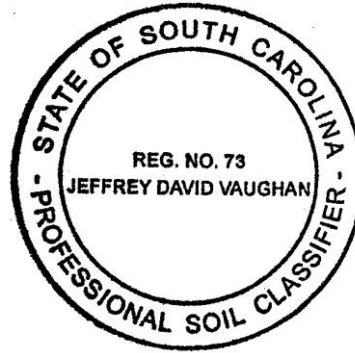




Agri-Waste Technology, Inc.  
 501 North Salem Street  
 Suite 203  
 Apex, NC 27502  
 919-859-0669  
 www.agriwaste.com



January 25, 2019

**SITE FEASIBILITY SUMMARY – ON-SITE WASTEWATER SYSTEMS  
 FOR  
 MT LAND, LLC  
 RIDGEVILLE, SC – HWY 61 TRACTS**

AWT, Inc. was contracted to perform an exploratory review of three land parcels in Dorchester County, SC for purpose of assessing general suitability for land treatment of wastewater. Land treatment means that final disposal of wastewater would occur on the property by means of subsurface (septic) system(s) or surface application of treated wastewater with irrigation. The review was conducted with available resources including Dorchester County GIS maps (topography, wetlands, floodplains) and the U.S. Department of Agriculture’s National Cooperative Soil Survey database.

Subject Parcels:

Parcel Number	Owner	Acreage
142-00-00-012	Rodney Piercey- Trustee	834.6
142-00-00-022	Rodney Piercey- Trustee	484.6
142-00-00-015	Rodney Piercey- Trustee	145.9

The three parcels are contiguous and lie on either side of SC Highway 61, approximately three miles west of Summerville, SC. In the attachments to this report, you will find related maps. The first four maps include the following general information for the combined three parcels:

- 1) Vicinity map – shows the parcel locations in the county
- 2) Property map – shows the outline of the three contiguous parcels
- 3) Topography map – shows land elevation contours and some water features
- 4) Soils map – shows the soil map units retrieved from USDA-National Cooperative Soil Survey. The scale is such that an expanded view is necessary to draw conclusions. These expanded maps will be discussed in a later section.

Moving through the report, the parcels will be referred to as parcels 12, 15, and 22 as an abbreviation.

## Soils

Soils with similar properties and characteristics are mapped into units referred to as a soil “series”, with unique identifier names associated with each series classified by the USDA. The following soil series are found on the combined three parcels: Wahee, Daleville, Emporia, Grifton, Izagora, Jedburg, Mouzon, Noboco, Brookman, and Eulonia. These soils vary widely in their characteristics as related to the potential for sewage treatment and disposal.

The table below provides some key soil characteristics for each soil series as it relates to potential for wastewater application. The terms are relative, not quantitative, and explained below the table.

Soil Series	Subsoil Type	Depth to SHWT* (inches)	Flooding Potential	Utility for Wastewater **
Wahee	Clayey	12-18 inches	None to rare	None
Daleville	Clayey	<12 inches	moderate	None
Emporia	Loamy	36-48 inches	None	Moderate to good
Grifton	Loamy	<12 inches	Rare to common	None
Izagora	Loamy	18-30 inches	None	Poor to moderate
Jedburg	Loamy	12-18 inches	Rare	None
Mouzon	Loamy	<12 inches	Frequent	None
Noboco	Loamy	36-48 inches	None	Moderate to good
Eulonia	Clayey	18-30 inches	None	None to poor
Brookman	Clayey	<12 inches	Rare	None

\*SHWT: Seasonal High Water Table

\*\*Explanation for this category (these are relative values)

**None** means no potential for wastewater application – soil limitations are severe and cannot be overcome by site drainage or extensive wastewater treatment.

**Poor** means that the better extreme of these soils may support some wastewater application with extensive (and expensive) design, treatment, and site modification. Even so, wastewater volume will be limiting per unit area.

**Moderate** means that some or the majority of the soils in these map units are suitable for subsurface or surface wastewater application with little or no additional design features above standard designs. Wastewater volume will be somewhat limiting. Wastewater mounding must be assessed, and this is expected to limit volume application per unit area.

**Good** means that these specific areas of these soil map units are on the better drained limit of the soils. Wastewater systems will consist of a normal design with few limitations for wastewater application.

There are no soils mapped that have excellent drainage or suitability for wastewater application. Small areas may be located during a detailed evaluation. Excellent areas, if located, may allow for relatively high wastewater applications. As these soils are not mapped, the possibility of these is expected to be minor in extent, and possibly do not exist within these tracts.

### **Rules and requirements of soils for wastewater treatment**

For subsurface (usually referred to as septic systems) wastewater disposal, the minimum separation to natural SHWT is 36 inches. There are alternative options available that may allow use of soils with shallower water table with advanced treatment of the sewage, but in all cases the depth to SHWT must exceed 18 inches.

Surface application systems also require a minimum separation to SHWT of 36 inches. Likewise, with much higher degrees of wastewater treatment, this requirement may be reduced.

In both cases described above where one intends to use land treatment systems in soils less than 36 inches to SHWT, extensive site mapping, measurements, and modeling must be performed to insure proper wastewater system function and environmental protection.

### **Preliminary site assessment from existing data**

Please refer to the attached detailed site/soil maps. These are the four maps following the general site maps. There is a map for each of parcels 15 and 22. Parcel 12 is large and thus the map is split into 2 sections.

