MIDWEST WASH GROUP
NORTHEAST CORNER OF RTE 291 AND SE THOMPSON DRIVE LEE'S SUMMIT, MO 64081

PRELIMINARY STORMWATER DRAINAGE STUDY

Prepared for:

Midwest Wash Group
1362 NE Windsor Dr.
Lee's Summit, MO 64086

Olsson Project No. 022-04040
May 2023

olsson®

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1. GENERAL INFORMATION

The Midwest Wash Group's project (the project) is approximately 1.23 acres of proposed planned industrial. This project is located northeast of the intersection of HWY 291 and SE Thompson Drive in Lee's Summit, Missouri. Stormwater from the project is conveyed into the Big Creek Watershed. Figure 1 shows the location and boundary of the project.

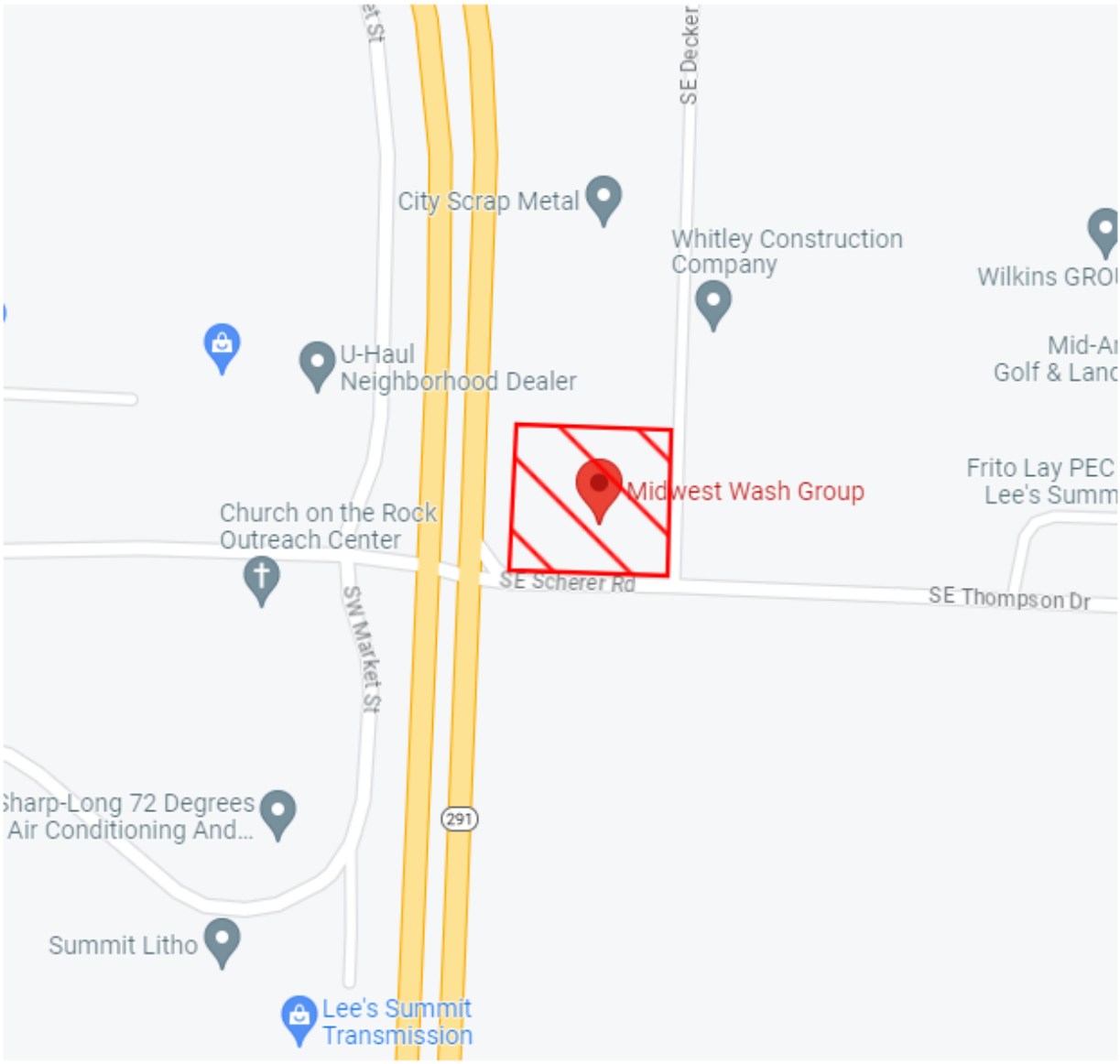


Figure 1. Location Map.

1.1 FEMA Floodplain Classifications

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel Number 29095C0438G classifies the project to be within the Zone X.

- Zone X – Areas that are determined to be moderate flood hazards areas and can be any of the following: areas of the 500-year (0.2-percent-annual-chance) flood; areas of average depths of less than one foot or with drainage areas less than one square mile; areas protected by levees from the 1% annual chance flood.

1.2 Soil Classifications

Soil maps published on the Natural Resources Conservation Service's (NRCS) Web Soil Survey categorize soils within the project boundary as shown in Table 1. See Exhibit 2 in Appendix A for a map of soils on the property.

Table 1. Soil Classifications.

Symbol	Name	Slopes	Hydrologic Soil Group
10116	Sampsel silty clay loam (9.7%)	2-5 %	C/D
10180	Udarents-Urban land-Sampsel complex (90.3%)	2-5 %	C

2. METHODOLOGY

This drainage study has been prepared to evaluate the hydrologic impact generated by the project. The base data for the models prepared for this report has been obtained from available online maps and aerial imagery. Stormwater management is based upon methods and objectives defined in the Kansas City Metropolitan Chapter of the American Public Works Association's (KC-APWA) 2011 design guidance document called "Section 5600 Storm Drainage Systems & Facilities". Stormwater runoff models were created for the 2-, 10-, and 100-year design storm events.

3. EXISTING CONDITIONS

The existing site consist of open green space currently. Existing drainage patterns sheet flow from the west public storm system (open flared end section) into our proposed site and then is captured by an existing swale (north of property), and then captured into another public storms system (flared end section). The total estimated area modeled within this drainage area is approximately 12.0 acres in existing conditions, which includes portions of on-site and off-site drainage area.

3.1 Hydrologic Analysis (Existing Conditions)

To provide a direct comparison between the existing and proposed conditions models, the points of interest have been kept consistent throughout the analysis.

Curve numbers were determined based on the soil classifications outlined in Section 1.2 and existing land use. Land use was determined from recent aerial imagery. Curve numbers were assumed as shown in Table 2.

Table 2. Curve Numbers.

Land Use	HSG	CN
Sampsel silty clay loam (9.7%)	C/D	74
Udarents-Urban land-Sampsel complex (90.3%)	D	80

*HSG = hydrologic soil group, *CN = curve number

Table 3. Existing Conditions Drainage Area Data.

