AS-BUILT STORMWATER MANAGEMENT REPORT

FOR

ROSWELL MANOR

Land Lots 611 & 612 - 1th District, 2st Section
City of Roswell - Fulton County, Georgia

Date: January 10, 2014

Prepared By:

Engineering E303 Stream Restoration

116 North Main Street, Suite B
Cumming, GA 30040
Phone: 770.442.0500

E303 Project No. 12-3681

CONTENTS

SUMMARY

The subject site is a 16.25 acre tract located in Land Lots 611 and 612 of the 1st District, 2nd Section of Fulton County in the City of Roswell, Georgia. The property is located north of Old Alabama Road approximately 1,500 feet north of the intersection of Old Alabama Road and Holcomb Bridge Road. The property abuts an office complex

Project History

This site was previously permitted for development in 2007 as a townhome community called Old Alabama Townhomes. The Old Alabama Townhomes project was an 94 unit development with the associated amenities, roadway, utility and stormwater management infrastructure. The project went dormant prior to completion and construction activity ceased after the completion of the infrastructure mentioned above including the stormwater management facilities.

In 2012 development on the site was resumed with a proposed 73 unit fee simple housing layout inclusive of an amenity. This project is known as Roswell Manor and is the subject of this analysis. The current design utilizes the existing infrastructure that was constructed per the approved construction plans for the Old Alabama Townhomes development with only minor modification proposed to the infrastructure to accommodate the new site layout. Given the decreases in site density and impervious area, only maintenance and upkeep was necessary for the existing stormwater management ponds to accommodate the Roswell Manor development.

Reduction of Impervious Area

As previously stated, the housing density was reduced from a 94 unit townhome community to a 73 unit single family development community. Reducing the site density of the project resulted in a net reduction of proposed impervious area. Originally the Old Alabama Townhomes project proposed a total of 366,767 sq. ft. of impervious area. The Roswell Manor project proposes 337,154 sq. ft. of impervious area which is 29,613 sf of impervious area less than what was called for in the original stormwater management design. Ground Cover Take-offs are included in the Runoff Curve Number

Calculations located in the Appendix of this report.

Area take-off calculations were performed using Carlson Hydrology 2014

Revised Basin Areas and Curve Numbers

The proposed onsite site basins were reassessed to account for minor grading and storm pipe changes that have taken place to accommodate the Roswell Manor development. A summary of the changes to the proposed basins is listed below:

Basin	Design Basin Characteristics	As-Built Basin Characteristics
Basin A	Area: 5.92 Acres CN: 80.2	Area: 5.63 Acres CN: 81.0
Basin A-Bypass	Area: 0.74 Acres CN:61.5	Area: 0.76 Acres CN: 66.0
Basin B	Area: 8.09 Acres CN: 80.2	Area: 8.51 Acres CN: 80.9
Basin B-Bypass	Area: 0.96 Acres CN: 61.5	Area: 0.97 Acres CN: 61.6
Basin C	Area: 0.15 Acres	Area: 0.07 Acres
Basin D	Area: 0.43 Acres	Area: 0.34 Acres

Please note that the table above only lists the modifications made to the basin characteristics that changed due to the revision in drainage design. The characteristics not listed, such as time of concentration and CN values, were not impacted and the values from the previously approved hydrologic design were used in the as-built model.

Methodology

This report utilizes the previously approved Hydrology Study for Old Alabama Townhomes by David A. Burre Engineers & Surveyors, Inc., most recently revised March 1, 2007 for predeveloped and as-designed site conditions.

The as-built hydrologic model for this site was built with consideration given to the drainage design modifications for Roswell Manor. The changes to the basin characteristics utilized in this model are previously listed in this report. The as-built ponds were modeled based on field information collected by Engineering303, LLC and the hydrologic model outputs reflect this data.

As-built summaries are provided for each respective pond and are included in this report. Please see report and the appendix for supporting calculations.

The SCS Method was used to analyze the stormwater management for this development.

Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2009, Version 6.066, was used for the hydrologic routing for this study.

AS-BUILT POND SUMMARIES

Pond A - As-Built Summary

Pond A				Top of Berm:	1039.7
Design Storm	As-Designed Release Rates (cfs)	As-Built Release Rates (cfs)	As-Designed Water Surface Elevation (ft)	As-Built Water Surface Elevation (ft)	As-Built Freeboard Provided (ft)
1	2.96	2.93	1037.71	1037.66	2.04
2	4.12	4.05	1037.88	1037.82	1.88
5	8.48	8.03	1038.16	1038.12	1.58
10	13.67	13.04	1038.32	1038.26	1.44
25	19.76	18.80	1038.47	1038.43	1.27
50	23.76	22.59	1038.56	1038.53	1.17
100	27.19	25.20	1038.63	1038.59	1.11

Basin A - Volume Summary						
Design Storm	Water Quality Volume (cf)	Channel Protection Volume	Diameter of Water Quality Orifice (ft)	Elevation of Water Quality Orifice (ft)	Diameter of Channel Protection Orifice (ft)	Elevation of Channel Protection Orifice (ft)
As-Desinged	56,105	N/A	N/A	1037.00	N/A	N/A
As-Built	52,944	N/A	N/A	1036.95	N/A	N/A

Note: Pond A is a wet pond with the water quality volume completely contained in the permanent pool thus no draw down orifice is provided for Pond A. The calculated water quality volume required for the entire development is 16,195 cf as per the approved hydrology study by David A. Burre Engineers & Surveyors most recently revised March 1, 2007. The the cumulative as-built water quality volume provided in both Pond A & B is 130,038 cf.

Additionally, Crystal Streams units are provided upstream of each of the outfalls into Pond A. (three units total). Though these units were installed as pre-treatment for Pond A the site will receive added water quality benifit in addition to the treatment received by the wet ponds.

Note: Channel Protection is not provided in Pond A as it was not included in the approved hydrologic design noted above. Thus, channel protection volume and orifice information is not included in the summary table.

Basin A - Flow Summary						
Design Storm	Predeveloped Flow (cfs)	As-Built Flow to Pond (cfs)	As-Built Bypass (cfs)	Allowable Flow* (cfs)	As-Built Pond Flow (cfs)	Flow Reduction (cfs)
1.0	3.7	9.8	0.8	2.9	2.9	0.0
2.0	6.0	12.3	1.1	5.0	4.1	0.9
5.0	11.4	17.5	0.8	10.6	8.0	2.6
10.0	15.9	21.5	2.4	13.6	13.0	0.5
25.0	22.6	26.9	3.2	19.4	18.8	0.6
50.0	28.1	30.9	3.8	24.3	22.6	1.7
100.0	32.0	33.7	4.3	27.7	25.2	2.5

*Allowable Flow = Predeveloped Flow less As-Built Bypass

Allowable Flow is the basis of comparison for the pond release rates as per the approved hydrology study
The Flow Summary table format was taken from the origionally approved Hydrology Study noted above.

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Pond No. 1 - Detention Pond A

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1036.95 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1036.95	17,000	0	0
0.55	1037.50	17,000	9,350	9,350
1.05	1038.00	17,000	8,500	17,850
1.35	1038.30	17,000	5,100	22,950
2.05	1039.00	20,050	12,968	35,918
3.05	1040.00	21,125	20,588	56,505

Culvert / Orifice Structures

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

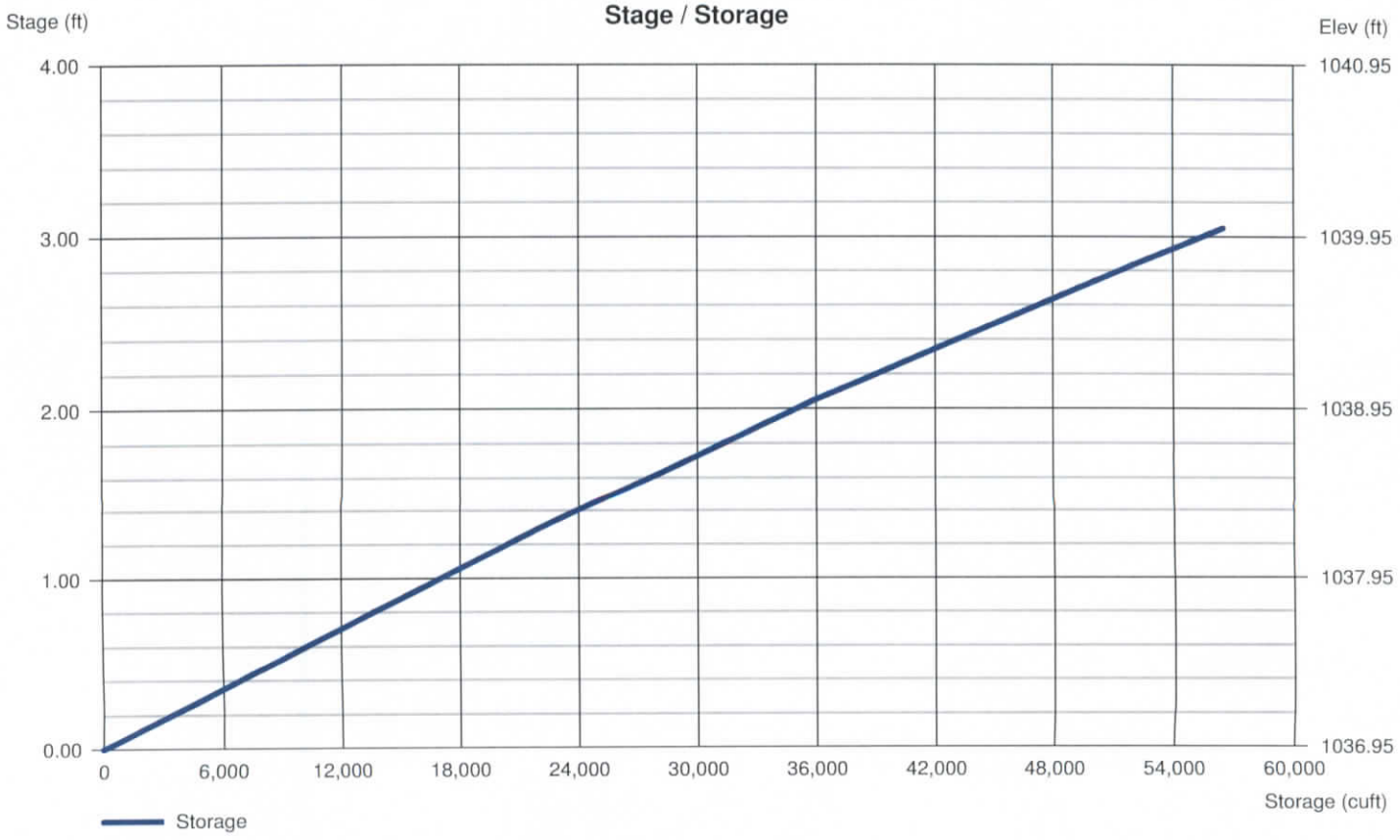
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 1.50	5.00	5.00	15.00
Crest El. (ft)	= 1036.95	1037.95	1037.95	1038.95
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= Rect	Rect	Rect	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).



