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

January 25, 2018

Table of Contents

Appendices

January 25, 2018
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://w ebsoilsurvey.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 stomwater 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 pond storage volume has been increased to offset the storage volume lost from the existing pond, as well as, to account for the additional impervious area proposed for this project. Additionally, the retaining wall will include an integral handrail for pedestrian safety. 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	**Total**
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. The outfall pipe is a 24" RCP pipe which has been upsized from the existing 18" pipe. This allows for one foot of freeboard while allowing the post development flow to still be less than the pre-developed condition. 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 Preciptation 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

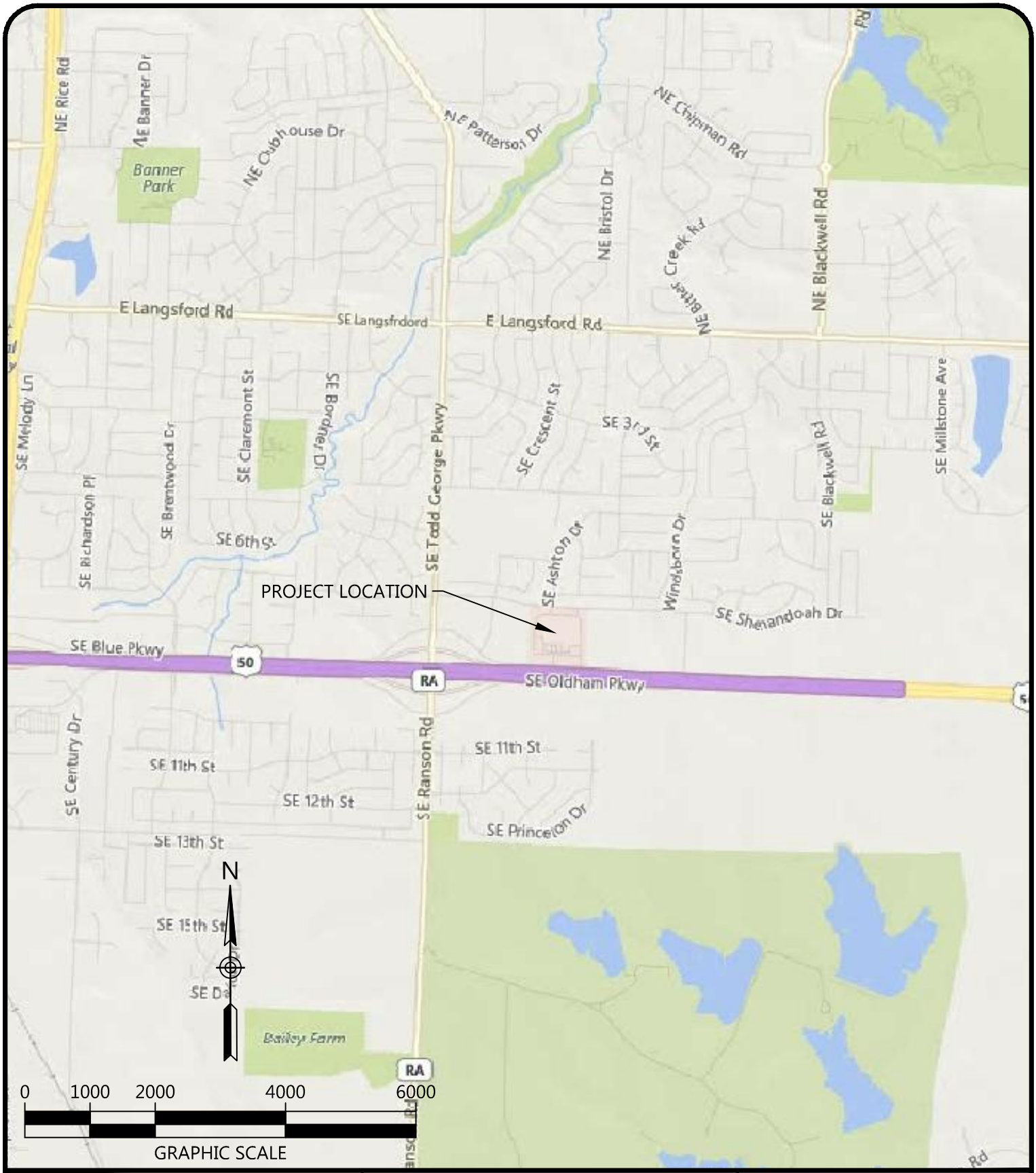
The onsite detention area provides the necessary stormwater attenuation for the proposed development and performs as required. The primary component of the analysis of attenuation success is the comparison of pre- versus post-development flow rates which can be found in the table below.

	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



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www.smeinc.com

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

TITLE:
Vicinity Map

PROJ # 527116043

DWG. NO.
EXH

DATE: 09/01/2017

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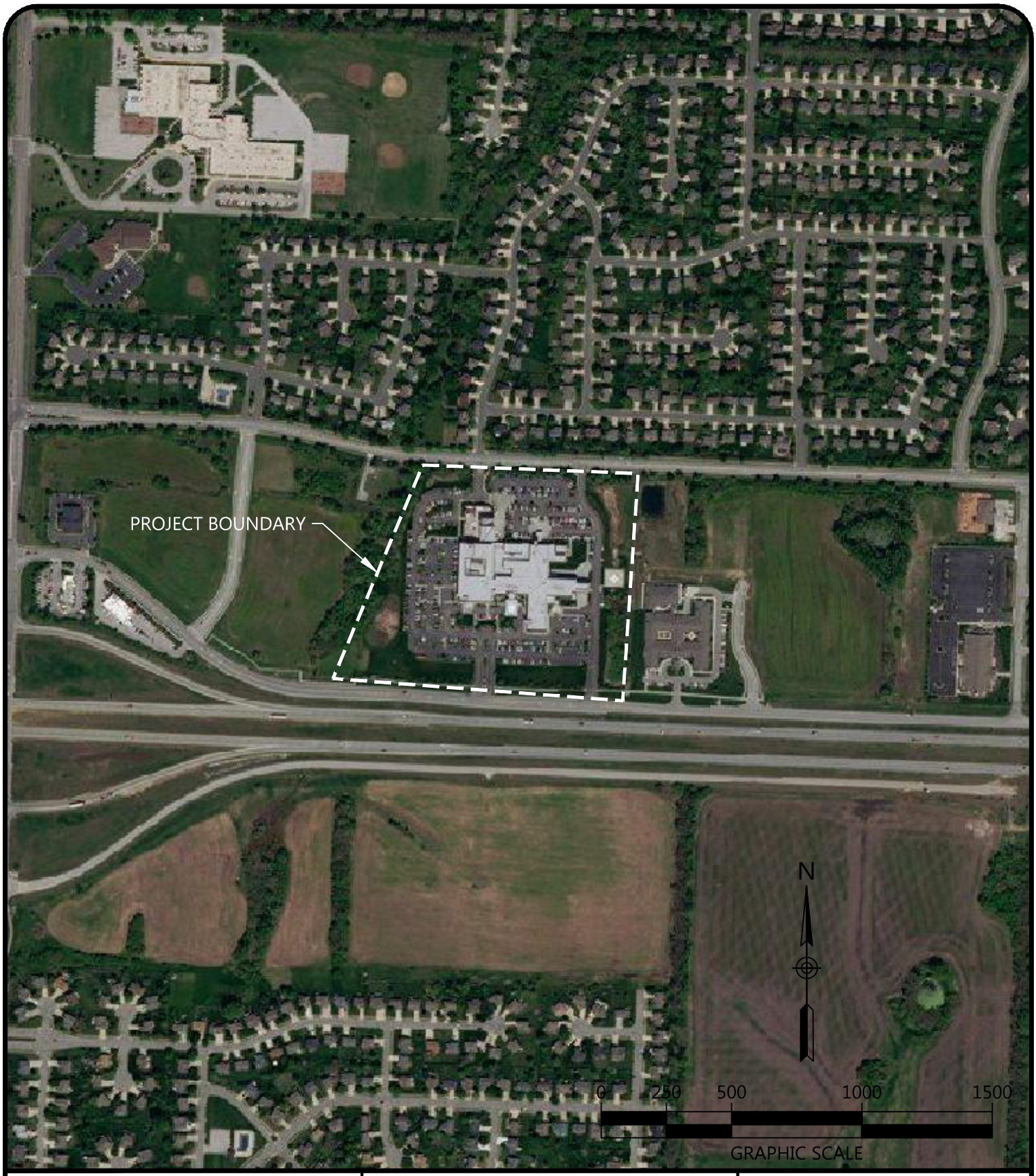

