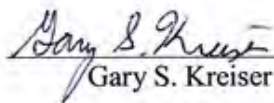


Soil and Site Evaluation For
Wastewater Treatment and Dispersal Systems
Mount Gilead Church Road
Connelly Springs, NC
Burke County
(APN: 31378)

July 25, 2024


Gary S. Kreiser



Findings: Based on the soil and site evaluation, there is a high degree of certainty that a four bedroom septic system could be installed, and the lot could be used for residential development. Due to the depth of the soil and slope, a Large Diameter Pipe (LDP) system would be the preferred system type.

No opinions are made regarding the following:

- Areas of the property not evaluated;
- 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 portion of an approximate 41 acre parcel (APN: 31378) located on Mount Gilead Church Road in Connelly Springs, Burke County, North Carolina on July 20, 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 four bedroom home.

At the time of the survey, the review area was wooded. A stream was located near the road. The review area was approximately 4 acres along the side slope and generally had a slope between 10 and 20 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 \geq 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, six (6) 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.

Depth to saprolite was the limiting soil factor (See Soil Boring Logs). The shallowest depth to saprolite was 28 inches (Boring 5). The other borings were at least 30 inches to saprolite. The typical texture of the soil was sandy clay loam to clay loam. An area of suitable soil was estimated to be 170,000 ft².

The saprolite encountered had a texture of sandy loam, with non-expansive clay mineralogy and did not contain open and continuous joints of quartz, or fractures of parent rock.

Based on the soil texture and depth to restrictive horizons a long-term acceptance rate (LTAR) of 0.4 gpd/ft² is recommended. Trench depth would be dependent on the exact location of the system but could be between 16-20 inches.

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.

For a 3 bedroom system, the design flow is 480 gallons per day (gpd). When the design flow is divided by the LTAR (using 0.4), the area of trench bottom can be calculated, which is 1,200 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 4 bedroom home would need 400 linear feet of trench of a conventional gravel system.

Based on the depth to saprolite in the suitable soil area and the slope in this area, a Large Diameter Pipe (LDP) is recommended instead of a conventional gravel system. The LDP allows for better use of space and slope correction and is easier to install on steeper slopes.

A 10" LDP system would require 480 linear feet of drain line. However, 10" LDP trenches would only have to be 6 feet apart, instead of 9 feet. Assuming 6 - 80 foot lines, the minimum area needed is 2,520 ft².

Additionally, septic systems need a designated repair area. At a minimum there needs to be at least 5,040 ft² for both the initial and repair area for each home.

Required horizontal setbacks (wells, property lines etc.,) were not considered in the soil that could be used for a septic system. These setbacks could affect the overall area that can be used.

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 houses and other improvements will need to be considered as to maximum the area of soil that can be used for septic.

CONCLUSIONS


Depth to saprolite was the limiting soil condition. Due to the depth of saprolite and slope a LDP system is recommended. The LDP system would maximum soil depth for slope correction and is easier to install on steeper slopes.

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. 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.

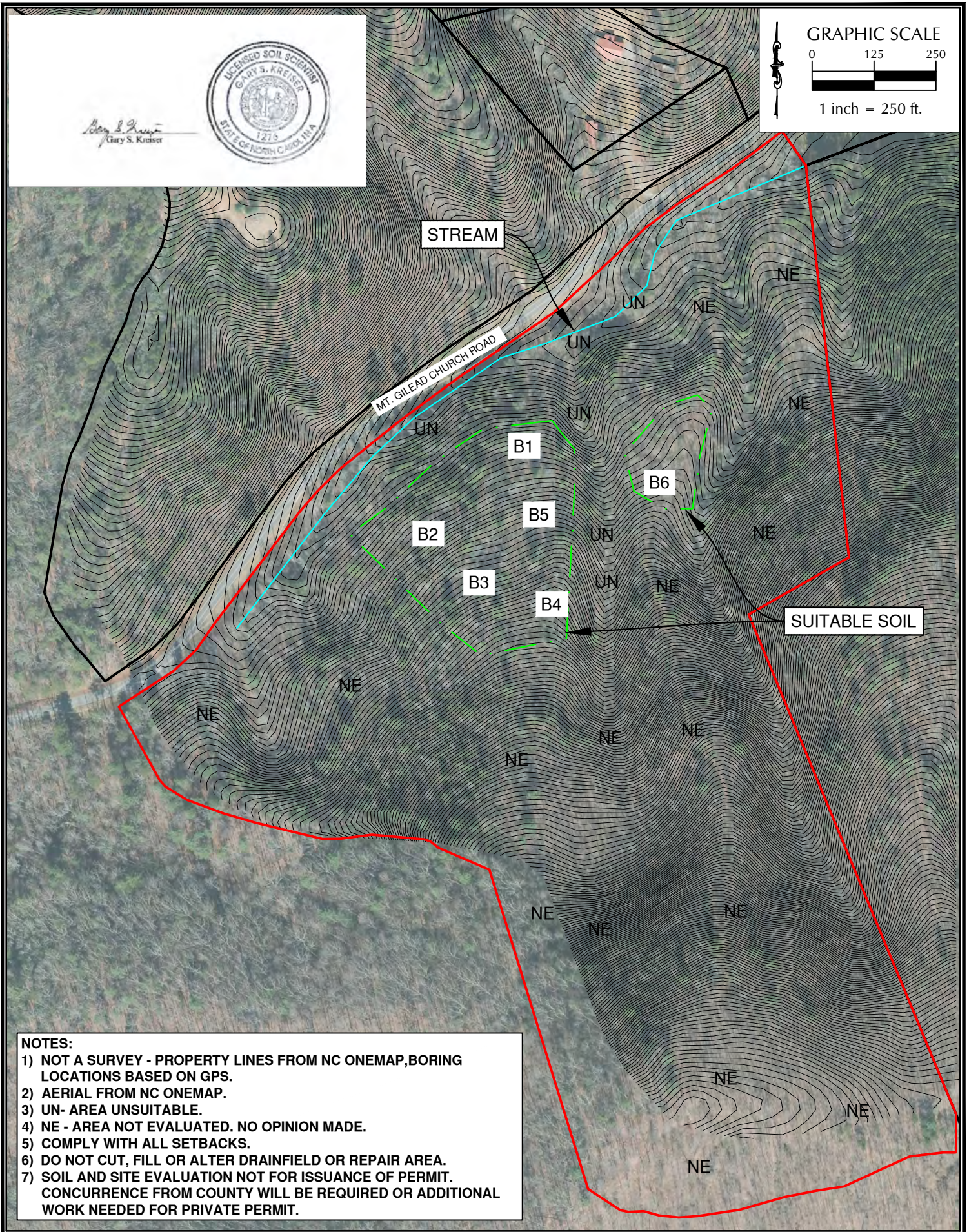
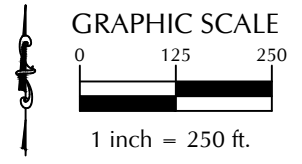
Sincerely,



