STORM WATER DRAINAGE REPORT

705 SE HIGH STREET

LOT 9A, LOT 11A, LOT 13A

BLOCK 5, LOWES ADDITION

LEE'S SUMMIT, MISSOURI

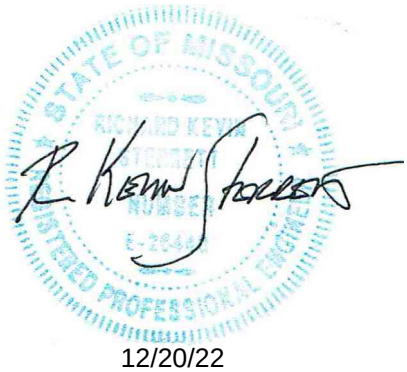
PREPARED FOR

705 HIGH STREET LLC

PREPARED BY

HG CONSULT, INC.

December 20, 2022



12/20/22

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3. Project Overview

The proposed project is a 3 lot, 0.49-acre residential subdivision developed in central part of Lee's Summit, Jackson County, Missouri. This is a subdivision with development on all four sides. The existing storm water flows to this site from the west to the east. Drainage Area E-4 drains North towards High Street. Drainage Areas E-1A, E-2A, and E-3 all drain South/Southeast offsite as shown on the attached Pre-development drainage area maps.

4. Drainage Assessment of the Project Site

After development this site will be diverting storm water from the ridge of each duplex to the North and to the South. The drainage to the North (P-2) will drain directly to High Street and the drainage to the South (P-1A) will drain through a surface swale to a proposed field inlet. This drainage will be piped by a series of HDPE pipes to the public storm sewer system on the North side of 3rd Street.

5. Pre-Development and Post-Development Calculations

Pre-Development Peak Runoff Rate

Sub-Area Name	10-Year (cfs)	100-Year (cfs)
E-1A	0.63	1.11
E-1B	0.29	0.51
POI (E-1A + E-1B)	0.92	1.62
E-2A	0.34	0.60
E-2B	0.34	0.60
E-3	0.39	0.68
E-4	1.07	1.87

Post-Development Peak Runoff Rate

Sub-Area Name	10-Year (cfs)	100-Year (cfs)
P-1A	1.11	1.95
P-1B	0.87	1.53
P-1C	0.34	0.60
POI (E-1A + E-1B + P-1C)	2.32	4.08
P-2	1.31	2.30
P-3	0.19	0.34

"Allowable Release Rates" When Applied to Post-Development On-Site Areas

Sub-Area Name	10-Year (cfs)	100-Year (cfs)
P-1A	*0.46	*0.69
P-1B	0.87	1.53
P-1C	0.34	0.60
POI (E-1A + E-1B + P-1C)	1.67	2.82
P-2	*0.54	*0.81
P-3	0.19	0.34

**Comprehensive values utilizing 2 cfs (10-YR), and 3 cfs (100-YR) per site acre*

As shown in the tables above, the pre-development peak flow at the point of interest is 0.92 cfs (10-year) and 1.62 cfs (100-year). The post-development peak flow rate at the same point of interest, as proposed, is 2.32 cfs (10-year) and 4.08 cfs (100-year). The main reason for the larger peak flows between pre-development and post-development is due to the proposed grading of the site. In the pre-developed scenario, the existing grade doesn't localize the runoff to the point of interest whereas in the post-developed scenario, grading along the back of the property will allow the runoff to channelize to the point of interest (proposed grated inlet).

If Comprehensive Control Strategy were used on this development, the allowable release rates at the point of interest would have been 1.67 cfs (10-year) and 2.82 cfs (100-year), as shown in the tables above.

Curve Numbers are based on APWA, Section 5600. Time of concentration was considered using TR-55; however, due to the small size of the drainage basin and the amount of impervious area on the site that will just be conveying sheet flow, a time of concentration of 5 minutes was assumed. This is the minimum time of concentration per APWA 5600.

6. Temporary Erosion and Sediment Control

During construction, it will be necessary to control erosion and sediment from the site during storms within the construction timeframe. To ensure that sediment does not enter the existing storm system, perimeter containment is controlled by silt fence installation and inlet protection. These erosion control devices, and their maintenance throughout the construction timeframe, are required by ordinance and the details for them are referenced by the City's Design and Construction Manual.

