

DRAINAGE DESIGN REPORT

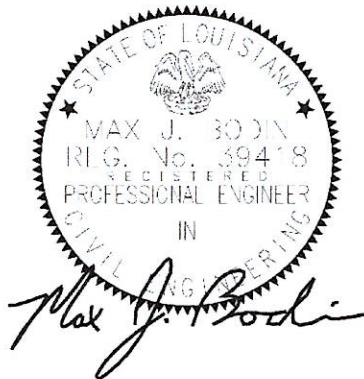
[Burgess Avenue]

LIVINGSTON PARISH

For: Foresight Surveying and Mapping

MAX BODIN, INC.

44052 W. Pleasant Ridge Rd.
Hammond, LA 70403



[8/24/26]
[revision no. 1 date]
[revision no. 2 date]

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1.0 INTRODUCTION

1.1 Location

[This site is a 12.56-acre tract of land located on the North side of Burgess Avenue, in Walker, Louisiana. It is currently undeveloped and majority of the property is open field See Appendix I Aerial View of Site

1.2 Flood Plain Status

[This site is in FEMA Flood Zone AE. See Appendix II FEMA Floodplain Area Map]

1.3 Drainage Basin and Outfalls

- Outfall 1 – Burgess Avenue North Side Ditch
- Outfall 2 – Illinois Central Railroad South Side Ditch

See Appendix III USGS Topographic Map]

2.0 DESIGN CRITERIA

2.1 References

- City of Walker, Louisiana □ Unified Development Code Page 134.

2.2 Hydraulic Criteria

- The Drainage Impact Study shall indicate existing condition peak twenty-five (25) year flow rates at the development entry and exit points.
- The Drainage Impact Study shall indicate existing condition peak one-hundred (100) year flow rates at the development entry and exit points.
- The Drainage Impact Study shall indicate future condition peak twenty-five (25) year flow rates at the development entry and exit points and ensure that there is no increase in the peak twenty-five (25) year flow rates. The City Building Official, Review Engineer, or Council may require at their discretion, additional detention restrictions using the 100-yr flow rates if there are known drainage issues or concerns in the subject area and there is concern that not doing so could negatively affect adjacent properties.
- The Drainage Impact Study shall indicate future condition peak one-hundred (100) year flow rates at the development entry and exit points. City of Walker, Louisiana □ Unified Development Code Page 134.
- If ponds are used in design for routing of flows, the twenty-five (25) year storm event shall be used in design. The effects of a 100-year storm on the pond should be provided and the reviewing agency (and/or City) may require up to a one-foot (1') pond freeboard for the 100-yr design if the pond is adjacent to or could negatively affect a residential property/development if the 100-yr design storm were not contained.

3.0 POST-DEVELOPMENT DRAINAGE ANALYSIS

3.1 General Concept

Design features post-development surface water runoff rates of the 25-year design storm and the 100-year design storm for the sizing of proposed roadside culverts being installed for each proposed newly created lot. See Appendix IV Comprehensive Drainage Plan.

3.2 Calculation Method

Rational Method	$Q = CIA$
Q	Runoff in CFS
C	Runoff Coefficient
I	Rainfall Intensity in/hr
A	Area

Post Development	C	I (25yr)	I (100yr)	A	Q25	Q100
C-1	0.5	9.331	11.037	1.000	4.666	5.518
C-2	0.5	8.935	10.600	1.000	4.468	5.300
C-3	0.5	8.936	10.600	1.011	4.517	5.358
C-4	0.5	8.576	10.201	1.086	4.657	5.539
C-5	0.5	8.576	10.201	1.126	4.829	5.743
C-6	0.5	8.247	9.833	1.258	5.188	6.185
C-7	0.5	8.247	9.833	1.153	4.755	5.669

4.0 CULVERT ANALYSIS

4.1 Calculation Method

Culvert	Receiving Swale	Slope %	Length	Diameter	Type	Qty	Q25
C-1	S-1	0.15	20'	24"	HP-Storm	1	4.666
C-2	S-2	0.25	20'	24"	HP-Storm	1	4.468
C-3	S-3	0.55	20'	24"	HP-Storm	1	4.517
C-4	S-4	0.60	20'	24"	HP-Storm	1	4.657
C-5	S-5	0.15	20'	24"	HP-Storm	1	4.829
C-6	S-6	0.25	20'	24"	HP-Storm	1	5.188
C-7	S-7	0.35	20'	24"	HP-Storm	1	4.755

5.0 CONCLUSIONS

5.1 Summary

A preliminary survey found (2) two existing 24" smooth flow culverts located upstream and downstream of the project site. Utilizing Hydraflow Express for Autodesk, it is the engineer's opinion, this size culvert is acceptable for the proposed lots associated with this project site. Five (5) additional 20' x 24" Hp-Storm culverts may be used for the proposed lots. Culverts are to be set at existing ditch grades or at the discretion of the City of Walker.

APPENDIX

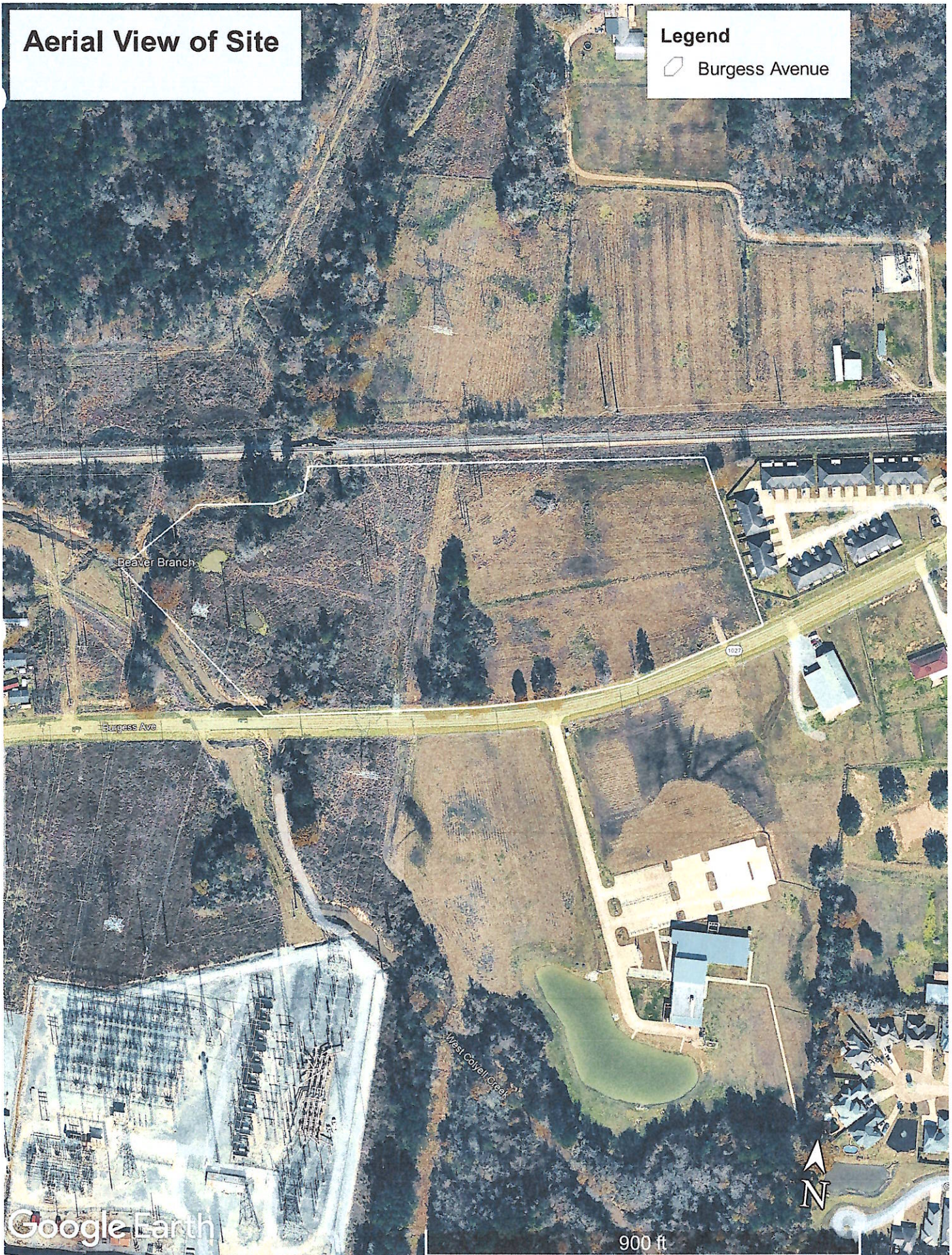
- I. Aerial View
- II. FEMA Floodplain Area Map
- III. USGS Topographic Map
- IV. Comprehensive Drainage Plan
- V. Hydraflow Hydrographs from Autodesk
 - Post-Development Runoff Report
 - Culvert Reports

APPENDIX I

Aerial View of Site

Legend

 Burgess Avenue



Google Earth

900 ft

APPENDIX II

National Flood Hazard Layer FIRMette

90°54'2"W 30°29'42"N



Legend

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

Without Base Flood Elevation (BFE)
Zone A, V, AE99

With BFE or Depth
Zone AE, AO, AH, VE, AR

Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Zone X

Future Conditions 1% Annual Chance Flood Hazard
Zone X

Area with Reduced Flood Risk due to Levee, See Notes, Zone X

Area with Flood Risk due to Levee
Zone D

SPECIAL FLOOD HAZARD AREAS

OTHER AREAS OF FLOOD HAZARD

NO SCREEN

Area of Minimal Flood Hazard
Zone X

Effective LOMRs

Area of Undetermined Flood Hazard
Zone D

Channel, Culvert, or Storm Sewer

Levee, Dike, or Floodwall

GENERAL STRUCTURES

Cross Sections with 1% Annual Chance Water Surface Elevation

Coastal Transect

Base Flood Elevation Line (BFE)

Limit of Study

Jurisdiction Boundary

Coastal Transect Baseline

Profile Baseline

Hydrographic Feature

OTHER FEATURES

Digital Data Available

No Digital Data Available

Unmapped

MAP PANELS

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/24/2026 at 6:36 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

0 250 500 1,000 1,500 2,000 Feet 1:6,000

90°53'25"W 30°29'11"N

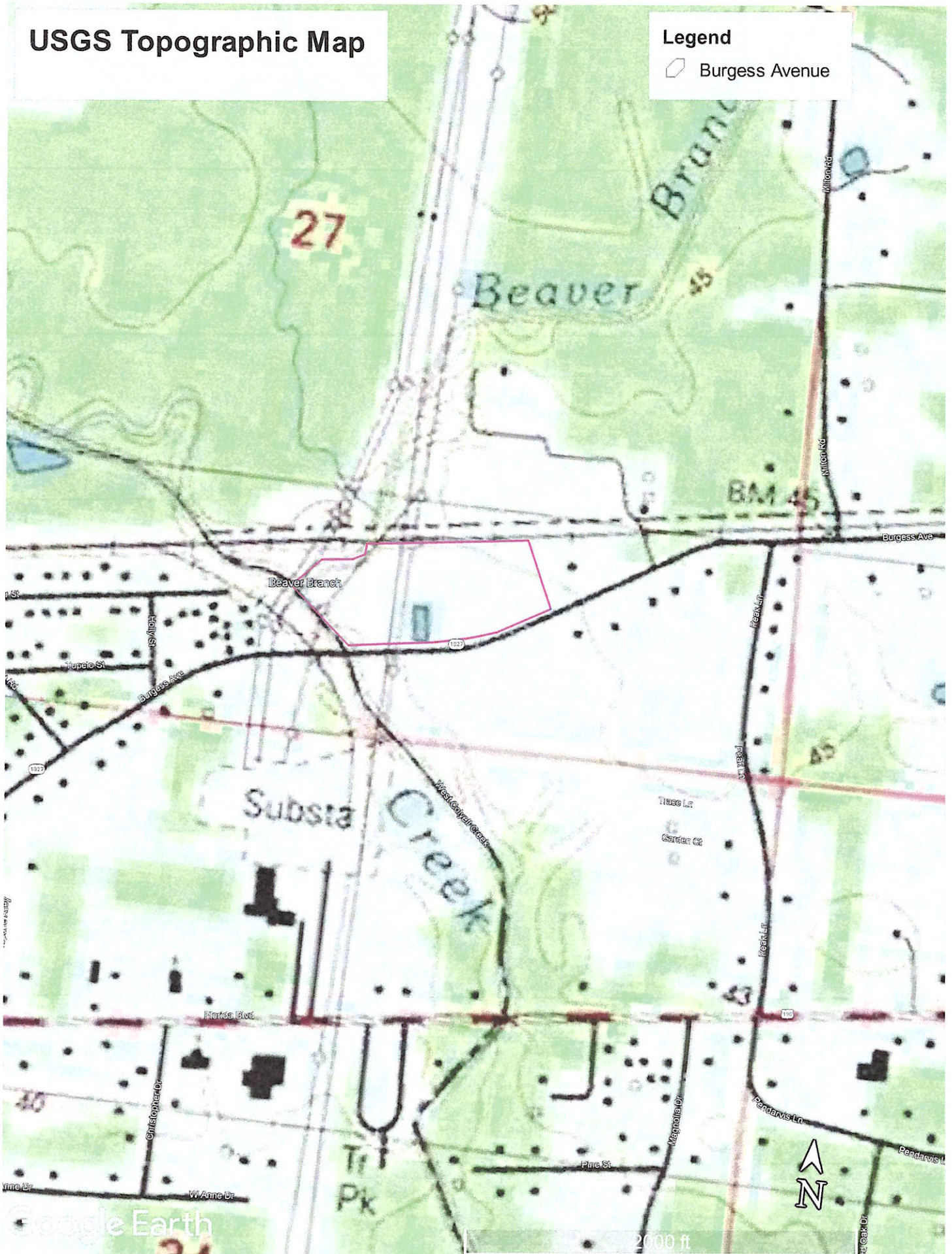
Basemap Imagery Source: USGS National Map 2023

