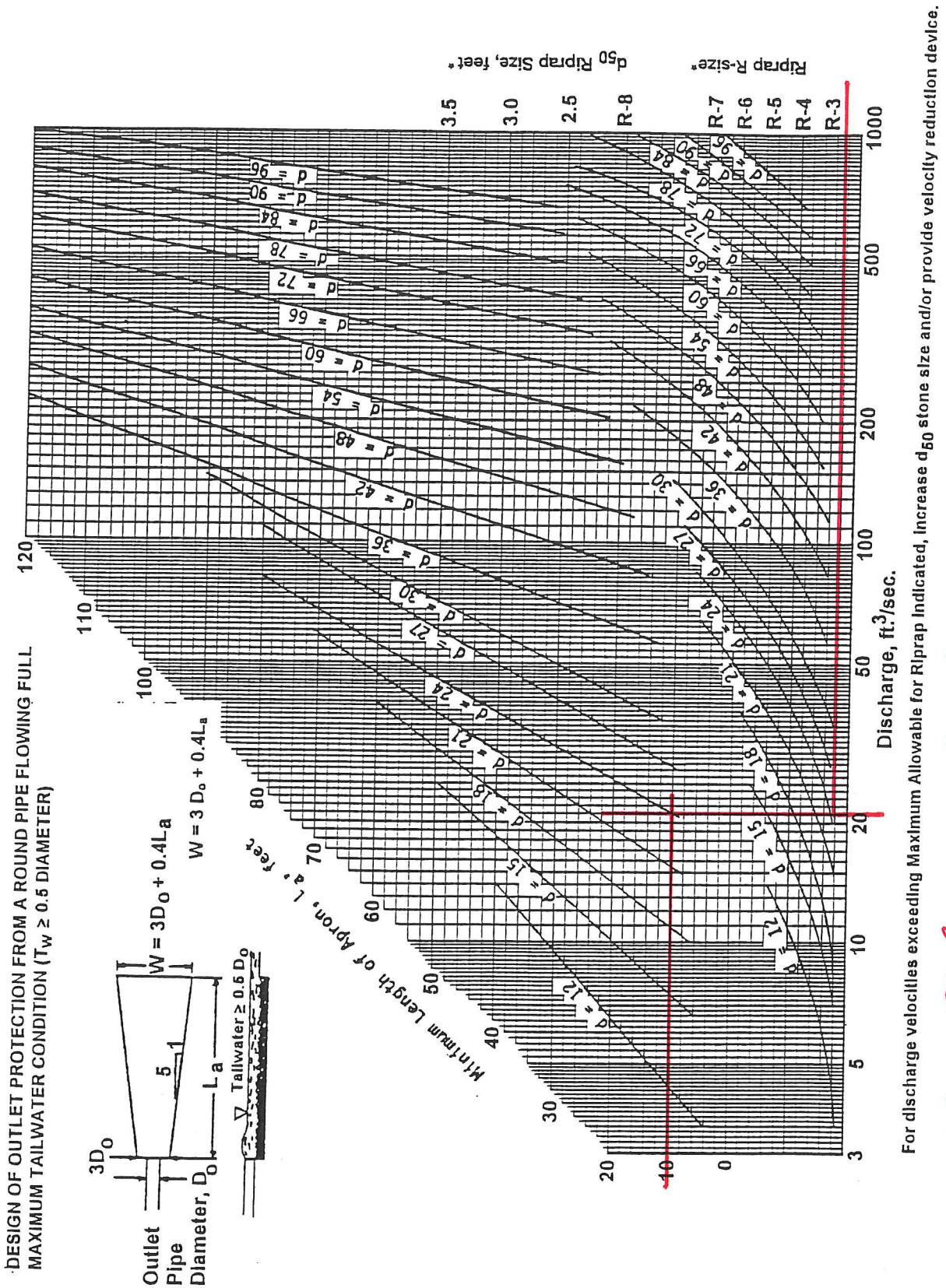


For discharge velocities exceeding Maximum Allowable for Riprap Indicated, Increase d_{50} stone size and/or provide velocity reduction device.

100YR = 12 cfs WIDTH = 11.2'
PIPE = 18"
Length = 13'

#E5

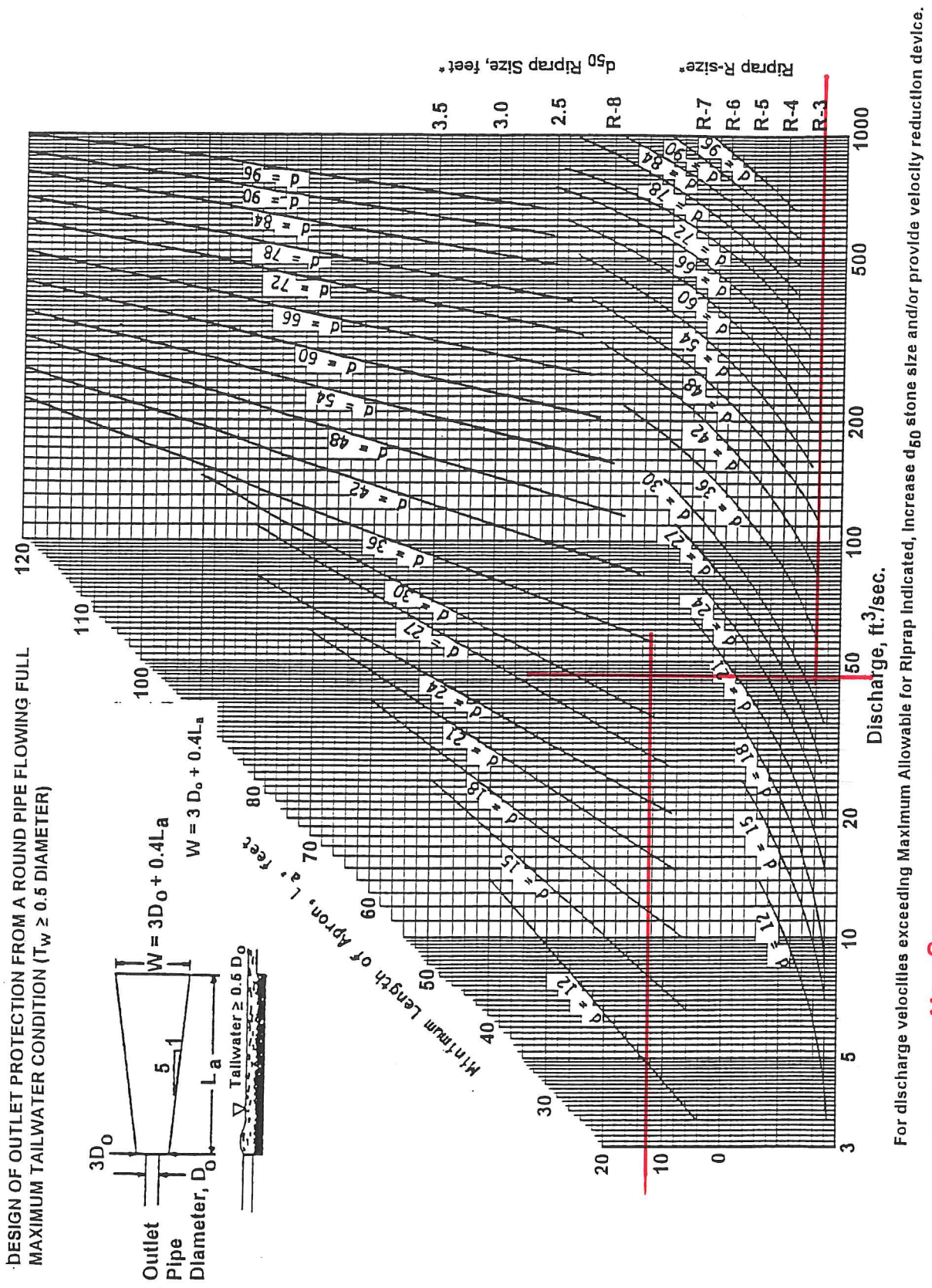
FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



10 hr = 21 cfs WIDTH = 10'
PIPE = 24"
Length = 10'

#E6

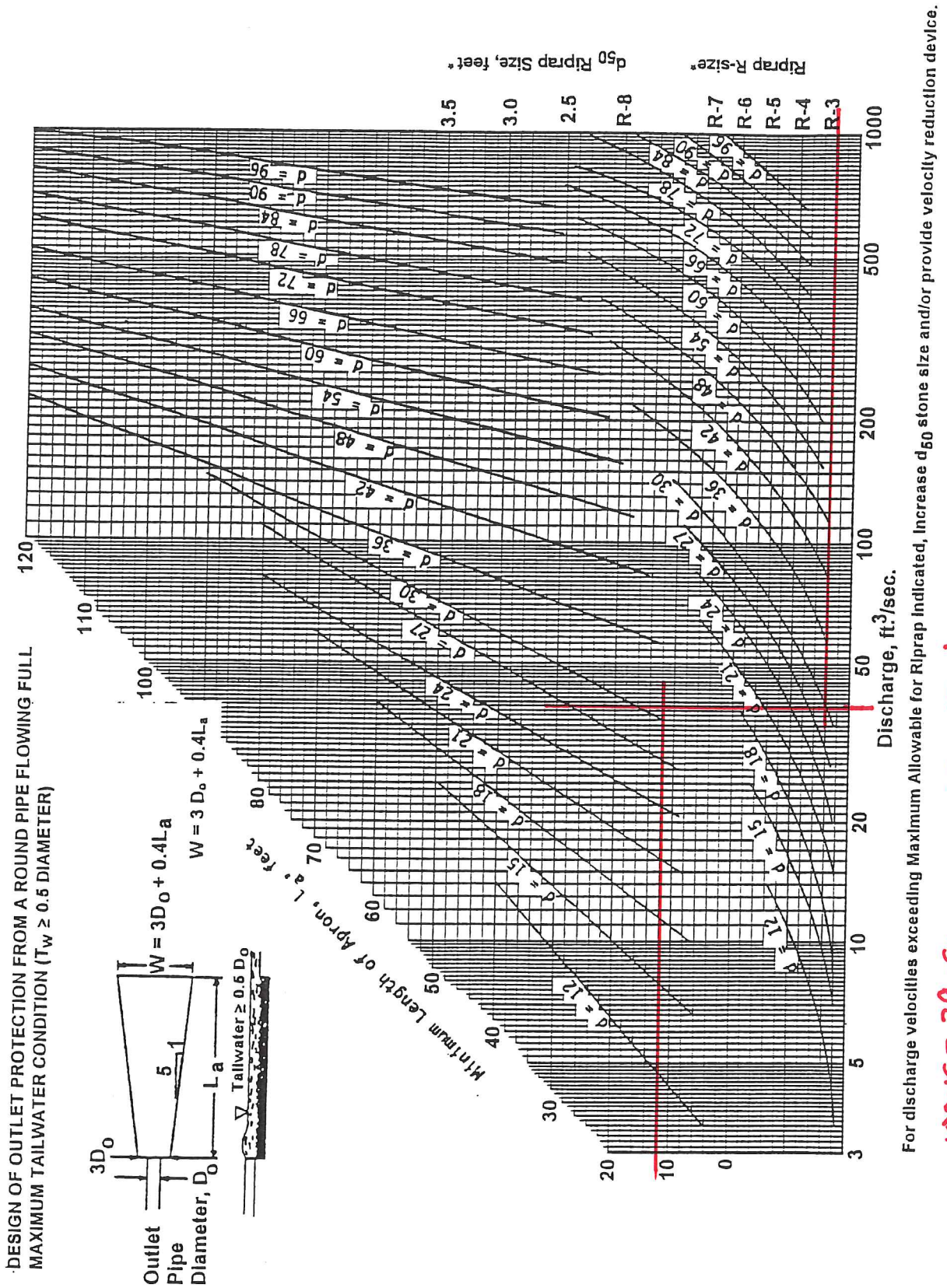
FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



100yr = 46cfs WIDTH = 13.8'
PIPE = 36"
Length = 12'

#E7

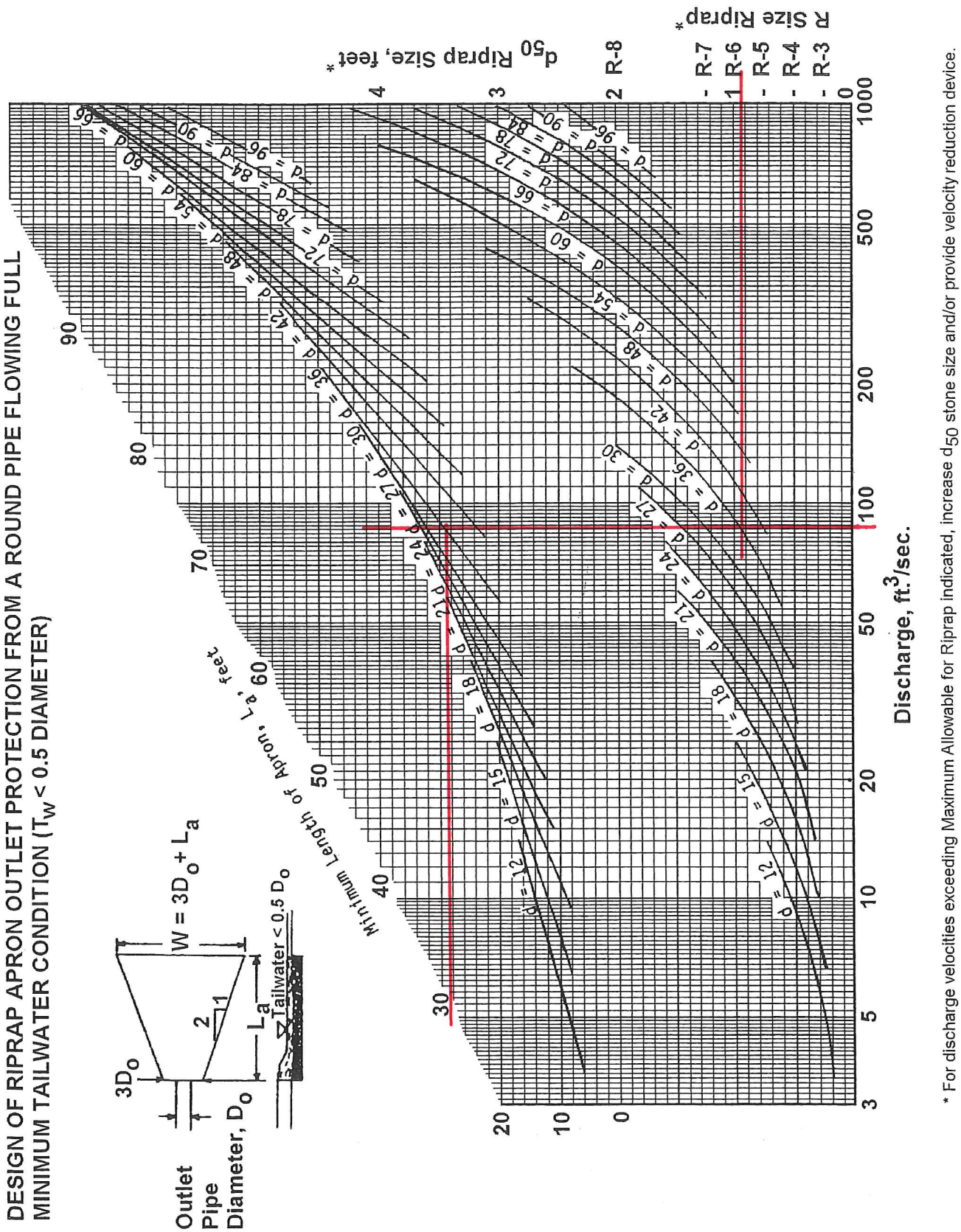
FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



100YR = 39 cfs WIDTH = 13.8'
PIPE = 36"
Length = 12'

#E8

FIGURE 21
Riprap Apron Design, Minimum Tailwater Condition



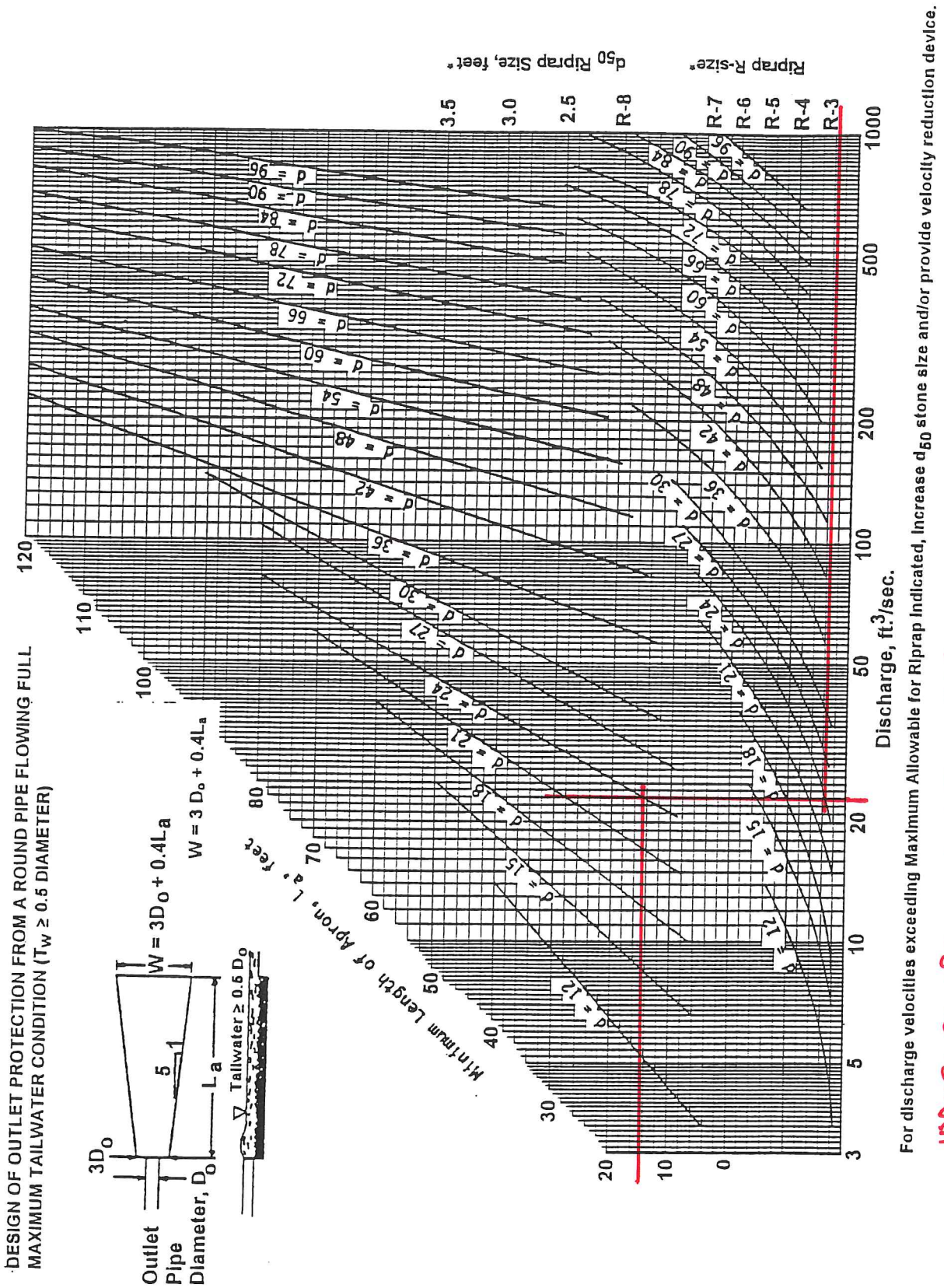
* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

100 yr = 87 cfs Length = 28'

PIPE = 36" WIDTH = 20.2'

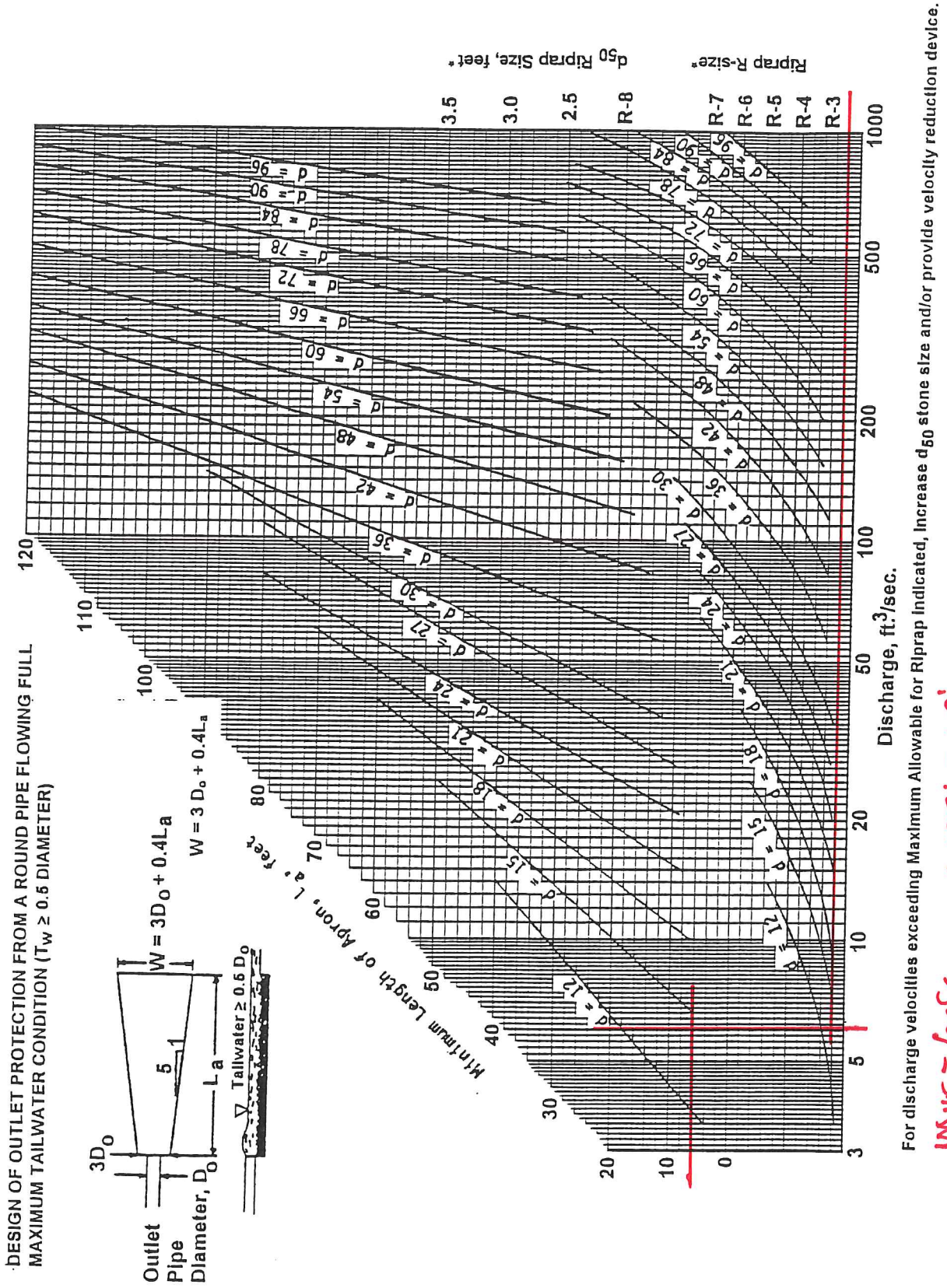
#E9

FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



100 yrs = 23 cfs WIDTH = 11.6'
PIPE = 24"
Length = 14'

FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition

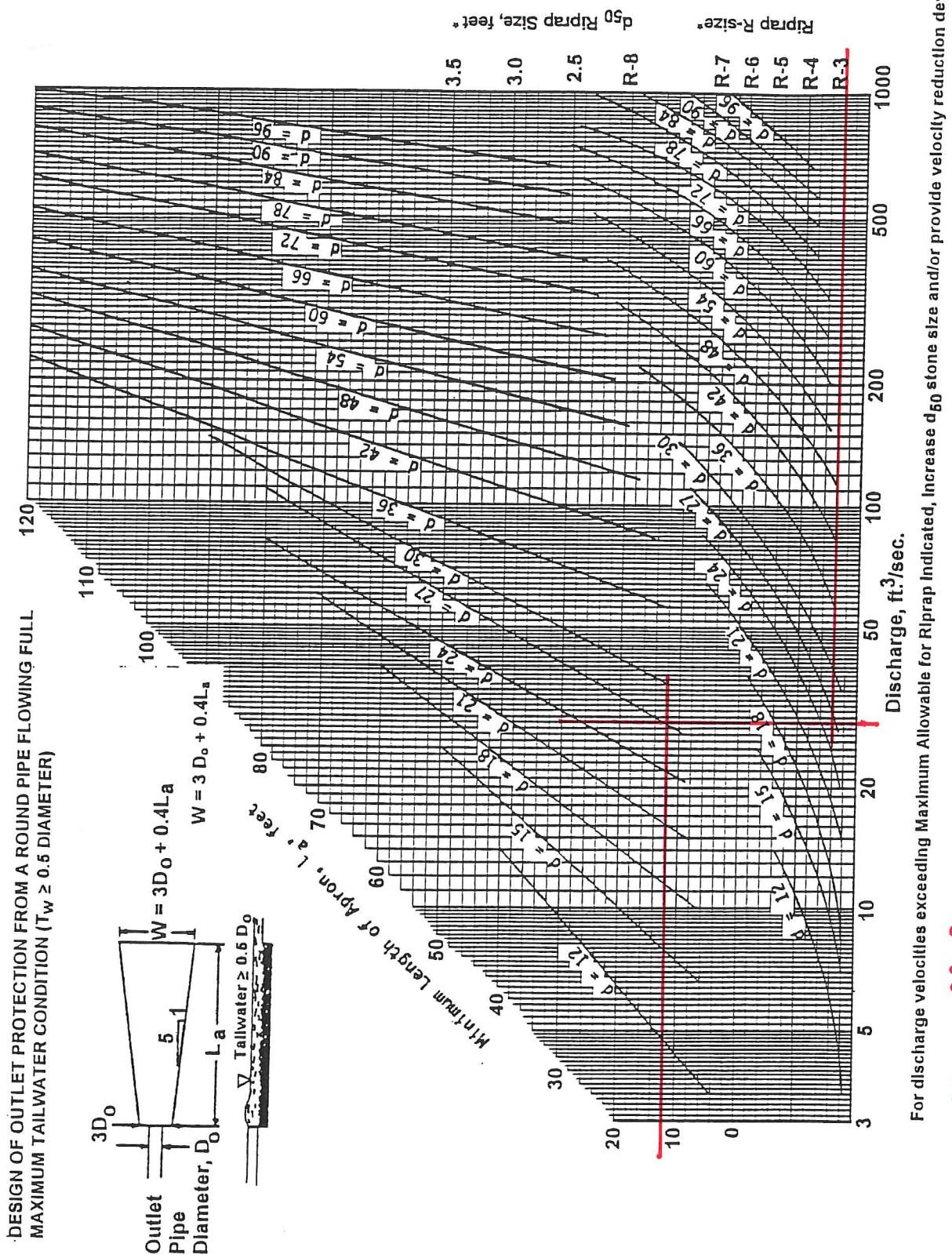


E10

105 yr = 6cfs WIDTH = 6.9'
PIPE = 18"
Length = 9'

#E11

FIGURE 22
Riprap Apron Design, Maximum Tailwater Condition



For discharge velocities exceeding Maximum Allowable for Riprap Indicated, Increase d_{50} stone size and/or provide velocity reduction device.

