



Agri-Waste Technology, Inc.

5400 Etta Burke Court
Raleigh, North Carolina 27606
Phone: (919) 859-0669
Fax: (919) 233-1970
Email: awt@agriwaste.com

April 4, 2007

MEMORANDUM

TO: Mr. Paul Austin, Landowner

XCOPY: Mr. Carter Crawford, Carter Crawford Design
Dr. Hal House, Integrated Water Strategies

FROM: Jeff Vaughan

SUBJECT: Progress Report on Wastewater System Design

The purpose of this document is to detail the progress to date regarding the wastewater system design for your property at 245 Buckhorn Road in Moncure, NC. It is our understanding that a wastewater system is needed for a proposed RV park and a proposed multi-purpose building on the property.

- 1) A preliminary soils evaluation was conducted for the entire property on February 15, February 16, and March 1, 2007. A copy of the report for this evaluation is attached. You and I met on the evening of February 22, 2007, to discuss the results (those that were available at the time) of the preliminary evaluation. The purpose of the preliminary soils evaluation was to determine the soil characteristics across the property and what type(s) of septic systems could potentially be used on various portions of the property.
- 2) A meeting was held at your home on March 12, 2007, with you, Dr. Hal House of Integrated Water Strategies, Mr. Carter Crawford of Carter Crawford Design, and myself. The purpose of the meeting was to discuss the type(s) of wastewater systems that could be used on the property for the proposed RV park and multi-purpose building. The preliminary soils evaluation report was also reviewed. The group discussed potentially using a surface application system to handle the wastewater from the proposed RV park and a subsurface "conventional" type septic system to handle the wastewater from the proposed multi-purpose building.

- 3) I had several conversations with local (Mr. Thomas Boyce of Chatham County Health Department) and state (Ms. Trish Angoli of the Department of Environmental Health with the NC Department of Environment and Natural Resources) regulatory personnel over the subsequent weeks. The purpose of the conversations was to preliminarily inform them of our likely proposals for wastewater treatment on the site and to obtain their input/ideas on the possible specifics of the wastewater treatment systems. Specifically, we discussed the likely design wastewater flows for the proposed wastewater systems.

I will continue to keep you informed on our progress. Please contact me with any questions, concerns, or comments.

ATTACHMENT



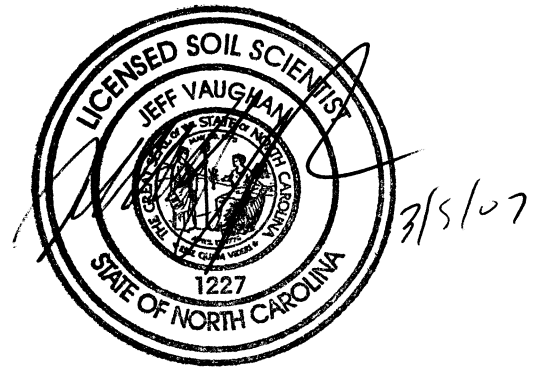
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Soil Suitability for Domestic Sewage Treatment and Disposal Systems

245 Buckhorn Road,
Moncure, NC 27559
Chatham County

Prepared for: Mr. Paul Austin, Owner

Prepared By: Jeff Vaughan, Ph.D., L.S.S.
Senior Agronomist/Soil Scientist

Enrique Cachafeiro
Soils/GIS Specialist

Report Date: March 5, 2007



Agri-Waste Technology, Inc.

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Raleigh, North Carolina 27606
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**Soil Suitability for Domestic Sewage Treatment and Disposal Systems
245 Buckhorn Road, Moncure, NC, 27559**

PREPARED FOR: Mr. Paul Austin, Owner

PREPARED BY: Jeff Vaughan
Enrique Cachafiero

DATE: March 5, 2007

Soil suitability for domestic sewage treatment and disposal systems was evaluated on February 15, February 16, and March 1, 2007, for property located at 245 Buckhorn Road in Moncure, NC. Jeff Vaughan, Enrique Cachafeiro, and Chris McGee of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. The detailed soil evaluation of the land area will follow. Property reference maps, provided by Mr. Carter Crawford, are in Attachment 1. A review of the soil and landscape characteristics that dictate soil suitability for domestic sewage treatment and disposal systems can be found in Attachment 2.

The total property area is approximately 78 acres. The property is mostly wooded. However, there are 2 dwellings with septic systems (Attachment 3), several stables and buildings associated with horses kept on-site, several vehicle paths, a pond, and some recently cleared land (Attachment 4). There are several drainage features with moderate slopes throughout the property as well as several logging paths (Attachment 4).

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

The aerial map in Attachment 4 details the approximate property boundaries, topography, soil boring locations, structures, water bodies, and soil types. Soil borings were flagged in the field with blue ribbon (24" of provisionally suitable soil), red and blue ribbon (18 to 23" of provisionally suitable soil), red ribbon (12 to 17" of provisionally suitable soil), or yellow ribbon (less than 12" of provisionally suitable soil). Approximately 130 soil borings were advanced within the property (Attachment 4). The majority of the soil borings exhibited soil characteristics and soil depths (23" or less) that are provisionally suitable for surface application or subsurface drip septic systems. Some of the soil borings exhibited soil characteristics and soil depths (24" or greater) that are provisionally suitable conventional or shallow conventional trench septic systems. These

soil borings were concentrated in either the extreme northeastern or the extreme southeastern sections of the property. Some parts of the property contained drainage features and/or complex topography and, thus, are unsuitable for septic systems. However, this evaluation was merely a preliminary review to determine what potential this land might have for domestic sewage treatment and disposal systems. Therefore, specific types of septic systems, exact locations of future drainfields and repair areas, plus buffers from property lines (current and potential future lot lines), building foundations, wells, etc. are not fully considered. These things will need to be more fully considered as the plans develop for the potential future of this site. It is likely that additional soil evaluations will be required once septic system layouts and types are considered and developed for this property so that septic system types and the location(s) of septic drainfield(s) can be more fully and appropriately considered.

Typical profile descriptions of the soil for this property are in Attachment 5. Four distinct soil profiles were observed in the soil borings on the property, either a deep red clay subsoil (30" or greater), a shallower yellow subsoil with indications of saprolite and/or wetness beginning at approximately 16", or a shallower yellow subsoil with indications of saprolite and/or wetness beginning at approximately 22".

The soil borings had the following characteristics. No restrictive horizons were found in any provisionally soil borings within 36" of the soil surface. Soil texture was provisionally suitable and was estimated to be sandy loam to silt loam near the soil surface (A horizons) and sandy clay loam to clay in the subsoil (B horizons). Soil structure was provisionally suitable and was estimated to be granular near the soil surface (A horizons) and subangular blocky in the subsoil (B horizons). Clay mineralogy was provisionally suitable with very friable to firm moist soil consistence and non-sticky to sticky and non-plastic to plastic wet soil consistence. Indications of saprolite were detected in some soil borings.

The major soil types on this property are Creedmoor-Green Level complex (map symbols CrB, CrC, and CrD) and White Store-Polkton complex (map symbol WhC). The Chatham County Soil Survey indicates that severe limitations exist for septic systems installed in these soils types (Attachment 6).

The land area required for a conventional or shallow conventional septic system is calculated based on the size of the proposed facility and the Long-Term Acceptance Rate (LTAR) of the soil. The LTAR range for the provisionally suitable soils (for conventional and shallow conventional septic systems) on this property is 0.1 – 0.4 GPD/ft² based on the most restrictive soil texture in the subsoil. The LTAR suggested by AWT for a majority of the provisionally suitable soils (for conventional and shallow conventional septic systems) is 0.25 GPD/ft², but the final LTAR for specific septic system types and septic drainfield locations will be set by the Chatham County Health Department.

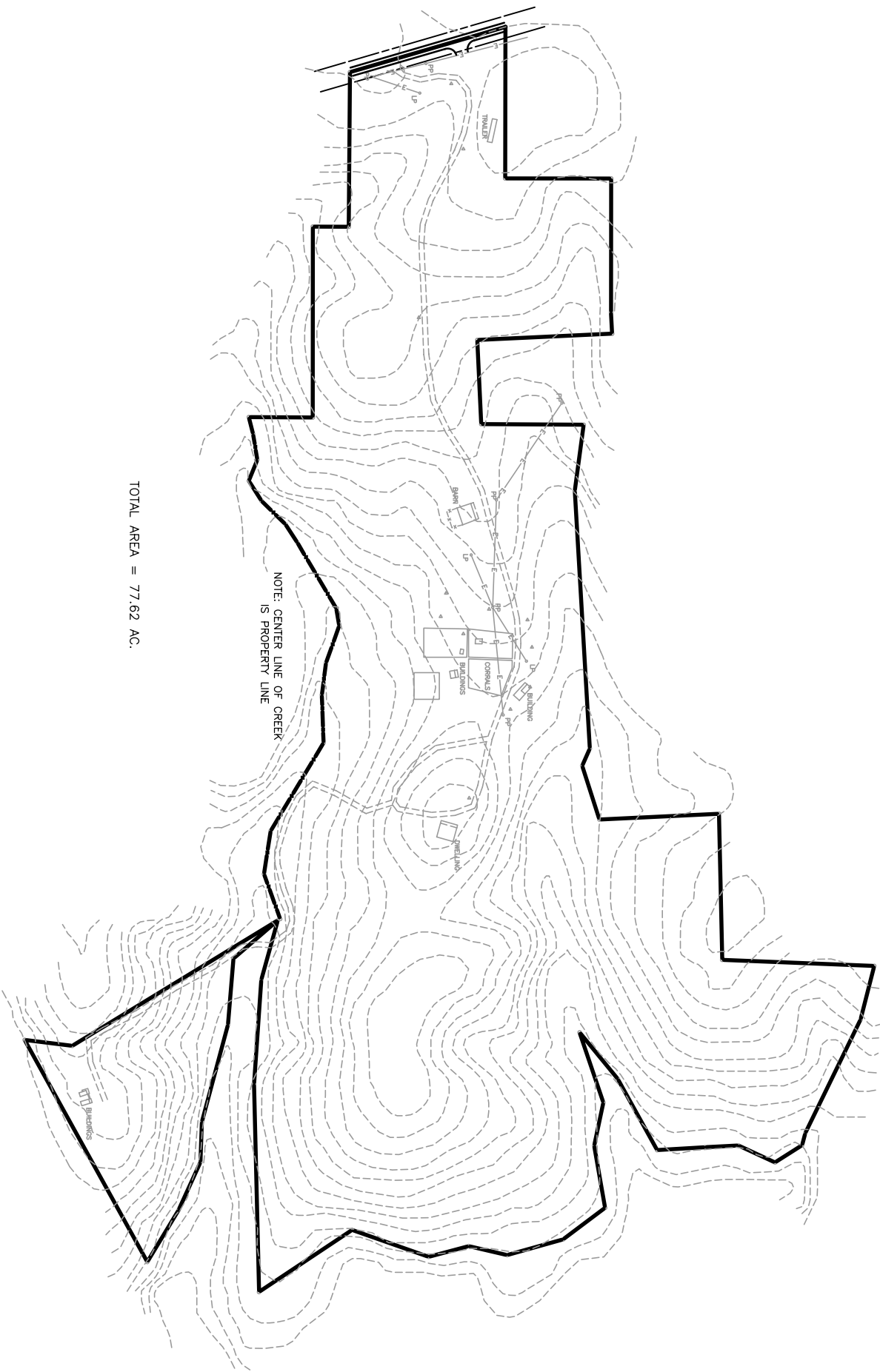
Several other septic systems may be possible for this site including, but not necessarily limited to, low pressure pipe, subsurface drip (with or without pre-treatment), or surface

application systems. Additional soils work would be required to determine the LTAR for these systems.