APPENDIX III

USGS Topographic Map

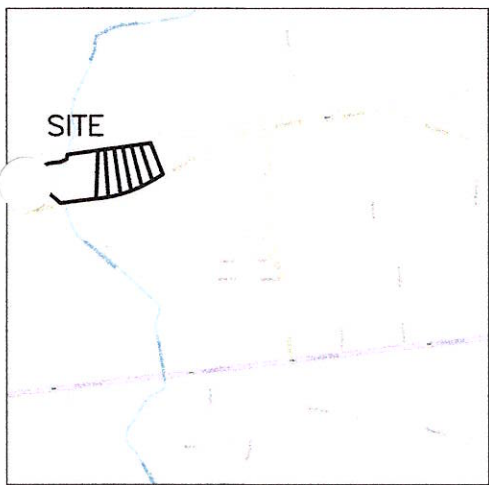
Legend

 Burgess Avenue



Google Earth

APPENDIX IV



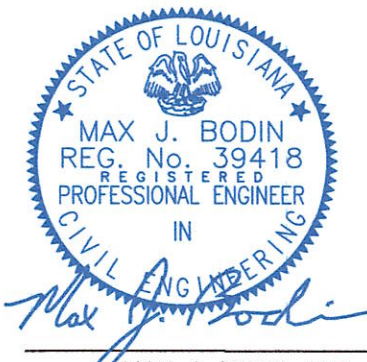
VICINITY MAP - SCALE 1:2000

SITE DATA:

1. No. LOTS: 7
2. TOTAL ACREAGE: 12.56
3. ASSESSMENT No.: 0479733

NOTES:

1. LOT LINE SWALES DRAINING TO FRONT OF PROPOSED LOTS ARE TO DRAIN TO ROAD RIGHT OF WAY DITCHES. LOT LINE SWALES DRAINING TO THE REAR OF LOT ARE TO BE GRADED TO EXISTING GRADE RETURNING TO SHEET FLOW.
2. ALL SEWER OUTFALLS TO BE DIRECTED TO ROAD DITCHES.
3. SIZE AND LOCATION OF PROPOSED HOMES WILL VARY. APPROXIMATE SIZE AND LOCATIONS ARE SHOWN.
4. ELEVATION DATUM NAVD88 UTILIZED.
5. CONTOURS WERE DERIVED FROM LIDAR.
6. EFFLUENT SEWER SERVICES LOCATIONS ARE PROPOSED AND ARE SUBJECT TO CHANGE IF DIRECTED BY ENVIRONMENTAL HEALTH.
7. DRIVEWAY PERMITS WILL BE NEEDED THROUGH PUBLIC WORKS ONCE HOUSES ARE TO BE BUILT.

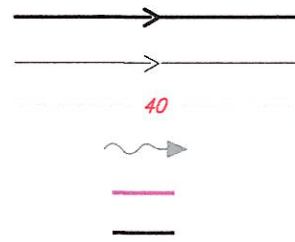


MAX J. BODIN, P.E.
LA. REG. NO. 39418

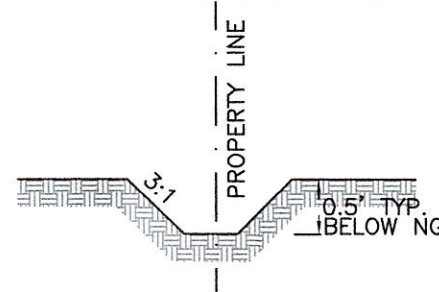
8/24/26

DATE

LEGEND:
PROPOSED LOT LINE SWALE:
EXISTING ROADSIDE DITCH:
EXISTING SURFACE CONTOUR:
DIRECTION OF SHEET FLOW:
EXISTING ROAD CULVERT:
PROPOSED ROAD CULVERT:



TYPICAL LOT LINE SWALE DETAIL
*NO DRAINAGE SERVITUDE



PROPOSED DRIVEWAY CULVERT TABLE

LOT	CULVERT	RECEIVING SWALE	25YR CFS	100YR CFS	SIZE	TYPE	INVERT
B-1	C-1	S-1	4.666	5.518	24"	EXISTING	40.94'
B-2	C-2	S-2	4.468	5.300	24"	HP-STORM	40.80'
B-3	C-3	S-3	4.517	5.358	24"	HP-STORM	40.16'
B-4	C-4	S-4	4.657	5.539	24"	HP-STORM	39.39'
B-5	C-5	S-5	4.829	5.743	24"	HP-STORM	39.23'
B-6	C-6	S-6	5.188	6.185	24"	HP-STORM	38.90'
B-7	C-7	S-7	4.755	5.669	24"	EXISTING	38.56'



Max Bodin, Inc.
Land Surveying & Consulting Engineers
44052 W. Pleasant Ridge Rd.
Hammond, LA 70403
Phone: 225-368-7698

COMPREHENSIVE DRAINAGE PLAN

DESIGNED: D.L.Q.
DRAWN: D.L.Q.
CHECKED: M.J.B.
APPROVED: M.J.B.
DATE: 08/24/2026
SCALE: 1"=120'

SECTION 27 T6S-R3E, CITY OF WALKER
PARISH OF LIVINGSTON, STATE OF LOUISIANA

PROJECT NO.
26152
SHEET NO.
1 OF 1

APPENDIX V

Hydraflow Table of Contents

New.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. o.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	4.666	1	2	560	-----	-----	-----	C-1
2	Rational	4.468	1	3	804	-----	-----	-----	C-2
3	Rational	4.517	1	3	813	-----	-----	-----	C-3
4	Rational	4.657	1	4	1,118	-----	-----	-----	C-4
5	Rational	4.829	1	4	1,159	-----	-----	-----	C-5
6	Rational	5.188	1	5	1,556	-----	-----	-----	C-6
7	Rational	4.755	1	5	1,426	-----	-----	-----	C-7
New.gpw					Return Period: 25 Year			Monday, 08 / 24 / 2026	

Hydrograph Report

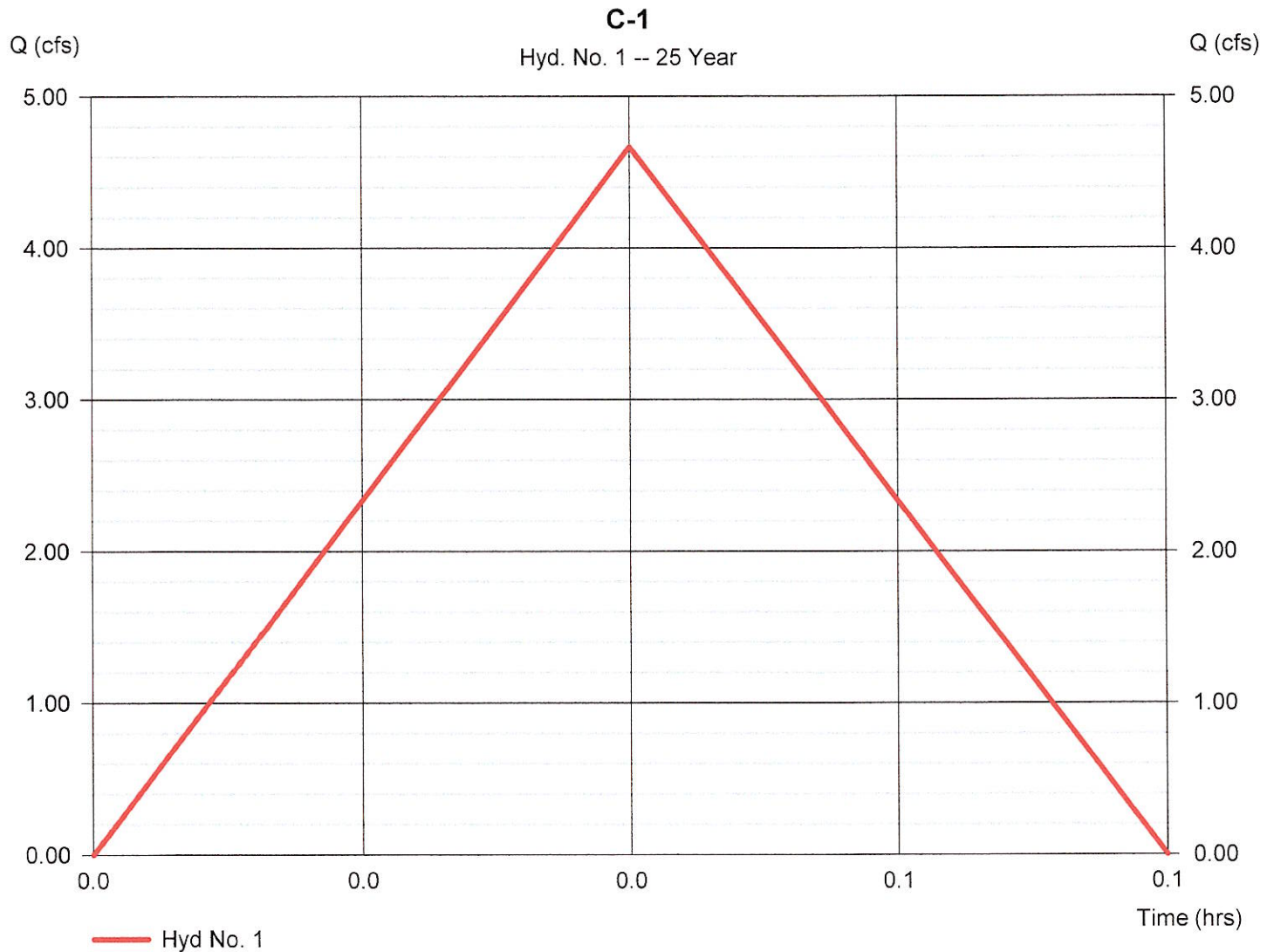
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 1

C-1

Hydrograph type	= Rational	Peak discharge	= 4.666 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.03 hrs
Time interval	= 1 min	Hyd. volume	= 560 cuft
Drainage area	= 1.000 ac	Runoff coeff.	= 0.5
Intensity	= 9.331 in/hr	Tc by TR55	= 2.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 1

C-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.87	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=2.49	0.00	0.00				
Flow length (ft)	286.3	0.0	0.0				
Travel Time (min)	= 1.91	+	0.00	+	0.00	=	1.91
Total Travel Time, Tc					2.00 min		

