

# **PRELIMINARY STORM WATER MANAGEMENT STUDY**

## **MCPL – LEE’S SUMMIT BRANCH REMODEL**

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### **150 NORTHWEST OLDHAM PARKWAY LEE’S SUMMIT, MISSOURI**

**PREPARED FOR  
MID-CONTINENT PUBLIC LIBRARY**

**PREPARED BY  
OLSSON, INC.  
OVERLAND PARK, KANSAS**



**JANUARY, 2021**

**OLSSON PROJECT NO. B18-0330.182**

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# MCPL – Lee’s Summit Branch Remodel

## Preliminary Stormwater Management Study

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# **MCPL – Lee’s Summit Branch Remodel**

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## **Preliminary Stormwater Management Study**

### **TABLES**

Table 1 – Post-Development Curve Number Analysis

Table 2 – Proposed Peak Flows

### **APPENDICES**

Appendix A: Maps

Appendix B: FEMA Flood Classification Firms

Appendix C: Soil Map



# **MCPL – Lee’s Summit Branch Remodel**

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## **Preliminary Stormwater Management Study**

### **GENERAL INFORMATION**

This Stormwater Management Study is being submitted on behalf of the Mid-Continent Public Library (MCPL) for the proposed remodel and expansion of the existing Lee’s Summit Branch Library facility located at 150 Northwest Oldham Road in Lee’s Summit, Missouri.

#### **Project Location and Description**

The site is located on a platted lot of land recorded as Mid-Continent Add Tract A in the Northeast ¼ of Section 1, Township 47 North, Range 32 West, in Jackson County, Lee’s Summit, Missouri. Currently, the site is 1.6 acres, however, MCPL is exchanging property (approximately 0.1 acres) with the adjacent owner of the Summit Shopping to accommodate their branch expansion plans. The legal description for the adjacent property is Summit Shopping Center Lot 1 (See Exhibit 1 – Appendix A).

The Summit Shopping Center borders the library property on the north and east. Oldham Road (MoDOT Right of-Way) is to the east of the property. Residential properties border on the south. The proposed remodel plans anticipate the construction of a 6,100 sf building addition to the existing 16,500 sf. library facility. The improvements will also consist of the reconstruction of the existing parking lot, addition of a drive through service window and service area, and utility upgrades. To expand parking for the library site an agreement has been made with the owners of the Summit Shopping to construct new parking on their property.

The entirety of the existing and acquired sites are located outside of the 100-Year FEMA Floodplain (See Appendix B).

#### **Study Purpose**

The purpose of this study is to provide a Stormwater Management Plan for the proposed development in accordance with the American Public Works Association (APWA) *Standard Specifications and Design Criteria* Section 5600 “Storm Drainage Systems and Facilities”,



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## **Preliminary Stormwater Management Study**

APWA Manual of Best Management Practices (BMP) for Stormwater Quality, and applicable City of Lee’s Summit, Missouri guidelines.

### **Soils Descriptions**

Soil classifications were obtained from the Natural Resource Conservation Service’s website by utilizing the Web Soil Survey feature. The site soil composition and classification are listed below:

10181 – Udarents-Urban Land-Sampsel Complex, 5 to 9 percent slopes – HSG Type C.

\*HSG – Hydrologic Soils Group

See Soils Map in Appendix C.

## **METHODOLOGY**

### **General Criteria and References**

Analytical and design criteria conform to those of Division V - *Section 5600 – “Storm Drainage Systems and Facilities”* of the Kansas City Metropolitan Chapter of the American Public Works Association’s *“Standard Specifications and Design Criteria”*. Based on these criteria’s, Post-development discharge rates for the 1, 10, and 100-year storm events will be limited to provisions in section 5608.4-C1 *Performance Criteria – “Comprehensive Control”*. Post-development discharge rates are limited to 0.5 cfs per acre for 2-Year, 2.0 cfs per acre for 10-year, and 3.0 cfs per acre for 100-year storm events. Pre and post-development flows from the site are shown below and were calculated using HEC-HMS for the 1, 10 and 100-year storm events. Existing and proposed hydrographs were calculated using the 24-hour SCS Type II rainfall distribution. Existing times of concentration were determined using Inlet Time and Travel Time equations found in Section 5602.7 of APWA Section 5600. A minimum inlet time of five minutes was utilized when calculating the times that were under five minutes. This method was also applied during the calculation of the proposed times of concentration.



