



Soil & Environmental Consultants, PA

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March 16, 2006 amended February 7, 2007.
Project #6748.S3

Polk-Sullivan LLC
P.O. Box 5689
Cary, NC 27512

Re: Soil/Site Evaluation on the 54-acre Lowell Williams property adjacent to Bynum Ridge Road, Chatham County, NC.

Dear Ms. Smith:

Soil & Environmental Consultants, PA (S&EC) performed a detailed subsurface and preliminary surface soil and site evaluation on the above referenced tract. This was performed at your request as part of the preliminary planning process in order to determine areas of soil that have potential for subsurface and surface wastewater disposal. Fieldwork was performed March 13th-15th, 2006 and January 29th, 2007.

S&EC 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 and surface disposal of wastewater, was developed. Soil boundaries for the conventional soil units were flagged in the field and were located by S&EC using a GPS receiver. The soil/site evaluation criteria used was that contained in 15 A NCAC 18A .1900 "Laws and Rules for Sewage Treatment and Disposal Systems". Subsurface drip potential areas were estimated in the field, and sketched on the attached map via GPS recorded soil borings.

FINDINGS

This site is located in the Slate Belt region of Chatham County. The upland soils on this tract are similar to the Georgeville and Lignum soil series. The Georgeville soil series has a loam surface material over a clay subsoil. These soils are at least 24 inches deep to prohibitive soil characteristics and are generally useable for subsurface septic systems. The Lignum soils exhibit soil wetness prior to 24 inches and are generally unsuitable for conventional subsurface septic systems, but may be suitable for pretreatment subsurface drip or surface septic systems.

The accompanying AutoCAD map indicates the areas with potential use for subsurface and surface wastewater disposal. The green hatched units indicate areas of soils which are at least 24 inches deep to prohibitive soil characteristics and have potential for a conventional septic system, a modified conventional (shallow placed lines with no fill required over the disposal area) or a low pressure pipe system (LPP) and/or ultra-shallow conventional (shallow placed lines with fill required over the disposal field) system. The blue "honeycomb" hatched areas (12 to 18 inch soils) have potential for subsurface drip septic systems. "UN" on the attached map indicates areas of soils that are generally unsuitable for the type of systems mentioned above.

It should be noted that a substantial amount of large boulders and rock outcroppings were present on this site. While S&EC delineated the majority of these outcrops as unsuitable for subsurface

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systems, there may be some additional outcrops in the conventional soil units that were not delineated by S&EC.

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.) on that, or adjacent lots. The area ultimately designated by the appropriate permitting agency 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 health department or state permitting agency, depending on the type of septic system specified. A lot with initially adequate useable soil area may be rendered unusable as a result of improper site planning and/or disturbance. A field layout of the proposed septic systems may be required as part of the individual lot development process.

Upon completion of a subdivision plan, S&EC recommends reviewing the plan before recording the subdivision lots. It is important to note that any preliminary certification that a subdivision plan meets does not represent approval or a permit for any site work, nor does it guarantee issuance of an improvement permit for any lot. 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 and siting.

GENERAL SUBSURFACE WASTEWATER CONSIDERATIONS

Once potentially useable areas are located through vertical borings, the next consideration is the horizontal extent of those areas. The size and configuration of the useable soil area 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 function 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. (see Attachment 1).

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 3 bedroom residence is approximately 12,000 to 15,000 ft² (could be more depending on site features) or 600 to 720 linear feet of conventional line (system and repair) or 1440 linear feet of LPP 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 to 0.30 gpd/ft² for conventional septic systems (.1955), a LTAR of 0.25 to 0.30 gpd/ft² for modified conventional (.1956) and 0.10 gpd/ft² for LPP septic systems (.1957a). The health department will determine the ultimate LTAR after their lot evaluation. S&EC will be glad to assist in any system layout or sizing calculations if requested.

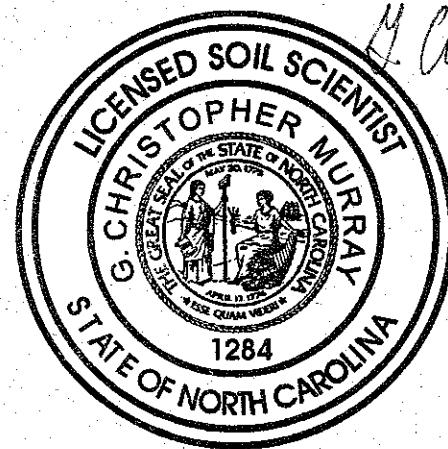
This report discusses the general location of potentially useable soils for on-site subsurface a wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the local health department or state. S&EC is a professional consulting firm that specializes in the delineation of soil areas for wastewater disposal, and the layout and design of wastewater treatment systems. As a professional consulting firm, S&EC is hired for its 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, S&EC cannot guarantee that areas delineated and/or systems designed will be permitted by the governing agencies. As always, S&EC recommends 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 local 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.