Hydrograph Report

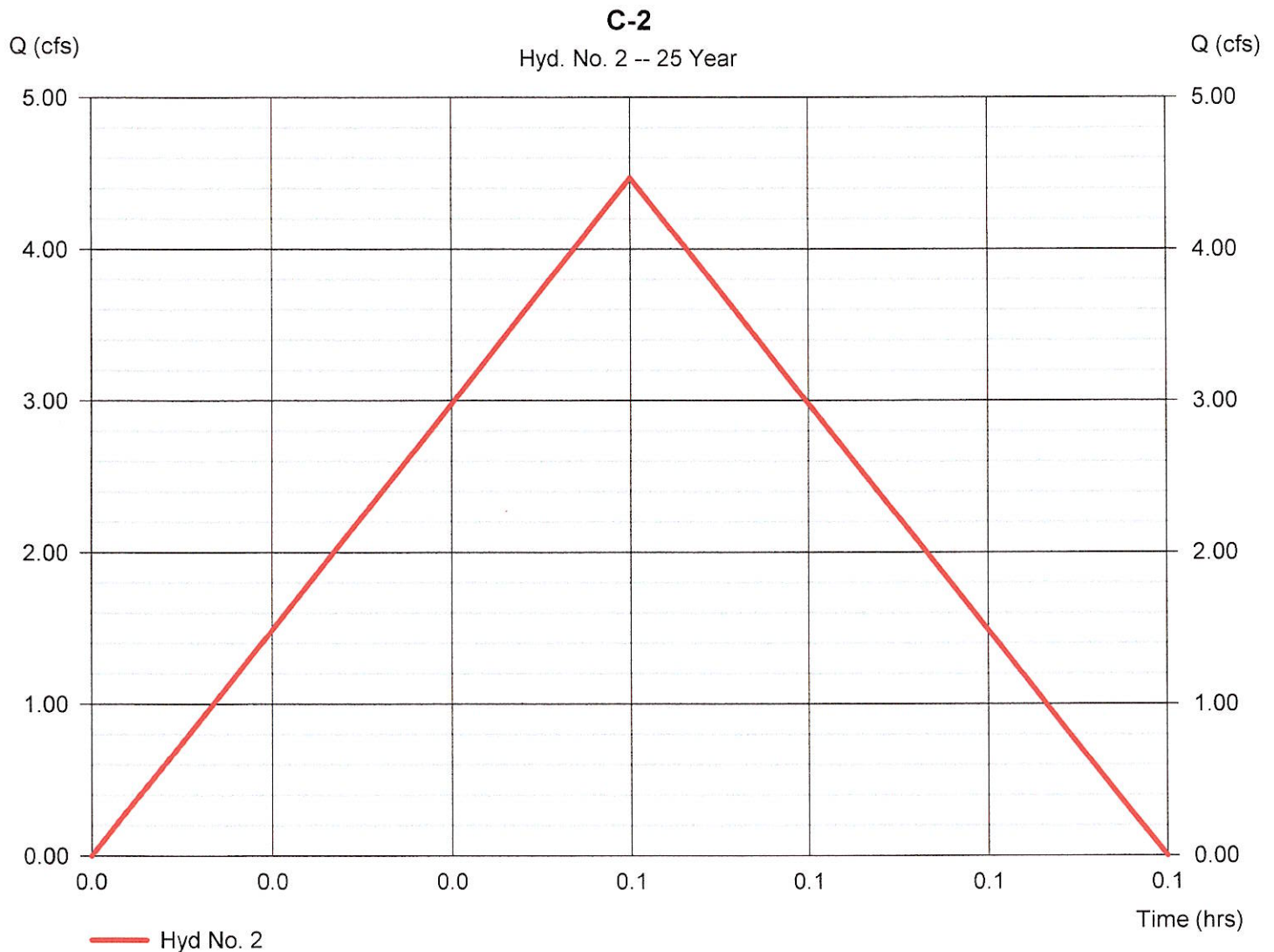
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 2

C-2

Hydrograph type	= Rational	Peak discharge	= 4.468 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.05 hrs
Time interval	= 1 min	Hyd. volume	= 804 cuft
Drainage area	= 1.000 ac	Runoff coeff.	= 0.5
Intensity	= 8.936 in/hr	Tc by TR55	= 3.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 2

C-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.000	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.57	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=2.02	0.00	0.00				
Flow length (ft)	406.8	0.0	0.0				
Travel Time (min)	= 3.36	+	0.00	+	0.00	=	3.36
Total Travel Time, Tc				3.00 min			

Hydrograph Report

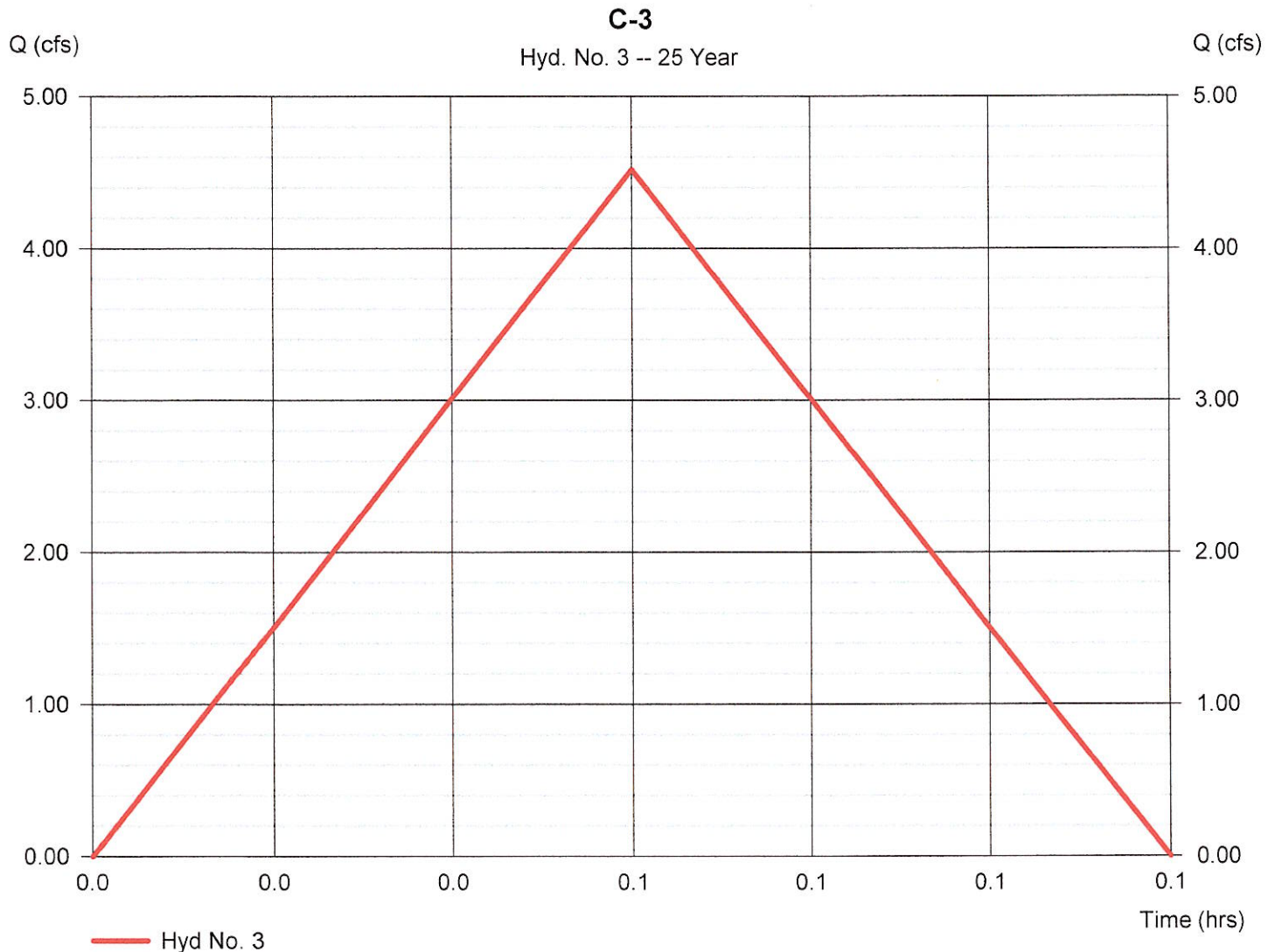
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 3

C-3

Hydrograph type	= Rational	Peak discharge	= 4.517 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.05 hrs
Time interval	= 1 min	Hyd. volume	= 813 cuft
Drainage area	= 1.011 ac	Runoff coeff.	= 0.5
Intensity	= 8.936 in/hr	Tc by TR55	= 3.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 3

C-3

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.70	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=2.24	0.00	0.00				
Flow length (ft)	446.1	0.0	0.0				
Travel Time (min)	= 3.32	+	0.00	+	0.00	=	3.32
Total Travel Time, Tc					3.00 min		

Hydrograph Report

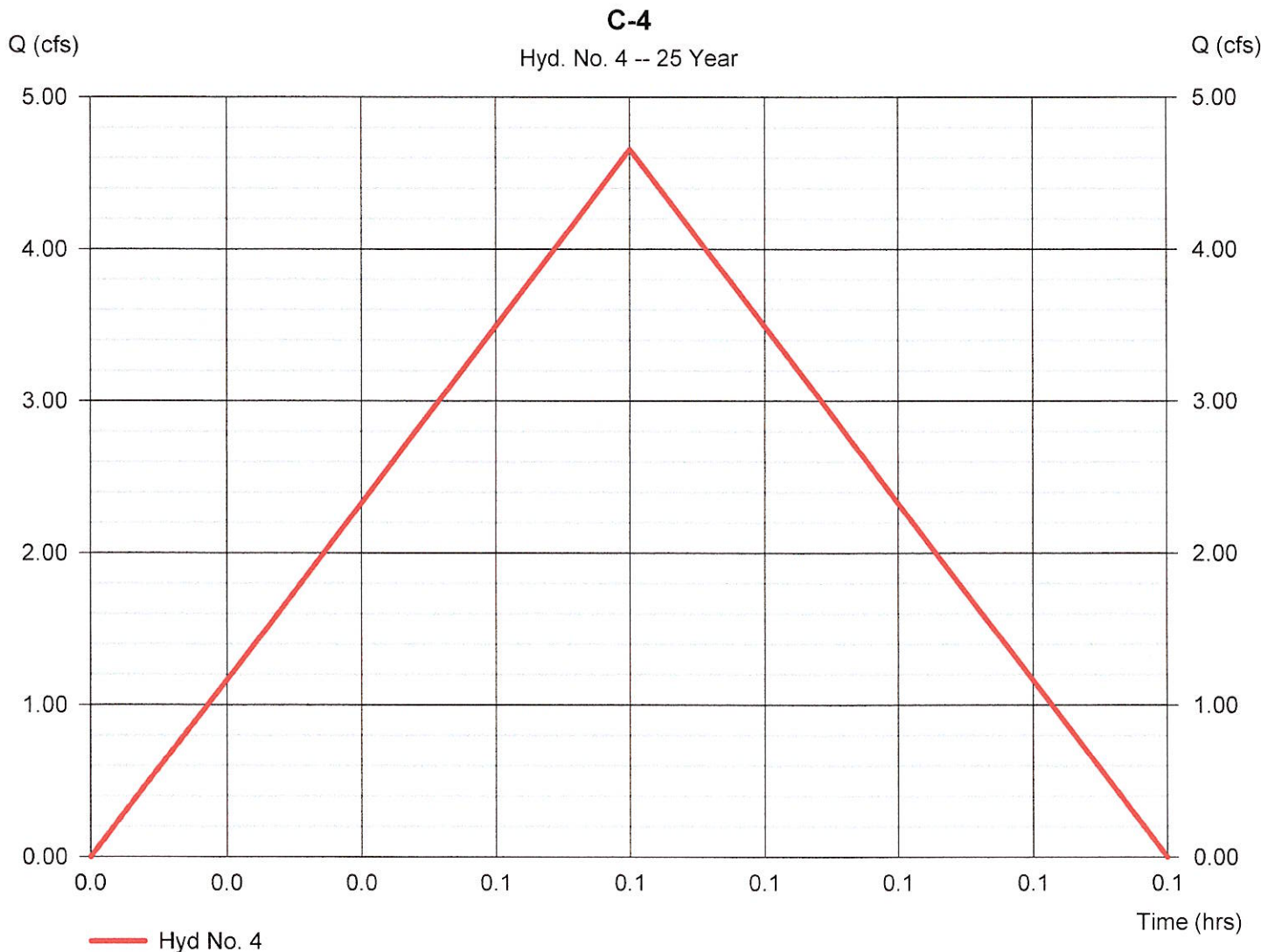
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 4