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## **Preliminary Stormwater Management Study**

### **HYDROLOGIC/HYDRAULIC ANALYSES**

#### **Existing Conditions Analysis**

The existing site is currently functioning as a branch for MCPL. The Summit Shopping Center borders the library property on the north and east. Oldham Road (MoDOT Right of-Way) is to the east of the property. Residential properties border on the south. An agreement has been arranged with Summit Shopping Center to exchange property on the northern edge of the library property. The library will gain a portion of the shopping center property to enable the library to construct its expansion. The shopping center will gain ownership of the entrance. An access entrance will be granted to Library to maintain access.

Current runoff for the existing library is collected by existing storm infrastructure that drains to a ditch along Oldham Parkway and McClendon Drive on the east side of the property. Roof drains on the west side of the building daylight above ground. The runoff continues to the south and then turns to the east to an existing flume in the parking area. Approximately 4 acres to the north and west of the library drains from the existing shopping center parking across the northern edge of the library property. Almost the entirety of the studied area drains by pipe or ditch to a storm structure at the southeast corner of the site to an area inlet shown as Outfall "A" on the existing conditions exhibit. A turfed area on the south of the site drains to the backyards of the residences to the south. Approximately 0.02 acres drain directly to McClendon Drive.

Exhibit 1 in Appendix A shows the existing conditions for the site.

#### **Proposed Conditions Analysis**

A new 6,100 sf addition will be constructed on the north side of the existing library. The parking area will be rearranged to maximize parking for the larger building. Additional parking will also be constructed to the northeast of the proposed building on the shopping center property. This will serve as parking for both library and shopping center patrons.



## MCPL – Lee’s Summit Branch Remodel

### Preliminary Stormwater Management Study

City staff has noted that there has been flooding issues in the areas south of the site. In order to prevent an increase in runoff, asphaltic pavement will be removed south and west of the building to offset the increase in impervious areas for the building and new parking. Impervious area on the library site will decrease by approximately 3100 sf on the library site. Impervious area will decrease by approximately 100 sf on the shopping center site. Exhibit 2 in Appendix A shows proposed site plan.

The Stormwater Management Plan noted as Exhibit 3 in Appendix A shows the proposed improvements. The site drainage patterns will remain the same as existing. Site drainage will be improved with the addition of more efficiently placed drainage structures and enclosed storm sewer system. The decrease in impervious area will decrease runoff from the site. The system continues to drain to Outfall “A”. The structure at Outfall “A” will be reconstructed as a portion of the site improvements.

**Table 1: Post-Development Curve Number Analysis**

Sub-Area	Area (AC)	Soil Group	Curve Number
Pavement, Buildings, Impervious	1.7	C	98
Turf (Good)	0.9	C	84

A peak flow analysis of the post-development site was conducted using HEC-HMS, the composite curve number, and rainfall and distribution information acquired from APWA section 5600. Post-development peak flows to the outfall are summarized in the Table 2. Exhibit 4 in Appendix A shows the drainage calculations for the proposed site.

**Table 2: Proposed Peak Flows**

Sub-Area / Outfall	Tributary Area (acres)	Q (1-Year Storm) (cfs)	Q (10-Year Storm) (cfs)	Q (100-Year Storm) (cfs)
Outfall A	2.6	8.2	16.2	23.1



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## **Preliminary Stormwater Management Study**

Existing offsite drainage patterns on the south side of the property and at the entrance will remain the same as pre construction.

