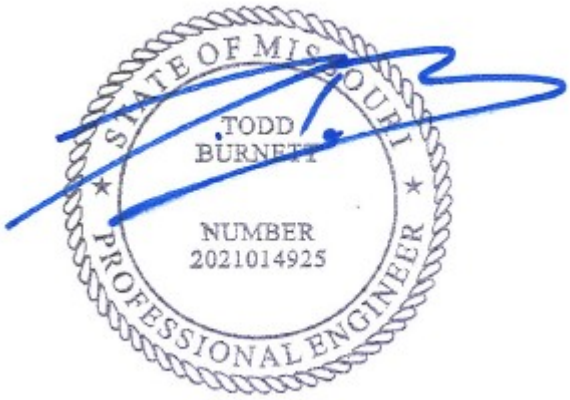
STORMWATER MANAGEMENT REPORT

Caliber Collision
710 SE 7th Terrace
Lee's Summit, Missouri 64063



Original Submittal: 07/23/2021

Prepared by
Freeland and Kauffman, Inc.
Engineers – Landscape Architects
209 West Stone Avenue
Greenville, SC 29609
864-233-5497

INDEX

I. PROJECT DESCRIPTION

The following is the stormwater management report for the proposed Caliber Collision at 710 SE 7th Terrace in Lee's Summit, Missouri This site is approximately 1.38 acres . Development will consist of the construction of a 11,500 square foot Caliber Collision automotive collision repair facility, all associated utilities, vehicle storage area, parking areas, grading, landscaping, and stormwater management facilities. As there is not enough surface area available due to site restraints and landscape requirements, a StormTech Underground Detention System is proposed for the developed site's stormwater runoff requirements. This underground detention system consists of 45" high MC-3500 Chambers with 9" of stone below and 12 "of stone above it with total storage height of 66" from elev. 2008.5 to elev. 2014.0. The outfall of the underground detention system is to exit the site via a storm sewer to an existing catch basin storm structure located within the existing drainage easement at the northeast of the site in Lot 3 Chapman Plaza II. All of the runoff from the developed site (approximately 1.1 acres in total) is captured by/treated by the underground detention system. A storm sewer is provided along the north of site to by-pass the runoff from future development at west of the site. The construction activities for the Caliber Collision discussed above will disturb approximately 1.30 acres.

The property is bordered by SE 7th Terrace to the north, SE Blue Parkway to the south, Calvert's Express Auto Service & Tire to the east, and Classic paint & Collision, Inc. to the west.

As previously stated, ***all*** discharge from the site is ultimately routed to an offsite storm structure located in Lot 3, Chapman Plaza II which will be connected to storm system at SE 7th Terrace and ultimately directed to a tributary of the E. Fork Little Blue River.

Executive Summary

This hydraulic study will show the proposed site will be developed to meet all City of Lee's Summit Stormwater Management requirements. The on-site storm system has been designed to meet the requirements in Section 5608.4.C1 Comprehensive Control as outlined in APWA Section 5600 "Storm Drainage Systems & Facilities", which requires the design to "limit the two-year rate less than or equal to 0.5 cfs per site acre, ten-year rate less than or equal to 2.0 cfs per site acre, 100-yr rate less than or equal to 3.0 cfs per site acre and 40-hour extended detention of 1.37"/24 hour rainfall. The existing site has Hydrologic Soil group "C" soil. As previously mentioned, various site constraints prevent a traditional stormwater pond design. The provided system's designs primary method of attenuating the requirements will be via underground storage.

Flow Rate Summary Table

Developed Site Area Acre	Storm Event (24-hour duration)	Allowable Development Peak Flow Rate (cfs)	Post-Development Peak Flow Rates (cfs)
1.1	2-year	0.55	0.31
1.1	10-year	2.2	0.53
1.1	100-year	3.3	2.4

II. PRE-DEVELOPMENT CONDITIONS:

The proposed development is situated on an approximately 1.38-acre tract of land located at 710 SE 7th Terrace. The site is legally described as Lot 2, Chapman Plaza II.
Per topographic survey by Heideman Associates Inc. dated 05-04-21, the property was covered with gravel and grass and elevations varied from 2014 t0 2018. The site generally slopes downward in direction from south side of the site to north side. The runoff from the site is collected and conveyed by the existing storm drain system at SE 7th Terrace. As the required stormwater Management does not take account of the existing condition, this report has not analyzed the existing hydrology parameters.
:

III. POST-DEVELOPMENT CONDITIONS:

An underground chamber detention system is proposed to be located at the north and east of the site within the open space and parking lot. The proposed underground detention system is a MC-3500 StormTech Chamber System, an open bottomed chamber. Reference the Site Development Plans for Caliber Collision for additional information of the underground detention system. Outflow from the detention system will be routed through an outlet riser structure and conveyed through a proposed storm pipe system to an existing catch basin storm structure located within the existing drainage easement at the northeast of the site in Lot 3 Chapman Plaza II. The outflow from detention system will be connected to the by-pass line from Lot 1 before connecting it to the existing catch basin structure. This piped system drains eventually to the tributary of E. Fork Little Blue River through the storm drain system at SE 7th Terrace.

The detention system is designed to store and release the majority of runoff generated by the proposed development.

The area analyzed in the Post-Development condition comprises of 1.1 acres of developed site from total of 1.38 acres. Visual representations of these areas and their layout configuration have been provided in Appendix A of this report and is titled the "Post Development Map". This area contains the majority of the proposed Caliber Collision

development including the building all the paved parking and curbed areas. Utilizing proposed curb and gutters, roof leaders, inlets, vegetated swales and the proposed storm sewer system by Caliber Collision, Post-Development Area will be routed to the proposed underground detention system.

Runoff Calculations:

Runoff calculations are performed for Post-Development drainage area as per SCS unit Hydrograph method using Hydraflow and TR-55.

A. Runoff Curve Number:

Land use curve number is used based upon Section 5602.3, Table 5602-3 APWA "Storm Drainage Systems & Facilities ".

Post-Development Area

Business: Neighborhood Areas Hydrologic Soil Group C
CN = 94

Total Land Area = 1.1 Acres
Weighted Runoff Curve Number = 94

B. Time of Concentration:

Shortest time of concentration of 0.10 hour is assumed.

C. Rainfall:

The 24-hour precipitation amounts for the site as provided by SCS Tr-55 for Jackson County are as follows:

2-year storm event:	3.8 inches
10-year storm event:	5.5 inches
100-year storm event:	8.3 inches

D. Rate of Runoff:

Above curve numbers and times of concentration were used to determine rate of runoff using the SCS hydrograph method. A hydrograph for the post-development conditions of the site under study can be generated showing rate of flow versus time. These hydrographs are included in Appendix B. Following are the computed peak rates of runoff for the drainage basins:

Post-Development Area (to Underground Detention System)

Storm Event (24-hour duration)	Peak Flow Rate, Q (cfs)
2-year	5.3
10-year	8.0
100-year	12.3

Post-Development Area (Out of the Underground Detention System)

Storm Event (24-hour duration)	Peak Flow Rate, Q (cfs)	WS elev (Top of Storage el. 2014.0)
2-year	0.31	1010.4
10-year	0.53	1011.3
100-year	2.4	1013.0

Developed Site Area Acre	Storm Event (24-hour duration)	Allowable Development Peak Flow Rate (cfs)	Post-Development Peak Flow Rates (cfs)
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1.1	10-year	2,2	0.53
1.1	100-year	3.3	2.4

As can be seen in the table above, the underground detention system acts to reduce the developed peak discharges from the 2-year, 10-year, and 100-year, 24-hour storm events. This is aided by the by the open bottomed design of the MC-3500 StormTech Chamber System proposed for this development.

IV. WATER QUALITY DESIGN AND CALCULATIONS:

Water Quality for the project was designed per the City of Lee's Summit's ordinances which requires the 40-hour extended detention of 1.37"/24 hour rainfall.

The Water Quality Volume (WQ_V) that is to be detained for 40 hour is calculated as per APWA/MARC-BMP Manual, 6.2:

- WQ_V = P x Rv x (43560/12) where:
  - P = Rainfall event in inches = 1.37"
  - Rv = Volumetric runoff coefficient = 0.05 +0.009 (I)
  - I = Percent Site Impervious
    I = 85%
    Rv = .05 +.009 x 85 = 0.815

- WQ_V = (1.37) x (0.815) x (43560/12)
  = 4053 Cu. Ft
  Use storage at elev. 1009.83, Storage available = 4199 Cu. Ft
  Release it in 40 hours

- Release rate :4199 cu ft x (1/40x 3600 sec) = 0.029 cf/sec
- Using a 1.0" Orifice
- $Q_{Release} = C_d A_o (SQRT(2*G*H)$
  =0.6*0.055*SQRT(2*32.2*1.33/2)
  =0.022 cf/sec < 0.029 cf/sec, therefore orifice meets 40 hour minimum

Water Quality Storage is provided from elev. 1008.5 to elev. 1009.83 and is released by 1" orifice at elev. 1008.5.
Next opening is 4" orifice at 1009.83

V. PIPE SIZING CALCULATIONS:

Included in this report in Appendix C are the pipe sizing calculations for the on-site pipes and catch basins. These are generated by the rational method, and are based on the 100-year intensity for all storm drain structures flowing to the detention system. These calculations show the total flow for each pipe section, velocity, hydraulic grade elevations, and spreads at each inlet. Reference the Inlet Area Map in Appendix A for clarification of the drainage areas discharging to each inlet and pipe.

Drainage areas for each structure were delineated (see Inlet Area Map in Appendix A) and flow to each catch basin was determined. The drainage to each structure was determined using the Rational Method form of storm analysis where weighted Runoff Coefficients were determined based on each area's coverage. In addition to each structure's added stormwater from their respective drainage area, the discharge from the underground

detention system was added to the pipe's directly "downstream" of the underground detention system.

An analysis of the proposed storm system along SE Blue Parkway was performed to ensure the discharge to the proposed pipe under the proposed driveway is adequately sized when combined with the discharge from the upstream pipes. Also, a storm sewer stub is proposed from the adjacent property to the west of the Caliber Collision property. Inlet "1B" in the plans is proposed to provide connection to an existing storm structure for the adjacent site should it be developed in the future. Per the City of Lee's Summit Code, the maximum allowed discharge form a developed site is 3 cfs per developed acre. Assuming the 1.70 acres delineated in the Inlet Area Map (in Appendix A) is developed, the maximum discharge allowed from the adjacent site would be approximately 5.1 cfs. This runoff value is less than the existing conditions site runoff calculated the Rational Method. Reference should once again be made to the Inlet Area Map provided in Appendix A for calculations and delineations of the drainage areas. To be conservative in the design, the runoff values generated from the existing conditions (the higher value) are used for adequately sizing the storm sewer pipe for the adjacent property's connection to Inlet 1B, and ultimately to the existing storm structure connection point.

Storm profiles of the storm sewer pipe network were created and the Hydraulic Grade Lines resulting from the 100-year, 24-hour storm event discharge was mapped to each pipe. Having each pipe's HGL remain within the pipe proves that each storm pipe is sufficiently sized to accommodate the storm runoff from each structure and development. In the analysis performed for this project, each pipe's 100-year storm event HGL remained within their respective pipes. Reference the Storm Profiles Sheets within the Site Development Plans prepared by Freeland and Kauffman, Inc.

Appendix A

July 20, 2021

Tax Parcels

Selected Parcel

Green: Band_2

Addresses

Nearmap

Blue: Band_3

Addresses

Red: Band_1

1:2,257

0 0.01 0.03 0.06 mi

0 0.02 0.04 0.09 km

City of Lees Summit, Jackson County, MO, Missouri Dept. of Conservation,

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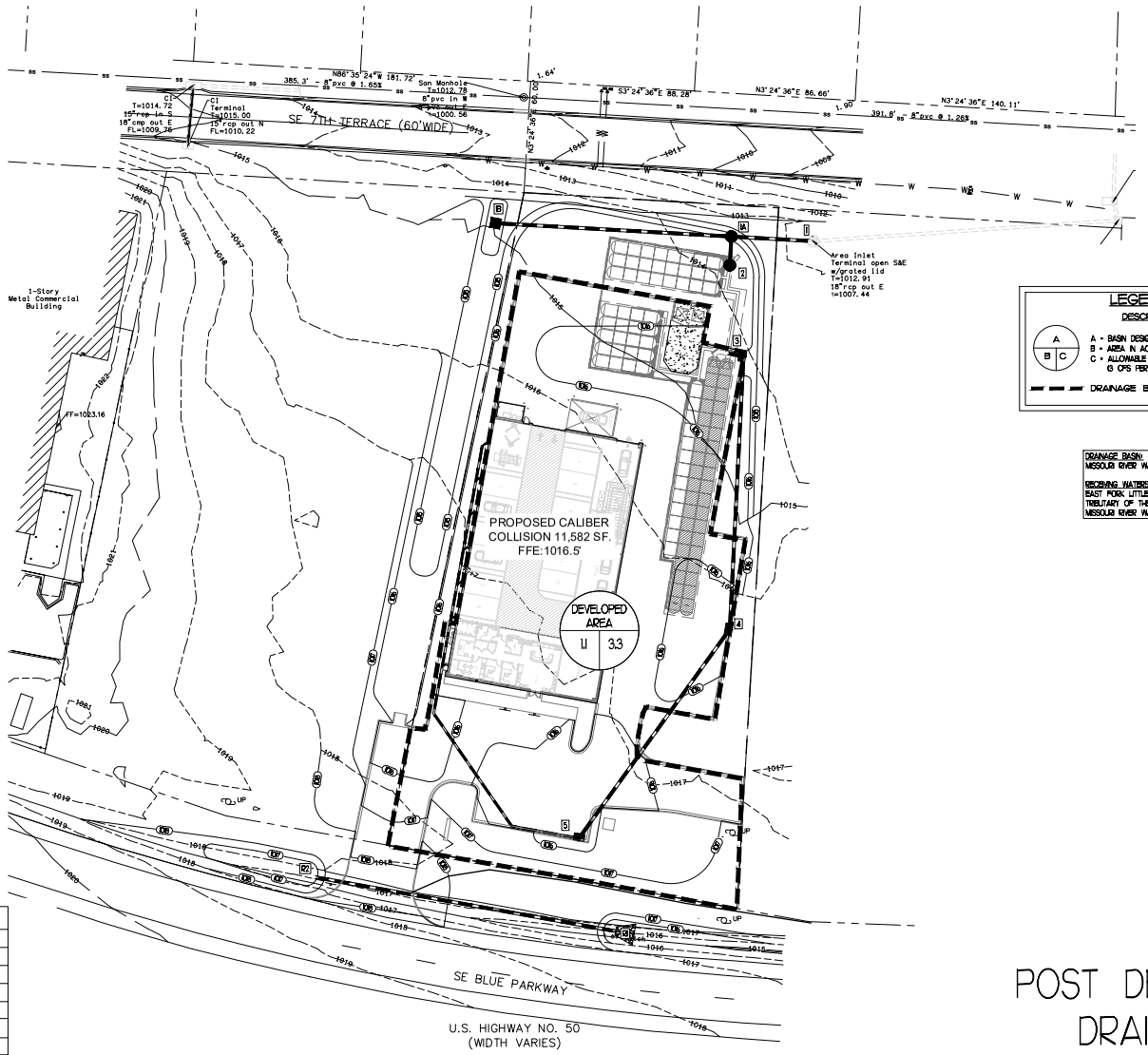
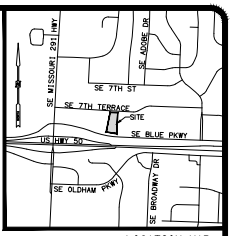
LEE'S SUMMIT, MO 64063

USGS QUAD MAP





LOCATION MAP
NOT TO SCALE

LEGEND

DESCRIPTION

A - BASIN DESIGNATION
B - AREA IN ACRES
C - ALLOWABLE DISCHARG IN CFS
(3 CFS PER 1 ACRE FOR 100 YEAR)

DRAINAGE BASIN BOUNDARY

DRAINAGE BASIN:
MISSOURI RIVER WATERSHED

RECEIVING WATERS:
EAST FORK LITTLE BLUE RIVER, TRIBUTARY OF THE BLUE RIVER - MISSOURI RIVER WATERSHED

ACREAGE SUMMARY (IN ACRES)	
TOTAL PARCEL AREA	1.55
ON-SITE DISTURBED AREA	1.55
OFF-SITE DISTURBED AREA	0.55
TOTAL DISTURBED AREA	1.05
IMPERVIOUS AREA PRE-CONSTRUCTION (ON-SITE ONLY & WITHIN LIMITS)	0.46
PERVIOUS AREA PRE-CONSTRUCTION (ON-SITE ONLY)	0.00
IMPERVIOUS AREA POST-CONSTRUCTION (ON-SITE ONLY)	0.00
PERVIOUS AREA POST-CONSTRUCTION (ON-SITE ONLY)	0.46
IMPERVIOUS AREA INCREASE (PRE VS POST) (ON-SITE ONLY)	0.42
IMPERVIOUS PERCENTAGE (AT POST-CONSTRUCTION STATE)	65.2%

EVERY DIGGING JOB REQUIRES A CALL – EVEN SMALL PROJECTS LIKE PLANTING TREES OR SHRUBS. IF YOU HIT AN UNDERGROUND UTILITY LINE WHILE DIGGING, YOU COULD BE RESPONSIBLE FOR THE COST OF REPAIRS. YOU COULD ALSO CAUSE SERVICE TO AN ENTIRE NEIGHBORHOOD AND POTENTIALLY BE RESPONSIBLE FOR FINES AND REPAIR COSTS.

SMART DIGGING MEANS CALLING 811 BEFORE EACH JOB, WHETHER YOU ARE A HOMEOWNER OR A PROFESSIONAL EXCAVATOR. ONE CALL TO 811 GETS YOUR UNDERGROUND UTILITY LINES MARKED FOR FREE.

POST DEVELOPMENT DRAINAGE AREA

SCALE 1" = 30'

REVISIONS	BY

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7/23/2021

CALIBER COLLISION
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CROSS DEVELOPMENT, CC LEE'S SUMMIT, LLC
4586 MARSH RIDGE ROAD
CARMEL, IN 46033
TEL: (214) 914-8282

DRAWN	BAC
CHECKED	TMB
DATE	7/23/2021
SCALE	
DRAWING	14

STORM DRAIN NOTES

1. ALL HYDRAULIC DATA FOR THE STORM DRAINAGE PIPES ARE BASED ON THE 100-YEAR DESIGN STORM.
2. ALL MAN-CLE DIAMETERS AND ALL INLET DIMENSIONS SHALL HAVE A MINIMUM INSIDE DIMENSION OF 4' DIAMETER (OR CLEAR) OR 4'-0" SQUARED. STRUCTURES SHALL BE LIPSIZED AS NEEDED TO ACCOMMODATE THE CONNECTING PIPE SIZES/ ANGLES.
3. STORM DRAIN PIPE SHALL BE CLASS III WALL 'B' RCP IN ACCORDANCE WITH ASTM C-76, UNLESS NOTED OTHERWISE.
4. HIGH DENSITY POLYETHYLENE PIPE (HDPE) MAY BE USED AS AN ALTERNATE. ALL HDPE PIPE, JOINTS, AND FITTINGS SHALL MEET THE REQUIREMENTS OF AASHTO DESIGNATIONS M252 AND M294 TYPE S.
5. PIPE LENGTHS ARE BASED ON HORIZONTAL DISTANCE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE AND USED FOR DESIGN ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL PIPE LENGTHS NEEDED FOR CONSTRUCTION.
6. CONTRACTOR IS RESPONSIBLE FOR COMPARING THE STORM DRAIN WITH THE PROFILES FOR THE STORM DRAIN LINES AND INFORMING THE ENGINEER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. STORM DRAIN PIPE SHALL HAVE WATER TIGHT JOINTS IN ACCORDANCE WITH ASTM C 361, C443, AND D3212.

