



EXHIBIT C

ISSUE STATEMENT: PUBLIC HEARING AND RECOMMENDATION TO CITY COUNCIL CONCERNING A PRELIMINARY PLAT FOR APPROXIMATELY 80.6 ACRES OF PROPERTY LOCATED IN THE 900 BLOCK OF SOUTH NORTON ROAD

DATE: JUNE 5, 2023

SUBMITTED BY: OAKHURST DEVELOPMENT, LLC

PRESENTED BY: PLANNING AND DEVELOPMENT DEPARTMENT

Background

The property owner of approximately 80.6 acres of undeveloped property located between South Gregg Road & South Norton Road, south of the Forest Park subdivision, has submitted a preliminary plat for Oakhurst Subdivision. The subject property was annexed into the Nixa City Limits in May of 2018. The subject property also received its current zoning at the same time. A previous preliminary plat was approved by Nixa City Council in May of 2018. In June of 2018 a realignment of Inman Road was approved to avoid sinkholes and site grade issues.

Preliminary plats are a means to provide subdivision developers with an initial approval concerning compliance of planned arrangement with the City's zoning, subdivision, and other pertinent regulations prior to engaging the more expensive actions of detailed engineering and construction.

Analysis

The Oakhurst subdivision proposes to create 155 buildable single family residential lots that are all planned to be served by public streets, municipal water, municipal sanitary sewer, and municipal electric services. Additionally, the subdivision will create 4 common area lots that will be dedicated and maintained by a homeowner's association. At the time of development, a traffic impact study must be submitted to determine if any off-site transportation improvements will need to be made at the access point onto **Inman Rd and currently unnamed roads.**

Zoning consists of: phases 1-3 are zoned R-1 (Single Family Residential), phase 4 is zoned R-3 (Multi-family Residential), and phase 5 is zoned NC (Neighborhood Commercial).

Recommendation

Staff has reviewed the Oakhurst preliminary plat and has determined the document to be in conformance with the applicable regulations of the Nixa City Code concerning major subdivisions within the R-1, R-3, and NC zoning districts.

City of
NIXA

DEVELOPMENT DEPARTMENT P&Z Application

Phone: 417-725-5850

Fax: 417-725-6394

Date of Application: 4/10/23

PROJECT TITLE & TYPE

Title As It Appears on Plans: Oakhurst

☐ Annexation, Zoning & Concept Plan

☒ Preliminary Plat

☐ Special Use Permit

☐ Rezoning And Concept Plan

☐ Minor Subdivision (3 or less lots)

☐ Final Plat

☐ Board Adjustments

☐ Exception to Subdivision Regulations

☐ Zoning Code Amendment

☐ Vacation of Easement

☐ Vacation of Right-of-Way

☐ _____

INFORMATION

Applicant's Name: Oakhurst Development LLC Project Location: NE Cor. of Inman & Gregg

Applicant's Address: 5051 S National B5-100 Existing Use: Pasture

Springfield, MO 65810 Proposed Use: Res., Multi-Fam. & Commerical

Phone/Fax/Mobile: (417) 889-4300 Existing Zoning: R1, R3, NC

Relationship to Owner: Owner Proposed Zoning: R1, R3, NC (no change)

Legal Description of Property:

All of the South Half (S1/2) of the Southwest Quarter (SW1/4) of Section 23, Township 27 North, Range 22 West, All in Christian County, Missouri, Containing 79.905 Acres more or less.

Pre-application conference was held with: Scott Godbey

PERSONS IN INTEREST

Name: Address: Zip: Phone/Fax/Mobile:

MORTGAGEES:

OPTIONEES:

City of
NIXA

DEVELOPMENT DEPARTMENT P&Z Application

Phone: 417-725-5850

Fax: 417-725-6394

CONSULTANTS:

Name:

Shaffer & Hines, Inc.

Address:

P.O. Box 493, Nixa, MO 65714

Zip:

Phone/Fax/Mobile:

(417) 725-4663 (o)

(417) 725-5230 (f)

CONTACT PERSON:

Identify one person to serve as the contact for the Planning Department during the review process. This will be the only person notified by the Planning Department of meeting schedules. It will be his or her responsibility to notify the other parties who may be involved in the project.

Address: P.O. Box 493

Nixa, MO 65714

Phone/Fax: (417) 725-4663

Name Clayton Hines

OWNER CERTIFICATION:

I certify that I am a person in interest and the information and exhibits Herewith are true and correct to the best of my knowledge and that in Filing this application, I am acting with the knowledge and consent of all persons in interest. Without the consent of persons in interest, the Requested action cannot lawfully be accomplished.

Address: 5051 S. National Bldg 5-100

Springfield, MO 65810

Phone/Fax: (417) 889-4300

Name: Stu Stenger

Owner's Signature: 

Member _____

STAFF USE ONLY

APPLICATION ACCEPTED

Date: _____ ☐ Property Owners within 185 feet of Property notified

Time: _____ ☐ Application Requirements Complete

By: _____

Fee Received: _____

**LIMITED SUBSURFACE
INVESTIGATION**

FOR

OAKHURST SUBDIVISION
S1/2, SW1/4, SECTION 23, T27N, R22W
NIXA, MISSOURI

Prepared for:

Stenger Homes
5051 S. National Ave., Building 5-100
Springfield, MO 65810

Prepared by:



Springfield, MO
4168 W. Kearney Springfield, MO 65803
Call 417.864.6000 Fax 417.864.6004
www.ppimo.com

PPI Project Number: 285300

March 1, 2023

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1.0 INTRODUCTION

Palmerton & Parrish, Inc. (PPI) was retained by Stenger Homes to perform a limited subsurface investigation on three (3) possible sinkholes located at the proposed Oakhurst residential subdivision located in the south half of the southwest quarter of section 23, township 27 north, range 22 west in Nixa, Christian County, Missouri. The results of that evaluation are presented in the following pages. PPI previously performed a sinkhole evaluation on the property with an initial report dated October 19, 2017. An updated report was issued on December 8, 2022 to reflect recent changes in the Nixa City Code regarding sinkhole rim setbacks. See Figure 1 in Appendix I for the location of the sinkholes on the property and the possible sinkholes subject to this investigation.

2.0 PREVIOUS INVESTIGATION

The subject property was initially visited on April and September, 2017 to visually observe any sinkholes or other karst features that may exist on the site. Six (6) sinkholes and three (3) possible sinkholes were observed on the subject property. See the Sinkhole Evaluation report dated December 8, 2022 for descriptions of each sinkhole and possible sinkhole, the general geology of the area, and a limited flooding evaluation.

3.0 LIMITED SUBSURFACE INVESTIGATION

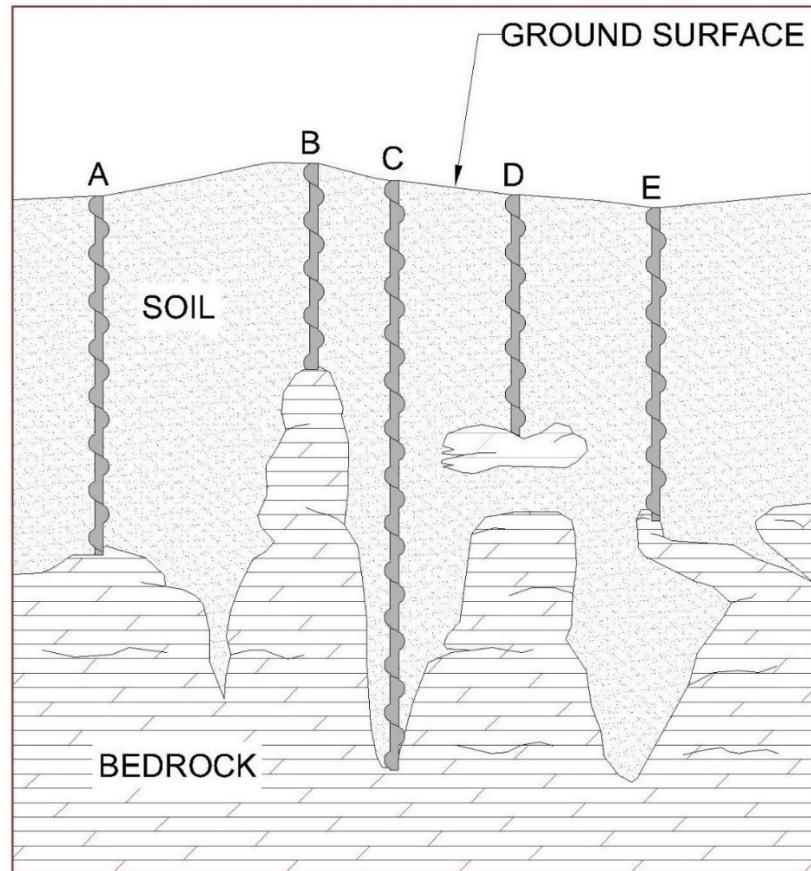
From January 13 to 17, 2023, eleven (11) soil borings were drilled at the subject property to determine the nature of the possible sinkholes identified as S7, S8, and S9. The location of these possible sinkhole areas can be viewed on Figures 1 in Appendix I. All soil borings were drilled using a CME-55 track mounted drill rig with soil samples observed in the field by a geologist.

Borings 1-4 were drilled in possible sinkhole S7. Boring 1, located in the center of the depression, encountered lean brown cherty clays to a depth of 20.5 ft. followed by fat red cherty clay. Boring 1 was discontinued at a depth of 40 ft. without encountering bedrock. Borings 2-4, located on the side slopes of the depression, encountered lean brown clays to a depth of 3 ft. followed by fat red cherty clay. Limestone bedrock was encountered in borings 2, 3, and 4 at depths of 35.3 ft., 40.3 ft., and 19.5 ft., respectively. Figure 2 in Appendix I shows a boring location plan and generalized cross section through sinkhole S7.

Borings 5-8 were drilled in possible sinkhole S8. Borings 6 and 7, located in the floor of the depression, encountered a moderately thick layer of lean brown cherty clays followed by fat red cherty clay. Borings 5 and 6 were discontinued at depths of 42 ft. and 44.7 ft., respectively, without encountering bedrock. Borings 5 and 8, located on the side slopes of the depression, encountered a thin layer of lean brown clays followed by fat red cherty clay. Auger refusal, assumed to be limestone bedrock, was encountered in borings 5 and 8 at depths of 42 ft. and 44 ft., respectively. In the bottom of borings 5, 6, and 8 were very soft and wet clays with fragments of weathered limestone. Figure 3 in Appendix I shows a boring location plan and generalized cross section through sinkhole S8.

Borings 9-11 were drilled in possible sinkhole S9. Boring 9, located in the center of the depression, encountered lean brown cherty clays to a depth of 6.5 ft. followed by fat red cherty clay with auger refusal on limestone bedrock at 24 ft. Boring 10, located on the slope of the depression, encountered lean brown and gray cherty clays to a depth of 15 ft. followed by fat red cherty clay with auger refusal on limestone bedrock at 30 ft. Boring 11, located on the slope of the depression, encountered lean brown cherty clays to a depth of 5 ft. followed by fat red cherty clay with auger refusal on limestone bedrock at 20.5 ft. Figure 4 in Appendix I shows a boring location plan and generalized cross section through depression S9.

Auger refusal is defined as the depth below the ground surface at which a boring can no longer be advanced with the soil drilling technique being used. Auger refusal is subjective and is based upon the type of drilling equipment and types of augers being used, as well as the effort exerted by the driller. Several different auger refusal conditions are possible in the general site area. These conditions are represented graphically in the adjacent figure: (A) on the upper surface of continuous bedrock, (B) on rock “pinnacles”, (C) in widened joints that may extend well below the surrounding bedrock surface, (D) slabs of unweathered rock suspended in the residual soil matrix, or “floaters”, or (E) on the upper surface of discontinuous bedrock.



Note: While it is possible that some or all of the auger refusal conditions shown above are present at the Project Site, this figure is for illustration purposes only, and should not be considered "representative" of any specific auger refusal condition at the Project Site.

Boring logs with stratum depths and descriptions along with general notes regarding boring logs are presented in Appendix II.

4.0 CONCLUSIONS

Based on the soils and subsurface conditions observed in soil borings 1-8, it is PPI's opinion that the depressions at S7 and S8 are sinkholes. Soils and subsurface conditions observed in soil borings 9-11 indicate that depression S9 is likely not a sinkhole. It is likely that this depression was formed by the construction of the Gregg Road embankment to the west of the depression. An updated sinkhole map, with the City of Nixa 30' rim setback, is included in Appendix I as Figure 5.

5.0 REPORT LIMITATIONS

This evaluation was performed using visual observation, a site topographic survey, and eleven (11) soil borings. No geophysical methods, or other methods were employed to characterize the subsurface conditions at the site property. We have employed accepted engineering geologic and hydrogeologic procedures, and our opinions and conclusions are made in accordance with generally accepted principles and practices of these professions. The contents of this report are valid as of the date of preparation. However, changes in the condition of the site property can occur over time as a result of either natural processes or human activity. Should such changes occur, it might be necessary to re-evaluate some of the opinions and conclusions of this report.

