



## Soil & Environmental Consultants, Inc.

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April 21, 2025  
Project #16410.S1

Richard Danek  
981 Old Graham Road  
Pittsboro, NC 27312

Re: Soil/Site Evaluation on Chicken Bridge Rd & River Rd Parcels,  
~206-Acre Site, Chatham County, NC

Dear Mr. Danek:

Soil & Environmental Consultants, Inc. (S&EC) performed a preliminary soil and site evaluation on the above referenced tract. This was performed at your request as part of the preliminary planning process in order to determine areas of soil that have potential for subsurface and surface wastewater disposal per our agreement/contract from March 11, 2025. Fieldwork was performed in March and April 2025.

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 moist and dry soil conditions. From these observations, an evaluation of the site was developed, relative to subsurface and surface disposal of wastewater. Soil boundaries were estimated and sketched onto the map based on GPS data, site features, and topographic conditions. The soil/site evaluation criteria used is that contained in 15A NCAC 18E "Wastewater Treatment and Dispersal Systems", "15A NCAC 02T Waste Not Discharged To Surface Waters", and "15A NCAC 02U Reclaimed Water [RCW]".

### FINDINGS

This site is located in the Slate Belt/mixed mineralogy geological piedmont region of Chatham County. The upland soils on this tract are similar to the Georgeville, Tarrus, Badin, Wedowee, Helena, Cid, Lignum, and Iredell soil series. The soils on this site generally have a loamy surface material over a clayey subsoil. The soils ranged from soils suitable for conventional type subsurface septic systems (red hatched areas) to soils suitable only for pretreatment surface septic systems with approved imported soil material in the disposal area. Some areas are unsuitable due to rock outcrops, unsuitable landscape features (gullies, drainages, etc), shallow rock, and/or disturbed soils from former logging activity. Some areas will need to be evaluated through backhoe pit evaluations at the time of septic permitting due to some marginal soils, rocky soils, steep soils, and/or shallow saprolite (weathered rock material).

The accompanying AutoCAD/GPS Sketch Soils/Site Evaluation map indicates the areas with potential use for subsurface and surface wastewater disposal.

The **red cross** hatched units indicate areas of soils which are at least 28 to 36+ inches deep to prohibitive soil characteristics and these areas have potential for Conventional Gravel Pipe, Accepted 25% Reduction Products (Standard Chamber or EZ-Flow), Panel Block (PPBPS), Low

Profile Chamber (LPC), large diameter pipe (LDP), and/or Low Pressure Pipe (LPP) septic systems. The red cross hatched areas generally have soils supportive of long-term acceptance rate (LTAR) for Gravel, Accepted, PPBPS, LDP, or LPC septic systems of 0.25 to 0.3 and/or LPP/drip LTARs ranging from 0.1 to 0.15.

The **magenta** hatched units indicate areas of soils which are at least 20 to 30+ inches deep to prohibitive soil characteristics and these areas have potential for large diameter pipe (LDP), low profile chamber (LPC), low pressure pipe (LPP) and/or pretreatment subsurface drip septic systems. The magenta hatched areas generally have soils supportive of long-term acceptance rate (LTAR) for LDP or LPC septic systems of 0.225 to 0.3 and/or LPP/drip LTARs ranging from 0.1 to 0.15. These soil areas should be evaluated through backhoe pit evaluations to determine the best septic options available prior to septic permitting and/or subdivision recordation.

The **green** hatched units indicate areas of soils which are at least 18 to 24+ inches deep to prohibitive soil characteristics and these areas have potential for pretreatment (NSF/ANSI 40, TS-I, TS-II, and/or RCW) subsurface drip septic systems. The green hatched areas generally have soils supportive of long-term acceptance rate (LTAR) for drip ranging from 0.08 to 0.15. Drip septic systems within these areas may need Special Site Evaluations/soil hydraulic conductivity (Ksat) testing (depending on soil conditions & site) depending on pretreatment level utilized and will need a wastewater engineered design prior to securing a septic permit. The pretreatment standard used for the drip may vary with individual soil areas based on the soil characteristics and proposed site/lot development plans.

