

DRAINAGE STATEMENT
MO' BETTAHS

**520 NW CHIPMAN RD.,
LEE SUMMIT, MO 64086**

Prepared for:
Savory Development Fund, LLC
1557 W. Innovation Way,
Lehi Utah 84043

Prepared by:
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Bowman Project No. 070460-01-001

1.0 INTRODUCTION

The purpose of the Drainage Statement is to identify drainage impacts resulting from land development activities and determine the improvements necessary to control the increase in storm water runoff and to treat the pollutants that can adversely impact water quality.

The proposed 0.88-acre subject site is located at 520 NW Chipman Rd. within the City of Lee's Summit, Missouri city limits. The overall lot is described as Lot 4C-2, Summit Orchard, Lot 4C-1, 4C-2 and 4C-3, corrected Summit Orchard, Lot 4A-4E, a subdivision in the City of Lee's Summit, Jackson County, Missouri, according to the recorded plat thereof. West and east of the subject site is a proposed restaurant and coffee shop with drive thru respectively, north is a commercial strip center and south is NW Chipman Rd.

The subject site is undeveloped. The purpose of this report is the following:

- Establish onsite drainage criteria for the development.
- Show compliance with the City of Lee's Summit Design Standards.

2.0 SITE DESCRIPTION

2.1 Drainage Basin

The site is currently undeveloped. Onsite storm water runoff will flow towards the master planned storm system. The site currently contains no visible retention basins. The drainage map for this site is in Appendix A. Existing elevations vary from 1006'-1008'. The site slopes from northwest corner to the southeast onto the master plan system.

2.2 Floodplain Status

According to FEMA FIRM Map 29095C0417G with effective date of January 20, 2017, the site lies in Zone X which is considered as an area of minimal flood hazard, known as areas outside the Special Flood Hazard Areas and higher than the elevation of the 0.2-percent-annual-chance flood.

3.0 DESIGN

3.1 Pre vs Post Development Comparison

The pre-development vs post-development drainage area maps were analyzed to determine the peak flows. The pre-developed runoff coefficient for the proposed site is 0.38 and a post-developed runoff coefficient for the proposed site is 0.70.

Using the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) Precipitation Frequency Data Server (PFDS), the precipitation for a 100-year recurrence is 4.21 inches/hour for a time of concentration of 5 minutes.

Hydrology calculations were performed using City of Lee's Summit "Rational Method". Flows from the watersheds were computed for a 5-year storm occurrence, 10-year storm occurrence, 25-year storm occurrence, 50-year storm occurrence and a 100-year occurrence for both the existing and proposed site conditions. The hydrology calculations are included in the appendix.

3.0 CONCLUSION

The Mo' Bettahs restaurant development has been designed in accordance with the City of Lee's Summit Drainage criteria. All drainage is designed to be carried through the proposed underground system which eventually connects to the proposed master plan system that accounts for the increase in flow for this proposed development.

