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A Comparison of Field Methods at Camp Lawton (9JS1)

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(Under the Direction of Sue M. Moore)

Camp Lawton was a Confederate POW Camp located in Jenkins County, Georgia during the latter part of the Civil War. This research uses shovel testing, metal detection, magnetometry, soil phosphate analysis, and terrestrial LiDAR scanning to attempt to ascertain which method, or combination of methods, is more effective on mid-19th century components in the Georgia Coastal Plain. Findings were inconclusive, but indicate that shovel testing and metal detection are the more effective methods. Data also suggest that areas of Confederate occupation at Camp Lawton probably covered a much larger area than previously anticipated.

INDEX WORDS:Index Term: Camp Lawton, 9JS1, Jenkins County, Magnolia Springs State Park, Bo Ginn National Fish Hatchery, Civil War, Shovel Testing, Metal Detection, Magnetometry, Phosphate Analysis, Terrestrial LiDAR, Archaeology

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Chapter 1 - Introduction

Located in what is now Magnolia Springs State Park and Bo Ginn Fish Hatchery in Jenkins County, Georgia, Camp Lawton (9JS1) was a Civil War prisoner of war camp. Considered the largest prison in the world in 1864, Camp Lawton was a 42 acre open stockade POW camp. Camp Lawton was planned as an alternate location to relieve over-crowding from Camp Sumter, commonly known as Andersonville. While conditions at Lawton were an improvement over Sumter, they were far from ideal. Camp Lawton began receiving prisoners in October 1864, was in use for six weeks, and eventually held a total of 10,299 prisoners. Of those 10,299 prisoners, 349 enlisted in the CSA military, and 285 worked at the prison as parolees (Jameson 2013:33). At least 486 prisoners, or approximately 5% of the prisoner population, died.

Research at the Civil War era site of Camp Lawton is an on-going archaeological project made possible through the cooperation of the Georgia Department of Natural Resources and the United States Fish and Wildlife Service and largely carried out by the faculty and students of Georgia Southern University. The project is a long-term endeavor to understand more about the lives of both guards and prisoners in Civil War POW camps and to increase public awareness of cultural resource preservation.

Since 2010, numerous undergraduate and graduate students have performed research and gained valuable experience at the site. Several Master's theses have been written on the site since that time. Much of the previous work has focused on the prisoner encampment area and the stockade (Chapman 2012; Gibson 2015; Morrow 2012). The following research attempts to use a variety of field methods to identify Confederate occupations associated with the site. This research is based in field methodology; traditional field methods, chemical analyses, and remote sensing are used in an effort to both identify Confederate occupations and to identify the method or combination of methods best suited to identify these kinds of archaeological deposits.

For reasons which will be explained in greater detail later, the methods chosen were shovel testing, metal detection, magnetometry, soil phosphate analysis, and terrestrial LiDAR scanning. Results show that metal detection and shovel testing were potentially the more effective methods for the archaeological deposits encountered at Camp Lawton. However, findings were inconclusive.

Chapter 2 - Civil War Prisoner of War Camps

Although the United States military had a number of military stockades and prisons prior to the Civil War and both the Union and Confederacy took ownership of these during the Civil War, these prisons were fewer and smaller in scale than what would be necessary throughout the war. In addition, there was no formal system to govern them on either side. This lack of proper facilities, and facility management, would prove to be a constant issue during the war, with more than 150 military prison camps eventually being established, all of which became filled beyond capacity in excessively unhealthy conditions (Jameson 2013:25). This lack of planning was largely due to the belief shared by both sides that the war would result in relatively few casualties and be over before the end of 1861. This paradigm was shifted by the First Battle of Bull Run, or First Manassas, on July 21st, 1861.

The number of prisoners captured during Bull Run alone was sufficient to fill existing prisons and jails. Field commanders largely followed the tradition of paroling prisoners immediately following a battle, forcing them to sign an oath swearing to return home and not take part in further military action. This was the official position of neither the Union nor the Confederacy, however, and facilities to house prisoners quickly filled beyond their intended capacity. New facilities were constructed to contain this massive influx of prisoners of war, with large commercial buildings being retrofitted for incarceration. These new buildings were rushed and little forethought was given to the sanitation needs of such large numbers of prisoners. Consequently, disease was prevalent. In fact, starvation and disease would be fundamental factors in prisoner survival; figures from the end of the war estimate that 15.5% of Union prisoners and 12.1% of Confederate prisoners did not survive internment (Derden 2012:17).

It was not until a year after Bull Run that a formal system of exchange was agreed upon and implemented by the governments of the Confederacy and the Union, on July 22nd, 1862. Not wishing to confer legitimacy to the sovereignty of the Confederate States of America, President Lincoln initially refused to negotiate the matter. It was not until both Northern and Southern newspapers created a public fervor by publishing letters from prisoners that negotiations began. The exchange system appeared to be a decent solution, and overcrowding was slowly alleviated, until the system broke down (Derden 2012:19).

Later in 1862, Jefferson Davis refused to exchange African American prisoners, sparking tensions with the Union. This eventually led to US Secretary of War Edwin Stanton refusing the exchange of commissioned officers in December 1862. Further complicating issues of the prisoner exchange system were the major Confederate defeats at Gettysburg, Vicksburg, and Port Hudson (Davis 2010:16). The influx of Confederate prisoners from these defeats led to an advantageous imbalance in the number of captives for the Union. Realizing the Union had the upper hand in parole negotiations, Secretary Stanton decreed that no more exchanges would be made. The only exception would be 10,000 Confederate prisoners from Vicksburg, to balance the numbers (Bearss 1970:4). By May 1863, all exchanges were cancelled (Bearss 1970:12). The number of prisoners held by both sides skyrocketed after the cessation of the prisoner exchange system, with the Union holding approximately 67,500 prisoners and the Confederacy holding approximately 50,000 prisoners by August 1864 (Davis 2010:16). Soon, the number of prisoners held indefinitely at the Belle Island and Libby prisons in Richmond, Virginia became a cause for concern, both in terms of the foodstuffs being consumed by inmates as well as public fear of the chance of mass escape (Davis 2010:17). For the South, the lack of a plan to deal with the volume of incoming prisoners resulted in numerous hasty decisions, many of which were costly for the Union prisoners.

During the last two years of the war, the primary construction plan for Confederate prisons was an open stockade, almost universally constructed near the confluence of multiple rail lines. The size, shape, and internal layout of each was variable, but the construction style was often uniform in Georgia (Leader 1998:16). These stockades were constructed by placing logs or milled timbers vertically in a trench to form the enclosure in which prisoners would be held. While this was the fundamental construction method for these open stockades, it should be noted that stockade wall height, trench depth, the source of labor, and the preparation of the logs differed from camp to camp (Avery and Garrow 2008; Gibson 2015).

The open stockade camps were inexpensive and able to be constructed quickly, but not without significant disadvantages. Prisoners suffered constant exposure to the elements. This, combined with lack of medicine, clean water, and adequate food, as well as abysmal sanitation conditions, led to an incredible death toll.

By the time Camp Lawton opened in October of 1864, the Confederacy was already facing multiple difficulties in terms of both military victories and the movement of supplies. Camp Sumter had opened in late February of 1864, but an unanticipated amount of prisoners combined with mounting Confederate military defeats would stretch supplies beyond the breaking point.

As other military prisoner of war camps were constructed later in 1864, the situation had become bleaker for the Confederacy. Ulysses S. Grant had been appointed lieutenant general over all Union armies in early March. Later that month, General Nathaniel Banks had begun the Red River Campaign. The goal of this campaign was to strike deeply into several parts of the

Southern interior using joint army and naval military action. Finally, Sherman had taken Atlanta, secured his supply lines, and devastated the Army of Tennessee. Sherman faced virtually no opposition during his March to the Sea, which began in mid-November 1864. Facing an overwhelming military force and scarce supplies, Camp Lawton was abandoned after just six weeks of operation.

Chapter 3 - The Archaeology of Civil War Military Prisons

Firsthand accounts of Civil War prisons were published as early as 1865 and remained popular in the following decades. In 1865, Sydney Andrews toured the South investigating and chronicling prison camps for the Chicago Tribune and Boston Advertiser (Andrews 2004). In some cases, such as the Florence stockade in South Carolina, many structures were still standing, and Andrews was able to provide a descriptive account.

Historical documentation is not the sole means by which information concerning Civil War prison camps can be gathered. Archaeological investigations and examinations of artifact assemblages may offer significant insight into a number of activities (Mytum and Carr 2013:7). These include but are not limited to data regarding layout and construction of the camp as well as construction and function of associated structures and information on diet, hygiene, and use and discard of artifacts. This is possible in spite of the inherent difficulties involved with gleaning information about prisoners or the camps themselves, such as short lengths of operation and distribution of features.

Then as now, the general population had more interest in the prisoners incarcerated at these facilities more so than the captors or the camps themselves. This scrutinizing of prisoners and their daily lives at the expense of a broader understanding of military prisons has plagued both historians and archaeologists. Even today, archaeological investigations of Confederate military prison camps focus almost exclusively on the prisoners and few surveys have attempted to identify associated camp structures or areas of Confederate activities beyond the walls of Civil War prisoner of war camps (Avery and Garrow 2008:3, Mytum and Carr 2013:8).

Because of this, there are few comparative sites that can provide relevant archaeological data for this research. Below is a discussion of previous work at Camp Lawton, followed by descriptions of work at the Florence stockade in Florence, South Carolina and Camp Sumter near Andersonville, Georgia.

<u>Camp Lawton (9JS1)</u>

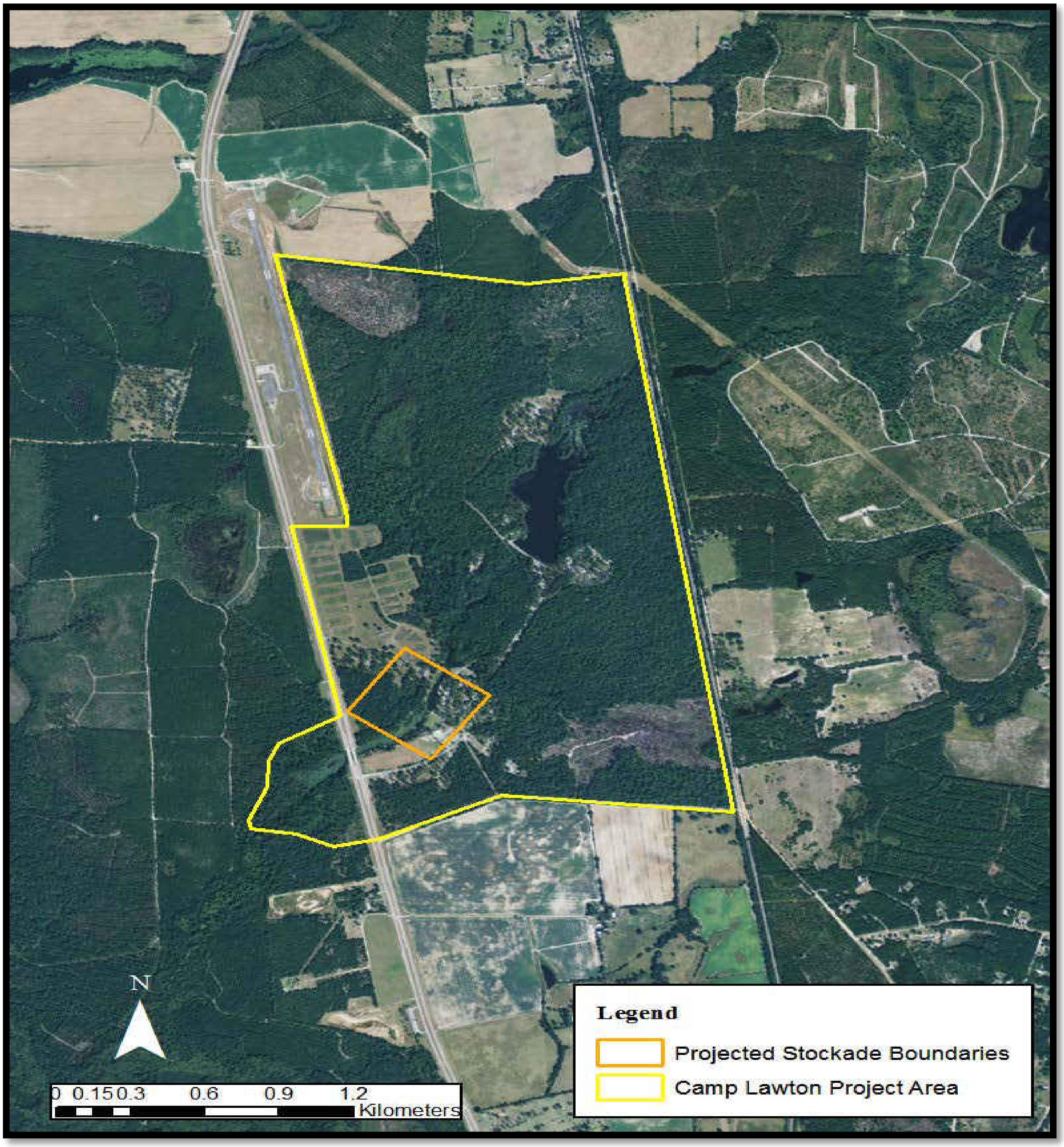


Figure 1: Camp Lawton Project area

Lawton was one of several Confederate prisons planned by General John Winder, commander of the Confederate Prisoner of War system for Georgia and Alabama. Winder's map of the stockade layout (Fig. 2) is minimalistic and does not include associated structures or areas of activity.

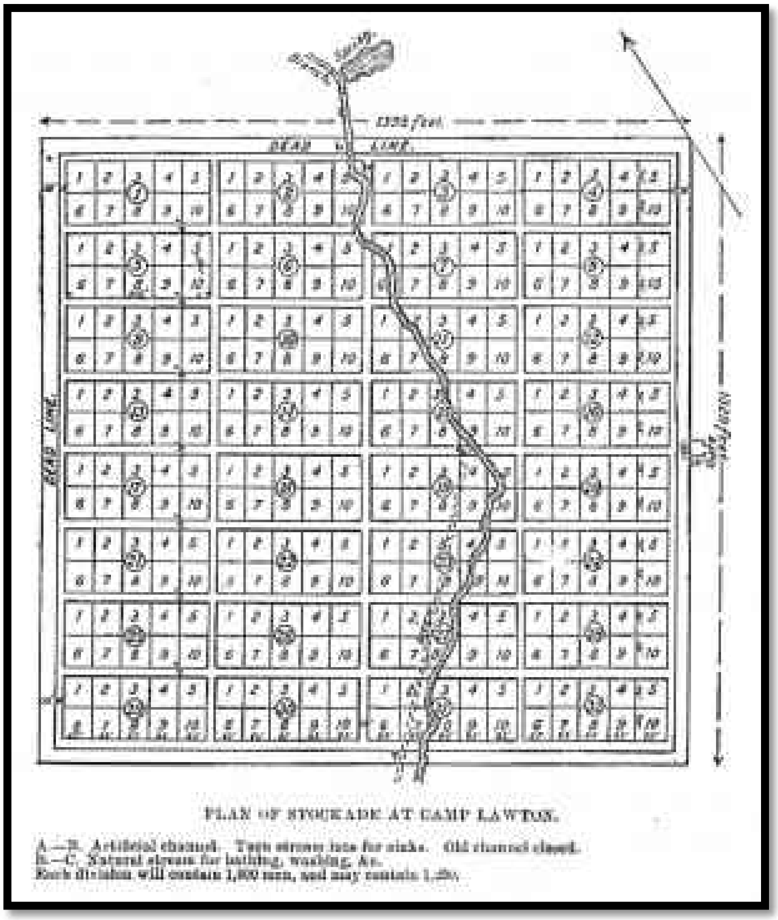


Figure 2: Winder's plan for the Camp Lawton stockade

However, we know of several types of structures associated with the prison. These include officers' quarters, enlisted men's barracks, and two hospitals (Derden 2012:58). The hospitals were located west and downstream from the spring creek. On the southern side of the spring creek stood the hospital for the Confederate guards, while the hospital for Union prisoners was located on the northern bank. This prisoner hospital was associated with a mass grave for the prisoners. Roughly 800 sets of human remains were later exhumed and reinterred at Beaufort National Cemetery (U.S. Department of Veterans Affairs 2015).

Historical documentation in the form of watercolor paintings has so far been the most informative, as far as extra-stockade structures and areas of Confederate activity. These paintings are the product of a prisoner incarcerated at Camp Lawton, Robert Knox Sneden. Sneden was a Union soldier from New York who was captured on November 27, 1863 near Brandy Station, Virginia (Sneden 2000b: 1-191). He was held at a number of Confederate prisons, including Camp Sumter, Camp Lawton, and the Florence stockade. While at Camp Lawton, Sneden worked as a parolee at the Union hospital (Sneden 2000b; Sneden 2000c). His ease of access to areas outside of the stockade allowed him to observe the layout of the surrounding area, which he would paint after the war. He attempted to get them published as a book, but this would not happen until 2000 (Sneden 2000a).

Herein lies one of the fundamental problems with Sneden's work. Although he made sketches while imprisoned, his watercolors were painted over a period of several years after the end of the war. This casts some doubt as to the validity of structure placement, size, and number. Additionally, Sneden was a cartographer for the Union army, but his paintings lack any true sense of scale. Finally, one must always concede the possibility that Sneden's works were never meant to be truly authentic. Indeed, the bulk of the surrounding structures appearing in his maps may have simply been placed in the rough vicinity of where clusters of structures had been. Therefore, his paintings must be examined with a critical eye.

Sneden's maps do show some level of accuracy that must be acknowledged. His paintings of the interior of the stockade do largely reflect what has been identified archaeologically (Sneden

2000a:269; Sneden 2001:224-226; Chapman 2012; Elliott and Battle 2012). Some surrounding areas can potentially be regarded with the same level of accuracy as well. For example, given his parolee position as an assistant at the Union hospital, it is likely that Sneden would be able to accurately represent this structure as well as others he would have encountered along the road. The opposite of this may be true as well, however. For instance, Sneden shows a small cluster of structures and a powder magazine located within the Camp Lawton earthen fort, although he very probably was never allowed inside the fort area. Nevertheless, Sneden's paintings offer a visual representation of the surrounding area and are a place to start investigations of structures and areas of activity associated with the site.

In late November, only six weeks after opening for operation, General Winder began evacuating prisoners from Camp Lawton to other camps such as Blackshear, Florence, and Savannah, in order to avoid their liberation by the forces of General Sherman, who was engaged in his March to the Sea. The camp was abandoned soon thereafter. Sherman's men did indeed encounter Camp Lawton, which they burned. The remaining salvageable materials of the camp were then taken by the local population once the Confederate and Union military forces had left the area (Derden 2012:128-163).

It was not until the early-mid 20th century that any activity outside of farming was seen in the area. It was at this time that the mayor of Millen, Georgia, Walter Harrison, pushed to have the site made into a public park. Magnolia Springs State Park was established in 1939, with work performed by the Civilian Conservation Corps (CCC) (Derden 2012:206-207). Records of the CCC activity at the site have so far not been located, and their impact on the integrity of Camp Lawton is largely unknown. However, there is some information concerning the CCC works.

Aerial photographs from 1941 show the establishment of a CCC camp west of where the stockade wall had been, where test Area 5 of this thesis research was conducted (Fig. 3). The full extent of this camp and its function are currently unknown.

Figure 3: 1941 aerial photograph of CCC camp overlaying modern imagery

While the bulk of the work completed by the CCC is unknown, there are some significant activities of which we are aware. Buildings and facilities relating to the construction of Magnolia Springs State Park as well as barracks for workers were erected. Other activities included dredging and widening the spring creek, with the dredged soils deposited as overburden in an adjacent field to the south. Additionally, the CCC created a new entrance into the earthworks fort at some point after 1941 (Fig. 3). This was done by removing a portion of the northern wall and filling in the original entrance, on the southern portion of the fort. This was likely for tourist access.

Initial archaeological investigations of Camp Lawton began in 1975 with the work of Georgia Department of Natural Resources historian Billy Townsend (1975). In his report, Townsend proposed a potential location and orientation of the stockade walls. His prediction was largely accurate, despite having no physical evidence.

In 1976, Georgia Department of Natural Resources archaeologist John R. Morgan recorded Camp Lawton in the state archaeological file as 9JS1 (1976). That same year, he and fellow Georgia Department of Natural Resources archaeologist Marilyn Pennington filed to have Camp Lawton listed on the National Register of Historic Places (Morgan and Pennington 1976). The boundaries initially proposed would not have covered the full extent of what is now known to be the stockade boundaries, but a revised National Register of Historic Places form was submitted by Morgan (1978). The proposed updated boundaries would encompass the full extent of Camp Lawton's stockade.

A survey for the widening of state highway 25 performed by Jannie Loubser in 1997 revealed two additional earthworks associated with the Confederate occupation at Camp Lawton, on the western side of the highway (Loubser 1997a; 1997b). The expansion of highway 25 into a four-lane highway has damaged the earthworks reported by Loubser (Elliott and Battle 2010:24); there is a possibility that the initial construction of the highway could have compromised the integrity of structures or assemblages associated with Camp Lawton (Wheaton 2000).

In 2005, a report for the Georgia Department of Natural Resources, Parks and Historic Sites Division by Georgia Department of Transportation archaeologist Shawn Patch included a ground-penetrating radar survey (2006). A long linear feature and clear geologic disturbance was noted immediately south of the park's spring creek. Patch accurately predicted this feature to be a section of the stockade wall and recommended further investigation.

Georgia Department of Natural Resources, Historic Preservation Division archaeologists Christine Neal and Jennifer Bedell performed more research on the linear feature in 2007 (Neal and Bedell 2007). Two trenches were excavated. Each was one shovel-blade wide, five meters in length, and one meter in depth. One trench found no archaeological remains, but the other revealed burned wood. Neal and Bedell interpreted this to possibly be part of a pikeline for the defense of gun embankments.

In 2010, the LAMAR Institute performed a combined ground-penetrating radar and metal detection survey of Camp Lawton (Elliott and Battle 2010). Elliott's ground-penetrating radar survey was able to accurately predict the location and orientation of the stockade walls, and Battle's metal detection survey yielded several artifacts associated with the Confederate occupation. Elliott and Battle provided the initial data necessary for Georgia Southern University to move forward with more testing.

The first report by Georgia Southern University for the Camp Lawton Project began in 2010 with the field work of Master's student, Kevin Chapman (2012). After Elliott and Battle showed successfully that metal detection surveys could be useful at Camp Lawton (2010), Chapman combined shovel testing and metal detection to attempt to locate areas of prisoner occupation at Camp Lawton. Chapman was able to locate a large artifact scatter in the federally-owned hatchery land north of the spring creek. Chapman noticed that the dense scatter of artifacts conspicuously terminated at a certain point, in a linear fashion. He predicted that this abrupt termination coincided with the location of the stockade's northwestern wall.

Georgia Southern University Master's student Amanda Morrow (2012) examined the chemical microenvironment of a portion of the Camp Lawton Project area. Morrow used handheld X-ray fluorescence (XRF) to examine and compare the chemical nature of the soil matrix and corrosion of ferrous objects recovered from Camp Lawton. Her examination of the soil chemical properties at Camp Lawton may in time lead to more effective methods of stabilization, treatment, and conservation of recovered artifacts.

Later field work performed by Georgia Southern University Master's student Hubert Gibson (2015) would focus on other sections of the stockade wall. The focus of Gibson's research was to attempt to identify the full extent of the stockade walls, as well as methods of construction. His findings suggest the use of slave labor for most of the construction on site.

Public Broadcasting Service and Oregon Public Broadcasting television show Time Team America performed ground-penetrating radar, magnetic gradient, conductivity, and magnetic susceptibility surveys at Camp Lawton in 2012 (Fig. 4). The report is forthcoming at the time of writing.

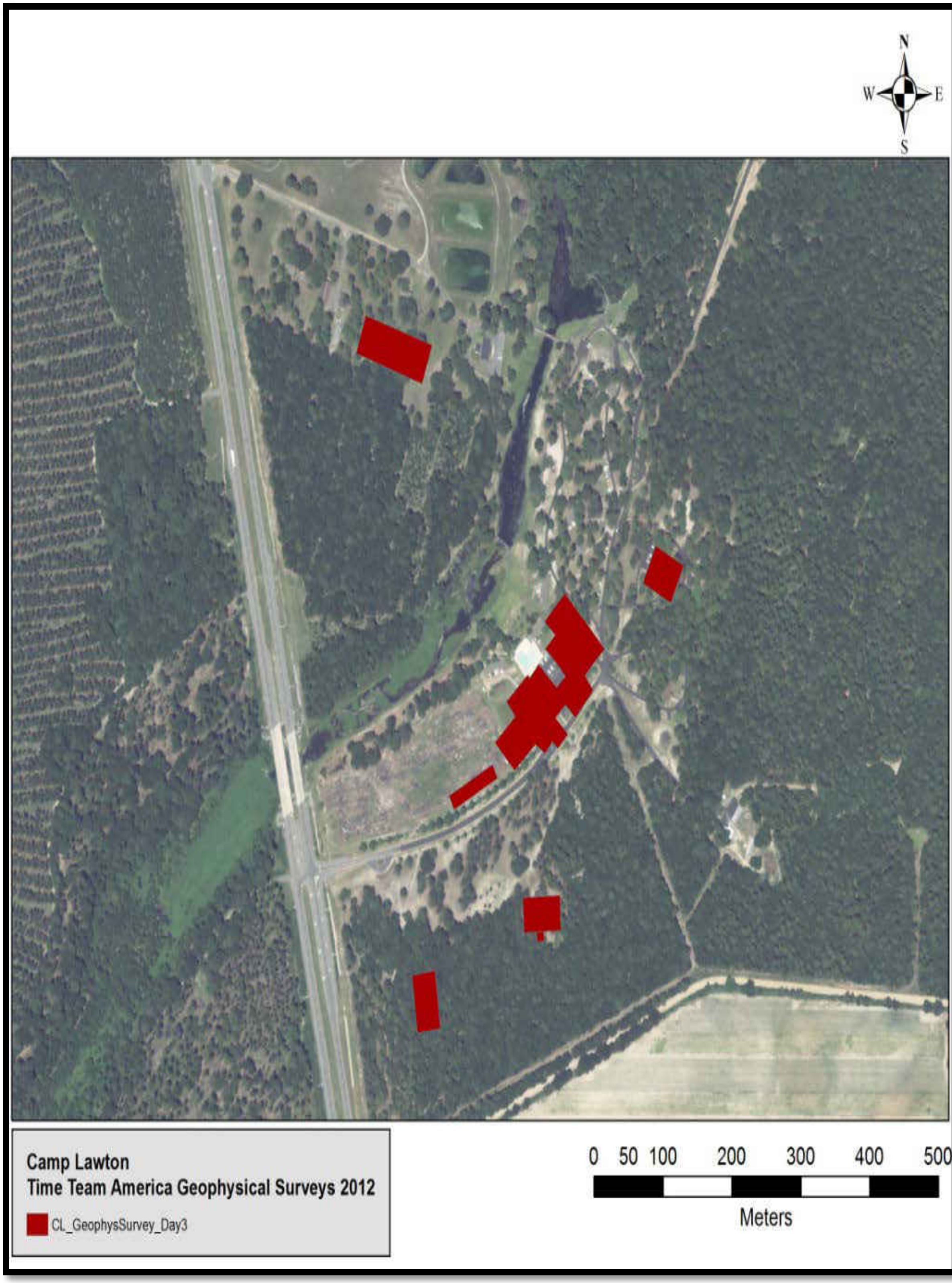


Figure 4: Time Team of America survey areas

Georgia Southern University professor Dr. Lance Greene was hired as Director of the Camp Lawton project in fall 2012. His research interest focused on the lives of prisoners and their areas of occupation. His work has so far yielded significant results, identifying several features associated with prisoners' huts. These huts were generally small holes dug into the ground with crude or makeshift implements for the prisoners to lie within. They would then cover themselves with a simple blanket or attach a blanket to supporting sticks to act as a roof and protect them from the elements (Derden 2012:73).

Greene has also excavated a portion of one of the brick ovens erected within the stockade. These ovens were intended by the Confederacy for prisoner use, though evidence indicates that prisoners adopted some unorthodox use of the ovens. There are contemporary accounts that prisoners would sleep in the ovens, in addition to standard cooking practices. The recovery of bricks from some shebang features would also indicate that some prisoners were able to recover some bricks from the ovens for use in their own individual areas of occupation (Greene 2013:8, 11).

Florence Stockade (38FL2)

Of the two comparative sites examined for this research, the prisoner camp at Florence, South Carolina is the most relevant. This is due to the similarities between the Florence stockade and Camp Lawton. Like Camp Lawton, the Florence stockade was also planned by General John Winder as part of the same Confederate prison network during the latter part of the Civil War. More directly related to this research are the similarities in physical characteristics shared between the two sites (Fig. 5): both Florence and Lawton were roughly the same shape, though Lawton was considerably larger. Each also had a stream bisecting the stockade. Additionally, the lives of prison guards were similar at both camps due to the lack of supplies and materials available near the end of the war (Avery and Garrow 2008; Derden 2012). Confederate military prisons in the Southeast tended to have a general layout (Leader 1998:16). The stockades in Millen and Florence were planned by the same man, operated at a similar point in the Civil War, and shared many of the same prisoners (McElroy 1969; Sneden 2000a, 2000b, 2001). It is reasonable to expect areas beyond the stockade walls at Florence to be analogous with Lawton. As such, an examination of archaeological data outside the Florence stockade could potentially provide substantial information on the lives of Confederate soldiers such as the types of architecture and material culture they employed at Camp Lawton. These comparative data were used to choose the field methods used in this study.

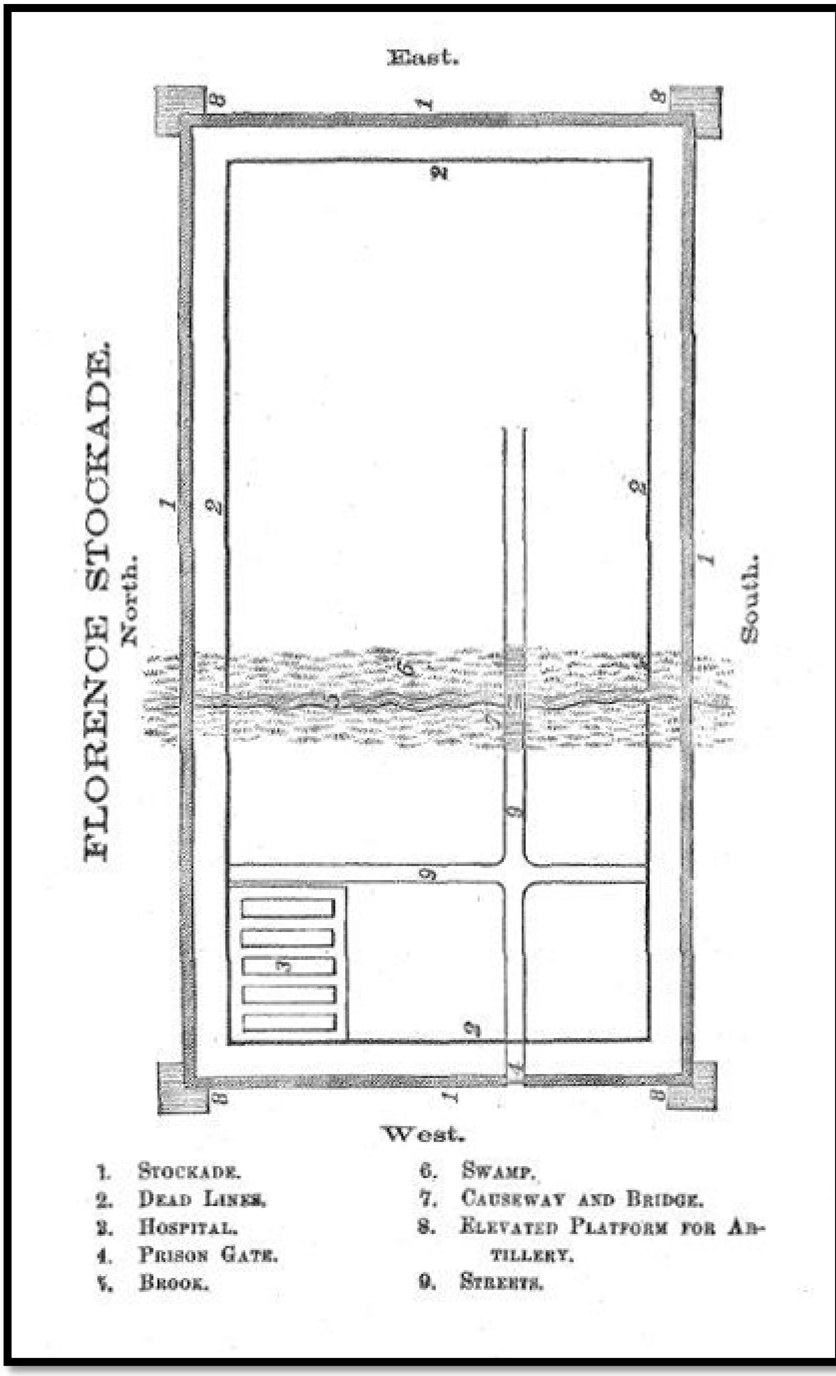


Figure 5: Plan for the Florence Stockade

The Civil War POW camp in Florence, South Carolina (38FL2) opened on September 15, 1864 and closed no later than February 22, 1865 (Leader 1998:14). The camp covered approximately 23 acres and housed over 15,000 Union prisoners before it was abandoned. The stockade had palisade walls with a perimeter of 1,400 feet x 725 feet and posts stood approximately 12 feet above the ground surface. Like Andersonville, the Florence stockade was constructed using slave labor (Avery and Garrow 2008:28). Similar to Camp Lawton, Florence was also constructed to ease over-crowding in other prisons, particularly Andersonville. It also served the purpose of removing prisoners of war from the front lines and appeased Charleston city officials who blamed Union prisoners for an outbreak of yellow fever in the city. However, by the time the Florence stockade was in operation, the erosion of Confederate logistics was too severe to provide adequate supplies for prisoners as well as guards (Leader 1998:14).

Archaeological investigation of the Florence stockade began on June 9th, 1997 when South Carolina Institute of Archaeology and Anthropology (SCIAA) archaeologist Dr. Jonathan Leader conducted an investigation of the western portion of the stockade wall for the City of Florence. Mechanical stripping uncovered portions of the northern and western walls of the stockade, as well as support structures for a gate and associated artillery emplacement (Leader 1997).

Further archaeological investigation took place in 2005 when the National Cemetery Administration (NCA) began clearing nearby land for an expansion of the Florence National Cemetery. MACTEC Engineering and Consulting hired TRC to conduct Phase II archaeological investigations of the area (Grunden and Holland 2005). Phase II testing involved mechanical stripping of the plowzone in trenches measuring 2.5 m wide by approximately 36 m long, which revealed 149 potential cultural features (Grunden and Holland 2005).

In 2008 Paul Avery and Patrick Garrow performed a Phase III survey at the site. Their work focused primarily on Confederate structures outside of the stockade walls. Findings of the survey show that Confederate activity was largely similar to what one would expect from the prisoners (Avery and Garrow 2008:261). Contemporary accounts from one guard, Second Lieutenant Thomas J. Eccles, state that while not on duty soldiers were busy constructing and maintaining shelters, policing the camp, preparing food, maintaining equipment, and mending clothes (Avery and Garrow 2008:277).

Work at the Florence stockade yielded 521 features. Of these, 149 were revealed from phase II testing (Grunden and Holland 2005) and 372 from phase III excavations. In total, 179 features were excavated and the artifacts from each were placed into one of eight categories based on the Carolina Artifact Pattern created by Stanley South (Avery and Garrow 2008:63; South 1978). These categories were grouped by Architectural, Activities, Arms, Clothing, Furniture, Kitchen, Personal, and Tobacco Pipe.

Of the eight categories used by Avery and Garrow, the architectural and kitchen groups are the most relevant to this research. Therefore, features included within these groups will be examined. There were eight excavated features associated with structures (features 85, 93, 95, 212, 216, 221, 223, and 540).

Feature 85 was a hearth determined to have been associated with a small cabin or hut with a likely area of 48 square feet. There were 137 artifacts found within Feature 85. Sixty-nine artifacts, 50.36% of the total, fell into the activities group. However, most of these were unidentified fragments of iron or tin. The architectural group contained 49 artifacts, or 35.77%. The arms group included 13 artifacts (9.49%), the clothing group contained five artifacts (3.65%), and the personal group contained one artifact (0.73%) (Avery and Garrow 2008:70-71).

