



Soil & Environmental Consultants, PA

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sandec.com

June 27, 2017

S&EC Project #13203.S1

Alex Barroso & Gary Colen
239 Parker Road,
Chapel Hill, NC 27517

Re: Soil/Site Evaluation on 2206, 2094, 2062 & 2064 Manns Chapel Road Property,
114.67-Acre Site, Chatham County, NC

Dear Mr. Barroso & Mr. Colen:

Soil & Environmental Consultants, PA (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 wastewater disposal. Fieldwork was performed in June 2017.

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 soil conditions. From these observations, an evaluation of the site was developed, relative to subsurface disposal of wastewater. Soil areas were estimated in the field. The soil/site evaluation criteria used is that contained in 15 A NCAC 18A .1900 "Laws and Rules for Sewage Treatment and Disposal Systems".

FINDINGS

This site is located in the Acid Crystalline region of Chatham County. The upland soils on this tract are similar to the Appling, Pacolet, and Wedowee soil series with inclusions of Helena soil series. The Appling, Pacolet, and Wedowee soil series have a sandy surface material over a clayey subsoil. These soils are at least 24 inches deep to prohibitive soil characteristics and are generally useable for subsurface septic systems. The Helena soil series have slow permeability clayey subsoil and are generally unsuitable for conventional subsurface septic systems. This property has several extremely rocky areas and backhoe pits may be needed to further evaluate these areas.

The accompanying AutoCAD sketch map indicates the estimated areas with potential use for subsurface wastewater disposal. The blue cross hatching indicates areas of soils which are at least 24 to 36+ inches deep to prohibitive soil characteristics and these areas have potential for a conventional septic system, a modified conventional (shallow placed lines with no fill required over the disposal area) or a low pressure pipe system (LPP) and/or ultra-shallow conventional (shallow placed lines with fill required over the disposal field) system. Unit

“UN” on the attached map indicates areas of soils that are less than 24 inches to prohibitive soil characteristics and are generally unsuitable for the type of systems mentioned above. However, they may be suitable for more expensive alternative septic systems, i.e. pretreatment drip or spray irrigation, etc. Such systems are expensive and if requested, S&EC can provide additional information concerning these types of systems. Unit “NE” on the attached map indicates areas that contain thick vegetation and were inaccessible. This property has several extremely rocky areas and backhoe pits may be needed to further evaluate these areas. There may be inclusions of unsuitable soil within suitable soil map units due to soil variability, thick vegetation, and/or rocky conditions.

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 on the site plan for the septic system and repair must remain undisturbed (no mechanical clearing, excavation, heavy traffic or other significant site disturbing activities) until authorized by the health department. A lot with initially adequate useable soil area may be rendered unusable as a result of improper site planning and/or disturbance. A field layout of the proposed septic systems may be required as part of the individual lot development process.

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 disposal field is determined by: 1) the design flow from the source (120 gallons/bedroom/day in residences), and 2) the long term acceptance rate (LTAR) of the soil (based on the hydraulic conductivity of the soil, a function of the soil’s texture, mineralogy, structure, porosity, etc.). The configuration must be such that an efficient layout of disposal lines (on contour) is possible. An additional consideration is the required setbacks for the system from various elements such as wells (100’), streams and ponds (50’) or more (depending on watershed regulations), property lines (10’), top of embankment (15’), watershed buffers, etc. (see Attachment 1).

The utility of a potential useable soil area for a subsurface system is most accurately determined by an on-ground layout of the proposed system. The total area needed for system and repair areas will depend upon the system type, the layout of that system and the total design flow (factors mentioned above). A typical area needed for a 4 bedroom residence is approximately 17,000 to 20,000 ft² (could be more depending on site features) or 800 to 960 linear feet of conventional line (system and repair) or 1,920 linear feet of LPP line (system and repair). These estimates reference Laws and Rules for Sewage Treatment and Disposal Systems for North Carolina and use a LTAR of 0.25-0.3 gpd/ft² for conventional septic systems (.1955), a LTAR of 0.25-0.3 gpd/ft² for modified conventional (.1956) and 0.1 gpd/ft² for LPP septic systems (.1957a). The ultimate LTAR will be determined by the health department after their lot evaluation. S&EC will be glad to assist in any detailed soils evaluation, system layout, or sizing calculations if requested. If S&EC does any additional fieldwork on this property, some portions of the property may need to be hydro-axed, cleared, and/or made accessible because of the current inaccessible thick vegetation in various locations.

