



Drainage Design Summary
Lee's Summit Medical Center –
Medical Office Building
Lee's Summit, MO
S&ME Project No. 527116043

PREPARED FOR:

Lee's Summit Medical Center
2100 SE Blue Parkway
Lee's Summit, MO 64063

PREPARED BY:

S&ME, Inc.
1615 Edgewater Dr., Suite 200
Orlando, FL 32804

December 28, 2017



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December 28, 2017
George B. Huddleston, III, P.E.
MO PE 2017-035508



1.0 Overview

1.1 Site Description

The proposed project is a Medical Office Building (MOB) addition to the existing Lee's Summit Medical Center Campus. The site is located south of SE Shenandoah Drive and north of SE Blue Parkway between SE Cumberland Drive and SE Battery Drive in Lee's Summit, MO.

The existing portion of campus being modified presently contains a parking lot and an existing dry detention pond for the southwest portion of the campus. The proposed project impact area consists of 5.69± ac., of which 3.46± ac. is impervious development.

Surface runoff from the existing site is collected by a series of catch basins which appear to direct storm flows towards the southwest to a dry detention pond for treatment before discharging to an existing 60 inch CMP underneath Southeast Shenandoah Drive. The proposed site improvements will include a revised dry detention pond to provide stormwater attenuation by means of detention.

1.2 Existing Soils, Groundwater and Topography

The topography of the site is relatively flat with grades ranging from approximately 1016± down to 991± NAVD88. A review of the USDA Soil Conservation Service Soil Survey of Jackson County, Missouri indicates that the following soil types can be found on the site:

Soils Survey, Jackson County, Missouri		
Map Unit Symbol	Map Unit Name	Hydrologic Group
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	D
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	C

Source: <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

The primary hydrologic soils located within the limits of design/ construction are classified as Group 'C/D' (see **Appendix II**).

A geotechnical investigation was performed by Terracon, dated June 9, 2017 (provided under a separate cover). Groundwater elevations are located at approximately 9± below grade NAVD88.

2.0 Design Overview

This project is located east and south of the existing Lee's Summit Medical Center; therefore, the stormwater analyses detailed herein are focused on the existing and proposed conditions of this portion of the campus. The remainder of the Lee's Summit Medical Center will remain mostly unchanged.



Detention criteria will be determined as provided for in the American Public Works Associations (APWA), Division V, Section 5600, as approved on November 19, 2003 by the Kansas City Metropolitan Chapter of the APWA and as adopted and amended on September 16, 2004 by the City of Lee's Summit. Criteria such as soil types, ground cover and ground topography were used to calculate times of concentration (Tc) and runoff curve numbers (CN) per TR-55 methodology, and considered as part of this analysis.

3.0 Pre-Development Stormwater Conditions

The existing stormwater management system appears to have surface runoff captured by catch basins and routed to a dry detention pond located in the southwest corner of the property. Per the previous stormwater management plan for the Lee's Summit Medical Center, prepared by GBA on April 13, 2006, the existing detention pond, Pond A accounted for Watershed-A which included some of the future parking lot expansion.

Based on the previous stormwater management plan, we determined the additional basin areas that will be routed through the pond in post-development to determine the total outfall from the site for the disturbed portions of the campus. Per the previous stormwater report, the basin area discharging to Pond A is 7.11 acres. Watersheds A-1 and A-2 were added to the pre-development condition to account for the areas that will be disturbed in the post condition.

Per the calculations provided in the 2006 Lee's Summit Medical Center Stormwater Report, the maximum permitted discharge from the stormwater system in Watershed A is 12 cfs, 19 cfs, 27 cfs for the 2/24, 10/24, and 100/24 storm events, respectively. Additional maximum flows from Watershed A-1 and Watershed A-2 were added to the maximum discharge from Watershed A to get the total discharge rate for the pre-development condition. A summary of the modeled pre-development conditions results are provided here:

	Pre-Development Max. Flow (cfs)		
	02-Yr/ 24-Hr	10-Yr/ 24-Hr	100-Yr/ 24-Hr
Watershed A*	12.00	19.00	27.00
Watershed A-1	0.42	0.85	1.67
Watershed A-2	0.86	1.71	3.36
Pond A Discharge	13.28	21.56	32.03

* From 2006 Lee's Summit Medical Center Stormwater Report

The information detailing this information is provided in **Appendix VII**.

4.0 Proposed Stormwater Design

4.1 Wetland Considerations

There are no proposed wetland impacts.



4.2 Post-Development Stormwater Conditions

The proposed improvements to the project area interchange impervious area used for parking with impervious area for the MOB (including future expansion zones). Additional parking spaces are necessary for the MOB which requires parking to be provided in a portion of the existing dry detention pond. To offset the removed volume from the existing pond a retaining wall is proposed on the east and south to maintain the required pond volume. The retaining wall will include an integral handrail. The proposed project area of 7.11 acres overlays with some of the existing impervious area. The proposed building (with expansion zone) and parking covers 3.64 ac. total, with 1.78 ac. of impervious area removed (a difference of 1.86 ac. of additional impervious area).

Impervious Area			
	Removed	Added (with Expansion Zone)	
Building	--	33,415.26	
Pavement	70,404.65	113,447.76	
Sidewalk	2,179.04	7,356.97	
Concrete	5,089.84	4,403.42	
SF	77,673.53	158,623.41	(80,949.88)
Acre	1.78	3.64	(1.86)

In the post-development condition, the stormwater flows generated by the site are directed to catch basins that route flows to the modified dry detention pond. Per TR-55 methodology, a CN value of 98 was used to reflect the imperviousness of the proposed building and paved areas, while the pervious areas had CN values of 74 assigned for the corresponding Type 'C' soil groups, respectively (see **Appendix VIII**). Based on the previously used Tc values, the minimum permissible Tc values of 6 minutes were assumed. There are three (3) sub-basins defined to exist based on topography and site conditions: Basin A, Basin A-1 and Basin A-2 which collect in Pond A. Resulting Pond A discharge rates can be found below:

	Post-Development Max. Flow (cfs)		
	02-Yr/ 24-Hr	10-Yr/ 24-Hr	100-Yr/ 24-Hr
Pond A Discharge	12.95	21.40	30.49

4.3 Water Quantity

Per APWA, Division V, Section 5600, the design storms for this project are the 2-year/ 24-hour, 10-year/ 24-hour and 100-year/ 24-hour storm events. The design storms were evaluated using modeling software detailed below for the pre- versus post-development flow rates resulting from each basin.

4.4 Stormwater Modeling

Modeling software, adICPR, ver 3.10, Service Pack 11 by Streamline Technologies (ICPR), was used to quantify the pre- and post-development conditions, based on the model parameters discussed above. Rainfall amounts were obtained for NOAA's Precipitation Atlas (see **Appendix VII**). The rainfall depths for each of the design storms is 3.71", 5.66" and 9.25" for the 2/24, 10/24, and 100/24 storm events, respectively. ICPR storm attenuation analysis is provided in **Appendix V**.



5.0 Floodplain Considerations

FEMA FIRM Panel 29095C0439G, dated January 20, 2017, included in **Appendix II**, was referenced to determine if portions of the property lie within the 100-year flood plain. The FIRM indicates no portion of the proposed project or its associated development lies within the established flood plain.

6.0 Storm Drain Hydraulics

The proposed storm conveyance system, proposed to be mainly constructed of yard drains, catch basins and trench drains was evaluated using the Bentley StormCAD V8i, Series 5 (StormCAD) modeling software. A series of catchment areas with given Tc's, C coefficients, and areas subdivide the site into small contributing areas to each proposed inlet for the given 10-year design storm's stage at peak inflow resulting from the primary stormwater design for Pond A. The hydrograph data is provided by *NOAA Atlas 14 Precipitation Intensity*; https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mo, provided for reference in **Appendix VIII**. Each catchment area will then calculate the amount of runoff collected by each inlet, and conveyed through the pipe network to the proposed stormwater treatment and storage systems. Profiles of the resulting HGLs are provided in the StormCAD modeling results in **Appendix VIII**.

7.0 Conclusion

The proposed project to add an MOB to the existing Lee's Summit Medical Center campus, and its accompanying stormwater management system, has been shown not to adversely impact either the surrounding properties, or the subject property itself. Per the American Public Works Association, Division V, Section 5600 design regulations and design code criteria, the following parameters had to be considered for the pre-development vs. post-development conditions:

- Stormwater quantity for the 2-, 10-, and 100-year, 24-hour storm events
- Floodplain compensating storage, if necessary

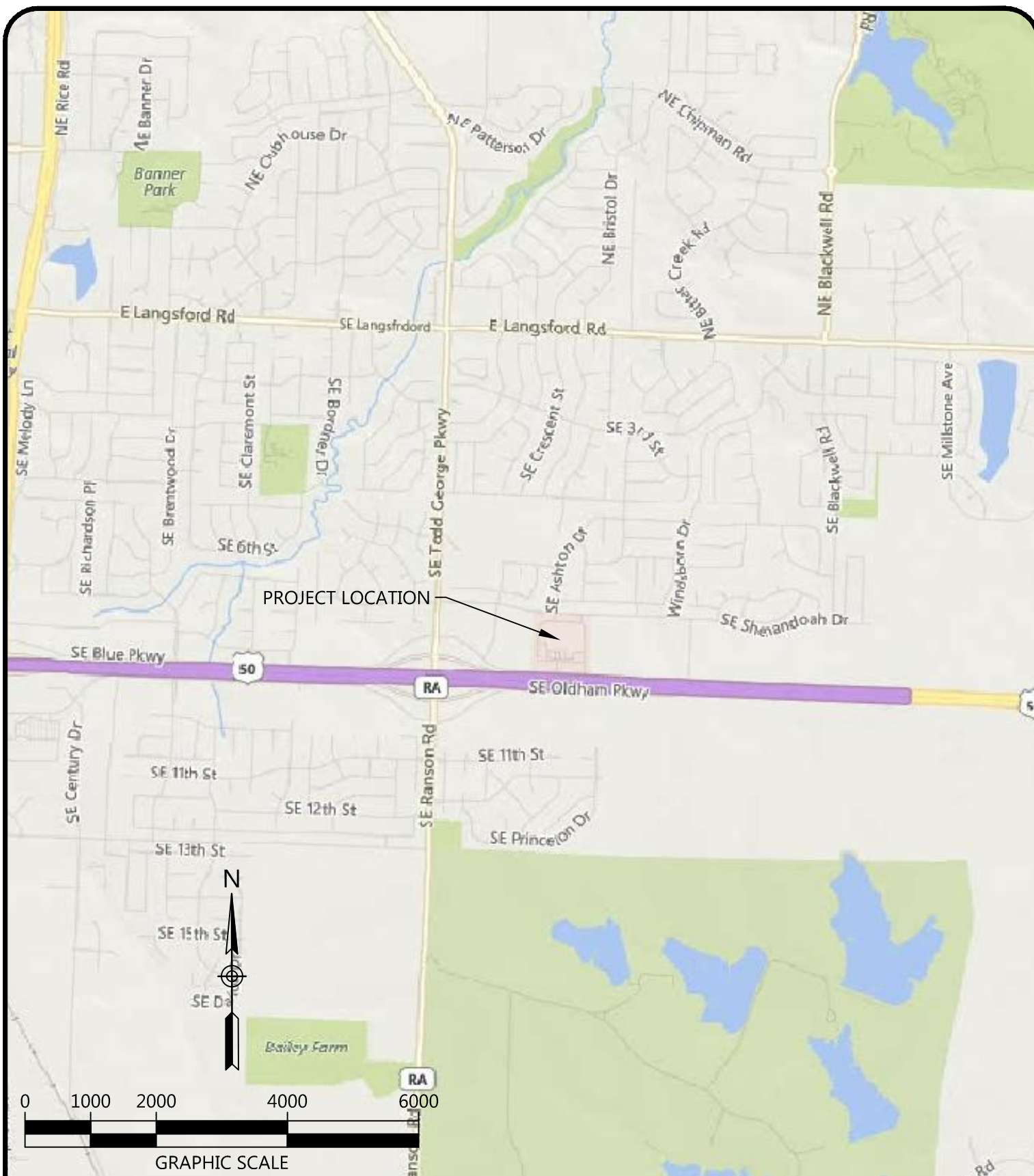
The onsite detention area provides the necessary stormwater attenuation for the proposed development and performs as required. The primary component of the analysis of attenuation success is the comparison of pre- versus post-development flow rates which can be found in the table below.

	Max. Flow (cfs)		
	02-Yr/ 24-Hr	10-Yr/ 24-Hr	100-Yr/ 24-Hr
Pre Outflow	13.28	21.56	32.03
Post Outflow	12.95	21.40	30.49
Delta	(0.33)	(0.16)	(1.54)

As is demonstrated, the Post-Development flow rates during all storms to the Boundary Node are lower than the Pre-Development flow rates to the Boundary Node as a result of the modified detention area.