Feature 93 was likely a small cabin or hut with a stove. The structure likely measured 10ft. by 7ft. and had an approximate surface area of 70 square feet. There was a total of five artifacts recovered from the feature, with only two being diagnostic. Both diagnostic artifacts were nails, one cut and one wrought (Avery and Garrow 2008:71)

Feature 95 was interpreted to have been a cabin, in spite of the presence of a human burial within the feature. The cabin was determined to have had an area of approximately 50 square feet. There was no evidence of a hearth or stove associated with this structure. In addition to a human skeleton, 49 artifacts were recovered from the feature. Of these, the clothing group made up the majority with 22 artifacts, or 44.9%. The architectural group constituted 30.61% with 15 artifacts, the arms group contained five artifacts (10.2%), the kitchen and activities groups each contained three artifacts (6.12% each), and the tobacco pipe group contained one artifact (0.02%) (Avery and Garrow 2008:71-75).

Feature 212 was a large hut with an area of approximately 64 square feet. The feature contained 117 artifacts, 66 (56.41%) of which were not diagnostic. The activities group contained 67 artifacts (57.26%), the architectural group contained 32 artifacts (27.35%), the kitchen group contained 10 artifacts (8.55%), the arms group contained seven artifacts (5.98%), and the clothing group contained one artifact (0.85%) (Avery and Garrow 2008:75-78).

Feature 216 was a hut near to feature 212 with a similar surface area. The feature contained 99 artifacts, seven (7.07%) of which were not diagnostic. The architectural group yielded the largest amount of artifacts for feature 216 with 47 (47.47%). The kitchen group contained 40 (40.4%) artifacts, the activities group contained eight (8.08%), and the arms group contained four (4.04%) (Avery and Garrow 2008:78-79).

Feature 221 was a larger hut with an approximate area of 80 square feet. The feature contained 91 artifacts, 24 (26.37%) of which were not diagnostic. The architectural group contained 39 (42.86%) artifacts, the kitchen group contained 22 (24.18%) artifacts, the activities group contained 21 (23.08%) artifacts, the personal group contained five (5.49%) artifacts, the arms group contained three (3.3%) and the clothing group contained one (1.1%) artifact (Avery and Garrow 2008:80).

Feature 223 was a hut of similar form to features 212 and 216, except with a noticeably larger area of approximately 100 square feet. The feature contained 211 artifacts, 12 (5.69%) of which were not diagnostic. For the feature, the architectural group contained 116 (54.98%) artifacts, the kitchen group contained 54 (25.59%), the arms group contained 18 (8.53%), the activities group contained 12 (5.69%), the clothing group contained six (2.84%), and the personal group contained five (2.37%) (Avery and Garrow 2008:80-83).

Feature 540 was the largest structure identified in the survey, with an approximate area of 140-150 square feet. The feature appears to have remained open a period of time after its abandonment, and was at least partially filled by natural processes (Avery and Garrow 2008:84). Feature 540 yielded 390 artifacts, 115 (29.49%) of which were not diagnostic. Artifacts recovered from the feature included 139 (35.64%) artifacts from the architectural group, 129 (33.08%) from the kitchen group, 102 (26.15%) from the activities group, eight (2.05%) from the arms and personal groups, five (1.28%) from the tobacco group, and three (0.77%) from the clothing group (Avery and Garrow 2008:84-88).

An examination of these features associated with structures at the Florence stockade is the most important comparative data available for this research. The investigations into Confederate loci at the Florence stockade can potentially yield valuable insights into the sorts of features and artifact assemblages one could reasonably expect to encounter at Camp Lawton. If the anticipated similarities between the Camp Lawton and the Florence stockade hold true, one would expect to see many structures associated with the Confederate occupation. The eight features excavated at Florence which were associated with structures covered a distance of several hundred meters from the stockade. Therefore, investigations at Camp Lawton should not feel pressured to investigate only areas immediately beyond the stockade boundaries. In fact, the closest structure identified at Florence was approximately 250 meters north of the stockade walls. Further, the project area for the phase III survey at Florence was positioned slightly north of where the stockade's northwest corner had been. It is possible that structures could have been placed along all sides of the stockade, spanning out several hundred meters in all directions.

Using this information, if architectural features are uncovered are Camp Lawton, comparing the size and architectural styles to those uncovered at the Florence stockade may help form a clearer picture of the Confederate layout. Further, the research performed at the Florence stockade has revealed artifact assemblages which would likely be encountered in Confederate loci uncovered at Camp Lawton. Ferrous artifacts are expected, but the recovered artifacts from features at the Florence stockade suggest one would expect to specifically see a large amount of artifacts related to either architecture or arms. Specifically, cut nails and ammunition contemporary with the mid-19th century are likely to be present in areas associated with Confederate occupation.

Camp Sumter

Camp Sumter, more popularly known as Andersonville, is the most notorious prison in American history. In fact, more books have been written about Camp Sumter than any other prison in the world (Davis 2010:9). Captain William Sidney Winder was ordered, in late 1863, by Secretary of War James A. Seddon to find a suitable location within Georgia for a new large-scale military prison in the early days after the prisoner exchange system was dissolved. After initially considering Albany and Americus, R.B. Winder eventually settled on a small town with a population of about 20 called Andersonville (Bearss 1970:16).

Construction of Camp Sumter began on January 10, 1864 with the impressed labor of approximately 500 African-American slaves under the direction of Richard B. Winder, now the quartermaster of Camp Sumter (Davis 2010:25). The prison was operational from late February 1864 through early May 1865, and during that time held 40,000 civilians, officers commanding African-American soldiers, and enlisted soldiers and sailors, both black and white (Davis 2010:9).

Captain Richard B. Winder, cousin of Captain W. Sidney Winder, was originally sent to Andersonville to construct a facility capable of holding approximately 6,000 prisoners. After his arrival, Winder created a prison design with an area of 16.5 acres, which he felt was sufficient to house 10,000 prisoners (Prentice and Prentice 1990:3). By June 1864 the prisoner population had reached 20,000, and it was deemed necessary to enlarge the prison. Surrounding swampland was drained and the walls were extended to the north 610 feet, bringing the total area of the stockade interior to 26.5 acres (Prentice and Mathison 1989:9).

Upon arrival, inmates found that the stockade wall was still unfinished, with the southwestern corner still being constructed by the impressed slaves (McElroy 1969:134). Nevertheless, they were impressed with the overall construction, reporting that the interior of the stockade was 1,000 feet by 800 feet. The stockade walls were thought to have been comprised of square hewn pine logs two or three feet across and 25 feet tall, with five feet of that length being buried. The creek running through the stockade was said to have been a yard wide and ten inches deep (McElroy 1969:128-129). One of the most notorious characteristics of Camp Sumter, the deadline, was not an original fixture of the camp. A deadline was a demarcated area within the immediate perimeter of the stockade established to prevent prisoners from climbing or tunneling under the walls. Prisoners crossing this line would be shot. One prisoner claimed it was installed after the failed escape attempt of several soldiers, including him (McElroy 1969:141).

Due to prisoner overcrowding, originally installed facilities eventually became inadequate. The original hospital was located within the stockade, but was relocated outside of the stockade in May 1864. This second facility was a tent hospital measuring 260 feet by 340 feet and lying in an area of approximately five acres, enclosed with a plank fence (Marrinan and Wild 1985:2). A third hospital, referred to as a "shed hospital" was later constructed in the Fall of 1864 as the size of the tent hospital became inadequate to properly care for the volume of prisoners.

Camp Sumter was originally guarded by 400 men from the 26th Alabama infantry regiment and 270 men from the 55th Georgia infantry regiment posted on the walls, later being joined by the 57th Georgia infantry regiment and Gamble's Florida light artillery in April 1864. The light artillery regiment arrived with four pieces of artillery, but was later bolstered by several pieces acquired during the Battle of Olustee. On May 9 the garrisoned troops were joined by four Georgia Reserve regiments under the command of Brigadier General Lucius J. Gatrell's 2nd brigade: the 1st Georgia Reserve regiment under Colonel James H. Fannin, the 2nd Georgia Reserve regiment under Colonel Robert F. Maddox, the 3rd Georgia Reserve regiment under Colonel C.J. Harris, and the 4th Georgia Reserve regiment under Colonel Robert S. Taylor. By May 15 all originally garrisoned regiments except the 55th Georgia infantry regiment had departed Camp Sumter for the front lines (Davis 2010:27-28).

Given its significance, Camp Sumter has been the subject of much historical research and archaeological investigation. A detailed history of Camp Sumter and the surrounding area was compiled by Edwin Bearss in 1970 for the Office of History and Historic Architecture, Eastern Service Center (Bearss 1970). This has proven to be a comprehensive and useful resource, cited many times since its publication.

In 1984 Teresa L. Paglione (1984) performed an archaeological survey examining Tract 01-142, a 20.33 acre parcel of land adjoining the western boundary of Andersonville National Historic Site, for evidence of its association with Camp Sumter. The survey determined that a 20.33 acre tract, which was purchased in 1875 as part of a national cemetery, was part of the Confederate locus at Andersonville. This showed that areas of use and activity at Confederate POW camps were significantly larger than previously suspected.

Many additional archaeological investigations and surveys have taken place in and around the area of Camp Sumter before and after Paglione's 1984 survey. This one was chosen specifically in order to examine the breadth of space utilized by the Confederacy beyond the stockade walls. While no evidence of structures was found during the survey, it shows that the area of activity around the stockade walls was far-reaching, much like at the Florence stockade.

A great deal of research has been performed on Civil War POW camps. However, the vast majority of this research has focused exclusively on the lives of prisoners (Avery and Garrow 2008:3). While the story of the prisoners is one that most certainly should be told, the story of the guards is no less important. The story of both parties is equally important to our understanding of this critical era of our shared history; the story of one side cannot be fully understood without a comprehensive understanding of the other. This research seeks to locate Confederate loci at Camp Lawton in order to begin to tell this story.

Chapter 4 - Test Areas

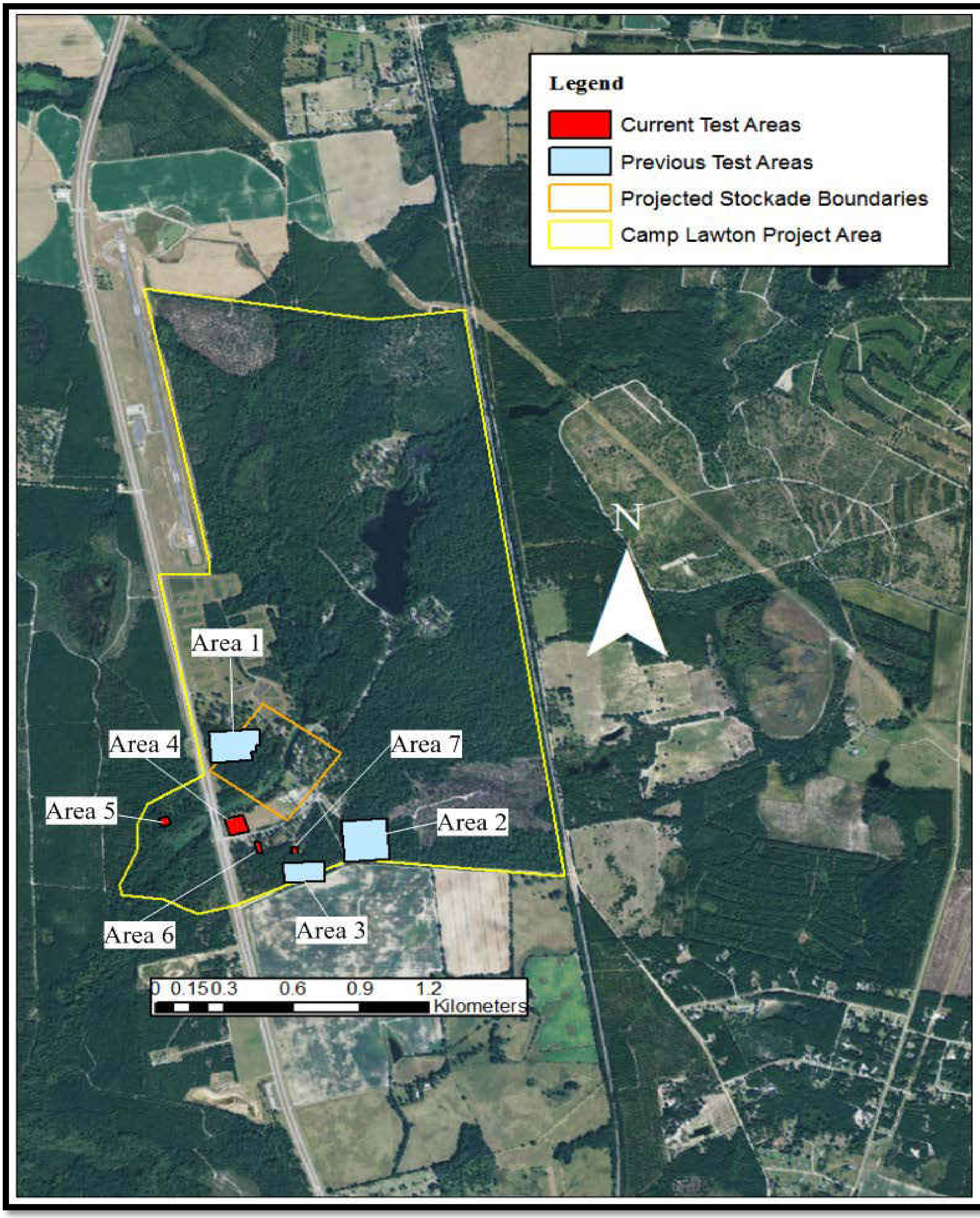


Figure 6: Map of all Camp Lawton Project test areas

Four test areas at Camp Lawton (Fig. 6) were selected for this research based on multiple factors. First, areas had to be beyond the boundaries of the stockade wall. From there, the areas were selected after a pedestrian survey and examination of the general topography of the terrain coupled with other factors such as access to water, distance from the stockade, and a review of primary and secondary historical sources. The specific criteria for selecting each test area is described below. Once the areas had been selected, a survey grid following their landforms was established with five meter interval transects. Previous work at Camp Lawton by Kevin Chapman (Chapman 2012) had established test Areas 1-3, and so numbering of my research areas began with Area 4.

Area 4

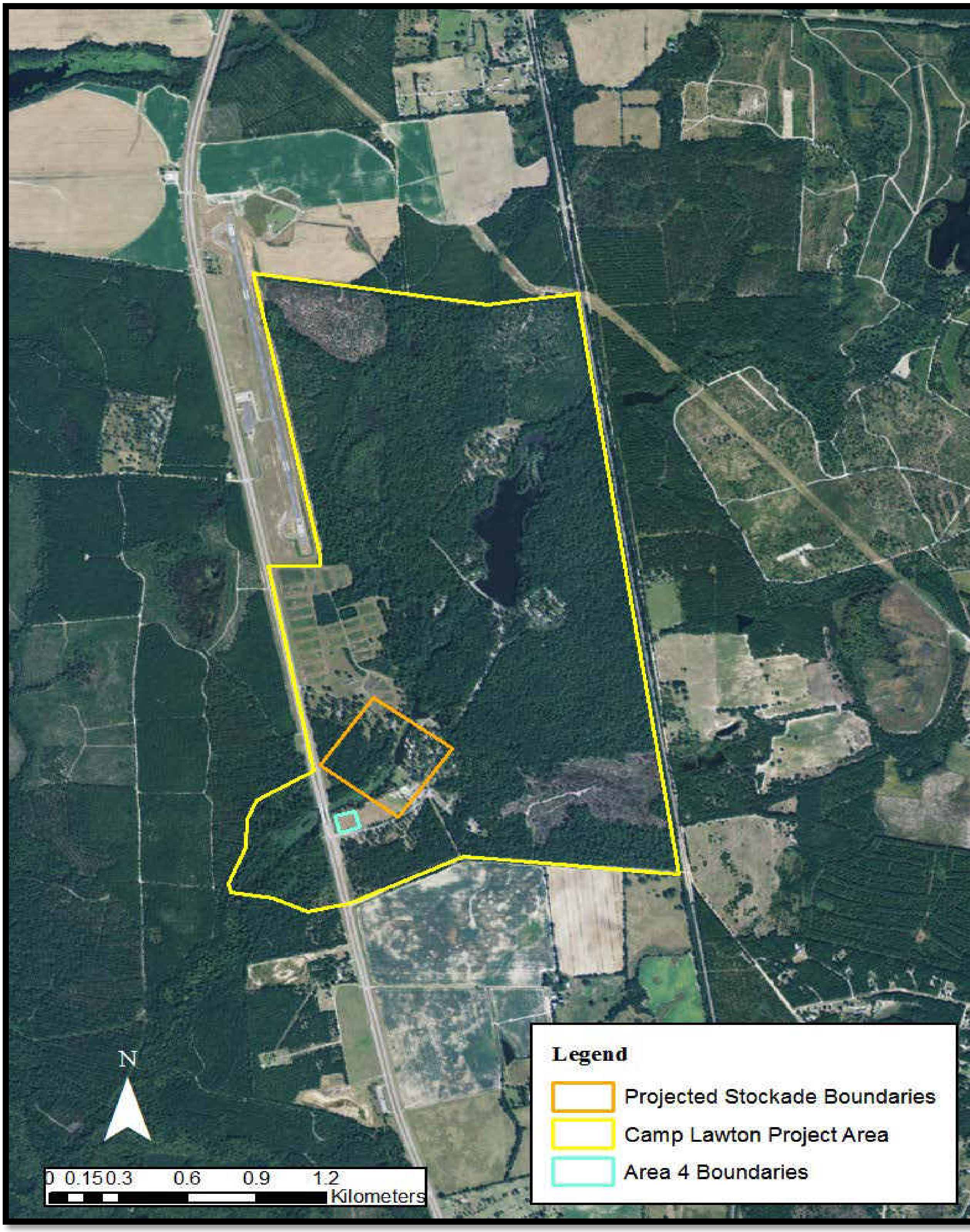


Figure 7: Map of Area 4

Area 4 was principally chosen due to its promising landform characteristics such as high, level terrain and proximity to both the adjacent spring creek as well as the stockade walls. Examining the maps of Robert Knox Sneden provided further support with his depictions of structures in an open field to the west of the prison (Sneden 2000a:269; Sneden 2001:226).

Area 4 is an 80 m x 80 m block located in a large open field to the west and downstream of where the stockade wall had been. The area is heavily disturbed, having been subjected to farming, soil deposition from Civilian Conservation Corps creek dredging in the 1940s, and then from a baseball field and road construction. Soils include older plowzones and recent overburden associated the Civilian Conservation Corps work.

Area 5

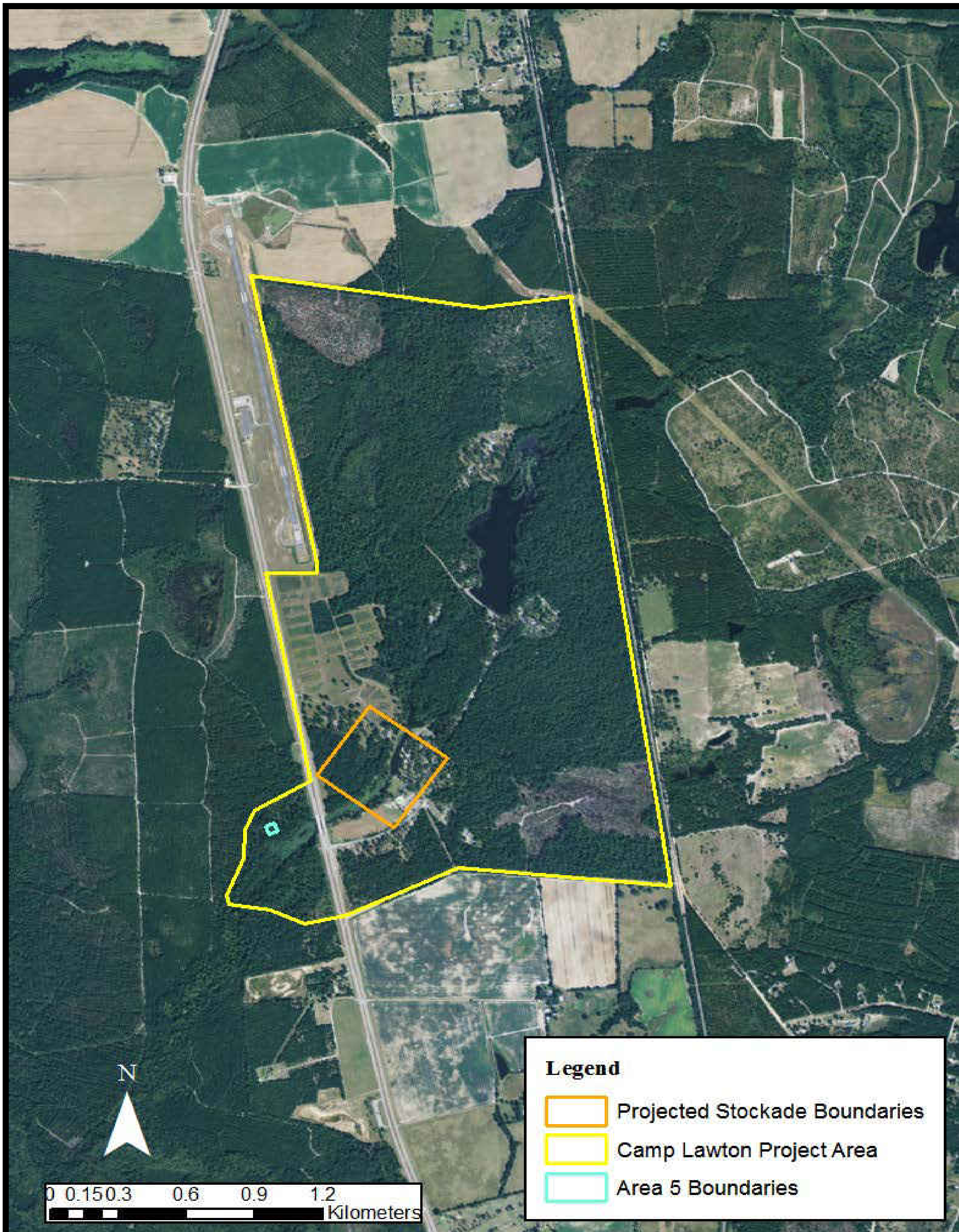


Figure 8: Map of Area 5

This area was chosen because historical documentation and illustrations from Sneden indicate that one of the two hospitals, the one for Union prisoners, was downstream from the stockade (Derden 2012:58; Sneden 2000a:269) and north of the creek. Within this area there is one location that is elevated and relatively flat.

Area 5 is a 40 m x 40 m block lying further west and downstream from Area 4, across modern Highway 25. It is heavily disturbed, having been the location of a CCC camp and later being logged (Fig. 9). The later CCC component creates difficulty in identifying any underlying Civil War era occupation, and an aerial photograph from 1941 shows several CCC buildings in test Area 5.

Figure 9: Area 5 in relation to CCC camp

Area 6

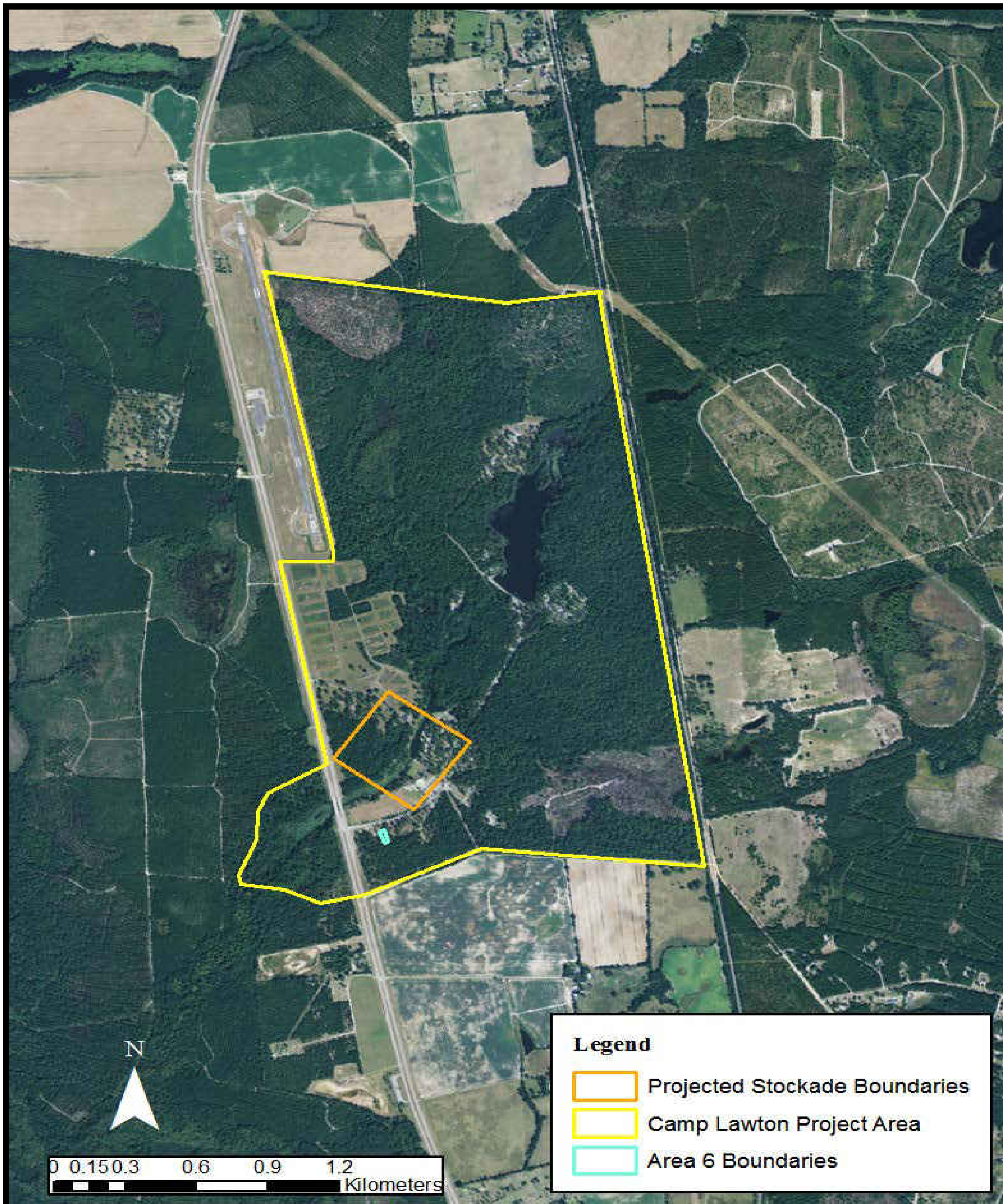


Figure 10: Map of Area 6

Area 6 was chosen because of its proximity to Area 4 and the Confederate earthworks and the recovery of a lead sprue and lead shot during a metal detector reconnaissance sweep performed by myself and Dr. Lance Greene. It was also speculated that the inclusion of a drainage ditch in the area might offer some insight into the surface topography of the mid-19th century.

Area 6 is a 20 m x 60 m block lying roughly south of Area 4 on an inclined slope leading to the Camp Lawton breastworks. The nature of the disturbances in this block is largely unknown. However, the area can be assumed to have been logged in the past, and exhibits signs of erosion, although the area has not eroded to subsoil. Of note in this area is the existence of a small runoff ditch which appears to have previously extended north toward the spring creek, cutting into Area 4.

A CCC-era trash dump was identified in a segment of this ditch, indicating that at least part of this area was used for the disposal of trash.

Area 7

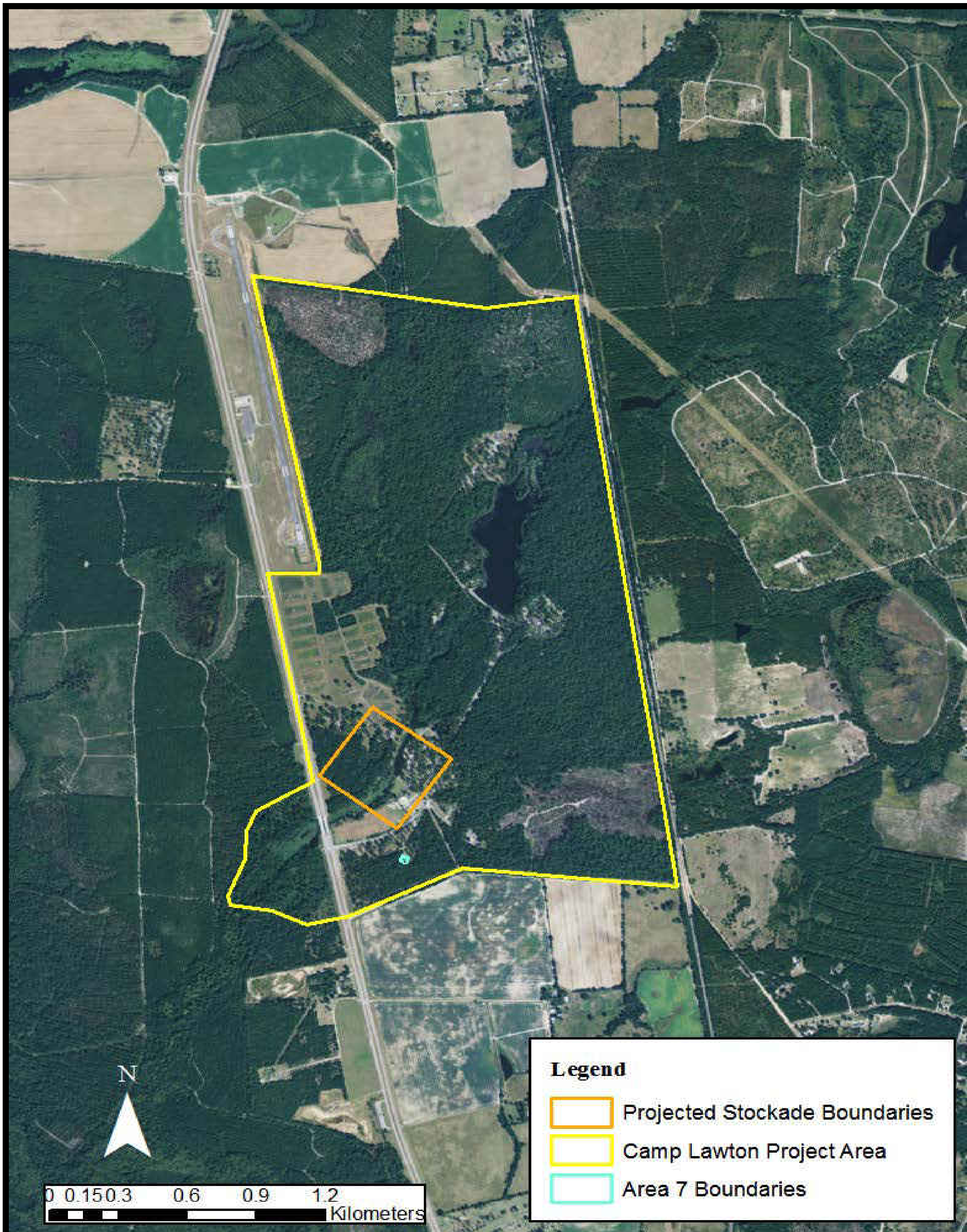


Figure 11: Map of Area 7

Area 7 was chosen largely because there had never been a thorough archaeological survey within the fort at Camp Lawton. Unlike the other test areas surveyed for this research, the inside of the fort is an area beyond the stockade wall boundary that is certain to have experienced substantial human activity during the Civil War.

Area 7 is located within the earthworks fort, which was said by Sneden to have contained a powder magazine as well as some small structures. A 40 m x 40 m grid was established within the fort. Some of the shovel tests could not be excavated due to intrusion onto the earthworks berms. This would not only have been destructive, but would also have been irrelevant information for this research, as this proposal aims to identify areas of differential human activity not readily identifiable through extant earthworks.

The only known disturbances to have occurred within the fort after the Civil War are deforesting and an alteration of the walls by the CCC. The original entrance from the south was filled and a new entrance cut in the northern wall. This was probably performed for easier tourist access.

Chapter 5 - Field Methods

Method	Area 4	Area 5	Area 6	Area 7
Shovel Testing	X	X	X	X
Metal Detection	X	X	X	X
Magnetometry	X	X	X	X
Soil Phosphate Analysis	X	X	X	X
Terrestrial LiDAR Scanning	X	X	X	
Excavation Units	X	X		X

Table 1: Methods applied to test areas

Prospection is one of three broad categories of survey type in archaeology, together with statistical surveys and structural surveys. Prospection can be defined as a survey aimed at identifying archaeological materials of a particular type or age, or that can be used to test very specific hypotheses (Banning 2002:27-28). Prospection with a clear research question is often called “purposive prospection” (Banning 2002:133). Unlike the other survey types, prospection is a means by which sites are identified instead of investigated.

Site identification can be impeded in multiple ways. These include ground cover of decaying vegetation, thick, low lying vegetation, burial of sediments, construction activity, submergence from rising sea level, swamp formation, reservoir construction, and impenetrable terrain or vegetation (Hally 1981:27). Purposive prospection seeks to mitigate these factors by utilizing any information that might increase the chances of site identification by increasing obtrusiveness. Obtrusiveness is the combined characteristics which cause it to contrast more or less with its environment. Information which increases obtrusiveness may be background research in the form of historical documents, the examination of landforms, or remote sensing techniques which generate subsurface data. These data are then analyzed using Geographic Information System programs and ground-truthed.

This thesis research uses purposive prospection to answer which method, or combination of methods, is more effective for locating and investigating mid-19th century military sites in the southeastern United States. Comparing testing techniques to standard archaeological methodology such as shovel testing is by no means unique (Silliman et al. 2000; Crutchley 2009; Viberg and Wikstrom 2011; Chapman 2012). Performing a battery of surveys and examining their effectiveness in concert with one another and standard methods is not exactly a novel approach, but it is relatively uncommon due to time and budget constraints.

Each method used in this research was chosen to provide a different line of evidence and increase obtrusiveness in different ways: visual examination, statistical sampling, remote sensing, chemical analysis, and landform mapping

This survey began with simple – yet fundamental – surface survey. Pedestrian surveys have long been known to be quite effective in certain circumstances (Lenington 1970:89). The initial surface survey coupled with historic documentation informed the choosing of the four test areas.

From there a shovel testing survey was performed, after which metal detecting and magnetometer (MAG) surveys were conducted, as well as soil phosphate testing and terrestrial laser (LiDAR) scanning. These methods were applied by the author to all four areas, with the exception of terrestrial LiDAR scanning in Area 7 and excavation units in Area 6 (Table 1). Area 7 had previously been LiDAR scanned by Georgia Southern University Master’s student Matthew Luke (2012). Area 6 was felt to not have strong enough evidence of cultural loci to warrant excavation units.

Shovel Testing

Shovel testing is standard on most preliminary archaeological surveys. It is primarily considered a field method specific for site discovery (McManamon 1984:261), but that is not its only benefit. Shovel testing is equally effective at identifying intrasite components, and surveys are carried out for the purpose of guiding placement of excavation units as often as discovering sites (West Virginia 2014:6).

There are more quantitative reasons why shovel testing has become a necessary method in surveys. Shovel testing is generally better at detecting artifacts and features versus other exploratory methods such as post holes, auger holes, and soil cores. This is due to the larger volume of the shovel test pit, which increases the likelihood of locating artifacts.

Surface survey can potentially be more effective as an exploratory method than shovel testing, however this requires little to no ground cover (Wood and Lucas 2005:57-58). Consequently, shovel testing is utilized in most cases in the Southeast due to the amount of vegetation and ground cover. Although shovel tests are an effective means of testing as an exploratory method, they should still be implemented correctly to maximize site or intrasite detection of archaeological components. Detection largely relies on four factors: site size, frequency and intrasite distribution of artifacts, shovel test size, and number and spacing of shovel tests (McManamon 1984:268). There are numerous studies detailing the efficacy of differing shovel testing patterns, but shovel testing should at a minimum cover project corridors and be placed systematically on a grid or transects.

For this project, square shovel test pits were dug on odd-numbered transects, creating a 10 meter interval. They were dug 40 cm on a side and to a depth of 80 cm, or 10 cm into the subsoil surface if it was encountered prior to this depth. Soils were screened using a ¼” mesh.

Munsell colors and soil descriptions and zone layers were noted, and artifacts collected. Once shovel testing had been completed, spatial data concerning the grid boundaries and shovel test locations were gathered using a total station.

Metal Detection

The use of metal detectors in archaeology has a long and largely successful history. Metal detectors are particularly beneficial when used on historic sites of shallow deposition, as the signal from more shallow metal artifacts will be stronger. This is especially true of military-related sites (Scott et al. 1989). This is one of the main reasons why metal detection has become common in battlefield and conflict archaeology, a field in which Douglas Scott heavily utilized metal detection. However, in recent years metal detecting has come to be seen by many as unscientific.

Recently, television programs such as *Diggers*© from the National Geographic Channel© and *American Digger*© from Spike Network© have reignited this commonly perceived pet peeve of archaeologists; practices which seem to endorse the wanton destruction of history and cultural materials for profit (Pitts and Klat 2012:2). Of course this is not necessarily the case.