The **cyan** hatched units indicate areas of soils which are at least 13 to 18+ inches deep to prohibitive soil characteristics and these areas have potential for pretreatment (NSF/ANSI 40, TS-I, TS-II, and/or RCW) subsurface drip septic systems. The cyan hatched areas generally have soils supportive of long-term acceptance rate (LTAR) for drip ranging from 0.07 to 0.15. These areas could include inclusions of areas only suitable for pretreatment surface drip or spray irrigation septic systems. Drip septic systems within these areas may need Special Site Evaluations/soil hydraulic conductivity (Ksat) testing (depending on soil conditions & site) and will need a wastewater engineered design prior to securing a septic permit. The pretreatment standard used for the drip may vary with individual soil areas based on the soil characteristics and proposed site/lot development plans.

The **yellow** hatched units indicate areas of soils which are extremely rocky, have boulders, have rock outcrops, have steep slopes, and will need backhoe pit evaluations to determine subsurface septic suitability potential. There are patches of unsuitable soil mixed among patches of soil suitable for subsurface septic. Further soil evaluations will be needed within these areas.

The **blue** hatched units indicate areas only suitable for pretreatment surface drip or pretreatment surface spray irrigation septic systems with North Carolina Division of Water Resources (NCDWR) approved fill on top of the native soil. The blue hatched areas will need the SFR Loading Rate determined by hydraulic conductivity (Ksat) testing and NCDWR SFR Irrigation Area Calculation Worksheet prior to final design and permitting. Pretreatment surface spray irrigation septic systems with NCDWR approved fill have more restrictive septic setbacks than pretreatment surface drip. The amount of NCDWR approved fill needed for a specific drain field or spray field will be based on the vertical separation from the perched or apparent seasonal high-water table (soil wetness conditions) from the ground surface in the targeted septic area(s).

The septic LTARs, SFR Loading Rate, and/or area needed in given soil areas may vary from what S&EC has stated based on specific lot evaluations/proposed septic areas. The ultimate LTAR/

SFR Loading Rate and septic system type will be determined by the local health department and/or licensed soil scientist after their lot specific evaluation. Unit "UN" on the attached map indicates areas of unsuitable landscape position and are unsuitable for the type of systems mentioned above. Unit "TTE" on the attached map indicates areas that were not evaluated due to thick vegetation at the time of this evaluation.

The site plan for each lot must ensure that adequate soil area for system and repair is unaffected by site elements (house placement, driveway, wells, patios, decks, etc.) on that, or adjacent lots. The area ultimately designated by the health department or licensed soil scientist on the site plan for the septic must remain undisturbed (no mechanical clearing, excavation, heavy traffic, or other significant site disturbing activities) until authorized by the authorizing agent (local health dept, NCDWR, AOWE, or PE). A lot with initially adequate useable soil area may be rendered unusable as a result of improper site planning and/or disturbance. A septic design of the proposed septic system(s) will be required as part of the individual site development process.

### **CHATHAM COUNTY REGULATIONS**

As part of Chatham County's subdivision recordation process, Chatham County requires a licensed soil scientist to sign and seal the final mylar plat(s) to certify that each proposed lot meets the North Carolina 15A NCAC 18E wastewater and/or 15A NCAC 02T wastewater regulations. This preliminary report and map are to assist in developing a preliminary subdivision plan, but additional soils work and a soil scientist sealing the subdivision mylars will be needed once a subdivision plan is developed. Additional soils work may include additional hand auger soil borings and/or backhoe pits and (depending on the size of the usable, suitable soil area on each lot) a field septic layout of the system and repair utilizing the site plan showing the proposed house/building, driveway/parking lots, deck(s), well, etc that is prepared by your planner. Once the subdivision is recorded, individual lot owners can apply for septic permit(s) and can provide the soils/septic layout information for the given lot (if any additional work was performed on the lot) from the recordation process to aid in the septic permitting process. S&EC will be glad to provide a cost for the additional work needed to record a subdivision once a preliminary subdivision plan has been developed.

