Drainage Impact Study

for:

IBC

2320 NE Independence Avenue,
Lee's Summit, MO.

Prepared by:
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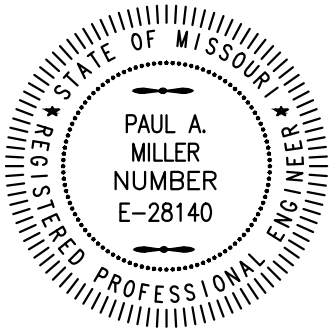
Certificate # 006278



Paul A. Miller
Licensee # E-28140

August 6, 2018
Rev 1: September 21, 2018
Rev 2: October 10, 2018

Table of Contents

Appendices

Existing Condition Analysis

This project is located at the corner of Pavestone Drive and Independence Avenue, Lee's Summit, MO. The existing site is currently undeveloped and resides in the Little Blue River watershed. The 1.36-acre project site currently has a Rational 'C' value of 0.32. The site drains overland offsite, primarily from the north to south, into the right of way. The table below shows the peak flow for the existing site runoff.

Table 1 – Existing Site Runoff Hydraflow Results	
Storm Event	Pre-developed site (cfs)
2-Yr	2.77
10-Yr	3.77
100-Yr	6.61

Soils encountered on the site are 10024- Greenton-Urban land complex, 5 to 9 percent slope, and 10136-Sibley-Urban land complex, 2 to 5 percent slopes. Hydrologic Soil Groups of the encountered soils are D and C respectively (see Appendix A, NRCS Soil Report).

According to the National Flood Insurance Program, Flood Hazard Boundary Map Panel No. 0430G, Community #290174, Dated January 20,2017, the proposed site lies in Zone X, Areas determined to be outside the 0.2% annual chance floodplain.

Proposed Condition Analysis

The proposed improvements for the site include the construction of an office/warehouse building that is approximately 11,970 sq.ft., parking lot and drive, a gravel storage yard, and the associated utilities. The proposed C value is 0.63. 1.0 acres of the site, including the roof, the storage yard, and the parking lot will drain to an on-site underground detention system with an orifice plate inserted into a curb inlet structure. This orifice plate has been designed per the BMP manual for the 40-hour extended detention of the 90% mean annual event, as well as control the excess runoff for the 2-, 10-, and 100-year peak flow to equal to or less than the pre-development numbers. The storm system connects into the public storm sewer box on Pavestone Drive. The rest of the site that is not detained consists of various areas near property boundaries and within utility easements. These areas could not be detained and will continue to drain overland, as the pre-development did, to the right of way. Below, Table 2 shows the peak flow for the proposed site after detention.

Table 2 – Proposed Site Runoff with Detention Hydraflow Results	
Storm Event	Post-developed site (cfs)
2-Yr	1.28
10-Yr	2.36
100-Yr	5.71

The Hydraflow results for the site are included in Appendix B. The hydrographs have been labeled to correspond with the drainage area map provided in Appendix A. Appendix A also contains C3.2 Storm Plan & Profile showing the layout and design of the storm system for the proposed site along with a detail for the orifice plate to control flow from the detention system.

Summary

The proposed site will increase the impervious area by 0.68 acres. An onsite detention basin will be used to handle the 40-hour extended detention of the 90% mean annual event, as well as control the excess runoff for the 2-, 10-, and 100-year peak flow to equal to or less than the pre-development numbers for 1 acre of the 1.36-acre site. This detention also takes on a small portion of offsite runoff. The remaining 0.36 acres that is not detained is part of various areas near property boundaries where runoff could not be detained due to site constraints, i.e. tying into adjacent topography or within existing utility easements. The runoff for the site has still been reduced from the existing runoff. Table 3 below shows the peak flow comparison for the existing and proposed site runoff.

Table 3 – Peak Flow Comparison

	2 Year Storm Q (cfs)	10 Year Storm Q (cfs)	100 Year Storm Q (cfs)
Pre-Development	2.77	3.77	6.61
Post-Development Before Detention	5.07	6.89	12.07
Post-Development with Detention	1.28	2.36	5.71

Appendix A – Supporting Data

Custom Soil Resource Report
Soil Map

Map Scale: 1:636 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 30 60 120 180

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

Jackson County, Missouri

10024—Greenton-Urban land complex, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2qky4
Elevation: 800 to 1,100 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Greenton and similar soils: 60 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex, concave
Parent material: Loess over residuum weathered from limestone and shale

Typical profile

A - 0 to 16 inches: silty clay loam
Bt1 - 16 to 26 inches: silty clay loam
2Bt2 - 26 to 80 inches: silty clay

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: About 16 inches to abrupt textural change
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Loess Upland Prairie (R109XY002MO)
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Across-slope shape: Convex, concave

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

10136—Sibley-Urban land complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ql0j
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sibley and similar soils: 60 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sibley

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

A - 0 to 17 inches: silt loam
Bt - 17 to 65 inches: silty clay loam
C - 65 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Deep Loess Upland Prairie (R107BY002MO)
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane West Zone (FIPS zone 2403). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the U.S.D.A Farm Service National Agriculture ImageryProgram (NAIP) dated 2014. Produced at scale of 1:24,000.

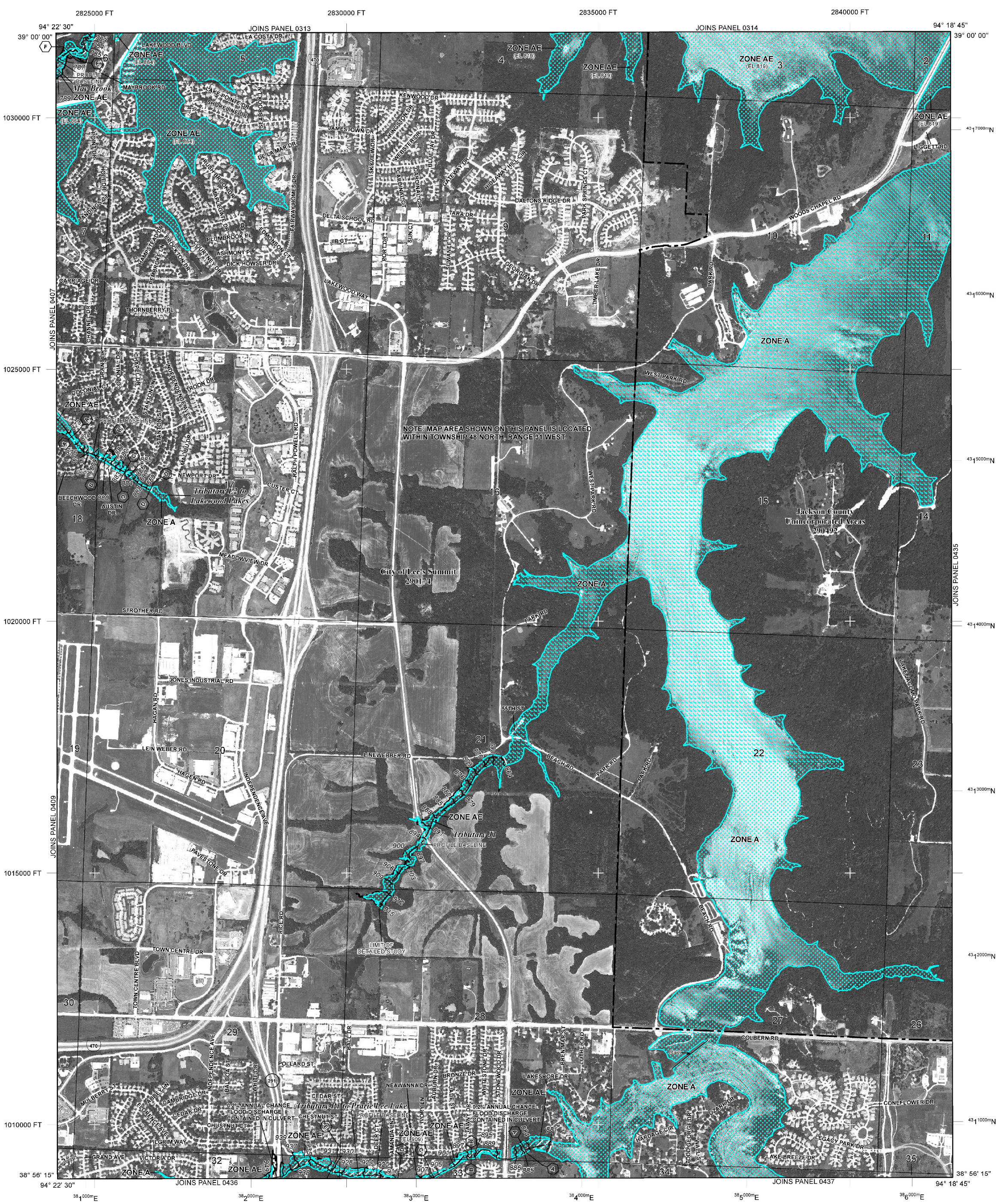
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary
0.2% Annual Chance Floodplain Boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
	Culvert
	Bridge
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Missouri State Plane West Zone (FIPS Zone 2403), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 29, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 20, 2017 - to change Special Flood Hazard Areas.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0430G

FIRM
FLOOD INSURANCE RATE MAP
JACKSON COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 430 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JACKSON COUNTY	290492	0430	G
LEE'S SUMMIT, CITY OF	290174	0430	G

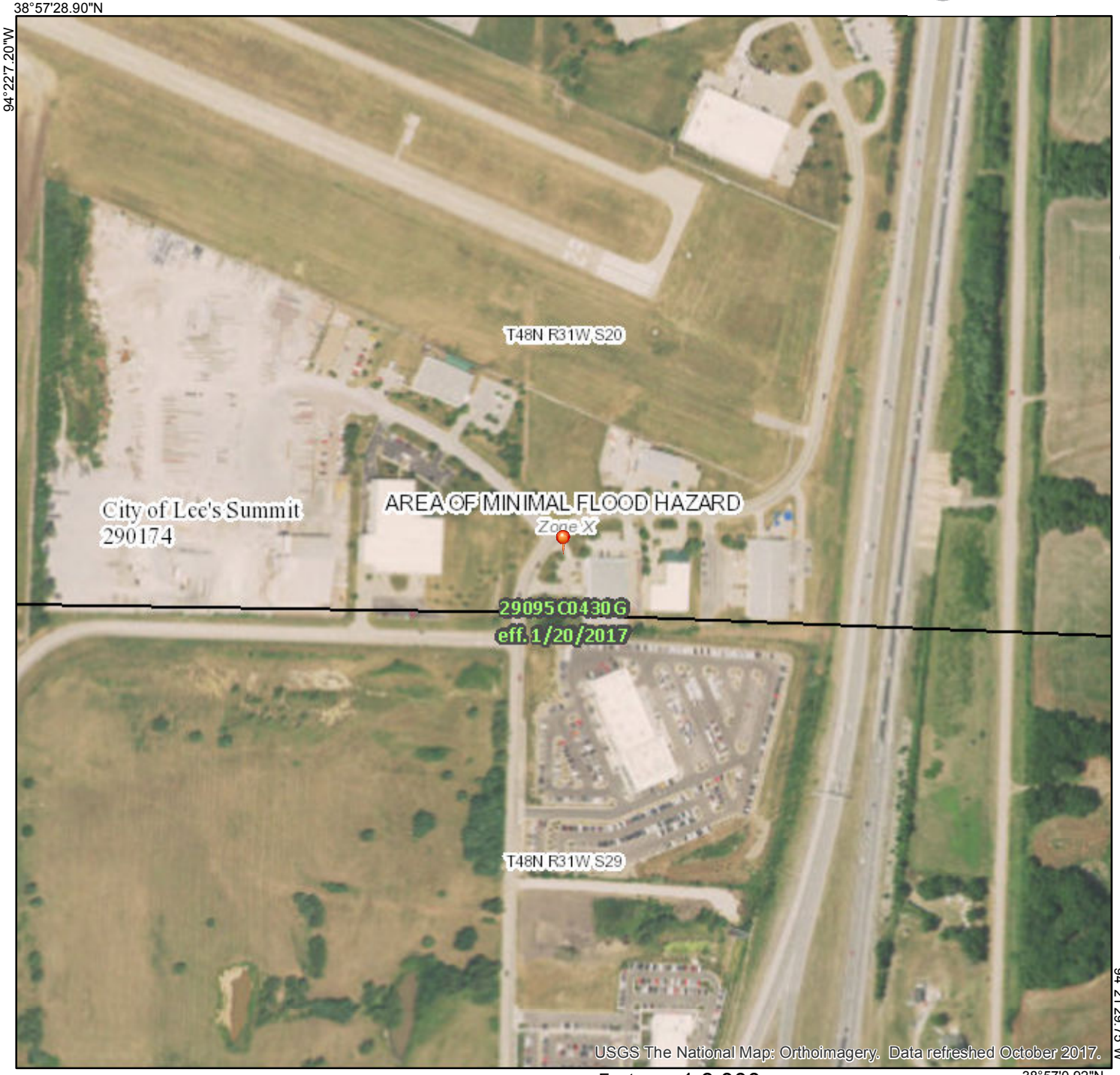
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29095C0430G
MAP REVISED
JANUARY 20, 2017

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA



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, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- 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 *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 8/2/2018 at 12:09:20 PM 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.

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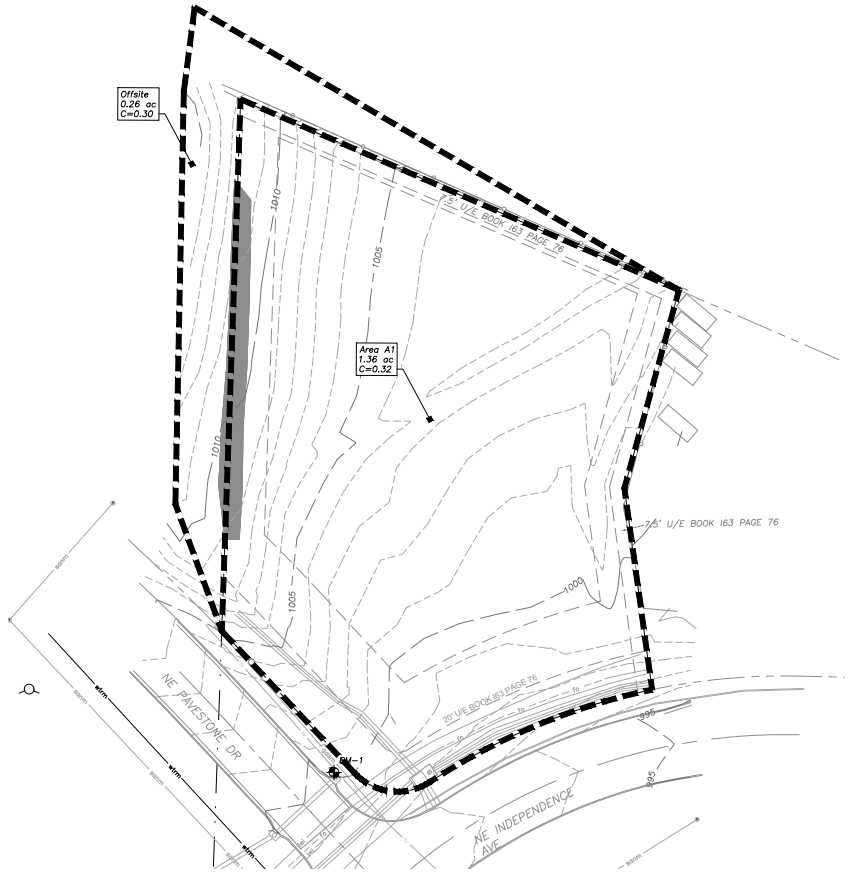
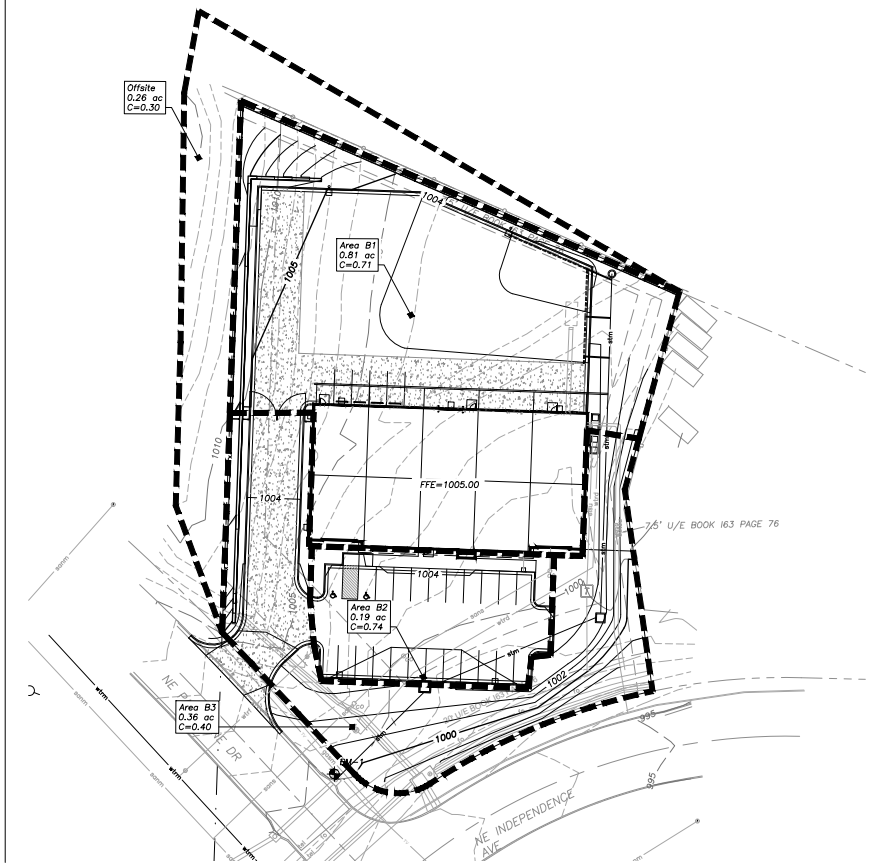


1 Existing Drainage Area Map
north 1"=30' 0 15 30 60

Pre-Construction Impervious Area Calculations

	Square Feet	Acres
Area of Site	59,242	1.36
Impervious Area	1,307	0.03
Pervious Area	57,935	1.33

Q: 2 year 2.77 cfs
10 year 3.77 cfs
100 year 6.61 cfs



2 Proposed Drainage Area Map
north 1"=30' 0 15 30 60

Post-Construction Impervious Area Calculations

	Square Feet	Acres
Area of Site	59,242	1.36
Impervious Area	24,829	0.71
Pervious Area	34,413	0.65
Increased Impervious Area		0.68

Q: 2 year 5.07 cfs
10 year 6.89 cfs
100 year 12.07 cfs

Q: Post Detention
2 year 1.28 cfs
10 year 2.36 cfs
100 year 5.71 cfs

MISSOURI ONE CALL SYSTEM, INC. 800-344-7483 STOP-CALL BEFORE YOU DIG

Floodplain Note:

The subject property is located in zone X of FEMA FIRM MAP number 29095C0430G, revised January 20, 2017, Zone X is defined as areas determined to be outside the 0.2% annual chance floodplain.