These maps depict only the soils areas that have potential for wastewater acceptance. The soils units then are color coded as follows:

Green: Moderate to good potential for wastewater acceptance

Yellow: Low to moderate potential for wastewater acceptance

Red: None to poor potential for wastewater acceptance

Because the Emporia soils only contain one soil unit of limited extent, you will only see one yellow mapped area. The green units reflect Noboco soils. The red reflects the Izagora and Eulonia soils, which would possibly have marginal potential for wastewater acceptance. The remainder of the maps show no color shading as these areas have no potential for wastewater. These areas have soils that are poorly drained, may have flooding potential. There are also likely extensive areas of jurisdictional wetlands (more on this subject later) within these regions.

The intent of making this type of map is to segregate areas on the parcel to further investigate with on-site soils and GIS work. The goal is to identify approximately 150 acres with the better potential for wastewater acceptance. To attain the acreage goal, the Izagora and Eulonia soils were included. This does not imply that these soils will accept wastewater of any volume, as on-site work must be performed to verify the soil limitations and depth to SHWT.

Finally, two specific maps have been created, and these reflect the recommended evaluation areas. These are the final two maps in the attachment section. These maps depict three areas as "A", "B", and "C". These maps target the Noboco soils and neighboring soils (Eulonia and Izagora) that have some capacity for wastewater application based on AWT's research. Areas were drawn that reflect using these better soils for wastewater application. Some of the area within each defined area may need to

be removed upon field investigation. The areas were developed to target the best soils and allow areas of reasonable size for wastewater development. Only one small area of Emporia soils exists and its size was not considered reasonable to include. Note that depending on the type of project and development, several individual wastewater systems can be created to serve the project. Parcel 15 is entirely in wet/floodplain soils and none of this parcel is suitable.

Approximate size of the recommended evaluation areas:

Area A: 78 acres

Area B: 64 acres

Area C: 44 acres

Total: 186 acres

In each of the three better areas defined, the Noboco soils account for about 15-30% of the total area, with other soils accounting for the remaining 70-85%. Some of these other soil areas are likely to be removed from consideration upon field investigation. Our estimate at this time is that we would lose about 50% of the red soils areas.

Ultimately the functionality expected for each area noted as A, B, and C is:

Noboco soils: 15-30%

Eulonia and Izagora soils: 30%

Unused: 40-50%

For very general planning, the following wastewater volumes could be expected on a per/acre basis:

-Noboco soils: 650,000 gallons per year, or an equivalent daily flow of about 1800 gallons per day.

-Izagora and Eulonia soils: 200,000 gallons per year, or an equivalent daily flow of about 550 gallons per day.

The above estimates do *not* take into account the potential for groundwater mounding which must be assessed if maximum soils hydraulic loading rates are approached.

The following table defines potential for each of the three areas. Please note that the acreage of the individual soil types does not add up to the total to allow for an estimated loss of area due to very poor soils and general wastewater layout design inefficiencies.

Zone	Area (acres)	% Noboco	% other soils-useable	Gallons per day-Noboco soils	Gallons per day-other soils	Total gallons per day
A	78	30	30	42,120	12,870	54,990
B	64	30	30	34,560	10,560	45,120
C	44	15	30	11,880	7,260	19,140
Total	186	-	-	88,560	30,690	119,250

**IMPORTANT NOTE: THE ABOVE TABLE REFLECTS INDEPENDENT ESTIMATES BASED SOLELY ON SOIL QUALITY AND EXPECTED RANGES IN DEPTH TO SHWT ACROSS THE**

***SOIL MAP UNITS. BECAUSE TOPOGRAPHY IS RELATIVELY LEVEL, A SIGNIFICANT AMOUNT OF GROUNDWATER MOUNDING IS EXPECTED. THE ABOVE ESTIMATES COULD DECREASE SIGNIFICANTLY DUE TO THIS. EXTENSIVE SOILS AND HYDROGEOLOGICAL WORK ARE REQUIRED TO ASSESS THIS COMPONENT.***

### **Wastewater system options**

Several options exist for development of these parcels with on-site wastewater treatment. The selection of the most ideal method will require knowledge of development goals, density, location of improvements, and finally details from the on-site assessment. Overall, the site is very gentle with nearly level topography overall. Wet soils exist over much of the area. The areas of better drained soils such as Noboco are interspersed throughout the tracts.

The wastewater treatment options include subsurface systems or surface systems (spray irrigation).

Subsurface systems of a relatively simple design would be limited to the best soil areas (Noboco soils), and a detailed study in the field would be required to delineate all possible areas where depth to SHWT exceeds 36 inches. This would likely result in a number of septic systems or zones. Depending on the proposed development, this approach may be attractive. The existing mapping shows that approximately 112 acres of Noboco soils exist over the three tracts (none on parcel 15). Not all of this area is expected to be suitable, as variations may result in soils with depth to SHWT less than 36 inches.

With the remaining soils, some level of wastewater treatment would be required. There are a number of possible options, and these can be discussed more during subsequent project meetings. All areas with seasonal high table less than 18 inches could not be used, and this could include some of the Izagora and Eulonia soils.

Surface irrigation would require some level of wastewater treatment prior to surface irrigation. This system option would be more logical if the goal would be to maintain all the wastewater infrastructure in one or two select areas of the property. Surface irrigation would also require some storage structure to hold wastewater during abnormally wet periods, for irrigation under better weather conditions.

There are positive aspects to both surface and subsurface wastewater application. Much of this again depends on how the property is to be developed and ultimately how much wastewater, and what type, is to be generated.

### **Jurisdictional Wetlands**

Jurisdictional wetlands exist over all three tracts. The easternmost parcel is likely 100% wetlands, and very likely would classify as high value wetlands and below headwaters wetlands. No impacts are expected in this area, and likely no impacts would be allowed.

The remaining two tracts will have wetland soils scattered intermittently throughout the tracts (typically driven by topography). Depending on the density of development, likely

some impacts are expected. Avoidance is the best option, and then nationwide (general) permits can be used for intermittent impacts such as road and utility crossings. Soils that are poorly drained or very poorly drained have a high likelihood to be classified as jurisdictional wetlands.

