

Shaffer Soil Services
685 Sanford Road
Pittsboro, NC 27312

June 30, 2001

Mr. Jesse Fearrington
724 Morris Road
Pittsboro, NC 27312

Subject: Site Evaluation for Septic Systems
Fearrington Subdivision
Mt. Gilead Church Road
Chatham County

During June, 2001 I performed a site evaluation on the above named parcel of land for purpose of siting wastewater systems for six proposed lots. The property is approximately 30 acres in size and lies on the east side of Mt. Gilead Church Road, about 2 miles north of its intersection with U.S. Route 64. The subdivision is bordered on the west side by the Monterrane Phase 2 subdivision. For this purpose, I advanced hand auger borings over each proposed lot as determined by the preliminary lot layout design that was provided by you. The borings were done on each lot until a satisfactory site was located for each septic system. Each lot is proposed for a 5-bedroom home. In each case an anticipated homesite was determined, and the soils downslope were evaluated for possibility of a gravity-fed conventional system. Where downslope soils were unsuitable, other areas on the lot were examined to determine the best possible septic system alternative.

I evaluated the soil and site conditions as required by the State Division of Environmental Health and the Chatham County Board of Health. Soil profiles were evaluated for depth to seasonal high water table, depth to bedrock or other limiting layer, texture, structure, consistence, color, clay mineralogy, slope and topography, and where all conditions were determined to be either suitable or provisionally suitable, available space as required by 15 A NCAC 18A . 1945. The tract consists of smooth and rolling topography with uniform slopes ranging from 3 to over 20 percent.

The attachment to this report details the average soil conditions and their range in characteristics found on the 6 lots. The soil conditions are similar across lots 50, 51, 53, 54, and 55. These soils are reddish brown to yellowish red, well drained, and moderately deep, and as such are very suitable for treatment of on-site wastewater. Due to the depth and clay content, the soils are considered provisionally suitable per state rule terminology. The attachment details the soil conditions and limitations, and the specifics of the wastewater system that is appropriate for the site conditions. The soils on Lot 52 were significantly different. It appears that an intermediate to mafic intrusion underlies the majority of this lot, and the result is that very firm, expansive clays underlie the soils at a depth of 18 to 24 inches. The northwest corner of this lot has similar soils to the other 5 lots, but not enough area of these better soils exists to site a wastewater system. For this reason, an alternative system type is suggested for this lot.

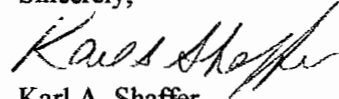
Each area for the septic field for each lot consists of approximately 16,000 to 18,000 square feet of suitable soil, and should be sufficient to site a system for a 5-bedroom home. This area includes the

required repair area. Each site is field flagged with orange flagging. The sites should be approximately 75 feet away from any property lines as planned for in the proposed subdivision covenants. The numbered flags as referenced on the attached site sketch maps represent soil borings at the field corners and through the centers. Other orange flagging on the tract is simply used to help define the boundaries of the system areas to make them easy to identify in the field. At this point, you should make applications for the improvements permits for the septic sites to the Chatham County Health Department. They will also perform a site evaluation as part of the permitting process. Once the permits are issued, it is recommended to get the perimeters surveyed and recorded so that the permits will not expire.

This report represents my professional opinion. The recommendations given in this report will not insure that permits would be either issued or denied for any particular part of the tract or any given number of lots, and likewise will not insure that a specific type and size of wastewater system will be allowed. These decisions will be made by the staff of the local health department. Also, this report does not indicate any guarantee that an installed system will function properly for a specified amount of time. Proper function of wastewater systems is dependent on installation procedures as well as owner maintenance. In a clayey soil such as exists on your property, installation should take place under relatively dry conditions to minimize the effect of soil clogging and smearing which would reduce the soil permeability. You may wish to supply a copy of this report to the Health Department representative when making application for the site permits.