Local Benchmarks: BM-#

BM-1: Chiseled Square in Northwest Corner of Curb Inlet on North side of NE Pavestone Drive
Northing = 999983.011
Easting = 1000072.494
Elevation = 1000.101

Utility Legend

existing	
proposed	
sanm	sanitary main
sans	sanitary service
storm	storm sewer (existing)
storm	storm sewer (solid wall, proposed)
storm	storm sewer (solid wall, proposed)
stm	storm sewer (perforated, proposed)
wtrm	water main
wtrf	water service (fire)
wtrd	water service (domestic)
wtri	water service (irrigation)
gasm	natural gas main
gass	natural gas service schematic
elpu	underground primary electric
elsu	underground secondary electric
datu	underground cable/phone/data
datsu	underground cable/phone/data service

Drainage Legend
drainage area

Property Legend
right of way
property lines
easements
setbacks

Grading Legend
existing minor contour
existing major contour
proposed minor contour
proposed major contour

STORM SEWER CALCULATIONS

10-year Storm Event

Drainage Areas	Structure Type	InletTime (min)	iInlet (in/hr)	Q (cfs)	Total CxA	Tc (min)	iSys (in/hr)	Flow Rate (cfs)	Line Size (in)	Line Slope (%)	Inv Up (ft)	Inv Dn (ft)	Pipe Travel (min)	Capacity Full (cfs)	VelUp (ft/s)	VelDn (ft/s)	VelAve (ft/s)	Line Length (ft)	HGLUp	HGLDn
B1 & B2	Orifice Plate	5.00	0.00	2.36	0.00	5.00	0.00	2.36	18.00	0.50	996.66	996.34	0.82	7.31	2.05	1.52	1.79	65.94	997.59	997.57

100-year Storm Event

Drainage Areas	Structure Type	InletTime (min)	iInlet (in/hr)	Q (cfs)	Total CxA	Tc (min)	iSys (in/hr)	Flow Rate (cfs)	Line Size (in)	Line Slope (%)	Inv Up (ft)	Inv Dn (ft)	Pipe Travel (min)	Capacity Full (cfs)	VelUp (ft/s)	VelDn (ft/s)	VelAve (ft/s)	Line Length (ft)	HGLUp	HGLDn
B1 & B2	Orifice Plate	5.00	0.00	5.71	0.00	5.00	0.00	5.68	18.00	0.50	996.66	996.34	0.34	7.31	4.21	3.66	3.94	65.97	997.73	997.57

** The flow has been manually entered to be modeled through the 18" pipe using output numbers from Hydraflow where the detention basin has been modeled. See storm study for more information on the detention.

a new development for
IBC
2320 NE Independence Ave.
Lee's Summit, Missouri 64064

date
08.06.2018
drawn by
ANH
checked by
PAM
revisions
09.21.2018 1
10.02.2018 2

sheet number
C3.1
drawing type
fdp
project number
18091

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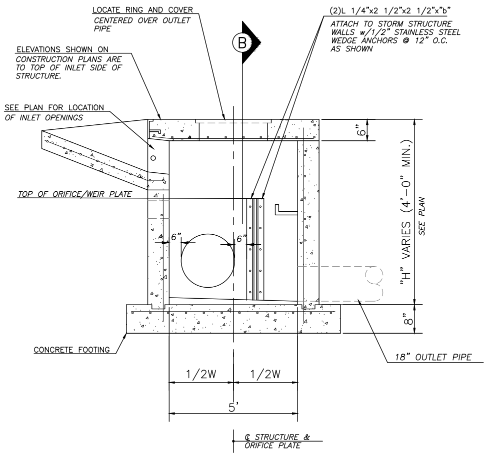
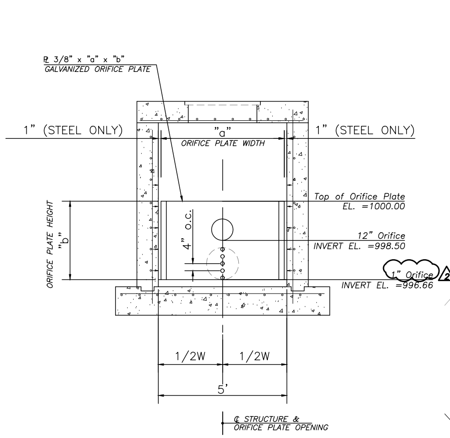
Licensee # E-28140

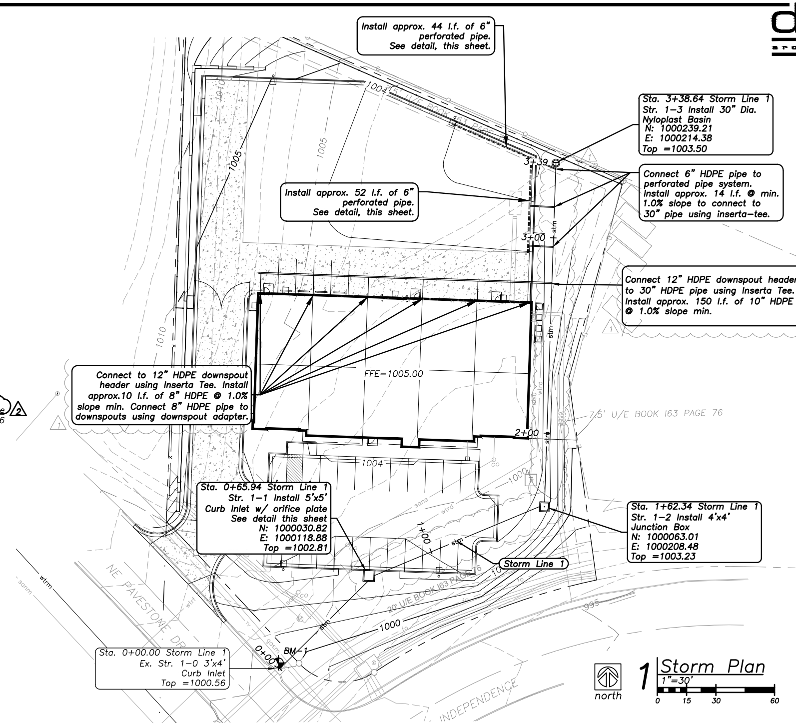


A TYPICAL SECTION OF STORM STRUCTURE w/ ORIFICE PLATE



B TYPICAL ELEVATION OF STORM STRUCTURE w/ ORIFICE PLATE

3 Orifice Plate Details
not to scale



1 Storm Plan
1"=30'
0 15 30 60

Local Benchmarks: BM-#

BM-1: Chiseled Square in Northwest Corner of Curb Inlet on North side of NE Pavestone Drive
Northing = 999983.011
Easting = 1000072.494
Elevation = 1000.101

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Property Legend

right of way
property lines
easements
setbacks

Grading Legend

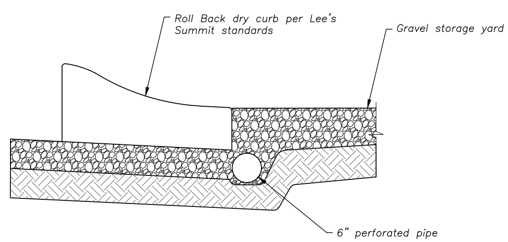
existing minor contour
existing major contour
proposed minor contour
proposed major contour

Utility Legend

existing
proposed

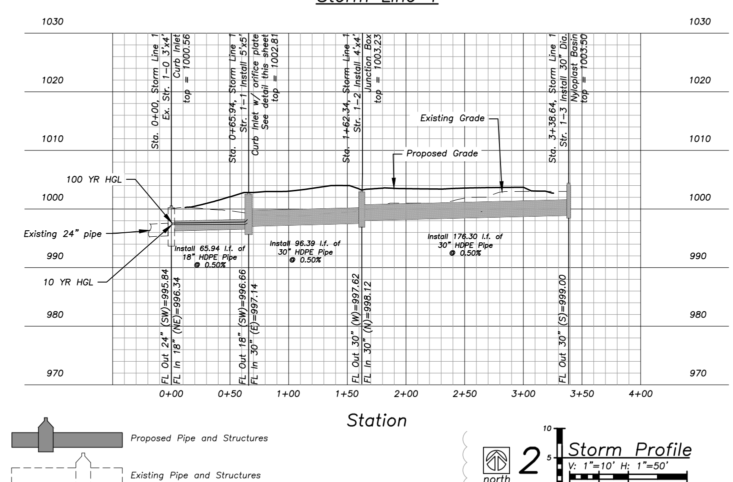
Linetypes

sanm	sanitary main
sans	sanitary service
	storm sewer (existing)
	storm sewer (solid wall, proposed)
stm	storm sewer (solid wall, proposed)
	storm sewer (perforated, proposed)
wtrm	water main
wtrf	water service (fire)
wtrd	water service (domestic)
wtri	water service (irrigation)
gasm	natural gas main
gass	natural gas service schematic
elpu	underground primary electric
elsu	underground secondary electric
datu	underground cable/phone/data
datsu	underground cable/phone/data service



4 Perforated Pipe Detail
not to scale

Storm Line 1



2 Storm Profile
V: 1"=10' H: 1"=50'
0 25 50 100

a new development for
IBC
2320 NE Independence Ave.
Lee's Summit, Missouri 64064

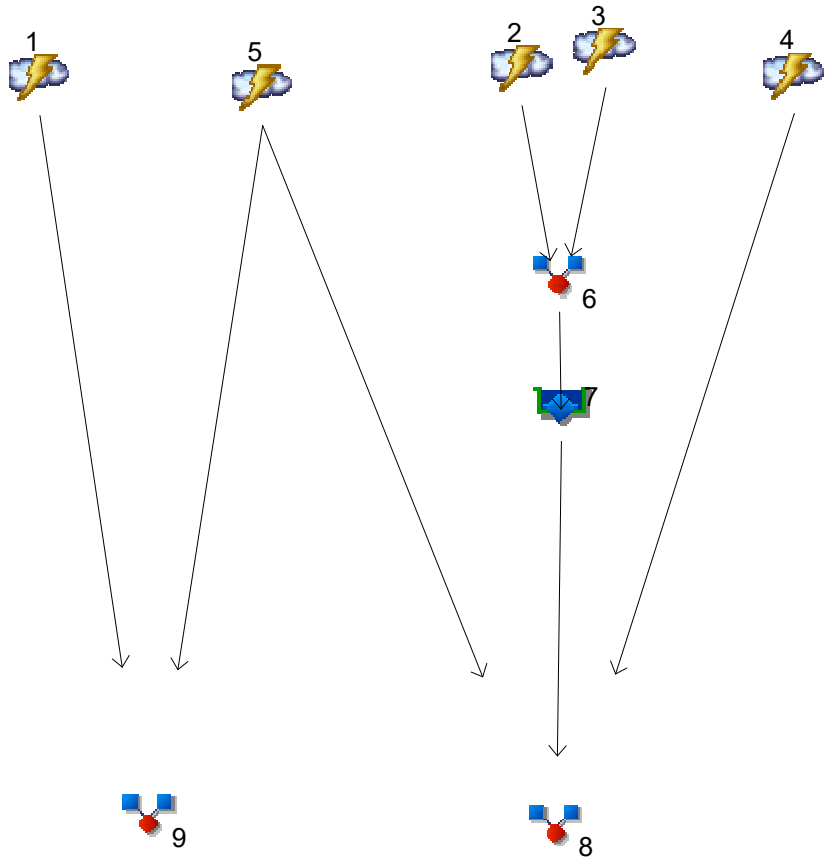
date 08.06.2018
drawn by ANH
checked by PAM
revisions
09.21.2018 1
10.02.2018 2

sheet number
C3.2
drawing type fdp
project number 18091

Appendix B – Hydraflow Hydrograph Output

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	Rational	A1 Existing
2	Rational	B1
3	Rational	B2
4	Rational	B3
5	Rational	offsite existing
6	Combine	<no description>
7	Reservoir	<no description>
8	Combine	<no description>
9	Combine	<no description>

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	------	1.271	2.352	-------	-------	3.198	-------	-------	5.601	A1 Existing
2	Rational	------	1.632	3.021	-------	-------	4.107	-------	-------	7.193	B1
3	Rational	------	0.411	0.760	-------	-------	1.033	-------	-------	1.810	B2
4	Rational	------	0.420	0.778	-------	-------	1.058	-------	-------	1.853	B3
5	Rational	------	0.228	0.422	-------	-------	0.573	-------	-------	1.004	offsite existing
6	Combine	2, 3,	2.043	3.781	-------	-------	5.140	-------	-------	9.003	<no description>
7	Reservoir	6	0.092	0.739	-------	-------	1.675	-------	-------	4.233	<no description>
8	Combine	4, 5, 7	0.707	1.289	-------	-------	2.367	-------	-------	5.713	<no description>
9	Combine	1, 5,	1.499	2.774	-------	-------	3.771	-------	-------	6.605	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.271	1	5	381	------	------	------	A1 Existing
2	Rational	1.632	1	5	490	------	------	------	B1
3	Rational	0.411	1	5	123	------	------	------	B2
4	Rational	0.420	1	5	126	------	------	------	B3
5	Rational	0.228	1	5	68	------	------	------	offsite existing
6	Combine	2.043	1	5	613	2, 3,	------	------	<no description>
7	Reservoir	0.092	1	10	607	6	998.34	581	<no description>
8	Combine	0.707	1	5	801	4, 5, 7	------	------	<no description>
9	Combine	1.499	1	5	450	1, 5,	------	------	<no description>

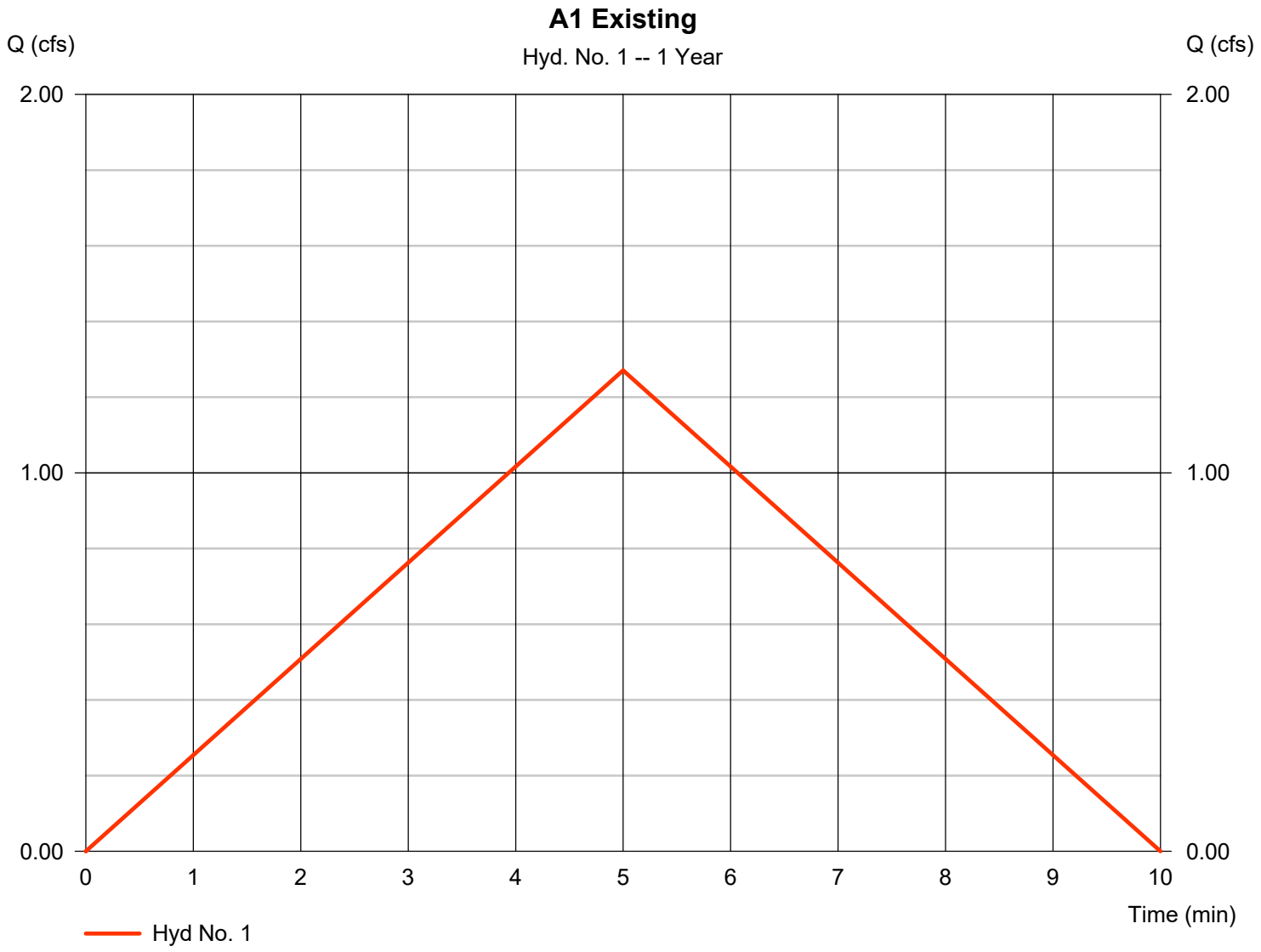
Hydrograph Report

Hyd. No. 1

A1 Existing

Hydrograph type	=	Rational	Peak discharge	=	1.271 cfs
Storm frequency	=	1 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	381 cuft
Drainage area	=	1.360 ac	Runoff coeff.	=	0.32*
Intensity	=	2.920 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.040 x 0.90) + (1.320 x 0.30)] / 1.360



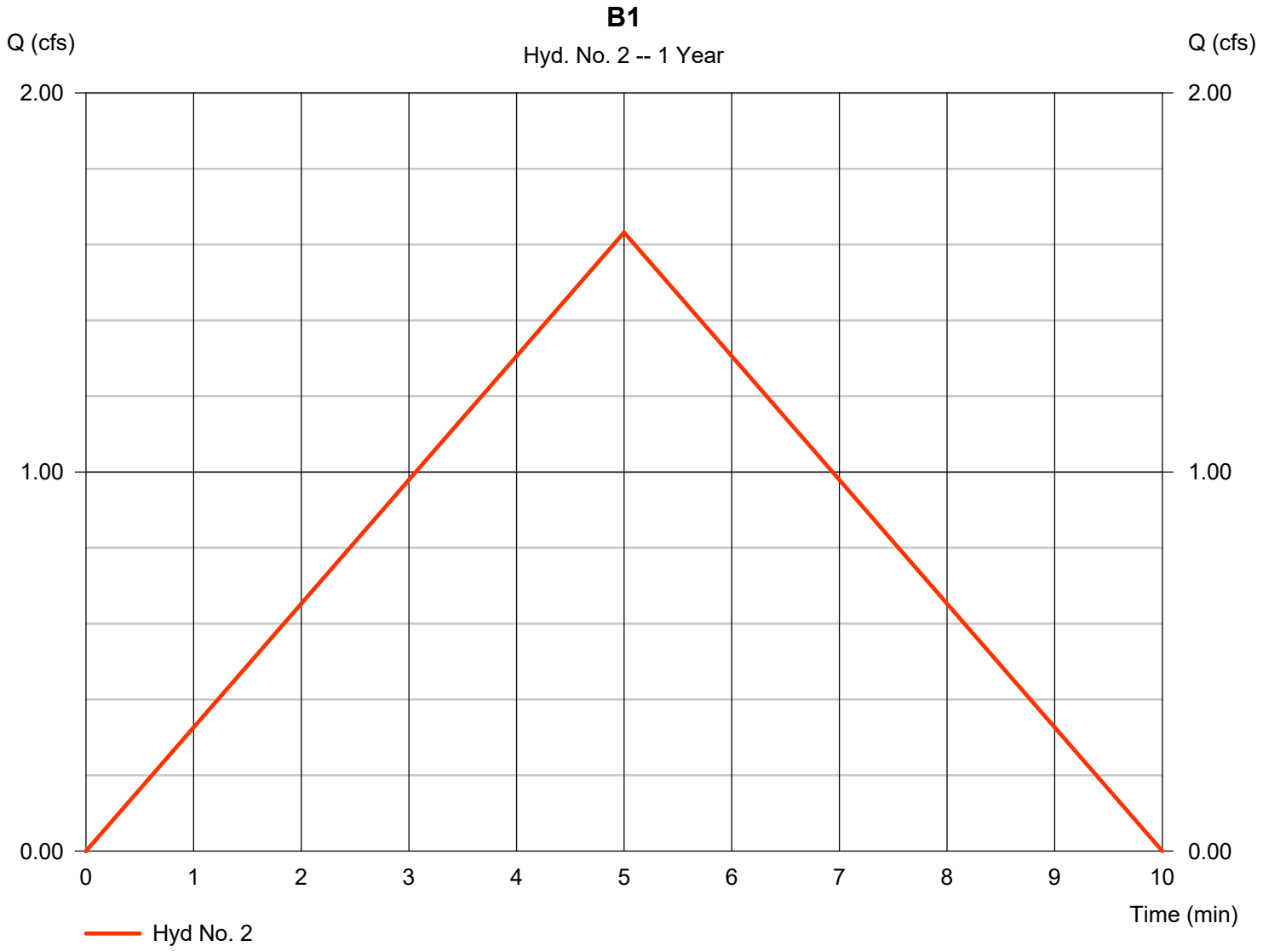
Hydrograph Report

Hyd. No. 2

B1

Hydrograph type	= Rational	Peak discharge	= 1.632 cfs
Storm frequency	= 1 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 490 cuft
Drainage area	= 0.810 ac	Runoff coeff.	= 0.69*
Intensity	= 2.920 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCAPWA.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.370 x 0.90) + (0.200 x 0.30) + (0.240 x 0.70)] / 0.810



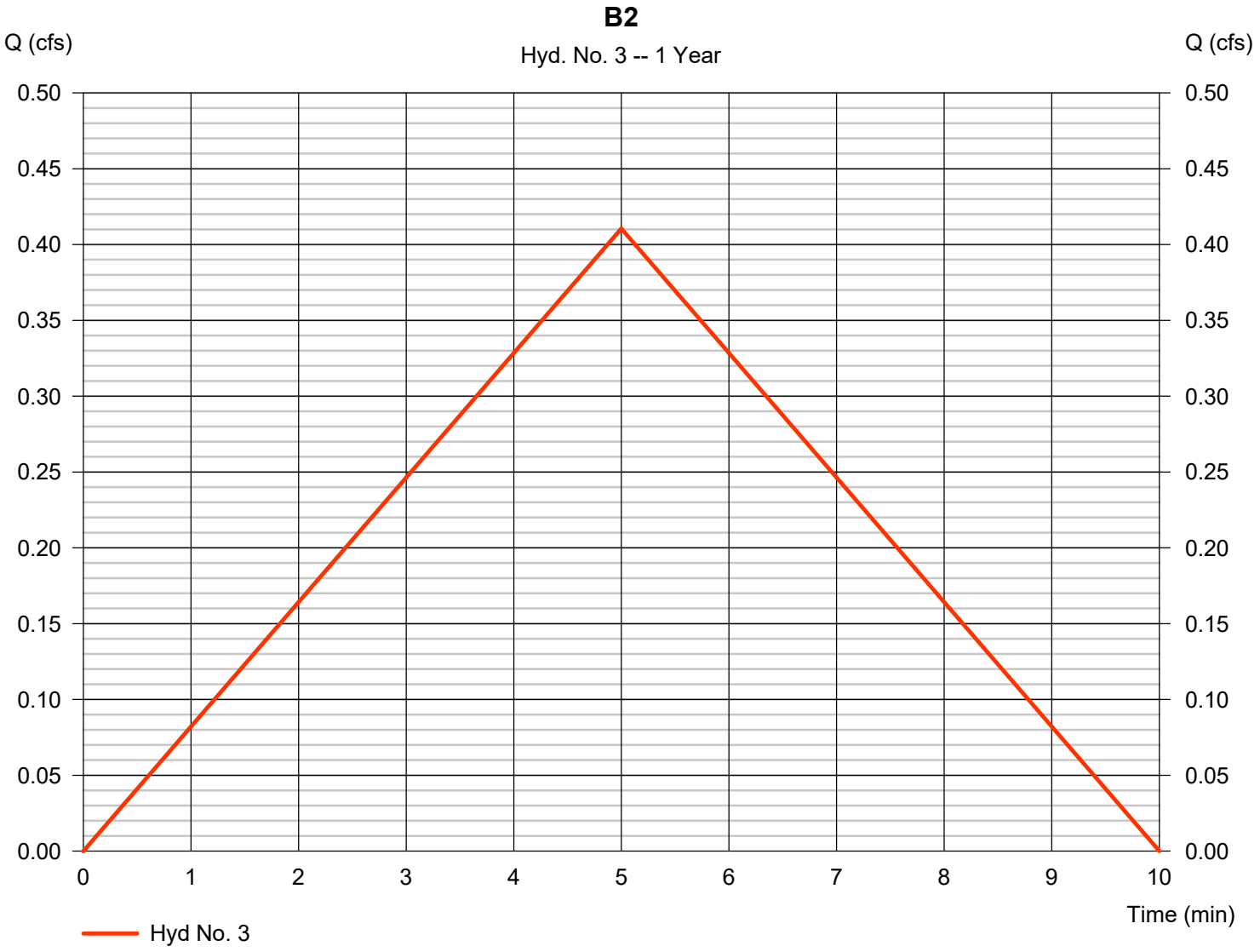
Hydrograph Report

Hyd. No. 3

B2

Hydrograph type	=	Rational	Peak discharge	=	0.411 cfs
Storm frequency	=	1 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	123 cuft
Drainage area	=	0.190 ac	Runoff coeff.	=	0.74*
Intensity	=	2.920 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.050 x 0.30)] / 0.190