STAGE - STORAGE CURVE (detention volume) WQ VOL - POND A					
ELEVATION	STAGE	AREA	AVE. AREA	VOLUME	TOTAL VOLUME
		FT^2			cu. Ft
1,031.70	0.00	0.00		0	**0**
	-	-			-
	-	-	138.50		-
1,032.00	0.30	277.00		42	**42**
	-	-			-
	-	-	3,394.50		-
1,032.40	0.70	6,512.00		1,358	**1,399**
	-	-			-
	-	-	8,044.50		-
1,034.00	2.30	9,577.00		12,871	**14,271**
	-	-			-
	-	-	11,069.50		-
1,035.86	4.16	12,562.00		20,589	**34,860**
		-			-
	-	-	14,504.50		-
1,036.00	4.30	16,447.00		2,031	**36,890**
		-			-
	-	-	16,898.50		-
1,036.95	5.25	17,350.00		16,054	**52,944**

Pond B - As-Built Summary

Pond B				Top of Berm:	1013.4
Design Storm	As-Designed Release Rates (cfs)	As-Built Release Rates (cfs)	As-Designed Water Surface Elevation (ft)	As-Built Water Surface Elevation (ft)	As-Built Freeboard Provided (ft)
1	1.72	1.80	1008.78	1008.57	4.83
2	2.42	2.52	1008.98	1008.77	4.63
5	4.56	4.75	1009.38	1009.18	4.22
10	6.83	7.01	1009.67	1009.48	3.92
25	10.43	10.73	1010.05	1009.86	3.54
50	13.40	13.61	1010.33	1010.12	3.28
100	15.46	15.55	1010.51	1010.29	3.11

Basin B - Volume Summary						
Design Storm	Water Quality Volume (cf)	Channel Protection Volume	Diameter of Water Quality Orifice (ft)	Elevation of Water Quality Orifice (ft)	Diameter of Channel Protection Orifice (ft)	Elevation of Channel Protection Orifice (ft)
As-Desinged	79,315	N/A	N/A	1008.00	N/A	N/A
As-Built	77,094	N/A	N/A	1007.77	N/A	N/A

Note: Pond B is a wet pond with the water quality volume completely contained in the permanent pool thus no draw down orifice is provided for Pond B. The calculated water quality volume required for the entire development is 16,195 cf as per the approved hydrology study by David A. Burre Engineers & Surveyors most recently revised March 1, 2007. The the cumulative as-built water quality volume provided in both Pond A & B is 103,038 cf.

Additionally, Crystal Streams units are provided upstream of each of the outfalls into Pond B. (four units total). Though these units were installed as pre-treatment for Pond B the site will receive added water quality benifit in addition to the treatment received by the wet ponds.

Note: Channel Protection is not provided in Pond B as it was not included in the approved hydrologic design noted above. Thus, channel protection volume and orifice information is not included in the summary table.

Note: A plunge pool was installed at the outfall of Pond B under the previous permit for Old Alabama Townhomes. This plunge pool has remained intact though it was unmaintained while the project set dormant for over 5 years. The plunge pool is to remain in place and will provide energy dissipation and slowing discharge velocities.

Basin B - Flow Summary						
Design Storm	Predeveloped Flow (cfs)	As-Built Flow to Pond (cfs)	As-Built Bypass (cfs)	Allowable Flow* (cfs)	As-Built Pond Flow (cfs)	Flow Reduction (cfs)
1	2.3	14.8	0.5	1.8	1.8	0.0
2	3.7	18.6	0.7	3.0	2.5	0.4
5	7.0	26.4	1.4	5.6	4.8	0.8
10	9.8	32.4	2.0	7.8	7.0	0.8
25	13.8	40.5	2.8	11.0	10.7	0.3
50	17.2	46.7	3.5	13.7	13.6	0.1
100	19.6	50.8	4.0	15.7	15.6	0.1

*Allowable Flow = Predeveloped Flow less As-Built Bypass

Allowable Flow is the basis of comparison for the pond release rates as per the approved hydrology study
The Flow Summary table format was taken from the origionally approved Hydrology Study noted above.

STAGE - STORAGE CURVE (detention volume) WQ VOL - POND B					
ELEVATION	STAGE	AREA	AVE. AREA	VOLUME	TOTAL VOLUME
		FT^2			cu. Ft
1,004.15	0.00	16,369.00		0	**0**
	-	-			-
	-	-	18,823.00		-
1,006.00	1.85	21,277.00		34,823	**34,823**
	-	-			-
	-	-	22,195.50		-
1,006.84	2.69	23,114.00		18,644	**53,467**
	-	-			-
	-	-	25,406.00		-
1,007.77	3.62	27,698.00		23,628	**77,094**

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Pond No. 2 - Detention Pond B

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1007.77 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1007.77	27,783	0	0
2.20	1009.97	27,783	61,123	61,123
3.23	1011.00	33,330	31,473	92,596
4.23	1012.00	39,654	36,492	129,088

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

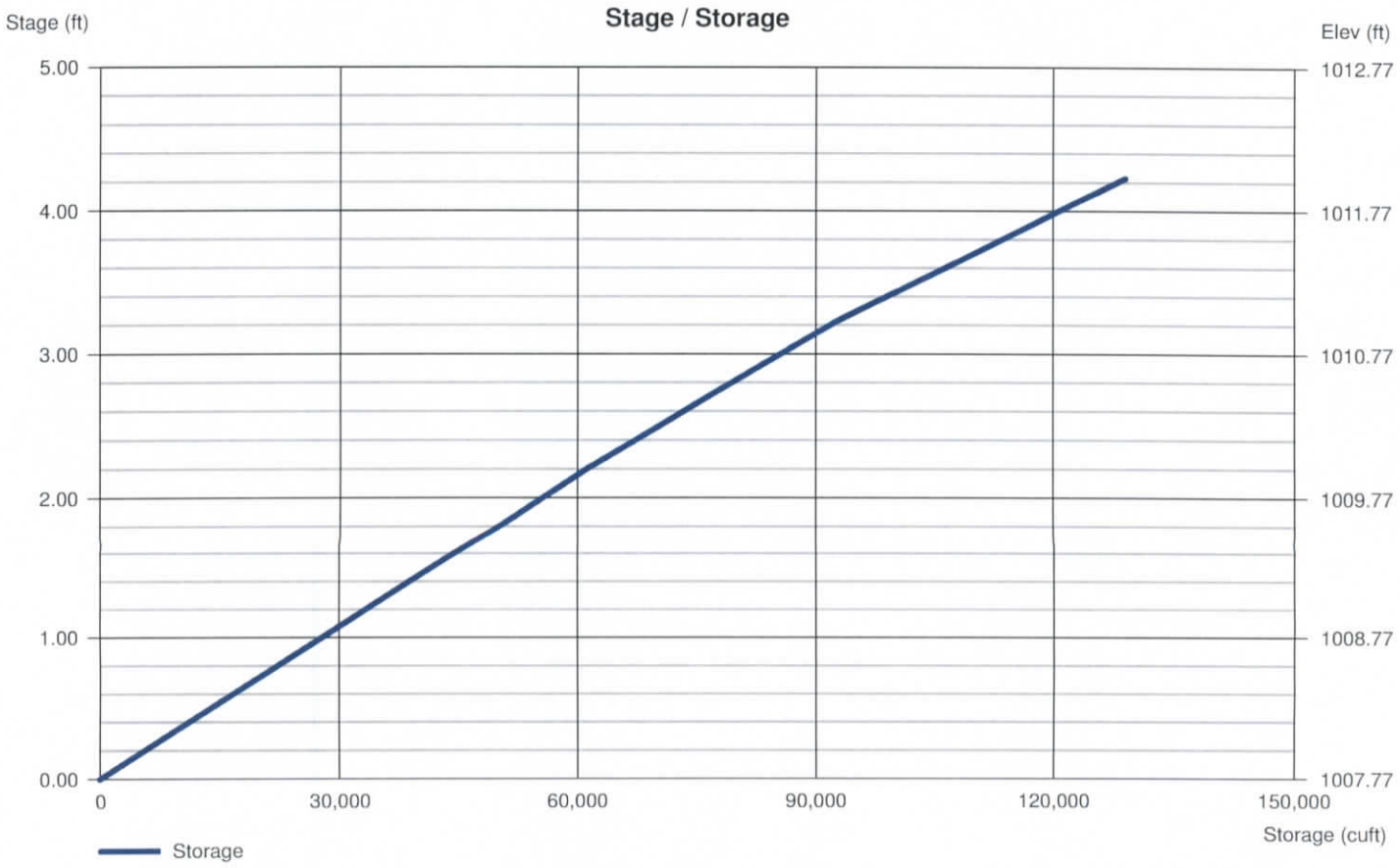
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.75	1.00	12.00	0.00
Crest El. (ft)	= 1007.77	1008.87	1010.95	0.00
Weir Coeff.	= 3.33	3.33	2.60	0.00
Weir Type	= Rect	Rect	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).



