S&EC

Soil & Environmental Consultants, Inc.

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William N. Sharpe, Jr.
3000 Galloway Ridge, Apt. J 306
Pittsboro, NC 27312

February 11, 2025
Project #16328.S1

Re: Preliminary Soil/Site Evaluation on the Sharpe Property, Crawford Dairy Road, 51.77-acres, Chatham County NC

Dear Mr. Sharpe

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/or surface wastewater disposal. Soils fieldwork was performed in January and February 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 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" and "15A NCAC 02T Waste Not Discharged To Surface Waters".

FINDINGS

The upland soils on this tract have shallow expansive clays and shallow soil wetness conditions that make them unsuitable for conventional type subsurface septic systems but have potential for TS-II Pretreatment Spray Irrigation, TS-II Pretreatment Surface Drip Irrigation, and one area suitable for TS-II Pretreatment Subsurface septic systems.

The accompanying AutoCAD/GPS Sketch Soil/Site Evaluation map indicates the areas with potential use for surface and subsurface wastewater disposal. The magenta hatched soil unit has potential for TS-II pretreatment subsurface drip septic systems. The blue cross hatched units indicate areas only suitable for pretreatment surface drip septic systems with North Carolina Division of Water Resources (NCDWR) approved fill. 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 spray irrigation septic systems with NCDWR approved fill would work in the blue hatched units in addition to surface drip but spray systems have more restrictive septic setbacks. The amount of NCDWR approved fill needed for a specific drain 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 SFR Loading Rate will be determined by the licensed soil scientist after their lot specific evaluation. Unit "UN" on the attached map indicates areas of unsuitable drainage features, unsuitable topo, and/or wetland/creek setbacks. Some areas contain significant surface rock and will need further soils investigation during septic system permitting.

The site plan for each lot must ensure that adequate soil area for the proposed septic system type is unaffected by site elements (house placement, driveway, wells, patios, decks, etc.) on that, or adjacent lots. The area ultimately designated by the licensed soil scientist on the site plan for the septic system must remain undisturbed (no mechanical clearing, excavation, heavy traffic, or other significant site disturbing activities) until authorized by the County or NCDWR. 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 will be required as part of the individual site development process. An individual septic system permit will be required for each lot prior to obtaining a building permit.

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 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. 2) the 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 that is on this property shall be designed by a professional wastewater engineer (PE). 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 Attachments 1 and 2).

Due to the restrictive soil characteristics found on-site, prior to any wastewater entering the proposed drain field the wastewater must be pretreated. 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 septic system area needed (outside of setbacks) in the **magenta cross hatched area for a 4 bedroom residence is approximately 16,000 to 18,000 square feet** (could be more depending on site features and Ksat calculations). These estimates reference 15A NCAC 18E "Wastewater Treatment and Dispersal Systems".

A typical septic system area needed (outside of setbacks) in the **blue hatched areas for a 4 bedroom residence is approximately 25,000 to 30,000 square feet** (could be more depending on site features and Ksat calculations). 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. These estimates reference 15A NCAC 02T Waste Not Discharged To Surface Waters Section .0600 – Single Family Residence Wastewater Irrigation Systems. The licensed soil scientist will determine the ultimate septic system type and SFR Loading Rate after their lot specific evaluation. 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 will 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 surface wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the County 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.

Additional site testing and evaluations will be required to obtain septic permits from the North Carolina Division of Water Resources (NCDWR). 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.

02/11/25

Ricky Pontello
NC Licensed Soil Scientist #1232

Encl: Attachment 1 – 2T Setbacks (Surface Septic)
Attachment 2 - 15A NCAC 18E .0601 LOCATION OF WASTEWATER SYSTEMS (Subsurface Drip Septic)
Soil Suitability Map