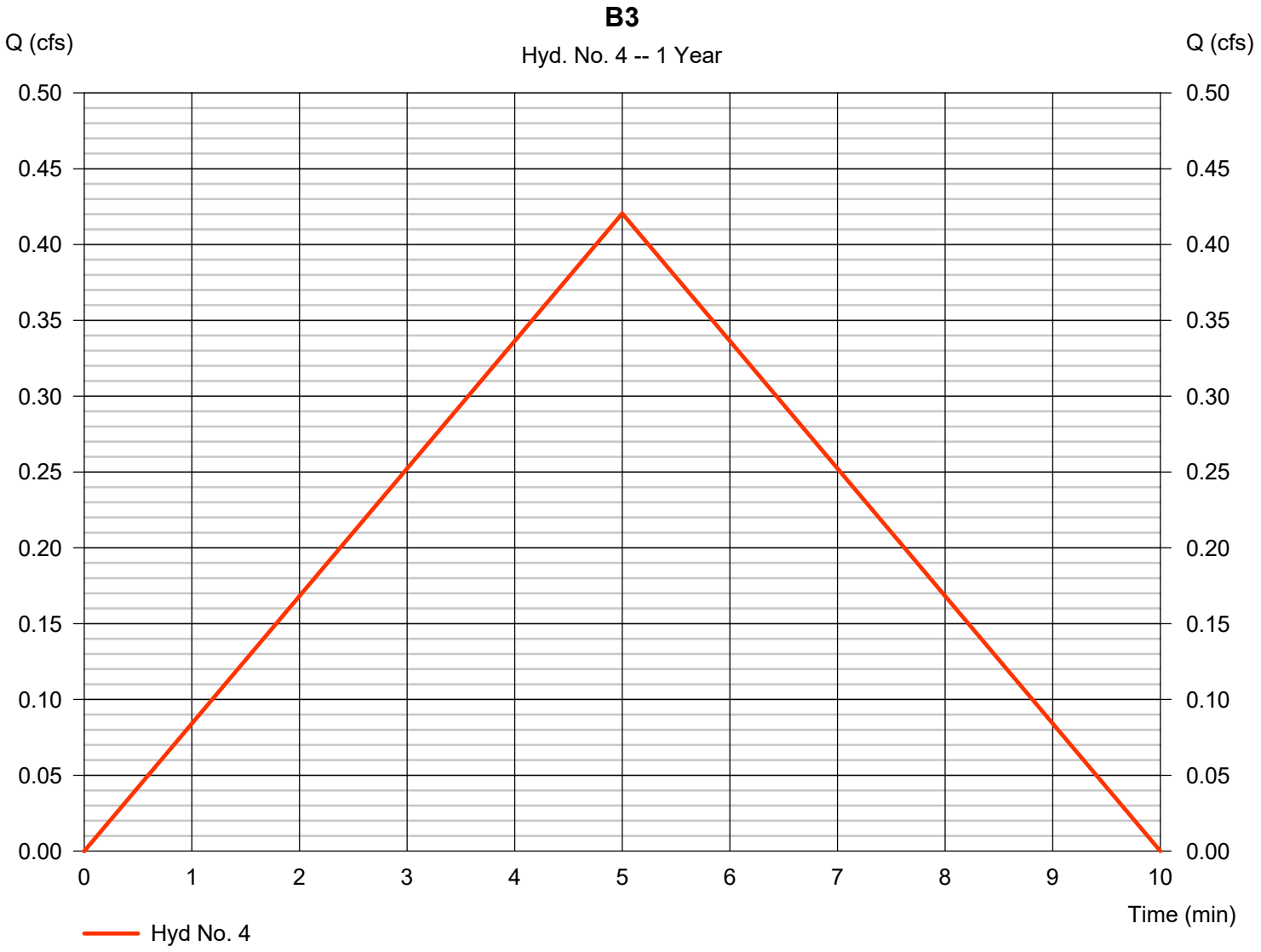
Hydrograph Report

Hyd. No. 4

B3

Hydrograph type	=	Rational	Peak discharge	=	0.420 cfs
Storm frequency	=	1 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	126 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.4*
Intensity	=	2.920 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.060 x 0.90) + (0.300 x 0.30)] / 0.360



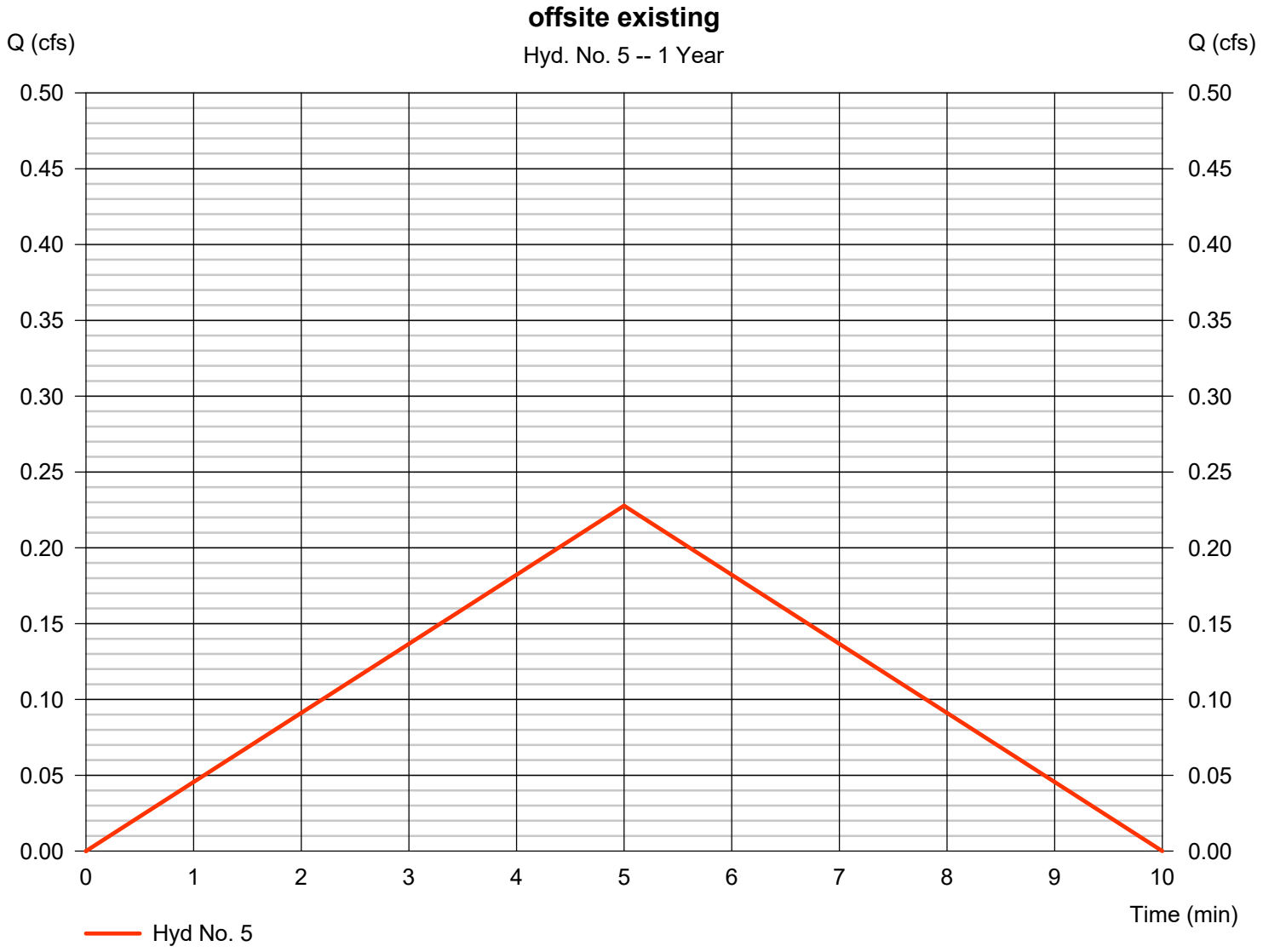
Hydrograph Report

Hyd. No. 5

offsite existing

Hydrograph type	=	Rational	Peak discharge	=	0.228 cfs
Storm frequency	=	1 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	68 cuft
Drainage area	=	0.260 ac	Runoff coeff.	=	0.3*
Intensity	=	2.920 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.570 x 0.90) + (0.260 x 0.70) + (0.530 x 0.30)] / 0.260

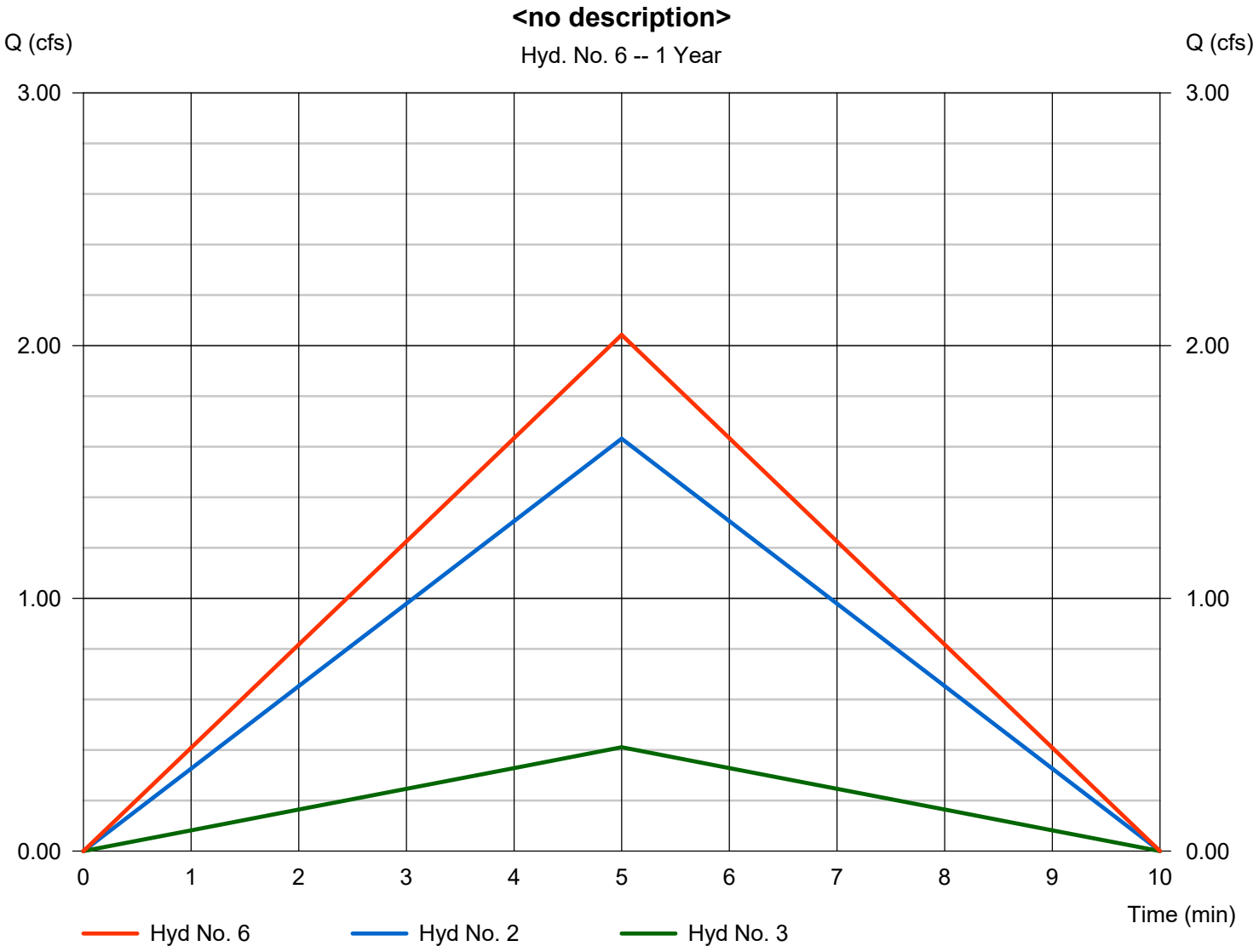


Hydrograph Report

Hyd. No. 6

<no description>

Hydrograph type	= Combine	Peak discharge	= 2.043 cfs
Storm frequency	= 1 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 613 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.000 ac



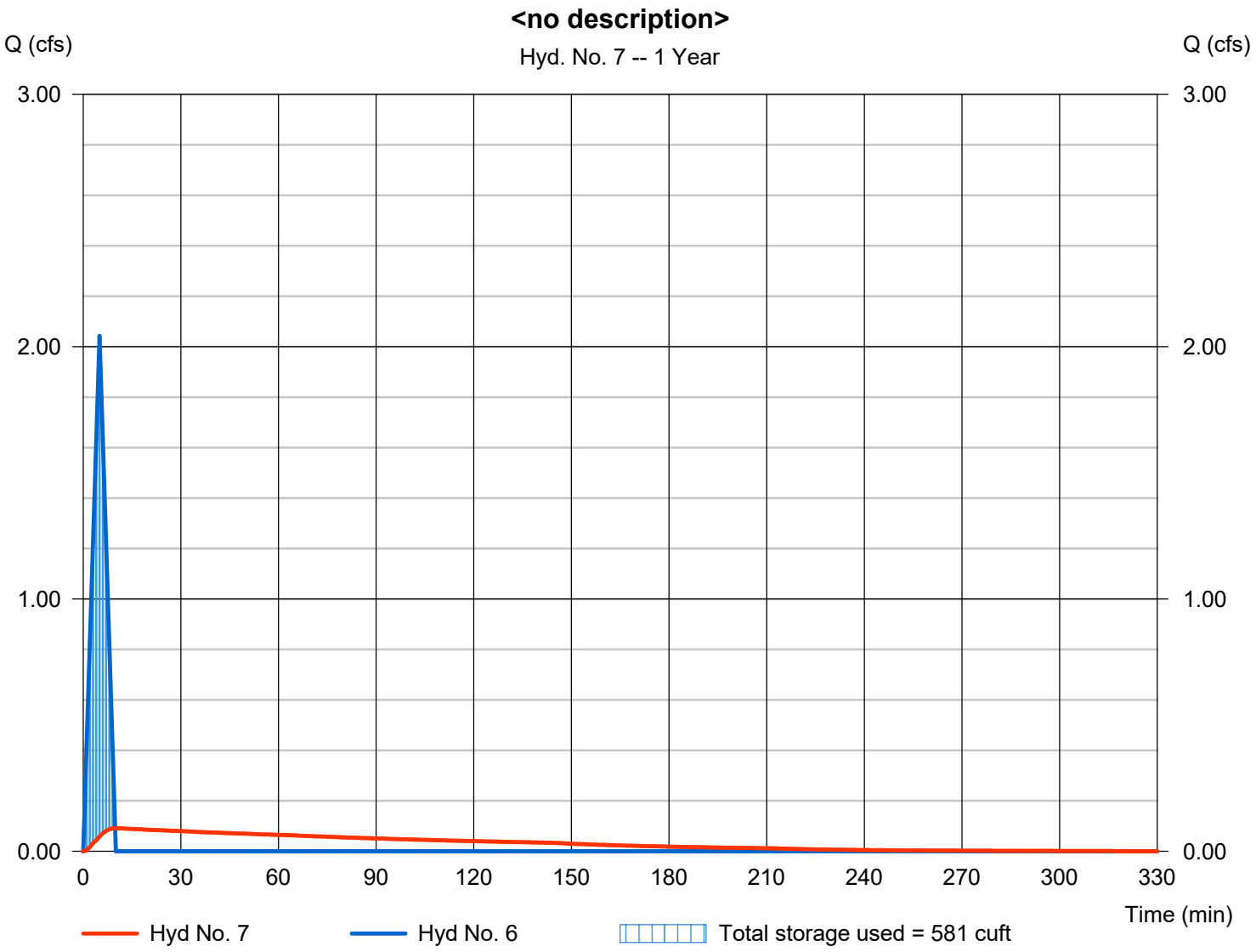
Hydrograph Report

Hyd. No. 7

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	0.092 cfs
Storm frequency	=	1 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	607 cuft
Inflow hyd. No.	=	6 - <no description>	Max. Elevation	=	998.34 ft
Reservoir name	=	30 in. pipe system	Max. Storage	=	581 cuft

Storage Indication method used.

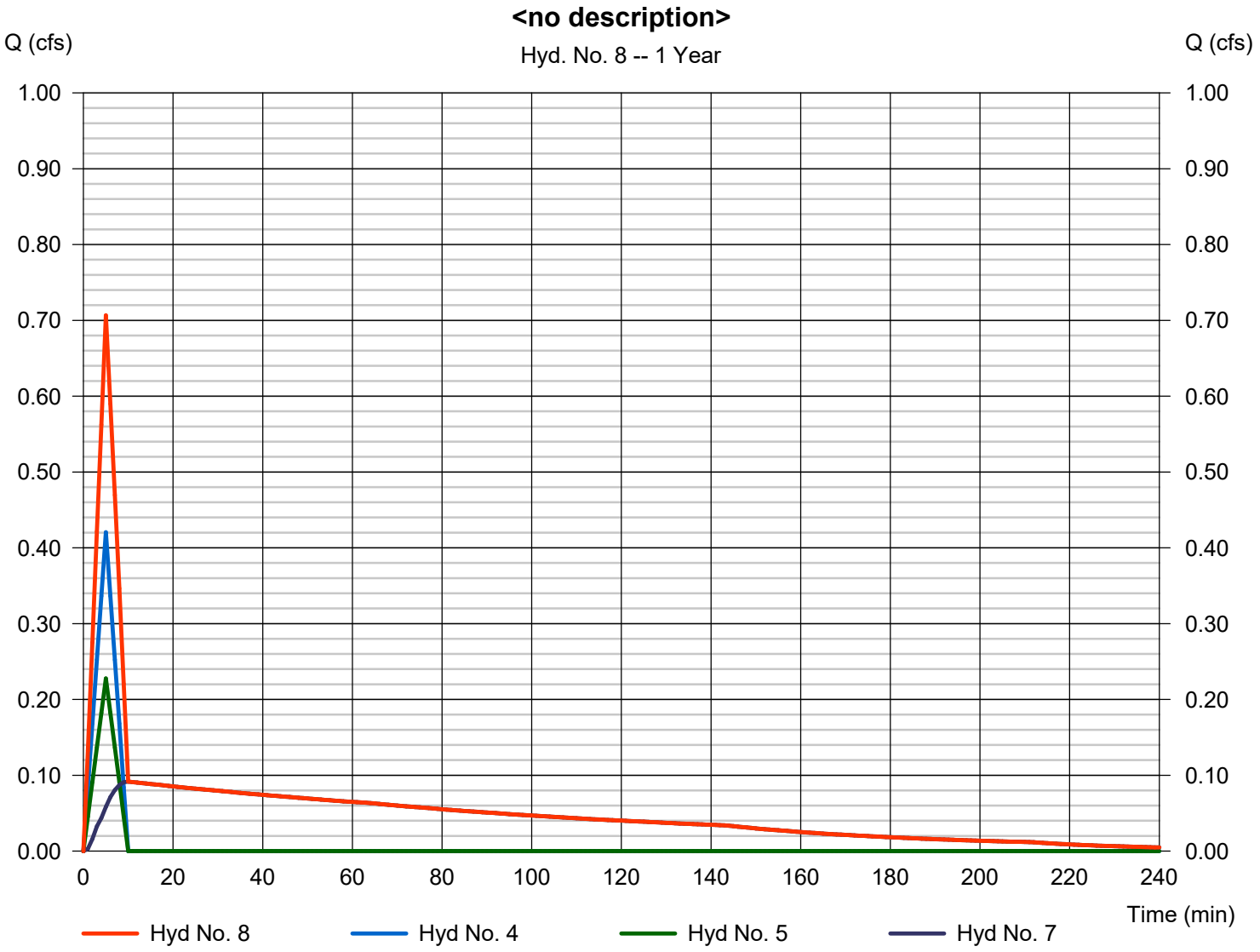


Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	= Combine	Peak discharge	= 0.707 cfs
Storm frequency	= 1 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 801 cuft
Inflow hyds.	= 4, 5, 7	Contrib. drain. area	= 0.620 ac

