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CANAAN LAND CHURCH

2777 GANTZ ROAD

COLUMBUS, OHIO

RECEIVED

MAR 28 2016

GC PLANNING COMMISSION

PRELIMINARY

SITE STORMWATER MANAGEMENT

28 JANUARY, 2016



[Handwritten Signature]
28 January 2016

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PROJECT DESCRIPTION

CANAAN LAND CHURCH NEW CHURCH BUILDING AND PAVED PARKING

The current site is a developed property containing a church with multiple buildings and paved parking to their north and east. The property is located on the north side of the intersection of Gantz Road and Home Road in Grove City, Ohio, Franklin County. The site contains one parcel of land (PID: 040-007355-00) totaling 6.600 acres of which 1.974 acres is currently impervious area. The 3 building structures located on the site are located along the western property line and in the center of the site with asphalt parking to the north and east of the site. The proposed redevelopment requires the demolition of the asphalt pavement to the northwest of the central building for proposed building to be built on. Paved parking will also be added to the site to the north of the proposed new building. The access point to the site will remain the same with the paved full access drive located along Gantz Road. All stormwater on the NE half of the site will drain to a proposed dry detention pond located on the eastern corner of the site. The pond will drain via a 15" HDPE pipe to a proposed headwall feeding into the ditchline east of the drive culvert. Stormwater water quality will be accomplished using the EPA 48-hr draw down time being released from the pond through the use of a 2' x 2' catchbasin and 10" riser. All storage for the stormwater is accomplished within the pond on the site.

PROJECT SUMMARY

PROJECT NAME: Canaan Land Church

LOCATION: 2777 Gantz Road
Grove City, Oh 43123

PROJECT DESCRIPTION: The redevelopment of an area of paved parking into a new building and the construction of additional paved parking.

EXISTING USE: Church with paved parking and auxiliary facilities

PROPOSED USE: Church Building and Parking

AREA: 4.7387 Acres
Impervious: 2.8250 Acres (59.6%)
Pervious: 1.9137 Acres (40.4%)

DETENTION TYPE: Dry Detention Basin

CRITICAL STORM EVENT: Critical Storm Event (5-year Storm) controlled to the pre-developed 1-year peak discharge and 100-year post-developed storm event controlled to the 10-year pre-developed peak discharge rate.

EPA-WATER QUALITY: EPA 48 Hour Draw Down time based on WQ Volume

STORMWATER MANAGEMENT SUMMARY TABLE
WATER QUANTITY

	1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Pre-developed Q (cfs)	4.759	6.825	9.448	11.54	14.77	17.64	20.67
Post-developed Q (cfs)	6.824	9.380	12.56	15.06	18.89	22.26	25.81
Allowable Release (cfs)	4.759	4.759	4.759	11.54	11.54	11.54	11.54
Actual Release (cfs)	0.225	0.338	0.504	0.895	3.769	6.230	6.915
Ponding Elevation (ft)	774.05	774.36	774.75	775.02	775.20	775.40	775.68
Storage Volume (CF)	12,392	15,215	18,079	20,120	23,156	25,894	28,874

STORMWATER QUALITY SUMMARY TABLE:

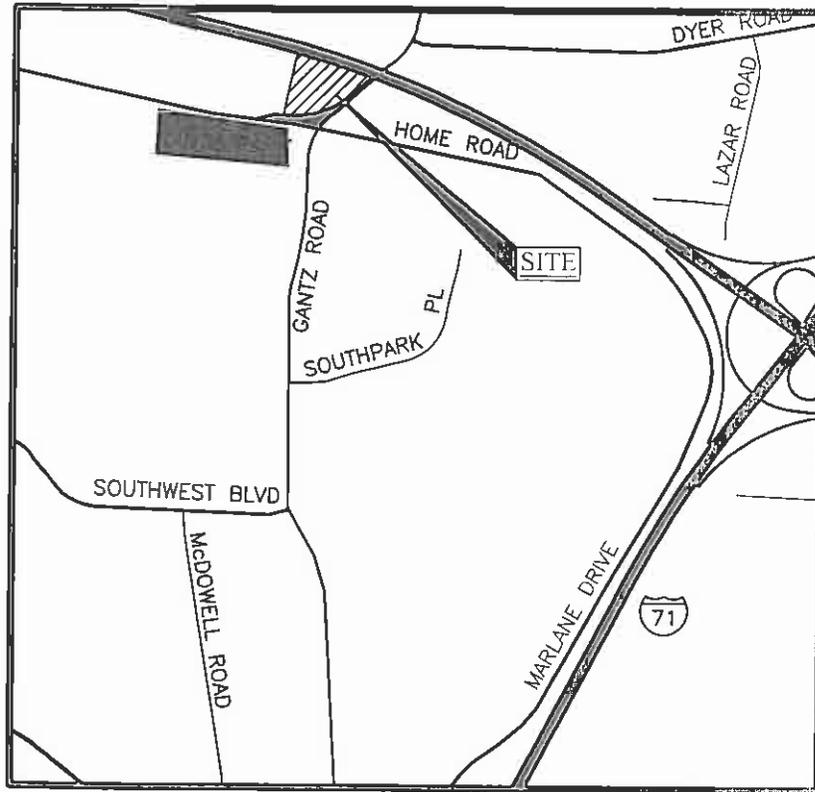
Post Developed Q Peak Inflow

T%= 100

Q_p= 2.2747 CFS

**SITE LOCATION
&
IMPERVIOUS AREA**

(SECTION A)



SITE LOCATION MAP

NOT TO SCALE

CLIENT LOGO

DEVELOPER/CLIENT

STONE ENVIRONMENTAL
748 GREEN CREST DR
WESTERVILLE, OH 43081
(614) 865-1874

PROJECT NAME AND ADDRESS

CANAAN LAND CHURCH
2777 GANTZ ROAD
GROVE CITY, OH 43123

CONSULTANT



DATE

REVISIONS

DRAWN BY: AEL

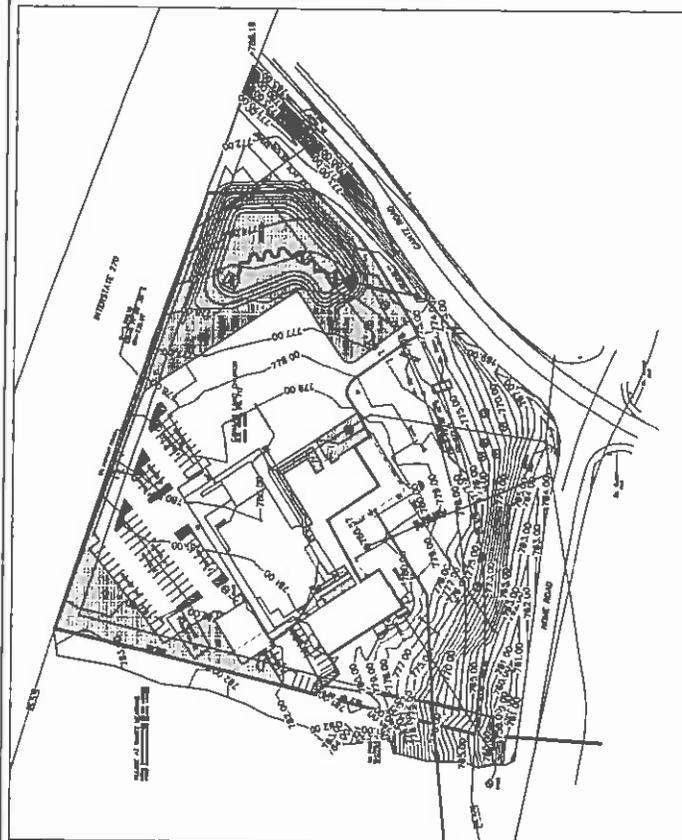
CHECKED BY: SB

DATE: 22 JANUARY, 2016

SCALE: 1" TO 40'

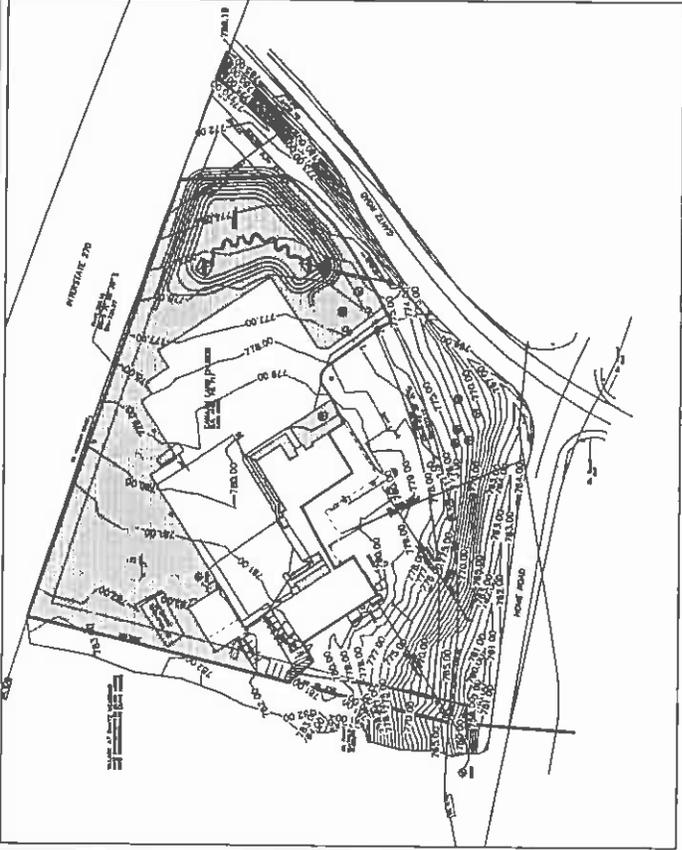
DATE PLOTTED: SITE EXHIBIT

SHEET NO.:



POST DEVELOPMENT

PRE DEVELOPMENT SITE DATA TABLE	
TOTAL SITE AREA:	6,600 AC.
TOTAL DRAINAGE AREA:	4,738.7 AC.
TOTAL DISTURBED AREA:	4,738.7 AC.
POST-DEVELOPED IMPERVIOUS AREA:	2,825.0 AC. (59.6%)
POST-DEVELOPED PERVIOUS AREA:	1,913.7 AC. (40.4%)



PRE DEVELOPMENT

PRE DEVELOPMENT SITE DATA TABLE	
TOTAL SITE AREA:	6,600 AC.
TOTAL DRAINAGE AREA:	4,738.7 AC.
TOTAL DISTURBED AREA:	4,738.7 AC.
PRE-DEVELOPED IMPERVIOUS AREA:	1,974.2 AC. (41.7%)
PRE-DEVELOPED PERVIOUS AREA:	2,764.5 AC. (58.3%)

**PRE & POST
CURVE NUMBER
WORKSHEETS / NRCS
SOIL REPORT

(SECTION B)**

TR 55 Worksheet 2: Runoff Curve Number and Runoff

Project: Canaan Land Church Designed By: JB Date: 1/20/14

Location: Gantz & Home Road Checked: MC Date: 1/20/14

Check one: Present Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (Appendix A)	Cover description (Cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
CrA, CeB, Ut Hyd. Grp. - D <input checked="" type="checkbox"/>	Open Space - Good Condition	80			2.7	217.2
CrA, CeB, Ut Hyd. Grp. - D <input checked="" type="checkbox"/>	Impervious Area - Bldg, Roof, Pavement, Etc...	98			1.8	177.6
CeC2 Hyd. Grp. - C <input checked="" type="checkbox"/>	Open Space - Good Condition	74			0.0	3.7
CeC2 Hyd. Grp. - C <input checked="" type="checkbox"/>	Impervious Area - Bldg, Roof, Pavement, Etc...	98			0.2	16.0
Totals =					4.7	414.4

^{1/} Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{414.4}{4.7} = 87$ Use CN = 87

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency years	2	10	25
Rainfall, P (24 hour) in.	2.7	3.9	4.6
Runoff, Q in.	1.5	2.5	3.3

(Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4.)

TR 55 Worksheet 2: Runoff Curve Number and Runoff

Project: Canaan Land Church Designed By: JB Date: 1/20/14

Location: Gantz and Home Road Checked: MC Date: 1/20/14

Check one: Present Developed

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		Table 2-2	Fig. 2-3	Fig. 2-4		
CrA, CeB, Ut Hyd. Grp. - D <input checked="" type="checkbox"/>	Open Space - Good Condition	80			1.8	147.4
CrA, CeB, Ut Hyd. Grp. - D <input checked="" type="checkbox"/>	Impervious Area - Bldg, Roof, Pavement, Etc...	98			2.6	250.2
CeC2 Hyd. Grp. - C <input checked="" type="checkbox"/>	Open Space - Good Condition	74			0.1	7.3
CeC2 Hyd. Grp. - C <input checked="" type="checkbox"/>	Impervious Area - Bldg, Roof, Pavement, Etc...	98			0.2	16.0
Totals =					4.7	420.9

^{1/} Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{420.9}{4.7} = 90$ Use CN = 90

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency years	2	10	25
Rainfall, P (24 hour) in.	2.7	3.9	4.8
Runoff, Q in.	1.7	2.8	3.8

(Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4.)