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Appendix II – Support Maps and Project Documents (FIRM Panel, Soils Maps, Property Appraiser's Card, etc.)

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

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

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

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

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

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

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

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

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

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

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

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

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

LEGEND

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

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

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

Culvert

Bridge

45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

3100000 FT — 5000-foot ticks: Missouri State Plane West Zone (FIPS Zone 2403), Transverse Mercator projection

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 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, Unincorporated	290402	0439	G
LEE'S SUMMIT, CITY OF	290174	0439	G

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

MAP NUMBER
29095C0439G
MAP REVISED
JANUARY 20, 2017

Federal Emergency Management Agency

Map Scale: 1:2,540 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Jackson County, Missouri
Survey Area Data: Version 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

Jackson County, Missouri GIS

Property Summary for:
60-420-99-09-00-0-00-000

GIS Department • 415 E 12th St • Room G8 • Kansas City, MO 64106
Link to Report

Property Information

Parcel ID: 60-420-99-09-00-0-00-000

Addresses on this Parcel:

There are 3 addresses on this parcel.

(Primary)		
2100 SE SHENANDOAH DR LEE'S SUMMIT, MO 64063	1950 SE SHENANDOAH DR LEE'S SUMMIT, MO 64063	2000 SE SHENANDOAH DR LEE'S SUMMIT, MO 64063

Owner Information:
MIDWEST DIVISION LSH LLC
PO BOX 80610
INDIANAPOLIS, IN 46280

Mortgage Holder Information:
No Mortgage Holder Information.

Property Characteristics:
Year Built: NA
Living Area (Approx. sq. ft.): NA
Tax Neighborhood Code: 9978
Parcel Area (Approx.): 28.39 (acres), 1,239,168.70 (SqFt)

Property Class (PCA Code): Commercial Improved (code: 2010)

Land Use Type: Hospital (code: 2221)

Tax Code Area:
Code: 49
City: Lee's Summit
Fire: NA
Library: Mid Continent
School: Lees Summit R-7
Water: NA

Assessment Information:
Tax Year: 2017
Market Value: $40,856,600
Assessed Value: $13,072,753
Taxable Value: $1,384,935
Where are my tax dollars going?

Exemptions and Abatements Status (2014):
1) Description: D10 - D10 (N) TIF, D10 Placeholder for TIF not an Exemption

Community Improvement District (CID):
Property is not in a CID for which Jackson County collects a tax or assessment.

TIF Information:
TIF Plan: 50 Hwy Corridor TIF 10
TIF Project: 50 Hwy Corridor Project 1

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

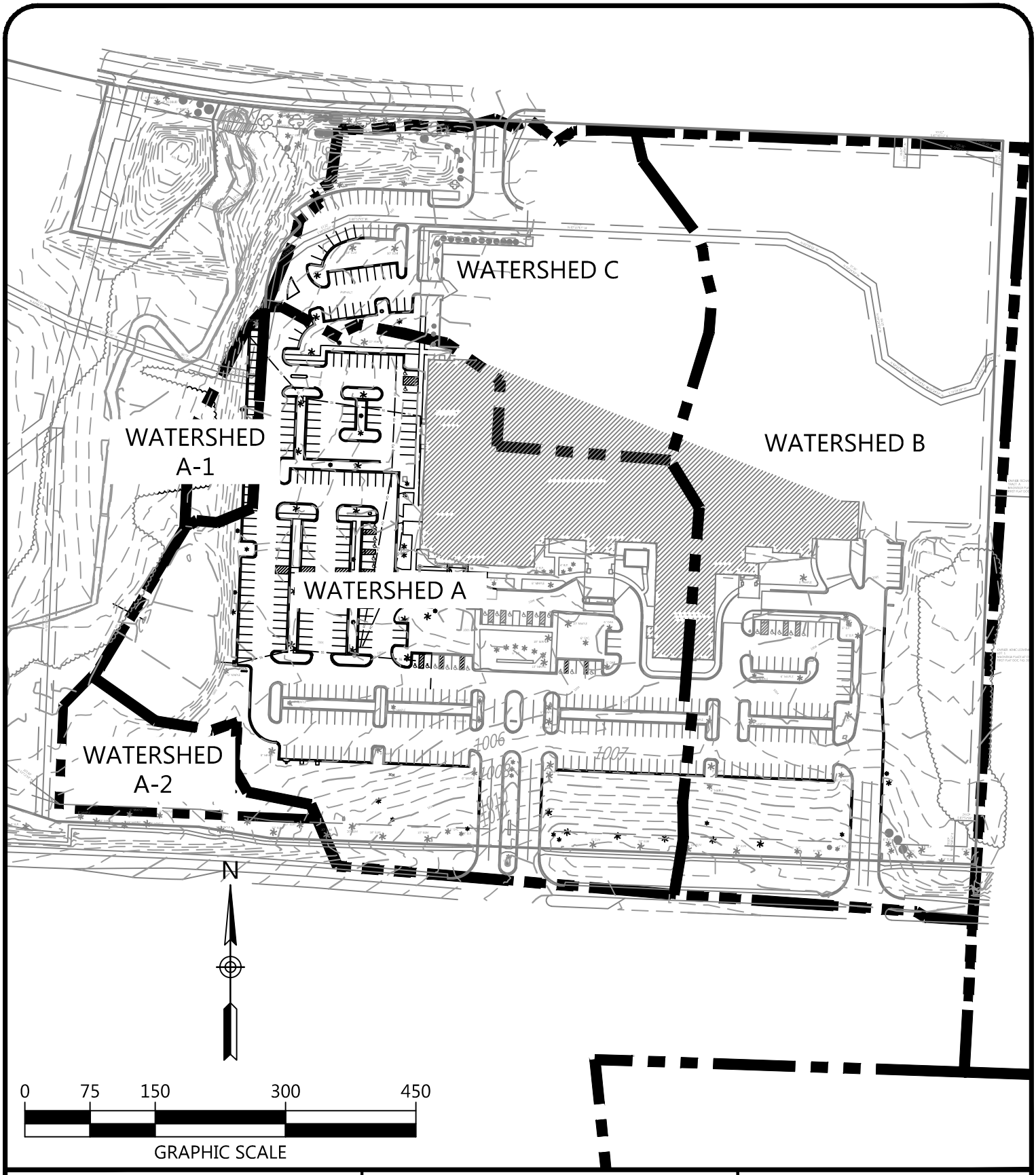
Receipts

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.