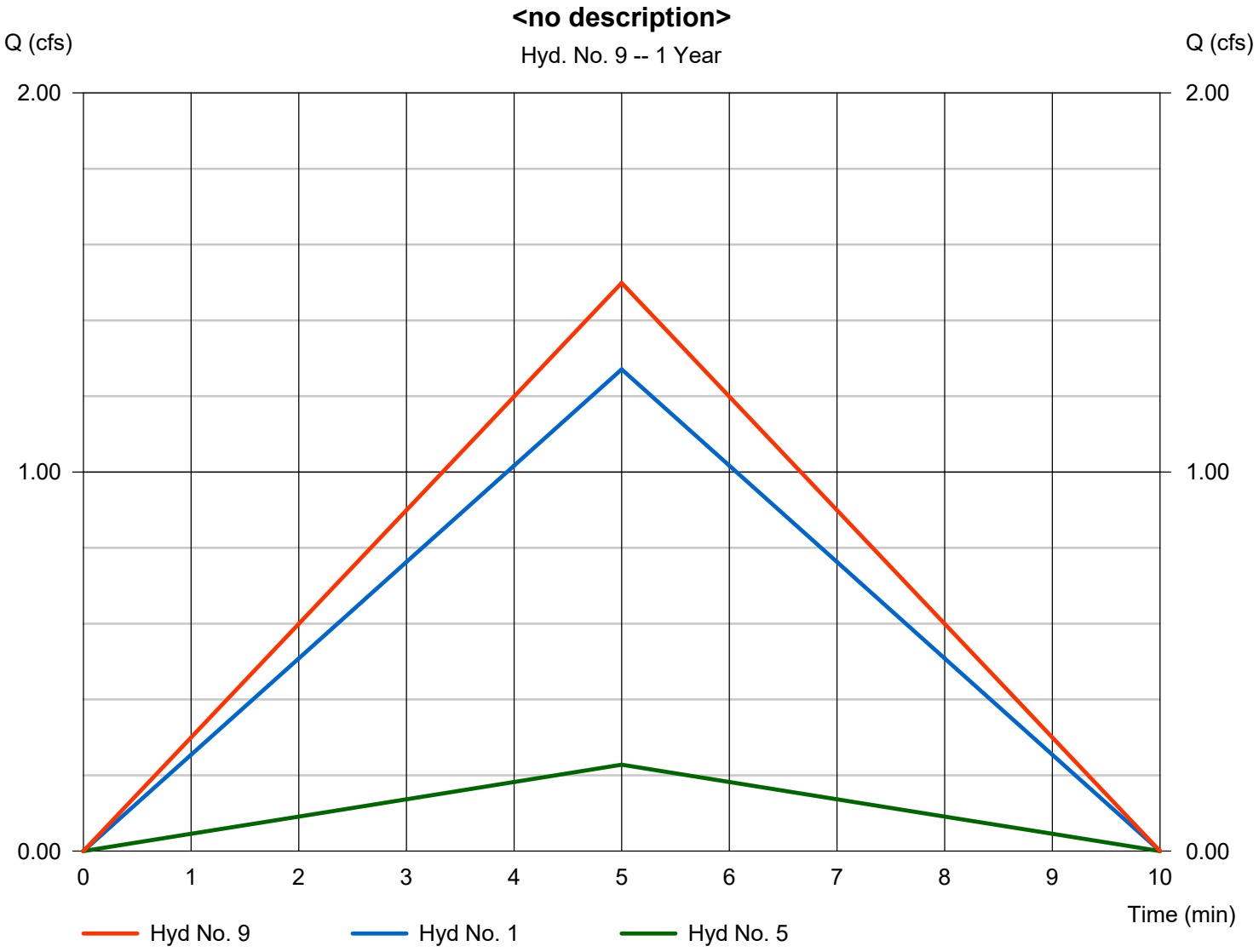


Hydrograph Report

Hyd. No. 9

<no description>

Hydrograph type	= Combine	Peak discharge	= 1.499 cfs
Storm frequency	= 1 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 450 cuft
Inflow hyds.	= 1, 5	Contrib. drain. area	= 1.620 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	2.352	1	5	706	------	------	------	A1 Existing
2	Rational	3.021	1	5	906	------	------	------	B1
3	Rational	0.760	1	5	228	------	------	------	B2
4	Rational	0.778	1	5	234	------	------	------	B3
5	Rational	0.422	1	5	126	------	------	------	offsite existing
6	Combine	3.781	1	5	1,134	2, 3,	------	------	<no description>
7	Reservoir	0.739	1	9	1,128	6	998.89	1,006	<no description>
8	Combine	1.289	1	5	1,488	4, 5, 7	------	------	<no description>
9	Combine	2.774	1	5	832	1, 5,	------	------	<no description>

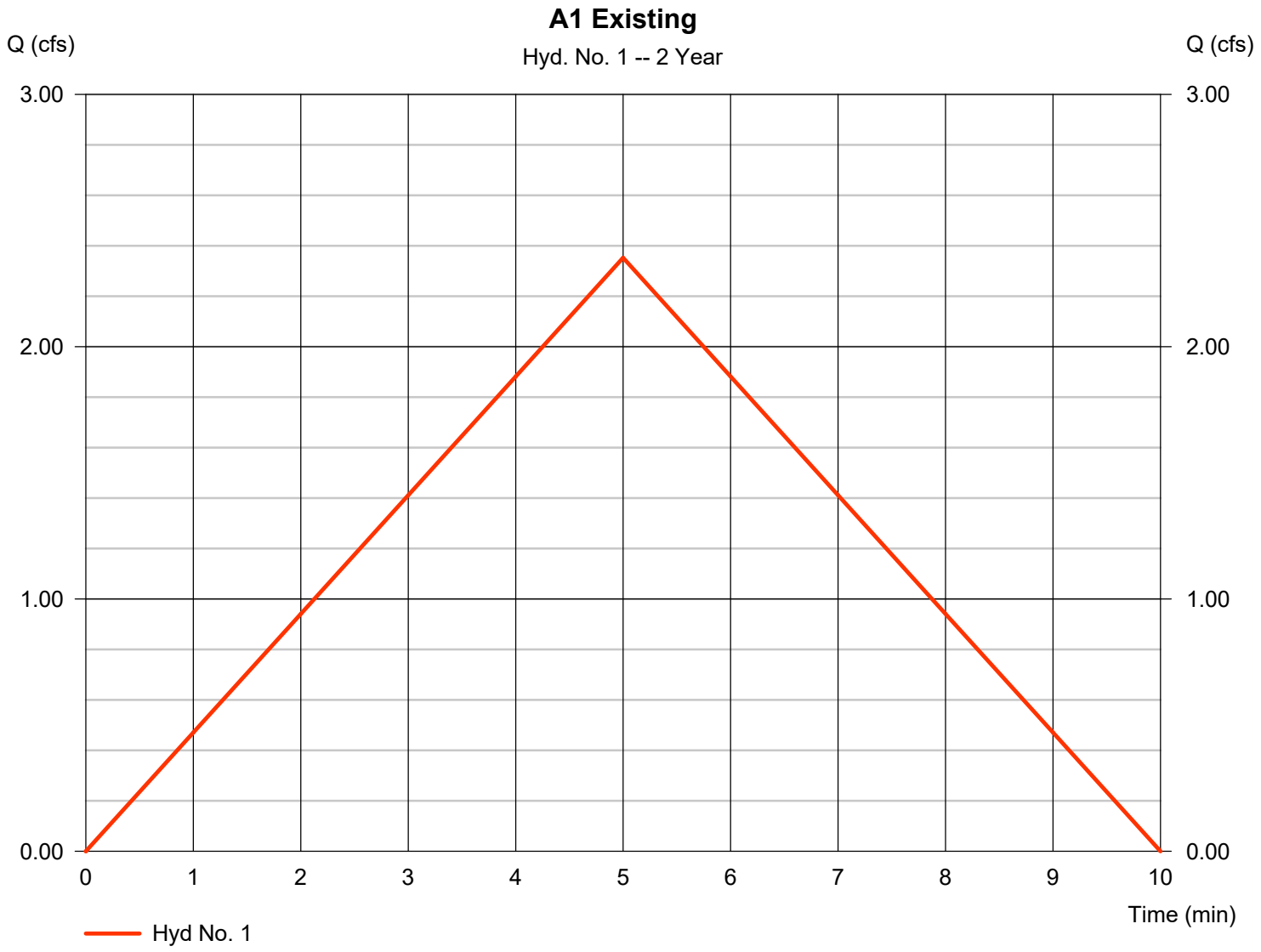
Hydrograph Report

Hyd. No. 1

A1 Existing

Hydrograph type	= Rational	Peak discharge	= 2.352 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 706 cuft
Drainage area	= 1.360 ac	Runoff coeff.	= 0.32*
Intensity	= 5.406 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCAPWA.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.040 x 0.90) + (1.320 x 0.30)] / 1.360



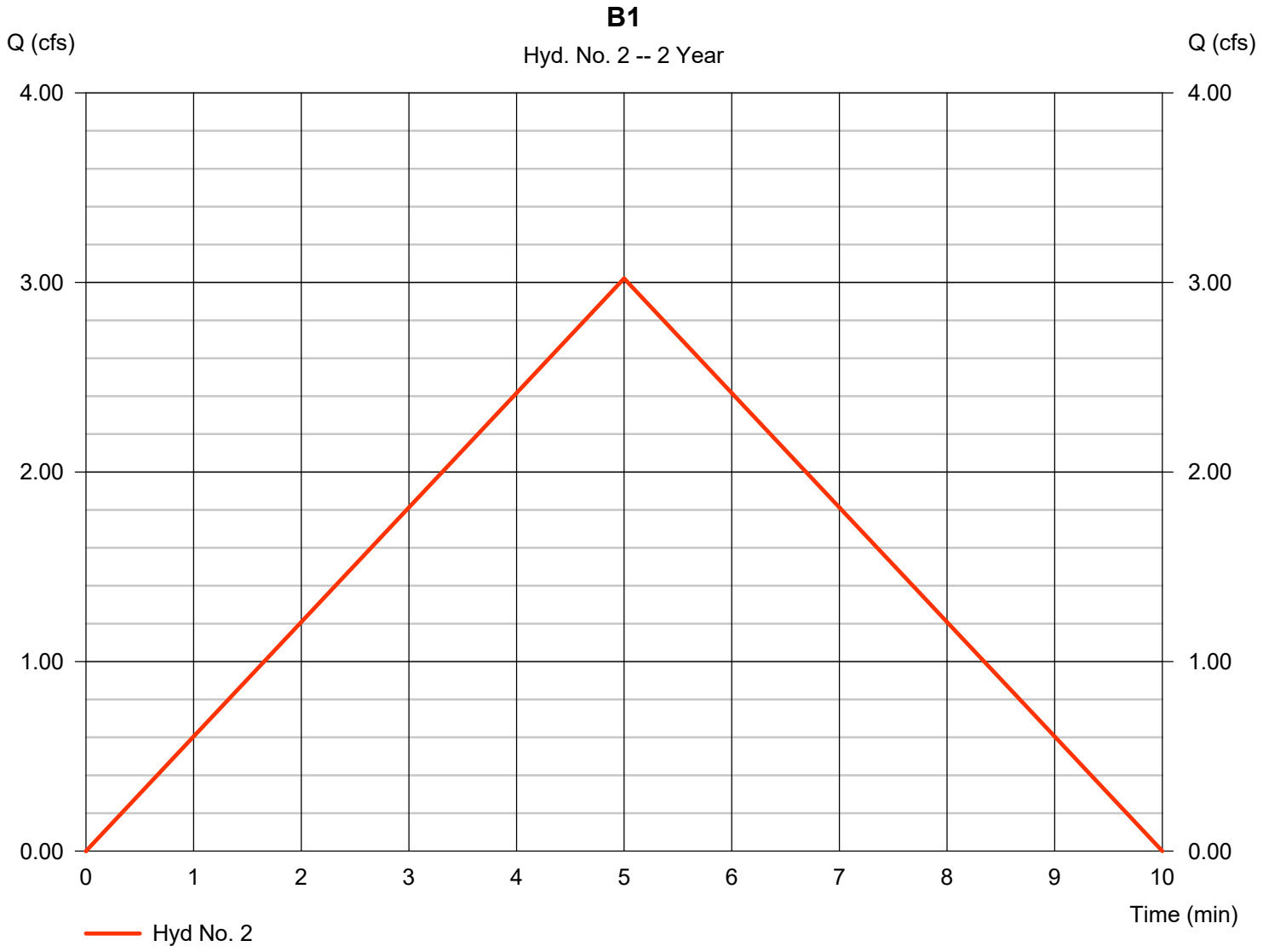
Hydrograph Report

Hyd. No. 2

B1

Hydrograph type	=	Rational	Peak discharge	=	3.021 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	906 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.69*
Intensity	=	5.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.370 x 0.90) + (0.200 x 0.30) + (0.240 x 0.70)] / 0.810



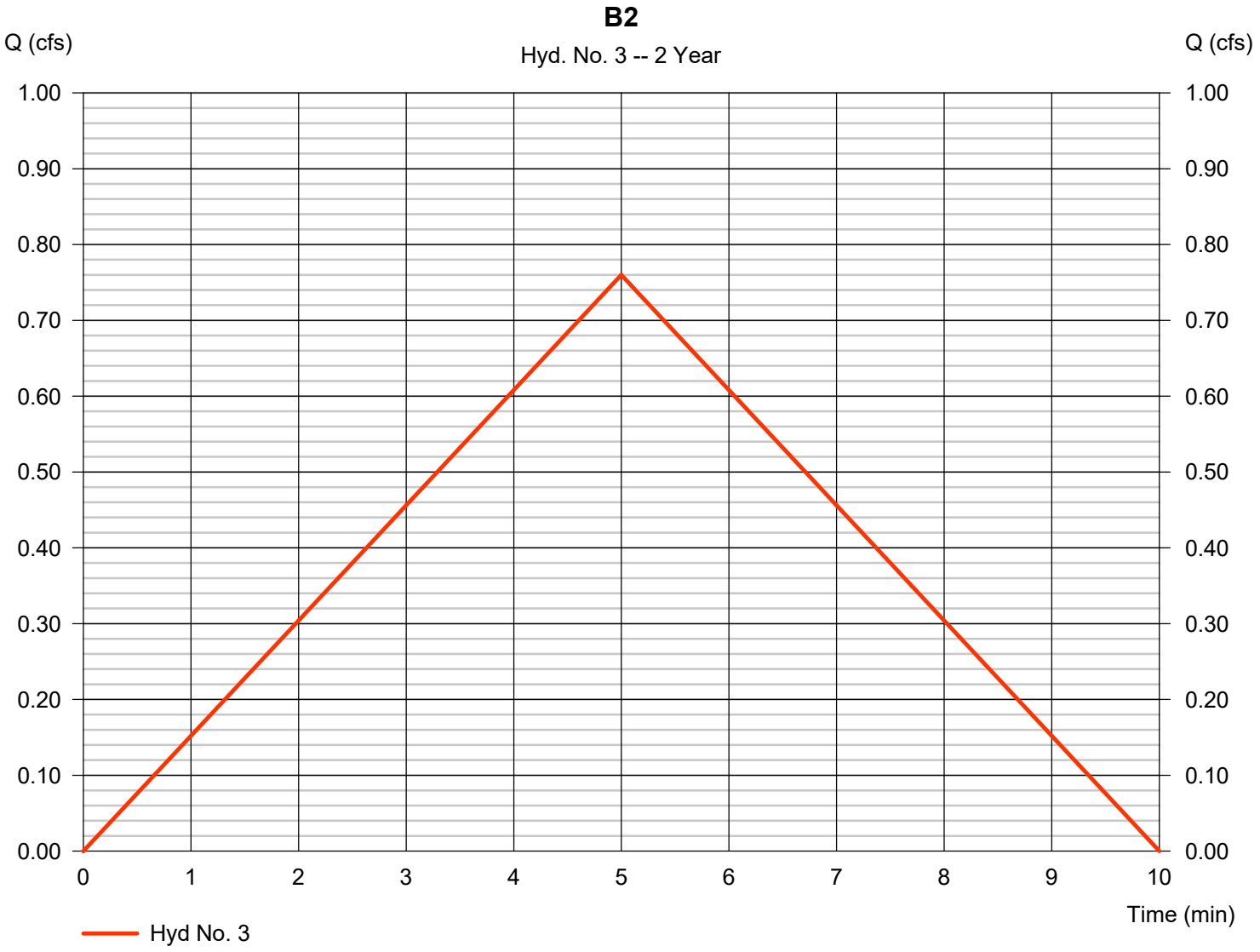
Hydrograph Report

Hyd. No. 3

B2

Hydrograph type	=	Rational	Peak discharge	=	0.760 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	228 cuft
Drainage area	=	0.190 ac	Runoff coeff.	=	0.74*
Intensity	=	5.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.050 x 0.30)] / 0.190



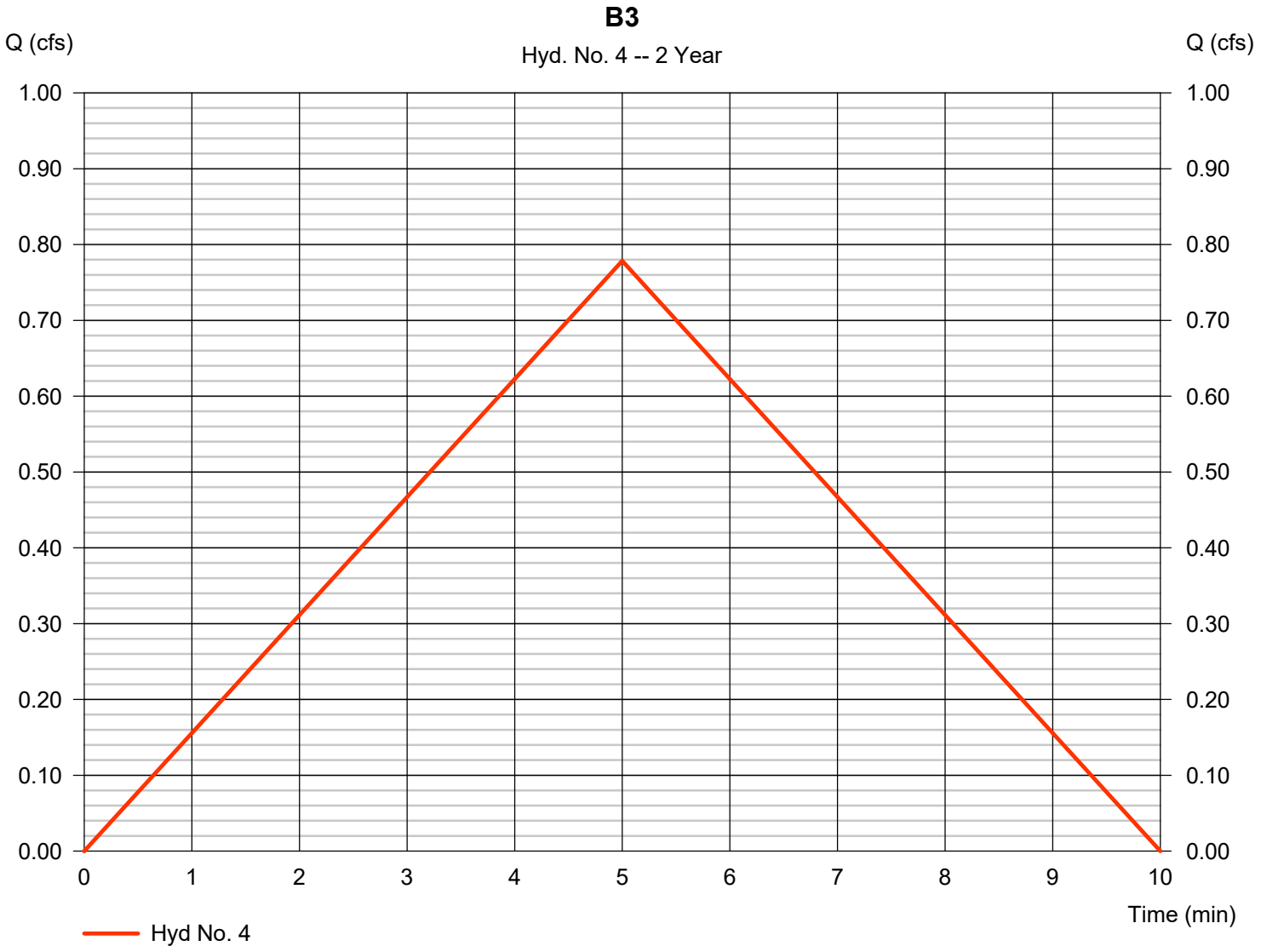
Hydrograph Report

Hyd. No. 4

B3

Hydrograph type	=	Rational	Peak discharge	=	0.778 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.4*
Intensity	=	5.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.060 x 0.90) + (0.300 x 0.30)] / 0.360



