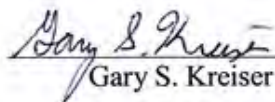


Soil and Site Evaluation For
Wastewater Treatment and Dispersal Systems
East Lawyers Road
Wingate, NC
Union County
(APN: 02-230-008)

September 10, 2024


Gary S. Kreiser



Findings: Based on the soil and site evaluation, there is a high degree of certainty that two conventional septic system could be installed on the property. However, a drip system would most likely be required for a third home. Using a drip system, there is a high degree of certainty that the lot could be used for three homes.

No opinions are made regarding the following:

- Applicable zoning requirements;
- House location;
- Specific septic system layout/components; and
- Horizontal setbacks required from septic systems.

INTRODUCTION

Soil & Septic Solutions performed an on-site subsurface wastewater system investigation on a 9.01 acre tract (APN: 02-230-008) located on E. Lawyers Road in Wingate, Union County, North Carolina on March 23, 2024. The property was evaluated in accordance with 15A NCAC 18E "Wastewater Treatment and Dispersal Systems". The purpose of this investigation was to perform an analysis of parcel capacity for a residence.

At the time of the survey, the property was agricultural field and wooded. The slope was typically 5 to 10 percent.

INVESTIGATION METHODOLOGY

Soil borings were made with a hand-turned auger in the study area. Observations of the landscape (slope, drainage patterns, past use, etc.) as well as soil properties (depth, texture, structure, seasonal wetness, restrictive horizons, etc.) to a depth ≥ 48 inches when possible were recorded. Soil color was determined with a Munsell Soil Color Chart. From these observations, potentially suitable areas for wastewater disposal were identified.

A handheld global positioning system (GPS) with sub-meter accuracy was used to locate each soil boring as well as other pertinent site features.

FINDINGS

On the day of the field investigation, fifteen (15) hand auger borings were made on the property, logged, and their locations are shown in the Soil Boring Location Exhibit. Soil Boring logs are attached. A drainage/stream was encountered in the wooded area.

Depth to rock/saprolite was the limiting soil factor (See Soil Boring Logs). The shallowest depth to rock occurred at 12 inches. Borings 1 through 4 had a depth to saprolite that ranged from 33-48 inches. It is estimated that this area is approximately 40,000 ft². Borings 11 and 12 had a depth to saprolite of 30 and 33, respectively. This area is estimated to be approximately 5,000 ft².

The soil texture was typically silty clay loam. Borings that were shallow to rock typically had accumulation of rock fragments in the soil.

Based on the soil texture and depth to restrictive horizons a long-term acceptance rate (LTAR) of 0.45 gpd/ft² is recommended.

The concave slope/drainage head was not suitable due to topography.

GENERAL DESIGN AND INSTALLATION CRITERIA

Wastewater systems can be used when there is at least 12 inches of naturally occurring soil between the bottom of the trench and the limiting condition.

The conventional type of system requires a 12 inch trench depth. With the required 12 inch soil depth and 12 inch trench depth, there needs to be at least 24 inches of suitable soil. This property has two areas that would be suitable for a conventional type of system

The conventional type of system requires a 12 inch trench depth. With the required 12 inch soil depth and 12 inch trench depth, there needs to be at least 24 inches of suitable soil. Most of the soil borings had enough soil to correct for slope and meet the requirements and would be suitable for a conventional type of system (See Soil Boring Location Exhibit). Depending on the exact location of the system, the system may require a shallow placement, which may require a soil cap.

The size of the wastewater system is based on the design flow and the soils LTAR. For a 3 bedroom home, the design flow is 360 gallons per day (gpd). When the design flow is divided by the LTAR (using 0.45), the area of trench bottom can be calculated, which is 800 ft². The total length of

trenches can be calculated by dividing the trench bottom area by 3 feet (which is the maximum trench width). Using these calculations, a 3 bedroom home would need 267 linear feet of trench.

Septic lines are laid on contours 9 feet apart from the center. Assuming 3- 89 foot trenches, the minimum area needed is approximately 1,900 ft². This area assumes an even linear slope with parallel septic lines. Additionally, septic systems need a designated repair area. At a minimum there needs to be approximately 3,800 ft² for both the initial and repair area. This area can be reduced by using approved systems that allow for a 25% reduction in trench length.

Drip dispersal systems can be used when there is at least 18 inches of suitable soil above a limiting condition. Based on the soil borings, two areas have the potential to use a drip system for wastewater disposal. It is estimated that the areas are approximately 20,000 ft² and 23,000 ft².

Required horizontal setbacks were not considered in the soil that could be used for a wastewater disposal system. These setbacks will affect the overall area that can be used. Depending on the house location, the system may need to have a pump tank to pump to the septic system.

