



# Soil & Environmental Consultants, PA

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November 16, 2005  
Project #9853.S2

RBV Investments, LLC  
Attn: Rex Vick  
1130 Situs Court, Suite 250  
Raleigh NC 27606

Re: Preliminary Soil/Site evaluation for Surface and Subsurface Septic Systems on the 49- acre Schwartz Property adjacent to Mount Gilead Church Road, Chatham County, NC.

Dear Mr. Vick:

Soil & Environmental Consultants, PA (S&EC) performed a preliminary subsurface and 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 in November of 2005.

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 dry soil conditions. From these observations, an evaluation of the site was developed, relative to subsurface and surface disposal of wastewater. Soil lines were flagged in the field and located using GPS receivers. 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 Piedmont region of Chatham County. The upland soils on this tract are similar to the Cecil/Pacolet and Helena soil series. The Cecil/Pacolet soil series have a sandy loam surface material over a clay loam to clay subsoil. These soils are at least 24 inches deep to prohibitive soil characteristics and are generally useable for subsurface septic systems. The Helena soils have expansive clay mineralogy and wetness before 24 inches and are generally unsuitable for conventional subsurface septic systems, but have potential for surface drip and/or spray irrigation systems.

The accompanying GPS AutoCAD sketch map indicates the areas with potential use for surface and subsurface 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. Unit "UN" on the attached map indicates areas of soils that are generally unsuitable for the type of systems mentioned above.

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

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other significant site disturbing activities) until authorized by the health department or state Division of Water Quality, 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 subsurface disposal 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 ft<sup>2</sup> (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/ft<sup>2</sup> for conventional septic systems (.1955), a LTAR of 0.25 to 0.30 gpd/ft<sup>2</sup> for modified conventional (.1956) and 0.10 gpd/ft<sup>2</sup> 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.

### **GENERAL WASTEWATER CONSIDERATIONS FOR SURFACE APPLICATION SYSTEMS**

Once potentially useable surface disposal 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 surface 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.). An additional consideration is the required setbacks for surface applied systems from various elements such as wells (100'), streams and ponds (100') or more (depending on watershed regulations), property lines (150' for spray and 50' for drip), and off site residences (100' and 400' for drip and spray systems respectively).

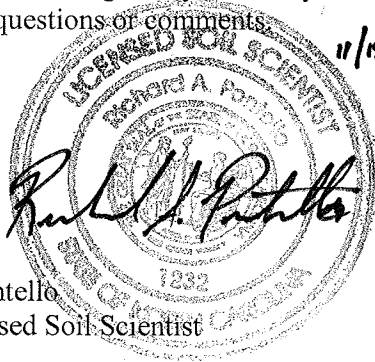
The total area needed for a surface system will depend upon the system type, the layout of that system, the total design flow, and water balance information. A typical area needed for a three-bedroom residence is approximately 15,000 ft<sup>2</sup> to 20,000 ft<sup>2</sup> (could be more depending on site features) meeting all of the required setbacks. General lot size for a surface drip irrigation system is a minimum of approximately 3-acres and a minimum of approximately 5-acres for spray irrigation.

This report discusses the general location of potentially useable soils for on-site subsurface and surface 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 Division of Water Quality. 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 appropriate permitting agency 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,



Ricky Pontello  
NC Licensed Soil Scientist

A handwritten signature in black ink that reads "Larry Sink" followed by a stylized flourish.

Larry Sink  
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:

- |  |                                     |
|--|-------------------------------------|
| (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.

## **SETBACKS FOR SURFACE DRIP AND SPRAY IRRIGATION**

<b><u>DRIP</u></b>	<b><u>SPRAY</u></b>	<b><u>PARAMETER</u></b>
10'	100'	INTERCEPTOR DRAINS, AND SURFACE WATER DIVERSIONS (UPSLOPE FROM SYSTEM).
15'	200'	RESIDENCE FOUNDATION/BASEMENT
15'	15'	2' CUT EMBANKMENT.
25'	100'	INTERCEPTOR DRAINS, SURFACE WATER DIVERSIONS, AND GROUND WATER LOWERING/SURFACE DRAINAGE DITCHES (DOWNSLOPE FROM SYSTEM).
50'	50'	PUBLIC RIGHT-OF-WAY SURFACE DISPOSAL
50'	150'	ANY PROPERTY LINE
100'	400'	PLACE OF PUBLIC ASSEMBLY OR HABITABLE RESIDENCE OFF PROPERTY.
100'	100'	ANY SWIMMING POOL, ANY WELL, ANY PUBLIC OR PRIVATE WATER SUPPLY, AND ANY LAKE OR IMPOUNDMENT.

- **SOME COUNTIES (i.e., WAKE) MAY HAVE ADDITIONAL FOUNDATION SETBACK REQUIREMENTS.**
- **ANY OR ALL OF THESE SETBACKS MAY BE VARIED IF THE ADJACENT PROPERTY OWNERS SIGN A WAIVER/PERMISSION NOTICE.**
- **SETBACKS FOR TERTIARY TREATED EFFLUENT TO BE APPLIED TO GOLF COURSED VARY FROM THIS TABLE.**