It is important to note that any preliminary certification for a subdivision final plat does not represent approval or a permit for any sitework, nor does it guarantee issuance of an improvement permit for any lot. Final site approval for issuance of improvements is based on regulations in force at the time of permitting and is dependent on satisfactory completion of individual site evaluations following application for an improvement permit detailing a specific use and siting.

### **GENERAL WASTEWATER CONSIDERATIONS**

Once potentially useable areas are located through vertical borings, the next consideration is the horizontal extent of those areas. The size and configuration of the useable soil area dictate the utility of that area. The size of a subsurface and/or surface disposal field is determined by: 1) the design daily flow (DDF) from the source (120 gallons per day [GPD] per bedroom in dwelling units or 60 gallons per day per person when occupancy exceeds two persons per bedroom in dwelling units, whichever is greater; commercial and industrial facilities DDF are based on the criteria in 15A NCAC 18E.0401 and 15A NCAC 02T .0114), 2) the long term acceptance rate (LTAR) and/or SFR Loading Rate of the soil (based on the septic drain line lateral type, hydraulic conductivity of the soil or saprolite, the soil or saprolite texture, mineralogy, structure, porosity, etc.), and 3) the design/configuration of the septic system. Any wastewater system shall be designed by a professional engineer (PE) that meets one or more of the conditions within 15A NCAC 18E.0303, due to local regulations, and/or has surface disposal of wastewater application associated with the system. The subsurface septic 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 buildings, wells, streams and ponds, property lines, watershed buffers, etc. (see Attachment 1 and 2). Setbacks may vary if reclaimed water [RCW] pretreatment is utilized.

For this soils/site evaluation, S&EC assumes the septic tank effluent entering the drain field meets the standards for Domestic Strength Effluent (DSE) as defined by 15A NCAC 18E .0402 (and shown in the table below) unless a higher effluent standard is needed for the septic system(s) (such as advanced pretreatment using a standard of NSF/ANSI 40, TS-I, TS-II, or Reclaimed Water [RCW]). Advanced pretreatment of the wastewater will be needed prior to wastewater disposal for septic systems located in the green, cyan, and blue soil areas. Some septic systems located within the magenta and yellow soil areas may need pretreatment prior to wastewater disposal. DSE is usually produced by the usual wastewater usage from a dwelling unit. Any septic tank effluent going to the drain field exceeding the DSE standard below or any facility defined as having potential for generating high strength wastewater effluent as defined by 15A NCAC 18E.0401 shall be addressed in writing by a wastewater engineer.

Constituent	Maximum DSE (mg/L)
BOD (Five Day Biochemical Oxygen Demand)	≤ 350
TSS (Total Suspended Solids)	≤ 100
TKN (Total Kjeldahl Nitrogen)	≤ 100
FOG (Fats, Oils and Grease)	≤ 30

The utility of a potential usable soil area for a subsurface system (red, magenta, green, cyan, and yellow soil areas) 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).

Due to the restrictive soil characteristics found on-site in the green, cyan and blue soil areas, prior to any wastewater entering the proposed drain field or spray field the wastewater must be pretreated to the TS-II standard for a subsurface drip (as defined by 15A NCAC 18E .1201 Table XXV), pretreated to the 15A NCAC 02T .0605 treatment standard for surface drip or surface spray irrigation, and/or pretreated to the Reclaimed Water [RCW] standard (as defined by 15A NCAC 02U .0301) for subsurface drip, surface drip, or surface spray irrigation. The pretreatment standard used for the drip or spray irrigation septic systems may vary with individual soil areas utilized, wastewater design, and proposed site/lot development plans.