United States
Department of
Agriculture

NRCS

Natural
Resources
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A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Franklin County, Ohio

Canaan Church



December 24, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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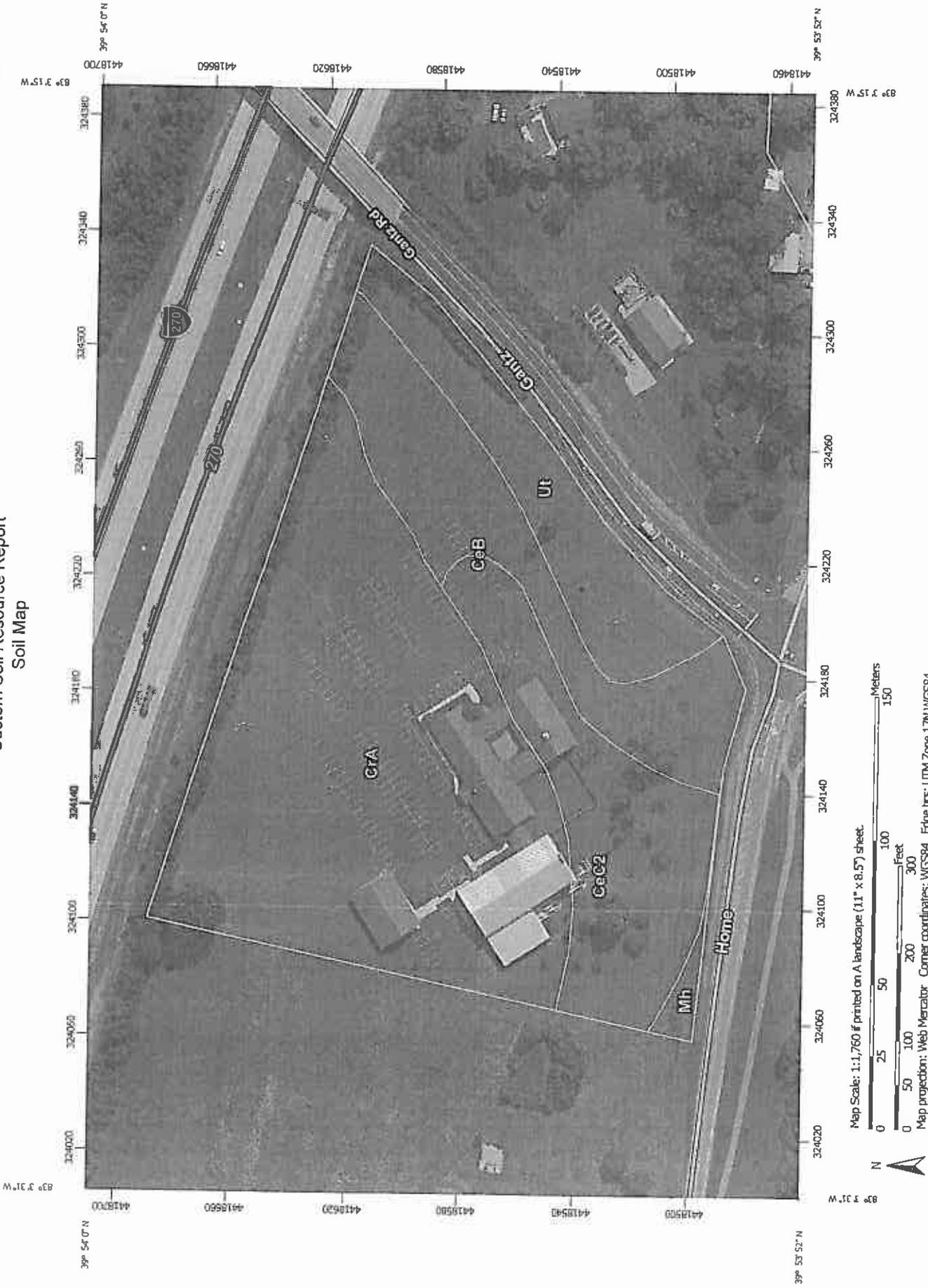
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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,760 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tris: UTM Zone 17N WGS84

MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Soils		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	Special Point Features		Special Line Features
	Blowout		
	Borrow Pit		Water Features
	Clay Spot		Streams and Canals
	Closed Depression		Transportation
	Gravel Pit		Rails
	Gravelly Spot		Interstate Highways
	Landfill		US Routes
	Lava Flow		Major Roads
	Marsh or swamp		Local Roads
	Mine or Quarry		Background
	Miscellaneous Water		Aerial Photography
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Franklin County, Ohio
 Survey Area Data: Version 13, Sep 26, 2015

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

Date(s) aerial images were photographed: Aug 4, 2014—Aug 27, 2014

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.

Map Unit Legend

Franklin County, Ohio (OH049)			
Map Unit Symbol	Map Unit Name	Acres In AOI	Percent of AOI
CeB	Celina silt loam, 2 to 6 percent slopes	1.4	16.8%
CeC2	Celina silt loam, 6 to 12 percent slopes, eroded	1.5	17.5%
CrA	Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	4.4	52.4%
Mh	Medway silt loam, occasionally flooded	0.1	1.0%
U1	Udorthents-Urban land complex, gently rolling	1.0	12.2%
Totals for Area of Interest		8.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Franklin County, Ohio

CeB—Celina silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2rwj9
Elevation: 820 to 1,180 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Celina and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Celina

Setting

Landform: Till plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess derived from quartzite over loamy till derived from limestone and dolomite

Typical profile

Ap - 0 to 9 inches: silt loam
2Bt - 9 to 38 inches: clay loam
2Cd - 38 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 24 to 40 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 45 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: CID

Minor Components

Kokomo

Percent of map unit: 5 percent

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Landform: Depressions on till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Crosby

Percent of map unit: 5 percent
Landform: Till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear

Brookston

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

CeC2—Celina silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5mpp
Elevation: 860 to 1,100 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 151 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Celina and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Celina

Setting

Landform: Moraines, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 25 inches: silty clay loam
H3 - 25 to 70 inches: loam

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Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 45 percent
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Unnamed (G111AYA-6OH)

Minor Components

Crosby

Percent of map unit: 10 percent
Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Convex

Kokomo

Percent of map unit: 5 percent
Landform: Drainageways

Lewisburg

Percent of map unit: 5 percent
Landform: Till plains

CrA—Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2thy7
Elevation: 520 to 1,550 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Crosby and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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Description of Crosby

Setting

Landform: Ground moraines, recessional moraines, water-lain moraines

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Silty material or loess over loamy till

Typical profile

Ap - 0 to 8 inches: silt loam

BE - 8 to 11 inches: silt loam

Bt1 - 11 to 14 inches: silt loam

2Bt2 - 14 to 28 inches: silty clay loam

2BCt - 28 to 36 inches: loam

2Cd - 36 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 24 to 40 inches to densic material

Natural drainage class: Somewhat poorly drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high
(0.01 to 0.20 in/hr)

Depth to water table: About 6 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 50 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D

Minor Components

Kokomo, drained

Percent of map unit: 5 percent

Landform: Depressions, swales, water-lain moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope, dip

Down-slope shape: Linear

Across-slope shape: Concave

Celina, eroded

Percent of map unit: 4 percent

Landform: Ground moraines, recessional moraines, water-lain moraines

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope,
rise

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

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Miamian, eroded

Percent of map unit: 1 percent

Landform: Ground moraines, recessional moraines, water-lain moraines

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Crest, head slope, nose slope, side slope, rise

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Mh—Medway silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: 5mqj

Elevation: 900 to 1,100 feet

Mean annual precipitation: 27 to 45 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Medway and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Medway

Setting

Landform: Flood plains

Parent material: Fine-loamy alluvium

Typical profile

H1 - 0 to 15 inches: silt loam

H2 - 15 to 30 inches: loam

H3 - 30 to 70 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent

Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Minor Components

Sloan

Percent of map unit: 5 percent

Landform: Depressions

Warsaw

Percent of map unit: 5 percent

Landform: Kames, outwash plains, terraces, valley trains

Wea

Percent of map unit: 5 percent

Landform: Kames, outwash plains, outwash terraces, stream terraces

Ut—Udorthents-Urban land complex, gently rolling

Map Unit Setting

National map unit symbol: 5mrj

Mean annual precipitation: 35 to 45 inches

Mean annual air temperature: 50 to 55 degrees F

Frost-free period: 160 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent

Urban land: 40 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Properties and qualities

Slope: 2 to 12 percent

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Areas similar to adjacent soils

Percent of map unit: 5 percent

Slopes of 12 to 55 percent

Percent of map unit: 5 percent

Custom Soil Resource Report

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**CRITICAL
STORM
CALCULATION

(SECTION C)**

CRITICAL STORM CALCULATION

Canaan Church

Runoff Volumes for the 1 year Pre- and Post-Development Storms were obtained from the 1 year hydrograph volumes calculated by Hydraflow Storm Routing.

1 year Pre-Developed Runoff = 17,616 CF

1 year Post-Developed Runoff = 21,334 CF

% Runoff Increase

$$\frac{(21,334 \text{ CF} - 17,616 \text{ CF})}{17,616 \text{ CF}} \times 100 = 21.10\% \text{ Increase in Runoff Volume}$$

Therefore, the Critical Storm is the 5 year event.

**HYDRAFLOW
STORM ROUTING
OUTPUT**

(SECTION D)

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Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3



Legend

Hyd. Origin	Description
1 SCS Runoff	Present Conditions
2 SCS Runoff	Post Construction
3 Reservoir	Actual Release

Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	—	4.759	6.825	—	9.448	11.54	14.77	17.64	20.67	Present Conditions
2	SCS Runoff	—	6.824	9.380	—	12.56	15.06	18.89	22.26	25.81	Post Construction
3	Reservoir	2	0.225	0.338	—	0.504	0.895	3.770	6.231	6.915	Actual Release

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.759	2	728	17,616	—	—	—	Present Conditions
2	SCS Runoff	6.824	2	724	21,334	—	—	—	Post Construction
3	Reservoir	0.225	2	950	19,672	2	774.05	14,378	Actual Release
Storm Route_Canaan Church_Gantz & Home_Route 101 - 1 Year								Monday, 01 / 25 / 2016	

Hydrograph Report

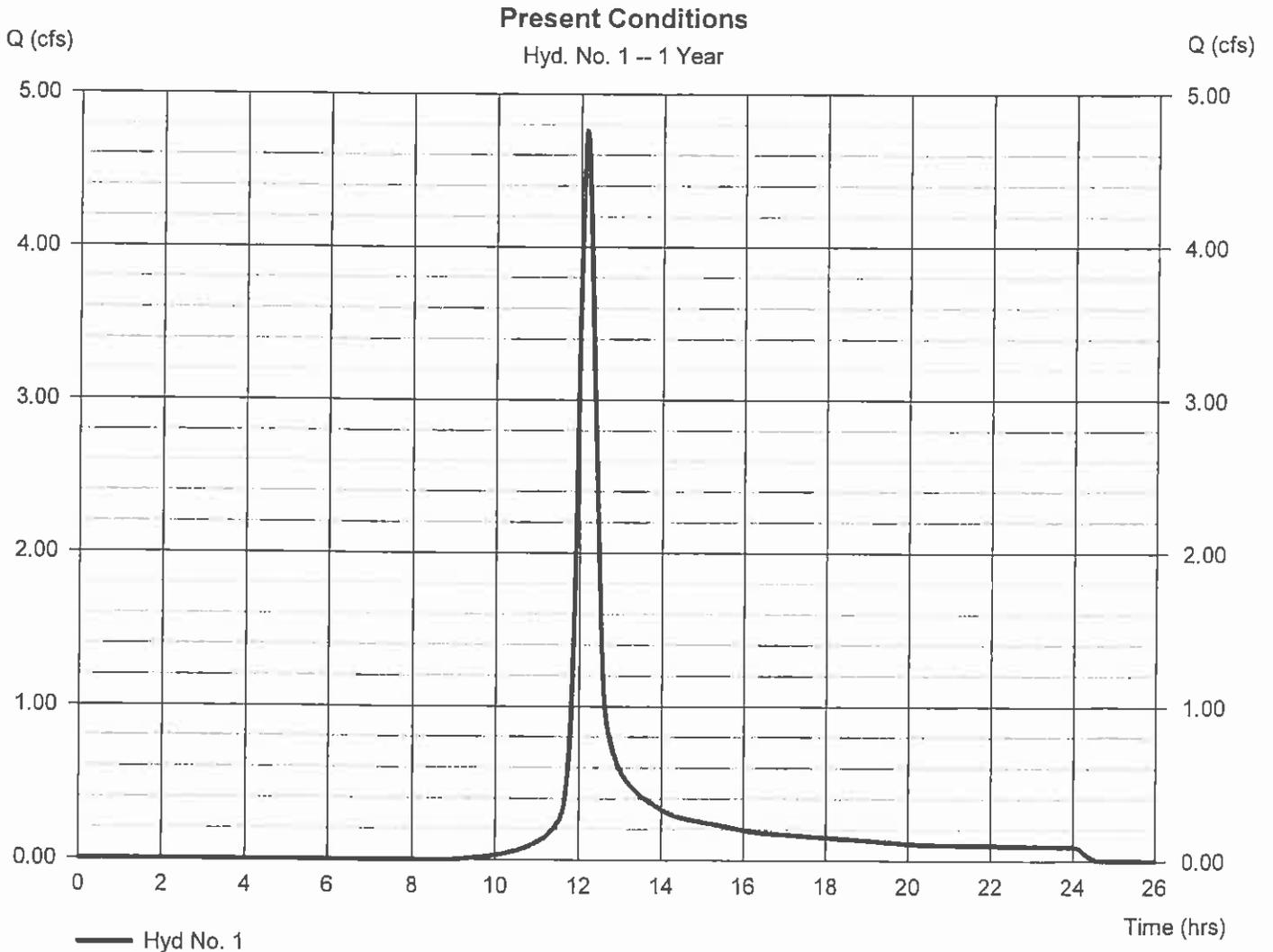
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 4.759 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 17,616 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 2.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hyd. No. 1

Present Conditions

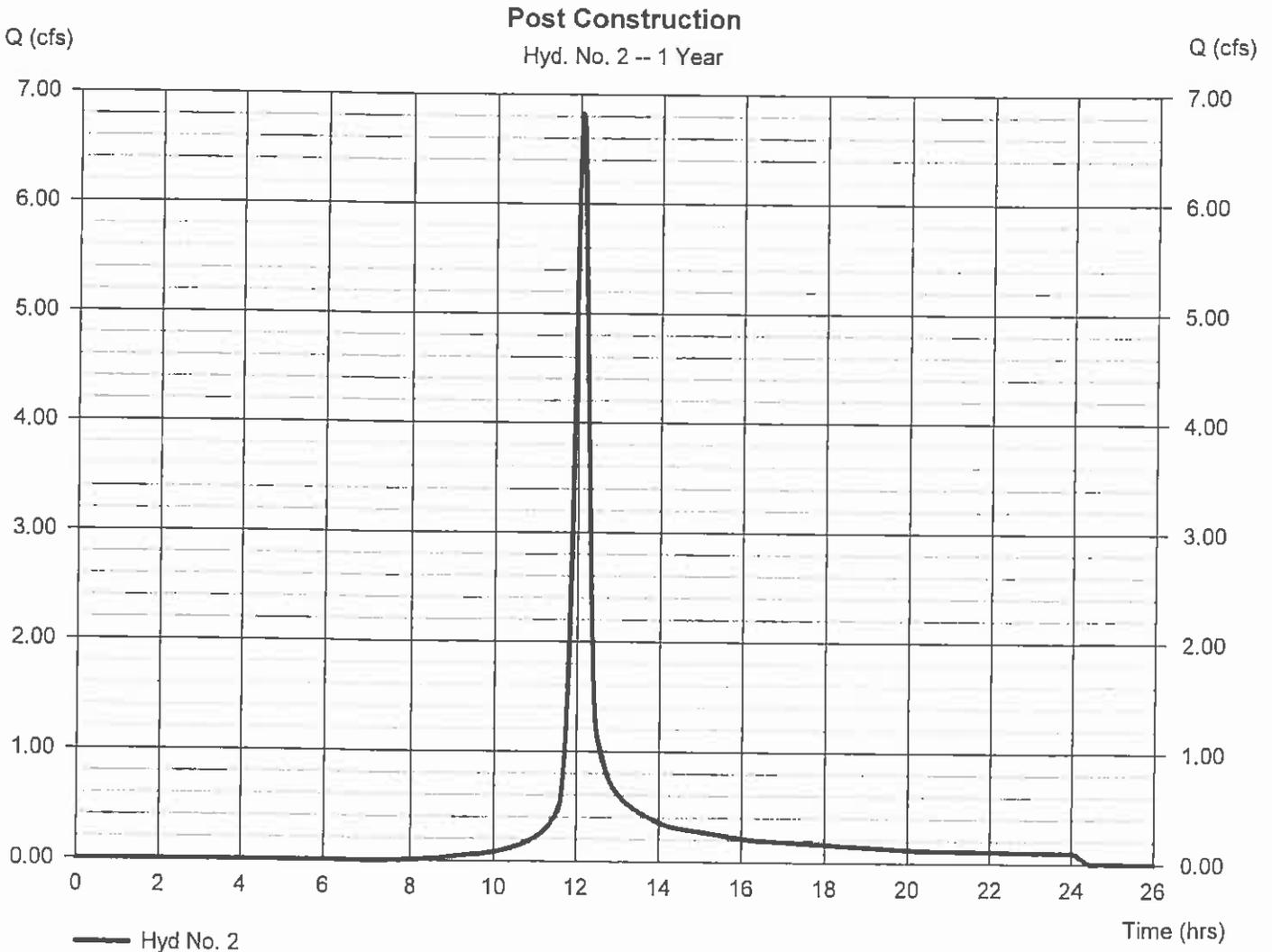
<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 166.4	300.0	0.0	
Two-year 24-hr precip. (in)	= 2.70	2.70	0.00	
Land slope (%)	= 1.30	1.30	0.00	
Travel Time (min)	= 19.04	+ 3.77	+ 0.00	= 22.82
Shallow Concentrated Flow				
Flow length (ft)	= 145.37	0.00	0.00	
Watercourse slope (%)	= 1.70	0.00	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	=2.10	0.00	0.00	
Travel Time (min)	= 1.15	+ 0.00	+ 0.00	= 1.15
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	{{0}}0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				24.00 min