Based on the results of this evaluation, the installation of conventional or shallow conventional septic systems seems most probable on the extreme northeastern corner of this property as well as smaller areas in the extreme southeastern corner of this property. Subsurface drip and/or surface application septic systems are also a possibility on other areas of the property. We appreciate the opportunity to assist you in this matter. Please contact us with any questions, concerns, or comments.

austin

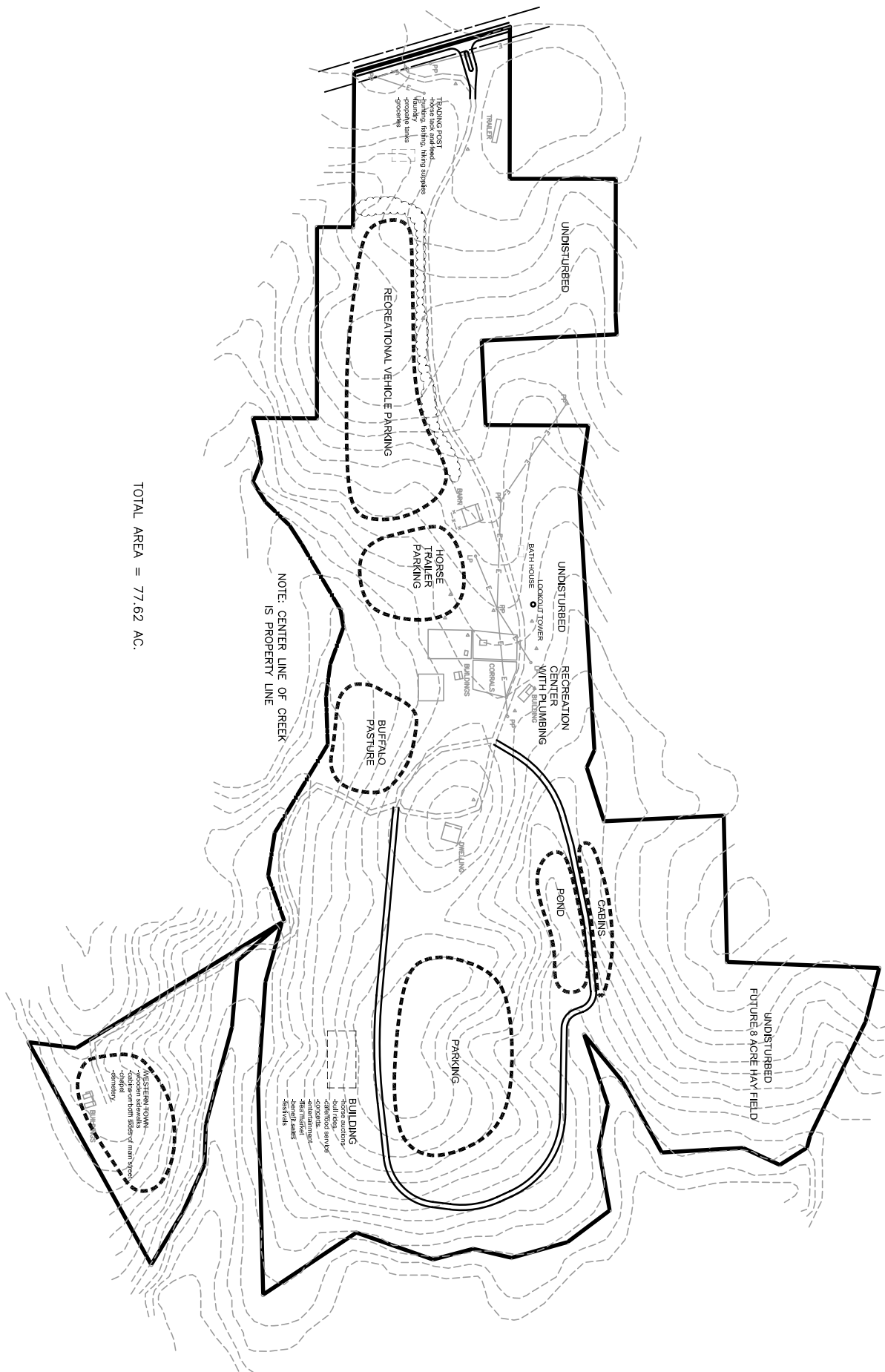
ATTACHMENT 1: Property Reference Maps



NOTE: CENTER LINE OF CREEK
IS PROPERTY LINE

TOTAL AREA = 77.62 AC.

STP SURVEYS



TOTAL AREA = 77.62 AC.

NOTE: CENTER LINE OF CREEK IS PROPERTY LINE

BUILDING
 -all roofs, except
 -some sections
 -entirement
 -several
 -desirable

PARKING
 -some sections
 -entirement
 -several
 -desirable

WESTERN TOWN
 -all roofs, except
 -some sections
 -entirement
 -several
 -desirable

UNDISTURBED
 FUTURE 8 ACRE HAY FIELD

UNDISTURBED

RECREATIONAL VEHICLE PARKING

HORSE TRAILER PARKING

BUFFALO PASTURE

UNDISTURBED
 RECREATION CENTER WITH PLUMBING

POND

GABINS

PARKING

TRADING POST
 -all roofs, except
 -some sections
 -entirement
 -several
 -desirable

TRAILER

BATH HOUSE

LOOKOUT TOWER

CONCRETE

BUILDING

TRAILER

TRAILER

TRAILER

TRAILER

TRAILER

TRAILER

TRAILER

**ATTACHMENT 2: Review of Rules Pertaining to Domestic
Sewage Treatment and Disposal Systems**

Five categories of soil and landscape characteristics are evaluated to determine soil suitability for domestic sewage treatment and disposal systems and include: topography and landscape position, soil morphological characteristics, soil wetness conditions, soil depth, and restrictive horizons. The soil and landscape characteristics found in a particular location dictate the type(s) of domestic sewage treatment and disposal system that can be used on a parcel of land. The detailed rules can be found in Section .1900 – Sewage Treatment and Disposal Systems, but a general review of the five categories and other relevant rules can be found in the sections below.

.1940 TOPOGRAPHY AND LANDSCAPE POSITION

Uniform slopes less than 15 percent are considered suitable, uniform slopes between 15 and 30 percent are considered provisionally suitable, and slopes greater than 30 percent are considered unsuitable for domestic sewage treatment and disposal systems. Complex slope patterns and slopes dissected by gullies and ravines are considered unsuitable for domestic sewage treatment and disposal systems. Depressions and wetlands are also considered unsuitable for domestic sewage treatment and disposal systems.

.1941 SOIL MORPHOLOGICAL CHARACTERISTICS

Sandy and coarse loamy textured soils (sand, loamy sand, sandy loam, and loam) are considered suitable for domestic sewage treatment and disposal systems. Fine loamy and clayey textured soils (silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay) are considered provisionally suitable for domestic sewage treatment and disposal systems.

Crumb, granular, and single-grained soil structures are considered suitable for domestic sewage treatment and disposal systems. Blocky soil structures are considered provisionally suitable for domestic sewage treatment and disposal systems. Platy, prismatic, and massive soil structures are considered unsuitable for domestic sewage treatment and disposal systems.

Slightly expansive clay mineralogy is considered suitable for domestic sewage treatment and disposal systems. Slightly expansive clay minerals exhibit loose, very friable, friable, or firm moist soil consistence. Expansive clay mineralogy is considered unsuitable for domestic sewage treatment and disposal systems. Expansive clay minerals exhibit very firm or extremely firm moist soil consistence. Organic soils are considered unsuitable for domestic sewage treatment and disposal systems.

.1942 SOIL WETNESS CONDITIONS

Soil wetness conditions are caused by seasonal high water table, perched water table, tidal water, seasonally saturated soils, or lateral water movement. Soil wetness conditions are indicated by soil colors, either in mottles or mass, with a chroma of 2 or less according to the Munsell color charts. Soil wetness conditions detected 48 inches in depth or deeper are considered suitable for domestic sewage treatment and disposal systems. Soil wetness conditions detected between 36 to 48 inches in depth are considered provisionally suitable for domestic sewage treatment and disposal systems. Soil wetness conditions detected 36 inches in depth or shallower are considered unsuitable for domestic sewage treatment and disposal systems.

.1943 SOIL DEPTH

Soil depths to rock, parent material, or saprolite greater than 48 inches are considered suitable for domestic sewage treatment and disposal systems. Soil depths to rock, parent material, or saprolite between 36 and 48 inches are considered provisionally suitable for domestic sewage treatment and disposal systems. Soil depths to rock, parent material, or saprolite less than 36 inches are considered unsuitable for domestic sewage treatment and disposal systems. Saprolite has a massive, rock-controlled structure, and retains the mineral arrangement of its parent rock in at least 50 percent of its volume. Saprolite only forms from metamorphic and igneous rock parent materials and is typically referred to as "rotten rock".

