January 17, 2019

Dawn Bell
Project Manager, Development Center
Lee's Summit, Missouri
220 SE Green Street
Lee' Summit, MO 64063

Re: O'Reilly Development's proposed Lee's Summit Senior Community

The following information is our analysis of our proposed senior community development.

1.0 INTRODUCTION

The objective of this analysis is to provide a description of the proposed development.

Currently the property is zoned CP-2 and we are requesting as part of our application allowance of a senior living community use within this zoning district.

2.0 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development consists of a parcel of land that is to be platted into 2 lots, the remaining tract is to be unplatted. The property is located on the south side of SE Oldham Parkway and to the east of SE Ranson Road. The project is to be on the lot created at the east side of the tract of land. The project will include Princeton Road extending to the north through the site to Oldham Road.

Lot 1, 10.45 acres, is a senior living community use. The senior living community consist of a Memory Care Facility, Assisted Living Facility and an Independent Living Facility. This a full continuum of care facility.

Memory Care	(18) studio units	(18) beds
Assisted Living	(28) studio units	(44) beds
	(16) 1 bedroom units	
Independent Living	(15) studio units	(92) dwelling units
	(43) 1 bedroom units	
	(34) 2 bedroom units	

The Assisted Living and Memory care residencies will be licensed care facilities and meet the state requirements for licensure. The memory care units are studio type units. The assisted living units are 1 bedroom and studio type units, each unit has a small kitchenette, sink, refrigerator and microwave. The assisted living and memory care facilities contain private courtyards for resident use. Other amenities within consist of dining areas, salon, therapeutic spa room, theater, wellness fitness area, library spaces and communal living space.

The independent living facility consist of private units that all have kitchens so residents if desire can do their own cooking. Also available to the residents is dining area where they can choose to have meals. The commercial kitchen associated with the dining area is shared with the assisted living facility. All the resident units have exterior balcony or patio. Amenities available for resident use will include: community dining area, private dining room, communal living spaces, library, media rooms, craft room, community room, workshop, theater, bistro, wellness fitness area and a swimming pool.

Lot 2 .8714 acres.

3.0 EXTERIOR FINISHES

The intention of the senior living community is to provide a home like atmosphere. Exterior materials that are being proposed consist of brick, thin stone veneer, cement board siding (vertical and horizontal).

4.0 COVERED PARKING

The project incorporates the use of carports as an option to resident parking. The proposed development consist of 30 covered parking spaces.

5.0 STORM WATER STUDY

Included within the submittal is the storm water drainage study prepared by Olsson.

6.0 SANITARY SEWER IMPACT

Included within the submittal is the required sanitary impact study prepared by HDR engineers.

7.0 TRAFFIC STUDY

Included within the submittal is the required traffic impact study prepared by Priority Engineers Inc.

8.0 SITE LIGHITING

A site plan with lighting photometrics has been included as part of the submittal. Included within the submittal are the cut sheets of the lighting that will be utilized throughout the site.

Sincerely,

Scott J. Auman, AIA NCARB

STARK WILSON DUNCAN ARCHITECTS INC – 315 NICHOLS ROAD, SUITE 228 – KANSAS CITY, MO 64112 – T 816.531.1698 F 816.531.1978

STORM WATER STUDY

STARK WILSON DUNCAN ARCHITECTS INC – 315 NICHOLS ROAD, SUITE 228 – KANSAS CITY, MO 64112 – T 816.531.1698 F 816.531.1978

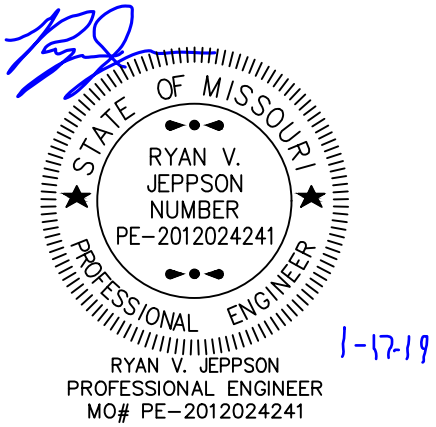
PRELIMINARY STORMWATER DRAINAGE STUDY FOR LEE'S SUMMIT SENIOR LIVING COMMUNITY

SE Oldham Parkway
Lee Summit, Missouri

South Prairie Lee Watershed

Prepared for:

Lee's Summit Senior Community, LLC
5051 S. National Avenue, Ste. 4-110
Springfield, Missouri
Phone: 417-893-6006



Original Report Date: January 2019

Prepared By: Trevor Drake
Reviewed By: Ryan Jeppson, P.E.
Olsson, Inc.
550 St. Louis St.
Springfield, MO 65806
Missouri Engineering Certificate of Authority #001592
Olsson Project No. 018-1450

olsson

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1. GENERAL INFORMATION

The following stormwater report is for the Lee's Summit Senior Living Community located on the south side of Oldham Parkway approximately 0.4 miles east of Todd George Parkway. The proposed 157,515-sqft facility will be on a 10.45 acre± site that is currently vacant agricultural crop land. In the existing condition the site generally flows from south to the north towards Oldham Parkway. A subtle ridge line splits the site into two sub-drainage areas. The western onsite drainage area discharges to the Oldham Parkway drainage swale at the northwest corner of the site (POI #1). The swale drains to a 5'x5' RCB culvert that flows north underneath the Oldham Parkway, US Route 50, and Blue Parkway to the E. Fork Little Blue River through an unnamed tributary. The eastern onsite drainage area intercepts offsite runoff from approximately 5-acres of agricultural land from the east. Runoff continues to flow north and northeast to an existing 30" RCP culvert (POI #2) that discharges north underneath Oldham Parkway, US Route 50, and Blue Parkway. Storm water continues north to an existing wet detention facility located south of Shenandoah Drive.

Stormwater runoff from the proposed Lee's Summit Senior Living Community will be collected and conveyed through onsite storm sewer, that is routed to proposed bioretention and extended dry detention facilities. These facilities will discharge the water in compliance with the City of Lee Summit's design standards to the existing outfall locations previously discussed.

According the FEMA Flood Map Service Center the site is in an area of minimal flood hazard, Zone X, per map #29095C049G dated 01/20/2017. Zone X is the FEMA flood insurance rate zone that corresponds to "areas of 0.2% annual chance flood; areas of 1% chance flood with average depths less than 1 foot or within drainage areas of less than 1 square mile; and areas protected by levees from 1% annual chance flood." The FEMA FIRMette has been included in Appendix A.

Per the National Wetlands Inventory, the site has no "blue line" streams or wetlands located on site.

Soil data was taken from the USDA Natural Resources Conservation Service – Web Soil Survey of Jackson, County Missouri. The Web soil survey categorize soils on the proposed Lee's Summit Senior Living Community as:

TABLE 1. SITE SOIL CLASSIFICATION

Map Unit	Map Unit Name	Percent Slopes	Rating	Area in AOI (acres)	Percent of AOI
10000	**Arisburg Silt Loam**	1 to 5	C	15.9	85.9%
10082	**Arisburg-Urban land complex**	1 to 5	C	2.6	14.1%

*see Web Soil Survey pdf located in Appendix A

2. METHODOLOGY

This Preliminary Stormwater Drainage Study has been prepared to evaluate the hydrologic impact generated by the development of the Lee's Summit Senior Living Community. The base data for models prepared for this report have been obtained through topographic surveys, online maps, and aerial imagery.

The following method was used to study and model existing and proposed conditions for stormwater runoff:

- TR-55 Unit Hydrograph Method
  - 2-year, 10-year, 100-year Return Frequency Storms
  - 24-Hour SCS Type II Rainfall Distribution
  - SCS Runoff Curve Numbers Per SCS TR-55
  - SCS TR-55 Methods for determining Time of Concentration and Travel Time

Rainfall depth & duration data were taken from the National Oceanic and Atmospheric Administration (NOAA). A summary of the rainfall data used in the calculations are presented in Table 2.

TABLE 2. RAINFALL PRECIPITATION

Annual Exceedance Probability (AEP)	**Rainfall Depth** (inches)
1-year	3.71
10-year	5.66
100-year	9.25

*Preliminary Hydraflow reports have been provided in Appendix A

3. EXISTING CONDITIONS ANALYSIS

Existing conditions where modeled assuming straight row crop ground cover in good condition. This assumption was used to calculate existing condition flow rates and the level service required for proposed BMP implementation. Discharge from the proposed development will adhere to APWA and Lee's Summit discharge requirements. Refer to Figure 1 for existing condition sub-drainage area locations, runoff curve numbers, and sub-drainage area acreage.

In the existing condition the site generally flows from south to the north towards Oldham Parkway. A subtle ridge line splits the site into two sub-drainage areas. The western onsite drainage area (EX10) discharges to the Oldham Parkway drainage swale at the northwest corner of the site (POI #1). The swale drains to a 5'x5' RCB culvert that flows north underneath the Oldham Parkway, US Route 50, and Blue Parkway to the E. Fork Little Blue River through an unnamed tributary.

The eastern onsite drainage area (EX20) intercepts offsite runoff from approximately 5-acres of agricultural land from the east (OFF20). Runoff continues to flow north and northeast to an existing 30" RCP culvert (POI #2) that discharges north underneath Oldham Parkway, US Route 50, and Blue Parkway. Storm water continues north to an existing wet detention facility located south of Shenandoah Drive.

The following table(s), Table 3A & 3B, summarizes the results of the existing conditions analysis:

TABLE 3A. EXISTING CONDITIONS ANALYSIS SUMMARY POINT OF INTEREST #1

Subarea	Drainage Area (acres)	Curve Number	Tc (Minutes)	Existing $Q_{2\text{-year}}$ (cfs)	Existing $Q_{10\text{-year}}$ (cfs)	Existing $Q_{100\text{-year}}$ (cfs)
EX 10 (POI #1)	**3.98**	85	26.3	8.529	15.28	27.78

TABLE 3B. EXISTING CONDITIONS ANALYSIS SUMMARY POINT OF INTEREST #2

Subarea	Drainage Area (acres)	Curve Number	Tc (Minutes)	Existing $Q_{2\text{-year}}$ (cfs)	Existing $Q_{10\text{-year}}$ (cfs)	Existing $Q_{100\text{-year}}$ (cfs)
EX 20	**8.27**	85	25.1	17.72	31.75	57.71
OFF 20	**4.94**	85	28.9	9.875	17.72	32.26
PO1 #2				27.43	49.14	89.48

4. PROPOSED CONDITIONS ANALYSIS

The proposed conditions section of this analysis assumes completion of the Lee's Summit Senior Living Community. As in the existing conditions, the proposed conditions stormwater runoff model was created and ran for the 2, 10, and 100-year storm events. The complete output for the Hydraflow model has been included in Appendix A. Refer to Figure 2 for developed sub-drainage area locations, runoff curve numbers, and sub-drainage area acreage.

In the developed condition drainage area DEV 10 flows into Bio Detention Facility #1 before flowing into the proposed dry detention basin. Drainage area DEV 30 is conveyed into the dry detention basin through an underground storm sewer system. The detention facility discharges to Point of Interest #1, along with some of the existing flow from SE Oldham Parkway.

Point of Interest #2 accepts flow from the eastern half of the site. Drainage area DEV 20 is routed through Bio Detention Facility #2 before it is discharged to the point of interest. While drainage area DEV 21, which is the proposed public roadway to be constructed on the eastern edge of the site, is collected in an underground storm sewer system and conveyed to Point of Interest #2.

The following tables contain input data and summarize the computed results of the developed conditions analysis:

TABLE 4A. DEVELOPED CONDITIONS ANALYSIS SUMMARY POINT OF INTEREST #1

Subarea	Drainage Area (acres)	Curve Number	Tc (Minutes)	Developed $Q_{2\text{-year}}$ (cfs)	Developed $Q_{10\text{-year}}$ (cfs)	Developed $Q_{100\text{-year}}$ (cfs)
DEV 10	**3.09**	92	5	13.97	22.55	38.09
DEV 30	**4.17**	88	5	16.89	28.62	49.83
ALLOWABLE DISCHARGE	**7.26**			3.63	8.52	21.78
DA 11 (R/W)	**1.06**	87	5	4.161	7.144	12.58

TABLE 4B. DEVELOPED CONDITIONS ANALYSIS SUMMARY POINT OF INTEREST #2

Subarea	Drainage Area (acres)	Curve Number	Tc (Minutes)	Developed $Q_{2\text{-year}}$ (cfs)	Developed $Q_{10\text{-year}}$ (cfs)	Developed $Q_{100\text{-year}}$ (cfs)
DEV 20	**2.52**	90	5	10.82	17.87	30.66
ALLOWABLE DISCHARGE	**2.52**			1.26	5.04	7.56
DA 21 (R/W)	**1.78**	86	5	6.763	11.77	20.92
OFF 22 (R/W)	**0.56**	87	5	2.198	3.774	6.646
OFF 20	**4.94**	86	28.9	10.25	18.13	32.64

TABLE 5A. DRY DETENTION FACILITY SUMMARY

Return Frequency	Developed Q_{DEV} (cfs)	Detention Volume (cf)	WSE (ft)
2	2.326	11,278	1021.25
10	5.936	17,339	1021.90
100	14.34	30,074	1022.97

TABLE 5B. BIO DETENTION #1 FACILITY SUMMARY

Return Frequency	Developed Q_{DEV} (cfs)	Detention Volume (cf)	WSE (ft)
2	1.639	28,068	1019.49
10	5.936	43,201	1020.17
100	14.34	60,228	1020.78

TABLE 5C. BIO DETENTION #2 FACILITY SUMMARY

Return Frequency	Developed Q_{DEV} (cfs)	Detention Volume (cf)	WSE (ft)
2	0.688	11,609	1020.50
10	4.768	17,383	1021.10
100	6.002	30,251	1022.22

TABLE 6A. POINT OF INTEREST #1 SUMMARY

Return Frequency	Existing Q_{pre} (cfs)	Developed Q_{DEV} (cfs)
2	**8.529**	5.507
10	**15.28**	8.708
100	**27.78**	27.23

TABLE 6B. POINT OF INTEREST #2 SUMMARY

Return Frequency	Existing Q_{pre} (cfs)	Developed Q_{DEV} (cfs)
2	**27.43**	15.57
10	**49.14**	29.06
100	**89.48**	53.22

Water quality volume treatment calculations were determined using the 2012 APWA/MARC BMP manual level of surface calculations. The level of surface calculation considered all onsite development. Existing offsite right-of-way and proposed public right-of-way will not be

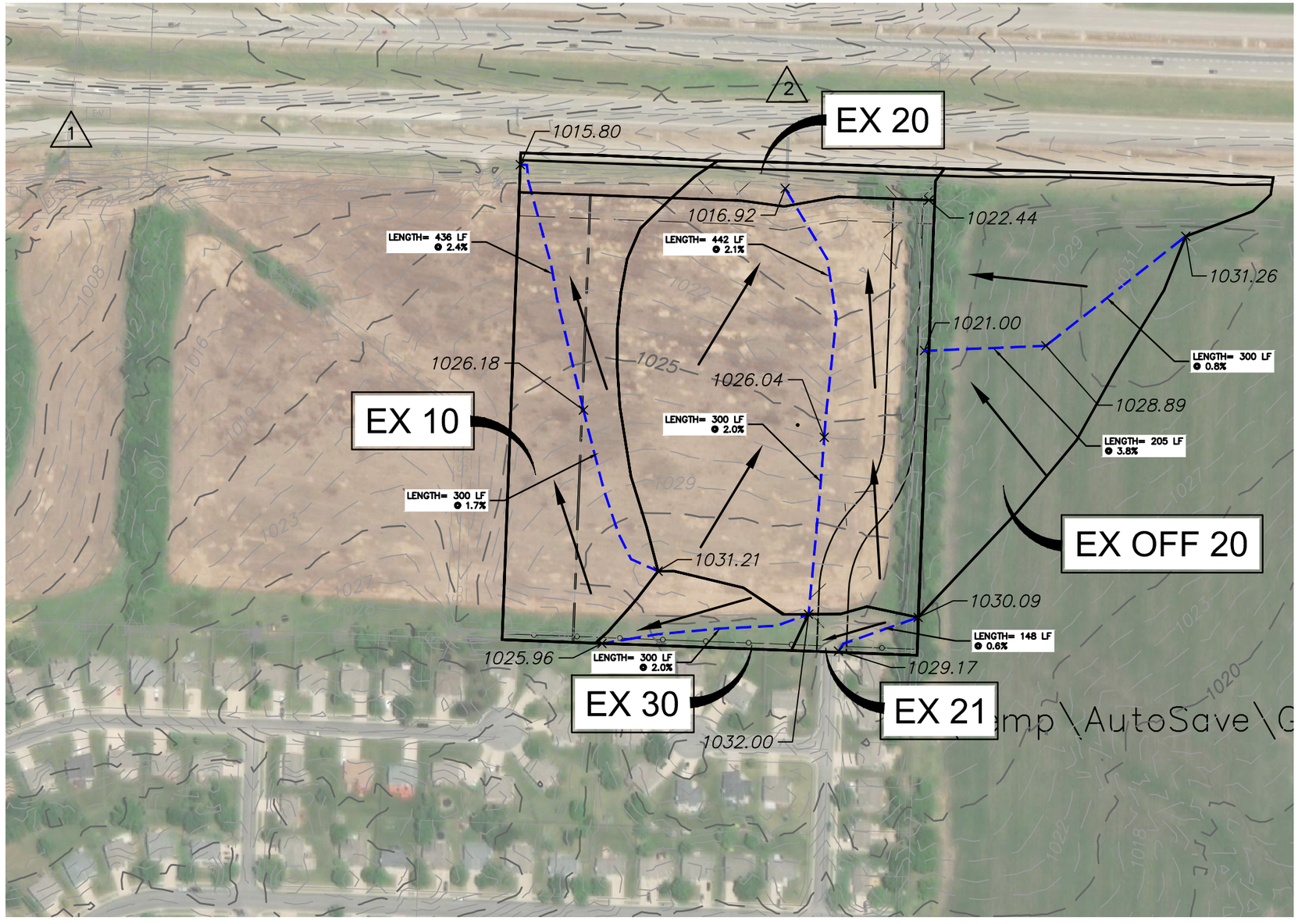
conveyed through onsite BMPs. Water quality level of service and water quality volume calculations are provided in Appendix B.

5. CONCLUSIONS & RECOMMENDATIONS

The Lee's Summit Senior Living Community has been evaluated in this report to show that the stormwater discharge from the site will remain within the acceptable levels. A new detention basin and two new biodetention basins are to be constructed to handle the increased runoff created from the development.

In conclusion, all peak discharges for the points of interest for all events area at or below the established limits. See Appendix C for City of Lee's Summit BMP Level of Service Worksheet.

It is therefore requested that Lee's Summit, Missouri approve this "Lee's Summit Senior Living Community Preliminary Stormwater Drainage Study." This study will be verified with the final construction documents for the construction with the development.



LEGEND

- DRAINAGE AREA BOUNDARY
- TC ROUTE
- FLOW DIRECTION
- 1 POINT OF INTEREST

SUMMARY TABLE			
SUBBASIN	AREA (AC)	CN	TC (MIN.)
EX 10	3.98	85	26.30
EX 20	8.27	85	25.10
EX 21	0.31	85	18.81
EX30	0.69	85	19.75
EX OFF 20	4.94	85	28.90

N

0’ 100’ 200’ 400’

SCALE IN FEET

DWG: F:\2018\1001-1500\018-1450\40-Design\AutoCAD\Preliminary Plans\Xref\C_XHYDR_81450.dwg
DATE: Jan 15, 2019 5:14pm
XREFS: C_PBASE_81450 V_XBOU_81450 V_TOPO_81450
USER: tdrake

PROJECT: 018-1450
DRAWN BY: TDD
DATE: 01/16/2019

EXISTING CONDITIONS DRAINAGE AREA MAP

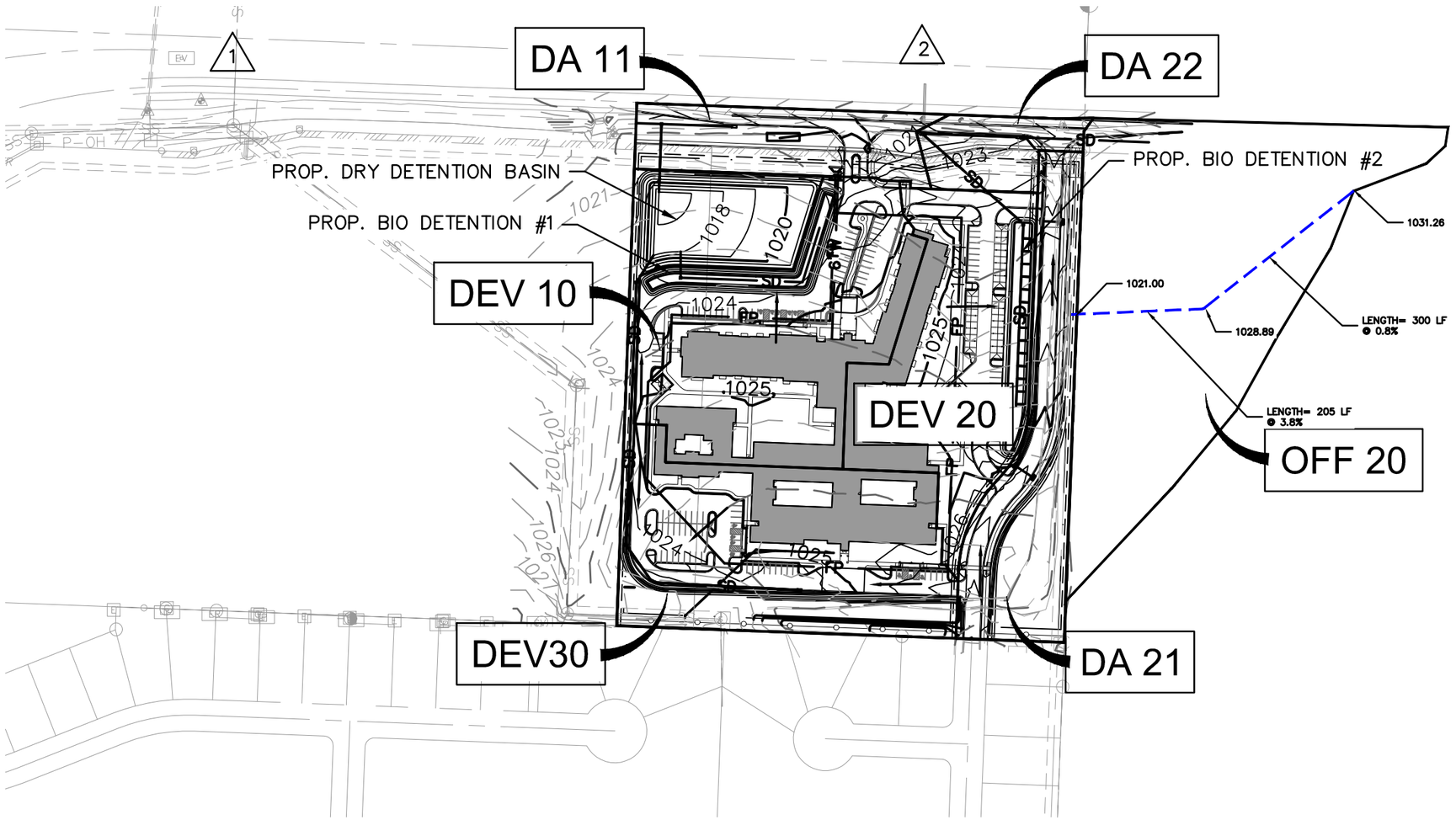
olsson
550 St. Louis Street
Springfield, MO 65806
TEL 417.890.8802
FAX 401.890.8805

FIGURE
F-1

LEGEND

- DRAINAGE AREA BOUNDARY
- TC ROUTE
- FLOW DIRECTION
- 1 — POINT OF INTEREST

SUMMARY TABLE			
SUBBASIN	AREA (AC)	CN	TC (MIN.)
DEV 10	3.09	92	5.00
DA 11	1.06	87	5.00
DEV 30	4.17	88	5.00
DEV 20	2.52	90	5.00
DA 21	1.78	86	5.00
OFF DA 22	0.56	87	5.00
OFF 20	4.94	86	28.90



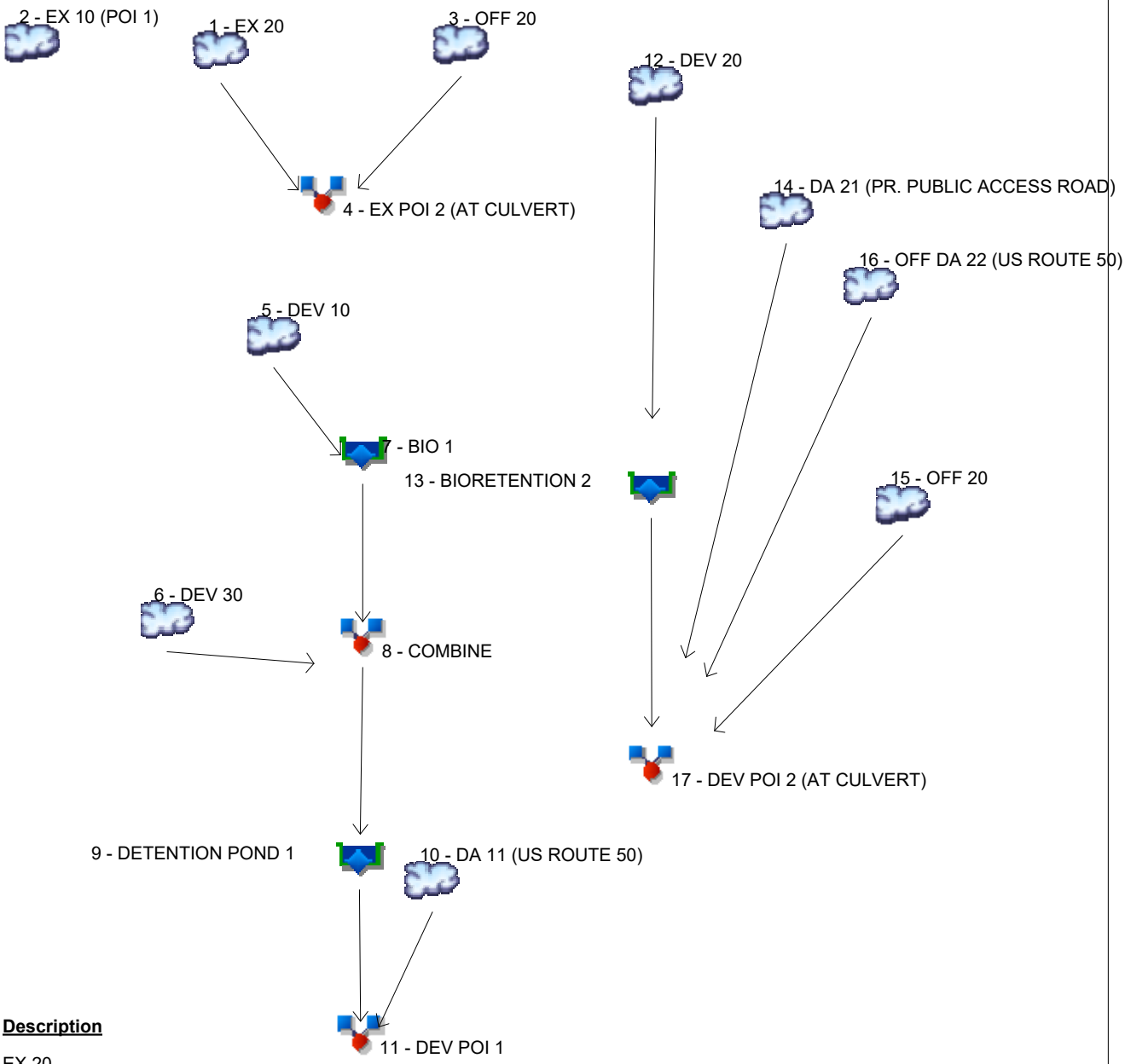
PROJECT: 018-1450 DRAWN BY: TDD DATE: 01/16/2019	DEVELOPED CONDITIONS DRAINAGE AREA MAP	olsson 550 St. Louis Street Springfield, MO 65806 TEL 417.890.8802 FAX 401.890.8805	FIGURE F-2

APPENDIX A

Hydrology & Detention Calculations

Hydraflow Table of Contents

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX 20
2	SCS Runoff	EX 10 (POI 1)
3	SCS Runoff	OFF 20
4	Combine	EX POI 2 (AT CULVERT)
5	SCS Runoff	DEV 10
6	SCS Runoff	DEV 30
7	Reservoir	BIO 1
8	Combine	COMBINE
9	Reservoir	DETENTION POND 1
10	SCS Runoff	DA 11 (US ROUTE 50)
11	Combine	DEV POI 1
12	SCS Runoff	DEV 20
13	Reservoir	BIORETENTION 2
14	SCS Runoff	DA 21 (PR. PUBLIC ACCESS ROAD)
15	SCS Runoff	OFF 20
16	SCS Runoff	OFF DA 22 (US ROUTE 50)
17	Combine	DEV POI 2 (AT CULVERT)

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	17.72	2	728	65,024	------	------	------	EX 20
2	SCS Runoff	8.529	2	728	31,293	------	------	------	EX 10 (POI 1)
3	SCS Runoff	9.875	2	730	39,458	------	------	------	OFF 20
4	Combine	27.43	2	730	104,481	1, 3	------	------	EX POI 2 (AT CULVERT)
5	SCS Runoff	13.97	2	716	29,845	------	------	------	DEV 10
6	SCS Runoff	16.89	2	716	34,924	------	------	------	DEV 30
7	Reservoir	2.326	2	726	29,832	5	1021.25	11,278	BIO 1
8	Combine	18.92	2	716	64,756	6, 7	------	------	COMBINE
9	Reservoir	1.639	2	860	64,753	8	1019.49	28,068	DETENTION POND 1
10	SCS Runoff	4.161	2	716	8,557	------	------	------	DA 11 (US ROUTE 50)
11	Combine	5.507	2	716	73,310	9, 10	------	------	DEV POI 1
12	SCS Runoff	10.82	2	716	22,684	------	------	------	DEV 20
13	Reservoir	0.688	2	756	22,668	12	1020.50	11,609	BIORETENTION 2
14	SCS Runoff	6.763	2	716	13,843	------	------	------	DA 21 (PR. PUBLIC ACCESS ROAD)
15	SCS Runoff	10.25	2	730	40,979	------	------	------	OFF 20
16	SCS Runoff	2.198	2	716	4,521	------	------	------	OFF DA 22 (US ROUTE 50)
17	Combine	15.57	2	718	82,010	13, 14, 15, 16	------	------	DEV POI 2 (AT CULVERT)

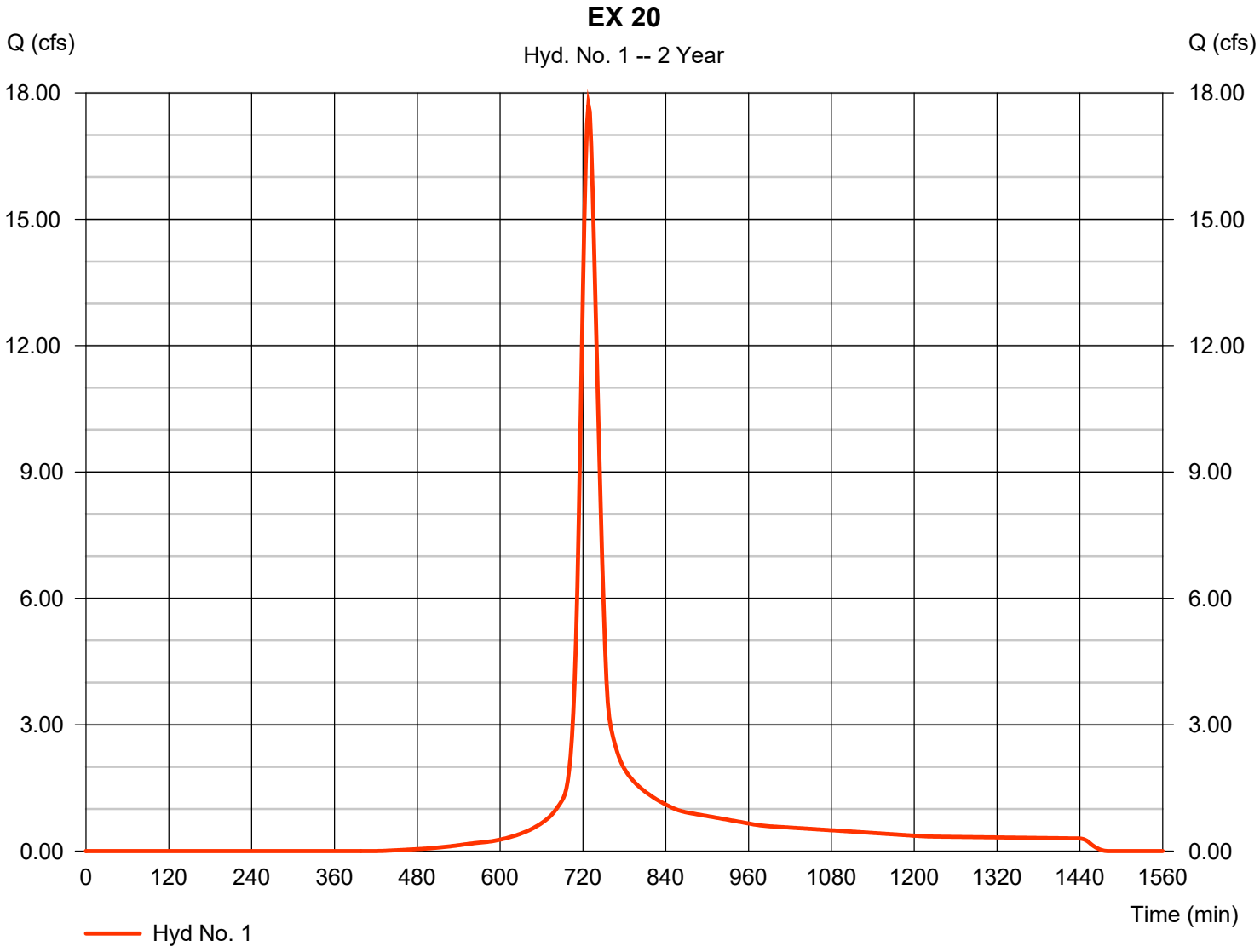
Hydrograph Report

Hyd. No. 1

EX 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.72 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	65,024 cuft
Drainage area	=	8.270 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	25.10 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.110 x 98) + (8.160 x 85)] / 8.270



TR55 Tc Worksheet

Hyd. No. 1

EX 20

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 21.91**	**+**	**0.00**	**+**	**0.00**	**=**	**21.91**
Shallow Concentrated Flow							
Flow length (ft)	= 440.00		0.00		0.00		
Watercourse slope (%)	= 2.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.28		0.00		0.00		
Travel Time (min)	**= 3.21**	**+**	**0.00**	**+**	**0.00**	**=**	**3.21**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 25.10 min

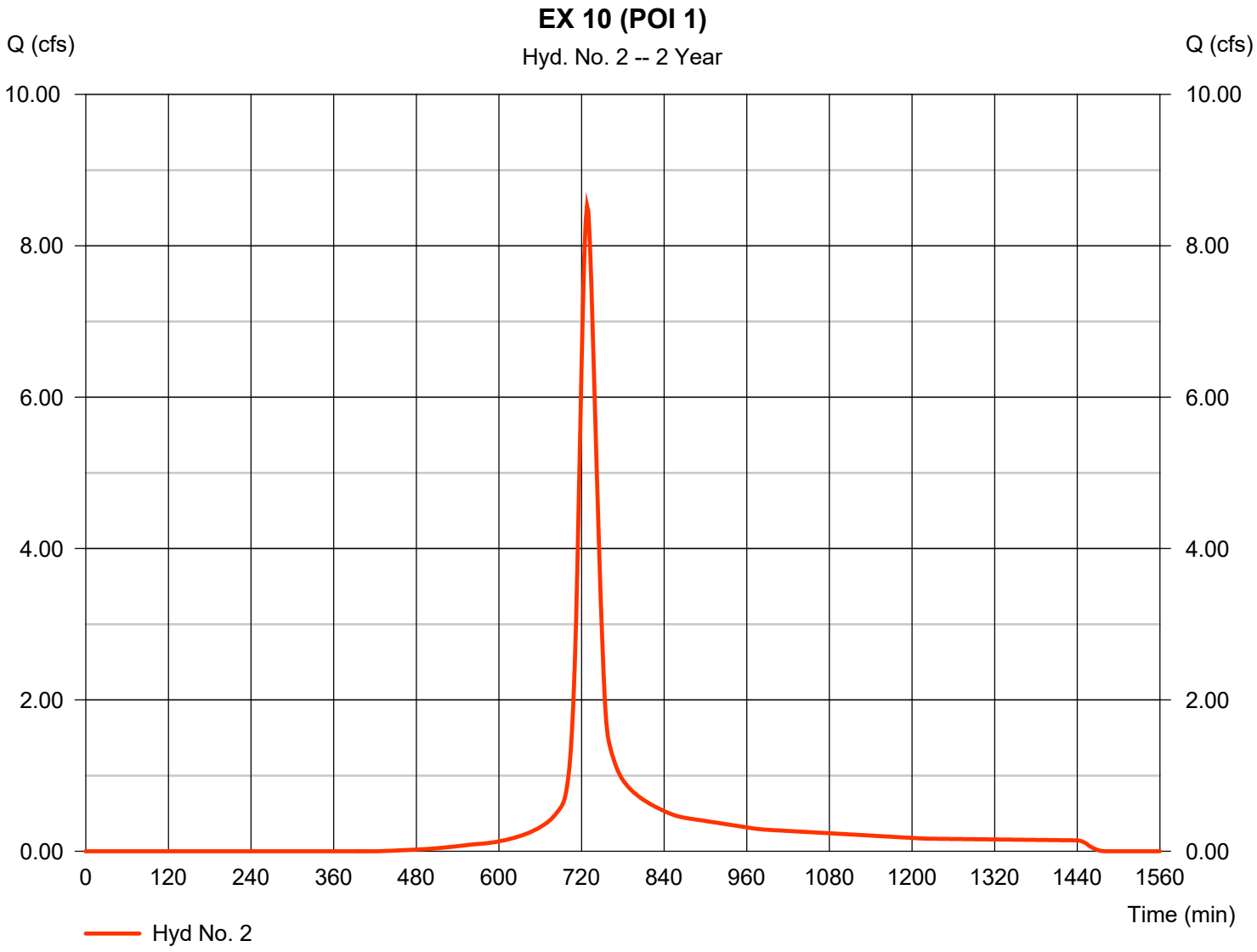
Hydrograph Report

Hyd. No. 2

EX 10 (POI 1)

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.529 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	31,293 cuft
Drainage area	=	3.980 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.30 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.090 x 98) + (3.890 x 85)] / 3.980



TR55 Tc Worksheet

Hyd. No. 2

EX 10 (POI 1)

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 1.70		0.00		0.00		
Travel Time (min)	**= 23.39**	**+**	**0.00**	**+**	**0.00**	**=**	**23.39**
Shallow Concentrated Flow							
Flow length (ft)	= 435.00		0.00		0.00		
Watercourse slope (%)	= 2.40		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.50		0.00		0.00		
Travel Time (min)	**= 2.90**	**+**	**0.00**	**+**	**0.00**	**=**	**2.90**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 26.30 min

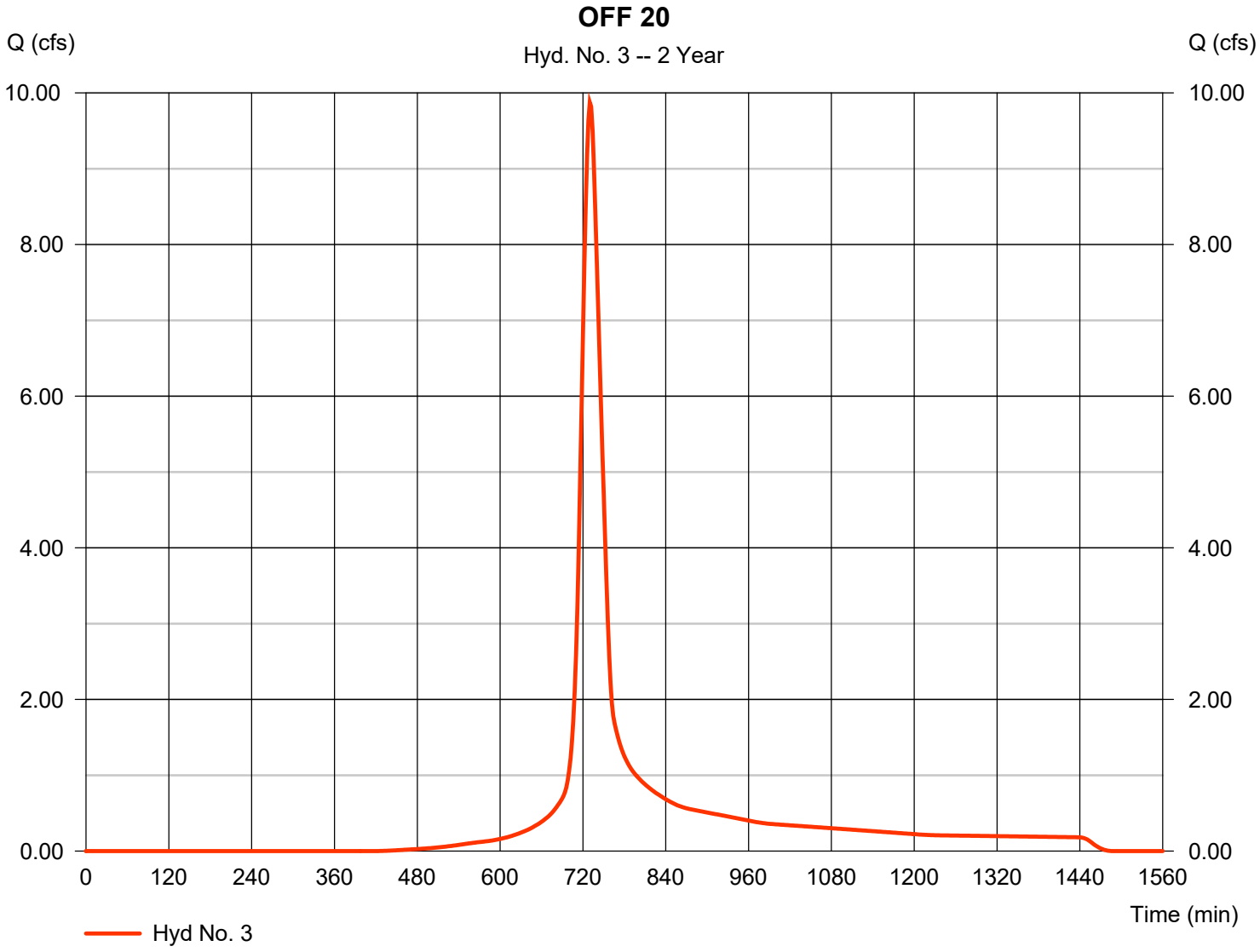
Hydrograph Report

Hyd. No. 3

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.875 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	39,458 cuft
Drainage area	=	4.940 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.90 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.140 x 98) + (4.800 x 85)] / 4.940



TR55 Tc Worksheet

Hyd. No. 3

OFF 20

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 1.10		0.00		0.00		
Travel Time (min)	**= 27.83**	**+**	**0.00**	**+**	**0.00**	**=**	**27.83**
Shallow Concentrated Flow							
Flow length (ft)	= 205.00		0.00		0.00		
Watercourse slope (%)	= 3.80		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=3.15		0.00		0.00		
Travel Time (min)	**= 1.09**	**+**	**0.00**	**+**	**0.00**	**=**	**1.09**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

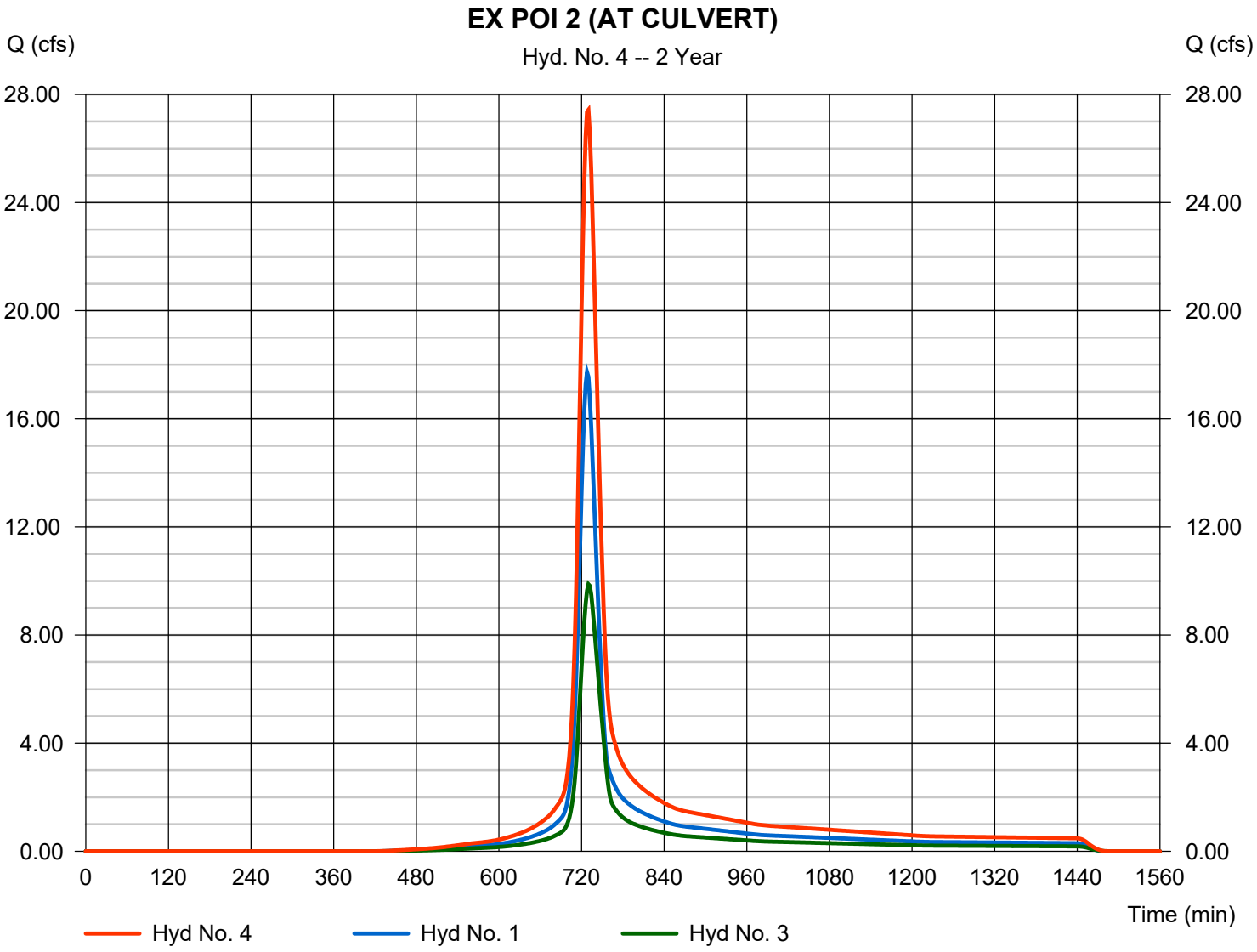
Total Travel Time, Tc ..... 28.90 min

Hydrograph Report

Hyd. No. 4

EX POI 2 (AT CULVERT)

Hydrograph type	=	Combine	Peak discharge	=	27.43 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	104,481 cuft
Inflow hyds.	=	1, 3	Contrib. drain. area	=	13.210 ac



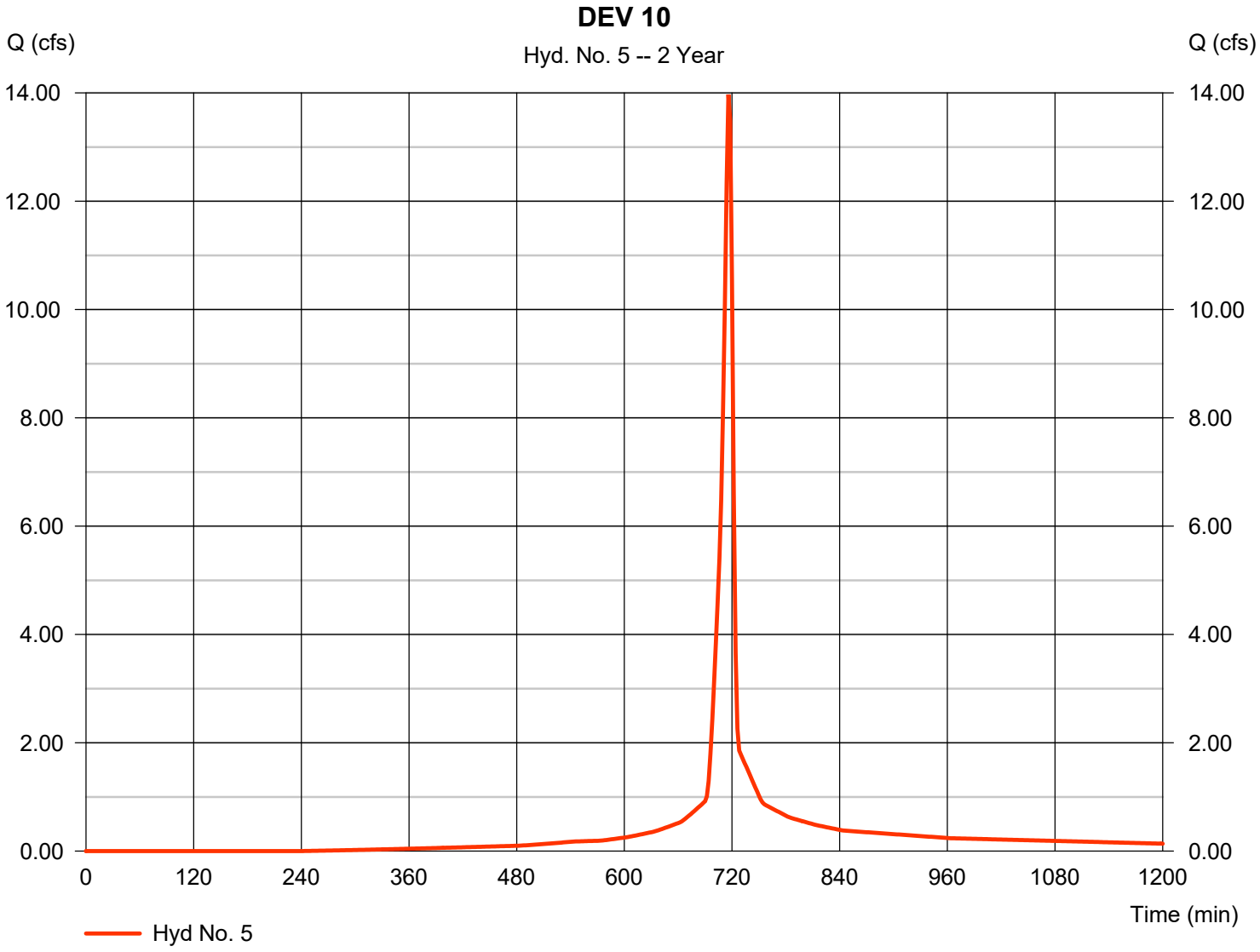
Hydrograph Report

Hyd. No. 5

DEV 10

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.97 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	29,845 cuft
Drainage area	=	3.090 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.020 x 98) + (1.070 x 80)] / 3.090



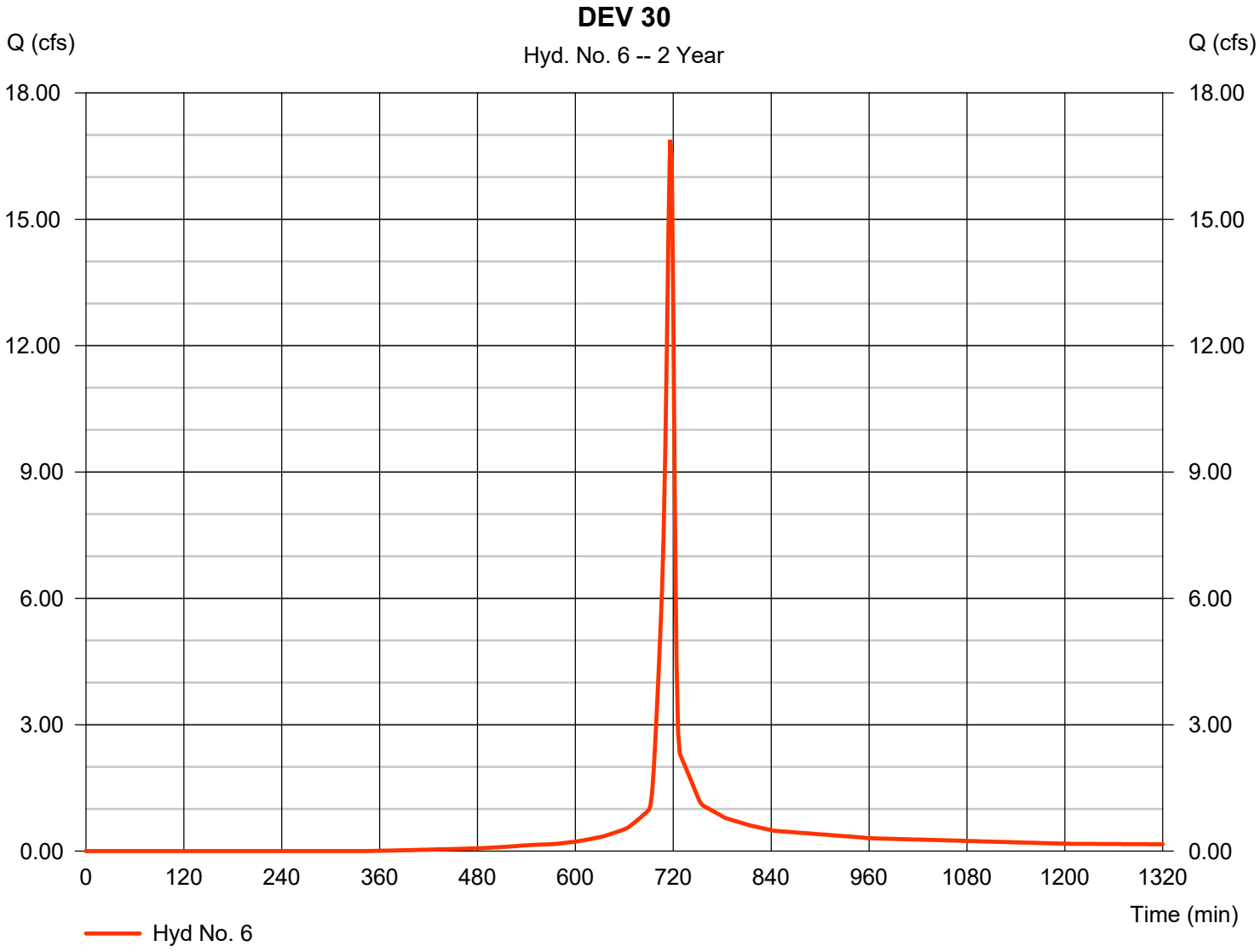
Hydrograph Report

Hyd. No. 6

DEV 30

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.89 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	34,924 cuft
Drainage area	=	4.170 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.850 x 98) + (2.320 x 80)] / 4.170



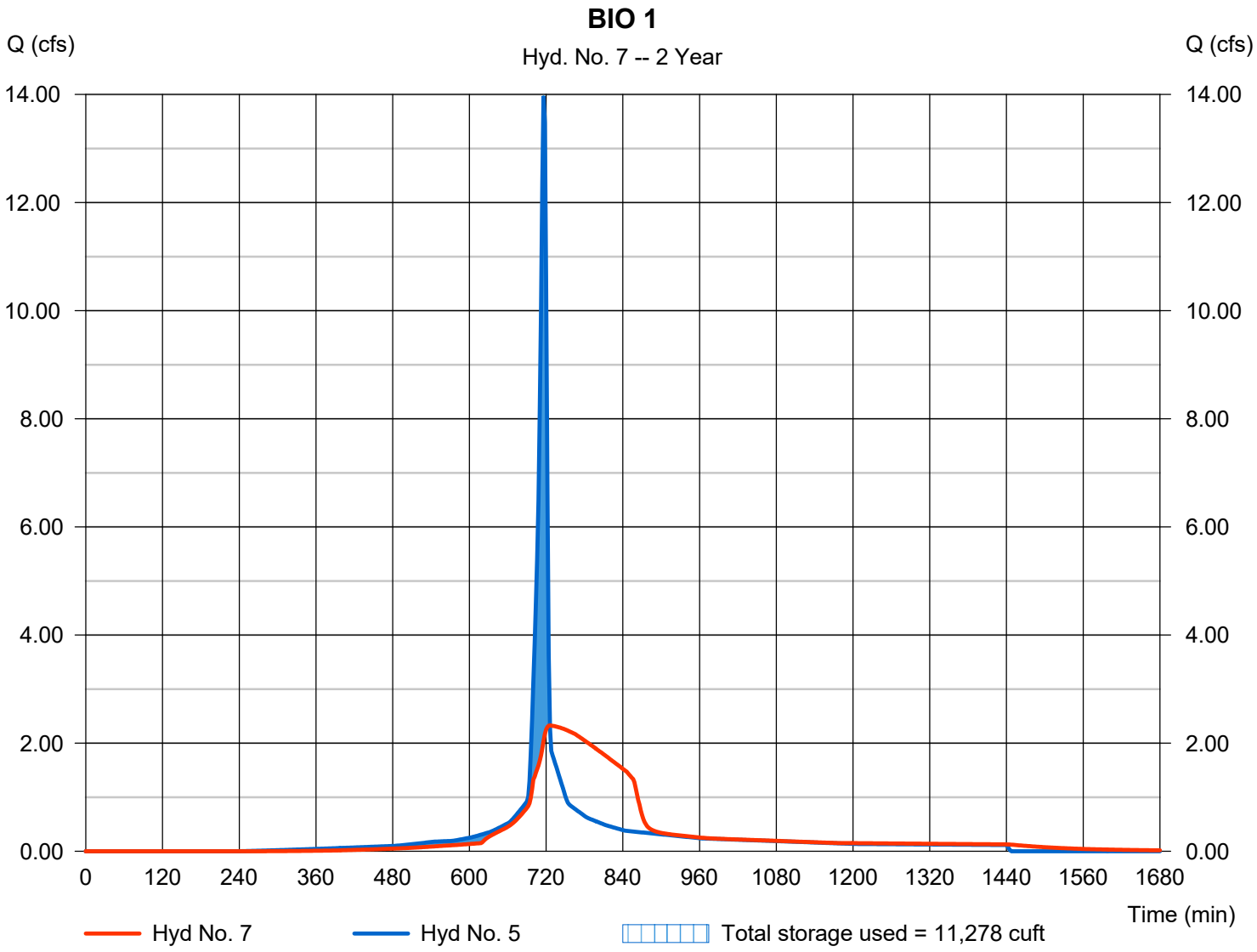
Hydrograph Report

Hyd. No. 7

BIO 1

Hydrograph type	=	Reservoir	Peak discharge	=	2.326 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	29,832 cuft
Inflow hyd. No.	=	5 - DEV 10	Max. Elevation	=	1021.25 ft
Reservoir name	=	BIORETENTION 1	Max. Storage	=	11,278 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIORETENTION 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1019.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1019.00	00	0	0
1.00	1020.00	5,796	1,932	1,932
2.00	1021.00	8,214	6,969	8,901
3.00	1022.00	10,869	9,510	18,411
4.00	1023.00	13,220	12,024	30,435
5.00	1024.00	13,220	13,219	43,653