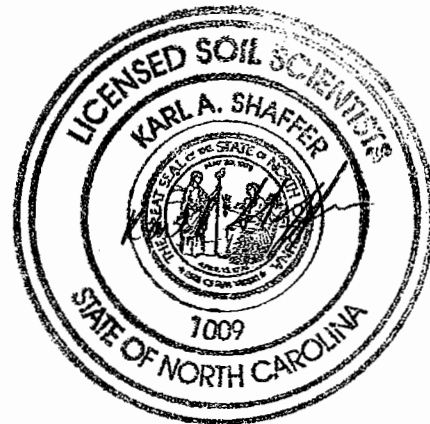
If you have any questions concerning this report or require further assistance, please do not hesitate to contact me. Thank you for the opportunity to perform this service for you.

Sincerely,



Karl A. Shaffer
NC Licensed Soil Scientist
Certificate No. 1009

Attachments: Soil descriptions and system specifications
Site maps for each lot
Invoice



GEORGEVILLE SOIL SERIES - Fearrington Property
6/29/01

(This profile description defines the average soil type over lots 50, 51, 53, 54, and 55 in the area designated for the subsurface sewage system permits. See below for ranges in characteristics.)

0 - 5 inches: dark brown (10YR4/3) loam; moderate medium granular structure; very friable; nonsticky, nonplastic, few small gravels; abrupt smooth boundary; common fine and medium roots.

5- 10 inches: yellowish red (5 YR 5/6) clay loam; moderate fine subangular blocky structure; friable; slightly sticky, nonplastic; clear smooth boundary; common fine roots.

10 - 30 inches: red (2.5 YR 5/8) silty clay; moderate medium subangular blocky structure; firm, sticky, slightly plastic; gradual smooth boundary; few fine roots.

30 - 36 inches: red (2.5 YR 5/8) and yellowish red (5 YR 5/8) silty clay with common (up to 20%) pockets and streaks of yellowish brown, light brown, and light gray partially weathered rock; weak medium subangular blocky structure; firm; sticky, slightly plastic; gradual wavy boundary.

36 - 40+ inches: mottled yellowish red (5 YR 5/8), strong brown (7.5 YR 6/6) and light yellowish brown (10 YR 6/4) silty clay loam saprolite (soft weathered bedrock that is easily augered out -soft Cr horizon); friable; slightly sticky, non-plastic; few small areas of light gray (10 YR 6/2) material.

NOTES:

Landscape position: linear sideslope- smooth - 5 to 12 percent slopes

Clay mineralogy: In suitable range (non-expansive)

Water Table: over 40 inches. NOTE: The borings may exhibit low-chroma colors (less than 2) below a depth of 24 inches which are indicative of partially weathered parent material.

Depth to restrictive horizon: ranges from 30 to over 36 inches in the area of the proposed septic fields, with 32 inches being an average depth for planning purposes. The restrictive horizon consists of saprolite from metamorphic rock, which is massive (structureless). Pockets of parent material may be noted as shallow as 25 inches, however, within the proposed drainfield areas, the depth at which the parent material (saprolite) predominates any soil horizon is consistently deeper than 30 inches. There is typically a gradual boundary between the well-structured soil clayey B horizon material and the obvious saprolite; a gradual boundary indicating that this change takes place over a depth of 6 to 12 inches.

Design loading rate: The soil is a group 4 soil, and should be acceptable for a design LTAR of 0.25 GPD/FT². This rate will be assigned by the representative of the county health department.

For a 5-bedroom design, the following design features would result from the above recommended loading rate:

0.25 LTAR for 600 GPD = 2400 ft² = 800 linear feet of 3-foot wide trench

For a 4-bedroom home, the trench length is 640 linear feet

Note: All systems can reduce lateral length by 25% by using an innovative trench design such as the trademark names EEEZZZ Lay or Infiltrator, which are state-approved systems.

