HAL OWEN & ASSOCIATES, INC.

SOIL & ENVIRONMENTAL SCIENTISTS

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16 March, 2004

Mr. Dan Sullivan
Contentnea Creek Development Company
12512 Peede Road
Raleigh, NC 27614

Reference: Preliminary Soil Investigation for The Estates At Windfall Creek
Big Woods Road, Chatham County, North Carolina

Dear Mr. Sullivan,

Thank you very much for the payment provided for the wetland delineation work conducted at this property. Although we proposed to delineate the wetlands and compile the certification package for the Corps of Engineers for the Swan Tract with a budget of $4000, we were able to identify the wetlands on *both* tracts and conduct a site visit with the Corps of Engineers for $5171.25. A small amount of work is yet to be completed after the survey maps are returned to us that will enable us to make submittal of the certification package to the Corps of Engineers. The cost of this additional work should not exceed $250.

The enclosed invoices are for soil investigations conducted at the Big Woods Road project. Additional soil investigations were conducted for the problem lots in the first tract (Swann Tract) and those findings are included on the attached map. After we were informed by the COE that we could not make a second road crossing, additional work was conducted in the area north of the creek. Only limited amounts of usable soils had been previously observed in this area. After the potential to utilize soil areas on the other side of the creek became much more difficult, more usable soil areas were badly needed in this area. This additional work was outside the scope described in the proposal and caused us to slightly exceed the proposal budget. However, with much effort some important additional usable soil areas were identified. This type of high intensity investigation needs to be conducted for portions of the northern tract as well. As you can see on the map, the amount of usable soils greatly diminished as the investigation progressed to the north. Some proposed lots have no usable soil areas observed at this point. We were able to stay within the budget for the northern tract in spite of the need to hand deliver the report to Pittsboro.

Ben Dewar

Additional investigations may identify some small areas of usable soils, but we need to determine the scope of the study. For instance, on problem lots we can investigate for all subsurface potentials including drip with pre-treatment filters. Chatham County will allow us to be as innovative as the state rules will allow. Although we do not want to have to use these type systems, adding the pre-treatment filter to the drip disposal system will open up significant amounts of usable soil areas and may be necessary for some proposed lots. We may have to, or want to, modify some lot lines after the survey work is provided to identify the lots.

Let me know if you need additional information or how to proceed.

Sincerely,

Hal Owen

Hal Owen

cc: Jonna Birtcher
John Harris
Irv Staton
Kathy Morris

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Big Woods Road, Chatham County, North Carolina

Dear Mr. Sullivan,

A site investigation has been conducted for the above referenced property, located on the western side of Big Woods Road and just north of US Hwy 64 near Jordan Lake. The purpose of this investigation was to determine the site's ability to support subsurface sewage waste disposal systems. All sewage disposal ratings and determinations were made in accordance with "Laws and Rules for Sanitary Sewage Collection, Treatment and Disposal, 15A NCAC 18A .1900." This report represents my professional opinion as a Licensed Soil Scientist but does not guarantee or represent permit approval for any lot by the local Health Department. An improvement permit for all residences will need to be obtained from the Health Department that specifies the proposed home size and location, and the design and location of the septic system to be installed.

The soils at the property are formed from weathered volcanic rocks that have been highly metamorphosed by subsurface pressures. The depth to bedrock is variable across the site and was observed to be undulating within the usable soil areas shown on the attached map. The surface topography is also rolling or undulating, and sideslopes were often steep, eroded and shallow to bedrock or unsuitable layers. Most usable areas observed at the site are located on the ridgetops. The combination of undulating bedrock depths and undulating surface topography creates a situation in which the soil depths range greatly and are very complex. The areas demonstrated on the attached map should not be considered purely one soil type or another. Inclusions of contrasting soils exist within the usable soil areas that will need to be further investigated and identified at a later time. Likewise, it is also likely that additional areas of usable soils can be located within the areas shown as unsuitable. Due to diminishing amounts of usable soils, the investigation was expanded on the northern half of the property to include soil areas adequate to support more expensive experimental systems, such as pre-treatment filter systems with low-pressure pipe or drip disposal. These marginal soils also occur on the southern half of the property but were not identified. Backhoe pits will greatly facilitate not only the examination, but also the interpretation of the soils on this property, especially the more marginal soils. Additional investigations are advised for each proposed lot to more fully determine their ability to support a residence.

This property is composed of a mixture of soils that range from provisionally suitable to unsuitable for subsurface sewage waste disposal. A dominant portion of the soil areas shown as provisionally suitable will adequately function as sewage waste disposal sites but will require additional drainline due to clayey textured subsoil characteristics. In areas of deeper soils, you should expect that 400 - 500 feet of conventional drainline would be required for the initial system of a three-bedroom home. Included within the areas shown as provisionally suitable are more shallow soils that are adequate for modified conventional or alternative systems. These soils are limited in soil depth to the extent that systems that can be installed ultra shallow will likely be required. These more marginal soils were typically observed near the boundary with the unsuitable soils but were also observed randomly throughout the usable soil areas. The southern half of the property generally demonstrated a higher percentage of deeper soils than the northern half.

The areas shown as provisionally suitable for pre-treatment or drip disposal were observed to be underlain by marginally usable soils due to limited usable depths ranging from 18 to 24 inches below ground surface. These soils will likely require either pre-treatment filters with conventional, innovative or low-pressure drainlines; or drip disposal systems. The use of these type soils appears to be necessary on the northern half of the property.

The unsuitable soil area is so rated due to excessive soil wetness and/or inadequate soil depth. The ability to utilize alternative systems or make modifications to this area to allow for septic systems is minimal. Some of this area will likely support building foundations, and homes could be sited in this area. Included in the unsuitable areas are soils adequate for pre-treatment systems with subsurface drip disposal and areas adequate only for surface applications. These areas can be identified at a later time if needed.

I appreciate the opportunity to provide this service and trust that you will feel free to call on me again in the future. If you have any questions or need additional information, please contact me at your convenience.

Sincerely,

Hal Owen
Licensed Soil Scientist