Hydrograph Report

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 6.824 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 21,334 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 2.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 2

Post Construction

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.2	300.0	135.1	
Two-year 24-hr precip. (in)	= 2.70	2.70	2.70	
Land slope (%)	= 1.30	1.30	1.30	
Travel Time (min)	= 12.69	+ 3.77	+ 1.99	= 18.46
Shallow Concentrated Flow				
Flow length (ft)	= 54.28	0.00	0.00	
Watercourse slope (%)	= 1.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.61	0.00	0.00	
Travel Time (min)	= 0.56	+ 0.00	+ 0.00	= 0.56
Channel Flow				
X sectional flow area (sqft)	= 0.79	0.00	0.00	
Wetted perimeter (ft)	= 3.14	0.00	0.00	
Channel slope (%)	= 0.40	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=2.48	0.00	0.00	
Flow length (ft)	{{0}}137.0	0.0	0.0	
Travel Time (min)	= 0.92	+ 0.00	+ 0.00	= 0.92
Total Travel Time, Tc				19.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

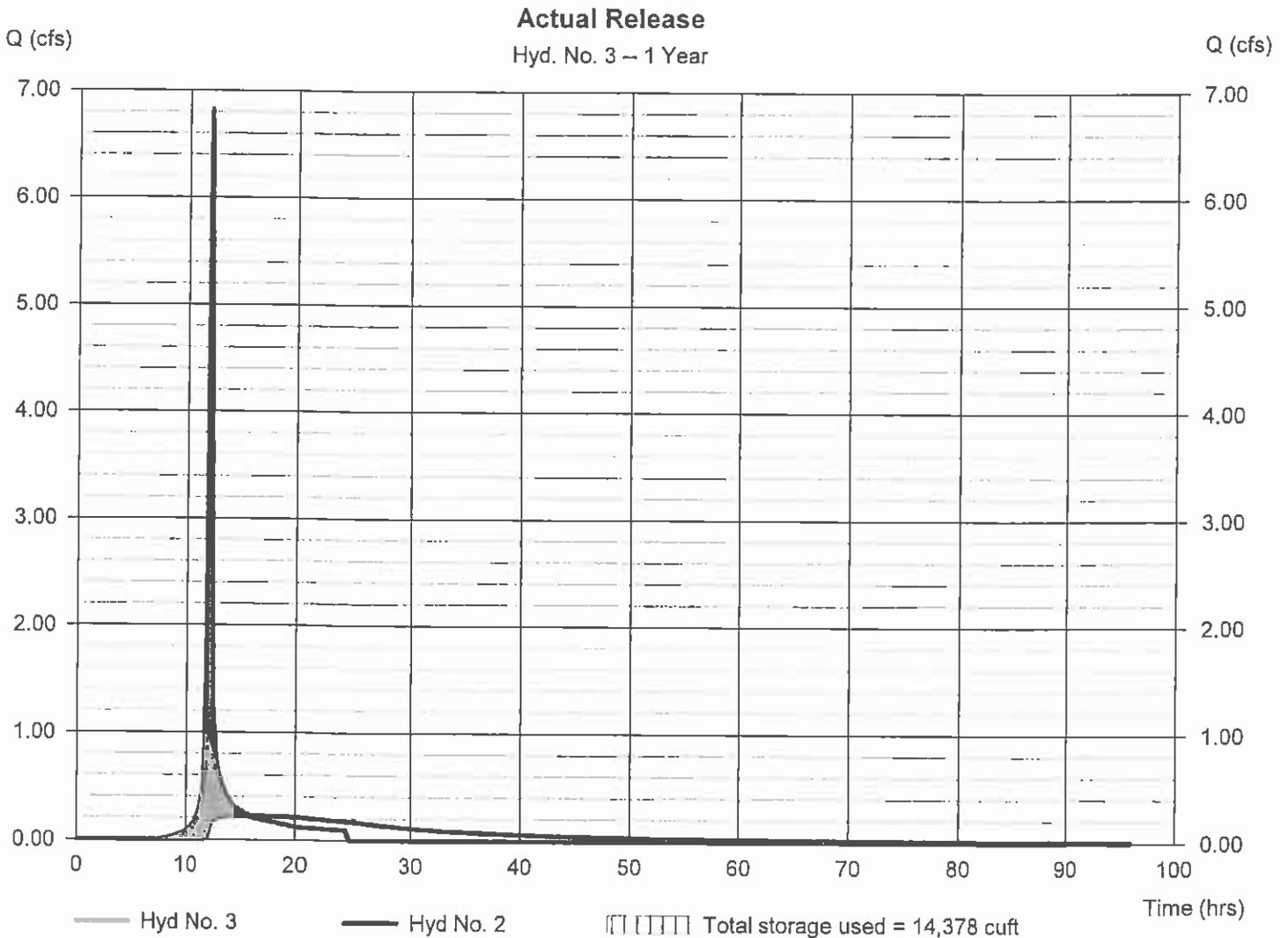
Monday, 01 / 25 / 2016

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 0.225 cfs
Storm frequency	= 1 yrs	Time to peak	= 15.83 hrs
Time interval	= 2 min	Hyd. volume	= 19,672 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 774.05 ft
Reservoir name	= <New Pond>	Max. Storage	= 14,378 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - <New Pond>

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begning Elevation = 773.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	773.00	12,106	0	0
1.00	774.00	15,147	13,597	13,597
2.00	775.00	18,821	16,949	30,546
3.00	776.00	22,387	20,576	51,122

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rlse (In)	= 15.00	Inactive	0.00	1.13
Span (In)	= 15.00	4.00	0.00	1.13
No. Barrels	= 1	1	0	20
Invert El. (ft)	= 773.00	773.00	0.00	773.00
Length (ft)	= 90.00	1.00	0.00	1.50
Slope (%)	= 0.40	0.40	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	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	Inactive	0.00	0.00
Crest El. (ft)	= 775.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Recl	Recl	—	—
Multi-Stage	= Yes	No	No	No
Exfil.(In/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir users 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	773.00	0.00	0.00	—	0.00	0.00	—	—	—	—	—	0.000
0.10	1,360	773.10	0.01 oc	0.00	—	0.01	0.00	—	—	—	—	—	0.005
0.20	2,719	773.20	0.02 ic	0.00	—	0.02	0.00	—	—	—	—	—	0.016
0.30	4,079	773.30	0.03 ic	0.00	—	0.03	0.00	—	—	—	—	—	0.031
0.40	5,439	773.40	0.05 ic	0.00	—	0.05	0.00	—	—	—	—	—	0.049
0.50	6,798	773.50	0.07 ic	0.00	—	0.07	0.00	—	—	—	—	—	0.070
0.60	8,158	773.60	0.10 ic	0.00	—	0.09	0.00	—	—	—	—	—	0.093
0.70	9,518	773.70	0.12 ic	0.00	—	0.12	0.00	—	—	—	—	—	0.119
0.80	10,877	773.80	0.15 ic	0.00	—	0.15	0.00	—	—	—	—	—	0.148
0.90	12,237	773.90	0.18 ic	0.00	—	0.18	0.00	—	—	—	—	—	0.177
1.00	13,597	774.00	0.21 ic	0.00	—	0.21	0.00	—	—	—	—	—	0.210
1.10	15,292	774.10	0.24 ic	0.00	—	0.24	0.00	—	—	—	—	—	0.243
1.20	16,987	774.20	0.28 ic	0.00	—	0.28	0.00	—	—	—	—	—	0.278
1.30	18,682	774.30	0.31 ic	0.00	—	0.31	0.00	—	—	—	—	—	0.315
1.40	20,376	774.40	0.35 ic	0.00	—	0.35	0.00	—	—	—	—	—	0.353
1.50	22,071	774.50	0.39 ic	0.00	—	0.39	0.00	—	—	—	—	—	0.394
1.60	23,766	774.60	0.44 ic	0.00	—	0.44	0.00	—	—	—	—	—	0.437
1.70	25,461	774.70	0.48 ic	0.00	—	0.48	0.00	—	—	—	—	—	0.481
1.80	27,156	774.80	0.53 ic	0.00	—	0.52	0.00	—	—	—	—	—	0.525
1.90	28,851	774.90	0.59 ic	0.00	—	0.57	0.00	—	—	—	—	—	0.570
2.00	30,546	775.00	0.62 ic	0.00	—	0.62	0.00	—	—	—	—	—	0.619
2.10	32,604	775.10	1.79 oc	0.00	—	0.50	1.26	—	—	—	—	—	1.766
2.20	34,661	775.20	3.78 oc	0.00	—	0.21	3.57	—	—	—	—	—	3.778
2.30	36,719	775.30	5.80 oc	0.00	—	0.02	5.78 s	—	—	—	—	—	5.799
2.40	38,776	775.40	6.23 oc	0.00	—	0.01	6.22 s	—	—	—	—	—	6.229
2.50	40,834	775.50	6.52 oc	0.00	—	0.00	6.51 s	—	—	—	—	—	6.511
2.60	42,892	775.60	6.75 oc	0.00	—	0.00	6.74 s	—	—	—	—	—	6.746
2.70	44,949	775.70	6.97 oc	0.00	—	0.00	6.97 s	—	—	—	—	—	6.967
2.80	47,007	775.80	7.17 oc	0.00	—	0.00	7.16 s	—	—	—	—	—	7.161
2.90	49,065	775.90	7.37 oc	0.00	—	0.00	7.35 s	—	—	—	—	—	7.351
3.00	51,122	776.00	7.55 oc	0.00	—	0.00	7.55 s	—	—	—	—	—	7.547

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

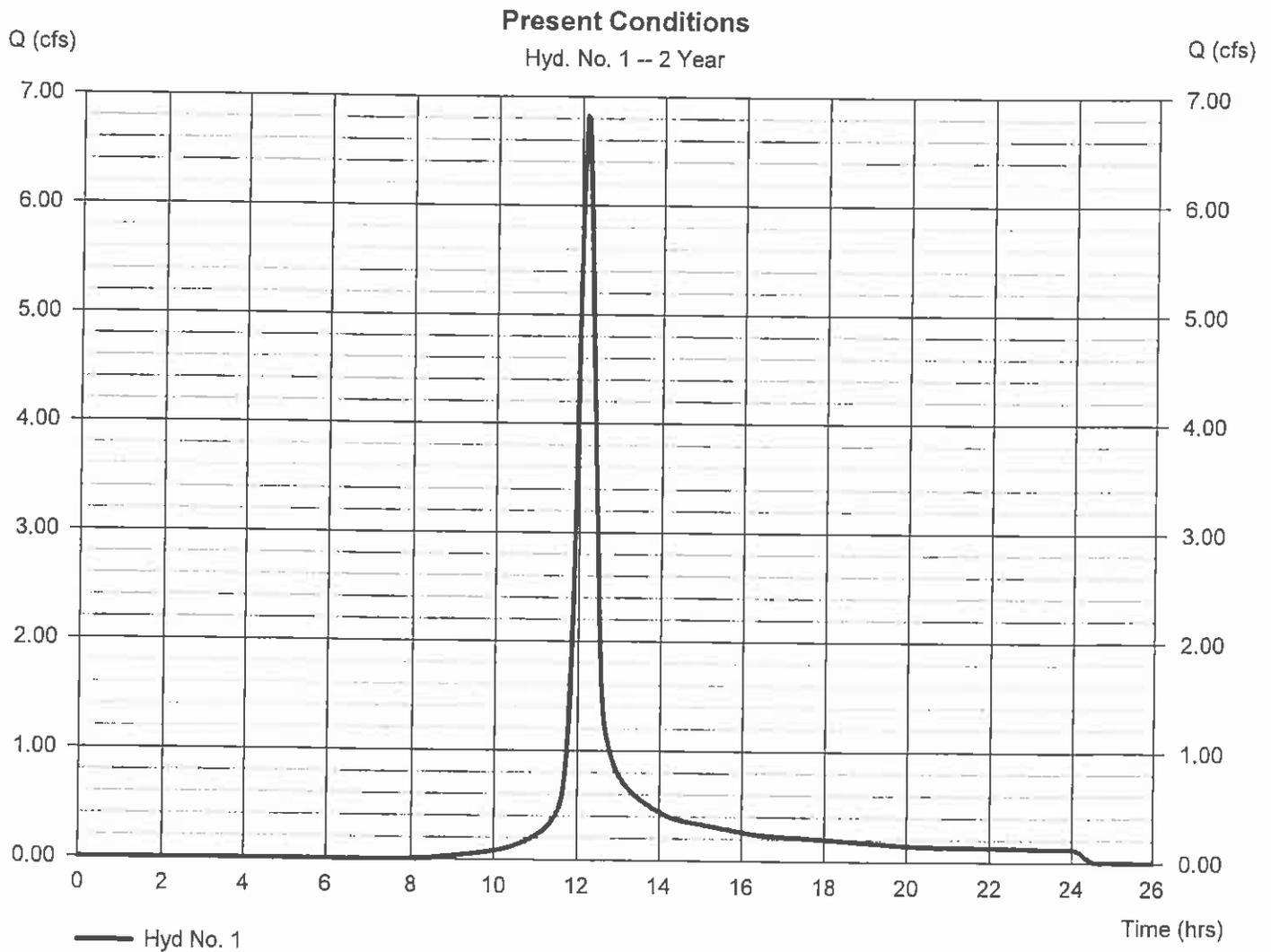
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.825	2	728	25,062	—	—	—	Present Condilions
2	SCS Runoff	9.380	2	724	29,426	—	—	—	Post Construction
3	Reservoir	0.338	2	916	27,624	2	774.36	19,695	Actual Release
Storm Route_Canaan Church_Gantz & Home Rd - 2 Year Return Period								Monday, 01 / 25 / 2016	

