2020-0064231

EAGLE CLIFF CONDOMINIUMS
BK. 61 MAPS, PG. 66

S 89°52'21" E 25.00'
(S 89°25'34" E 25.00')

OVER HEAD ELECTRIC LINES TYPICAL

STORM INLET 36" C.M.P.

S 89°36'38" E 297.36'
(S 89°25'34" E 296.67')
[S 89°25'56" E 297.21']

CONCRETE CURB

12" BLOCK WALL TYPICAL

5' UTILITY EASEMENT
BK. 3147 O.R., PG. 351

0.5'

0.9'

36" C.M.P.

EDGE OF DECORATIVE ROCK

A FOUND 1/2 INCH REBAR WITH ALUMINUM TAG "LS 32224" BEARS N13°13'41"E, 0.97' FROM ACCEPTED MONUMENT

LAT:34°51'45.13742"
LON:111°47'39.94217"
N:151366.34
E:141683.04

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION, DURING THE MONTH OF AUGUST 2020, IN CONFORMANCE WITH THE ARIZONA BOUNDARY SURVEY MINIMUM STANDARDS ADOPTED IN FEBRUARY OF 2002.

STAN DICKEY
LS 32224

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
32224
STAN DICKEY
Date Signed
ARIZONA U.S.A.

DATE OF SURVEY: 08/14/2020

SYMBOL LEGEND

◒	FOUND 1/2 INCH REBAR WITH PLASTIC CAP STAMPED "LS 26925"
•	CALCULATED POINT NOTHING FOUND OR SET
◒	BRASS CAP COS #49 PER BOOK 183 OF LAND SURVEYS, PAGE 94
◎	FOUND 1/2 INCH REBAR WITH PLASTIC CAP STAMPED "LS 5357"
○	FOUND 1\2 INCH REBAR WITH AFFIXED BRASS TAG "FND MON LS 32224"
⊗	FOUND 1/2 INCH REBAR IN BRUSH PILE ILLEGIBLE
//	INDICATES LINE NOT TO SCALE
( )	INDICATES RECORD DIMENSIONS PER BOOK 3281 OF RECORDS, PAGE 935
[ ]	INDICATES RECORD DIMENSIONS PER BOOK 61 OF MAPS & PLATS, PAGE 66
* *	INDICATES RECORD DIMENSIONS PER BOOK 23 OF MAPS & PLATS, PAGE 48
□T	INDICATES TELEPHONE RISER
W	INDICATES WATER VALVE
Ⓟ	INDICATES WATER PUMP STATION
□W	INDICATES WATER METER
▭	INDICATES SPEED LIMIT SIGN
P	INDICATES POWER POLE
↓	INDICATES POWER POLE GUY ANCHOR

N

SCALE 1" = 20'
0' 20' 40' 80'

The Basis of Bearings for this survey is Geodetic North as determined from GPS observations. See Surveyor's Note 4 right.

SUNSET DRIVE

N 00°14'04" W 325.60'
(N 00°00'19" W 325.60')

N 00°10'21" W 325.67'

50' R.O.W. OF SUNSET DRIVE
BK.12 L.S. PG.34

25'

25'

SOUTHWEST CORNER OF SECTION 12 FOUND CITY OF SEDONA BRASS CAP IN A HAND HOLE IN THE CENTERLINE OF SUNSET MARKED "NO. 49"

LAT:34°51'41.94461"
LON:111°47'43.80161"
N:151042.82'
E:141362.02'

11 12 *25'* 24.65'
14 13

ROCK LANDSCAPE BORDER TYPICAL

6' CHAIN LINK FENCE

2.2'

5.1'

297.51'

4' WOOD FENCE FOR DUMPSTER

EDGE OF DECORATIVE ROCK

2.8'

48" C.M.P.

48" C.M.P.

WATER VAULT

S 89°41'41" E 322.16'
S 89°38'15"E 321.96'

LINETYPE INDICATES CENTERLINE OF WASH
SEE BOOK 3281 OF OFFICIAL RECORDS, PAGE 940, EASEMENT 1.3 DRAINAGE EASEMENT
ALSO SEE SURVEYOR'S NOTE 2.

MCINNS FAMILY TRUST
BK. 4510 O.R.,PG. 762

GRASSHOPPER FLATS
BK. 23 MAPS, PG. 48

END FENCE

N 00°11'56" W 325.24'
280.68'

VILLAGE BIBLE CHURCH.
BK. 1372 O.R.,PG. 488

WIRE FENCE

END FENCE

1.5'

APPROXIMATE TOE OF BANK

TOP OF FILL BANK

44.65'

FERCHOFF SEDONA, LLC.
BK. 4866 O.R.,PG. 275

FERCHOFF SEDONA, LLC.
BK. 4866 O.R.,PG. 275

24X36

COORDINATE SYSTEM DEFINITION
LINEAR UNIT : INTERNATIONAL FEET
GEODETIC DATUM : NAD83 (2011)
VERTICAL DATUM : N/A
SYSTEM : CAPSTONE-VVLDP
ZONE: VERDE VALLEY

PROJECTION:
TRANSVERSE MERCATOR

LATITUDE OF GRID ORIGIN :	34°40'N
LONGITUDE OF CENTRAL MERIDIAN:	112°00'W
NORTHING AT GRID ORIGIN:	80,000.00 FT
EASTING AT CENTRAL MERIDIAN:	80,000.00 FT
CENTRAL MERIDIAN SCALE FACTOR:	1.000185 EXACT

Surveyor's Notes

(1) This plat was prepared for the sole benefit of McInnis Family Trust. It was prepared for a specific user and for a specific purpose pursuant to an agreement with the client and as such its purpose may be misleading to others. For these reasons, use by others is forbidden without the express written consent of the certifier signed hereon.

(2) All easements disclosed in Schedule B, Part 2 of Pioneer Title Agency's ALTA Commitment for Title Insurance, Issuing Office File No: 72303201-023-JGM, Dated 7/17/2020 at 7:30am, have been shown hereon except for a drainage easement recorded in Book 3281 of Official Records, Page 940 which is shown as a centerline only as the width and volume of the burdened area is undefined and not mappable, and except for a Joint Ownership Agreement which affects Lot 94 Foothills South Unit Two Amended and does not impact the subject parcel APN 408-26-030C.

(3) The Surveyors Certification is subject to a limitation of liability. The General Public are on notice that this Results of Survey is subject to a limitation of liability not to exceed the price of the original proposal dated 7/30/2020 between Cornerstone Surveying and Engineering, Inc., an Arizona Corporation and McInnis Family Trust. By reliance the acceptance of these terms is effectuated. Copies of the terms and conditions are available upon request.

(4) All measured bearings and distances shown hereon are grid values based upon the projection definition shown hereon. The projection was defined such that grid distances are nearly equivalent to ground distances in the project area. The basis of bearings is Geodetic North. However, measured grid bearings shown hereon (or implied by grid coordinates) do not equal geodetic bearings due to meridian convergence.

(5) Only visible above ground utilities are shown hereon. No attempt was made to determine the location of all underground utilities.

ABBREVIATION LEGEND

N: - NORTHING COORDINATE
E: - EASTING COORDINATE
LAT: - LATITUDE - NORTH
LON: - LONGITUDE - WEST
STOR. - STORAGE
ADDN. - ADDITION
ID. - IDENTIFICATION
LS - LAND SURVEYOR
APN - ACCESSOR'S PARCEL NUMBER

2020-0064231 LS
10/23/2020 08:37:01 AM Page: 1 of 1
Leslie M. Hoffman
OFFICIAL RECORDS OF YAVAPAI COUNTY $24.00
CORNERSTONE SURVEYING & ENGINEERING INC

	NAME	DATE
DESIGN	N/A	N/A
DRAWN	S. DICKEY	8-15-2020
CHECKED	S. DICKEY	8-15-2020
REVISED		
DWG. NAME	12008031-EAGLE CLIFF	

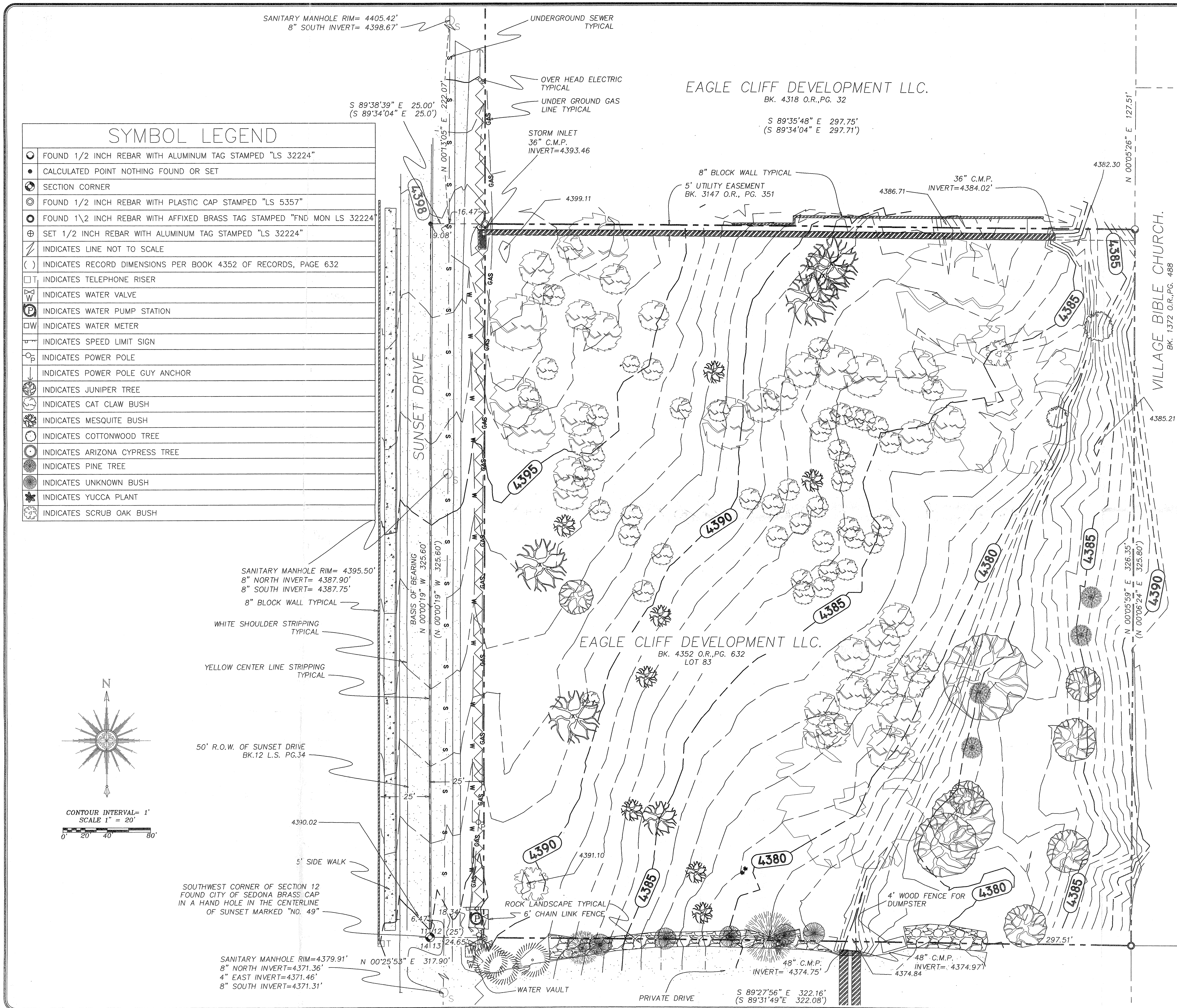
RESULTS OF SURVEY

of the Southwest Quarter of Southwest Quater of the Southwest Quarter of the Southwest Quarter of Section 12, Township 17, Range 5 East, Yavapai County, Arizona

CORNERSTONE surveying & engineering, inc
1010 N. Main Street
Cottonwood, Az. 86326
PH: 928-649-0949
Fax: 928-639-3801

JOB NUMBER: 12008031 APN: 408-26-030C

CLIENT	SHEET	SECTION	TOWNSHIP	RANGE
MCINNIS	1 of 1	12	17N	5E
	Gila & Salt River Base & Meridian			



SYMBOL LEGEND
FOUND 1/2 INCH REBAR WITH ALUMINUM TAG STAMPED "LS 32224"
CALCULATED POINT NOTHING FOUND OR SET
SECTION CORNER
FOUND 1/2 INCH REBAR WITH PLASTIC CAP STAMPED "LS 5357"
FOUND 1\2 INCH REBAR WITH AFFIXED BRASS TAG STAMPED "FND MON LS 32224"
SET 1/2 INCH REBAR WITH ALUMINUM TAG STAMPED "LS 32224"
INDICATES LINE NOT TO SCALE
( ) INDICATES RECORD DIMENSIONS PER BOOK 4352 OF RECORDS, PAGE 632
INDICATES TELEPHONE RISER
INDICATES WATER VALVE
INDICATES WATER PUMP STATION
INDICATES WATER METER
INDICATES SPEED LIMIT SIGN
INDICATES POWER POLE
INDICATES POWER POLE GUY ANCHOR
INDICATES JUNIPER TREE
INDICATES CAT CLAW BUSH
INDICATES MESQUITE BUSH
INDICATES COTTONWOOD TREE
INDICATES ARIZONA CYPRESS TREE
INDICATES PINE TREE
INDICATES UNKNOWN BUSH
INDICATES YUCCA PLANT
INDICATES SCRUB OAK BUSH
SANITARY MANHOLE RIM= 4405.42'
8" SOUTH INVERT= 4398.67'
UNDERGROUND SEWER TYPICAL
OVER HEAD ELECTRIC TYPICAL
UNDER GROUND GAS LINE TYPICAL
STORM INLET 36" C.M.P. INVERT=4393.46
S 89°38'39" E 25.00'
(S 89°34'04" E 25.0')
N 00°13'05" E 222.07'
EAGLE CLIFF DEVELOPMENT LLC.
BK. 4318 O.R.,PG. 32
S 89°35'48" E 297.75'
(S 89°34'04" E 297.71')
8" BLOCK WALL TYPICAL
5' UTILITY EASEMENT
BK. 3147 O.R., PG. 351
36" C.M.P.
INVERT=4384.02'
4386.71
4382.30
N 00°05'26" E 127.51'
4399.11
16.47'
9.08'
VILLAGE BIBLE CHURCH.
BK. 1372 O.R.,PG. 488
4385.21
SUNSET DRIVE
4395
4390
4385
4380
SANITARY MANHOLE RIM= 4395.50'
8" NORTH INVERT= 4387.90'
8" SOUTH INVERT= 4387.75'
8" BLOCK WALL TYPICAL
WHITE SHOULDER STRIPPING TYPICAL
YELLOW CENTER LINE STRIPPING TYPICAL
BASIS OF BEARING
N 00°00'19" W 325.60'
(N 00°00'19" W 325.60')
EAGLE CLIFF DEVELOPMENT LLC.
BK. 4352 O.R.,PG. 632
LOT 83
N 00°05'59" E 326.35'
(N 00°06'24" E 325.80')
50' R.O.W. OF SUNSET DRIVE
BK.12 L.S. PG.34
25'
25'
4390.02
5' SIDE WALK
4391.10
SOUTHWEST CORNER OF SECTION 12
FOUND CITY OF SEDONA BRASS CAP
IN A HAND HOLE IN THE CENTERLINE
OF SUNSET MARKED "NO. 49"
ROCK LANDSCAPE TYPICAL
6' CHAIN LINK FENCE
4' WOOD FENCE FOR DUMPSTER
6.47'
18.34'
11.12 (25')
14.13
24.65'
297.51'
SANITARY MANHOLE RIM=4379.91'
8" NORTH INVERT=4371.36'
4" EAST INVERT=4371.46'
8" SOUTH INVERT=4371.31'
N 00°25'53" E 317.90'
WATER VAULT
PRIVATE DRIVE
48" C.M.P.
INVERT= 4374.75'
48" C.M.P.
INVERT= 4374.97'
4374.84
S 89°27'56" E 322.16'
(S 89°31'49"E 322.08')
N
CONTOUR INTERVAL= 1'
SCALE 1" = 20'
0' 20' 40' 80'

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION, DURING THE MONTH OF SEPTEMBER 2006, IN CONFORMANCE WITH THE ARIZONA BOUNDARY SURVEY MINIMUM STANDARDS ADOPTED IN FEBRUARY OF 2002.

STAN DICKEY
LS 32224

DATE OF SURVEY: 08/29/06

Notes

(1) This plat was prepared for the sole benefit of Gary Muise. It was prepared for a specific user and for a specific purpose pursuant to an agreement with the client and as such its purpose may be misleading to others. For these reasons, use by others is forbidden without the express written consent of the certifier signed hereon.

(2) This survey is subject to all conditions, restrictions, reservations, rights-of-way, abandonments, easements and all pertinent documents of record which may be revealed by a current title report. All Easements supplied by the client have platted hereon.

(3) The Base Benchmark For This Survey is No. 79 of the City of Sedona Vertical Control List being a Found Brass Cap on the West side of Coffee Pot Drive near Iris Lane, the West Quater Corner of Section 12, Having an Elevation of 4474.82

(4) See Job number 10106251 for Boundary information.

(5) All underground Utility locations were provided by Arizona Bluestake, no Warranty is either expressed or implied by the Surveyor as to the accuracy of said locations. Bluestake should be contacted prior to any excavation.

YAVAPAI COUNTY RECORDER

RECORDED AT THE REQUEST OF CORNERSTONE SURVEYING & ENGINEERING, INC.

________ A.D. 2006

AT ________ O'CLOCK

BOOK ________ OF LAND SURVEYS

PAGE ________

RECORDS OF YAVAPAI COUNTY, ARIZONA

PATSY JENNY-COLON
COUNTY RECORDER

DEPUTY RECORDER

	NAME	DATE
DESIGN	N/A	N/A
DRAWN	P.COX	9-12-06
CHECKED	S. DICKEY	9-12-06
REVISED		
DWG. NAME:	10608291-MUISE SUNSET DRIVE	

RESULTS OF SURVEY

in the Southwest Quarter of Southwest Quater of the Southwest Quarter of the Southwest Quarter of Section 12, Township 17, Range 5 East, Yavapai County, Arizona

CORNERSTONE
SURVEYING & ENGINEERING, INC.
1010 N. MAIN STREET
COTTONWOOD, AZ. 86326
PH: 928-649-0949
FAX: 928-639-3801

JOB NUMBER: 10608291 APN: 408-26-030C

CLIENT	SHEET	SECTION	TOWNSHIP	RANGE
MUISE	1 of 1	12	17N	5E

Gila & Salt River Base & Meridian

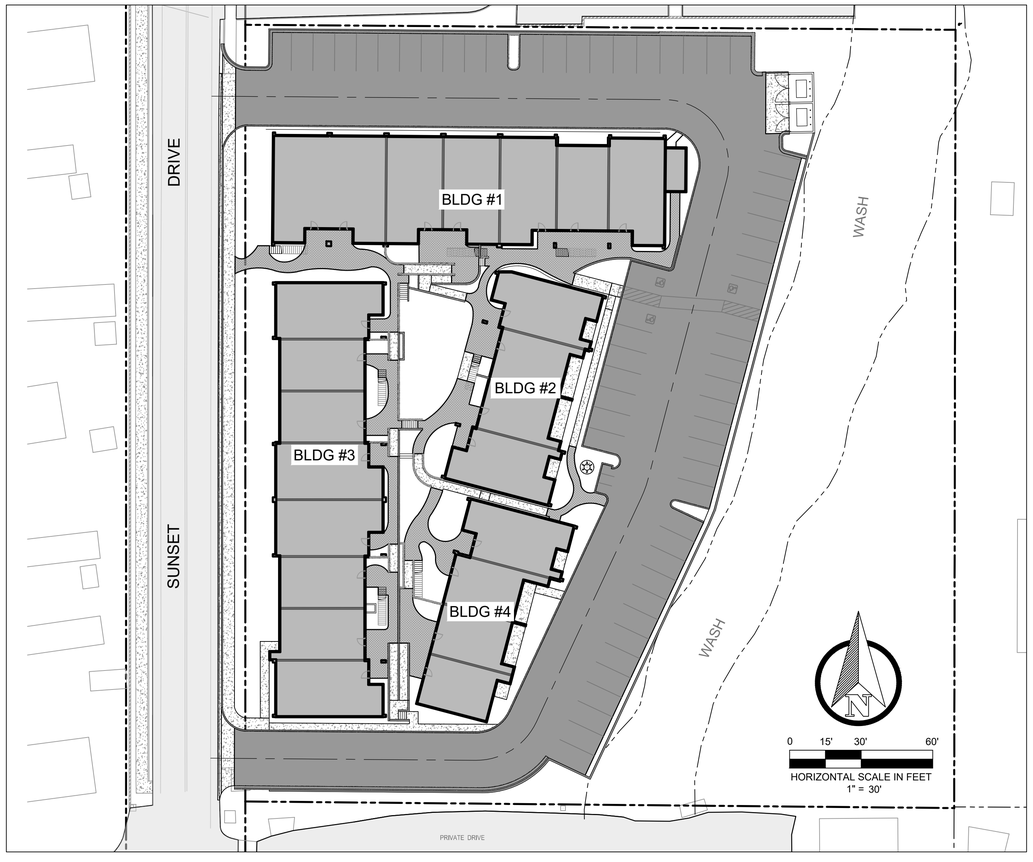
SEDONA LOFTS

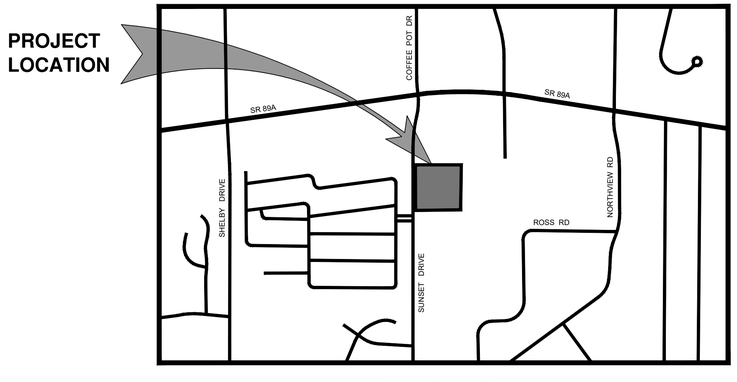
220 SUNSET DRIVE
SEDONA, ARIZONA

HUD#: _____

APN: 408-26-030C
LOCATED IN THE SW 1/4 OF SECTION 12, T17N, R 5E,
G&SRB&M YAVAPAI COUNTY, ARIZONA

SHEET INDEX





VICINITY MAP
SEDONA, ARIZONA
NO SCALE

DEVELOPER:

KEITH HOLBEN
MK COMPANY, INC.
15010 N 78TH WAY, SUITE 109
SCOTTSDALE, AZ 85260
480-998-2803

CIVIL ENGINEER:

SEFTON ENGINEERING CONSULTANTS
40 STUTZ BEARCAT DR.
SEDONA, ARIZONA 86336
PHONE: (928) 202-3999
LUKE A. SEFTON, P.E. 37322
TIMOTHY HUSKETT, P.E. 58609

LAND SURVEYOR:

CORNERSTONE SURVEYING & ENGINEERING, INC.
1010 N. MAIN STREET
COTTONWOOD, AZ 86326
(928) 649-0949

ARCHITECT:

SUOLL ARCHITECTS
6619 N SCOTTSDALE ROAD
SCOTTSDALE, AZ 85250
602-677-3141

GEOTECHNICAL ENGINEER:

ACS SERVICES, LLC
2235 WEST BROADWAY ROAD
MESA, ARIZONA 85202
(480) 968-0190

Contact Arizona 811 at least two full working days before you begin excavation
Call 811 or click Arizona811.com

37322
LUKE A
SEFTON
DATE SIGNED: 10-17-21
ARIZONA, U.S.A.

Sefton Engineering Consultants
Your Ideas to Completion
Surveying • Engineering • Land Planning
40 STUTZ BEARCAT DR. #8
SEDONA, ARIZONA 86336
PH: (928) 202-3999 LS@SEFENGCO.COM

SHEET TITLE: COVER SHEET

PROJECT TITLE: SEDONA LOFTS
MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	AS NOTED
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-1

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1 GENERAL

1.1 ALL PAVING, GRADING PIPING AND UTILITY LINE CONSTRUCTION WORK WITHIN THE PUBLIC RIGHT-OF-WAY, ON PRIVATE STREETS, ACCESS WAYS, LOT GRADING, MATERIALS, AND WORKMANSHIP SHALL COMPLY WITH ENGINEERING STANDARDS AND SPECIFICATIONS, AND SHALL CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) AND A.D.O.T. STANDARD DETAILS AND SPECIFICATIONS. GRADING WORK SHALL CONFORM TO MAG SPECS, THE SOILS REPORT AND CHAPTER 70 ENTITLED "EXCAVATION AND GRADING" OF THE UNIFORM BUILDING CODE (UBC) LATEST EDITION, SUBSECTIONS 7001 TO 7005, 7009 TO 7013, FIGURES 70-1 AND 70-2 AND AS STATED THEREIN. LOCAL MUNICIPAL STANDARD DETAILS WILL CONTINUE TO APPLY WHERE NOT ADOPTED OR INCLUDED BY MAG. THE FOLLOWING NOTES AND SPECIFICATIONS ARE HEREBY MADE A PART OF THE CONTRACT DOCUMENTS AND PROJECT MANUAL. WHERE THERE EXISTS A CONFLICT BETWEEN THESE NOTES, MAG SPECS, UBC, THE SOILS REPORT OR THE PROJECT MANUAL, THE MORE STRINGENT OF THE REQUIREMENTS SHALL GOVERN UNLESS PRIOR CLARIFICATION FROM THE ENGINEER HAS BEEN GIVEN IN WRITING TO THE CONTRACTOR. THE CONTRACTOR AS STATED HEREIN SHALL MEAN THE GENERAL CONTRACTOR AND HIS ASSOCIATED SUBCONTRACTORS. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND PERFORMANCE OF THE WORK OF ALL OF HIS SUBCONTRACTORS AND SUPPLIERS.

1.2 ALL WORK SHALL BE BID AND INSTALLED BY THE CONTRACTOR COMPLETE AND OPERATIONAL TO LINES, GRADES AND FUNCTIONS INDICATED ON ALL PLANS AND SPECIFICATIONS. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY TO COMPLETE ALL PROJECT EARTHWORK AND SITE WORK INCLUDING BUT NOT LIMITED TO: SITE CLEARING, GRUBBING, DEMOLITION'S, DEBRIS REMOVALS FROM THE SITE, IMPORT AND/OR EXPORT OF SOILS AND OTHER MATERIALS TO AND FROM THE SITE, BORROW MATERIALS, TEMPORARY SOILS MATERIAL STOCKPILING, BACKFILL OF ONSITE BORROW PITS, MOVING OF MATERIALS, CUT AND FILL, SLOPES, SOILS AND BANK STABILIZATION AND PROTECTION, BERMING, ROADWAY EXCAVATIONS, RELOCATION'S, STRUCTURE EXCAVATIONS, TRENCHING, ALL BACKFILLING, SITE GRADING, PAVING, PIPING, UTILITY LINE AND STORM DRAINAGE CONSTRUCTION, CURBS, SITE CONCRETE WORK AND OTHER MISCELLANEOUS SITE WORK STRUCTURES AND ITEMS INDICATED ON THE PLANS AND IN THE CONTRACT DOCUMENTS.

1.3 ALL OBSTRUCTIONS IN THE ROAD PRISM SHALL BE REMOVED BEFORE ANY CONSTRUCTION IS PERMITTED.

1.4 ANY QUANTITIES SHOWN ON PLANS ARE NOT VERIFIED BY THE ENGINEER. QUANTITIES ARE APPROXIMATE ONLY AND INTENDED AS A GUIDE FOR OWNERS PURPOSES. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING HIS OWN QUANTITY TAKE OFFS. THE CONTRACTOR SHALL VISIT THE SITE AND REVIEW THE SOILS CONDITIONS AND THE SOILS REPORT (XXXXXXXXXXX #XXXXXXXXX) WITH THE PROJECT SOILS ENGINEER PRIOR TO BIDDING THIS PROJECT. ANY DISCREPANCIES IN SITE MATERIALS SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER 7 DAYS MINIMUM PRIOR TO BID OPENING FOR REVIEW. ALL SHRINK OF EARTH MATERIAL OR EXCESS MATERIAL FROM UTILITY TRENCHES AND FOUNDATIONS SHALL BE INCLUDED IN THE CONTRACTOR'S BID.

1.5 THE ENGINEER MAY REQUIRE THE SUBMITTAL OF A "CERTIFICATE OF COMPLIANCE" AND/OR "MANUFACTURER'S GUIDELINES" FOR ANY MATERIALS USED IN THE WORK. MANUFACTURER'S GUIDELINES SHALL CONSISTS OF WRITTEN INSTRUCTIONS FOR SHIPPING, HANDLING, UNLOADING, CUTTING, JOINING, INSTALLATION, STORAGE, AND/OR ANY OTHER FACETS OF CONSTRUCTION.

1.6 THE ENGINEER WILL REQUIRE ANY MATERIALS USED IN THE WORK TO BE TESTED ACCORDING TO AASHTO AND ASTM STANDARDS. THE CONTRACTOR SHALL, AT HIS EXPENSE, SUPPLY CERTIFICATES OR RESULTS OF TESTING.

1.7 ALL WORK AND MATERIALS NOT CONFORMING TO SPECIFICATIONS OR PERFORMED WITHOUT THE CONSENT OF THE OWNER OR HIS REPRESENTATIVE WILL BE SUBJECT TO REJECTION BY THE OWNER AND/OR ENGINEER AND REPLACED AT THE CONTRACTOR'S EXPENSE.

1.8 THE CONTRACTOR SHALL GUARD AGAINST DAMAGE DURING CONSTRUCTION TO ADJACENT PROPERTIES, FENCES, WALLS AND UTILITY EQUIPMENT. ANY ITEMS DAMAGED BY CONSTRUCTION SHALL BE REPLACED WITH SAME KIND OR BETTER AT CONTRACTOR'S EXPENSE.

1.9 NO CONSTRUCTION SHALL BEGIN UNTIL CONFLICTING UNDERGROUND UTILITY MITIGATING CONSTRUCTION IS COMPLETED, IF ANY.

1.10 NO EXISTING SURVEY MONUMENTATION SHALL BE REMOVED OR DISTURBED BY THE CONTRACTOR WITHOUT NOTIFICATION AND APPROVAL OF THE PROJECT SURVEYOR. THE CONTRACTOR SHALL CONTACT THE PROJECT SURVEYOR FOR THE SETTING OF REFERENCE POINTS 48 HOURS PRIOR TO DISTURBING OR REMOVING ANY MONUMENTS. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR COSTS TO REESTABLISH MONUMENTATION OR CONTROLS REMOVED WITHOUT PRIOR NOTICE AND APPROVAL.

1.11 TRAFFIC CONTROL SHALL CONFORM TO THE LOCAL ADOPTED STANDARDS AND MUTCD. CONTRACTOR SHALL SUBMIT PLAN TO PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO STARTING CONSTRUCTION.

1.12 BENCH MARK: ELEVATIONS ESTABLISHED WITH REFERENCE TO THE BENCH MARK AS INDICATED ON THE SURVEY CONTROL SHEET.

1.13 CONTRACTOR SHALL COORDINATE HIS WORK WITH THE DESIGN ENGINEER, OWNER, PUBLIC UTILITY COMPANIES AND OTHER ASSOCIATED TRADES ON AND ADJACENT TO THE PROJECT SITE. COORDINATE INSTALLATION OF ALL PUBLIC AND PRIVATE UNDERGROUND UTILITIES, PIPES, CONDUITS AND PIPE SLEEVE SIZES AND LOCATIONS PRIOR TO THEIR PLACEMENT. INSTALLATION: THE CONTRACTOR IS RESPONSIBLE FOR SETTING CAPPED SLEEVES AND PROVIDING TYPE 1 COMPACTION IN ALL BACKFILLED TRENCHES IN PAVED AREAS AND EASEMENTS. PROVIDE TRACER WIRE AND MARKER AT GRADE LEVEL FOR FUTURE LOCATING.

1.14 CONTRACTOR TO BE RESPONSIBLE FOR ALL IDENTIFIED AND REQUIRED TESTING AND CONSTRUCTION STAKING, AND FOR THE FOLLOWING ADDITIONAL ENGINEERING SERVICES SHOULD THEY OCCUR;

A. RE-OBSERVATION, COORDINATION AND EXTRA TESTING OR RETESTING COSTS INCURRED BECAUSE OF IMPROPER OR FAULTY CONSTRUCTION.

B. ANY RESTAKING REQUIRED BY THE CONTRACTOR.

C. CHANGES AND SUBSTITUTIONS IN MATERIALS CONSTRUCTION METHODS, REQUESTED BY THE CONTRACTOR, THAT MUST BE REVIEWED, RECALCULATED OR APPROVED BY THE PROJECT ENGINEER.

D. ENGINEERING DESIGN SERVICES REQUESTED BY THE CONTRACTOR OR CAUSED BY ERRORS OR OMISSIONS BY THE CONTRACTOR.

E. ANY ENGINEERING DESIGN APPROVED BY OTHERS AND SUBMITTED FOR REVIEW. THESE SHALL BEAR THE SEAL OF AN ENGINEER REGISTERED IN ARIZONA.

1.15 ANY DIFFERENCE BETWEEN PLANS AND SPECIFICATIONS AND QUESTIONS AS TO THEIR MEANING SHALL BE DETERMINED PRIOR TO BID OPENING OF THE CONTRACT AND SHALL BE INTERPRETED BY THE ENGINEER. THE GENERAL INTENT AND MEANING OF THE PLANS AND SPECIFICATIONS WILL GOVERN AND SHALL NOT WARRANT ANY ADDITIONAL COMPENSATION TO THE CONTRACTOR. THE ENGINEER WILL PROVIDE FULL INSTRUCTIONS WHEN DISCREPANCIES ARE DISCOVERED IN THE DOCUMENTS.

1.16 THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LIMITS OF THE WORK AREA PRIOR TO BEGINNING CONSTRUCTION ALL CONSTRUCTION LIMITS, AREAS OF WORK, SETBACKS, PERIMETERS, ADJACENT PROPERTY LINES, BOUNDARIES, AND OTHER CRITERIA DEFINING THE LIMITS OF THE CONTRACTOR'S WORK AREA AND LIMITS, SHALL BE STAKED BY THE CONTRACTOR'S SURVEYOR PRIOR TO CONSTRUCTION OR CLEARING OF THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH THE EXTENT OF WORK TO BE DONE IN EACH SEPARATE PHASE OF THE PROJECT, AND ANY WORK NECESSARY IN INACTIVE PHASES REQUIRED TO DEEM THE ACTIVE PHASES FINISHED, SAFE, AND SERVICEABLE.

1.17 THE CONTRACTOR OR SUBCONTRACTORS SHALL NOT DEVIATE FROM THESE PLANS OR MAKE FIELD CHANGES WITHOUT WRITTEN APPROVAL FROM THE NATION. ANY CHANGES MADE WITHOUT APPROVAL OF THE PROJECT ENGINEER ARE SUBJECT TO REMOVAL AT THE EXPENSE OF THE CONTRACTOR.

1.18 THE PROJECT ENGINEER RESERVES THE RIGHT TO MAKE MINOR FIELD MODIFICATIONS TO GRADES AND STRUCTURE DESIGNS TO ACCOMMODATE FIELD CONDITIONS FOUND ON SITE THAT DO NOT INVOLVE COST OR TIME. THIS INCLUDES BUT IS NOT LIMITED TO MINOR MODIFICATIONS TO GRADE, ALIGNMENT, SLOPE OR STRUCTURE LOCATIONS.

1.19 NO JOB WILL BE CONSIDERED COMPLETE UNTIL FINE GRADING IS COMPLETE AND ALL CURBS, PAVEMENT AND SIDEWALKS HAVE BEEN SWEPT CLEAN OF ALL DIRT AND DEBRIS. ALL SURVEY MONUMENTS ARE INSTALLED AND ALL VALVES, MANHOLES AND BOXES HAVE BEEN ADJUSTED ACCORDING TO THE PLANS AND STANDARD DETAILS.

1.20 EXISTING GRADES INDICATED ON PLANS ARE BASED ON PRE-GRADING CONDITIONS. LOSSES IN MATERIAL DUE TO SHRINKAGE OF MATERIAL, DEMOLITION OF EXISTING SITE FEATURES, CLEARING AND GRUBBING OF THE SITE SHALL BE INCLUDED IN CONTRACTOR'S BID.

1.21 SHOP DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR PER MAG SECTION 105.2.

1.22 ALL SERVICES SHALL BE MAINTAINED TO ALL AREAS AT ALL TIMES DURING THE CONSTRUCTION PERIOD, EXCEPT WHEN IT IS NECESSARY TO SHUT DOWN A LINE TO MAKE A CONNECTION WITH THE NEW LINE. RESIDENTS SHALL BE GIVEN A 24 HOUR NOTICE WHEN IT IS KNOWN THAT SERVICE WILL BE INTERRUPTED.

1.23 NO EXISTING SURVEY MONUMENTATION SHALL BE REMOVED OR DISTURBED BY THE CONTRACTOR WITHOUT NOTIFICATION AND APPROVAL OF THE PROJECT SURVEYOR. THE CONTRACTOR SHALL CONTACT THE PROJECT MANAGER FOR THE SETTING OF REFERENCE POINTS 48 HOURS PRIOR TO DISTURBING OR REMOVING ANY MONUMENTS. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR COSTS TO REESTABLISH MONUMENTATION OR CONTROLS REMOVED WITHOUT PRIOR NOTICE AND APPROVAL.

1.24 THE CONTRACTOR SHALL COORDINATE HIS WORK AND COOPERATE WITH ANY OTHER PERSONS OR ENTITIES OPERATING ON OR ADJACENT TO THE SITE OF THE PROJECT.

1.25 RETAINING WALLS SHALL BEAR INTO NATURAL BEDROCK, OR COMPACTED SOIL WHICH HAS A BEARING VALUE OF 3,000 P.S.F. VERIFICATION OF SAID BEARING VALUE TO BE PROVIDED BY THE SOILS ENGINEER.

2 PERMITS

2.1 CONTRACTOR SHALL OBTAIN ALL PERMITS AT HIS OWN EXPENSE FROM FEDERAL, STATE OR LOCAL MUNICIPAL AND AIR POLLUTION CONTROL AUTHORITIES PRIOR TO BEGINNING CONSTRUCTION.

2.2 REQUIRED PERMITS SHALL BE SECURED BY THE CONTRACTOR FROM THE APPROPRIATE AGENCIES.

2.3 THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AT HIS OWN EXPENSE ALL APPROPRIATE INSURANCE FORMS FOR PERMIT REQUIREMENTS.

2.4 IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE FOR THE RELOCATION AND RELOCATION COSTS, IF ANY, OF ALL UTILITIES, AND SUBMIT A UTILITY RELOCATION SCHEDULE TO THE MUNICIPALITY AND DESIGN ENGINEER PRIOR TO CONSTRUCTION. ALL PUBLIC UTILITY EQUIPMENT POLES, BOXES, STRUCTURES AND MUNICIPAL UTILITY COMPANY EQUIPMENT SHALL BE RELOCATED BY THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY BEFORE ANY WORK IS STARTED.

3 APPROVALS

3.1 THE CONTRACTOR IS TO USE ONLY THAT OFFICIAL CONSTRUCTION SET OF DRAWINGS WHICH CONTAINS THE APPROVAL OF THE GOVERNMENT AGENCY SIGNED ON THE COVER SHEET OF THE PLANS. THE CONTRACTOR SHALL NOT PLACE BIDS ON A SET OF DRAWINGS UNSIGNED BY THE GOVERNMENT AGENCY AND/OR MARKED "NOT FOR CONSTRUCTION".

4 RECORD DRAWINGS

4.1 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE AND KEEP AN UPDATED RECORD SET OF AS-BUILT INFORMATION DRAWINGS IN GOOD CONDITION ON THE JOB SITE FOR THE PROJECT MANAGER & UTILITY DIRECTOR TO INSPECT AND PROVIDE A COPY TO THE PROJECT ENGINEER AT COMPLETION OF THE WORK, WITH THE RECORD SET SHOWING FIELD VERIFIED LOCATIONS OF ALL VALVES, BOXES, MANHOLES, UTILITY POLES, PIPE SLEEVES, UTILITY ENCASEMENT AND OTHER UTILITY LINES AND EQUIPMENT ABOVE AND BELOW GROUND WHICH THE CONTRACTOR ENCOUNTERS AND INSTALLS IN HIS AREA OF WORK.

4.2 ACCEPTANCE OF THE COMPLETED PAVING, GRADING OR UTILITY INSTALLATION WILL NOT BE GIVEN UNTIL REPRODUCIBLE AS-BUILT PLANS HAVE BEEN SUBMITTED BY THE CONTRACTOR TO THE ENGINEER AND APPROVED BY THE LOCAL GOVERNING AGENCY INCLUDING HOUSING AND UTILITY DEPARTMENTS.

5 OBSERVATION

5.1 ALL MATERIALS USED AND ALL WORK DONE BY THE CONTRACTOR SHALL BE SUBJECT AT ALL TIMES TO THE OBSERVATION, TESTING AND APPROVAL OF THE ENGINEER AND GOVERNING AGENCY. SPECIAL INSPECTION AND TESTING SERVICES SHALL BE PROVIDED AT THE CONTRACTOR'S EXPENSE, AS REQUIRED BY THE CONTRACT DOCUMENTS.

5.2 THE CONTRACTOR SHALL CONTACT THE APPROPRIATE PUBLIC UTILITY COMPANIES FOR INSPECTION OF TRENCHING, BEDDING AND BACKFILLING DONE IN CONJUNCTION WITH INSTALLATION OF THOSE UTILITIES ON THIS PROJECT.

5.3 SUBMITTAL OF AN ENGINEER'S CERTIFICATE OF COMPLETION IS REQUIRED BY A.D.E.Q. FOR ALL WATER AND SEWER SYSTEM CONSTRUCTION. RELATED INSPECTION AND TESTING SHALL BE PROVIDED BY THE DEVELOPER'S ENGINEER AT THE DEVELOPER'S EXPENSE.

5.4 SOILS COMPACTION TEST RESULTS MUST BE SUBMITTED TO THE PROJECT ENGINEER'S OFFICE FOR ALL FILL MATERIAL FOR ROADS, TRENCH BACKFILL AND SITE FILL MATERIALS UNDER SLABS AND STRUCTURES. NO FILL MATERIALS SHALL BE PLACED WITHOUT TESTING DURING PLACEMENT. NO EARTH MATERIAL SHALL BE PLACED WITHOUT APPROVAL OF THE PREVIOUS LIFTS. THE CONTRACTOR SHALL SUBMIT ALL TEST RESULTS TO THE PROJECT ENGINEER.

5.5 THE CONTRACTOR WILL BE RESPONSIBLE FOR SCHEDULING AND COORDINATION OF ALL TESTING INCLUDING THE FOLLOWING ITEMS WHICH SHALL BE TESTED IN ACCORDANCE WITH MAG SPECIFICATIONS FOR:

1. SUBGRADE COMPACTION
2. BASE COURSE COMPACTION
3. ASPHALT PAVEMENT MIX DESIGN QUALITY
4. CONCRETE STRENGTH
5. TRENCH BEDDING AND BACKFILL
6. TESTING FOR UTILITIES, PIPING AND DRAINAGE SYSTEMS
7. RETAINING WALLS CONCRETE AND COMPACTION

5.6 THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR 24 HOURS PRIOR TO BEGINNING DIFFERENT ASPECTS OF CONSTRUCTION SO THAT INSPECTIONS MAY BE SCHEDULED.

6 FINAL ACCEPTANCE

6.1 APPROVAL OF A PORTION OF THE WORK IN PROGRESS DOES NOT GUARANTEE ITS FINAL ACCEPTANCE. TESTING AND EVALUATION MAY CONTINUE UNTIL WRITTEN FINAL ACCEPTANCE OF A COMPLETE WORKABLE UNIT. ACCEPTANCE OF COMPLETED IMPROVEMENTS WILL NOT BE GIVEN UNTIL DEFECTIVE OR UNAUTHORIZED WORK IS REMOVED, AND FINAL CLEANUP IS COMPLETE.

6.2 APPROVAL OF A PORTION OF THE WORK IN PROGRESS DOES NOT GUARANTEE ITS FINAL ACCEPTANCE. TESTING AND EVALUATION MAY CONTINUE UNTIL WRITTEN FINAL ACCEPTANCE OF A COMPLETE WORKABLE UNIT. ACCEPTANCE OF COMPLETED IMPROVEMENTS WILL NOT BE GIVEN UNTIL DEFECTIVE OR UNAUTHORIZED WORK IS REMOVED, AND FINAL CLEANUP IS COMPLETE.

7 UTILITIES

7.1 A UTILITY COORDINATION MEETING SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO THE START OF ANY WORK. ALL UTILITY ISSUES SHALL BE ADDRESSED IN ACCORDANCE WITH MAG

7.2 THE CONTRACTOR SHALL CALL "BLUE STAKE" AND NOTIFY THE APPROPRIATE PRIVATE, PUBLIC AND MUNICIPAL UTILITY COMPANIES 48 HOURS PRIOR TO ANY CONSTRUCTION WORK TO VERIFY LOCATION AND DEPTH OF ALL UTILITY LINES IN THE AREA OF WORK. UTILITIES IF INDICATED ON PLANS ARE APPROXIMATE LOCATIONS ONLY, TAKEN FROM THE UTILITY COMPANY MAPS. IF THE CONTRACTOR ENCOUNTERS ANY LINES NOT INDICATED ON THE DRAWINGS OR MARKED IN THE FIELD BY THE UTILITY COMPANY THAT MAY INTERFERE WITH HIS WORK, HE SHALL NOTIFY THE APPROPRIATE UTILITY COMPANY IMMEDIATELY FOR DISPOSITION OF THOSE FACILITIES.

7.3 THE CONTRACTOR IS RESPONSIBLE FOR PREPARATION OF GRADE, TRENCHING, BACKFILLING, PAD CONSTRUCTION AND CONCRETE PADS FOR UTILITY EQUIPMENT INSTALLED ON THIS PROJECT. CONTRACTOR SHALL CONTACT LOCAL UTILITY COMPANIES FOR DETAILS AND REQUIREMENTS.

7.4 REQUIRED UTILITY SLEEVES SHALL BE PLACED PRIOR TO SUBBASE CONSTRUCTION AND PAVING. CONTACT APPROPRIATE UTILITY COMPANIES FOR REQUIREMENTS IN ALL AREAS.

7.5 ALL WATER MAINS, APPURTENANCES, AND INSTALLATION SHALL CONFORM TO A.W.W.A. STANDARDS AND ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY, AND ARIZONA WATER COMPANY REQUIREMENTS. WATER SYSTEM SHALL BE TESTED PER A.D.E.Q. BULLETIN NO. 10 TO THE APPROPRIATE A.W.W.A. STANDARDS.

7.6 ALL FIRE HYDRANTS SHALL MEET ALL REQUIREMENTS OF A.W.W.A. C-509-80.

8 CONSTRUCTION STAKING

8.1 THE ACCURACY OF ALL CONSTRUCTION WORK SHALL BE MAINTAINED AND VERIFIED BY A REGISTERED LAND SURVEYOR. CONSTRUCTION STAKING SUITABLE TO THE ENGINEER WILL BE SET ESTABLISHING LINES AND GRADES (FINISH OR FLOWLINE) FOR ALL CONSTRUCTION INCLUDING ROADS, CURB AND GUTTER, SIDEWALKS, UTILITIES, STRUCTURES, AND OTHER WORK AS CONSIDERED NECESSARY BY THE PROJECT ENGINEER. ALL SURVEY CONTROL SHALL BE SET BY THE SURVEYOR FROM MONUMENTS ACCEPTABLE TO THE ENGINEER.

8.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING.

9 GRADING AND EARTHWORK

9.1 PERFORM ALL EARTHWORK GRADING, CUTTING AND FILLING AS PER THE PROJECT SOILS REPORT FOR THIS PROJECT.

9.2 NO GRADING OR TRENCHING WORK SHALL BEGIN PRIOR TO SUPPORTING AND PROTECTING EXISTING ONSITE AND ADJACENT PROPERTY FROM SETTLING, CRACKING, OR OTHER DAMAGE WHICH MIGHT RESULT.

9.3 WATER SOURCE: THE CONTRACTOR SHALL MAKE THE NECESSARY ARRANGEMENTS FOR OBTAINING ALL WATER REQUIRED FOR SOIL COMPACTION, DRINKING PURPOSES AND DUST CONTROL. (MAG SPEC 225)

9.4 CLEARING AND GRUBBING: EXAMINE SITE AND PROVIDE NECESSARY EQUIPMENT AND LABOR TO REMOVE FROM THE SITE AND DISPOSE OF STUMPS, ROOTS, ROCKS, LOOSE FILL, VEGETATION, DEBRIS, AND ANY OTHER OBJECTIONABLE MATERIALS FROM THE BUILDING AND FILL AREAS. CLEAN, UNCLASSIFIED ONSITE SOILS MAY BE USED IN GENERAL AS FILL MATERIAL. SEE MAG SPECIFICATION SECTIONS 201 AND 215.

9.5 TOPSOIL THAT WILL BE AFFECTED BY ROUGH GRADING OR EXCAVATION SHALL BE STOCKPILED ON THE SITE SEPARATELY AND SHALL NOT BE USED FOR FILL, BUT SHALL BE CONSERVED AND USED FOR FINE AND FINISH GRADING.

9.6 SITE DRAINAGE: CONSTRUCTION OF ALL SWALES, CHANNELS, DRAINAGE PIPES, DRAINAGE STRUCTURES AND BANK PROTECTION SHALL BE CONSTRUCTED DURING THE FIRST PHASES OF SITE CONSTRUCTION TO PROTECT ALL OTHER CONSTRUCTION FROM SURFACE WATERS. DIVERT RUN OFF WATER AROUND CONSTRUCTION OPERATIONS. CARE SHALL BE TAKEN BY THE CONTRACTOR NOT TO ADVERSELY AFFECT ADJACENT PROPERTIES. DRAIN EXCAVATIONS BY PUMPING OR OTHER SATISFACTORY METHOD TO PREVENT SOFTENING OF THE FOUNDATION SOILS, UNDERCUTTING OF FOOTINGS, OR OTHER ACTIONS DETRIMENTAL TO PROPER CONSTRUCTION PROCEDURES.

9.7 THE CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM ALL WALLS AND FOUNDATIONS. ALL STORM DRAINS, DRAIN LINES, OVERFLOWS, OUTLETS, AND/OR OTHER DRAINAGE TYPE OUTLETS WHICH CONDUCT MOISTURE NEAR THE STRUCTURES SHALL BE POSITIVELY DRAINED AWAY FORM THE STRUCTURE. NO WATER SHALL BE PERMITTED TO POND NEAR STRUCTURES OR FOUNDATIONS. ALL DRAINAGE SHALL BE CHANNELED AND TAKEN A MINIMUM OF 10 FEET AWAY FROM ALL STRUCTURES.

9.8 SUBGRADE PREPARATION: IF THE NATURAL SUBGRADE IS LESS THAN THE REQUIRED DENSITY, IT SHALL BE SCARIFIED AND COMPACTED TO A MINIMUM DEPTH OF TWELVE INCHES OR AS NOTED IN THE SOILS REPORT IMMEDIATELY PRIOR TO PLACING SUBSEQUENT FILL MATERIAL THEREON. THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND REPAIR OF DAMAGE TO PREPARED SUBGRADE CAUSED BY CONTRACTORS OPERATIONS OR PUBLIC TRAFFIC UNTIL ACCEPTANCE OF PROJECT. NO MATERIALS SHALL BE PLACED UPON THE PREPARED SUBGRADE UNTIL IT MEETS THE SPECIFIED REQUIREMENTS. ROADWAY SUBGRADE COMPACTION INCLUDES SUBGRADE UNDER ALL PAVEMENT, CURB, SIDEWALKS, SHOULDERS AND FILL SLOPES. SUBGRADE TOLERANCES SHALL BE AS SPECIFIED IN MAG SECTION 301. OPEN LANDSCAPED AREAS SHALL BE GRADED TO +/- 0.20 FEET.

9.9 EARTH FILL: AREAS TO BE FILLED SHALL BE LEVELED TO PROVIDE A LEVEL BASE TO SUPPORT FILL MATERIALS. SUBGRADE AND SUBBASE AREAS REQUIRING FILL MATERIAL SHALL BE SCARIFIED MOISTENED AND COMPACTED PRIOR TO PLACING FILL. ALL FILL, SUBGRADE AND SUBBASE MATERIALS SHALL BE COMPACTED TO SPECIFIED DENSITIES AT OR NEAR OPTIMUM MOISTURE CONTENTS AS VERIFIED AND RECOMMENDED BY THE SOILS ENGINEER. PLACE FILL IN HORIZONTAL LIFTS NOT EXCEEDING SIX INCHES IN LOOSE THICKNESS BEFORE COMPACTION. SLOPED SURFACES SHALL BE PLOWED, STEPPED, AND BENCHED SO THAT THE FILL MATERIAL WILL BOND WITH THE EXISTING MATERIAL. BENCH AT THE TOE OF FILL SLOPES AND PERIODIC INTERVALS UP THE FILL SLOPES BENCHES.

9.10 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE SOILS ENGINEER FOR SCHEDULING OF COMPACTION TESTING. THE FREQUENCY OF DENSITY AND MOISTURE TESTS REQUIRED FOR ADEQUATE CONTROL SHALL BE THE RESPONSIBILITY OF THE SOILS ENGINEER WHO SHALL CERTIFY TO THE ENGINEER AND CONTRACTOR AT PROJECT END THAT THE ROADBED FILL IS COMPACTED AS OUTLINED HEREIN. COMPACTION SHALL BE ACHIEVED BY MECHANICAL MEANS. IN NO CASE SHALL STRUCTURE BACKFILLING BE FLOOD WATER SETTLED.

9.11 ALL SLOPE CONSTRUCTION AND ROADWAY EXCAVATION SHALL CONFORM TO THE REQUIREMENTS OF MAG SPECIFICATIONS SECTIONS 201, 205, 212, 301, AND UBC SECTIONS 7009 AND 8010. CUT AND FILL SLOPES SHALL BE AS INDICATED ON THE DETAILS AND PLANS. CUT AND FILL SLOPE GRADIENTS SHALL NOT EXCEED 2:1 IN STEEPNESS WITHOUT WRITTEN AUTHORIZATION FROM THE PROJECT ENGINEER AND EXAMINATION BY THE PROJECT ENGINEER. ALL SLOPE CONDITIONS SHALL BE PROVIDED WITH THE APPROPRIATE BENCHES AS SPECIFIED IN THE REFERENCE DOCUMENTS AND INDICATED ON THE PLANS. IF SOILS CONDITIONS ARE ENCOUNTERED WHICH DO NOT ALLOW THE ESTABLISHMENT OF THE INDICATED CUT OR FILL SLOPES, THE PROJECT ENGINEER AND SOILS ENGINEER SHALL BE CONTACTED IMMEDIATELY TO DETERMINE AN ADJUSTMENT TO THE SLOPE GRADIENT OR TO ESTABLISH A METHOD OF STABILIZATION. ALL FILL SLOPES SHALL BE COMPACTED AS EACH LIFT OF FILL MATERIAL IS PLACED. ALL CUT AND FILL SLOPES SHALL BE UNIFORMLY GRADED TO LINES AND GRADES INDICATED. TOPS OF ALL CUT SLOPES SHALL BE ROUNDED AND ALL UNSTABLE AND LOOSE MATERIAL AT TOP OF SLOPE SHALL BE REMOVED. TOP OF CUT SLOPES OVER 10' HIGH SHALL BE PROVIDED WITH BROW DITCHES FOR DRAINAGE.

NOTE:
REFER TO SECTION 15 FOR SEED MIX DESIGN.

NOTE:
THERE ARE EXISTING SEWER, WATER, GAS, AND DRY UTILITIES LOCATED WITHIN THE ROAD PRISM. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT THESE UTILITIES DURING CONSTRUCTION.

9.12 COMPACT TO THE FOLLOWING SPECIFIED PERCENT OF MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D698 AND MAG SECTION 211.

MINIMUM PERCENT COMPACTION:

SUBGRADE SOIL:
ROADWAY AND STRUCTURE AREAS----------95
PAVED AREAS (PAVEMENTS, SIDEWALKS, & PADS)---------95

EARTH FILL:
ROADWAY AND STRUCTURE AREAS----------95
PAVED AREAS (PAVEMENTS, SIDEWALKS, & PADS)---------95
GRASSED AND PLANTING AREAS----------85
AGGREGATE BASE COURSE----------100
BACKFILL AROUND STRUCTURES----------95
BACKFILL FOR UTILITY TRENCHES (PER MAG SECTION 601) EXCEPT AS FOLLOWS: BACKFILL FOR TRENCHES SHALL BE COMPACTED TO 100%.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR READING AND UNDERSTANDING THE PROJECT SOIL REPORT.

NATIONAL PROFESSIONAL ENGINEER
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SHEET TITLE: NOTES - SHEET 1 OF 3

PROJECT TITLE:

SEDONA LOFTS

MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	NONE
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-2

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9 GRADING AND EARTHWORK

9.13 EXCAVATION: EXCAVATE TO THE DIMENSIONS AND DEPTHS INDICATED ON THE DRAWINGS. FOUNDATIONS SHALL REST ON ENGINEERED COMPACTED FILL OR UNDISTURBED NATURAL SOILS AT GRADE ELEVATIONS INDICATED. IF SUITABLE SOIL IS NOT REACHED AT THE DEPTHS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE SOILS ENGINEER AND ENGINEER. THE CONTRACTOR WILL BE DIRECTED, IN WRITING, TO EXCAVATE TO THE DEPTH OF SUITABLE SOIL. EXCAVATION FOR FOUNDATIONS WHICH ARE CARRIED BELOW THE DEPTHS INDICATED SHALL HAVE THE CONCRETE EXTENDED TO THE BOTTOM OF THE EXCAVATION AT THE CONTRACTOR'S EXPENSE. SEE MAG SPECIFICATION SECTION 206.

9.14 WATERING: CAREFULLY WATER EARTH FILL DURING PLACING BY MEANS OF A FINE SPRAY OR OTHER APPROVED METHOD, SO THAT EACH LAYER IS THOROUGHLY AND UNIFORMLY WETTED. MOISTURE CONTENT OF THE MATERIAL SHALL BE CAREFULLY CONTROLLED AT ALL TIMES AND CHECKED AT PROPER INTERVALS TO INSURE CORRECT MOISTURE FOR COMPACTION SPECIFIED. SEE MAG SECTION 225 AND SOILS REPORT.

10 PAVING

10.1 COMPLETE ASPHALTIC CONCRETE PAVEMENT INSTALLATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

A. TACK COATING OF CONCRETE SURFACES, UNDILUTED .02 TO .10 GAL/SY, DILUTED 1:1 MIXTURE, .05 TO .15 GAL/SY, OR AS DIRECTED.

B. PAINT FOR PAVEMENT STRIPING AND MARKING SHALL CONFORM TO FEDERAL SPEC. NO. TTP-155E, "PAINT, TRAFFIC, HIGHWAY, WHITE AND YELLOW". COLORS FOR PAVEMENT MARKING AND STRIPING SHALL BE AS SPECIFIED BY THE PROJECT ENGINEER.

C. TRAFFIC CONTROL DEVICES: SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" LATEST EDITION, PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

10.2 ASPHALTIC PAVEMENT SHALL CONFORM TO MAG SPECIFICATION SECTION 32 WITH THICKNESS AND DESIGN MIX AS INDICATED ON THE PLANS.

10.3 ALL FRAMES, COVERS, VALVE BOXES, AND MANHOLES IN PAVED AREAS AND RIGHT-OF-WAY SHALL BE ADJUSTED TO GRADE BY THE PAVING CONTRACTOR. IN NON-PAVED AREAS THEY SHALL BE ADJUSTED TO GRADE BY THE GENERAL CONTRACTOR.

10.4 ALL PAVING WORK SHALL BE PLACED IN STRICT CONFORMANCE TO MAG SECTION 321 PAR.3213 WEATHER AND MOISTURE CONDITIONS. ALL WORK AND MATERIALS PLACED IN VIOLATION OF THESE REQUIREMENTS WILL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

10.5 EXACT POINT OF PAVEMENT MATCHING, TERMINATION AND/OR OVERLAY, IF NECESSARY, SHALL BE SUBJECT TO FIELD APPROVAL BY THE ENGINEER, HIS REPRESENTATIVE AND LOCAL MUNICIPAL AUTHORITIES. EDGE OF EXISTING PAVEMENT WHERE NECESSARY SHALL BE UNIFORMLY SAWCUT AND TACK COAT APPLIED. 10.6 THE CONTRACTOR SHALL IN ALL AREAS OF PAVING PROVIDE A UNIFORM DENSE SURFACE SMOOTH AND TRUE TO LINE. SURFACE SHALL BE FREE OF PITS, DEPRESSIONS, ROCK POCKETS AND PATCHES.