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

This report and site evaluation is not conformant to the Engineered Option Permit (EOP) process. Additional site testing and evaluations will be required to utilize the EOP process. 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.


An individual septic system permit will be required for each lot prior to obtaining a building permit. This will involve a detailed evaluation by the local health department to determine, among other things, system size and layout, well, drive and house location. Only after developing this information can a final determination be made concerning specifics of system design and site utilization.

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

Sincerely,
Soil & Environmental Consultants, PA



Ricky Pontello
NC Licensed Soil Scientist


Cory Connell
Soil Scientist in Training

Encl: Attachment 1
Soil Suitability Map

Attachment 1

.1950 Location of Sanitary Sewage Systems

(c) Every sanitary sewage treatment and disposal system shall be located at least the minimum horizontal distance from the following:

- | | |
|--|-------------------------------------|
| (1) any private water supply source including a well or spring | 100 feet |
| (2) any public water supply source | 100 feet |
| (3) streams classified as WS-I | 100 feet |
| (4) water classified as S.A. | 100 feet from mean high water mark |
| (5) Other coastal waters | 50 feet from mean high water mark |
| (6) any other stream, canal, marsh, or other surface waters | 50 feet |
| (7) any Class I or Class II reservoir | 100 feet from normal pool elevation |
| (8) any permanent storm water retention pond | 50 feet from flood pool elevation |
| (9) any other lake or pond | 50 feet from normal pool elevation |
| (10) any building foundation | 5 feet |
| (11) any basement | 15 feet |
| (12) any property line | 10 feet |
| (13) top of slope of embankments or cuts of 2 feet or more vertical height | 15 feet |
| (14) any water line | 10 feet |
| (15) drainage systems: | |
| (A) Interceptor drains, foundation drains and storm water diversions | |
| (i) upslope | 10 feet |
| (ii) sideslope | 15 feet |
| (iii) downslope | 25 feet |
| (B) Groundwater lowering ditched and devices | 25 feet |
| (16) any swimming pool | 15 feet |
| (17) any other nitrification field (except repair area) | 20 feet |
| (b) Ground absorption, sewage treatment and disposal systems may be located closer than 100 feet from a private well supply, except springs and uncased wells located downslope and used as a source of drinking water, repairs, space limitations and other site-planning considerations but shall be located the maximum feasible distance and, in no case, less than 50 feet. | |
| (c) Nitrification fields and repair areas shall not be located under paved areas or areas subject to vehicular traffic. If effluent is to be conveyed under areas subject to vehicular traffic, ductile iron or its equivalent pipe shall be used. However, pipe specified in Rule .1955 (e) may be used if a minimum of 30 inches of compacted cover is provided over the pipe. | |

Note: Systems over 3000 GPD or an individual nitrification fields with a capacity of 1500 GPD or more have more restrictive setback requirements, see .1950 (a) (17) (d) for specifics.

Chris Seamster

From: Ricky Pontello <rpontello@sandec.com>
Sent: Wednesday, March 14, 2018 10:31 AM
To: Cory Connell; Chris Seamster; Alex Barroso
Cc: David Clark; Gareth Avant; Ben Smith
Subject: RE: Ryan's Crossing-First Plat
Attachments: Ryan's Crossing - FirstPlat Site Plan-Soils Overlaid 020118.pdf

Short but sweet. See confirmation from Thomas at Chatham County Environmental Services and let me know if you have any questions.

Thanks. Ricky

From: Thomas Boyce [<mailto:thomas.boyce@chathamnc.org>]
Sent: Wednesday, March 14, 2018 8:43 AM
To: Ricky Pontello
Subject: RE: Ryan's Crossing-First Plat

Looks fine

From: Ricky Pontello [<mailto:rpontello@sandec.com>]
Sent: Wednesday, March 14, 2018 8:31 AM
To: Thomas Boyce <thomas.boyce@chathamnc.org>
Subject: FW: Ryan's Crossing-First Plat

Hey Thomas, are you good with this at this point? Obviously more work to be done but wanted to see if you need anything else from us.

Thanks. Ricky

From: Cory Connell
Sent: Tuesday, March 13, 2018 8:49 AM
To: Chris Seamster; Alex Barroso
Cc: David Clark; Gareth Avant; Ben Smith; Ricky Pontello
Subject: RE: Ryan's Crossing-First Plat

Alex,

Attached is the most recent soils for septic map from 2-1-2018, it's the same one that is in the EIA. The original soils report from June 27, 2017 will work (it's also in the EIA).