### **Stormwater Detention Requirements**

As stated previously, impervious areas will decrease on the site. Therefore, detention will not be required. The decrease in impervious area is below the 5000 sf increase threshold, and therefore exempt from the requirements Section 5601.3.

### **STORMWATER TREATMENT REQUIREMENTS**

The decrease in impervious area is below the 5000 sf increase threshold, and therefore exempt from the requirements Section 5601.3

### **CLEAN WATER ACT SECTION 404 PERMITTING REQUIREMENTS**

No jurisdictional Waters of the United States have been identified on the study site. Therefore, a Section 404 permit is not required.

### **FEMA/DWR PERMIT REQUIREMENTS**

No FEMA permitting or submittals will be required on this site because there are no FEMA delineated floodplains on the site. A copy of the FIRM map for this area has been included in Appendix B.

### **CONCLUSIONS AND RECOMMENDATIONS**

As outlined in the preceding report, removal of existing pavement south and west of the library building will result in a net decrease in impervious areas on the site. Therefore, runoff rates in the post-development condition will decrease, protecting downstream properties. Based on these facts and other information provided herein, we request approval of this stormwater study.



## ***Appendix A***

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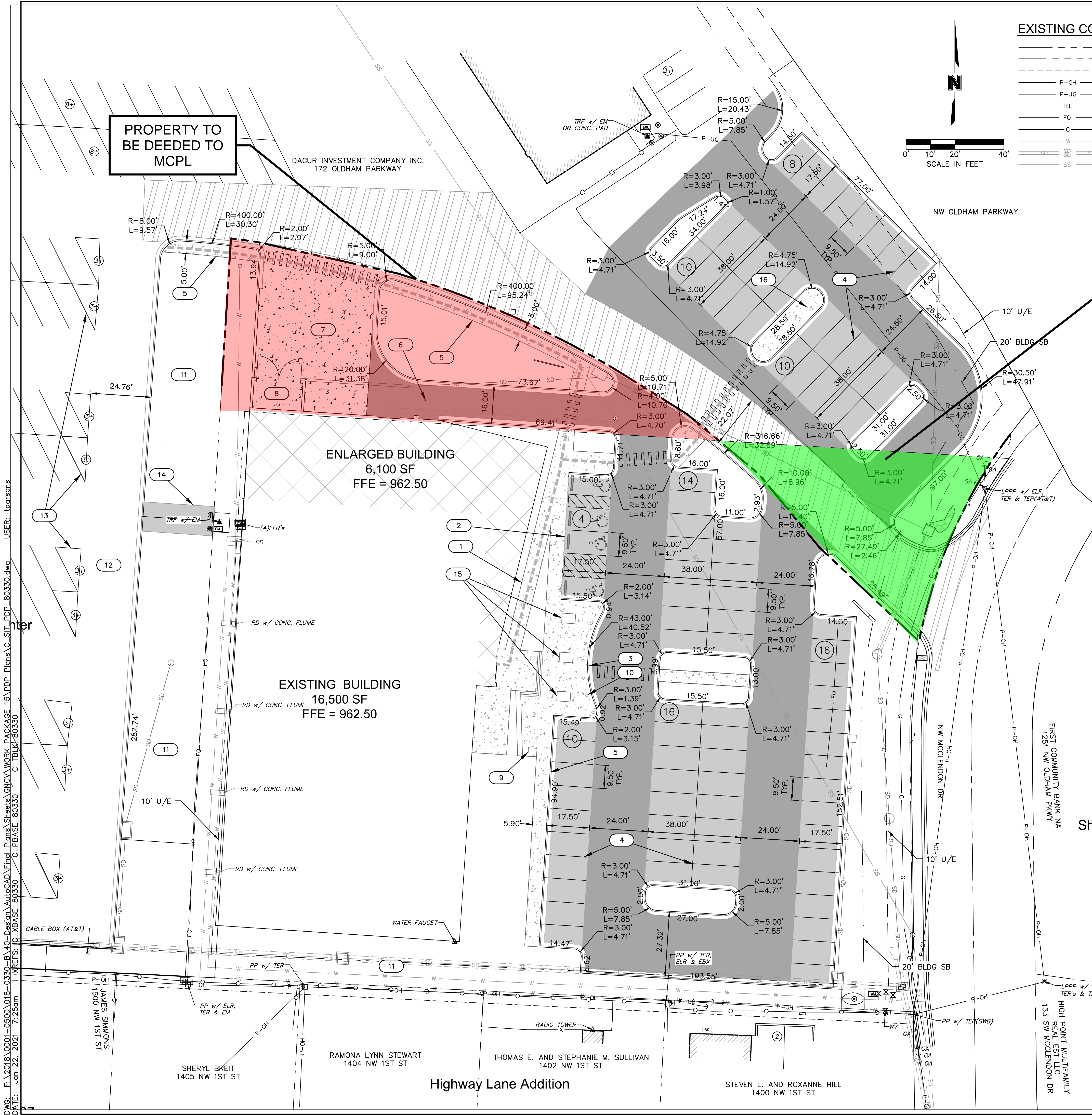
### ***Map Exhibits***