Permitting of the septic system may be done through the County Environmental Health Department or through the private permitting option. It is recommended that a site layout be performed to verify that there is enough space for the septic and repair system. Additionally, careful placement of the house and other improvements will need to be considered as to maximum the area of soil that can be used for septic.

CONCLUSIONS


Depth to rock/saprolite was the limiting soil condition. There is enough area for two conventional septic systems. Two areas suitable for drip dispersal were found. The potential third home would most likely need to be a drip system. Further analysis and site layout is recommended to determine the extent of the area and the potential system layout and configuration of potential lots.

The exact location of the system and potential layout as well as house location and horizontal setbacks, were not calculated or defined. Careful consideration as to house location and other improvements will need to be evaluated to maximize the potential septic area.

The findings presented herein represent Soil & Septic Solutions' soil and site evaluation and knowledge of the current laws and regulations governing on-site wastewater systems in North Carolina. This report discusses the general location of suitable soils and site conditions that are favorable for septic systems and does not constitute or imply any approval or permit as needed from the County Health Department.

It is Soil & Septic Solutions' professional opinion that this lot can be used for residential development if a drip or fill type system is used. Any concurrence with the findings of this report would be made during the County's site evaluation. Additionally, do not clear or grub any land until the County has granted the appropriate approvals.

Sincerely,

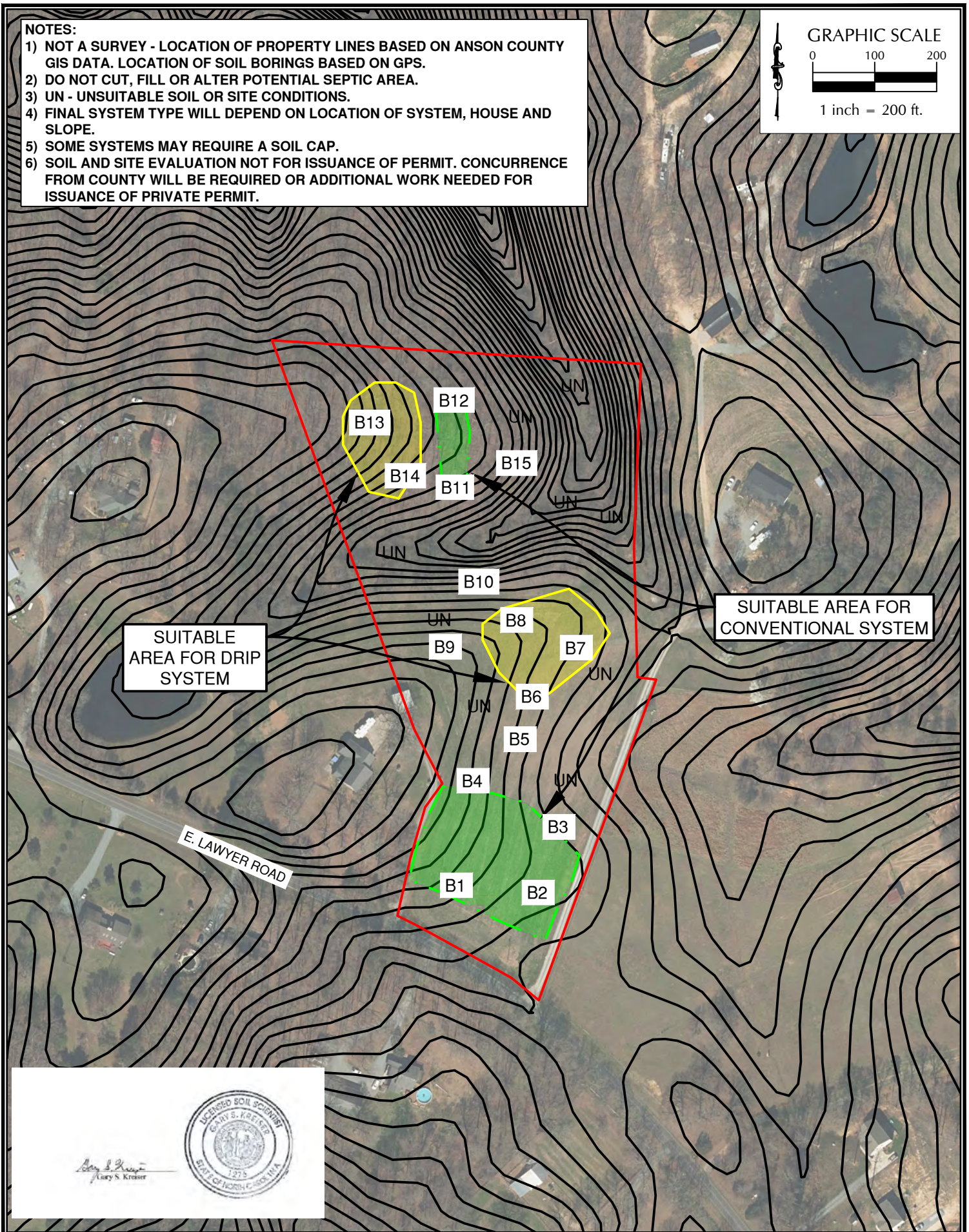
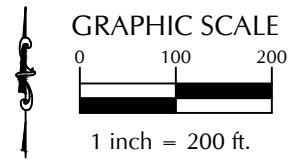