.1944 RESTRICTIVE HORIZONS

Restrictive horizons are capable of perching ground water or sewage effluent and are strongly compacted or cemented. Restrictive horizons resist soil excavation or augering. Soils with restrictive horizons three inches or more in thickness at depths greater than 48 inches are considered suitable for domestic sewage treatment and disposal systems. Soils with restrictive horizons three inches or more in thickness at depths between 36 and 48 inches are considered provisionally suitable for domestic sewage treatment and disposal systems. Soils with restrictive horizons three inches or more in thickness at depths less than 36 inches are considered unsuitable for domestic sewage treatment and disposal systems.

.1950 LOCATION OF SANITARY SEWAGE SYSTEMS

WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES NOTICE

No area for domestic sewage treatment and disposal system installation (or repair in Wake County) may be disturbed by clearing, excavation, filling, vehicle or equipment traffic, or storage of building materials.

.1947 DETERMINATION OF OVERALL SITE SUITABILITY

.1948 SITE CLASSIFICATION

All of the criteria for the five categories above are to be determined and classified as suitable, provisionally suitable, or suitable according to the respective rules described above. If all criteria are classified the same, that overall site classification will prevail. If there is a variation in the classification of several criteria, the most limiting classification will be used to determine the overall site classification.

A suitable classification generally indicates soil and landscape conditions favorable for the operation of a domestic sewage treatment and disposal system or slight limitations that can be readily overcome by proper design and installation. A provisionally suitable classification indicates soil and/or landscape conditions have moderate limitations for the operation of a domestic sewage treatment and disposal system, but modifications and careful planning, design, and installation can result in satisfactory system function. An unsuitable classification indicates severe soil and/or landscape limitations for the operation of a domestic sewage treatment and disposal system.

SUMMARY

Suitable/provisionally suitable landscapes and soils to a depth of 36 inches can, in general, be used for conventional gravity driven septic systems. Suitable/provisionally suitable landscapes

and soils to a depth of 24 –36 inches can, in general, be used for alternative septic systems such as shallow conventional and low pressure pipe systems, among others. All alternative systems for provisionally suitable landscapes and soils must be proposed to and approved by the Chatham County Health Department. Any landscapes or soils classified as unsuitable may be reclassified as provisionally suitable by the Chatham County Health Department after a site investigation by department personnel.

**ATTACHMENT 3: Chatham County Health Department
Septic System Documentation**

FEB-15-2007 11:29



* I'm not sure if this is the address you are looking for

CHATHAM COUNTY PUBLIC HEALTH DEPARTMENT

Division of Environmental Health

80 EAST STREET, P.O. BOX 130 • PITTSBORO, NC 27312-0130

Phone 919-542-8208 • Fax 919-542-8288

Request for Public Records

North Carolina General Statute Chapter 132 Sections 132-1 through 132-10

Request for Public Record Review may be filed during normal business hours (8:00 AM - 5:00 PM). Every effort will be made to process your request in a timely manner.

Date 2/15/07

Name of Person Requesting Records Allison Johnson, Agri-Waste Technology

Address 5400 Etta Burke Ct, Raleigh, NC 27606

Telephone 919-859-0669 Fax 919-233-1970

Description of Records Requested (PLEASE BE SPECIFIC)

CHECK ALL THAT APPLY

WELL PERMIT [checked] OTHER [] (PLEASE DESCRIBE)
SEPTIC PERMIT [checked]

CURRENT OWNER

Paul Austin

PROPERTY ADDRESS AND/OR PARCEL #

245 Buckhorn Rd, Moncure, NC #73961

(FOR WELL AND SEPTIC PERMIT RECORD) PLEASE PROVIDE OWNER/BUSINESS NAME AND YEAR WHEN WELL OR SEPTIC SYSTEM WAS INSTALLED IF DIFFERENT THAN CURRENT OWNER

SUBDIVISION NAME AND LOT NUMBER

DO YOU WISH TO HAVE RECORD CERTIFIED YES [] NO [checked]

SIGNATURE Allison Johnson Thank you!

For office use only.

Record Custodian's Initial H/S Date Reviewed/Provided 2-15-07

Reviewed onsite [] Mailed/Faxed [] Number of Copies [] \$ 25/page Total Doc

Elizabeth Buchanan 997 or 2002

Holly Coleman R.S. Interim Public Health Director 80 East Street, PO Box 130, Pittsboro, NC 27312 Phone 919-542-8208 Fax 919-542-8288

811 ADDRESS

Aselia, Paul site 44
NAME / SUBDIVISION & LOT #

CHATHAM COUNTY HEALTH DEPARTMENT SEWAGE DISPOSAL OPERATIONS PERMIT

Date 4-16-08

Improvements Permit No. TS 15227

Owner Paul Aselia

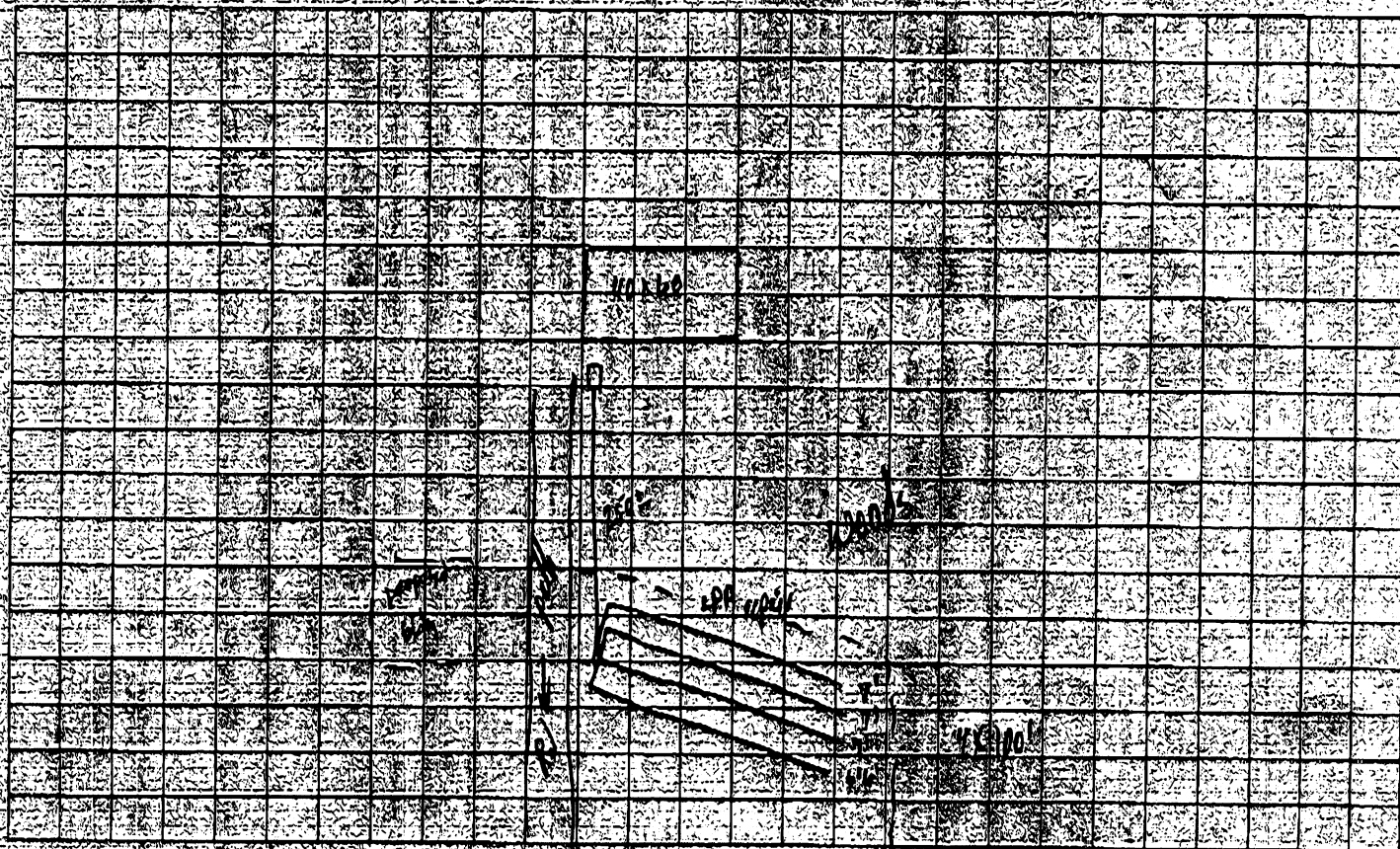
Conditions

This permit authorizes the owner to operate the sewage disposal system in accordance with the state and local rules. The department does recommend that septic tanks be pumped out every 3 to 5 years and filters be cleaned every 2 to 3 years. In the event of a malfunction contact this office.

This certifies that the system has been installed in compliance with applicable NC General Statutes and Rules for Sewage Treatment and Disposal and all conditions of the Improvements Permit and Construction Authorization.

Thomas O. Benson Sr.
Environmental Health Specialist

Type System: I II III IV V Other _____ Installer M. Kelly



CHATHAM COUNTY HEALTH DEPARTMENT ENVIRONMENTAL HEALTH DIVISION

80 East Street
P. O. Box 130
Pittsboro, NC 27312-0130
Phone (919) 542-8208 Fax (919) 542-8288

1000 S. 10th Avenue
Siler City, NC 27344
Phone (919) 742-4911 Fax (919) 742-1442

OFFICE USE ONLY

TPN _____
Permit No. JB45027
Date 4-5-02
EHS TJB
System Type II

Improvement Permit for Wastewater Systems ARTICLE II-CHAPTER 130A OF THE NC GENERAL STATUTES

NEW REPAIR EXPANSION

An Improvement Permit is issued to Paul Austin for
a 6.3 acre site located on Backhills Rd (1/2 mile on left) site #1 3000' from road
in Chatham County. It is specifically issued for the following facility:

Facility: Residential () Non-Residential ()

No. Bedrooms 3 No. Residents/Employees 4 max

Type Wastewater: Residential () Commercial ()

Initial System Type: I () II () III () IV () V () VI ()

Description _____

Type System: Shallow Conventional () LPP ()

Other _____

Design Flow 360 EPGD Application Rate .3 GPD/ft²

Size Tank(s) w/Risers and Effluent Filter ST 1000 Gal PT _____ Gal

Nitrification Line (Length/Width/Max Depth) 400 x 3 x 24

(On contour in approved septic area; sch. 40 PVC required over step-downs)

Repair System Type: I () II () III () IV () V () VI ()

Description Low Pressure Pipe

Special Conditions _____

A plat with site plan showing specific location of the facility, the site for the proposed wastewater system, existing buildings, property lines, water supplies, surface waters, the conditions for any site modifications; and any other information required by the department must be attached to be valid.