It is premature to provide an exhaustive discussion of wetlands without knowing the nature of the development. The key points are: (1) wetlands definitely exist, (2) avoidance of impacts is recommended, and (3) minor impacts can be permitted, but will require strict delineation and cooperation with the regulatory authority. Impacts above minor, or over certain threshold areas, would require mitigation. With the size of these parcels, mitigation can likely occur right on the property. In other instances, mitigation banks can be used, much like a commodity.

### **SUMMARY**

The three combined parcels have extensive areas of wet and/or flooded soils that are not acceptable for on-site wastewater treatment and disposal. Select areas are targeted and defined in this report that are worthy of additional investigation. The soils span the regulatory threshold for differing types of acceptable wastewater systems. Further, groundwater mounding may greatly affect the ultimate hydraulic capacity of these soils.

The parcels do offer some potential for on-site wastewater application. A combined system in one location could be used, or a series of smaller systems spaced around the property may also warrant consideration. Overall, the potential for on-site wastewater application is, at best, moderate in the recommended soils areas. On-site evaluation will help determine the full extent of these areas and fine tune the estimates provided in this report. Prior to the field site evaluation, some design parameters for type and extent of development are advised.

AWT, Inc. appreciates the opportunity to provide this project review. Please advise of any questions or comments that arise upon review of this material. Thank you.



Karl Shaffer and Jeff Vaughan  
AWT Project Soil Scientists

#### Map Attachments:

- 1) Vicinity Map
- 2) Property Map
- 3) Topography Map
- 4) General Soils Map- entire three parcels
- 5) Detailed soils map
  - a. Parcel 15
  - b. Parcel 22
  - c. Parcel 12- 2 maps
- 6) Proposed detailed evaluation areas
  - a. Parcel 22
  - b. Parcel 12

## **Attachment 1: Vicinity Map**



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501 N. Salem St. Suite 203  
Apex NC 27502  
P: 919.859.0669  
www.agriwaste.com

Vicinity Map

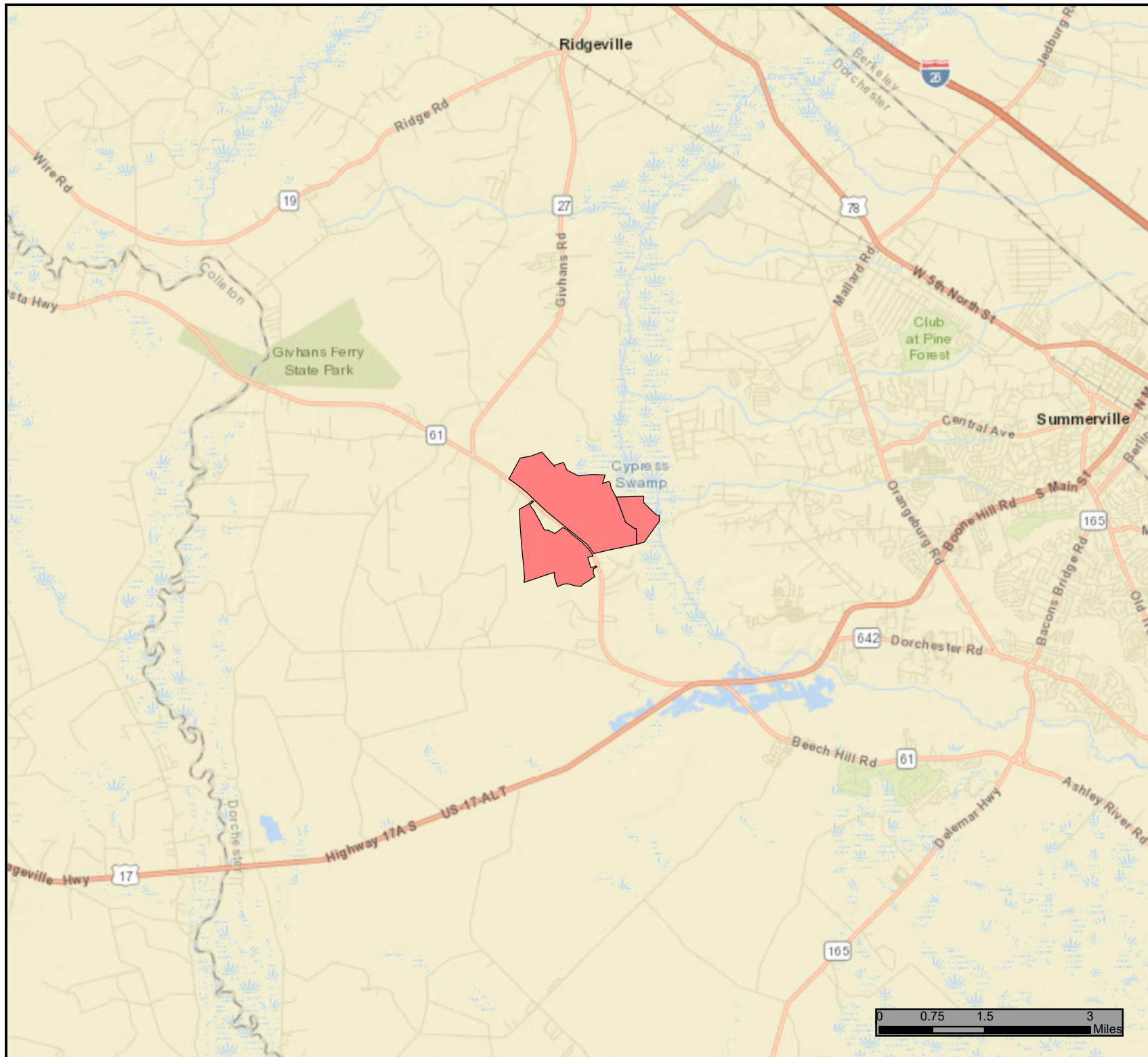
MT Land LLC  
Dorchester Co., SC



Legend

○ Property

Drawn By: Trevor Hackney  
Reviewed By: Chris McGee  
Date: 1/21/19



\*\*\* This map was created for proposed planning purposes only. It is not intended to be used as a plat or survey map of any type.\*\*\*



