



STORMWATER MANAGEMENT REPORT

FOR

PRELIMINARY & FINAL SITE PLAN

'DUNKIN'

**LOT 64
Block 28005**

**TOWNSHIP OF MONTGOMERY
SOMERSET COUNTY, NEW JERSEY**

October 2020

Prepared by:

A handwritten signature in black ink, appearing to read 'Paul W. Ferriero'.

Paul W. Ferriero, P.E., CME
N.J.P.E. Lic. No. 32978



TABLE OF CONTENTS

	<u>Page</u>
1. Project Description	3
2. Soils	3
3. Stormwater Analysis Methodology	3
4. Stormwater Quality	4
5. Stormwater Recharge	4
6. Stormwater Quantity	4
7. Stormwater Collection System	4
7. Summary and Conclusions	5
Appendix A	- USGS Map - USDA Soil Survey Map - FEMA Map
Appendix B	- Pre-Development Conditions Hydrographs
Appendix C	- Peak Flow Rate Reduction Calculations
Appendix D	- Post Development Conditions Hydrographs
Appendix E	- Basin Routing Analysis
Appendix F	- Stormwater Collection and Conveyance Calculations
Appendix G	- Stormfilter Sizing Calculations Stormfilter by Contech Standard Detail
Appendix H	- Drainage Area Maps

1. Project Description

This project proposes the construction of a new Dunkin Coffee, Espresso and Donut shop within the Township of Montgomery at the northeastern quadrant of the intersections of Route 206 and the Georgetown-Franklin Turnpike. The site has been previously developed and consists of a boarded-up brick building, both pavement and concrete driveways, concrete islands and lighting. The site has not been in service for many years and is in disrepair. The proposed construction will provide for a new 1,820sf building, 17 parking spaces, room for stacking 16 vehicles for the drive-up window and related infrastructure. Per the NJDEP GEOWEB, there are no wetlands located within 300' of the parcel, there are no streams within 300' of the parcel and the parcel is located within Zone X, minimal flood area according to the FEMA flood map.

A copy of the USGS Quadrangle Map and FEMA map with the project area depicted on it has been included in Appendix A.

2. Soils

The developable area of the subject parcel is characterized by soils identified by the United States Department of Agriculture natural Sources Conservation Service (NRCS) Web Soil Survey, as Birdsboro silt loam complex, 2 to 6 percent slopes. These soils are described in the survey as being well drained and have a Hydrologic Soil Group (HSG) classification of 'B'.

A copy of the NRCS Soil Survey Map with the area depicted on it has been included in Appendix A.

3. Stormwater Analysis Methodology

The project proposes to disturb less than 1-acre of land, and proposes less than ¼ acre of new impervious cover and is not considered a "major development" as defined by NJAC 7:8. The proposed stormwater management Filter system has been designed to reduce the amount of TSS pollutants by 80% as required by the Township of Montgomery Stormwater Management rules for re-development. The proposed underground detention basin is designed to maintain pre-construction runoff rates per NJDOT requirements.

Stormwater runoff volumes and peak flow rates have been calculated using the NRCS Method and pipe flows have been calculated using the Rational Method for the existing and proposed conditions for the 2, 10, 25- and 100-year storm events as outlined in Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds. The stormwater analysis was performed utilizing Hydraflow Hydrographs Extension for AutoCAD Civil 3D (v10.3) based on the NJDEP IDF curves and coefficients. A 10-minute time of concentration was utilized for the existing and proposed hydrograph analyses due to the limited size of the project area and runoff flow paths. The existing and proposed runoff conditions were determined through analysis of the change in land surface and applying the project disturbance limit as the drainage area boundary.

Existing Condition:

The area to be redeveloped consists of pavement, concrete, the existing structure and small disconnected grass areas. The property was previously used as a gas and service station. A composite curve number of 78 was estimated based on the land cover present within the 19,154 sf (0.520 Ac.) drainage area boundary utilized for the existing condition analysis. A 10-minute time of concentration (Tc) was utilized to analyze runoff from the pre-developed area.

Proposed Condition:

The project will result in the creation of 2,213 sf of new impervious coverage within the drainage area utilized for the analysis. Due to lot constraints, the proposed parking lot expansion is directly connected to the stormwater detention system. The increase in runoff resulting from the proposed construction will be mitigated through the use of a subsurface stormwater detention system. Stormwater runoff will be collected, stored, and discharged at a control rate before being conveyed to the existing stormwater conveyance system located within the NJDOT right-of-way for U.S. Route 206. Existing drainage patterns and discharge rates from the project area will be preserved, and the paved area will be surrounded by proposed landscaping which will serve as a buffer to the adjacent properties. Due to the limited size of the proposed project, a 10 minute time of concentration was used for the stormwater analysis.

4. Stormwater Quality:

For developments which propose an increase of greater than 10,890 sf (0.25 acres) of impervious surfaces, the NJDEP Stormwater management rules require stormwater management measures designed to reduce the post-construction load of total suspended solids (TSS) from the Water Quality Storm (WQS) by 80% of the anticipated load from the developed site. Since this project proposes less than 10,890 sf of new impervious surface, the stormwater quality requirements of N.J.A.C. 7:8 are not applicable. Under Montgomery Township's Land Development Ordinance, Chapter 16, the Township has implemented Stormwater requirements for 'Minor' developments. Per subsection 16-5.2g7, "If the applicant is seeking subdivision or minor or major site plan approval, or approval for 'd' variances pursuant to N.J.S.A. 40:55D-70d or for 'c' variances for lot coverage", Stormwater Runoff Quality Standards apply. This project seeks site plan approval, therefore 80% TSS removal is required. Water quality will be improved by changing the type of 'Use' from a gas/service station use to a food service-oriented business. This project also proposes to capture and reduce the amount of suspended solids for the increase in impervious cover by treating an area of 0.08 acres, or 3,484s.f.± of proposed pavement. In order to achieve 80% TSS removal rate, a Stormfilter Chamber by Contech Engineered Solutions, LLC is proposed. The filter system will consist of a concrete chamber filled with eight (8) 18" filters, each able to handle flows of 15gpm. A bypass system is constructed within the chamber to allow for larger storm events to pass freely without interruption to the treatment bay. This filter system is Certified by the NJDEP as providing an 80% TSS removal rate.

5. Stormwater Recharge:

For developments which propose an increase of greater than 0.25 acres of impervious surfaces or propose to disturb greater than 1-acre of land, the NJDEP Stormwater management rules require stormwater management measures designed to maintain 100% of the pre-development annual average groundwater recharge in the post-developed state. This project proposes less than 10,890 sf of new impervious surface and proposes to disturb less than 1-acre of land for the construction of the proposed improvements. The stormwater recharge requirements of N.J.A.C. 7:8 are not applicable.

6. Stormwater Quantity:

Post-construction peak runoff rate reductions of 50 percent for the 2-year storm, 75 percent for the 10-year storm, and 80 percent for the 100-year storm are required for projects considered a "major development" as defined by NJAC 7:8. Since this project is not considered a "major development" as defined by NJAC 7:8, the project is not subject to the rate reductions required by the rules. However, discharge of stormwater runoff from the site will be conveyed to the NJDOT stormwater facilities. This project proposes to increase the impervious coverage by 2,213sf. In order to comply with State regulations, stormwater management measures have been designed for the project to reduce or maintain the predevelopment peak runoff rates in the post-constructed condition.

As shown on the drainage area map in Appendix D, a total contributory drainage area of 0.520 acres was utilized for the pre-development and post-development peak flow rate analysis. Peak runoff rates from the

area to be disturbed must be maintained or reduced in the post-developed condition. The existing peak runoff rates and proposed discharges from the drainage area analyzed are summarized as follows:

Storm Event	Pre-Development Peak Runoff (EDA) (cfs)	Post-Development Peak Runoff (PDA) (cfs)
2 yr.	1.1	0.9
10 yr.	1.8	1.6
25 yr.	2.3	2.2
100 yr.	3.2	3.2

7. Stormwater Collection System

Currently, runoff generated from the site flows un-detained, in a northeasterly direction to an inlet located along US Route 206. This inlet is a part of a NJDOT stormwater collection/conveyance system along US Route 206. The NJDOT stormwater conveyance system consists of 24" RCP with a slope of 3.5% where the proposed connection is located. The existing NJDOT conveyance system was previously analyzed which demonstrated that the runoff generated by this development will not greatly impact the system.

Calculations were performed for the proposed development which indicates the proposed onsite conveyance system is designed to adequately capture and convey the 2, 10, 25 and 100 year storms safely. Three (3) inlets are proposed to capture the onsite stormwater runoff, while roof leaders will convey roof runoff directly to the proposed underground detention system. 12" RCP is specified for a portion of the onsite conveyance system due to burial constraints, the proposed pavement box depth and invert elevations to the proposed detention system. The detention system consists of 3 rows of 36" HDPE pipe and manhole OS-1, an outfall structure. The outfall structure is designed to reduce flow rates to less than, or equal to, flow rates of the pre-existing conditions.

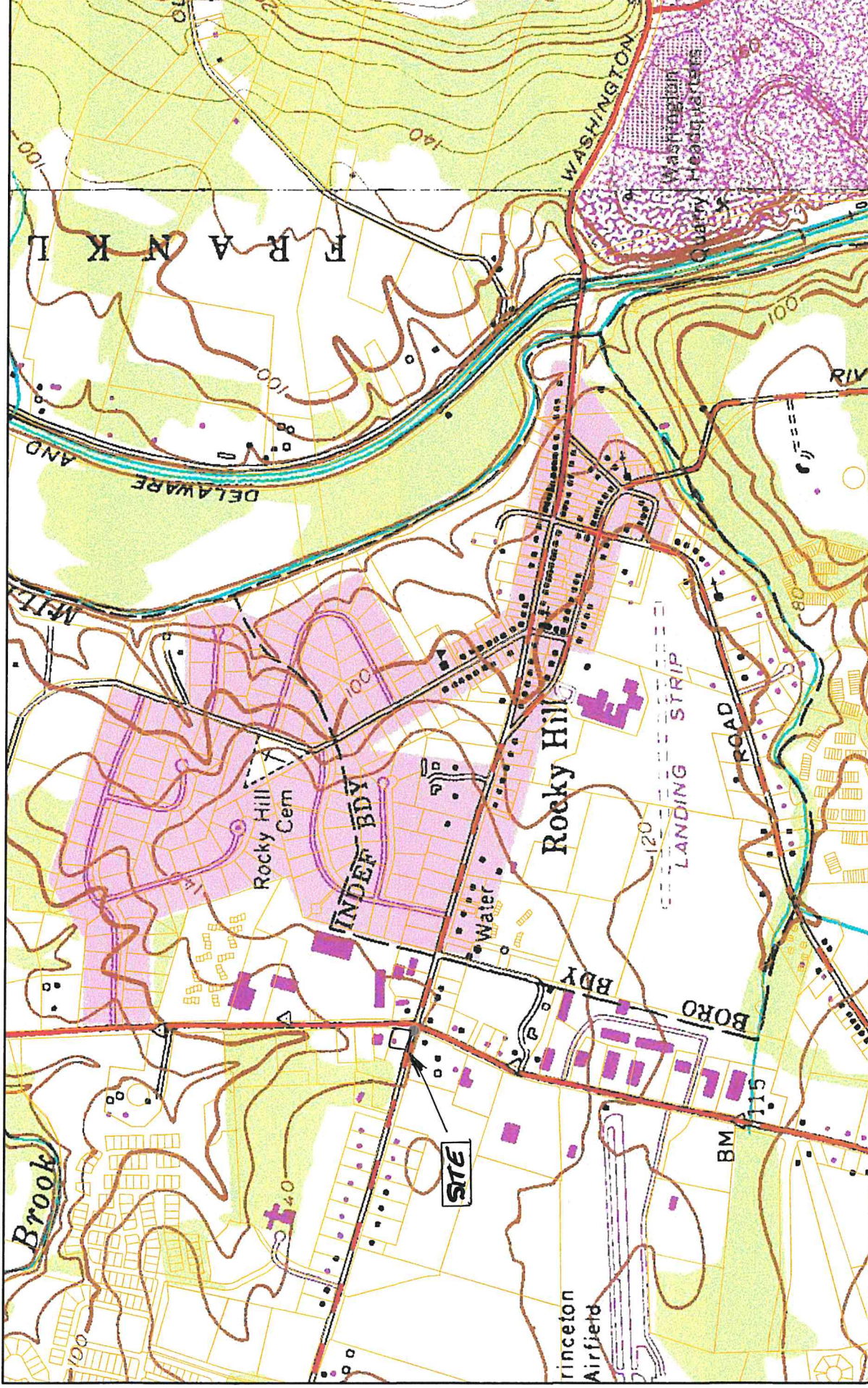
8. Summary and Conclusions:

The stormwater management controls for the project have been designed to mitigate the effects of the proposed construction on lot 64 in block 28005 through storage, discharge control and mitigation for TSS removal of runoff collected from the proposed development. The proposed stormwater underground detention system will result in the maintenance or reduction of pre-construction runoff rates from the project area based on the analysis of the 2yr, 10yr, 25yr and 100yr storm events. The proposed stormwater controls ensure that there will be no negative downstream impacts with respect to runoff quantity and suspended solids as a result of the proposed construction. The calculations indicate that the drainage system as designed does have adequate capacity to convey all of the storm events including the 100 year storm.

APPENDIX A

**USGS MAP
USDA SOILS MAP
FEMA MAP**

1270 US Route 206, Skillman, NJ



10/14/2020, 6:15:56 AM

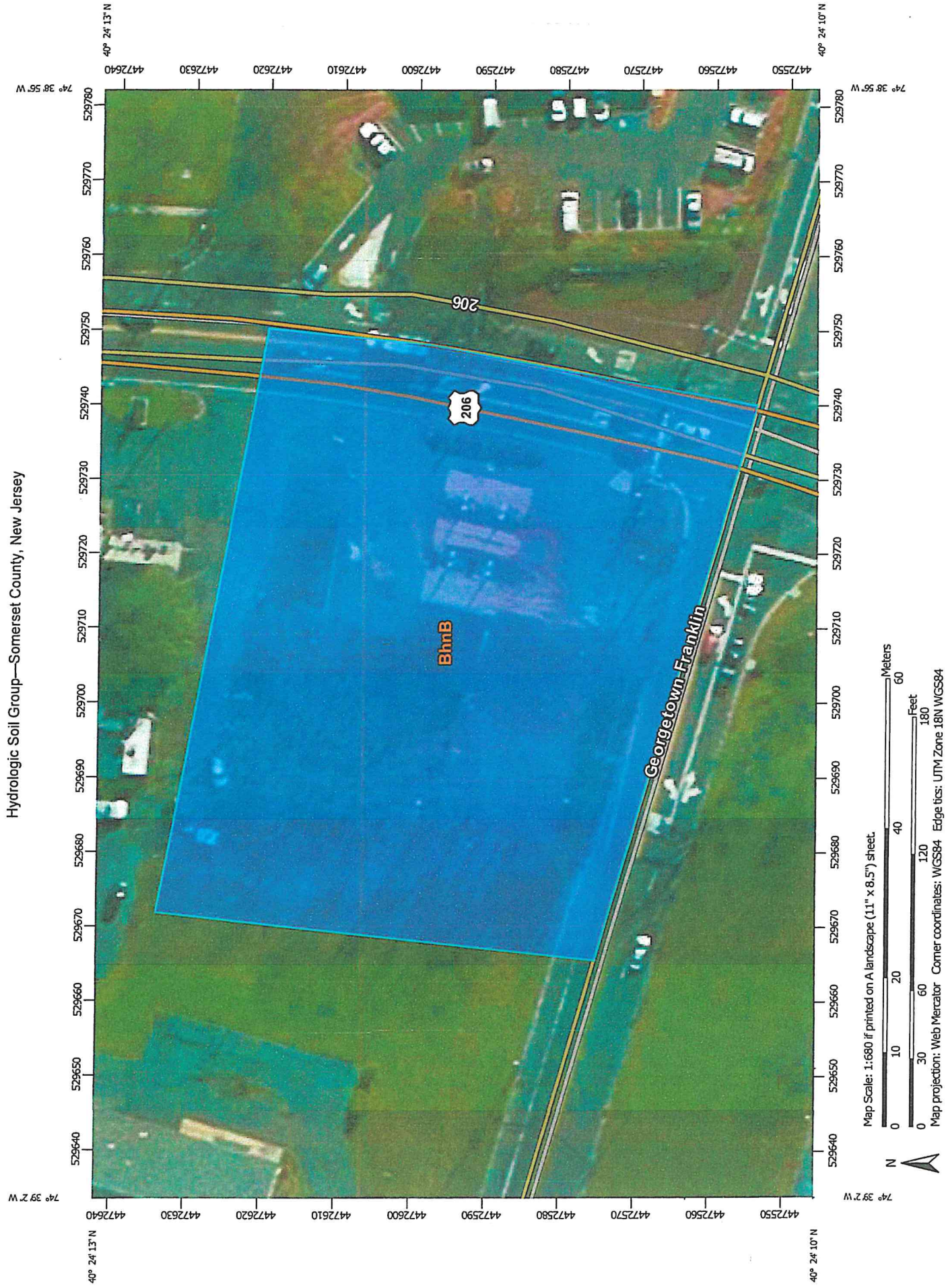
1:18,056

County Boundaries

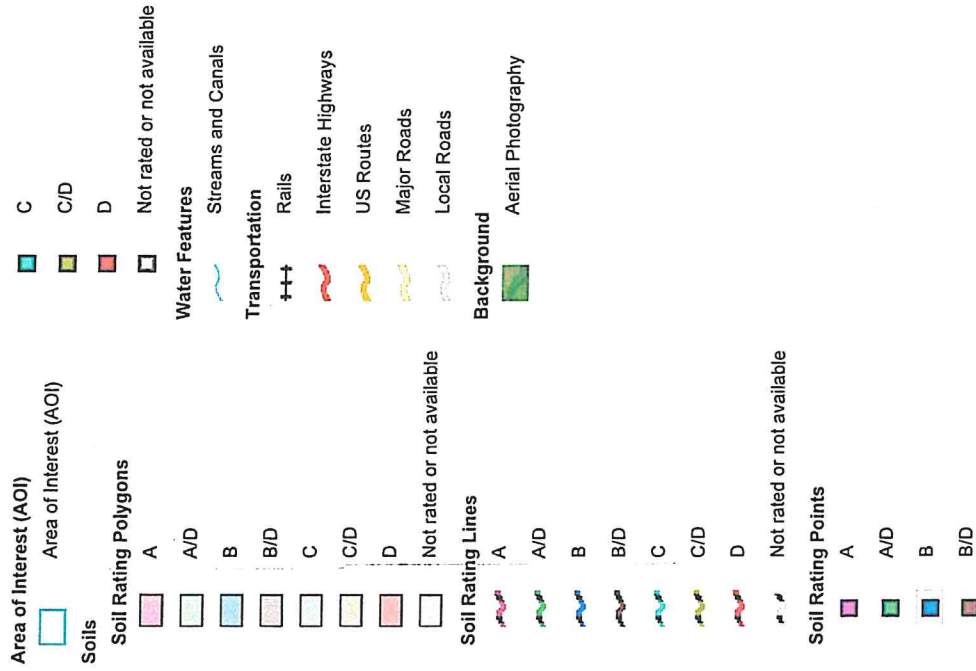
Parcels Data (Block and Lot)

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap

New Jersey Department of Environmental Protection
Esri Community Maps Contributors, Somerset County, NJ, State of New Jersey, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METINASA, USGS, EPA, NPS, US Census Bureau, USDA | NJDEP | NJDEP | NJDEP, Bureau of Energy and Sustainability Edition 20190327 |



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Somerset County, New Jersey
Survey Area Data: Version 12, Sep 24, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 19, 2011—May 1, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Somerset County, New Jersey (NJ035)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BhnB	Birdsboro silt loam, 2 to 6 percent slopes	B	1.2	100.0%
Totals for Area of Interest			1.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

74°39'17"W 40°24'25"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

Without Base Flood Elevation (BFE)
Zone A, V, AE, AH, VE, AR
With BFE or Depth
Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee. See Notes.
Area with Flood Risk due to Levee

OTHER AREAS

NO SCREEN
Area of Minimal Flood Hazard
Effective LOMRs
Area of Undetermined Flood Hazard
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall

GENERAL STRUCTURES

20.2
17.5
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Base Flood Elevation Line (BFE)
Limit of Study
Jurisdiction Boundary
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature

OTHER FEATURES

Digital Data Available
No Digital Data Available
Unmapped

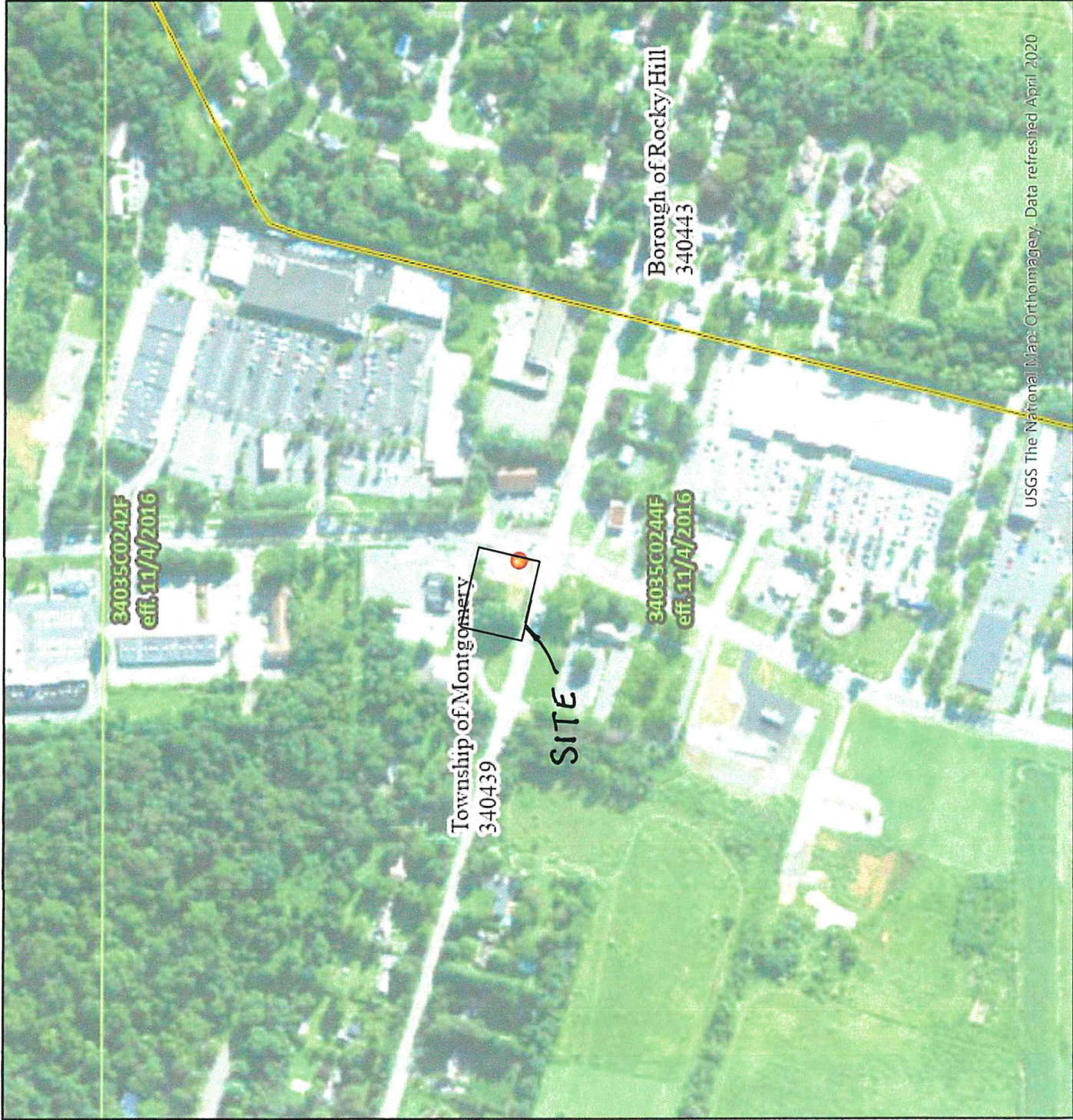
MAP PANELS

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/14/2020 at 6:28 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



USGS The National Map: Orthom imagery. Data refreshed April 2020

74°39'17"W 40°24'25"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

APPENDIX B

PRE-DEVELOPED CONDITIONS
HYDROGRAPHS

Hydraflow Table of Contents

SCS Dunkin 36 10-22-2020.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Watershed Model Schematic.....	1
---------------------------------------	----------

Hydrograph Return Period Recap.....	2
--	----------

2 - Year

Summary Report.....	3
----------------------------	----------

Hydrograph Reports.....	4
--------------------------------	----------

Hydrograph No. 1, SCS Runoff, Pre-Perv.....	4
---	---

Hydrograph No. 2, SCS Runoff, Pre--Imp.....	5
---	---

Hydrograph No. 3, SCS Runoff, Pre-gravel.....	6
---	---

Hydrograph No. 4, Combine, Pre-total.....	7
---	---

Hydrograph No. 5, SCS Runoff, CB-2 perv.....	8
--	---

Hydrograph No. 6, SCS Runoff, CB-2 Imp.....	9
---	---

Hydrograph No. 7, Combine, CB-2 total.....	10
--	----

Hydrograph No. 8, SCS Runoff, CB-1 Perv.....	11
--	----

Hydrograph No. 9, SCS Runoff, CB-1 Imp.....	12
---	----

Hydrograph No. 10, Combine, CB-1 total.....	13
---	----

Hydrograph No. 11, SCS Runoff, CB-3 Imp.....	14
--	----

Hydrograph No. 12, SCS Runoff, Dunkin Bldg.....	15
---	----

Hydrograph No. 13, Combine, Total to Basin.....	16
---	----

Hydrograph No. 14, Reservoir, Det Basin.....	17
--	----

Pond Report - Det Basin.....	18
------------------------------	----

Hydrograph No. 15, SCS Runoff, Bypass-Perv.....	21
---	----

Hydrograph No. 16, SCS Runoff, Bypass-Imp.....	22
--	----

Hydrograph No. 17, Combine, Bypass Totla.....	23
---	----

Hydrograph No. 18, Combine, Total out.....	24
--	----

10 - Year

Summary Report.....	25
----------------------------	-----------

Hydrograph Reports.....	26
--------------------------------	-----------

Hydrograph No. 1, SCS Runoff, Pre-Perv.....	26
---	----

Hydrograph No. 2, SCS Runoff, Pre--Imp.....	27
---	----

Hydrograph No. 3, SCS Runoff, Pre-gravel.....	28
---	----

Hydrograph No. 4, Combine, Pre-total.....	29
---	----

Hydrograph No. 5, SCS Runoff, CB-2 perv.....	30
--	----

Hydrograph No. 6, SCS Runoff, CB-2 Imp.....	31
---	----

Hydrograph No. 7, Combine, CB-2 total.....	32
--	----

Hydrograph No. 8, SCS Runoff, CB-1 Perv.....	33
--	----

Hydrograph No. 9, SCS Runoff, CB-1 Imp.....	34
---	----

Hydrograph No. 10, Combine, CB-1 total.....	35
---	----

Hydrograph No. 11, SCS Runoff, CB-3 Imp.....	36
--	----

Hydrograph No. 12, SCS Runoff, Dunkin Bldg.....	37
---	----

Hydrograph No. 13, Combine, Total to Basin.....	38
---	----

Hydrograph No. 14, Reservoir, Det Basin.....	39
--	----

Hydrograph No. 15, SCS Runoff, Bypass-Perv.....	40
---	----

Hydrograph No. 16, SCS Runoff, Bypass-Imp.....	41
--	----

Hydrograph No. 17, Combine, Bypass Totla.....	42
---	----

Hydrograph No. 18, Combine, Total out.....	43
--	----

25 - Year

Summary Report.....	44
Hydrograph Reports.....	45
Hydrograph No. 1, SCS Runoff, Pre-Perv.....	45
Hydrograph No. 2, SCS Runoff, Pre--Imp.....	46
Hydrograph No. 3, SCS Runoff, Pre-gravel.....	47
Hydrograph No. 4, Combine, Pre-total.....	48
Hydrograph No. 5, SCS Runoff, CB-2 perv.....	49
Hydrograph No. 6, SCS Runoff, CB-2 Imp.....	50
Hydrograph No. 7, Combine, CB-2 total.....	51
Hydrograph No. 8, SCS Runoff, CB-1 Perv.....	52
Hydrograph No. 9, SCS Runoff, CB-1 Imp.....	53
Hydrograph No. 10, Combine, CB-1 total.....	54
Hydrograph No. 11, SCS Runoff, CB-3 Imp.....	55
Hydrograph No. 12, SCS Runoff, Dunkin Bldg.....	56
Hydrograph No. 13, Combine, Total to Basin.....	57
Hydrograph No. 14, Reservoir, Det Basin.....	58
Hydrograph No. 15, SCS Runoff, Bypass-Perv.....	59
Hydrograph No. 16, SCS Runoff, Bypass-Imp.....	60
Hydrograph No. 17, Combine, Bypass Totla.....	61
Hydrograph No. 18, Combine, Total out.....	62

100 - Year

Summary Report.....	63
Hydrograph Reports.....	64
Hydrograph No. 1, SCS Runoff, Pre-Perv.....	64
Hydrograph No. 2, SCS Runoff, Pre--Imp.....	65
Hydrograph No. 3, SCS Runoff, Pre-gravel.....	66
Hydrograph No. 4, Combine, Pre-total.....	67
Hydrograph No. 5, SCS Runoff, CB-2 perv.....	68
Hydrograph No. 6, SCS Runoff, CB-2 Imp.....	69
Hydrograph No. 7, Combine, CB-2 total.....	70
Hydrograph No. 8, SCS Runoff, CB-1 Perv.....	71
Hydrograph No. 9, SCS Runoff, CB-1 Imp.....	72
Hydrograph No. 10, Combine, CB-1 total.....	73
Hydrograph No. 11, SCS Runoff, CB-3 Imp.....	74
Hydrograph No. 12, SCS Runoff, Dunkin Bldg.....	75
Hydrograph No. 13, Combine, Total to Basin.....	76
Hydrograph No. 14, Reservoir, Det Basin.....	77
Hydrograph No. 15, SCS Runoff, Bypass-Perv.....	78
Hydrograph No. 16, SCS Runoff, Bypass-Imp.....	79
Hydrograph No. 17, Combine, Bypass Totla.....	80
Hydrograph No. 18, Combine, Total out.....	81

	fair	----- 35	----- 56	----- 70	----- 77
	good	----- 30	----- 48	----- 65	----- 73
Woods - grass combination	poor	----- 57	----- 73	----- 82	----- 86
	fair	----- 43	----- 65	----- 76	----- 82
	good	----- 32	----- 58	----- 72	----- 79
Woods	poor	----- 45	----- 66	----- 77	----- 83
	fair	----- 36	----- 60	----- 73	----- 79
	good	----- 30	----- 55	----- 70	----- 77
Farmsteads	---	----- 59	----- 74	----- 82	----- 86
FULLY DEVELOPED URBAN AREAS (Veg Established)					
Open space (Lawns,parks etc.)					
	Poor condition; grass cover < 50%	----- 68	----- 79	----- 86	----- 89
	Fair condition; grass cover 50% to 75 %	----- 49	----- 69	----- 79	----- 84
	Good condition; grass cover > 75%	----- 39	----- 61	----- 74	----- 80
Impervious Areas					
	Paved parking lots, roofs, driveways	----- 98	----- 98	----- 98	----- 98
	Streets and roads				
	Paved; curbs and storm sew	----- 98	----- 98	----- 98	----- 98
	Paved; open ditches (w/right-of-way)	----- 83	----- 89	----- 92	----- 93
	Gravel (w/ right-of-way)	----- 76	----- 85	----- 89	----- 91
	Dirt (w/ right-of-way)	----- 72	----- 82	----- 87	----- 89
Urban Districts					
	Avg % impervious				
	Commercial & business	----- 89	----- 92	----- 94	----- 95
	Industrial	----- 81	----- 88	----- 91	----- 93
Residential districts by average lot size					
	Avg % impervious				
	1/8 acre (town houses)	----- 77	----- 85	----- 90	----- 92
	1/4 acre	----- 61	----- 75	----- 83	----- 87
	1/3 acre	----- 57	----- 72	----- 81	----- 86
	1/2 acre	----- 54	----- 70	----- 80	----- 85
	1 acre	----- 51	----- 68	----- 79	----- 84
	2 acre	----- 46	----- 65	----- 77	----- 82
	User defined urban	----- **	----- **	----- **	----- **
DEVELOPING URBAN AREA (No Vegetation)					
	Newly graded area (pervious or	----- 77	----- 86	----- 91	----- 94

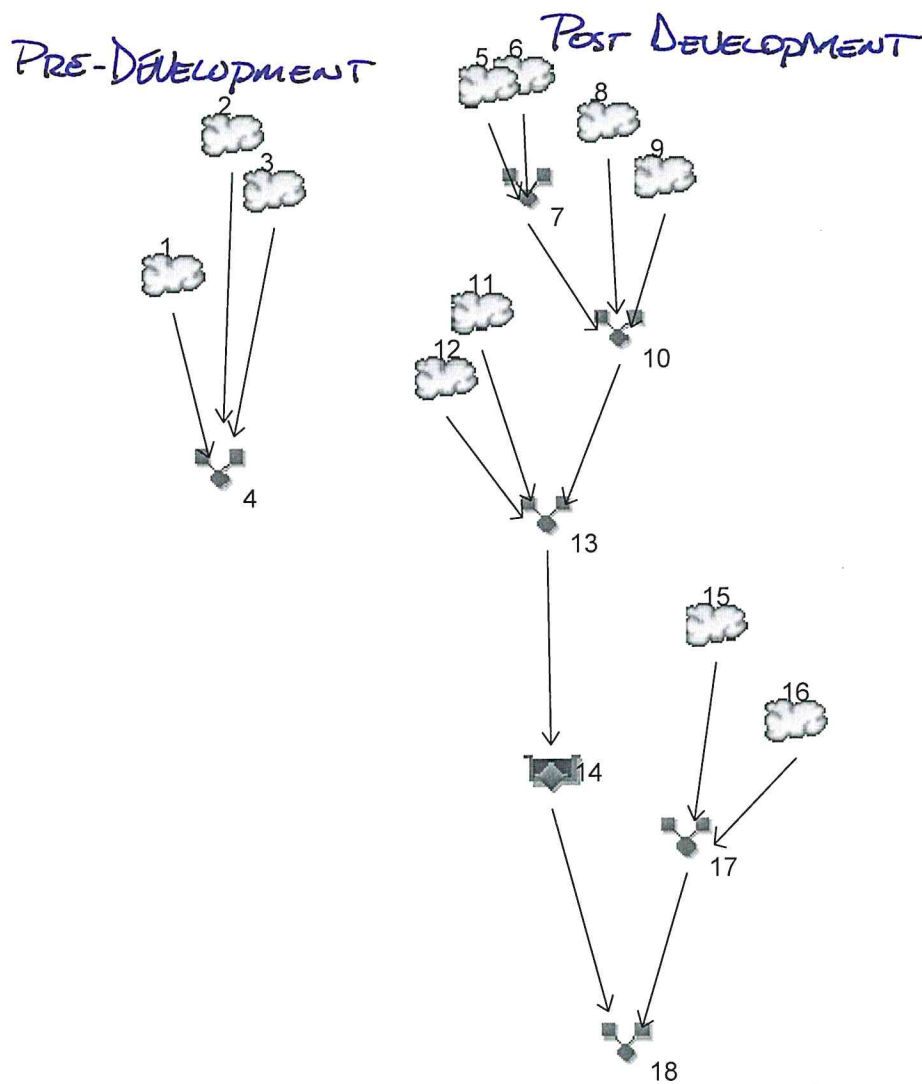
0 0 0 0

Total Acres 0

Weighted Runoff Curve Number (RCN) 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre-Perv
2	SCS Runoff	Pre-Imp
3	SCS Runoff	Pre-gravel
4	Combine	Pre-total
5	SCS Runoff	CB-2 perv
6	SCS Runoff	CB-2 Imp
7	Combine	CB-2 total
8	SCS Runoff	CB-1 Perv
9	SCS Runoff	CB-1 Imp
10	Combine	CB-1 total
11	SCS Runoff	CB-3 Imp
12	SCS Runoff	Dunkin Bldg
13	Combine	Total to Basin
14	Reservoir	Det Basin
15	SCS Runoff	Bypass-Perv
16	SCS Runoff	Bypass-Imp
17	Combine	Bypass Totla
18	Combine	Total out

Hydrograph Return Period Recap

Hydratlow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	-----	-----	0.051	-----	-----	0.186	0.299	-----	0.530	Pre-Perv
2	SCS Runoff	-----	-----	0.880	-----	-----	1.329	1.635	-----	2.187	Pre-Imp
3	SCS Runoff	-----	-----	0.159	-----	-----	0.283	0.369	-----	0.523	Pre-gravel
4	Combine	1, 2, 3	-----	1.084	-----	-----	1.793	2.297	-----	3.232	Pre-total
5	SCS Runoff	-----	-----	0.007	-----	-----	0.027	0.043	-----	0.076	CB-2 perv
6	SCS Runoff	-----	-----	0.557	-----	-----	0.842	1.036	-----	1.385	CB-2 Imp
7	Combine	5, 6	-----	0.564	-----	-----	0.868	1.077	-----	1.460	CB-2 total
8	SCS Runoff	-----	-----	0.004	-----	-----	0.013	0.021	-----	0.038	CB-1 Perv
9	SCS Runoff	-----	-----	0.264	-----	-----	0.399	0.491	-----	0.656	CB-1 Imp
10	Combine	7, 8, 9	-----	0.831	-----	-----	1.279	1.589	-----	2.153	CB-1 total
11	SCS Runoff	-----	-----	0.235	-----	-----	0.355	0.436	-----	0.583	CB-3 Imp
12	SCS Runoff	-----	-----	0.117	-----	-----	0.177	0.218	-----	0.292	Dunkin Bldg
13	Combine	10, 11, 12	-----	1.183	-----	-----	1.811	2.243	-----	3.028	Total to Basin
14	Reservoir	13	-----	0.726	-----	-----	1.380	1.804	-----	2.671	Det Basin
15	SCS Runoff	-----	-----	0.007	-----	-----	0.027	0.043	-----	0.076	Bypass-Perv
16	SCS Runoff	-----	-----	0.205	-----	-----	0.310	0.382	-----	0.510	Bypass-Imp
17	Combine	15, 16	-----	0.212	-----	-----	0.336	0.423	-----	0.585	Bypass Totla
18	Combine	14, 17	-----	0.867	-----	-----	1.649	2.161	-----	3.184	Total out
Proj. file: SCS Dunkin 36 10-22-2020.gpw										Friday, 10 / 23 / 2020	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.051	1	730	255	-----	-----	-----	Pre-Perv
2	SCS Runoff	0.880	1	726	3,384	-----	-----	-----	Pre--Imp
3	SCS Runoff	0.159	1	727	545	-----	-----	-----	Pre-gravel
4	Combine	1.084	1	727	4,184	1, 2, 3	-----	-----	Pre-total
5	SCS Runoff	0.007	1	730	36	-----	-----	-----	CB-2 perv
6	SCS Runoff	0.557	1	726	2,143	-----	-----	-----	CB-2 Imp
7	Combine	0.564	1	726	2,179	5, 6	-----	-----	CB-2 total
8	SCS Runoff	0.004	1	730	18	-----	-----	-----	CB-1 Perv
9	SCS Runoff	0.264	1	726	1,015	-----	-----	-----	CB-1 Imp
10	Combine	0.831	1	726	3,213	7, 8, 9	-----	-----	CB-1 total
11	SCS Runoff	0.235	1	726	902	-----	-----	-----	CB-3 Imp
12	SCS Runoff	0.117	1	726	451	-----	-----	-----	Dunkin Bldg
13	Combine	1.183	1	726	4,566	10, 11, 12	-----	-----	Total to Basin
14	Reservoir	0.726	1	734	4,553	13	123.96	1,137	Det Basin
15	SCS Runoff	0.007	1	730	36	-----	-----	-----	Bypass-Perv
16	SCS Runoff	0.205	1	726	789	-----	-----	-----	Bypass-Imp
17	Combine	0.212	1	726	826	15, 16	-----	-----	Bypass Totla
18	Combine	0.867	1	733	5,379	14, 17	-----	-----	Total out
SCS Dunkin 36 10-22-2020.gpw					Return Period: 2 Year			Friday, 10 / 23 / 2020	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

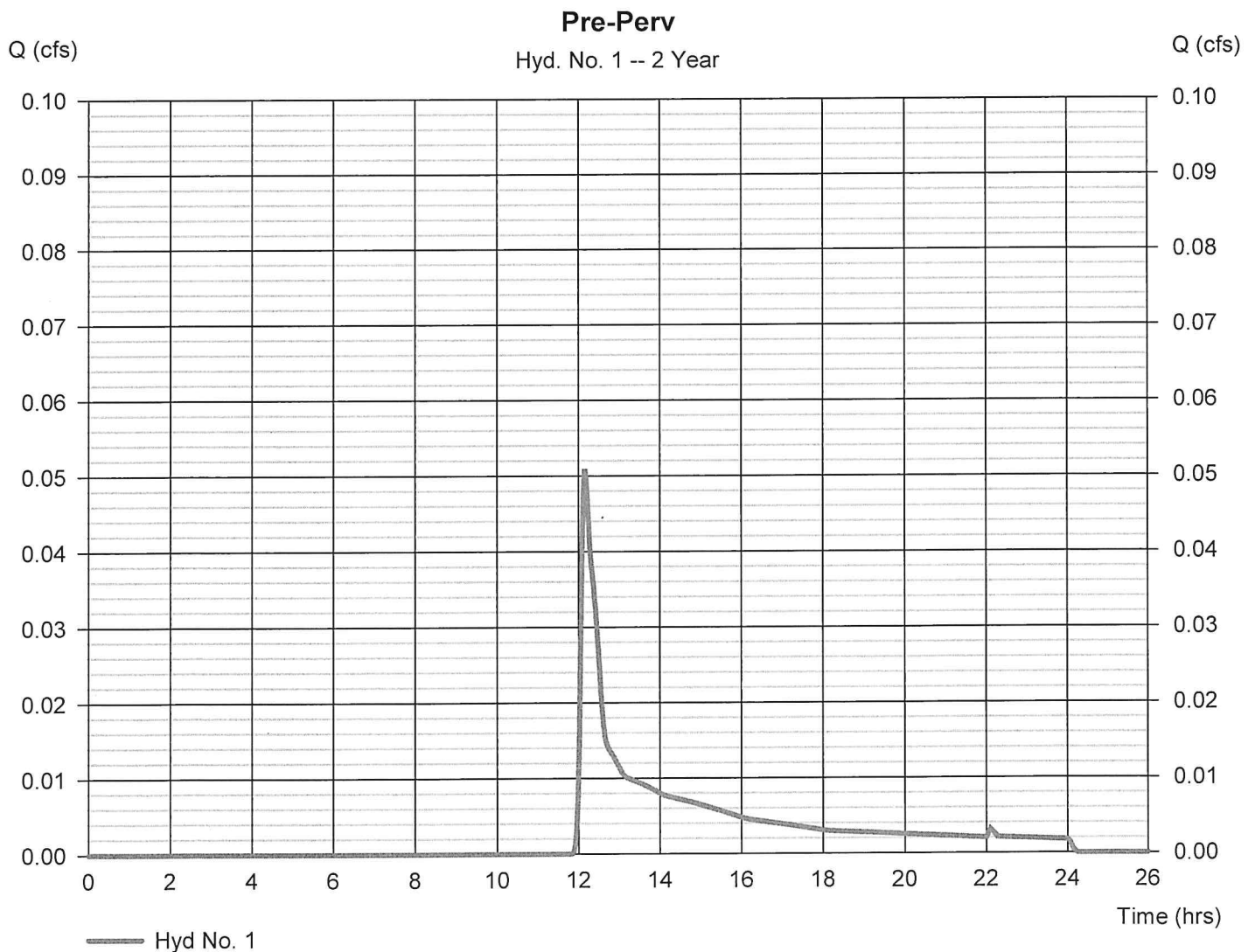
Friday, 10 / 23 / 2020

Hyd. No. 1

Pre-Perv

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.140 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.051 cfs
 Time to peak = 12.17 hrs
 Hyd. volume = 255 cuft
 Curve number = 61
 Hydraulic length = 198 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

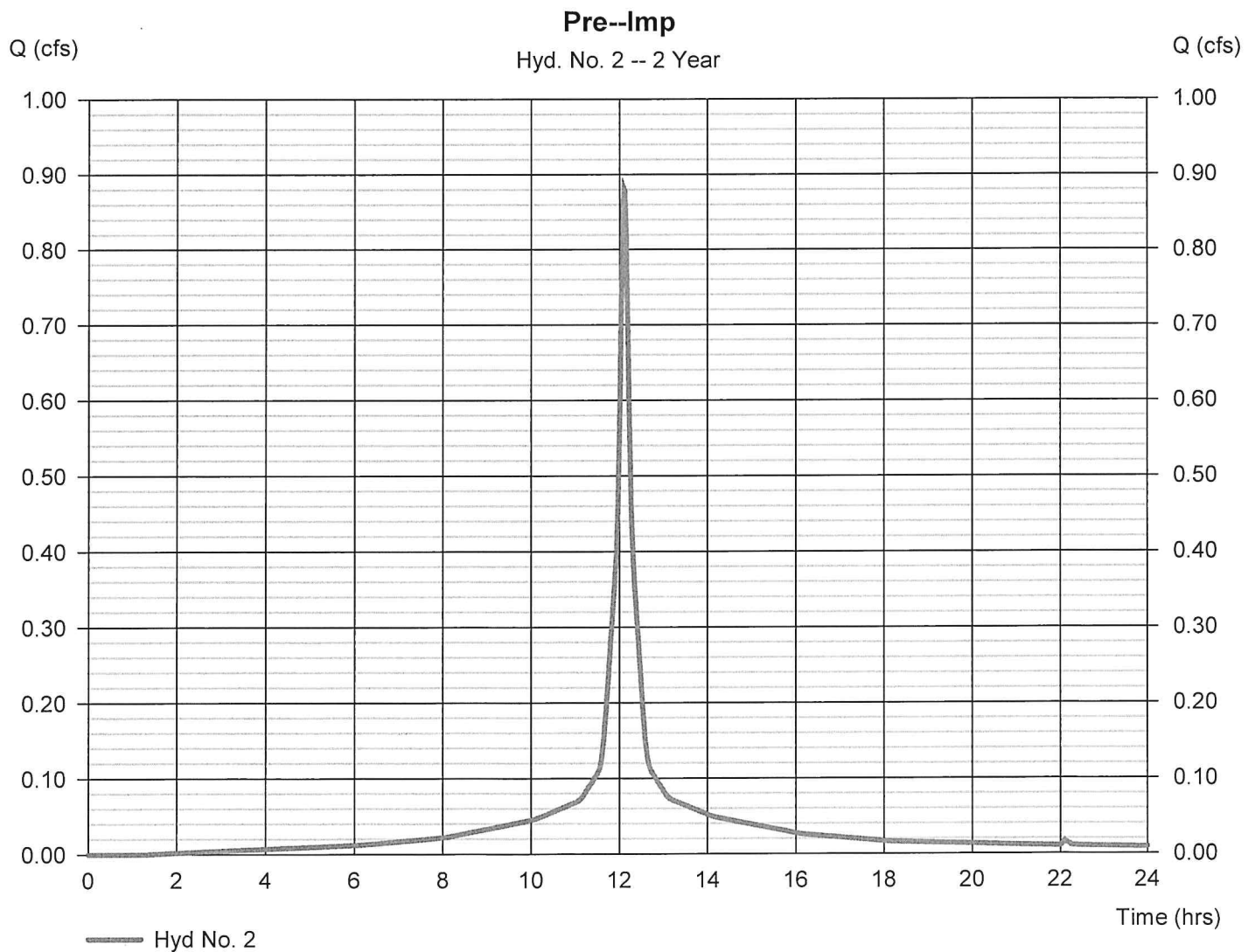
Friday, 10 / 23 / 2020

Hyd. No. 2

Pre--Imp

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.300 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.880 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 3,384 cuft
 Curve number = 98
 Hydraulic length = 178 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

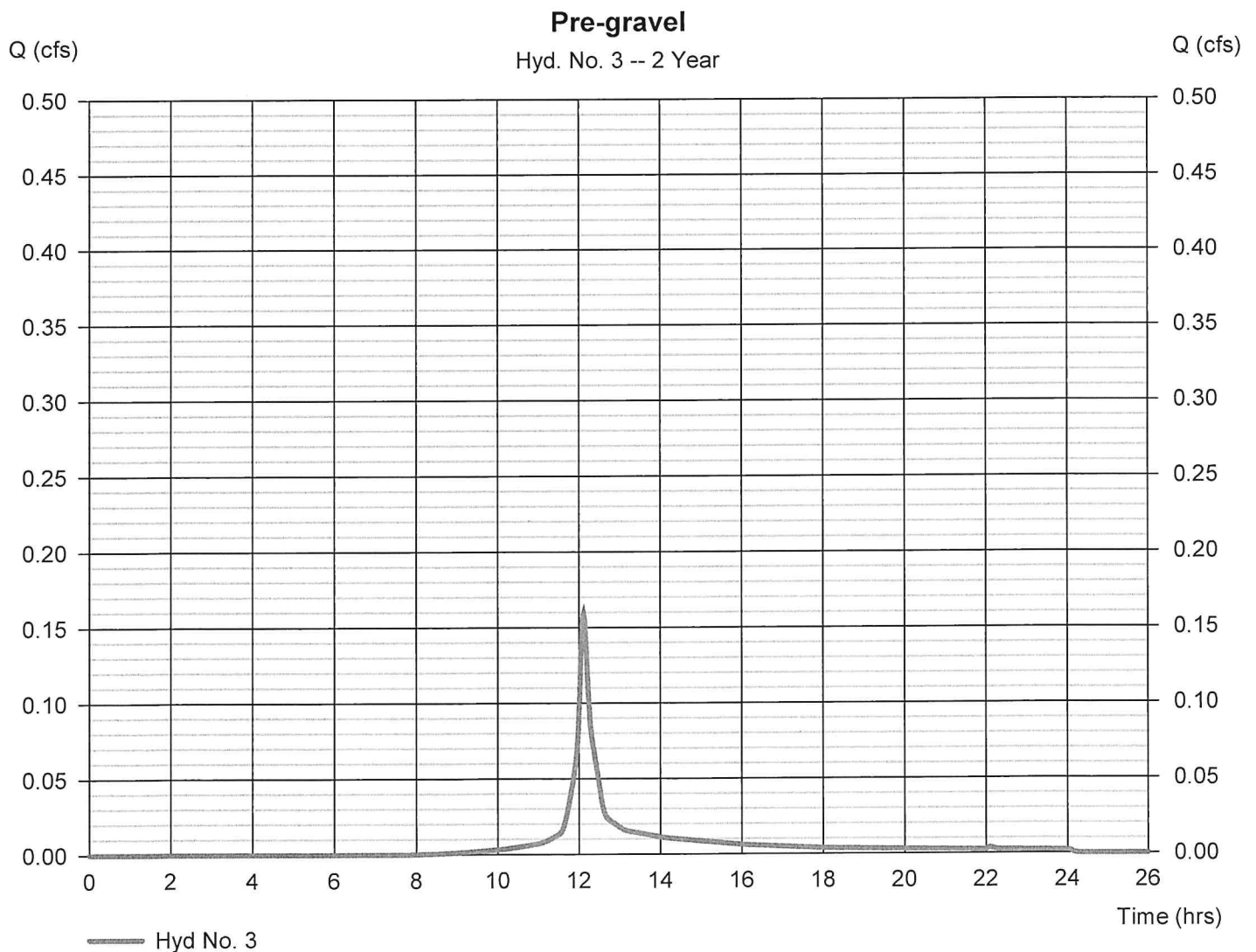
Friday, 10 / 23 / 2020

Hyd. No. 3

Pre-gravel

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.080 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.159 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 545 cuft
 Curve number = 85
 Hydraulic length = 178 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