Appendices

Appendix I – Vicinity & Aerial Maps



1615 EDGEWATER DRIVE,
SUITE 200,
ORLANDO, FLORIDA 32804
T 407.975.1273
F 407.975.1278
www.smeinc.com

PROJECT:
**Lee's Summit MC
Medical Office Building**
Lee's Summit, MO

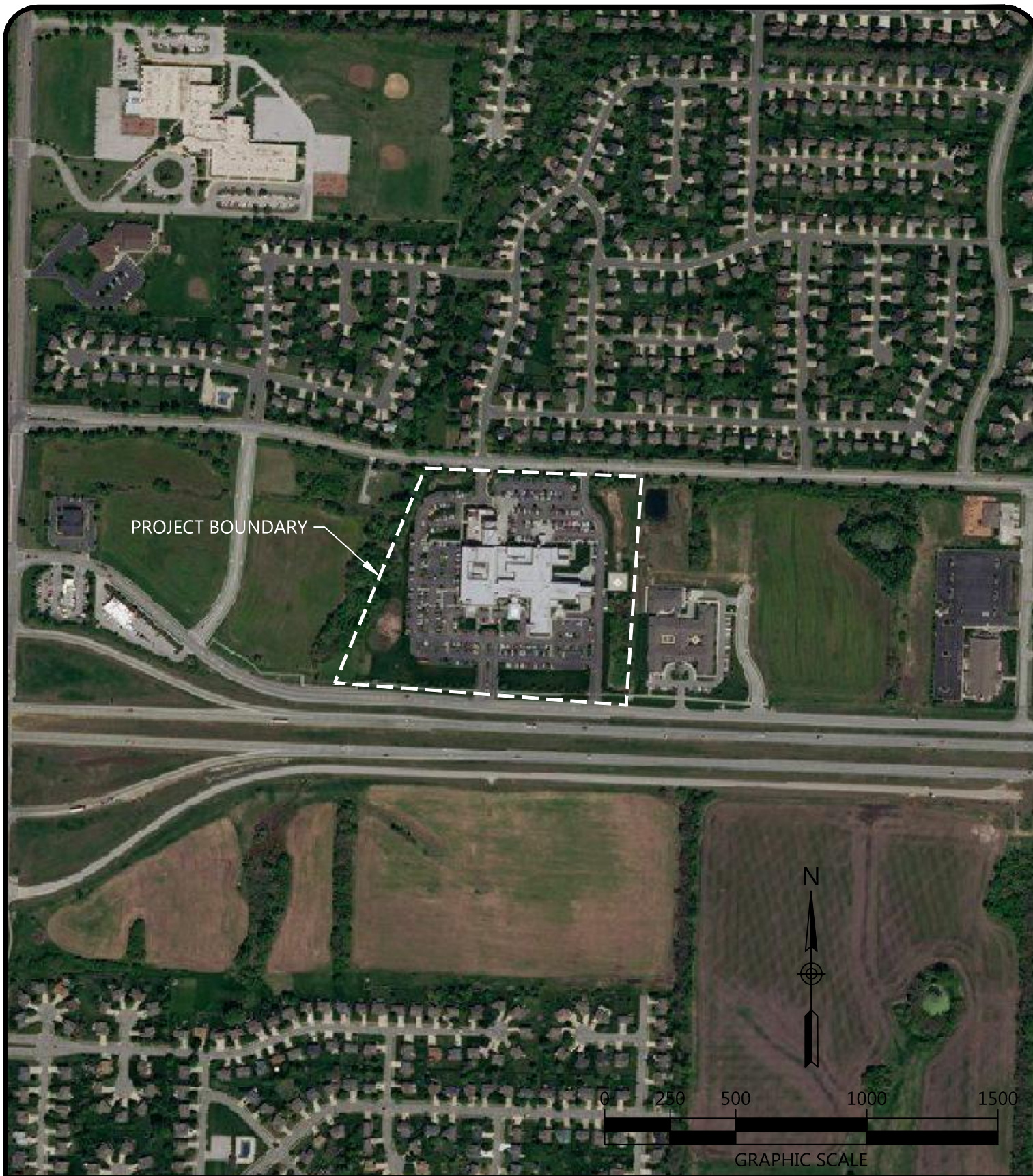
TITLE:
Vicinity Map

PROJ # 527116043

DATE: 09/01/2017

DWG. NO.

EXH



1615 EDGEWATER DRIVE,
SUITE 200,
ORLANDO, FLORIDA 32804
T 407.975.1273
F 407.975.1278
www.smeinc.com

PROJECT:
Lee's Summit MC
Medical Office Building
Lee's Summit, MO

TITLE:
Aerial Map

PROJ # 527116043

DATE: 09/01/2017

DWG. NO.

EXH

**Appendix II – Support Maps and Project Documents (FIRM Panel,
Soils Maps, Property Appraiser’s Card, etc.)**

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 **Floodway** 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, NNGS12
National Geodetic Survey
SMMC-3 #6202
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 Imagery Program (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 unreviewed 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 actual 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 decommissioned. 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 average 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

Base Flood Elevation line and value; elevation in feet

Base Flood Elevation value where uniform within zone; elevation in feet

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Current

Bridge

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

3100000 FT

FIPS Zone 2403, Transverse Mercator projection

Bench mark (see explanation in Notes to Users section of this FISB panel)

1:1.5

River Mile

MAP REPOSITORIES

Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

September 29, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

January 25, 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 1-800-438-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0439G
FIRM
FLOOD INSURANCE RATE MAP
JACKSON COUNTY,
MISSOURI
AND INCORPORATED AREAS
PANEL 439 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

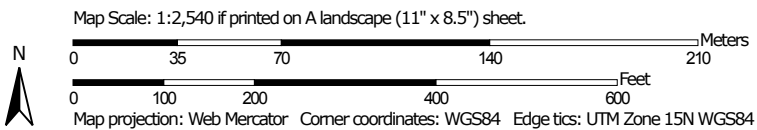
CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
JACKSON COUNTY	290402	0439	G	
LEES SUMMIT	290174	0439	G	
CITY OF				

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
29095C0439G
MAP REVISED
JANUARY 20, 2017

Federal Emergency Management Agency

Hydrologic Soil Group—Jackson County, Missouri



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/28/2017
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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 17, Sep 28, 2016

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

Date(s) aerial images were photographed: Oct 14, 2014—Oct 10, 2016

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

Hydrologic Soil Group— Summary by Map Unit — Jackson County, Missouri (MO095)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	D	11.9	58.4%
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	C	8.5	41.6%
Totals for Area of Interest			20.4	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



GIS Department • 415 E 12th St • Room G8 • Kansas City, MO 64106
[Link to Report](#)

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Property Tax Account Summary

[Direct Link to Jackson County Assessment Profile](#)

Parcel Number 60-420-99-09-00-0-00-000 Property Address 2100 SE SHENANDOAH DR , LEES SUMMIT, MO 64063

General Information
 Property Description HCA MIDWEST, LOTS 1A & 1B---LOT 1A
 Property Category Land and Improvements
 Status Active, Host Other Property, Locally Assessed
 Tax Code Area 049

Property Characteristics
 Property Class 2010

Parties

Role	Percent	Name	Address
Taxpayer	100	MIDWEST DIVISION LSH LLC	C/O % DUCHARME, MCMILLEN & ASSOC, PO BOX 80610, INDIANAPOLIS, IN 46280
Owner	100	MIDWEST DIVISION LSH LLC	C/O % DUCHARME, MCMILLEN & ASSOC, PO BOX 80610, INDIANAPOLIS, IN 46280

Property Values

Value Type	Tax Year 2017	Tax Year 2016	Tax Year 2015	Tax Year 2014	Tax Year 2013
Market Value Total	40,856,600	38,500,324	38,500,324	38,500,000	38,500,000
Taxable Value Total	1,384,935	1,384,935	1,384,935	1,384,935	1,384,935
Assessed Value Total	13,072,753	12,318,745	12,318,745	12,318,706	12,318,706

Active Exemptions
 D10 (N) TIF
 Events

Effective Date	Entry Date-Time	Type	Remarks
12/10/2007	12/10/2007 12:17	Created by Seg/Merge	Created by Seg/Merge 017341, Effective: 01/01/2008 by shelpau

No Charges are currently due.
 No Charge Amounts are currently due for this property. If you believe this is incorrect, please contact the Taxpayer Services Unit at (816) 881-3232.

NOTICE: Telephones are staffed during regular business hours (8am to 5pm, Monday through Friday, excluding holidays observed by Jackson County).

Distribution of Current Taxes

District	Amount
BOARD OF DISABLED SERVICES	1,022.080000
CITY - LEES SUMMIT	21,325.230000
JACKSON COUNTY	6,959.300000
LEES SUMMIT SCHOOL R-VII	83,036.550000
MENTAL HEALTH	1,663.300000
METRO JUNIOR COLLEGE	3,239.360000
MID-CONTINENT LIBRARY	4,366.700000
STATE BLIND PENSION	415.480000
CITY - LEES SUMMIT	960,108.790000
REPLACEMENT TAX	157,110.160000
STATE BLIND PENSION	3,280.140000
REPLACEMENT TAX	19,898.500000

Receipts

Date	Receipt No.	Amount Applied	Amount Due	Tendered	Change
01/04/2017 14:47	10121405	1,262,425.59	1,262,425.59	1,262,425.59	0.00
01/19/2016 11:11	9593769	1,259,296.63	1,259,296.63	1,259,296.63	0.00
12/22/2014 08:17	8893891	1,284,250.91	1,284,250.91	1,284,250.91	0.00
01/30/2014 11:27	8484908	1,277,069.10	1,277,069.10	1,277,069.10	0.00
12/21/2012 00:00	7786343	1,276,231.44	1,276,231.44	1,276,231.44	0.00
03/09/2012 08:45	7417464	55,687.99	199,741.04	199,741.04	0.00
01/04/2012 00:00	7350831	1,222,699.22	1,422,440.26	1,222,699.22	0.00

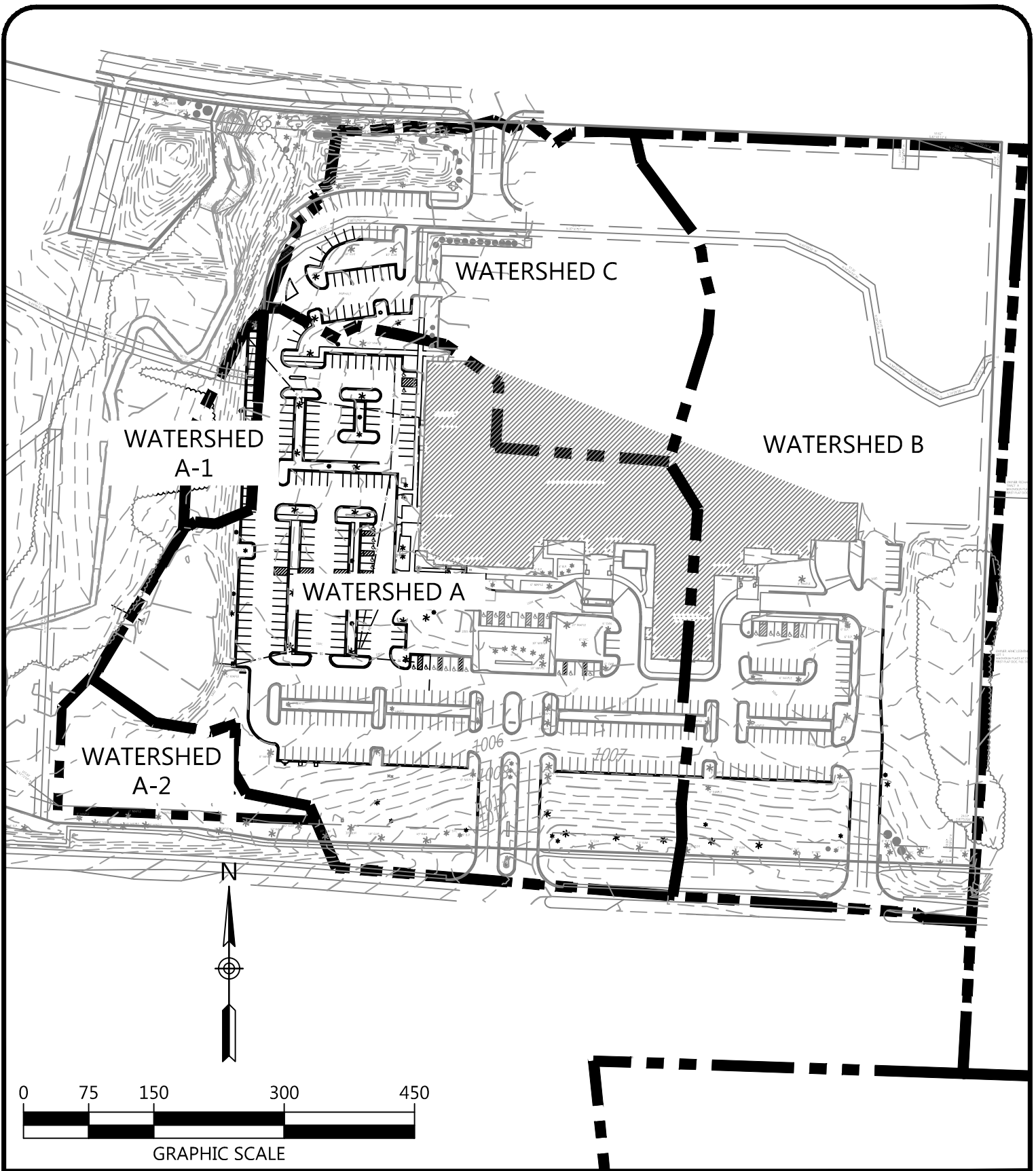
REMINDER: Occasionally, the parcel number for a real estate parcel changes, due to a parcel segregation or merge. In such a case, a search of the new parcel number may not reflect tax delinquency or a full tax history concerning that parcel. You may wish to contact us to obtain that information. Or, you may wish to search all relevant parcel numbers of parcels involved in such a segregation or merge. [Click here](#) to begin a search on this website to see if a parcel was involved in a segregation or merge occurring within the past five years and to see a list of parent parcel(s) and child parcel(s) involved.
NOTE: Information concerning a segregation or merge occurring more than five years prior to the search is not available on this website.

