

RECONNAISSANCE SOIL & SITE EVALUATION

4900 Schley Road
Orange County, NC
Three Oaks Job # 18-764

Prepared For:

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Prepared By:



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July 16, 2018



John C. Roberts



INTRODUCTION & SITE DESCRIPTION

A Reconnaissance Soil & Site Evaluation was performed on a 57.8-acre tract located at 4900 Schley Road in Orange County, NC (PIN: 9887924176). Three Oaks Engineering (Three Oaks) was obtained to determine if suitable soils exist within the tract to support subsurface wastewater systems for single-family residences. The property was evaluated in accordance with Orange County and North Carolina statutes for waste disposal (“Orange County Regulations for Wastewater Treatment and Disposal Systems”, effective February 26, 2015 and “Laws and Rules for Sewage Treatment and Disposal Systems”, amended July 1, 2016).

An existing well, septic tank, and septic drainfield were noted in the front portion of the property and shown on Figure 1.

INVESTIGATION METHODOLOGY

The field survey was conducted on June 29 and July 2, 2018, by John C. Roberts, LSS, Evan T. Morgan, LSS-IT, and Jake Rosemond. Soil borings were advanced with a hand-auger and soil color was determined using a Munsell Soil Color Chart. Observations of the landscape as well as soil properties (depth, texture, structure, soil wetness, restrictive horizons, etc.) were recorded. Soil borings were marked in the field with blue flagging.

FINDINGS

Sixty (60) soil borings were advanced and their locations noted on Figure 1. Detailed soil boring descriptions are attached.

Soil borings rated as Provisionally Suitable for Conventional Systems typically exhibited a friable or firm clay loam textured surface with weak, medium, subangular blocky structure that ranged in depth from 4 to 12 inches. Subsurface horizons exhibited a firm clay texture with weak, medium, subangular blocky structure that ranged in depth from 30 to 36 inches.

Soil borings rated as Provisionally Suitable for Modified/Alternative Systems typically exhibited a friable clay loam textured surface with weak, medium, subangular blocky structure that ranged in depth from 6 to 10 inches. Upper subsurface horizons exhibited a firm, clay texture with weak, medium, subangular blocky structure that ranged in depth from 25 to 28 inches. Lower subsurface horizons exhibited unsuitable soil characteristics such as >50% parent material and/or expansive clay mineralogy.

Soil borings rated as Provisionally Suitable for Subsurface Drip Systems typically exhibited a friable clay loam textured surface with weak, medium, subangular blocky structure that ranged in depth from 6 to 18 inches. Upper subsurface horizons exhibited a firm clay loam or clay texture with weak, medium, subangular blocky structure that ranged in depth from 14 to 23 inches. Lower subsurface horizons exhibited unsuitable soil characteristics such as >50% parent material, soil wetness and/or expansive clay mineralogy.

Soil borings rated as Unsuitable exhibited >50% parent material, and/or expansive clay mineralogy within 12 inches of the soil surface. Several unsuitable landscapes were noted

throughout the property and included drainageways, potential streams, ditches, and a wet depression. Approximate locations for these features area shown on Figure 1.