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	8.00	0.00	0.00
Span (in)	= 12.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1019.00	1019.00	0.00	0.00
Length (ft)	= 10.00	0.50	0.00	0.00
Slope (%)	= 2.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

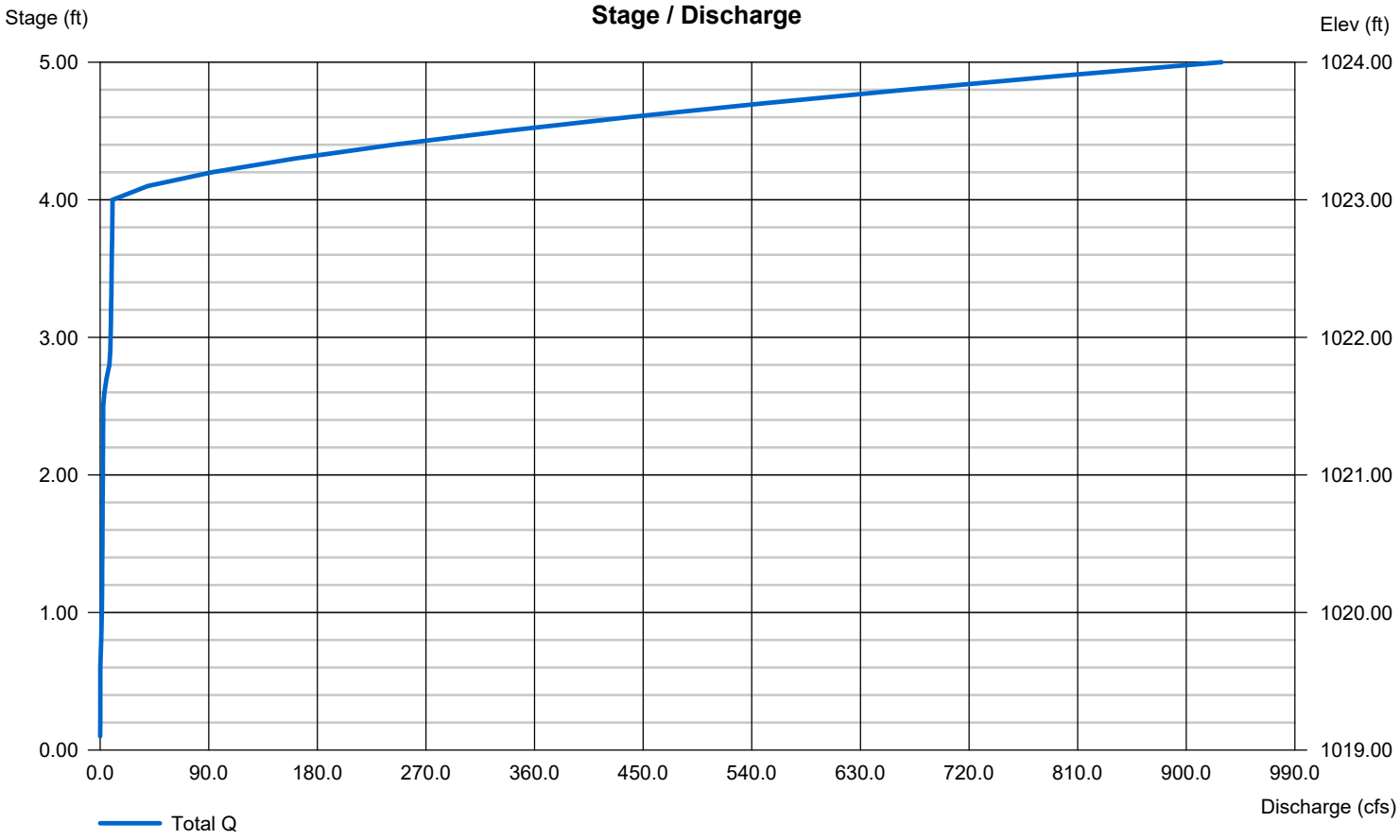
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.00	353.00	0.00	0.00
Crest El. (ft)	= 1021.50	1023.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

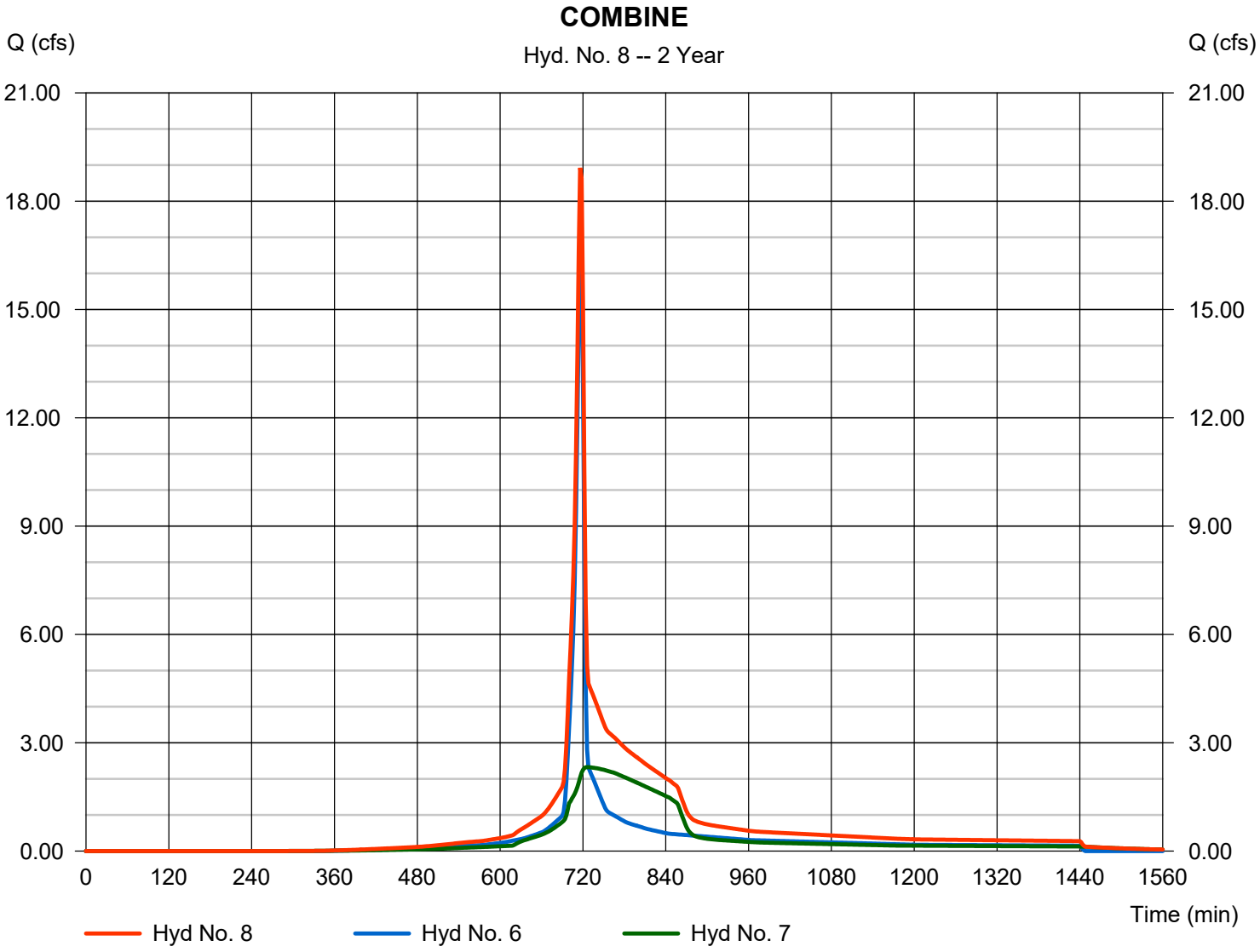


Hydrograph Report

Hyd. No. 8

COMBINE

Hydrograph type	= Combine	Peak discharge	= 18.92 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 64,756 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.170 ac



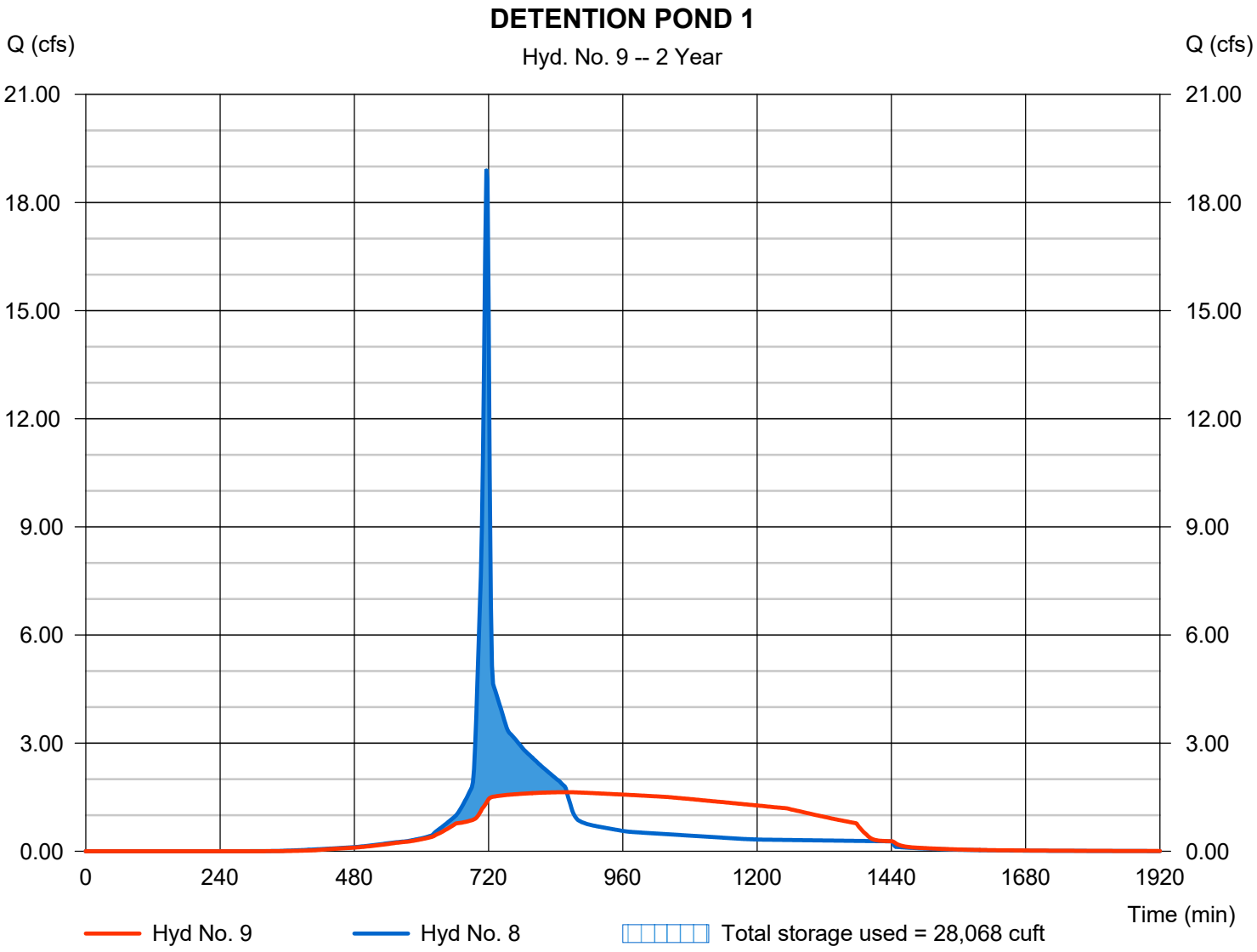
Hydrograph Report

Hyd. No. 9

DETENTION POND 1

Hydrograph type	=	Reservoir	Peak discharge	=	1.639 cfs
Storm frequency	=	2 yrs	Time to peak	=	860 min
Time interval	=	2 min	Hyd. volume	=	64,753 cuft
Inflow hyd. No.	=	8 - COMBINE	Max. Elevation	=	1019.49 ft
Reservoir name	=	DRY DETENTION 1	Max. Storage	=	28,068 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DRY DETENTION 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1016.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1016.00	00	0	0
1.00	1017.00	2,042	681	681
2.00	1018.00	8,847	5,046	5,727
3.00	1019.00	16,278	12,374	18,100
4.00	1020.00	24,535	20,264	38,364
5.00	1021.00	31,558	27,970	66,334
6.00	1022.00	35,419	33,467	99,801

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	6.00	0.00	0.00
Span (in)	= 30.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1016.00	1016.00	0.00	0.00
Length (ft)	= 200.00	0.50	0.00	0.00
Slope (%)	= 0.50	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

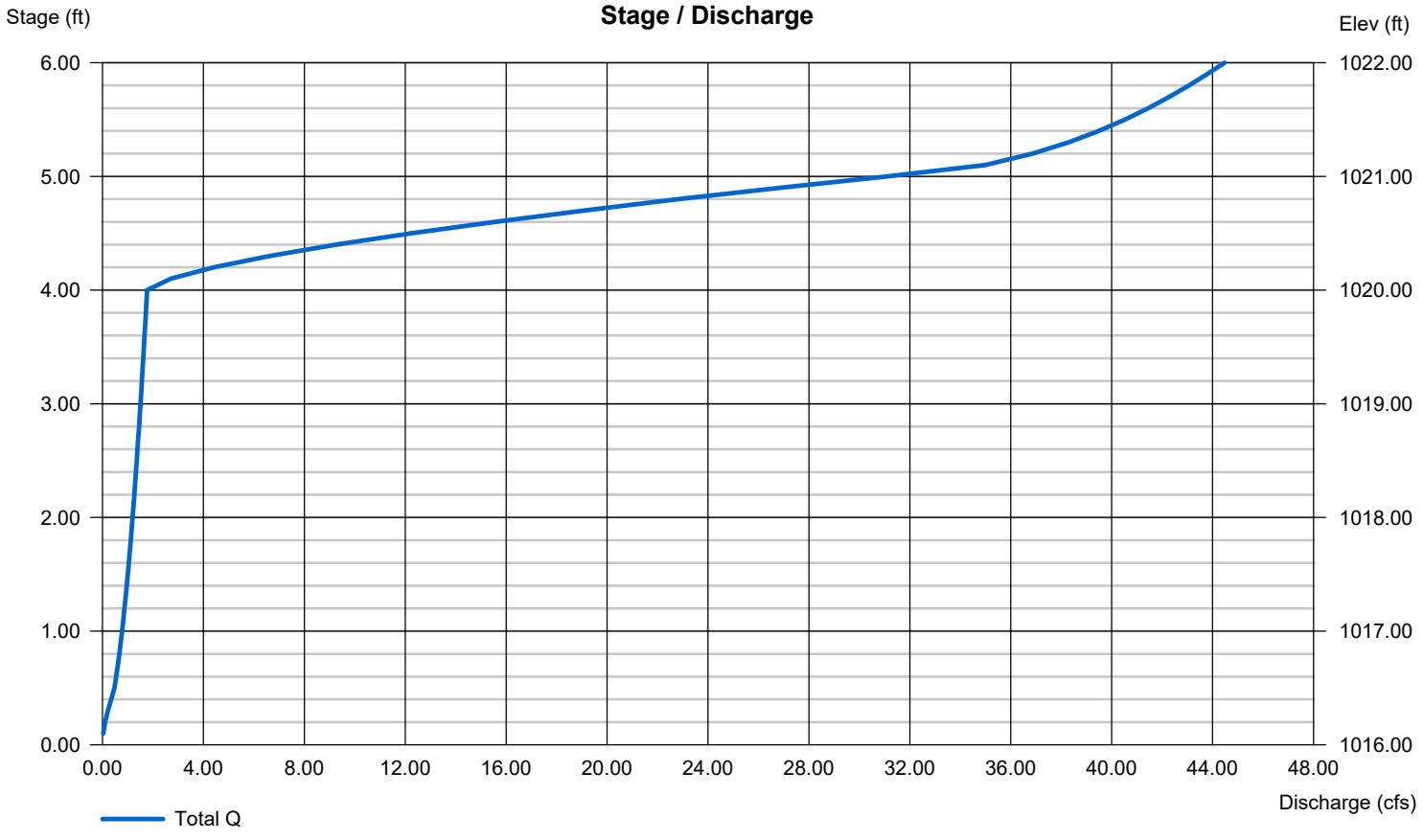
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.00	0.00	0.00	0.00
Crest El. (ft)	= 1020.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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



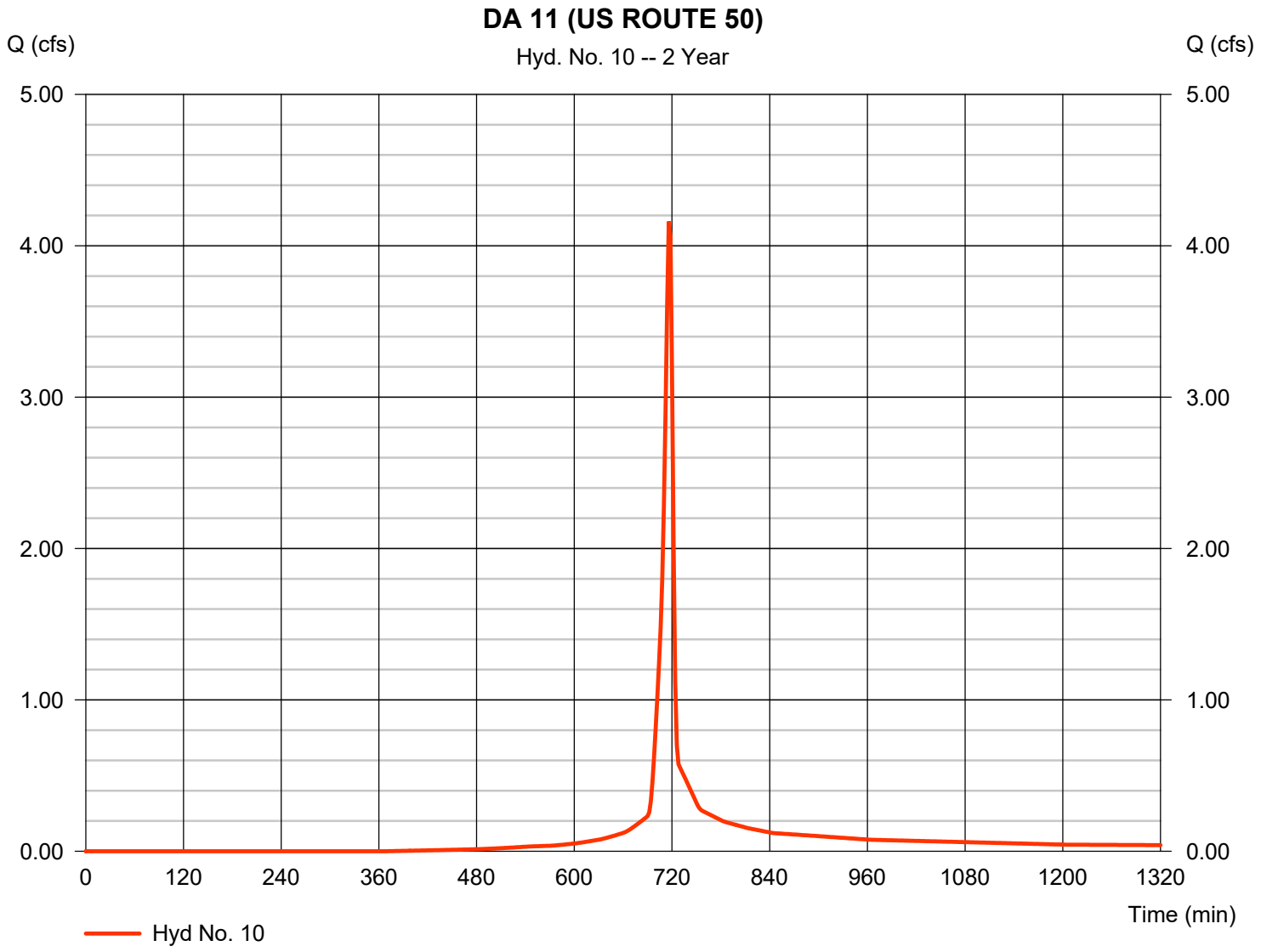
Hydrograph Report

Hyd. No. 10

DA 11 (US ROUTE 50)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.161 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 8,557 cuft
Drainage area	= 1.060 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.71 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (0.660 x 80)] / 1.060

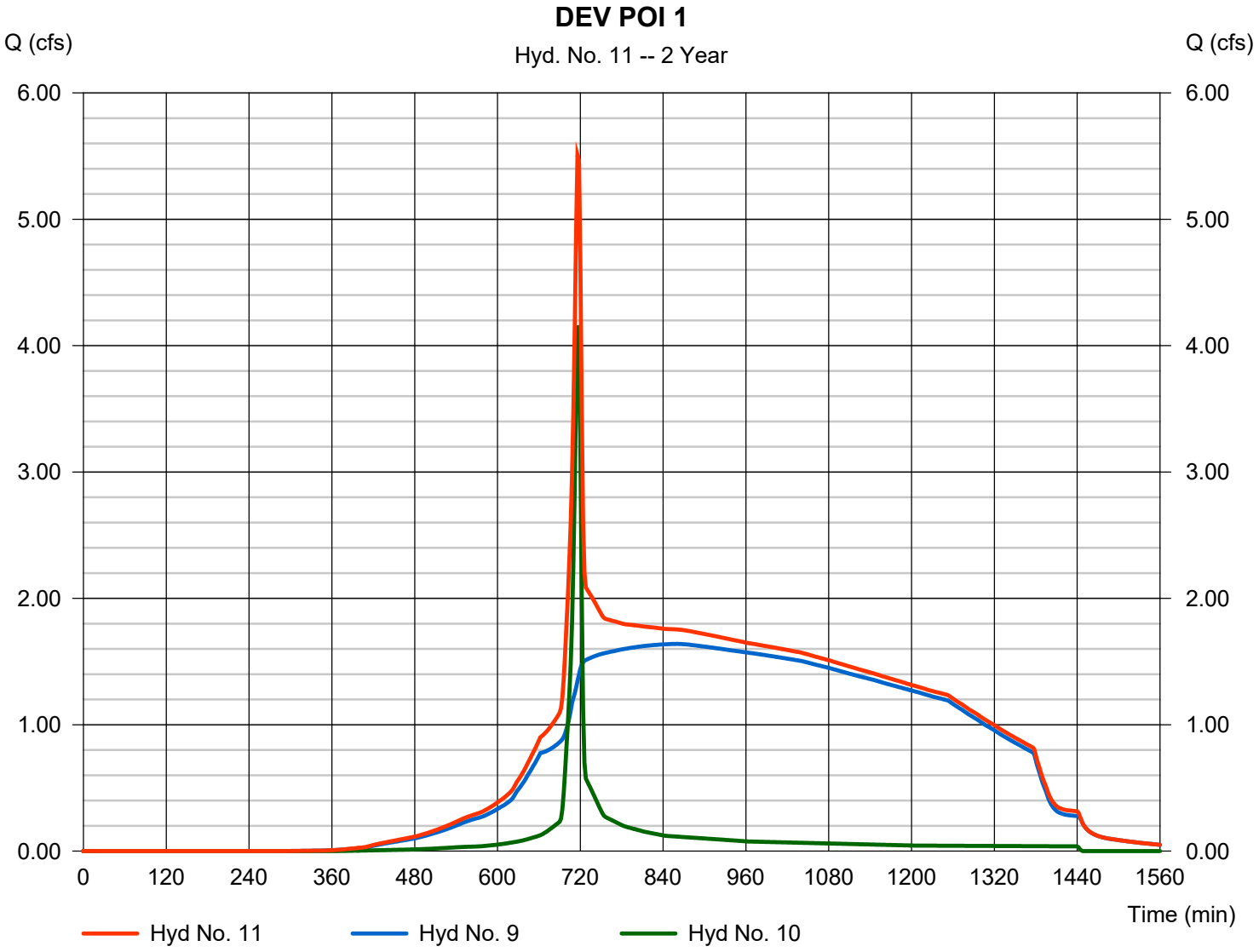


Hydrograph Report

Hyd. No. 11

DEV POI 1

Hydrograph type	=	Combine	Peak discharge	=	5.507 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	73,310 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	1.060 ac



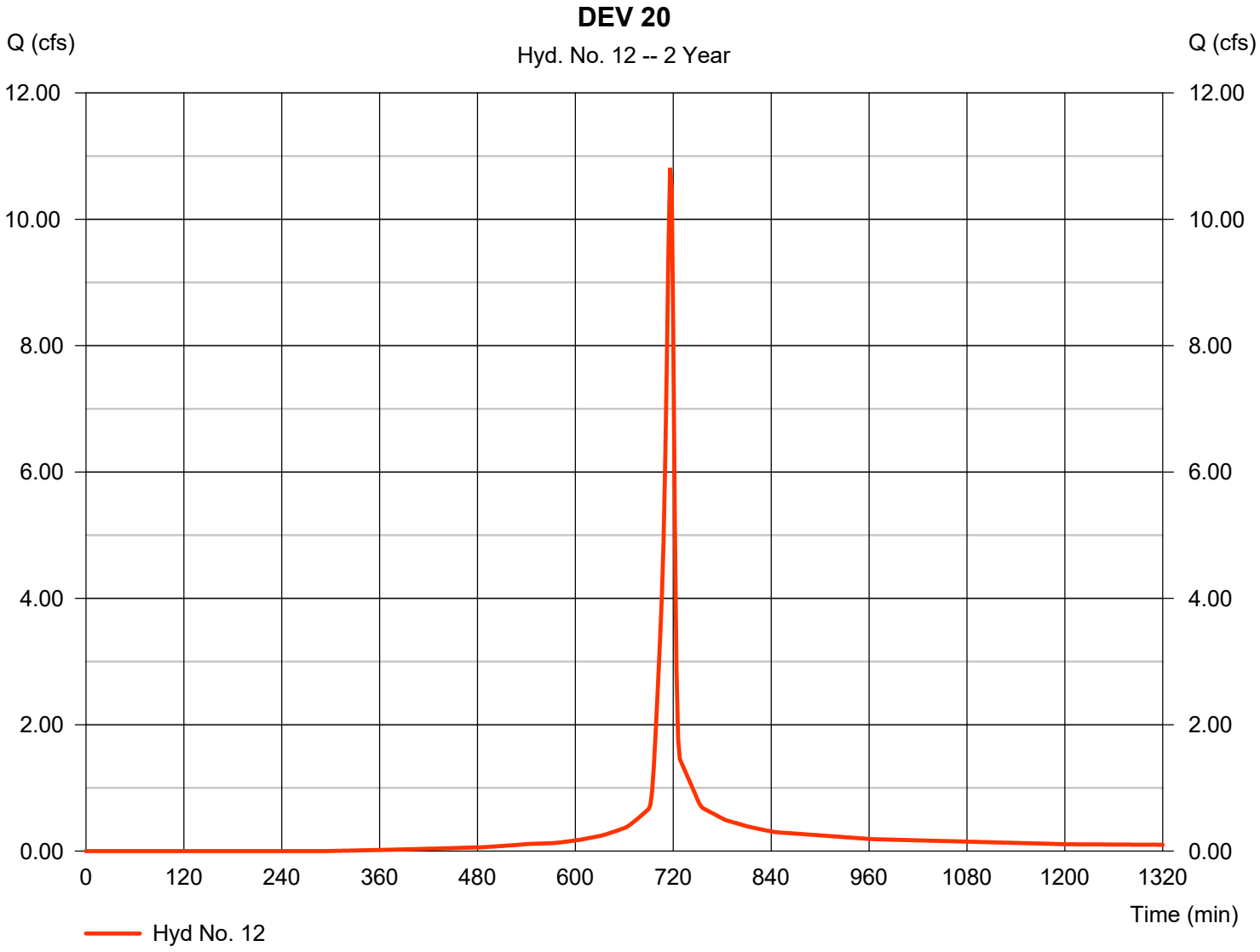
Hydrograph Report

Hyd. No. 12

DEV 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.82 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	22,684 cuft
Drainage area	=	2.520 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.340 x 98) + (1.180 x 80)] / 2.520



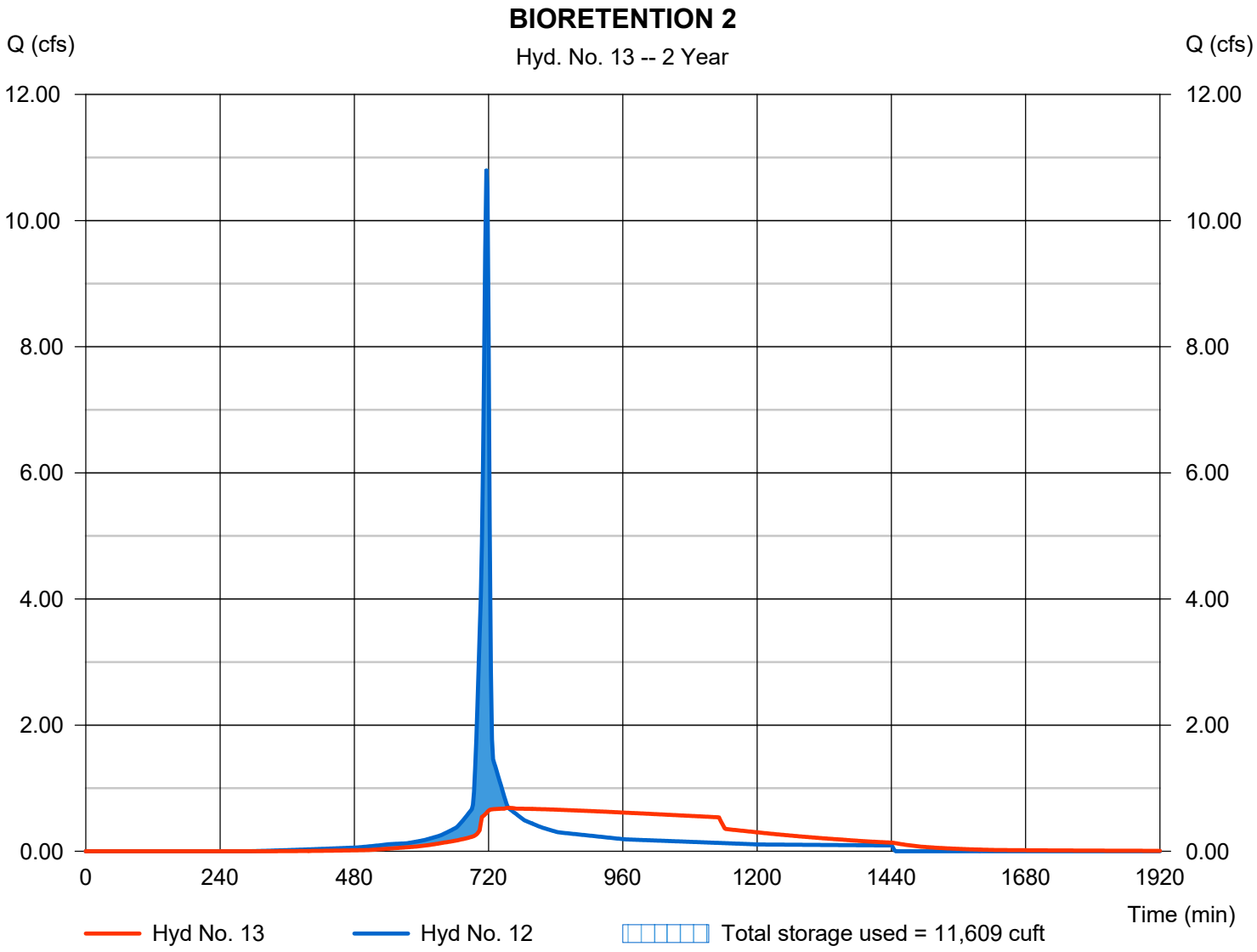
Hydrograph Report

Hyd. No. 13

BIORETENTION 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.688 cfs
Storm frequency	=	2 yrs	Time to peak	=	756 min
Time interval	=	2 min	Hyd. volume	=	22,668 cuft
Inflow hyd. No.	=	12 - DEV 20	Max. Elevation	=	1020.50 ft
Reservoir name	=	BIORETENTION 2	Max. Storage	=	11,609 cuft

Storage Indication method used.



Pond No. 3 - BIORETENTION 2

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1017.50	n/a	0	0
1.00	1018.50	n/a	3,248	3,248
2.00	1019.50	n/a	203	3,451
3.00	1020.50	n/a	8,121	11,572
4.00	1021.50	n/a	9,629	21,201
5.00	1022.50	n/a	12,697	33,898

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	4.00	0.00	0.00
Span (in)	= 12.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1017.50	1017.50	0.00	0.00
Length (ft)	= 100.00	0.50	0.00	0.00
Slope (%)	= 0.50	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

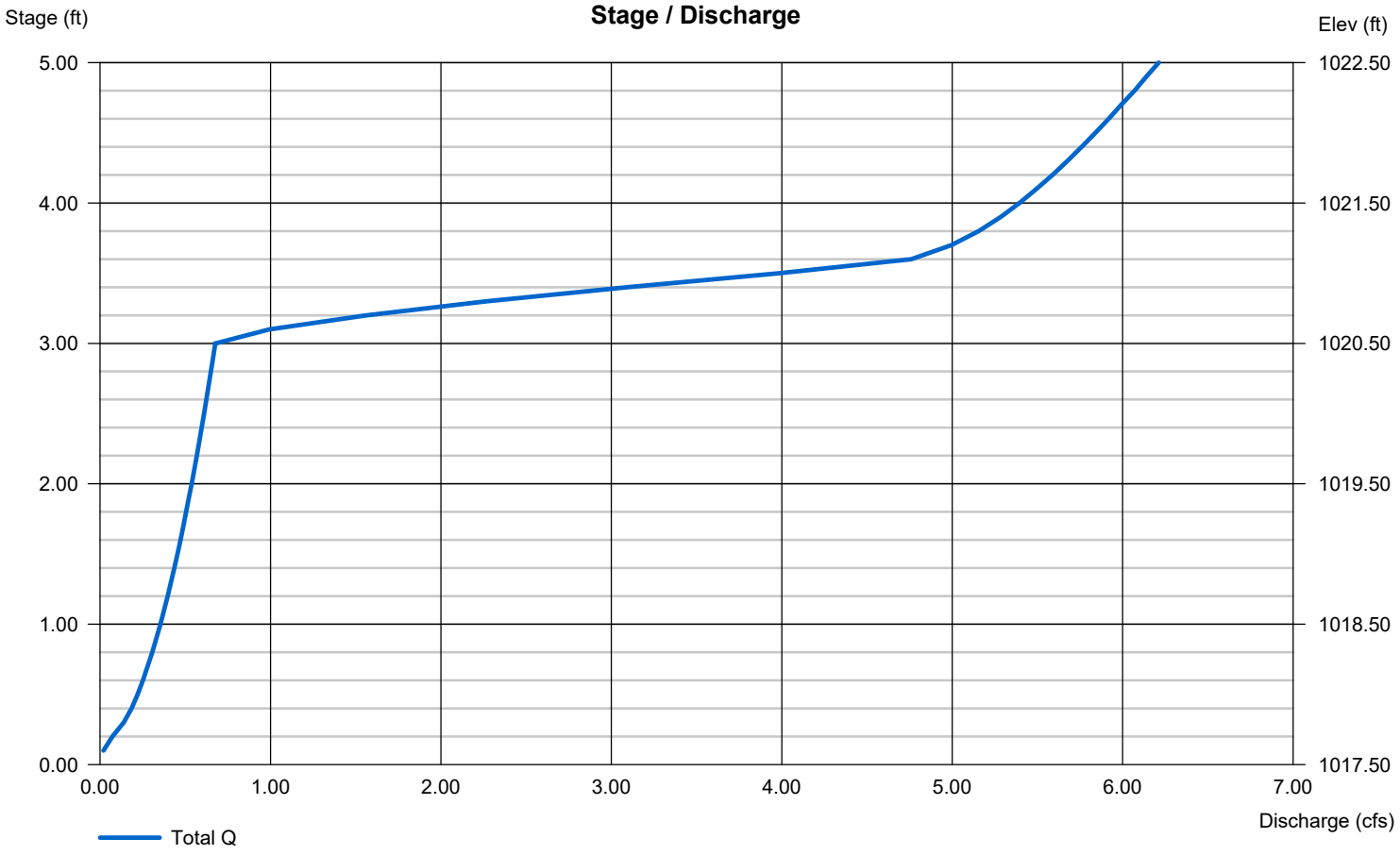
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 1020.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



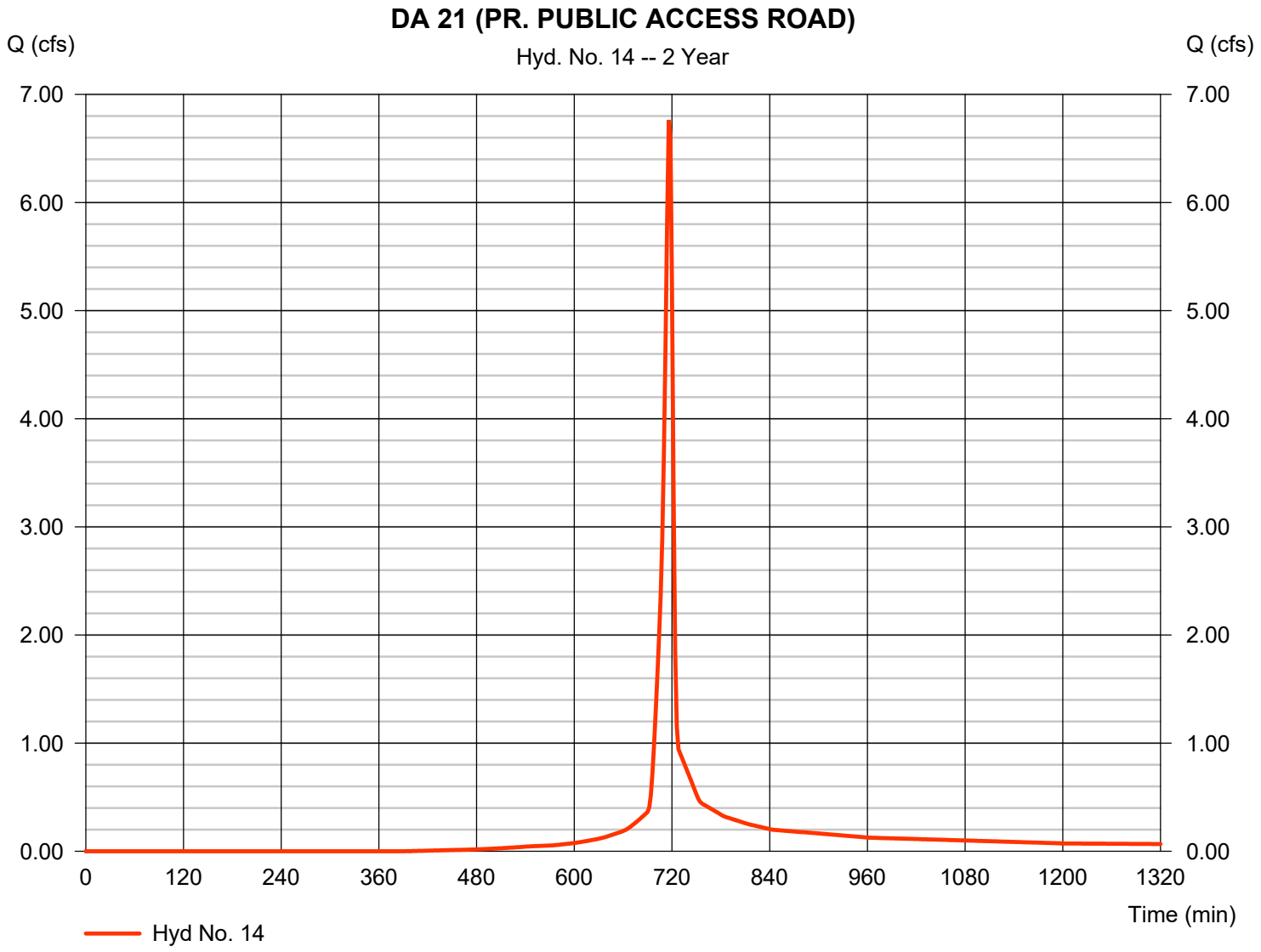
Hydrograph Report

Hyd. No. 14

DA 21 (PR. PUBLIC ACCESS ROAD)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.763 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 13,843 cuft
Drainage area	= 1.780 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.71 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.630 x 98) + (1.150 x 80)] / 1.780



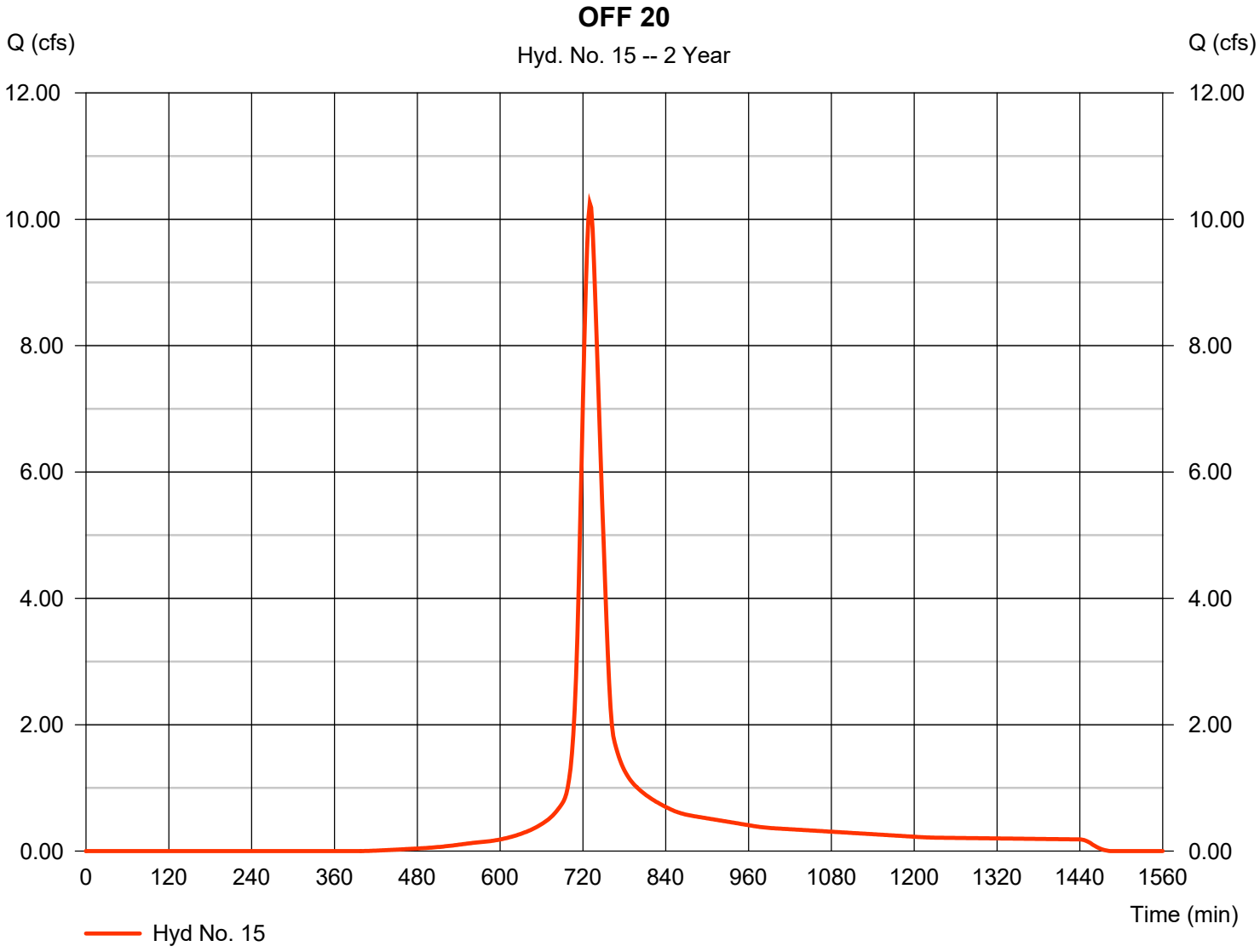
Hydrograph Report

Hyd. No. 15

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.25 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	40,979 cuft
Drainage area	=	4.940 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	28.90 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 98) + (4.750 x 85)] / 4.940



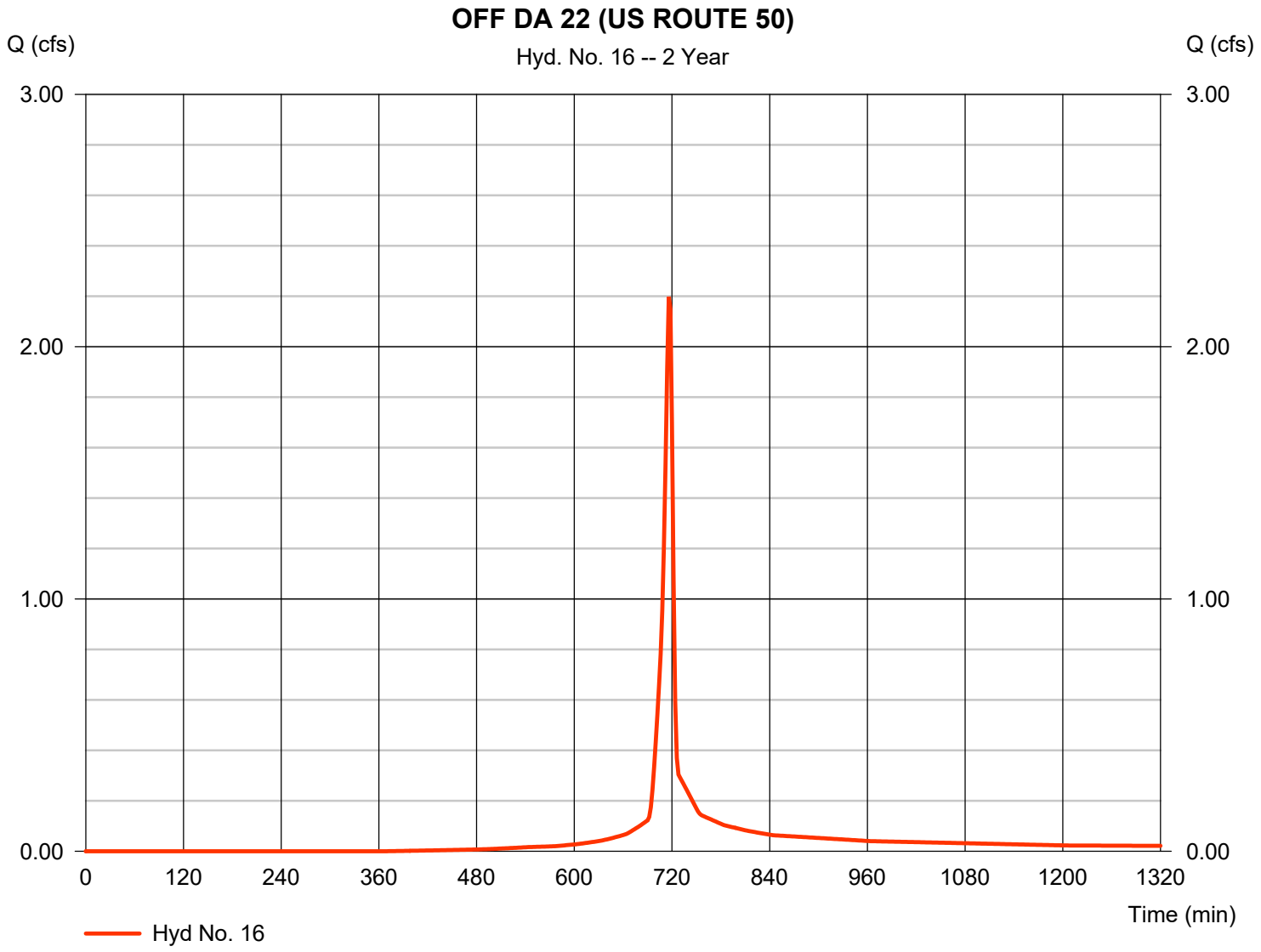
Hydrograph Report

Hyd. No. 16

OFF DA 22 (US ROUTE 50)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.198 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,521 cuft
Drainage area	=	0.560 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.210 x 98) + (0.350 x 80)] / 0.560

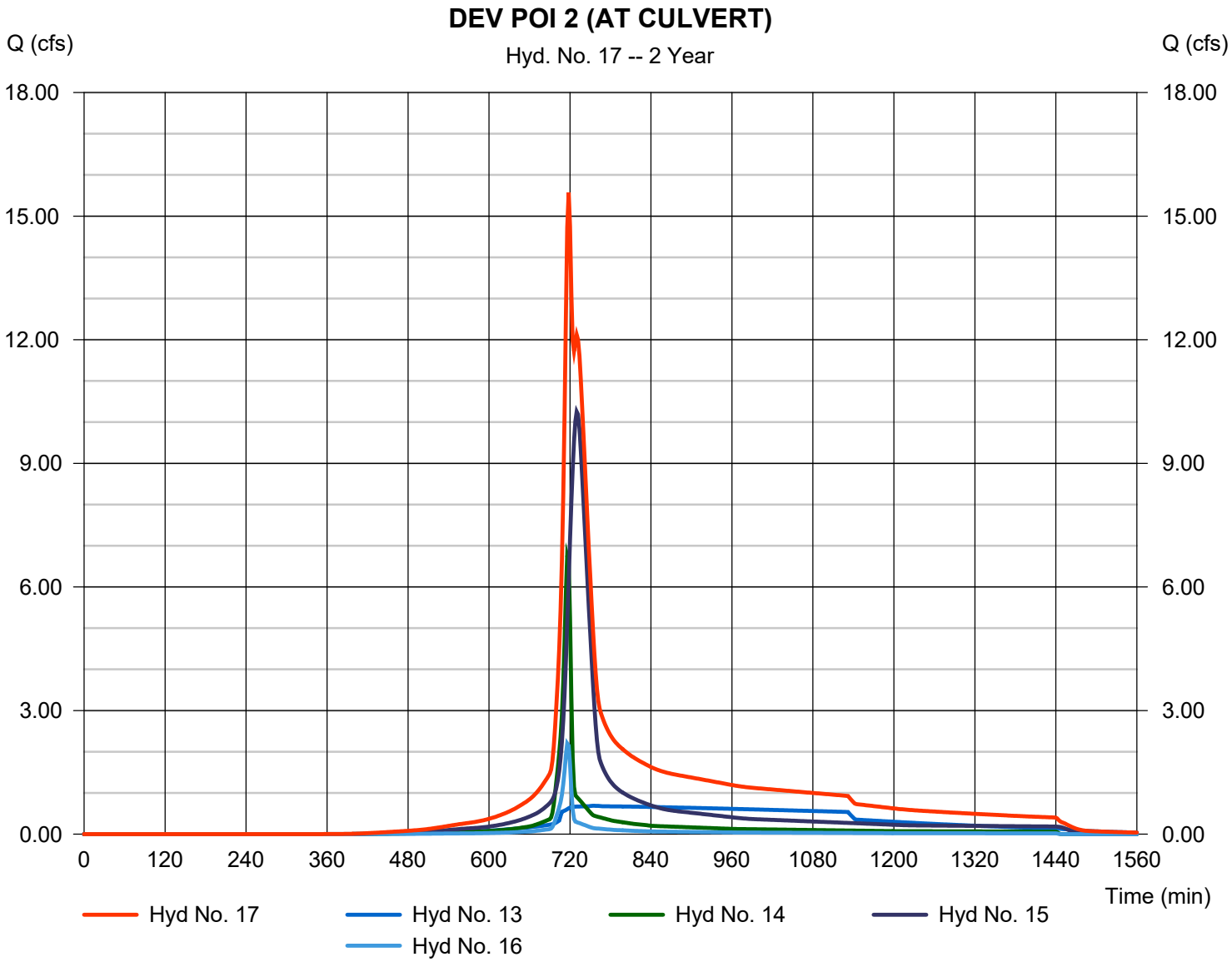


Hydrograph Report

Hyd. No. 17

DEV POI 2 (AT CULVERT)

Hydrograph type	=	Combine	Peak discharge	=	15.57 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	82,010 cuft
Inflow hyds.	=	13, 14, 15, 16	Contrib. drain. area	=	7.280 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	31.75	2	728	117,694	------	------	------	EX 20
2	SCS Runoff	15.28	2	728	56,641	------	------	------	EX 10 (POI 1)
3	SCS Runoff	17.72	2	730	71,419	------	------	------	OFF 20
4	Combine	49.14	2	728	189,112	1, 3	------	------	EX POI 2 (AT CULVERT)
5	SCS Runoff	22.55	2	716	49,797	------	------	------	DEV 10
6	SCS Runoff	28.62	2	716	61,008	------	------	------	DEV 30
7	Reservoir	8.272	2	722	49,784	5	1021.90	17,339	BIO 1
8	Combine	31.96	2	718	110,792	6, 7	------	------	COMBINE
9	Reservoir	3.953	2	768	110,790	8	1020.17	43,201	DETENTION POND 1
10	SCS Runoff	7.144	2	716	15,124	------	------	------	DA 11 (US ROUTE 50)
11	Combine	8.708	2	716	125,914	9, 10	------	------	DEV POI 1
12	SCS Runoff	17.87	2	716	38,722	------	------	------	DEV 20
13	Reservoir	4.768	2	724	38,705	12	1021.10	17,383	BIORETENTION 2
14	SCS Runoff	11.77	2	716	24,758	------	------	------	DA 21 (PR. PUBLIC ACCESS ROAD)
15	SCS Runoff	18.13	2	730	73,291	------	------	------	OFF 20
16	SCS Runoff	3.774	2	716	7,990	------	------	------	OFF DA 22 (US ROUTE 50)
17	Combine	29.06	2	718	144,745	13, 14, 15, 16	------	------	DEV POI 2 (AT CULVERT)

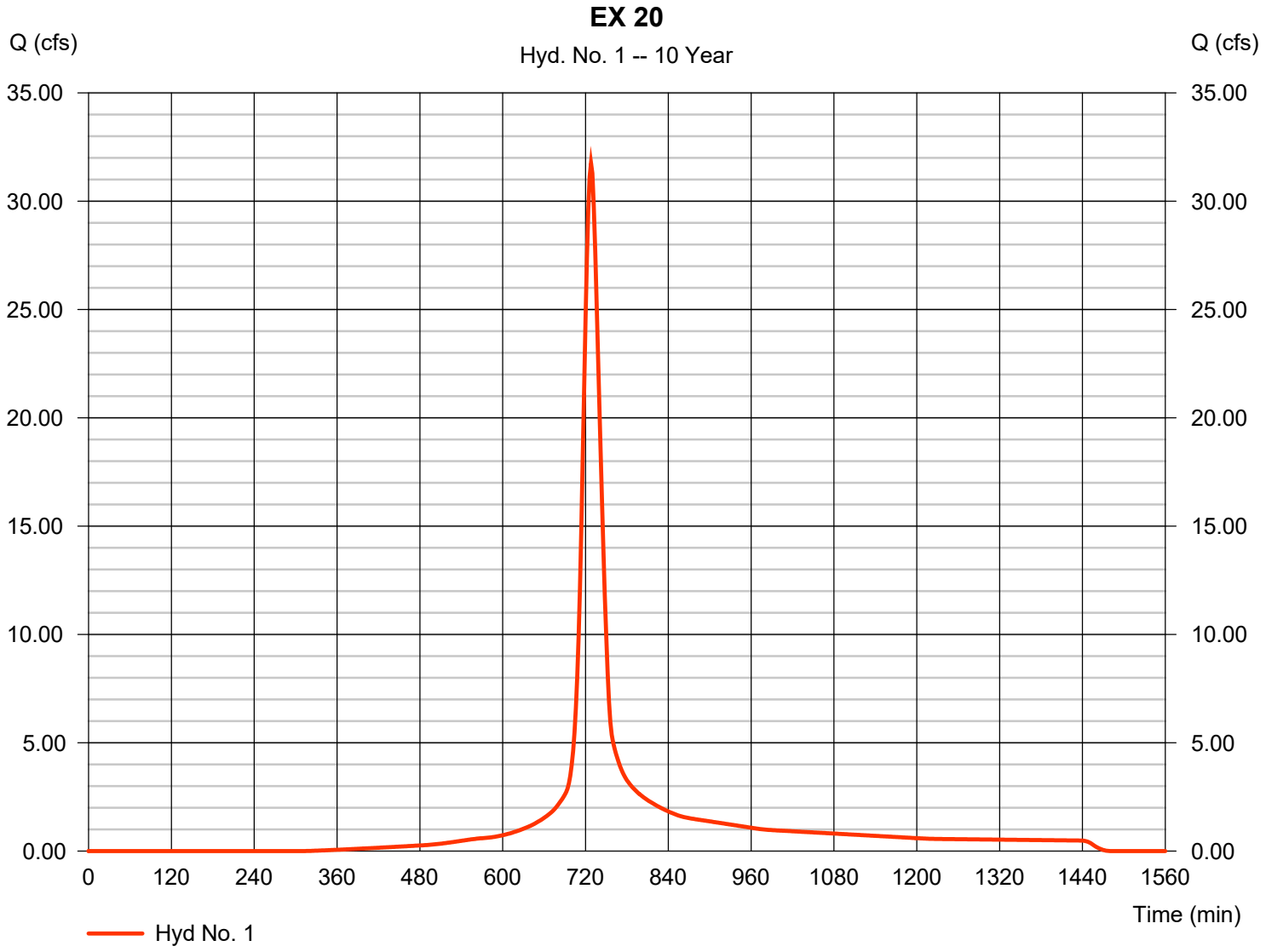
Hydrograph Report

Hyd. No. 1

EX 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	117,694 cuft
Drainage area	=	8.270 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	25.10 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.110 x 98) + (8.160 x 85)] / 8.270