Appendix III - Pre-Development Drainage Basin Map



1615 EDGEWATER DRIVE,
SUITE 200.
ORLANDO, FLORIDA 32804
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www.smeinc.com

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

TITLE:
Pre Basin Map

PROJ # 527116043

DWG. NO.
EXH

DATE: 09/01/2017

G:\Projects\2016\527116043\Engineering\dwg\527116043_Post Development Basin Map.dwg-PRE Sep 07, 2017 oberryhill

Appendix IV - ICPR Pre-Development Modeling

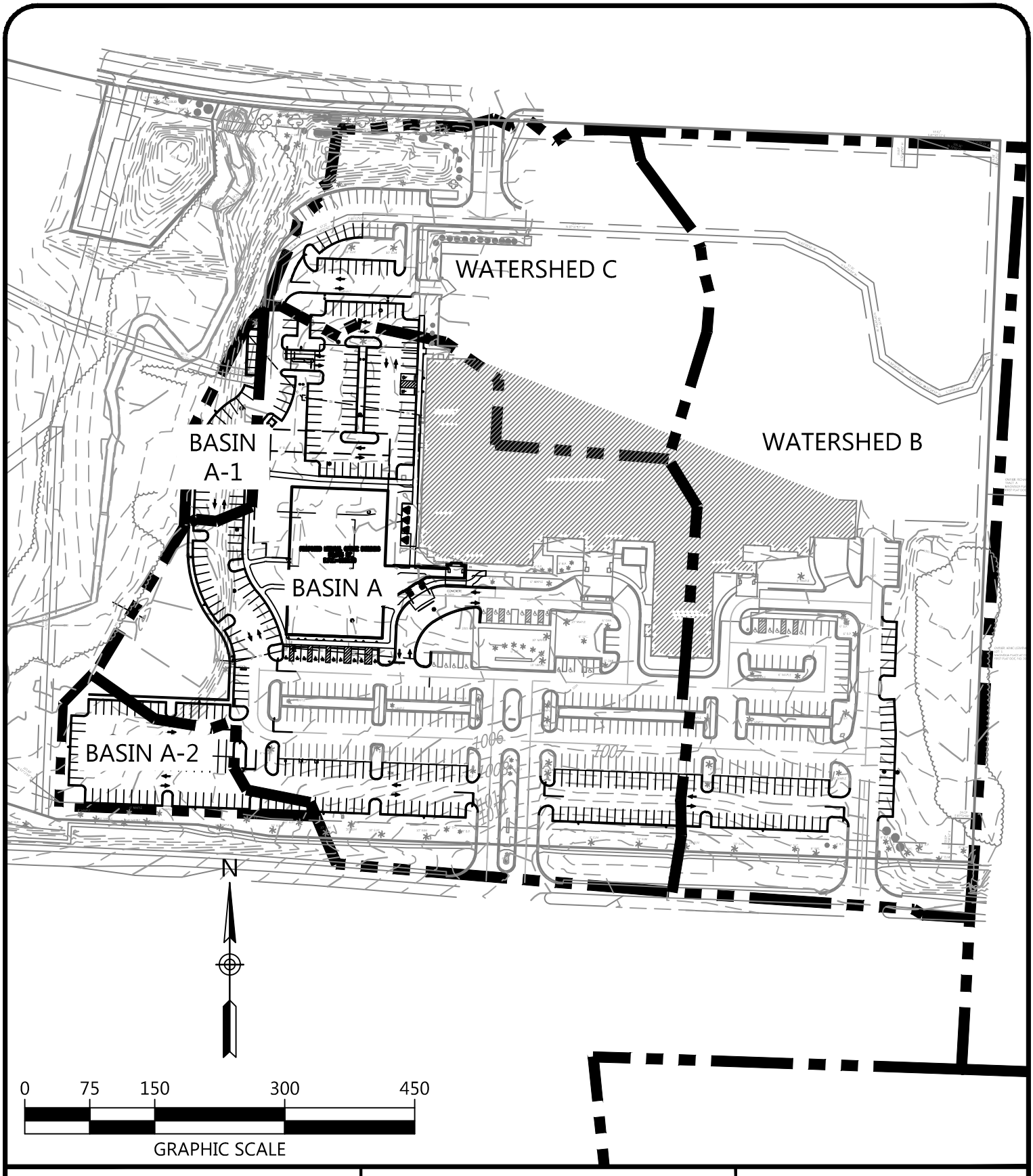
```
            Basin Name: Watershed A-1
            Group Name: BASE
            Simulation: 002Yr024Hr-Pre
             Node Name: Boundary
            Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
   Spec Time Inc (min): 0.80
   Comp Time Inc (min): 0.80
         Rainfall File: Scsiii
  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: Scsiii
  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: 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): 0.655
   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
```

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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F 407.975.1278
www.smeinc.com

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

TITLE:
Post Basin Map

PROJ # 527116043

DWG. NO.
EXH

DATE: 09/01/2017

G:\Projects\2016\527116043\Engineering\dwg\527116043_Post Development Basin Map.dwg-POST Sep 07, 2017 oberryhill