APPENDIX A

FIGURES

520 NW Chipman Rd.

Lee Summit, MO

Legend

520 NW Chipman Rd

PROPOSED SITE

Google Earth

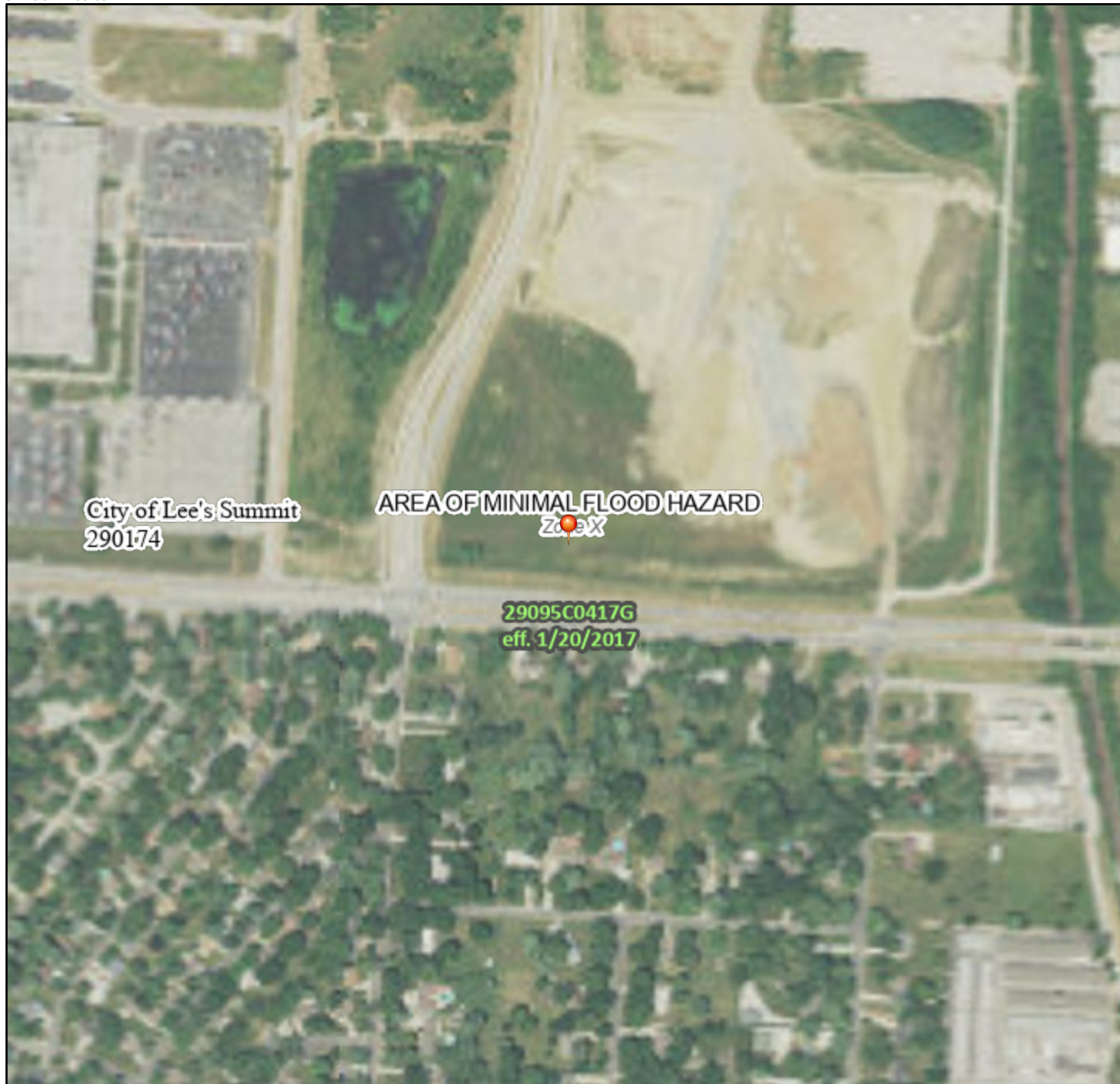


500 ft

National Flood Hazard Layer FIRMMette



94°23'51"W 38°55'47"N



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

1:6,000

94°23'14"W 38°55'19"N

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

Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

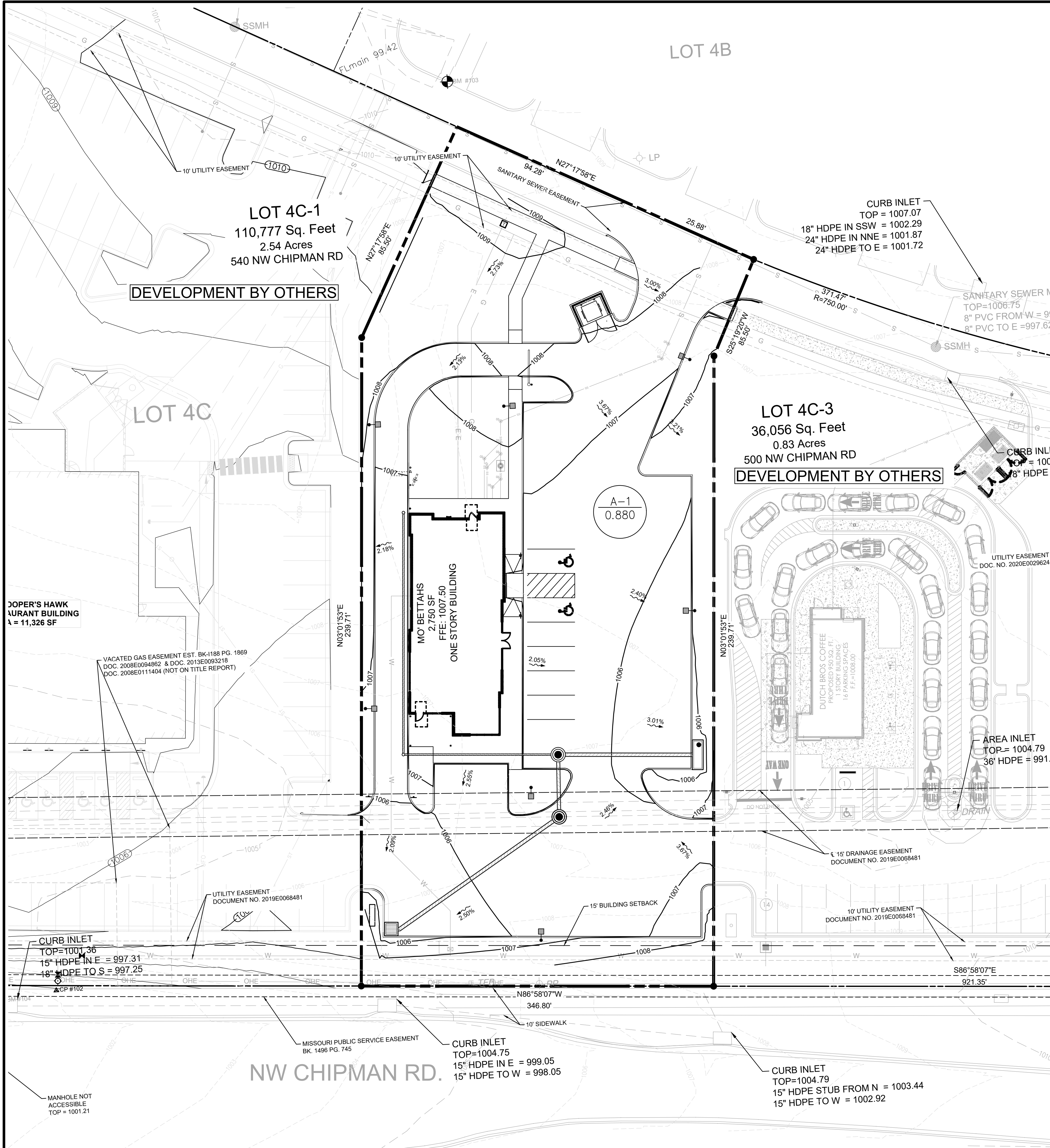


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

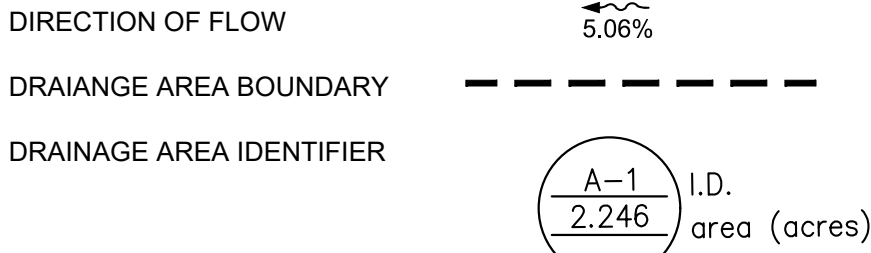
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/26/2021 at 12:21 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by 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.