A typical area needed (outside of septic setbacks) in the **red cross hatched areas for a 4 bedroom residence septic is approximately 12,000 to 15,000 ft<sup>2</sup>** (could be more or less depending on site features, septic type, etc).

A typical area needed (outside of septic setbacks) in the **magenta hatched areas for a 4 bedroom residence septic is approximately 14,000 to 17,000 ft<sup>2</sup>** (could be more or less depending on site features, septic type, etc).

A typical area needed (outside of septic setbacks) in the **green and cyan hatched areas for a 4 bedroom residence is approximately 15,000 to 20,000 ft<sup>2</sup>** (could be more or less depending on site features, Ksats, pretreatment standard utilized, etc).

A typical area needed (outside of septic setbacks) in the **blue hatched areas for a 4 bedroom residence is approximately 18,000 to 26,000 ft<sup>2</sup>** (could be more or less depending on site features, Ksats, pretreatment standard utilized, how much imported soil fill is needed, etc).

These estimates reference Subchapter 18E – Wastewater Treatment and Dispersal Systems for North Carolina and 15A NCAC 02T Waste Not Discharged To Surface Waters Section .0600 – Single Family Residence Wastewater Irrigation Systems. The local health department and/or licensed soil scientist will determine the ultimate septic system type and LTAR/SFR Loading Rate after their lot specific evaluation. Some of the complex septic systems that would potentially work on this site will need Special Site Evaluations/soil hydraulic conductivity (Ksat) testing and will need a wastewater engineered design prior to securing a septic permit. S&EC can assist with Special Site Evaluations/Ksat testing, septic layouts, and design daily flow sizing calculations if requested.

With respect to pretreatment surface systems, the SFR Loading Rate is established by running multiple tests to measure the “saturated hydraulic conductivity” of each soil horizon of all soil series present on a site. Once these rates of water movement are established, the SFR Loading Rate can be determined using calculations performed with the SFR Irrigation Area Calculation Worksheet (15A NCAC.02T.0600 only). Final SFR Loading Rate approval will be determined by NC Division of Water Resources (NCDWR).

During the Soils/Ksat phase of work for design and permitting for pretreatment surface systems, the vertical separation between the apparent or perched seasonal high-water table (soil wetness conditions) and the ground surface shall be provided by the licensed soil scientist working on the project. The separation between an apparent seasonal high-water table shall be 18 inches or more. The separation between a perched seasonal high-water table shall be 12 inches or more. If the licensed soil scientist states that there is a perched seasonal high-water table, then documentation proving the perched seasonal high-water table conditions must be provided. To determine if seasonal high-water table (soil wetness) conditions are perched or apparent, a licensed soil scientist must evaluate deep (7 feet or more) below the ground surface using hand augers, backhoe pit evaluations, and/or drill rig boring evaluations. The depth to apparent or perched seasonal high-water table and its separation from the ground surface will determine if NCDWR approved fill is needed as part of the wastewater design and how much NCDWR approved fill would be needed. S&EC can assist with soil fill material guidance for surface wastewater irrigation field areas if requested.

This report discusses the general location of potentially useable soils for on-site subsurface and/or surface wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the local health department and/or NC Division of Water Resources (NCDWR). S&EC is a professional consulting firm that specializes in the delineation of soil areas for wastewater disposal and the layout and design of wastewater treatment systems. As a professional consulting firm, S&EC is hired for its professional opinion in these matters. The rules governing wastewater treatment (interpreted and governed by local and state agencies) are evolving constantly and, in many cases, affected by the opinions of individuals employed by these governing agencies. Because of this, S&EC cannot guarantee that areas delineated and/or systems designed will be permitted by the governing agencies. As always, S&EC recommends that anyone making financial commitments on a tract be fully aware of individual permit requirements on that tract prior to final action.

An individual septic system permit will be required for each lot/area prior to obtaining a building permit. This will involve a detailed evaluation by the local health department or a licensed soil



scientist to determine, among other things, system type, 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.