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: Scsiii
  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: Scsiii
  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: Scsiii
   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: 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): 0.325
   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: 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): 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: 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): 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: 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): 0.655
   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	2	12.38	10.72	0.00	0.00
Pond A	BASE	002Yr24Hr-Post	12.38	994.59	999.00	0.0050	11469	12.25	19.13	12.38	10.72
Boundary	BASE	010Yr24Hr-Post	0.00	991.86	991.86	0.0000	2	12.39	15.06	0.00	0.00
Pond A	BASE	010Yr24Hr-Post	12.39	995.89	999.00	0.0050	12188	12.25	30.04	12.39	15.06
Boundary	BASE	100Yr24Hr-Post	0.00	991.86	991.86	0.0000	2	12.41	20.55	0.00	0.00
Pond A	BASE	100Yr24Hr-Post	12.41	998.39	999.00	0.0050	13684	12.25	49.91	12.41	20.55

```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Baisn A-1               Node: Pond A                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh484                  Peaking Factor: 484.0
         Rainfall File:                    Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
            Area(ac): 0.325                  Time Shift(hrs): 0.00
        Curve Number: 88.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00



--------------------------------------------------------------------------------------------------
        Name: Basin A                 Node: Pond A                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh484                  Peaking Factor: 484.0
         Rainfall File:                    Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
            Area(ac): 7.110                  Time Shift(hrs): 0.00
        Curve Number: 95.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00



--------------------------------------------------------------------------------------------------
        Name: Basin A-2               Node: Pond A                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh484                  Peaking Factor: 484.0
         Rainfall File:                    Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
            Area(ac): 0.655                  Time Shift(hrs): 0.00
        Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00



================================================================================
==== Nodes =====================================================================
================================================================================

     Name: Boundary           Base Flow(cfs): 0.000         Init Stage(ft): 991.860
    Group: BASE                                            Warn Stage(ft): 991.860
     Type: Time/Stage



     Time(hrs)       Stage(ft)
-------------- ---------------
          0.00         991.860
        999.00         991.860

--------------------------------------------------------------------------------------------
     Name: Pond A             Base Flow(cfs): 0.000         Init Stage(ft): 992.000
    Group: BASE                                            Warn Stage(ft): 999.000
     Type: Stage/Area
```

Stage(ft)	Area(ac)
992.000	0.2322
993.000	0.2438
994.000	0.2558
995.000	0.2682
996.000	0.2811
997.000	0.2945
998.000	0.3085
999.000	0.3230

Pipes

Name: PIpe A | From Node: Pond A | Length(ft): 60.00
Group: BASE | To Node: Boundary | Count: 1
Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.00
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	24.00	24.00
Rise(in):	24.00	24.00
Invert(ft):	992.000	991.860
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Channels

Name: | From Node: | Length(ft): 0.00
Group: BASE | To Node: | Count: 1
Friction Equation: Automatic
Solution Algorithm: Automatic
Flow: Both
Contraction Coef: 0.100
Expansion Coef: 0.300
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Trapezoidal	Trapezoidal
Invert(ft):	0.000	0.000
TClpInitZ(ft):	9999.000	9999.000
Manning's N:	0.000000	0.000000
Top Clip(ft):	0.000	0.000
Bot Clip(ft):	0.000	0.000
Main XSec:		
AuxElev1(ft):		
Aux XSec1:		
AuxElev2(ft):		
Aux XSec2:		
Top Width(ft):		
Depth(ft):		
Bot Width(ft):	0.000	0.000
LtSdSlp(h/v):	0.00	0.00
RtSdSlp(h/v):	0.00	0.00

==== Hydrology Simulations ==
==

Name: 002Yr024Hr-Post
Filename: G:\Projects\2016\527116043\Engineering\ICPR\002Yr024Hr-Post.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Scsiii
Rainfall Amount(in): 3.71

Time(hrs)	Print Inc(min)
30.000	5.00

Name: 010Yr 024Hr-Pos
Filename: G:\Projects\2016\527116043\Engineering\ICPR\010Yr 024Hr-Post.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Scsiii
Rainfall Amount(in): 5.66

Time(hrs)	Print Inc(min)
30.000	5.00

Name: 100Yr24Hr-Post
Filename: G:\Projects\2016\527116043\Engineering\ICPR\100Yr24Hr-Post.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Scsiii
Rainfall Amount(in): 9.25

Time(hrs)	Print Inc(min)
30.000	5.00

==
==== Routing Simulations ==
==

Name: 002Yr24Hr-Post Hydrology Sim: 002Yr024Hr-Post
Filename: G:\Projects\2016\527116043\Engineering\ICPR\002Yr24Hr-Post.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run

BASE Yes

Name: 010Yr24Hr-Post Hydrology Sim: 010Yr 024Hr-Pos
Filename: G:\Projects\2016\527116043\Engineering\ICPR\010Yr24Hr-Post.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 100Yr24Hr-Post Hydrology Sim: 100Yr24Hr-Post
Filename: G:\Projects\2016\527116043\Engineering\ICPR\100Yr24Hr-Post.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

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, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

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

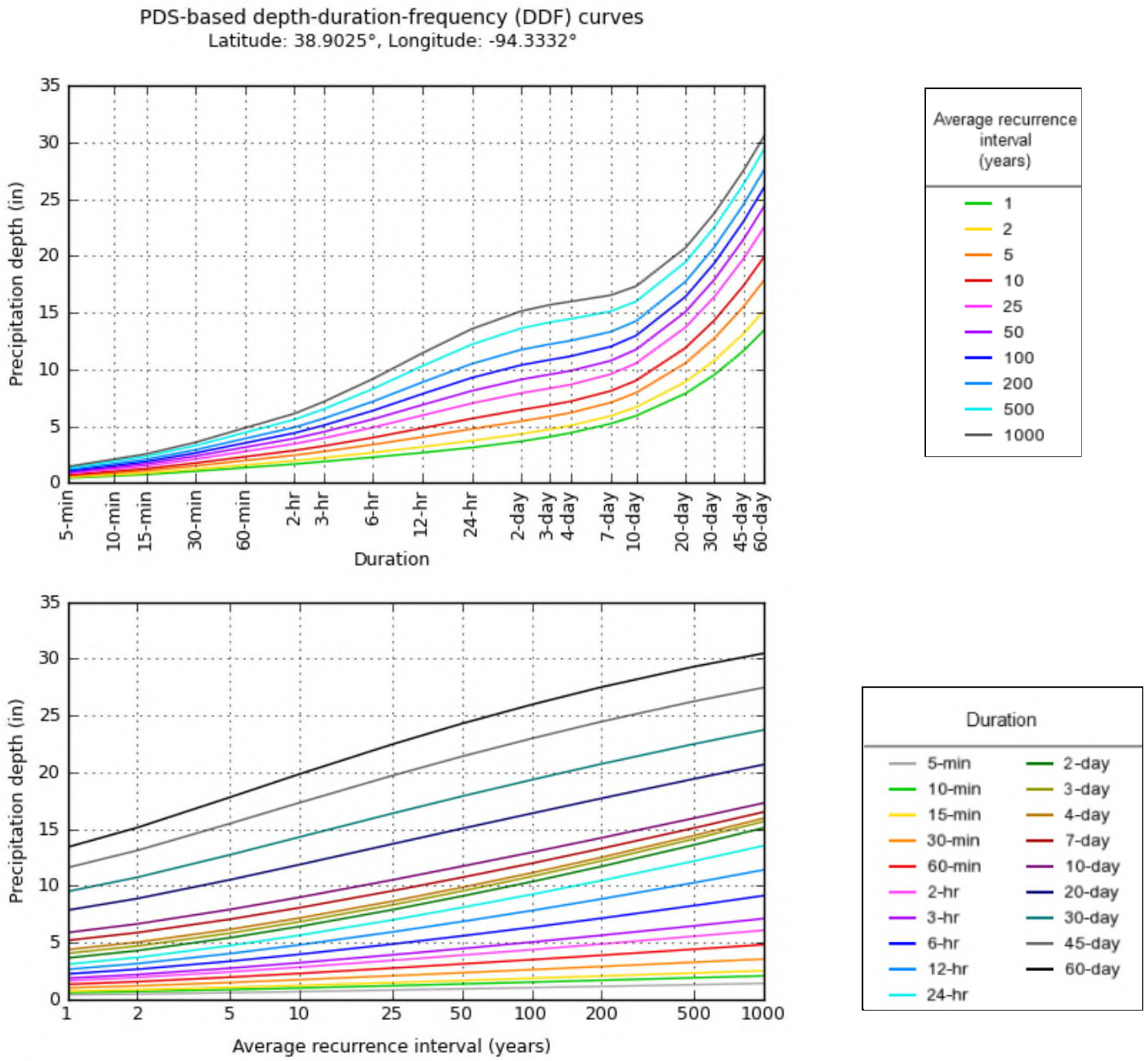
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