10.6 THE CONTRACTOR SHALL IN ALL AREAS OF PAVING PROVIDE A UNIFORM DENSE SURFACE SMOOTH AND TRUE TO LINE. SURFACE SHALL BE FREE OF PITS, DEPRESSIONS, ROCK POCKETS AND PATCHES.

11 FIELD INSPECTION

11.1 THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL CONSTRUCTION STAKING. ANY ADDITIONAL STAKING WILL BE AT THE COST OF THE CONTRACTOR.

11.2 THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR 24 HOURS PRIOR TO BEGINNING DIFFERENT ASPECTS OF CONSTRUCTION SO THAT INSPECTIONS MAY BE SCHEDULED.

11.3 ANY QUESTIONS RAISED RELATIVE TO ACCURACY OF IMPROVEMENT INSTALLATION SHALL NOT BE RAISED SUBSEQUENT TO COMPLETION OF THE WORK UNLESS ALL SURVEY STAKES ARE MAINTAINED INTACT. SHOULD SUCH STAKES NOT BE PRESENT AND VERIFIED AS TO THEIR ORIGIN, NO CLAIM FOR ADDITIONAL COMPENSATION FOR CORRECTION SHALL BE PRESENTED TO ANY PARTY AND SUCH WORK SHALL BE CORRECTED BY THE CONTRACTOR AT HIS EXPENSE.

12 SUSPENSION OF WORK

12.1 THE ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MAY SUSPEND THE WORK BY WRITTEN NOTICE WHEN, IN HIS JUDGMENT, PROGRESS IS UNSATISFACTORY, WORK BEING DONE IS UNAUTHORIZED OR DEFECTIVE, WEATHER CONDITIONS ARE UNSUITABLE, OR THERE IS DANGER TO THE PUBLIC HEALTH OR SAFETY.

13 WARRANTY

13.1 ANY DEFECTS WHICH APPEAR IN THE WORK WITHIN TWO YEARS FROM THE DATE OF ACCEPTANCE AND WHICH ARE DUE TO IMPROPER WORKMANSHIP OR INFERIOR MATERIALS SUPPLIED SHALL BE CORRECTED BY OR AT THE EXPENSE OF THE CONTRACTOR.

14 EROSION CONTROL NOTES

(SPECIFICATIONS FOR PERMANENT SEEDING)

14.1 SITE PREPARATION
- A. INSTALL NECESSARY SURFACE WATER CONTROL MEASURES PRIOR TO PLANTING PERMANENT SEEDING.
- B. GRADE TO PERMIT USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION.
- C. PROVIDE ADEQUATE DRAINAGE WHERE INTERNAL WATER MOVEMENT, ESPECIALLY AT TOES OF SLOPES, MAY CAUSE SEEPS OR SLIPPAGE BEFORE SEEDING IS WELL ESTABLISHED.

14.2 SEEDBED PREPARATION
- A. AS PRACTICAL, PERFORM ALL CULTURAL OPERATIONS AT RIGHT ANGLES TO THE SLOPE.
- B. IMMEDIATELY BEFORE SEEDING, RAKE OR OTHERWISE LOOSEN PLANTING SURFACE TO PROVIDE A SMOOTH, FRIABLE SURFACE FREE OF EARTH CLODS, HUMPS AND DEPRESSIONS, AND DISPOSE OF LOOSE STONES HAVING A DIMENSION GREATER THAN ONE INCH AND DEBRIS BROUGHT TO THE SURFACE DURING CULTIVATION.

14.3 PLANTING
- A. APPLY SEED MIX AT THE RATE OF 11 POUNDS PER ACRE. MIX SHALL CONTAIN THE FOLLOWING PROPORTION OF PURE LIVE SEED: SAND DROPSEED (SPOROBOLUS CRYPTANDRUS) 1 LB SIDEOATS GRAMA (BOUTELOUS CURTIPENDULA)5 LB CRESTED WHEAT GRASS (AGROPYRON CRISTATUM) 5 LB
- B. APPLY SEED IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER WITH HALF THE SPECIFIED APPLICATION RATE APPLIED IN EACH DIRECTION.
- C. IMMEDIATELY AFTER SEEDING, UNIFORMLY SPREAD SCREENED MANURE AT THE RATE OF ONE CUBIC YARD PER 1000 SQUARE FEET AND WATER UNTIL THE GROUND IS WET TO A MINIMUM DEPTH OF TWO INCHES.
- D. HYDRAULIC SEEDING USING 1500 POUNDS OF WOOD CELLULOSE FIBER PER ACRE MAY BE UTILIZED IN LIEU OF PLANTING.

14.4 MAINTENANCE
- A. PROTECT PLANTED AREAS FROM GRAZING, FIRE, TRAFFIC, AND WEED GROWTH.
- B. MAINTAIN PLANTED AREAS UNTIL A GOOD STAND OF GRASS IS ESTABLISHED. AREAS AS REQUIRED IF NO GROWTH IS PRESENT WITHIN 15 DAYS OF PLANTING.

15 TEMPORARY EROSION CONTROL

15.1 EROSION CONTROL BERMS AND ROCK CHECK DAMS
- A. PROVIDE EARTHEN BERMS AT TOES OF SLOPES REMAINING BARE BETWEEN CONSTRUCTION PHASES.
- B. PLACE TEMPORARY ROCK CHECK DAMS IN ROAD DITCHES AND CHANNELS IF RIP-RAP PROTECTION WILL NOT BE PROVIDED WITHIN 60 DAYS.

15.2 CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING EROSION CONTROL MEASURES SUCH AS SAND BAGGING, TEMPORARY DE-SILTING BASIN CONSTRUCTION BERMS, VISQUEEN, ETC. TO PROTECT ADJOINING PROPERTIES FROM EROSION.

16 SEWER LINE NOTES

16.1 ALL PVC LINES WILL BE BURIED WITH A GREEN #14 TRACE WIRE WITH A "CAUTION SEWER LINE BELOW" TAPE.

16.2 SEWER "YARD" LINES WILL BE CONSTRUCTED OF 4" ABS/PVC PIPE WITH GLUE JOINTS. NO JOINTS TO BE CONSTRUCTED WITHIN 6 FEET EITHER SIDE OF WATER "YARD" LINE CROSSINGS.

16.3 UNLESS SPECIFICALLY CALLED OUT ALL INVERTS ARE TO BE THREE (3) FEET BELOW FINISHED FLOOR STUBBED OUT.

16.4 MARK EACH STUB-OUT PER M.S.D. 440-1. IF BUILDING LOCATION IS KNOWN THEN MARK PER M.S.D. 440-2.

16.5 EXFILTRATION FROM ALL MANHOLES SHALL BE LIMITED TO 0.1 GALLONS PER HOUR PER VERTICAL FOOT.

16.6 ALL NEW SEWER LINES ARE TO BE TESTED FOR INFILTRATION/EXFILTRATION AS PER A.D.E.Q. BULLETIN # 11. MAXIMUM ALLOWABLE INFILTRATION/EXFILTRATION IS 0.158 GALLONS/INCH DIAMETER/100 FEET.

16.7 SHORT TERM DEFLECTION TESTING FOR AT LEAST 20% OF PVC SEWER SHALL BE PERFORMED. SHORT TERM DEFLECTION IN EXCESS OF 5% SHALL BE CONSIDERED UNSERVICEABLE AND SHALL BE REPAIRED AND RETESTED.

16.8 THE ENGINEER SHALL REVISE THESE PLANS TO "AS BUILT" CONDITIONS AND RETURN THEM TO YAVAPAI COUNTY ENVIRONMENTAL SERVICES PRIOR TO THE ACCEPTANCE OF ANY IMPROVEMENTS SHOWN ON THESE PLANS.

16.9 SEWER PIPE SHALL BE IN ACCORDANCE WITH SECTION 745 OF THE MAG STANDARD SPECIFICATIONS.

16.10 CONSTRUCTION AND TESTING OF SEWER LINES SHALL BE IN ACCORDANCE WITH MAG STANDARD SPECIFICATIONS SECTION 615.

16.11 INSTALLATION OF PVC SEWER MUST BE IN CONFORMANCE WITH STANDARD SPECIFICATION ASTM D2321.

16.12 WATER TIGHTNESS TESTING OF THE SEWER LINE SHALL BE PERFORMED IN ACCORDANCE WITH MAG SPECIFICATION 615.10.

16.13 SEWER SERVICE TAPS SHALL BE INSTALLED IN ACCORDANCE WITH MAG STANDARD DETAIL 440. SERVICE PIPE SHALL BE 4-INCH FOR HOUSE CONNECTIONS. TAP LOCATION AND SERVICE LINES SHALL BE FIELD LOCATED AND MARKED WITH A GREEN # 4 REBAR OR AS SPECIFIED.

16.14 SEWER LINES MUST HAVE 3' MINIMUM COVER OVER PIPE.

16.15 TRENCH EXCAVATION, BEDDING, AND BACKFILLING FOR SEWER PIPES SHALL BE IN COMPLIANCE WITH MAG SPECIFICATIONS SECTION 601.

16.16 SEWER MAINS (GRAVITY, PRESSURE, FORCE) SHALL BE KEPT AT A MINIMUM OF 100 FEET FROM DRINKING WATER WELLS, UNLESS THE FOLLOWING CONDITIONS ARE MET: 1. WATER MAIN PIPE, PRESSURE TESTED IN PLACE TO 150 PSI WITHOUT EXCESSIVE LEAKAGE, MAY BE USED FOR PRESSURE SEWERS AND FORCE MAINS AT DISTANCES GREATER THAN 20 FEET FROM DRINKING WATER WELLS.

17 WATER LINE NOTES

17.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE ARIZONA WATER COMPANY (A.W.CO.) STANDARD SPECIFICATIONS TO INCLUDE E-4-1-1 AND E-8-1.

17.2 CONTRACTOR SHALL ACQUIRE ALL NECESSARY PERMITS.

17.3 THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

17.4 THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING "BLUE STAKE" AT 1-800-STAKE IT (1-800-782-5348) TWO WORKING DAYS PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

17.5 DUCTILE IRON PIPE (PUSH-ON TYPE) CLASS 350, CEMENT LINED AND CONFORMING TO AWWA C151 SHALL BE USED AS MAIN LINE WATER PIPING. ALL MAIN LINE VALVES SHALL CONFORM TO AWWA C500 WITH A MINIMUM WORKING PRESSURE OF 200 PSI. ALL CAST IRON FITTINGS TO BE CEMENT LINED IN ACCORDANCE WITH AWWA C104 AND SHALL CONFORM TO AWWA C110 WITH A MINIMUM WORKING PRESSURE OF 250 PSI.

17.6 WATER MAINS NEAR SEWER MAINS SHALL HAVE SEPARATION OR PROTECTION IN ACCORDANCE WITH AAC R18-5-502.C INCLUDED HEREIN.

A. IN ORDER TO PROTECT PUBLIC WATER SYSTEMS FROM POSSIBLE CONTAMINATION, A WATER MAIN SHALL NOT:

1. INFRINGE UPON AN AREA WHICH IS WITHIN SIX FEET OF EITHER SIDE OF A SEWER MAIN AND SHALL NOT BE BELOW, AT THE SAME LEVEL AS, OR LESS THAN TWO FEET ABOVE THE TOP OF THE SEWER MAIN, UNLESS EXTRA PROTECTION IS PROVIDED. EXTRA PROTECTION SHALL CONSIST OF CONSTRUCTING THE SEWER MAIN AND WATER MAIN WITH MECHANICAL JOINT DUCTILE IRON PIPE OR WITH SLIP-JOINT DUCTILE IRON PIPE IF JOINT RESTRAINT IS PROVIDED OR SHALL CONSIST OF ENCASING THE SEWER MAIN IN AT LEAST SIX INCHES OF CONCRETE.

2. UNDER ANY CIRCUMSTANCES, INFRINGE UPON AN AREA WHICH IS WITHIN TWO FEET BELOW THE SEWER MAIN.

B. WHEN UNUSUAL CONDITIONS SUCH AS, BUT NOT LIMITED TO, HIGHWAY OR BRIDGE CROSSINGS PREVENT THE WATER AND SEWER MAIN SEPARATIONS REQUIRED BY SUBSECTION A ABOVE FROM BEING MET, THE DEPARTMENT WILL REVIEW AND MAY APPROVE, REQUEST FOR AUTHORIZATION TO USE ALTERNATE CONSTRUCTION TECHNIQUES, MATERIALS AND JOINTS ON A CASE-BY-CASE BASIS.

C. NO WATER PIPE SHALL PASS THROUGH, OR COME INTO CONTACT WITH ANY PART OF A SEWER MANHOLE. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATER MAINS AND MANHOLES SHALL BE SIX FEET MEASURED FROM THE CENTER OF THE MANHOLE.

D. THE MINIMUM SEPARATION BETWEEN FORCE, GRAVITY OR PRESSURE SEWERS AND WATER MAINS SHALL BE TWO FEET VERTICALLY AND SIX FEET HORIZONTALLY UNDER ALL CONDITIONS. WHERE A SEWER FORCE MAIN CROSSES ABOVE, OR LESS THAN TWO FEET BELOW A WATER LINE, THE SEWER MAIN SHALL BE ENCASED IN AT LEAST SIX INCHES OF CONCRETE FOR 10 FEET ON EITHER SIDE OF THE WATER MAIN.

E. ALL DISTANCES ARE MEASURED PERPENDICULARLY FROM THE OUTSIDE OF THE SEWER MAIN TO THE OUTSIDE OF THE WATER MAIN. THESE SEPARATION REQUIREMENTS DO NOT APPLY TO BUILDING PLUMBING OR INDIVIDUAL HOUSE SERVICE CONNECTIONS.

F. ALL WATER SERVICE LINES THAT ARE UNDER PAVEMENT SHALL BE SLEEVED IN 4" CLASS 160 PVC PIPE CONDUIT.

G. THRUST BLOCKS SHALL BE INSTALLED AT ALL ANGLES, TEEs AND IN ACCORDANCE WITH AWC STANDARDS E-9-5-1, E-9-5-2 OR PER DETAILS.

17.7 A ONE (1) FOOT MINIMUM VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN A STORM DRAIN CROSSING A WATER MAIN. THE MINIMUM VERTICAL SEPARATION IS MEASURED FROM OUTSIDE OF WATER MAIN TO OUTSIDE OF STORM DRAIN. EXTRA PROTECTION IS REQUIRED PER MAG SPECIFICATIONS WHEN THESE REQUIREMENTS ARE NOT MET.

17.8 A THREE (3) FOOT MINIMUM HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN A FIRE HYDRANT AND ANY WATER SERVICE LINE.

17.9 RECLAIMED WASTEWATER MAINS SHALL BE CONSIDERED THE SAME AS WATER MAINS FOR THE PURPOSE OF MINIMUM COVER AND SEPARATION.

17.10 VERTICAL CLEARANCE BETWEEN WATER MAINS AND SEWER SERVICE CONNECTIONS:

THE WATER MAIN MAIN SHALL NOT BE LESS THAN SIX (6) INCHES ABOVE THE SEWER SERVICE EVEN IF THE SEWER SERVICE CONNECTION IS CONSTRUCTED WITH DUCTILE IRON PIPE IN ACCORDANCE WITH NOTE 3B OF MAG STANDARD DETAIL 404-11.

18 STORM SEWER NOTES

18.1 ALL CORRUGATED METAL PIPE TO BE 14 GAUGE, UNLESS OTHERWISE APPROVED BY THE DESIGN ENGINEER.

18.2 ALL CORRUGATED METAL PIPE SHALL HAVE FLARED END SECTIONS, EXCEPT WHERE HEADWALLS ARE USED.

18.3 ALL DRAINAGE CULVERTS AND PIPES SHALL HAVE A MINIMUM COVER OF 12".

19 DRY UTILITIES NOTES

19.1 GAS MAINS SHALL HAVE A MINIMUM COVER OF 36" WITH SAND SHADE 6" BELOW AND ABOVE PIPING. MAINTAIN A MINIMUM OF 1 FOOT VERTICAL AND HORIZONTAL SEPARATION BE-BETWEEN GAS LINE AND OTHER UTILITIES. CONSULT CITIZEN'S UTILITIES FOR FUR-OTHER REQUIREMENTS.

19.2 PRIMARY ELECTRIC LINES SHALL HAVE A MINIMUM COVER OF 48". CONSULT APS FOR FURTHER REQUIREMENTS.

19.3 CABLE TV LINES SHALL BE INSTALLED PER THE REQUIREMENTS OF SEDONA CABLEVISION.

19.4 TELEPHONE LINES SHALL BE INSTALLED PER THE REQUIREMENTS OF US WEST.

20 LANDSCAPING NOTES

20.1 ALL EXISTING TREES AND SHRUBS NOT AFFECTED BY BUILDING CONSTRUCTION OR ROAD DEVELOPMENT MUST BE FENCED WITH A CONSTRUCTION ENVELOPE FENCE TO PROTECT THEM DURING CONSTRUCTION.

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SHEET TITLE: NOTES - SHEET 2 OF 3

PROJECT TITLE: SEDONA LOFTS

MK COMPANY, INC.

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21 ADEQ WATER AND SEWER SYSTEM NOTES

1 WATER SYSTEM THRUST BLOCKING AND/OR JOINT RESTRAINT

2 PIPE LINES SHALL BE PROVIDED WITH CONCRETE THRUST BLOCKS AT ALL CHANGES IN DIRECTION AND SIZE AND AT ALL TEES, VALVES, PLUGS, AND DEAD ENDS, PER MAG STANDARD DETAILS 301 AND 380 AND YAG STANDARD DETAIL 3-03. PIPE LINES MAY ALSO BE PROVIDED WITH RESTRAINED JOINTS AT ALL CHANGES IN DIRECTION AND SIZE AND AT ALL TEES, VALVES, PLUGS, AND DEAD ENDS, PER MAG STANDARD DETAILS 302 AND 303.

3 TRENCHING AND BACKFILLING

3.1 ROUGH GRADING SHALL BE COMPLETED PRIOR TO INSTALLATION OF UNDERGROUND UTILITIES.

3.2 TRENCH BOTTOM SHALL BE COMPACTED BY SUITABLE MEANS APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF BEDDING MATERIAL. BEDDING MATERIAL SHALL BE PLACED TO PROVIDE UNIFORM AND ADEQUATE LONGITUDINAL SUPPORT UNDER THE PIPE. THE CONTRACTOR SHALL ENSURE THAT A MINIMUM COMPACTED DEPTH OF 6" IS MAINTAINED UNDERNEATH THE PIPE. BELL HOLES SHOULD BE PROVIDED AT EACH JOINT TO PERMIT PROPER ASSEMBLY WHILE MAINTAINING UNIFORM SUPPORT.

3.3 BEDDING MATERIAL SHALL BE AGGREGATE BASE COURSE WITH A MAXIMUM PARTICLE SIZE OF 3/4" AND SHALL BE NON-PLASTIC. WHERE DEPTH OF COVER IS 2-FT. OR LESS, BACKFILL MATERIAL SHALL BE ROUNDED GRAVEL WITH A MAXIMUM PARTICLE SIZE OF 1/2" AND WITH NO MORE THAN 20% PASSING THE #200 SIEVE.

4 GENERAL CONTRACTOR TO STUB OUT UTILITIES 1-FT WITHIN EACH PROPERTY AND MARKED. SEWER TO BE MARKED PER M.S.D. 440-1. IF BUILDING LOCATION IS KNOWN THEN MARK PER M.S.D. 440-2. ALL OTHER UTILITIES TO BE MARKED WITH METAL STUD PER M.S.D. 440-1 BUT PAINTED GREEN FOR SEWER, BLUE FOR WATER AND RED FOR APS. PIPES ALSO TO HAVE TRACER WIRE AND MARKING TAPE.

5 BACKFILL SHALL BE PLACED IN LAYERS OF NOT MORE THAN 8" LOOSE DEPTH AND COMPACTED TO ACHIEVE COMPACTION OF 95% OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99 AND T-191 OR ASTM D-2922 AND D-3017. THE CONTRACTOR SHALL CONTRACT WITH AN INDEPENDENT TESTING LABORATORY TO PROVIDED COMPACTION TESTING. TESTS SHALL BE PROVIDED AT MINIMUM INTERVALS OF ONE TEST PER 50 CUBIC YARDS OF TRENCH BACKFILL. TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER DAILY.

6 TRENCHING, PIPELAYING, BACKFILLING, AND ALL OTHER CONSTRUCTION SHALL BE PERFORMED UNDER THE INSPECTION, COORDINATION, AND SUPERVISION OF A REGISTERED PROFESSIONAL CIVIL ENGINEER.

7 NO TRENCH SHALL BE FILLED WITH BEDDING MATERIAL OR BACKFILL UNTIL THE EXCAVATION AND PIPE LAYING, RESPECTIVELY, HAVE BEEN APPROVED BY THE OWNER OR HIS AUTHORIZED REPRESENTATIVE.

8 THE EXCAVATION METHOD EMPLOYED SHALL BE THE CONTRACTOR'S OPTION. MATERIAL SHALL NOT BE STOCKPILED TO A DEPTH OF MORE THAN 5 FEET ABOVE FINISHED GRADE WITHIN 25 FEET OF ANY EXCAVATION OR STRUCTURE. EXCAVATION SHALL EXTEND SUFFICIENT DISTANCE FROM WALLS AND FOOTINGS TO ALLOW PLACING AND REMOVAL OF FORMS, INSTALLATION OF SERVICES AND INSPECTION BY THE ENGINEER. WITHIN 12" OF FINISHED GRADE SHOWN ON THE DRAWINGS, AND FOR THE MANHOLES, FILL AND BACKFILL SHALL BE NATIVE MATERIAL, FREE FROM BROKEN CONCRETE, ORGANIC MATERIAL, OR OTHER DEBRIS WITH SUFFICIENT FINES TO FILL ALL VOIDS AND TO INSURE A UNIFORMLY COMPACTED MASS OF THE REQUIRED DENSITY AND HAVING A MAXIMUM SIZE OF 2 – ½ INCHES WITH 0 TO 20% MINUS #200. ALL FILL AND BACKFILL SHALL BE PLACED IN LAYERS OF NOT MORE THAN 8" LOOSE AND COMPACTED TO 95% OF MAXIMUM DENSITY, DETERMINED BY AASHTO TEST METHOD T-99, PRIOR TO PLACEMENT OF THE NEXT LAYER.

22 WATER AND SEWER SYSTEM DESIGN

22.1 WATER AND SEWER MAINS SHALL BE SEPARATED IN ORDER TO PROTECT PUBLIC WATER SYSTEMS FROM POSSIBLE CONTAMINATION. ALL DISTANCES ARE MEASURED PERPENDICULARLY FROM THE OUTSIDE OF THE SEWER MAIN TO THE OUTSIDE OF THE WATER MAIN. SEPARATION REQUIREMENTS ARE AS FOLLOWS:

1. WATER MAIN SHALL NOT BE PLACED: (AAC: 18-5-502)

   A. WITHIN SIX FEET, HORIZONTAL DISTANCE, AND BELOW TWO FEET, VERTICAL DISTANCE, ABOVE THE TOP OF A SEWER MAIN UNLESS EXTRA PROTECTION IS PROVIDED (WHEN A WATER MAIN IS ABOVE A SEWER MAIN; EXTRA PROTECTION IS REQUIRED WHEN THE WATER MAIN IS CLOSER THAN TWO (2) FEET TO THE SEWER MAIN. WHEN A WATER MAIN IS BELOW A SEWER MAIN: THE MINIMUM SEPARATION IS TWO (2) FEET AND EXTRA PROTECTION IS ALWAYS REQUIRED PER MAG SPECIFICATIONS). EXTRA PROTECTION SHALL CONSIST OF CONSTRUCTING THE SEWER MAIN WITH MECHANICAL JOINT DUCTILE IRON PIPE OR WITH SLIP-JOINT DUCTILE IRON PIPE IF JOINT RESTRAINT IS PROVIDED. ALTERNATE EXTRA PROTECTION SHALL CONSIST OF ENCASING BOTH THE WATER AND SEWER MAINS IN AT LEAST SIX INCHES OF CONCRETE FOR AT LEAST TEN FEET BEYOND THE AREA COVERED BY THIS SUBPARAGRAPH.

   B. WITHIN TWO FEET HORIZONTALLY AND TWO FEET BELOW THE SEWER MAIN.

2. NO WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SEWER MANHOLE. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATER MAINS AND MANHOLES SHALL BE SIX FEET, MEASURED FROM THE CENTER OF THE MANHOLE.

3. THE MINIMUM SEPARATION BETWEEN FORCE MAINS OR PRESSURE SEWERS AND WATER MAINS SHALL BE TWO FEET VERTICALLY AND SIX FEET HORIZONTALLY UNDER ALL CONDITIONS. WHERE A SEWER FORCE MAIN CROSSES ABOVE OR LESS THAN SIX FEET BELOW A WATER LINE, THE SEWER MAIN SHALL BE ENCASED IN AT LEAST SIX INCHES OF CONCRETE OR CONSTRUCTED USING MECHANICAL JOINT DUCTILE IRON PIPE FOR TEN FEET ON EITHER SIDE OF THE WATER MAIN.

4. A ONE (1) FOOT MINIMUM VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN A STORM DRAIN CROSSING A WATER MAIN. THE MINIMUM VERTICAL SEPARATION IS MEASURED FROM OUTSIDE OF WATER MAIN TO OUTSIDE OF STORM DRAIN. EXTRA PROTECTION IS REQUIRED PER MAG SPECIFICATIONS WHEN THESE REQUIREMENTS ARE NOT MET.

5. A SIX (6) FOOT MINIMUM HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN A SEWER MAIN OR STORM DRAIN AND A WATER MAIN. THE MINIMUM HORIZONTAL SEPARATION IS MEASURED FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE.

6. WHENEVER TWO PARALLEL WATER MAINS ARE REQUIRED, THERE SHALL BE A TEN (10) FOOT MINIMUM HORIZONTAL SEPARATION BETWEEN THE TWO MAINS TO ALLOW FOR TAPPING, TIE-OVER, AND MAINTENANCE.

7. A THREE (3) FOOT MINIMUM HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN A FIRE HYDRANT AND ANY WATER SERVICE LINE.

8. RECLAIMED WASTEWATER MAINS SHALL BE CONSIDERED THE SAME AS WATER MAINS FOR THE PURPOSE OF MINIMUM COVER AND SEPARATION.

9. VERTICAL CLEARANCE BETWEEN WATER MAINS AND SEWER SERVICE CONNECTIONS: THE WATER MAIN SHALL NOT BE LESS THAN 6 INCHES ABOVE THE SEWER SERVICE EVEN IF THE SEWER SERVICE CONNECTION IS CONSTRUCTED WITH DUCTILE IRON PIPE IN ACCORDANCE WITH NOTE 3B OF MAG STANDARD DETAIL 404-1.

10. WHEN THE SEWER SERVICE IS ABOVE THE WATER MAIN IS NOT ALLOWED.

11. SEPARATION FROM STORM DRAINS AND CULVERTS; WATER AND SEWER MAINS SHALL MAINTAIN SIX (6) FEET HORIZONTAL AND ONE FOOT VERTICAL SEPARATION FROM STORM DRAINS AND CULVERTS.

12. MINIMUM COVER IS TO BE MEASURED TO SUBGRADE UNLESS THERE IS NO PAVEMENT; THEN IT IS MEASURED TO FINISHED GRADE. IN ALL CASES, SEWER LINES ARE TO BE AT A DEPTH SUFFICIENT TO PROVIDE GRAVITY SERVICE TO ALL ADJACENT BUILDING PADS. SERVICE LINES ARE TO BE LAID AT GRADES AND DEPTHS PRESCRIBED IN THE INTERNATIONAL PLUMBING CODE.

22.2 MANHOLES

ALL MANHOLES SHALL BE 4-FT. ID PRECAST CONCRETE WITH POURED-IN-PLACE CONCRETE BASE AND TRAFFIC BEARING RING AND COVER. ALL COVERS SHALL BE 2-FT. IN DIAMETER AND SHALL BE MARKED "SEWER". TEST MANHOLES FOR WATER TIGHTNESS (INFILTRATION) PER R 18-9-E301.4.01.D.3.F. WATER TIGHTNESS SHALL BE TESTED BY EITHER 1) FILLING THE MANHOLE WITH WATER AND ENSURING THAT THE DROP IN WATER LEVEL DOES NOT EXCEED 0.001% OF THE TOTAL MANHOLE VOLUME IN ONE HOUR, OR 2) AIR PRESSURE TESTING USING THE "STANDARD TEST METHOD FOR CONCRETE SEWER MANHOLES BY NEGATIVE AIR PRESSURE (VACUUM) TEST". ASTM C-1244-93. TEST 100% OF ALL MANHOLES. MANHOLES SHALL CONFORM TO A.D.E.Q. AND M.A.G. SPECIFICATIONS. CONSTRUCTION SHALL CONFORM TO M.A.G. STD. DTLS. 420-1 AND 420-2.'

22.3 CONCRETE

CLASS A CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI. ALL POURED-IN-PLACE CONCRETE FOR WATER CONTAINING AND/OR TRANSPORTING CHAMBERS, MANHOLES AND BOXES, AND FOUNDATIONS SHALL BE CLASS A CONCRETE, AND SHALL BE SMOOTH FINISHED ON WATER CONTACT SURFACES. THRUST BLOCKS, VALVE ANCHORS, AND CONCRETE SURROUNDS MAY BE FORMED FROM CLASS C CONCRETE. THE EXCAVATION METHOD EMPLOYED SHALL BE THE CONTRACTOR'S GRADE WITHIN 25 FEET OF ANY EXCAVATION OR STRUCTURE. EXCAVATION SHALL EXTEND A SUFFICIENT DISTANCE FROM WALLS AND FOOTINGS TO ALLOW PLACING AND REMOVAL OF FORMS, INSTALLATION OF SERVICES AND INSPECTION BY THE ENGINEER.

23 SEWER AND WATER LINE TESTING

GRAVITY SANITARY SEWER TESTING:

ALL GRAVITY SANITARY SEWER MAINS SHALL BE TESTED IN ACCORDANCE WITH THE ARIZONA ADMINISTRATIVE CODE. ALL ACCEPTANCE TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE PROJECT ENGINEER OR AUTHORIZED REPRESENTATIVE. TESTING SHALL CONSIST OF THE FOLLOWING:

1. TEST EACH SECTION OF GRAVITY PIPELINE FOR LEAKAGE AND PRESSURE RATING AFTER BACKFILLING OCCURS AND BEFORE ROAD IS PAVED. PERFORM LEAKAGE TESTS WITH THE AIR TEST AS SPECIFIED BELOW. TEST LATERALS FROM THE MAIN LINE TO PROPERTY LINE.
2. IN ADDITION TO PRESSURE AND LEAKAGE TESTING, A DEFLECTION TEST SHALL BE PERFORMED ON ALL GRAVITY PIPELINES INSTALLED. A RIGID BALL OR MANDREL DEFLECTION TESTING EQUIPMENT AND LABOR SHALL BE PROVIDED. TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES. ANY SECTION OF THE PIPELINE WHICH SHOWS DEFLECTION IN EXCESS OF 5 PERCENT OF THE AVERAGE INSIDE DIAMETER AS PER ASTM D3034 SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. ENGINEER MAY REQUIRE CONTRACTOR TO TEST PVC PIPE AFTER BACKFILL HAS BEEN IN PLACE FOR 30 DAYS.
3. VIDEO INSPECTION

3.a. THE CONTRACTOR WILL BE REQUIRED TO VIDEO RECORD THE INTERIOR OF THE SEWER LINE USING A VIDEO CAMERA. ANY DEFECTS OR 'SAGS' IN THE PIPE OR CONSTRUCTION METHODS REVEALED BY THE INSPECTION SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.

3.b. THE CONTRACTOR SHALL RE-VIDEO THE PIPE AFTER IT HAS BEEN REPAIRED OR EXCAVATED. ANY ADDITIONAL INSPECTION(S) REQUIRED, BASED ON A FAILURE OR DEFICIENCY DISCOVERED DURING THE INSPECTION, SHALL BE PAID FOR BY THE CONTRACTOR. ALL SEWER LINE VIDEOS SHALL BE TURNED IN TO THE PROJECT MANAGER AFTER ACCEPTANCE.

4. AIR TESTING (ASTM F1417)

4.a. PERFORM AIR TESTS FOR PLASTIC MAINLINE AND WILL INCLUDE LATERAL PIPES TO THE PROPERTY LINES WHERE APPLICABLE.

4.b. CONTRACTOR SHALL FURNISH ALL FACILITIES REQUIRED INCLUDING: NECESSARY PIPING CONNECTIONS, TEST PUMPING EQUIPMENT, PRESSURE GAUGES OR MANOMETERS, BULKHEADS, ALL MISCELLANEOUS ITEMS REQUIRED. OBTAIN APPROVAL OF EQUIPMENT AND ACCEPTANCE OF METHODS PROPOSED FOR USE. CONDUCT. INITIAL TEST ON FIRST SECTION OF PIPE LAID BY EACH CREW.

4.c. INTRODUCE LOW-PRESSURE AIR UNTIL INTERNAL AIR PRESSURE IS 4.0 PSI. ALLOW TWO TO FIVE MINUTES FOR INTERNAL AIR PRESSURE AND TEMPERATURE TO STABILIZE. ADJUST PRESSURE TO 3.5 PSI AND START TEST. THE TIME REQUIRED FOR THE PRESSURE TO DECREASE 1.0 PSI FROM 3.5 TO 2.5 PSI GREATER THAN THE AVERAGE BACK PRESSURE OF ANY GROUND WATER ABOVE THE PIPE INVERT SHALL NOT BE LESS THAN THE MINIMUM TEST TIME IN THE FOLLOWING FOR THE GIVEN DIAMETERS: NOMINAL PIPE TIME (MIN) PER DIAMETER PER 100FT OF PIPE: 4"=.66 MIN; 6"=1.48 MIN; 8"=2.510 MIN; 10"=3.912 MIN; 12"=5.615 MIN; 15"=8.918 MIN; 18" =12.8 MIN.

5. MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH AAC R18-9-E301D.3, ASTM C -1244 AND MAG SPECIFICATION SECTION 615.

WATER SYSTEM PRESSURE AND LEAKAGE TESTING:

1. THE CONTRACTOR SHALL PROVIDE THE LABOR, TOOLS, EQUIPMENT, AND MATERIALS NECESSARY TO PERFORM THE PRESSURE TESTS AND LEAKAGE TESTS.
2. ALL TESTS PERFORMED FOR EACH PIPE TEST SECTION, FACILITY, OR PART OF A FACILITY SHALL BE OBSERVED AND APPROVED BY THE ENGINEER BEFORE ACCEPTANCE. IN THE EVENT THE CONTRACTOR PERFORMS ANY TEST WITHOUT OBSERVED BY THE ENGINEER, THE CONTRACTOR WILL BE REQUIRED TO TEST THE SECTION, FACILITY, OR PART OF A FACILITY AGAIN IN CONFORMANCE WITH THIS SPECIFICATION AT NO COST TO THE OWNER.
3. SUBMIT TEST RESULTS OF ALL TESTING INCLUDED IN THIS SECTION, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PRESSURE TESTS AND GAUGE CALIBRATIONS.
4. THE ENGINEER AND PROJECT MANAGER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO ANY TESTING AND/OR DISINFECTING.
5. TEST PRESSURES SHALL BE 150 PSI, MEASURED AT THE LOWEST POINT OF THE PIPE SEGMENT BEING TESTED. ONLY POTABLE WATER SHALL BE USED FOR FLUSHING AND TESTING THE POTABLE WATER SYSTEM.
6. THE CONTRACTOR WILL BE RESPONSIBLE FOR DISPOSAL OF ANY WATER ASSOCIATED WITH HYDROSTATIC TESTING. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT ENGINEER TO DETERMINE DISPOSAL LOCATIONS. PERMITTING, COORDINATION, AND APPROVAL OF DISPOSAL LOCATIONS ARE THE RESPONSIBILITY OF CONTRACTOR. ALL TEMPORARY PLUGS, BULKHEADS, OR BLIND FLANGES USED FOR HYDROSTATIC TESTING WILL BE FURNISHED BY THE CONTRACTOR AND INCIDENTAL TO THE COST OF THE PIPELINE.
7. ALL PRESSURE MAINS SHALL BE PRESSURE AND LEAKAGE TESTED IN ACCORDANCE WITH MAG SPECIFICATION SECTION 610. SUBSECTION 610.15 EXCEPT THAT THE MAXIMUM ALLOWABLE LEAKAGE FROM THE PIPE LINE SHALL BE DETERMINED BY THE FOLLOWING FORMULA: WHERE: L = SD√P/133,200; L = ALLOWABLE LEAKAGE IN GALLONS PER HOUR, S = LENGTH OF PIPE TESTED IN FEET, D = NOMINAL DIAMETER OF PIPE IN INCHES, AND P = AVERAGE TEST PRESSURE IN PSI GAGE DURING THE HYDROSTATIC TEST AS MEASURED AT THE LOWEST POINT IN THE TEST SECTION.
8. EACH SECTION OF PRESSURE MAIN TO BE TESTED SHALL BE SLOWLY FILLED WITH WATER AND THE SPECIFIED TEST PRESSURE SHALL BE APPLIED BY MEANS OF A PUMP CONNECTED TO THE PIPE IN A MANNER SATISFACTORY TO THE ENGINEER. BEFORE APPLYING THE SPECIFIED TEST PRESSURE, ALL AIR SHALL BE EXPELLED FROM THE PIPE. THE WATER PRESSURE SHALL BE BROUGHT TO THE SPECIFIED TEST PRESSURES AND MAINTAINED FOR AT LEAST 2 HOURS. LEAKAGE WILL BE DETERMINED BY MEASURING THE QUANTITY OF WATER TO BE SUPPLIED TO MAINTAIN THE SPECIFIED TEST PRESSURE. THE CONTRACTOR SHALL REPAIR AND RETEST ANY LINES THAT FAILED.
9. PRESSURE TESTING OF NEW MAINS SHALL BE BY THE CONTRACTOR PER MAG SECTION 610.15 AND PROJECT ENGINEER OR REPRESENTATION WILL BE PRESENT AT ALL TESTING.

WATER SYSTEM CHLORINATION FLUSHING AND BACTERIOLOGICAL TESTING:

1. CHLORINATION, FLUSHING AND BACTERIOLOGICAL TESTING CHLORINATION AND FLUSHING OF NEW MAINS SHALL BE PERFORMED BY THE CONTRACTOR PER MAG SECTION 611 AND PART V OF ADEQ ENGINEERING BULLETIN NO. 8, BEFORE BEING PLACED IN SERVICE, ALL NEWLY INSTALLED PIPE, VALVES, HYDRANTS, AND APPURTENANCES SHALL BE FLUSHED, DISINFECTED, KEPT CLEAN, AND WILL BE SAMPLED FOR ACCEPTABLE BACTERIOLOGICAL ANALYSIS. THE CONTRACTOR WILL HAVE SAMPLE TAKEN FROM EACH AND EVERY 500-FOOT INTERVAL, AND AT EACH END. FOR EACH HYDRANT LATERAL OVER 18-FEET IN LENGTH, A SAMPLE WILL BE TAKEN AT THE HYDRANT END. ON NEW WATERLINE WITHOUT HYDRANT, TEMPORARY SAMPLING TAPS SHALL BE PROVIDED, AND THEN REMOVED AND PLUGGED AFTER ACCEPTABLE BACTERIOLOGICAL RESULTS ARE RECEIVED. HYDRANT USED FOR SAMPLING SHALL BE FITTED WITH AN APPROVED SAMPLING TAP.

THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT ENGINEER AND UTILITY DEPARTMENT FOR THE LOCATION OF SAMPLING TAPS.

2. PRE-DISINFECTION FLUSHING: PIPE SHALL FIRST BE FLUSHED TO REMOVE ANY SOLID OR CONTAMINATED MATERIAL. FLUSHING VELOCITY SHALL BE AT LEAST 2.5-FEET PER SECOND IN THE PIPE. FLUSHING PERIOD SHALL BE AT LEAST 5 MINUTES FOR EVERY 150-FEET OF NEW PIPE BUT IN NO CASE LESS THAN 30 MINUTES. B. ONE 2-1/2 INCH HYDRANT OPENING WILL, UNDER NORMAL PRESSURE OF 40 PSI, PROVIDE THIS VELOCITY IN PIPE SIZES UP TO AND INCLUDING 12-INCHES.
3. FINAL FLUSHING AND TESTING. FOLLOWING CHLORINATION, ALL TREATED WATER SHALL BE FLUSHED FROM THE PIPE UNTIL THE REPLACEMENT WATER TREATED THROUGHOUT ITS LENGTHS SHOWS AN ABSENCE OF CHLORINE. IF CHLORINE IS NORMALLY USED IN THE SOURCE OF SUPPLY, TESTS SHALL SHOW A RESIDUAL NOT IN EXCESS OF THAT CARRIED IN THE SYSTEM. FLUSHING VELOCITY SHALL BE AT LEAST 2.5-FEET PER SECOND IN THE WATERLINE. FLUSHING PERIOD SHALL BE AT LEAST 5 MINUTES FOR EVERY 150-FEET OF NEW WATERLINE BUT IN NO CASE LESS THAN 30 MINUTES. ALL HYDRANTS ON THE NEW WATERLINE SHALL BE FLUSHED TO REMOVE EXCESS CHLORINE FROM THE HYDRANT AND HYDRANT BRANCH.
6. THE CONTRACTOR WILL PROVIDE A COPY OF ALL TEST TO THE PROJECT ENGINEER AND UTILITY DEPARTMENT.

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NOTES - SHEET 3 OF 3

SHEET TITLE:

PROJECT TITLE:

SEDONA LOFTS

MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	NONE
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-4

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CONSTRUCTION NOTES:

1. CONTRACTOR TO VERIFY ALL EXISTING UTILITY CONNECTION POINTS PRIOR TO INSTALLATION OF NEW SERVICE LINES.
2. TEMPORARY TRAFFIC SURFACING SHALL BE APPLIED PRIOR TO CONSTRUCTION AND SHALL CONSIST OF NO LESS THAN A 4" THICKNESS OF 3/4" AGGREGATE. THE SURFACE SHALL EXTEND FROM THE EXISTING ROADWAY TO THE BUILDING FOOTPRINT.
3. ALL NEW SIDEWALKS, DRIVEWAYS, EXPOSED SURFACES OF CONCRETE DRAINAGE STRUCTURES, AND OTHER EXPOSED CONCRETE SURFACES SHALL BE INTEGRALLY COLORED "SEDONA RED". THE AMOUNT OF CONCRETE COLOR ADDITIVE REQUIRED IS 3.05 LBS OF DAVIS 160 LIQUID PER SACK OF CONCRETE. THIS IS THE SEDONA RED AS MANUFACTURED BY HANSON CONCRETE IN COTTONWOOD ARIZONA. VARIATIONS IN THE ADDITIVE TO ACCOMPLISH THE "SEDONA RED" SHALL BE SUBJECT TO CITY ENGINEER APPROVAL.
4. WATER AND SEWER SERVICES SHALL BE INSTALLED PER INTERNATIONAL PLUMBING CODE REQUIREMENTS.
5. DURING CONSTRUCTION PHASE: IMPLEMENT STRAW WATTLES, SILT FENCING OR OTHER APPROPRIATE "BEST MANAGEMENT PRACTICES" (BMPS) TO MITIGATE STORMWATER POLLUTON AND PREVENT EROSION ONSITE AND SEDIMENT LEAVING THE PROPERTY AND ENTERING THE THE CITY OF SEDONA MS4. THESE BMPS ARE TO BE PROPERLY INSTALLED AND MAINTAINED. CONSTRACTOR IS TO PROVIDE INFORMATION, LOCATION AND OTHER DETAILS REGARDING STROMWATER POLLUTION PREVENTION MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION.
6. POST CONSTRUTION PHASE: BMPS SHALL BE IMPLEMENTED TO PREVENT STROMWATER POLLUTION AND SITE EROSION ONCE ACTIVE CONSTRUTION IS COMPLETED. THESE BMPS INCLUDE REVEGETATION, GENTLE SLOPING , TERRACING AND LANDSCAPING (WITH ROCK OR OTHER SUITABLE MATERIAL AND FILTER FABRIC) . THIS SHOULD BE IN CONJUNCTION WTIH THE REQUIRED STROMWATER MEASURES ADRESSING VOLUME , SUCH AS RENTENTION/DETENTON BASINS, SWALES AND RIPRAP PADS. ALSO PROVIDE INFORMATION, LOCATON AND OTHER DETAILS REGARDING STROMWATER POLLUTION PREVENTION MEASURES TO BE IMPLEMENTED AFTER CONSTRUTION.

KEY NOTES:

1. SEWER SERVICE LINE WITH DUAL DIRECTION CLEANOUT AT BUILDINGS.
2. 2" WATER SERVICE.
3. 4" FIRE SUPPRESSION SUPPLY
4. 4" WATER METER & BACKFLOW PREVENTION VALVE
5. 2" WATER METER
6. STORM DRAIN PIPING SYSTEM (SEE SHEET C-9)
7. STORM DRAIN POND (SEE SHEET C-9)
8. ASPHALT DRIVEWAY & PARKING (SEE DETAIL)
9. CONC. CURB & GUTTER (SEE DETAIL)
10. CONC. CURB (SEE DETAIL)
11. 2' WIDE GRAVEL APRON (SEE DETAIL)
12. RETAINING WALL (4' HIGH MAX) (SEE DETAIL)
13. RETAINING WALL (5' HIGH MAX) (SEE DETAIL)
14. 3' x 2' GRAVEL PAD AT DOWNSPOUT (QTY = 11)
15. RIPRAP LINED SWALE (SEE DETAIL)
16. CONC. ENTRANCE PER MAG STD DTL 250-2 (SEE DETAIL)
17. EXISTING WATER PUMP STATION (TO BE RELOCATED)
18. 5' CONC. SIDEWALK
19. RIPRAP LINED POND OVERFLOW CHANNEL
20. RETAINING WALL (1.5' HIGH MAX) (SEE DETAIL)
21. STEM WALL (SEE ARCHITECTURAL PLANS)

LINETYPE LEGEND

- EXISTING STORM SEWER LINE
- EXISTING WATER SERVICE — W —
- EXISTING SANITARY SERVICE — SS —
- EXISTING UNDERGROUND ELECTRIC LINE — UGE —
- EXISTING GAS LINE — G —
- EXISTING CONTOURS 4095 / 4096
- PROPOSED CONTOURS 4095 / 4096
- PROPOSED STORM SEWER LINE
- PROPOSED 6" WATER MAIN — 6"W —
- PROPOSED 8" SANITARY MAIN — 8"SS —
- PROPOSED 6" SANITARY MAIN — 6"SS —
- PROPOSED 4" SANITARY SERVICE — 4"SS —
- PROPOSED UNDERGROUND ELECTRIC LINE — UGE —
- PROPOSED COMMUNICATION LINE — COMM —
- PROPOSED GAS LINE — G —
- PROPOSED ROAD CENTERLINE
- PARCEL BOUNDARY & RIGHT-OF-WAY LINE
- PROPOSED LOT LINE
- BUILDING SETBACK LINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- PROPOSED SIGHT DISTANCE TRIANGLE
- PROPOSED FLOW LINE
- PROPOSED FENCE
- PROPOSED CHAIN-LINK FENCE

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SHEET TITLE: OVERALL SITE & UTILITY PLAN

PROJECT TITLE:
SEDONA LOFTS
MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	1" = 20'
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-5

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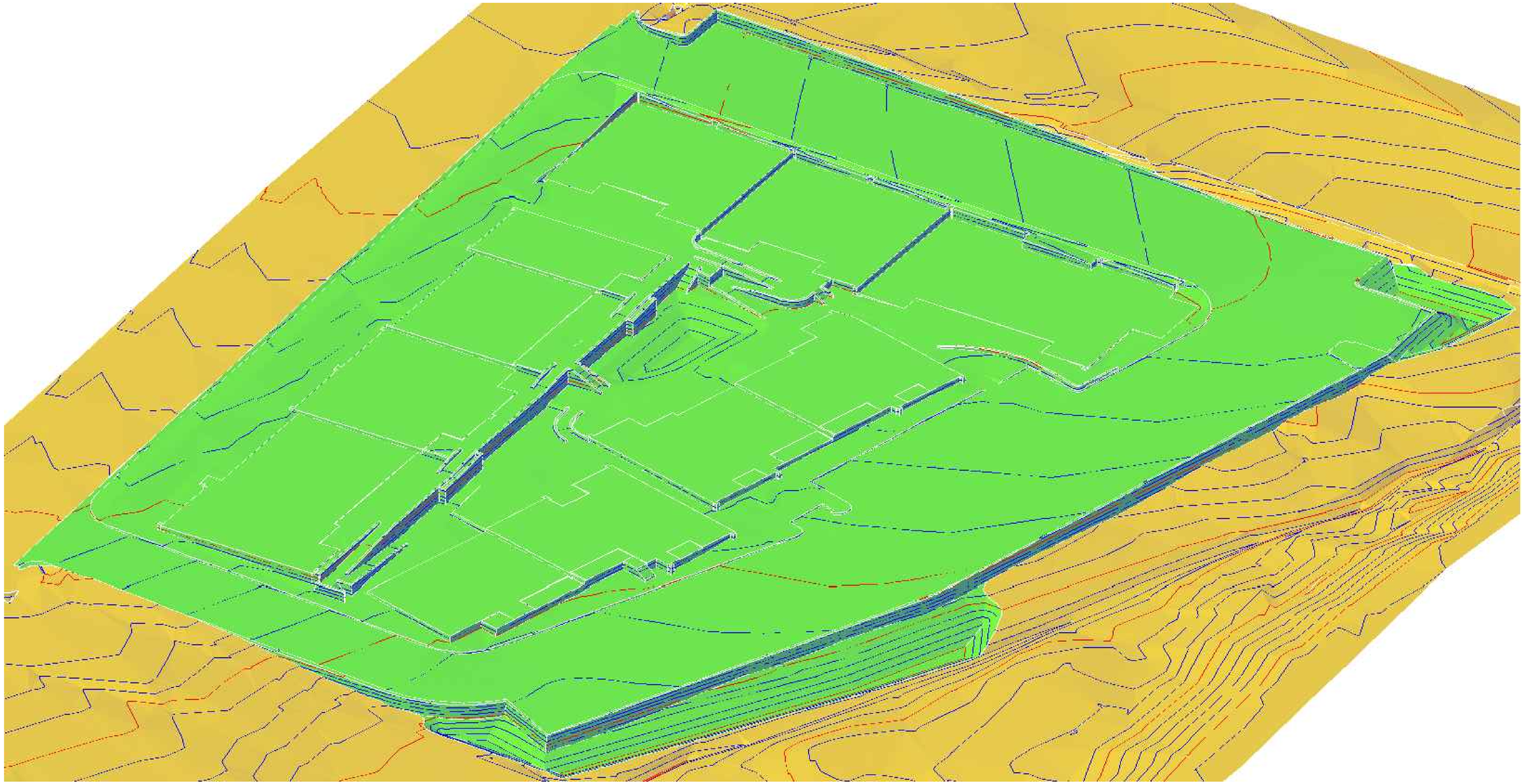

3D SURFACE MODEL

LOOKING NW WITH 1' CONTOURS

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SHEET TITLE: 3D MODEL

PROJECT TITLE:

SEDONA LOFTS

MK COMPANY, INC.

DRAWN BY:	RJB
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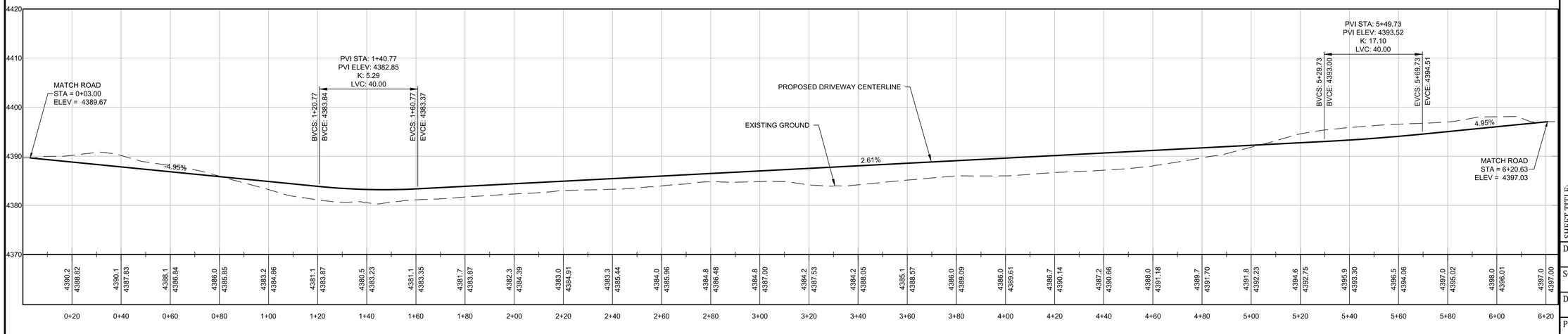
DRIVEWAY PLAN

0 10' 20' 40'

HORIZONTAL SCALE IN FEET
1" = 20'



DRIVEWAY PROFILE

0 10' 20' 40'

HORIZONTAL SCALE IN FEET
1" = 20'

VERTICAL SCALE IN FEET
1" = 10'

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SHEET TITLE: DRIVEWAY PLAN & PROFILE

PROJECT TITLE:

SEDONA LOFTS

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DRAWN BY:	RJB
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DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-7

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SHEET TITLE: GRADING & DRAINAGE - SHEET 1 OF 2

PROJECT TITLE:

SEDONA LOFTS

MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	1" = 10'
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-8

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GENERAL GRADING AND DRAINAGE NOTES:

1. TOP OF CUT SLOPES SHALL BE MADE NOT NEARER TO A SITE BOUNDARY LINE THAN 1/5 OF THE THE VERTICAL HEIGHT OF THE CUT WITH A MINIMUM OF 2 FEET. THE TOE OF FILL SLOPES SHALL BE MADE NOT NEARER TO A SITE BOUNDARY LINE THAN 1/2 OF THE VERTICAL HEIGHT OF THE FILL, WITH A MINIMUM OF 2 FEET. ALL CUT OR FILL SLOPES STEEPER THAN 2:1 SHALL BE STABILIZED WITH RIPRAP.
2. THE GROUND SURFACE SHALL BE PREPARED TO RECEIVE FILL BY REMOVING ALL VEGETATION, NON-COMPLYING FILL, AND OTHER UNSUITABLE MATERIALS.
3. NO ROCK OR SIMILAR IRREDUCIBLE MATERIAL WITH A MAXIMUM DIMENSION GREATER THAN 12" SHALL BE ALLOWED IN FILLS IN THE ABSENCE OF A SOILS REPORT AND INSPECTION BY A SOILS ENGINEER.
4. ALL FILLS SHALL BE COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DENSITY AND VERIFIED BY A COMPACTION REPORT WHEN SUPPORTING A STRUCTURE.

VOLUMES

EARTHWORKS: (PR LESS EX)
CUT: 1460 CY
FILL: 3410 CY
NET: 3410 - (1460 + 150) = 1800 CY (IMPORT)

MATERIALS:
ASPHALT & BASE
8,012 SF X 0.75 FT = 770 CY

SLAB CONCRETE:
24,000 SF X 0.33 = 290 CY

SITE NET (EARTHWORK)
1800 - 770 - 290 = 740 CY (IMPORT)

NOTE: VOLUMES ARE APPROXIMATE

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SHEET TITLE: GRADING & DRAINAGE - SHEET 2 OF 2

PROJECT TITLE:

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MK COMPANY, INC.

DRAWN BY:	RJB
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DATE:	10-17-2021
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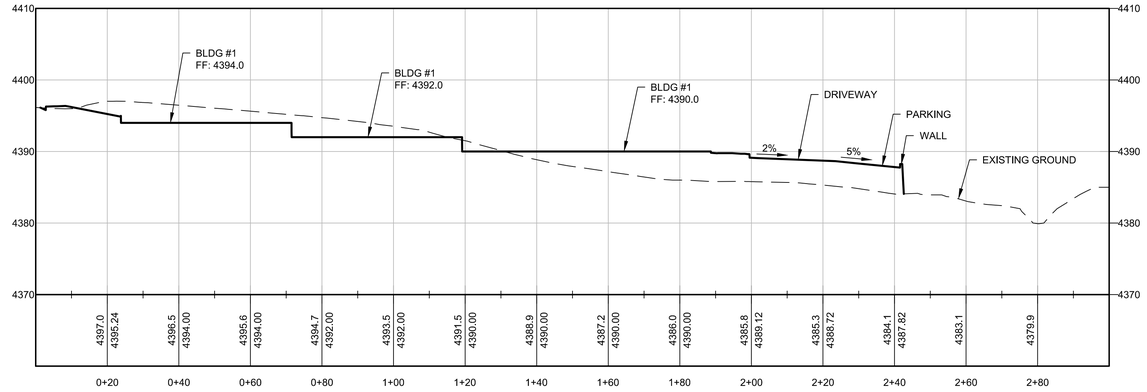
SECTION REFERENCE

0 15' 30' 60'

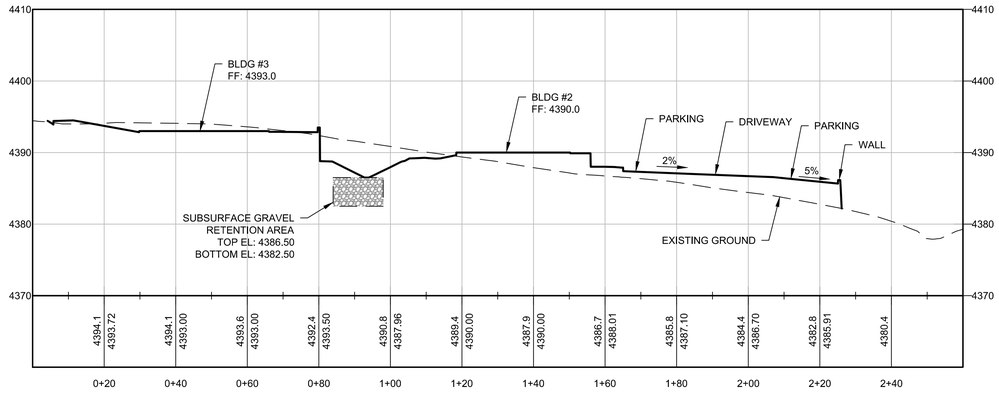
HORIZONTAL SCALE IN FEET
1" = 30'



SECTION 'C'

0 5' 10' 20'

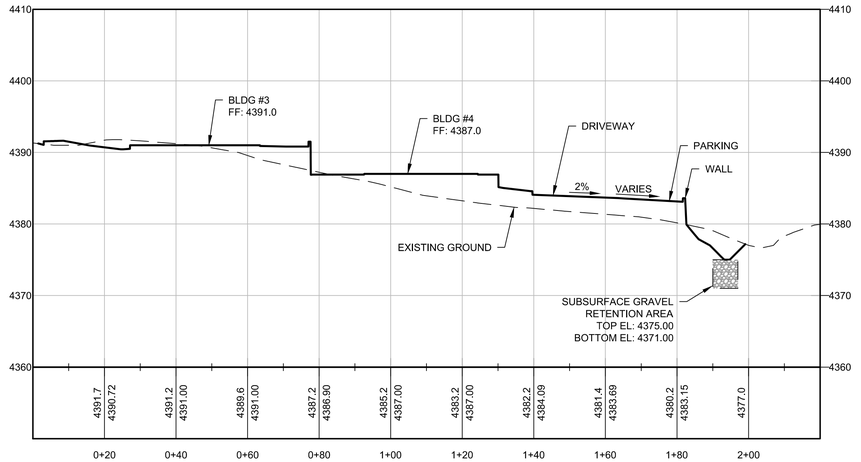
HORIZONTAL SCALE IN FEET
1" = 10'
VERTICAL SCALE IN FEET
1" = 2'



SECTION 'B'

0 5' 10' 20'

HORIZONTAL SCALE IN FEET
1" = 10'
VERTICAL SCALE IN FEET
1" = 2'



SECTION 'A'

0 5' 10' 20'

HORIZONTAL SCALE IN FEET
1" = 10'
VERTICAL SCALE IN FEET
1" = 2'

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SHEET TITLE: SECTIONS

PROJECT TITLE:

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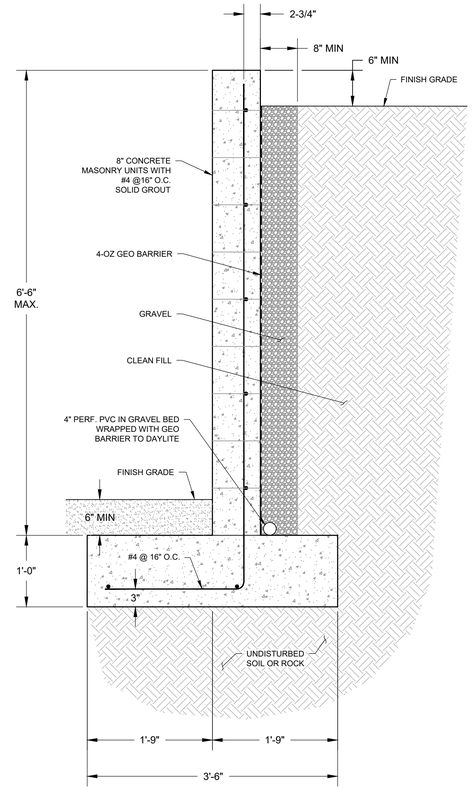
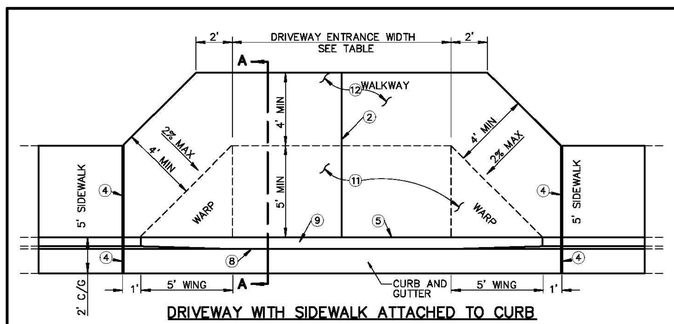


DETAIL 'C'
RETAINING WALL (UP TO 6'-6" HIGH)

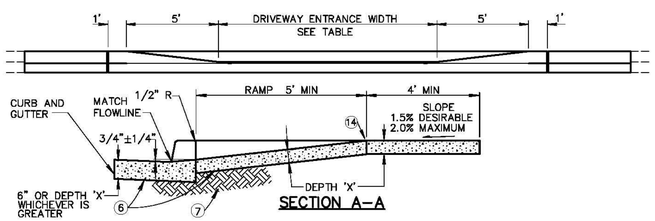
SCALE: 1" = 1'

NOTES:

1. BASE FOUNDATION TO BE APPROVED BY THE SITE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF THE CONCRETE FOOTING.
2. ALL BACKFILL MATERIALS TO BE COMPACTED IN 8" LIFTS TO 95% STANDARD PROCTOR DENSITY OR 92% MODIFIED PROCTOR DENSITY.