100yr = 29 cfs
Pipe = 30"
Width = 13.8'
Length = 12'

SECTION THREE

STORMWATER FLOW RATE MANAGEMENT

DESIGN

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.24

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	4.660	8.441	-------	15.73	22.27	28.36	34.66	41.12	Pre Dev Area #1
2	SCS Runoff	------	15.72	23.48	-------	37.44	49.43	60.14	70.98	81.90	Post Dev SWM #1 Watershed
3	Reservoir	2	3.713	6.310	-------	12.78	16.15	18.58	23.83	32.66	SWM #1 Discharge
6	SCS Runoff	------	8.040	16.00	-------	32.10	46.58	60.06	74.18	88.88	Pre Dev. Area #2
8	SCS Runoff	------	10.91	14.28	-------	19.89	24.34	28.22	32.08	35.92	Post Dev SWM #3 Watershed
9	Reservoir	8	1.360	1.490	-------	1.669	1.797	2.602	6.227	11.71	SWM #3 Discharge
11	SCS Runoff	------	27.84	39.36	-------	59.70	76.33	90.98	105.66	120.34	Post Dev SWM 2 Watershed
12	Combine	9, 11	29.11	40.67	-------	61.17	77.90	92.63	107.39	122.13	Total Flow to SWM #2
13	Reservoir	12	5.670	7.106	-------	13.01	15.90	17.83	28.04	34.25	Basin 2 Discharge
14	SCS Runoff	------	1.074	1.772	-------	3.078	4.205	5.237	6.321	7.424	Post Dev Area 2 Undetained Flow
15	Combine	13, 14	6.260	7.784	-------	14.13	18.25	20.95	29.73	37.39	Post Dev Area 2 Total Flow
17	SCS Runoff	------	9.885	19.62	-------	38.96	56.29	72.55	89.68	107.34	Pre Dev. Area #3
18	SCS Runoff	------	28.66	41.73	-------	64.80	83.85	100.73	117.71	134.74	Post Dev SWM #4 Watershed
19	Reservoir	18	9.297	13.02	-------	28.16	35.87	50.36	68.70	86.43	SWM #4 Discharge
22	SCS Runoff	------	1.682	5.156	-------	13.70	22.03	30.02	38.53	47.44	Pre Dev. Area #4
23	Reservoir	22	0.005	0.112	-------	0.240	0.770	2.182	5.944	17.31	Existing Pond Discharg
24	SCS Runoff	------	9.906	17.63	-------	32.43	45.54	57.75	70.37	83.29	Post Dev SWM #5 Watershed
25	Reservoir	24	0.000	0.000	-------	0.231	0.327	2.059	5.111	12.39	Modified Pond Discharg

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.24

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	4.660	2	724	15,691	------	------	------	Pre Dev Area #1
2	SCS Runoff	15.72	2	718	31,514	------	------	------	Post Dev SWM #1 Watershed
3	Reservoir	3.713	2	726	31,511	2	104.82	8,937	SWM #1 Discharge
6	SCS Runoff	8.040	2	730	38,234	------	------	------	Pre Dev. Area #2
8	SCS Runoff	10.91	2	716	22,526	------	------	------	Post Dev SWM #3 Watershed
9	Reservoir	1.360	2	732	22,521	8	160.59	9,325	SWM #3 Discharge
11	SCS Runoff	27.84	2	718	55,932	------	------	------	Post Dev SWM 2 Watershed
12	Combine	29.11	2	718	78,453	9, 11	------	------	Total Flow to SWM #2
13	Reservoir	5.670	2	728	78,449	12	145.53	20,186	Basin 2 Discharge
14	SCS Runoff	1.074	2	718	2,236	------	------	------	Post Dev Area 2 Undetained Flow
15	Combine	6.260	2	720	80,684	13, 14	------	------	Post Dev Area 2 Total Flow
17	SCS Runoff	9.885	2	726	41,722	------	------	------	Pre Dev. Area #3
18	SCS Runoff	28.66	2	724	91,449	------	------	------	Post Dev SWM #4 Watershed
19	Reservoir	9.297	2	742	91,442	18	156.07	27,417	SWM #4 Discharge
22	SCS Runoff	1.682	2	730	12,391	------	------	------	Pre Dev. Area #4
23	Reservoir	0.005	2	1466	679	22	172.13	12,370	Existing Pond Discharg
24	SCS Runoff	9.906	2	726	37,073	------	------	------	Post Dev SWM #5 Watershed
25	Reservoir	0.000	2	n/a	0	24	172.58	37,073	Modified Pond Discharg

Hydrograph Report

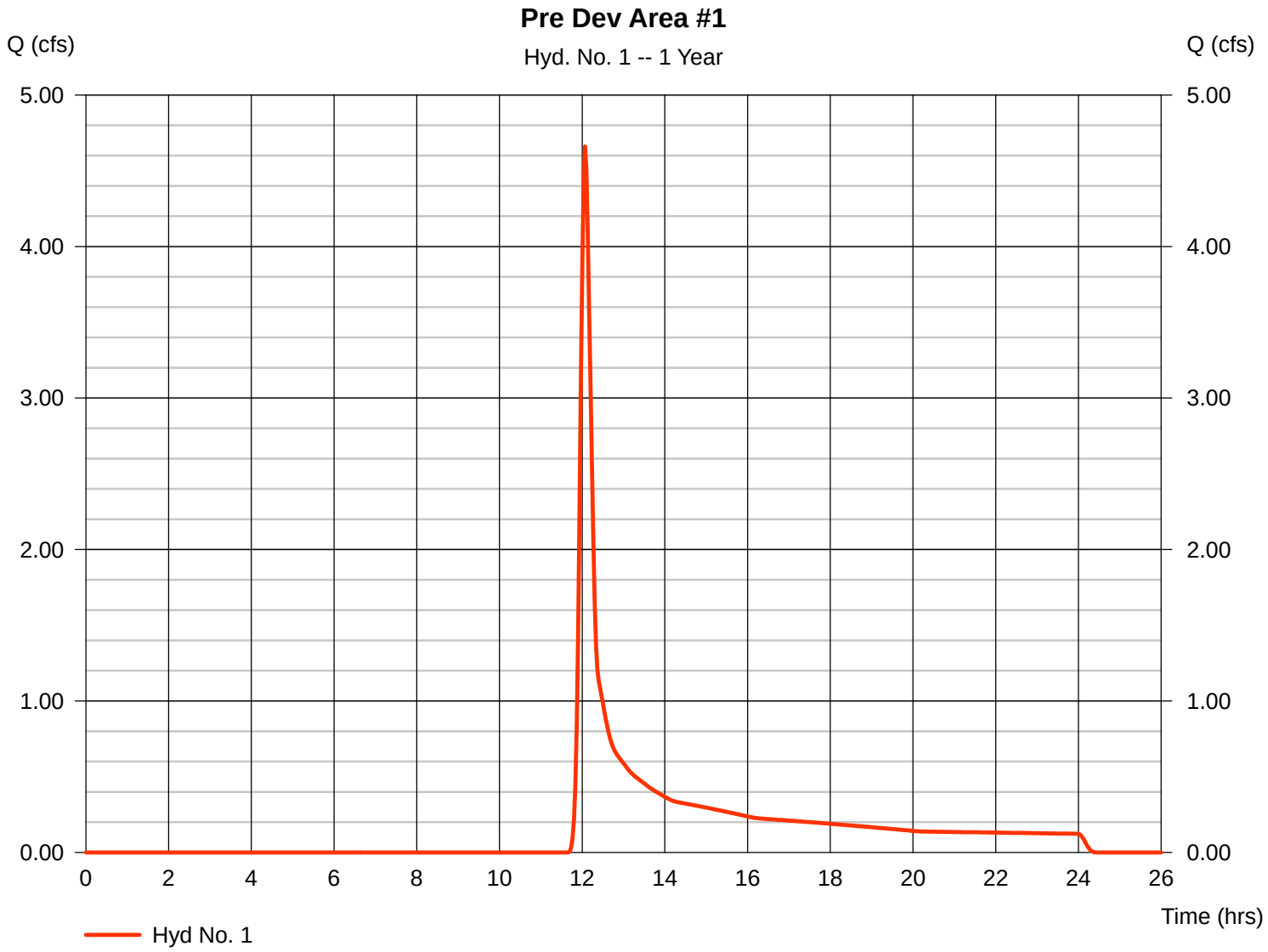
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 1

Pre Dev Area #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.660 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	15,691 cuft
Drainage area	=	8.800 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.10 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.620 x 58) + (8.180 x 71)] / 8.800



TR55 Tc Worksheet

Hyd. No. 1

Pre Dev Area #1

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.20		0.00		0.00		
Land slope (%)	=	3.70		0.00		0.00		
Travel Time (min)	**=**	**10.60**	**+**	**0.00**	**+**	**0.00**	**=**	**10.60**
Shallow Concentrated Flow								
Flow length (ft)	=	1340.00		0.00		0.00		
Watercourse slope (%)	=	6.30		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	4.05		0.00		0.00		
Travel Time (min)	**=**	**5.51**	**+**	**0.00**	**+**	**0.00**	**=**	**5.51**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 16.10 min

Hydrograph Report

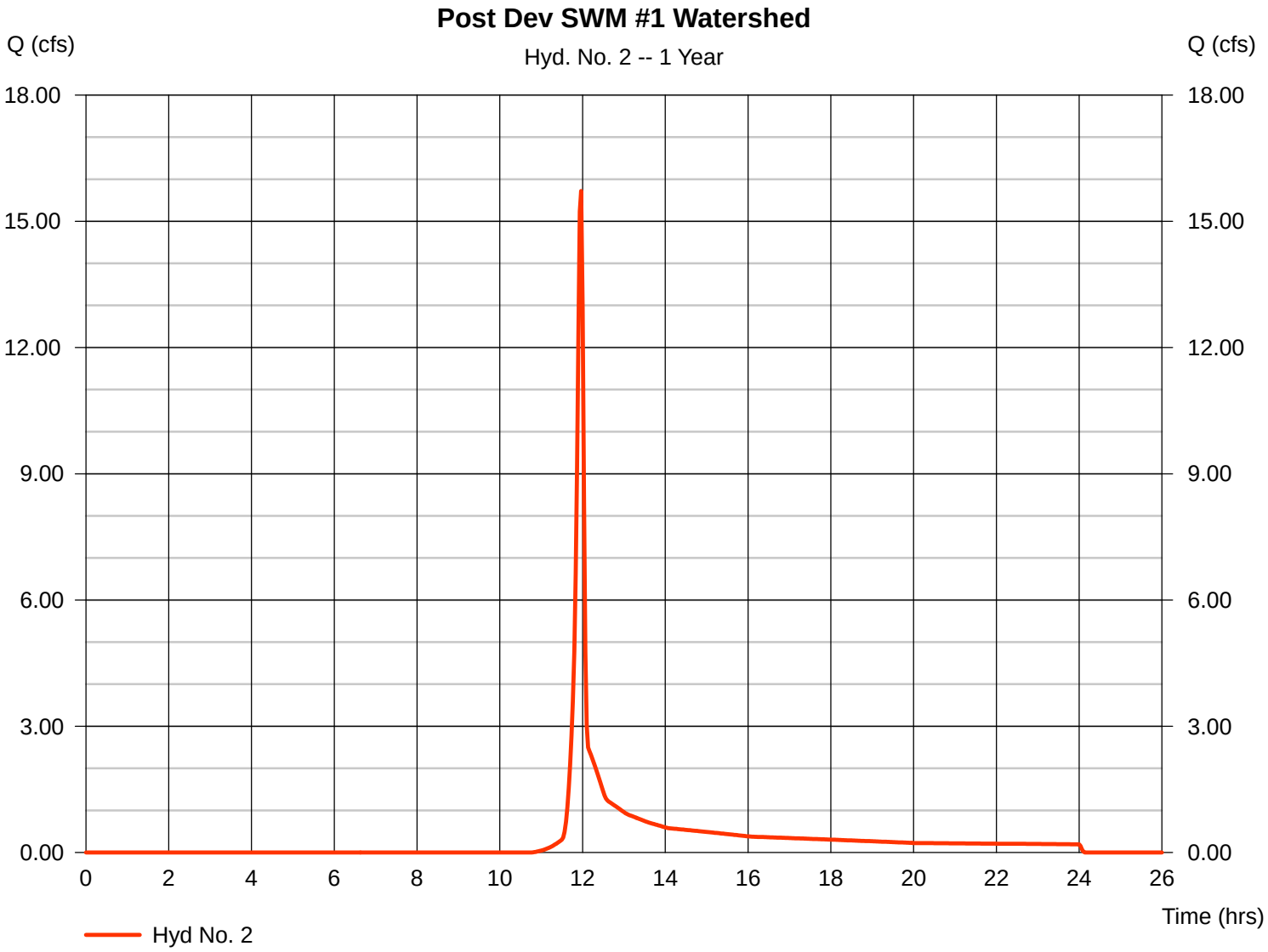
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 2

Post Dev SWM #1 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.72 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	31,514 cuft
Drainage area	=	10.850 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = + (8.950 x 74) + (0.180 x 85) + (0.060 x 89) + (1.660 x 98)] / 10.850



Hydrograph Report

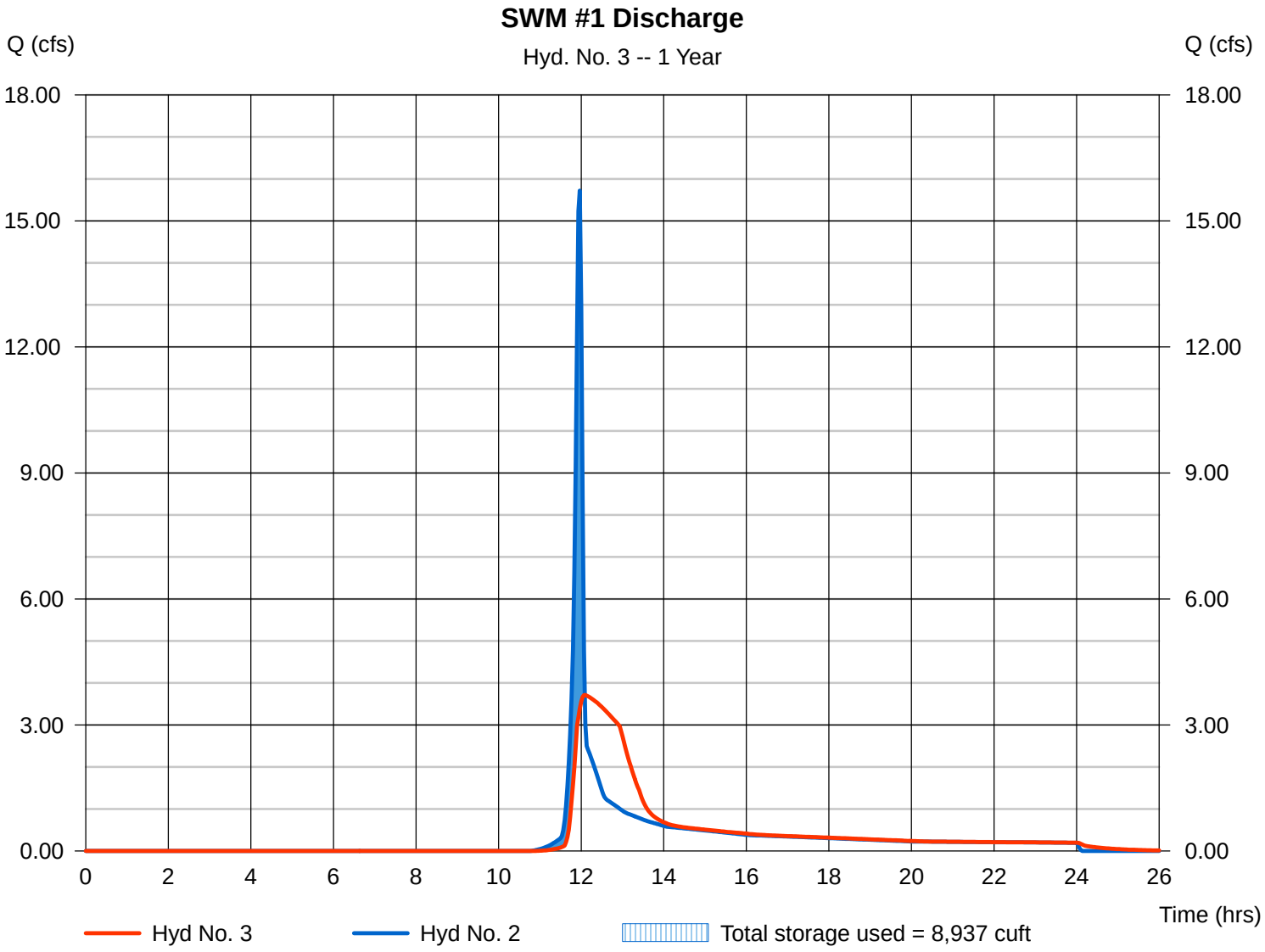
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 3

SWM #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	3.713 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	31,511 cuft
Inflow hyd. No.	=	2 - Post Dev SWM #1 Watershed	Max. Elevation	=	104.82 ft
Reservoir name	=	Detention Basin 1	Max. Storage	=	8,937 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 5 - Detention Basin 1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.00	00	0	0
2.00	104.00	5,270	3,513	3,513
4.00	106.00	8,176	13,339	16,852
6.00	108.00	11,198	19,293	36,145
7.00	109.00	12,981	12,077	48,222
8.00	110.00	14,764	13,862	62,084

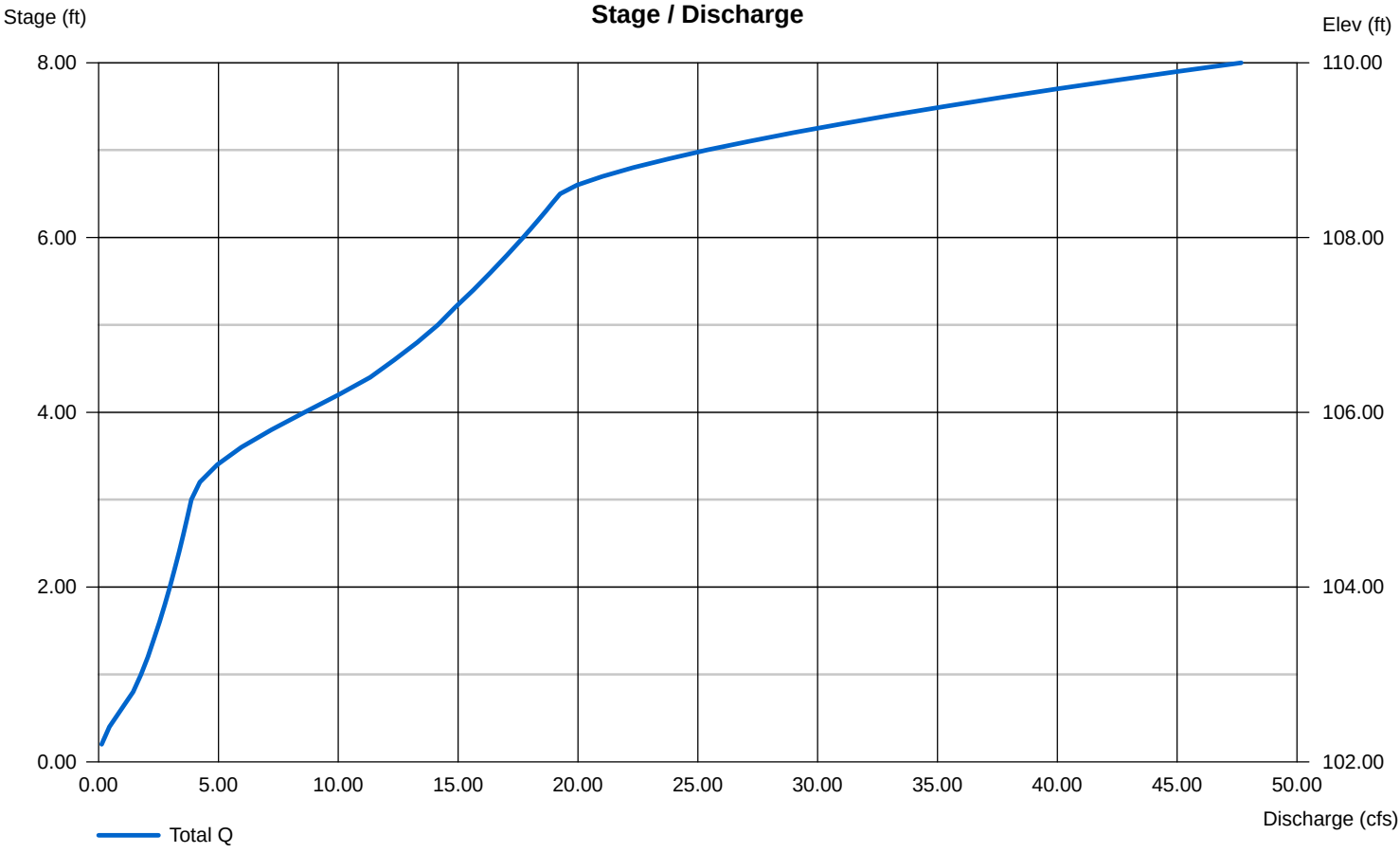
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	10.00	18.00	0.00
Span (in)	= 24.00	10.00	18.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 102.00	102.00	105.00	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 108.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
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

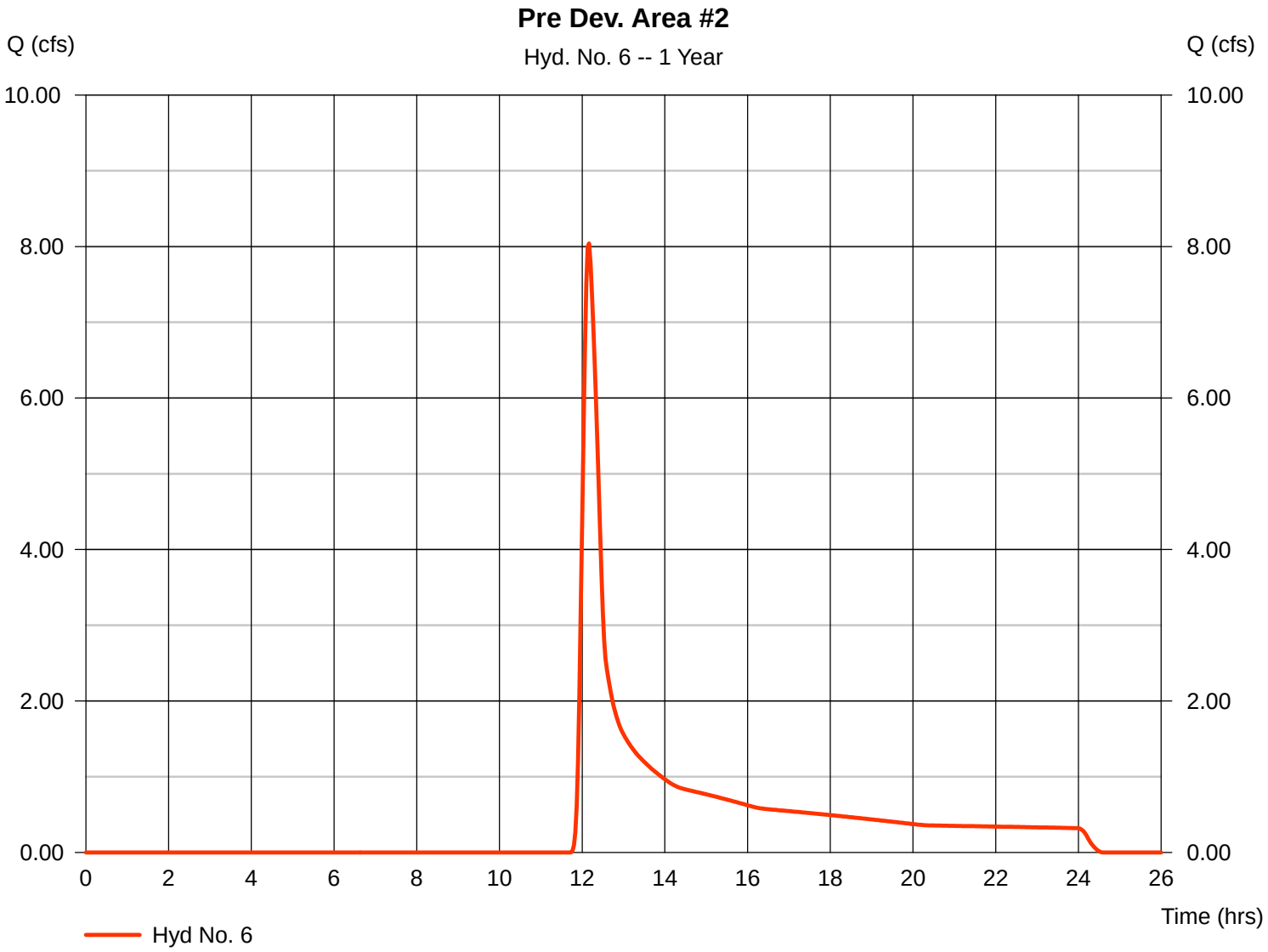
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 6

Pre Dev. Area #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.040 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	38,234 cuft
Drainage area	=	23.940 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.50 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(5.130 x 58) + (18.810 x 71)] / 23.940



TR55 Tc Worksheet

Hyd. No. 6

Pre Dev. Area #2

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.20		0.00		0.00		
Land slope (%)	=	5.30		0.00		0.00		
Travel Time (min)	**=**	**9.18**	**+**	**0.00**	**+**	**0.00**	**=**	**9.18**
Shallow Concentrated Flow								
Flow length (ft)	=	1940.00		0.00		0.00		
Watercourse slope (%)	=	3.12		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.85		0.00		0.00		
Travel Time (min)	**=**	**11.35**	**+**	**0.00**	**+**	**0.00**	**=**	**11.35**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 20.50 min

Hydrograph Report

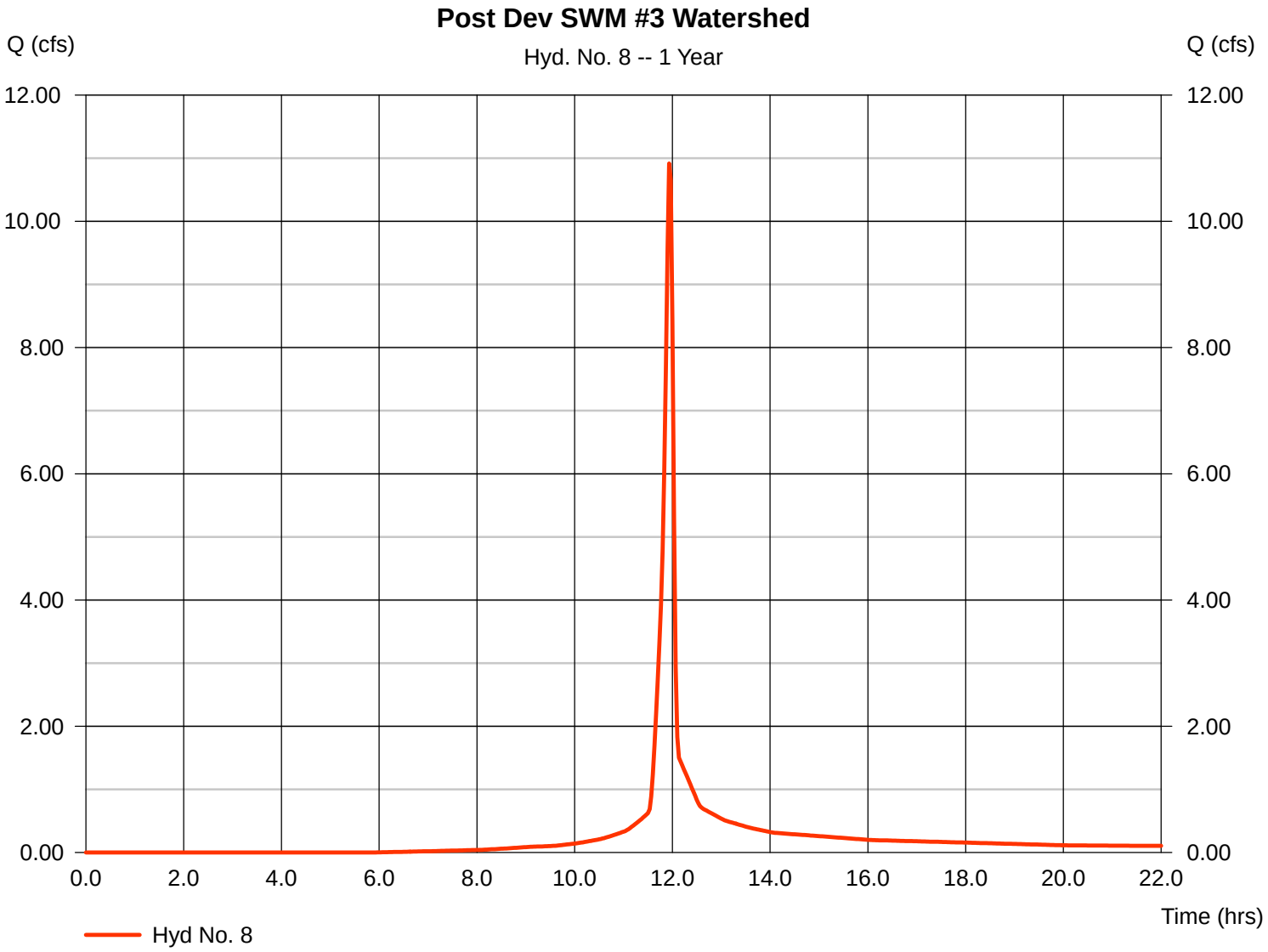
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 8

Post Dev SWM #3 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.91 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	22,526 cuft
Drainage area	=	3.890 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.200 x 74) + (2.690 x 98)] / 3.890



Hydrograph Report

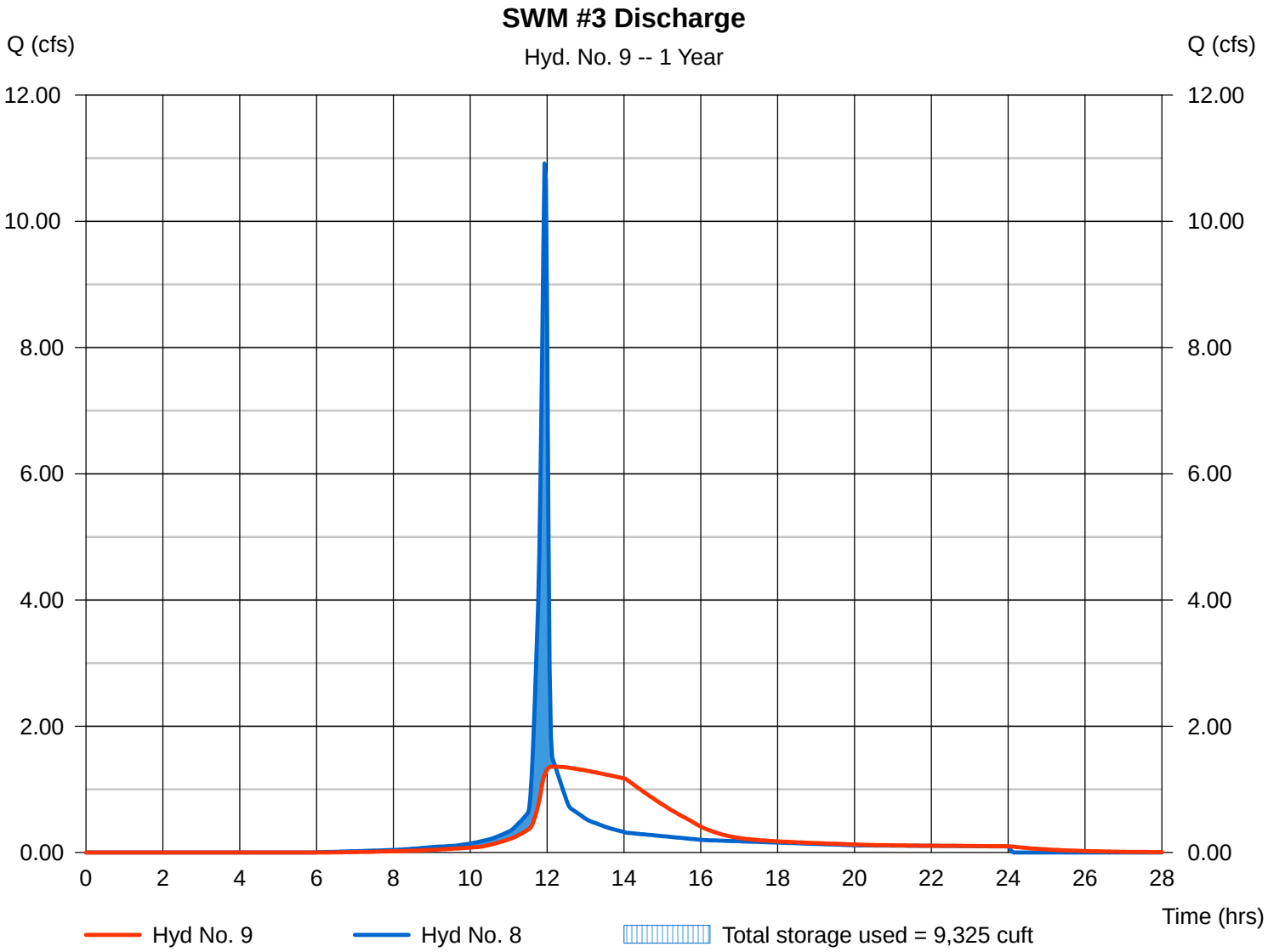
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 9

SWM #3 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	1.360 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	22,521 cuft
Inflow hyd. No.	=	8 - Post Dev SWM #3 Watershed	Max. Elevation	=	160.59 ft
Reservoir name	=	Detention Basin 3	Max. Storage	=	9,325 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 3 - Detention Basin 3

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 158.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	158.00	00	0	0
2.00	160.00	7,090	4,726	4,726
3.00	161.00	8,582	7,823	12,550
4.00	162.00	10,074	9,317	21,867
5.00	163.00	12,050	11,046	32,913
6.00	164.00	14,026	13,024	45,937