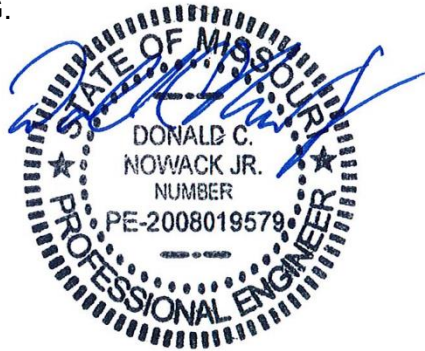
Prepared By:



3/1/23

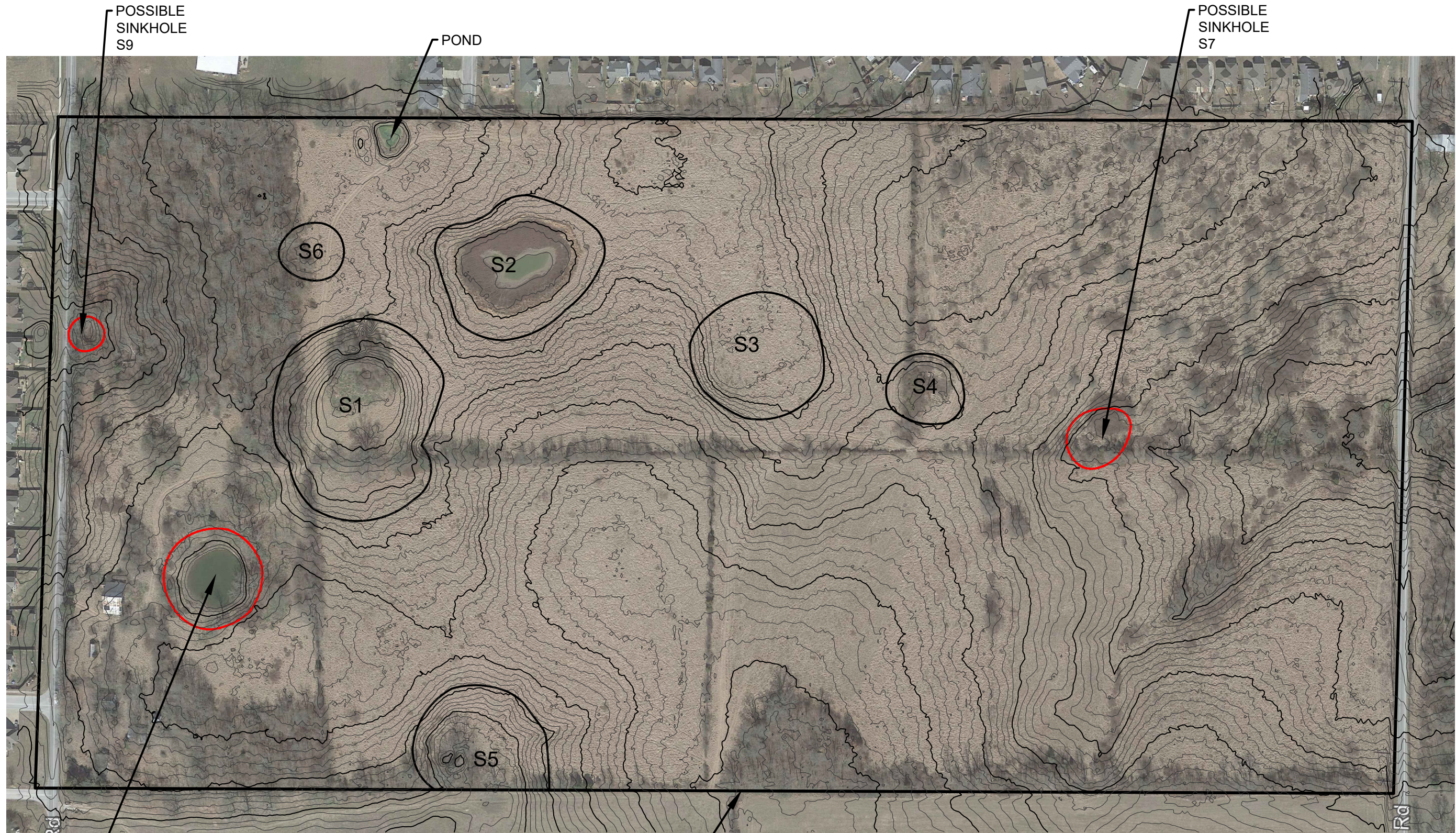
Donald Nowack, P.E., R.G.

Date



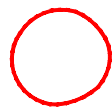
APPENDIX I

FIGURES

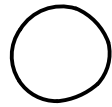


POSSIBLE
SINKHOLE
S8

SUBJECT PROPERTY
BOUNDARY



Possible Sinkhole, to be Investigated



Sinkhole

SCALE
1" = 200'

Project: Oakhurst Subdivision, Nixa, MO
Client: Stenger Homes

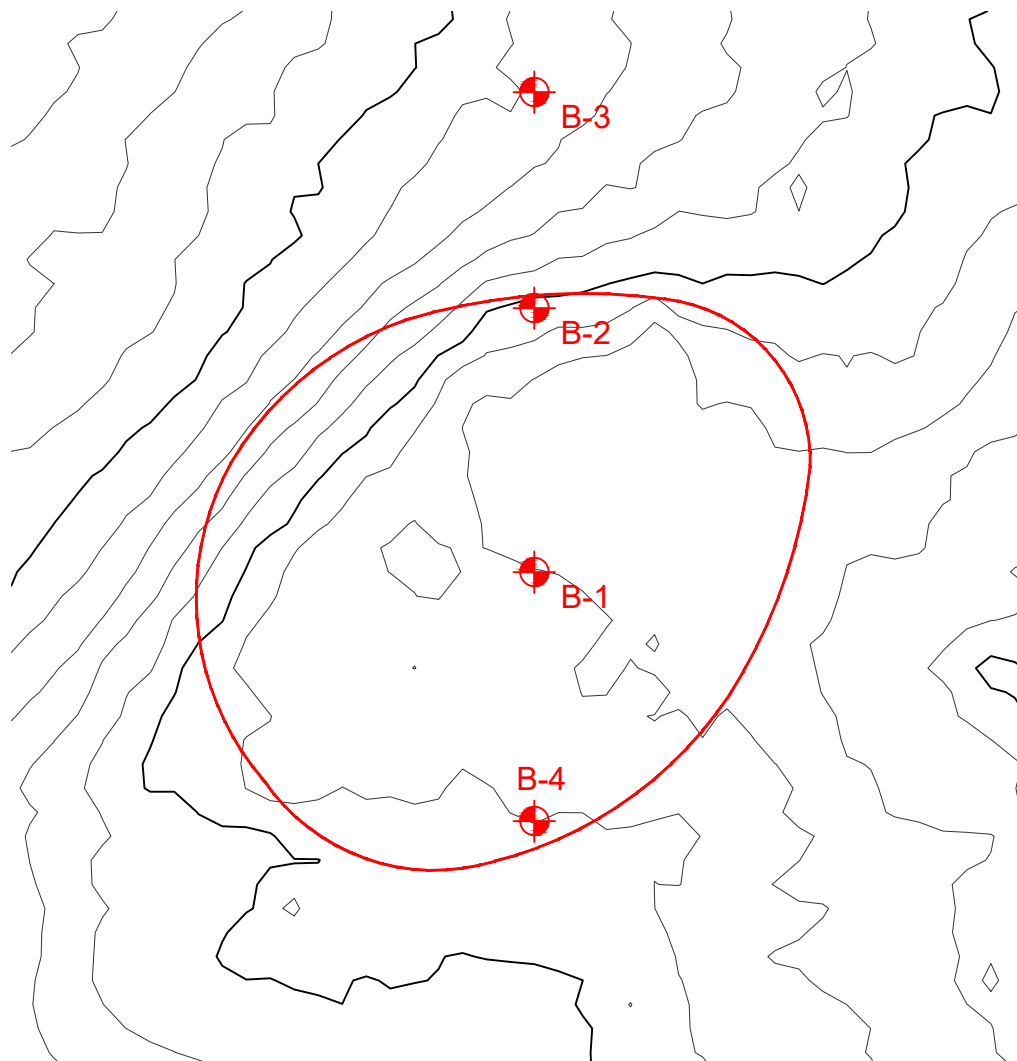
Plan View of Site on Aerial Photograph
Conditions Prior to Subsurface Investigation

DATE: March 1, 2023

Project Number: 285300

PPI PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 1

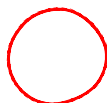


SCALE
1" = 40'

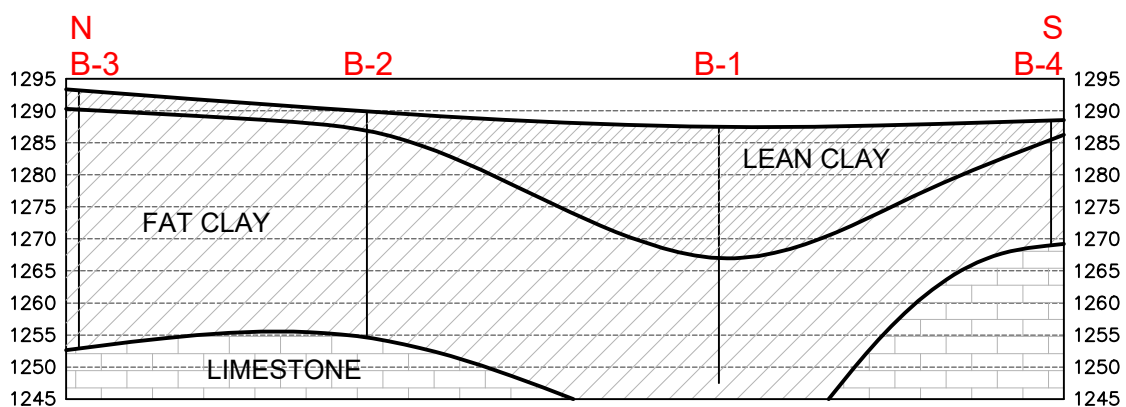
LEGEND



Boring Location



Sinkhole Rim



SCALE
1" = 30'

Note that the bedrock surface in the cross sections is generalized. The actual bedrock surface is highly irregular. See diagram in Section 3.0 of the report.