DRIVEWAY WITH SIDEWALK ATTACHED TO CURB



SECTION A–A

NOTES:

1. DEPRESSED CURB SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE TYPE OF CURB USED AT THAT LOCATION.
2. CONTRACTION JOINT(S) FOR DRIVEWAY ENTRANCE: WIDTH LESS THAN 22' NONE REQUIRED; WIDTH GREATER THAN 22' AND LESS THAN 30' LOCATE SINGLE JOINT ON D/W CENTERLINE; WIDTH OF 30' OR GREATER LOCATE TWO JOINTS TO EQUALLY DIVIDE THE DRIVEWAY ENTRANCE WIDTH.
3. DETAIL GEOMETRICS ARE BASED ON A CURB HEIGHT OF SIX INCHES (6"), AN ATTACHED SIDEWALK WIDTH OF FIVE FEET (5'), AND A DRIVEWAY RAMP LENGTH NOT EXCEEDING SIX FEET (6'). GEOMETRIC MODIFICATIONS MAY BE REQUIRED WHEN CONDITIONS ARE MODIFIED.
4. 1/2–INCH EXPANSION JOINTS SHALL COMPLY WITH SECTION 340.
5. BACK OF CURB – CONSTRUCTION JOINT.
6. CONCRETE CLASS AS NOTED IN TABLE. CONCRETE PER SECTION 725.
7. SUBGRADE PREPARATION, SECT. 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. SECT. A–A AND ELEVATION: D/W SHOWN WITH VERTICAL CURB AND GUTTER, ROLL TYPE CURB AND GUTTER TREATED SIMILARLY.
11. ROUGH BROOM FINISH FULL WIDTH OF RAMP AND WINGS.
12. TROWEL AND USE LIGHT HAIR BROOM FINISH FOR WALKWAY AREA.
13. 'DRIVEWAY ENTRANCE WIDTH' IS THE DRIVEWAY WIDTH PLUS ADDITIONAL WIDENING REQUIRED BY THE LOCAL JURISDICTION.
14. ELEVATION AT TOP OF DRIVEWAY RAMP SHALL BE EQUAL TO OR HIGHER THAN NORMAL CURB ELEVATION.

COMMERCIAL AND INDUSTRIAL					RESIDENTIAL				
DRIVEWAY ENTRANCE WIDTH	MIN.	MAX.	CLASS	DEPTH 'X'	DRIVEWAY ENTRANCE WIDTH	MIN.	MAX.	CLASS	DEPTH 'X'
COMMERCIAL	✱ 16'	40'	A	9"	MAJOR STREET	16'	30'	B	5"
INDUSTRIAL	✱ 16'	40'	A	9"	COLLECTOR STREET	✱ 12'	30'	B	5"
✱24' MIN. FOR TWO WAY TRAFFIC					LOCAL STREET	12'	30'	B	5"
					✱16' DESIRABLE				

DETAIL NO.			REVISED	DETAIL NO.
250–2	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	DRIVEWAY ENTRANCES WITH SIDEWALK ATTACHED TO CURB	01–01–2013	250–2

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SHEET TITLE: DETAILS

PROJECT TITLE:

SEDONA LOFTS

MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	AS NOTED
DATE:	10-17-2021
PROJECT NO:	170202A
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STORM WATER MANAGEMENT POLLUTION PREVENTION PLAN (SWMPPP) NOTES

1. THE SWPPP IS INTENDED TO BE A DYNAMIC PLAN THAT CAN BE REVISED EITHER AS A RESULT OF UNANTICIPATED CONDITIONS DURING DESIGN OR AS A RESULT OF CHANGING CONDITIONS IN THE FIELD. MAKING CHANGES TO THE PLAN WHERE IT IS NOT EFFECTIVE IS A REQUIREMENT OF THE AZPDES PERMIT. ANY CHANGES TO THE PLAN SHALL BE NOTED AND DATED ON THE PLAN.

2. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT A NOTICE OF INTENT (NOI) AND A NOTICE OF TERMINATION (NOT) IS SENT AT THE BEGINNING AND END OF THE PROJECT TO THE PROPER AUTHORITIES. THE CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING THE REQUIREMENT OF THE EPA'S NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (AZPDES) PERMITTING PROGRAM, ESTABLISHED UNDER SECTION 402 OF THE CLEAN WATER ACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SWPPP ACTIVITIES AND FOR ALL SUB CONSULTANTS ON SITE. THE CONTRACTOR SHALL OBTAIN AN NOI AT HTTP://CDX.EPA.GOV/, THE SWPPP TEMPLATE IS LOCATED AT HTTP://WATER.EPA.GOV/POLWASTE/NPDES/BASICS/UPLOAD/SW_CGP2012_SWPPPTEMPLATE.DOCX. FURTHER INFORMATION CAN BE FOUND AT HTTP://WATER.EPA.GOV/POLWASTE/NPDES/STORMWATER/STORMWATER-POLLUTION-PREVENTION-PLANS-FOR-CONSTRUCTION-ACTIVITIES.CFM. A TUTORIAL IS AVAILABLE AT HTTP://WWW.EPA.GOV/NPDES/PUBS/ENOI_2012CGP_USERMANUAL.PDF FOR REGISTRATION. IF YOU HAVE ANY QUESTION YOU MAY CALL 1-888-890-1995 OR FOR NOI INFORMATION YOU MAY CALL 1-866-352-7755.

3. LIMIT LAND DISTURBANCE AND PRESERVE EXISTING VEGETATION. SENSITIVITY TO THE ENVIRONMENT DURING CONSTRUCTION IS A DEFINING FACTOR IN PRESERVING NATURAL VEGETATION. THE EXTENT OF THE CUT AND FILL SLOPES SHOULD BE FIELD SURVEYED AND STAKED PRIOR TO CONSTRUCTION TO DEFINE ALL AREAS THAT REQUIRE GRADING. AREAS OUTSIDE THESE LIMITS SHOULD BE PROTECTED FROM ALL CONSTRUCTION ACTIVITIES. TREES THAT LIE WITHIN TRANSITION AREAS OF SIGNIFICANT CUT OR FILL AND OUTSIDE REQUIRED CLEAR-ZONE DISTANCES SHALL BE FLAGGED AND/OR FENCED FOR PROTECTION. EXISTING TREES AT OR NEAR THE TOE OF FILL SLOPES SHALL BE SAVED WITH PROTECTIVE TREE WELLS.

4. MINIMIZE SOIL EXPOSURE AND RE-VEGETATE DENUDED AREAS. TRY TO SCHEDULE CONSTRUCTION TO COINCIDE WITH THE DRY SEASON OF THE SITE'S LOCATION. LIMIT THE SIZE OF THE EXPOSED AREA AND AMOUNT OF TIME IT IS EXPOSED. UNDER THE EPA'S GENERAL PERMIT ALL BARE GROUND SHALL BE SEEDED WITHIN 14 DAYS AFTER GRADING IS FINISHED WITH SOME EXCEPTIONS.

5. PROTECT FILL SLOPES FROM ROADWAY RUNOFF. DROWN DRAINS AND RIPRAP PROTECTION HAVE BEEN CALLED OUT ON THE PLAN AS NEEDED. THE CONTRACTOR SHOULD MONITOR SLOPES TO ENSURE ADEQUATE PROTECTION IS PROVIDED THROUGH OUT THE CONSTRUCTION ACTIVITIES.

6. PREVENT EROSION IN AREAS WHERE RUNOFF CONCENTRATES. CONTRACTOR SHALL PROVIDE PROTECTION OF ALL DITCHES, OPEN CHANNELS, CULVERT AND CHANNEL OUTLETS AS SHOWN ON THE CONSTRUCTION PLAN.

7. TRAP SEDIMENT BEFORE IT LEAVES THE SITE. IT IS PREFERABLE TO PROVIDE EROSION CONTROL INSTEAD OF SEDIMENT CONTROL WHERE PRACTICABLE. IT IS IMPORTANT THAT REGULAR MAINTENANCE OF ANY SEDIMENT TRAPPING IS CONDUCTED ON A REGULAR BASIS IN ORDER FOR IT TO OPERATE EFFECTIVELY. THIS INCLUDES REMOVING ACCUMULATIONS OF SEDIMENT AND MAKING NECESSARY REPAIRS AND ADJUSTMENTS. TEMPORARY SEDIMENT BARRIERS SHOULD BE PLACED AROUND CATCH BASIN INLETS DURING CONSTRUCTION TO TRAP SEDIMENT BEFORE IT ENTERS THE INLET, SEDIMENT TRAPPING IS NECESSARY AT SOIL STOCKPILES AND THESE STOCKPILES SHOULD BE LOCATED ABOVE AND AWAY FROM STREAMS, WASHES AND SWALES TO PREVENT THEM FROM BEING WASHED DOWNSTREAM. A STABILIZED CONSTRUCTION ENTRANCE SHOULD BE PROVIDED TO REMOVE SEDIMENT FROM THE TIRES OF THE VEHICLES BEFORE THEY LEAVE THE SITE.

8. AS NEEDED A SPILL CONTAINMENT AREA SHOULD BE PROVIDED AT THE JOB SITE FOR STORING CHEMICALS, FUELS, PAINTS AND OTHER MATERIALS. THIS AREA WILL PREVENT CHEMICALS FROM MIXING WITH STORM WATER AND DISCHARGING INTO STREAMS AND WASHES, OR SEEPING INTO AND CONTAMINATING THE SURROUNDING SOIL. THE PROTECTED AREA SHOULD BE EXCAVATED OR BERMED, AND LINED WITH PLASTIC SO THAT AN ACCIDENTAL SPILL FROM A CHEMICAL DRUM WILL BE CONTAINED. IT SHOULD BE LOCATED IN AREAS WHERE ANY SPILL WILL BE PREVENTED FROM DISCHARGING OFF-SITE. PROCEDURES SHALL BE ESTABLISHED TO PREVENT CONTAMINATION OF ON-SITE SOILS FROM EQUIPMENT MAINTENANCE. CONSTRUCTION EQUIPMENT SHALL BE REGULARLY MAINTAINED TO REPAIR LEAKY HOSES AND GASKETS. USED OIL, HYDRAULIC FLUIDS, FILTERS, BATTERIES AND TIRES SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND FEDERAL LAWS

9. SOLID WASTE MATERIALS SHOULD BE COLLECTED DAILY. A TRASH CONTAINER OR DUMPSTER SHOULD BE PROVIDED AT THE SITE TO CONTAIN SMALLER WASTE MATERIALS. THE TRASH CONTAINERS SHOULD BE COVERED TO PREVENT MIXING WITH RAINWATER OR LOSS OF CONTENTS BY HIGH WINDS. OTHER TYPES OF LARGER DEBRIS, SUCH AS: VEGETATION FORM CLEARING OPERATIONS SHOULD BE COLLECTED AND STOCKPILED ON A DAILY BASIS AND DISPOSED OF REGULARLY. THE STOCKPILE LOCATION SHALL BE LOCATED AWAY FROM STREAMS AND WASHES.

10. TEMPORARY PITS OR BERMED AREAS SHOULD BE PROVIDED AT THE CONSTRUCTION SITE FOR THE WASHOUT OF CONCRETE TRUCKS AND FOR WASHING AGGREGATE MATERIALS AND TOOLS. THE WASH WATER SHOULD BE KEPT OUT OF STREAMS AND WASHES. WASHOUT AREAS SHOULD BE LARGE ENOUGH TO RETAIN ALL WASH WATER. HARDENED CONCRETE SHOULD BE ROUTINELY REMOVED AND DISPOSED OF IN ORDER TO MAINTAIN ADEQUATE WATER PERCOLATION.

11. PROPER IMPLEMENTATION, INSPECTION AND MAINTENANCE OF POLLUTION CONTROL MEASURES IS ESSENTIAL TO ACHIEVE THE GOALS OF EROSION AND SEDIMENT CONTROL AND TO IDENTIFY POTENTIAL PROBLEMS. A RAIN GAGE SHOULD BE KEPT AT THE SITE TO RECORD THE DEPTH OF RAINFALL. THE CONTRACTOR SHOULD COORDINATE THE IMPLEMENTATION, INSPECTION AND MAINTENANCE OF THE POLLUTION CONTROLS WITH THE PROJECT INSPECTOR. THE CONTRACTOR SHOULD ALSO MONITOR WEATHER FORECASTS AND MAKE ALL SITE INSPECTIONS AND NECESSARY REPAIRS BEFORE STORMS ARE EXPECTED. THE CONTRACTOR SHALL MONITOR AND RECORD WEEKLY EXTENDED WEATHER FORECASTS. THESE FORECASTS SHALL BE DISCUSSED BY THE CONTRACTOR AT REGULARLY SCHEDULED WEEKLY PROGRESS MEETINGS. IN THE EVENT THAT EXTENDED FORECASTS REPORT A HIGH PROBABILITY FOR PRECIPITATION IN THE GIVEN PROJECT AREA, THE CONTRACTOR SHALL REVIEW AND SUPPLEMENT EXISTING EROSION CONTROL MEASURES. HE SHALL ALSO INSTALL ADDITIONAL MEASURES IN AREAS DETERMINED TO BE SUSCEPTIBLE TO EROSION AND/OR SEDIMENTATION, AS DIRECTED BY THE PROJECT ENGINEER. THE EPA GENERAL PERMIT REQUIRES REGULAR INSPECTIONS EVERY 7 DAYS OR WITHIN 24 HOURS AFTER A RAINFALL OF ¼ INCH OR GREATER.

12. THE CONTRACTOR MUST RECORD ANY DAMAGES OR DEFICIENCIES IN THE CONTROL MEASURES ON A INSPECTION REPORT FORM. THIS REPORT DOCUMENTS THE INSPECTION OF THE POLLUTION PREVENTION MEASURES. THE SAME FORM CAN BE USED TO REQUEST REPAIRS AND TO PROVE THAT REQUIRED INSPECTIONS AND MAINTENANCE WERE PERFORMED. AS A CONDITION OF THE GENERAL PERMIT, THE CONTRACTOR SHALL CORRECT DAMAGE OR DEFICIENCIES AS SOON AS PRACTICABLE AFTER THE INSPECTION; BUT IN NO CASE LATER THAN 7 DAYS AFTER THE INSPECTION. ANY CHANGES THAT MAY BE REQUIRED TO CORRECT DEFICIENCIES IN THE SWPPP SHOULD ALSO BE MADE AS SOON AS PRACTICABLE AFTER THE INSPECTION; BUT IN NO CASE LATER THAN 7 DAYS AFTER THE INSPECTION

13. OVERVIEW OF INSPECTION REQUIREMENTS, CONSTRUCTION OPERATORS COVERED UNDER THE 2012 CGP ARE SUBJECT TO THE FOLLOWING REQUIREMENTS IN PART 4:

INSPECTION FREQUENCY (SEE PART 4.1.4)

YOU ARE REQUIRED TO CONDUCT INSPECTIONS EITHER:

- ONCE EVERY 7 CALENDAR DAYS. OR
- ONCE EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT OF 0.25 INCHES OR GREATER.

YOUR INSPECTION FREQUENCY IS INCREASED IF THE SITE DISCHARGES TO A SENSITIVE WATER. SEE PART 4.1.3. YOUR INSPECTION FREQUENCY MAY BE DECREASED TO ACCOUNT FOR STABILIZED AREAS, OR FOR ARID, SEMI-ARID, OR DROUGHT-STRICKEN CONDITIONS, OR FOR FROZEN CONDITIONS. SEE PART 4.1.4.

AREAS THAT NEED TO BE INSPECTED (SEE PART 4.1.5)

DURING EACH INSPECTION, YOU MUST INSPECT THE FOLLOWING AREAS OF YOUR SITE:

- CLEARED, GRADED, OR EXCAVATED AREAS OF THE SITE;
- STORMWATER CONTROLS (E.G., PERIMETER CONTROLS, SEDIMENT BASINS, INLETS, EXIT POINTS ETC.) AND POLLUTION PREVENTION PRACTICES (E.G., POLLUTION PREVENTION PRACTICES FOR VEHICLE FUELING/MAINTENANCE AND WASHING, CONSTRUCTION PRODUCT STORAGE, HANDLING, AND DISPOSAL, ETC.) AT THE SITE;
- MATERIAL, WASTE, OR BORROW AREAS COVERED BY THE PERMIT, AND EQUIPMENT STORAGE AND MAINTENANCE AREAS;
- AREAS WHERE STORMWATER FLOWS WITHIN THE SITE;
- STORMWATER DISCHARGE POINTS; AND
- AREAS WHERE STABILIZATION HAS BEEN IMPLEMENTED.

WHAT TO CHECK FOR DURING YOUR INSPECTION (SEE PART 4.1.6)

DURING YOUR SITE INSPECTION, YOU ARE REQUIRED TO CHECK:

- WHETHER STORMWATER CONTROLS OR POLLUTION PREVENTION PRACTICES REQUIRE MAINTENANCE OR CORRECTIVE ACTION, OR WHETHER NEW OR MODIFIED CONTROLS ARE REQUIRED;
- FOR THE PRESENCE OF CONDITIONS THAT COULD LEAD TO SPILLS, LEAKS, OR OTHER POLLUTANT ACCUMULATIONS AND DISCHARGES;
- WHETHER THERE ARE VISIBLE SIGNS OF EROSION AND SEDIMENT ACCUMULATION AT POINTS OF DISCHARGE AND TO THE CHANNELS AND STREAMBANKS THAT ARE IN THE IMMEDIATE VICINITY OF THE DISCHARGE;
- IF A STORMWATER DISCHARGE IS OCCURRING AT THE TIME OF THE INSPECTION, WHETHER THERE ARE OBVIOUS, VISUAL SIGNS OF POLLUTANT DISCHARGES; AND
- IF ANY PERMIT VIOLATIONS HAVE OCCURRED ON THE SITE.

INSPECTION REPORTS (SEE PART 4.1.7)

WITHIN 24 HOURS OF COMPLETING EACH INSPECTION, YOU ARE REQUIRED TO COMPLETE AN INSPECTION REPORT THAT INCLUDES:

- DATE OF INSPECTION;
- NAMES AND TITLES OF PERSONS CONDUCTING THE INSPECTION;
- SUMMARY OF INSPECTION FINDINGS;
- RAIN GAUGE OR WEATHER STATION READINGS IF YOUR INSPECTION IS TRIGGERED BY THE 0.25 INCH STORM THRESHOLD; AND
- IF YOU DETERMINE THAT A PORTION OF YOUR SITE IS UNSAFE TO ACCESS FOR THE INSPECTION, DOCUMENTATION OF WHAT CONDITIONS PREVENTED THE INSPECTION AND WHERE THESE CONDITIONS OCCURRED ON THE SITE

14. REMOVAL OF TEMPORARY CONTROLS WHEN THE PROJECT IS COMPLETE IS THE RESPONSIBILITY OF THE CONTRACTOR. AFTER ALL CONSTRUCTION ACTIVITIES HAVE STOPPED, THE CONTRACTOR MUST KEEP A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN. RECORDS OF ALL THE DATA USED TO COMPLETE THE NOTICE OF INTENT MUST ALSO BE KEPT FOR A PERIOD OF THREE YEARS FOLLOWING FINAL STABILIZATION. THE RETENTION PERIOD MAY BE EXTENDED BY THE EPA'S REQUEST.

15. AS A CONDITION OF THE GENERAL PERMIT, A COPY OF THE CONTRACTOR'S NOI AND A COPY OF THE SWPPP ARE TO REMAIN AT THE JOB SITE THROUGHOUT THE CONSTRUCTION PROCESS AND AVAILABLE DAILY TO THE PROJECT MANAGER.

16. DUST CONTROL IN ACCORDANCE WITH THE COUNTY REQUIREMENTS SHALL BE PROVIDED AT ALL TIMES WHILE UNDER CONSTRUCTION.

17. THE CONTRACTOR SHALL KEEP THE SITE WATERED DOWN (OR OTHER APPROVED METHODS) TO PREVENT DUST MIGRATING OFFSITE.

18. THE CONTRACTOR SHALL ON A DAILY OR AS NEEDED BASIS CLEAN ALL ROADS LEADING OUT OF THE SITE AND SHALL PLACE SAND BAGS (OR OTHER APPROVED METHODS) TO TRAP SEDIMENT BEFORE IT ENTERS INTO THE STORM DRAIN SYSTEM.

19. ALL DUMP TRUCKS ENTERING AND EXITING THE SITE SHALL BE COVERED WITH AN APPROVED COVER TO PREVENT DUST AND FLYING DEBRIS.

20. THE CONTRACTOR WILL PROVIDE THE COUNTY A SIGNED COPY OF THE SWPPP BEFORE BEGINNING CONSTRUCTION.

I CERTIFY UNDER PENALTY OF LAW THAT I UNDERSTAND THE TERMS AND CONDITIONS
OF THE GENERAL ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES) PERMIT
THAT AUTHORIZES THE STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL
ACTIVITY FROM THE CONSTRUCTION SITE IDENTIFIED AS PART OF THIS CERTIFICATION.

CONTRACTOR SIGNATURE PRINT NAME OF CONTRACTOR AND COMPANY

37322
LUKE A
SEFTON
DATE SIGNED 10-17-21
ARIZONA, U.S.A.

Sefton Engineering Consultants
Your Ideas to Completion
Surveying • Engineering • Land Planning
40 STUTZ BEARCAT DR. #8
SEDONA, ARIZONA 86336
PH: (928) 202-3999 LS@SEFENGCO.COM

SHEET TITLE: STORM WATER POLLUTION PREVENTION PLAN

PROJECT TITLE: **SEDONA LOFTS**

MK COMPANY, INC.

DRAWN BY:	RJB
SCALE:	1" = 20'
DATE:	10-17-2021
PROJECT NO:	170202A
SHEET NO.	C-12

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Final Drainage Report

Prepared for:

SUNSET DRIVE APARTMENTS
220 Sunset Drive
Sedona, Arizona 86336

Prepared by:

Sefton Engineering Consultants
Your Ideas to Completion
Surveying • Engineering • Land Planning

100% Veteran Owned

40 Stutz Bearcat Drive Sedona, Arizona 86336

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170202A

CONTENTS

I. GENERAL LOCATION AND DESCRIPTION

A. LOCATION

This project is located with in the City of Sedona, Yavapai County, Arizona, more specifically described as Assessors Parcel Number 408-26-030C. The Site is situated at the SW ¼ of the SW ¼ of the SW ¼ of section 12, Township 17N, Range 5E of the Gila and Salt River Base and Meridian. The Site is located south of Highway 89A, East of Sunset Drive. The Sunset Apartments is proposed to be accessed from Sunset Drive.

Project Developer: Caroline Lobo
suoLL architects
6619 North Scottsdale Road
Scottsdale, Arizona 85250

B. DESCRIPTION OF PROPERTY

The property encompasses approximately 2.4 acres of undeveloped land of which 1.61 acres is zoned commercial (CO) and 0.79 acres is zoned multi-family residential (RM-2). The general soil condition is classified as Soil Conservation Services (SCS) Hydrological Soil Group Type 'B' with an estimated 10 percent vegetation. SCS Type 'B' soil is typically characterized as Sandy Loam which has a moderate infiltration rate and runoff potential (Appendix A-1). Vegetation cover consists of sparce growth of desert brush and moderately growth of desert grass and juniper trees. The trees grow along the wash and other means of conveying water. The general area looks as if the vegetation has been removed in the past. The existing topography of the property is moderately sloped with an average approximately 6 to 8 percent grade in a southeast direction towards the existing wash graded in a north to south direction. There are no existing irrigation facilities within the property.

The development will consist of three apartment buildings with office. The proposed location of the structures is along center of the western property border and into the center of the property. The development will also consist of asphalt paved driveways and parking lots. These driveways will access the property from Sunset Drive and will loop around the structures. The onsite asphalt pavement will be framed with concrete curb or retaining walls.

A major drainage way identified as Profile 3,800 within the City of Sedona Floodplain Management Study dated May 1994, flows through the property from the northeast property corner to the center southern property boundary. The major drainage way has an established floodplain delineated within the City of Sedona Floodplain Management Study and is situated within a designated Zone X area as indicated in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 04025C1435G, effective date September 3, 2010 (See Appendix B-1). FEMA Zone X is described as outside the designated floodplain zone but could possibly be subject to localized flooding.

II. DRAINAGE BASINS AND SUB-BASINS

A. MAJOR BASIN

The property is located within the Coffee Pot Drainage Basin, more specifically Basin B63B, as shown in the City of Sedona Storm Water Master Plan dated March 2005. The basin primarily consists of developed areas within the City of Sedona limits and has a typical drainage pattern in a north to south direction. The typical drainage throughout the basin is primarily sheet flow which eventually concentrates into a series of well-defined drainage channels which spills into Carrol Canyon Wash a tributary to Oak Creek. One of the well-defined drainage channels of the Coffee Pot Drainage Basin flows through the property. The drainage channel is identified as Profile 3,800 within the City of Sedona Floodplain Management Study dated May 1994.

According to the Soil Conservation Services General Soil Map for Yavapai County the soil within the basin is classified as Rough Broken Land Association consisting of rock outcroppings and pockets of very shallow soils on sandstone and shale formations. The portion of the site that is being evaluated; the soil is classified as SCS Hydrological Soil Group indicates that over have of the soil consists of a Type 'B' (Sandy LOAM). The east side of the wash consists of a different soil type that is classified as a Group type 'D' (Silty, Clay Loam). This classification is consistent with other soils within the area.

B. MINOR BASIN

1. Pre-Development

The property could be considered as a single drainage basin for the pre-development analysis contributing flow to the existing wash flowing through the property. Since this report is only concerned with the hydrologic impact the proposed development will have on historic drainage conditions within the surrounding area, the property will be considered as one drainage basin for the pre-development analysis as shown on the Pre-development Drainage Map (See Appendix C-1). For the post-development analysis, the property will be sub-divided into three drainage basins based on the proposed grading and drainage improvement facilities as shown on the Post-development Drainage Map (See Appendix C-2). Off-site flows entering the property within the existing wash will enter and leave the property as it currently flows within the wash. Figure 1 summarizes the pre-development sub-basin properties and Figure 2 summarizes the post-development sub-basin properties.

Pre-Development A-1	Area (acres)	Length (mi)	Elev. Delta (ft)	Slope (ft/mi)	Runoff Coefficient
Complete Site	1.53	0.048	16	333.3	0.4

Figure 1: Pre-Development Properties

Post-Development	Area (acres)	Time of Concentration	Runoff Coefficient
North Basin A-2	0.29	10	0.95
Central Basin A-3	0.83	10	0.89
South Basin A-4	0.40	10	0.95

Figure 2: Post Development Properties

The Site, a pre-development basin (A-1), encapsulates the entire property area and typically drains in a southeastern direction for the portion of the property west of the existing wash. The portion of the property on the east side, will not be developed at this time, and has surface drainage that consist of sheet flow and shallow concentrated that flows to the southwestern direction. Off-site flows are primary concentrated and contained within the existing wash with little to no sheet-flow draining through the property from beyond the property's northern and western boundaries. Flow crossing the property can be described as primarily overland flow drainage into the existing wash. The off-site flows entering the property within the wash flow through four 24-inch diameter pipes installed beneath a low water crossing before entering the property on the northern property boundary. Near the southern property boundary, the wash discharges into two 48-inch diameter pipes. The concentration point for sub-basin A-1 is identified as design point 1 (See Appendix C-1)

2. Post-Development

Post-Development northern sub-basin (A-2) encapsulates the portion of the property which is expected to drain to the concentration point identified as design point 2 (see Appendix C-2). Runoff flows through the basin can be described as primarily shallow sheet flow with slight concentrated flow along square curb.

Post-Development central sub-basin (A-3) encapsulates the portion of the property which is expected to drain to the concentration point identified as design point 3 (see Appendix C-2). Runoff flows through the basin can be described as a primarily shallow sheet flow across roof tops and sidewalks. These flows should be directed to the basin located approximately near center of the building by the means of roof drainage.

Post-development southern sub-basin (A-4) encapsulates the portion of the property which is expected to drain to the concentration point identified as design point 4 (see Appendix C-2). Runoff flows through the basin can be described as primarily shallow sheet flow with slight concentrated flow along square curb and retaining walls. The design point 4 is the only point where the entire post-development will drain into the wash. All other design points lead runoff flows to design point 4. This is to ensure that first flush is retained, and flows leave at rates below pre-development rates.

III. **DRAINAGE DESIGN CRITERIA**

A. REGULATIONS

The regulations described in the City of Sedona Land Development Code with additional references from the Yavapai County Drainage Criteria Manual (YCDDM) were followed while preparing the report. No deviation from the above referenced ordinance and manual was requested or anticipated.

B. DEVELOPMENT CRITERIA AND RESULTS

To date there has been no hydrologic or studies prepared or recorded specifically for this property. A comprehensive hydrologic study was prepared for the City of Sedona by Dibble and Associates titled the City of Sedona Stormwater Master Plan, dated March 2005. A hydraulic analysis of the wash flowing through the property has been documented by the City of Sedona Floodplain Management Study dated May 1994. Base Flood Elevations and floodplain and floodway boundaries for the wash have been determined by the hydraulic analysis. The property was configured and designed to not significantly impact historic drainage patterns within the area.

A hydrologic study was prepared for Assessor's Parcel Number 408-26-031A located north of the property titled *Final Drainage Report for Parcel 408-26-031A* prepared by Brent G. Maupin, P.E. dated August 2005. The study determined the hydrologic conditions for only that property with no detention design due to the time of concentration differences between the property and the existing wash. A hydrologic study was also prepared for an adjacent parcel to the northeast titled *Kallof Place Phase II Drainage Report* prepared by Lyon Engineering and Development, Inc. dated June 2007. The study determined the peak discharges for that property and documented an underground detention system design which mitigates the post-development runoff conditions to historic conditions. A hydrologic study was also prepared for an adjacent parcel to the north titled Drainage Report for Walgreens prepared by Shepard-Wesnitzer, Inc. dated April 1996. The study determined the hydrologic conditions for the site with no detention or retention design. The previous studies for the adjacent properties have no significant drainage impacts to the subject property as the properties were developed to not impact the historic drainage patterns adversely. The post-development hydrologic conditions of the subject property will not affect the previous studies for the adjacent properties since the properties are upstream of the Site.

C. HYDROLOGIC CRITERIA AND RESULTS

The hydrologic calculations used within this report will be used for addressing the pre-development and post-development design conditions and required first-flush retention for areas with impervious surfaces for this property only and not overriding any previous studies accepted by the city or county jurisdictions.

1. Methodology

Hydrologic calculations were performed using the Rational Method for both pre- and post-development as outlined within Section 7.3 of the YCDDM. The Rational Method is based on the equation Q-CiA where Q is the peak flow in cubic feet per second, C is the runoff coefficient, i is the average rainfall intensity in inches per hour, and A is the contributing drainage area in acres. HydraFlow Hydrographs 2020 modeling program based on the Rational Method was used to determine peak flows for the pre-development and post-development conditions of the property.

Rainfall intensities were taken from the NOAA Atlas 14 Point Precipitation Frequency Estimates found on the NOAA's National Weather Service website and used within the hydrologic model HydraFlow Hydrographs (Appendix D).

The property is split by two means, the most apparent one is the wash, and the other is the USGS soil classification. The western side of the wash and property consists of a group type B, while the eastern side

of the wash and property consist of type D soil. The western side of the property is the portion being developed, and the only significant amount of offsite water flow travels through the property in the wash. No offsite flows were calculated through the proposed development. Models were constructed for both pre- and post-development.

The pre-development or existing hydrologic runoff conditions for the sub-basin were represented using a runoff coefficient of 0.40 for all models of pre-development. These runoff coefficients were determined using ADOT Highway Drainage Design Manual. Figure 2-3 was employed to determine the runoff with type B soil and little less 10 percent of vegetation coverage. Using the NOAA Atlas 14 and a value of near 2.25 inches per hour to determine this coefficient values. The intensity differs from the site as a whole and the individual sub-basin. The time of concentration for the pre-development consisted of 15 minutes.

The post-development consisted of three sub-basins, northern (A-2), central (A-3), and southern (A-4). Both northern and southern sub-basins will be paved and have a coefficient of 0.95. The central sub-basin consists of roofs, and sidewalks, and a weighted coefficient of 0.89. These three (3) post-developments sub-basins have the time of concentration of 10 minutes. The change of pre- and post-development time of concentration is due to the surface change and ensures that the system is conservative.

The Proposed retention basin was designed in accordance with YCDDM for the first flush requirement. Precipitation caught on impervious surfaces of proposed development are to be retained and treated on-site prior to exiting the development in order to reduce the amount of off-site pollutants. Each post-development will be constructed using underground first flush basins, and these basins will consist of gravel with voids of no less than 40. The total amount of first flush storage is 2,560 cubic feet.

2. Results

Hydraflow Hydrograph was employed to construct models and calculated the results of both pre- and post-development (Appendix E).

a) Pre-Development

The results of the 2020 Hydraflow Hydrographs can be found in Figure 3: Pre-Development Discharge A-1. The flows are 1.27, 2.08, 2.61, and 3.52 cubic feet per second for the years events of 2, 10, 25, and 100 respectively. The result of the same software but with the sub-divided in the smaller areas can be found in Figure 4: Pre-Development Discharge Sub-Divided. Notice that the flows have been increased and this is due to the time of concentration of 10 minutes and not 15 minutes. The

Pre-Development Discharge A-1					
Design point	Basin Description	Peak Discharge (CFS)			
		2-year	10-year	25-year	100-year
1	A-1 Pre	1.27	2.08	2.61	3.52

Figure 4: Pre-Development Discharge A-1

Pre-Development Discharge Sub-Divided					
Design point	Basin Description	Peak Discharge (CFS)			
		2-Year	10-Year	25-Year	100-Year
2	North Basin A-2	0.29	0.47	0.60	0.80
3	Central Basin A-3	0.84	1.37	1.72	2.33
4	South Basin A-4	0.42	0.68	0.85	1.15
1	Total	1.54	2.53	3.17	4.29

Figure 3: Pre-Development Discharge Sub-Divided

flows found in Figure 3 will be used for the final design to ensure the system is more robust.

b) Post-Development

Results of the 2020 Hydraflow Hydrograph can be found in Figure 5: Post-Development Discharge without Mediation. This shows the flows of the developments and how they would increase with the amount of proposed impervious surfaces. The total amount is 3.34, 5.47, 6.87, and 9.29 cubic feet per second for a 2, 10, 25, and 100-year storm event respectively. These amounts are double any of the calculated pre-development flows and indicate mediation is required.

Post-Development Discharge without Mediation					
Design Point	Basin Description	Peak Discharge (CFS)			
		2-Year	10-Year	25-Year	100-Year
2	North Basin A-2	0.70	1.14	1.43	1.93
3	Central Basin A-3	1.86	3.05	3.83	5.18
4	South Basin A-4	0.96	1.57	1.97	2.66
1	Total	3.52	5.76	7.22	9.77

Figure 5: Post-Development Discharge without Mediation

Results of the 2020 Hydraflow Hydrograph can be found in figure 6: Post-Development Discharge with Mediation. This figure shows how the mediation will be used to restrict the flows to that of below pre-development flows. Due to the amount of surface change into impervious area, the first flush underground basins absorb flows of a 2-year storm event. The ground elevation basin will be employing certain sized pipes with their slopes to ensure that the flows do not exceed the flows of the other three (3) storm events. These flows are significantly less than what are seen in Figure 3 and below that in Figure 4.

Post-Development Discharge with Mediation						
Design Point	Basin Description	Peak Discharge (CFS)				First Flush Volume (cu. ft.)
		2-Year	10-Year	25-Year	100-Year	
2	North Basin A-2	0	1.72	2.50	3.45	504
3	Central Basin A-3	0	1.58	2.41	3.43	1092
4	South Basin A-4	0	0.61	1.95	3.12	964
1	Total	0	0.61	1.95	3.12	2560

Figure 6: Post-Development Discharge with Mediation

This property drains directly into the wash and flows off the site and into the two 48-inch diameter culverts located at near center of the southern property border. This proposed development will utilize the same means of drainage and drain into the wash.

IV. DRAINAGE FACILITY DESIGN

A. GENERAL CONCEPT

Both the property and the major basin's runoff flows to and through the existing wash that is located on this property. It is this same wash that is the outlet for this property. The final means of drainage is through the current drainage system, of the existing duel 48-inch diameter located at the southern property boundary.

The three basins can be consisted as a three-stage system with each having the first flush gravel retention. The basin located within the structure, basin A-3, detains most of that basin's water is restricted and then conveys it to the northern basin, A-2, through a 12-inch PVC culvert. The northern basin acts like the pre-mentioned one and restricts and conveys flows through a 10-inch PVC culvert to the southern basin. The southern basin, basin A-4, does the same, but the final culver consist of a 12-inch PVC culvert with the outlet exiting into existing wash, where it leaves the property.

Figure 7: Final Pre- and Post-Development Flows, shows that the post-development has the flows restricted below that to the pre-development flow rates. Due to the amount of the required first flush storage the 2-year storm event will have no flow leaving the site and is a main reason why the resulting flows are so restricted.

Final Pre- and Post-Development Flows				
Condition	Peak Discharge (CFS)			
	2-Year	10-Year	25-Year	100-Year
Pre-Development Flows	1.27	2.08	2.61	3.52
Post-Development Flows	0	0.61	1.95	3.12

Figure 7: Final Pre- and Post-Development Flow

V. CONCLUSION

It is the engineer's recommendation that the site be constructed as proposed. The plan will satisfy the conditions for design. The facilities will mitigate any anticipated increase related to the development. The project will comply with the City of Sedona and Yavapai County criteria and regulations. The point of contact regarding this study is Crockett Saline of Sefton Engineering Consultants.

VI. APPENDIX A

USGS Soil Map

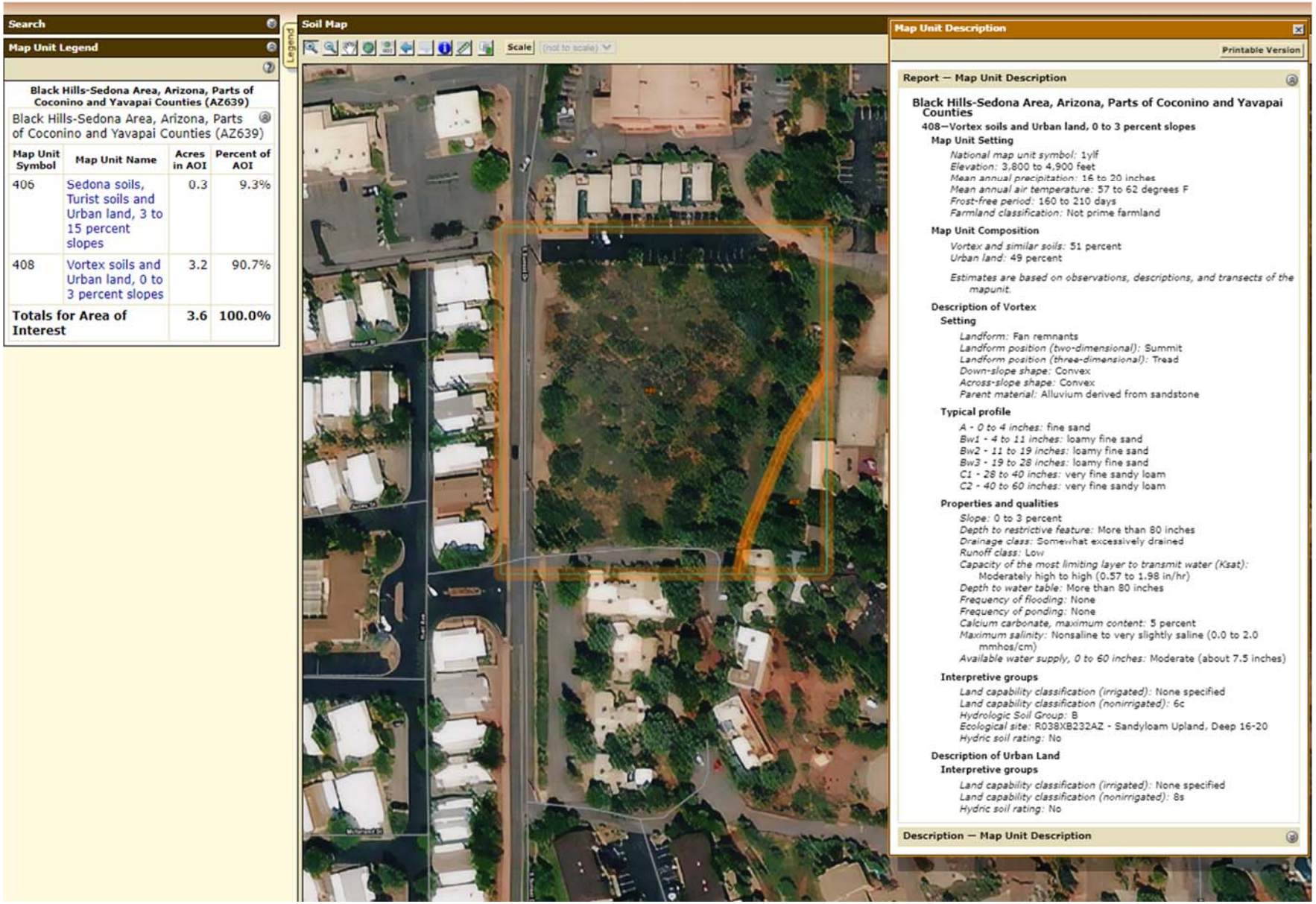

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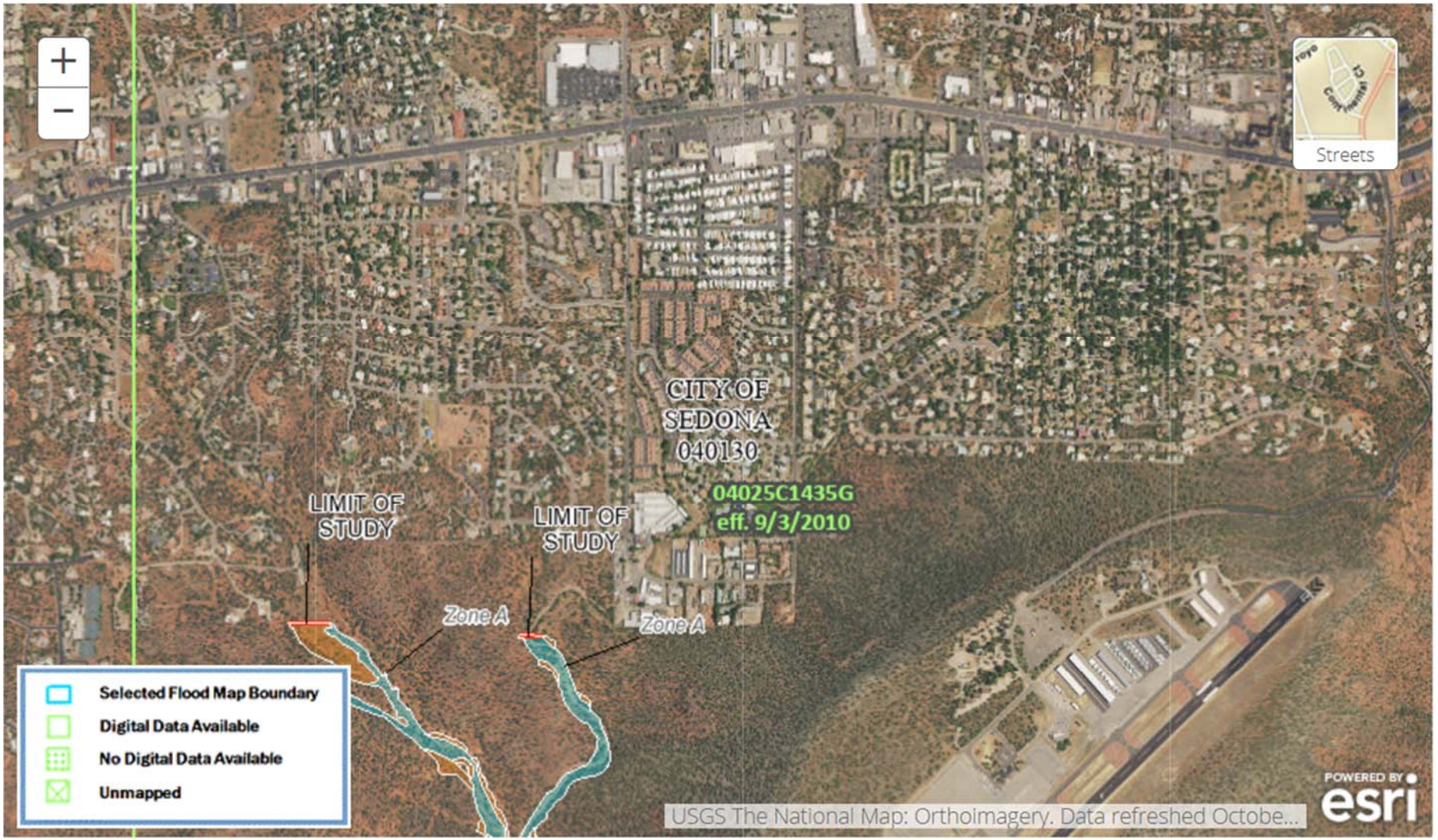
PLATE A-1

USDA SOIL MAP

VII. APPENDIX B

FEMA Flood Map



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FEMA FLOOD MAP

PLATE
B-1

VIII. APPENDIX C

Pre-Development Basin Plan

Pre-Development A-1	Area (acres)	Length (mi)	Elev. Delta (ft)	Slope (ft/mi)	Runoff Coefficient
Complete Site	1.53	0.048	16	333.3	0.4

Pre-Development Discharge A-1					
Design point	Basin Description	Peak Discharge (CFS)			
		2-year	10-year	25-year	100-year
1	A-1 Pre	1.27	2.08	2.61	3.52

LINETYPE LEGEND

- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = COMPOSITE RUNOFF COEFFICIENT
- D = COMPOSITE RUNOFF COEFFICIENT
- DRAINAGE FLOW

Registered Professional Engineer (Civil)
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LUKE A SEFTON
DATE SIGNED 8-5-21
ARIZONA, U.S.A.

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APPENDIX C-1 PRE-DEVELOPMENT DRAINAGE MAP

SUNSET DRIVE APARTMENTS

KEITH HOLBEN

DRAWN BY:	CDS
SCALE:	1" = 20'
DATE:	08-05-2021
PROJECT NO:	170202A
SHEET NO.	C-1

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Post-Development Discharge without Mediation					
Design Point	Basin Description	Peak Discharge (CFS)			
		2-Year	10-Year	25-Year	100-Year
2	North Basin A-2	0.70	1.14	1.43	1.93
3	Central Basin A-3	1.86	3.05	3.83	5.18
4	South Basin A-4	0.96	1.57	1.97	2.66
1	Total	3.52	5.76	7.22	9.77

Post-Development Discharge with Mediation						
Design Point	Basin Description	Peak Discharge (CFS)				First Flush Volume
		2-Year	10-Year	25-Year	100-Year	(cu. ft.)
2	North Basin A-2	0	1.72	2.50	3.45	504
3	Central Basin A-3	0	1.58	2.41	3.43	1092
4	South Basin A-4	0	0.61	1.95	3.12	964
1	Total	0	0.61	1.95	3.12	2560

Final Pre- and Post-Development Flows				
Condition	Peak Discharge (CFS)			
	2-Year	10-Year	25-Year	100-Year
Pre-Development Flows	1.27	2.08	2.61	3.52
Post-Development Flows	0	0.61	1.95	3.12

LINETYPE LEGEND

- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = COMPOSITE RUNOFF COEFFICIENT
- D = COMPOSITE RUNOFF COEFFICIENT
- DRAINAGE FLOW

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APPENDIX C-2 POST-DEVELOPMENT DRAINAGE MAP

SUNSET DRIVE APARTMENTS

KEITH HOLBEN

DRAWN BY:	CDS
SCALE:	1" = 20'
DATE:	08-05-2021
PROJECT NO:	170202A
SHEET NO.	C-2

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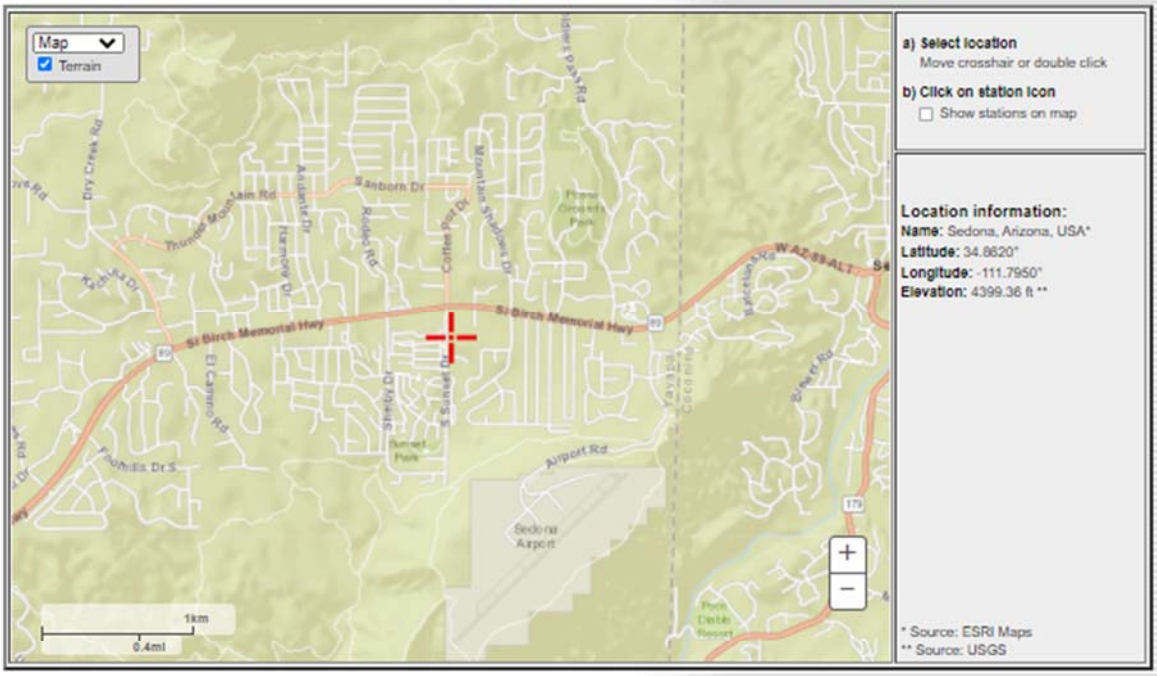
IX. APPENDIX D

Post-Development Basins Plan



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 1, Version 5

PF tabular | PF graphical | Supplementary information | Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	2.53 (2.11-3.01)	3.25 (2.72-3.89)	4.39 (3.66-5.23)	5.34 (4.45-6.35)	6.70 (5.53-7.92)	7.82 (6.42-9.26)	9.05 (7.36-10.7)	10.4 (8.30-12.3)	12.3 (9.66-14.7)	13.9 (10.8-16.7)
10-min	1.93 (1.61-2.29)	2.48 (2.08-2.96)	3.34 (2.79-3.98)	4.06 (3.39-4.83)	5.09 (4.21-6.03)	5.95 (4.89-7.05)	6.88 (5.60-8.15)	7.88 (6.32-9.35)	9.34 (7.36-11.2)	10.6 (8.21-12.7)
15-min	1.59 (1.33-1.90)	2.05 (1.71-2.44)	2.76 (2.30-3.29)	3.36 (2.80-3.99)	4.21 (3.48-4.98)	4.92 (4.04-5.82)	5.69 (4.62-6.74)	6.52 (5.22-7.73)	7.72 (6.08-9.23)	8.73 (6.78-10.5)
30-min	1.07 (0.896-1.28)	1.38 (1.15-1.64)	1.86 (1.55-2.21)	2.26 (1.89-2.69)	2.83 (2.34-3.35)	3.31 (2.72-3.92)	3.83 (3.12-4.54)	4.39 (3.52-5.21)	5.20 (4.09-6.21)	5.88 (4.57-7.07)
60-min	0.663 (0.555-0.789)	0.853 (0.713-1.02)	1.15 (0.960-1.37)	1.40 (1.17-1.66)	1.75 (1.45-2.08)	2.05 (1.68-2.43)	2.37 (1.93-2.81)	2.71 (2.18-3.22)	3.22 (2.53-3.85)	3.64 (2.83-4.37)
2-hr	0.391 (0.340-0.454)	0.454 (0.426-0.576)	0.652 (0.563-0.758)	0.787 (0.674-0.914)	0.980 (0.834-1.13)	1.14 (0.958-1.32)	1.32 (1.10-1.53)	1.51 (1.24-1.75)	1.79 (1.44-2.08)	2.02 (1.60-2.36)
3-hr	0.280 (0.246-0.323)	0.354 (0.312-0.409)	0.454 (0.398-0.523)	0.540 (0.472-0.622)	0.664 (0.574-0.765)	0.770 (0.660-0.884)	0.886 (0.750-1.02)	1.01 (0.847-1.17)	1.20 (0.985-1.40)	1.36 (1.09-1.59)
6-hr	0.170 (0.152-0.189)	0.211 (0.189-0.235)	0.262 (0.234-0.292)	0.308 (0.275-0.343)	0.373 (0.330-0.415)	0.426 (0.374-0.474)	0.483 (0.420-0.540)	0.544 (0.467-0.610)	0.634 (0.536-0.717)	0.707 (0.588-0.805)
12-hr	0.108 (0.098-0.120)	0.134 (0.121-0.149)	0.164 (0.147-0.181)	0.189 (0.169-0.208)	0.223 (0.199-0.246)	0.249 (0.221-0.274)	0.276 (0.243-0.305)	0.304 (0.265-0.336)	0.343 (0.295-0.382)	0.374 (0.319-0.420)
24-hr	0.068 (0.062-0.075)	0.085 (0.077-0.094)	0.106 (0.096-0.117)	0.123 (0.111-0.136)	0.146 (0.132-0.161)	0.164 (0.148-0.181)	0.183 (0.163-0.202)	0.202 (0.180-0.224)	0.229 (0.201-0.254)	0.249 (0.218-0.278)
2-day	0.040 (0.036-0.044)	0.049 (0.045-0.055)	0.061 (0.056-0.068)	0.071 (0.065-0.078)	0.085 (0.077-0.093)	0.095 (0.086-0.105)	0.106 (0.095-0.117)	0.117 (0.104-0.129)	0.132 (0.117-0.147)	0.144 (0.126-0.160)
3-day	0.028 (0.026-0.031)	0.035 (0.032-0.039)	0.044 (0.040-0.049)	0.051 (0.047-0.056)	0.061 (0.055-0.067)	0.069 (0.062-0.076)	0.077 (0.069-0.085)	0.086 (0.076-0.094)	0.097 (0.086-0.108)	0.107 (0.093-0.118)
4-day	0.023 (0.021-0.025)	0.028 (0.026-0.031)	0.036 (0.032-0.039)	0.041 (0.038-0.045)	0.050 (0.045-0.054)	0.056 (0.051-0.061)	0.063 (0.056-0.069)	0.070 (0.062-0.077)	0.080 (0.070-0.088)	0.088 (0.077-0.097)
7-day	0.015 (0.014-0.017)	0.019 (0.017-0.021)	0.024 (0.022-0.026)	0.027 (0.025-0.030)	0.033 (0.030-0.036)	0.037 (0.033-0.040)	0.041 (0.037-0.045)	0.045 (0.041-0.050)	0.051 (0.046-0.057)	0.056 (0.050-0.062)
10-day	0.012 (0.011-0.013)	0.015 (0.014-0.017)	0.019 (0.017-0.020)	0.021 (0.020-0.023)	0.025 (0.023-0.028)	0.028 (0.025-0.031)	0.031 (0.028-0.034)	0.034 (0.030-0.037)	0.038 (0.034-0.042)	0.041 (0.036-0.045)
20-day	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.011-0.013)	0.013 (0.012-0.015)	0.015 (0.014-0.017)	0.017 (0.015-0.018)	0.018 (0.017-0.020)	0.020 (0.018-0.022)	0.021 (0.019-0.023)	0.023 (0.020-0.025)
30-day	0.006 (0.006-0.007)	0.008 (0.007-0.009)	0.009 (0.009-0.010)	0.011 (0.010-0.012)	0.012 (0.011-0.013)	0.013 (0.012-0.015)	0.014 (0.013-0.016)	0.015 (0.014-0.017)	0.017 (0.015-0.018)	0.018 (0.016-0.019)
45-day	0.005 (0.005-0.005)	0.006 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.008-0.009)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.012 (0.010-0.013)	0.012 (0.011-0.014)	0.014 (0.012-0.015)	0.014 (0.013-0.016)

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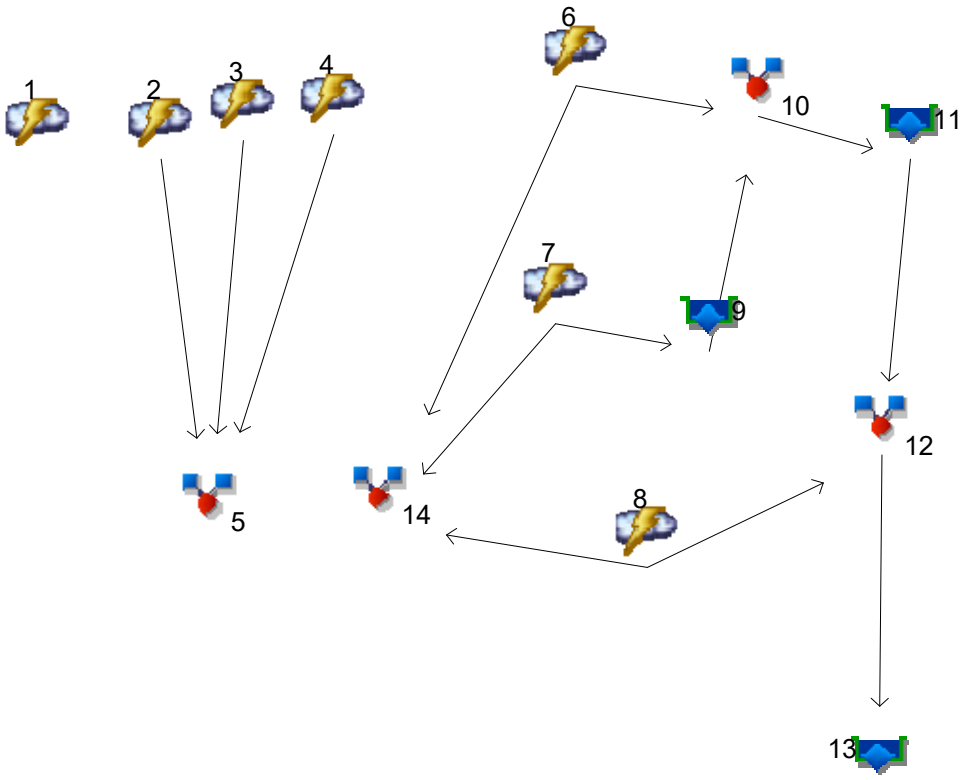
NOAA ATLAS 14

PLATE
D-1

X. APPENDIX E

Hydroflow Hydrograph Result

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	Pre-Development Single Basin
2	Rational	North Pre-Development
3	Rational	Center Per-Development
4	Rational	Southern Pre-Development
5	Combine	Pre-Development Micro-Basin
6	Rational	Northern (A-2) Basin Post-Development
7	Rational	Center Basin (A-3) Post-Development
8	Rational	Souther Basin (A-4) Post-Development
9	Reservoir	Center Pond
10	Combine	Culvert from Center to Nothern Basin
11	Reservoir	Northern Pond
12	Combine	Culvert from Nothern to Southern Basin
13	Reservoir	Southern Pond
14	Combine	Development without Mediation

