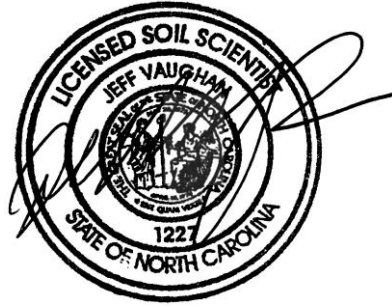




Agri-Waste Technology, Inc.

501 N Salem Street, Suite 203, Apex, NC 27502

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Soil Suitability for Sewage Treatment and Disposal Systems

1750 Oak Ridge Church Rd
Kittrell, NC 27544
Vance County PIN: 0488 01002

Prepared For: Orcutt Construction, Client

Prepared By: Jeff Vaughan, Ph.D., L.S.S.
Senior Agronomist/Soil Scientist

Bailey Stiles, Environmental Scientist

Report Date: July 15, 2024



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**Soil Suitability for Sewage Treatment and Disposal Systems
1750 Oak Ridge Church Rd, Kittrell, NC 27544
Vance County PIN: 0488 01002**

PREPARED FOR: Orcutt Construction, LLC, Client

PREPARED BY: Jeff Vaughan, LSS

Bailey Stiles

REPORT DATE: July 15, 2024

The soil suitability for domestic sewage treatment and disposal systems was evaluated on July 11, 2024, for the property located at 1750 Oak Ridge Church Rd. Bailey Stiles and Noah Puckett of Agri-Waste Technology, Inc. (AWT) conducted the soils and site evaluation. A detailed explanation of the findings will follow. A property reference map is in Attachment 1.

The total property area is approximately 2.66 acres. The property currently contains a home with an associated septic system, well, and other landscape features typically associated with a single-family residence. The property is partially wooded and partially developed. There are several drainage features with moderate slopes on the property. We understand that the desire is to subdivide the property and build an additional single-family dwelling on the property.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

The aerial map in Attachment 2 details the approximate property boundaries, soil boring locations, soil types, and soil areas for septic systems. Numerous soil borings were advanced on the property (Attachment 2). A portion of the property contained drainage features, and/or unsuitable soils and, thus, are unsuitable for septic systems. However, this evaluation was merely a preliminary review to determine what potential this land might have for domestic sewage treatment and disposal systems. Therefore, specific types of septic systems, exact locations of future drainfields and repair areas, plus buffers from property lines (current and potential future lot lines), building foundations, wells, etc. are not fully considered. These things will need to be more fully considered as the

plans develop for the potential future of this site. It is possible that additional soil evaluations will be required once lot layouts are considered and developed for this property so that septic system types and the location of a septic drainfield can be more fully and appropriately considered.

The suitable areas exhibited soil characteristics and soil depths that is suitable for drip septic systems. This suitable area is shown on the maps in Attachment 2. The major soil types on this property are Cecil sandy clay loam (map symbol CeB2) and Iredell fine sandy loam (map symbol IrB). The Vance County Soil Survey indicates that septic system installation in these soils is moderate to severe (Attachment 3). Typical profile descriptions of the suitable soil for this property are in Attachment 4.

One distinct soil profile was observed in the suitable soil borings on the property. The suitable soil borings had the following characteristics: The soil texture was suitable and was estimated to be sandy loam near the soil surface (A horizon) and clay loam in the subsoil (B horizons). The soil structure was suitable and was estimated to be granular near the soil surface (A horizon) and weak subangular blocky to angular blocky in the subsoil (B horizons). The clay mineralogy was generally unsuitable with very firm moist soil consistence with sticky and plastic wet soil consistence and indications of saturation.

The land area required for a subsurface drip septic system is calculated based on the size of the proposed facility and the Long-Term Acceptance Rate (LTAR) of the soil. The LTAR range for the suitable soils on this property is 0.05 – 0.1 GPD/ft² based on the most restrictive soil texture in the subsoil. The LTAR suggested by AWT for most of the subsurface drip suitable soil is 0.1 GPD/ft², but the final LTAR for specific septic system types and septic drainfield locations will be set by the Granville -Vance County Health Department or the permitting agency. Generally, 9,000-11,000 ft² of suitable soil for conventional septic systems is required for a 3-bedroom home. The detailed computations are in Attachment 5.