Attachments:

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

Gary S. Krueger
Gary S. Krueger



NOTES:

- 1) NOT A SURVEY - PROPERTY LINES FROM NC ONEMAP, BORING LOCATIONS BASED ON GPS.
- 2) AERIAL FROM NC ONEMAP.
- 3) UN- AREA UNSUITABLE.
- 4) NE - AREA NOT EVALUATED. NO OPINION MADE.
- 5) COMPLY WITH ALL SETBACKS.
- 6) DO NOT CUT, FILL OR ALTER DRAINFIELD OR REPAIR AREA.
- 7) SOIL AND SITE EVALUATION NOT FOR ISSUANCE OF PERMIT. CONCURRENCE FROM COUNTY WILL BE REQUIRED OR ADDITIONAL WORK NEEDED FOR PRIVATE PERMIT.

MOUNT GILEAD CHURCH ROAD
APN: 31378

SOIL BORING LOCATIONS

SOIL & SEPTIC SOLUTIONS

SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

(Complete all fields in full)

OWNER: _____ DATE EVALUATED: 7/20/24

ADDRESS: Mount Gilead Church Road

PROPOSED FACILITY: house PROPOSED DESIGN FLOW (.0400): 480 PROPERTY SIZE: 41

acres 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 10-15%	0-24	GR/SL	FR/SS/SP/SEXP	10YR 6/4	S	-	-	S 0.4	3.6-5.4
		24-48	SBK/SCL	FR/SS/SP/SEXP						
2	L 10-15%	0-30	GR/SL	FR/SS/SP/SEXP	10YR 6/4	S	-	-	S 0.4	3.6-5.4
		30-48	SBK/SCL	FR/SS/SP/SEXP						
3	L 15%	0-18	GR/SL	FR/SS/SP/SEXP	10YR 6/4	S	-	-	S 0.4	5.4
		18-33	SBK/SCL	FR/SS/SP/SEXP						
		33-48	M/SL	VFR/SS/SP/SEXP						
4	L 20%	0-10	GR/SL	FR/SS/SP/SEXP	10YR 6/4	S	-	-	S 0.4	7.2
		10-30	SBK/SCL	FR/SS/SP/SEXP						
		30-48	M/SL	VFR/SS/SP/SEXP						

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM	SITE CLASSIFICATION (.0509): _____ EVALUATED BY: <u>GARY KREISER</u> OTHER(S) PRESENT: _____
Available Space (.0508)	Y	Y	
System Type(s)	LDP	LDP	
Site LTAR	0.4	0.4	
Maximum Trench Depth	16-20	16-20	

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		None	EFI (Extremely firm)	SP (Slightly plastic)	PL (Platy)
N (Nose slope)		SiCL (Silty clay loam)					P (Plastic)		
R (Ridge/summit)		Si (Silt)						VP (Very plastic)	
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: 7/20/24
COUNTY: BURKE

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 15%	0-8	GR/SL	FR/SS/SP/SEXP	10YR 6/4 2.5YR 4/6	S	-	-	S 0.4	5.4
		8-28	SBK/CL	FR/SS/SP/SEXP						
		28-48	M/SL	VFR/SS/SP/SEXP						
6	L 15-20%	0-10	GR/SL	FR/SS/SP/SEXP	10YR 6/4 2.5YR 4/6	S	-	-	S 0.4	5.4-7.2
		10-36	SBK/CL	FR/SS/SP/SEXP						
		36-48	M/SL	VFR/SS/SP/SEXP						

COMMENTS: _____