DISCUSSION

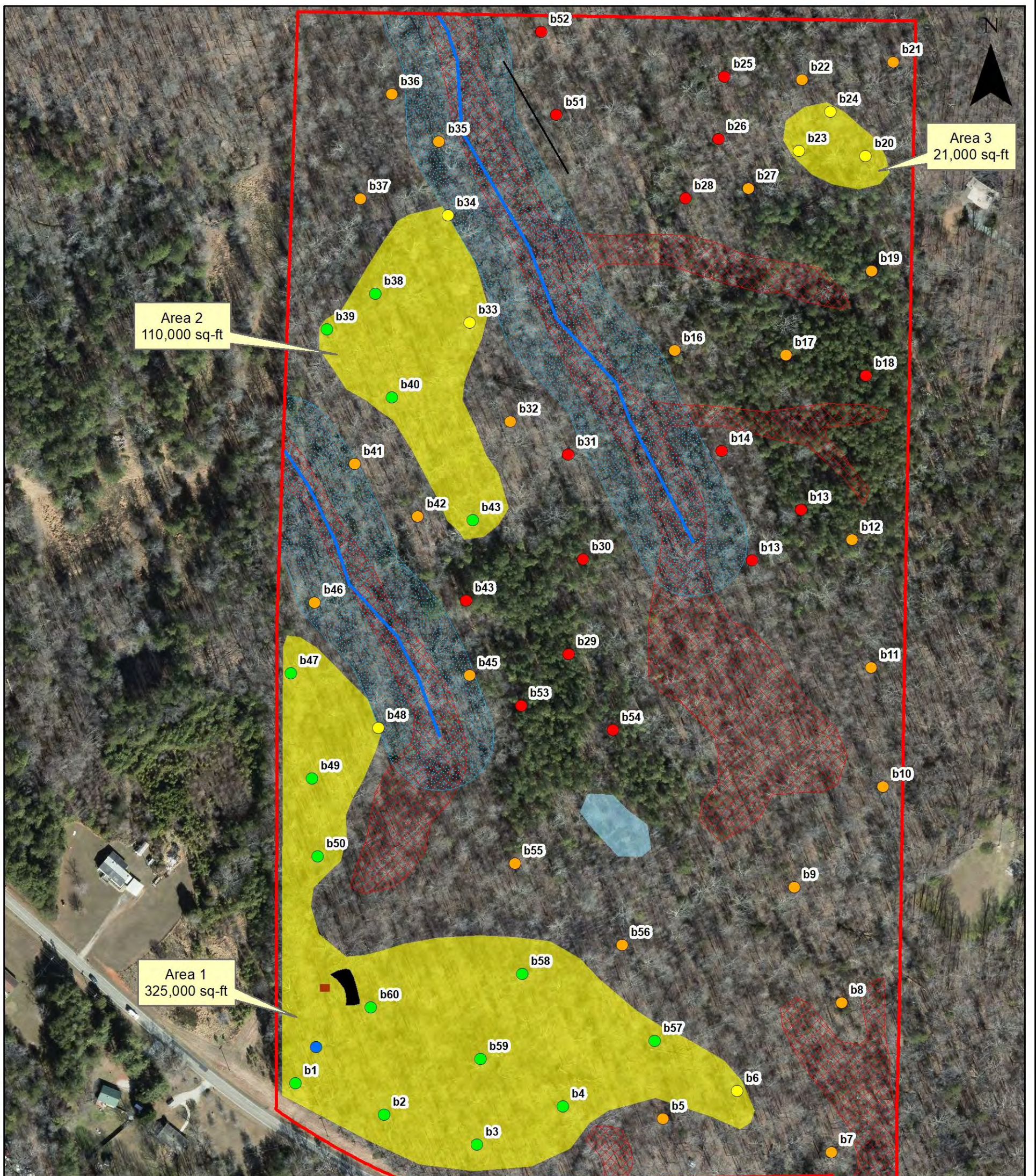
Three areas of soil rated as Provisionally Suitable for Conventional and/or Modified/Alternative Systems were identified and are shown on Figure 1. Area 1 is located in the front of the lot along the ridge and sideslopes of the western and southern property lines. Area 1 encompasses 325,000 sq-ft and contains an existing well, septic tank and septic drainfield. Area 2 is located along the ridgetop in the northwest corner of the property and encompasses 110,000 sq-ft. Area 3 is located on a ridge between two drainages in the northeast corner of the property and encompasses 21,000 sq-ft.

Based on observed soil characteristics, a long-term acceptance rate (LTAR) of 0.25 to 0.3 GPD/sq-ft is anticipated for these areas. Approximately 12,000-14,000 sq-ft of uniform land area will be needed to support the initial and repair system for a four-bedroom home (480 GPD). Septic systems sited in areas with usable soil of less than 30 inches (borings labeled as Provisionally Suitable for Modified/Alternative Systems) will require a soil capping to be placed over the entire system.

CONCLUSIONS

The findings presented herein represent Three Oaks' professional opinion based on our Reconnaissance Soil and Site Evaluation and knowledge of the current laws and rules governing on-site wastewater systems in Orange County and North Carolina. Three areas of usable soil rated as Provisionally Suitable for Conventional and/or Modified/Alternative Systems were identified. The recommended LTAR for the areas is expected to range from 0.25 to 0.3 GPD/sq-ft and will require 12,000 to 14,000 sq-ft to support an initial system and repair area for a four-bedroom home.