Once the roads start to be pushed in and/or the lots have been cleared of the thick vegetation (shrub pine trees, blackberry bushes, etc), S&EC will walk each lot and determine how much suitable soil is on each lot. That'll help us determine what lots we'll need septic layouts on, what lots we might need to shift some lot lines, etc. Also Chatham County will require S&EC to sign the final mylars in regards to septic for Ryan's Crossing Subdivision. S&EC will create individual maps of each lot that will show how much suitable soil is on the lot, a septic layout (as needed), a house location, and a rough driveway location. The individual lot maps will help once you apply for the individual septic permits.

Chris,

Once it gets closer and the lots are cleared please email us an updated lot plan CAD file. We'll put that in our GPS units to navigate the lots and do the detailed soils evaluation on each. After doing the detailed soils evaluation, we'll have an idea if we need to shift any lot lines prior to having the lot lines surveyed and prior to us completing the septic layouts.

Thanks,
Cory Connell

Cory Connell, SSIT

Staff Soil Scientist

Soil & Environmental Consultants, PA

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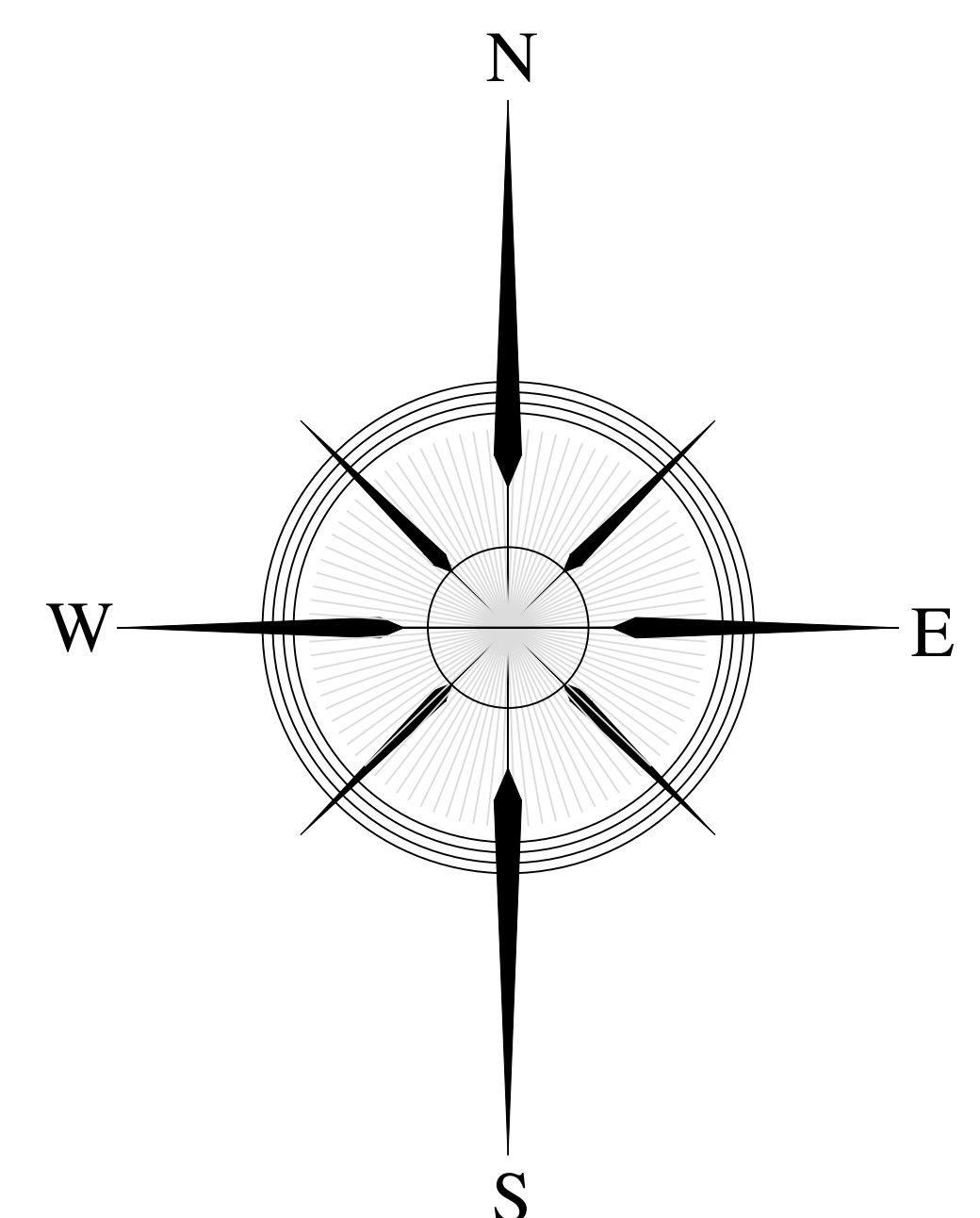
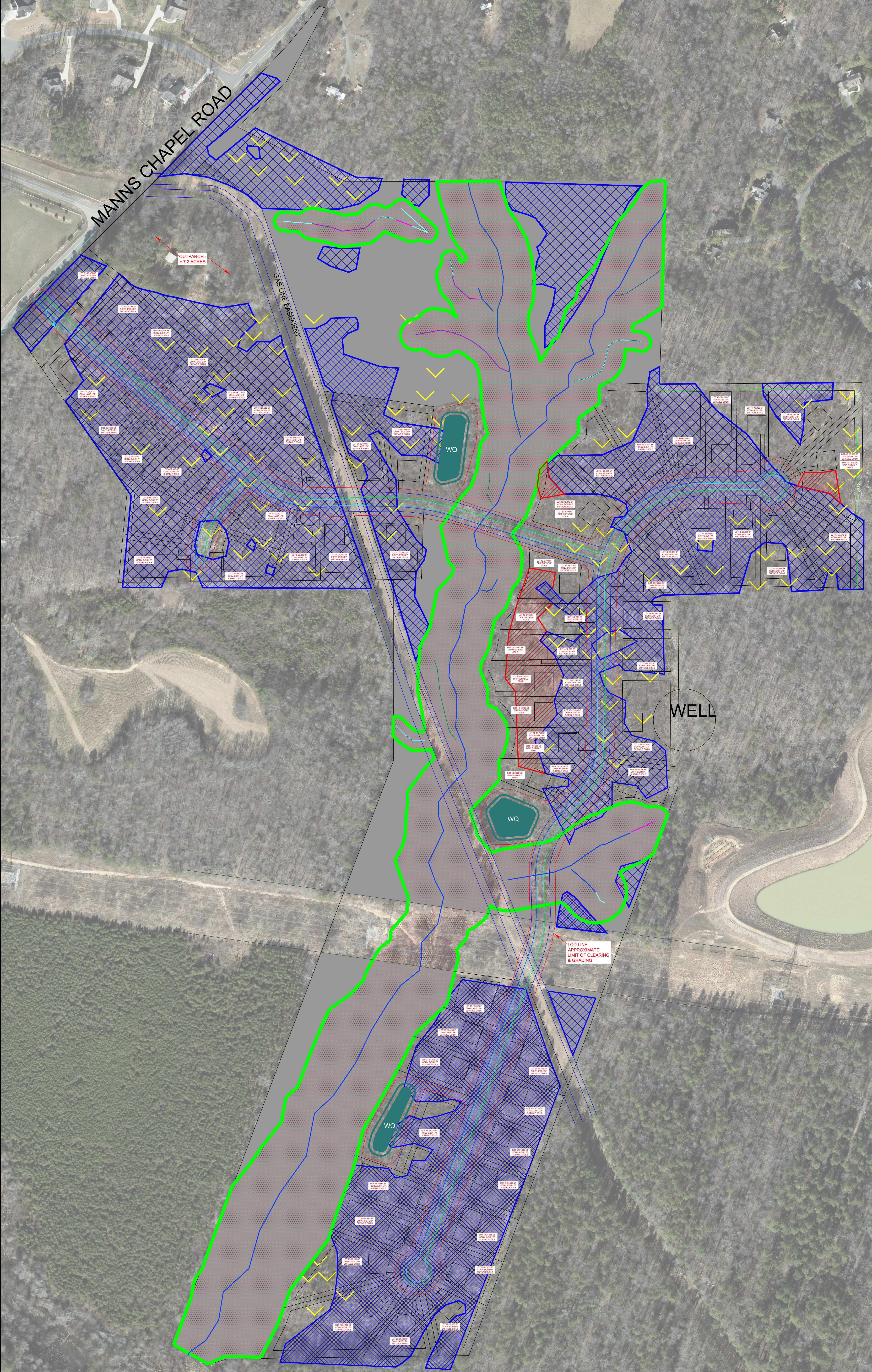
cconnell@sandec.com

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GRAPHIC SCALE
1" = 100'



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, GPS POINTS, AND OTHER SITE FEATURES.