Attachment 1

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).**

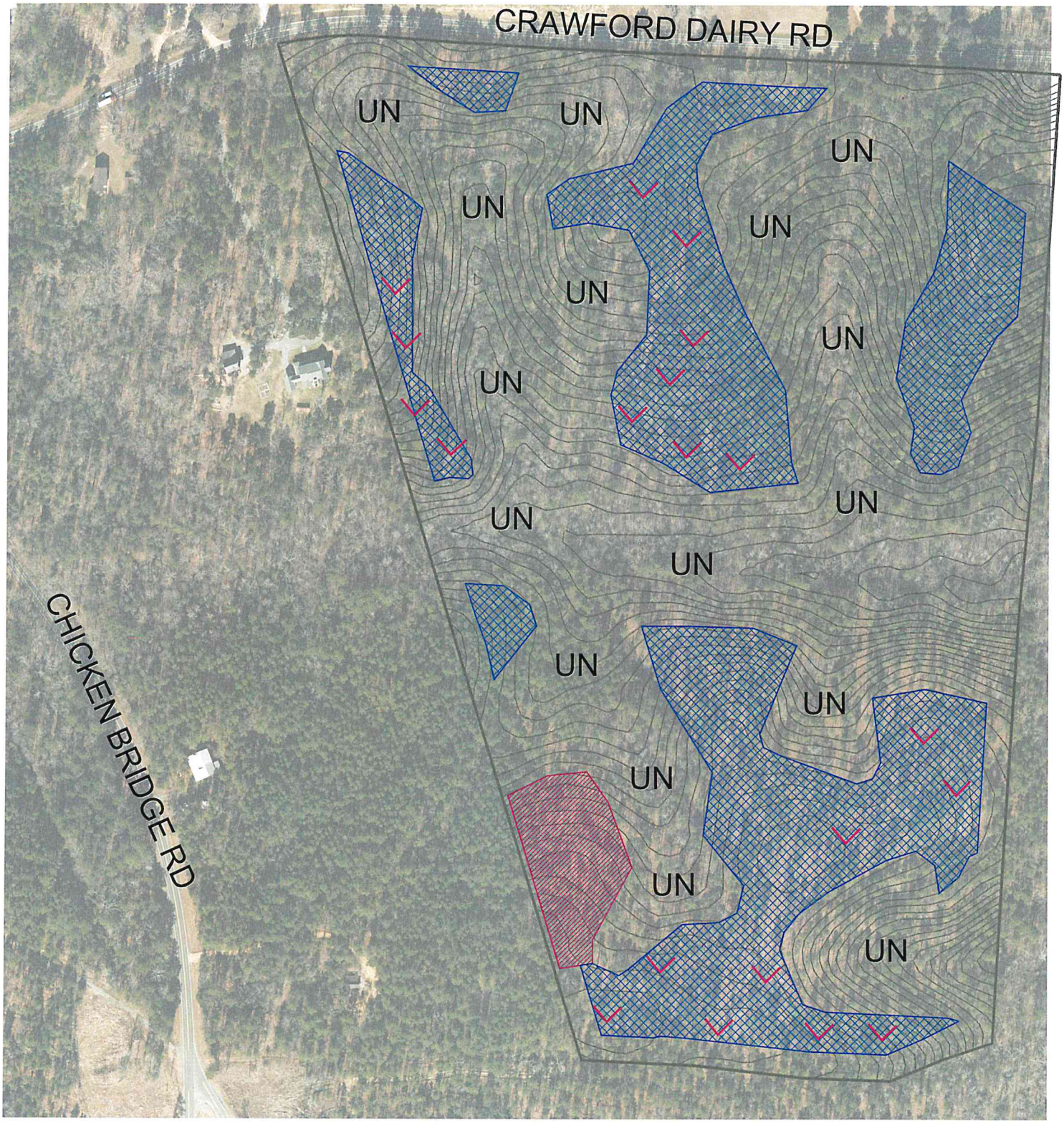
Attachment 2 15A NCAC 18E .0601 LOCATION OF WASTEWATER SYSTEMS

(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

Site Features	Setback (feet)
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, ***whichever is more limiting***	5
Utility transmission and distribution line poles and towers, including guy wires, ***unless a greater setback is required by the utility company***	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.



Areas contain soils with the potential for TS–II Pretreatment Spray irrigation and TS–II Pretreatment Surface Drip septic systems with added NCDWR approved fill to meet the vertical separation requirements to soil wetness conditions.

Area contains soils with the potential for TS–II Pretreatment Subsurface Drip septic systems.

UN — Unsuitable areas due to drainage features, unsuitable topo and/or wetland/creek setbacks.

Areas contain significant surface rock and will need further soils investigation during septic system permitting.

**SUITABLE FOR PRELIMINARY PLANNING PURPOSES ONLY. SITE WILL REQUIRE REVIEW BY THE COUNTY HEALTH DEPARTMENT, NCDWR AND SOIL SCIENTIST ON A LOT BY LOT BASIS. THIS MAP SHOULD BE USED AS A GENERAL GUIDE. SOME ADJUSTMENTS WILL BE NECESSARY IN THE FIELD DUE TO SOIL VARIABILITY AND TOPOGRAPHIC IRREGULARITIES. THIS MAP ONLY REFLECTS EXISTING SOIL SUITABILITY FOR ON–SITE SEPTIC TANK SYSTEMS.

SEE ACCOMPANYING S&EC REPORT.

PRELIMINARY SOIL/SITE EVALUATION.
SOIL LINES WERE DELINEATED IN THE FIELD BY S&EC PERSONNEL. THE SOIL LINES WERE SKETCHED ONTO THE MAP BASED ON TOPOGRAPHY AND OTHER SITE FEATURES.

NOT A SURVEY.
2-FOOT CONTOURS FROM NCDOT GIS. PARCEL BOUNDARIES FROM CHATHAM COUNTY GIS. AERIAL FROM NCONEMAP.COM.

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GRAPHIC SCALE
1" = 120'
120 0 120 240

Sheet No.: 1 of 1
Date: FEBRUARY 20
Field Work: JM MB RP
Drawn: JM RP
Project Manager: RP
Project No.: 1G326.51

Project: SHARPE PROPERTY - CRAWFORD DAIRY ROAD
Location: CHATHAM CO., NC
Sheet Title:
Client:

S&EC Soil & Environmental Consultants, Inc.