1, 2, 5, 10, 25, 50, 100-YEAR SUMMARY REPORTS

Hydrograph Return Period Recap

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	------	3.692	6.035	-------	11.42	15.94	22.55	28.13	31.98	Predeveloped Basin A
2	SCS Runoff	------	9.822	12.33	-------	17.52	21.50	26.88	30.94	33.65	As-Built Basin A
3	SCS Runoff	------	0.773	1.090	-------	1.790	2.357	3.190	3.844	4.290	Bypass As-Built Basin A
4	Reservoir	2	2.939	4.053	-------	8.029	13.04	18.80	22.59	25.20	Detention Pond A
5	SCS Runoff	------	2.263	3.699	-------	7.000	9.769	13.82	17.24	19.60	Predeveloped Basin B
6	SCS Runoff	------	14.77	18.56	-------	26.39	32.41	40.54	46.67	50.76	As-Built Basin B
7	SCS Runoff	------	0.471	0.744	-------	1.429	2.006	2.836	3.495	3.948	Bypass As-Built Basin B
8	Reservoir	6	1.802	2.515	-------	4.749	7.077	10.73	13.61	15.55	Detention Pond B
9	SCS Runoff	------	0.354	0.560	-------	1.033	1.427	1.992	2.439	2.745	Predeveloped Basin C
10	SCS Runoff	------	0.381	0.599	-------	1.095	1.509	2.101	2.568	2.887	Predeveloped Basin D
11	SCS Runoff	------	0.061	0.094	-------	0.169	0.231	0.320	0.390	0.437	As-Built Basin C
12	SCS Runoff	------	0.254	0.393	-------	0.710	0.973	1.349	1.645	1.848	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.692	6	726	15,794	------	------	------	Predeveloped Basin A
2	SCS Runoff	9.822	6	720	30,577	------	------	------	As-Built Basin A
3	SCS Runoff	0.773	3	720	1,876	------	------	------	Bypass As-Built Basin A
4	Reservoir	2.939	6	738	30,563	2	1037.66	11,934	Detention Pond A
5	SCS Runoff	2.263	6	726	9,680	------	------	------	Predeveloped Basin B
6	SCS Runoff	14.77	6	720	46,014	------	------	------	As-Built Basin B
7	SCS Runoff	0.471	5	725	1,765	------	------	------	Bypass As-Built Basin B
8	Reservoir	1.802	6	762	45,990	6	1008.57	22,259	Detention Pond B
9	SCS Runoff	0.354	1	718	803	------	------	------	Predeveloped Basin C
10	SCS Runoff	0.381	2	718	903	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.061	1	716	122	------	------	------	As-Built Basin C
12	SCS Runoff	0.254	2	718	591	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	6.035	6	726	22,846	------	------	------	Predeveloped Basin A
2	SCS Runoff	12.33	6	720	38,083	------	------	------	As-Built Basin A
3	SCS Runoff	1.090	3	720	2,565	------	------	------	Bypass As-Built Basin A
4	Reservoir	4.053	6	738	38,069	2	1037.82	14,784	Detention Pond A
5	SCS Runoff	3.699	6	726	14,002	------	------	------	Predeveloped Basin B
6	SCS Runoff	18.56	6	720	57,338	------	------	------	As-Built Basin B
7	SCS Runoff	0.744	5	720	2,514	------	------	------	Bypass As-Built Basin B
8	Reservoir	2.515	6	756	57,314	6	1008.77	27,832	Detention Pond B
9	SCS Runoff	0.560	1	717	1,157	------	------	------	Predeveloped Basin C
10	SCS Runoff	0.599	2	718	1,302	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.094	1	716	175	------	------	------	As-Built Basin C
12	SCS Runoff	0.393	2	718	848	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	11.42	6	726	39,299	------	------	------	Predeveloped Basin A
2	SCS Runoff	17.52	6	720	53,825	------	------	------	As-Built Basin A
3	SCS Runoff	1.790	3	720	4,120	------	------	------	Bypass As-Built Basin A
4	Reservoir	8.029	6	732	53,811	2	1038.12	19,505	Detention Pond A
5	SCS Runoff	7.000	6	726	24,085	------	------	------	Predeveloped Basin B
6	SCS Runoff	26.39	6	720	81,096	------	------	------	As-Built Basin B
7	SCS Runoff	1.429	5	720	4,258	------	------	------	Bypass As-Built Basin B
8	Reservoir	4.749	6	744	81,072	6	1009.18	39,017	Detention Pond B
9	SCS Runoff	1.033	1	717	1,990	------	------	------	Predeveloped Basin C
10	SCS Runoff	1.095	2	718	2,239	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.169	1	716	298	------	------	------	As-Built Basin C
12	SCS Runoff	0.710	2	718	1,447	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	15.94	6	726	53,332	------	------	------	Predeveloped Basin A
2	SCS Runoff	21.50	6	720	66,083	------	------	------	As-Built Basin A
3	SCS Runoff	2.357	3	720	5,407	------	------	------	Bypass As-Built Basin A
4	Reservoir	13.04	6	732	66,068	2	1038.26	22,176	Detention Pond A
5	SCS Runoff	9.769	6	726	32,685	------	------	------	Predeveloped Basin B
6	SCS Runoff	32.41	6	720	99,602	------	------	------	As-Built Basin B
7	SCS Runoff	2.006	5	720	5,737	------	------	------	Bypass As-Built Basin B
8	Reservoir	7.077	6	744	99,579	6	1009.48	47,141	Detention Pond B
9	SCS Runoff	1.427	1	717	2,700	------	------	------	Predeveloped Basin C
10	SCS Runoff	1.509	2	718	3,038	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.231	1	716	403	------	------	------	As-Built Basin C
12	SCS Runoff	0.973	2	718	1,957	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	22.55	6	720	73,802	------	------	------	Predeveloped Basin A
2	SCS Runoff	26.88	6	720	82,839	------	------	------	As-Built Basin A
3	SCS Runoff	3.190	3	717	7,246	------	------	------	Bypass As-Built Basin A
4	Reservoir	18.80	6	732	82,824	2	1038.43	24,803	Detention Pond A
5	SCS Runoff	13.82	6	720	45,231	------	------	------	Predeveloped Basin B
6	SCS Runoff	40.54	6	720	124,905	------	------	------	As-Built Basin B
7	SCS Runoff	2.836	5	720	7,884	------	------	------	Bypass As-Built Basin B
8	Reservoir	10.73	6	738	124,881	6	1009.86	57,738	Detention Pond B
9	SCS Runoff	1.992	1	717	3,737	------	------	------	Predeveloped Basin C
10	SCS Runoff	2.101	2	718	4,204	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.320	1	716	556	------	------	------	As-Built Basin C
12	SCS Runoff	1.349	2	718	2,700	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	28.13	6	720	90,221	------	------	------	Predeveloped Basin A
2	SCS Runoff	30.94	6	720	95,633	------	------	------	As-Built Basin A
3	SCS Runoff	3.844	3	717	8,696	------	------	------	Bypass As-Built Basin A
4	Reservoir	22.59	6	732	95,618	2	1038.53	26,393	Detention Pond A
5	SCS Runoff	17.24	6	720	55,294	------	------	------	Predeveloped Basin B
6	SCS Runoff	46.67	6	720	144,228	------	------	------	As-Built Basin B
7	SCS Runoff	3.495	5	720	9,600	------	------	------	Bypass As-Built Basin B
8	Reservoir	13.61	6	738	144,205	6	1010.12	65,570	Detention Pond B
9	SCS Runoff	2.439	1	717	4,568	------	------	------	Predeveloped Basin C
10	SCS Runoff	2.568	2	718	5,139	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.390	1	716	678	------	------	------	As-Built Basin C
12	SCS Runoff	1.645	2	718	3,294	------	------	------	As-Built Basin D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	31.98	6	720	101,588	------	------	------	Predeveloped Basin A
2	SCS Runoff	33.65	6	720	104,246	------	------	------	As-Built Basin A
3	SCS Runoff	4.290	3	717	9,691	------	------	------	Bypass As-Built Basin A
4	Reservoir	25.20	6	726	104,232	2	1038.59	27,422	Detention Pond A
5	SCS Runoff	19.60	6	720	62,260	------	------	------	Predeveloped Basin B
6	SCS Runoff	50.76	6	720	157,239	------	------	------	As-Built Basin B
7	SCS Runoff	3.948	5	720	10,785	------	------	------	Bypass As-Built Basin B
8	Reservoir	15.55	6	738	157,215	6	1010.29	70,693	Detention Pond B
9	SCS Runoff	2.745	1	717	5,144	------	------	------	Predeveloped Basin C
10	SCS Runoff	2.887	2	718	5,787	------	------	------	Predeveloped Basin D
11	SCS Runoff	0.437	1	716	763	------	------	------	As-Built Basin C
12	SCS Runoff	1.848	2	718	3,706	------	------	------	As-Built Basin D