Drainage Area	On-site Area (acres)	Off-site Area (acres)	Total Area (acres)	
A	1.29	0		
B	0	12.0		
Total Area:			13.29	
Drainage Area	**Storm Event**	**K Value**	**Intensity (in/Hr)**	**Runoff Q (cfs)**
A (On-site)	10-YR	1.0	7.35	2.85
	100-YR	1.25	10.32	4.99
B (Off-site)	10-YR	1.0	7.35	26.46
	100-YR	1.25	10.32	49.04

3.2 Detention Requirements

Per APWA Section 5608.4 and the City of Lee's Summit criteria, the performance criteria for comprehensive control is to provide detention to limit peak flow rates at downstream points of interest to maximum release rates:

- 50 percent storm peak rate less than or equal to 0.5 cfs per site acre
- 10 percent storm peak rate less than or equal to 2.0 cfs per site acre
- 1 percent storm peak rate less than or equal to 3.0 cfs per site acre

4. PROPOSED CONDITIONS

The proposed conditions sections of this analysis assume completion the project. The project will consist of a proposed car wash facility. With this, the impervious area has been calculated to show the impervious area has increased to roughly 59%.

4.1 Effects of Development

The modeled drainage areas and points of interest are similar to the existing conditions model. However, throughout the site, some shifting of ridgelines will occur, accommodating proposed detention facility and anticipated grading activities, which will change the relative areas draining to each point of interest. The following is a summary of the proposed conditions drainage areas.

Drainage Area A (on-site) in proposed conditions is approximately 1.12 acres overall. Proposed grading activities and construction of buildings on-site will alter ridgelines from existing conditions, shifting areas very slightly. Please note, there is a difference between Existing Drainage Area A and Existing Drainage Area A due to site specifics, however, with this the small difference (0.17 acres) will sheet flow into Decker Street (Eastern Street) and into the public setback curb inlet. This inlet was already anticipated to capture this runoff, but gutter spread calcs were completed and proves this additional runoff can be handled.

Drainage Area B (off-site) in proposed conditions is approximately 12.0 acres overall. The only proposed grading activity that will occur within this Drainage Area is a modified swale in order to keep this runoff on the outskirts of the property site. This area was calculated via GIS, but it is assumed existing conditions currently take this water through a swale and into the public system. As discussed above, only a slight modification will need to occur in order to keep water from in its existing route/etc.

4.2 Hydrologic Analysis (Proposed Conditions)

The analysis provided in Section 3 established existing conditions of the development's drainage areas. The analysis in Section 4 will provide guidance for configuring the detention basin to meet the objectives established in Section 3. Proposed curve numbers for the on-site drainage areas were calculated based off impervious areas for the developed site.

The following tables summarize the results of the existing vs. proposed conditions analysis. Table 4 summarizes the proposed conditions drainage area data. Tables 5 compares the flow rates without detention along with Table 6 shows that detention is provided, to demonstrate the effects of development for each drainage area.

Table 4. Proposed Conditions Drainage Area Data.

***Note: Difference between Existing Drainage Area A and Proposed Drainage Area A of 0.17 acres. This water will sheet flow to Decker Street and be captured into existing public storm system (which was already calculated to handle this runoff)**

Drainage Area	On-site Area (acres)	Off-site Area (acres)	Total Area (acres)	
A	*1.12	0		
B	0	12.0		
Total Area:			13.29	
Drainage Area	**Storm Event**	**K Value**	**Intensity (in/Hr)**	**Runoff Q (cfs)**
A (On-site)	10-YR	1.0	7.35	5.43
	100-YR	1.25	10.32	9.53
B (Off-site)	10-YR	1.0	7.35	26.46
	100-YR	1.25	10.32	49.04

Table 5 shows post-development peak discharge values points of interest assuming no detention is provided. Proposed conditions peak flow rates without detention are higher than allowable release rates for the 10-year storm and 100-year storm. Section 4.4 will analyze the effects of detention on proposed conditions peak flow rates and provide a comparison to peak flow rates without detention to determine if detention is beneficial for this project.

Table 5. Proposed (No Detention) Conditions Peak Flow Comparison

Drainage Area	Storm Event	Runoff Q (cfs)	Difference (cfs)
Existing A (On-site)	10-YR	2.85	2.85 – 5.43 = **-2.58**
	100-YR	4.99	
Proposed A (On-site)	10-YR	5.43	4.99 – 9.53= **-4.54**
	100-YR	9.53	

4.3 Proposed Detention Facilities

To mitigate the increases in peak flows (shown in the previous table) and, where possible, to decrease further to the allowable release rates established in Section 3, detention will be provided for each of the on-site drainage areas. This detention facility will be constructed as part of the project. The detention facility is designed to capture most of the site runoff and to mitigate increases in peak discharge from the site.

The detention facility will contain a 6" outlet pipe set at the bottom of the detention basin. Additional information will be provided for the outlet structure with the final stormwater drainage study.

It should be noted that this detention basin/structure will consist of a (3) sided 6' tall retaining wall with (1) open side to allow for ease of maintenance and an overflow path. Due to site constraints with existing utilities/etc. this was the only available location to fit a sufficient basin.

Tables 6 includes hydrologic summaries of the proposed detention facilities for the 10- and 100-year storm events, respectively.

Table 6. Proposed Conditions Detention Flow

Drainage Area	Storm Event	Runoff Q (cfs)
Proposed A (On-site)	10-YR	1.05
	100-YR	1.42

4.4 Effects of Proposed Detention

The tables above compare the results of the proposed conditions analysis with the detention described above to the existing conditions from Section 3 at the points of interest.

As shown in Table 6, with the addition of detention facility, peak discharges at Drainage Area A will be at or below the allowable release rates for the 10-year and 100-year storm.

5. SUMMARY

This stormwater drainage study was prepared to evaluate the hydrologic impact generated by the Car Wash project and to provide recommendations for a comprehensive stormwater management plan. The project is a proposed car wash on approximately 1.29 acres.

6. CONCLUSIONS AND RECOMMENDATIONS

This proposed stormwater management plan was designed to achieve compliance with current design criteria in effect for the City of Lee's Summit, Missouri.

The results of the analysis demonstrate that the future stormwater management plan for the project will achieve compliance with design criteria or the requested waiver. We therefore request approval of this Scannell Development Preliminary Stormwater Drainage Study. This approval is conditional and should be substantiated with each plat of the project.

7. REFERENCES

Best Management Products, Inc. (2021). “Frequently Asked Questions” <https://www.bmpinc.com/faq/>