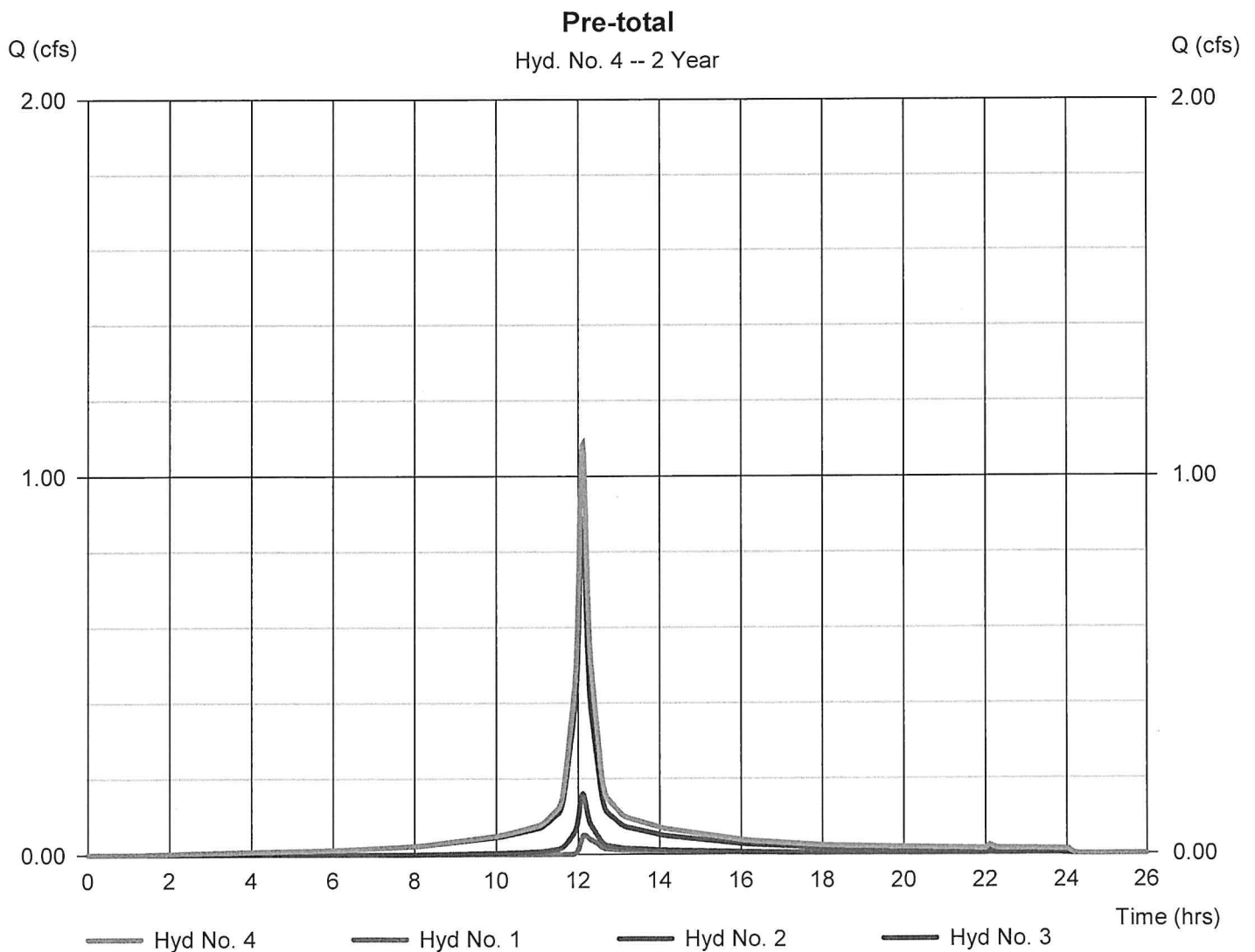
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 1.084 cfs
Time to peak = 12.12 hrs
Hyd. volume = 4,184 cuft
Contrib. drain. area = 0.520 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

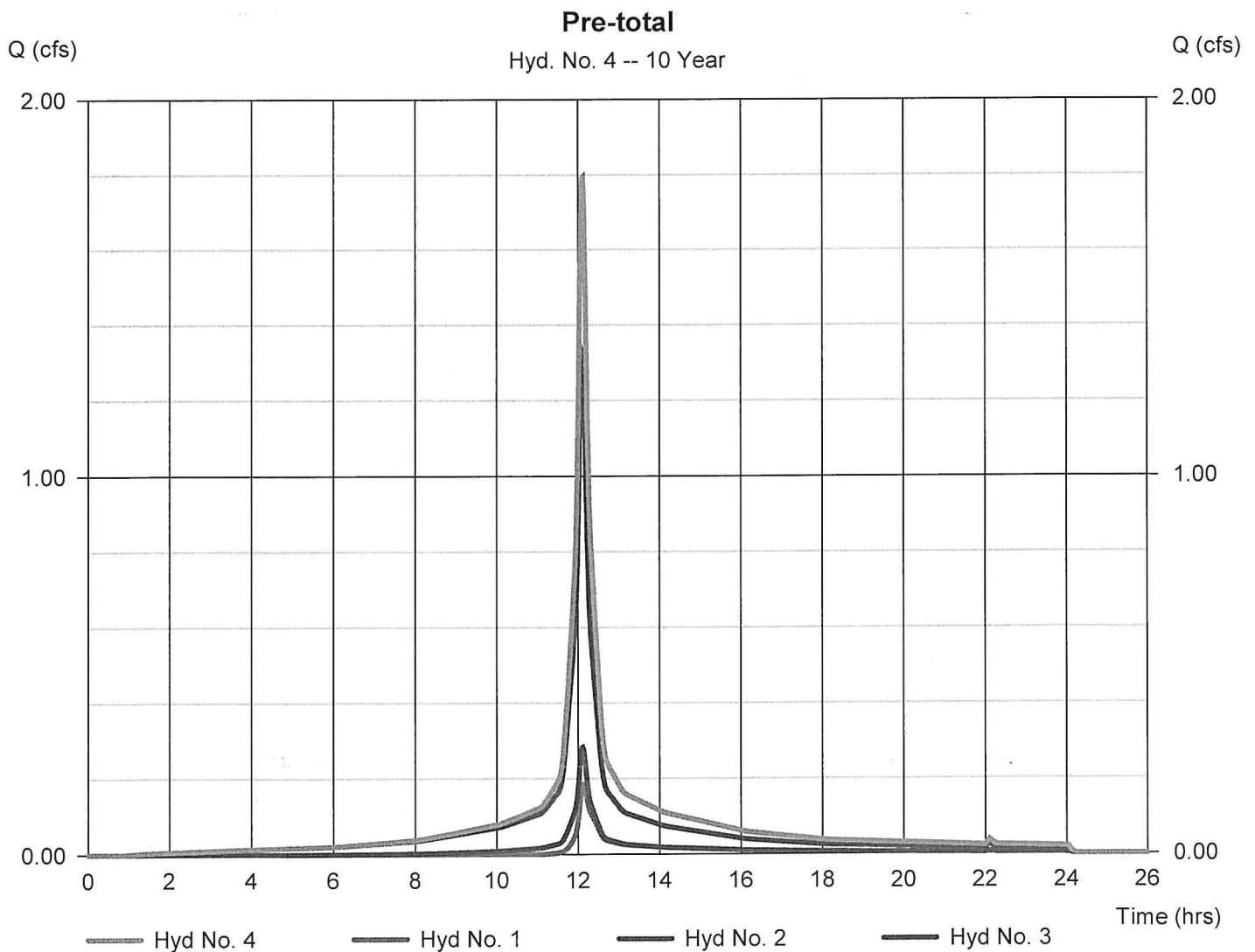
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 1.793 cfs
Time to peak = 12.12 hrs
Hyd. volume = 6,878 cuft
Contrib. drain. area = 0.520 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

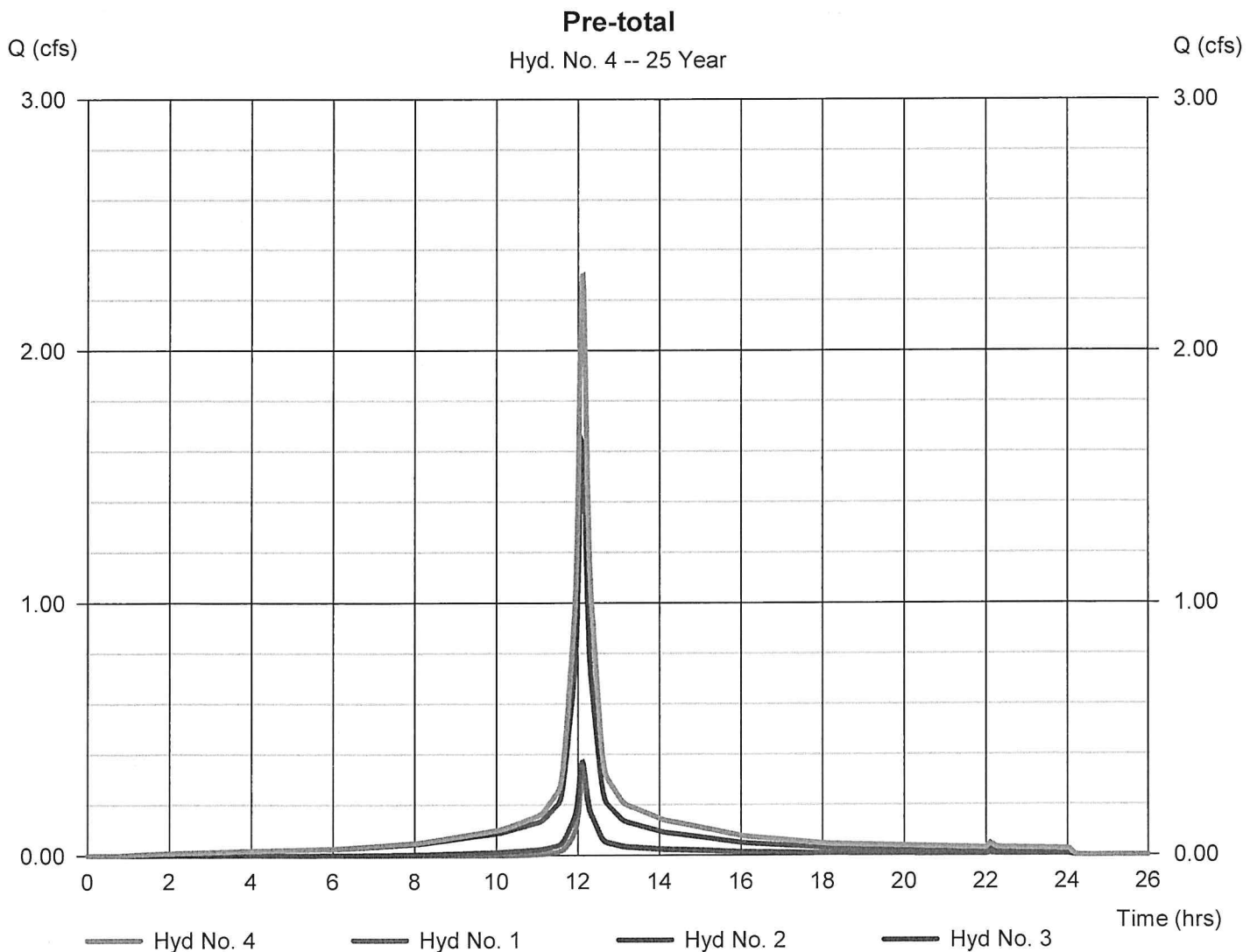
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 2.297 cfs
Time to peak = 12.12 hrs
Hyd. volume = 8,799 cuft
Contrib. drain. area = 0.520 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

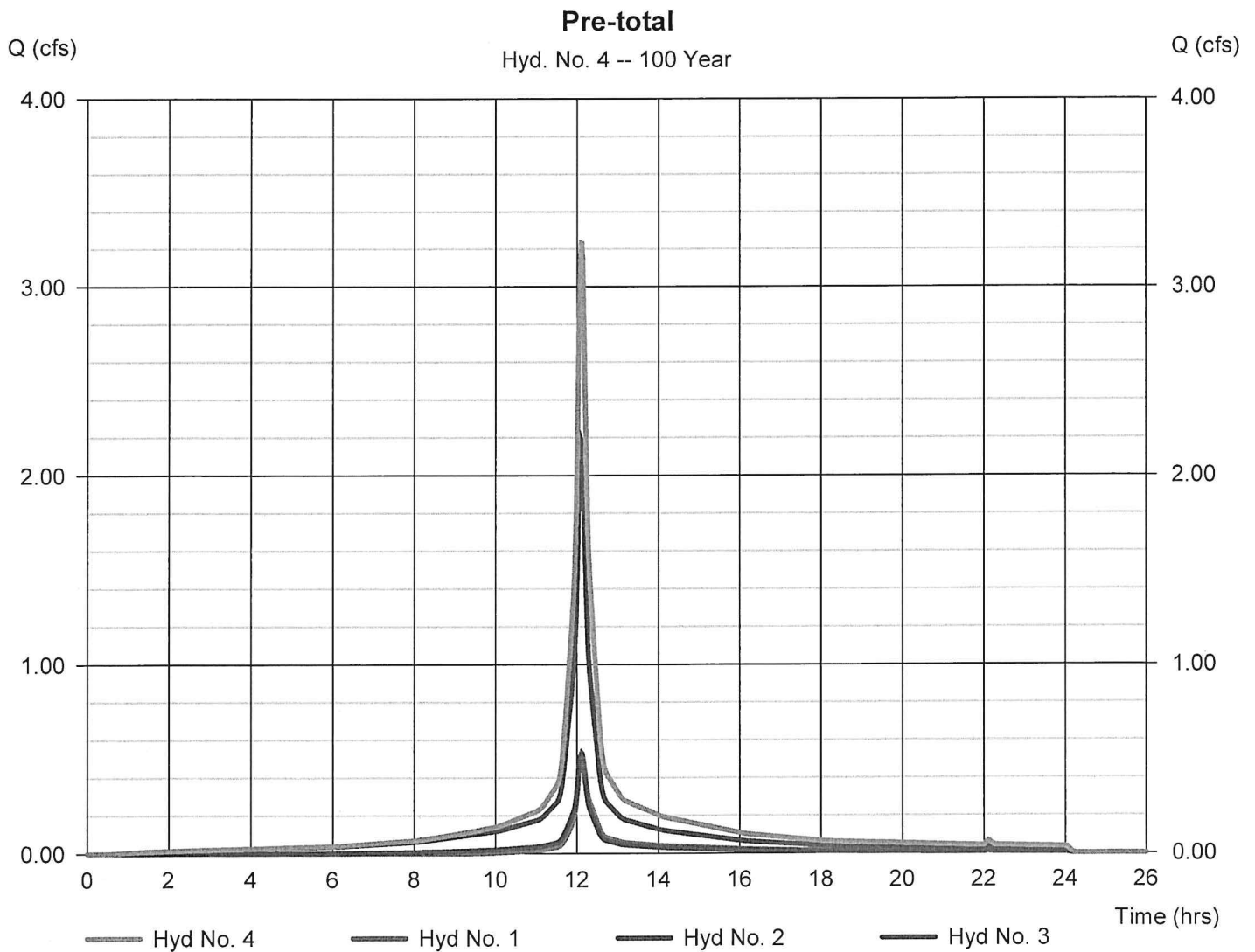
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 3.232 cfs
Time to peak = 12.10 hrs
Hyd. volume = 12,375 cuft
Contrib. drain. area = 0.520 ac



APPENDIX C

PEAK FLOW RATE REDUCTION CALCULATIONS

PEAK FLOW RATE REDUCTION CALCULATIONS

Analysis Point #1

2 Year Storm Event

Drainage Area =	0.52	acres
Disturbed Area =	0.51	acres
Undisturbed Area		
=	0.01	acres
Reduction Required =	1	(0%)
2 YR Peak Flowrate =	1.1	cfs
Target Flowrate =	1.10	cfs

10 Year Storm Event

Drainage Area =	0.52	acres
Disturbed Area =	0.51	acres
Undisturbed Area		
=	0.01	acres
Reduction Required =	1	(0%)
10 YR Peak Flowrate		
=	1.6	cfs
Target Flowrate =	1.60	cfs

100 Year Storm Event

Drainage Area =	0.52	acres
Disturbed Area =	0.51	acres
Undisturbed Area		
=	0.01	acres
Reduction Required =	1	(0%)
100 YR Peak Flowrate		
=	3.3	cfs
Target Flowrate =	3.30	cfs

APPENDIX D

POST-DEVELOPED CONDITIONS HYDROGRAPHS

	fair	----- 35	----- 56	----- 70	----- 77
	good	----- 30	----- 48	----- 65	----- 73
Woods - grass combination	poor	----- 57	----- 73	----- 82	----- 86
	fair	----- 43	----- 65	----- 76	----- 82
	good	----- 32	----- 58	----- 72	----- 79
Woods	poor	----- 45	----- 66	----- 77	----- 83
	fair	----- 36	----- 60	----- 73	----- 79
	good	----- 30	----- 55	----- 70	----- 77
Farmsteads	---	----- 59	----- 74	----- 82	----- 86
FULLY DEVELOPED URBAN AREAS (Veg Established)					
Open space (Lawns,parks etc.)					
	Poor condition; grass cover < 50%	----- 68	----- 79	----- 86	----- 89
	Fair condition; grass cover 50% to 75 %	----- 49	----- 69	----- 79	----- 84
	Good condition; grass cover > 75%	----- 39	----- 61	----- 74	----- 80
Impervious Areas					
	Paved parking lots, roofs, driveways	----- 98	----- 98	----- 98	----- 98
	Streets and roads				
	Paved; curbs and storm sew	----- 98	----- 98	----- 98	----- 98
	Paved; open ditches (w/right-of-way)	----- 83	----- 89	----- 92	----- 93
	Gravel (w/ right-of-way)	----- 76	----- 85	----- 89	----- 91
	Dirt (w/ right-of-way)	----- 72	----- 82	----- 87	----- 89
Urban Districts					
	Avg % impervious				
	Commercial & business	----- 89	----- 92	----- 94	----- 95
	Industrial	----- 81	----- 88	----- 91	----- 93
Residential districts by average lot size					
	Avg % impervious				
	1/8 acre (town houses)	----- 77	----- 85	----- 90	----- 92
	1/4 acre	----- 61	----- 75	----- 83	----- 87
	1/3 acre	----- 57	----- 72	----- 81	----- 86
	1/2 acre	----- 54	----- 70	----- 80	----- 85
	1 acre	----- 51	----- 68	----- 79	----- 84
	2 acre	----- 46	----- 65	----- 77	----- 82
	User defined urban	----- **	----- **	----- **	----- **
DEVELOPING URBAN AREA (No Vegetation)					
	Newly graded area (pervious or	----- 77	----- 86	----- 91	----- 94

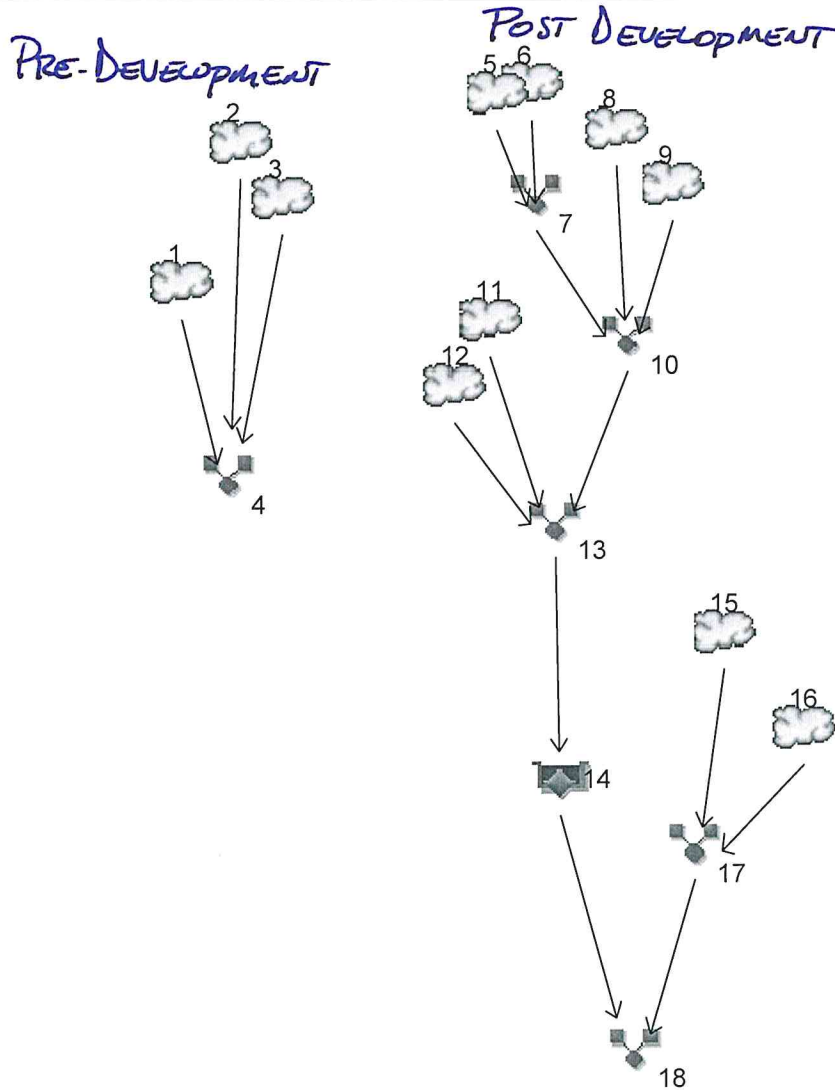
0 0 0 0

Total Acres 0

Weighted Runoff Curve Number (RCN) 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre-Perv
2	SCS Runoff	Pre-Imp
3	SCS Runoff	Pre-gravel
4	Combine	Pre-total
5	SCS Runoff	CB-2 perv
6	SCS Runoff	CB-2 Imp
7	Combine	CB-2 total
8	SCS Runoff	CB-1 Perv
9	SCS Runoff	CB-1 Imp
10	Combine	CB-1 total
11	SCS Runoff	CB-3 Imp
12	SCS Runoff	Dunkin Bldg
13	Combine	Total to Basin
14	Reservoir	Det Basin
15	SCS Runoff	Bypass-Perv
16	SCS Runoff	Bypass-Imp
17	Combine	Bypass Totla
18	Combine	Total out

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.051	1	730	255	-----	-----	-----	Pre-Perv
2	SCS Runoff	0.880	1	726	3,384	-----	-----	-----	Pre--Imp
3	SCS Runoff	0.159	1	727	545	-----	-----	-----	Pre-gravel
4	Combine	1.084	1	727	4,184	1, 2, 3	-----	-----	Pre-total
5	SCS Runoff	0.007	1	730	36	-----	-----	-----	CB-2 perv
6	SCS Runoff	0.557	1	726	2,143	-----	-----	-----	CB-2 Imp
7	Combine	0.564	1	726	2,179	5, 6	-----	-----	CB-2 total
8	SCS Runoff	0.004	1	730	18	-----	-----	-----	CB-1 Perv
9	SCS Runoff	0.264	1	726	1,015	-----	-----	-----	CB-1 Imp
10	Combine	0.831	1	726	3,213	7, 8, 9	-----	-----	CB-1 total
11	SCS Runoff	0.235	1	726	902	-----	-----	-----	CB-3 Imp
12	SCS Runoff	0.117	1	726	451	-----	-----	-----	Dunkin Bldg
13	Combine	1.183	1	726	4,566	10, 11, 12	-----	-----	Total to Basin
14	Reservoir	0.726	1	734	4,553	13	123.96	1,137	Det Basin
15	SCS Runoff	0.007	1	730	36	-----	-----	-----	Bypass-Perv
16	SCS Runoff	0.205	1	726	789	-----	-----	-----	Bypass-Imp
17	Combine	0.212	1	726	826	15, 16	-----	-----	Bypass Totla
18	Combine	0.867	1	733	5,379	14, 17	-----	-----	Total out
SCS Dunkin 36 10-22-2020.gpw					Return Period: 2 Year			Friday, 10 / 23 / 2020	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

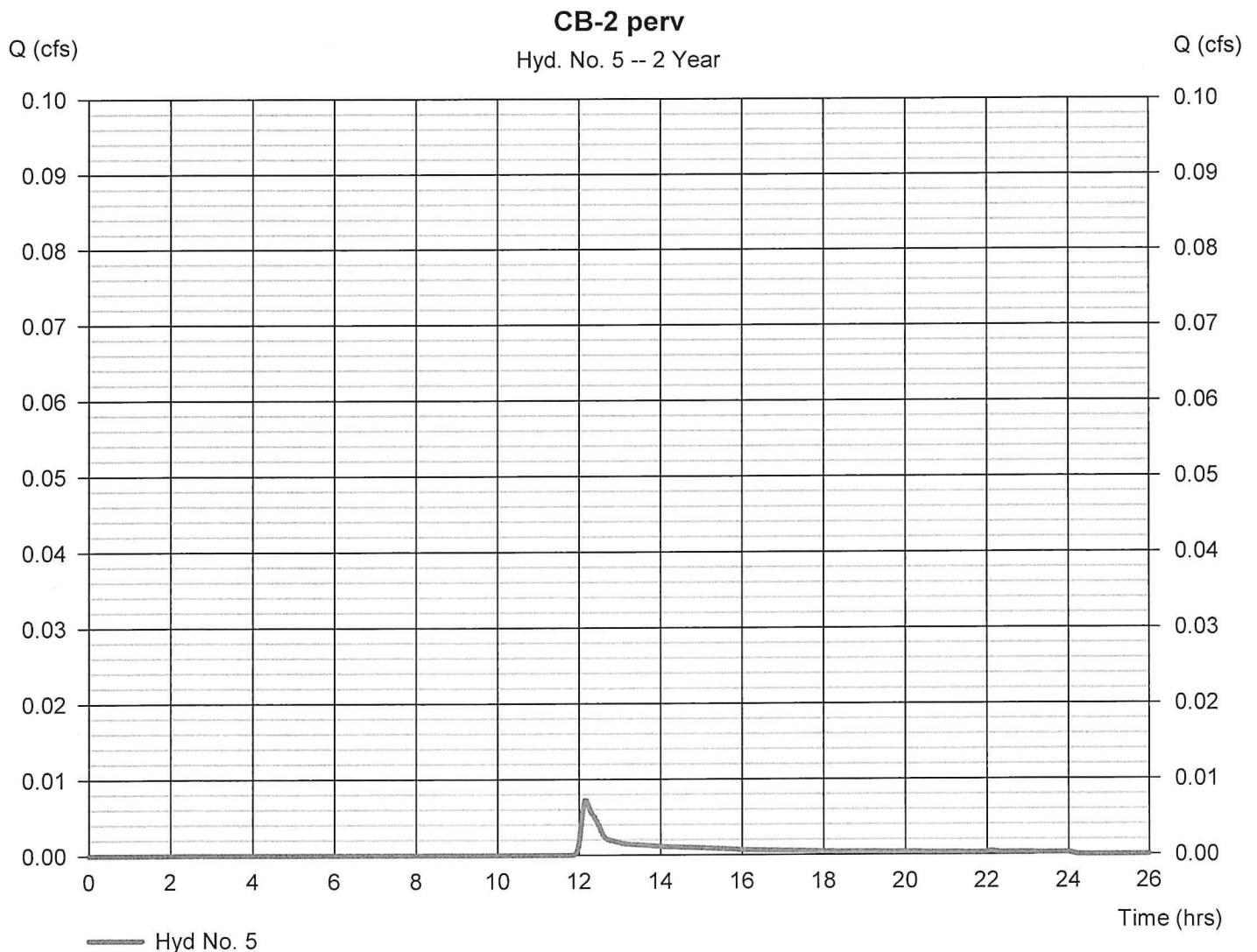
Friday, 10 / 23 / 2020

Hyd. No. 5

CB-2 perv

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.020 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.007 cfs
 Time to peak = 12.17 hrs
 Hyd. volume = 36 cuft
 Curve number = 61
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

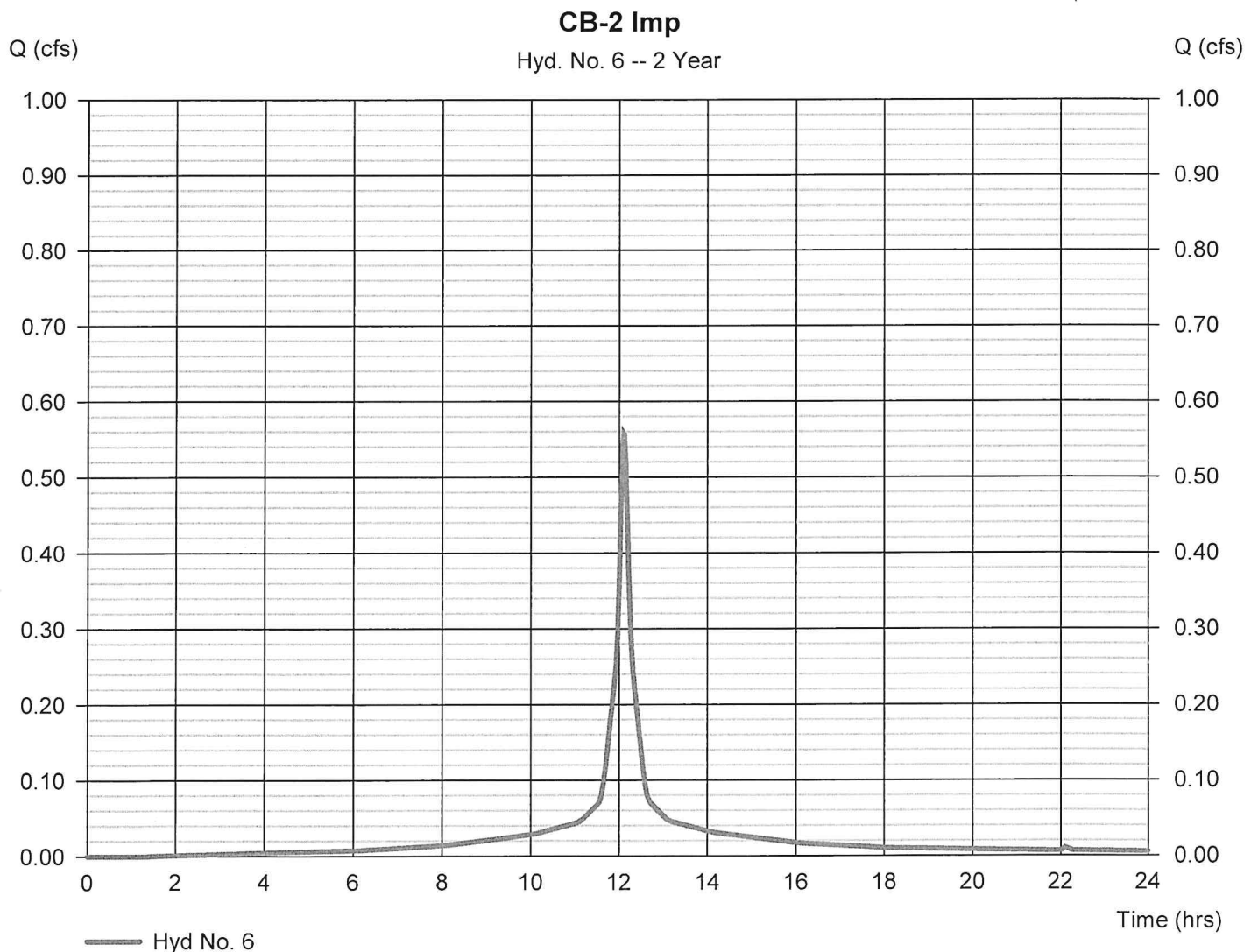
Friday, 10 / 23 / 2020

Hyd. No. 6

CB-2 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.190 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.557 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 2,143 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

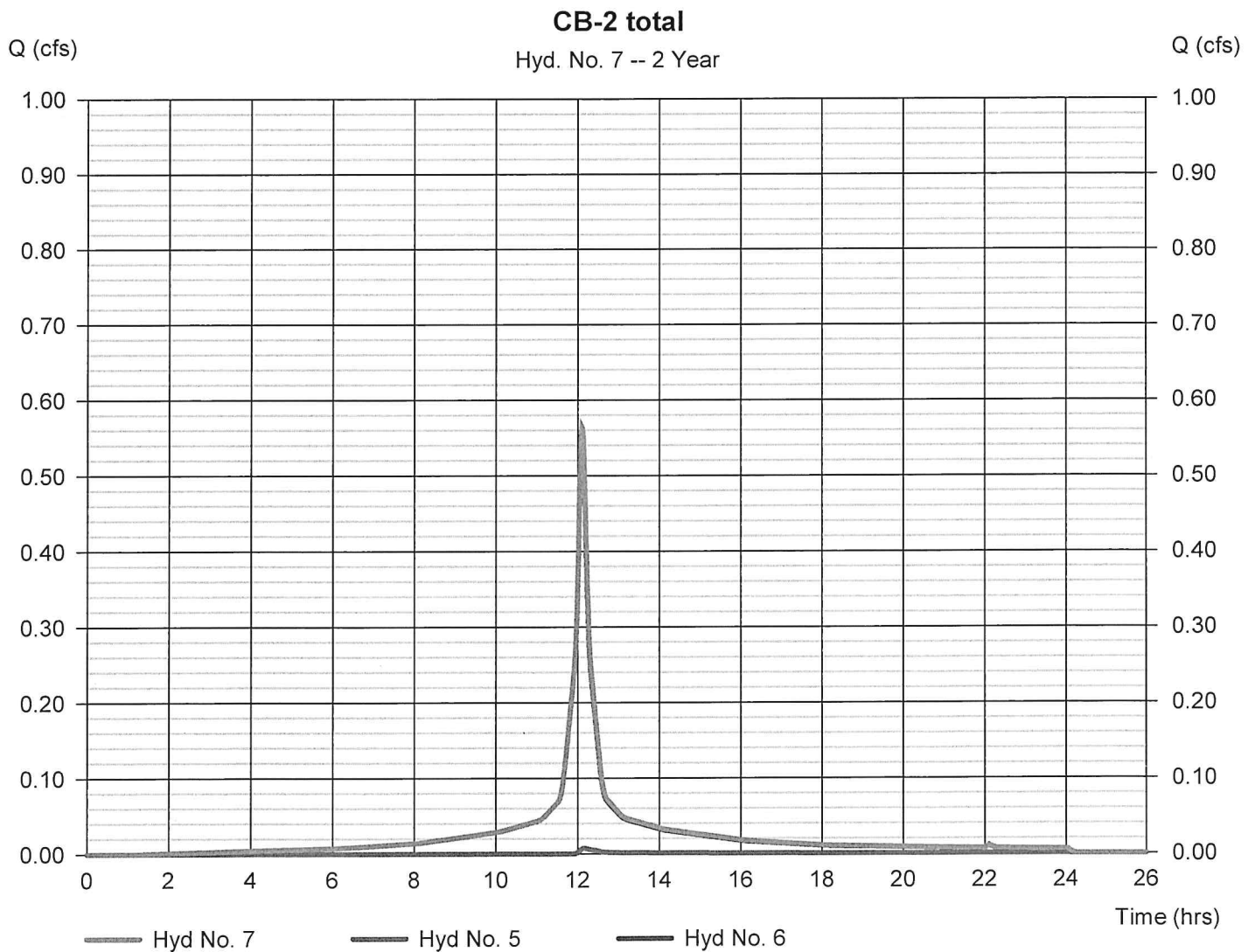
Friday, 10 / 23 / 2020

Hyd. No. 7

CB-2 total

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 1 min
 Inflow hyds. = 5, 6

Peak discharge = 0.564 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 2,179 cuft
 Contrib. drain. area = 0.210 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

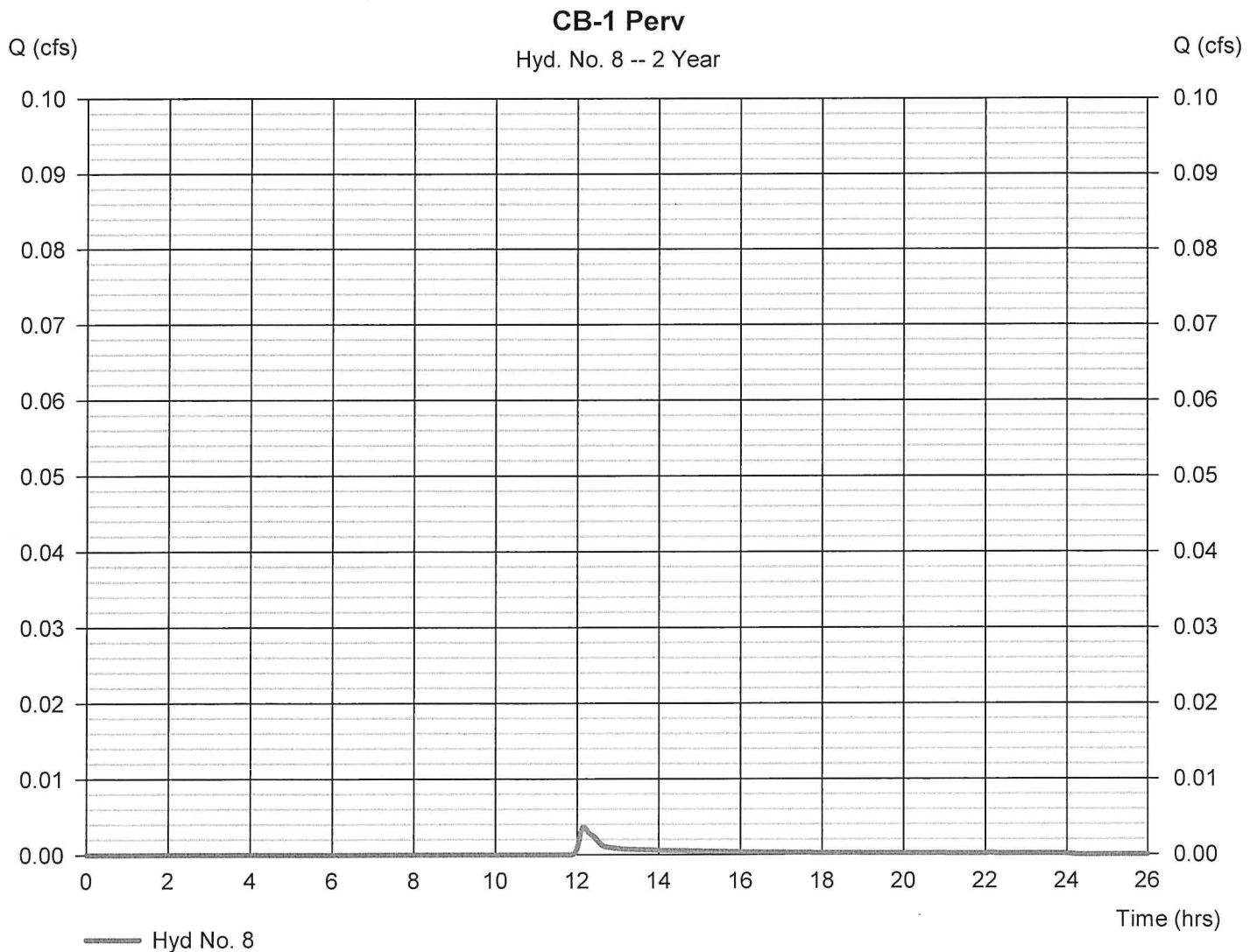
Friday, 10 / 23 / 2020

Hyd. No. 8

CB-1 Perv

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.010 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.004 cfs
 Time to peak = 12.17 hrs
 Hyd. volume = 18 cuft
 Curve number = 61
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

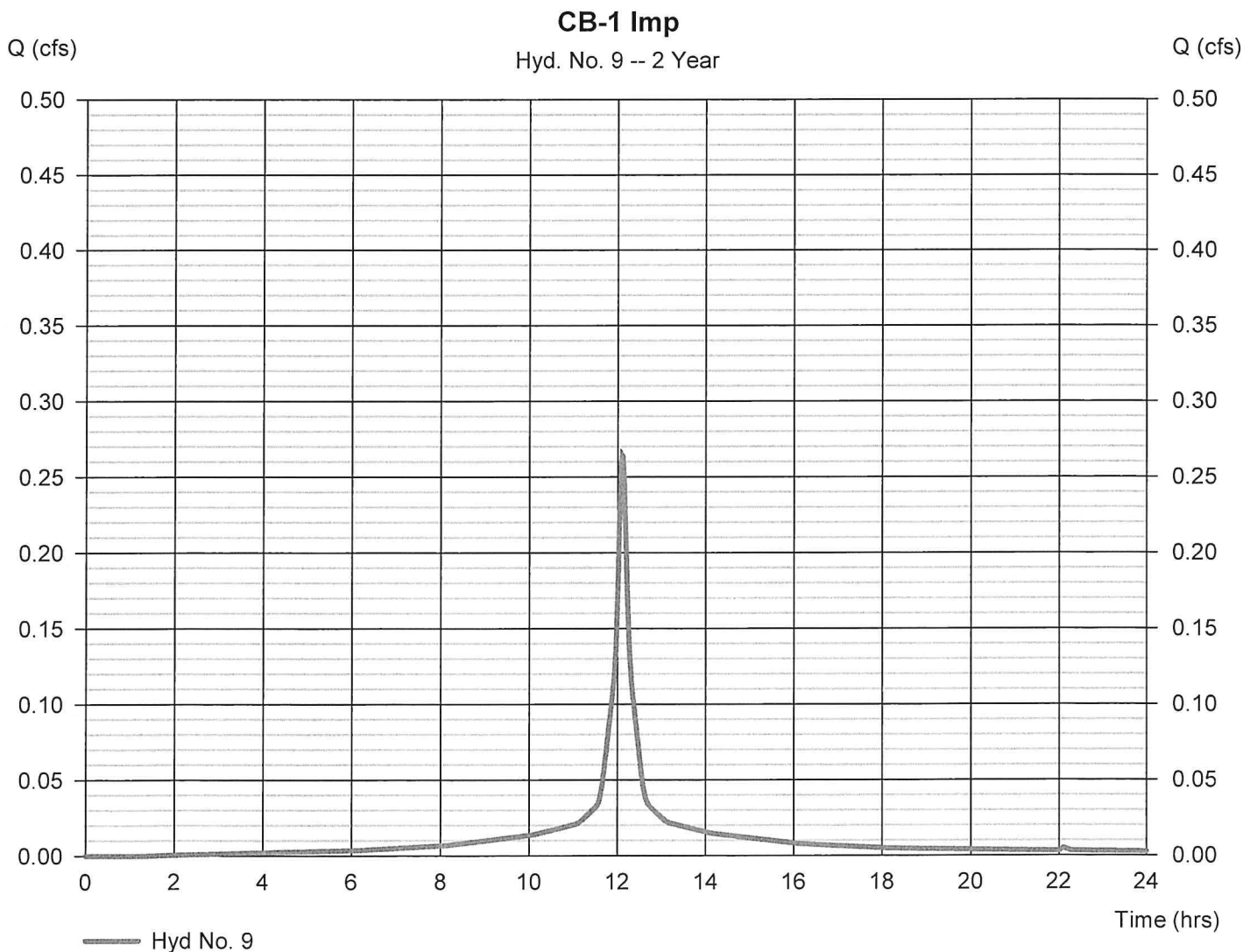
Friday, 10 / 23 / 2020

Hyd. No. 9

CB-1 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.090 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.264 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 1,015 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

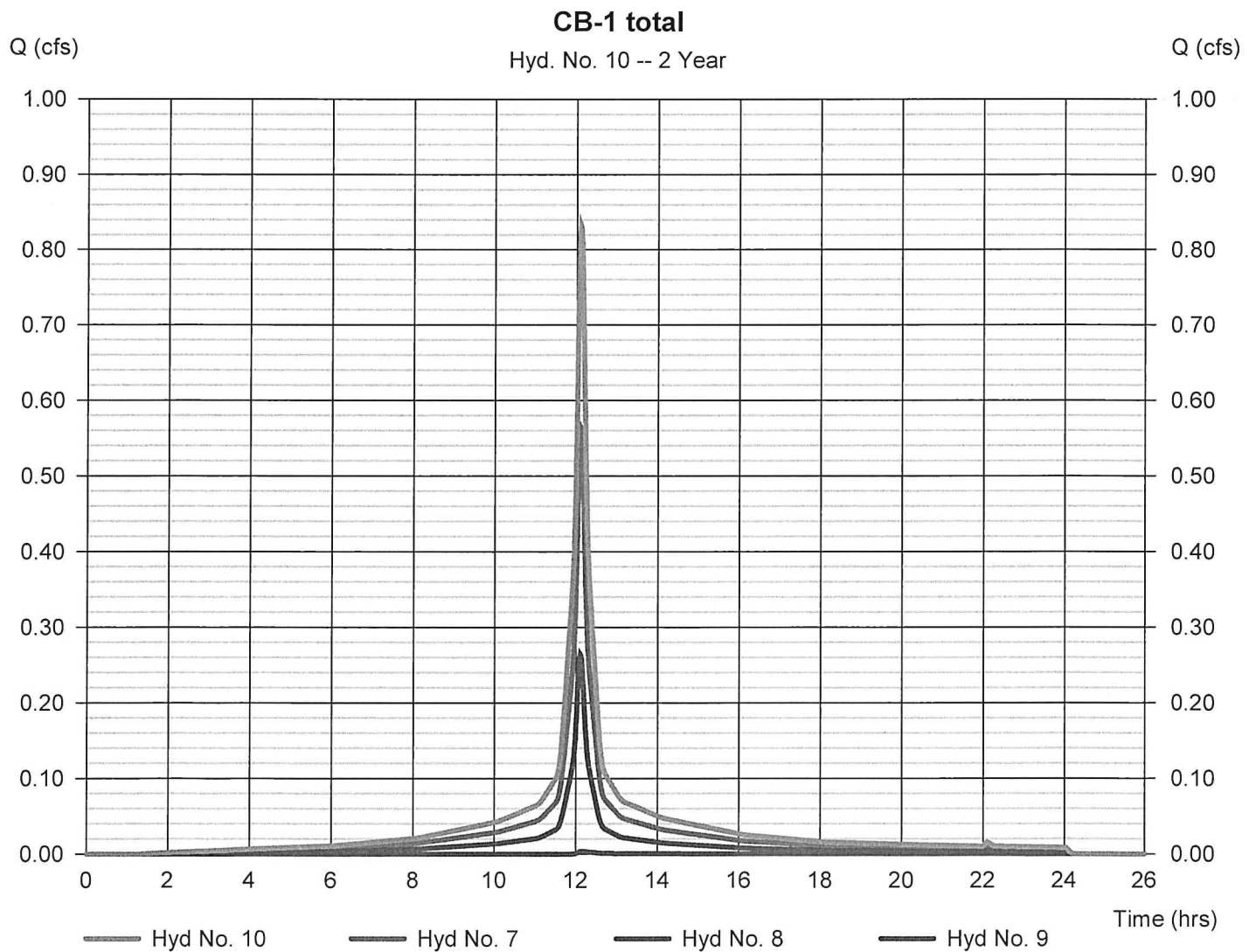
Friday, 10 / 23 / 2020

Hyd. No. 10

CB-1 total

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 7, 8, 9

Peak discharge = 0.831 cfs
Time to peak = 12.10 hrs
Hyd. volume = 3,213 cuft
Contrib. drain. area = 0.100 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

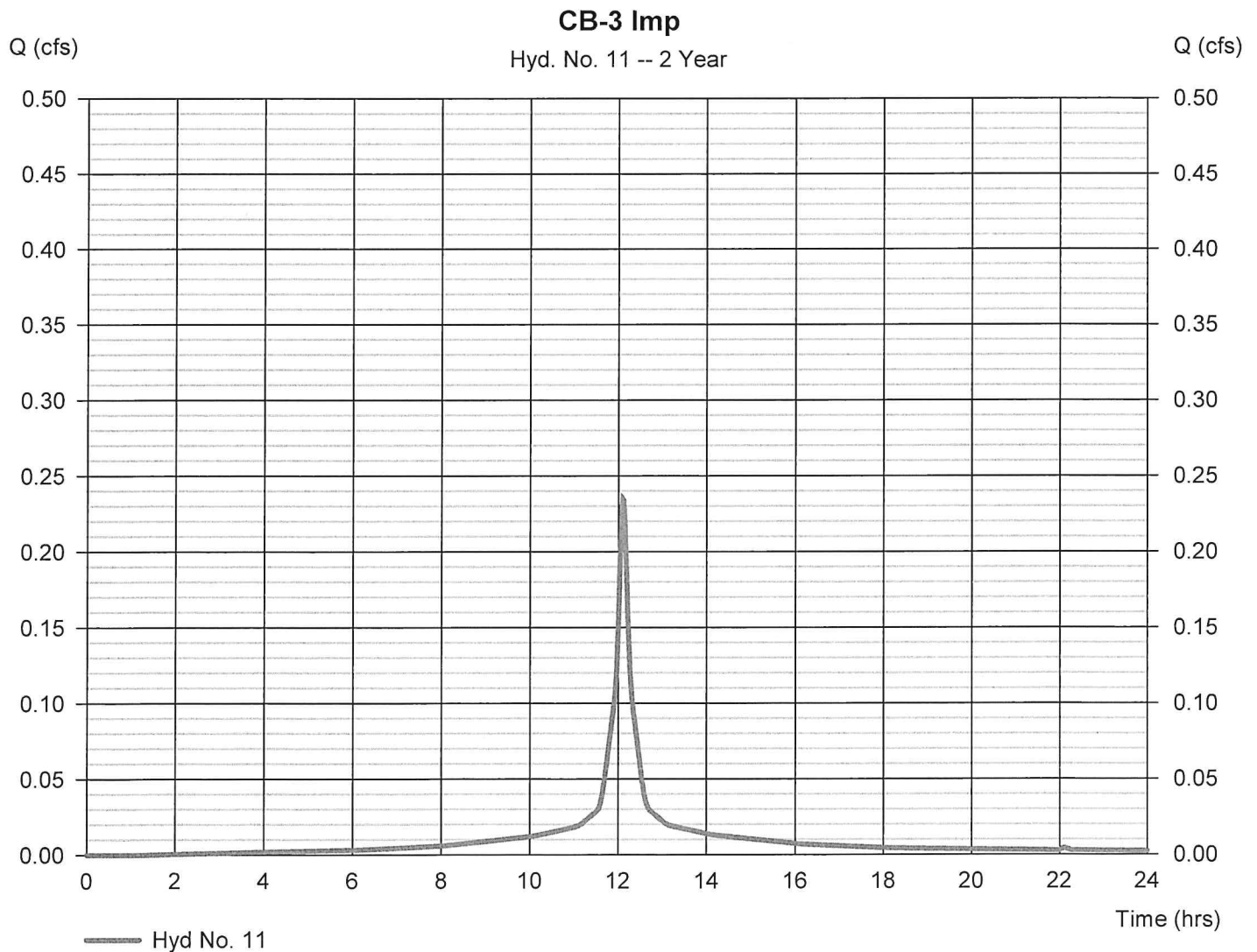
Friday, 10 / 23 / 2020

Hyd. No. 11

CB-3 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.080 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.235 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 902 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

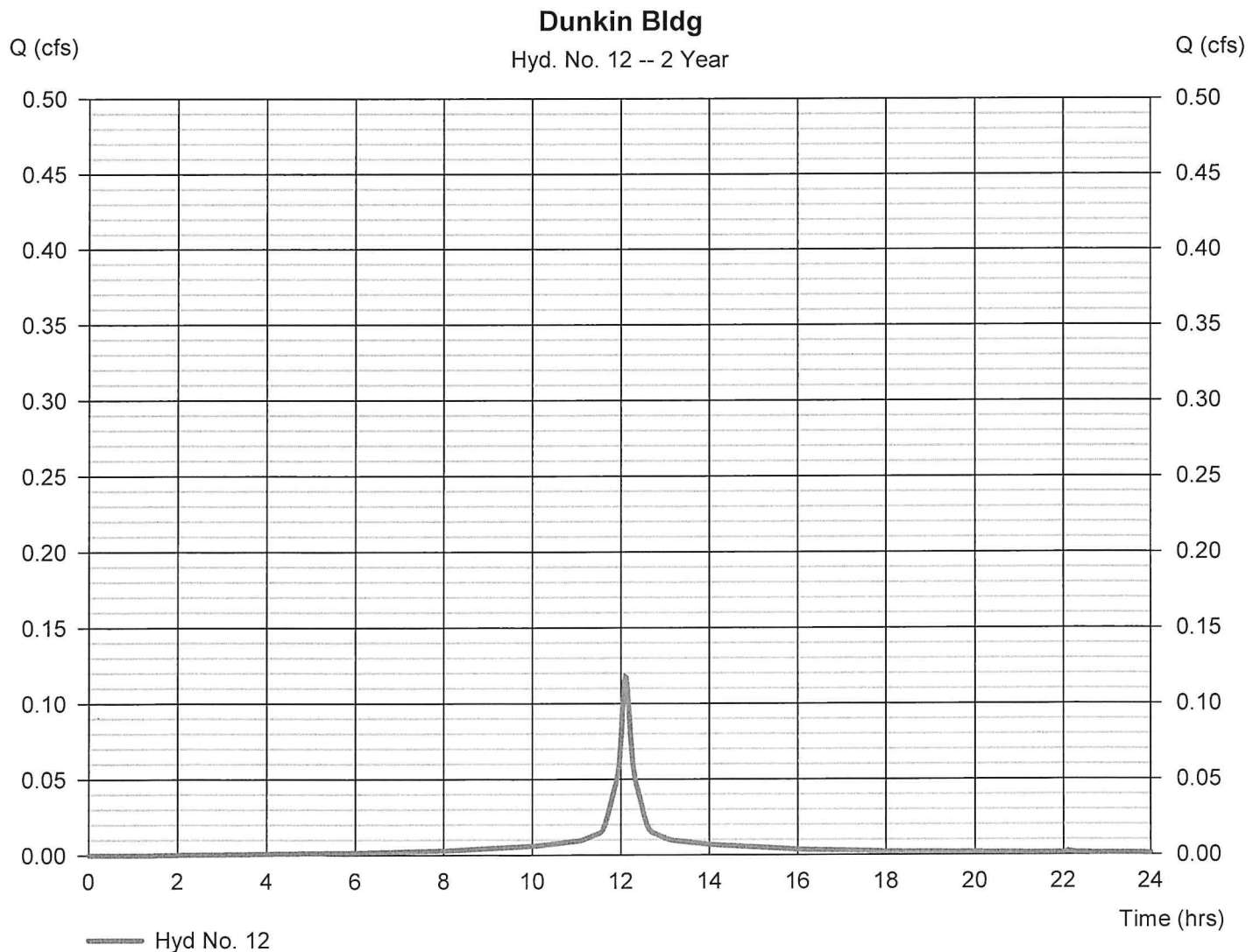
Friday, 10 / 23 / 2020

Hyd. No. 12

Dunkin Bldg

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.040 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.117 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 451 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