100 – YEAR HYDROGRAPHS

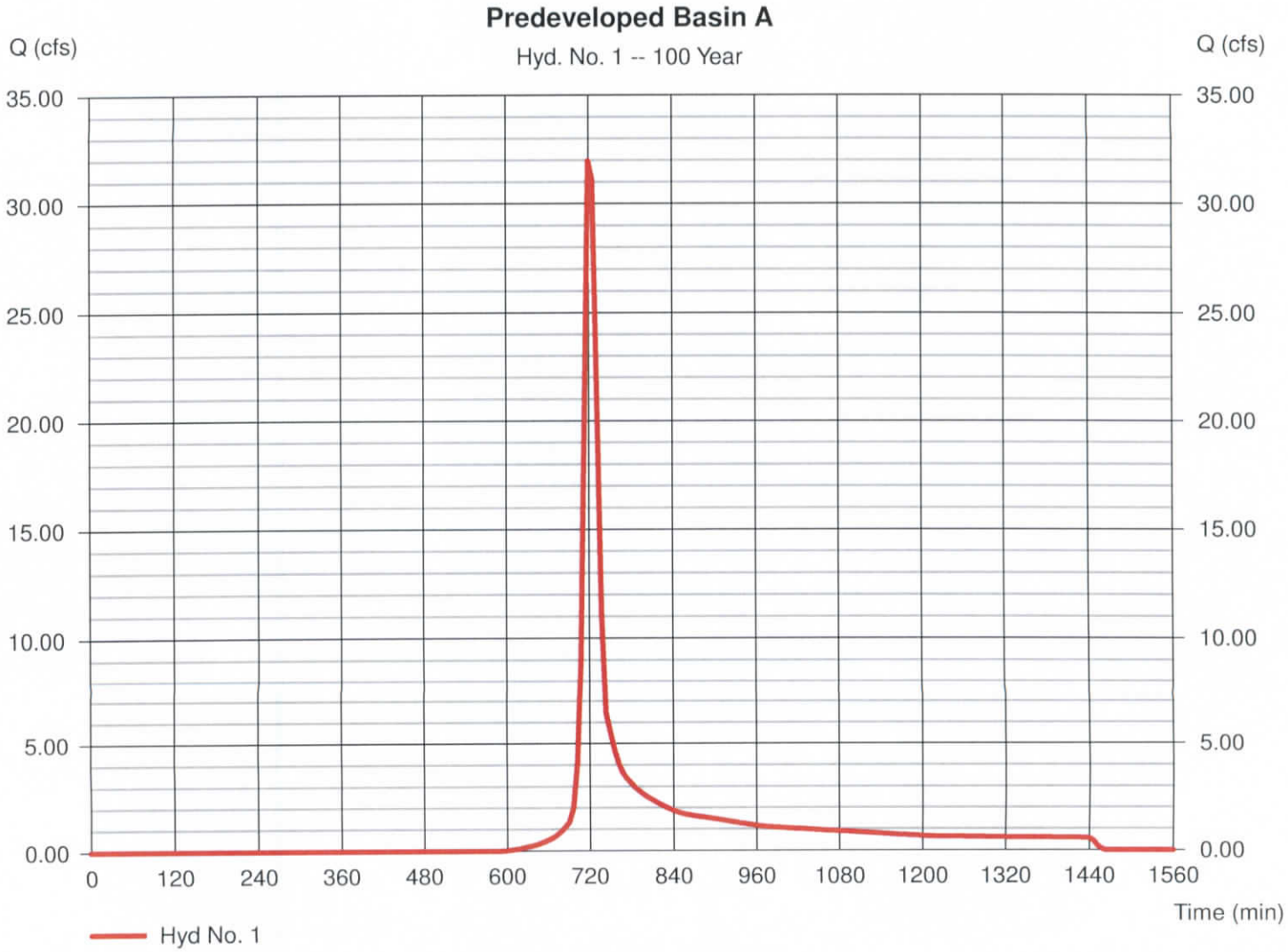
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 1

Predeveloped Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 31.98 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 6 min	Hyd. volume	= 101,588 cuft
Drainage area	= 9.480 ac	Curve number	= 60.5
Basin Slope	= 7.6 %	Hydraulic length	= 705 ft
Tc method	= LAG	Time of conc. (Tc)	= 14.80 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



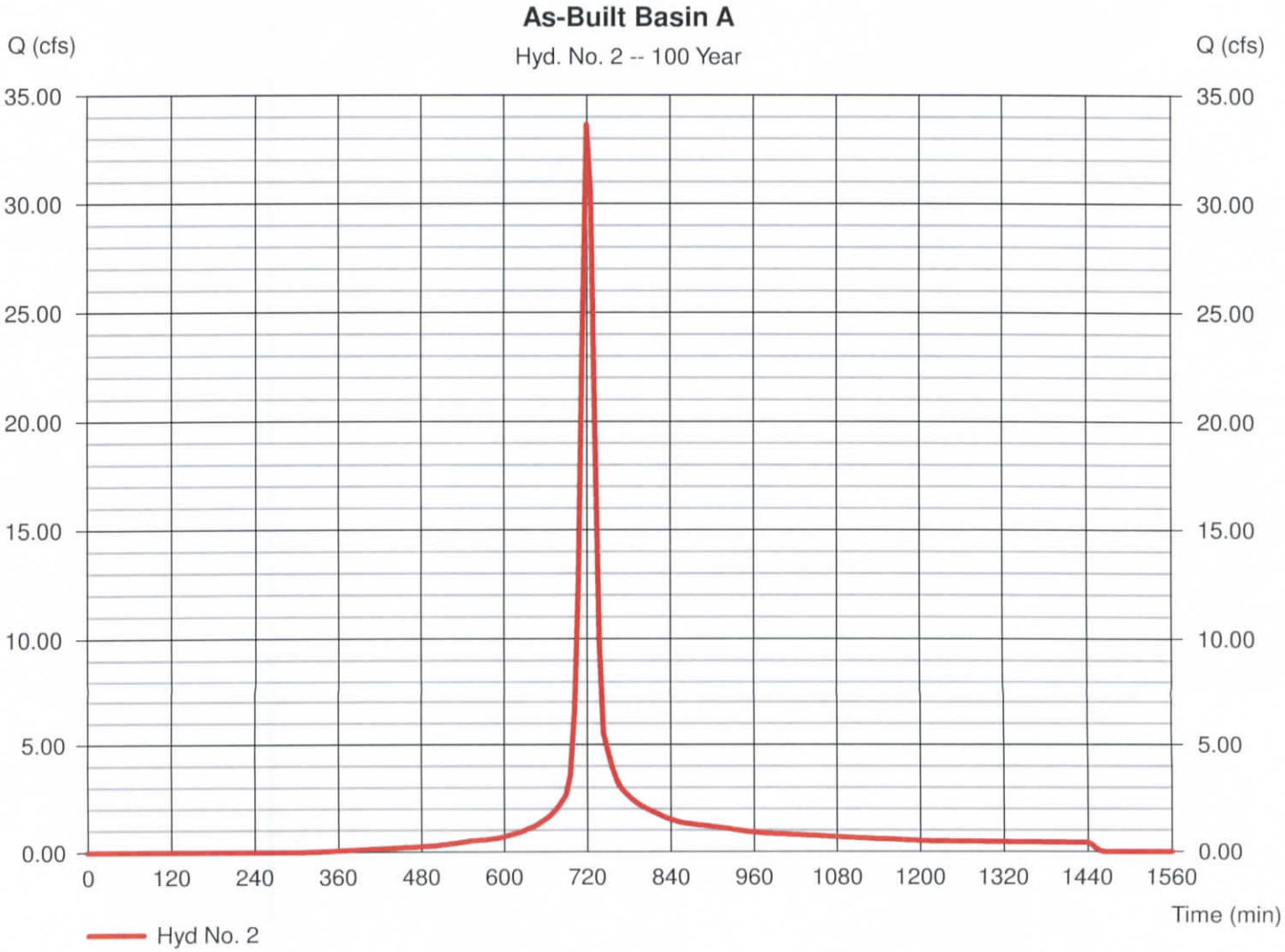
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 2

As-Built Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 33.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 6 min	Hyd. volume	= 104,246 cuft
Drainage area	= 5.630 ac	Curve number	= 81
Basin Slope	= 7.6 %	Hydraulic length	= 980 ft
Tc method	= LAG	Time of conc. (Tc)	= 10.98 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

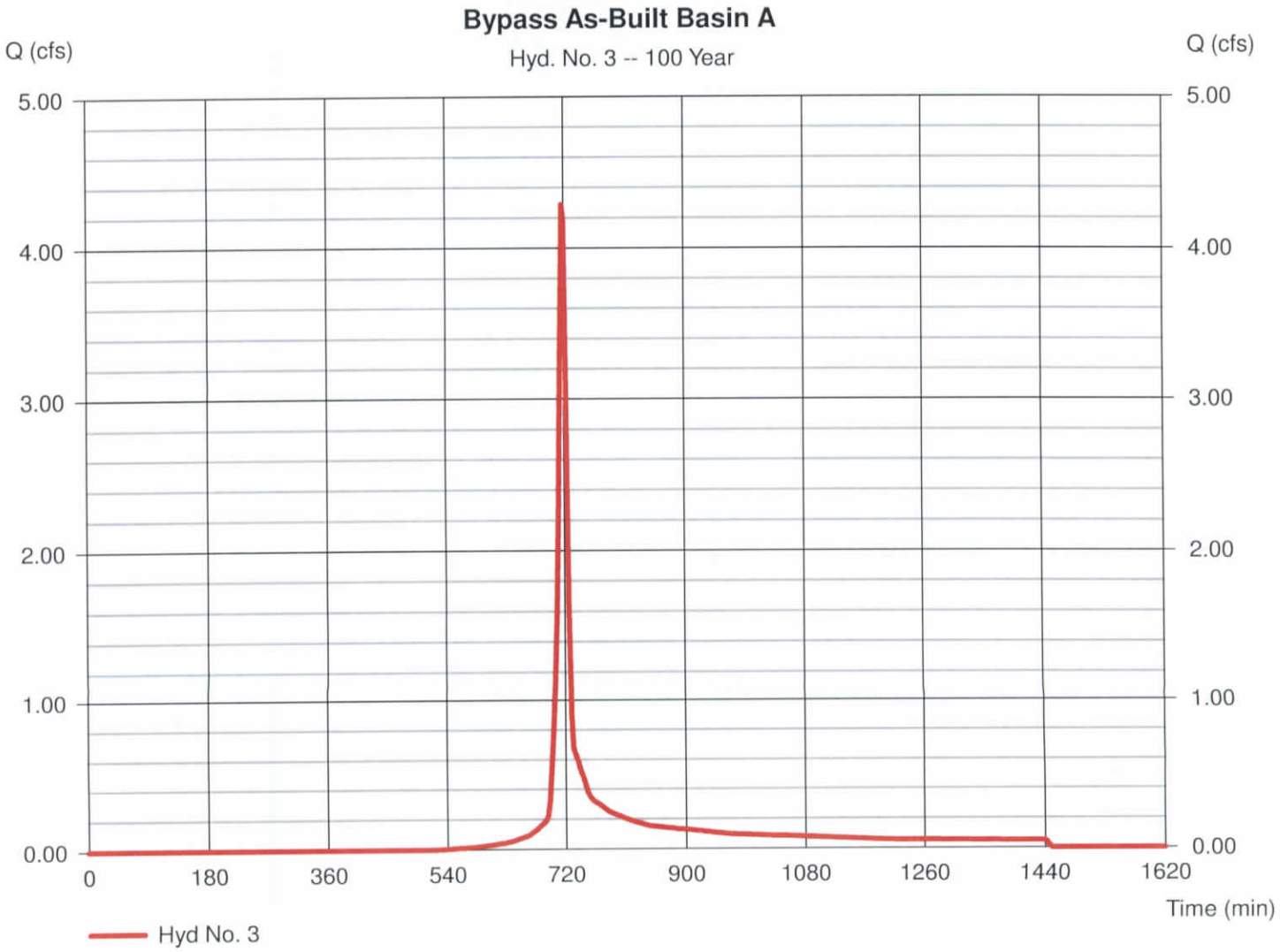


Hydrograph Report

Hyd. No. 3

Bypass As-Built Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 4.290 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 9,691 cuft
Drainage area	= 0.760 ac	Curve number	= 66
Basin Slope	= 7.6 %	Hydraulic length	= 350 ft
Tc method	= LAG	Time of conc. (Tc)	= 7.38 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