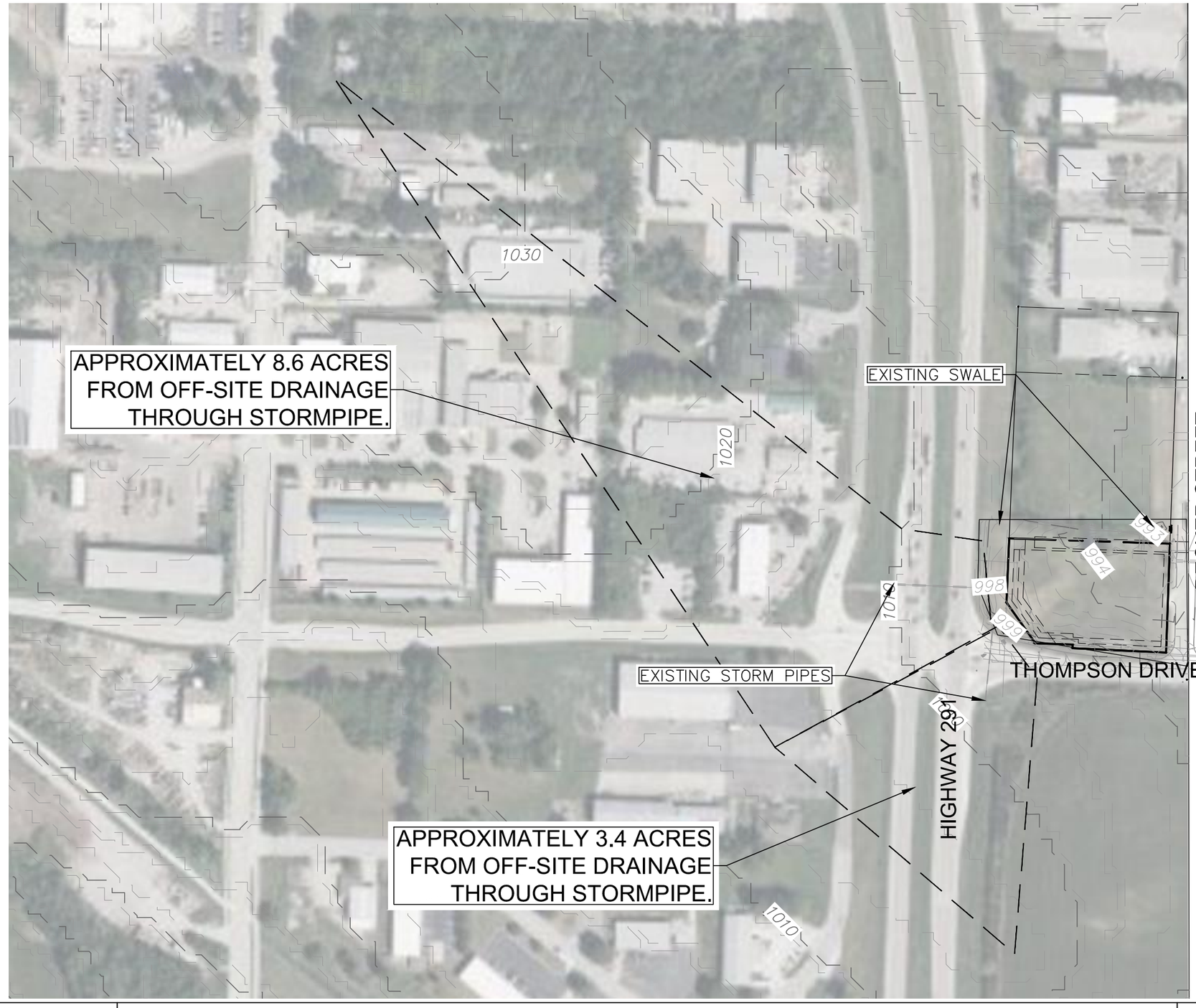
City of Lee’s Summit. (2020). “Section 5600 – Storm Drainage Systems & Facilities, City of Lee’s Summit, Missouri, Design Criteria”

FEMA (Federal Emergency Management Agency). (2021). “FEMA Flood Map Service Center”. <https://msc.fema.gov/portal/home> (March 23, 2023).

KC-APWA (American Public Works Association, Kansas City Metropolitan Chapter). (2011). “Division V Section 5600 Storm Drainage Systems & Facilities”.

APPENDIX A

Site Maps



NOTES:
OFFSITE DRAINAGE CONTOURS ARE APPROXIMATE AND PROVIDED BY BING TERRAIN DATA.

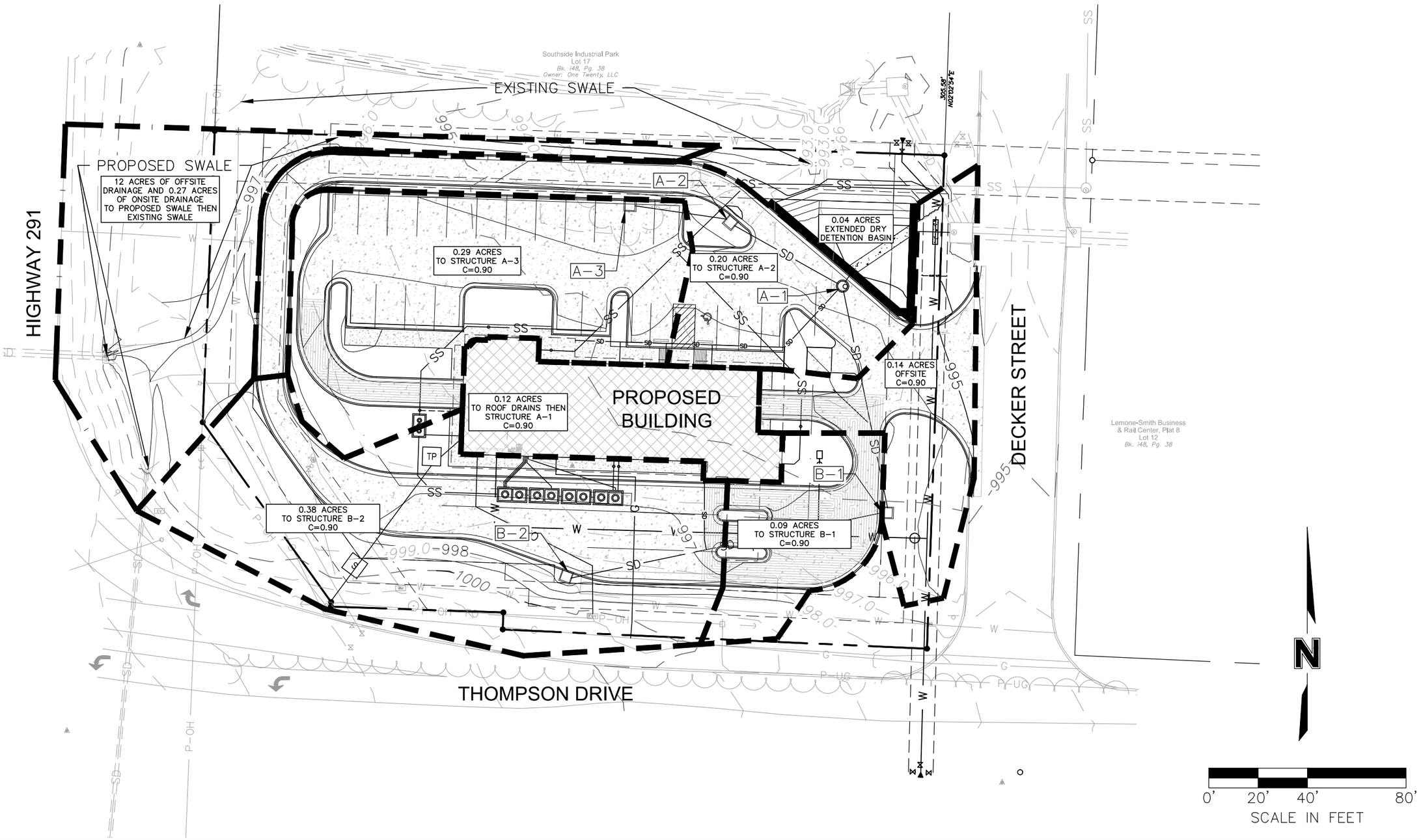
PROJECT NO: 022-04040 DRAWN BY: SLG DATE: 03/21/23	EXISTING CONDITIONS	olsson 7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170	EXHIBIT 1