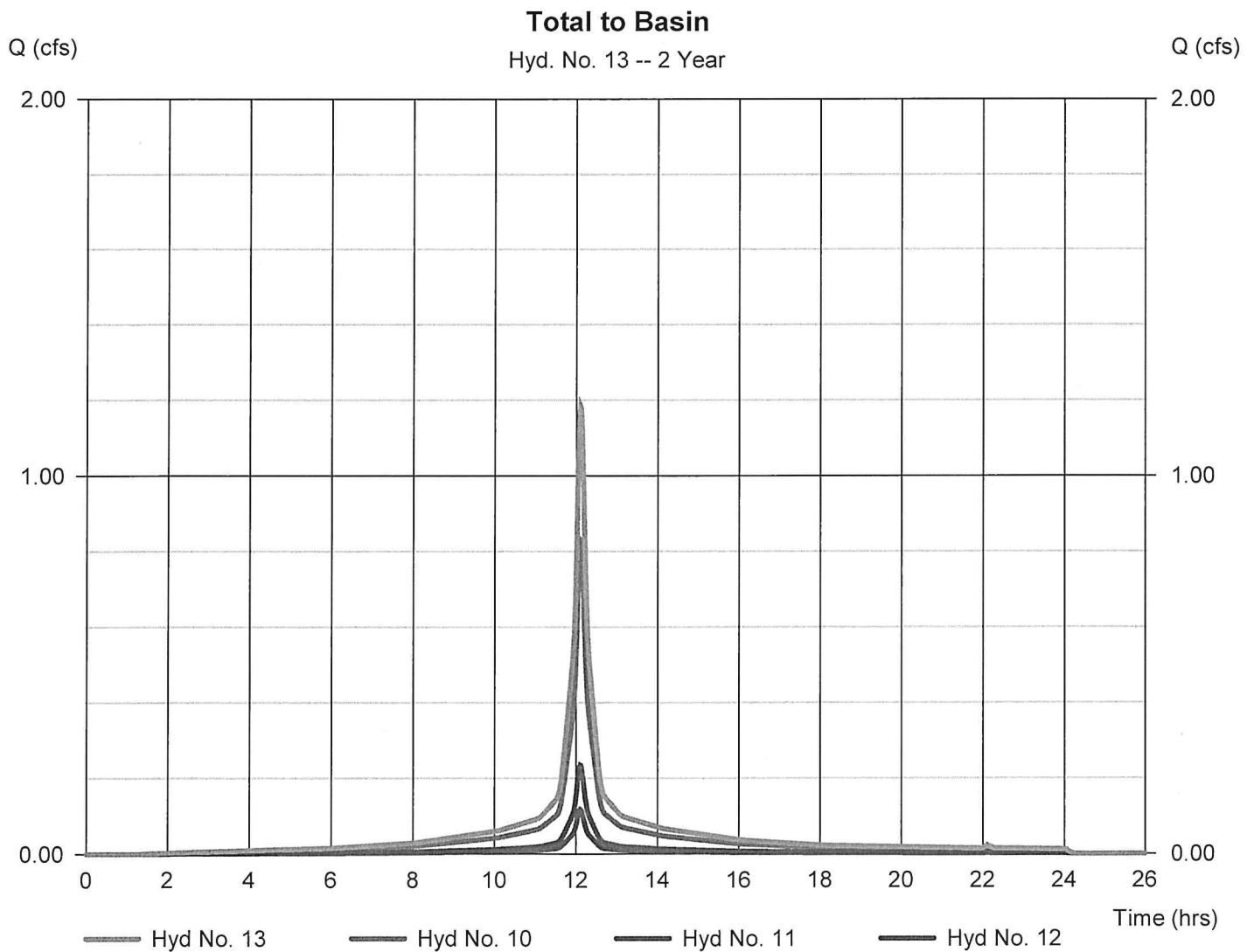
Friday, 10 / 23 / 2020

Hyd. No. 13

Total to Basin

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 10, 11, 12

Peak discharge = 1.183 cfs
Time to peak = 12.10 hrs
Hyd. volume = 4,566 cuft
Contrib. drain. area = 0.120 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

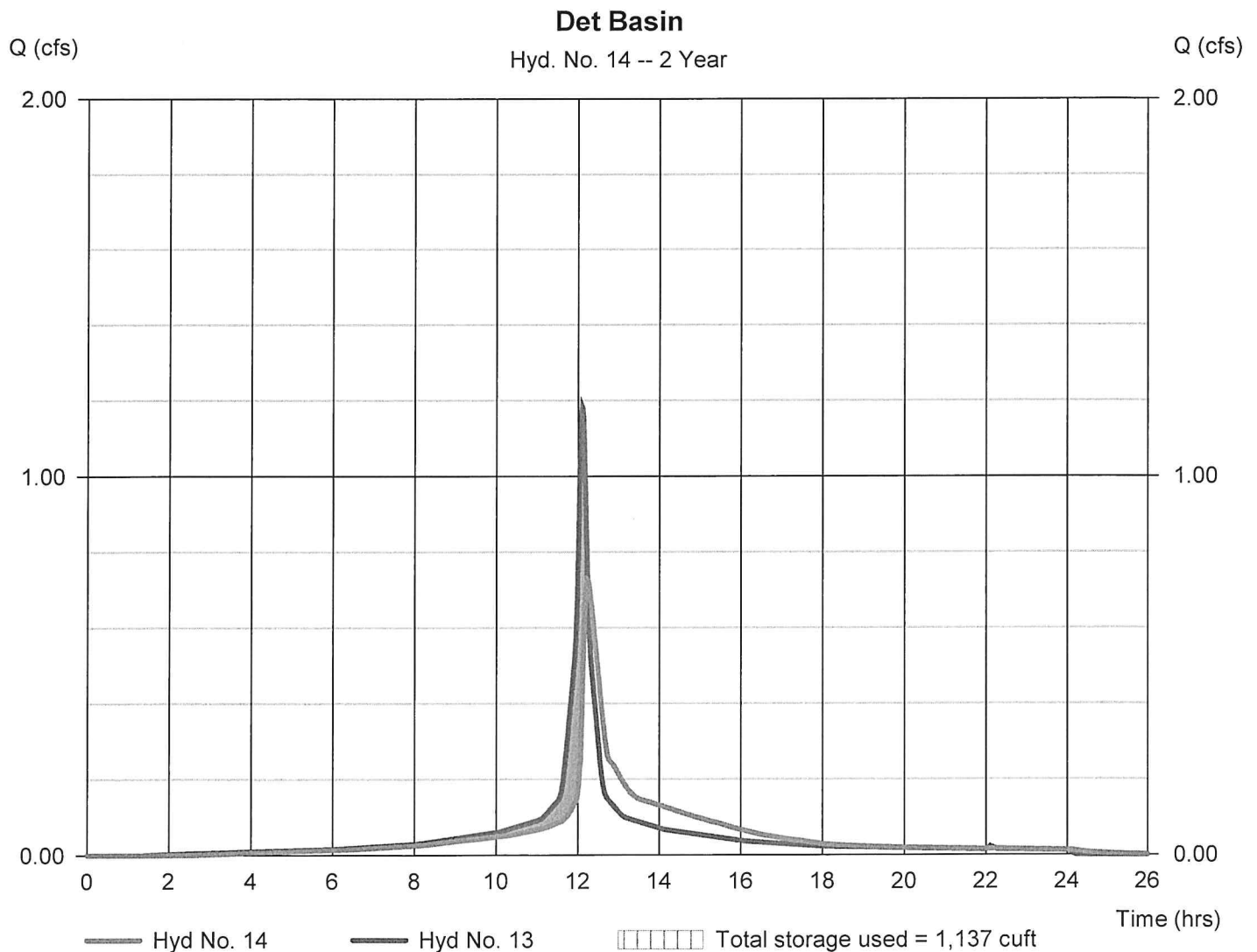
Friday, 10 / 23 / 2020

Hyd. No. 14

Det Basin

Hydrograph type	= Reservoir	Peak discharge	= 0.726 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 4,553 cuft
Inflow hyd. No.	= 13 - Total to Basin	Max. Elevation	= 123.96 ft
Reservoir name	= Det Basin	Max. Storage	= 1,137 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Pond No. 1 - Det Basin

Pond Data

UG Chambers -Invert elev. = 122.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 80.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.20	n/a	0	0
0.30	122.50	n/a	97	97
0.60	122.80	n/a	169	266
0.90	123.10	n/a	205	471
1.20	123.40	n/a	226	697
1.50	123.70	n/a	236	933
1.80	124.00	n/a	236	1,170
2.10	124.30	n/a	226	1,396
2.40	124.60	n/a	205	1,601
2.70	124.90	n/a	169	1,769
3.00	125.20	n/a	97	1,866

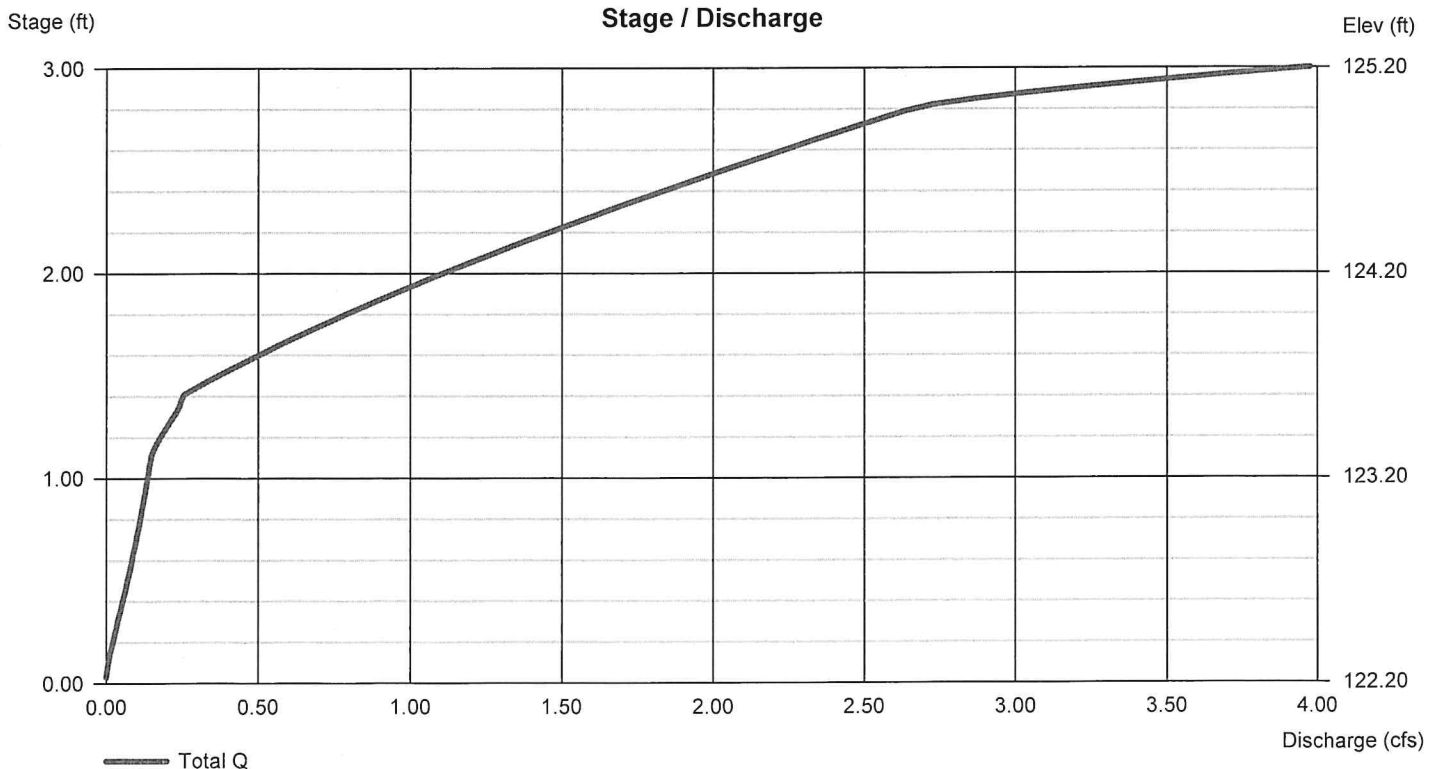
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	3.00	0.00	0.00
Span (in)	= 15.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 122.20	122.13	0.00	0.00
Length (ft)	= 7.00	0.00	0.00	0.00
Slope (%)	= 0.01	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)	= 0.33	4.00	Inactive	0.00
Crest El. (ft)	= 123.30	125.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= Rect	Broad	Broad	---
Multi-Stage	= Yes	Yes	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).



Pond Report

18

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Pond No. 1 - Det Basin

Pond Data

UG Chambers -Invert elev. = 122.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 80.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.20	n/a	0	0
0.30	122.50	n/a	97	97
0.60	122.80	n/a	169	266
0.90	123.10	n/a	205	471
1.20	123.40	n/a	226	697
1.50	123.70	n/a	236	933
1.80	124.00	n/a	236	1,170
2.10	124.30	n/a	226	1,396
2.40	124.60	n/a	205	1,601
2.70	124.90	n/a	169	1,769
3.00	125.20	n/a	97	1,866

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	3.00	0.00	0.00
Span (in)	= 15.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 122.20	122.13	0.00	0.00
Length (ft)	= 7.00	0.00	0.00	0.00
Slope (%)	= 0.01	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)	= 0.33	4.00	Inactive	0.00
Crest El. (ft)	= 123.30	125.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= Rect	Broad	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	122.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.03	10	122.23	0.00 oc	0.00 ic	---	---	0.00	0.00	---	---	---	---	0.000
0.06	19	122.26	0.00 oc	0.00 ic	---	---	0.00	0.00	---	---	---	---	0.003
0.09	29	122.29	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.006
0.12	39	122.32	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.010
0.15	49	122.35	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.014
0.18	58	122.38	0.02 oc	0.02 ic	---	---	0.00	0.00	---	---	---	---	0.019
0.21	68	122.41	0.02 oc	0.02 ic	---	---	0.00	0.00	---	---	---	---	0.024
0.24	78	122.44	0.03 oc	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.028
0.27	88	122.47	0.03 oc	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.034
0.30	97	122.50	0.04 oc	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.038
0.33	114	122.53	0.04 oc	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.043
0.36	131	122.56	0.05 oc	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.049
0.39	148	122.59	0.05 oc	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.053
0.42	165	122.62	0.06 oc	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.058
0.45	182	122.65	0.06 oc	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.063
0.48	198	122.68	0.07 oc	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.068
0.51	215	122.71	0.07 oc	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.072
0.54	232	122.74	0.08 oc	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.077
0.57	249	122.77	0.08 oc	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.081
0.60	266	122.80	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.085
0.63	286	122.83	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.089
0.66	307	122.86	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.093
0.69	327	122.89	0.10 oc	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.098
0.72	348	122.92	0.10 oc	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.101
0.75	369	122.95	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.106
0.78	389	122.98	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.109
0.81	410	123.01	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.114
0.84	430	123.04	0.12 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.117
0.87	451	123.07	0.12 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.121

Continues on next page...

Det Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.90	471	123.10	0.13 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.124
0.93	494	123.13	0.13 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.128
0.96	516	123.16	0.13 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.131
0.99	539	123.19	0.14 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.135
1.02	562	123.22	0.14 oc	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.139
1.05	584	123.25	0.14 oc	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
1.08	607	123.28	0.15 oc	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.145
1.11	629	123.31	0.15 oc	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
1.14	652	123.34	0.16 oc	0.15 ic	---	---	0.01	0.00	---	---	---	---	0.157
1.17	675	123.37	0.17 oc	0.15 ic	---	---	0.02	0.00	---	---	---	---	0.166
1.20	697	123.40	0.18 oc	0.14 ic	---	---	0.03	0.00	---	---	---	---	0.178
1.23	721	123.43	0.19 oc	0.14 ic	---	---	0.05	0.00	---	---	---	---	0.191
1.26	744	123.46	0.20 oc	0.13 ic	---	---	0.07	0.00	---	---	---	---	0.203
1.29	768	123.49	0.22 oc	0.13 ic	---	---	0.09	0.00	---	---	---	---	0.216
1.32	792	123.52	0.23 oc	0.12 ic	---	---	0.11	0.00	---	---	---	---	0.230
1.35	815	123.55	0.24 oc	0.11 ic	---	---	0.13 s	0.00	---	---	---	---	0.240
1.38	839	123.58	0.25 oc	0.10 ic	---	---	0.15 s	0.00	---	---	---	---	0.247
1.41	863	123.61	0.26 oc	0.09 ic	---	---	0.16 s	0.00	---	---	---	---	0.256
1.44	886	123.64	0.30 oc	0.10 ic	---	---	0.19 s	0.00	---	---	---	---	0.293
1.47	910	123.67	0.34 oc	0.11 ic	---	---	0.22 s	0.00	---	---	---	---	0.331
1.50	933	123.70	0.37 oc	0.12 ic	---	---	0.25 s	0.00	---	---	---	---	0.369
1.53	957	123.73	0.41 oc	0.12 ic	---	---	0.28 s	0.00	---	---	---	---	0.408
1.56	981	123.76	0.45 oc	0.13 ic	---	---	0.32 s	0.00	---	---	---	---	0.447
1.59	1,004	123.79	0.49 oc	0.14 ic	---	---	0.35 s	0.00	---	---	---	---	0.487
1.62	1,028	123.82	0.53 oc	0.14 ic	---	---	0.39 s	0.00	---	---	---	---	0.528
1.65	1,052	123.85	0.57 oc	0.15 ic	---	---	0.42 s	0.00	---	---	---	---	0.570
1.68	1,075	123.88	0.61 oc	0.15 ic	---	---	0.46 s	0.00	---	---	---	---	0.612
1.71	1,099	123.91	0.66 oc	0.16 ic	---	---	0.50 s	0.00	---	---	---	---	0.655
1.74	1,122	123.94	0.70 oc	0.16 ic	---	---	0.54 s	0.00	---	---	---	---	0.699
1.77	1,146	123.97	0.75 oc	0.17 ic	---	---	0.57 s	0.00	---	---	---	---	0.744
1.80	1,170	124.00	0.79 oc	0.17 ic	---	---	0.62 s	0.00	---	---	---	---	0.789
1.83	1,192	124.03	0.84 oc	0.18 ic	---	---	0.66 s	0.00	---	---	---	---	0.835
1.86	1,215	124.06	0.88 oc	0.18 ic	---	---	0.70 s	0.00	---	---	---	---	0.882
1.89	1,237	124.09	0.93 oc	0.19 ic	---	---	0.74 s	0.00	---	---	---	---	0.930
1.92	1,260	124.12	0.98 oc	0.19 ic	---	---	0.79 s	0.00	---	---	---	---	0.978
1.95	1,283	124.15	1.03 oc	0.20 ic	---	---	0.83 s	0.00	---	---	---	---	1.027
1.98	1,305	124.18	1.08 oc	0.20 ic	---	---	0.88 s	0.00	---	---	---	---	1.076
2.01	1,328	124.21	1.13 oc	0.20 ic	---	---	0.92 s	0.00	---	---	---	---	1.126
2.04	1,350	124.24	1.18 oc	0.21 ic	---	---	0.97 s	0.00	---	---	---	---	1.177
2.07	1,373	124.27	1.23 oc	0.21 ic	---	---	1.02 s	0.00	---	---	---	---	1.229
2.10	1,396	124.30	1.28 oc	0.21 ic	---	---	1.07 s	0.00	---	---	---	---	1.281
2.13	1,416	124.33	1.34 oc	0.22 ic	---	---	1.12 s	0.00	---	---	---	---	1.334
2.16	1,437	124.36	1.39 oc	0.22 ic	---	---	1.17 s	0.00	---	---	---	---	1.387
2.19	1,457	124.39	1.44 oc	0.22 ic	---	---	1.22 s	0.00	---	---	---	---	1.441
2.22	1,478	124.42	1.50 oc	0.23 ic	---	---	1.27 s	0.00	---	---	---	---	1.496
2.25	1,498	124.45	1.55 oc	0.23 ic	---	---	1.32 s	0.00	---	---	---	---	1.551
2.28	1,519	124.48	1.61 oc	0.23 ic	---	---	1.37 s	0.00	---	---	---	---	1.607
2.31	1,539	124.51	1.66 oc	0.24 ic	---	---	1.43 s	0.00	---	---	---	---	1.663
2.34	1,560	124.54	1.72 oc	0.24 ic	---	---	1.48 s	0.00	---	---	---	---	1.720
2.37	1,580	124.57	1.78 oc	0.24 ic	---	---	1.53 s	0.00	---	---	---	---	1.777
2.40	1,601	124.60	1.84 oc	0.25 ic	---	---	1.59 s	0.00	---	---	---	---	1.835
2.43	1,618	124.63	1.89 oc	0.25 ic	---	---	1.64 s	0.00	---	---	---	---	1.894
2.46	1,635	124.66	1.95 oc	0.25 ic	---	---	1.70 s	0.00	---	---	---	---	1.953
2.49	1,651	124.69	2.01 oc	0.26 ic	---	---	1.76 s	0.00	---	---	---	---	2.013
2.52	1,668	124.72	2.07 oc	0.26 ic	---	---	1.81 s	0.00	---	---	---	---	2.073
2.55	1,685	124.75	2.13 oc	0.26 ic	---	---	1.87 s	0.00	---	---	---	---	2.133
2.58	1,702	124.78	2.20 oc	0.26 ic	---	---	1.93 s	0.00	---	---	---	---	2.195
2.61	1,719	124.81	2.26 oc	0.27 ic	---	---	1.99 s	0.00	---	---	---	---	2.256
2.64	1,736	124.84	2.32 oc	0.27 ic	---	---	2.05 s	0.00	---	---	---	---	2.318
2.67	1,753	124.87	2.38 oc	0.27 ic	---	---	2.11 s	0.00	---	---	---	---	2.381
2.70	1,769	124.90	2.44 oc	0.27 ic	---	---	2.17 s	0.00	---	---	---	---	2.444
2.73	1,779	124.93	2.51 oc	0.28 ic	---	---	2.23 s	0.00	---	---	---	---	2.508
2.76	1,789	124.96	2.57 oc	0.28 ic	---	---	2.29 s	0.00	---	---	---	---	2.572
2.79	1,799	124.99	2.64 oc	0.28 ic	---	---	2.35 s	0.00	---	---	---	---	2.636
2.82	1,808	125.02	2.73 oc	0.28 ic	---	---	2.42 s	0.03	---	---	---	---	2.729
2.85	1,818	125.05	2.88 oc	0.29 ic	---	---	2.48 s	0.12	---	---	---	---	2.878
2.88	1,828	125.08	3.06 oc	0.29 ic	---	---	2.54 s	0.24	---	---	---	---	3.057
2.91	1,837	125.11	3.26 oc	0.29 ic	---	---	2.59 s	0.38	---	---	---	---	3.260
2.94	1,847	125.14	3.48 oc	0.29 ic	---	---	2.65 s	0.54	---	---	---	---	3.483
2.97	1,857	125.17	3.72 oc	0.29 ic	---	---	2.71 s	0.73	---	---	---	---	3.722

Continues on next page...

Det Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.00	1,866	125.20	3.98 oc	0.29 ic	---	---	2.76 s	0.93	---	---	---	---	3.977

...End

Hydrograph Report

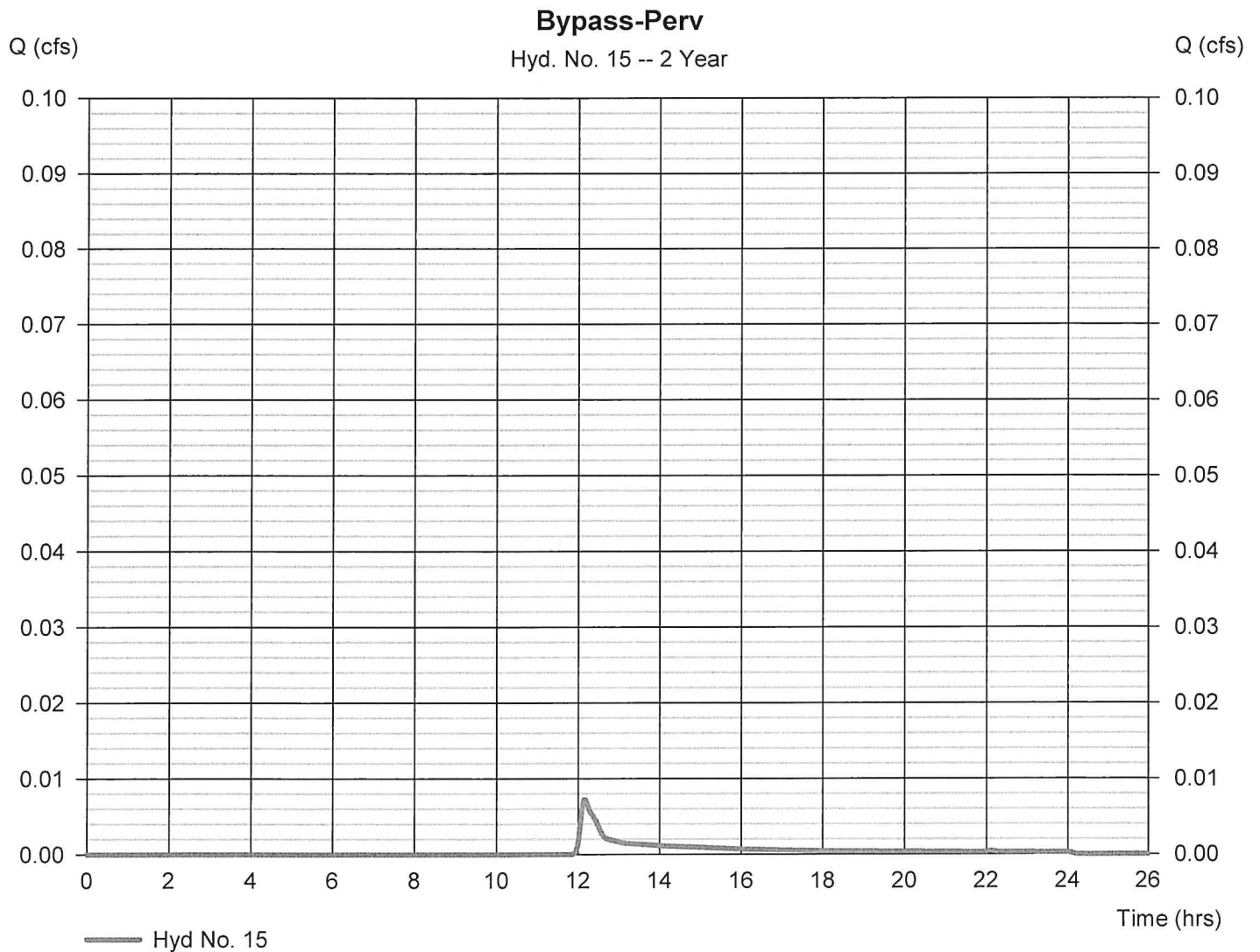
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 15

Bypass-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.007 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 36 cuft
Drainage area	= 0.020 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.34 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

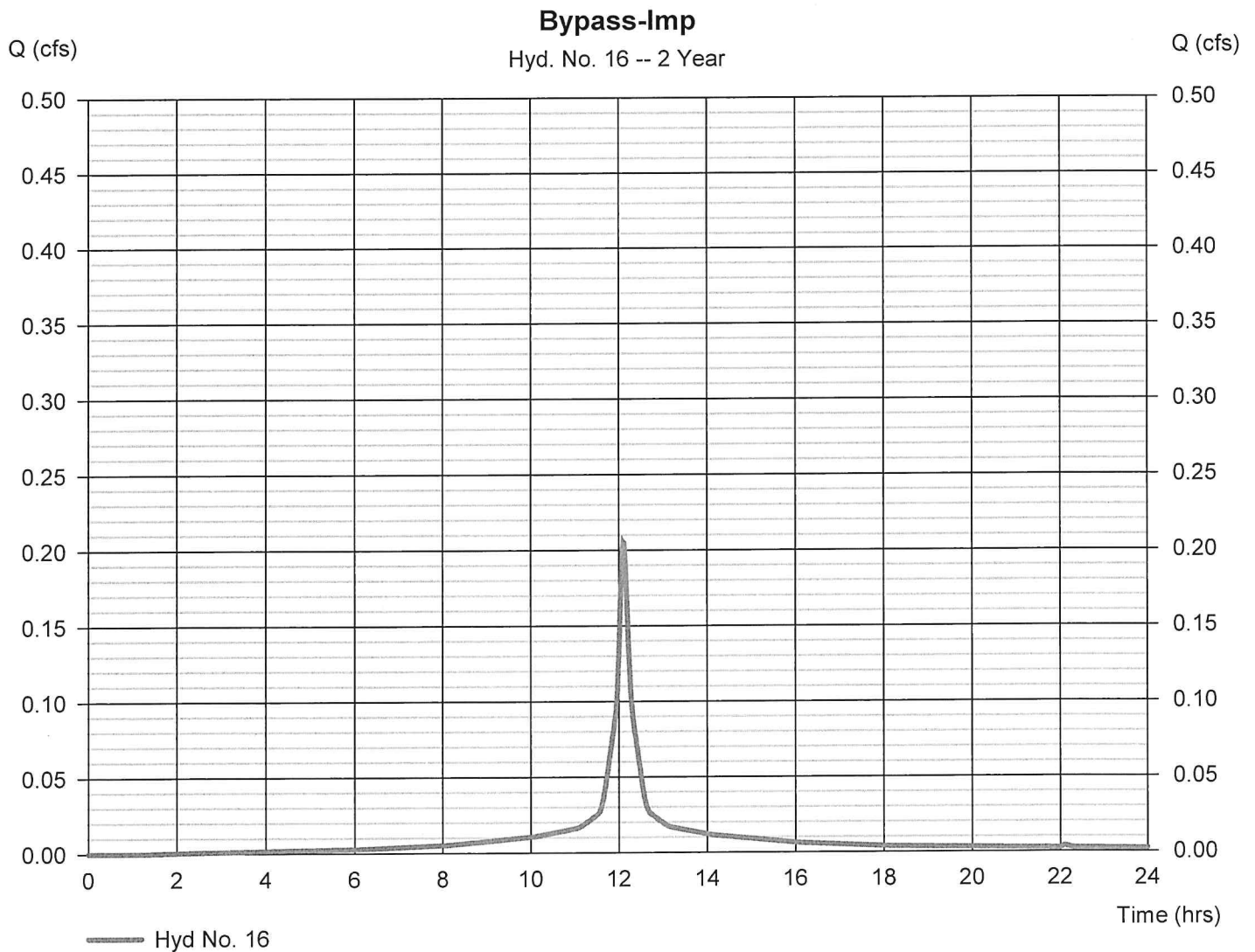
Friday, 10 / 23 / 2020

Hyd. No. 16

Bypass-Imp

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.070 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.34 in
 Storm duration = 24 hrs

Peak discharge = 0.205 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 789 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484

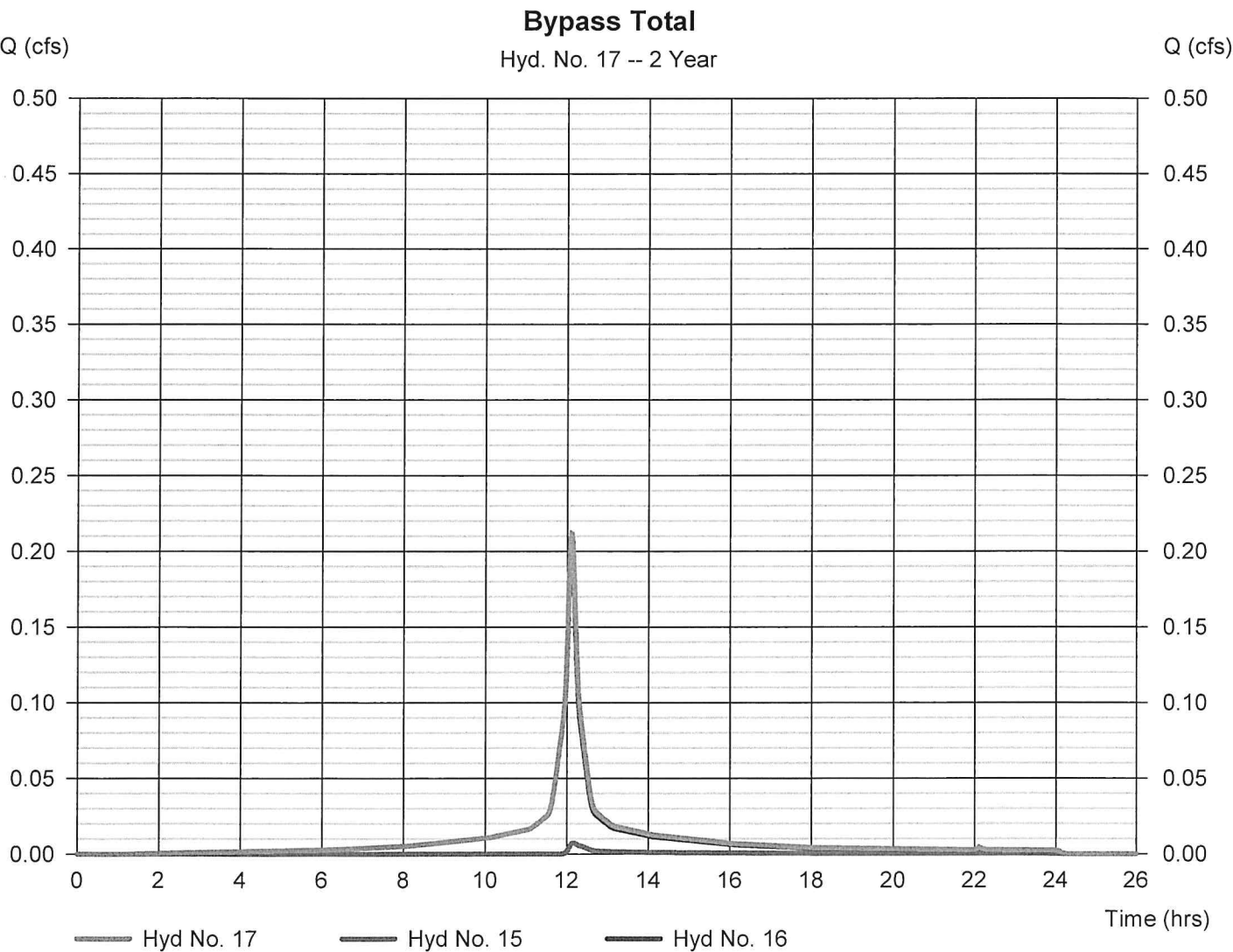


Hydrograph Report

Hyd. No. 17

Bypass Total

Hydrograph type	= Combine	Peak discharge	= 0.212 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 826 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.090 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

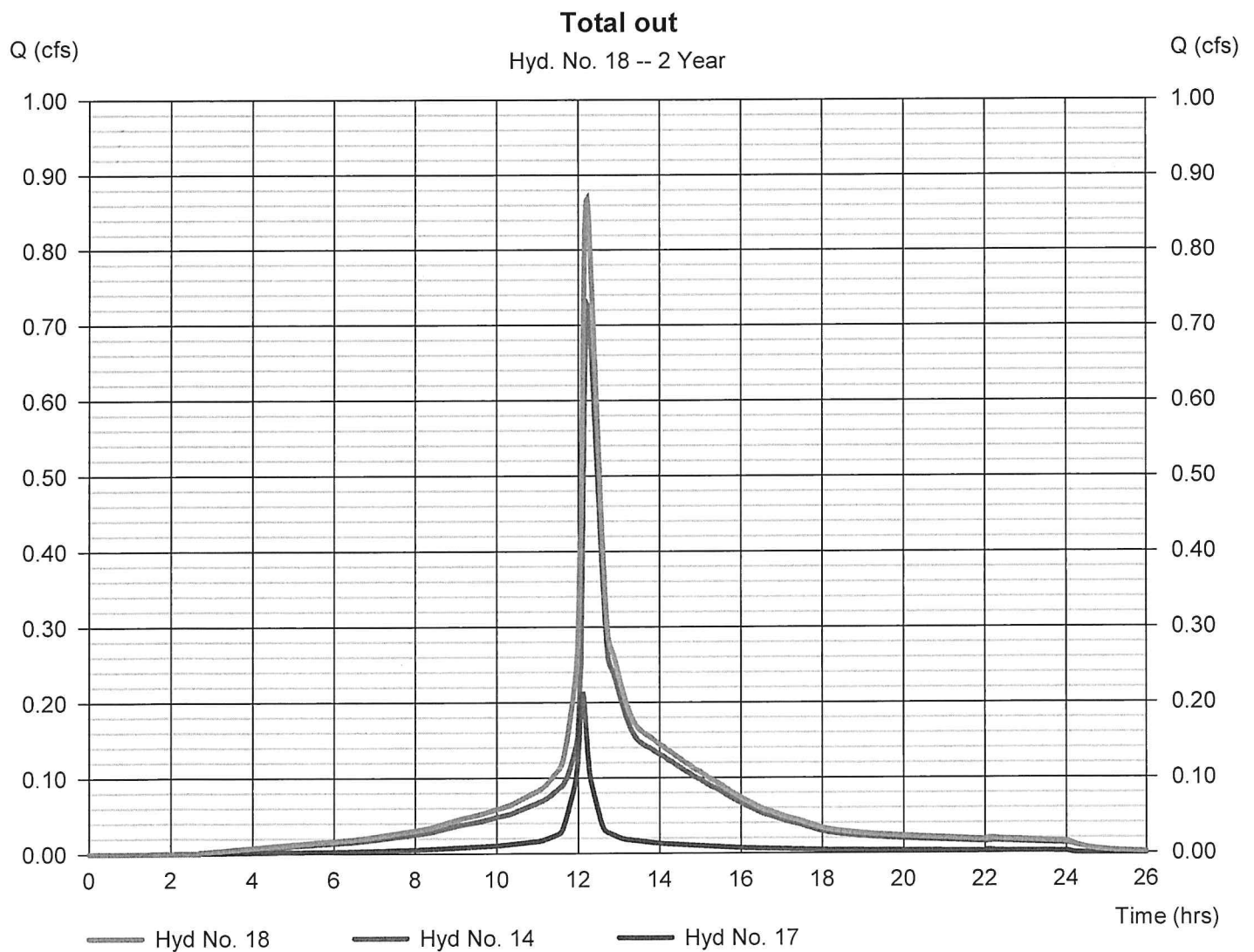
Friday, 10 / 23 / 2020

Hyd. No. 18

Total out

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 14, 17

Peak discharge = 0.867 cfs
Time to peak = 12.22 hrs
Hyd. volume = 5,379 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.186	1	728	699	-----	-----	-----	Pre-Perv
2	SCS Runoff	1.329	1	726	5,198	-----	-----	-----	Pre--Imp
3	SCS Runoff	0.283	1	727	981	-----	-----	-----	Pre-gravel
4	Combine	1.793	1	727	6,878	1, 2, 3	-----	-----	Pre-total
5	SCS Runoff	0.027	1	728	100	-----	-----	-----	CB-2 perv
6	SCS Runoff	0.842	1	726	3,292	-----	-----	-----	CB-2 Imp
7	Combine	0.868	1	726	3,392	5, 6	-----	-----	CB-2 total
8	SCS Runoff	0.013	1	728	50	-----	-----	-----	CB-1 Perv
9	SCS Runoff	0.399	1	726	1,559	-----	-----	-----	CB-1 Imp
10	Combine	1.279	1	726	5,001	7, 8, 9	-----	-----	CB-1 total
11	SCS Runoff	0.355	1	726	1,386	-----	-----	-----	CB-3 Imp
12	SCS Runoff	0.177	1	726	693	-----	-----	-----	Dunkin Bldg
13	Combine	1.811	1	726	7,080	10, 11, 12	-----	-----	Total to Basin
14	Reservoir	1.380	1	732	7,068	13	124.36	1,434	Det Basin
15	SCS Runoff	0.027	1	728	100	-----	-----	-----	Bypass-Perv
16	SCS Runoff	0.310	1	726	1,213	-----	-----	-----	Bypass-Imp
17	Combine	0.336	1	726	1,313	15, 16	-----	-----	Bypass Totla
18	Combine	1.649	1	731	8,380	14, 17	-----	-----	Total out
SCS Dunkin 36 10-22-2020.gpw					Return Period: 10 Year			Friday, 10 / 23 / 2020	

Hydrograph Report

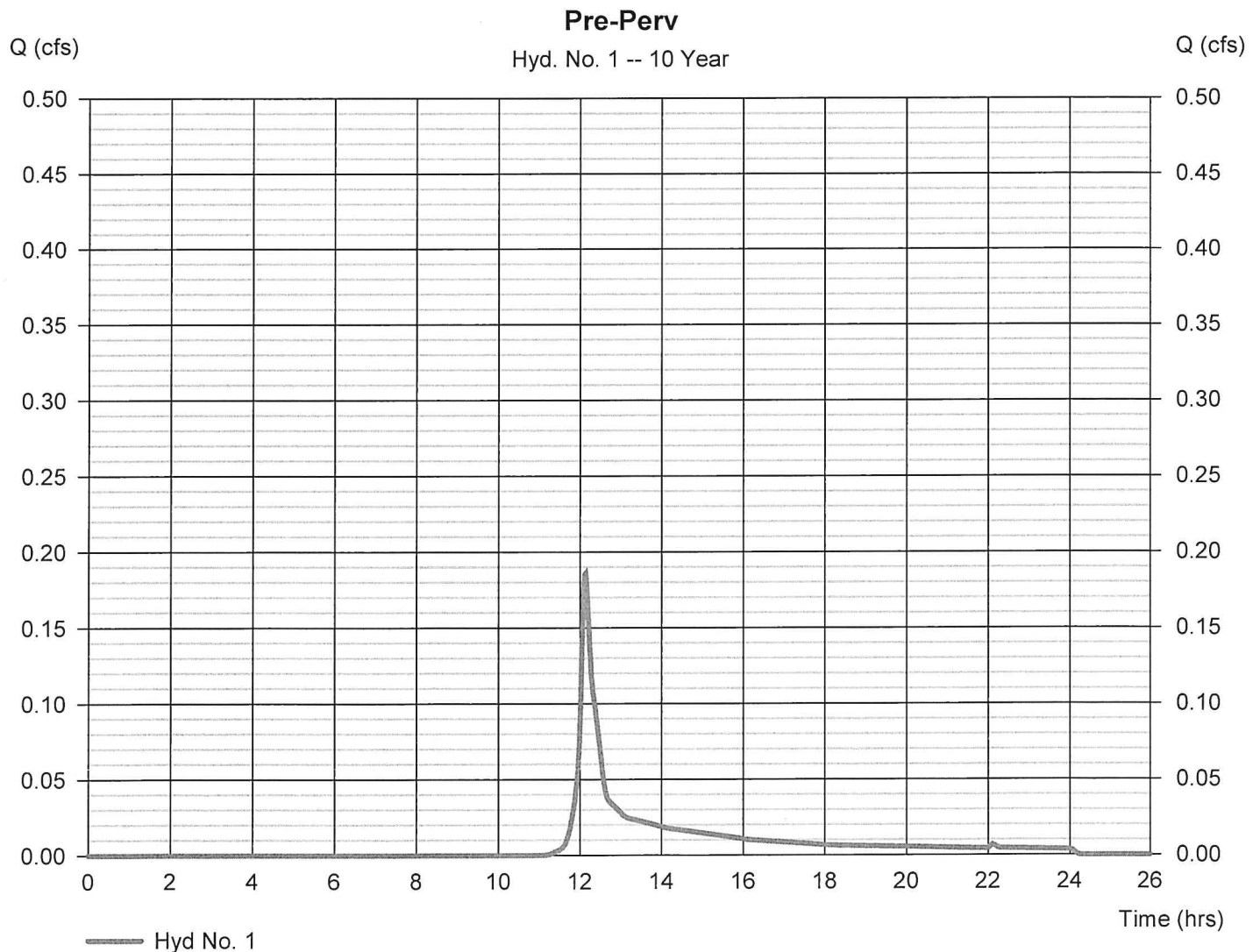
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 1

Pre-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.186 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 699 cuft
Drainage area	= 0.140 ac	Curve number	= 61
Basin Slope	= 0.1 %	Hydraulic length	= 198 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

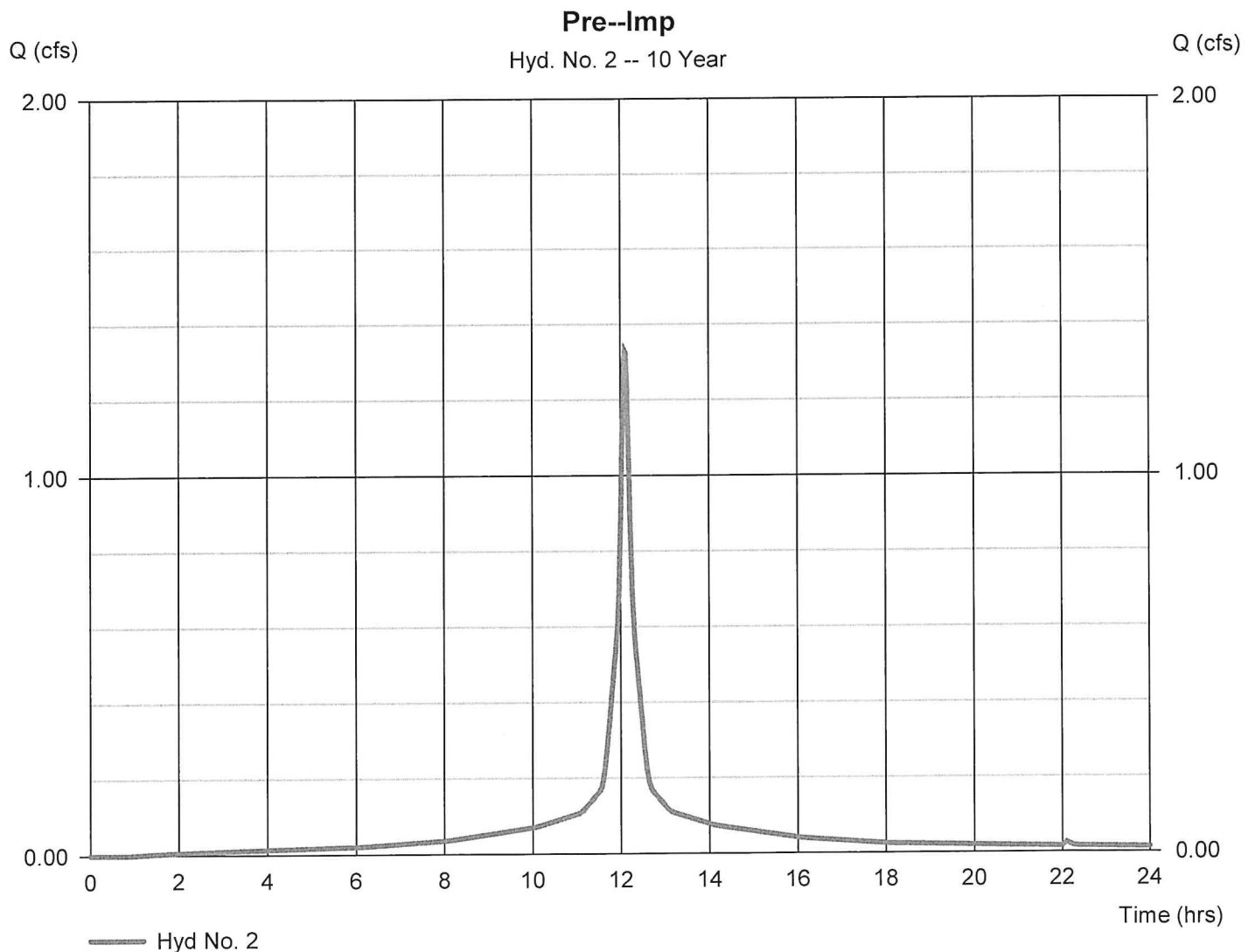
Friday, 10 / 23 / 2020

Hyd. No. 2

Pre--Imp

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.300 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 5.01 in
 Storm duration = 24 hrs

Peak discharge = 1.329 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 5,198 cuft
 Curve number = 98
 Hydraulic length = 178 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

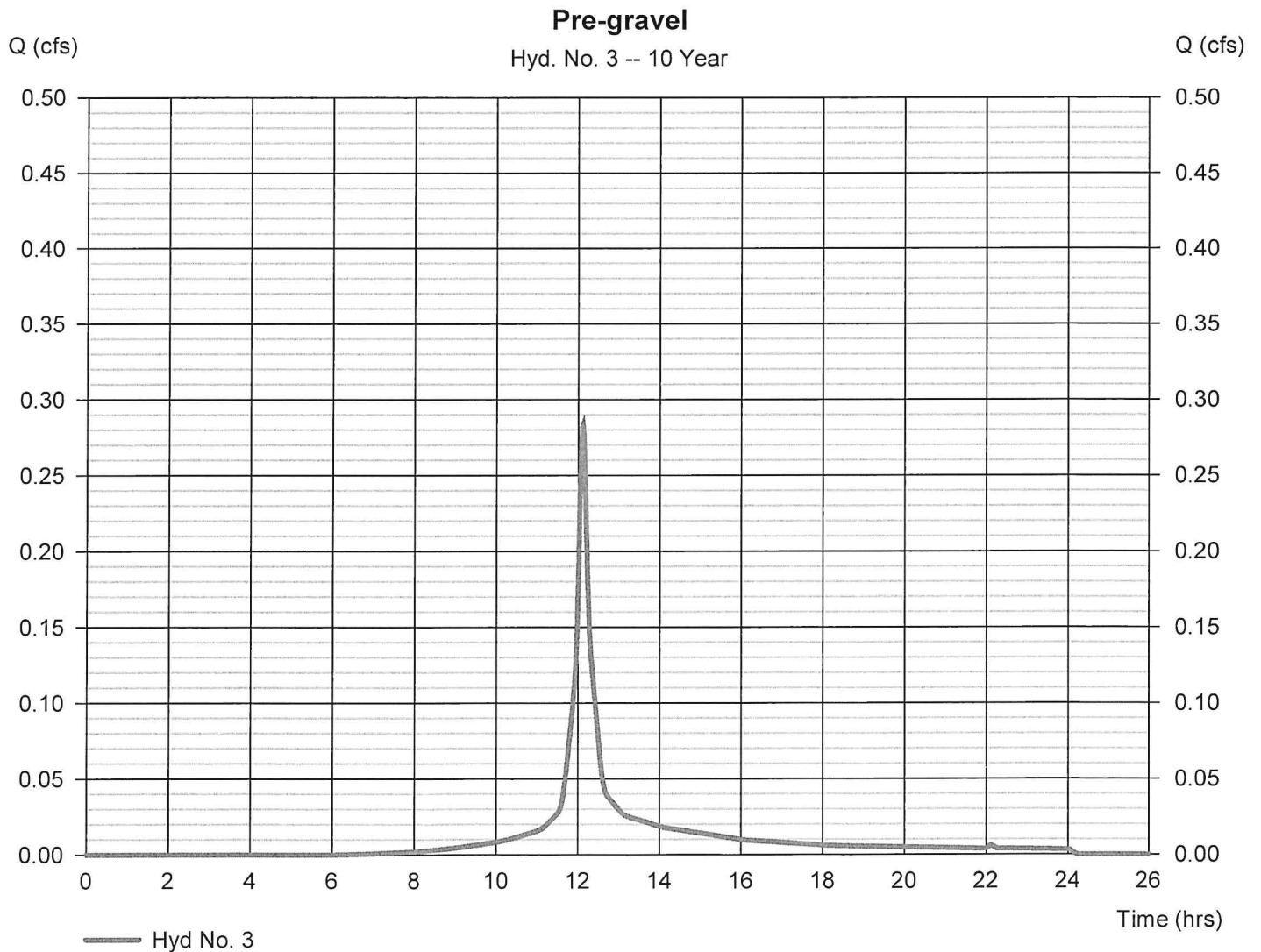
Friday, 10 / 23 / 2020

Hyd. No. 3

Pre-gravel

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.080 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 5.01 in
 Storm duration = 24 hrs

Peak discharge = 0.283 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 981 cuft
 Curve number = 85
 Hydraulic length = 178 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

