Soil Suitability for Domestic Sewage Treatment and Disposal Systems
Carr Store Road & Lees Chapel Road
Orange County, North Carolina

PREPARED FOR: Mr. Steve Puckett

PREPARED BY: Derrick A. Smith, LSS, REHS

DATE: October 17, 2016

Soil suitability for domestic sewage treatment and disposal systems was evaluated on October 16, 2016 on portions of property located near the intersection of Carr Store Road and Lees Chapel Road (~40 acres). I, Derrick Smith, a NC licensed soil scientist conducted the soil evaluation. This was performed at your request as part of the preliminary planning process in order to determine areas of soil with potential for a conventional subsurface wastewater system.

I traversed the property and observed landforms (slope, drainage patterns, past use, etc.) as well as soil conditions (depth, texture, structure, seasonal wetness, restrictive horizons, etc.) through the use of hand auger borings. The site was evaluated during moist soil conditions. From these observations, an evaluation of the site, relative to subsurface disposal of wastewater, was developed. Soil areas were estimated in the field. The soil/site evaluation criteria used is that contained in 15 A NCAC 18A .1900 "Laws and Rules for Sewage Treatment and Disposal Systems".

FINDINGS

This site is located in the slate and mafic region of Orange County. The soils on this tract within the suitable soil areas are similar to the Georgeville/Herndon soil series. The Georgeville and Herndon soil series has a silt loam to loam surface material over a silty clay to clay subsoil. Usable soil depths ranges between 30-36+ inches within the evaluated areas. Soil borings were provisionally suitable with respect to restrictive horizons, i.e. no restrictive horizons were found in any borings within the provisionally suitable soil areas. Soil structure was provisionally suitable and was estimated to be granular to subangular blocky near the soil surface and subangular to angular blocky in the subsoil. Clay mineralogy was suitable with friable to firm moist soil consistence and slightly sticky to sticky and slightly plastic to plastic wet soil consistence.

Please be aware that not all of the soil on this property is suitable for a conventional subsurface septic system. There were soil borings that contained expansive clay mineralogy and/or chroma 2 mottles (indicative of a soil wetness condition) prior to 24 inches. These soils are similar in nature to an Enon soil series. The soybean field area off Lees Chapel Road is provisionally suitable from the road frontage back approximately 150 feet; however, once you descend back towards the natural drainage way (lower area), the soils begin to exhibit expansive soil properties prior to 24 inches which carry all the way back towards the tree line. See the attached sketch map for provisionally suitable soil areas (soil areas are approximate).

The site plan for each lot must ensure that adequate soil area for system and repair is unaffected by site elements (house placement, driveway, wells, patios, decks, etc.). The area ultimately designated by the Orange County health department on the site plan for the septic system and repair must remain undisturbed (no mechanical clearing, excavation, heavy traffic or other significant site disturbing activities) until authorized by the Orange County health department. A lot with initially adequate useable soil area may be rendered unusable as a result of improper site planning and/or disturbance.

Final site approval for issuance of improvements is based on regulations in force at the time of permitting and is dependent on satisfactory completion of individual site evaluations following application for an improvement permit detailing a specific use.

GENERAL WASTEWATER CONSIDERATIONS

Once potentially useable areas are located through vertical borings and/or backhoe pits, the next consideration is the horizontal extent of those areas. The size and configuration of the useable soil areas dictate the utility of that area. The size of a subsurface disposal field is determined by : 1) the design flow from the source (120 gallons/bedroom/day in residences), and 2) the long term acceptance rate (LTAR) of the soil (based on the hydraulic conductivity of the soil, a functions of the soil's texture, mineralogy, structure, porosity, etc.). The configuration must be such that an efficient layout of disposal lines (on contour) is possible. An additional consideration is the required setbacks for the system from various elements such as wells (100'), streams and ponds (50') or more (depending on watershed regulations), property lines (10'), top of embankment (15'), watershed buffers, etc.

The utility of a potential useable soil area for a subsurface system is most accurately determined by an on-ground layout of the proposed system. The total area needed for system and repair areas will depend upon the system type, the layout of that system and the total design flow (factors mentioned above). A typical area needed for a four bedroom residence is approximately 16,000 to 20,000 ft^2 (could be more depending on site features) or 960 to 1,280 linear feet of conventional line or accepted line (system and repair). These estimates reference Laws and Rules for Sewage Treatment and Disposal Systems for North Carolina and use a LTAR of 0.25 gpd/ft^2 for conventional septic systems (.1955), and a LTAR of 0.25 gpd/ft^2 for modified conventional septic systems (.1956). The health department will determine the ultimate LTAR after their lot evaluation. I will be glad to assist in any system layout or sizing calculations, if requested.