DWG: F:\2022\04001-04500\022-04040\40-Design\Exhibits\Storm Report\Exhibits\C_SIT01_02204040.dwg USER: bpayne2
DATE: May 08, 2023 3:16pm XREFS: C_XBASE_02204040 C_PBASE_02204040 C_PSURF_02204040

LEGEND

PROPERTY LINE

PROPOSED DRAINAGE BOUNDARY (1.11 ACRES)



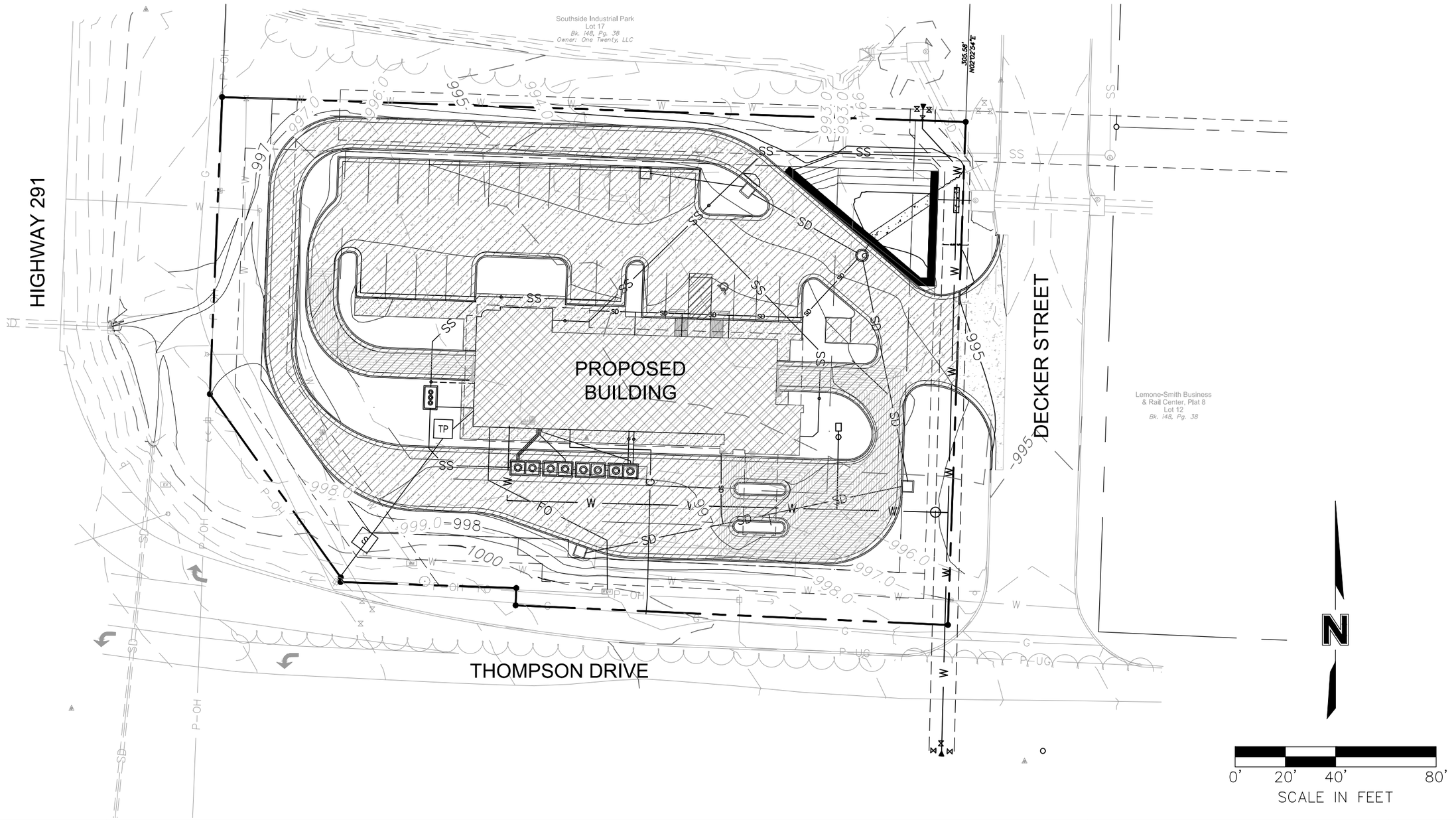
PROJECT NO: 022-04040	PROPOSED DRAINAGE CONDITIONS	olsson 7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170	EXHIBIT 1
DRAWN BY: SLG			
DATE: 03/21/23			

DWG: F:\2022\04001-04500\022-04040\40-Design\Exhibits\Storm Report\Exhibits\C_SIT01_02204040.dwg USER: bpayne2
DATE: May 08, 2023 3:17pm XREFS: C_XBASE_02204040 C_PBASE_02204040 C_PSURF_02204040

LEGEND

PROPERTY LINE

PROPOSED IMPERVIOUS AREA (.76 ACRES)



PROJECT NO: 022-04040	PROPOSED IMPERVIOUS CONDITIONS	olsson 7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170	EXHIBIT 1
DRAWN BY: SLG			
DATE: 03/21/23			