Conclusions

Based on the results of this evaluation, the installation of a subsurface anaerobic drip septic system seems very probable on this property in the area designated on the map. A detailed site plan and design will be needed to maximize the space. Subsurface drip septic systems usually cost between \$25,000-\$35,000 to install and an additional \$8,000-\$10,000 to design and permit.

We appreciate the opportunity to assist you in this matter. Please contact us with any questions, concerns, or comments.

Attachment 1: GIS Aerial

Vance County Tax Parcel Viewer



Vance County Roads (Centerlines)

Buildings

Tax Parcels

Attachment 2: AWT Maps



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Preliminary Soil Evaluation

Orcutt Construction
Vance Co., NC
PIN: 0488 01002

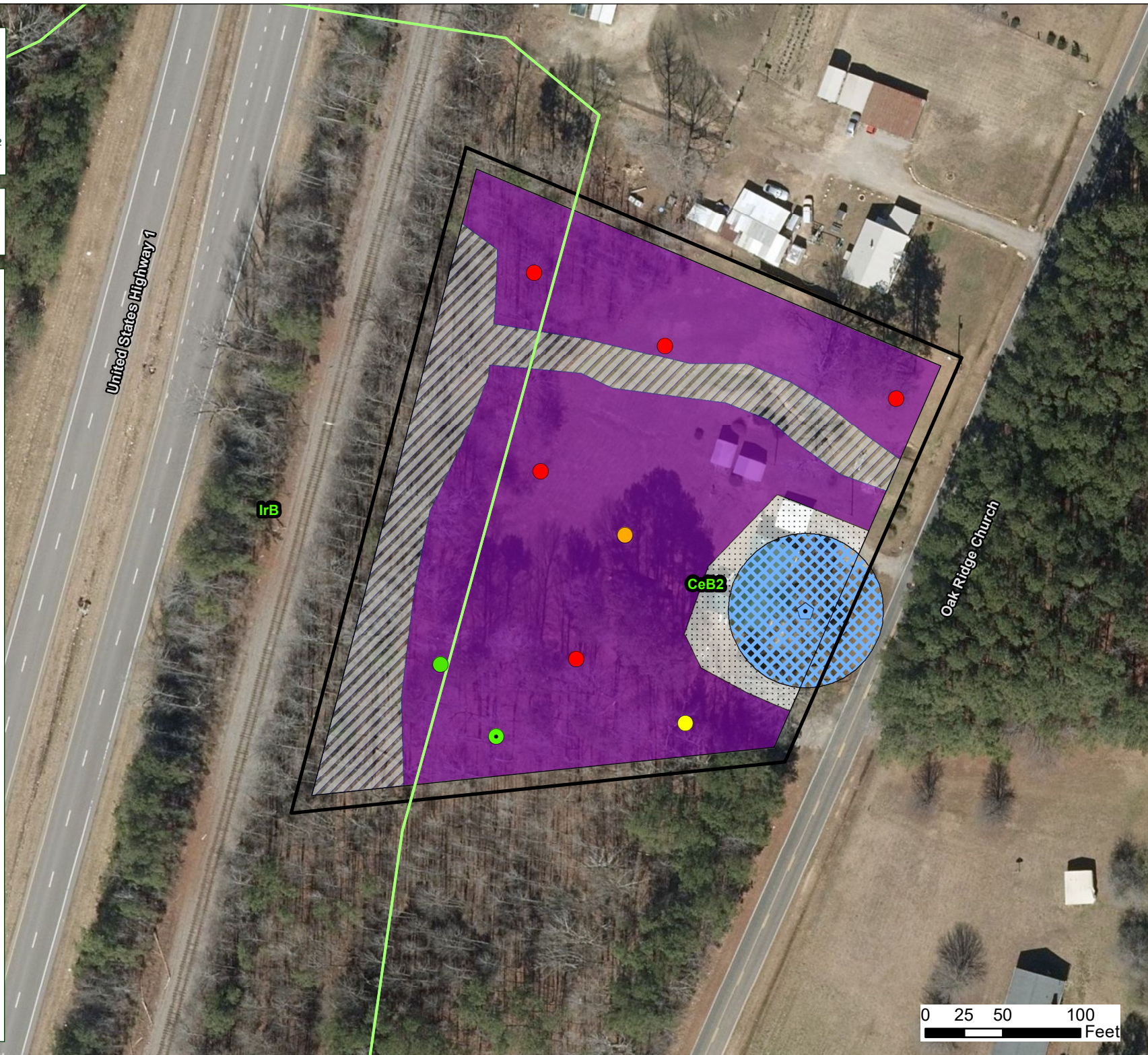


Area for Septic:
~71,776 sq.ft.