Hydrograph Report

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 6.825 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 25,062 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 2.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

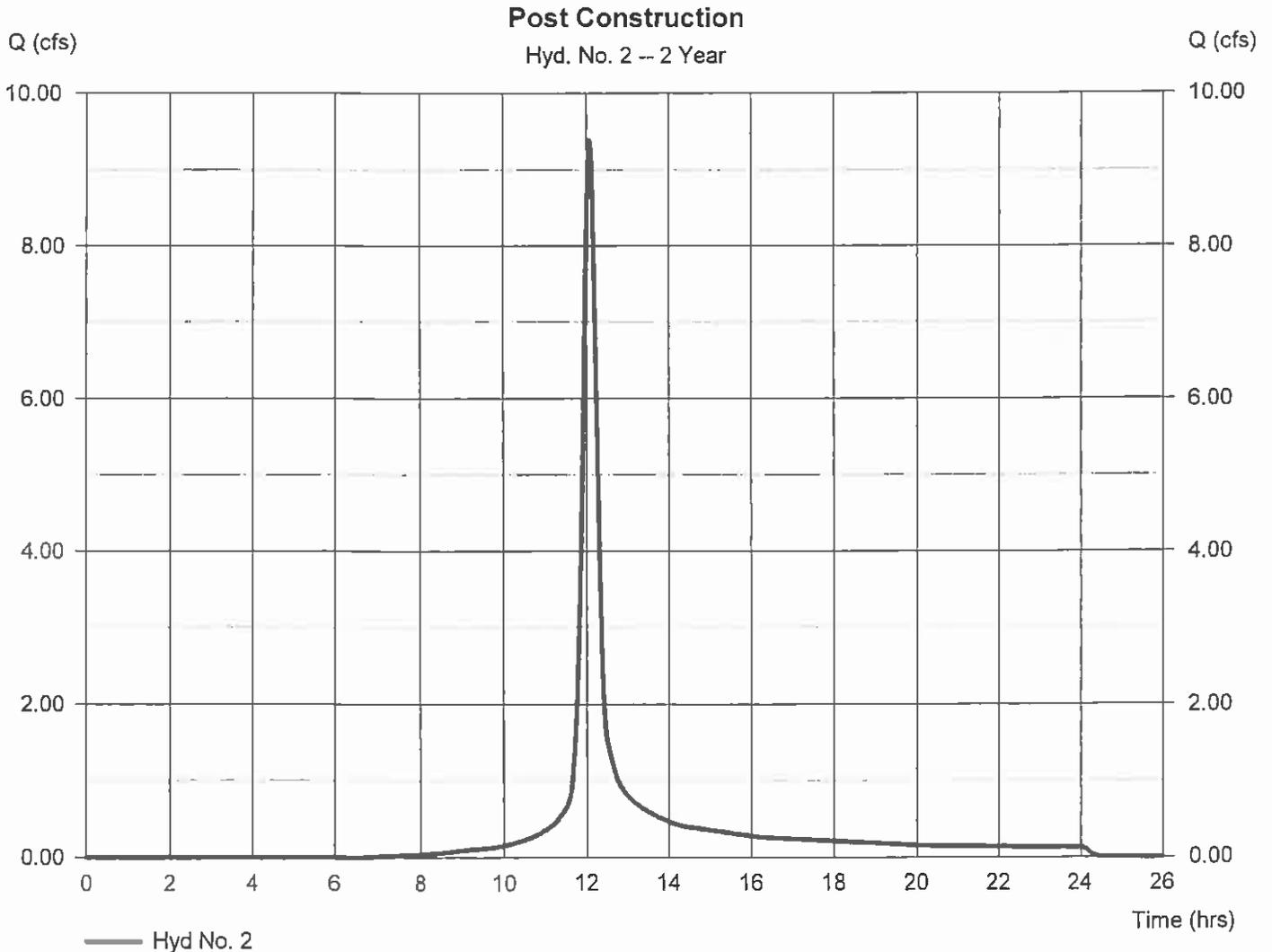
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 9.380 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 29,426 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 2.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



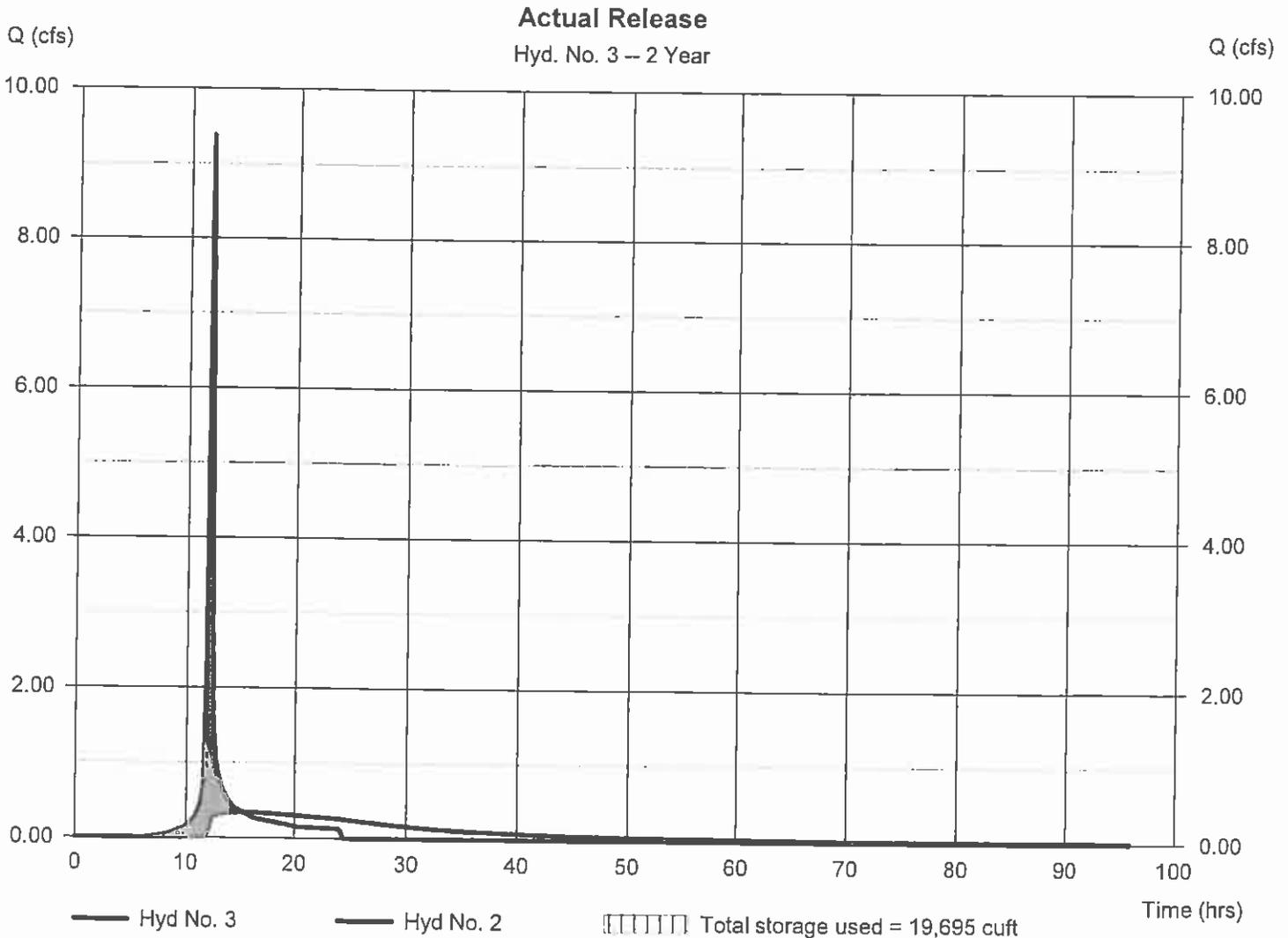
Hydrograph Report

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 0.338 cfs
Storm frequency	= 2 yrs	Time to peak	= 15.27 hrs
Time interval	= 2 min	Hyd. volume	= 27,624 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 774.36 ft
Reservoir name	= <New Pond>	Max. Storage	= 19,695 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	9.448	2	728	34,680	—	—	—	Present Conditions
2	SCS Runoff	12.56	2	724	39,700	—	—	—	Post Construction
3	Reservoir	0.504	2	874	37,767	2	774.75	26,360	Actual Release
Storm Route_Canaan Church_Gantz & Home Return - 5 Year							Monday, 01 / 25 / 2016		

Hydrograph Report

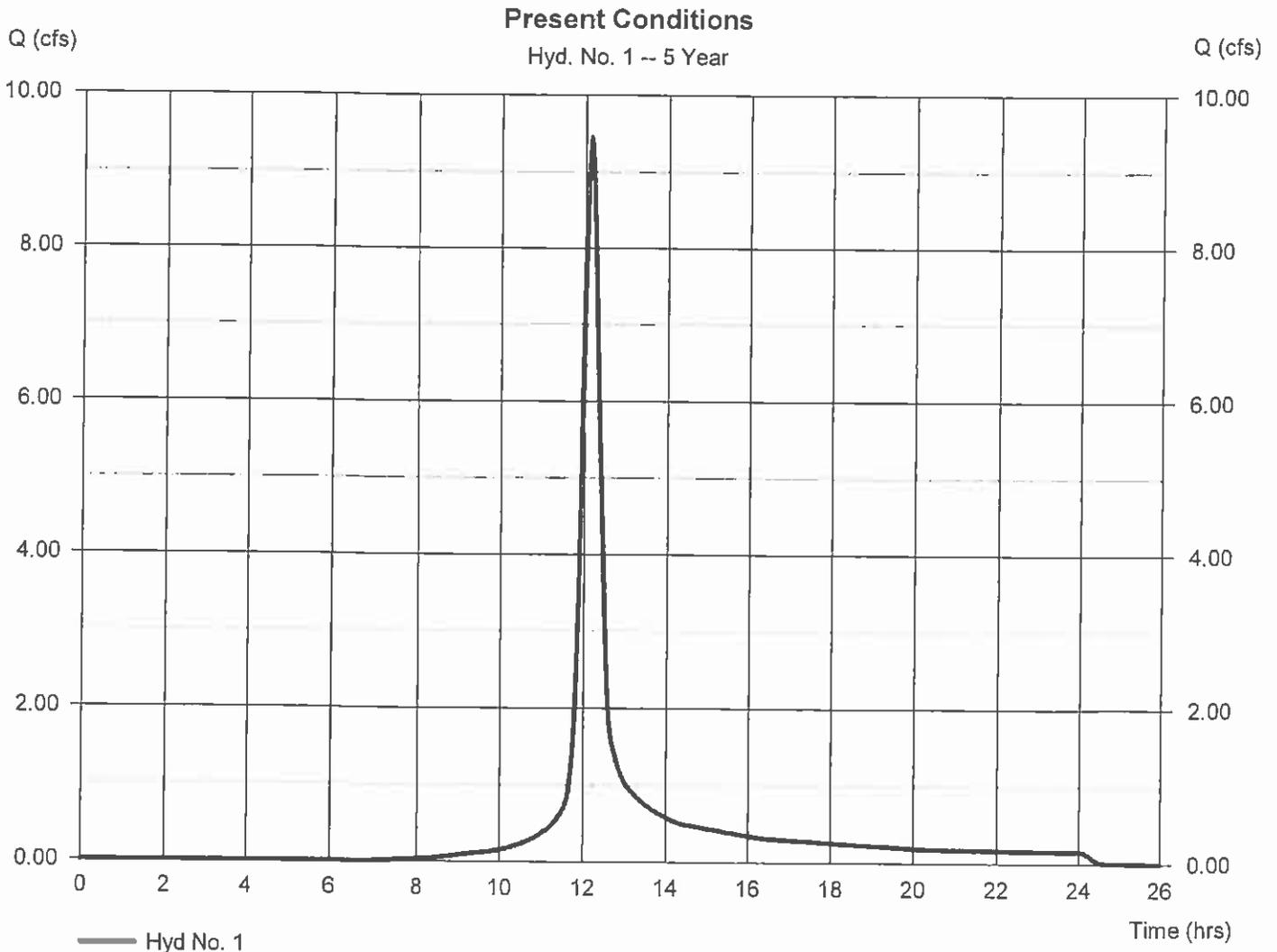
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 9.448 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 34,680 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 3.35 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