NOTES TO USERS

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

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

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

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

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

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

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

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

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

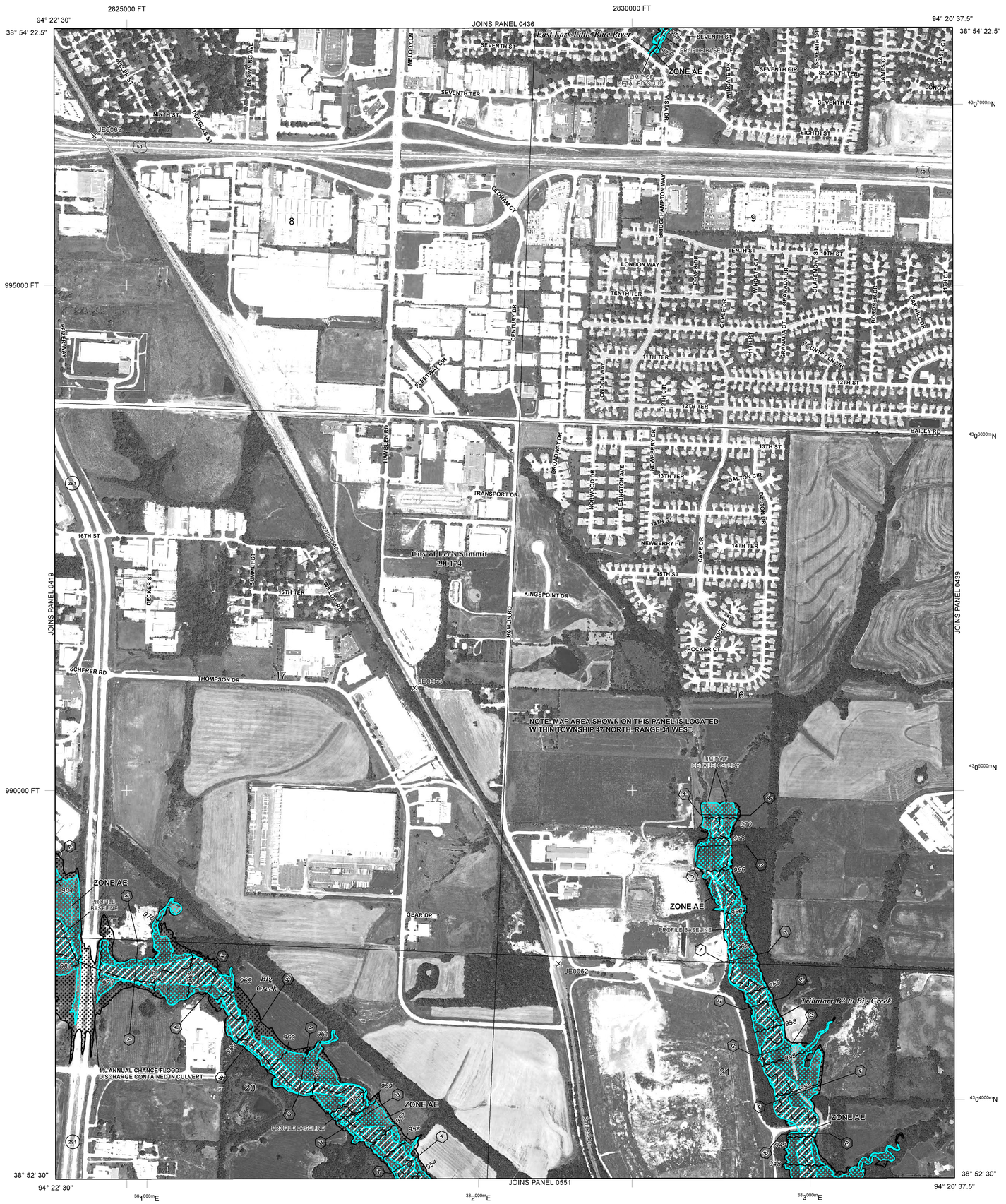
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

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

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

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

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



LEGEND

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

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

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

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

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0438G

FIRM

FLOOD INSURANCE RATE MAP

JACKSON COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 438 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEE'S SUMMIT, CITY OF	290174	0438	G

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

MAP NUMBER
29095C0438G
MAP REVISED
JANUARY 20, 2017

Federal Emergency Management Agency

Map Scale: 1:701 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 30 60 120 180

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 24, Aug 31, 2022

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

Date(s) aerial images were photographed: Aug 30, 2022—Sep 8, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10116	Sampsel silty clay loam, 2 to 5 percent slopes	0.2	9.7%
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	1.9	90.3%
Totals for Area of Interest		**2.1**	**100.0%**

APPENDIX B

Existing Condition Hydrographs

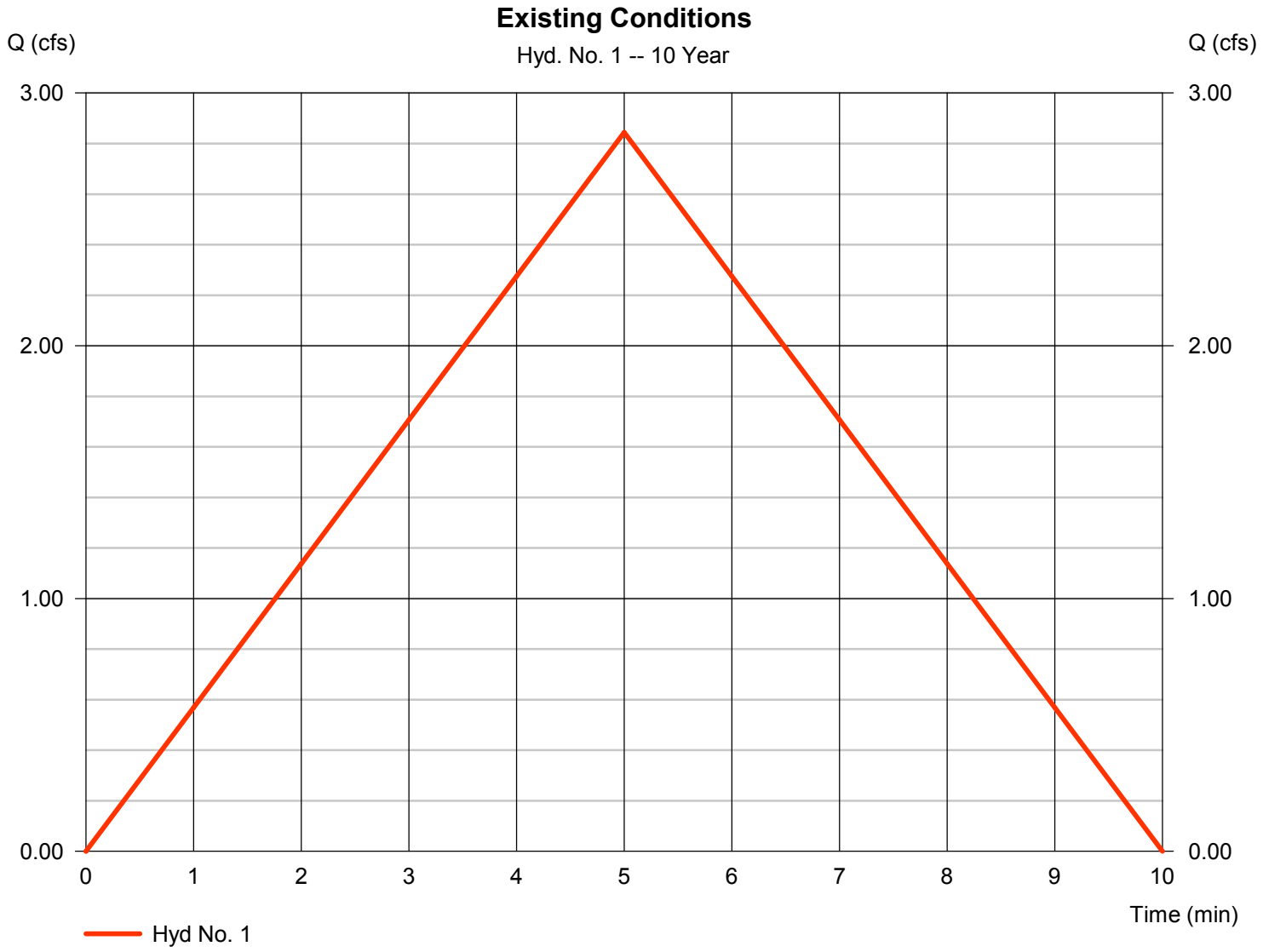
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 1 / 2023

Hyd. No. 1

Existing Conditions

Hydrograph type	= Rational	Peak discharge	= 2.844 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 853 cuft
Drainage area	= 1.290 ac	Runoff coeff.	= 0.3
Intensity	= 7.348 in/hr	Tc by User	= 5.00 min
IDF Curve	= APWA 5-15 Min Tc.IDF	Asc/Rec limb fact	= 1/1