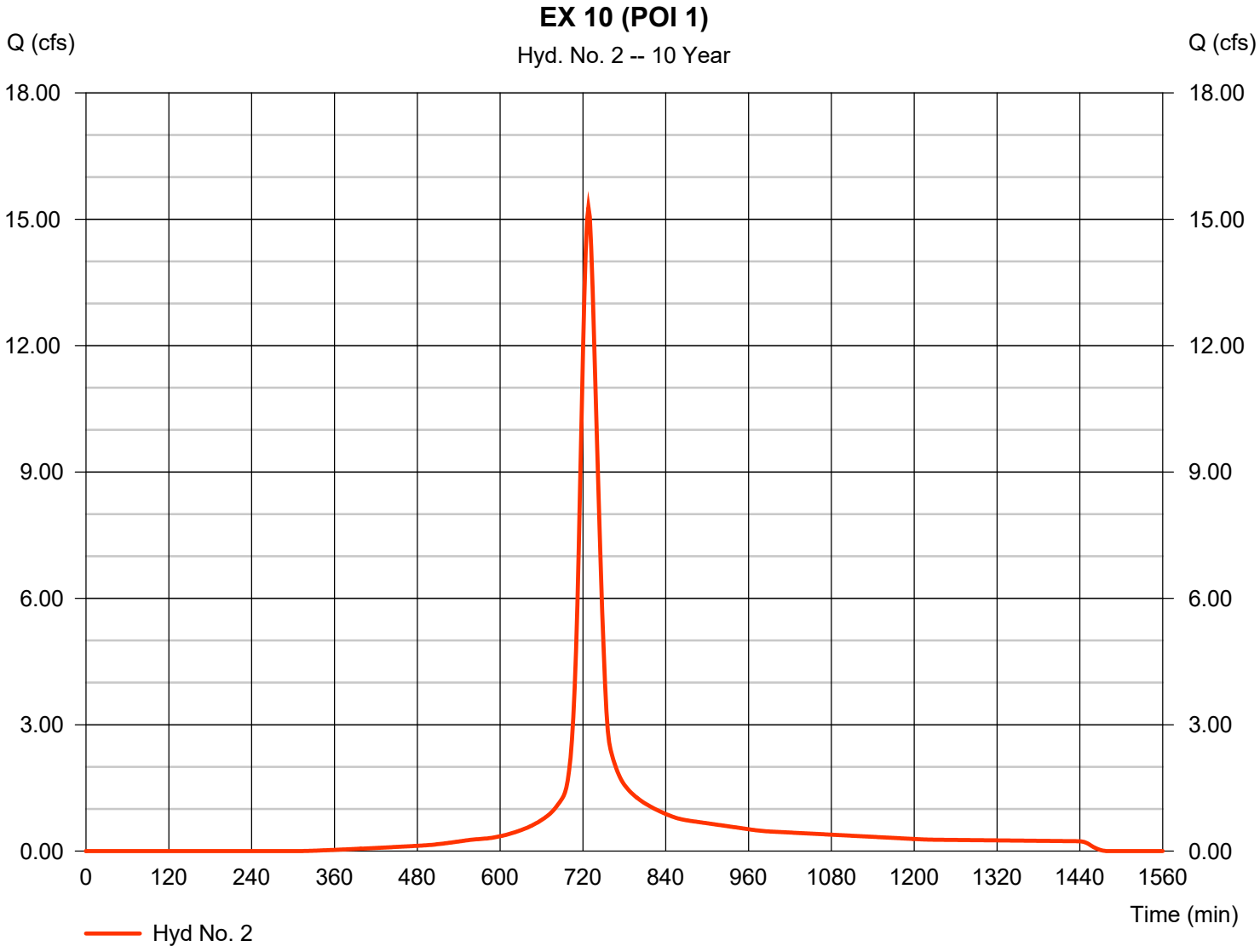
Hydrograph Report

Hyd. No. 2

EX 10 (POI 1)

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.28 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	56,641 cuft
Drainage area	=	3.980 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.30 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.090 x 98) + (3.890 x 85)] / 3.980



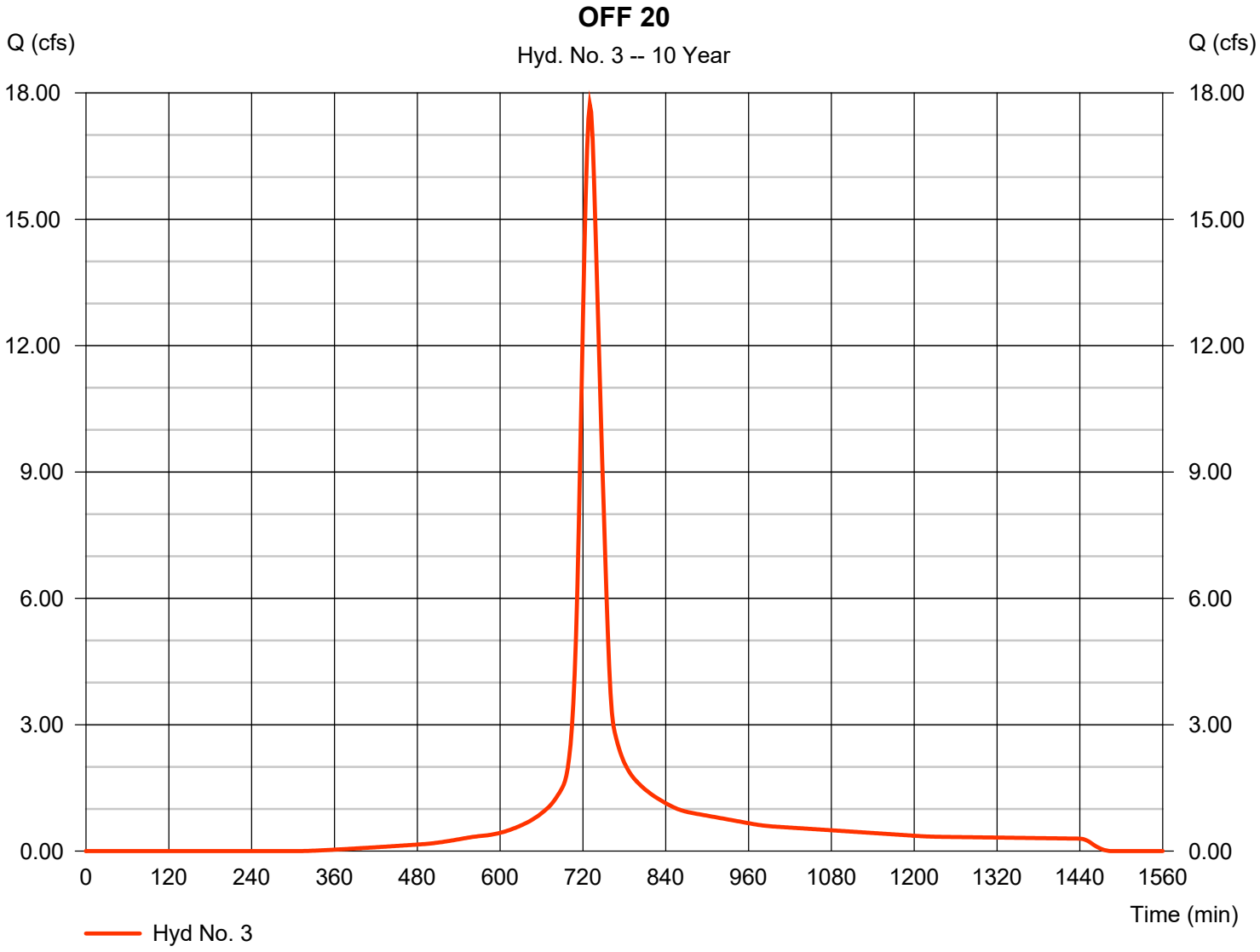
Hydrograph Report

Hyd. No. 3

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.72 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	71,419 cuft
Drainage area	=	4.940 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.90 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.140 x 98) + (4.800 x 85)] / 4.940

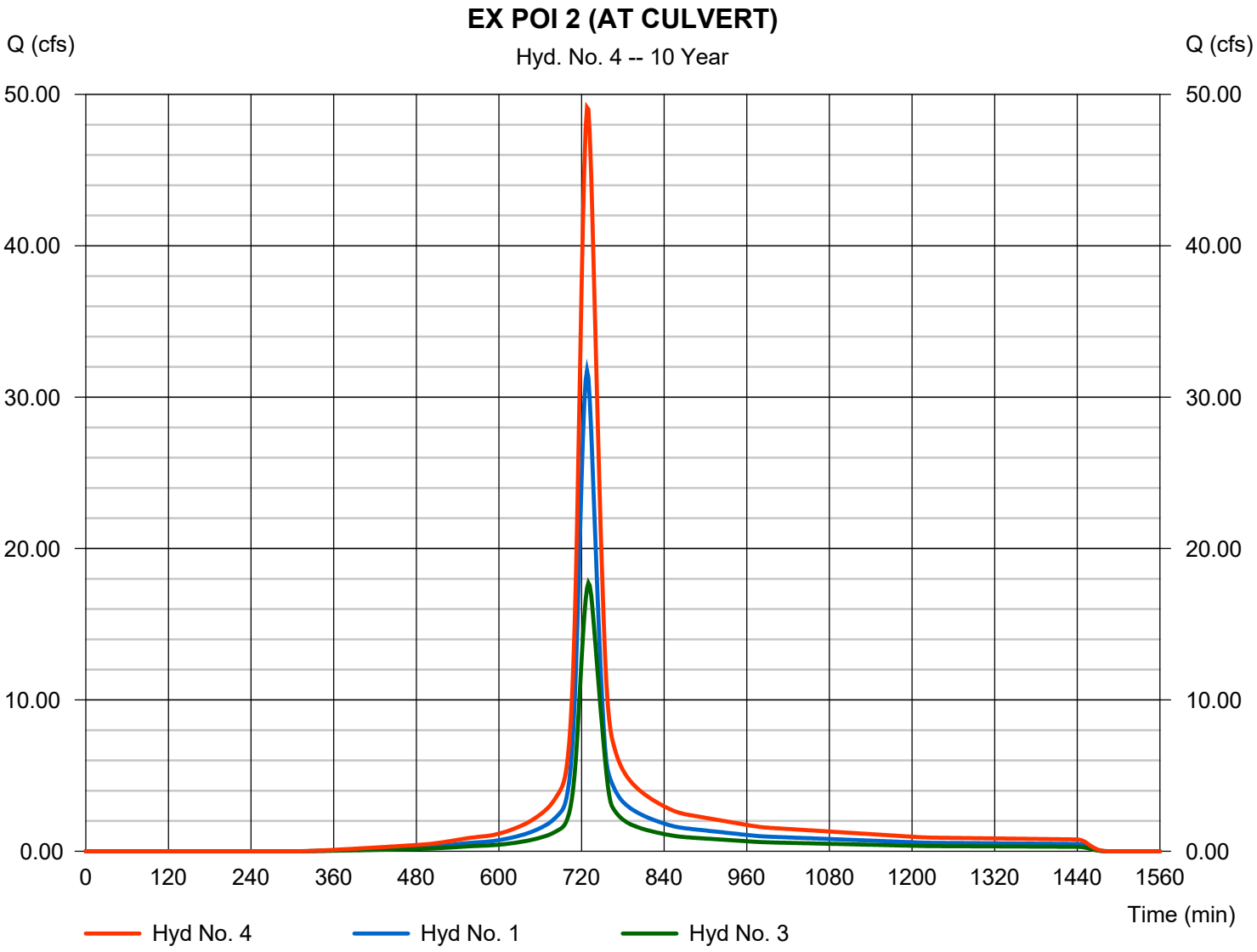


Hydrograph Report

Hyd. No. 4

EX POI 2 (AT CULVERT)

Hydrograph type	= Combine	Peak discharge	= 49.14 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 189,112 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 13.210 ac



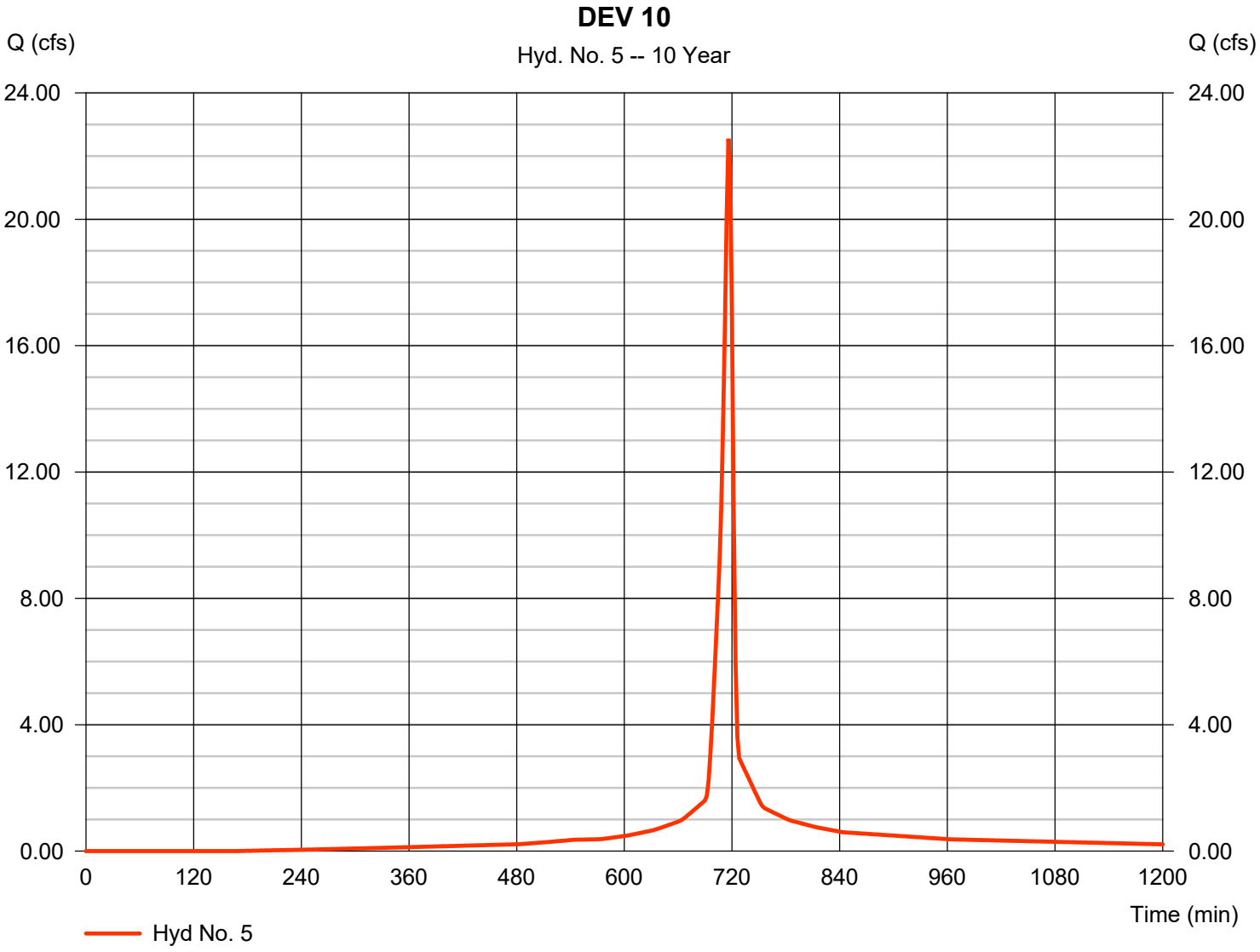
Hydrograph Report

Hyd. No. 5

DEV 10

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	49,797 cuft
Drainage area	=	3.090 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.020 x 98) + (1.070 x 80)] / 3.090



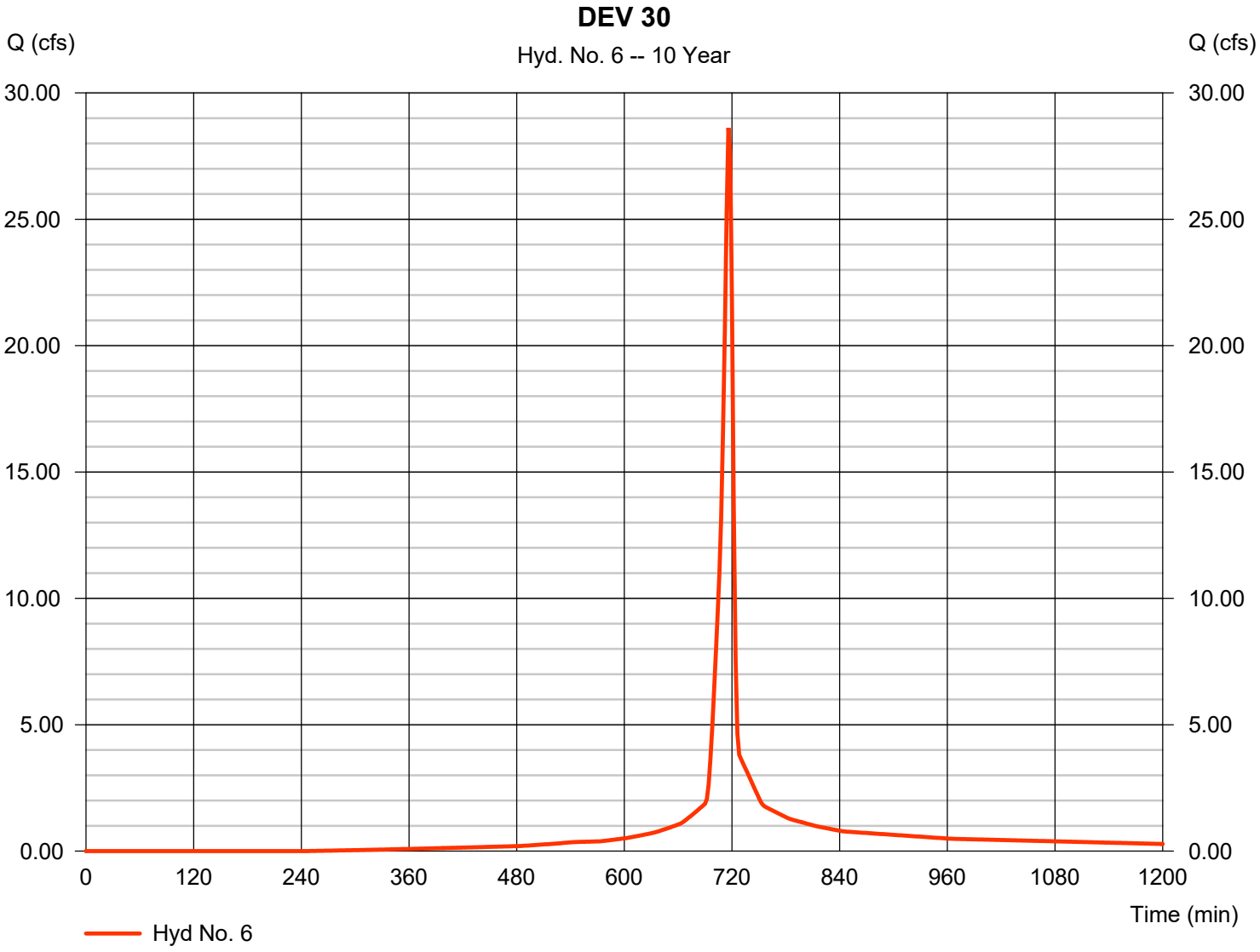
Hydrograph Report

Hyd. No. 6

DEV 30

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.62 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	61,008 cuft
Drainage area	=	4.170 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.850 x 98) + (2.320 x 80)] / 4.170



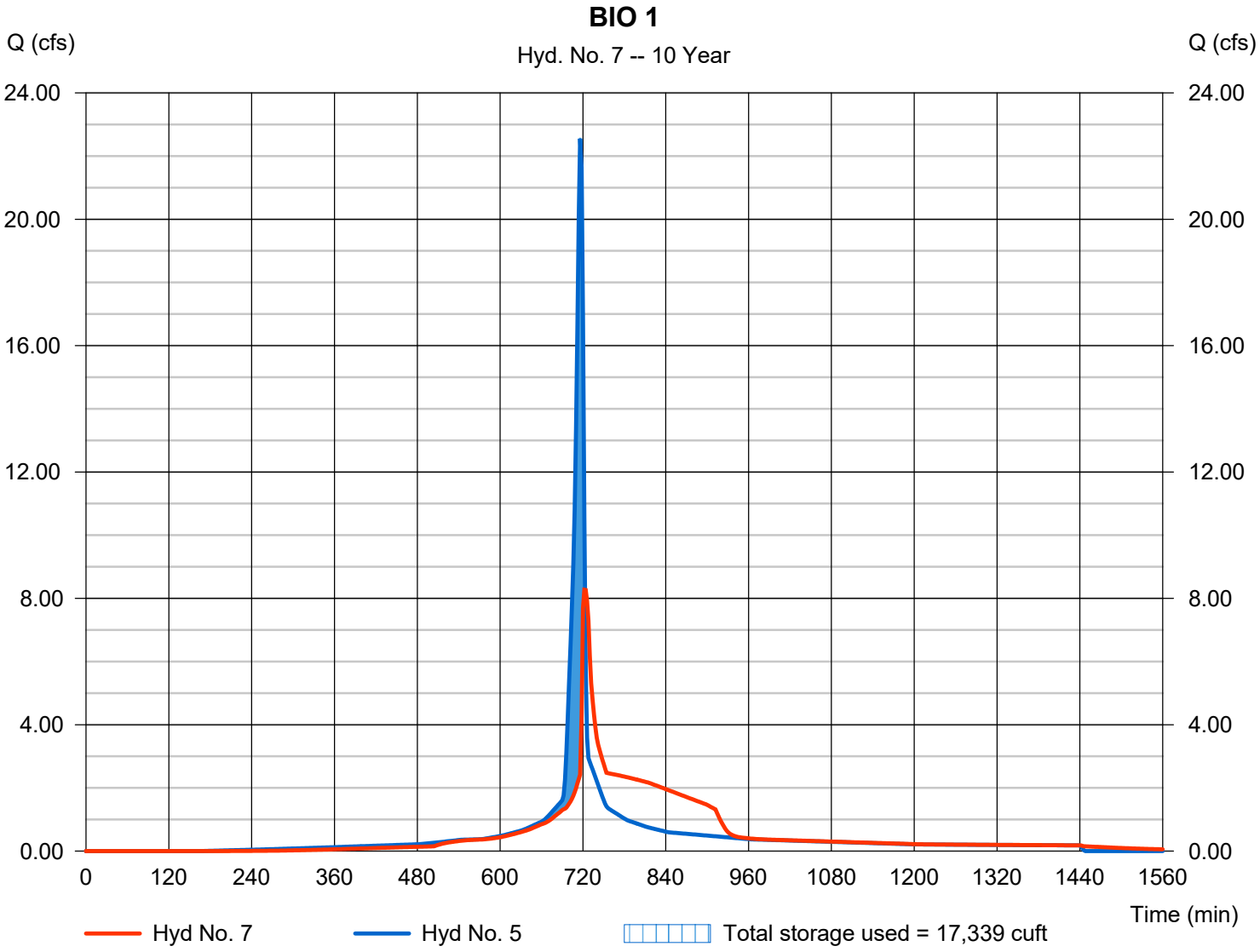
Hydrograph Report

Hyd. No. 7

BIO 1

Hydrograph type	=	Reservoir	Peak discharge	=	8.272 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	49,784 cuft
Inflow hyd. No.	=	5 - DEV 10	Max. Elevation	=	1021.90 ft
Reservoir name	=	BIORETENTION 1	Max. Storage	=	17,339 cuft

Storage Indication method used.

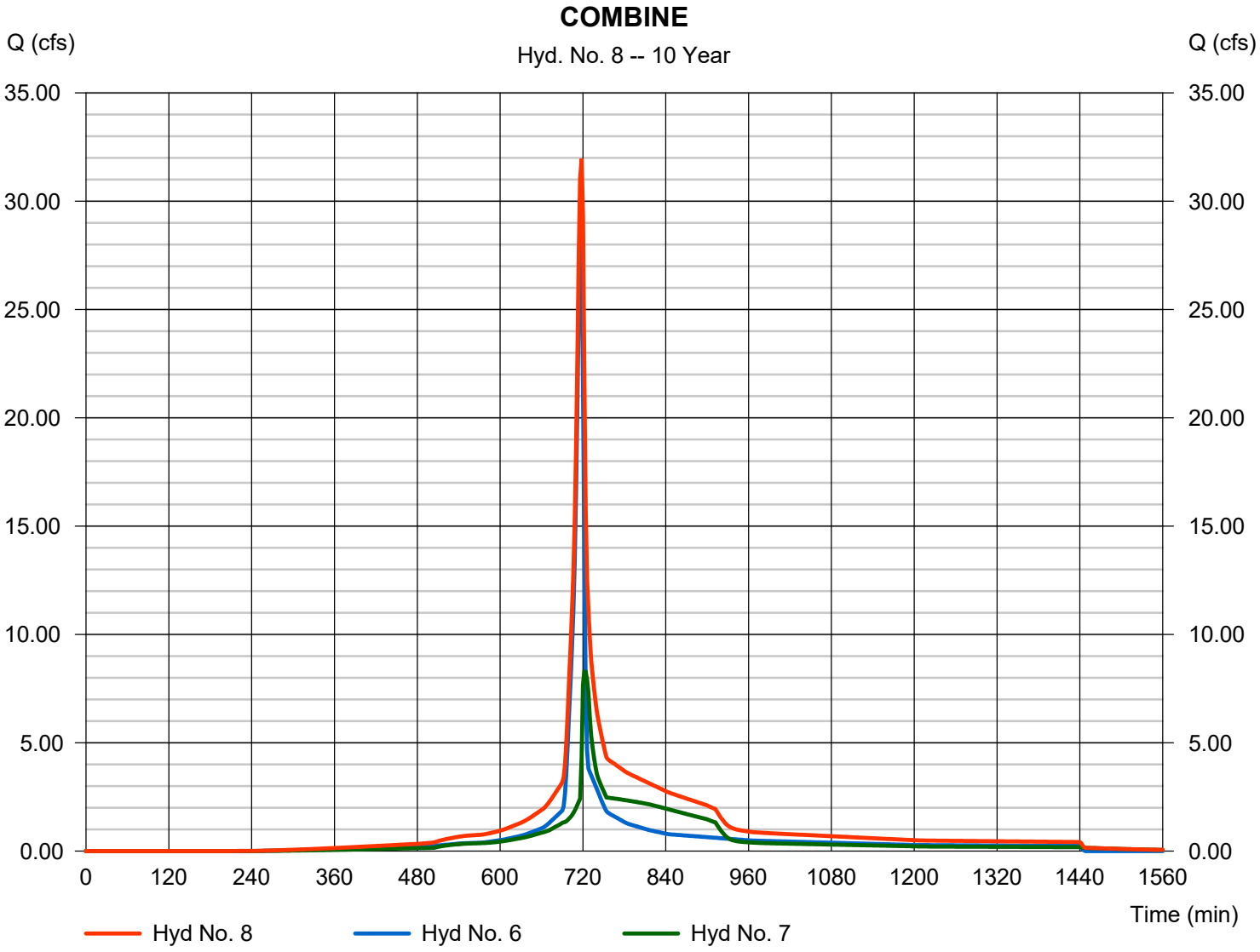


Hydrograph Report

Hyd. No. 8

COMBINE

Hydrograph type	=	Combine	Peak discharge	=	31.96 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	110,792 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	4.170 ac



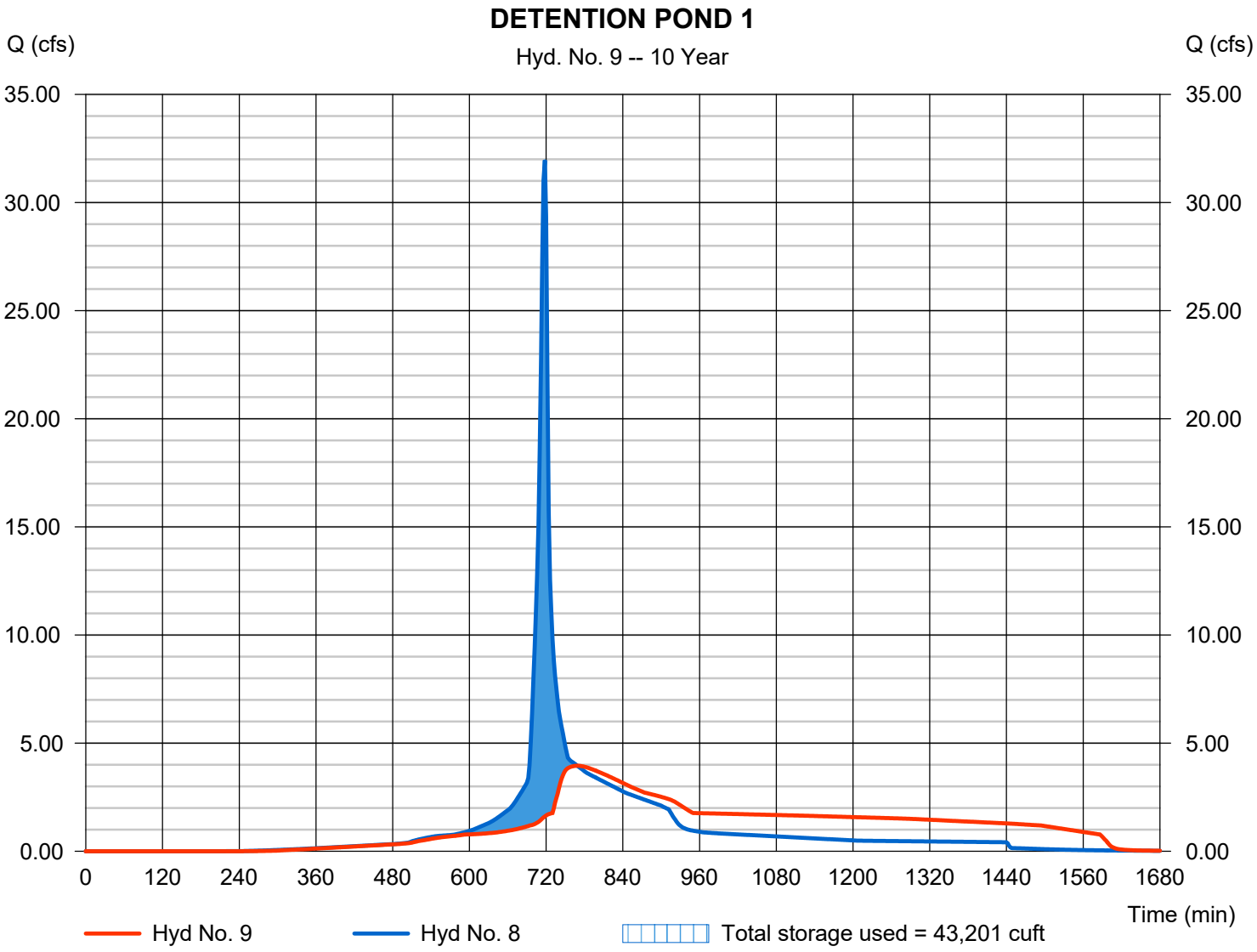
Hydrograph Report

Hyd. No. 9

DETENTION POND 1

Hydrograph type	=	Reservoir	Peak discharge	=	3.953 cfs
Storm frequency	=	10 yrs	Time to peak	=	768 min
Time interval	=	2 min	Hyd. volume	=	110,790 cuft
Inflow hyd. No.	=	8 - COMBINE	Max. Elevation	=	1020.17 ft
Reservoir name	=	DRY DETENTION 1	Max. Storage	=	43,201 cuft

Storage Indication method used.



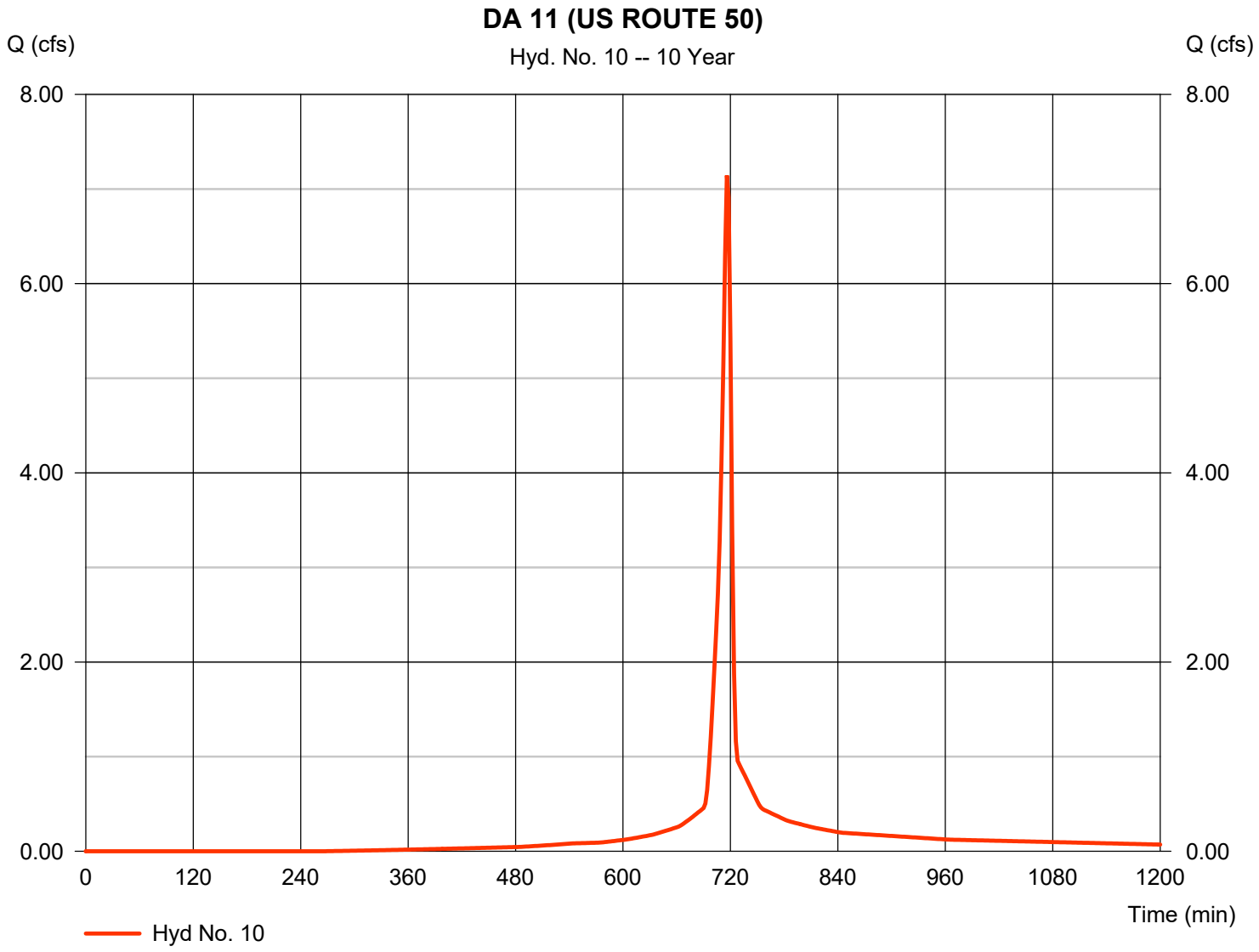
Hydrograph Report

Hyd. No. 10

DA 11 (US ROUTE 50)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.144 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 15,124 cuft
Drainage area	= 1.060 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.66 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (0.660 x 80)] / 1.060

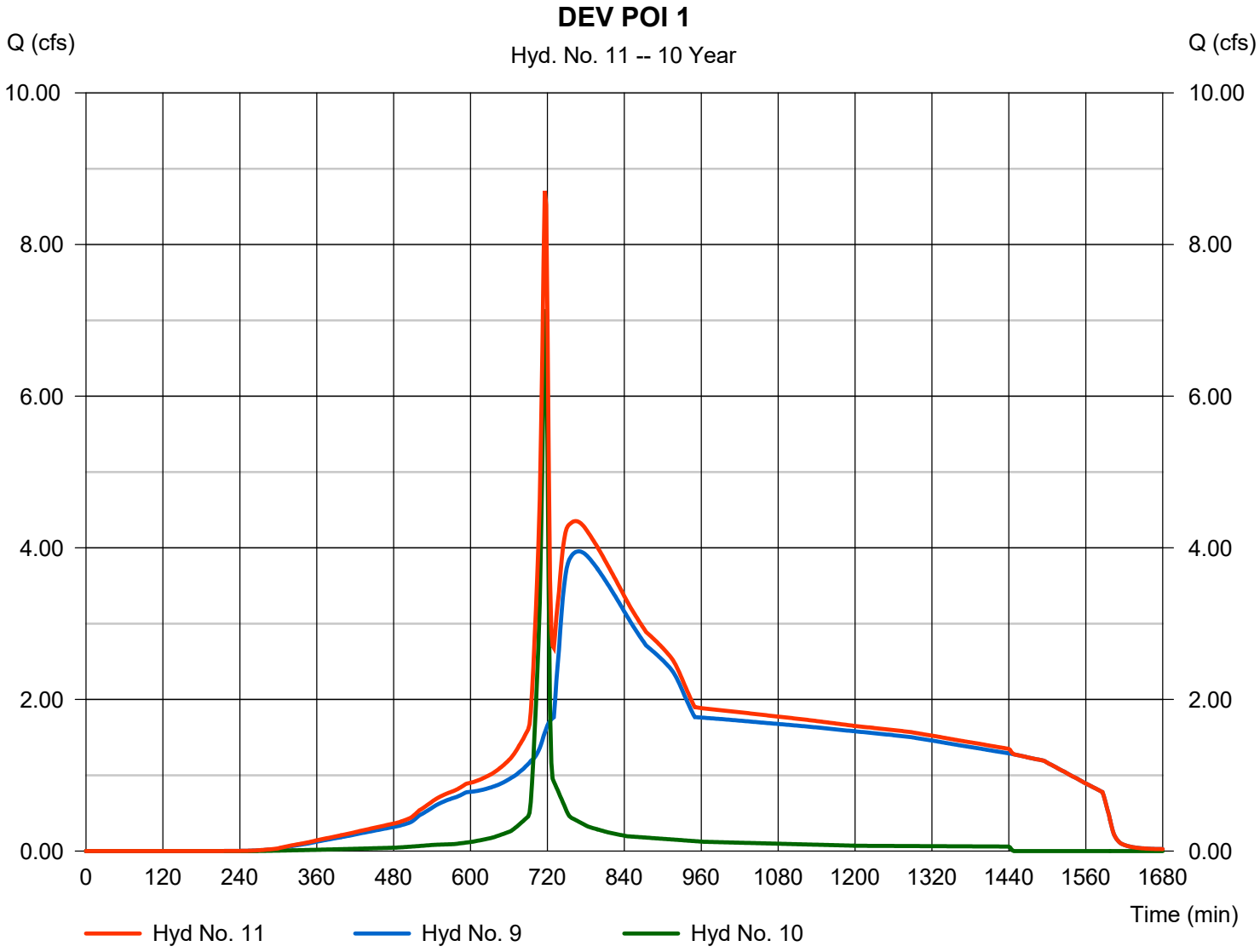


Hydrograph Report

Hyd. No. 11

DEV POI 1

Hydrograph type	=	Combine	Peak discharge	=	8.708 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	125,914 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	1.060 ac



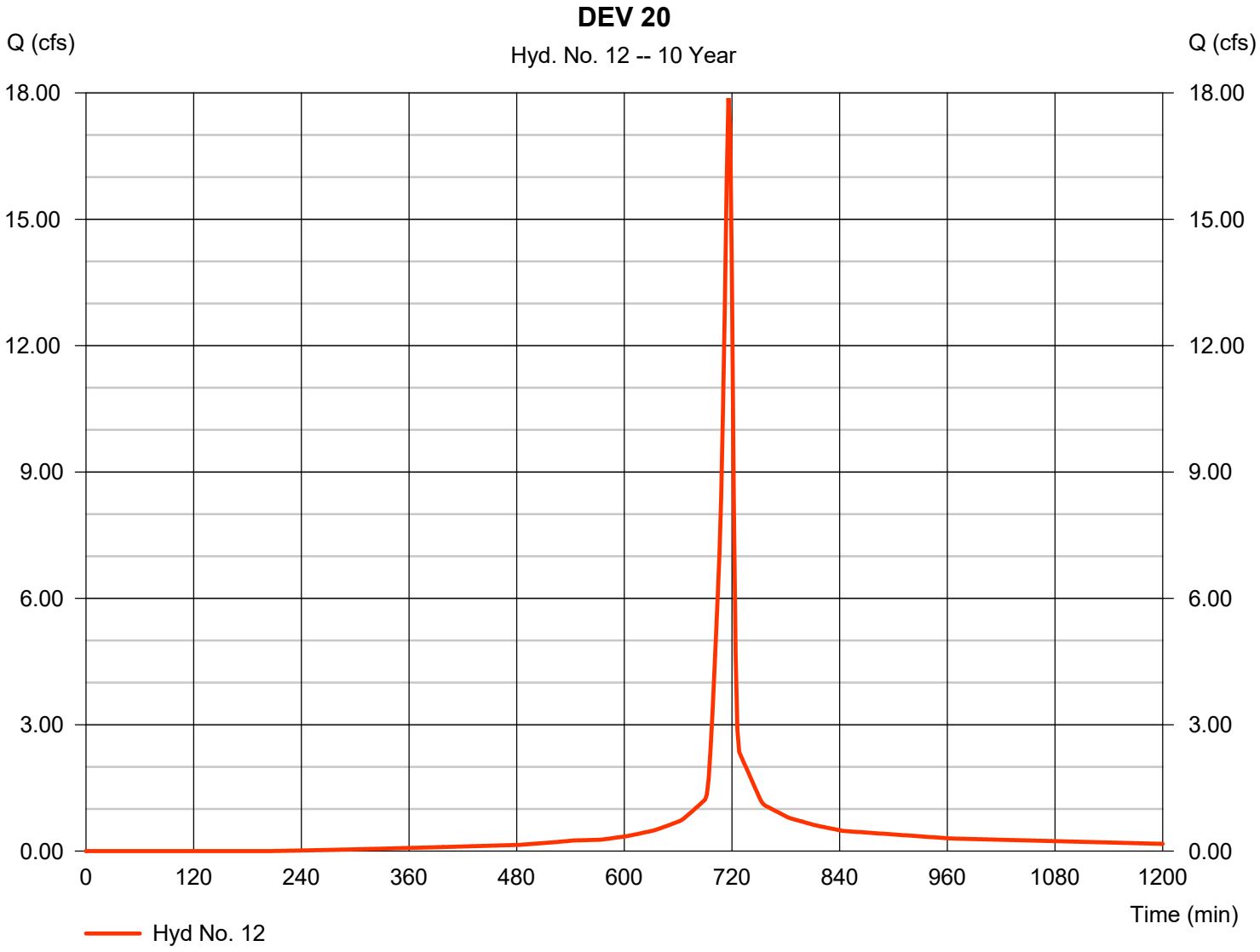
Hydrograph Report

Hyd. No. 12

DEV 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.87 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	38,722 cuft
Drainage area	=	2.520 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.340 x 98) + (1.180 x 80)] / 2.520



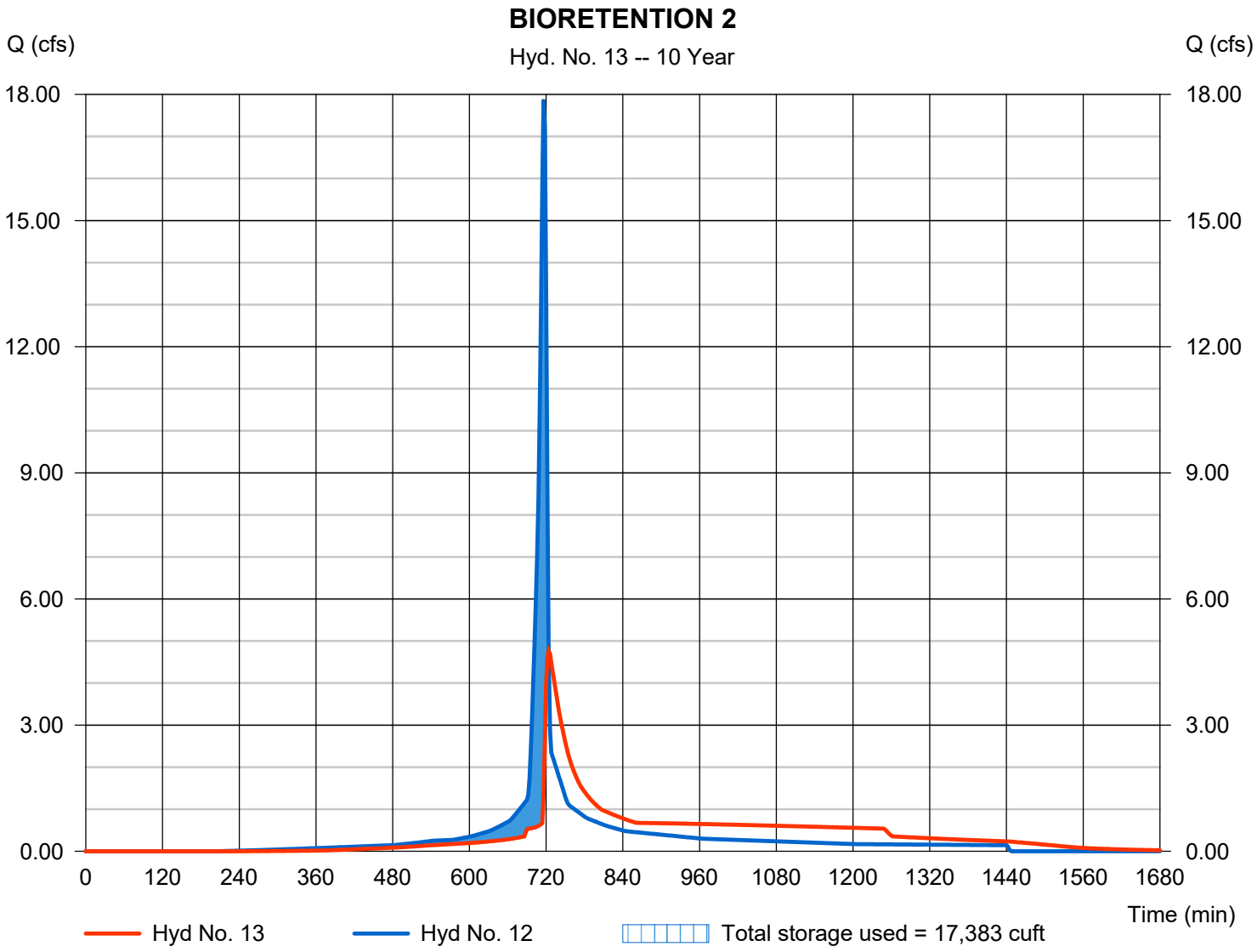
Hydrograph Report

Hyd. No. 13

BIORETENTION 2

Hydrograph type	=	Reservoir	Peak discharge	=	4.768 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	38,705 cuft
Inflow hyd. No.	=	12 - DEV 20	Max. Elevation	=	1021.10 ft
Reservoir name	=	BIORETENTION 2	Max. Storage	=	17,383 cuft

Storage Indication method used.



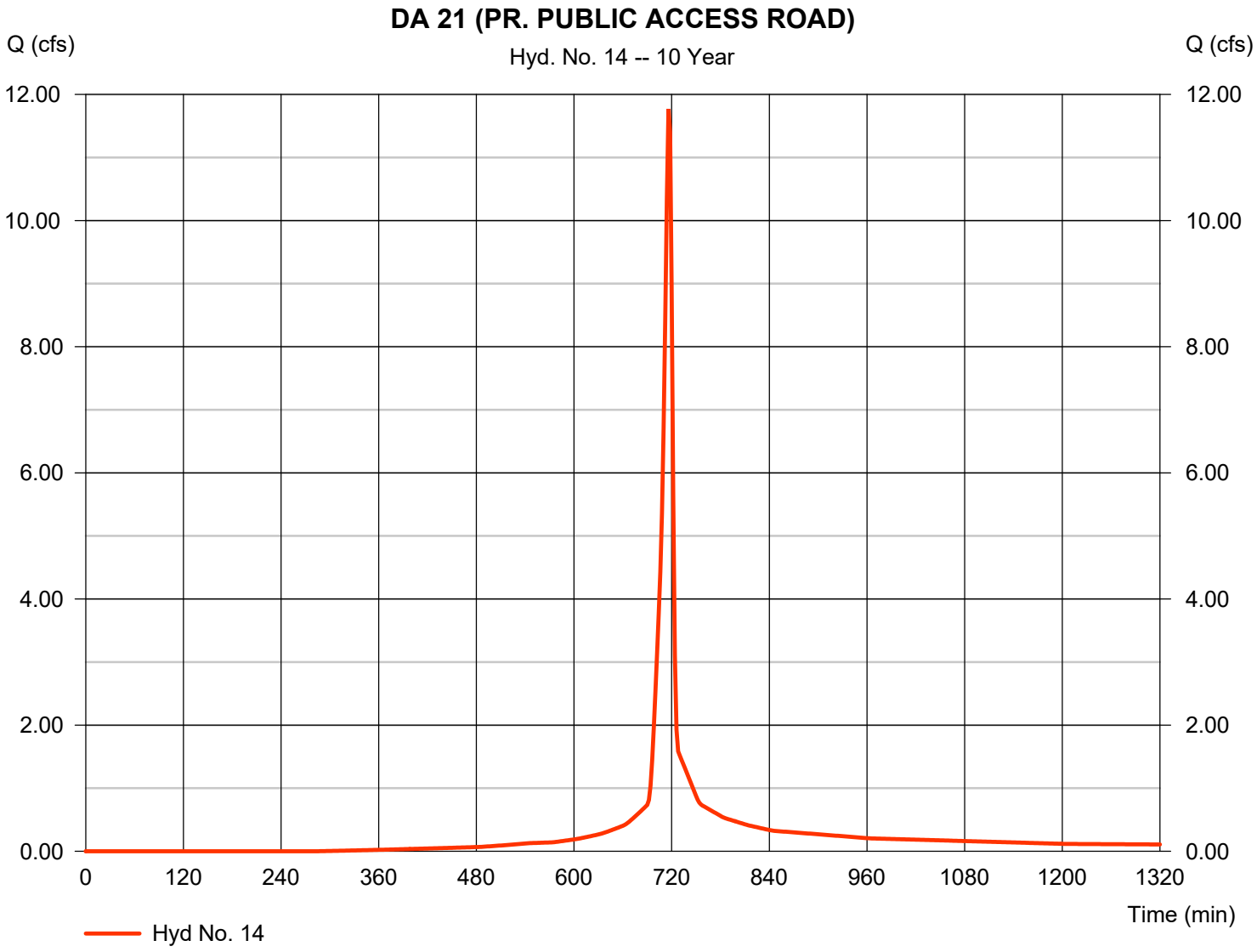
Hydrograph Report

Hyd. No. 14

DA 21 (PR. PUBLIC ACCESS ROAD)

Hydrograph type	= SCS Runoff	Peak discharge	= 11.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 24,758 cuft
Drainage area	= 1.780 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.66 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.630 x 98) + (1.150 x 80)] / 1.780



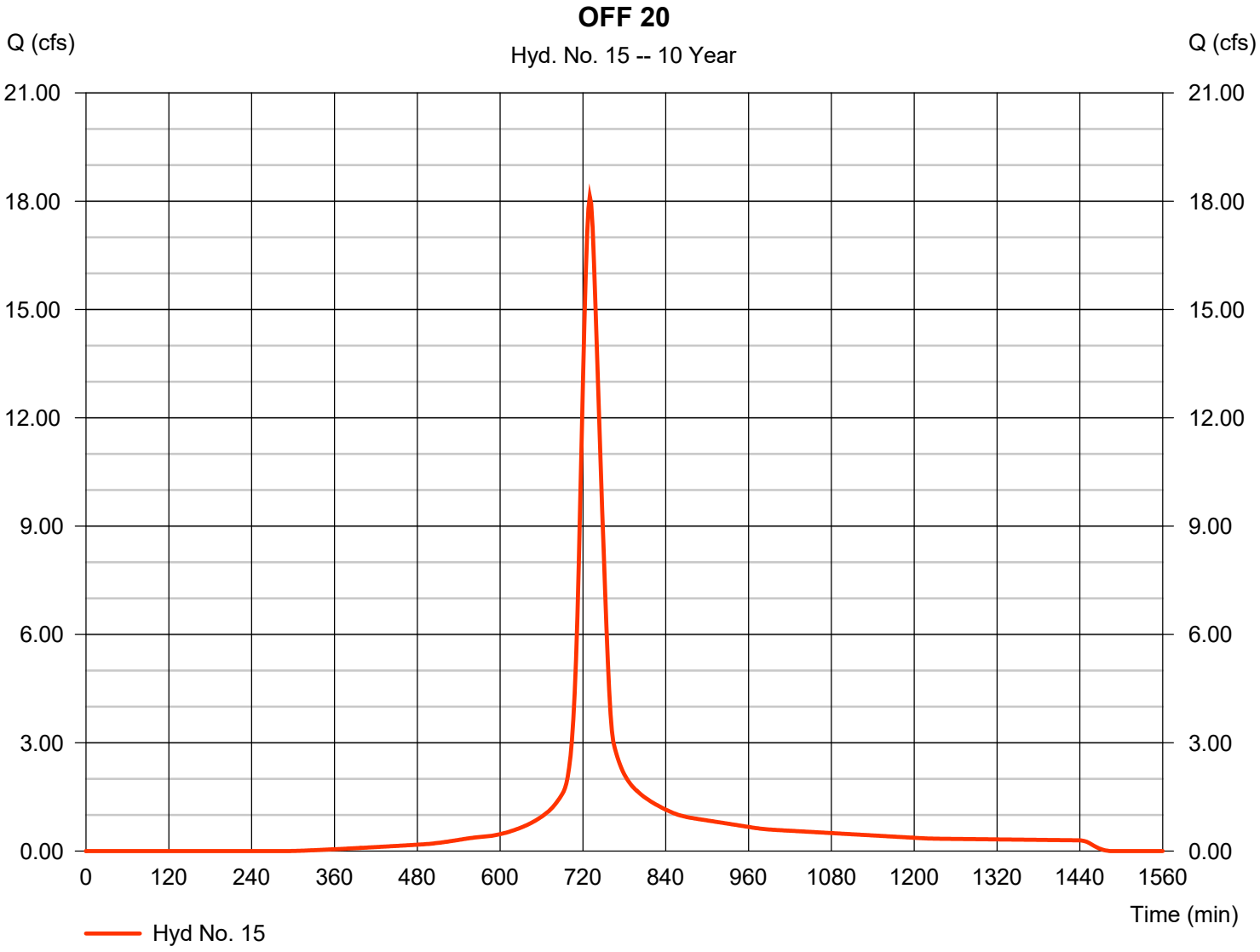
Hydrograph Report

Hyd. No. 15

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.13 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	73,291 cuft
Drainage area	=	4.940 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	28.90 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 98) + (4.750 x 85)] / 4.940