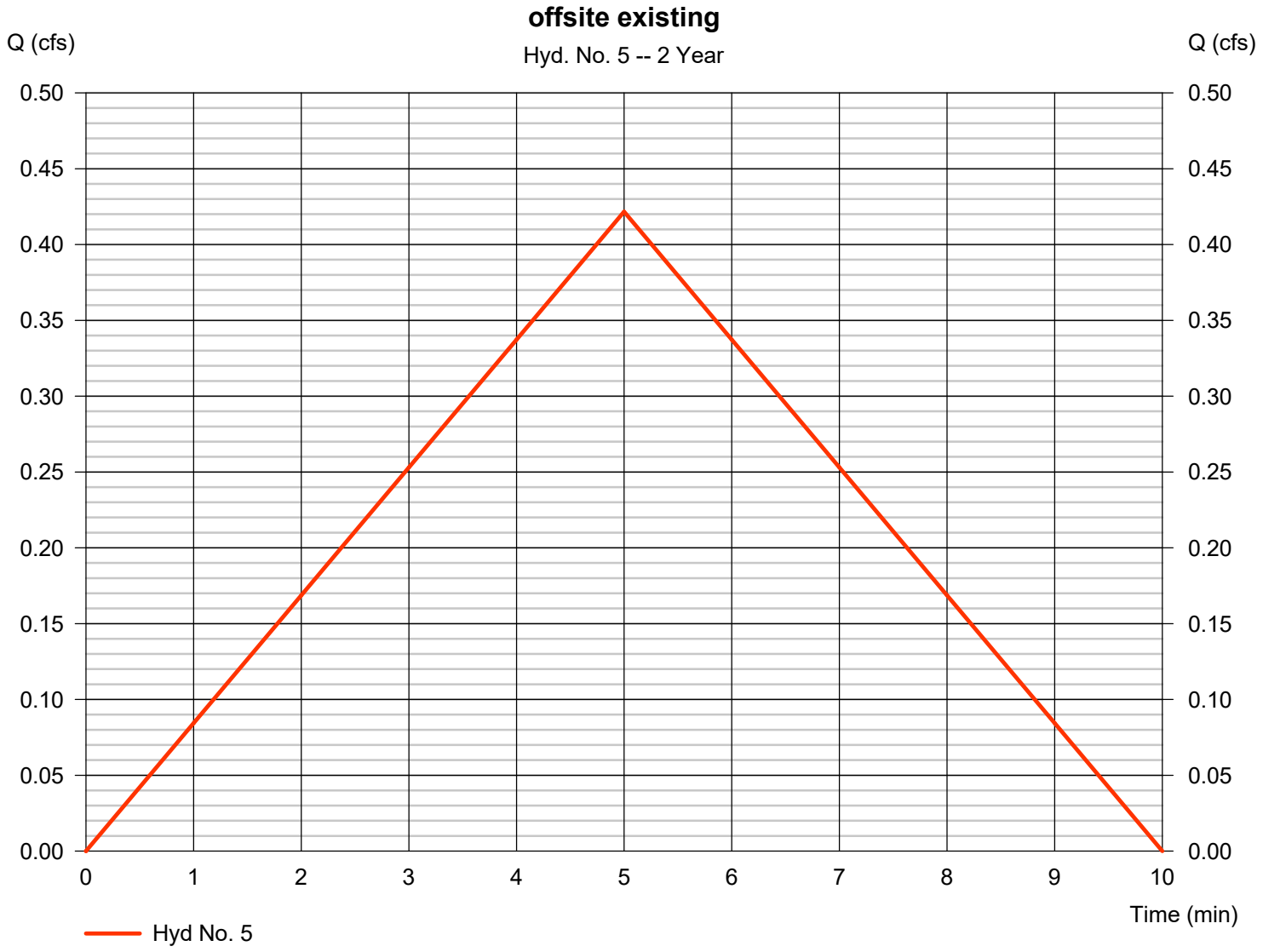
Hydrograph Report

Hyd. No. 5

offsite existing

Hydrograph type	=	Rational	Peak discharge	=	0.422 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	126 cuft
Drainage area	=	0.260 ac	Runoff coeff.	=	0.3*
Intensity	=	5.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.570 x 0.90) + (0.260 x 0.70) + (0.530 x 0.30)] / 0.260

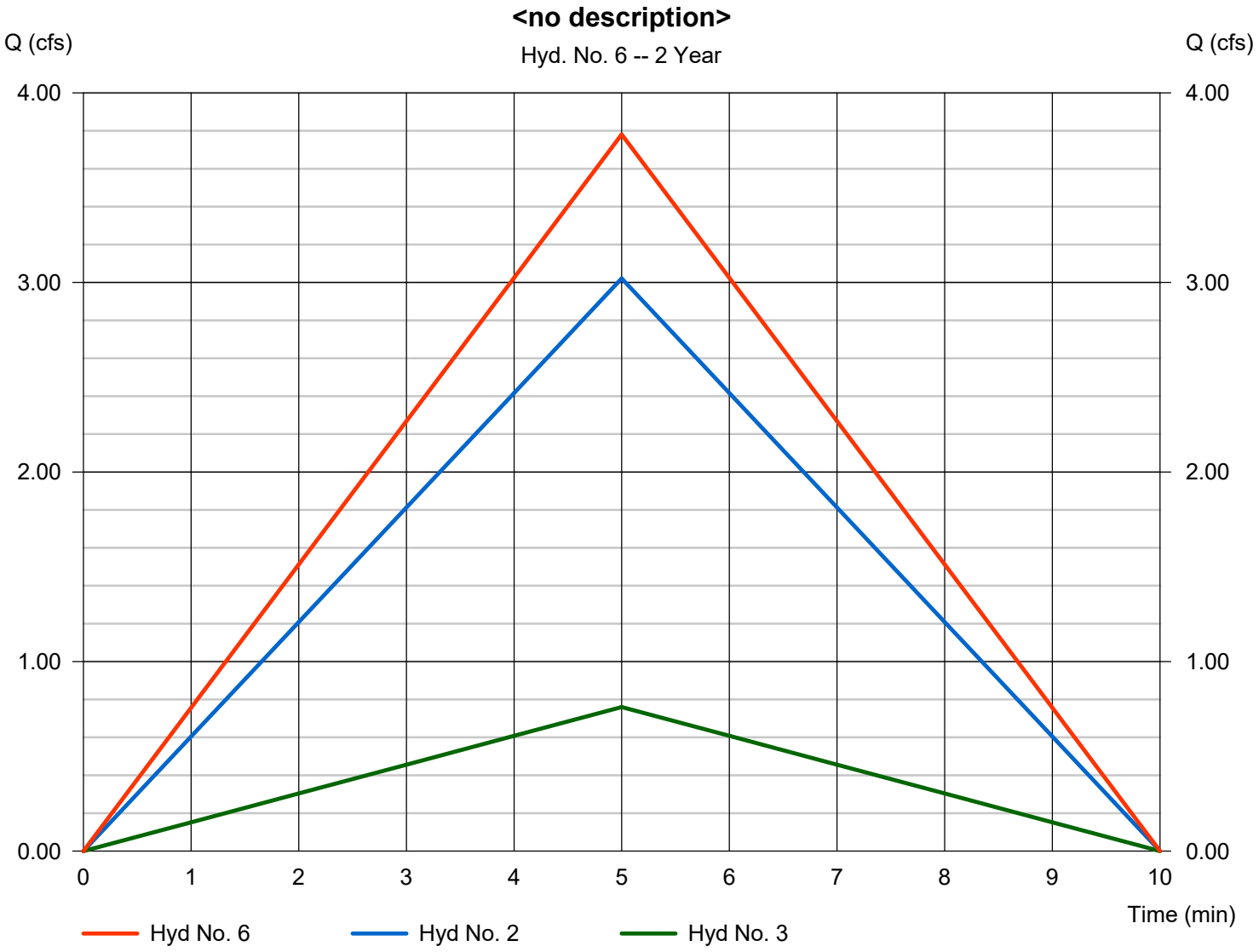


Hydrograph Report

Hyd. No. 6

<no description>

Hydrograph type	= Combine	Peak discharge	= 3.781 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,134 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.000 ac



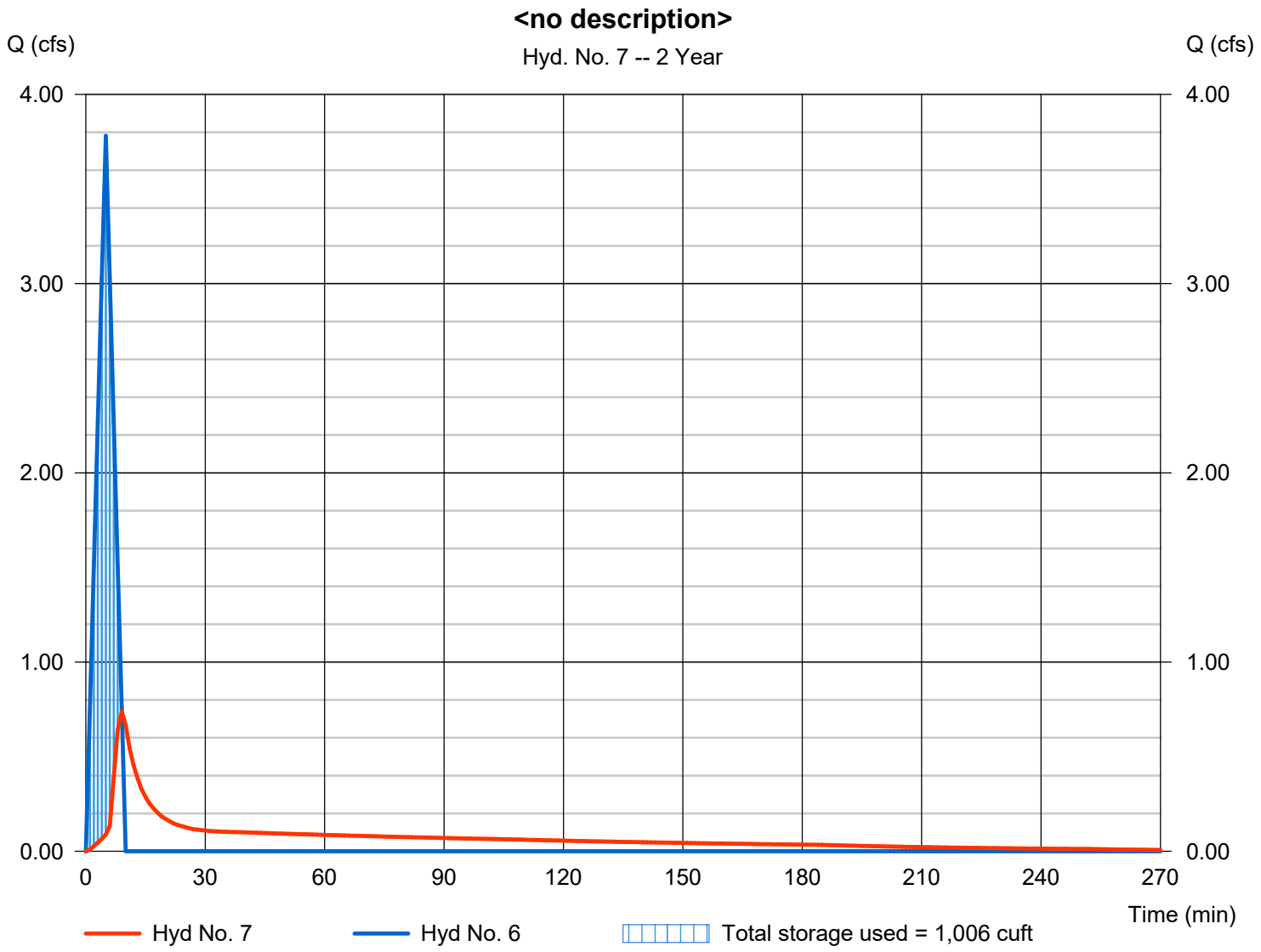
Hydrograph Report

Hyd. No. 7

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	0.739 cfs
Storm frequency	=	2 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	1,128 cuft
Inflow hyd. No.	=	6 - <no description>	Max. Elevation	=	998.89 ft
Reservoir name	=	30 in. pipe system	Max. Storage	=	1,006 cuft

Storage Indication method used.

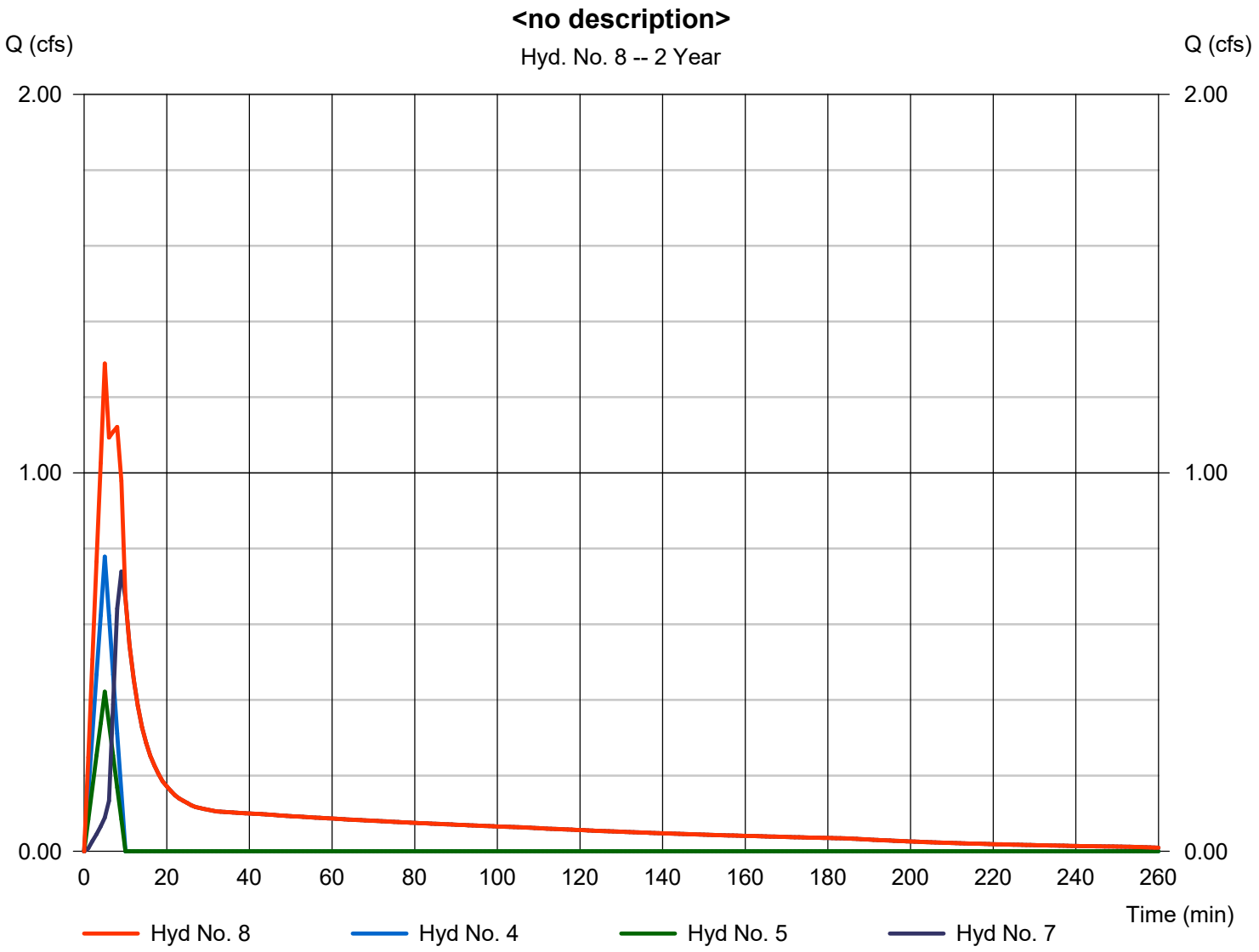


Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	= Combine	Peak discharge	= 1.289 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,488 cuft
Inflow hyds.	= 4, 5, 7	Contrib. drain. area	= 0.620 ac

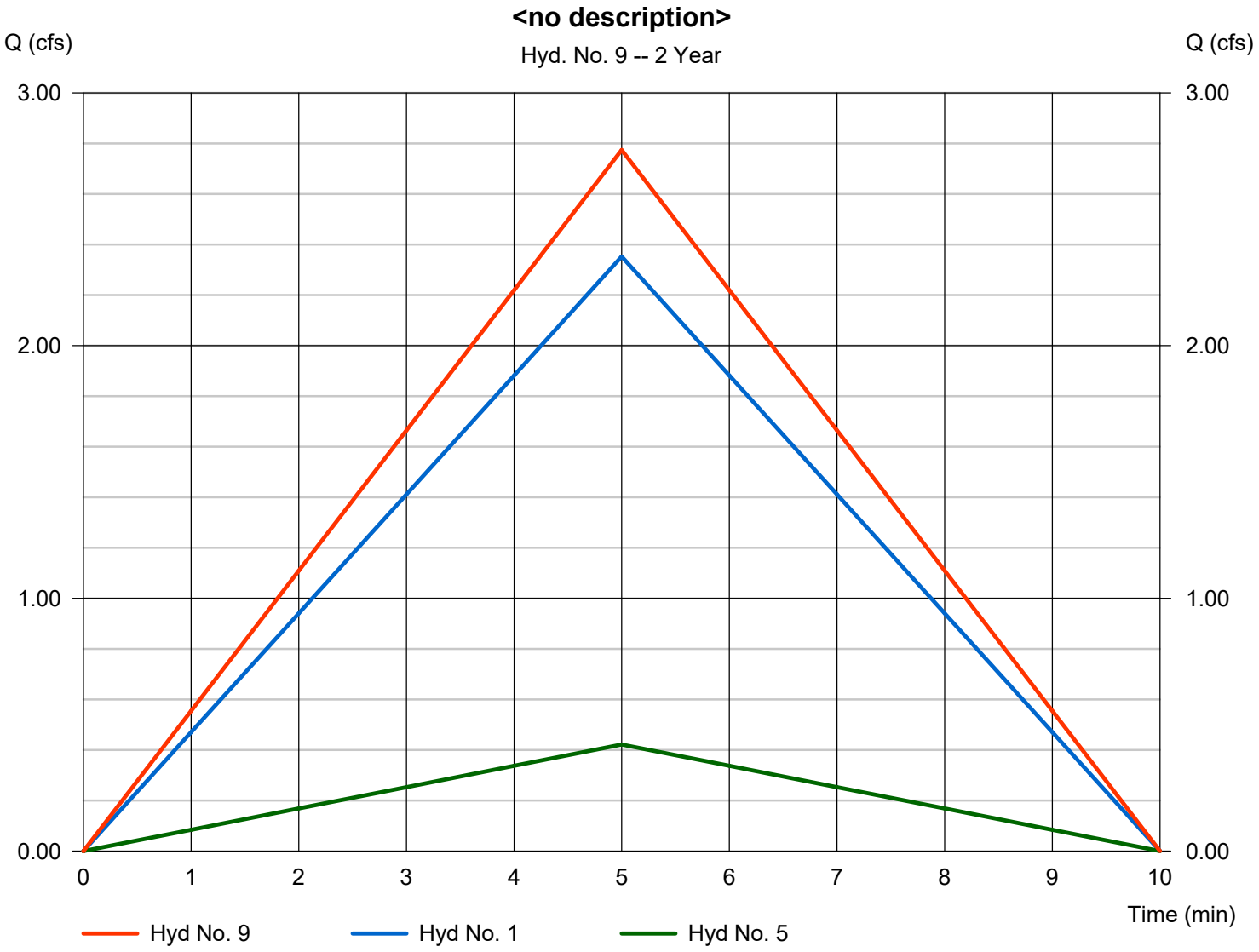


Hydrograph Report

Hyd. No. 9

<no description>

Hydrograph type	= Combine	Peak discharge	= 2.774 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 832 cuft
Inflow hyds.	= 1, 5	Contrib. drain. area	= 1.620 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	3.198	1	5	959	------	------	------	A1 Existing
2	Rational	4.107	1	5	1,232	------	------	------	B1
3	Rational	1.033	1	5	310	------	------	------	B2
4	Rational	1.058	1	5	317	------	------	------	B3
5	Rational	0.573	1	5	172	------	------	------	offsite existing
6	Combine	5.140	1	5	1,542	2, 3,	------	------	<no description>
7	Reservoir	1.675	1	8	1,536	6	999.18	1,221	<no description>
8	Combine	2.367	1	7	2,025	4, 5, 7	------	------	<no description>
9	Combine	3.771	1	5	1,131	1, 5,	------	------	<no description>

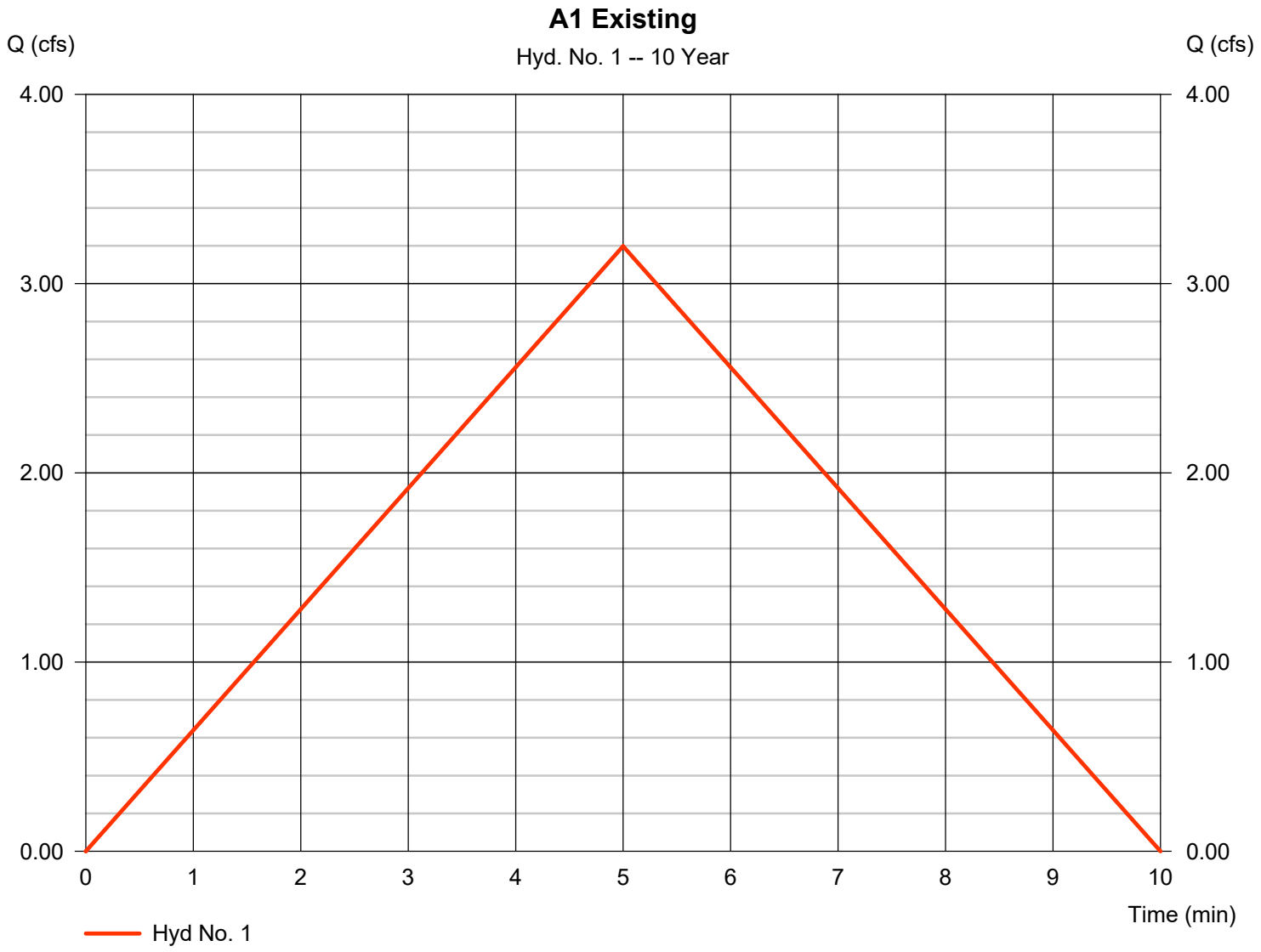
Hydrograph Report

Hyd. No. 1

A1 Existing

Hydrograph type	=	Rational	Peak discharge	=	3.198 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	959 cuft
Drainage area	=	1.360 ac	Runoff coeff.	=	0.32*
Intensity	=	7.348 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.040 x 0.90) + (1.320 x 0.30)] / 1.360