C-4

Hydrograph type	= Rational	Peak discharge	= 4.657 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,118 cuft
Drainage area	= 1.086 ac	Runoff coeff.	= 0.5
Intensity	= 8.576 in/hr	Tc by TR55	= 4.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 4

C-4

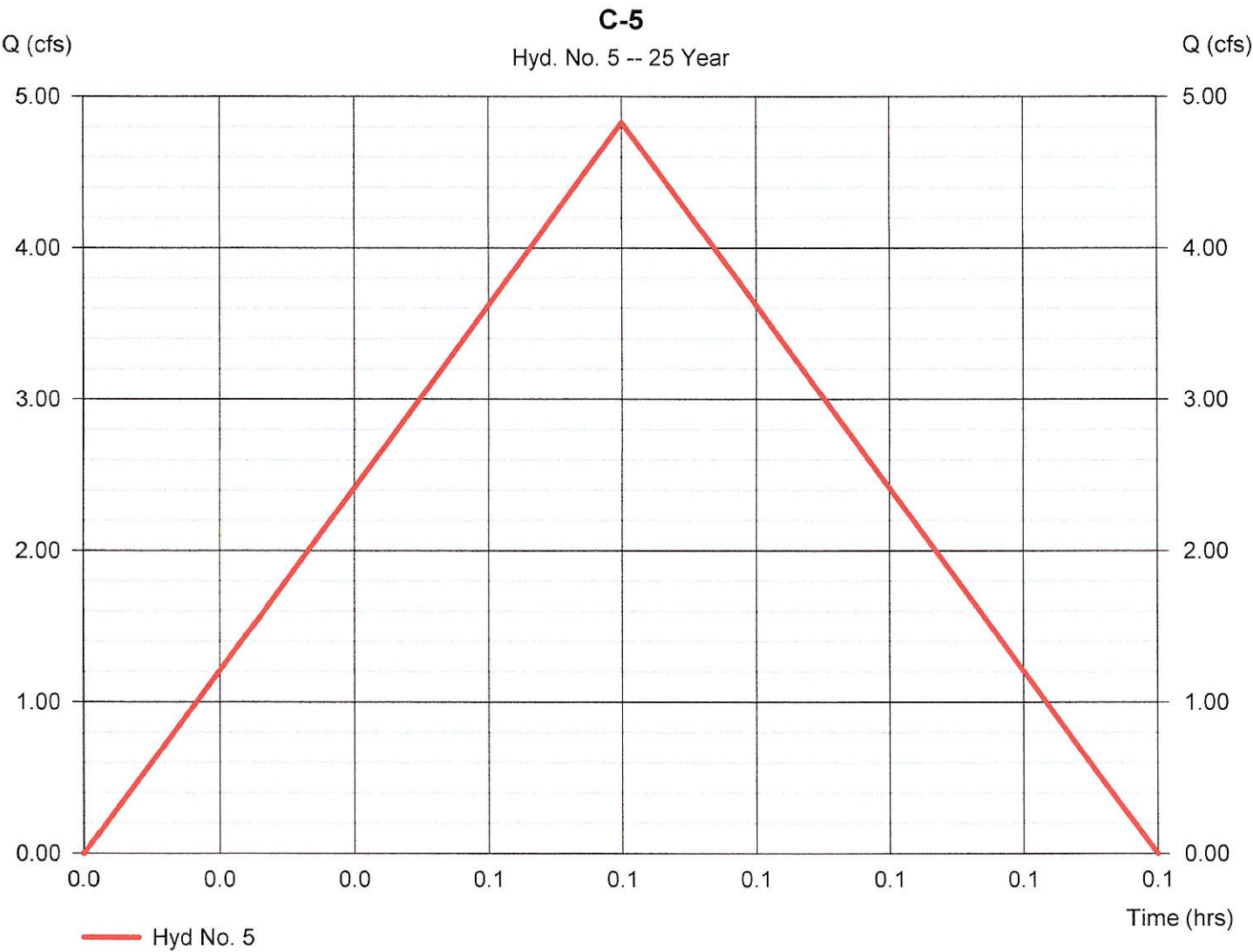
<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.52	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=1.93	0.00	0.00				
Flow length (ft)	{0}476.9	0.0	0.0				
Travel Time (min)	= 4.12	+	0.00	+	0.00	=	4.12
Total Travel Time, Tc					4.00 min		

Hydrograph Report

Hyd. No. 5

C-5

Hydrograph type	= Rational	Peak discharge	= 4.829 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,159 cuft
Drainage area	= 1.126 ac	Runoff coeff.	= 0.5
Intensity	= 8.576 in/hr	Tc by TR55	= 4.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 5

C-5

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.69	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=2.22	0.00	0.00				
Flow length (ft)	498.3	0.0	0.0				
Travel Time (min)	= 3.74	+	0.00	+	0.00	=	3.74
Total Travel Time, Tc					4.00 min		

Hydrograph Report

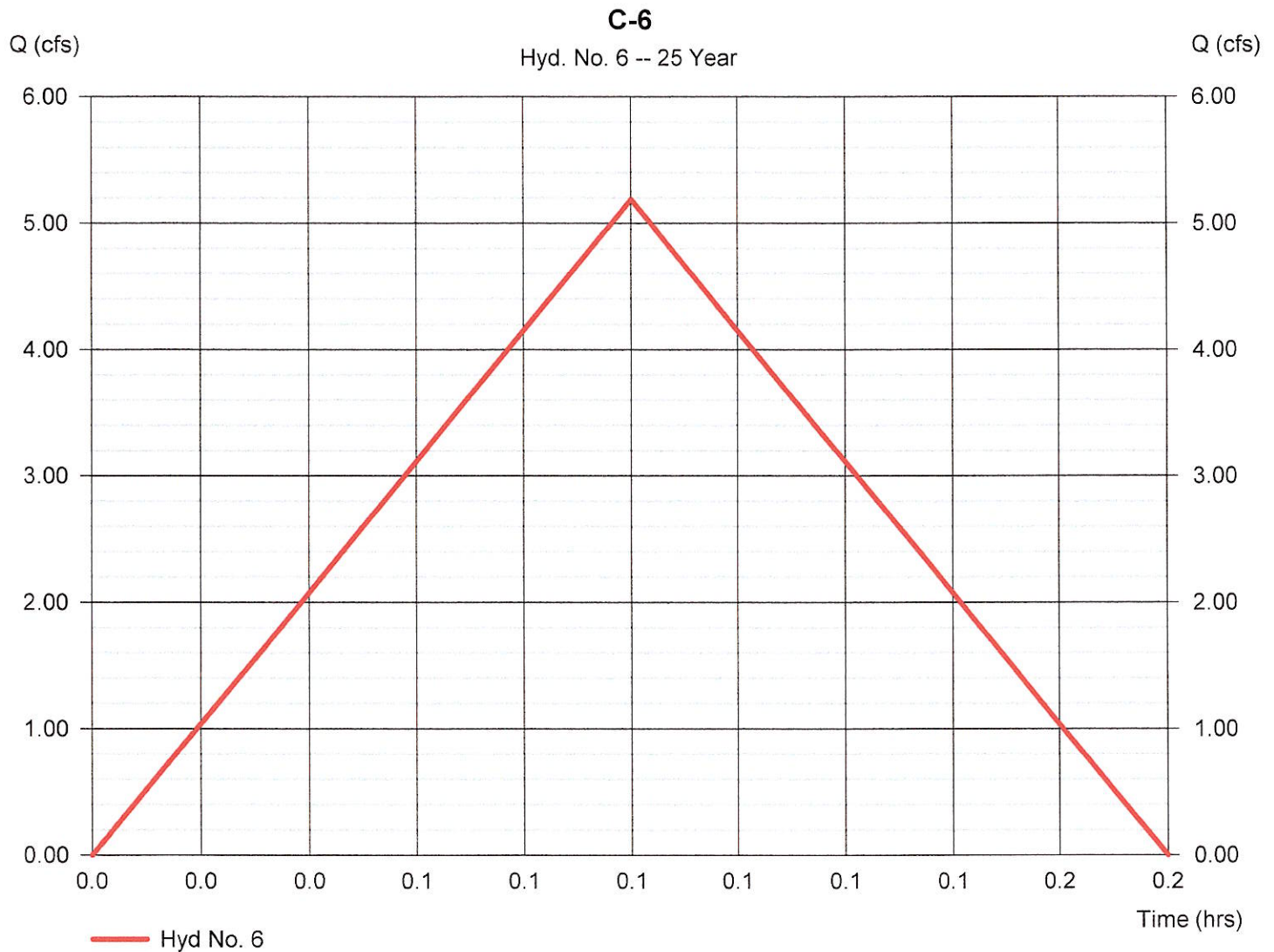
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 6

C-6

Hydrograph type	= Rational	Peak discharge	= 5.188 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,556 cuft
Drainage area	= 1.258 ac	Runoff coeff.	= 0.5
Intensity	= 8.247 in/hr	Tc by TR55	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 6

C-6

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.37	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=1.63	0.00	0.00				
Flow length (ft)	510.5	0.0	0.0				
Travel Time (min)	= 5.23	+	0.00	+	0.00	=	5.23
Total Travel Time, Tc					5.00 min		

Hydrograph Report

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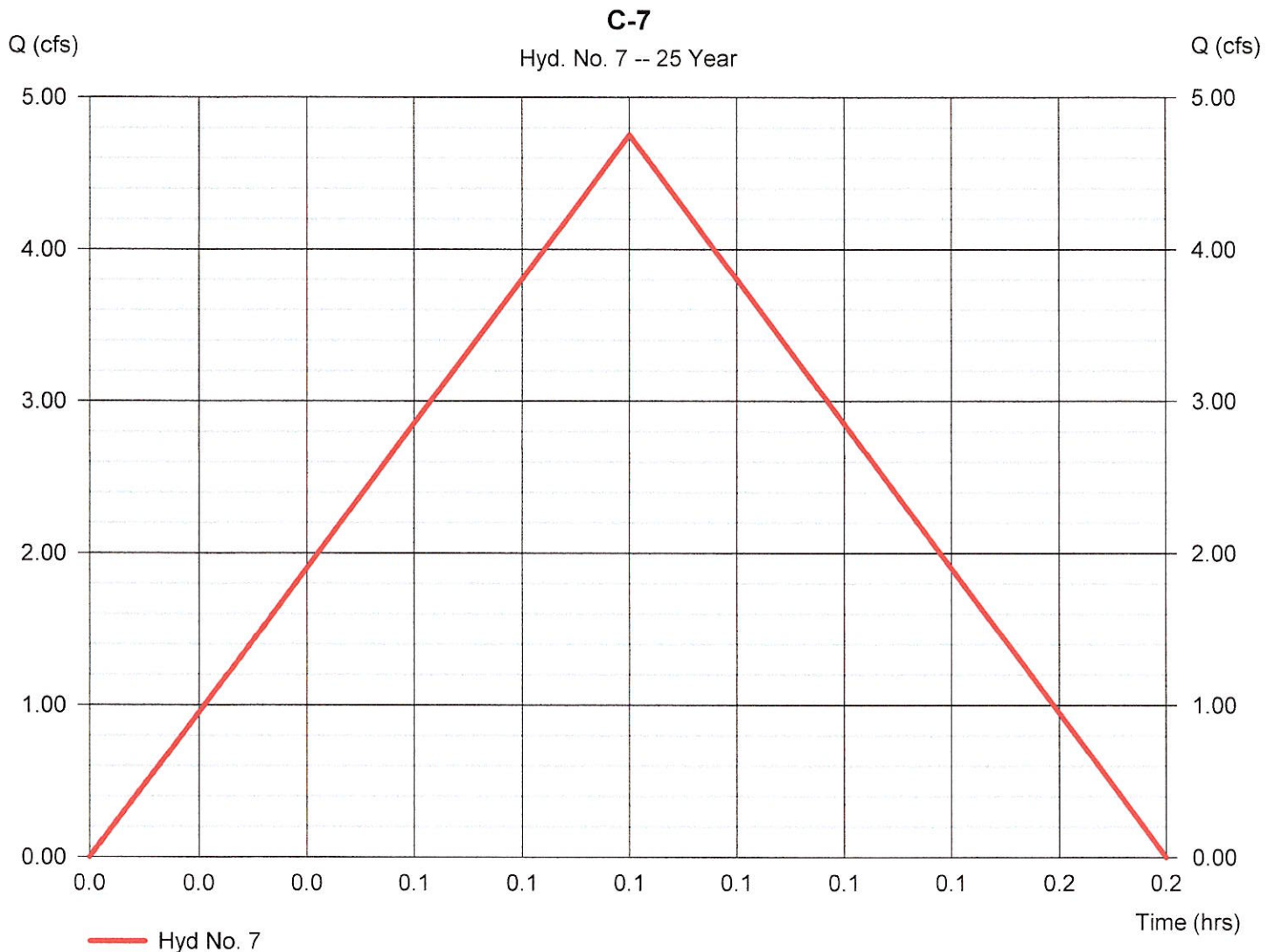
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 7