ATTENTION: This website will close at 11:00 p.m. on December 31.
 Taxes paid online after the website reopens in the New Year will accrue interest, penalties and fees.

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 Version 1.0.5228.20119

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Appendix III - Pre-Development Drainage Basin Map



1615 EDGEWATER DRIVE,
SUITE 200,
ORLANDO, FLORIDA 32804
T 407.975.1273
F 407.975.1278
www.smeinc.com

PROJECT:
Lee's Summit MC
Medical Office Building
Lee's Summit, MO

TITLE:
Pre Basin Map

PROJ # 527116043

DATE: 09/01/2017

DWG. NO.

EXH

Appendix IV - ICPR Pre-Development Modeling

Basin Name: Watershed A-1
Group Name: BASE
Simulation: 002Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh256
Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsii
Rainfall Amount (in): 3.710
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.25
Flow Max (cfs): 0.42
Runoff Volume (in): 1.519
Runoff Volume (ft3): 1792

Basin Name: Watershed A-2
Group Name: BASE
Simulation: 002Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh256
Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsii
Rainfall Amount (in): 3.710
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.25
Flow Max (cfs): 0.86
Runoff Volume (in): 1.519
Runoff Volume (ft3): 3612

Basin Name: Watershed A-1
Group Name: BASE
Simulation: 010Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh256

Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsiii
Rainfall Amount (in): 5.660
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.25
Flow Max (cfs): 0.85
Runoff Volume (in): 3.088
Runoff Volume (ft3): 3643

Basin Name: Watershed A-2
Group Name: BASE
Simulation: 010Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh256
Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsiii
Rainfall Amount (in): 5.660
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.25
Flow Max (cfs): 1.71
Runoff Volume (in): 3.088
Runoff Volume (ft3): 7341

Basin Name: Watershed A-1
Group Name: BASE
Simulation: 100Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh256
Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsiii
Rainfall Amount (in): 9.250
Storm Duration (hrs): 24.00
Status: Onsite

Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 1.67
Runoff Volume (in): 6.305
Runoff Volume (ft3): 7439

Basin Name: Watershed A-2
Group Name: BASE
Simulation: 100Yr024Hr-Pre
Node Name: Boundary
Basin Type: SCS Unit Hydrograph

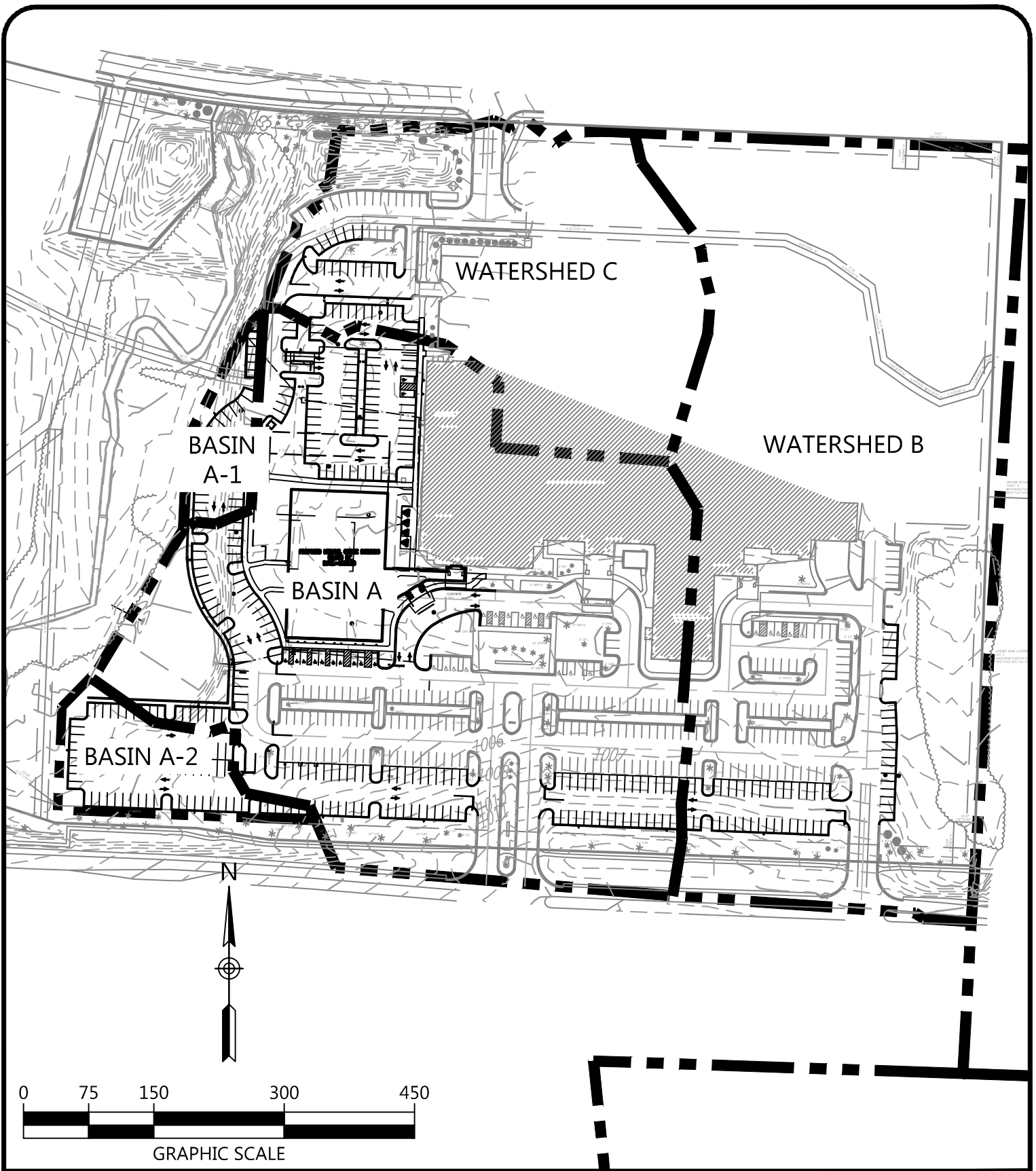
Unit Hydrograph: Uh256
Peaking Fator: 256.0
Spec Time Inc (min): 0.80
Comp Time Inc (min): 0.80
Rainfall File: Scsii
Rainfall Amount (in): 9.250
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 6.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 76.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 3.36
Runoff Volume (in): 6.305
Runoff Volume (ft3): 14992

Lee's Summit MOB

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Boundary	BASE	002Yr024Hr-Pre	0.00	991.86	991.86	0.0000	0	12.25	1.27	0.00	0.00
Boundary	BASE	010Yr024Hr-Pre	0.00	991.86	991.86	0.0000	0	12.24	2.54	0.00	0.00
Boundary	BASE	100Yr024Hr-Pre	0.00	991.86	991.86	0.0000	0	12.24	5.00	0.00	0.00

Appendix V - Post-Development Drainage Map



1615 EDGEWATER DRIVE,
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PROJECT:
Lee's Summit MC
Medical Office Building
Lee's Summit, MO

TITLE:
Post Basin Map

PROJ # 527116043

DATE: 09/01/2017

DWG. NO.
EXH

Appendix VI - ICPR Post-Development Modeling

Basin Name: Baisn A-1
Group Name: BASE
Simulation: 002Yr024Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsiiii
Rainfall Amount (in): 3.710
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.001
Curve Number: 88.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 0.67
Runoff Volume (in): 2.458
Runoff Volume (ft3): 2899

Basin Name: Basin A
Group Name: BASE
Simulation: 002Yr024Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsiiii
Rainfall Amount (in): 3.710
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 7.110
Vol of Unit Hyd (in): 1.000
Curve Number: 95.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 17.11
Runoff Volume (in): 3.141
Runoff Volume (ft3): 81074

Basin Name: Basin A-2
Group Name: BASE
Simulation: 002Yr024Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484

Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsii
Rainfall Amount (in): 3.710
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 1.42
Runoff Volume (in): 2.642
Runoff Volume (ft3): 6281

Basin Name: Baisn A-1
Group Name: BASE
Simulation: 010Yr 024Hr-Pos
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsii
Rainfall Amount (in): 5.660
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.001
Curve Number: 88.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 1.12
Runoff Volume (in): 4.293
Runoff Volume (ft3): 5065

Basin Name: Basin A
Group Name: BASE
Simulation: 010Yr 024Hr-Pos
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsii
Rainfall Amount (in): 5.660
Storm Duration (hrs): 24.00
Status: Onsite

Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 7.110
Vol of Unit Hyd (in): 1.000
Curve Number: 95.000
DCIA (%): 0.000

Time Max (hrs): 12.22
Flow Max (cfs): 26.73
Runoff Volume (in): 5.067
Runoff Volume (ft3): 130781

Basin Name: Basin A-2
Group Name: BASE
Simulation: 010Yr 024Hr-Pos
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsiii
Rainfall Amount (in): 5.660
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 2.33
Runoff Volume (in): 4.509
Runoff Volume (ft3): 10721

Basin Name: Baisn A-1
Group Name: BASE
Simulation: 100Yr24Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsiii
Rainfall Amount (in): 9.250
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.325
Vol of Unit Hyd (in): 1.001
Curve Number: 88.000
DCIA (%): 0.000

Time Max (hrs): 12.24
Flow Max (cfs): 1.94
Runoff Volume (in): 7.783
Runoff Volume (ft3): 9182

Basin Name: Basin A
Group Name: BASE
Simulation: 100Yr24Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsii
Rainfall Amount (in): 9.250
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 7.110
Vol of Unit Hyd (in): 1.000
Curve Number: 95.000
DCIA (%): 0.000

Time Max (hrs): 12.22
Flow Max (cfs): 44.25
Runoff Volume (in): 8.636
Runoff Volume (ft3): 222877

Basin Name: Basin A-2
Group Name: BASE
Simulation: 100Yr24Hr-Post
Node Name: Pond A
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Scsii
Rainfall Amount (in): 9.250
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 0.655
Vol of Unit Hyd (in): 1.000
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.22
Flow Max (cfs): 3.97
Runoff Volume (in): 8.028
Runoff Volume (ft3): 19087

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Boundary	BASE	002Yr24Hr-Post	0.00	991.86	991.86	0.0000	3	12.35	12.95	0.00	0.00
Pond A	BASE	002Yr24Hr-Post	12.35	994.27	999.00	0.0050	11304	12.25	19.13	12.35	12.95
Boundary	BASE	010Yr24Hr-Post	0.00	991.86	991.86	0.0000	3	12.34	21.40	0.00	0.00
Pond A	BASE	010Yr24Hr-Post	12.34	995.19	999.00	0.0050	11790	12.25	30.04	12.34	21.40
Boundary	BASE	100Yr24Hr-Post	0.00	991.86	991.86	0.0000	3	12.37	30.49	0.00	0.00
Pond A	BASE	100Yr24Hr-Post	12.37	997.09	999.00	-0.0050	12884	12.25	49.91	12.37	30.49