Project: Oakhurst Subdivision, Nixa, MO
Client: Stenger Homes

Boring Locations & Cross Section - Sinkhole S7

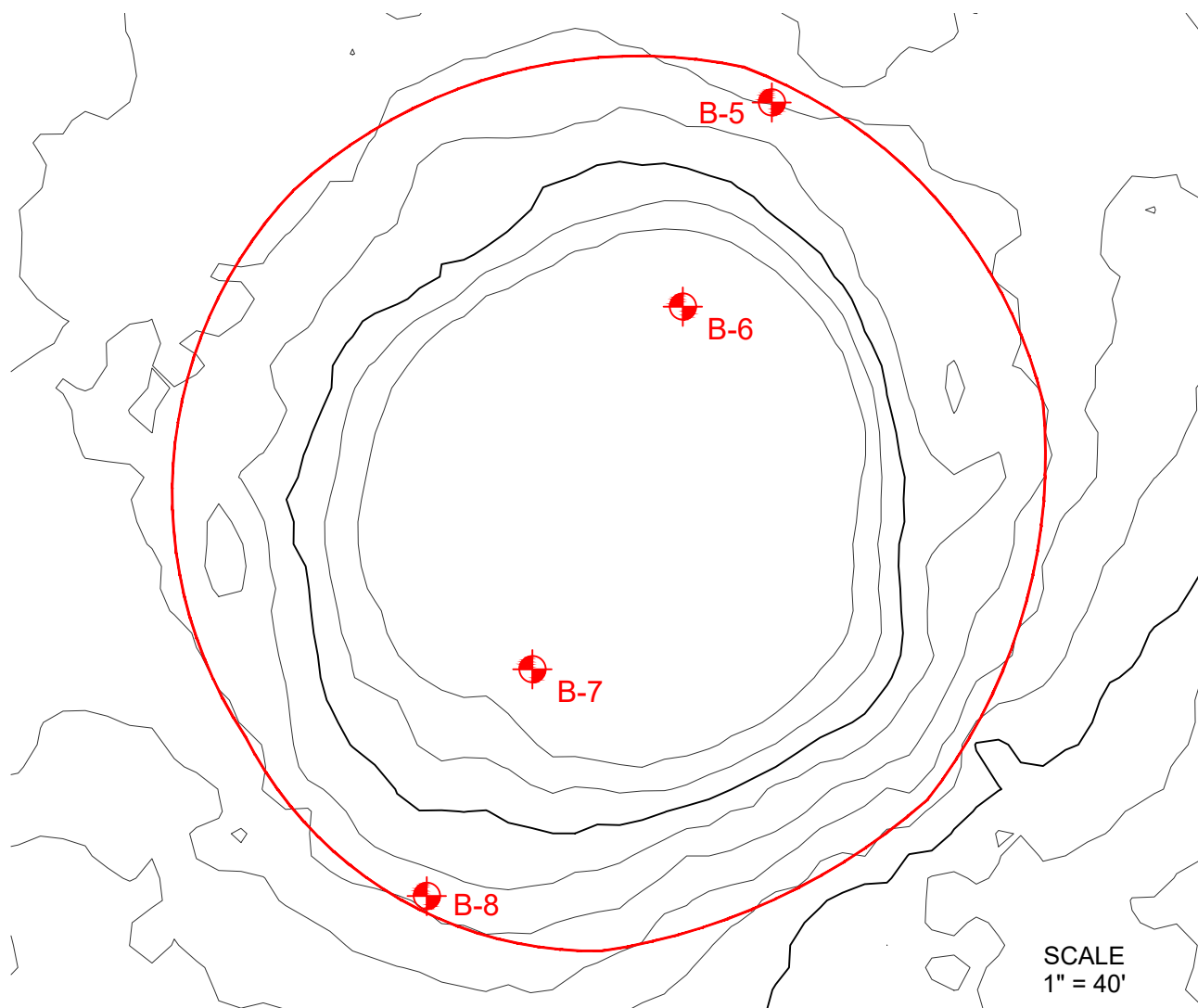
DATE: March 1, 2023

Project Number: 285300

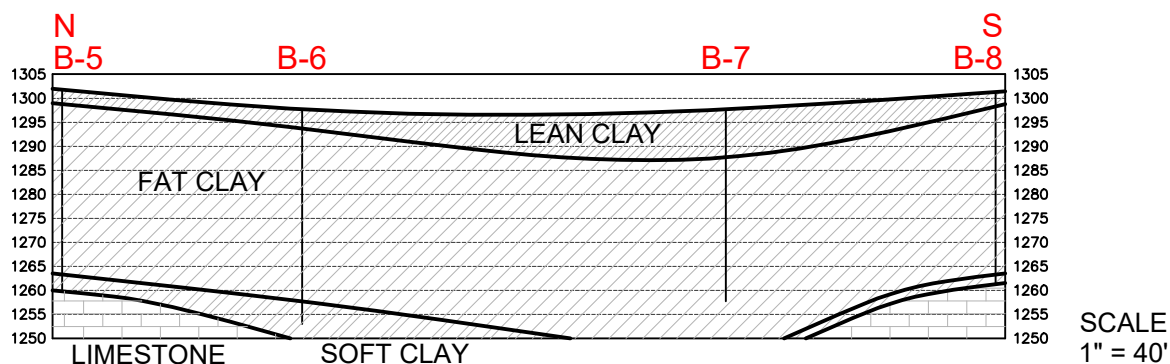


PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 2



LEGEND



Note that the bedrock surface in the cross sections is generalized. The actual bedrock surface is highly irregular. See diagram in Section 3.0 of the report.

Project: Oakhurst Subdivision, Nixa, MO
Client: Stenger Homes

Boring Locations & Cross Section - Sinkhole S8

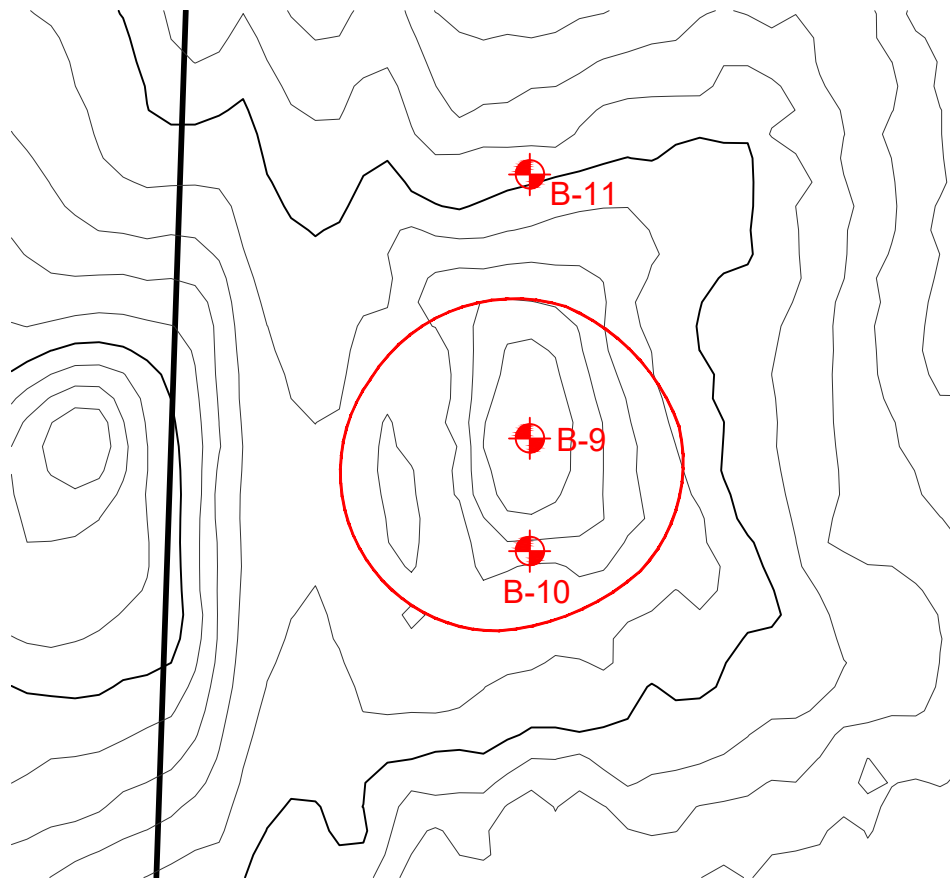
DATE: March 1, 2023

Project Number: 285300




PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

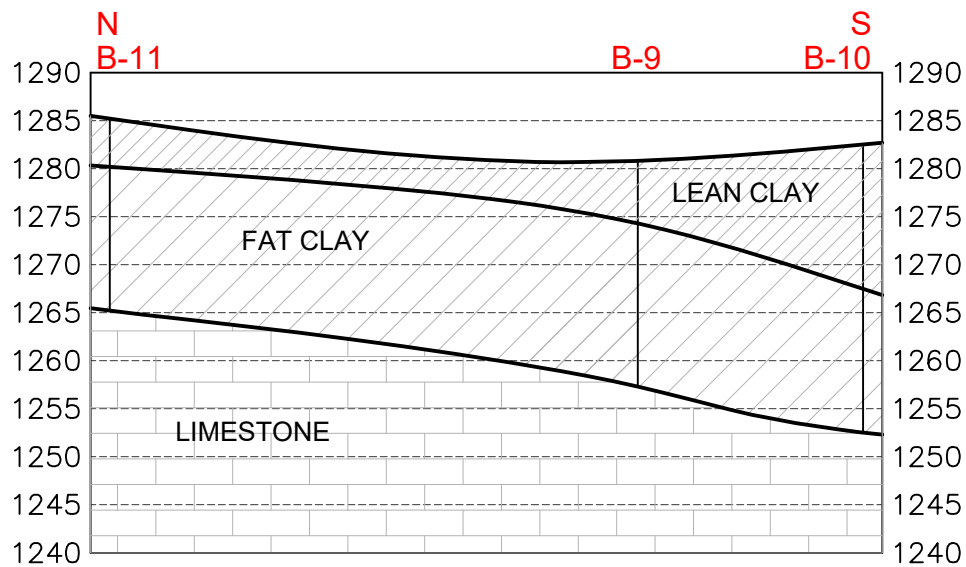
FIGURE 3



SCALE
1" = 40'

LEGEND

 Boring Location



SCALE
1" = 20'

Note that the bedrock surface in the cross sections is generalized. The actual bedrock surface is highly irregular. See diagram in Section 3.0 of the report.

Project: Oakhurst Subdivision, Nixa, MO
Client: Stenger Homes

Boring Locations & Cross Section - Depression S9

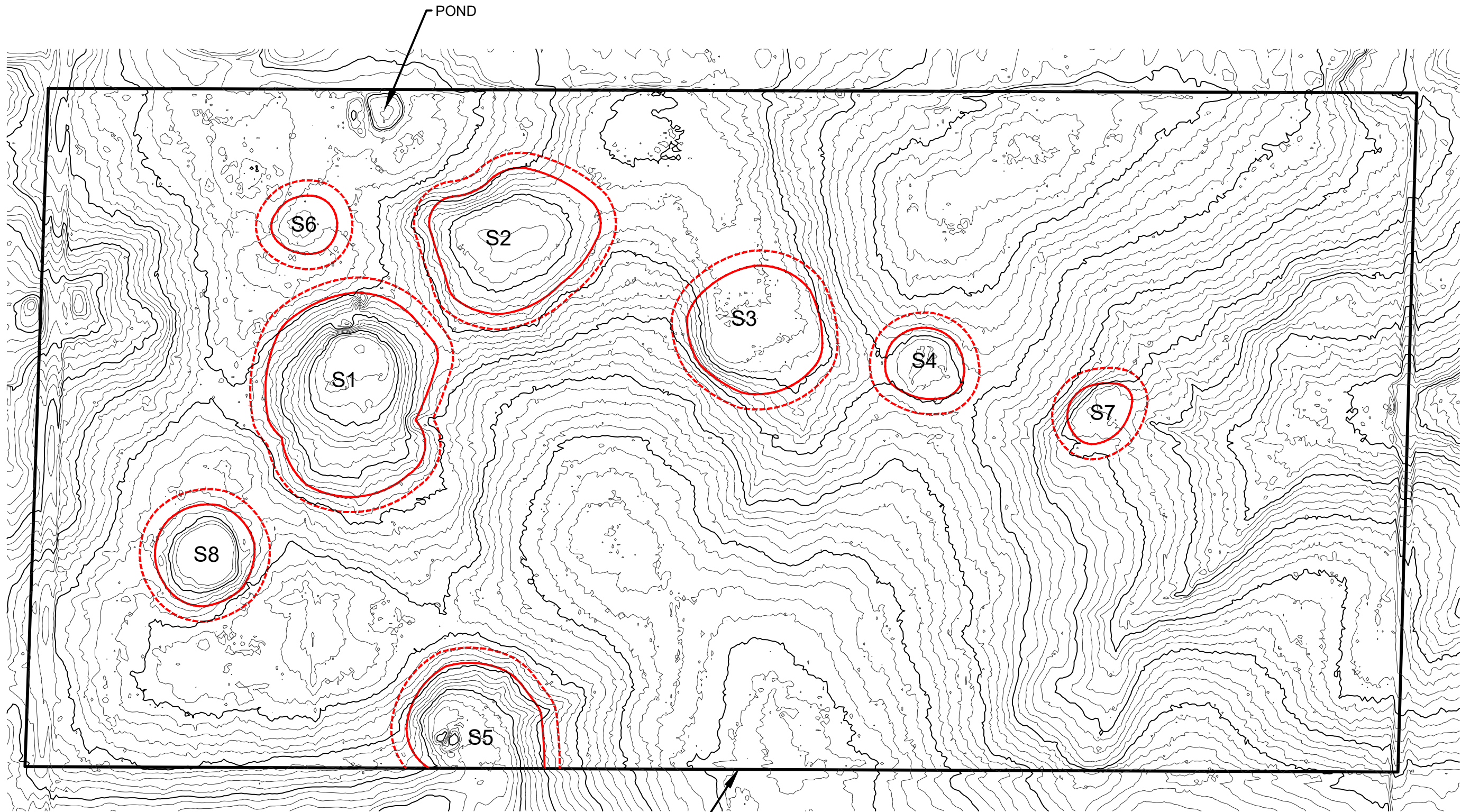
DATE: March 1, 2023

Project Number: 285300



PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 4



SUBJECT PROPERTY
BOUNDARY

Sinkhole Rim

Sinkhole Rim 30 ft. Setback

SCALE
1" = 200'

Project: Oakhurst Subdivision, Nixa, MO
Client: Stenger Homes

Updated Sinkhole Map with Setbacks

DATE: March 1, 2023

Project Number: 285300

PpI PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 5

APPENDIX II

SOIL BORING LOGS & KEY TO SYMBOLS



4168 W. Kearney St.
Springfield, MO 65802
Telephone: 417-864-6000

GEOTECHNICAL BORING LOG

BORING NUMBER

1

PAGE 1 OF 2

CLIENT	Stenger Homes	PROJECT NAME	Oakhurst
PROJECT NO.	285300	PROJECT LOCATION	Nixa, MO
DATE STARTED	1/13/23	COMPLETED	1/13/23
DRILLER	SP	DRILL RIG	2015 CME 55
HAMMER TYPE	Auto	GROUND WATER LEVELS	
LOGGED BY	DN	AT TIME OF DRILLING	None
CHECKED BY	BP	AT END OF DRILLING	
NOTES			

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆				ELEVATION (ft)
								▲ N VALUE ▲				
								PL MC LL				
								■ SHEAR STRENGTH (ksf) ■				
								1 2 3 4				
0	CFA - 4.5"		Lean Clay (CL) with silt, soft, moist, brown		SPT 1	1-2-2 (4)						
			2.5 ft									
			Lean Clay (CL) scattered chert gravel, medium stiff to stiff, moist, brown		SPT 2	3-3-3 (6)						
5												
					SPT 3	3-4-5 (9)						
10												
					SPT 4	4-6-9 (15)						
15												
					SPT 5	5-7-9 (16)						
20			20.5 ft									
	Fat Clay (CH) with chert gravel, stiff, moist, red											

25

(Continued Next Page)



4168 W. Kearney St.
Springfield, MO 65802
Telephone: 417-864-6000

GEOTECHNICAL BORING LOG

BORING NUMBER

1

PAGE 2 OF 2

CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf)				ELEVATION (ft)	
								20	40	60	80		100
								▲ N VALUE ▲					
								PL	MC	LL			
								20	40	60	80		
■ SHEAR STRENGTH (ksf) ■								1	2	3	4		
25	CFA - 4.5"		Fat Clay (CH) with chert gravel, stiff, moist, red (continued)			3-4-5 (9)							
30													
35													
40			Bottom of borehole at 40.0 feet.										