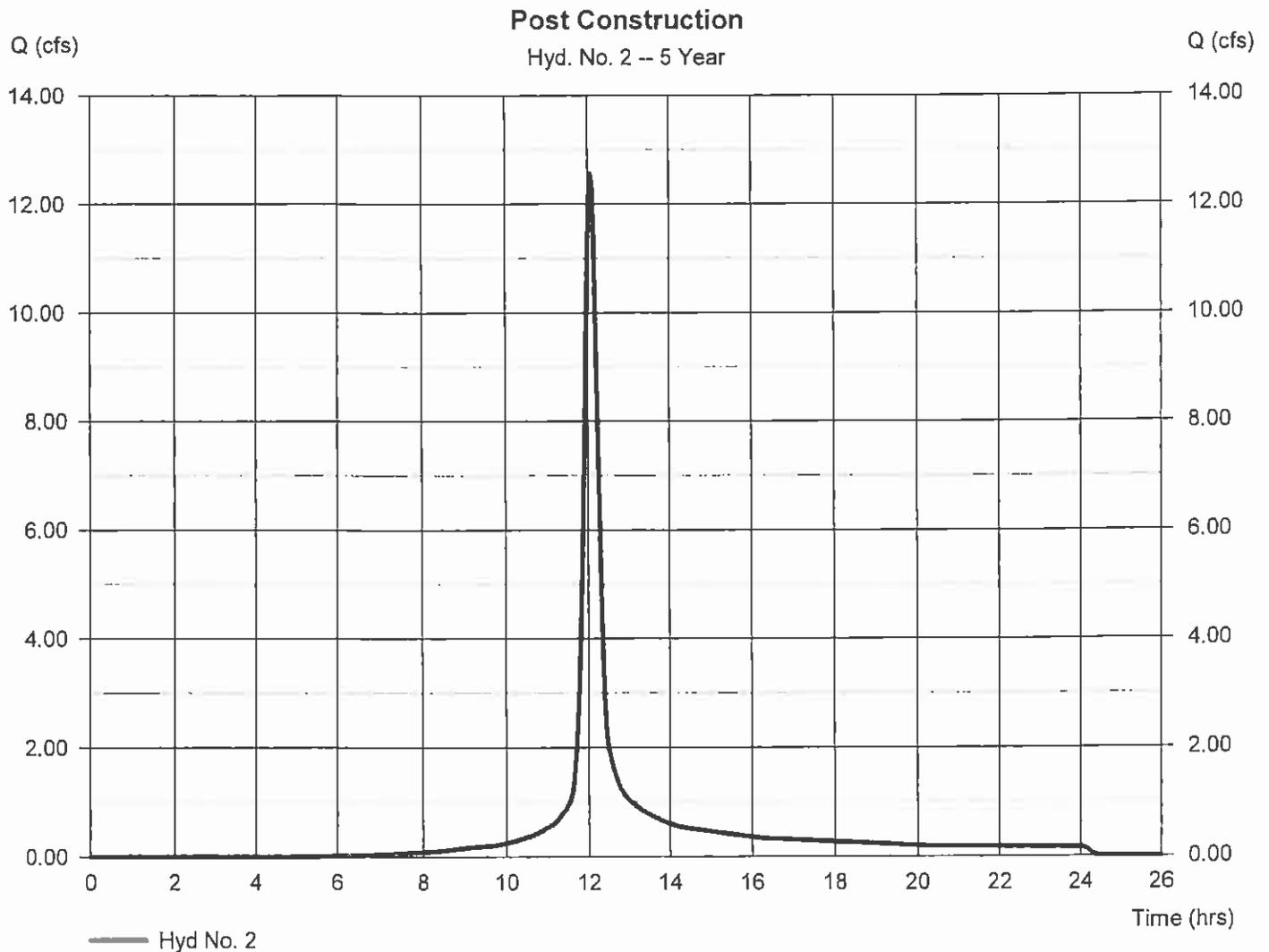
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 12.56 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 39,700 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 3.35 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesks, Inc. v10.3

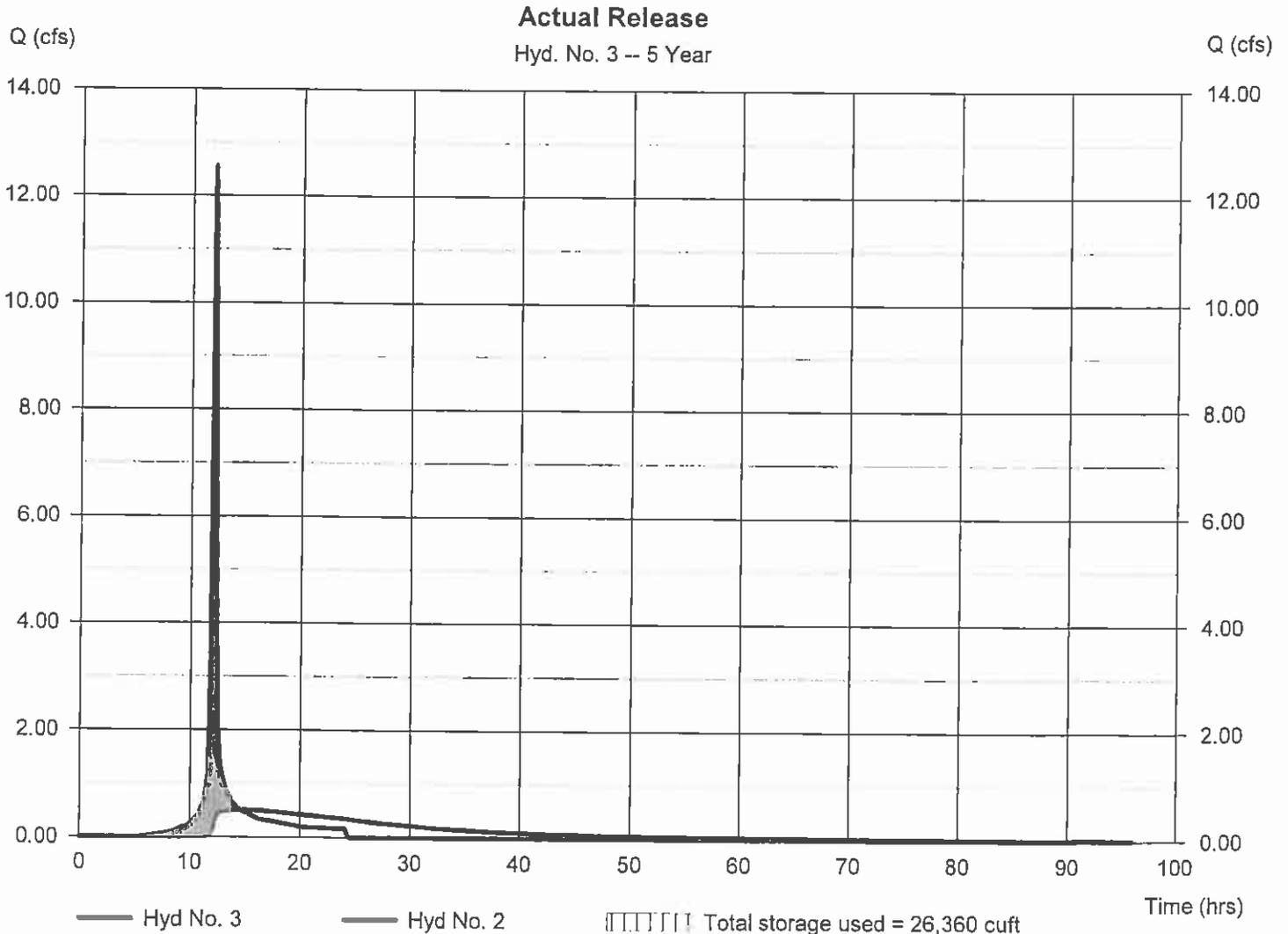
Monday, 01 / 25 / 2016

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 0.504 cfs
Storm frequency	= 5 yrs	Time to peak	= 14.57 hrs
Time interval	= 2 min	Hyd. volume	= 37,767 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 774.75 ft
Reservoir name	= <New Pond>	Max. Storage	= 26,360 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.54	2	728	42,477	---	---	---	Present Conditions
2	SCS Runoff	15.06	2	724	47,934	---	---	---	Post Construction
3	Reservoir	0.895	2	812	45,931	2	775.02	31,042	Actual Release
Storm Route_Canaan Church_Gantz & Home Return - 10 Year								Monday, 01 / 25 / 2016	

Hydrograph Report

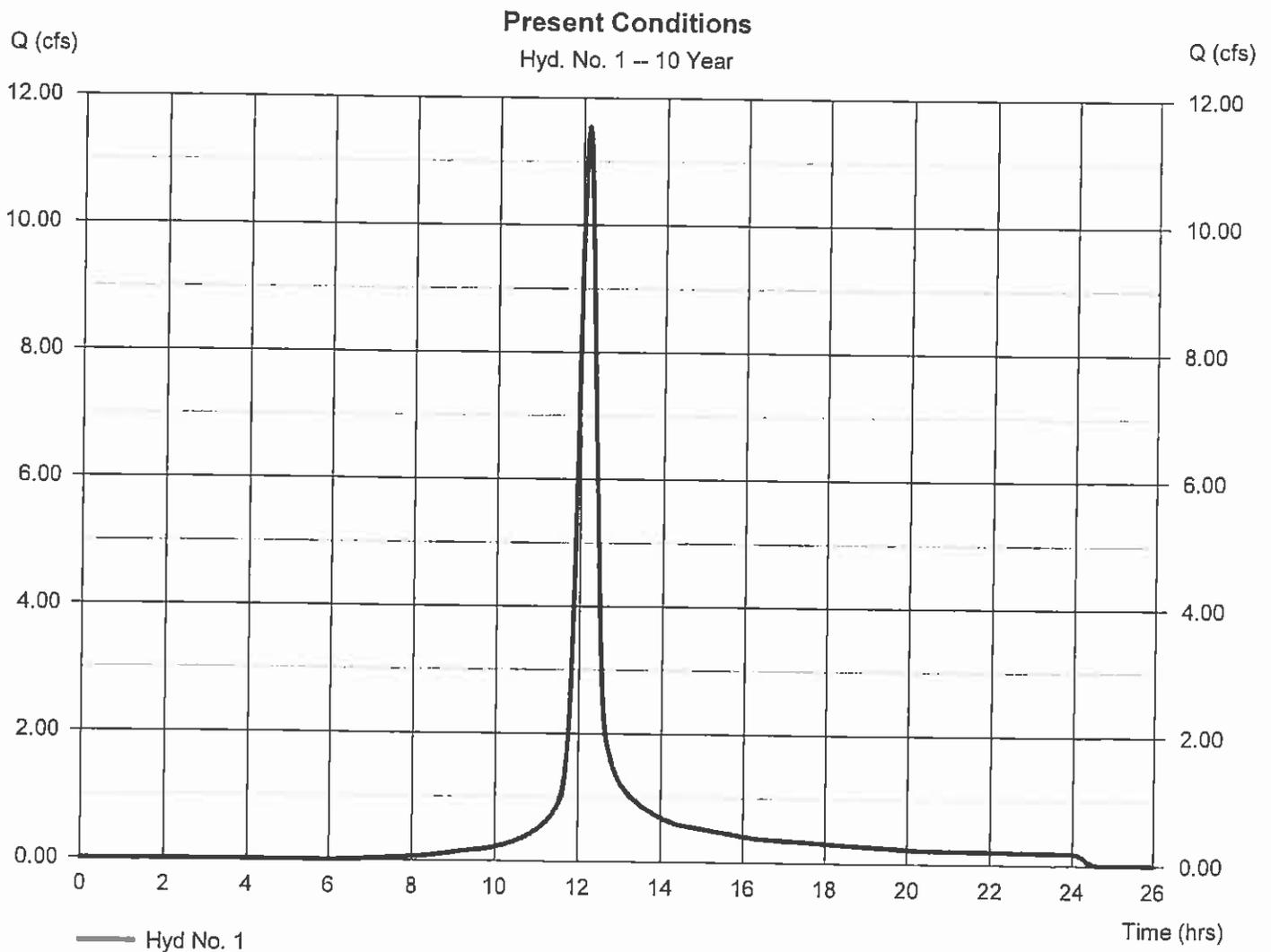
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 11.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 42,477 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 3.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

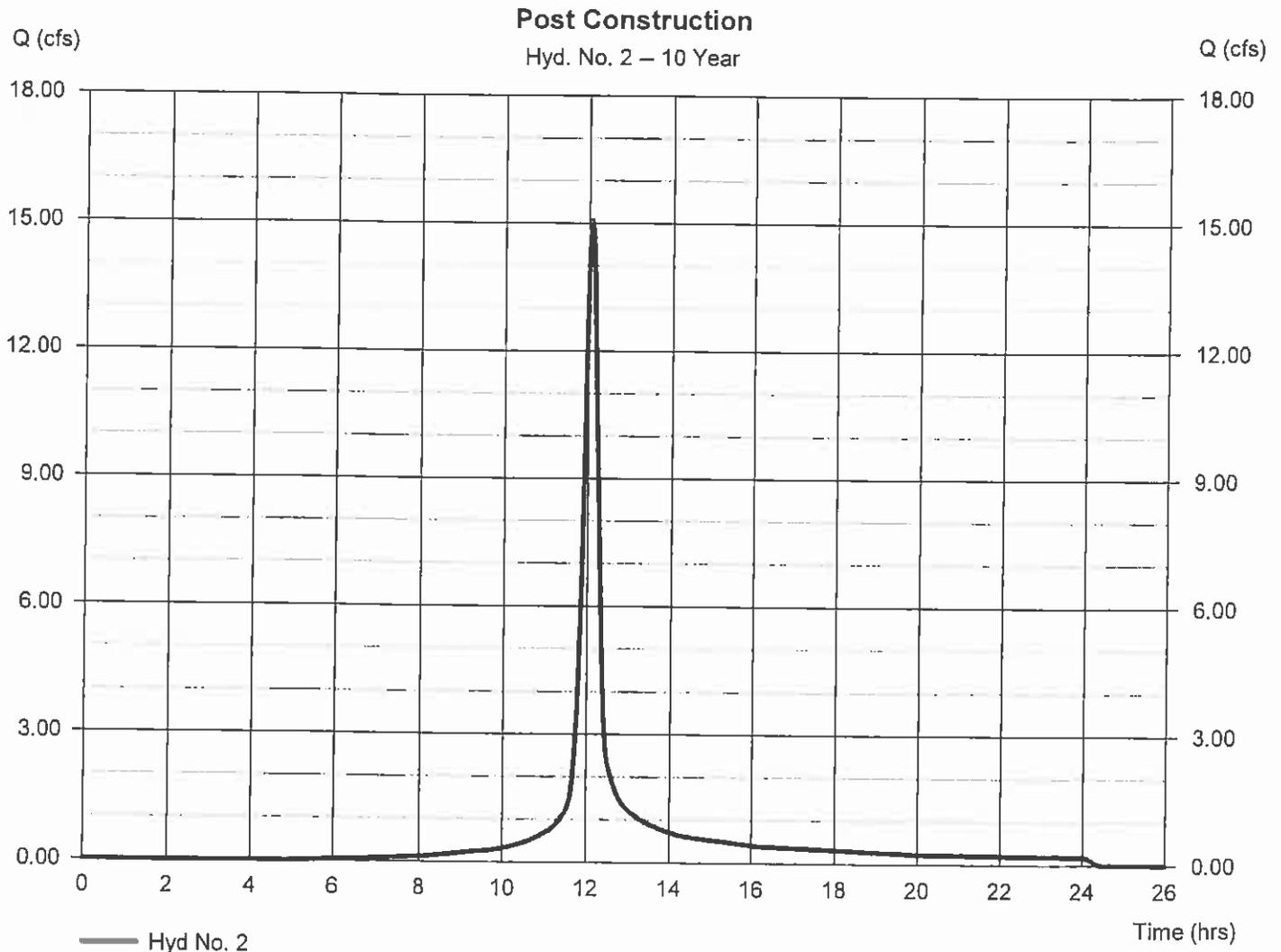


Hydrograph Report

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 15.06 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 47,934 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 3.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