SYSTEM TYPES: Where the depth to restrictive layers is below 30 inches, a standard conventional design may be used. This requires a maximum trench depth to maintain a minimum of 12 inches of suitable soil above the restrictive layer, a minimum gravel depth of 12 inches, with 6 inches of cover. As the restrictive layer approaches the 24 inch depth from the soil surface, a modified conventional system known as a shallow placement system can be installed with the same design specifications. This may result in the backfill over the system of adjacent topsoil for the purpose of planting of vegetation and obtaining the mandatory minimum of 6 inches of cover. Either a standard conventional or shallow placement system should be acceptable for these 5 lots. Both systems rely on gravity for wastewater distribution, however, should the future property buyer choose to build the home at a lower elevation, a "pump to conventional" system can be used. This does not impact the drainfield layout, it simply implies that the septic tank effluent will be pumped to the drainfield, with gravity flow used for the wastewater distribution. It appears that Lot 50 will require a pump system, as the most suitable soils are near the north end, higher elevation, of the lot. Other portions of lot 50 would require the use of an alternative or innovative system, as the soils have limitations for soil depth less than 24 inches.

**MECKLENBURG VARIANT SOIL SERIES - Fearrington Property
6/29/01**

(This profile description defines the average soil type over lot 52 in the area designated for the subsurface sewage system permit. See below for ranges in characteristics.)

0 - 5 inches: dark brown (10YR4/3) loam; moderate medium granular structure; very friable; nonsticky, nonplastic, few small gravels; abrupt smooth boundary; common fine and medium roots.

5- 22 inches: yellowish red (5 YR 5/6) clay loam; moderate medium subangular blocky structure; firm; sticky, plastic; clear smooth boundary; common fine roots.

22 - 30 inches: red (2.5 YR 5/8) and yellowish red (5 YR 5/8) clay with common (up to 20%) pockets and streaks of yellowish brown, light brown, and light gray which may be indicative of temporary perched wetness; weak medium and coarse subangular blocky structure; very firm; very sticky, plastic; gradual wavy boundary.

30 – 40+ inches: mottled yellowish red (5 YR 5/8), strong brown (7.5 YR 6/6) and light yellowish brown (10 YR 6/4) clay loam saprolite (soft weathered bedrock that is easily augered out -soft Cr horizon); friable; slightly sticky, non-plastic; few small areas of light gray (10 YR 6/2) material.

NOTES:

Landscape position: linear sideslope- smooth – 5 to 10 percent slopes

Clay mineralogy: In suitable range (non-expansive) above 22 inches; expansive below 22 inches

Water Table: While the evidence is inconclusive and faint, it is perceived that seasonal wetness occurs in the 22 to 30 inch layer. Regardless, this layer is unsuitable due to the expansive clays with coarse structure.

Depth to restrictive horizon: ranges from 18 to over 30 inches in the area of the proposed septic fields, however the better soils are on the higher parts of the lot with insufficient area, and the soils described above will be located in the drainfield area. The average estimated depth to the restriction zone is 22 inches for planning purposes.

Design loading rate: The soil is a group 4 soil, and should be acceptable for a design LTAR of 0.10 GPD/FT². This rate will be assigned by the representative of the county health department and is reflective of using a low pressure pipe system.

For a 5-bedroom design, the following design features would result from the above recommended loading rate:

**0.10 LTAR for LPP system for 600 GPD = 6000 ft² of system area.
For a 4-bedroom home, the system area is 4800 square feet.**

SYSTEM TYPES: With the soil criteria variable in this area, but averaging 22 inches in depth to the restriction, and maintaining a minimum depth of at least 18 inches, a fill low pressure pipe (LPP) system is the alternative that is available per state rules. Other more expensive options which were not evaluated include spray irrigation, sand filters, peat filters, or drip irrigation. With the exception of spray irrigation and drip irrigation, the other system types would still use the same component of the lot. For a spray or drip system, the system ideally should be centrally located to make the most benefit of the required buffers for these systems. Should you desire to investigate these system types, please contact me and the area will be re-evaluated.