Appendix VII – Support Material



NOAA Atlas 14, Volume 8, Version 2
Location name: Lees Summit, Missouri, USA*
Latitude: 38.9025°, Longitude: -94.3332°
Elevation: 1014.77 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, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.415 (0.324-0.529)	0.484 (0.378-0.618)	0.599 (0.466-0.767)	0.696 (0.539-0.894)	0.832 (0.625-1.10)	0.938 (0.691-1.25)	1.05 (0.748-1.43)	1.16 (0.798-1.62)	1.31 (0.871-1.87)	1.42 (0.926-2.07)
10-min	0.607 (0.474-0.775)	0.709 (0.553-0.905)	0.877 (0.682-1.12)	1.02 (0.789-1.31)	1.22 (0.916-1.61)	1.37 (1.01-1.84)	1.53 (1.10-2.09)	1.70 (1.17-2.37)	1.92 (1.27-2.75)	2.08 (1.36-3.03)
15-min	0.740 (0.578-0.945)	0.864 (0.674-1.10)	1.07 (0.832-1.37)	1.24 (0.962-1.60)	1.49 (1.12-1.96)	1.68 (1.23-2.24)	1.87 (1.34-2.55)	2.07 (1.43-2.89)	2.34 (1.56-3.35)	2.54 (1.65-3.69)
30-min	1.02 (0.800-1.31)	1.20 (0.939-1.54)	1.50 (1.17-1.92)	1.75 (1.35-2.24)	2.09 (1.57-2.76)	2.36 (1.74-3.15)	2.63 (1.88-3.59)	2.91 (2.00-4.07)	3.28 (2.18-4.70)	3.57 (2.32-5.18)
60-min	1.34 (1.05-1.71)	1.57 (1.23-2.01)	1.97 (1.53-2.52)	2.30 (1.78-2.95)	2.76 (2.08-3.66)	3.13 (2.31-4.20)	3.51 (2.51-4.80)	3.90 (2.69-5.46)	4.43 (2.95-6.35)	4.83 (3.14-7.02)
2-hr	1.66 (1.30-2.10)	1.95 (1.53-2.47)	2.43 (1.91-3.09)	2.85 (2.22-3.63)	3.44 (2.61-4.53)	3.91 (2.90-5.20)	4.39 (3.16-5.97)	4.89 (3.40-6.81)	5.57 (3.74-7.94)	6.10 (4.00-8.80)
3-hr	1.87 (1.48-2.36)	2.20 (1.74-2.78)	2.76 (2.17-3.49)	3.24 (2.54-4.11)	3.93 (3.00-5.16)	4.48 (3.35-5.95)	5.06 (3.67-6.86)	5.66 (3.95-7.85)	6.48 (4.38-9.22)	7.13 (4.70-10.3)
6-hr	2.26 (1.80-2.82)	2.66 (2.12-3.34)	3.37 (2.67-4.22)	3.98 (3.14-5.01)	4.88 (3.76-6.37)	5.60 (4.22-7.39)	6.36 (4.65-8.57)	7.16 (5.05-9.89)	8.27 (5.63-11.7)	9.15 (6.07-13.1)
12-hr	2.66 (2.13-3.30)	3.16 (2.54-3.93)	4.04 (3.23-5.03)	4.81 (3.83-6.02)	5.94 (4.62-7.72)	6.86 (5.21-9.00)	7.83 (5.77-10.5)	8.86 (6.30-12.2)	10.3 (7.06-14.5)	11.4 (7.64-16.2)
24-hr	3.11 (2.51-3.82)	3.71 (2.99-4.57)	4.74 (3.82-5.86)	5.66 (4.54-7.02)	7.00 (5.48-9.03)	8.10 (6.20-10.5)	9.25 (6.88-12.3)	10.5 (7.51-14.3)	12.2 (8.44-17.0)	13.5 (9.14-19.1)
2-day	3.66 (2.98-4.47)	4.31 (3.50-5.26)	5.43 (4.41-6.66)	6.43 (5.19-7.91)	7.90 (6.24-10.1)	9.10 (7.03-11.8)	10.4 (7.77-13.7)	11.7 (8.47-15.9)	13.6 (9.50-18.9)	15.1 (10.3-21.2)
3-day	4.06 (3.33-4.94)	4.71 (3.85-5.73)	5.84 (4.76-7.12)	6.85 (5.55-8.38)	8.33 (6.61-10.6)	9.55 (7.41-12.3)	10.8 (8.16-14.3)	12.2 (8.87-16.5)	14.1 (9.92-19.5)	15.7 (10.7-21.9)
4-day	4.40 (3.61-5.33)	5.05 (4.14-6.12)	6.17 (5.05-7.50)	7.18 (5.84-8.76)	8.65 (6.89-11.0)	9.87 (7.68-12.7)	11.1 (8.42-14.6)	12.5 (9.12-16.8)	14.4 (10.2-19.9)	16.0 (10.9-22.2)
7-day	5.21 (4.30-6.27)	5.89 (4.86-7.10)	7.07 (5.82-8.53)	8.09 (6.62-9.80)	9.56 (7.64-12.0)	10.8 (8.41-13.7)	12.0 (9.11-15.6)	13.3 (9.74-17.7)	15.1 (10.7-20.6)	16.5 (11.4-22.9)
10-day	5.90 (4.89-7.07)	6.66 (5.52-7.99)	7.93 (6.55-9.53)	9.00 (7.40-10.9)	10.5 (8.43-13.1)	11.7 (9.20-14.8)	13.0 (9.87-16.7)	14.2 (10.5-18.9)	16.0 (11.3-21.7)	17.3 (12.0-23.9)
20-day	7.87 (6.58-9.35)	8.89 (7.43-10.6)	10.5 (8.78-12.6)	11.9 (9.85-14.2)	13.7 (11.0-16.8)	15.1 (11.9-18.7)	16.4 (12.5-20.9)	17.7 (13.1-23.2)	19.4 (13.9-26.1)	20.7 (14.5-28.3)
30-day	9.51 (7.99-11.3)	10.8 (9.03-12.7)	12.7 (10.7-15.1)	14.3 (11.9-17.1)	16.4 (13.2-19.9)	17.9 (14.1-22.1)	19.3 (14.9-24.5)	20.8 (15.4-27.0)	22.5 (16.1-30.1)	23.7 (16.7-32.4)
45-day	11.6 (9.80-13.7)	13.1 (11.1-15.5)	15.5 (13.0-18.3)	17.3 (14.5-20.6)	19.7 (15.9-23.8)	21.4 (17.0-26.3)	23.0 (17.7-28.9)	24.5 (18.2-31.6)	26.3 (18.9-34.9)	27.5 (19.4-37.3)
60-day	13.4 (11.4-15.7)	15.1 (12.8-17.8)	17.8 (15.0-21.0)	19.9 (16.7-23.5)	22.5 (18.2-27.0)	24.3 (19.3-29.7)	26.0 (20.1-32.5)	27.5 (20.5-35.4)	29.3 (21.1-38.7)	30.5 (21.6-41.3)

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

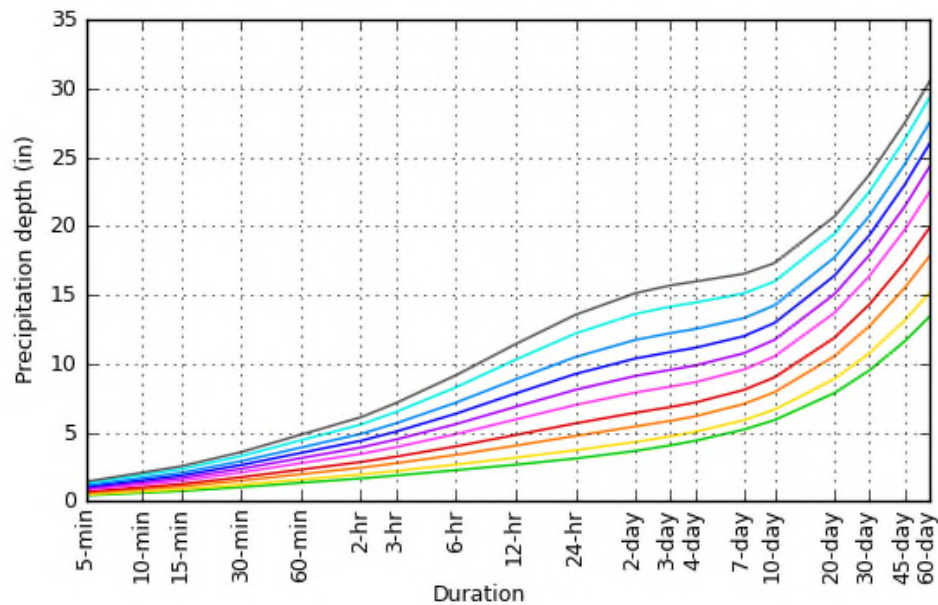
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

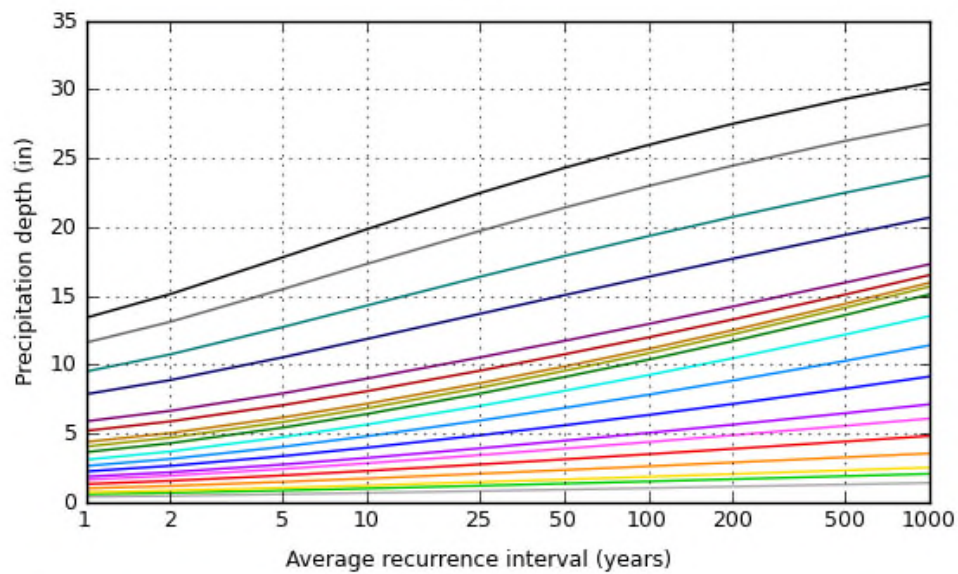
[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 38.9025°, Longitude: -94.3332°



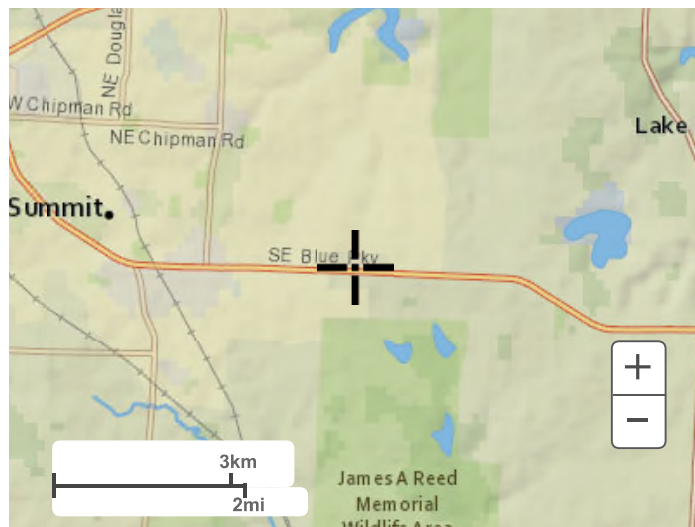
Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



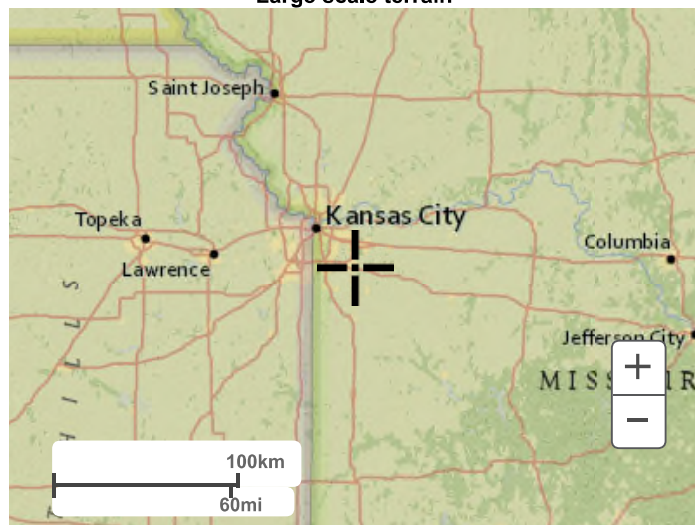
Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