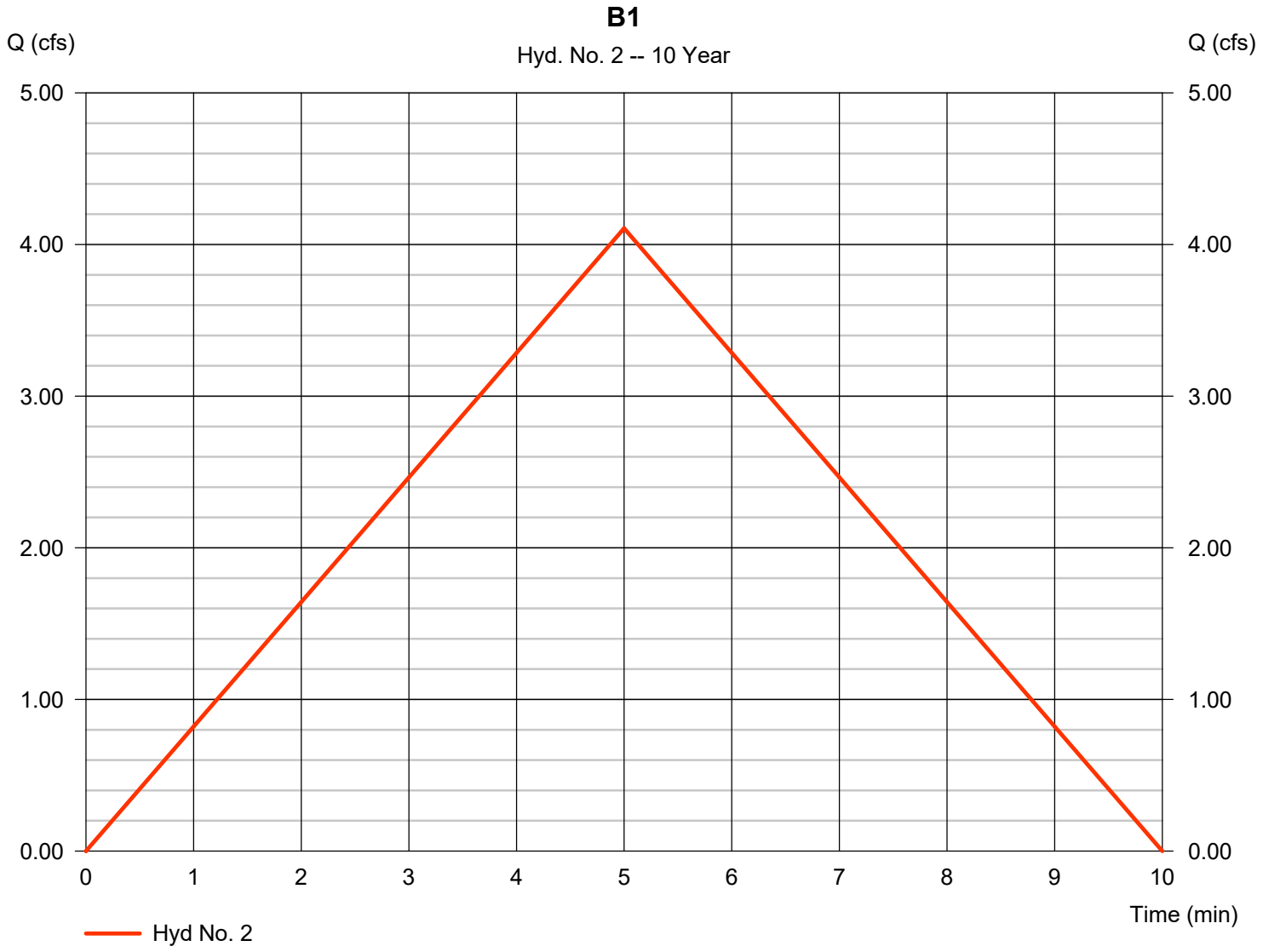
Hydrograph Report

Hyd. No. 2

B1

Hydrograph type	= Rational	Peak discharge	= 4.107 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,232 cuft
Drainage area	= 0.810 ac	Runoff coeff.	= 0.69*
Intensity	= 7.348 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCAPWA.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.370 x 0.90) + (0.200 x 0.30) + (0.240 x 0.70)] / 0.810



Hydrograph Report

Hyd. No. 3

B2

Hydrograph type	=	Rational	Peak discharge	=	1.033 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	310 cuft
Drainage area	=	0.190 ac	Runoff coeff.	=	0.74*
Intensity	=	7.348 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.050 x 0.30)] / 0.190

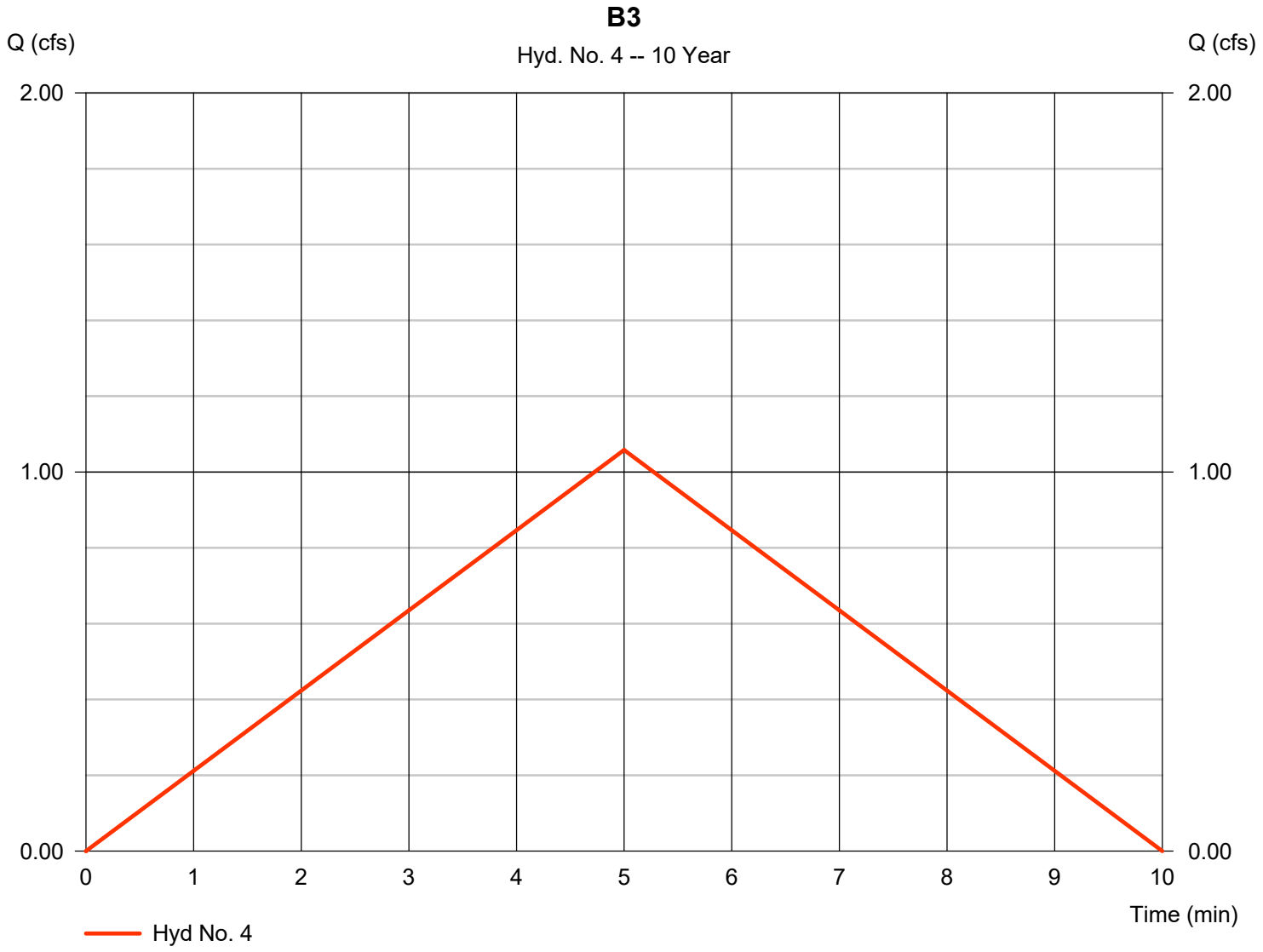
Hydrograph Report

Hyd. No. 4

B3

Hydrograph type	=	Rational	Peak discharge	=	1.058 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	317 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.4*
Intensity	=	7.348 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.060 x 0.90) + (0.300 x 0.30)] / 0.360



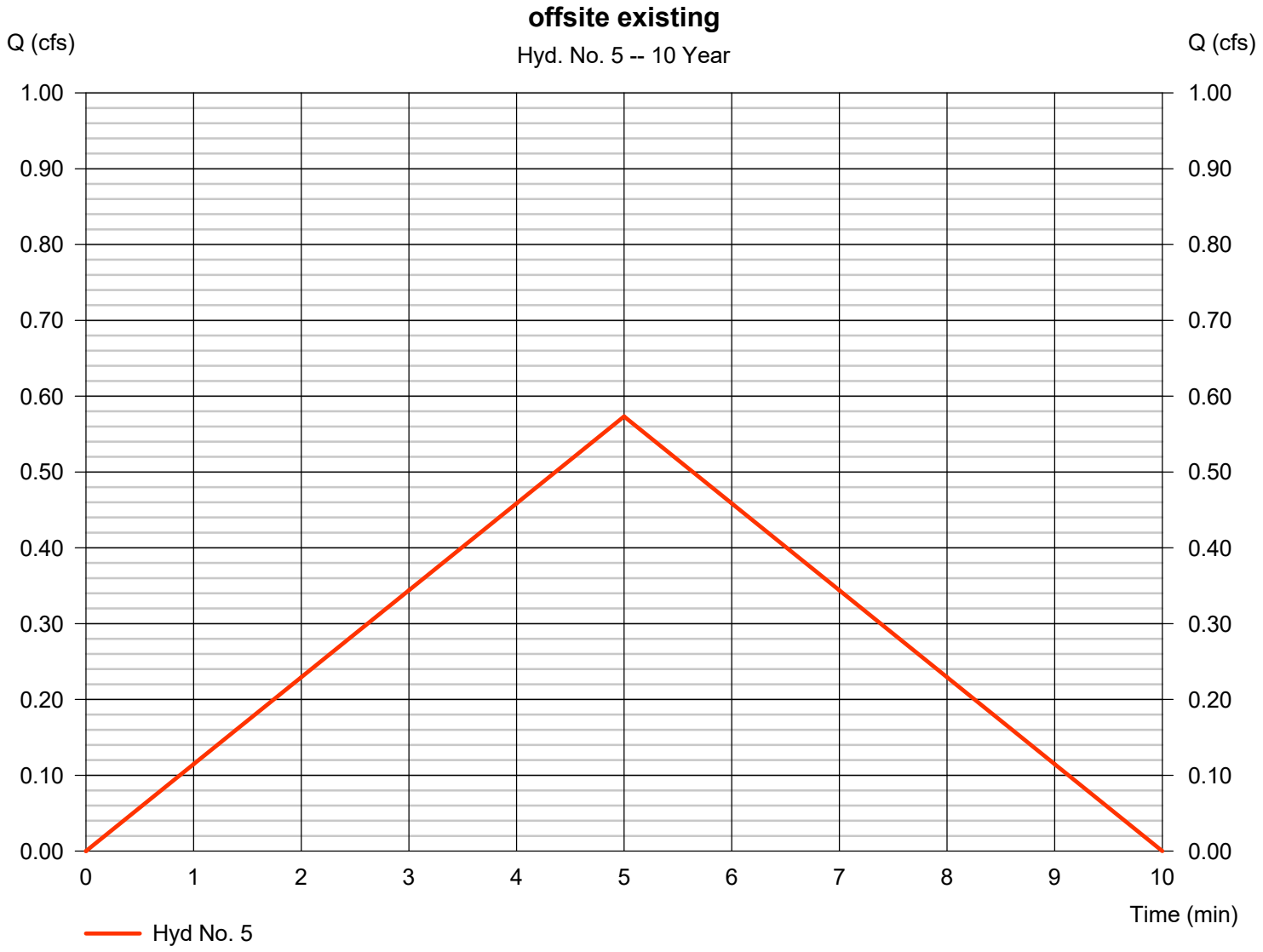
Hydrograph Report

Hyd. No. 5

offsite existing

Hydrograph type	=	Rational	Peak discharge	=	0.573 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	172 cuft
Drainage area	=	0.260 ac	Runoff coeff.	=	0.3*
Intensity	=	7.348 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.570 x 0.90) + (0.260 x 0.70) + (0.530 x 0.30)] / 0.260

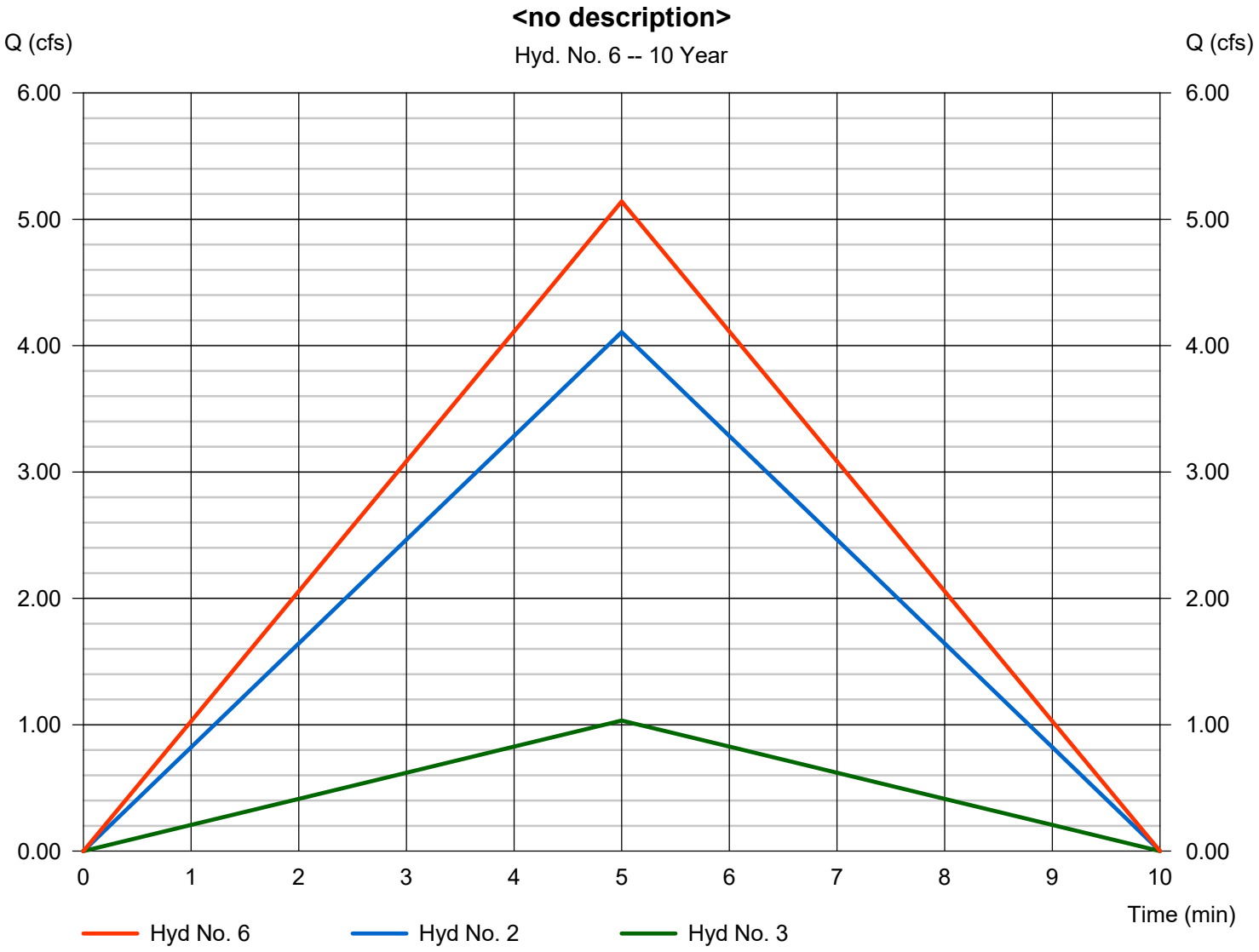


Hydrograph Report

Hyd. No. 6

<no description>

Hydrograph type	= Combine	Peak discharge	= 5.140 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,542 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.000 ac



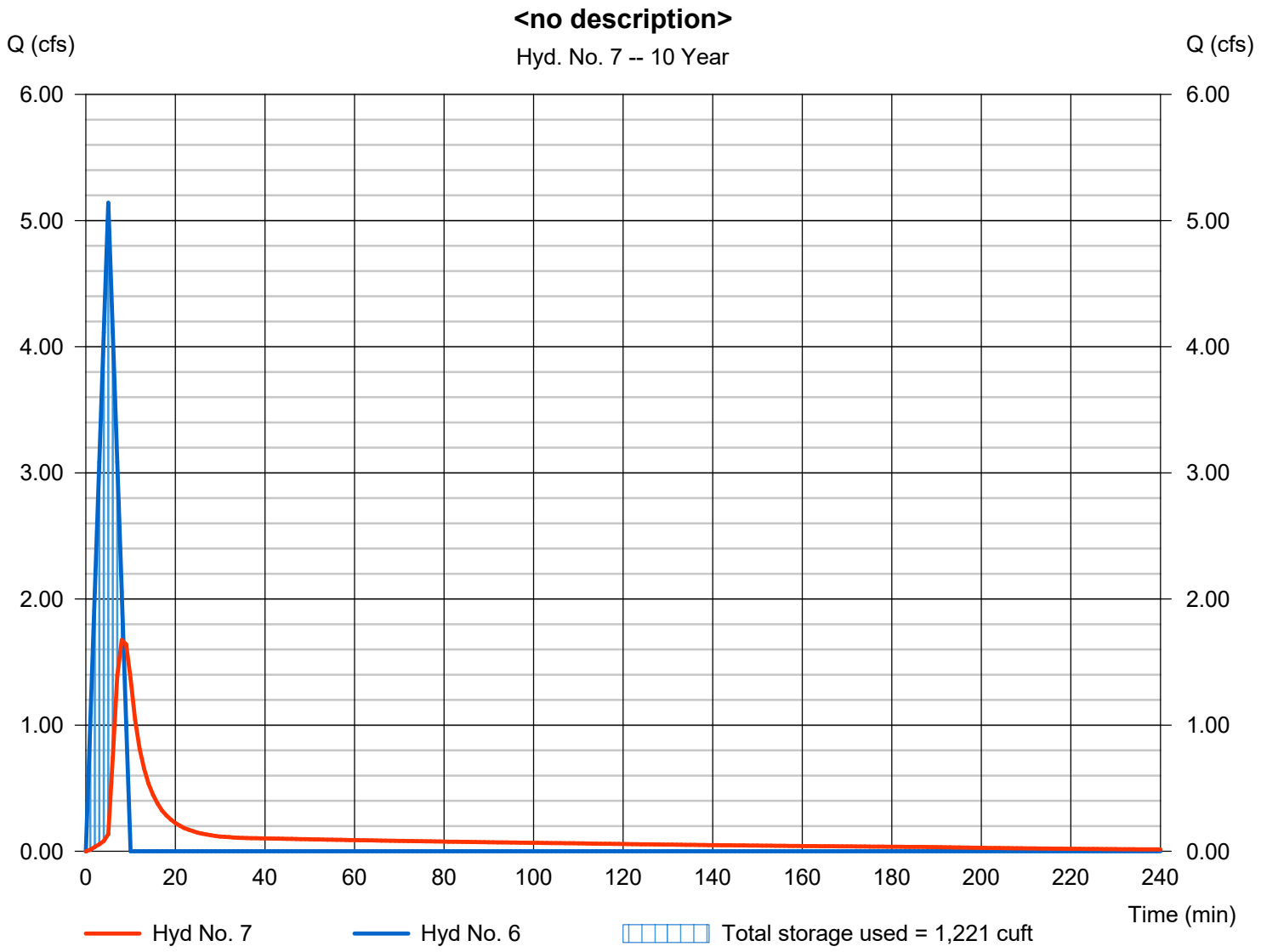
Hydrograph Report

Hyd. No. 7

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 1.675 cfs
Storm frequency	= 10 yrs	Time to peak	= 8 min
Time interval	= 1 min	Hyd. volume	= 1,536 cuft
Inflow hyd. No.	= 6 - <no description>	Max. Elevation	= 999.18 ft
Reservoir name	= 30 in. pipe system	Max. Storage	= 1,221 cuft

Storage Indication method used.