INLET DRAINAGE AREAS

TYPE	INLET	AREA (AC.)	TC (MIN.)	IMPERVIOUS COVERAGE (ACRE)	IMPERVIOUS RUNOFF COEFFICIENT	PERVIOUS COVERAGE (ACRE)	PERVIOUS RUNOFF COEFFICIENT	WEIGHTED RUNOFF COEFFICIENT	"I" 50	"I" 100	Q50 (CFS)	Q100 (CFS)	PONDING DEPTH @ INLET PER 100-YR STORM (FT)
PROPOSED	1B *	1.70	5	0.04	0.90	1.66	0.35	0.36	11.30	12.60	6.97	7.77	0.3000
	3	0.26	5	0.26	0.90	0.00	0.35	0.90	11.30	12.60	2.64	2.95	0.2600
	4	0.15	5	0.15	0.90	0.00	0.35	0.90	11.30	12.60	1.53	1.70	0.2000
	5	0.62	5	0.47	0.90	0.15	0.35	0.77	11.30	12.60	5.37	5.99	0.3900
	R-2	0.94	5	0.29	0.90	0.65	0.35	0.52	11.30	12.60	5.52	6.16	** NOT CALCULATED
EXISTING	EX-1	0.08	5	0.02	0.90	0.06	0.35	0.49	11.30	12.60	0.44	0.49	** NOT CALCUALTED
	EX-2	0.47	5	0.08	0.90	0.39	0.35	0.44	11.30	12.60	2.36	2.63	** NOT CALUCLATED

RUNOFF COEFFICIENTS USED TO CALCULATE THE WEIGHTED RUNOFF COEFFICIENT ARE LISTED BELOW

- LAWNS/GRASS: 0.35
- ROOFS/PAVEMENT: 0.90

RAINFALL DATA FROM NOAA ATLAS 14, VOLUME 8, VERSION 2, LEE'S SUMMIT, MISSOURI

* THE AREA SHOWN FOR INLET 1B ASSUMES THAT THE ADJACENT PROPERTY WILL BE DEVELOPED AND CONNECT IT'S STORM SEWER SYSTEM TO STRUCTURE 1B. PER THE CITY OF LEE'S SUMMIT CODE, THE MAXIMUM ALLOWED DISCHARGE FROM THE DEVELOPED SITE IS 3 CFS PER DEVELOPED ACRE. ASSUMING 1.70 ACRES OF DEVELOPED AREA, THE MAXIMUM DISCHARGE ALLOWED FROM THE ADJACENT SITE WOULD BE 5.1 CFS WHICH IS LESS THAN THE EXISTING SITE'S UNDEVELOPED CONDITION (WHICH RESULTS IN THE VALUE(S) SHOWN IN THE TABLE ABOVE). TO BE CONSERVATIVE, THE RELEASES FOR INLET 1B ABOVE ARE USED TO ADEQUATELY SIZE THE STORM SEWER PIPES PROPOSED BY THE CALIBER COLLISION DEVELOPMENT.

** THE PONDING DEPTHS FOR THESE INLETS WERE NOT CALCULATED AS THEY ARE A RESULT OF THE EXISTING CONDITIONS OF THE SURROUNDING PROPERTIES AND ADDITIONAL SURVEY INFORMATION WILL BE REQUIRED TO ACCURATELY CALCULATE. ADDITIONALLY, THESE "INLETS" ARE OPEN-ENDED PIPES AND NOT "STORM STRUCTURES". THEIR PONDING DEPTHS ARE NEGLECTED AS THEY CONTAIN CONDITIONS WHERE PONDING IS NOT AN ISSUE (I.E. CONTAINED WITHIN DITCHES)

RAINFALL DISTRIBUTION FOR LEE'S SUMMIT, MISSOURI

STORM EVENT	2-YR	10-YR	25-YR	50-YR	100-YR
RAINFALL (INCHES/HR)	5.81	8.35	9.98	11.30	12.60

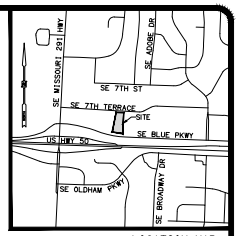
- THE RAINFALL FOR RAINFALL DISTRIBUTION DAT A TAKEN FROM NOAA ATLAS 14, VOLUME 8, VERSION 2 FOR LEE'S SUMMIT, MISSOURI
- STORM DISTRIBUTION TYPE II
- 24-HOUR STORM DISTRIBUTION

LEGEND

DESCRIPTION

A = BASIN DESIGNATION
B = AREA IN ACRES
C = RUNOFF COEFFICIENT

DRAINAGE BASIN BOUNDARY



LOCATION MAP
NOT TO SCALE

WATER TIGHT STORM PIPES:
CONTRACTOR TO ENSURE THAT ALL STORM PIPES ARE WATER TIGHT AND TESTED PER ASTM C902-02.

CONTRACTOR TO ENSURE ALL STORM DRAIN PIPE SHALL HAVE WATER TIGHT JOINTS IN ACCORDANCE WITH ASTM C 361, C443 AND D3212.

DRAINAGE BASIN:
MISSOURI RIVER WATERSHED

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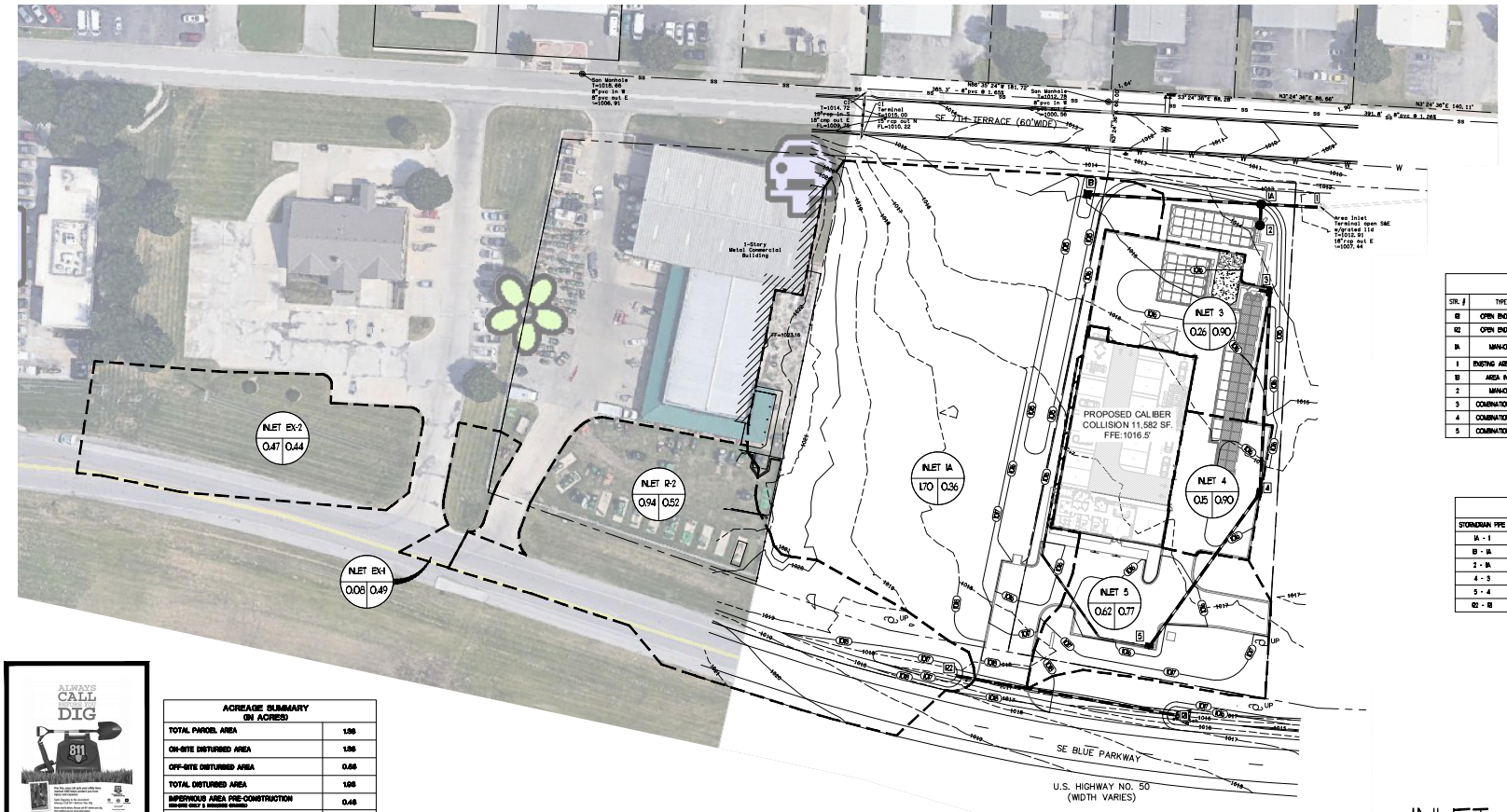

STORM DRAIN STRUCTURE TABLE

STR. #	TYPE	RIM/THROAT	INV. IN	INV. OUT
02	OPEN END PIPE	1017.26	1015.15 (D3)	
02	OPEN END PIPE	1015.31		1014.00 (1B)
1A	MAN-CLE	1016.00	1009.30 (1B) 1009.30 (3)	1009.30 (1)
1	EXISTING AREA INLET	1012.91	1007.60 (1A)	
1B	AREA INLET	1014.00		1007.60 (1A)
2	MAN-CLE	1016.20		1008.50 (1A)
3	COMBINATION INLET	1015.50	1008.10 (4)	1007.70 (1,R2)
4	COMBINATION INLET	1015.60	1007.70 (5)	1007.50 (3)
5	COMBINATION INLET	1015.00		1008.00 (4)

STORM PIPE TABLE

STORMDRAIN PIPE	SIZE	LENGTH	SLOPE	INV. IN	INV. OUT
1A - 1	18"	44'	1.1%	1008.50'	1007.60'
1B - 1A	18"	67'	1.03%	1009.60'	1008.30'
2 - 1A	18"	16'	1.31%	1008.50'	1008.30'
4 - 3	18"	147'	0.95%	1008.90'	1008.10'
5 - 4	18"	59'	0.34%	1008.00'	1007.70'
R2 - R2	18"	164'	0.32%	1014.00'	1008.95'

ACREAGE SUMMARY (IN ACRES)

TOTAL PARCEL AREA	1.96
ON-SITE DISTURBED AREA	1.96
OFF-SITE DISTURBED AREA	0.66
TOTAL DISTURBED AREA	1.96
IMPERVIOUS AREA PRE-CONSTRUCTION (CONCRETE ONLY & BUILDING STRUCTURE)	0.46
PERVIOUS AREA PRE-CONSTRUCTION (GRASS ONLY)	0.00
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INLET AREA MAP

SCALE 1" = 30'

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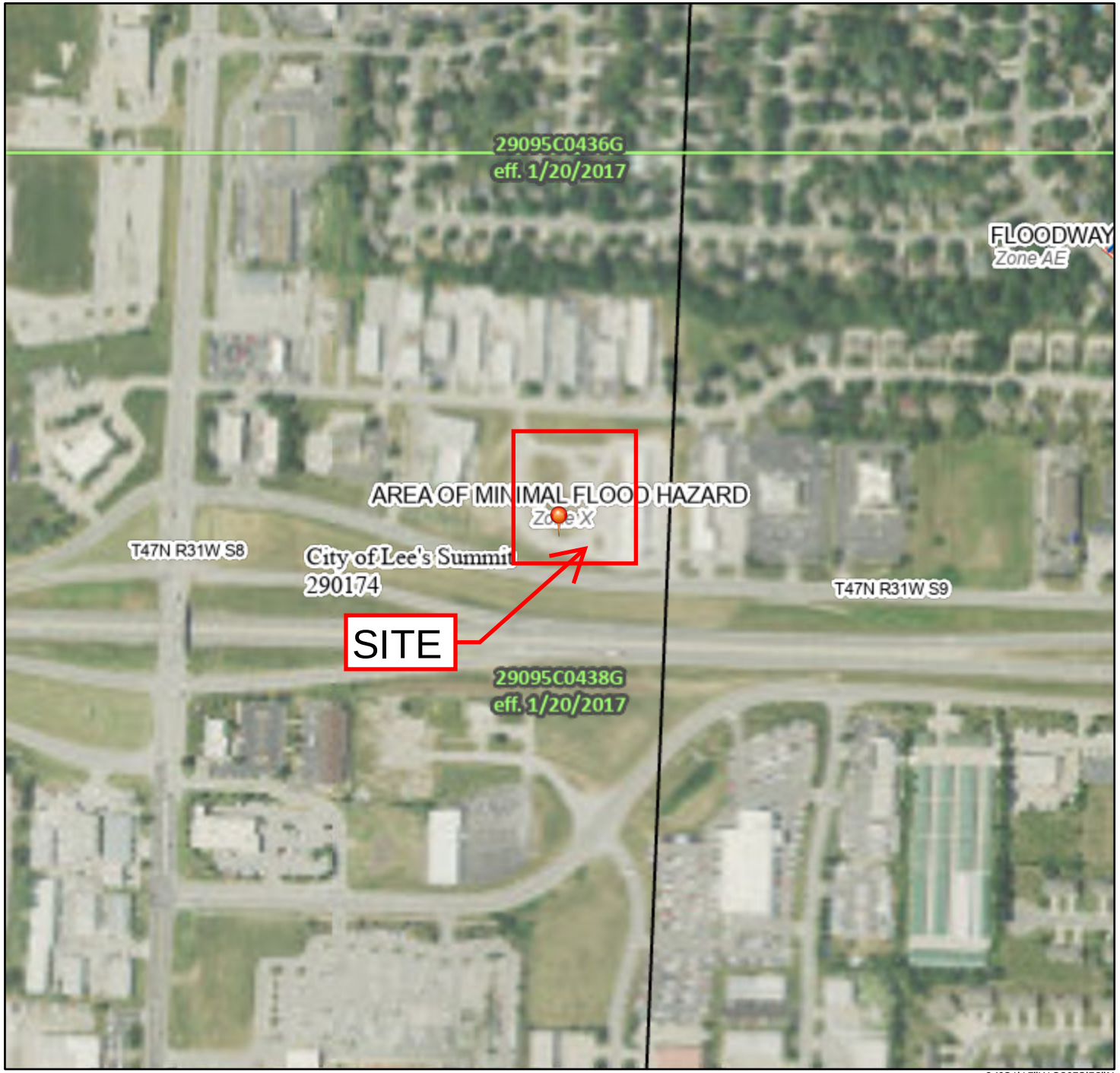
National Flood Hazard Layer FIRMette

FEMA

94°21'53"W 38°54'26"N



94°21'15"W 38°53'58"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

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

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

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

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

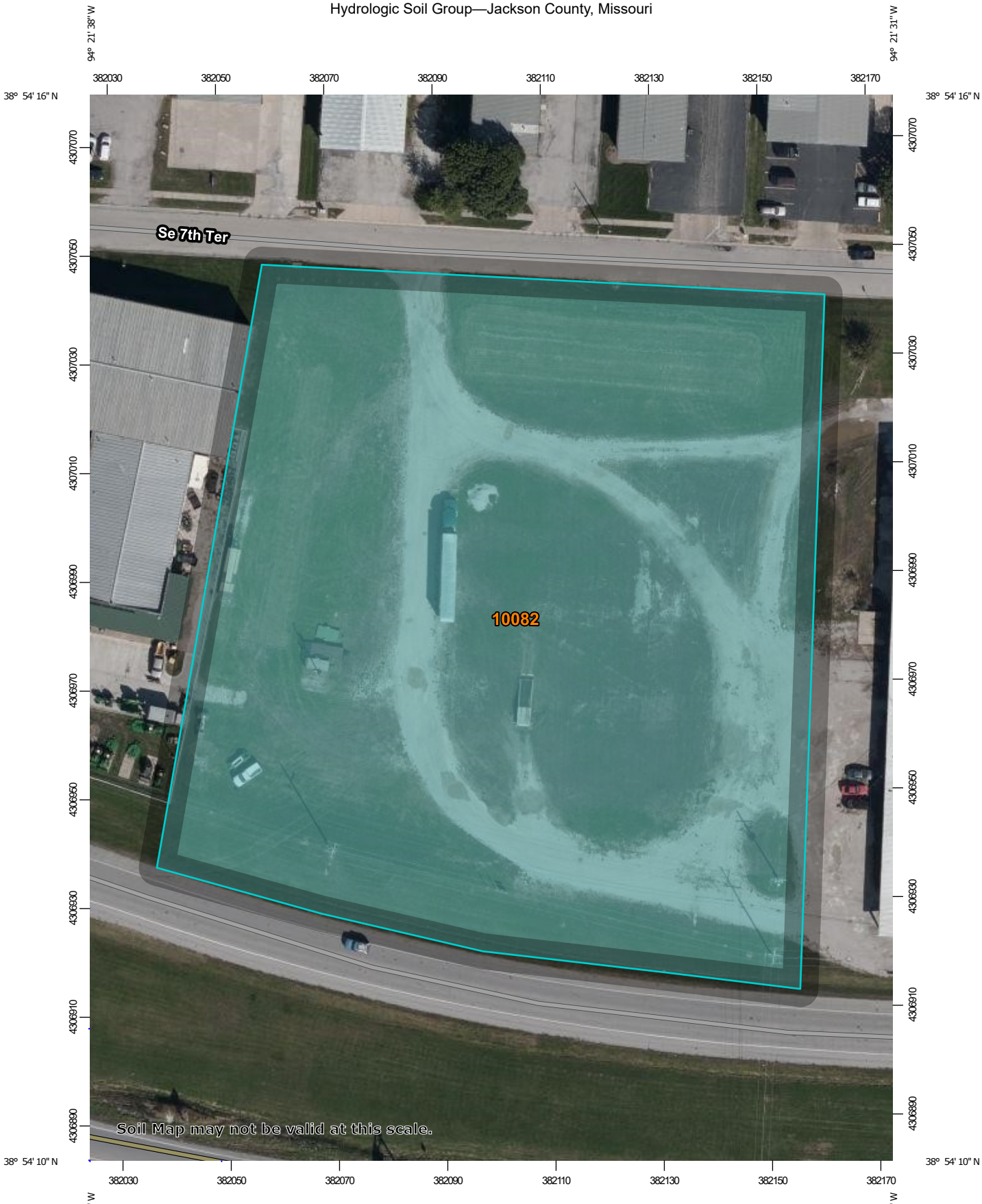
N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/1/2021 at 11:23 AM 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.