This permit is valid [] without expiration [] for five years but is subject to revocation if the site is altered, soil disturbed, set-backs violated, or the plans of intended use are changed. The Improvement Permit shall not be affected by change in ownership.

THIS IS NOT AUTHORIZATION TO INSTALL. An authorization for Wastewater Construction must be obtained from this department before installation.

Issued by Thomas O. Bayne R.S.
Environmental Health Specialist

N.C. Registration Number 1353

Date 4-5-02

911 Address

Name Austin, Paul site #1

CHATHAM COUNTY HEALTH DEPARTMENT SEWAGE DISPOSAL CONSTRUCTION AUTHORIZATION (Required for Building Permit)

Date 4-10-02

Improvements Permit No. 7845022

New

Repair

Expansion

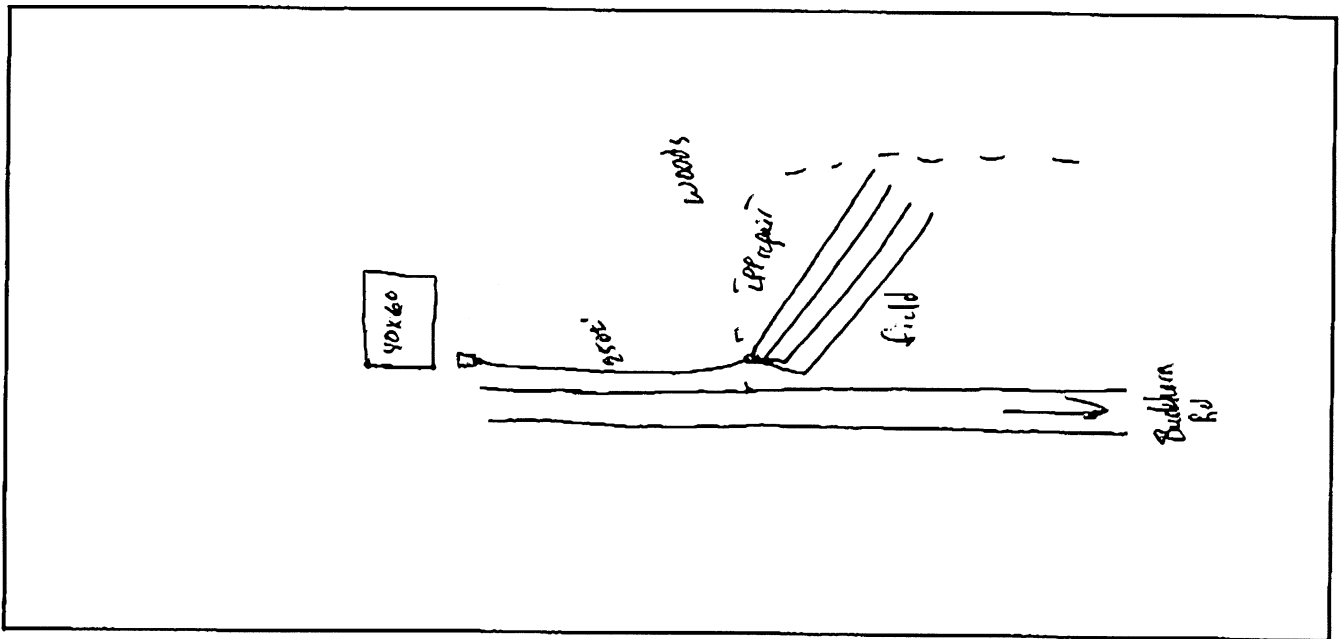
Owner Paul Austin

Location Backhorn Rd

This permit authorizes the owner to install the sewage disposal system within five years of the issue date on the Improvement Permit. The installer must be registered in Chatham County. Before an Operations Permit can be issued, all required inspections and conditions of the permit must be completed and verified by this department.

Plans (if required) approved by _____

The installer must flag the system prior to installation to ensure proper grade.



This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes. The Construction Authorization shall not be affected by change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal conditions of this permit.

System Type II

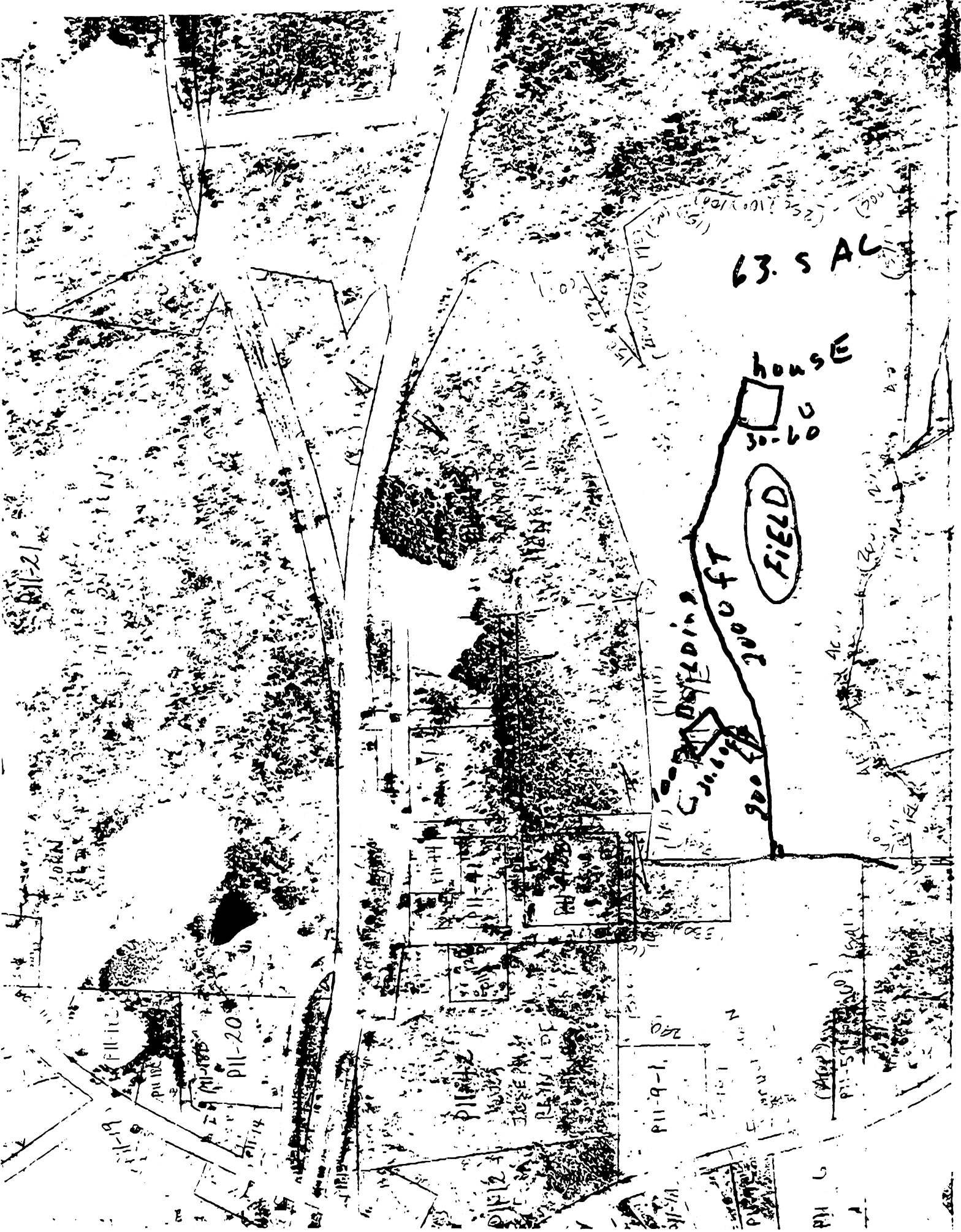
Frederic O. Perry B.S.
Environmental Health Specialist

****If applicable**

I understand the system type specified is different from the type specified on the application.
I accept the specifications of this permit.