## **Attachment 2: Property Map**



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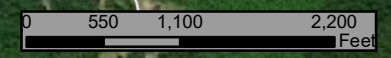
**Preliminary Soil  
Evaluation Map**

MT Land LLC  
Dorchester Co., SC



**Legend**  
— Road  
○ Property

Drawn By: Trevor Hackney  
Reviewed By: Chris McGee  
Date: 1/21/19



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## **Attachment 3: Topography Map**



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Preliminary Soil  
Evaluation Map

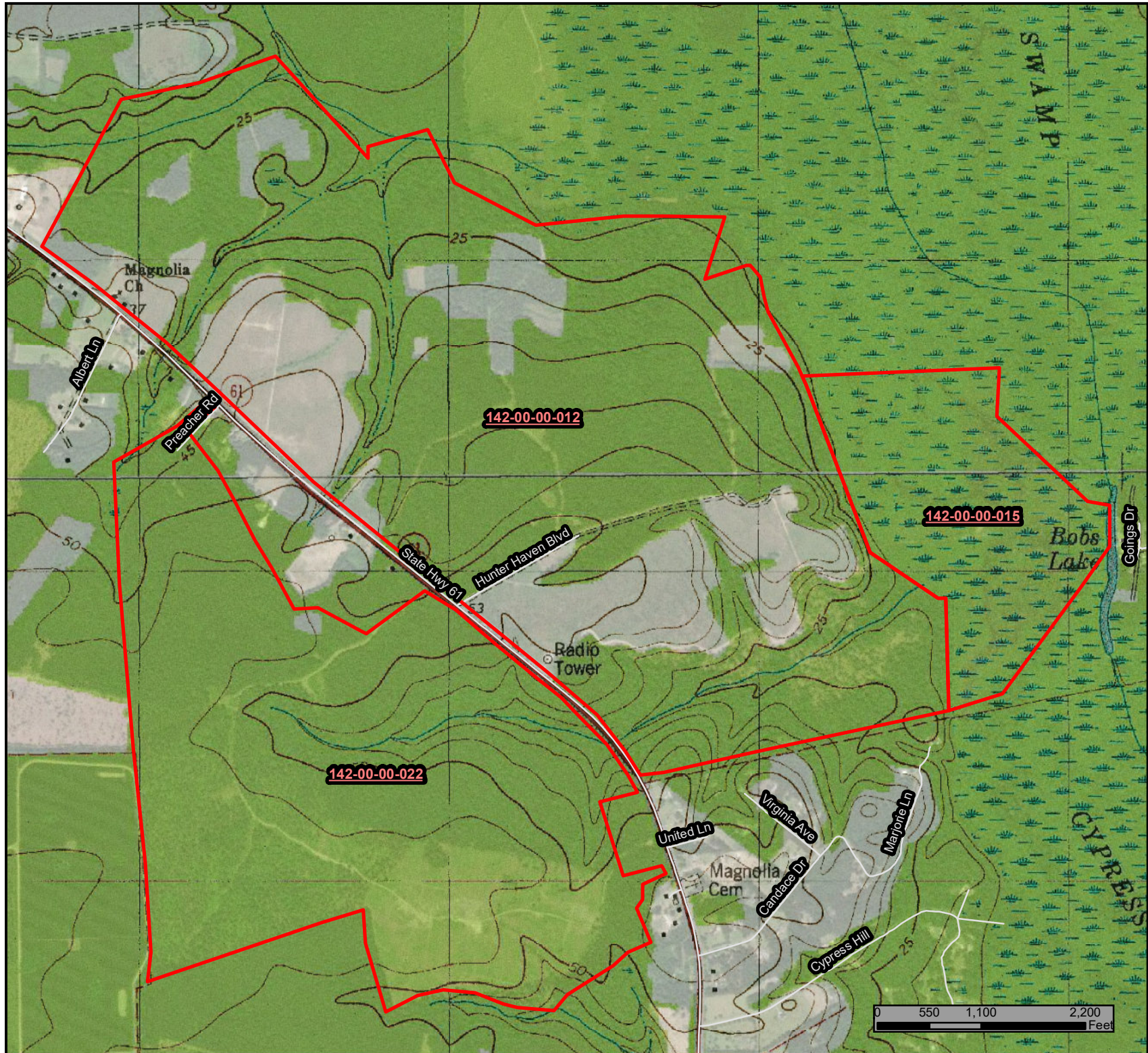
MT Land LLC  
Dorchester Co., SC



Legend

- Road
- Property

Drawn By: Trevor Hackney  
Reviewed By: Chris McGee  
Date: 1/21/19



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## **Attachment 4: General Soils Map**



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**Preliminary Soil Evaluation Map**

MT Land LLC  
 Dorchester Co., SC



**Soil Type**

- Br-Brookman clay loam
- Da-Daleville silt loam
- EpB-Emporia loamy fine sand
- EuA-Eulonia find sandy loam
- Gr-Grifton fine sandy loam
- IzA-Izagora silt loam
- Jd-Jedburg loam
- Mo-Mouzon fine sandy loam
- NoA-Noboco loamy sand
- Wa-wahee fine sandy loam

**Legend**

- Road
- Property
- Soil Type

Drawn By: Trevor Hackney  
 Reviewed By: Chris McGee  
 Date: 1/21/19

See Web  
 Soil Survey  
 report for soil  
 type  
 details.