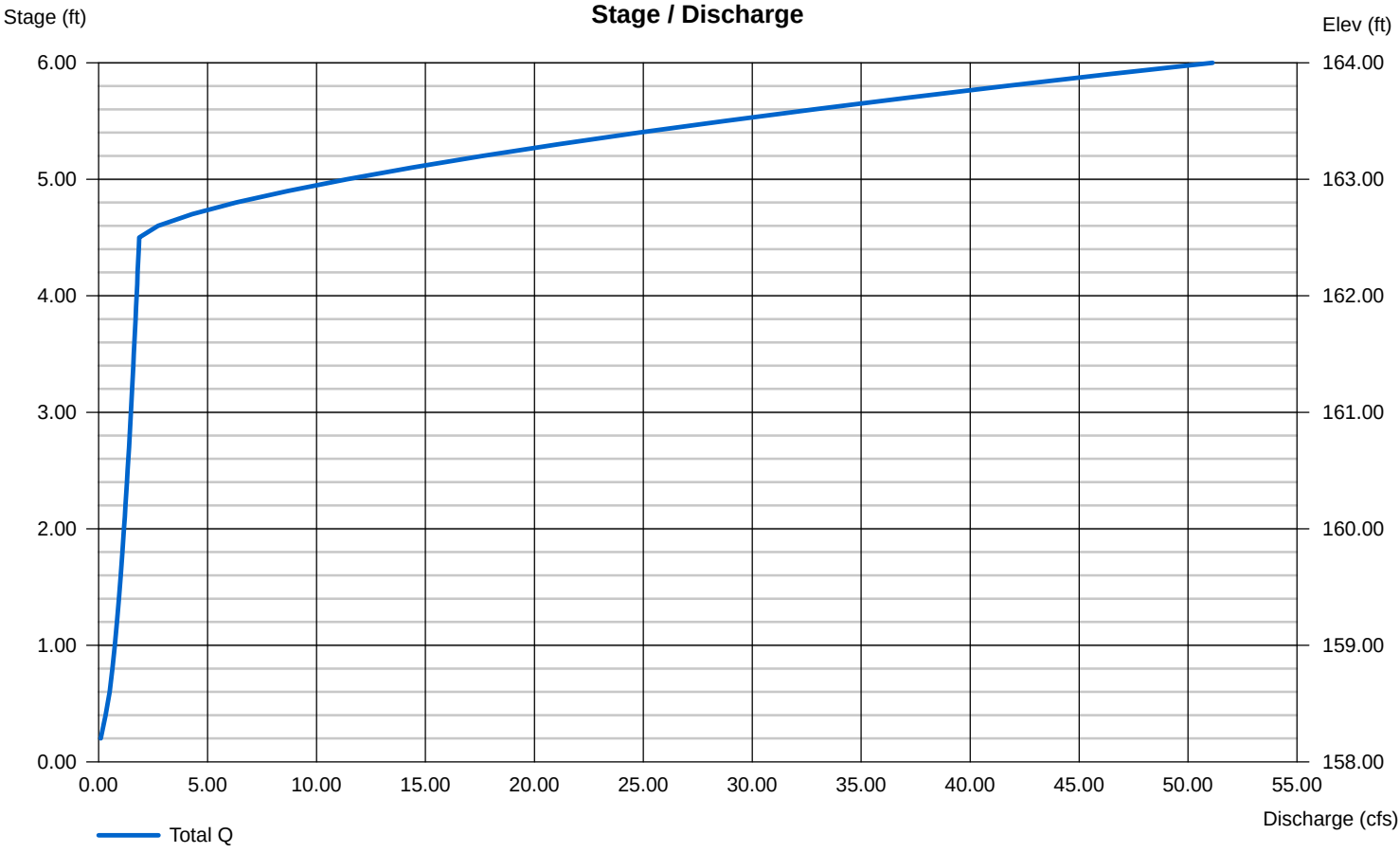
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 158.00	158.00	0.00	0.00
Length (ft)	= 80.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 162.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
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

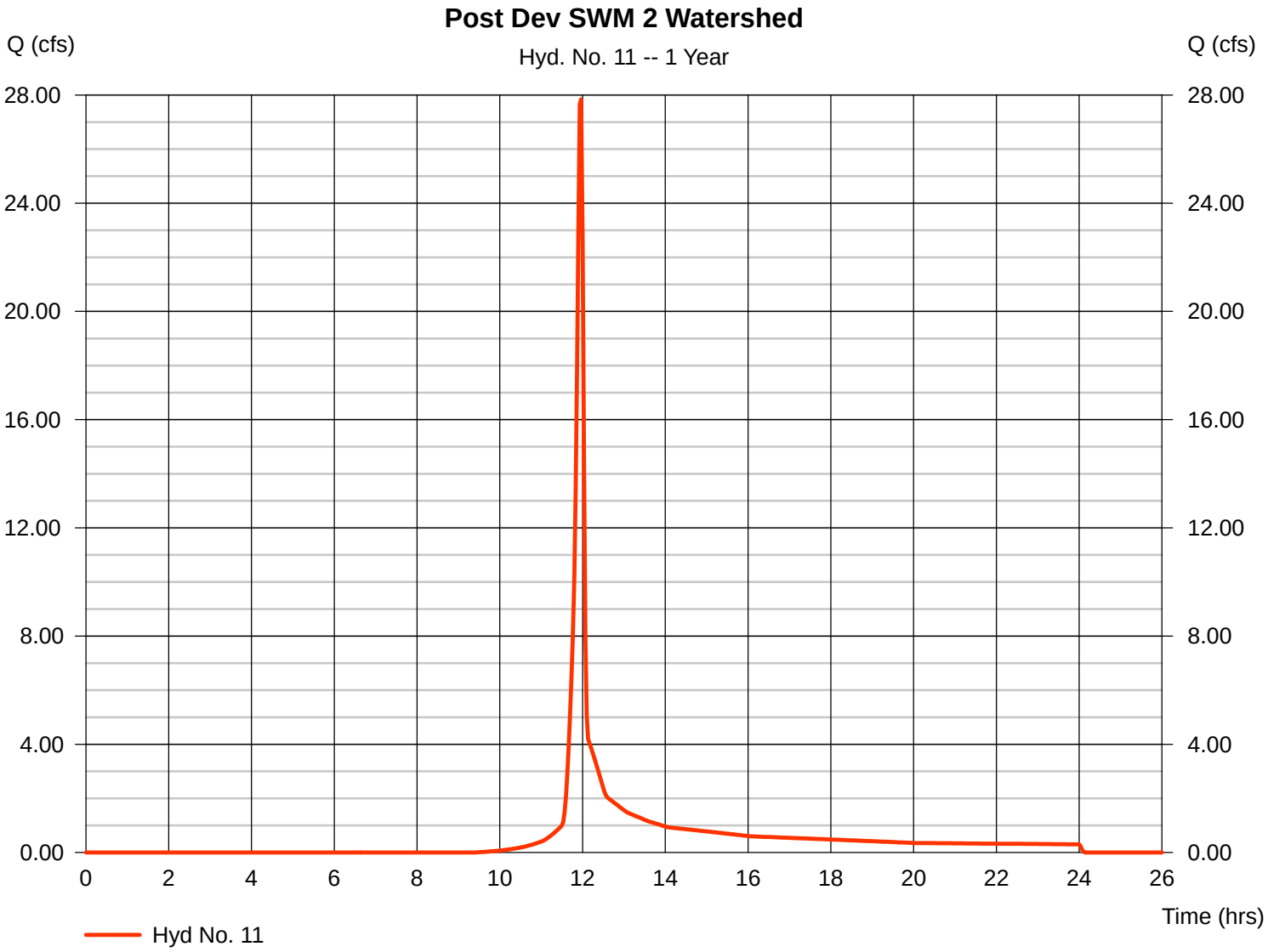
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 11

Post Dev SWM 2 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.84 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	55,932 cuft
Drainage area	=	14.520 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.400 x 61) + (6.490 x 74) + (0.080 x 85) + (0.390 x 89) + (6.160 x 98)] / 14.520

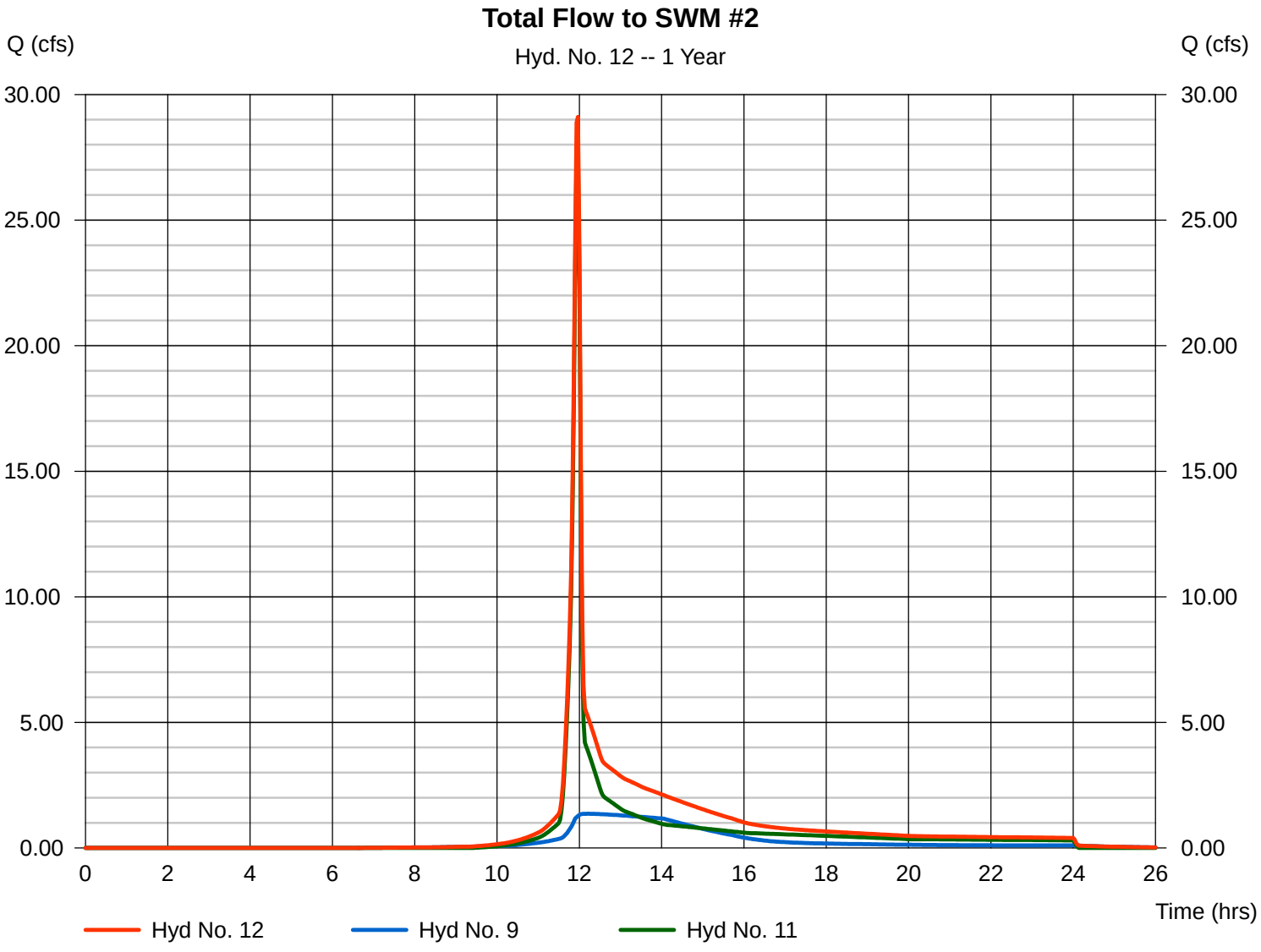


Hydrograph Report

Hyd. No. 12

Total Flow to SWM #2

Hydrograph type	=	Combine	Peak discharge	=	29.11 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	78,453 cuft
Inflow hyds.	=	9, 11	Contrib. drain. area	=	14.520 ac



Hydrograph Report

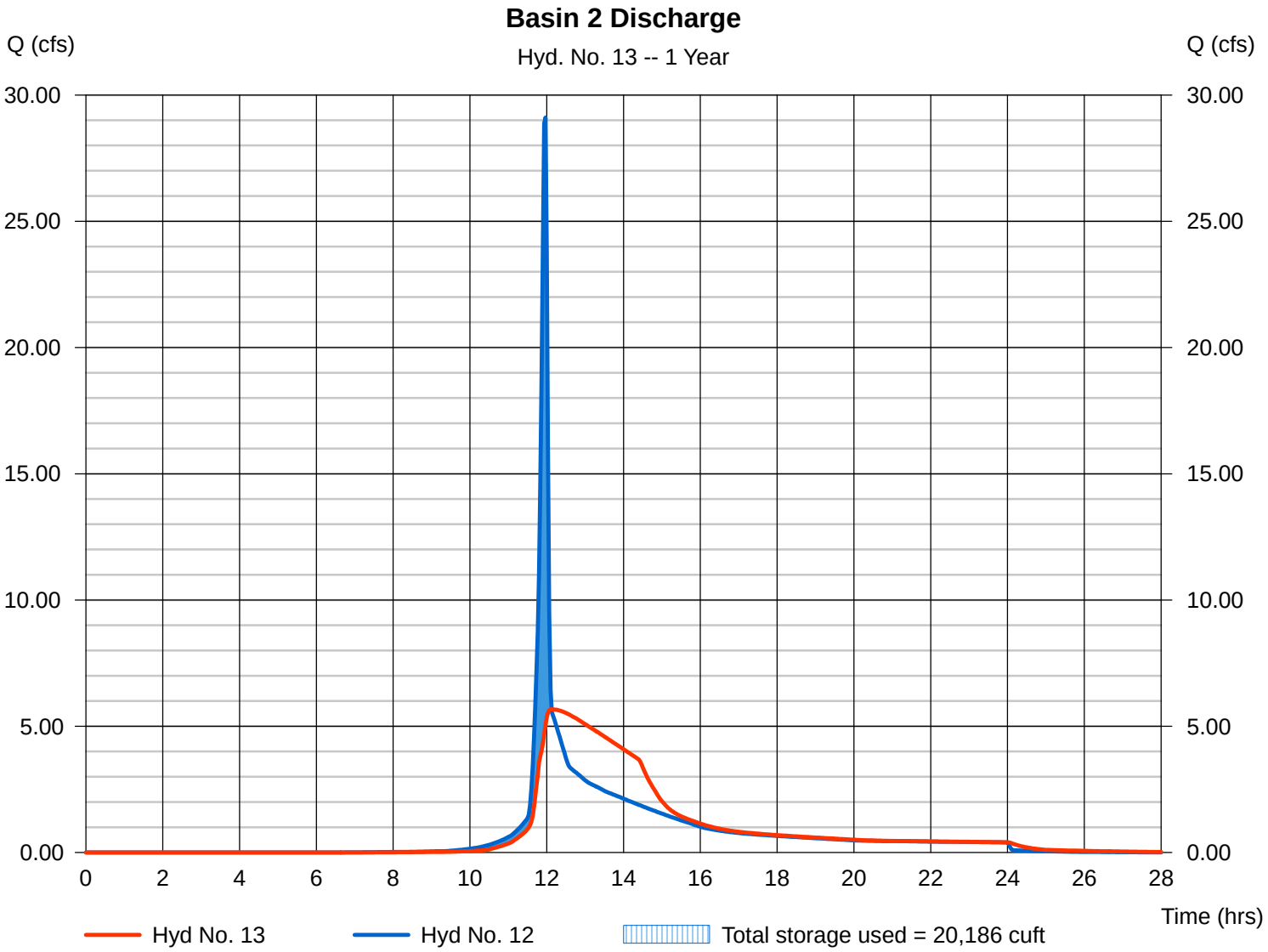
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 13

Basin 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	5.670 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	78,449 cuft
Inflow hyd. No.	=	12 - Total Flow to SWM #2	Max. Elevation	=	145.53 ft
Reservoir name	=	Detention Basin 2	Max. Storage	=	20,186 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 2 - Detention Basin 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 142.25 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	142.25	00	0	0
1.75	144.00	7,982	4,656	4,656
3.75	146.00	12,554	20,362	25,018
5.75	148.00	17,360	29,781	54,799
7.75	150.00	21,700	38,975	93,775
9.75	152.00	26,350	47,970	141,745

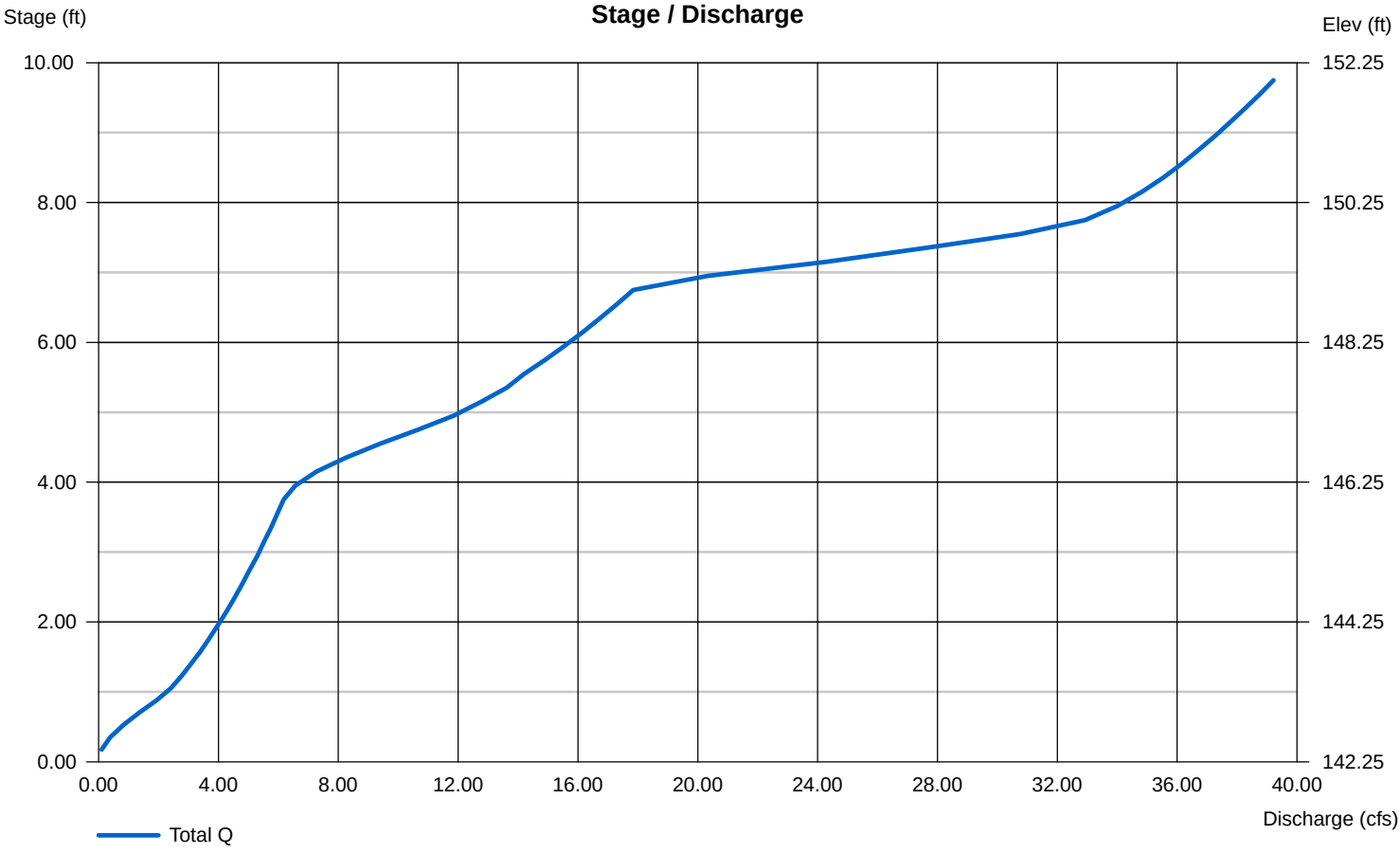
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	12.00	16.00	0.00
Span (in)	= 24.00	12.00	16.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 142.25	142.25	146.00	0.00
Length (ft)	= 172.00	0.00	0.00	0.00
Slope (%)	= 0.63	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 149.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

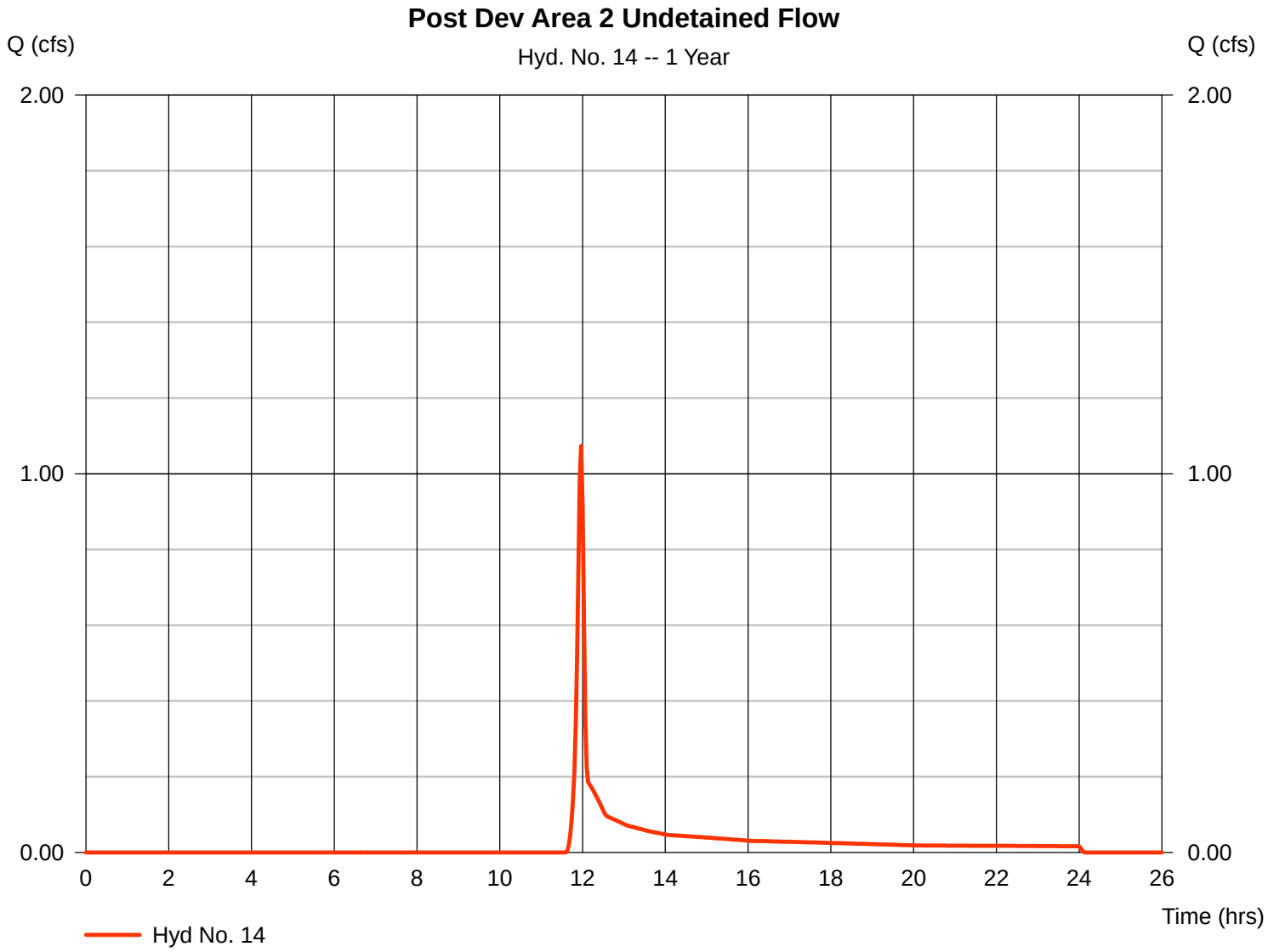
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 14

Post Dev Area 2 Undetained Flow

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.074 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	2,236 cuft
Drainage area	=	1.130 ac	Curve number	=	72*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.800 x 74) + (0.330 x 98)] / 1.130



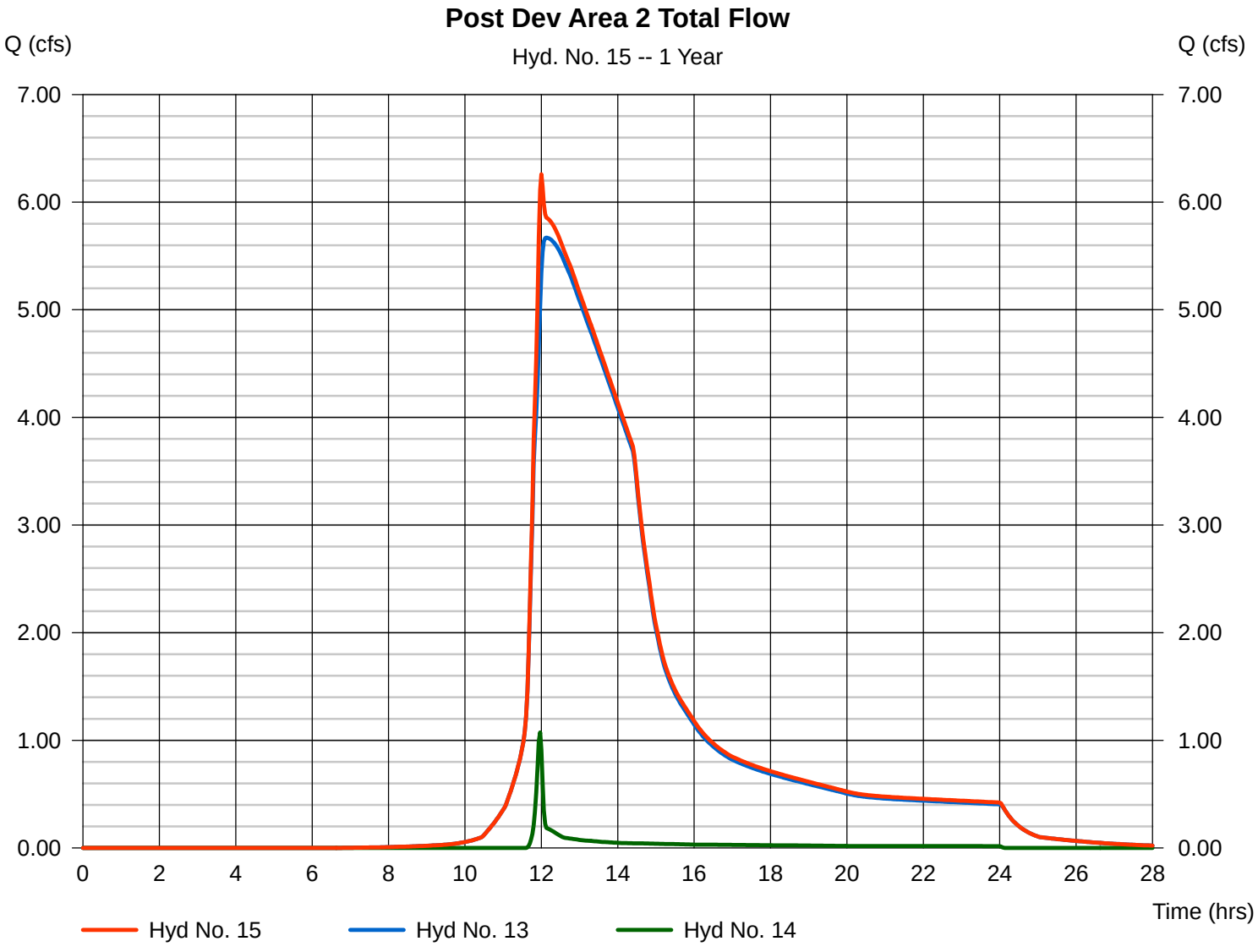
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 15

Post Dev Area 2 Total Flow

Hydrograph type	=	Combine	Peak discharge	=	6.260 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	80,684 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	1.130 ac



Hydrograph Report

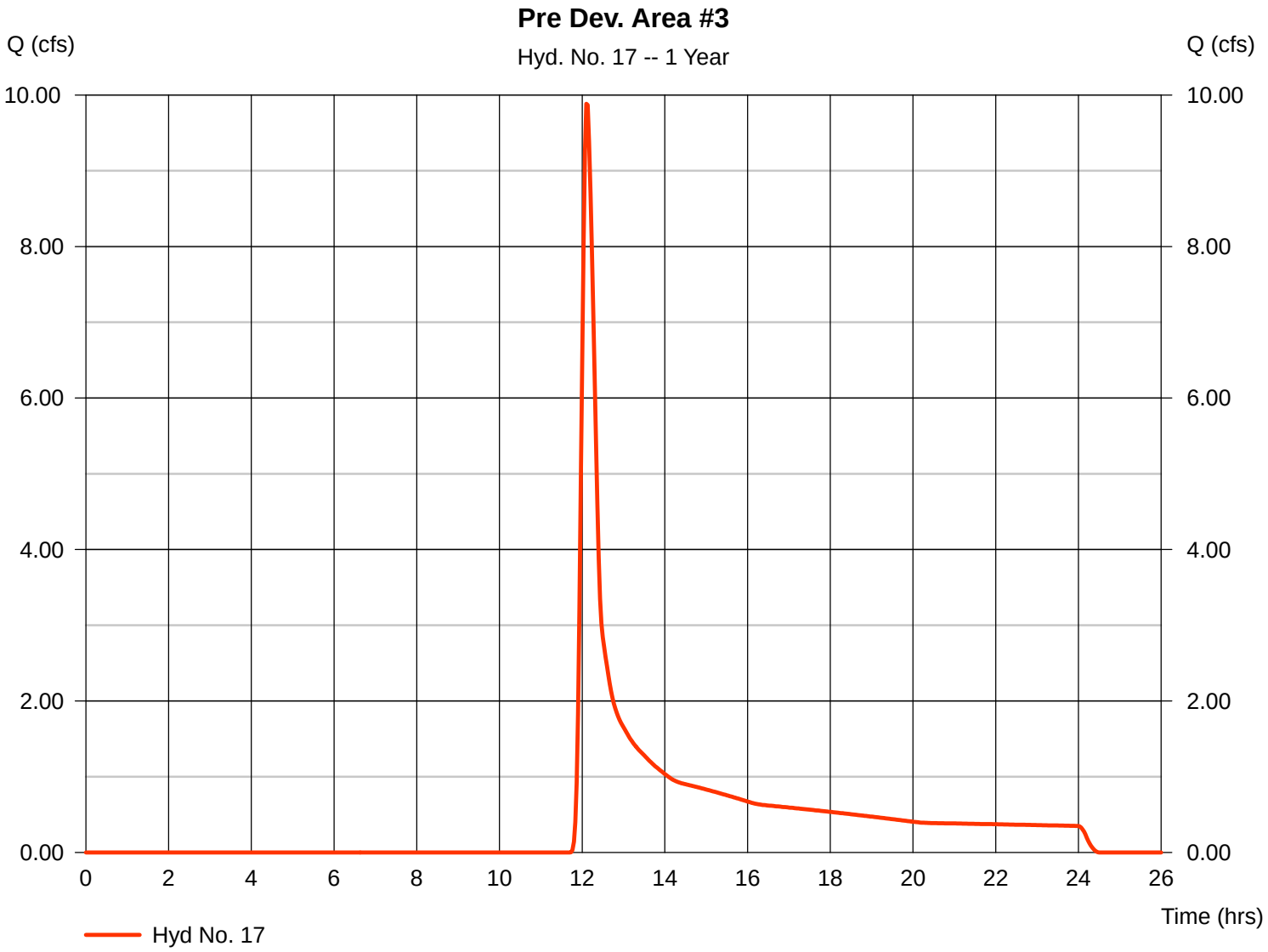
Hydraflow Hydrographs by Intelisolve v9.24 — Thursday, Feb 26, 2015

Hyd. No. 17

Pre Dev. Area #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.885 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	41,722 cuft
Drainage area	=	26.590 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.00 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(5.590 x 58) + (21.000 x 71)] / 26.590



TR55 Tc Worksheet

Hyd. No. 17

Pre Dev. Area #3

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.20		0.00		0.00		
Land slope (%)	=	4.70		0.00		0.00		
Travel Time (min)	**=**	**9.63**	**+**	**0.00**	**+**	**0.00**	**=**	**9.63**
Shallow Concentrated Flow								
Flow length (ft)	=	1800.00		0.00		0.00		
Watercourse slope (%)	=	3.19		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.88		0.00		0.00		
Travel Time (min)	**=**	**10.41**	**+**	**0.00**	**+**	**0.00**	**=**	**10.41**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 20.00 min