****NOTE:** THIS PROPERTY HAS SEVERAL EXTREMELY ROCKY AREAS AND BACKHOE AREAS MAY BE NEEDED TO FURTHER EVALUATE THESE AREAS. THERE MAY BE INCLUSIONS OF UNSUITABLE SOIL WITHIN SUITABLE SOIL MAP UNITS DUE TO SOIL VARIABILITY, THICK VEGETATION, AND/OR ROCKY CONDITIONS.

****THIS MAP AND CORRESPONDING SITE EVALUATION IS NOT CONFORMANT TO THE ENGINEERED OPTION PERMIT (EOP) PROCESS. ADDITIONAL SITE TESTING AND EVALUATIONS WILL BE REQUIRED TO UTILIZE THE EOP PROCESS.**

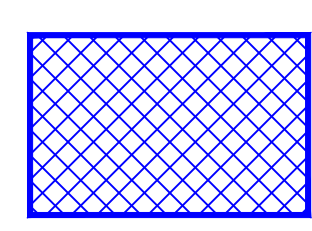
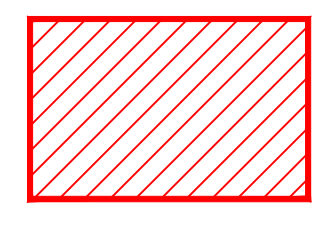
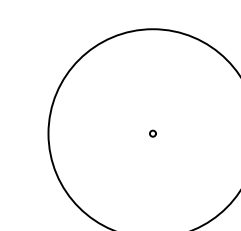
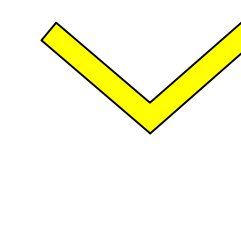
****SUITABLE FOR PRELIMINARY PLANNING PURPOSES ONLY. SITE WILL REQUIRE APPROVAL BY THE COUNTY HEALTH DEPARTMENT ON A CASE BY CASE BASIS. THIS MAP SHOULD BE USED AS A GENERAL GUIDE. SOME ADJUSTMENTS WILL BE NECESSARY IN THE FIELD DUE TO SOIL VARIABILITY AND TOPOGRAPHIC IRREGULARITIES. THIS MAP ONLY REFLECTS EXISTING SOIL SUITABILITY FOR ON-SITE SEPTIC TANK SYSTEMS. SOME OTHER CONSIDERATIONS THAT AFFECT SITE SUITABILITY THAT SHOULD BE CONSIDERED IN DEVELOPMENT DESIGN ARE:**

- 1) 10' SETBACK FROM PROPERTY LINE
- 2) 100' SETBACK FROM ANY WELL
- 3) 25' SETBACK FROM DRAINAGE DITCHES.

SEE ACCOMPANYING S&EC REPORT.

NOT A SURVEY.
SITE INFORMATION AND SUBDIVISION PLAN FROM MCKIM & CREED ENGINEERING. 2017 AERIAL FROM NCONEMAP.COM.

LEGEND

-  Areas contain soils with 24 to 30 inches or more of useable material and have the potential for conventional, modified conventional, ultra-shallow and/or low pressure pipe septic systems. Approximate suitable soil square footage is listed on each lot.
-  Areas contain soils with 18 inches or more of useable material and have the potential for drip septic systems. These areas may contain deeper soils suitable for other septic system types but further evaluation will be needed after these areas are cleared. Approximate suitable soil square footage is listed on each lot.
-  Existing private well, (100' system & repair) septic system setback.
-  Extremely rocky areas; Backhoe pits maybe needed to further evaluate these areas.

Project Manager: DW	Project No.: 1320354
Drawn: CC	Date: NOVEMBER 2017
Field Work: JM,CC	Sheet No.: 1 of 1

Project: RYAN'S CROSSING SUBDIVISION
Sheet Title: PRELIMINARY SOILS OVERLAID ON PRELIMINARY SITE PLAN

Location: CHATHAM CO., NC
Client: ALEX BORROSO & GARY COLEN



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