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	-------	1.711	2.078	2.606	3.044	3.524	Pre-Development Single Basin
2	Rational	------	-------	0.290	-------	0.390	0.474	0.595	0.694	0.804	North Pre-Development
3	Rational	------	-------	0.840	-------	1.131	1.374	1.724	2.013	2.332	Center Per-Development
4	Rational	------	-------	0.415	-------	0.559	0.679	0.852	0.994	1.152	Southern Pre-Development
5	Combine	2, 3, 4	-------	1.544	-------	2.080	2.527	3.171	3.701	4.288	Pre-Development Micro-Basin
6	Rational	------	-------	0.695	-------	0.936	1.137	1.427	1.666	1.930	Northern (A-2) Basin Post-Developme
7	Rational	------	-------	1.864	-------	2.511	3.050	3.827	4.468	5.175	Center Basin (A-3) Post-Development
8	Rational	------	-------	0.959	-------	1.291	1.569	1.969	2.298	2.662	Souther Basin (A-4) Post-Developme
9	Reservoir	7	-------	0.000	-------	0.851	1.580	2.407	2.922	3.431	Center Pond
10	Combine	6, 9	-------	0.695	-------	1.194	2.168	3.359	4.116	4.877	Culvert from Center to Nothern Basin
11	Reservoir	10	-------	0.000	-------	0.711	1.722	2.496	2.989	3.450	Northern Pond
12	Combine	8, 11	-------	0.959	-------	1.291	2.311	3.454	4.132	4.838	Culvert from Nothern to Southern Bas
13	Reservoir	12	-------	0.000	-------	0.000	0.613	1.945	2.600	3.124	Southern Pond
14	Combine	6, 7, 8,	-------	3.517	-------	4.738	5.756	7.224	8.432	9.768	Development without Mediation

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 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	15	1,144	------	------	------	Pre-Development Single Basin
2	Rational	0.290	1	10	174	------	------	------	North Pre-Development
3	Rational	0.840	1	10	504	------	------	------	Center Per-Development
4	Rational	0.415	1	10	249	------	------	------	Southern Pre-Development
5	Combine	1.544	1	10	926	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	0.695	1	10	417	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	1.864	1	10	1,118	------	------	------	Center Basin (A-3) Post-Development
8	Rational	0.959	1	10	575	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	0.000	1	n/a	0	7	4.08	1,118	Center Pond
10	Combine	0.695	1	10	417	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	0.000	1	n/a	0	10	3.35	417	Northern Pond
12	Combine	0.959	1	10	575	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	0.000	1	n/a	0	12	2.40	575	Southern Pond
14	Combine	3.517	1	10	2,110	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

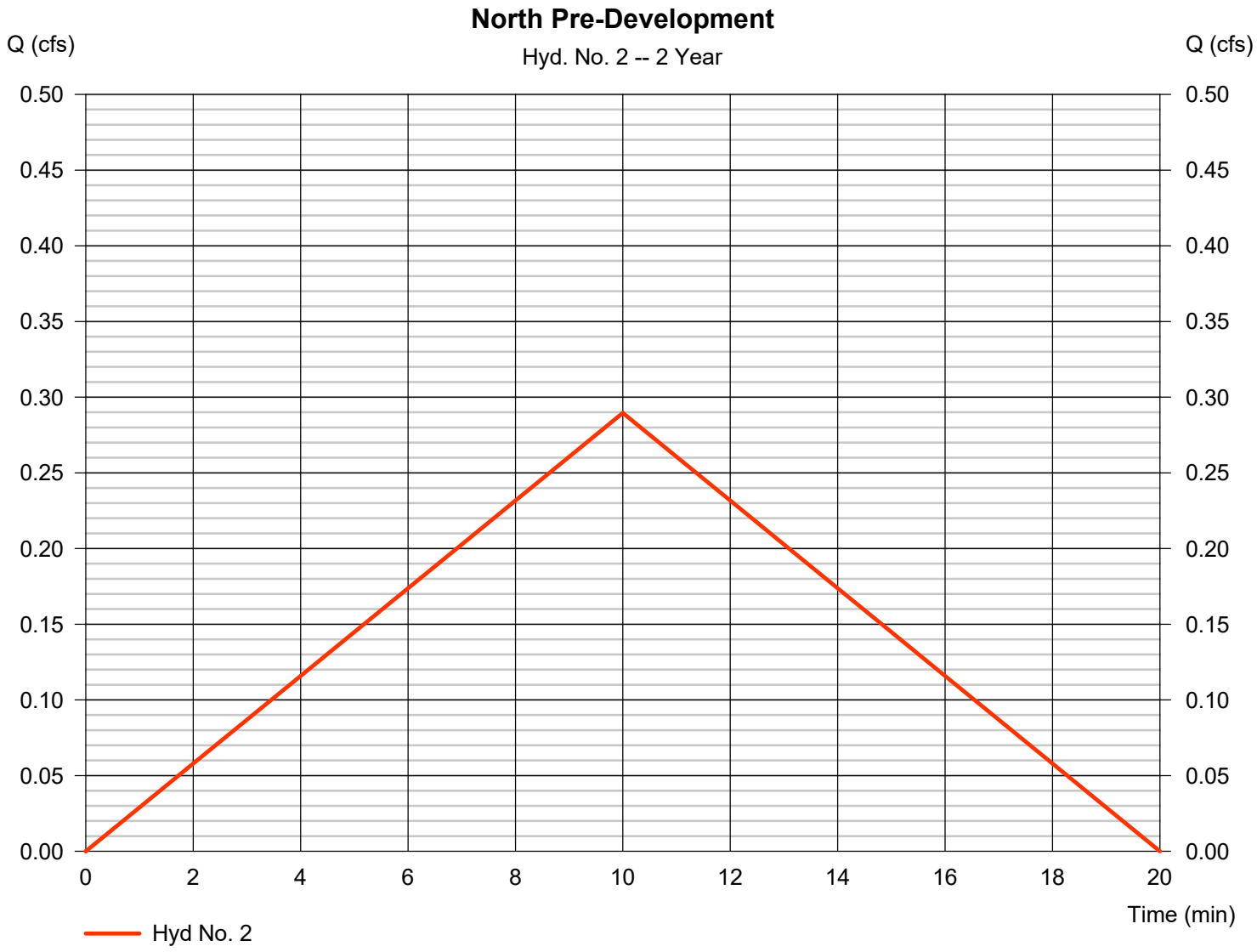
Hydrograph type	= Rational	Peak discharge	= 1.271 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 1,144 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.4
Intensity	= 2.076 in/hr	Tc by User	= 15.00 min
IDF Curve	= sedona.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.290 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	174 cuft
Drainage area	=	0.287 ac	Runoff coeff.	=	0.4
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

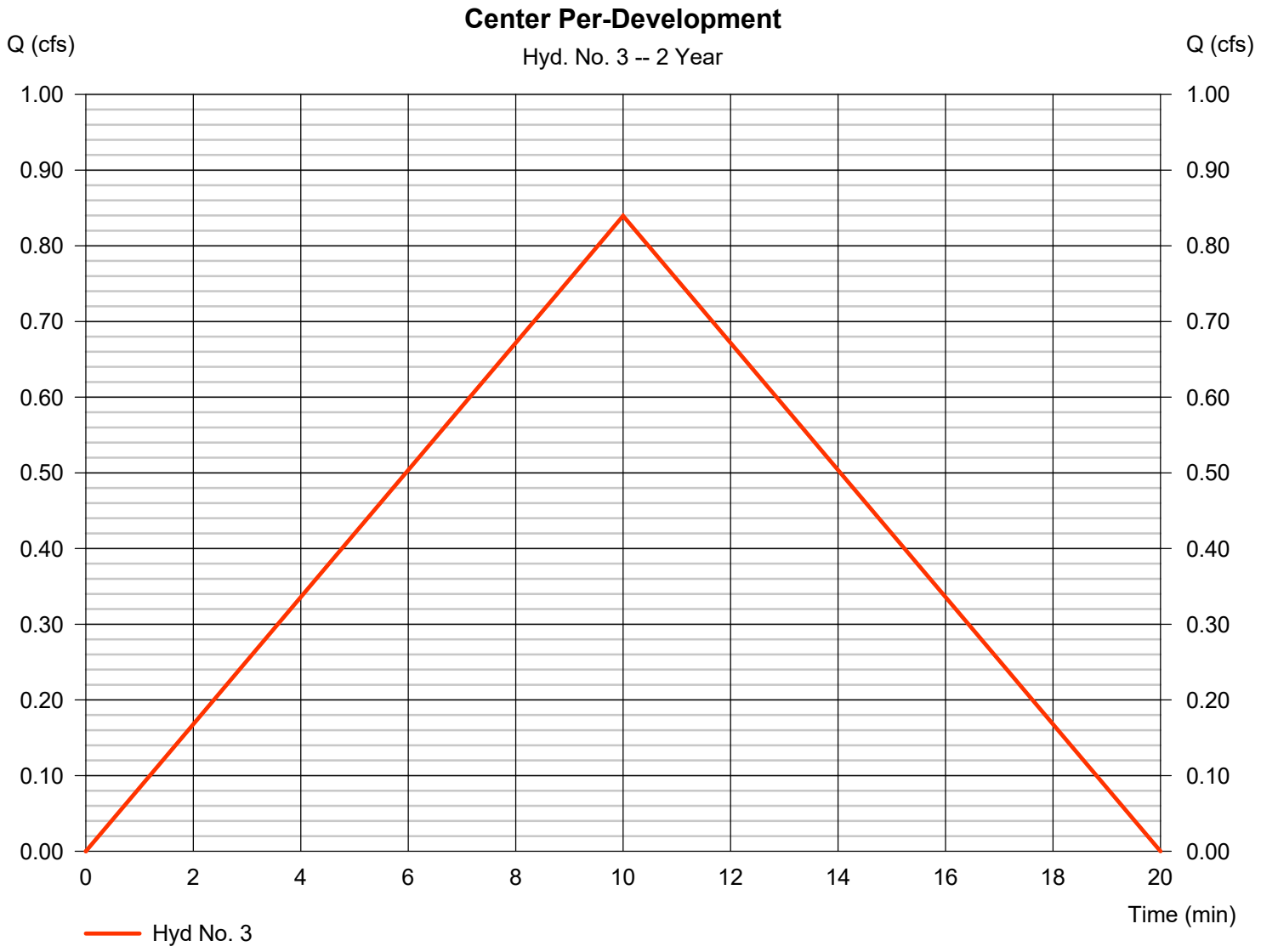


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	0.840 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	504 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

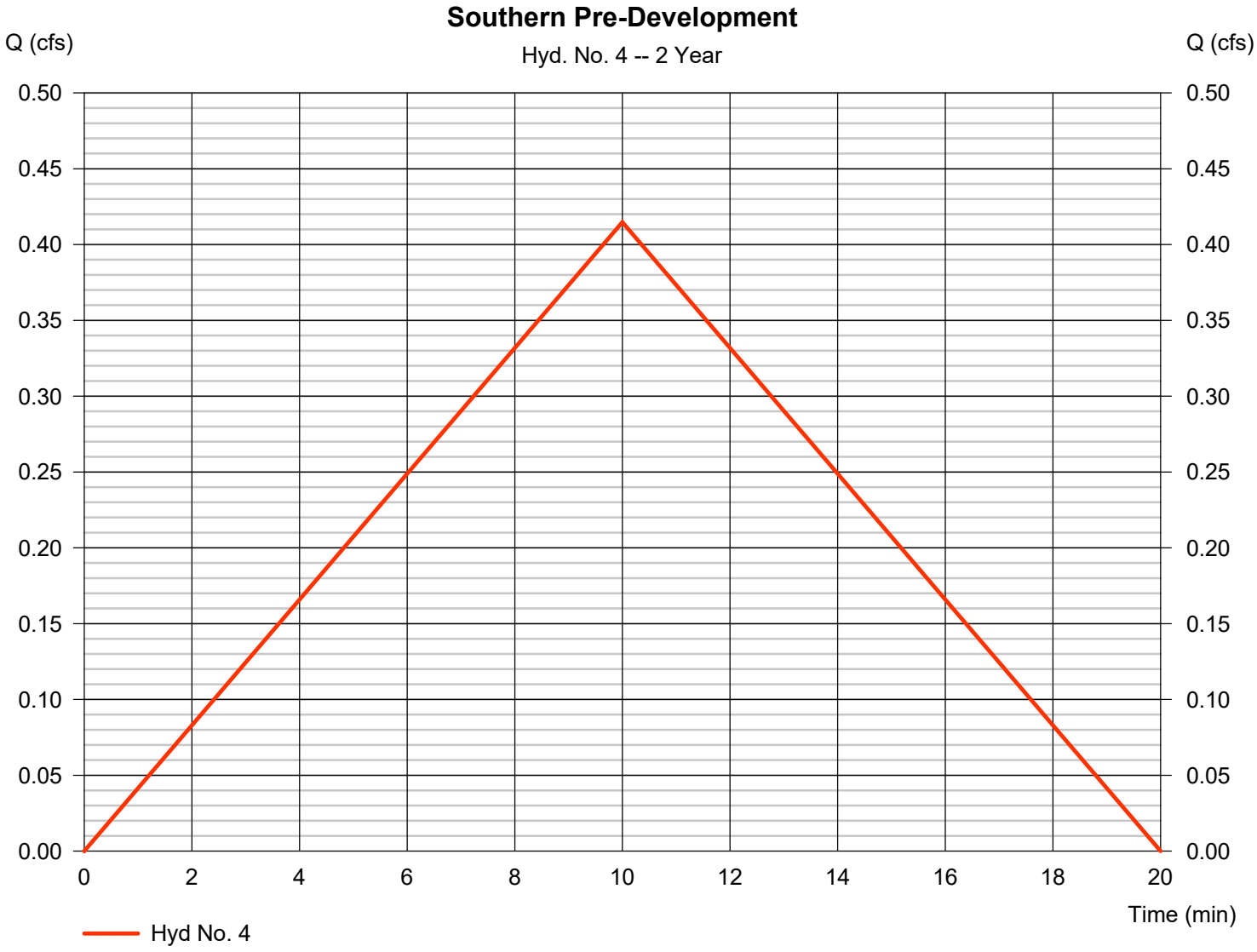


Hydrograph Report

Hyd. No. 4

Southern Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.415 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	249 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

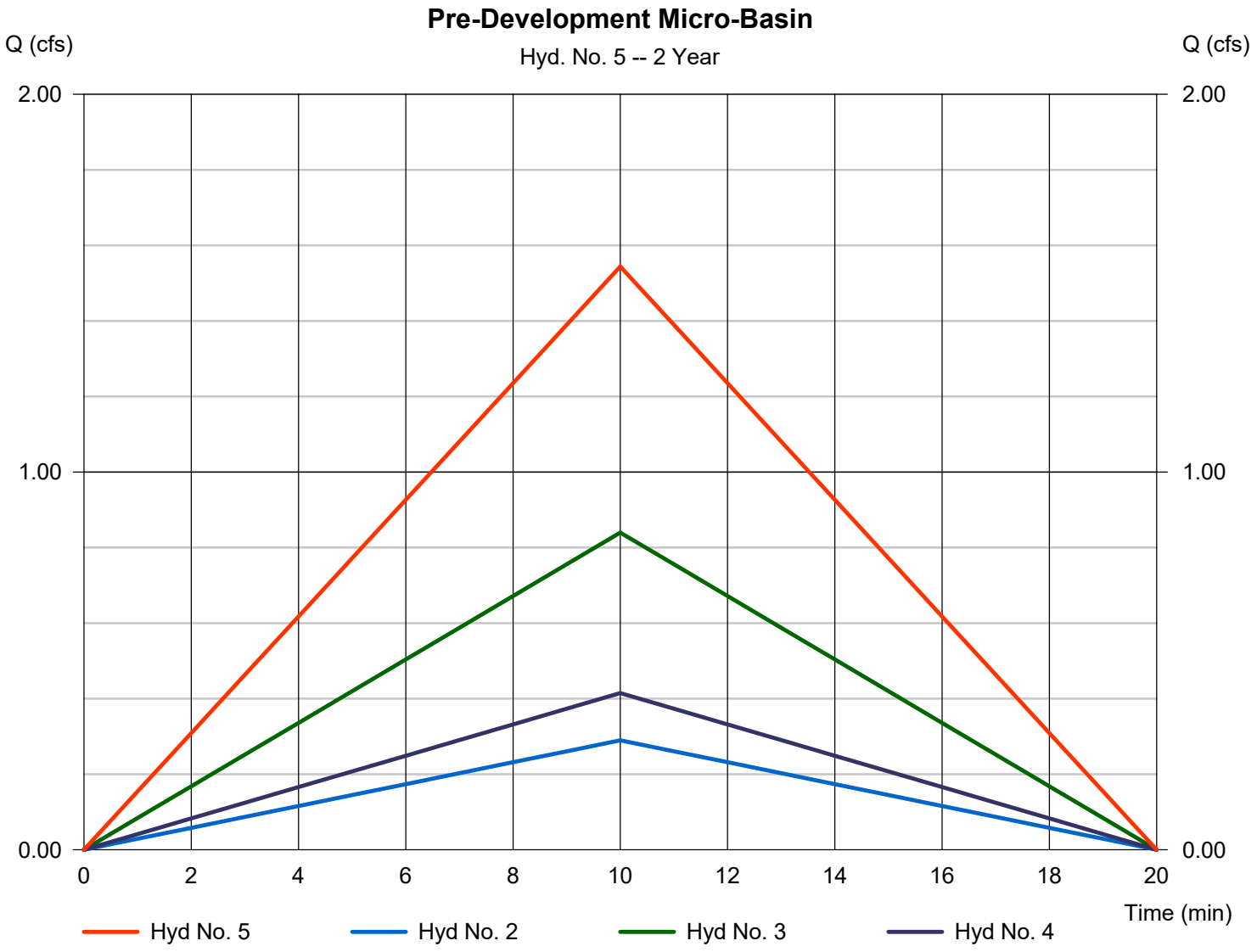


Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	=	Combine	Peak discharge	=	1.544 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	926 cuft
Inflow hyds.	=	2, 3, 4	Contrib. drain. area	=	1.530 ac

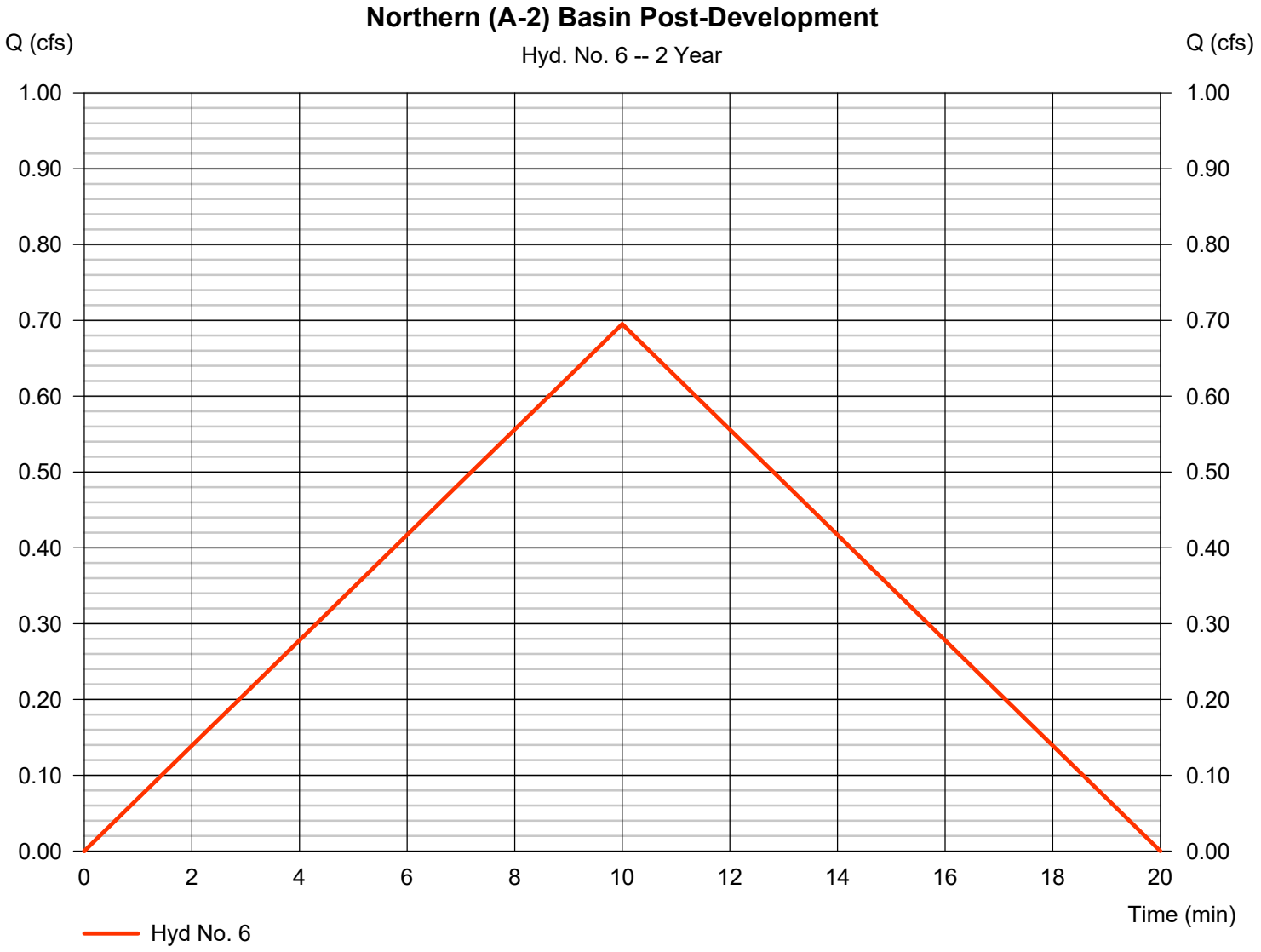


Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

Hydrograph type	=	Rational	Peak discharge	=	0.695 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	417 cuft
Drainage area	=	0.290 ac	Runoff coeff.	=	0.95
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

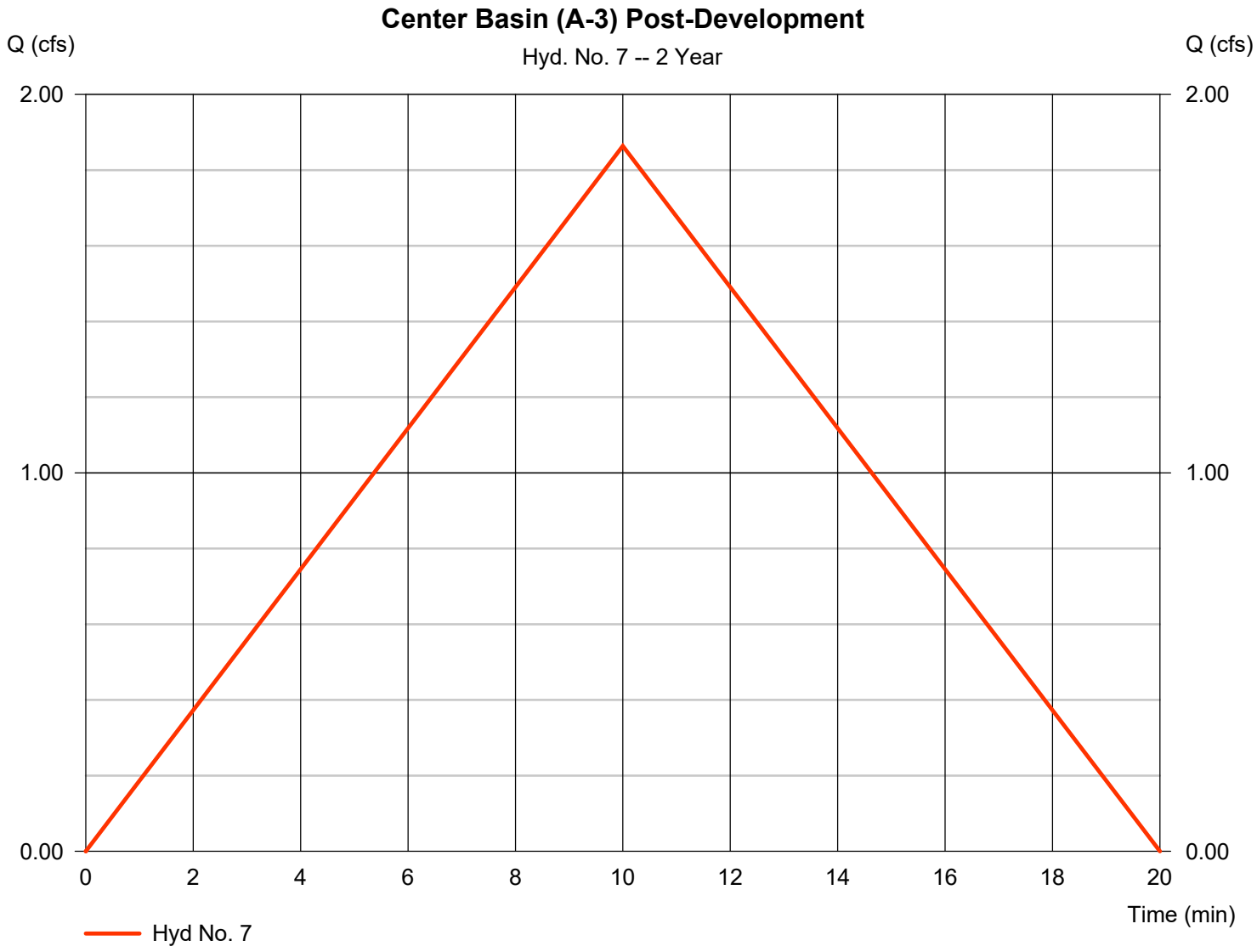


Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.864 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,118 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.89
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

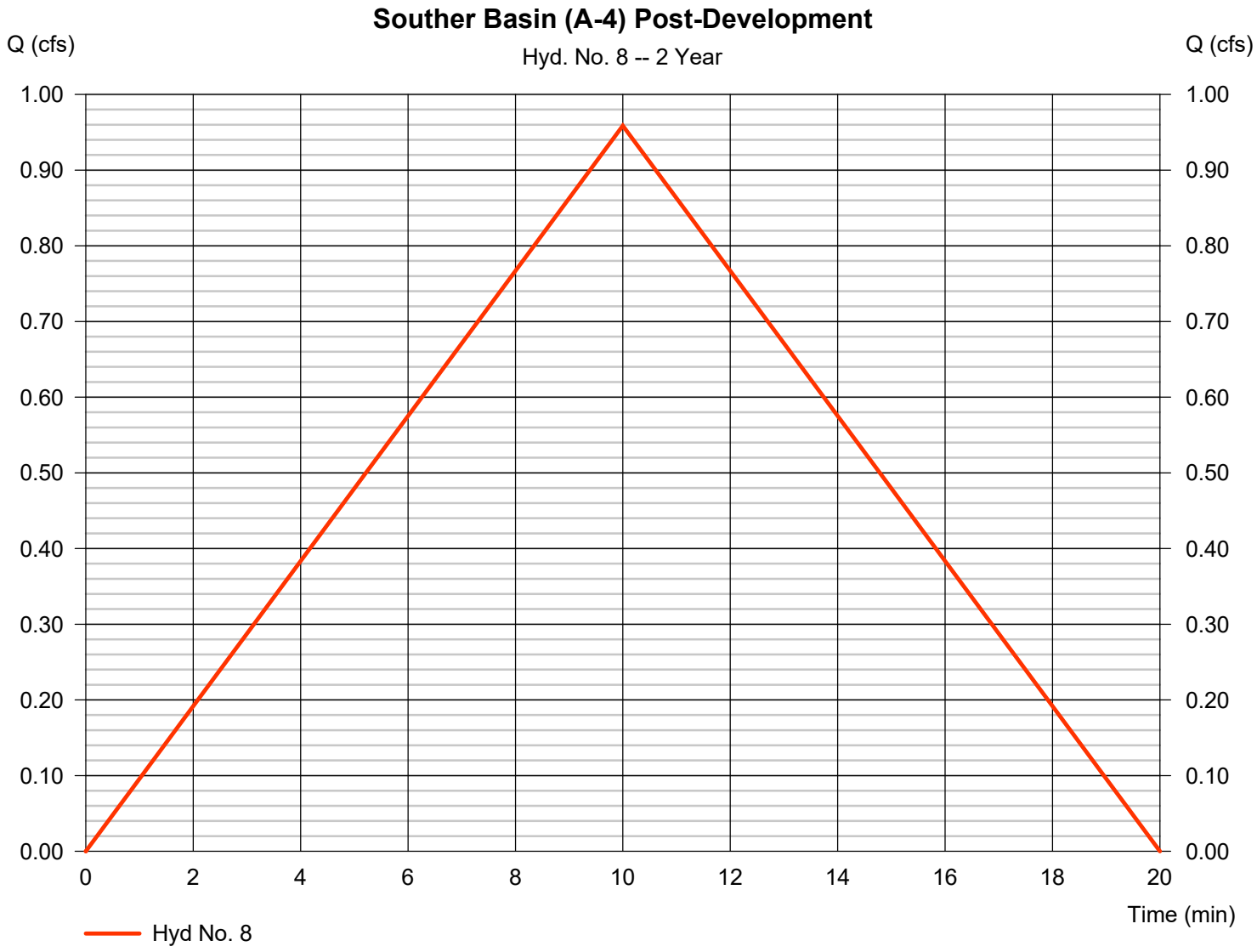


Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	0.959 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	575 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	2.523 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



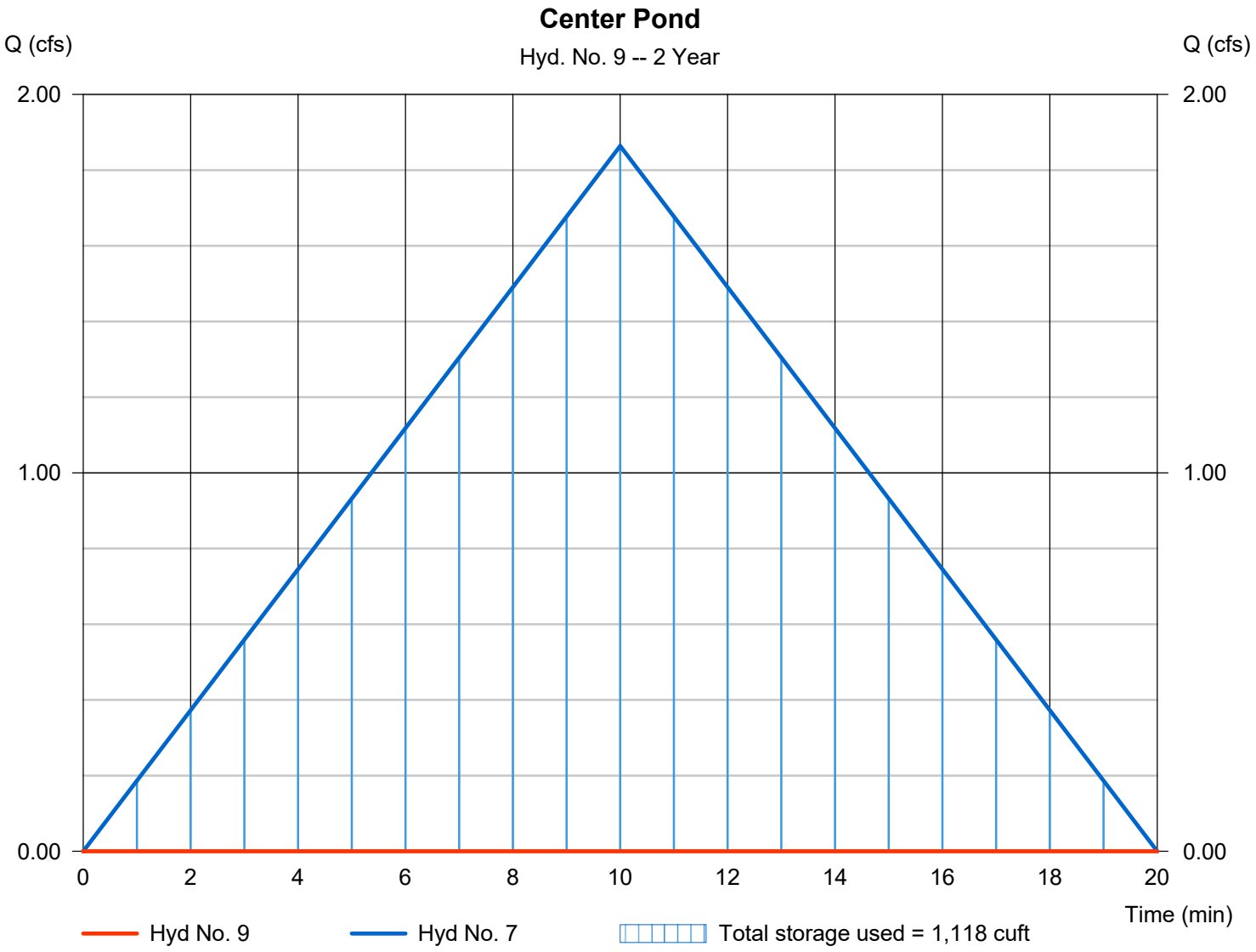
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Development	Max. Elevation	=	4.08 ft
Reservoir name	=	center pond	Max. Storage	=	1,118 cuft

Storage Indication method used.

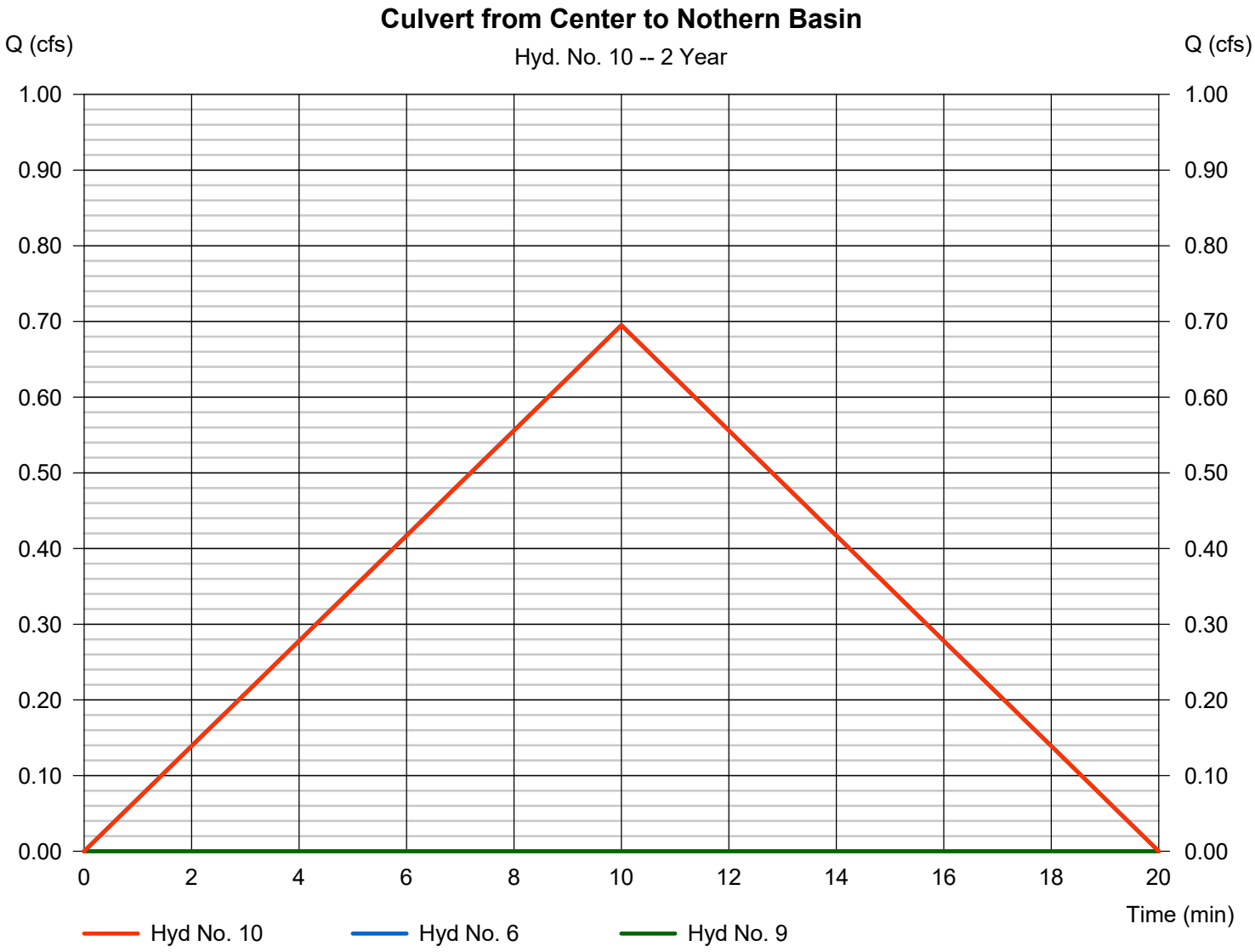


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	= Combine	Peak discharge	= 0.695 cfs
Storm frequency	= 2 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 417 cuft
Inflow hyds.	= 6, 9	Contrib. drain. area	= 0.290 ac



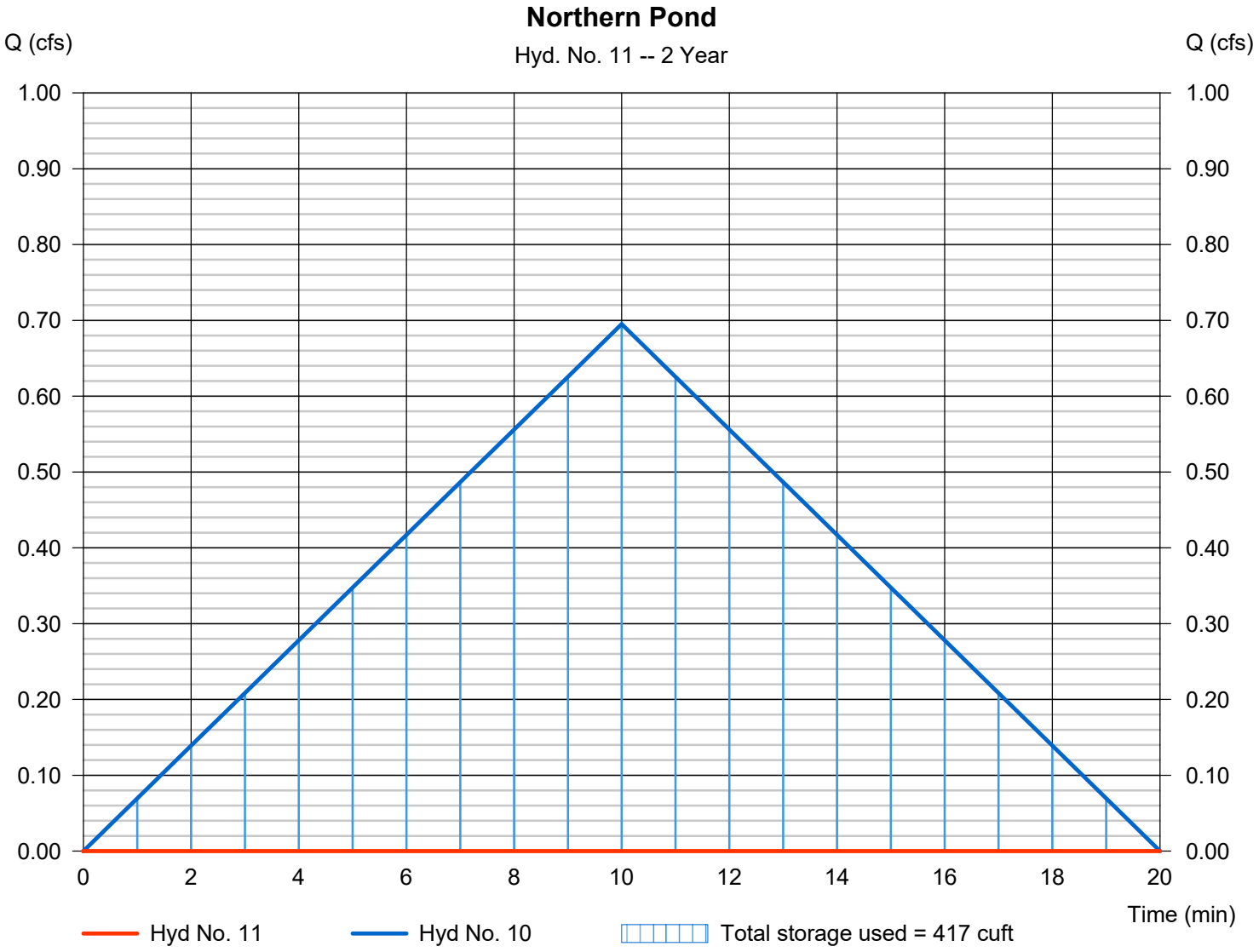
Hydrograph Report

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	3.35 ft
Reservoir name	=	north pond	Max. Storage	=	417 cuft

Storage Indication method used.

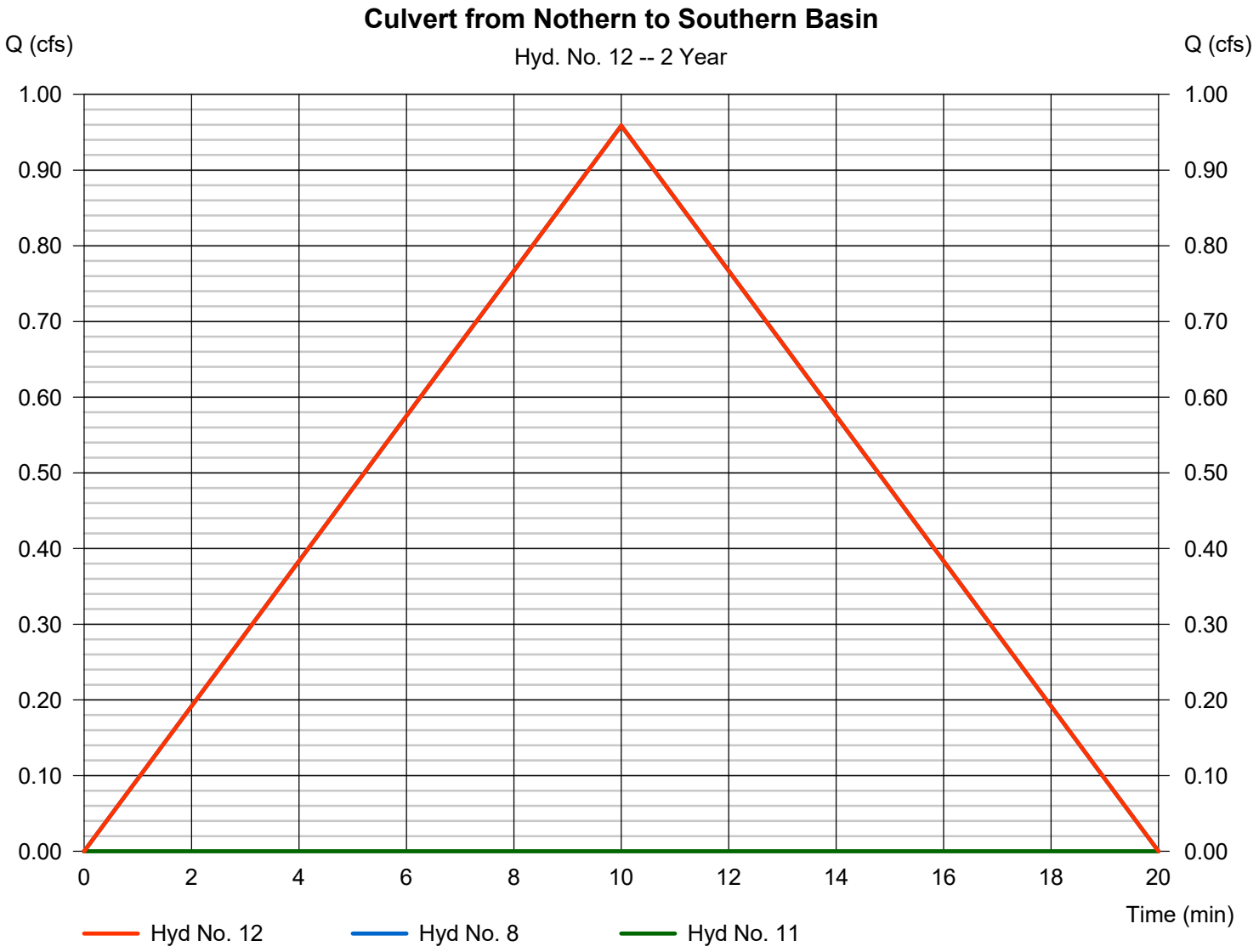


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	=	Combine	Peak discharge	=	0.959 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	575 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.400 ac



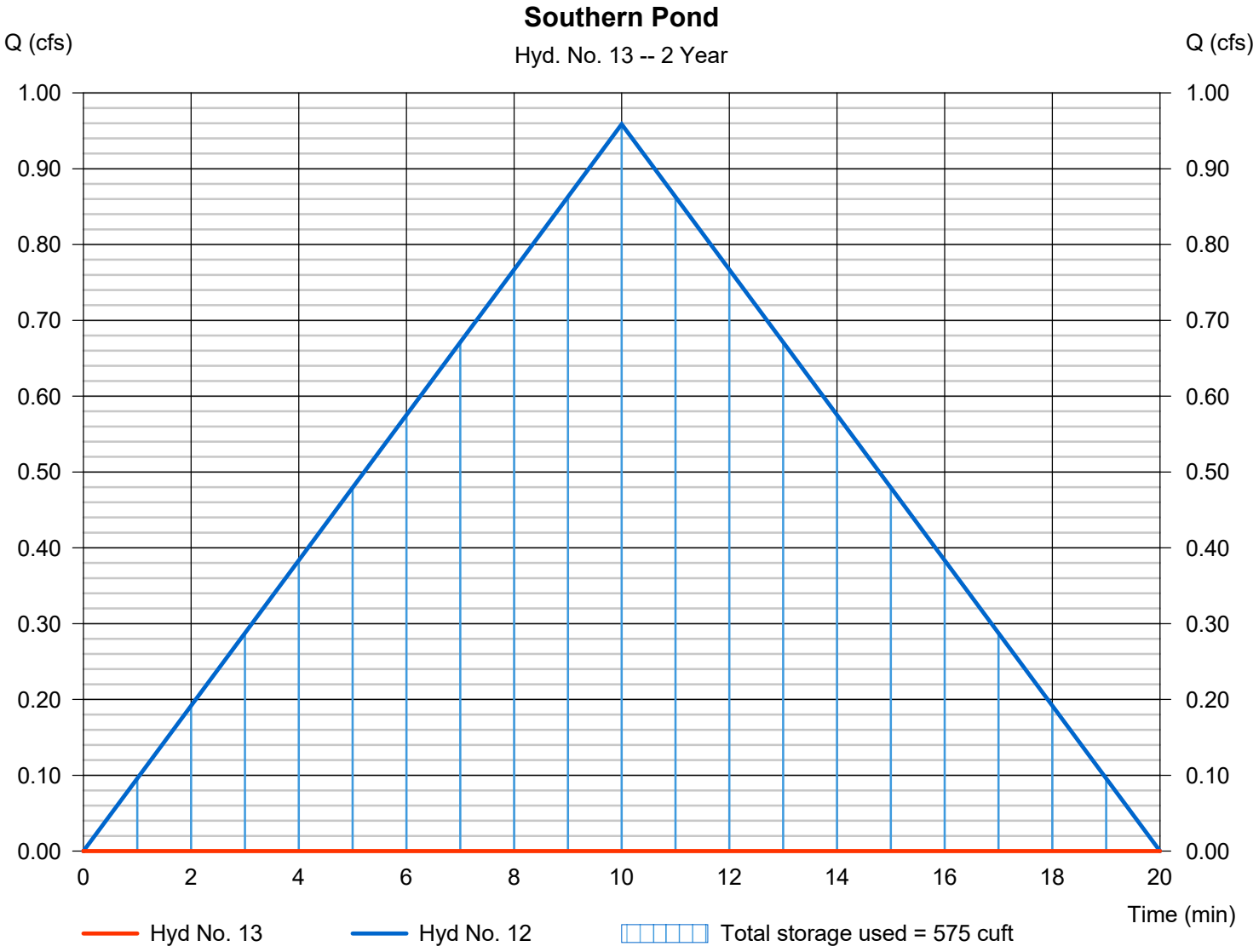
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	2.40 ft
Reservoir name	=	southern pond	Max. Storage	=	575 cuft

Storage Indication method used.

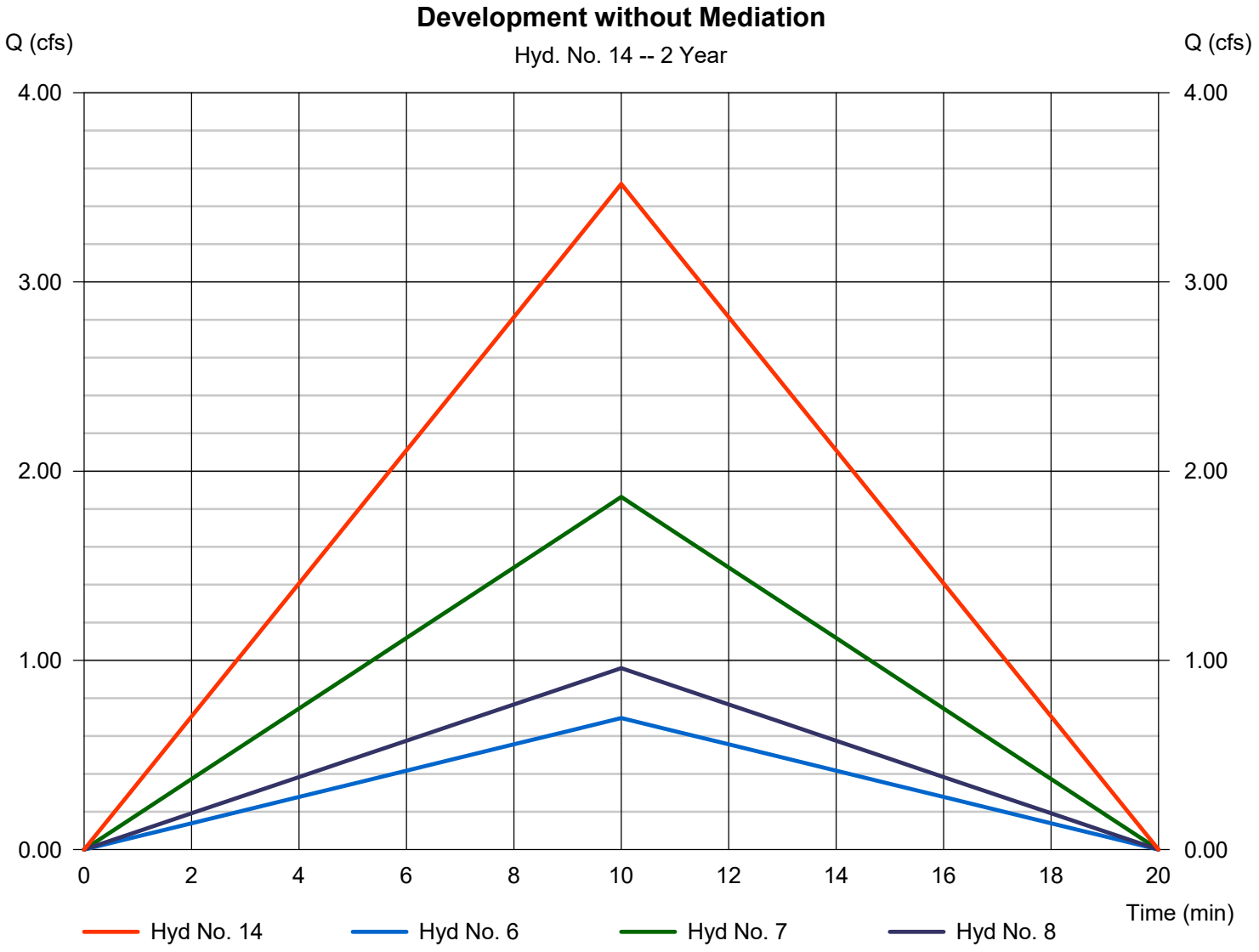


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	=	Combine	Peak discharge	=	3.517 cfs
Storm frequency	=	2 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,110 cuft
Inflow hyds.	=	6, 7, 8	Contrib. drain. area	=	1.520 ac



Hydrograph Summary Report

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

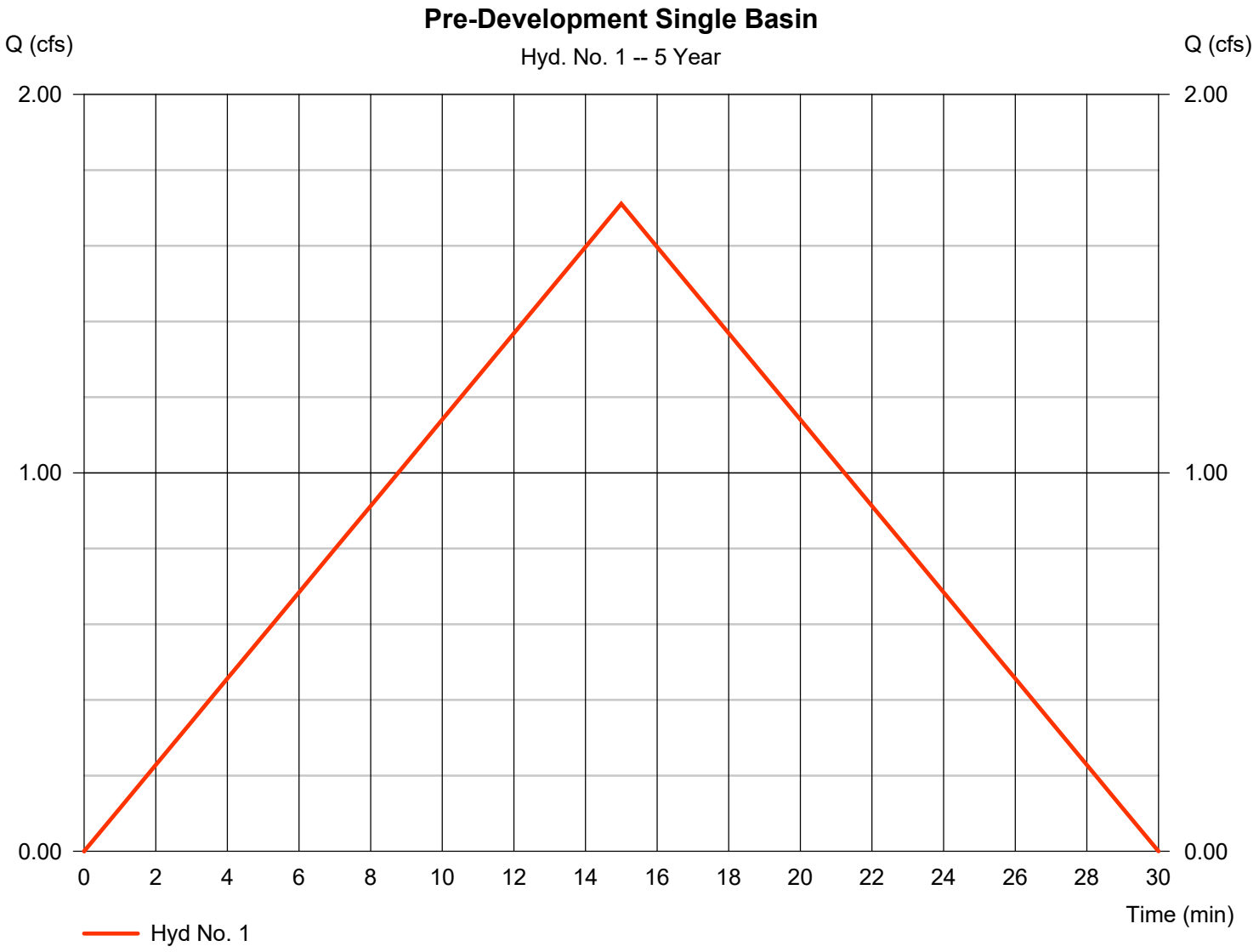
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.711	1	15	1,540	------	------	------	Pre-Development Single Basin
2	Rational	0.390	1	10	234	------	------	------	North Pre-Development
3	Rational	1.131	1	10	679	------	------	------	Center Per-Development
4	Rational	0.559	1	10	335	------	------	------	Southern Pre-Development
5	Combine	2.080	1	10	1,248	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	0.936	1	10	562	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	2.511	1	10	1,506	------	------	------	Center Basin (A-3) Post-Development
8	Rational	1.291	1	10	775	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	0.851	1	17	275	7	5.22	1,333	Center Pond
10	Combine	1.194	1	16	837	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	0.711	1	19	267	10	5.46	674	Northern Pond
12	Combine	1.291	1	10	1,041	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	0.000	1	n/a	0	12	4.16	1,041	Southern Pond
14	Combine	4.738	1	10	2,843	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

Hydrograph type	= Rational	Peak discharge	= 1.711 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 1,540 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.4
Intensity	= 2.796 in/hr	Tc by User	= 15.00 min
IDF Curve	= sedona.IDF	Asc/Rec limb fact	= 1/1

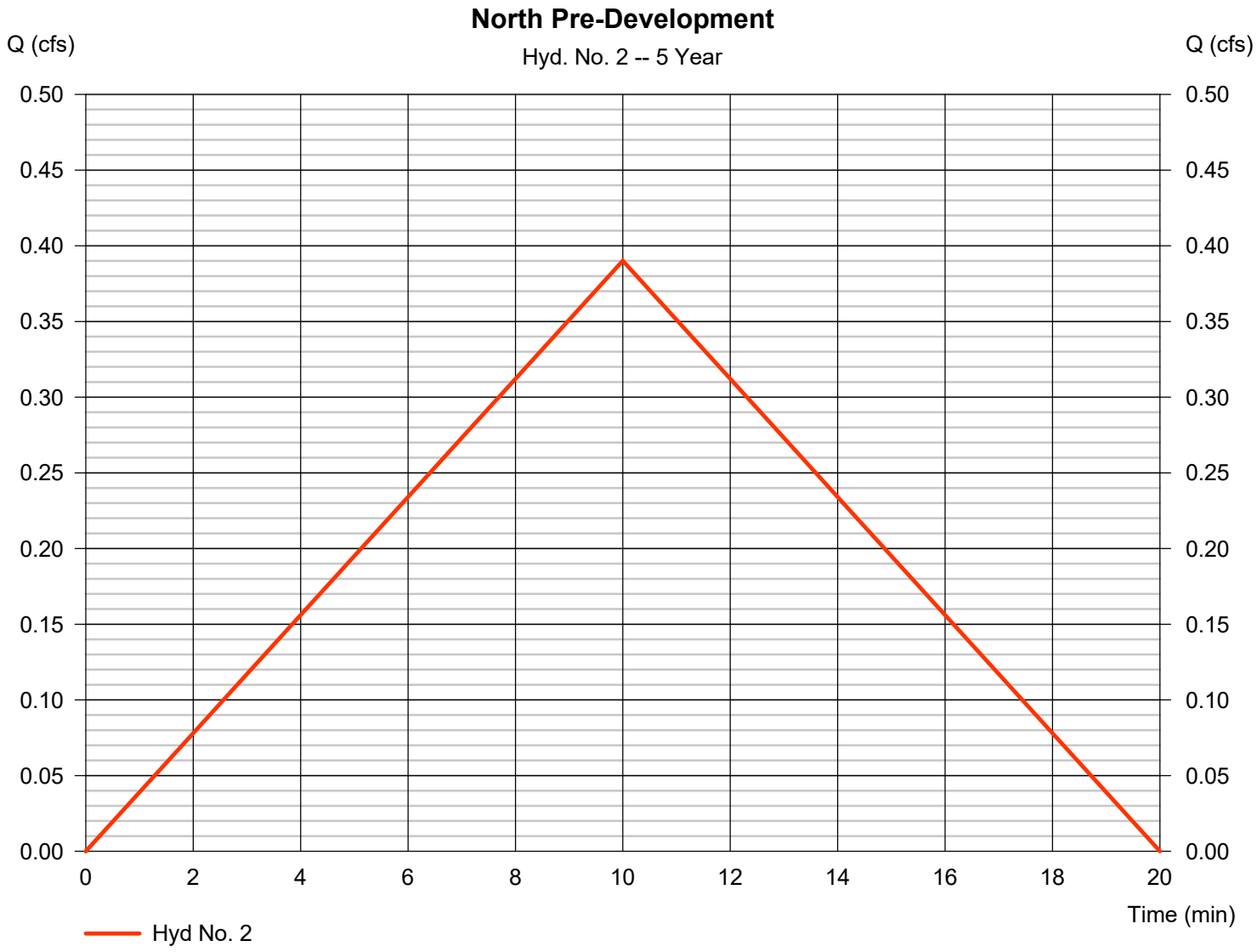


Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.390 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.287 ac	Runoff coeff.	=	0.4
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