A subdivision lying in the Southeast Quarter of Section 1, Township 47 North,  
Range 32 West, in the City of Lee's Summit, Jackson County, Missouri







EXISTING CONDITIONS LEGEND

- PROPERTY LINES
- RIGHT-OF-WAY LINES
- EASEMENT LINES
- P-OH OVERHEAD ELECTRIC
- P-UG UNDERGROUND ELECTRIC
- TEL UNDERGROUND TELEPHONE
- FO UNDERGROUND FIBER OPTIC
- G GAS LINE
- W WATER LINE
- SD STORM SEWER LINE
- SS SANITARY SEWER LINE

PROPOSED CONDITIONS LEGEND

- E PROPOSED UNDERGROUND ELECTRIC
- FO PROPOSED FIBER OPTIC
- W PROPOSED WATER LINE
- FP PROPOSED FIRE PROTECTION LINE
- SD PROPOSED STORM SEWER LINE
- T PROPOSED TURF DRAIN LINE
- SS PROPOSED SANITARY SEWER SERVICE
- CONCRETE CURB & GUTTER
- PROPOSED CONCRETE PAVEMENT
- PROPOSED HEAVY DUTY ASPHALT PAVEMENT
- PROPOSED LIGHT DUTY ASPHALT PAVEMENT
- PROPOSED MILL & OVERLAY ASPHALT PAVEMENT
- ADA PATH - SIDEWALKS NOT DELINEATED AS ADA PATHS MAY NOT BE ADA COMPLIANT.
- ACCESSIBLE RAMP
- PARKING COUNT

PROPERTY TO BE DEEDED TO SHOPPING CENTER WITH ACCESS ESMT FOR MCPL

- NOTE
- DIMENSIONS ARE TO BACK OF CURB
  - EDGE PARKING STALLS ARE 9.5'X17'
  - CENTRAL PARKING STALLS ARE 9.5'X19'

KEYNOTES:

- CONSTRUCT ADA ACCESSIBLE RAMP
- ADA PARKING STALL LAYOUT
- PROPOSED DROP OFF ZONE
- INSTALL PAVEMENT STRIPING - TYPICAL
- INSTALL CONCRETE SIDEWALK
- PROPOSED DRIVE THRU WINDOW AND LANE
- SERVICE AREA
- TRASH ENCLOSURE
- PROPOSED BOOK DROP-OFF
- PROPOSED BOLLARD (TYPICAL)
- ADDITIONAL GREEN SPACE
- RELOCATED DRIVE LANE
- REVISED STRIPING IN EXISTING LOT
- 10' ACCESS ASPHALT LANE FOR TRANSFORMER
- PROPOSED PLANTERS
- PROPOSED CONCRETE ISLAND