Map Scale: 1:956 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

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 22, May 29, 2020

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

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 2019

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
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	C	3.4	100.0%
Totals for Area of Interest			**3.4**	**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: 38.9038°, Longitude: -94.3595°
Elevation: 1016.38 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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.97** (3.92-6.28)	**5.81** (4.57-7.33)	**7.19** (5.65-9.10)	**8.35** (6.53-10.6)	**9.98** (7.57-13.1)	**11.3** (8.36-14.9)	**12.6** (9.05-17.0)	**13.9** (9.64-19.3)	**15.7** (10.5-22.3)	**17.1** (11.2-24.6)
10-min	**3.64** (2.87-4.60)	**4.25** (3.35-5.37)	**5.26** (4.13-6.66)	**6.11** (4.78-7.77)	**7.31** (5.54-9.56)	**8.25** (6.13-10.9)	**9.20** (6.62-12.4)	**10.2** (7.05-14.1)	**11.5** (7.69-16.3)	**12.5** (8.17-18.0)
15-min	**2.96** (2.34-3.74)	**3.46** (2.72-4.36)	**4.28** (3.36-5.42)	**4.97** (3.89-6.32)	**5.94** (4.51-7.78)	**6.71** (4.98-8.88)	**7.48** (5.38-10.1)	**8.28** (5.73-11.5)	**9.36** (6.25-13.3)	**10.2** (6.64-14.6)
30-min	**2.05** (1.62-2.59)	**2.41** (1.90-3.04)	**2.99** (2.35-3.79)	**3.49** (2.73-4.43)	**4.18** (3.17-5.46)	**4.72** (3.50-6.24)	**5.26** (3.78-7.11)	**5.82** (4.03-8.06)	**6.57** (4.39-9.32)	**7.15** (4.66-10.3)
60-min	**1.34** (1.06-1.69)	**1.57** (1.24-1.99)	**1.96** (1.54-2.49)	**2.29** (1.79-2.92)	**2.76** (2.10-3.62)	**3.13** (2.33-4.15)	**3.51** (2.53-4.75)	**3.90** (2.70-5.41)	**4.43** (2.96-6.29)	**4.84** (3.16-6.96)
2-hr	**0.827** (0.657-1.04)	**0.972** (0.771-1.22)	**1.21** (0.960-1.53)	**1.42** (1.12-1.79)	**1.72** (1.31-2.24)	**1.95** (1.46-2.57)	**2.19** (1.59-2.95)	**2.44** (1.71-3.37)	**2.79** (1.88-3.94)	**3.06** (2.01-4.36)
3-hr	**0.623** (0.497-0.777)	**0.731** (0.583-0.913)	**0.916** (0.728-1.15)	**1.08** (0.850-1.35)	**1.31** (1.00-1.70)	**1.49** (1.12-1.96)	**1.68** (1.23-2.26)	**1.88** (1.32-2.59)	**2.16** (1.46-3.04)	**2.38** (1.57-3.39)
6-hr	**0.376** (0.302-0.466)	**0.444** (0.356-0.550)	**0.561** (0.449-0.697)	**0.664** (0.528-0.827)	**0.813** (0.631-1.05)	**0.934** (0.708-1.22)	**1.06** (0.780-1.42)	**1.20** (0.846-1.63)	**1.38** (0.944-1.94)	**1.53** (1.02-2.16)
12-hr	**0.220** (0.178-0.270)	**0.262** (0.212-0.323)	**0.335** (0.270-0.413)	**0.400** (0.320-0.494)	**0.493** (0.386-0.634)	**0.570** (0.435-0.740)	**0.650** (0.481-0.862)	**0.735** (0.524-0.998)	**0.853** (0.587-1.19)	**0.947** (0.635-1.33)
24-hr	**0.129** (0.105-0.158)	**0.154** (0.126-0.188)	**0.198** (0.160-0.242)	**0.236** (0.190-0.290)	**0.292** (0.230-0.372)	**0.337** (0.260-0.435)	**0.385** (0.287-0.507)	**0.436** (0.313-0.588)	**0.507** (0.352-0.701)	**0.563** (0.380-0.786)
2-day	**0.076** (0.062-0.092)	**0.090** (0.073-0.108)	**0.113** (0.092-0.137)	**0.134** (0.109-0.163)	**0.164** (0.130-0.208)	**0.189** (0.147-0.242)	**0.215** (0.162-0.282)	**0.243** (0.176-0.326)	**0.282** (0.197-0.388)	**0.313** (0.213-0.434)
3-day	**0.056** (0.046-0.068)	**0.065** (0.054-0.079)	**0.081** (0.066-0.098)	**0.095** (0.077-0.115)	**0.115** (0.092-0.145)	**0.132** (0.103-0.168)	**0.150** (0.113-0.195)	**0.169** (0.123-0.225)	**0.195** (0.137-0.267)	**0.217** (0.148-0.299)
4-day	**0.046** (0.038-0.055)	**0.052** (0.043-0.063)	**0.064** (0.053-0.077)	**0.075** (0.061-0.090)	**0.090** (0.072-0.113)	**0.102** (0.080-0.130)	**0.116** (0.088-0.150)	**0.130** (0.095-0.173)	**0.150** (0.105-0.204)	**0.165** (0.113-0.228)
7-day	**0.031** (0.026-0.037)	**0.035** (0.029-0.042)	**0.042** (0.035-0.050)	**0.048** (0.039-0.058)	**0.057** (0.045-0.070)	**0.064** (0.050-0.080)	**0.071** (0.054-0.091)	**0.079** (0.058-0.104)	**0.089** (0.063-0.121)	**0.098** (0.068-0.134)
10-day	**0.025** (0.020-0.029)	**0.028** (0.023-0.033)	**0.033** (0.027-0.039)	**0.037** (0.031-0.045)	**0.044** (0.035-0.054)	**0.049** (0.038-0.061)	**0.054** (0.041-0.069)	**0.059** (0.043-0.077)	**0.066** (0.047-0.089)	**0.072** (0.050-0.098)
20-day	**0.016** (0.014-0.019)	**0.018** (0.016-0.022)	**0.022** (0.018-0.026)	**0.025** (0.021-0.029)	**0.028** (0.023-0.035)	**0.031** (0.025-0.039)	**0.034** (0.026-0.043)	**0.037** (0.027-0.048)	**0.040** (0.029-0.054)	**0.043** (0.030-0.058)
30-day	**0.013** (0.011-0.015)	**0.015** (0.013-0.017)	**0.018** (0.015-0.021)	**0.020** (0.017-0.023)	**0.023** (0.018-0.027)	**0.025** (0.020-0.030)	**0.027** (0.021-0.034)	**0.029** (0.021-0.037)	**0.031** (0.022-0.041)	**0.033** (0.023-0.044)
45-day	**0.011** (0.009-0.013)	**0.012** (0.010-0.014)	**0.014** (0.012-0.017)	**0.016** (0.013-0.019)	**0.018** (0.015-0.022)	**0.020** (0.016-0.024)	**0.021** (0.016-0.026)	**0.023** (0.017-0.029)	**0.024** (0.017-0.032)	**0.025** (0.018-0.034)
60-day	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.012** (0.010-0.014)	**0.014** (0.012-0.016)	**0.016** (0.013-0.019)	**0.017** (0.013-0.020)	**0.018** (0.014-0.022)	**0.019** (0.014-0.024)	**0.020** (0.015-0.027)	**0.021** (0.015-0.028)

[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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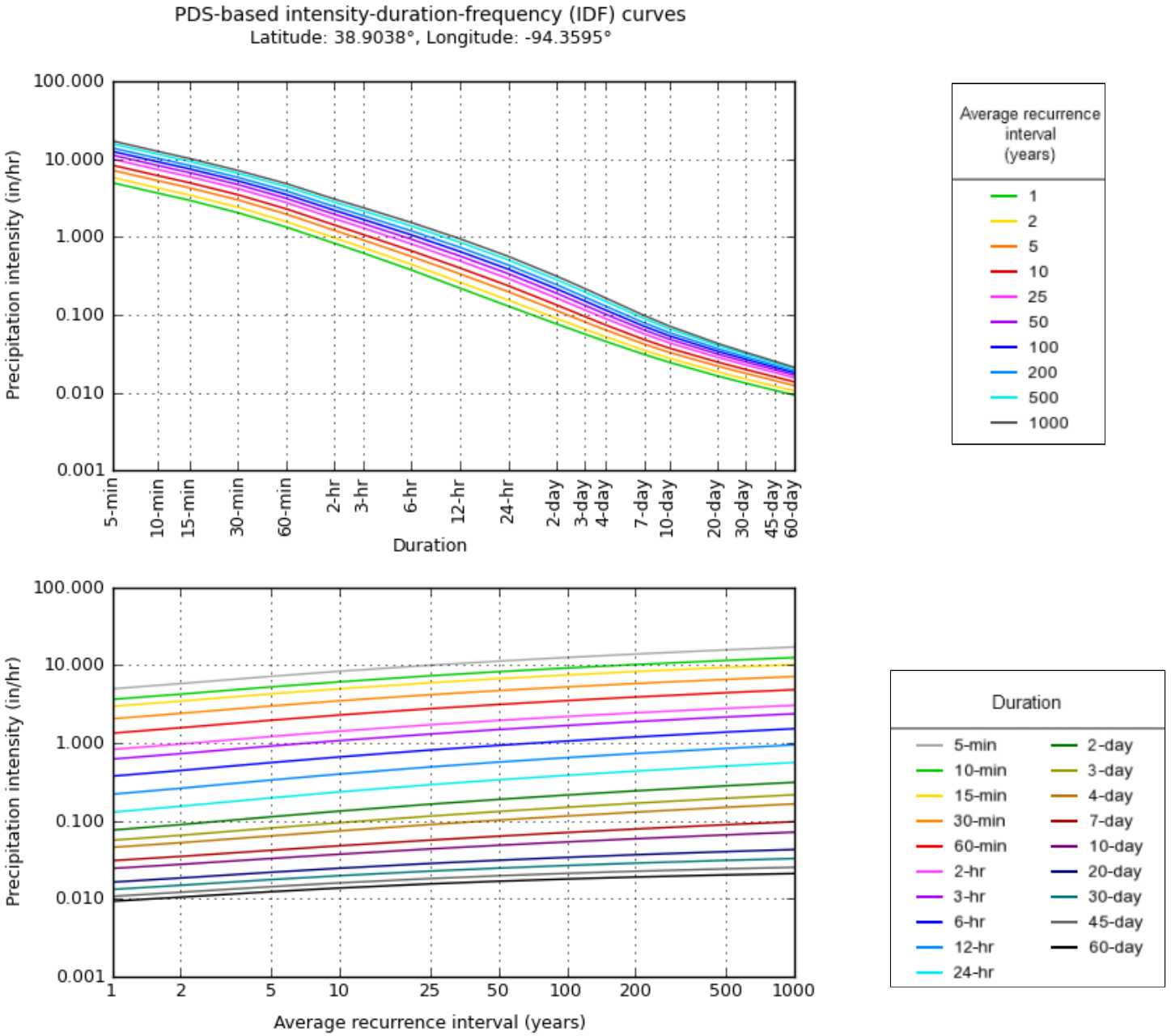
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Thu Jul 15 13:49:29 2021

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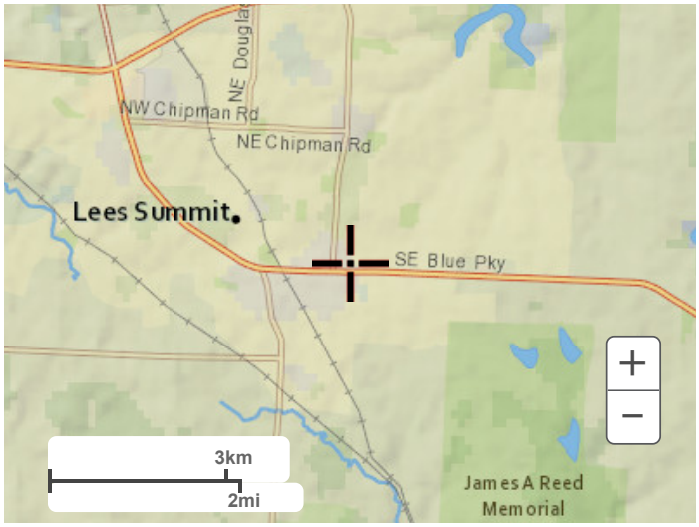
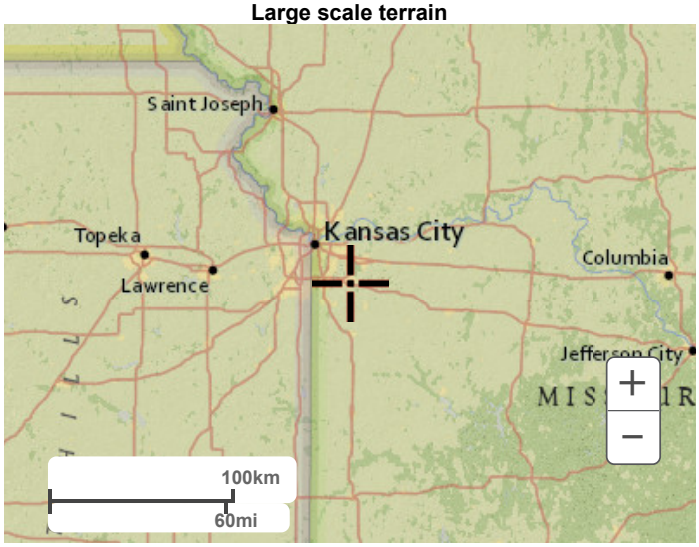
Maps & aerials