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## **Attachment 5: Detailed Soils Maps**



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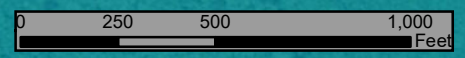
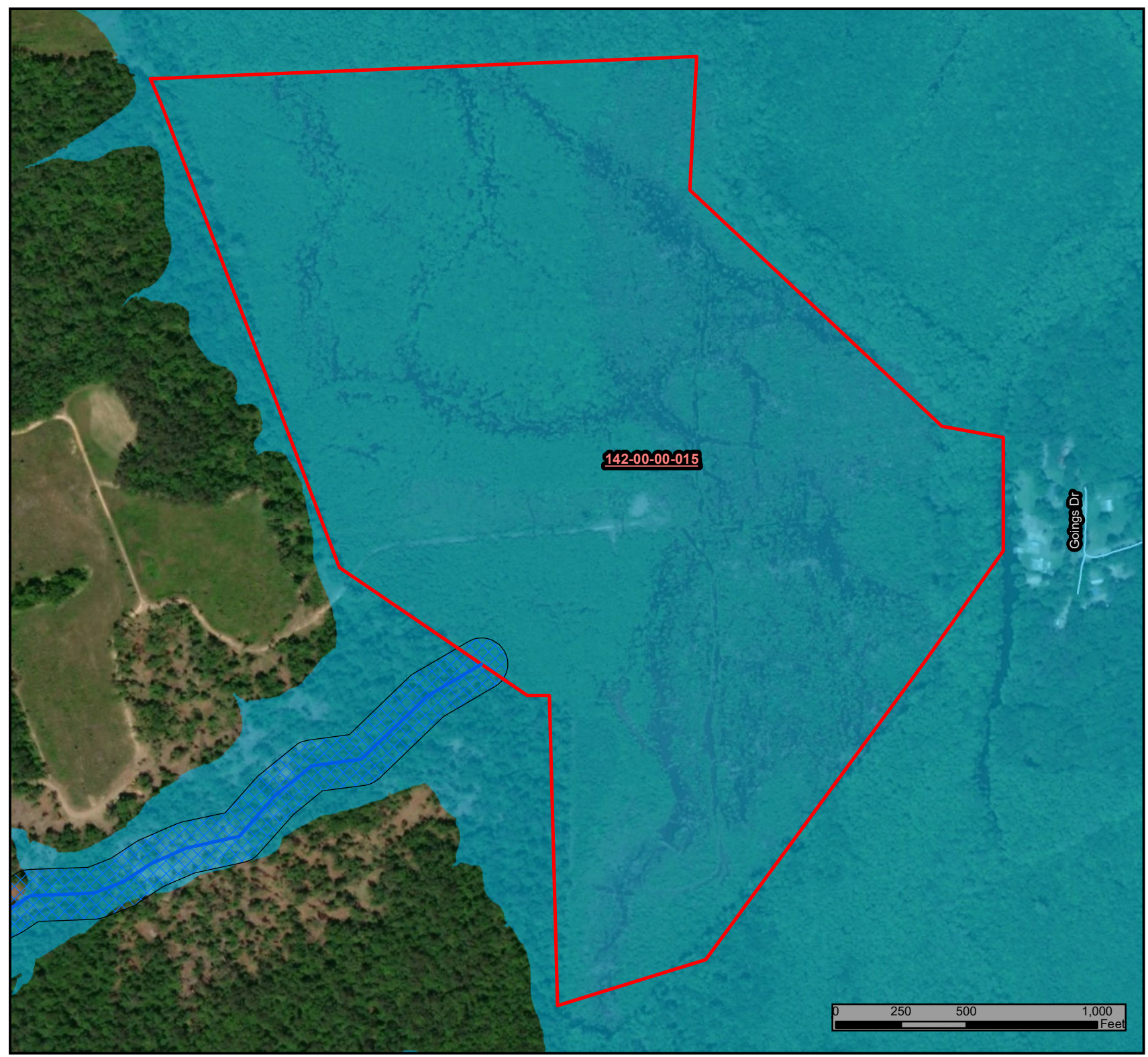
**Legend**

- Road
- Surface Water
- Surface Water Buffer 100'
- Property

**Flood Hazard (www.fema.gov)**

- AE (inside 100 yr. floodplain)
- X (outside 100 yr. floodplain)