SITE DATA						
	PRE CONSTRUCTION			POST CONSTRUCTION		
	TOTAL	LIB	SC	TOTAL	LIB	SC
SITE AREA (AC) - ZONING CP-2						
DISTURBED AREA:	2.6	1.6	0.9	2.6	1.7	0.9
IMPERVIOUS:	1.8	1.2	0.5	1.7	1.2	0.5
PERVIOUS:	0.8	0.4	0.4	0.9	0.5	0.4
% IMPERVIOUS:	69%	76%	58%	66%	72%	56%
% PERVIOUS	31%	24%	42%	34%	28%	44%
BUILDING AREA (SF)						
BUILDING AREA	16500	16500	0	22600	22600	0
FAR (0.55 MAX):	23%			31%		
PARKING						
PARKING SPACES	83	53	30*	96	68**	28
ADA	3	3	0	4	4***	0
NOTES: (LIB - LIBRARY PROPERTY, SC - SHOPPING CENTER PROPERTY)						
* 30 SPACES REMOVED WEST OF EXISTING LIBRARY, 28 SPACES WILL BE						
** 3 PER 1000 SF = 66						
** 3 ADA SPACES ARE REQUIRED PER CITY TABLE						

# SAPP DESIGN ARCHITECTS

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### SPECIAL NOTICES

In the event the client consents to allow, authorize or approve of changes to any plans, specifications or other construction documents, and these changes are not approved in writing by the design professional, the client recognizes that such changes and the results thereof are not the responsibility of the design professional. Therefore, the client agrees to release the design professional from any liability arising from the construction, use or result of such changes. In addition, the client agrees to the fullest extent permitted by law, to indemnify and hold the design professional harmless from any damage, liability or cost (including reasonable attorney's fees and costs of defense) arising from such changes.

The personal seal of the registered Architect or Engineer shall be the legal equivalent of his signature wherever & whenever used, and the owner of the seal shall authenticate this sheet and the specification sections pertaining to this sheet. Responsibility shall be disclaimed for all other plans, specifications, estimates, reports or other documents or instruments relating to or intended to be used for any part or parts of the architectural project.

Mid-Continent Public Library  
PRELIMINARY DEVELOPMENT PLAN  
**LEE'S SUMMIT LIBRARY**  
150 NW Oldham Parkway  
LEE'S SUMMIT, MO 64081  
JACKSON COUNTY

Engineer of Record  
Terry M Parsons, Engineer MO PE-2018010505

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Revision No.	Description	Date

Project No.	Date	Drawn
B18-0330	10.12.2020	HMO

Drawing No. **C2.0**

**SITE & DIMENSION PLAN**  
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EXISTING CONDITIONS LEGEND

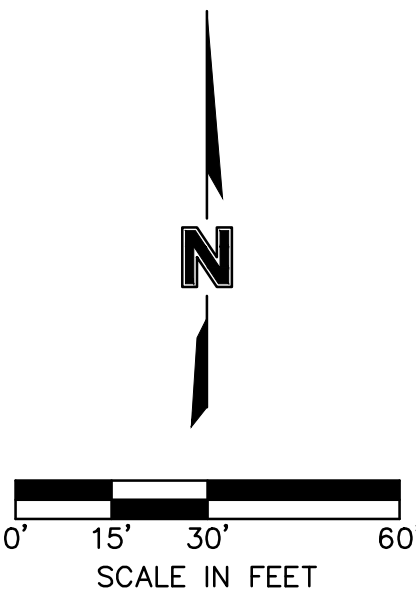
---	PROPERTY LINES
---	RIGHT-OF-WAY LINES
---	EASEMENT LINES
P-OH	OVERHEAD ELECTRIC
P-UG	UNDERGROUND ELECTRIC
TEL	UNDERGROUND TELEPHONE
FO	UNDERGROUND FIBER OPTIC
G	GAS LINE
W	WATER LINE
SD	STORM SEWER LINE
SS	SANITARY SEWER LINE