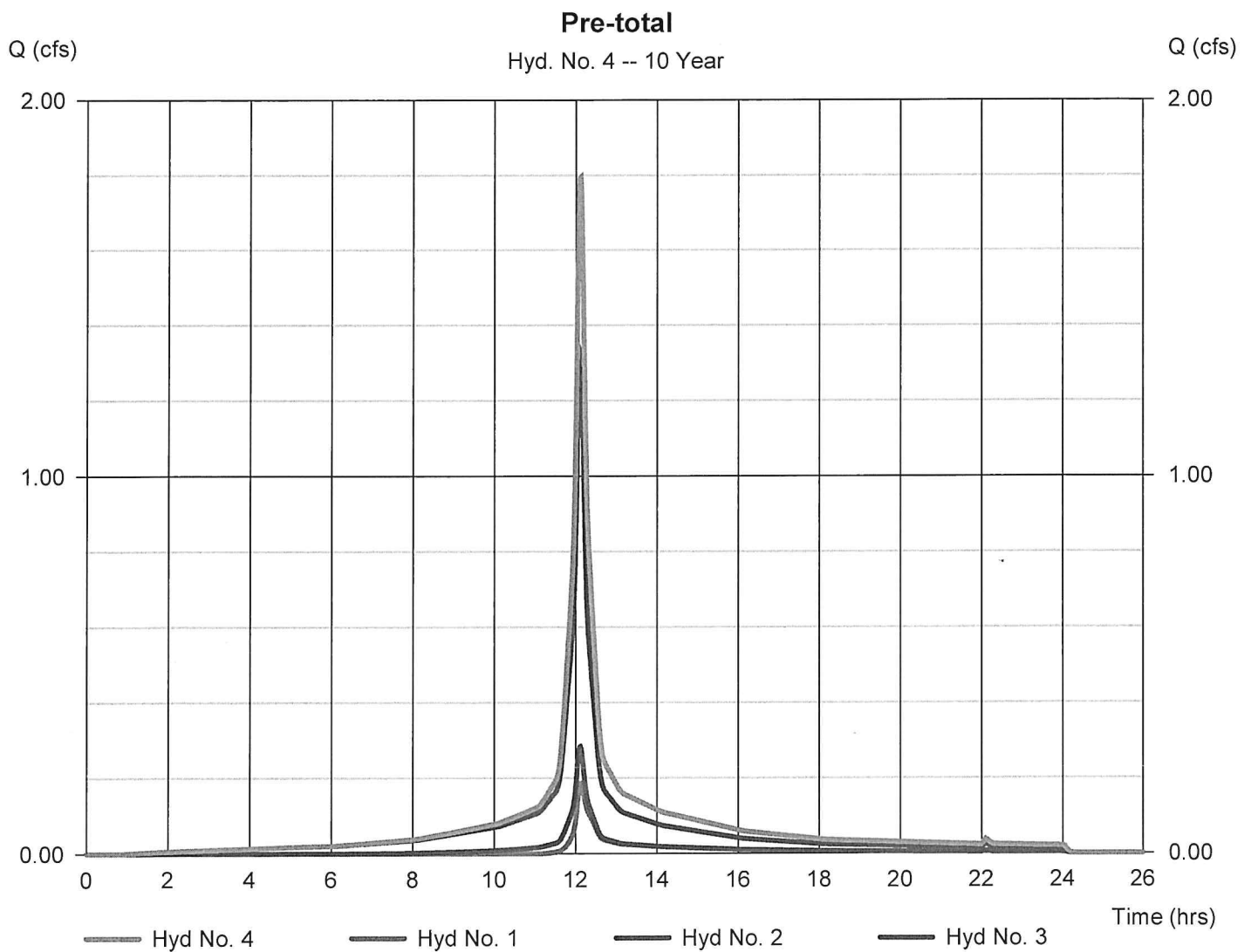
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 1.793 cfs
Time to peak = 12.12 hrs
Hyd. volume = 6,878 cuft
Contrib. drain. area = 0.520 ac



Hydrograph Report

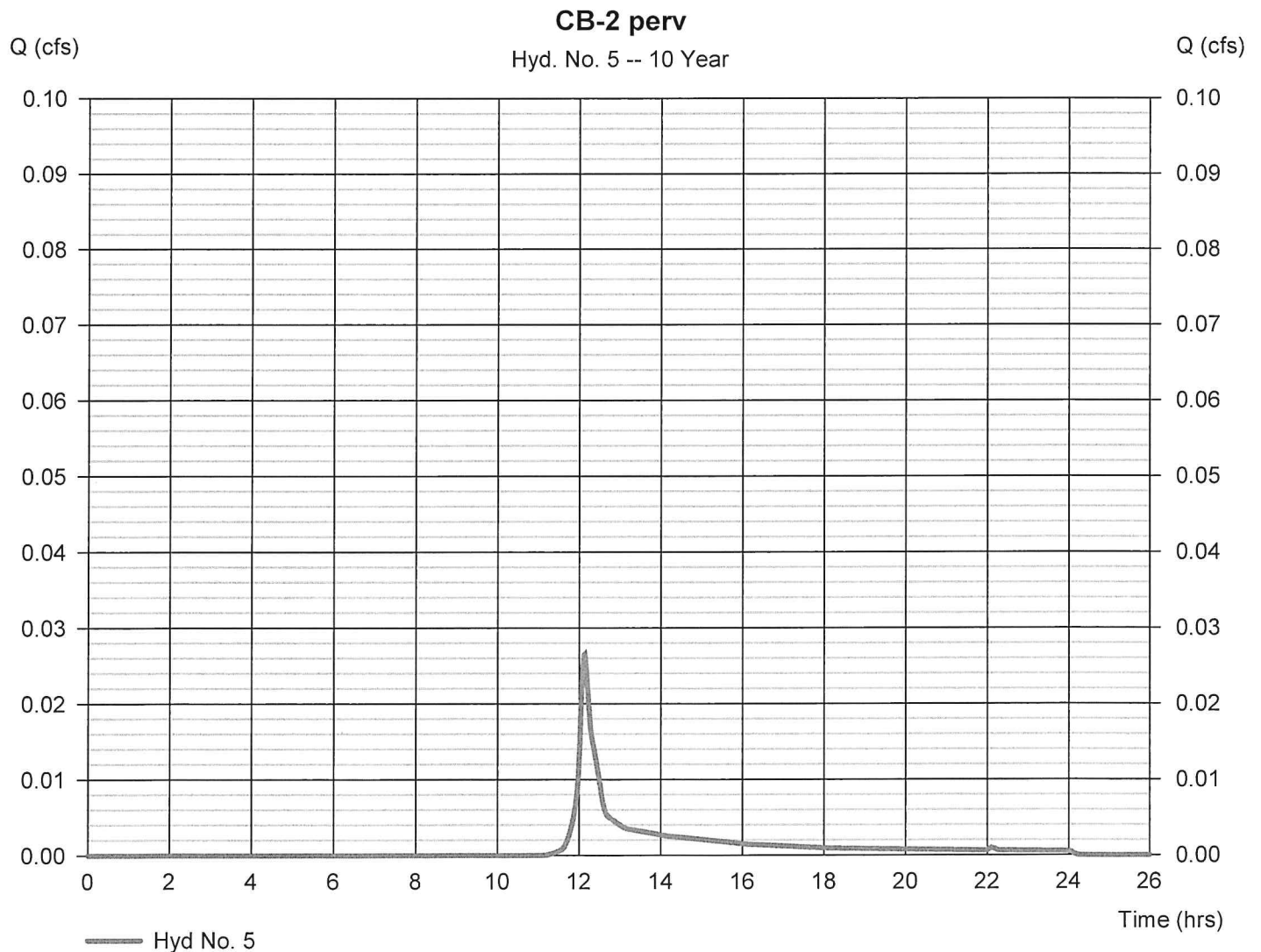
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 5

CB-2 perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.027 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 100 cuft
Drainage area	= 0.020 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

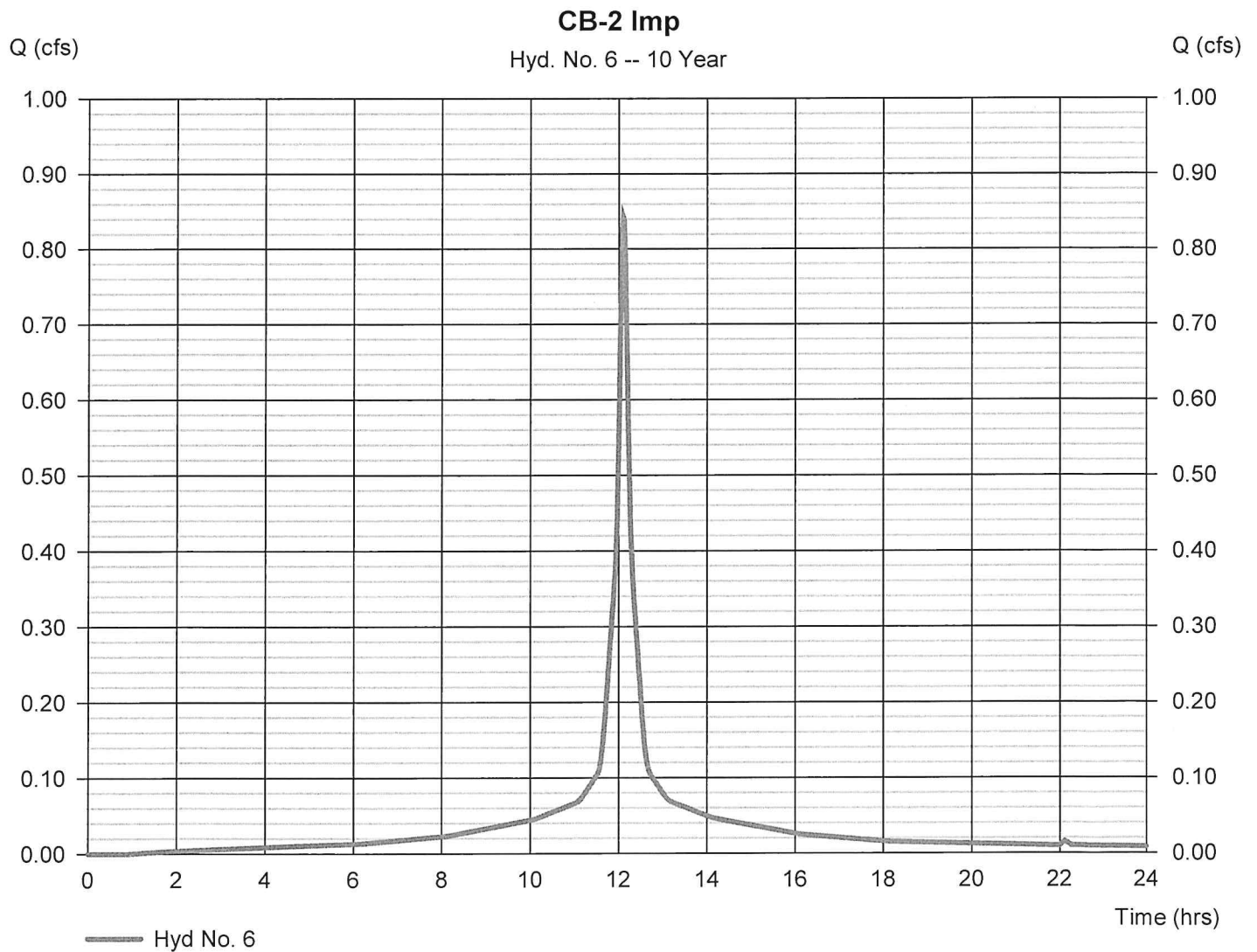
Friday, 10 / 23 / 2020

Hyd. No. 6

CB-2 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.190 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 5.01 in
 Storm duration = 24 hrs

Peak discharge = 0.842 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 3,292 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

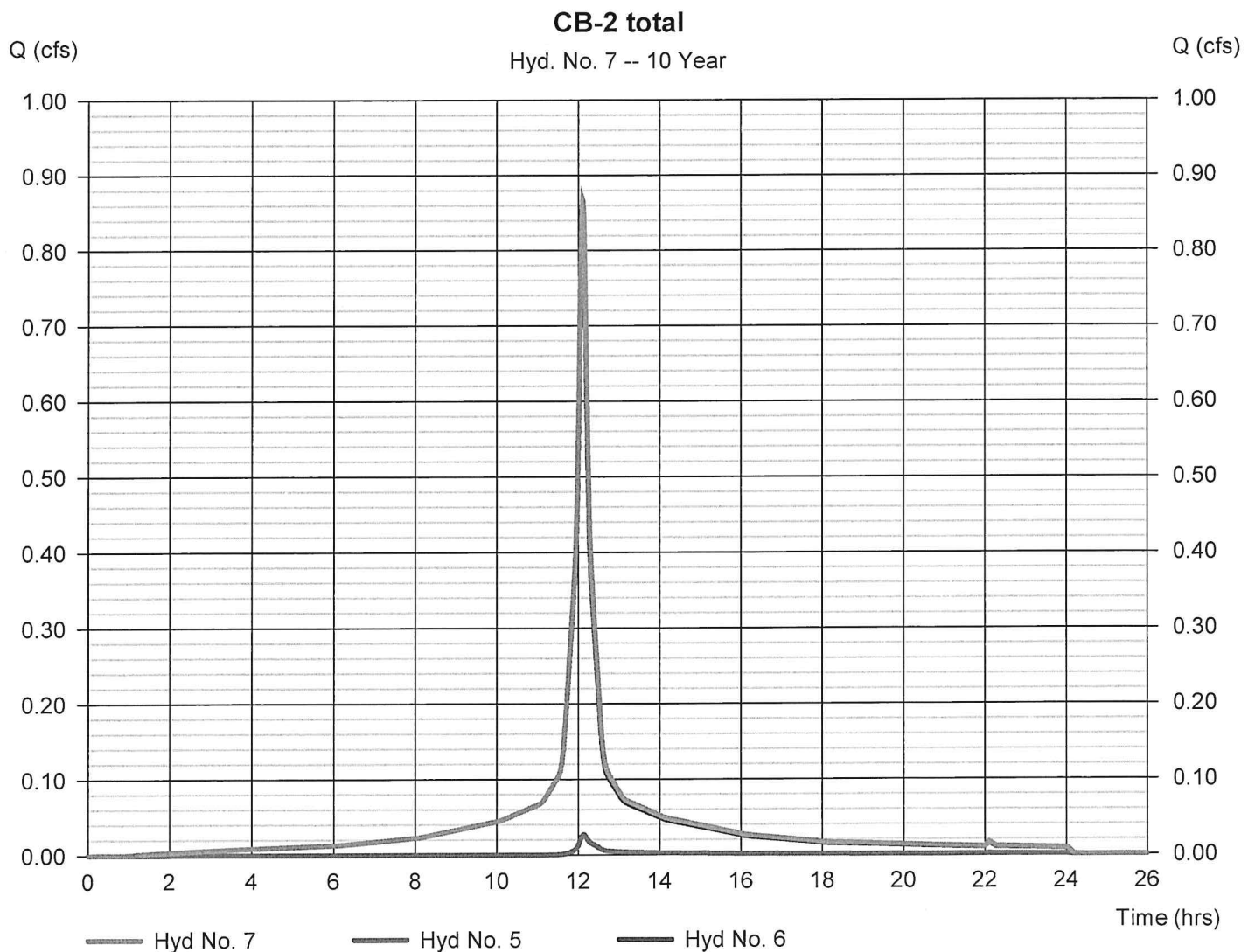
Friday, 10 / 23 / 2020

Hyd. No. 7

CB-2 total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 5, 6

Peak discharge = 0.868 cfs
Time to peak = 12.10 hrs
Hyd. volume = 3,392 cuft
Contrib. drain. area = 0.210 ac



Hydrograph Report

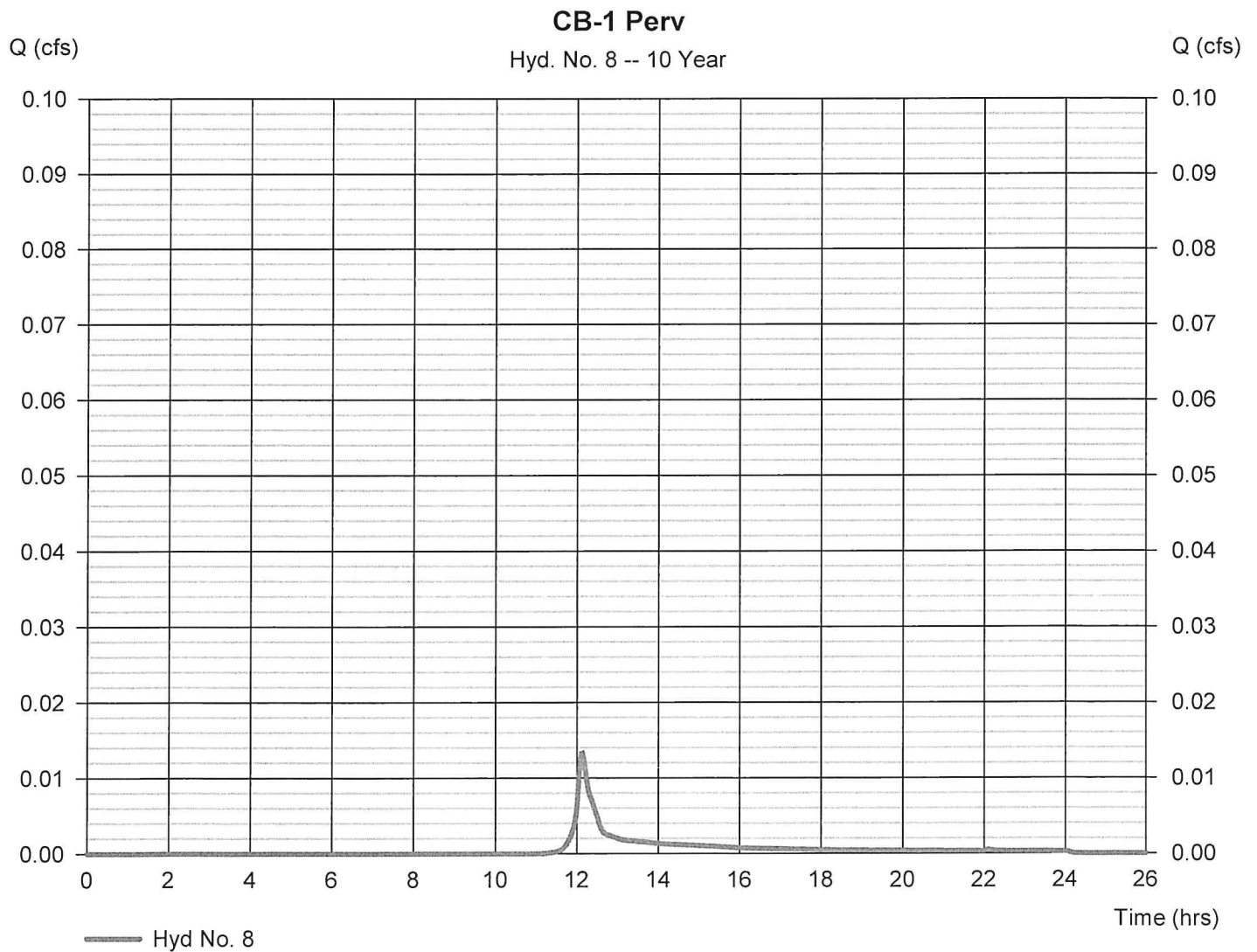
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 8

CB-1 Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.013 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 50 cuft
Drainage area	= 0.010 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

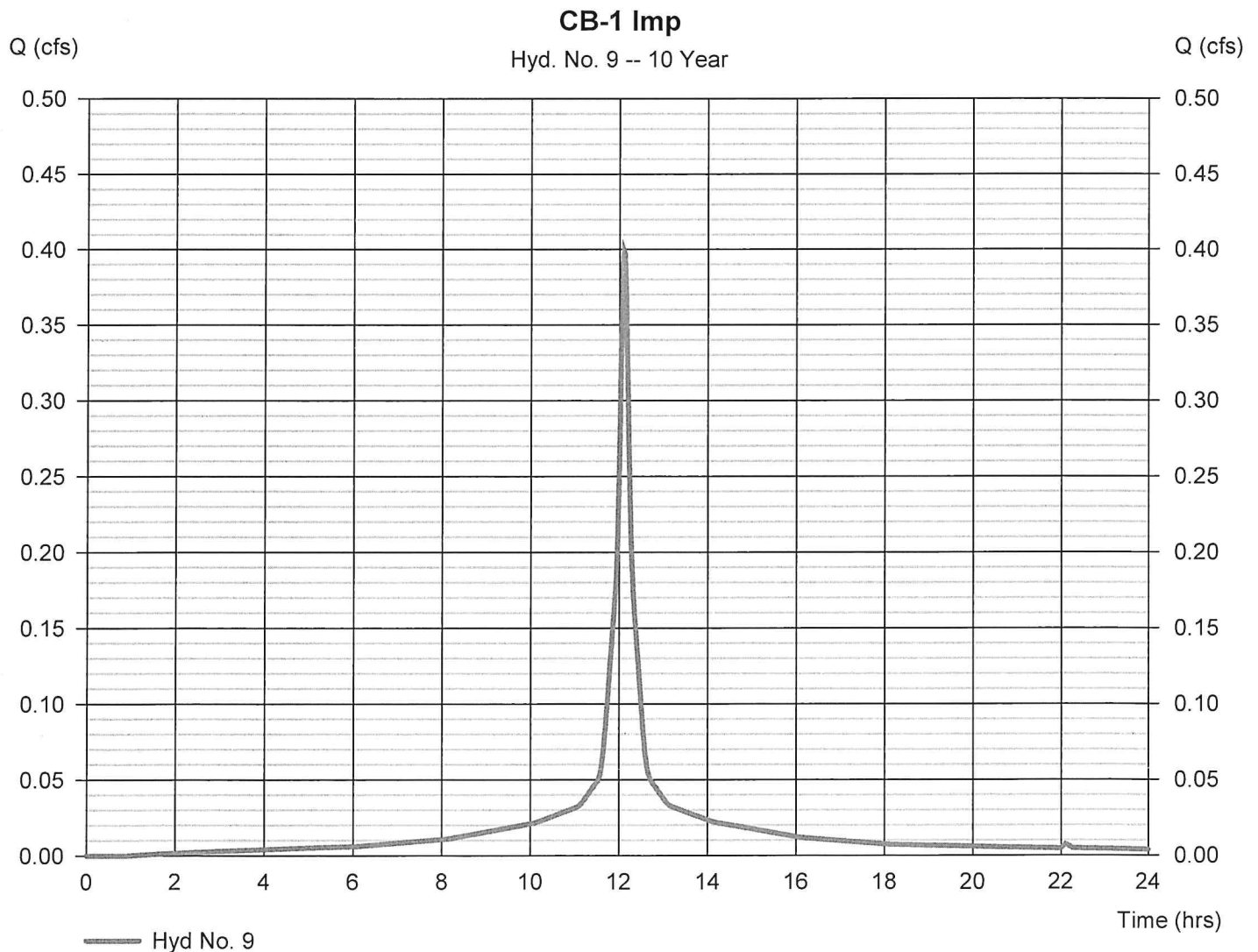
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 9

CB-1 Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.399 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,559 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

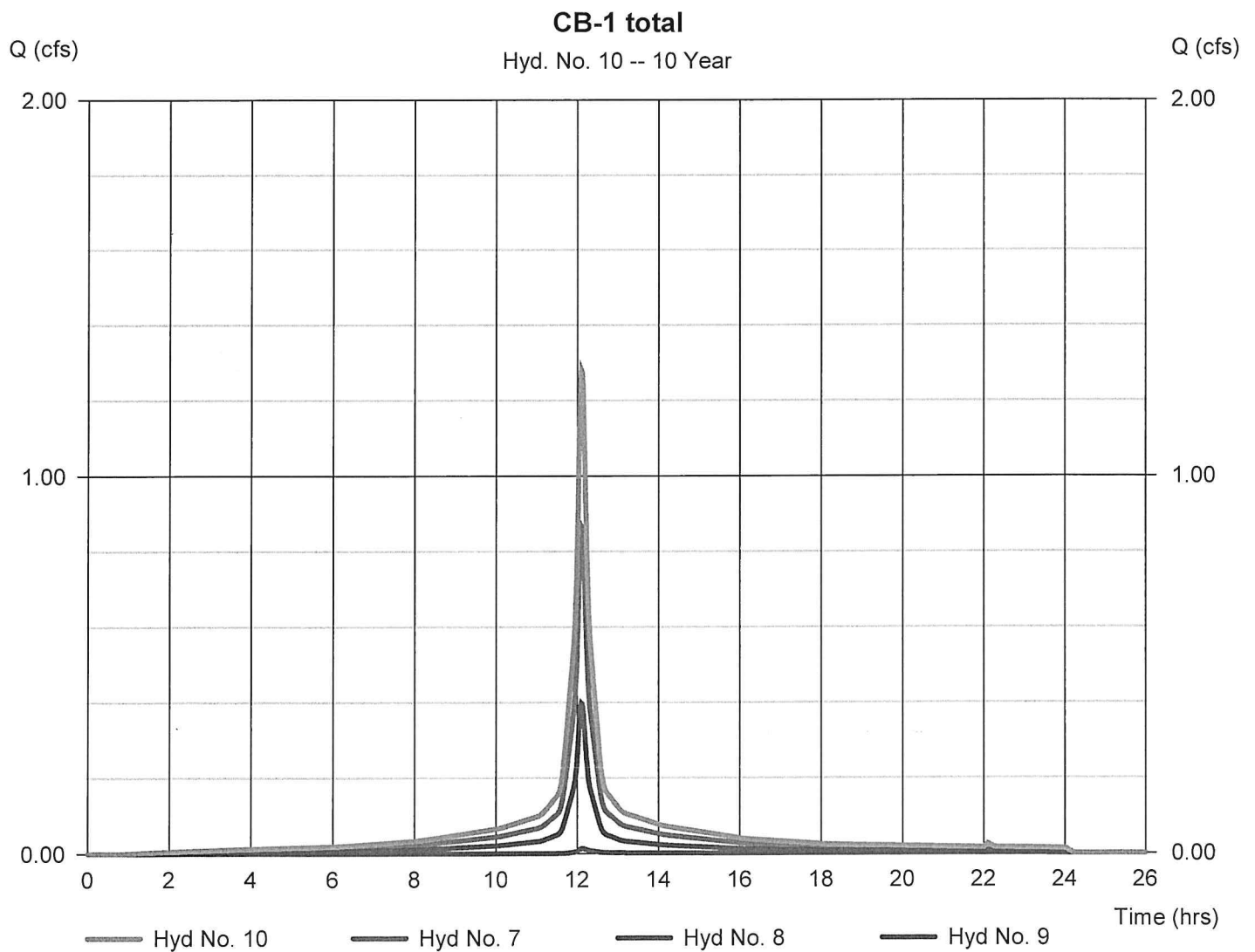
Friday, 10 / 23 / 2020

Hyd. No. 10

CB-1 total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 7, 8, 9

Peak discharge = 1.279 cfs
Time to peak = 12.10 hrs
Hyd. volume = 5,001 cuft
Contrib. drain. area = 0.100 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

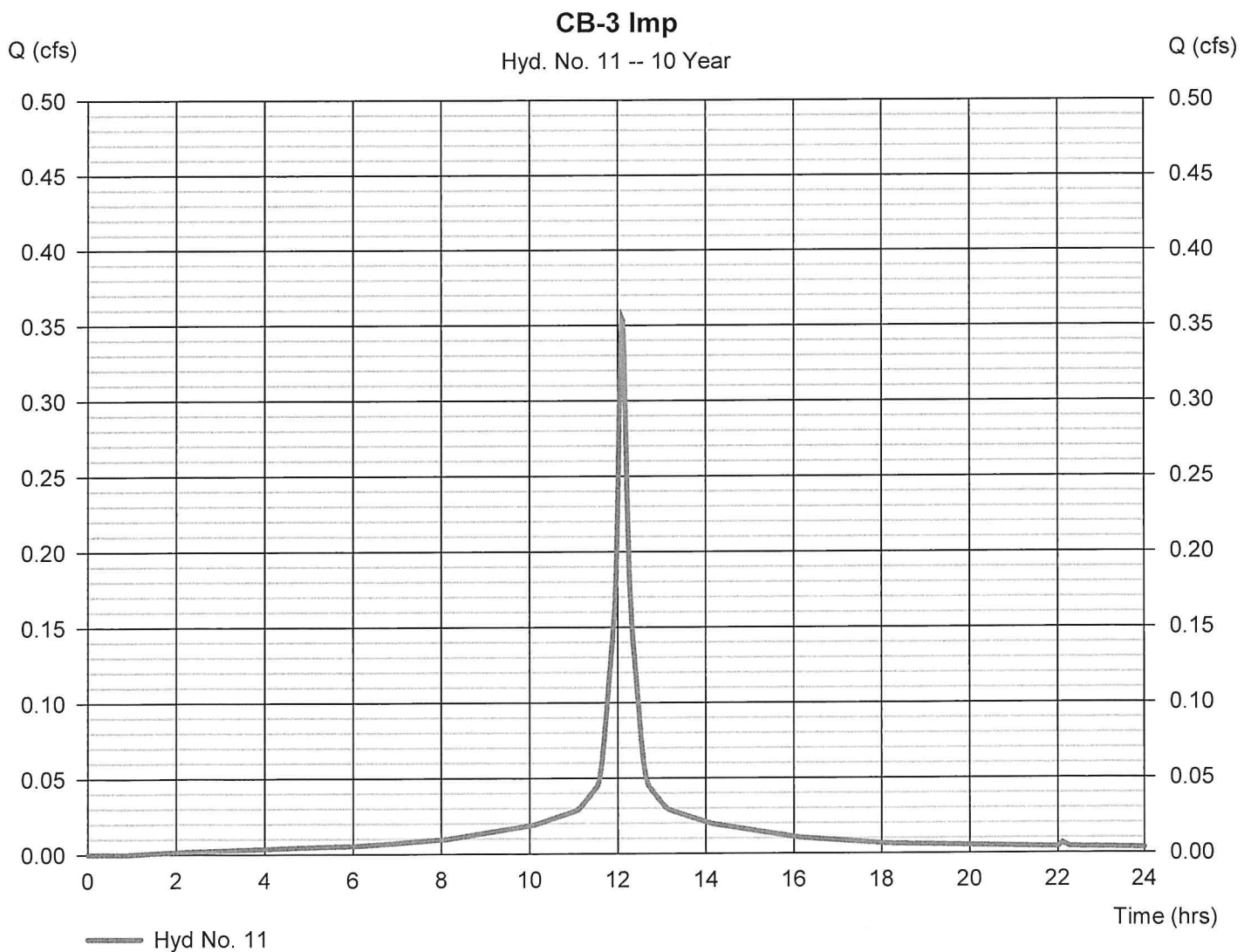
Friday, 10 / 23 / 2020

Hyd. No. 11

CB-3 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.080 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 5.01 in
 Storm duration = 24 hrs

Peak discharge = 0.355 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 1,386 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

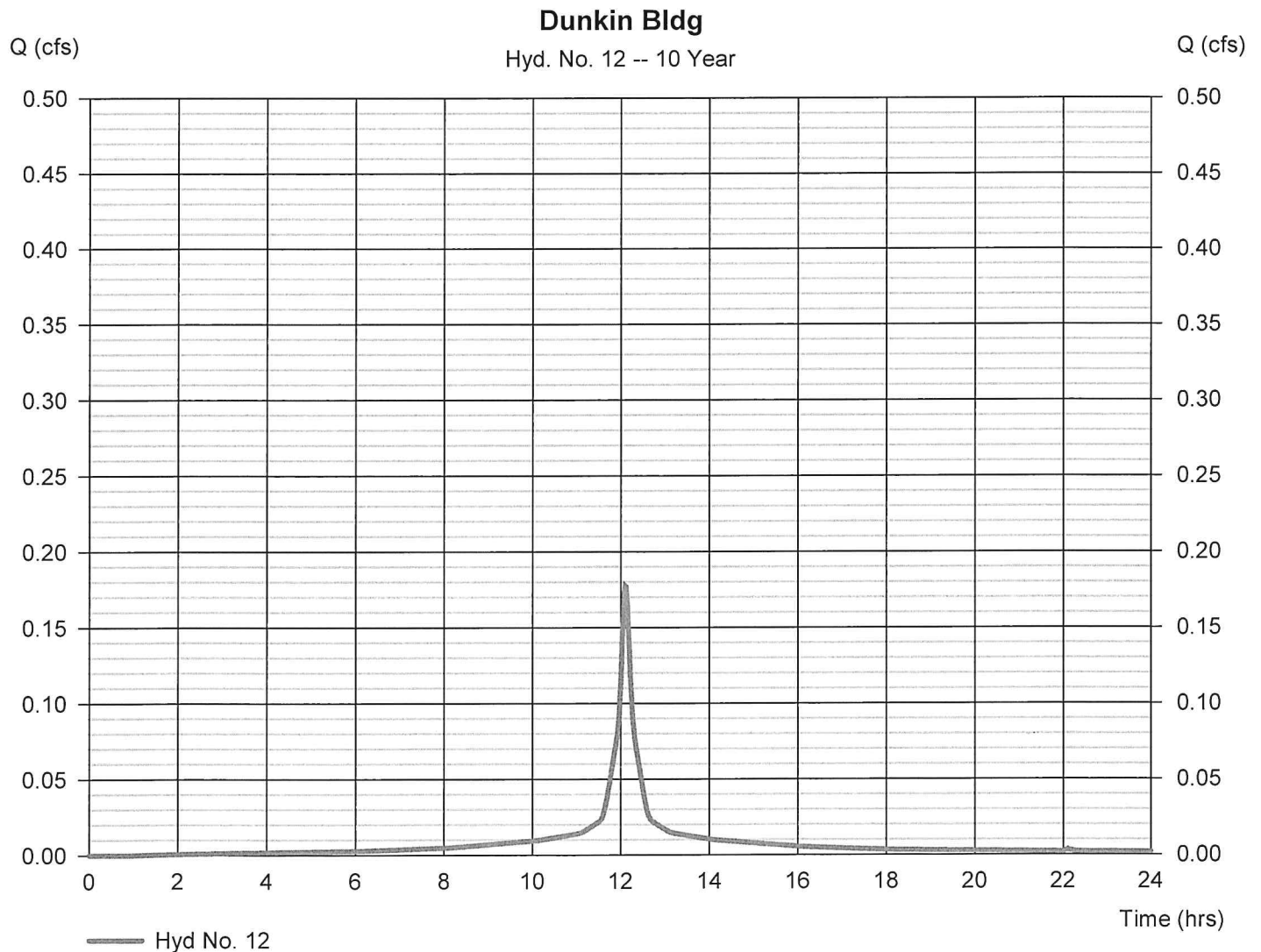
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 12

Dunkin Bldg

Hydrograph type	= SCS Runoff	Peak discharge	= 0.177 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 693 cuft
Drainage area	= 0.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

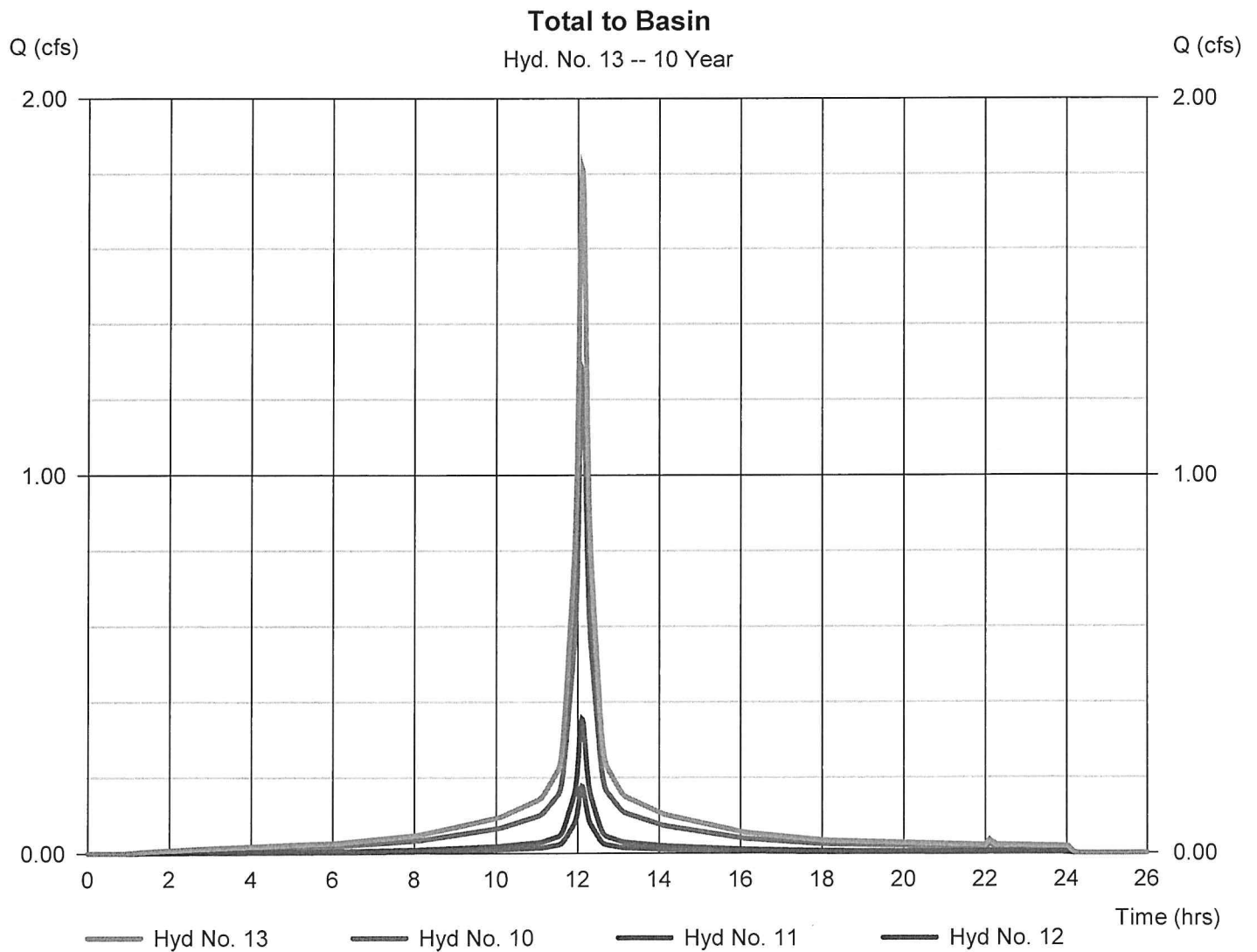
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 13

Total to Basin

Hydrograph type	= Combine	Peak discharge	= 1.811 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 7,080 cuft
Inflow hyds.	= 10, 11, 12	Contrib. drain. area	= 0.120 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

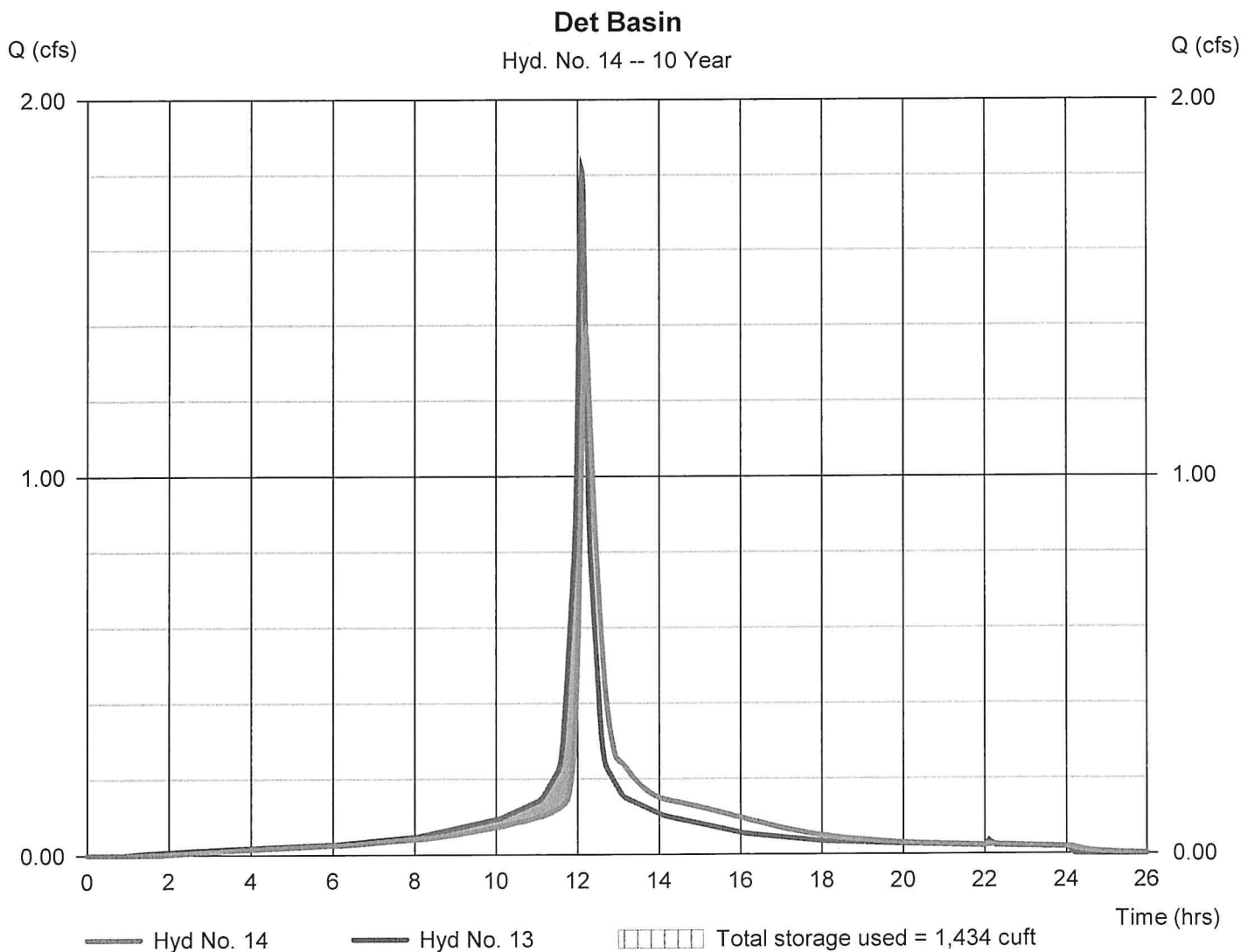
Friday, 10 / 23 / 2020

Hyd. No. 14

Det Basin

Hydrograph type	= Reservoir	Peak discharge	= 1.380 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.20 hrs
Time interval	= 1 min	Hyd. volume	= 7,068 cuft
Inflow hyd. No.	= 13 - Total to Basin	Max. Elevation	= 124.36 ft
Reservoir name	= Det Basin	Max. Storage	= 1,434 cuft

Storage Indication method used.



Hydrograph Report

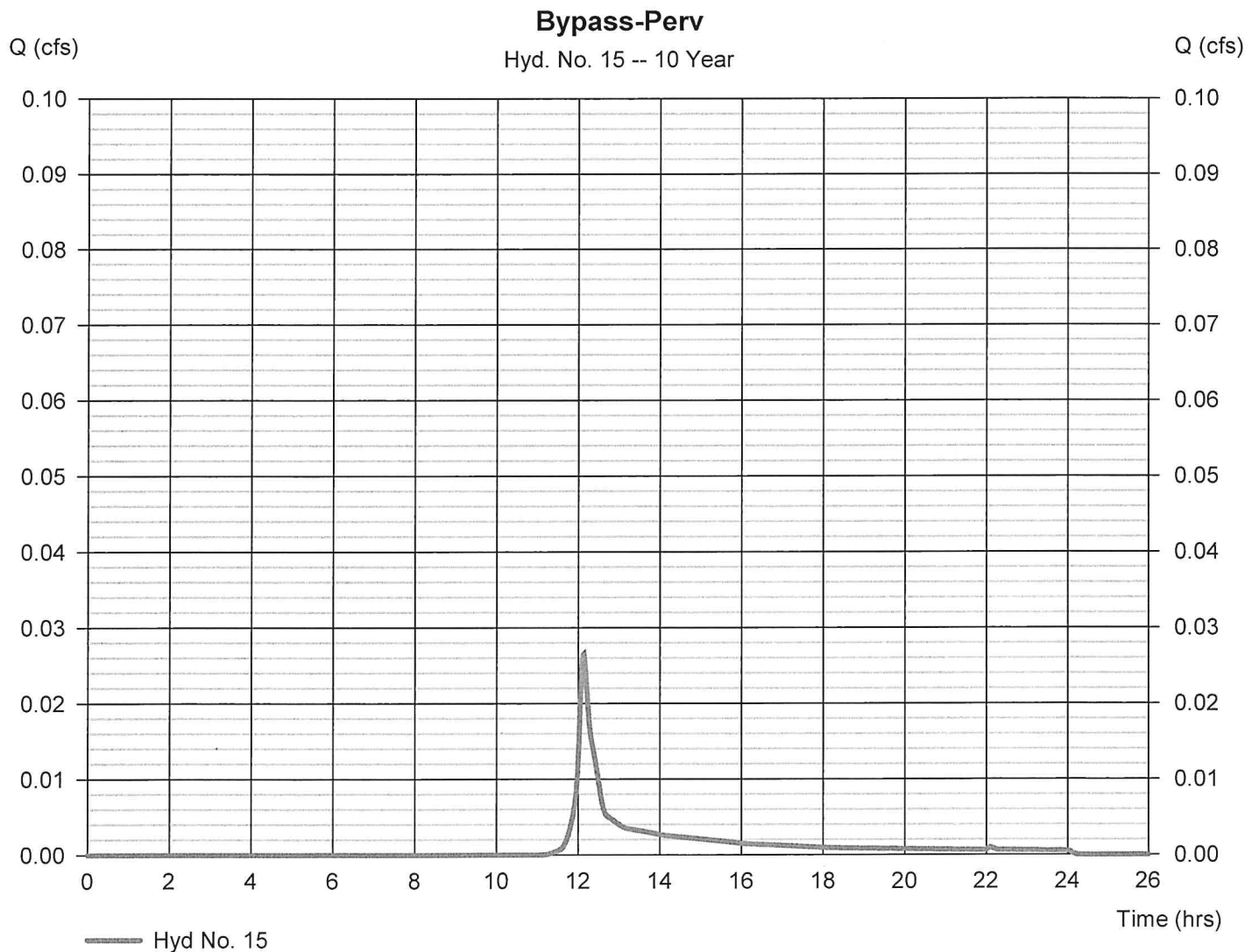
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 15

Bypass-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.027 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 100 cuft
Drainage area	= 0.020 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

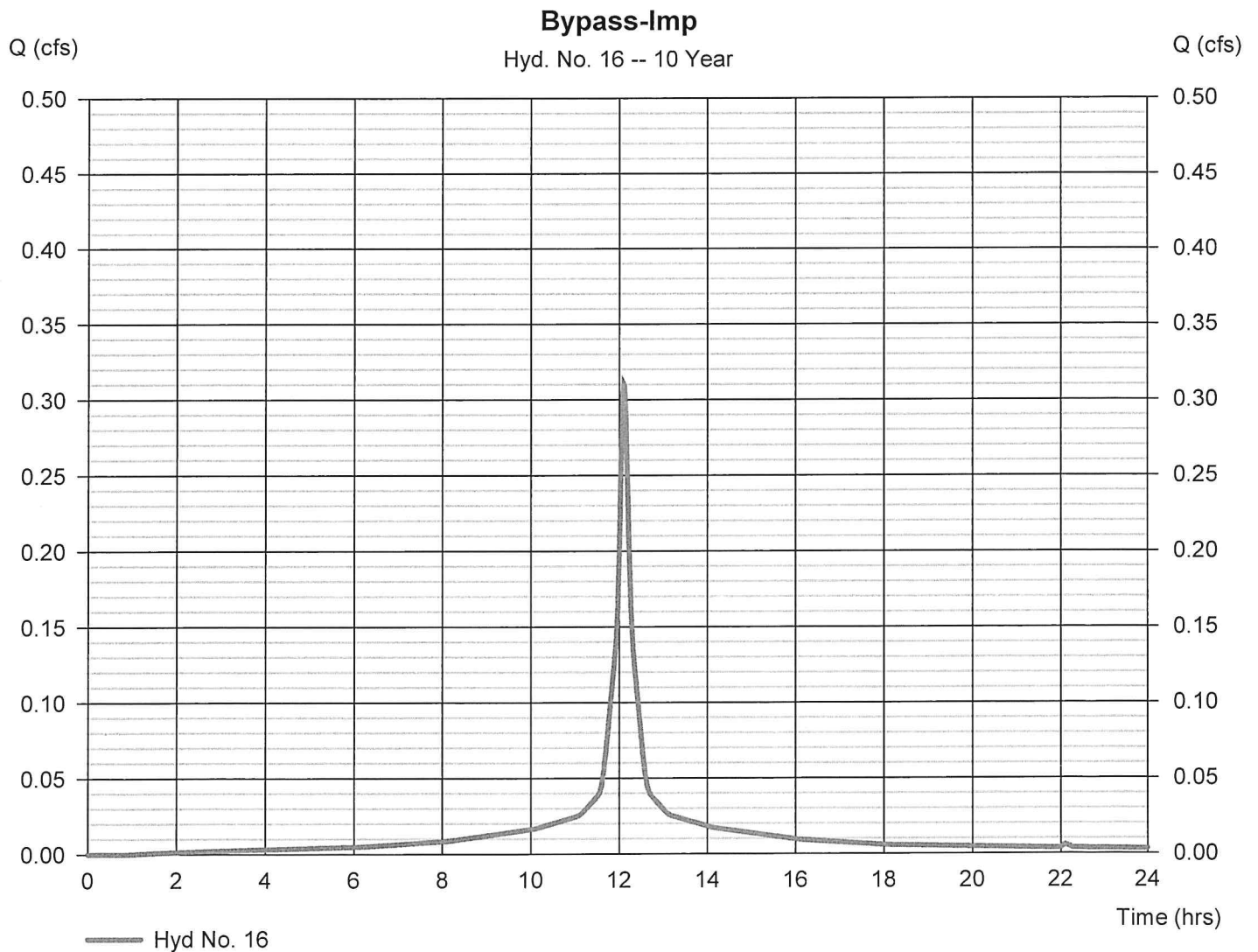
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 16

Bypass-Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.310 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,213 cuft
Drainage area	= 0.070 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

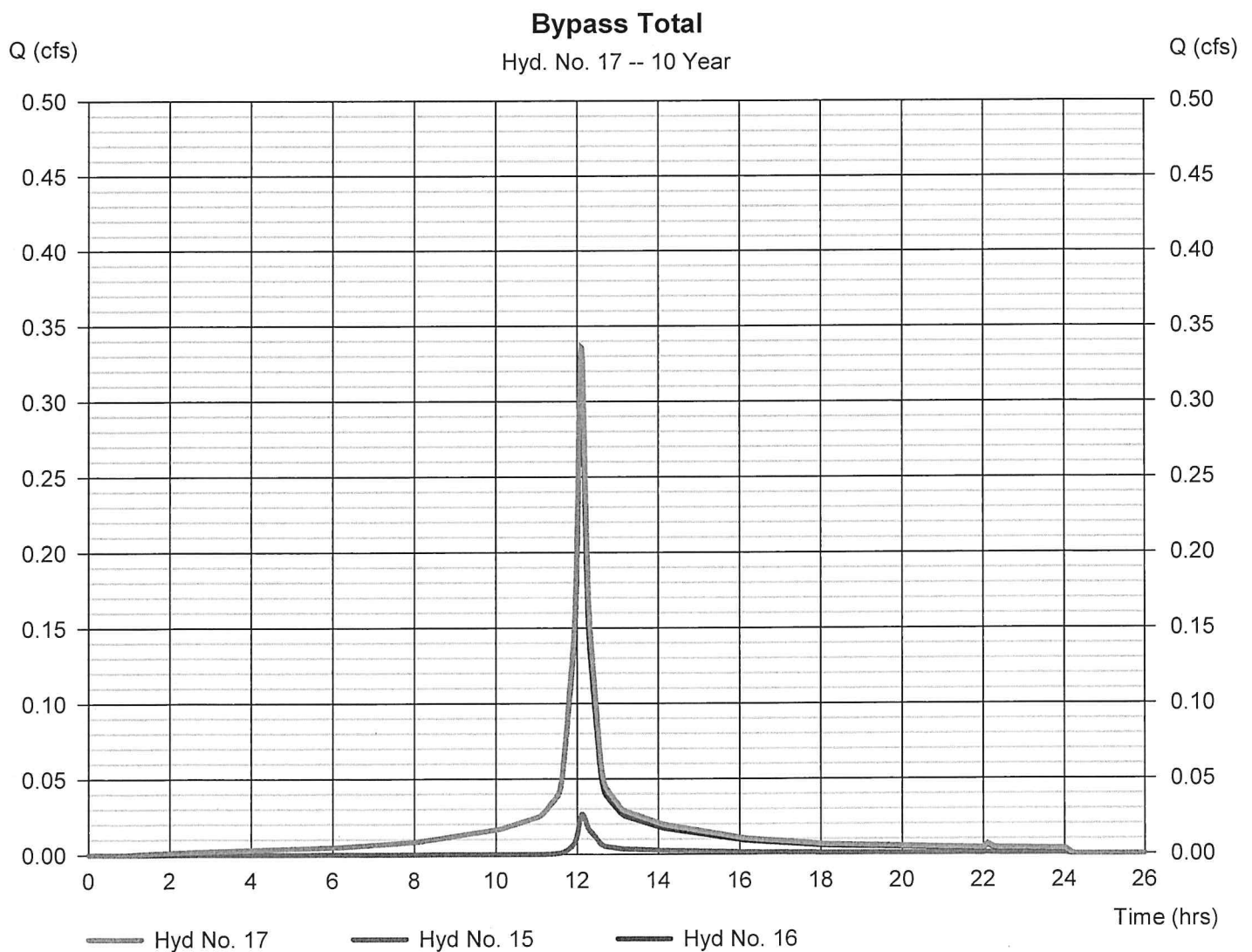
Friday, 10 / 23 / 2020

Hyd. No. 17

Bypass Total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 15, 16

Peak discharge = 0.336 cfs
Time to peak = 12.10 hrs
Hyd. volume = 1,313 cuft
Contrib. drain. area = 0.090 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