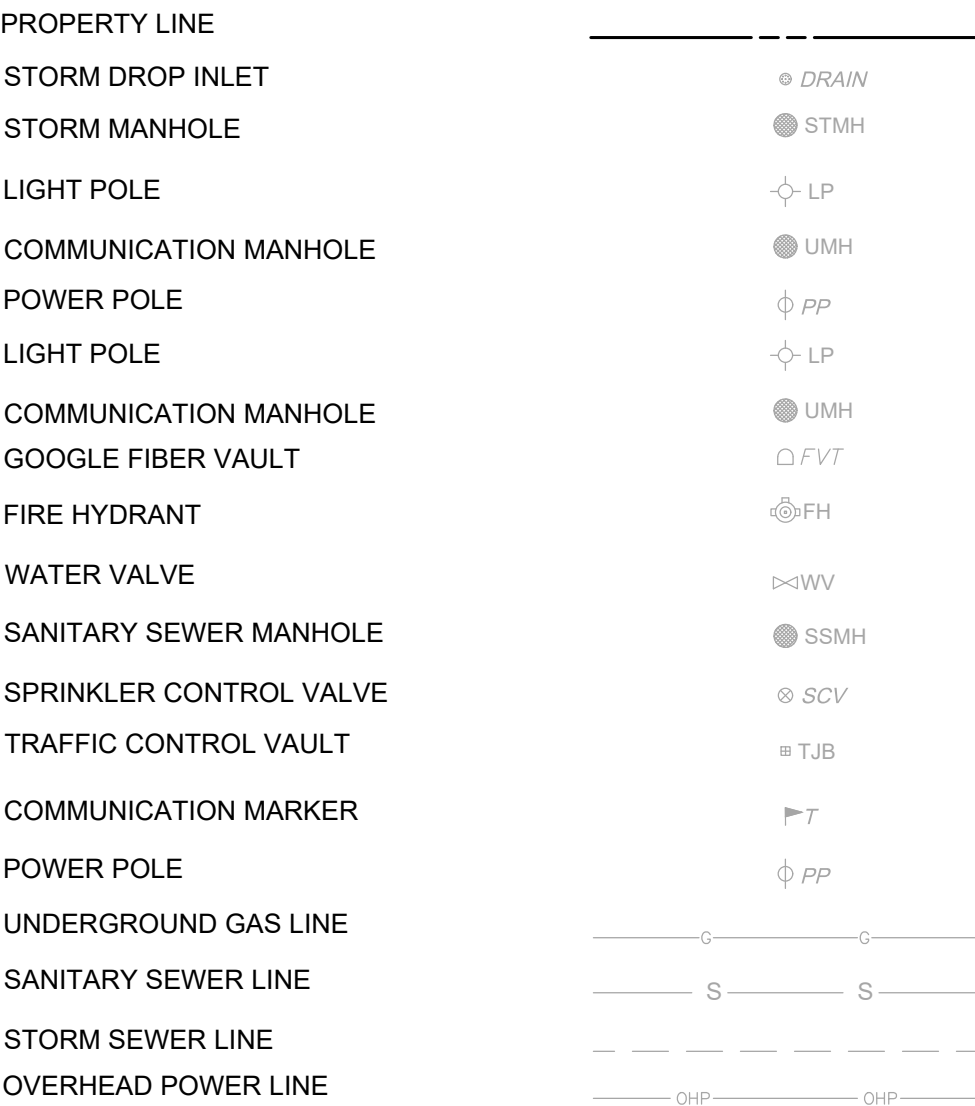


BENCHMARKS		
No. 103	CONTROL/ TBM (1005943.8164, 2822115.1076)	ELEV: 1010.04'
No. 104	CONTROL/ TBM (1005935.3569, 2821932.3569)	ELEV: 1000.36'