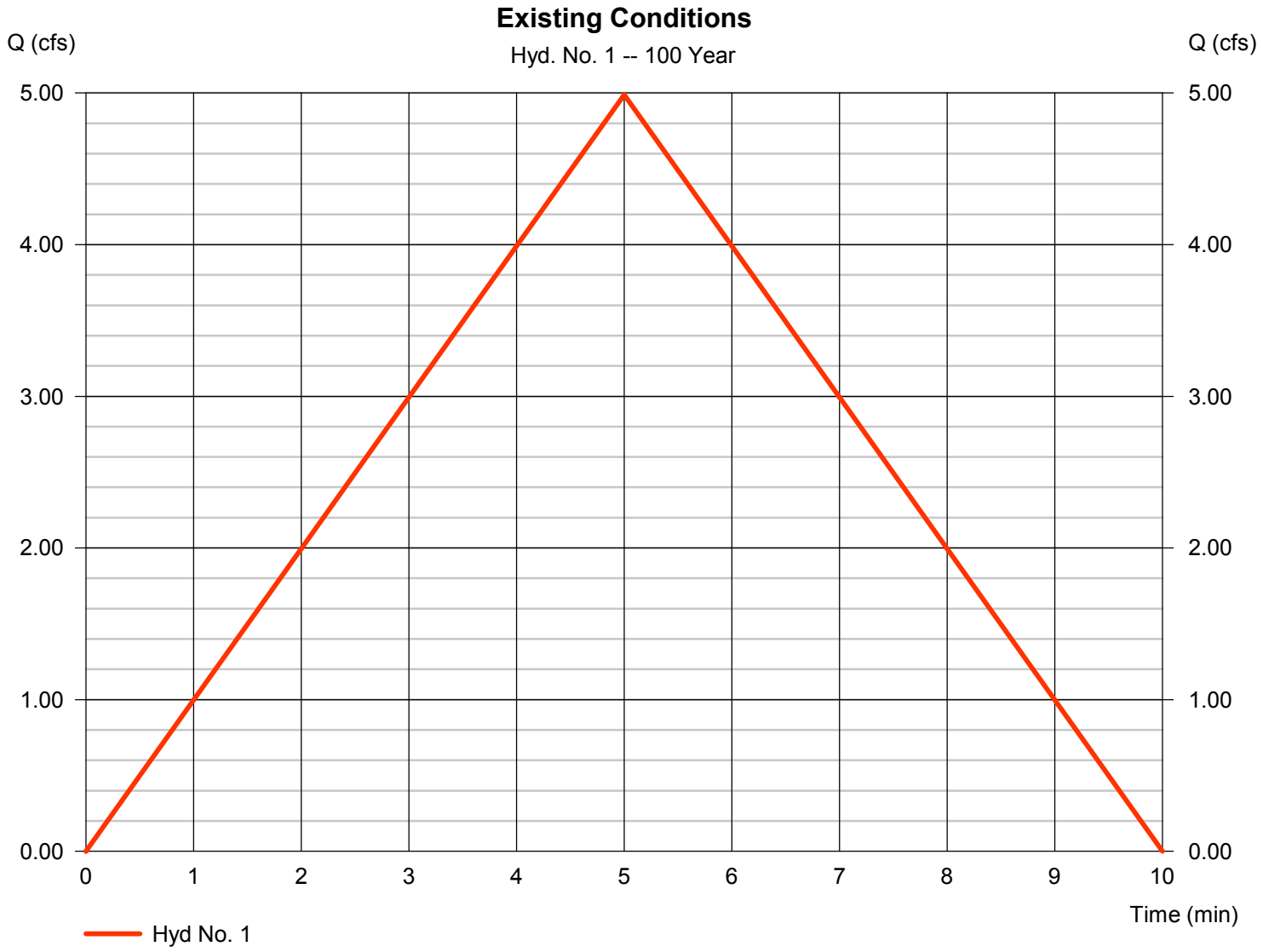
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 1 / 2023

Hyd. No. 1

Existing Conditions

Hydrograph type	= Rational	Peak discharge	= 4.988 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,497 cuft
Drainage area	= 1.290 ac	Runoff coeff.	= 0.3
Intensity	= 12.890 in/hr	Tc by User	= 5.00 min
IDF Curve	= APWA 5-15 Min Tc.IDF	Asc/Rec limb fact	= 1/1



APPENDIX C

Proposed Condition Hydrographs with Detention Storage

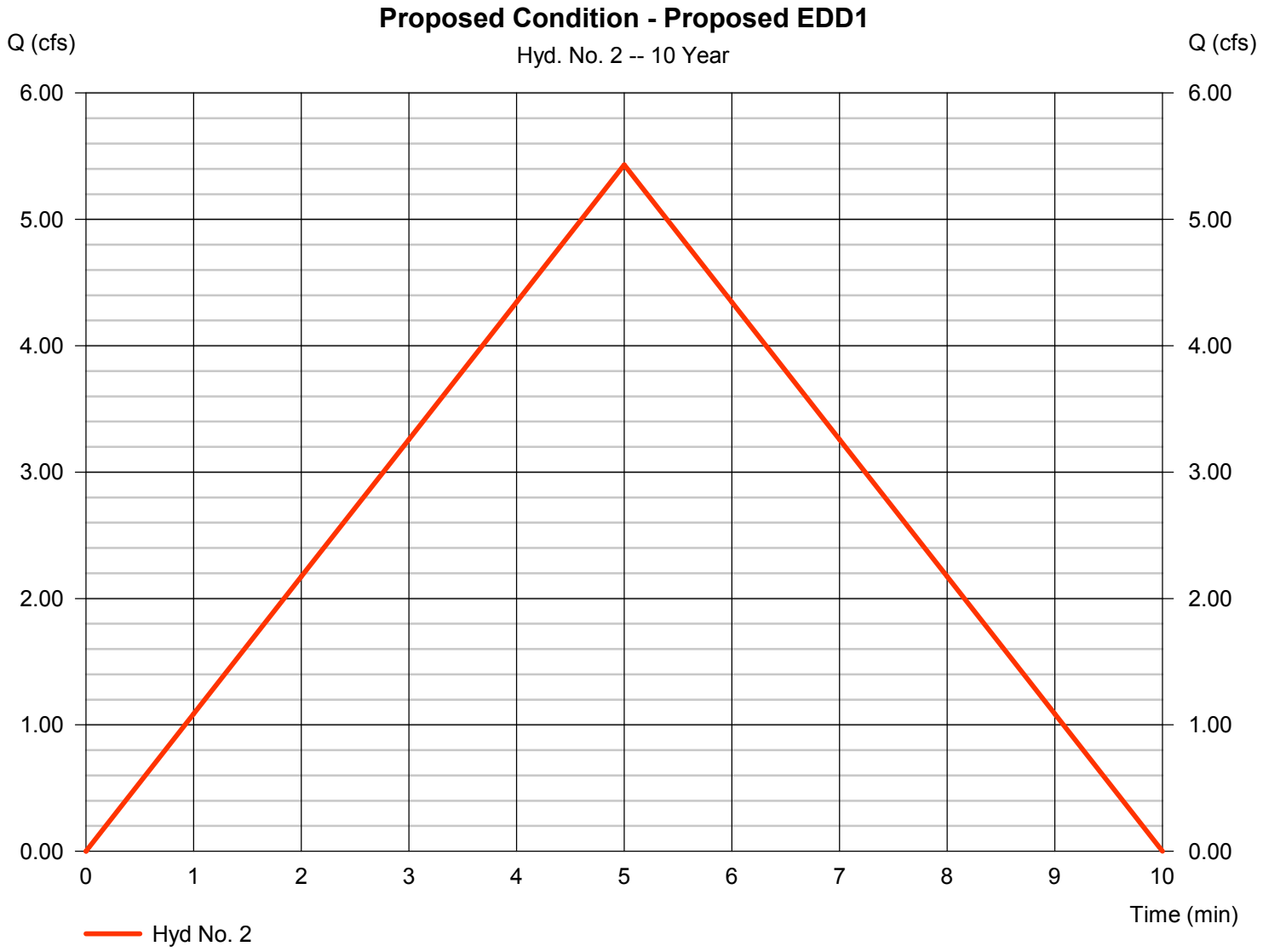
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 1 / 2023