C-7

Hydrograph type	= Rational	Peak discharge	= 4.755 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,426 cuft
Drainage area	= 1.153 ac	Runoff coeff.	= 0.5
Intensity	= 8.247 in/hr	Tc by TR55	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No. 7

C-7

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.011	0.011				
Flow length (ft)	= 0.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00				
Land slope (%)	= 0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.75	0.00	0.00				
Wetted perimeter (ft)	= 5.16	0.00	0.00				
Channel slope (%)	= 0.51	0.00	0.00				
Manning's n-value	= 0.027	0.015	0.015				
Velocity (ft/s)	=1.91	0.00	0.00				
Flow length (ft)	(0)517.8	0.0	0.0				
Travel Time (min)	= 4.52	+	0.00	+	0.00	=	4.52
Total Travel Time, Tc					5.00 min		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. lo.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	5.518	1	2	662	-----	-----	-----	C-1
2	Rational	5.300	1	3	954	-----	-----	-----	C-2
3	Rational	5.358	1	3	965	-----	-----	-----	C-3
4	Rational	5.539	1	4	1,329	-----	-----	-----	C-4
5	Rational	5.743	1	4	1,378	-----	-----	-----	C-5
6	Rational	6.185	1	5	1,855	-----	-----	-----	C-6
7	Rational	5.669	1	5	1,701	-----	-----	-----	C-7
New.gpw					Return Period: 100 Year			Monday, 08 / 24 / 2026	

Hydrograph Report

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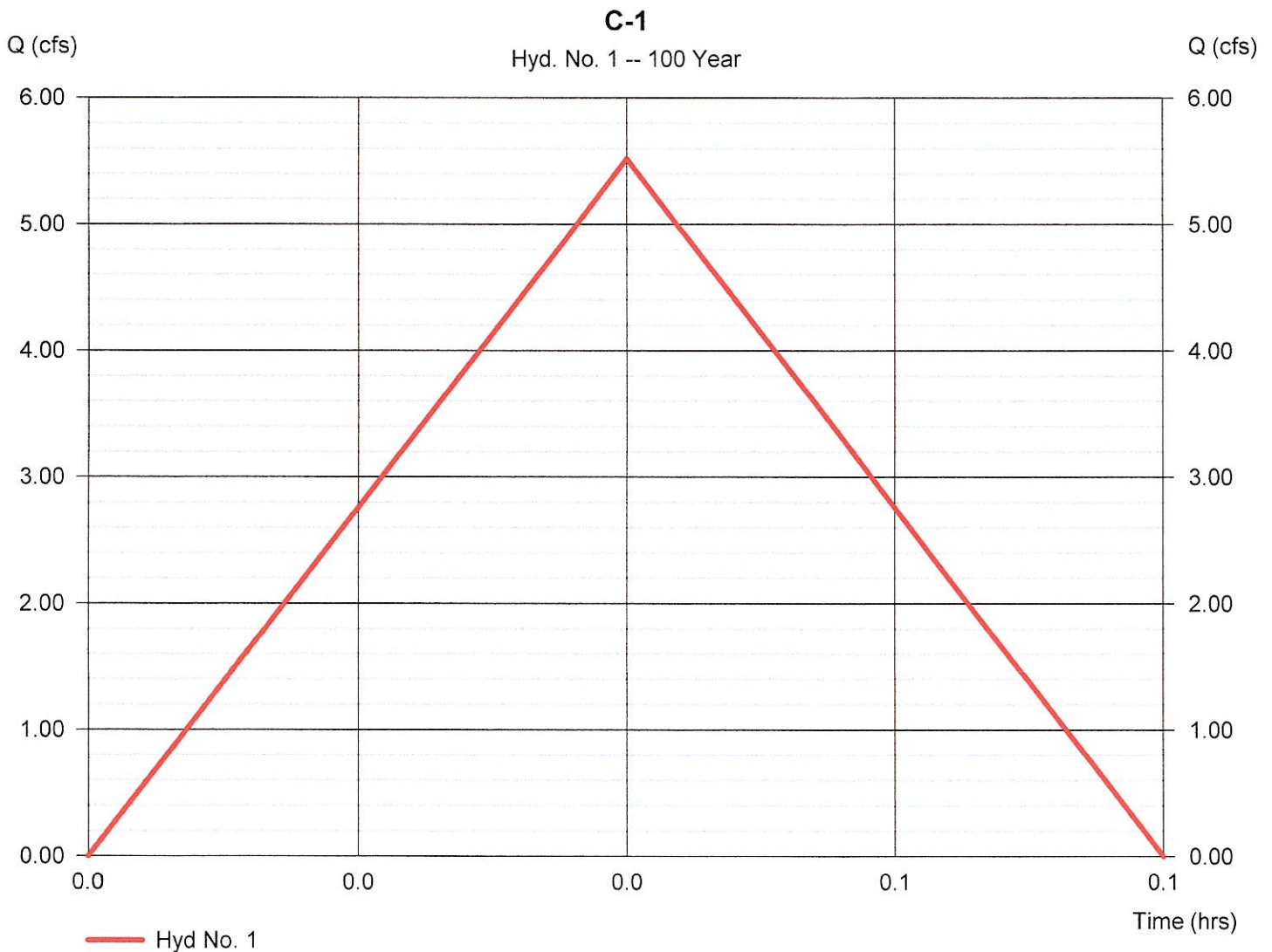
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 1

C-1

Hydrograph type	= Rational	Peak discharge	= 5.518 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.03 hrs
Time interval	= 1 min	Hyd. volume	= 662 cuft
Drainage area	= 1.000 ac	Runoff coeff.	= 0.5
Intensity	= 11.037 in/hr	Tc by TR55	= 2.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

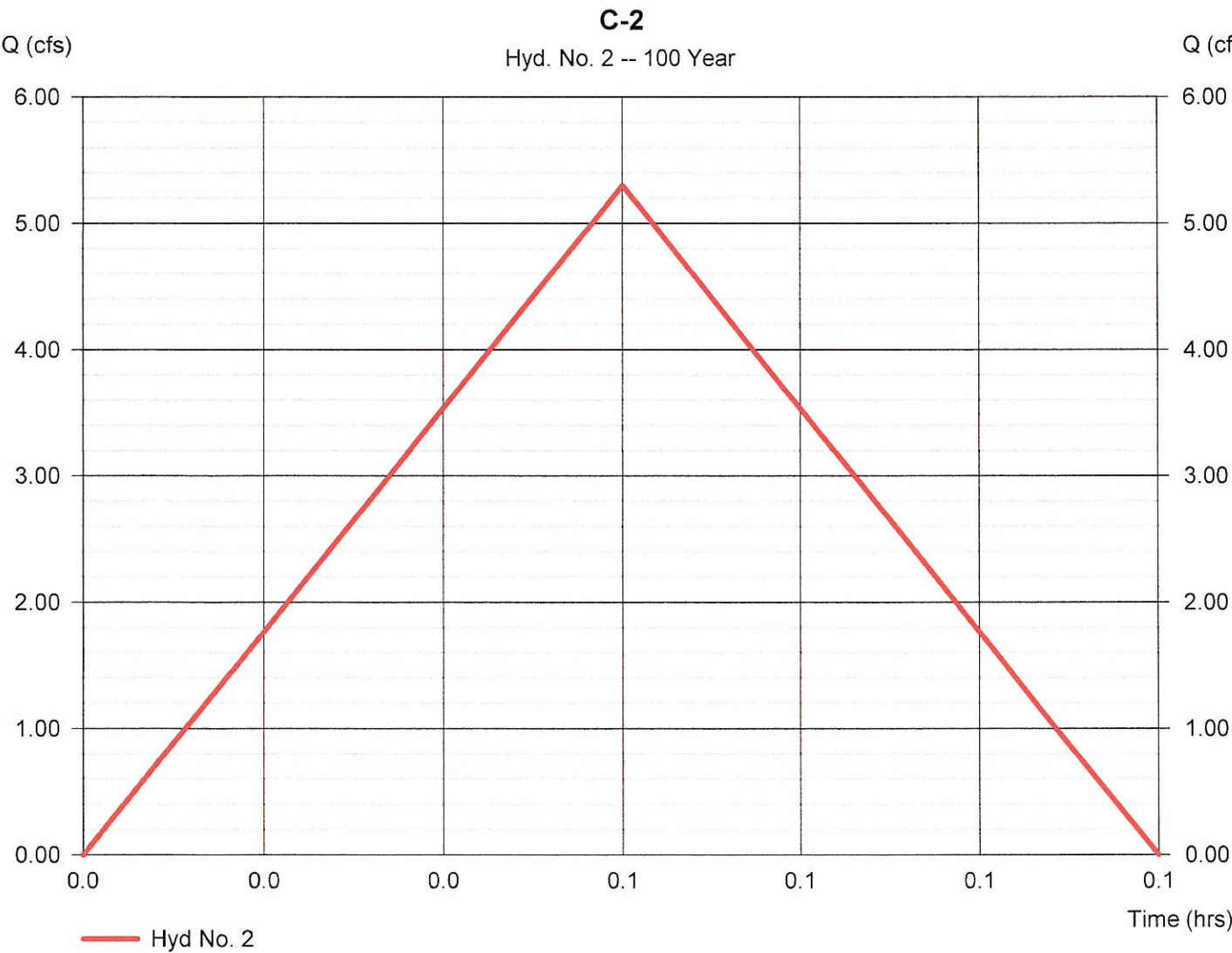
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 2

C-2

Hydrograph type	= Rational	Peak discharge	= 5.300 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.05 hrs
Time interval	= 1 min	Hyd. volume	= 954 cuft
Drainage area	= 1.000 ac	Runoff coeff.	= 0.5
Intensity	= 10.600 in/hr	Tc by TR55	= 3.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