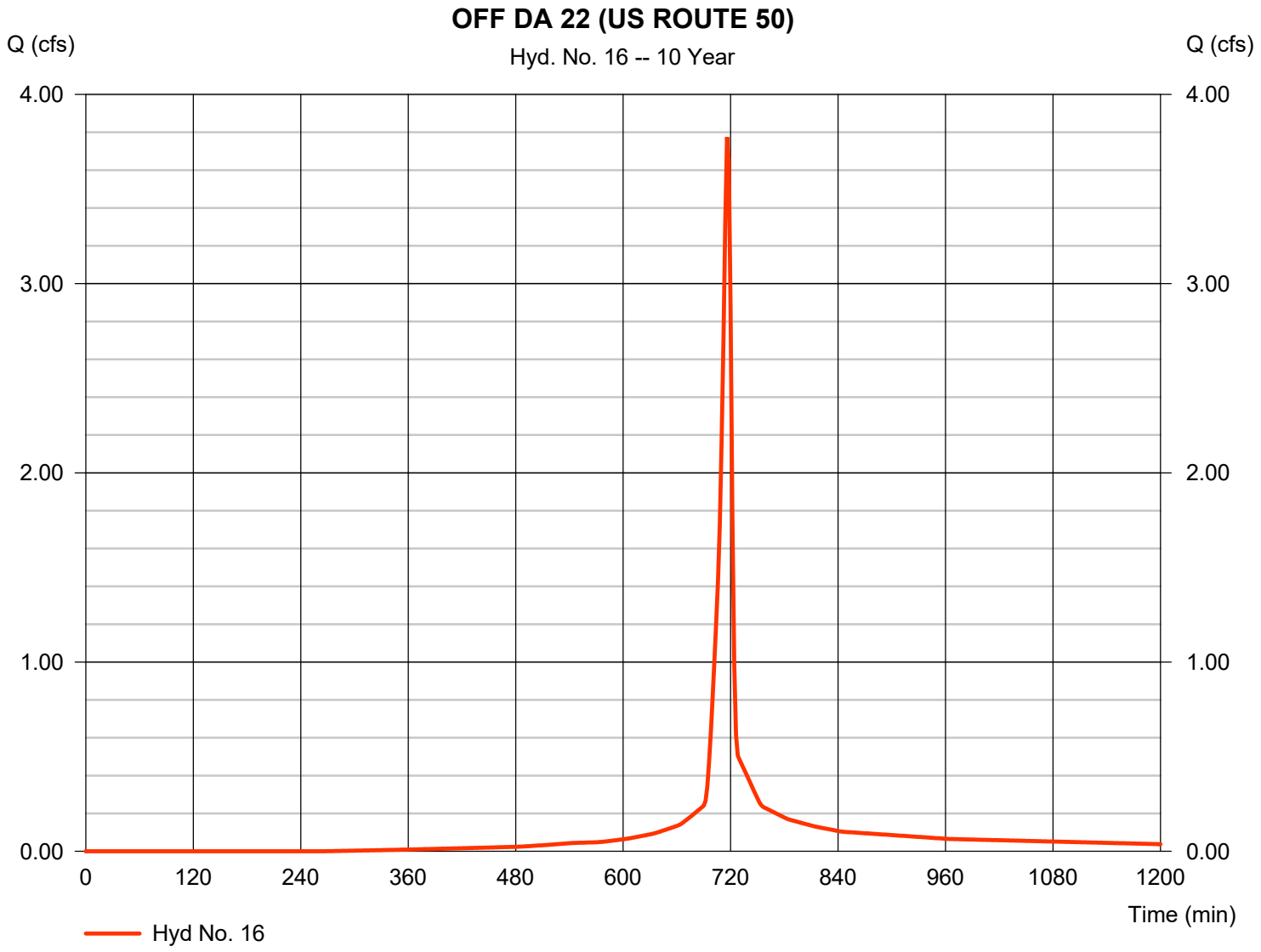
Hydrograph Report

Hyd. No. 16

OFF DA 22 (US ROUTE 50)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.774 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	7,990 cuft
Drainage area	=	0.560 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.66 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.210 x 98) + (0.350 x 80)] / 0.560

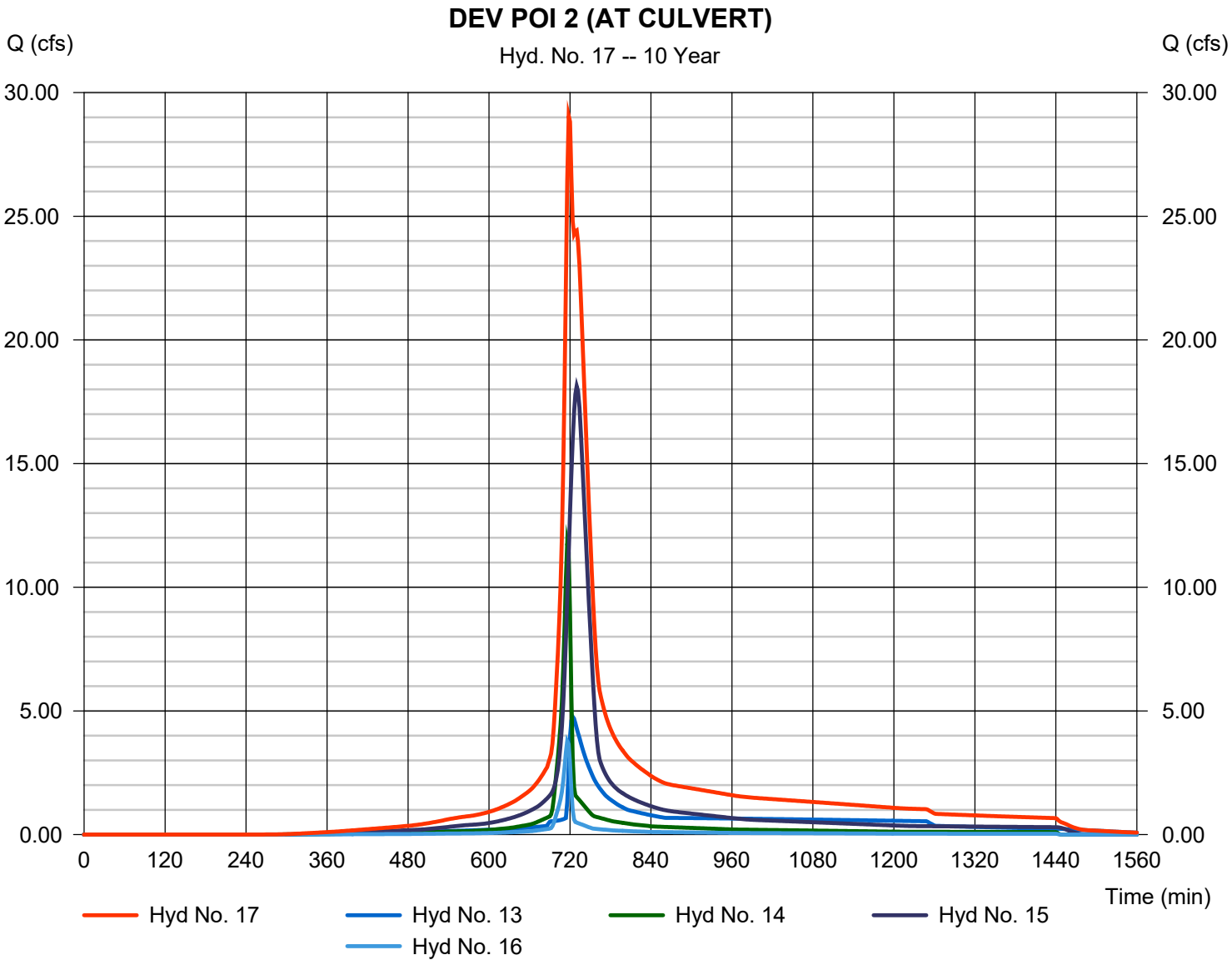


Hydrograph Report

Hyd. No. 17

DEV POI 2 (AT CULVERT)

Hydrograph type	=	Combine	Peak discharge	=	29.06 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	144,745 cuft
Inflow hyds.	=	13, 14, 15, 16	Contrib. drain. area	=	7.280 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	57.71	2	728	219,400	------	------	------	EX 20
2	SCS Runoff	27.78	2	728	105,588	------	------	------	EX 10 (POI 1)
3	SCS Runoff	32.26	2	730	133,137	------	------	------	OFF 20
4	Combine	89.48	2	728	352,537	1, 3	------	------	EX POI 2 (AT CULVERT)
5	SCS Runoff	38.09	2	716	87,096	------	------	------	DEV 10
6	SCS Runoff	49.93	2	716	110,597	------	------	------	DEV 30
7	Reservoir	10.22	2	724	87,083	5	1022.97	30,074	BIO 1
8	Combine	59.12	2	716	197,680	6, 7	------	------	COMBINE
9	Reservoir	22.15	2	724	197,678	8	1020.78	60,228	DETENTION POND 1
10	SCS Runoff	12.58	2	716	27,670	------	------	------	DA 11 (US ROUTE 50)
11	Combine	27.23	2	720	225,348	9, 10	------	------	DEV POI 1
12	SCS Runoff	30.66	2	716	68,937	------	------	------	DEV 20
13	Reservoir	6.002	2	726	68,920	12	1022.22	30,251	BIORETENTION 2
14	SCS Runoff	20.92	2	716	45,720	------	------	------	DA 21 (PR. PUBLIC ACCESS ROAD)
15	SCS Runoff	32.64	2	730	135,346	------	------	------	OFF 20
16	SCS Runoff	6.646	2	716	14,618	------	------	------	OFF DA 22 (US ROUTE 50)
17	Combine	53.22	2	718	264,605	13, 14, 15, 16	------	------	DEV POI 2 (AT CULVERT)

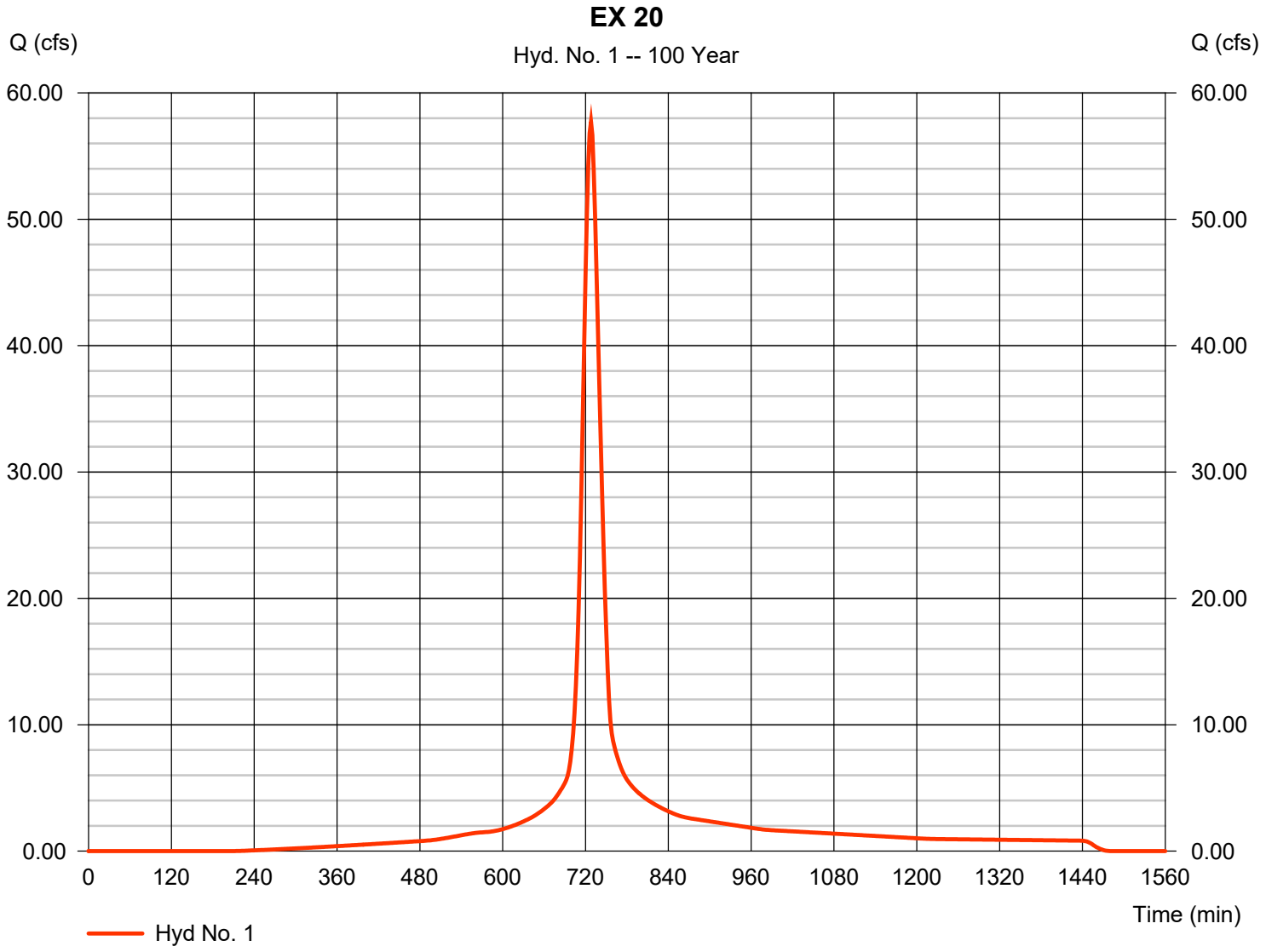
Hydrograph Report

Hyd. No. 1

EX 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	57.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	219,400 cuft
Drainage area	=	8.270 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	25.10 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.110 x 98) + (8.160 x 85)] / 8.270



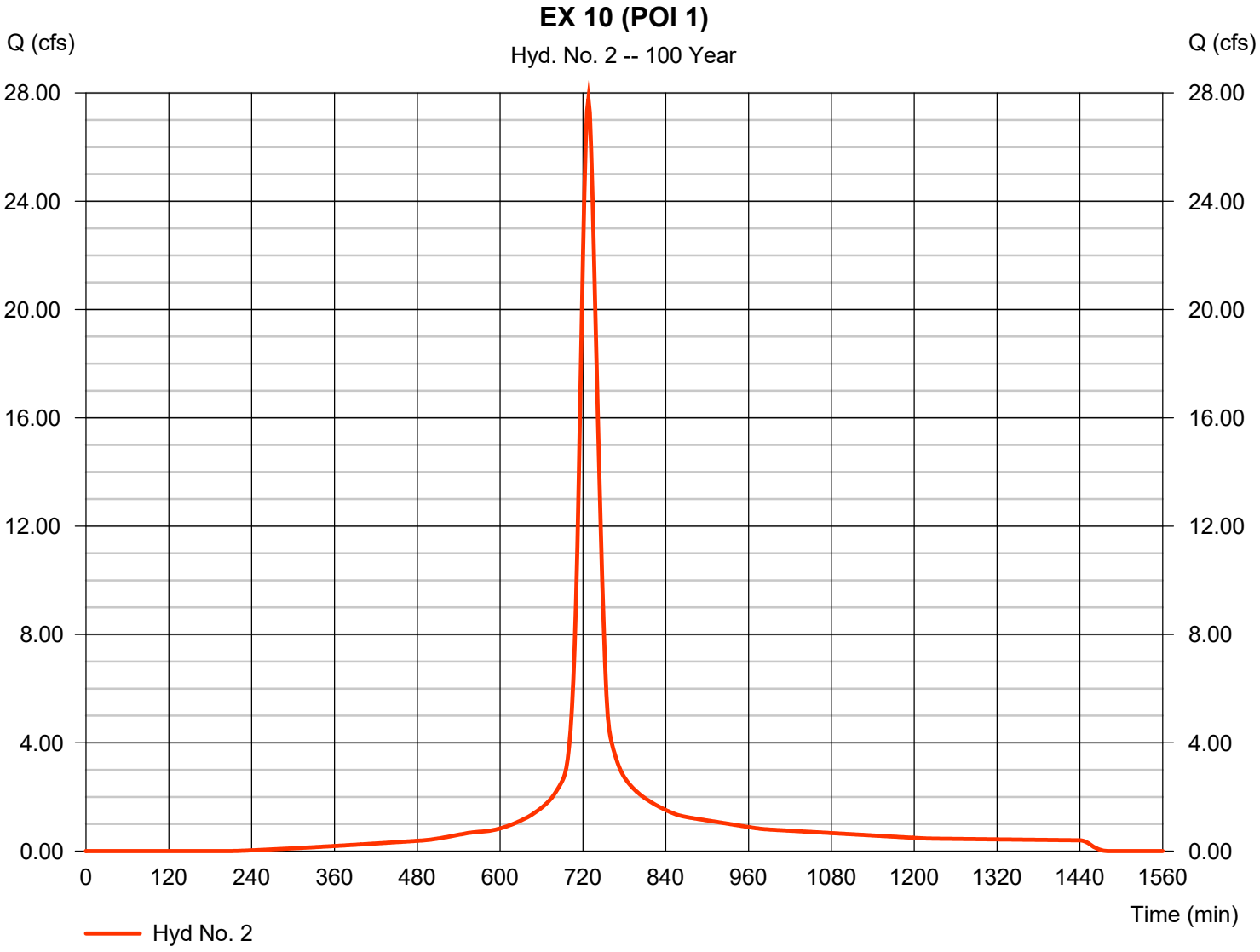
Hydrograph Report

Hyd. No. 2

EX 10 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 27.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 105,588 cuft
Drainage area	= 3.980 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.30 min
Total precip.	= 9.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.090 x 98) + (3.890 x 85)] / 3.980



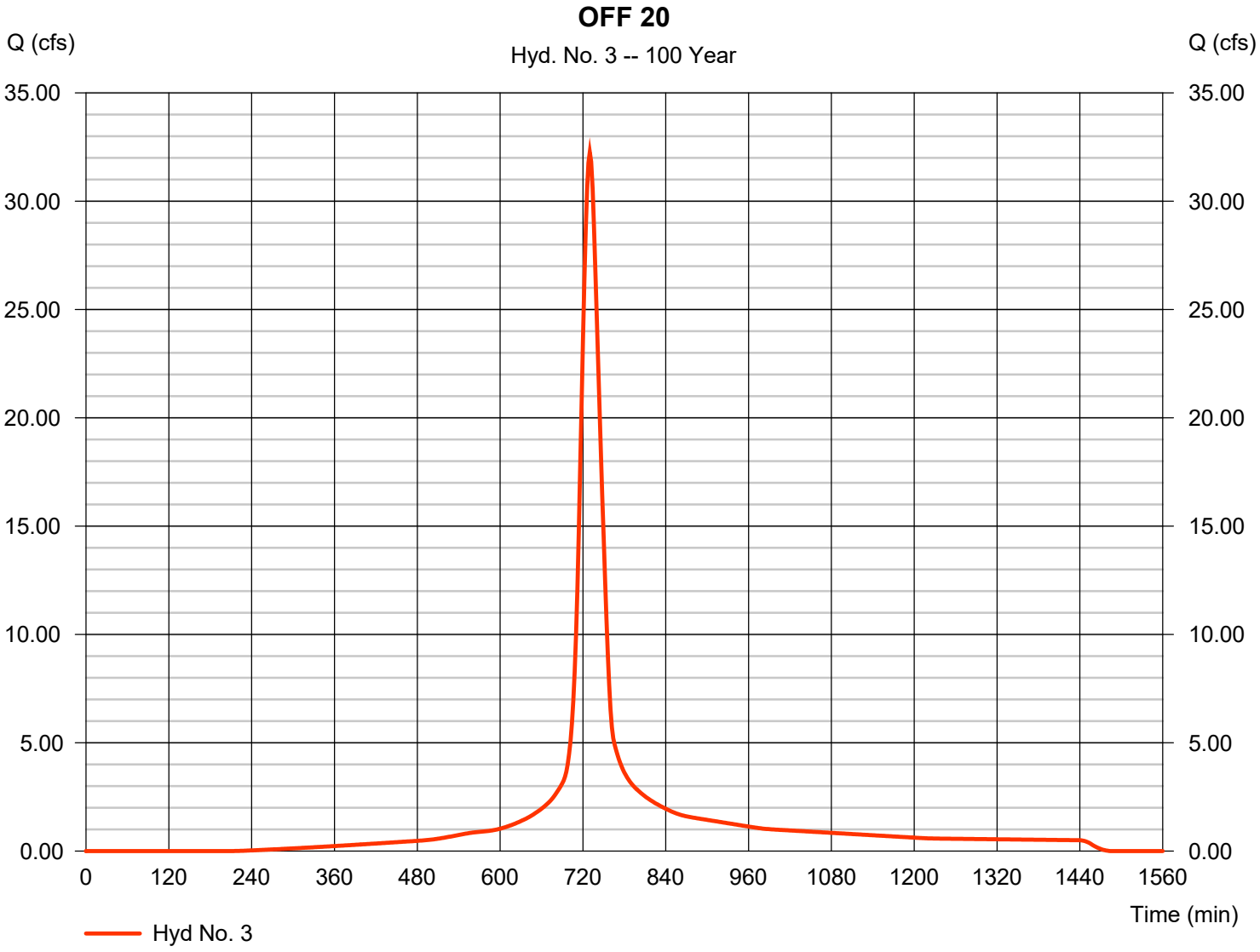
Hydrograph Report

Hyd. No. 3

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	133,137 cuft
Drainage area	=	4.940 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	28.90 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.140 x 98) + (4.800 x 85)] / 4.940

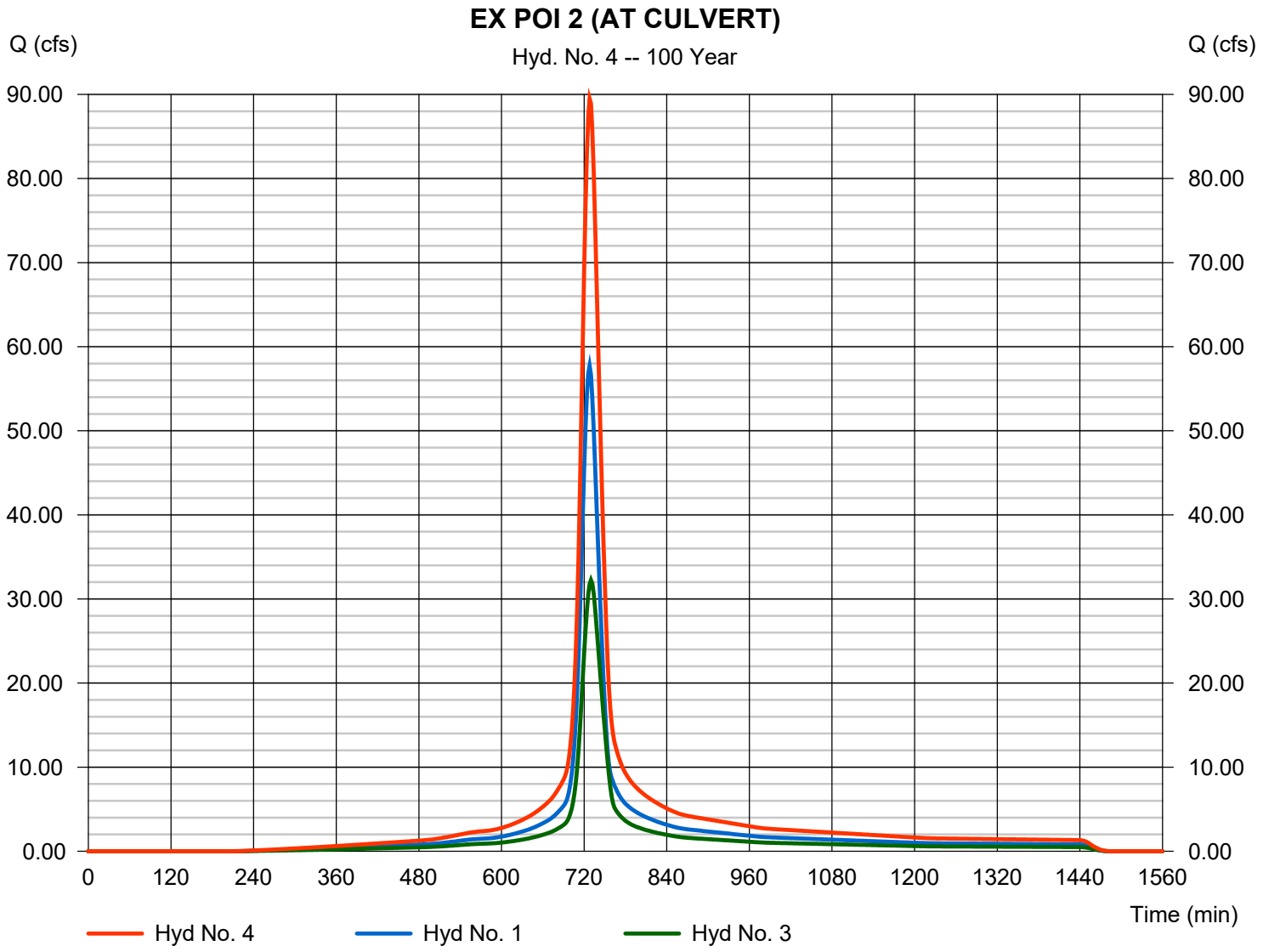


Hydrograph Report

Hyd. No. 4

EX POI 2 (AT CULVERT)

Hydrograph type	=	Combine	Peak discharge	=	89.48 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	352,537 cuft
Inflow hyds.	=	1, 3	Contrib. drain. area	=	13.210 ac



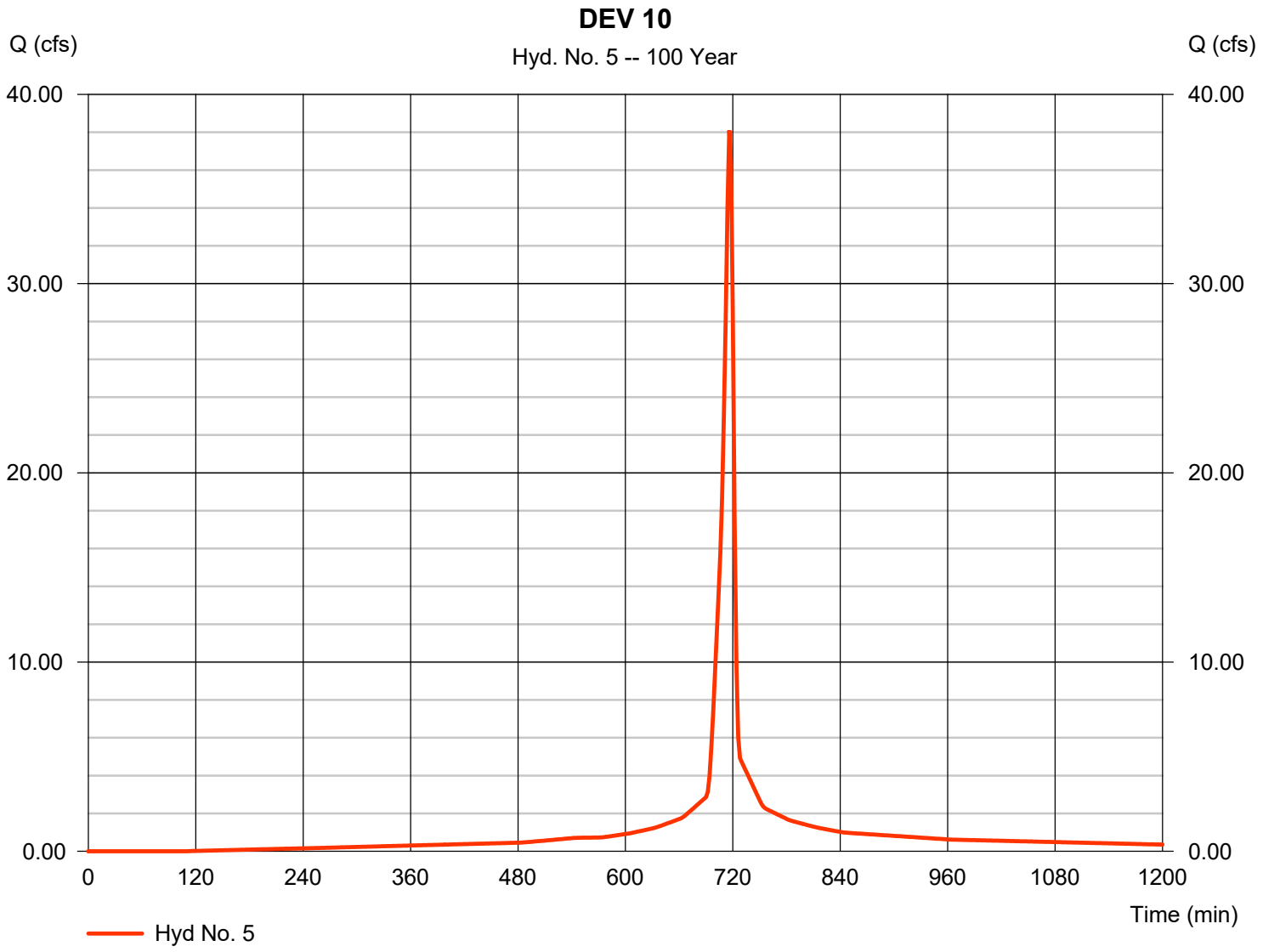
Hydrograph Report

Hyd. No. 5

DEV 10

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.09 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	87,096 cuft
Drainage area	=	3.090 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.020 x 98) + (1.070 x 80)] / 3.090



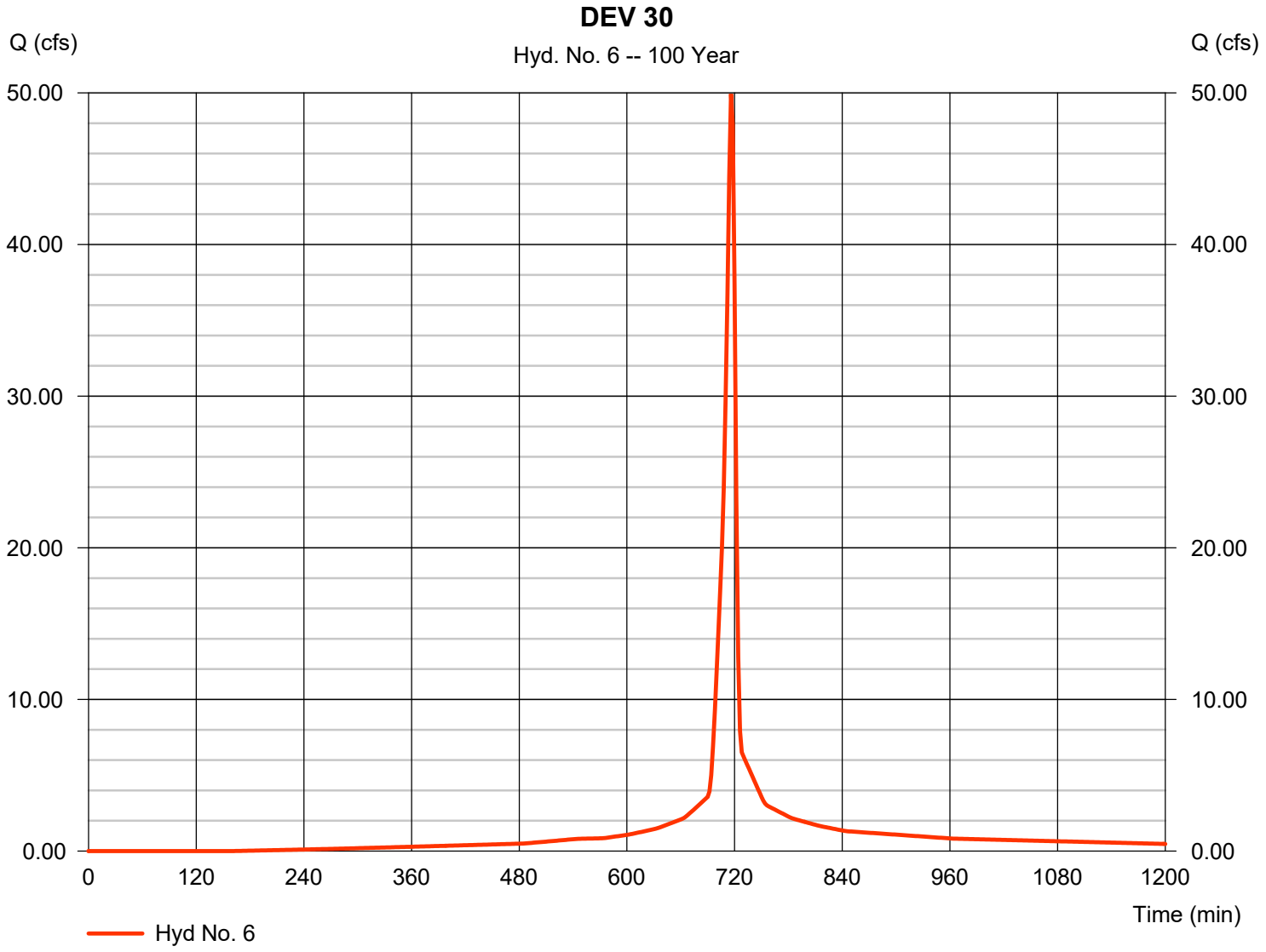
Hydrograph Report

Hyd. No. 6

DEV 30

Hydrograph type	=	SCS Runoff	Peak discharge	=	49.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	110,597 cuft
Drainage area	=	4.170 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.850 x 98) + (2.320 x 80)] / 4.170



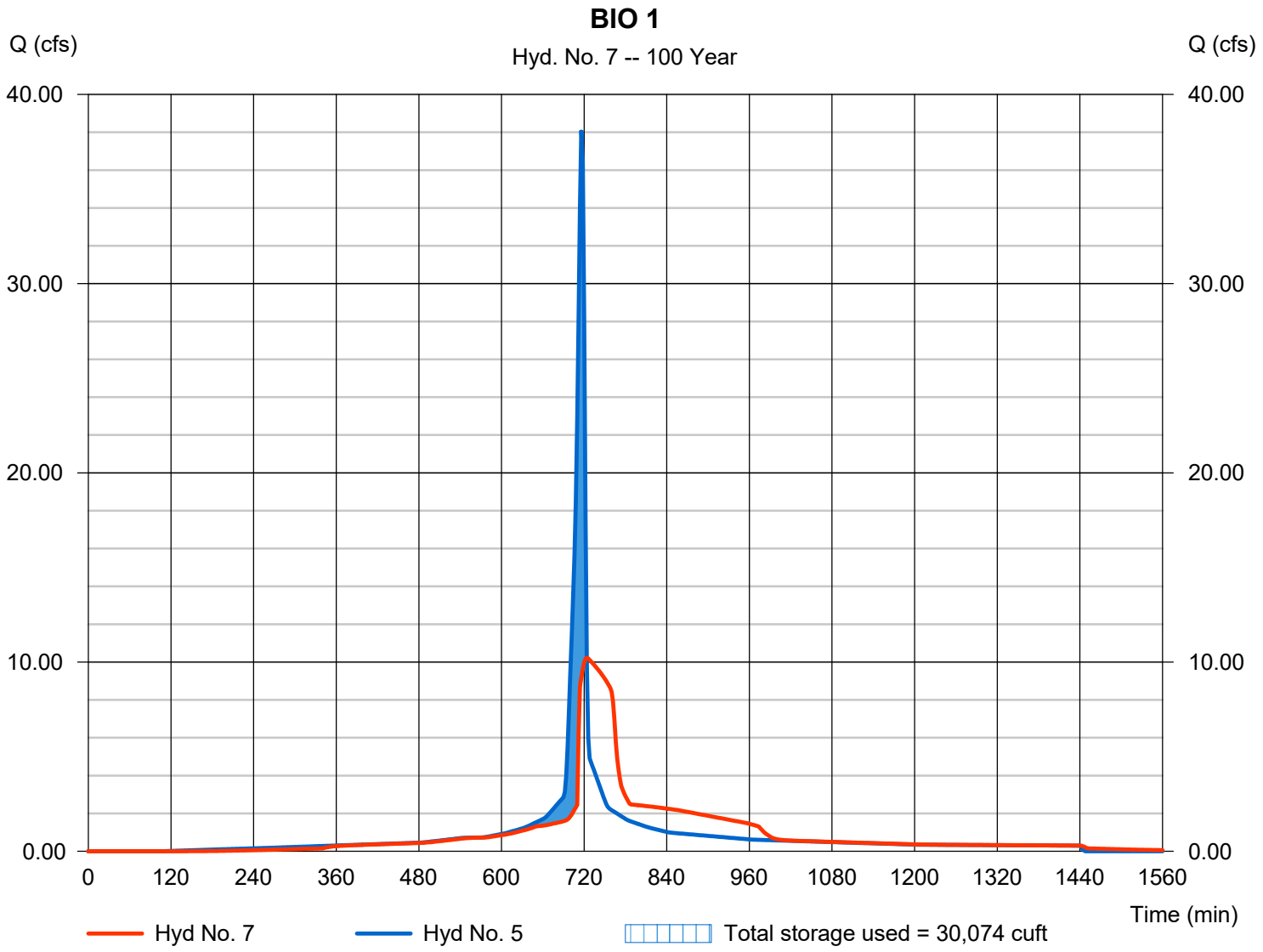
Hydrograph Report

Hyd. No. 7

BIO 1

Hydrograph type	=	Reservoir	Peak discharge	=	10.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	87,083 cuft
Inflow hyd. No.	=	5 - DEV 10	Max. Elevation	=	1022.97 ft
Reservoir name	=	BIORETENTION 1	Max. Storage	=	30,074 cuft

Storage Indication method used.

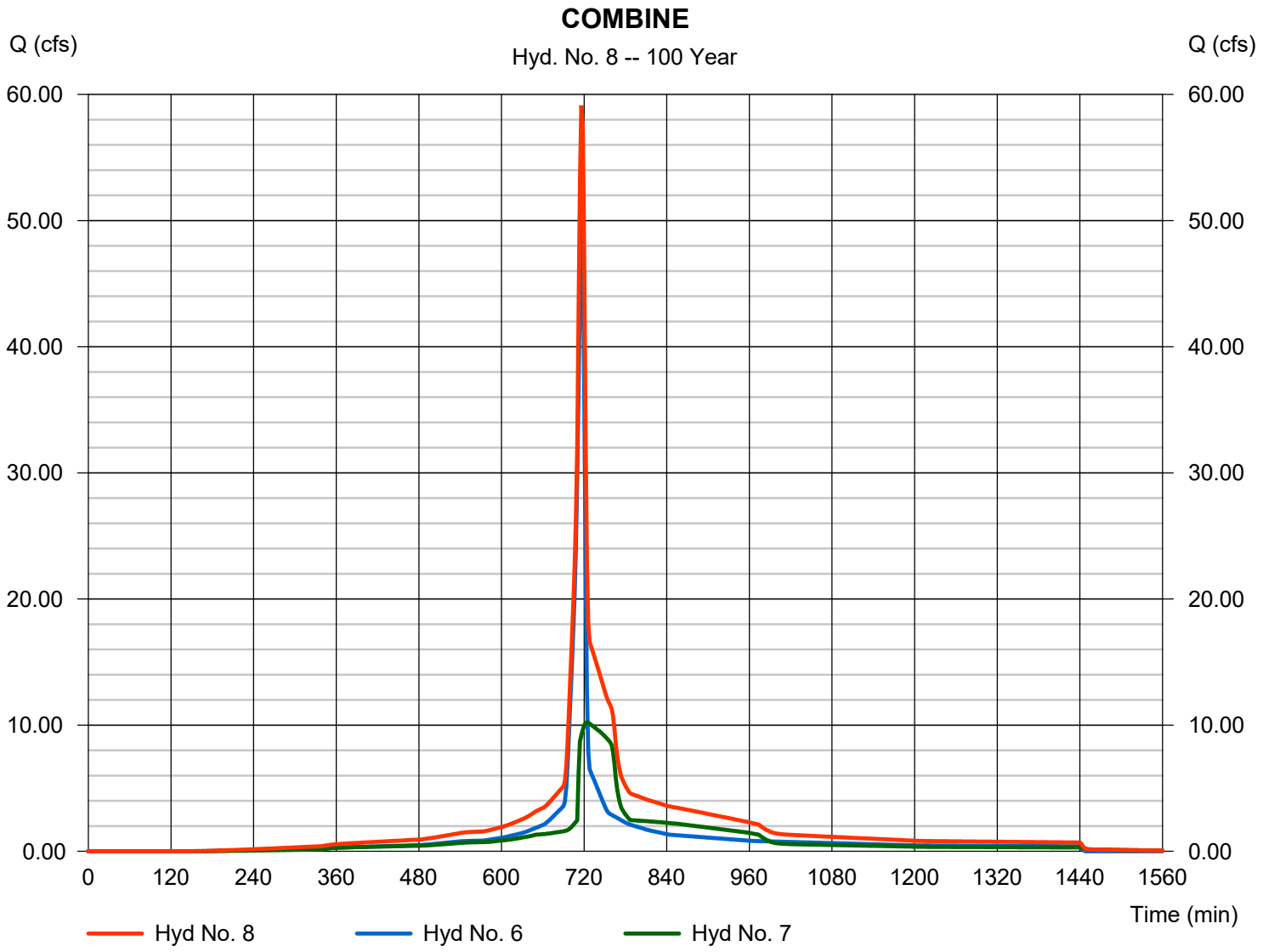


Hydrograph Report

Hyd. No. 8

COMBINE

Hydrograph type	=	Combine	Peak discharge	=	59.12 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	197,680 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	4.170 ac



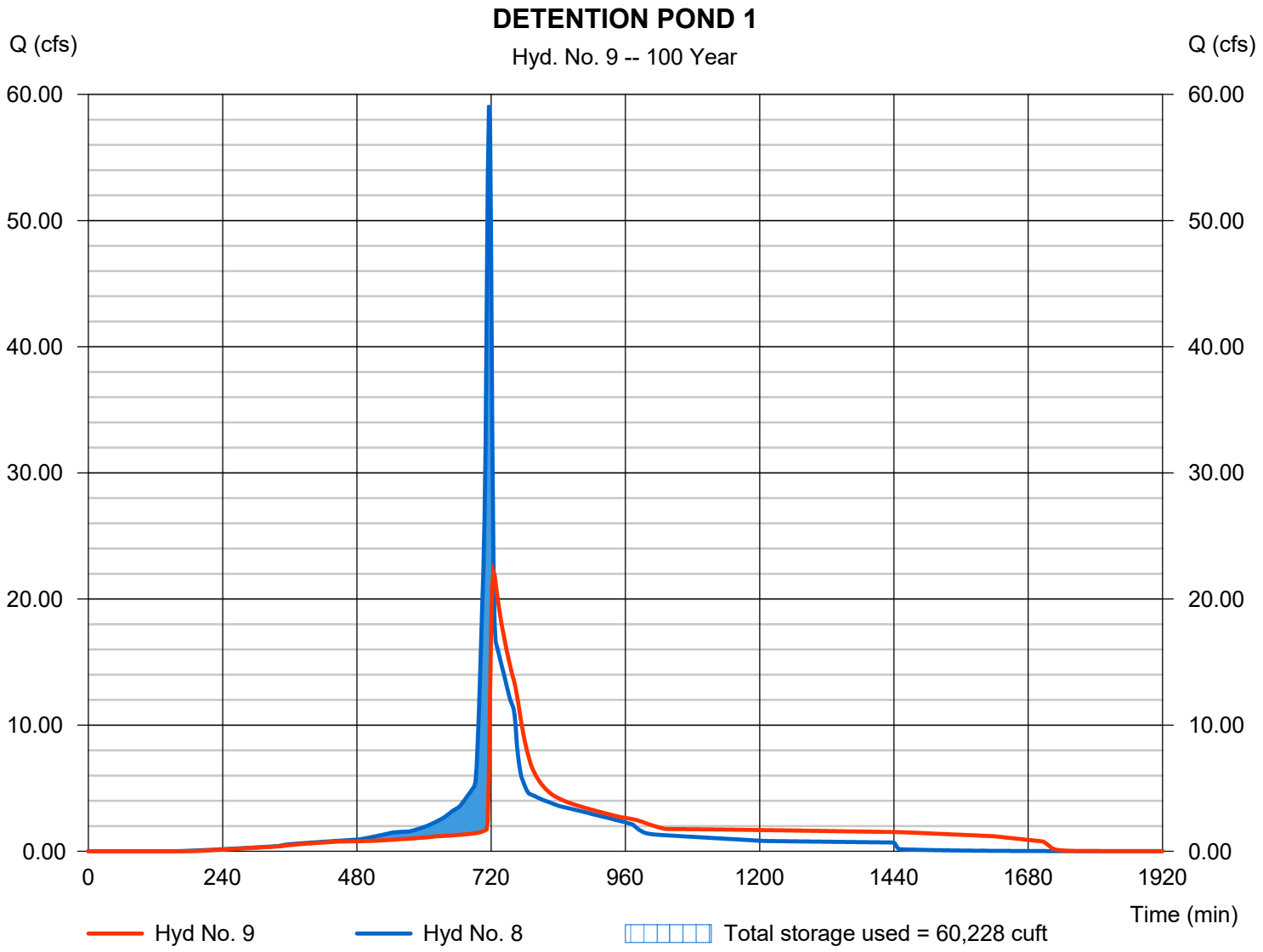
Hydrograph Report

Hyd. No. 9

DETENTION POND 1

Hydrograph type	=	Reservoir	Peak discharge	=	22.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	197,678 cuft
Inflow hyd. No.	=	8 - COMBINE	Max. Elevation	=	1020.78 ft
Reservoir name	=	DRY DETENTION 1	Max. Storage	=	60,228 cuft

Storage Indication method used.



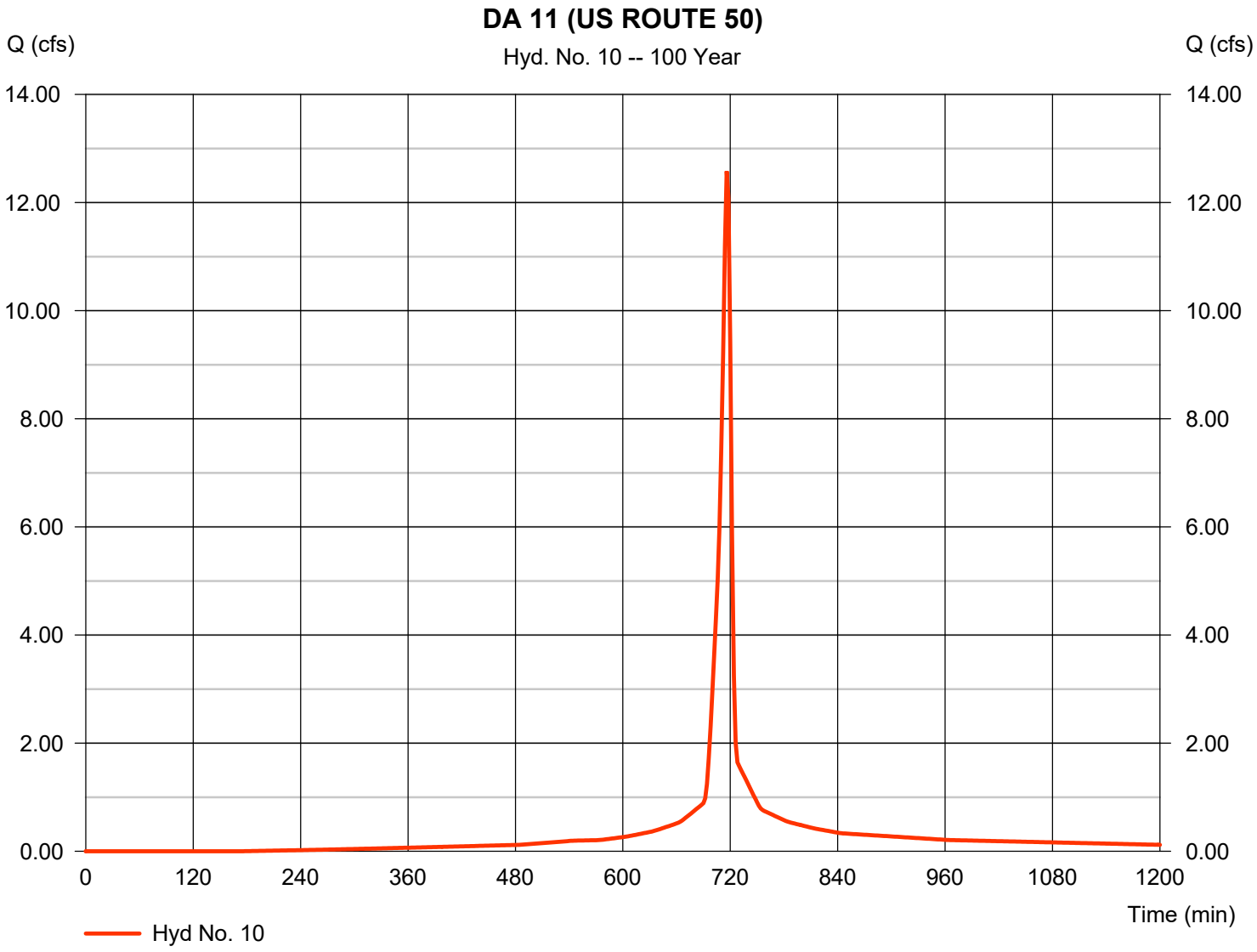
Hydrograph Report

Hyd. No. 10

DA 11 (US ROUTE 50)

Hydrograph type	= SCS Runoff	Peak discharge	= 12.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 27,670 cuft
Drainage area	= 1.060 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 9.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (0.660 x 80)] / 1.060

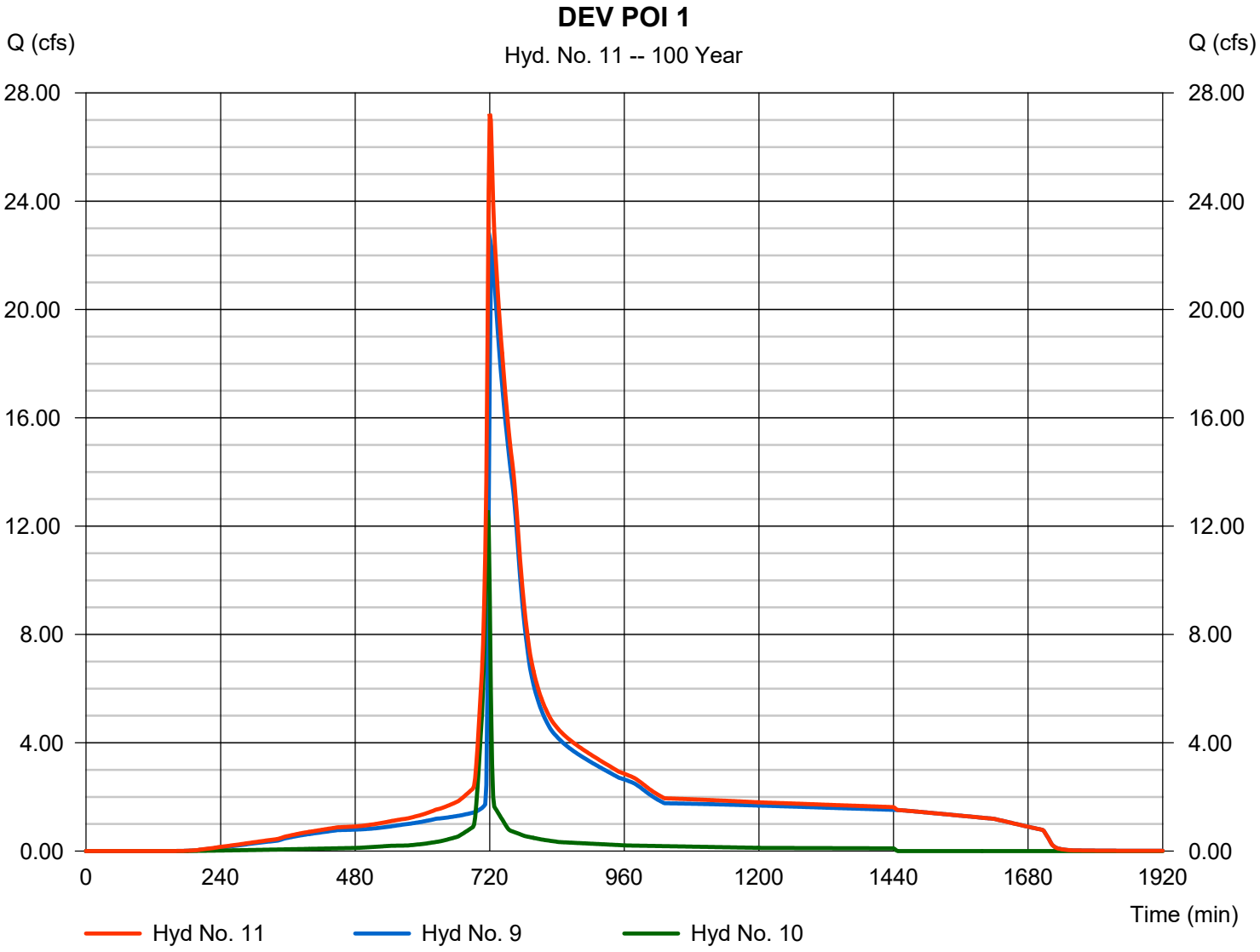


Hydrograph Report

Hyd. No. 11

DEV POI 1

Hydrograph type	= Combine	Peak discharge	= 27.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 225,348 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.060 ac



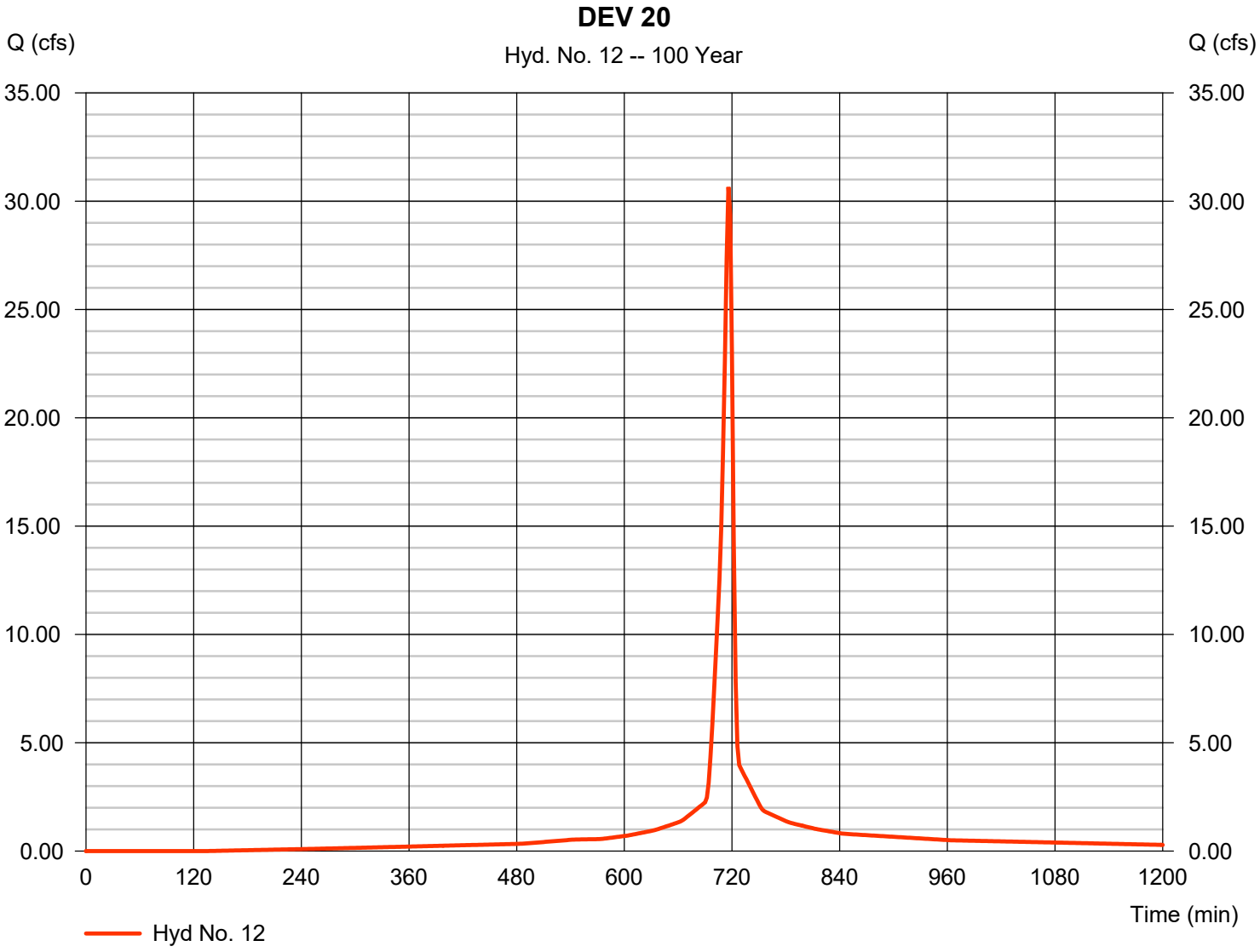
Hydrograph Report

Hyd. No. 12

DEV 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.66 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	68,937 cuft
Drainage area	=	2.520 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.340 x 98) + (1.180 x 80)] / 2.520



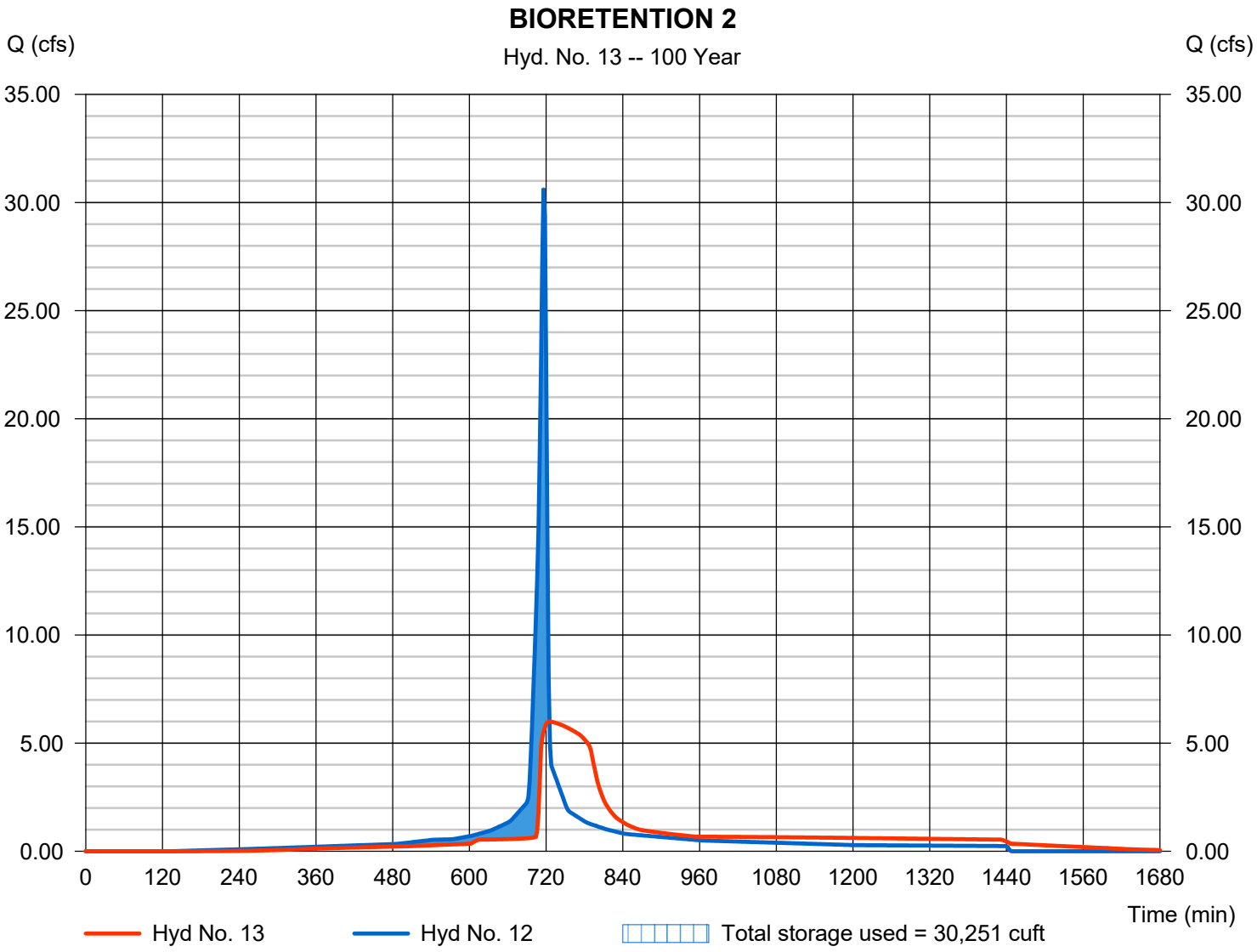
Hydrograph Report

Hyd. No. 13

BIORETENTION 2

Hydrograph type	=	Reservoir	Peak discharge	=	6.002 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	68,920 cuft
Inflow hyd. No.	=	12 - DEV 20	Max. Elevation	=	1022.22 ft
Reservoir name	=	BIORETENTION 2	Max. Storage	=	30,251 cuft

Storage Indication method used.