Metal detection very much has a part in historic archaeology and the deceptively simple construction of the metal detection apparatus is even known for being more accurate than other more expensive geophysical prospecting tools such as magnetometers or resistivity machines. Its simplicity belies its power: metal detectors can actually detect buried kilns, brick walls, and any human-built features that have become magnetized, generally through heat alteration (Orser 2004:162). In addition to its surprising effectiveness as a survey tool, the relatively cheaper cost of metal detection versus other survey methods like MAG or resistivity make it an appealing choice.

Historic site delineation requiring a metal detector has become a necessary step for some agencies. For example, the Georgia Department of Transportation requires the use of metal detection surveys for historic components (GDOT 2010:13-14). Another benefit is that certain types of ground disturbances can actually be beneficial when using a metal detector. This is notably the case for a survey area which has been plowed since the deposition of an assemblage, as experiments have shown that plowed soil tends to move artifacts vertically rather than horizontally (Sharpe 2013:45). This is helpful for metal detecting because of its inability to reliably pick up artifacts below a certain depth, which depends upon coil size, soil type, moisture level, and trace elements.

Metal detection surveys on military sites are particularly useful because of the large amount of metal artifacts often associated with such occupations, especially sites dating from at least the 19th century and the advent of mass production of metal products. The cultural material recovered from sites in the 19th century also have a proportionally higher amount of metal artifacts versus artifacts constructed of organic materials. The longevity of metal artifacts is due to them reaching a chemical equilibrium in the soil, and so being better preserved. This is reflected in the recovered artifacts from the Florence stockade, as the structure features mention previously yielded virtually all metallic artifacts

The metal detection survey for this project was conducted within the same grid used for shovel testing. Instead of surveying the odd-numbered transects used for shovel testing, both odd and even transects were metal detected. The operator walked down each transect line metal detecting in one meter arcs.

For Areas 5 and 6 the models used were two Nautilus DMC II-B machines, one with an 8” head and one with a 10” head, and one DMC II-Bα machine with a 6” head. These three machines were also used for the first seven transects of Area 4. Before the metal detection survey of Area 4 could be completed, the machines required repair. However, no repair facility could be located for the models used. Two Garrett AT Pro machines were acquired to complete the remainder of the survey in Area 4, as well as the survey in Area 7. One Garrett AT Pro machine utilized a DD search coil with an 8.5" head and the other used a DD search soil with an 11" head. In total, there were five different search coil sizes used for the metal detection survey. Although attempts were made to standardize settings on the machines in order to provide a more uniform survey, it should be noted that there was some level of variation.

For all metal detection survey work using the Nautilus machines, the ground balance was set to 65, the transmit power to 44, and the discrimination to 15. These settings were replicated on the Garrett AT Pro machines as closely as was possible, though recreating the settings exactly was not possible due to the interface of the machines. When a metallic signal was received by the machine, a 40 cm x 40 cm shovel test pit was dug in slices, approximately two to three centimeters thick. There was no set depth for artifact shovel test pits; depth of individual shovel tests depended upon the depth of artifacts. Once the artifact had been recovered, the metal detector was again run within the shovel test pit to verify that no additional metallic artifacts remained. Locations of recovered artifacts were recorded with X and Y coordinates within the survey grids.

Magnetometry

Magnetometry (MAG) is a method of remote sensing which detects subsurface anomalies. This is done by emitting electromagnetic pulses into the ground. These pulses highlight individual subsurface magnetic fields which are measured against variations in the Earth's magnetic field. These variations result from the proximity of magnetic objects and subsoil deposits of magnetically variable susceptibility (Banning 2002:44). These magnetic fields are measured and mapped. Magnetometry can be used effectively to detect ferrous artifacts, kilns and furnaces, and even subsurface features with sufficient contrast in magnetic susceptibility from the surrounding soil matrix (Lennington 1970:104). It is non-invasive, meaning that it causes no soil disturbance (Hemeda 2013:346). Once the soil has been disturbed or things have been removed, data are instantly destroyed (Neumann et al. 2010: 27). Second, though it uses many stationary pulses, the overall image it creates covers the entire site survey. Therefore, the data can be used to create a 3D image of magnetic readings of the site without actually disturbing the soil. Using these data, any part of the site surveyed using magnetotometry can be examined at any depth (Aspinall et al. 2009:17). This has the potential to give archaeologists an amazing glimpse of the entirety of a site with less manpower than shovel testing while maintaining the integrity of the site stratigraphy and deposits.

There are two main principles in the use of magnetometers: remanent and induced magnetism. Remanent magnetism is the permanent magnetization of an object due to its mineral composition and/or thermal history, while induced magnetism is a function of an object's susceptibility to being magnetized (Silliman et al. 2000:91). For example, fired clays or rocks resulting from thermal processes have remanent magnetism while ferrous objects are considered to have induced magnetism, though they have inherent remanent magnetic properties as well.

When using magnetometry for archaeological surveys, there are five variables to consider: (1) magnetometer type (alkali-vapor, cesium-vapor, proton procession, fluxgate, and Overhauser), (2) sensor configuration (gradiometer or single-sensor), (3) sensor heights, (4) intensity of data collected, and (5) post-survey data correction (Silliman et al. 2000:91).

Naturally, the general consideration given to each variable and the degree to which they are integrated for a survey depends entirely on time, resources, and available funding for a project.

Magnetometry is not without its weaknesses. One possible concern is soil type and the soil's level of moisture. Chiefly, dry, sandy soils with high trace levels of iron have a tendency to result in particularly poor results (Aspinall et al. 2009; Walker and Perrula 2010; Johnson 2006). The high iron content of some soils can potentially produce false-positives within the data. Also, MAG equipment can be problematic and inflexible for those not well versed in its use. Improper use of the equipment can lead to any number of problems with the data, including false positives and, in some cases, simply no discernible sub-surface anomalies (Breiner 1999:11-12). Perhaps most confusing is the influence of the earth's magnetic field over MAG data at certain latitudes. For example, the magnetic anomaly which signals a potential artifact or assemblage is only positioned directly over the target at the poles or the equator. In more intermediate latitudes, the target is located by the offset of its associated positive and negative anomalies (Banning 2002:44). Naturally, this necessitates an experienced user in data processing for magnetometry.

MAG survey for this research was conducted by Dr. Dan Bigman from Georgia State University (Bigman and Greene 2015). Data were collected for Area 6 using a G-858 cesium-vapor total field magnetometer manufactured by Geometrix. Data were collected in continuous mode with readings recorded every 1/10 of a second and the surveyor collected transects at a spacing of 1 m. After the survey of Area 6, Dr. Bigman attempted to survey Area 4 with the G-858 cesium-vapor model, but was met with mechanical failure. He later returned to re-survey Area 4, as well as survey Areas 5 and 7, using three Ferex fluxgate gradiometers mounted on a pushcart with a survey wheel. The sensors were spaced 0.5 meters apart with a transect interval of 0.5 meters. The surveyor collected data at a sampling interval of 20 cm. An automatic fiduciary marker recorded every 1 meter with the survey wheel in order to limit error. The second model used was more sophisticated and powerful, but Dr. Bigman felt the completed survey of Area 6 yielded so little that it did not warrant an additional survey.

The project attempted to collect data in 40 m x 40 m grids, but grid sizes had to be reduced on occasion due to surface obstructions. Such obstructions included trees, earthworks associated with the Civil War era occupation, and park infrastructure such as the entrance gate.

All magnetic data for Areas 4, 5, and 7 were processed using Data2Line© software. The processing procedure filtered data first and enhanced images second. Individual grids were de-staggered to correct for shifts in data locations due to inconsistencies in surveyor speed or lags in recording from the instrument. Next, a zero-mean traverse filter was applied to each transect to compensate for heading errors and instrument drift. Finally, the data were smoothed using a 5 m x 5 m low-pass filter to remove noise and facilitate interpretation. Data from Area 6 were processed using MagPick© software. A zero-median traverse filter was applied to each transect to correct for diurnal drift, variation in topography, and variation in background susceptibility. The two software packages used to process data are comparable.

The survey recorded magnetic anomalies in each area with varying signatures, each representing changes in the local field strength from different sources. The signatures of these anomalies fall into three categories, 1) localized clusters of magnetic highs and lows which are interpreted as artifact clusters likely consisting in part of metal sources, 2) isolated dipolar anomalies of approximately equal positive and negative responses created by single metal objects of historic or modern origin, and 3) positive (what some call mono-polar) magnetic anomalies that likely represent pit features, midden deposits, or organic remains.

Phosphate Analysis

Phosphate is an inorganic chemical this plays an important role in biochemistry and biogeochemistry. Analysis of soil phosphate levels saw its genesis with testing for phosphorous levels in the field of agronomy (Wilkins 2009:18). However in the 1920s, phosphate levels in the soil were shown to correspond to areas of human occupation (Bjelajac 1996:243, Holliday and Gartner 2007:305, Persson 1997:441, Roos and Nolan 2012:25, Wilkins 2009:17-18). That is, phosphate levels in the soil typically see an increase due to human occupation and activity. These increases can be attributed to excreta, butchering of animals, food remains, human remains, the deterioration of materials, and other activities (Orser 2004:166).

It should be noted, however, that not all human activity raises phosphate levels in the soil. Indeed, a number of activities have no resulting soil phosphate increase, and some activities may actually decrease levels. One example of an activity which can decrease phosphates in the soil is burning (Holliday and Gartner 2007:307). Therefore, one should not take relative increases in soil phosphates to be necessarily indicative of human occupation, or relatively lower levels to be indicative of areas of no human activity (McManamon 1984:239). However, the efficacy of soil phosphate analysis in identifying areas of human occupation has been well documented.

Soil phosphates are the most commonly analyzed anthropogenic chemical constituent in archaeology. This is largely due to their stable nature. Indeed, phosphorous is one of the most stable elements in soils. Unlike many other chemical constituents, phosphorous is cycled through the soil in geologic time, meaning its cycling is tied directly to stratigraphy (Holliday and Gartner 2007:301-302, Orser 2004:166). However, one should not take this to mean that phosphate levels cannot be altered by myriad geological processes, soil formation, or disturbances.

There are two primary types of soil phosphorous: Pav, or available phosphorous, and Ptot, or total phosphorous. Available phosphorous is the fraction of organic phosphorous and phosphates that are not water-soluble and exist in a solid state within the soil. Total phosphorous, on the other hand, is the combination of available phosphorous and water-soluble phosphorous. Total phosphorous can be used by plants and is found in ground and soil water (Wilkins 2009:13). Of the two, studies have shown that it is in general more effective to analyze total phosphorous level versus available phosphorous, although both can be quite useful in the identification of human occupation areas (Wilkins 2009:15). It should be noted that the Mehlich 3 extraction process used in this thesis research (Mehlich 1984) analyzes available phosphorous, which can potentially be altered more easily by natural processes than the total phosphorous fraction (Wilkins 2009:15). Available phosphorous is the most studied chemical fraction between the two (Wilkins 2009:13) and the wealth of scholarly work involving available phosphorous should alleviate any fear that the data generated by this research would be faulty.

A number of soil phosphate tests have been invented over the years, both for field and laboratory use. The Mehlich 3 process was selected for this research. While a number of field tests have been shown to produce reliable results, it was felt that a laboratory test would help mitigate sample contamination.

Human activity as well as the components of structures can potentially increase soil phosphate levels. This makes soil phosphate analysis a useful testing method. Because it is known that both the Florence Stockade and Camp Lawton had a similar design and were both maintained by the Confederacy, it is logical to assume Confederate structures and areas of activity beyond the stockade walls would be likewise similar. Therefore, if areas of high relative soil phosphates are found to be related to cultural features, it may be possible to discern their functions by comparing the distributions of features from Camp Lawton and the Florence Stockade.

Nine-ounce samples of soil were taken from each soil stratum of each shovel test. Samples were recovered from these profiles using tongue depressors and paper cups, and neither depressors nor cups were used more than once to limit any potential phosphate cross-contamination. Samples were later air dried and sifted through a 2 mm mesh screen to remove organic materials, such as roots, and break apart the soil matrixes. Once the samples had been prepared, they were treated with the Mehlich 3 process (Mehlich 1984).

The Mehlich 3 process requires several reagents be combined to form a solution, which extracts phosphates from the sample, and a stock solution. The stock solution is comprised of ammonium fluoride (NH_4F) and ethylenediaminetetraacetic acid (EDTA). The extractant is composed of glacial acetic acid (CH_3COOH), ammonium nitrate (NH_3NO_3), and nitric acid (HNO_3) added to the stock solution.

Phosphate extraction for each soil sample proceeds as follows: First, 2 grams of air-dried soil from the parent sample is placed in an extraction vial. Next, 20 mL of the extractant solution is added to the sample. The vial is then capped and shaken for five minutes at room temperature. Once this is done, the extractant is filtered through No. 42 filter paper into a sample vial. Once the extractant has been fully filtered into the sample vial, a PhosVer3 "pillow" is added to the sample. PhosVer3 pillows are 10 mL of ascorbic acid used to leach out reactive phosphates. The sample is agitated for 15 seconds after the pillow has been added.

Once a sample was processed, it was examined using a colorimeter. Colorimeters determine the density of a solute within a solution. This is done by emitting a specific wavelength of light. The result is a numerical value representing the rate of absorbance by the solute. The model used was a Hach Pocket Colorimeter II for reactive phosphorous and phosphonates. The colorimeter requires a "blank" be used in order to acquire a relative phosphate level for the prepared sample. Roos and Nolan (2012) used deionized water with a PhosVer3 pillow as their blank, and so this research followed suit.

Sample vials, glass funnels, and colorimeter vials were washed out with a solution of diluted hydrochloric acid at a ratio of 9 parts deionized water per part of acid in order to limit phosphate and chemical cross-contamination. Mehlich described a rinse solution consisting of aluminum chloride hexa-hydrate (1984:1412), but diluted hydrochloric acid has been shown to be effective in the past.

Phosphate levels were graphically represented using Surfer 10™ by Golden Software©. Contour maps using the phosphate reading data as the Z value were generated for soil zones in each shovel test to determine any spikes in relative phosphate levels across the areas. Contours shown in between and beyond shovel tests are interpolated using data from these tests.

LiDAR

LiDAR, a portmanteau of "light" and "radar", is a quickly-developing technology which has its roots in the pulse-based laser rangefinders developed in the 1970s and 1980s (Luke 2015:28). Its application as an advanced mapping tool was quickly realized and by the late 1990s LiDAR was mounted aboard aircraft to create detailed topographic images (Fardinhouseini et al. 2011:108) and can be used effectively in many environments (Collins and Kayen 2006:3). Within a decade, more compact versions of LiDAR mapping technology became available in the form of terrestrial LiDAR scanning units.

Today, there are three principle types of LiDAR scanners: triangulation, time of flight, and phase. There are advantages and disadvantages to each, dependent upon factors such as budget, environment, time, and minimum resolution needs.

Triangulation is a short-range LiDAR scan method. The machine fires a laser line or single laser point which is reflected off of an object back to the machine's lens. Using trigonometry, the scanner is able to calculate the distance between the scanned object and the scanner itself. Triangulation scanners are potentially the most accurate LiDAR method, with possible accuracy on the order of tens of micrometers. However, their resolution is lower than other methods, and both accuracy and resolution decline sharply beyond several meters (3D Systems 2016).

Time of flight scanners use a simple formula to determine an object's distance: $d = c \cdot t/2$. This means that distance (d) equals one half of the travel time (t), given that the speed of light (c) is a known constant. In practice, this means that the scanner fires a laser beam which is then reflected back into the machine's lens. The scanner can then recognize the distance between it and the scanned object by halving the time it takes for the laser beam to return (San Jose Alonso et al. 2011:378). Therefore, effectiveness of time of flight scanners depends entirely upon its ability to calculate time. Contemporary higher-end models of time of flight scanners measure time in picoseconds and can potentially fire 100,000 laser beams per second. They also have the longest effective scanning distance of any method, capable of measuring objects multiple kilometers away, given line-of-sight.

Pulse-phase scanners operate under similar principles as time of flight scanners; however, instead of measuring the time it takes a beam of light to be reflected off of a surface, a pulse-phase scanner measures the intensity of the emitted wave in order to determine distance. Many current models use many frequencies, known as multi-frequency-ranging (MF) in order to increase accuracy (San Jose Alonso, et al 2011:378).

Regardless of the scanner method, all LiDAR scanner types process data the same way. Once the laser beam is reflected off of a surface and returned to the machine, the location of that reflected surface is assigned x, y, and z data, relative to the machine itself. All of the points are then consolidated into a point cloud using cloud processing software. Point clouds can be exported and processed to produce a digital elevation model (DEM), a three-dimensional topographic map of scanned surfaces.

In the case of terrestrial LiDAR scanning, multiple scans are often necessary within an area because the scanner is shooting points from a tripod on the ground surface rather than from overhead. Light is reflected only from surfaces which are in a direct line-of-sight from the scanner. As a result, it is necessary to scan from multiple positions in order to fully capture a three-dimensional object. A minimum of three scan targets are left in place as the machine is moved for multiple scans. The points clouds are then tied together using the stationary scan targets as anchors.

The efficacy of aerial LiDAR has been known and widely published for some time (Sittler 2004, Devereux et al. 2008, Luke 2015). In short, aerial LiDAR allows for accurate mapping of topography even through tree cover and has been used successfully in archaeological feature detection. However, aerial LiDAR is best utilized for large tracts of land in which one requires general topography. Terrestrial LiDAR is less expensive to deploy, schedule, and operate than aerial LiDAR, has significant increases in resolution versus aerial LiDAR, and can map features otherwise obscured from the air (Soulard and Bogle 2011:1). Additionally, because terrestrial LiDAR mapping creates multiple point clouds, the increased amount of data allows for extremely high-resolution DEMs to be generated, with sub-centimeter accuracy (Lim et al. 2013:6356). Because aerial LiDAR was unavailable and the individual areas of this research are relatively small, terrestrial LiDAR was selected.

Individual scan plans were made for Areas 4, 5, and 6. The earthen fort in which the survey grid for Area 7 was established had previously been scanned by another graduate student, Matthew Luke. His DEM was used for this research.

Scan data was collected using a ScanStation© C10 scanner manufactured by Leica Geosystems©. The data were then imported into Leica Geosystems© proprietary point cloud processing software Cyclone™. Point clouds were registered and consolidated within this program. The resultant file was then further processed into DEM data using Leica Geosystems© Cyclone II Topo™. Cyclone II Topo™ produces files containing the x, y, and z coordinates of sampled data points recovered from the environment scan. Vegetation was removed using the Cyclone II Topo™ software in order to better see the surface topography. These files were then imported into Surfer by Golden Software in order to create the DEM files for each area.

Excavation Units

Excavation is the method of removing objects and exposing stationary features that have been concealed by later deposits. It is the only method through which archaeologists may recover and collect a large amount of physical information concerning cultural materials and/or the geology of the survey area (Joukowsky 1980:158). This information is usually gathered from analysis of the recovered material culture or examination of the depositional history within an excavation.

In the past, archaeologists would often excavate areas which appeared to be promising at a glance, or were related to cultural materials visible on the ground surface (Hester et al.

1997:73). Today, there are many methods and theories concerning excavations. One common thread among contemporary excavation models is that they be a last resort, due to their inherently destructive nature. It is for this reason that excavations are only employed as a last resort for testing a hypothesis or model (Juokowsky 1980:159).

For this research, 1 m x 1 m excavation test units were utilized. Units were placed only in areas of overlapping evidence of cultural materials or around shovel tests which contained soil staining likely to have been cultural in origin. An additional 1 m x 1 m test unit was placed beside any unit with features or depositional anomalies which extended beyond the profile walls. These units were laid out on the same axis as the survey block they were within. The elevated datum was placed in the southwest corner and units were excavated in 10 cm arbitrary levels. Soils were screened using a ¼" mesh screen and artifacts were bagged. Munsell colors and soil texture and strata description were recorded. Spatial information of the excavation units were recorded and mapped using a total station.

Chapter 6 - Results

Surveys for each of the utilized methods were able to be performed in each area without issue. Results will first be summarized by method and then expanded upon in detail by area.

Shovel Testing

Of the 138 shovel tests originally gridded, 133 were excavated. The reasons for not excavating the remaining five were massive ground disturbance and avoiding tests in the fort earthworks. Of the excavated shovel tests, 31 (23.31%) were positive. No artifacts that were recovered from the shovel testing survey were unambiguously associated with the Confederate occupation at Camp Lawton.

Metal Detection

A total of 31 artifacts was recovered from the four test areas (Table 2). Locational data for several of the artifacts was lost or never recorded. Among those with no recorded locational data were two artifacts from the northwestern section of Area 4 which had the highest probability of dating to the Civil War era. Four additional artifacts initially appeared to be associated with the Confederate occupation at Camp Lawton, but two of these were revealed to be modern reproductions and the other two are likely reproductions as well. These will be further discussed in the sections for the areas in which they were recovered.

Test Area	Number of Artifacts Recovered	Percentage	Comments
4	21	67.74%	
5	2	6.45%	Recovered artifacts came from extension beyond survey area
6	5	16.13%	
7	3	9.68%	
Total	31	100%	

Table 2: Metal detection artifact recovery by area

Magnetometry

Interpretations of the magnetometer survey yielded eight potential artifact clusters, eight potential graves, pits, or ditches, and several dozen isolated metal artifacts. All potential graves, pits, or ditches, as well as six of the potential artifact clusters were located in Area 4. The survey of Area 4 also revealed a large soil disturbance in the northwest corner of the survey grid and an historic drain field located approximately 20 m east of the Area 4 survey block. The saturation of metal artifacts in Area 5 prevented any interpretations of the data. Area 6 was interpreted to have an artifact cluster in the southeast section, near the beginning of the drainage ditch. The data for Area 7 were interpreted to have an artifact cluster in the northeast section.

Phosphate Analysis

A total of 271 phosphate tests was processed from Areas 4, 5, 6, and 7 with an average reading of 0.789 mg/kg (Table 3). Only samples with relative soil phosphate levels over 2 mg/kg were examined. Surprisingly, the two areas with the lowest average soil phosphate levels, Area 5 and Area 7, are the two areas known for certain to have been occupied.

Area	Zone	Number	Average Phosphate Level (mg/kg)
4	A	78	0.944
	B	74	0.764
	C	40	0.758
5	A	25	0.599
	B	1	0.11
6	A	21	0.862
	B	4	1.43
7	A	14	0.276
	B	14	0.264

Table 3: Average soil phosphate values by area

<u>LiDAR</u>

Digital elevation models for all four areas revealed no landform characteristics which were not already immediately visible from either pedestrian survey or examination of satellite imagery or topographic maps.

<u>Excavation Units</u>

Of the three excavation units placed in Area 4, two showed a significant amount of deposited overburden from 20th century activity. The other did not reveal any cultural information, but offered some insight into the geology of the survey area. This will be discussed in the Area 4 section. The excavation units in Area 5 revealed a domestic structure either associated with a CCC locus at Magnolia Springs State Park or an earlier late-19th century dwelling. The excavation unit in Area 7 revealed no cultural information.

<u>Area 4</u>

Shovel Testing

Area 4 contained 78 shovel tests (Fig. 12), 11 (14.1%) of which were positive (Fig. 13). A disturbance resulting from road construction in the southwestern portion of the survey area prevented further shovel testing along Transect 17. This disturbance included the deposition of gravel and modern trash. Of the positive shovel tests, 7 shovel tests yielded prehistoric artifacts and one yielded modern trash (Table 4). The remaining three positive shovel tests contained artifacts potentially associated with the Civil War-era occupation, the CCC-era occupation, or occupations associated with tenant farming.

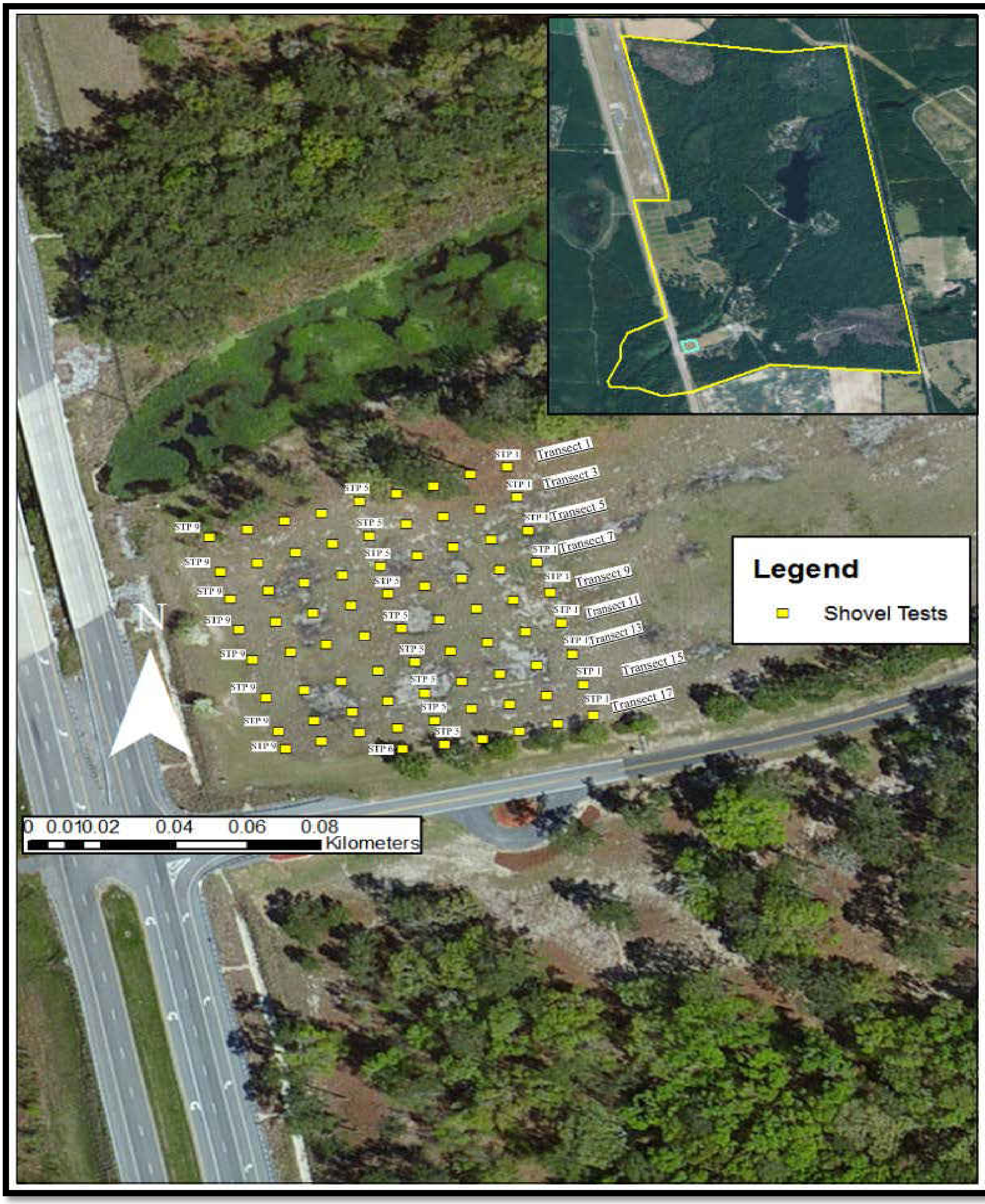


Figure 12: Locations of shovel-test pits in Area 4

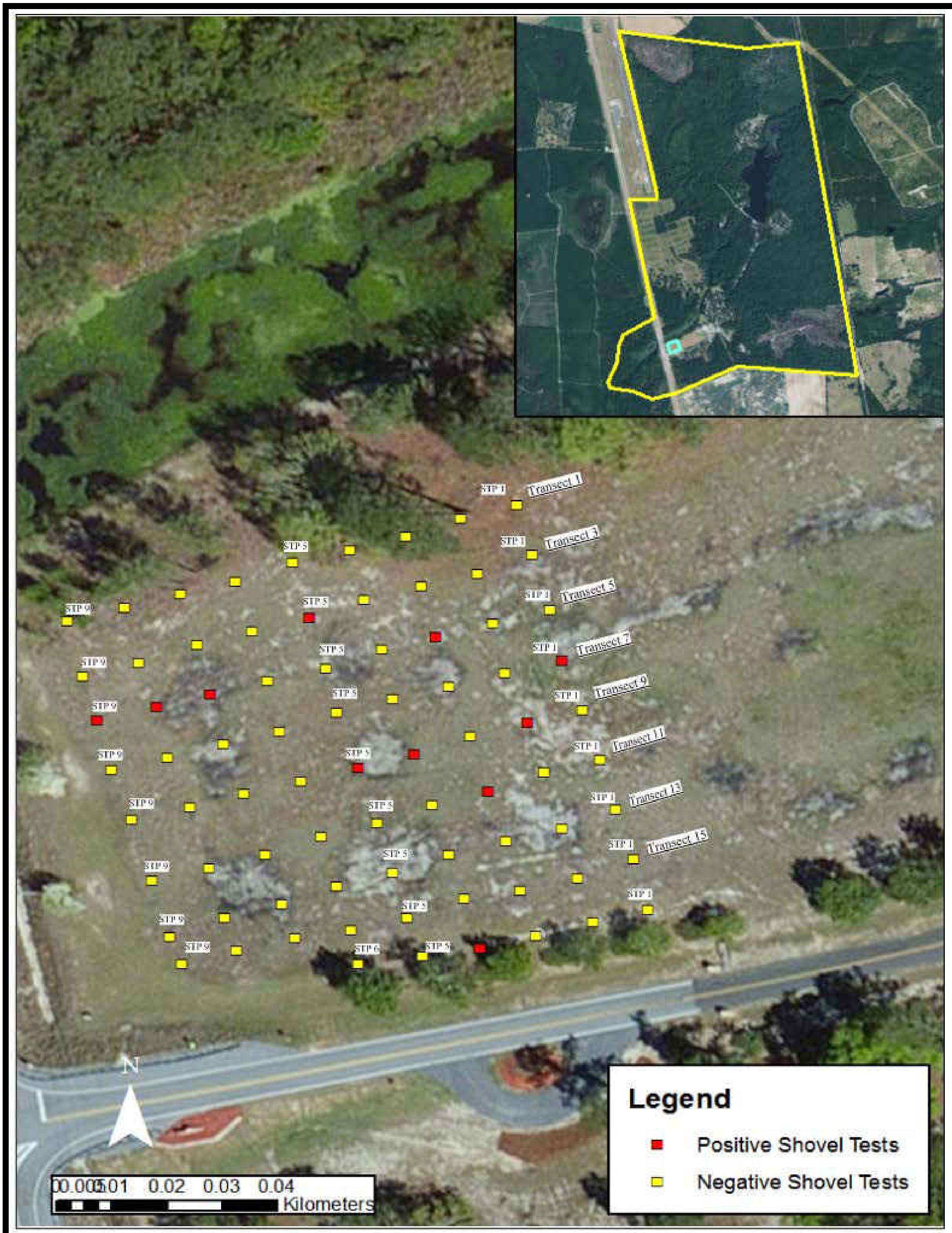


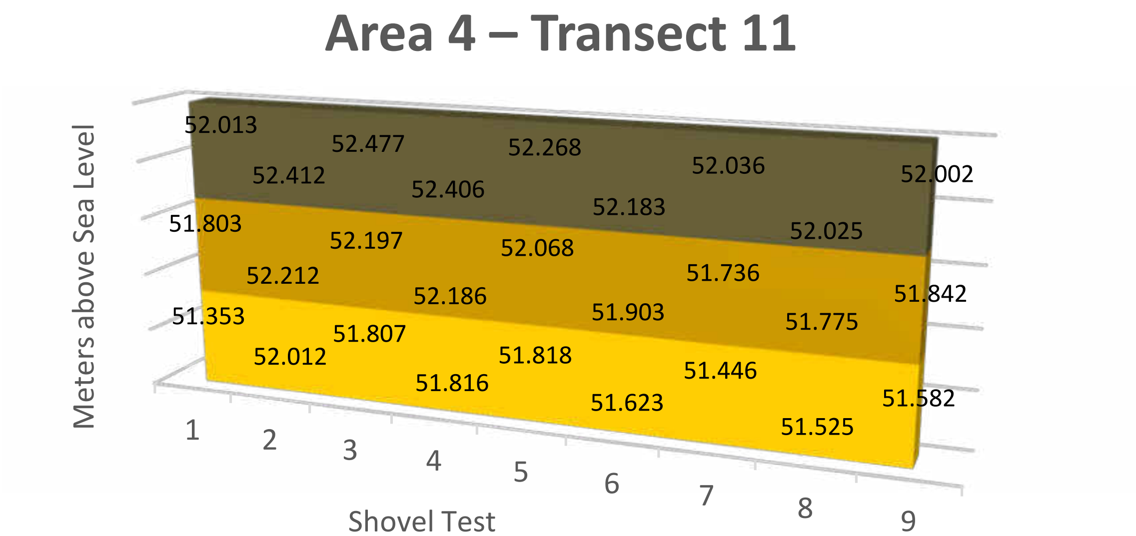
Figure 13: Locations of positive shovel-test pits in Area 4

Transect	STP	Zone	Artifact(s)	Count
3	5	B	Prehistoric pottery	1
3	5	B	Chert debitage	1
5	3	A	Chert debitage	1
5	7	B	Chert debitage	1
5	8	A	Chert debitage	1
5	9	C	Chert debitage	1
7	1	A	Brick fragment	1
9	2	A	Colorless glass fragment	1
9	4	B	Chert debitage	1
9	5	B	Stoneware	1
17	4	B	Modern square bolt	1

Table 4: List of positive shovel-test pits in Area 4

STP 5 on Transect 3 contained two artifacts from Zone B: a grit-tempered prehistoric ceramic sherd and a chert flake. STPs 3, 7, 8, and 9 on Transect 5 each contained a single chert flake. STP 1 on Transect 9 contained a fragment of brick from Zone A. STP 2 on Transect 9 contained a small fragment of colorless glass, shovel test 4 contained a chert flake, and STP 5 contained a brown stoneware sherd.

Soils in Area 4 were largely consistent throughout, with a 10 YR 5/2 grayish brown sandy loam Zone A and 10 YR 6/4 light yellowish brown sandy silt Zone B above a 10 YR 5/6 light brown clayey loam subsoil (Fig. 14). Transects 1 through 7 on the northern section of the survey area had more pronounced variation in soil zone depths, which will be discussed in the excavation unit section of Area 4. The following figure is a representation of the soil zones present in Area 4. Due to the 80 m length of the survey grid, the figure is not to scale.



	1	2	3	4	5	6	7	8	9
Zone A	52.013	52.412	52.477	52.406	52.268	52.183	52.036	52.025	52.002
Zone B	51.803	52.212	52.197	52.186	52.068	51.903	51.736	51.775	51.842
Zone C	51.353	52.012	51.807	51.816	51.818	51.623	51.446	51.525	51.582

Figure 14: Area 4 soil profile on Transect 11

Metal Detection

The metal detection survey of Area 4 recovered 18 artifacts, several of which could potentially date from the mid-19th century through the mid-20th century (Table 5). Of particular note are three artifacts: a ferrous horse bridle buckle (Fig. 16) from the approximate center of Transect 5, near STP4, and a ferrous belt buckle from between STP 8 and STP 9 of Transect 5. However, the exact provenience information for these two artifacts, in addition to several artifacts recovered from the northwest section, was not recorded by one of the field supervisors and thus they do not appear on the following map of metal detection hits from the area (Fig. 15).

The final artifact of note was recovered approximately 14 m east of STP 9 on Transect 6. This was a large ferrous knife blade, possibly dating to the Civil War occupation.