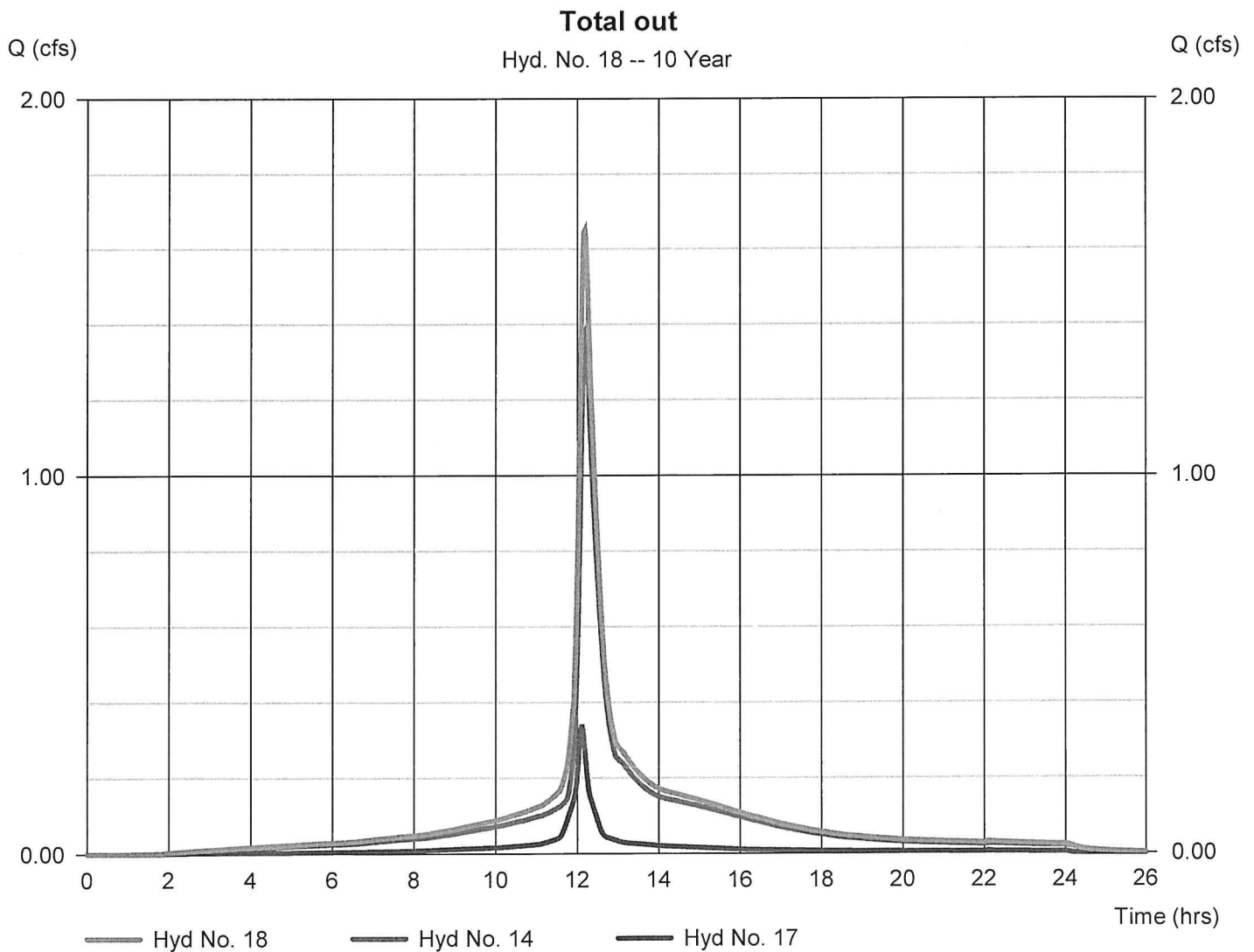
Friday, 10 / 23 / 2020

Hyd. No. 18

Total out

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 14, 17

Peak discharge = 1.649 cfs
Time to peak = 12.18 hrs
Hyd. volume = 8,380 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.299	1	727	1,071	-----	-----	-----	Pre-Perv
2	SCS Runoff	1.635	1	726	6,438	-----	-----	-----	Pre--Imp
3	SCS Runoff	0.369	1	727	1,291	-----	-----	-----	Pre-gravel
4	Combine	2.297	1	727	8,799	1, 2, 3	-----	-----	Pre-total
5	SCS Runoff	0.043	1	727	153	-----	-----	-----	CB-2 perv
6	SCS Runoff	1.036	1	726	4,077	-----	-----	-----	CB-2 Imp
7	Combine	1.077	1	726	4,230	5, 6	-----	-----	CB-2 total
8	SCS Runoff	0.021	1	727	76	-----	-----	-----	CB-1 Perv
9	SCS Runoff	0.491	1	726	1,931	-----	-----	-----	CB-1 Imp
10	Combine	1.589	1	726	6,238	7, 8, 9	-----	-----	CB-1 total
11	SCS Runoff	0.436	1	726	1,717	-----	-----	-----	CB-3 Imp
12	SCS Runoff	0.218	1	726	858	-----	-----	-----	Dunkin Bldg
13	Combine	2.243	1	726	8,813	10, 11, 12	-----	-----	Total to Basin
14	Reservoir	1.804	1	731	8,801	13	124.58	1,590	Det Basin
15	SCS Runoff	0.043	1	727	153	-----	-----	-----	Bypass-Perv
16	SCS Runoff	0.382	1	726	1,502	-----	-----	-----	Bypass-Imp
17	Combine	0.423	1	726	1,655	15, 16	-----	-----	Bypass Totla
18	Combine	2.161	1	730	10,456	14, 17	-----	-----	Total out
SCS Dunkin 36 10-22-2020.gpw					Return Period: 25 Year			Friday, 10 / 23 / 2020	

Hydrograph Report

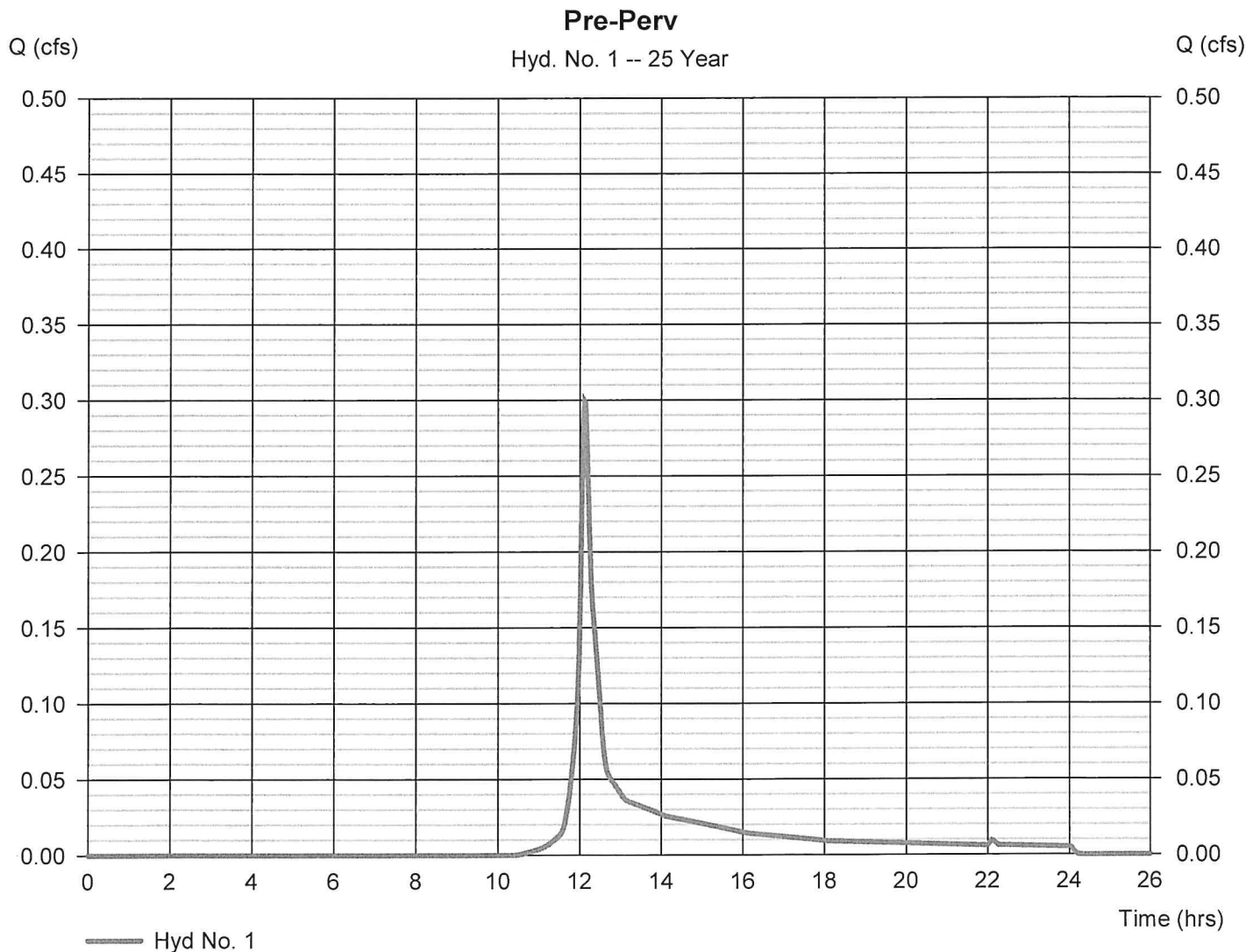
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 1

Pre-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.299 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 1,071 cuft
Drainage area	= 0.140 ac	Curve number	= 61
Basin Slope	= 0.1 %	Hydraulic length	= 198 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

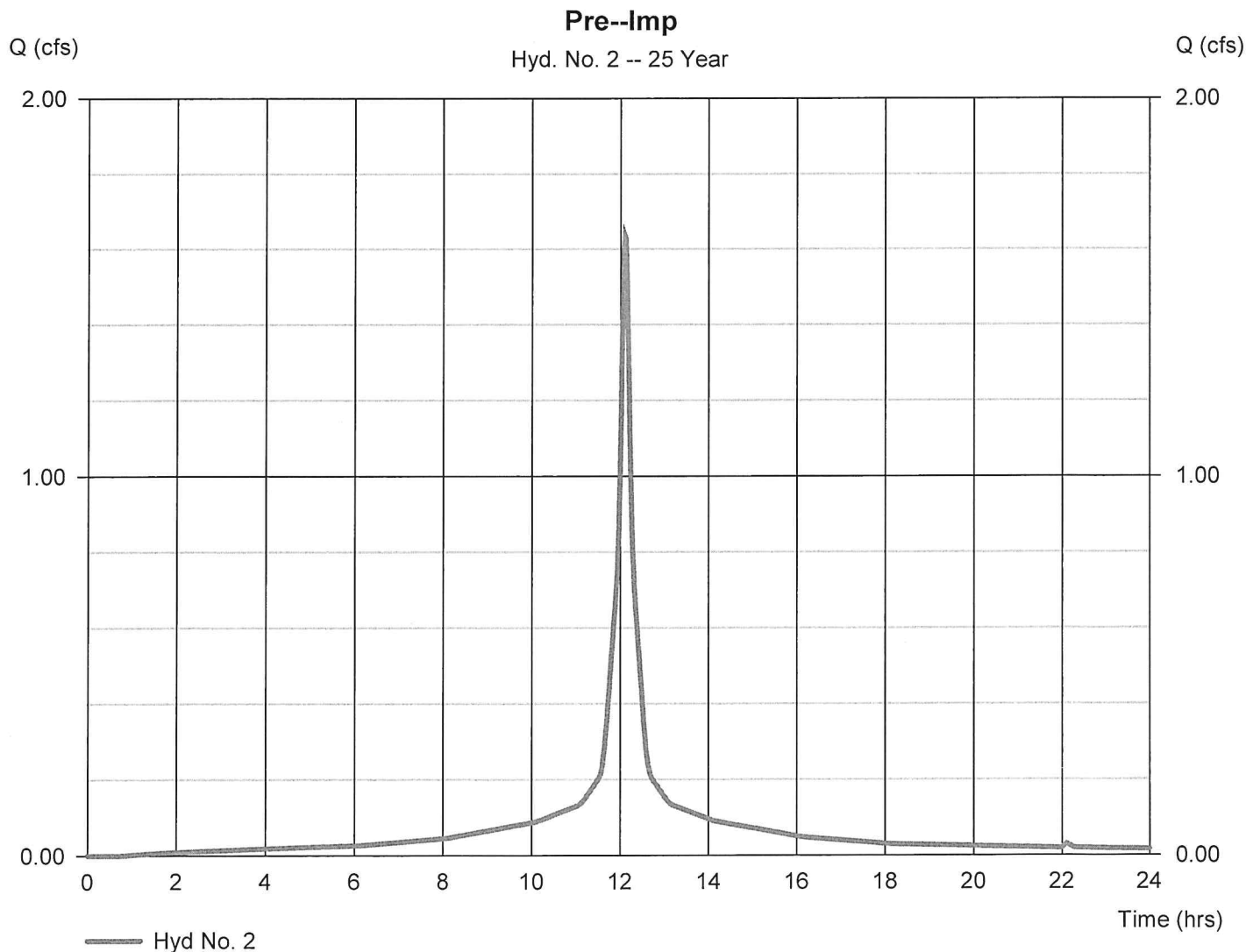
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 2

Pre--Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 1.635 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 6,438 cuft
Drainage area	= 0.300 ac	Curve number	= 98
Basin Slope	= 0.1 %	Hydraulic length	= 178 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

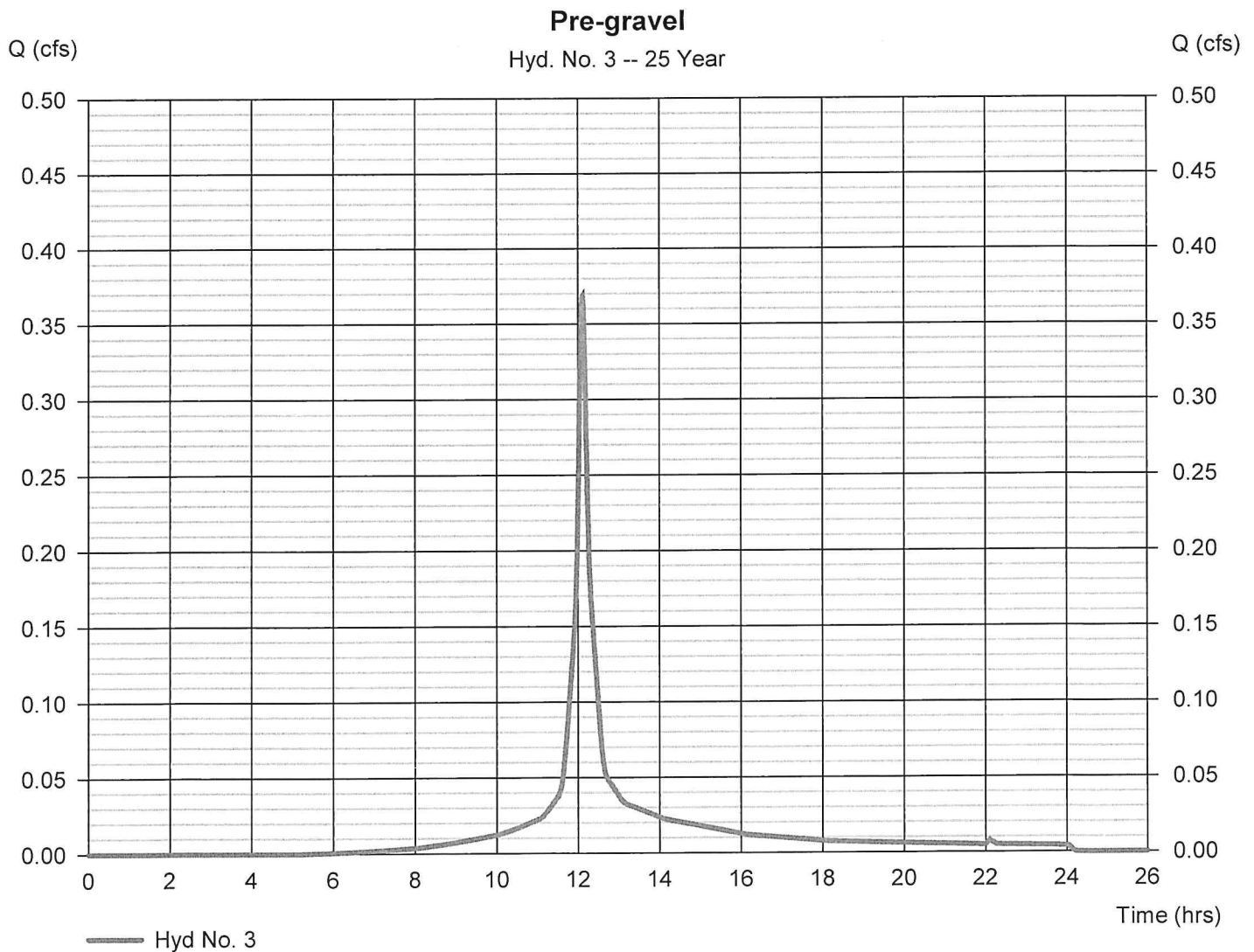
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 3

Pre-gravel

Hydrograph type	= SCS Runoff	Peak discharge	= 0.369 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 1,291 cuft
Drainage area	= 0.080 ac	Curve number	= 85
Basin Slope	= 0.1 %	Hydraulic length	= 178 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

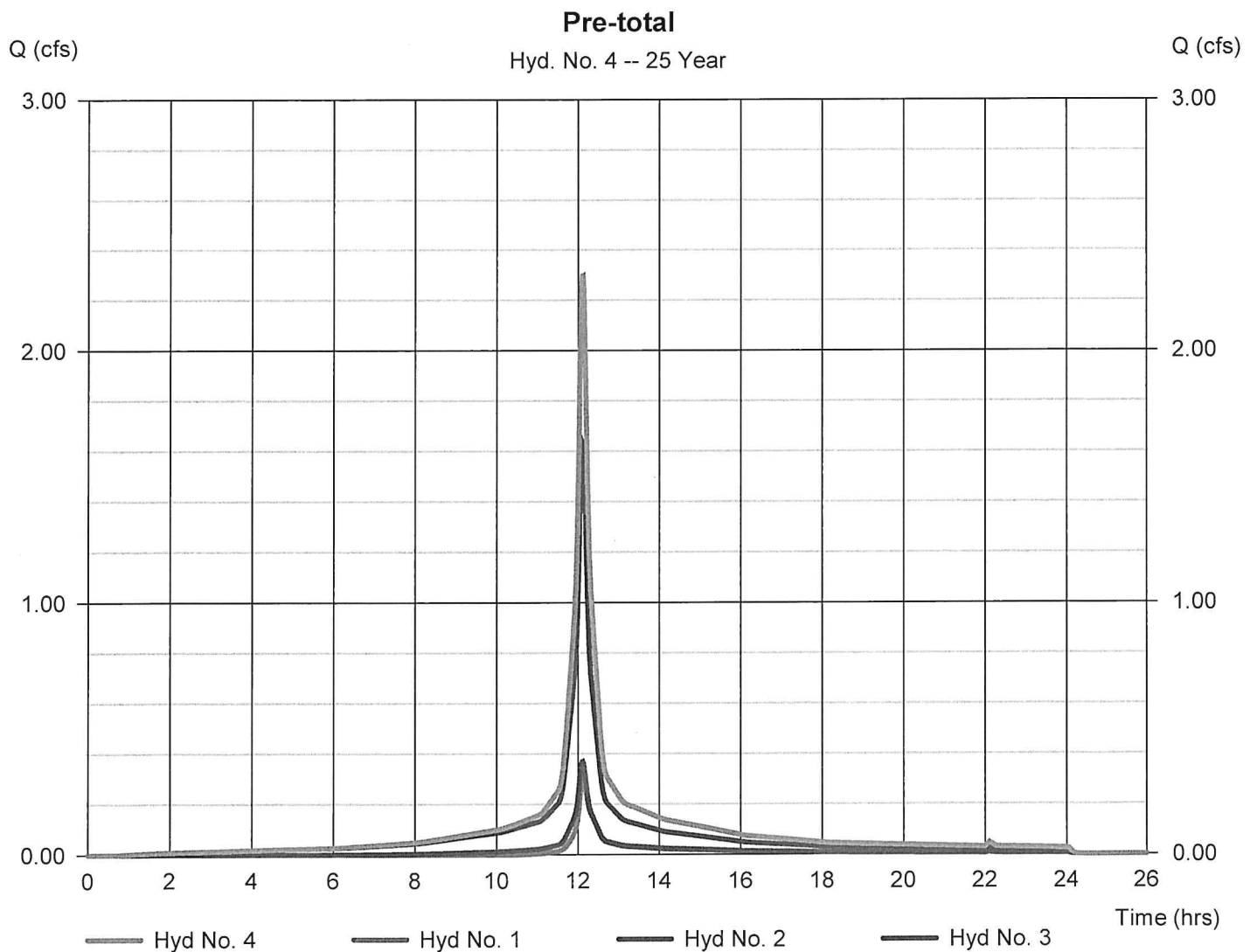
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 1, 2, 3

Peak discharge = 2.297 cfs
Time to peak = 12.12 hrs
Hyd. volume = 8,799 cuft
Contrib. drain. area = 0.520 ac



Hydrograph Report

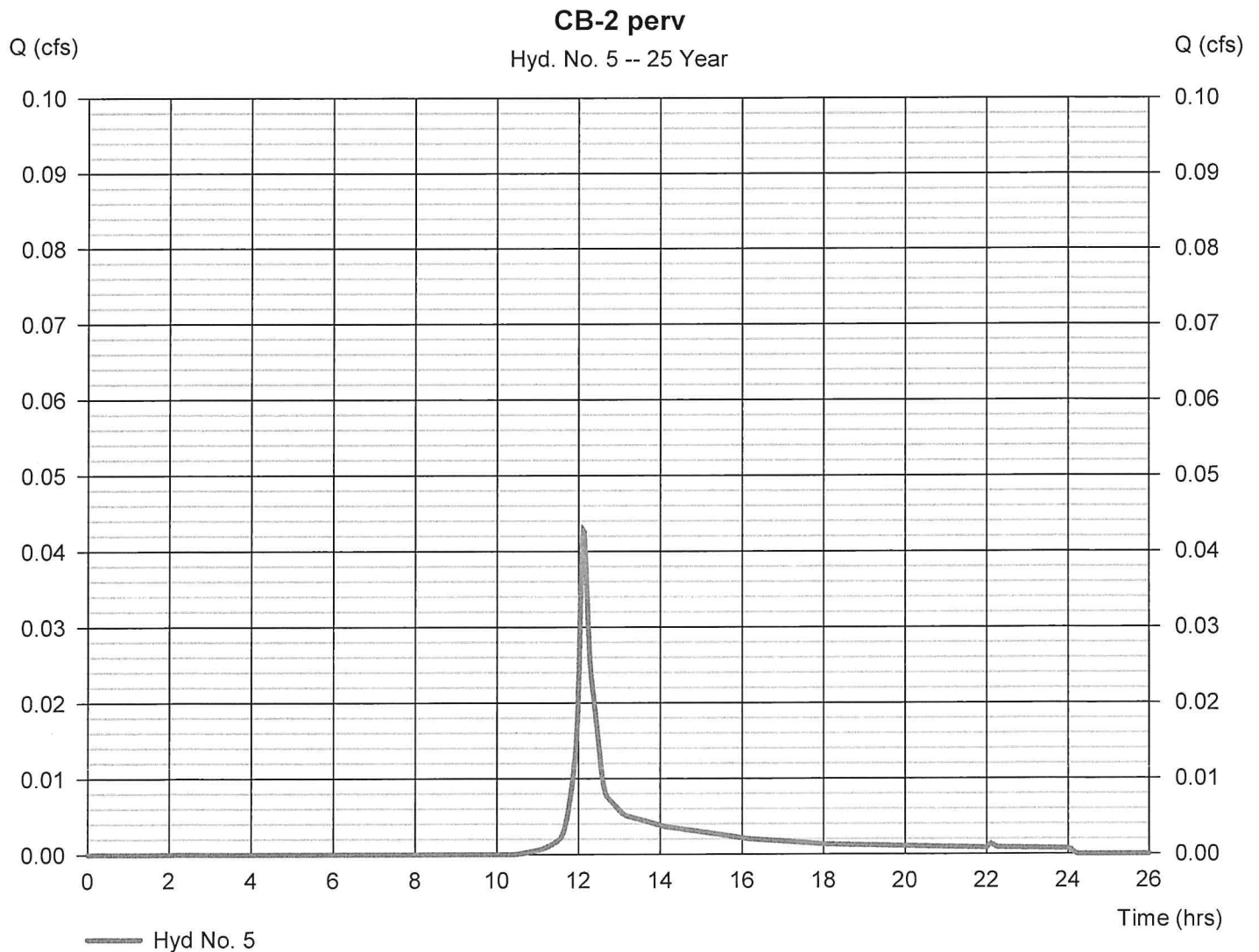
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 5

CB-2 perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.043 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 153 cuft
Drainage area	= 0.020 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

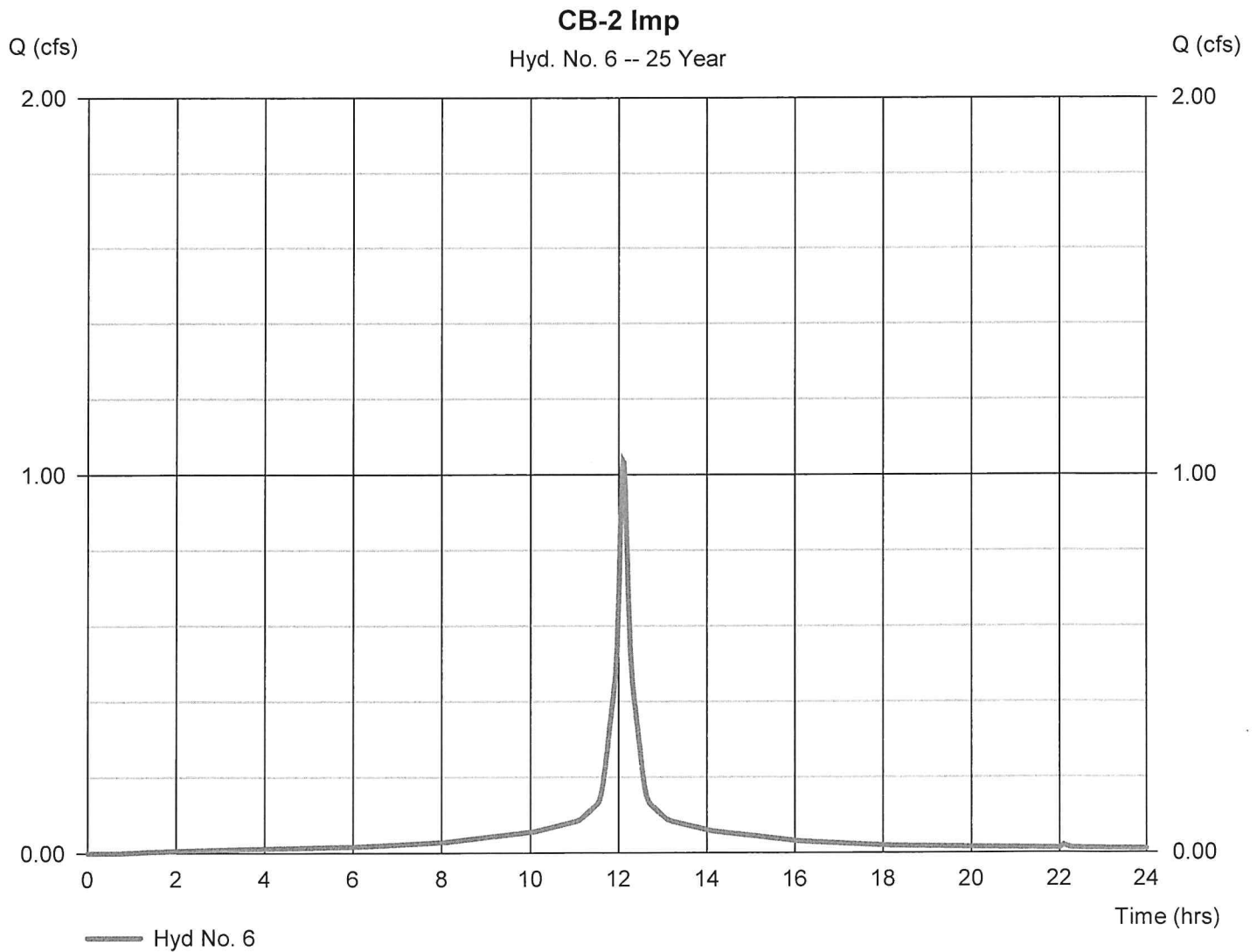
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 6

CB-2 Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 1.036 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 4,077 cuft
Drainage area	= 0.190 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

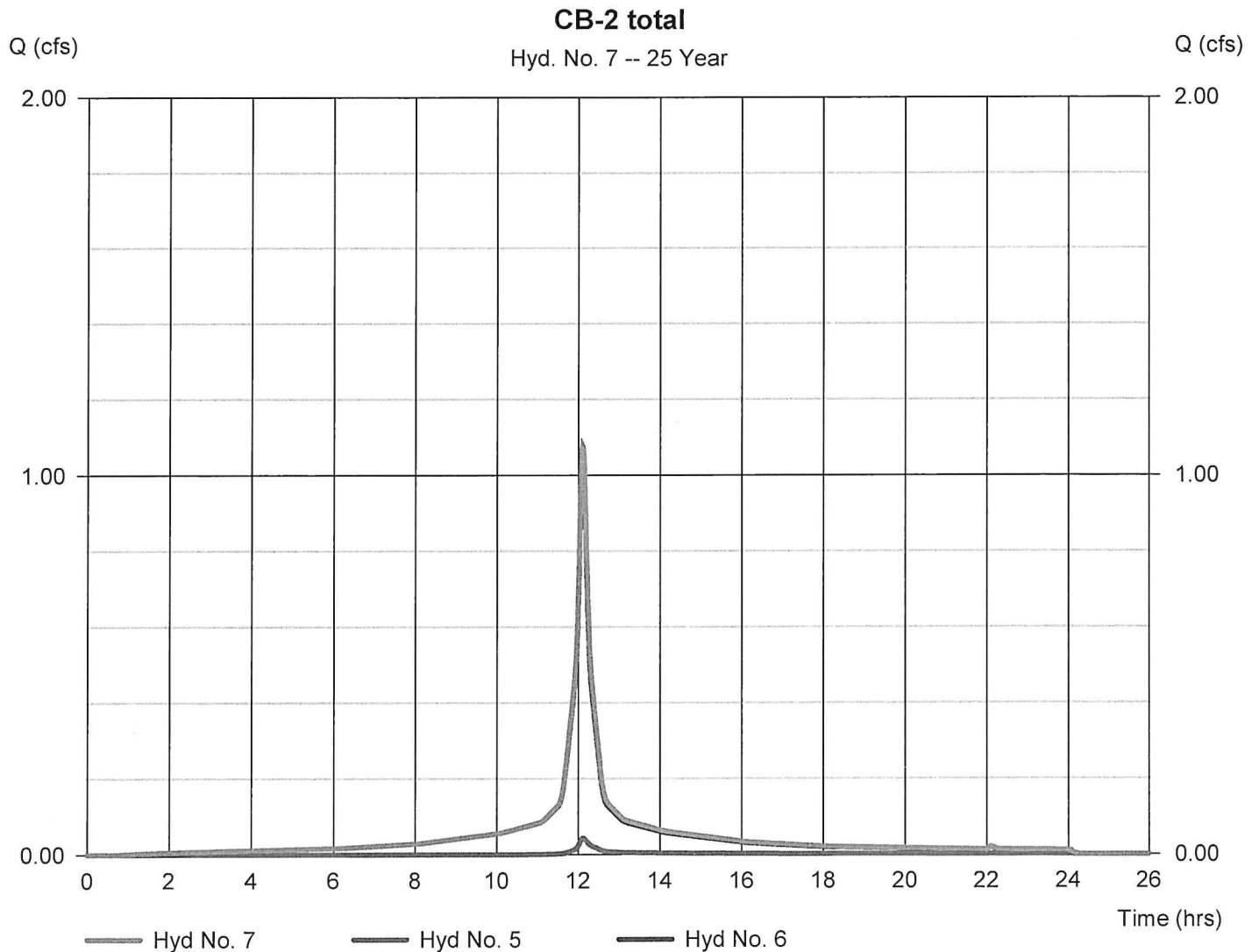
Friday, 10 / 23 / 2020

Hyd. No. 7

CB-2 total

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 5, 6

Peak discharge = 1.077 cfs
Time to peak = 12.10 hrs
Hyd. volume = 4,230 cuft
Contrib. drain. area = 0.210 ac



Hydrograph Report

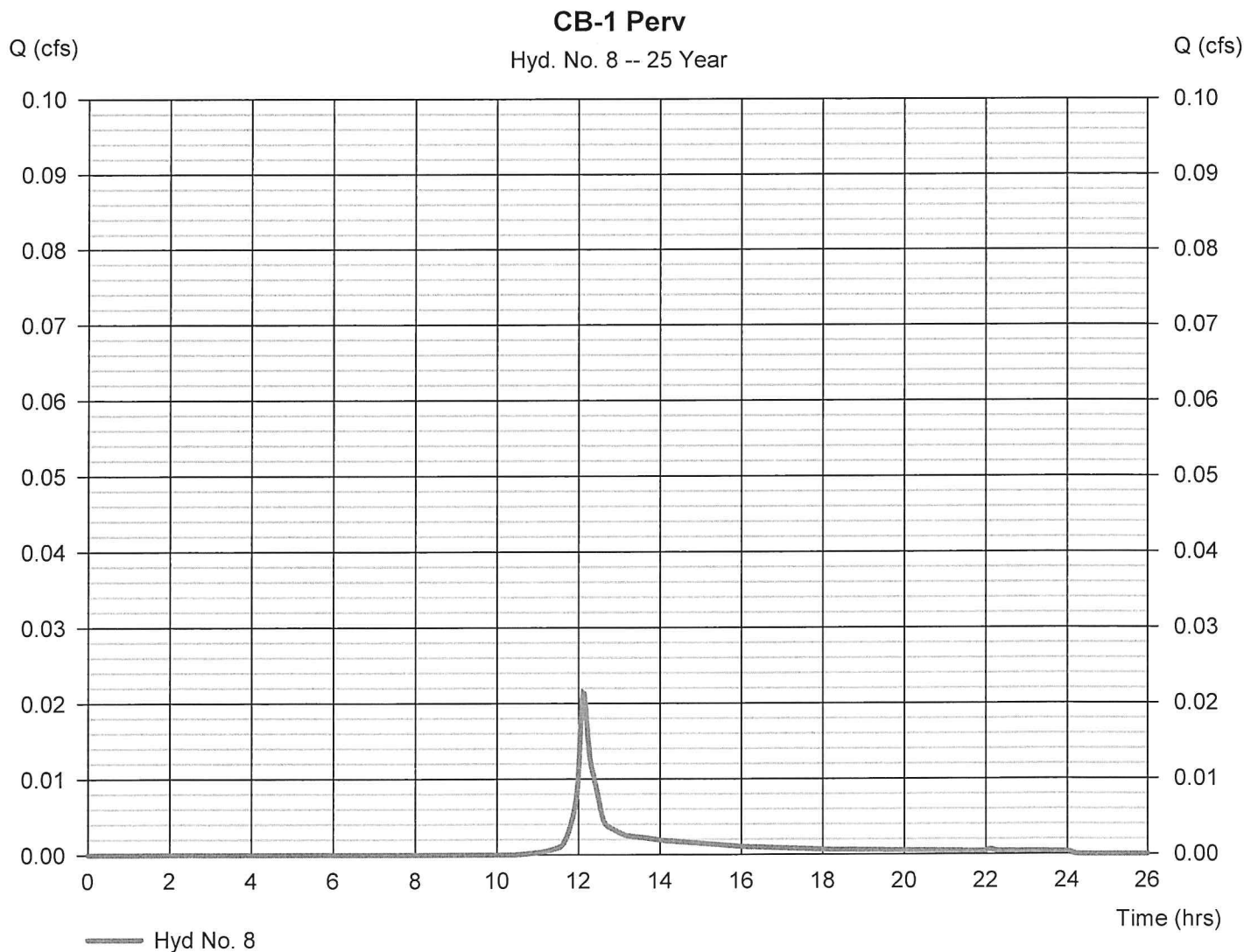
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 8

CB-1 Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.021 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 76 cuft
Drainage area	= 0.010 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

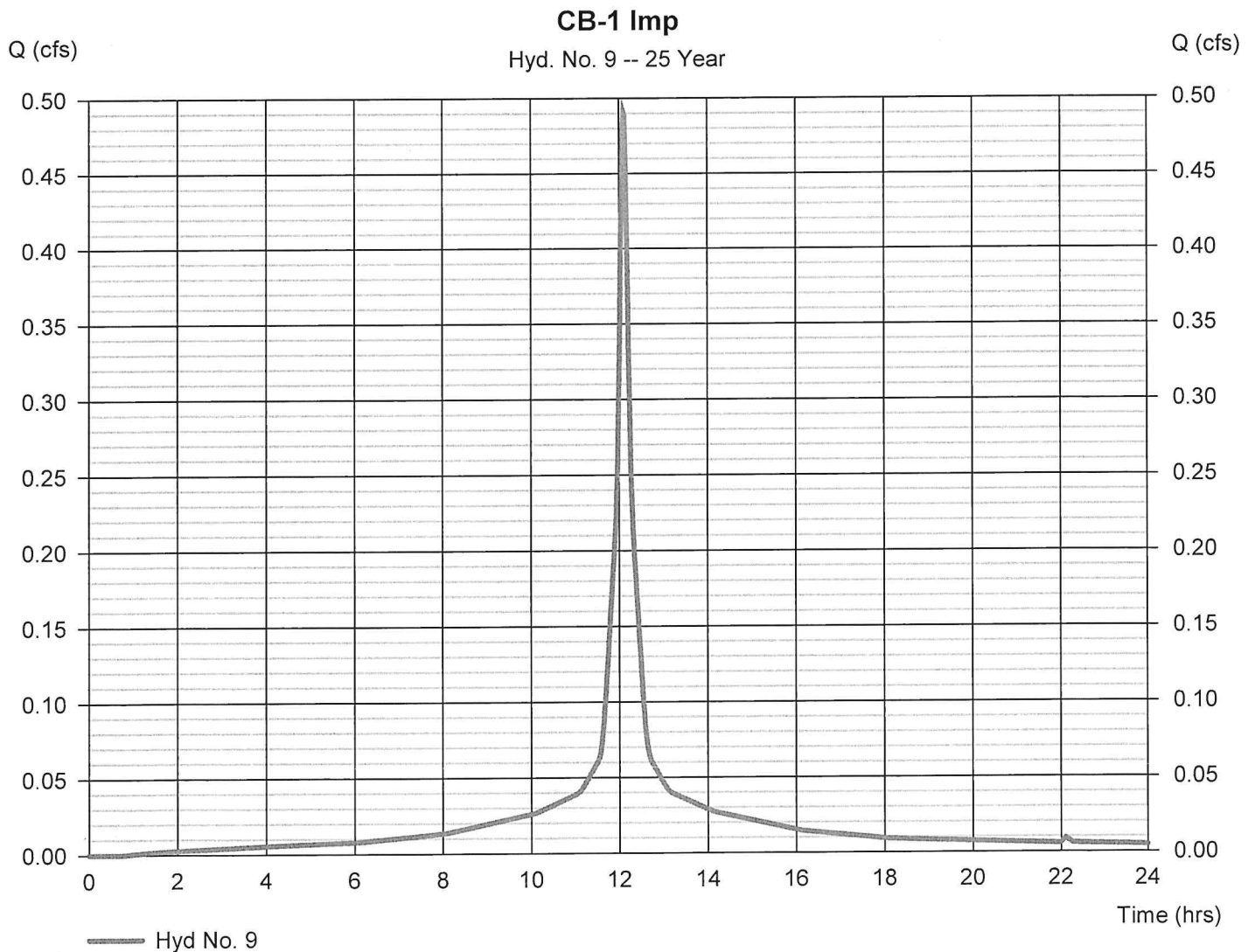
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 9

CB-1 Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.491 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,931 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

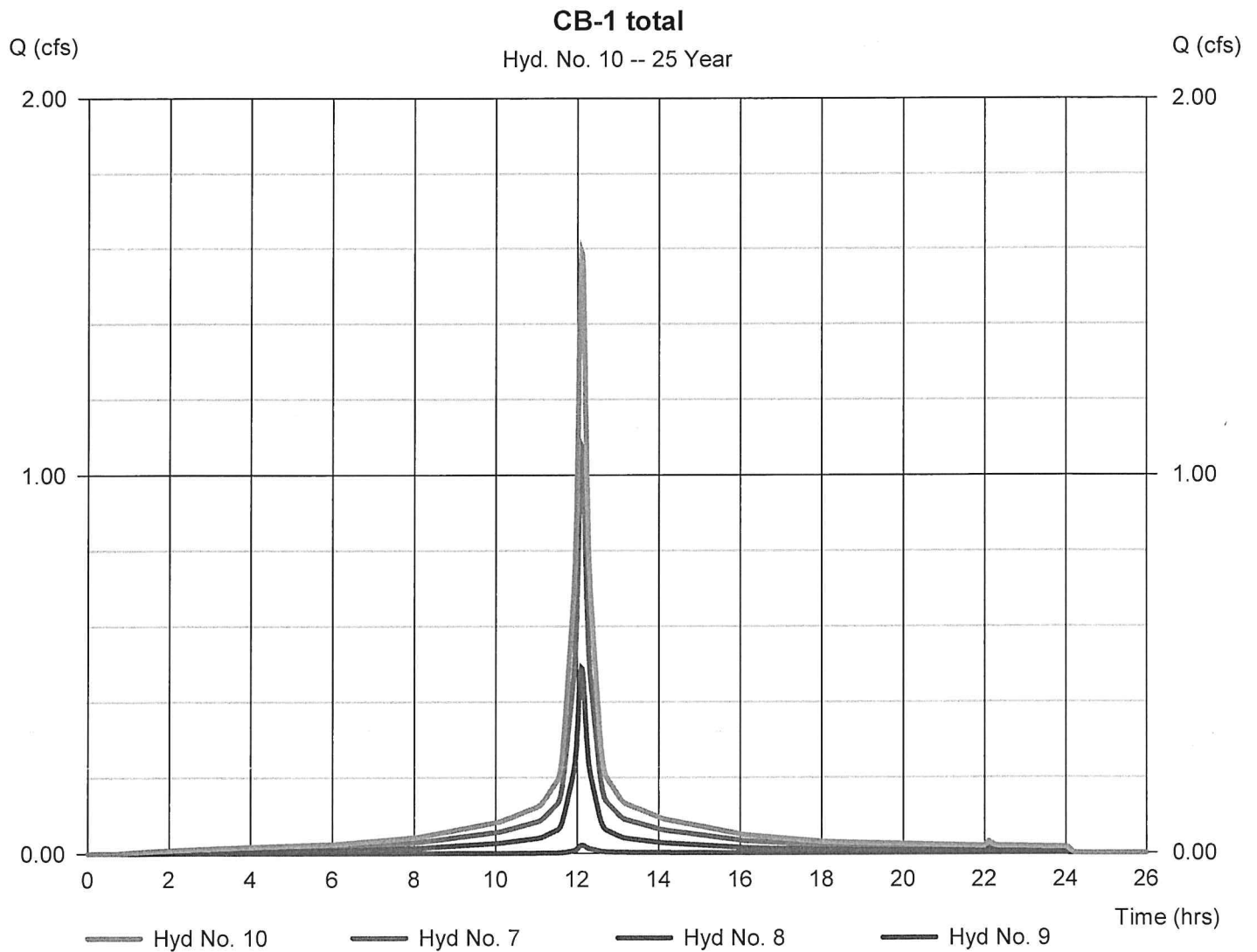
Friday, 10 / 23 / 2020

Hyd. No. 10

CB-1 total

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 7, 8, 9

Peak discharge = 1.589 cfs
Time to peak = 12.10 hrs
Hyd. volume = 6,238 cuft
Contrib. drain. area = 0.100 ac



Hydrograph Report

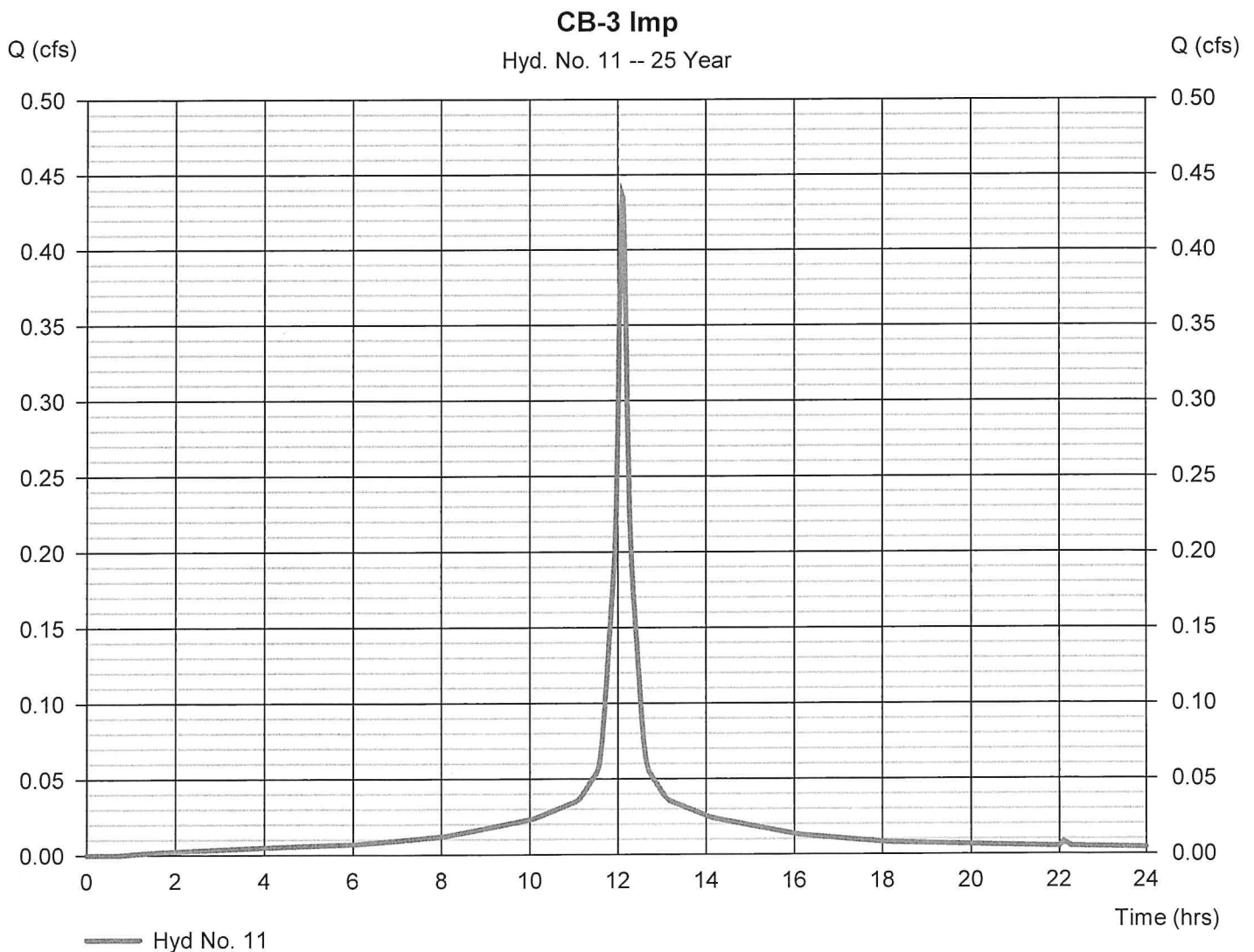
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 11

CB-3 Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.436 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,717 cuft
Drainage area	= 0.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

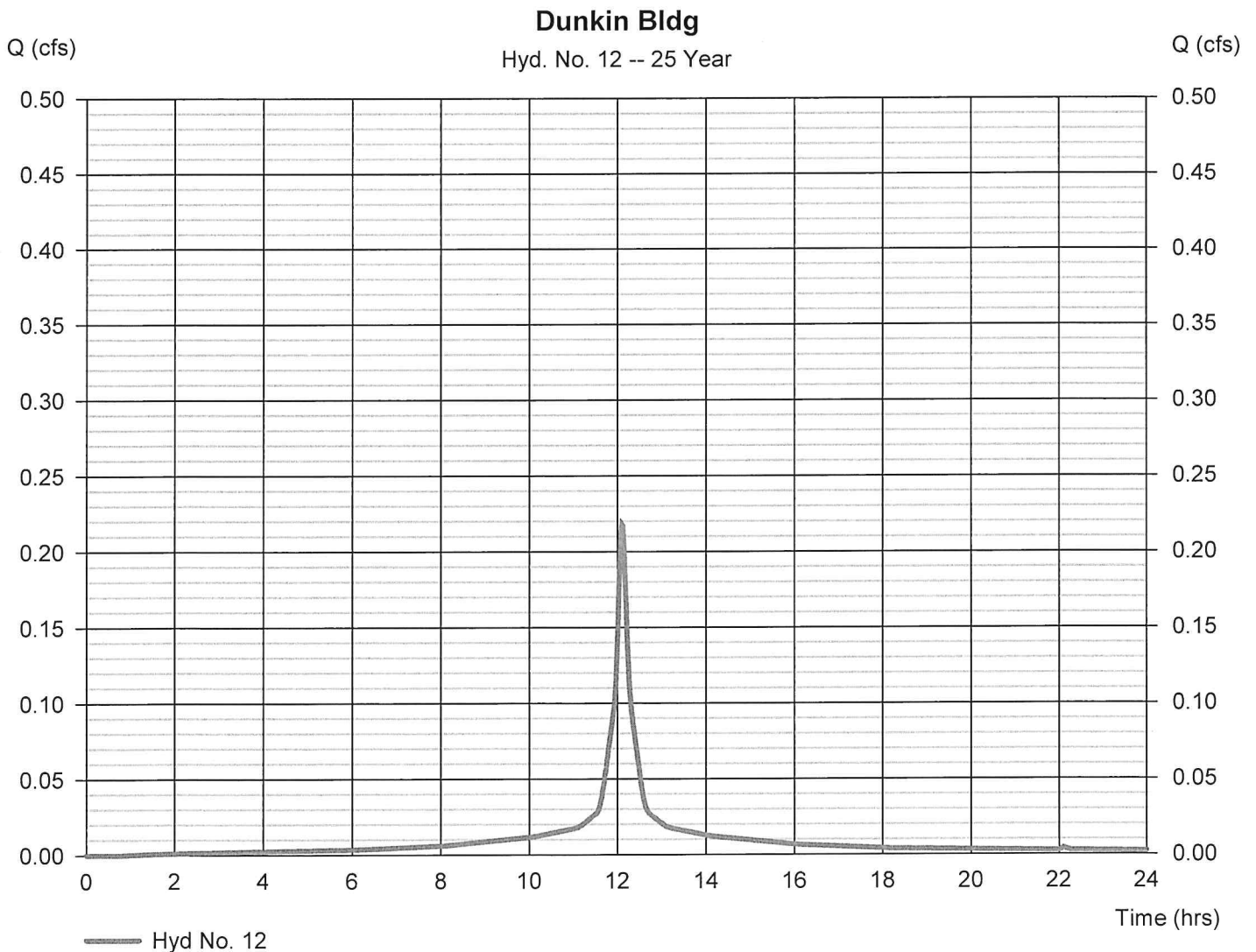
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 12

Dunkin Bldg

Hydrograph type	= SCS Runoff	Peak discharge	= 0.218 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 858 cuft
Drainage area	= 0.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