7. Conclusion

The proposed project is a proposed residential subdivision. The report has been prepared to evaluate the storm water discharge. Even though there is an increase in impervious coverage due to the 3 (three) proposed houses, it has been shown that with the addition of the basin inlets on the south side of property, there will be very minimal impact or increase in sheet flow to the downstream areas.

A waiver is requested, to the City of Lee's Summit, MO City Engineer, that no detention shall be required since the amount of additional storm water is negligible and handled through the proposed underground system.

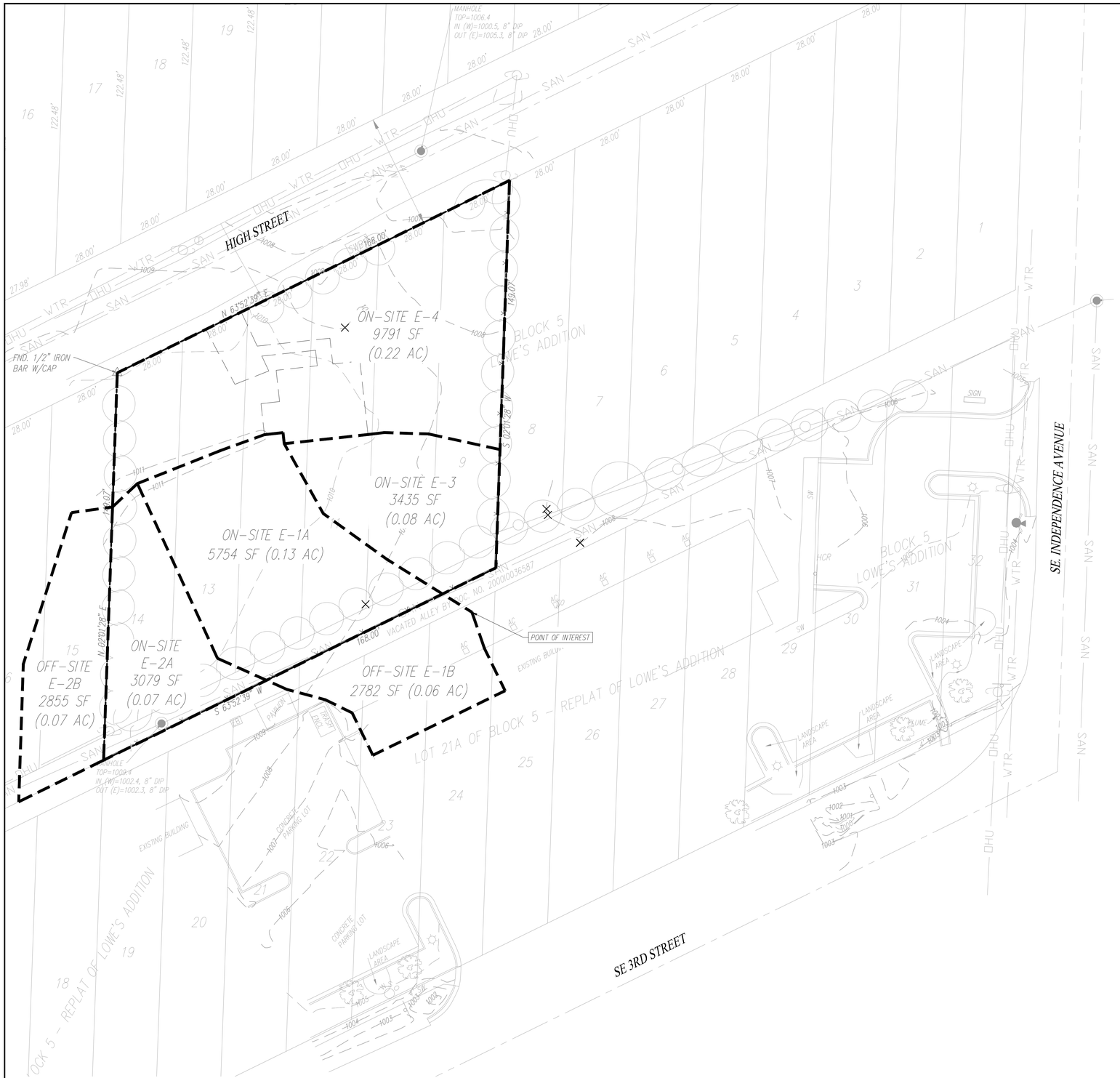
PEAK FLOWS AT POINT OF INTEREST

Rational method of calculating storm water flow:

