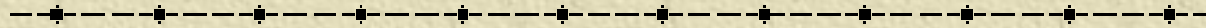


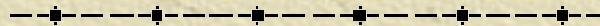


Case Study: Difficult Sites – Clay Mineralogy



R. Scott Greene

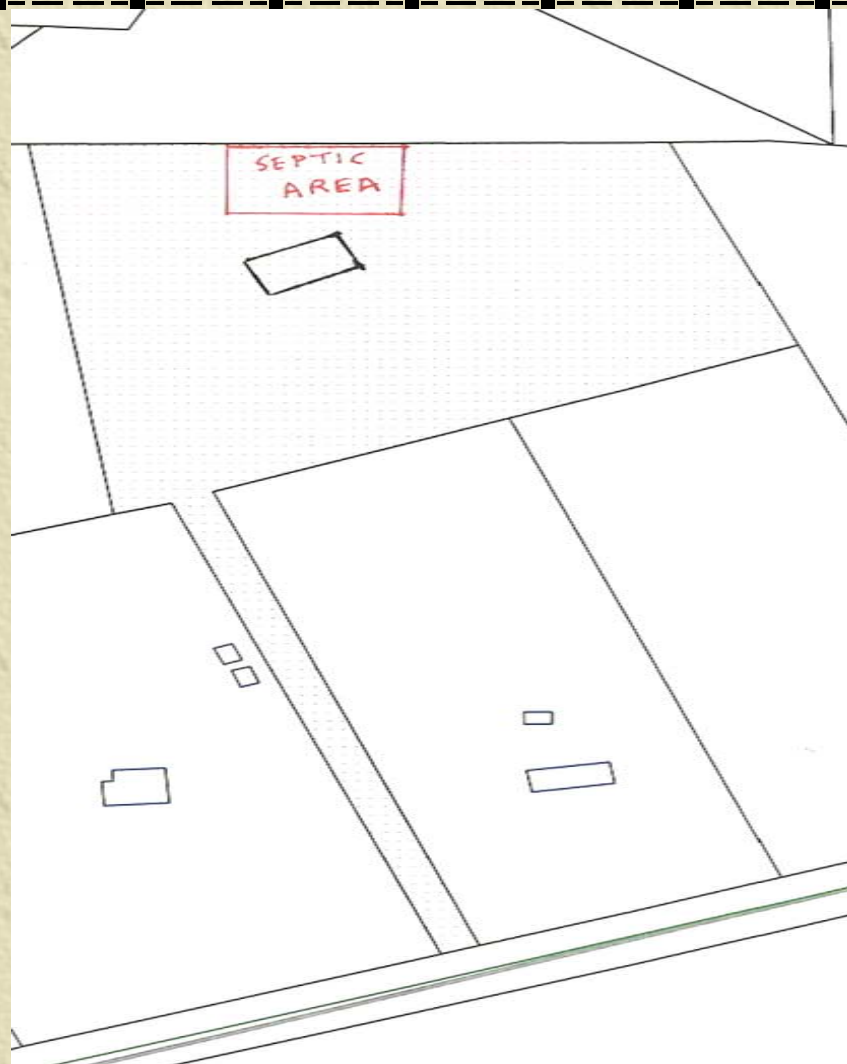
Alan Clapp



Background

- ✦ Lot in rural Orange County
- ✦ Site originally permitted in 1994
- ✦ Usable soil depths were 24-30”
- ✦ Original Permit expired in 1999
- ✦ New Application filed later in 1999 and a new Improvement Permit and Construction Authorization were issued for the same site.
- ✦ In 2002 the property is sold.