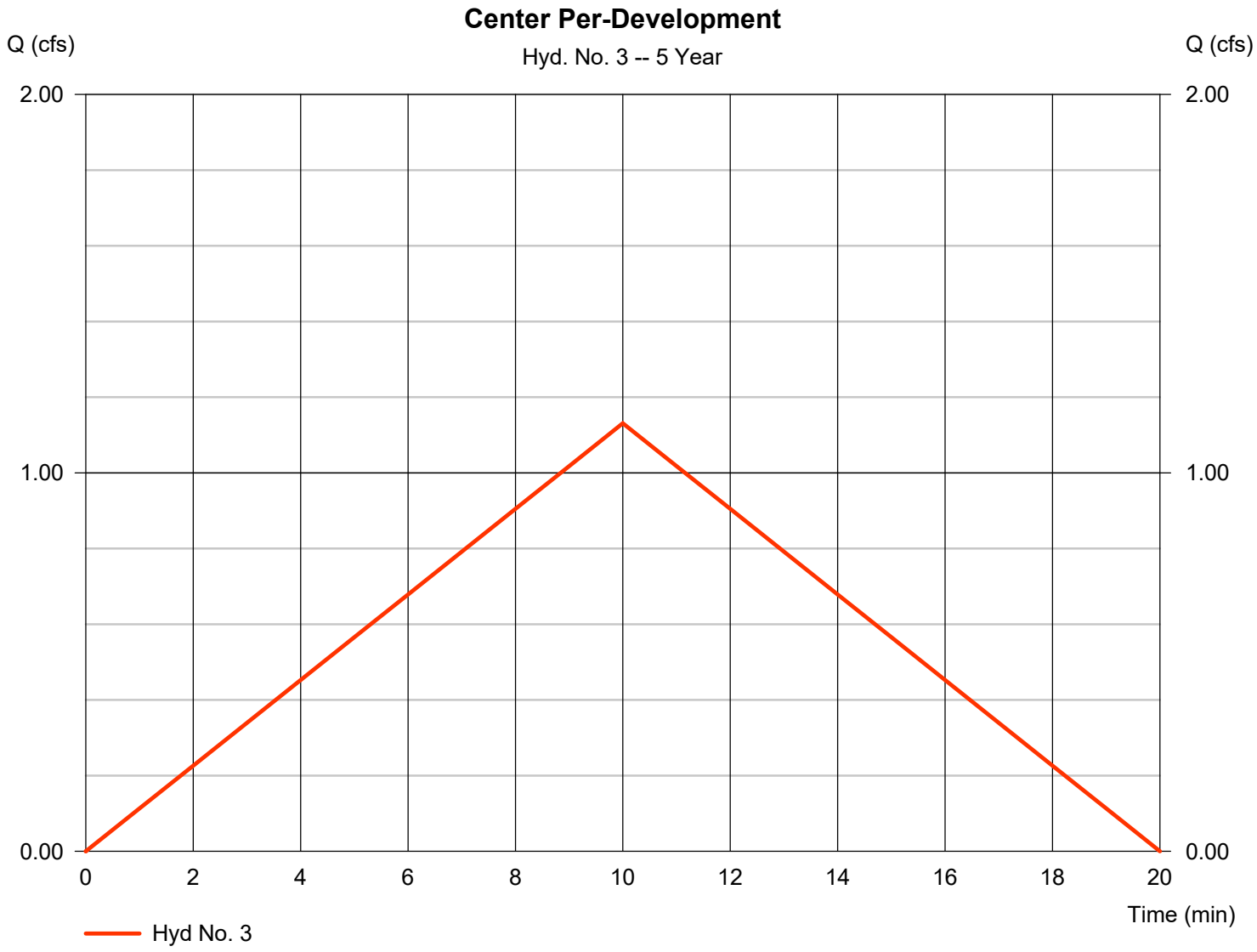


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	1.131 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	679 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

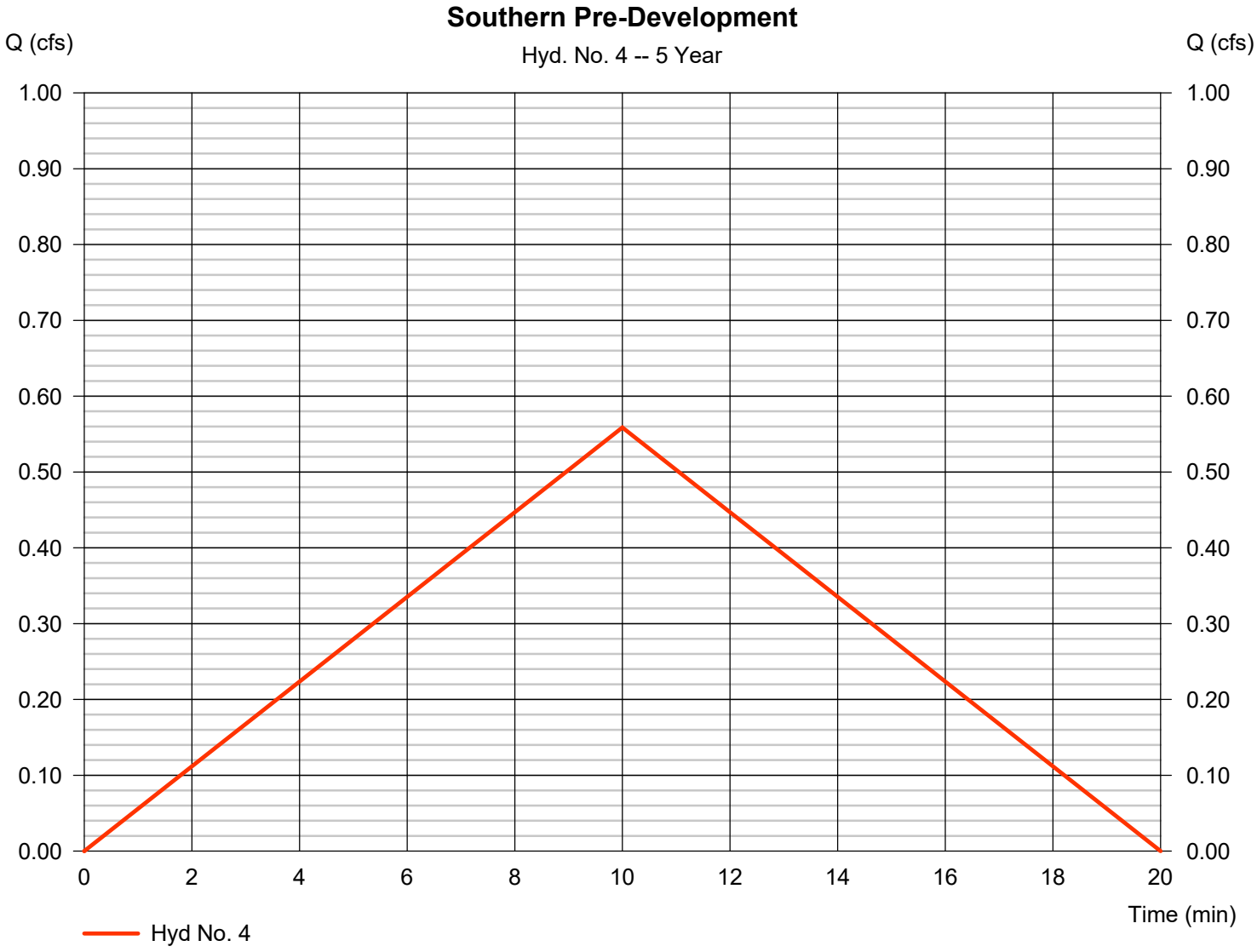


Hydrograph Report

Hyd. No. 4

Southern Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.559 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	335 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

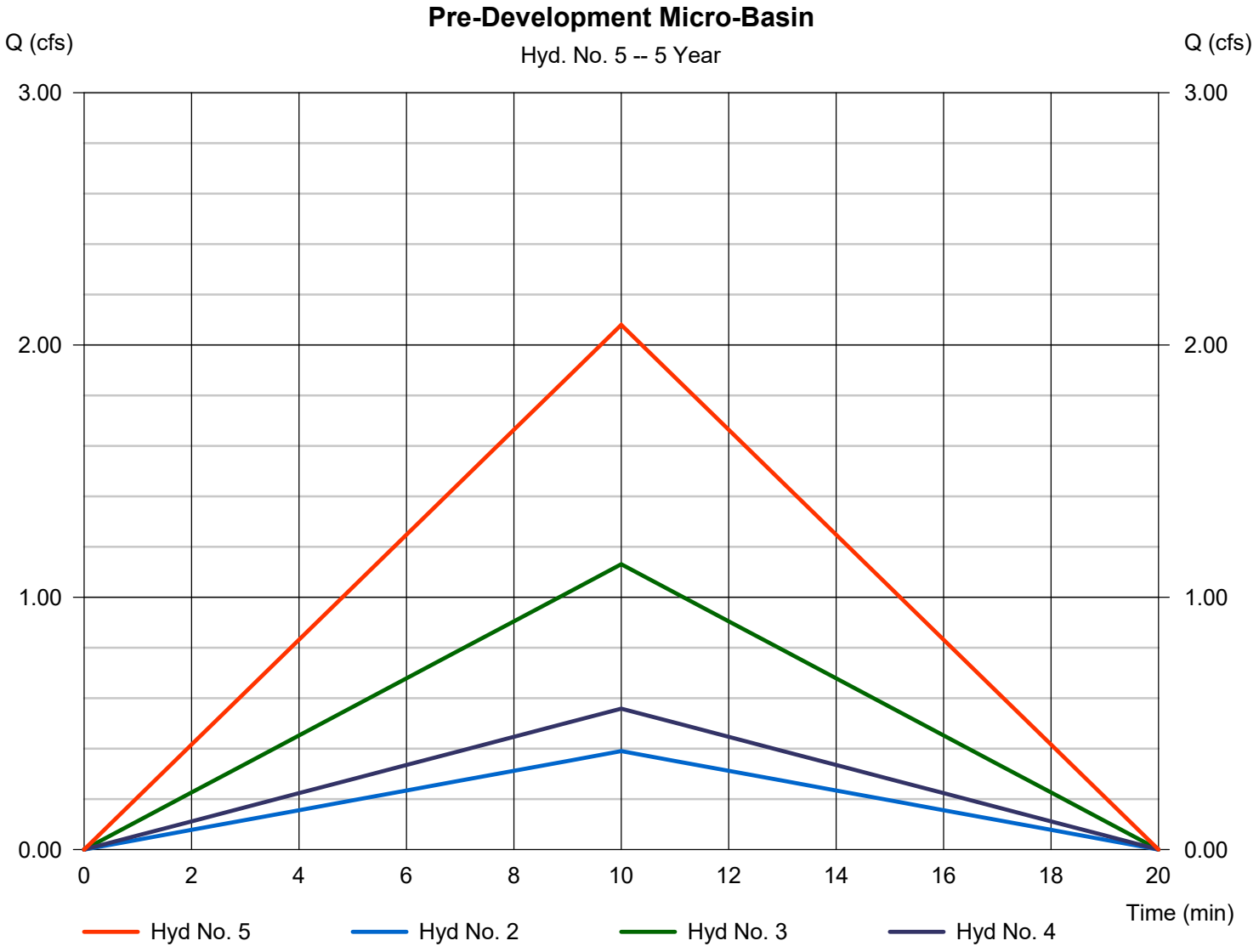


Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	=	Combine	Peak discharge	=	2.080 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,248 cuft
Inflow hyds.	=	2, 3, 4	Contrib. drain. area	=	1.530 ac



Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

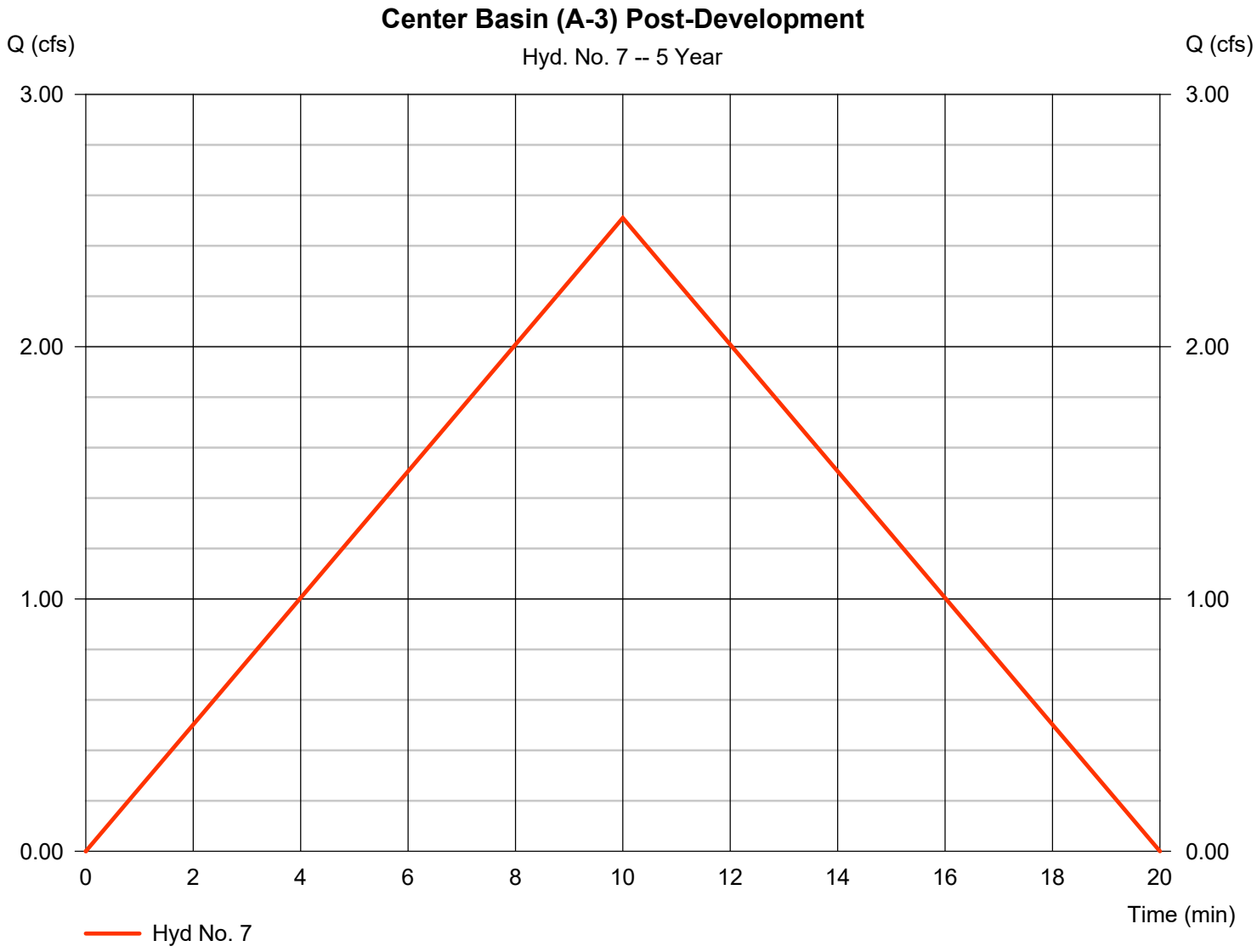
Hydrograph type	=	Rational	Peak discharge	=	0.936 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	562 cuft
Drainage area	=	0.290 ac	Runoff coeff.	=	0.95
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	2.511 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,506 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.89
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.291 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	775 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	3.399 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

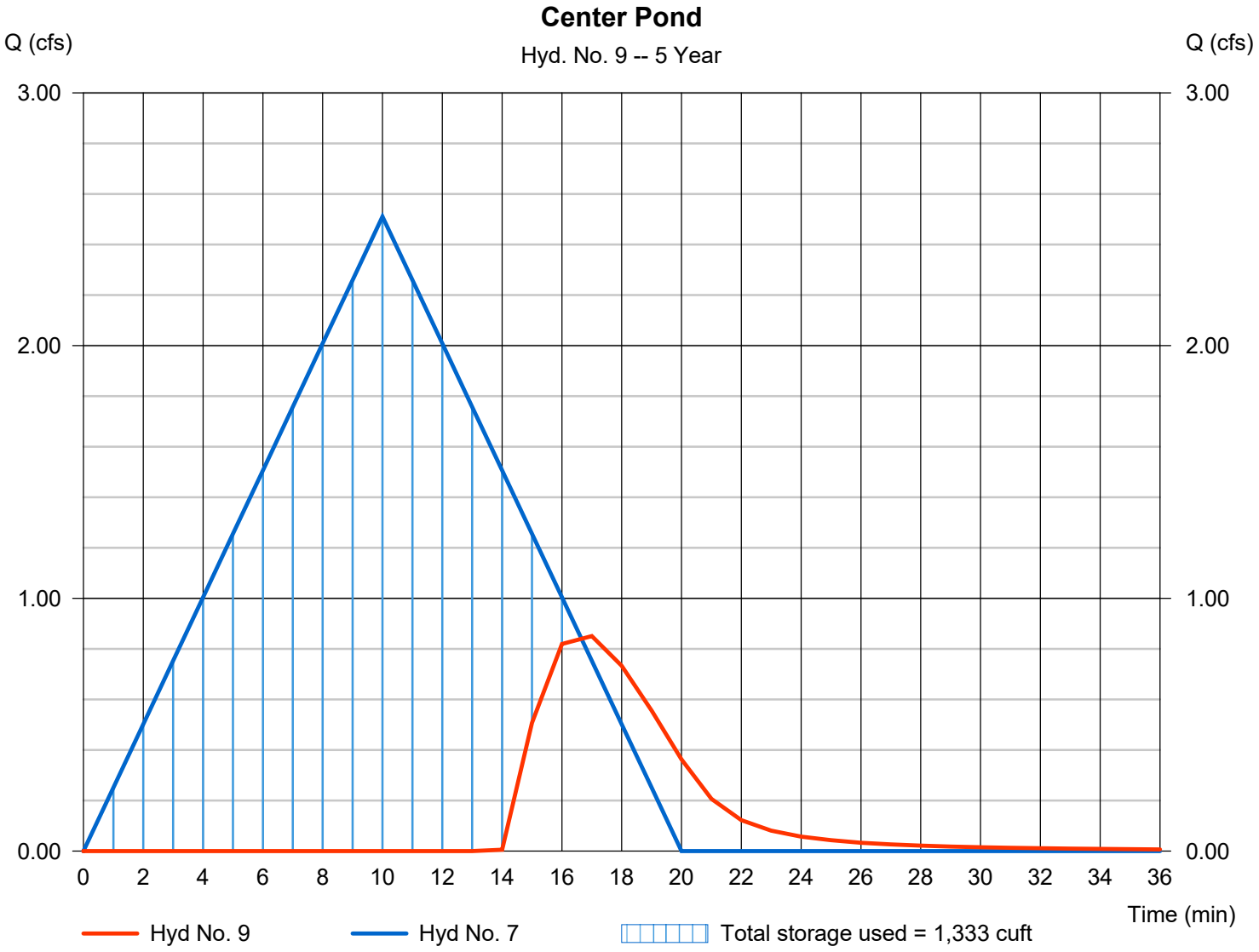
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.851 cfs
Storm frequency	=	5 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	275 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Dev	Max. Elevation	=	5.22 ft
Reservoir name	=	center pond	Max. Storage	=	1,333 cuft

Storage Indication method used.

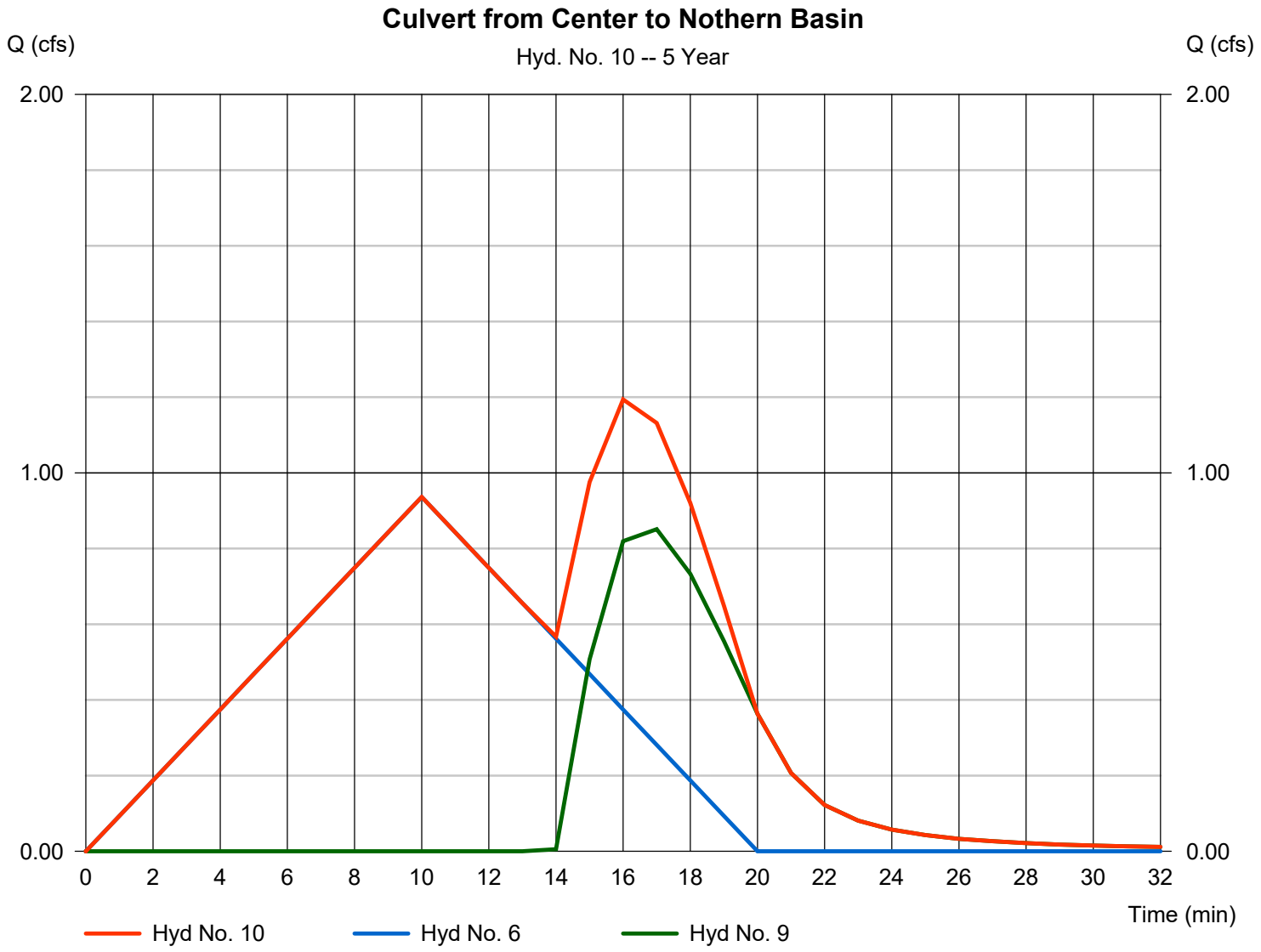


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	=	Combine	Peak discharge	=	1.194 cfs
Storm frequency	=	5 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	837 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.290 ac



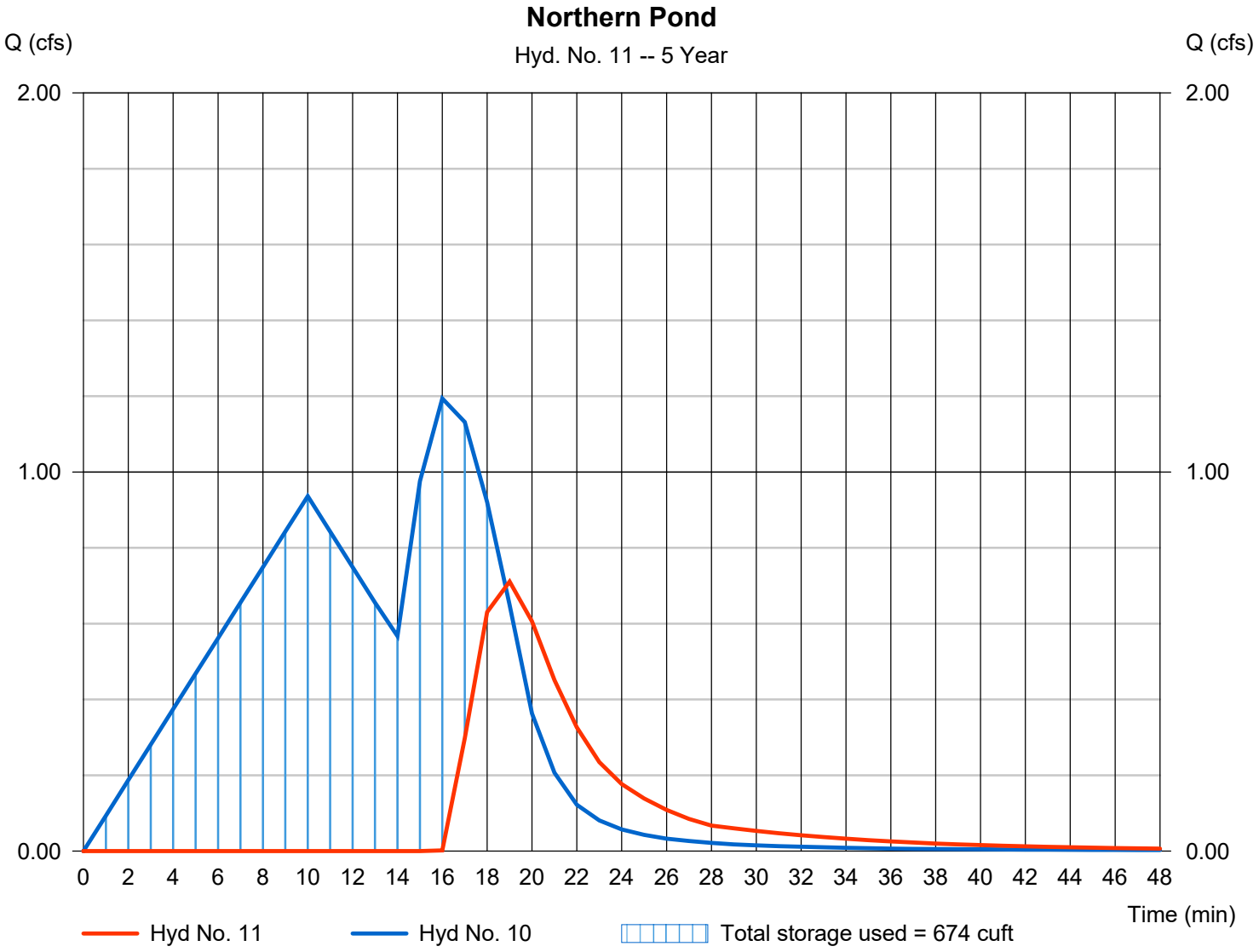
Hydrograph Report

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.711 cfs
Storm frequency	=	5 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	267 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	5.46 ft
Reservoir name	=	north pond	Max. Storage	=	674 cuft

Storage Indication method used.

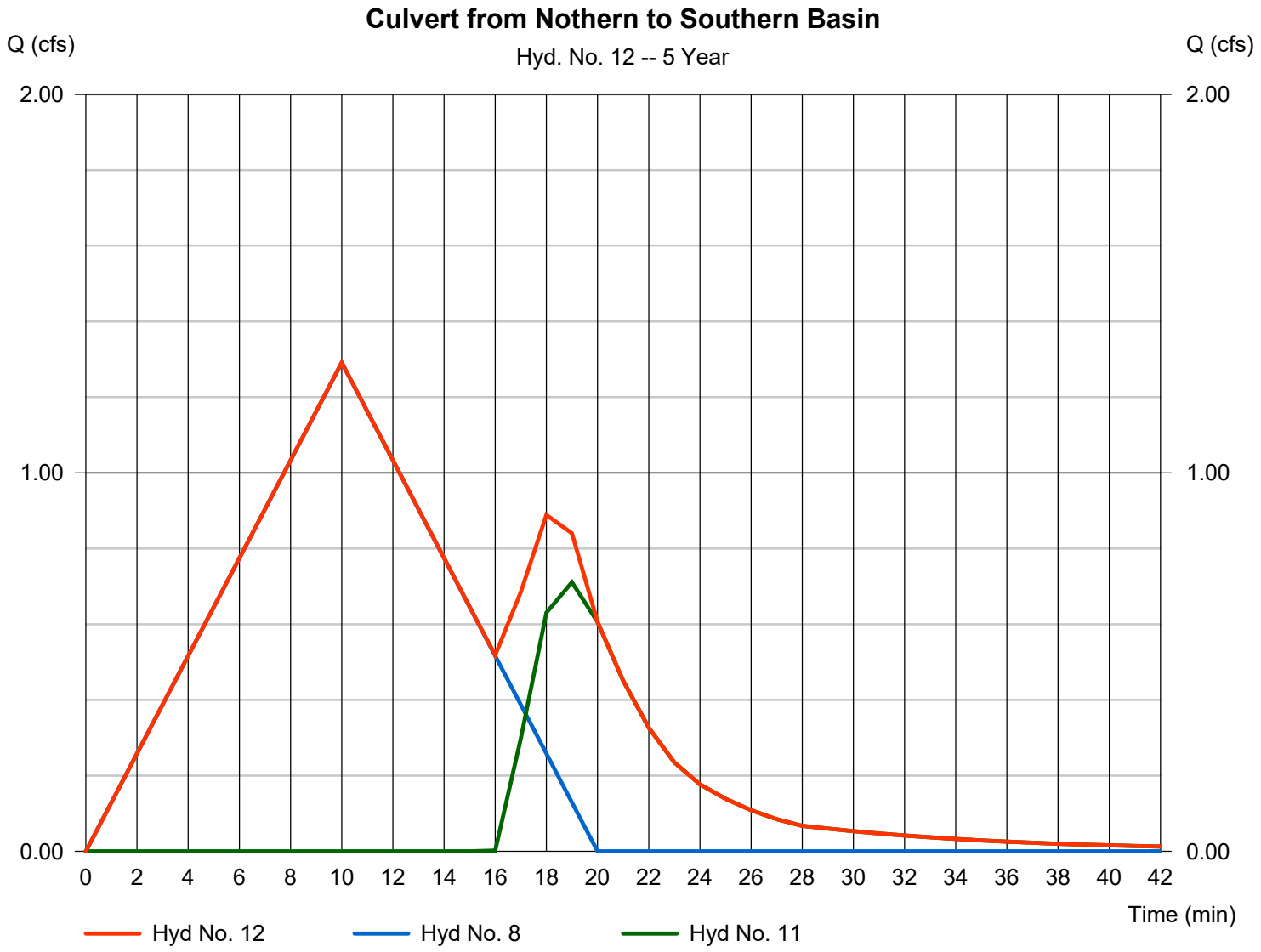


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	=	Combine	Peak discharge	=	1.291 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,041 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.400 ac



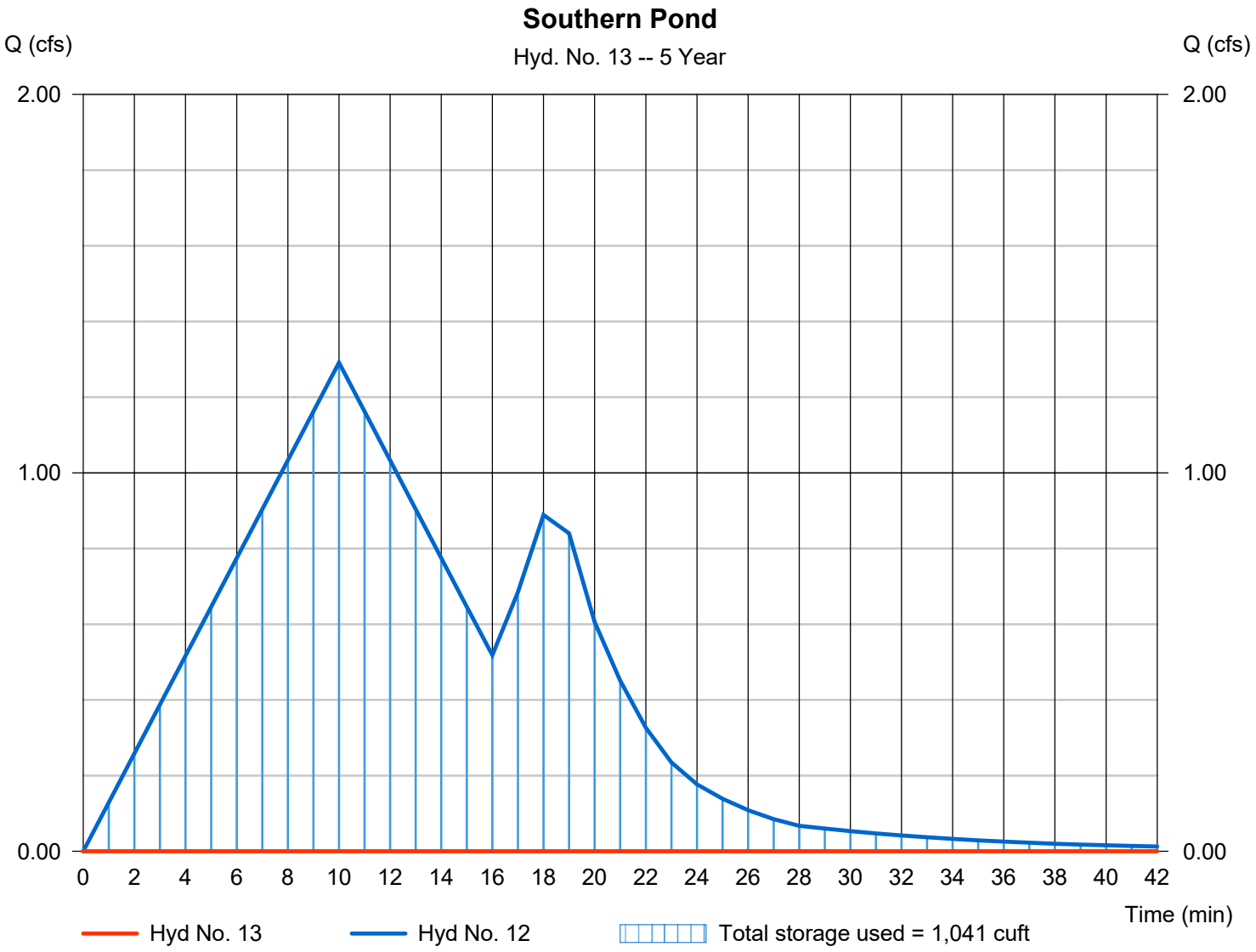
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	5 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	4.16 ft
Reservoir name	=	southern pond	Max. Storage	=	1,041 cuft

Storage Indication method used.

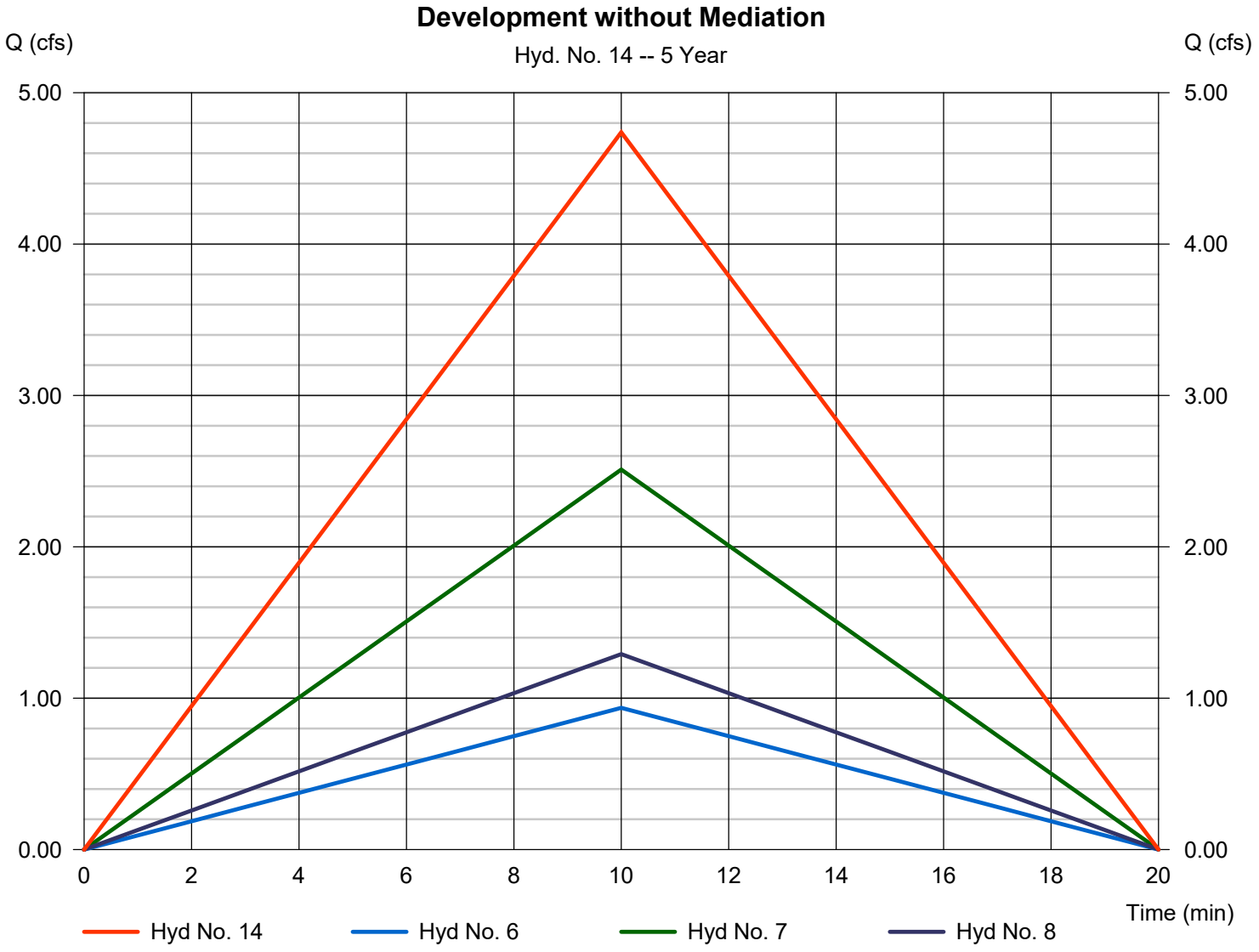


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	=	Combine	Peak discharge	=	4.738 cfs
Storm frequency	=	5 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,843 cuft
Inflow hyds.	=	6, 7, 8	Contrib. drain. area	=	1.520 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 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	2.078	1	15	1,870	------	------	------	Pre-Development Single Basin
2	Rational	0.474	1	10	284	------	------	------	North Pre-Development
3	Rational	1.374	1	10	824	------	------	------	Center Per-Development
4	Rational	0.679	1	10	407	------	------	------	Southern Pre-Development
5	Combine	2.527	1	10	1,516	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	1.137	1	10	682	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	3.050	1	10	1,830	------	------	------	Center Basin (A-3) Post-Development
8	Rational	1.569	1	10	941	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	1.580	1	15	599	7	5.43	1,401	Center Pond
10	Combine	2.168	1	14	1,281	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	1.722	1	17	711	10	5.85	762	Northern Pond
12	Combine	2.311	1	16	1,652	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	0.613	1	21	447	12	4.89	1,436	Southern Pond
14	Combine	5.756	1	10	3,453	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

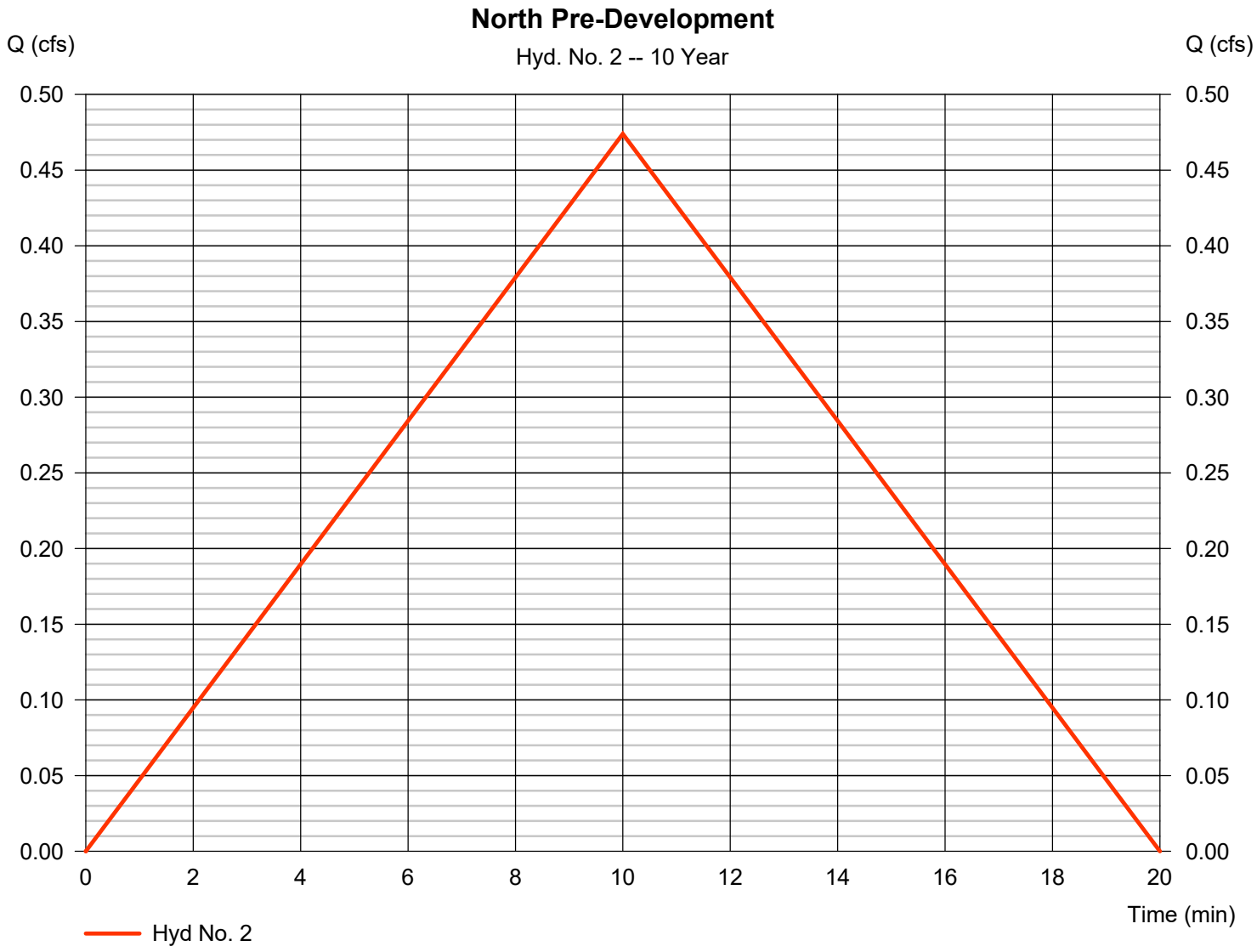
Hydrograph type	=	Rational	Peak discharge	=	2.078 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	1,870 cuft
Drainage area	=	1.530 ac	Runoff coeff.	=	0.4
Intensity	=	3.395 in/hr	Tc by User	=	15.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.474 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	284 cuft
Drainage area	=	0.287 ac	Runoff coeff.	=	0.4
Intensity	=	4.128 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

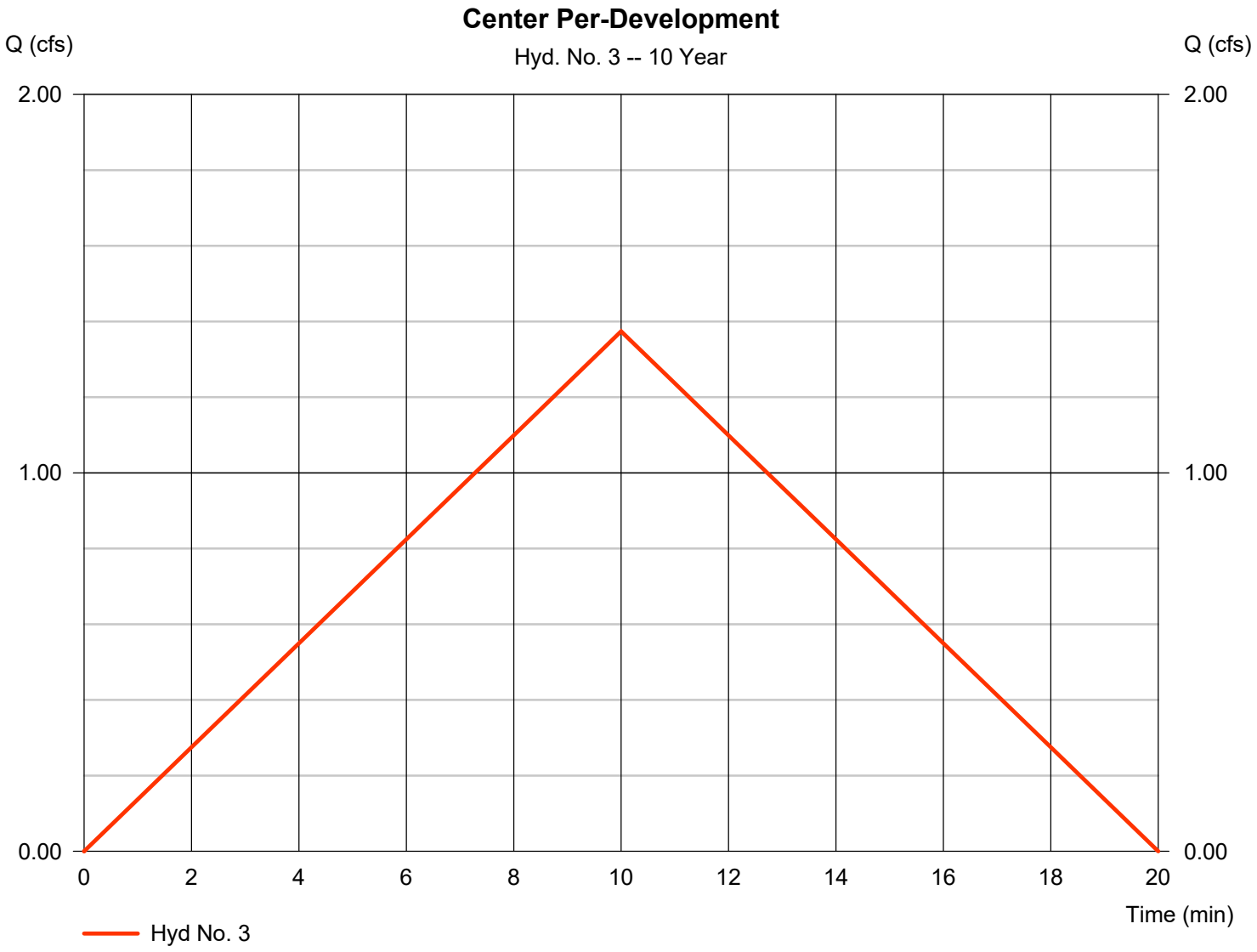


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	1.374 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	824 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	4.128 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 4

Southern Pre-Development

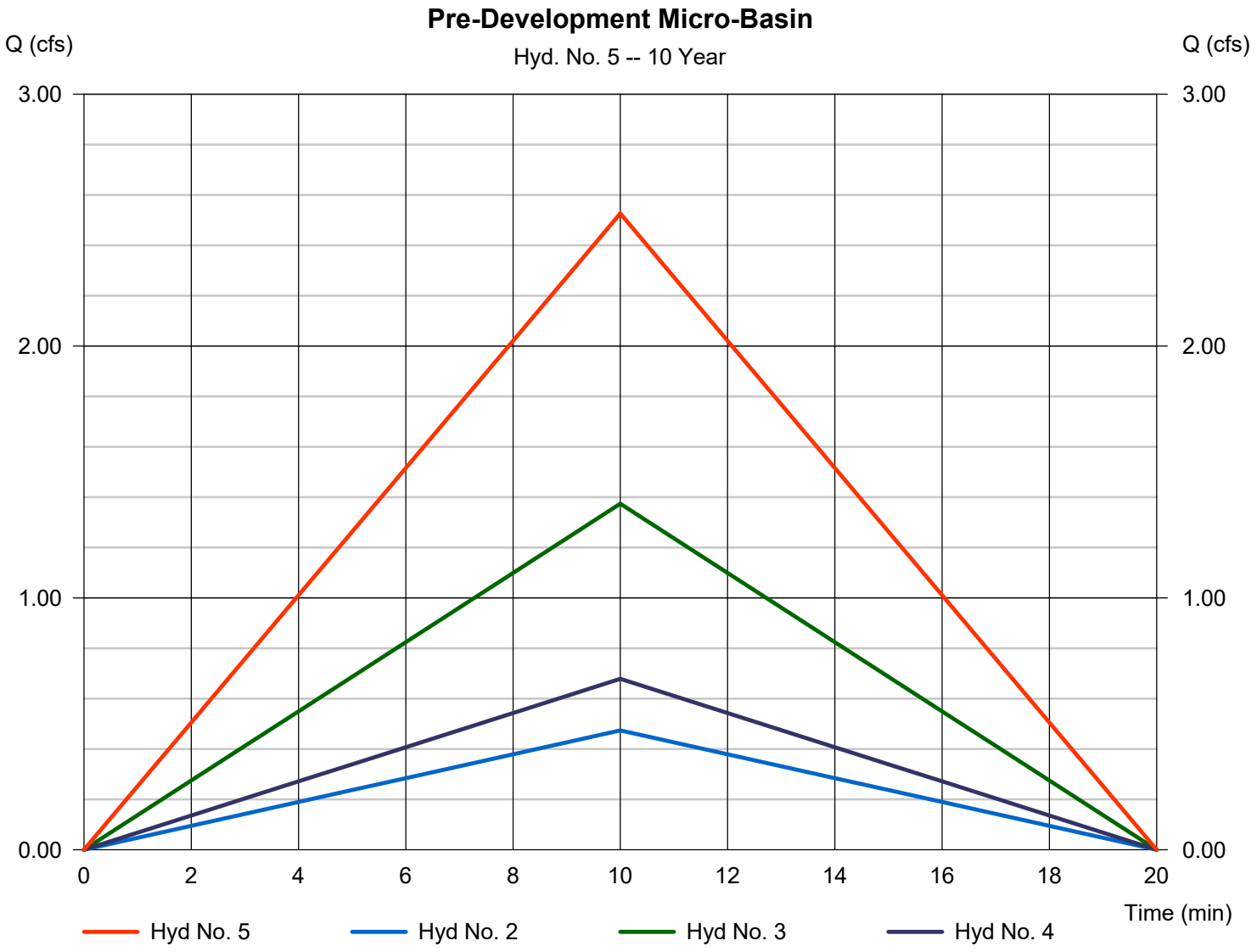
Hydrograph type	=	Rational	Peak discharge	=	0.679 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	407 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	4.128 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	= Combine	Peak discharge	= 2.527 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 1,516 cuft
Inflow hyds.	= 2, 3, 4	Contrib. drain. area	= 1.530 ac

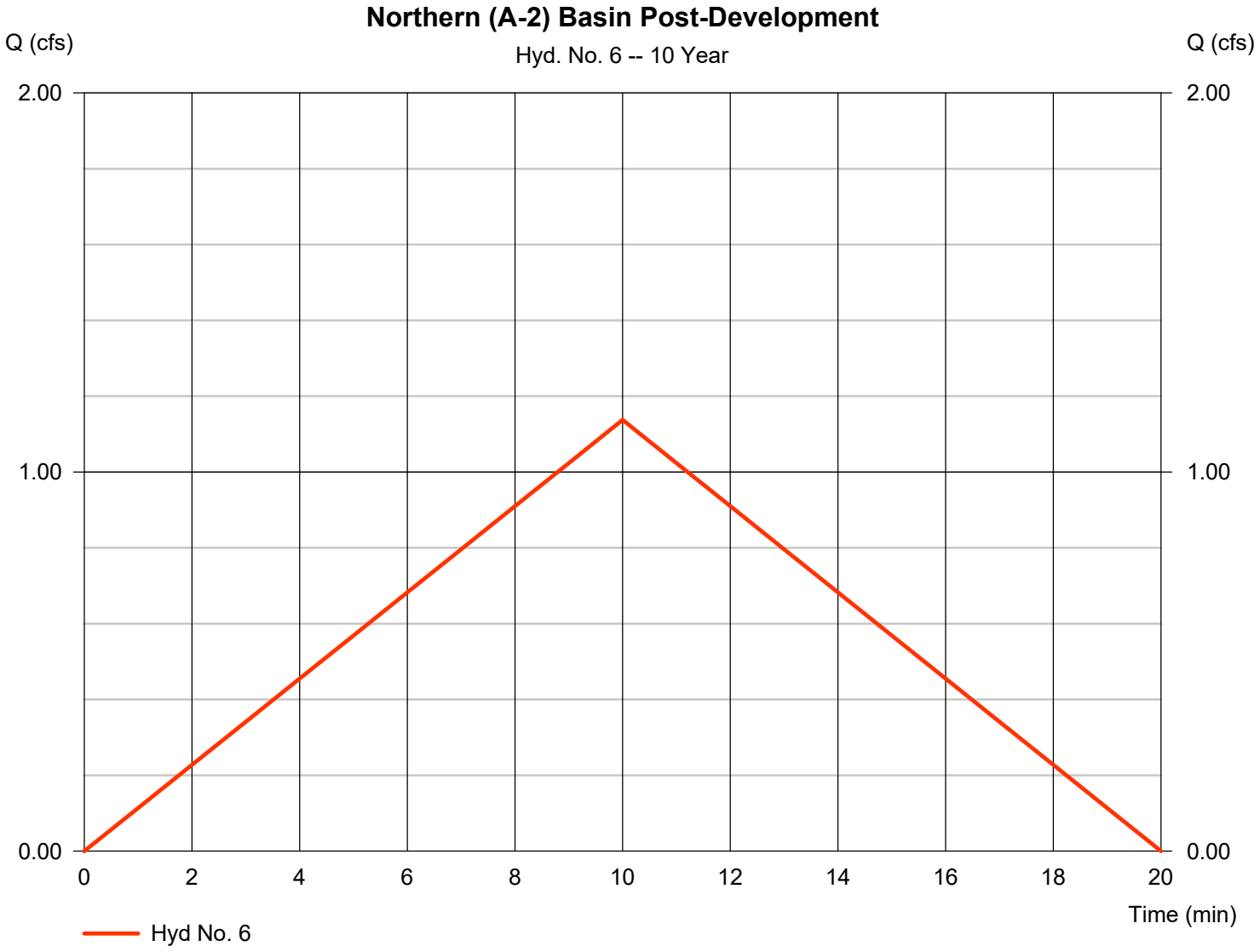


Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

Hydrograph type	= Rational	Peak discharge	= 1.137 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 682 cuft
Drainage area	= 0.290 ac	Runoff coeff.	= 0.95
Intensity	= 4.128 in/hr	Tc by User	= 10.00 min
IDF Curve	= sedona.IDF	Asc/Rec limb fact	= 1/1

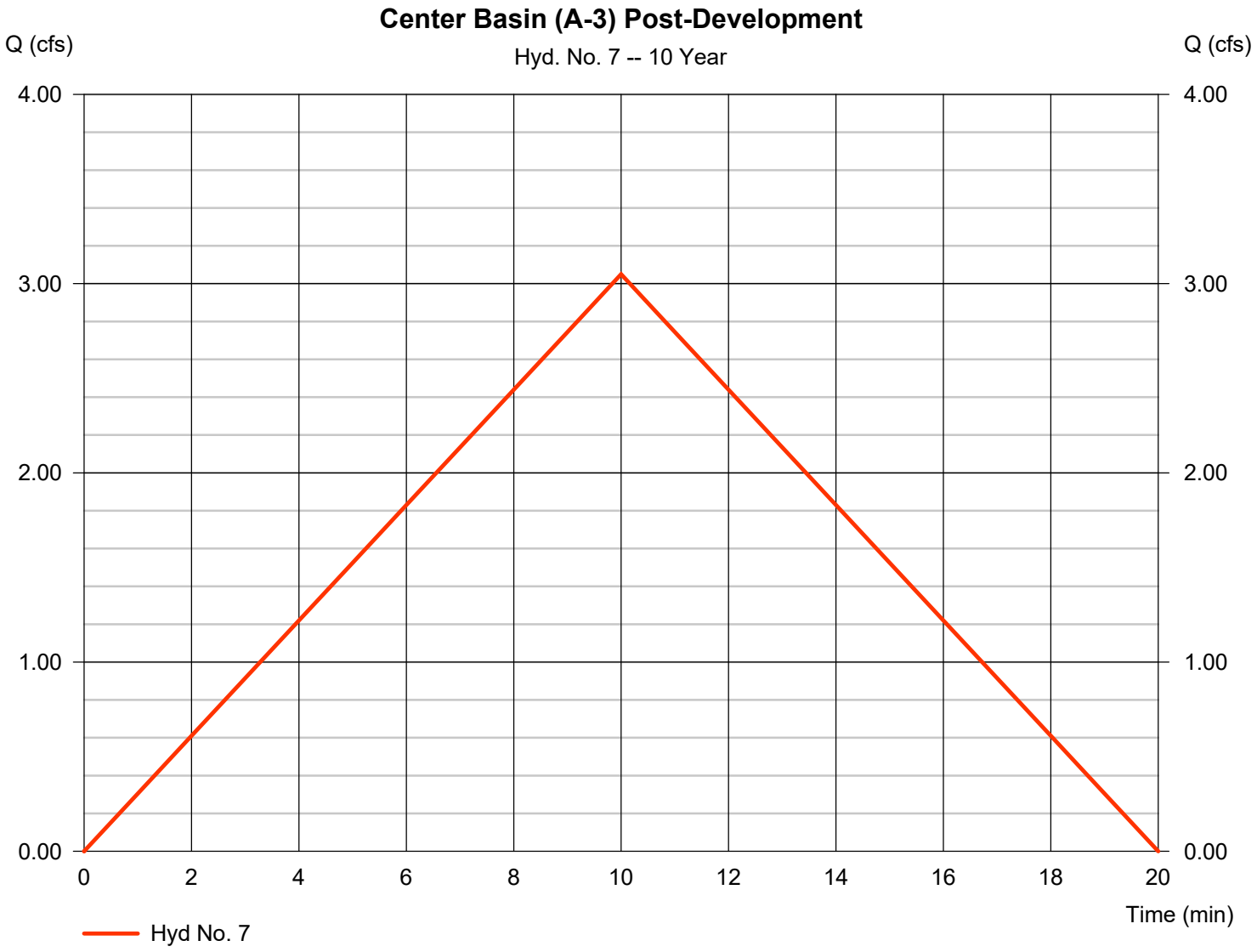


Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	3.050 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,830 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.89
Intensity	=	4.128 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

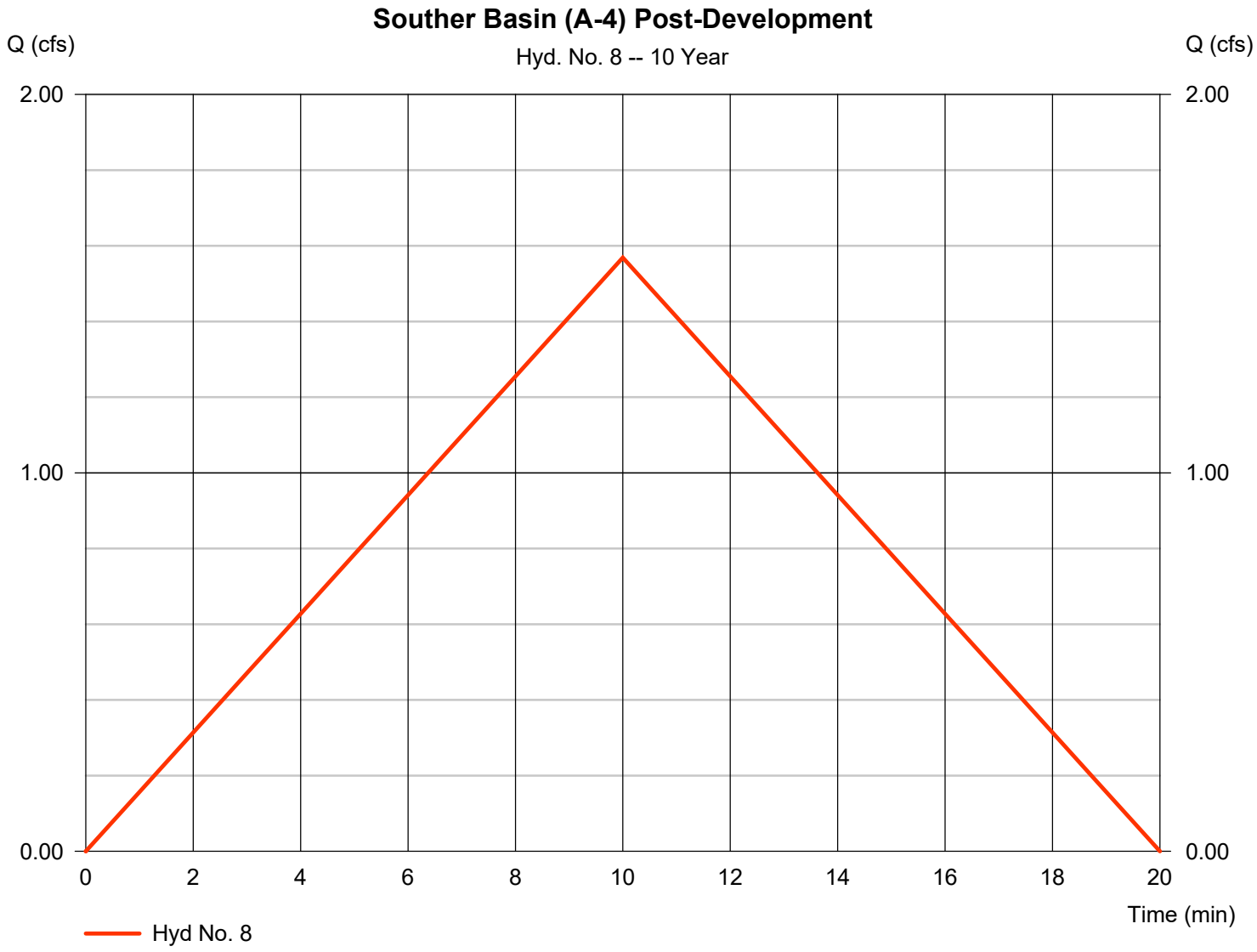


Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.569 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	941 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	4.128 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



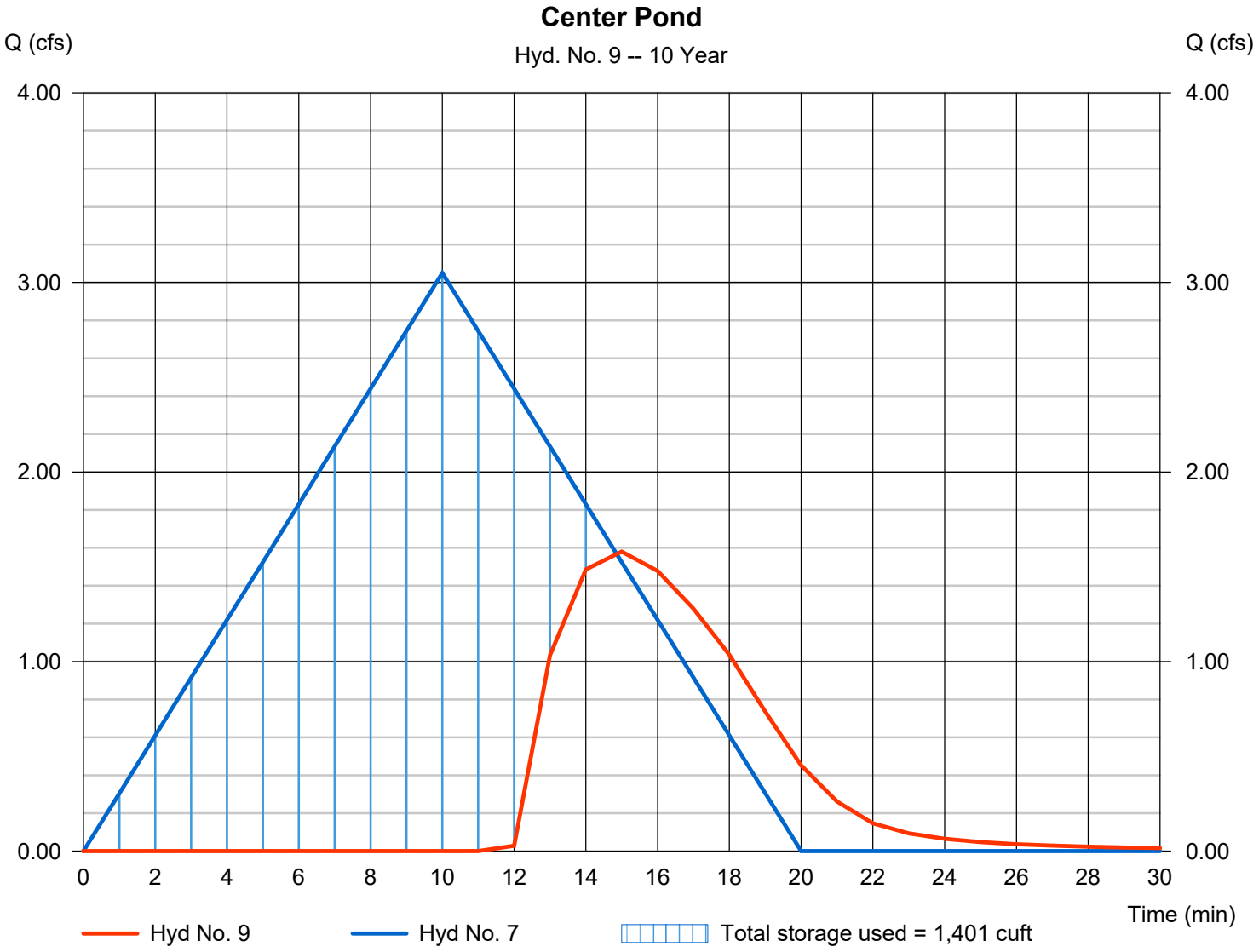
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	1.580 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	599 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Dev	Max. Elevation	=	5.43 ft
Reservoir name	=	center pond	Max. Storage	=	1,401 cuft

Storage Indication method used.