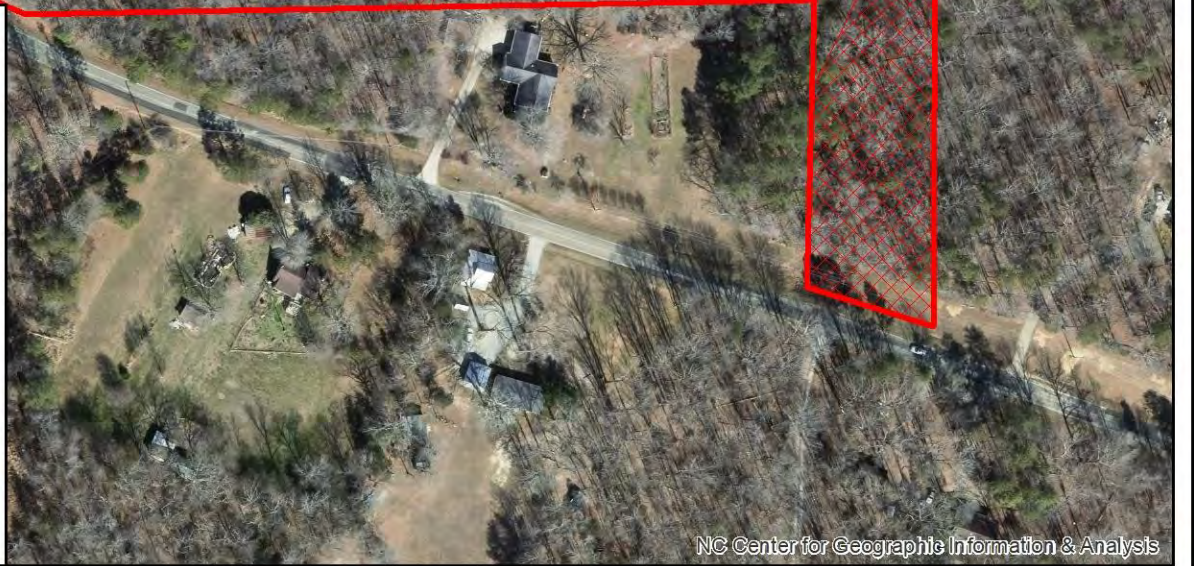
Soils naturally change across a landscape and contain many inclusions. As such, attempts to quantify them are not always precise and exact. Due to this inherent variability of soils and the subjectivity when determining limiting factors, there is no guarantee that a regulating authority will agree with the findings of this report. An Improvement Permit for a subsurface septic system would be issued by Orange County Environmental Health (OCEH). Any concurrence with the findings of this report would be made by OCEH at the time an Improvement Permit is issued.



Parcel Boundary

Soil Borings

- Provisionally Suitable for Conventional Systems
- Provisionally Suitable for Modified/Alternative Systems
- Provisionally Suitable for Subsurface Drip Systems
- Unsuitable
- Well
- Septic Tank
- Provisionally Suitable for Conventional and/or Modified/Alternative Systems
- Approximate Location of Potential Stream
- 100-ft Stream Buffer
- Wet Depression
- Existing Septic Drainfield
- Drainageway
- Ditch



NC Center for Geographic Information & Analysis



Reconnaissance Soil & Site Evaluation

4900 Schley Road

Orange County, North Carolina

Date: July 2018	
Scale: 0 75 150 Feet	
Job No.: 18-764	
Drawn By: ETM	Checked By: JCR

Figure

1

Soil Evaluation Form

Three Oaks Engineering
 324 Blackwell Street, Suite 1200
 Durham, NC 27701
 919.732.1300

Sheet 1 of 6
 Job: 18-764
 County: Orange
 Date: 6-29-18

Soil Borings

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Landscape Position	L	L	L	L	R	L	L	L	R	R
Slope (%)	0-2	0-2	3-5	3-5	2-4	6-8	6-8	4-6	4-6	5-7
Horizon 1 Depth	30	36	6	4	6	8	18	16	6	15
Texture	C	C	CL	CL	CL	CL	CL	CL	CL	CL
Consistence	FI	FI	FR	FR	FR	FR	FR	FR	FR	FR
Structure	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	AR		34	32	20	28	AR		27	AR
Texture			C	C	C	C			C	
Consistence			FI	FI	FI	FI			FI	
Structure			SBK	SBK	SBK	SBK			SBK	
Clay Mineralogy			SE	SE	SE	SE			SE	
Horizon 3 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness										
Restrictive Horizon	PM-30		PM-34	PM-32	PM-20	PM-28		16-PM	22-PM	
Saprolite										
Other							18-AR			15-AR
CLASSIFICATION	PS	PS	PS	PS	PS-clip	PS	PS-clip	PS-clip	PS-clip	PS-clip
LTAR (gpd/ft ²)										