This report and site evaluation is not conformant to the Engineered Option Permit (EOP), Authorized Onsite Wastewater Evaluator (AOWE) Permit Option, or the G.S. 130A-335(a2) hybrid private septic permitting process. Additional site testing and evaluations will be required to utilize a private septic permitting process (for subsurface septic options), to obtain a septic permit from the local health department (for subsurface septic options), and/or to obtain a septic permit from North Carolina Division of Water Resources (NCDWR) (for surface septic options). The soil report and map associated with this project is for the exclusive use of the addressee and the use or reliance by all others is expressly denied without the written consent of S&EC.

Soil & Environmental Consultants, Inc. is pleased to be of service in this matter and we look forward to assisting with any site analysis needs you may have in the future. Please feel free to call with any questions or comments.

Sincerely,

Soil & Environmental Consultants, Inc.



Ricky Pontello

NC Licensed Soil Scientist #1232

Encl: Attachment 1 – Subsurface Septic Setbacks for  $\leq 3,000$  GPD systems (18E Septic Regs.)  
Attachment 2 – Residential Surface Septic setbacks (2T Septic Regs.)  
Chicken Bridge Rd & River Rd Soil Suitability Map

**Attachment 1****15A NCAC 18E .0601 LOCATION OF WASTEWATER SYSTEMS**

- (a) Every wastewater system shall be located the minimum setbacks from the site features specified in Table IX. The setback shall be measured on the ground surface, unless otherwise specified in this Rule, from the nearest wastewater system component sidewall or as otherwise specified in a system specific rule or PIA Approval.

**TABLE IX.** Minimum setbacks from all wastewater systems to site features

<b>Site Features</b>	<b>Setback (feet)</b>
Any transient or non-transient non-community water supply well, community well, shared water supply well, well that complies with 15A NCAC 18A .1700, or water supply spring	100
A private drinking water well or upslope spring serving a single-family dwelling unit, including wastewater systems permitted or installed in saprolite	50
Any other well or source not listed in this table, excluding monitoring wells	50
Surface waters classified WS-I, from ordinary high-water mark	100
Waters classified SA, from mean high-water mark	100
Any Class I or Class II reservoir, from normal water level	100
Lake or pond, from normal water level	50
Any other stream, non-water supply spring, or other surface waters, from the ordinary high-water mark	50
Tidal influenced waters, such as marshes and coastal waters, from mean high-water mark	50
Permanent stormwater retention basin, from normal water level	50
Any water line, unless the requirements of Paragraph (l) have been met. Collection sewers & water lines shall not cross except in conditions stated in 15A NCAC 18E .0601 (m).	10
Closed loop geothermal wells	50 for drain fields at the time the well is constructed and 15 for water-tight sewer collection mains & septic supply lines (see 15A NCAC 02C.0222)
Building foundation and any structural supports requiring a footing or other load bearing construction in the North Carolina Building Code	5
Appurtenant structures such as stairs, or landing structures designed specifically to be set directly on the ground and do not require footings; sidewalks; pavers; light fixtures; or signage	1
Any basement, cellar, or in-ground swimming pool	15
Buried storage tank or basin, except stormwater	10
Above ground swimming pool and appurtenances that require a building permit	5
Top of slope of embankment or cuts of two feet or more vertical height with a slope greater than 50 percent	15
Top of slope of embankment or cuts of two feet or more vertical height with a slope greater than 33 percent and less than or equal to 50 percent	15 If the site has suitable soil depth that extends for a minimum horizontal distance of 15 feet from the edge of the dispersal field, no minimum setback is required.
Top of slope of embankment or cuts of two feet or more vertical height with a slope less than or equal to 33 percent	0
Groundwater lowering system, as measured on the ground surface from the edge of the feature	25
Downslope interceptor drains and surface water diversions with a vertical cut of more than two feet, as measured on the ground surface from the edge of the feature	15
Upslope and sideslope interceptor drains and surface water diversions with a vertical cut of more than two feet, as measured on the ground surface from the edge of the feature	10
Bio-retention area, injection well, infiltration system, or dry pond	25
Any other dispersal field, except designated dispersal field repair area for project site	20
Any property line	10
Burial plot or graveyard boundary	10
Above ground storage tank from dripline or foundation pad, <i>whichever is more limiting</i>	5
Utility transmission and distribution line poles and towers, including guy wires, <i>unless a greater setback is required by the utility company</i>	5
Utility transformer, ground-surface mounted	5