Owner/Legal Representative Signature _____ Date: _____

Name Paul Austin site #/ 911 Address



811 ADDRESS

Highway land site #2
NAME / SUBDIVISION & LOT #

CHATHAM COUNTY HEALTH DEPARTMENT SEWAGE DISPOSAL OPERATIONS PERMIT

Date 4-16-02

Improvements Permit No. 487-002

Owner Paul Austin

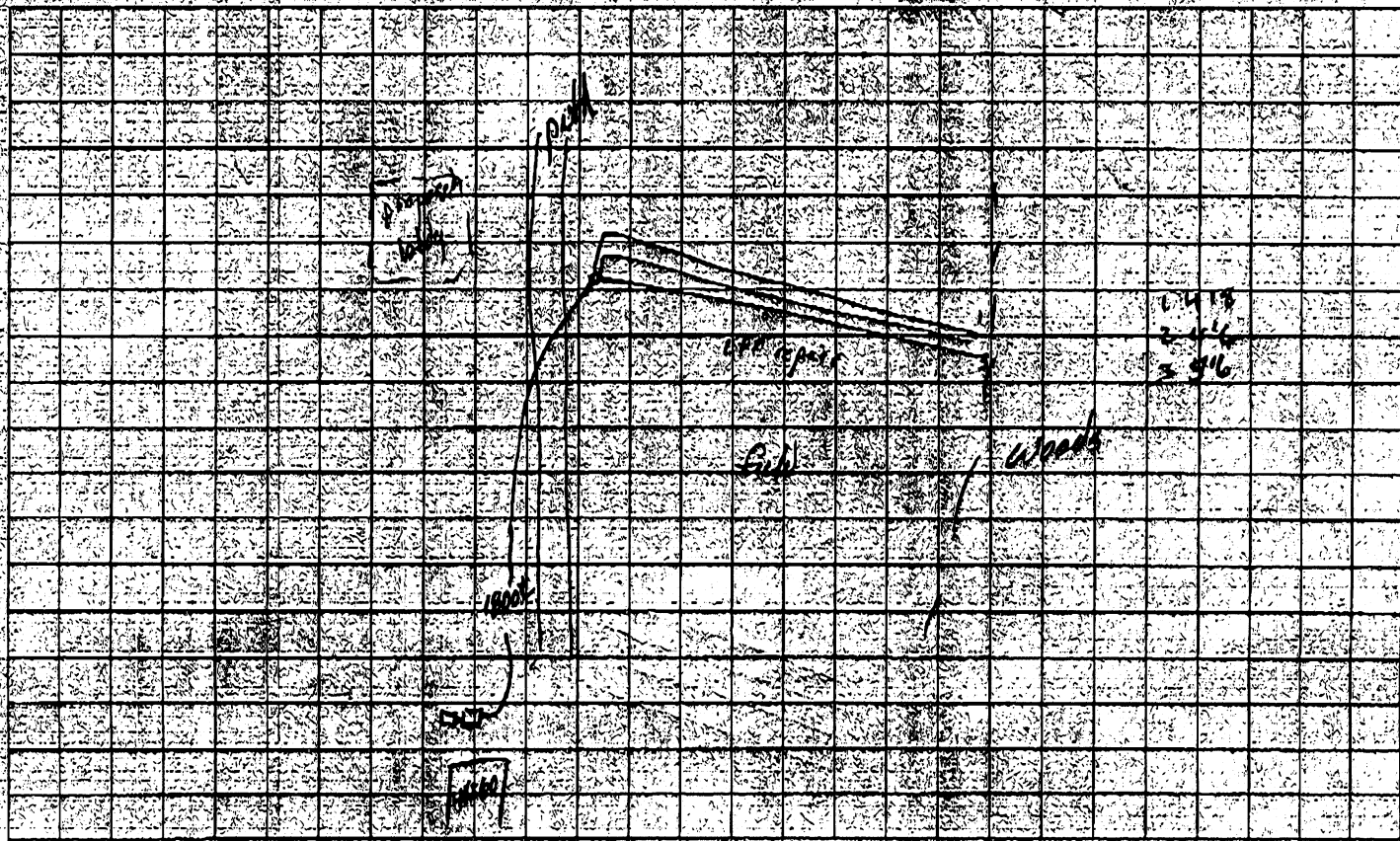
Conditions _____

This permit authorizes the owner to operate the sewage disposal system in accordance with the state and local rules. The department does recommend that septic tanks be pumped out every 3 to 5 years and filters be cleaned every 2 to 3 years. In the event of a malfunction contact this office.

This certifies that the system has been installed in compliance with applicable NC General Statutes and Rules for Sewage Treatment and Disposal and all conditions of the Improvements Permit and Construction Authorization.

Thomas O. Ryan Jr.
Environmental Health Specialist

Type System: I II III M V Other _____ Installer *Mike Key*



CHATHAM COUNTY HEALTH DEPARTMENT SEWAGE DISPOSAL CONSTRUCTION AUTHORIZATION (Required for Building Permit)

Date 4-10-02

Improvements Permit No. TB45024

New Repair Expansion

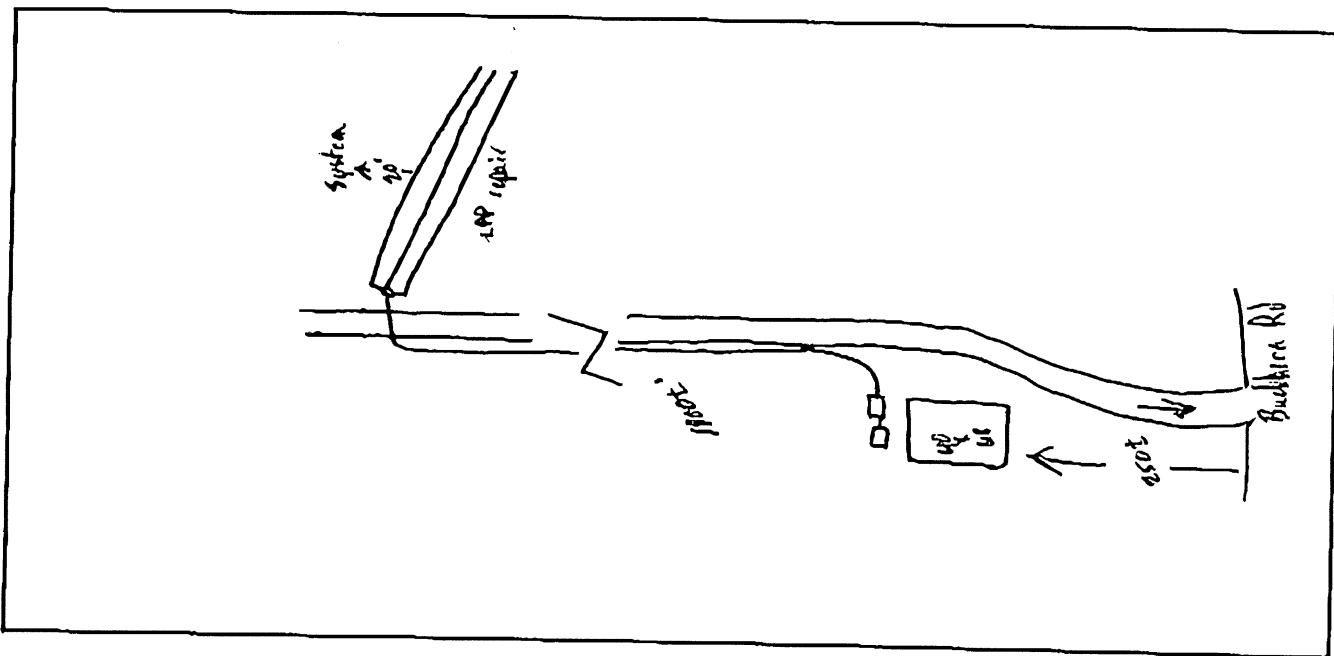
Owner Paul Austin

Location Buckhara Rd

This permit authorizes the owner to install the sewage disposal system within five years of the issue date on the Improvement Permit. The installer must be registered in Chatham County. Before an Operations Permit can be issued, all required inspections and conditions of the permit must be completed and verified by this department.

Plans (if required) approved by _____

The installer must flag the system prior to installation to ensure proper grade.



This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes. The Construction Authorization shall not be affected by change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal conditions of this permit.

System Type III

Thomas J. Bayne R.S.
Environmental Health Specialist

****If applicable**

I understand the system type specified is different from the type specified on the application.
I accept the specifications of this permit.

Owner/Legal Representative Signature _____ Date: _____

Name Paul Austin site # 2 911 Address

CHATHAM COUNTY HEALTH DEPARTMENT ENVIRONMENTAL HEALTH DIVISION

80 East Street
P. O. Box 130
Pittsboro, NC 27312-0130
Phone (919) 542-8208 Fax (919) 542-8288

1000 S. 10th Avenue
Siler City, NC 27344
Phone (919) 742-4911 Fax (919) 742-1442

OFFICE USE ONLY

TPN _____
Permit No. TB45024
Date 4-5-02
EHS TJB
System Type TU

Improvement Permit for Wastewater Systems ARTICLE II-CHAPTER 130A OF THE NC GENERAL STATUTES

NEW REPAIR EXPANSION

An Improvement Permit is issued to Paul Austin for
a 6.32 acre site located on Buckhorn Rd (1/2 mile on left) site # 2 250' from road
in Chatham County. It is specifically issued for the following facility:

Facility: Residential () Non-Residential ()

No. Bedrooms 3 No. Residents/Employees 6 max

Type Wastewater: Residential () Commercial ()

Initial System Type: I () II () III () IV () V () VI ()

Description _____

Type System: Shallow Conventional () LPP ()

Other with pump

Design Flow 360 EGPLD Application Rate .3 GPD/ft²

Size Tank(s) w/Risers and Effluent Filter ST 1000 Gal PT _____ Gal

Nitrification Line (Length/Width/Max Depth) 400x3x24

(On contour in approved septic area; sch. 40 PVC required over step-downs)

Repair System Type: I () II () III () IV () V () VI ()

Description Low Pressure Pipe

Special Conditions _____

A plat with site plan showing specific location of the facility, the site for the proposed wastewater system, existing buildings, property lines, water supplies, surface waters, the conditions for any site modifications; and any other information required by the department must be attached to be valid.

This permit is valid [] without expiration [x] for five years but is subject to revocation if the site is altered, soil disturbed, set-backs violated, or the plans of intended use are changed.

The Improvement Permit shall not be affected by change in ownership.

THIS IS NOT AUTHORIZATION TO INSTALL. An authorization for Wastewater Construction must be obtained from this department before installation.

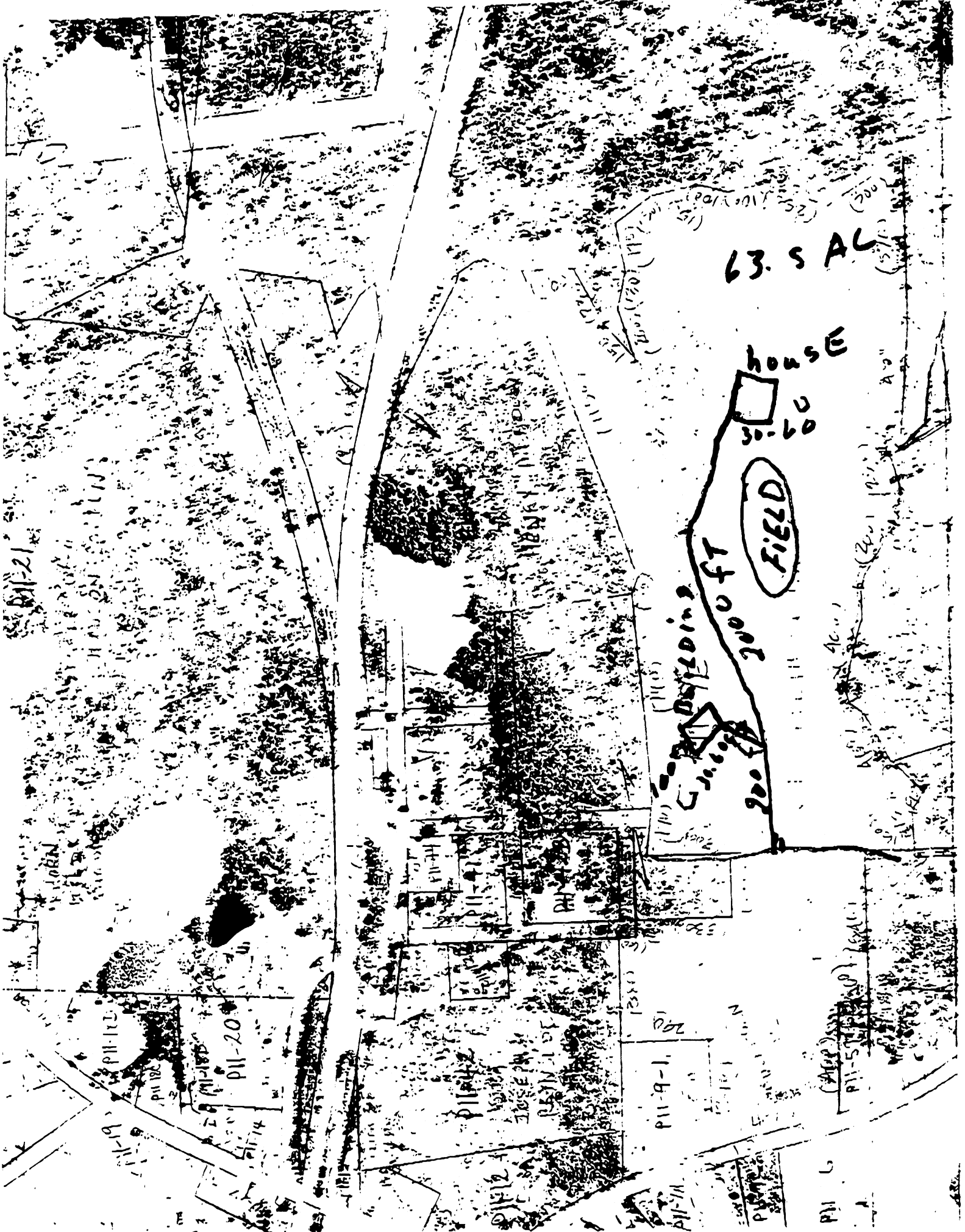
Issued by Thomas J. Boyce R.S.
Environmental Health Specialist

