

July 11, 2005
Project #9677.S1

Apex Nurseries Inc.
Attn: Will Copeland
2551 Hollands Chapel Road
Apex, NC 27523

Re: Preliminary Soil/Site Evaluation on 5.6+/- Acre Site located on Big Woods Road, adjacent to US Hwy 64 West, Chatham County, NC

Dear Mr. Copeland:

Soil & Environmental Consultants, PA (S&EC) performed a preliminary soil/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 wastewater disposal. Fieldwork was performed in July 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, relative to subsurface disposal of wastewater, was developed. 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 Carolina Slate Belt region of Chatham County. The upland soils on this tract are similar to the Georgeville and Badin soil series. The Georgeville soil series has a silt loam surface material over clay subsoil. These soils are 24-30+ inches deep to prohibitive soil characteristics and are generally useable for conventional, modified conventional, ultra-shallow, and/or LPP low pressure pipe septic systems. The Badin soil series has a silt loam surface material over silty clay subsoil. These soils are less than 24 inches deep to prohibitive soil characteristics (parent material) and are unsuitable for the type of subsurface septic systems mentioned above.

The accompanying GPS/AutoCAD map indicates the areas with potential use for subsurface wastewater disposal. **The "hatched" units indicate areas of soils that are at least 24 inches deep to prohibitive soil characteristics, and the approximate size of these areas is 56,000 square feet.** Unit "UN" 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.

The site plan for each lot/site 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.

GENERAL WASTEWATER CONSIDERATIONS

Once potentially useable areas were 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 was 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 (50', 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).

The total area needed for system and repair areas will depend upon the system type, the long term acceptance rate, and the total design flow (factors mentioned above). A typical area needed for a five bedroom residence is approximately 20,000 to 22,000 ft² (could be more depending on site features) or 1200 to 1600 linear feet of conventional line (system and repair) or 2400 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 0.25gpd/ft² for conventional septic systems (.1955), a LTAR of 0.25gpd/ft² for modified conventional (.1956) and 0.1gpd/ft² for LPP septic systems (.1957a). The Chatham County health department will determine the ultimate LTAR after their lot evaluation.

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 on that tract prior to final action.

An individual septic system improvements permit will be required for this 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.

Other Site Considerations

Proposed Cape Fear River Basin Riparian Buffer Rules

The Proposed Cape Fear River Basin riparian buffer rules, if implemented, would protect up to 50 feet from the edge of existing “surface waters” (intermittent streams, perennial streams, lakes, ponds and estuaries) located within the Cape Fear River Basin. The 50-foot buffer basically consists of two zones. Zone 1 is measured 30 feet landward from the top bank of streams and intended to contain an undisturbed-forested area. Zone 2 is measured 20 feet from the edge of the first zone and is intended to contain a vegetated buffer. A couple of notable points of the rules include the following: the allowance of grading with re-vegetating within Zone 2 (the outer 20 feet) and the requirement of mitigation for road crossings greater than 150 feet in width and utility lines running parallel and within the buffers.

There are no intermittent or perennial stream channels indicated on the most recent version of the appropriate (Figure 1) USGS Quadrangle or (Figure 2) Chatham County Soil Survey that would be subject to the Proposed Cape Fear River Riparian Buffer.

Wetland Permitting

Wetland impact permits are issued on a per-project basis as determined by the USACE. The USACE has determined that impacts on parcels sub-divided from larger tracts are sometimes considered to be cumulative to existing impacts for the large tract. If this is the case, then thresholds as discussed below may not apply and impacts to wetlands must be considered in light of existing permits.

Preconstruction notification to the USACE and the NC-DWQ is not required for wetland impacts that meet the general conditions of Nationwide Permit 39 and that impact less than 1/10 acre per project. Preconstruction notification and approval by the USACE is required for wetland impacts that exceed 1/10 of an acre and /or any stream channel impacts. **Preconstruction notification and approval by the NC-DWQ is required for wetland impacts that exceed 1/10 of an acre if the property is west of I-95 or 1/3 of an acre if the project is east of I-95. Preconstruction notification and approval by the NC-DWQ is required for any stream channel impacts within buffered basins (i.e. the Neuse, Tar-Pamlico, Randleman, and portions of the Catawba Basins) or for cumulative stream impacts that exceed 150 linear feet in non-buffered basins.** If development impacts exceed the thresholds for notification and proposed impervious area for the project or any part of the project exceeds 30%, then stormwater treatment to meet the pollutant removal design standard of 85% removal of total suspended solids (i.e., wet detention basins, stormwater wetlands, bioretention areas, etc.) and 30% of Nitrogen will likely be required by the NC-DWQ. The maximum permanent impact allowed per project under the nationwide permits is 1/2 acre of wetland and/or 300 linear feet of USACE important stream channel. Nationwide Permit 39 limits above-grade fills within 100-year floodplains specifically prohibiting above-grade fill within the floodway.

Additionally, Nationwide Permit 39 limits stream channelization and relocation to streams with an average annual flow of less than 1cfs.

Per project impacts to vegetated wetlands in excess of 1 acre or impacts to streams that contain “significant aquatic function” in excess of 150 linear feet will most likely require mitigation by the NC-DWQ. The USACE may require mitigation for any wetland/jurisdictional waters impacts. Actual mitigation requirements are typically determined on a case-by-case basis. Wetland mitigation is a complex process that requires planning and monitoring. S&EC will discuss mitigation issues with you if we believe your project may require mitigation.

Impacts to channels containing “significant aquatic function” in excess of the notification thresholds may require mitigation. Channel mitigation is typically intended to replace lost significant aquatic functions and values. Relocating channels is considered to be an adverse impact and typically results in mitigation within the new channel. Therefore, this type of mitigation usually requires that meanders be created within constructed channels. Side-slopes and beds be vegetated; riprap is discouraged.

A complete NC-DWQ 401 Water Quality Certification application for a Nationwide Permit has a maximum 60-day processing period. A complete USACE Nationwide Permit application has a 45-day processing period, while Individual Permit applications submitted to the USACE have no maximum processing periods. **The USACE requires that all impacts to wetlands or Waters of the US, less than 1/10 acre, be reported to the USACE within 30 days of the completion of construction.**

Nationwide Permits can potentially be utilized if the project is designed to impact up to 1/2 acre of jurisdictional wetlands or waters of the US including a maximum of 300 linear feet of important stream channel impact under NWP 39. Cumulative impacts per project over these nationwide thresholds will require an individual permit. Individual Permits require an analysis to determine that the proposed impact is the least environmentally damaging practical alternative, typically require compensatory mitigation, notification to adjacent property owners, a public notice, and may require a public hearing. All impacts greater than 1/10 acre require written justification.

No jurisdictional wetlands were found on property within the drainage way of the ephemeral channel found on site.

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,

Walter Cole
NC Licensed Soil Scientist #1267
Registered Sanitarian #1510

Encl: Figure 1 & 2
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.