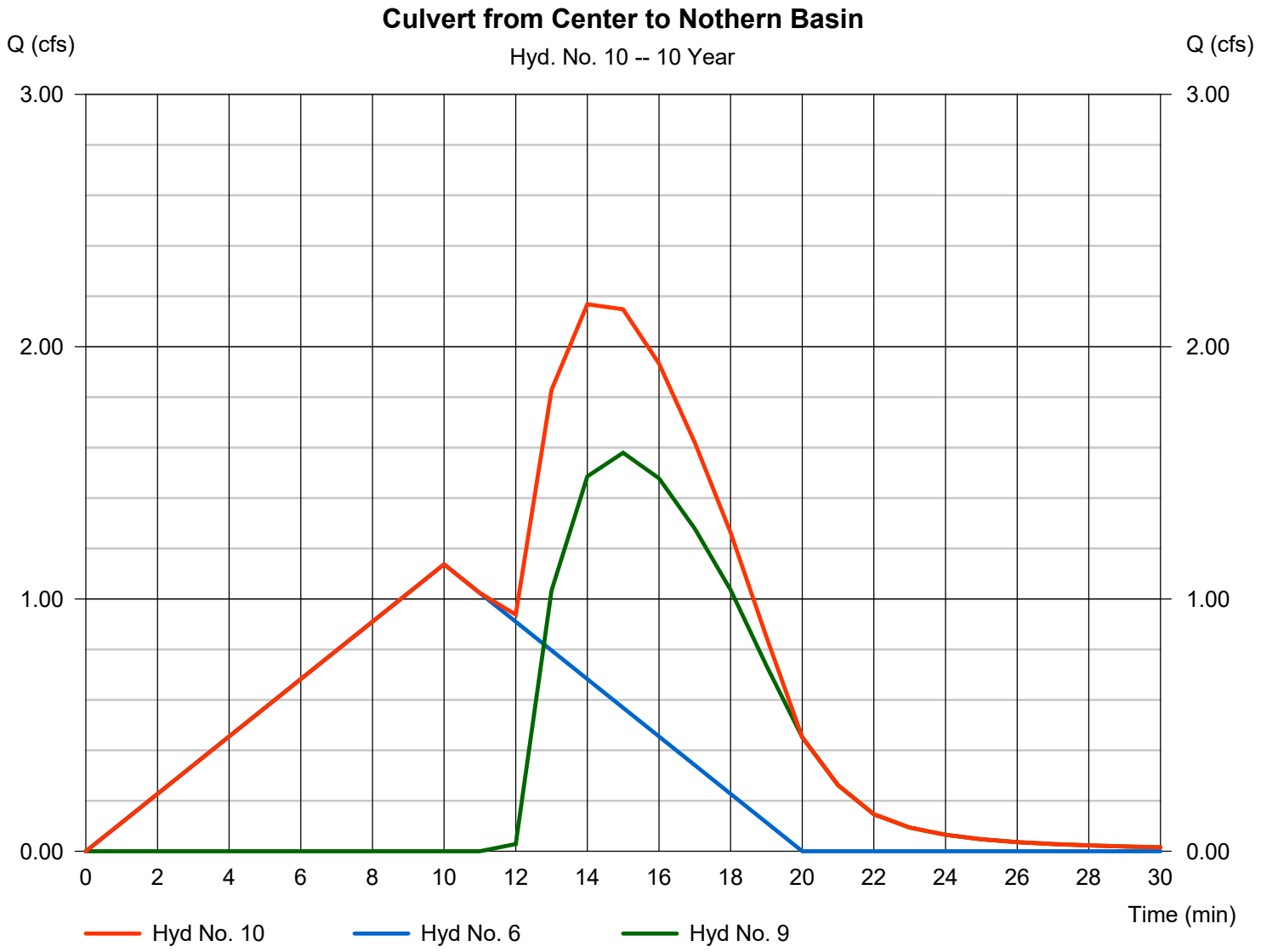


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	= Combine	Peak discharge	= 2.168 cfs
Storm frequency	= 10 yrs	Time to peak	= 14 min
Time interval	= 1 min	Hyd. volume	= 1,281 cuft
Inflow hyds.	= 6, 9	Contrib. drain. area	= 0.290 ac



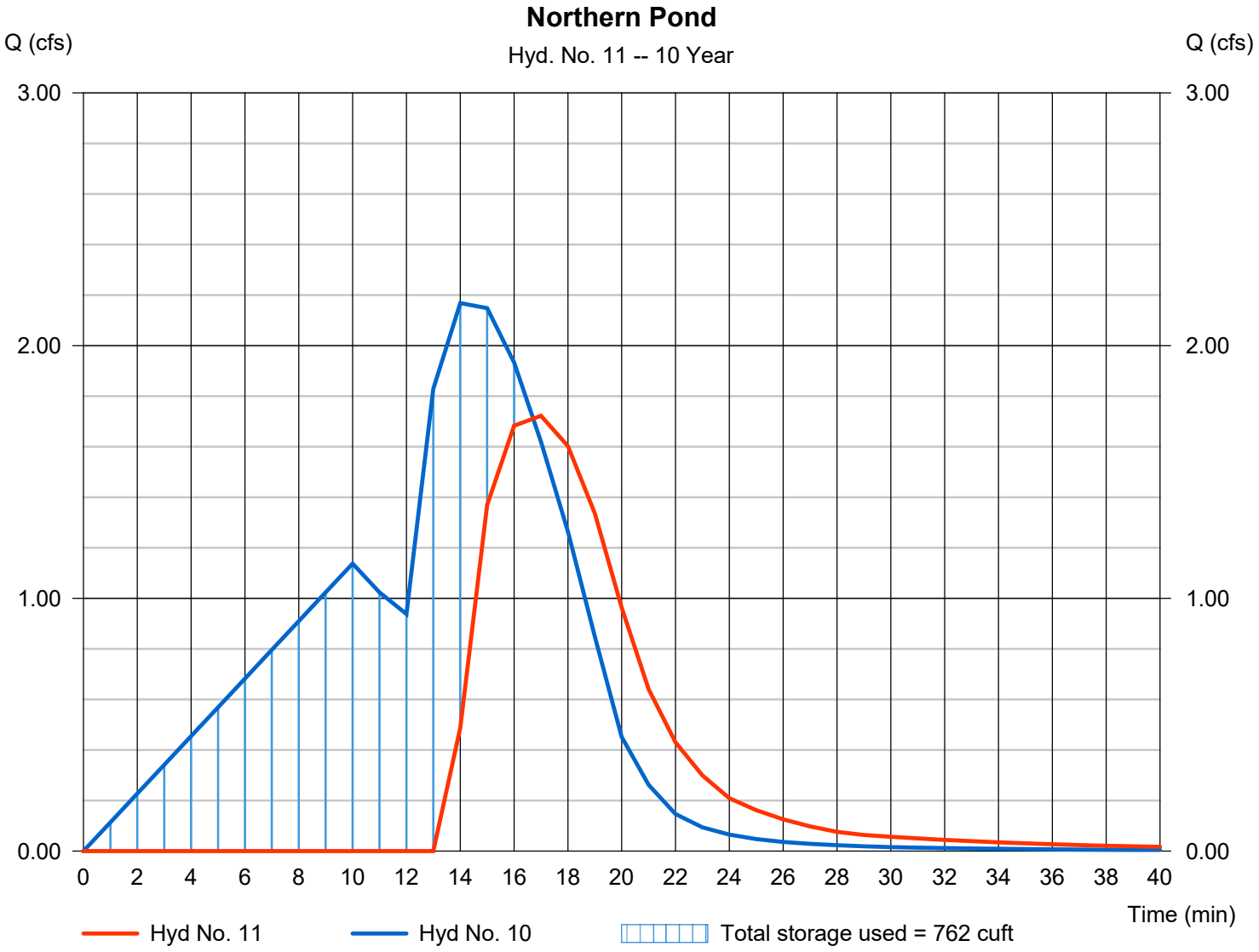
Hydrograph Report

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	1.722 cfs
Storm frequency	=	10 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	711 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	5.85 ft
Reservoir name	=	north pond	Max. Storage	=	762 cuft

Storage Indication method used.

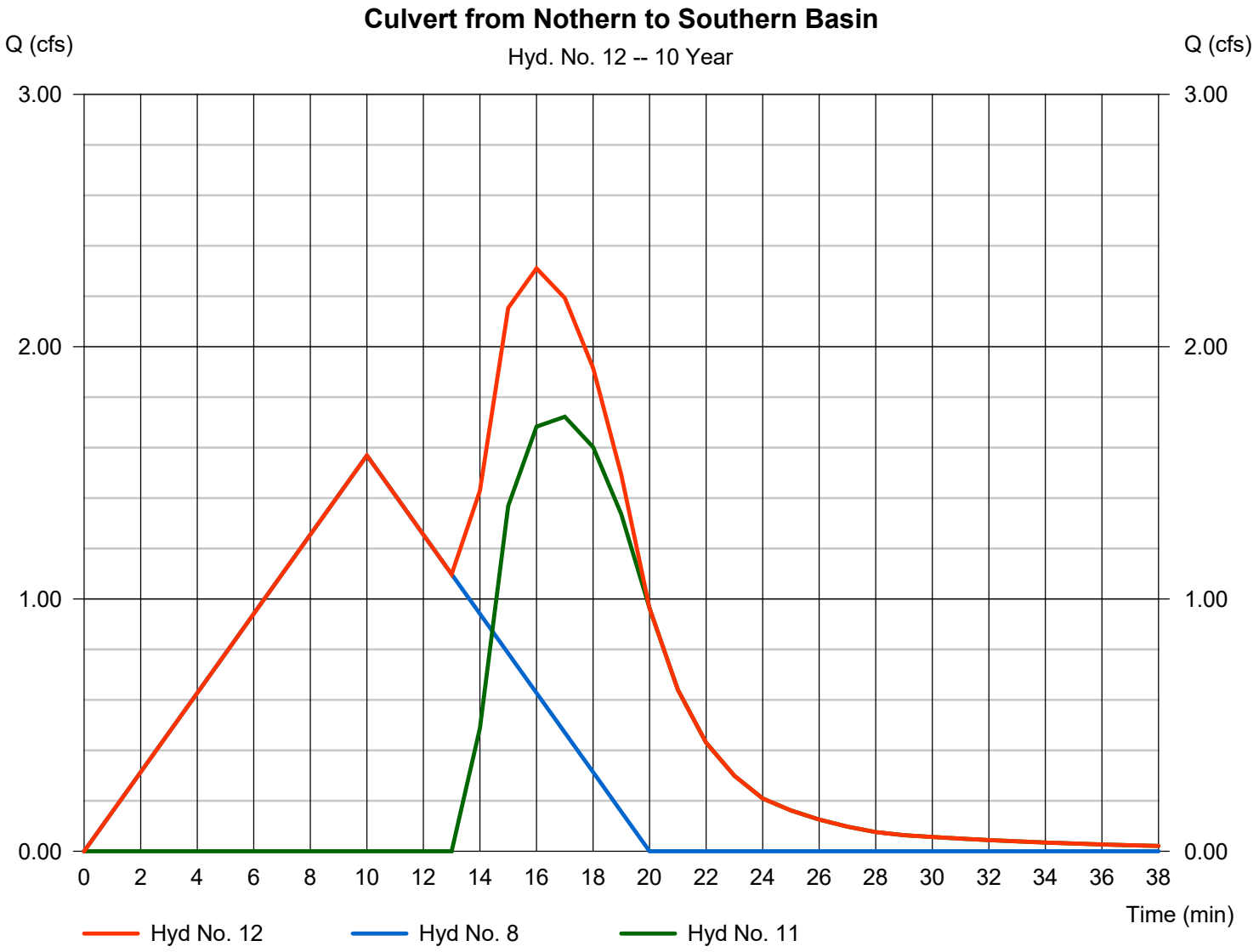


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	= Combine	Peak discharge	= 2.311 cfs
Storm frequency	= 10 yrs	Time to peak	= 16 min
Time interval	= 1 min	Hyd. volume	= 1,652 cuft
Inflow hyds.	= 8, 11	Contrib. drain. area	= 0.400 ac



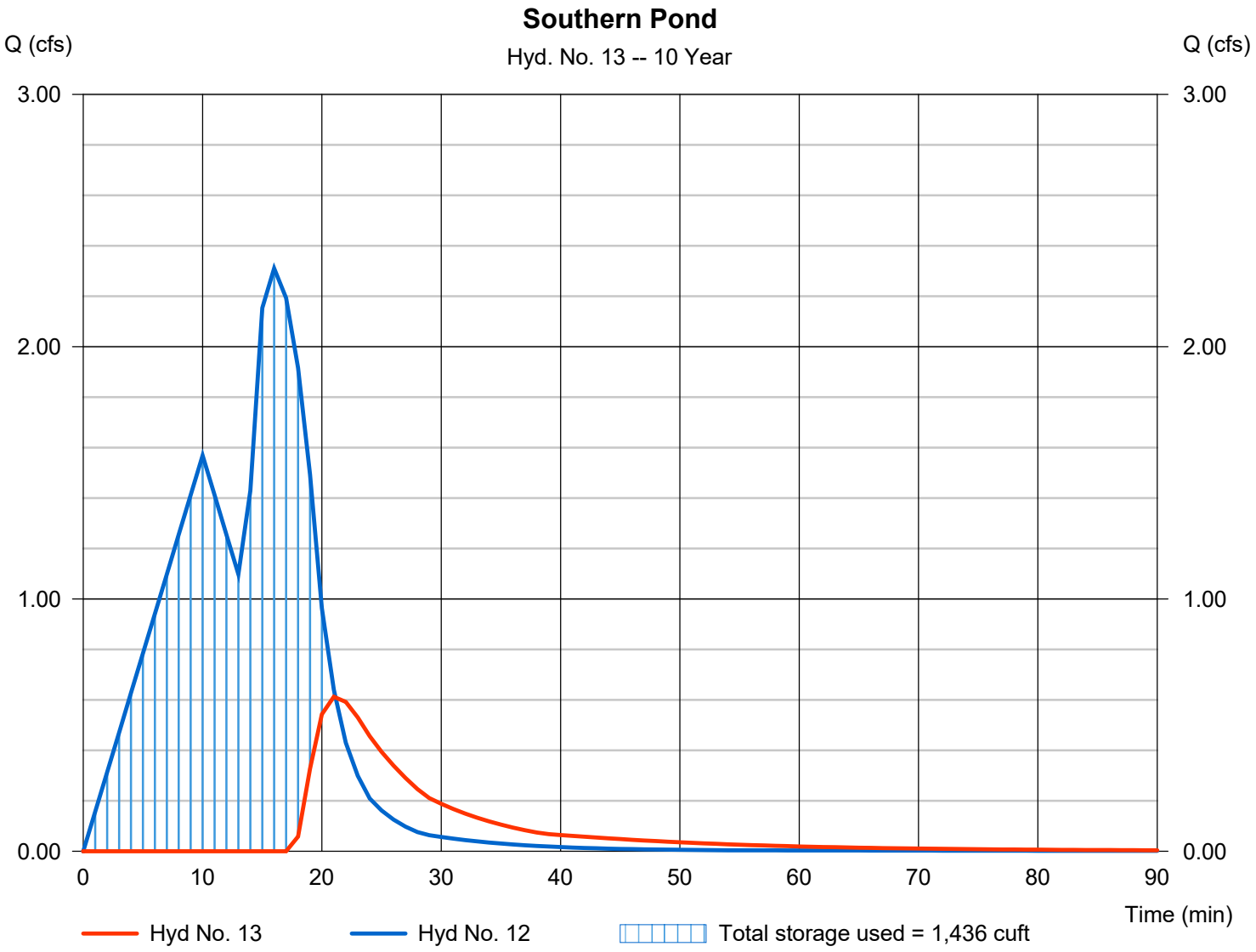
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.613 cfs
Storm frequency	=	10 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	447 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	4.89 ft
Reservoir name	=	southern pond	Max. Storage	=	1,436 cuft

Storage Indication method used.

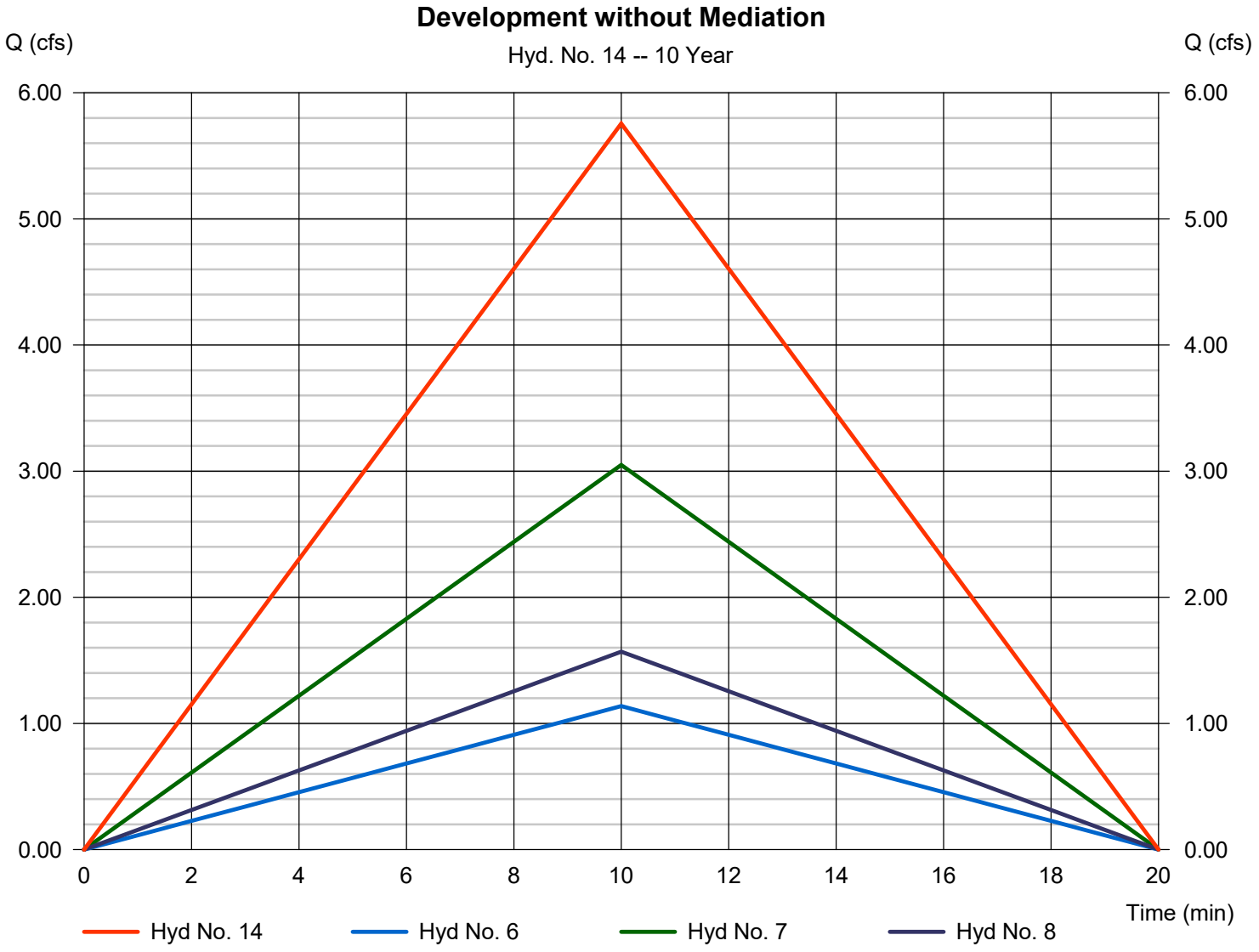


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	=	Combine	Peak discharge	=	5.756 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	3,453 cuft
Inflow hyds.	=	6, 7, 8	Contrib. drain. area	=	1.520 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 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	2.606	1	15	2,345	------	------	------	Pre-Development Single Basin
2	Rational	0.595	1	10	357	------	------	------	North Pre-Development
3	Rational	1.724	1	10	1,035	------	------	------	Center Per-Development
4	Rational	0.852	1	10	511	------	------	------	Southern Pre-Development
5	Combine	3.171	1	10	1,903	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	1.427	1	10	856	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	3.827	1	10	2,296	------	------	------	Center Basin (A-3) Post-Development
8	Rational	1.969	1	10	1,181	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	2.407	1	14	1,066	7	5.65	1,492	Center Pond
10	Combine	3.359	1	13	1,922	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	2.496	1	16	1,351	10	6.32	932	Northern Pond
12	Combine	3.454	1	14	2,533	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	1.945	1	20	1,328	12	5.27	1,790	Southern Pond
14	Combine	7.224	1	10	4,334	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

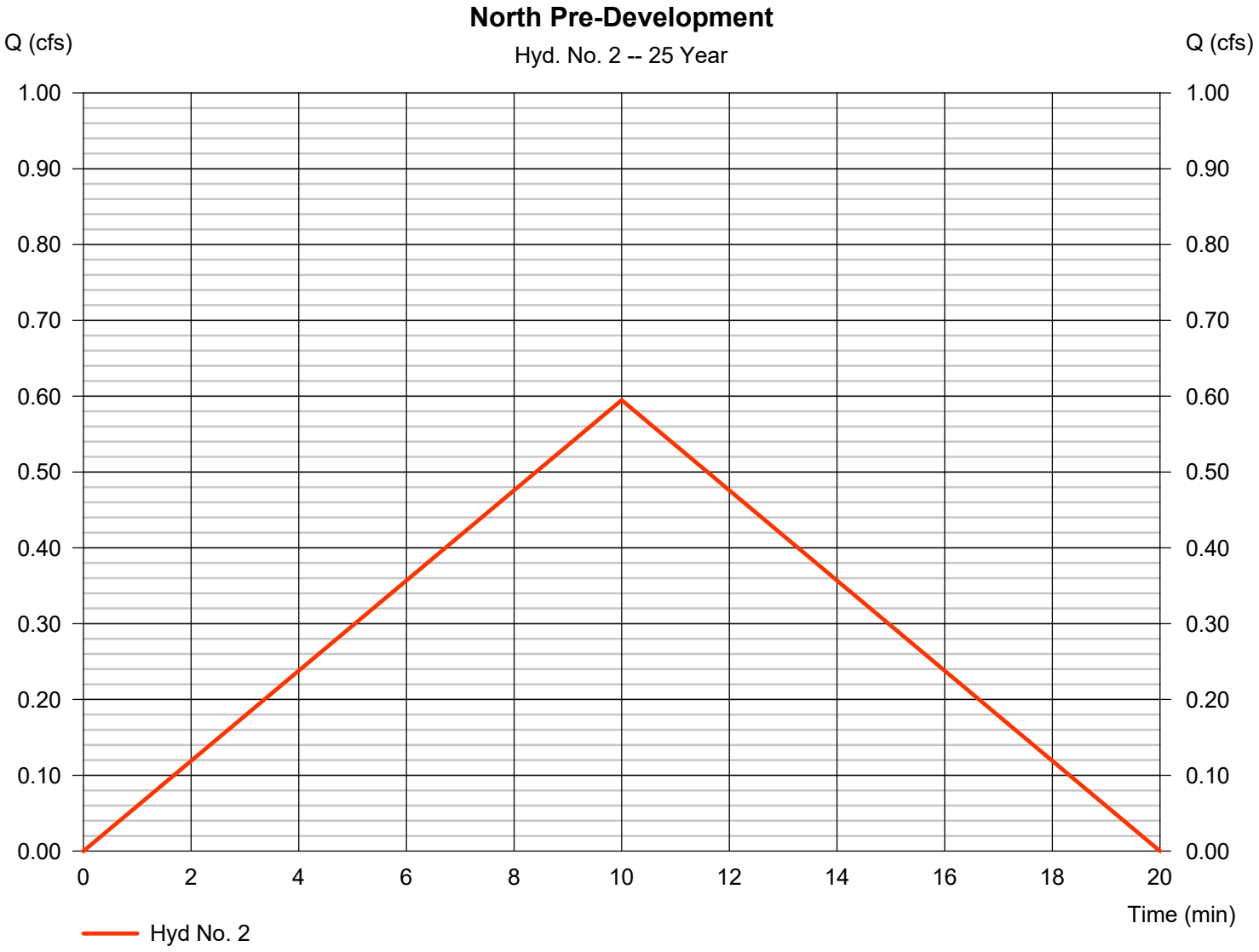
Hydrograph type	=	Rational	Peak discharge	=	2.606 cfs
Storm frequency	=	25 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	2,345 cuft
Drainage area	=	1.530 ac	Runoff coeff.	=	0.4
Intensity	=	4.258 in/hr	Tc by User	=	15.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.595 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	357 cuft
Drainage area	=	0.287 ac	Runoff coeff.	=	0.4
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

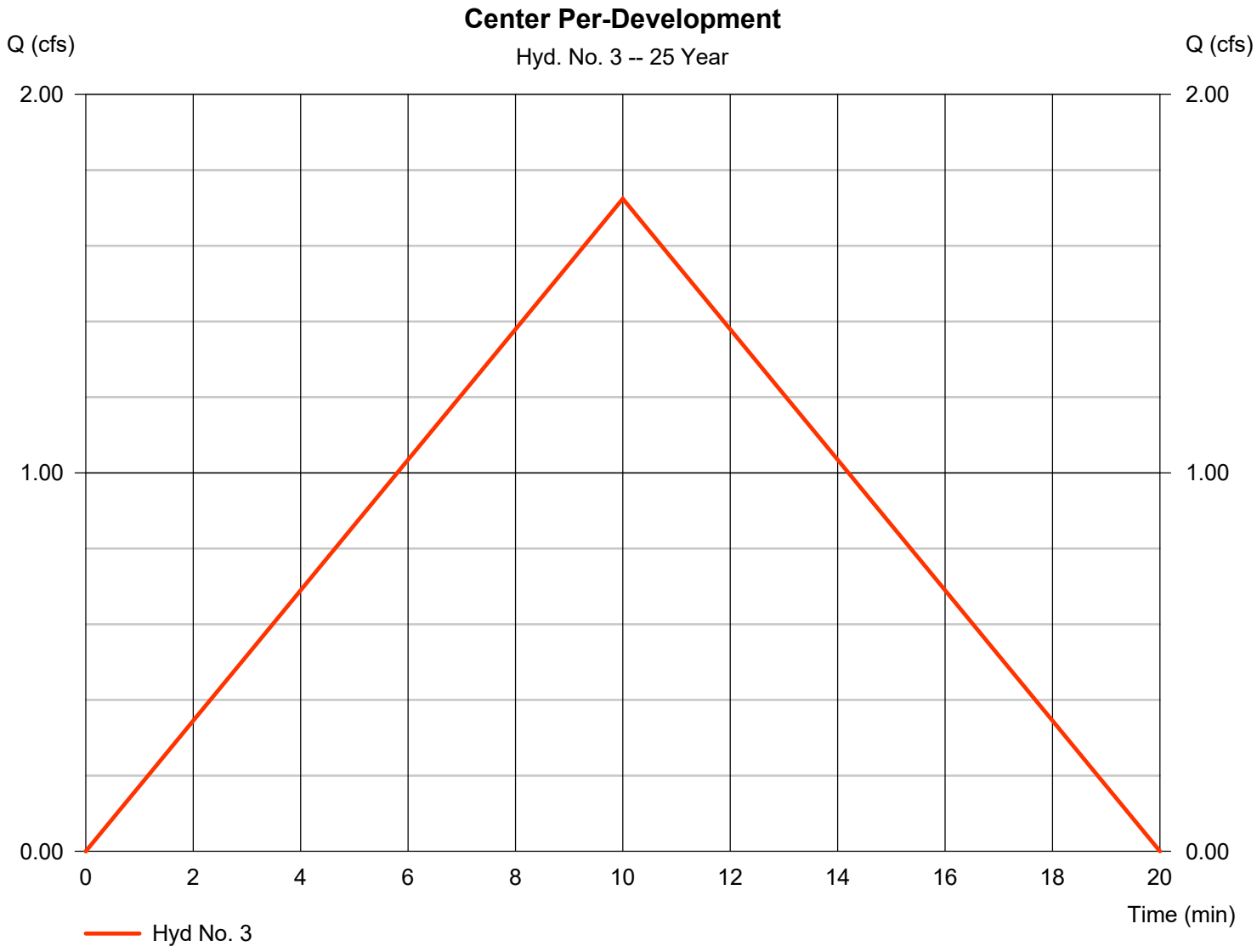


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	1.724 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,035 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

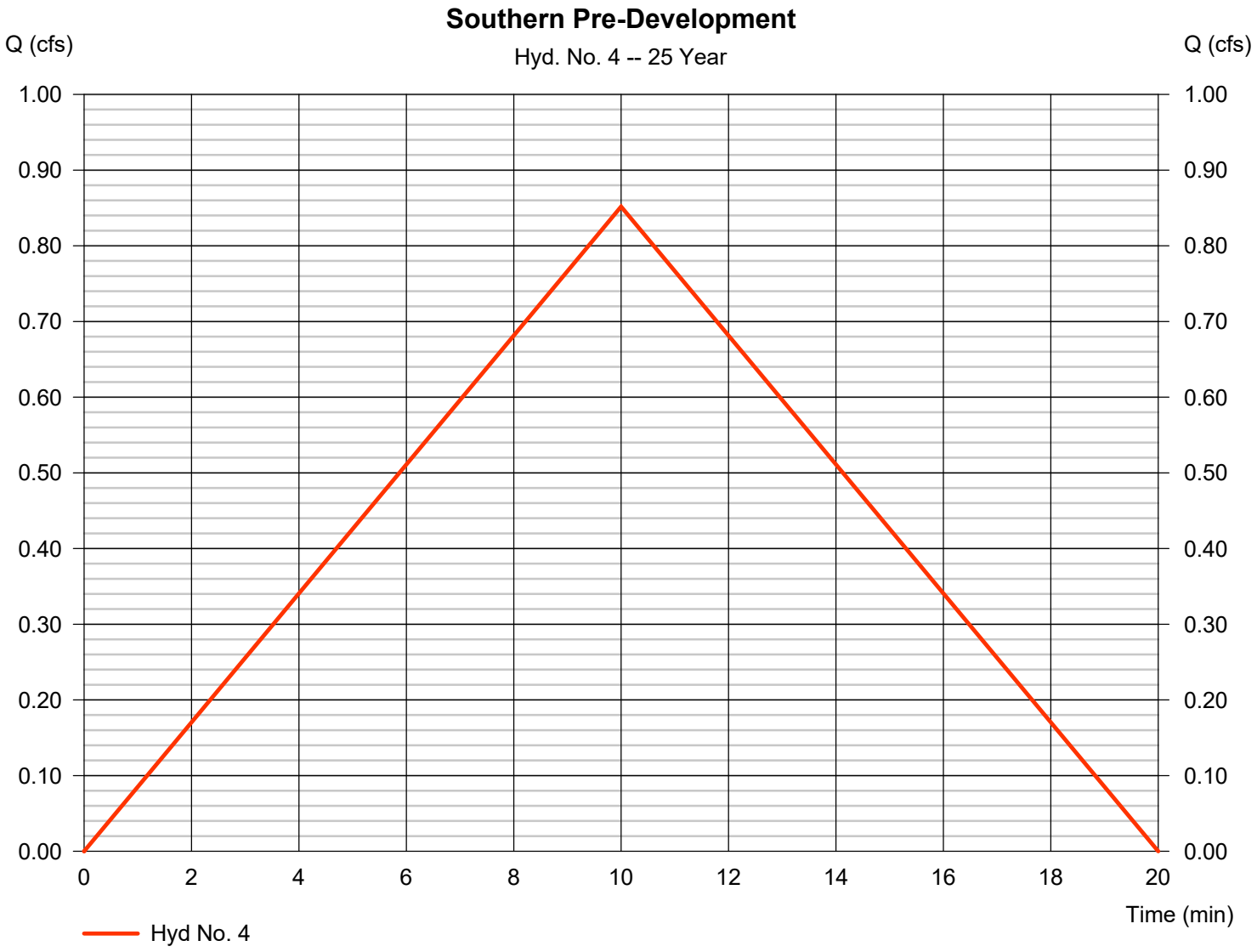


Hydrograph Report

Hyd. No. 4

Southern Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.852 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	511 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

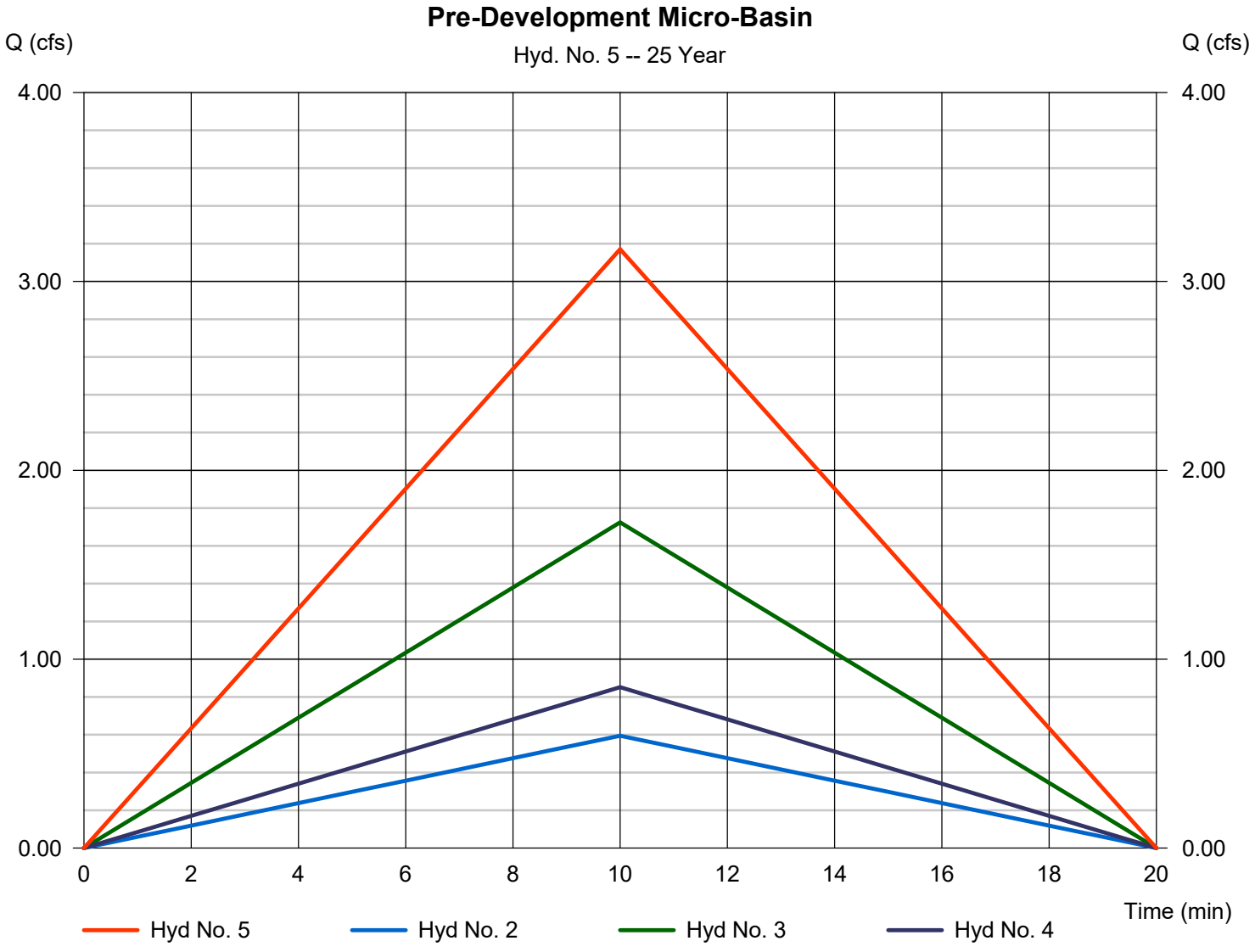


Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	= Combine	Peak discharge	= 3.171 cfs
Storm frequency	= 25 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 1,903 cuft
Inflow hyds.	= 2, 3, 4	Contrib. drain. area	= 1.530 ac

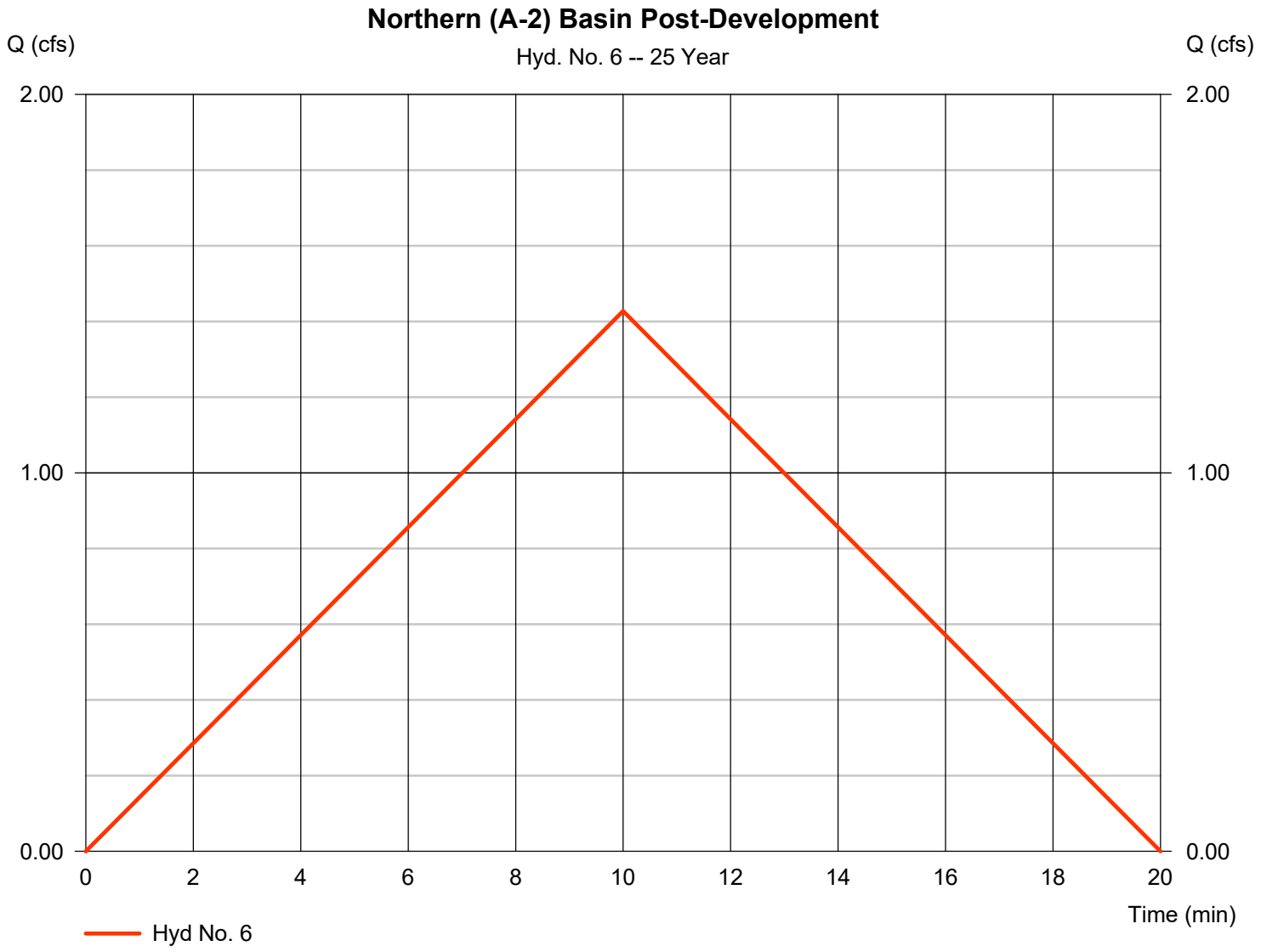


Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.427 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	856 cuft
Drainage area	=	0.290 ac	Runoff coeff.	=	0.95
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

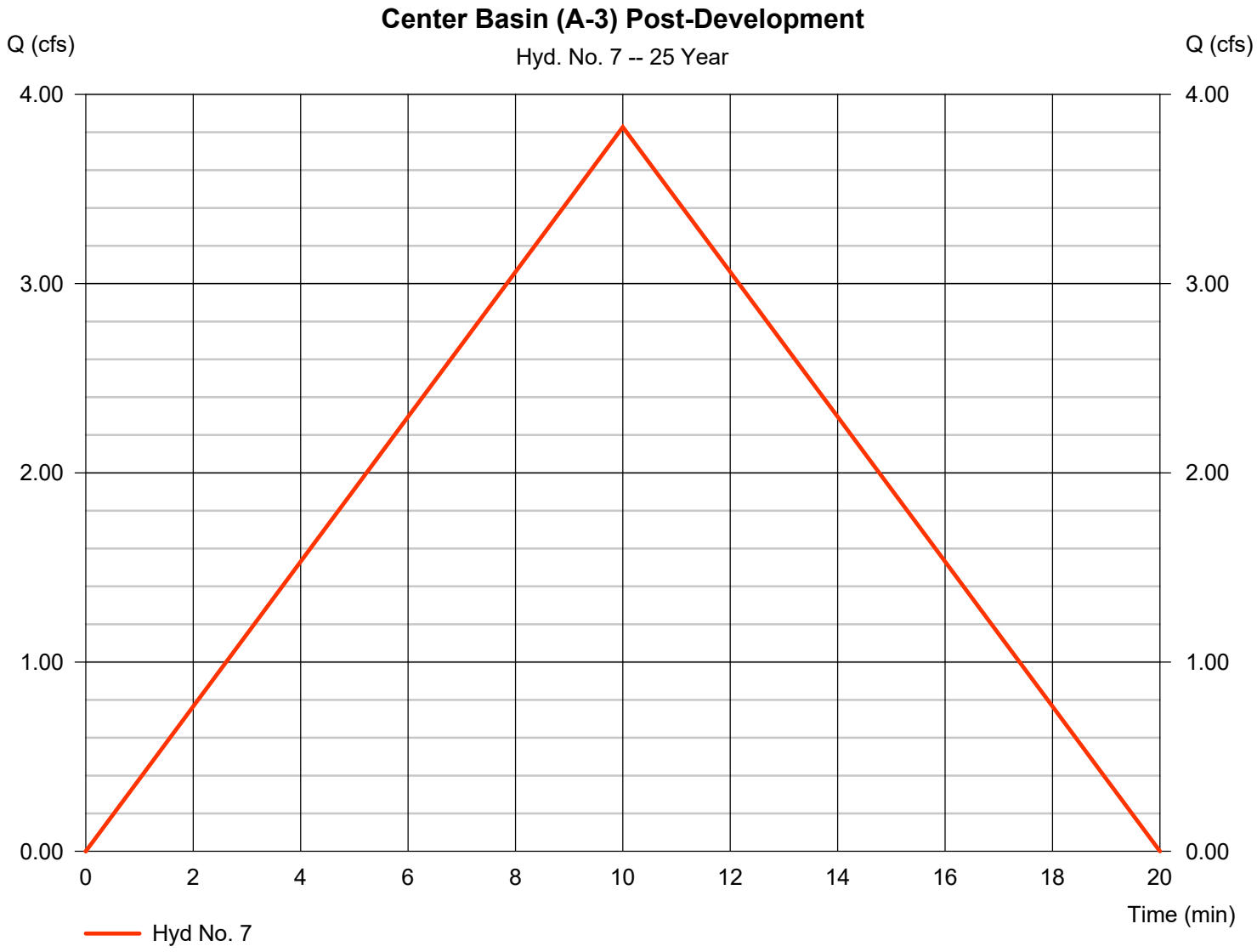


Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	3.827 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,296 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.89
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

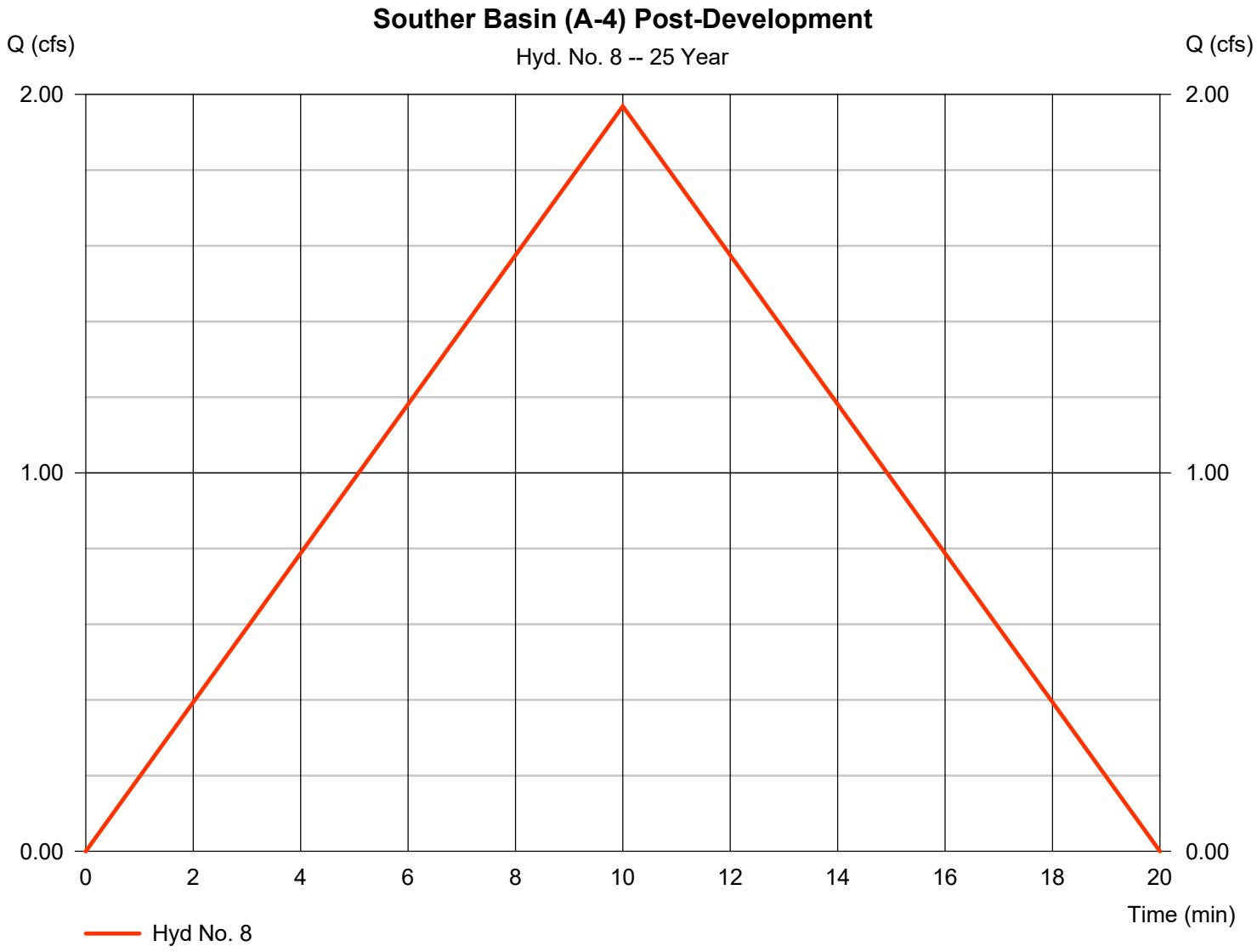


Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.969 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,181 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	5.181 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



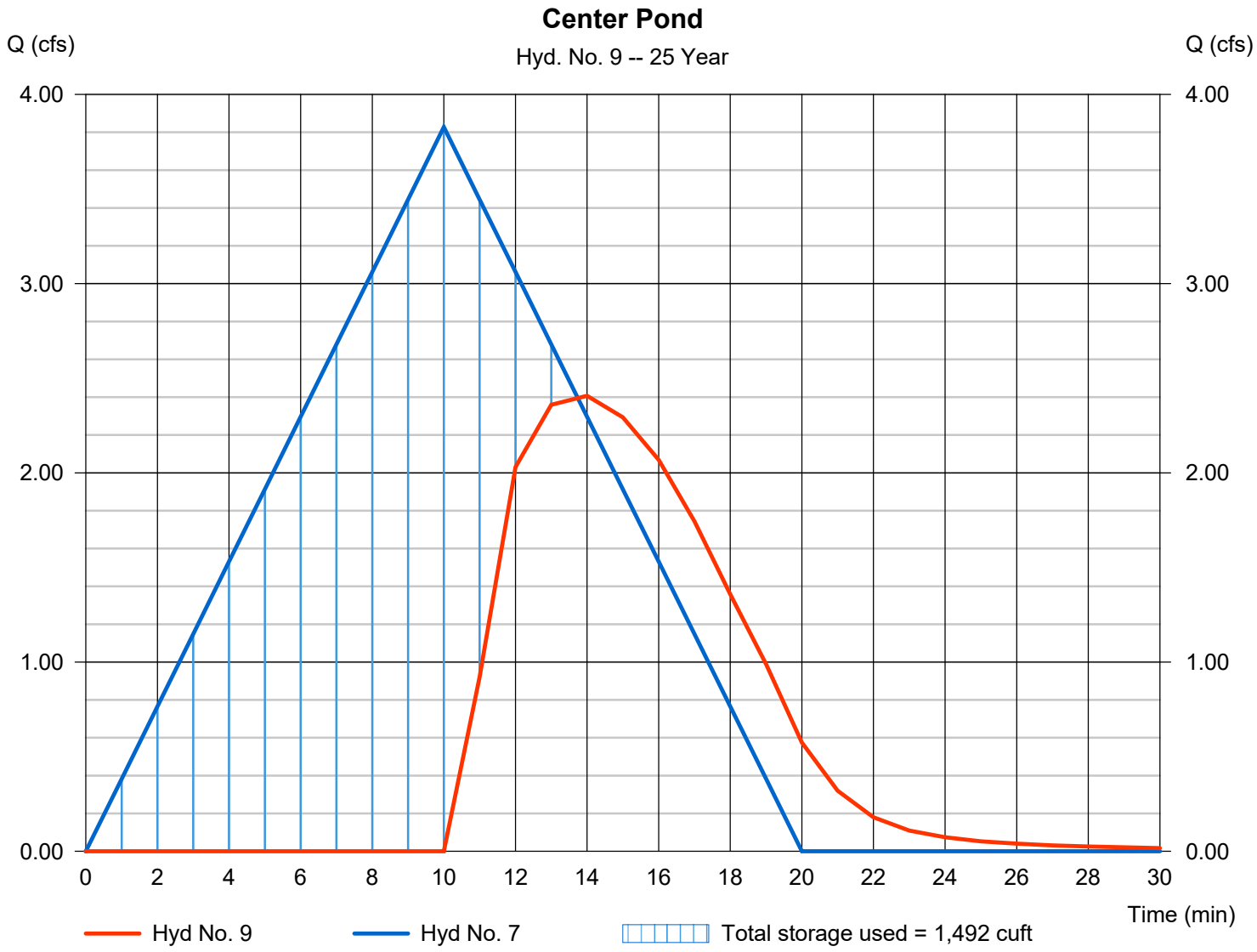
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.407 cfs
Storm frequency	=	25 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	1,066 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Dev	Max. Elevation	=	5.65 ft
Reservoir name	=	center pond	Max. Storage	=	1,492 cuft

Storage Indication method used.

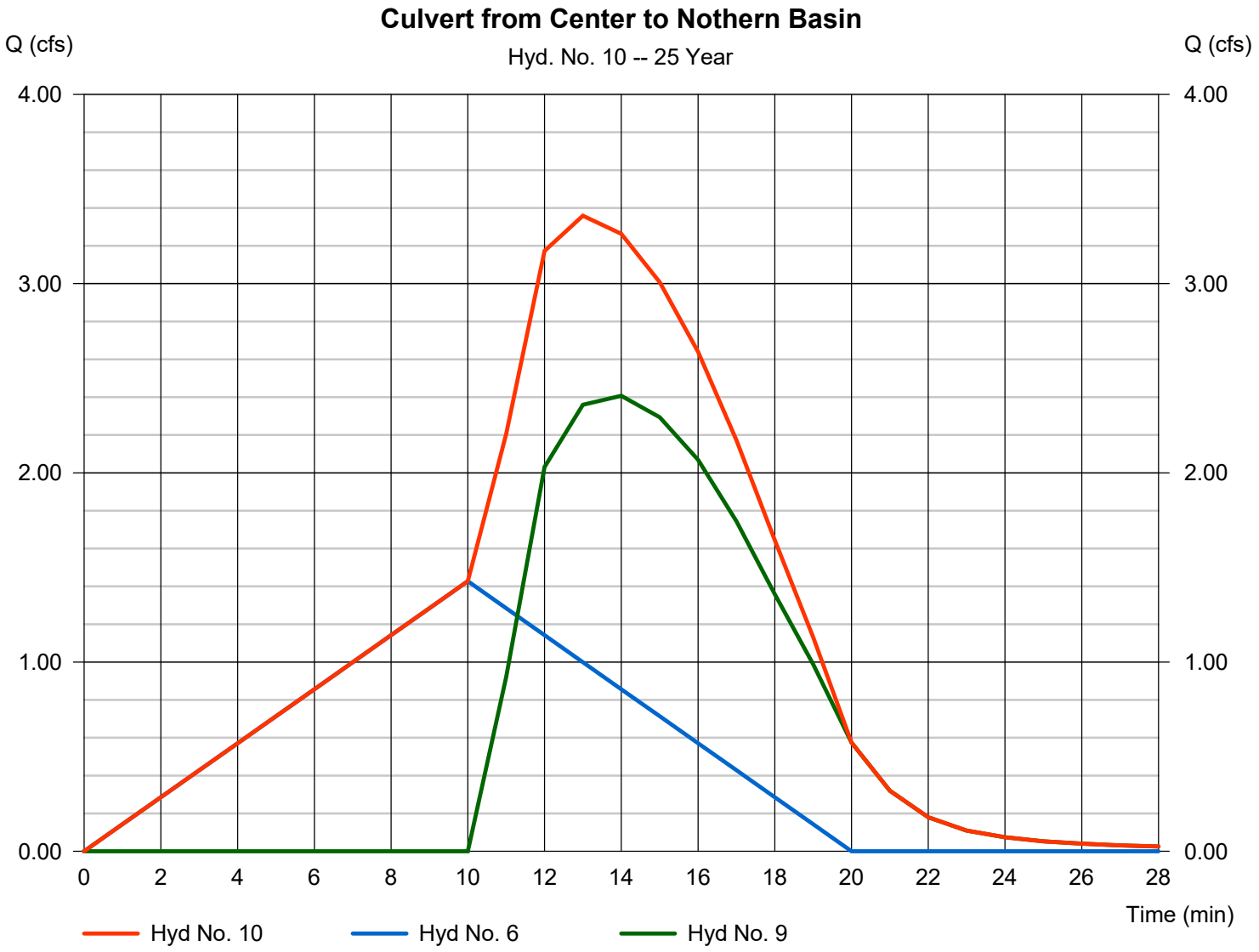


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	=	Combine	Peak discharge	=	3.359 cfs
Storm frequency	=	25 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,922 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.290 ac



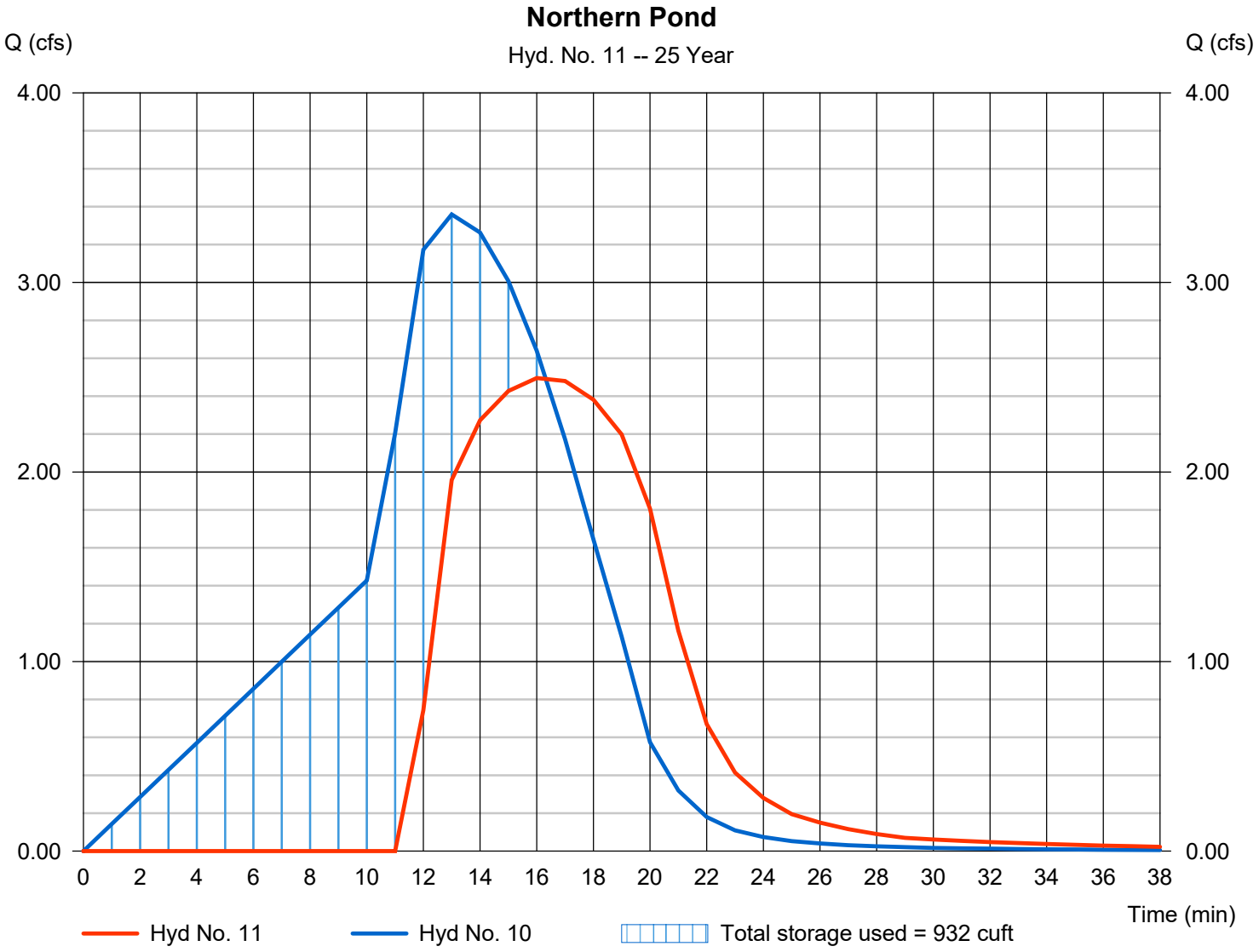
Hydrograph Report

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.496 cfs
Storm frequency	=	25 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	1,351 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	6.32 ft
Reservoir name	=	north pond	Max. Storage	=	932 cuft

Storage Indication method used.