Q = kCIA C = 0.66

Q_{10} = (1.00) (0.66) (7.35) (0.19) = 0.92 cfs

Q_{100} = (1.25) (0.66) (10.32) (0.19) = 1.62 cfs



KEY

PROPOSED		EXISTING
979	Grades	960
– – –	Drainage Area	

NO.	BY	CK/APP
DATE	REVISION	

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STATE OF MISSOURI
RICHARD KEVIN STERRETT
NUMBER 26440
REGISTERED PROFESSIONAL ENGINEER

R. KEVIN STERRETT MO E-26440

12/20/22

Consult Inc engineers planners

CORPORATE LICENSE No. E2010005873

PRE-DEVELOPMENT DRAINAGE AREA MAP

705 SE HIGH STREET DUPLEXES

LEE'S SUMMIT - JACKSON COUNTY - MISSOURI

X-REF NO.
211188

DRAWING NO.
21085

DATE
OCTOBER 7, 2021

JOB NO.
21085

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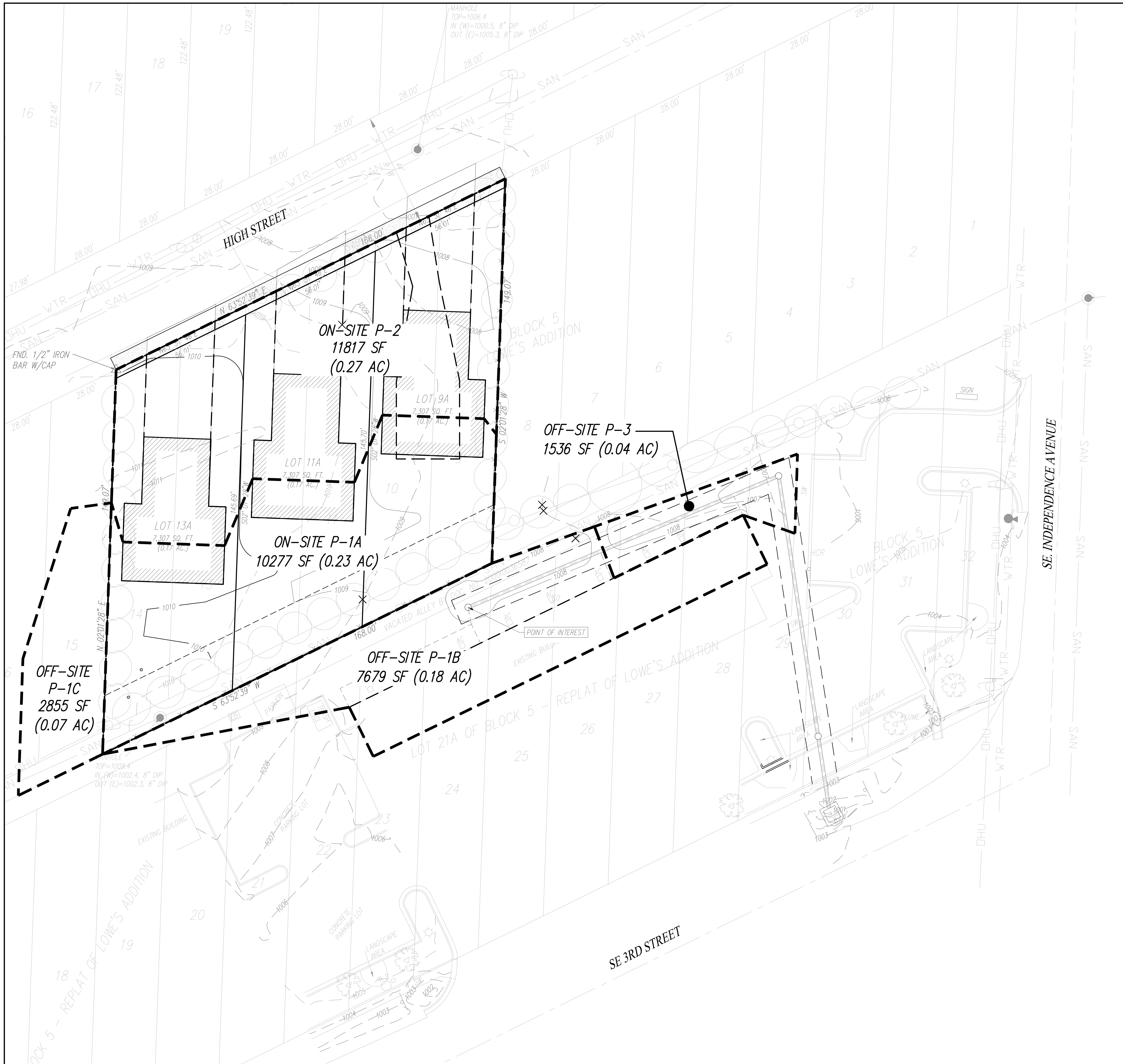