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:_MASTER PROJECT FILE\2021_ MOISTENGER, RON CO-285300-OAKHURST-ENV\BORING LOGS\BORING LOGS.GPJ



4168 W. Kearney St.
Springfield, MO 65802
Telephone: 417-864-6000













GEOTECHNICAL BORING LOG

BORING NUMBER

2

PAGE 1 OF 2

CLIENT	Stenger Homes	PROJECT NAME	Oakhurst
PROJECT NO.	285300	PROJECT LOCATION	Nixa, MO
DATE STARTED	1/13/23	COMPLETED	1/16/23
DRILLER	SP	DRILL RIG	2015 CME 55
HAMMER TYPE	Auto	GROUND WATER LEVELS	
LOGGED BY	DN	AT TIME OF DRILLING	None
CHECKED BY	BP	AT END OF DRILLING	
NOTES			

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆				ELEVATION (ft)	
								20	40	60	80		100
								▲ N VALUE ▲					
								20	40	60	80		
								PL	MC	LL			
								■ SHEAR STRENGTH (ksf) ■					
								1	2	3	4		
0	CFA - 4.5"		Lean Clay (CL) scattered chert gravel, medium stiff, moist, brown	 SPT 1		2-3-3 (6)							
			Fat Clay (CH) scattered chert gravel, medium stiff to stiff, moist, red	 SPT 2		5-9-5 (14)							
5													
					 SPT 3		3-5-4 (9)						
10													
				 SPT 4		5-4-4 (8)							
15													
				 SPT 5		7-6-8 (14)							
20													



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Telephone: 417-864-6000

GEOTECHNICAL BORING LOG

BORING NUMBER

2

PAGE 2 OF 2

CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆	▲ N VALUE ▲	— PL — MC — LL —	■ SHEAR STRENGTH (ksf) ■	ELEVATION (ft)
								20 40 60 80 100	20 40 60 80			
										20 40 60 80		
											1 2 3 4	
25			Fat Clay (CH) scattered chert gravel, medium stiff to stiff, moist, red (<i>continued</i>)									
30												
35												

CFA - 4.5"

Weathered limestone, wet, gray

Limestone, hard, gray

Refusal at 35.5 feet.

Bottom of borehole at 35.5 feet.

35.3 ft
35.5 ft

SPT
6

50/2"



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Springfield, MO 65802
Telephone: 417-864-6000

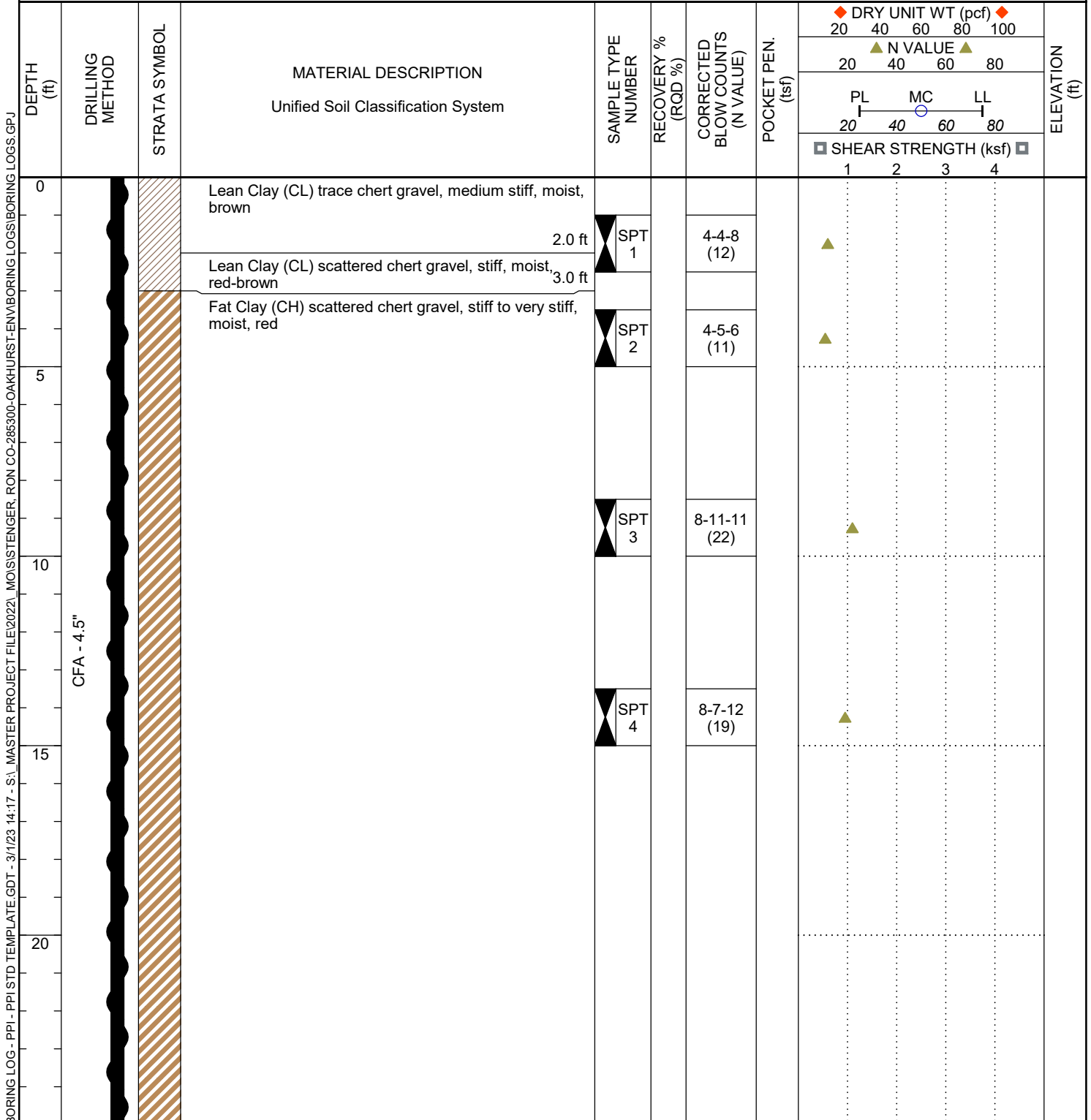
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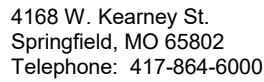
BORING NUMBER

3

PAGE 1 OF 2

CLIENT	Stenger Homes	PROJECT NAME	Oakhurst
PROJECT NO.	285300	PROJECT LOCATION	Nixa, MO
DATE STARTED	1/16/23	COMPLETED	1/16/23
DRILLER	SP	DRILL RIG	2015 CME 55
HAMMER TYPE	Auto	GROUND WATER LEVELS	
LOGGED BY	DN	AT TIME OF DRILLING	None
CHECKED BY	BP	AT END OF DRILLING	
NOTES			





BORING NUMBER

PAGE 1 OF 1

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf)		ELEVATION (ft)			
								20	40		60	80	100
								N VALUE					
								20	40		60	80	
0			Lean Clay (CL) scattered chert gravel, medium stiff, moist, brown										
				SPT 1		3-2-3 (5)							
				SPT 2		2-3-4 (7)							
5			Fat Clay (CH) scattered chert gravel, medium stiff to stiff, moist, red										
				SPT 3		7-9-12 (21)							
10													
15													
19.5 ft			Weathered limestone, soft, wet, gray	SPT 4		50/1"							
19.8 ft			Limestone, hard, gray										
			Refusal at 19.8 feet. Bottom of borehole at 19.8 feet.										

BOHRING LOG - PPI - PPI STD TEMPLATE.GDT 14:17 - S:\MASTER PROJECT FILE\2022\ MO\SISTENGER, RON CO-285300-OAKHURST-ENV\BORING LOGS\BORING LOGS.GPJ

4168 W. Kearney St.
Springfield, MO 65802
Telephone: 417-864-6000



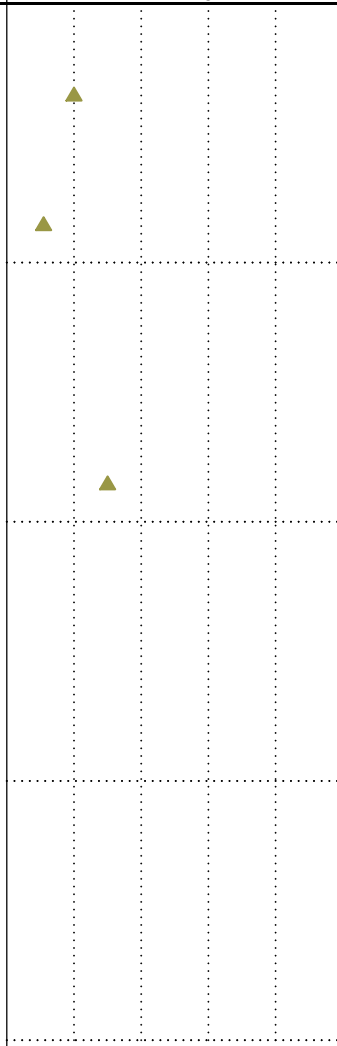



GEOTECHNICAL BORING LOG

BORING NUMBER

5

PAGE 1 OF 2

CLIENT <u>Stenger Homes</u>	PROJECT NAME <u>Oakhurst</u>
PROJECT NO. <u>285300</u>	PROJECT LOCATION <u>Nixa, MO</u>
DATE STARTED <u>1/17/23</u>	COMPLETED <u>1/17/23</u>
DRILLER <u>SP</u>	DRILL RIG <u>2015 CME 55</u>
HAMMER TYPE <u>Auto</u>	SURFACE ELEVATION _____ BENCHMARK EL. _____
LOGGED BY <u>DN</u>	GROUND WATER LEVELS
CHECKED BY <u>BP</u>	AT TIME OF DRILLING <u>None</u>
NOTES _____	AT END OF DRILLING _____

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:_MASTER PROJECT FILE\2022\ _MOI\S\STENGER, RON CO-285300-OAKHURST-ENVIRING LOGS\BORING LOGS.GPJ	DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	20 40 60 80 100 ▲ DRY UNIT WT (pcf) ▲ 20 40 60 80 ▲ N VALUE ▲ PL MC LL 20 40 60 80 ■ SHEAR STRENGTH (ksf) ■				ELEVATION (ft)
	0	CFA - 4.5"		Lean Clay (CL) scattered chert gravel, very stiff, moist, brown	 SPT 1		3-9-11 (20)						
	3.0 ft												
	5			Fat Clay (CH) scattered chert gravel, stiff to very stiff, moist, red	 SPT 2	7-6-5 (11)							
	10							 SPT 3			5-9-21 (30)		
15													
20													



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GEOTECHNICAL BORING LOG

BORING NUMBER

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PAGE 2 OF 2

CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:\MASTER PROJECT FILE\2022\MOISISTENGER, RON CO-285300-OAKHURST-ENNVBORING LOGS.GPJ	DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆ 20 40 60 80 100 ▲ N VALUE ▲ 20 40 60 80 PL MC LL 20 40 60 80 ■ SHEAR STRENGTH (ksf) ■ 1 2 3 4	ELEVATION (ft)
	25	CFA - 4.5"		Fat Clay (CH) scattered chert gravel, stiff to very stiff, moist, red (continued)						
	30									
	35									
	38.5 ft									
40			Fat Clay (CH) scattered weathered limestone, very soft, wet, red	SPT 4	0-0-0 (0)					
42.0 ft			Refusal at 42.0 feet. Bottom of borehole at 42.0 feet.							