**Note:** Collection sewers and septic supply lines shall be located the minimum setbacks to site features shown in Table IX (above), unless a different minimum setback is specified in Table XII. If the design flow is over 3,000 gallons per day (GPD) some setbacks may exceed the setbacks stated above, see Table XI. Depending on local and county regulations some setbacks may be more restrictive.

## Attachment 2

### 15A NCAC 02T .0606 SETBACKS (Surface Septic)

(a) The setbacks for irrigation sites shall be as follows:	Spray (feet)	Drip (feet)
Each habitable residence or place of assembly under separate ownership or not to be maintained as part of the project site	400	100
Each habitable residence or place of assembly owned by the permittee to be maintained as part of the project site	200	15
Each private or public water supply source	100	100
Surface waters such as intermittent and perennial streams, perennial waterbodies, and wetlands	100	100
Groundwater lowering ditches where the bottom of the ditch intersects the SHWT	100	100
Surface water diversions such as ephemeral streams, waterways, and ditches	25	25
Each well with exception of monitoring wells	100	100
Each property line	150	50
Top of slope of embankments or cuts of two feet or more in vertical height	15	15
Each water line from a disposal system	10	10
Subsurface groundwater lowering drainage systems	100	100
Public right of way	50	50
Nitrification field	20	20
Each building foundation or basement	15	15

(b) Treatment and storage facilities associated with systems permitted under this Section shall adhere to the setback requirements in Section .0500 of this Subchapter except as provided in this Rule.