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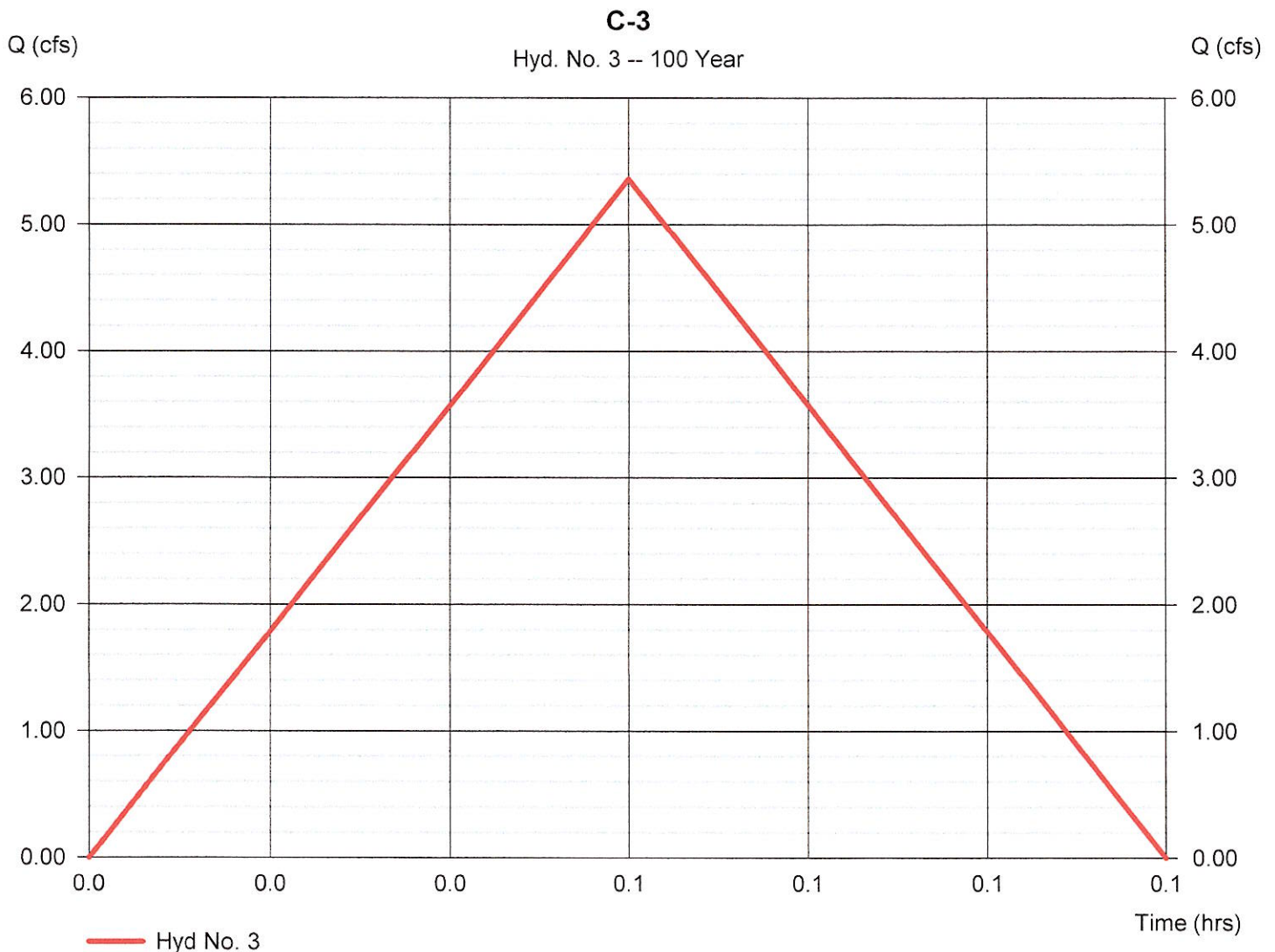
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 3

C-3

Hydrograph type	= Rational	Peak discharge	= 5.358 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.05 hrs
Time interval	= 1 min	Hyd. volume	= 965 cuft
Drainage area	= 1.011 ac	Runoff coeff.	= 0.5
Intensity	= 10.600 in/hr	Tc by TR55	= 3.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

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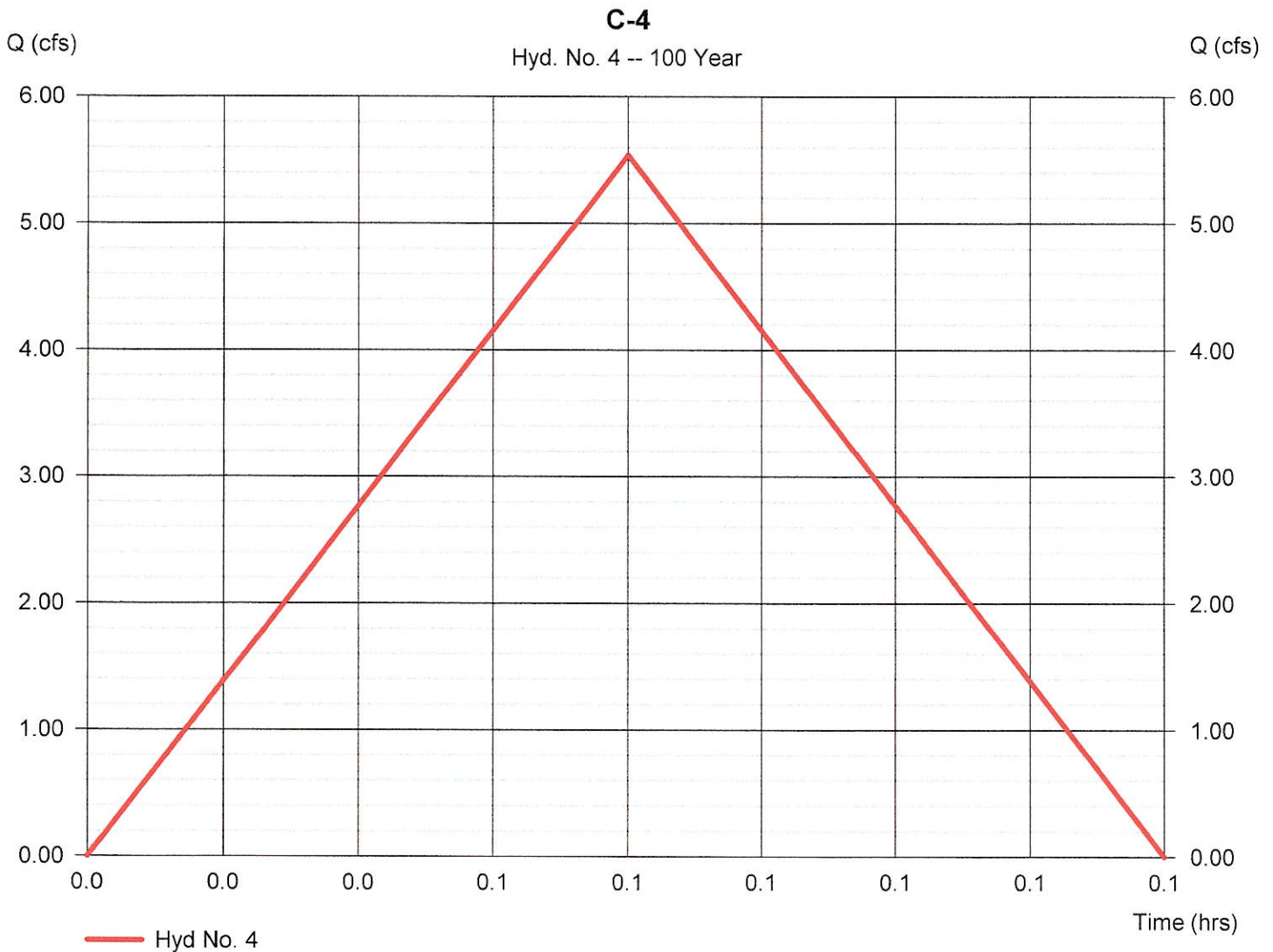
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 4

C-4

Hydrograph type	= Rational	Peak discharge	= 5.539 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,329 cuft
Drainage area	= 1.086 ac	Runoff coeff.	= 0.5
Intensity	= 10.201 in/hr	Tc by TR55	= 4.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

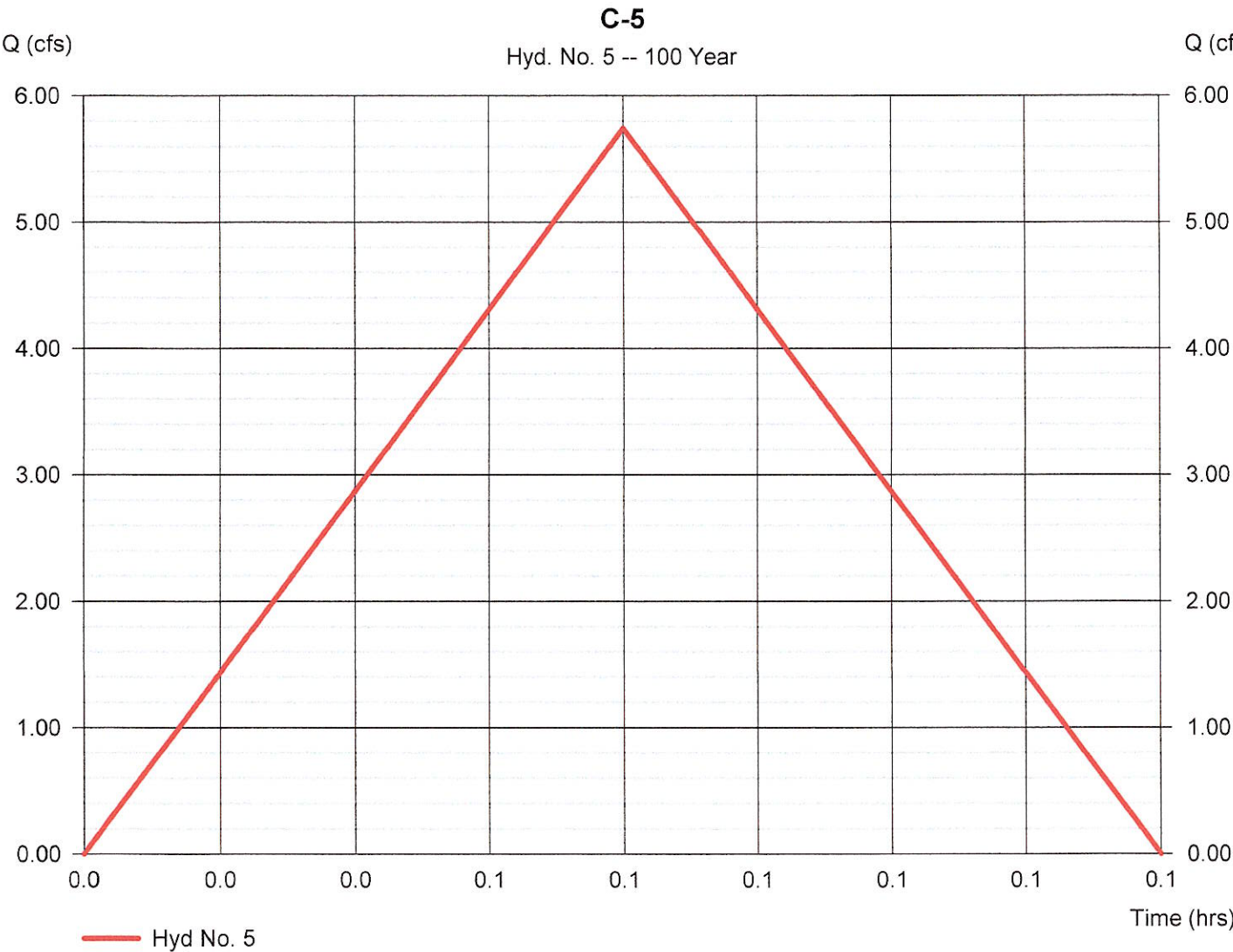
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Monday, 08 / 24 / 2026

Hyd. No. 5

C-5

Hydrograph type	= Rational	Peak discharge	= 5.743 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,378 cuft
Drainage area	= 1.126 ac	Runoff coeff.	= 0.5
Intensity	= 10.201 in/hr	Tc by TR55	= 4.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