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:_MASTER PROJECT FILE\2023\ MOISTENGER, RON CO-285300-OAKHURST-ENV\BORING LOGS\BORING LOGS.GPJ



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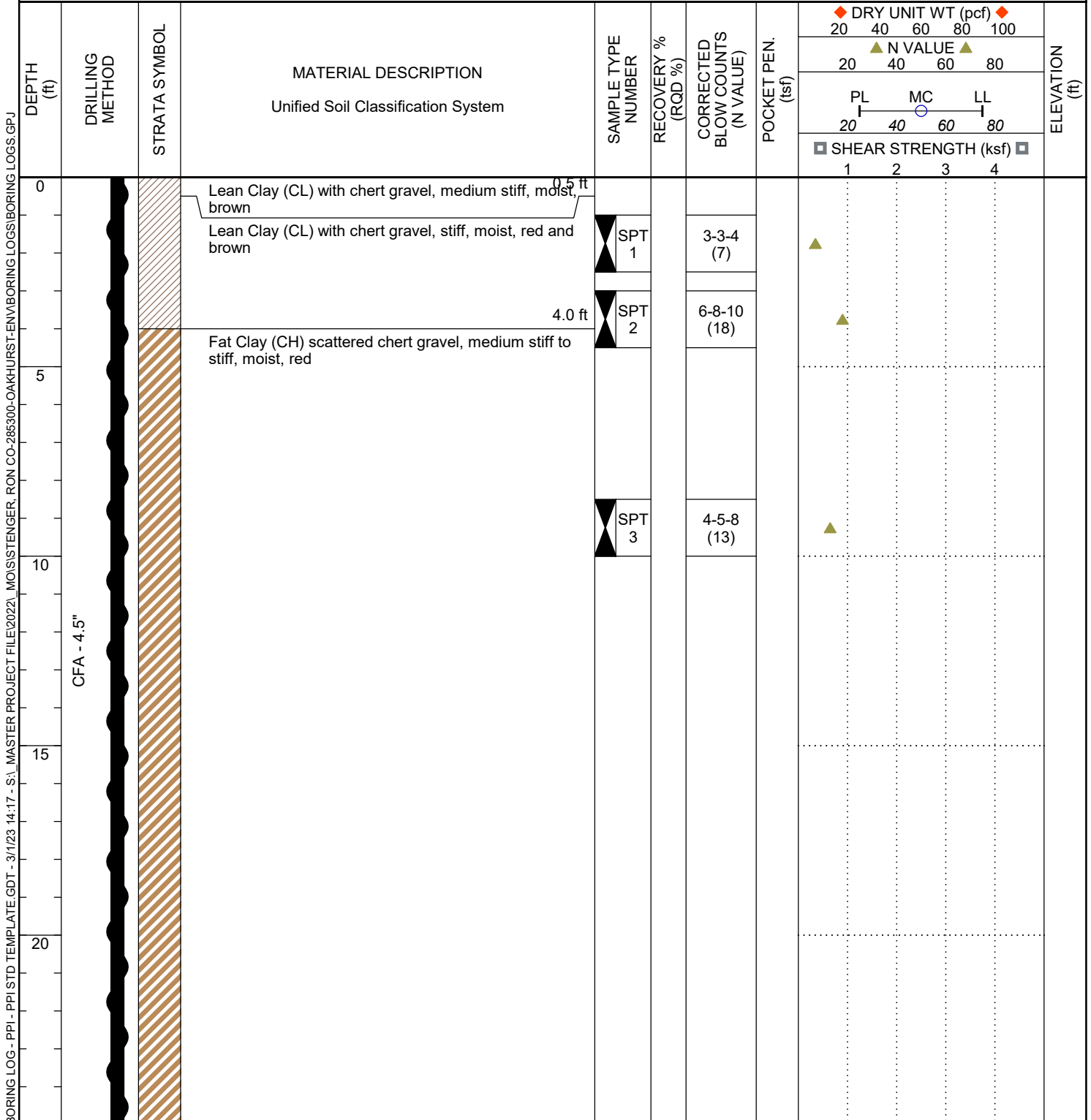
GEOTECHNICAL BORING LOG

BORING NUMBER

6

PAGE 1 OF 2

CLIENT	Stenger Homes	PROJECT NAME	Oakhurst
PROJECT NO.	285300	PROJECT LOCATION	Nixa, MO
DATE STARTED	1/17/23	COMPLETED	1/17/23
DRILLER	SP	DRILL RIG	2015 CME 55
HAMMER TYPE	Auto	GROUND WATER LEVELS	
LOGGED BY	DN	AT TIME OF DRILLING	None
CHECKED BY	BP	AT END OF DRILLING	
NOTES			



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GEOTECHNICAL BORING LOG

BORING NUMBER

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CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

[illegible]

Bottom of borehole at 44.7 feet.



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GEOTECHNICAL BORING LOG

BORING NUMBER

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PAGE 1 OF 2

CLIENT <u>Stenger Homes</u>	PROJECT NAME <u>Oakhurst</u>
PROJECT NO. <u>285300</u>	PROJECT LOCATION <u>Nixa, MO</u>
DATE STARTED <u>1/17/23</u>	COMPLETED <u>1/17/23</u>
SURFACE ELEVATION _____	BENCHMARK EL. _____
DRILLER <u>SP</u>	DRILL RIG <u>2015 CME 55</u>
GROUND WATER LEVELS	
HAMMER TYPE <u>Auto</u>	AT TIME OF DRILLING <u>None</u>
LOGGED BY <u>DN</u>	CHECKED BY <u>BP</u>
AT END OF DRILLING _____	
NOTES _____	

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆	▲ N VALUE ▲	PL MC LL	■ SHEAR STRENGTH (ksf) ■	ELEVATION (ft)
								20 40 60 80 100	20 40 60 80			
0			Lean Clay (CL) trace chert gravel, very soft to medium stiff, moist, gray	SPT 1		0-0-1 (1)						
				SPT 2		2-2-3 (5)						
5												
				SPT 3		3-3-5 (8)						
10												
			Fat Clay (CH) scattered chert gravel, stiff to very stiff, moist, red	SPT 4		6-4-5 (9)						
15												
				SPT 5		5-7-10 (17)						
20												
25												



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GEOTECHNICAL BORING LOG

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PAGE 2 OF 2

CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf)				ELEVATION (ft)	
								20	40	60	80		100
								▲ N VALUE ▲					
								PL	MC	LL			
								20	40	60	80		
■ SHEAR STRENGTH (ksf) ■								1	2	3	4		
25	CFA - 4.5"		Fat Clay (CH) scattered chert gravel, stiff to very stiff, moist, red (continued)			3-4-6-5 (10)							
30													
35													
40			Bottom of borehole at 40.0 feet.		SPT 6								

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:_MASTER PROJECT FILE\2021_ MOISSTENGER, RON CO-285300-OAKHURST-ENV\BORING LOGS\BORING LOGS.GPJ



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GEOTECHNICAL BORING LOG

BORING NUMBER

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PAGE 1 OF 2

CLIENT <u>Stenger Homes</u>	PROJECT NAME <u>Oakhurst</u>
PROJECT NO. <u>285300</u>	PROJECT LOCATION <u>Nixa, MO</u>
DATE STARTED <u>1/17/23</u>	COMPLETED <u>1/17/23</u>
SURFACE ELEVATION _____	BENCHMARK EL. _____
DRILLER <u>SP</u>	DRILL RIG <u>2015 CME 55</u>
GROUND WATER LEVELS	
HAMMER TYPE <u>Auto</u>	AT TIME OF DRILLING <u>None</u>
LOGGED BY <u>DN</u>	CHECKED BY <u>BP</u>
AT END OF DRILLING _____	
NOTES _____	

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆				ELEVATION (ft)												
								20 40 60 80 100																
								▲ N VALUE ▲																
								PL MC LL																
								20 40 60 80																
								■ SHEAR STRENGTH (ksf) ■																
								1 2 3 4																
0	CFA - 4.5"		Lean Clay (CL) trace chert gravel, medium stiff, moist, brown			2-1-4 (5)																		
			3.0 ft																					
				Fat Clay (CH) with chert gravel, stiff, moist, red			5-5-6 (11)																	
5																								
10																								



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GEOTECHNICAL BORING LOG

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CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆	▲ N VALUE ▲	PL MC LL	■ SHEAR STRENGTH (ksf) ■	ELEVATION (ft)
								20 40 60 80 100	20 40 60 80			
25	CFA - 4.5"		Fat Clay (CH) with chert gravel, stiff, moist, red (continued)									
30												
35												
40			Fat Clay (CH) with chert gravel, very soft, wet, red	SPT 3		0-0-0 (0)						
44.0 ft			Refusal at 44.0 feet. Bottom of borehole at 44.0 feet.									

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:\MASTER PROJECT FILE\2022\MOISTENGER, RON CO-285300-OAKHURST-ENV\BORING LOGS\BORING LOGS.GPJ



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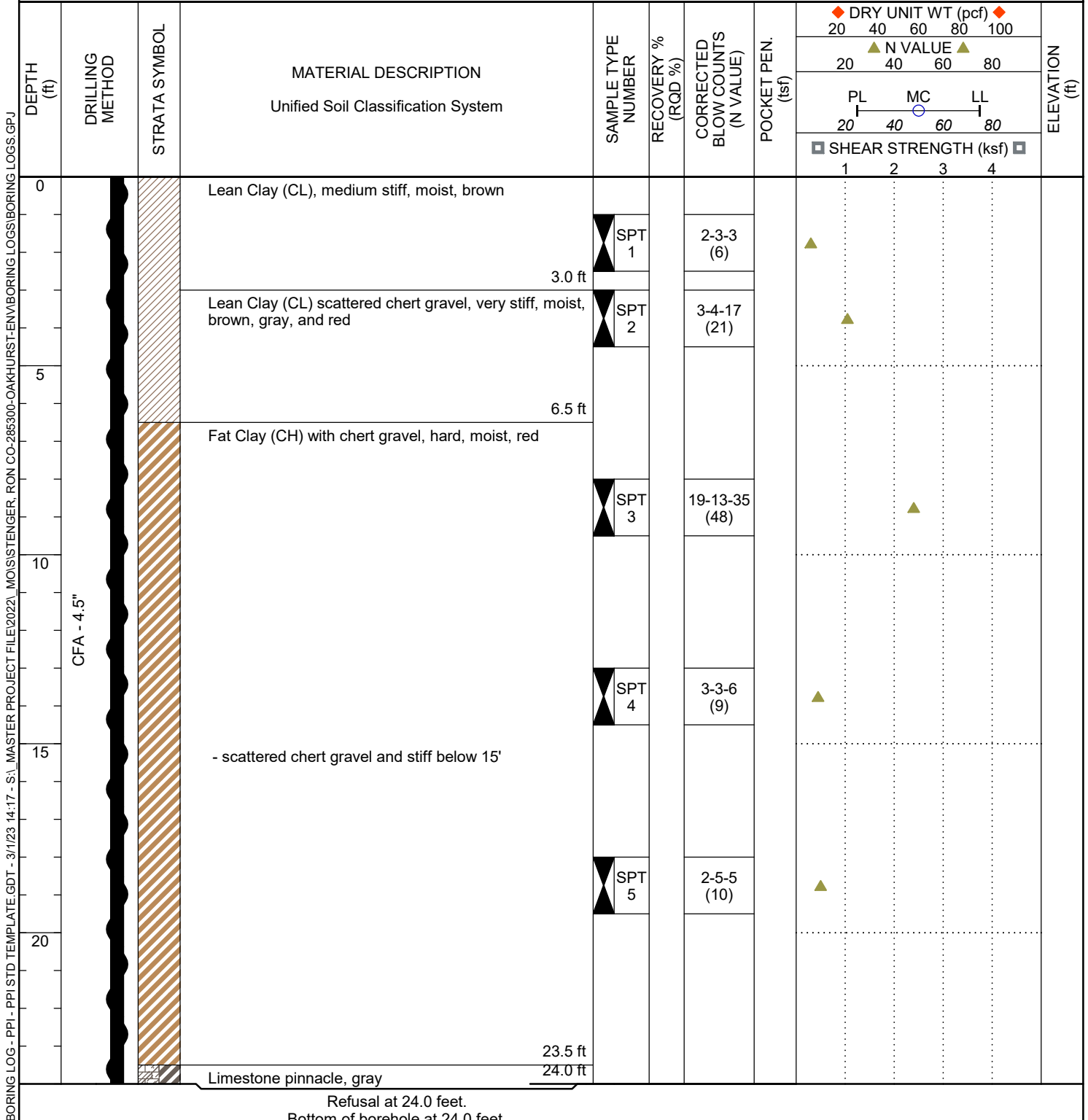
GEOTECHNICAL BORING LOG

BORING NUMBER

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PAGE 1 OF 1

CLIENT	Stenger Homes	PROJECT NAME	Oakhurst
PROJECT NO.	285300	PROJECT LOCATION	Nixa, MO
DATE STARTED	1/16/23	COMPLETED	1/16/23
DRILLER	RA	DRILL RIG	2014 CME 55
HAMMER TYPE	Auto	GROUND WATER LEVELS	
LOGGED BY	DN	AT TIME OF DRILLING	None
CHECKED BY	BP	AT END OF DRILLING	
NOTES			





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GEOTECHNICAL BORING LOG

BORING NUMBER

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PAGE 1 OF 2

CLIENT <u>Stenger Homes</u>	PROJECT NAME <u>Oakhurst</u>
PROJECT NO. <u>285300</u>	PROJECT LOCATION <u>Nixa, MO</u>
DATE STARTED <u>1/16/23</u>	COMPLETED <u>1/16/23</u>
SURFACE ELEVATION _____	BENCHMARK EL. _____
DRILLER <u>RA</u>	DRILL RIG <u>2014 CME 55</u>
GROUND WATER LEVELS	
HAMMER TYPE <u>Auto</u>	AT TIME OF DRILLING <u>None</u>
LOGGED BY <u>DN</u>	CHECKED BY <u>BP</u>
AT END OF DRILLING _____	
NOTES _____	

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆ 20 40 60 80 100				ELEVATION (ft)
								▲ N VALUE ▲ 20 40 60 80				
								PL MC LL 20 40 60 80				
								■ SHEAR STRENGTH (ksf) ■ 1 2 3 4				
0	CFA - 4.5"		Lean Clay (CL) trace chert gravel, medium stiff, moist, brown	SPT 1		1-2-3 (5)						
			SPT 2		3-3-4 (7)							
5												
			8.0 ft	SPT 3		6-16-20 (36)						
10				SPT 4		5-7-6 (13)						
15			15.0 ft									
	Fat Clay (CH) with chert gravel, very stiff, moist, red		SPT 5		19-12-6 (18)							
20												



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GEOTECHNICAL BORING LOG

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CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	◆ DRY UNIT WT (pcf) ◆	ELEVATION (ft)
								20 40 60 80 100	
								▲ N VALUE ▲	
								PL MC LL	
								■ SHEAR STRENGTH (ksf) ■	
1 2 3 4									
25	CFA - 4.5"		Fat Clay (CH) with chert gravel, very stiff, moist, red (continued)						
			30.0 ft						

30

Limestone

Refusal at 30.0 feet.
Bottom of borehole at 30.0 feet.