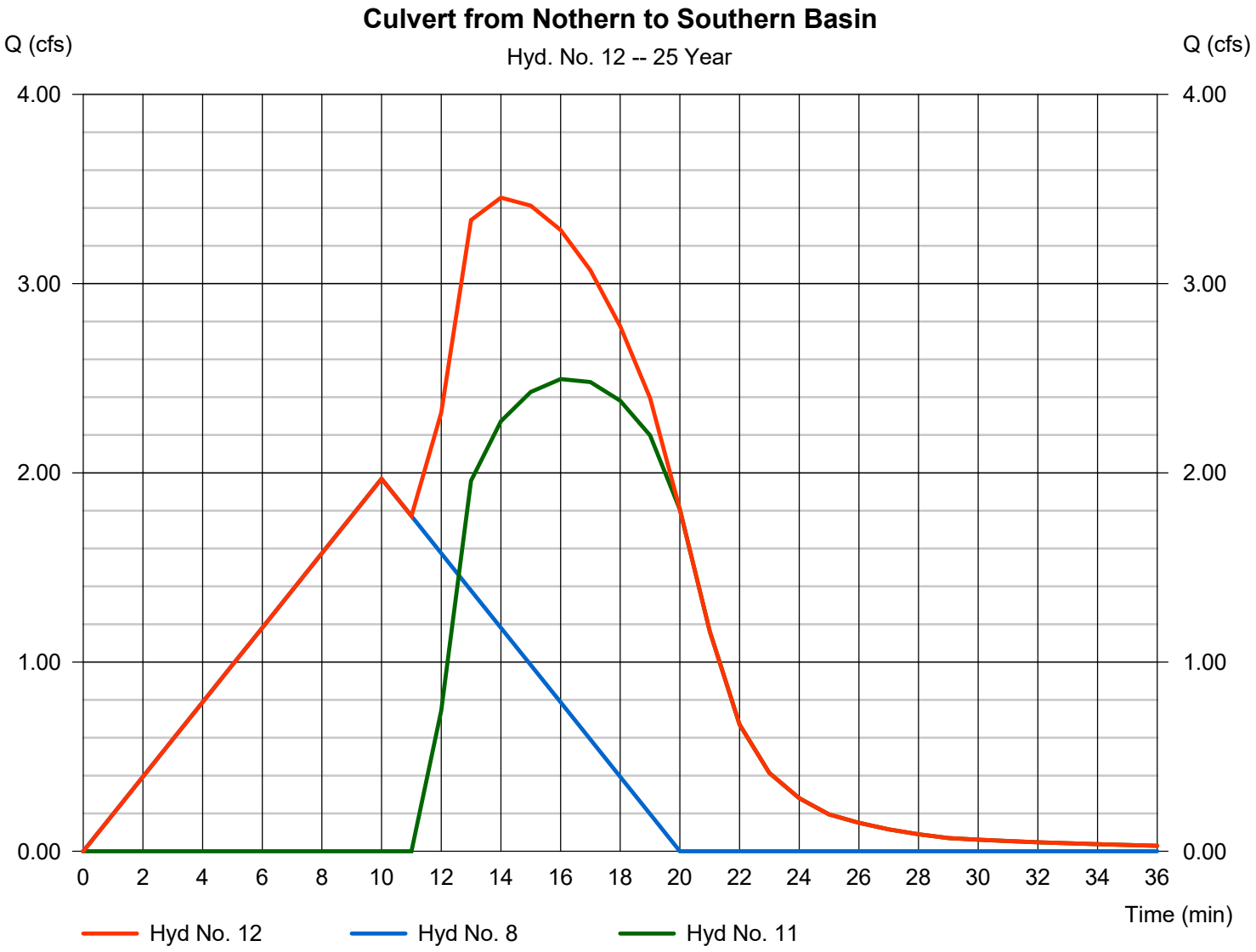


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	=	Combine	Peak discharge	=	3.454 cfs
Storm frequency	=	25 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	2,533 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.400 ac



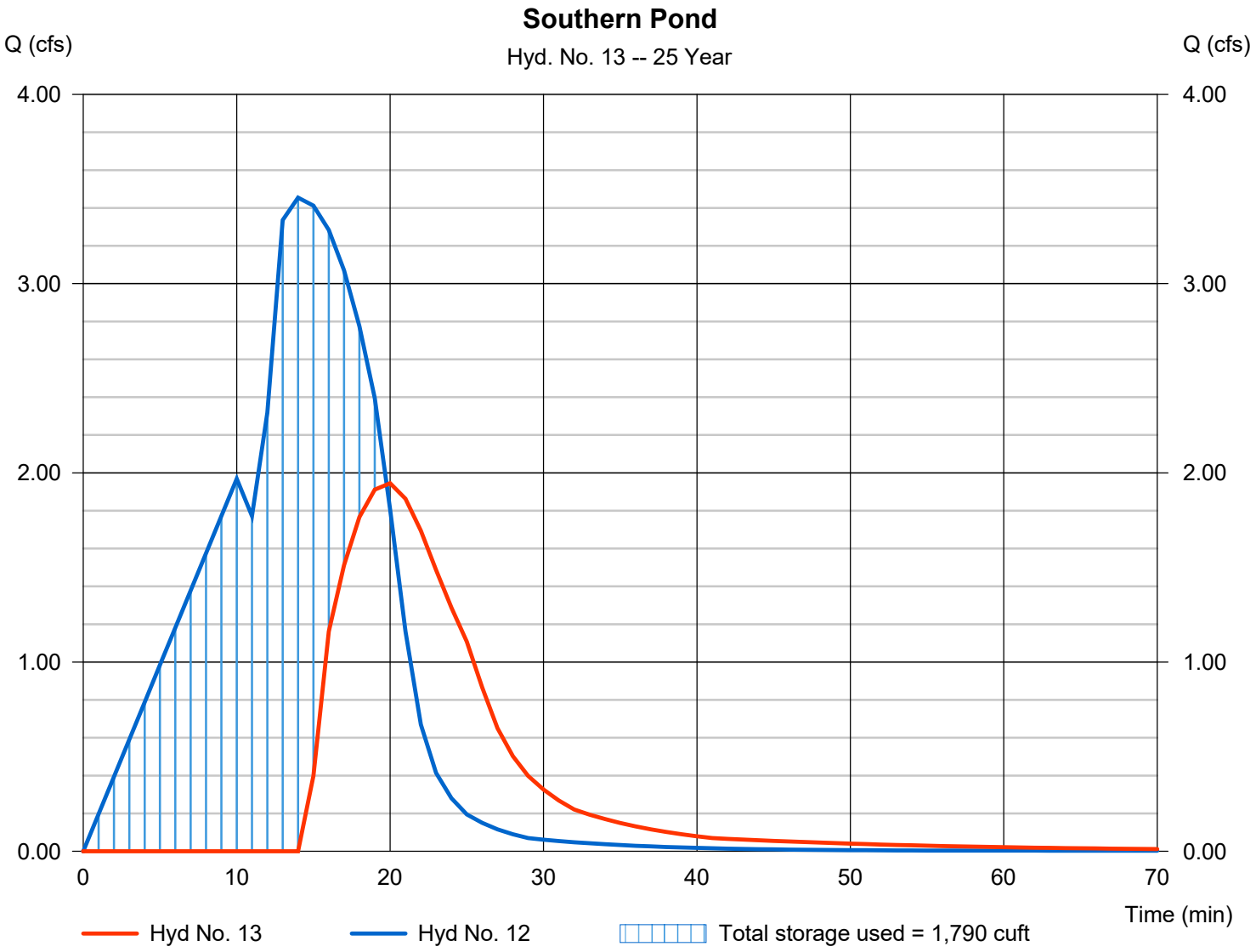
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	1.945 cfs
Storm frequency	=	25 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	1,328 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	5.27 ft
Reservoir name	=	southern pond	Max. Storage	=	1,790 cuft

Storage Indication method used.

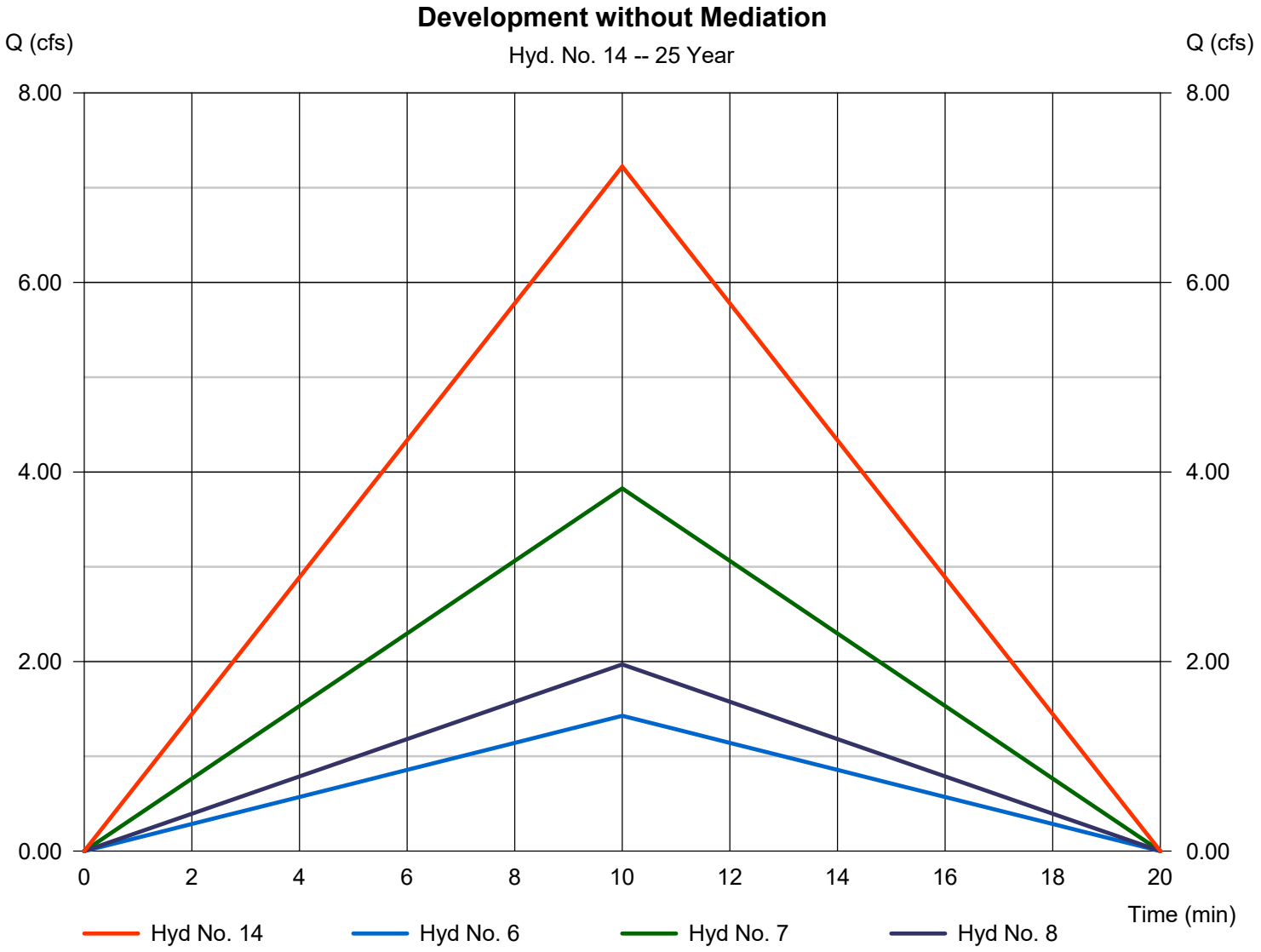


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	= Combine	Peak discharge	= 7.224 cfs
Storm frequency	= 25 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 4,334 cuft
Inflow hyds.	= 6, 7, 8	Contrib. drain. area	= 1.520 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 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	3.044	1	15	2,739	------	------	------	Pre-Development Single Basin
2	Rational	0.694	1	10	417	------	------	------	North Pre-Development
3	Rational	2.013	1	10	1,208	------	------	------	Center Per-Development
4	Rational	0.994	1	10	597	------	------	------	Southern Pre-Development
5	Combine	3.701	1	10	2,221	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	1.666	1	10	1,000	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	4.468	1	10	2,681	------	------	------	Center Basin (A-3) Post-Development
8	Rational	2.298	1	10	1,379	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	2.922	1	13	1,450	7	5.85	1,587	Center Pond
10	Combine	4.116	1	12	2,449	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	2.989	1	17	1,879	10	6.71	1,107	Northern Pond
12	Combine	4.132	1	14	3,258	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	2.600	1	20	2,053	12	5.47	2,016	Southern Pond
14	Combine	8.432	1	10	5,059	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

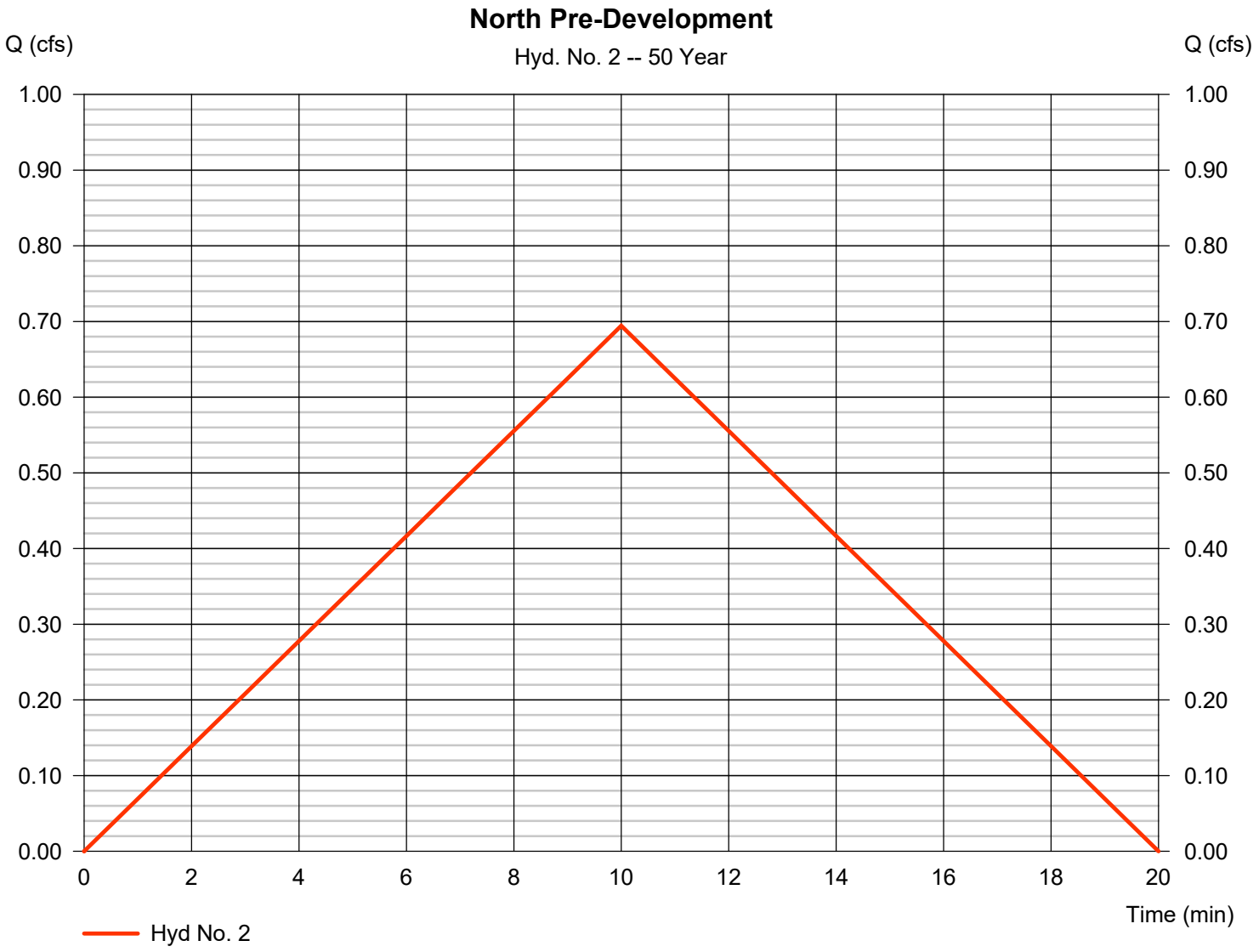
Hydrograph type	=	Rational	Peak discharge	=	3.044 cfs
Storm frequency	=	50 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	2,739 cuft
Drainage area	=	1.530 ac	Runoff coeff.	=	0.4
Intensity	=	4.973 in/hr	Tc by User	=	15.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.694 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	417 cuft
Drainage area	=	0.287 ac	Runoff coeff.	=	0.4
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

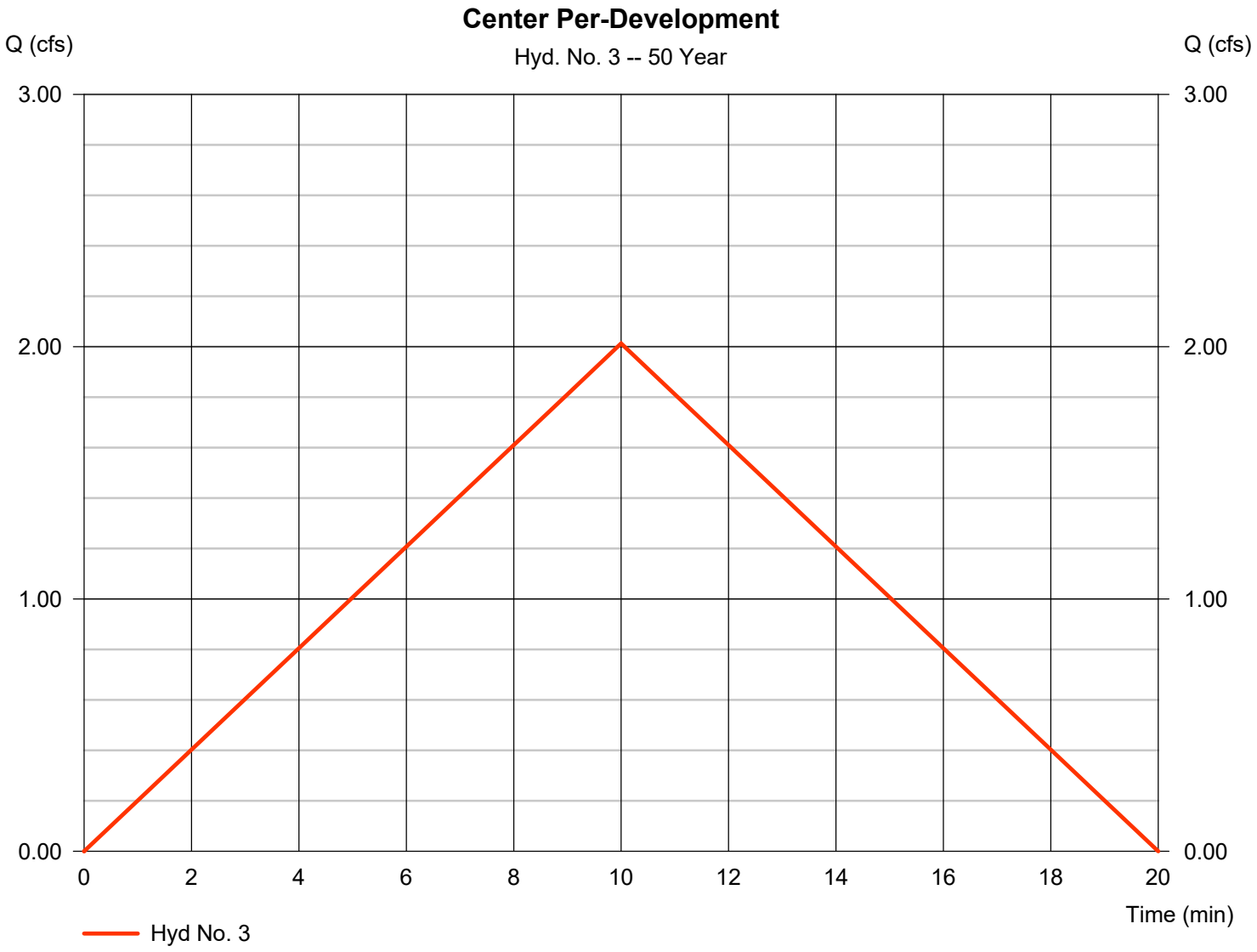


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	2.013 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,208 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

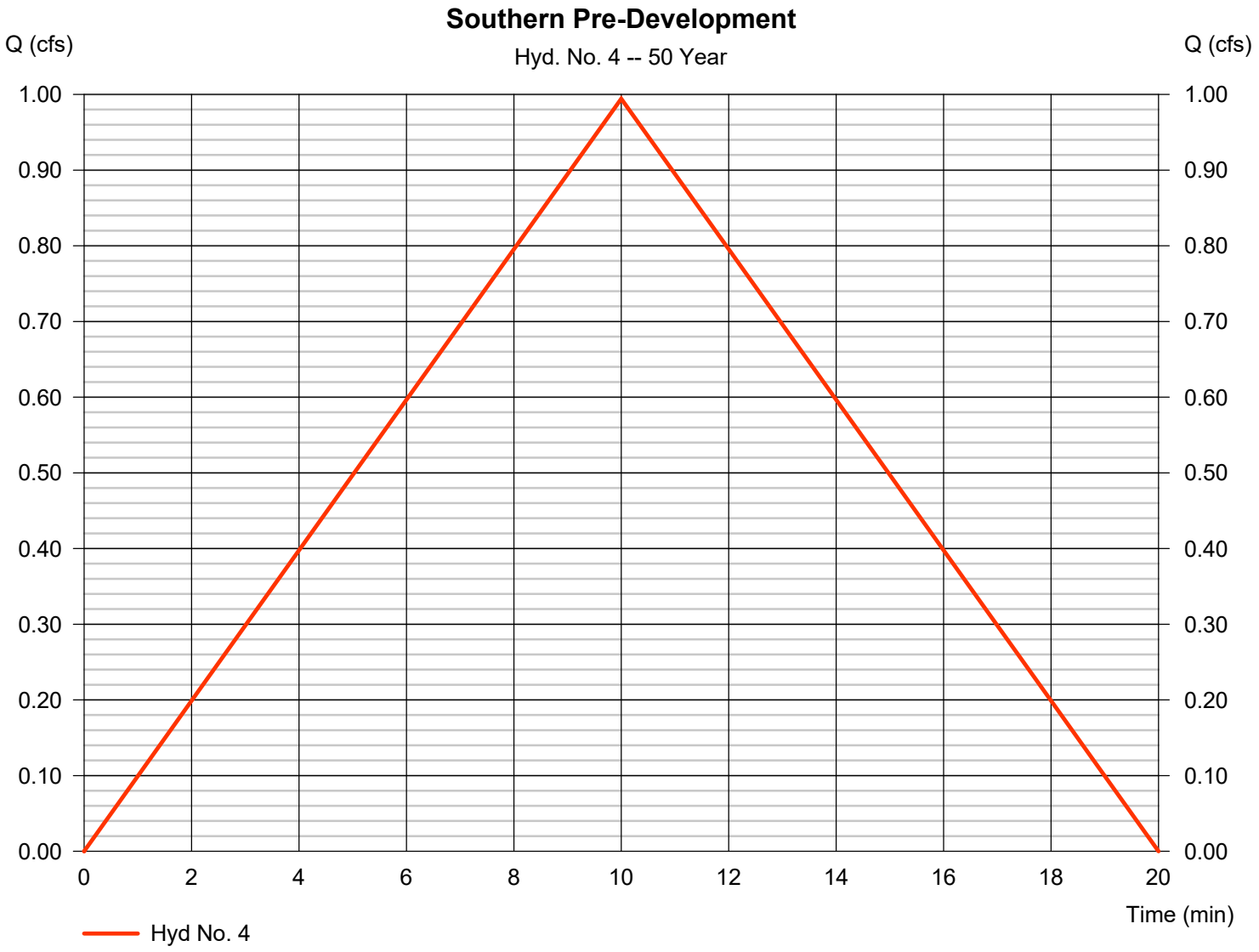


Hydrograph Report

Hyd. No. 4

Southern Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	0.994 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	597 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

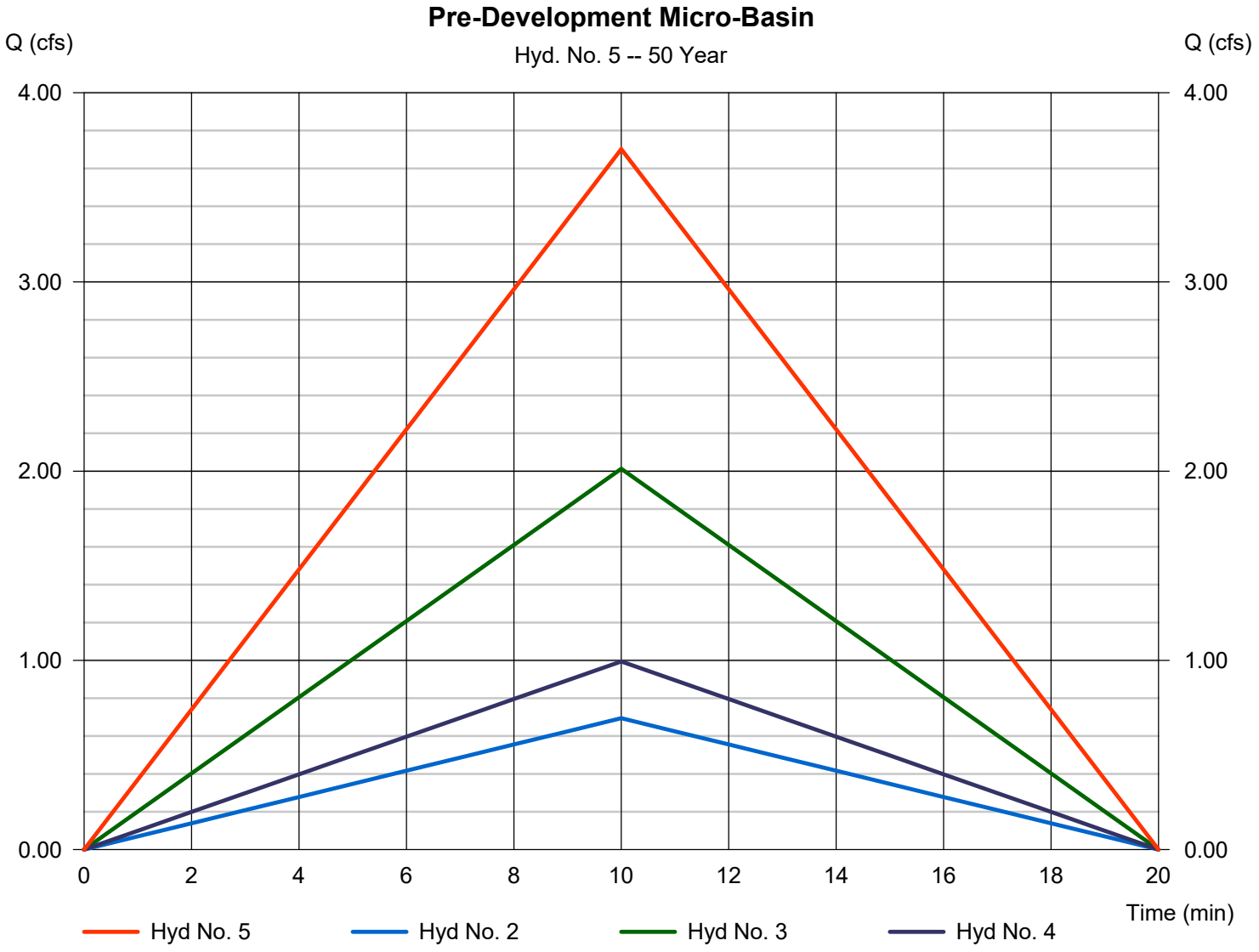


Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	=	Combine	Peak discharge	=	3.701 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,221 cuft
Inflow hyds.	=	2, 3, 4	Contrib. drain. area	=	1.530 ac

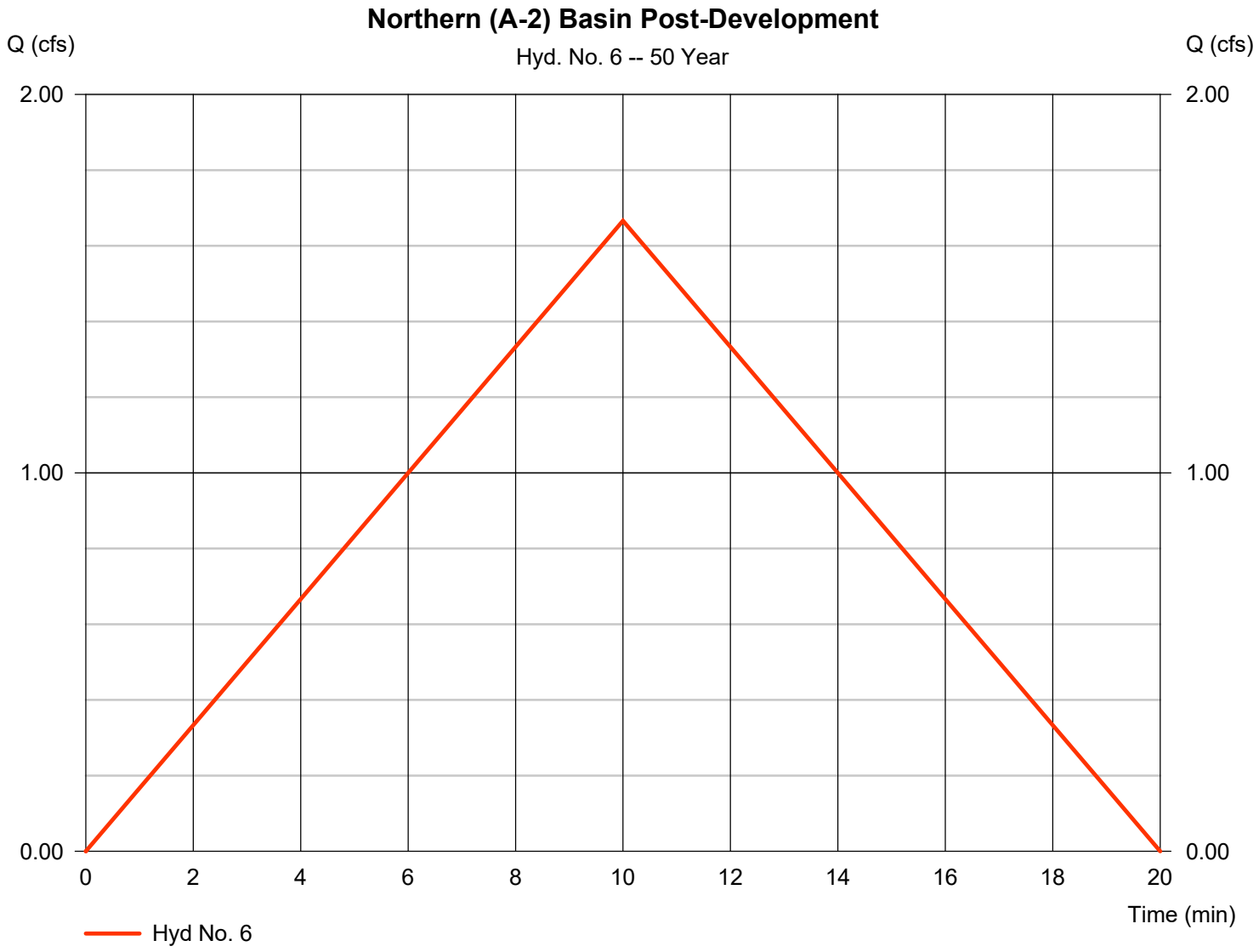


Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.666 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,000 cuft
Drainage area	=	0.290 ac	Runoff coeff.	=	0.95
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

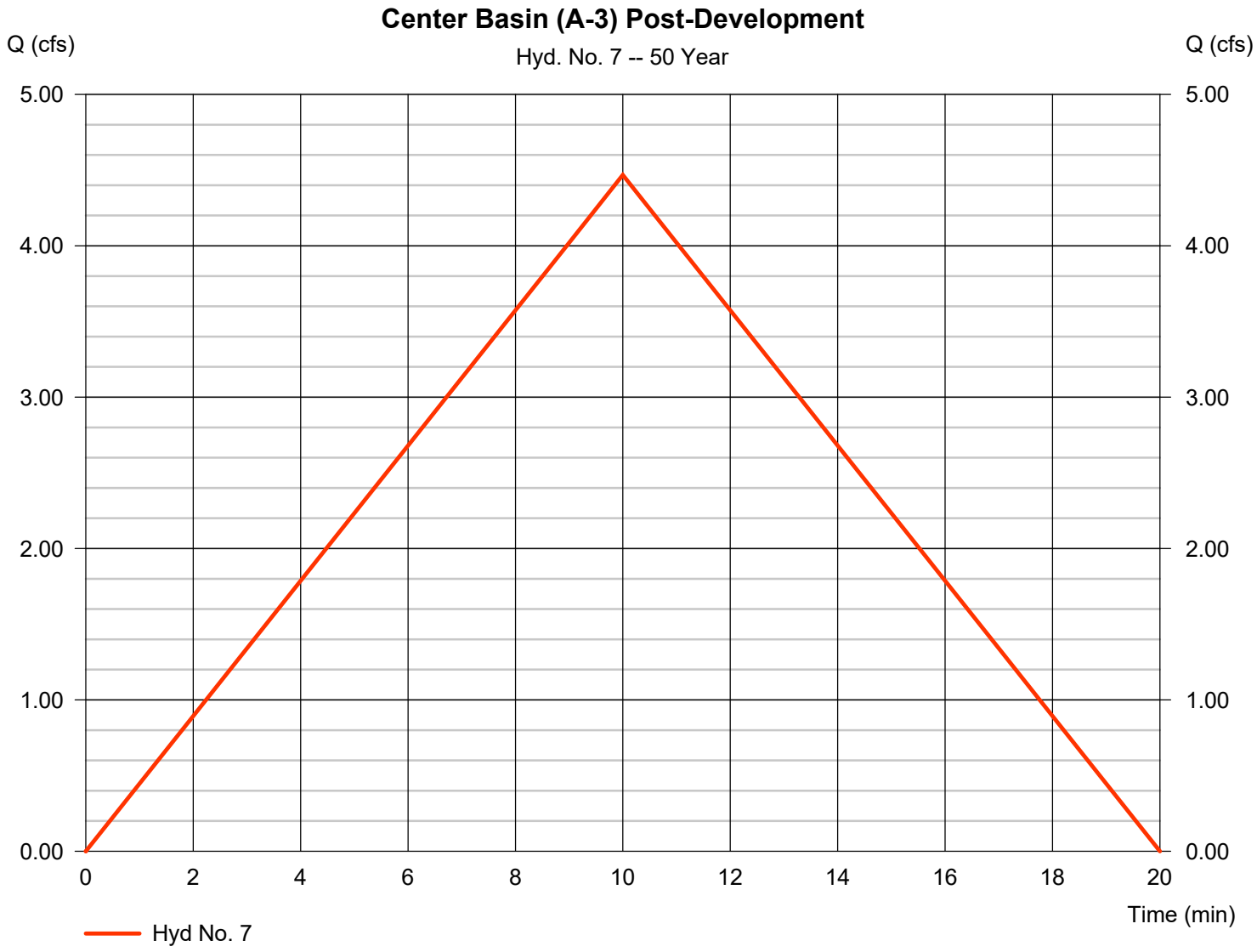


Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	4.468 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,681 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.89
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

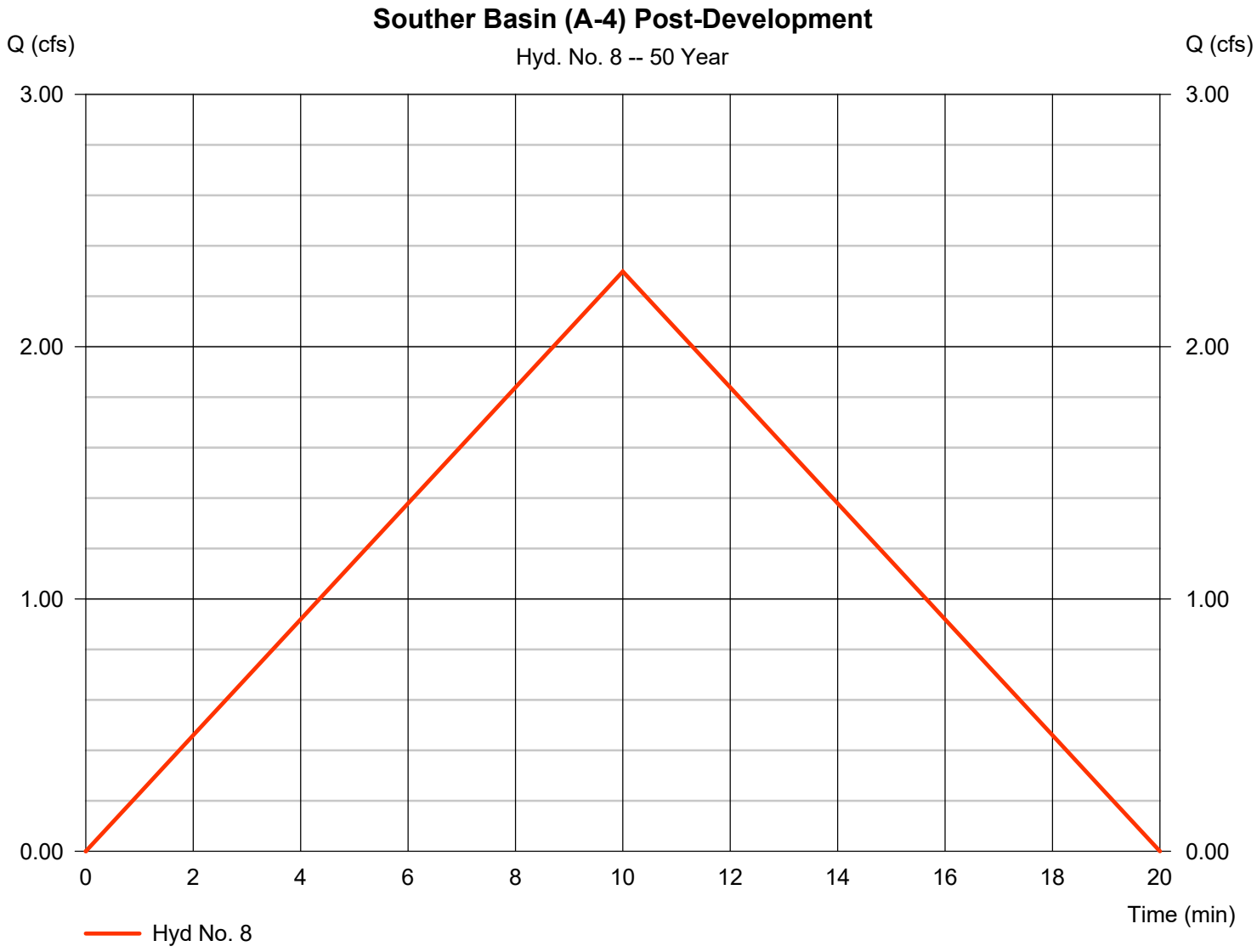


Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	2.298 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,379 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	6.048 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



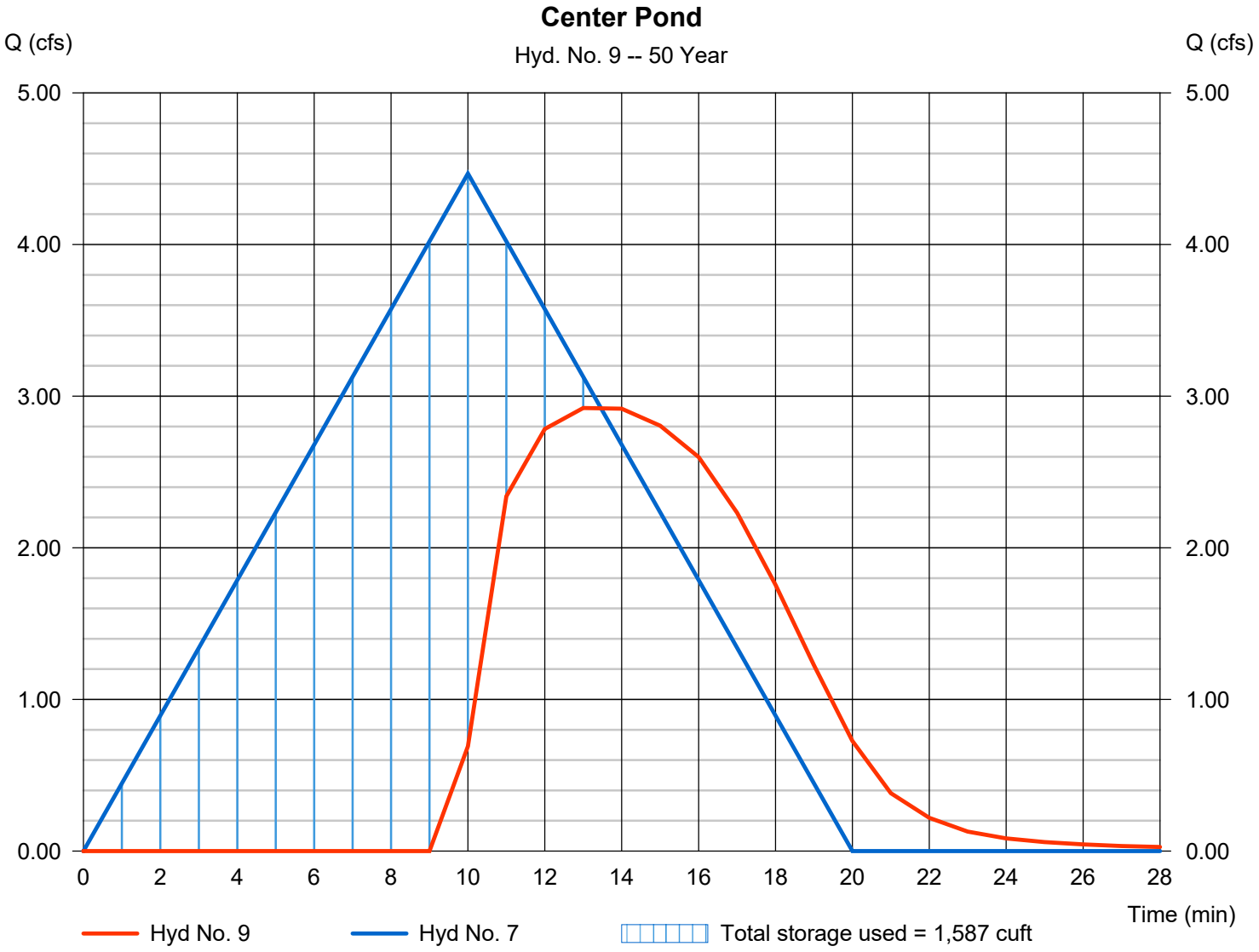
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.922 cfs
Storm frequency	=	50 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,450 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Dev	Max. Elevation	=	5.85 ft
Reservoir name	=	center pond	Max. Storage	=	1,587 cuft

Storage Indication method used.

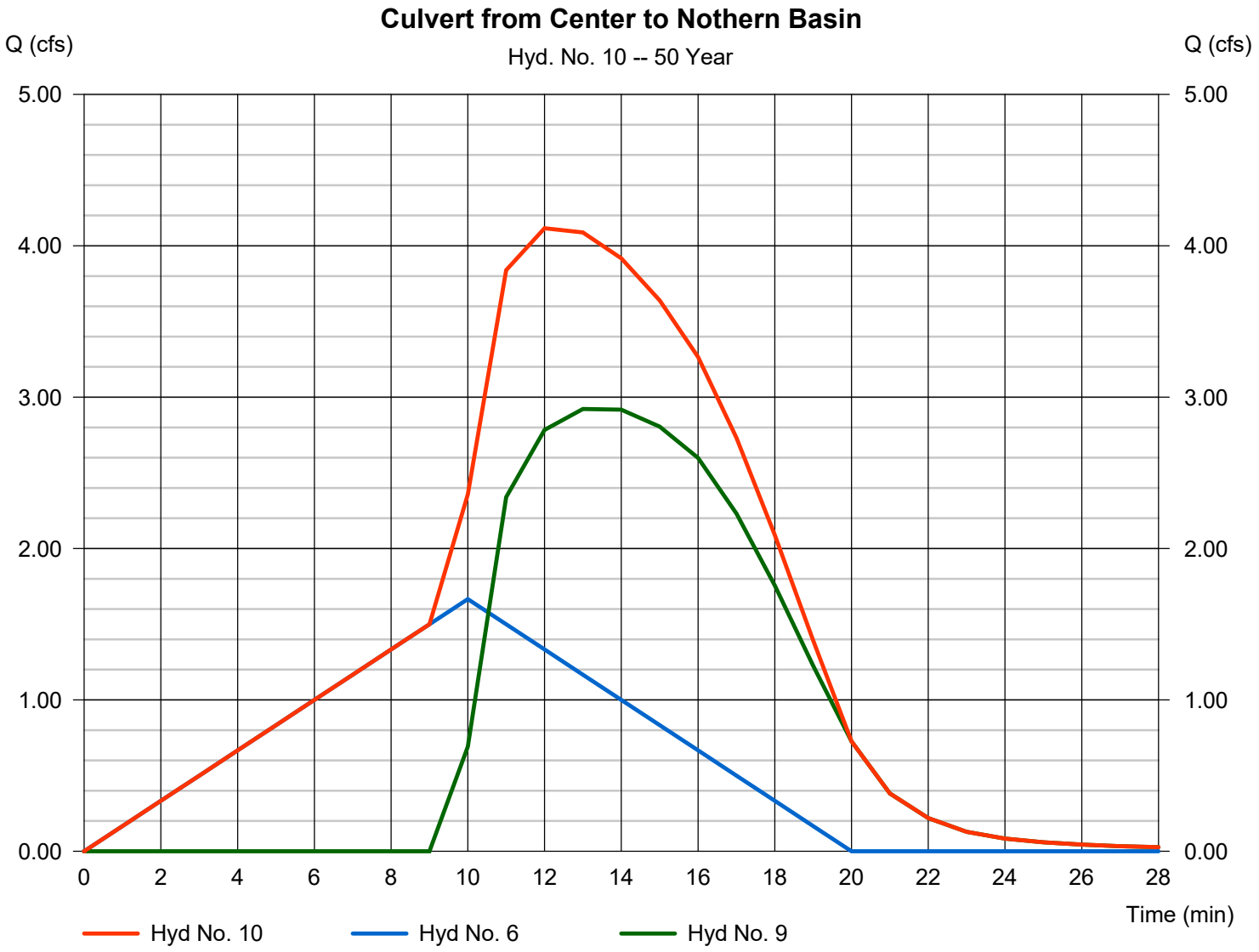


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	=	Combine	Peak discharge	=	4.116 cfs
Storm frequency	=	50 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	2,449 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.290 ac



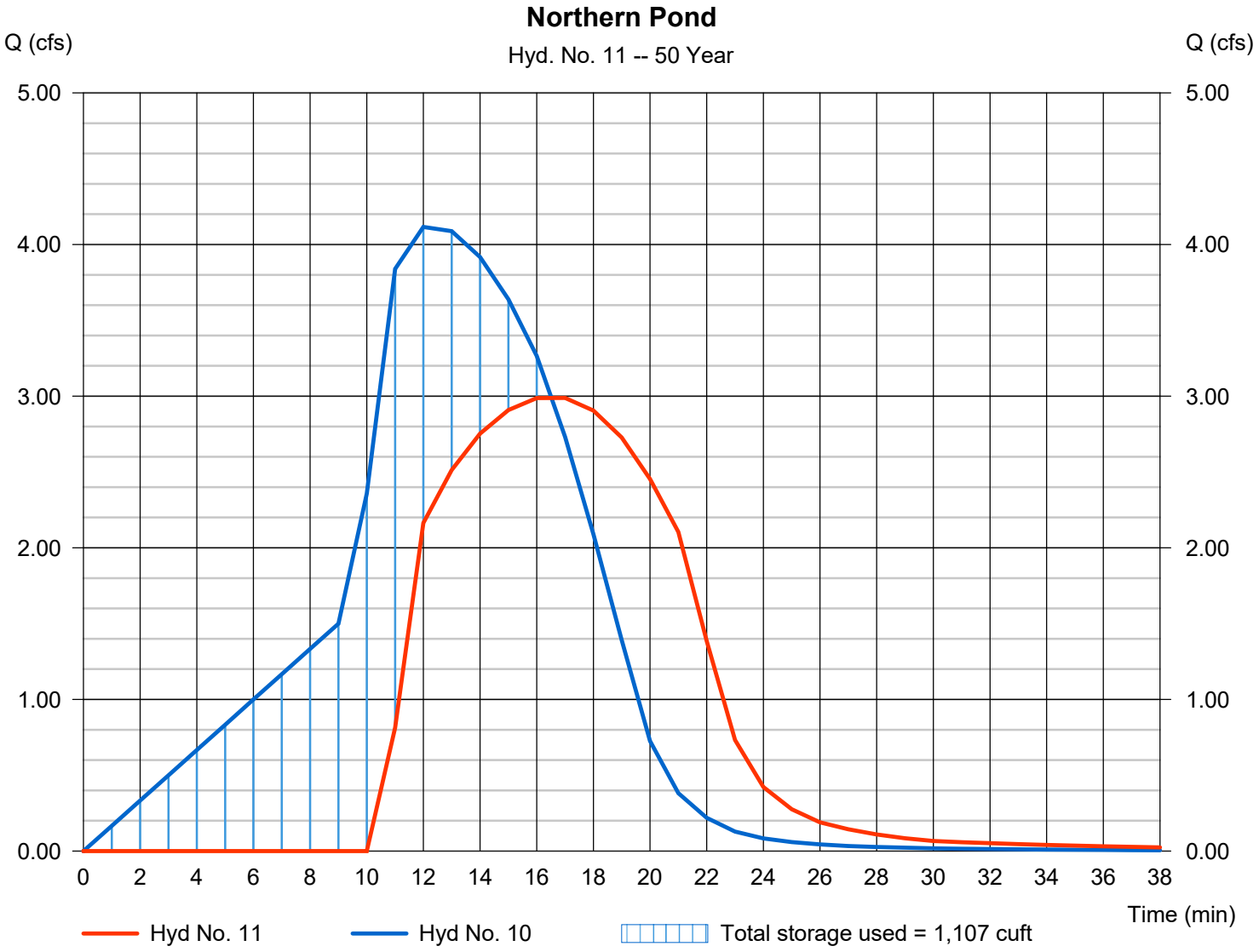
Hydrograph Report

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.989 cfs
Storm frequency	=	50 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	1,879 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	6.71 ft
Reservoir name	=	north pond	Max. Storage	=	1,107 cuft

Storage Indication method used.

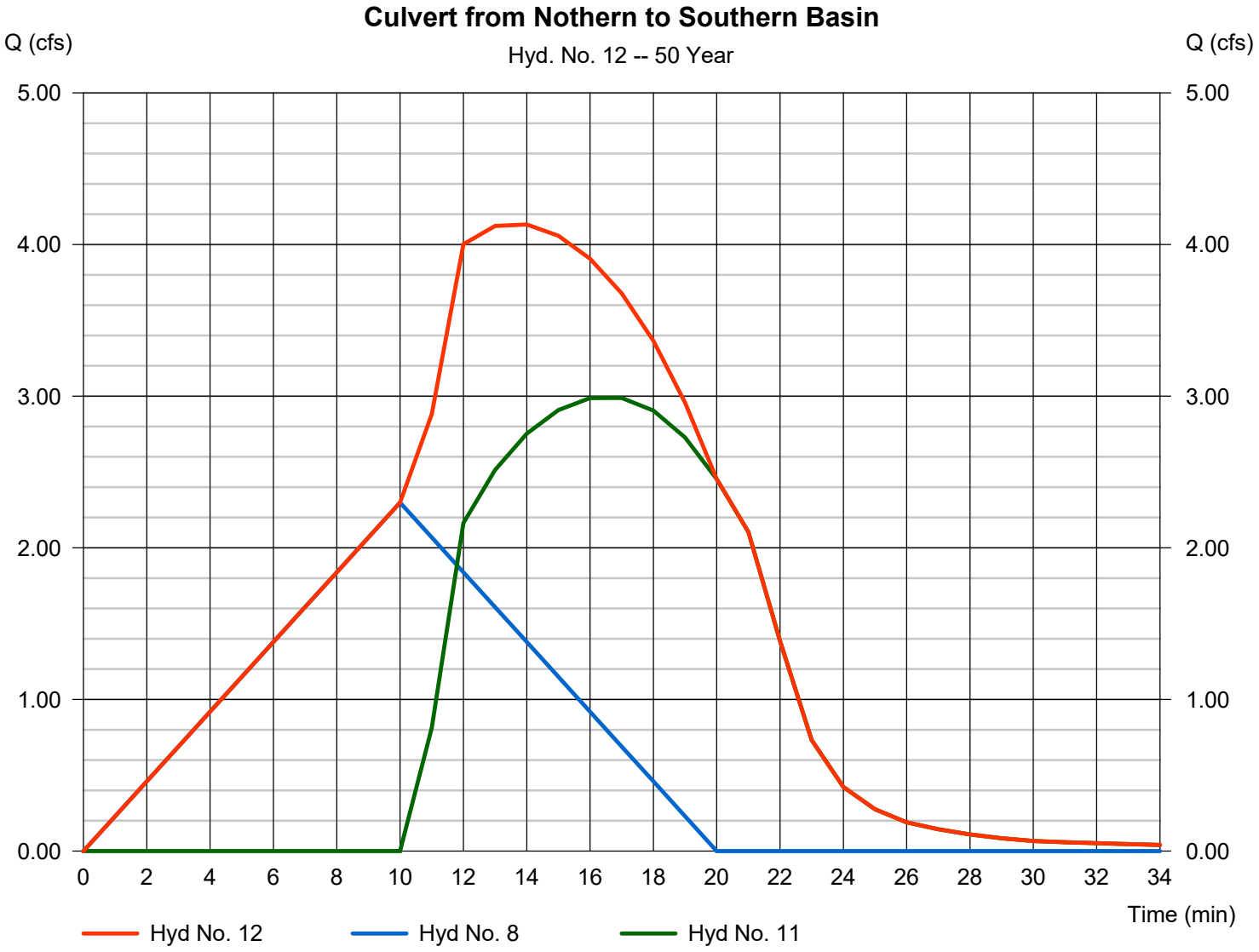


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	=	Combine	Peak discharge	=	4.132 cfs
Storm frequency	=	50 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	3,258 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.400 ac



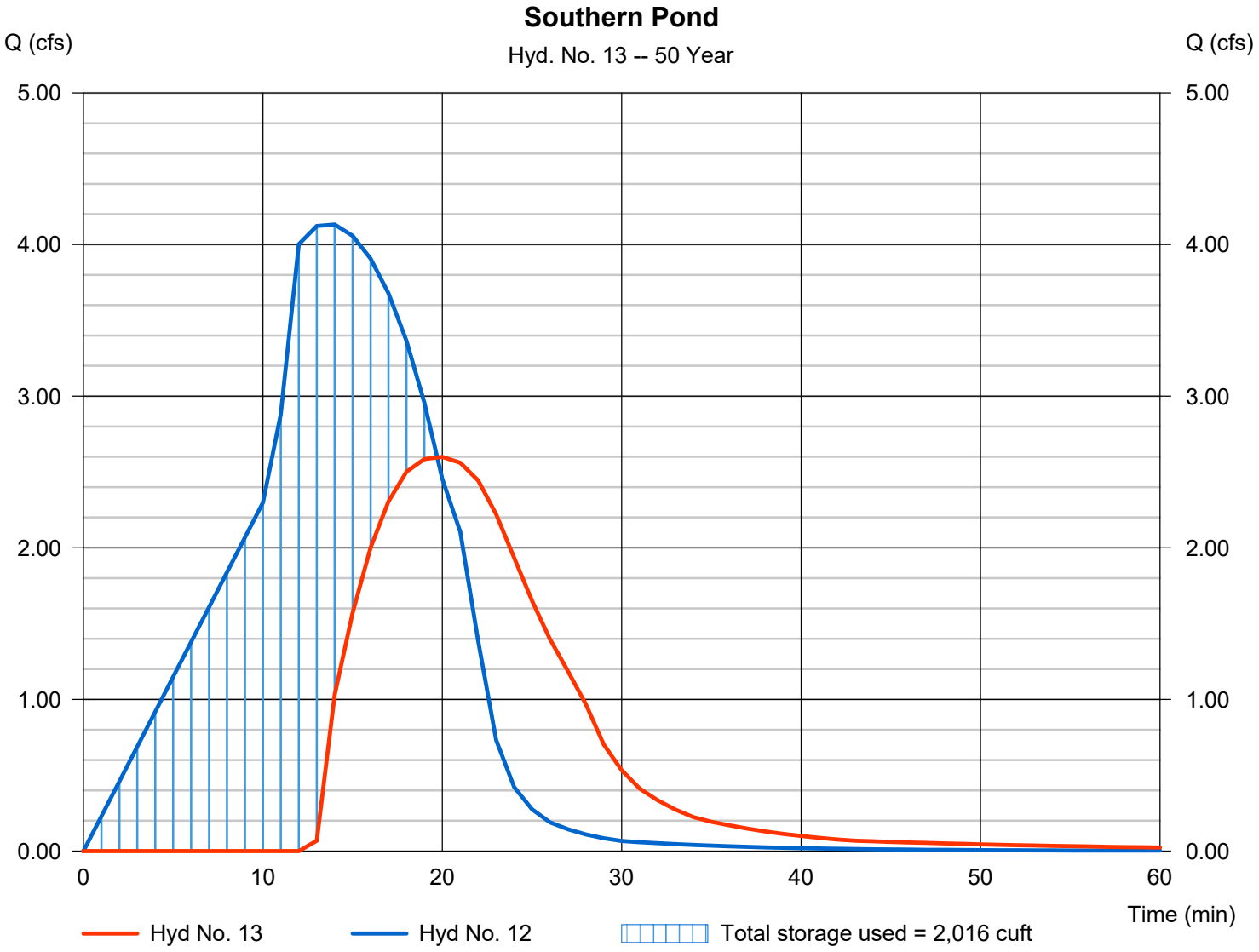
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.600 cfs
Storm frequency	=	50 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	2,053 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	5.47 ft
Reservoir name	=	southern pond	Max. Storage	=	2,016 cuft

Storage Indication method used.