Maps & aerals

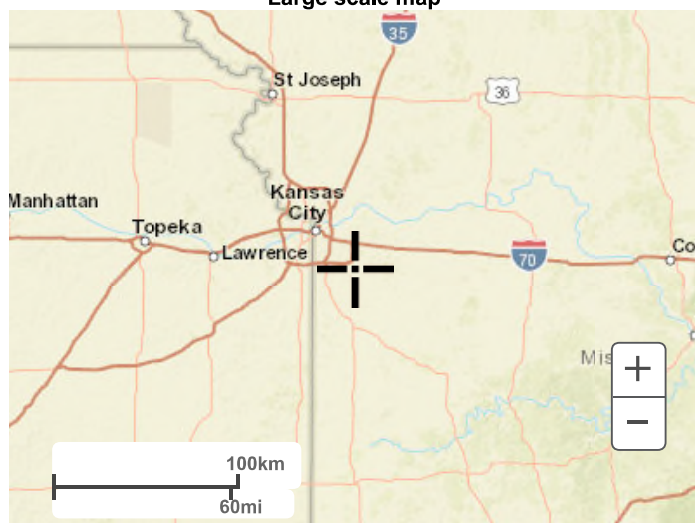
Small scale terrain



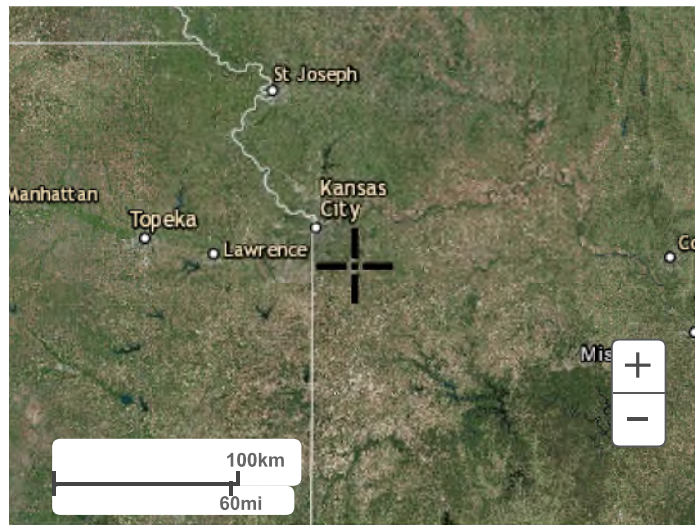
Large scale terrain



Large scale map



Large scale aerial



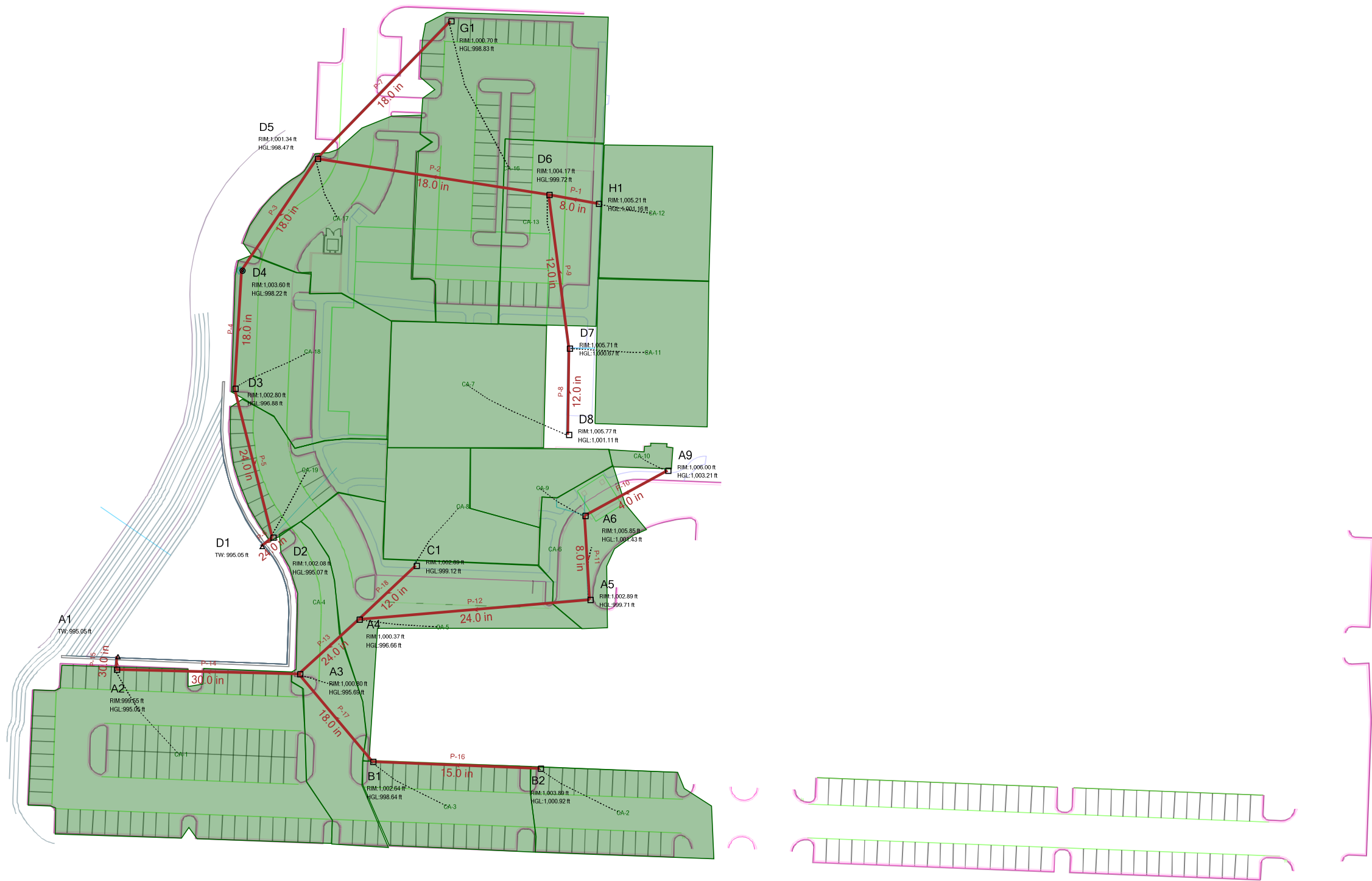
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Appendix VIII – StormCAD Hydraulics Modeling

Scenario: Base



FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (Scaled) (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (Out) (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Diameter (in)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
P-1	H1	D6	35.7	1.00	2.92	2.87	1,000.69	998.91	0.050	0.012	8.0	1,001.16	999.98
P-2	D6	D5	166.7	4.43	10.51	2.50	998.91	997.24	0.010	0.013	18.0	999.72	998.78
P-3	D5	D4	95.8	7.69	8.17	4.45	997.24	996.66	0.006	0.013	18.0	998.47	998.08
P-4	D4	D3	84.1	7.60	10.43	4.55	996.66	995.83	0.010	0.013	18.0	997.73	997.18
P-5	D3	D2	109.3	8.69	38.89	2.77	995.83	992.60	0.030	0.013	24.0	996.88	995.16
P-6	D2	D1	10.3	9.24	54.72	2.94	992.60	992.00	0.059	0.013	24.0	995.07	995.05
P-7	G1	D5	136.4	2.29	5.76	1.30	997.65	997.24	0.003	0.013	18.0	998.83	998.78
P-8	D8	D7	61.5	1.32	3.84	1.93	1,000.62	1,000.01	0.010	0.012	12.0	1,001.11	1,000.82
P-9	D7	D6	110.2	2.41	3.86	3.06	1,000.01	998.91	0.010	0.012	12.0	1,000.67	999.98
P-10	A9	A6	67.0	0.08	0.35	0.95	1,003.05	1,001.07	0.030	0.012	4.0	1,003.21	1,001.53
P-11	A6	A5	59.9	0.59	2.23	2.25	1,001.07	999.33	0.029	0.012	8.0	1,001.43	999.80
P-12	A5	A4	164.7	1.19	32.02	0.96	999.33	996.03	0.020	0.013	24.0	999.71	996.86
P-13	A4	A3	57.7	3.22	31.81	1.89	996.03	994.89	0.020	0.013	24.0	996.66	995.96
P-14	A3	A2	130.3	5.91	58.16	1.20	994.89	992.27	0.020	0.013	30.0	995.69	995.09
P-15	A2	A1	9.5	8.62	69.14	1.76	992.27	992.00	0.028	0.013	30.0	995.05	995.05
P-16	B2	B1	119.4	0.94	9.16	1.51	1,000.54	998.14	0.020	0.013	15.0	1,000.92	998.77
P-17	B1	A3	81.5	1.78	20.98	1.33	998.14	994.89	0.040	0.013	18.0	998.64	995.96
P-18	C1	A4	55.7	0.87	8.50	1.24	998.73	996.03	0.048	0.012	12.0	999.12	996.86

FlexTable: Catch Basin Table

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)
H1	1,005.21	1,000.69	1,001.38	1,001.16	Standard	1.000
D6	1,004.17	998.91	999.98	999.72	Standard	0.800
D5	1,001.34	997.24	998.78	998.47	Standard	0.800
D3	1,002.80	995.83	997.18	996.88	Standard	0.700
D2	1,002.08	992.60	995.16	995.07	Standard	0.700
G1	1,000.70	997.65	998.87	998.83	Standard	1.000
D8	1,005.77	1,000.62	1,001.29	1,001.11	Standard	1.000
D7	1,005.71	1,000.01	1,000.82	1,000.67	Standard	0.500
A9	1,006.00	1,003.05	1,003.27	1,003.21	Standard	1.000
A6	1,005.85	1,001.07	1,001.53	1,001.43	Standard	0.700
A5	1,002.89	999.33	999.80	999.71	Standard	0.700
A4	1,000.37	996.03	996.86	996.66	Standard	0.900
A3	1,000.80	994.89	995.96	995.69	Standard	0.900
A2	999.55	992.27	995.09	995.05	Standard	0.800
B2	1,003.89	1,000.54	1,001.06	1,000.92	Standard	1.000
B1	1,002.64	998.14	998.77	998.64	Standard	0.700
C1	1,002.89	998.73	999.27	999.12	Standard	1.000

FlexTable: Manhole Table

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)
D4	1,003.60	996.66	998.08	997.73	Standard	0.700

FlexTable: Catchment Table

Label	Outflow Element	Area (User Defined) (acres)	Runoff Coefficient (Rational)	Time of Concentration (min)	Catchment Intensity (in/h)	Flow (Total Out) (cfs)
CA-1	A2		0.900	10.000	6.110	2.94
CA-2	B2		0.900	10.000	6.110	0.94
CA-3	B1		0.900	10.000	6.110	0.87
CA-4	A3		0.900	10.000	6.110	1.02
CA-5	A4		0.850	10.000	6.110	1.28
CA-6	A5		0.850	10.000	6.110	0.62
CA-7	D8		0.950	10.000	6.110	1.32
CA-8	C1		0.950	10.000	6.110	0.87
CA-9	A6		0.950	10.000	6.110	0.51
CA-10	A9		0.950	10.000	6.110	0.08
CA-11	D7		0.950	10.000	6.110	1.11
CA-12	H1		0.950	10.000	6.110	1.00
CA-13	D6		0.850	10.000	6.110	1.10
CA-16	G1		0.850	10.000	6.110	2.29
CA-17	D5		0.700	10.000	6.110	1.20
CA-18	D3		0.750	10.000	6.110	1.23
CA-19	D2		0.750	10.000	6.110	0.66

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (cfs)
D1	992.00	992.00	User Defined Tailwater	995.05	995.05	9.22
A1	992.00	992.00	User Defined Tailwater	995.05	995.05	8.59

Storm Data Detailed Report: LeesSummit

Element Details		
ID	987	Notes
Label	LeesSummit	

Duration (min)	1 Year (in/h)	2 Year (in/h)	5 Year (in/h)	10 Year (in/h)	25 Year (in/h)	50 Year (in/h)
5.000	4.980	5.810	7.190	8.340	9.970	11.300
10.000	3.640	4.250	5.260	6.110	7.300	8.240
15.000	2.960	3.460	4.280	4.970	5.940	6.700
30.000	2.050	2.410	2.990	3.490	4.180	4.720
60.000	1.340	1.580	1.970	2.300	2.770	3.140
120.000	0.828	0.973	1.220	1.430	1.720	1.960
180.000	0.623	0.733	0.919	1.080	1.310	1.500
360.000	0.377	0.445	0.563	0.666	0.815	0.937
720.000	0.220	0.263	0.336	0.400	0.494	0.570
1,440.000	0.129	0.155	0.198	0.236	0.292	0.338
2,880.000	0.076	0.090	0.113	0.134	0.165	0.190
4,320.000	0.056	0.065	0.081	0.095	0.116	0.133
10,080.000	0.046	0.053	0.064	0.075	0.090	0.103
14,400.000	0.031	0.035	0.042	0.048	0.057	0.064