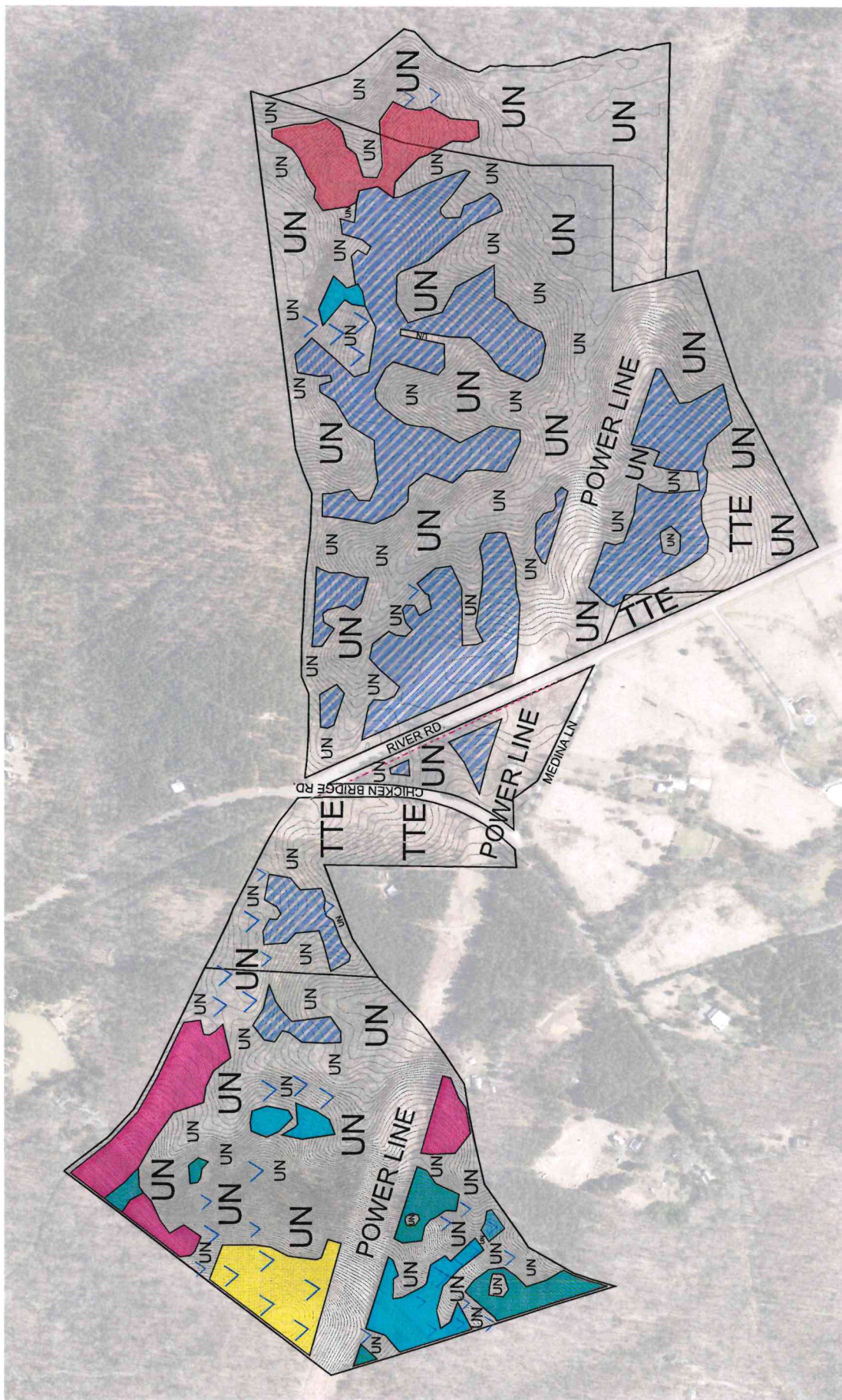
(c) Setback waivers shall be written, notarized, signed by all parties involved, and recorded with the county Register of Deeds. Waivers involving the compliance boundary shall be in accordance with 15A NCAC 02L .0107.

(d) Setbacks to property lines established in Paragraphs (a) and (b) of this Rule shall not be applicable if the permittee, or the entity from which the permittee is leasing, owns both parcels separated by the property line.

(e) Habitable residences or places of assembly under separate ownership constructed after the non-discharge facilities were originally permitted or subsequently modified are exempt from the setback requirements in Paragraphs (a) and (b) of this Rule

- **The setbacks above are in addition to the setbacks stated in the 15A NCAC 18E .0601 regulations. Some counties may have additional setbacks requirements.**
- **SOME OF THESE SETBACKS MAY BE VARIED IF THE ADJACENT PROPERTY OWNERS SIGN A WAIVER/PERMISSION NOTICE AS PER 02T .0606(c).**



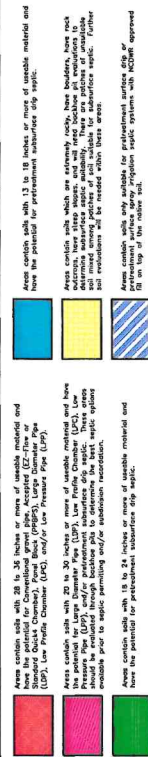


GRAPHIC SCALE  
1" = 150'

[illegible]

UN  
TTE

## LEGEND



Extremely rock areas. Some of these areas have gravelly soils, shallow rock, rock outcrops, boulders, etc. These areas may need to be restorated with broken pit evaluations at the time of septic permitting.

ens contain soils only suitable for pretreatment surface drip or  
stretment) surface spray irrigation septic systems with NCDNR approved  
one foot of the nation and

soils contain soils with 18 to 24 inches or more of useable material and the potential for pretreatment subsurface drip septic.

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