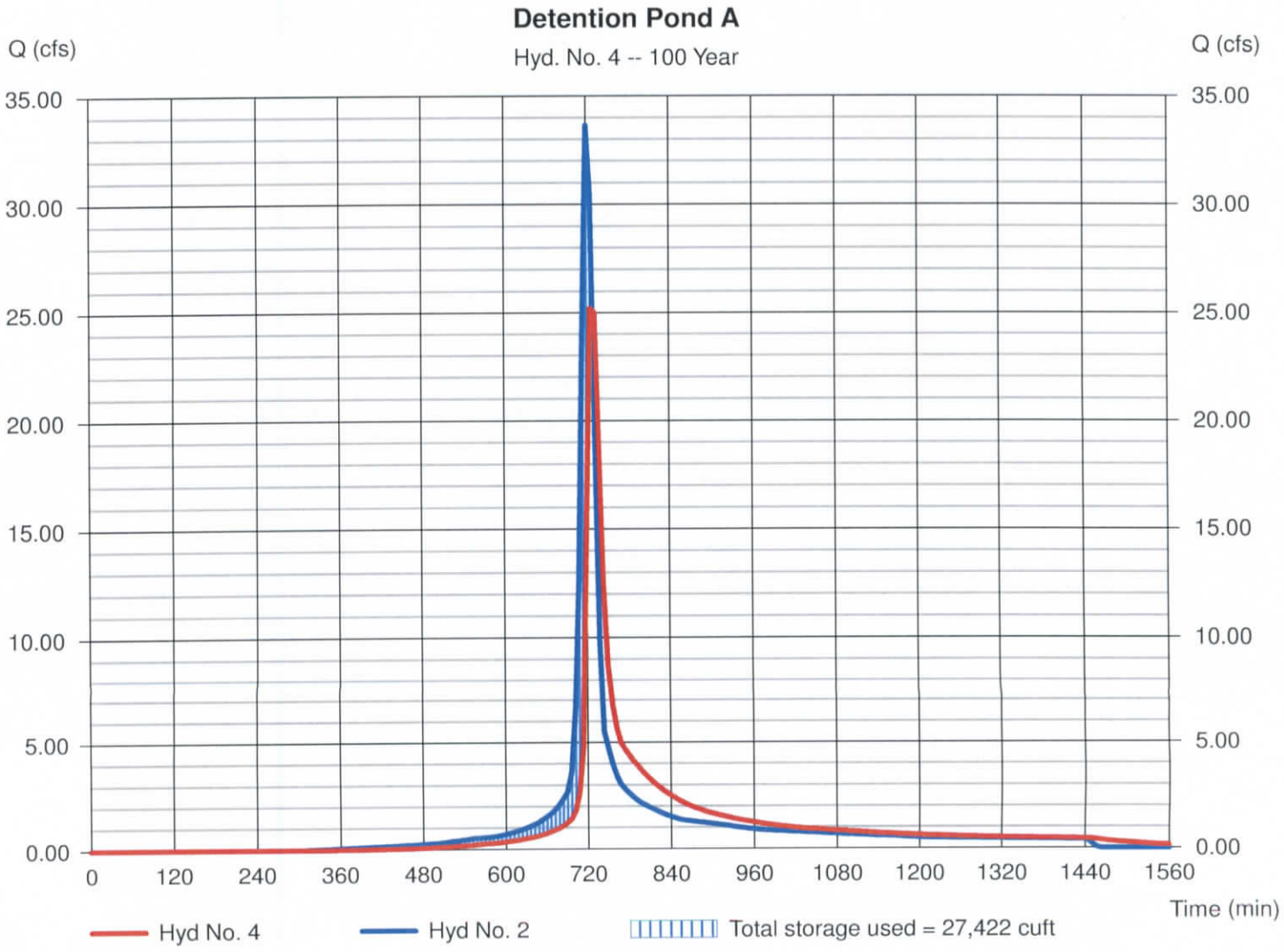
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 4

Detention Pond A

Hydrograph type	= Reservoir	Peak discharge	= 25.20 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 6 min	Hyd. volume	= 104,232 cuft
Inflow hyd. No.	= 2 - As-Built Basin A	Max. Elevation	= 1038.59 ft
Reservoir name	= Detention Pond A	Max. Storage	= 27,422 cuft

Storage Indication method used.



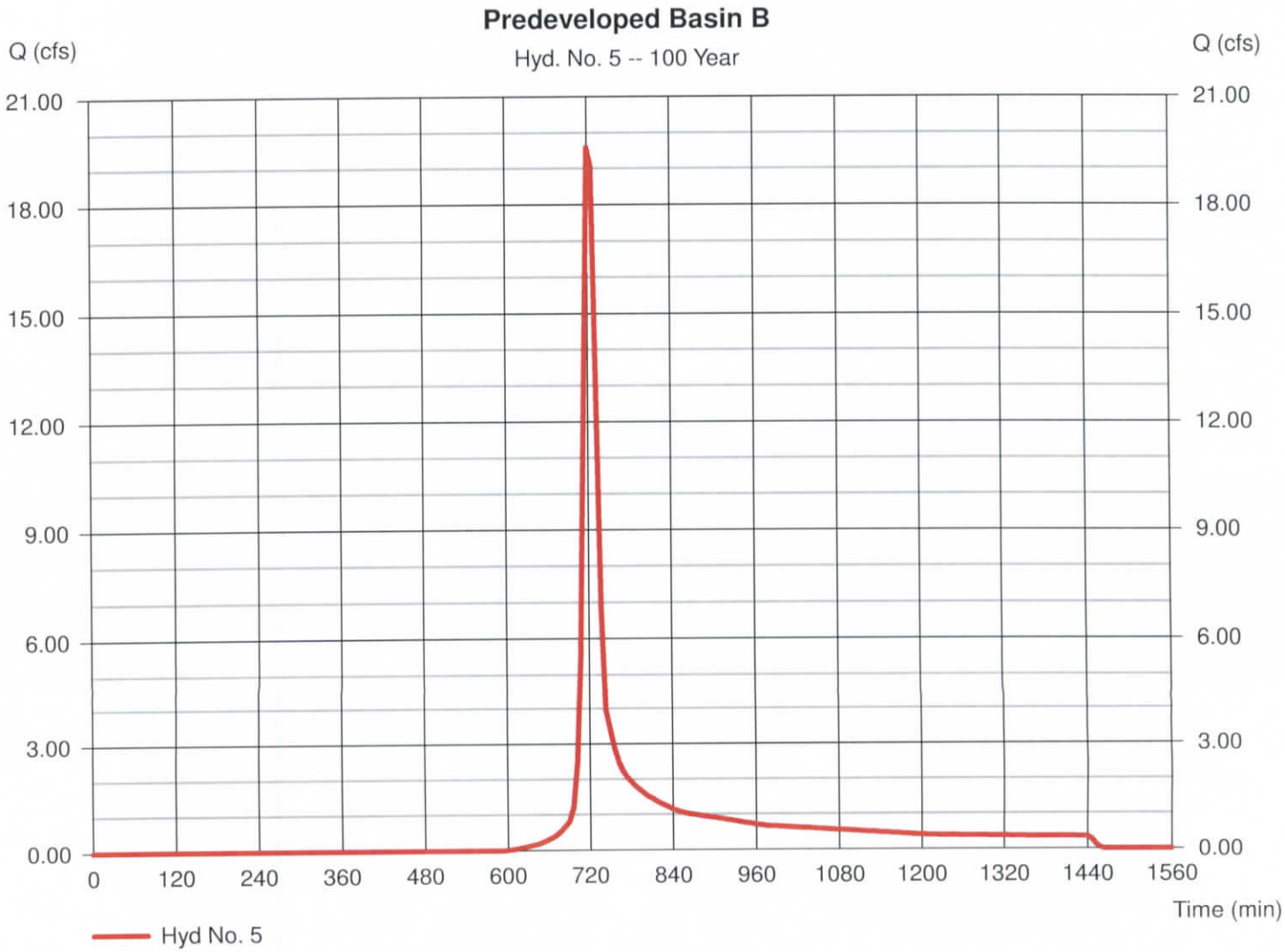
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 5

Predeveloped Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 19.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 6 min	Hyd. volume	= 62,260 cuft
Drainage area	= 5.810 ac	Curve number	= 60.5
Basin Slope	= 7.6 %	Hydraulic length	= 885 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.80 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