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 3/1/23 14:17 - S:_MASTER PROJECT FILE\2023\ MOISTENGER, RON CO-285300-OAKHURST-ENVIRONMENTAL BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER

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CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

DATE STARTED 1/16/23

COMPLETED 1/16/23

SURFACE ELEVATION

BENCHMARK EL.

DRILLER RADRILL RIG 2014 CME 55

GROUND WATER LEVELS

HAMMER TYPE Auto

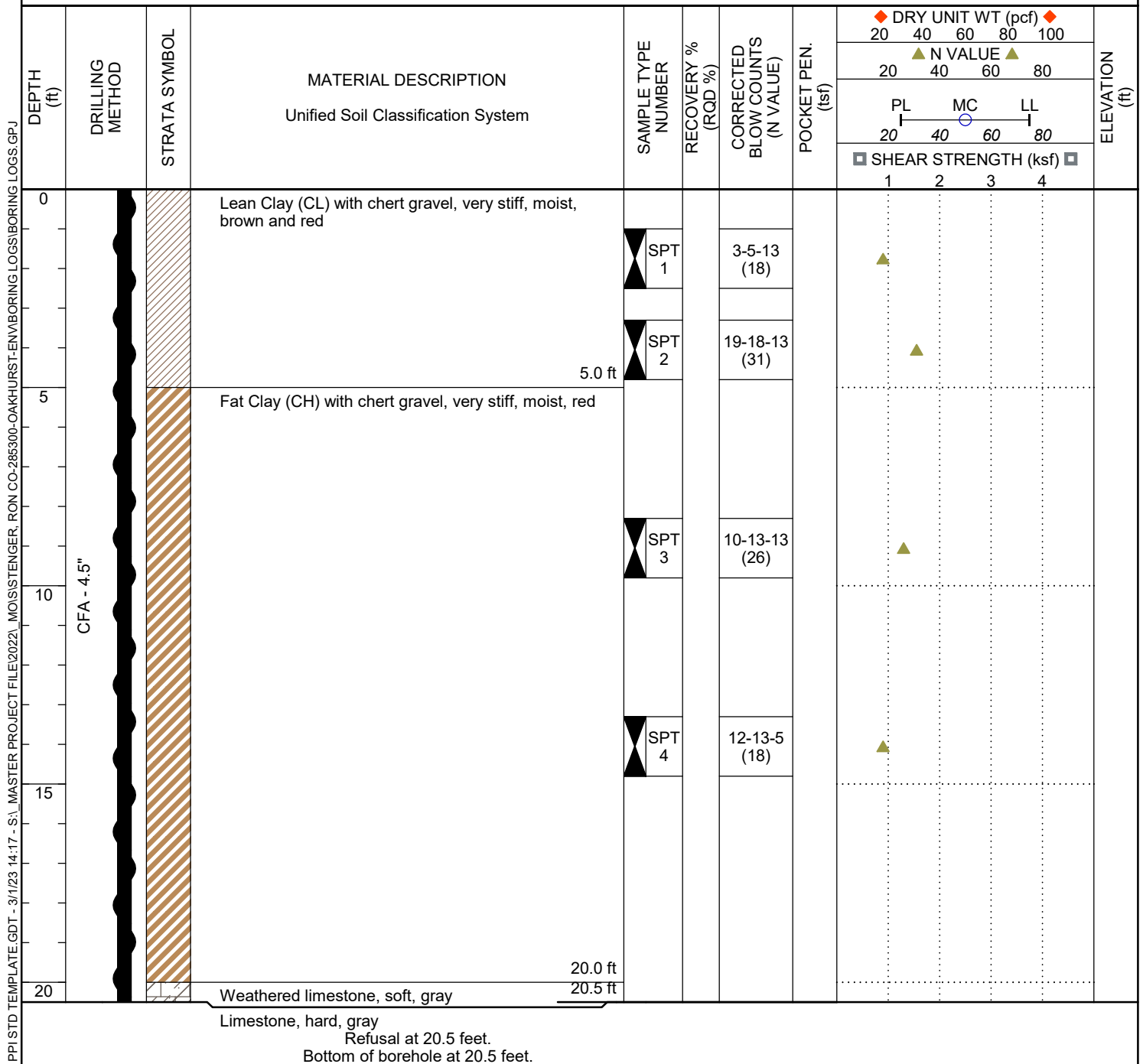
AT TIME OF DRILLING None

LOGGED BY DN

CHECKED BY BP

AT END OF DRILLING

NOTES





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KEY TO SYMBOLS

CLIENT Stenger Homes

PROJECT NAME Oakhurst

PROJECT NO. 285300

PROJECT LOCATION Nixa, MO

LITHOLOGIC SYMBOLS (Unified Soil Classification System)



CH: USCS High Plasticity Clay



CL: USCS Low Plasticity Clay



LIMESTONE PINNACLE & CH:
Limestone Pinnacle Next to USCS Fat
Clay



WEATHERED LIMESTONE: Weathered
Limestone

SAMPLER SYMBOLS



Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
▽ Water Level at Time
Drilling, or as Shown
▼ Water Level at End of
Drilling, or as Shown
▽ Water Level After 24
Hours, or as Shown

APPENDIX III

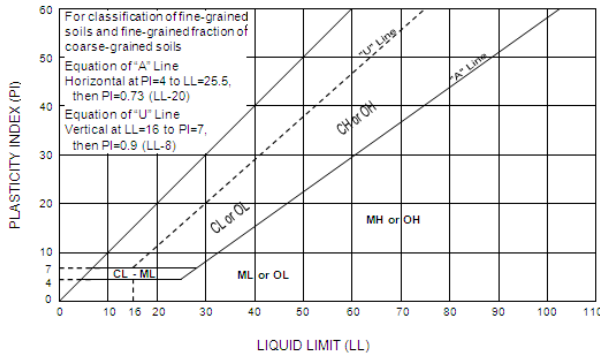
GENERAL NOTES & IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL ENGINEERING REPORT

GENERAL NOTES

SOIL PROPERTIES & DESCRIPTIONS

COHESIVE SOILS

Consistency	Unconfined Compressive Strength (Qu)	Pocket Penetrometer Strength	N-Value
	(psf)	(tsf)	(blows/ft)
Very Soft	<500	<0.25	0-1
Soft	500-1000	0.25-0.50	2-4
Medium Stiff	1001-2000	0.50-1.00	5-8
Stiff	2001-4000	1.00-2.00	9-15
Very Stiff	4001-8000	2.00-4.00	16-30
Hard	>8000	>4.00	31-60
Very Hard			>60



Group Symbol	Group Name
CL	Lean Clay
ML	Silt
OL	Organic Clay or Silt
CH	Fat Clay
MH	Elastic Silt
OH	Organic Clay or Silt
PT	Peat
CL-CH	Lean to Fat Clay

Plasticity		Moisture	
Description	Liquid Limit (LL)	Descriptive Term	Guide
Lean	<45%	Dry	No indication of water
Lean to Fat	45-49%	Moist	Indication of water
Fat	≥50%	Wet	Visible water

Fine Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: SILT, LEAN CLAY, FAT CLAY, ELASTIC SILT	PRIMARY CONSTITUENT
Sandy, gravelly, abundant cobbles, abundant boulders	>30-50]
with sand, with gravel, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered sand, scattered gravel, scattered cobbles, scattered boulders	5-15]
a trace sand, a trace gravel, a few cobbles, a few boulders	<5]
The relationship of clay and silt constituents is based on plasticity and normally determined by performing index tests. Refined classifications are based on Atterberg Limits tests and the Plasticity Chart.	

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	N-VALUE	MOISTURE CONDITION	
		Descriptive Term	Guide
Very Loose	0-4	Dry	No indication of water
Loose	5-10	Moist	Damp but no visible water
Medium Dense	11-24	Wet	Visible free water, usually
Dense	25-50		soil is below water table.
Very Dense	≥51		

**GRAIN SIZE IDENTIFICATION		
Name	Size Limits	Familiar Example
Boulder	12 in. or more	Larger than basketball
Cobbles	3 in. to 12 in.	Grapefruit
Coarse Gravel	¾-in. to 3 in.	Orange or lemon
Fine Gravel	No. 4 sieve to ¾-in.	Grape or pea
Coarse Sand	No. 10 sieve to No. 4 sieve	Rock salt
Medium Sand	No. 40 sieve to No. 10 sieve	Sugar, table salt
Fine Sand*	No. 200 sieve to No. 40 sieve	Powdered sugar
Fines	Less than No. 200 sieve	
*Particles finer than fine sand cannot be discerned with the naked eye at a distance of 8 in.		

Coarse Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: GRAVEL, SAND, COBBLES, BOULDERS	PRIMARY CONSTITUENT
Sandy, gravelly, abundant cobbles, abundant boulders	>30-50]
with gravel, with sand, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered gravel, scattered sand, scattered cobbles, scattered boulders	5-15]
a trace gravel, a trace sand, a few cobbles, a few boulders	<5]
Silty (MH & ML)*, clayey (CL & CH)*	<15]
(with silt, with clay)*	5-15] – secondary fine grained constituents
(trace silt, trace clay)*	<5]
*Index tests and/or plasticity tests are performed to determine whether the term "silt" or "clay" is used.	

*Modified after Ref. ASTM D2487-93 & D2488-93

**Modified after Ref. Oregon DOT 1987 & FHWA 1997

***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

GENERAL NOTES

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD)	
Description of Rock Quality	*RQD (%)
Very Poor	< 25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	90-100
*RQD is defined as the total length of sound core pieces 4 in. or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.	

SCALE OF RELATIVE ROCK HARDNESS		
Term	Field Identification	Approx. Unconfined Compressive Strength (tsf)
Extremely Soft	Can be indented by thumbnail	2.6-10
Very Soft	Can be peeled by pocket knife	10-50
Soft	Can be peeled with difficulty by pocket knife	50-260
Medium Hard	Can be grooved 2 mm deep by firm pressure of knife	260-520
Moderately Hard	Requires one hammer blow to fracture	520-1040
Hard	Can be scratched with knife or pick only with difficulty	1040-2610
Very Hard	Cannot be scratched by knife or sharp pick	>2610

DEGREE OF WEATHERING	
Slightly Weathered	Rock generally fresh, joints stained and discoloration extends into rock up to 25mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered	Rock mass is decomposed 50% or less, significant portions of rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

GRAIN SIZE (TYPICALLY FOR SEDIMENTARY ROCKS)		
Description	Diameter (mm)	Field Identification
Very Coarse Grained	>4.76	Individual grains can easily be distinguished by eye.
Coarse Grained	2.0-4.76	
Medium Grained	0.42-2.0	Individual grains can be distinguished by eye.
Fine Grained	0.074-0.42	Individual grains can be distinguished by eye with difficulty.
Very Fine Grained	<0.074	Individual grains cannot be distinguished by unaided eye.

VOIDS	
Pit	Voids barely seen with naked eye to 6mm (¼-in)
Vug	Voids 6 to 50mm (¼ to 2 in) in diameter
Cavity	50 to 600mm (2 to 24 in) in diameter
Cave	>600mm

BEDDING THICKNESS	
Very Thick Bedded	> 3' thick
Thick Bedded	1' to 3' thick
Medium Bedded	4" to 1' thick
Thin Bedded	1¼" to 4" thick
Very Thin Bedded	½" to 1¼" thick
Thickly Laminated	⅛" to ½" thick
Thinly Laminated	⅛" or less (paper thin)

DRILLING NOTES

Drilling and Sampling Symbols

NQ – Rock Core (2-in. diameter)
 HQ – Rock Core (3 in. diameter)
 HSA – Hollow Stem Auger

CFA – Continuous Flight (Solid Stem) Auger
 SS – Split Spoon Sampler
 ST – Shelby Tube

WB – Wash Bore or Mud Rotary
 TP – Test-Pit
 HA – Hand Auger

Soil Sample Types

Shelby Tube Samples: Relatively undisturbed soil samples were obtained from the borings using thin wall (Shelby) tube samplers pushed hydraulically into the soil in advance of drilling. This sampling, which is considered to be undisturbed, was performed in accordance with the requirements of ASTM D 1587. This type of sample is considered best for the testing of "in-situ" soil properties such as natural density and strength characteristics. The use of this sampling method is basically restricted to soil containing little to no chert fragments and to softer shale deposits.

Split Spoon Samples: The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot of an 18-in. long, 2-in. O.D. split-barrel sampler with a 140 lb. hammer falling a distance of 30 in. The Standard Penetration Test is carried out according to ASTM D-1586.

Water Level Measurements

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, shallow groundwater may indicate a perched condition. Caution is merited when interpreting short-term water level readings from open bore holes. Accurate water levels are best determined from piezometers.

Automatic Hammer

Palmerton and Parrish's CME's are equipped with automatic hammers. The conventional method used to obtain disturbed soil samples used a safety hammer operated by company personnel with a cat head and rope. However, use of an automatic hammer allows a greater mechanical efficiency to be achieved in the field while performing a Standard Penetration resistance test based upon automatic hammer efficiencies calibrated using dynamic testing techniques.