Soil Types:
CeB2: Cecil sandy clay loam
IrB: Iredell fine sandy loam

- Parcel
- Parcel Buffer 10 ft.
- Soil Type
- Well
- Well Buffer 50 ft.
- Evaluation Area**
 - Suitable Area
 - Bad Topo
 - Disturbed
- Soil Boring Depth (in.)**
 - 13-17"
 - 18-23"
 - 24-29"
 - 30-35"
 - 36"+

Drawn By: William Snoeyink
Reviewed By: Bailey Stiles
Date: 7/12/2024





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Preliminary Soil Evaluation

Orcutt Construction
Vance Co., NC
PIN: 0488 01002



Area for Septic:
~71,776 sq.ft.

Soil Types:
CeB2: Cecil sandy clay loam
IrB: Iredell fine sandy loam

- Parcel
- Parcel Buffer 10 ft.
- 2 ft. Contour

- Well
- Well Buffer 50 ft.

Evaluation Area

- Suitable Area
- Bad Topo
- Disturbed

Soil Boring Depth (in.)

- 13-17"
- 18-23"
- 24-29"
- 30-35"
- 36"+

Drawn By: William Snoeyink
Reviewed By: Bailey Stiles
Date: 7/12/2024

0 25 50 100
Feet

Attachment 3: Soil Survey Descriptions

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ApB, AuB ¹ ----- Appling	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
CeB2----- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight-----	Fair: too clayey.
CeD2----- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, seepage.	Moderate: slope.	Fair: too clayey, slope.
CuB ¹ ----- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight-----	Fair: too clayey.
Cw----- Chewacla	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
DuB----- Durham	Moderate: wetness.	Moderate: slope, seepage.	Slight-----	Slight-----	Good.
GeB----- Georgeville	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----	Poor: too clayey.
GeD----- Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: too clayey.
GoC, GoE----- Goldston	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: seepage.	Poor: small stones, thin layer.
HeB----- Helena	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
IrB----- Iredell	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: thin layer.
LgB----- Lignum	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey.
LoB----- Louisburg	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
LoD----- Louisburg	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: slope.
LoE----- Louisburg	Severe: slope.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: slope.
NaB----- Nason	Moderate: depth to rock.	Moderate: slope, seepage.	Severe: too clayey.	Slight-----	Poor: too clayey.

See footnote at end of table.

Attachment 4: Profile Descriptions



Agri-Waste Technology, Inc.
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Property ID#: 0488 01002
Property Recorded: _____
County: Vance

**SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM**

Applicant: Orcutt Construction, LLC
Address: 412 Hamby St
Clayton, NC 27520

Owner: X Agent: _____ Phone: 525-831-9388
Dates Evaluated: 7/11/2024
Proposed Facility: Single Family Residence
Property Size: 2.66 acres

Location Site: 1750 Oak Ridge Church Road, Kittrell, NC 27544

Water Supply: On Site Well X Comm. Well _____ Public _____ Other _____ Evaluation Method: Auger Boring: X Pit _____

PROFILE 1: Typical Profile Description

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance / Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence (Wet)	Consistence (Moist)
A 0-3"	10YR 4/4	-	-	SL	GR	NEXP	NS, NP	Vfr
Bt1 3-11"	10YR 5/6	-	-	SCL	WSBK	SEXP	SS, SP	Fi
Bt2 11-17"	10YR 4/4	7.5YR 5/8, 10YR7/2	2, m, D	CL	ABK	SEXP	SS, SP	Fi

Landscape Pos/Slope %	S	Profile LTAR	0.05 - 0.15 GPD/FT ²
Wetness Condition	US	System Type	Subsurface Drip
Saprolite	S		
Restrictive Horizon	N/A		
Profile Classification	S		

Comments: Some indications of saturation (chroma 2) around 13-16". Moderate slope on the site and drainage feature located along the center and back property line.