100 Year (in/h)
12.600
9.200
7.480
5.260
3.510
2.200
1.690
1.060
0.651
0.386
0.216
0.151
0.116
0.071

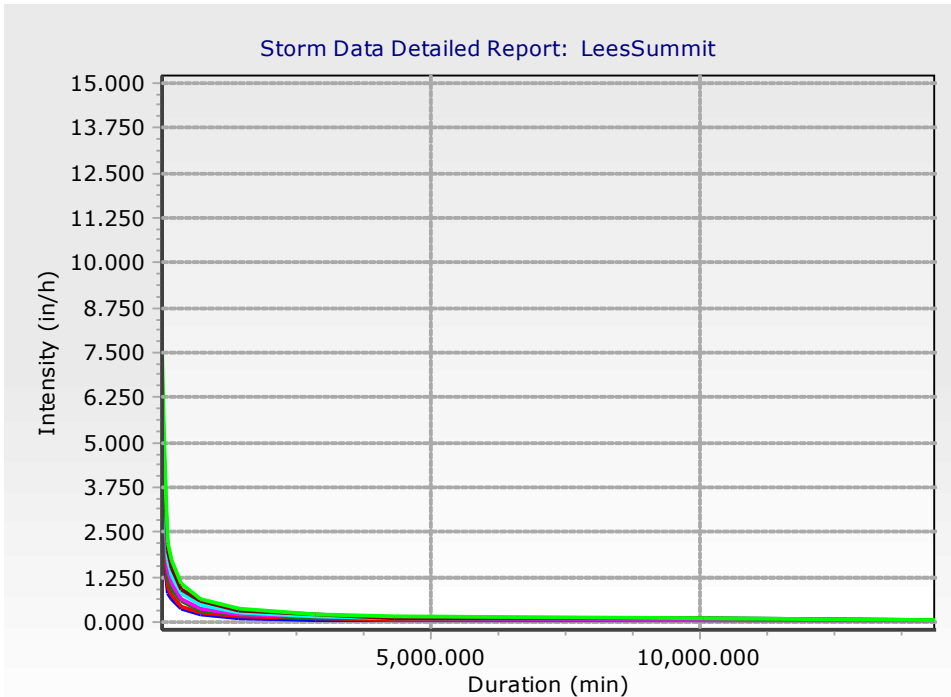
Library Status Summary

Synchronization Details	
ID	987
Label	LeesSummit

Storm Data Detailed Report: LeesSummit

Library Status Summary

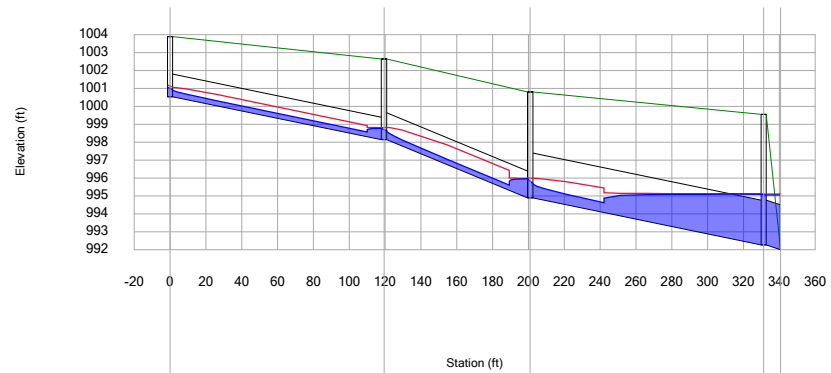
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Library Modified Date	Orphan (local)
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Engineering Reference Guid	Orphan (local)



Profile Report

Profile: Profile - A1-B2

Profile - A1-B2 - Base

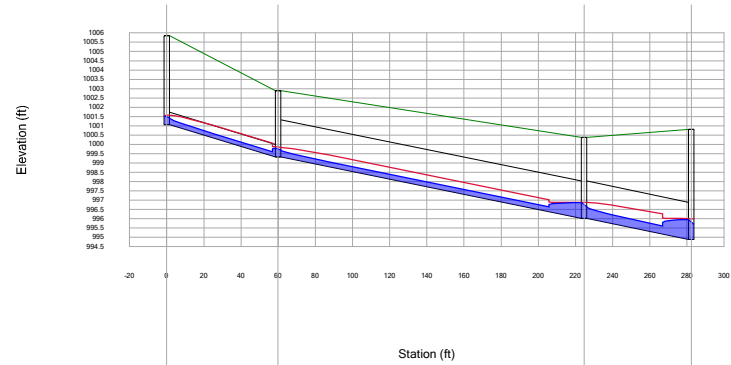


ID\Label	1022 \ P-16		1023 \ P-17		1017 \ P-14		1019 \ P-15	
Link Length (ft)	119.4		81.5		130.3		9.5	
Rise (in)\Material	15.0 \ Concrete (centrif. spun)		15.0 \ Concrete (centrif. spun)		15.0 \ Concrete (centrif. spun)		15.0 \ Concrete (centrif. spun)	
Flow (cfs)	0.94		1.78		5.91		8.62	
Slope (ft/ft)	0.020		0.040		0.020		0.028	
ID\Label	1020 \ B2		1021 \ B1		1014 \ A3		1016 \ A2	
Ground (ft)	1003.89		1002.64		1000.80		999.500	
Invert (ft)	1000.54		998.14		994.89		993.700	
Station (ft)	0.0		119.4		200.9		334.7	

Profile Report

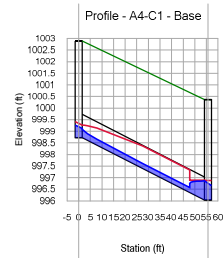
Profile: Profile - A3-A6

Profile - A3-A6 - Base



ID\Label	1011 \ P-11		1013 \ P-12		1015 \ P-13	
Link Length (ft)	59.9		164.7		57.7	
Rise (in)\Material	8.0 \ PVC		24.0 \ Concrete (centrif. spun)		24.0 \ Concrete (centrif. spun)	
Flow (cfs)	0.59		1.19		3.22	
Slope (ft/ft)	0.029		0.020		0.020	
ID\Label	1008 \ A6	1010 \ A5		1012 \ A4	1014 \ A3	
Ground (ft)	1005.85	1002.89		1000.37	1000.80	
Invert (ft)	1001.07	999.33		996.03	994.89	
Station (ft)	0.0	59.9		224.6	282.3	

Profile Report **Profile: Profile - A4-C1**

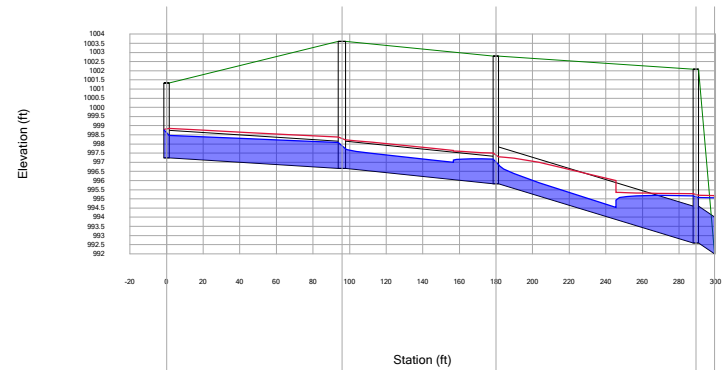


ID\Label	1025 \ P-18	
Link Length (ft)	55.7	
Rise (in)\Material	12.0 \ PVC	
Flow (cfs)	0.87	
Slope (ft/ft)	0.048	
ID\Label	1024 \ C1	1012 \ A4
Ground (ft)	1002.89	1000.37
Invert (ft)	998.73	996.03
Station (ft)	0.0	55.7

Profile Report

Profile: Profile - D1-D5

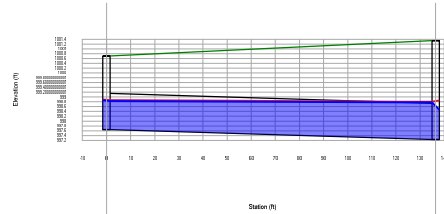
Profile - D1-D5 - Base



ID\Label	994 \ P-3	996 \ P-4	998 \ P-5	1000 \ P-6
Link Length (ft)	95.8	84.1	109.3	10.3
Rise (in)\Material	18.0 \ Concrete (centrif. spun)	18.0 \ Concrete (centrif. spun)	24.0 \ Concrete (centrif. spun)	24.0 \ Concrete (centrif. spun)
Flow (cfs)	7.69	7.60	8.69	9.24
Slope (ft/ft)	0.006	0.010	0.030	0.059
ID\Label	991 \ D5	993 \ D4	995 \ D3	999 \ D1
Ground (ft)	1001.34	1003.60	1002.80	1002.80
Invert (ft)	997.24	996.66	995.83	995.80
Station (ft)	0.0	95.8	180.0	289.5

Profile Report **Profile: Profile - D5-G1**

Profile - D5-G1 - Base

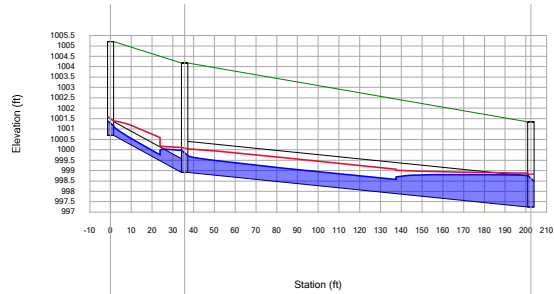


ID\Label	1002 \ P-7	
Link Length (ft)	136.4	
Rise (in)\Material	18.0 \ Concrete (centrif. spun)	
Flow (cfs)	2.29	
Slope (ft/ft)	0.003	
ID\Label	1001 \ G1	991 \ D5
Ground (ft)	1000.70	1001.34
Invert (ft)	997.65	997.24
Station (ft)	0.0	136.4

Profile Report

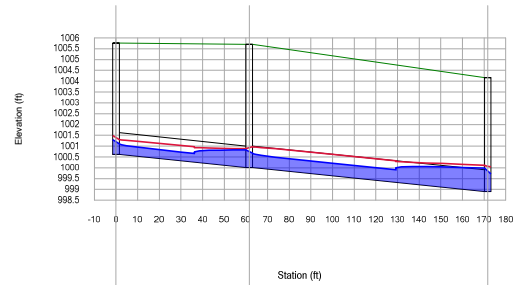
Profile: Profile - D5-H1

Profile - D5-H1 - Base



ID\Label	990 \ P-1	992 \ P-2	
Link Length (ft)	35.7	166.7	
Rise (in)\Material	8.0 \ PVC	18.0 \ Concrete (centrif. spun)	
Flow (cfs)	1.00	4.43	
Slope (ft/ft)	0.050	0.010	
ID\Label	988 \ H1	989 \ D6	991 \ D5
Ground (ft)	1005.21	1004.17	1001.34
Invert (ft)	1000.69	998.91	997.24
Station (ft)	0.0	35.7	202.4

Profile Report **Profile: Profile - D6-D8** Profile - D6-D8 - Base



ID\Label	1005 \ P-8	1006 \ P-9	
Link Length (ft)	61.5	110.2	
Rise (in)\Material	12.0 \ PVC	12.0 \ PVC	
Flow (cfs)	1.32	2.41	
Slope (ft/ft)	0.010	0.010	
ID\Label	1003 \ D8	1004 \ D7	989 \ D6
Ground (ft)	1005.77	1005.71	1004.17
Invert (ft)	1000.62	1000.01	998.91
Station (ft)	0.0	61.5	171.7

Lee's Summit MOB
Post-Development
Node Time Series (Stage at Peak Inflow for Secondary Storm)
2017-09-06
527116043

Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af
010Yr24Hr-Post	Pond A	BASE	0.00	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	0.26	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	0.50	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	0.77	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	1.02	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	1.27	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	1.52	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	1.77	992.00	999.00	10118	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	2.02	992.00	999.00	10115	0.00	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	2.27	992.00	999.00	10116	0.03	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	2.52	992.01	999.00	10120	0.06	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	2.77	992.01	999.00	10125	0.05	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	3.02	992.02	999.00	10131	0.10	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	3.27	992.03	999.00	10140	0.12	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	3.52	992.04	999.00	10149	0.13	0.00	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	3.77	992.05	999.00	10158	0.16	0.01	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	4.02	992.06	999.00	10167	0.17	0.02	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	4.27	992.08	999.00	10178	0.26	0.03	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	4.52	992.10	999.00	10189	0.21	0.04	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	4.77	992.11	999.00	10199	0.24	0.06	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	5.02	992.13	999.00	10211	0.33	0.07	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	5.27	992.15	999.00	10221	0.26	0.09	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	5.52	992.17	999.00	10232	0.37	0.12	0.0	0.0
010Yr24Hr-Post	Pond A	BASE	5.77	992.19	999.00	10244	0.36	0.15	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	6.02	992.21	999.00	10256	0.41	0.18	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	6.27	992.23	999.00	10267	0.43	0.22	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	6.52	992.25	999.00	10276	0.42	0.25	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	6.77	992.27	999.00	10288	0.56	0.29	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	7.02	992.28	999.00	10297	0.45	0.33	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	7.27	992.30	999.00	10306	0.61	0.37	0.1	0.0
010Yr24Hr-Post	Pond A	BASE	7.52	992.32	999.00	10319	0.70	0.43	0.1	0.1
010Yr24Hr-Post	Pond A	BASE	7.77	992.35	999.00	10336	0.92	0.51	0.1	0.1
010Yr24Hr-Post	Pond A	BASE	8.02	992.39	999.00	10358	1.07	0.62	0.2	0.1
010Yr24Hr-Post	Pond A	BASE	8.27	992.42	999.00	10373	0.92	0.70	0.2	0.1
010Yr24Hr-Post	Pond A	BASE	8.52	992.44	999.00	10386	1.14	0.79	0.2	0.1
010Yr24Hr-Post	Pond A	BASE	8.77	992.47	999.00	10402	1.21	0.89	0.2	0.1
010Yr24Hr-Post	Pond A	BASE	9.02	992.50	999.00	10419	1.35	1.00	0.3	0.1
010Yr24Hr-Post	Pond A	BASE	9.27	992.53	999.00	10434	1.39	1.10	0.3	0.2
010Yr24Hr-Post	Pond A	BASE	9.52	992.55	999.00	10446	1.44	1.19	0.3	0.2
010Yr24Hr-Post	Pond A	BASE	9.77	992.58	999.00	10462	1.72	1.31	0.3	0.2
010Yr24Hr-Post	Pond A	BASE	10.02	992.61	999.00	10476	1.65	1.42	0.4	0.2
010Yr24Hr-Post	Pond A	BASE	10.27	992.64	999.00	10494	2.10	1.57	0.4	0.3
010Yr24Hr-Post	Pond A	BASE	10.52	992.68	999.00	10515	2.15	1.75	0.5	0.3
010Yr24Hr-Post	Pond A	BASE	10.77	992.73	999.00	10540	2.68	1.98	0.5	0.3
010Yr24Hr-Post	Pond A	BASE	11.02	992.80	999.00	10574	3.08	2.31	0.6	0.4
010Yr24Hr-Post	Pond A	BASE	11.27	992.86	999.00	10607	3.37	2.64	0.6	0.4
010Yr24Hr-Post	Pond A	BASE	11.51	992.96	999.00	10656	4.69	3.19	0.7	0.5
010Yr24Hr-Post	Pond A	BASE	11.75	993.13	999.00	10745	6.70	4.24	0.8	0.6
010Yr24Hr-Post	Pond A	BASE	12.00	993.99	999.00	11157	27.59	10.55	1.2	0.7
010Yr24Hr-Post	Pond A	BASE	12.25	995.05	999.00	11726	29.97	20.35	1.8	1.0
010Yr24Hr-Post	Pond A	BASE	12.50	994.84	999.00	11611	8.28	18.35	2.2	1.4
010Yr24Hr-Post	Pond A	BASE	12.75	994.16	999.00	11247	5.21	11.99	2.3	1.8
010Yr24Hr-Post	Pond A	BASE	13.00	993.70	999.00	11035	3.86	8.44	2.4	2.0
010Yr24Hr-Post	Pond A	BASE	13.25	993.41	999.00	10890	3.42	6.20	2.5	2.1
010Yr24Hr-Post	Pond A	BASE	13.50	993.21	999.00	10789	2.79	4.81	2.5	2.2
010Yr24Hr-Post	Pond A	BASE	13.75	993.08	999.00	10719	2.65	3.92	2.6	2.3
010Yr24Hr-Post	Pond A	BASE	14.00	992.98	999.00	10668	2.29	3.32	2.7	2.4
010Yr24Hr-Post	Pond A	BASE	14.25	992.90	999.00	10628	2.08	2.87	2.7	2.5

Lee's Summit MOB
Post-Development
Node Time Series (Stage at Peak Inflow for Secondary Storm)
2017-09-06
527116043

Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af
010Yr24Hr-Post	Pond A	BASE	14.51	992.84	999.00	10599	2.06	2.56	2.7	2.5
010Yr24Hr-Post	Pond A	BASE	14.76	992.80	999.00	10575	1.74	2.31	2.8	2.6
010Yr24Hr-Post	Pond A	BASE	15.01	992.76	999.00	10553	1.71	2.10	2.8	2.6
010Yr24Hr-Post	Pond A	BASE	15.26	992.73	999.00	10539	1.69	1.96	2.9	2.7
010Yr24Hr-Post	Pond A	BASE	15.51	992.70	999.00	10522	1.40	1.81	2.9	2.7
010Yr24Hr-Post	Pond A	BASE	15.76	992.67	999.00	10509	1.50	1.69	2.9	2.7
010Yr24Hr-Post	Pond A	BASE	16.01	992.65	999.00	10499	1.39	1.61	2.9	2.8
010Yr24Hr-Post	Pond A	BASE	16.26	992.63	999.00	10489	1.33	1.53	3.0	2.8
010Yr24Hr-Post	Pond A	BASE	16.51	992.61	999.00	10479	1.22	1.45	3.0	2.8
010Yr24Hr-Post	Pond A	BASE	16.76	992.60	999.00	10472	1.30	1.39	3.0	2.9
010Yr24Hr-Post	Pond A	BASE	17.01	992.57	999.00	10457	0.80	1.28	3.0	2.9
010Yr24Hr-Post	Pond A	BASE	17.26	992.54	999.00	10440	0.85	1.15	3.1	2.9
010Yr24Hr-Post	Pond A	BASE	17.51	992.52	999.00	10426	0.77	1.05	3.1	2.9
010Yr24Hr-Post	Pond A	BASE	17.76	992.50	999.00	10417	0.85	0.99	3.1	3.0
010Yr24Hr-Post	Pond A	BASE	18.01	992.49	999.00	10410	0.77	0.94	3.1	3.0
010Yr24Hr-Post	Pond A	BASE	18.26	992.47	999.00	10403	0.75	0.89	3.1	3.0
010Yr24Hr-Post	Pond A	BASE	18.51	992.45	999.00	10392	0.54	0.82	3.1	3.0
010Yr24Hr-Post	Pond A	BASE	18.76	992.44	999.00	10385	0.74	0.78	3.2	3.0
010Yr24Hr-Post	Pond A	BASE	19.01	992.43	999.00	10382	0.69	0.76	3.2	3.0
010Yr24Hr-Post	Pond A	BASE	19.26	992.42	999.00	10377	0.58	0.73	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	19.51	992.42	999.00	10373	0.68	0.71	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	19.76	992.41	999.00	10370	0.58	0.69	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	20.01	992.40	999.00	10365	0.57	0.66	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	20.26	992.39	999.00	10360	0.52	0.63	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	20.51	992.39	999.00	10356	0.56	0.61	3.2	3.1
010Yr24Hr-Post	Pond A	BASE	20.76	992.38	999.00	10353	0.52	0.60	3.3	3.1
010Yr24Hr-Post	Pond A	BASE	21.01	992.38	999.00	10351	0.57	0.58	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	21.26	992.38	999.00	10350	0.57	0.58	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	21.51	992.37	999.00	10349	0.52	0.57	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	21.76	992.37	999.00	10348	0.56	0.57	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	22.01	992.37	999.00	10346	0.52	0.56	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	22.26	992.36	999.00	10342	0.40	0.53	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	22.51	992.36	999.00	10338	0.51	0.52	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	22.76	992.35	999.00	10335	0.40	0.50	3.3	3.2
010Yr24Hr-Post	Pond A	BASE	23.01	992.35	999.00	10335	0.55	0.50	3.4	3.2
010Yr24Hr-Post	Pond A	BASE	23.26	992.34	999.00	10332	0.36	0.49	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	23.51	992.34	999.00	10331	0.55	0.48	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	23.76	992.34	999.00	10329	0.36	0.47	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	24.01	992.33	999.00	10325	0.37	0.45	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	24.26	992.31	999.00	10312	0.02	0.39	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	24.51	992.28	999.00	10295	0.00	0.32	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	24.76	992.25	999.00	10280	0.00	0.27	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	25.01	992.23	999.00	10268	0.00	0.22	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	25.26	992.21	999.00	10258	0.00	0.19	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	25.51	992.20	999.00	10249	0.00	0.16	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	25.76	992.18	999.00	10241	0.00	0.14	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	26.01	992.17	999.00	10234	0.00	0.13	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	26.26	992.16	999.00	10228	0.00	0.11	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	26.51	992.15	999.00	10222	0.00	0.10	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	26.76	992.14	999.00	10218	0.00	0.09	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	27.01	992.14	999.00	10213	0.00	0.08	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	27.26	992.13	999.00	10209	0.00	0.07	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	27.51	992.12	999.00	10206	0.00	0.07	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	27.76	992.12	999.00	10202	0.00	0.06	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	28.01	992.11	999.00	10199	0.00	0.06	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	28.26	992.11	999.00	10196	0.00	0.05	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	28.51	992.11	999.00	10193	0.00	0.05	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	28.76	992.10	999.00	10191	0.00	0.04	3.4	3.3

Lee's Summit MOB
 Post-Development
 Node Time Series (Stage at Peak Inflow for Secondary Storm)
 2017-09-06
 527116043

Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af
010Yr24Hr-Post	Pond A	BASE	29.01	992.10	999.00	10189	0.00	0.04	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	29.26	992.09	999.00	10187	0.00	0.04	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	29.51	992.09	999.00	10185	0.00	0.03	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	29.76	992.09	999.00	10183	0.00	0.03	3.4	3.3
010Yr24Hr-Post	Pond A	BASE	30.00	992.09	999.00	10181	0.00	0.03	3.4	3.3



NOAA Atlas 14, Volume 8, Version 2
Location name: Lees Summit, Missouri, USA*
Latitude: 38.9042°, Longitude: -94.333°
Elevation: 1003.25 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, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