Hydrograph Report

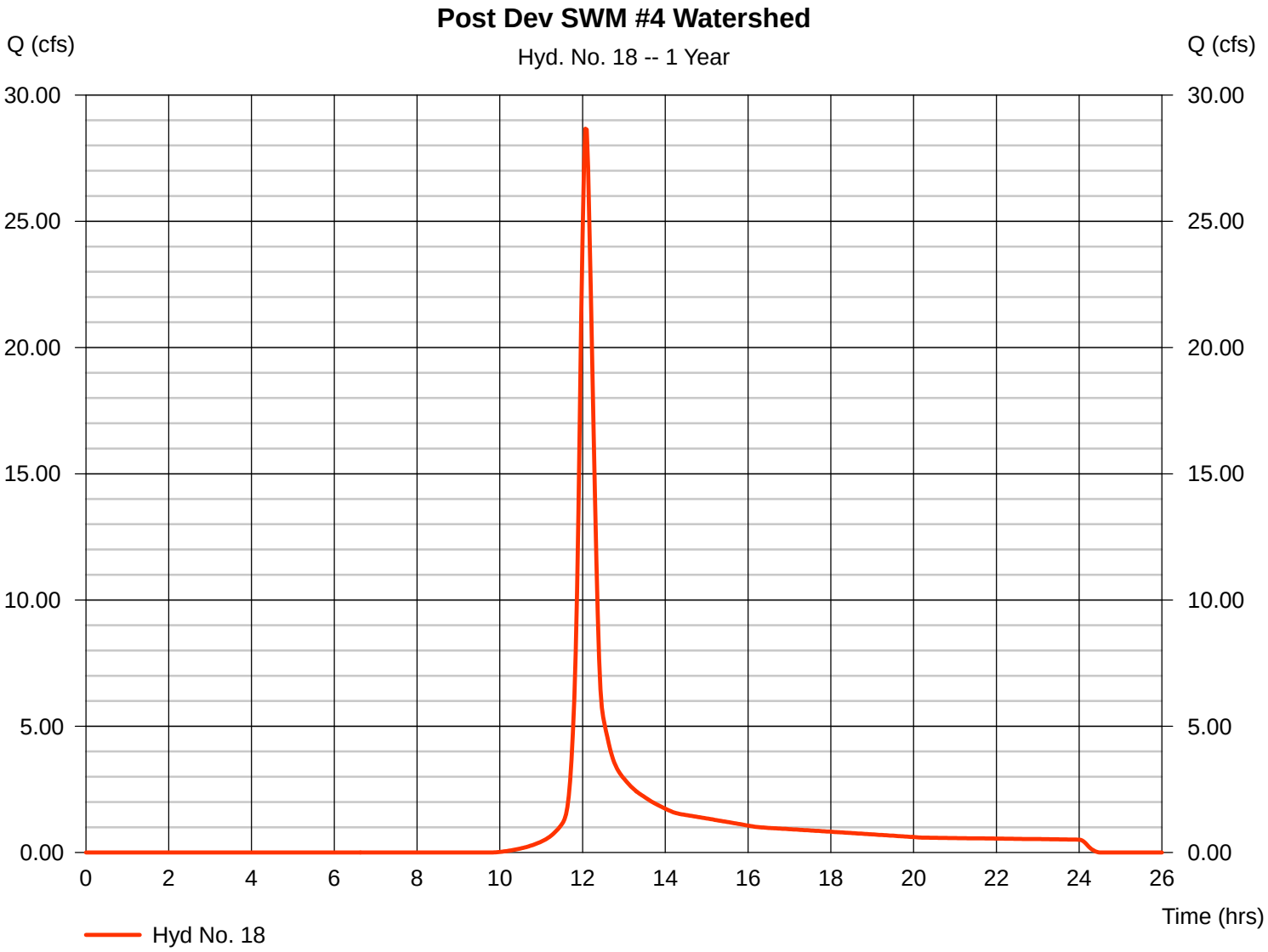
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 18

Post Dev SWM #4 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.66 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	91,449 cuft
Drainage area	=	23.500 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.30 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.700 x 61) + (10.240 x 74) + (9.560 x 98)] / 23.500



TR55 Tc Worksheet

Hyd. No. 18

Post Dev SWM #4 Watershed

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.120		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.20		0.00		0.00		
Land slope (%)	=	1.00		0.00		0.00		
Travel Time (min)	**=**	**14.96**	**+**	**0.00**	**+**	**0.00**	**=**	**14.96**
Shallow Concentrated Flow								
Flow length (ft)	=	180.00		380.00		0.00		
Watercourse slope (%)	=	2.80		4.70		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.70		4.41		0.00		
Travel Time (min)	**=**	**1.11**	**+**	**1.44**	**+**	**0.00**	**=**	**2.55**
Channel Flow								
X sectional flow area (sqft)	=	3.14		0.00		0.00		
Wetted perimeter (ft)	=	6.28		0.00		0.00		
Channel slope (%)	=	4.00		0.00		0.00		
Manning's n-value	=	0.012		0.015		0.015		
Velocity (ft/s)	=	15.61		0.00		0.00		
Flow length (ft)	=	700.0		0.0		0.0		
Travel Time (min)	**=**	**0.75**	**+**	**0.00**	**+**	**0.00**	**=**	**0.75**

Total Travel Time, Tc ..... 18.30 min

Hydrograph Report

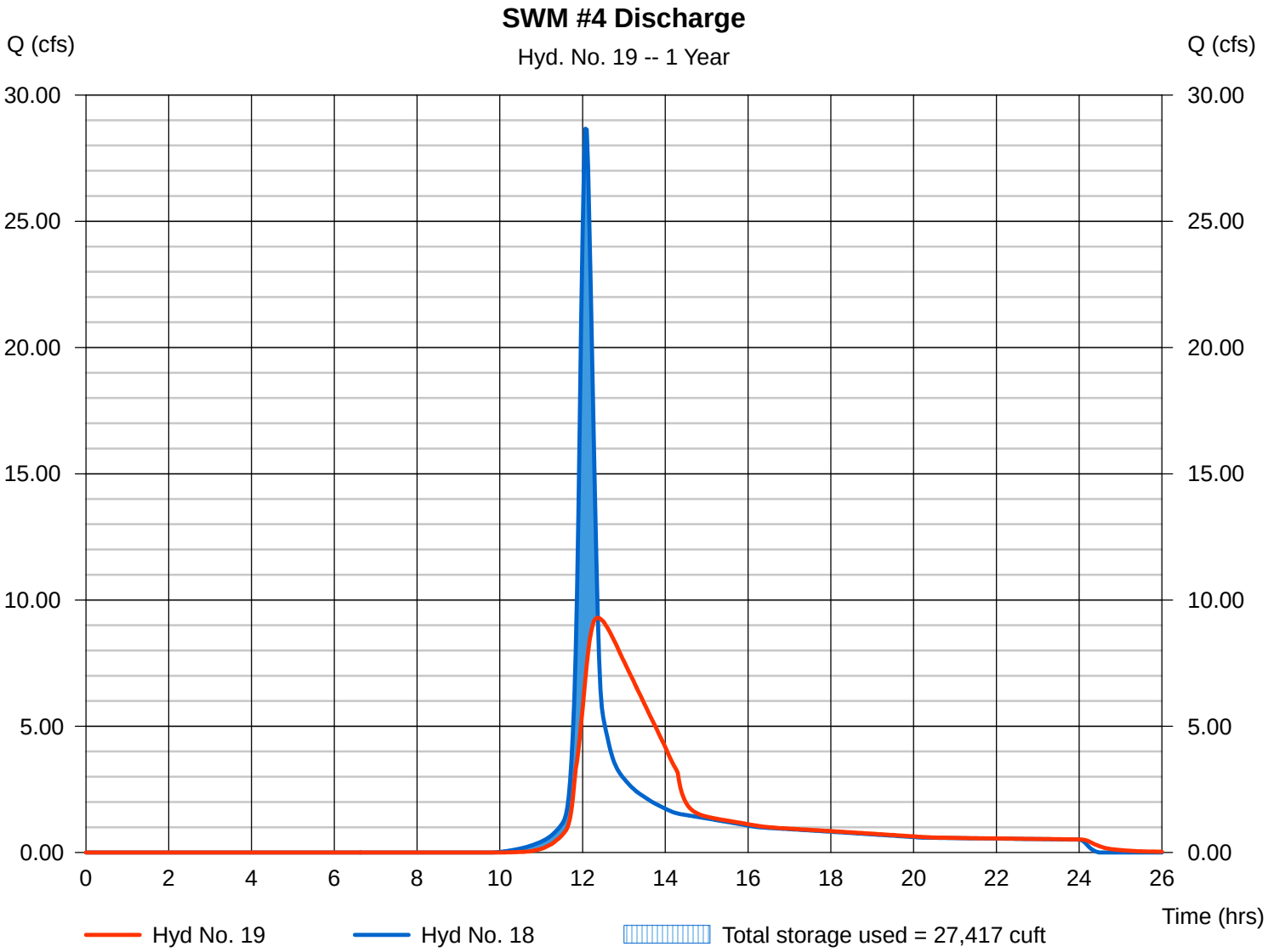
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 19

SWM #4 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	9.297 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.37 hrs
Time interval	=	2 min	Hyd. volume	=	91,442 cuft
Inflow hyd. No.	=	18 - Post Dev SWM #4 Watershed	Max. Elevation	=	156.07 ft
Reservoir name	=	Detention Basin #4	Max. Storage	=	27,417 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 4 - Detention Basin #4

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 153.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	153.00	00	0	0
1.00	154.00	8,214	2,738	2,738
3.00	156.00	15,576	23,398	26,136
5.00	158.00	20,110	35,586	61,722
7.00	160.00	24,102	44,147	105,870
8.00	161.00	26,175	25,129	130,998
9.00	162.00	28,248	27,202	158,201

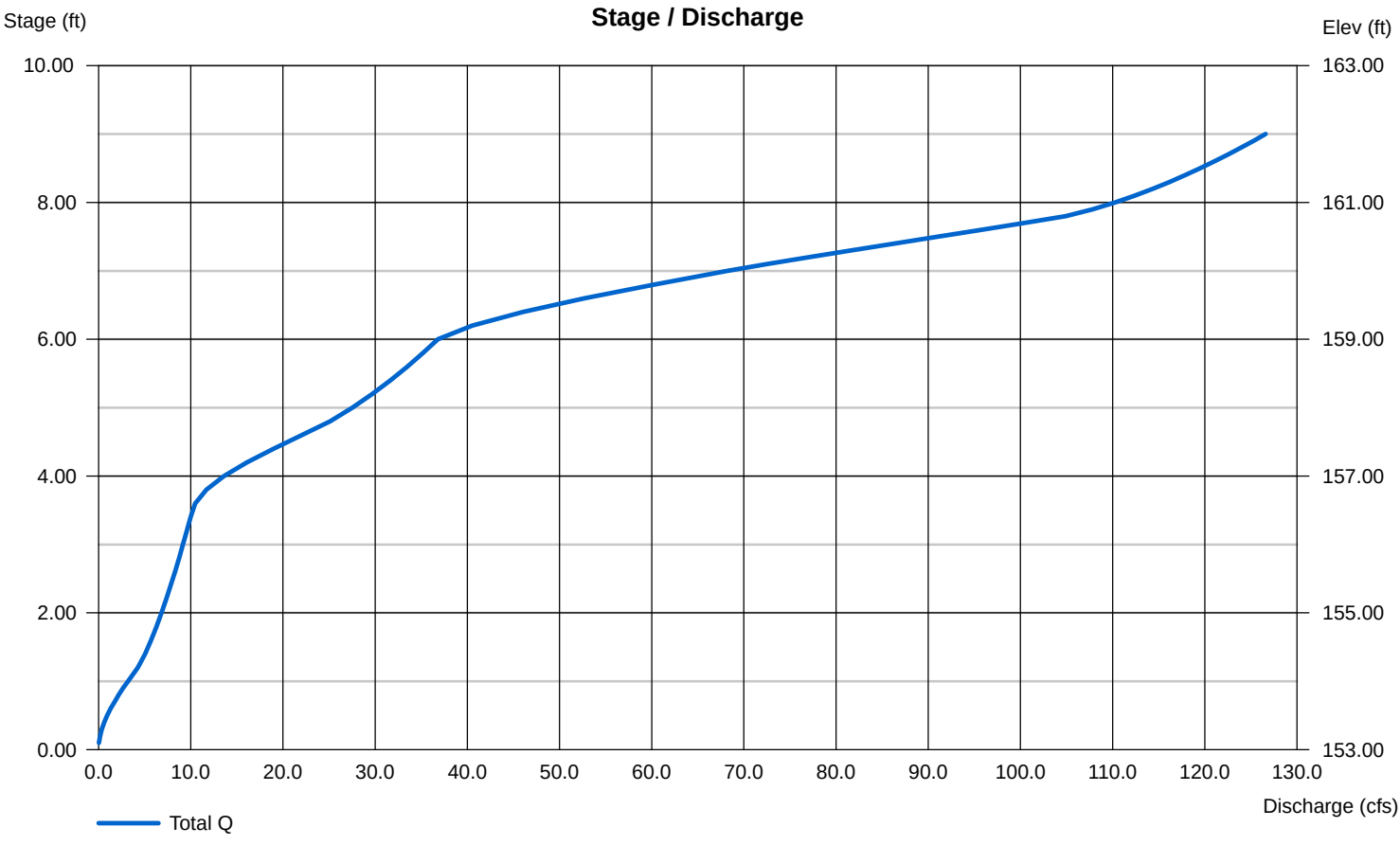
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	16.00	18.00	0.00
Span (in)	= 36.00	16.00	18.00	0.00
No. Barrels	= 1	1	2	0
Invert El. (ft)	= 153.00	153.00	156.50	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 159.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

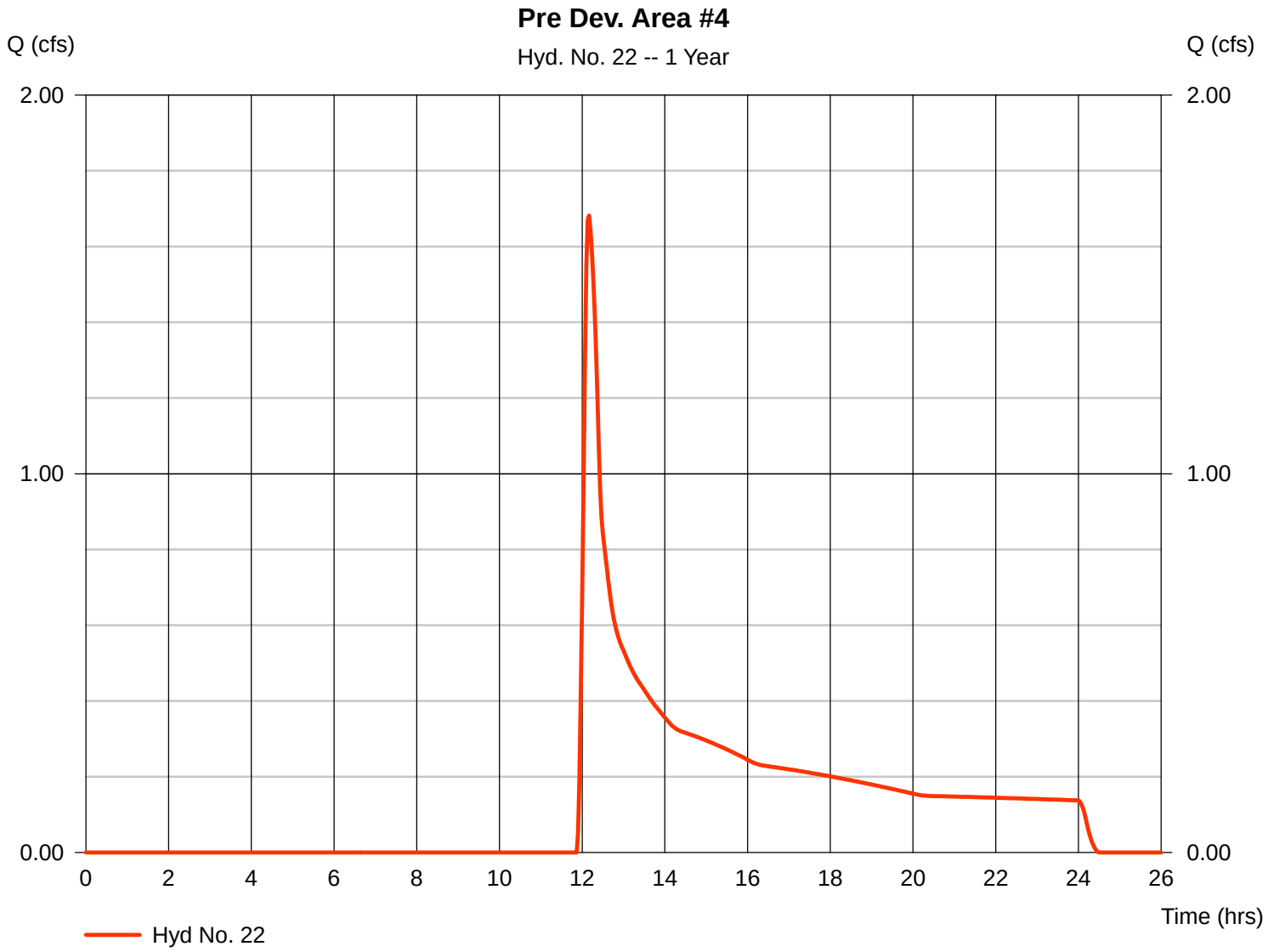
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 22

Pre Dev. Area #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.682 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	12,391 cuft
Drainage area	=	15.120 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	17.40 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(11.060 x 58) + (4.060 x 71)] / 15.120



TR55 Tc Worksheet

Hyd. No. 22

Pre Dev. Area #4

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.20		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**13.55**	**+**	**0.00**	**+**	**0.00**	**=**	**13.55**
Shallow Concentrated Flow								
Flow length (ft)	=	860.00		0.00		0.00		
Watercourse slope (%)	=	5.27		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	3.70		0.00		0.00		
Travel Time (min)	**=**	**3.87**	**+**	**0.00**	**+**	**0.00**	**=**	**3.87**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 17.40 min

Hydrograph Report

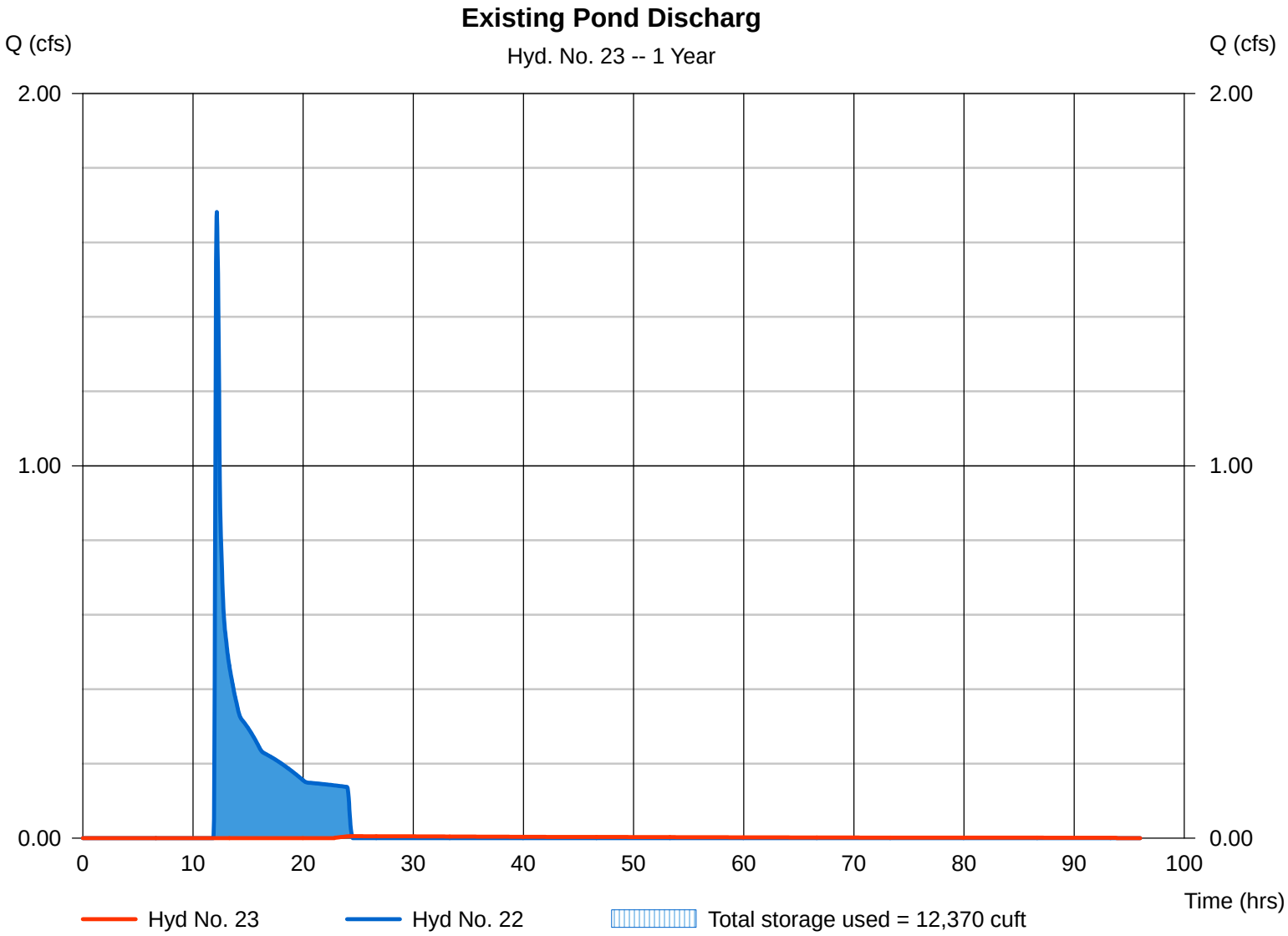
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 23

Existing Pond Discharg

Hydrograph type	=	Reservoir	Peak discharge	=	0.005 cfs
Storm frequency	=	1 yrs	Time to peak	=	24.43 hrs
Time interval	=	2 min	Hyd. volume	=	679 cuft
Inflow hyd. No.	=	22 - Pre Dev. Area #4	Max. Elevation	=	172.13 ft
Reservoir name	=	Existing Pond	Max. Storage	=	12,370 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 1 - Existing Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 171.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	171.50	00	0	0
0.50	172.00	40,455	6,742	6,742
1.60	173.10	48,050	48,613	55,355
2.00	173.50	52,126	20,028	75,383

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 172.10	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

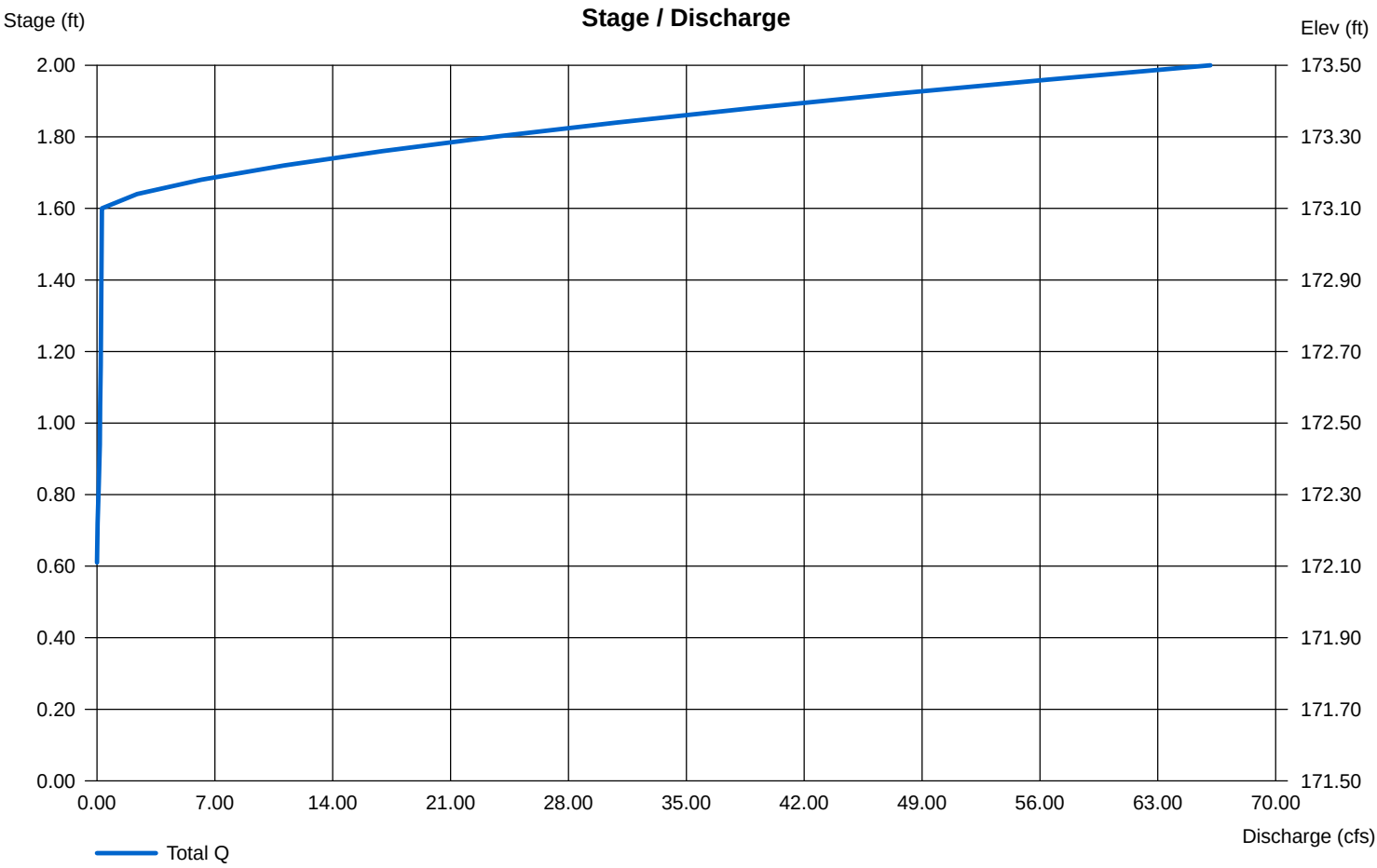
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 100.00	0.00	0.00	0.00
Crest El. (ft)	= 173.10	0.00	0.00	0.00
Weir Coeff.	= 2.60	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

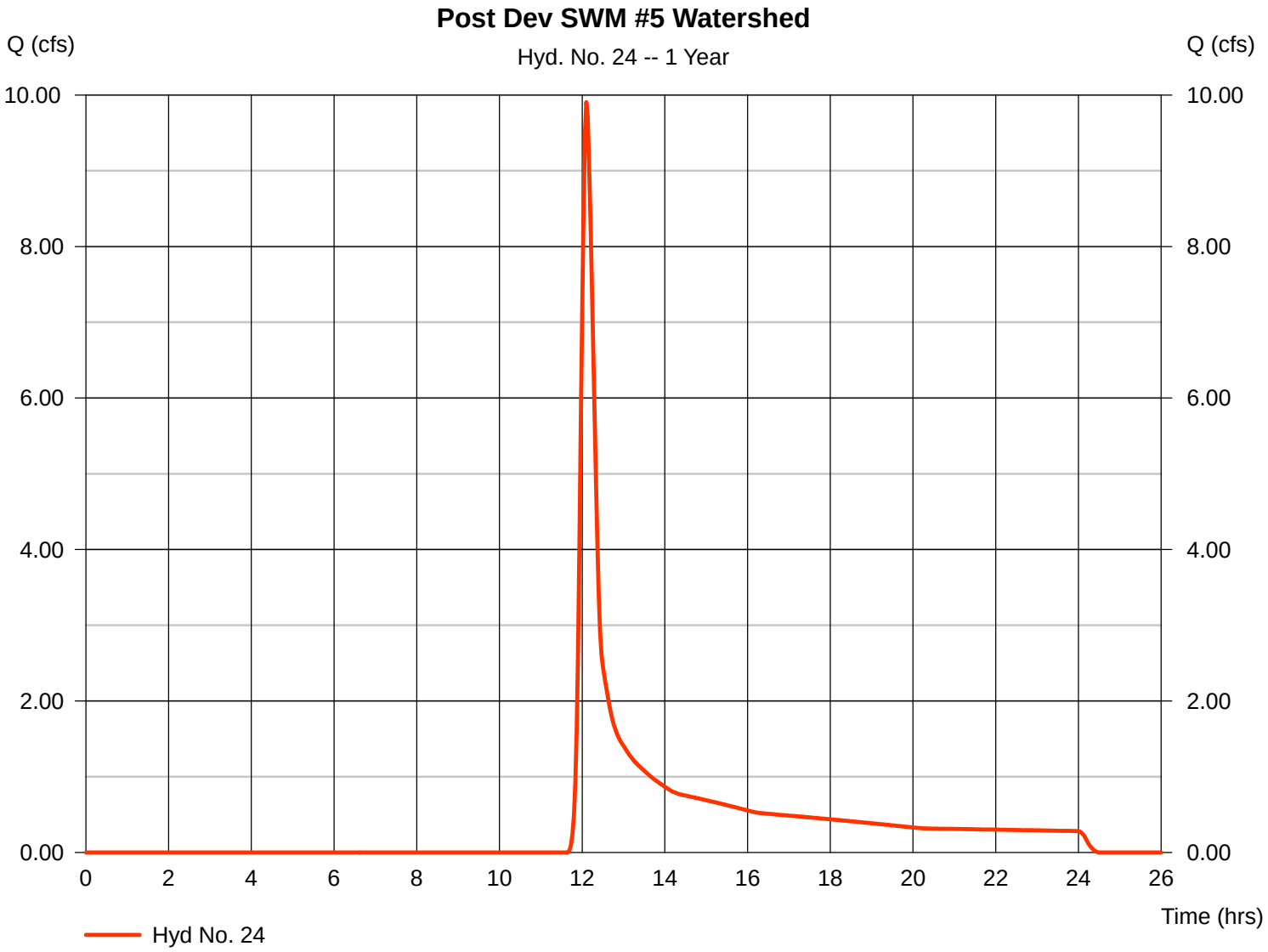
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 24

Post Dev SWM #5 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.906 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	37,073 cuft
Drainage area	=	18.850 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	17.40 min
Total precip.	=	2.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(11.790 x 61) + (2.900 x 74) + (0.240 x 85) + (3.920 x 98)] / 18.850