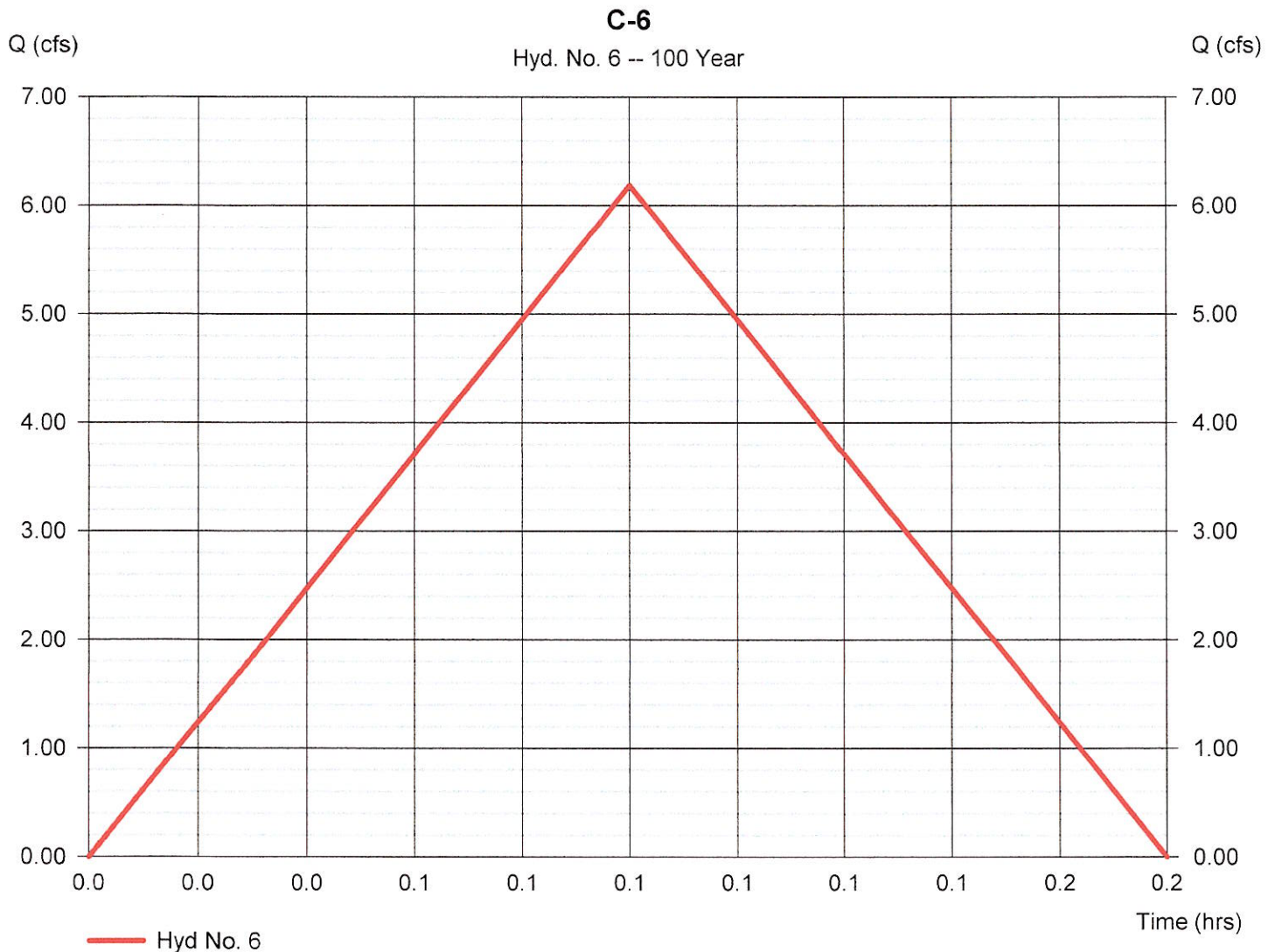
Monday, 08 / 24 / 2026

Hyd. No. 6

C-6

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.258 ac
Intensity = 9.833 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 6.185 cfs
Time to peak = 0.08 hrs
Hyd. volume = 1,855 cuft
Runoff coeff. = 0.5
Tc by TR55 = 5.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

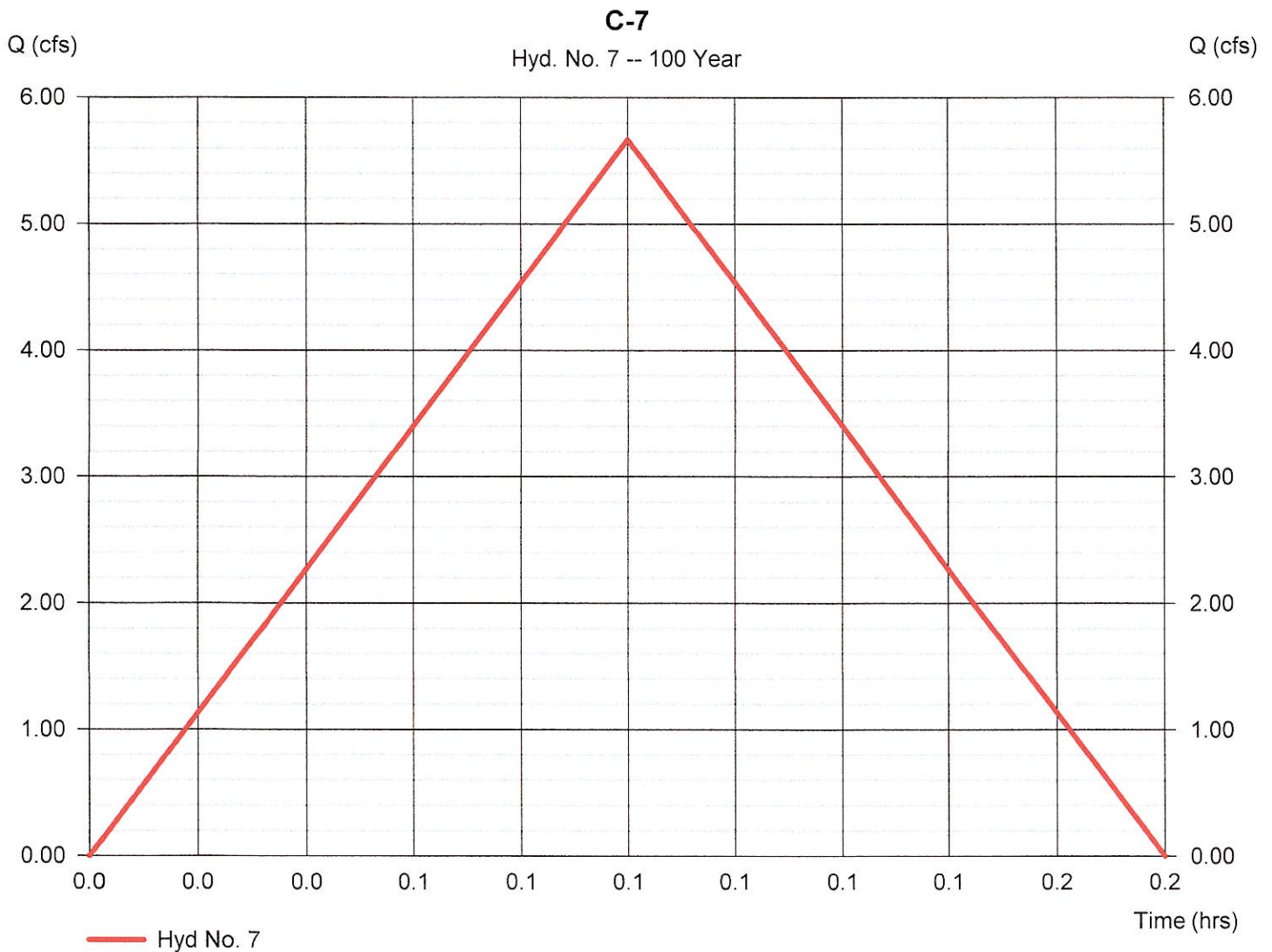
Monday, 08 / 24 / 2026

Hyd. No. 7

C-7

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.153 ac
Intensity = 9.833 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 5.669 cfs
Time to peak = 0.08 hrs
Hyd. volume = 1,701 cuft
Runoff coeff. = 0.5
Tc by TR55 = 5.00 min
Asc/Rec limb fact = 1/1



Culvert Report

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

Monday, Aug 24 2026

C-1

Invert Elev Dn (ft)	= 40.91
Pipe Length (ft)	= 20.00
Slope (%)	= 0.15
Invert Elev Up (ft)	= 40.94
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Projecting
Coeff. K,M,c,Y,k	= 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

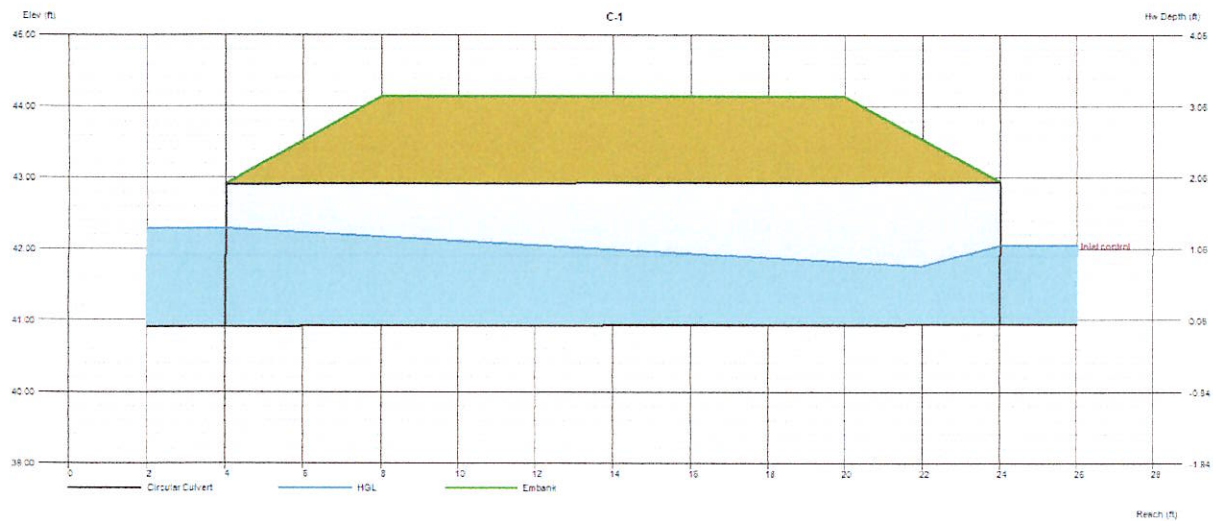
Top Elevation (ft)	= 44.14
Top Width (ft)	= 12.00
Crest Width (ft)	= 0.00

Calculations

Qmin (cfs)	= 4.67
Qmax (cfs)	= 5.52
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 4.67
Qpipe (cfs)	= 4.67
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 2.02
Veloc Up (ft/s)	= 4.27
HGL Dn (ft)	= 42.29
HGL Up (ft)	= 41.70
Hw Elev (ft)	= 42.05
Hw/D (ft)	= 0.56
Flow Regime	= Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-2

Invert Elev Dn (ft) = 40.75
Pipe Length (ft) = 20.00
Slope (%) = 0.25
Invert Elev Up (ft) = 40.80
Rise (in) = 24.0
Shape = Circular
Span (in) = 24.0
No. Barrels = 1
n-Value = 0.012
Culvert Type = Circular Corrugate Metal Pipe
Culvert Entrance = Projecting
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

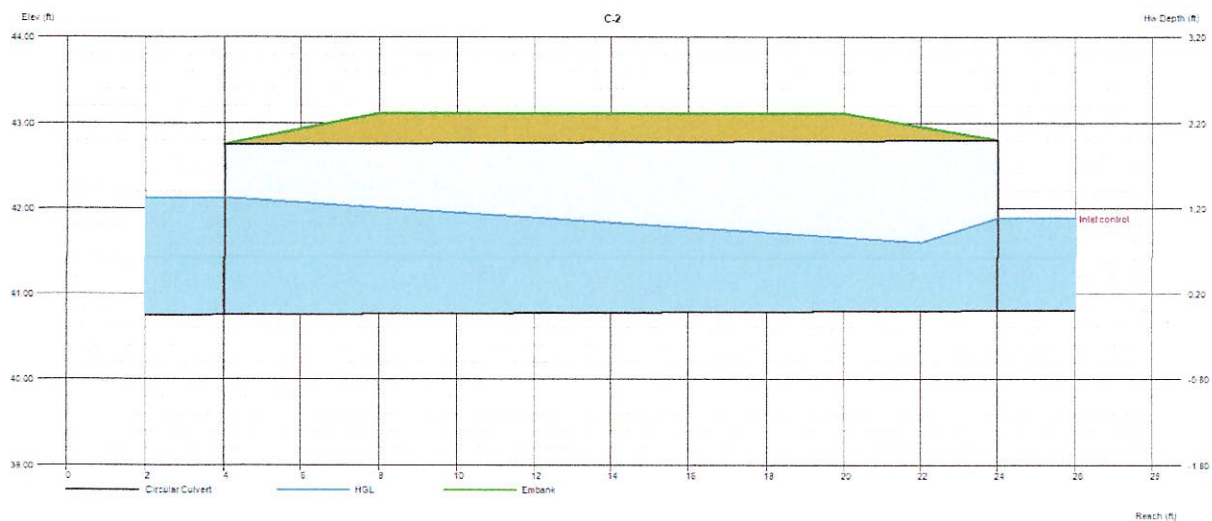
Top Elevation (ft) = 43.11
Top Width (ft) = 12.00
Crest Width (ft) = 0.00

Calculations

Qmin (cfs) = 4.47
Qmax (cfs) = 5.30
Tailwater Elev (ft) = $(dc+D)/2$

Highlighted

Qtotal (cfs) = 4.47
Qpipe (cfs) = 4.47
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 1.95
Veloc Up (ft/s) = 4.21
HGL Dn (ft) = 42.12
HGL Up (ft) = 41.54
Hw Elev (ft) = 41.88
Hw/D (ft) = 0.54
Flow Regime = Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-3