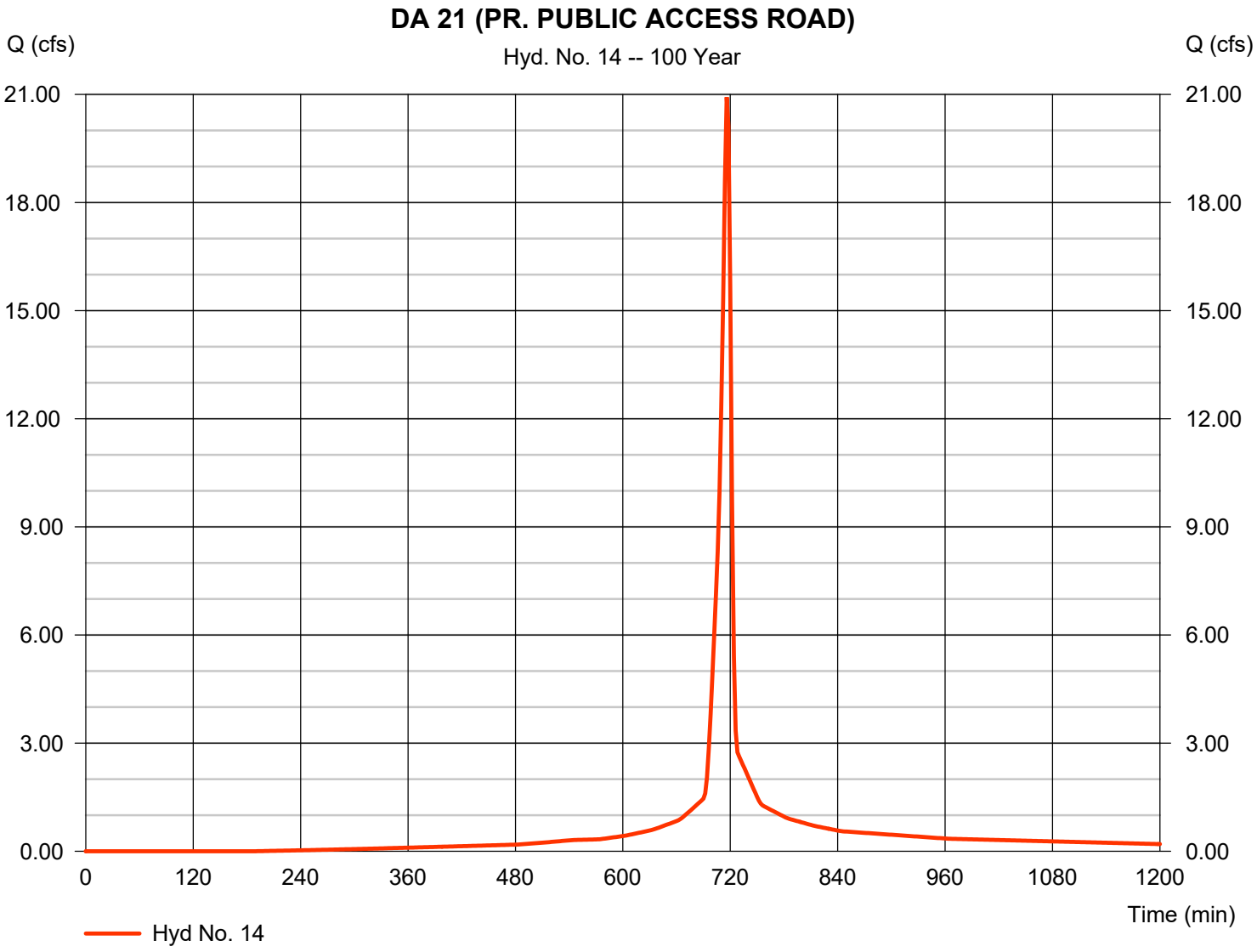
Hydrograph Report

Hyd. No. 14

DA 21 (PR. PUBLIC ACCESS ROAD)

Hydrograph type	= SCS Runoff	Peak discharge	= 20.92 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 45,720 cuft
Drainage area	= 1.780 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 9.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.630 x 98) + (1.150 x 80)] / 1.780



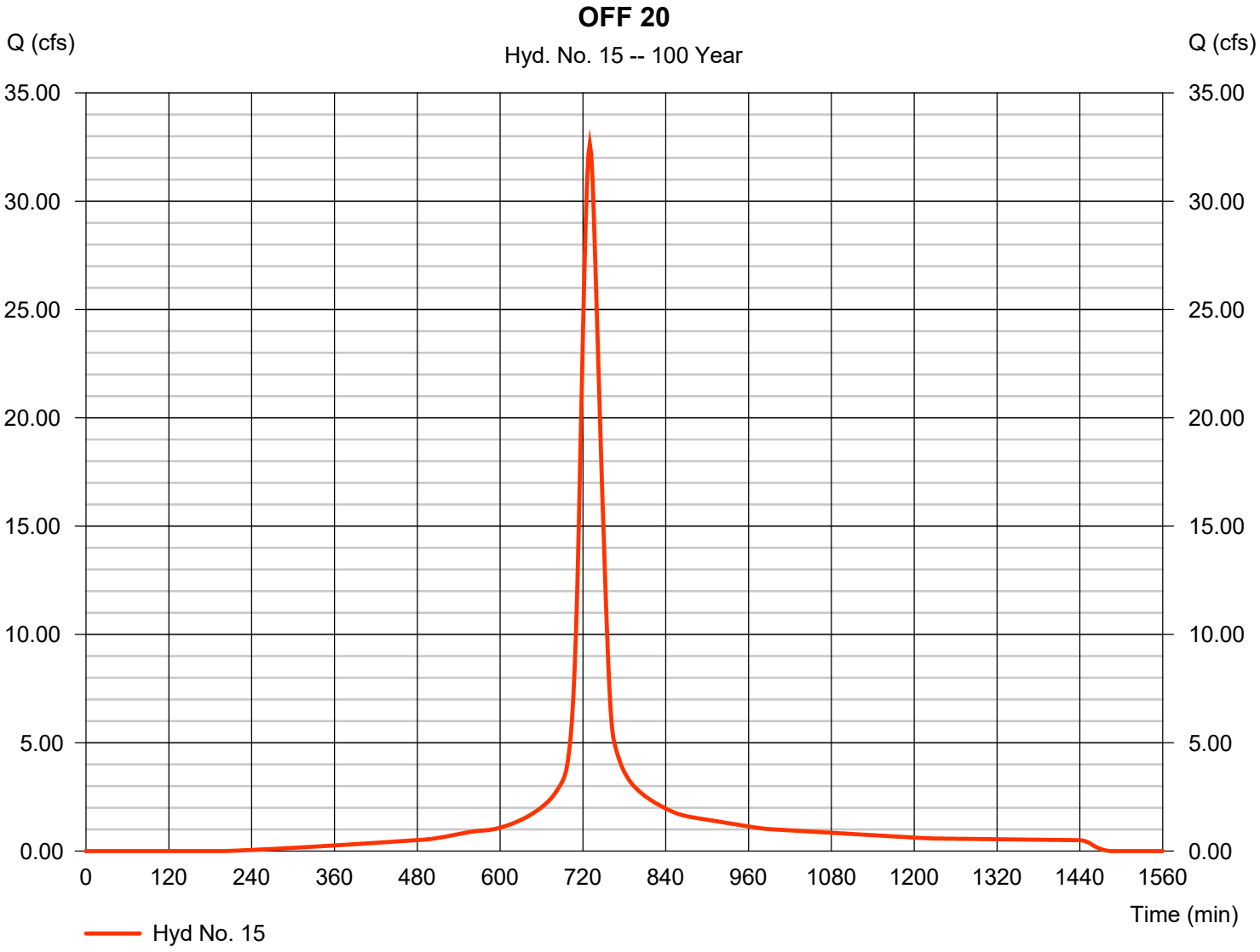
Hydrograph Report

Hyd. No. 15

OFF 20

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.64 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	135,346 cuft
Drainage area	=	4.940 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	28.90 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 98) + (4.750 x 85)] / 4.940



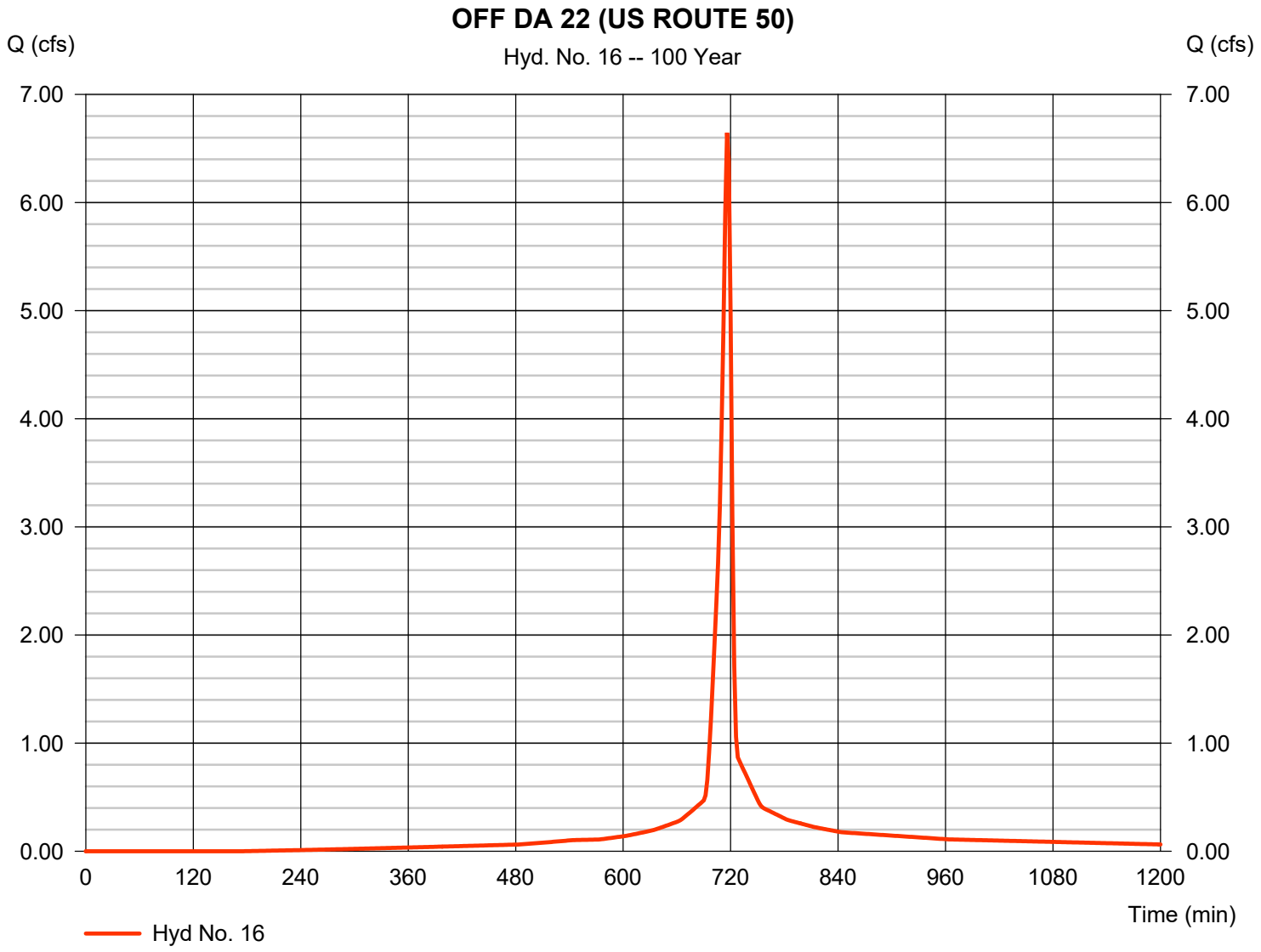
Hydrograph Report

Hyd. No. 16

OFF DA 22 (US ROUTE 50)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.646 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	14,618 cuft
Drainage area	=	0.560 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.210 x 98) + (0.350 x 80)] / 0.560

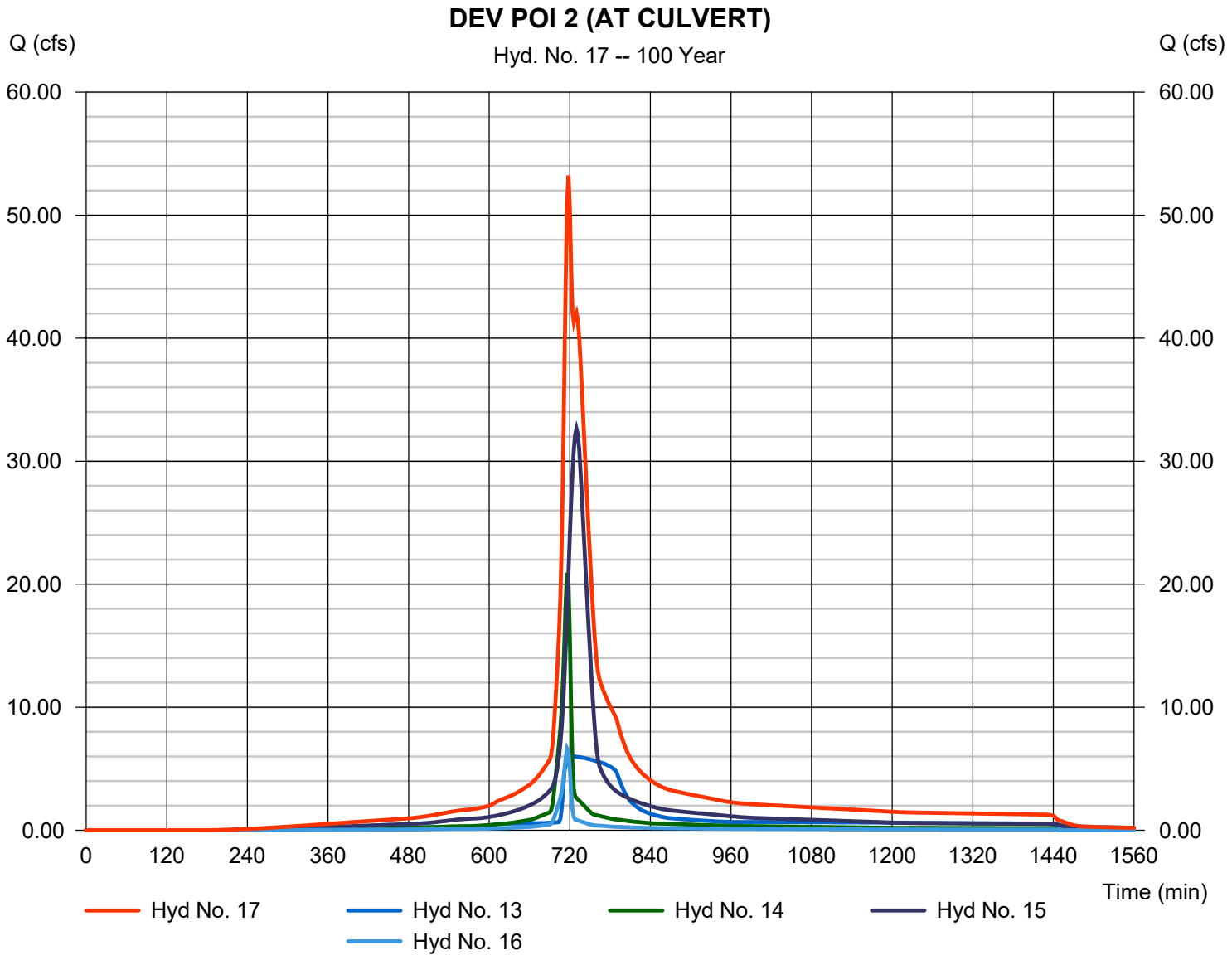


Hydrograph Report

Hyd. No. 17

DEV POI 2 (AT CULVERT)

Hydrograph type	=	Combine	Peak discharge	=	53.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	264,605 cuft
Inflow hyds.	=	13, 14, 15, 16	Contrib. drain. area	=	7.280 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

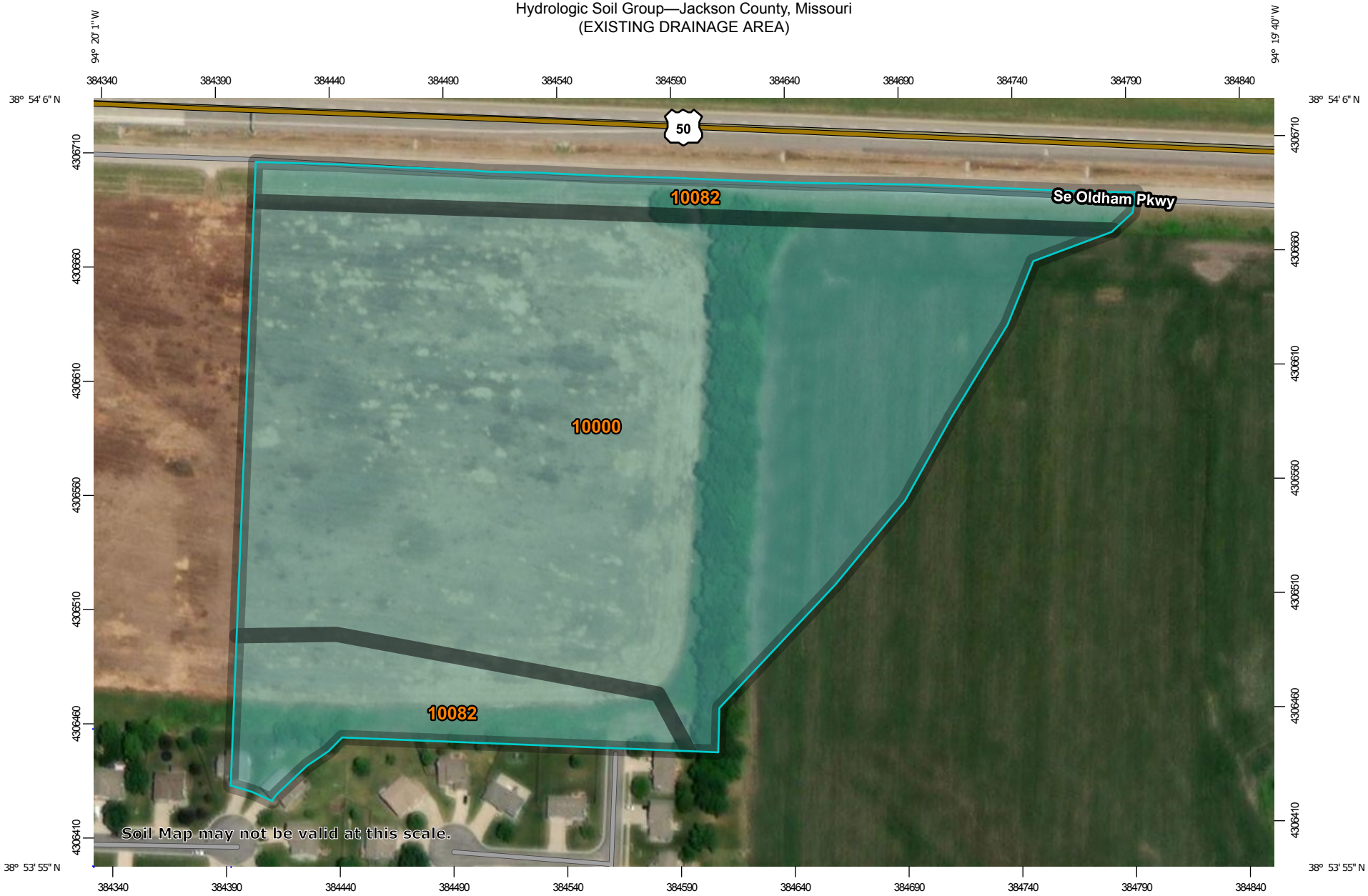
Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

18\1001-1500\018-1450\40-Design\Calcs\GNCV\Stormwater\HYDRAFLOW\Lees Summit MO Lat 38.9 Long 94.33.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	3.71	0.00	0.00	5.66	7.00	0.00	9.25
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydrologic Soil Group—Jackson County, Missouri
(EXISTING DRAINAGE AREA)



Map Scale: 1:2,370 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Jackson County, Missouri
Survey Area Data: Version 19, Sep 13, 2018

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

Date(s) aerial images were photographed: Jun 11, 2017—Sep 22, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10000	Arisburg silt loam, 1 to 5 percent slopes	C	14.9	80.7%
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	C	3.6	19.3%
Totals for Area of Interest			**18.4**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOAA Atlas 14, Volume 8, Version 2
Location name: Lees Summit, Missouri, USA*
Latitude: 38.9004°, Longitude: -94.3314°
Elevation: 1024.15 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.415 (0.324-0.529)	0.484 (0.378-0.618)	0.599 (0.466-0.767)	0.696 (0.539-0.894)	0.832 (0.625-1.10)	0.938 (0.691-1.25)	1.05 (0.748-1.43)	1.16 (0.798-1.62)	1.31 (0.871-1.87)	1.42 (0.926-2.07)
10-min	0.607 (0.474-0.775)	0.709 (0.553-0.905)	0.877 (0.682-1.12)	1.02 (0.789-1.31)	1.22 (0.916-1.61)	1.37 (1.01-1.84)	1.53 (1.10-2.09)	1.70 (1.17-2.37)	1.92 (1.27-2.75)	2.08 (1.36-3.03)
15-min	0.740 (0.578-0.945)	0.864 (0.674-1.10)	1.07 (0.832-1.37)	1.24 (0.962-1.60)	1.49 (1.12-1.96)	1.68 (1.23-2.24)	1.87 (1.34-2.55)	2.07 (1.43-2.89)	2.34 (1.56-3.35)	2.54 (1.65-3.69)
30-min	1.02 (0.800-1.31)	1.20 (0.939-1.54)	1.50 (1.17-1.92)	1.75 (1.35-2.24)	2.09 (1.57-2.76)	2.36 (1.74-3.15)	2.63 (1.88-3.59)	2.91 (2.00-4.07)	3.28 (2.18-4.70)	3.57 (2.32-5.18)
60-min	1.34 (1.05-1.71)	1.57 (1.23-2.01)	1.97 (1.53-2.52)	2.30 (1.78-2.95)	2.76 (2.08-3.66)	3.13 (2.31-4.20)	3.51 (2.51-4.80)	3.90 (2.69-5.46)	4.43 (2.95-6.35)	4.83 (3.14-7.02)
2-hr	1.66 (1.30-2.10)	1.95 (1.53-2.47)	2.43 (1.91-3.09)	2.85 (2.22-3.63)	3.44 (2.61-4.53)	3.91 (2.90-5.20)	4.39 (3.16-5.97)	4.89 (3.40-6.81)	5.57 (3.74-7.94)	6.10 (4.00-8.80)
3-hr	1.87 (1.48-2.36)	2.20 (1.74-2.78)	2.76 (2.17-3.49)	3.24 (2.54-4.11)	3.93 (3.00-5.16)	4.48 (3.35-5.95)	5.06 (3.67-6.86)	5.66 (3.95-7.85)	6.48 (4.38-9.22)	7.13 (4.70-10.3)
6-hr	2.26 (1.80-2.82)	2.66 (2.12-3.34)	3.37 (2.67-4.22)	3.98 (3.14-5.01)	4.88 (3.76-6.37)	5.60 (4.22-7.39)	6.36 (4.65-8.57)	7.16 (5.05-9.89)	8.27 (5.63-11.7)	9.15 (6.07-13.1)
12-hr	2.66 (2.13-3.30)	3.16 (2.54-3.93)	4.04 (3.23-5.03)	4.81 (3.83-6.02)	5.94 (4.62-7.72)	6.86 (5.21-9.00)	7.83 (5.77-10.5)	8.86 (6.30-12.2)	10.3 (7.06-14.5)	11.4 (7.64-16.2)
24-hr	3.11 (2.51-3.82)	3.71 (2.99-4.57)	4.74 (3.82-5.86)	5.66 (4.54-7.02)	7.00 (5.48-9.03)	8.10 (6.20-10.5)	9.25 (6.88-12.3)	10.5 (7.51-14.3)	12.2 (8.44-17.0)	13.5 (9.14-19.1)
2-day	3.66 (2.98-4.47)	4.31 (3.50-5.26)	5.43 (4.41-6.66)	6.43 (5.19-7.91)	7.90 (6.24-10.1)	9.10 (7.03-11.8)	10.4 (7.77-13.7)	11.7 (8.47-15.9)	13.6 (9.50-18.9)	15.1 (10.3-21.2)
3-day	4.06 (3.33-4.94)	4.71 (3.85-5.73)	5.84 (4.76-7.12)	6.85 (5.55-8.38)	8.33 (6.61-10.6)	9.55 (7.41-12.3)	10.8 (8.16-14.3)	12.2 (8.87-16.5)	14.1 (9.92-19.5)	15.7 (10.7-21.9)
4-day	4.40 (3.61-5.33)	5.05 (4.14-6.12)	6.17 (5.05-7.50)	7.18 (5.84-8.76)	8.65 (6.89-11.0)	9.87 (7.68-12.7)	11.1 (8.42-14.6)	12.5 (9.12-16.8)	14.4 (10.2-19.9)	16.0 (10.9-22.2)
7-day	5.21 (4.30-6.27)	5.89 (4.86-7.10)	7.07 (5.82-8.53)	8.09 (6.62-9.80)	9.56 (7.64-12.0)	10.8 (8.41-13.7)	12.0 (9.11-15.6)	13.3 (9.74-17.7)	15.1 (10.7-20.6)	16.5 (11.4-22.9)
10-day	5.90 (4.89-7.07)	6.66 (5.52-7.99)	7.93 (6.55-9.53)	9.00 (7.40-10.9)	10.5 (8.43-13.1)	11.7 (9.20-14.8)	13.0 (9.87-16.7)	14.2 (10.5-18.9)	16.0 (11.3-21.7)	17.3 (12.0-23.9)
20-day	7.87 (6.58-9.35)	8.89 (7.43-10.6)	10.5 (8.78-12.6)	11.9 (9.85-14.2)	13.7 (11.0-16.8)	15.1 (11.9-18.7)	16.4 (12.5-20.9)	17.7 (13.1-23.2)	19.4 (13.9-26.1)	20.7 (14.5-28.3)
30-day	9.51 (7.99-11.3)	10.8 (9.03-12.7)	12.7 (10.7-15.1)	14.3 (11.9-17.1)	16.4 (13.2-19.9)	17.9 (14.1-22.1)	19.3 (14.9-24.5)	20.8 (15.4-27.0)	22.5 (16.1-30.1)	23.7 (16.7-32.4)
45-day	11.6 (9.80-13.7)	13.1 (11.1-15.5)	15.5 (13.0-18.3)	17.3 (14.5-20.6)	19.7 (15.9-23.8)	21.4 (17.0-26.3)	23.0 (17.7-28.9)	24.5 (18.2-31.6)	26.3 (18.9-34.9)	27.5 (19.4-37.3)
60-day	13.4 (11.4-15.7)	15.1 (12.8-17.8)	17.8 (15.0-21.0)	19.9 (16.7-23.5)	22.5 (18.2-27.0)	24.3 (19.3-29.7)	26.0 (20.1-32.5)	27.5 (20.5-35.4)	29.3 (21.1-38.7)	30.5 (21.6-41.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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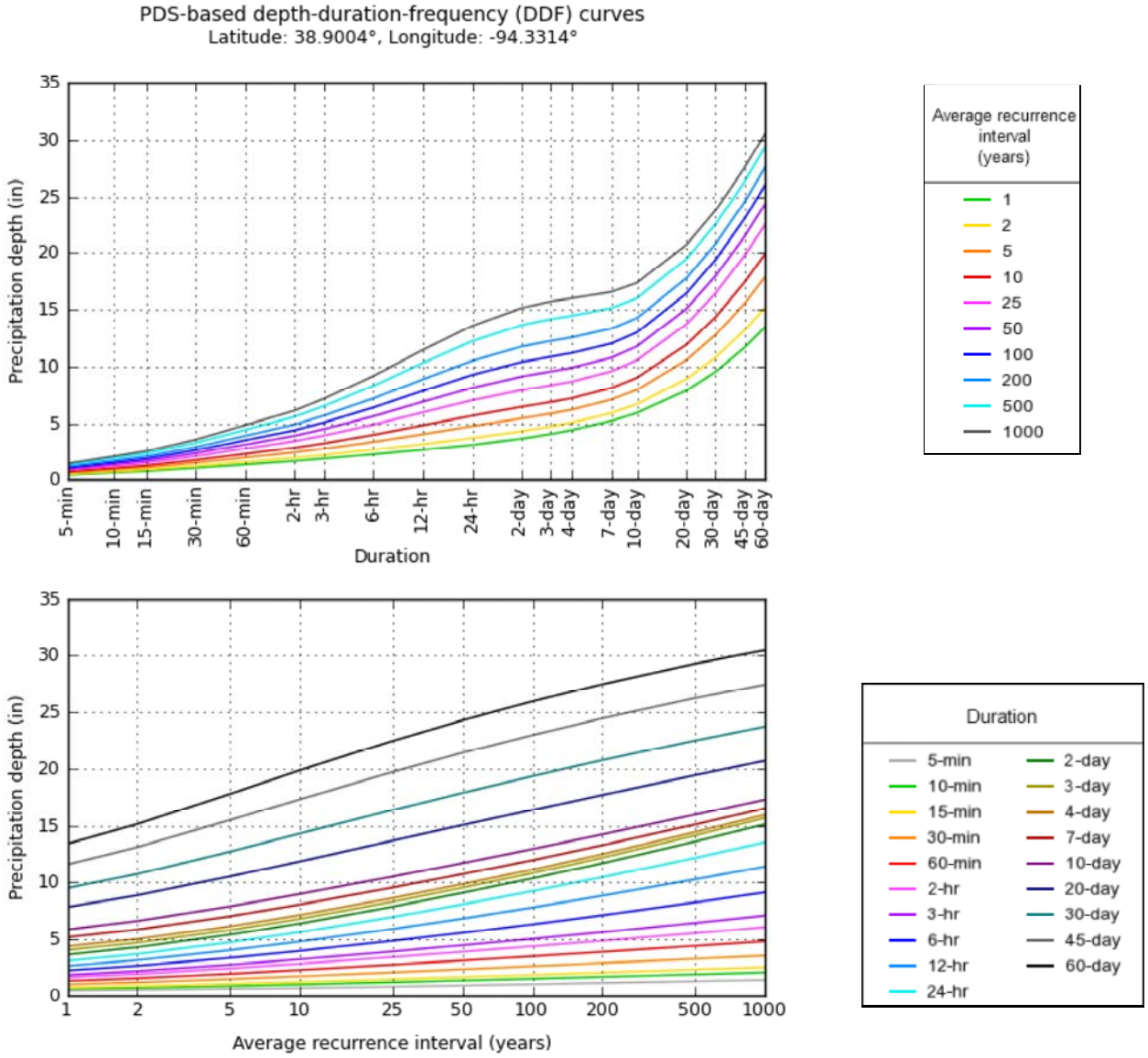
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Mon Jan 7 21:25:41 2019

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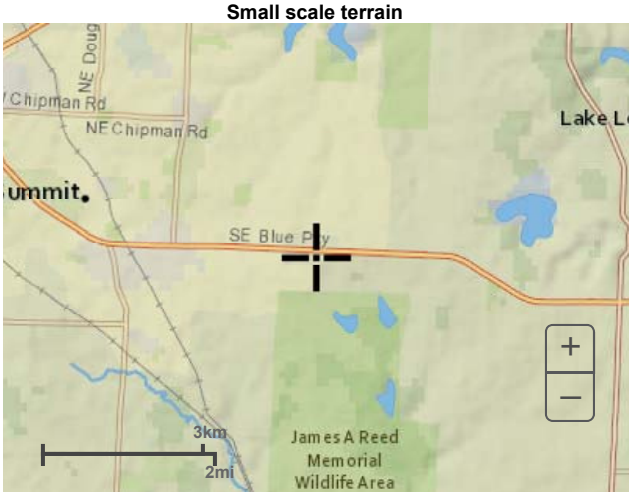
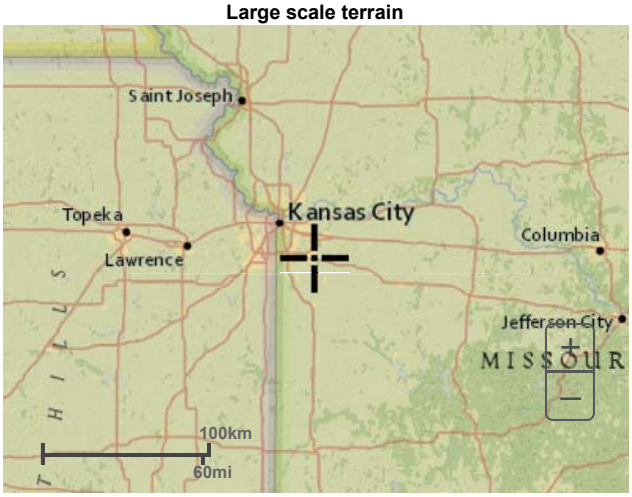
Maps & aerials

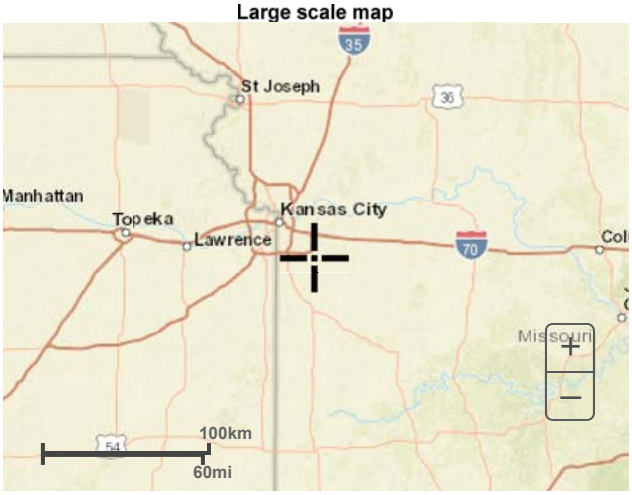
Small scale terrain



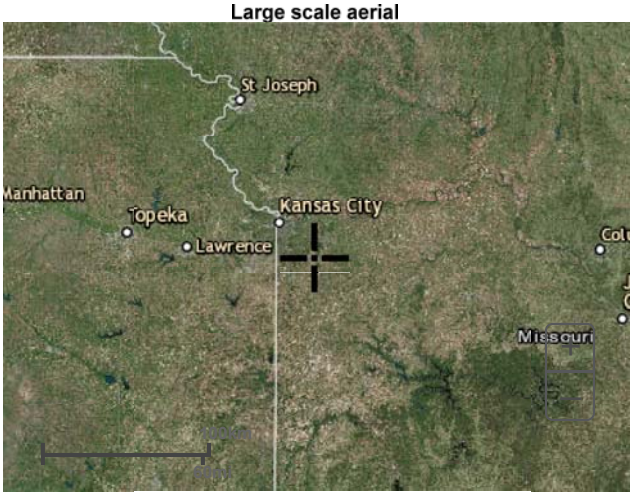
Large scale terrain



Large scale map



Large scale aerial



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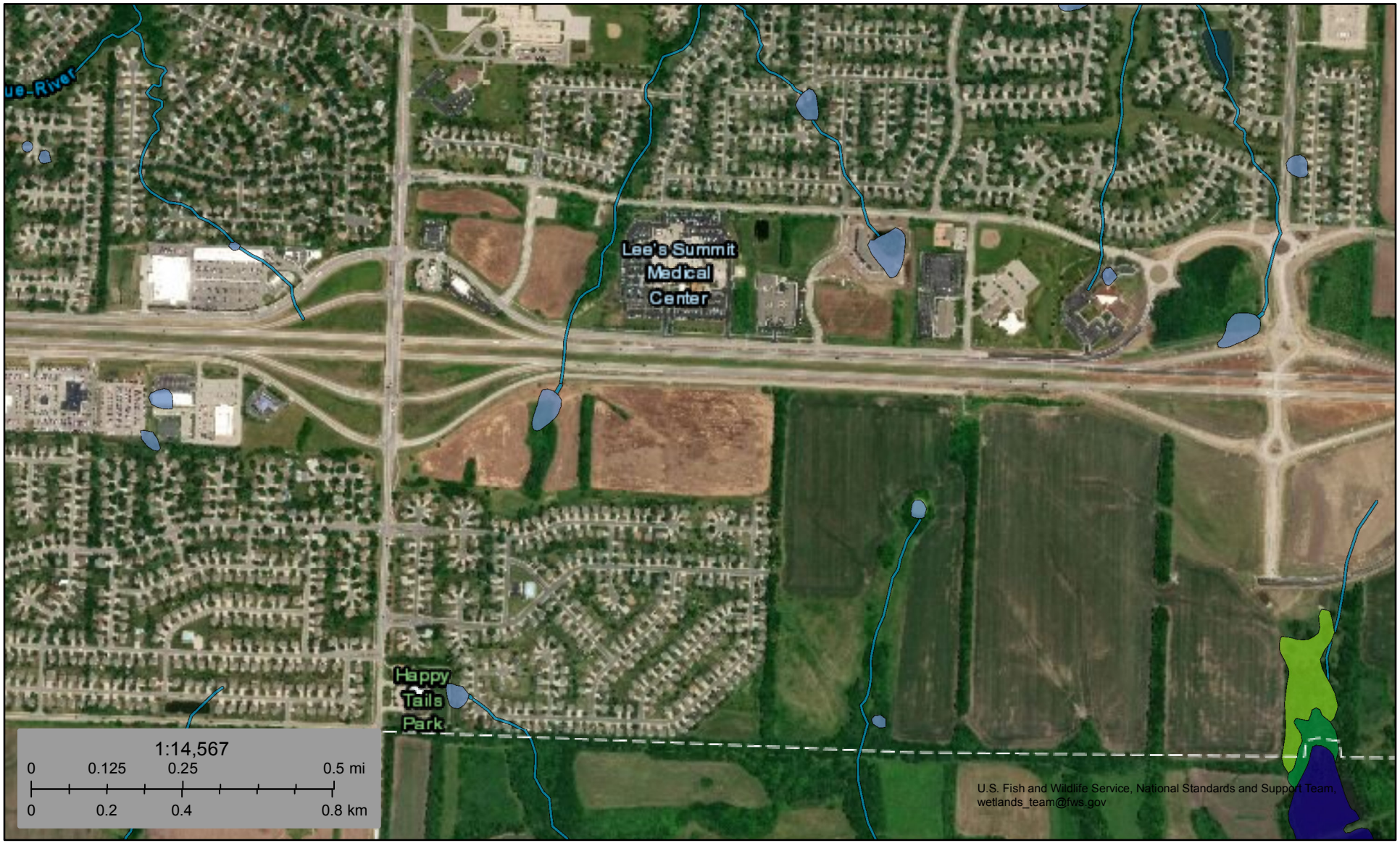
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

U.S. Fish and Wildlife Service
National Wetlands Inventory

Lee's Summit Senior Community Wetland I



January 15, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

APPENDIX B

Water Quality Calculations

DA 10 - Water Quality Volume Calculation Worksheet
Short Cut Method (Claytor and Schueler, 1996)
Date: 01/10/2019

Project Name: Lee's Summit Senior Living Facility
Description: DA 10 Water Quality Volume
Drainage Areas to Pond 1

$$WQV\ (ft^3) = (P/12)(R_v)(A*43{,}560)$$

Where

P = rainfall depth = 1.37 inches
R_v = volumetric runoff coefficient = 0.05 + 0.009I
I = percent impervious cover (in percent, e.g. 80% = 80)
A = total site area in acres

P=	1.37	inch
A=	3.09	acres
Impervious Area=	2.02	acres
I=	65	%
Rv=	0.635	

WQV=	**9758**	**cubic feet**
	0.224	ac-ft

DA 20 - Water Quality Volume Calculation Worksheet
Short Cut Method (Claytor and Schueler, 1996)
Date:

Project Name:
Description: DA 20 Water Quality Volume

$$WQV\ (ft^3) = (P/12)(R_v)(A*43{,}560)$$

Where

P = rainfall depth = 1 1.37 inches
R_v = volumetric runoff coefficient = 0.05 + 0.009I
I = percent impervious cover (in percent, e.g. 80% = 80)
A = total site area in acres

P=	1.37	inch
A=	2.52	acres
Impervious Area=	1.34	acres
I=	53	%
Rv=	0.527	

WQV=	**6604**	**cubic feet**
	0.152	ac-ft

DA 30 - Water Quality Volume Calculation Worksheet
Short Cut Method (Claytor and Schueler, 1996)
Date:

Project Name:
Description: **DA 30 Water Quality Volume**

$$WQV\ (ft^3) = (P/12)(R_v)(A*43{,}560)$$

Where

P = rainfall depth = 1 1.37 inches
R_v = volumetric runoff coefficient = 0.05 + 0.009I
I = percent impervious cover (in percent, e.g. 80% = 80)
A = total site area in acres

P=	1.37	inch
A=	4.17	acres
Impervious Area=	1.85	acres
I=	44	%
Rv=	0.446	

WQV=	**9249**	**cubic feet**
	0.212	ac-ft

APPENDIX C

APWA\MARC BMP Level of Service Calculations

WORKSHEET 1: REQUIRED LEVEL OF SERVICE - UNDEVELOPED SITE

Project: By: Date:
Location: Checked: Date:

1. Runoff Curve Number

A. Predevelopment CN

Cover Description	Soil HSG	CN from Table 1	Area (ac.)	Product of CN x Area
Straight Row Crops (GOOD)	C	85	9.78	
		Totals:		

Area-Weighted CN = total product/total area = 85 (Round to integer)

B. Postdevelopment CN

Cover Description	Soil HSG[1]	CN from Table 1	Area (ac.)	Product of CN x Area
PAVEMENT/ROOFS	NA	98	5.21	510.58
OPEN SPACE (TURF,GOOD)	D	80	4.57	365.6
		Totals:	9.78	876.18

[1] Postdevelopment CN is one HSG higher for all cover types except preserved vegetation, absent documentation showing how postdevelopment soil structure will be preserved.

Area-Weighted CN = total product/total area = 90 (Round to integer)

C. Level of Service (LS) Calculation

Predevelopment CN:	85
Postdevelopment CN:	90
Difference:	5
LS Required (see scale at right):	6

Change in CN	LS
17+	8
7 to 16	7
4 to 6	6
1 to 3	5
0	4
-7 to -1	3
-8 to -17	2
-18 to -21	1
-22 -	0

WORKSHEET 2: DEVELOP MITIGATION PACKAGE(S) THAT MEET THE REQUIRED LS

Project: By: Date:
Location: Checked: Date:
Sheet __ of __

1. Required LS (New Development, Wksht 1) or Total VR (Redevelopment, Wksht 1A): 6

Note: Various BMPs may alter CN of proposed development, and LS; recalculate both if applicable.

2. Proposed BMP Option Package No. ___

Cover/BMP Description	Treatment Area	VR from Table 4.4 or 4.6[1]	Product of VR x Area
Extended Dry Detention DA30	4.17	4.0	16.68
Bioretention 1 DA10	3.09	8.5	26.26
Bioretention 2 DA 20	2.52	8.5	21.42
Total[2]:	9.78	**Total:**	64.36
		***Weighted VR:**	6.58

= total product/total a

[1] VR calculated for final BMP only in Treatment Train.
[2] Total treatment area cannot exceed 100 percent of the actual site area.
* Blank In Redevelopment

Meets required LS (Yes/No)? YES (If No, or if additional options are being tested, proceed below.)

3. Proposed BMP Option Package No. ___

Cover/BMP Description	Treatment Area	VR from Table 4.4 or 4.6[1]	Product of VR x Area
Total[2]:		**Total:**	
		***Weighted VR:**	

= total product/total a

[1] VR calculated for final BMP only in Treatment Train.
[2] Total treatment area cannot exceed 100 percent of the actual site area.
* Blank In Redevelopment

Meets required LS (Yes/No)? (If No, or if additional options are being tested, move to next sheet.)

LEE'S SUMMIT SENIOR LIVING COMMUNITY

Lee's Summit, MO - 2019

January 2019

Olsson Project No. 018-1450

SANITARY SEWER IMPACT

STARK WILSON DUNCAN ARCHITECTS INC – 315 NICHOLS ROAD, SUITE 228 – KANSAS CITY, MO 64112 – T 816.531.1698 F 816.531.1978

December 4, 2018

Mr. Scott Auman, AIA, NCARB
Stark Wilson Duncan Architects, Inc.
315 Nichols Road, Suite 228
Kansas City, MO 64112

Re: City of Lee's Summit, MO
Senior Living Community

Dear Mr. Auman:

An analysis was completed to determine the effect of proposed growth on the South Prairie Lee Interceptor. The proposed growth consists of the development of approximately 10.9 acres located south of Highway 50 and east of Ranson Road.

A proposed development map was submitted for the property at Highway 50 and Ranson Road. The proposed development consists of Memory Care facility, Independent Living facility, and Assisted Living units.

Flows were projected for the existing condition using the City of Lee's Summit Design Criteria with the revised k factors for the South Prairie Lee Watershed established in the 2012 Wastewater Master Plan Update. For the proposed development, flow projections were made utilizing the City of Lee's Summit design criteria. The projected flow for the development is 0.155 MGD, as indicated on the attached worksheet.

It was assumed that the flow would enter the collection system at Manhole 68-164. The South Prairie Lee Interceptor was evaluated from the point of entry to MH 26-298, just prior to its discharge at the Scruggs Road Lift Station. The extents of the analysis are indicated on the attached Figure 1.

The Scruggs Road Pump Station pumps to the Tudor Road Pump Station. The 2007 Wastewater Master Plan recommended upgrades to the Scruggs Road Pump Station to increase capacity to 16 MGD, as well as improvements to the force main, gravity interceptor, and excess flow holding basin. The Master Plan also recommended improvements to the Tudor Road Pump Station to expand the capacity to 24 MGD. The Master Plan should be referenced for future planning of these facilities.

In the 2007 Wastewater Master Plan, a significant portion of the South Prairie Lee Interceptor was indicated as necessitating improvements to accommodate additional flow from future growth. In this analysis, the focus was on identifying improvement alternatives that would offset the projected flow from the future development. The intent of this exercise was to find a solution that would allow the development to move forward but would not cause conditions to worsen in the South Prairie Lee Interceptor. By upsizing/paralleling segments in the South Prairie Lee Interceptor, the hydraulic grade line at the approximate point in the sewer system where the future development would tie-in is reduced to the same elevation as it was prior to its development.

The attached Table 1 compares the hydraulic grade line under existing conditions, which is the baseline, to the hydraulic grade line of existing conditions plus the proposed development. A positive surcharge depth versus the manhole top indicates the hydraulic grade line is above the manhole rim elevation. A number of segments indicate an increase greater than one foot from the hydraulic grade line for existing conditions: MH 164 through MH 33-193 and MH 33-28 through MH 33-230.

Table 1 also compares the hydraulic grade line assuming the upsizing of segments to increase capacity. Three segments were identified, as indicated on Figure 1: MH 68-010 to MH 68-009, MH 33-192 to MH 33-193, and MH 33-230 to MH 33-370. It is recommended that these segments be upsized to offset the projected flow from the proposed development. A cost estimate is attached. It is our recommendation that the developer be responsible for the construction costs associated with the upsizing these segments, completed under a future CIP project by the City.

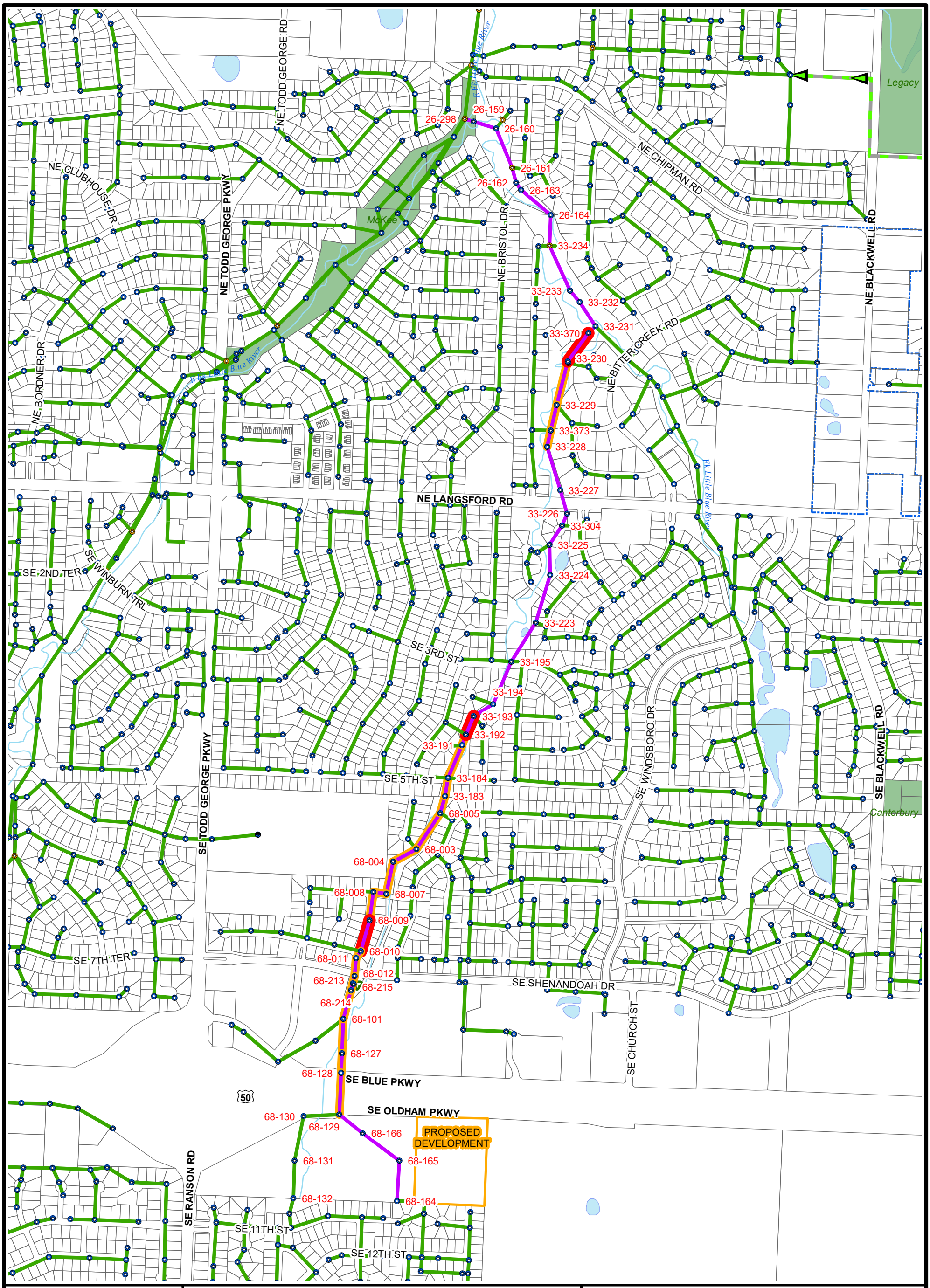
If you have any questions, please feel free to contact me at 816-347-1164.

Sincerely,

Amanda Bagwell

Amanda Bagwell, P.E.
Project Manager

CC: Pat Young, HDR



Legend

- Project_Location
- Access Tee
- Drop
- Standard
- Manholes Buried
- Pump Stations
- Forced Mains

Gravity Mains

- Segments Identified for Capacity Increase
- Capacity Impacted Segments
- Analyzed Sections
- Unanalyzed Sections

City of Lee's Summit, Missouri
South Prairie Lee Watershed

Figure 1
Senior Living Community Analysis

Table 1
City of Lee's Summit, Missouri
South Prairie Lee Interceptor Improvements

		Ex Condition		Existing Condition with Senior Living Community (SLC)		Existing Condition Plus SLC with Proposed Upsized Segments	
Upstream ID	Downstream ID	Existing Diameter	Surcharge Depth vs Manhole Top (ft)	Existing Diameter	Surcharge Depth vs Manhole Top (ft)	Revised Diameter	Surcharge Depth vs Manhole Top (ft)
26-159*	26-298*	24	-10.35	24	-10.34	24	-10.34
26-160*	26-159*	24	-12.85	24	-12.82	24	-12.82
26-161*	26-160*	24	-11.58	24	-11.51	24	-11.51
26-162*	26-161*	24	-17.33	24	-17.33	24	-17.33
26-163*	26-162*	24	-17.35	24	-17.35	24	-17.35
26-164*	26-163*	24	-16.54	24	-16.54	24	-16.54
33-234	26-164*	24	-14.50	24	-14.50	24	-14.50
33-233	33-234	24	-12.53	24	-12.53	24	-12.53
33-232	33-233	15	-10.83	15	-10.59	15	-10.59
33-231	33-232	15	-9.05	15	-8.51	15	-8.51
33-370	33-231	15	-6.64	15	-6.02	15	-6.02
33-230	33-370	15	-4.82	15	-3.99	18	-5.47
33-229	33-230	15	-7.99	15	-6.90	15	-8.38
33-373	33-229	15	-7.25	15	-5.98	15	-7.25
33-228	33-373	15	-7.86	15	-6.50	15	-7.77
33-227	33-228	15	-7.56	15	-7.16	15	-7.56
33-226	33-227	15	-6.52	15	-6.52	15	-6.52
33-304	33-226	15	-7.90	15	-7.82	15	-7.82
33-225	33-304	15	-5.19	15	-5.19	15	-5.19
33-224	33-225	15	-9.15	15	-8.90	15	-8.90
33-223	33-224	15	-7.18	15	-6.69	15	-6.69
33-195	33-223	15	-5.29	15	-4.57	15	-4.57
33-194	33-195	21	-7.40	21	-6.77	21	-6.77
33-193	33-194	12	-6.44	12	-5.48	12	-5.48
33-192	33-193	12	-5.16	12	-3.94	15	-5.39
33-191	33-192	12	-4.92	12	-3.51	12	-4.97
33-184	33-191	12	-4.08	12	-2.18	12	-3.63
33-183	33-184	12	-3.31	12	-1.16	12	-2.62
68-005	33-183	10	-3.72	10	-0.96	12	-5.26
68-003	68-005	10	-7.22	10	-3.70	10	-8.00
68-004	68-003	8	-6.02	8	-1.00	10	-9.37
68-007	68-004	8	-4.52	8	2.29	8	-6.07
68-008	68-007	8	-5.00	8	2.46	8	-5.90
68-009	68-008	8	-6.77	8	2.07	8	-6.29
68-010	68-009	8	-5.86	8	4.43	12	-8.10
68-011	68-010	8	-6.85	8	3.79	8	-8.74
68-012	68-011	8	-5.38	8	6.06	8	-6.47
68-213	68-012	8	-5.37	8	6.40	8	-6.13
68-214	68-213	8	-6.12	8	5.96	8	-6.57
68-101	68-214	8	-6.61	8	6.73	8	-5.80
68-127	68-101	8	-7.54	8	7.05	8	-5.48
68-128	68-127	8	-9.68	8	5.64	8	-6.89
68-129	68-128	8	-18.30	8	-1.48	8	-14.01
68-166	68-129	8	-24.44	8	-7.21	8	-19.74
68-165	68-166	8	-28.63	8	-12.34	8	-24.87
68-164	68-165	8	-29.70	8	-14.45	8	-26.98

*Manhole ID's were taken from GIS and vary from Manhole ID's from record drawings, which were, respectively, from downstream to upstream: 26-048, 26-298, 26-041, 26-044, 26-083, 26-084, and 26-085

Segment Identified for Upsizing
Surcharge increase greater than 1 foot from existing condition

ENGINEER'S PRELIMINARY COST ESTIMATE OF PROBABLE CONSTRUCTION COSTS
SENIOR LIVING COMMUNITY
LEE'S SUMMIT, MO

December 4, 2018

Item No.	Description	Quantity	Unit	Unit Price $	Price $
1.	Mobilization (3% max of total bid)	1	LS	$6,000.00	$6,000.00
2.	Demolition, Clearing & Grubbing	1	LS	$5,000.00	$5,000.00
3.	18" Sanitary Sewer (PVC)	295	LF	$178.00	$52,510.00
4.	15" Sanitary Sewer (PVC)	165	LF	$166.00	$27,390.00
5.	12" Sanitary Sewer (PVC)	290	LF	$153.00	$44,370.00
6.	4' Dia. Manhole (8'-12' Depth)	6	EA	$4,800.00	$28,800.00
7.	Connection to Existing Sewer Lateral	10	EA	$600.00	$6,000.00
8.	Sod	100	SY	$5.00	$500.00
9.	Seed and Mulch	1	AC	$2,000.00	$2,000.00
10.	Bypass Pumping	1	LS	$30,000.00	$30,000.00
11.	Erosion Control	1	LS	$5,000.00	$5,000.00
				SUBTOTAL:	**$207,570.00**
				CONTINGENCY (15%):	$31,200.00
				TOTAL CONSTRUCTION:	**$239,000.00**
				Legal, Easements, Engineering, Inspection (20%):	$47,800.00
				PROJECT TOTAL:	**$287,000.00**

TRAFFIC STUDY

STARK WILSON DUNCAN ARCHITECTS INC – 315 NICHOLS ROAD, SUITE 228 – KANSAS CITY, MO 64112 – T 816.531.1698 F 816.531.1978

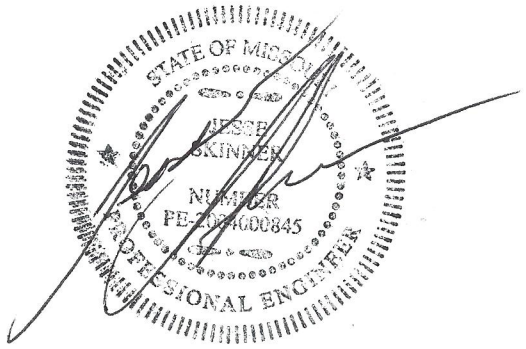
Lee's Summit Senior Living Community

TRAFFIC IMPACT STUDY

November 13, 2018

Prepared For:
Stark Wilson Duncan Architects, Inc.
315 Nichols Road, Suite 228
Kansas City, Missouri 64112

Prepared By:
Priority Engineers, Inc.
PO Box 563
Garden City, MO 64747



11-13-2018

November 13, 2018

Mr. Scott Auman
Stark Wilson Duncan Architects, Inc.
315 Nichols Road, Suite 228
Kansas City, Missouri 64112

RE: 1811 Lee's Summit Senior Living Traffic Memo - Lee's Summit, MO

In response to your request, Priority Engineers, Inc. has completed a traffic impact study for the above referenced project. The purpose of the analysis is to determine the potential traffic impacts associated with this development on the intersections and streets surrounding this site, primarily during the AM and PM peak hours. The following report documents our analysis and recommendations.