Drawn By: Trevor Hackney  
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**Preliminary Soil  
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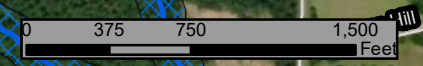
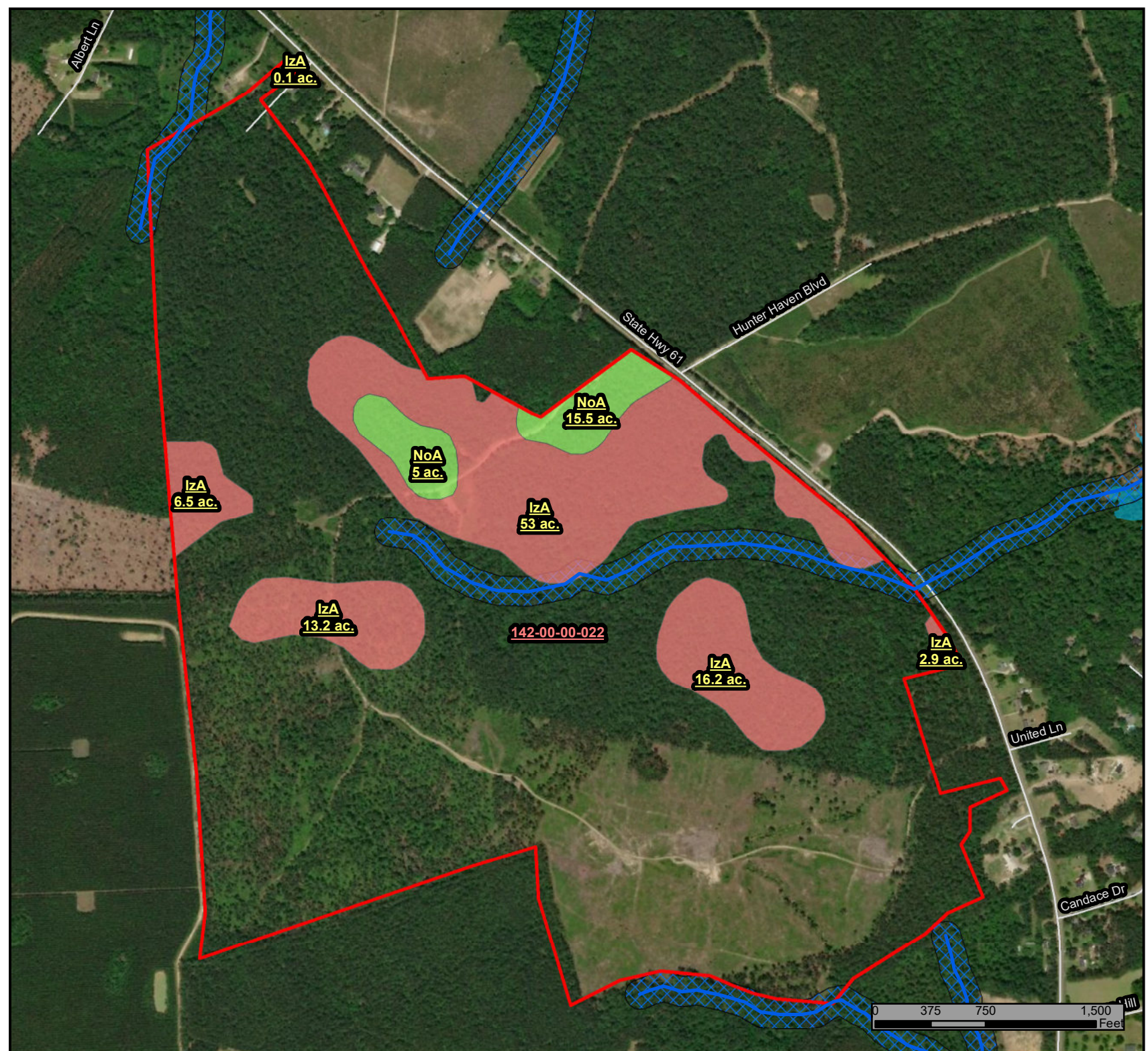
**Soil Type**

EpB-Emporia  
 EuA-Eulonia  
 IzA-Izagora  
 NoA-Noboco

**Legend**

- Road
- Surface Water
- Surface Water Buffer 100'
- Property
- Soil Type**
- Noboco
- Izagora/Eulonia
- Flood Hazard ([www.fema.gov](http://www.fema.gov))**
- AE (inside 100 yr. floodplain)
- X (outside 100 yr. floodplain)

Drawn By: Trevor Hackney  
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**Preliminary Soil  
 Evaluation Map**

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 Dorchester Co., SC



**Soil Type**

EpB-Emporia  
 EuA-Eulonia  
 IzA-Izagora  
 NoA-Noboco

**Legend**

- Road
- Surface Water
- Surface Water Buffer 100'
- Property
- Soil Type**
- Noboco
- Emporia
- Izagora/Eulonia
- Flood Hazard ([www.fema.gov](http://www.fema.gov))**
- AE (inside 100 yr. floodplain)
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### Preliminary Soil Evaluation Map