NOAA Atlas 14, Volume 8, Version 2

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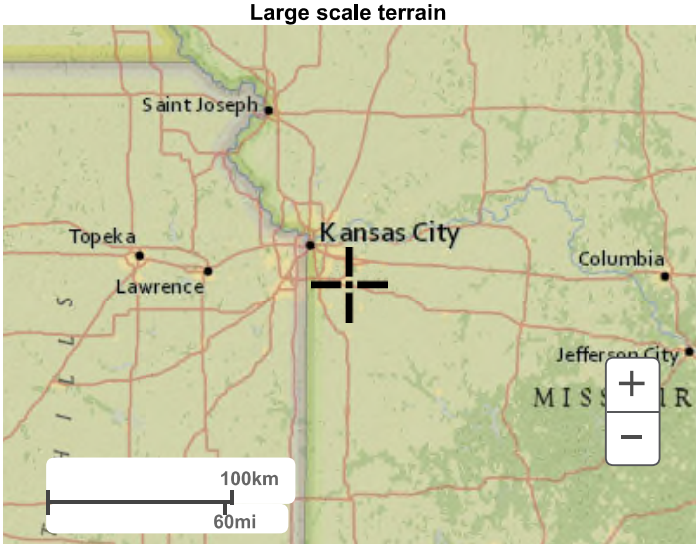
Back to Top

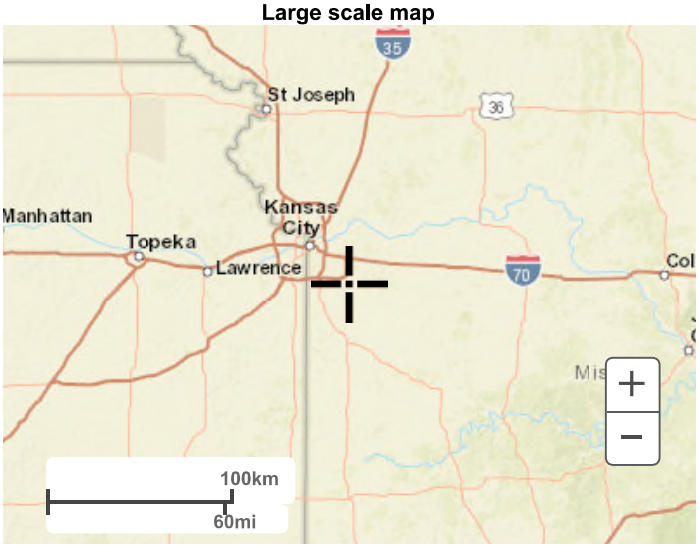
Maps & aerials

Small scale terrain

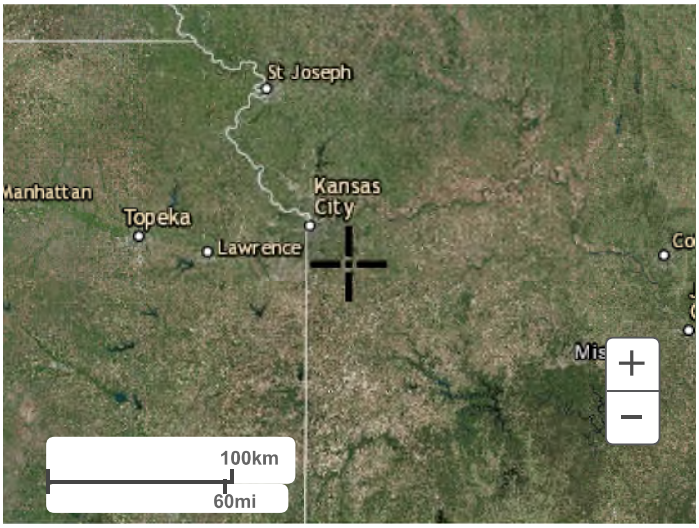
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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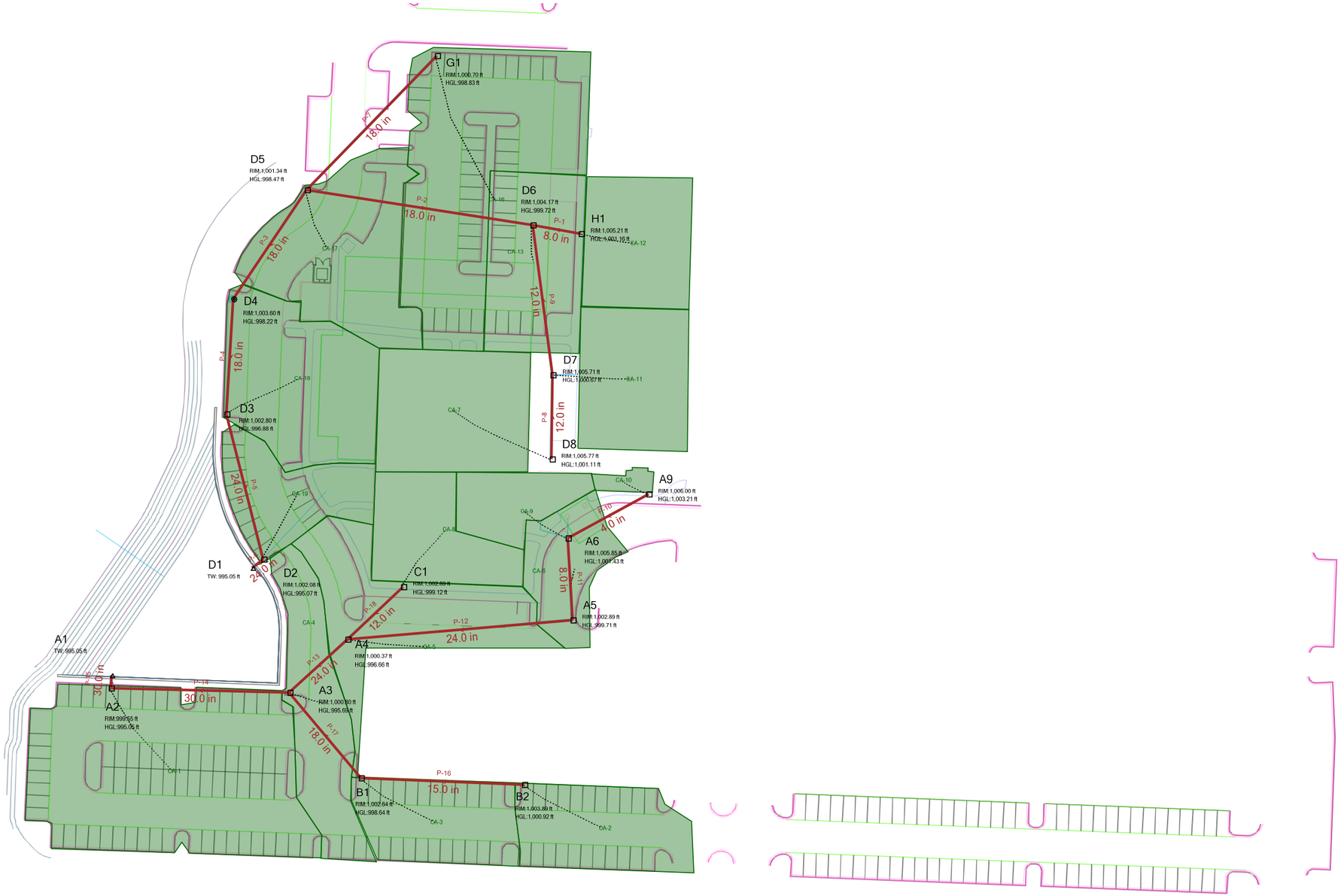
Appendix VIII – StormCAD Hydraulics Modeling