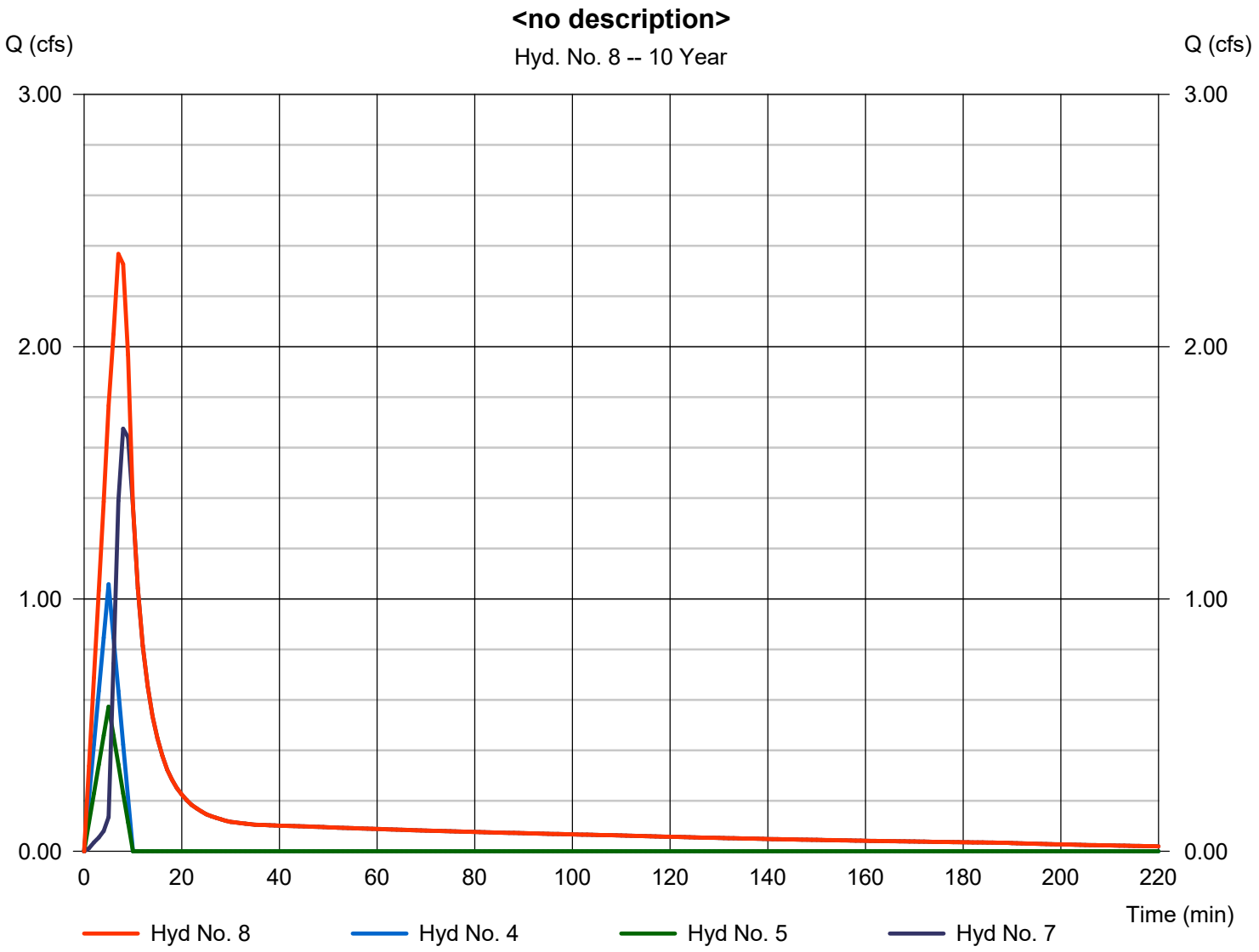


Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	= Combine	Peak discharge	= 2.367 cfs
Storm frequency	= 10 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 2,025 cuft
Inflow hyds.	= 4, 5, 7	Contrib. drain. area	= 0.620 ac

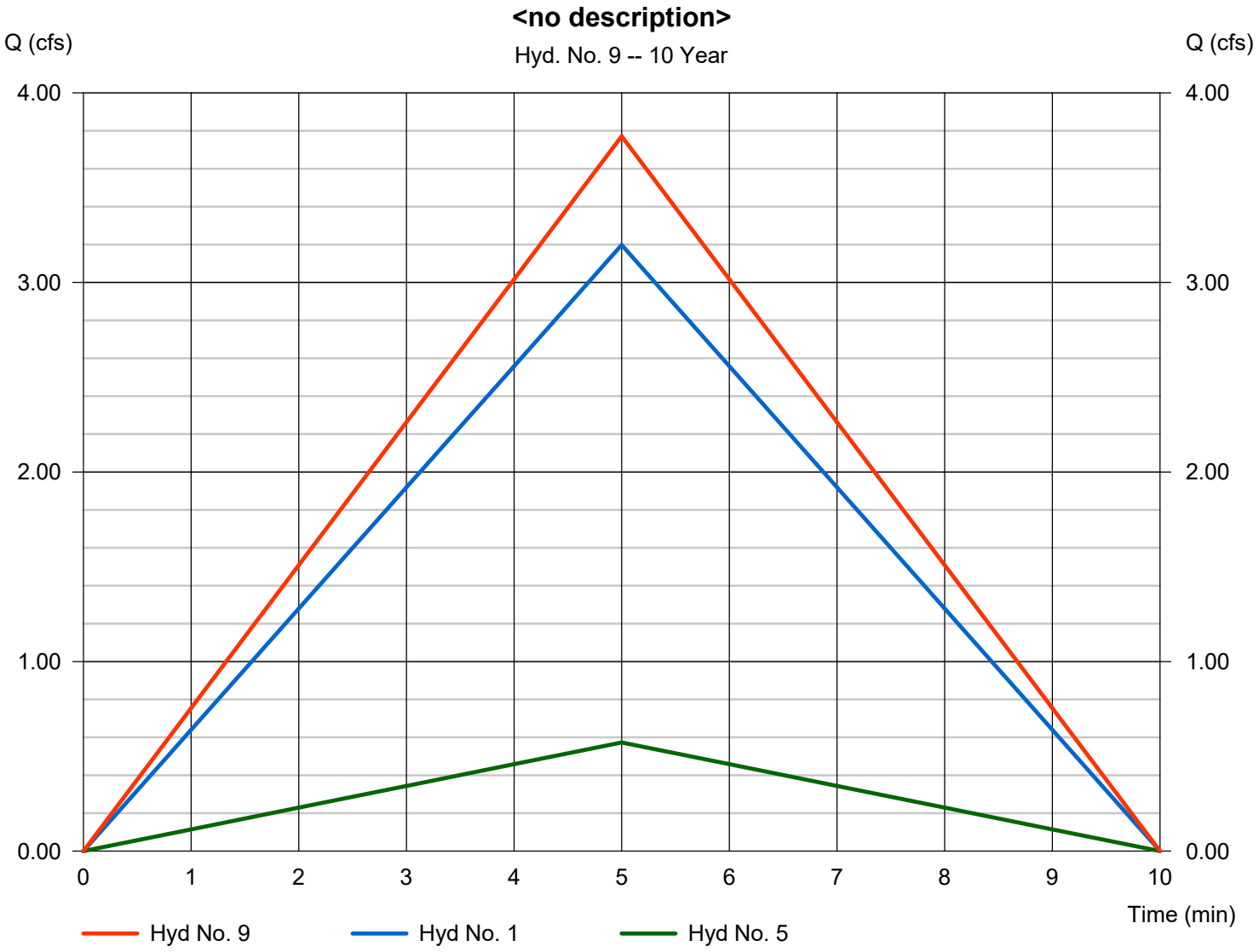


Hydrograph Report

Hyd. No. 9

<no description>

Hydrograph type	= Combine	Peak discharge	= 3.771 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,131 cuft
Inflow hyds.	= 1, 5	Contrib. drain. area	= 1.620 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	5.601	1	5	1,680	------	------	------	A1 Existing
2	Rational	7.193	1	5	2,158	------	------	------	B1
3	Rational	1.810	1	5	543	------	------	------	B2
4	Rational	1.853	1	5	556	------	------	------	B3
5	Rational	1.004	1	5	301	------	------	------	offsite existing
6	Combine	9.003	1	5	2,701	2, 3,	------	------	<no description>
7	Reservoir	4.233	1	8	2,695	6	1000.09	1,780	<no description>
8	Combine	5.713	1	7	3,552	4, 5, 7	------	------	<no description>
9	Combine	6.605	1	5	1,982	1, 5,	------	------	<no description>

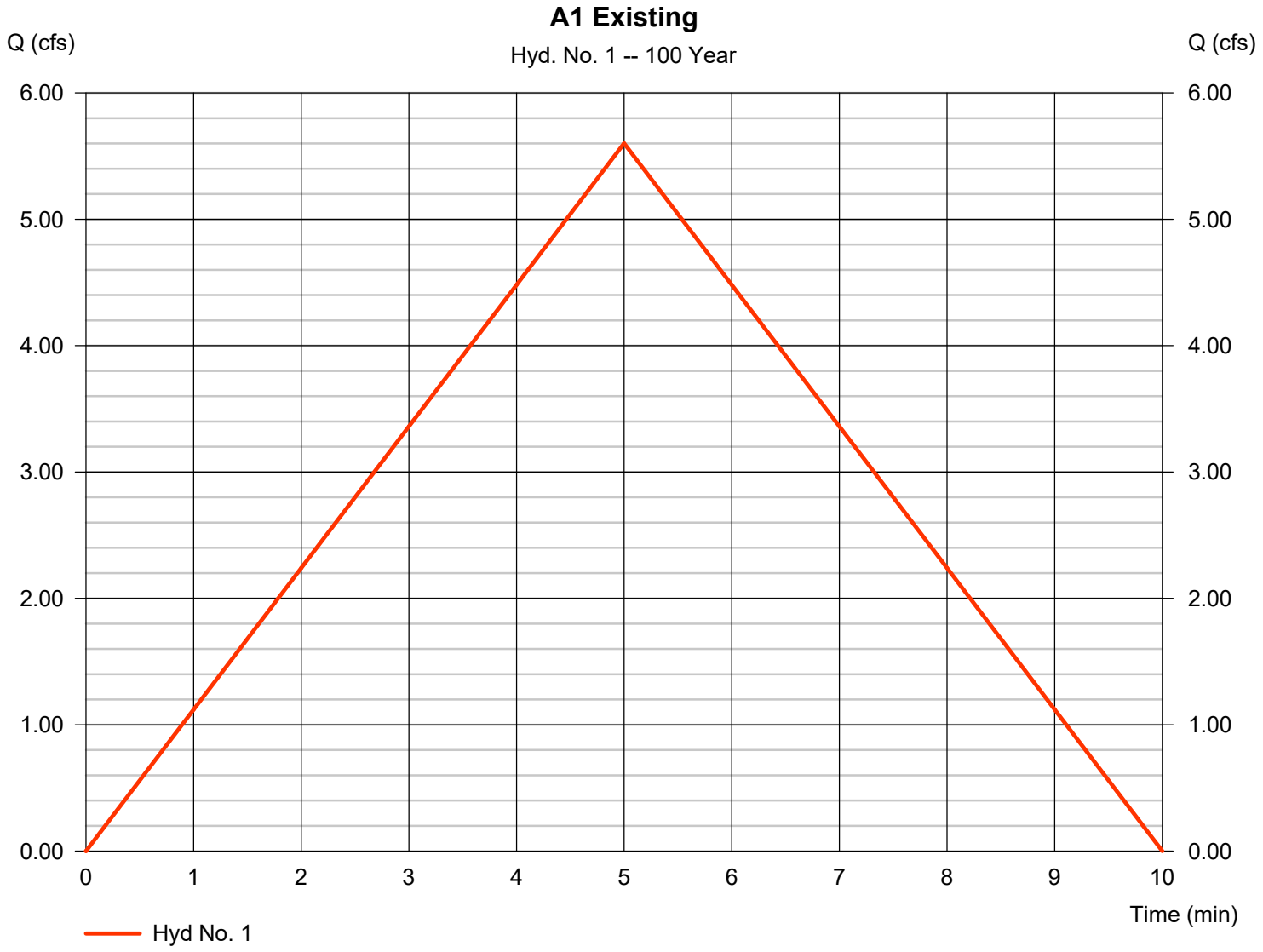
Hydrograph Report

Hyd. No. 1

A1 Existing

Hydrograph type	=	Rational	Peak discharge	=	5.601 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,680 cuft
Drainage area	=	1.360 ac	Runoff coeff.	=	0.32*
Intensity	=	12.871 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.040 x 0.90) + (1.320 x 0.30)] / 1.360



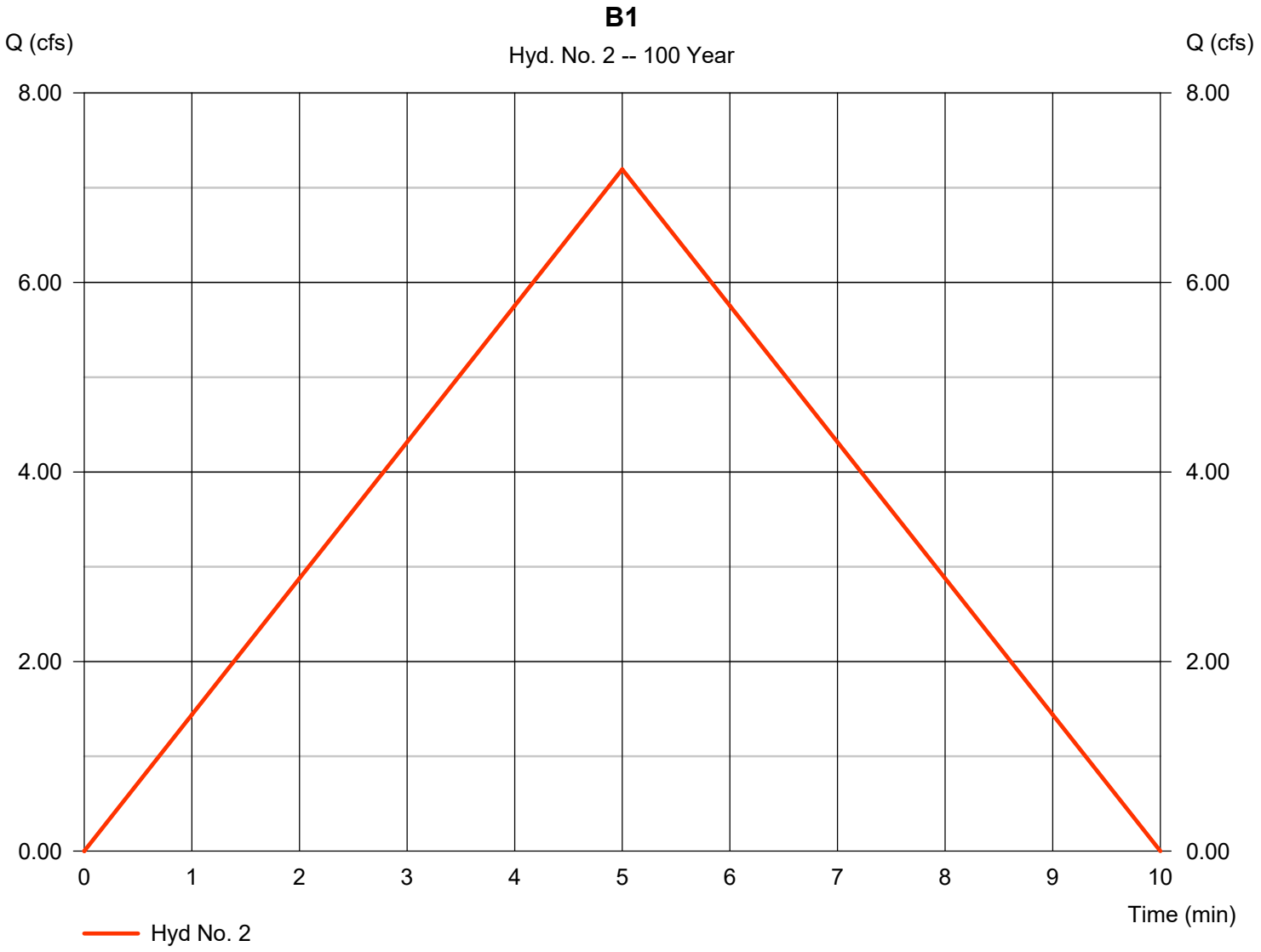
Hydrograph Report

Hyd. No. 2

B1

Hydrograph type	=	Rational	Peak discharge	=	7.193 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,158 cuft
Drainage area	=	0.810 ac	Runoff coeff.	=	0.69*
Intensity	=	12.871 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.370 x 0.90) + (0.200 x 0.30) + (0.240 x 0.70)] / 0.810



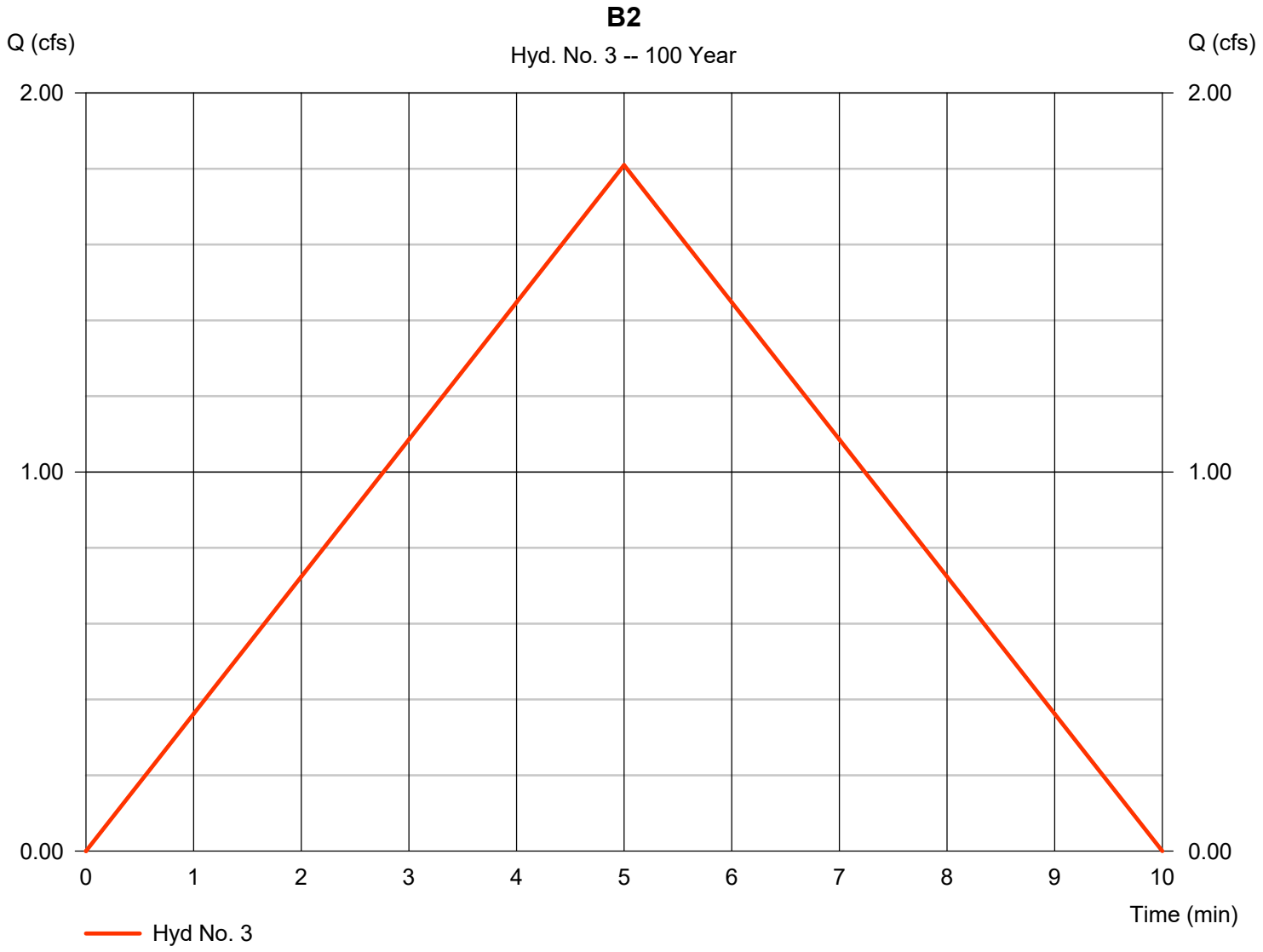
Hydrograph Report

Hyd. No. 3

B2

Hydrograph type	=	Rational	Peak discharge	=	1.810 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	543 cuft
Drainage area	=	0.190 ac	Runoff coeff.	=	0.74*
Intensity	=	12.871 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.050 x 0.30)] / 0.190