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Dorchester Co., SC



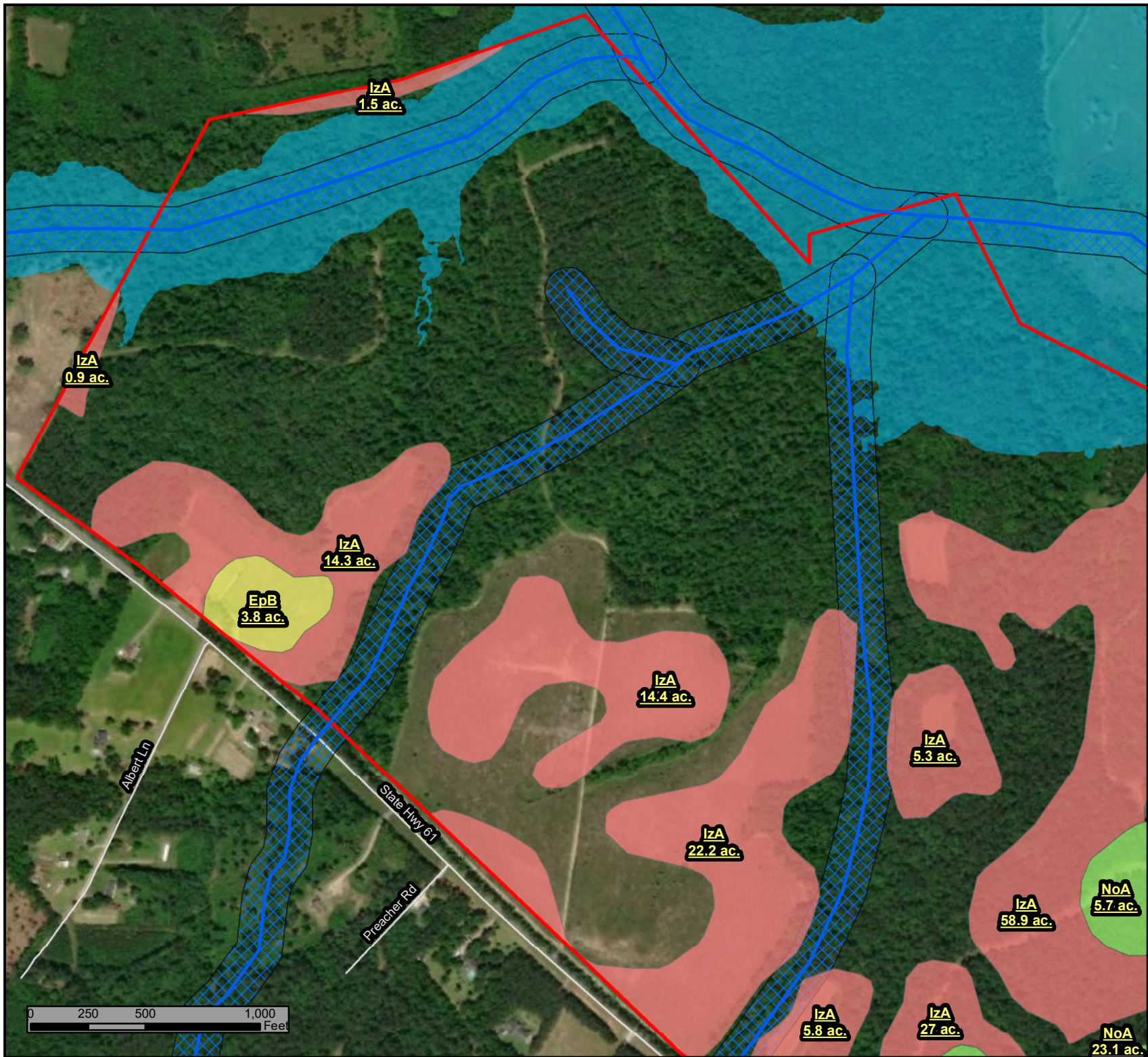
#### Soil Type

EpB-Emporia  
EuA-Eulonia  
IzA-Izagora  
NoA-Noboco

#### Legend

- Road
  - Surface Water
  - Surface Water Buffer 100'
  - Property
- Soil Type**
- Noboco
  - Emporia
  - Izagora/Eulonia
- Flood Hazard ([www.fema.gov](http://www.fema.gov))**
- AE (inside 100 yr. floodplain)
  - X (outside 100 yr. floodplain)

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## **Attachment 6: Proposed Detailed Evaluation Areas**



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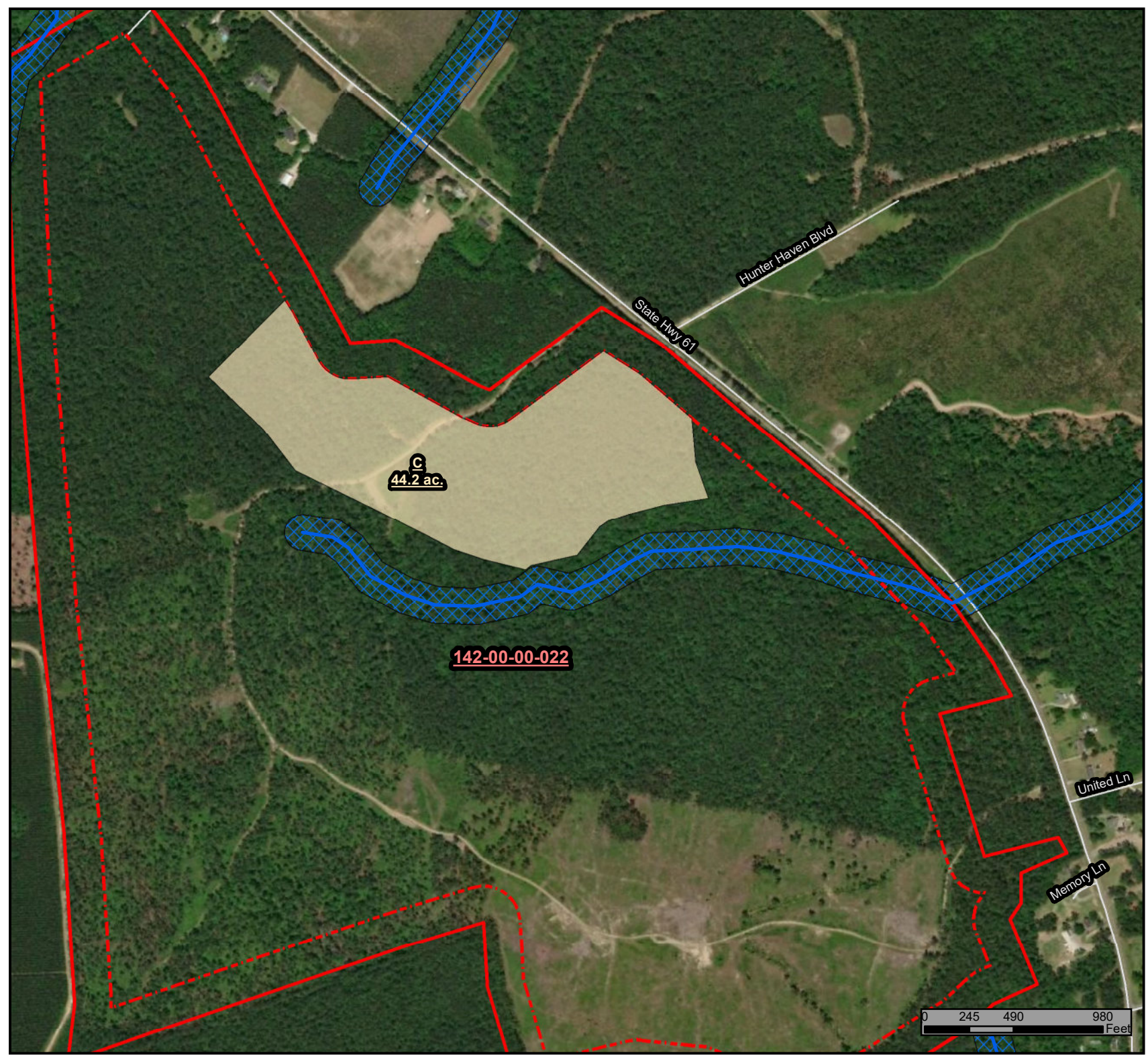
**Preliminary Soil  
Evaluation Map**