Hydrograph Report

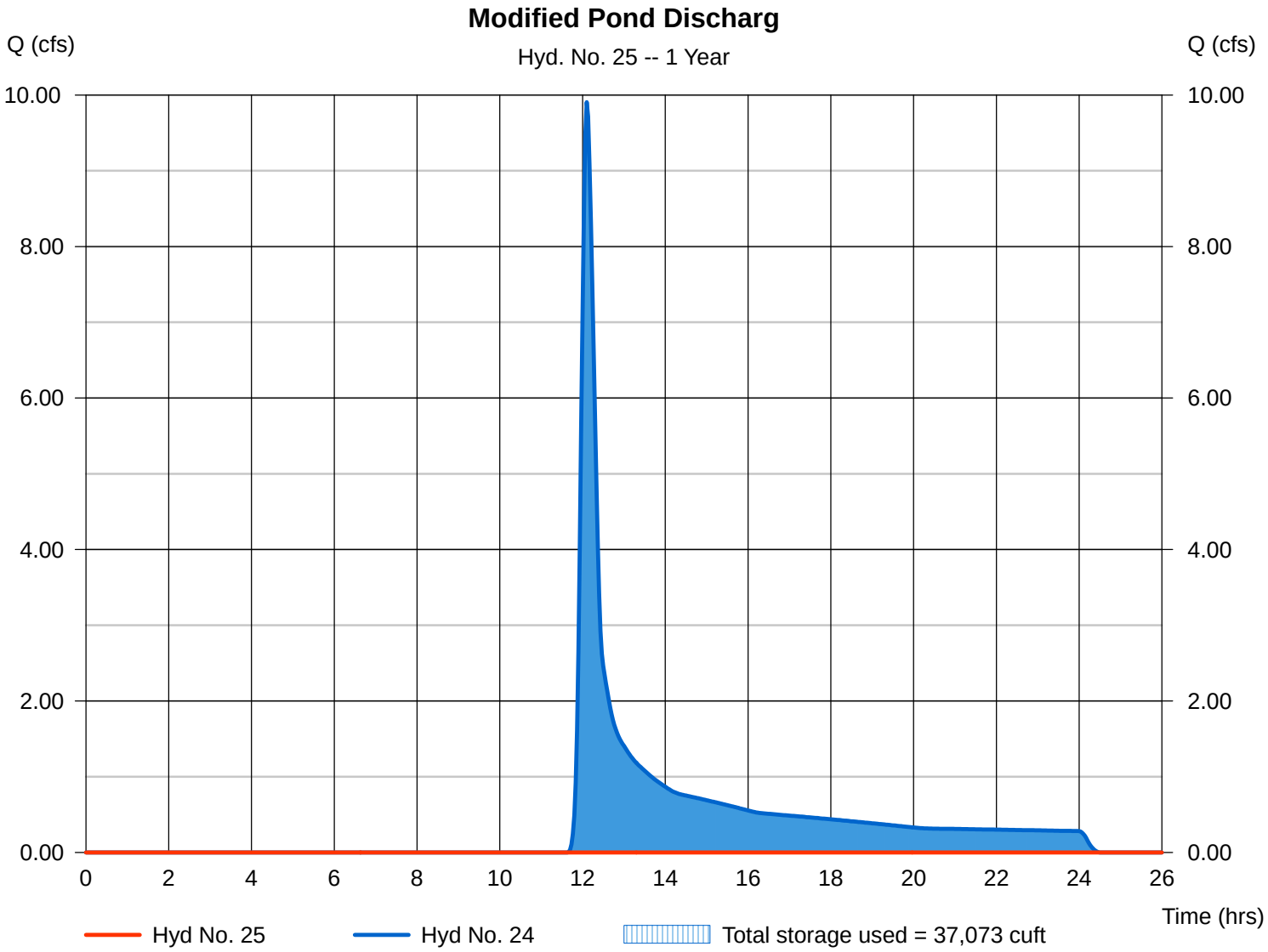
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 25

Modified Pond Discharg

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	24 - Post Dev SWM #5 Watershed	Max. Elevation	=	172.58 ft
Reservoir name	=	Modified Pond	Max. Storage	=	37,073 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Pond No. 6 - Modified Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 171.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	171.50	00	0	0
0.50	172.00	47,469	7,911	7,911
1.60	173.10	53,048	55,250	63,161
2.00	173.50	55,064	21,619	84,780
2.50	174.00	57,582	28,156	112,937
3.00	174.50	61,074	29,657	142,593

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 173.10	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

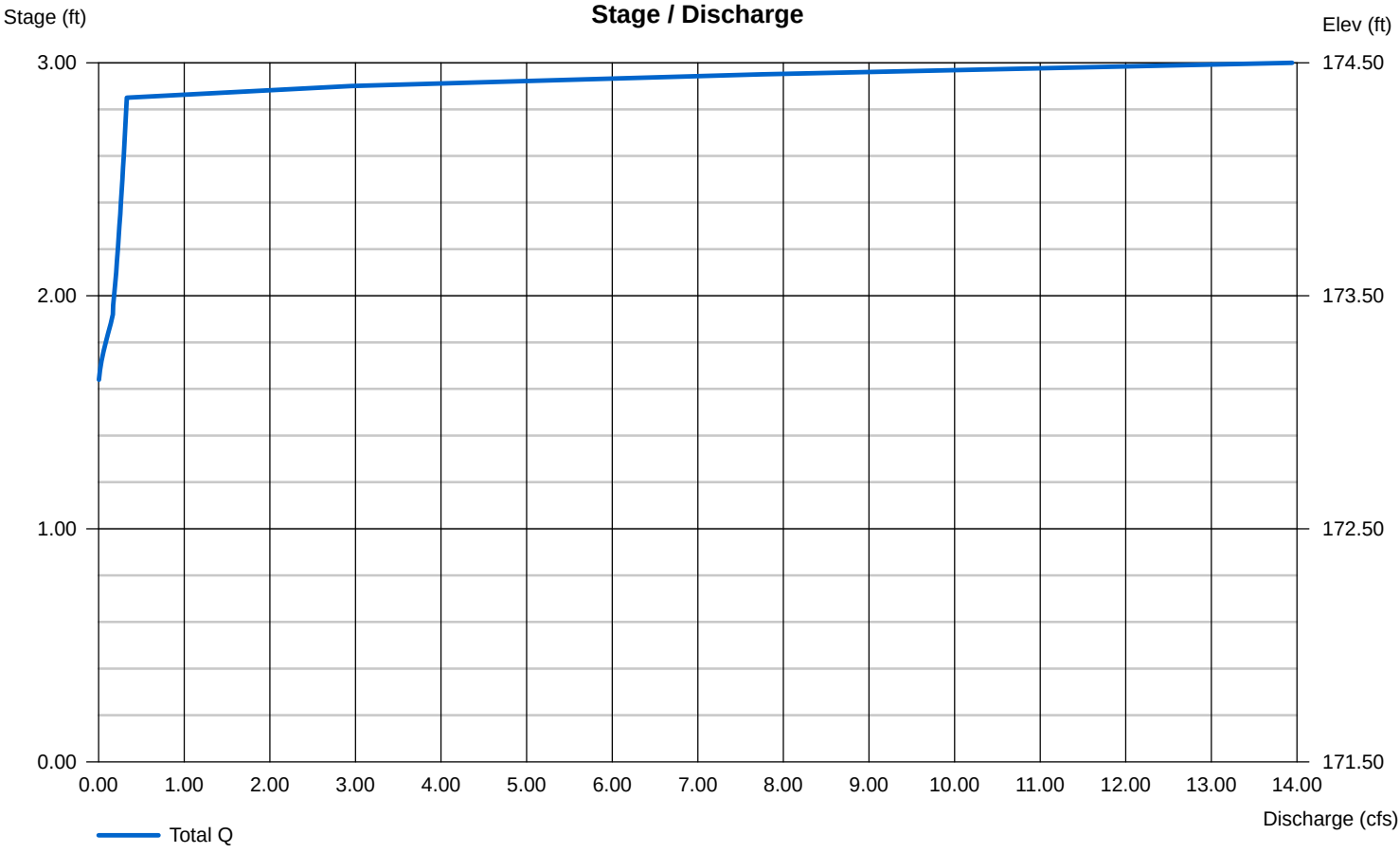
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 90.00	0.00	0.00	0.00
Crest El. (ft)	= 174.35	0.00	0.00	0.00
Weir Coeff.	= 2.60	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 Summary Report

Hydraflow Hydrographs by Intelisolve v9.24

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	41.12	2	722	115,290	------	------	------	Pre Dev Area #1
2	SCS Runoff	81.90	2	716	168,581	------	------	------	Post Dev SWM #1 Watershed
3	Reservoir	32.66	2	722	168,578	2	109.41	53,479	SWM #1 Discharge
6	SCS Runoff	88.88	2	726	308,813	------	------	------	Pre Dev. Area #2
8	SCS Runoff	35.92	2	716	79,921	------	------	------	Post Dev SWM #3 Watershed
9	Reservoir	11.71	2	724	79,916	8	163.02	33,051	SWM #3 Discharge
11	SCS Runoff	120.34	2	716	253,107	------	------	------	Post Dev SWM 2 Watershed
12	Combine	122.13	2	716	333,023	9, 11	------	------	Total Flow to SWM #2
13	Reservoir	34.25	2	726	333,018	12	150.27	100,080	Basin 2 Discharge
14	SCS Runoff	7.424	2	716	15,053	------	------	------	Post Dev Area 2 Undetained Flow
15	Combine	37.39	2	722	348,071	13, 14	------	------	Post Dev Area 2 Total Flow
17	SCS Runoff	107.34	2	724	336,979	------	------	------	Pre Dev. Area #3
18	SCS Runoff	134.74	2	724	427,374	------	------	------	Post Dev SWM #4 Watershed
19	Reservoir	86.43	2	734	427,367	18	160.41	115,979	SWM #4 Discharge
22	SCS Runoff	47.44	2	726	152,270	------	------	------	Pre Dev. Area #4
23	Reservoir	17.31	2	742	136,301	22	173.26	63,475	Existing Pond Discharg
24	SCS Runoff	83.29	2	724	260,548	------	------	------	Post Dev SWM #5 Watershed
25	Reservoir	12.39	2	754	185,380	24	174.49	141,850	Modified Pond Discharg

Hydrograph Report

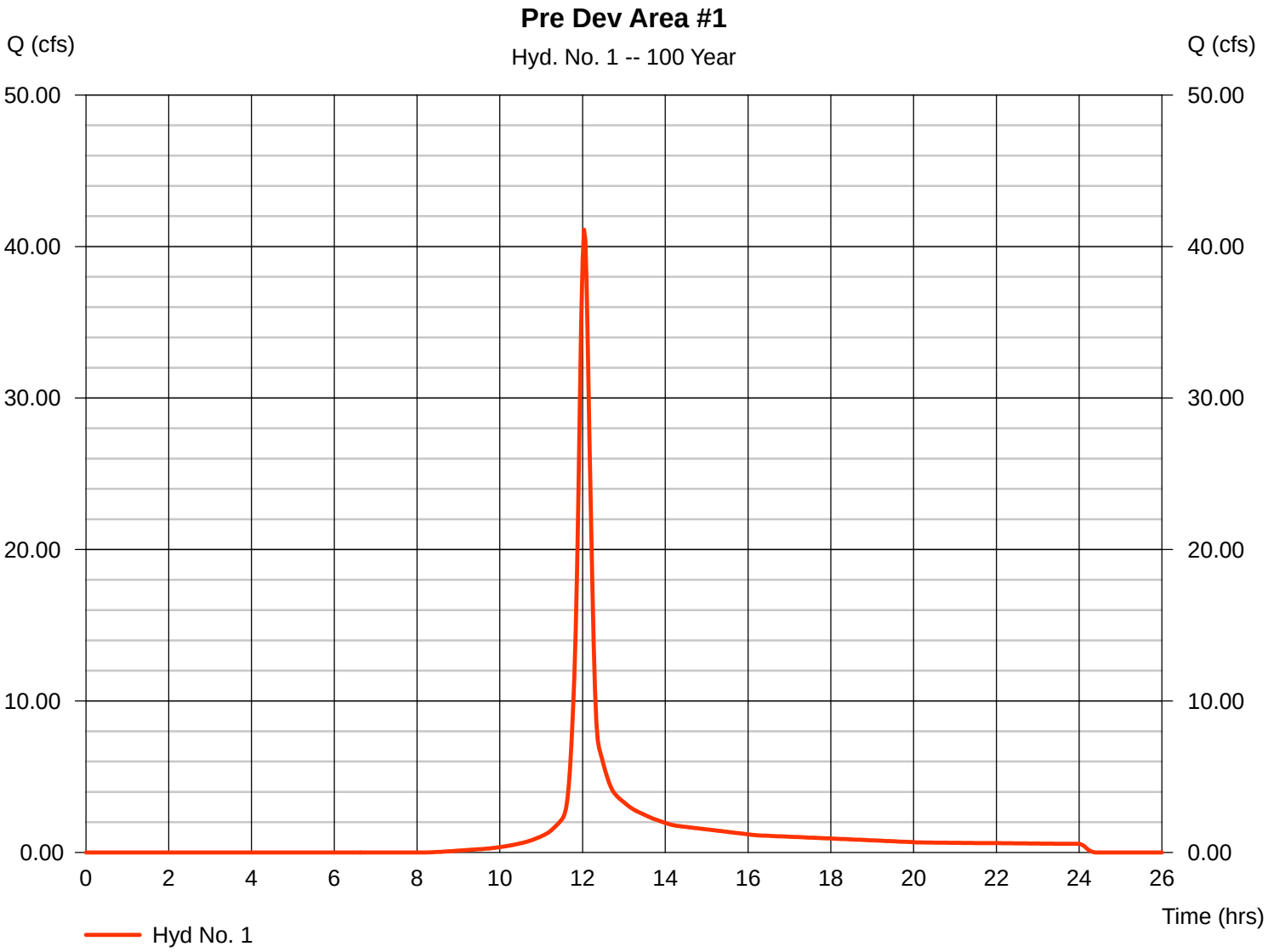
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 1

Pre Dev Area #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.12 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	115,290 cuft
Drainage area	=	8.800 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.10 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.620 x 58) + (8.180 x 71)] / 8.800



Hydrograph Report

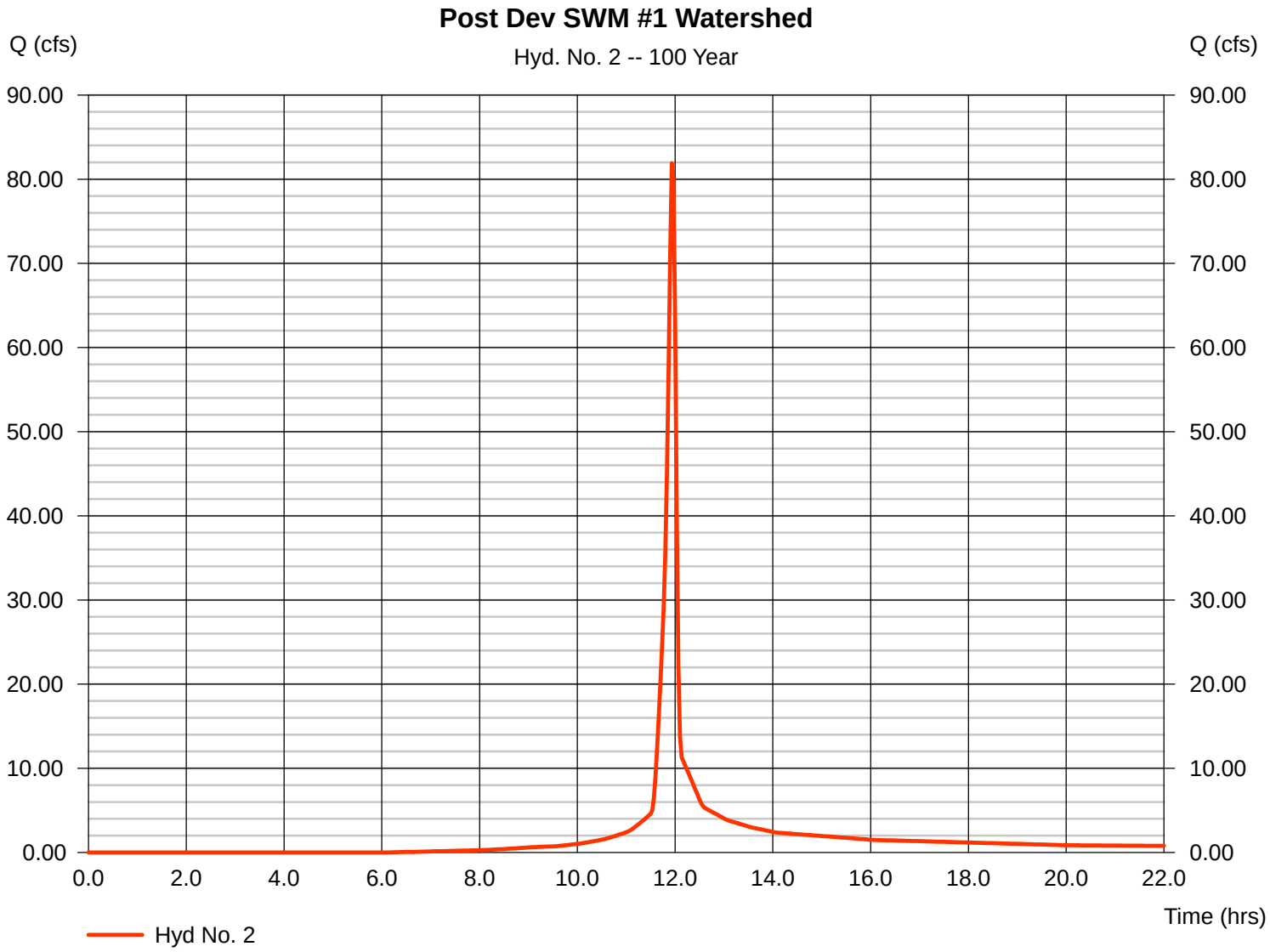
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 2

Post Dev SWM #1 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	81.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	168,581 cuft
Drainage area	=	10.850 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = + (8.950 x 74) + (0.180 x 85) + (0.060 x 89) + (1.660 x 98)] / 10.850



Hydrograph Report

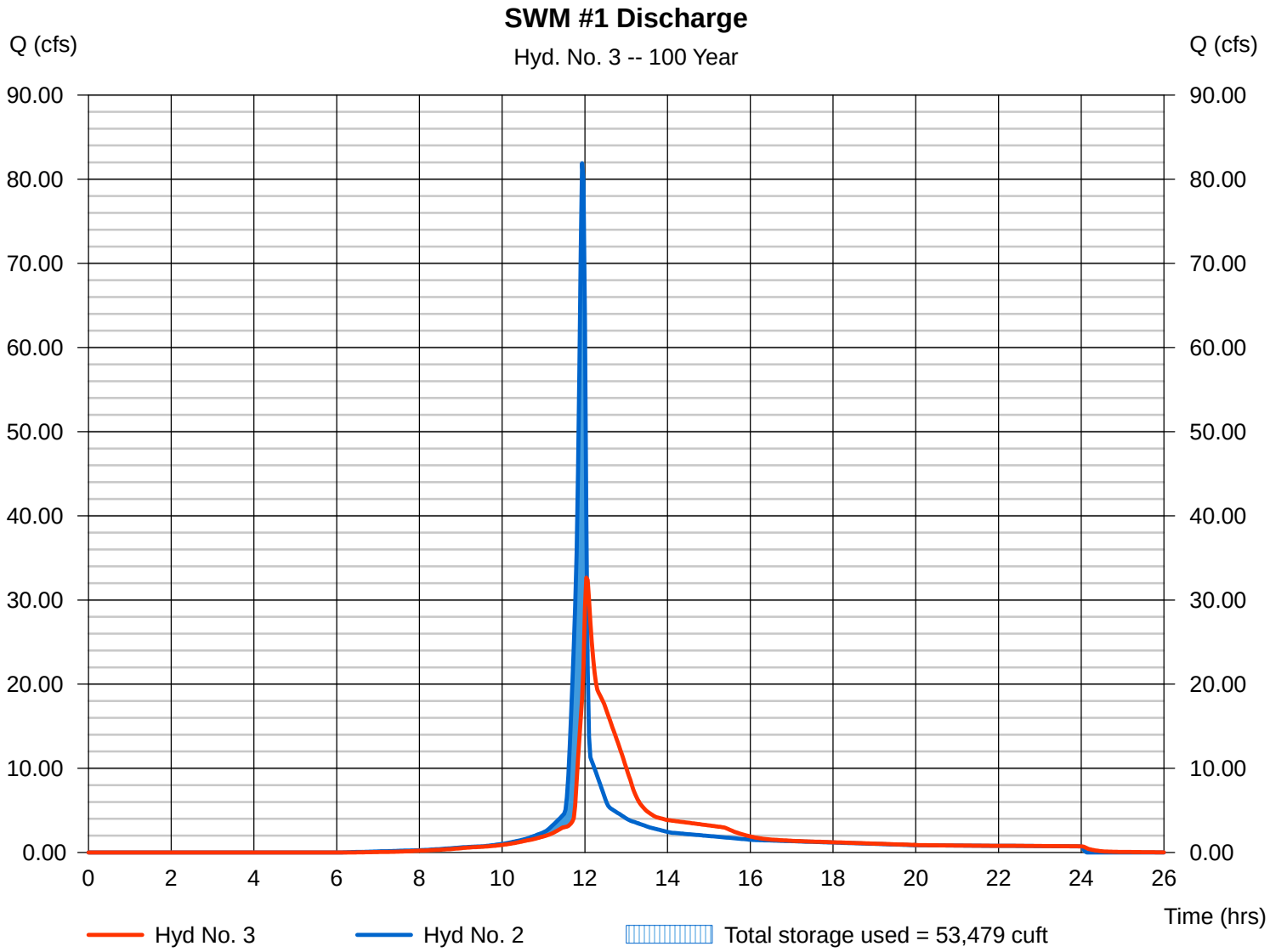
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 3

SWM #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	32.66 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	168,578 cuft
Inflow hyd. No.	=	2 - Post Dev SWM #1 Watershed	Max. Elevation	=	109.41 ft
Reservoir name	=	Detention Basin 1	Max. Storage	=	53,479 cuft

Storage Indication method used.



Hydrograph Report

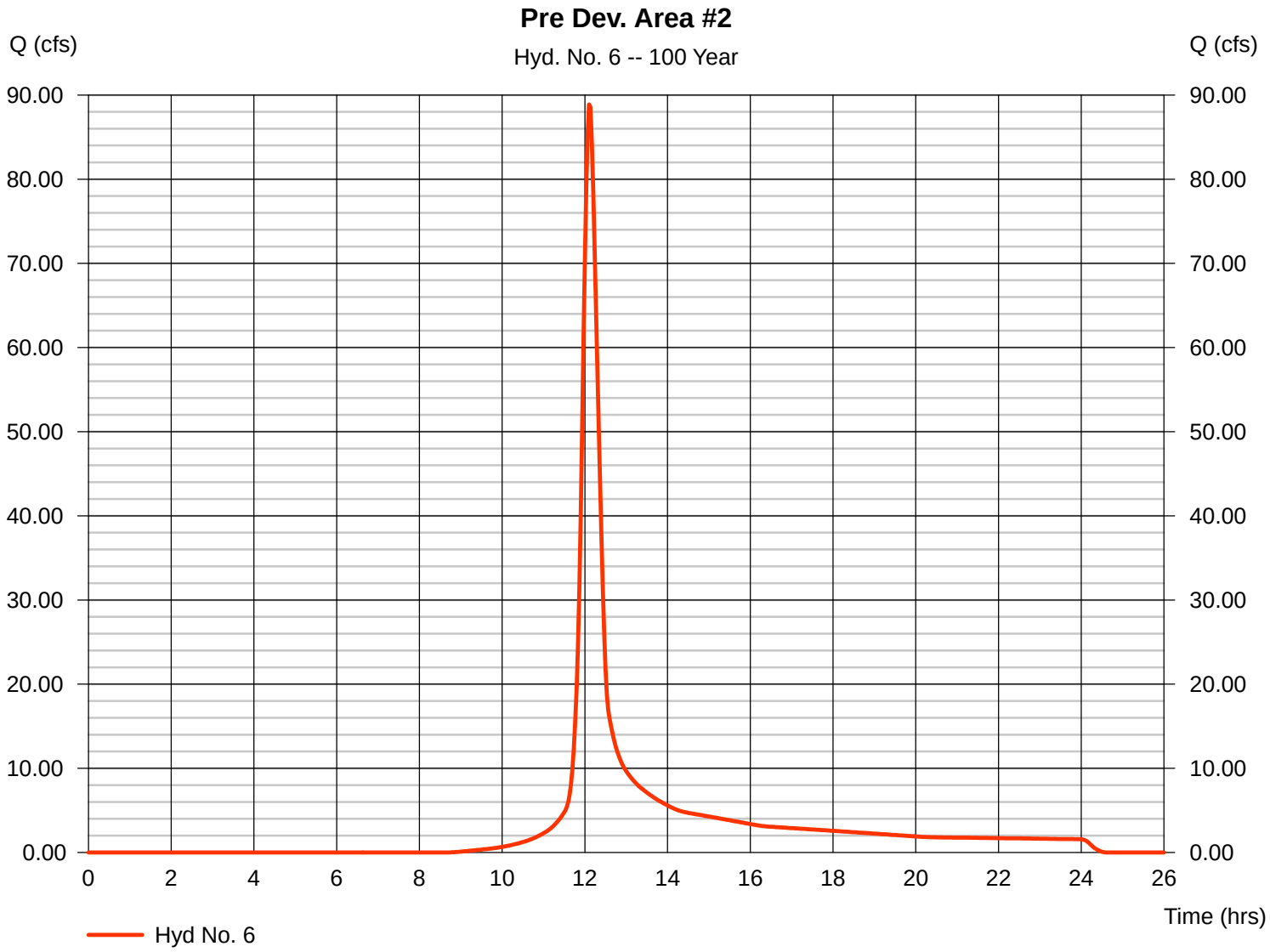
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 6

Pre Dev. Area #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	88.88 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	308,813 cuft
Drainage area	=	23.940 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.50 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(5.130 x 58) + (18.810 x 71)] / 23.940



Hydrograph Report

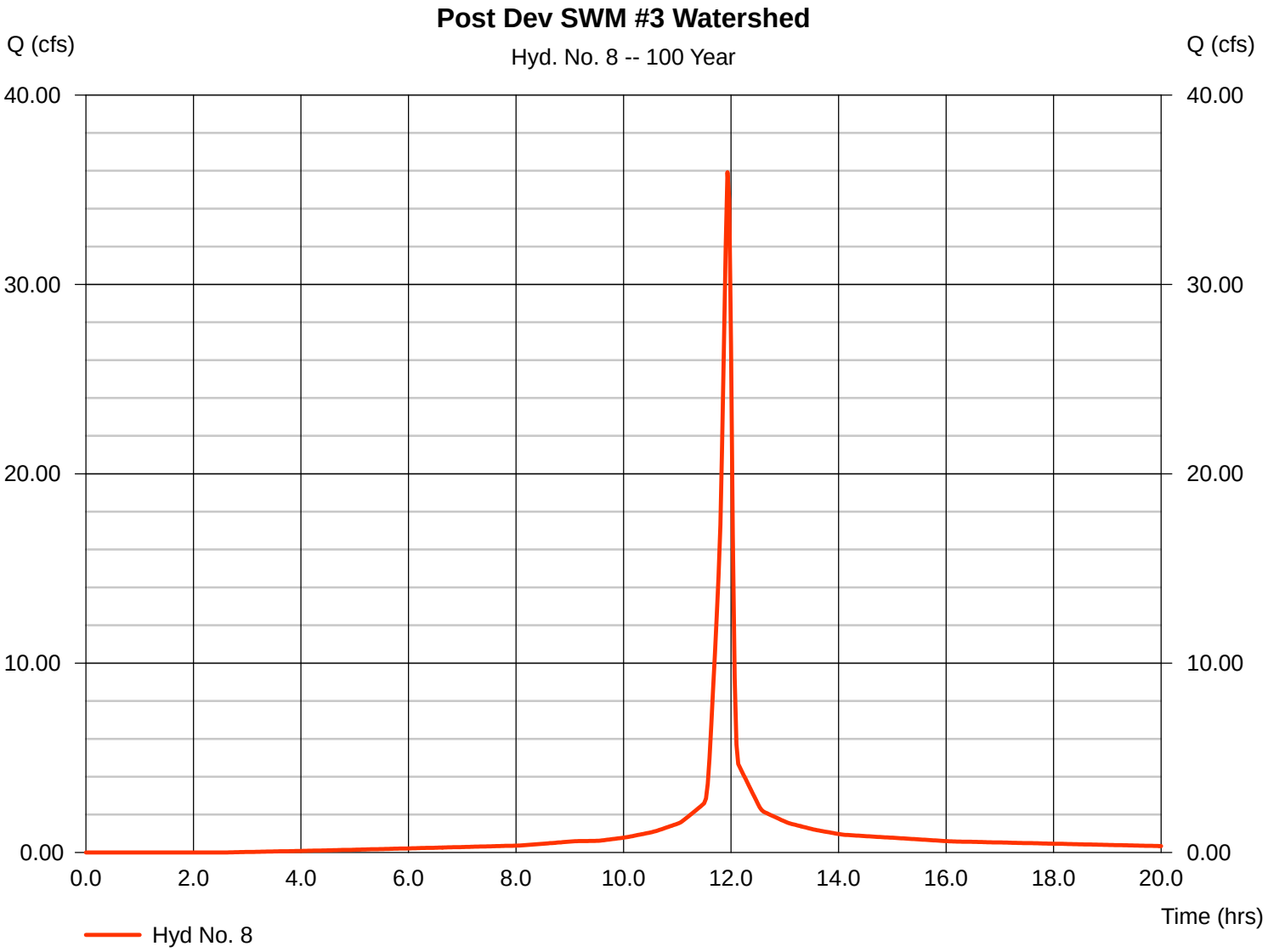
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 8

Post Dev SWM #3 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	79,921 cuft
Drainage area	=	3.890 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.200 x 74) + (2.690 x 98)] / 3.890



Hydrograph Report

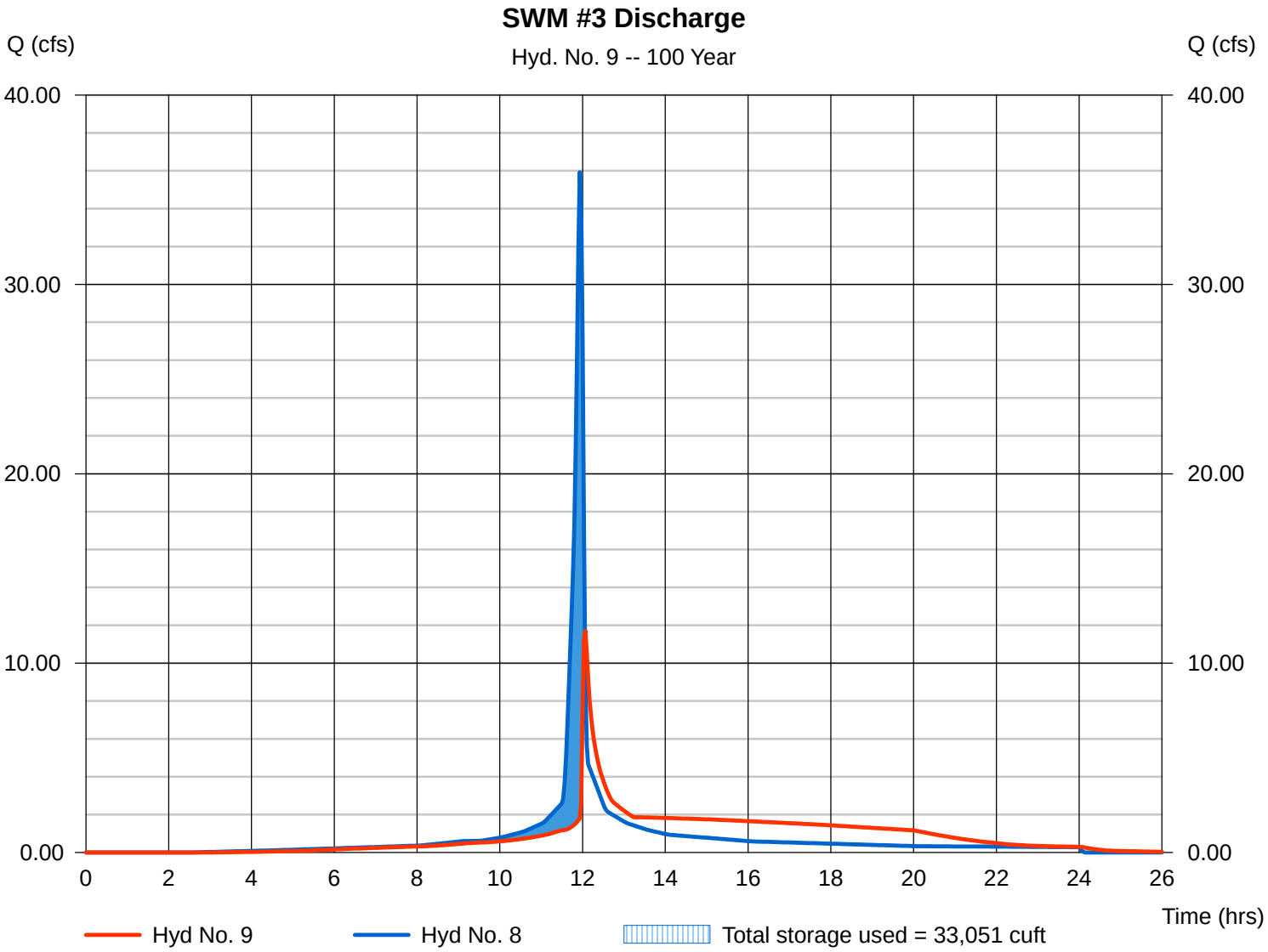
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 9

SWM #3 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	11.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	79,916 cuft
Inflow hyd. No.	=	8 - Post Dev SWM #3 Watershed	Max. Elevation	=	163.02 ft
Reservoir name	=	Detention Basin 3	Max. Storage	=	33,051 cuft

Storage Indication method used.