*Modified after Ref. ASTM D2487-93 & D2488-93

**Modified after Ref. Oregon DOT 1987 & FHWA 1997

***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.

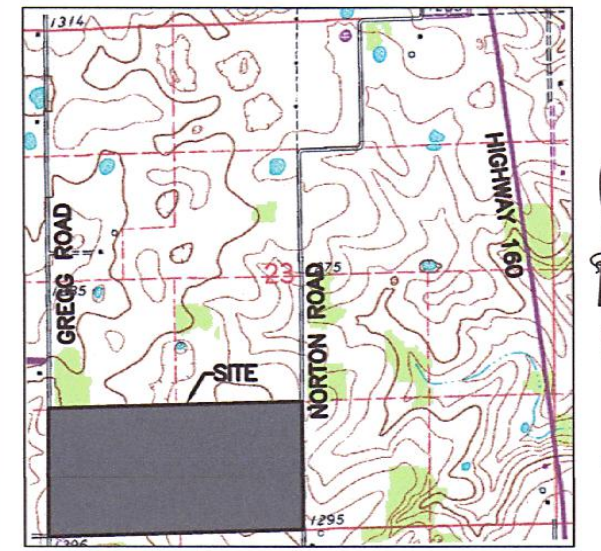


Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org

LOCATION MAP:

SECTION 23, TOWNSHIP 27 NORTH, RANGE 22 WEST
SCALE: 1" = 200'

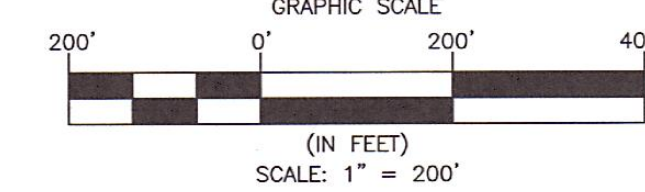


LEGEND:

- = EXISTING IRON PIN FOUND (EXCEPT AS NOTED)
- = 5/8" IRON PIN SET, CAPPED
- = EXISTING PERMANENT MON. FOUND (EXCEPT AS NOTED)
- = PERMANENT MON. SET (5/8" x 24" REBAR W/ ALUM. CAP)
- (M) = MEASURED DATA
- (D) = PLATTED DATA
- BSL = DEEDED DATA
- BSL = BUILDING SETBACK LINE
- DRAIN = DRAINAGE
- SEWER = SANITARY SEWER
- UTIL. = UTILITY
- ESMT. = EASEMENT
- N = NORTH
- S = SOUTH
- E = EAST
- W = WEST
- = EXISTING CHAIN LINK FENCE
- = EXISTING BOARD FENCE
- = EXISTING WIRE FENCE

PRELIMINARY PLAT OAKHURST BEING A PART OF THE S1/2 OF THE SW1/4, IN SECTION 23, TOWNSHIP 27 NORTH, RANGE 22 WEST, IN THE CITY OF NIXA, CHRISTIAN COUNTY, MISSOURI

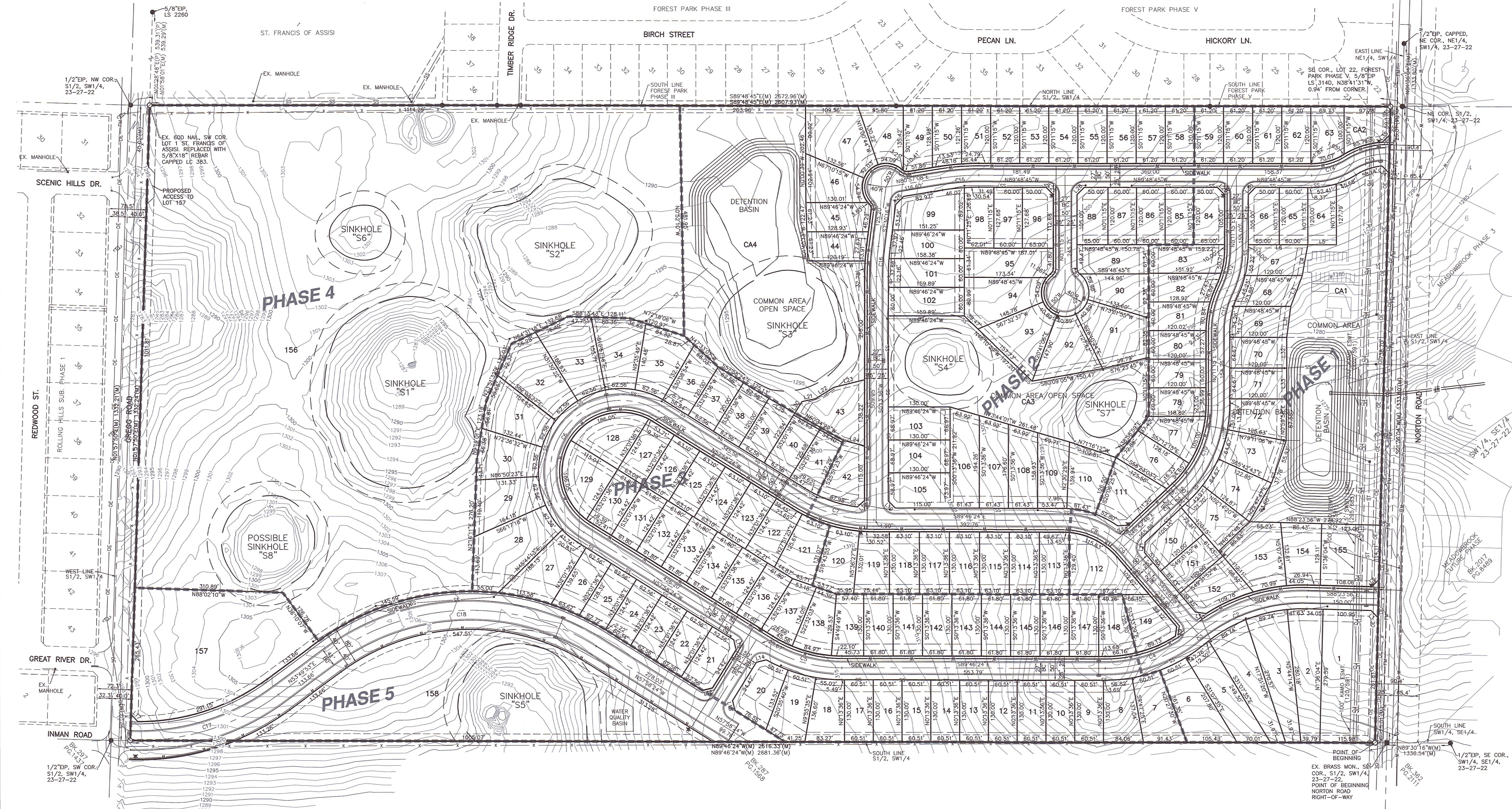
BEARINGS ARE BASED ON THE NAD 83 MISSOURI COORDINATE SYSTEM. ZONE COORDINATES WERE ESTABLISHED FROM MISSOURI STATE DEPARTMENT OF REVENUE CONTROL MONUMENT, CH-14, GRID FACTOR: 0.999993, DATE OF ADJUSTMENT: DECEMBER, 2004



DESCRIPTION:

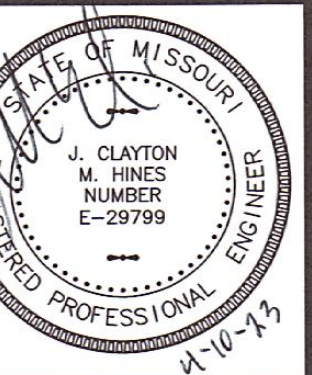
SOURCE OF DESCRIPTION: BOOK 297 AT PAGE 1439 IN THE CHRISTIAN RECORDER'S OFFICE.

THAT CERTAIN PARCEL OR TRACT OF LAND BEING A PART OF THE SOUTH HALF (S1/2) OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 23, TOWNSHIP 27 NORTH, RANGE 22 WEST, IN CHRISTIAN COUNTY, MISSOURI, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT AN EXISTING BRASS MONUMENT AT THE SOUTHEAST CORNER OF THE SAID S1/2 OF THE SW1/4; THENCE N89°48'24"W, ALONG THE SOUTH LINE OF SAID S1/2 OF THE SW1/4, A DISTANCE OF 25.01 FEET TO AN IRON PIN SET FOR A POINT OF BEGINNING; THENCE CONTINUING N89°48'24"W, ALONG SAID SOUTH LINE, A DISTANCE OF 2616.33 FEET TO AN IRON PIN SET; THENCE N01°57'50"E, A DISTANCE OF 1332.24 FEET TO AN IRON PIN SET ON THE NORTH LINE OF SAID S1/2 OF THE SW1/4, SAID POINT BEING THE SOUTHWEST CORNER OF LOT 1 IN ST. FRANCIS OF ASSISI, A SUBDIVISION IN THE CITY OF NIXA, CHRISTIAN COUNTY, MISSOURI; THENCE S89°48'45"E, ALONG THE NORTH LINE OF SAID S1/2 OF THE SW1/4, SAID LINE ALSO BEING THE SOUTH LINE OF SAID LOT 1, THE SOUTH OF FOREST PARK PHASE II, A SUBDIVISION IN THE CITY OF NIXA, CHRISTIAN COUNTY, MISSOURI, AND THE SOUTH LINE OF FOREST PARK PHASE V, A SUBDIVISION IN THE CITY OF NIXA, CHRISTIAN COUNTY, MISSOURI, A DISTANCE OF 2607.93 FEET TO AN IRON PIN SET AT THE SOUTHEAST CORNER OF LOT 22 IN SAID FOREST PARK PHASE V; THENCE S01°36'04"W, A DISTANCE OF 1333.78 FEET TO THE POINT OF BEGINNING, SAID TRACT OF LAND CONTAINS 79.905 ACRES (MORE OR LESS) AND IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, AND RESTRICTIONS OF RECORD.



OAKHURST
A SUBDIVISION IN THE CITY OF NIXA,
CHRISTIAN COUNTY, MISSOURI

DEVELOPERS:
OAKHURST DEVELOPMENT, LLC



SHAFFER & HINES, INC.
CERTIFICATE OF AUTHORITY
LICENSE NO. E-1665-D

SHAFFER & HINES
CONSULTING ENGINEERS - REGISTERED LAND SURVEYORS
DBE CERTIFIED COMPANY

P.O. Box 493, Nixa, Missouri 65714
Tel: (417) 725-4663 • Fax: (417) 725-5230
Email: ch@shaferhines.com



PRELIMINARY PLAT

DESIGN BY JCMH
DRAWN BY BW
CHECKED BY JCMH
DATE 03-24-2023
SCALE AS SHOWN

REVISIONS

JOB NO.
170015

SHEET
1 OF 2

PRELIMINARY PLAT
OAKHURST
BEING A PART OF THE S1/2 OF THE SW1/4,
IN SECTION 23, TOWNSHIP 27 NORTH, RANGE 22 WEST,
IN THE CITY OF NIXA, CHRISTIAN COUNTY, MISSOURI

LINE TABLE:

LINE	LENGTH	BEARING
L1	21.21'	S43°23'56"E
L2	21.21'	S46°36'04"W
L3	69.02'	S20°39'00"W
L4	65.72'	N10°28'44"E
L5	60.00'	S89°48'45"E
L6	125.00'	N89°48'45"W
L7	20.41'	N39°01'26"E
L8	19.83'	S56°42'42"E
L9	19.92'	N7°55'14"E
L10	22.39'	S82°10'56"E
L11	21.73'	N3°07'19"E
L12	22.87'	S87°02'52"W
L13	21.21'	S12°58'24"E
L14	21.44'	N76°25'22"E
L15	21.21'	N12°58'24"W
L16	21.21'	S77°01'36"W
L17	21.04'	N43°30'11"W
L18	20.13'	N48°05'40"E
L19	21.21'	S44°46'24"E
L20	28.21'	S32°01'36"W
L21	28.73'	N77°55'41"E
L22	46.02'	N58°48'50"E
L23	65.79'	N76°11'50"E
L24	45.26'	S75°34'56"E
L25	62.63'	N60°34'22"W
L26	24.05'	N44°13'42"E
L27	21.21'	S44°48'45"E
L28	21.21'	N45°11'15"E
L29	21.21'	S44°48'45"E
L30	21.21'	N45°11'15"E
L31	65.20'	N7°32'28"E
L32	64.67'	N0°11'15"E
L33	64.67'	N0°11'15"E
L34	20.57'	S45°07'08"E
L35	21.66'	N45°22'22"E

CURVE TABLE:

CURVE	RADIUS	LENGTH	TANGENT	CHORD	DELTA	CHORD BEARING
C2	350.00'	246.52'	128.62'	241.46'	040°21'23"	S71°25'22"W
C3	350.00'	4.83'	2.42'	4.83'	000°47'27"	S50°50'57"W
C4	300.00'	208.25'	108.52'	204.09'	039°46'22"	N70°20'25"E
C5	300.00'	166.50'	85.46'	164.38'	031°48'00"	S73°52'24"E
C6	149.42'	469.42'	INFINITY	298.84'	180°00'00"	S32°01'36"W
C7	300.00'	166.50'	85.46'	164.38'	031°48'00"	S73°52'24"E
C8	175.00'	141.98'	75.16'	138.12'	046°29'10"	N66°31'49"W
C9	175.00'	8.61'	4.31'	8.61'	002°49'07"	N41°52'41"W
C10	250.00'	203.00'	107.47'	197.47'	046°31'31"	N23°27'00"E
C11	200.00'	89.30'	45.41'	88.56'	025°35'00"	S12°58'45"W
C12	200.00'	89.30'	45.41'	88.56'	025°35'00"	N12°58'45"E
C13	150.00'	87.78'	45.19'	86.53'	033°31'47"	S74°50'10"W
C14	150.00'	84.08'	43.18'	82.98'	032°06'59"	N74°07'46"E
C15	500.00'	80.59'	40.38'	80.51'	009°14'07"	S85°34'12"W
C16	500.00'	63.51'	31.80'	63.47'	007°16'40"	S3°51'56"W
C17	500.00'	332.77'	172.81'	326.66'	038°07'57"	N72°53'52"E
C18	500.00'	595.12'	338.50'	560.60'	068°11'43"	S87°55'44"W
C19	15.00'	13.62'	7.32'	13.16'	052°01'12"	N17°54'40"E
C20	15.00'	13.62'	7.32'	13.16'	052°01'12"	S34°06'32"E
C21	15.00'	13.62'	7.32'	13.16'	052°01'12"	N26°11'51"E
C22	15.00'	13.62'	7.32'	13.16'	052°01'12"	S25°49'21"E
C23	15.00'	13.62'	7.32'	13.16'	052°01'12"	N18°30'20"E
C24	15.00'	13.62'	7.32'	13.16'	052°01'12"	S73°02'15"E