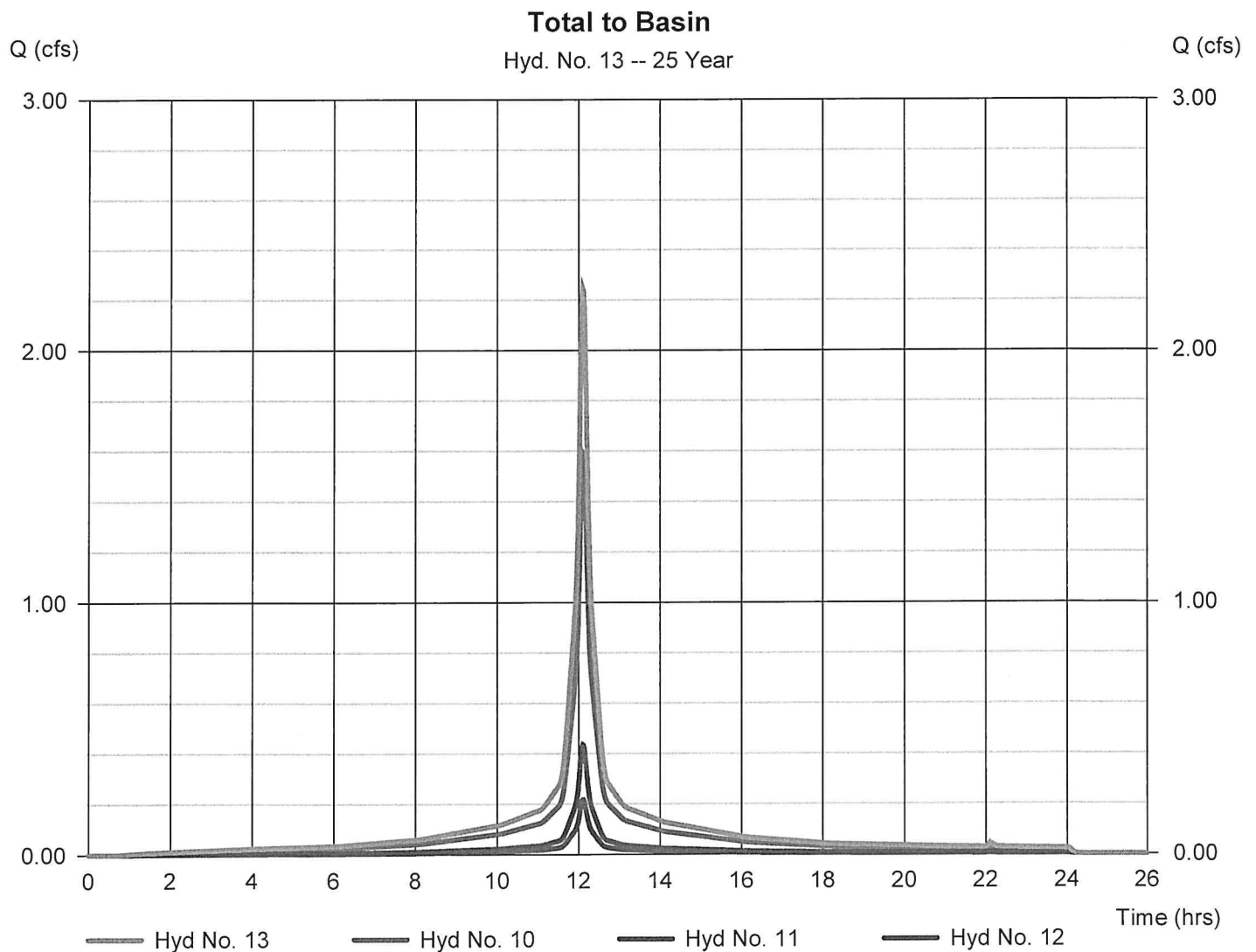
Friday, 10 / 23 / 2020

Hyd. No. 13

Total to Basin

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 10, 11, 12

Peak discharge = 2.243 cfs
Time to peak = 12.10 hrs
Hyd. volume = 8,813 cuft
Contrib. drain. area = 0.120 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

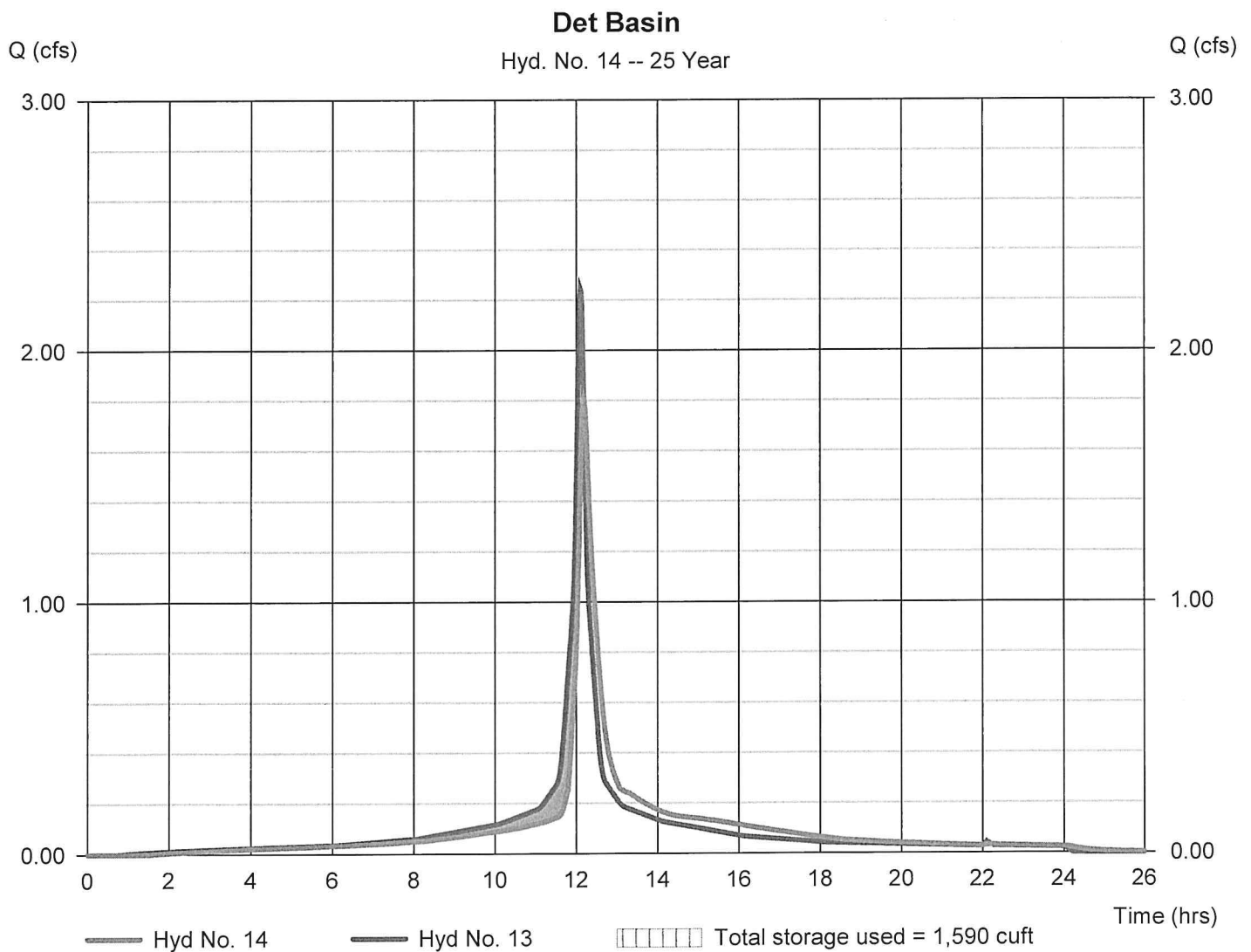
Friday, 10 / 23 / 2020

Hyd. No. 14

Det Basin

Hydrograph type	= Reservoir	Peak discharge	= 1.804 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 8,801 cuft
Inflow hyd. No.	= 13 - Total to Basin	Max. Elevation	= 124.58 ft
Reservoir name	= Det Basin	Max. Storage	= 1,590 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

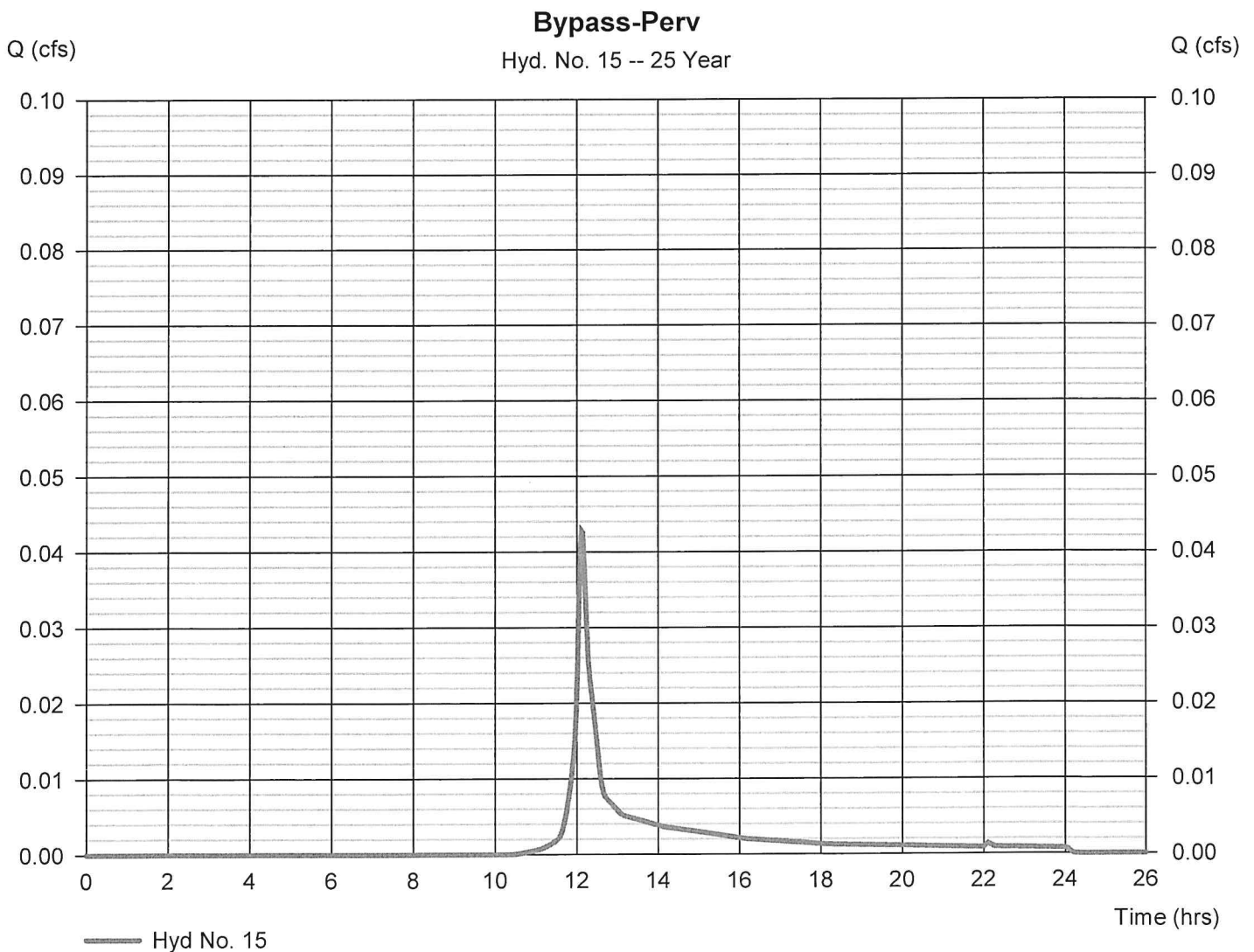
Friday, 10 / 23 / 2020

Hyd. No. 15

Bypass-Perv

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 0.020 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 6.15 in
 Storm duration = 24 hrs

Peak discharge = 0.043 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 153 cuft
 Curve number = 61
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

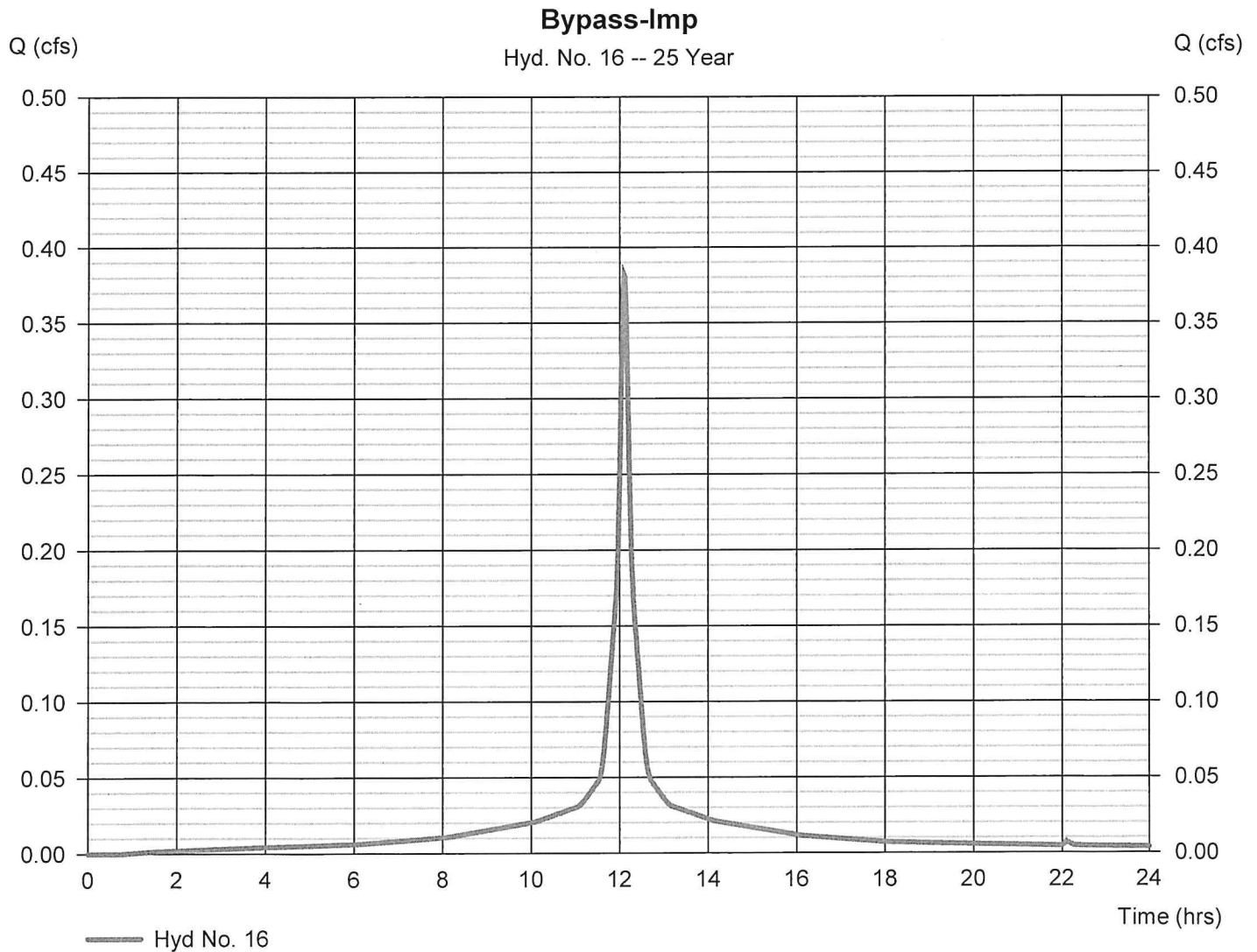
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 16

Bypass-Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.382 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,502 cuft
Drainage area	= 0.070 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

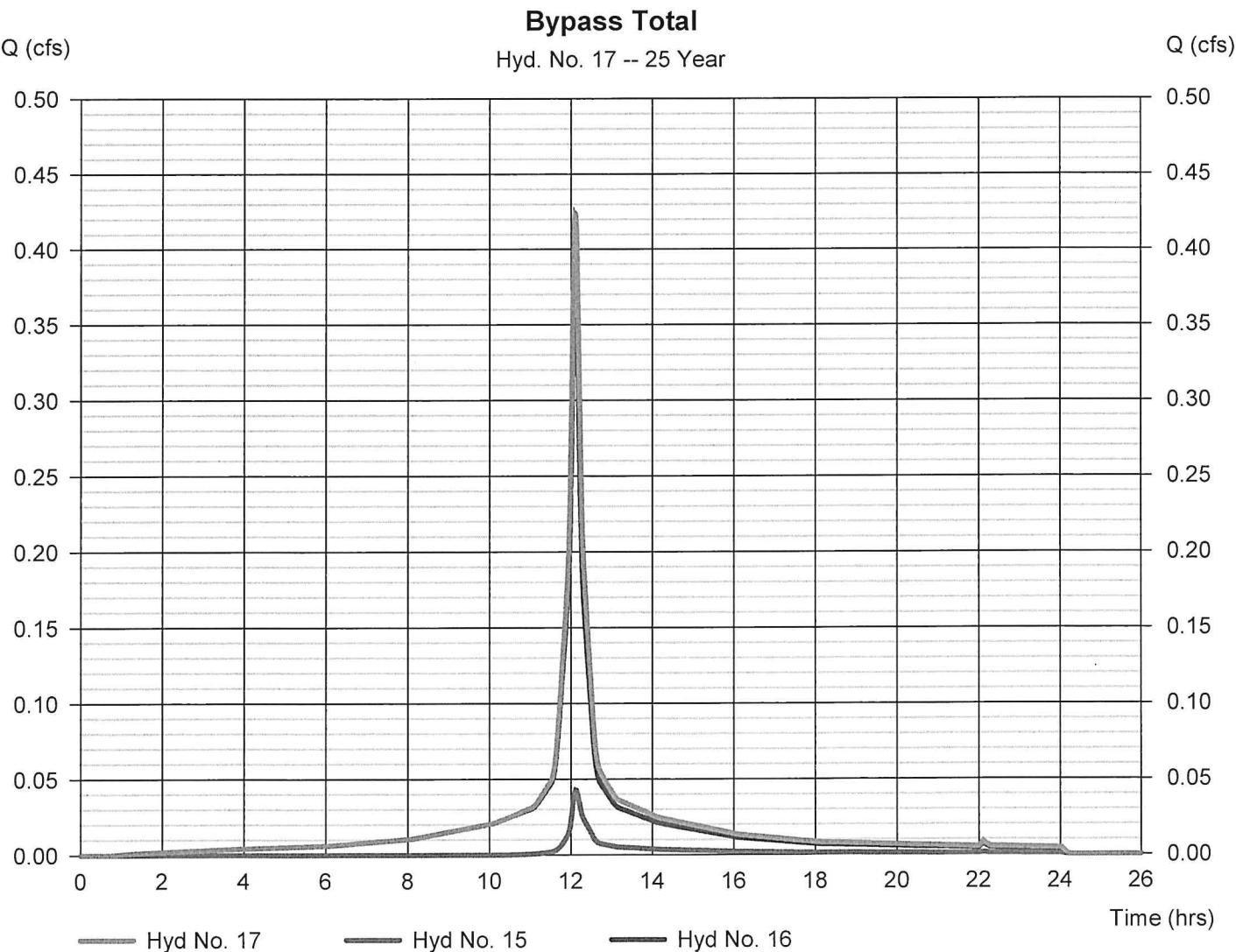


Hydrograph Report

Hyd. No. 17

Bypass Total

Hydrograph type	= Combine	Peak discharge	= 0.423 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,655 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.090 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

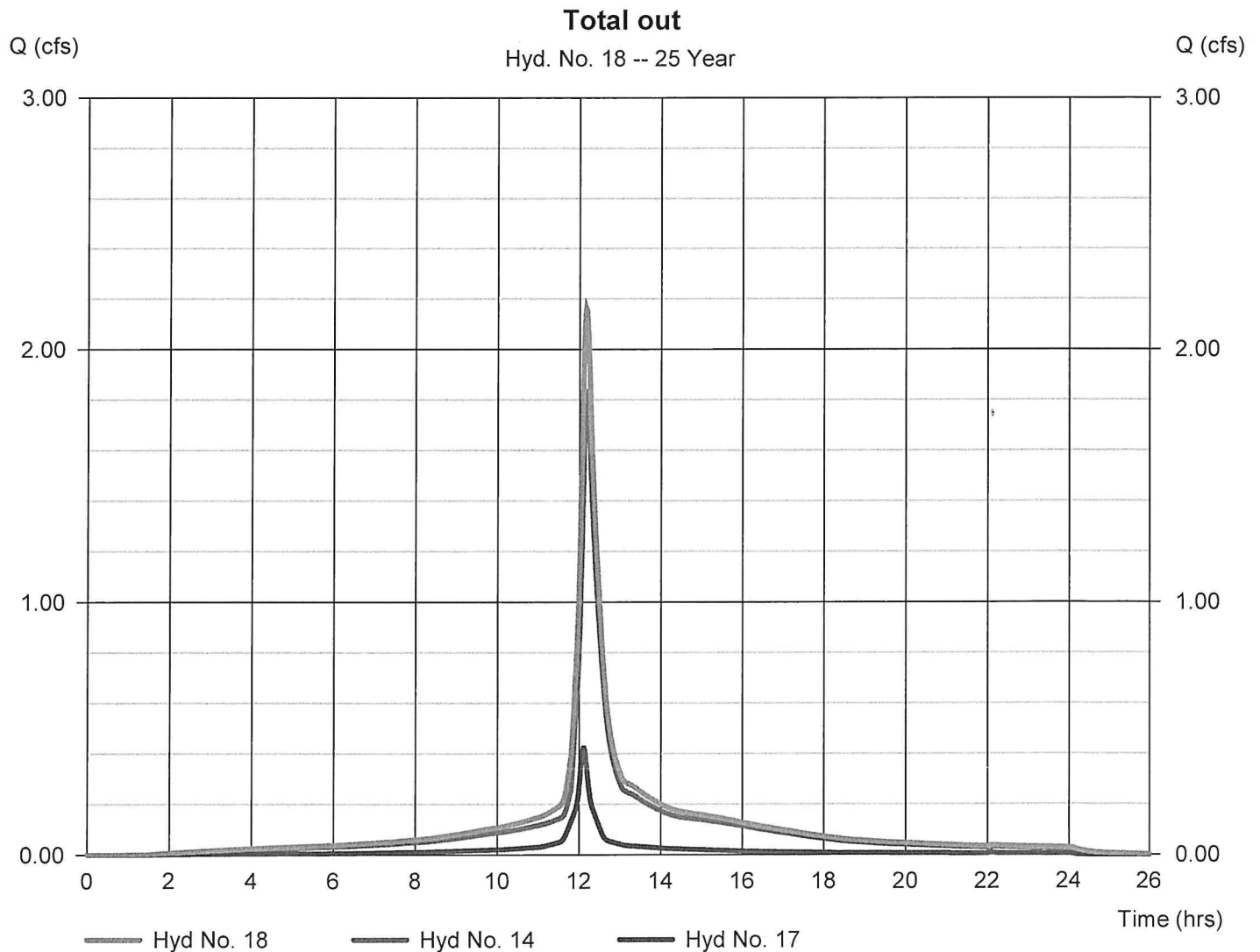
Friday, 10 / 23 / 2020

Hyd. No. 18

Total out

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 1 min
Inflow hyds. = 14, 17

Peak discharge = 2.161 cfs
Time to peak = 12.17 hrs
Hyd. volume = 10,456 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.530	1	727	1,832	-----	-----	-----	Pre-Perv
2	SCS Runoff	2.187	1	726	8,679	-----	-----	-----	Pre--Imp
3	SCS Runoff	0.523	1	726	1,863	-----	-----	-----	Pre-gravel
4	Combine	3.232	1	726	12,375	1, 2, 3	-----	-----	Pre-total
5	SCS Runoff	0.076	1	727	262	-----	-----	-----	CB-2 perv
6	SCS Runoff	1.385	1	726	5,497	-----	-----	-----	CB-2 Imp
7	Combine	1.460	1	726	5,759	5, 6	-----	-----	CB-2 total
8	SCS Runoff	0.038	1	727	131	-----	-----	-----	CB-1 Perv
9	SCS Runoff	0.656	1	726	2,604	-----	-----	-----	CB-1 Imp
10	Combine	2.153	1	726	8,493	7, 8, 9	-----	-----	CB-1 total
11	SCS Runoff	0.583	1	726	2,315	-----	-----	-----	CB-3 Imp
12	SCS Runoff	0.292	1	726	1,157	-----	-----	-----	Dunkin Bldg
13	Combine	3.028	1	726	11,965	10, 11, 12	-----	-----	Total to Basin
14	Reservoir	2.671	1	730	11,953	13	125.00	1,802	Det Basin
15	SCS Runoff	0.076	1	727	262	-----	-----	-----	Bypass-Perv
16	SCS Runoff	0.510	1	726	2,025	-----	-----	-----	Bypass-Imp
17	Combine	0.585	1	726	2,287	15, 16	-----	-----	Bypass Totla
18	Combine	3.184	1	730	14,240	14, 17	-----	-----	Total out
SCS Dunkin 36 10-22-2020.gpw					Return Period: 100 Year			Friday, 10 / 23 / 2020	

Hydrograph Report

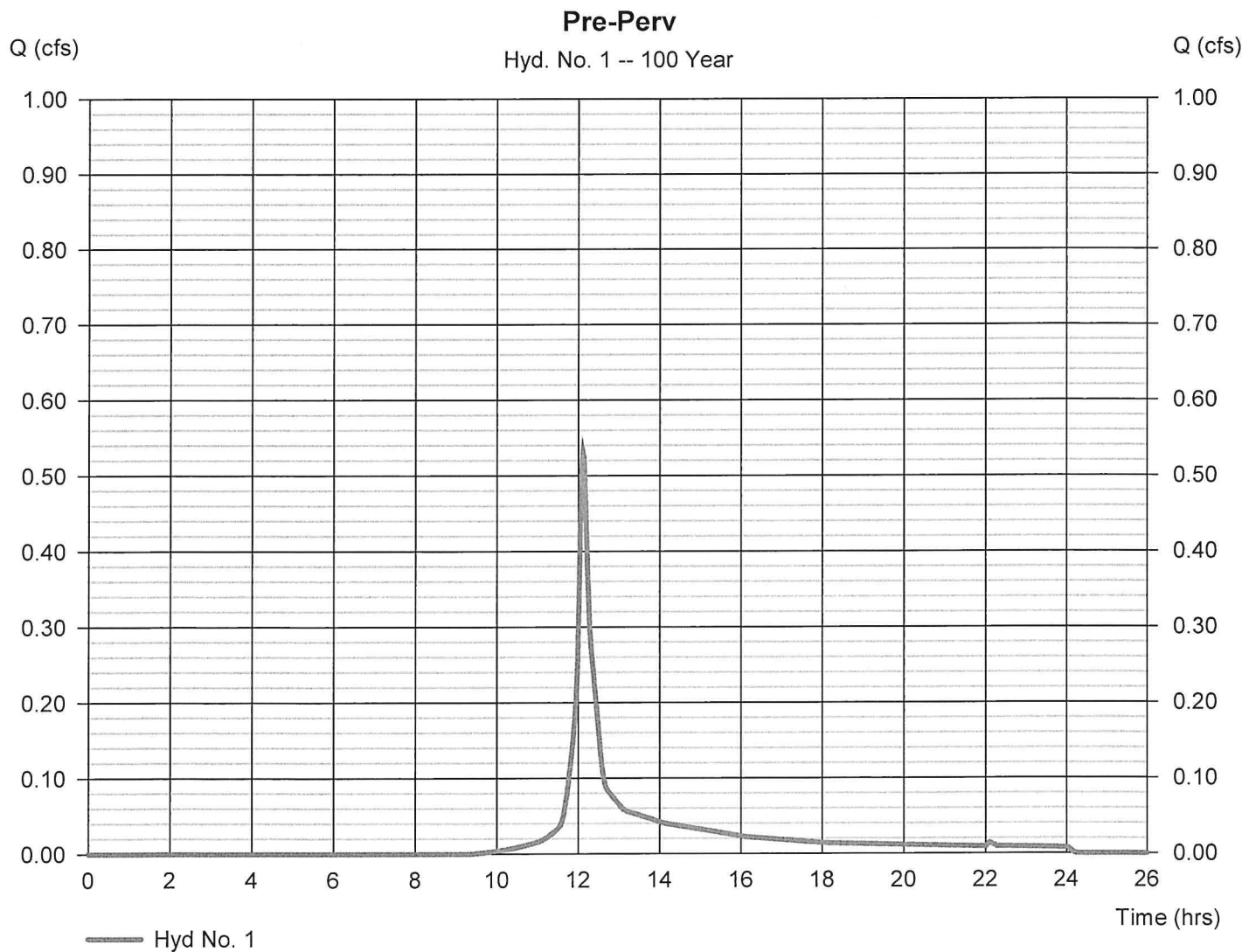
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 1

Pre-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.530 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 1,832 cuft
Drainage area	= 0.140 ac	Curve number	= 61
Basin Slope	= 0.1 %	Hydraulic length	= 198 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

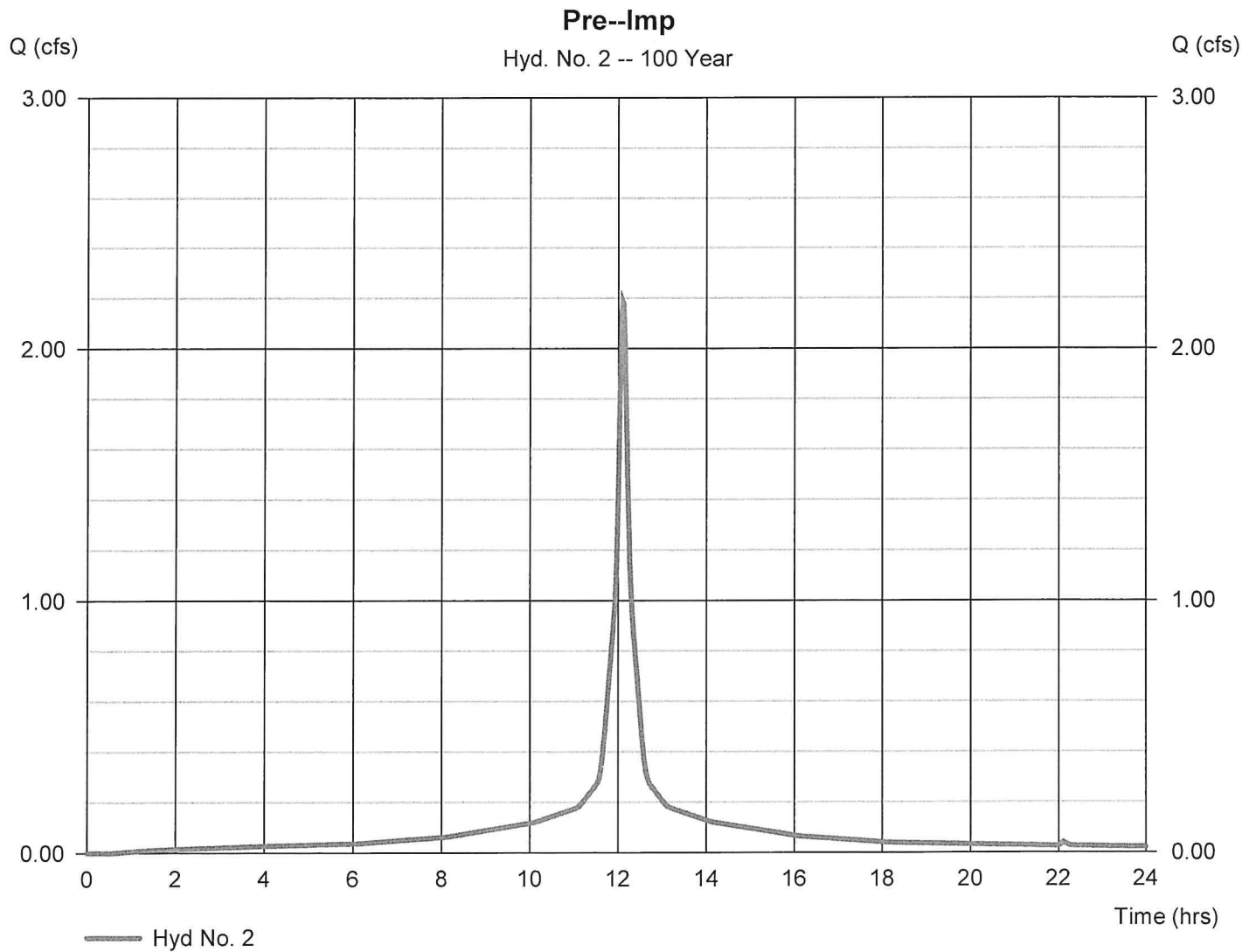
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 2

Pre--Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 2.187 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 8,679 cuft
Drainage area	= 0.300 ac	Curve number	= 98
Basin Slope	= 0.1 %	Hydraulic length	= 178 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

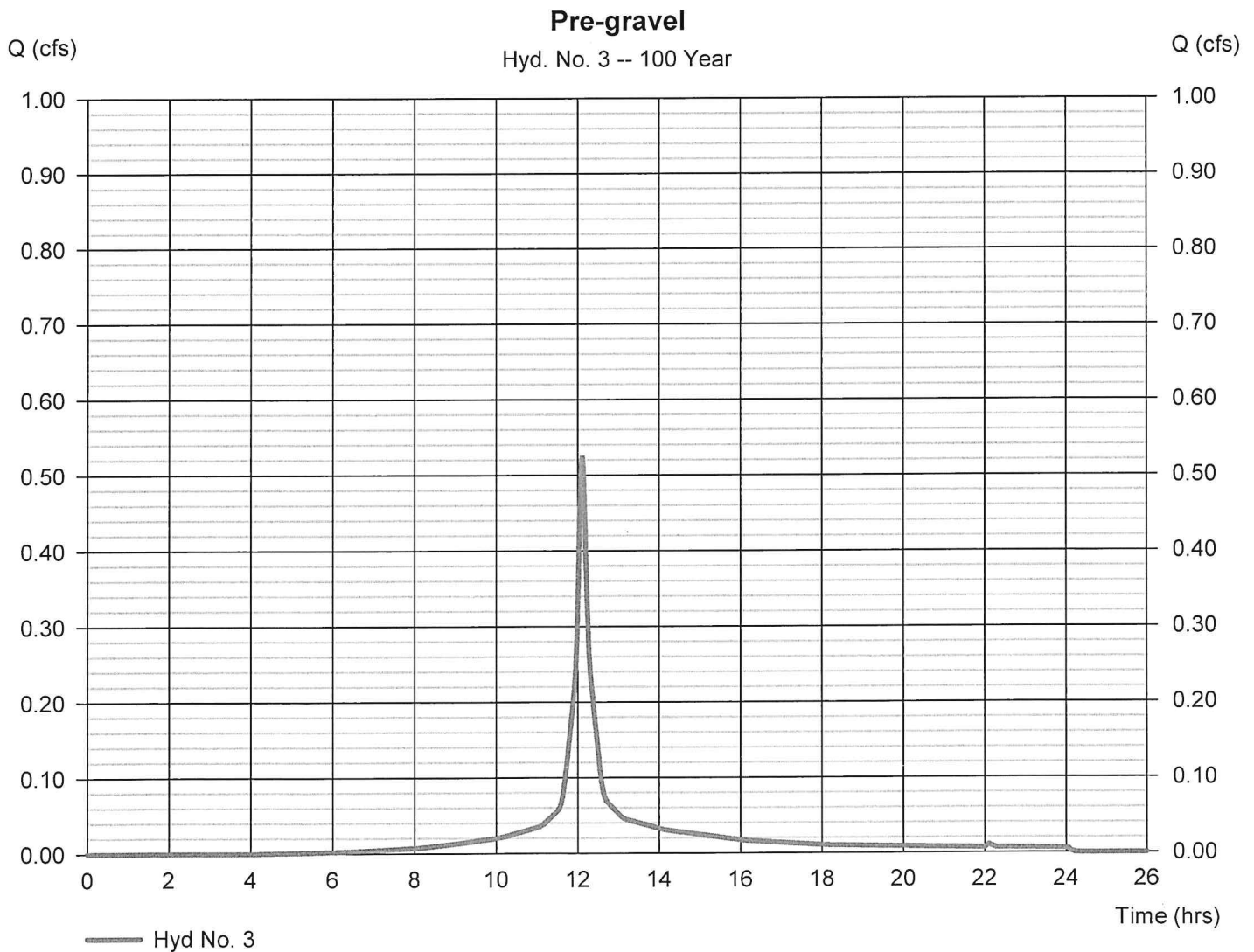
Friday, 10 / 23 / 2020

Hyd. No. 3

Pre-gravel

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.080 ac
 Basin Slope = 0.1 %
 Tc method = User
 Total precip. = 8.21 in
 Storm duration = 24 hrs

Peak discharge = 0.523 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 1,863 cuft
 Curve number = 85
 Hydraulic length = 178 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

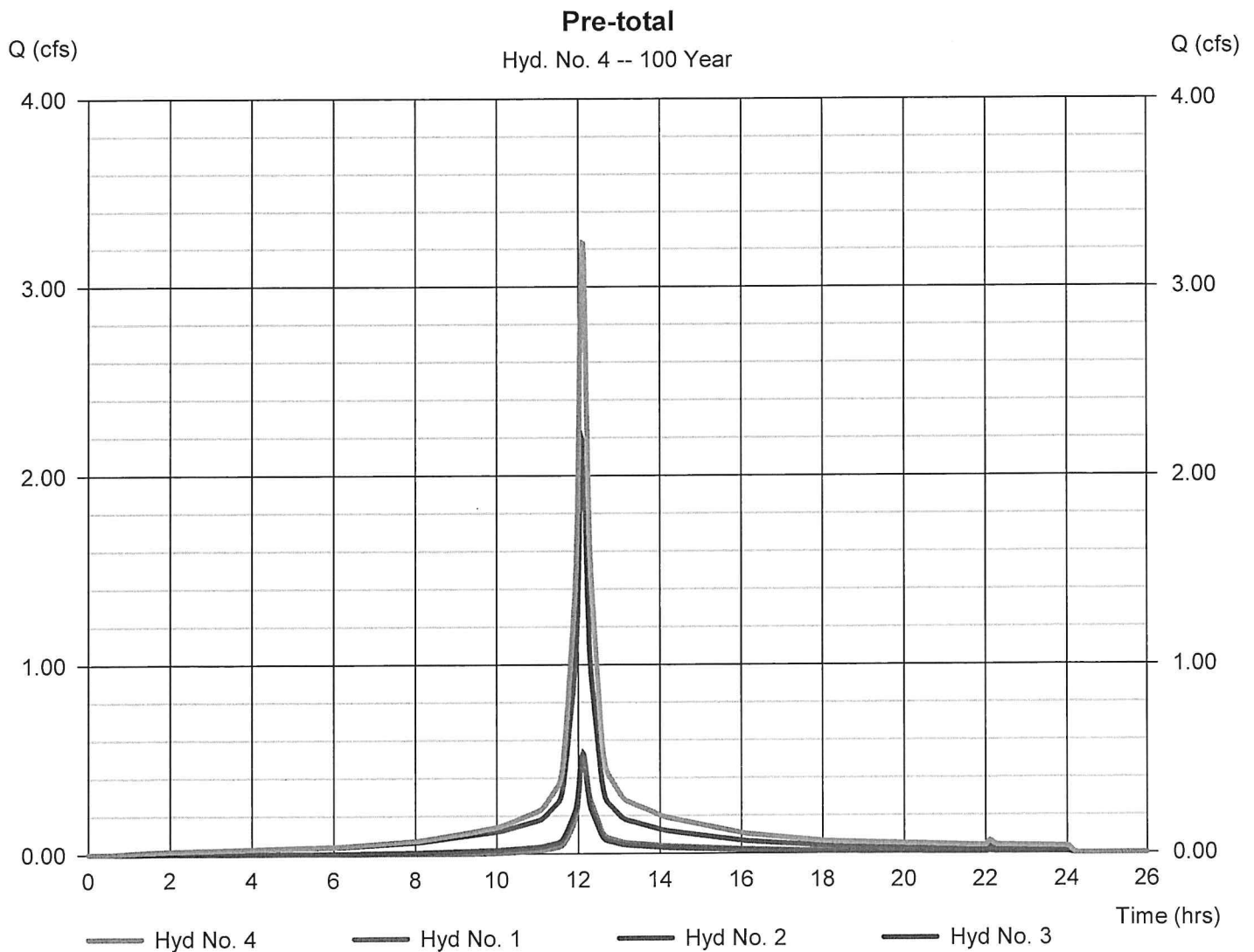
Friday, 10 / 23 / 2020

Hyd. No. 4

Pre-total

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 1 min
 Inflow hyds. = 1, 2, 3

Peak discharge = 3.232 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 12,375 cuft
 Contrib. drain. area = 0.520 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

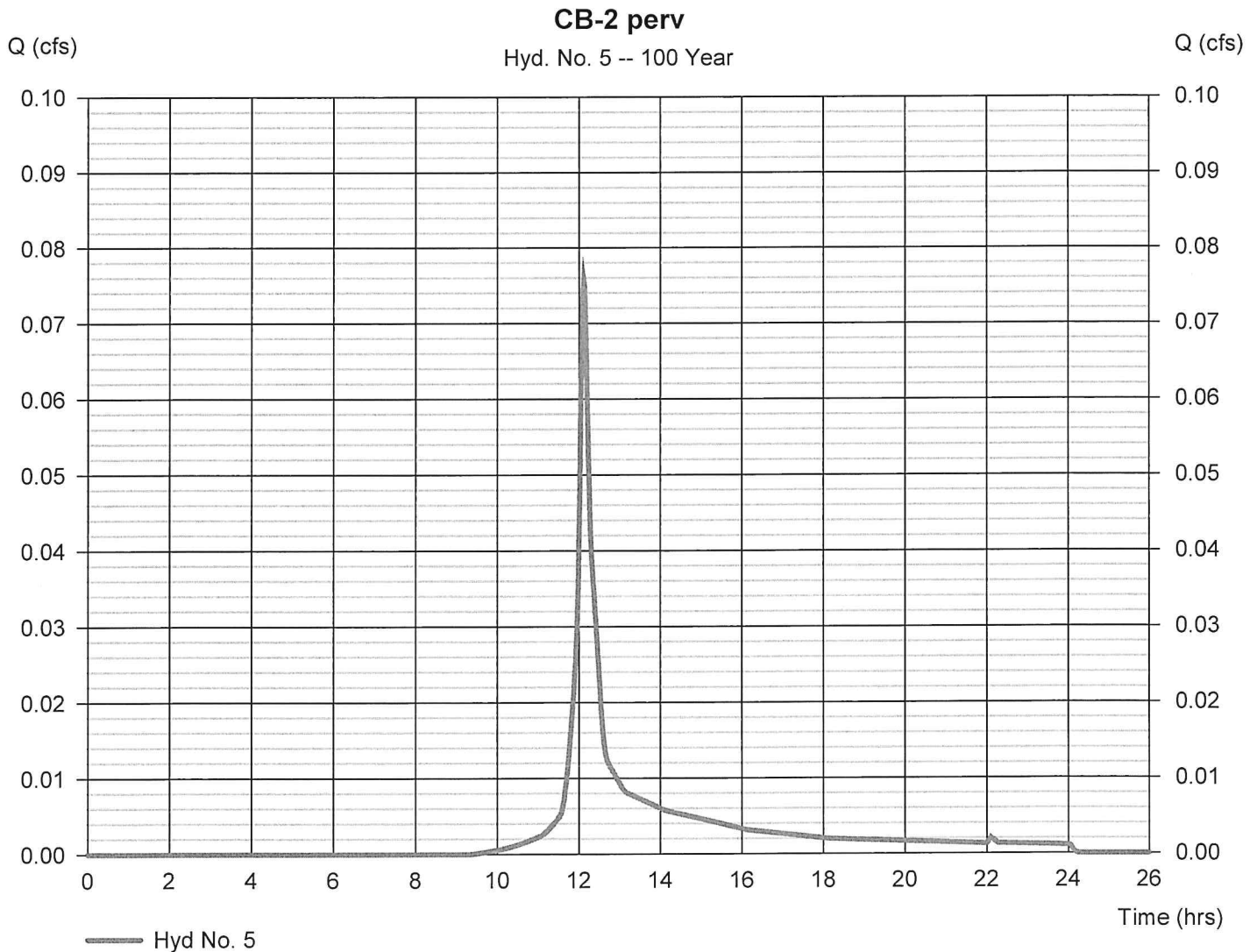
Friday, 10 / 23 / 2020

Hyd. No. 5

CB-2 perv

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.020 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 8.21 in
 Storm duration = 24 hrs

Peak discharge = 0.076 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 262 cuft
 Curve number = 61
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

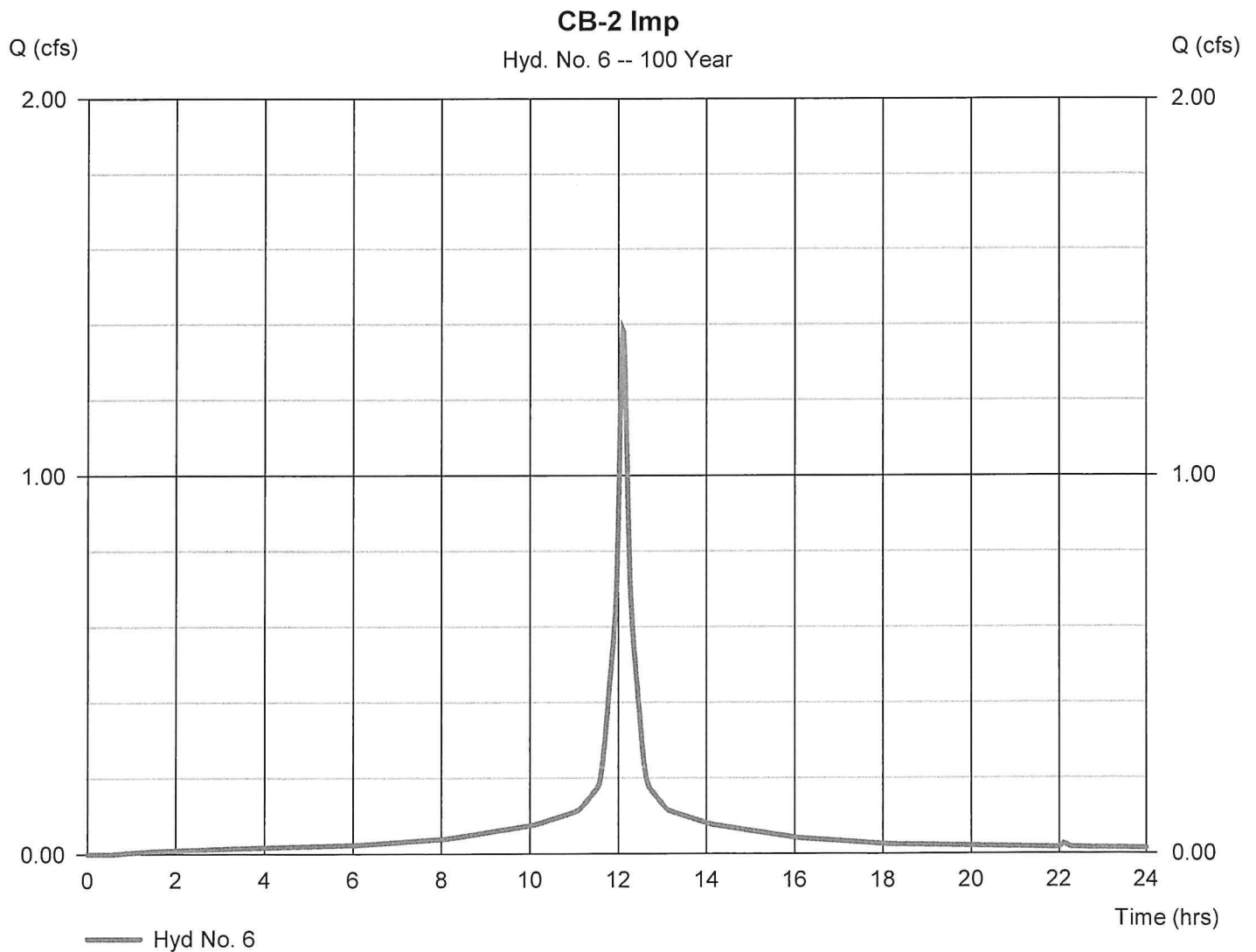
Friday, 10 / 23 / 2020

Hyd. No. 6

CB-2 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.190 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 8.21 in
 Storm duration = 24 hrs

Peak discharge = 1.385 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 5,497 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

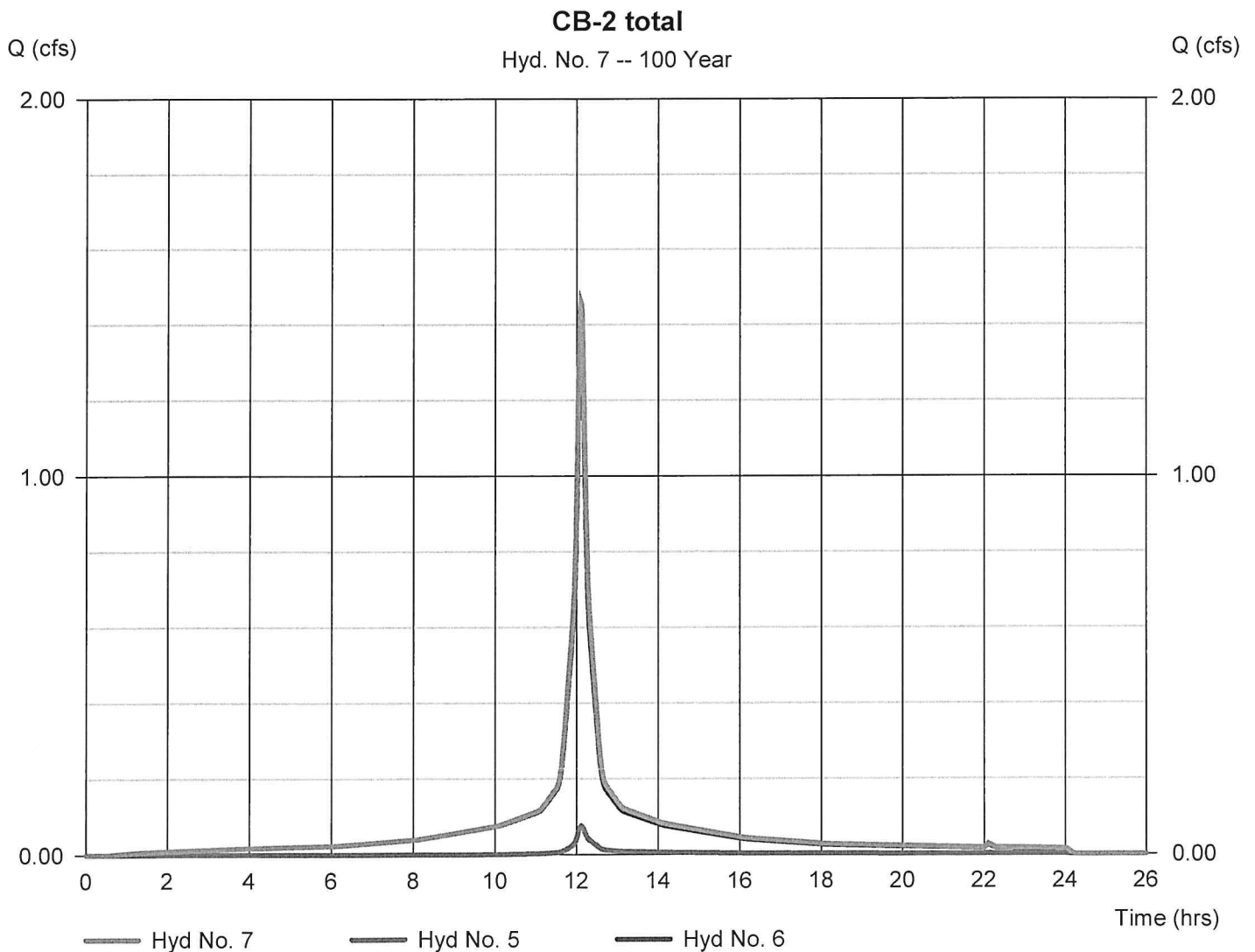
Friday, 10 / 23 / 2020

Hyd. No. 7

CB-2 total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 5, 6

Peak discharge = 1.460 cfs
Time to peak = 12.10 hrs
Hyd. volume = 5,759 cuft
Contrib. drain. area = 0.210 ac