Hydrograph Report

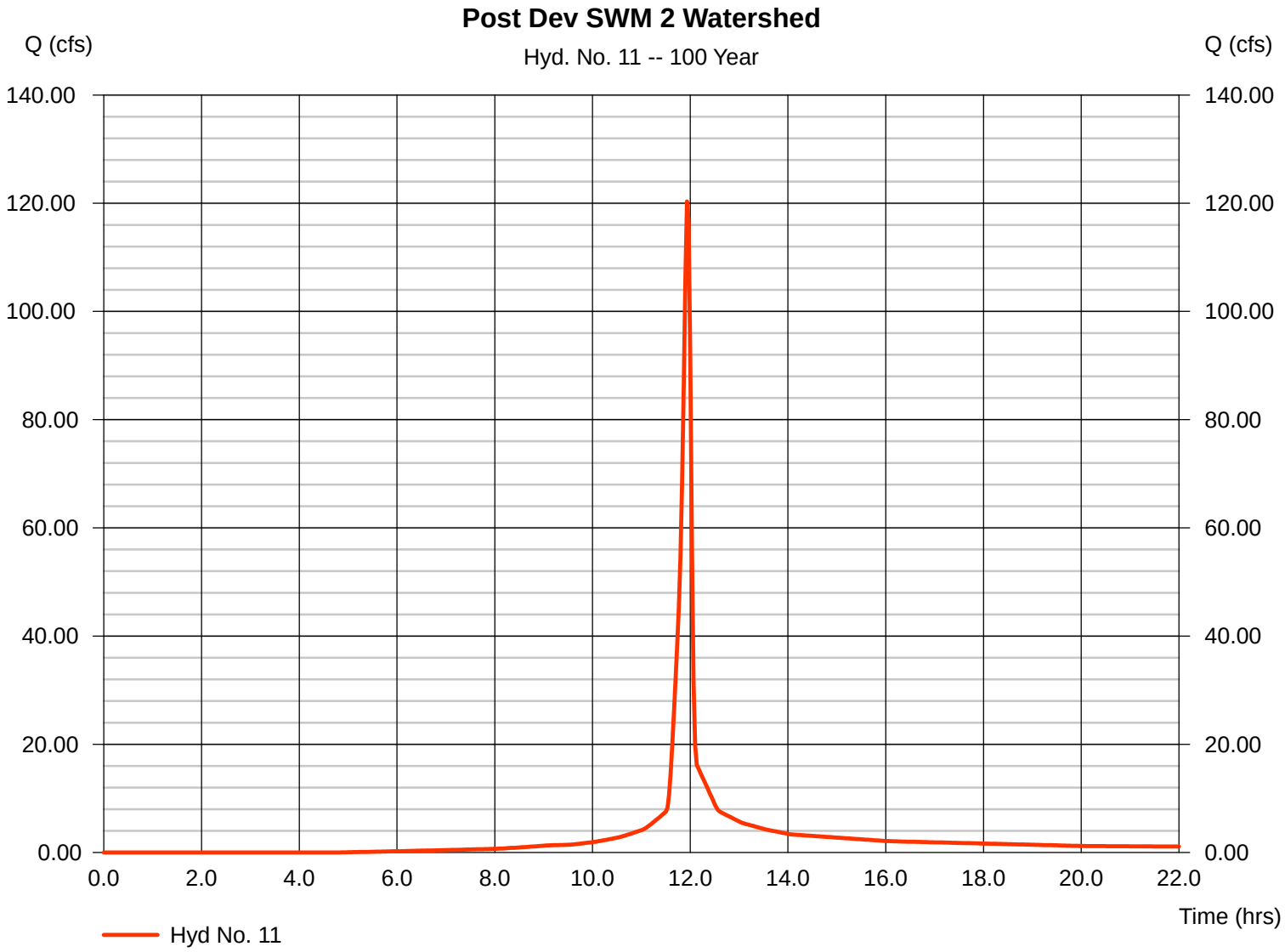
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 11

Post Dev SWM 2 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	120.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	253,107 cuft
Drainage area	=	14.520 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.400 x 61) + (6.490 x 74) + (0.080 x 85) + (0.390 x 89) + (6.160 x 98)] / 14.520

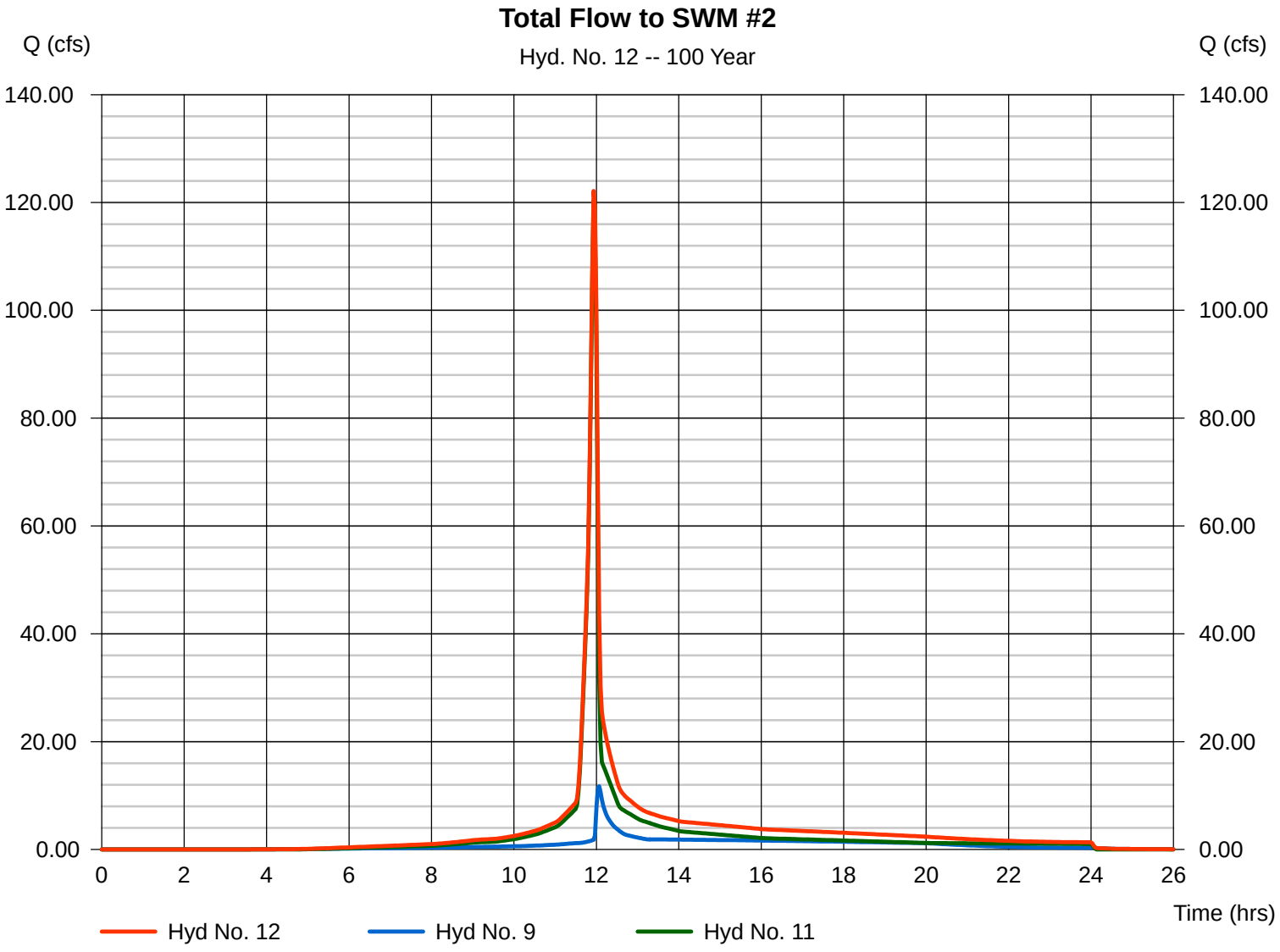


Hydrograph Report

Hyd. No. 12

Total Flow to SWM #2

Hydrograph type	=	Combine	Peak discharge	=	122.13 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	333,023 cuft
Inflow hyds.	=	9, 11	Contrib. drain. area	=	14.520 ac



Hydrograph Report

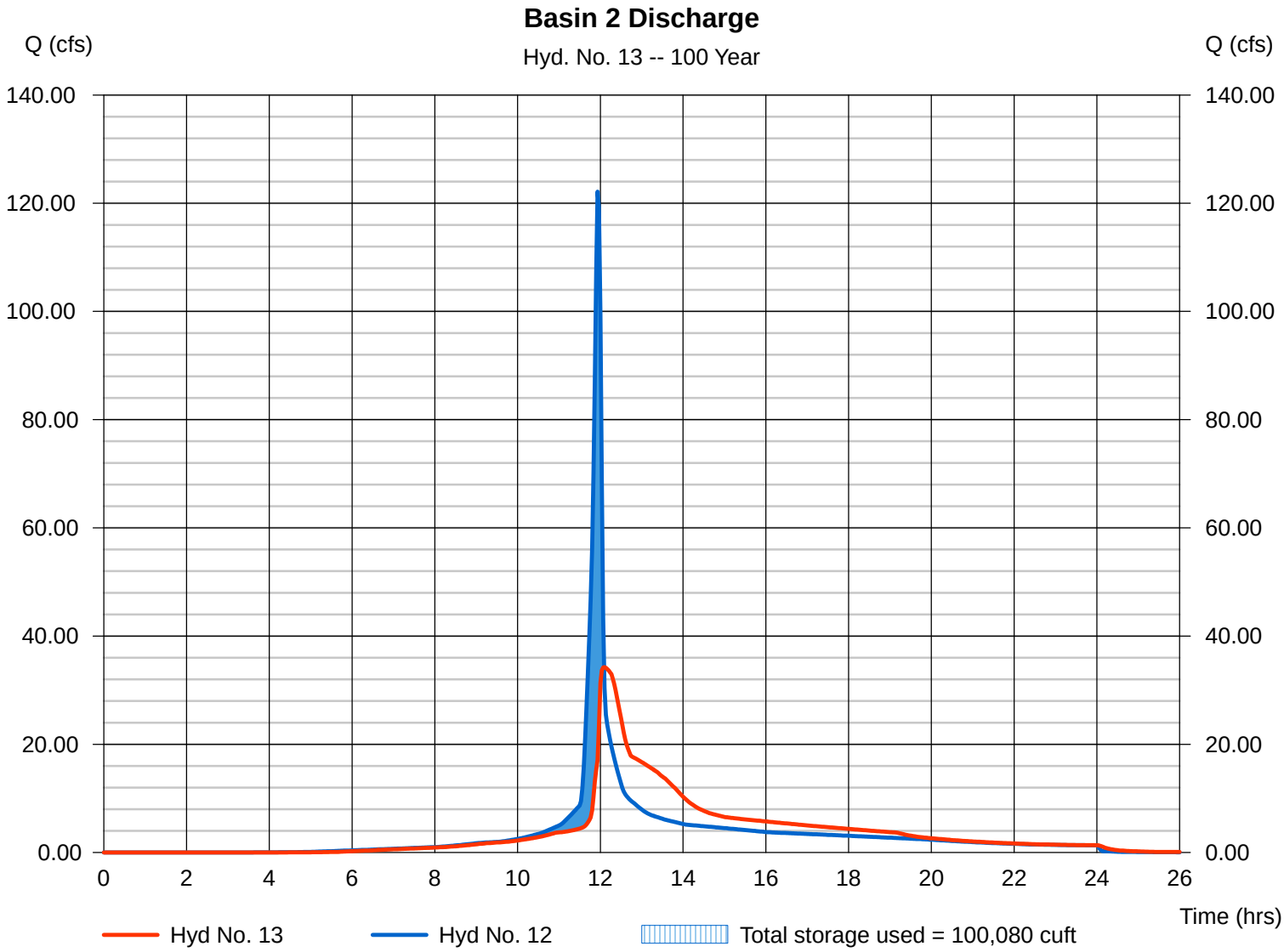
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 13

Basin 2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	34.25 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	333,018 cuft
Inflow hyd. No.	=	12 - Total Flow to SWM #2	Max. Elevation	=	150.27 ft
Reservoir name	=	Detention Basin 2	Max. Storage	=	100,080 cuft

Storage Indication method used.



Hydrograph Report

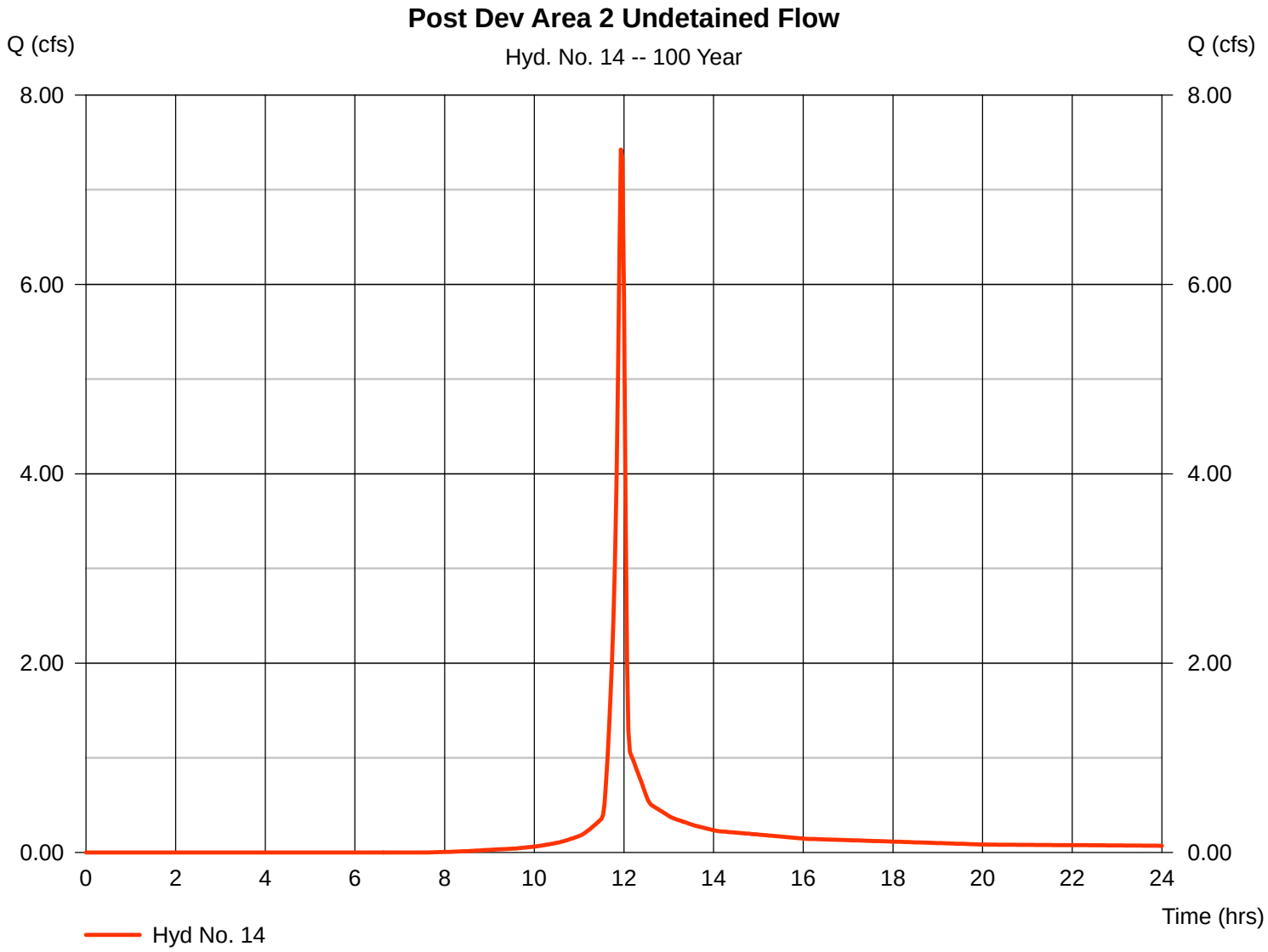
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 14

Post Dev Area 2 Undetained Flow

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.424 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	15,053 cuft
Drainage area	=	1.130 ac	Curve number	=	72*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.800 x 74) + (0.330 x 98)] / 1.130

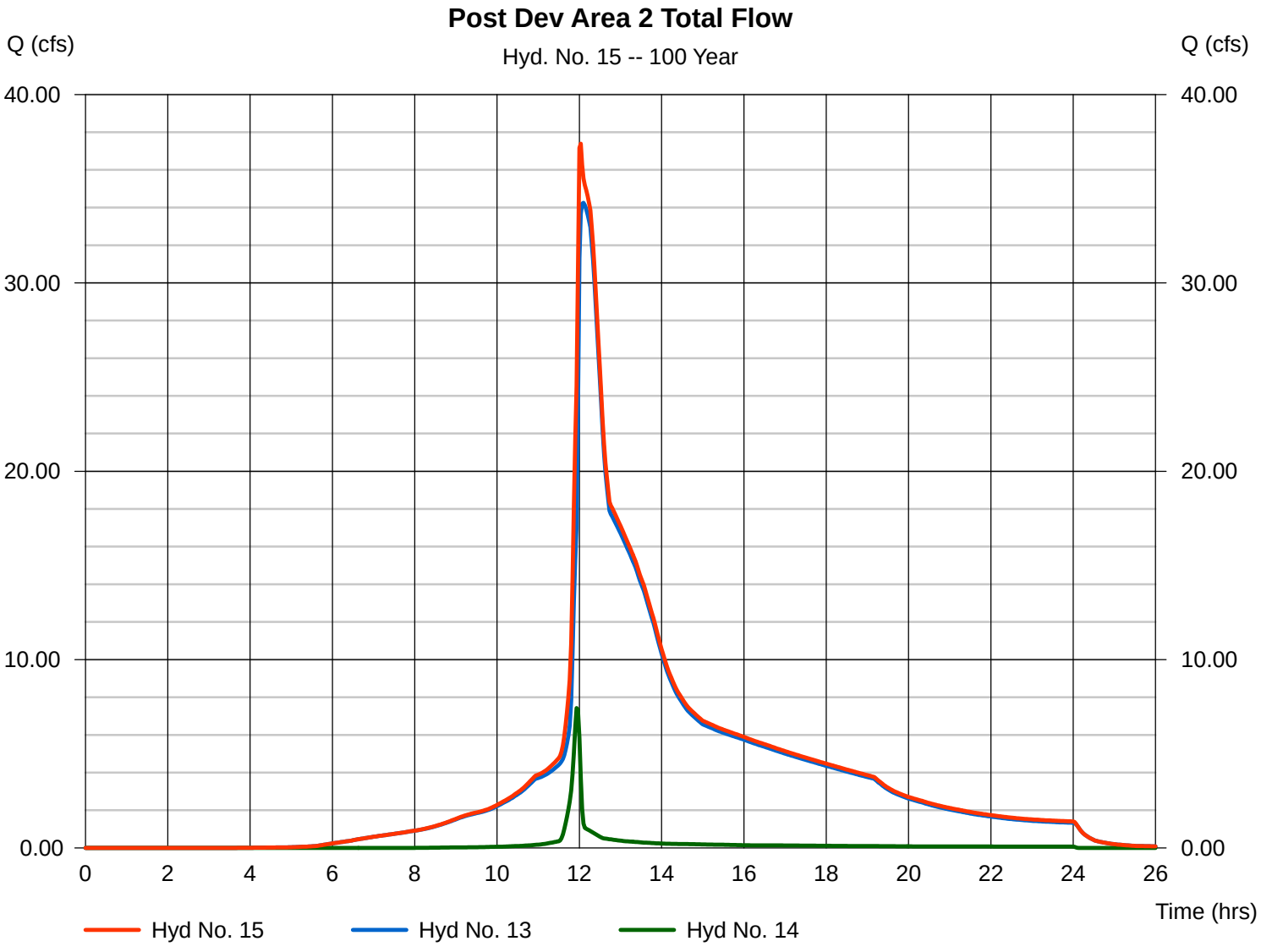


Hydrograph Report

Hyd. No. 15

Post Dev Area 2 Total Flow

Hydrograph type	=	Combine	Peak discharge	=	37.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	348,071 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	1.130 ac



Hydrograph Report

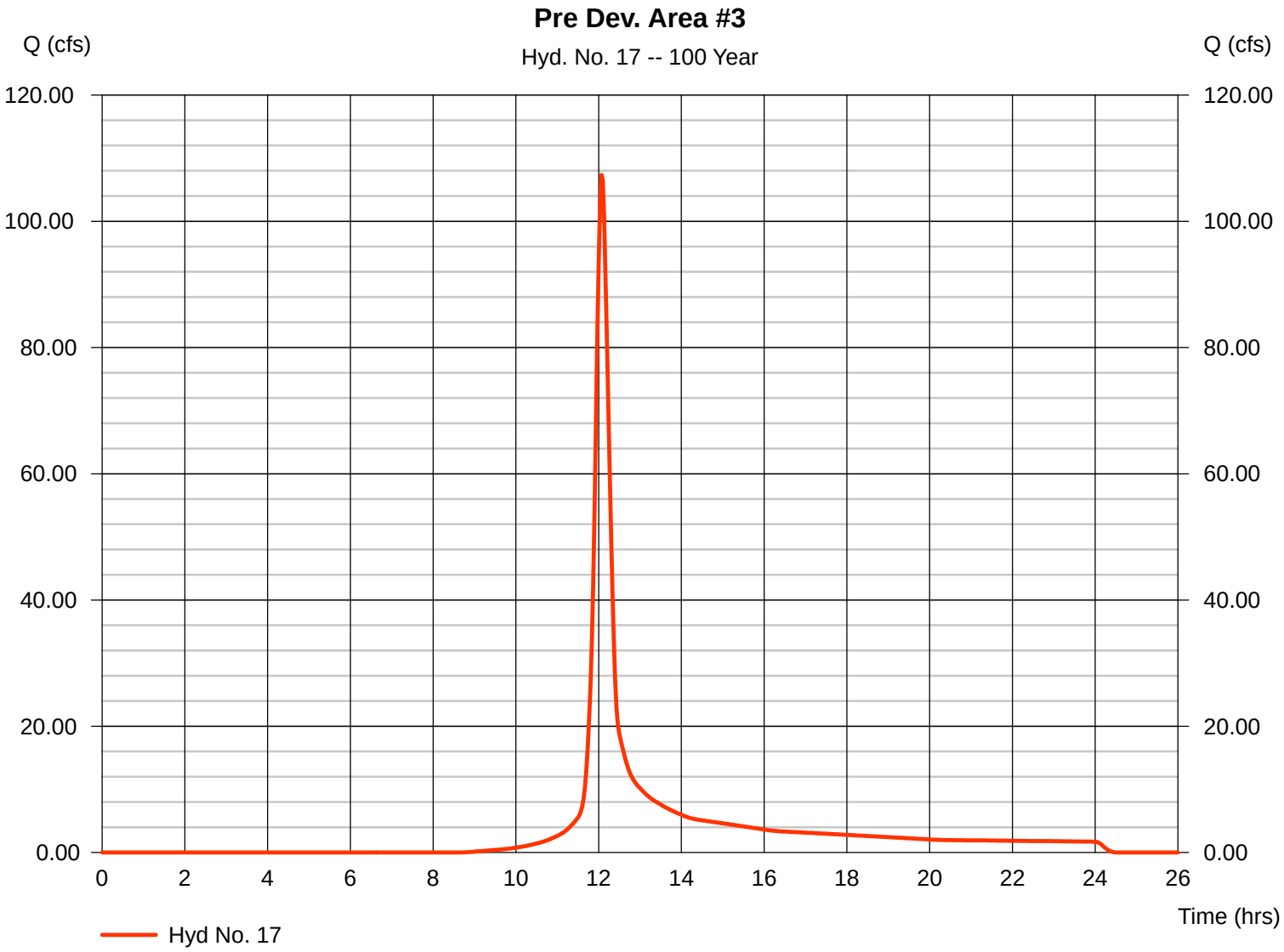
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 17

Pre Dev. Area #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	107.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	336,979 cuft
Drainage area	=	26.590 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.00 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(5.590 x 58) + (21.000 x 71)] / 26.590



Hydrograph Report

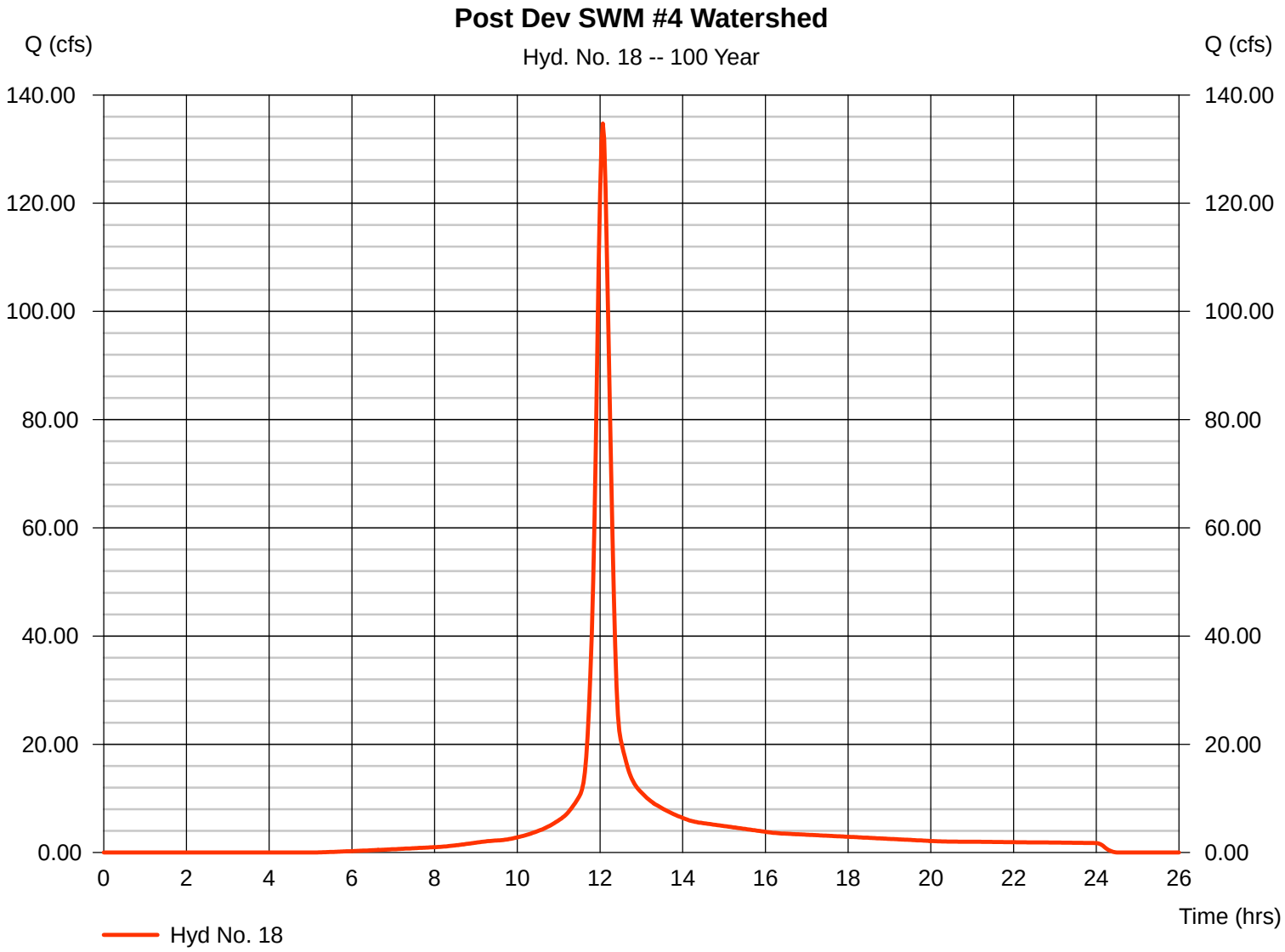
Hydraflow Hydrographs by Intelisolve v9.24 — Thursday, Feb 26, 2015

Hyd. No. 18

Post Dev SWM #4 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	134.74 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	427,374 cuft
Drainage area	=	23.500 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.30 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.700 x 61) + (10.240 x 74) + (9.560 x 98)] / 23.500



Hydrograph Report

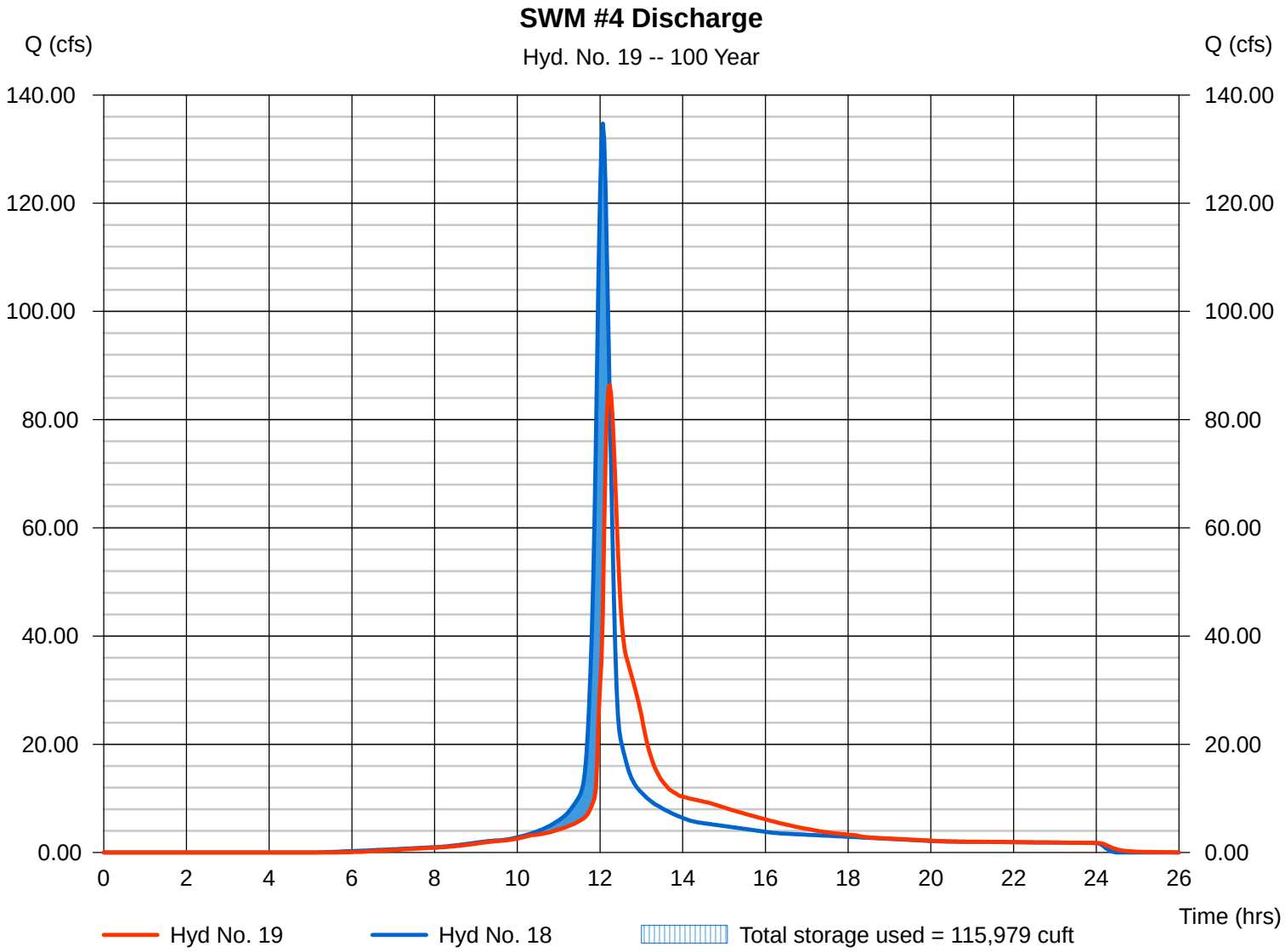
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 19

SWM #4 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	86.43 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	427,367 cuft
Inflow hyd. No.	=	18 - Post Dev SWM #4 Watershed	Max. Elevation	=	160.41 ft
Reservoir name	=	Detention Basin #4	Max. Storage	=	115,979 cuft

Storage Indication method used.