Transect	MDR	Depth	Artifact(s)	Count
1	1	7cmbs	Washer	1
1	2	15cmbs	Fence staple	1
1	3	6cmbs	Modern bolt	1
2	1	17cmbs	Strap metal	1
2	1	21cmbs	Large iron bolt	1
5	4	17 cmbs	Horse bridle buckle	1
5	5	22 cmbs	Strap iron	1
5	6	19 cmbs	Strap iron	1
5	7	9 cmbs	Strap iron	1
5	8	1 cmbs	Nut and bolt	1
5	9	20 cmbs	Belt buckle	1
5	10	15cmbs	Strap iron	1
6	1	14 cmbs	Knife blade	1
11	1	5 cmbs	Modern nail	1
11	2	13 cmbs	Unidentifiable cast iron	1
13	1	19 cmbs	Door hinge	1
15	1	12 cmbs	Unidentifiable iron artifact	1
15	2	6 cmbs	Metal cylinder	1

Table 5: Artifacts recovered from Area 4 metal detection survey

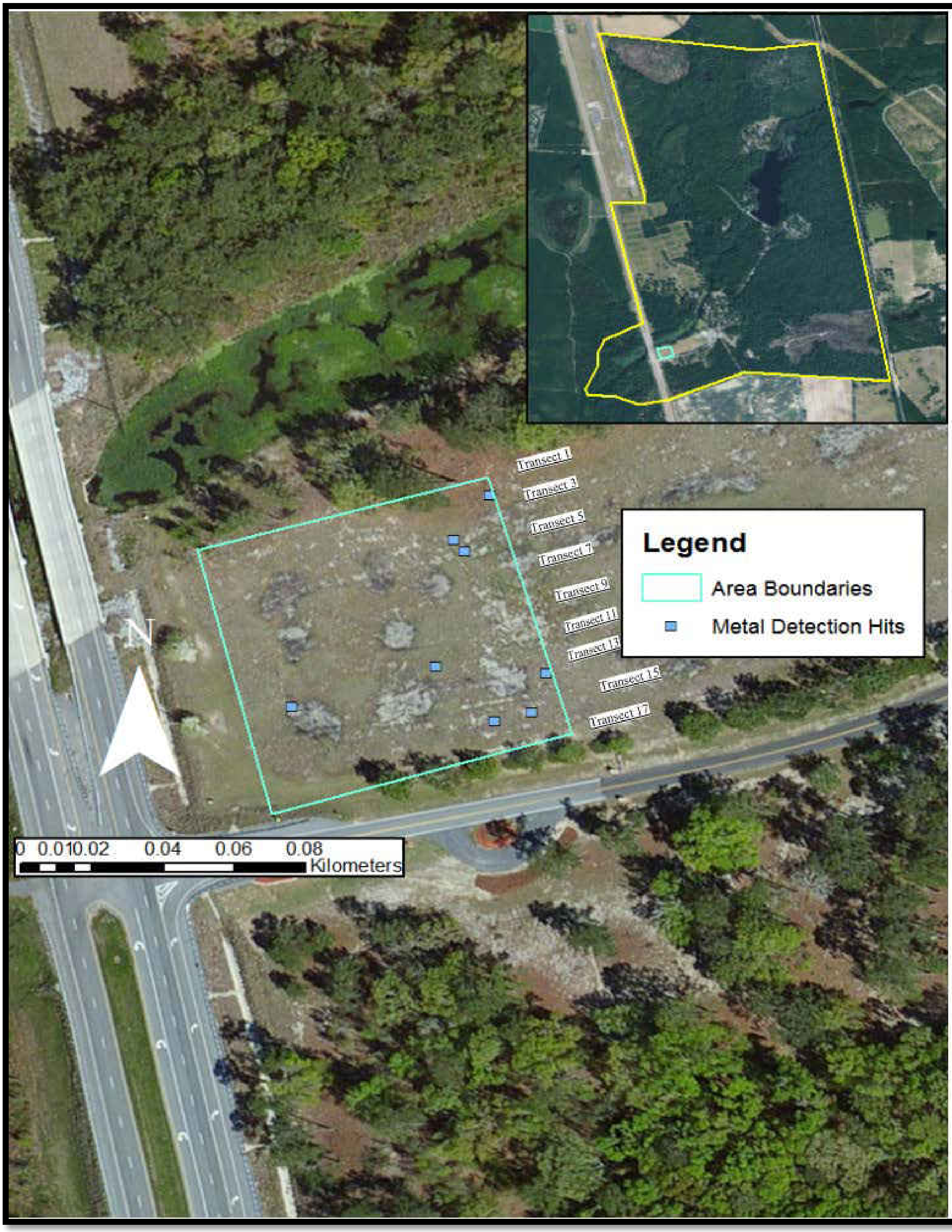


Figure 15: Recovered artifacts from Area 4 metal detecting survey

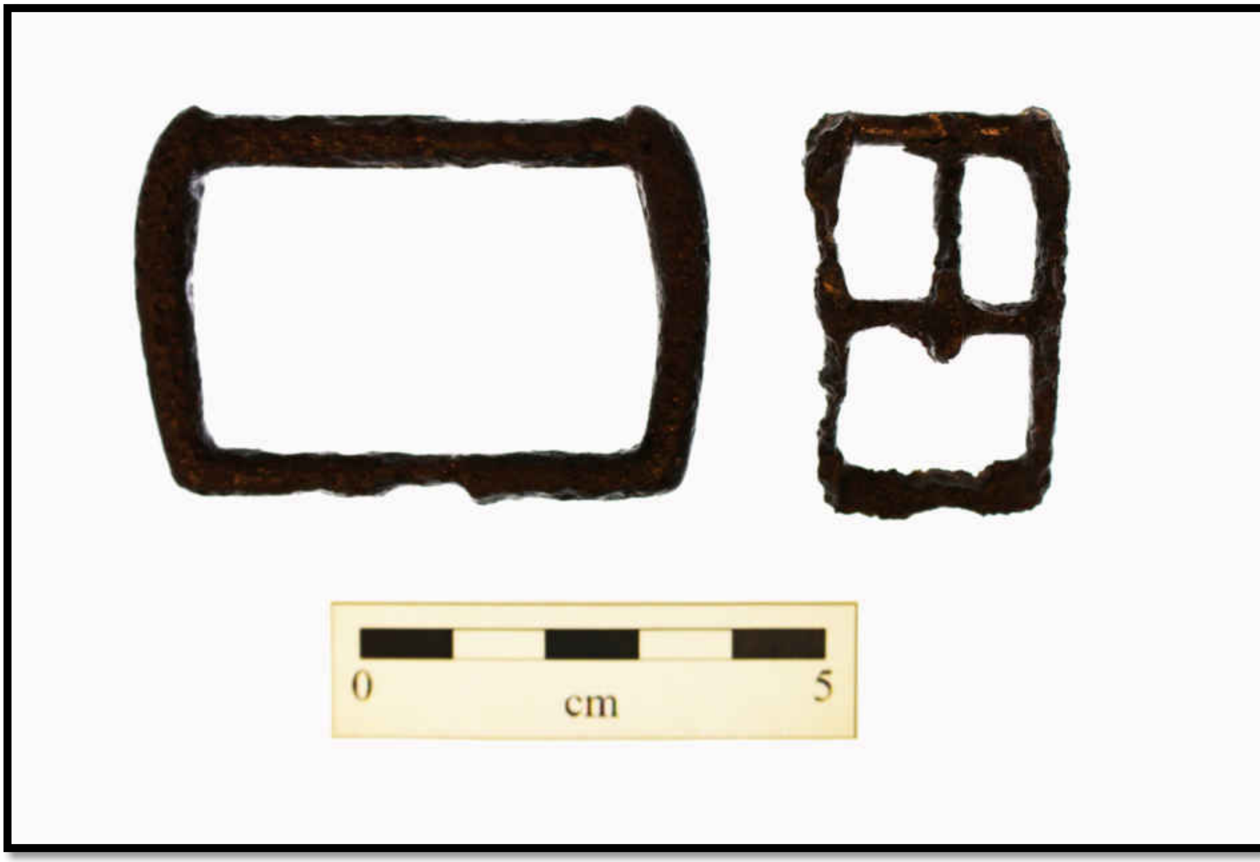


Figure 16: Belt buckle (left) and horse bridle buckle (right)

Magnetometer

The magnetometer survey of the field in which Area 4 is located covered a 220 m x 80 m block. This included a 140 m x 80 m block in addition to Area 4 (Fig. 17). The data from the additional 140 m x 80 m block was not part of this thesis research, but was recovered by Dr. Bigman in the hope that it would yield some positive data concerning Confederate loci outside of the stockade walls. The majority of the area was revealed to contain a 20th century sewage drain field.

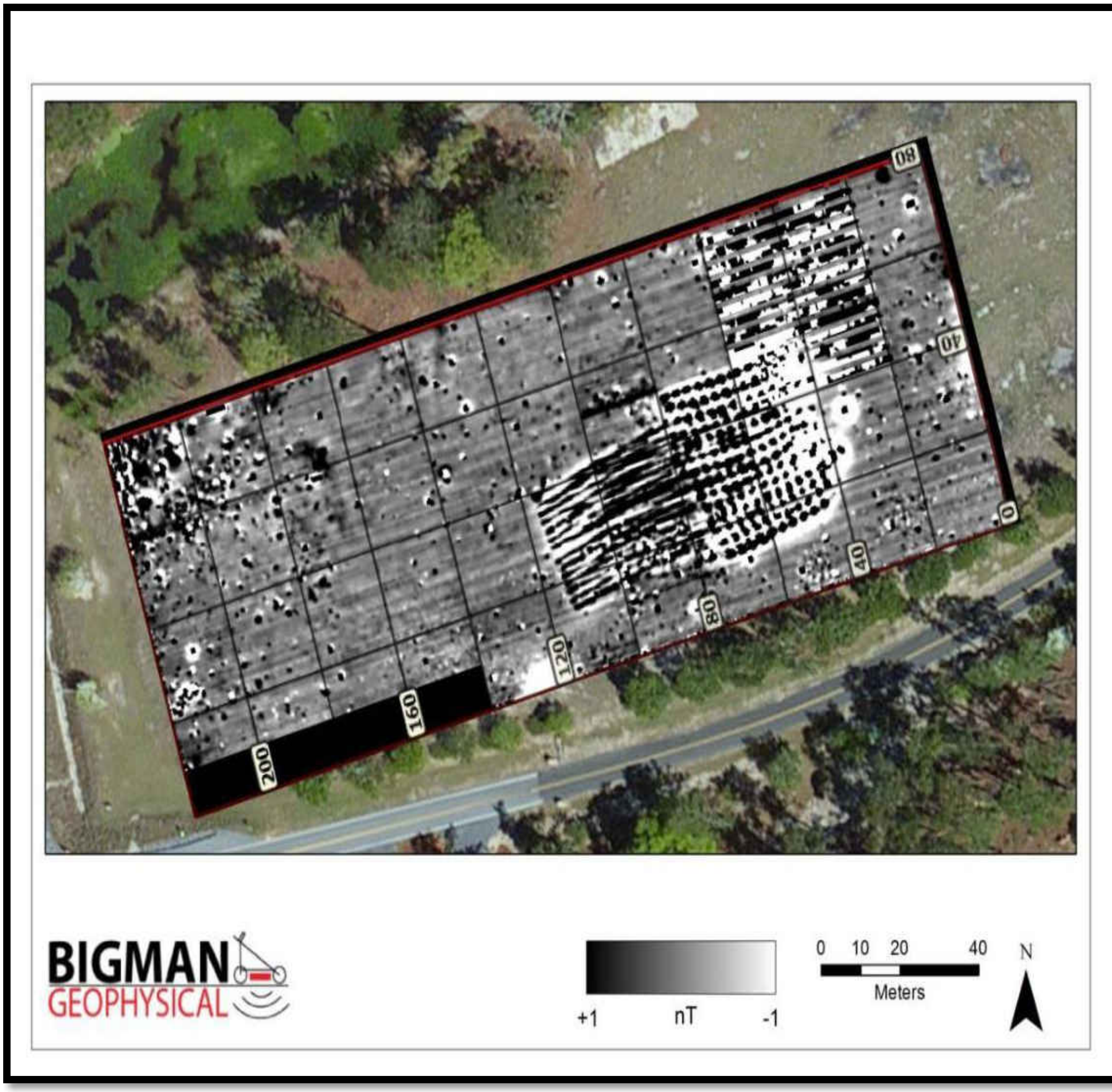


Figure 17: Magnetometer survey of Area 4 and larger area

Dr. Bigman offered his interpretation of the anomalies detected by the magnetometer (Fig. 18). Numerous isolated dipolar anomalies are distributed across Area 4. It is impossible to distinguish between historic and modern sources for these anomalies. However, the magnetometer recorded three possible artifact clusters in Area 4. One cluster is located in the northeast corner; the second is approximately 20 meters north of the southwest corner; and the third cluster is in the northwest corner.

Numerous mono-polar magnetic anomalies, interpreted as pit features by Dr. Bigman, are located throughout the survey area and range in size. Smaller mono-polar anomalies recorded may indicate remains of graves, fire pits or decayed post holes. The vicinity of area had been a pine stand which was logged in 2012, and it is likely that at least some anomalies are the products of bioturbation. However, even recent bioturbation has been shown to have little impact on magnetic susceptibility (Ellwood 1984). Bioturbation may be represented in the magnetometer data as small pits. Larger anomalies may represent possible pits or ditches of Civil War origin.

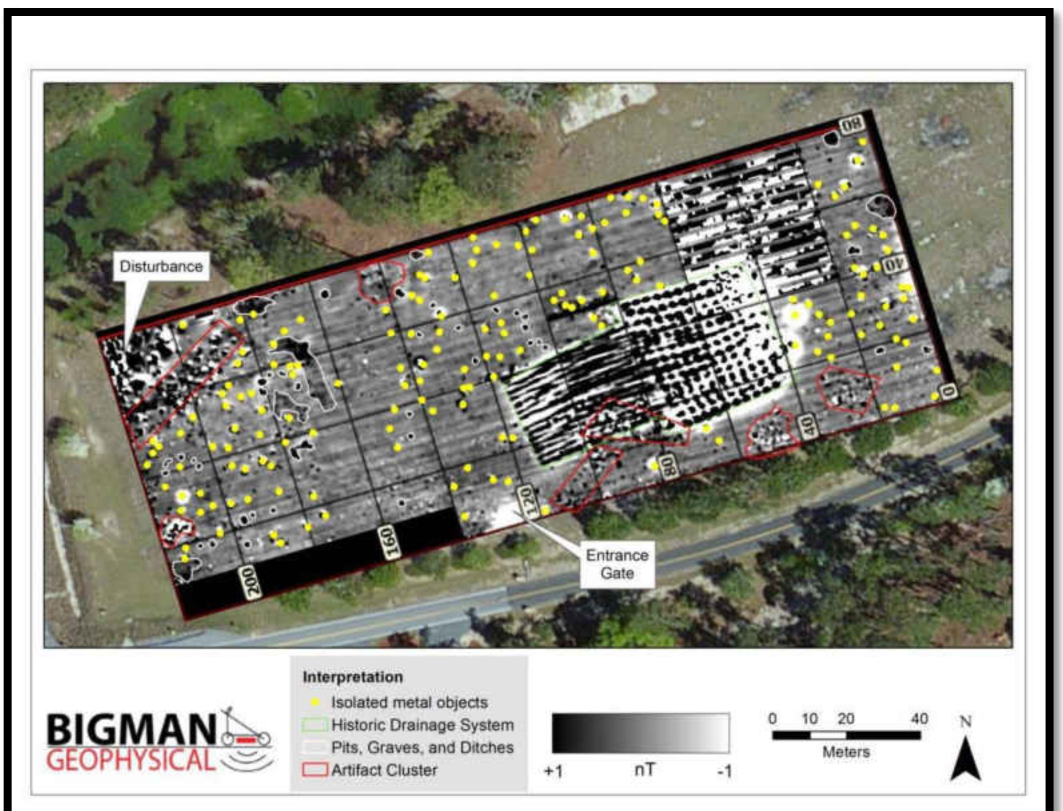


Figure 18: Area 4 magnetometer survey data with interpretations

Phosphate Testing

One hundred ninety-six soil samples from Area 4 were processed. The lowest level of total soil phosphorous recorded was 0.10 mg/kg. The highest levels recorded are 3.30mg/kg, which is the highest level the colorimeter used can detect. Of those processed, 24 samples (12.24%) were above 2 mg/kg, 20 samples (10.2%) were between 1.05 mg/kg and 1.97 mg/kg, and 152 samples (77.55%) were below 1 mg/kg (Table 6).

Transect	STP	Zone	Phosphate Level Reading (mg/kg)
1	1	B	3.3
1	3	C	3.3
3	6	A	3.3
3	6	B	3.3
3	7	A	3.3
5	1	A	3.3
7	7	A	3.3
17	1	A	3.03
7	7	C	3.02
1	1	A	2.97
3	5	A	2.83
3	8	B	2.8
11	7	A	2.7
5	1	B	2.67
7	3	A	2.64
3	6	C	2.6
17	2	B	2.51
3	2	C	2.5
3	9	A	2.39
9	1	A	2.36
3	8	A	2.16
7	8	A	2.12
7	7	B	2.06
1	3	B	2.03

Table 6: Area 4 soil phosphate values over 2 mg/kg

Of the 24 samples with soil phosphate values above 2 mg/kg, 15 samples, or 62.5%, were from the three northernmost shovel testing transects, parallel with the spring creek. This trend continued among all three soil zones.

Zone A soil phosphate levels have large concentrations along the STP 1 line for Transects 1, 3, 5, 7, and 9, and another concentration in the northwest corner along Transect 3 from STPs 5 through 9, and extending south to roughly STPs 7 through 9 on Transect 7 (Fig. 19). This zone contained 4 samples which were beyond the limit of the colorimeter to detect: STPs 6 and 7 on Transect 3, STP 1 on Transect 5, and STP 7 on Transect 7.

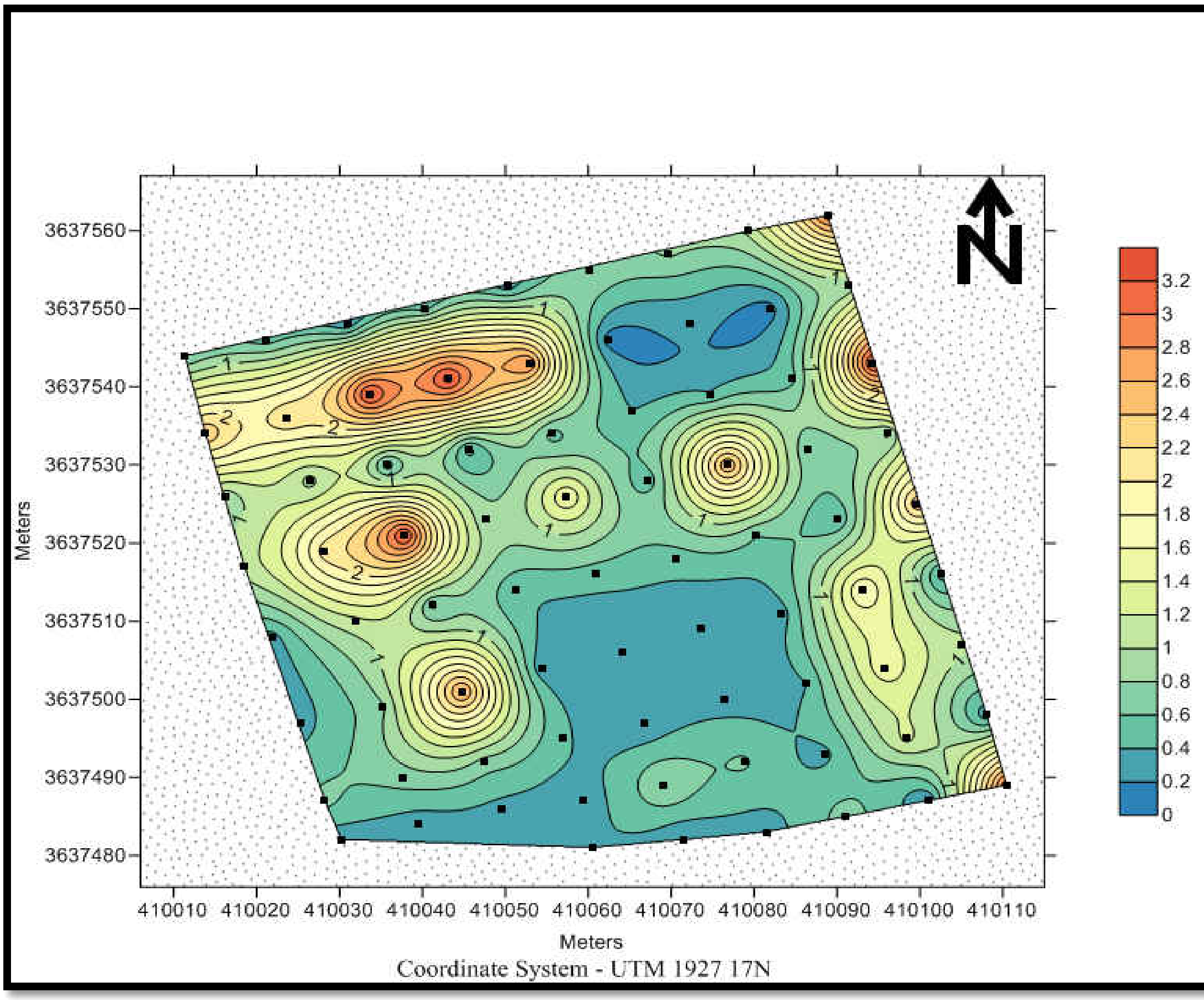


Figure 19: Area 4 Zone A soil phosphate values

The soil phosphate levels for Zone B continue this trend in the northeast and northwest corners (Fig. 20). This zone contained two samples beyond what the colorimeter can detect: STP 1 on Transect 1 and STP 6 on Transect 3.

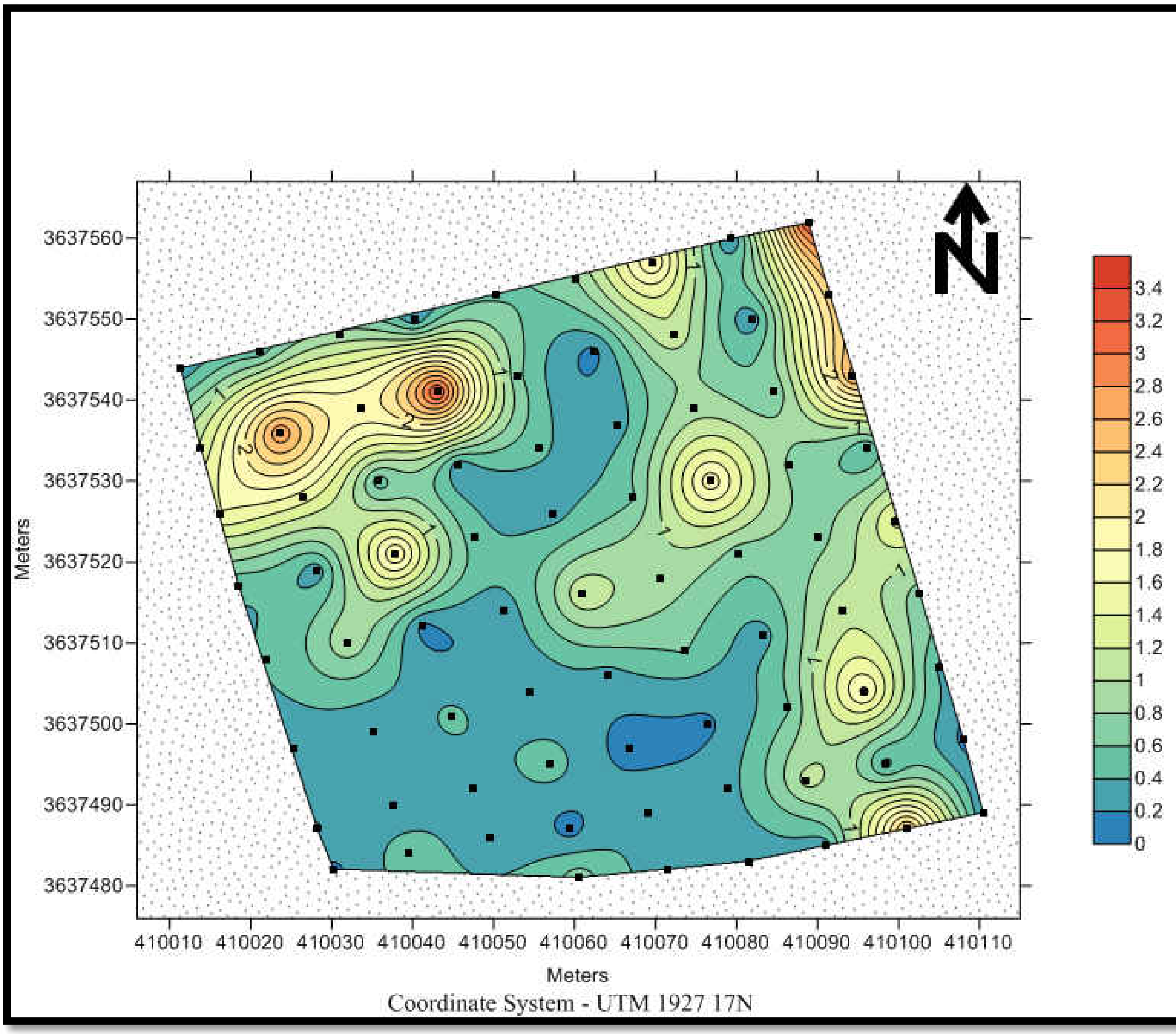


Figure 20: Area 4 Zone B soil phosphate values

Zone C sees this trend largely continued, although the levels for the northeast corner appear to be lower than in Zone A or Zone B (Fig. 21). The northwest corner however, appears to maintain the relative elevated levels. Zone C contained one sample beyond the capabilities of the colorimeter. This was STP 3 on Transect 1.

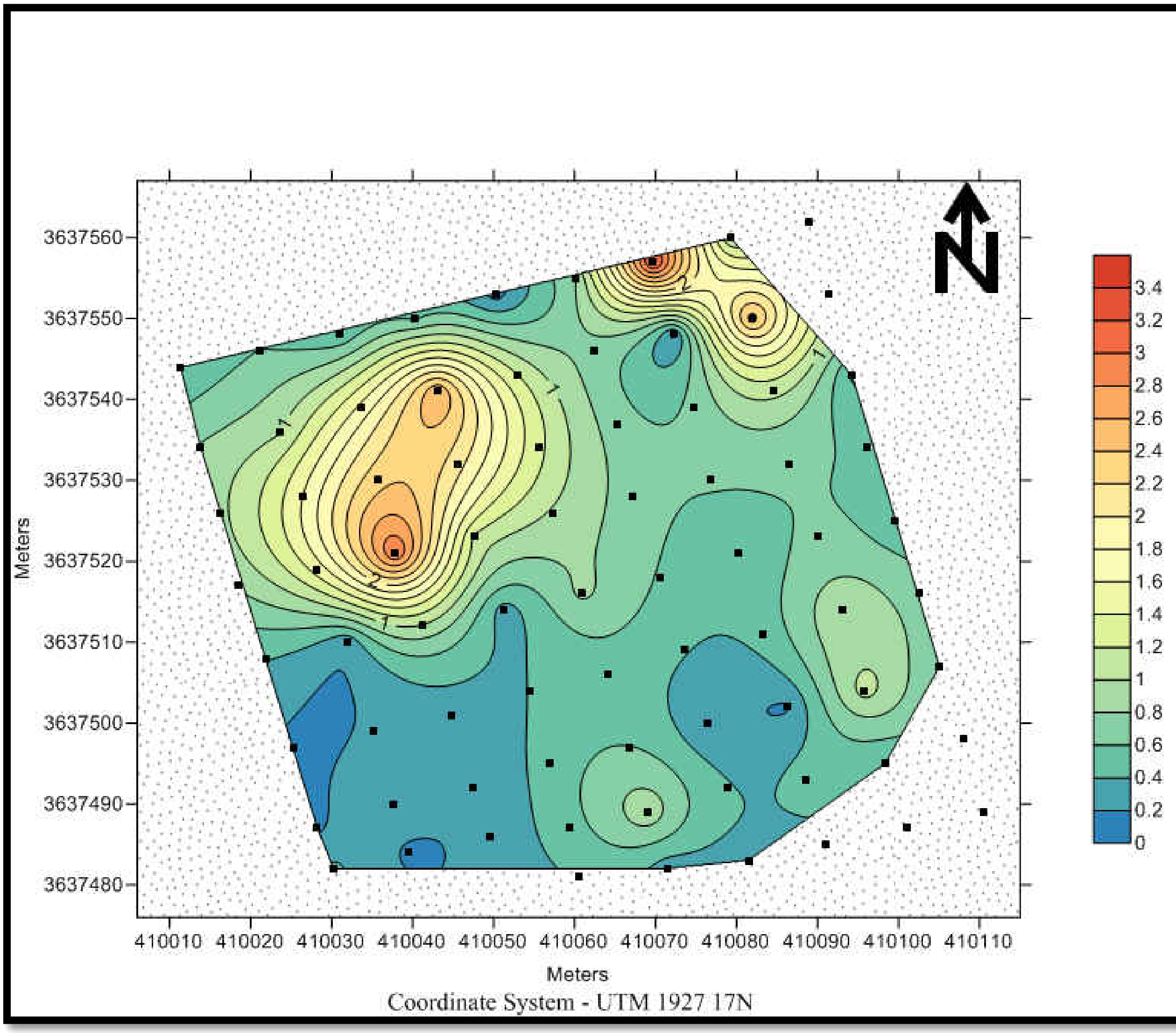


Figure 21: Area 4 Zone C soil phosphate values

Higher concentrations of soil phosphates do not appear to be related to aberrations in soil coloration. In fact, only two of the samples are associated with atypical colors. These are STP 7 on Transect 3 and STP 7 on Transect 11. These two samples were darker than normal soils, and have markedly elevated phosphate values. However, as there are only two samples, there is no discernible pattern. Additionally, few buried soil anomalies were identified through shovel testing, and none of these are associated with phosphate levels above 1 mg/kg.

There were only two samples with phosphate levels above 2 mg/kg associated with shovel tests which yielded artifacts, but neither of the soil samples came from the zones from which the artifacts were recovered. The horse bridle buckle, belt buckle, and large knife fragment from the metal detection survey were all recovered from the northwestern corner of the area containing the higher phosphate values. These artifacts are probable period artifacts from the mid-19^{th} century.

LiDAR

Initial pedestrian survey of Area 4 showed it to have an elevated, level shelf situated roughly in its center (Fig. 22). It was not until a DEM was generated from terrestrial LiDAR scans that this landform was revealed to instead be a ridge of higher elevation, not a flat plain.

Figure 22: Digital elevation model of Area 4

The soils between STPs 5 and 6 on Transect 1 showed a layer of significantly darker coloration. Potential explanations for this will be discussed in the following section under excavation Units 15 and 16.

Excavation Units

Three excavation units were placed in Area 4. Two, Units 15 and 16, were placed to investigate atypical soil horizons found to stretch from STP 5 to STP 6 on Transect 1. Excavation Unit 20 was placed where multiple lines of evidence suggested a likely location for evidence of human occupation (Fig. 23).

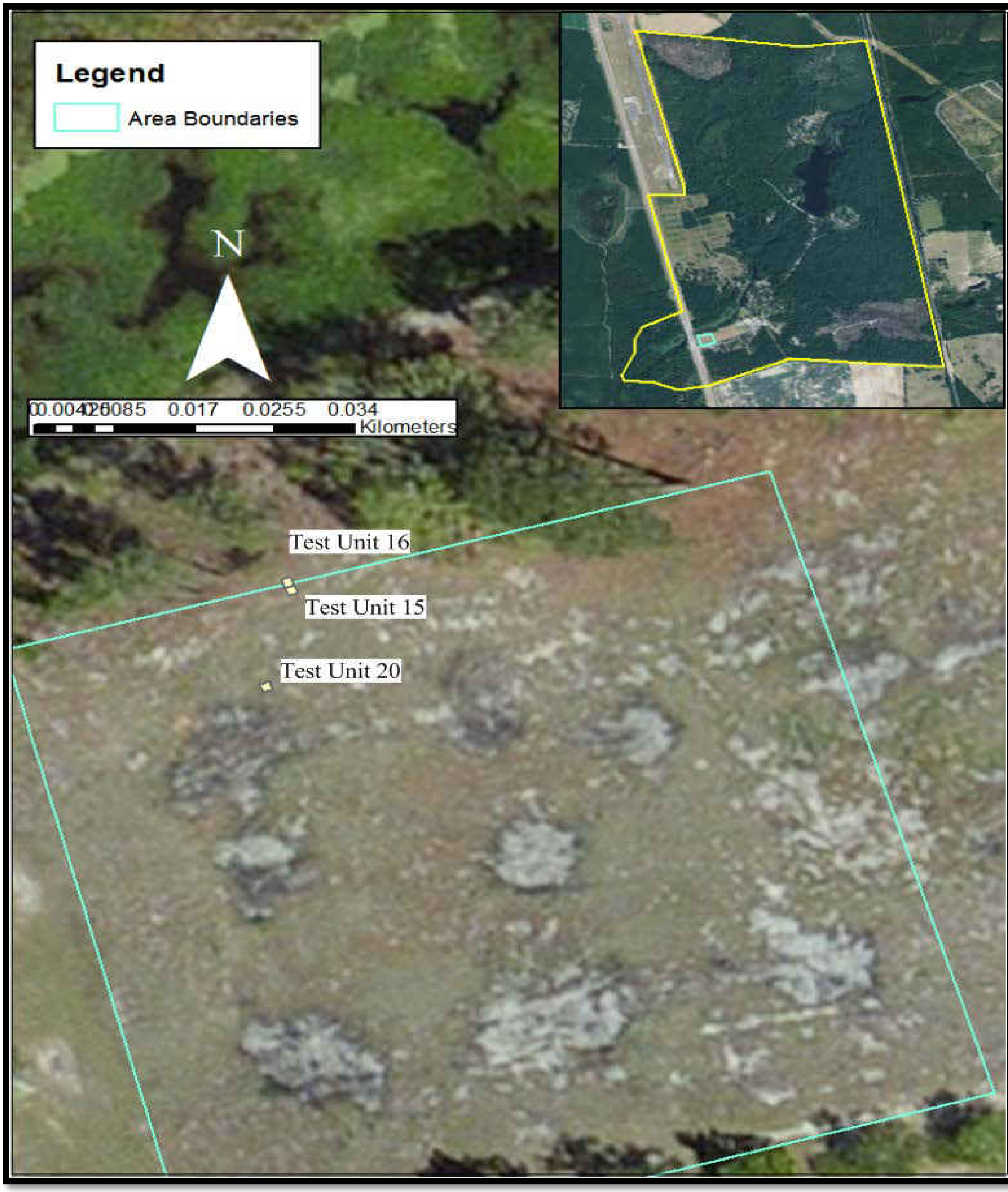


Figure 23: Locations of Area 4 test units

Excavation Unit 15 was a 1 m x 1 m unit situated on the Transect 1 line with STP 6 at its center. This unit was placed primarily to investigate the dark banding present in the shovel test. The unit was dug to a depth of 68 cm below 10 cm elevated datum. Levels A and B were excavated in natural strata. 10 cm arbitrary levels began in Level C. There were several zones of alternating sandy silt and sandy loam soils present in the floor of the unit as well as profile walls. The most pronounced lensing occurred in the southern wall. One small shard of light green glass was recovered from near the northern wall in Level B.

Test Unit 16 was a 1 m x 1 m extension of the southern wall of Unit 15. Unit 16 was excavated to a depth of approximately 150 cm below datum. The first two levels of Unit 16 were excavated in natural strata, and the seven zones of Level C were excavated in 10 cm arbitrary levels. The proximal section of a wire nail was recovered from the western wall of Level C, Zone 6. Soils near the base of Zone 7 had a distinct chemical odor. This is possibly due to the presence of petroleum.

Soil lensing was similar but more pronounced in test Unit 16 than test Unit 15 (Fig. 24, 25, and 26). The most prominent lensing occurred in the southwestern corner, where lensing from each soil zone continued along the southern and western profile walls (Fig. 27). Soil coring showed these soils to continue down another 80cm. Due to the stark breaks in soil zones and the recovered wire nail, the lensing was determined to be the result of soil deposition from backfilling, probably from CCC activity.