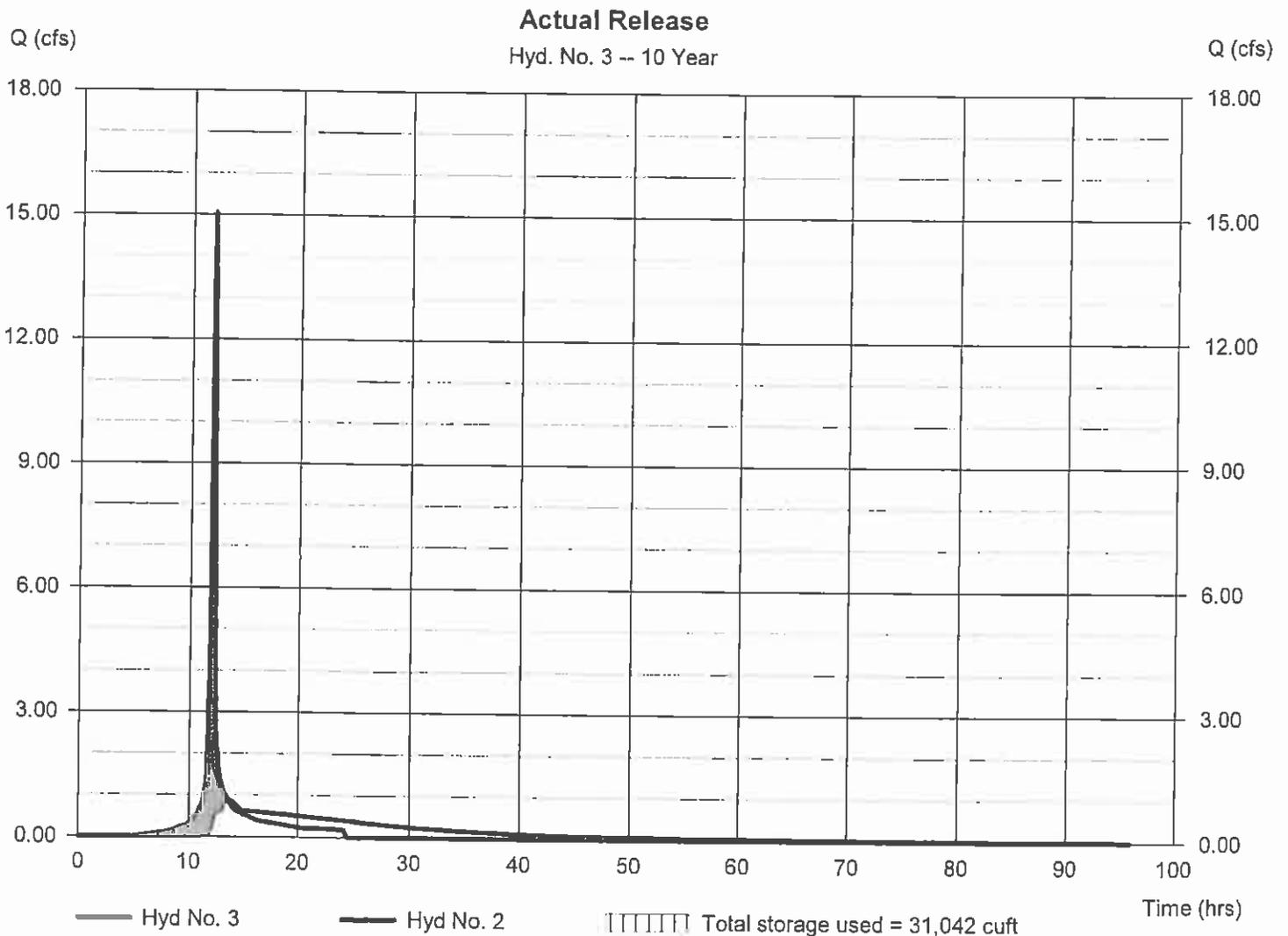
Hydrograph Report

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 0.895 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.53 hrs
Time interval	= 2 min	Hyd. volume	= 45,931 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 775.02 ft
Reservoir name	= <New Pond>	Max. Storage	= 31,042 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	14.77	2	728	54,685	—	—	—	Present Conditions
2	SCS Runoff	18.89	2	724	60,721	—	—	—	Post Construction
3	Reservoir	3.770	2	746	58,684	2	775.20	34,653	Actual Release

Hydrograph Report

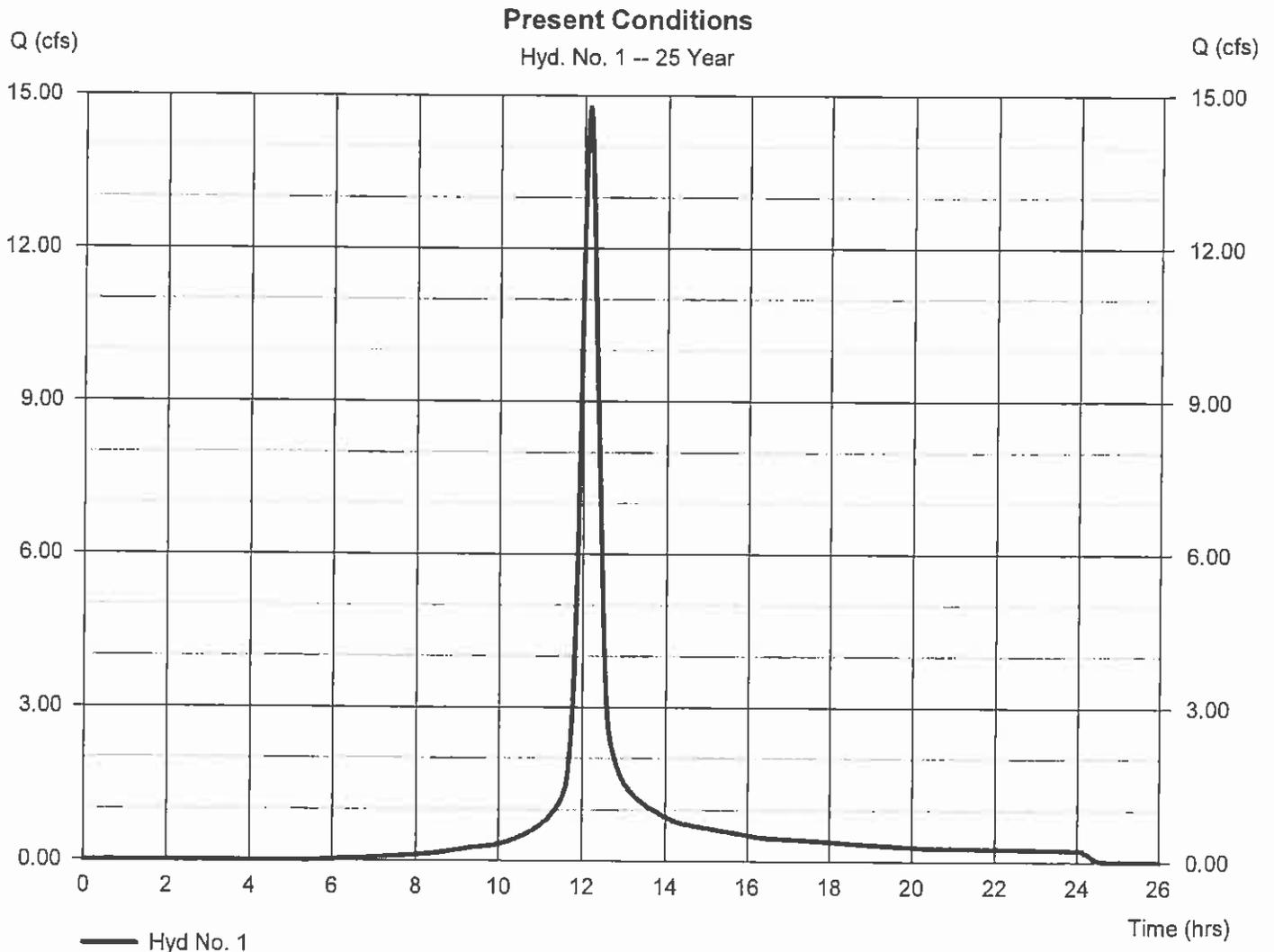
Hydralow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Monday, 01 / 25 / 2016

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 14.77 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 54,685 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

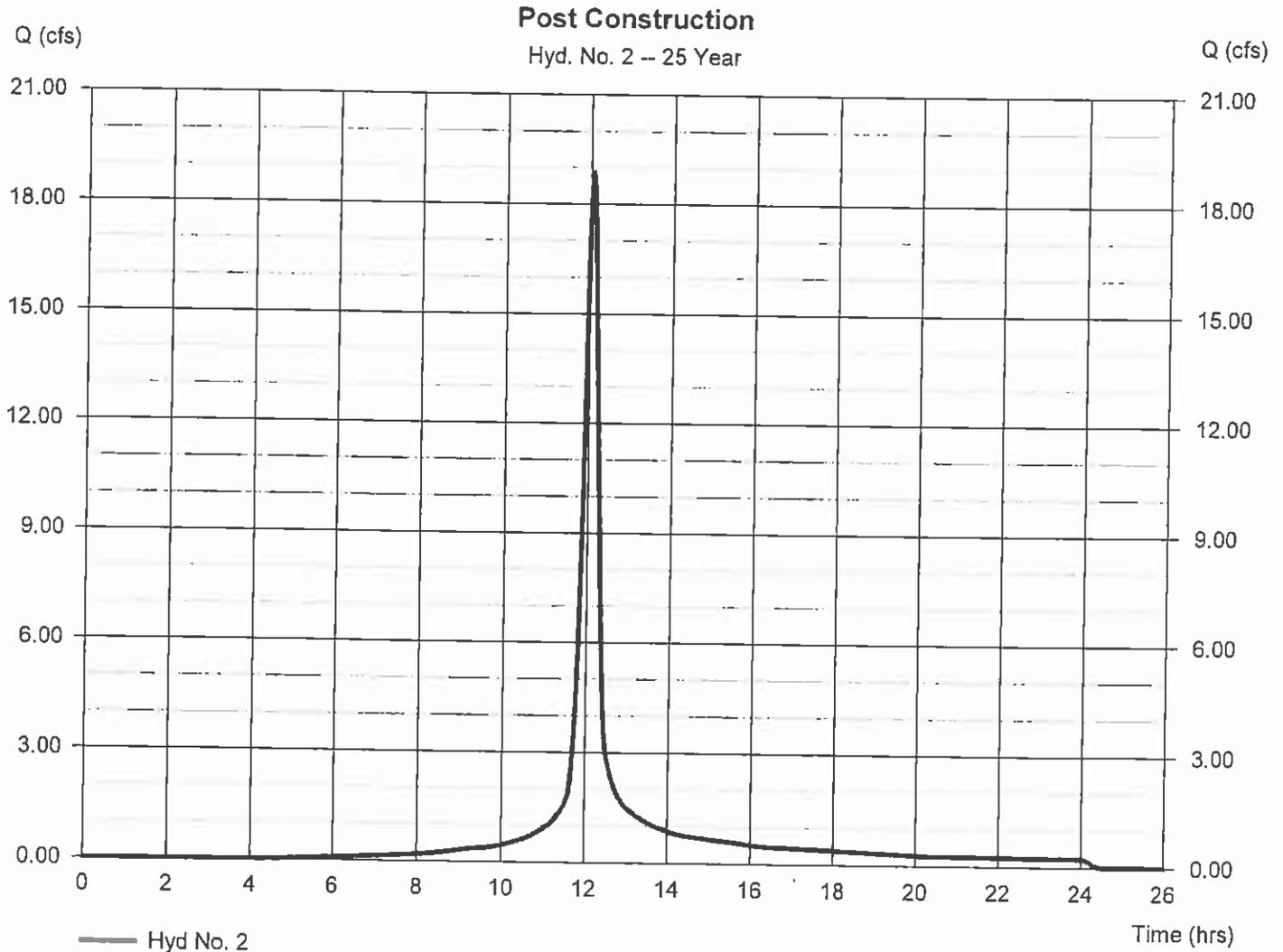


Hydrograph Report

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 18.89 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 60,721 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

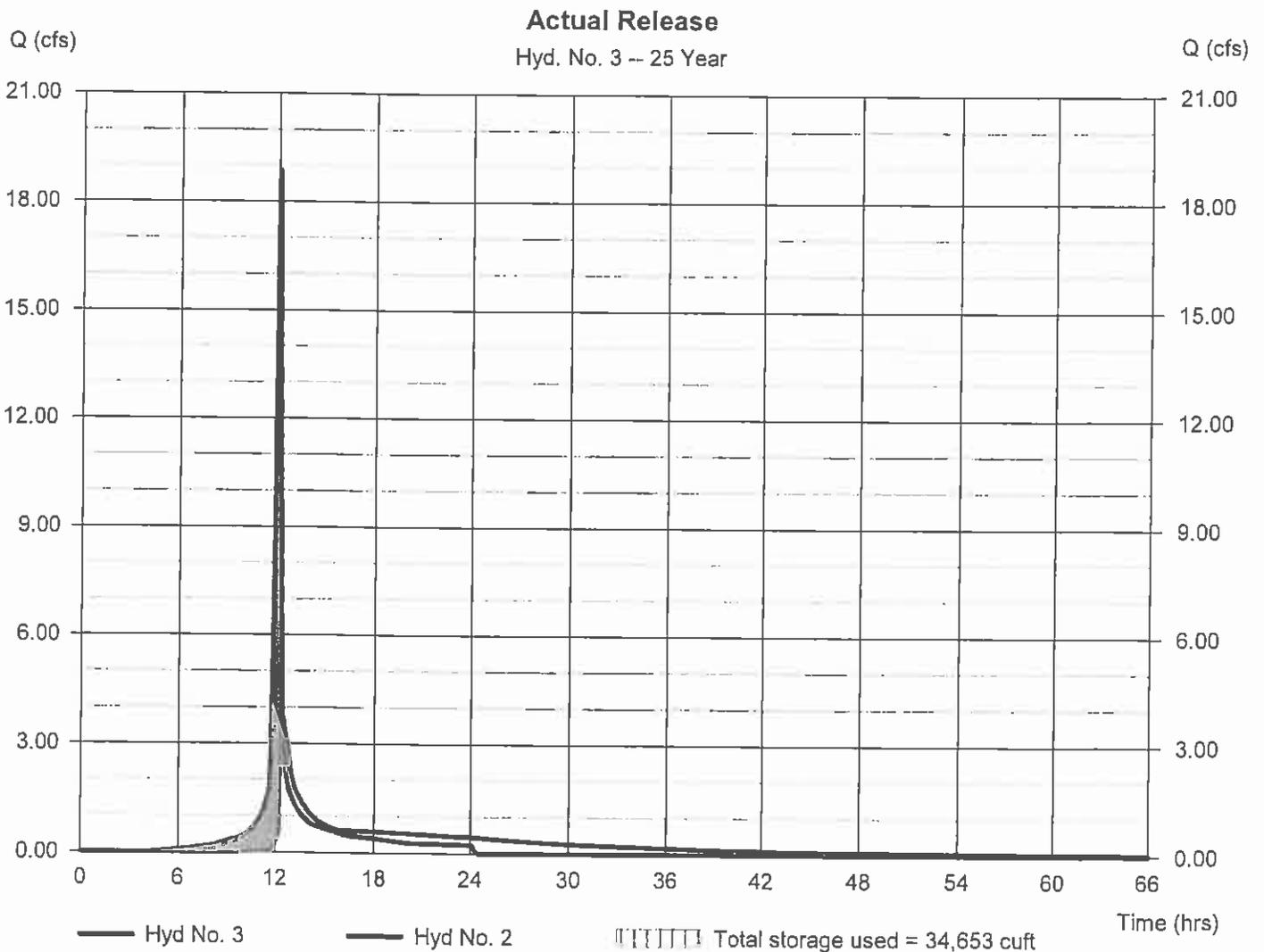
Monday, 01 / 25 / 2016

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 3.770 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 58,684 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 775.20 ft
Reservoir name	= <New Pond>	Max. Storage	= 34,653 cuft