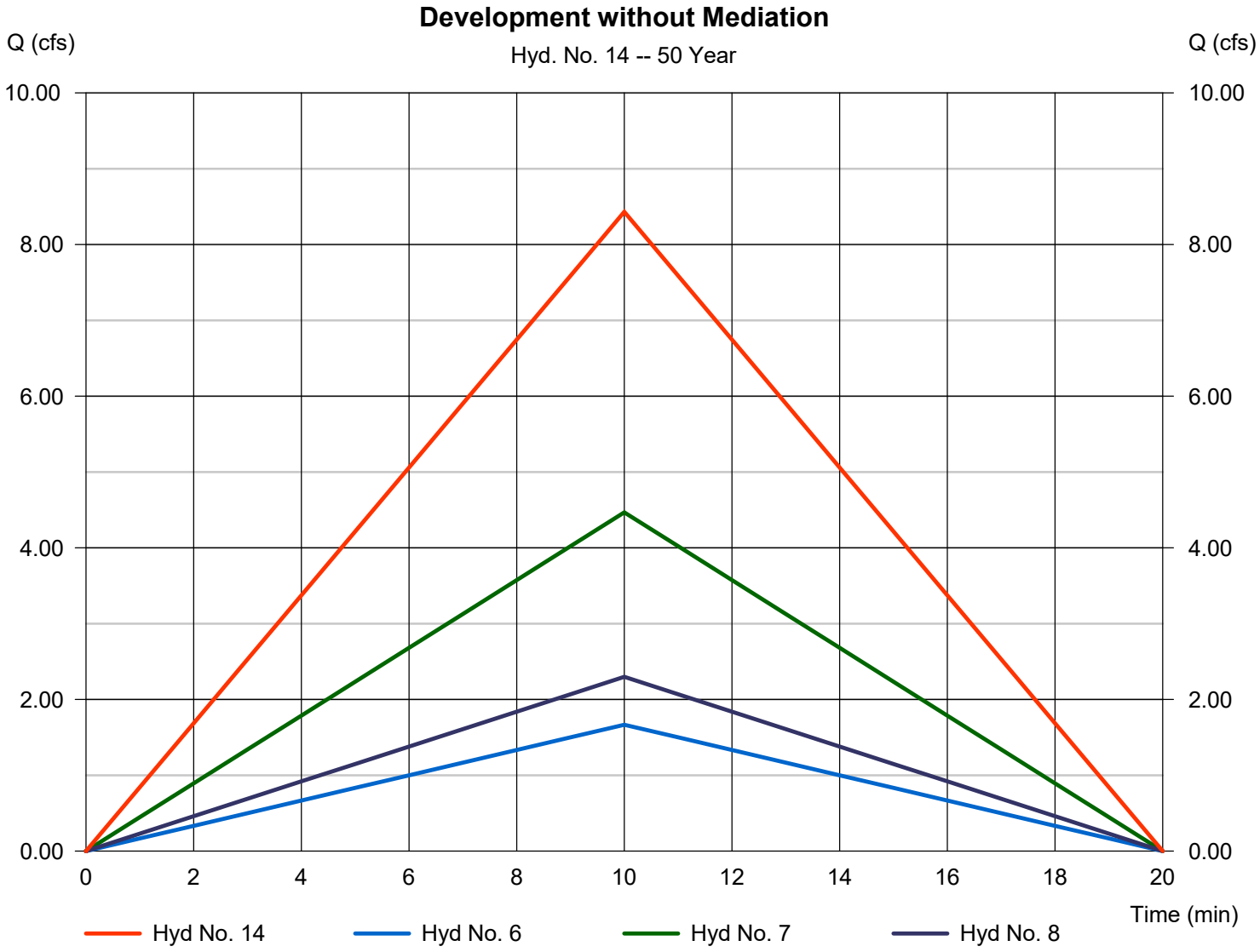


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	=	Combine	Peak discharge	=	8.432 cfs
Storm frequency	=	50 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	5,059 cuft
Inflow hyds.	=	6, 7, 8	Contrib. drain. area	=	1.520 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 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	3.524	1	15	3,172	------	------	------	Pre-Development Single Basin
2	Rational	0.804	1	10	483	------	------	------	North Pre-Development
3	Rational	2.332	1	10	1,399	------	------	------	Center Per-Development
4	Rational	1.152	1	10	691	------	------	------	Southern Pre-Development
5	Combine	4.288	1	10	2,573	2, 3, 4	------	------	Pre-Development Micro-Basin
6	Rational	1.930	1	10	1,158	------	------	------	Northern (A-2) Basin Post-Developme
7	Rational	5.175	1	10	3,105	------	------	------	Center Basin (A-3) Post-Development
8	Rational	2.662	1	10	1,597	------	------	------	Souther Basin (A-4) Post-Developme
9	Reservoir	3.431	1	13	1,874	7	6.07	1,716	Center Pond
10	Combine	4.877	1	12	3,032	6, 9	------	------	Culvert from Center to Nothern Basin
11	Reservoir	3.450	1	17	2,462	10	7.14	1,317	Northern Pond
12	Combine	4.838	1	13	4,059	8, 11	------	------	Culvert from Nothern to Southern Bas
13	Reservoir	3.124	1	20	2,855	12	5.68	2,263	Southern Pond
14	Combine	9.768	1	10	5,861	6, 7, 8,	------	------	Development without Mediation

Hydrograph Report

Hyd. No. 1

Pre-Development Single Basin

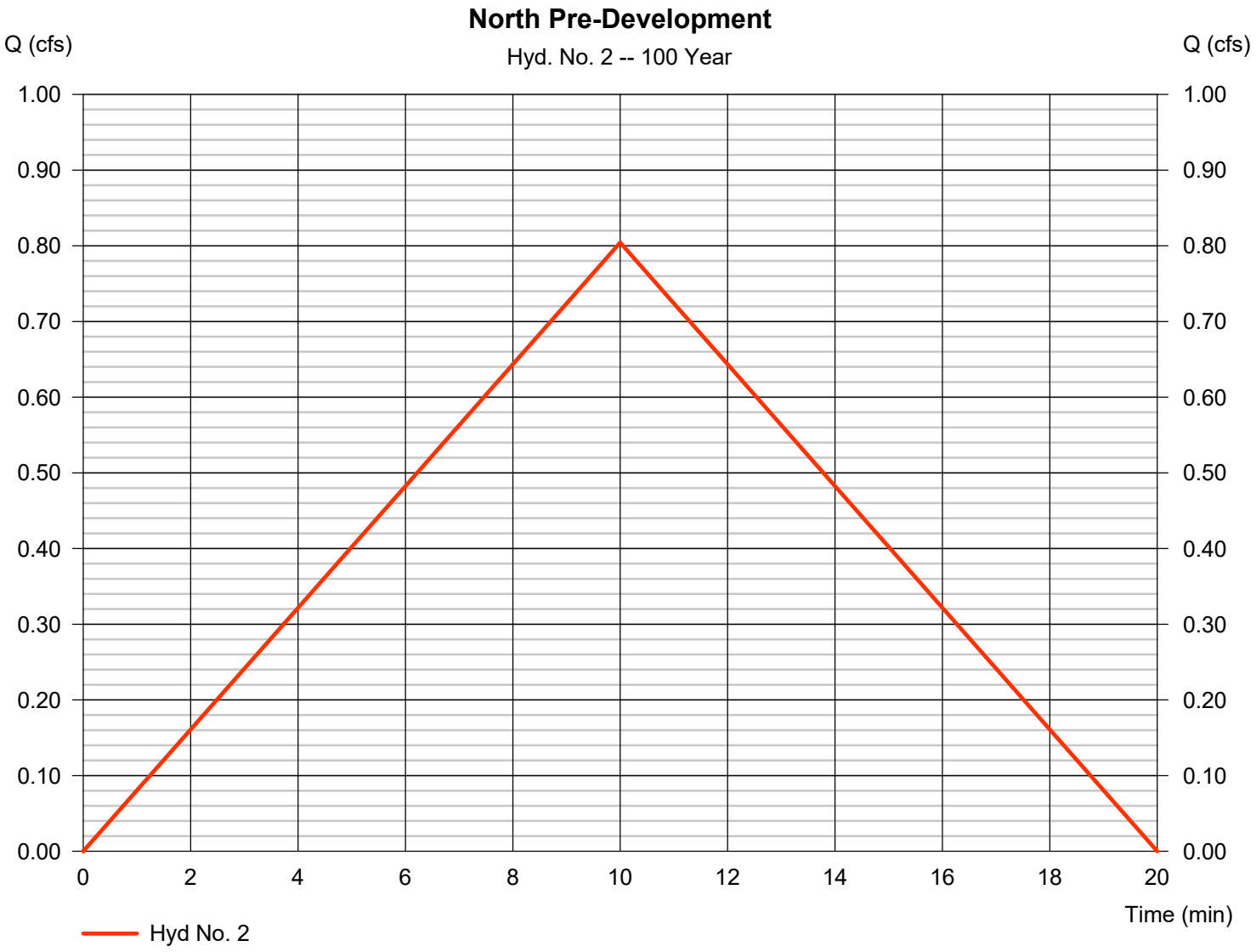
Hydrograph type	=	Rational	Peak discharge	=	3.524 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	3,172 cuft
Drainage area	=	1.530 ac	Runoff coeff.	=	0.4
Intensity	=	5.759 in/hr	Tc by User	=	15.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 2

North Pre-Development

Hydrograph type	= Rational	Peak discharge	= 0.804 cfs
Storm frequency	= 100 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 483 cuft
Drainage area	= 0.287 ac	Runoff coeff.	= 0.4
Intensity	= 7.006 in/hr	Tc by User	= 10.00 min
IDF Curve	= sedona.IDF	Asc/Rec limb fact	= 1/1

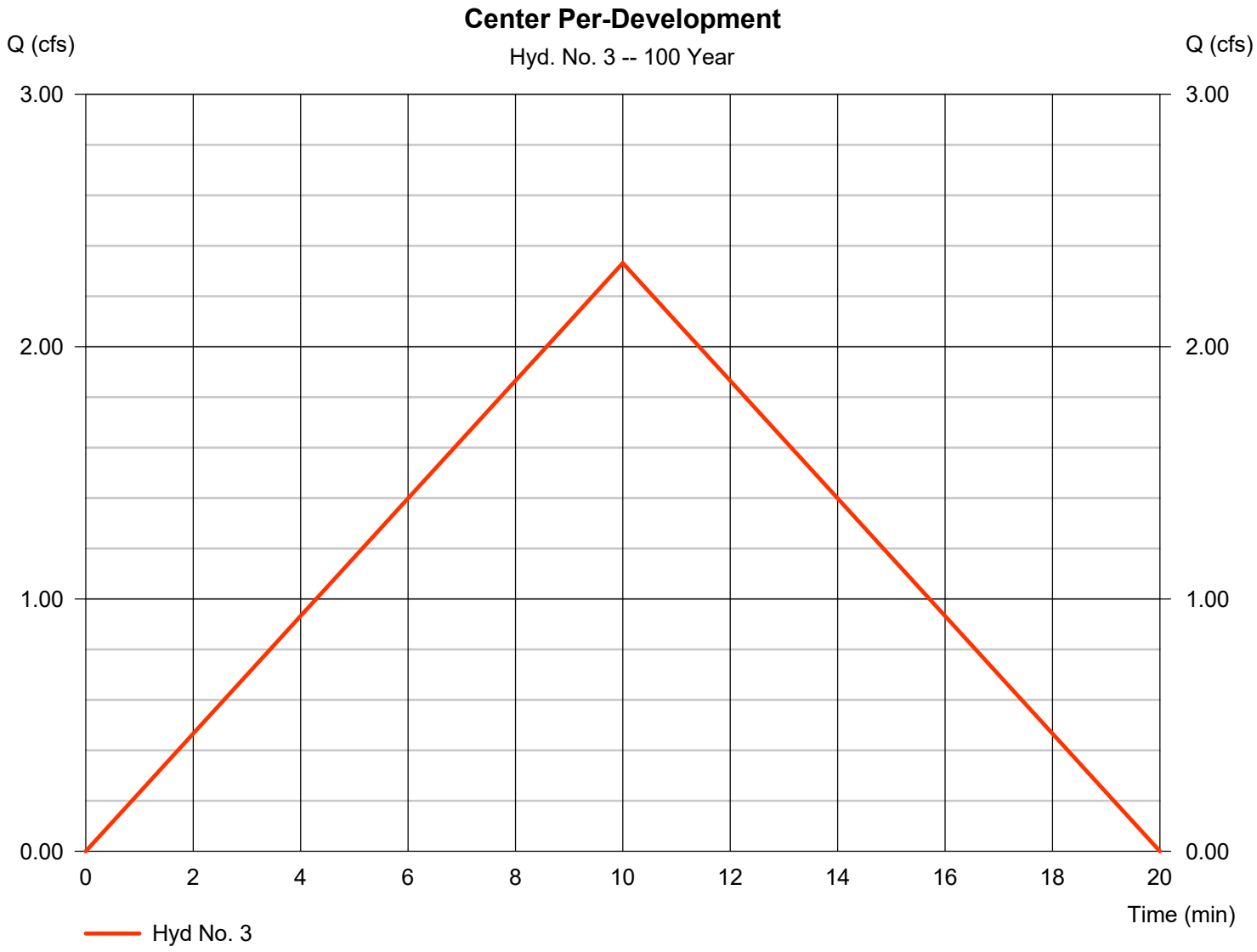


Hydrograph Report

Hyd. No. 3

Center Per-Development

Hydrograph type	=	Rational	Peak discharge	=	2.332 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,399 cuft
Drainage area	=	0.832 ac	Runoff coeff.	=	0.4
Intensity	=	7.006 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

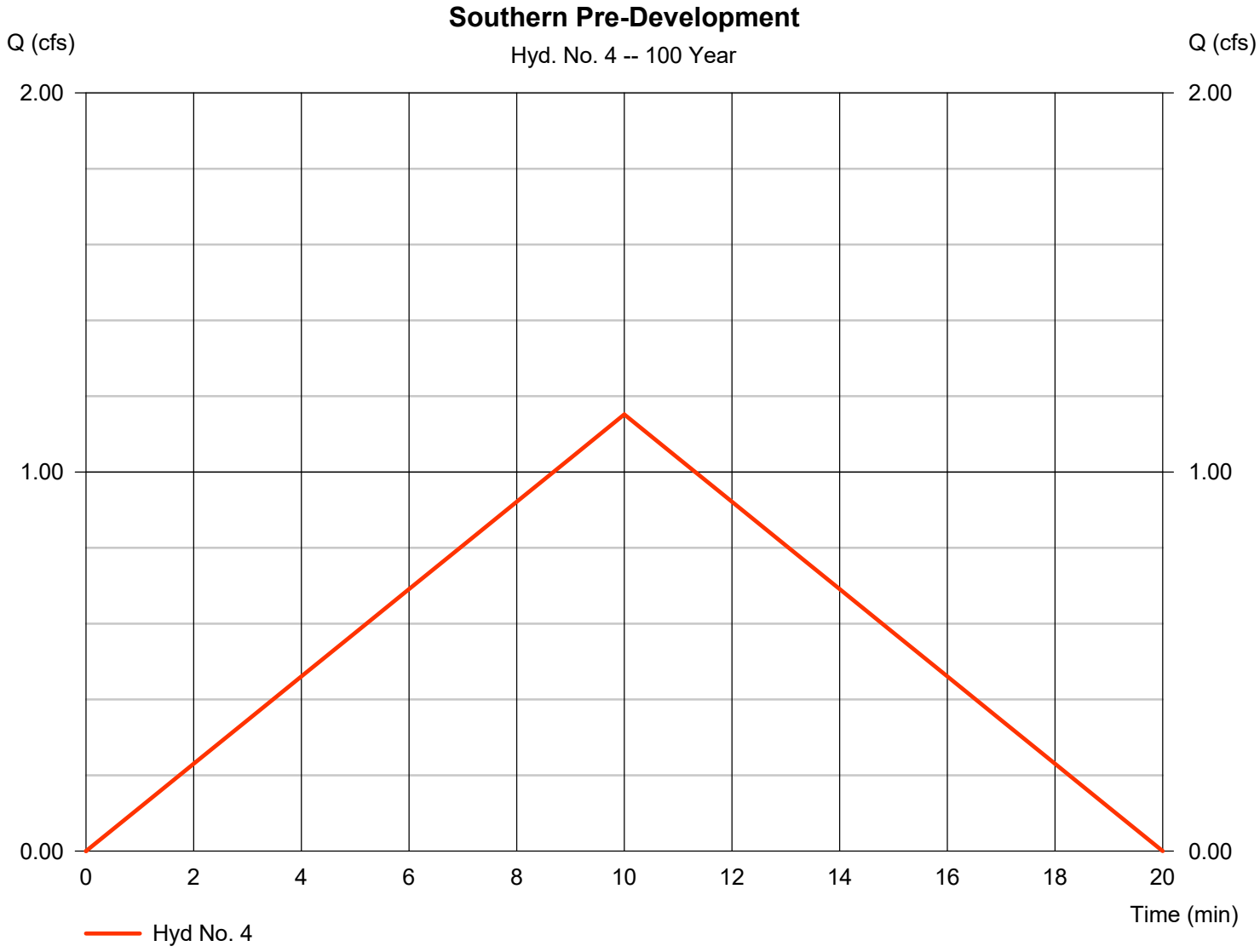


Hydrograph Report

Hyd. No. 4

Southern Pre-Development

Hydrograph type	=	Rational	Peak discharge	=	1.152 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	691 cuft
Drainage area	=	0.411 ac	Runoff coeff.	=	0.4
Intensity	=	7.006 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

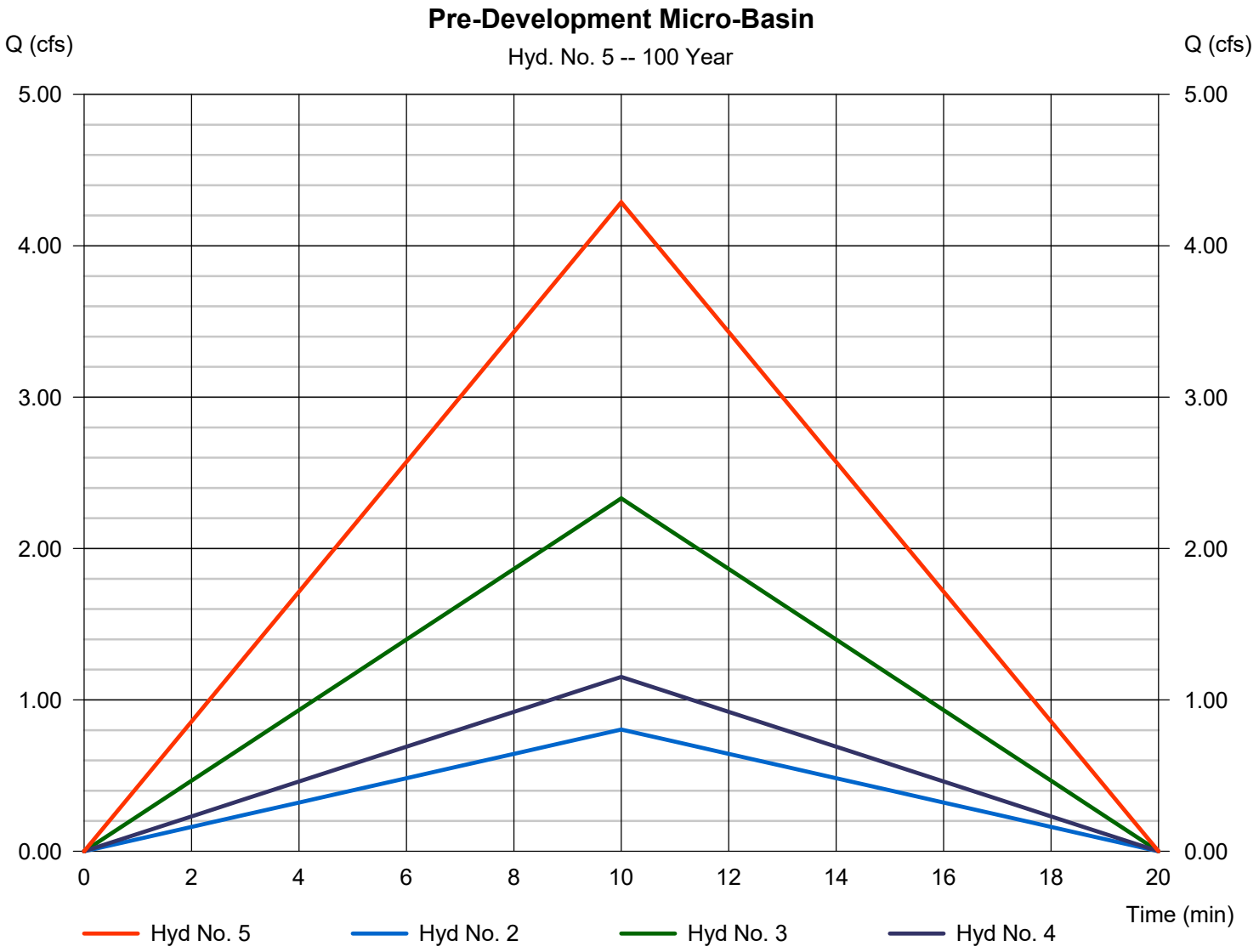


Hydrograph Report

Hyd. No. 5

Pre-Development Micro-Basin

Hydrograph type	=	Combine	Peak discharge	=	4.288 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	2,573 cuft
Inflow hyds.	=	2, 3, 4	Contrib. drain. area	=	1.530 ac

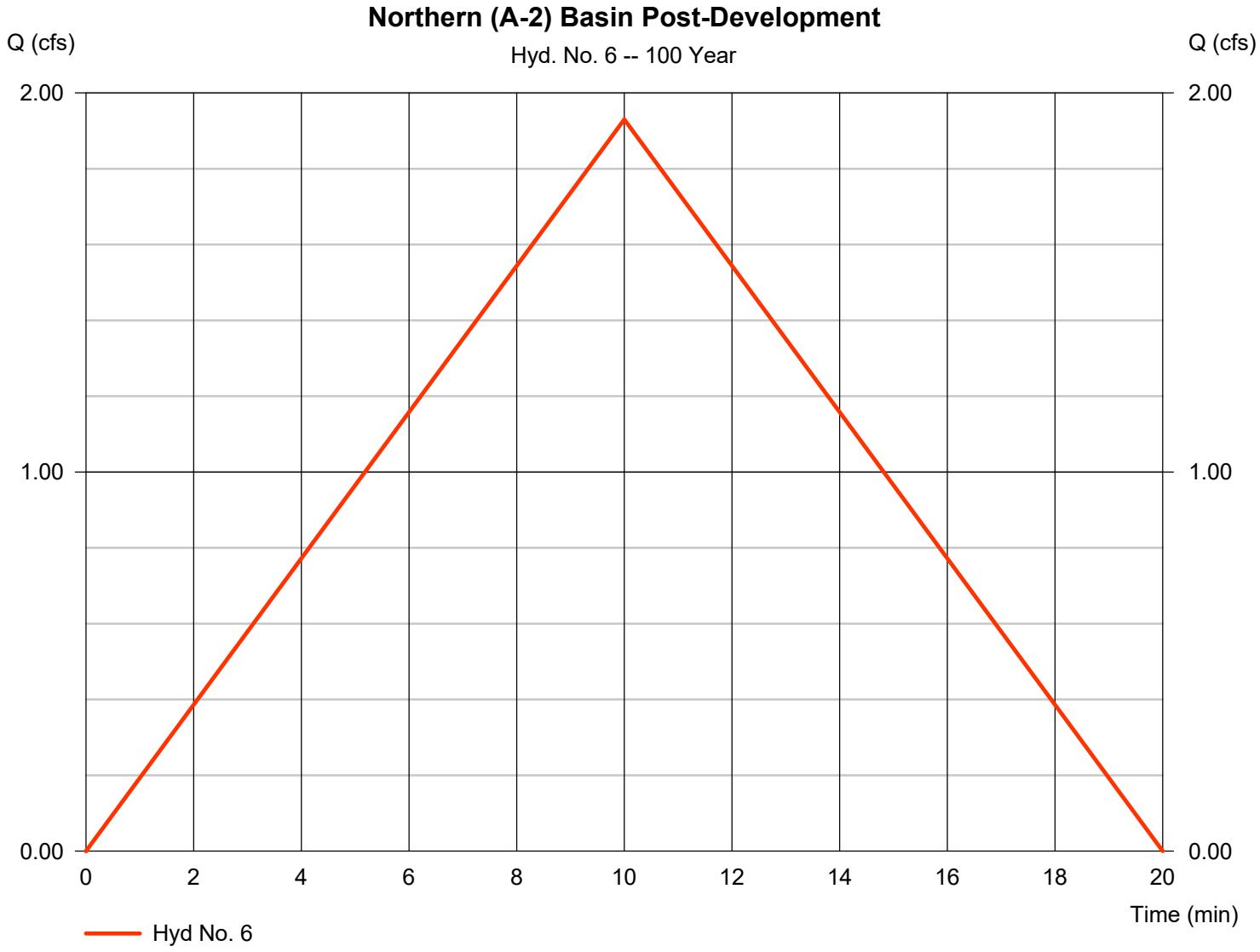


Hydrograph Report

Hyd. No. 6

Northern (A-2) Basin Post-Development

Hydrograph type	=	Rational	Peak discharge	=	1.930 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,158 cuft
Drainage area	=	0.290 ac	Runoff coeff.	=	0.95
Intensity	=	7.006 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1

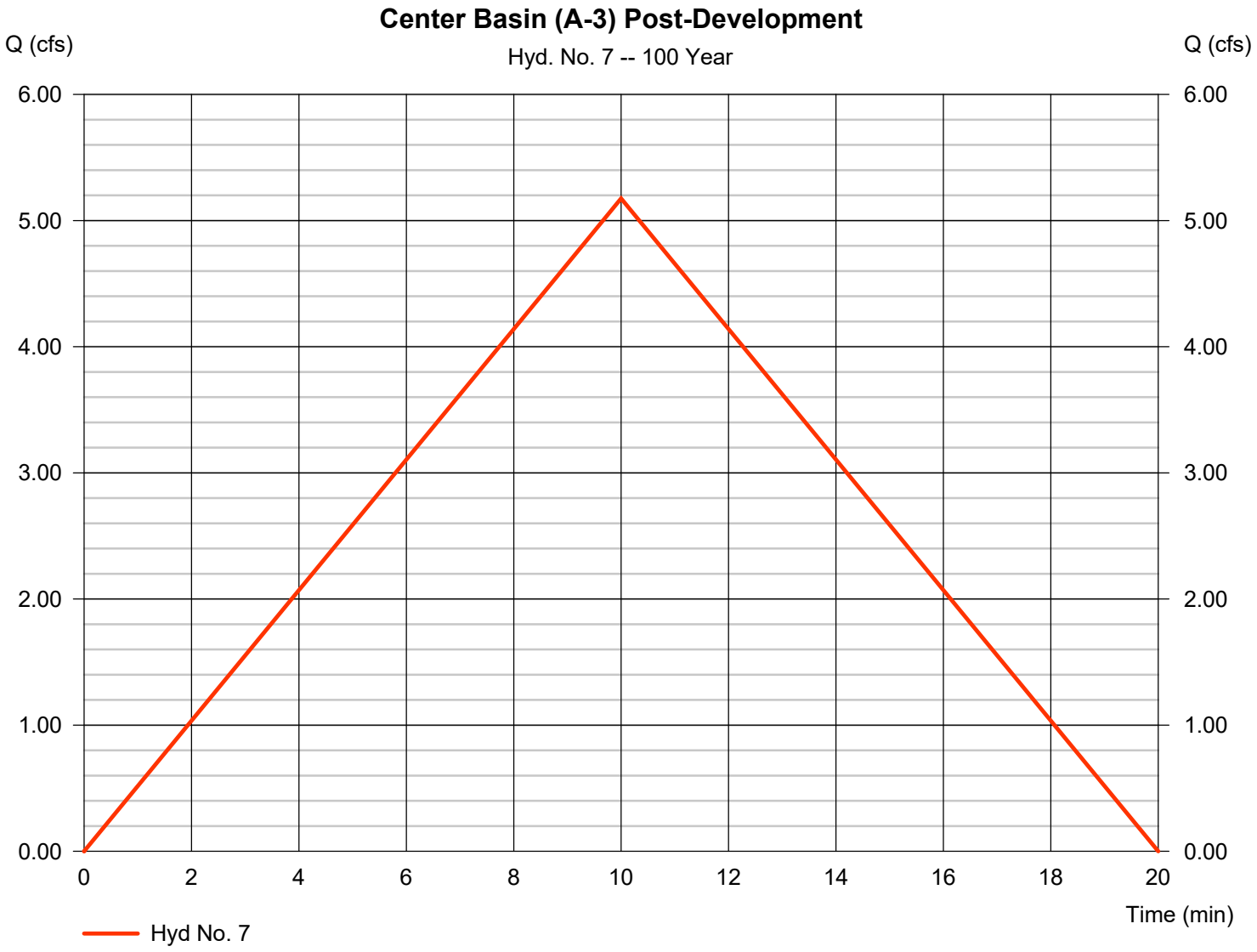


Hydrograph Report

Hyd. No. 7

Center Basin (A-3) Post-Development

Hydrograph type	= Rational	Peak discharge	= 5.175 cfs
Storm frequency	= 100 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 3,105 cuft
Drainage area	= 0.830 ac	Runoff coeff.	= 0.89
Intensity	= 7.006 in/hr	Tc by User	= 10.00 min
IDF Curve	= sedona.IDF	Asc/Rec limb fact	= 1/1

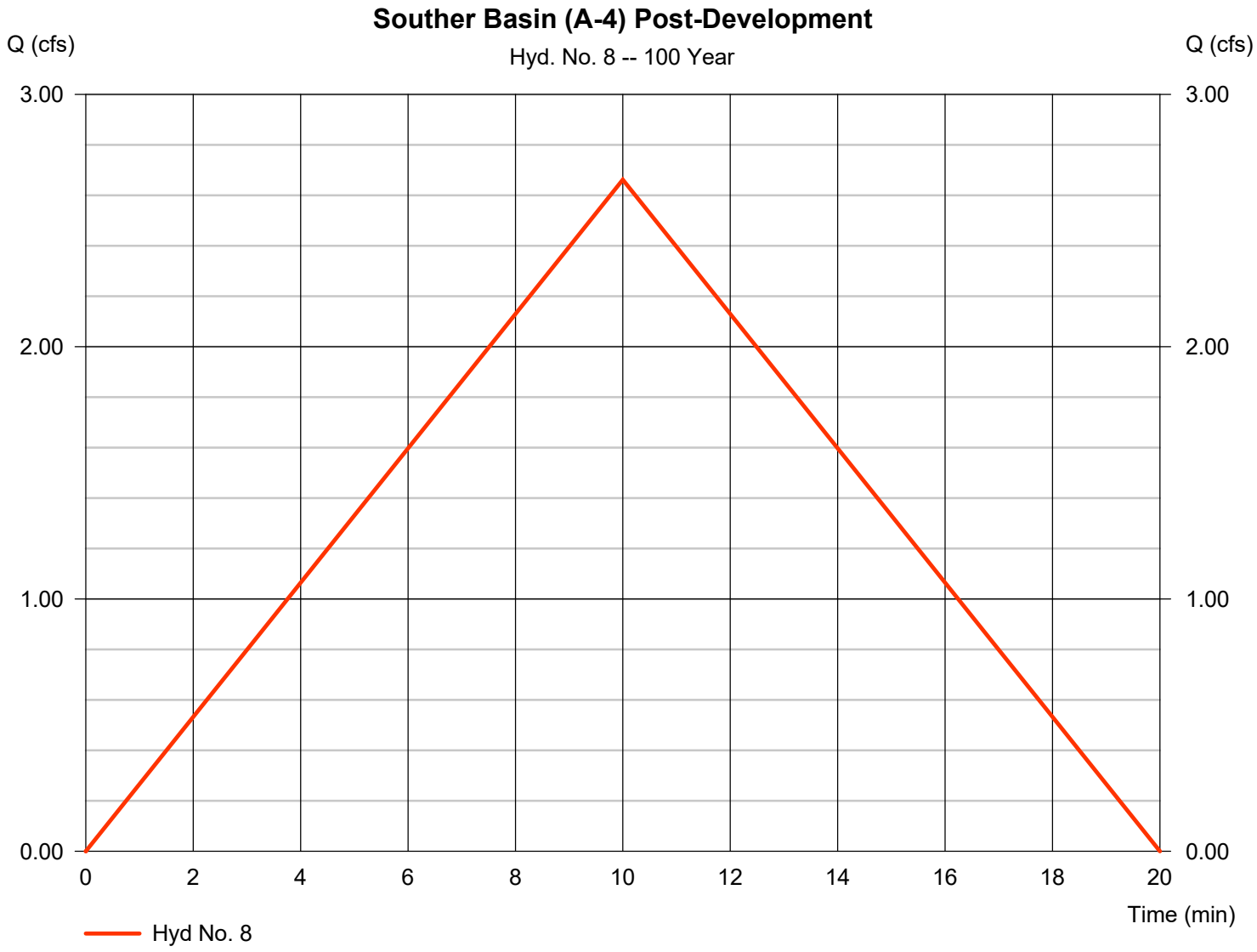


Hydrograph Report

Hyd. No. 8

Souther Basin (A-4) Post-Development

Hydrograph type	=	Rational	Peak discharge	=	2.662 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	1,597 cuft
Drainage area	=	0.400 ac	Runoff coeff.	=	0.95
Intensity	=	7.006 in/hr	Tc by User	=	10.00 min
IDF Curve	=	sedona.IDF	Asc/Rec limb fact	=	1/1



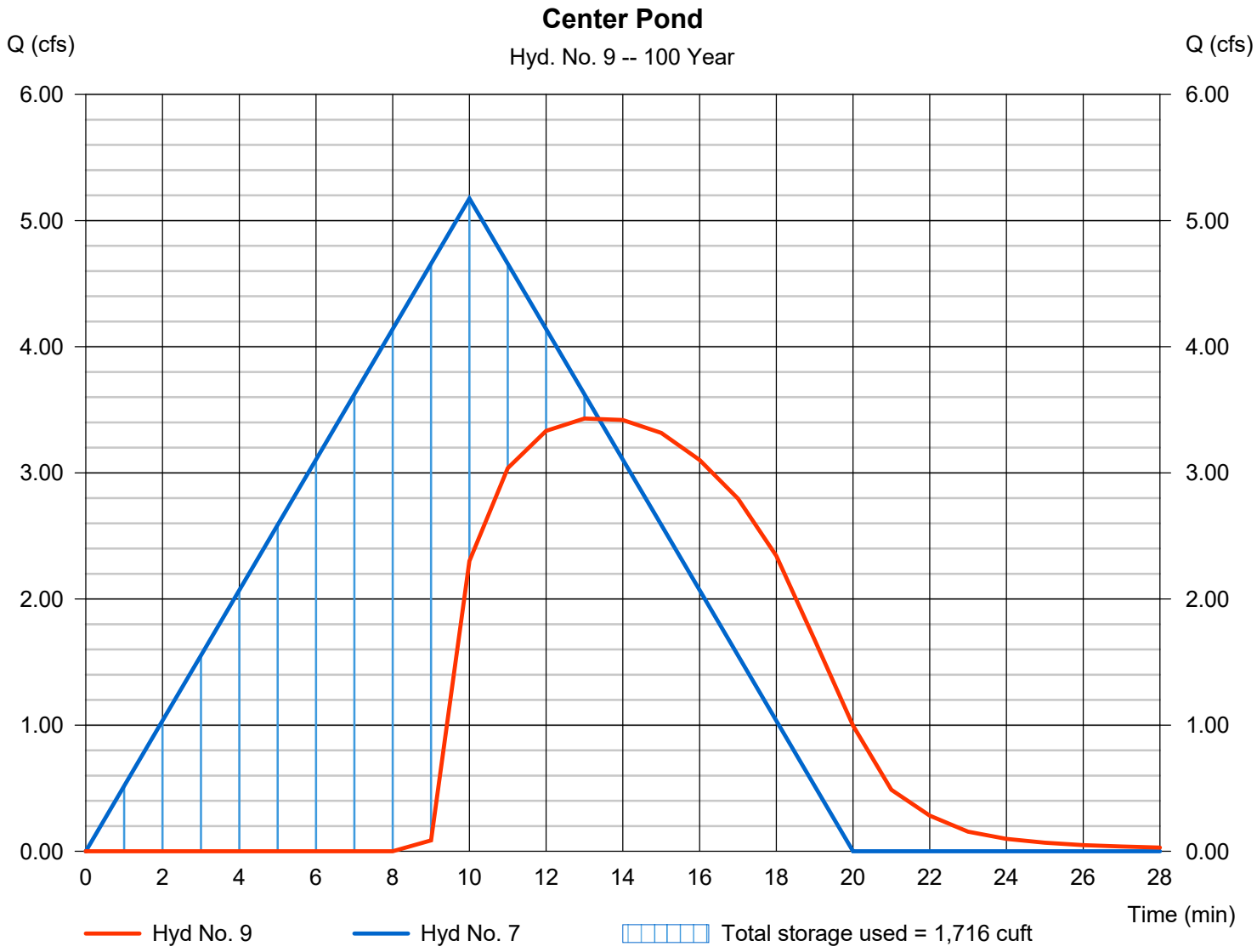
Hydrograph Report

Hyd. No. 9

Center Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.431 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,874 cuft
Inflow hyd. No.	=	7 - Center Basin (A-3) Post-Dev	Max. Elevation	=	6.07 ft
Reservoir name	=	center pond	Max. Storage	=	1,716 cuft

Storage Indication method used.

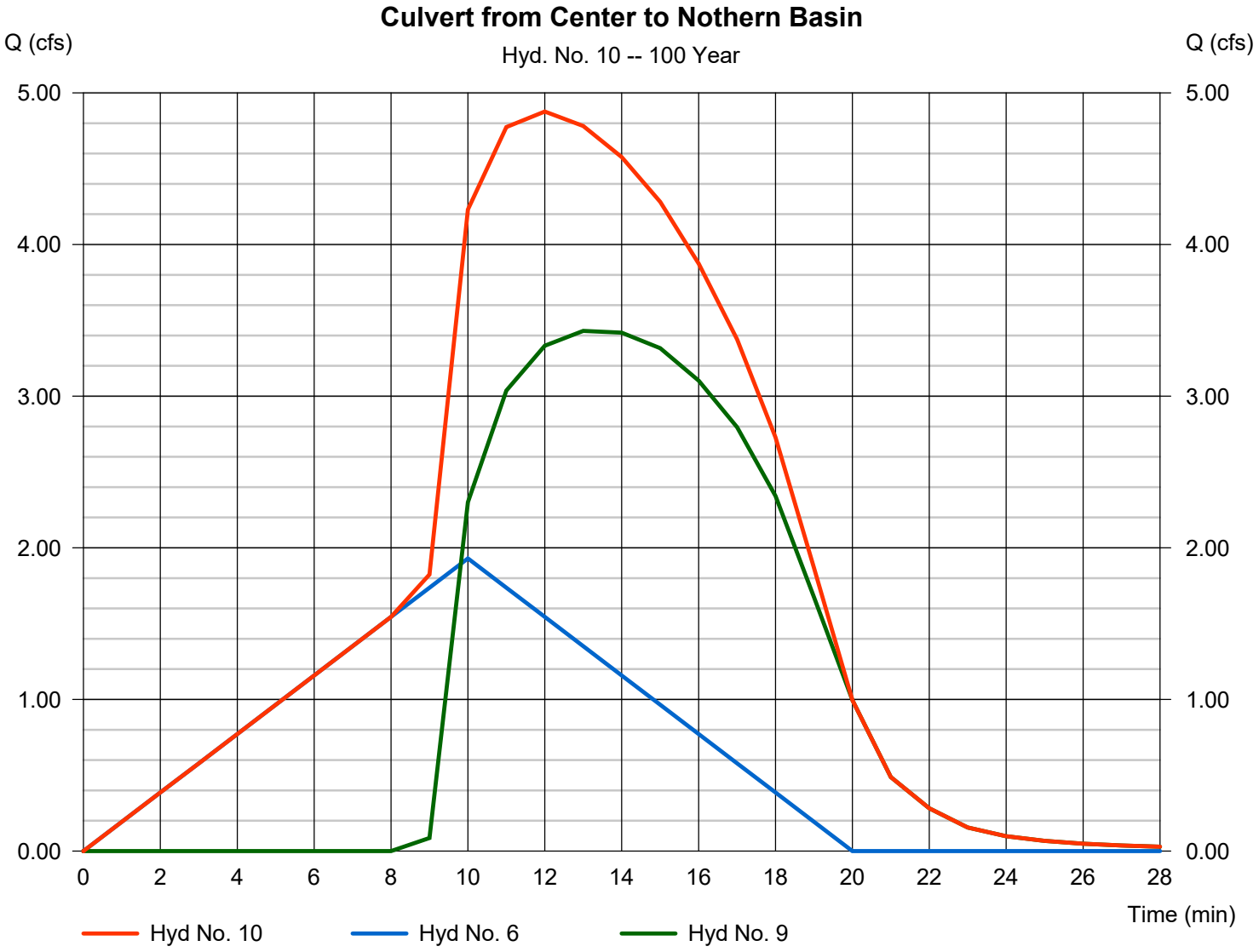


Hydrograph Report

Hyd. No. 10

Culvert from Center to Nothern Basin

Hydrograph type	=	Combine	Peak discharge	=	4.877 cfs
Storm frequency	=	100 yrs	Time to peak	=	12 min
Time interval	=	1 min	Hyd. volume	=	3,032 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.290 ac



Hydrograph Report

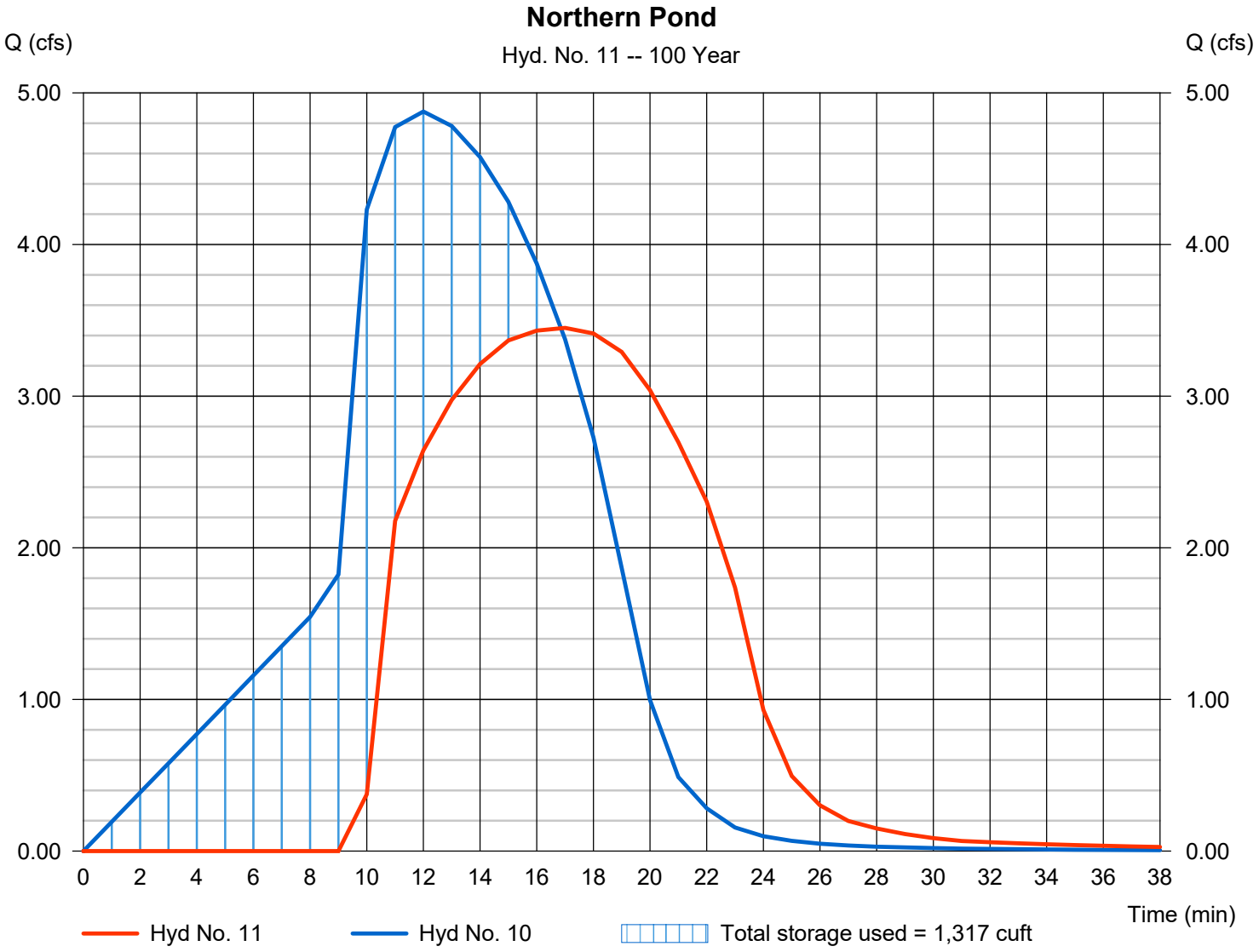
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 09 / 30 / 2021

Hyd. No. 11

Northern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.450 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	2,462 cuft
Inflow hyd. No.	=	10 - Culvert from Center to Northern Basin	Max. Elevation	=	7.14 ft
Reservoir name	=	north pond	Max. Storage	=	1,317 cuft

Storage Indication method used.

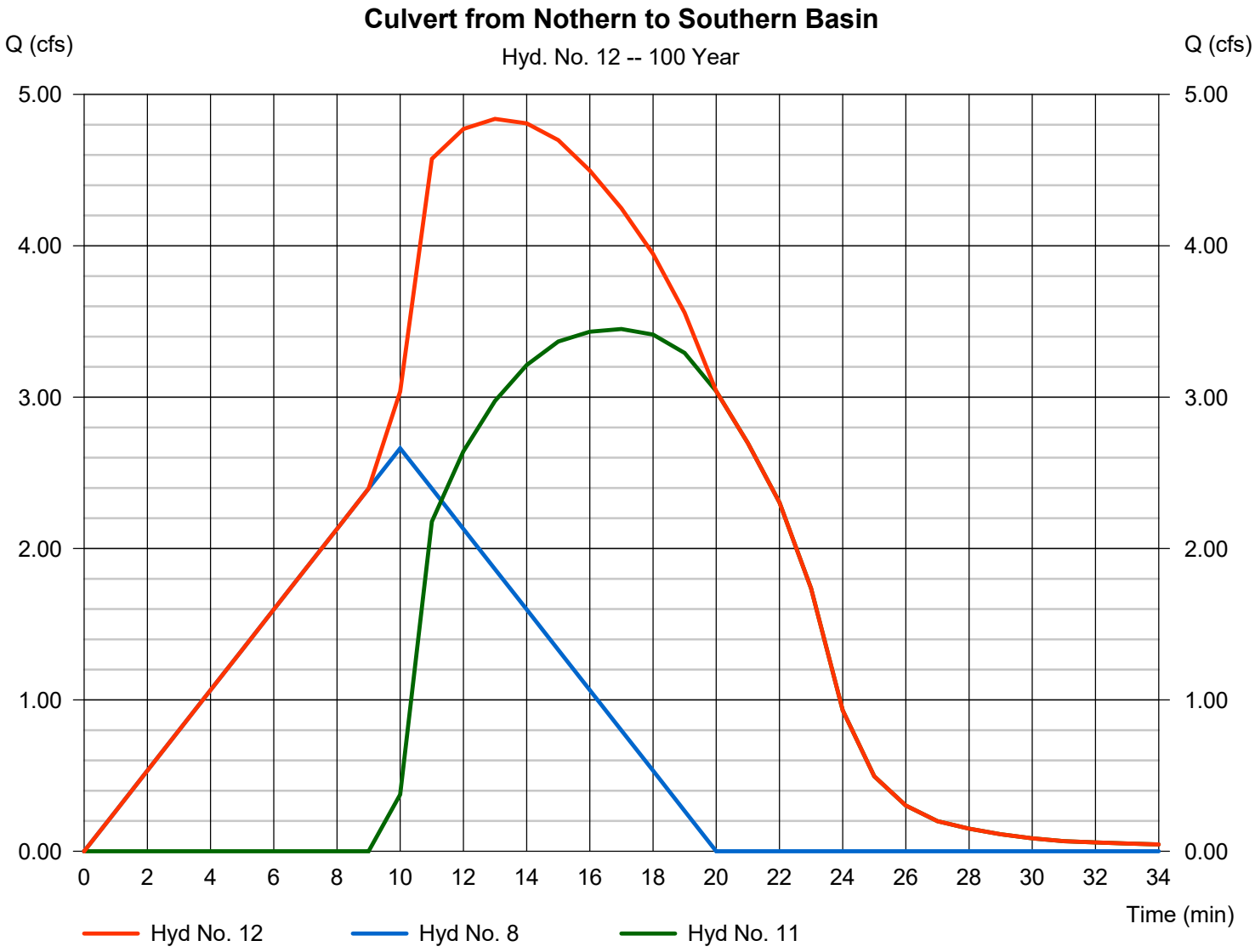


Hydrograph Report

Hyd. No. 12

Culvert from Nothern to Southern Basin

Hydrograph type	=	Combine	Peak discharge	=	4.838 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	4,059 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.400 ac



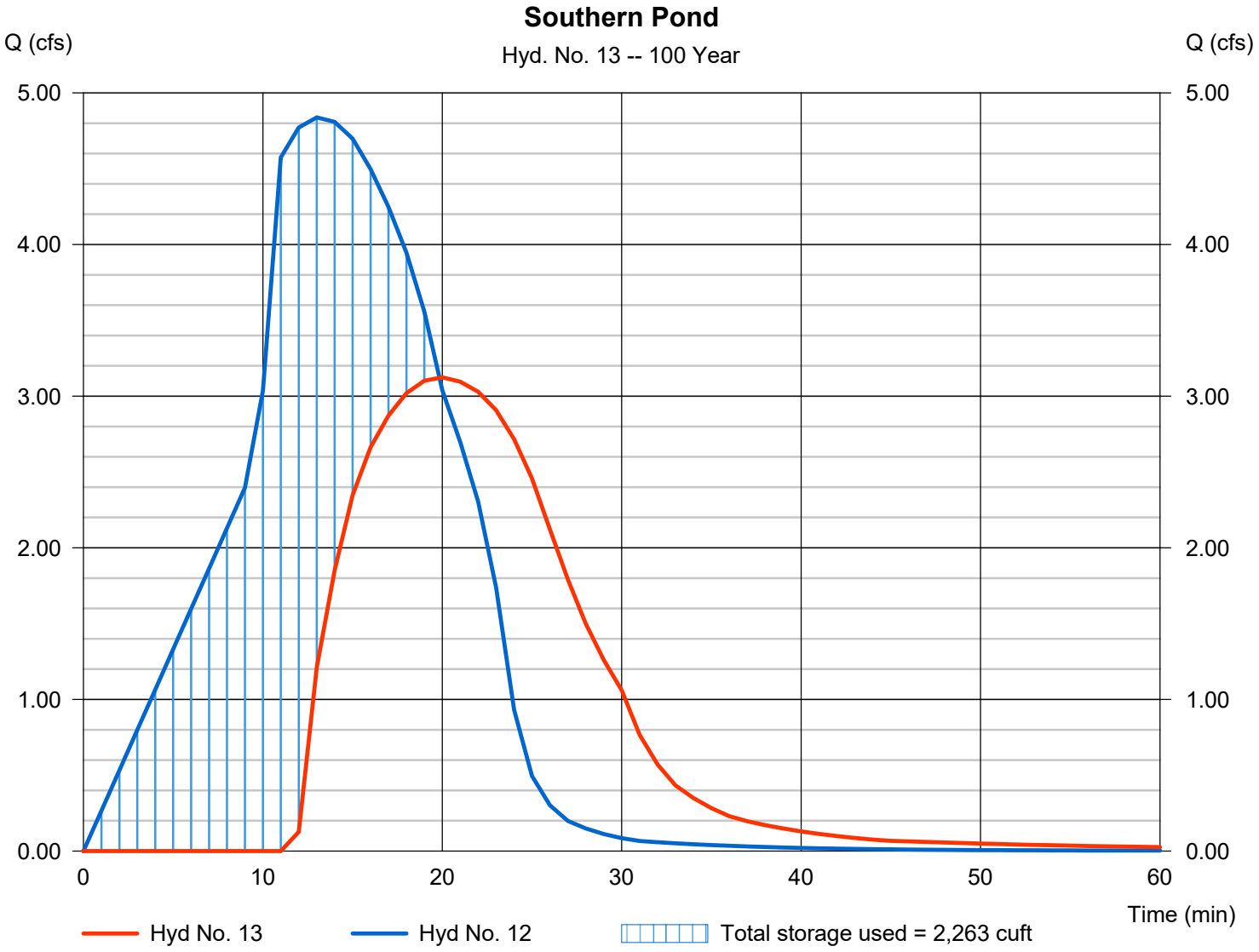
Hydrograph Report

Hyd. No. 13

Southern Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.124 cfs
Storm frequency	=	100 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	2,855 cuft
Inflow hyd. No.	=	12 - Culvert from Nothern to Southern Basin	Max. Elevation	=	5.68 ft
Reservoir name	=	southern pond	Max. Storage	=	2,263 cuft

Storage Indication method used.

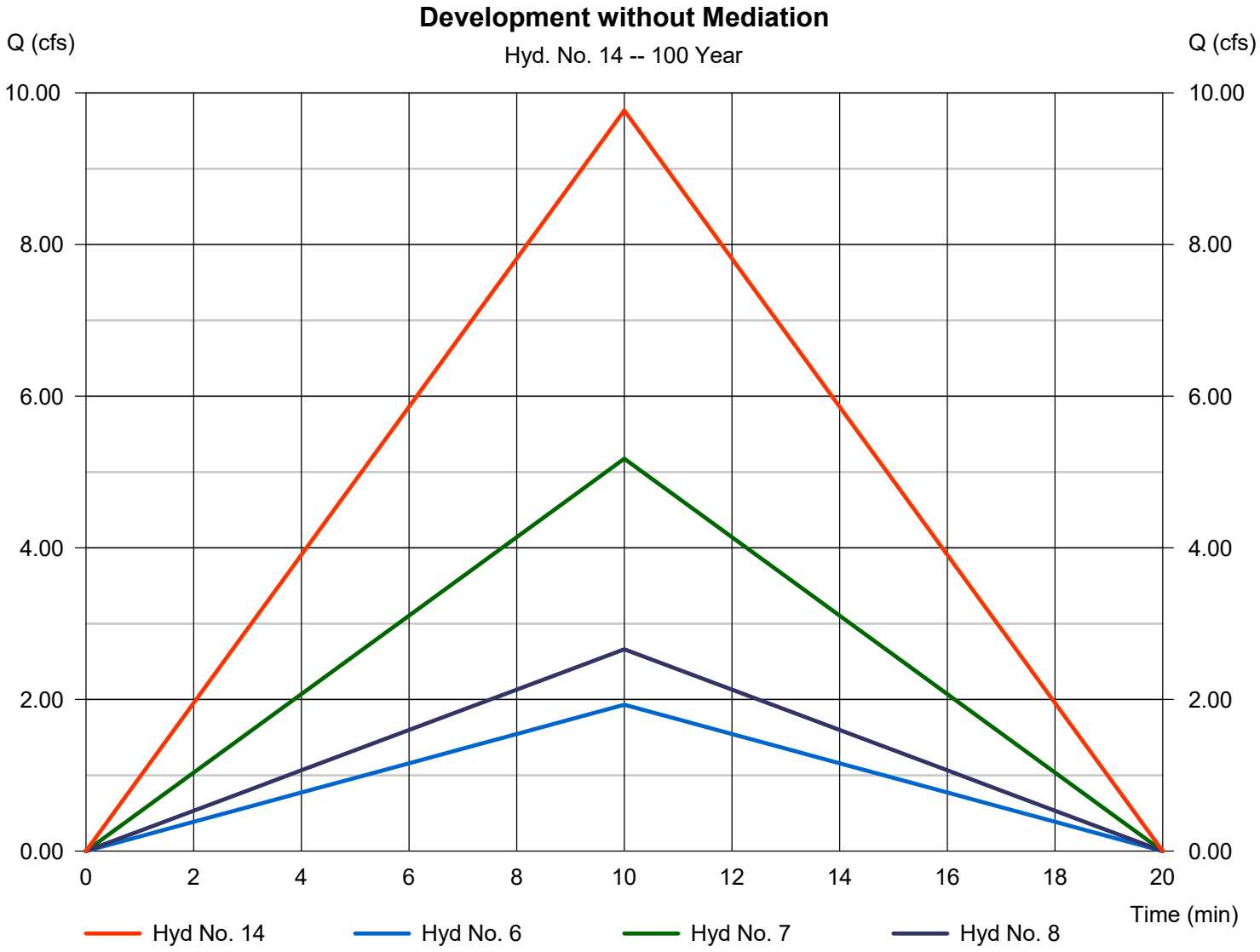


Hydrograph Report

Hyd. No. 14

Development without Mediation

Hydrograph type	=	Combine	Peak discharge	=	9.768 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	5,861 cuft
Inflow hyds.	=	6, 7, 8	Contrib. drain. area	=	1.520 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	24.6100	9.4000	0.8535	--------
2	32.8403	9.7000	0.8610	--------
3	0.0000	0.0000	0.0000	--------
5	41.7858	9.3000	0.8477	--------
10	49.3321	9.1000	0.8410	--------
25	62.4815	9.1000	0.8441	--------
50	72.3523	9.1000	0.8414	--------
100	84.1871	9.1000	0.8429	--------

File name: sedona.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	2.53	1.96	1.61	1.37	1.20	1.07	0.97	0.88	0.81	0.75	0.70	0.66
2	3.25	2.52	2.08	1.77	1.55	1.38	1.25	1.14	1.05	0.97	0.91	0.85
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	4.38	3.40	2.80	2.39	2.09	1.86	1.68	1.53	1.41	1.31	1.23	1.15
10	5.33	4.13	3.40	2.90	2.54	2.26	2.04	1.87	1.72	1.60	1.49	1.40
25	6.69	5.18	4.26	3.63	3.18	2.83	2.56	2.34	2.15	2.00	1.86	1.75
50	7.81	6.05	4.97	4.24	3.71	3.31	2.99	2.73	2.52	2.34	2.18	2.05
100	9.05	7.01	5.76	4.91	4.30	3.83	3.46	3.16	2.91	2.70	2.52	2.37

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	0.00	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

Hydraflow Table of Contents

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Robert Lane, Public Lands
Cheri Baker, Office Manager
Crockett Saline, E.I.T.
Christopher Henry, E.I.T.
David Nicolella, Planner
Leonard Filner, Planner

October 4, 2021

Sedona Community Development Department
102 Roadrunner Dr. Bldg. 104
Sedona, AZ 86336

Subject: Sunset Drive Apartments – Traffic Generation

Dear Sedona Community Development Department,

Sefton Engineering has prepared this Traffic Generation Assessment as required by the City of Sedona in accordance with the Community Development Design, Review, Engineering, and Administrative Manual for the proposed development of the property located east Sunset Drive. More specifically described as APN 408-26-030C in Yavapai County, Arizona. The property abuts and will use Sunset Drive as entrance and exit. Approximately 0.1 miles north of the property Sunset Drive intersects with State Route 89A. Sunset Drive is a two-lane road and classified as a Minor Collector Road, and State Route 89A is classified as a Major Arterial Road and is a four-lane roadway. The posted speed limit on Sunset Drive is 25 MPH and the posted speed limit on State Route 89A is 35 MPH.

The Institute of Transportation Engineers (ITE) Trip Generation Rates 10th Edition was used to obtain the trip generation rates for the proposed development based on the proposed use. This development will include four 2-story structures consisting of 46 apartments. Traffic generation estimations were calculated for the Average Weekday, AM Peak Hour and PM Peak Hour using the proper land usage shown in the table. The results of the calculations are shown below:

Sunset Apartments Trip Generation									
Land Use	ITE Code	Intensity	Daily Trips	Peak Hour Generated Trips		Total Distributed Trips Generation Rate			
				AM	PM	AM In	AM Out	PM In	PM Out
Trip Generation Rates, 10th Edition									
Multifamily Low Rise Housing Up to 2 Story (Apartments, Condo, Town Home)	220	Dwelling Unit	7.32	0.46	0.56	0.23	0.77	0.63	0.37
Trip Generation Summary									
Description		Size	Daily Trips	Total PH Generated Trips		Total Distribution of Generated Trip			
				AM	PM	AM In	AM Out	PM In	PM Out
Multifamily Low Rise Housing Up to 2 Story (Apartments, Condo, Town Home)		46	337	21	26	5	16	16	10
Proposed Project Trips			337	21	26	5	16	16	10

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It is shown in the table above that this development will produce approximately 21 and 26 total traffic movements during the AM and PM Peak Hour respectively.

Sincerely,

Luke Sefton, PE, CFM

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