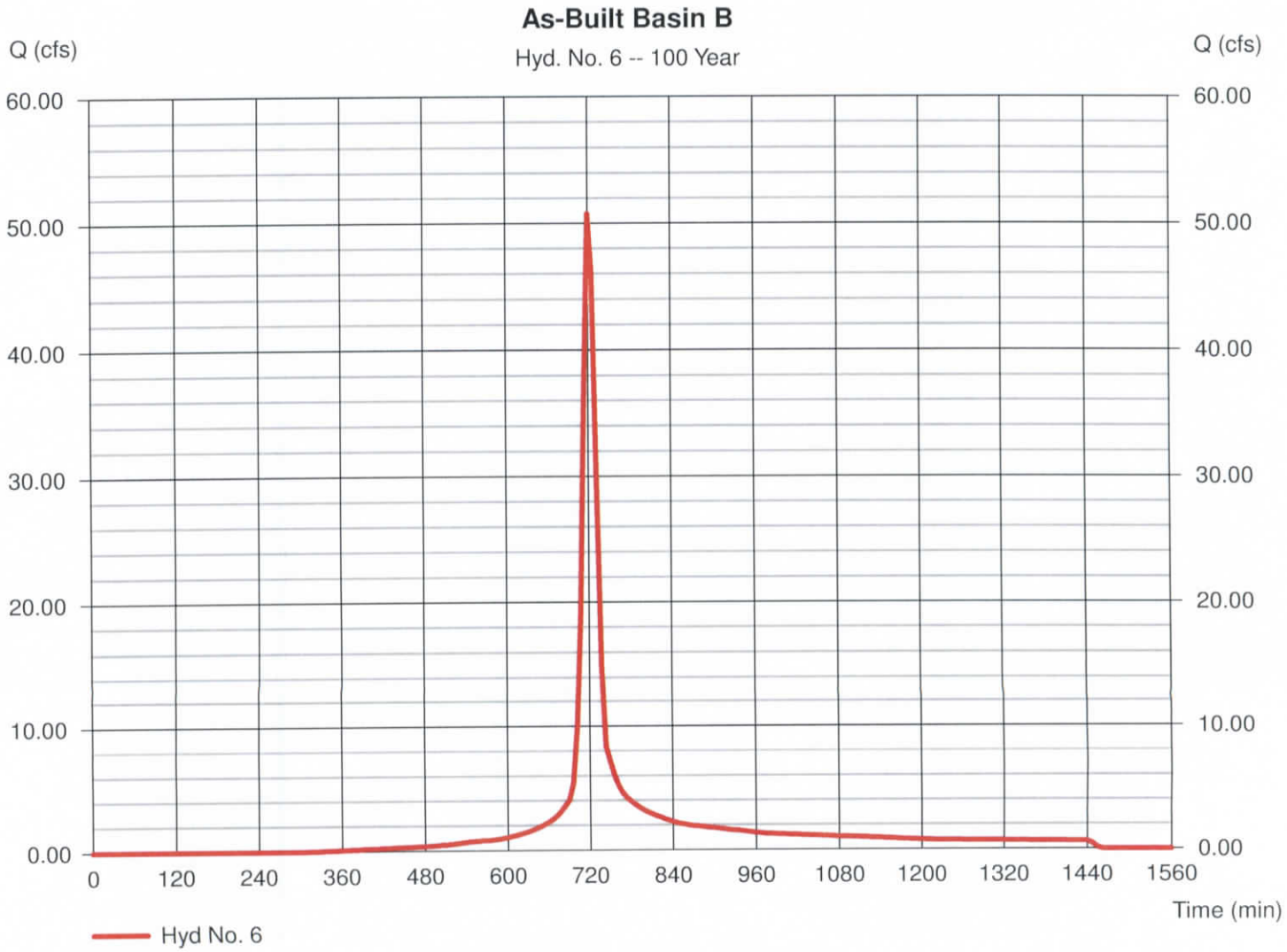
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 6

As-Built Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 50.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 6 min	Hyd. volume	= 157,239 cuft
Drainage area	= 8.510 ac	Curve number	= 80.9
Basin Slope	= 7.6 %	Hydraulic length	= 1100 ft
Tc method	= LAG	Time of conc. (Tc)	= 12.08 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

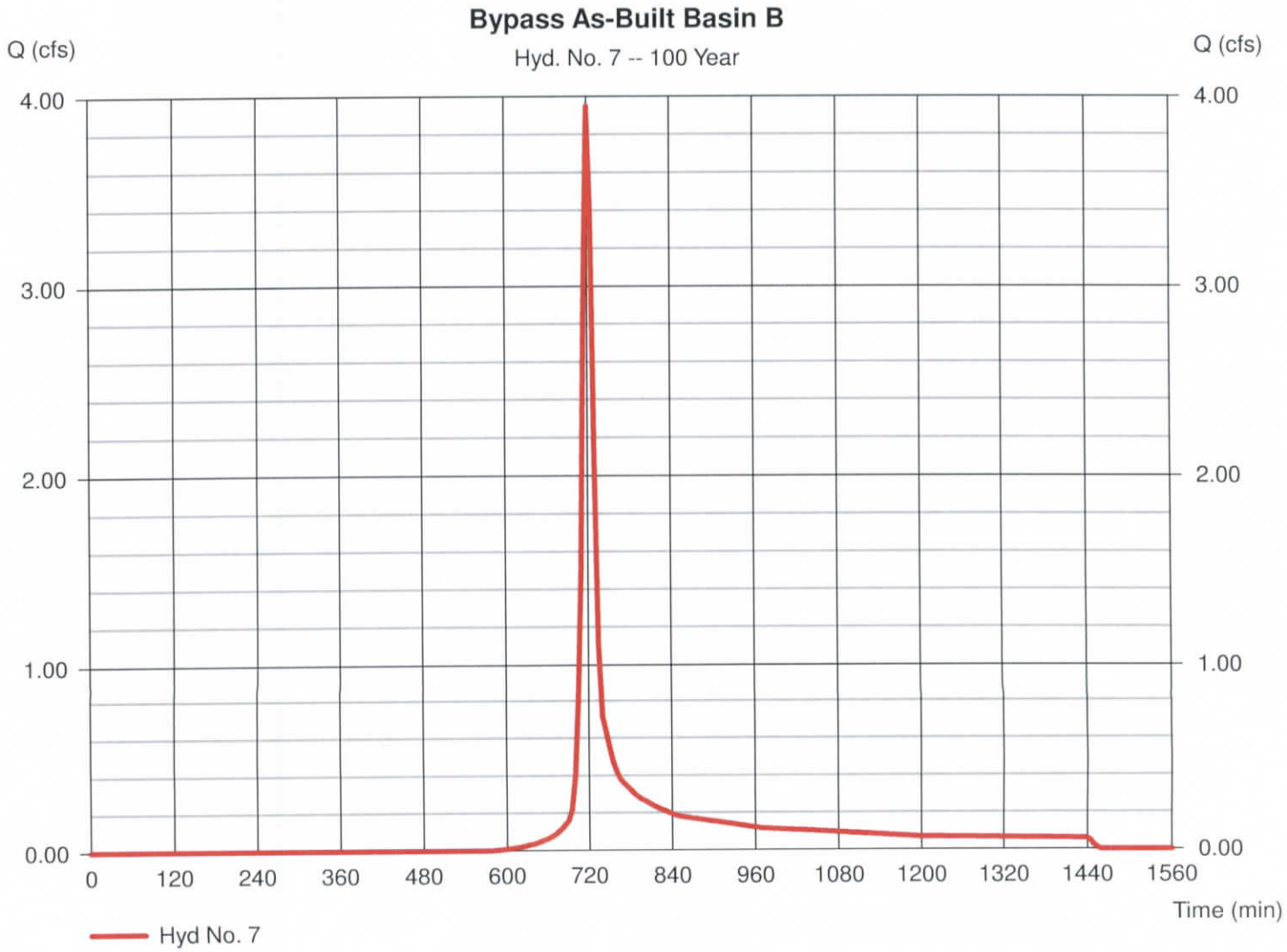


Hydrograph Report

Hyd. No. 7

Bypass As-Built Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 3.948 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 5 min	Hyd. volume	= 10,785 cuft
Drainage area	= 0.970 ac	Curve number	= 61.6
Basin Slope	= 7.6 %	Hydraulic length	= 570 ft
Tc method	= LAG	Time of conc. (Tc)	= 12.21 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



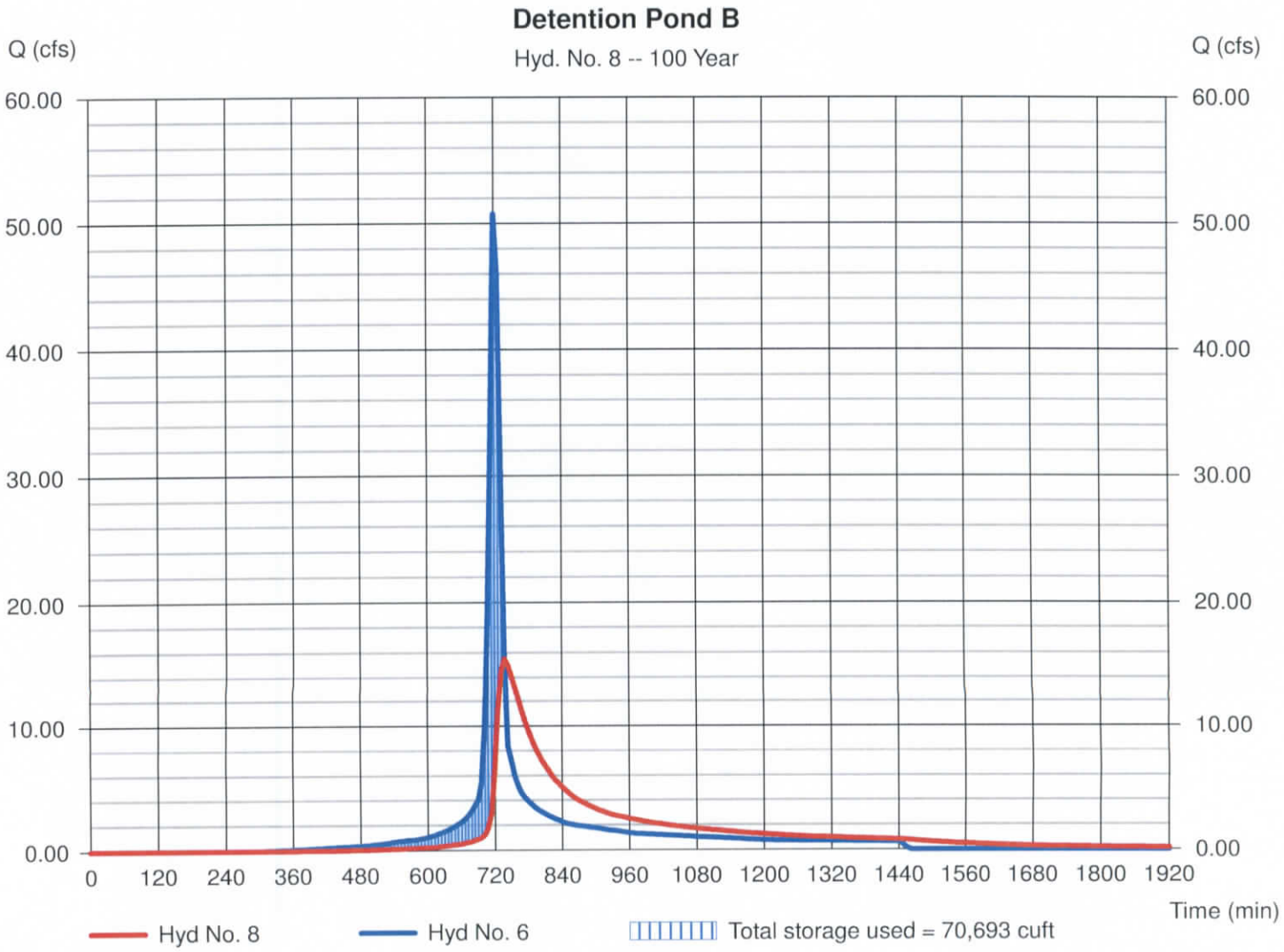
Hydrograph Report

Hyd. No. 8

Detention Pond B

Hydrograph type	=	Reservoir	Peak discharge	=	15.55 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	6 min	Hyd. volume	=	157,215 cuft
Inflow hyd. No.	=	6 - As-Built Basin B	Max. Elevation	=	1010.29 ft
Reservoir name	=	Detention Pond B	Max. Storage	=	70,693 cuft

Storage Indication method used.