Storage Indicalion method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

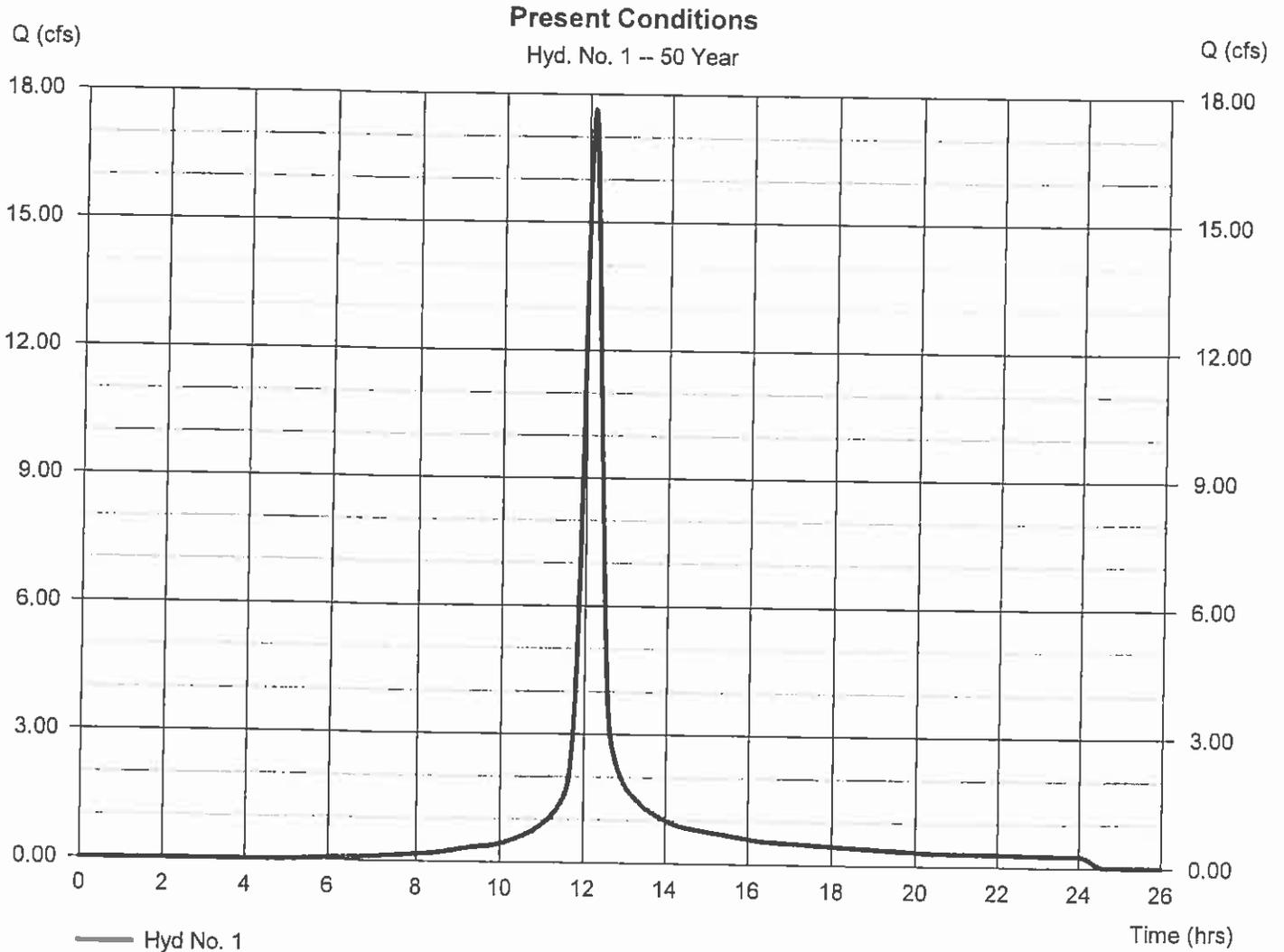
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	17.64	2	728	65,683	—	—	—	Present Conditions
2	SCS Runoff	22.26	2	724	72,163	—	—	—	Post Construction
3	Reservoir	6.231	2	742	70,102	2	775.40	38,790	Actual Release
Storm Route_Canaan Church_Gantz & Home Rd - 50 Year							Monday, 01 / 25 / 2016		

Hydrograph Report

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 17.64 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 65,683 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 5.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

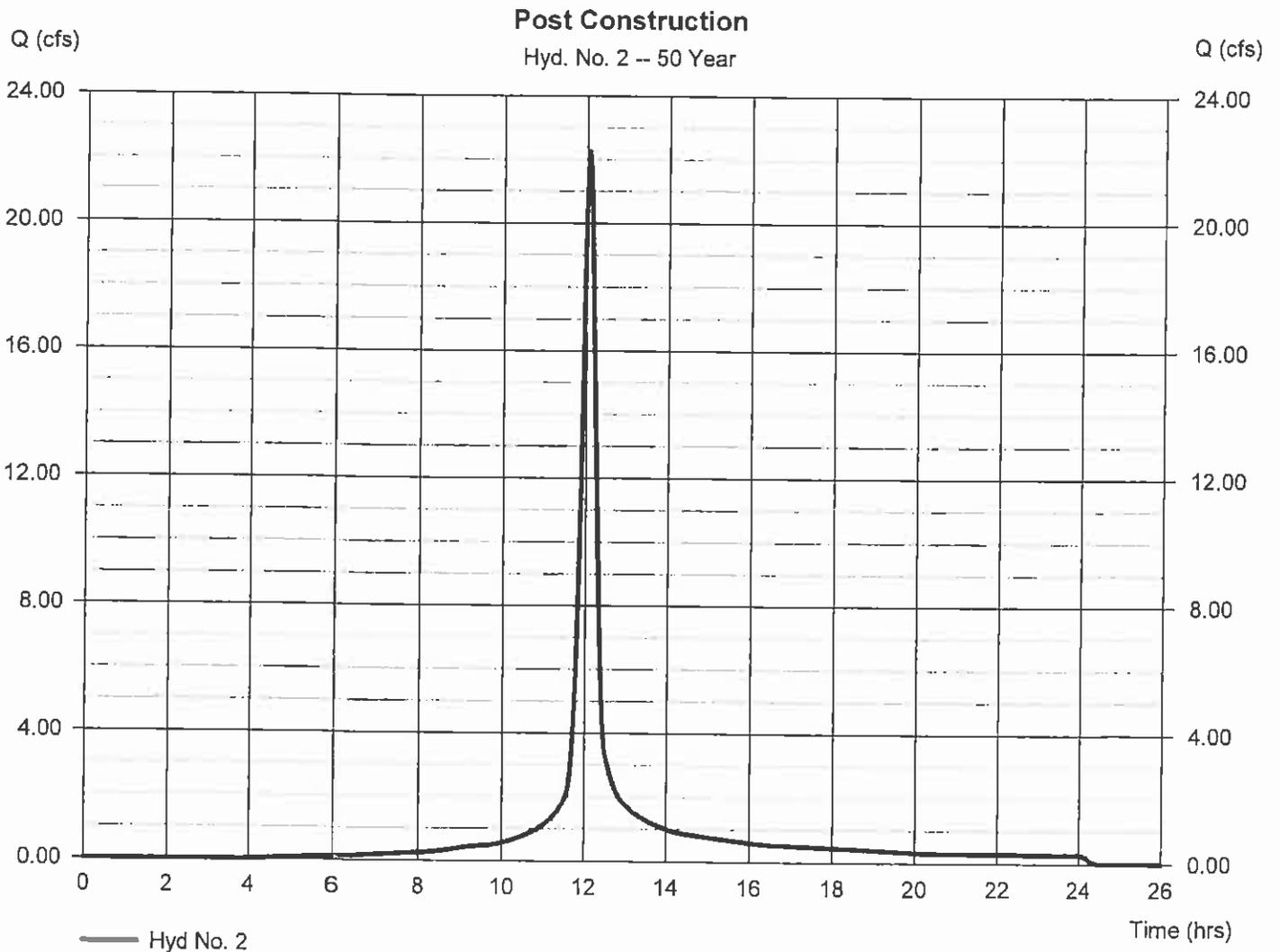


Hydrograph Report

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 22.26 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 72,163 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 5.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

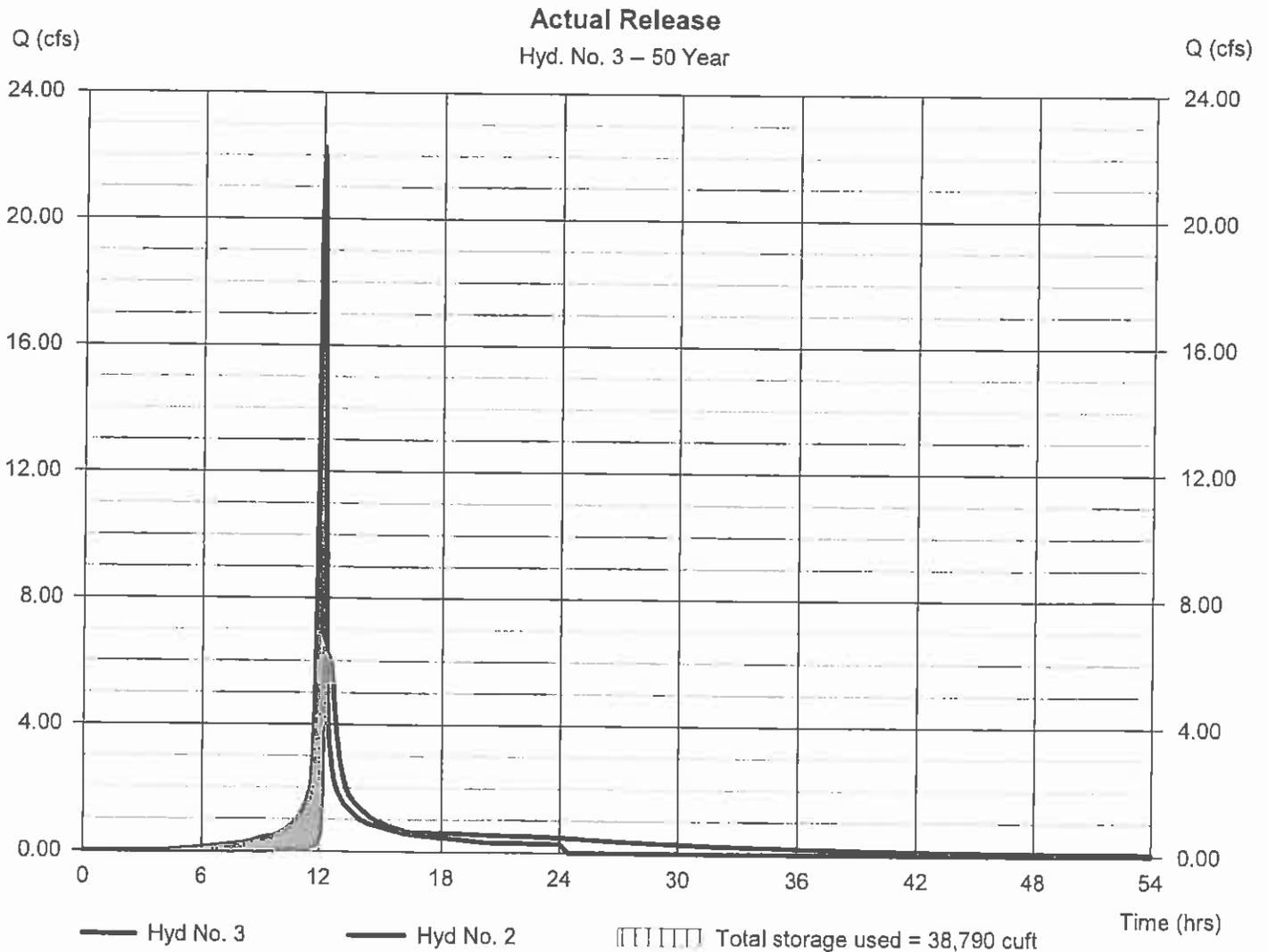
Monday, 01 / 25 / 2016

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 6.231 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 70,102 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 775.40 ft
Reservoir name	= <New Pond>	Max. Storage	= 38,790 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