Comments: PM > 50% Parent Material
 AR = Auger Refusal

Evaluated by: ETM

Soil Evaluation Form

Three Oaks Engineering
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Sheet 2 of 6
 Job: 18-764
 County: Orange
 Date: 6-29-18

Soil Borings

	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20
Landscape Position	L	R	R	R	R	R	R	R	R	R
Slope (%)	4-6	2-4	4-6	6-8	4-6	4-6	4-6	4-6	4-6	4-6
Horizon 1 Depth	10	12	10	12	6	10	13	8	6	8
Texture	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL
Consistence	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR
Structure	SBM	SBM	SBM	SBM	SBM	SBM	SBM	SBM	SBM	SBM
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	22	21				19	15	17	15	28
Texture	C	C				CL	C	C	C	C
Consistence	FI	FI				FI	FI	FI	FI	FI
Structure	SBM	SBM				SBM	om	om	SBM	SBM
Clay Mineralogy	SE	SE				SE	E	E	SE	SE
Horizon 3 Depth	AR									
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness										
Restrictive Horizon	PM-22	PM-21	PM-10	PM-12	PM-6	PM-19	Exp-13	Exp-8	PM-15	PM-28
Saprolite										
Other										
CLASSIFICATION	ps-drip	ps-drip	U	U	U	ps-drip	ps-drip	U	ps-drip	PS
LTAR (gpd/ft ²)										

CL Mottled heavy PM

Comments:

PM > 50% Parent Material
 AR = Auger Refusal

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Soil Evaluation Form

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Sheet 3 of 6
 Job: 18-764
 County: Orange
 Date: 6-29-18

Soil Borings

	B21	B22	B23	B24	B25	B26	B27	B28	B29	B30
Landscape Position	R	R	R	R	R	R	R	R	L	L
Slope (%)	4-6	4-6	4-6	4-6	6-8	6-8	6-8	6-8	0-2	4-6
Horizon 1 Depth	10	8	8	10	8	7	14	10	10	6
Texture	CL	CL	CL	CL	CL	CL	CL	CL	CL	SiCL
Consistence	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR
Structure	SBH	SBK	SBK	SBK	SBH	SBK	SBH	SBH	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	3	15	27	25		AR	16	15	15	15
Texture	C	C	C	C			C	C	C	CL
Consistence	FI	FI	FI	FI			FI	FI	FI	FR
Structure	SBH	SBK	SBH	SBK						
Clay Mineralogy	SE	SE	SE	SE			OM	OM	OM	OM
Horizon 3 Depth				27			E	E	E	SE
Texture				C						AR
Consistence				FI						
Structure				OM						
Clay Mineralogy				E						
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness		15		25			14			
Restrictive Horizon	PM-23	PM-15	PM-27	25-Exp	PM-8	PM-7	PM-14	PM-10	Exp-10	PM-6
Saprolite										
Other						AR-7				
CLASSIFICATION	ps-drip	ps-drip	PS	PS	U	U	ps-drip	U	U	U
LTAR (gpd/ft ²)			.275	.275						

Comments: PM > 50% Parent Material
 AR = Auger Refusal

Evaluated by: ETM

Soil Evaluation Form

Three Oaks Engineering
 324 Blackwell Street, Suite 1200
 Durham, NC 27701
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Sheet 4 of 6
 Job: 18-764
 County: Orange
 Date: 6-29-18