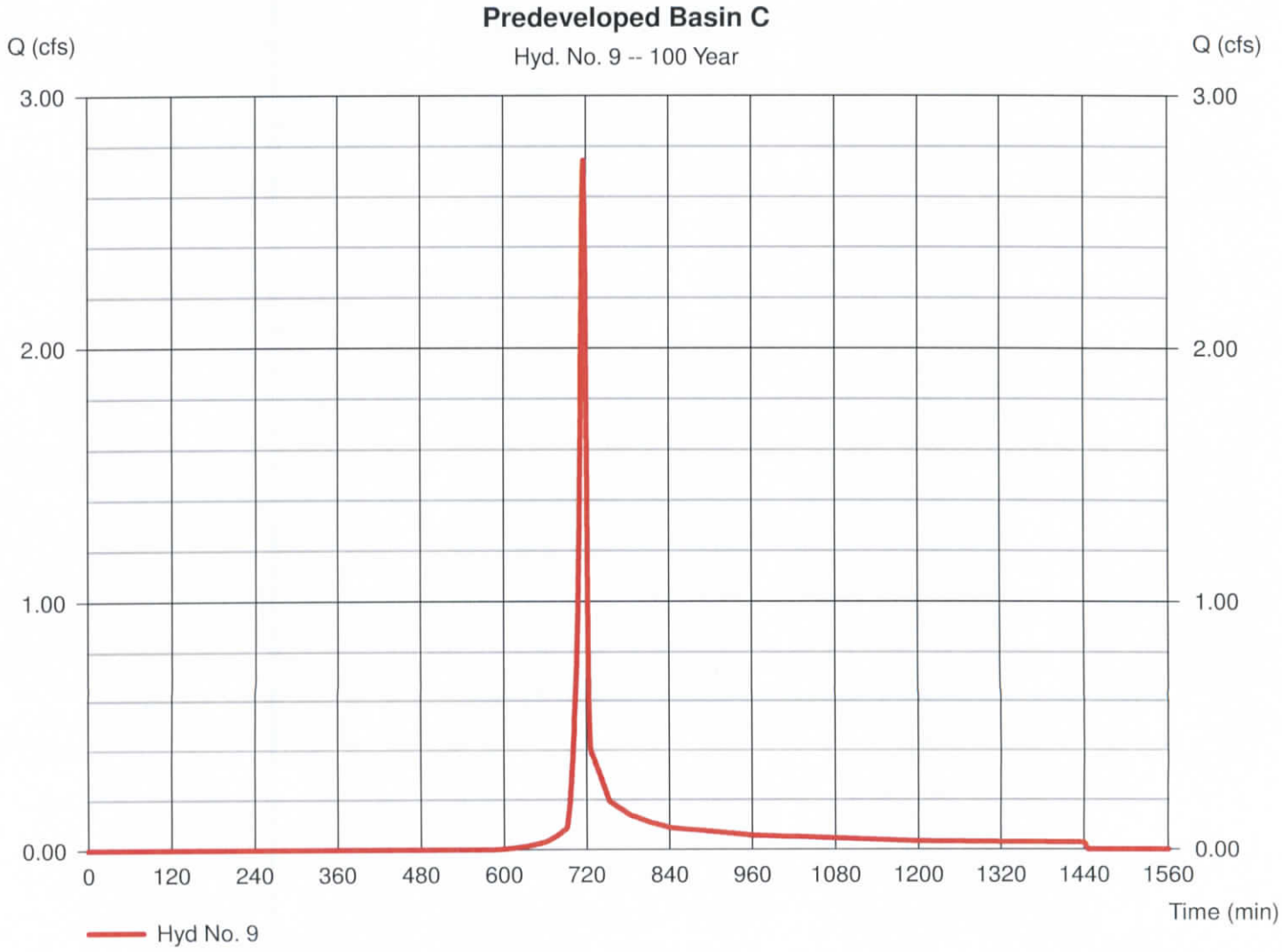


Hydrograph Report

Hyd. No. 9

Predeveloped Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 2.745 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 5,144 cuft
Drainage area	= 0.450 ac	Curve number	= 60.5
Basin Slope	= 7.6 %	Hydraulic length	= 120 ft
Tc method	= LAG	Time of conc. (Tc)	= 3.60 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

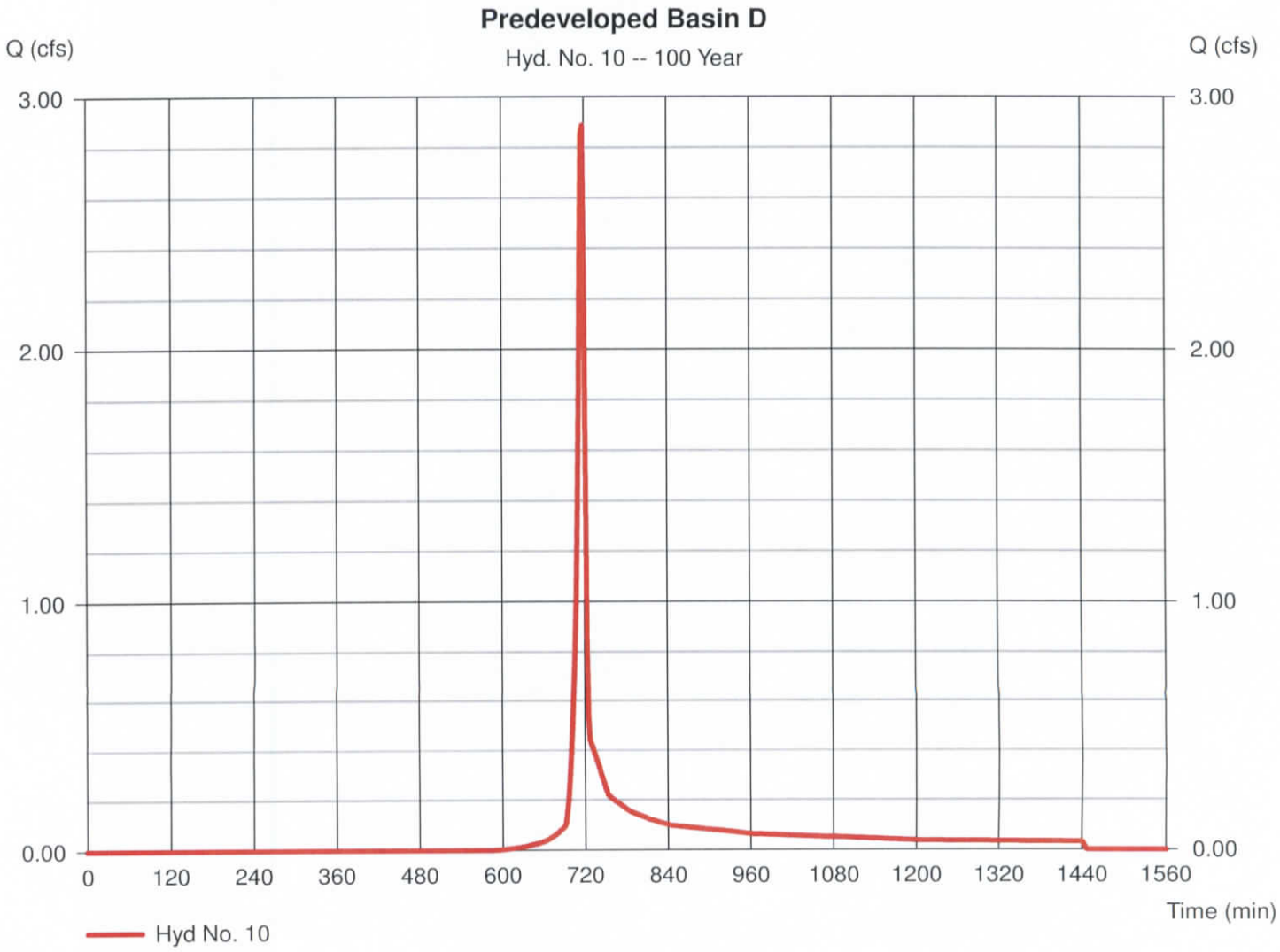


Hydrograph Report

Hyd. No. 10

Predeveloped Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 2.887 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 5,787 cuft
Drainage area	= 0.540 ac	Curve number	= 60.5
Basin Slope	= 7.6 %	Hydraulic length	= 150 ft
Tc method	= LAG	Time of conc. (Tc)	= 4.30 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