This report discusses the general location of potentially useable soils for on-site subsurface wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the Orange County health department. As a licensed soil scientist, I am hired for my professional opinion in these matters. The rules governing wastewater treatment (interpreted and governed by local and state agencies) are evolving constantly, and in many cases, affected by the opinions of individuals

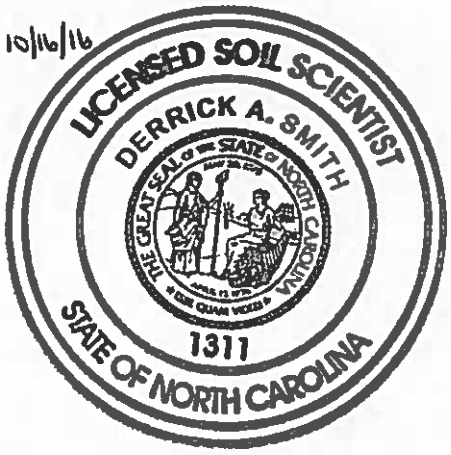
employed by these governing agencies. Because of this, I cannot guarantee that areas delineated and/or systems designed will be permitted by the governing agencies. As always, I recommend that anyone making financial commitments on a tract be fully aware of individual permit requirements on that tract prior to final action.

An individual septic system permit will be required for each lot prior to obtaining a building permit. This will involve a detailed evaluation by the Orange County health department to determine, among other things, system size and layout, well, drive and house location. Only after developing this information can a final determination be made concerning specifics of system design and site utilization.

I am pleased to be of service in this matter and I look forward to assisting in any site analysis needs you may have in the future. Please feel free to call with any questions or comments.

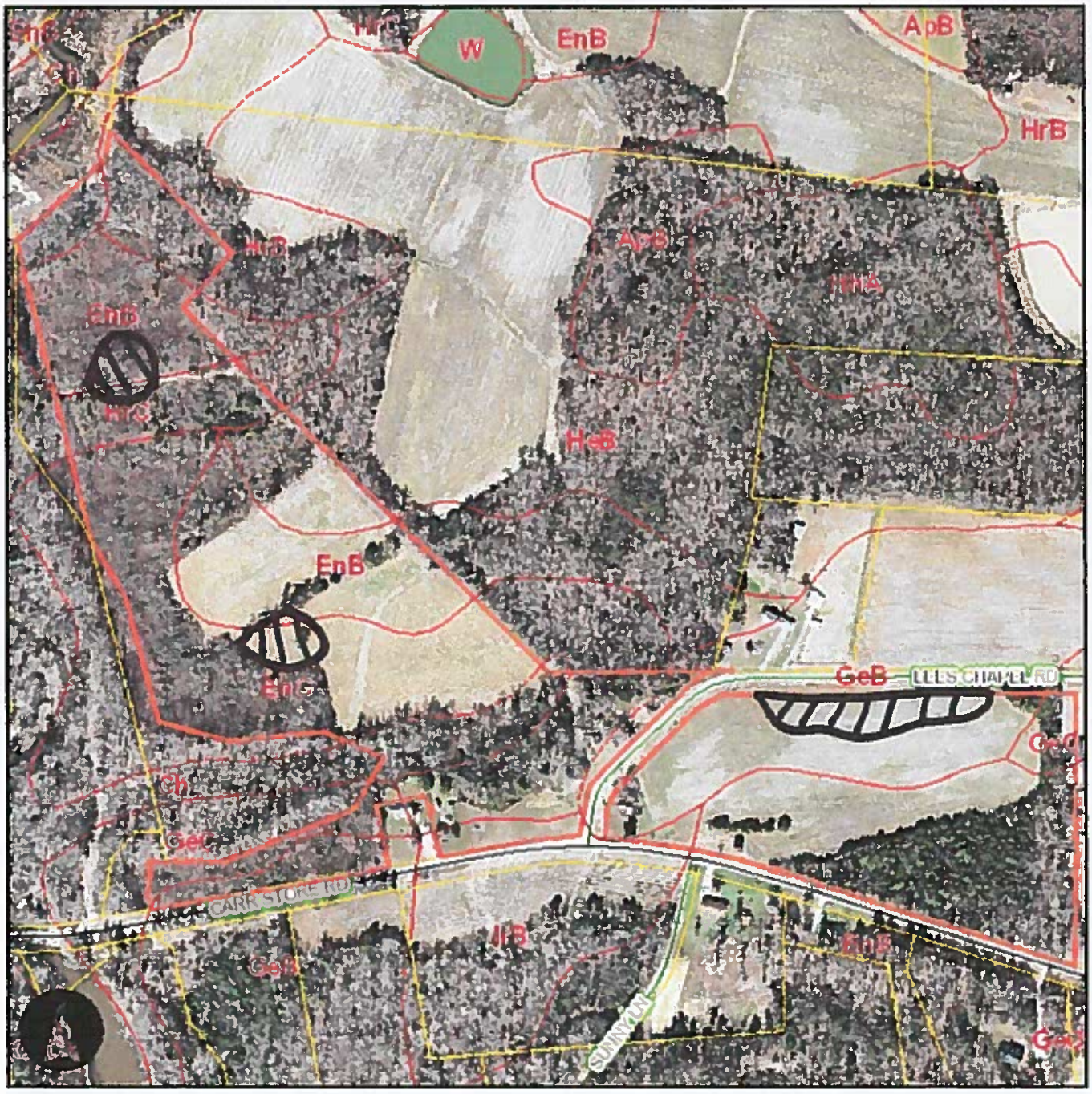
Sincerely,

Derrick A. Smith, LSS, REHS
NC Licensed Soil Scientist #1311
NC Registered Environmental Health Specialist #2402



Orange County, NC GIS

TAKE EFFLAND - CEDAR GROVE RD → R CARR STORE RD → R LEES CHAPEL RD



1 inch = 400 feet

Created on 10/15/2016. Orange County, North Carolina.