DRAINAGE LEGEND



EXISTING LEGEND



PROPOSED IMPERVIOUS AREA CALCULATIONS

PROPOSED IMPERVIOUS AREA	= 0.588 AC (66.94%)
PROPOSED OPEN SPACE AREA	= 0.290 AC (33.06%)
NET OPEN SPACE DECREASE	=0.109 AC

Post-Development Conditions											
Drainage Area	Acres	Time of Concentration (Min)	Runoff Coefficient C	5 Year Intensity (In/Hr)	5 Year Runoff (cfs)	10 Year Intensity (In/Hr)	10 Year Runoff (cfs)	25 Year Intensity (In/Hr)	25 Year Runoff (cfs)	50 Year Intensity (In/Hr)	50 Year Runoff (cfs)
A-1	0.880	5.00	0.70	7.18	4.42	8.34	5.14	9.98	6.15	11.30	6.96

Runoff coefficient per Section 5602.3.C of Design and construction manual
C=0.3 + 0.6 x I
C=0.3 + 0.6 x 0.6694
C=0.70

CALCULATIONS PER CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL

DIFFERENCE IN RUNOFF (EXISTING VS PROPOSED)					
5 Year Runoff (cfs)	10 Year Runoff (cfs)	25 Year Runoff (cfs)	50 Year Runoff (cfs)	100 Year Runoff (cfs)	Net Change
2.02	2.35	2.81	3.18	3.55	Increase



THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY BE OCCASIONED BY THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

Bowman

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REVISIONS		DATE
REVISION	DESCRIPTION	

PROPOSED DRAINAGE AREA MAP

MO' BETTAHS
520 NW CHIPMAN RD
LEE'S SUMMIT, MO 64086



DESIGN	DRAWN	CHKD
BB	BB	KAN
JOB No. 070460-01-001		
SHEET C4.1		

APPENDIX B

PEAK FLOW CALCULATIONS

Pre-Development Conditions													
Drainage Area	Acres	Time of Concentration (Min)	Runoff Coefficient C	5 Year Intensity (In/Hr)	5 Year Runoff (cfs)	10 Year Intensity (In/Hr)	10 Year Runoff (cfs)	25 Year Intensity (In/Hr)	25 Year Runoff (cfs)	50 Year Intensity (In/Hr)	50 Year Runoff (cfs)	100 Year Intensity (In/Hr)	100 Year Runoff (cfs)
A-1	0.880	5.00	0.38	7.18	2.40	8.34	2.79	9.98	3.34	11.30	3.78	12.60	4.21

Runoff coefficient per Section 5602.3.C of Design and construction manual

C=0.3 + 0.6 x I

C=0.3 + 0.6 x 0.1284

C=0.38

CALCULATIONS PER CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL

Post-Development Conditions													
Drainage Area	Acres	Time of Concentration (Min)	Runoff Coefficient C	5 Year Intensity (In/Hr)	5 Year Runoff (cfs)	10 Year Intensity (In/Hr)	10 Year Runoff (cfs)	25 Year Intensity (In/Hr)	25 Year Runoff (cfs)	50 Year Intensity (In/Hr)	50 Year Runoff (cfs)	100 Year Intensity (In/Hr)	100 Year Runoff (cfs)
A-1	0.880	5.00	0.70	7.18	4.42	8.34	5.14	9.98	6.15	11.30	6.96	12.60	7.76

Runoff coefficient per Section 5602.3.C of Design and construction manual

C=0.3 + 0.6 x I

C=0.3 + 0.6 x 0.6694

C=0.70

CALCULATIONS PER CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL

DIFFERENCE IN RUNOFF (EXISTING VS PROPOSED)					
5 Year Runoff (cfs)	10 Year Runoff (cfs)	25 Year Runoff (cfs)	50 Year Runoff (cfs)	100 Year Runoff (cfs)	Net Change
2.02	2.35	2.81	3.18	3.55	Increase