Hydrograph Report

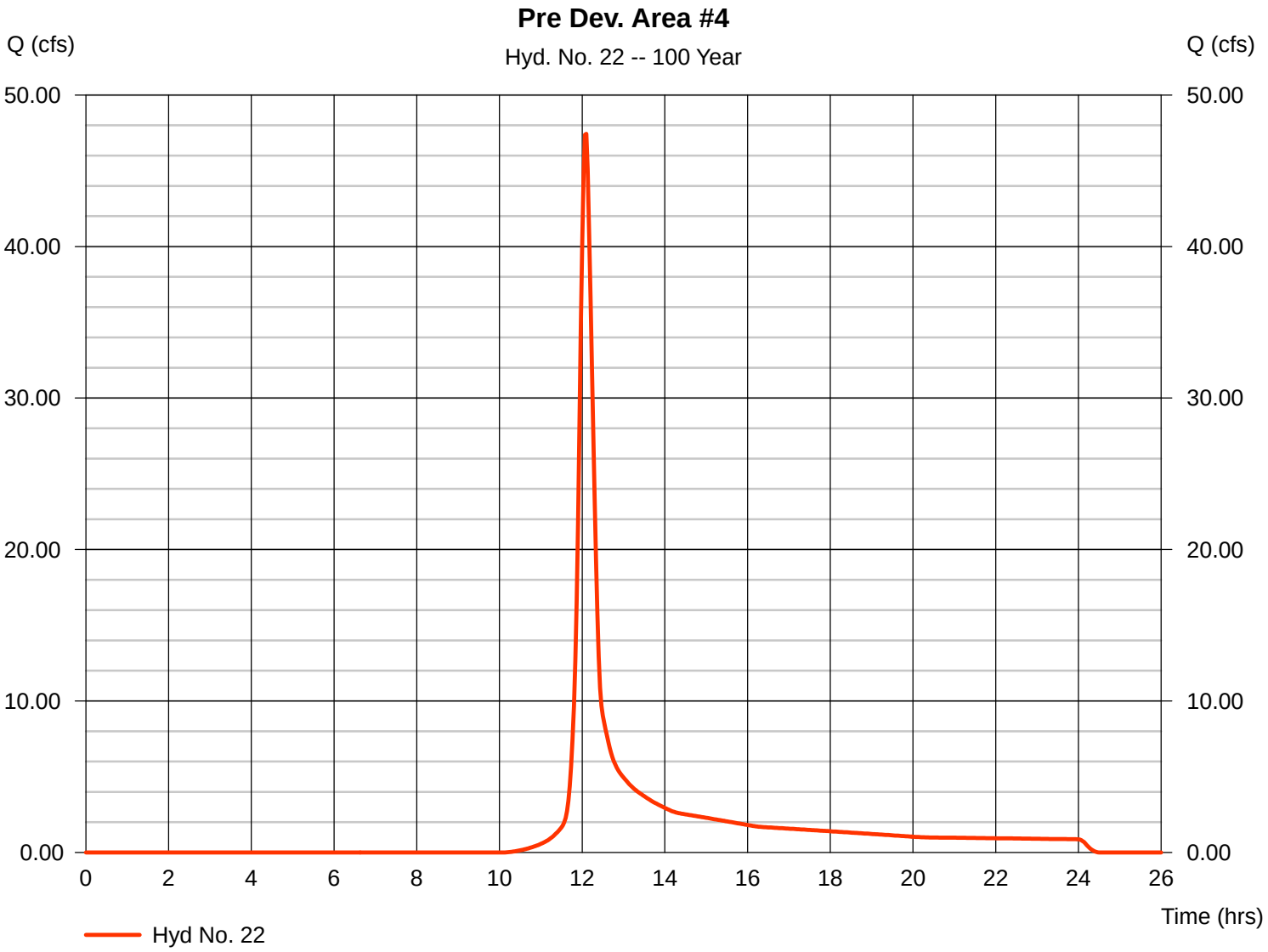
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 22

Pre Dev. Area #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.44 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	152,270 cuft
Drainage area	=	15.120 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	17.40 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(11.060 x 58) + (4.060 x 71)] / 15.120



Hydrograph Report

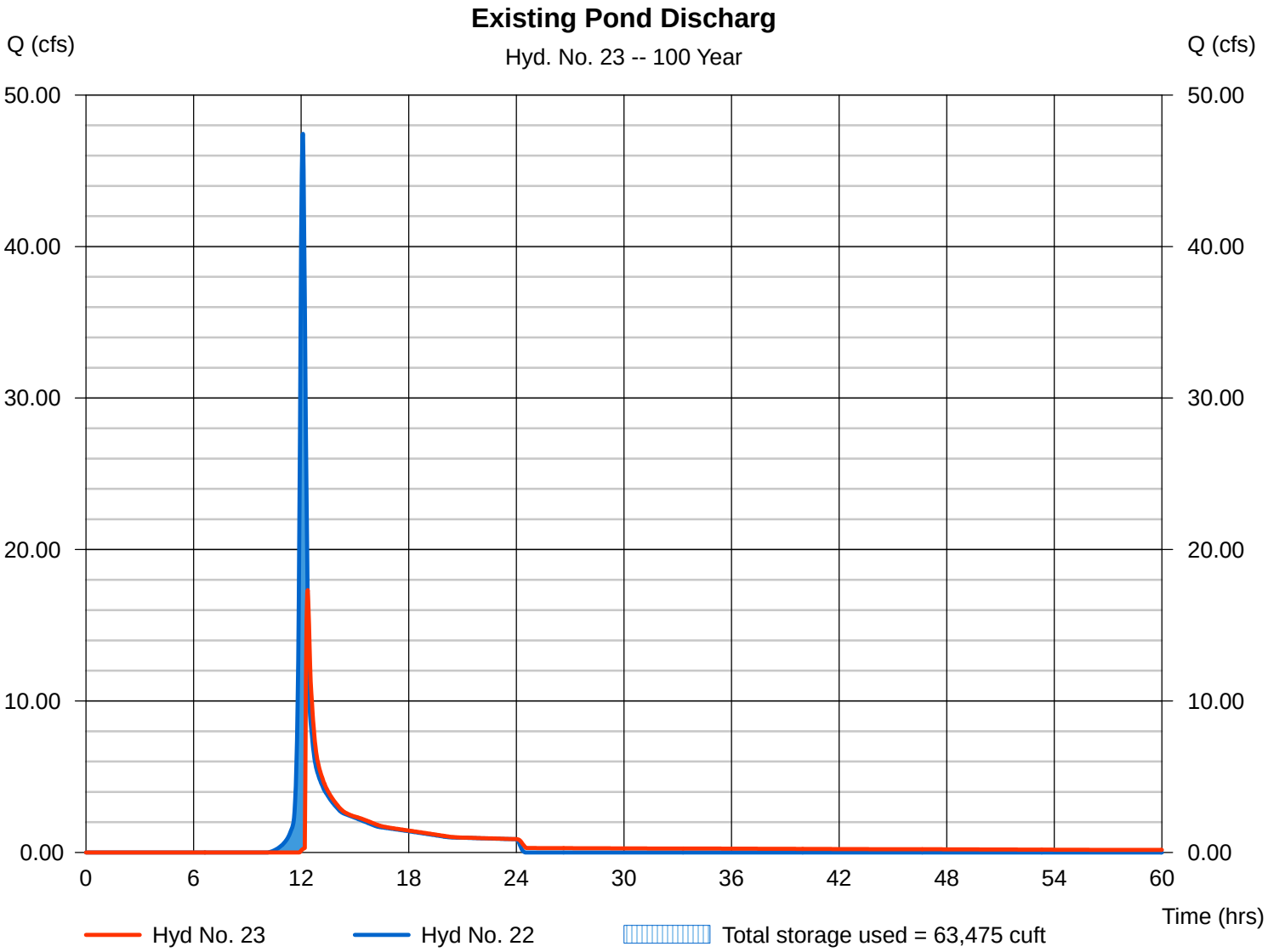
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 23

Existing Pond Discharg

Hydrograph type	=	Reservoir	Peak discharge	=	17.31 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.37 hrs
Time interval	=	2 min	Hyd. volume	=	136,301 cuft
Inflow hyd. No.	=	22 - Pre Dev. Area #4	Max. Elevation	=	173.26 ft
Reservoir name	=	Existing Pond	Max. Storage	=	63,475 cuft

Storage Indication method used.



Hydrograph Report

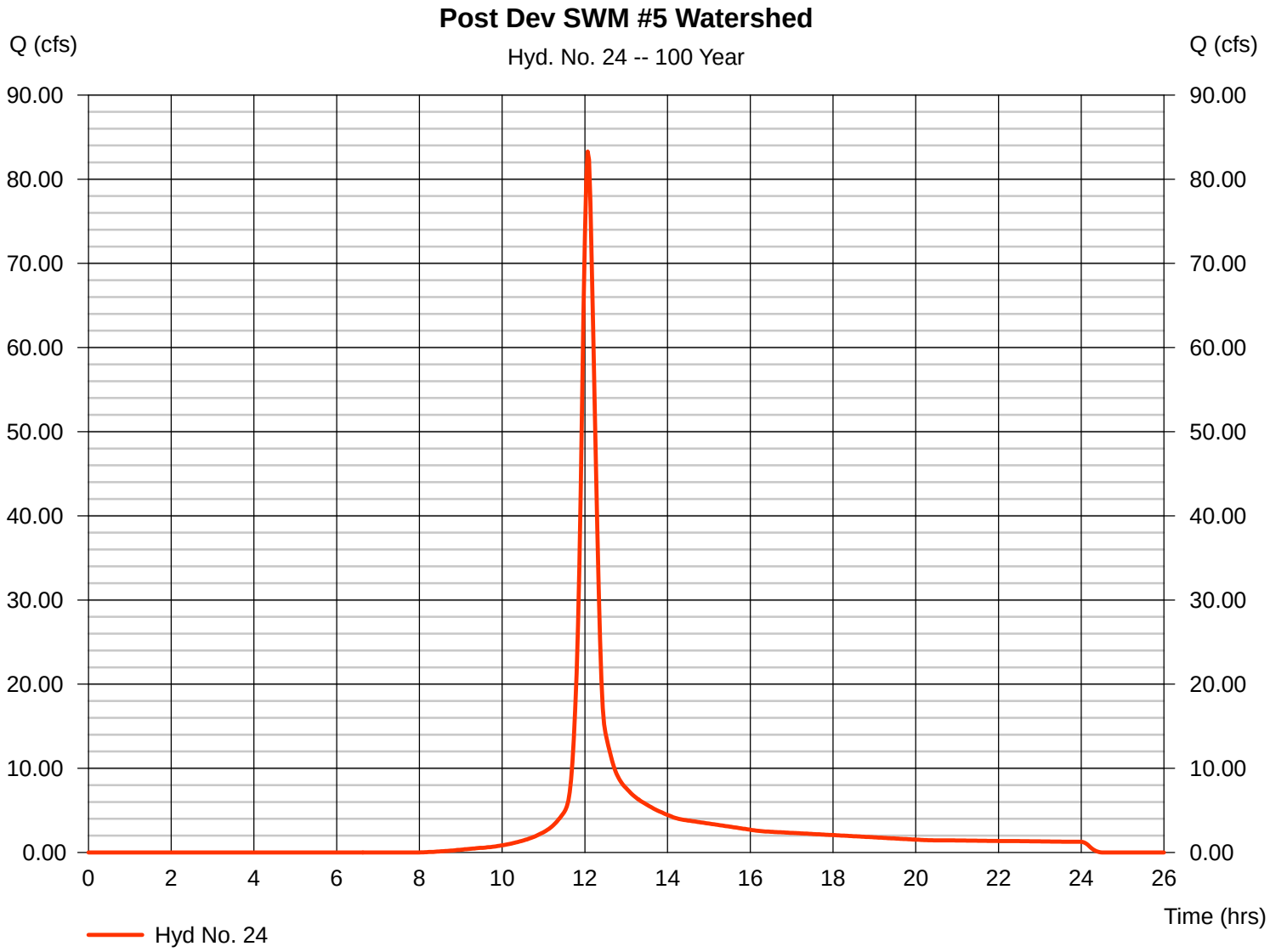
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 24

Post Dev SWM #5 Watershed

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.29 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	260,548 cuft
Drainage area	=	18.850 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	17.40 min
Total precip.	=	7.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(11.790 x 61) + (2.900 x 74) + (0.240 x 85) + (3.920 x 98)] / 18.850



Hydrograph Report

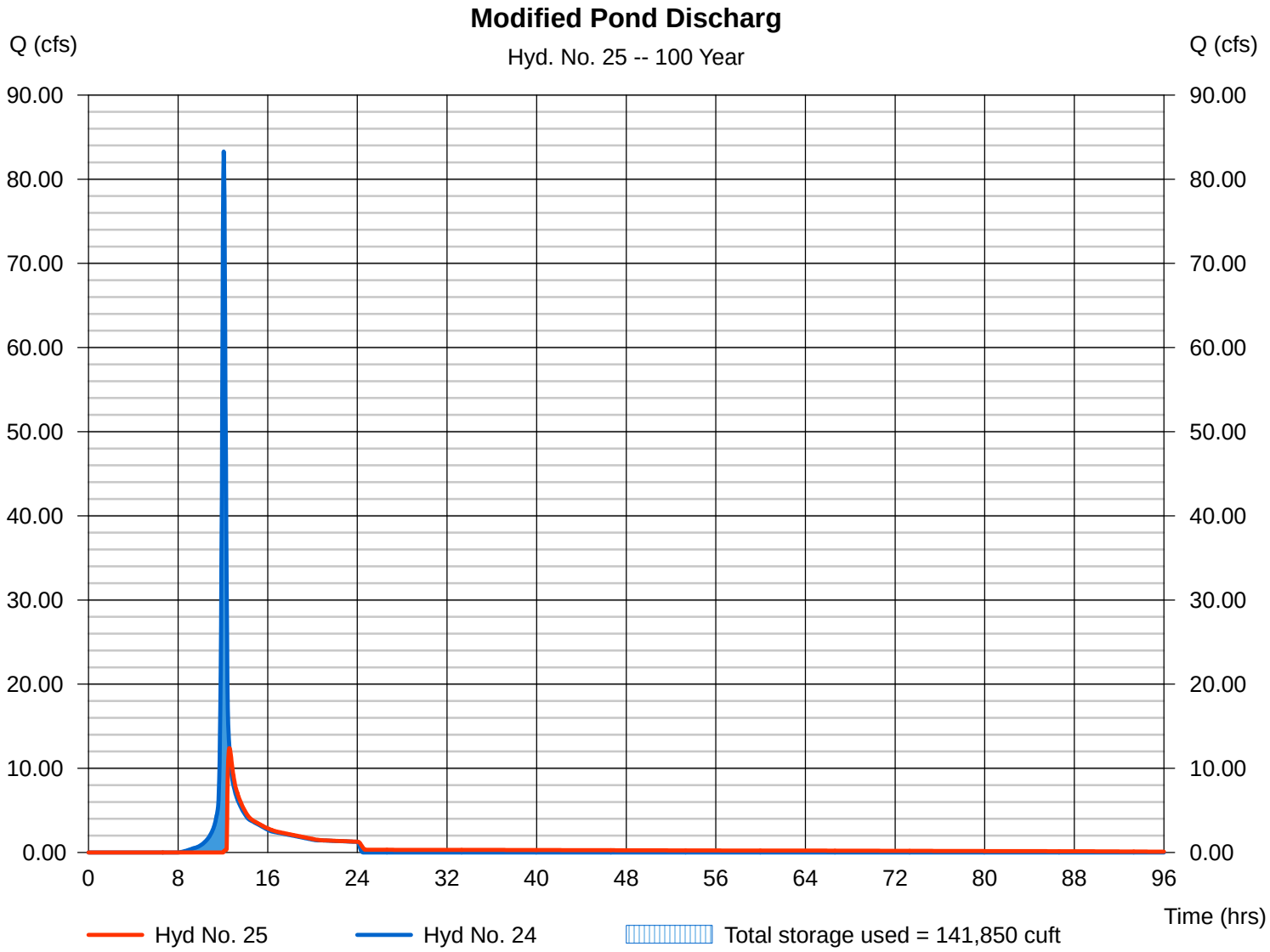
Hydraflow Hydrographs by Intelisolve v9.24 Thursday, Feb 26, 2015

Hyd. No. 25

Modified Pond Discharg

Hydrograph type	=	Reservoir	Peak discharge	=	12.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.57 hrs
Time interval	=	2 min	Hyd. volume	=	185,380 cuft
Inflow hyd. No.	=	24 - Post Dev SWM #5 Watershed	Max. Elevation	=	174.49 ft
Reservoir name	=	Modified Pond	Max. Storage	=	141,850 cuft

Storage Indication method used.



SWM #1

EMERGENCY SPILLWAY DESIGN

Q = 3.1 x L x H^1.5

Q = 100 Year Post Dev. Flow =	80.19	cfs			
H = Head =	0.5	feet			
Solve for:					
L = Length of the Spillway =	73.17	feet	use	74	feet

Top of Berm Elev.:	110.75			
100 Year Water Surface Elev.:	109.20			
Set spillway at :	109.25			
Provide one foot of freeboard:	109.75	+ one foot =	110.75	Min.

ANTI-SEEP COLLLAR DESIGN

BASIN 1

Ls = Y x (Z+4) x (1+slope/ (0.25 - slope))

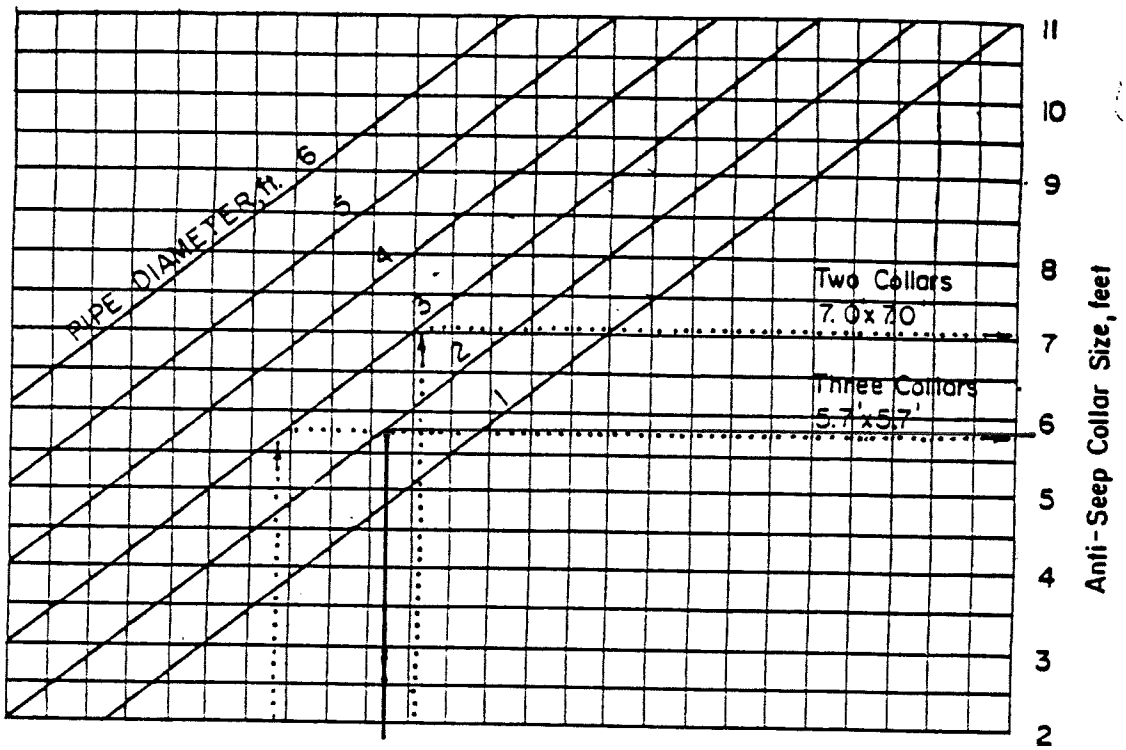
Y =	7.2
Z =	3
Slope =	0.01

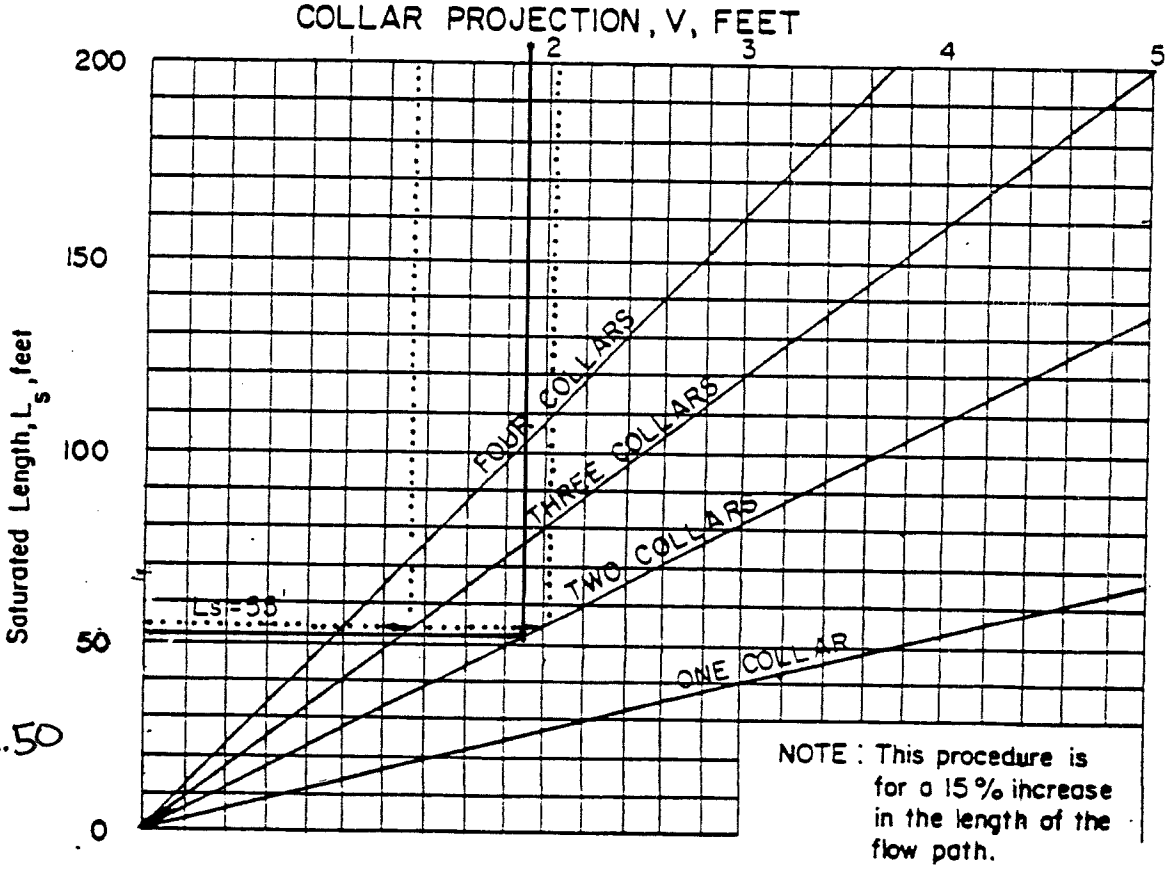
Solve for:

Ls = Saturated Length = 52.50

Use 2 5.7' x 5.7' collars at
17.5' from the outlet

ANTI-SEEP COLLAR DESIGN





$L_S = 52.50$

SWM #1

Two Collars 5.7' x 5.7'

SWM #2

EMERGENCY SPILLWAY DESIGN

Q = 3.1 x L x H^1.5

Q = 100 Year Post Dev. Flow =	122.13	cfs			
H = Head =	0.85	feet			
Solve for:					
L = Length of the Spillway =	50.27	feet	use	51	feet

Top of Berm Elev.:	152.00
100 Year Water Surface Elev.:	150.12
Set spillway at :	150.15

Provide one foot of freeboard: 151 + one foot = 152 Min.

ANTI-SEEP COLLLAR DESIGN

Ls = Y x (Z+4) x (1+slope/ (0.25 - slope))

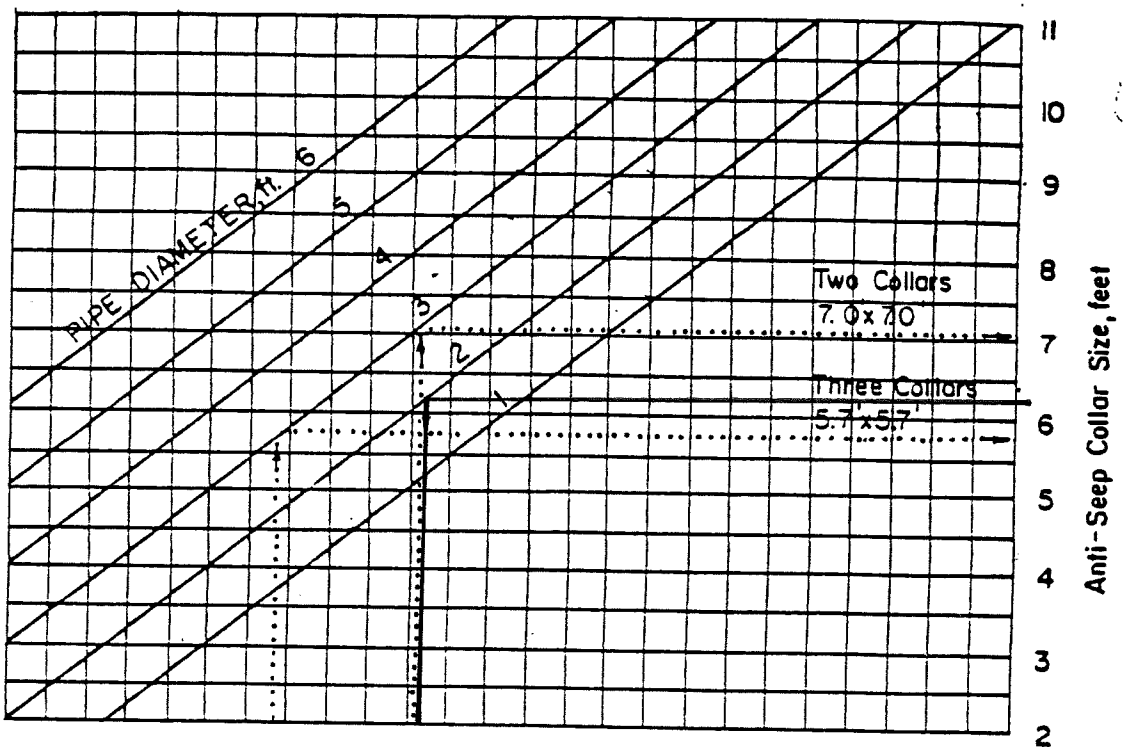
Y =	7.9
Z =	3
Slope =	0.0063

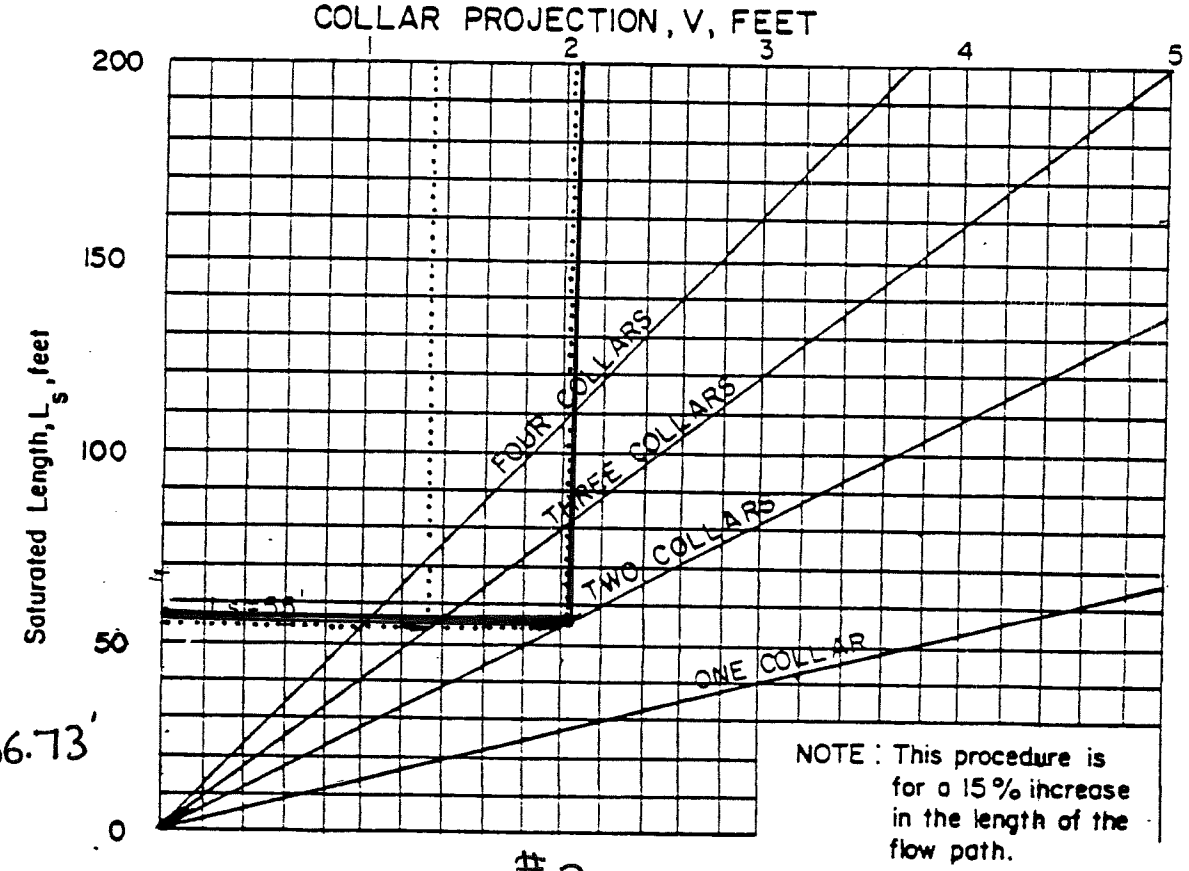
Solve for:

Ls = Saturated Length = 56.73

Use 2 6.25' x 6.25' collars at
18.91' from the outlet

ANTI-SEEP COLLAR DESIGN





$L_s = 56.73'$

SWM #2

Two Collars 6.25' x 6.25'

SWM #3

EMERGENCY SPILLWAY DESIGN

Q = 3.1 x L x H^1.5

Q = 100 Year Post Dev. Flow =	35.92	cfs			
H = Head =	0.95	feet			
Solve for:					
L = Length of the Spillway =	12.51	feet	use	15	feet

Top of Berm Elev.:	165.00
100 Year Water Surface Elev.:	163.02
Set spillway at :	163.05

Provide one foot of freeboard: 164 + one foot = 165 Min.