Hydrograph Report

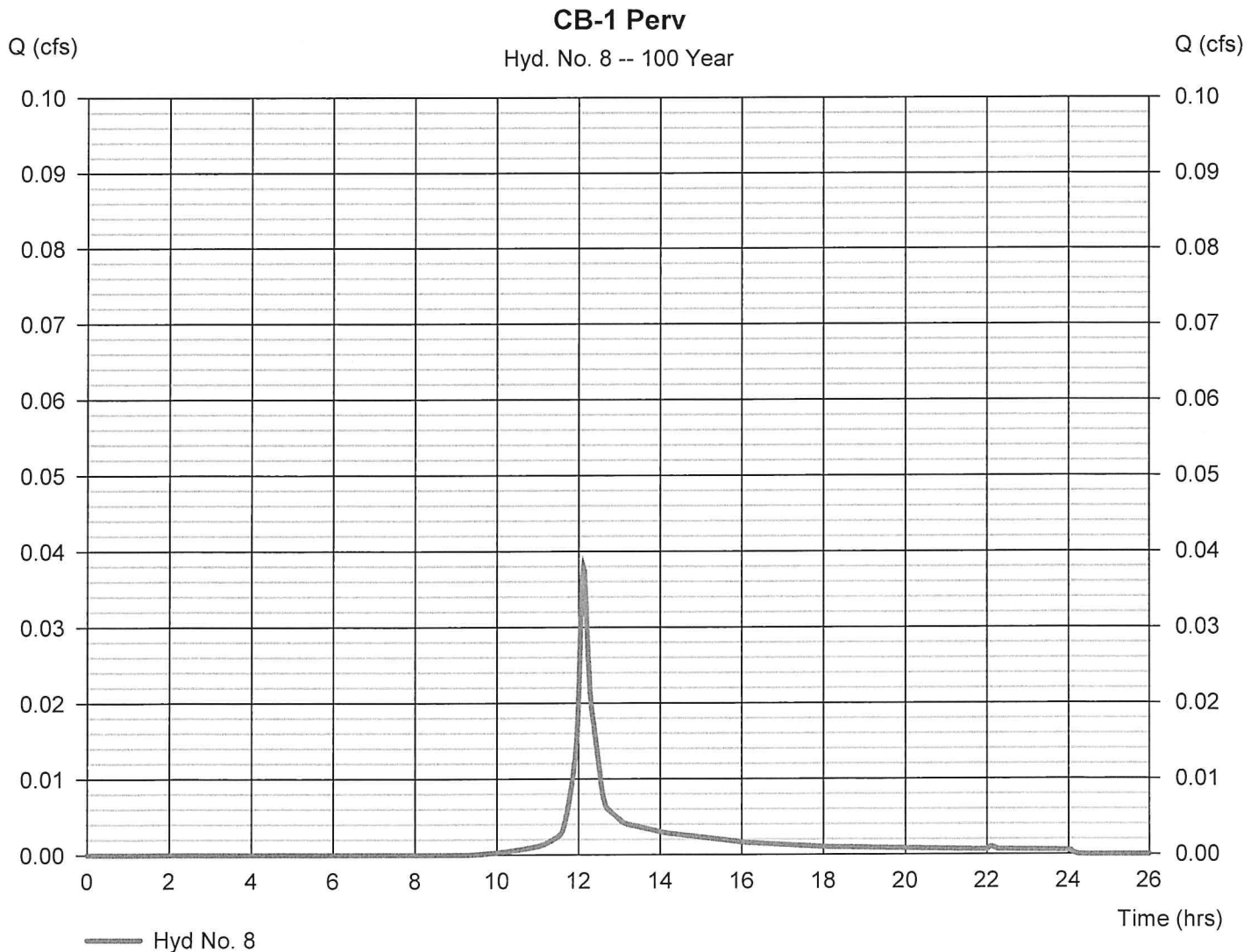
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 8

CB-1 Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.038 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 131 cuft
Drainage area	= 0.010 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

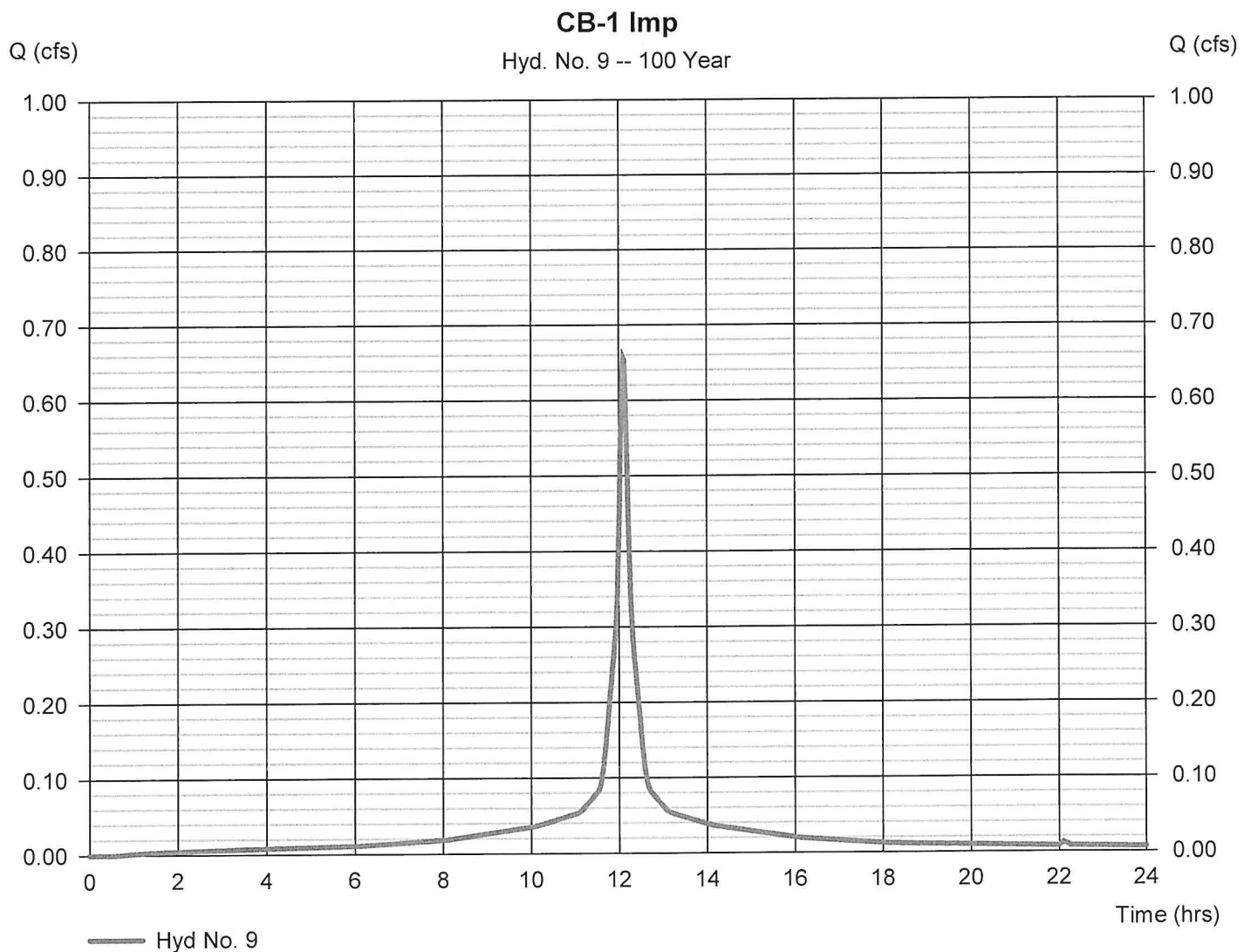
Friday, 10 / 23 / 2020

Hyd. No. 9

CB-1 Imp

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.090 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 8.21 in
 Storm duration = 24 hrs

Peak discharge = 0.656 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 2,604 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

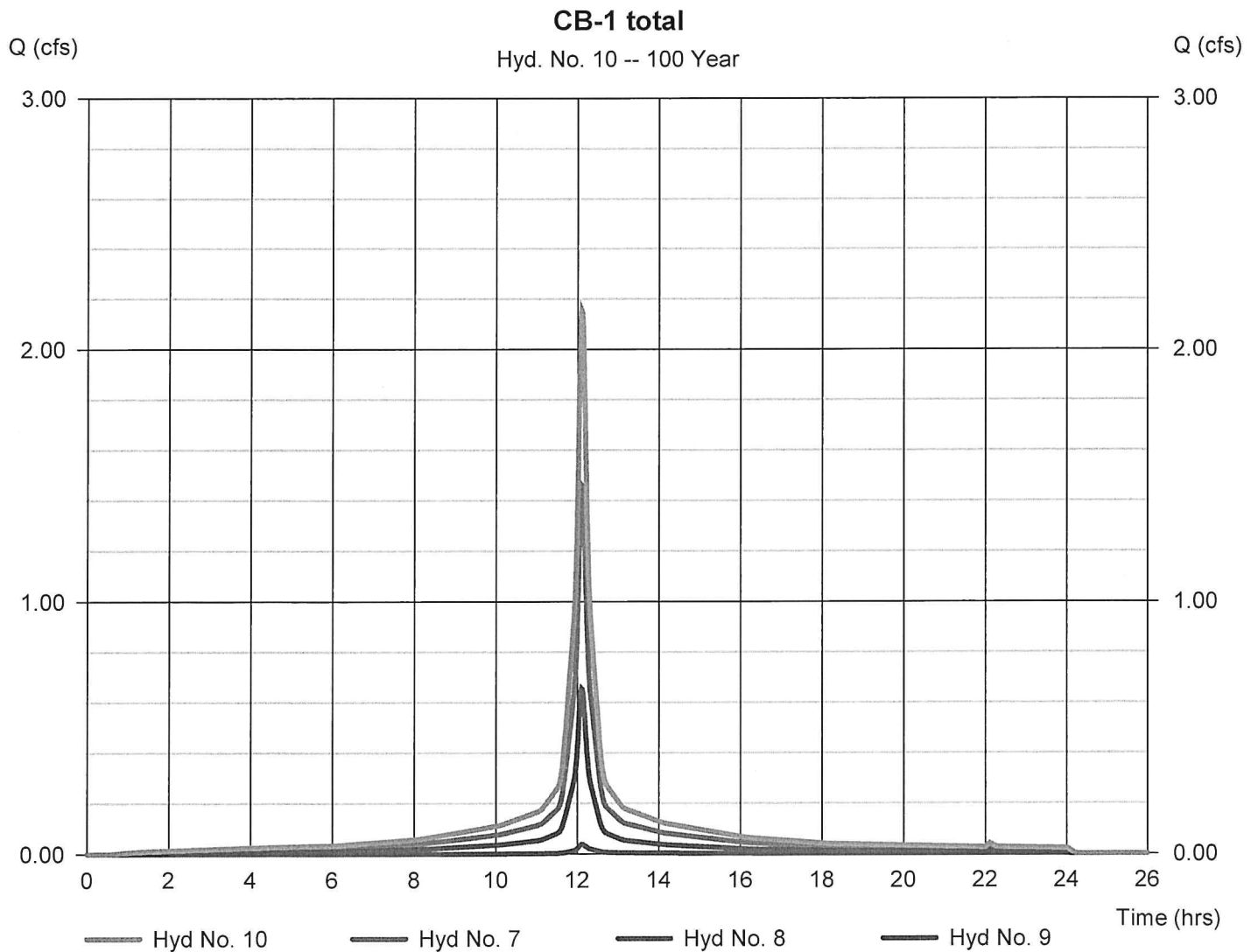
Friday, 10 / 23 / 2020

Hyd. No. 10

CB-1 total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 7, 8, 9

Peak discharge = 2.153 cfs
Time to peak = 12.10 hrs
Hyd. volume = 8,493 cuft
Contrib. drain. area = 0.100 ac



Hydrograph Report

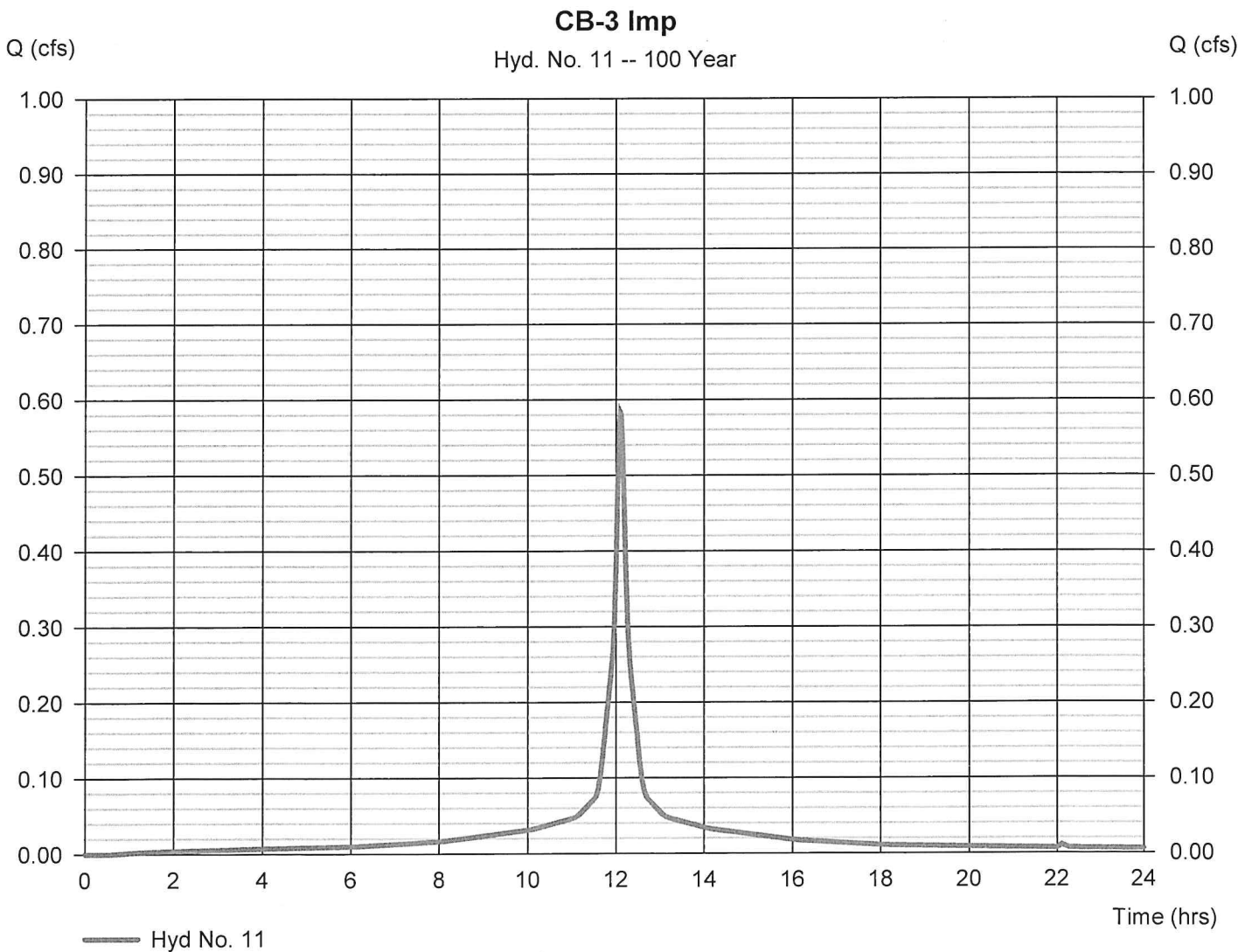
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 11

CB-3 Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.583 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,315 cuft
Drainage area	= 0.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

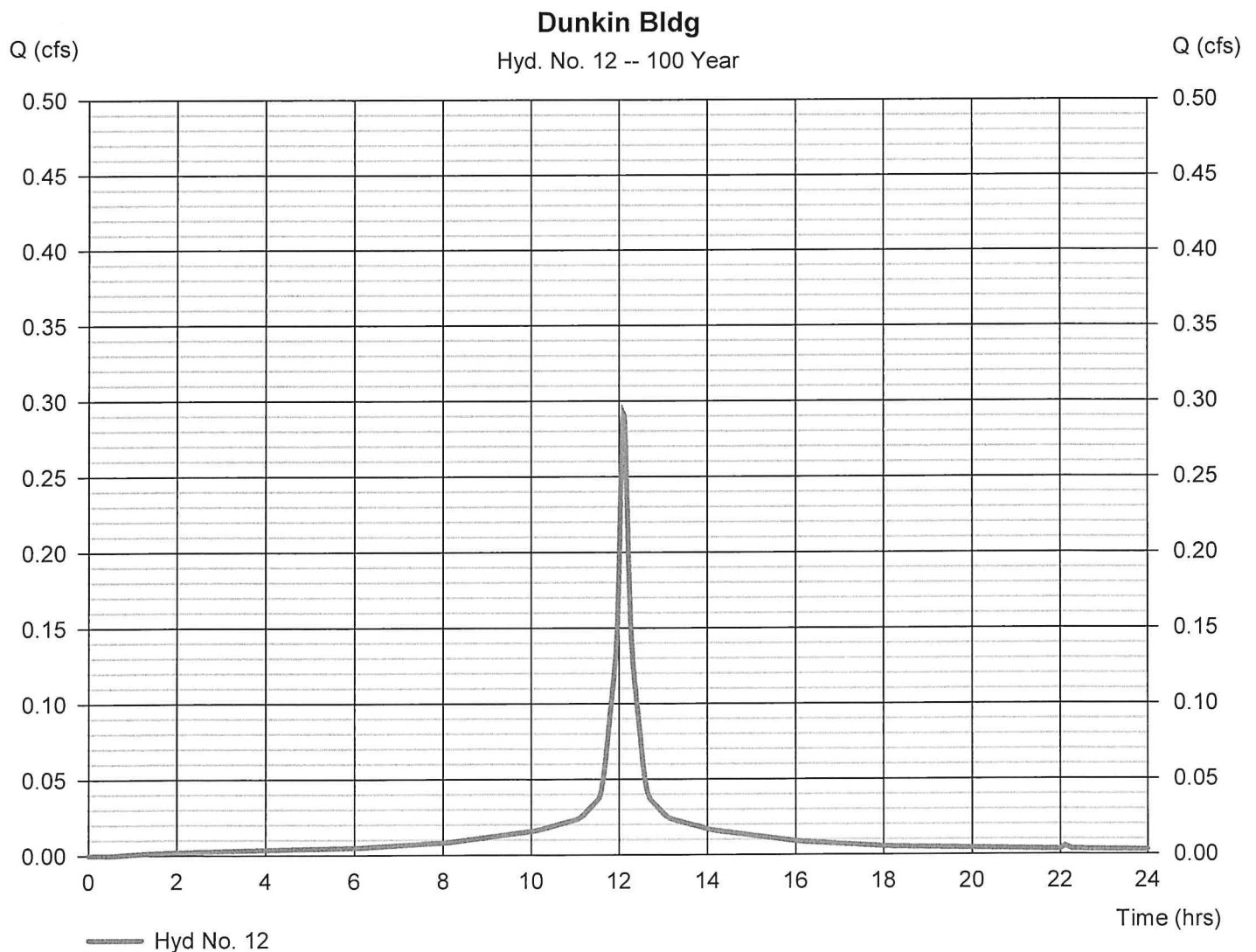
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 12

Dunkin Bldg

Hydrograph type	= SCS Runoff	Peak discharge	= 0.292 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,157 cuft
Drainage area	= 0.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

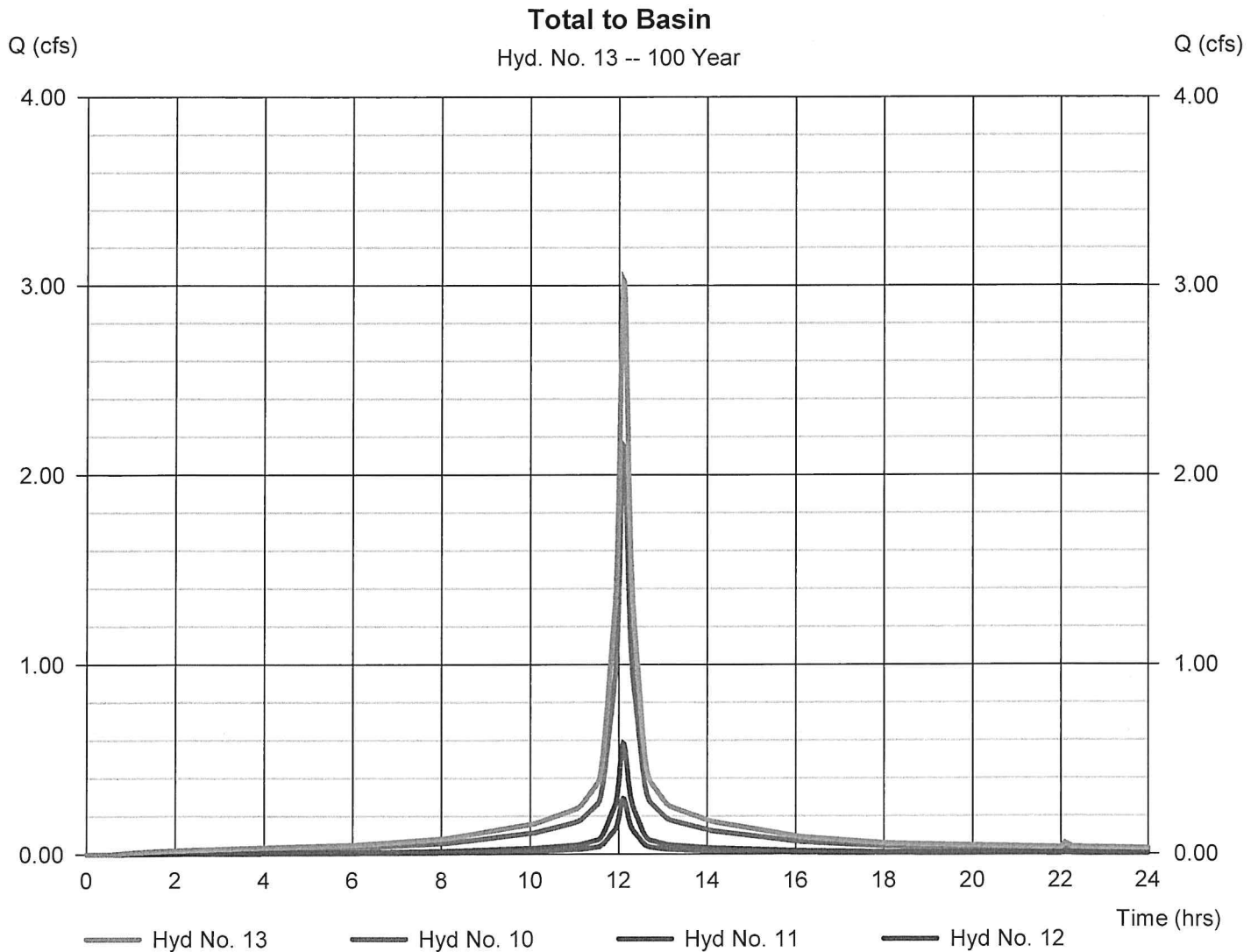
Friday, 10 / 23 / 2020

Hyd. No. 13

Total to Basin

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 10, 11, 12

Peak discharge = 3.028 cfs
Time to peak = 12.10 hrs
Hyd. volume = 11,965 cuft
Contrib. drain. area = 0.120 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

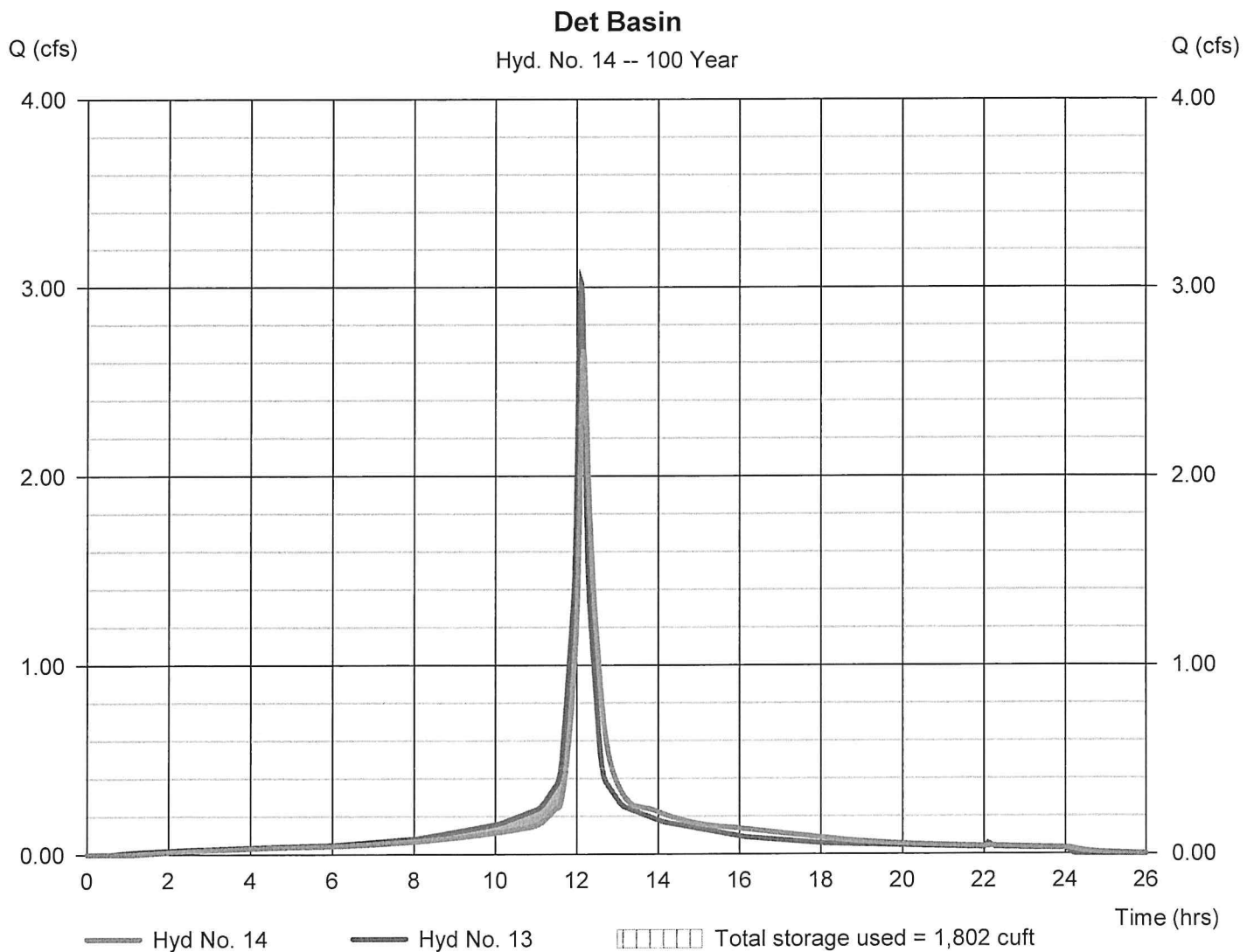
Friday, 10 / 23 / 2020

Hyd. No. 14

Det Basin

Hydrograph type	= Reservoir	Peak discharge	= 2.671 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 11,953 cuft
Inflow hyd. No.	= 13 - Total to Basin	Max. Elevation	= 125.00 ft
Reservoir name	= Det Basin	Max. Storage	= 1,802 cuft

Storage Indication method used.



Hydrograph Report

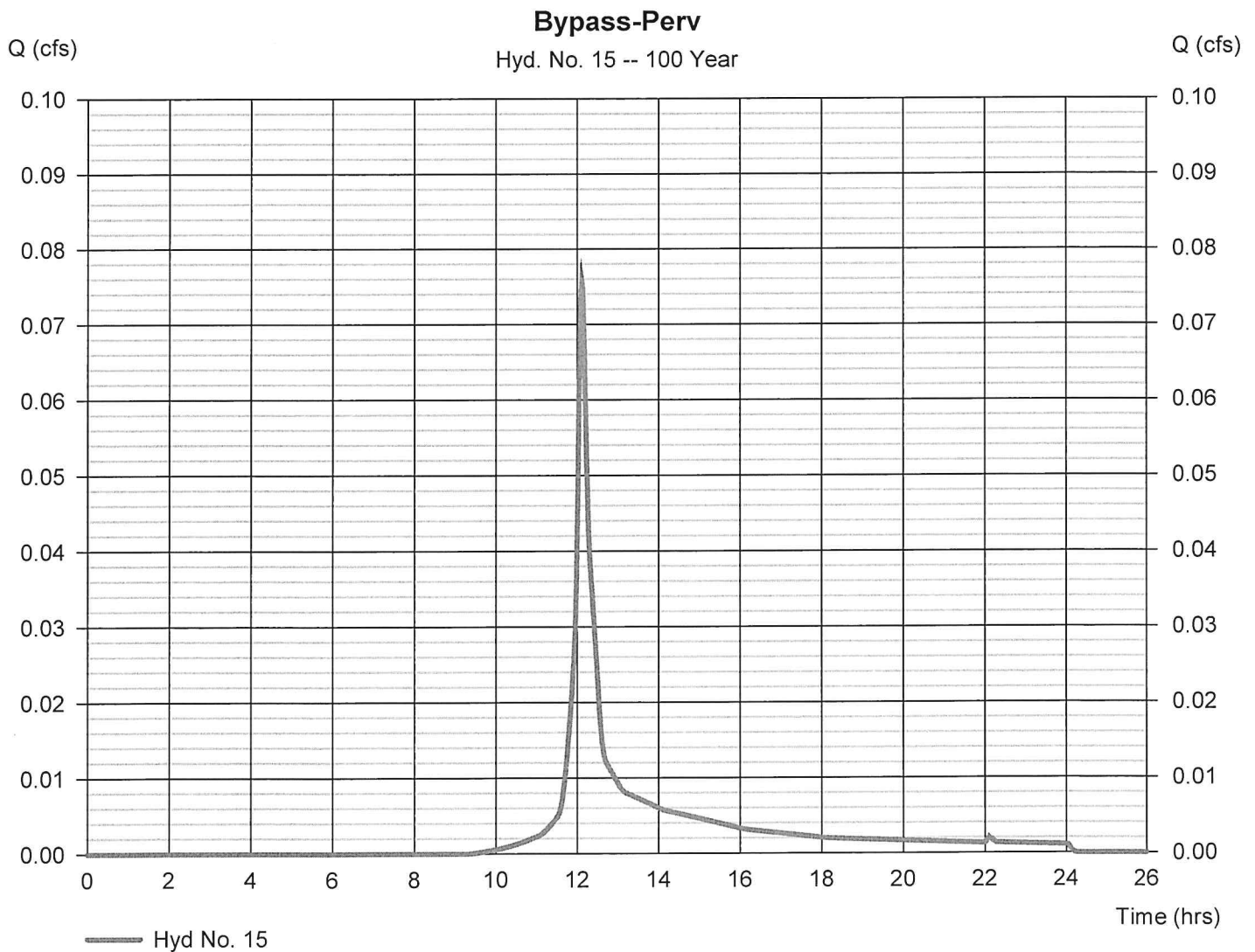
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 15

Bypass-Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.076 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 262 cuft
Drainage area	= 0.020 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

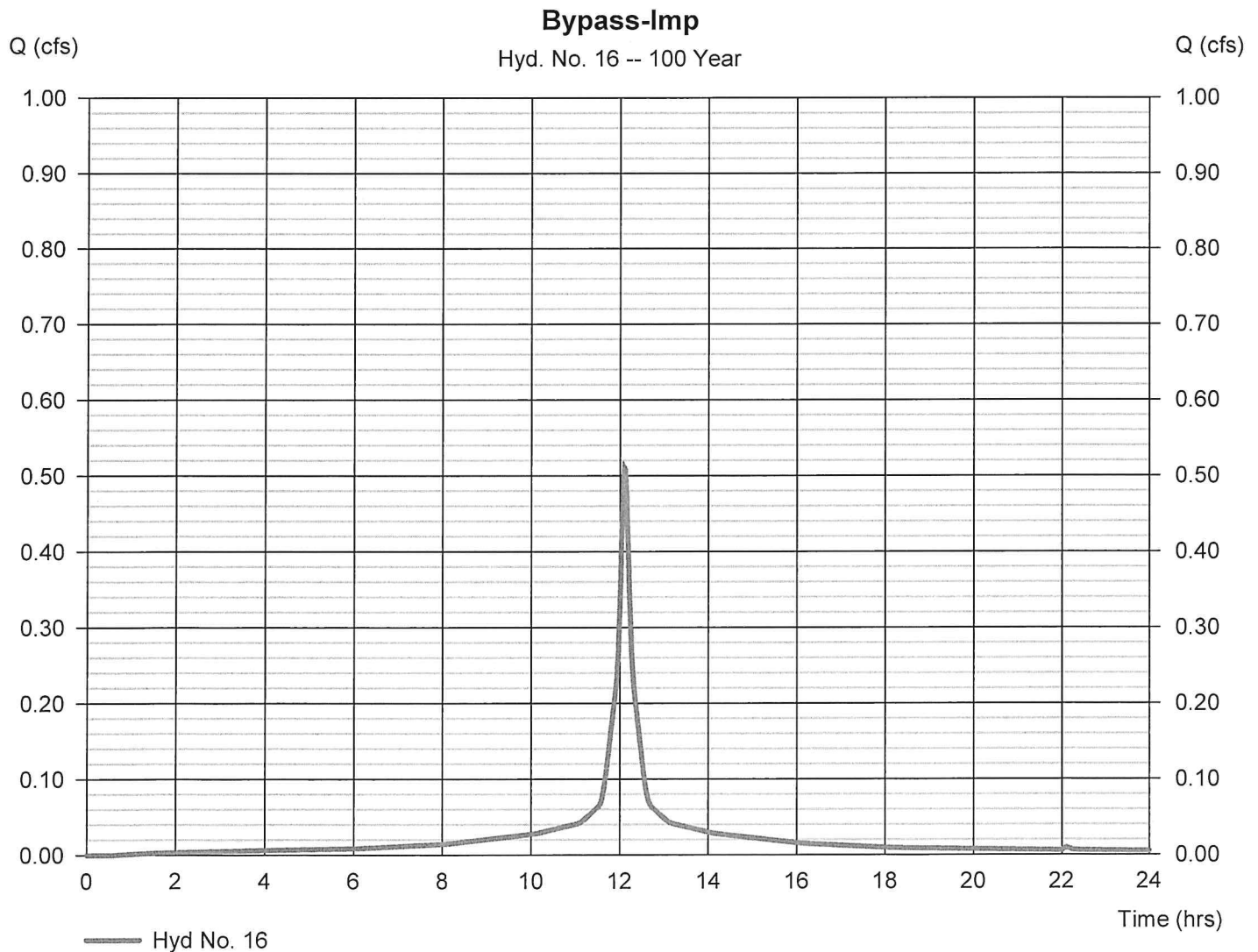
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Hyd. No. 16

Bypass-Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.510 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,025 cuft
Drainage area	= 0.070 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

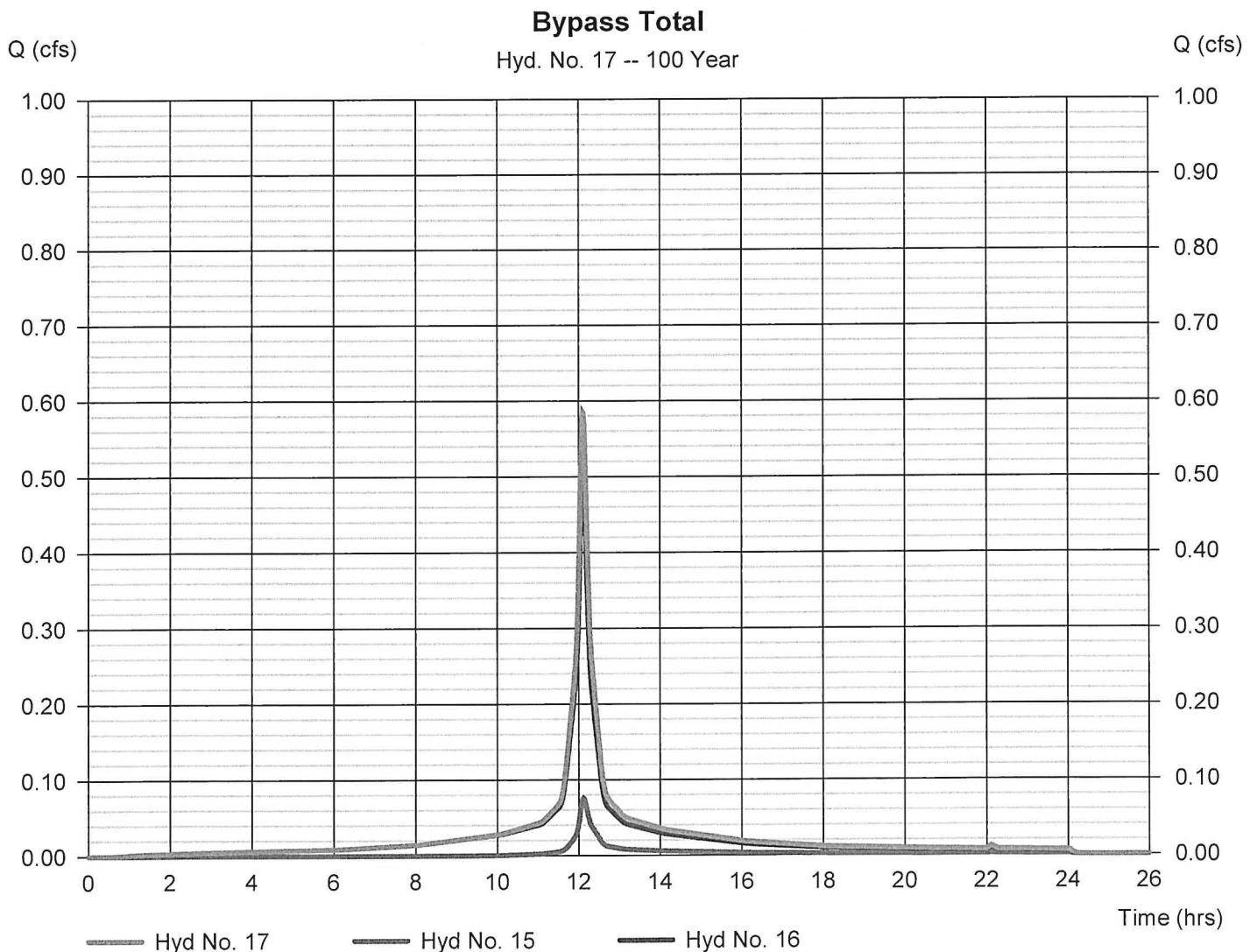
Friday, 10 / 23 / 2020

Hyd. No. 17

Bypass Total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 15, 16

Peak discharge = 0.585 cfs
Time to peak = 12.10 hrs
Hyd. volume = 2,287 cuft
Contrib. drain. area = 0.090 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

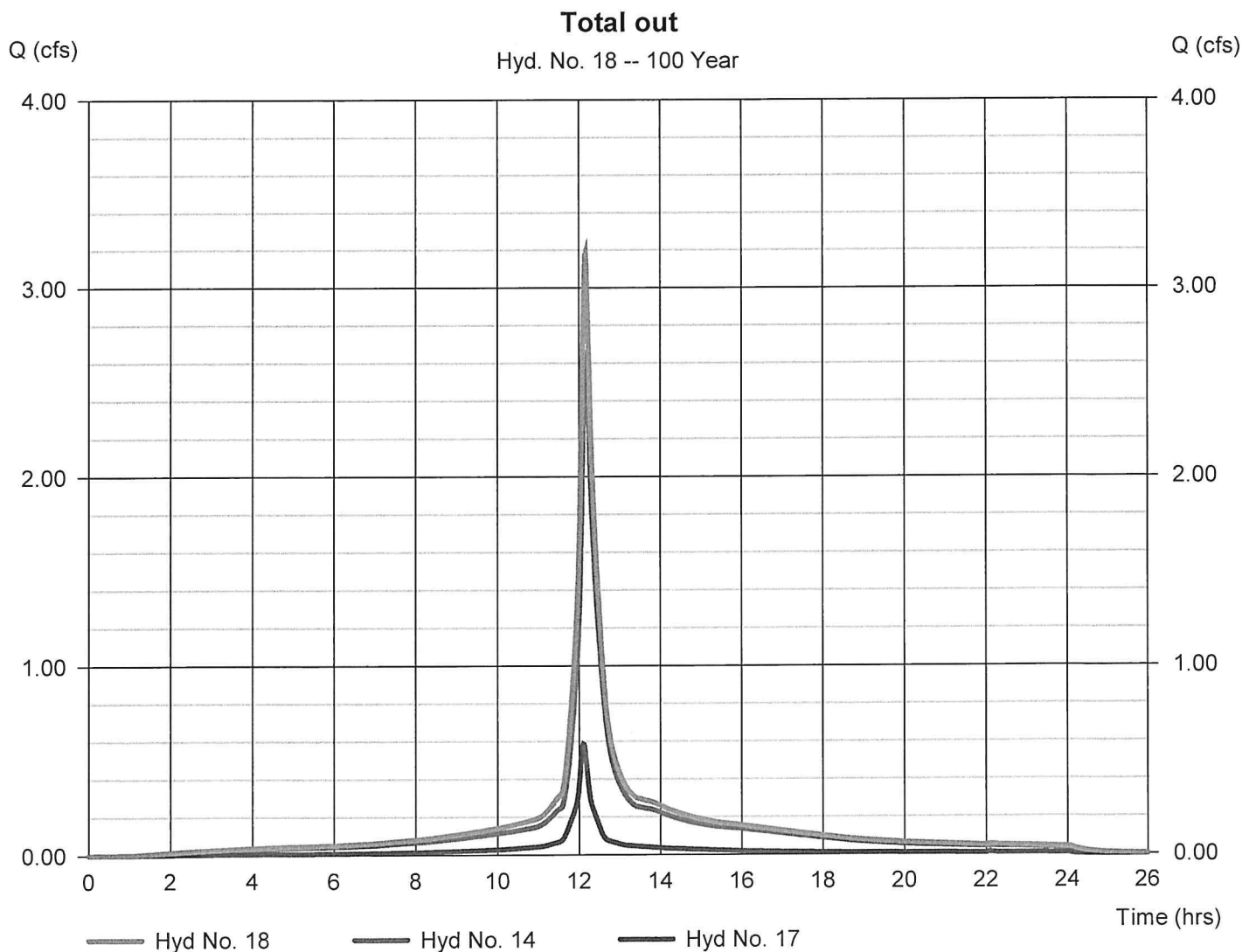
Friday, 10 / 23 / 2020

Hyd. No. 18

Total out

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 14, 17

Peak discharge = 3.184 cfs
Time to peak = 12.17 hrs
Hyd. volume = 14,240 cuft
Contrib. drain. area = 0.000 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Tuesday, 10 / 13 / 2020

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	38.8826	8.7000	0.7618	-----
3	0.0000	0.0000	0.0000	-----
5	59.2470	10.7000	0.8140	-----
10	268.0393	22.6000	1.1096	-----
25	125.3528	15.9000	0.9137	-----
50	171.9655	18.5000	0.9564	-----
100	186.5883	18.8000	0.9497	-----

File name: NJDEP.IDF

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

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.29	4.18	3.49	3.01	2.67	2.40	2.19	2.01	1.87	1.75	1.64	1.55
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.30	5.03	4.22	3.65	3.23	2.90	2.64	2.43	2.25	2.09	1.96	1.85
10	6.75	5.61	4.79	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.14	2.00
25	7.80	6.41	5.46	4.76	4.22	3.80	3.46	3.17	2.93	2.73	2.55	2.40
50	8.40	6.98	5.98	5.24	4.66	4.20	3.82	3.51	3.25	3.02	2.82	2.65
100	9.20	7.67	6.59	5.78	5.15	4.65	4.24	3.90	3.61	3.36	3.14	2.95

Tc = time in minutes. Values may exceed 60.

Precip. file name: Z:\Stormwater\NJ-24HR\NJ-24HR-RAIN-SOMERSET.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.76	3.34	0.00	4.25	5.01	6.15	7.13	8.21
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Custom	1.25	1.75	0.00	2.80	3.90	5.25	6.00	7.10

APPENDIX E

BASIN ROUTING ANALYSIS

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Tuesday, 10 / 27 / 2020

Pond No. 1 - Det Basin

Pond Data

UG Chambers -Invert elev. = 122.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 80.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.20	n/a	0	0
0.30	122.50	n/a	97	97
0.60	122.80	n/a	169	266
0.90	123.10	n/a	205	471
1.20	123.40	n/a	226	697
1.50	123.70	n/a	236	933
1.80	124.00	n/a	236	1,170
2.10	124.30	n/a	226	1,396
2.40	124.60	n/a	205	1,601
2.70	124.90	n/a	169	1,769
3.00	125.20	n/a	97	1,866

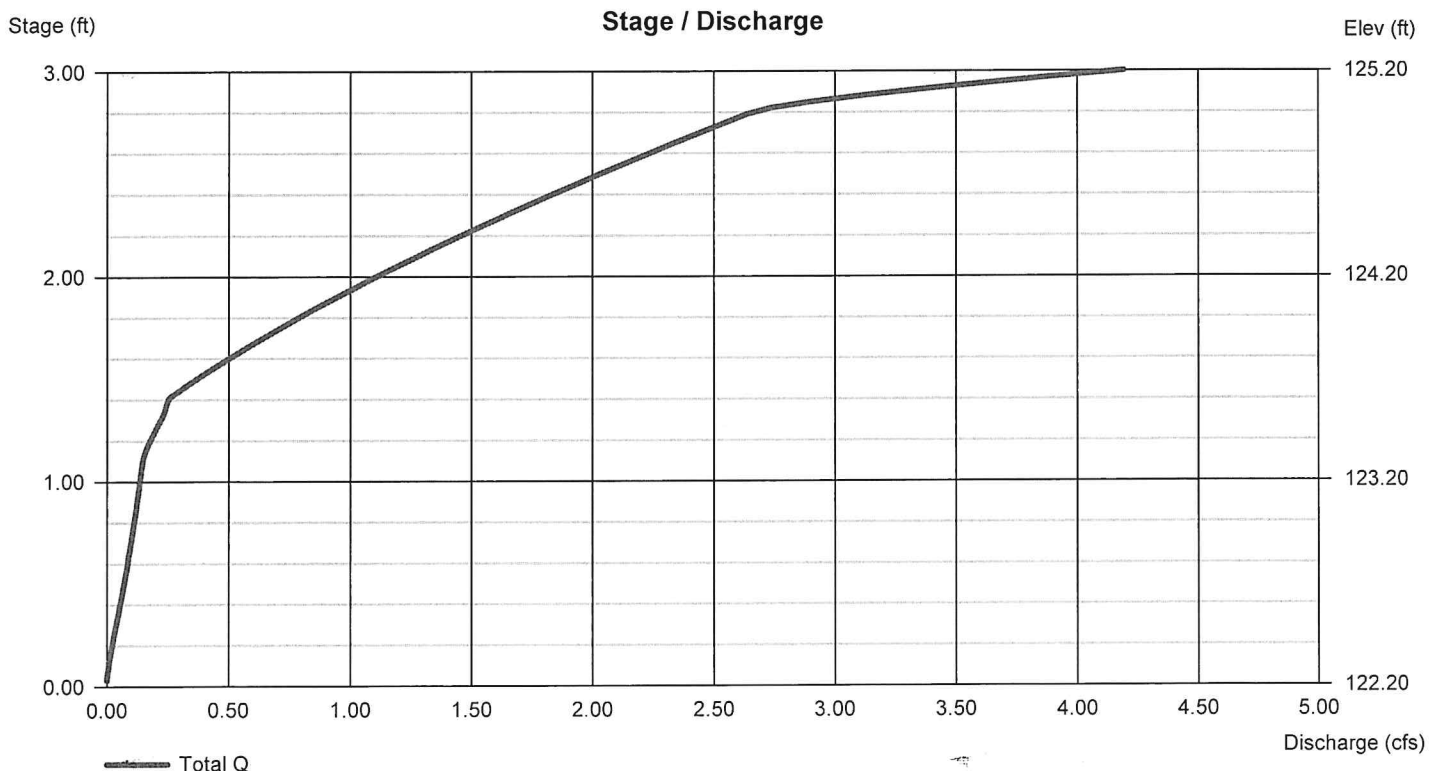
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	3.00	0.00	0.00
Span (in)	= 15.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 122.20	122.13	0.00	0.00
Length (ft)	= 7.00	0.00	0.00	0.00
Slope (%)	= 0.01	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)	= 0.33	5.00	Inactive	0.00
Crest El. (ft)	= 123.30	125.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= Rect	Broad	Broad	---
Multi-Stage	= Yes	Yes	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).



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Tuesday, 10 / 27 / 2020

Pond No. 1 - Det Basin

Pond Data

UG Chambers -Invert elev. = 122.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 80.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.20	n/a	0	0
0.30	122.50	n/a	97	97
0.60	122.80	n/a	169	266
0.90	123.10	n/a	205	471
1.20	123.40	n/a	226	697
1.50	123.70	n/a	236	933
1.80	124.00	n/a	236	1,170
2.10	124.30	n/a	226	1,396
2.40	124.60	n/a	205	1,601
2.70	124.90	n/a	169	1,769
3.00	125.20	n/a	97	1,866

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	3.00	0.00	0.00
Span (in)	= 15.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 122.20	122.13	0.00	0.00
Length (ft)	= 7.00	0.00	0.00	0.00
Slope (%)	= 0.01	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)	= 0.33	5.00	Inactive	0.00
Crest El. (ft)	= 123.30	125.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= Rect	Broad	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	122.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.30	97	122.50	0.04 oc	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.038
0.60	266	122.80	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.085
0.90	471	123.10	0.13 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.124
1.20	697	123.40	0.18 oc	0.14 ic	---	---	0.03	0.00	---	---	---	---	0.178
1.50	933	123.70	0.37 oc	0.12 ic	---	---	0.25 s	0.00	---	---	---	---	0.369
1.80	1,170	124.00	0.79 oc	0.17 ic	---	---	0.62 s	0.00	---	---	---	---	0.789
2.10	1,396	124.30	1.28 oc	0.21 ic	---	---	1.07 s	0.00	---	---	---	---	1.281
2.40	1,601	124.60	1.84 oc	0.25 ic	---	---	1.59 s	0.00	---	---	---	---	1.835
2.70	1,769	124.90	2.44 oc	0.27 ic	---	---	2.17 s	0.00	---	---	---	---	2.444
3.00	1,866	125.20	4.19 oc	0.28 ic	---	---	2.75 s	1.16	---	---	---	---	4.193

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Friday, 10 / 23 / 2020

Pond No. 1 - Det Basin

Pond Data

UG Chambers -Invert elev. = 122.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 80.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.20	n/a	0	0
0.30	122.50	n/a	97	97
0.60	122.80	n/a	169	266
0.90	123.10	n/a	205	471
1.20	123.40	n/a	226	697
1.50	123.70	n/a	236	933
1.80	124.00	n/a	236	1,170
2.10	124.30	n/a	226	1,396
2.40	124.60	n/a	205	1,601
2.70	124.90	n/a	169	1,769
3.00	125.20	n/a	97	1,866

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	3.00	0.00	0.00
Span (in)	= 15.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 122.20	122.13	0.00	0.00
Length (ft)	= 7.00	0.00	0.00	0.00
Slope (%)	= 0.01	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)	= 0.33	5.00	Inactive	0.00
Crest El. (ft)	= 123.30	125.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= Rect	Broad	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	122.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.03	10	122.23	0.00 oc	0.00 ic	---	---	0.00	0.00	---	---	---	---	0.000
0.06	19	122.26	0.00 oc	0.00 ic	---	---	0.00	0.00	---	---	---	---	0.003
0.09	29	122.29	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.006
0.12	39	122.32	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.010
0.15	49	122.35	0.01 oc	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.014
0.18	58	122.38	0.02 oc	0.02 ic	---	---	0.00	0.00	---	---	---	---	0.019
0.21	68	122.41	0.02 oc	0.02 ic	---	---	0.00	0.00	---	---	---	---	0.024
0.24	78	122.44	0.03 oc	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.028
0.27	88	122.47	0.03 oc	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.034
0.30	97	122.50	0.04 oc	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.038
0.33	114	122.53	0.04 oc	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.043
0.36	131	122.56	0.05 oc	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.049
0.39	148	122.59	0.05 oc	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.053
0.42	165	122.62	0.06 oc	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.058
0.45	182	122.65	0.06 oc	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.063
0.48	198	122.68	0.07 oc	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.068
0.51	215	122.71	0.07 oc	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.072
0.54	232	122.74	0.08 oc	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.077
0.57	249	122.77	0.08 oc	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.081
0.60	266	122.80	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.085
0.63	286	122.83	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.089
0.66	307	122.86	0.09 oc	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.093
0.69	327	122.89	0.10 oc	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.098
0.72	348	122.92	0.10 oc	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.101
0.75	369	122.95	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.106
0.78	389	122.98	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.109
0.81	410	123.01	0.11 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.114
0.84	430	123.04	0.12 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.117
0.87	451	123.07	0.12 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.121

Continues on next page...