EVALUATED BY: Bailey Stiles and Noah Puckett

COMMENTS: _____

LEGEND OF ABBREVIATIONS FOR SOIL/SITE EVALUATION FORM

LANDSCAPE POSITION

CC – Concave Slope
 CV – Convex Slope
 DS – Debris Slump
 D – Depression
 DW – Drainage Way
 FP – Flood Plain
 FS – Foot Slope
 H – Head Slope
 I – Interfluve
 L – Linear Slope
 N – Nose Slope
 P – Pocosin
 R – Ridge
 S – Shoulder
 T – Terrace

STRUCTURE

G – Single Grain
 M – Massive
 CR – Crumb
 GR – Granular
 SBK – Subangular Blocky
 ABK – Angular Blocky
 PL – Platy
 PR – Prismatic
 (w in front denotes “weak”)

MOTTLES

1 – Few
 2 – Common
 3 – Many

 f – Fine
 m – Medium
 c – Coarse

 F – Faint
 D – Distinct
 P – Prominent

MOIST CONSISTENCE

VFr – Very Friable
 Fr – Friable
 Fi – Firm
 VFi – Very Firm
 EFi – Extremely Firm

WET CONSISTENCE

NS – Non Sticky
 SS – Slightly Sticky
 S – Sticky
 VS – Very Sticky

 NP – Non Plastic
 SP – Slightly Plastic
 P – Plastic
 VP – Very Plastic

MINERALOLOGY

NEXP – Non Expansive
 SEXP – Slightly Expansive
 EXP – Expansive

<u>TEXTURE GROUP</u>	<u>TEXTURE CLASS</u>	<u>.1955 LTAR (gal/day/sq.ft.)</u>
I	S – Sand	1.2 – 0.8
	LS – Loamy Sand	
II	SL – Sandy Loam	0.8 – 0.6
	L – Loam	
III	SCL – Sandy Clay Loam	0.6 – 0.3
	CL – Clay Loam	
	SiL – Silt Loam	
	Si – Silt	
	SiCL – Silty Clay Loam	
IV	SC – Sandy Clay	0.4 – 0.1
	SiC – Silty Clay	
	C – Clay	

Attachment 5: Drip Septic System Area Computations

Drip Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 7/15/2024

Client Name: Orcutt
Number Bedrooms: 2
Design Flow (gal/day): 240 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.05
Trench Bottom Area (ft²): 4800 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 2400

Minimum Field Area Required (ft²): 4800 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 12000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 14400 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 2
Design Flow (gal/day): 240 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.1
Trench Bottom Area (ft²): 2400 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 1200

Minimum Field Area Required (ft²): 2400 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 6000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 7200 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 2
Design Flow (gal/day): 240 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.15
Trench Bottom Area (ft²): 1600 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 800

Minimum Field Area Required (ft²): 1600 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 4000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 4800 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Drip Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 7/15/2024

Client Name: Orcutt
Number Bedrooms: 3
Design Flow (gal/day): 360 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.05
Trench Bottom Area (ft²): 7200 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 3600

Minimum Field Area Required (ft²): 7200 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 18000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 21600 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 3
Design Flow (gal/day): 360 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.1
Trench Bottom Area (ft²): 3600 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 1800

Minimum Field Area Required (ft²): 3600 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 9000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 10800 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 3
Design Flow (gal/day): 360 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.15
Trench Bottom Area (ft²): 2400 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 1200

Minimum Field Area Required (ft²): 2400 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 6000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 7200 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Drip Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 7/15/2024

Client Name: Orcutt
Number Bedrooms: 4
Design Flow (gal/day): 480 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.05
Trench Bottom Area (ft²): 9600 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 4800

Minimum Field Area Required (ft²): 9600 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 24000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 28800 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 4
Design Flow (gal/day): 480 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.1
Trench Bottom Area (ft²): 4800 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 2400

Minimum Field Area Required (ft²): 4800 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 12000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 14400 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: Orcutt
Number Bedrooms: 4
Design Flow (gal/day): 480 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.15
Trench Bottom Area (ft²): 3200 (Design flow/LTAR)
Trench Width (ft): 0
On-center distance between trenches (ft): 2
Trench Bottom Length (ft): 1600

Minimum Field Area Required (ft²): 3200 (Trench Bottom Length*Trench on-center distance)
Total Field Area Required (ft²)⁽¹⁾: 8000 (Minimum field area*2.5)
Total Field Area Required (ft²)⁽¹⁾: 9600 (Minimum field area*3)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.