We appreciate the opportunity to work with you on this project. Please contact us with any questions or if you require additional information.

Sincerely,

PRIORITY ENGINEERS, INC.

Jesse Skinner, P.E., PTOE

Priority Engineers, Inc.
PO Box 563
Garden City, MO 64747
816.738.4400

Table of Contents

1) INTRODUCTION

The purpose of this study is to examine the potential traffic impacts associated with the proposed Lee's Summit Senior Living Community development located south of SE Oldham Parkway and east of Ranson Road (Missouri Route RA) in Lee's Summit, Missouri.

The study area is shown in Figure 1. The site layout is shown in Figure 2.

2) EXISTING CONDITIONS

The property is currently undeveloped.

SE Oldham Parkway is a two-lane roadway adjacent to this property with a posted speed limit of 40 miles per hour. SE Oldham Parkway is classified as a Commercial or Industrial Collector by the City of Lee's Summit's *Thoroughfare Master Plan*. The Mid America Regional Council (MARC) has given this roadway a functional classification of Local Road.

Ranson Road (Missouri Route RA) is a two-lane road with a posted speed limit of 45 miles per hour south of the intersection with SE Oldham Parkway and a posted speed limit of 40 MPH north of the intersection with SE Oldham Parkway. Ranson Road is classified as a Major Arterial by the City of Lee's Summit. The Mid America Regional Council (MARC) has given this roadway a functional classification of Major Collector.

A twenty-four hour turning movement count was performed on the intersection of SE Oldham Parkway with Ranson Road on October 24th through October 25th of this year. The peak hours were determined to be 7:30 to 8:30 in the AM and from 4:45 to 5:45 in the PM. The complete traffic counts are shown in Appendix II. The peak hour traffic volumes and existing lane configurations are shown in Figures 4-8.

3) PROPOSED DEVELOPMENT

The proposed site plan is shown in Figure 2. The proposed development consists of Senior Living complex that will include 91 units of Independent Living, 44 beds of Assisted Living and an 18 bed Memory Care unit.

The proposed development will have an entrance onto SE Oldham Parkway and an access point into the local road network to the south.

4) TRIP GENERATION

The vehicle trips generated by the proposed development were estimated using the Institute of Transportation Engineers' Trip Generation, 10th Edition. Land Use 252, Senior Adult Housing Attached was used for the Independent Living housing. Land Use 254, Assisted Living, was used for the assisted living. Land Use 620. Nursing Home, was used for the Memory Care Unit. The estimated AM and PM peak hour traffic volumes associated with these uses are shown in Table 1.

Table 1: Trip Generation

Land Use	*Intensity*	*Daily*	*AM Peak Hour*			*PM Peak Hour*		
			Total	*In*	*Out*	*Total*	*In*	*Out*
Independent Living (Senior Adult Housing - Attached)	91 Units	337	18	6	12	24	13	11
Assisted Living	44 Beds	114	8	5	3	11	4	7
Memory Care (Nursing Home)	18 Beds	55	3	2	1	4	1	3
Total		**506**	**29**	**13**	**16**	**39**	**18**	**21**

5) TRIP DISTRIBUTION

Trips generated by the Lee's Summit Senior Living Community development were distributed based on existing traffic flows and a general analysis of the surrounding area. The trips were distributed onto the existing street system approximately as follows:

- 45 percent to/from the north on Ranson Road
- 40 percent to/from the south on Ranson Road
- 15 percent to/from the west via SWSE Oldham Parkway

The proposed development trips are shown in Figures 11-12 of Appendix I.

6) SIGNAL WARRANTS

The Missouri Department of Transportation (MoDOT) Engineering Policy Guide (EPG) was consulted to evaluate the if a Signal would be warranted under the existing traffic volumes at the stop-controlled intersection of SE Oldham Parkway and Ranson Road. Warrant One (Eight Hour Warrant) was 2 vehicles less than the required minor road approach volumes during the eight hours of this evaluation. If the 45 MPH speed limit on Ranson Road south of the intersection is used to apply a 70% condition to the warrant analysis, both Condition A and Condition B are exceeded.

Warrant Two (Four Hour Warrant) analysis is shown in Figures 12 and 13 of Appendix I. Warrant Two is met for the existing traffic volumes, for the 70 % condition factoring in the speed limit on Ranson Road but does not exceed the threshold of the full warrant yet.

Warrant Three (Peak Hour Warrant) is met with existing traffic volumes.

7) LEVEL OF SERVICE AND VOLUME/CAPACITY ANALYSES

Capacity analysis was used to quantify the impacts of the increased traffic on the intersections studied. The methodology outlined in the Highway Capacity Manual, 6th Edition, was used as a basis to perform the analysis for this study. Capacity analysis defines the quality of traffic operation for an intersection using a grading system called Level of Service (LOS). The LOS is defined in terms of average vehicle delay. Levels of service A through F have been established with A representing the best and F the worst.

Table 3: Level of Service Definitions

Level of Service	*Unsignalized Intersection*	*Signalized Intersection*
A	< 10 Seconds	< 10 Seconds
B	< 15 Seconds	< 20 Seconds
C	< 25 Seconds	< 35 Seconds
D	< 35 Seconds	< 55 Seconds
E	< 50 Seconds	< 80 Seconds
F	≥ 50 Seconds	≥ 80 Seconds

The study intersections were evaluated using Synchro, an analysis package based in part on Highway Capacity Manual methods. The analysis reports are included in Appendix II.

Existing Conditions

The levels of service and lane configuration for existing conditions are shown in Figures 6 and 7in Appendix I.

During the AM Peak Hour, the intersection of SE Oldham and Ranson Road experiences levels of service for individual movements at a level of service C or better meeting the desired goal of the City's *Level of Service Policy*. During the PM Peak Hour, the intersection of SE Oldham Parkway and Ranson Road experiences levels of service F for eastbound movements on SE Oldham Parkway with a maximum design queue length of 15.7 vehicles.

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Existing + Proposed Conditions

The levels of service and lane configuration, for the existing plus approved development scenario are shown in Figures 10 and 11 in Appendix I.

During the AM Peak Hour, the stop-controlled intersection of SE Oldham Parkway and Ranson Road meets the goals of the City's *Level of Service Policy* for all movements. During the PM Peak Hour, the goals stated in the City's *Level of Service Policy* are not met for movements on SE Oldham Parkway. Eastbound SE Oldham Parkway experiences a level of service F with a maximum design queue of 17.6 vehicles. Westbound SE Oldham Parkway experiences a level of service E with less than 1 vehicle maximum design queue length.

8) UNIMPROVED ROAD POLICY

The City of Lee's Summit Unimproved Road Policy outlines the relation to unimproved roads to proposed developments. Unimproved roads are typically those roads that are narrow in width with drainage ditches adjacent to the roadway. *The Unimproved Road Policy* allows

development up to 5,000 vehicles per day (approximately 50% capacity) before a roadway is required to be improved to at least the Interim Road Standard.

The total volume of traffic that will be SE Oldham Parkway with the addition of the proposed development should be approximately 539 vehicles in total (506 new vehicles + 33 existing vehicles. The 50 percent capacity threshold will not be exceeded by this project.

9) RECOMMENDATIONS & CONCLUSIONS

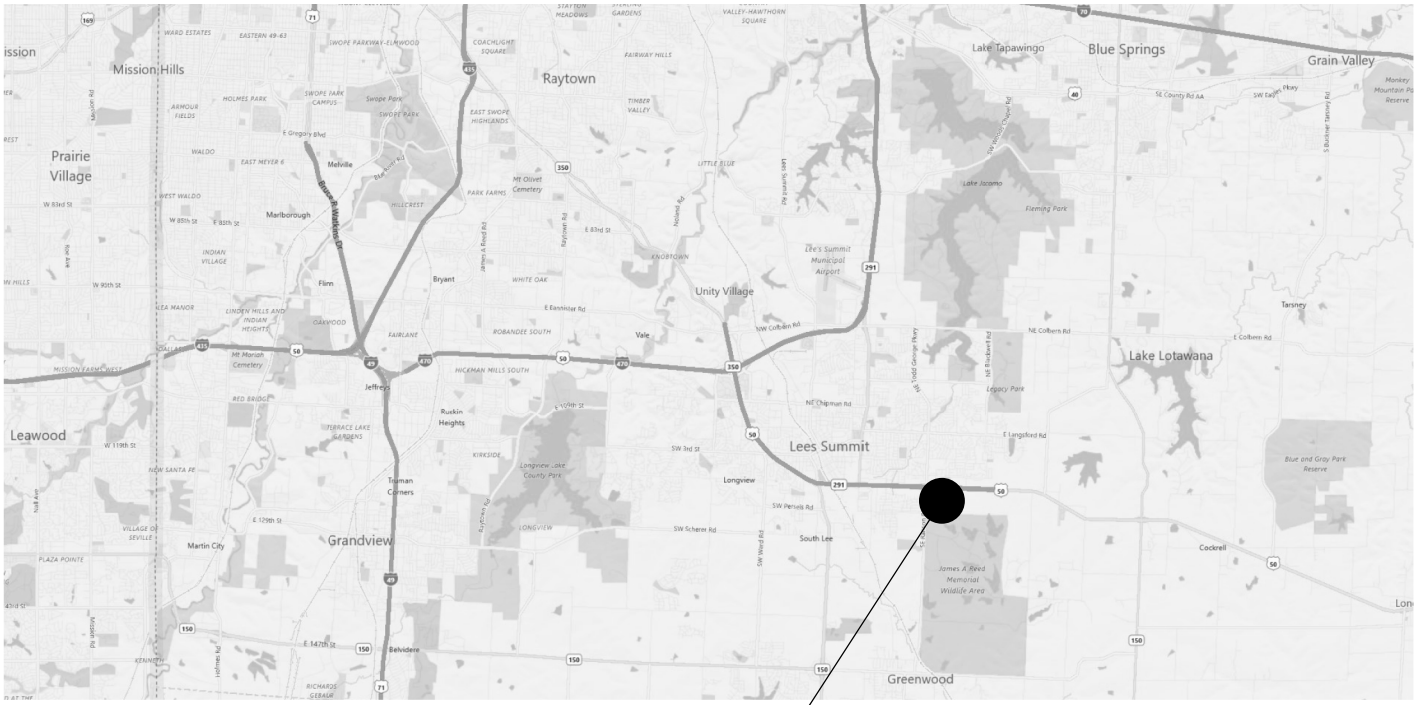
This study documents the impact of the proposed Lee's Summit Senior Living Community Development on the nearby intersection of SE Oldham Parkway and Ranson Road.

The existing traffic volumes at the intersection of SE Oldham Parkway and Ranson Road meets the 70% Warrant One threshold and is within two vehicles of meeting the 100% Warrant One threshold. The existing traffic volumes also exceed the threshold of the 70 % Warrant Two and the threshold for Warrant Three. Additionally, the existing level of service for eastbound traffic on SE Oldham Parkway operates at a level of service F with significant queueing.

It is recommended that this intersection be signalized. The need for signalization is met with existing traffic volumes and is not a result of the proposed development.

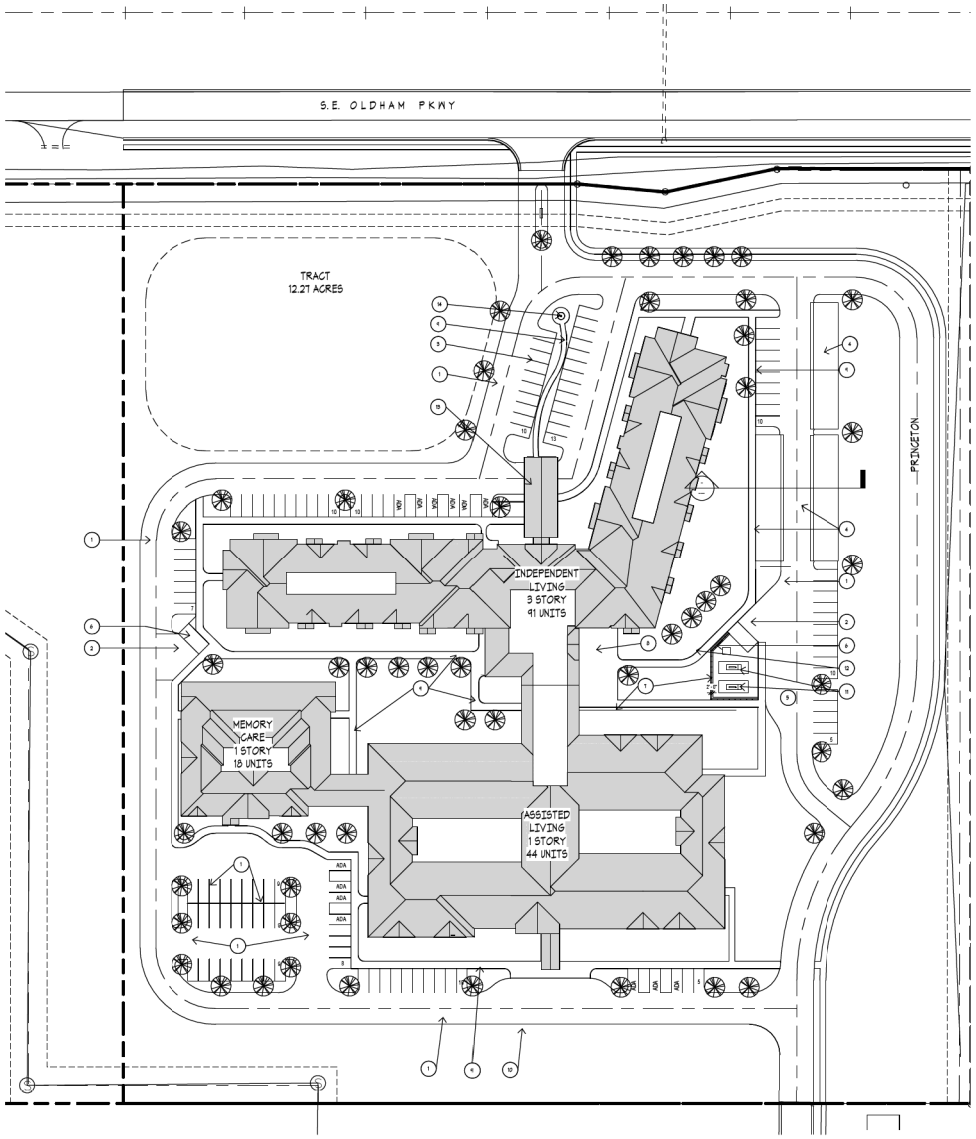
No additional improvements are necessary as a result of this development.

APPENDIX I



Project Location	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 1

priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400



SITE PLAN - OPTION A
1" = 40'-0"

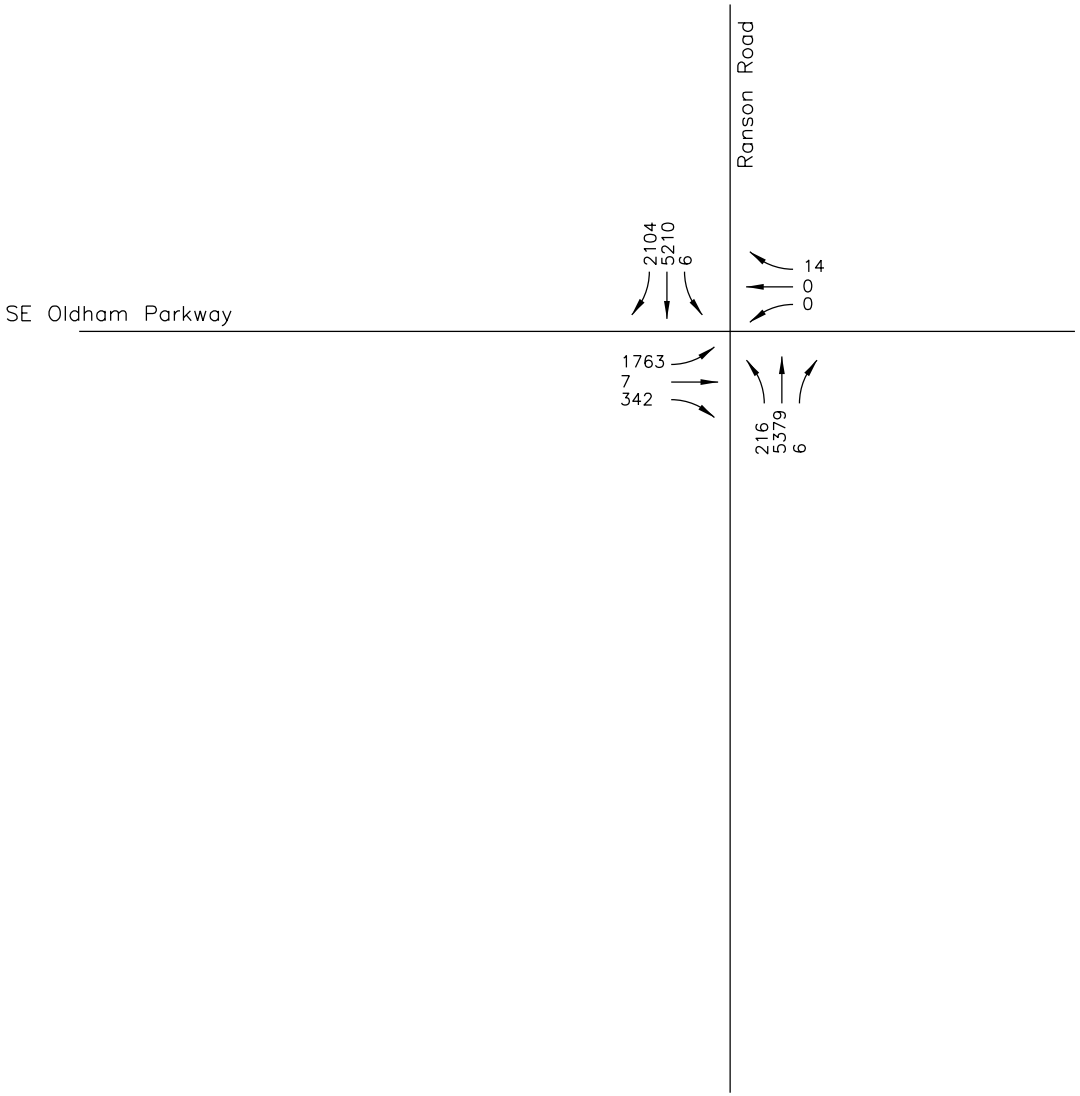
Site Plan

Lee's Summit
Senior Living Community
Lee's Summit, MO

No Scale

Figure 2

priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400

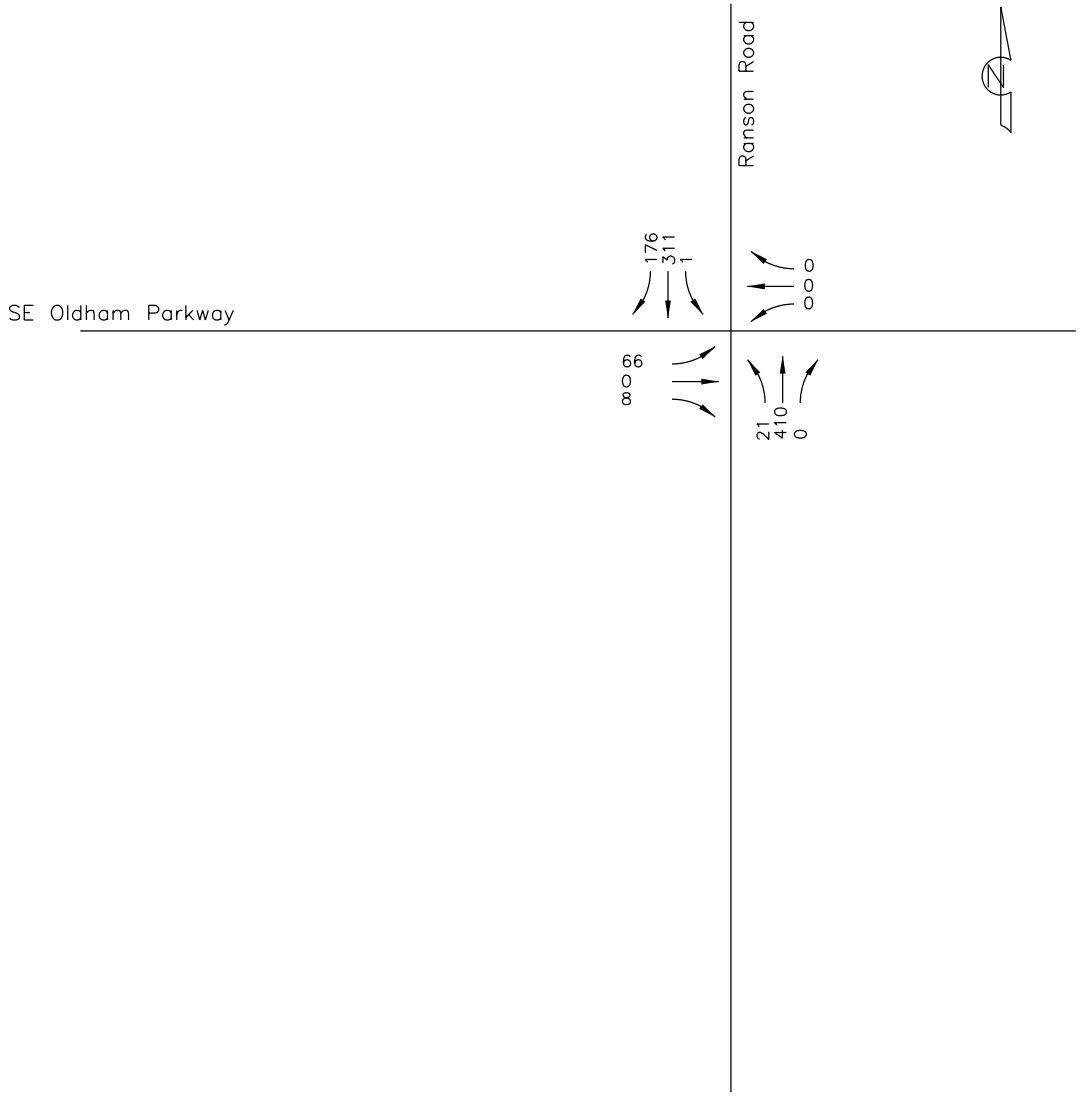


LEGEND

Total Volume

24 HR TRAFFIC VOLUMES	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 3

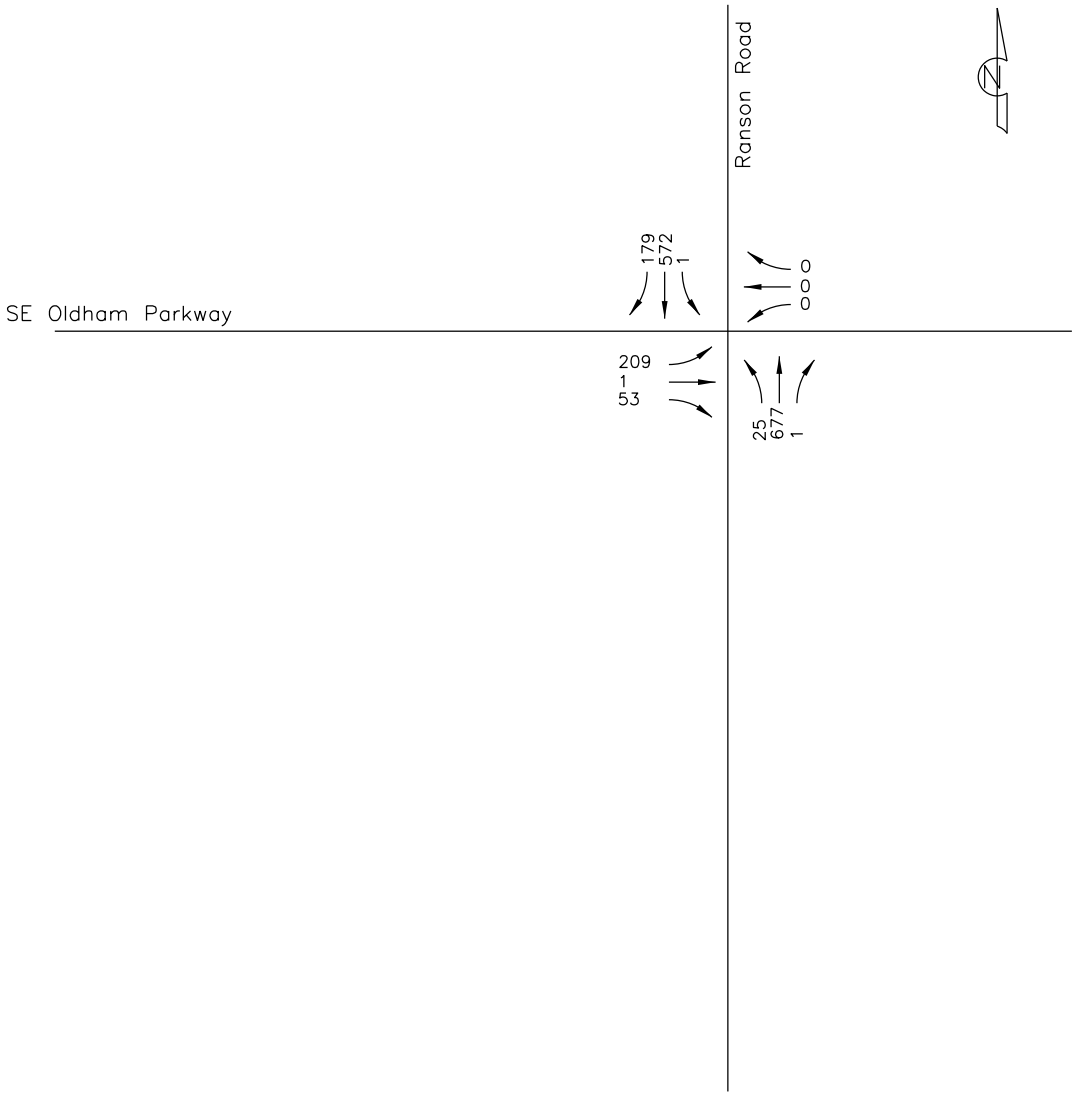
priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400



LEGEND

Total Volume

Existing AM Peak Hour Traffic Volumes	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 4	priority ENGINEERS PO Box 563 Garden City, MO 64747 816.738.4400

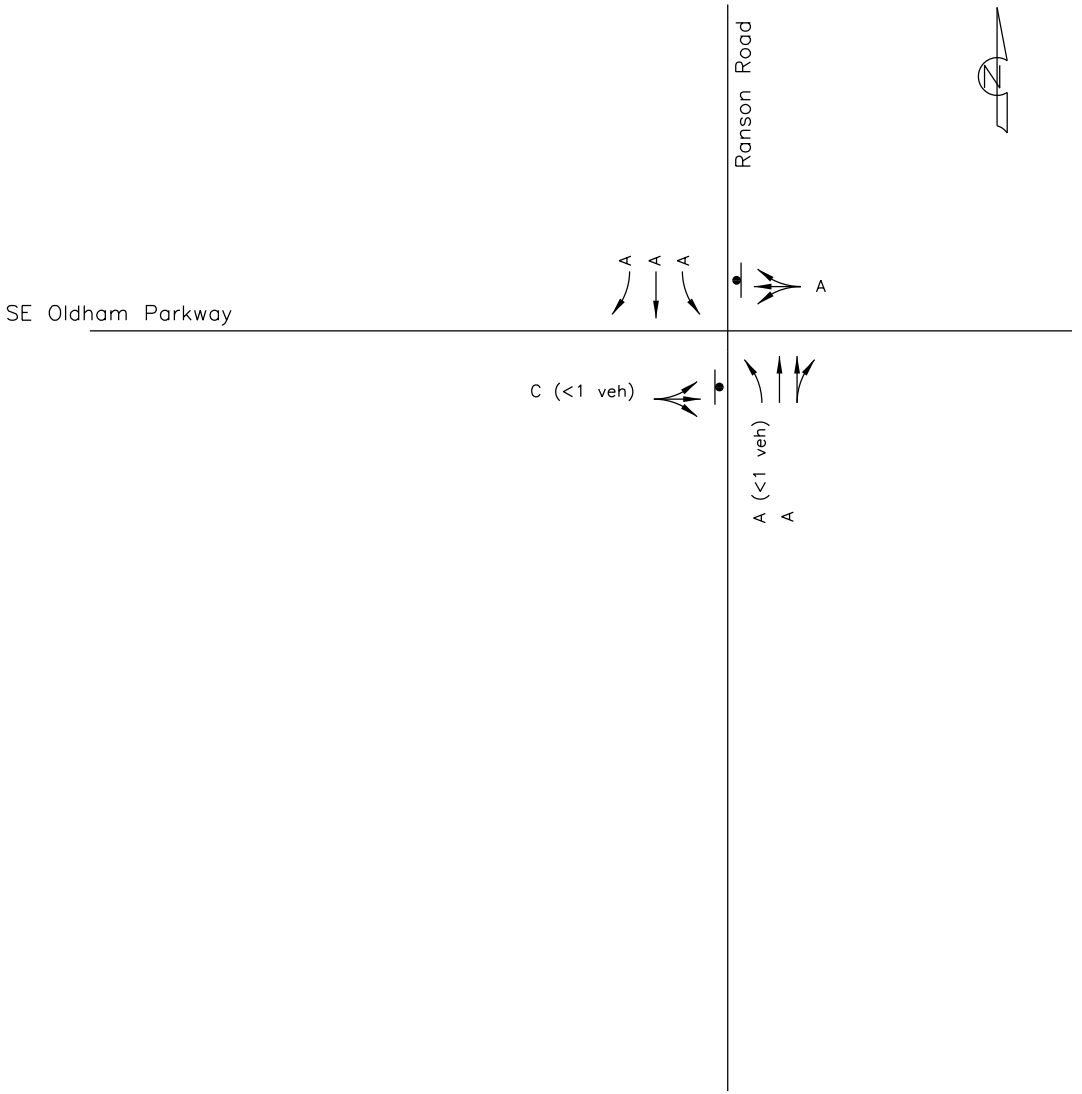


LEGEND

Total Volume

Existing PM Peak Hour Traffic Volumes	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale	Figure 5

priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400



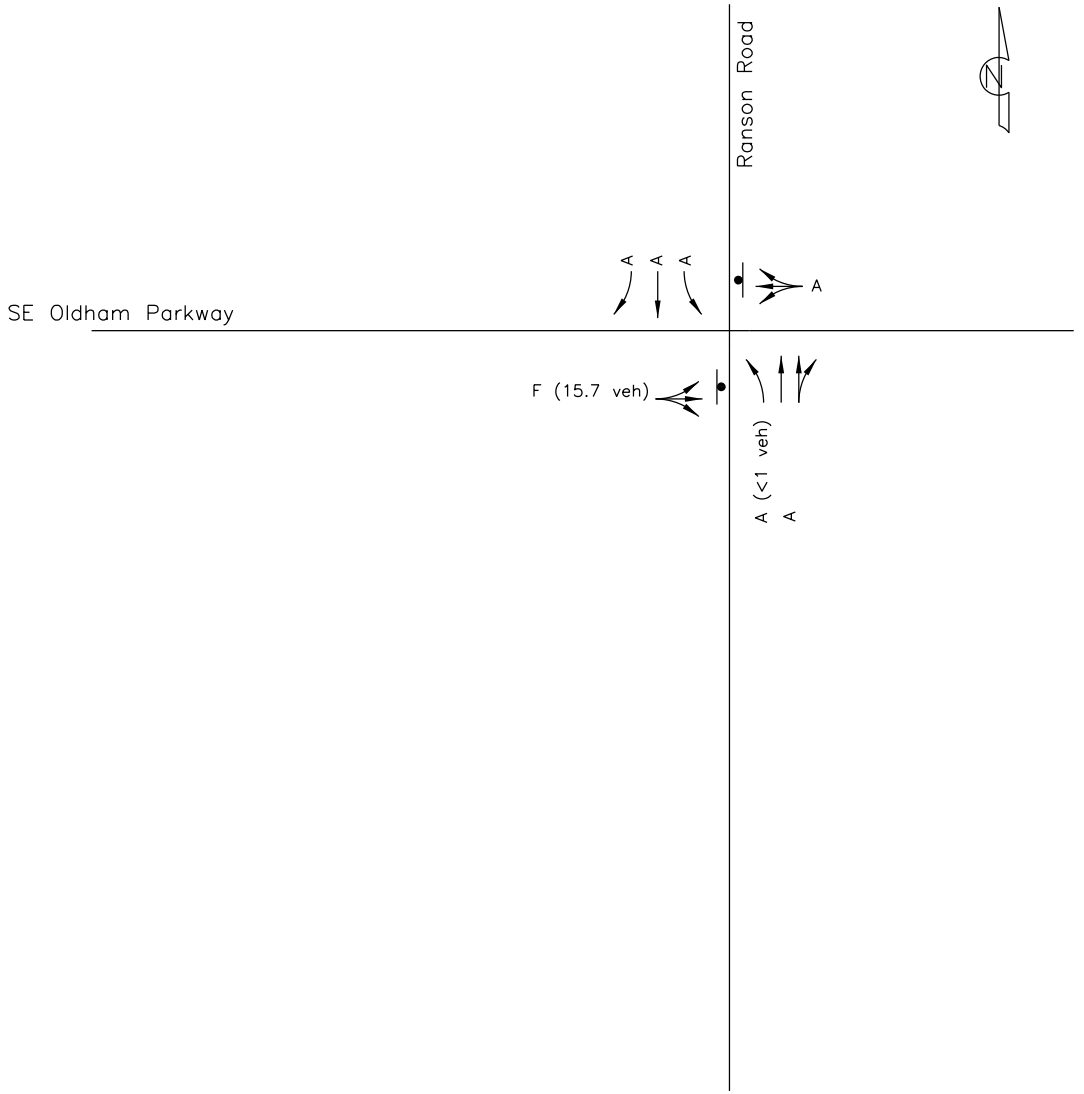
LEGEND

HCM LOS (95th Percentile Queue)

Stop Sign

Ⓐ Traffic Signal LOS

Existing AM Peak Hour Lane Configuration & Levels of Service	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 6	priority ENGINEERS PO Box 563 Garden City, MO 64747 816.738.4400



LEGEND

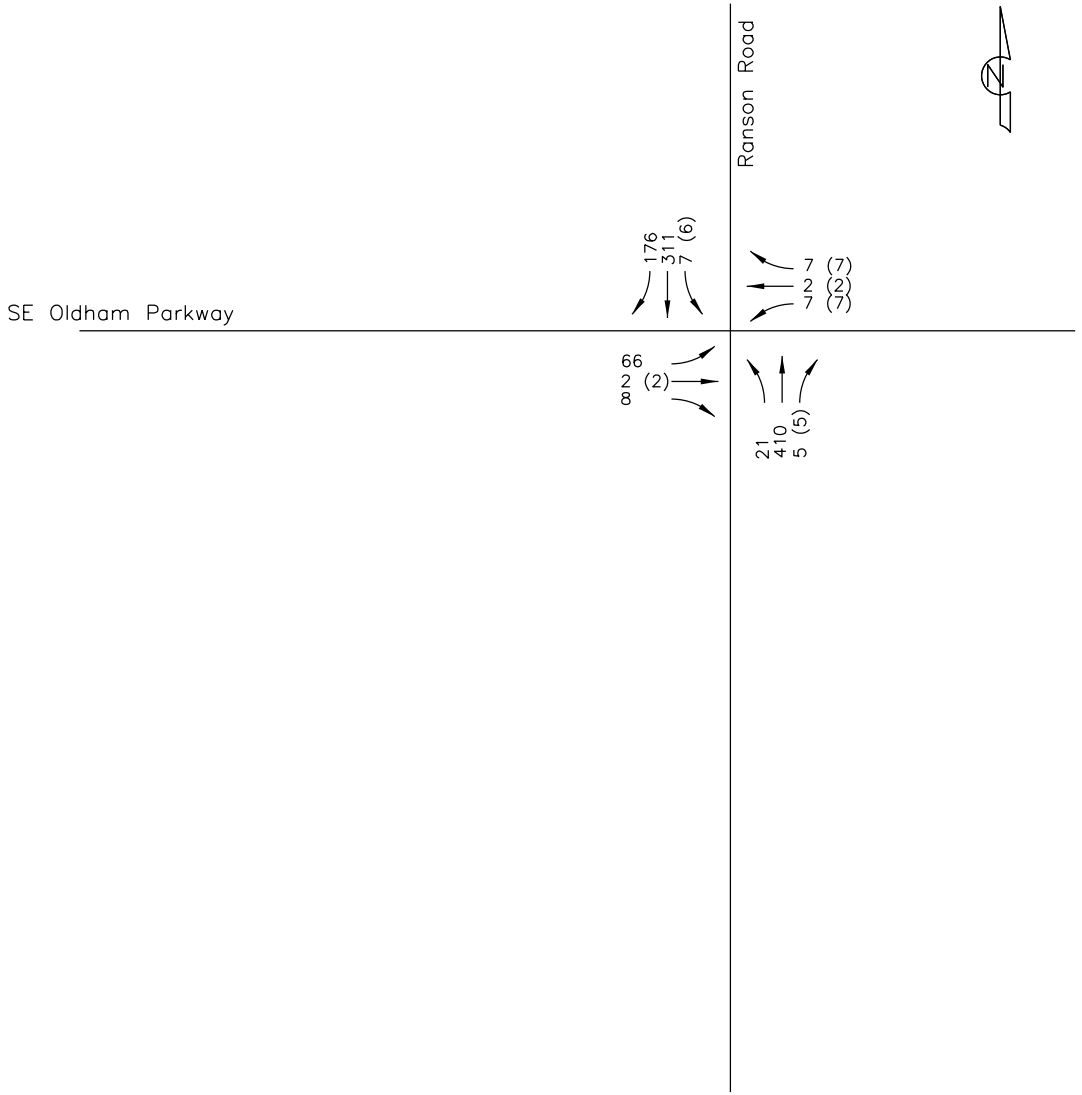
HCM LOS (95th Percentile Queue)

Stop Sign

Ⓐ Traffic Signal LOS

Existing PM Peak Hour Lane Configuration & Levels of Service	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 7

priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400

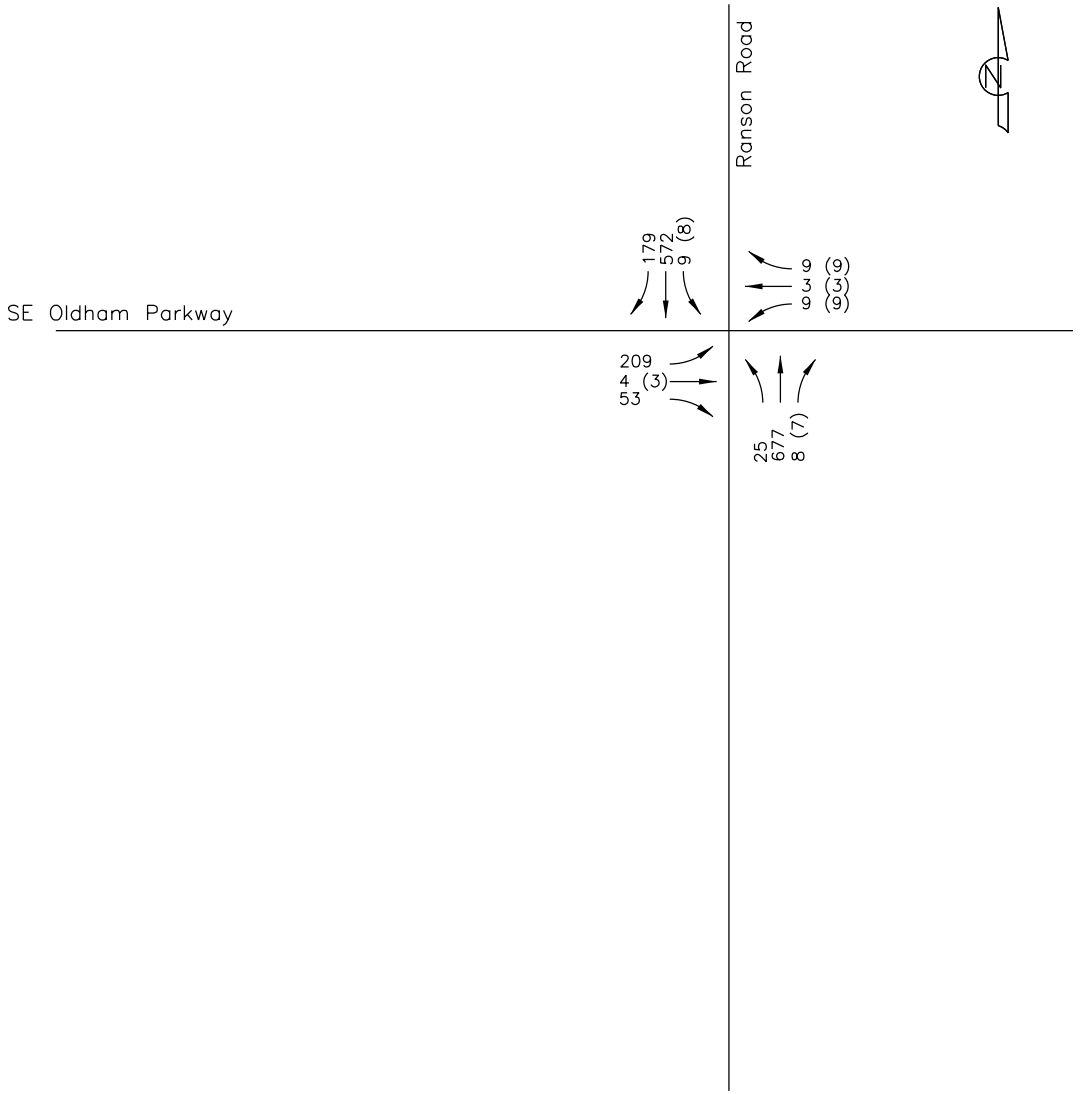


LEGEND

Total Volume (Site Generated)[Pass-By]

Existing + Proposed AM Peak Hour Traffic Volumes	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 8

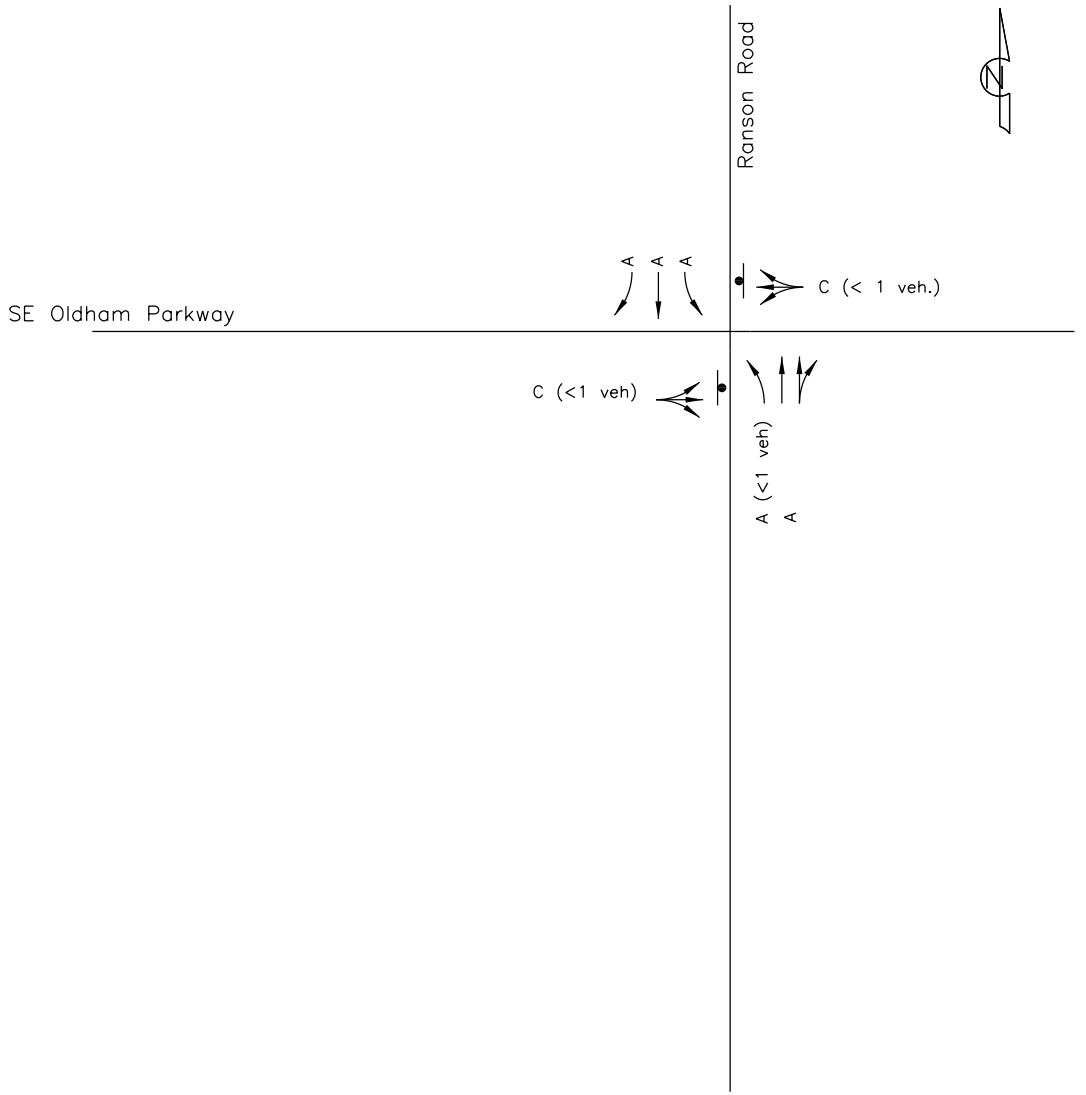
Priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400



LEGEND

Total Volume (Site Generated)[Pass-By]

Existing + Proposed PM Peak Hour Traffic Volumes	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 9	priority ENGINEERS PO Box 563 Garden City, MO 64747 816.738.4400

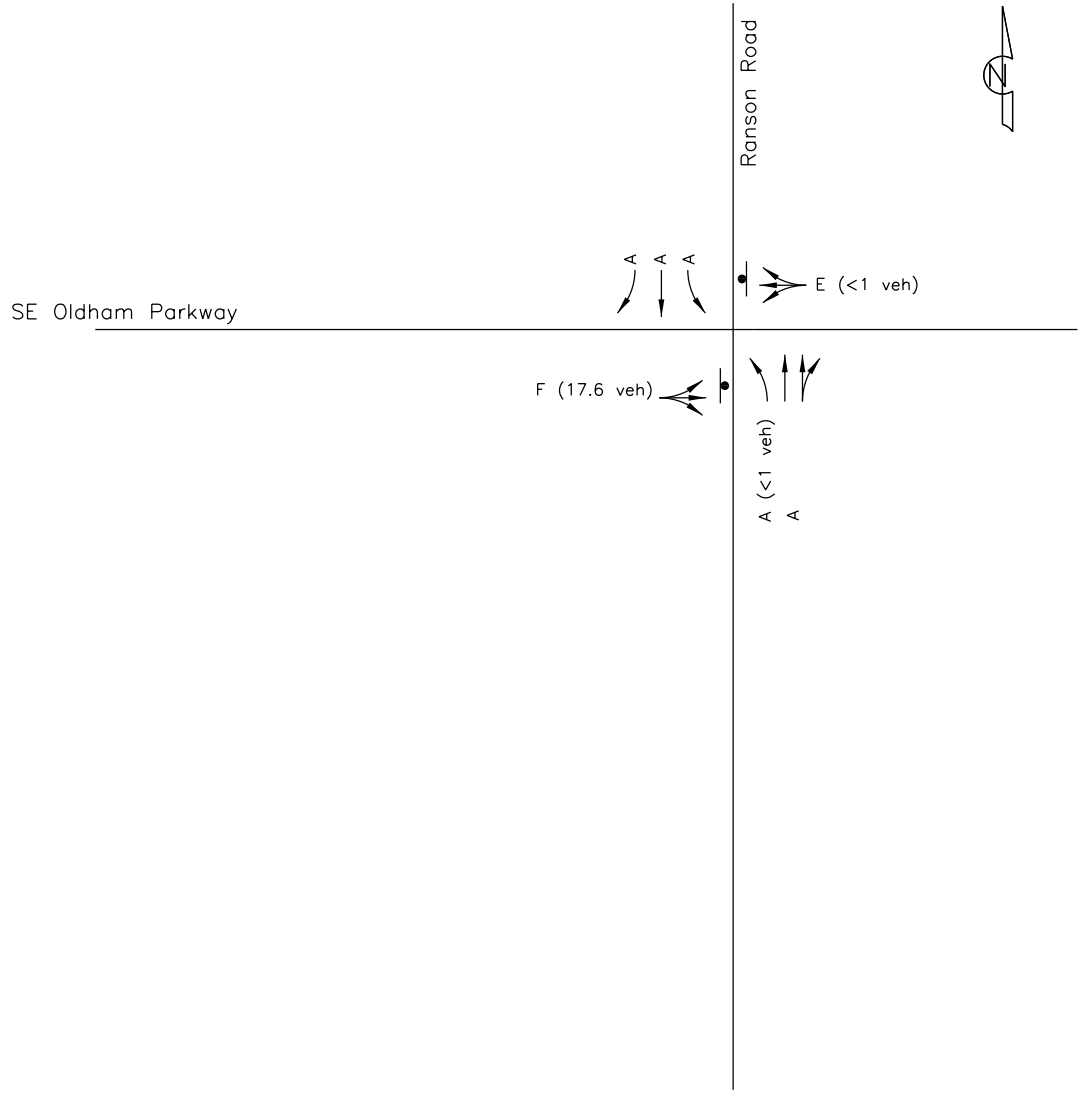


LEGEND

- HCM LOS (95th Percentile Queue)
- Stop Sign
- Ⓐ Traffic Signal LOS

Existing + Proposed AM Peak Hour Lane Configuration & Levels of Service	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 10

Priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400



LEGEND

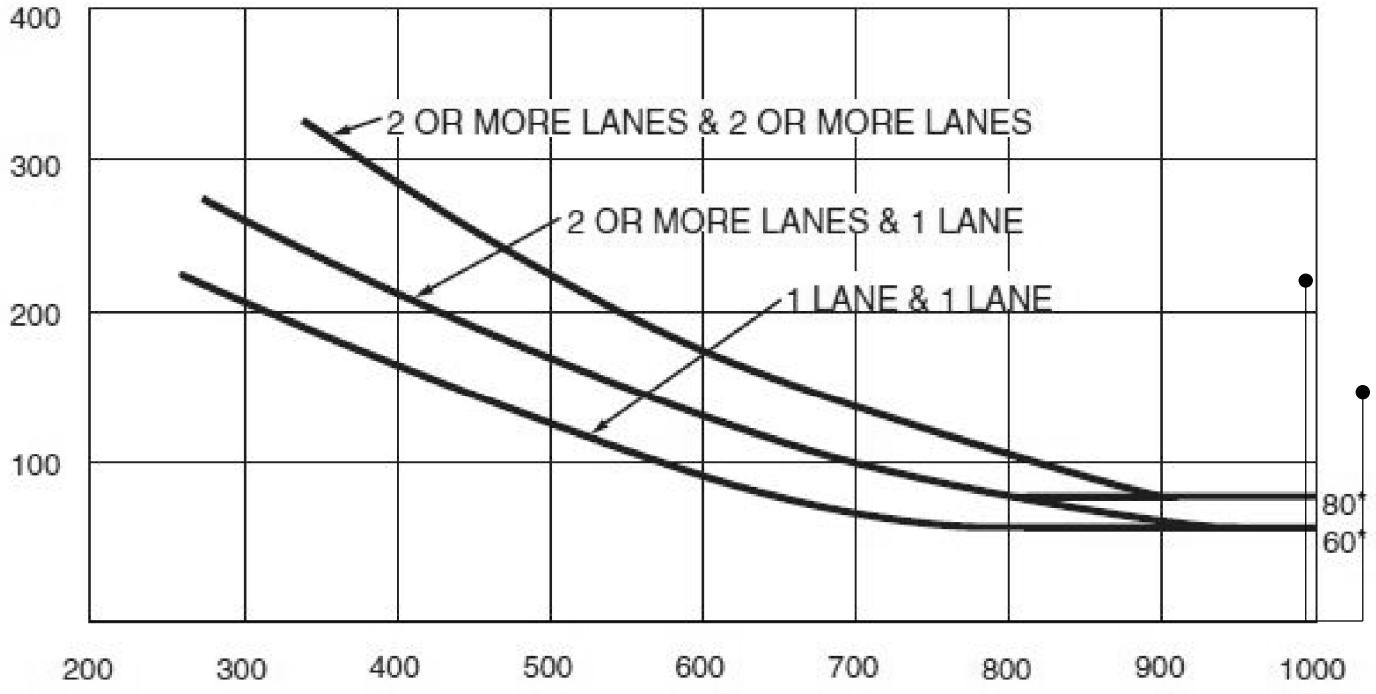
HCM LOS (95th Percentile Queue)

Stop Sign

Ⓐ Traffic Signal LOS

Existing + Proposed PM Peak Hour Lane Configuration & Levels of Service	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 11	priority ENGINEERS PO Box 563 Garden City, MO 64747 816.738.4400

EXISTING 4 HR SIGNAL WARRANT (100 %)	Lee's Summit Senior Living Community Lee's Summit, MO	No Scale Figure 12	priority ENGINEERS PO Box 563 Garden City, MO 64747 816.738.4400



EXISTING 4 HOUR SIGNAL WARRANT
(70 %)