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)	100 Year (in/h)
5.000	4.980	5.810	7.190	8.340	9.970	11.300	12.600
10.000	3.640	4.250	5.260	6.110	7.300	8.240	9.200
15.000	2.960	3.460	4.280	4.970	5.940	6.700	7.480
30.000	2.050	2.410	2.990	3.490	4.180	4.720	5.260
60.000	1.340	1.580	1.970	2.300	2.770	3.140	3.510
120.000	0.828	0.973	1.220	1.430	1.720	1.960	2.200
180.000	0.623	0.733	0.919	1.080	1.310	1.500	1.690
360.000	0.377	0.445	0.563	0.666	0.815	0.937	1.060
720.000	0.220	0.263	0.336	0.400	0.494	0.570	0.651
1,440.000	0.129	0.155	0.198	0.236	0.292	0.338	0.386
2,880.000	0.076	0.090	0.113	0.134	0.165	0.190	0.216
4,320.000	0.056	0.065	0.081	0.095	0.116	0.133	0.151
10,080.000	0.046	0.053	0.064	0.075	0.090	0.103	0.116
14,400.000	0.031	0.035	0.042	0.048	0.057	0.064	0.071

Library Status Summary

	Synchronization Details
ID	987
Label	LeesSummit

Storm Data Detailed Report: LeesSummit

Library Status Summary

	Synchronization Details
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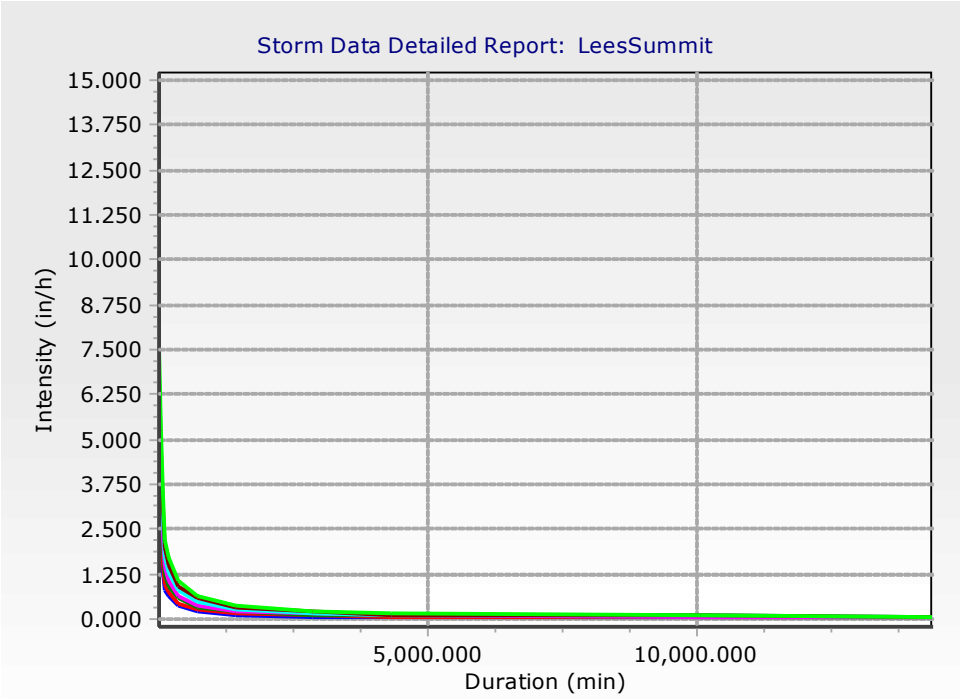
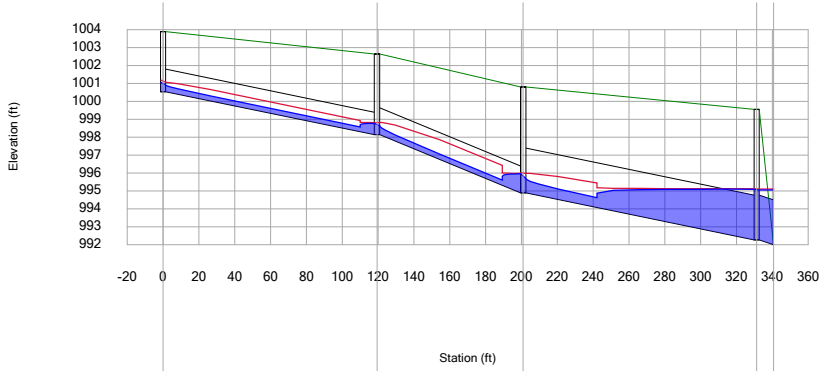
Library Modified Date	Orphan (local)
Synchronization Status	Orphan (local)
Engineering Reference Guid	Orphan (local)



Profile Report

Profile: Profile - A1-B2

Profile - A1-B2 - Base

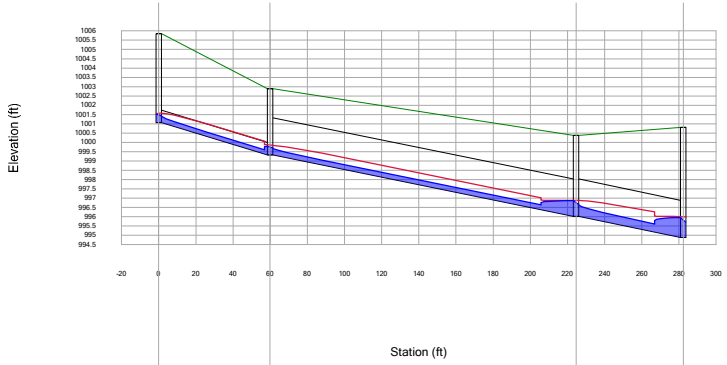


ID\Label		1022 \ P-16		1023 \ P-17		1017 \ P-14	1019 \ P-15
Link Length (ft)		119.4		81.5		130.3	9.5
Rise (in)\Material		15.0 \ Concrete (centrif. spun)		18.0 \ Concrete (centrif. spun)		30.0 \ Concrete (centrif. spun)	30.0 \ Concrete (centrif. spun)
Flow (cfs)		0.94		1.78		5.91	8.62
Slope (ft/ft)		0.020		0.040		0.020	0.028
ID\Label	1020 \ B2		1021 \ B1		1014 \ A3		1018 \ A1
Ground (ft)	1003.89		1002.64		1000.80		999.55
Invert (ft)	1000.54		998.14		994.89		992.70
Station (ft)	0.0		119.4		200.9		331.4