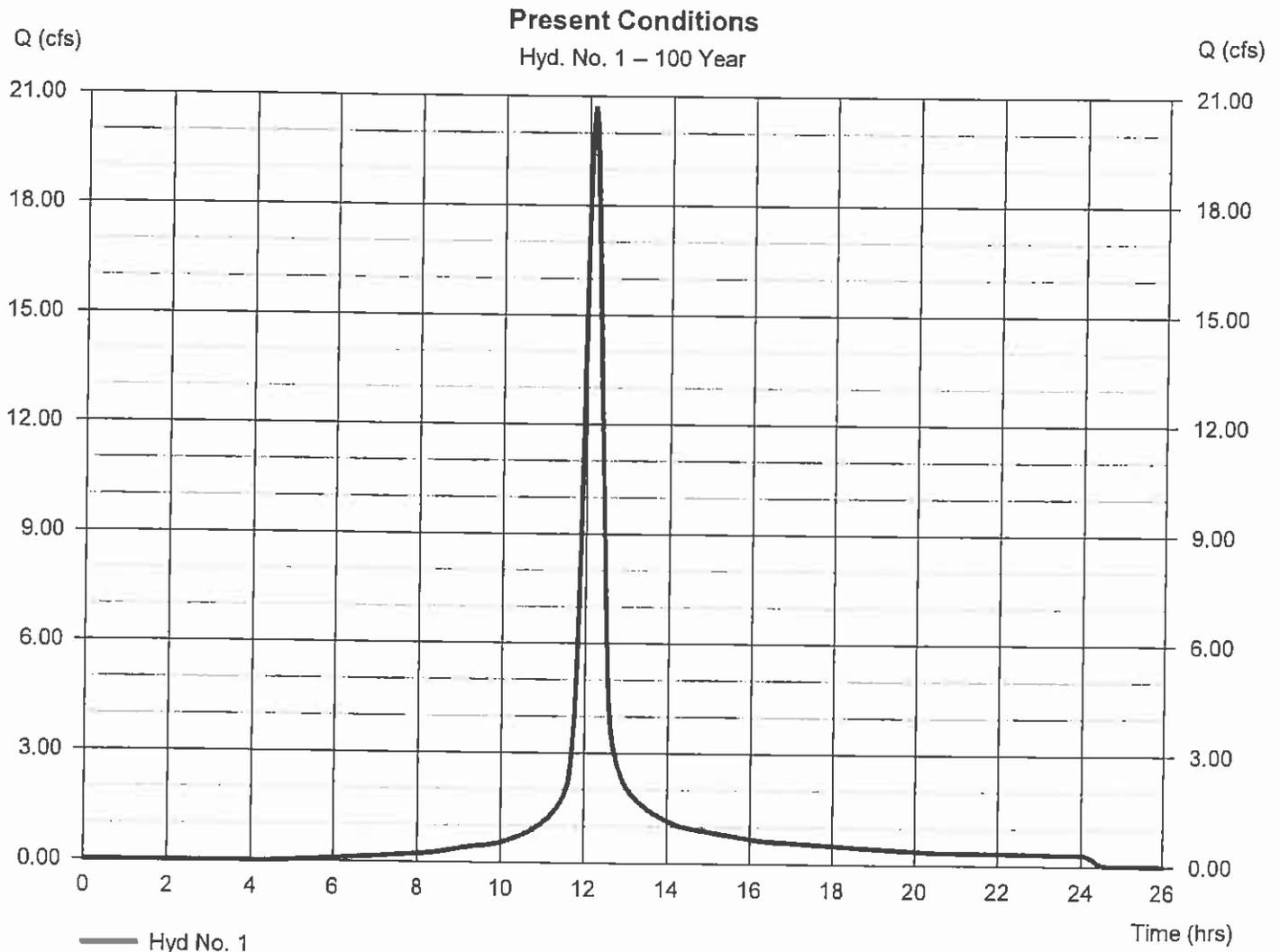
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	20.67	2	728	77,461	—	—	—	Present Conditions
2	SCS Runoff	25.81	2	724	84,362	—	—	—	Post Construction
3	Reservoir	6.915	2	742	82,277	2	775.68	44,467	Actual Release
Storm Route_Canaan Church_Gantz & Home Rd - 100 Year								Monday, 01 / 25 / 2016	

Hydrograph Report

Hyd. No. 1

Present Conditions

Hydrograph type	= SCS Runoff	Peak discharge	= 20.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 77,461 cuft
Drainage area	= 4.739 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.00 min
Total precip.	= 6.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

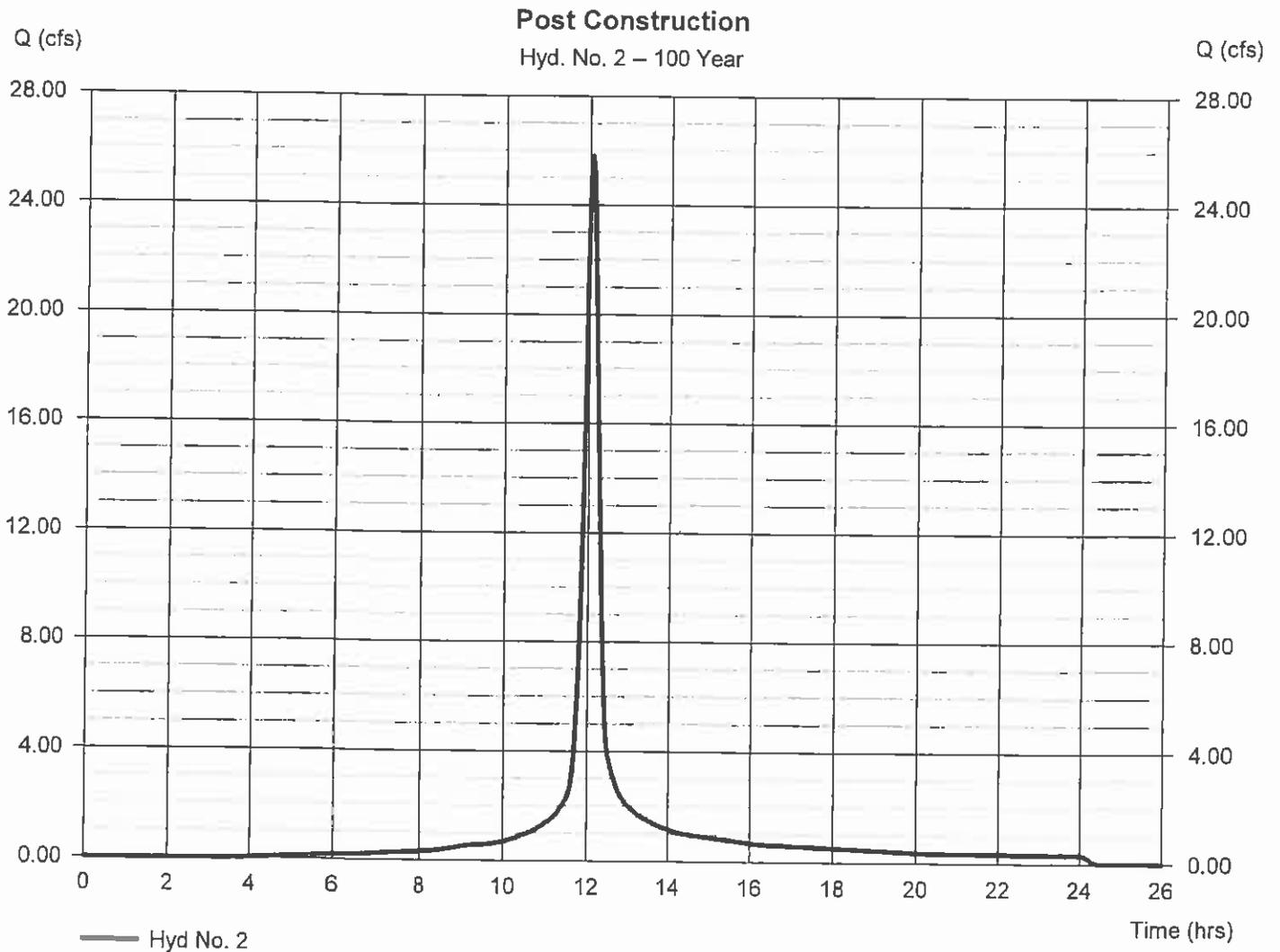


Hydrograph Report

Hyd. No. 2

Post Construction

Hydrograph type	= SCS Runoff	Peak discharge	= 25.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 84,362 cuft
Drainage area	= 4.739 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.90 min
Total precip.	= 6.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



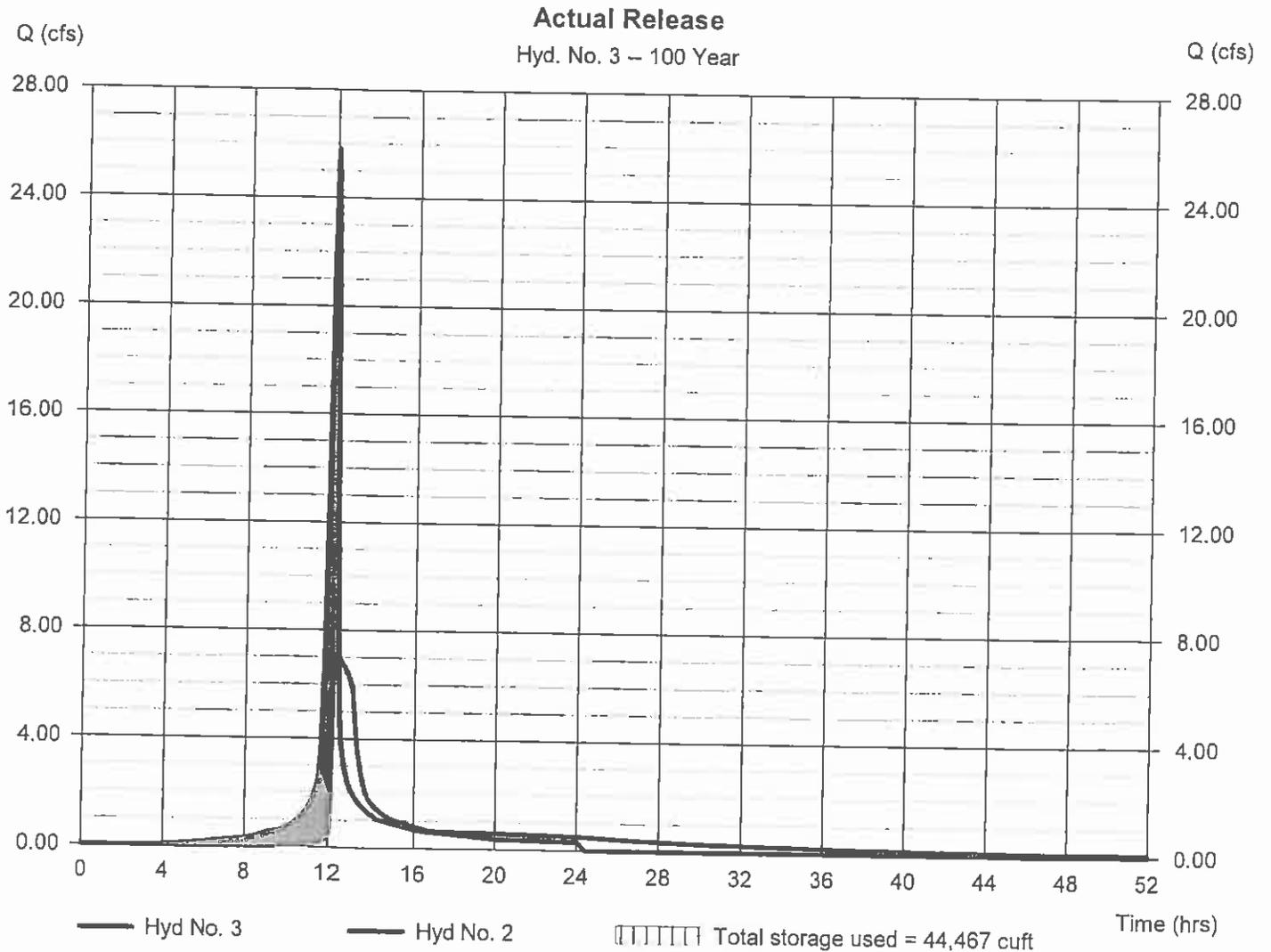
Hydrograph Report

Hyd. No. 3

Actual Release

Hydrograph type	= Reservoir	Peak discharge	= 6.915 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 82,277 cuft
Inflow hyd. No.	= 2 - Post Construction	Max. Elevation	= 775.68 ft
Reservoir name	= <New Pond>	Max. Storage	= 44,467 cuft

Storage Indication method used.



**WATER QUALITY
CALCULATIONS**

(SECTION E)

WATER QUALITY FLOW CALCULATION

Canaan Church

Reference: ODOT 1100 Drainage Design Procedures

$$Q = CiA \quad (1101.2.2)$$

Where:

$$C = 0.751 \quad \text{Coefficient of Run-off} \quad (\text{Table 1101-2})$$

$$\begin{aligned} C &= (0.90) * (0.638) + (0.50) * (0.362) \\ C &= (0.574) + (0.181) \\ C &= 0.755 \end{aligned}$$

$$i = 0.65 \quad \text{Average Rainfall Intensity} \quad (1115.5)$$

$$A = 1.862 \text{ Ac} \quad \text{Drainage Area in Acres}$$

$$WQ_f = CiA = (0.755) * (0.65) * (3.064) = 1.50366 \text{ cfs}$$

***All Reference materials can be found in the accompanying sheets located within this section.*

Storm Water Quality Volume Calculation Canaan Land Church

Storm Water Quality Volume Equation:

$$WQ_V = \frac{C_q \cdot P \cdot A}{12}$$

$P = \text{Precipitation} = 0.75 \text{ Inches of Rainfall}$

$A = \text{Disturbed Area} = 4.7387 \text{ Acres}$

$C_q = \text{Runoff Coefficient}$

$$C_q = 0.858i^3 - 0.78i^2 + 0.774i + 0.04 \quad \text{Where: } i = \frac{\text{impervious area}}{\text{total disturbed area}} = \frac{2.8250}{4.7387} = 0.5962$$

$$C_q = (0.858)(0.5962)^3 - (0.78)(0.5962)^2 + (0.774)(0.5962) + 0.04$$

$$C_q = 0.4061$$

$$WQ_V = \frac{((0.4061) * (0.75) * (4.7387))}{12}$$

$$WQ_V = 0.1203 \text{ Acres} - FT$$

$$WQ_V = \left(0.1203 \text{ Acres} - FT * 43560 \frac{SF}{\text{Acre}} \right) = 5239.14 \text{ cuFT}$$

Increase by 20% for Extended Detention within Dry Basin:

$$\text{Total } WQ_V = 5239.14 \text{ cuFT} * 1.2 = 6286.97 \text{ cuFT}$$

Storm Water Detention Provided for Water Quality:

$$\text{Water Quality Draw Down Time} = \frac{V}{Q_{AVG}}$$

$V = \text{Water Quality Volume} = 6299 \text{ cuFT}$

$Q_{AVG} = \text{Average Water Quality Discharge} = (0.070 - 0.000) / 2 = 0.035 \text{ cuFT/sec}$

$$\text{Water Quality Draw Down Time} = \frac{6299 \text{ cuFT}}{\left(0.035 \frac{\text{cuFT}}{\text{sec}} \right)}$$

$$\text{Water Quality Draw Down Time} = 179,972 \text{ sec}$$

Water Quality Volume Draw Down Time conversion:

$$179,972 \text{ sec} * \left[\frac{1 \text{ min}}{60 \text{ sec}} \right] * \left[\frac{1 \text{ hour}}{60 \text{ min}} \right] = 49.99 \text{ hours}$$