Hyd. No. 2

Proposed Condition - Proposed EDD1

Hydrograph type	= Rational	Peak discharge	= 5.432 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,630 cuft
Drainage area	= 1.120 ac	Runoff coeff.	= 0.66
Intensity	= 7.348 in/hr	Tc by User	= 5.00 min
IDF Curve	= APWA 5-15 Min Tc.IDF	Asc/Rec limb fact	= 1/1



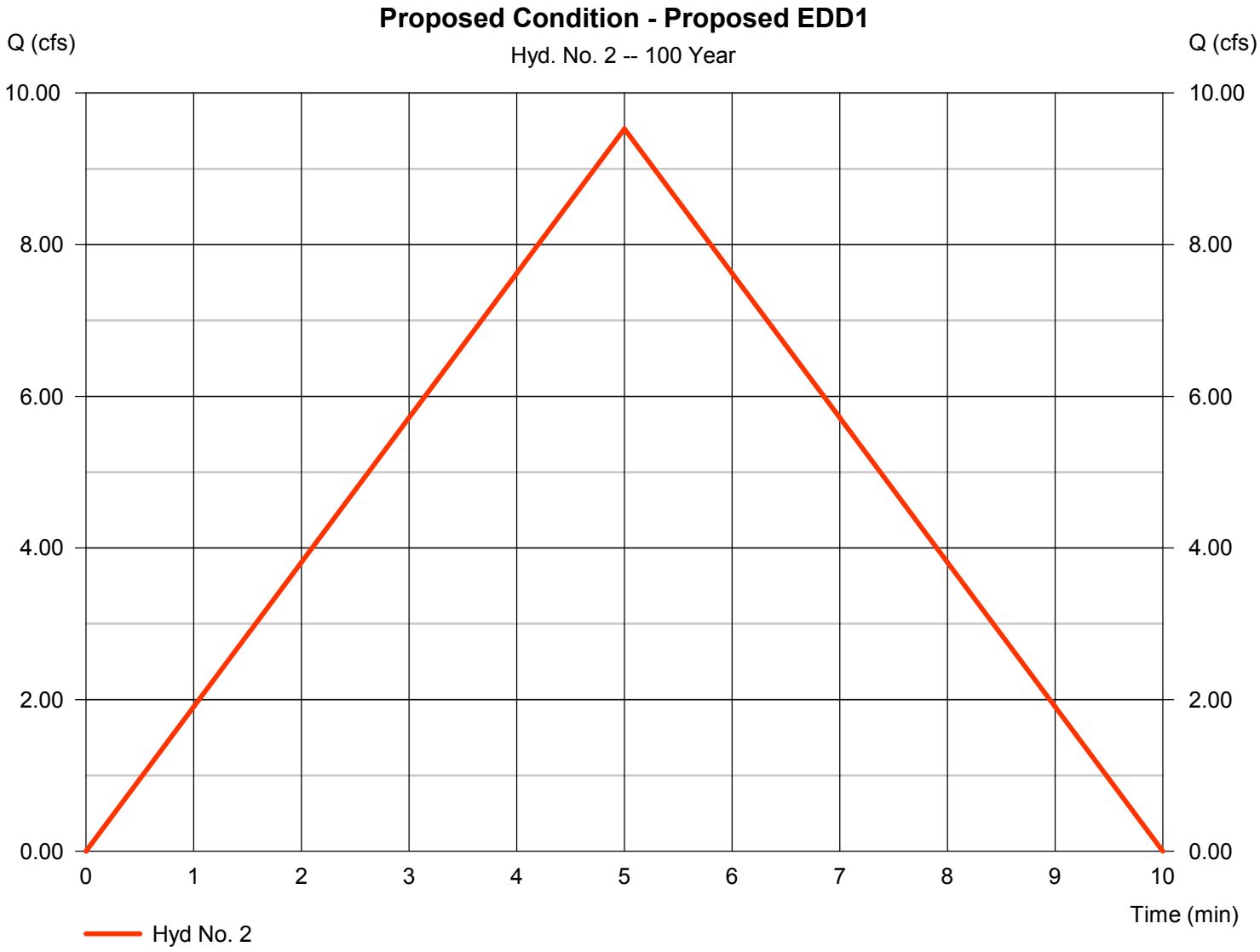
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 1 / 2023

Hyd. No. 2

Proposed Condition - Proposed EDD1

Hydrograph type	= Rational	Peak discharge	= 9.528 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,858 cuft
Drainage area	= 1.120 ac	Runoff coeff.	= 0.66
Intensity	= 12.890 in/hr	Tc by User	= 5.00 min
IDF Curve	= APWA 5-15 Min Tc.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