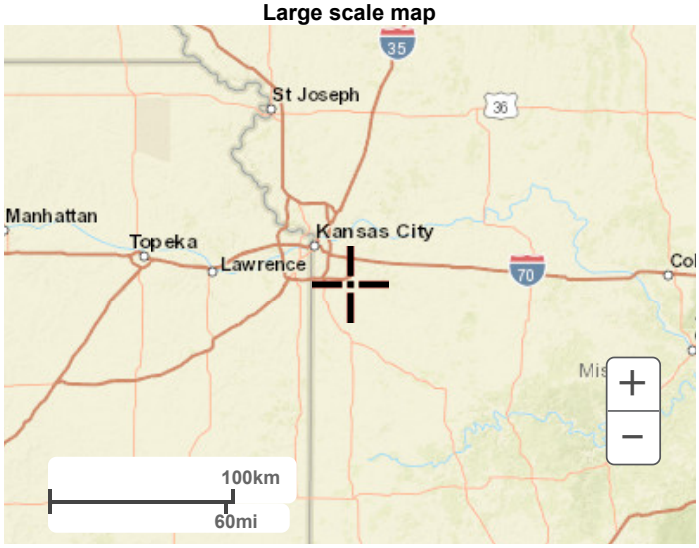
Small scale terrain



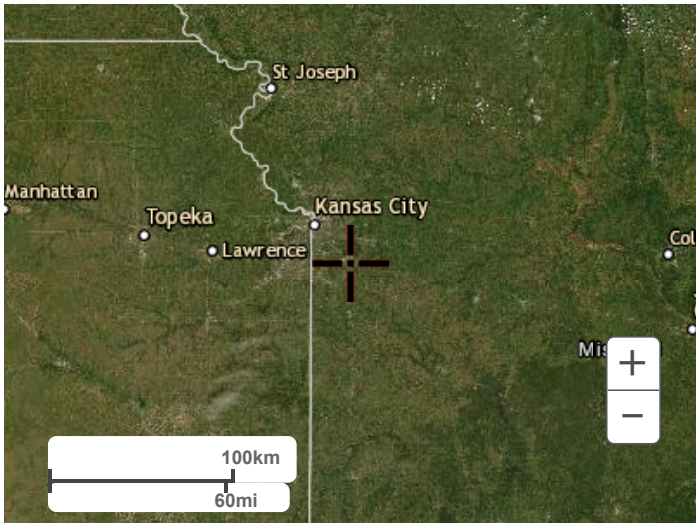
Large scale terrain



Large scale map



Large scale aerial



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Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 8, Version 2
Location name: Lees Summit, Missouri, USA*
Latitude: 38.9038°, Longitude: -94.3595°
Elevation: 1016.38 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	**0.414** (0.327-0.523)	**0.484** (0.381-0.611)	**0.599** (0.471-0.758)	**0.696** (0.544-0.885)	**0.832** (0.631-1.09)	**0.939** (0.697-1.24)	**1.05** (0.754-1.42)	**1.16** (0.803-1.61)	**1.31** (0.875-1.86)	**1.43** (0.930-2.05)
10-min	**0.607** (0.479-0.766)	**0.708** (0.558-0.895)	**0.877** (0.689-1.11)	**1.02** (0.797-1.30)	**1.22** (0.924-1.59)	**1.38** (1.02-1.82)	**1.53** (1.10-2.07)	**1.70** (1.18-2.35)	**1.92** (1.28-2.72)	**2.09** (1.36-3.00)
15-min	**0.740** (0.584-0.934)	**0.864** (0.681-1.09)	**1.07** (0.840-1.35)	**1.24** (0.972-1.58)	**1.49** (1.13-1.94)	**1.68** (1.25-2.22)	**1.87** (1.35-2.53)	**2.07** (1.43-2.87)	**2.34** (1.56-3.32)	**2.55** (1.66-3.66)
30-min	**1.02** (0.808-1.29)	**1.20** (0.948-1.52)	**1.50** (1.18-1.90)	**1.75** (1.36-2.22)	**2.09** (1.58-2.73)	**2.36** (1.75-3.12)	**2.63** (1.89-3.56)	**2.91** (2.02-4.03)	**3.29** (2.19-4.66)	**3.57** (2.33-5.14)
60-min	**1.34** (1.06-1.69)	**1.57** (1.24-1.99)	**1.96** (1.54-2.49)	**2.29** (1.79-2.92)	**2.76** (2.10-3.62)	**3.13** (2.33-4.15)	**3.51** (2.53-4.75)	**3.90** (2.70-5.41)	**4.43** (2.96-6.29)	**4.84** (3.16-6.96)
2-hr	**1.65** (1.31-2.07)	**1.94** (1.54-2.44)	**2.43** (1.92-3.05)	**2.84** (2.24-3.59)	**3.43** (2.63-4.47)	**3.90** (2.92-5.14)	**4.39** (3.18-5.90)	**4.89** (3.41-6.74)	**5.58** (3.76-7.87)	**6.11** (4.01-8.73)
3-hr	**1.87** (1.49-2.33)	**2.20** (1.75-2.74)	**2.75** (2.19-3.44)	**3.23** (2.55-4.06)	**3.92** (3.02-5.10)	**4.48** (3.37-5.88)	**5.05** (3.68-6.78)	**5.66** (3.97-7.77)	**6.49** (4.39-9.14)	**7.14** (4.71-10.2)
6-hr	**2.25** (1.81-2.79)	**2.66** (2.13-3.30)	**3.36** (2.69-4.17)	**3.98** (3.16-4.95)	**4.87** (3.78-6.30)	**5.60** (4.24-7.31)	**6.36** (4.67-8.48)	**7.16** (5.07-9.79)	**8.28** (5.65-11.6)	**9.16** (6.09-12.9)
12-hr	**2.65** (2.14-3.26)	**3.16** (2.55-3.89)	**4.04** (3.26-4.98)	**4.82** (3.86-5.96)	**5.94** (4.65-7.64)	**6.87** (5.24-8.91)	**7.83** (5.80-10.4)	**8.86** (6.32-12.0)	**10.3** (7.08-14.3)	**11.4** (7.65-16.0)
24-hr	**3.10** (2.53-3.78)	**3.71** (3.01-4.52)	**4.75** (3.85-5.80)	**5.66** (4.57-6.95)	**7.00** (5.51-8.93)	**8.10** (6.23-10.4)	**9.24** (6.90-12.2)	**10.5** (7.52-14.1)	**12.2** (8.44-16.8)	**13.5** (9.13-18.9)
2-day	**3.66** (3.00-4.42)	**4.30** (3.53-5.21)	**5.43** (4.43-6.58)	**6.42** (5.22-7.82)	**7.88** (6.25-9.98)	**9.07** (7.04-11.6)	**10.3** (7.77-13.5)	**11.7** (8.46-15.6)	**13.5** (9.47-18.6)	**15.0** (10.2-20.8)
3-day	**4.06** (3.34-4.89)	**4.71** (3.87-5.67)	**5.83** (4.78-7.04)	**6.83** (5.57-8.28)	**8.30** (6.62-10.5)	**9.51** (7.41-12.1)	**10.8** (8.15-14.1)	**12.2** (8.85-16.2)	**14.1** (9.89-19.2)	**15.6** (10.7-21.5)
4-day	**4.39** (3.63-5.27)	**5.04** (4.16-6.05)	**6.16** (5.07-7.41)	**7.16** (5.85-8.65)	**8.62** (6.89-10.8)	**9.83** (7.68-12.5)	**11.1** (8.41-14.4)	**12.5** (9.10-16.6)	**14.4** (10.1-19.6)	**15.9** (10.9-21.9)
7-day	**5.20** (4.32-6.20)	**5.88** (4.88-7.02)	**7.05** (5.83-8.43)	**8.06** (6.63-9.68)	**9.52** (7.64-11.8)	**10.7** (8.40-13.5)	**11.9** (9.09-15.4)	**13.2** (9.71-17.5)	**15.0** (10.6-20.3)	**16.4** (11.3-22.5)
10-day	**5.89** (4.91-7.00)	**6.65** (5.53-7.90)	**7.90** (6.56-9.41)	**8.97** (7.41-10.7)	**10.5** (8.43-12.9)	**11.7** (9.19-14.6)	**12.9** (9.85-16.5)	**14.2** (10.4-18.6)	**15.9** (11.3-21.4)	**17.2** (11.9-23.5)
20-day	**7.86** (6.60-9.25)	**8.88** (7.45-10.5)	**10.5** (8.80-12.4)	**11.9** (9.86-14.1)	**13.7** (11.0-16.6)	**15.0** (11.9-18.5)	**16.3** (12.5-20.6)	**17.7** (13.1-22.9)	**19.4** (13.8-25.8)	**20.6** (14.4-28.0)
30-day	**9.50** (8.01-11.1)	**10.7** (9.05-12.6)	**12.7** (10.7-14.9)	**14.3** (11.9-16.9)	**16.3** (13.2-19.7)	**17.9** (14.1-21.9)	**19.3** (14.8-24.2)	**20.7** (15.4-26.6)	**22.4** (16.1-29.7)	**23.7** (16.6-32.0)
45-day	**11.6** (9.82-13.5)	**13.1** (11.1-15.3)	**15.5** (13.0-18.1)	**17.3** (14.5-20.3)	**19.7** (15.9-23.5)	**21.3** (17.0-26.0)	**22.9** (17.7-28.5)	**24.4** (18.2-31.2)	**26.2** (18.8-34.4)	**27.4** (19.3-36.8)
60-day	**13.4** (11.4-15.6)	**15.1** (12.8-17.6)	**17.8** (15.0-20.7)	**19.8** (16.7-23.2)	**22.4** (18.2-26.7)	**24.2** (19.3-29.3)	**25.9** (20.0-32.1)	**27.4** (20.5-34.9)	**29.2** (21.1-38.2)	**30.4** (21.5-40.7)

[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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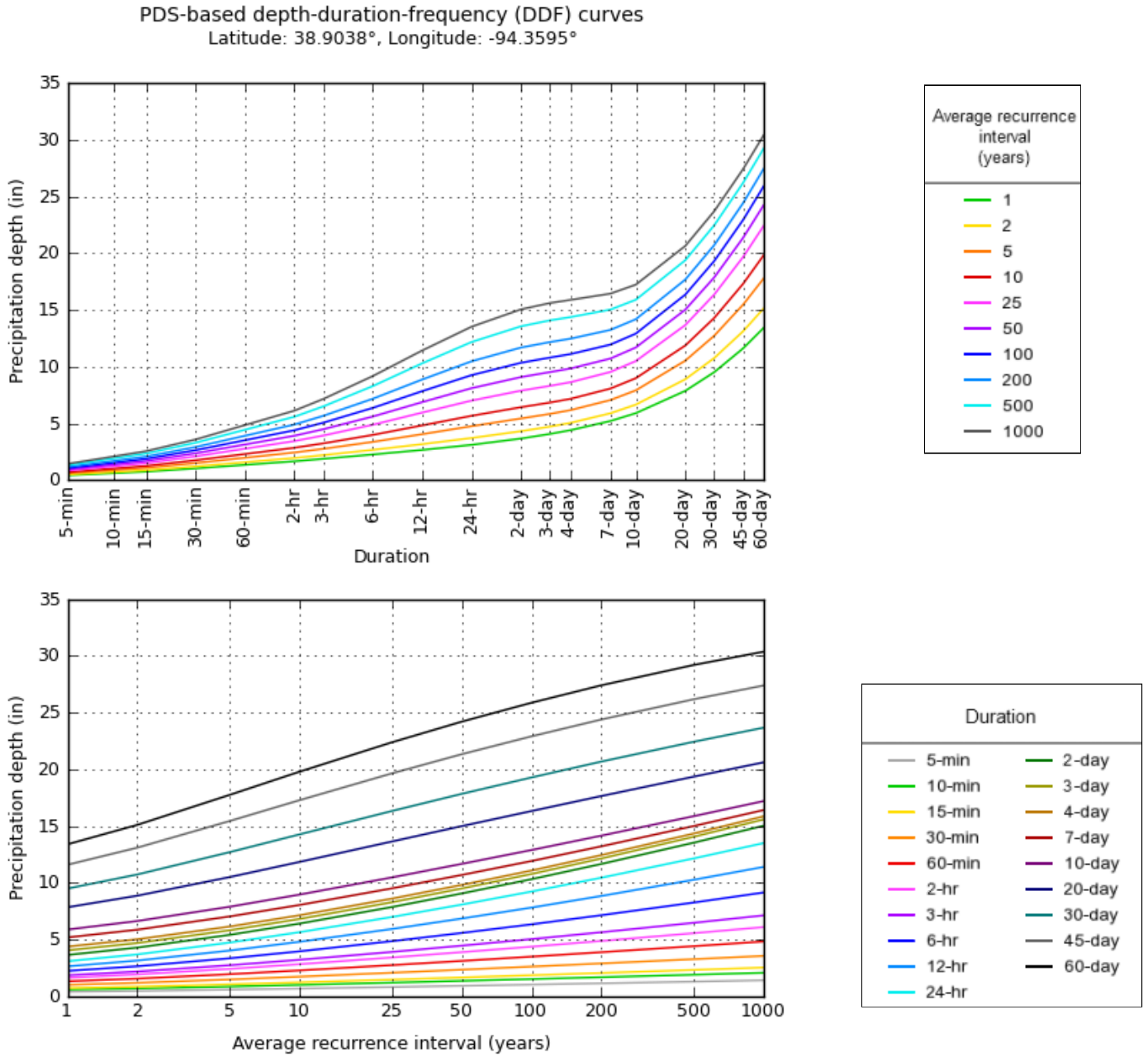
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Thu Jul 15 13:48:55 2021

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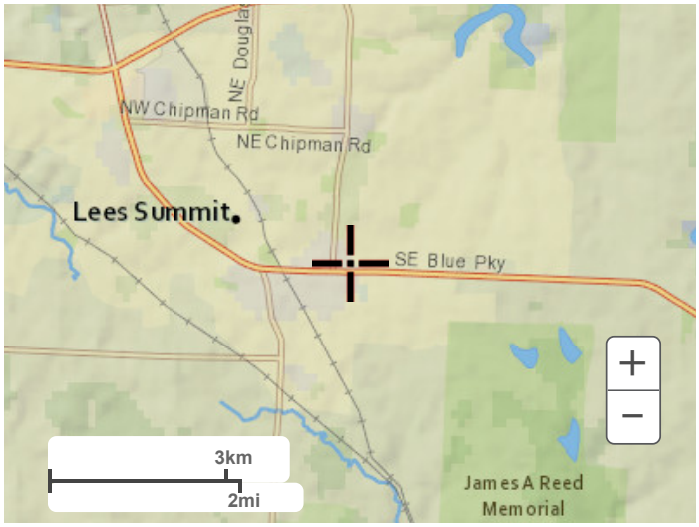
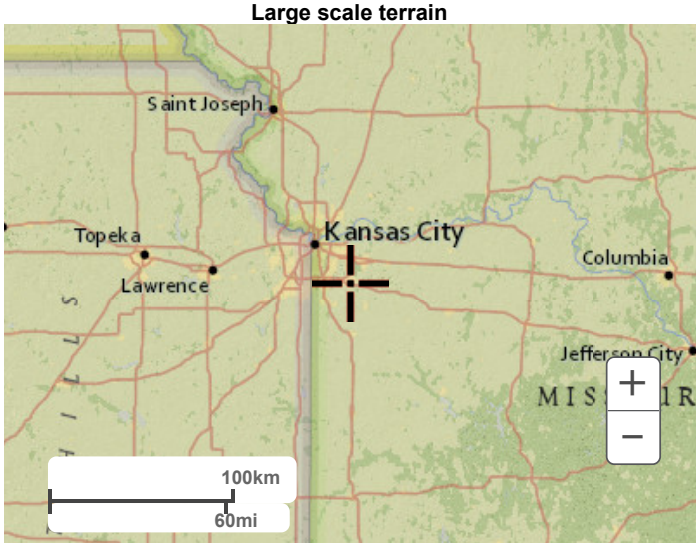
Maps & aerials

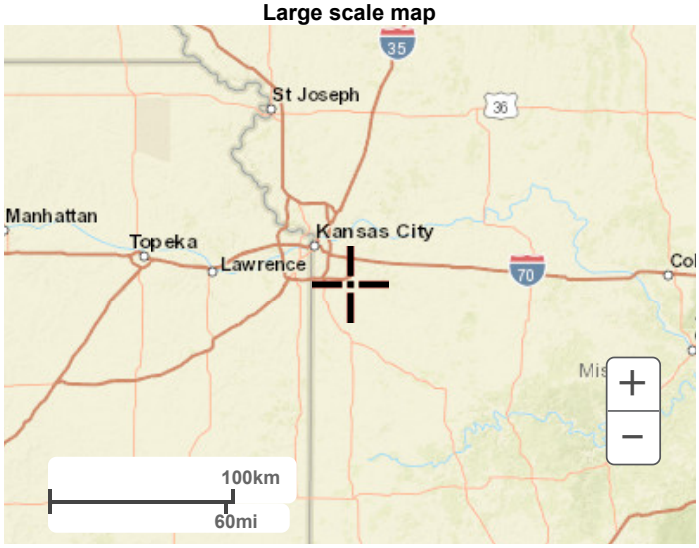
Small scale terrain



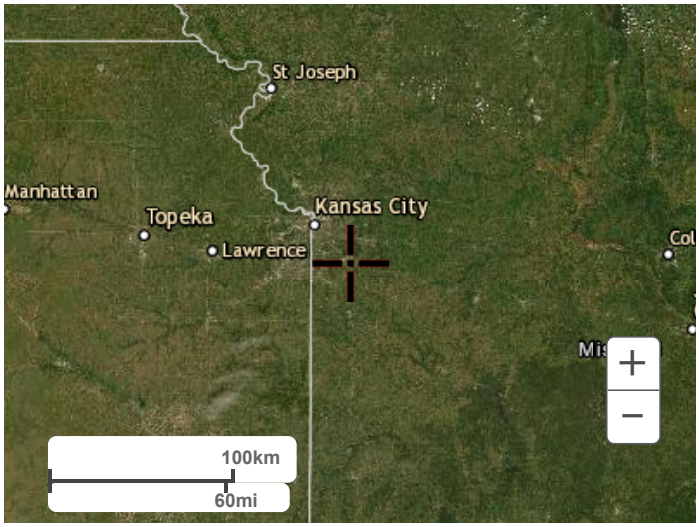
Large scale terrain



Large scale map



Large scale aerial



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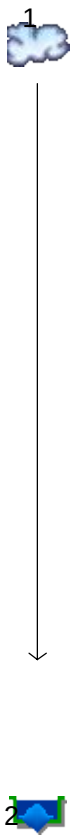
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix B

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Developed Area
2	Reservoir	<no description>

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	5.340	-------	-------	7.974	9.970	11.65	12.26	Developed Area
2	Reservoir	1	-------	0.312	-------	-------	0.525	0.660	1.405	2.384	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

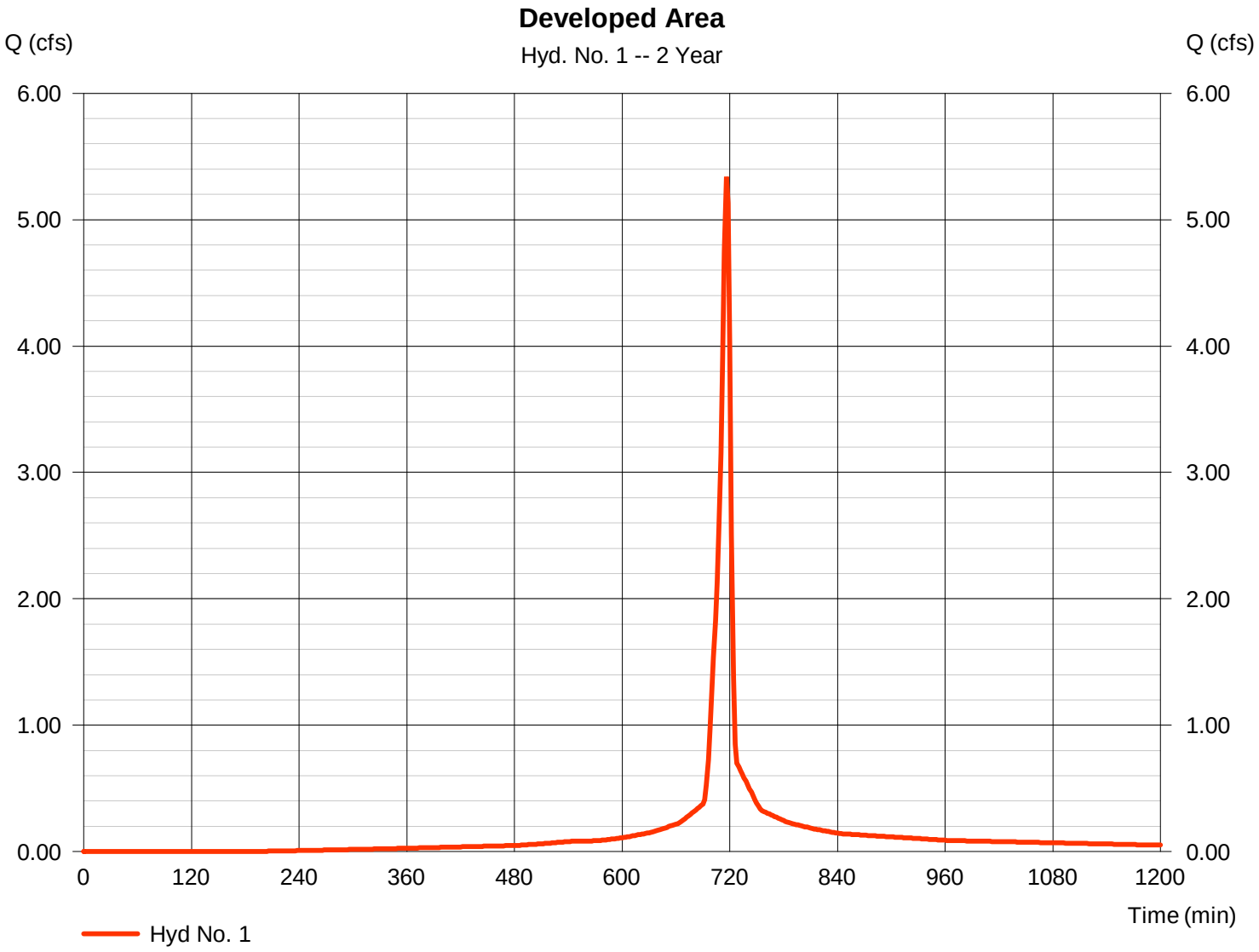
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.340	2	716	11,712	------	------	------	Developed Area
2	Reservoir	0.312	2	760	11,706	1	1010.43	6,950	<no description>

Hydrograph Report

Hyd. No. 1

Developed Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.340 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	11,712 cuft
Drainage area	=	1.100 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