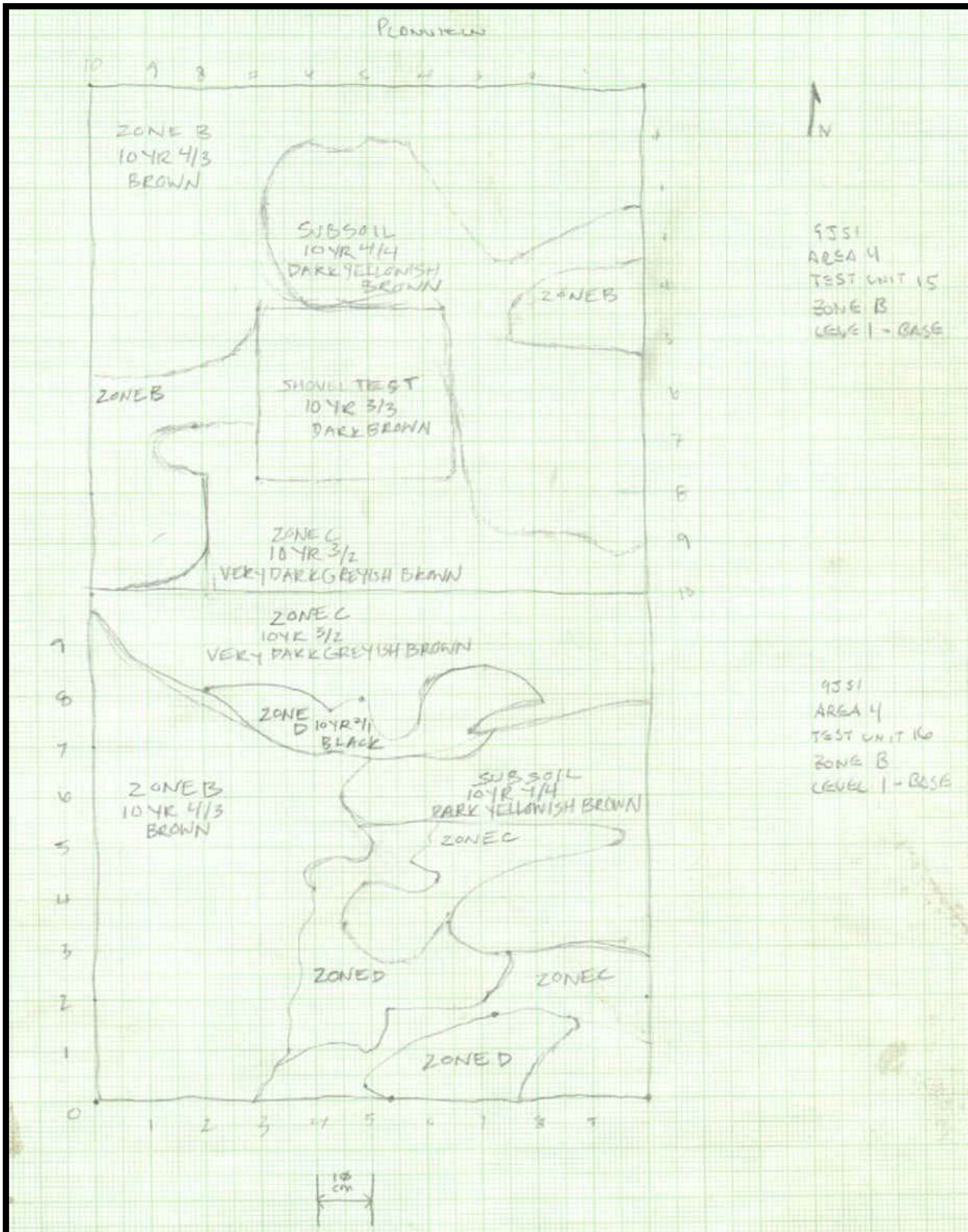


Figure 24: Planview drawing of test Units 15 (top) and 16 (bottom); Zone B, Level 1

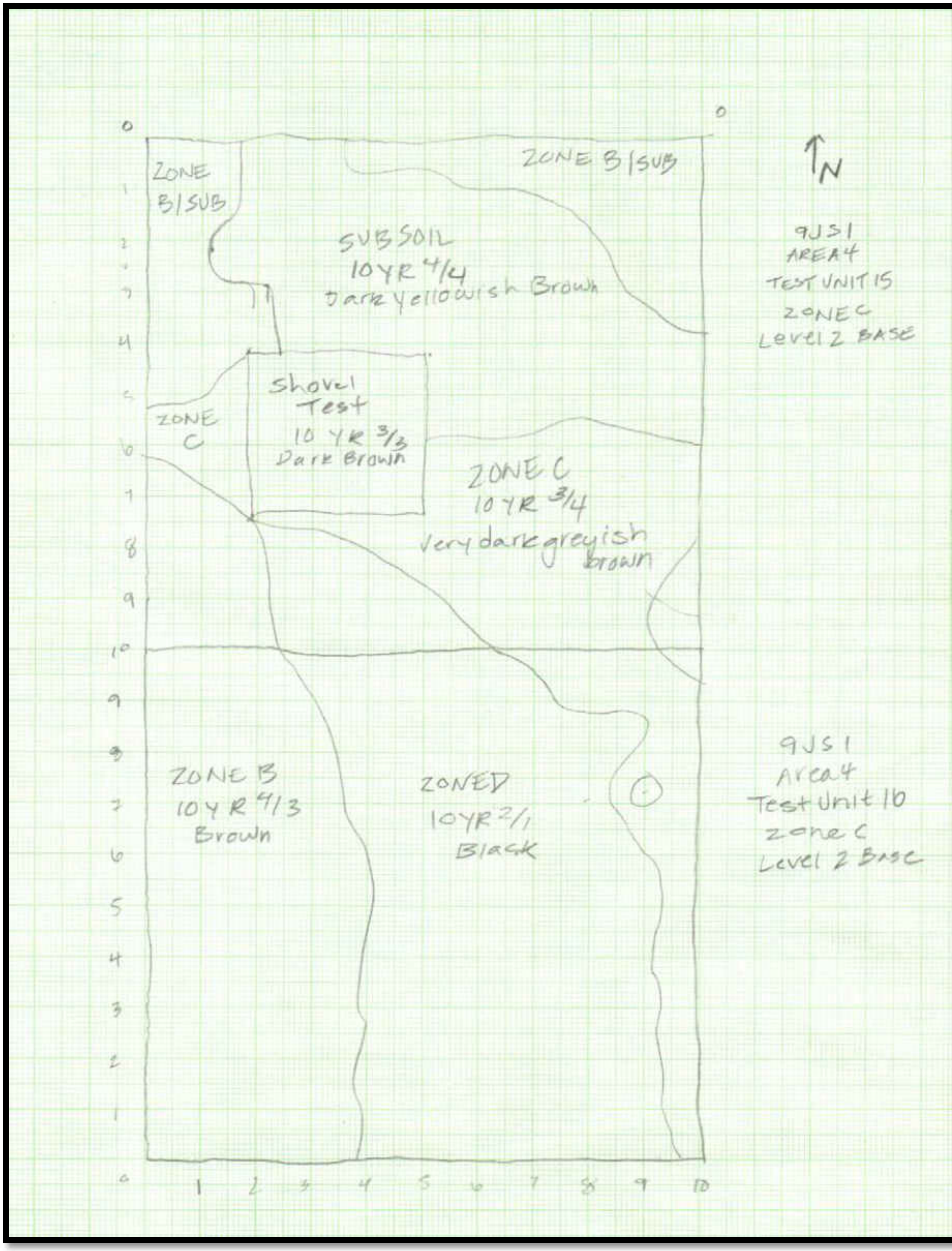


Figure 25: Planview drawing of test Units 15 (top) and 16 (bottom); Zone C, Level 2

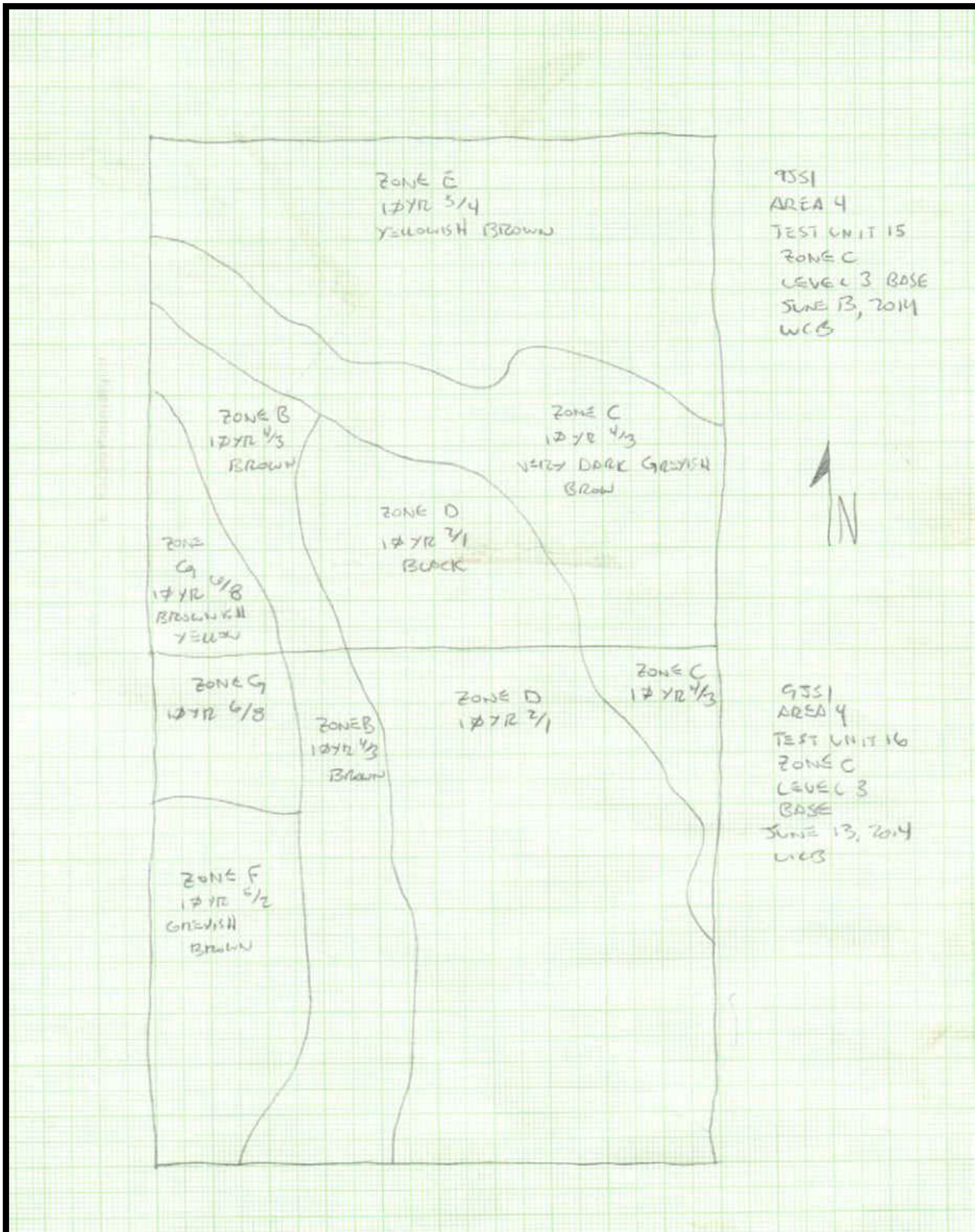


Figure 26: Planview drawing of test Units 15 (top) and 16 (bottom); Zone C, Level 3

Figure 27: Soil staining in excavation Units 15 (right) and 16 (left)

The higher-elevation ridge running roughly north-south through the center of Area 4 closely matches the direction of a drainage ditch present in Area 6, immediately to the south. It is known from historical documentation that the CCC conducted dredging of the nearby spring creek and leveled the field in which Area 4 sits. Therefore, it is probable that the soil deposition present in excavation Units 15 and 16 is the result of backfilling this natural drainage ditch.

Unit 20 was selected because it was the intersection of multiple lines of evidence for human occupation. Relative phosphate levels along Transect 3 were elevated, with STP 6 having among the highest levels throughout soil Zones A, B, and C. Additionally, the two potential Civil War-era artifacts from the metal detection survey, the horse bridle buckle and the belt buckle, were recovered from near STPs 4 and 9 on Transect 5, respectively. Finally, the magnetometer survey revealed numerous magnetic anomalies considered to be artifact clusters (Bigman and Greene 2015). All of this made the entire northwestern portion of Area 4 a likely candidate for further investigation for signs of human occupation.

Excavation Unit 20 was located halfway between STPs 6 and 7 on Transect 3. It was excavated to a depth of approximately 54 cm below datum (Fig. 28). The only artifacts recovered were a modern fence staple from the base of Zone 1, Level 1 (27 cm below datum) and a small chert flake from Zone 1, Level 2. Despite being located near the edge of the high-elevation ridge bisecting Area 4, Unit 20 did not have atypical soil profiles (Fig. 29).

Figure 28: Test Unit 20, base of Level 3, Zone 1; closing photograph

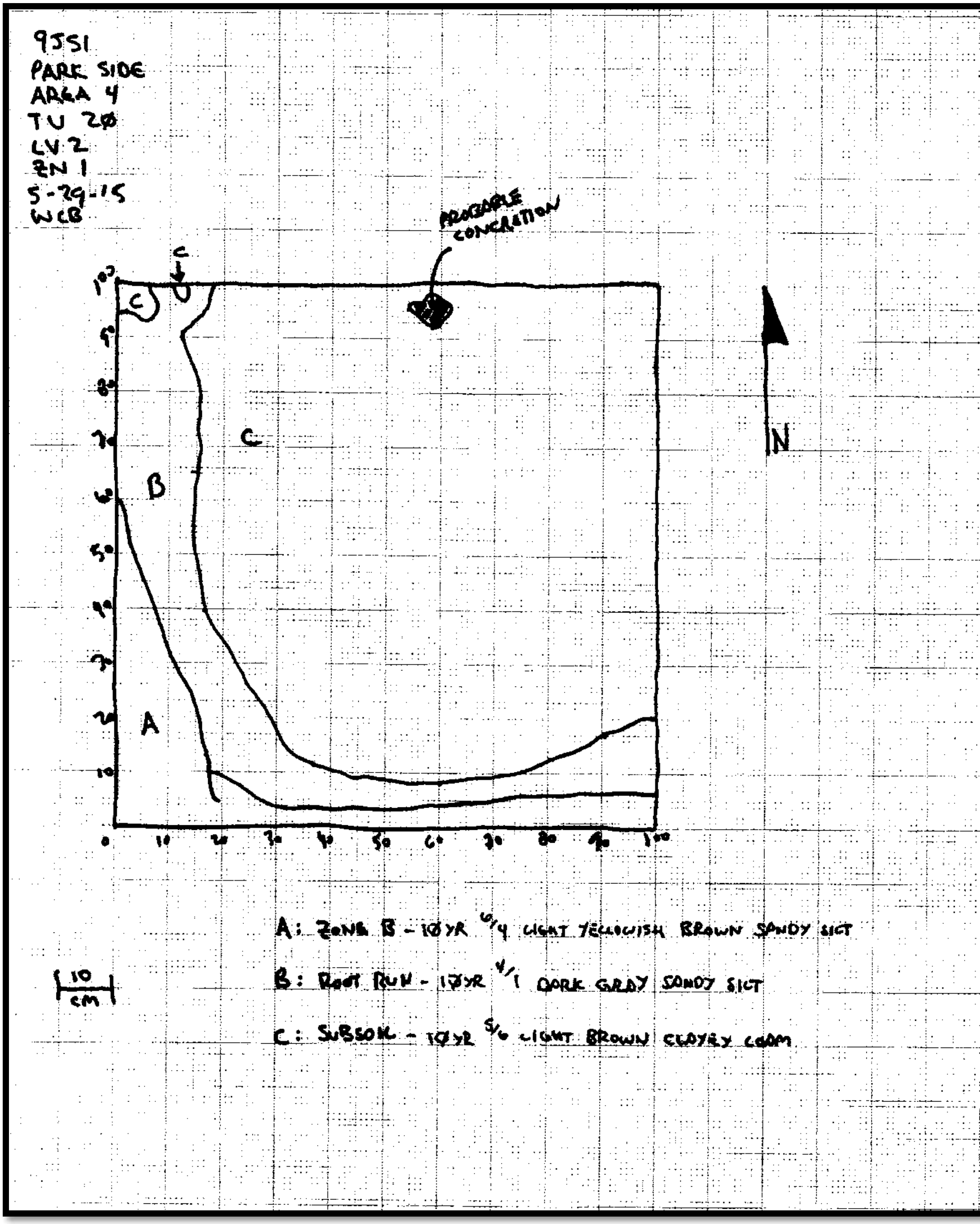


Figure 29: Planview drawing of test Unit 20; Level 2, Zone 1

There was no discernible physical evidence from the excavation to suggest a reason for the high soil phosphate levels in the area. Additionally, the magnetometer survey appeared to have resulted in a false positive; while myriad magnetic anomalies were present in the processed data, they appear to have been the result of large redoximorphic nodules. Redoximorphic features are geological anomalies resulting from alternating periods of reduction and oxidation of iron and manganese within soil. Where these compounds are oxidized and precipitated, they may form hard concretions which possess concentric layers or nodules which have no visible internal structure. Unit 20 revealed a high amount of large iron concretions not identified through any previous fieldwork from any of the four test areas.

Area 5

Shovel Testing

Area 5 contained 25 shovel tests (Fig. 30), 19 (76%) of which were positive (Fig. 31). All but one of the positive shovel tests yielded artifacts which were probably related to the CCC occupation (Table 7). These include brick and mortar fragments, wire nails, and various types of bottle glass. This was not unexpected, as there are not only aerial photographs showing a CCC structure in this area, but evidence of a structural foundation is still present. Of note was STP 5 on Transect 9. This shovel test produced artifacts markedly different from the other positive shovel tests in the area. These include cobalt glass, lantern glass, and medicine vial glass (Fig. 32).

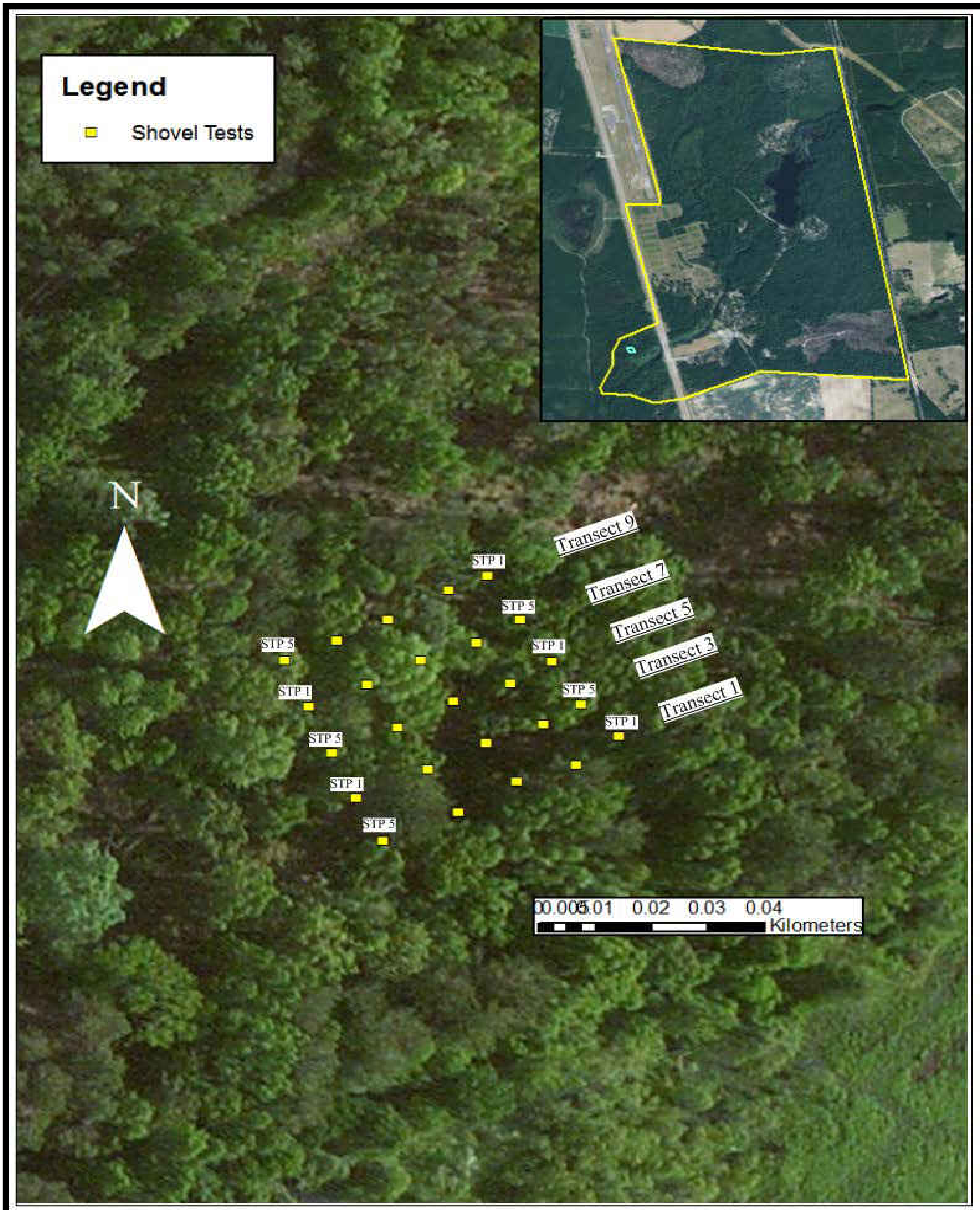


Figure 30: Location of shovel-test pits in Area 5

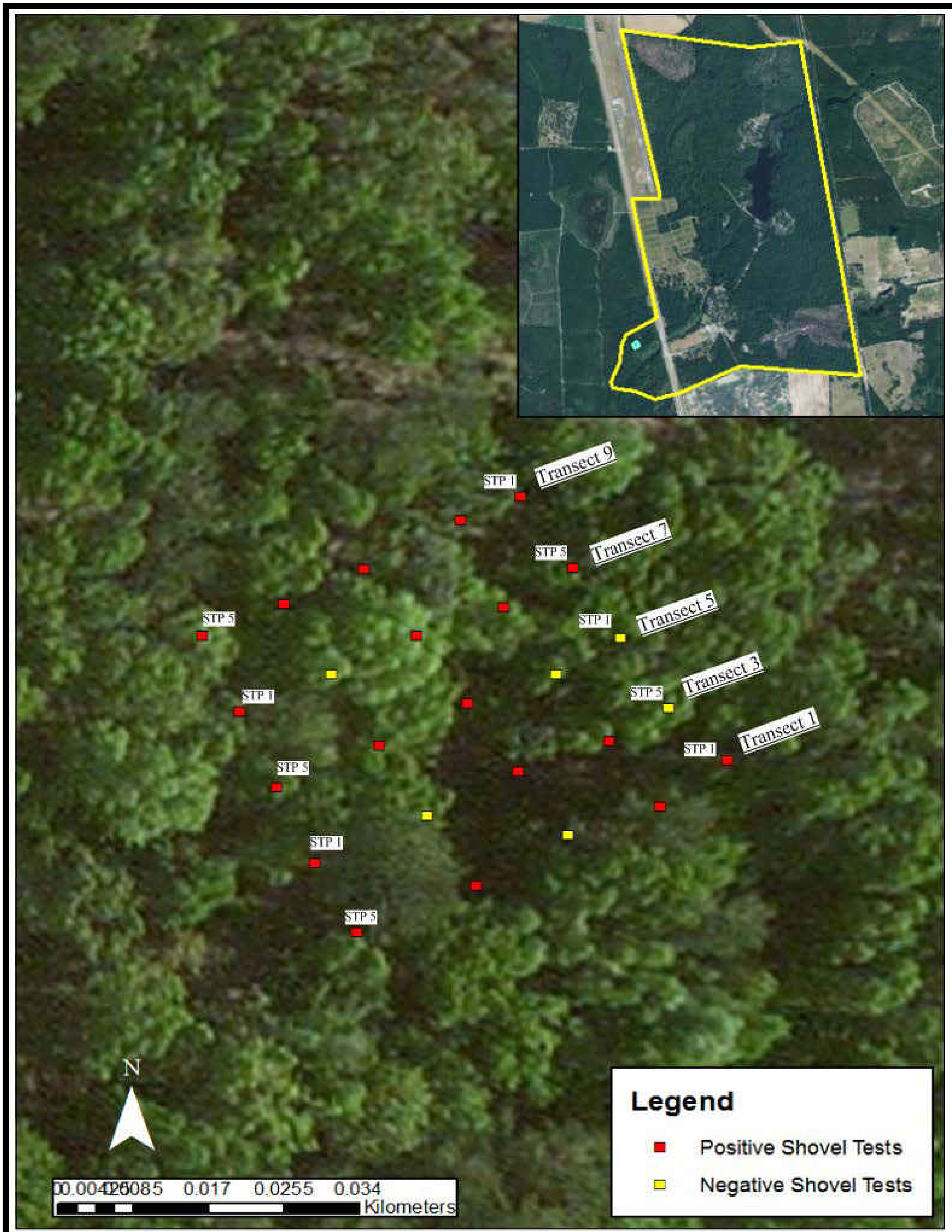


Figure 31: Positive shovel-test pits in Area 5

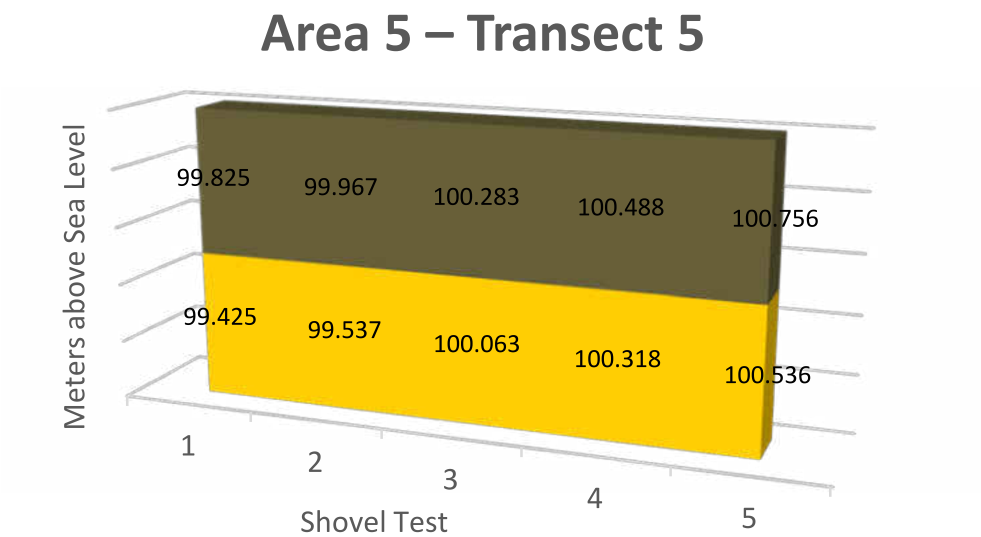
Figure 32: Glass recovered from Transect 9, STP 5

Although the recovered glass fragments from this shovel test were not definitively Civil War-era, they were different enough from the other recovered artifacts to warrant further investigation. The shovel test was expanded to a 50 cm x 50 cm test pit, and more of the cobalt glass was recovered. The test pit was then expanded into a 1 m x 1 m excavation unit and designated test Unit 17.

Transect	STP	Artifacts(s)
1	1	wire nail, .22 cartridge, window glass
1	2	brick fragment, mortar
1	3	clear glass, modern nail
1	4	wire nail, burned chert, iron button, iron corrugated frame fastener
1	5	brick fragment, colorless glass
3	1	brick fragment
3	3	colorless glass, annular whiteware, slag, chert
3	5	milk glass, chert, glass, mortar
5	1	floor tile, chert
5	2	colorless glass, brown glass, nails
5	3	colorless glass, green glass, metal fragment
5	4	wire nail
7	1	green painted brick, colorless glass, brown bottle glass
7	2	colorless glass, brown glass
7	4	blue glass
7	5	slag
9	1	glazed brick fragment, colorless glass
9	2	glass jar, brown glass, slag, tin fragments
9	5	blue glass, medicine vial glass, lantern glass

Table 7: List of positive shovel-tests pits in Area 5

Soils in Area 5 were consistent across the survey grid, but different from Areas 4, 6, and 7; Area 5 has only two soil zones as opposed to three zones in the other areas. The soil zones for Area 5 consist of a 10 YR 4/3 brown sandy silt Zone A and a 10 YR 4/6 dark yellowish brown clayey sand Zone B, or subsoil. The following figure (Fig. 33) is not to scale, and merely represents the soil zones and depths.



	1	2	3	4	5
Zone A	99.825	99.967	100.283	100.488	100.756
Zone B	99.425	99.537	100.063	100.318	100.536

Figure 33: Soil profile of Transect 5, Area 5

Metal Detection

Given the large amounts of CCC-era deposits, it was decided that the CCC occupation could lead to further research. Consequently, to remove so many artifacts associated with that occupation would likely hinder any related research. As a result, metal detection hits corresponding to materials such as aluminum were not investigated since the industrial production of such materials post-dates the Civil War. The metal detection survey for Area 5 recovered no artifacts.

A 20 m x 20 m metal detection extension grid was established north of the northwest corner of Area 5 in order to investigate the different types of artifacts recovered from shovel test 5 on Transect 9. This reconnaissance survey revealed a mixed assemblage of what appeared to likely be CCC and an earlier occupation, likely dating to the late 19th century. A single large iron object was recovered from this reconnaissance survey. Excavation Unit 18 was placed over a shovel test pit in this extension grid in order to investigate the darker soils encountered while excavating the metal detector hits.

Magnetometer

Dr. Bigman found the data collected in Area 5 to be virtually un-interpretable. The magnetometer recorded significant variation across the entire grid; however, some of this variation is likely the result of root disturbance, bushes, and other obstructions limiting the quality of data collection. In addition, historic objects, modern trash, and concrete associated with the CCC encampment were distributed across the survey grid and several small cavities were present on the ground surface (Fig. 34). The magnetometer data provide little useful information to help better understand this area of the site.

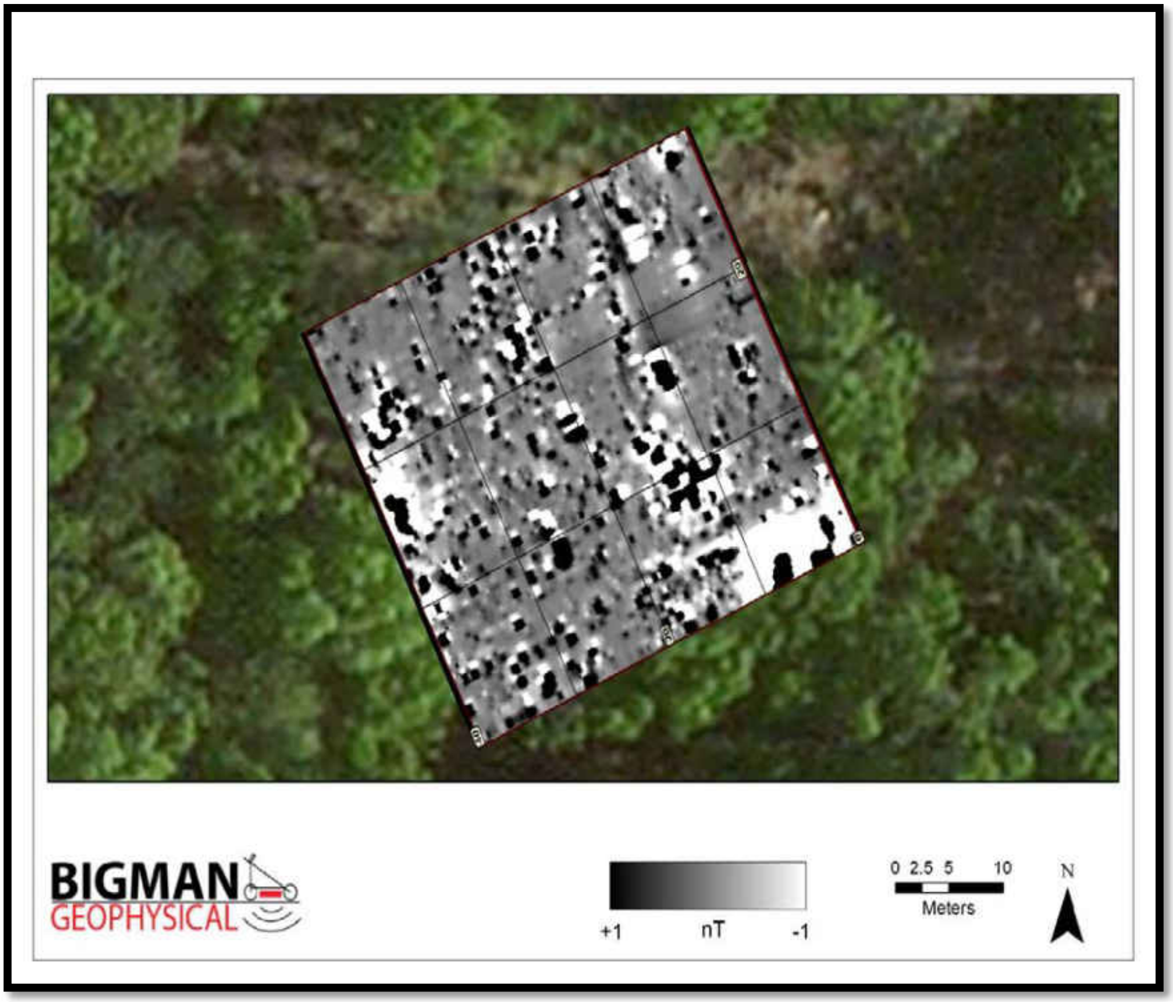


Figure 34: Area 5 magnetometer survey data

Phosphate Testing

Of the 26 soil samples recovered from Area 5 for soil phosphate analysis, only one (3.85%) had a phosphate value above 2 mg/kg (Fig. 35). This comes as somewhat of a surprise considering the recent time period in which a structure had been located in the area. The one shovel test to have a relative soil phosphate level over 2 mg/kg was STP 1 on Transect 1, with a value of 3.02 mg/kg. This elevated reading likely corresponds to a nearby well.

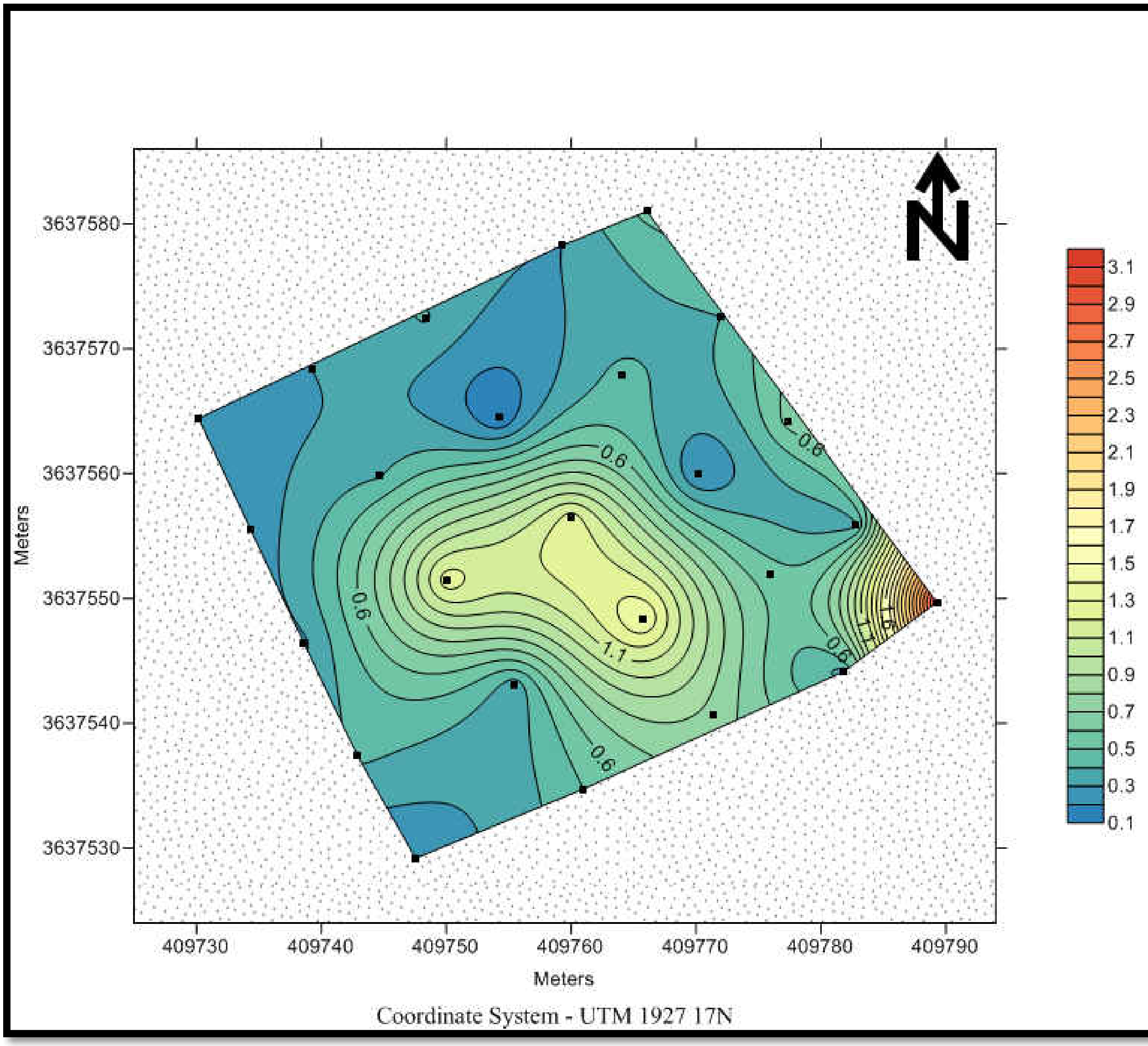


Figure 35: Area 5 Zone A soil phosphate values

LiDAR

Terrestrial LiDAR scans of Area 5 revealed little that could not already be discerned by the naked eye. This is potentially due to the presence of a CCC structure, which might have resulted in a general leveling of the ground surface. What can be seen from the DEM is that the eastern side of the area has a higher elevation than the west, with the general trend being that the southwest section has a lower elevation (Fig. 36). There appears to be a trench running northeast-southwest near the northwestern corner of the area. This linear depression is a drainage ditch and is probably natural in origin.