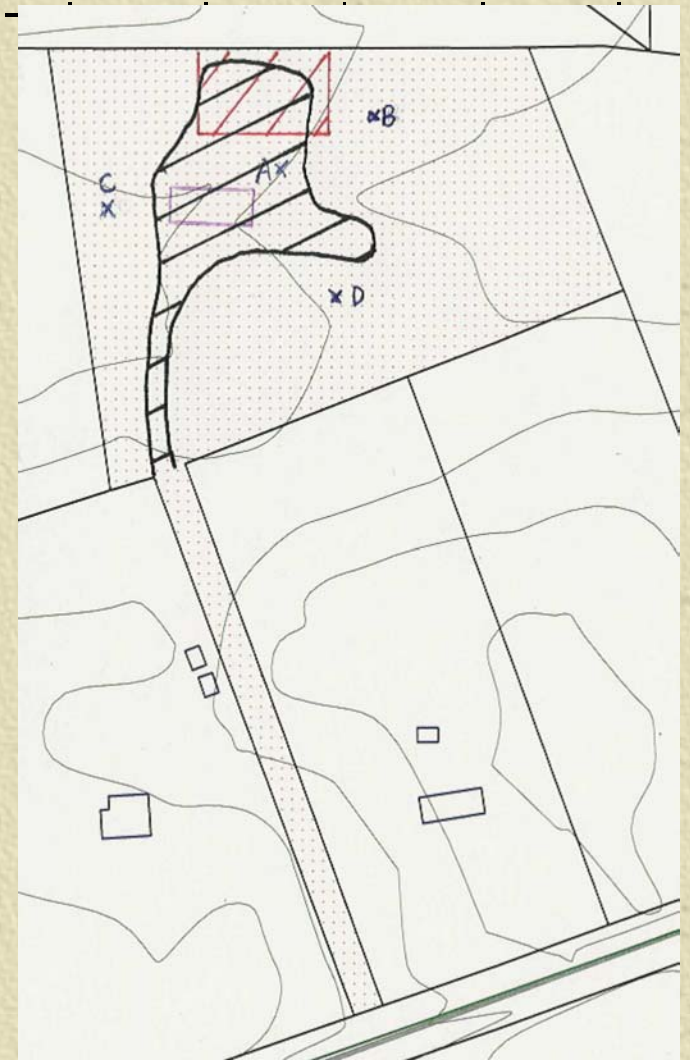
Original Evaluation - 1994



Background continued

- ✦ New owner sets up manufactured home.
- ✦ Pre-construction conference in 2002 with the septic installer found that 8-10” of the original approved area (24-30” soils) had been graded for the manufactured home building pad and to provide positive drainage around the home site.

Preconstruction Conference 2002



Background continued

- ✦ Adjacent soils were classified as unsuitable due to very sticky, very plastic wet consistence on the ridge and linear slopes and due to soil wetness in the concave and head slope areas.
- ✦ The new owner and manufactured home company contacted a soil scientist to look at the property.

.1948 (d) Proposal

A&L Analytical Laboratories, Inc.

2790 Whitten Rd. Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

<http://www.allabs.com>



The One Source.

TEXTURE ANALYSIS

Client : R. SCOTT GREEN SOIL SCIENTIST 111 ALISON LN ARCHDALE, NC 27263	Grower : R. SCOTT GREENE Date Received : 01/14/2003	Report No : 03-014-0615 Cust No : 29150 Date Printed : 01/24/2003 Page : 1 of 1
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<u>Lab No</u>	<u>Sample Identification</u>	<u>Percent Sand</u>	<u>Percent Silt</u>	<u>Percent Clay</u>	<u>Textural Classification</u>
28072	1A 24-28	11	14	75	Clay
28073	2A 20-24	22	18	60	Clay
28074	3A 16-20	12	22	66	Clay
28075	4A 16-20	8	14	78	Clay

Example CEC Analysis

Report Number

P03-014-0103

Page : 1



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Account Number

29150

Send To :

R. SCOTT GREEN
SOIL SCIENTIST
111 ALISON LN
ARCHDALE, NC 27263

Client : R. SCOTT GREEN

Purchase Order :

Report Date : 01/23/2003

Date received : 1/14/2003

REPORT OF ANALYSIS

Lab Number : 70950

Sample Id : 1A 24-28"

Analysis	Result	Detection Limit	Method	Date and Time Test Started	Analyst
Cation Exchange Capacity	12.6	0.1	SW-9081	Jan 15 2003 10:00AM	KD

Comments:

SW : USEPA, SW-846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, 3rd Ed. Current Revision

CEC at pH 7

REPORT OF ANALYSIS

Lab Number : 70950
Sample Id : 1A 24-28"

Analysis	Result	Detection Limit	Method
Cation Exchange Capacity	12.6	0.1	SW-9081

REPORT OF ANALYSIS

Lab Number : 70951
Sample Id : 2A 20-24"

Analysis	Result	Detection Limit	Method
Cation Exchange Capacity,meq/100g	8.1	0.1	SW-9081

REPORT OF ANALYSIS

Lab Number : 70952
Sample Id : 3A 16-20"

Analysis	Result	Detection Limit	Method
Cation Exchange Capacity,meq/100g	8.5	0.1	SW-9081

REPORT OF ANALYSIS

Lab Number : 70953
Sample Id : 4A 16-20"

Analysis	Result	Detection Limit	Method
Cation Exchange Capacity	10.5	0.1	SW-9081

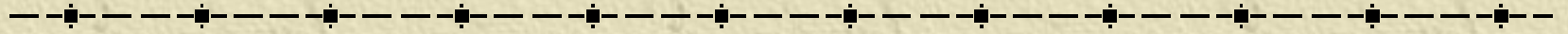
Apparent CEC Calculations

- ✦ Apparent CEC = (meq CEC7/ 100g soil) / (% clay/ 100g soil)
- ✦ Apparent CEC is a weighted test based on the clay fraction. CEC at pH 7 and Particle Size Analysis must be known.
- ✦ Note: Must use the CEC measured at pH 7 not 8.2.

Apparent CEC Calculations

Sample #	1	2	3	4
CEC7	12.6	8.1	8.5	10.5
% clay	75	60	66	78
Apparent CEC	16.8	13.5	12.8	13.5
	✗	✓	✓	✓

Apparent CEC



✦ Cost

- ✦ Particle Size Analysis:
- ✦ CEC at pH 7:

Conclusion:

- ✦ Moist and Wet Field Consistence determination of unsuitable was found to be in error due to the high clay content (%).
- ✦ Particle size analysis was able to show the clay %.
- ✦ Apparent CEC was able to show that three of the four split samples had values less than the 16.3 threshold.

Conclusion cont.

- ✦ A layout was done in the area confined to the three usable samples and area not graded. The area where the soils were graded were either solid piped across or avoided altogether.
- ✦ The site was able to be permitted at a low loading rate (.175 gpd/ft²) with parallel distribution of the trenches.