Soil & Environmental Consultants, PA is pleased to be of service in this matter and we 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,



G. Christopher Murray
2/7/09

Chris Murray
NC Licensed Soil Scientist

Encl: Attachment 1
Setbacks for Surface Drip and Spray Irrigation
Soil Suitability Map

Attachment 1

.1950 Location of Sanitary Sewage Systems


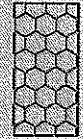

(c) Every sanitary sewage treatment and disposal system shall be located at least the minimum horizontal distance from the following:

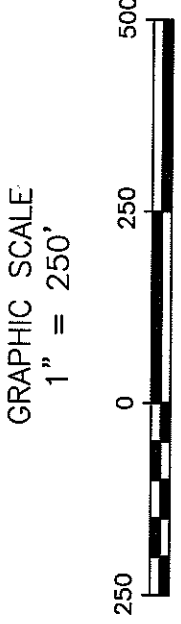
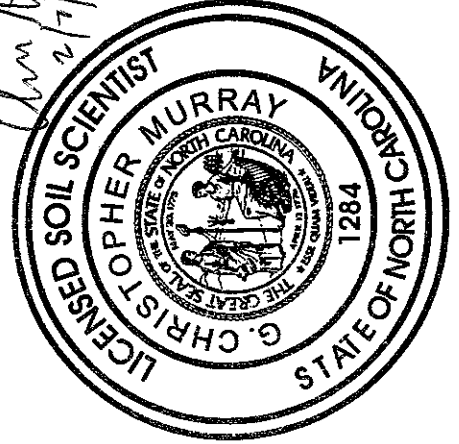
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|--|-------------------------------------|
| (1) any private water supply source including a well or spring | 100 feet |
| (2) any public water supply source | 100 feet |
| (3) streams classified as WS-I | 100 feet |
| (4) water classified as S.A. | 100 feet from mean high water mark |
| (5) Other coastal waters | 50 feet from mean high water mark |
| (6) any other stream, canal, marsh, or other surface waters | 50 feet |
| (7) any Class I or Class II reservoir | 100 feet from normal pool elevation |
| (8) any permanent storm water retention pond | 50 feet from flood pool elevation |
| (9) any other lake or pond | 50 feet from normal pool elevation |
| (10) any building foundation | 5 feet |
| (11) any basement | 15 feet |
| (12) any property line | 10 feet |
| (13) top of slope of embankments or cuts of 2 feet or more vertical height | 15 feet |
| (14) any water line | 10 feet |
| (15) drainage systems: | |
| (A) Interceptor drains, foundation drains and storm water diversions | |
| (i) upslope | 10 feet |
| (ii) sideslope | 15 feet |
| (iii) downslope | 25 feet |
| (B) Groundwater lowering ditched and devices | 25 feet |
| (16) any swimming pool | 15 feet |
| (17) any other nitrification field (except repair area) | 20 feet |
| (b) Ground absorption, sewage treatment and disposal systems may be located closer than 100 feet from a private well supply, except springs and uncased wells located downslope and used as a source of drinking water, repairs, space limitations and other site-planning considerations but shall be located the maximum feasible distance and, in no case, less than 50 feet. | |
| (c) Nitrification fields and repair areas shall not be located under paved areas or areas subject to vehicular traffic. If effluent is to be conveyed under areas subject to vehicular traffic, ductile iron or its equivalent pipe shall be used. However, pipe specified in Rule .1955 (e) may be used if a minimum of 30 inches of compacted cover is provided over the pipe. | |

Note: Systems over 3000 GPD or an individual nitrification fields with a capacity of 1500 GPD or more have more restrictive setback requirements, see .1950 (a) (17) (d) for specifics.



LEGEND

-  Areas contain soils with 24 inches or more of useable material and have the potential for conventional, modified conventional, ultra-shallow and low pressure pipe septic systems.
-  Potential for pretreatment subsurface drip septic systems.
- UN** Unsuitable areas.
-  Location of GPS soil boring log.



****PRELIMINARY SOIL/SITE EVALUATION FOR SUBSURFACE DRIP DISPOSAL. SOIL LINES WERE DELINEATED IN THE FIELD BY S&EC PERSONNEL. THE SOIL LINES WERE SKETCHED ONTO THE MAP BASED ON SOIL BORING LOGS, TOPOGRAPHY AND OTHER SITE FEATURES.**

****NOT A SURVEY. CADASTRAL INFORMATION, AND AERIAL PHOTOGRAPH ARE FROM THE CHATHAM COUNTY GEOGRAPHIC INFORMATION SERVICE. TOPOGRAPHIC LINES ARE FROM THE NCDOT LIDAR DATA SET.**

****SUITABLE FOR PRELIMINARY PLANNING PURPOSES ONLY. ALL LOTS WILL REQUIRE APPROVAL BY THE COUNTY HEALTH DEPARTMENT ON A LOT BY LOT BASIS. THIS MAP SHOULD BY USED AS A GENERAL GUIDE, SOME ADJUSTMENTS WILL BE NECESSARY IN THE FIELD DUE TO SOIL VARIABILITY AND TOPOGRAPHIC IRREGULARITIES. THIS MAP ONLY REFLECTS EXISTING SOIL SUITABILITY FOR ON-SITE SEPTIC TANK SYSTEMS. SOME OTHER CONSIDERATIONS THAT AFFECT SITE SUITABILITY THAT SHOULD BE CONSIDERED IN DEVELOPMENT DESIGN ARE:**

- 1) 10' SETBACK FROM PROPERTY LINE
- 2) 100' SETBACK FROM ANY WELL
- 3) 50' SETBACK FROM STREAMS, PONDS OR LAKES.

See accompanying S&EC report.

****DUE TO THICK VEGETATION, SITE ACCESSIBILITY WAS LIMITED DURING THE SOIL/SITE EVALUATION. THEREFORE, THERE MAY BE INCLUSIONS OF UNSUITABLE SOIL SHOWN AS SUITABLE ON THIS MAP.**



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Project: LOWELL WILLIAMS TRACT		Project No.: 6748.53
Location: CHATHAM CO., NC	Client: Robbie Swain	Drawn: CM
Site Title: Preliminary Soil/Site Evaluation	Scale: 1" = 200'	Field Work: CM
		Sheet No.: 1 of 1