Soil Borings

	B31	B32	B33	B34	B35	B36	B37	B38	B39	B41
Landscape Position	LS	LS	L	L	LS	R	L	L	L	L
Slope (%)	6-8	4-6	5-7	4-6	8-10	6-8	4-6	4-6	4-6	4-6
Horizon 1 Depth	5	8	6	27	20	15	10	7	6	8
Texture	L	CL	CL	C	CL	CL	CL	CL	CL	CL
Consistence	FR	FI	FR	FI	FI	FR	FR	FR	FR	FR
Structure	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	10	14	28	30	22	AR	15	36	36	36
Texture	CL	C	C	CL	CL		C	C	C	C
Consistence	FR	FI	FI	FR	FR		FI	FI	FI	FI
Structure	SBK	SBK	SBK	om	om		SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE		SE	SE	SE	SE
Horizon 3 Depth		16+					18			
Texture		C					CL/C			
Consistence		FI					FI			
Structure		om					om			
Clay Mineralogy		E					E			
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness	5									
Restrictive Horizon	pm-9	14-pm	28-pm	27-pm	22-pm	15-AR	pm/ox-15			
Saprolite										
Other		HL-Exp								
CLASSIFICATION	U	ps-drip	PS	PS	ps-drip	ps-drip	ps-drip	PS	PS	PS
LTAR (gpd/ft ²)										

Comments: (clayey)
 pm > 50% Parent Material

Evaluated by: ETM

Soil Evaluation Form

Three Oaks Engineering
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Sheet 5 of 6
 Job: 19-764
 County: Orange
 Date: 10-29-18

Soil Borings

	B41	B42	B43	B44	B45	B46	B47	B48	B49	B50
Landscape Position	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS
Slope (%)	6-8	4-6	3-5	2-4	4-6	6-8	6-8	6-8	4-6	4-6
Horizon 1 Depth	14	10	6	8	8	6	4	6	4	8
Texture	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL
Consistence	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR
Structure	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	AR	15	36		13	16	36	26	36	34
Texture		C	C		CL	CL	C	C	C	C
Consistence		FI	FI		FI	FI	FI	FI	FI	FI
Structure		SBK	SBK		SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy		SE	SE		SE	SE	SE	SE	SE	SE
Horizon 3 Depth					15					
Texture					C					
Consistence					FI					
Structure					GM					
Clay Mineralogy					E					
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness										
Restrictive Horizon	AR-14	PM-15		PM-8	Exp-13	PM-16		PM-26		PM-34
Saprolite										
Other										
CLASSIFICATION	PK-clnp	PS-clnp	PS	U	PS-clnp	PS-clnp	PS	PS	PS	PS
LTAR (gpd/ft ²)										

Discipline

Comments:

PM 750% Parent Material

Evaluated by: ETM

Soil Evaluation Form

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324 Blackwell Street, Suite 1200
Durham, NC 27701
919.732.1300

Sheet 6 of 6
 Job: 18-764
 County: Orange
 Date: 7-2-18

Soil Borings

	B51	B52	B53	B54	B55	B56	B57	B58	B59	B60
Landscape Position	LS	LS	LS	LS	LS	R	L	L	L	L
Slope (%)	2-4	2-4	4-6	2-4	4-6	5-7	4-6	2-4	2-4	2-4
Horizon 1 Depth	10	10	7	10	4	6	6	12	6	6
Texture	SIL	SIL	SIL	SIL	L	L	CL	CL	CL	CL
Consistence	FR	FR	FR	FR	FR	FR	FI	FI	FI	FI
Structure	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 2 Depth	12	12	10	12	18	20	30	34	36	36
Texture	SIL	SIL	CL	SIL	C	CL	L	C	C	C
Consistence	FR	FR	FI	FR	FI	FI	FI	FI	FI	FI
Structure	SBK	OM	OM	OM	SBK	SBK	SBK	SBK	SBK	SBK
Clay Mineralogy	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Horizon 3 Depth		AR		AR	21	22				
Texture					CL	CL				
Consistence					FR	FR				
Structure					OM	OM				
Clay Mineralogy					SE	SE				
Horizon 4 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Horizon 5 Depth										
Texture										
Consistence										
Structure										
Clay Mineralogy										
Soil Wetness	10									
Restrictive Horizon	Pm-16	Pm-10	Pm-7	Pm-16	Pm-18	Pm-20	Pm-30	Pm-34		
Saprolite										
Other										
CLASSIFICATION	U	U	U	U	P-drip	P-drip	PS	PS	PS	PS
LTAR (gpd/ft ²)										

Comments: Pm > 50% Parent Material
 AR = Auger Refusal

Evaluated by: ETM, JCR