Lee's Summit
Senior Living Community
Lee's Summit, MO

No Scale

Figure 13

priority ENGINEERS
PO Box 563
Garden City, MO 64747
816.738.4400

APPENDIX II

Peak Hour Traffic Counts

Synchro Reports

Time	Peds	SB Right	SB Thru	SB Left	SB UTrn	Bike	Peds	WB Right	WB Thru	WB Left	WB Utrn	Bike	Peds	NB Right	NB Thru	NB Left	NB UTrn	Bike	Peds	EB Right	EB Thru	EB Left	EB UTrn	Bike
00:00	0	0	8	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0
00:15	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
00:30	0	0	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
00:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
01:00	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
01:15	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
01:30	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
01:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
02:15	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
02:30	0	0	4	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
02:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
03:00	0	0	3	1	0	0	0	4	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0
03:15	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
03:30	0	2	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
03:45	0	1	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
04:00	0	0	2	0	0	0	0	2	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0
04:15	0	0	4	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	1	0	0
04:30	0	1	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
04:45	0	6	9	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	1	0	0	0	0
05:00	0	4	13	0	1	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	2	0	0
05:15	0	7	19	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	1	0	0
05:30	0	4	25	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0
05:45	0	9	30	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	0	0	2	0	0
06:00	0	7	27	0	0	0	0	0	0	0	0	0	0	0	64	1	0	0	0	0	0	3	0	0
06:15	0	13	31	0	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0	1	0	7	0	0
06:30	0	21	48	0	0	0	0	0	0	0	0	0	0	0	84	3	0	0	0	2	0	3	0	0
06:45	0	23	76	0	0	0	0	0	0	0	0	0	0	0	109	3	0	0	0	0	0	10	0	0
07:00	0	41	43	0	0	0	0	0	0	0	0	0	0	0	103	5	0	0	0	0	0	10	0	0
07:15	0	49	59	0	0	0	0	0	0	0	0	0	0	0	107	6	0	0	0	3	0	13	0	0
07:30	0	47	82	0	0	0	0	0	0	0	0	0	0	0	124	5	0	0	0	0	0	19	0	0
07:45	0	43	80	0	0	0	0	0	0	0	0	0	0	0	92	7	0	0	1	1	0	19	0	0
08:00	0	41	76	0	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	2	0	13	0	0
08:15	0	45	73	1	0	0	0	0	0	0	0	0	0	0	94	3	0	0	0	5	0	15	0	0
08:30	0	46	57	1	0	0	1	0	0	0	0	0	0	0	108	4	0	0	0	2	1	20	0	0
08:45	0	47	81	0	0	0	0	2	0	0	0	0	0	0	110	3	0	0	0	1	0	16	0	0
09:00	0	46	52	0	0	0	0	0	0	0	0	0	0	0	87	9	0	0	0	4	0	28	0	0
09:15	0	43	42	0	0	0	0	0	0	0	0	0	0	0	72	10	0	0	0	7	0	26	0	0
09:30	0	29	43	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	2	0	25	0	0
09:45	0	35	42	0	0	0	0	0	0	0	0	0	0	0	62	5	0	0	0	3	0	26	0	0
10:00	0	27	29	0	0	0	0	0	0	0	0	0	0	0	59	3	0	0	0	8	0	24	0	0
10:15	0	41	41	0	0	0	0	0	0	0	0	0	0	0	42	3	0	0	0	7	0	22	0	0
10:30	0	26	49	0	0	0	0	0	0	0	0	0	0	0	55	4	0	0	0	5	0	30	1	0
10:45	0	40	58	0	0	0	0	0	0	0	0	0	0	0	53	8	0	0	0	4	1	22	0	0
11:00	0	26	42	1	0	0	0	2	0	0	0	0	0	0	69	5	0	0	0	4	0	35	0	0
11:15	0	37	63	0	0	0	0	0	0	0	0	0	0	0	59	3	0	0	0	5	0	41	0	0
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12:30	0	50	68	0	0	0	1	0	0	0	0	0	0	0	68	2	0	0	0	8	0	36	0	0
12:45	0	45	72	0	0	0	0	0	0	0	0	0	0	0	60	4	0	0	0	6	0	25	0	0
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13:15	0	35	78	0	0	0	0	0	0	0	0	0	0	0	74	2	0	0	0	6	0	24	0	0
13:30	0	32	66	0	0	0	0	0	0	0	0	0	0	0	67	4	0	0	0	9	0	48	0	0
13:45	0	32	70	0	0	0	0	0	0	0	0	0	0	0	54	2	0	0	0	4	0	27	0	0
14:00	0	31	68	0	0	0	0	0	0	0	0	0	0	0	81	4	0	0	0	5	0	40	0	0
14:15	0	28	63	0	0	0	0	0	0	0	0	0	0	0	60	3	0	0	0	8	0	18	0	0
14:30	0	45	94	0	0	0	0	0	0	0	0	0	0	0	55	4	0	0	0	9	0	23	0	0
14:45	0	48	85	1	0	0	0	0	0	0	0	0	0	0	65	3	0	0	0	9	1	42	0	0
15:00	0	40	96	0	0	0	0	0	0	0	0	0	0	1	80	3	0	0	0	11	1	42	0	0
15:15	0	41	91	0	0	0	0	0	0	0	0	0	0	0	83	2	0	0	0	11	0	50	0	0
15:30	0	51	107	0	0	0	0	0	0	0	0	0	0	0	104	5	0	0	0	11	0	44	0	0
15:45	0	42	145	0	0	1	0	0	0	0	0	0	0	0	99	3	0	0	0	10	0	33	0	0
16:00	0	44	124	0	0	0	2	0	0	0	0	0	0	0	129	5	0	0	0	9	0	40	0	0
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16:30	0	58	138	0	0	0	1	0	0	0	0	0	0	0	115	4	0	0	0	9	0	53	0	0
16:45	0	53	139	0	1	0	1	0	0	0	0	0	0	1	151	6	0	0	0	12	0	55	0	0
17:00	0	50	131	1	0	0	2	0	0	0	0	0	0	0	184	10	0	0	0	19	1	54	0	0
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17:30	0	34	157	0	0	0	0	0	0	0	0	0	0	0	143	6	0	0	0	8	0	50	0	0
17:45	0	38	115	0	0	0	0	0	0	0	0	0	0	0	132	1	0	0	0	5	0	45	0	0
18:00	0	26	137	0	0	0	0	0	0	0	0	0	0	0	94	3	0	0	0	5	0	56	0	0
18:15	0	38	127	0	0	0	0	0	0	0	0	0	0	0	104	2	0	0	0	3	0	27	0	0
18:30	0	26	134	0	0	0	0	0	0	0	0	0	0	0	110	1	0	0	0	10	1	23	0	0
18:45	0	26	115	0	0	0	0	0	0	0	0	0	0	0	85	2	0	0	0	1	0	17	0	0
19:00	0	12	80	0	0	0	0	0	0	0	0	0	0	0	73	1	0	0	0	4	0	34	0	0
19:15	0	13	92	0	0	0	0	0	0	0	0	0	0	0	65	2	0	0	0	3	0	28	0	0
19:30	0	6	77	0	0	0	0	0	0	0	0	0	0	0	45	3	0	0	0	1	0	17	0	0
19:45	0	15	63	0	0	0	0	0	0	0	0	0	0	0	60	3	0	0	0	4	0	14	0	0
20:00	0	9	73	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	0	2	0	19	0	0
20:15	0	11	62	0	0	0	0	0	0	0	0	0	0	0	47	1	0	0	0	3	0	15	0	0

20:30	0	9	53	0	0	0		0	0	0	0	0	0		0	1	54	2	0	0		0	1	0	17	0	0
20:45	0	6	61	0	0	0		0	2	0	0	0	0		0	0	30	1	0	0		0	1	0	10	0	0
21:00	0	5	55	0	0	0		0	0	0	0	0	0		0	0	32	0	0	0		0	1	0	11	0	0
21:15	0	5	52	0	0	0		0	0	0	0	0	0		0	0	22	0	0	0		0	2	0	3	0	0
21:30	0	1	44	0	0	0		0	0	0	0	0	0		0	0	19	0	0	0		0	2	0	3	0	0
21:45	0	2	28	0	0	0		0	0	0	0	0	0		0	0	21	0	0	0		0	0	0	4	0	0
22:00	0	0	21	0	0	0		0	0	0	0	0	0		0	0	12	0	0	0		0	0	0	2	0	0
22:15	0	1	29	0	0	0		0	0	0	0	0	0		0	0	13	0	0	0		0	0	0	1	0	0
22:30	0	1	24	0	0	0		0	0	0	0	0	0		0	0	8	0	0	0		0	1	0	4	0	0
22:45	0	0	13	0	0	0		0	0	0	0	0	0		0	0	7	0	0	0		0	0	0	0	0	0
23:00	0	1	6	0	0	0		0	0	0	0	0	0		0	0	10	0	0	0		0	0	0	2	0	0
23:15	0	1	10	0	0	0		0	0	0	0	0	0		0	0	7	0	0	0		0	0	0	0	0	0
23:30	0	1	11	0	0	0		0	0	0	0	0	0		0	0	2	0	0	0		0	0	0	0	0	0
23:45	0	0	10	0	0	0		0	0	0	0	0	0		0	0	5	0	0	0		0	0	0	0	0	0
Total	0	2104	5210	6	5	1	0	8	14	0	0	0	0	0	0	6	5379	216	1	0	0	2	342	7	1763	1	0

Time	Peds	SB Right	SB Thru	SB Left	SB UTrn	Bike	Peds	WB Right	WB Thru	WB Left	WB Utrn	Bike	Peds	NB Right	NB Thru	NB Left	NB UTrn	Bike	Peds	EB Right	EB Thru	EB Left	EB UTrn	Bike		
07:00	0	41	43	0	0	0	0	0	0	0	0	0	0	0	103	5	0	0	0	0	0	10	0	0	202	
07:15	0	49	59	0	0	0	0	0	0	0	0	0	0	0	107	6	0	0	0	3	0	13	0	0	237	
07:30	0	47	82	0	0	0	0	0	0	0	0	0	0	0	124	5	0	0	0	0	0	19	0	0	277	
07:45	0	43	80	0	0	0	0	0	0	0	0	0	0	0	92	7	0	0	1	1	0	19	0	0	242	958
08:00	0	41	76	0	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	2	0	13	0	0	238	994
08:15	0	45	73	1	0	0	0	0	0	0	0	0	0	0	94	3	0	0	0	5	0	15	0	0	236	993
08:30	0	46	57	1	0	0	1	0	0	0	0	0	0	0	108	4	0	0	0	2	1	20	0	0	239	955
08:45	0	47	81	0	0	0	0	2	0	0	0	0	0	0	110	3	0	0	0	1	0	16	0	0	260	973
TOTAL		176	311	1	0	0	0	0	0	0	0	0	0	0	410	21	0	0	0	1	8	0	66	0	0	0	993	

Time	Peds	SB Right	SB Thru	SB Left	SB UTrn	Bike	Peds	WB Right	WB Thru	WB Left	WB Utrn	Bike	Peds	NB Right	NB Thru	NB Left	NB UTrn	Bike	Peds	EB Right	EB Thru	EB Left	EB UTrn	Bike		
16:00	0	44	124	0	0	0	2	0	0	0	0	0	0	0	129	5	0	0	0	9	0	40	0	0	351	
16:15	0	53	127	0	1	0	0	0	0	0	0	0	0	0	136	2	0	0	0	10	0	52	0	0	381	
16:30	0	58	138	0	0	0	1	0	0	0	0	0	0	0	115	4	0	0	0	9	0	53	0	0	377	
16:45	0	53	139	0	1	0	1	0	0	0	0	0	0	1	151	6	0	0	0	12	0	55	0	0	418	1527
17:00	0	50	131	1	0	0	2	0	0	0	0	0	0	0	184	10	0	0	0	19	1	54	0	0	450	1626
17:15	0	42	145	0	0	0	0	0	0	0	0	0	0	0	199	3	0	0	0	14	0	50	0	0	453	1698
17:30	0	34	157	0	0	0	0	0	0	0	0	0	0	0	143	6	0	0	0	8	0	50	0	0	398	1719
17:45	0	38	115	0	0	0	0	0	0	0	0	0	0	0	132	1	0	0	0	5	0	45	0	0	336	1637
Total	0	179	572	1	1	0	3	0	0	0	0	0	0	1	677	25	0	0	0	53	1	209	0	0	1719	

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	0	8	0	0	0	21	410	0	1	311	176
Future Vol, veh/h	66	0	8	0	0	0	21	410	0	1	311	176
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	72	0	9	0	0	0	23	446	0	1	338	191

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	609	832	338	932	1023	223	529	0	0	446	0	0
Stage 1	340	340	-	492	492	-	-	-	-	-	-	-
Stage 2	269	492	-	440	531	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	393	304	703	234	235	781	1036	-	-	1112	-	-
Stage 1	674	639	-	528	547	-	-	-	-	-	-	-
Stage 2	714	547	-	595	525	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	386	297	703	227	230	781	1036	-	-	1112	-	-
Mov Cap-2 Maneuver	386	297	-	227	230	-	-	-	-	-	-	-
Stage 1	659	638	-	516	535	-	-	-	-	-	-	-
Stage 2	698	535	-	587	524	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	0	0.4	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1036	-	-	406	-	1112	-	-
HCM Lane V/C Ratio	0.022	-	-	0.198	-	0.001	-	-
HCM Control Delay (s)	8.6	-	-	16	0	8.2	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	-	0	-	-

Intersection	
Int Delay, s/veh	33.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	209	1	53	0	0	0	25	677	1	1	572	179
Future Vol, veh/h	209	1	53	0	0	0	25	677	1	1	572	179
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	227	1	58	0	0	0	27	736	1	1	622	195

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1046	1415	622	1542	1610	369	817	0	0	737	0	0
Stage 1	624	624	-	791	791	-	-	-	-	-	-	-
Stage 2	422	791	-	751	819	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	~ 194	137	486	86	104	629	809	-	-	867	-	-
Stage 1	472	477	-	350	400	-	-	-	-	-	-	-
Stage 2	581	400	-	402	388	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 189	132	486	73	100	629	809	-	-	867	-	-
Mov Cap-2 Maneuver	~ 189	132	-	73	100	-	-	-	-	-	-	-
Stage 1	456	477	-	338	387	-	-	-	-	-	-	-
Stage 2	562	387	-	353	388	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	220.5	0	0.3	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	809	-	-	215	-	867	-	-
HCM Lane V/C Ratio	0.034	-	-	1.33	-	0.001	-	-
HCM Control Delay (s)	9.6	-	-	220.5	0	9.2	-	-
HCM Lane LOS	A	-	-	F	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	15.7	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	2	8	7	2	7	21	410	5	7	311	176
Future Vol, veh/h	66	2	8	7	2	7	21	410	5	7	311	176
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	72	2	9	8	2	8	23	446	5	8	338	191

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	624	851	338	950	1040	226	529	0	0	451	0	0
Stage 1	354	354	-	495	495	-	-	-	-	-	-	-
Stage 2	270	497	-	455	545	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	384	296	703	227	230	778	1036	-	-	1108	-	-
Stage 1	662	630	-	526	545	-	-	-	-	-	-	-
Stage 2	713	544	-	584	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	369	287	703	218	223	778	1036	-	-	1108	-	-
Mov Cap-2 Maneuver	369	287	-	218	223	-	-	-	-	-	-	-
Stage 1	647	626	-	514	533	-	-	-	-	-	-	-
Stage 2	688	532	-	571	514	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	16.9	0.4	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1036	-	-	385	320	1108	-	-
HCM Lane V/C Ratio	0.022	-	-	0.215	0.054	0.007	-	-
HCM Control Delay (s)	8.6	-	-	16.9	16.9	8.3	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.2	0	-	-

Intersection	
Int Delay, s/veh	42.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	209	4	53	9	3	9	25	677	8	9	572	179
Future Vol, veh/h	209	4	53	9	3	9	25	677	8	9	572	179
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	227	4	58	10	3	10	27	736	9	10	622	195

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1066	1441	622	1566	1632	373	817	0	0	745	0	0
Stage 1	642	642	-	795	795	-	-	-	-	-	-	-
Stage 2	424	799	-	771	837	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	~ 188	132	486	82	101	625	809	-	-	861	-	-
Stage 1	462	468	-	348	398	-	-	-	-	-	-	-
Stage 2	579	397	-	392	381	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 174	126	486	68	96	625	809	-	-	861	-	-
Mov Cap-2 Maneuver	~ 174	126	-	68	96	-	-	-	-	-	-	-
Stage 1	447	462	-	337	385	-	-	-	-	-	-	-
Stage 2	546	384	-	338	376	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	277.3	42.7	0.3	0.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	809	-	-	198	118	861	-	-
HCM Lane V/C Ratio	0.034	-	-	1.46	0.193	0.011	-	-
HCM Control Delay (s)	9.6	-	-	277.3	42.7	9.2	-	-
HCM Lane LOS	A	-	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	17.6	0.7	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

SITE LIGHTING

STARK WILSON DUNCAN ARCHITECTS INC – 315 NICHOLS ROAD, SUITE 228 – KANSAS CITY, MO 64112 – T 816.531.1698 F 816.531.1978

NORA | NSPEC®

ILLUMINATING THE FUTURE...SINCE 1989

Type CC

Project

Catalog No.

Lamp/Wattage

NRM-611 / NRM-612 / NRM-618

6" Marquise I Reflectors

Source: 11W to 26W LED
850lm to 2000lm

PRODUCT DESCRIPTION

6" Marquise Series with thermal management system combined in a single compact unit. Cree TrueWhite® LED ceramic package and Unitized Thermal Management (UTM) system. Outboard mounted driver allows for cooler operation and extends life.

Cree TrueWhite technology with the highest performing commercially available LEDs and mixes in complementary light from red and unsaturated yellow LEDs to create beautiful, warm, white light. This patented approach enables precise color management to preserve reliable high color consistency over the life of the product.

FEATURES

- 5-year Limited Warranty
- Cree TrueWhite® or Comfort Dim Technology
- 850lm, 1250lm or 2000lm LED packages
- 2700K, 3000K, 3500K and 4000K @ 90+CRI
- Can be used to comply with 2016 Title 24 - part 6 High Efficacy LED light source requirements

CONSTRUCTION

Trim: Aluminum spun reflector with deep set diffused lens for excellent visual comfort while providing high lumen output.

Mounting: Trim includes torsion springs to mount trim securely to housing.

ELECTRICAL

Delivered Lumens / Wattage:
L85 = 802lm / 11W; **L12** = 1148lm / 16W;
L20 = 1798lm / 26W
Color Temperature: 2700K, 3000K, 3500K, 4000K
CRI: 90+CRI
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Comfort Dim color tunes the temperature from a bright 2700K, to a romantic and comfortable 1800K on a gradual, even curve.
Comfort Dim is available in 2 different lumen levels:

- 850 and 1250 Lumens for lower ceiling heights in commercial and residential applications.
- 2000 Lumens for light commercial and residential high ceiling applications.

Dimming: Specified by housing

COMPATIBLE HOUSINGS

Reflectors are compatible with respective Marquise I series housings manufactured by Nora Lighting.

CATALOG NO.	DESCRIPTION
NHM-612	6" Non-IC New Construction (1250lm)
NHM-620	6" Non-IC New Construction (2000lm)
NHRM-612	6" Non-IC Remodel (1250lm)
NHRM-620	6" Non-IC Remodel (2000lm)
NHMIC-685	6" IC New Construction (850lm)
NHRMIC-685	6" IC Remodel (850lm)
NHMICD-612	6" IC Double Wall (1250lm)
NHMICD-620	6" IC Double Wall (2000lm)
NFBIC-6L	6" IC Dedicated Fire Box (850 or 1250lm)

DECO GLASS OPTIONS

NRM-618 is compatible with up to two decorative glass options sold separately. Each glass includes mounting hardware.

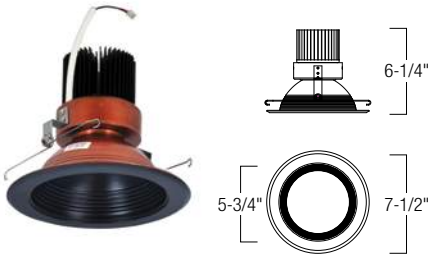
NTG-6B/120	6" Tempered Blue Glass with 4-3/8" Open Center
NTG-6B/80	6" Tempered Blue Glass with 3-1/8" Open Center
NTG-6CF	6" Tempered Clear Glass with Frosted Center
NTG-6FC	6" Tempered Frosted Glass with Clear Center
NTG-6HF	6" Tempered Clear Glass with Frosted Center and 3-1/8" Open Center

LABELS AND LISTINGS

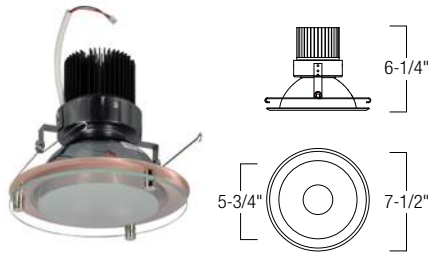
- cULus Listed for Wet Location when used with compatible housing
- ENERGY STAR® certified
- Can be used to comply with 2016 Title 24 - part 6 High Efficacy LED light source requirements
- 5-Year Limited Warranty
- WSEC ASTM E283 for Air-Tight

PRODUCT IMAGES AND DIMENSIONS

NRM-611 Round Open Reflector
BW, BZ, CO, DW, HZW, NN, WW



NRM-612 Round Baffle
BW, BZ, CO, NN, WW



NRM-618 Decorative Glass Reflector
(Specify glass separately)
BW, BZ, CO, DW, HZW, NN, WW

6" Marquise I Reflectors - Dedicated Housing Required

Reflector Type	Lumens / Wattage	Color Temp.	Finish (see chart below)
NRM-611 = Round Open Reflector	**L85** = 850lm / 11W	**27** = 2700K	**BW** = Black / White Flange
NRM-612 = Round Baffle	**L12** = 1250lm / 16W	**30** = 3000K	**BZ** = Bronze / Bronze Flange
NRM-618 = Round Deco Glass*	**L20** = 2000lm / 26W	**35** = 3500K	**CO** = Copper / Copper Flange
		40 = 4000K	**DW** = Diffused Clear / White Flange
		CD = Comfort Dim	**HZW** = Haze / White Flange
			NN = Natural Metal / Natural Metal Flange
			WW = White / White Flange

*Deco Glass Option

NTG-6B/120	Tempered Blue Glass with 4-3/8" Open Center
NTG-6B/80	Tempered Blue Glass with 3-1/8" Open Center
NTG-6CF	Tempered Clear Glass with Frosted Center
NTG-6FC	Tempered Frosted Glass with Clear Center
NTG-6HF	Tempered Clear Glass with Frosted Center and 3-1/8'' Open Center

Available Trim Finishes

	BW	BZ	CO	DW	HZW	NN	WW
611	•	•	•	•	•	•	•
612	•	•	•			•	•
618	•	•	•	•	•	•	•

Example: **NRM-611L1230WW** = 6" Marquise I Round Open Reflector, 1250lm / 16W LED, 3000K, White Reflector / White Flange

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Type

Project

Catalog No.

Lamp/Wattage

NRM-614 / NRM-617 / NRM-619

6" Marquise I Adjustable Reflectors

Source: 11W to 26W LED
850lm to 2000lm

PRODUCT DESCRIPTION

Nora Lighting's 6" recessed downlight fixture solution with thermal management system combined in a single compact unit. CREE True White LED ceramic package and Unitized Thermal Management (UTM) system. Outboard mounted driver allows for cooler operation and extends life.

FEATURES

- 5-year Limited Warranty
- Cree TrueWhite® or Comfort Dim Technology
- 850lm, 1250lm or 2000lm LED packages
- 2700K, 3000K, 3500K and 4000K @ 90+CRI
- Certified to the Energy Commission as meeting high efficacy light source requirements

CONSTRUCTION

Trim: Aluminum spun reflector with deep set diffused lens for excellent visual comfort while providing high lumen output.

Mounting: Trim includes torsion springs to mount trim securely to housing.

ELECTRICAL

Delivered Lumens / Wattage:
L85 = 870lm / 11W; **L12** = 1246lm / 16W;
L20 = 1951lm / 26W
Color Temperature: 2700K, 3000K, 3500K, 4000K
CRI: 90+CRI
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Comfort Dim color tunes the temperature from a bright 2700K, to a romantic and comfortable 1800K on a gradual, even curve.
Comfort Dim is available in 2 different lumen levels:

- 850 and 1250 Lumens for lower ceiling heights in commercial and residential applications.
- 2000 Lumens for light commercial and residential high ceiling applications.

Dimming: Specified by housing

COMPATIBLE HOUSINGS

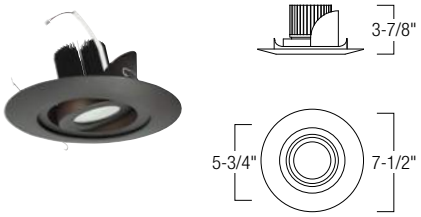
Reflectors are compatible with respective Marquise I series housings manufactured by Nora Lighting.

CATALOG NO.	DESCRIPTION
NHM-612	6" Non-IC New Construction (1250lm)
NHM-620	6" Non-IC New Construction (2000lm)
NHRM-612	6" Non-IC Remodel (1250lm)
NHRM-620	6" Non-IC Remodel (2000lm)
NHMIC-685	6" IC New Construction (850lm)
NHRMIC-685	6" IC Remodel (850lm)
NHMICD-612	6" IC Double Wall (1250lm)
NFBIC-6L	6" IC Dedicated Fire Box (850 or 1250lm)

LABELS AND LISTINGS

- cULus Listed for Damp Location when used with compatible housing
- ENERGY STAR® certified
- Can be used to comply with 2016 Title 24 - part 6 High Efficacy LED light source requirements
- 5-Year Limited Warranty
- WSEC ASTM E283 for Air-Tight

PRODUCT IMAGES AND DIMENSIONS



NRM-614 Surface Adjustable Reflector
B, BZ, C, CO, NN, WW

NRM-617 Regressed Baffle Adjustable
BW, BZ, CO, NN, WW

NRM-619 Regressed Reflector Adjustable
BW, BZ, CO, HZW, NN, WW

6" Adjustable Marquise I Reflectors - Dedicated Housing Required

Reflector Type	Lumens / Wattage	Color Temp.	Finish (see chart below)
NRM-614 = Surface Adjustable	**L85** = 850lm / 11W	**27** = 2700K	**B** = Black
NRM-617 = Regress Baffle Adj.	**L12** = 1250lm / 16W	**30** = 3000K	**BW** = Black / White Flange
NRM-619 = Regress Reflector Adj.	**L20** = 2000lm / 26W	**35** = 3500K	**BZ** = Bronze / Bronze Flange
		40 = 4000K	**C** = Chrome
		CD = Comfort Dim	**CO** = Copper / Copper Flange
			HZW = Haze / White Flange
			NN = Natural Metal / Natural Metal Flange
			WW = White / White Flange

Available Trim Finishes

	B	BW	BZ	C	CO	HZW	NN	WW
614	•		•	•	•		•	•
617		•	•		•		•	•
619		•	•		•	•	•	•

Example: **NRM-614L1230BZ** = 6" Marquise I Surface Adjustable, 1250lm / 16W LED, 3000K, Bronze Finish

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Type

Project

Catalog No.

Lamp/Wattage

NHMICD-612 / NHMICD-620

6" Marquise I IC Air-Tight Double Wall New Construction Housing

Source: 16W to 26W LED
1250lm to 2000lm

PRODUCT DESCRIPTION

Dedicated new construction housing for use in insulated ceilings can be in direct contact with thermal insulation. Air-tight construction provides energy savings by reducing the flow of air through the ceiling.

CONSTRUCTION

Plaster Frame: 0.040 steel frame with integral bar hanger brackets. Brackets can accommodate longer 27" accessory flat bar hangers. Brackets run along all sides of frame to allow bar hangers to be run parallel or perpendicular to junction box.

Housing: 0.040 aluminum housing with riveted cap adjusts from 3/8" to 7/8". Spring brackets accept torsion wing trim springs; slots on socket plate surface accept standard coil springs.

Air Flow Restriction: Housing has factory installed gaskets to restrict airflow from room into ceiling plenum to <2CFM (cubic feet per minute) in accordance with ASTM-283 Air-Tight requirements.

Clearance: "IC" Insulated ceiling housings are direct contact rated; no minimum clearance is required.

Bar Hangers: Two 13-3/4" to 24-1/2" adjustable bar hangers with captive nails are included on frame. Bar hangers are parallel to junction box, but can be repositioned 90° perpendicular to junction box if desired. "L" Shaped bar hanger foot to align to bottom of construction joist. A T-Bar notch allow for easy installation in a suspended ceiling.

Junction Box: Prewired 25 cubic inch 0.064" thick galvanized steel, with five 1/2", two 3/4" knockouts, four Romex® pryouts, and snap on covers. All leads are #18AWG wire, the ground wire is connected to the bottom, and quick connectors are supplied on all leads. Through branch circuit wiring, (4-in, 4-out).

ELECTRICAL

Input Voltage: 120V or 277V
Delivered Lumens / Wattage:
NHMIC-612 = 1246lm / 16W;
NHMIC-620 = 1951lm / 26W
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Available in 1250lm & 2000lm
Dimming: Triac, ELV or 0-10V dimming
Click Here or check complete dimmer list at www.NoraLighting.com in the "Compatibility" page under "Resources" tab

Emergency LED Driver (BSL17C-C2)

- Requires access from above the ceiling
- Up to 7.5W emergency illumination with LEDs.
- Illumination Time: 90min
- Voltage: 120/277 VAC, 60Hz
- Output Voltage: 15.0-50.0 VDC

COMPATIBLE REFLECTORS

CATALOG NO.	DESCRIPTION
NRM-611	6" Round Open Reflector
NRM-612	6" Round Baffle
NRM-618	6" Round Deco Glass
NRM-614	6" Round Surface Adjustable
NRM-617	6" Round Regress Baffle Adjustable
NRM-619	6" Round Regress Reflector Adjustable

LABELS AND LISTINGS

- cULus Listed for Damp Location w/ Feed Through
- cULus Wet Listed (Only with designated trims)
- Meets or exceeds ASTM-283 Air-Tight Requirements

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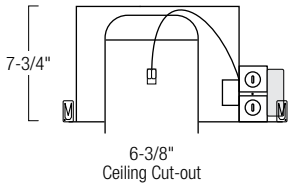
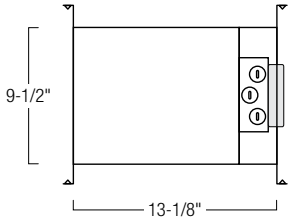
PRODUCT IMAGES AND DIMENSIONS





6" Marquise I IC Air-Tight Double Wall New Construction Housing - Compatible with Marquise I Reflectors

Installation Type / Lumens / Wattage	LED Module	Driver	Emergency
NHMICD-612 = IC / 1250lm / 16W	**(blank)** = Cree TrueWhite®	**LE1** = 120V Input; Triac/ELV/0-10V dimming[1]	**EM** - Emergency Pack w/ Remote Test Switch
NHMICD-620 = IC / 2000lm / 26W	**C** = Comfort Dim	**LE2** = 277V Input; 0-10V dimming[1]	
		LE4 = 120V Input; Triac/ELV/0-10V dimming[1]	

[1] LE1 - 120V Triac/ELV dimming for 1250lm; 0-10V dimming for 2000lm (Note: when used with 1250lm Comfort Dim, only use ELV dimmers)
LE2 - 277V 0-10V dimming
LE4 - 120V Triac/ELV dimming for 2000lm; 0-10V dimming for 1250lm

Example: **NHMICD-620LE1** = 6" Marquise I IC Air-Tight Double Wall New Construction Housing, 2000lm / 26W LED, 120V Input

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Type

Project

Catalog No.

Lamp/Wattage

NHM-612 / NHM-620 / NHMIC-685

6" Marquise I Air-Tight New Construction Housing

Source: 11W to 26W LED
850lm to 2000lm

PRODUCT DESCRIPTION

Dedicated new construction housing for installation in Non-IC or insulated ceilings, must specify. Air-tight construction provides energy savings by reducing the flow of air through the ceiling.

CONSTRUCTION

Plaster Frame: 0.040 steel frame with integral bar hanger brackets. Brackets can accommodate longer 27" accessory flat bar hangers. Brackets run along all sides of frame to allow bar hangers to be run parallel or perpendicular to junction box.

Housing: 0.040 aluminum one-piece can. Adjustable ceiling thickness from 3/8" to 7/8".

Air Flow Restriction: Housing has factory installed gaskets to restrict airflow from room into ceiling plenum to <2CFM (cubic feet per minute) in accordance with ASTM-283 Air-Tight requirements.

Bar Hangers: Two 13-3/4" to 24-1/2" adjustable bar hangers with captive nails are included on frame. Bar hangers are parallel to junction box, but can be repositioned 90º perpendicular to junction box if desired. "L" Shaped bar hanger foot to align to bottom of construction joist. A T-Bar notch allow for easy installation in a suspended ceiling.

Junction Box: Prewired 25 cubic inch 0.064" thick galvanized steel, with seven 1/2" knockouts, four Romex® pryouts, and snap on covers. All leads are #18AWG wire, the ground wire is connected to the bottom, and quick connectors are supplied on all leads. Through branch circuit wiring, (4-in, 4-out).

CLEARANCE

Non-IC: Non-Insulated housings require a minimum clearance of 3" from thermal insulation and 1/2" from adjacent building components.
IC: Insulated ceiling housings are direct contact rated; no minimum clearance is required.

ELECTRICAL

Input Voltage: 120V or 277V
Delivered Lumens / Wattage:
NHMIC-685 = 870lm / 11W;
NHM-612 = 1246lm / 16W;
NHM-620 = 1951lm / 26W
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Available in 850-2000lm
Dimming: Triac, ELV or 0-10V dimming
Click Here or check complete dimmer list at www.NoraLighting.com in the "Compatibility" page under "Resources" tab

Emergency LED Driver (BSL17C-C2)

- Up to 7.5W emergency illumination with LEDs.
- Illumination Time: 90min
- Voltage: 120/277 VAC, 60Hz
- Output Voltage: 15.0-50.0 VDC

COMPATIBLE REFLECTORS

CATALOG NO.	DESCRIPTION
NRM-611	6" Round Open Reflector
NRM-612	6" Round Baffle
NRM-618	6" Round Deco Glass
NRM-614	6" Round Surface Adjustable
NRM-617	6" Round Regress Baffle Adjustable
NRM-619	6" Round Regress Reflector Adjustable

LABELS AND LISTINGS

- cULus Listed for Damp Location w/ Feed Through
- cULus Wet Listed (Only with designated trims)
- Meets or exceeds ASTM-283 Air-Tight Requirements

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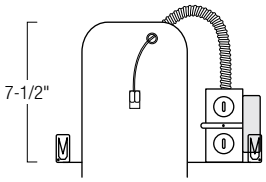
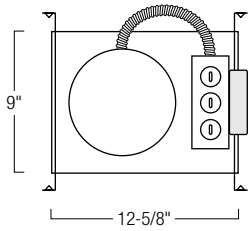
PRODUCT IMAGES AND DIMENSIONS





6" Marquise I Air-Tight New Construction Housing - Compatible with Marquise I Reflectors

Installation Type / Lumens / Wattage	LED Module	Driver / Dimming	Emergency
NHMIC-685 = IC / 850lm / 11W	**(blank)** = Cree TrueWhite®	**LE1** = 120V Input; Triac/ELV/0-10V dimming[1]	**EM** - Emergency Pack w/ Remote Test Switch
NHM-612 = Non-IC / 1250lm / 16W	**C** = Comfort Dim	**LE2** = 277V Input; 0-10V dimming[1]	
NHM-620 = Non-IC / 2000lm / 26W		**LE4** = 120V Input; Triac/ELV/0-10V dimming[1]	

[1] LE1 - 120V Triac/ELV dimming for 850-1250lm; 0-10V dimming for 2000lm (Note: when used with 850lm-1250lm Comfort Dim, only use ELV dimmers)
LE2 - 277V 0-10V dimming
LE4 - 120V Triac/ELV dimming for 2000lm; 0-10V dimming for 850-1250lm

Example: **NHMIC-685LE1** = 6" Marquise I IC Air-Tight New Construction Housing, 850lm / 11W LED, 120V Input

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Type	
Project	
Catalog No.	
Lamp/Wattage	

NHRM-612 / NHRM-620 / NHRMIC-685

6" Marquise I Air-Tight Remodel Housing

Source: 11W to 26W LED
850lm to 2000lm

PRODUCT DESCRIPTION

Dedicated remodel housing for use in Non-IC or insulated ceilings, must specify. Air-tight construction provides energy savings by reducing the flow of air through the ceiling.

CONSTRUCTION

Housing: 0.040 aluminum housing adjusts to a maximum ceiling thickness of 5/8" (16mm). Housing terminates at a 1/4" ceiling flange for even positioning of housing angle within the ceiling. Structural arm consists of 0.050 steel and connects to housing with j-box and ballast. Integral springs brackets provided.

Air Flow Restriction: Housing has factory installed gaskets to restrict airflow from room into ceiling plenum to <2CFM (cubic feet per minute) in accordance with ASTM-283 Air-Tight requirements.

Mounting: Four high tension tempered steel springs secure remodel housing to 5/8" thick (max) ceiling (Hole cutout template provided for convenience).

Junction Box: Prewired 25 cubic inch 0.064" thick galvanized steel, with five 1/2", two 3/4" knockouts, four Romex® pryouts, and snap on covers. All leads are #18AWG wire, the ground wire is connected to the bottom, and quick connectors are supplied on all leads. Through branch circuit wiring, (4-in, 4-out).

CLEARANCE

Non-IC: Non-Insulated housings require a minimum clearance of 3" from thermal insulation and 1/2" from adjacent building components.
IC: Insulated ceiling housings are direct contact rated; no minimum clearance is required.

ELECTRICAL

Input Voltage: 120V or 277V
Delivered Lumens / Wattage:
NHRMIC-685 = 870lm / 11W;
NHRM-612 = 1246lm / 16W;
NHRM-620 = 1951lm / 26W
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Available in 850-2000lm
Dimming: Triac, ELV or 0-10V dimming
Click Here or check complete dimmer list at www.NoraLighting.com in the "Compatibility" page under "Resources" tab

Emergency LED Driver (BSL17C-C2)

- Up to 7.5W emergency illumination with LEDs.
- Illumination Time: 90min
- Voltage: 120/277 VAC, 60Hz
- Output Voltage: 15.0-50.0 VDC

COMPATIBLE REFLECTORS

CATALOG NO.	DESCRIPTION
NRM-611	6" Round Open Reflector
NRM-612	6" Round Baffle
NRM-618	6" Round Deco Glass
NRM-614	6" Round Surface Adjustable
NRM-617	6" Round Regress Baffle Adjustable
NRM-619	6" Round Regress Reflector Adjustable

LABELS AND LISTINGS

- cULus Listed for Damp Location w/ Feed Through
- cULus Wet Listed (Only with designated trims)
- Meets or exceeds ASTM-283 Air-Tight Requirements

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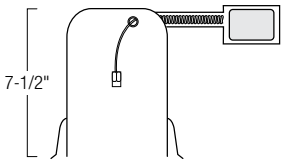
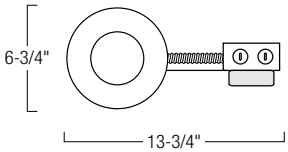
PRODUCT IMAGES AND DIMENSIONS



6-3/8"
Ceiling Cut-out



6" Marquise I Air-Tight Remodel Housing - Compatible with Marquise I Reflectors

Installation Type / Lumens / Wattage	LED Module	Driver	Emergency
NHRMIC-685 = IC / 850lm / 11W	**(blank)** = Cree TrueWhite®	**LE1** = 120V Input; Triac/ELV/0-10V dimming[1]	**EM** - Emergency Pack w/ Remote Test Switch
NHRM-612 = Non-IC / 1250lm / 16W	**C** = Comfort Dim	**LE2** = 277V Input; 0-10V dimming[1]	
NHRM-620 = Non-IC / 2000lm / 26W		**LE4** = 120V Input; Triac/ELV/0-10V dimming[1]	

[1] LE1 - 120V Triac/ELV dimming for 850-1250lm; 0-10V dimming for 2000lm (Note: when used with 850lm-1250lm Comfort Dim, only use ELV dimmers)
LE2 - 277V 0-10V dimming
LE4 - 120V Triac/ELV dimming for 2000lm; 0-10V dimming for 850-1250lm

Example: **NHRMIC-685LE1** = 6" Marquise I IC Air-Tight Remodel Housing, 850lm / 11W LED, 120V Input

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Type	
Project	
Catalog No.	
Lamp/Wattage	

NFBIC-6L85AT / NFBIC-6L12AT

6" Marquise I IC Air-Tight Housing - 2 Hour Fire & Sound Dampening Rated

Source: 11W to 16W LED
850lm to 1250lm

PRODUCT DESCRIPTION

Specification grade fire-rated new construction housing. The double wall fixture incorporates a non-combustible fiber insulation to prevent passage of flames, toxic gases, ignitable gasses into ceiling plenums. The cULus listed housing is rated for a minimum of 2 hours protection. The noncombustible fiber fill also acts as sound deadening material eliminating the transfer of sound between floors. Suitable for commerical, multi-family and residential applications.

FEATURES

- Rated for direct contact with insulation
- cULus classified 2 Hour Fire Rating
- cULus Wet Listed (Only with designated trims)
- cULus listed for damp location and through branch circuit wiring
- Quick connect provided
- 24-1/2" Bar hangers with captive nails and alignment foot
- Accommodates 1-3/4" maximum ceiling thickness

CONSTRUCTION

Plaster Frame: High quality 0.03" steel die cut one piece frame.

Housing: Die formed 20 guage galvanized steel construction. Housing interior is comprised of a flexible non-combustible insulation.

Air Flow Restriction: Housing has factory installed gaskets to restrict airflow from room into ceiling plenum to <2CFM (cubic feet per minute) in accordance with ASTM-283 Air-Tight requirements.

Bar Hangers: Two 13-3/4" to 24-1/2" adjustable bar hangers with captive nails are included on frame. Bar hangers are parallel to junction box, but can be repositioned 90° perpendicular to junction box if desired. "L" Shaped bar hanger foot to align to bottom of construction joist. A T-Bar notch allow for easy installation in a suspended ceiling.

Junction Box: Prewired 0.03" thick galvanized steel, with seven 1/2" knockouts, four Romex® pryouts, and snap on covers. All leads are #18AWG wire, the ground wire is connected to the bottom, and quick connectors are supplied on all leads. Through branch circuit wiring, (4-in, 4-out).

Quick Connect Feature: Housing contains three UL approved quick connections that allow insertion of 1/4" stripped solid or tinned standard conductors to be inserted into the connector. Connectors are pre-attached to fixture power, common, and ground circuits.

Thermal Protector: Standard UL thermal protector rated for 90ºC is affixed to inner top surface of housing.

Installation: Number of luminaries not to exceed the ratio, one per 25sq ft of the total ceiling area, with minimum separation of 3ft between luminairies.

Comfort Dim: Nora Lighting introduces Comfort Dim™, a warm new lumen range that creates a candlelight ambiance in dining rooms, restaurants, cineplexes, home theatres, multipurpose venues and other facilities. Comfort Dim color tunes the temperature from a bright 2700K to a soft and comfortable 1800K on a gradual even curve.

ELECTRICAL

Input Voltage: 120V or 277V
Delivered Lumens / Wattage:
L85 = 870lm / 11W; **L12** = 1246lm / 16W
Operating Temp.: 0˚C to 75˚C ambient temperature
Comfort Dim: Available in 850lm-1250lm
Dimming: Triac, ELV or 0-10V dimming
Click Here or check complete dimmer list at www.NoraLighting.com in the "Compatibility" page under "Resources" tab

COMPATIBLE REFLECTORS

CATALOG NO.	DESCRIPTION
NRM-611	6" Round Open Reflector
NRM-612	6" Round Baffle
NRM-618	6" Round Deco Glass
NRM-614	6" Round Surface Adjustable
NRM-617	6" Round Regress Baffle Adjustable
NRM-619	6" Round Regress Reflector Adjustable

LABELS AND LISTINGS

- UL Classified. Two Hour Fire Rating
- cULus Listed for Damp Location w/ Feed Through
- cULus Wet Listed (Only with designated trims)
- Meets or exceeds ASTM-283 Air-Tight Requirements
- ANSI/UL 263
- ANSI/UL 1598

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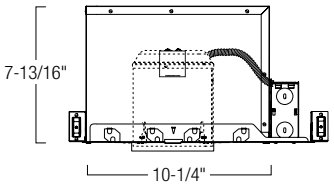
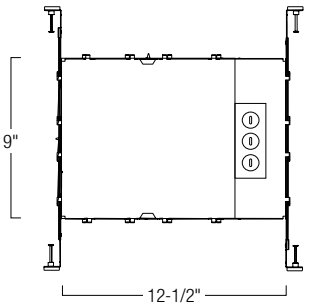
PRODUCT IMAGES AND DIMENSIONS





6" Marquise I LED Firebox - Compatible with Marquise I Reflectors

Installation Type / Lumens / Wattage	LED Module	Driver
NFBIC-6L85AT = IC / 850lm / 11W	**(blank)** = Cree TrueWhite®	**1** = 120V Input; Triac/ELV dimming[1]
NFBIC-6L12AT = IC / 1250lm / 16W	**C** = Comfort Dim	**2** = 277V Input; 0-10V dimming
		4 = 120V Input; 0-10V dimming

[1] When used with Comfort Dim, only use ELV dimmers

Example: **NFBIC-6L12AT1** = 6" Marquise I LED Firebox Housing, 1250lm / 16W LED, 120V Input

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Type	
Project	
Catalog No.	
Lamp/Wattage	

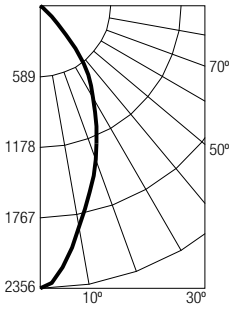
PHOTOMETRICS

6" Marquise I Series

Test Information

Test Number: 727354
Part Number: NRM-611L2040DW
Lumens: 1798lm
Wattage: 25W
Efficacy: 72lpw
CCT / CRI: 4000K / 90 CRI
Spacing Criteria (0º-180): 0.7
Spacing Criteria (90º-270): 0.7

Polar Curve



Illuminance at a Distance

Distance from Luminaire	FC at Nadir	Beam Diameter
4'	147fc	3'-6"
6'	65.4fc	5'-4"
8'	36.8fc	7'
10'	23.6fc	8'-10"
12'	16.4fc	10'-6"

Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	1159	64.5
0-40	1589	88.4
0-60	1798	100
0-90	1798	100
90-180	0	0
0-180	1798	100

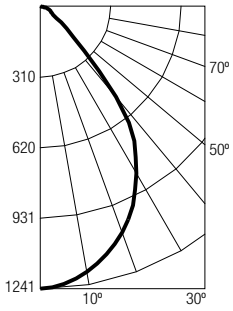
Candela Table

Vertical Angles	Candela
0	2356
5	2190
15	1607
25	1110
35	701
45	210

Test Information

Test Number: 727389
Part Number: NRM-612L2040WW
Lumens: 1721lm
Wattage: 25W
Efficacy: 69lpw
CCT / CRI: 4000K / 90 CRI
Spacing Criteria (0º-180): 1.06
Spacing Criteria (90º-270): 1.06

Polar Curve



Illuminance at a Distance

Distance from Luminaire	FC at Nadir	Beam Diameter
4'	77.5fc	6'-2"
6'	34.5fc	9'-5"
8'	19.4fc	12'-6"
10'	12.4fc	15'-7"
12'	8.6fc	18'-8"

Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	874	50.8
0-40	1316	76.5
0-60	1629	94.7
0-90	1721	100
90-180	0	0
0-180	1721	100

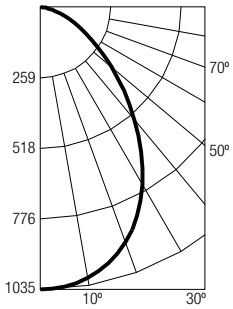
Candela Table

Vertical Angles	Candela
0	1241
5	1224
15	1126
25	964
35	723
45	277

Test Information

Test Number: 727401
Part Number: NRM-614L2040WW
Lumens: 1951lm
Wattage: 25W
Efficacy: 78lpw
CCT / CRI: 4000K / 90 CRI
Spacing Criteria (0º-180): 1.12
Spacing Criteria (90º-270): 1.12

Polar Curve



Illuminance at a Distance

Distance from Luminaire	FC at Nadir	Beam Diameter
4'	64.7fc	7'
6'	28.8fc	10'-6"
8'	16.2fc	13'-11"
10'	10.4fc	17'-5"
12'	7.2fc	20'-11"

Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	757	38.8
0-40	1161	59.5
0-60	1732	88.8
0-90	1951	100
90-180	0	0
0-180	1951	100

Candela Table

Vertical Angles	Candela
0	1035
5	1028
15	972
25	843
35	648
45	435

6505 Gayhart St., Commerce, CA 90040 | Phone: 800.686.6672 | www.noralighting.com | e-mail: nora@noralighting.com

McGraw-Edison

DESCRIPTION

The Galleon™ LED luminaire delivers exceptional performance in a highly scalable, low-profile design. Patented, high-efficiency AccuLED Optics™ system provides uniform and energy conscious illumination to walkways, parking lots, roadways, building areas and security lighting applications. IP66 rated and UL/cUL Listed for wet locations.

Catalog #		Type
Project		SA SA SB SC SC
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
Extruded aluminum driver enclosure thermally isolated from Light Squares for optimal thermal performance. Heavy-wall, die-cast aluminum end caps enclose housing and die-cast aluminum heat sinks. A unique, patent pending interlocking housing and heat sink provides scalability with superior structural rigidity. 3G vibration tested. Optional tool-less hardware available for ease of entry into electrical chamber. Housing is IP66 rated.

Optics
Patented, high-efficiency injection-molded AccuLED Optics technology. Optics are precisely designed to shape the distribution maximizing efficiency and application spacing. AccuLED Optics create consistent distributions with the scalability to meet customized application requirements. Offered standard in 4000K (+/- 275K) CCT 70 CRI. Optional 6000K CCT and 3000K CCT.

Electrical
LED drivers are mounted to removable tray assembly for ease of maintenance. 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Standard with 0-10V dimming. Shipped standard with Eaton proprietary circuit module designed to withstand 10kV of transient line surge. The Galleon LED luminaire is suitable for operation in -40°C to 40°C ambient environments. For applications with ambient temperatures exceeding 40°C, specify the HA (High Ambient) option. Light Squares are IP66 rated. Greater than 90% lumen maintenance expected at 60,000 hours. Available in standard 1A drive current and optional 530mA and 700mA drive currents.

Mounting
STANDARD ARM MOUNT: Extruded aluminum arm includes internal bolt guides allowing for easy positioning of fixture during assembly. When mounting two or more luminaires at 90° and 120° apart, the EA extended arm may be required. Refer to the arm mounting requirement table. Round pole adapter included. For wall mounting, specify wall mount bracket option. 3G vibration rated. QUICK MOUNT ARM: Arm is bolted directly to the pole and the fixture slides onto the quick mount arm and is secured via a single fastener, facilitating quick and easy installation. The versatile, patent pending, quick mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the quick mount arm enables wiring of the fixture without having to access the driver compartment. A knock-out enables round pole mounting.

Finish
Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Heat sink is powder coated black. Standard colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available.

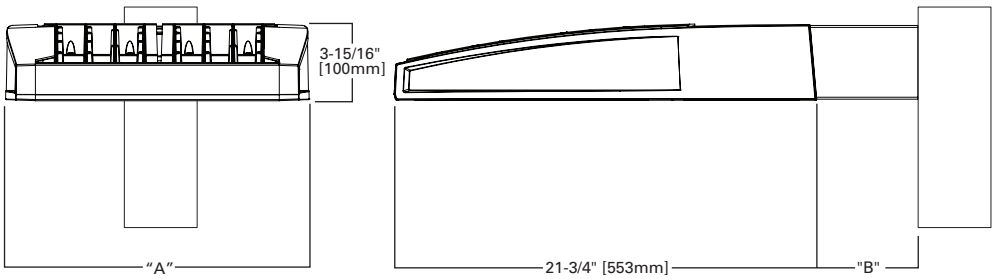
Warranty
Five-year warranty.

GLEON
GALLEON LED

1-10 Light Squares
Solid State LED

AREA/SITE LUMINAIRE

DIMENSIONS



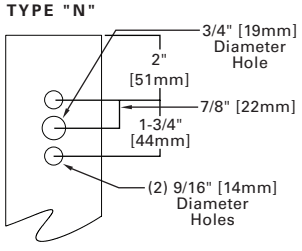
DIMENSION DATA

Number of Light Squares	"A" Width	"B" Standard Arm Length	"B" Optional Arm Length [1]	Weight with Arm (lbs.)	EPA with Arm [2] (Sq. Ft.)
1-4	15-1/2" (394mm)	7" (178mm)	10" (254mm)	33 (15.0 kgs.)	0.96
5-6	21-5/8" (549mm)	7" (178mm)	10" (254mm)	44 (20.0 kgs.)	1.00
7-8	27-5/8" (702mm)	7" (178mm)	13" (330mm)	54 (24.5 kgs.)	1.07
9-10	33-3/4" (857mm)	7" (178mm)	16" (406mm)	63 (28.6 kgs.)	1.12

NOTES: 1. Optional arm length to be used when mounting two fixtures at 90° on a single pole. **2.** EPA calculated with optional arm length.

DRILLING PATTERN

TYPE "N"



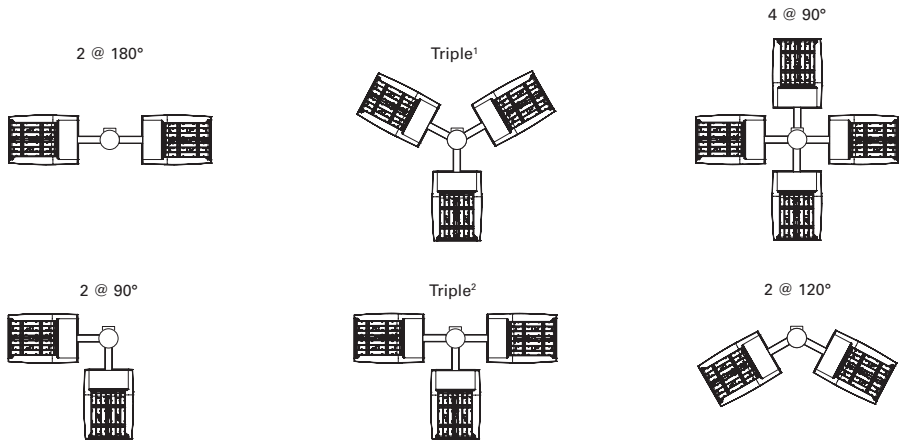
CERTIFICATION DATA
UL/cUL Wet Location Listed
ISO 9001
LM79 / LM80 Compliant
3G Vibration Rated
IP66 Rated
DesignLights Consortium™ Qualified*

ENERGY DATA
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120V-277V 50/60Hz
347V & 480V 60Hz
-40°C Min. Temperature
40°C Max. Temperature
50°C Max. Temperature (HA Option)

*www.designlights.org

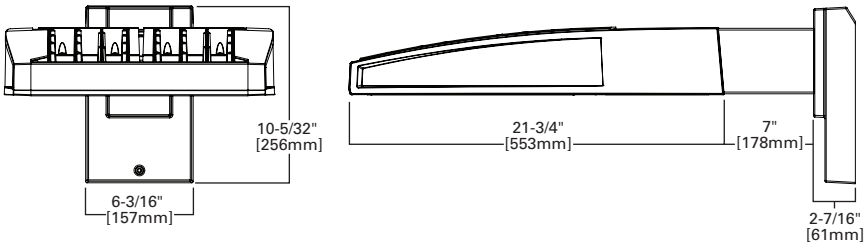
ARM MOUNTING REQUIREMENTS

Configuration	90° Apart	120° Apart
GLEON-AE-01	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-02	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-03	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-04	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-05	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AE-06	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AE-07	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AE-08	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AE-09	16" Extended Arm (Required)	16" Extended Arm (Required)
GLEON-AE-10	16" Extended Arm (Required)	16" Extended Arm (Required)

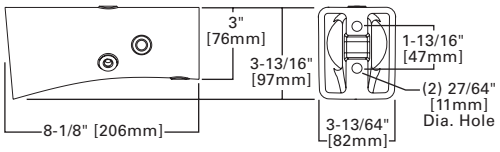


NOTES: 1 Round poles are 3 @ 120°. Square poles are 3 @ 90°. **2** Round poles are 3 @ 90°.

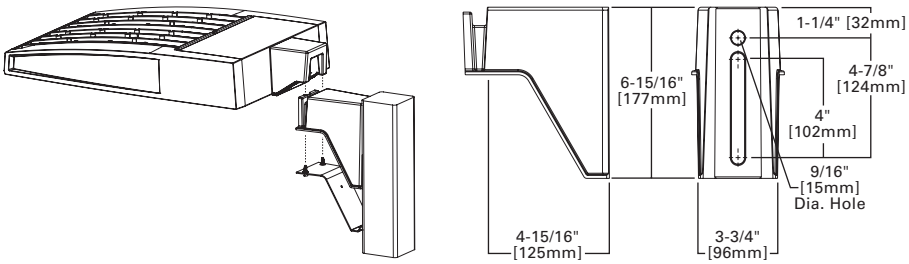
STANDARD WALL MOUNT



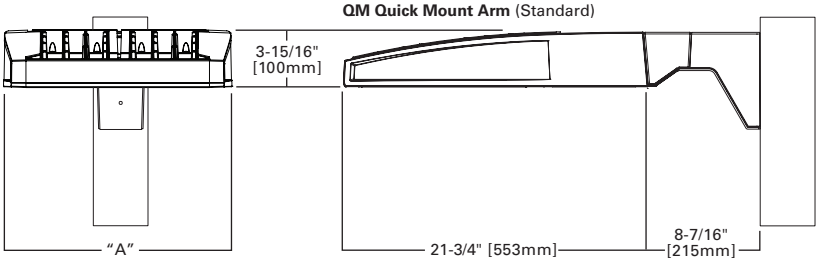
MAST ARM MOUNT



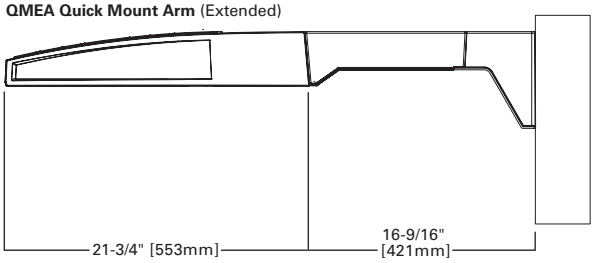
QUICK MOUNT ARM (INCLUDES FIXTURE ADAPTER)



QM Quick Mount Arm (Standard)



QMEA Quick Mount Arm (Extended)

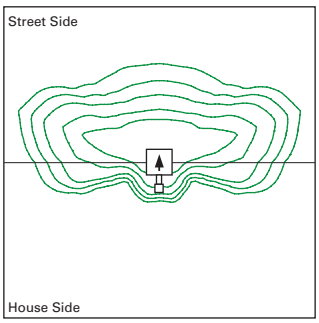


QUICK MOUNT ARM DATA

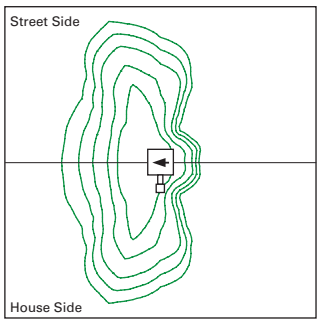
Number of Light Squares [1,2]	"A" Width	Weight with QM Arm (lbs.)	Weight with QMEA Arm (lbs.)	EPA (Sq. Ft.)
1-4	15-1/2" (394mm)	35 (15.91 kgs.)	38 (17.27 kgs.)	1.11
5-6 [3]	21-5/8" (549mm)	46 (20.91 kgs.)	49 (22.27 kgs.)	
7-8	27-5/8" (702mm)	56 (25.45 kgs.)	59 (26.82 kgs.)	