Attachments:

- 1) Soil boring Location Exhibit
- 2) Soil Boring Logs

NOTES:

- 1) NOT A SURVEY - LOCATION OF PROPERTY LINES BASED ON ANSON COUNTY GIS DATA. LOCATION OF SOIL BORINGS BASED ON GPS.
- 2) DO NOT CUT, FILL OR ALTER POTENTIAL SEPTIC AREA.
- 3) UN - UNSUITABLE SOIL OR SITE CONDITIONS.
- 4) FINAL SYSTEM TYPE WILL DEPEND ON LOCATION OF SYSTEM, HOUSE AND SLOPE.
- 5) SOME SYSTEMS MAY REQUIRE A SOIL CAP.
- 6) SOIL AND SITE EVALUATION NOT FOR ISSUANCE OF PERMIT. CONCURRENCE FROM COUNTY WILL BE REQUIRED OR ADDITIONAL WORK NEEDED FOR ISSUANCE OF PRIVATE PERMIT.



E LAWYERS ROAD
APN: 02-230-008
WINGATE UNION COUNTY NORTH CAROLINA

SOIL BORING LOCATIONS

SOIL & SEPTIC SOLUTIONS

SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

(Complete all fields in full)

OWNER: _____ DATE EVALUATED: 8/31/24
 ADDRESS: E. LAWYERS ROAD (APN 02-230-0008)
 PROPOSED FACILITY: _____ PROPOSED DESIGN FLOW (.0400): _____ PROPERTY SIZE: _____
 LOCATION OF SITE: _____ PROPERTY RECORDED: _____
 WATER SUPPLY: Public Single Family Well Shared Well Spring Other _____ WATER SUPPLY SETBACK: _____
 EVALUATION METHOD: Auger Boring Pit Cut TYPE OF WASTEWATER: Domestic High Strength IPWW

P R O F I L E #	.0502 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY		OTHER PROFILE FACTORS				.0509 PROFILE CLASS & LTAR*	.0502(d) SLOPE CORRE CTION
			.0503 STRUCTURE/ TEXTURE	.0503 CONSISTENCE/ MINERALOGY	.0504 SOIL WETNESS/ COLOR	.0505 SOIL DEPTH	.0506 SAPRO CLASS	.0507 RESTR HORIZ		
1	L 3-5%	0-12	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 5YR 5/6	S	-	-	S 0.45	1.1-1.8
		12-48	SBK/SiCL	FR/SS/SP/SEXP						
2	L 3-5%	0-33	SBK/SiCL	FR/SS/SP/SEXP	5YR 5/6	S	UN	-	S 0.45	1.1-1.8
		33-48	M/SiCL	FR/SS/SP/SEXP						
3	L 5-10%	0-10	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 5YR 5/6	S	UN	-	S 0.45	1.8-3.6
		10-36	SBK/SiCL	FR/SS/SP/SEXP						
		36-48	M/SiCL	FR/SS/SP/SEXP						
4	L 3-5%	0-10	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 5YR 5/6	S	UN	-	S 0.45	1.1-1.8
		10-34	SBK/SiCL	FR/SS/SP/SEXP						
		34-48	M/SiCL	FR/SS/SP/SEXP						

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM	SITE CLASSIFICATION (.0509): _____ EVALUATED BY: <u>GARY KREISER</u> OTHER(S) PRESENT: _____
Available Space (.0508)			
System Type(s)			
Site LTAR			
Maximum Trench Depth			