MT Land LLC  
Dorchester Co., SC



- Legend**
- Road
  - Surface Water
  - Evaluation Area
  - Property
  - Property Buffer 200'
  - Surface Water Buffer 100'

Drawn By: Trevor Hackney  
Reviewed By: Chris McGee  
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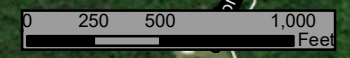
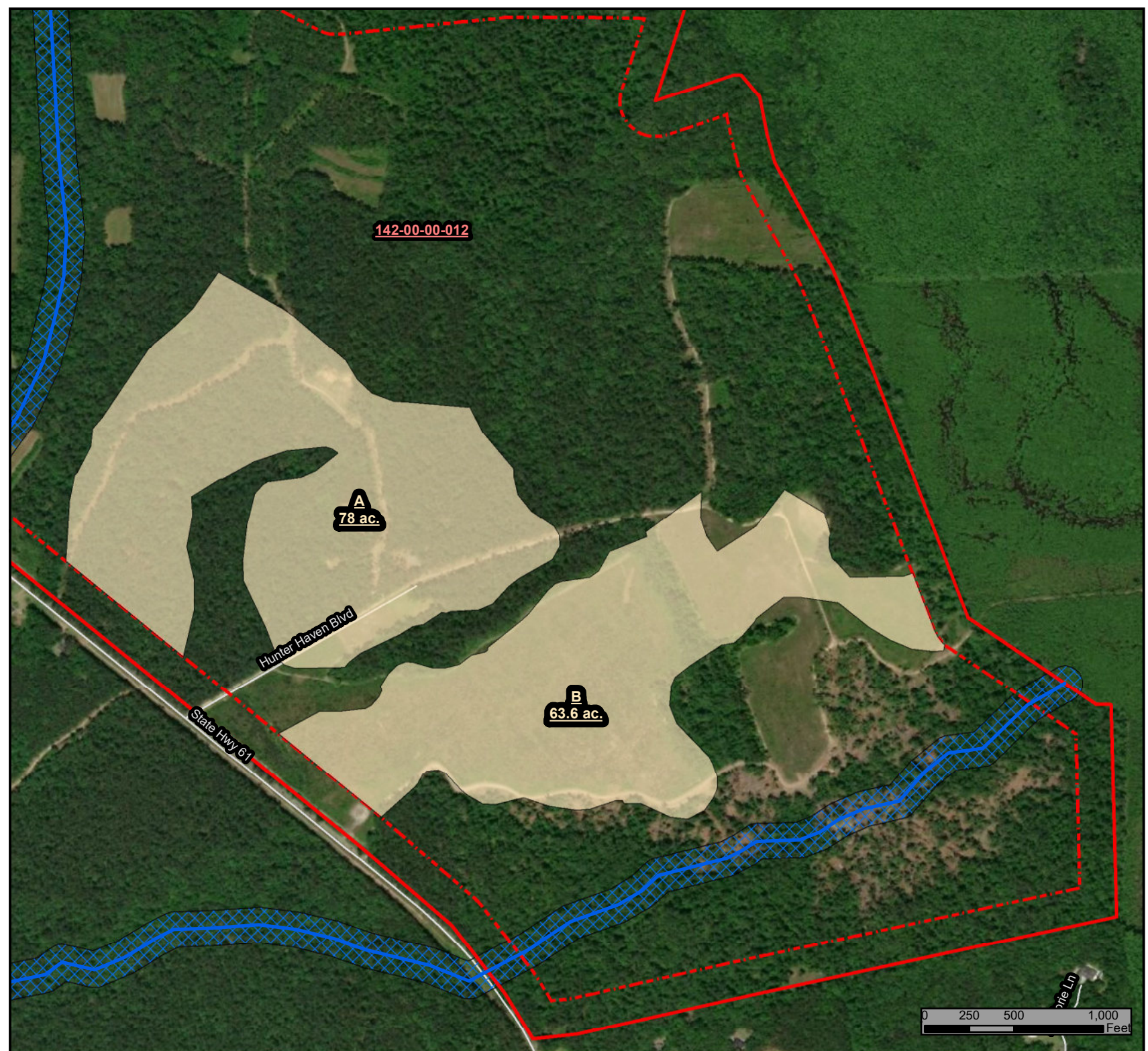
**Preliminary Soil  
Evaluation Map**

MT Land LLC  
Dorchester Co., SC



- Legend**
- Road
  - Surface Water
  - Evaluation Area
  - Property
  - Property Buffer 200'
  - Surface Water Buffer 100'

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