Invert Elev Dn (ft)	= 40.16
Pipe Length (ft)	= 20.00
Slope (%)	= 0.55
Invert Elev Up (ft)	= 40.27
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Projecting
Coeff. K,M,c,Y,k	= 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

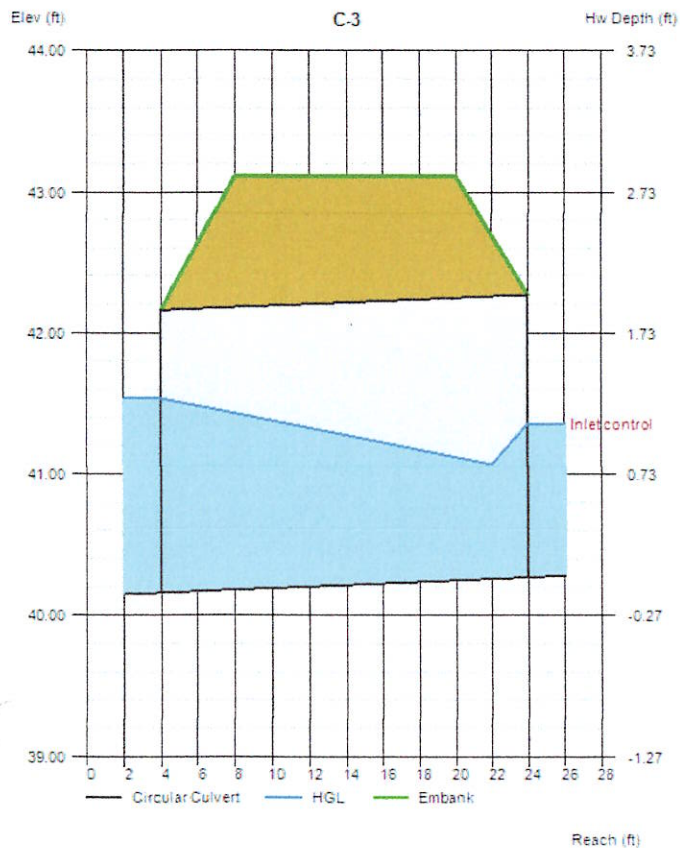
Top Elevation (ft)	= 43.11
Top Width (ft)	= 12.00
Crest Width (ft)	= 0.00

Calculations

Qmin (cfs)	= 4.52
Qmax (cfs)	= 5.36
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 4.52
Qpipe (cfs)	= 4.52
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 1.97
Veloc Up (ft/s)	= 4.22
HGL Dn (ft)	= 41.53
HGL Up (ft)	= 41.02
Hw Elev (ft)	= 41.36
Hw/D (ft)	= 0.54
Flow Regime	= Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-4

Invert Elev Dn (ft)	= 39.39
Pipe Length (ft)	= 20.00
Slope (%)	= 0.60
Invert Elev Up (ft)	= 39.51
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Projecting
Coeff. K,M,c,Y,k	= 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

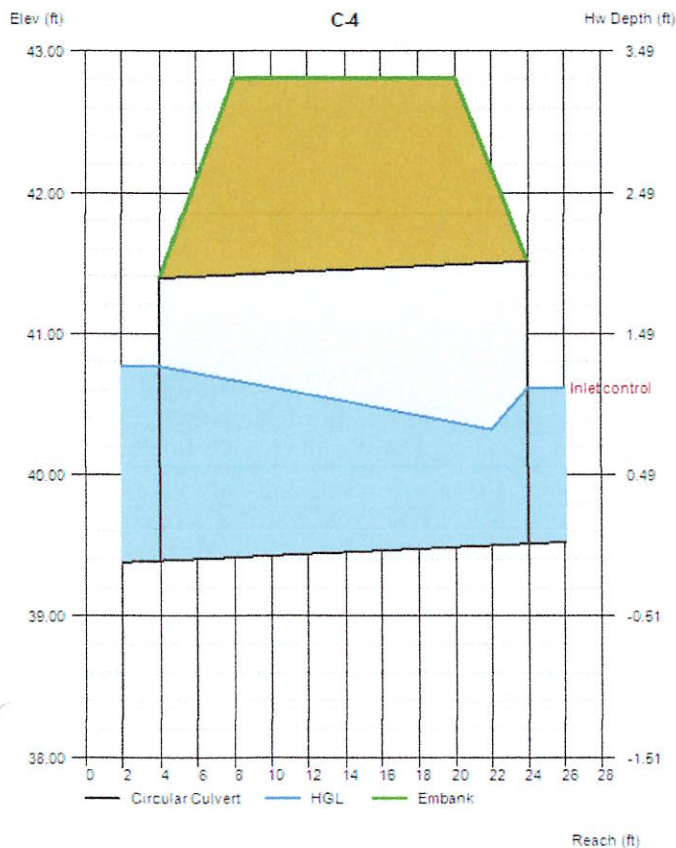
Top Elevation (ft)	= 42.81
Top Width (ft)	= 12.00
Crest Width (ft)	= 0.00

Calculations

Qmin (cfs)	= 4.66
Qmax (cfs)	= 5.54
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 4.66
Qpipe (cfs)	= 4.66
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 2.02
Veloc Up (ft/s)	= 4.26
HGL Dn (ft)	= 40.77
HGL Up (ft)	= 40.27
Hw Elev (ft)	= 40.62
Hw/D (ft)	= 0.55
Flow Regime	= Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-5

Invert Elev Dn (ft) = 39.23
Pipe Length (ft) = 20.00
Slope (%) = 0.15
Invert Elev Up (ft) = 39.26
Rise (in) = 24.0
Shape = Circular
Span (in) = 24.0
No. Barrels = 1
n-Value = 0.012
Culvert Type = Circular Corrugate Metal Pipe
Culvert Entrance = Projecting
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

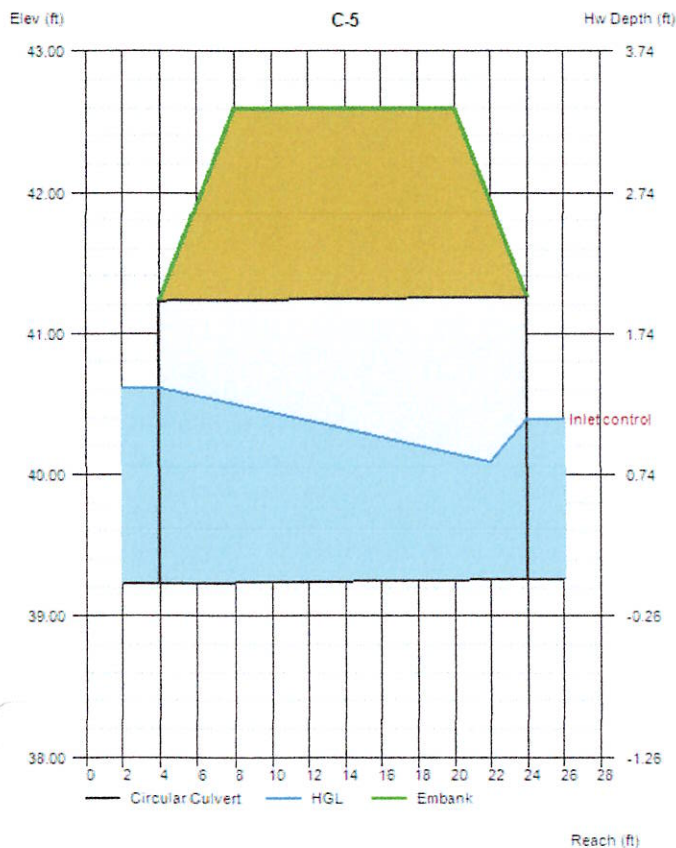
Top Elevation (ft) = 42.60
Top Width (ft) = 12.00
Crest Width (ft) = 0.00

Calculations

Qmin (cfs) = 4.83
Qmax (cfs) = 5.74
Tailwater Elev (ft) = (dc+D)/2

Highlighted

Qtotal (cfs) = 4.83
Qpipe (cfs) = 4.83
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 2.08
Veloc Up (ft/s) = 4.31
HGL Dn (ft) = 40.62
HGL Up (ft) = 40.03
Hw Elev (ft) = 40.40
Hw/D (ft) = 0.57
Flow Regime = Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-6

Invert Elev Dn (ft) = 38.90
Pipe Length (ft) = 20.00
Slope (%) = 0.25
Invert Elev Up (ft) = 38.95
Rise (in) = 24.0
Shape = Circular
Span (in) = 24.0
No. Barrels = 1
n-Value = 0.012
Culvert Type = Circular Corrugate Metal Pipe
Culvert Entrance = Projecting
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

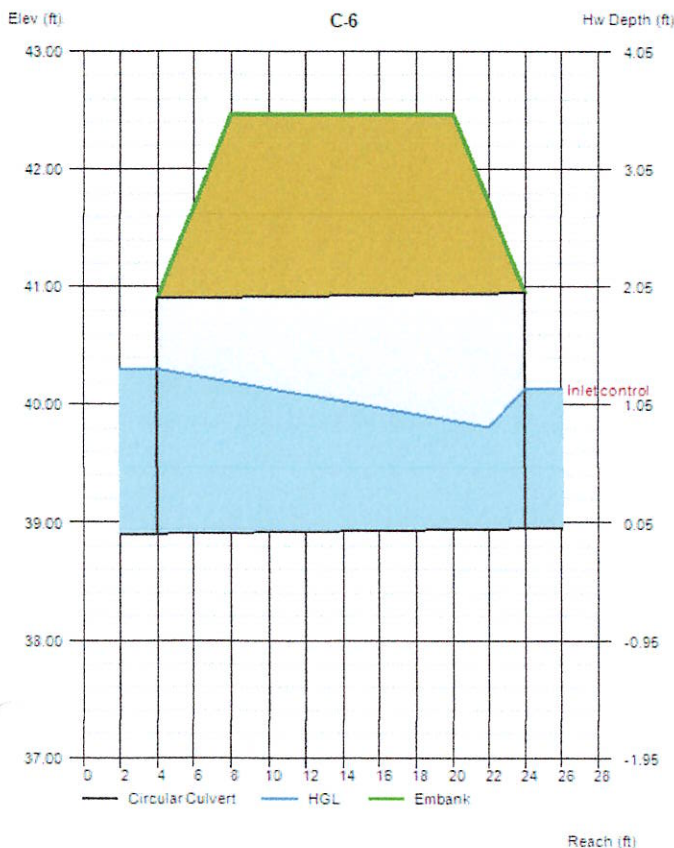
Top Elevation (ft) = 42.47
Top Width (ft) = 12.00
Crest Width (ft) = 0.00

Calculations

Qmin (cfs) = 5.19
Qmax (cfs) = 6.19
Tailwater Elev (ft) = $(dc+D)/2$

Highlighted

Qtotal (cfs) = 5.19
Qpipe (cfs) = 5.19
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 2.21
Veloc Up (ft/s) = 4.40
HGL Dn (ft) = 40.30
HGL Up (ft) = 39.75
Hw Elev (ft) = 40.14
Hw/D (ft) = 0.59
Flow Regime = Inlet Control



Culvert Report

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

Monday, Aug 24 2026

C-7

Invert Elev Dn (ft) = 38.49
Pipe Length (ft) = 20.00
Slope (%) = 0.35
Invert Elev Up (ft) = 38.56
Rise (in) = 24.0
Shape = Circular
Span (in) = 24.0
No. Barrels = 1
n-Value = 0.012
Culvert Type = Circular Corrugate Metal Pipe
Culvert Entrance = Projecting
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

Top Elevation (ft) = 42.58
Top Width (ft) = 12.00
Crest Width (ft) = 0.00

Calculations

Qmin (cfs) = 4.76
Qmax (cfs) = 5.67
Tailwater Elev (ft) = $(dc+D)/2$

Highlighted

Qtotal (cfs) = 4.76
Qpipe (cfs) = 4.76
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 2.05
Veloc Up (ft/s) = 4.29
HGL Dn (ft) = 39.87
HGL Up (ft) = 39.33
Hw Elev (ft) = 39.69
Hw/D (ft) = 0.56
Flow Regime = Inlet Control