Profile Report

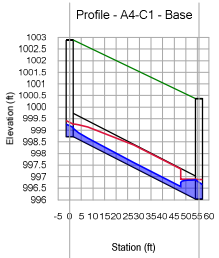
Profile: Profile - A3-A6

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

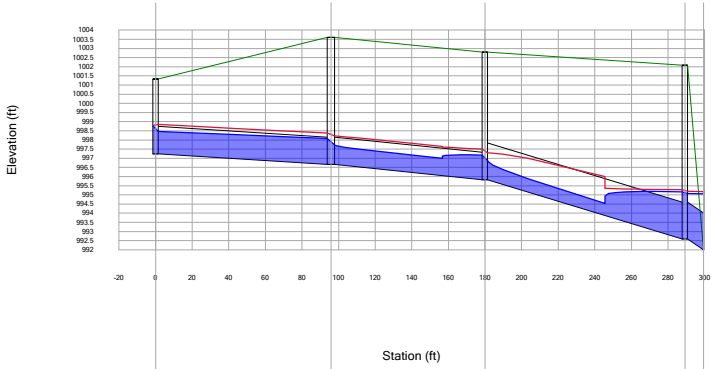


ID\Label	1025 \ P-18	
Link Length (ft)	55.7	
Rise (in)\Material	12.0 \ PVC	
Flow (cfs)	0.87	
Slope (ft/ft)	0.048	
ID\Label	1024 \ C1	1012 \ A4
Ground (ft)	1002.89	1000.37
Invert (ft)	998.73	996.03
Station (ft)	0.0	55.7

Profile Report

Profile: Profile - D1-D5

Profile - D1-D5 - Base

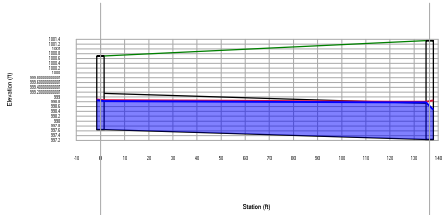


ID\Label	994 \ P-3	996 \ P-4	998 \ P-5	1000 \ P-6
Link Length (ft)	95.8	84.1	109.3	10.3
Rise (in)\Material	18.0 \ Concrete (centrif. spun)	24.0 \ Concrete (centrif. spun)	24.0 \ Concrete (centrif. spun)	24.0 \ Concrete (centrif. spun)
Flow (cfs)	7.69	7.60	8.69	9.24
Slope (ft/ft)	0.006	0.010	0.030	0.059
ID\Label	991 \ D5	993 \ D4	995 \ D3	997 \ D2	999 \ D1
Ground (ft)	1001.34	1003.60	1002.80	1002.28	1002.00
Invert (ft)	997.24	996.66	995.83	995.00	994.95
Station (ft)	0.0	95.8	180.0	289.3	299.5

Profile Report

Profile: Profile - D5-G1

Profile - D5-G1 - Base

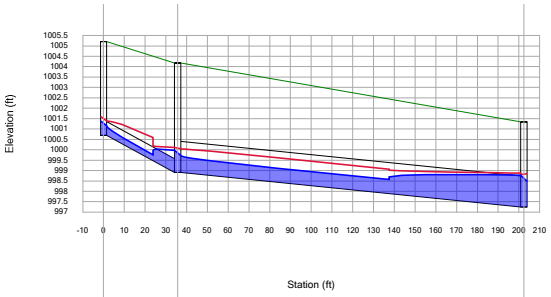


ID\Label	1002 \ P-7	
Link Length (ft)	136.4	
Rise (in)\Material	18.0 \ Concrete (centrif. spun)	
Flow (cfs)	2.29	
Slope (ft/ft)	0.003	
ID\Label	1001 \ G1	991 \ D5
Ground (ft)	1000.70	1001.34
Invert (ft)	997.65	997.24
Station (ft)	0.0	136.4

Profile Report

Profile: Profile - D5-H1

Profile - D5-H1 - Base

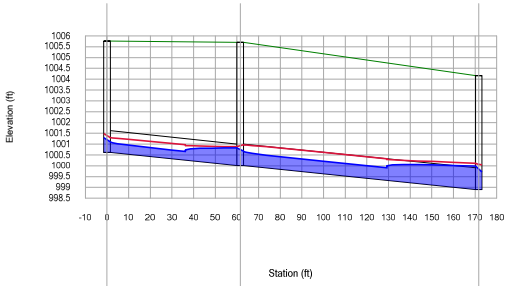


ID\Label	990 \ P-1	992 \ P-2	
Link Length (ft)	35.7	166.7	
Rise (in)\Material	8.0 \ PVC	18.0 \ Concrete (centrif. spun)	
Flow (cfs)	1.00	4.43	
Slope (ft/ft)	0.050	0.010	
ID\Label	988 \ H1	989 \ D6	991 \ D5
Ground (ft)	1005.21	1004.17	1001.34
Invert (ft)	1000.69	998.91	997.24
Station (ft)	0.0	35.7	202.4

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	Stage	Warning Stage	Surface Area	Total Inflow	Total Outflow	Total Vol In	Total Vol Out
			hrs	ft	ft	ft2	cfs	cfs	af	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	Stage	Warning Stage	Surface Area	Total Inflow	Total Outflow	Total Vol In	Total Vol Out
			hrs	ft	ft	ft2	cfs	cfs	af	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	Stage	Warning Stage	Surface Area	Total Inflow	Total Outflow	Total Vol In	Total Vol Out
			hrs	ft	ft	ft2	cfs	cfs	af	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, 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	4.98 (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)