NOTES: 1 QM option available with 1-8 light square configurations. **2** QMEA option available with 1-6 light square configurations. **3** QMEA arm to be used when mounting two fixtures at 90° on a single pole.

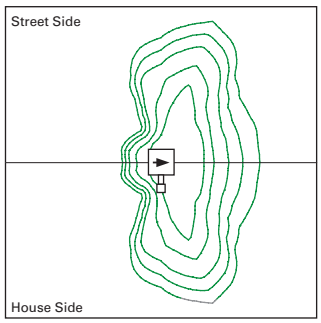
OPTIC ORIENTATION



Standard



Optics Rotated Left @ 90° [L90]

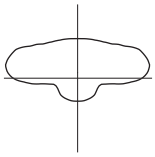


Optics Rotated Right @ 90° [R90]

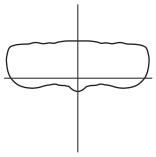
OPTICAL DISTRIBUTIONS

Asymmetric Area Distributions

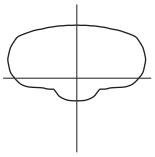
T2
(Type II)



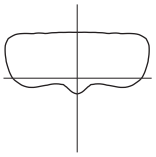
SL2
(Type II with Spill Control)



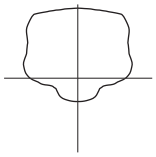
T3
(Type III)



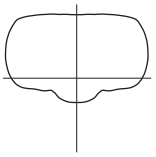
SL3
(Type III with Spill Control)



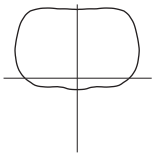
T4FT
(Type IV Forward Throw)



T4W
(Type IV Wide)

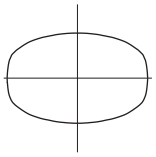


SL4
(Type IV with Spill Control)

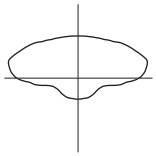


Asymmetric Roadway Distributions

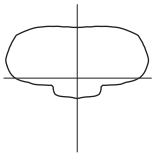
RW
(Rectangular Wide Type I)



T2R
(Type II Roadway)

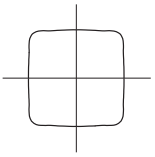


T3R
(Type III Roadway)

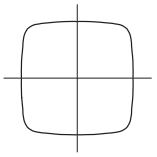


Symmertric Distributions

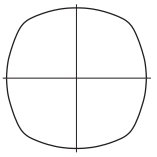
5NQ
(Type V Square Narrow)



5MQ
(Type V Square Medium)

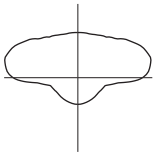


5WQ
(Type V Square Wide)

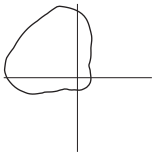


Specialized Distributions

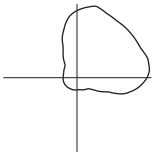
AFL
(Automotive Frontline)



SLL
(90° Spill Light Eliminator Left)



SLR
(90° Spill Light Eliminator Right)



NOMINAL POWER AND LUMENS (1A)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Drive Current		1A	1A	1A	1A	1A	1A	1A	1A	1A	1A
Nominal Power (Watts)		56	107	157	213	264	315	370	421	475	528
Input Current @ 120V (A)		0.47	0.90	1.31	1.79	2.21	2.64	3.09	3.51	3.96	4.41
Input Current @ 208V (A)		0.28	0.51	0.74	1.02	1.25	1.48	1.76	1.99	2.22	2.50
Input Current @ 240V (A)		0.25	0.45	0.65	0.90	1.10	1.30	1.55	1.75	1.95	2.20
Input Current @ 277V (A)		0.23	0.41	0.59	0.82	1.00	1.18	1.41	1.59	1.77	2.00
Optics											
T2	Lumens	5,272	10,303	15,373	20,313	25,168	30,118	35,618	40,357	45,018	49,842
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5
T2R	Lumens	5,597	10,938	16,321	21,565	26,719	31,974	37,813	42,844	47,792	52,914
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B4-U0-G4	B4-U0-G5
T3	Lumens	5,374	10,501	15,669	20,704	25,652	30,697	36,303	41,134	45,884	50,802
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
T3R	Lumens	5,493	10,735	16,017	21,164	26,222	31,379	37,110	42,048	46,904	51,930
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4FT	Lumens	5,405	10,562	15,760	20,824	25,801	30,875	36,514	41,372	46,150	51,096
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	Lumens	5,335	10,426	15,556	20,555	25,468	30,476	36,042	40,838	45,554	50,436
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL2	Lumens	5,263	10,285	15,347	20,278	25,124	30,066	35,556	40,288	44,940	49,756
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
SL3	Lumens	5,373	10,500	15,667	20,701	25,649	30,693	36,298	41,128	45,878	50,794
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL4	Lumens	5,105	9,976	14,886	19,669	24,370	29,163	34,488	39,078	43,591	48,262
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	Lumens	5,542	10,830	16,160	21,352	26,455	31,658	37,439	42,421	47,320	52,392
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4
5MQ	Lumens	5,644	11,029	16,457	21,745	26,942	32,241	38,128	43,202	48,191	53,356
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5
5WQ	Lumens	5,659	11,059	16,501	21,803	27,014	32,327	38,230	43,317	48,320	53,498
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5
SLL/SLR	Lumens	4,722	9,227	13,767	18,191	22,539	26,971	31,897	36,141	40,315	44,635
	BUG Rating	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
RW	Lumens	5,492	10,732	16,014	21,159	26,216	31,372	37,101	42,038	46,893	51,918
	BUG Rating	B2-U0-G1	B3-U0-G1	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
AFL	Lumens	5,512	10,771	16,072	21,236	26,311	31,486	37,236	42,191	47,063	52,107
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

NOMINAL POWER AND LUMENS (700MA)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Drive Current		700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA
Nominal Power (Watts)		38	72	105	138	176	210	243	276	314	348
Input Current @ 120V (A)		0.32	0.59	0.86	1.14	1.45	1.72	2	2.28	2.58	2.86
Input Current @ 208V (A)		0.21	0.36	0.51	0.67	0.87	1.02	1.18	1.34	1.53	1.69
Input Current @ 240V (A)		0.19	0.32	0.45	0.59	0.77	0.90	1.04	1.18	1.35	1.49
Input Current @ 277V (A)		0.20	0.29	0.40	0.51	0.69	0.80	0.91	1.02	1.20	1.31
Optics											
T2	Lumens	3,854	7,531	11,237	14,847	18,395	22,013	26,033	29,497	32,904	36,430
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
T2R	Lumens	4,091	7,995	11,929	15,762	19,529	23,370	27,638	31,316	34,932	38,676
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
T3	Lumens	3,928	7,676	11,453	15,133	18,750	22,437	26,534	30,065	33,537	37,132
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
T3R	Lumens	4,015	7,846	11,707	15,469	19,166	22,936	27,124	30,733	34,283	37,957
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
T4FT	Lumens	3,951	7,720	11,519	15,221	18,858	22,567	26,688	30,240	33,732	37,347
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	Lumens	3,900	7,620	11,370	15,024	18,615	22,276	26,343	29,849	33,296	36,864
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL2	Lumens	3,847	7,518	11,217	14,821	18,364	21,975	25,988	29,447	32,847	36,368
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
SL3	Lumens	3,927	7,675	11,451	15,131	18,747	22,434	26,531	30,061	33,533	37,126
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
SL4	Lumens	3,731	7,292	10,880	14,376	17,812	21,315	25,208	28,562	31,861	35,275
	BUG Rating	B1-U0-G2	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G4	B2-U0-G5	B2-U0-G5	B3-U0-G5
5NQ	Lumens	4,051	7,916	11,811	15,606	19,336	23,139	27,365	31,006	34,587	38,294
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3
5MQ	Lumens	4,125	8,062	12,029	15,894	19,692	23,565	27,869	31,577	35,224	38,999
	BUG Rating	B2-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
5WQ	Lumens	4,136	8,083	12,061	15,936	19,745	23,628	27,943	31,661	35,318	39,103
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4
SLL/SLR	Lumens	3,451	6,744	10,063	13,296	16,474	19,714	23,314	26,416	29,467	32,625
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
RW	Lumens	4,014	7,844	11,704	15,465	19,162	22,930	27,118	30,726	34,274	37,948
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3
AFL	Lumens	4,029	7,873	11,747	15,522	19,231	23,014	27,216	30,838	34,399	38,086
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

NOMINAL POWER AND LUMENS (530MA)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Drive Current		530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA
Nominal Power (Watts)		30	54	80	105	130	159	184	209	234	259
Input Current @ 120V (A)		0.25	0.45	0.66	0.86	1.07	1.32	1.52	1.72	1.93	2.14
Input Current @ 208V (A)		0.17	0.28	0.39	0.51	0.63	0.78	0.9	1.02	1.14	1.26
Input Current @ 240V (A)		0.17	0.25	0.35	0.45	0.55	0.70	0.80	0.90	1.00	1.10
Input Current @ 277V (A)		0.19	0.24	0.32	0.40	0.49	0.64	0.72	0.80	0.89	0.98
Optics											
T2	Lumens	3,079	6,017	8,978	11,862	14,697	17,588	20,800	23,567	26,289	29,106
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4
T2R	Lumens	3,269	6,388	9,531	12,593	15,603	18,672	22,082	25,020	27,909	30,900
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4
T3	Lumens	3,138	6,133	9,150	12,091	14,980	17,926	21,200	24,021	26,795	29,667
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
T3R	Lumens	3,208	6,269	9,354	12,359	15,313	18,325	21,671	24,555	27,390	30,326
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
T4FT	Lumens	3,156	6,168	9,203	12,161	15,067	18,030	21,323	24,160	26,950	29,839
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
T4W	Lumens	3,116	6,088	9,084	12,004	14,872	17,797	21,047	23,848	26,602	29,453
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
SL2	Lumens	3,074	6,006	8,962	11,842	14,672	17,558	20,764	23,527	26,244	29,056
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
SL3	Lumens	3,138	6,132	9,149	12,089	14,978	17,924	21,197	24,018	26,791	29,662
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
SL4	Lumens	2,981	5,826	8,693	11,486	14,231	17,030	20,140	22,820	25,456	28,184
	BUG Rating	B0-U0-G1	B1-U0-G2	B1-U0-G3	B1-U0-G3	B1-U0-G3	B2-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G4	B2-U0-G5
5NQ	Lumens	3,236	6,324	9,437	12,469	15,449	18,487	21,863	24,773	27,634	30,595
	BUG Rating	B1-U0-G0	B2-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2
5MQ	Lumens	3,296	6,441	9,610	12,698	15,733	18,828	22,266	25,229	28,142	31,158
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G3
5WQ	Lumens	3,305	6,458	9,636	12,732	15,775	18,878	22,325	25,296	28,217	31,241
	BUG Rating	B2-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
SLL/SLR	Lumens	2,757	5,388	8,040	10,623	13,162	15,751	18,627	21,105	23,543	26,066
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4
RW	Lumens	3,207	6,267	9,351	12,356	15,309	18,320	21,666	24,549	27,384	30,319
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3
AFL	Lumens	3,219	6,290	9,385	12,401	15,365	18,387	21,745	24,638	27,484	30,429
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

ORDERING INFORMATION

Sample Number: GLEON-AE-04-LED-E1-T3-GM-700

Product Family [1, 2]	Light Engine	Number of Light Squares [3]	Lamp Type	Voltage	Distribution	Color	Mounting
GLEON=Galleon	**AE**=1A Drive Current	**01**=1 **02**=2 **03**=3 **04**=4 **05**=5 **06**=6 **07**=7 [4] **08**=8 [4] **09**=9 [5] **10**=10 [5]	**LED**=Solid State Light Emitting Diodes	**E1**=(120-277V) **347**=347V [6] **480**=480V [6, 7]	**T2**=Type II **T2R**=Type II Roadway **T3**=Type III **T3R**=Type III Roadway **T4FT**=Type IV Forward Throw **T4W**=Type IV Wide **5NQ**=Type V Narrow **5MQ**=Type V Square Medium **5WQ**=Type V Square Wide **SL2**=Type II w/Spill Control **SL3**=Type III w/Spill Control **SL4**=Type IV w/Spill Control **SLL**=90° Spill Light Eliminator Left **SLR**=90° Spill Light Eliminator Right **RW**=Rectangular Wide Type I **AFL**=Automotive Frontline	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **WH**=White	**[Blank]**=Arm for Round or Square Pole **EA**=Extended Arm [8] **MA**=Mast Arm Adapter [9] **WM**=Wall Mount **QM**=Quick Mount Arm (Standard Length) [10] **QMEA**=Quick Mount Arm (Extended Length) [11]

Options (Add as Suffix)

2L=Two Circuits [12, 13]
7030=70 CRI / 3000K [14]
8030=80 CRI / 3000K [15]
7050=70 CRI / 5000K [15]
7060=70 CRI / 6000K [14]
530=Drive Current Factory Set to 530mA [16]
700=Drive Current Factory Set to 700mA [16]
P=Button Type Photocontrol (120, 208, 240 or 277V)
PER7=NEMA 7-PIN Twistlock Photocontrol Receptacle
R=NEMA Twistlock Photocontrol Receptacle
HA=50°C High Ambient [13, 17]
MS/DIM-L08=Motion Sensor for Dimming Operation, Maximum 8' Mounting Height [18, 19, 20, 21, 22]
MS/DIM-L20=Motion Sensor for Dimming Operation, 9' - 20' Mounting Height [18, 19, 20, 21, 22]
MS/DIM-L40=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height [18, 19, 20, 21]
MS/DIM-L40W=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height (Wide Range) [18, 19, 20, 21, 25]
MS/X-L08=Bi-Level Motion Sensor, Maximum 8' Mounting Height [18, 19, 20, 21, 22, 26]
MS/X-L20=Bi-Level Motion Sensor, 9' - 20' Mounting Height [18, 19, 20, 21, 23, 26]
MS/X-L40=Bi-Level Motion Sensor, 21' - 40' Mounting Height [18, 19, 20, 21, 24, 26]
MS/X-L40W=Bi-Level Motion Sensor, 21' - 40' Mounting Height (Wide Range) [18, 19, 20, 21, 25, 26]
MS-L08=Motion Sensor for ON/OFF Operation, Maximum 8' Mounting Height [18, 19, 20, 21, 22]
MS-L20=Motion Sensor for ON/OFF Operation, 9' - 20' Mounting Height [18, 19, 20, 21, 23]
MS-L40=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height [18, 19, 20, 21, 24]
MS-L40W=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height (Wide Range) [18, 19, 20, 25]
DIMRF-LW=LumaWatt Wireless Sensor, Wide Lens for 8' - 16' Mounting Height [27]
DIMRF-LN=LumaWatt Wireless Sensor, Narrow Lens for 16' - 40' Mounting Height [27]
L90=Optics Rotated 90° Left
R90=Optics Rotated 90° Right
MT=Factory Installed Mesh Top
TH=Tool-less Door Hardware
LCF=Light Square Trim Plate Painted to Match Housing [28]
HSS=Factory Installed House Side Shield [29]
CE=CE Marking [30]

Accessories (Order Separately)

OA/RA1016=NEMA Photocontrol Multi-Tap - 105-285V
OA/RA1027=NEMA Photocontrol - 480V
OA/RA1201=NEMA Photocontrol - 347V
OA/RA1013=Photocontrol Shorting Cap
OA/RA1014=120V Photocontrol
MA1252=10kV Surge Module Replacement
MA1036-XX=Single Tenon Adapter for 2-3/8" O.D. Tenon
MA1037-XX=2 @ 180° Tenon Adapter for 2-3/8" O.D. Tenon
MA1197-XX=3 @ 120° Tenon Adapter for 2-3/8" O.D. Tenon
MA1188-XX=4 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1189-XX=2 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1190-XX=3 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1191-XX=2 @ 120° Tenon Adapter for 2-3/8" O.D. Tenon
MA1038-XX=Single Tenon Adapter for 3-1/2" O.D. Tenon
MA1039-XX=2 @ 180° Tenon Adapter for 3-1/2" O.D. Tenon
MA1192-XX=3 @ 120° Tenon Adapter for 3-1/2" O.D. Tenon
MA1193-XX=4 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon
MA1194-XX=2 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon
MA1195-XX=3 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon
FSIR-100=Wireless Configuration Tool for Occupancy Sensor [31]
GLEON-MT1=Field Installed Mesh Top for 1-4 Light Squares
GLEON-MT2=Field Installed Mesh Top for 5-6 Light Squares
GLEON-MT3=Field Installed Mesh Top for 7-8 Light Squares
GLEON-MT4=Field Installed Mesh Top for 9-10 Light Squares
GLEON-QM=Quick Mount Arm Kit [10]
GLEON-QM-EA=Quick Mount Extended Length Arm Kit [11]
LS/HSS=Field Installed House Side Shield [29, 32]

NOTES:
1. Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional support information.
2. DesignLights Consortium™ Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
3. Standard 4000K CCT and minimum 70 CRI.
4. Not compatible with extended quick mount arm (QMEA).
5. Not compatible with standard quick mount arm (QM) or extended quick mount arm (QMEA).
6. Requires the use of a step down transformer when combined with MS/DIM, MS/X or DIMRF.
7. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
8. May be required when two or more luminaires are oriented on a 90° or 120° drilling pattern. Refer to arm mounting requirement table.
9. Factory installed.
10. Maximum 8 light squares.
11. Maximum 6 light squares.
12. 2L is not available with MS/X or MS/DIM at 347V or 480V. 2L in AE-02 through AE-04 requires a larger housing, normally used for AE-05 or AE-06. Extended arm option may be required when mounting two or more fixtures per pole at 90° or 120°. Refer to arm mounting requirement table.
13. Not available with LumaWatt wireless sensors.
14. Extended lead times apply. Use dedicated IES files for 3000K and 6000K when performing layouts. These files are published on the Galleon luminaire product page on the website.
15. Extended lead times apply. For 8030, factor 7030 IES files x .92 (8% lumen loss). For 7050, use 7060 IES files.
16. 1 Amp standard. Use dedicated IES files for 530mA and 700mA when performing layouts. These files are published on the Galleon luminaire product page on the website.
17. 50°C lumen maintenance data applies to 530mA and 700mA drive currents.
18. Consult factory for more information.
19. Utilizes internal step-down transformer when 347V or 480V is selected.
20. The FSIR-100 accessory is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
21. Not available with HA option.
22. Approximately 22' detection diameter at 8' mounting height.
23. Approximately 40' detection diameter at 20' mounting height.
24. Approximately 60' detection diameter at 40' mounting height.
25. Approximately 100' detection diameter at 40' mounting height.
26. Replace X with number of light squares operating in low output mode.
27. LumaWatt wireless sensors are factory installed only requiring network components RF-EM-1, RF-GW-1 and RF-ROUT-1 in appropriate quantities. See www.eaton.com/lighting for LumaWatt application information.
28. Not available with house side shield (HSS).
29. Only for use with SL2, SL3, SL4 and AFL distributions. The Light Square trim plate is painted black when the HSS option is selected.
30. CE is not available with the DIMRF, MS, MS/X, MS/DIM, P, R or PER7 options. Available in 120-277V only.
31. This tool enables adjustment of parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
32. One required for each Light Square.

McGraw-Edison

DESCRIPTION

The Concise™ LED luminaire features a rugged and low profile housing construction incorporating patent pending, modular LED LightBAR™ technology. Through superior optical control, the Concise luminaire delivers uniform and energy conscious illumination optimized to improve vehicular movement and pedestrian safety. UL/cUL listed for wet locations.

Catalog #		Type
Project		SD
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
One-piece, low copper die-cast aluminum housing features heavy wall construction for superior heat transfer and resistance to corrosion. Formed aluminum faceplate is secured via four stainless steel fasteners and is recessed for clean mating of door and housing. Optional tamper-proof Torx™ -head fasteners offer vandal resistant access to the electrical compartment.

Optics
Choice of nine patented, high-efficiency AccuLED Optics™ distributions. Optics are precisely designed to shape the light output, maximizing efficiency and application spacing. AccuLED Optics technology creates consistent distributions with the scalability to meet customized application requirements. Offered Standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 3000K CCT, 5000K CCT and 5700K CCT.

Electrical
LED drivers mount to die-cast aluminum back housing for optimal heat sinking, operation efficacy, and prolonged life. Standard drivers feature electronic universal voltage (120-277V 50/60Hz), 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Greater than 0.9 power factor, less than 20% harmonic distortion, and is suitable for operation in -40°C to 40°C ambient environments. All fixtures are shipped standard with 10kV/10kA common – and differential – mode surge protection. LightBARs feature an IP66 enclosure rating and maintain greater than 95% lumen maintenance at 60,000 hours per IESNA TM-21. Occupancy sensor and dimming options available.

Mounting
Standard fixture mounts to a square or octagonal 4" surface or recessed j-box via heavy gauge painted quick mount box complete with toolless removable cable allowing for hands-free fixture wiring. Single carton packaging of housing and quick mounting box for contractor friendly arrival of product to site. Optional mounting methods include rigid or free swinging pendant, trunnion mount and wall mount and surface mount configurations.

Finish
Cast components and mounting box finished in a super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Standard colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available.

Warranty
Five-year warranty.

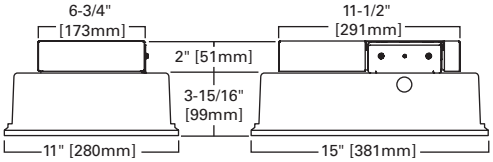
CNC
CONCISE LED

1 - 4 LightBARs
Solid State LED

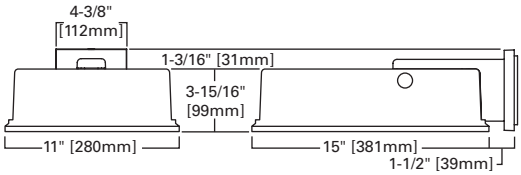
CANOPY LUMINAIRE

MOUNTING METHODS

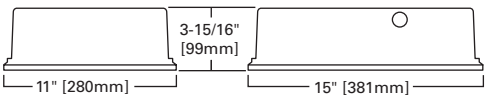
J-Box Mount [Standard]



Wall Mount [WM]



Surface Mount [SM]



CERTIFICATION DATA

UL/cUL Listed
LM79 / LM80 Compliant
IP65 Fixture Rating
IP66 LightBARs
ISO 9001

ENERGY DATA

Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120V-277V/50 & 60Hz, 347V/60Hz, 480V/60Hz
-40°C Minimum Temperature
40°C Ambient Temperature Rating
50°C Ambient Temperature Rating (HA option)

SHIPPING DATA

Approximate Net Weight:
16 lbs. (8 kgs.)

POWER AND LUMENS BY BAR COUNT (21 LED LIGHTBARS)

Number of LightBARs		**E01**	**E02**	**E03**	**E04**
Drive Current		350mA Drive Current			
Power (Watts)		25W	52W	75W	97W
Current @ 120V (A)		0.22	0.44	0.63	0.82
Current @ 277V (A)		0.10	0.20	0.28	0.36
Power (Watts)		31W	58W	82W	99W
Current @ 347V (A)		0.11	0.19	0.28	0.29
Current @ 480V (A)		0.09	0.15	0.20	0.21
CQ	Lumens	3,108	6,215	9,323	12,431
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2
SQ	Lumens	3,066	6,131	9,197	12,262
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2
WQ	Lumens	3,092	6,184	9,276	12,368
	BUG Rating	B2-U0-G1	B3-U0-G2	B3-U0-G3	B4-U0-G3
GL2	Lumens	2,928	5,856	8,784	11,712
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
GL3	Lumens	2,969	5,937	8,906	11,875
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
GL4	Lumens	2,882	5,764	8,646	11,528
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
RW	Lumens	3,004	6,007	9,011	12,015
	BUG Rating	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
CPL/CPR	Lumens	2,693	5,387	8,080	10,774
	BUG Rating	B1-U0-G2	B1-U0-G2	B1-U0-G3	B2-U0-G3

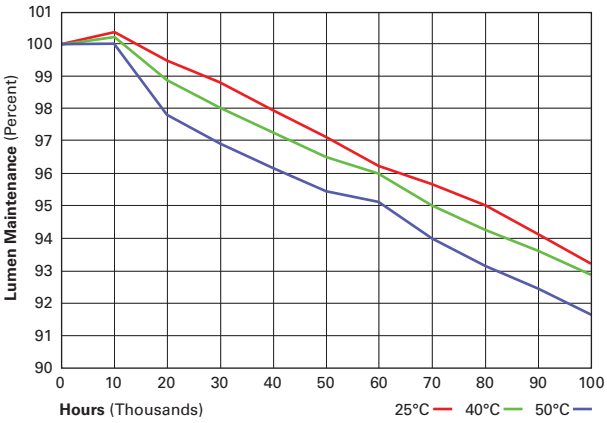
POWER AND LUMENS BY BAR COUNT (7 LED LIGHTBARS)

Number of LightBARs		**F01**	**F02**	**F03**	**F04**
Drive Current		1A Drive Current			
Power (Watts)		26W	55W	78W	102W
Current @ 120V (A)		0.22	0.46	0.66	0.86
Current @ 277V (A)		0.10	0.21	0.29	0.37
Power (Watts)		32W	60W	85W	105W
Current @ 347V (A)		0.11	0.19	0.28	0.30
Current @ 480V (A)		0.09	0.15	0.21	0.22
CQ	Lumens	2,565	5,131	7,696	10,262
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2
SQ	Lumens	2,531	5,061	7,592	10,123
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2
WQ	Lumens	2,553	5,105	7,658	10,210
	BUG Rating	B2-U0-G1	B3-U0-G2	B3-U0-G3	B4-U0-G3
GL2	Lumens	2,417	4,834	7,251	9,668
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2
GL3	Lumens	2,451	4,901	7,352	9,803
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2
GL4	Lumens	2,379	4,758	7,138	9,517
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2
RW	Lumens	2,480	4,959	7,439	9,918
	BUG Rating	B1-U0-G1	B2-U0-G2	B3-U0-G3	B3-U0-G3
CPL/CPR	Lumens	2,224	4,447	6,671	8,894
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G3	B1-U0-G3

LUMEN MAINTENANCE

Ambient Temperature	**25,000 Hours***	**50,000 Hours***	**60,000 Hours***	**100,000 Hours**	**Theoretical L70 (Hours)**
25ºC	> 99%	> 97%	> 96%	> 93%	> 450,000
40ºC	> 98%	> 97%	> 96%	> 92%	> 425,000
50ºC	> 97%	> 96%	> 95%	> 91%	> 400,000

* Per IESNA TM-21 data.

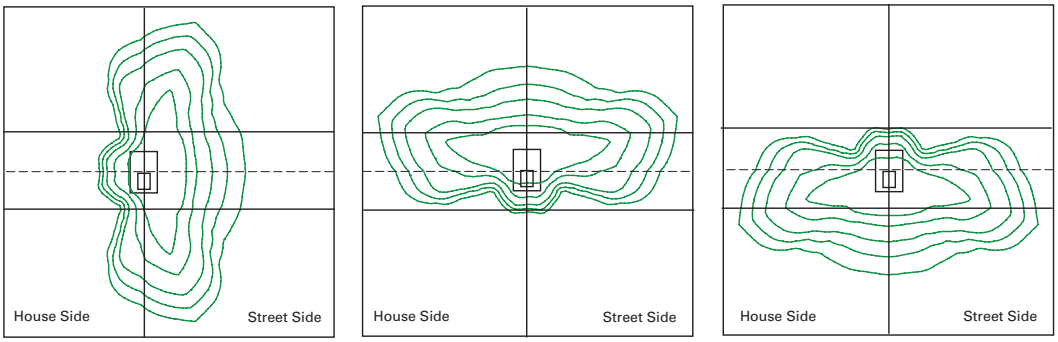


LUMEN MULTIPLIER

Ambient Temperature	**Lumen Multiplier**
10ºC	1.02
15ºC	1.01
25ºC	1.00
40ºC	0.99
50ºC	0.96

OPTIC ORIENTATION

Dotted lines represent driving lanes.



ORDERING INFORMATION

Sample Number: CNC-E04-LED-E1-SQ-TW

Product Family	Number of LightBARs [1, 2]	Lamp Type	Voltage	Distribution	Color
CNC=Concise	**E01**=(1) 21 LED LightBAR [3] **E02**=(2) 21 LED LightBARs **E03**=(3) 21 LED LightBARs **E04**=(4) 21 LED LightBARs **F01**=(1) 7 LED LightBAR [3] **F02**=(2) 7 LED LightBARs **F03**=(3) 7 LED LightBARs **F04**=(4) 7 LED LightBARs	**LED**=Solid State Light Emitting Diodes	**E1**=Electronic (120V-277V) **347**=347V **480**=480V [4]	**CQ**=Concentrated Type V Square **SQ**=Type V Square **WQ**=Wide Type V Square **GL2**=Type II w/Glare Control **GL3**=Type III w/Glare Control **GL4**=Type IV w/Glare Control **RW**=Rectangular **CPL**=90° Forward Throw Perimeter Left **CPR**=90° Forward Throw Perimeter Right	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **TW**=True White

Options (Add as Suffix)		**Accessories** (Order Separately)
DIM=0-10V Dimming Drivers [5] **HA**=50°C High Ambient Temperature Rating [6] **2L**=Two Circuits [7, 8] **WM**=Wall Mount **L90**=Optics Rotated 90° Left **R90**=Optics Rotated 90° Right **TR**=Tamper-Resistant Fasteners **TMB**=Trunnion Mount with Connection Box (Some Assembly Required)	**SM**=Surface Mount [9] **7030**=70 CRI / 3000K CCT [10] **7050**=70 CRI / 5000K CCT [10] **7060**=70 CRI / 5700K CCT [10] **8030**=80 CRI / 3000K CCT [10] **LCF**=LightBAR Cover Plate Matches Housing Finish **ICP**=Integral Cold Weather Battery Pack (Specify 120V or 277V. Must Specify Voltage) [11] **OSX**=Integral Occupancy Sensor (Specify Number of LightBARs) [12]	**MA1253**=10kV Circuit Module Replacement **RV/WG**=Field-Installed Wire Guard

NOTES:
1. Standard 4000K CCT and greater than 70CRI.
2. 21 LED LightBAR powered at 350mA, 7 LED LightBAR powered at 1A.
3. Not available with 2L two circuits option.
4. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
5. Not available with HA option. Not available in E04 or F04 with 347V or 480V.
6. Not available in models with E04 or F04.
7. Available in models with E02-E04, or F02-F04. Low-level output varies by bar count specified. Consult factory.
8. Consult factory before ordering in combination with OSX option.
9. Surface mount configuration limited to 25°C ambient conditions.
10. Lead times apply. See website for IES files.
11. Available with E01 and F01 configurations only. Rated for 25°C ambient operating temperature.
12. Housed in external box mounted to the luminaire. Available in E02-E04 and F02-F04 configurations. Replace X with number of LightBARs (e.g., OS2) controlled by the occupancy sensor, default time delay setting is 15-minutes. Standard lens covers up to 12' mounting height, 360° and maximum 20' diameter. For other configurations, consult customer service.

A850SRLED OLD TOWN SERIES

LED

CLICK FOR FAQ's FAQ

EPA 1.21 (ft²)
WEIGHT 32 LBS

RATED IP65

LUMEN RANGE 2570 to 10845

LIFE SPAN L70 UP TO 100,000 HOURS

7 YEAR WARRANTY 7

DLC QPL LISTED

JOB NAME

FIXTURE TYPE SF

MEMO

BUILD A PART NUMBER

ORDERING EXAMPLE: 2A-A850SRLED-5P-4ARC45T5-MDH03-A-PEC-FHD/480PM/4212FP4/BKT

Mounting Config.	Fixture	Fitter	LED	CCT	Type	Driver	Lens	Option Photocontrol	Option Term. Block	Option GFI	Option Fuse	Option House Side Shield	Option Deco. Ring	Arm See Arm Spec Sheets	Pole See Pole Spec Sheets	Finish

Mounting Configuration

(Click here to link to mounting configuration specification page)

- 1W
- 2A
- 3A90
- 1AM
- PT
- 2A90
- 3APT
- 2AM
- 1A
- 2APT
- 4A
- 450PB
- 1APT
- 3A
- 4APT

W = Wall Mount **PT** = Post Top **APT** = Post Top Arm Mid-Mount **A** = Arm Mount **AM** = Arm Mid-Mount **PB** = Pier Base

Fixture

- A850SRLED

Fitter

- 5P[1]
- 991[1]
- 995[1]
- OLF3[1]
- 73
- 992[1]
- BD4
- OLF4[1]
- 74
- 993[1]
- BD5
- 588
- 990[1]
- 994[1]
- BD7
- C2097[1]

[1] Add "T" after fitter designation for optional "Twist-lock" fitter.

LED

- 6ARC
- 4ARC
- 3ARC
- 2ARC

CCT - Color Temperature (K)

- 45(00)
- 35(00)
- 27(00)

Type

- T2
- T3
- T3R
- T4
- T5

Driver

- MDL03 (120v-277v, 350Ma)
- MDH03 (347v-480v, 350Ma)
- MDL05 (120v-277v, 525Ma)
- MDH05 (347v-480v, 525Ma)

Lens

- A (Acrylic)
- P (Polycarbonate)

Options

- **PEC** Electronic Photocontrol (120v-277v)
- **R**[2] Receptacle Only for Twist-Lock Photocontrol
- **RI**[2] Twist-Lock Photocontrol & Receptacle (120v-277v)
- **SRR** Solid Roof: Receptacle Only for Twist-Lock Photocontrol
- **SRRI** Solid Roof: Twist-Lock Photocontrol & Receptacle (120v-277v); 3-PIN
- **TB**[2] Terminal Block
- **G**[2] 15A Duplex GFI for Utility Fitter
- **FHD**[3] Double Fuse and Holder
- **HSS** House Side Shield
- **IHSS** Internal House Side Shield
- **CDRCL**[4] Cast Decorative Ring with Custom Logo
- **CDR** Cast Decorative Ring
- **PBDR**[5] Perforated Brass Decorative Ring

[2] For 900 series utility fitter only. [3] Ships loose for installation in base. [4] Consult factory for specification details.
[5] Standard is polished, for painted ring specify PBDR-P.

Arm (Click here to link to arm specification page)

See Arms & Wall Brackets specification sheets.

- 50
- 70
- 480
- 6236
- TA
- BA
- 478
- 80
- 55
- 579
- TASCR

Pole (Click here to link to pole specification page)

See Pole specification sheets.

Finish (Click here to view paint finish sheet)

Standard Finishes[6]

- **BKT** Black Textured
- **WHT** White Textured
- **PGT** Park Green Textured
- **ABZT** Architectural Medium Bronze Textured
- **DBT** Dark Bronze Textured

[6] Smooth finishes are available upon request.

Custom Finishes[7]

- **CM** Custom Match
- **OI** Old Iron
- **RT** Rust
- **WBR** Weathered Brown
- **CD** Cedar
- **WBK** Weathered Black
- **TT** Two Tone

[7] Custom colors require upcharge.

Sternberg Select Finishes

- **VG** Verde Green
- **SI** Swedish Iron
- **OWGT** Old World Gray Textured

Specifications

Fixture

The luminaire shall be 16" diameter and 40-1/2" . The acorn shall be supplied with a cast aluminum finial and a solid, cast aluminum roof which includes optimized heat sinks to provide maximum life and performance for the LED light sources. The acorn shall be sealed to the cast aluminum roof to provide a moisture-free and bug-free optics chamber for the LED light sources and Rated IP65.

Fitter - Standard

The fitter shall be heavy wall cast aluminum, 356 alloy for high tensile strength. It shall have an 8-1/2" inside diameter opening to attach to the 8" neck of the acorn globe. When ordered with a Sternberg aluminum pole, the fitter shall be welded to the pole top or tenon for safety and to ensure the fixture will be plumb, secure and level over the life of the installation. The fitter shall have a one-piece ring bug gasket to resist insect penetration into lamp assembly.

900 Series Utility Fitter Option

The fitter shall be heavy wall cast aluminum, 360 die cast alloy for high tensile strength. It shall have a 9-1/4" inside diameter opening to attach to the 8" neck of the acorn globe. It shall have a hinged, tool-less entry door that provides open access to all of the components. The 900 series shall have an optional terminal block for ease of wiring, an optional Twist-Lock Photocontrol receptacle, an optional single GFCI outlet for auxiliary power needs. The top mounted ballast mounting plate shall be cast aluminum and provide tool-less removal from the housing using 2 finger latches. When ordered with a Sternberg aluminum pole, the fitter shall be set screwed to the pole top or tenon. The fitter shall have a one-piece ring bug gasket to resist insect penetration into lamp assembly. When supplied with GFI receptacle a hole will be provided for cord and plug installation with the access door closed. When cord and plug is not in use a filler plug will be provided and shall be tethered to the fitter for easy recovery and installation.

See next page

SternbergLighting
ESTABLISHED 1923 / EMPLOYEE OWNED

800-621-3376
555 Lawrence Ave., Roselle, IL 60172
info@sternberglighting.com
www.sternberglighting.com

A850SRLED OLD TOWN SERIES

LED

Twist-Lock Fitter (Optional)

The TL (Twist-Lock) fitter shall have an aluminum die-cast twist-lock mechanism. The tool-less 1/4 turn action allows for easy globe removal and replacement. A die-cast ring assembly is mechanically attached to the globe and is removable if the globe is broken or replaced.

LEDs

The luminaire shall use high output, high brightness LED's. They shall be mounted in arrays, on printed circuit boards designed to maximize heat transfer to the heat sink surface. The arrays shall be roof mounted to minimize up-light. The LED's and printed circuit boards shall be shall be environmentally friendly and 100% recyclable, they shall also be protected from moisture and corrosion by a conformal coating of 1 to 3 mils. They shall not contain lead, mercury or any other hazardous substances and shall be RoHS compliant. The LED life rating data shall be determined in accordance with IESNA LM-80. They shall operate in a -40°C (-40°F) to +50°C (122°F) ambient air temperature range. The High Performance white LED's will have a life expectancy of approximately 100,000 hours with not less than 70% of original brightness (lumen maintenance), rated at 25°C. The High Brightness, High Output LED's shall be 4500K (3500K or 2700K option) color temperature with a typical of 70 CRI. The luminaire shall have a minimum _____ (see table) delivered initial lumen rating when operated at steady state with an average ambient temperature of 25°C (77°F).

Optics

The luminaire shall be provided with individual, refractor type optics applied to each LED. The luminaire shall provide Type ___ (2, 3, 3R, 4 or 5) light distribution per the IESNA classifications. Testing shall be done in accordance with IESNA LM-79.

Electronic Drivers

The LED driver shall be U.L. Recognized. It shall be securely mounted inside the fitter, for optimized performance and longevity. The LED driver shall be supplied with a quick-disconnect electrical connector on the power supply, providing easy power connections and fixture installation. It shall have overload as well as short circuit protection, and have a DC voltage output, constant current design, 50/60HZ. The LED driver shall be supplied with line-ground, line-neutral and neutral-ground electrical surge protection in accordance with IEEE/ANSI C62.41.2 guidelines.

For Sources Over 50W: The driver shall have a minimum efficiency of 90%. The driver shall be rated at full load with THD<20% and a power factor of greater than 0.90.

The driver shall contain over-heat protection which reduces output to less than half rating if the case temperature reaches 85°C.

Photocontrols

Button Style: On single post top fixtures the photocontrol shall be mounted in the fitter and pre-wired to ballast. On multiple head fixture assembly's photocontrol shall be mounted in the pole shaft on an access plate and are not pre-wired as ballast housing assemblies and fitters are packaged separately for ease of wiring to source. The electronic button type photocontrol is instant on with a 5-10 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt.

Twist-Lock Style: The photocontrol shall be mounted in the utility fitter and pre-wired to ballast. The twist lock type photocontrol is instant on with a 3-6 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt.

Photocontrols are warranted for 2 years and electronic photocontrols are warranted for 6 years.

Warranty

Seven-year limited warranty. See product and finish warranty guide for details.

Finish

Refer to website for details.

Performance

Light Source	T2 Spec Lumens	T3 Spec Lumens	T3R Spec Lumens	T4 Spec Lumens	T5 Spec Lumens	Watts
6ARC27T-MDL05	9970	10160	10015	10030	10160	144
6ARC35T-MDL05	11375	11595	11425	11445	11595	144
6ARC45T-MDL05	12785	13025	12840	12860	13025	144
6ARC27T-MDL03	7210	7345	7315	7290	7380	96
6ARC35T-MDL03	8225	8380	8345	8320	8420	96
6ARC45T-MDL03	9245	9415	9375	9345	9460	96
4ARC27T-MDL03	4800	4940	4850	4865	4935	66
4ARC35T-MDL03	5480	5635	5535	5550	5630	66
4ARC45T-MDL03	6155	6330	6215	6235	6330	66
3ARC27T-MDL03	3635	3730	3670	3665	3740	53
3ARC35T-MDL03	4150	4260	4190	4180	4270	53
3ARC45T-MDL03	4660	4785	4710	4700	4795	53
2ARC27T-MDL03	2375	2495	2415	2440	2560	33
2ARC35T-MDL03	2715	2850	2755	2780	2920	33
2ARC45T-MDL03	3050	3200	3095	3125	3285	33

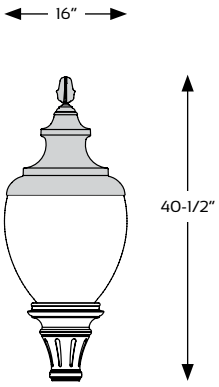
SternbergLighting
ESTABLISHED 1923 / EMPLOYEE OWNED

800-621-3376
555 Lawrence Ave., Roselle, IL 60172
info@sternberglighting.com
www.sternberglighting.com

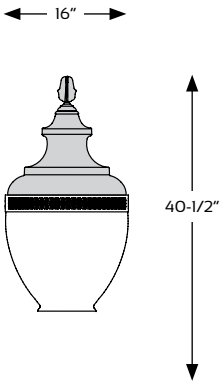
A850SRLED OLD TOWN SERIES

LED

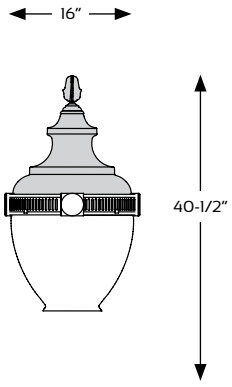
Fixture Examples



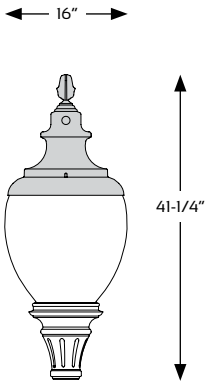
A850SRLED-5P



PBDR Option
Perforated Brass
Decorative Ring
PBDR-P
Painted to match
fixture finish



CDR Options
CDR:
Gold Medallion
CDR-CL:
Custom Logo
Cast Aluminum Deco.
Rings



SRR OPTION
Solid Roof with
Twist-Lock
Photocontrol

Fitters

10-1/8" W
10-3/8" H

5P or 5T*
Fits 3" OD
x 3" tall
tenon/pole

10-1/8" W
10-1/8" H

BD4
Fits 4" OD
x 5" tall
tenon/pole

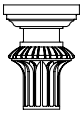
10-1/8" W
10-1/4" H

BD5
Fits 5" OD
x 6" tall
tenon/pole

10-1/8" W
11-3/4" H

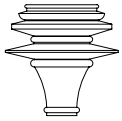
BD7
Fits 7" OD
x 1" tall
tenon/pole

9-3/4" W
13-1/4" H



73
Fits 3" OD
x 4" tall
tenon/pole
74
Fits 4" OD
x 4" tall
tenon/pole

14-1/2" W
14-1/4" H

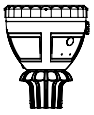


588
(Art Deco I)
Fits 3" OD
x 3" tall
tenon/pole

10-1/2" W
15-3/4" H

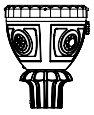
990 or 990T*
Fits 3" OD
x 3" tall
tenon/pole
994 or 994T*
Fits 4" OD
x 3" tall
tenon/pole

10-1/2" W
13-1/8" H



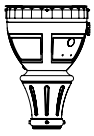
991 or 991T*
Fits 3" OD
x 3" tall
tenon/pole

10-1/2" W
13-1/8" H



992 or 992T*
Fits 3" OD
x 3" tall
tenon/pole

10-1/2" W
15-3/4" H



993 or 993T*
Fits 3" OD
x 3" tall
tenon/pole
995 or 995T*
Fits 4" OD
x 3" tall
tenon/pole

10-1/2" W
11-3/8" H

OL3 or OL3T*
Fits 3" OD
x 3" tall
tenon/pole
OL4 or OL4T*
Fits 4" OD
x 3" tall
tenon/pole

10" W
3-1/4" H

C2097 or
C2097T*
Fits 7" OD
x 1" tall
tenon/pole

*Twist Lock Acorn (Fitter TL)

11
2015

SternbergLighting
ESTABLISHED 1923 / EMPLOYEE OWNED

800-621-3376
555 Lawrence Ave., Roselle, IL 60172
info@sternberglighting.com
www.sternberglighting.com

McGraw-Edison

DESCRIPTION

The Impact Elite family of wall luminaires is the ideal complement to site design. Incorporating modular LightSquares technology, the Impact Elite luminaire provides outstanding uniformity and energy-conscious illumination. Combined with a rugged construction, the Impact Elite luminaire is the ideal facade and security luminaire for zones surrounding schools, office complexes, apartments and recreational facilities. UL/cUL listed for wet locations.

		Type
Catalog #		SH
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
Heavy-wall, die-cast aluminum housing and removable hinged door frame for precise tolerance control and repeatability. Hinged door inset for clean mating with housing surface and secured via two captive fasteners. Optional tamper-resistant Torx™ head fasteners offer vandal resistant access to the electrical chamber.

Optics
Choice of 10 patented, high-efficiency AccuLED Optics™ distributions. Optics are precisely designed to shape the light output, maximizing efficiency and application spacing. AccuLED Optics technology creates consistent distributions with the scalability to meet customized application requirements. Offered Standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 3000K, 5000K and 5700K CCT.

Electrical
LED drivers mount to die-cast aluminum back housing for optimal heat sinking, operation efficacy, and prolonged life. Standard drivers feature electronic universal voltage (120-277V 50/60Hz), 347V 60Hz or 480V 60Hz operation, greater than 0.9 power factor, less than 20% harmonic distortion, and are suitable for operation in -40°C to 40°C ambient environments. All fixtures are shipped standard with 10kV/10kA common – and differential – mode surge protection. LightSquares feature an IP66 enclosure rating and maintain greater than 90% lumen maintenance at 60,000 hours per IESNA TM-21. Emergency egress options for -20°C ambient environments and occupancy sensor available.

Mounting
Gasketed and zinc plated rigid steel mounting attachment fits directly to 4" j-box or wall with the Impact Elite "Hook-N-Lock" mechanism for quick installation. Secured with two captive corrosion resistant black oxide coated allen head set screws concealed but accessible from bottom of fixture.

Finish
Cast components finished in a five-stage super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Standard colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available. Consult the McGraw-Edison Architectural Colors brochure for the complete selection.

Warranty
Five-year warranty.



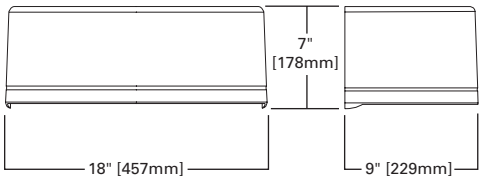

ISC/ISS/IST/ISW
IMPACT ELITE LED

1 LightSquare
Solid State LED

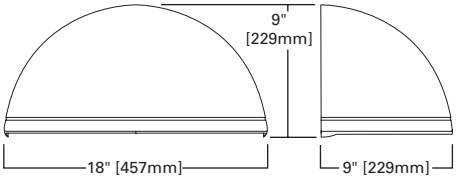
WALL MOUNT LUMINAIRE

DIMENSIONS

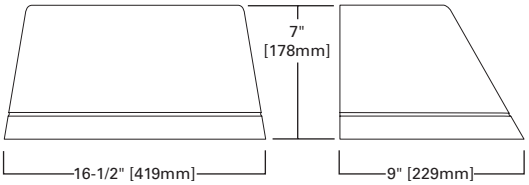
Cylinder



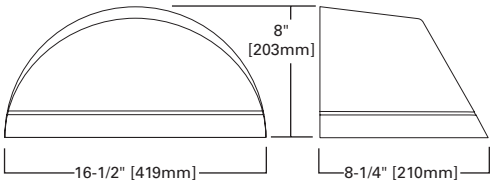
Quarter Sphere



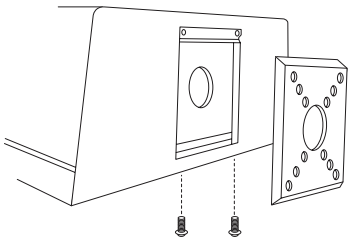
Trapezoid



Wedge



HOOK-N-LOCK MOUNTING



CERTIFICATION DATA
UL/cUL Listed
LM79 / LM80 Compliant
IP66 LightSquare
DesignLights Consortium® Qualified*
ISO 9001

ENERGY DATA
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120-277V/50 & 60Hz, 347V/60Hz, 480V/60Hz
-40°C Minimum Temperature
40°C Ambient Temperature Rating

SHIPPING DATA
Approximate Net Weight:
18 lbs. (8 kgs.)

*www.designlights.org

Powering Business Worldwide

POWER AND LUMENS

1 LightSquare (AF)		**Cylinder (ISC) and Quarter Sphere (ISS)**						**Trapezoid (IST) and Wedge (ISW)**					
Drive Current (mA)		350	450	600	800	1000	1200	350	450	600	800	1000	1200
Power (Watts)	120-277V	20.3	25.5	33.4	43.9	55.1	66.2	20.3	25.5	33.4	43.9	55.1	66.2
Current (A)	120V	0.17	0.22	0.29	0.38	0.48	0.56	0.17	0.22	0.29	0.38	0.48	0.56
	277V	0.09	0.10	0.13	0.17	0.21	0.25	0.09	0.10	0.13	0.17	0.21	0.25
Power (Watts)	347V or 480V	23.3	28.7	36.6	49.5	60.7	70.1	23.3	28.7	36.6	49.5	60.7	70.1
Current (A)	347V	0.07	0.08	0.11	0.15	0.18	0.21	0.07	0.08	0.11	0.15	0.18	0.21
	480V	0.05	0.06	0.08	0.11	0.13	0.16	0.05	0.06	0.08	0.11	0.13	0.16
Optics													
T2	Lumens	2,336	2,934	3,827	4,791	5,663	6,444	2,498	3,136	4,091	5,122	6,054	6,889
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
T3	Lumens	2,385	2,994	3,906	4,889	5,779	6,577	2,504	3,144	4,101	5,133	6,068	6,905
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
T4FT	Lumens	2,360	2,963	3,866	4,839	5,720	6,509	2,530	3,177	4,145	5,188	6,133	6,979
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
T4W	Lumens	2,386	2,996	3,908	4,892	5,783	6,581	2,500	3,139	4,095	5,126	6,059	6,895
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
SL2	Lumens	2,257	2,834	3,697	4,628	5,470	6,225	2,413	3,030	3,953	4,948	5,849	6,656
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
SL3	Lumens	2,220	2,787	3,636	4,552	5,380	6,122	2,365	2,970	3,874	4,849	5,732	6,523
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
SL4	Lumens	2,110	2,649	3,456	4,326	5,113	5,818	2,234	2,805	3,660	4,581	5,415	6,162
	BUG Rating	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
SLL/SLR	Lumens	1,990	2,498	3,259	4,080	4,823	5,488	2,154	2,705	3,529	4,418	5,222	5,942
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2	B1-U1-G2
RW	Lumens	2,380	2,988	3,898	4,880	5,768	6,564	2,465	3,095	4,037	5,054	5,974	6,798
	BUG Rating	B2-U0-G0	B2-U0-G0	B2-U0-G0	B2-U0-G0	B2-U0-G0	B2-U0-G0	B3-U1-G1	B3-U1-G1	B3-U1-G1	B3-U1-G1	B3-U1-G1	B3-U1-G1

LUMEN MAINTENANCE

Current	**Ambient Temperature**	**25000 Hours***	**50000 Hours***	**60000 Hours***	**100000 Hours***	**Theoretical L70 (Hours)***
Up to 1.2A	Up to 40°C	>95%	>91%	>90%	>83%	20,4000

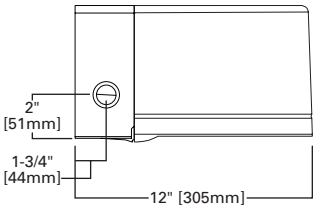
*Data calculated based on TM-21 calculator.

LUMEN MULTIPLIER

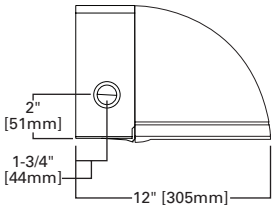
Ambient Temperature	**Lumen Multiplier**
10°C	1.02
15°C	1.01
25°C	1.00
40°C	0.99

THRUWAY BACK BOX

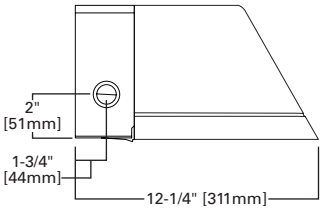
Cylinder



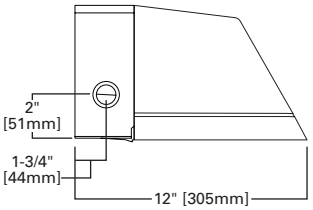
Quarter Sphere



Trapezoid



Wedge



ORDERING INFORMATION

Sample Number: ISC-AF-1200-LED-E1-T3-BZ

Product Family [1]	Light Engine	Drive Current	Lamp Type	Voltage	Distribution	Color
ISC=Impact Elite LED Small Cylinder **ISS**=Impact Elite LED Small Quarter Sphere **IST**=Impact Elite LED Small Trapezoid **ISW**=Impact Elite LED Small Wedge	**AF**=(1) LightSquare	**350**=Drive Current Factory Set to 350mA **450**=Drive Current Factory Set to 450mA **600**=Drive Current Factory Set to 600mA **800**=Drive Current Factory Set to 800mA **1000**=Drive Current Factory Set to 1000mA **1200**=Drive Current Factory Set to 1200mA [2]	**LED**=Solid State Light Emitting Diodes	**E1**=Electronic (120-277V) **347**=347V [2] **480**=480V [2, 3]	**T2**=Type II **T3**=Type III **T4FT**=Type IV Forward Throw **T4W**=Type IV Wide **SL2**=Type II w/Spill Control **SL3**=Type III w/Spill Control **SL4**=Type IV w/Spill Control **SLL**=90° Spill Light Eliminator Left **SLR**=90° Spill Light Eliminator Right **RW**=Rectangular Wide Type I	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **WH**=White

Options (Add as Suffix)	**Accessories** (Order Separately) [17]
7030=70 CRI / 3000K CCT [4] **7050**=70 CRI / 5000K CCT [4] **7060**=70 CRI / 5700K CCT [4] **8030**=80 CRI / 3000K CCT [4] **PER7**=NEMA 7-PIN Twistlock Photocontrol Receptacle [2, 5, 6] **P**=Button Type Photocontrol (Available in 120, 208, 240 or 277V. Must Specify Voltage) [2, 6] **HA**=50°C High Ambient [7] **AHD145**=After Hours Dim, 5 Hours, 50% [8] **AHD245**=After Hours Dim, 6 Hours, 50% [8] **AHD255**=After Hours Dim, 7 Hours, 50% [8] **AHD355**=After Hours Dim, 8 Hours, 50% [8] **MS/DIM-LXX**=Motion Sensor for Dimming Operation [9, 10, 11] **LWR-LW**=LumaWatt Pro Wireless Sensor, Wide Lens for 8' - 16' Mounting Height [6, 11, 12] **LWR-LN**=LumaWatt Pro Wireless Sensor, Narrow Lens for 16' - 40' Mounting Height [6, 11, 12] **BBB**=Battery Pack with Back Box (Specify 120V or 277V) [13] **CWB**=Cold Weather Battery Pack with Back Box (Specify 120V or 277V) [14] **LCF**=LightSquare Trim Plate Matches Housing Finish **HSS**=Factory Installed House Side Shield [15] **ULG**=Uplight Glow [5, 6] **TR**=Tamper Resistant Hardware **X**=Driver Surge Protection (6kV) Only [16]	**MA1253**=10kV Circuit Module Replacement **MA1254-XX**=Thruway Back Box - Impact Elite Trapezoid **MA1255-XX**=Thruway Back Box - Impact Elite Cylinder **MA1256-XX**=Thruway Back Box - Impact Elite Quarter Sphere **MA1257-XX**=Thruway Back Box - Impact Elite Wedge **FSIR-100**=Wireless Configuration Tool for Occupancy Sensor

NOTES:
1. Standard 4000K CCT and greater than 70 CRI.
2. Not available with ULG option.
3. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
4. Exentended lead times apply.
5. Not available with ISS or ISW.
6. Not available with LWR-XX or MS/DIM-LXX.
7. Suitable for 50°C provided no options other than motion sensor are included and driver output set to 1.A or less.
8. Requires the use of P photocontrol or the PER7 photocontrol receptacle with photocontrol accessory. Not available with 350mA drive current. See After Hours Dim supplemental guide for additional information.
9. Specify lens in place of XX. Round to next highest option based on mounting height. Available options are 08, 20 and 40W.
10. The FSIR-100 configuration tool is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
11. Includes integral photocell.
12. LumaWatt Pro wireless sensors are factory installed and requiring network components in appropriate quantities. See www.eaton.com/lighting for LumaWatt Pro application information.
13. LED standard integral battery pack is rated for minimum operating temperature 32°F (0°C). Operates downlight for 90-minutes.
14. LED cold weather integral battery pack is rated for minimum operating temperature -4°F (-20°C). Operates downlight for 90-minutes.
15. Only for use with SL2, SL3 and SL4 distributions. The LightSquare trim plate is painted black when the HSS option is selected.
16. Removes additional surge module.
17. Specify color in place of XX.