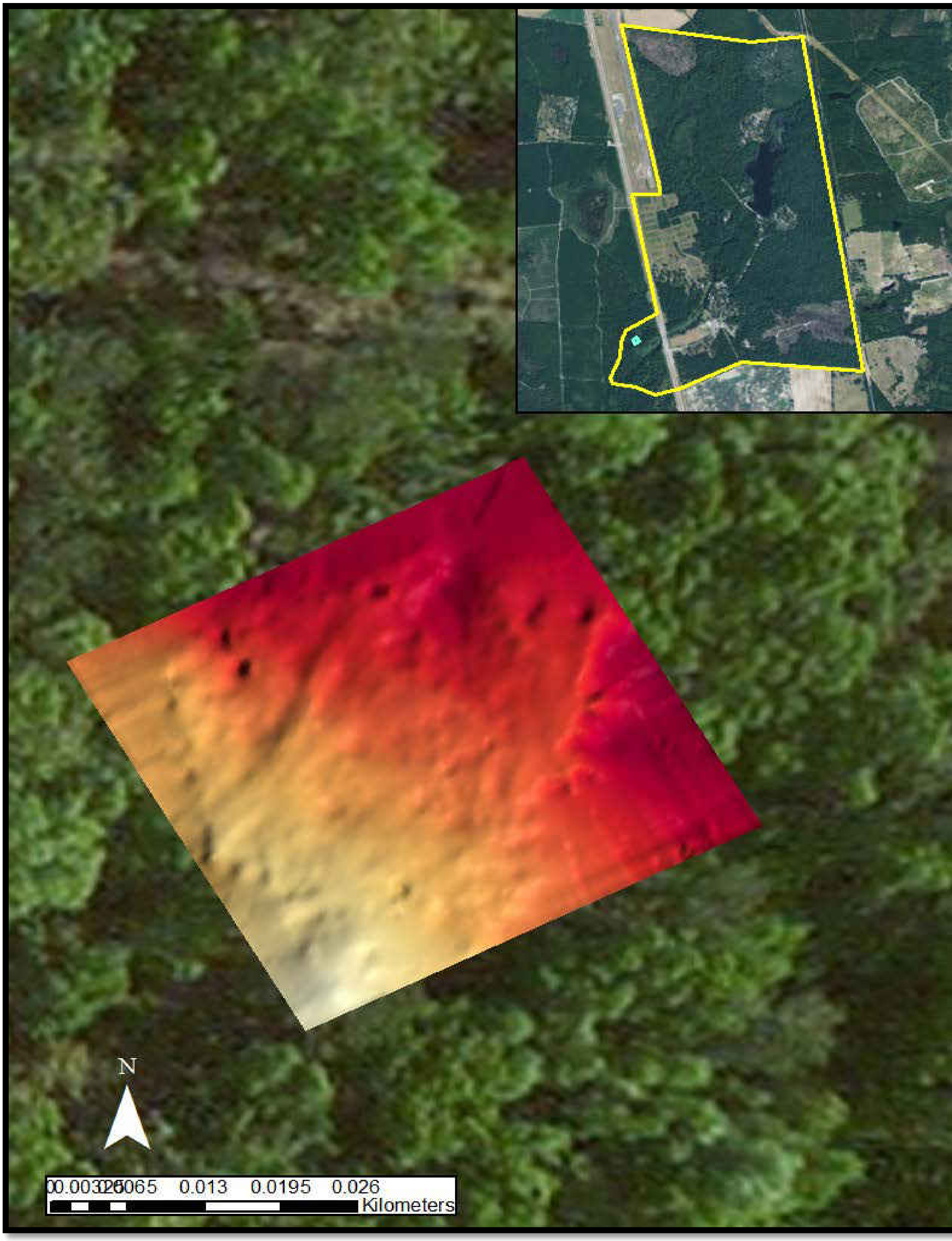


Figure 36: Digital elevation model of Area 5

Excavation Units

Excavation Units 17 and 18 were placed near each other in the northwest corner of the survey area. Unit 17 was placed over STP 5 on Transect 9 and Unit 18 was placed a short distance northeast of that location in the Area 5 extension (Fig. 37).

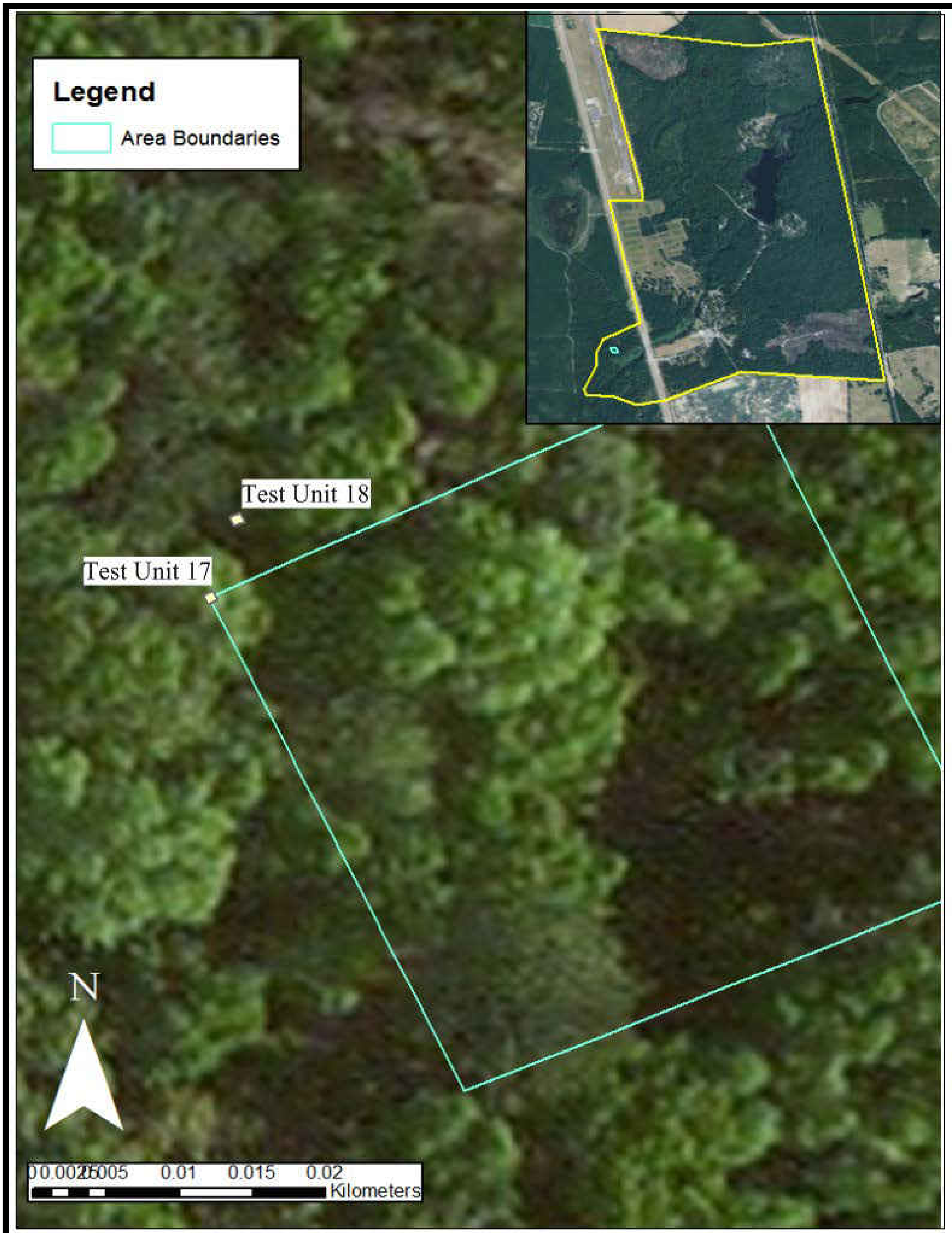


Figure 37: Locations of excavation units in Area 5

Excavation Unit 17 was an enlargement of the 50 cm x 50 cm extension of STP 5 on Transect 9 in order to further investigate the potential mid-19th century artifacts recovered from the shovel test (Fig. 38). The unit was excavated to a depth of approximately 55 cm below elevated datum. Additional dark blue glass and lantern glass were recovered from the Zone A soils. No artifacts were recovered from Zone B. Soil zone colors and depths remained consistent and no cultural features were found.

Figure 38: Test Unit 17, base of Zone B, Level 1; closing photograph

Unit 18 was excavated approximately five meters east of Transect 9 in the Area 5 extension. Although slightly beyond the survey grid boundaries, the unit was placed where multiple lines of evidence overlapped. This area contained potential 19th century artifacts recovered from the metal detection extension survey and was near STP 5 of Transect 9, where test Unit 17 was excavated (Fig. 39).

Figure 39: Test Unit 18, closing photograph

A number of artifacts predating the CCC occupation were recovered in the area (Table 8). The identifiable artifacts were largely domestic in nature, including burned amber bottle glass, colorless bottle glass, brick fragments, an iron pill container, a clothing fastener, and a milk glass cream bottle. These artifacts combined with the nearby dark blue glass, lantern glass, and vial glass from Unit 17 appear to not be related to the CCC occupation. However, they are also likely not associated with any Confederate occupation. Instead, it was determined that these artifacts likely originated from a late-19th century tenant farm house.

Artifact(s)	Count
Cloth fastener	1
Aluminum grommet	1
Cold cream jar	1
Brick fragment	1
Glass fragments	3
Pill container	1
Unidentified aluminum	1
Bottle glass fragments	14
Wire nail	1
Bundle of copper wire	1
Unidentified iron pieces	3

Table 8: Artifacts from test Unit 18

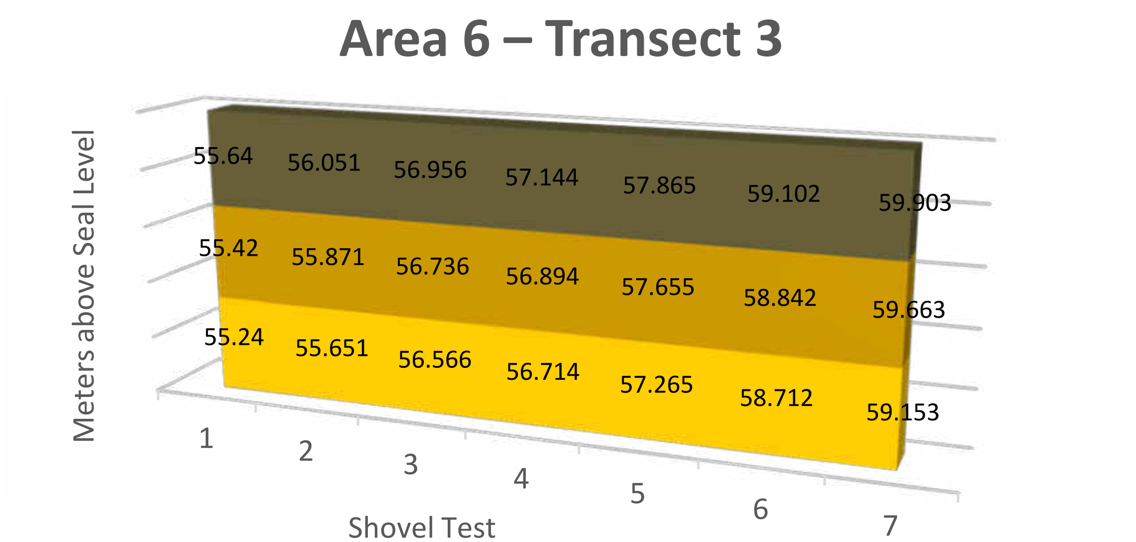
Area 6

Shovel Testing

Area 6 had a total of 21 shovel tests (Fig. 40), all of which were negative.

Figure 40: Locations of shovel-test pits in Area 6

Soils across Area 6 were consistent, with a 10 YR 4/2 dark grayish brown sandy silt Zone A, and 10 YR 4/6 dark yellowish brown sandy silt Zone B over a 10 YR 5/6 light brown clayey loam subsoil (Fig. 41). The following figure is not to scale.



	1	2	3	4	5	6	7
Zone A	55.64	56.051	56.956	57.144	57.865	59.102	59.903
Zone B	55.42	55.871	56.736	56.894	57.655	58.842	59.663
Zone C	55.24	55.651	56.566	56.714	57.265	58.712	59.153

Figure 41: Soil profile on Transect 3, Area 6

Metal Detection

The metal detecting survey of Area 6 yielded a total of 11 artifacts, two of which were recovered during a reconnaissance sweep of the landform prior to it being selected as a test area (Fig. 42). These two artifacts were an impacted lead shot and a fragment of lead sprue recovered approximately 10 meters north-north east from STP 1 of Transect 1. They were believed at the time to have been contemporary with the Confederate occupation, but there is now some doubt due to the amount of Civil War re-enactor material recovered during this research. Location data for some artifacts was not recorded by previous field crews.

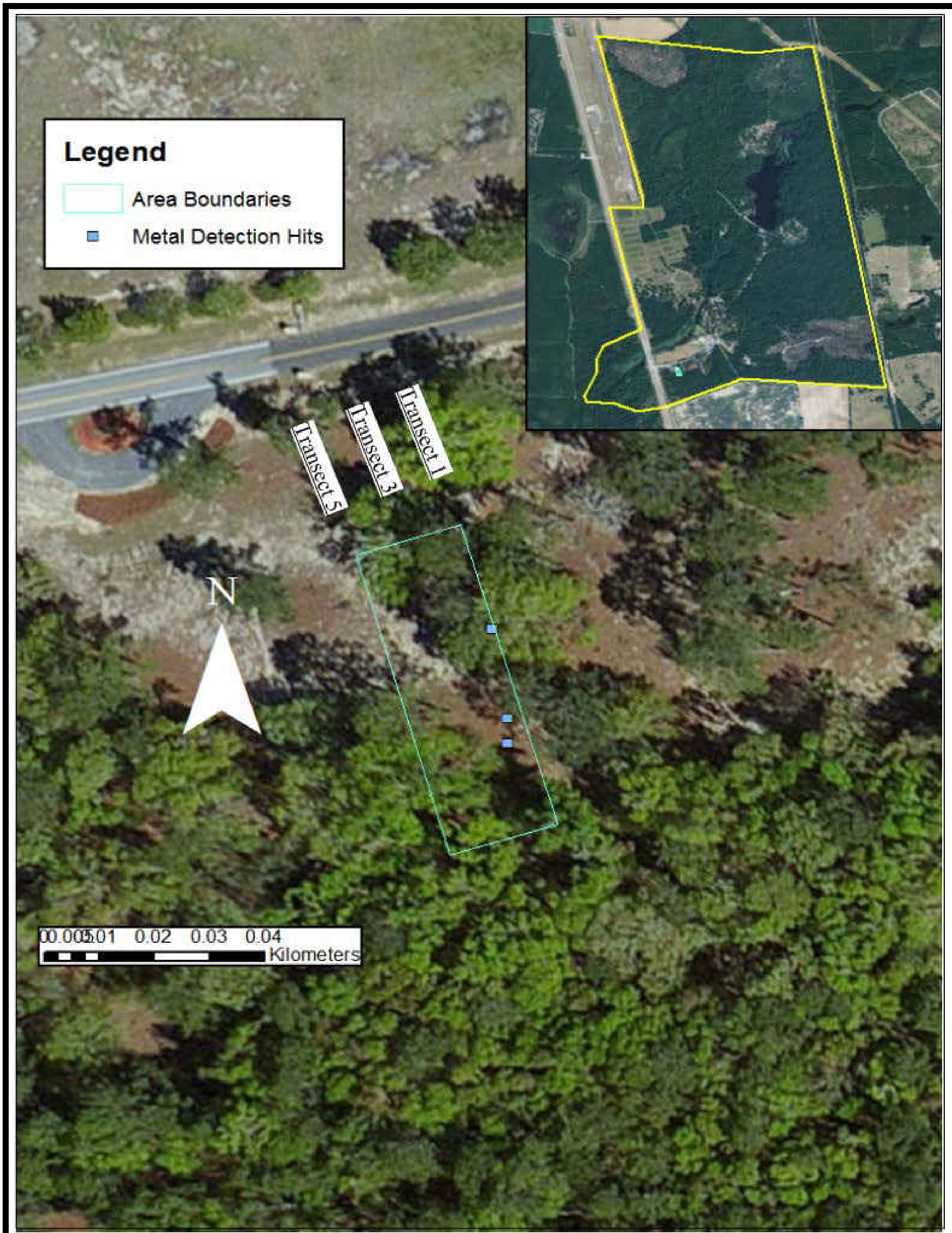


Figure 42: Recovered artifacts from Area 6 metal detection survey

The metal detection survey of the area revealed only probable CCC-related artifacts or modern trash (Table 9). One metal detection hit within the drainage ditch led to the discovery of a CCC trash dump.

Transect	MDR	Depth	Artifact(s)	Count
-	1	5 cmbs	Lead shot	1
-	1	5 cmbs	Lead sprue	1
1	1	6 cmbs	Wire nail	1
1	2	5 cmbs	Ferrous wire	1
1	3	4 cmbs	Horseshoe	1
1	4	21 cmbs	Ferrous wire	1
1	4	21 cmbs	Milk glass	1
1	4	21 cmbs	Metal sheet	1
5	1	3 cmbs	Iron bolt	1
5	2	8 cmbs	Possible cut nail fragment	1
5	3	6 cmbs	Cut nail	1

Table 9: Artifacts from Area 6 metal detection survey

Magnetometer

Magnetometry revealed several anomalies interpreted as metallic objects (Bigman and Greene 2015). However, these were not revealed by the metal detecting survey. The survey also identified a large anomaly in the southern portion of the test area, potentially a large artifact cluster, and a smaller anomaly north-northwest of this in the drainage ditch (Fig. 43). These two artifact clusters are likely the result of CCC trash dumping in the area revealed by the metal detection survey, mentioned previously.

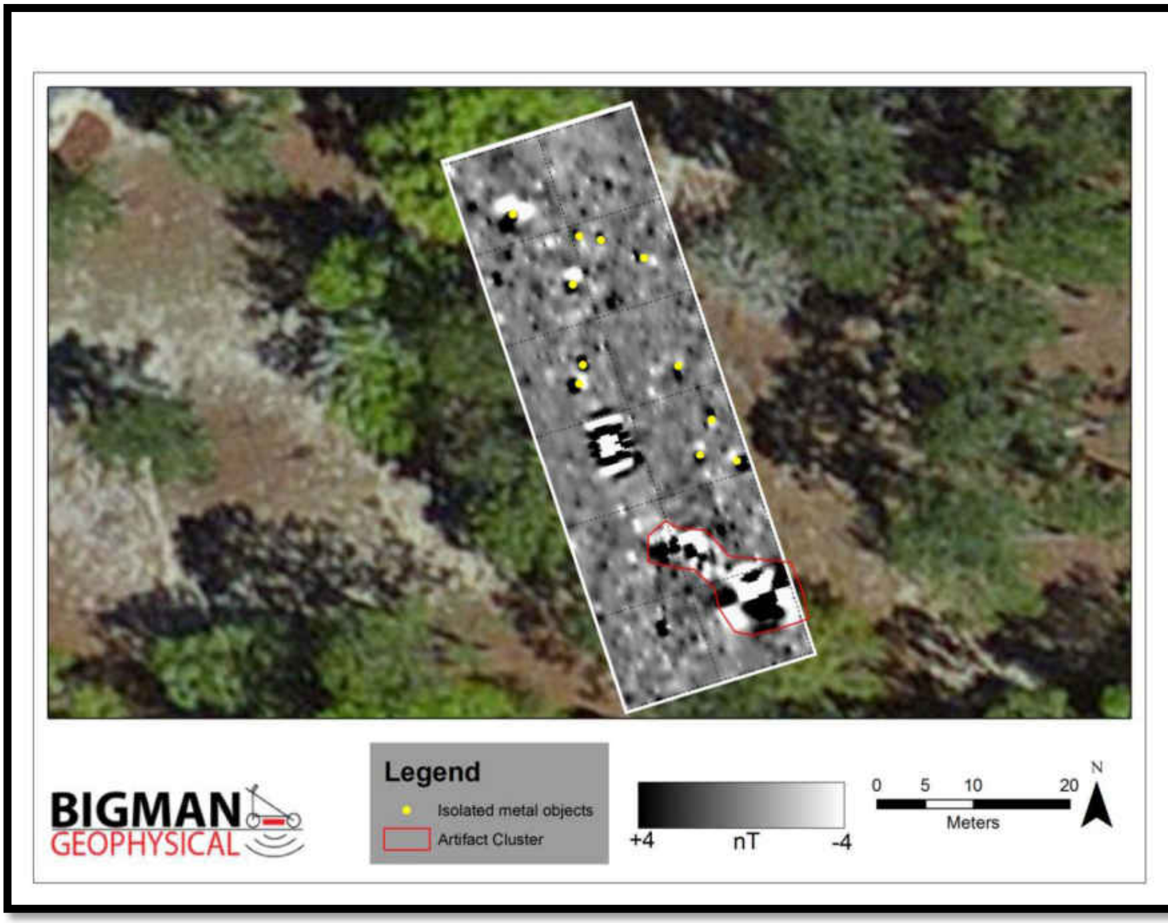


Figure 43: Area 6 magnetometer survey data with interpretations

Phosphate Testing

A total of 25 soil samples from Area 6 was processed. The lowest level of soil phosphorous recorded was 0.04 mg/kg and the highest was 3.3 mg/kg. Of those processed, 6 samples (24%) were above 2 mg/kg, 3 samples (12%) were between 1 mg/kg and 1.99 mg/kg, and 16 samples (64%) were below 1 mg/kg (Table 10).

Transect	Shovel Test	Zone	Phosphate Level Reading (mg/kg)
1	6	A	3.3
3	4	A	2.94
1	4	A	2.47
5	6	B	2.4
1	1	A	2.34
3	5	B	2.01

Table 10: Area 6 soil phosphate values over 2 mg/kg

The four Zone A samples with values over 2 mg/kg were all located on either the Transect 1 line or directly in the center of the survey area, where both the drainage ditch and the presumed CCC trash dump were located (Fig. 44). Field crews failed to recover soil samples from Zone B of every shovel test. Unfortunately, due to the number of shovel tests, the soil samples which were recovered were not sufficient to generate an effective contour map for Zone B.

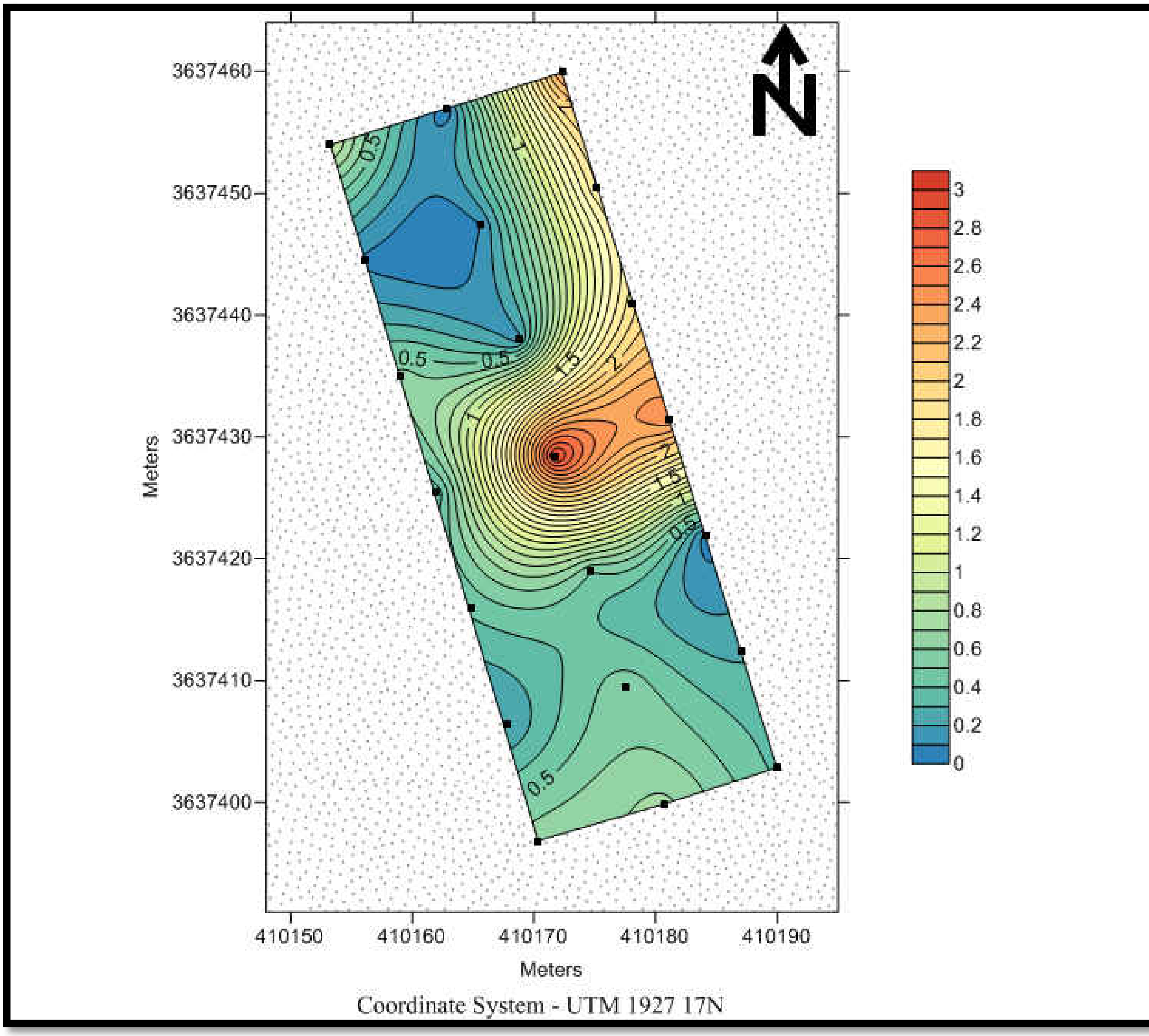


Figure 44: Area 6 Zone A soil phosphate values

LiDAR

The terrestrial LiDAR scan of Area 6 clearly shows the drainage ditch roughly bisecting the survey grid. This ditch is relatively shallow at the southern edge of the area, becomes wider and deeper as it continues northwest, and then becomes shallow again near the northwest corner. It is assumed the ditch once continued north through Area 4 toward the spring creek, but there is no visual evidence due to a modern road and the soil deposition from creek dredging in Area 4.

Additionally, there is a conspicuous increase in elevation of approximately five meters towards the southern portion of the area (Fig. 45).

Figure 45: Digital elevation model of Area 6

Excavation Units

No excavation units were placed in Area 6.

<u>Area 7</u>

Shovel Testing

Although 16 shovel test locations were originally laid out, STP 4 on Transect 1 and Transect 7 were not dug as they intruded upon the earthwork gun ramps (Fig. 46). Only STP 2 on Transect 3 was positive, and a friction primer was recovered along with a section of plastic tubing (Fig. 47). This friction primer is not contemporary to the Confederate occupation; it is a modern reproduction used by Civil War re-enactors.

Of note in this area was conspicuous soil staining in the floor of STP 3 on Transect 7.

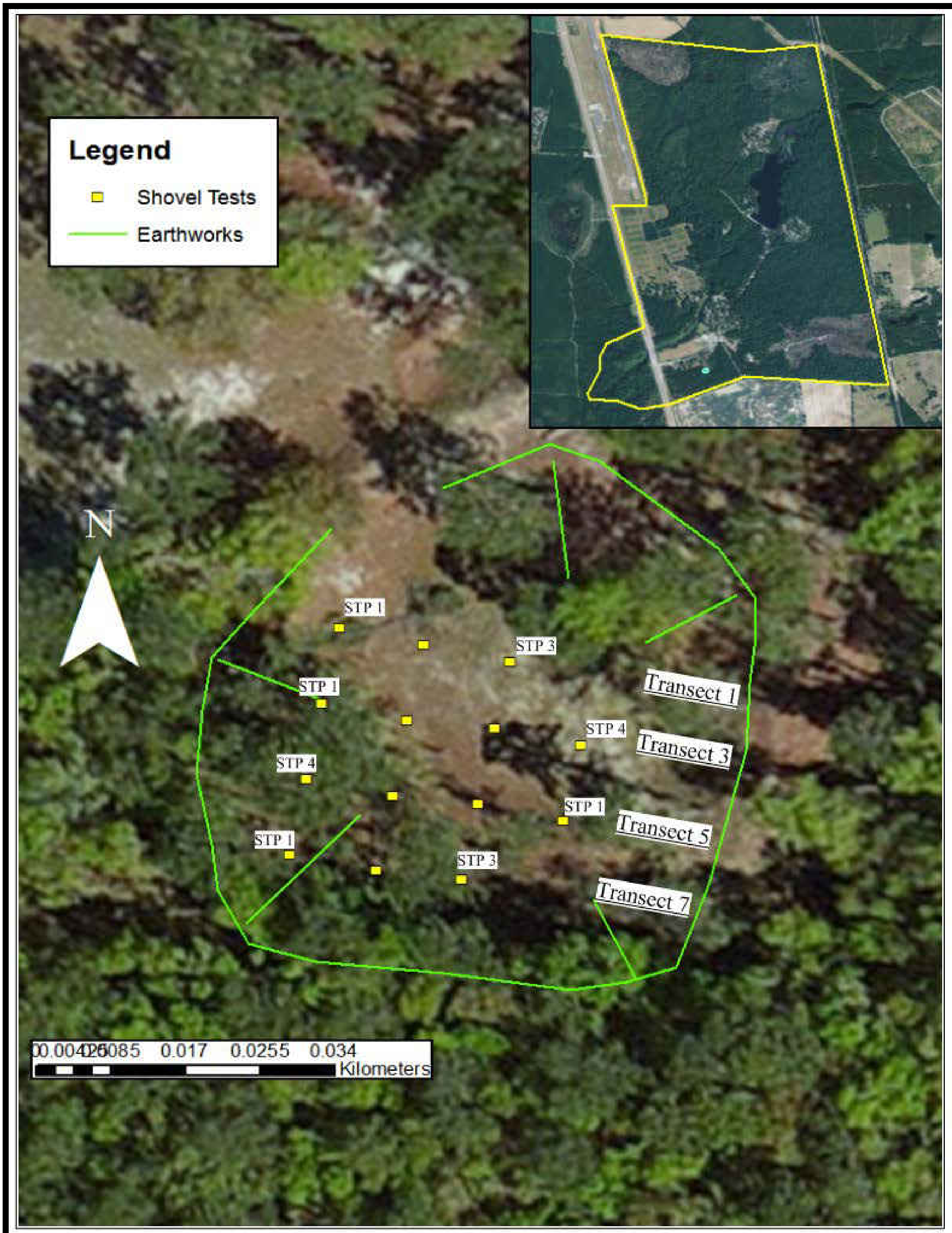


Figure 46: Locations of shovel-test pits in Area 7

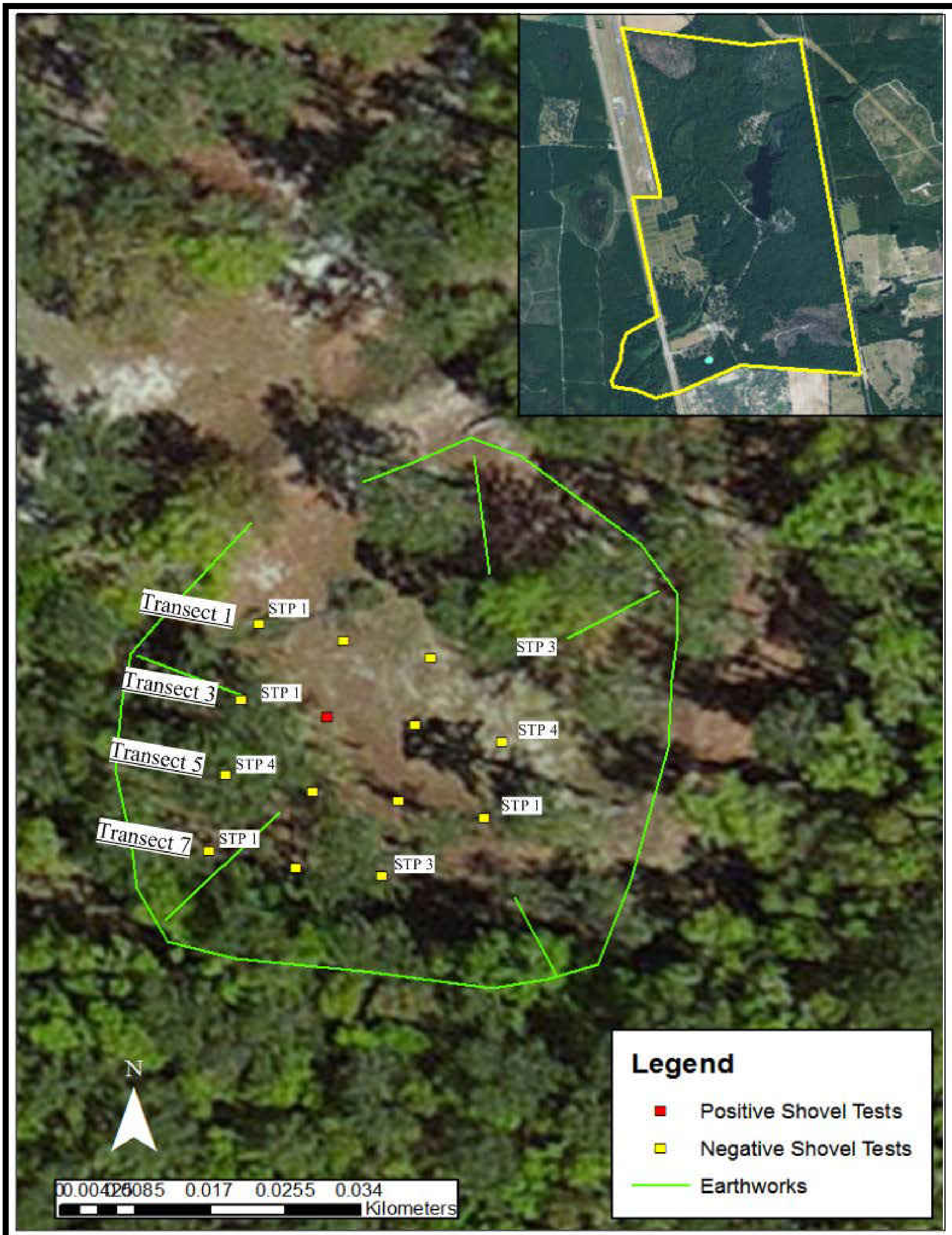
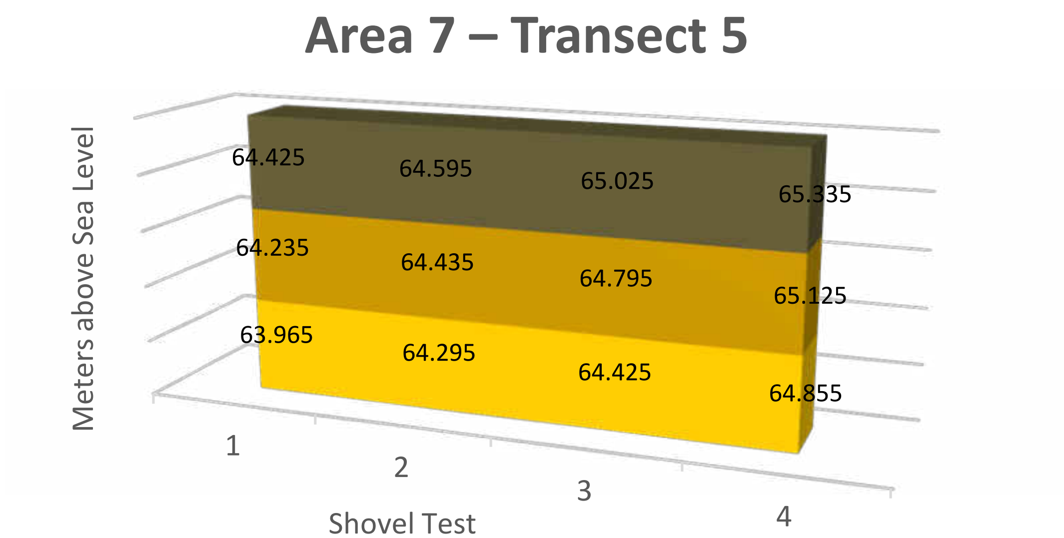


Figure 47: Location of positive shovel-test pits in Area 7

The soils in Area 7 were consistent, with a grayish brown sandy silt Zone A, a brownish yellow sandy loam Zone B, and yellowish brown clayey sand subsoil (Fig. 48). There was an abnormally high amount of iron concretions throughout soil Zones B and C in the survey area. The following figure is not to scale.