PEAK FLOWS AT POINT OF INTEREST

Rational method of calculating storm water flow:

$Q = kCIA$ $C = 0.66$

$Q_{10} = (1.00)\ (0.66)\ (7.35)\ (0.48) = 2.32$ cfs

$Q_{100} = (1.25)\ (0.66)\ (10.32)\ (0.48) = 4.08$ cfs

KEY

PROPOSED		EXISTING
979	Grades	960
- - - -	Drainage Area	

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STATE OF MISSOURI
RICHARD KEVIN STERRETT
NUMBER E-26440
REGISTERED PROFESSIONAL ENGINEER

12/20/22

R. KEVIN STERRETT MO E-26440

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POST-DEVELOPMENT DRAINAGE AREA MAP

705 SE HIGH STREET DUPLEXES

LEE'S SUMMIT - JACKSON COUNTY - MISSOURI

X-REF NO. 21118B

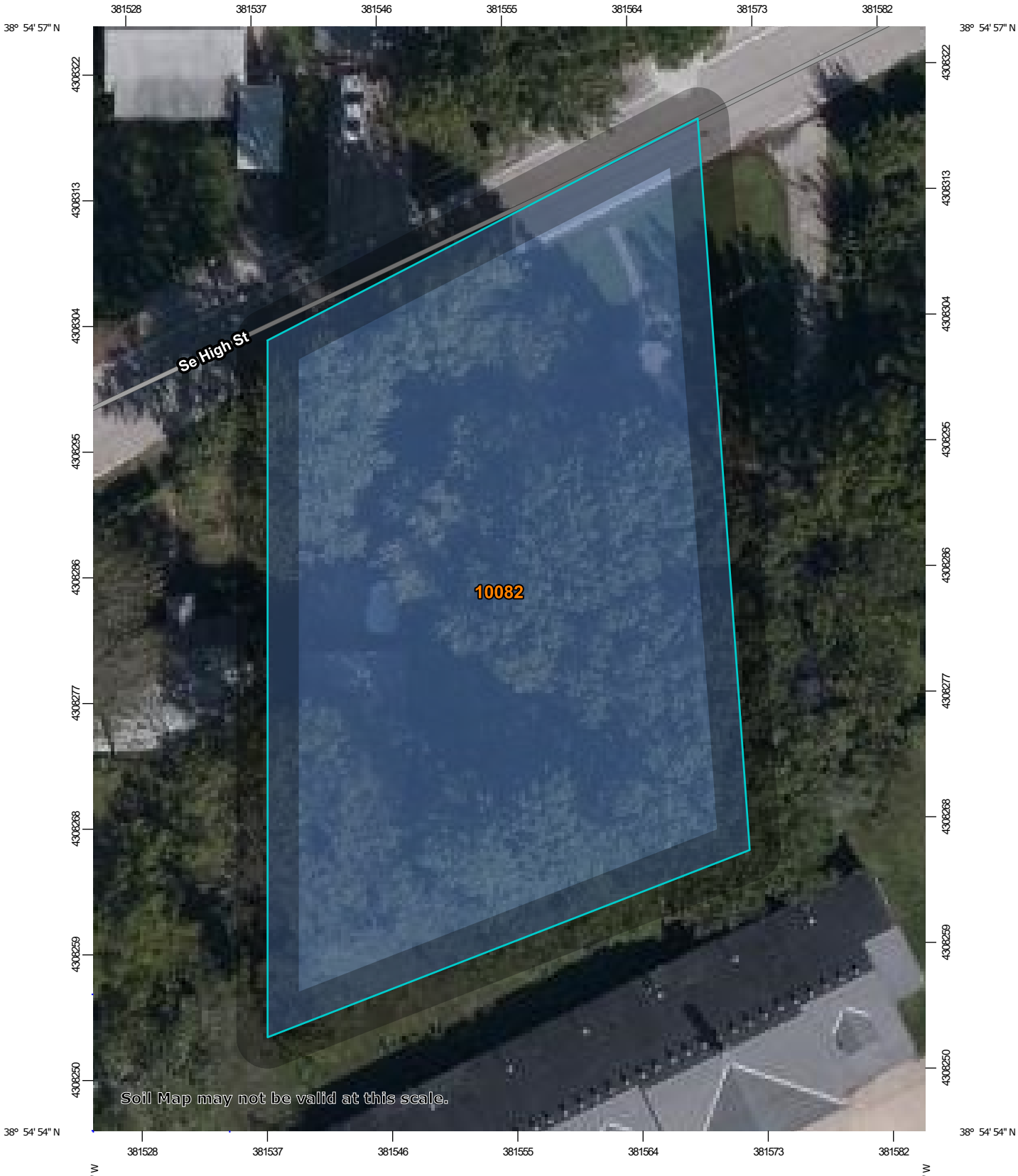
DRAWING NO. 21085

DATE OCTOBER 7, 2021

JOB NO. 21085

2 SHEET OF 2

AASHTO Group Classification (Surface)—Jackson County, Missouri
(705 HIGH STREET)



Map Scale: 1:386 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 15 30 60 90

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-1
- A-1-a
- A-1-b
- A-2
- A-2-4
- A-2-5
- A-2-6
- A-2-7
- A-3
- A-4
- A-5
- A-6
- A-7
- A-7-5
- A-7-6
- A-8
- Not rated or not available

Soil Rating Lines
- A-1
- A-1-a
- A-1-b
- A-2
- A-2-4
- A-2-5
- A-2-6
- A-2-7
- A-3
- A-4
- A-5
- A-6
- A-7
- A-7-5
- A-7-6
- A-8
- Not rated or not available

Soil Rating Points
- A-1
- A-1-a
- A-1-b
- A-2
- A-2-4
- A-2-5
- A-2-6
- A-2-7
- A-3
- A-4
- A-5
- A-6
- A-7
- A-7-5
- A-7-6
- A-8
- 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 24, Aug 31, 2022

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.

AASHTO Group Classification (Surface)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	A-6	0.4	100.0%
Totals for Area of Interest			**0.4**	**100.0%**

Description

AASHTO group classification is a system that classifies soils specifically for geotechnical engineering purposes that are related to highway and airfield construction. It is based on particle-size distribution and Atterberg limits, such as liquid limit and plasticity index. This classification system is covered in AASHTO Standard No. M 145-82. The classification is based on that portion of the soil that is smaller than 3 inches in diameter.

The AASHTO classification system has two general classifications: (i) granular materials having 35 percent or less, by weight, particles smaller than 0.074 mm in diameter and (ii) silt-clay materials having more than 35 percent, by weight, particles smaller than 0.074 mm in diameter. These two divisions are further subdivided into seven main group classifications, plus eight subgroups, for a total of fifteen for mineral soils. Another class for organic soils is used.

For each soil horizon in the database one or more AASHTO Group Classifications may be listed. One is marked as the representative or most commonly occurring. The representative classification is shown here for the surface layer of the soil.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)