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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	4.98 (3.89-6.34)	5.81 (4.54-7.40)	7.19 (5.59-9.18)	8.34 (6.47-10.7)	9.97 (7.51-13.2)	11.3 (8.30-15.0)	12.6 (8.99-17.1)	13.9 (9.60-19.4)	15.7 (10.5-22.5)	17.1 (11.1-24.8)
10-min	3.64 (2.85-4.64)	4.25 (3.32-5.42)	5.26 (4.10-6.72)	6.11 (4.73-7.84)	7.30 (5.50-9.64)	8.24 (6.08-11.0)	9.20 (6.58-12.5)	10.2 (7.03-14.2)	11.5 (7.67-16.5)	12.5 (8.15-18.2)
15-min	2.96 (2.32-3.78)	3.46 (2.70-4.40)	4.28 (3.33-5.46)	4.97 (3.85-6.37)	5.94 (4.47-7.84)	6.70 (4.94-8.95)	7.48 (5.35-10.2)	8.28 (5.71-11.6)	9.35 (6.24-13.4)	10.2 (6.63-14.8)
30-min	2.05 (1.60-2.61)	2.41 (1.88-3.07)	2.99 (2.33-3.83)	3.49 (2.70-4.47)	4.18 (3.14-5.51)	4.72 (3.48-6.29)	5.26 (3.76-7.17)	5.82 (4.01-8.12)	6.57 (4.38-9.40)	7.14 (4.65-10.4)
60-min	1.34 (1.05-1.71)	1.58 (1.23-2.01)	1.97 (1.53-2.51)	2.30 (1.78-2.95)	2.77 (2.08-3.66)	3.14 (2.31-4.19)	3.51 (2.52-4.80)	3.90 (2.69-5.46)	4.43 (2.96-6.35)	4.84 (3.15-7.02)
2-hr	0.828 (0.652-1.05)	0.973 (0.766-1.23)	1.22 (0.955-1.54)	1.43 (1.11-1.81)	1.72 (1.31-2.26)	1.96 (1.46-2.60)	2.20 (1.59-2.98)	2.45 (1.70-3.40)	2.79 (1.88-3.97)	3.06 (2.01-4.40)
3-hr	0.623 (0.493-0.784)	0.733 (0.579-0.923)	0.919 (0.724-1.16)	1.08 (0.847-1.37)	1.31 (1.00-1.72)	1.50 (1.12-1.98)	1.69 (1.22-2.28)	1.89 (1.32-2.62)	2.16 (1.46-3.07)	2.38 (1.57-3.42)
6-hr	0.377 (0.300-0.470)	0.445 (0.355-0.556)	0.563 (0.447-0.705)	0.666 (0.526-0.837)	0.815 (0.629-1.06)	0.937 (0.707-1.23)	1.06 (0.778-1.43)	1.20 (0.845-1.65)	1.38 (0.943-1.95)	1.53 (1.02-2.18)
12-hr	0.220 (0.177-0.273)	0.263 (0.211-0.326)	0.336 (0.269-0.417)	0.400 (0.318-0.499)	0.494 (0.384-0.640)	0.570 (0.434-0.747)	0.651 (0.480-0.871)	0.736 (0.524-1.01)	0.854 (0.587-1.20)	0.949 (0.635-1.34)
24-hr	0.129 (0.105-0.159)	0.155 (0.125-0.190)	0.198 (0.159-0.244)	0.236 (0.189-0.292)	0.292 (0.229-0.376)	0.338 (0.259-0.439)	0.386 (0.287-0.513)	0.437 (0.313-0.595)	0.508 (0.352-0.709)	0.565 (0.381-0.795)
2-day	0.076 (0.062-0.093)	0.090 (0.073-0.110)	0.113 (0.092-0.139)	0.134 (0.108-0.165)	0.165 (0.130-0.210)	0.190 (0.147-0.245)	0.216 (0.162-0.285)	0.244 (0.177-0.330)	0.284 (0.198-0.393)	0.315 (0.214-0.440)
3-day	0.056 (0.046-0.069)	0.065 (0.054-0.080)	0.081 (0.066-0.099)	0.095 (0.077-0.116)	0.116 (0.092-0.147)	0.133 (0.103-0.171)	0.151 (0.113-0.198)	0.170 (0.123-0.229)	0.197 (0.138-0.271)	0.218 (0.149-0.303)
4-day	0.046 (0.038-0.055)	0.053 (0.043-0.064)	0.064 (0.053-0.078)	0.075 (0.061-0.091)	0.090 (0.072-0.114)	0.103 (0.080-0.132)	0.116 (0.088-0.152)	0.130 (0.095-0.175)	0.150 (0.106-0.207)	0.166 (0.114-0.231)
7-day	0.031 (0.026-0.037)	0.035 (0.029-0.042)	0.042 (0.035-0.051)	0.048 (0.039-0.058)	0.057 (0.045-0.071)	0.064 (0.050-0.081)	0.071 (0.054-0.093)	0.079 (0.058-0.105)	0.090 (0.064-0.123)	0.098 (0.068-0.136)
10-day	0.025 (0.020-0.029)	0.028 (0.023-0.033)	0.033 (0.027-0.040)	0.038 (0.031-0.045)	0.044 (0.035-0.055)	0.049 (0.038-0.062)	0.054 (0.041-0.070)	0.059 (0.044-0.078)	0.067 (0.047-0.090)	0.072 (0.050-0.099)
20-day	0.016 (0.014-0.019)	0.019 (0.015-0.022)	0.022 (0.018-0.026)	0.025 (0.021-0.030)	0.029 (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 (0.030-0.059)
30-day	0.013 (0.011-0.016)	0.015 (0.013-0.018)	0.018 (0.015-0.021)	0.020 (0.017-0.024)	0.023 (0.018-0.028)	0.025 (0.020-0.031)	0.027 (0.021-0.034)	0.029 (0.021-0.037)	0.031 (0.022-0.042)	0.033 (0.023-0.045)
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 (0.016-0.027)	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)	0.011 (0.009-0.012)	0.012 (0.010-0.015)	0.014 (0.012-0.016)	0.016 (0.013-0.019)	0.017 (0.013-0.021)	0.018 (0.014-0.023)	0.019 (0.014-0.025)	0.020 (0.015-0.027)	0.021 (0.015-0.029)

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.

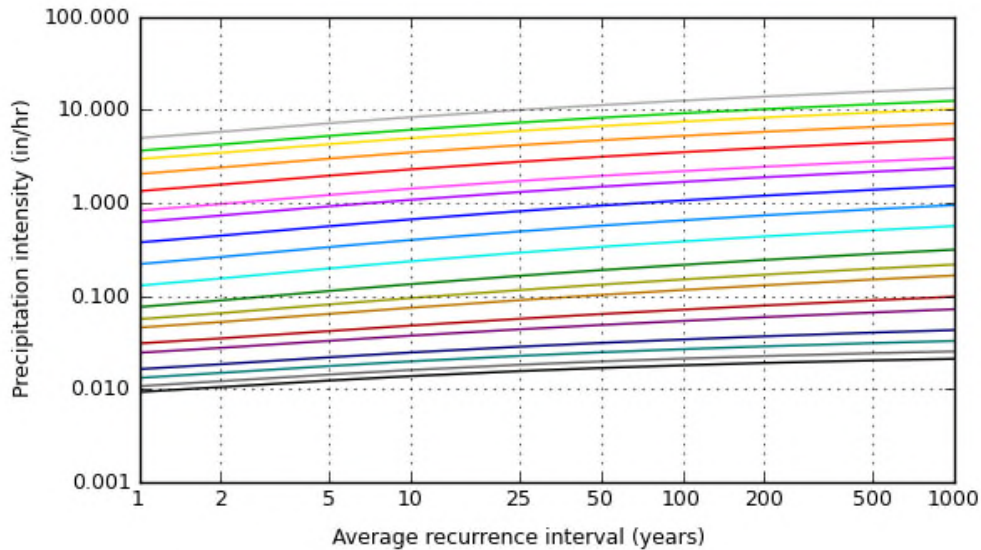
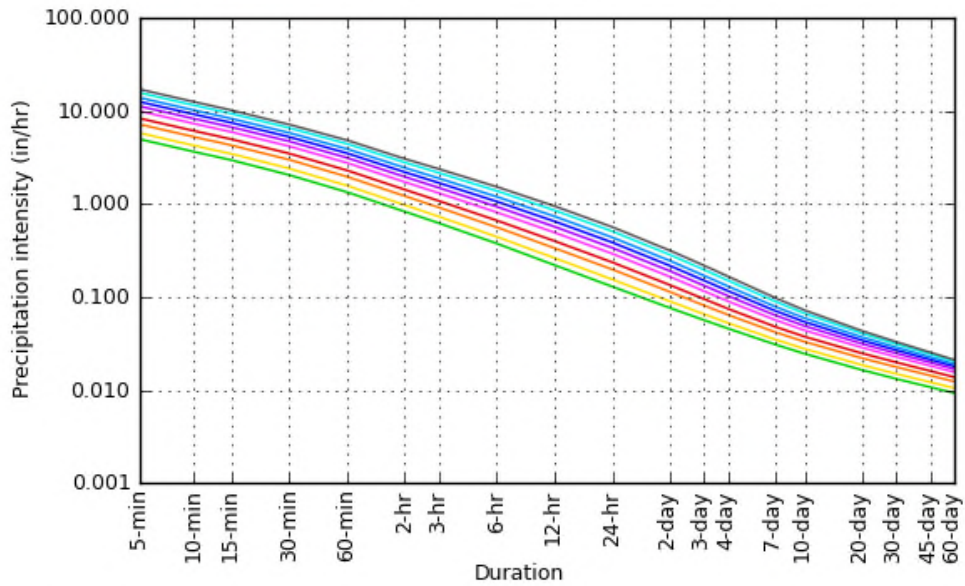
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based intensity-duration-frequency (IDF) curves

Latitude: 38.9042°, Longitude: -94.3330°



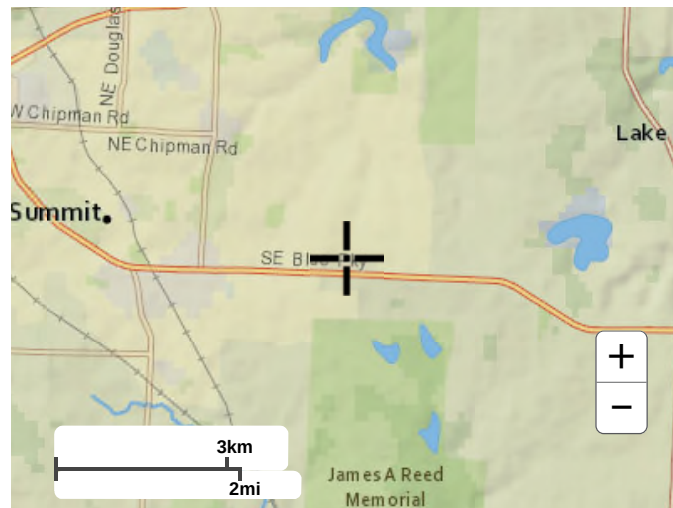
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Fri Jan 5 18:53:46 2018

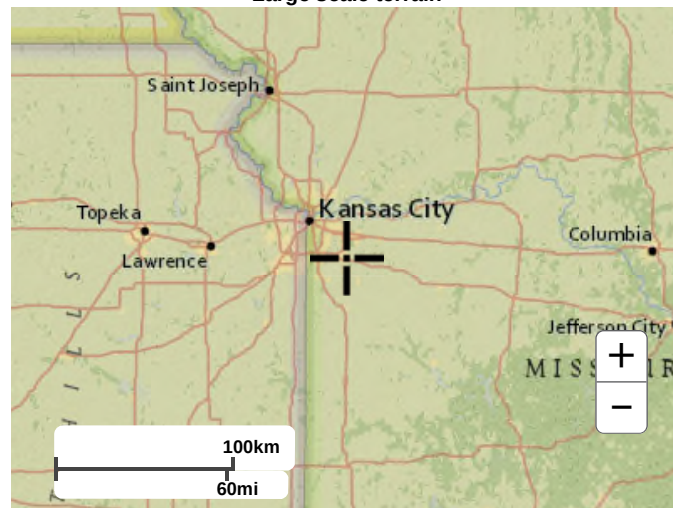
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Maps & aeriels

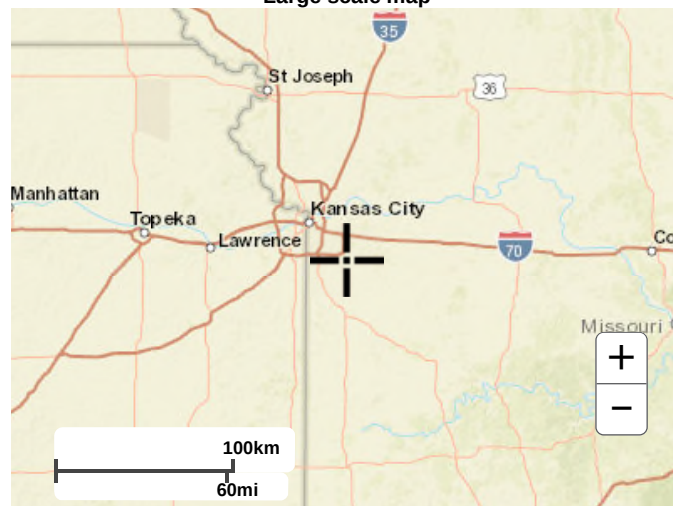
Small scale terrain



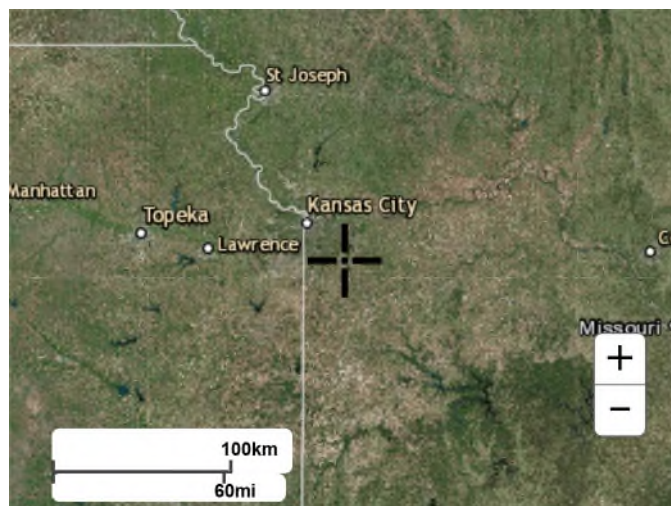
Large scale terrain



Large scale map



Large scale aerial

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