N.C. Registration Number 1353

Date 4-5-02

911 Address

Name Paul Austin, Paul Austin, Paul Austin site # 2



**ATTACHMENT 4: Property Map Detailing Soil Boring
Depths and Soil Types**



Agri-Waste Technology, Inc.
 5400 Etta Burke Court
 Raleigh, NC 27606
 Ph: 919-859-0669
 Fax: 919-233-1970
 www.agriwaste.com

Austin Property
245 Buckhorn Rd
Chatham Co, NC

Soil Types:
 CRB, C, D - Creedmoor
 -Greenlevel Complex
 Ced- Cecil gravelly
 loam
 Whc- White Store-
 Polkton Complex

Legend

2ft Contours

Depth of Prov Suitable Soil

- < 12"
- 12" - 17"
- 18" - 23"
- 24" - 29"
- 30" - 35"
- > 36"

○ Auger Refusal

○ Nonviable Pits

○ Property Line

Property Features

- Building
- New Pond

Soil Types

- Surface Waters

Drawn By: Enrique Caccharero
 Reviewed By: Jeff Vaughan
 Date: 03/01/2007



**ATTACHMENT 5: Typical Profile Descriptions of
Provisionally Suitable Soil**

ATTACHMENT 6: Soil Survey Information

538C=White Store-Polkton Complex, 6 to 10 percent slopes

Setting

Landscape: Triassic Basin uplands, mainly in the eastern part of the county
Landform: Interstream divides, ridges and side slopes
Shape of areas: Irregular
Size of areas: 5 to 200 acres

Composition

White Store and similar soils: 35 percent
Polkton and similar soils: 30 percent
Dissimilar soils: 35 percent

Typical Profile

White Store soils

Surface layer:

0 to 8 inches=light yellowish brown loam

Subsoil:

8 to 23 inches=strong brown and yellowish brown clay that has yellowish red and pale brown mottles

23 to 33 inches=yellowish brown clay that has light gray mottles

33 to 37 inches=light yellowish brown, light gray, pale brown, yellowish brown and dark reddish brown clay loam

Underlying material:

37 to 42 inches=dark reddish brown, reddish brown, white, and light gray sandy loam saprolite

Bedrock:

42 to 60 inches=weathered slightly fractured Triassic sandstone

Polkton soils

Surface layer:

0 to 4 inches=pale brown silt loam

Subsurface layer:

4 to 8 inches=light yellowish brown silt loam

Subsoil:

8 to 15 inches=brownish yellow sandy clay loam

15 to 22 inches=yellowish red clay

22 to 27 inches=yellowish red clay that has pinkish gray mottles

27 to 30 inches=brown silty clay loam that has pinkish gray and red mottles

Underlying material:

30 to 33 inches=pinkish gray silt loam saprolite that has reddish yellow and reddish brown mottles

Bedrock:

33 to 60 inches=weathered Triassic siltstone

Soil Properties and Qualities

Depth class: White Store=deep; Polkton=moderately deep
Agricultural drainage class: Moderately well drained

Permeability: Very slow
Available water capacity: Moderate to high
Depth to seasonal high water table; kind: White Store=1.0 to 1.5 feet below the soil surface during the months of December through March; perched;
Polkton=1.5 to 2.5 feet below the soil surface during the months of December through March; perched
Shrink-swell potential: Very high
Hazard of flooding: None
Surface runoff: Very rapid
Hazard of water erosion: Severe
Parent material: Residuum weathered from Triassic sandstone, mudstone, shale, siltstone and conglomerate
Depth to bedrock: White Store=40 to 60 inches to soft bedrock and more than 72 inches to hard bedrock; Polkton=20 to 40 inches to soft bedrock and 40 to 60 inches to hard bedrock

Minor Components:

Dissimilar:

Random areas of very deep Creedmoor soils that have high shrink swell, and depth to bedrock more than 60 inches
Random areas of Carbonton and Brickhaven with a higher silt content and moderate shrink swell
Random areas of Pinoka soils with loamy subsoils
Random areas of severely eroded White Store and Polkton soils that have higher clay content in the surface layer

Similar:

Random areas of White Store soils that have sandy loam, fine sandy loam, very fine sandy loam, or silt loam surface layers
Random areas of Polkton soils that have loam or very fine sandy loam surface layers
Random areas of Green Level soils that have a depth to bedrock of more than 60 inches
Soils with gravelly or cobbly surface layers that are shown with special symbols

Land Use

Dominant uses: Woodland
Other uses: Pasture and hayland

Agriculture

Cropland

Suitability: Poorly suited
Commonly grown crops: Few if any crops are currently grown on areas of this map unit
Management concerns: White Store=erodibility, wetness, and soil fertility;
Polkton=erodibility, wetness, soil fertility, and rooting depth
Management measures and considerations:

Resource management systems that include terraces and diversions, stripcropping, contour tillage, no-till farming, and crop residue management help to control soil erosion and surface runoff and maximize the infiltration of rainfall. Installing and maintaining an artificial drainage system helps to reduce wetness limitations and improve the productivity of these soils.

Delaying planting in spring helps to minimize clodding and rutting resulting from wetness caused by the high water table.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum, increase availability of plant nutrients, and maximize crop productivity.

Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth in Polkton soils.

Pasture and hayland

Suitability: Moderately suited for pasture and poorly suited for hayland

Commonly grown crops: Tall fescue, orchardgrass and clover

Management concerns: Erodibility, wetness, and soil fertility

Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.

Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.

Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Preventing overgrazing or preventing grazing when the soil is wet helps to prevent soil compaction, a decrease in productivity, and a rough surface layer. Some areas may need artificial drainage for maximum productivity.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum, increase availability of plant nutrients, and maximize production of forage and hay crops.

Woodland

Suitability: Well suited

Productivity class: Moderately high for loblolly pine

Management concerns: White Store=equipment use; Polkton=equipment use and windthrow hazard

Management measures and considerations:

Restricting the use of standard wheeled and tracked equipment to dry periods helps to minimize rutting and soil compaction, which occurs when the soils are saturated.

Productivity may be increased by periodically harvesting windthrown trees, which result from high winds and the limited rooting depth of Polkton soils.

Extra care is needed in maintaining roads and fire lanes because of the hazard of windthrow.

Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: White Store=wetness and shrink swell;
Polkton=wetness, shrink swell and depth to rock
Management measures and considerations:
Artificial drainage systems or diversions help to remove excess surface water.
Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.
Artificial drainage systems or diversions help to remove excess surface water.
Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling.
The soft bedrock underlying the soils in this map unit does not require special equipment for excavation but is difficult to revegetate or to pack if used in fill slopes.
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields

Suitability: Unsited

Management concerns: Wetness, restricted permeability, and depth to rock

Management measures and considerations:

This map unit has severe limitations affecting septic tank absorption fields. The Chatham County Health Department should be contacted for additional guidance.

A site on better suited soils should be selected.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength, and very high shrink swell

Management measures and considerations:

This map unit has severe limitations affecting roads and streets. A site on better suited soils should be selected.

Removing as much of the clay material as possible and increasing the thickness of the base aggregate help to improve soil performance.

Incorporating sand and gravel with the soil material, compacting roadbeds, and designing roads that conform to the natural slope help to improve soil strength.

Using a geotextile fabric filter cloth between the roadbed and the soil surface helps to minimize the loss of stone into the soil.

Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing campsites on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating campsites on the higher areas allows better surface water runoff and helps to keep campsites drier during wet periods.

Picnic areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing picnic facilities on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating picnic facilities on the higher areas allows better surface water runoff and helps to keep sites drier during wet periods.

Playgrounds

Suitability: Poorly suited

Management concerns: steepness of slope, wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting playgrounds. A site on better suited soils should be selected.

Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.

Artificial drainage systems or diversions help to remove excess surface water and minimize the wetness limitation.

Restricting use after heavy rains, when the soil is saturated will be necessary.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.

Paths and trails

Suitability: Poorly suited

Management concerns: Erodibility and wetness

Management measures and considerations:

Designing paths and trails on raised pads helps to minimize wetness.

Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, helps to maintain the stability of trails.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Interpretive Groups

Land capability classification: IIIe

Woodland ordination symbol: White Store=7D for loblolly pine; Polkton=6D for loblolly pine;

532B=Creedmoor-Green Level Complex, 2 to 6 percent slopes

Setting

Landscape: Triassic Basin uplands, mainly in the eastern part of the county around Jordan Lake

Landform: Interstream divides, ridges and side slopes

Shape of areas: Irregular

Size of areas: 5 to 200 acres

Composition

Creedmoor and similar soils: 45 percent

Green Level and similar soils: 43 percent

Dissimilar soils: 12 percent

Typical Profile

Creedmoor soils

Surface layer:

0 to 5 inches=brown sandy loam

Subsurface layer:

5 to 10 inches= very pale brown sandy loam

Subsoil:

10 to 15 inches=yellowish brown sandy clay loam

15 to 25 inches=yellowish brown clay that has red and strong brown mottles

25 to 45 inches=yellowish brown clay that has light brownish gray, pale brown and strong brown mottles

Underlying material:

45 to 62 inches=multicolored in shades of yellow, brown, red, gray and white sandy clay loam saprolite

Green Level soils

Surface layer:

0 to 1 inches; brown sandy loam

Subsurface layer:

1 to 8 inches; light yellowish brown sandy loam

Subsoil:

8 to 12 inches; strong brown clay loam with brownish yellow mottles

12 to 24 inches; yellowish brown clay with yellowish brown and light gray mottles

24 to 33 inches; yellowish brown clay with red and light gray mottles

33 to 38 inches; light gray sandy clay loam with yellowish brown, strong brown and light gray mottles

Underlying material:

38 to 51 inches; light gray sandy loam saprolite that has brown mottles

51 to 60 inches; light gray sandy loam saprolite that has brown mottles

Soil Properties and Qualities

Depth class: Very deep

Agricultural drainage class: Creedmoor=moderately well or somewhat poorly drained; Green Level=moderately well drained
Permeability: Very slow
Available water capacity: Moderate to high
Depth to seasonal high water table; kind: Creedmoor=1.0 to 2.0 feet during the months of January through March; perched; Green Level=1.0 to 1.5 feet below the soil surface during the months of December through May; perched
Shrink-swell potential: Creedmoor=high; Green Level=very high
Hazard of flooding: None
Surface runoff: Creedmoor=rapid; Green Level=very rapid
Hazard of water erosion: Creedmoor=moderate; Green Level=severe
Parent material: Residuum weathered from Triassic sandstone, mudstone, shale, siltstone and conglomerate
Depth to bedrock: More than 60 inches

Minor Components:

Dissimilar:

Random areas of well drained Mayodan soils with moderate shrink swell
Random areas of loamy soils with less clay in the subsoil layers and higher rates of permeability
Random areas of Creedmoor and Green Level soils with clay loam or sandy clay loam surface layers

Similar:

Random areas of Creedmoor and Green Level soils with fine sandy loam, coarse sandy loam, loamy sand, silt loam, or loam surface layers

Land Use

Dominant uses: Woodland and recreational uses associated with publicly owned lands around Jordan Lake

Other uses: Pasture and hayland, cropland and urban development

Agricultural Development

Cropland

Suitability: Creedmoor=well suited; Green Level=moderately suited

Commonly grown crops: Tobacco and small grain

Management concerns: Creedmoor=wetness, erodibility; Green Level=erodibility, wetness and soil fertility

Management measures and considerations:

Resource management systems that include terraces and diversions, stripcropping, contour tillage, no-till farming, and crop residue management help to control soil erosion and surface runoff and maximize the infiltration of rainfall. Installing and maintaining an artificial drainage system helps to reduce wetness limitations and improve the productivity of these soils.

Delaying planting in spring helps to minimize clodding and rutting resulting from wetness caused by the high water table.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in the Green Level soils, increase availability of plant nutrients, and maximize crop productivity.

Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth.

Pasture and hayland

Suitability: Creedmoor=well suited for pasture and moderately suited for hayland; Green Level=moderately suited for pasture and poorly suited for hayland

Commonly grown crops: Tall fescue, Bermuda grass, orchardgrass and clover

Management concerns: Creedmoor=wetness; Green Level=erodibility, wetness, and soil fertility

Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.

Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.

Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Preventing overgrazing or preventing grazing when the soil is wet helps to prevent soil compaction, a decrease in productivity, and a rough surface layer.

Some areas may need artificial drainage for maximum productivity.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in Green Level soils, increase availability of plant nutrients, and maximize production of forage and hay crops.

Woodland

Suitability: Well suited

Productivity class: Creedmoor=high for loblolly pine; Green Level=moderately high for loblolly pine

Management concerns: Equipment use

Management measures and considerations:

Restricting the use of standard wheeled and tracked equipment to dry periods helps to minimize rutting and soil compaction, which occurs when the soils are saturated.

Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings

Suitability: Creedmoor=moderately suited without basements; with basements=poorly suited; Green Level=poorly suited without basements; with basements=poorly suited

Management concerns: Wetness and shrink swell

Management measures and considerations:

Artificial drainage systems or diversions help to remove excess surface water.

Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.

Artificial drainage systems or diversions help to remove excess surface water.

Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling.

Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields

Suitability: Creedmoor=poorly suited; Green Level=unsuited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting septic tank absorption fields. The Chatham County Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Creedmoor=low strength and high shrink swell; Green Level=low strength and very high shrink swell

Management measures and considerations:

Removing as much of the clay material as possible and increasing the thickness of the base aggregate help to improve soil performance.

Incorporating sand and gravel with the soil material and compacting roadbeds helps to improve soil strength.

Using a geotextile fabric filter cloth between the roadbed and the soil surface helps to minimize the loss of stone into the soil.

Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing campsites on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating campsites on the higher areas allows better surface water runoff and helps to keep campsites drier during wet periods.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Picnic areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing picnic facilities on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating picnic facilities on the higher areas allows better surface water runoff and helps to keep sites drier during wet periods.

Playgrounds

Suitability: Poorly suited

Management concerns: steepness of slope, wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting playgrounds. A site on better suited soils should be selected.

Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.

Artificial drainage systems or diversions help to remove excess surface water and minimize the wetness limitation.

Restricting use after heavy rains, when the soil is saturated will be necessary.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.

Paths and trails

Suitability: Creedmoor=moderately suited; Green Level=poorly suited

Management concerns: Creedmoor=wetness; Green Level=erodibility

Management measures and considerations:

Designing paths and trails on raised pads helps to minimize wetness.

Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, helps to maintain the stability of trails.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Interpretive Groups

Land capability classification: Creedmoor=Ile; Green Level=Ile

Woodland ordination symbol: Creedmoor=9A for loblolly pine; Green Level=8C for Loblolly

532C=Creedmoor-Green Level Complex, 6 to 10 percent slopes

Setting

Landscape: Triassic Basin uplands, mainly in the eastern part of the county around Jordan Lake

Landform: Interstream divides, ridges and side slopes

Shape of areas: Irregular

Size of areas: 5 to 200 acres

Composition

Creedmoor and similar soils: 67 percent

Green Level and similar soils: 23 percent

Dissimilar soils: 10 percent

Typical Profile

Creedmoor soils

Surface layer:

0 to 5 inches=brown sandy loam

Subsurface layer:

5 to 10 inches= very pale brown sandy loam

Subsoil:

10 to 15 inches=yellowish brown sandy clay loam

15 to 25 inches=yellowish brown clay that has red and strong brown mottles

25 to 45 inches=yellowish brown clay that has light brownish gray, pale brown and strong brown mottles

Underlying material:

45 to 62 inches=multicolored in shades of yellow, brown, red, gray and white sandy clay loam saprolite

Green Level soils

Surface layer:

0 to 1 inches; brown sandy loam

Subsurface layer:

1 to 8 inches; light yellowish brown sandy loam

Subsoil:

8 to 12 inches; strong brown clay loam with brownish yellow mottles

12 to 24 inches; yellowish brown clay with yellowish brown and light gray mottles

24 to 33 inches; yellowish brown clay with red and light gray mottles

33 to 38 inches; light gray sandy clay loam with yellowish brown, strong brown and light gray mottles

Underlying material:

38 to 51 inches; light gray sandy loam saprolite that has brown mottles

51 to 60 inches; light gray sandy loam saprolite that has brown mottles

Soil Properties and Qualities

Depth class: Very deep

Agricultural drainage class: Creedmoor=moderately well or somewhat poorly drained; Green Level=moderately well drained

Permeability: Very slow
Available water capacity: Moderate to high
Depth to seasonal high water table; kind: Creedmoor=1.0 to 2.0 feet during the months of January through March; perched; Green Level=1.0 to 1.5 feet below the soil surface during the months of December through May; perched
Shrink-swell potential: Creedmoor=high; Green Level=very high
Hazard of flooding: None
Surface runoff: Creedmoor=rapid; Green Level=very rapid
Hazard of water erosion: Creedmoor=moderate; Green Level=severe
Parent material: Residuum weathered from Triassic sandstone, mudstone, shale, siltstone and conglomerate
Depth to bedrock: More than 60 inches

Minor Components:

Dissimilar:

Random areas of Polkton soils that have soft bedrock at a depth of 20 to 40 inches
Random areas of well drained Mayodan soils with moderate shrink swell
Random areas of loamy soils with less clay in the subsoil layers and higher rates of permeability
Random areas of severely eroded Creedmoor or Green Level soils with clay loam or sandy clay loam surface layers

Similar:

Random areas of Creedmoor soils with fine sandy loam, coarse sandy loam, loamy sand, silt loam or loam surface layers
Gravelly or cobbly areas shown with special symbols

Land Use

Dominant uses: Woodland and recreational uses associated with publicly owned lands around Jordan Lake
Other uses: Pasture and hayland, cropland and urban development

Agricultural Development

Cropland

Suitability: Creedmoor=moderately suited; Green Level=poorly suited;
Commonly grown crops: Tobacco and small grain
Management concerns: Creedmoor=wetness, erodibility; Green Level=erodibility, wetness and soil fertility
Management measures and considerations:
Resource management systems that include terraces and diversions, stripcropping, contour tillage, no-till farming, and crop residue management help to control soil erosion and surface runoff and maximize the infiltration of rainfall. Installing and maintaining an artificial drainage system helps to reduce wetness limitations and improve the productivity of these soils.
Delaying planting in spring helps to minimize clodding and rutting resulting from wetness caused by the high water table.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in the Green Level soils, increase availability of plant nutrients, and maximize crop productivity. Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth.

Pasture and hayland

Suitability: Creedmoor=well suited for pasture and moderately suited for hayland; Green Level=moderately suited for pasture and poorly suited for hayland

Commonly grown crops: Tall fescue, Bermuda grass, orchardgrass and clover

Management concerns: Creedmoor=wetness; Green Level=erodibility, wetness, and soil fertility

Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.

Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.

Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Preventing overgrazing or preventing grazing when the soil is wet helps to prevent soil compaction, a decrease in productivity, and a rough surface layer. Some areas may need artificial drainage for maximum productivity.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in Green Level soils, increase availability of plant nutrients, and maximize production of forage and hay crops.

Woodland

Suitability: Well suited

Productivity class: Creedmoor=high for loblolly pine; Green Level=moderately high for loblolly pine

Management concerns: Equipment use

Management measures and considerations:

Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and ensure planting success.

Restricting the use of standard wheeled and tracked equipment to dry periods helps to minimize rutting and soil compaction, which occurs when the soils are saturated.

Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings

Suitability: Creedmoor=moderately suited without basements; with basements=poorly suited; Green Level=poorly suited

Management concerns: Creedmoor=wetness, and shrink swell; Green Level=wetness and shrink swell

Management measures and considerations:

Artificial drainage systems or diversions help to remove excess surface water.

Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.

Artificial drainage systems or diversions help to remove excess surface water. Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling.

The soft bedrock underlying the Green Level soils in this map unit does not require special equipment for excavation but is difficult to revegetate or to pack if used in fill slopes.

Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields

Suitability: Creedmoor=poorly suited; Green Level=unsuited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting septic tank absorption fields. The Chatham County Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Creedmoor=low strength; Green Level=low strength and very high shrink swell

Management measures and considerations:

Removing as much of the clay material as possible and increasing the thickness of the base aggregate help to improve soil performance.

Incorporating sand and gravel with the soil material and compacting roadbeds helps to improve soil strength.

Using a geotextile fabric filter cloth between the roadbed and the soil surface helps to minimize the loss of stone into the soil.

Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing campsites on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating campsites on the higher areas allows better surface water runoff and helps to keep campsites drier during wet periods.

Picnic areas

Suitability: Poorly suited

Management concerns: Wetness and restricted permeability

Management measures and considerations:

Designing picnic facilities on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating picnic facilities on the higher areas allows better surface water runoff and helps to keep sites drier during wet periods.

Playgrounds

Suitability: Poorly suited

Management concerns: steepness of slope, wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting playgrounds. A site on better suited soils should be selected.

Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.

Artificial drainage systems or diversions help to remove excess surface water and minimize the wetness limitation.

Restricting use after heavy rains, when the soil is saturated will be necessary.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.

Paths and trails

Suitability: Creedmoor=moderately suited; Green Level=poorly suited

Management concerns: Creedmoor=wetness; Green Level=erodibility

Management measures and considerations:

Designing paths and trails on raised pads helps to minimize wetness.

Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, helps to maintain the stability of trails.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Interpretive Groups

Land capability classification: Creedmoor=IIIe; Green Level=IIIe

Woodland ordination symbol: Creedmoor=9A for loblolly pine; Green Level=8C for Loblolly

532D=Creedmoor-Green Level Complex, 10 to 15 percent slopes

Setting

Landscape: Triassic Basin uplands, mainly in the eastern part of the county around Jordan Lake

Landform: Narrow ridges and side slopes

Shape of areas: Irregular

Size of areas: 5 to 100 acres

Composition

Creedmoor and similar soils: 57 percent

Green Level and similar soils: 13 percent

Dissimilar soils: 30 percent

Typical Profile

Creedmoor soils

Surface layer:

0 to 5 inches=brown sandy loam

Subsurface layer:

5 to 10 inches= very pale brown sandy loam

Subsoil:

10 to 15 inches=yellowish brown sandy clay loam

15 to 25 inches=yellowish brown clay that has red and strong brown mottles

25 to 45 inches=yellowish brown clay that has light brownish gray, pale brown and strong brown mottles

Underlying material:

45 to 62 inches=multicolored in shades of yellow, brown, red, gray and white sandy clay loam saprolite

Green Level soils

Surface layer:

0 to 1 inches; brown sandy loam

Subsurface layer:

1 to 8 inches; light yellowish brown sandy loam

Subsoil:

8 to 12 inches; strong brown clay loam with brownish yellow mottles

12 to 24 inches; yellowish brown clay with yellowish brown and light gray mottles

24 to 33 inches; yellowish brown clay with red and light gray mottles

33 to 38 inches; light gray sandy clay loam with yellowish brown, strong brown and light gray mottles

Underlying material:

38 to 51 inches; light gray sandy loam saprolite that has brown mottles

51 to 60 inches; light gray sandy loam saprolite that has brown mottles

Soil Properties and Qualities

Depth class: Creedmoor=very deep; Green Level=deep

Agricultural drainage class: Creedmoor=moderately well or somewhat poorly drained; Green Level=moderately well drained
Permeability: Very slow
Available water capacity: moderate to high
Depth to seasonal high water table; kind: Creedmoor=1.0 to 2.0 feet during the months of January through March; perched; Green Level=1.0 to 1.5 feet below the soil surface during the months of December through May; perched
Shrink-swell potential: Creedmoor=high; Green Level=very high
Hazard of flooding: None
Surface runoff: Very rapid
Hazard of water erosion: Creedmoor=severe; Green Level=very severe
Parent material: Residuum weathered from Triassic sandstone, mudstone, shale, siltstone and conglomerate
Depth to bedrock: Creedmoor=more than 60 inches; Green Level=40 to 60 inches or more to soft bedrock and more than 72 inches to hard bedrock

Minor Components:

Dissimilar:

Random areas of slowly permeable Brickhaven soils that have moderate shrink swell
Random areas of Polkton soils that have soft bedrock at a depth of 20 to 40 inches
Random areas of well drained soils with loamy subsoil layers and higher rates of permeability
Random areas of severely eroded Creedmoor or Green Level soils with clay loam or sandy clay loam surface layers

Similar:

Random areas of Creedmoor soils with fine sandy loam, coarse sandy loam, loamy sand, loam or silt loam surface layers
Random areas of Green Level soils with sandy loam or fine sandy loam surface layers
Gravelly or cobbly areas shown with special symbols

Land Use

Dominant uses: Woodland and recreational uses associated with publicly owned lands around Jordan Lake
Other uses: Pasture and hayland, cropland and urban development

Agricultural Development

Cropland

Suitability: Creedmoor=moderately suited; Green Level=poorly suited;
Commonly grown crops: Tobacco and small grain
Management concerns: Creedmoor=wetness, erodibility; Green Level=erodibility, wetness and soil fertility
Management measures and considerations:
Resource management systems that include terraces and diversions, stripcropping, contour tillage, no-till farming, and crop residue management help to control soil erosion and surface runoff and maximize the infiltration of rainfall.

Installing and maintaining an artificial drainage system helps to reduce wetness limitations and improve the productivity of these soils.

Delaying planting in spring helps to minimize clodding and rutting resulting from wetness caused by the high water table.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in the Green Level soils, increase availability of plant nutrients, and maximize crop productivity.

Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth.

Pasture and hayland

Suitability: Creedmoor=well suited for pasture and moderately suited for hayland; Green Level=moderately suited for pasture and poorly suited for hayland

Commonly grown crops: Tall fescue, Bermuda grass, orchardgrass and clover

Management concerns: Creedmoor=erodibility and wetness; Green

Level=erodibility, wetness, and soil fertility

Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.

Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.

Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Preventing overgrazing or preventing grazing when the soil is wet helps to prevent soil compaction, a decrease in productivity, and a rough surface layer.

Some areas may need artificial drainage for maximum productivity.

Applying lime according to recommendations based on soil tests helps to overcome the toxic levels of Aluminum in Green Level soils, increase availability of plant nutrients, and maximize production of forage and hay crops.

Woodland

Suitability: Well suited

Productivity class: Creedmoor=high for loblolly pine; Green Level=moderately high for loblolly pine

Management concerns: Equipment use

Management measures and considerations:

Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and ensure planting success.

Restricting the use of standard wheeled and tracked equipment to dry periods helps to minimize rutting and soil compaction, which occurs when the soils are saturated.

Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings

Suitability: Creedmoor=moderately suited without basements; with basements=poorly suited; Green Level= poorly suited without basements; with basements=poorly suited

Management concerns: Creedmoor=wetness, steepness of slope, and shrink swell; Green Level=shrink swell, wetness and steepness of slope

Management measures and considerations:

Artificial drainage systems or diversions help to remove excess surface water.

Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.

Artificial drainage systems or diversions help to remove excess surface water.

Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling.

The soft bedrock underlying the Green Level soils in this map unit does not require special equipment for excavation but is difficult to revegetate or to pack if used in fill slopes.

Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields

Suitability: Creedmoor=poorly suited; Green Level=unsuited

Management concerns: Wetness, restricted permeability and steepness of slope

Management measures and considerations:

This map unit has severe limitations affecting septic tank absorption fields. The Chatham County Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Creedmoor=low strength; Green Level=low strength and very high shrink swell

Management measures and considerations:

Removing as much of the clay material as possible and increasing the thickness of the base aggregate help to improve soil performance.

Incorporating sand and gravel with the soil material and compacting roadbeds helps to improve soil strength.

Using a geotextile fabric filter cloth between the roadbed and the soil surface helps to minimize the loss of stone into the soil.

Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Wetness, restricted permeability and steepness of slope

Management measures and considerations:

Designing campsites on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.

Locating campsites on the higher areas allows better surface water runoff and helps to keep campsites drier during wet periods.

Picnic areas

Suitability: Poorly suited

Management concerns: Wetness, restricted permeability and steepness of slope

Management measures and considerations:

Designing picnic facilities on raised pads of gravel fill material helps to minimize the problems of wetness and restricted permeability.
Locating picnic facilities on the higher areas allows better surface water runoff and helps to keep sites drier during wet periods.

Playgrounds

Suitability: Poorly suited

Management concerns: steepness of slope, wetness and restricted permeability

Management measures and considerations:

This map unit has severe limitations affecting playgrounds. A site on better suited soils should be selected.

Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.

Artificial drainage systems or diversions help to remove excess surface water and minimize the wetness limitation.

Restricting use after heavy rains, when the soil is saturated will be necessary.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.

Paths and trails

Suitability: Creedmoor=moderately suited; Green Level=poorly suited

Management concerns: Creedmoor=wetness; Green Level=erodibility

Management measures and considerations:

Designing paths and trails on raised pads helps to minimize wetness.

Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, helps to maintain the stability of trails.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Interpretive Groups

Land capability classification: Creedmoor=IVe; Green Level=IVe

Woodland ordination symbol: Creedmoor=9A for loblolly pine; Green Level=7D for Loblolly