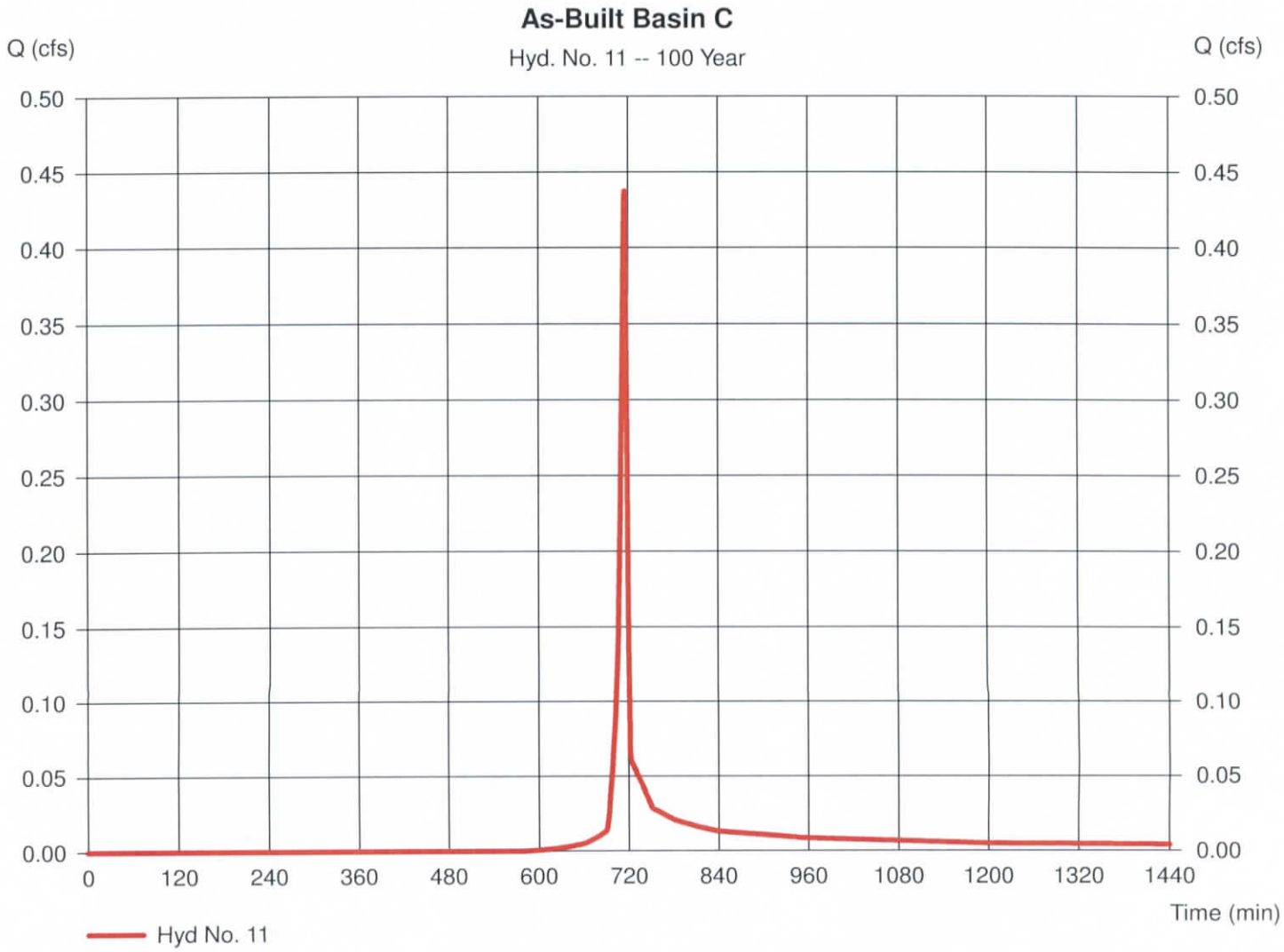
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 11

As-Built Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.437 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 763 cuft
Drainage area	= 0.070 ac	Curve number	= 61
Basin Slope	= 7.6 %	Hydraulic length	= 80 ft
Tc method	= LAG	Time of conc. (Tc)	= 2.58 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



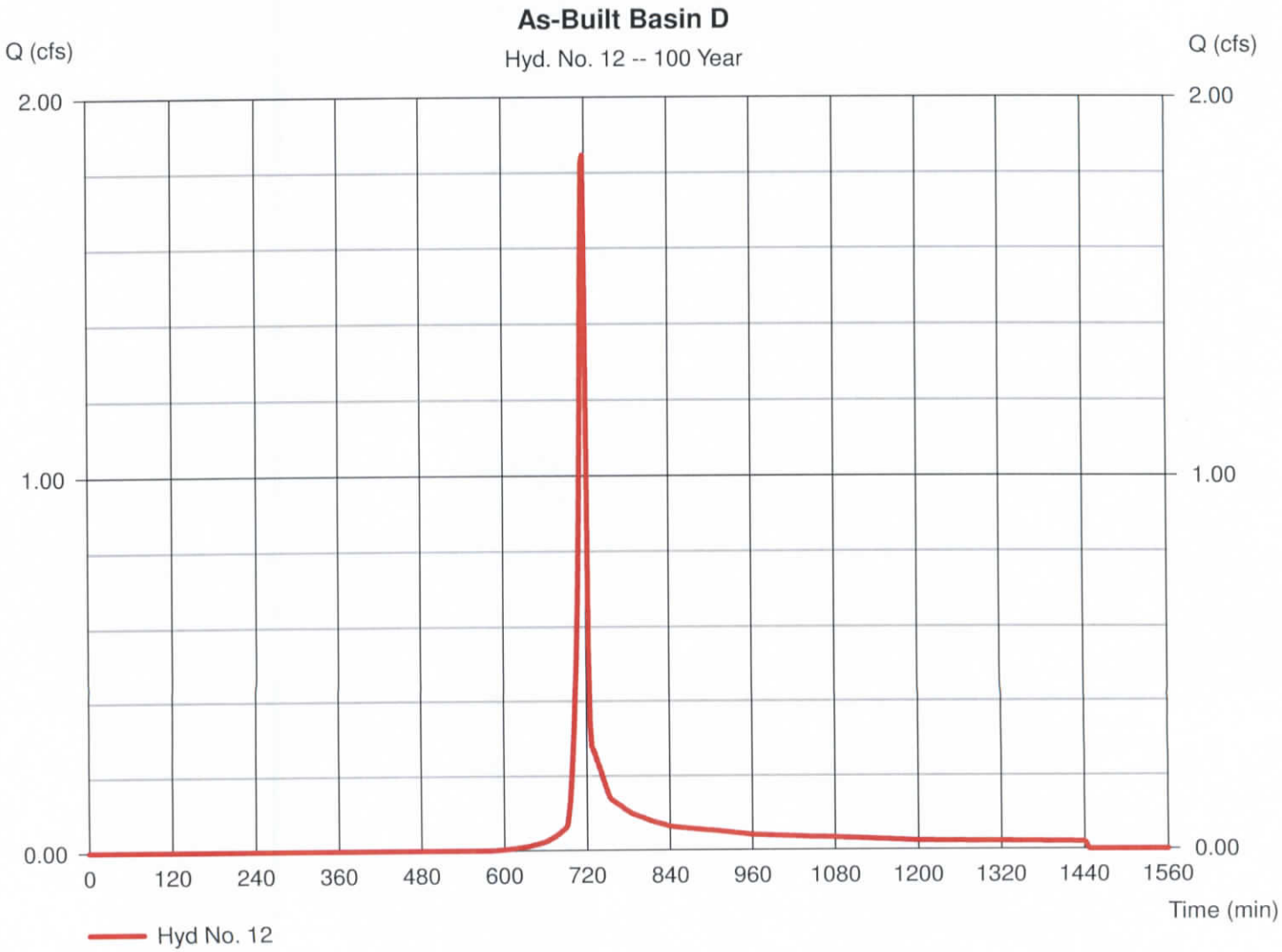
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jan 7, 2014

Hyd. No. 12

As-Built Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 1.848 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,706 cuft
Drainage area	= 0.340 ac	Curve number	= 61
Basin Slope	= 7.6 %	Hydraulic length	= 150 ft
Tc method	= LAG	Time of conc. (Tc)	= 4.26 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



APPENDIX

Runoff Curve Number and Runoff Mon Jan 06 13:55:19 2014

Project: By: Date: 01/06/14
Location: Basin A Checked: Date:
Developed

1. Runoff Curve Number (CN)

Cover description	CN	Soil Group	Area(Acre)
Impervious- Misc	98		0.306
Impervious-Driveway	98		0.284
Impervious-House	98		1.114
Impervious-Roadway	98		0.790
Impervious-Sidewalk	98		0.142
Landscaped	61		2.580
Water Surface	98		0.414

CN (weighted): 81.0
Total Area: 5.630 Acre

2. Runoff

Return Period:	1-Year	
Rainfall, P:	0.00	in
Runoff, Q:	0.0000	in
Runoff Volume:	0.0000	Acre-Ft

Runoff Curve Number and Runoff Mon Jan 06 13:56:10 2014

Project: By: Date: 01/06/14
Location: Basin A-Bypass Checked: Date:
Developed

1. Runoff Curve Number (CN)

Cover description	CN	Soil Group	Area(Acre)
Impervious-House	98		0.103
Landscaped	61		0.659

CN (weighted): 66.0
Total Area: 0.762 Acre

2. Runoff

Return Period:	1-Year	
Rainfall, P:	0.00	in
Runoff, Q:	0.0000	in
Runoff Volume:	0.0000	Acre-Ft

Runoff Curve Number and Runoff Tue Jan 07 09:34:08 2014

Project: By: Date: 01/07/14
Location: Basin B Checked: Date:
Developed

1. Runoff Curve Number (CN)

Cover description	CN	Soil Group	Area(Acre)
Impervious- Misc	98		0.125
Impervious-Driveway	98		0.555
Impervious-House	98		2.230
Impervious-Roadway	98		0.857
Impervious-Sidewalk	98		0.166
Landscaped	61		3.923
Water Surface	98		0.651

CN (weighted): 80.9
Total Area: 8.507 Acre

2. Runoff

Return Period:	1-Year	
Rainfall, P:	0.00	in
Runoff, Q:	0.0000	in
Runoff Volume:	0.0000	Acre-Ft

Project: By: Date: 01/07/14
Location: Basin B-Bypass Checked: Date:
Developed

1. Runoff Curve Number (CN)

Cover description	CN	Soil Group	Area(Acre)
Impervious-House	98		0.016
Landscaped	61		0.958

CN (weighted): 61.6
Total Area: 0.974 Acre

2. Runoff

Return Period:	1-Year	
Rainfall, P:	0.00	in
Runoff, Q:	0.0000	in
Runoff Volume:	0.0000	Acre-Ft