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May 8, 2006
Project 4-1633.S1

Mr. Edward Shenkman
S&S Partnership
3615 Dover Road
Durham, NC 27707

Re: Preliminary Soil/Site Evaluation and Preliminary Wetlands Approximation on 45 acres
Andrew Store Road Project, +/-45 Acre Site on Andrews Store Road and Lichen Road –
Chatham County, NC

Dear Mr. Shenkman:

Soil & Environmental Consultants, PA (S&EC) performed a preliminary soil and site evaluation and a preliminary wetlands approximation 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 wastewater disposal, and to determine approximate location and extent of jurisdictional wetlands and waters. Fieldwork was performed on May 2, 2006. This evaluation was originally intended to be a Detailed Soil/Site Evaluation. However, due to the highly variable soils, marginal soils, and bouldery surface encountered on the property, the evaluation was switched to a Preliminary Soil/Site Evaluation. This was done in order to more efficiently inform you of potential development limitations on this property.

PRELIMINARY SOIL/SITE EVALUATION

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 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 northern region of Chatham County. The upland soils on this tract are similar to the Wedowee, Vance, Whistlestop, and Helena soil series. The Wedowee soil series has a sandy loam surface material over a clayey subsoil. These soils are at least 30 inches deep to prohibitive soil characteristics and are generally useable for subsurface septic systems. The Vance and Whistlestop soils have mixed clay mineralogy, and soil wetness conditions. These soils are marginal with respect to septic system suitability. The Helena soils have mixed to expansive clay mineralogy and soil wetness conditions and are generally unsuitable for conventional subsurface septic systems.

It is important to note that this is a Preliminary Soil/Site Evaluation, and soil areas are an approximation only. A Detailed Soil/Site Evaluation is always recommended when your development goals are to maximize lot yield. In order to perform a Detailed evaluation, extensive

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evaluation with a backhoe will be necessary to delineate the various soil types on this project. This will require a new proposal which can be provided upon request. The bouldery surface found across the property may also have implications regarding the cost of septic system installation.

The accompanying AutoCAD map indicates the **estimated** areas with potential use for subsurface wastewater disposal. The red-slashed units indicate areas of soils with a bouldery surface which are at least 30 inches deep to prohibitive soil characteristics and these areas 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 purple-hatched units indicate areas of soils with a bouldery surface with 24 inches or more of marginal material and may have potential for a LPP or ultra-shallow conventional type septic system. These soils have mixed mineralogy, marginal wetness conditions, and/or marginal saprolite. These soils are marginal with respect to septic system suitability. The green-slashed unit indicates an area that is extremely bouldery, and penetration with a hand auger was not feasible, therefore this area was not evaluated. Unit "UNS" on the attached map indicates areas of soils that are less than 24 inches to prohibitive soil characteristics and are generally unsuitable for the type of systems mentioned above. However, they may be suitable for more expensive alternative septic systems, i.e. pretreatment drip or spray irrigation, etc. Such systems are expensive and, if requested, S&EC can provide additional information concerning these types of systems.

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 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 health department. 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 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 three-bedroom residence is approximately 10,000 to 12,000 ft² (could be more depending on site features) or 800 to 960 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 .3 gpd/ft² for conventional septic systems (.1955), a LTAR of .25 gpd/ft² for modified conventional (.1956) and .1 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 wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the local health department. 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, including, but not limited to, applying for and obtaining improvement permits and approval from local/State governing authorities 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.

PRELIMINARY WETLANDS APPROXIMATION

We have determined that wetlands and jurisdictional waters (i.e. perennial and intermittent streams) exist on the site. The attached AutoCAD map depicts the approximate location of wetlands and jurisdictional waters identified on the site. Please refer to the sketch map and the results and recommendations section below for more detailed information.

SCOPE OF WORK

The preliminary wetland delineation consisted of pedestrian reconnaissance of the property to examine the soils, vegetation, and hydrology for the presence of areas that meet the criteria for jurisdictional wetlands by the procedures described in the Corps of Engineers Wetlands Delineation Manual (January 1987 - Final Report). Areas on the site with positive indicators of hydric soils and evidence of wetland hydrology and hydrophytic vegetation were identified and sketched on a site map. Proof of wetland hydrology would be the existence of hydric soils with oxidized root channels in the upper 12 inches of the "A" horizon, water borne deposits, drift lines, scour marks, drainage patterns, regional indicators of soil saturation, etc. Surface waters such as intermittent and perennial stream channels, ponds, and lakes, which are also subject to regulation by the US Army Corps of Engineers (USACE) as waters of the US, were also identified. These surface waters may also be referred to as jurisdictional waters to indicate that they are within the

jurisdiction of the USACE. It is important to note that wetlands are also classified as waters of the US and regulated by the USACE.

RESULTS & RECOMMENDATIONS

The wetland sketch map depicts the approximate location of wetlands and jurisdictional waters identified within the evaluated area. No other wetlands or jurisdictional waters were found within the project boundaries. Surface water features have been classified in NC-DWQ's "Classification and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina" as Class "WS-IV;NSW" Waters.

Water Supply Waters Rules

Perennial streams within a classified water supply watershed require a 100-foot buffer for new development activities with greater than 24 percent "built upon" area (i.e., percent covered by impervious or partially impervious cover) and a 30-foot buffer for activities with less than 24 percent built upon area by the NC-DWQ. (These buffers are in addition to the 50-foot Neuse River Buffers. The stricter of the two buffers applies to these stream channels.) Other regulations may also apply. Chatham County regulations regarding streams and wetlands may also apply on this site.

It is important to note that the preliminary sketch map is intended to provide only an approximate size and location of the wetlands on-site. The actual size and location of wetlands may differ slightly from those depicted on the sketch map. If the final site plan proposes impacting any of these areas, then a detailed delineation should be performed and the flags surveyed to provide an accurate map.

If you choose to have us conduct a detailed delineation we will hang flags to demarcate the wetland boundaries. All S&EC flags comprising the wetland and other jurisdictional waters delineation should then be surveyed and a Wetland Delineation Map generated for use in obtaining USACE approval and permitting.

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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:

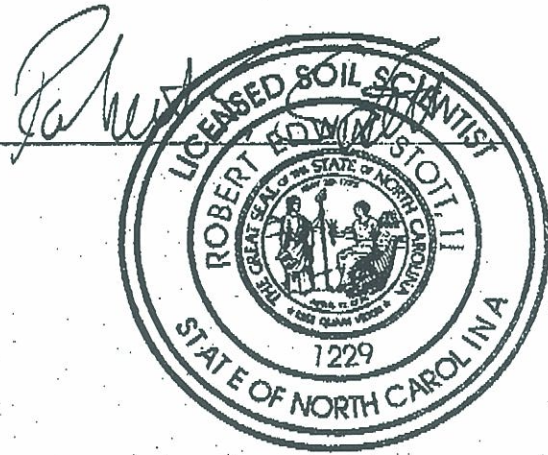
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| (1) any private water supply source including a well or spring | 100 feet |
| (2) any public water supply source | 100 feet |
| (3) streams classified as WS-I | 100 feet |
| (4) water classified as S.A. | 100 feet from mean high water mark |
| (5) 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.

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,

SEAL:



Robert Edwin Stott, R.S.
NC Licensed Soil Scientist

Jonathon R. Townsley
NC Soil Scientist in Training

Encl: Attachment 1
Soil Suitability Map