PROPOSED CONDITIONS LEGEND

E	PROPOSED UNDERGROUND ELECTRIC
FO	PROPOSED FIBER OPTIC
W	PROPOSED WATER LINE
FP	PROPOSED FIRE PROTECTION LINE
SD	PROPOSED STORM SEWER LINE
T	PROPOSED TURF DRAIN LINE
SS	PROPOSED SANITARY SEWER SERVICE
---	PROPOSED AGGREGATE PATH

SITE DATA

	PRE CONSTRUCTION			POST CONSTRUCTION		
	TOTAL	LIB	SC	TOTAL	LIB	SC
SITE AREA (ZONING CP-2)						
DISTURBED AREA:	111405	70306	41099	111405	71941	39464
IMPERVIOUS:	76988	53346	23642	73758	51854	21904
PERVIOUS:	34417	16960	17457	37647	20087	17560
% IMPERVIOUS:	69%	76%	58%	66%	72%	56%
% PERVIOUS	31%	24%	42%	34%	28%	44%



NOTE:  
GENERAL STRUCTURE DESCRIPTIONS AND CALCULATIONS ARE PROVIDED ON SHEET C5.1  
DRAINAGE AREAS OUTSIDE OF THE SURVEY AREA WERE DEFINED BY GOOGLE EARTH SURFACE

EXHIBIT 3  
PROPOSED  
STORMWATER  
MANAGEMENT PLAN

5.90 AC TO  
OUTFALL "A"  
Cum "C" = 0.72

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The personal seal of the registered Architect or Engineer shall be the legal equivalent of his signature whenever & wherever used, and the owner of the seal shall authenticate this sheet and the specification sections pertaining to this sheet. Responsibility shall be disclaimed for all other plans, specifications, estimates, reports or other documents or instruments relating to or intended to be used for any part or parts of the architectural project.

Mid-Continent Public Library  
PRELIMINARY DEVELOPMENT PLAN  
LEE'S SUMMIT LIBRARY  
150 NW Oldham Parkway  
LEE'S SUMMIT, MO 64081  
JACKSON COUNTY

PACKAGE  
15

Engineer of Record

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Revision No. Description Date

Project No. B18-0330 Date 10.12.2020 Drawn HMO

Drawing No.