LOT AREA TABLE:

LOT	AREA (SQ.FT.)	LOT	AREA (SQ.FT.)	LOT	AREA (SQ.FT.)	LOT	AREA (SQ.FT.)
1	32,145	42	9,471	83	9,432	124	7,851
2	16,170	43	12,215	84	7,687	125	7,851
3	16,709	44	7,602	85	7,200	126	7,851
4	15,442	45	8,148	86	7,200	127	7,849
5	13,620	46	9,357	87	7,200	128	10,992
6	14,151	47	16,678	88	7,687	129	10,992
7	10,966	48	9,195	89	9,228	130	7,688
8	9,531	49	8,186	90	9,474	131	7,689
9	7,867	50	7,625	91	14,866	132	7,689
10	7,867	51	7,359	92	11,802	133	7,689
11	7,867	52	7,344	93	13,330	134	7,689
12	7,867	53	7,344	94	13,572	135	7,689
13	7,867	54	7,344	95	11,373	136	7,689
14	7,867	55	7,344	96	8,186	137	8,246
15	7,867	56	7,344	97	7,661	138	8,566
16	7,867	57	7,344	98	7,907	139	8,136
17	7,867	58	7,344	99	11,498	140	8,034
18	9,467	59	7,344	100	9,295	141	8,034
19	10,276	60	7,344	101	9,571	142	8,034
20	9,743	61	7,344	102	9,592	143	8,034
21	8,181	62	7,344	103	8,967	144	8,034
22	7,784	63	7,930	104	8,967	145	8,034
23	7,784	64	7,333	105	9,504	146	8,034
24	7,784	65	7,200	106	12,476	147	8,034
25	7,868	66	7,687	107	11,391	148	8,297
26	8,343	67	7,826	108	10,306	149	8,832
27	12,934	68	7,715	109	9,615	150	8,210
28	19,191	69	7,883	110	10,636	151	7,372
29	12,716	70	7,760	111	11,617	152	9,358
30	11,188	71	7,760	112	13,827	153	14,411
31	12,693	72	9,209	113	8,201	154	10,214
32	15,702	73	9,677	114	8,203	155	15,775
33	15,275	74	9,641	115	8,203	156	936,328
34	13,195	75	9,339	116	8,203	157	81,601
35	12,016	76	9,129	117	8,203	158	144,098
36	8,153	77	8,645	118	8,203	CA1	137,593
37	7,508	78	7,191	119	9,025	CA2	7,833
38	7,508	79	7,200	120	10,172	CA3	81,601
39	7,596	80	7,200	121	9,785	CA4	182,756
40	7,774	81	7,385	122	8,427		
41	7,769	82	8,415	123	7,851		

NOTES:

1. THE PROPERTY SHOWN HEREON LIES WITHIN ZONE X A F.E.M.A. IDENTIFIED FLOOD HAZARD AREA, AN AREA OF MINIMAL FLOODING, ACCORDING TO PRELIMINARY COMMUNITY MAP PANEL NO. 29043C0068D AND MAP PANEL NO. 29043C0064D, WHICH BEARS AN EFFECTIVE DATE OF 09-20-2019.
2. SOURCE OF SURVEY: FINAL PLAT OF JACK'S PLACE PHASE ONE; FINAL PLAT OF JACK'S PLACE PHASE TWO; FINAL PLAT OF JACK'S PLACE PHASE THREE; FINAL PLAT OF FOREST PARK PHASE FOUR; FINAL PLAT OF FOREST PARK PHASE 5; SURVEY BY SHAFER & HINES, INC., DATED 08-16-2005, 07-20-2006, 05-05-2000; SURVEY BY AMSINGER SURVEYING INC., DATED 11-07-2003; FINAL PLAT OF HEDOPETH ADDITION; FINAL PLAT OF HEDOPETH ESTATES 4TH ADDITION; FINAL PLAT OF NEAL AND FASLER; FINAL PLAT OF BAILIE DIESEL SURVEY BY GUNTER & ASSOCIATES, INC., DATED 10-21-1993, 10-20-2004; SURVEY BY ROZELL ENGINEERING CO., DATED 01-29-1986; FINAL PLAT OF ST. FRANCIS OF ASSISSI; SURVEY BY TODD SURVEYING DATED 09-09-1996; SURVEY RECORD BOOK 4 AT PAGE 210-211, DATED MARCH 20, 1906.
3. NO INTERNAL FENCES WERE LOCATED DURING THE COURSE OF THIS SURVEY, AND ARE NOT SHOWN HEREON.
4. REFER TO SURVEY BY SHAFER & HINES, INC. DATED 02-02-2017, PROJECT NO. 160058, FOR ADDITIONAL INFORMATION NOT SHOWN ON THIS DRAWING.
5. LOTS 1-155 AND CA1-CA4 ARE ZONED AS R1.
6. LOTS 156-158 ARE ZONED AS NC (NEIGHBORHOOD COMMERCIAL).
7. LOT 157 IS ZONED AS R3 MULTI-FAMILY.
8. R-1 BUILDING SETBACKS: FRONT 25', SIDEYARD 7', SIDEYARD WITH STREET FRONTAGE 12', REAR 20', REAR YARD SETBACK ALONG A SECONDARY ARTERIAL STREET IS 40'.
9. SIDEWALKS WILL BE PROVIDED ON ONE SIDE OF ALL INTERNAL STREETS.
10. LOTS CA1-CA4 ARE COMMON AREA AND ARE TO BE DEEDED TO AND MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.
11. ALL STREETS, SANITARY SEWER, WATER, AND STORM WATER IMPROVEMENTS WILL BE PROVIDED PER CITY OF NIXA SPECIFICATIONS.
12. THERE SHALL BE A 12 FEET WIDE UTILITY EASEMENT PARALLEL AND ADJACENT TO ALL STREET RIGHT-OF-WAY LINES EXCEPT AS NOTED.
13. STREET RIGHT-OF-WAY LINES ARE PARALLEL WITH THE CENTERLINE DATA, EXCEPT AS NOTED.
14. LARGEST LOT: LOT 156 (936,328 SQ.FT.)
15. SMALLEST LOT: LOT 78 (7,191 SQ.FT.)
16. DEVELOPER: OAKHURST DEVELOPMENT, LLC
17. FOR SINKHOLE INFORMATION REFER TO THE SINKHOLE REPORT BY BY PALMERTON & PARRISH, INC., PROJECT # 242844, DATED 10-19-17 AND 12-08-22 AND THE LIMITED SUBSURFACE INVESTIGATION BY PALMERTON & PARRISH, INC, PROJECT # 285300, DATED 03-01-23.

OAKHURST
A SUBDIVISION IN THE CITY OF NIXA,
CHRISTIAN COUNTY, MISSOURI

DEVELOPERS:
OAKHURST DEVELOPMENT, LLC



SHAFER & HINES, INC.
CERTIFICATE OF AUTHORITY
LICENSE NO. E-1665-D

SHAFER & HINES
CONSULTING ENGINEERS - REGISTERED LAND SURVEYORS
DBE CERTIFIED COMPANY
P.O. Box 493, Nixa, Missouri, 65714
Tel: (417) 725-4663 • Fax: (417) 725-5230
Email: ch@shafferhines.com



PRELIMINARY PLAT

DESIGN BY JCHH
DRAWN BY BW
CHKD BY JCHH
DATE 03-24-2023
SCALE AS SHOWN

REVISIONS

JOB NO.

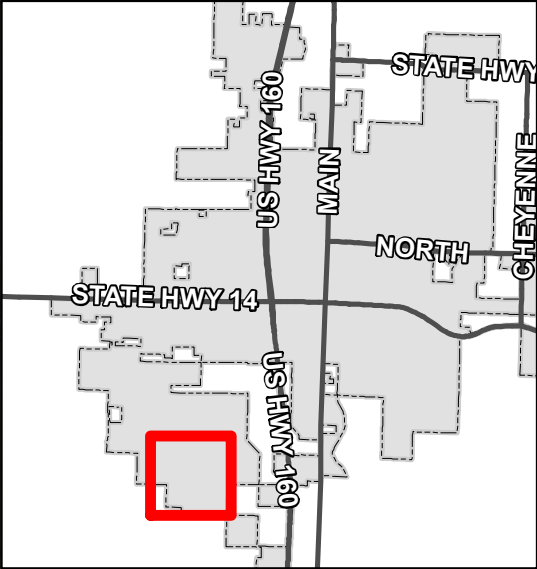
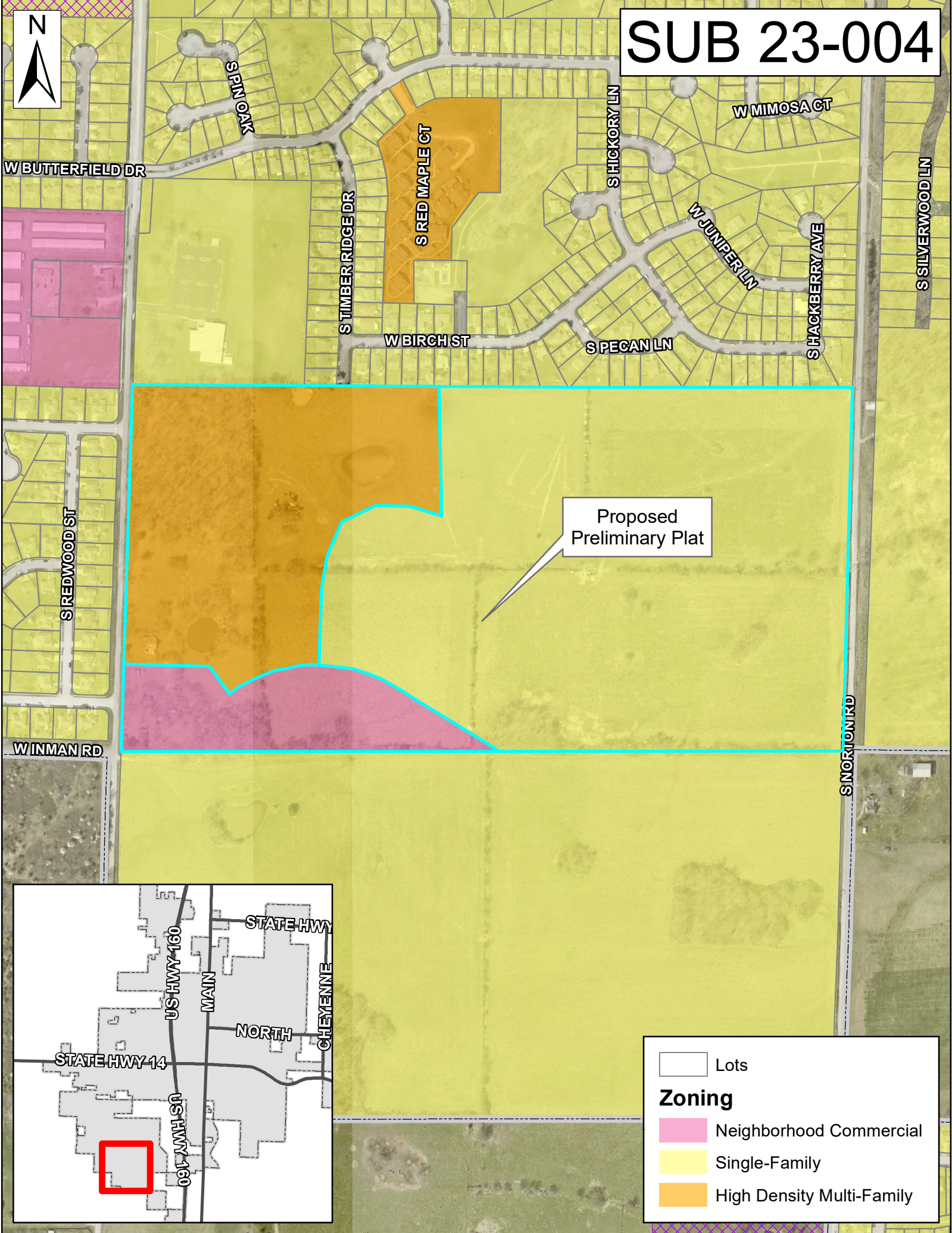
170015

SHEET

2 OF 2



SUB 23-004



- Lots
- Zoning**
- Neighborhood Commercial
 - Single-Family
 - High Density Multi-Family