Det Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.90	471	123.10	0.13 oc	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.124
0.93	494	123.13	0.13 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.128
0.96	516	123.16	0.13 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.131
0.99	539	123.19	0.14 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.135
1.02	562	123.22	0.14 oc	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.139
1.05	584	123.25	0.14 oc	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
1.08	607	123.28	0.15 oc	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.145
1.11	629	123.31	0.15 oc	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
1.14	652	123.34	0.16 oc	0.15 ic	---	---	0.01	0.00	---	---	---	---	0.157
1.17	675	123.37	0.17 oc	0.15 ic	---	---	0.02	0.00	---	---	---	---	0.166
1.20	697	123.40	0.18 oc	0.14 ic	---	---	0.03	0.00	---	---	---	---	0.178
1.23	721	123.43	0.19 oc	0.14 ic	---	---	0.05	0.00	---	---	---	---	0.191
1.26	744	123.46	0.20 oc	0.13 ic	---	---	0.07	0.00	---	---	---	---	0.203
1.29	768	123.49	0.22 oc	0.13 ic	---	---	0.09	0.00	---	---	---	---	0.216
1.32	792	123.52	0.23 oc	0.12 ic	---	---	0.11	0.00	---	---	---	---	0.230
1.35	815	123.55	0.24 oc	0.11 ic	---	---	0.13 s	0.00	---	---	---	---	0.240
1.38	839	123.58	0.25 oc	0.10 ic	---	---	0.15 s	0.00	---	---	---	---	0.247
1.41	863	123.61	0.26 oc	0.09 ic	---	---	0.16 s	0.00	---	---	---	---	0.256
1.44	886	123.64	0.30 oc	0.10 ic	---	---	0.19 s	0.00	---	---	---	---	0.293
1.47	910	123.67	0.34 oc	0.11 ic	---	---	0.22 s	0.00	---	---	---	---	0.331
1.50	933	123.70	0.37 oc	0.12 ic	---	---	0.25 s	0.00	---	---	---	---	0.369
1.53	957	123.73	0.41 oc	0.12 ic	---	---	0.28 s	0.00	---	---	---	---	0.408
1.56	981	123.76	0.45 oc	0.13 ic	---	---	0.32 s	0.00	---	---	---	---	0.447
1.59	1,004	123.79	0.49 oc	0.14 ic	---	---	0.35 s	0.00	---	---	---	---	0.487
1.62	1,028	123.82	0.53 oc	0.14 ic	---	---	0.39 s	0.00	---	---	---	---	0.528
1.65	1,052	123.85	0.57 oc	0.15 ic	---	---	0.42 s	0.00	---	---	---	---	0.570
1.68	1,075	123.88	0.61 oc	0.15 ic	---	---	0.46 s	0.00	---	---	---	---	0.612
1.71	1,099	123.91	0.66 oc	0.16 ic	---	---	0.50 s	0.00	---	---	---	---	0.655
1.74	1,122	123.94	0.70 oc	0.16 ic	---	---	0.54 s	0.00	---	---	---	---	0.699
1.77	1,146	123.97	0.75 oc	0.17 ic	---	---	0.57 s	0.00	---	---	---	---	0.744
1.80	1,170	124.00	0.79 oc	0.17 ic	---	---	0.62 s	0.00	---	---	---	---	0.789
1.83	1,192	124.03	0.84 oc	0.18 ic	---	---	0.66 s	0.00	---	---	---	---	0.835
1.86	1,215	124.06	0.88 oc	0.18 ic	---	---	0.70 s	0.00	---	---	---	---	0.882
1.89	1,237	124.09	0.93 oc	0.19 ic	---	---	0.74 s	0.00	---	---	---	---	0.930
1.92	1,260	124.12	0.98 oc	0.19 ic	---	---	0.79 s	0.00	---	---	---	---	0.978
1.95	1,283	124.15	1.03 oc	0.20 ic	---	---	0.83 s	0.00	---	---	---	---	1.027
1.98	1,305	124.18	1.08 oc	0.20 ic	---	---	0.88 s	0.00	---	---	---	---	1.076
2.01	1,328	124.21	1.13 oc	0.20 ic	---	---	0.92 s	0.00	---	---	---	---	1.126
2.04	1,350	124.24	1.18 oc	0.21 ic	---	---	0.97 s	0.00	---	---	---	---	1.177
2.07	1,373	124.27	1.23 oc	0.21 ic	---	---	1.02 s	0.00	---	---	---	---	1.229
2.10	1,396	124.30	1.28 oc	0.21 ic	---	---	1.07 s	0.00	---	---	---	---	1.281
2.13	1,416	124.33	1.34 oc	0.22 ic	---	---	1.12 s	0.00	---	---	---	---	1.334
2.16	1,437	124.36	1.39 oc	0.22 ic	---	---	1.17 s	0.00	---	---	---	---	1.387
2.19	1,457	124.39	1.44 oc	0.22 ic	---	---	1.22 s	0.00	---	---	---	---	1.441
2.22	1,478	124.42	1.50 oc	0.23 ic	---	---	1.27 s	0.00	---	---	---	---	1.496
2.25	1,498	124.45	1.55 oc	0.23 ic	---	---	1.32 s	0.00	---	---	---	---	1.551
2.28	1,519	124.48	1.61 oc	0.23 ic	---	---	1.37 s	0.00	---	---	---	---	1.607
2.31	1,539	124.51	1.66 oc	0.24 ic	---	---	1.43 s	0.00	---	---	---	---	1.663
2.34	1,560	124.54	1.72 oc	0.24 ic	---	---	1.48 s	0.00	---	---	---	---	1.720
2.37	1,580	124.57	1.78 oc	0.24 ic	---	---	1.53 s	0.00	---	---	---	---	1.777
2.40	1,601	124.60	1.84 oc	0.25 ic	---	---	1.59 s	0.00	---	---	---	---	1.835
2.43	1,618	124.63	1.89 oc	0.25 ic	---	---	1.64 s	0.00	---	---	---	---	1.894
2.46	1,635	124.66	1.95 oc	0.25 ic	---	---	1.70 s	0.00	---	---	---	---	1.953
2.49	1,651	124.69	2.01 oc	0.26 ic	---	---	1.76 s	0.00	---	---	---	---	2.013
2.52	1,668	124.72	2.07 oc	0.26 ic	---	---	1.81 s	0.00	---	---	---	---	2.073
2.55	1,685	124.75	2.13 oc	0.26 ic	---	---	1.87 s	0.00	---	---	---	---	2.133
2.58	1,702	124.78	2.20 oc	0.26 ic	---	---	1.93 s	0.00	---	---	---	---	2.195
2.61	1,719	124.81	2.26 oc	0.27 ic	---	---	1.99 s	0.00	---	---	---	---	2.256
2.64	1,736	124.84	2.32 oc	0.27 ic	---	---	2.05 s	0.00	---	---	---	---	2.318
2.67	1,753	124.87	2.38 oc	0.27 ic	---	---	2.11 s	0.00	---	---	---	---	2.381
2.70	1,769	124.90	2.44 oc	0.27 ic	---	---	2.17 s	0.00	---	---	---	---	2.444
2.73	1,779	124.93	2.51 oc	0.28 ic	---	---	2.23 s	0.00	---	---	---	---	2.508
2.76	1,789	124.96	2.57 oc	0.28 ic	---	---	2.29 s	0.00	---	---	---	---	2.572
2.79	1,799	124.99	2.64 oc	0.28 ic	---	---	2.35 s	0.00	---	---	---	---	2.636
2.82	1,808	125.02	2.74 oc	0.28 ic	---	---	2.42 s	0.04	---	---	---	---	2.736
2.85	1,818	125.05	2.91 oc	0.29 ic	---	---	2.48 s	0.15	---	---	---	---	2.906
2.88	1,828	125.08	3.11 oc	0.29 ic	---	---	2.53 s	0.29	---	---	---	---	3.113
2.91	1,837	125.11	3.35 oc	0.29 ic	---	---	2.59 s	0.47	---	---	---	---	3.350
2.94	1,847	125.14	3.61 oc	0.29 ic	---	---	2.64 s	0.68	---	---	---	---	3.611
2.97	1,857	125.17	3.89 oc	0.29 ic	---	---	2.70 s	0.91	---	---	---	---	3.893

Continues on next page...

Det Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.00	1,866	125.20	4.19 oc	0.28 ic	---	---	2.75 s	1.16	---	---	---	---	4.193

...End

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Tuesday, 10 / 27 / 2020

Hyd. No. 14

Det Basin

Hydrograph type	= Reservoir	Peak discharge	= 2.673 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 11,953 cuft
Inflow hyd. No.	= 13 - Total to Basin	Reservoir name	= Det Basin
Max. Elevation	= 125.00 ft	Max. Storage	= 1,802 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 1.00% of Qp. Print interval = 10)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
3.50	0.032	122.43	0.027	0.027	----	----	----	----	----	----	----	0.027
3.67	0.033	122.44	0.028	0.028	----	----	----	----	----	----	----	0.028
3.83	0.034	122.45	0.030	0.030	----	----	----	----	----	----	----	0.030
4.00	0.036	122.46	0.032	0.031	----	----	----	----	----	----	----	0.031
4.17	0.037	122.47	0.033	0.033	----	----	----	----	----	----	----	0.033
4.33	0.038	122.47	0.035	0.034	----	----	----	----	----	----	----	0.034
4.50	0.039	122.48	0.036	0.035	----	----	----	----	----	----	----	0.035
4.67	0.040	122.49	0.037	0.036	----	----	----	----	----	----	----	0.036
4.83	0.041	122.49	0.038	0.037	----	----	----	----	----	----	----	0.037
5.00	0.042	122.50	0.039	0.038	----	----	----	----	----	----	----	0.038
5.17	0.043	122.50	0.040	0.039	----	----	----	----	----	----	----	0.039
5.33	0.044	122.51	0.041	0.040	----	----	----	----	----	----	----	0.040
5.50	0.045	122.51	0.041	0.041	----	----	----	----	----	----	----	0.041
5.67	0.046	122.52	0.042	0.041	----	----	----	----	----	----	----	0.041
5.83	0.047	122.53	0.042	0.042	----	----	----	----	----	----	----	0.042
6.00	0.048	122.53	0.043	0.043	----	----	----	----	----	----	----	0.043
6.17	0.050	122.54	0.044	0.044	----	----	----	----	----	----	----	0.044
6.33	0.053	122.54	0.046	0.046	----	----	----	----	----	----	----	0.046
6.50	0.056	122.55	0.047	0.047	----	----	----	----	----	----	----	0.047
6.67	0.058	122.56	0.049	0.049	----	----	----	----	----	----	----	0.049

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
6.83	0.061	122.57	0.050	0.050	----	----	----	----	----	----	----	0.050
7.00	0.064	122.58	0.052	0.052	----	----	----	----	----	----	----	0.052
7.17	0.067	122.60	0.054	0.054	----	----	----	----	----	----	----	0.054
7.33	0.070	122.61	0.057	0.057	----	----	----	----	----	----	----	0.057
7.50	0.073	122.63	0.060	0.059	----	----	----	----	----	----	----	0.059
7.67	0.075	122.64	0.062	0.062	----	----	----	----	----	----	----	0.062
7.83	0.078	122.66	0.064	0.064	----	----	----	----	----	----	----	0.064
8.00	0.081	122.67	0.066	0.066	----	----	----	----	----	----	----	0.066
8.17	0.085	122.69	0.069	0.069	----	----	----	----	----	----	----	0.069
8.33	0.091	122.71	0.072	0.072	----	----	----	----	----	----	----	0.072
8.50	0.098	122.73	0.075	0.075	----	----	----	----	----	----	----	0.075
8.67	0.104	122.76	0.079	0.079	----	----	----	----	----	----	----	0.079
8.83	0.111	122.78	0.084	0.083	----	----	----	----	----	----	----	0.083
9.00	0.117	122.81	0.088	0.087	----	----	----	----	----	----	----	0.087
9.17	0.123	122.84	0.092	0.090	----	----	----	----	----	----	----	0.090
9.33	0.130	122.87	0.095	0.095	----	----	----	----	----	----	----	0.095
9.50	0.136	122.90	0.100	0.099	----	----	----	----	----	----	----	0.099
9.67	0.143	122.93	0.105	0.103	----	----	----	----	----	----	----	0.103
9.83	0.150	122.97	0.109	0.108	----	----	----	----	----	----	----	0.108
10.00	0.156	123.01	0.113	0.113	----	----	----	----	----	----	----	0.113
10.17	0.165	123.05	0.119	0.118	----	----	----	----	----	----	----	0.118
10.33	0.179	123.09	0.125	0.123	----	----	----	----	----	----	----	0.123
10.50	0.192	123.14	0.130	0.129	----	----	----	----	----	----	----	0.129
10.67	0.206	123.19	0.137	0.135	----	----	----	----	----	----	----	0.135
10.83	0.220	123.25	0.142	0.142	----	----	----	----	----	----	----	0.142
11.00	0.234	123.32	0.151	0.148	----	----	0.003	----	----	----	----	0.151
11.17	0.261	123.38	0.172	0.144	----	----	0.027	----	----	----	----	0.172

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
11.33	0.312	123.46	0.205	0.133	----	----	0.071	----	----	----	----	0.203
11.50	0.364	123.55	0.240	0.107	----	----	0.132	----	----	----	----	0.240
11.67	0.572	123.68	0.344	0.112	----	----	0.226	----	----	----	----	0.338
11.83	1.057	123.92	0.674	0.161	----	----	0.510	----	----	----	----	0.671
12.00	1.917	124.27	1.237	0.211	----	----	1.024	----	----	----	----	1.235
12.17	2.644	125.00 <<	2.673	0.283	----	----	2.377	0.013	----	----	----	2.673
12.33	1.268	124.54	1.726	0.241	----	----	1.484	----	----	----	----	1.725
12.50	0.760	124.21	1.129	0.203	----	----	0.923	----	----	----	----	1.127
12.67	0.412	123.94	0.699	0.164	----	----	0.533	----	----	----	----	0.696
12.83	0.343	123.78	0.484	0.136	----	----	0.344	----	----	----	----	0.480
13.00	0.290	123.70	0.375	0.119	----	----	0.255	----	----	----	----	0.374
13.17	0.251	123.65	0.313	0.106	----	----	0.201	----	----	----	----	0.306
13.33	0.236	123.62	0.271	0.097	----	----	0.170	----	----	----	----	0.267
13.50	0.222	123.60	0.254	0.097	----	----	0.156	----	----	----	----	0.252
13.67	0.208	123.57	0.245	0.101	----	----	0.143	----	----	----	----	0.245
13.83	0.194	123.54	0.237	0.110	----	----	0.127	----	----	----	----	0.237
14.00	0.180	123.51	0.225	0.120	----	----	0.104	----	----	----	----	0.224
14.17	0.169	123.47	0.211	0.129	----	----	0.080	----	----	----	----	0.210
14.33	0.162	123.45	0.198	0.136	----	----	0.061	----	----	----	----	0.197
14.50	0.155	123.42	0.187	0.140	----	----	0.046	----	----	----	----	0.187
14.67	0.149	123.40	0.177	0.143	----	----	0.034	----	----	----	----	0.177
14.83	0.142	123.38	0.168	0.145	----	----	0.023	----	----	----	----	0.168
15.00	0.135	123.36	0.161	0.147	----	----	0.015	----	----	----	----	0.161
15.17	0.129	123.33	0.155	0.148	----	----	0.007	----	----	----	----	0.155
15.33	0.122	123.31	0.150	0.148	----	----	0.002	----	----	----	----	0.150
15.50	0.115	123.29	0.147	0.146	----	----	0.000	----	----	----	----	0.146

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
15.67	0.109	123.26	0.144	0.143	----	----	----	----	----	----	----	0.143
15.83	0.102	123.23	0.140	0.140	----	----	----	----	----	----	----	0.140
16.00	0.095	123.20	0.138	0.137	----	----	----	----	----	----	----	0.137
16.17	0.090	123.17	0.133	0.132	----	----	----	----	----	----	----	0.132
16.33	0.087	123.14	0.129	0.129	----	----	----	----	----	----	----	0.129
16.50	0.084	123.10	0.127	0.124	----	----	----	----	----	----	----	0.124
16.67	0.081	123.07	0.121	0.121	----	----	----	----	----	----	----	0.121
16.83	0.078	123.03	0.118	0.116	----	----	----	----	----	----	----	0.116
17.00	0.075	123.00	0.113	0.112	----	----	----	----	----	----	----	0.112
17.17	0.072	122.97	0.109	0.108	----	----	----	----	----	----	----	0.108
17.33	0.070	122.94	0.105	0.104	----	----	----	----	----	----	----	0.104
17.50	0.067	122.91	0.102	0.100	----	----	----	----	----	----	----	0.100
17.67	0.064	122.88	0.097	0.097	----	----	----	----	----	----	----	0.097
17.83	0.061	122.85	0.093	0.092	----	----	----	----	----	----	----	0.092
18.00	0.058	122.82	0.090	0.088	----	----	----	----	----	----	----	0.088
18.17	0.056	122.80	0.086	0.085	----	----	----	----	----	----	----	0.085
18.33	0.055	122.77	0.081	0.081	----	----	----	----	----	----	----	0.081
18.50	0.054	122.74	0.077	0.077	----	----	----	----	----	----	----	0.077
18.67	0.053	122.72	0.073	0.073	----	----	----	----	----	----	----	0.073
18.83	0.052	122.70	0.070	0.070	----	----	----	----	----	----	----	0.070
19.00	0.051	122.68	0.068	0.068	----	----	----	----	----	----	----	0.068
19.17	0.050	122.66	0.065	0.065	----	----	----	----	----	----	----	0.065
19.33	0.050	122.65	0.063	0.063	----	----	----	----	----	----	----	0.063
19.50	0.049	122.63	0.061	0.061	----	----	----	----	----	----	----	0.061
19.67	0.048	122.62	0.059	0.059	----	----	----	----	----	----	----	0.059
19.83	0.047	122.61	0.057	0.057	----	----	----	----	----	----	----	0.057
20.00	0.046	122.60	0.055	0.055	----	----	----	----	----	----	----	0.055

Continues on next page...

Det Basin

Hydrograph Discharge Table

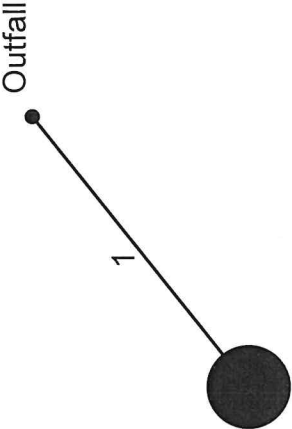
Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
20.17	0.045	122.59	0.053	0.053	----	----	----	----	----	----	----	0.053
20.33	0.044	122.58	0.052	0.052	----	----	----	----	----	----	----	0.052
20.50	0.043	122.58	0.051	0.051	----	----	----	----	----	----	----	0.051
20.67	0.043	122.57	0.050	0.050	----	----	----	----	----	----	----	0.050
20.83	0.042	122.56	0.049	0.049	----	----	----	----	----	----	----	0.049
21.00	0.041	122.55	0.047	0.047	----	----	----	----	----	----	----	0.047
21.17	0.040	122.55	0.046	0.046	----	----	----	----	----	----	----	0.046
21.33	0.039	122.54	0.045	0.045	----	----	----	----	----	----	----	0.045
21.50	0.038	122.53	0.044	0.044	----	----	----	----	----	----	----	0.044
21.67	0.037	122.53	0.043	0.043	----	----	----	----	----	----	----	0.043
21.83	0.036	122.52	0.042	0.042	----	----	----	----	----	----	----	0.042
22.00	0.036	122.52	0.041	0.041	----	----	----	----	----	----	----	0.041
22.17	0.049	122.52	0.042	0.042	----	----	----	----	----	----	----	0.042
22.33	0.037	122.52	0.042	0.042	----	----	----	----	----	----	----	0.042
22.50	0.036	122.52	0.041	0.041	----	----	----	----	----	----	----	0.041
22.67	0.035	122.51	0.041	0.040	----	----	----	----	----	----	----	0.040
22.83	0.035	122.51	0.040	0.039	----	----	----	----	----	----	----	0.039
23.00	0.034	122.50	0.040	0.039	----	----	----	----	----	----	----	0.039
23.17	0.033	122.50	0.039	0.038	----	----	----	----	----	----	----	0.038
23.33	0.033	122.49	0.037	0.036	----	----	----	----	----	----	----	0.036
23.50	0.032	122.48	0.036	0.035	----	----	----	----	----	----	----	0.035
23.67	0.032	122.48	0.035	0.035	----	----	----	----	----	----	----	0.035
23.83	0.031	122.47	0.034	0.034	----	----	----	----	----	----	----	0.034
24.00	0.030	122.47	0.033	0.033	----	----	----	----	----	----	----	0.033
24.17	0.006	122.44	0.029	0.029	----	----	----	----	----	----	----	0.029

...End

APPENDIX F

**STORMWATER COLLECTION
AND CONVEYANCE CALCULATIONS**

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



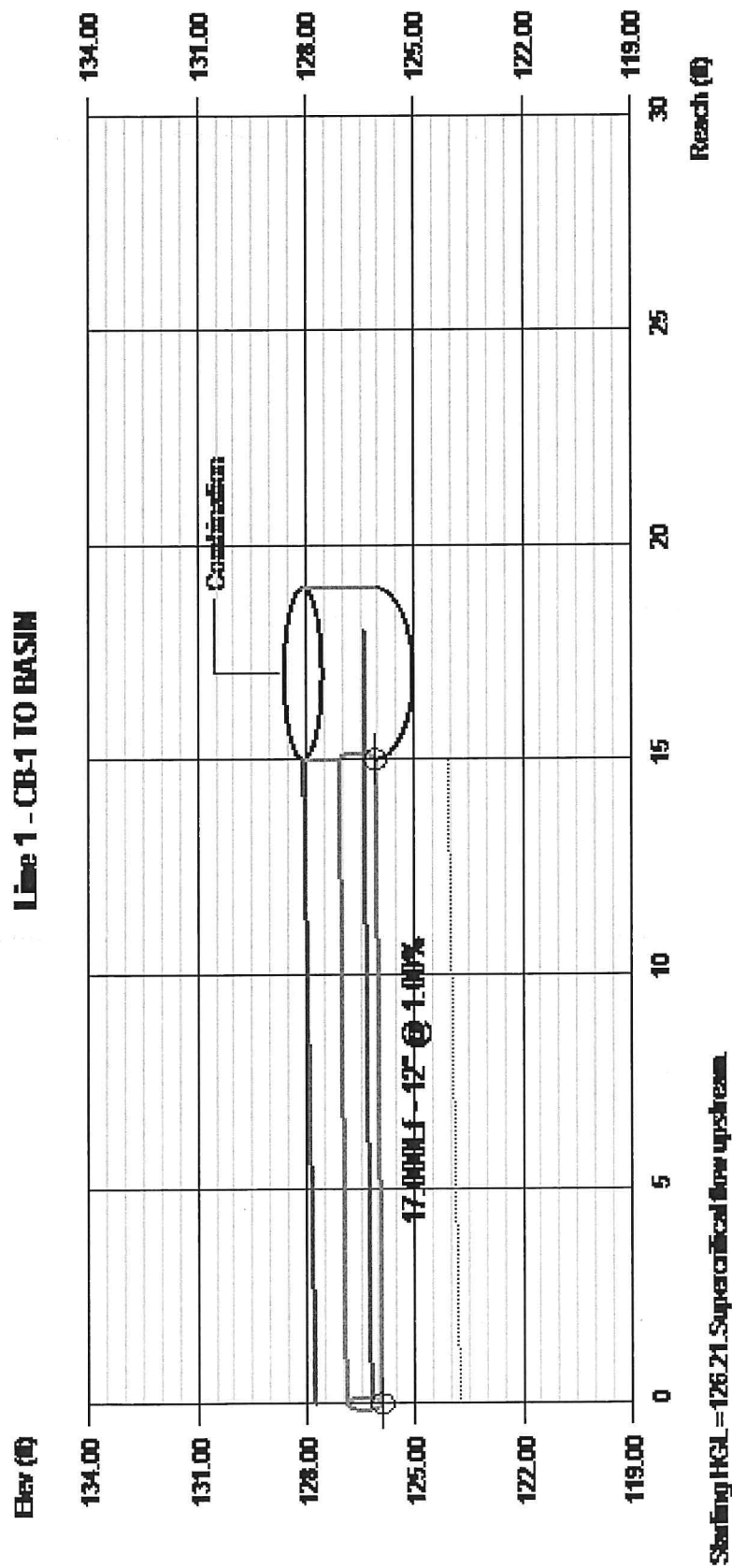
Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	17.000	0.10	0.10	0.90	0.09	0.09	10.0	10.0	6.4	0.58	3.56	2.81	12	1.00	125.91	126.08	126.21	126.40	127.75	128.08	CB-1 TO BASIN
Project File: CB-1 to det. basin.stm														Number of lines: 1				Run Date: 10/26/2020				
NOTES: Intensity = 125.35 / (Inlet time + 15.90) ^ 0.91 ; Return period = Yrs. 25 ; c = cir e = ellip b = box																						

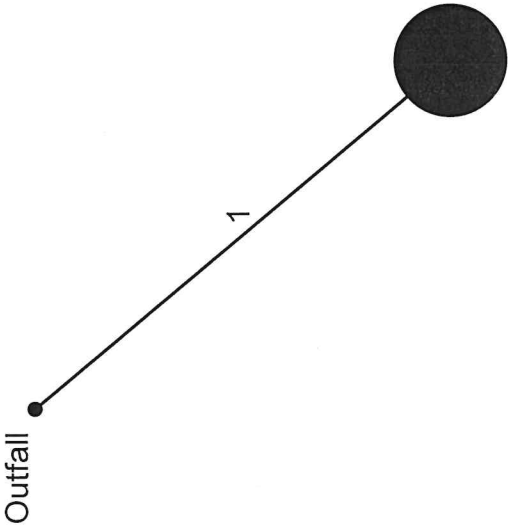
Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	12	0.58	125.91	126.21	0.30	0.20	2.91	0.11	126.32	0.000	17.000	126.08	126.40	0.32**	0.21	2.72	0.11	126.51	0.000	0.000	n/a	1.00	n/a

Project File: CB-1 to det. basin.stm										Number of lines: 1		Run Date: 10/26/2020	
Notes: ; ** Critical depth. ; c = cir e = ellip b = box													



cb-2 to basin

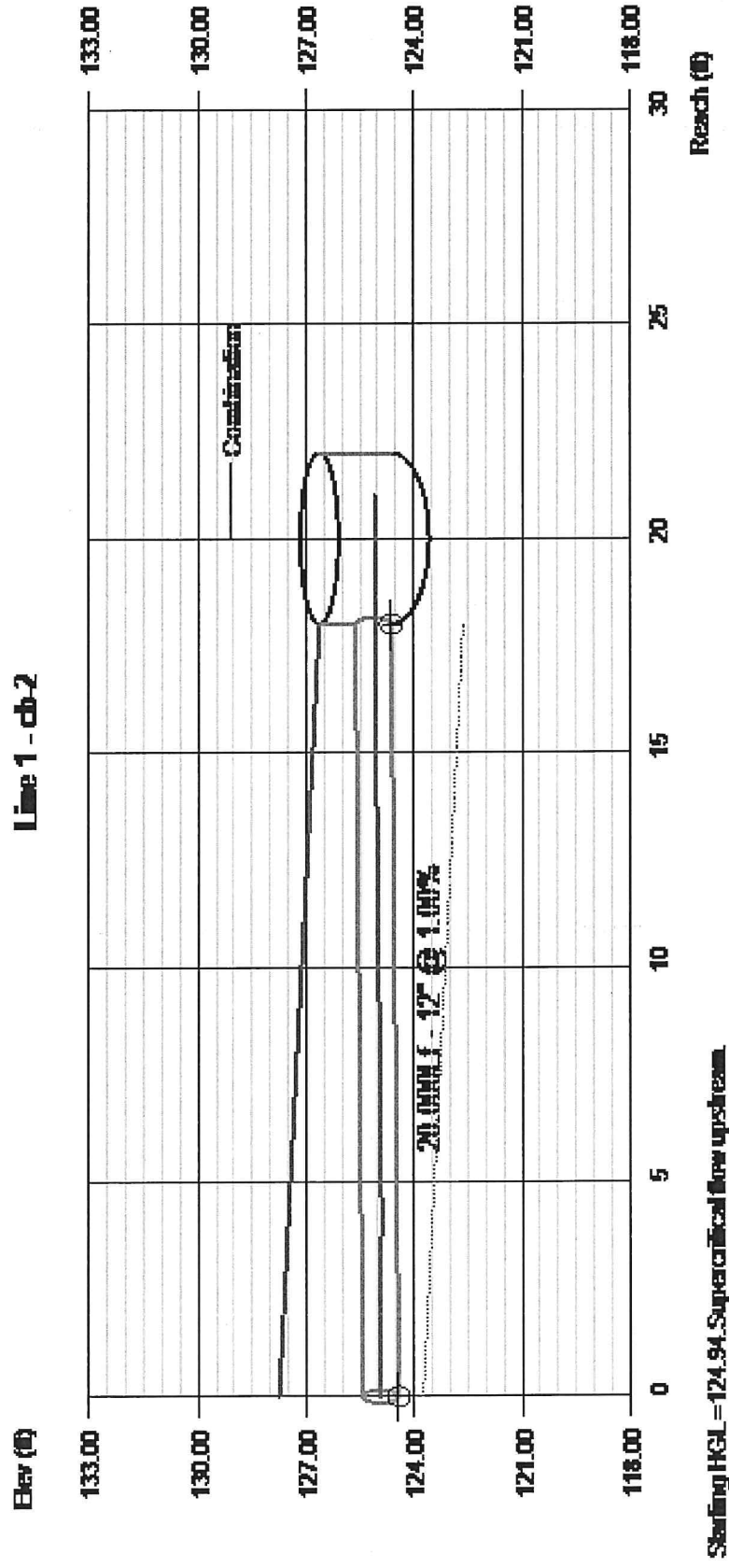


Storm Sewer Tabulation

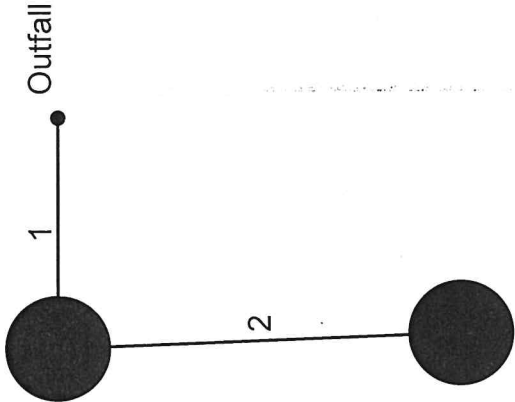
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID				
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)					
1	End	20.000	0.21	0.21	0.90	0.19	0.19	10.0	10.0	6.4	1.21	3.56	3.20	12	1.00	124.43	124.63	124.94	125.09	127.75	126.63	cb-2				
cb-2 to basin																							Number of lines: 1		Run Date: 10/26/2020	
NOTES: Intensity = 125.35 / (Inlet time + 15.90) ^ 0.91 ; Return period = Yrs. 25 ; c = cir e = ellip b = box																										

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)	
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)			
1	12	1.21	124.43	124.94	0.51	0.36	3.01	0.18	125.12	0.000	20.000	124.63	125.09 j	0.46**	0.36	3.40	0.18	125.27	0.000	0.000	n/a	1.00	0.18	
cb-2 to basin													Number of lines: 1										Run Date: 10/26/2020	
Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box																								



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: CB-3 to det Basin.stm

Number of lines: 2

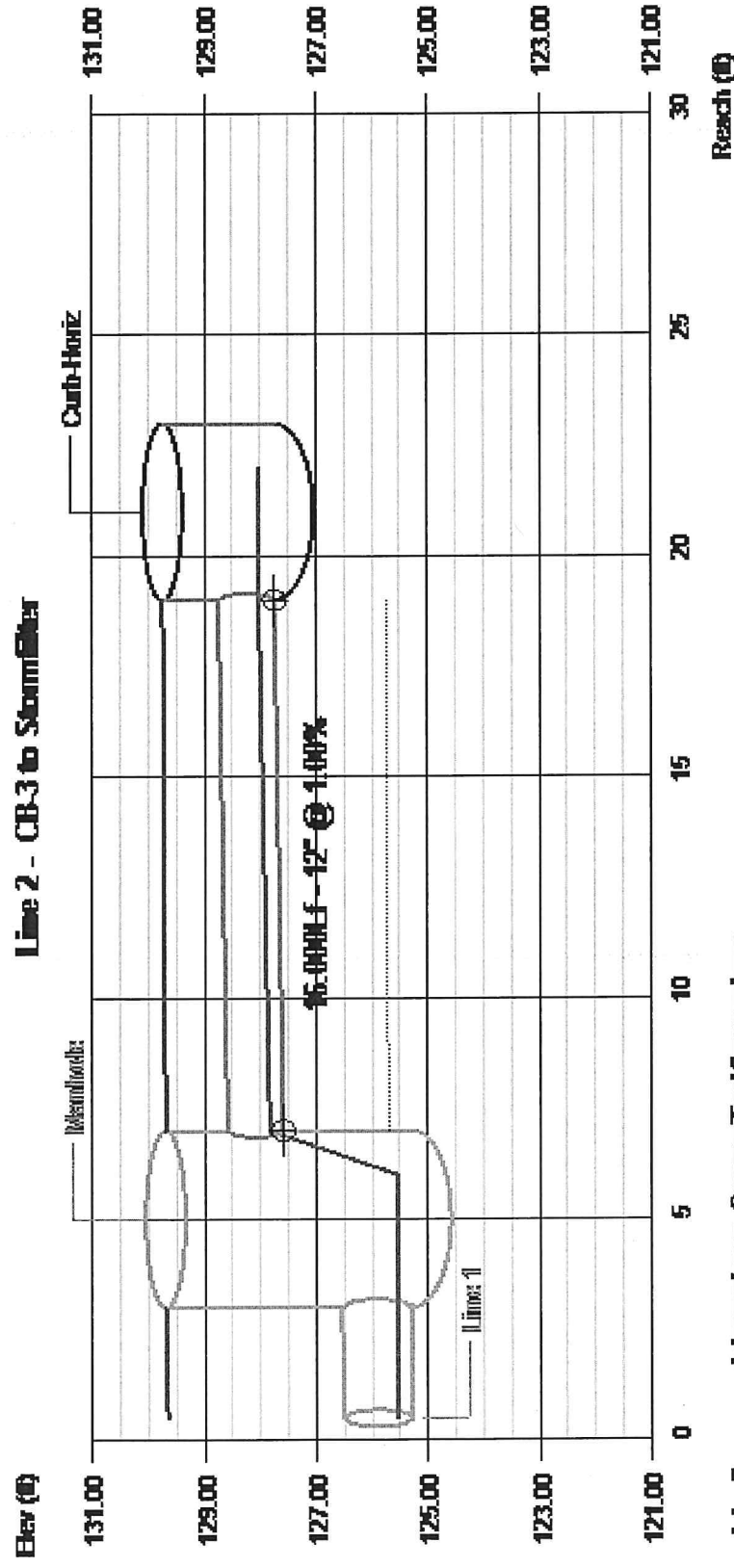
Date: 10/26/2020

Storm Sewer Tabulation

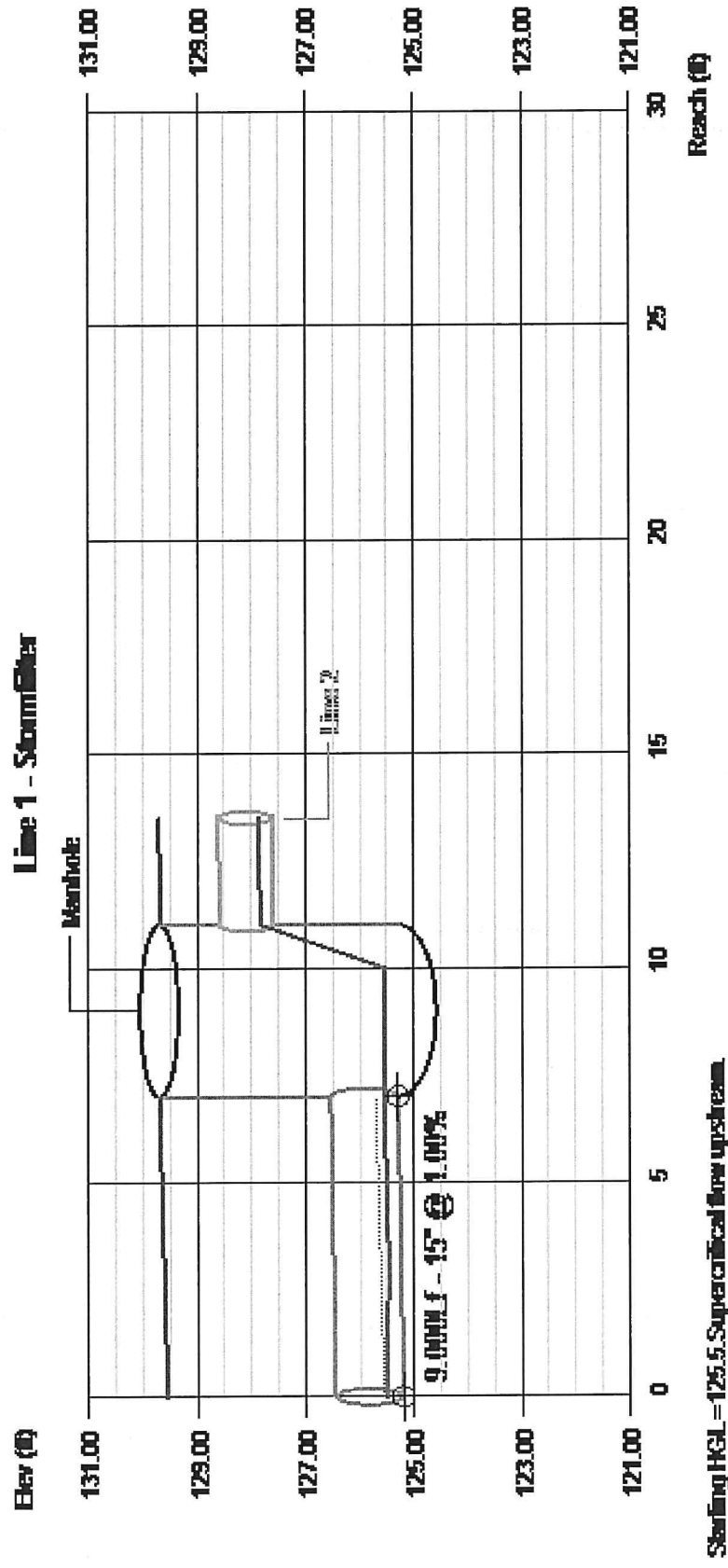
Station Line	To Line	Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
			Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	9.000	0.00	0.08	0.00	0.00	0.07	10.0	10.5	6.3	0.45	6.46	2.22	15	1.00	125.20	125.29	125.50	125.55	129.55	129.70	3-1
2	1	16.000	0.08	0.08	0.90	0.07	0.07	10.0	10.0	6.4	0.46	3.56	2.84	12	1.00	127.59	127.75	127.83	128.03	129.70	129.75	3-2
Project File: CB-3 to det Basin.stm																					Run Date: 10/26/2020	
NOTES: Intensity = 125.35 / (Inlet time + 15.90) ^ 0.91 ; Return period = Yrs. 25 ; c = cir e = ellip b = box																					Number of lines: 2	
Storm Sewers v2019.20																						

Hydraulic Grade Line Computations

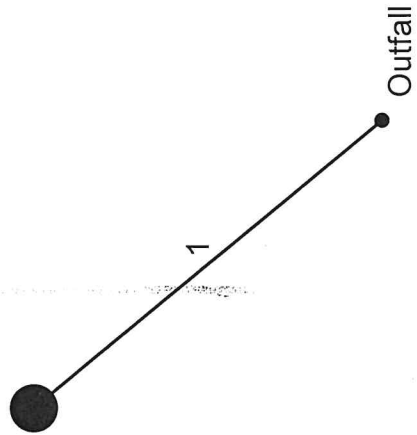
Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)	
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)			
1	15	0.45	125.20	125.50	0.30	0.19	2.01	0.09	125.59	0.000	9.000	125.29	125.55 j	0.26**	0.19	2.43	0.09	125.64	0.000	0.000	n/a	1.00	n/a	
2	12	0.46	127.59	127.83	0.24*	0.15	3.12	0.10	127.93	0.000	16.000	127.75	128.03	0.28**	0.18	2.55	0.10	128.13	0.000	0.000	n/a	1.00	n/a	
Project File: CB-3 to det Basin.stm											Number of lines: 2								Run Date: 10/26/2020					
Notes: * Normal depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box																								



Normal depth assumed downstream. Supercritical flow upstream.



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



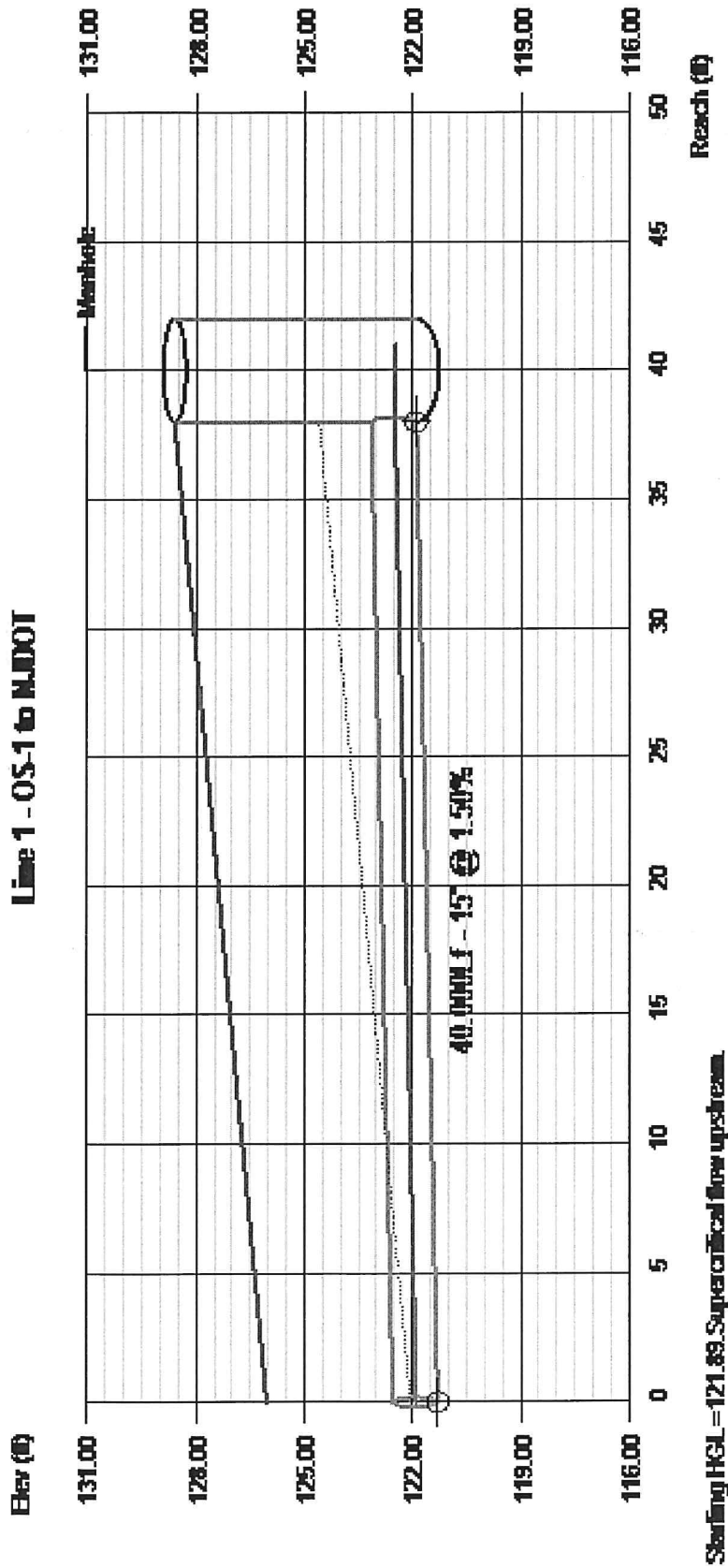
Project File: New.stm	Number of lines: 1	Date: 10/26/2020
-----------------------	--------------------	------------------

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	40.000	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	2.20	7.91	3.85	15	1.50	121.30	121.90	121.89	122.49	126.05	128.60	OS-1 to NJDOT
Project File: New.stm														Number of lines: 1		Run Date: 10/26/2020						
NOTES: Intensity = 125.35 / (Inlet time + 15.90) ^ 0.91 ; Return period = Yrs. 25 ; c = cir e = ellip b = box																						

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)	
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)			
1	15	2.20	121.30	121.89	0.59	0.57	3.85	0.23	122.12	0.000	40.000	121.90	122.49	0.59**	0.57	3.85	0.23	122.72	0.000	0.000	n/a	1.00	n/a	
Project File: New.stm			Number of lines: 1										Run Date: 10/26/2020											
Notes: ; ** Critical depth. ; c = cir e = ellip b = box																								



APPENDIX G

STORMFILTER SIZING CALCULATIONS STORMFILTER BY CONTECH STANDARD DETAIL



Ferriero
Engineering, Inc.

95-B ROUTE 24
PO BOX 571
CHESTER, NJ 07930
908-879-6209

PROJECT: 14046
BY: AMH DATE: 10-22-2020
CHKD: DATE:

STORM FILTER SIZING CALCULATIONS

$$T_c = 10 \text{ min.}$$

$$Q_{\text{peak}} = 0.25 \text{ cfs}$$

$$I = 3.2$$

$$C = .99$$

$$A = 0.08 \text{ ac}$$

$$.99 \times 3.2 \times .08 = 0.25 \times 448.83 = 114 \text{ gpm}$$

(MTFR) 114 gpm

$$12" \text{ CARTRIDGE} = 10 \text{ gpm}$$

$$18" \text{ CARTRIDGE} = 15 \text{ gpm}$$

$$27" \text{ CARTRIDGE} = 22.5 \text{ gpm}$$

$$18" \text{ CARTRIDGE} = 114 / 15 \rightarrow 8 \text{ CARTRIDGES REQUIRED}$$

NOTE:

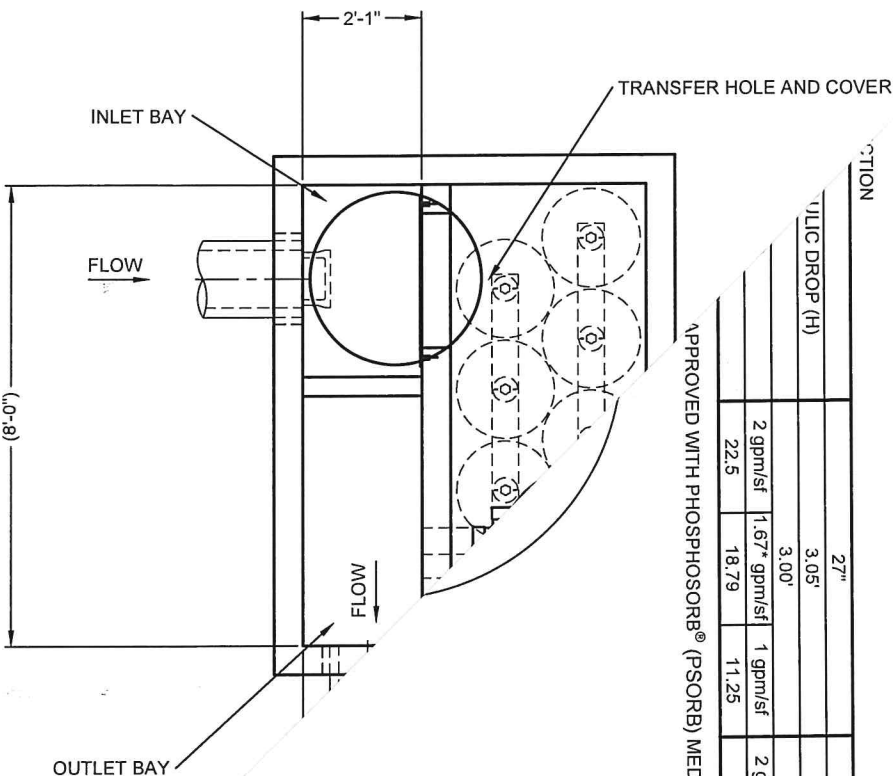
INCREASE IN IMPERVIOUS COVER = 2,213 SF OR 0.05 AC.

STORMFILTER DESIGN NOTES

THE 8' x 6' PEAK DIVERSION STORMFILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.
PEAK DIVERSION STORMFILTER IS AVAILABLE IN A LEFT INLET (AS SHOWN) OR RIGHT INLET CONFIGURATION.
DETAILS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.

ACTION		27"		18"		LOW DROP	
TULIC DROP (H)		3.05'		2.3'		1.8'	
		3.00'		2.25'		1.75'	
		2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
		22.5	18.79	11.25	15	12.53	7.5

APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



SITE SPECIFIC DATA REQUIREMENTS				
STRUCTURE ID				*
WATER QUALITY FLOW RATE (cfs)				*
PEAK FLOW RATE (cfs)				*
RETURN PERIOD OF PEAK FLOW (yrs)				*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))				*
NUMBER OF CARTRIDGES REQUIRED				*
CARTRIDGE FLOW RATE				*
MEDIA TYPE (PERLITE, ZPG, PSORB)				*
PIPE DATA:				
INLET PIPE	I.E.	MATERIAL		DIAMETER
OUTLET PIPE	*	*		*
UPSTREAM RIM ELEVATION				
DOWNSTREAM RIM ELEVATION				
ANTI-FLOTATION BALLAST				
		WIDTH		HEIGHT
		*		*

NOTES/SPECIAL REQUIREMENTS:

ENGINEER OF RECORD

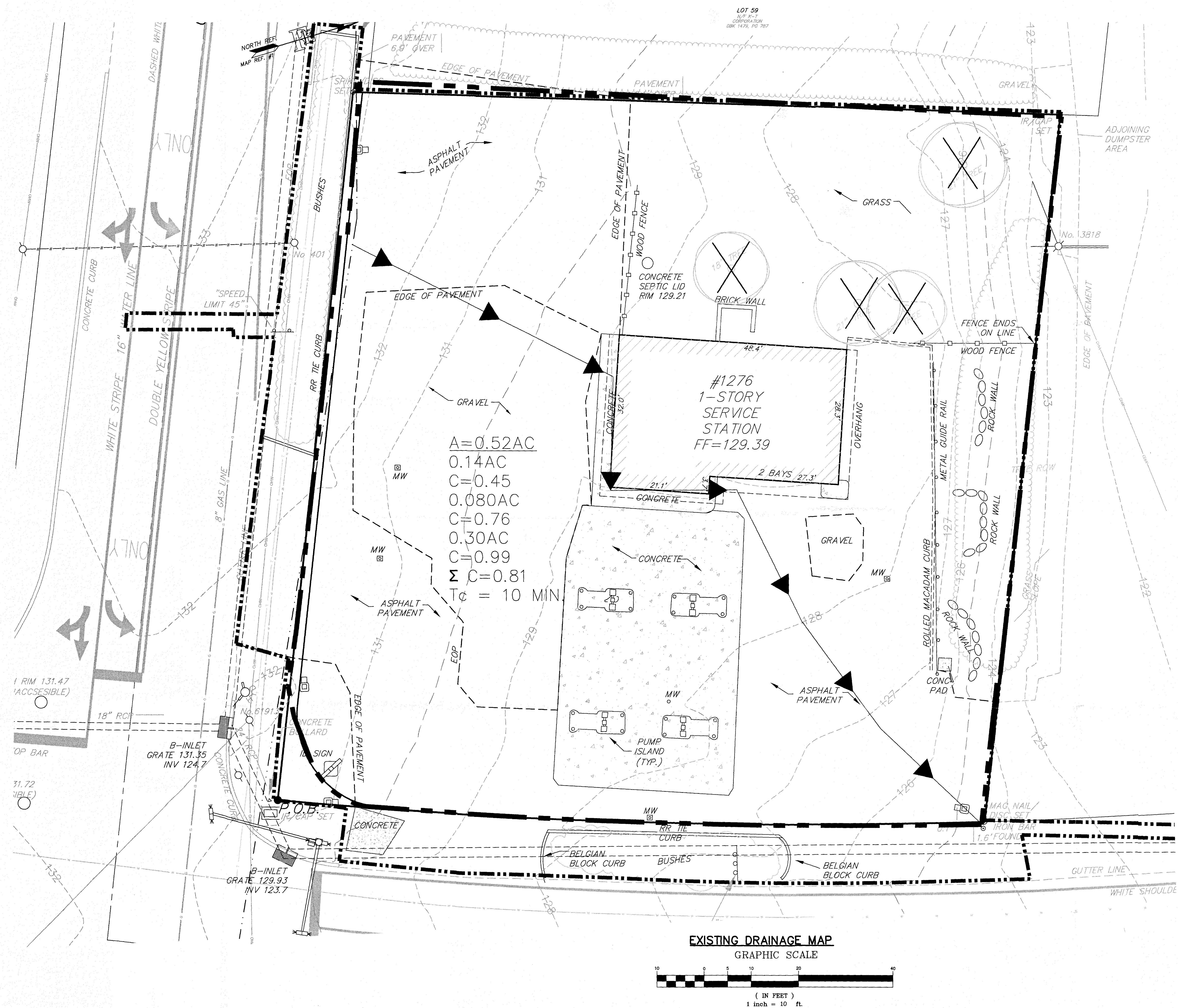
FINISHING, RADIAL MEDIA

CONCRETE DIVIDED BY THE

IN

TO IN

APPENDIX H
DRAINAGE AREA MAPS



DATE:	10/16/2020	PROJECT NO:
REVISION:		141046

Copyright © 2021, by Ferriero Engineering, Inc. All rights reserved. No part of these drawings may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Ferriero Engineering, Inc.