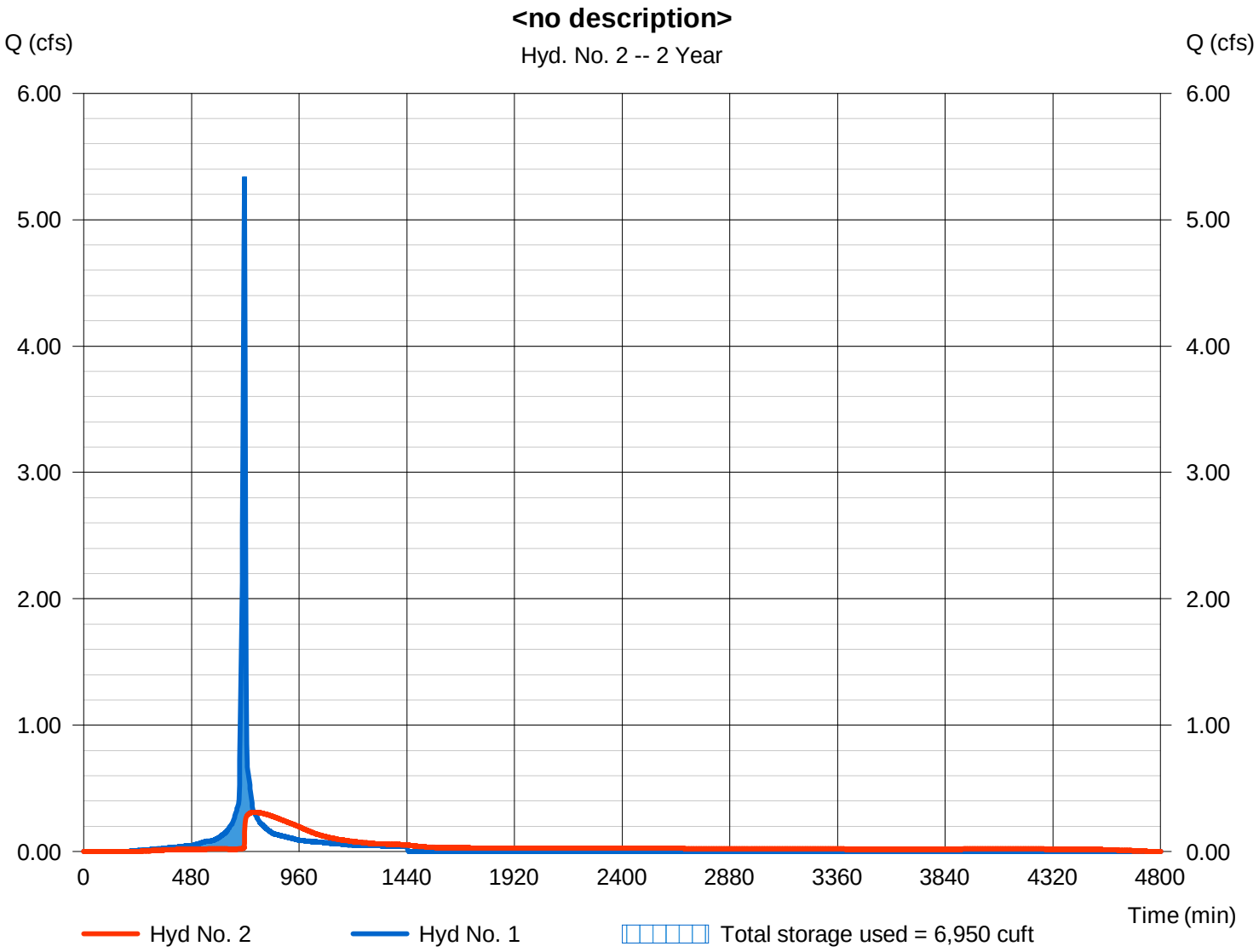
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 07 / 20 / 2021

Hyd. No. 2

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 0.312 cfs
Storm frequency	= 2 yrs	Time to peak	= 760 min
Time interval	= 2 min	Hyd. volume	= 11,706 cuft
Inflow hyd. No.	= 1 - Developed Area	Max. Elevation	= 1010.43 ft
Reservoir name	= Pond	Max. Storage	= 6,950 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond

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	1008.50	n/a	0	0
0.50	1009.00	n/a	155	155
1.00	1009.00	n/a	798	953
1.50	1009.50	n/a	1,673	2,626
2.00	1010.00	n/a	2,349	4,975
2.50	1010.50	n/a	2,279	7,254
3.00	1011.00	n/a	2,183	9,437
3.50	1011.50	n/a	2,054	11,491
4.00	1012.00	n/a	1,878	13,369
4.50	1012.50	n/a	1,613	14,982
5.00	1013.00	n/a	1,134	16,116
5.50	1013.50	n/a	953	17,068
6.00	1014.00	n/a	953	18,021

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	1.00	4.00	0.00
Span (in)	= 18.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1008.50	1008.50	1009.83	8.00
Length (ft)	= 20.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	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	Yes	No

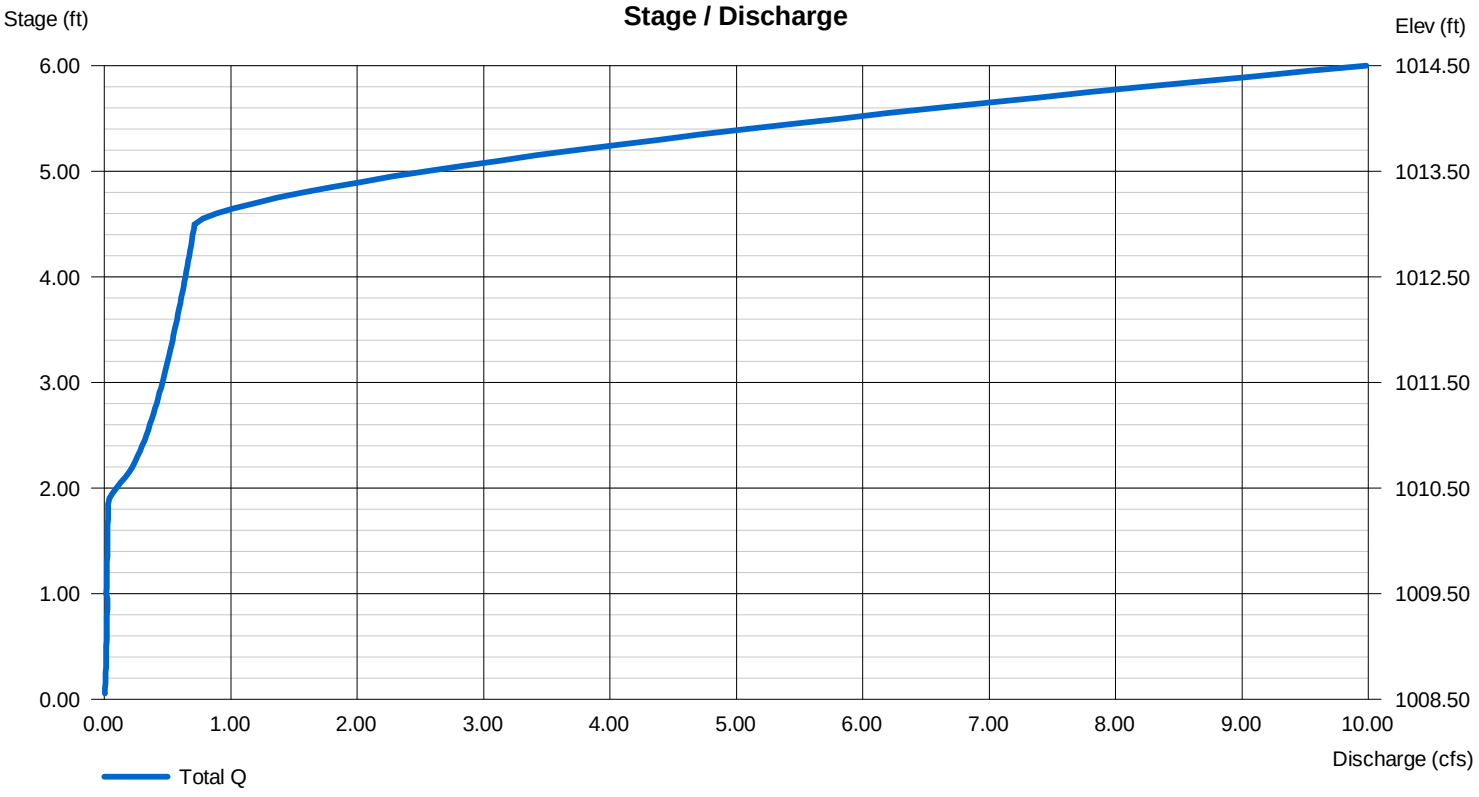
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	1.50	0.00	0.00
Crest El. (ft)	= 0.00	1012.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	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 Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

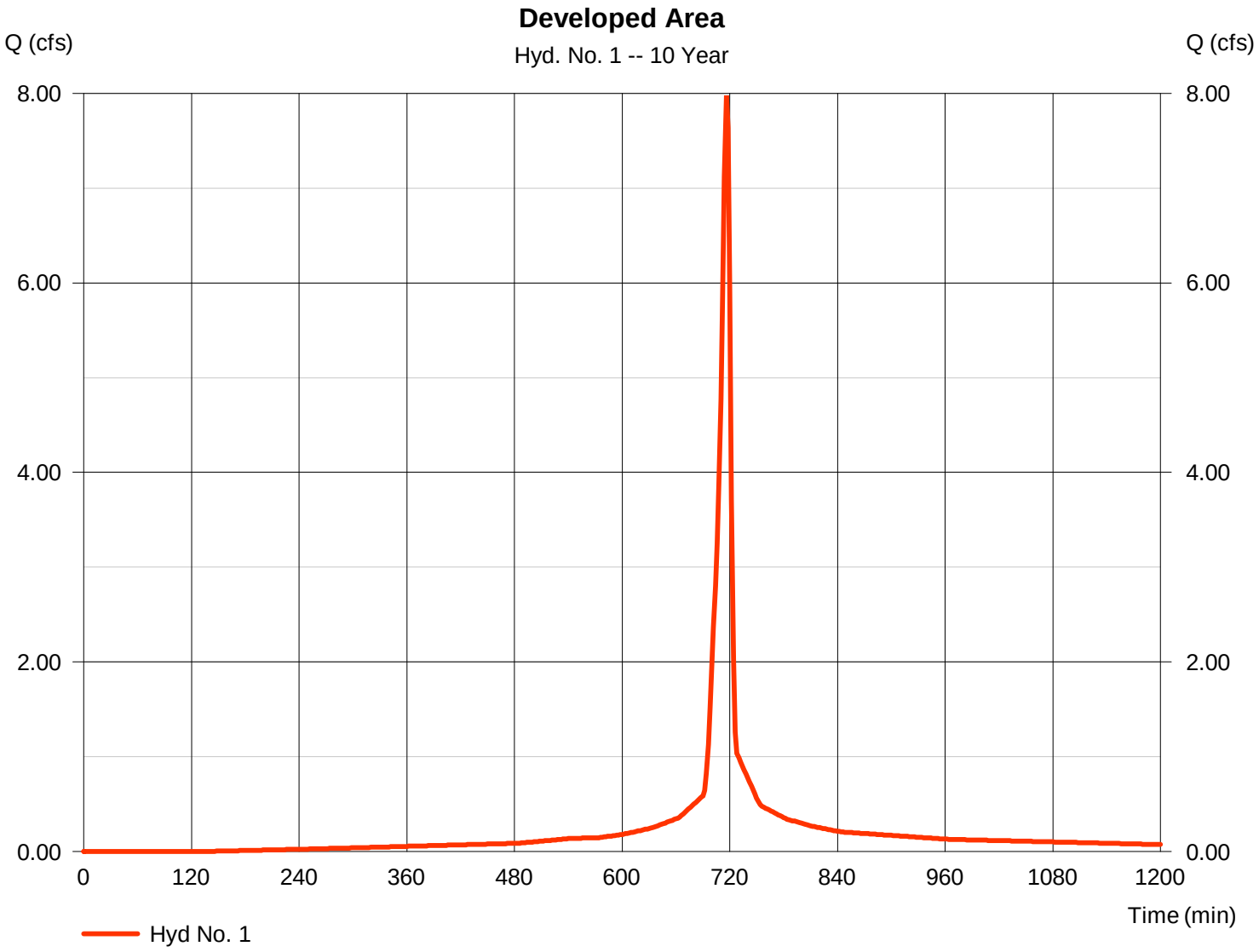
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	7.974	2	716	17,975	------	------	------	Developed Area
2	Reservoir	0.525	2	752	17,969	1	1011.32	10,758	<no description>

Hydrograph Report

Hyd. No. 1

Developed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 7.974 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 17,975 cuft
Drainage area	= 1.100 ac	Curve number	= 94
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



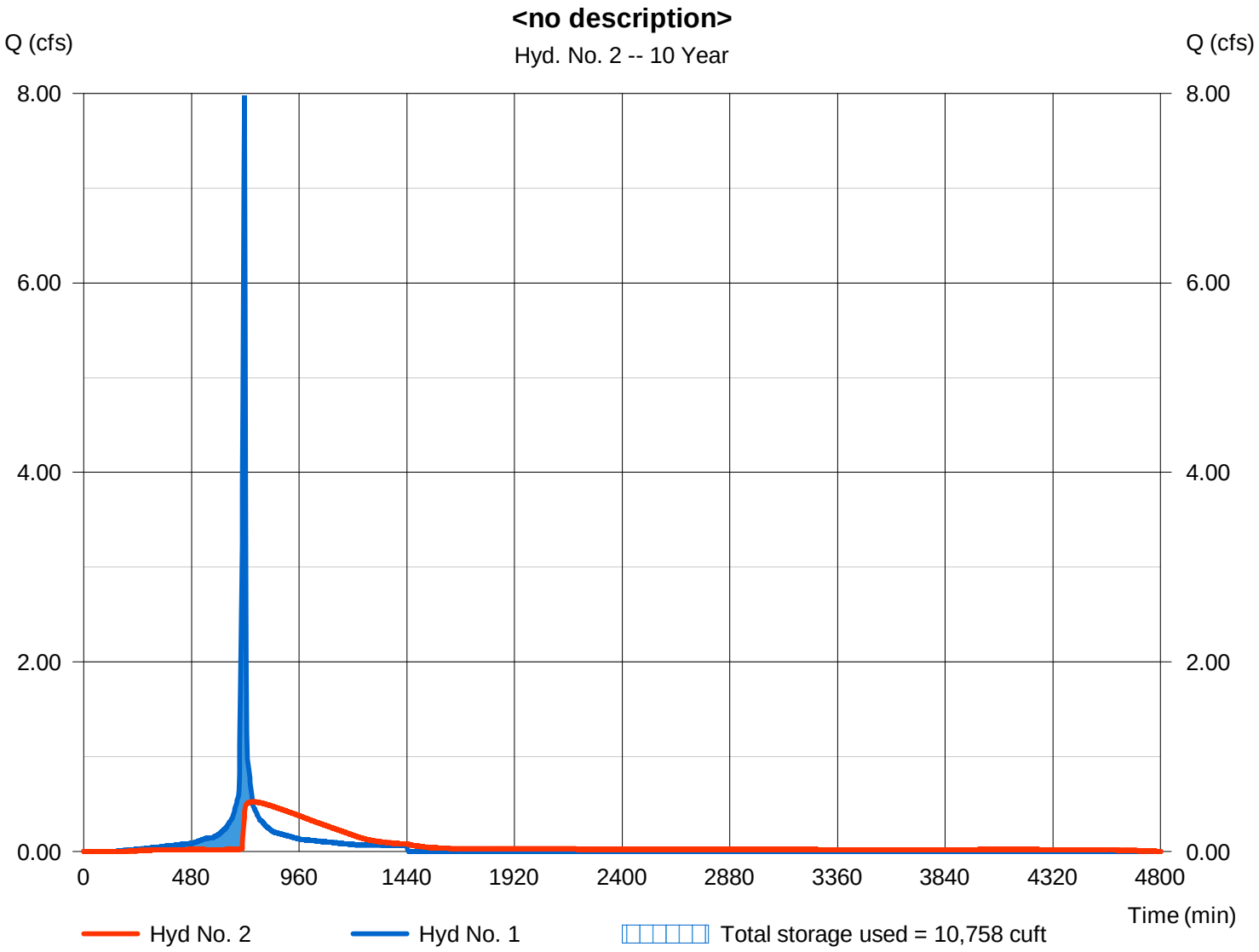
Hydrograph Report

Hyd. No. 2

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	0.525 cfs
Storm frequency	=	10 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	17,969 cuft
Inflow hyd. No.	=	1 - Developed Area	Max. Elevation	=	1011.32 ft
Reservoir name	=	Pond	Max. Storage	=	10,758 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

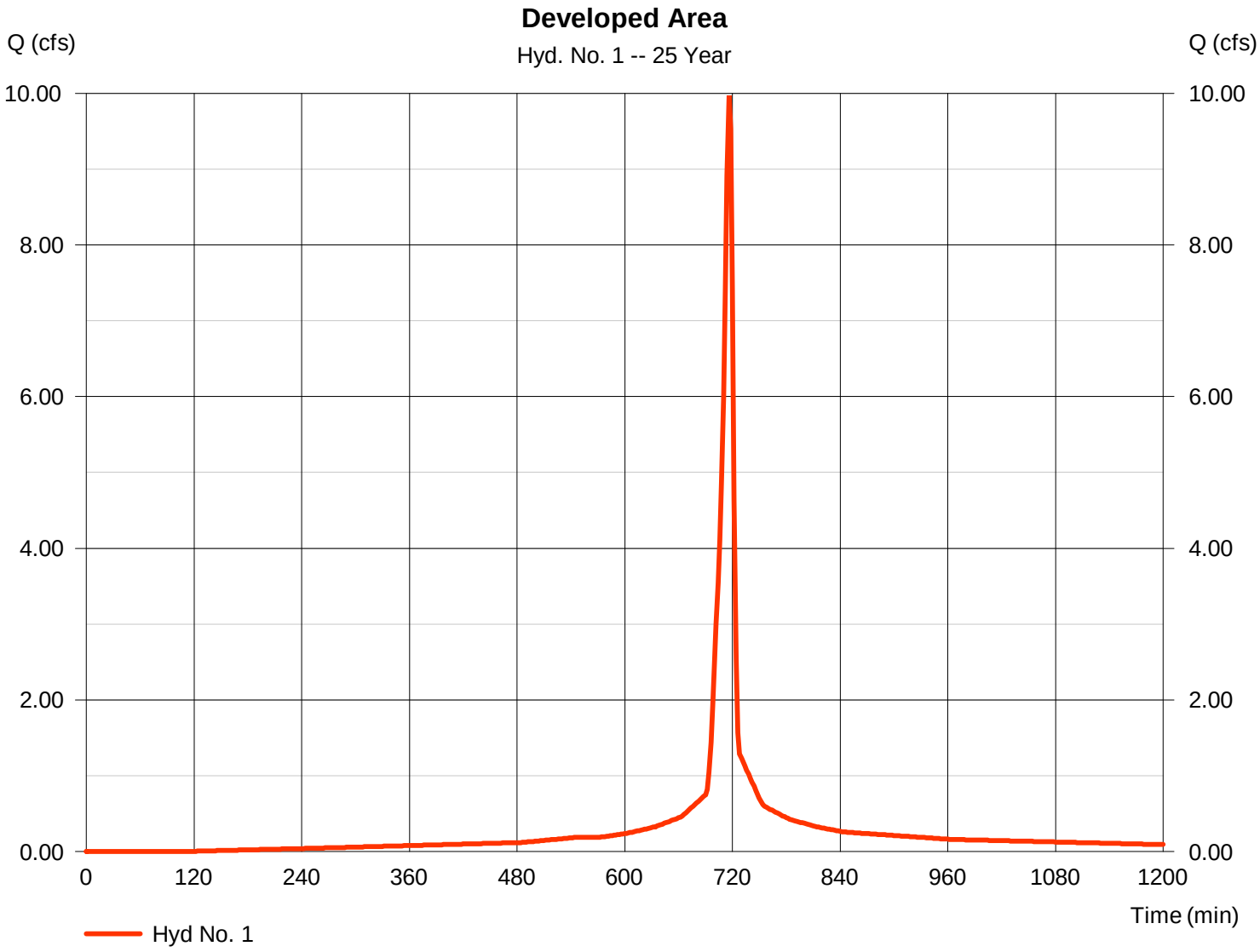
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.970	2	716	22,797	------	------	------	Developed Area
2	Reservoir	0.660	2	752	22,791	1	1012.12	13,754	<no description>