	1	2	3	4
Zone A	64.425	64.595	65.025	65.335
Zone B	64.235	64.435	64.795	65.125
Zone C	63.965	64.295	64.425	64.855

Figure 48: Area 7 Soil Profiles

Metal Detection

The metal detection survey of Area 7 produced several hits. Only three artifacts were recovered, as the others were post-Civil War shotgun shells (Fig. 49). Two of the recovered artifacts are indeterminate ferrous fragments and one is a reproduction percussion cap, intended for use by Civil War re-enactors (Table 11).

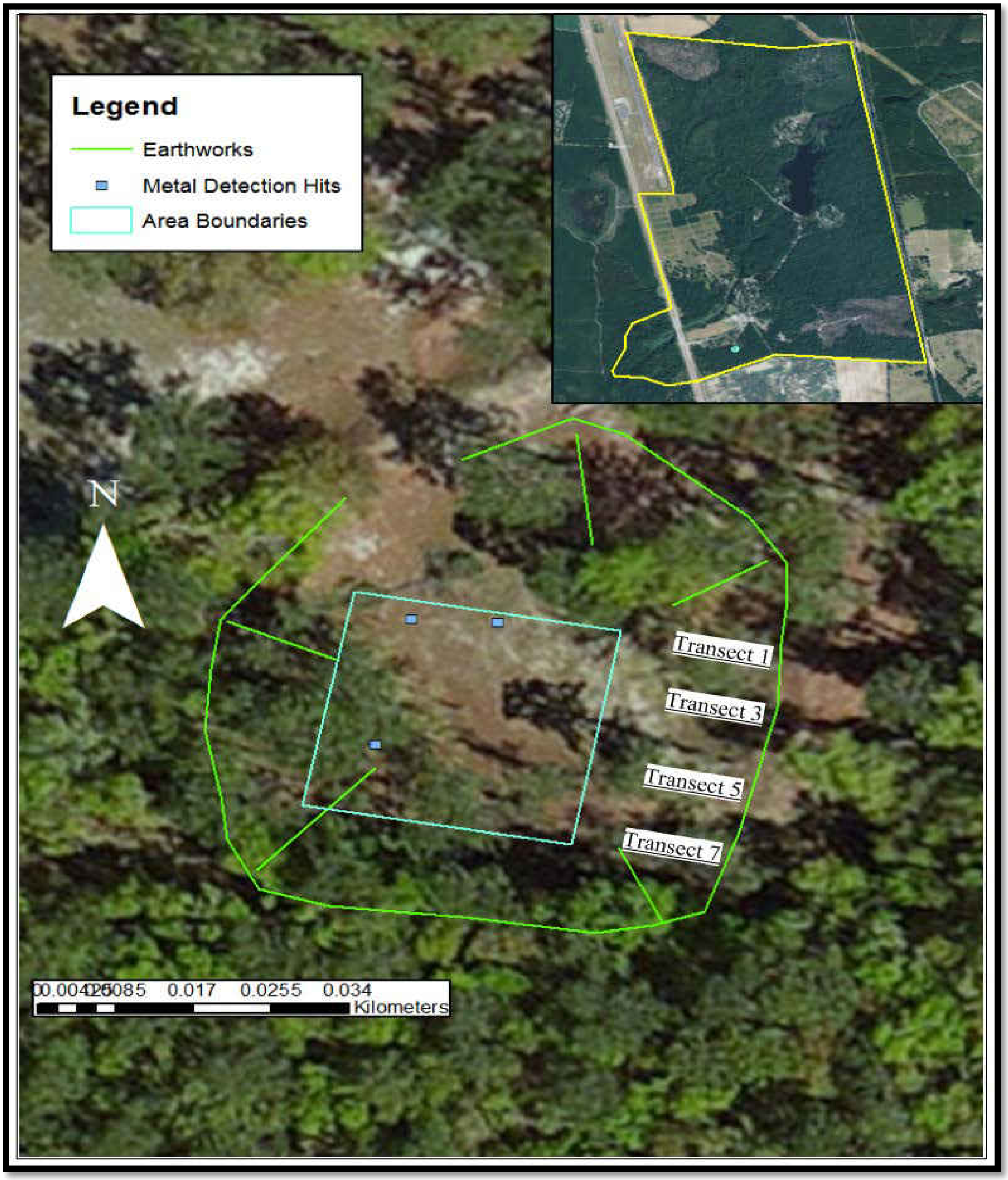


Figure 49: Location of artifacts recovered from Area 7 metal detection survey

Transect	MDR	Depth	Artifact(s)	Count
1	1	17 cmbs	Unidentified iron fragment	1
1	2	5.5 cmbs	Percussion cap	1
5	1	7 cmbs	Unidentified iron fragment	1

Table 11: List of artifact from Area 7 metal detection survey

Magnetometer

Magnetometry found little to no evidence indicative of building architecture in Area 7 (Bigman and Greene 2015). There is generally a variable distribution of magnetic values in the southwestern portion of the survey block, but it is unclear if this represents a cluster of artifacts or disturbance. Two distinct high amplitude di-polar anomalies in the northwestern portion of the survey block were interpreted as likely metal. Shovel-test excavations revealed these to be a small cluster of CCC-era shotgun shell brass and a metal fragment, underneath a tree stump. Finally, there is a cluster of generally positive magnetic anomalies in the northeastern portion of the survey block, near the ramp (Fig. 50). This may represent pits or artifact clustering. However, the location near the bottom of the ramp may indicate eroded soils of a higher magnetic susceptibility. Excavations were not performed here, as we were not permitted to disturb the earthworks.

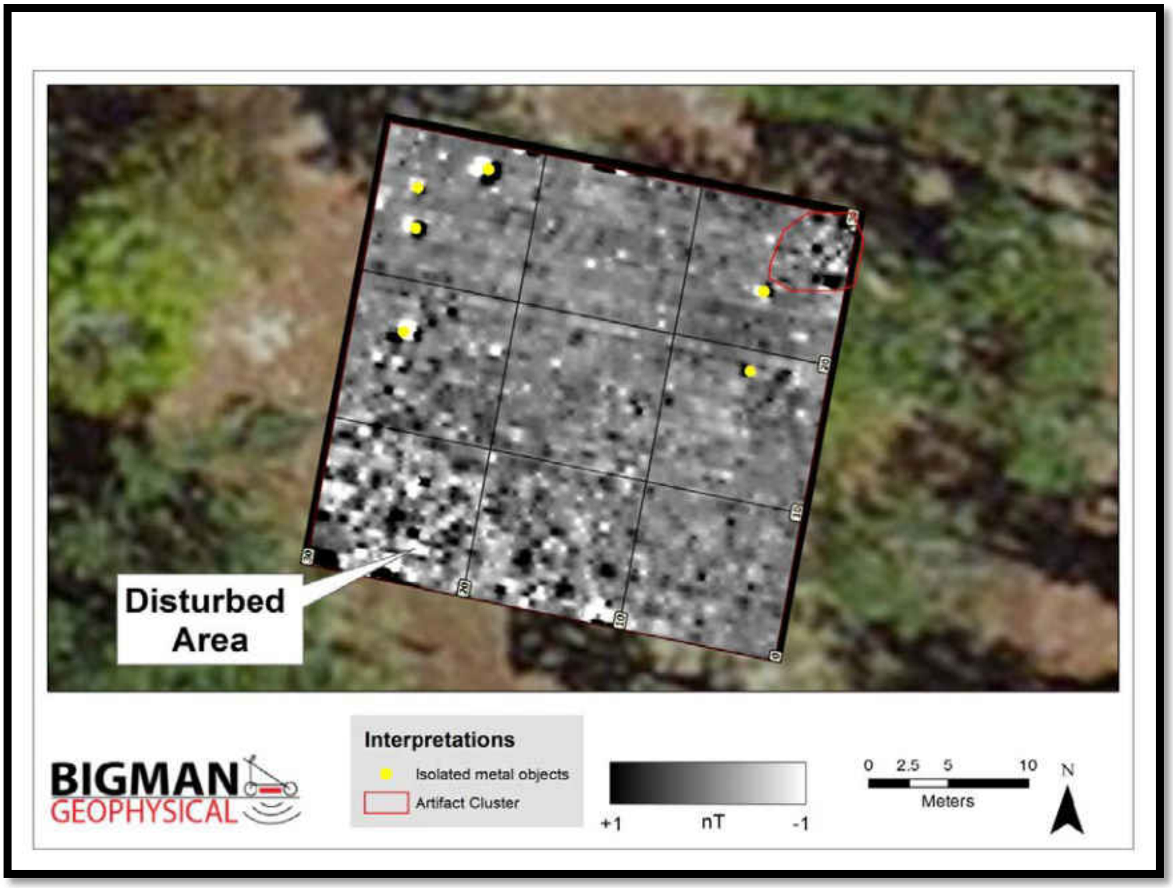


Figure 50: Area 7 magnetometer survey data with interpretations

Phosphate Testing

Area 7 had no soil samples with phosphate levels over 2 mg/kg. The highest level for the area was Zone A of STP 1 on Transect 7, with 0.89 mg/kg (Fig. 51). This shovel test was located between two large pine trees, which may account for the relative elevation of the phosphate levels. STP 2 on Transect 7 had the highest level of relative soil phosphates for all Zone B samples (Fig. 52), but this STP had no associated artifacts or soil anomalies.

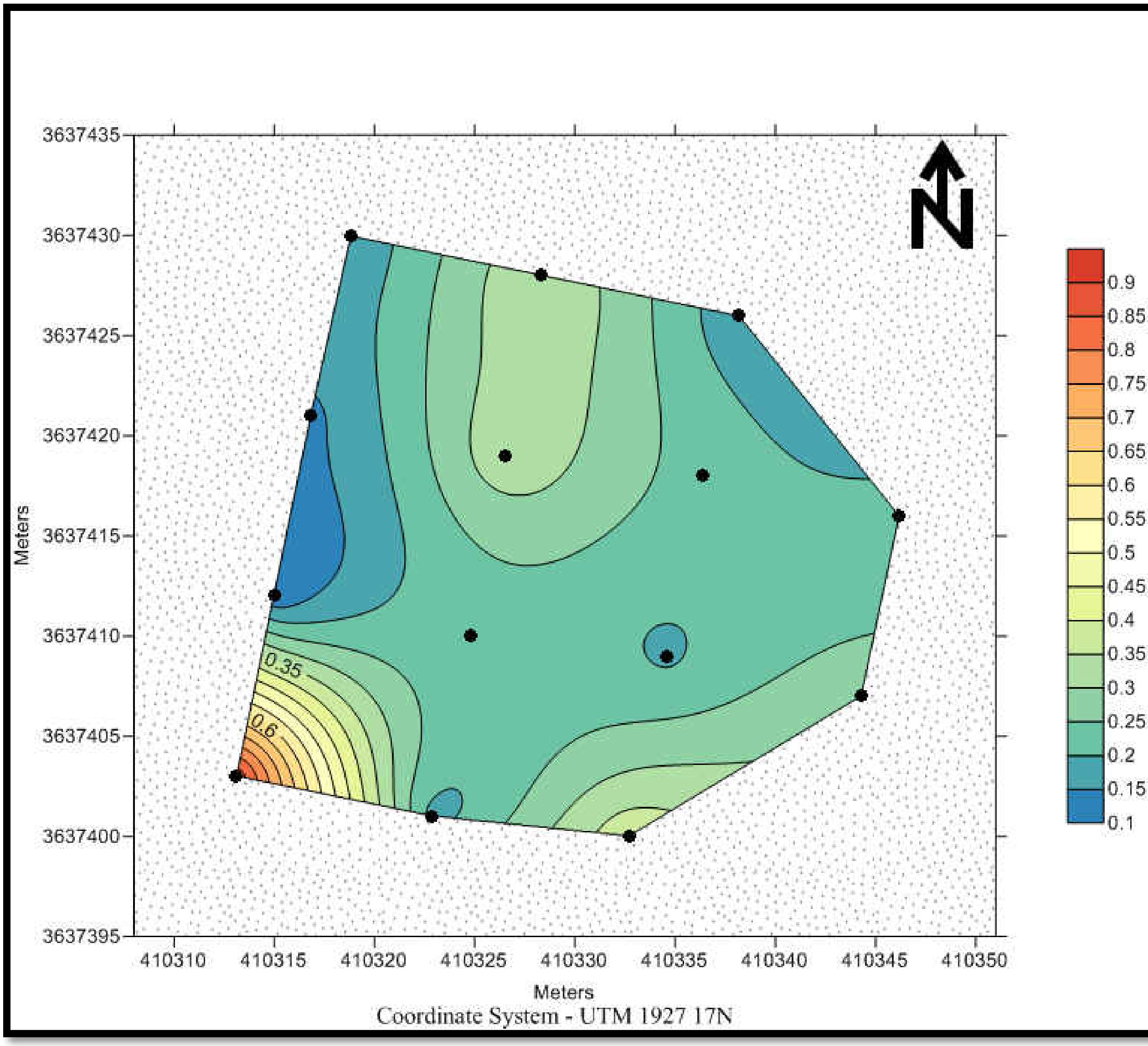


Figure 51: Area 7 Zone A soil phosphate values

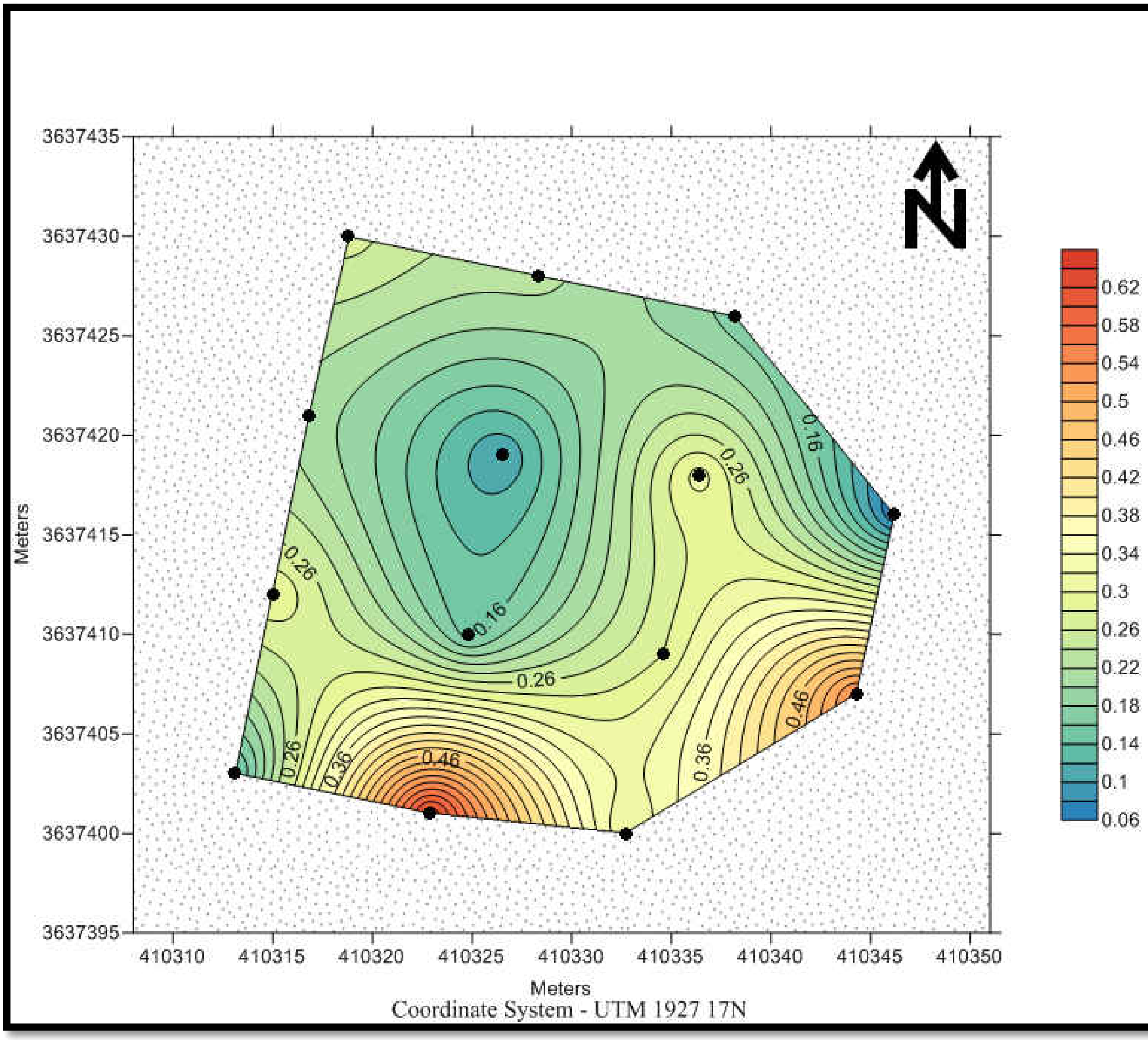


Figure 52: Area 7 Zone B soil phosphate levels

LiDAR

The terrestrial LiDAR scan data for Area 7 was collected, processed, and the DEM created by former Georgia Southern University graduate student Matthew Luke. The DEM does not show color-filled elevation contours, but it is still possible to discern elevation by contour lines. The earthwork berms and gun ramps are visible, as well as the inner plaza. The inside area of the fort is quite level, as one would expect from man-made construction (Fig. 53). Sneden claimed that the fort housed multiple structures as well as the magazine; however, LiDAR scanning did not reveal any topographic features within the earthworks which could be considered indicative of underlying structures.

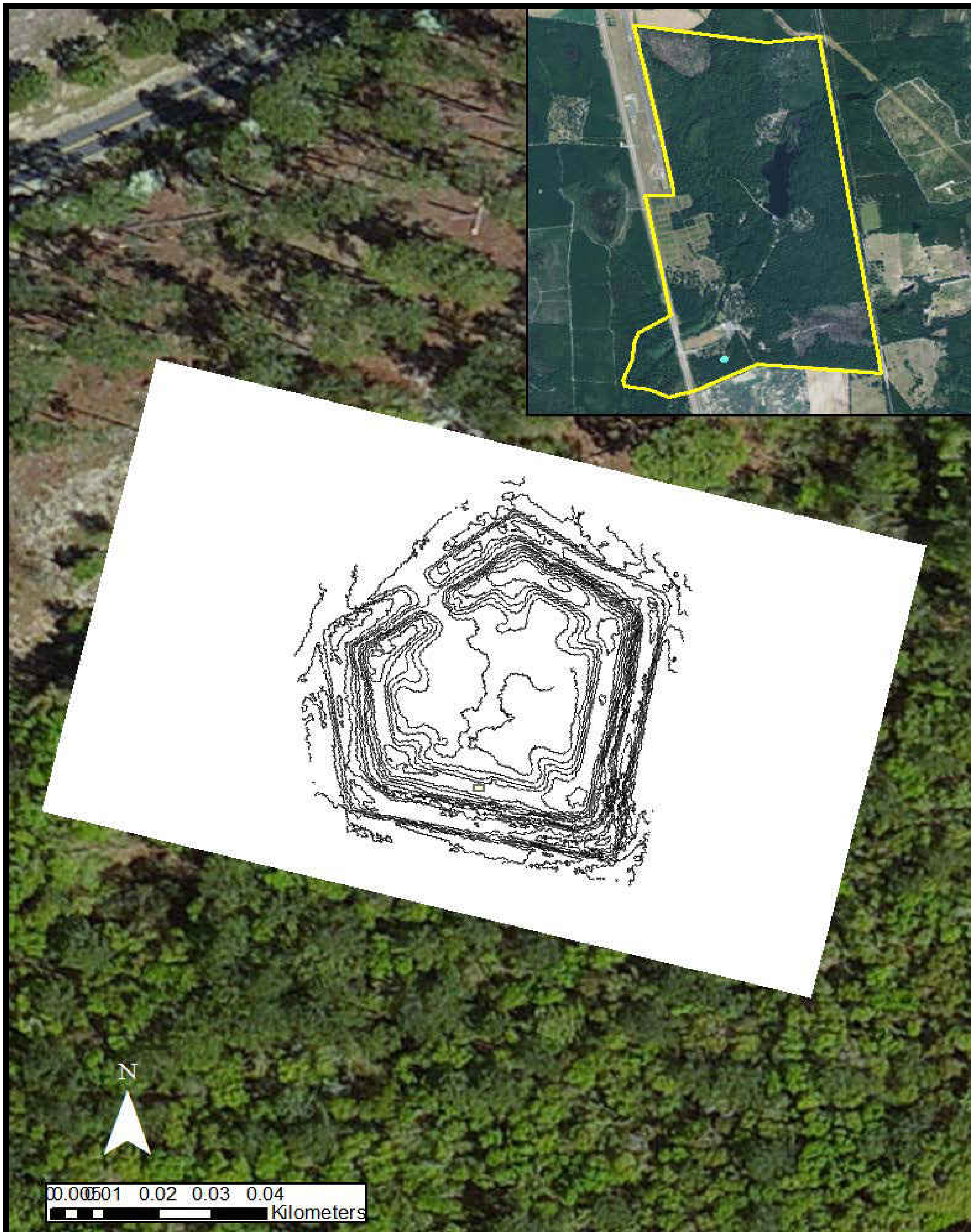


Figure 53: Digital elevation model of Area 7

Excavation Units

Excavation Unit 19 was situated with STP 3 of Transect 7 at its center. This location was chosen due to soil staining in the floor of the shovel test (Fig. 54). Initially the shovel test was expanded to a 50 cm x 50 cm block excavation to better investigate the staining, at which time a linear feature was observed and interpreted as potential artillery-wheel ruts. The unit was then expanded to a 1 m x 1 m block excavation. The unit was eventually expanded to the east following Transect 7, making it a 1 m x 2 m unit.

Figure 54: Location of excavation Unit 19

Unit 19 was excavated to a depth of approximately 56 cm below datum. 15 quarts of feature fill from Zone A and 54 quarts of feature fill from Zone B were bagged for water flotation. A large feature in the eastern section was bisected, and determined to be a decomposing root (Fig. 55).

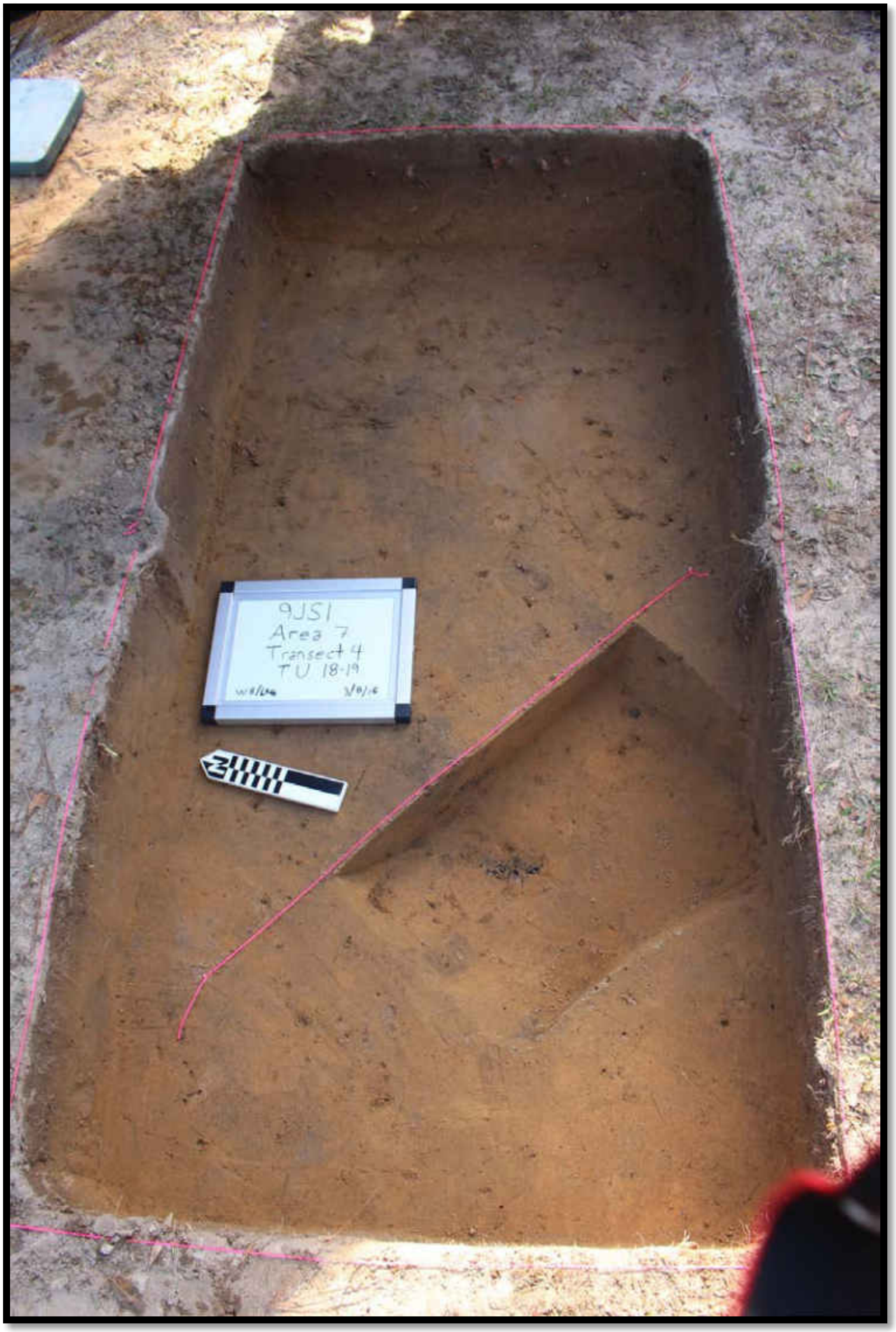


Figure 55: Bisected feature in excavation Unit 19

Chapter 7 - Conclusions

Due to the paucity of temporally diagnostic 19th century artifacts, the findings of this research are indeterminate. This is somewhat surprising considering each of the individual methods was largely successful, albeit not in every test area. It is difficult to compare the efficacy of the field methods used in this research against one another and there is no realistic way to quantify their success due to the lack of diagnostic mid-19th century artifacts. Instead, each field method will have to be examined individually and then compared to another method or methods with which it worked well in concert.

Shovel testing by far produced the largest number of artifacts, and the identification of dark banding and soil staining in shovel tests is sometimes just as revealing as the artifacts themselves. The slope of Area 6 and the drainage ditch were expected to have discouraged the presence of structures, and the slope would have likely caused artifacts to wash away due to soil erosion, with slopes between five to 12 degrees. The lack of success in shovel testing in Area 7 was expected. The bulk of Magnolia Springs State Park is rumored to have experienced heavy looting for decades, particularly by metal detection enthusiasts. It was believed this was the case within the fort as well. The lack of success with shovel testing in Area 7 could also be the result of earth moving by the CCC. Finally, Sneden could have simply been mistaken about the structures he claimed were within the fort.

The shovel testing survey did not lead to the identification of Confederate loci, but it did help address other questions beyond the scope of this research. In the case of Area 7, the lack of artifacts or soil staining indicative of human occupation could shed light on the veracity of primary documents used to inform research into the Civil War context at Camp Lawton. If there were indeed no structures within the fort, it is possible Sneden was mistaken in other respects as well. If Sneden were not mistaken and the dearth of artifacts and staining is the result of 20th century disturbance, then we may at least begin to be able to understand the impacts of CCC activity on the archaeological record.

Metal detection was quite effective, although it is believed the surveys would have been far more effective had the site not been presumably looted for several decades before this research could be conducted. According to employees at Magnolia Springs State Park, the park has been heavily metal detected by enthusiasts since the early-mid 1970s. If true, this is likely to be the reason for the limited success in identifying Confederate loci with metal detecting. Metal detecting did allow us a deeper understanding of CCC activity at Magnolia Springs in Area 6. In addition to earth moving, the trash dump located within the drainage ditch in Area 6 shows other impacts from CCC activity, allowing a greater understanding of activities.

The magnetometer survey seemed initially to be quite successful; subsurface magnetic distortions and ground disturbances were clearly visible in the collected data. The large anomalies believed to be indicative of large artifact signatures were revealed, in those ground-truthed, to be large subsurface iron concretions. Despite being within the survey grids, concretions of these sizes had not been encountered until after all shovel tests and metal detection surveys had been completed. The magnetometer did reveal itself to be quite adept at discerning CCC-related debris and artifacts. The locations of CCC trash dumps in Area 6 were plainly visible in the data, and Area 5 was so riddled with CCC debris that the data were unreadable. However, deeper, more ephemeral artifact assemblages, such as those from the mid-19th century, could be indiscernible in the magnetometer data due to the myriad subsurface concretions.

Phosphate testing led to unexpected results as well. Despite human activity and increased levels of soil phosphates having a positive correlation, the two areas known for certain to have had direct differential human activity had the lowest average levels. Area 4 had by far the highest level of soil phosphates. This could potentially be explained by the deposition of soils from the spring creek. Area 6 had few elevated samples. These may have been due to the CCC trash dumps, though they did not coincide spatially. Explanations for these results could be issues with the sampling methodology. First, samples were taken from each soil zone. Although soil phosphates are geologically stable, soil lenses associated with Confederate activity would be thin and only a fraction of the overall zone unless pit features were to be encountered. Further, samples would have to be taken from related lenses within strata in order to be truly uniform. Second, sample size could have negatively affected the results. Samples are relative to one another for this research, but if phosphate levels were uniformly high or low across a survey area, the data would be inconclusive. A more thorough examination of soil phosphate levels at Camp Lawton might include sampling from the entirety of the project area.

LiDAR scans of the areas were not very informative. This is likely due to the level of human activity after the Civil War. The terrain including and surrounding Area 4 has is known to have been leveled, but it is possible other areas have undergone post-Civil War era land alteration. The DEM for Area 4 did reveal the presence of a backfilled drainage ditch bisecting the area. The LiDAR evidence coupled with the data from excavation Units 15 and 16 were able to not only shed light on what the topography of the site might have looked like in the 19th century, but also the nature of soil deposition that the CCC are documented as having done.

Based on data gathered from shovel testing, metal detecting, magnetometry, phosphate testing, and terrestrial LiDAR scanning combined with the data gathered for this research through ground-truthing, it is not possible to definitively say which field methods or combinations of methods are more effective for the identification of 19th century sites in this region. Shovel testing and metal detecting to appear to be the most effective individually, and are indeed more effective in concert, however the lack of diagnostic artifacts and cultural features makes this impossible to claim with any certainty. The general lower levels of soil phosphates could be due to sample size and methodology. The levels presented in this research are not absolute values, but instead based off of the blank sample. Because only four separate areas were tested, soil phosphate levels throughout the Camp Lawton Project area are unknown. Terrestrial LiDAR scanning is a powerful tool and can easily lead to site identification, although perhaps this would be more likely in areas with less 20th century human activity.

All employed survey methods were in some way limited by 20th century activities such as dredging, building construction, road construction, artifact looting, and general earth moving. At least partially due to this, this research was unable to identify any Confederate loci. It is possible that Areas 4, 5, and 6 at no time had Confederate loci within their survey grid, but Area 7 certainly did. Regardless, this is evidenced now only by the existence of the earth embankments of the fort. No Confederate loci were identified, but this research was still able to contribute to the greater understanding of the archaeological history of these areas, particularly in the case of CCC activity.

This research has found that the areas surveyed have undergone a great deal of 20th century impact which has had at least two possible effects. First, soils are so disturbed by earth moving from multiple sources that the identification of 19th century deposits is more difficult and will require more extensive survey. Second, it is possible that Confederate loci, if they existed in the survey areas, have been partially or completely destroyed by these disturbances.

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APPENDIX A – Soil Phosphate Analyses

Area 4 Soil Phosphate Levels

Area	Transect	STP	Zone	Phosphate Reading (mg/kg)
4	1	1	A	2.97
4	1	1	B	3.3
4	1	2	A	1.05
4	1	2	B	0.17
4	1	2	C	0.99
4	1	3	A	0.83
4	1	3	B	2.03
4	1	3	C	3.3
4	1	4	A	0.78
4	1	4	B	0.79
4	1	4	C	0.79
4	1	5	A	0.26
4	1	5	B	0.57
4	1	5	C	0.12
4	1	5	D	-
4	1	6	A	0.54
4	1	6	B	0.22
4	1	6	C	0.58
4	1	7	A	0.24
4	1	7	B	0.88
4	1	7	C	0.43
4	1	7	D	-
4	1	8	A	0.5
4	1	8	B	0.49
4	1	8	C	0.61
4	1	8	D	-
4	1	9	A	0.59
4	1	9	B	0.23
4	1	9	C	0.43
4	3	1	A	0.84
4	3	2	A	0.12
4	3	2	B	0.25
4	3	2	C	2.5
4	3	3	A	0.27
4	3	3	B	1.17
4	3	3	C	0.17
4	3	4	A	0.1
4	3	4	B	0.14
4	3	4	C	-
4	3	5	A	2.83
4	3	5	B	0.66
4	3	6	A	3.3
4	3	6	B	3.3
4	3	6	C	2.6
4	3	7	A	3.3

Area 4 Soil Phosphate Levels, cont.

Area	Transect	STP	Zone	Phosphate Reading (mg/kg)
4	3	7	B	1.92
4	3	8	A	2.16
4	3	8	B	2.8
4	3	8	C	0.98
4	3	8	D	-
4	3	9	A	2.39
4	3	9	B	1.23
4	3	9	C	0.82
4	5	1	A	3.3
4	5	1	B	2.67
4	5	1	C	0.37
4	5	2	A	0.54
4	5	2	B	0.64
4	5	3	A	0.43
4	5	4	A	0.4
4	5	4	B	0.29
4	5	5	A	0.52
4	5	5	B	0.46
4	5	6	A	0.34
4	5	6	B	0.27
4	5	6	C	-
4	5	7	A	0.48
4	5	7	B	0.48
4	5	8	A	0.91
4	5	9	A	0.87
4	5	9	B	1.59
4	7	1	A	0.77
4	7	1	B	0.37
4	7	1	C	0.56
4	7	1	D	-
4	7	2	A	0.64
4	7	2	B	0.76
4	7	3	A	2.64
4	7	3	B	1.97
4	7	3	C	0.63
4	7	4	A	0.47
4	7	4	B	0.57
4	7	5	A	1.62
4	7	5	B	0.32
4	7	6	A	0.85
4	7	6	B	0.5
4	7	6	C	1.16
4	7	7	A	3.3
4	7	7	B	2.06
4	7	7	C	3.02
4	7	8	A	2.12
4	7	8	B	0.28
4	7	8	C	-

Area 4 Soil Phosphate Levels, cont.

Area	Transect	STP	Zone	Phosphate Reading (mg/kg)
4	7	9	A	1.11
4	7	9	B	0.44
4	9	1	A	2.36
4	9	1	B1	1.46
4	9	1	B2	0.54
4	9	1	C	0.46
4	9	1	D	-
4	9	2	A	0.41
4	9	2	B	0.73
4	9	2	C	0.66
4	9	3	A	0.61
4	9	3	B	0.68
4	9	3	C	0.4
4	9	4	A	0.5
4	9	4	B	0.93
4	9	5	A	0.5
4	9	5	B	1.18
4	9	5	C	0.84
4	9	6	A1	0.44
4	9	6	A2	0.83
4	9	6	B	0.28
4	9	6	C	0.32
4	9	7	A	0.56
4	9	7	B	0.14
4	9	8	A	1.14
4	9	8	B	0.97
4	9	8	C	0.24
4	9	9	A	0.32
4	11	1	A	0.3
4	11	1	B	0.68
4	11	2	A	1.83
4	11	2	B	1.15
4	11	2	C	0.98
4	11	3	A	0.31
4	11	3	B	0.31
4	11	4	A	0.26
4	11	4	B	0.61
4	11	5	A	0.3
4	11	5	B	0.32

Area 4 Soil Phosphate Levels, cont.

Area	Transect	STP	Zone	Phosphate Reading (mg/kg)
4	11	6	A	0.24
4	11	6	B	0.22
4	11	7	A	2.7
4	11	7	B	0.45
4	11	8	A	0.75
4	11	8	B	0.22
4	11	9	A	0.32
4	11	9	B	0.26
4	13	1	A	1.07
4	13	1	B	0.35
4	13	1	C	0.6
4	13	2	A	1.55
4	13	2	B	1.88
4	13	2	C	1.08
4	13	3	A	0.39
4	13	3	B	0.56
4	13	3	C	0.18
4	13	4	A	0.32
4	13	4	B	0.16
4	13	4	C	0.22
4	13	5	A	0.22
4	13	5	B	0.11
4	13	6	A	0.44
4	13	6	B	0.52
4	13	6	C	0.49
4	13	7	A	0.71
4	13	7	B	0.32
4	13	7	C	0.2
4	13	8	A	0.7
4	13	8	B	0.22
4	13	8	C	0.36
4	13	9	A	0.66
4	13	9	B	0.42
4	13	9	C	0.17
4	15	1	A	0.26
4	15	1	B	0.14
4	15	2	A	1.26
4	15	2	B	0.32
4	15	2	C	0.42

Area 4 Soil Phosphate Levels, cont.