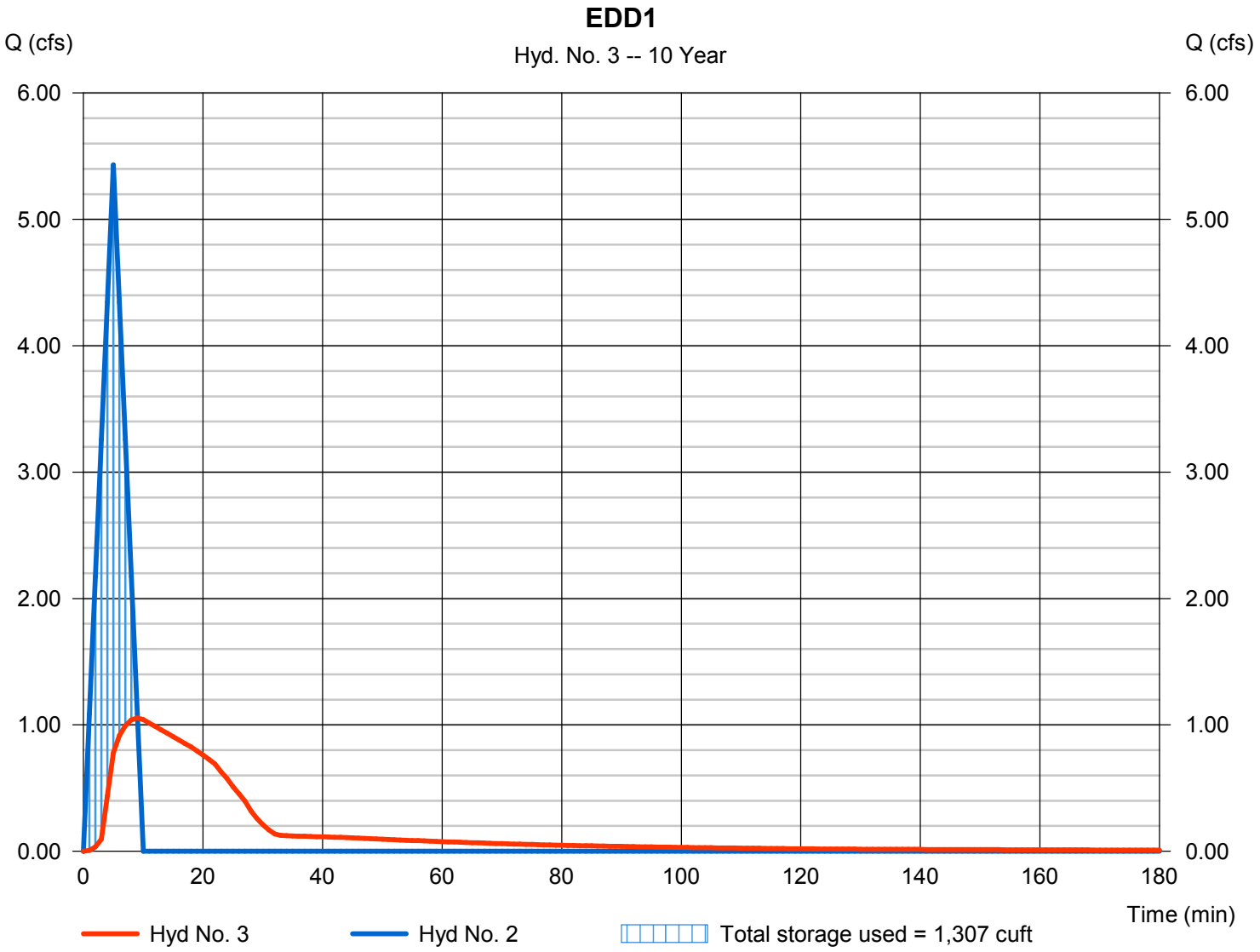
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 8 / 2023

Hyd. No. 3

EDD1

Hydrograph type	=	Reservoir	Peak discharge	=	1.054 cfs
Storm frequency	=	10 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	1,625 cuft
Inflow hyd. No.	=	2 - Proposed Condition - Proposed EDD1	Max. Elevation	=	991.49 ft
Reservoir name	=	EDD	Max. Storage	=	1,307 cuft

Storage Indication method used.



Hydrograph Report

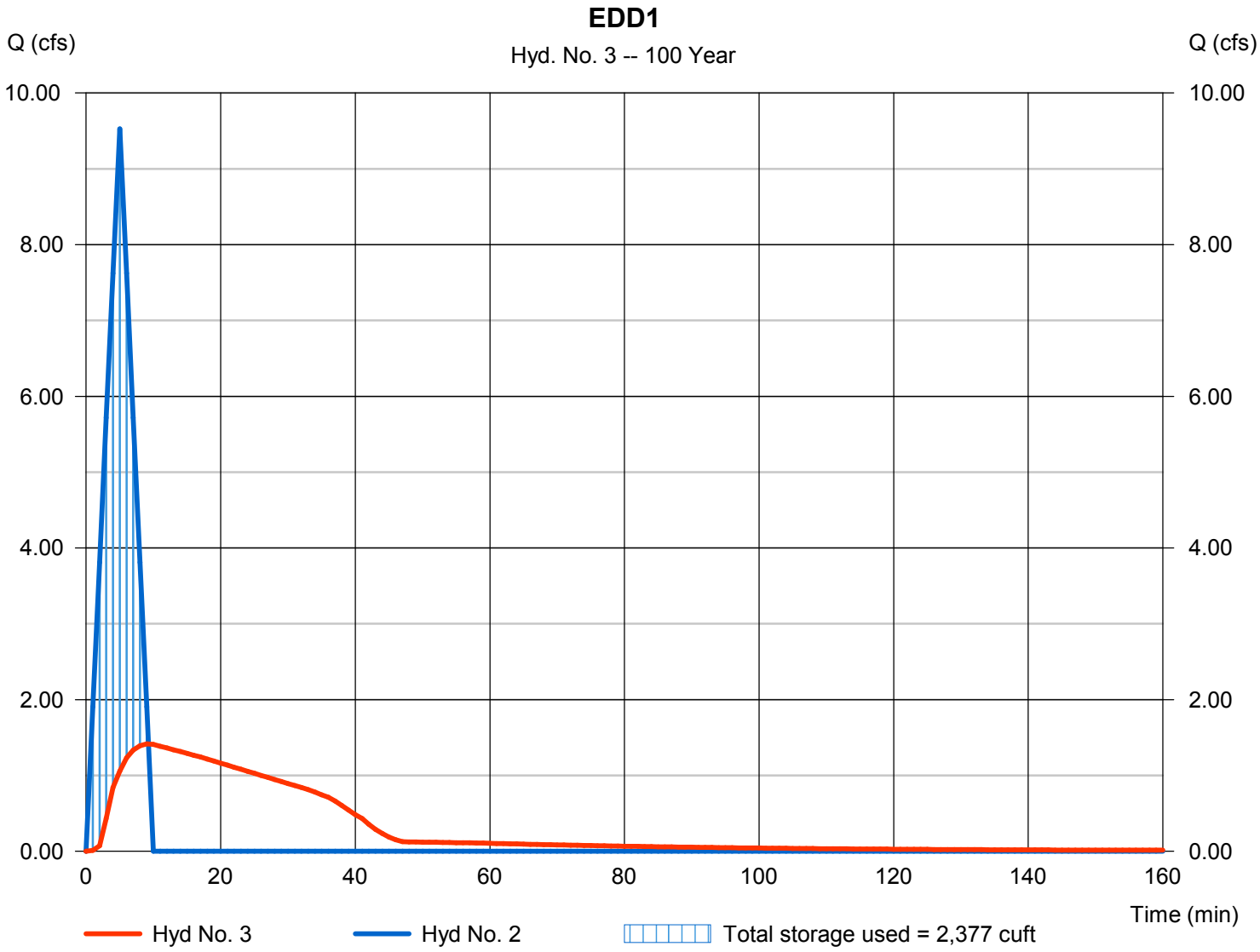
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 8 / 2023

Hyd. No. 3

EDD1

Hydrograph type	= Reservoir	Peak discharge	= 1.416 cfs
Storm frequency	= 100 yrs	Time to peak	= 9 min
Time interval	= 1 min	Hyd. volume	= 2,854 cuft
Inflow hyd. No.	= 2 - Proposed Condition - Proposed EDD1	Max. Elevation	= 992.49 ft
Reservoir name	= EDD	Max. Storage	= 2,377 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 8 / 2023

Hyd. No. 3

EDD1

Hydrograph type	=	Reservoir	Peak discharge	=	1.416 cfs
Storm frequency	=	100 yrs	Time to peak	=	9 min
Time interval	=	1 min	Hyd. volume	=	2,854 cuft
Inflow hyd. No.	=	2 - Proposed Condition - Proposed EDD1	Max. Elevation	=	992.49 ft
Reservoir name	=	EDD	Max. Storage	=	2,377 cuft

Storage Indication method used.