Hydrograph Report

Hyd. No. 1

Developed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 9.970 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 22,797 cuft
Drainage area	= 1.100 ac	Curve number	= 94
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



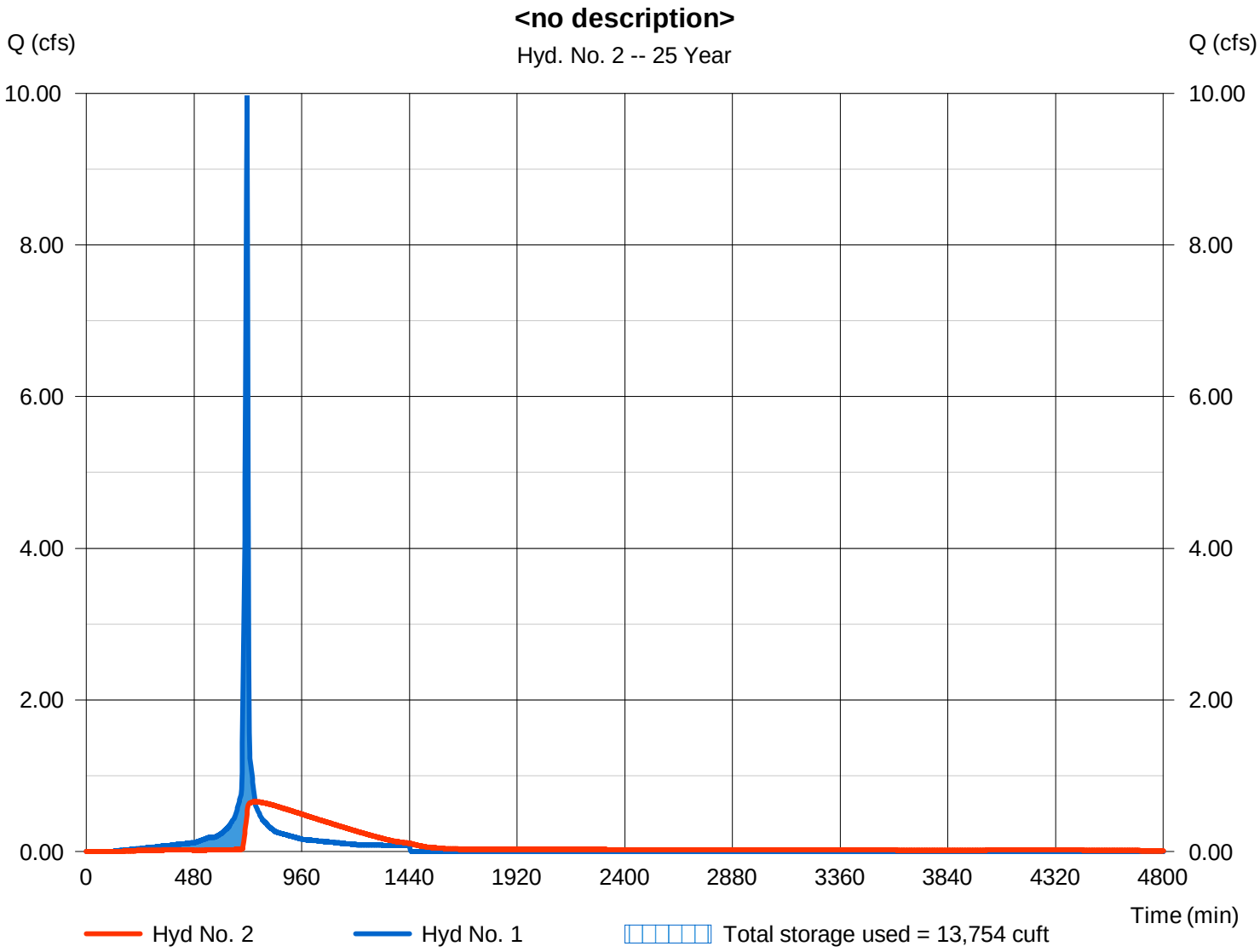
Hydrograph Report

Hyd. No. 2

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	0.660 cfs
Storm frequency	=	25 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	22,791 cuft
Inflow hyd. No.	=	1 - Developed Area	Max. Elevation	=	1012.12 ft
Reservoir name	=	Pond	Max. Storage	=	13,754 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

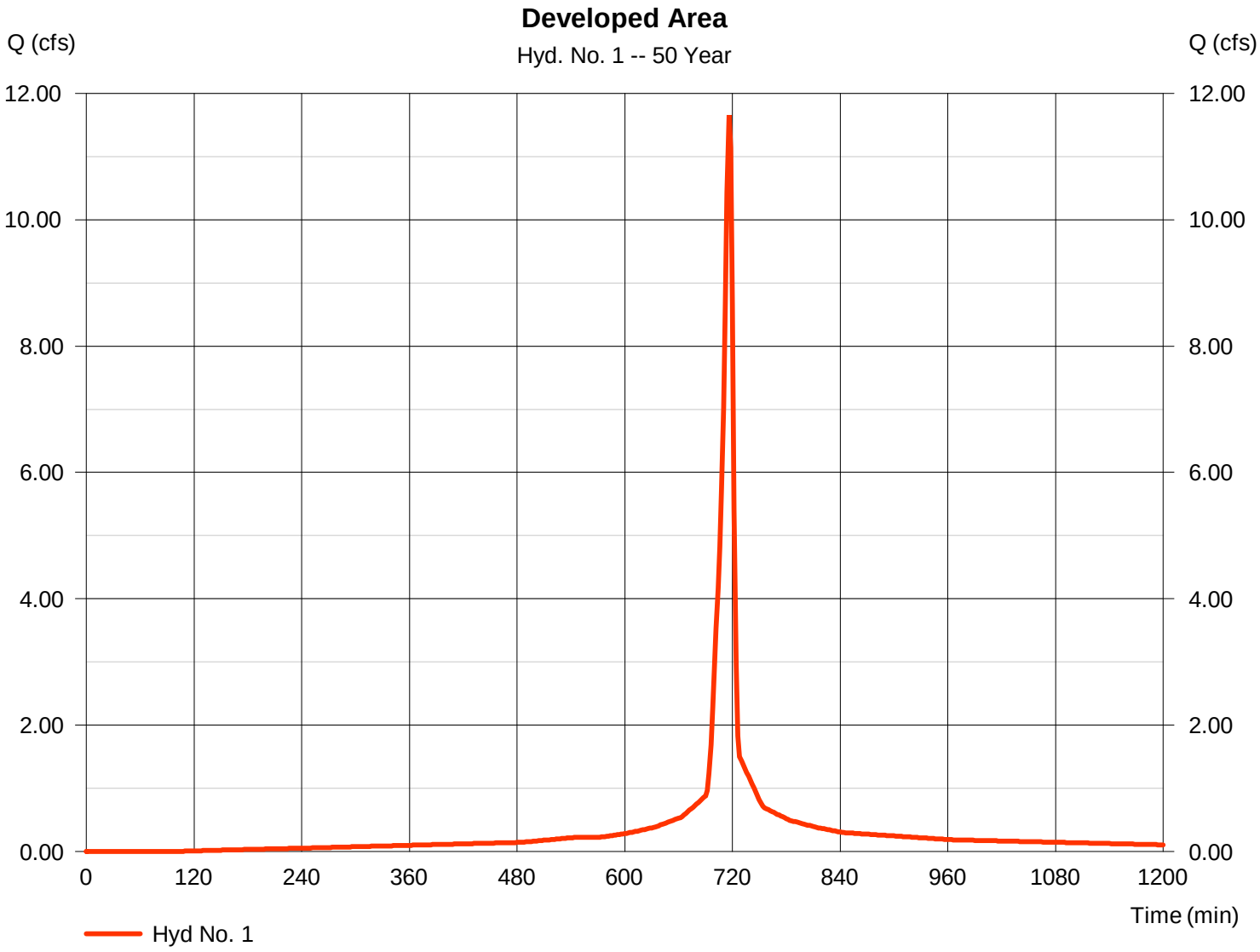
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.65	2	716	26,887	------	------	------	Developed Area
2	Reservoir	1.405	2	732	26,881	1	1012.76	15,567	<no description>

Hydrograph Report

Hyd. No. 1

Developed Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.65 cfs
Storm frequency	=	50 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	26,887 cuft
Drainage area	=	1.100 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



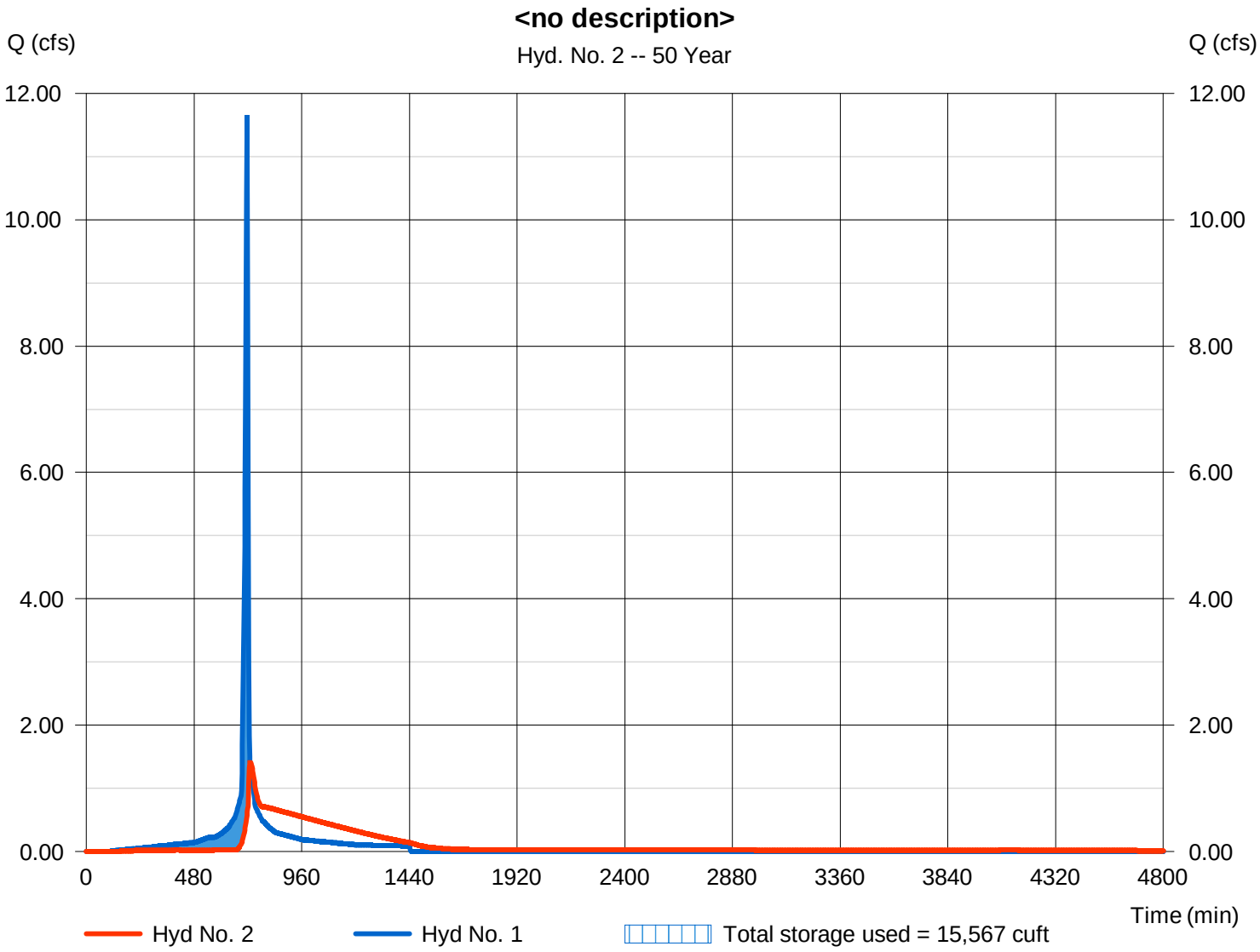
Hydrograph Report

Hyd. No. 2

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	1.405 cfs
Storm frequency	=	50 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	26,881 cuft
Inflow hyd. No.	=	1 - Developed Area	Max. Elevation	=	1012.76 ft
Reservoir name	=	Pond	Max. Storage	=	15,567 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

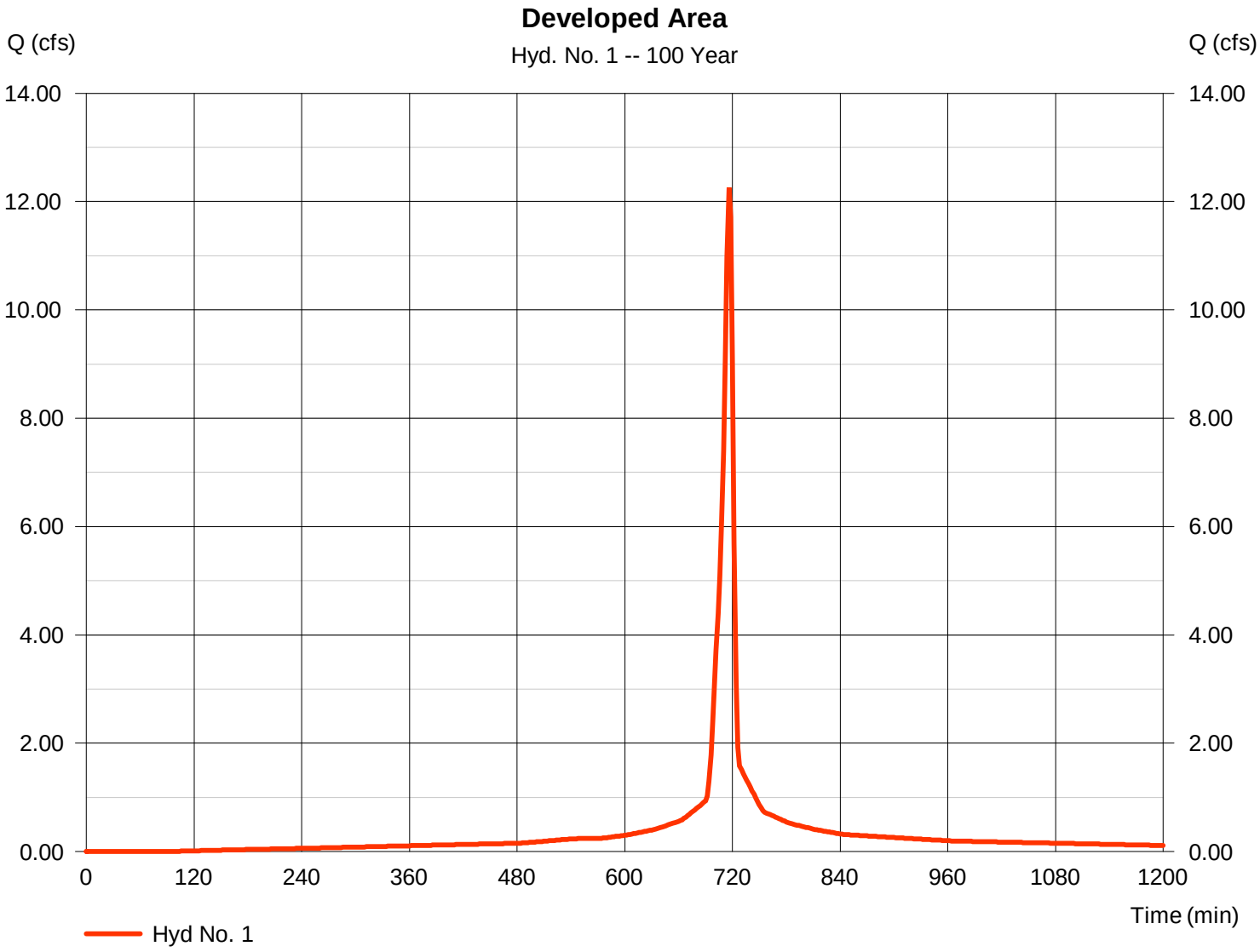
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	12.26	2	716	28,376	------	------	------	Developed Area
2	Reservoir	2.384	2	726	28,370	1	1012.97	16,047	<no description>

Hydrograph Report

Hyd. No. 1

Developed Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	28,376 cuft
Drainage area	=	1.100 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



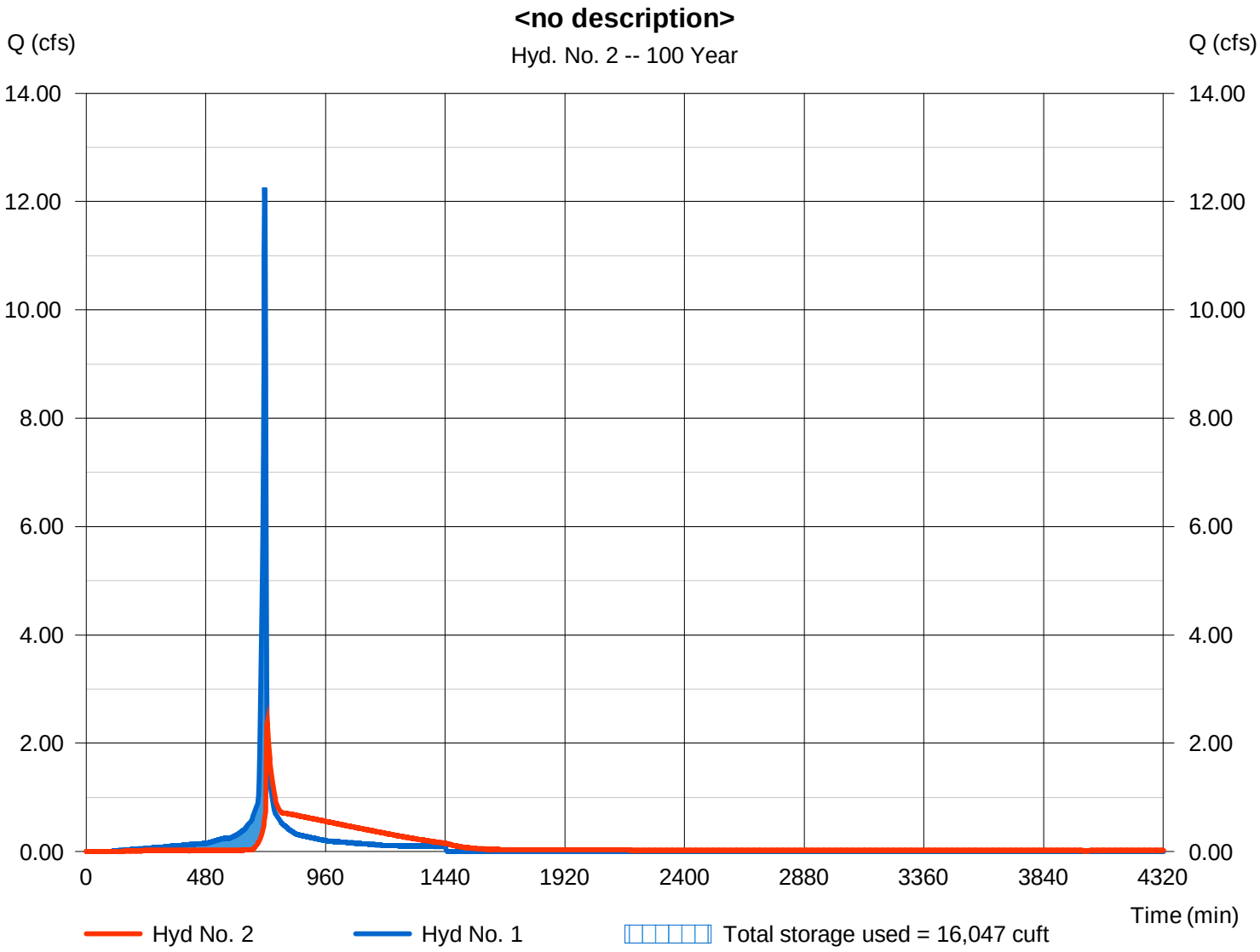
Hydrograph Report

Hyd. No. 2

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	2.384 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	28,370 cuft
Inflow hyd. No.	=	1 - Developed Area	Max. Elevation	=	1012.97 ft
Reservoir name	=	Pond	Max. Storage	=	16,047 cuft

Storage Indication method used.