C5.0

STORM SEWER PLAN

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DESIGN CONDITIONS: 100 YEAR STORM EVENT										PIPE DESIGN							
STRUCTURES		RUNOFF CALCULATIONS															
FROM	TO	DIRECT AREA (ACRES)	TOTAL AREA (ACRES)	C	KC (K=1.25)	Tc (MIN)	FLOW TIME (MIN)	INTENSITY (IN/HR)	DESIGN Q (CFS)	DESCRIPTION	PIPE LENGTH (L.F.)	PIPE SLOPE (%)	PIPE DIA (IN)	Q FULL (CFS)	PIPE AREA (SQ.FT.)	V FULL (F/S)	DESIGN V (F/S)
A5		0.30		0.90	1.00	5.0	-	10.32	3.10	EXISTING STRUCTURE							
	A4		1.36	0.75	0.94	5.0	-	10.32	13.16	30 in. HDPE	81.00	4.00	30	82.26	4.91	16.76	12.26
A4		0.43		0.89	1.11	5.0	-	10.32	4.94	6X4 CURB INLET OF EX. PIPE							
	A3		1.79	0.78	0.98	5.0	-	10.32	18.01	30 in. HDPE	92.00	4.00	30	82.26	4.91	16.76	13.40
A3		0.04		0.30	0.38	5.0	-	10.32	0.15	4X4 AREA INLET OF EX. PIPE							
	A2		2.21	0.75	0.94	5.0	-	10.32	21.38	30 in. HDPE	202.00	4.00	30	82.26	4.91	16.76	14.06
A2		0.45		0.70	0.88	5.0	-	10.32	4.06	6X4 CURB INLET OF EX. PIPE							
	A1		5.65	0.70	0.88	5.0	-	10.32	51.02	30 in. HDPE	27.00	4.00	30	82.26	4.91	16.76	17.62
A1		0.12		0.30	0.38	5.0	-	10.32	0.46	RECONS EX. AREA INLET							
	A0		5.77	0.67	0.84	5.0	-	10.32	49.87	36 in. HDPE	118.00	1.60	36	84.59	7.07	11.97	12.43
B4		0.30		0.72	0.90	5.0	-	10.32	2.79	6x4 CURB INLET							
	B3		0.30	0.72	0.90	5.0	-	10.32	2.79	15 in. HDPE	110.00	1.00	15	6.48	1.23	5.28	5.07
B3		0.81		0.40	0.50	5.0	-	10.32	4.18	RECONS EX. AREA INLET							
	B3		1.11	0.42	0.53	5.0	-	10.32	6.01	24 in. HDPE	55.00	1.50	24	27.78	3.14	8.84	7.05
B2		0.00		0.30	0.38	5.0	-	10.32	0.00	JUNCTION BOX							
	B1		2.85	0.67	0.84	5.0	-	10.32	24.63	30 in. HDPE	67.00	2.40	30	63.71	4.91	12.98	12.13
B1		0.14		0.42	0.53	5.0	-	10.32	0.76	CURB INLET							
	A1		2.99	0.67	0.84	5.0	-	10.32	25.84	36 in. HDPE	69.00	2.40	36	103.61	7.07	14.66	12.16
C1		0.38		0.68	0.85	5.0	-	10.32	3.33	6x4 CURB INLET							
	A2		0.38	0.68	0.85	5.0	-	10.32	3.33	15 in. HDPE	98.00	1.00	15	6.48	1.23	5.28	5.31
D2		0.63		0.58	0.73	5.0	-	10.32	4.71	4x4 AREA INLET							
	D2		0.63	0.58	0.73	5.0	-	10.32	4.71	15 in. HDPE	71.00	1.00	15	6.48	1.23	5.28	5.75
D1		0.43		0.89	1.00	5.0	-	10.32	4.44	6x4 CURB INLET							
	A4		1.06	0.71	0.89	5.0	-	10.32	9.71	18 in. HDPE	47.00	1.00	18	10.53	1.77	5.96	6.75
E2		0.19		0.52	0.65	5.0	-	10.32	1.27	TRENCH DRAIN							
	E1		0.19	0.33	0.41	5.0	-	10.32	0.81	15 in. HDPE	79.00	1.50	15	7.93	1.23	6.46	4.16
E1		1.55		0.87	1.00	5.0	-	10.32	16.00	6x4 CURB INLET							
	B2		1.74	0.83	1.00	5.0	-	10.32	17.96	24 in. HDPE	148.00	1.50	24	27.78	3.14	8.84	9.38

# EXHIBIT 4

## STORM SEWER CALCULATIONS



## ***Appendix B***

---

*FEMA Flood Classification Firm*



# National Flood Hazard Layer FIRMette



94°24'23"W 38°55'10"N



## Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
MAP PANELS		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **12/7/2020 at 2:52 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

USGS The National Map: Orthoimagery. Data refreshed October, 2020.

94°23'45"W 38°54'42"N

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



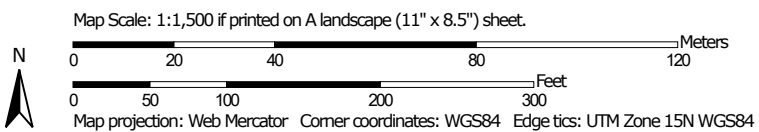
## ***Appendix C***

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### *Soil Map*



Soil Map—Jackson County, Missouri  
(MCPL Lees Summit Branch)



Natural Resources  
Conservation Service


Web Soil Survey  
National Cooperative Soil Survey

12/7/2020  
Page 1 of 3



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Jackson County, Missouri

Survey Area Data: Version 22, May 29, 2020

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

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

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



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10181	Udarents-Urban land-Sampsel complex, 5 to 9 percent slopes	8.6	100.0%
<b>Totals for Area of Interest</b>		<b>8.6</b>	<b>100.0%</b>