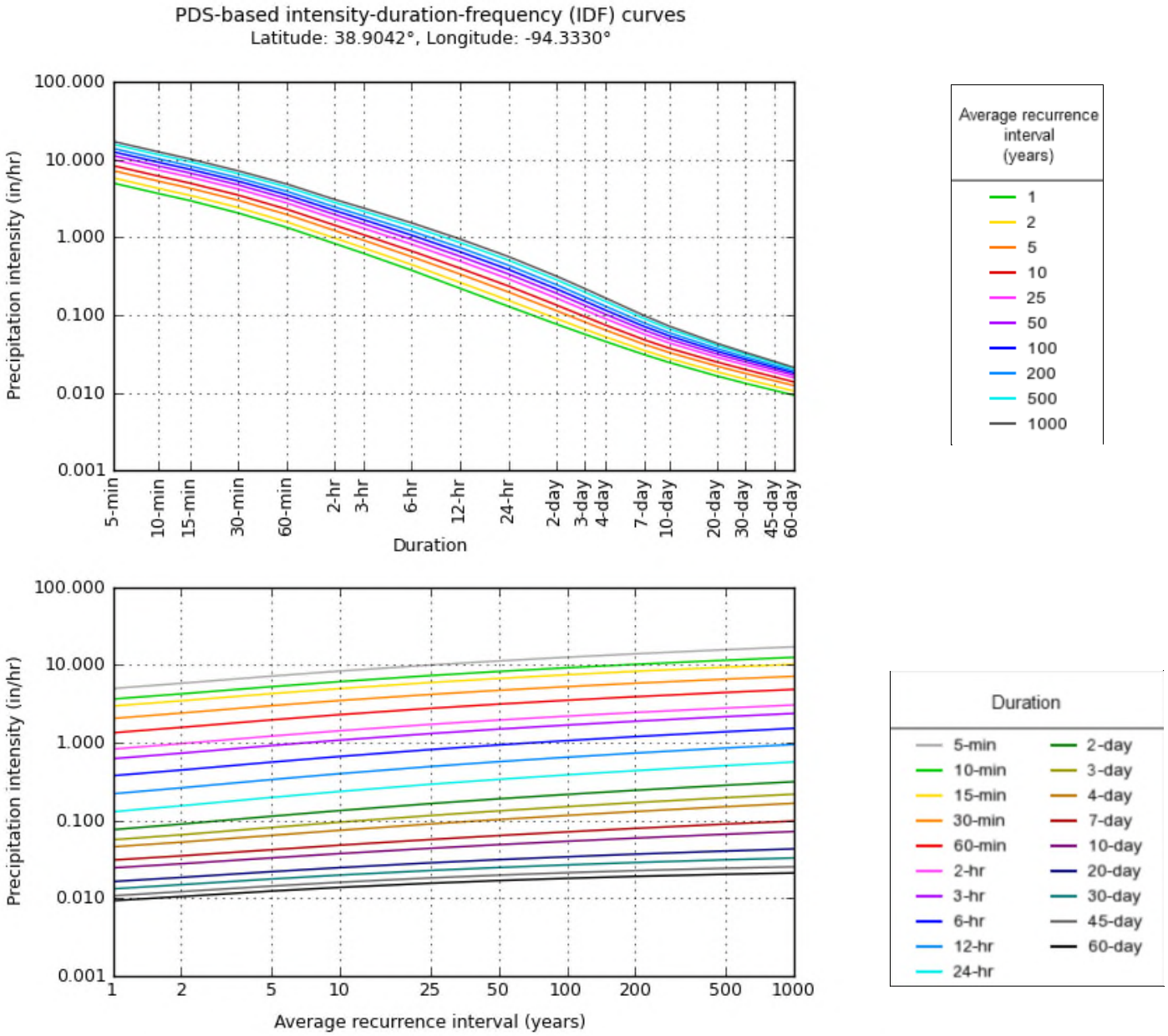
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

Back to Top

PF graphical



NOAA Atlas 14, Volume 8, Version 2

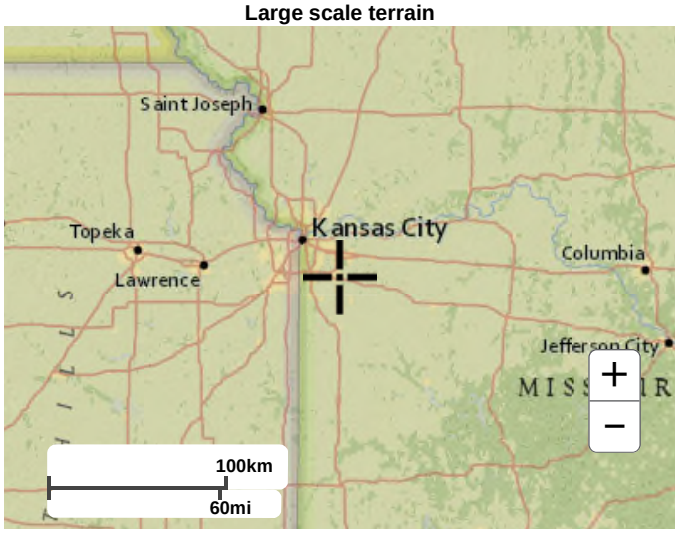
Created (GMT): Fri Jan 5 18:53:46 2018

Back to Top

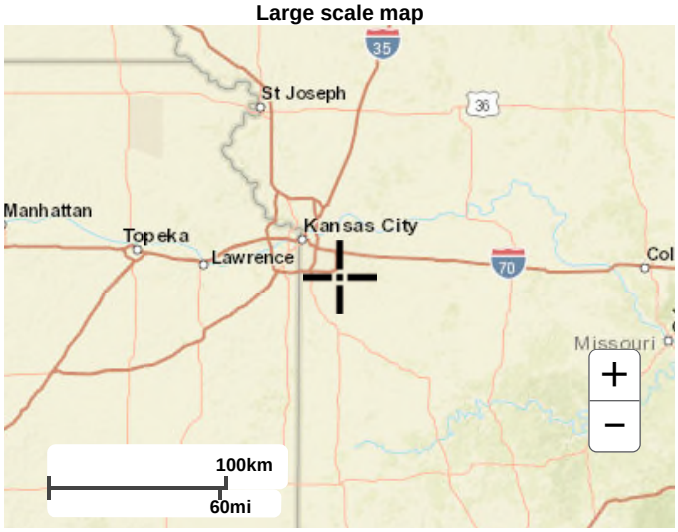
Maps & aerials

Small scale terrain

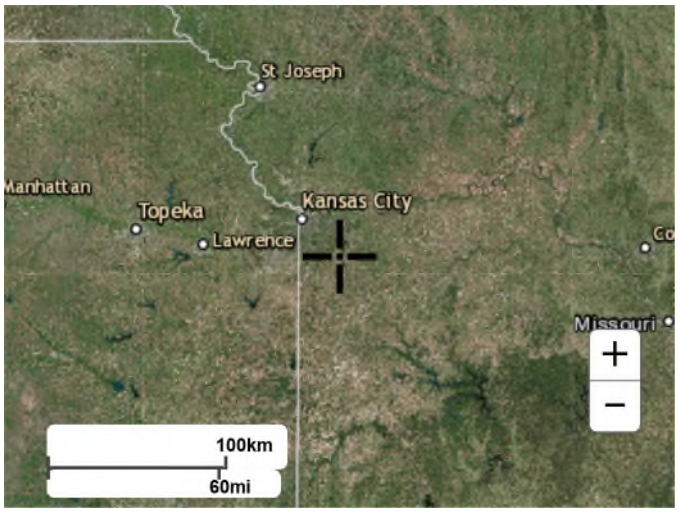
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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