ANTI-SEEP COLLLAR DESIGN

Ls = Y x (Z+4) x (1+slope/ (0.25 - slope))

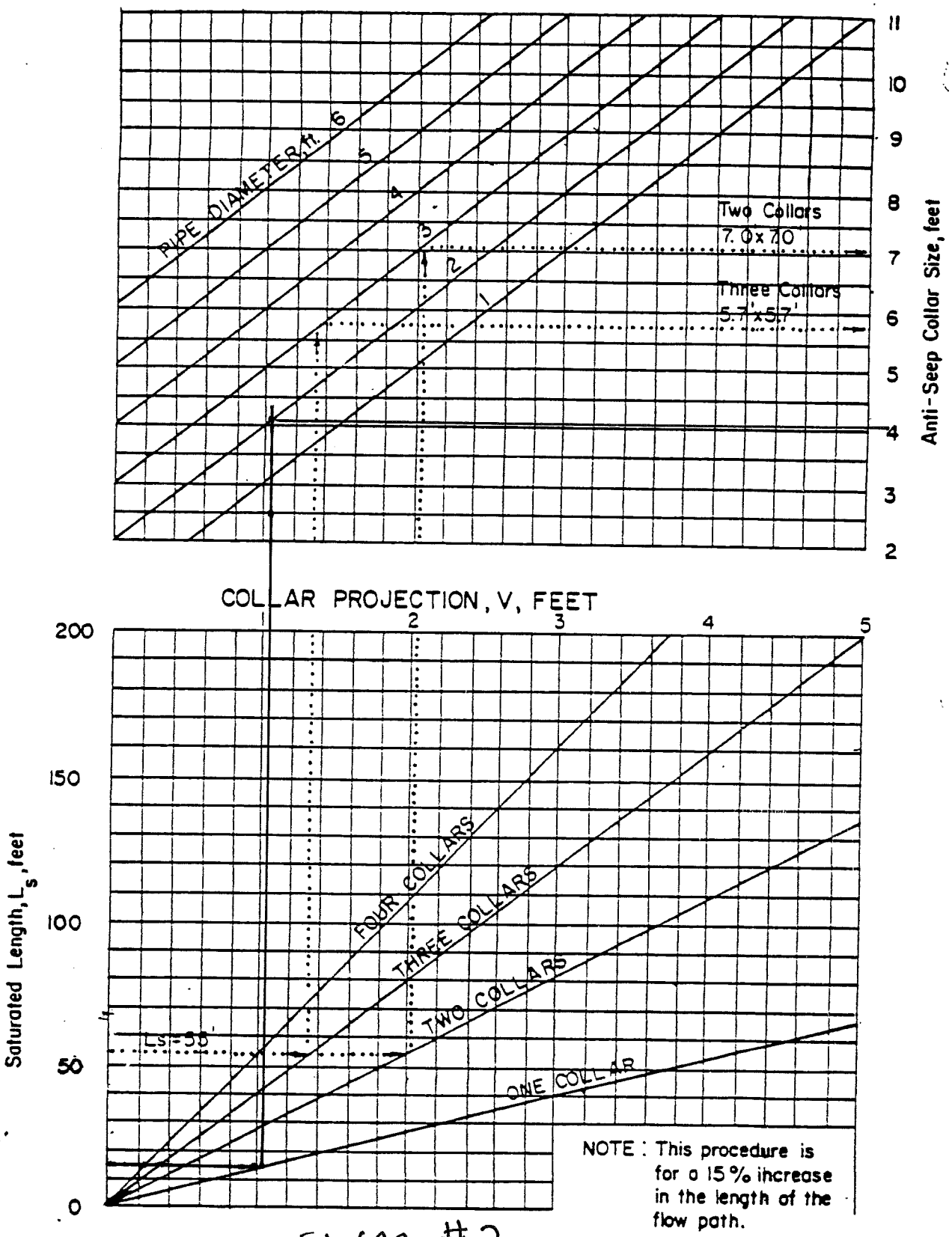
Y =	7.87
Z =	3
Slope =	0.0063

Solve for:

Ls = Saturated Length = 56.51

Use 1 4.1' x 4.1' collars at
28.25' from the outlet

ANTI-SEEP COLLAR DESIGN



$L_s = 15'$

SWM #3

One Collar 4.1'x4.1'

SWM #4

EMERGENCY SPILLWAY DESIGN

Q = 3.1 x L x H^1.5

Q = 100 Year Post Dev. Flow =	134.74	cfs		
H = Head =	0.55	feet		
Solve for:				
L = Length of the Spillway =	106.56	feet	use 107	feet

Top of Berm Elev.:	162.00			
100 Year Water Surface Elev.:	160.41			
Set spillway at :	160.45			
Provide one foot of freeboard:	161	+ one foot =	162	Min.

ANTI-SEEP COLLLAR DESIGN

Ls = Y x (Z+4) x (1+slope/ (0.25 - slope))

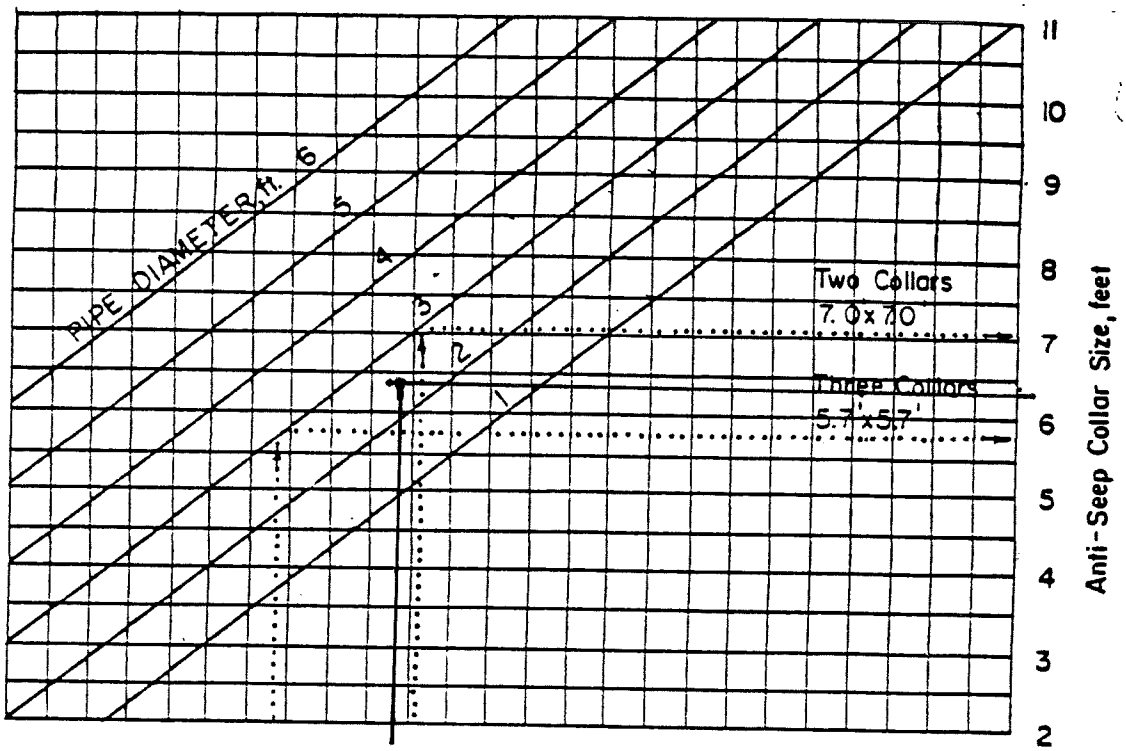
Y =	7.41
Z =	3
Slope =	0.01

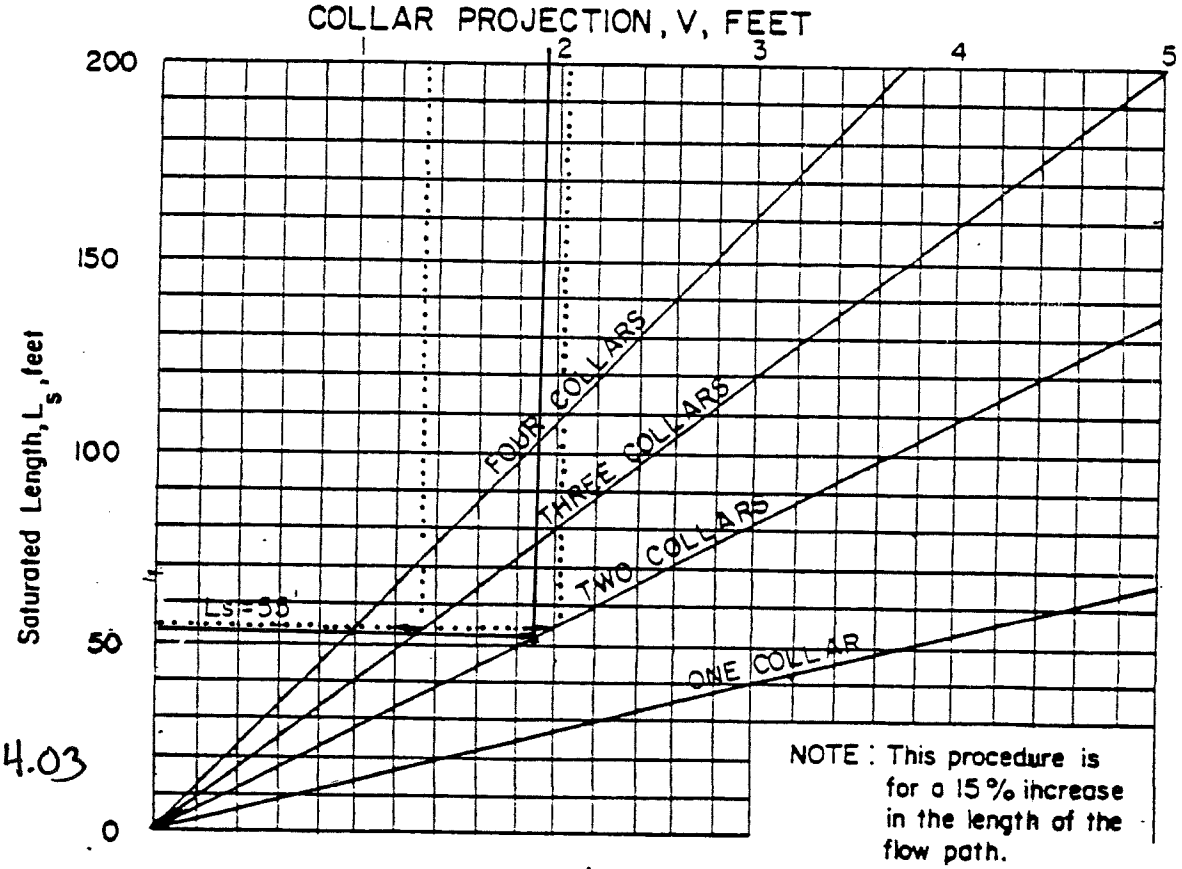
Solve for:

Ls = Saturated Length = 54.03

Use 2 6.35' x 6.35' collars at
18.01' from the outlet

ANTI-SEEP COLLAR DESIGN





$L_s = 54.03$

Swm #4

Two Collars 6.35' x 6.35'

SECTION FOUR

STORMWATER VOLUME MANAGEMENT

DESIGN

STORMWATER INFILTRATION DESIGN:

The increase in the two year volume of runoff as a result of the proposed improvements will be infiltrated on site to meet the Township Stormwater Regulations and the DEP BMP requirements. To accomplish this several systems throughout the site will be utilized. The type of proposed systems and their location reflects infiltration testing that has been conducted at the site. Overall the site has areas that have soils that are conducive to infiltration although the infiltration rate is low in the locations tested. Given the rate of infiltration found the site is not conducive to utilizing systems where storage is provided in systems that are several feet high. This type of system would require a dewatering time in excess of 72 hours. The testing locations and results are included in this report. The systems being proposed include the following:

- Porous paving (six separate locations)
- Recharge beds (stone area under football and soccer fields)
- Forebays and plunge pools (Forebay volume not included in calculations)

In addition it should be noted that the soccer and baseball fields will have minimal slope and therefore further limit the runoff in the field areas and further promote infiltration. These areas have not been included in the calculations that were completed to demonstrate compliance with the noted regulations.

The analysis utilized a meadow condition for the existing conditions throughout the entire tract. As the tract is a maintained golf course with low cut grass this is a very conservative assumption in the calculations. In addition, although DEP allows 80 % of impervious surfaces to be utilized as existing conditions; all impervious was considered meadow in this analysis.
To determine the required volume to be retained on site the DEP BMP worksheet #4 was utilized. There are four separate watersheds where runoff discharges from the site. The volume reduction was calculated for each watershed to ensure the watercourse receiving the runoff is not subjected to conditions that would permit erosion and degradation of the watercourse. All runoff from the site eventually discharges to Indian Creek which is west of the tract.

Watershed One:
To meet CG-1 requirements, the required volume to be retained / infiltrated = **24,842 CF** (from BMP Worksheet #4)

WATER QUALITY VOLUME CALCULATIONS
(Required Volume per Township Stormwater Management Ordinance)

Water Quality Volume (WQv) Calculations
WQv = (0.17) (Rv) (A)

= 0.17 [0.05 + 0.009 (17.5)] 10.85

Rv = 0.05 + 0.009(I)
I = Percent Impervious Cover (including gravel)
A = Area in Acres

= 0.383 Acre-Feet Required
= **16,683 CF Required**
Note as the BMP worksheet has a greater volume, that will be utilized as the required volume for removal.

Volume Reduction Provided:

Porous Paving Infiltration Determination:

The porous paving systems have been designed with storage provided at the bottom of the systems. The depth of storage provided equals the storage volume needed to retain the two year storm event (3.2 inches) given a void ratio of 40%. The volume infiltrated therefore equals the runoff from the drainage area to the porous paving area during the two year storm event.

Area 6:

Drainage Area = 1.50 acres
Volume Recharged = 1.5 x 43,560 x (3.2/12)
= 17,424 CF

Football field recharge Determination:

Drainage Area = 0.33 acres
Volume Recharged = 0.33 x 43,560 x (3.2/12)
= 3,840 CF

Detention Basin One Plunge Pool:

Volume provided in plunge pool area that is retained = 5,040 CF

Total Volume Removed = 17,424 + 3,840 + 5,040
= 26,304 CF

Watershed Two:
To meet CG-1 requirements, the required volume to be retained / infiltrated = **78,361 CF** (from BMP Worksheet #4)

WATER QUALITY VOLUME CALCULATIONS
(Required Volume per Township Stormwater Management Ordinance)

Water Quality Volume (WQv) Calculations
WQv = (0.17) (Rv) (A)

= 0.17 [0.05 + 0.009 (51.38)] 20.34

Rv = 0.05 + 0.009(I)
I = Percent Impervious Cover (including gravel)
A = Area in Acres

= 1.77 Acre-Feet Required
= 77,181 CF Required
Note as the BMP worksheet has a greater volume, that will be utilized as the required volume for removal.

Volume Reduction Provided:

Porous Paving Area 1

Drainage Area = 2.08 acres
Volume Recharged = 2.08 x 43,560 x (3.2/12)
= 24,161 CF

Porous Paving Area 2

Drainage Area = 0.70 acres
Volume Recharged = 0.70 x 43,560 x (3.2/12)
= 8,131 CF

Porous Paving Area 3A

Drainage Area = 4.08 acres
Volume Recharged = 4.08 x 43,560 x (3.2/12)
= 47,393 CF

Total Volume Removed = 24,161 + 8,131 + 47,393
= 79,685 CF

Watershed Three:
To meet CG-1 requirements, the required volume to be retained / infiltrated = **73,649 CF** (from BMP Worksheet #4)

WATER QUALITY VOLUME CALCULATIONS
(Required Volume per Township Stormwater Management Ordinance)

Water Quality Volume (WQv) Calculations
WQv = (0.17) (Rv) (A)

= 0.17 [0.05 + 0.009 (40.68)] 23.50

Rv = 0.05 + 0.009(I)
I = Percent Impervious Cover (including gravel)
A = Area in Acres

= 1.66 Acre-Feet Required
= 72,414 CF Required
Note as the BMP worksheet has a greater volume, that will be utilized as the required volume for removal.

Volume Reduction Provided:

Porous Paving Area 3B

Drainage Area = 1.78 acres
Volume Recharged = 1.78 x 43,560 x (3.2/12)
= 20,676 CF

Porous Paving Area 4

Drainage Area = 2.96 acres
Volume Recharged = 2.96 x 43,560 x (3.2/12)
= 34,383 CF

Championship Soccer field recharge Determination:

Drainage Area = 3.84 acres
Volume Recharged = 3.84 x 43,560 x (3.2/12)
= 44,605 CF

Total Volume Removed = 20,676 + 34,383 + 44,605
= 99,664 CF

Watershed Four:
To meet CG-1 requirements, the required volume to be retained / infiltrated = **45,409 CF** (from BMP Worksheet #4)

WATER QUALITY VOLUME CALCULATIONS
(Required Volume per Township Stormwater Management Ordinance)

Water Quality Volume (WQv) Calculations
WQv = (0.17) (Rv) (A)

= 0.17 [0.05 + 0.009 (21.06)] 18.61

Rv = 0.05 + 0.009(I)
I = Percent Impervious Cover (including gravel)
A = Area in Acres

= 0.758 Acre-Feet Required
= 33,011 CF Required
Note as the BMP worksheet has a greater volume, that will be utilized as the required volume for removal.

Volume Reduction Provided:

Porous Paving Area 5

Drainage Area = 1.66 acres
Volume Recharged = 1.66 x 43,560 x (3.2/12)
= 19,283 CF

Soccer field recharge Determination:

Drainage Area = 7.39 acres
Volume Recharged = 7.39 x 43,560 x (3.2/12)
= 85,842 CF

Total Volume Removed = 19,283 + 85,842
= 105,125 CF

Site Infiltration Testing:

Testing was completed throughout the site for areas suitable for stormwater infiltration. The locations that were evaluated are noted in the following soil profile pages as area #. Only areas tested for infiltration are noted in the plan set with a TP#. The test pit number corresponds with the permeameter borehole location.

Watershed #1

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

PROJECT: Westover
Drainage Area: 8.80 acres
2-Year Rainfall: 3.2 in

Total Site Area: _____ acres
Protected Site Area: _____ acres
Managed Area: 8.80 acres

Note: Developed conditions convey more drainage area to the watershed boundary than existing conditions.

Existing Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	B	27007	0.62	58	7.24	1.45	0.341	768
Meadow	C	356321	8.18	71	4.08	0.82	0.878	26074
TOTAL:			**8.80**					**26,842**

Developed Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	72310	1.66	98	0.20	0.04	2.967	17882
Gravel	B	7841	0.18	85	1.76	0.35	1.758	1148
Gravel	C	2614	0.06	89	1.24	0.25	2.082	453
Grass	B	30492	0.70	61	6.39	1.28	0.444	1128
Grass	C	359370	8.25	74	3.51	0.70	1.038	31072
TOTAL:			**10.85**					**51,683**

2-Year Volume Increase (ft^3): 24,842

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P + 0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
Q = Runoff (in)
Area = Land Use Area (sq. ft.)

NOTE: Runoff volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Watershed #2

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

PROJECT: Westover
Drainage Area: 23.94 acres
2-Year Rainfall: 3.2 in

Total Site Area: _____ acres
Protected Site Area: _____ acres
Managed Area: 23.94 acres

Note: Developed conditions convey less drainage area to the watershed boundary than in existing conditions.

Existing Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	B	223463	5.13	58	7.24	1.45	0.341	6354
Meadow	C	819364	18.81	71	4.08	0.82	0.878	59956
TOTAL:			**23.94**					**66,310**

Developed Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious		434729	9.98	98	0.20	0.04	2.967	107504
Gravel	B	3485	0.08	85	1.76	0.35	1.758	510
Gravel	C	16988	0.39	89	1.24	0.25	2.082	2947
Lawn	B	60984	1.40	58	7.24	1.45	0.341	1734
Lawn	C	369824	8.49	74	3.51	0.70	1.038	31976
TOTAL:			**20.34**					**144,671**

2-Year Volume Increase (ft^3): 78,361

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P + 0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
Q = Runoff (in)
Area = Land Use Area (sq. ft.)

NOTE: Runoff volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Watershed 3

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

PROJECT: Westover

Drainage Area: 26.59 acres *onsite area to SWM systems*

2-Year Rainfall: 3.2 in

Total Site Area: 0.00 acres

Protected Site Area: 0.00 acres

Managed Area: 26.59 acres

Existing Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
meadow	B	243500	5.59	58	7.24	1.45	0.341	6924
meadow	C	914760	21.00	71	4.08	0.82	0.878	66937
TOTAL:			**26.59**					**73,861**

Developed Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious		416434	9.56	98	0.20	0.04	2.967	102980
Grass	B	161172	3.70	61	6.39	1.28	0.444	5963
Grass	C	446054	10.24	74	3.51	0.70	1.038	38567
TOTAL:			**23.50**					**147,510**

2-Year Volume Increase (ft^3): 73,649

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P + 0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
Q = Runoff (in)
Area = Land Use Area (sq. ft.)

NOTE: Runoff volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Watershed 4

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

PROJECT: Westover

Drainage Area: 15.12 acres *onsite area to SWM systems*

2-Year Rainfall: 3.2 in

Total Site Area: 0.00 acres

Protected Site Area: 0.00 acres

Managed Area: 18.61 acres

Existing Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
meadow	B	481774	11.06	58	7.24	1.45	0.341	13699
meadow	C	176854	4.06	71	4.08	0.82	0.878	12941
TOTAL:			**15.12**					**26,640**

Developed Conditions:

Cover Type / Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia 0.2*s	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious		170755	3.92	98	0.20	0.04	2.967	42226
Grass	B	513572	11.79	61	6.39	1.28	0.444	19001
Grass	C	126324	2.90	74	3.51	0.70	1.038	10922
TOTAL:			**18.61**					**72,149**

2-Year Volume Increase (ft^3): 45,509

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P + 0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12

Q = Runoff (in)

Area = Land Use Area (sq. ft.)

NOTE: Runoff volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #1

Person Conducting Test: S. Andress
Date of Test: 3/15/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.40	0.13
60.0	1800	45.72	45.40	0.13
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #1

Person Conducting Test: S. Andress

Date of Test: 3/15/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	33.02	5.00
60.0	1800	45.72	35.56	4.00
90.0	1800	45.72	36.20	3.75
120.0	1800	45.72	36.20	3.75
150.0	1800	45.72	36.20	3.75
180.0	1800	45.72	36.83	3.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000261289

K =	**2.61E-04**	cm/sec
K =	**0.370**	**in/hr**
K =	**0.741**	**ft/day**

4-12

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #2

Person Conducting Test: S. Andress
Date of Test: 3/15/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	40.64	2.00
60.0	1800	45.72	41.28	1.75
90.0	1800	45.72	41.91	1.50
120.0	1800	45.72	41.91	1.50
150.0	1800	45.72	41.91	1.50
180.0	1800	45.72	42.55	1.25

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.69745E-05

K =	**8.70E-05**	cm/sec
K =	**0.123**	**in/hr**
K =	**0.247**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #2

Person Conducting Test: S. Andress
Date of Test: 3/15/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	44.45	0.50
60.0	1800	45.72	45.09	0.25
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #2

Person Conducting Test: S. Andress

Date of Test: 3/15/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	36.83	3.50
60.0	1800	45.72	37.47	3.25
90.0	1800	45.72	38.10	3.00
120.0	1800	45.72	38.10	3.00
150.0	1800	45.72	38.10	3.00
180.0	1800	45.72	38.74	2.75

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000200347

K =	**2.00E-04**	cm/sec
K =	**0.284**	**in/hr**
K =	**0.568**	**ft/day**

Falling Head Permeability Testing
Westover Golf

Permeameter Borehole: Area #8

Person Conducting Test: S. Andress
Date of Test: 3/15/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.09	0.25
60.0	1800	45.72	45.40	0.13
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #8

Person Conducting Test: S. Andress

Date of Test: 3/15/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.09	0.25
60.0	1800	45.72	45.09	0.25
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #4

Person Conducting Test: S. Andress
Date of Test: 3/15/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	38.10	3.00
60.0	1800	45.72	38.74	2.75
90.0	1800	45.72	38.74	2.75
120.0	1800	45.72	39.37	2.50
150.0	1800	45.72	39.37	2.50
180.0	1800	45.72	39.37	2.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000180698

K =	**1.81E-04**	cm/sec
K =	**0.256**	**in/hr**
K =	**0.512**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #4

Person Conducting Test: S. Andress

Date of Test: 3/15/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.09	0.25
60.0	1800	45.72	45.09	0.25
90.0	1800	45.72	45.09	0.25
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #4

Person Conducting Test: S. Andress

Date of Test: 3/15/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.09	0.25
60.0	1800	45.72	45.09	0.25
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #3

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.40	0.13
60.0	1800	45.72	45.40	0.13
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.72	0.00
150.0	1800	45.72	45.72	0.00
180.0	1800	45.72	45.72	0.00

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620

h = water column in casing (cm.) 45.72

K = Permeability (cm/sec.) 0

K = 0.00E+00 cm/sec

K = 0.000 in/hr

K = 0.000 ft/day

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #3

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	37.47	3.25
60.0	1800	45.72	38.10	3.00
90.0	1800	45.72	38.10	3.00
120.0	1800	45.72	38.74	2.75
150.0	1800	45.72	38.74	2.75
180.0	1800	45.72	38.74	2.75

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000200347

K =	**2.00E-04**	cm/sec
K =	**0.284**	**in/hr**
K =	**0.568**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #3

Person Conducting Test: S. Andress
Date of Test: 3/16/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	33.02	5.00
60.0	1800	45.72	33.02	5.00
90.0	1800	45.72	34.29	4.50
120.0	1800	45.72	34.29	4.50
150.0	1800	45.72	34.93	4.25
180.0	1800	45.72	34.93	4.25

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000325468

K =	**3.25E-04**	cm/sec
K =	**0.461**	**in/hr**
K =	**0.923**	**ft/day**

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Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #3

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	33.02	5.00
60.0	1800	45.72	35.56	4.00
90.0	1800	45.72	35.56	4.00
120.0	1800	45.72	36.20	3.75
150.0	1800	45.72	36.20	3.75
180.0	1800	45.72	36.20	3.75

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000282306

K =	**2.82E-04**	cm/sec
K =	**0.400**	**in/hr**
K =	**0.800**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #3

Person Conducting Test: S. Andress
Date of Test: 3/16/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	38.10	3.00
60.0	1800	45.72	38.74	2.75
90.0	1800	45.72	39.37	2.50
120.0	1800	45.72	39.37	2.50
150.0	1800	45.72	39.37	2.50
180.0	1800	45.72	40.01	2.25

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000161363

K =	**1.61E-04**	cm/sec
K =	**0.229**	**in/hr**
K =	**0.457**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #3

Person Conducting Test: S. Andress
Date of Test: 3/16/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	43.18	1.00
60.0	1800	45.72	43.82	0.75
90.0	1800	45.72	44.45	0.50
120.0	1800	45.72	44.45	0.50
150.0	1800	45.72	44.45	0.50
180.0	1800	45.72	44.45	0.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 3.40424E-05

K =	**3.40E-05**	cm/sec
K =	**0.048**	**in/hr**
K =	**0.096**	**ft/day**

Falling Head Permeability Testing
Westover Golf
Permeameter Borehole: Area #6

Person Conducting Test: S. Andress
Date of Test: 3/16/2012
Hole Diameter 7.620 centimeters
Water Level above bottom of boring (cm) 45.72
Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	44.45	0.50
60.0	1800	45.72	44.45	0.50
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #6

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	43.18	1.00
60.0	1800	45.72	43.18	1.00
90.0	1800	45.72	43.82	0.75
120.0	1800	45.72	44.45	0.50
150.0	1800	45.72	44.45	0.50
180.0	1800	45.72	44.45	0.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 3.40424E-05

K =	**3.40E-05**	cm/sec
K =	**0.048**	**in/hr**
K =	**0.096**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #7

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1.5

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	45.09	0.25
60.0	1800	45.72	45.09	0.25
90.0	1800	45.72	45.40	0.13
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #7

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	43.18	1.00
60.0	1800	45.72	43.82	0.75
90.0	1800	45.72	44.45	0.50
120.0	1800	45.72	44.45	0.50
150.0	1800	45.72	44.45	0.50
180.0	1800	45.72	44.45	0.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 3.40424E-05

K =	**3.40E-05**	cm/sec
K =	**0.048**	**in/hr**
K =	**0.096**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #5

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1.5

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	43.18	1.00
60.0	1800	45.72	43.18	1.00
90.0	1800	45.72	44.45	0.50
120.0	1800	45.72	45.09	0.25
150.0	1800	45.72	45.09	0.25
180.0	1800	45.72	45.09	0.25

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 1.69013E-05

K =	**1.69E-05**	cm/sec
K =	**0.024**	**in/hr**
K =	**0.048**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #5

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	2

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	43.82	0.75
60.0	1800	45.72	44.45	0.50
90.0	1800	45.72	45.09	0.25
120.0	1800	45.72	45.40	0.13
150.0	1800	45.72	45.40	0.13
180.0	1800	45.72	45.40	0.13

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 8.42111E-06

K =	**8.42E-06**	cm/sec
K =	**0.012**	**in/hr**
K =	**0.024**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #9

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	41.28	1.75
60.0	1800	45.72	41.91	1.50
90.0	1800	45.72	42.55	1.25
120.0	1800	45.72	42.55	1.25
150.0	1800	45.72	43.18	1.00
180.0	1800	45.72	43.18	1.00

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 6.90716E-05

K =	**6.91E-05**	cm/sec
K =	**0.098**	**in/hr**
K =	**0.196**	**ft/day**

Falling Head Permeability Testing

Westover Golf

Permeameter Borehole: Area #9

Person Conducting Test: S. Andress

Date of Test: 3/16/2012

Hole Diameter 7.620 centimeters

Water Level above bottom of boring (cm) 45.72

Measured from: Top of Pipe

Test Information:

Overall Casing Length (ft.):	1.50
Casing Diameter (in.)	3.00
Depth of Permeameter (ft.):	1

Time (min.)	Total Elapsed Interval (Sec.)	Starting Water Level (Centimetes)	Ending Water Drop (Centimetes)	Water Level (inches)
0.0	0	45.72	NA	NA
30.0	1800	45.72	40.01	2.25
60.0	1800	45.72	40.64	2.00
90.0	1800	45.72	41.28	1.75
120.0	1800	45.72	41.91	1.50
150.0	1800	45.72	41.91	1.50
180.0	1800	45.72	41.91	1.50

Hole was Presoaked 1 hour Prior to conducting test

Coefficient of Permeability (K) = (Pi * D)/((11*(time interval)) ln (starting water level / ending water level)

where: D = casing diameter (cm) 7.620
h = water column in casing (cm.) 45.72
K = Permeability (cm/sec.) 0.000105147

K =	**1.05E-04**	cm/sec
K =	**0.149**	**in/hr**
K =	**0.298**	**ft/day**