Comments: _____

LEGEND

LANDSCAPE POSITION	SOIL GROUP	SOIL TEXTURE	CONVENTIONAL LTAR (gpd/ft ²)	SAPROLITE LTAR (gpd/ft ²)	LPP LTAR (gpd/ft ²)	MINERALOGY/ CONSISTENCE		STRUCTURE	
						MOIST	WET		
CC (Concave slope)	I	S (Sand)	0.8 - 1.2	0.6 - 0.8	0.4 - 0.6	MOIST	WET	SG (Single grain)	
CV (Convex Slope)		LS (Loamy sand)		0.5 - 0.7		Lo (Loose)	NS (Non-sticky)	M (Massive)	
D (Drainage way)	II	SL (Sandy loam)	0.6 - 0.8	0.4 - 0.6	0.3 - 0.4	VFR (Very friable)	SS (Slightly sticky)	GR (Granular)	
FP (Flood plain)		L (Loam)		0.2 - 0.4		FR (Friable)	S (Sticky)	SBK (Subangular blocky)	
FS (Foot slope)	III	SiL (Silt loam)	0.3 - 0.6	0.1 - 0.3	0.15 - 0.3	FI (Firm)	VS (Very sticky)	ABK (Angular blocky)	
H (Head slope)		SCL (Sandy clay loam)		0.05 - 0.15**		VFI (Very firm)	NP (Non-plastic)	PR (Prismatic)	
L (Linear Slope)		CL (Clay loam)		None		0.15 - 0.3	EFI (Extremely firm)	SP (Slightly plastic)	PL (Platy)
N (Nose slope)		SiCL (Silty clay loam)					P (Plastic)	VP (Very plastic)	
R (Ridge/summit)		Si (Silt)							
S (Shoulder slope)	IV	SC (Sandy clay)	0.1 - 0.4	0.05 - 0.2	SEXP (Slightly expansive)				
T (Terrace)		SiC (Silty clay)			EXP (Expansive)				
TS (Toe Slope)		C (Clay)							
		O (Organic)	None						

* Adjust LTAR due to depth, consistence, structure, soil wetness, landscape, position, wastewater flow and quality.

**Sandy clay loam saprolite can only be used with advanced pretreatment in accordance with 15A NCAC 18E .1200.

HORIZON DEPTH In inches below natural soil surface

DEPTH OF FILL In inches from land surface

RESTRICTIVE HORIZON Thickness and depth from land surface

SAPROLITE S(suitable) or U(unsuitable); Evaluation of saprolite shall be by pits.

SOIL WETNESS CLASSIFICATION Inches from land surface to free water or inches from land surface to soil colors with chroma 2 or less - record Munsell color chip designation

S (Suitable) or U (Unsuitable)

Show profile locations and other site features (dimensions, reference or benchmark, and North).

SOIL/SITE EVALUATION
(Continuation Sheet-Complete all field in full)

DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH

PROPERTY ID #: _____
DATE OF EVALUATION: 8/31/24
COUNTY: UNION

P R O F I L E #	.0502 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY		OTHER PROFILE FACTORS				.0509 PROFILE CLASS & LTAR*	.0503 SLOPE CORRE CTION
			.0503 STRUCTURE/ TEXTURE	.0503 CONSISTENCE/ MINERALOGY	.0504 SOIL WETNESS/ COLOR	.0506 SOIL DEPTH	.0507 SAPRO CLASS	.0508 RESTR HORIZ		
5	L 5-10%	0-12	SBK/SiCL	FR/SS/SP/SEXP	2.5YR 6/4	UN	-	-	UN	
		12-AR	AUGER REFUSAL							
6	L 5-10%	0-20	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 WEATHERED SLATE	S	-	-	UN- CONVENTIO NAL	
		20+	M/SiL	FR/SS/SP/SEXP						
7	L 5-10%	0-28	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6	S	UN	-	S 0.3	1.8-3.6
		28-36+	M/SiC	FI/SS/SP/SEXP						
8	L 5-10%	0-18	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 WEATHERED ROCK	S	UN	-	UN - CONVENTIO NAL	-
		18-AR	AUGER REFUSAL							
9	L 5%	0-12	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6 FRAGMENT S ROCK	UN	-	-	UN	-
		12-AR	AUGER REFUSAL							

COMMENTS: _____

SOIL/SITE EVALUATION

(Continuation Sheet-Complete all field in full)

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10	L 5-10%	0-15	SBK/SiCL	FR/SS/SP/SEXP	2.5YR 6/4 ROCK FRAGMENTS	UN	-	-	UN	
		15-AR	AUGER REFUSAL							
11	L 3-5%	0-10	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6	S	-	-	S 0.3	1.1-1.8
		10-30	SBK/SiC	FI/SS/SP/SEXP						
		30+	M/SiC	FI/SS/SP/SEXP						
12	L 5-10%	0-15	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6	S	UN	-	S 0.45	1.8-3.6
		15-33	SBK/SiCL	FR/SS/SP/SEXP						
		33+	M/SiCL	FR/SS/SP/SEXP						
13	L 5-10%	0-18	SBK/SiCL	FR/SS/SP/SEXP	2.5YR 4/6	S	UN	-	UN - CONVENTIO NAL	-
		18-AR	AUGER REFUSAL							
14 15	L 5%	0-18	SBK/SiCL	FR/SS/SP/SEXP	2.5YR 4/6	S	UN	-	UN- CONVENTI ONAL	-
		18-30+	M/SiCL	FR/SS/SP/SEXP						
	0-12	SBK/SiCL	FR/SS/SP/SEXP	7.5YR 5/6	UN	UN	-	UN		
		12-AR	AUGER REFUSAL							ROCK FRAGMENTS

COMMENTS: _____