Hydrograph Report

Hyd. No. 4

B3

Hydrograph type	=	Rational	Peak discharge	=	1.853 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	556 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.4*
Intensity	=	12.871 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.060 x 0.90) + (0.300 x 0.30)] / 0.360

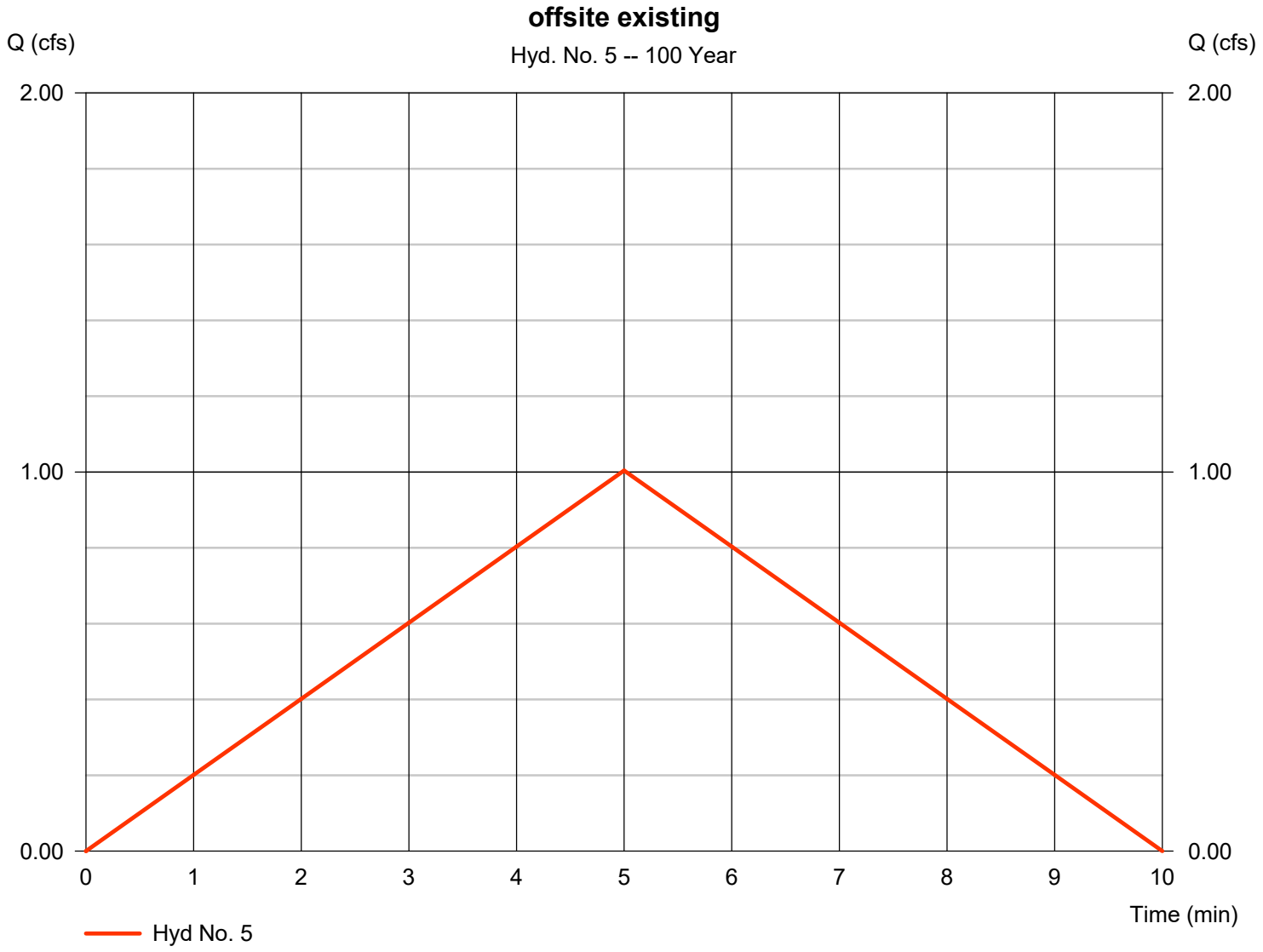
Hydrograph Report

Hyd. No. 5

offsite existing

Hydrograph type	=	Rational	Peak discharge	=	1.004 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	301 cuft
Drainage area	=	0.260 ac	Runoff coeff.	=	0.3*
Intensity	=	12.871 in/hr	Tc by User	=	5.00 min
IDF Curve	=	KCAPWA.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.570 x 0.90) + (0.260 x 0.70) + (0.530 x 0.30)] / 0.260

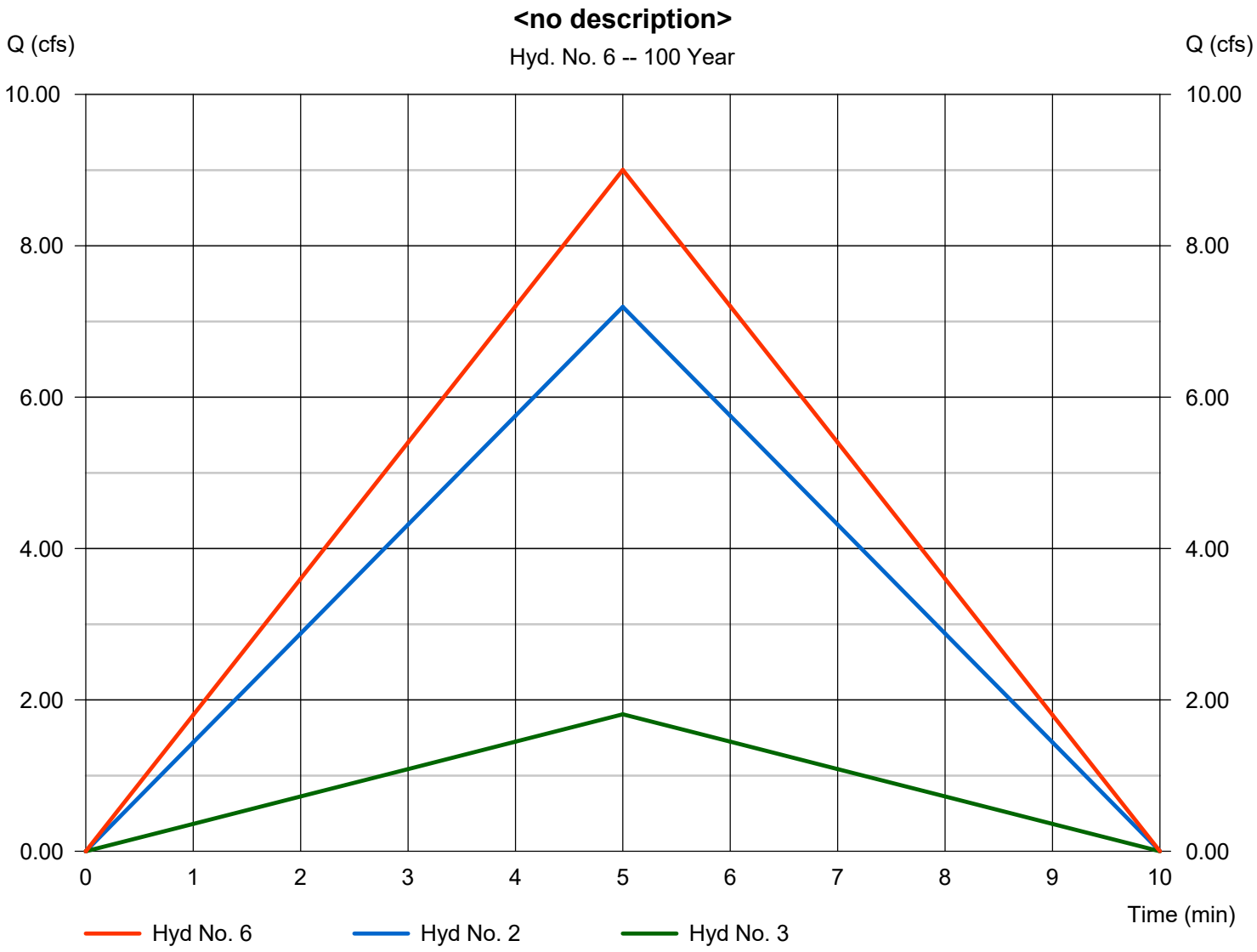


Hydrograph Report

Hyd. No. 6

<no description>

Hydrograph type	= Combine	Peak discharge	= 9.003 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,701 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.000 ac



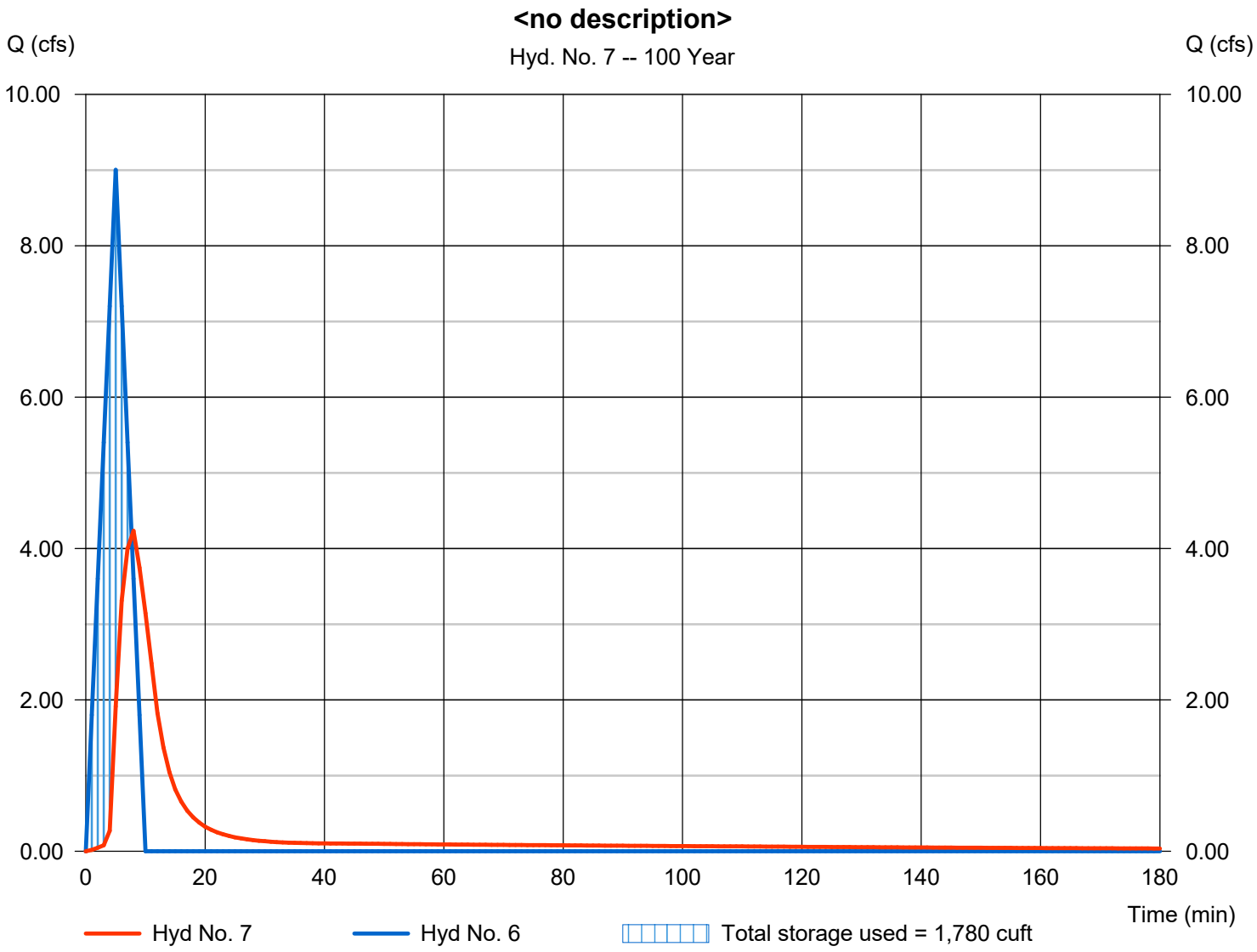
Hydrograph Report

Hyd. No. 7

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	4.233 cfs
Storm frequency	=	100 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	2,695 cuft
Inflow hyd. No.	=	6 - <no description>	Max. Elevation	=	1000.09 ft
Reservoir name	=	30 in. pipe system	Max. Storage	=	1,780 cuft

Storage Indication method used.

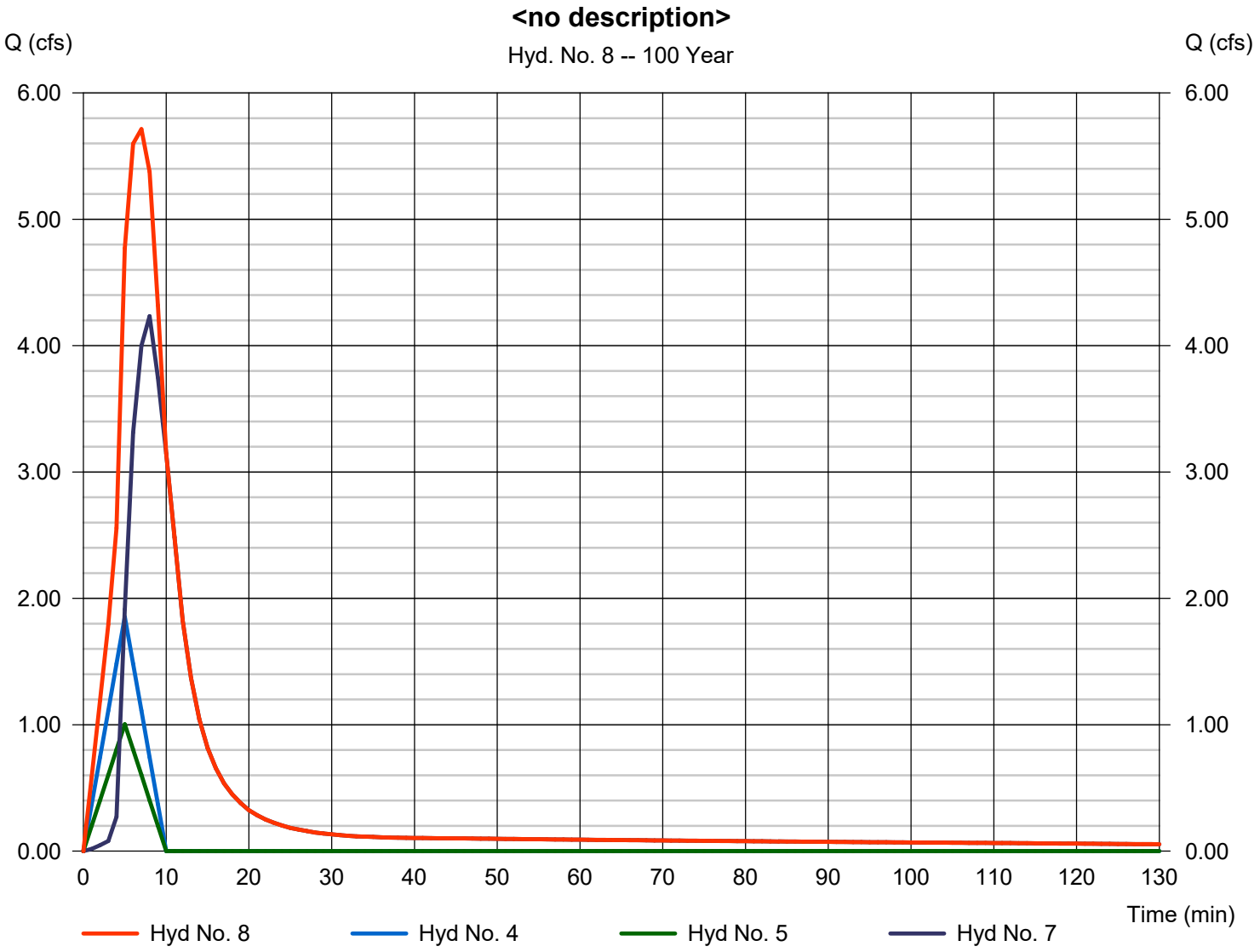


Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	= Combine	Peak discharge	= 5.713 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 3,552 cuft
Inflow hyds.	= 4, 5, 7	Contrib. drain. area	= 0.620 ac

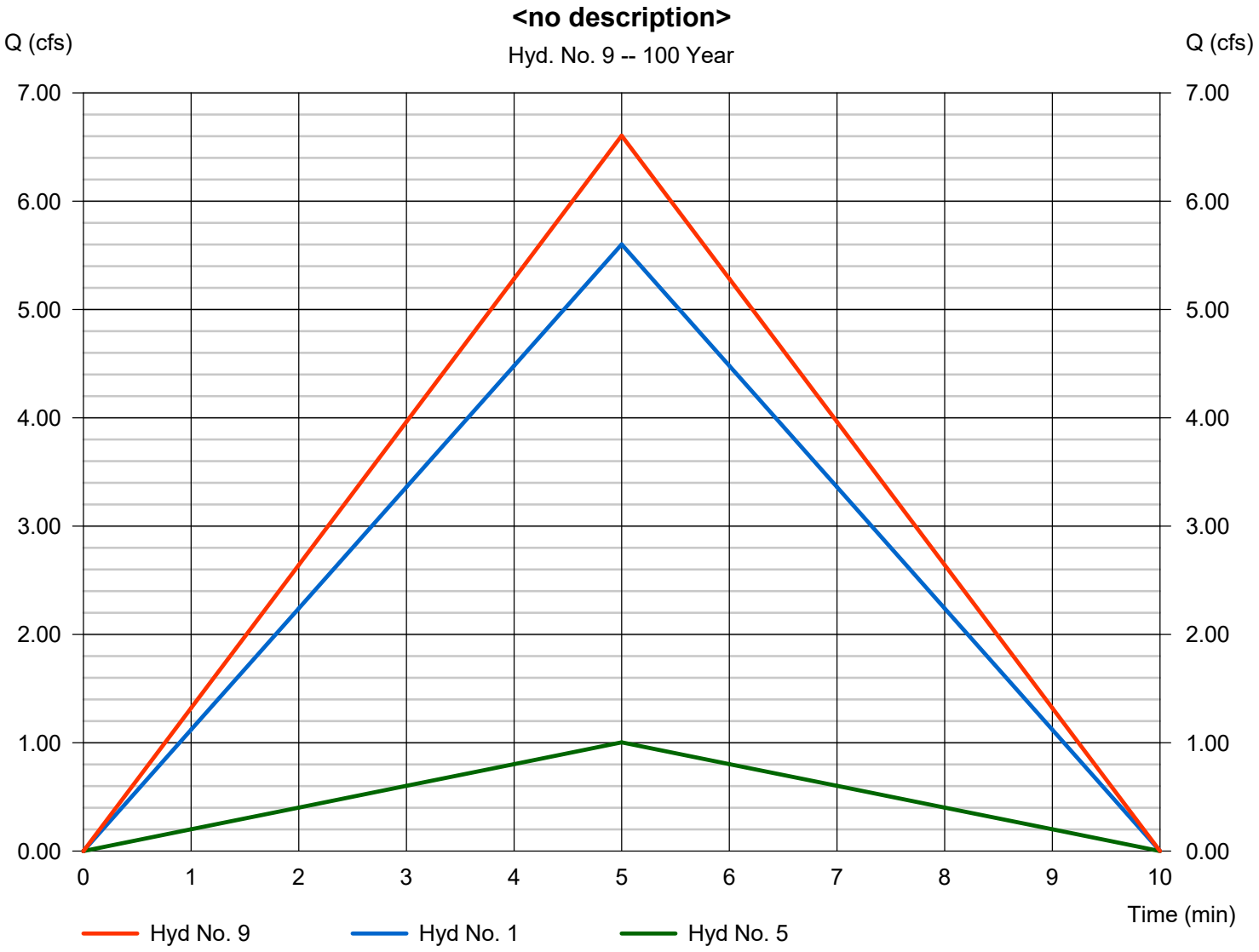


Hydrograph Report

Hyd. No. 9

<no description>

Hydrograph type	= Combine	Peak discharge	= 6.605 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,982 cuft
Inflow hyds.	= 1, 5	Contrib. drain. area	= 1.620 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	2.9200	0.1000	0.0000	--------
2	110.7137	16.5000	0.9842	--------
3	0.0000	0.0000	0.0000	--------
5	168.3971	19.5000	1.0189	--------
10	183.3473	19.2000	1.0096	--------
25	103.5313	15.9000	0.8218	--------
50	235.4014	19.9000	1.0020	--------
100	83.7894	6.1000	0.7783	--------

File name: KCAPWA.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	2.92	2.92	2.92	2.92	2.92	2.92	2.92	2.92	2.92	2.92	2.92	2.92
2	5.41	4.40	3.71	3.21	2.83	2.53	2.29	2.09	1.92	1.78	1.66	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	6.47	5.35	4.56	3.98	3.52	3.16	2.86	2.62	2.41	2.24	2.08	1.95
10	7.35	6.08	5.18	4.52	4.00	3.59	3.26	2.98	2.74	2.54	2.37	2.22
25	8.51	7.14	6.17	5.46	4.90	4.46	4.10	3.79	3.54	3.31	3.12	2.95
50	9.39	7.82	6.70	5.86	5.20	4.68	4.25	3.90	3.60	3.34	3.12	2.92
100	12.87	9.64	7.81	6.62	5.77	5.14	4.65	4.25	3.92	3.65	3.41	3.21

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.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	1.37	2.20	0.00	3.30	4.25	5.77	6.80	7.95
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10