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	0.0000	0.0000	0.0000	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	0.0000	0.0000	0.0000	--------
25	0.0000	0.0000	0.0000	--------
50	45.9758	3.8000	0.6466	--------
100	48.1629	3.4000	0.6312	--------

File name: Lee's Summit IDF.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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	11.27	8.42	6.90	5.92	5.23	4.72	4.32	3.99	3.72	3.49	3.30	3.13
100	12.57	9.36	7.66	6.58	5.83	5.26	4.82	4.46	4.16	3.91	3.70	3.51

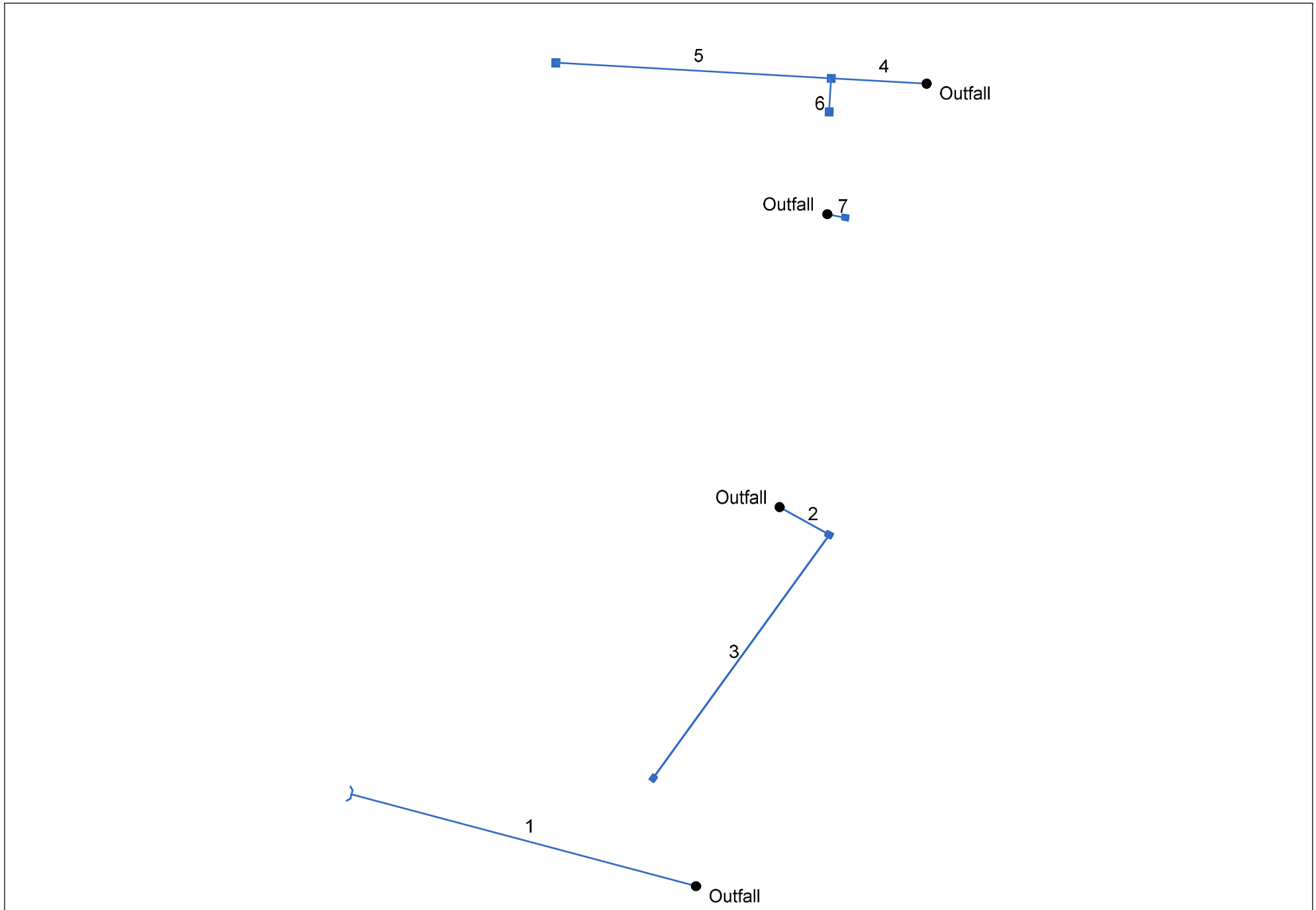
Tc = time in minutes. Values may exceed 60.

Precip. file name: G:\Projects\Cross Development\Lee's Summit, MO\Documents\SWM Design\Calculations\rainfall.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	3.80	0.00	0.00	5.50	6.80	7.90	8.30
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

Appendix C

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: CC Lees Summit MO Storm Sewers (2021 - 0722).stm	Number of lines: 7	Date: 7/22/2021

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	R1-R2	9.26	18	Cir	164.400	1015.15	1016.00	0.517	1016.33*	1017.64*	0.43	1018.07	End	OpenHeadwall
2	UGD-4	7.33	18	Cir	26.209	1009.20	1009.50	1.145	1010.25	1010.55	n/a	1010.55 j	End	Combination
3	4-5	6.00	18	Cir	138.832	1009.70	1011.00	0.936	1010.55	1011.95	n/a	1011.95	2	Combination
4	1-1A	9.72	18	Cir	44.108	1007.60	1008.10	1.134	1008.80	1009.30	n/a	1009.30	End	Manhole
5	1A-1B	7.69	18	Cir	127.189	1008.30	1009.60	1.022	1009.30	1010.67	n/a	1010.67	4	DropCurb
6	1A-2	2.30	18	Cir	15.501	1008.30	1008.50	1.290	1009.30	1009.07	n/a	1009.07	4	Manhole
7	UGD-3	2.94	18	Cir	8.339	1007.80	1007.90	1.200	1008.45	1008.55	n/a	1008.55	End	Combination

Project File: CC Lees Summit MO Storm Sewers (2021 - 0722).stm | Number of lines: 7 | Run Date: 7/22/2021

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	164.400	0.94	0.94	0.52	0.49	0.49	5.0	5.0	12.6	9.26	8.18	5.73	18	0.52	1015.15	1016.00	1016.33	1017.64	1017.36	1018.21	R1-R2
2	End	26.209	0.15	0.77	0.90	0.14	0.61	5.0	5.7	12.0	7.33	12.17	5.55	18	1.14	1009.20	1009.50	1010.25	1010.55	1016.04	1015.60	UGD-4
3	2	138.832	0.62	0.62	0.77	0.48	0.48	5.0	5.0	12.6	6.00	11.01	5.47	18	0.94	1009.70	1011.00	1010.55	1011.95	1015.60	1015.00	4-5
4	End	44.108	0.00	1.70	0.90	0.00	0.61	5.0	5.5	12.1	9.72	12.11	6.41	18	1.13	1007.60	1008.10	1008.80	1009.30	1012.91	1016.00	1-1A
5	4	127.189	1.70	1.70	0.36	0.61	0.61	5.0	5.0	12.6	7.69	11.50	5.91	18	1.02	1008.30	1009.60	1009.30	1010.67	1016.00	1013.50	1A-1B
6	4	15.501	0.00	0.00	0.90	0.00	0.00	5.0	5.0	0.0	2.30	12.92	2.77	18	1.29	1008.30	1008.50	1009.30	1009.07	1016.00	1016.20	1A-2
7	End	8.339	0.26	0.26	0.90	0.23	0.23	5.0	5.0	12.6	2.94	12.46	4.00	18	1.20	1007.80	1007.90	1008.45	1008.55	1015.60	1015.40	UGD-3

Project File: CC Lees Summit MO Storm Sewers (2021 - 0722).stm

Number of lines: 7

Run Date: 7/22/2021

NOTES:Intensity = 48.16 / (Inlet time + 3.40) ^ 0.63; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	R2	9.26*	0.00	9.26	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	4	1.70	0.00	1.70	0.00	Comb	6.0	3.58	3.09	2.98	1.98	Sag	2.00	0.050	0.020	0.000	0.20	6.95	0.20	6.95	0.0	Off
3	5	6.00	0.00	6.00	0.00	Comb	6.0	3.58	3.09	2.98	1.98	Sag	2.00	0.050	0.020	0.000	0.39	16.58	0.39	16.58	0.0	Off
4	1A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	1B	7.69	0.00	7.69	0.00	DrCrb	6.0	15.35	0.00	0.00	0.00	Sag	0.00	0.020	0.020	0.000	0.30	15.16	0.30	15.16	0.0	Off
6	2	2.30*	0.00	0.00	2.30	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7	3	2.94	0.00	2.94	0.00	Comb	6.0	3.58	3.09	2.98	1.98	Sag	2.00	0.050	0.020	0.000	0.26	10.18	0.26	10.18	0.0	Off

This 2.30 cfs of discharge added to the system is the discharge of the 100-year, 24-hour storm event from the underground detention shystme. This value was calcualted utilizing HydroCAD and these calculation can be found in Appendix B of this report.

This 9.26 cfs of discharge added to the system is the sum of the runoff directed to inlet "R-2", the runoff directed to inlet "EX-1", and the runoff directed to inlet "EX-2". Reference the Inlet Area Map included in Appendix A of the report for clarification. This combined discharge represents the approximate total runoff discharged to inlet R-2 via

Project File: CC Lees Summit MO Storm Sewers (2021 - 0722).stm | Number of lines: 7 | Run Date: 7/22/2021

NOTES: Inlet N-Values = 0.016; Intensity = 48.16 / (Inlet time + 3.40) ^ 0.63; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Appendix D

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	DIRK HUDSON 816-602-4201 DIRK.HUDSON@ADS-PIPE.COM
ADS SALES REP:	DUSTIN KETCHUM 316-201-7032 DUSTIN.KETCHUM@ADS-PIPE.COM
PROJECT NO:	S248764

Advanced Drainage Systems, Inc.

SiteASSIST™
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

CALIBER COLLISION

LEE'S SUMMIT, MO

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT

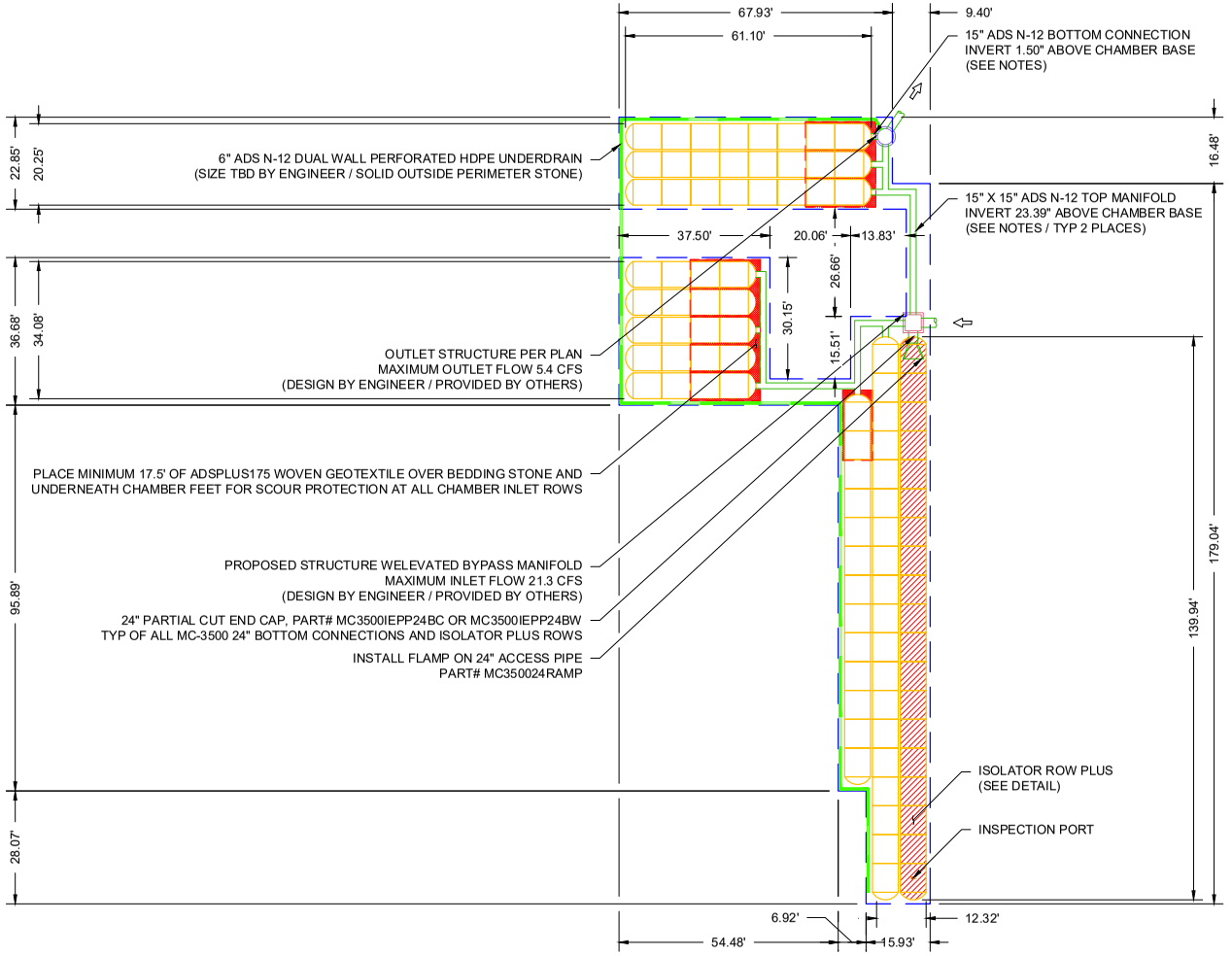
95	STORMTECH MC-3500 CHAMBERS
22	STORMTECH MC-3500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
30	% STONE VOID
18,021	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
6351	SYSTEM AREA (ft²)
749	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

1021.00	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
1015.00	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
1014.50	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
1014.50	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
1014.50	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
1014.00	TOP OF STONE
1013.00	TOP OF MC-3500 CHAMBER
1011.37	15" TOP MANIFOLD INVERT
1009.42	24" ISOLATOR ROW PLUS CONNECTION INVERT
1009.38	15" BOTTOM CONNECTION INVERT
1009.25	BOTTOM OF MC-3500 CHAMBER
1008.50	UNDERDRAIN INVERT
1008.50	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



CALIBER COLLISION
LEE'S SUMMIT, MO

DATE: 07-16-21 | DRAWN: RSG | CHECKED: AGC
PROJECT #: S248764

DATE	DRWN	CHKD	DESCRIPTION
07-21-21	RSG	AGC	REMOVED SECOND WQ STRUCTURE

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

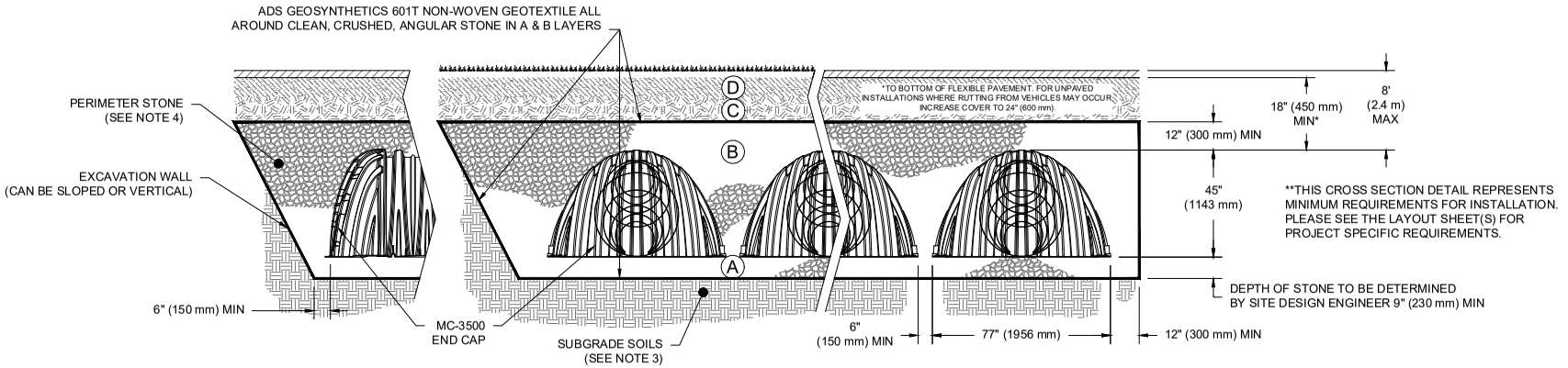
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

0 30' 60'

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

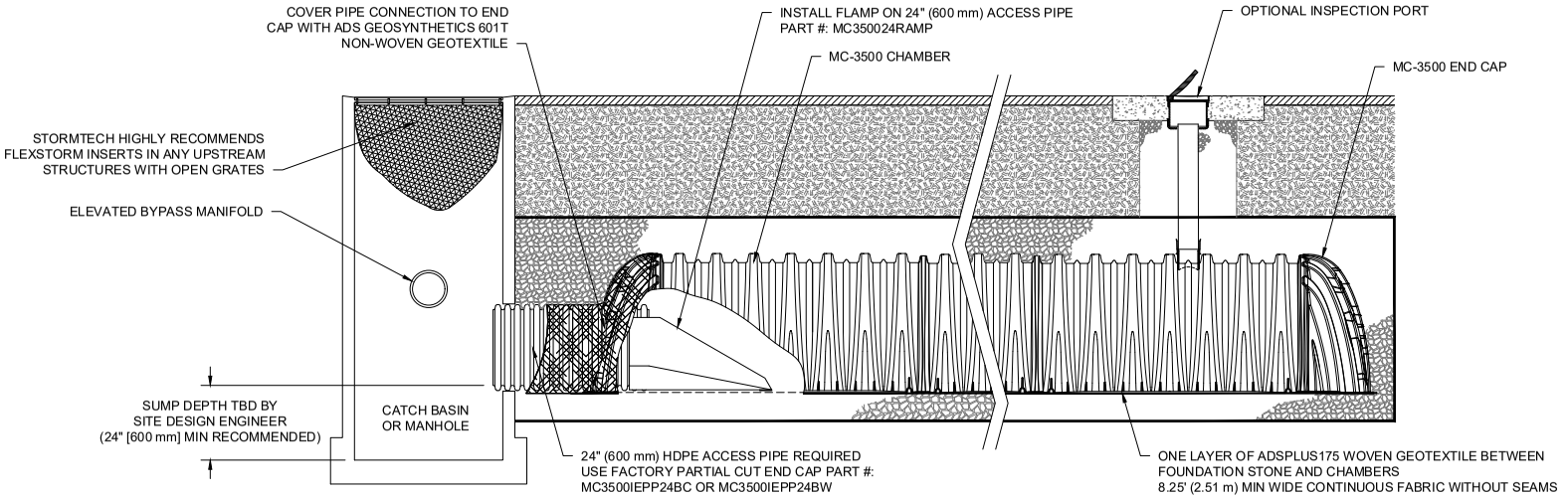
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

CALIBER COLLISION
LEE'S SUMMIT, MO
DATE: 07-16-21 | DRAWN: RSG | PROJECT #: S248764 | CHECKED: AGC

DATE	DRWN	CHKD	DESCRIPTION
07-21-21	RSG	AGC	REMOVED SECOND WQ STRUCTURE

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026



MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

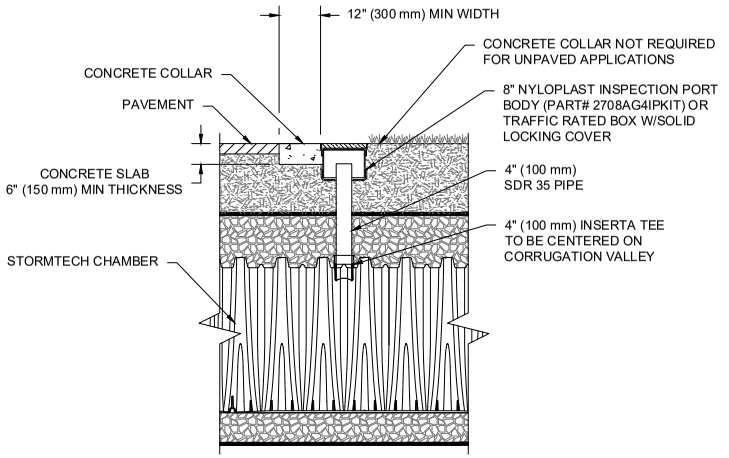
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)
NTS

CALIBER COLLISION
LEE'S SUMMIT, MO
DATE: 07-16-21 | DRAWN: RSG | PROJECT #: S248764 | CHECKED: AGC

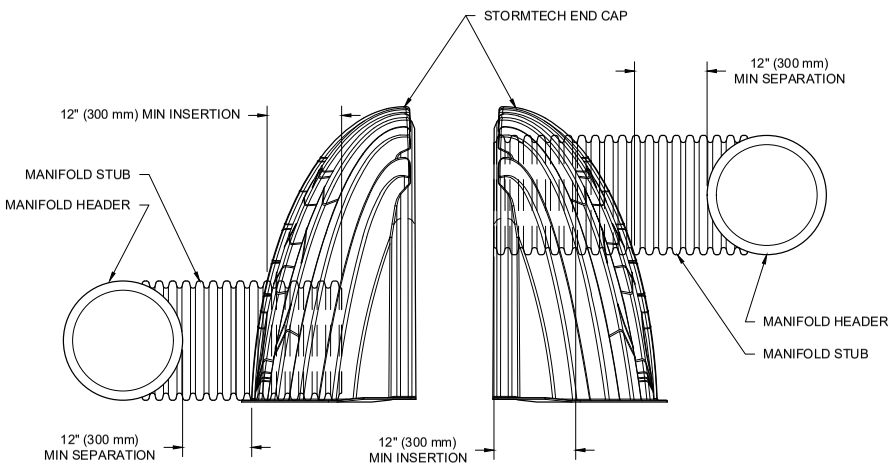
DATE	DRWN	CHKD	DESCRIPTION
07-21-21	RSG	AGC	REMOVED SECOND WQ STRUCTURE

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

MC-SERIES END CAP INSERTION DETAIL

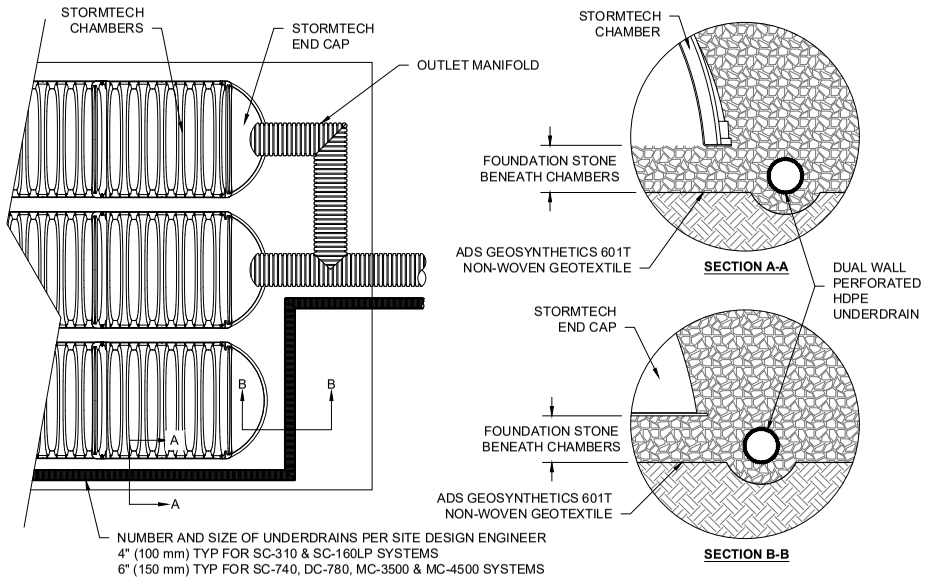
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

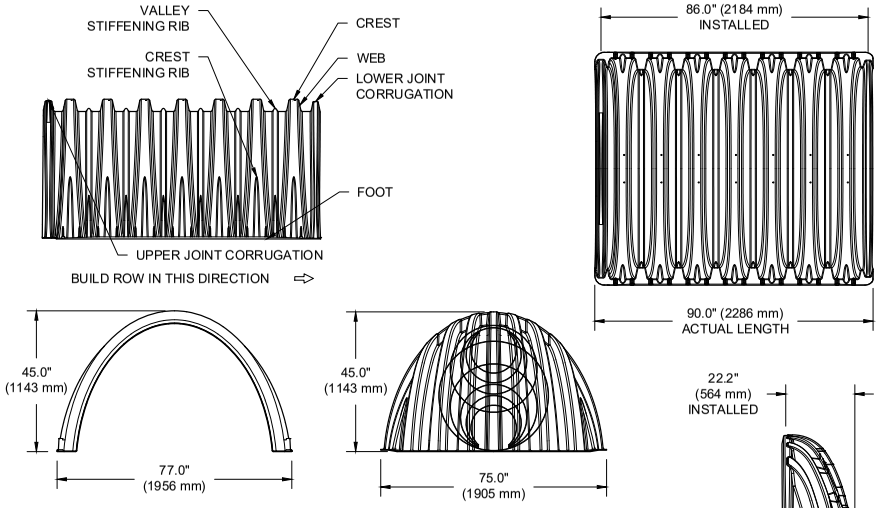
UNDERDRAIN DETAIL

NTS



MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

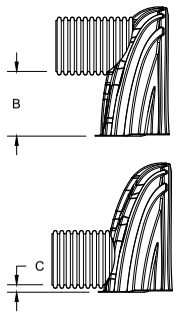
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

CALIBER COLLISION
LEE'S SUMMIT, MO
DATE: 07-16-21 DRAWN: RSG
PROJECT #: S248764 CHECKED: AGC

DATE	DRWN	CHKD	DESCRIPTION
07-21-21	RSG	AGC	REMOVED SECOND WQ STRUCTURE

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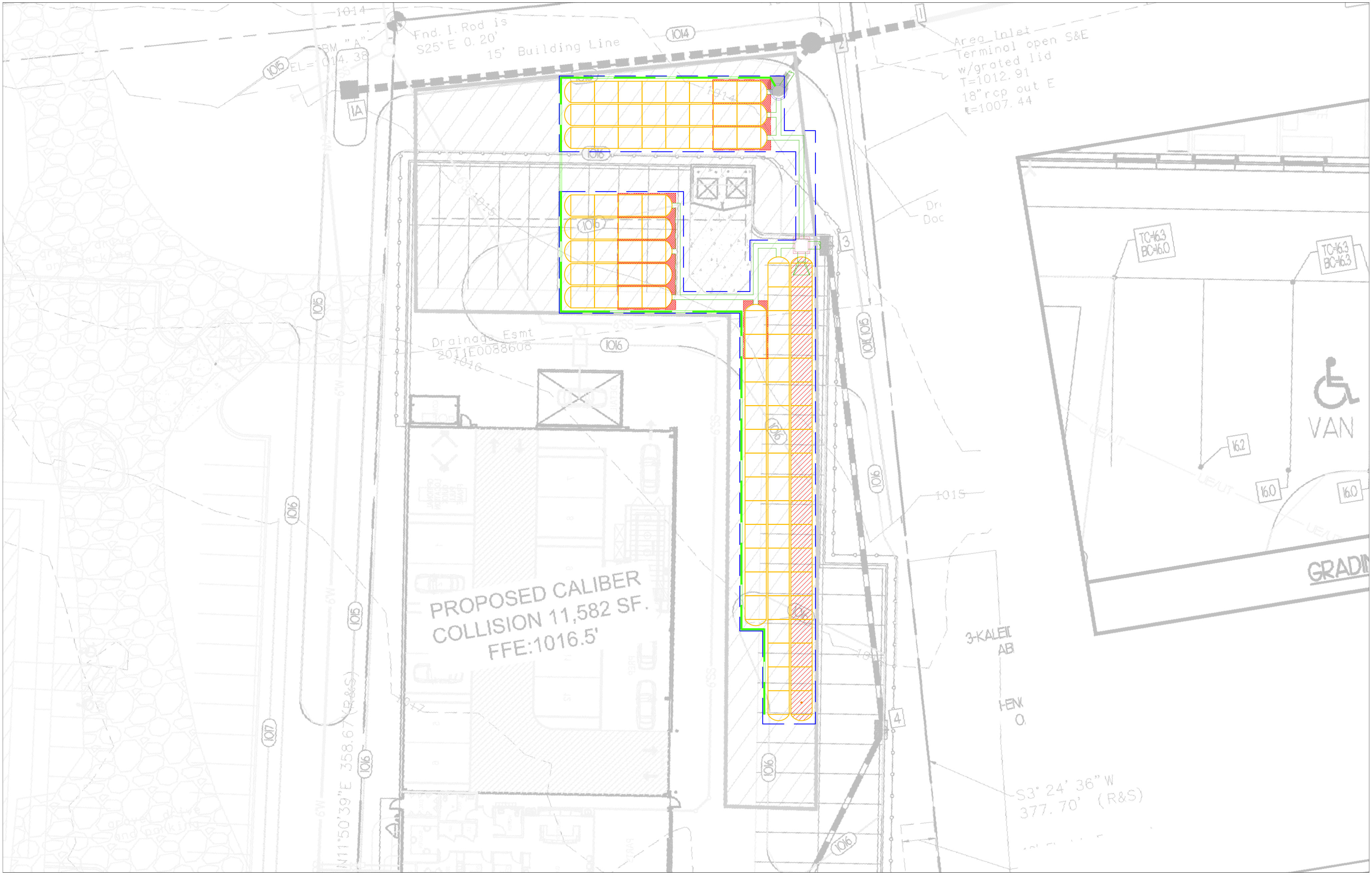
PROPOSED CALIBER
COLLISION 11,582 SF.
FFE:1016.5'
VAN
GRADI
TC=16.3
BC=16.0
TC=16.3
BC=16.3
16.2
16.0
16.0
3-KALEIL
AB
1-ENK
O
S3°24'36"W
377.70' (R&S)
Area Inlet
Terminal open S&E
w/grated lid
T=1012.91
18"rcp out E
E=1007.44
15' Building Line
Fnd. I. Rod is
S25°E 0.20'
Drainage Esmt
2011E0088608
N11°50'39"E 358.67' (R&S)
1A
1
2
3
4

Project: **Caliber Collision**

Chamber Model -	MC-3500	
Units -	**Imperial**	Click Here for Metric
Number of Chambers -	95	
Number of End Caps -	22	
Voids in the stone (porosity) -	30	%
Base of Stone Elevation -	1008.50	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	9	in
Amount of Stone Between Chambers -	6	in
Area of system -	6351	sf Min. Area - 5067 sf min. area

☑ Include Perimeter Stone in Calculations

StormTech MC-3500 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch, EC and Stone (cubic feet)	Cumulative System (cubic feet)	Elevation (feet)
66	0.00	0.00	0.00	0.00	158.78	158.78	18020.96	1014.00
65	0.00	0.00	0.00	0.00	158.78	158.78	17862.19	1013.92
64	0.00	0.00	0.00	0.00	158.78	158.78	17703.41	1013.83
63	0.00	0.00	0.00	0.00	158.78	158.78	17544.64	1013.75
62	0.00	0.00	0.00	0.00	158.78	158.78	17385.86	1013.67
61	0.00	0.00	0.00	0.00	158.78	158.78	17227.09	1013.58
60	0.00	0.00	0.00	0.00	158.78	158.78	17068.31	1013.50
59	0.00	0.00	0.00	0.00	158.78	158.78	16909.54	1013.42
58	0.00	0.00	0.00	0.00	158.78	158.78	16750.76	1013.33
57	0.00	0.00	0.00	0.00	158.78	158.78	16591.99	1013.25
56	0.00	0.00	0.00	0.00	158.78	158.78	16433.21	1013.17
55	0.00	0.00	0.00	0.00	158.78	158.78	16274.44	1013.08
54	0.06	0.00	5.52	0.00	157.12	162.64	16115.66	1013.00
53	0.19	0.02	18.44	0.53	153.09	172.05	15953.02	1012.92
52	0.29	0.04	27.93	0.83	150.15	178.90	15780.97	1012.83
51	0.40	0.05	38.35	1.13	146.93	186.41	15602.07	1012.75
50	0.69	0.07	65.28	1.49	138.74	205.51	15415.66	1012.67
49	1.03	0.09	97.69	1.94	128.89	228.52	15210.15	1012.58
48	1.25	0.11	118.71	2.36	122.46	243.52	14981.63	1012.50
47	1.42	0.13	135.11	2.78	117.41	255.30	14738.11	1012.42
46	1.57	0.14	149.45	3.18	112.99	265.61	14482.81	1012.33
45	1.71	0.16	162.18	3.58	109.05	274.81	14217.20	1012.25
44	1.83	0.18	173.71	4.00	105.46	283.17	13942.39	1012.17
43	1.94	0.20	184.09	4.41	102.23	290.72	13659.22	1012.08
42	2.04	0.22	193.88	4.80	99.17	297.85	13368.50	1012.00
41	2.13	0.23	202.80	5.17	96.39	304.35	13070.65	1011.92
40	2.22	0.25	211.30	5.51	93.73	310.54	12766.30	1011.83
39	2.31	0.27	219.15	5.84	91.28	316.27	12455.75	1011.75
38	2.38	0.28	226.55	6.16	88.96	321.67	12139.49	1011.67
37	2.46	0.29	233.61	6.47	86.75	326.83	11817.81	1011.58
36	2.53	0.31	240.18	6.77	84.69	331.64	11490.98	1011.50
35	2.59	0.32	246.41	7.07	82.73	336.21	11159.34	1011.42
34	2.66	0.33	252.33	7.36	80.87	340.55	10823.14	1011.33
33	2.72	0.35	257.93	7.63	79.10	344.67	10482.58	1011.25
32	2.77	0.36	263.27	7.92	77.42	348.61	10137.91	1011.17
31	2.82	0.37	268.34	8.19	75.82	352.35	9789.30	1011.08
30	2.88	0.38	273.17	8.45	74.29	355.91	9436.95	1011.00
29	2.92	0.40	277.79	8.71	72.82	359.33	9081.04	1010.92
28	2.97	0.41	282.14	8.97	71.44	362.55	8721.71	1010.83
27	3.01	0.42	286.18	9.21	70.16	365.55	8359.16	1010.75
26	3.05	0.43	290.06	9.45	68.92	368.43	7993.61	1010.67
25	3.09	0.44	293.96	9.69	67.68	371.33	7625.18	1010.58
24	3.13	0.45	297.40	9.92	66.58	373.90	7253.85	1010.50
23	3.17	0.46	300.74	10.14	65.51	376.39	6879.95	1010.42
22	3.20	0.47	303.95	10.35	64.48	378.79	6503.56	1010.33
21	3.23	0.48	306.96	10.56	63.52	381.04	6124.78	1010.25
20	3.26	0.49	309.83	10.76	62.60	383.19	5743.74	1010.17
19	3.29	0.50	312.57	10.96	61.72	385.25	5360.55	1010.08
18	3.32	0.51	315.21	11.14	60.87	387.22	4975.30	1010.00
17	3.34	0.51	317.69	11.32	60.07	389.08	4588.08	1009.92
16	3.37	0.52	320.02	11.49	59.32	390.83	4199.00	1009.83
15	3.39	0.53	322.29	11.65	58.59	392.53	3808.17	1009.75
14	3.41	0.54	324.38	11.80	57.92	394.10	3415.64	1009.67
13	3.44	0.54	326.52	11.95	57.24	395.70	3021.53	1009.58
12	3.46	0.55	328.48	12.09	56.60	397.17	2625.83	1009.50
11	3.48	0.56	330.48	12.21	55.97	398.66	2228.66	1009.42
10	3.51	0.59	332.98	13.09	54.95	401.03	1830.00	1009.33
9	0.00	0.00	0.00	0.00	158.78	158.78	1428.98	1009.25
8	0.00	0.00	0.00	0.00	158.78	158.78	1270.20	1009.17
7	0.00	0.00	0.00	0.00	158.78	158.78	1111.43	1009.08
6	0.00	0.00	0.00	0.00	158.78	158.78	952.65	1009.00
5	0.00	0.00	0.00	0.00	158.78	158.78	793.88	1008.92
4	0.00	0.00	0.00	0.00	158.78	158.78	635.10	1008.83
3	0.00	0.00	0.00	0.00	158.78	158.78	476.33	1008.75
2	0.00	0.00	0.00	0.00	158.78	158.78	317.55	1008.67
1	0.00	0.00	0.00	0.00	158.78	158.78	158.78	1008.58