Area	Transect	STP	Zone	Phosphate Reading (mg/kg)
4	15	3	A	0.35
4	15	3	B	1.08
4	15	3	C	0.48
4	15	4	A	0.63
4	15	4	B	0.33
4	15	5	A	0.83
4	15	5	B	0.41
4	15	5	C	0.95
4	15	6	A	0.29
4	15	6	B	0.11
4	15	7	A	0.34
4	15	7	B	0.25
4	15	8	A1	0.28
4	15	8	A2	0.3
4	15	8	B1	0.54
4	15	8	B2	0.17
4	15	8	C	0.16
4	15	9	A	0.26
4	15	9	B	0.15
4	15	9	C	0.44
4	17	1	A	3.03
4	17	1	B	0.2
4	17	2	A	0.2
4	17	2	B	2.51
4	17	3	A	0.7
4	17	3	B	0.3
4	17	4	A	0.3
4	17	4	B	0.29
4	17	4	C	0.31
4	17	5	A	0.2
4	17	5	B	0.21
4	17	5	C	0.29
4	17	6	A	0.39
4	17	6	B	0.72

Table 12: Soil phosphate values for Area 4

Area 5 Soil Phosphate Levels

Area	Transect	STP	Zone	Phosphate Level (mg/kg)
5	1	1	A	0.27
5	1	1	B	0.11
5	1	2	A	0.24
5	1	3	A	0.28
5	1	4	A	0.42
5	1	5	A	0.21
5	3	1	A	0.3
5	3	2	A	0.39
5	3	3	A	1.26
5	3	4	A	0.34
5	3	5	A	0.5
5	5	1	A	0.41
5	5	2	A	0.1
5	5	3	A	1.25
5	5	4	A	1.41
5	5	5	A	0.77
5	7	1	A	0.3
5	7	2	A	0.43
5	7	3	A	0.19
5	7	4	A	0.55
5	7	5	A	0.38
5	9	1	A	0.53
5	9	2	A	0.4
5	9	3	A	0.64
5	9	4	A	0.38
5	9	5	A	3.02

Table 13: Soil phosphate values for Area 5

Area 6 Soil Phosphate Levels

Area	Transect	STP	Zone	Phosphate Level (mg/kg)
6	1	1	A	2.34
6	1	2	A	1.79
6	1	3	A	1.86
6	1	4	A	2.47
6	1	5	A	0.06
6	1	6	A	3.3*
6	1	7	A	0.38
6	1	7	B	0.1
6	3	1	A	0.04
6	3	2	A	0.1
6	3	3	A	0.17
6	3	4	A	2.94
6	3	5	A	0.5
6	3	5	B	2.01
6	3	6	A	0.57
6	3	7	A	0.73
6	3	7	B	1.21
6	5	1	A	0.94
6	5	2	A	0.08
6	5	3	A	0.65
6	5	4	A	0.32
6	5	5	A	0.43
6	5	6	A	0.2
6	5	6	B	2.4
6	5	7	A	0.67

Table 14: Soil phosphate values for Area 6

Area 7 Soil Phosphate Levels

Area	Transect	STP	Zone	Phosphate Level (mg/kg)
7	1	1	A	0.16
7	1	1	B	0.27
7	1	2	A	0.35
7	1	2	B	0.23
7	1	3	A	0.16
7	1	3	B	0.17
7	1	4	A	-
7	3	1	A	0.14
7	3	1	B	0.21
7	3	2	A	0.34
7	3	2	B	0.1
7	3	3	A	0.23
7	3	3	B	0.31
7	3	4	A	0.21
7	3	4	B	0.06
7	5	1	A	0.11
7	5	1	B	0.3
7	5	2	A	0.23
7	5	2	B	0.15
7	5	3	A	0.19
7	5	3	B	0.28
7	5	4	A	0.28
7	5	4	B	0.55
7	7	1	A	0.89
7	7	1	B	0.13
7	7	2	A	0.18
7	7	2	B	0.64
7	7	3	A	0.39
7	7	3	B	0.3
7	7	4	A	-

Table 15: Soil phosphate values for Area 7

APPENDIX B – Artifact List

FS	Area	Trench	Test	Zone/Level/Depth	Catalogue	Count	Comments
886	4	Transect 1	STP 8	B	1	7	Quartz fragments
901	4	Transect 3	STP 5	B	4	6	Chert flakes
901	4	Transect 3	STP 5	B	3	2	Unidentified prehistoric sherds
902	4	Transect 3	STP 6	-	4	1	Chert flake
917	4	Transect 5	STP 3	B	2	1	Chert flake
921	4	Transect 5	STP 7	B	3	1	Chert flake
922	4	Transect 5	STP 8	A	2	1	Chert flake
923	4	Transect 5	STP 9	C	3	1	Chert flake
924	4	Transect 7	STP 1	A	1	1	Brick fragment
934	4	Transect 9	STP 1	D	6	1	Possible bone fragment
934	4	Transect 9	STP 1	D	8	1	Possible quartz tool fragment
934	4	Transect 9	STP 1	D	9	4	Chert flake
934	4	Transect 9	STP 1	D	7	1	Quartz fragment
935	4	Transect 9	STP 2	A	4	1	Glass fragment
937	4	Transect 9	STP 4	B	3	1	Chert flake
938	4	Transect 9	STP 5	A	4	1	Stoneware sherd
944	4	Transect 5	MDR 5	14cmbs	2	2	Strap iron
944	4	Transect 5	MDR 6	22cmbs	1	1	Strap iron
944	4	Transect 5	MDR 7	9cmbs	3	1	Strap iron
944	4	Transect 5	MDR 8	6cmbs	4	1	Modern nut and bolt
946	6	Recon	MD	5cmbs	1	1	Musket ball. Impacted.
947	6	Recon	MD	5cmbs	1	1	Lead sprue
963	6	Transect 1	MD 4	21cmbs	1	4	Iron wire fragments
963	6	Transect 1	MD 4	21cmbs	4	1	Glass fragment
963	6	Transect 1	MD 4	21cmbs	3	1	Zinc canning cap
963	6	Transect 1	MD 4	21cmbs	2	3	Milk glass canning jar lid
964	6	Transect 1	MD 2	5cmbs	1	5	Pieces of iron wire mass
965	6	Transect 1	MD 1	6cmbs	1	1	Large bent wire nail
966	5	Transect 1	STP 1	A	1	1	22 caliber rim-fire cartridge
966	5	Transect 1	STP 1	A	2	1	Wire nail
966	5	Transect 1	STP 1	B	3	2	Window glass fragments
967	5	Transect 1	STP 3	A	1	1	Wire nail
967	5	Transect 1	STP 3	A	2	1	Glass neck and body fragment
968	5	Transect 1	STP 4	B	1	1	Chert flake
968	5	Transect 1	STP 4	B	2	1	Possible iron button
968	5	Transect 1	STP 4	B	4	1	Wire nail
968	5	Transect 1	STP 4	B	5	1	Wire nail
968	5	Transect 1	STP 4	A	3	1	Iron corrugated frame fastener

Artifact List, cont.

FS	Area	Trench	Test	Zone/Level/Depth	Catalogue	Count	Comments
969	5	Transect 1	STP 5	A	2	1	Brick fragment
969	5	Transect 1	STP 5	A	1	1	Colorless glass fragment
970	5	Transect 3	STP 1	B	1	2	Small brick fragments
971	5	Transect 3	STP 2	A	2	5	Mortar fragments
972	5	Transect 3	STP 3	A	1	1	Slag
972	5	Transect 3	STP 3	A	2	13	Glass bottle base fragments
972	5	Transect 3	STP 3	A	3	3	Molded ceramic rim fragments
972	5	Transect 3	STP 3	A	4	1	Chert flake
973	5	Transect 5	STP 1	B	2	1	Chert flake
973	5	Transect 5	STP 1	A	1	3	Possible plastic tile fragments. Black.
974	5	Transect 3	STP 5	A	4	1	Milk glass fragment
974	5	Transect 3	STP 5	A	2	1	Aqua glass fragment
974	5	Transect 3	STP 5	A	3	1	Green glass fragment
974	5	Transect 3	STP 5	A	5	1	Mortar fragment
974	5	Transect 3	STP 5	A	6	1	Chert flake
974	5	Transect 3	STP 5	A	1	1	Colorless glass fragment
975	5	Transect 5	STP 2	A	4	1	Clinched wire nail
975	5	Transect 5	STP 2	A	3	1	Wire nail
975	5	Transect 5	STP 2	A	6	2	Headless nail fragments
975	5	Transect 5	STP 2	A	2	2	Glass fragments
975	5	Transect 5	STP 2	A	5	1	Clinched wire nail
975	5	Transect 5	STP 2	A	1	18	Brown glass bottle fragments
976	5	Transect 5	STP 3	A	3	1	Unidentified brass fragment
976	5	Transect 5	STP 3	A	2	2	Green glass fragments
976	5	Transect 5	STP 3	A	1	2	Bottle glass fragments
977	5	Transect 5	STP 4	A	1	1	Wire nail
978	5	Transect 7	STP 1	A	2	4	Colorless glass fragments
978	5	Transect 7	STP 1	A	1	4	Painted mortar fragments.
978	5	Transect 7	STP 1	A	3	1	Amber glass fragment
979	5	Transect 7	STP 2	A	1	5	Colorless Glass fragments
979	5	Transect 7	STP 2	A	2	1	Amber glass fragment
980	5	Transect 7	STP 4	B	1	1	Aqua glass fragment
981	5	Transect 7	STP 5	A	1	5	Slag pieces
982	5	Transect 9	STP 1	A	2	1	Glass fragment
982	5	Transect 9	STP 1	A	1	1	Brick fragment with red glaze
983	5	Transect 9	STP 2	A	1	1	Amber glass fragment
984	5	Transect 9	STP 5	A	1	1	Medical vial glass
984	5	Transect 9	STP 5	A	2	1	Lantern glass

Artifact List, cont.

FS	Area	Trench	Test	Zone/Level/Depth	Catalogue	Count	Comments
984	5	Transect 9	STP 5	A	3	12	Cobalt glass fragments
985	5	Transect 9	STP 5	A	1	2	Cobalt glass fragments
986	5	Transect 9	TU17	LVL A	1	1	Cobalt glass fragment
987	5	Transect 9	TU17	LVL A	1	1	Cobalt glass fragment
988	5	Extension	MD1	30cmbs	5	1	Brick fragment
988	5	Extension	MD1	30cmbs	3	1	Crushed thimble
988	5	Extension	MD1	30cmbs	2	1	Burned glass fragment
988	5	Extension	MD1	30cmbs	1	15	Glass bottle fragments
988	5	Extension	MD1	30cmbs	4	1	Unidentified iron fragment
989	5	Extension	MD1	30cmbs	1	1	Iron wire fragment
990	5	Extension	TU18	LVL A	10	1	Cloth fastener
990	5	Extension	TU18	LVL A	6	1	Aluminum grommet
990	5	Extension	TU18	LVL A	1	1	Cold cream jar. Milk glass body with iron lid.
990	5	Extension	TU18	LVL A	2	1	Brick fragment
990	5	Extension	TU18	LVL A	3	3	Glass fragments
990	5	Extension	TU18	LVL A	5	1	Pill container
990	5	Extension	TU18	LVL A	7	1	Unidentified aluminum fragment
990	5	Extension	TU18	LVL A	9	14	Bottle glass fragments
990	5	Extension	TU18	LVL A	11	1	Wire nail
990	5	Extension	TU18	LVL A	12	1	Small bundle of copper wire
990	5	Extension	TU18	LVL A	4	3	Unidentified iron fragments
990	5	Extension	TU18	LVL A	8	2	Brown glass bottle fragments. Melted
991	6	Transect 5	MD1	3cmbs	1	1	Modern screw
992	6	Transect 5	MD 2	8cmbs	1	2	Possible cut nail fragments
993	6	Transect 5	MD 3	6cmbs	1	1	Cut nail
994	4		TU15	LVL B	1	1	Colorless glass fragment

Table 16: FS List

APPENDIX C – Mehlich-3 Process

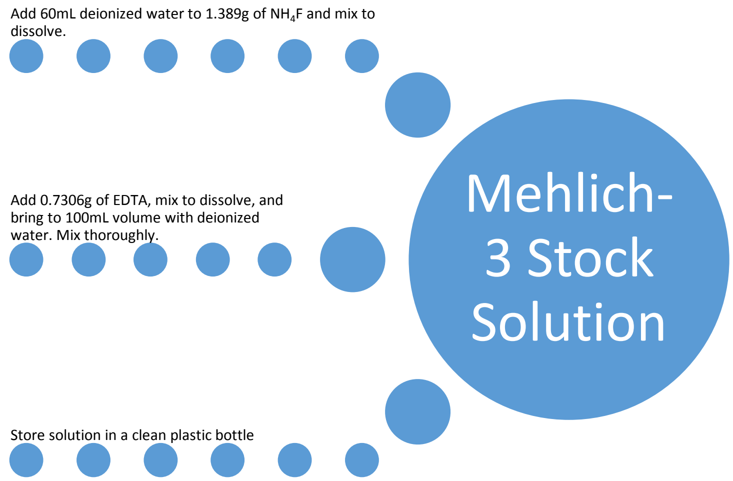

Figure 56: Steps to Create Mehlich-3 Stock Solution

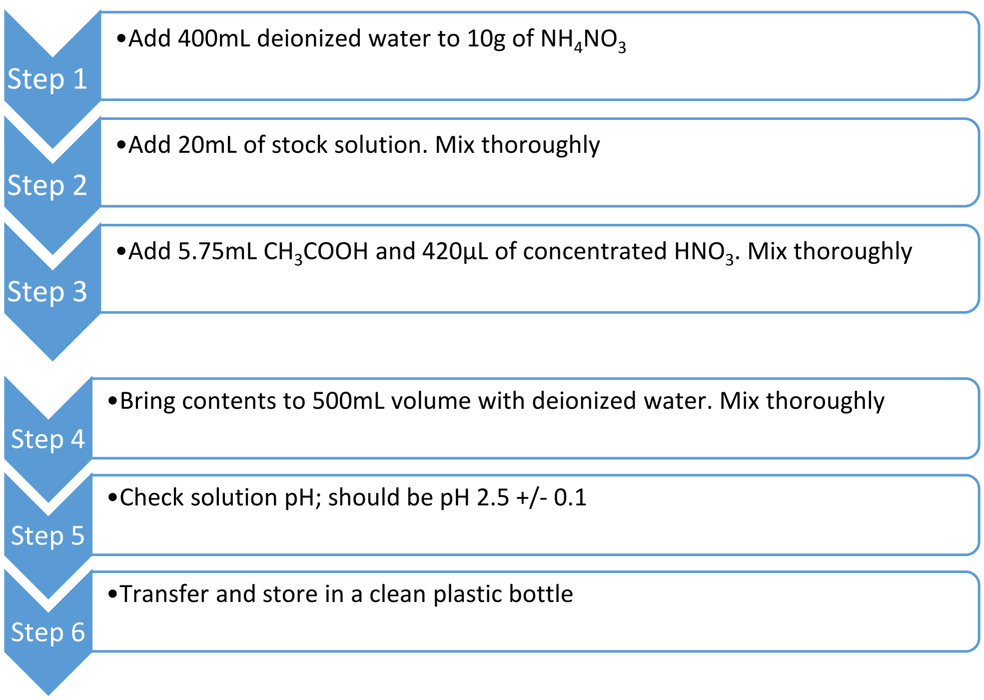

Figure 57: Steps to Create Mehlich-3 Extractant

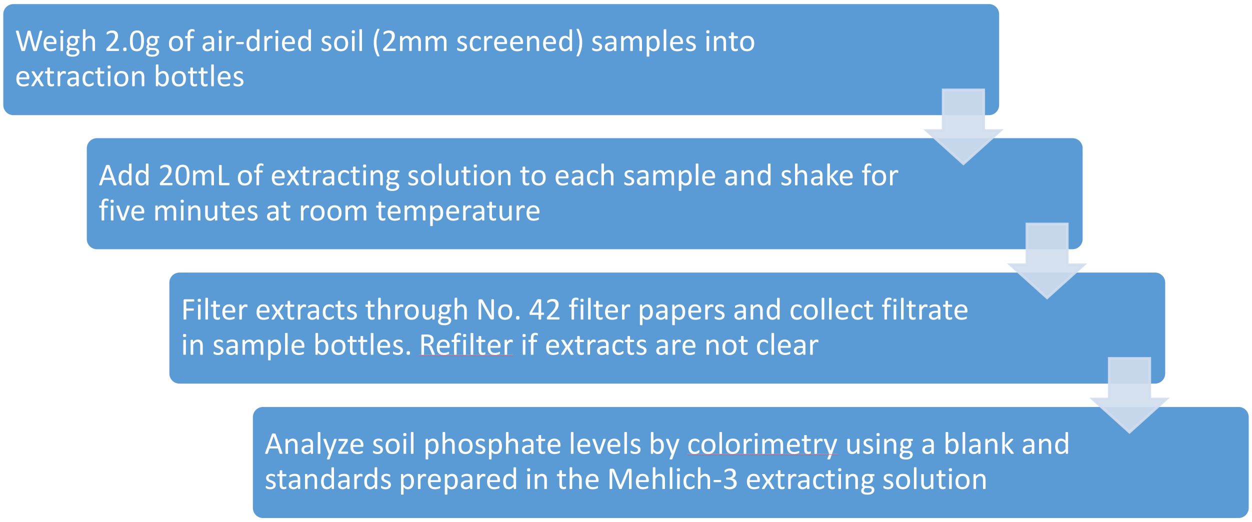

Figure 58: Mehlich-3 Process

APPENDIX D – Structural Feature Artifact List from Florence Stockade (38FL2)

Florence Stockade Feature 85 Artifact List

Cat Number	Number	Artifact Group	Class	Description
212	28	Activities	Tin sheet	Tin fragments
212	3	Architectural	Nail	Cut nail
212	9	Architectural	Nail	Cut nail
212	1	Architectural	Nail	Cut nail
212	1	Architectural	Nail	Cut nail
212	1	Arms	Ammunition	Percussion cap
212	2	Arms	Ammunition	Percussion cap
212	1	Arms	Ammunition	.64 cal ball
212	1	Arms	Ammunition	.64 cal ball
212	1	Arms	Ammunition	.64 cal ball
212	1	Clothing	Button	Corroded
212	1	Clothing	Button	Hole porcelain
212	1	Clothing	Button	Hole porcelain
212	1	Personal	Currency	Brass sutler’s token
213	13	Activities	Tin sheet	Tin fragments
214	11	Activities	Other	Ferrous fragments
218	1	Architectural	Brick	Handmade
218	4	Architectural	Nail	Cut nail
218	1	Arms	Ammunition	.577/.58 cal Minie ball
219	1	Architectural	Nail	Cut nail
219	1	Architectural	Nail	Cut nail
229	3	Activities	Other	Ferrous fragments
229	2	Architectural	Nail	Cut nail
229	9	Architectural	Nail	Cut nail
234	1	Activities	Tin Sheet	Tin fragments
234	1	Architectural	Nail	Cut nail
235	1	Architectural	Nail	Cut nail
241	2	Architectural	Nail	Cut nail
241	1	Architectural	Nail	Cut nail
241	1	Arms	Other	Lead
241	1	Arms	Ammunition	Percussion cap
241	1	Clothing	Button	Heavily corroded
242	1	Activities	Other	Ferrous fragments
242	2	Architectural	Nail	Cut nail
242	2	Architectural	Nail	Cut nail
242	4	Arms	Other	Lead
242	1	Clothing	Other	Copper eyelet fastener

Florence Stockade Feature 85 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
243	12	Activities	Tin Sheet	Tin fragments
243	4	Architectural	Nail	Cut nail
243	3	Architectural	Nail	Cut nail
243	1	Architectural	Nail	Indeterminate nail

Table 17: List of artifacts from Florence Stockade feature 85

Florence Stockade Feature 93 Artifact List

Cat Number	Number	Artifact Group	Class	Description
107	1	Architectural	Nail	Cut nail
107	1	Architectural	Nail	Wrought nail
122	3	Activities	Other	Slag

Table 18: List of artifacts from Florence Stockade feature 93

Florence Stockade Feature 95 Artifact List

Cat Number	Number	Artifact Group	Class	Description
48	4	Architectural	Nail	Indeterminate
49	1	Clothing	Button	4-hole porcelain
50	1	Clothing	Button	4-hole porcelain
51	1	Arms	Ammunition	Percussion cap
51	1	Kitchen	Ceramic	Stoneware
51	1	Tobacco pipe	Tobacco pipe	Fluted earthenware
59	1	Clothing	Button	Corroded
62	1	Clothing	Button	Corroded
64	1	Clothing	Button	2-hole porcelain
65	1	Clothing	Button	Corroded
66	1	Clothing	Button	Corroded
67	1	Clothing	Button	Corroded
68	1	Clothing	Button	Corroded
69	1	Clothing	Button	Corroded
70	1	Clothing	Button	Possible goldstone
72	1	Arms	Ammunition	.31 cal shot
73	1	Clothing	Button	Corroded
78	1	Architectural	Nail	Cut nail
78	1	Architectural	Nail	Cut nail
80	1	Clothing	Button	Corroded
81	1	Clothing	Button	Corroded
83	1	Clothing	Button	4-hole porcelain
85	1	Clothing	Button	Corroded
93	1	Architectural	Nail	Cut nail
93	1	Architectural	Nail	Cut nail
763	1	Activities	Other	Cinder
763	2	Activities	Other	Ferrous fragments
763	1	Architectural	Window glass	Blue/green
763	1	Architectural	Nail	Cut nail
763	1	Arms	Ammunition	.31 cal shot
764	6	Clothing	Button	Button fragments
765	1	Architectural	Nail	Cut nail
765	3	Architectural	Nail	Cut nail
765	1	Arms	Ammunition	.31 cal shot
765	2	Kitchen	Container glass	Blue/green
766	1	Architectural	Nail	Cut nail
766	1	Arms	Ammunition	.31 cal shot

Table 19: List of artifacts from Florence Stockade feature 95

Florence Stockade Feature 212 Artifact List

Cat Number	Number	Artifact Group	Class	Description
14	4	Activities	Other	Cinder
14	2	Activities	Other	Ferrous fragments
14	11	Activities	Tin sheet	Tin fragments
14	3	Architectural	Nail	Cut nail
14	1	Architectural	Nail	Cut nail
14	1	Architectural	Nail	Cut nail
14	1	Clothing	Button	4-hole porcelain
14	5	Kitchen	kitchenware	Fork fragments
16	49	Activities	Tin sheet	Tin fragments
19	2	Architectural	Nail	Cut nail
19	7	Architectural	Nail	Cut nail
19	2	Kitchen	Container glass	Colorless
23	1	Architectural	Nail	Cut nail
24	4	Architectural	Nail	Cut nail
24	1	Arms	Ammunition	.69 cal ball
25	1	Activities	Hardware	"U" staple
25	1	Architectural	Brick	Handmade
25	1	Architectural	Nail	Cut nail
25	6	Architectural	Nail	Cut nail
25	5	Architectural	nail	Cut nail
25	5	Arms	Accoutrements	Chain links
25	1	Arms	Ammunition	.69 cal ball
25	1	Kitchen	Ceramic	Undecorated
25	1	Kitchen	Ceramic	Undecorated
25	1	kitchen	Ceramic	Undecorated

Table 20: List of artifacts from Florence Stockade feature 212

Florence Stockade Feature 216 Artifact List

Cat Number	Number	Artifact Group	Class	Description
26	6	Activities	other	Ferrous fragments
26	2	Architectural	Nail	Cut nail
26	4	Architectural	Nail	Cut nail
26	1	Arms	Ammunition	.54 cal ball
26	1	Arms	Ammunition	.54 cal ball
26	1	Kitchen	Ceramic	Undecorated
26	4	Kitchen	Container glass	Dark olive bottle
26	1	Kitchen	Container glass	Olive bottle
26	1	Personal	Other	Copper bag latch
34	1	Kitchen	Container glass	Colorless
35	1	Activities	Other	Ferrous fragments
35	3	Architectural	Nail	Cut nail
35	1	Architectural	Nail	Cut nail
35	11	Architectural	Nail	Cut nail
35	1	Arms	Ammunition	Percussion cap
35	1	Arms	Other	Lead
35	3	Kitchen	Ceramic	Blue shell edge
35	1	Kitchen	Ceramic	Blue shell edge
35	1	Kitchen	Ceramic	Undecorated
35	1	Kitchen	Ceramic	Undecorated
35	3	Kitchen	Ceramic	Undecorated
35	1	Kitchen	Ceramic	Alkaline glazed
35	1	Kitchen	Ceramic	Salt glazed stoneware
35	1	Kitchen	Container glass	Amber fragment
35	2	Kitchen	Container glass	Blue/green fragment
35	1	Kitchen	Container glass	Colorless lamp glass
35	1	Kitchen	Container glass	Dark olive bottle
35	10	Kitchen	Container glass	Dark olive bottle
35	1	Kitchen	Container glass	Dark olive bottle
35	2	Kitchen	Container glass	Olive bottle
36	1	Activities	Other	Woven cord
36	19	Architectural	Nail	Cut nail
36	1	Architectural	Nail	Cut nail
36	6	Architectural	Nail	Cut nail
36	2	Kitchen	Ceramic	Indeterminate
36	1	Kitchen	Container glass	Colorless
36	1	Kitchen	Container glass	Olive bottle

Table 21: List of artifacts from Florence Stockade feature 216

Florence Stockade Feature 221 Artifact List

Cat Number	Number	Artifact Group	Class	Description
399	1	Activities	Other	Ferrous fragments
399	1	Architectural	Nail	Cut nail
403	1	Activities	Other	Cinder
403	1	Activities	Other	Coal
403	4	Activities	Tin sheet	Tin fragments
403	2	Architectural	Brick	Handmade
403	1	Architectural	Nail	Cut nail
403	3	Architectural	Nail	Cut nail
403	1	Architectural	Nail	Cut nail
403	1	Clothing	Other	Leather fragment
403	1	Kitchen	Ceramic	Alkaline glazed
403	17	Kitchen	Container Glass	Dark olive bottle
403	1	Kitchen	Container Glass	Dark olive bottle
403	1	Personal	Combs	Vulcanite comb tine
404	1	Architectural	Nail	Cut nail
404	2	Architectural	Nail	Cut nail
404	1	Architectural	Nail	Cut nail
404	1	Architectural	Nail	Cut nail
404	3	Architectural	Nail	Indeterminate
404	1	Arms	Ammunition	.54 cal ball
404	1	Kitchen	Ceramic	Undecorated
404	1	Kitchen	Ceramic	Undecorated
404	1	Kitchen	Ceramic	Undecorated
405	1	Activities	Hardware	Railroad spike
405	12	Activities	Tin sheet	Tin fragments
405	1	Architectural	Brick	Handmade
405	2	Architectural	Nail	Cut nail
405	4	Architectural	Nail	Cut nail
405	1	Arms	Ammunition	.54 cal ball
405	1	Personal	Writing	Graphite pencil lead
405	3	Personal	Combs	Vulcanite comb tine
406	1	Activities	Hardware	Railroad spike
406	5	Architectural	Nail	Cut nail
406	1	Architectural	Nail	Cut nail
406	1	Architectural	Nail	Cut nail
406	9	Architectural	Nail	Cut nail
406	1	Arms	Ammunition	.54 cal Minie ball

Table 22: List of artifacts from Florence Stockade feature 221

Florence Stockade Feature 223 Artifact List

Cat Number	Number	Artifact Group	Class	Description
53	1	Architectural	Window Glass	Light blue/green
53	23	Architectural	Nail	Cut nail
53	13	Architectural	Nail	Cut nail
53	2	Arms	Ammunition	Percussion cap
53	1	Arms	Ammunition	Percussion cap
53	1	Arms	Ammunition	Percussion cap
53	1	Arms	Ammunition	.64 cal ball
53	1	Clothing	Button	2 piece brass Eagle
53	1	Clothing	Button	2 piece brass Eagle
53	1	Clothing	Other Fasteners	Ferrous buckle
53	1	Kitchen	Container Glass	Colorless bottle
53	7	Kitchen	Container Glass	Light blue/green
53	2	Kitchen	Container Glass	Light blue/green
53	1	Kitchen	Container Glass	Light olive bottle
53	1	Kitchen	Container Glass	Olive bottle
53	28	Kitchen	Container Glass	Olive bottle
53	1	Kitchen	Kitchenware	Ferrous corkscrew
53	3	Personal	Combs	Vulcanite comb tine
53	2	Personal	Other	Vulcanite fragment
54	1	Activities	Other	Ferrous fragment
56	2	Architectural	Brick	Handmade
57	1	Architectural	Brick	Handmade
58	4	Architectural	Nail	Cut nail
58	1	Architectural	Nail	Cut nail
58	1	Arms	Ammunition	.64 cal round ball
71	1	Architectural	Nail	Cut nail
71	1	Arms	Ammunition	Percussion cap
71	1	Clothing	Button	Corroded
74	1	Kitchen	Container Glass	Olive bottle
75	1	Architectural	Nail	Cut nail
75	1	Architectural	Nail	Cut nail
75	1	Architectural	Nail	Indeterminate
75	1	Kitchen	Container Glass	Light aqua bottle
75	1	Kitchen	Container Glass	Olive bottle
84	6	Architectural	Nail	Cut nail
84	4	Architectural	Nail	Cut nail
90	2	Architectural	Nail	Cut nail
104	1	Architectural	Nail	Cut nail
105	2	Activities	Other	Slag

Florence Stockade Feature 223 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
105	1	Architectural	Window Glass	Light blue/green
105	2	Architectural	Nail	Cut nail
105	1	Arms	Ammunition	Percussion cap
105	1	Arms	Ammunition	.31 cal shot
105	1	Clothing	Button	2 piece brass Eagle
105	1	Kitchen	Container Glass	Olive bottle
108	7	Architectural	Nail	Cut nail
108	1	Arms	Ammunition	Percussion cap
108	1	Arms	Ammunition	Percussion cap
108	1	Arms	Ammunition	Percussion cap
108	1	Kitchen	Ceramic	Alkaline glazed
112	1	Arms	Accoutrements	Brass cartridge box
121	1	Architectural	Window Glass	Light blue/green
121	6	Architectural	Nail	Cut nail
121	2	Architectural	Nail	Cut nail
121	1	Architectural	Nail	Cut nail
121	1	Arms	Ammunition	.31 cal shot
121	3	Kitchen	Container Glass	Light aqua bottle
124	1	Architectural	Brick	Handmade
130	1	Kitchen	Container Glass	Olive bottle
131	2	Architectural	Nail	Cut nail
135	3	Architectural	Window Glass	Light blue/green
135	3	Architectural	Nail	Cut nail
135	3	Architectural	Nail	Cut nail
135	1	Arms	Accoutrements	Pewter canteen spout
135	1	Arms	Ammunition	Rifle bullet
135	1	Arms	Ammunition	.31 cal shot
135	1	Clothing	Button	Conserved
135	1	Kitchen	Container Glass	Amber bottle
135	1	Kitchen	Container Glass	Light aqua bottle
149	6	Architectural	Nail	Cut nail
149	3	Architectural	Nail	Cut nail
154	1	Architectural	Nail	Cut nail
156	1	Activities	Other	Ferrous fragments
156	1	Architectural	Nail	Cut nail
156	1	Architectural	Nail	Cut nail
157	1	Architectural	Nail	Cut nail
158	5	Activities	Other	Ferrous fragments
166	3	Architectural	Nail	Cut nail

Florence Stockade Feature 223 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
166	1	Architectural	Nail	Cut nail
166	1	Architectural	Nail	Cut nail
167	1	Activities	Other	Ferrous fragments
167	1	Architectural	Nail	Cut nail
167	1	Architectural	Nail	Cut nail
167	1	Arms	Ammunition	Percussion cap
169	1	Architectural	Nail	Cut nail
170	1	Architectural	Nail	Cut nail
170	2	Kitchen	Container Glass	Indeterminate
172	1	Activities	Hardware	Ferrous chain
176	1	Activities	Other	Ferrous fragments

Table 23: List of artifacts from Florence Stockade feature 223

Florence Stockade Feature 540 Artifact List

Cat Number	Number	Artifact Group	Class	Description
575	2	Architectural	Window Glass	blue/green
575	1	Architectural	Nail	Cut nail
575	1	Architectural	Nail	Cut nail
575	16	Architectural	Nail	Cut nail
575	1	Architectural	Nail	Cut nail
575	4	Architectural	Nail	Cut nail
575	2	Arms	Other	Lead sheet
575	1	Clothing	Button	4 piece brass Eagle
575	1	Kitchen	Container Glass	Light blue/green bottle
575	1	Kitchen	Container Glass	Light blue/green
575	1	Kitchen	Container Glass	Olive bottle
575	1	Kitchen	Container Glass	Indeterminate
575	1	Personal	Combs	Vulcanite comb tine
575	1	Personal	Jewelry	Vulcanite finger ring
576	2	Architectural	Brick	Handmade
576	1	Architectural	Brick	Handmade
577	1	Activities	Crate Band	Ferrous band fragment
577	1	Activities	Other	Ferrous fragment
577	28	Activities	Tin sheet	Tin fragments
577	24	Activities	Tin sheet	Tin fragments
577	3	Architectural	Brick	Handmade
577	2	Architectural	Window Glass	blue/green
577	2	Architectural	Nail	Cut nail
577	14	Architectural	Nail	Cut nail
577	1	Kitchen	Ceramic	Red transfer print
577	1	Kitchen	Ceramic	undecorated
577	2	Kitchen	Ceramic	Slip glazed stoneware
577	1	Kitchen	Ceramic	Alkaline glazed
577	2	Kitchen	Container Glass	Indeterminate
577	2	Kitchen	Container Glass	Light aqua bottle
577	1	Kitchen	Container Glass	Light aqua
577	1	Kitchen	Container Glass	Light blue/green bottle
577	9	Kitchen	Container Glass	Light olive bottle
577	8	Kitchen	Container Glass	Olive bottle fragment
577	5	Personal	Combs	Vulcanite comb tine
577	1	Tobacco Pipe	Tobacco Pipe	Unglazed redware
578	1	Architectural	Brick	Handmade
578	1	Architectural	Nail	Cut nail
578	1	Architectural	Nail	Cut nail

Florence Stockade Feature 540 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
578	5	Architectural	Nail	Indeterminate
578	1	Kitchen	Ceramic	Alkaline glazed
578	18	Kitchen	Container Glass	Olive bottle fragment
578	1	Kitchen	Container Glass	Olive bottle fragment
579	1	Architectural	Brick	Indeterminate
579	1	Kitchen	Container Glass	Indeterminate
587	3	Architectural	Nail	Cut nail
587	1	Architectural	Nail	Cut nail
587	2	Architectural	Nail	Cut nail
587	2	Arms	Other	Lead
587	3	Kitchen	Container Glass	Light blue/green
588	1	Activities	Hardware	Possible brass washer
588	2	Activities	Other	Ferrous fragments
588	4	Activities	Tin sheet	Tin fragments
588	1	Architectural	Nail	Cut nail
588	6	Architectural	Nail	Cut nail
588	1	Kitchen	Ceramic	Salt glazed stoneware
588	1	Kitchen	Container Glass	Light aqua bottle
588	9	Kitchen	Container Glass	Light aqua bottle
588	1	Kitchen	Container Glass	Light aqua bottle
588	3	Kitchen	Container Glass	Light aqua bottle
588	2	Tobacco Pipe	Tobacco Pipe	Earthenware face pipe
589	1	Activities	Other	Cinder
589	7	Activities	Tin sheet	Tin fragments
589	1	Architectural	Window Glass	Blue/green
589	2	Architectural	Nail	Cut nail
589	3	Architectural	Nail	Cut nail
589	1	Kitchen	Ceramic	Alkaline glazed
589	1	Kitchen	Container Glass	Light blue/green bottle
589	3	Kitchen	Container Glass	Light blue/green
589	5	Kitchen	Container Glass	Light olive
589	1	Kitchen	Container Glass	Olive bottle fragment
590	1	Architectural	Brick	Handmade
590	1	Kitchen	Container Glass	Olive bottle fragment
591	3	Architectural	Nail	Cut nail
591	1	Tobacco Pipe	Tobacco Pipe	Earthenware face pipe
592	1	Kitchen	Container Glass	Olive indeterminate
594	3	Activities	Other	Ferrous fragments
594	2	Architectural	Nail	Cut nail

Florence Stockade Feature 540 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
594	1	Architectural	Nail	Cut nail
601	1	Activities	Other	Ferrous fragment
601	1	Activities	Other	Indeterminate
601	9	Activities	Tin sheet	Tin fragments
601	3	Architectural	Nail	Cut nail
601	8	Architectural	Nail	Cut nail
601	1	Arms	Ammunition	.31 cal shot
601	1	Clothing	Button	Corroded
601	1	Clothing	Button	4-hole porcelain
601	1	Kitchen	Ceramic	Alkaline glazed
601	1	Kitchen	Ceramic	Salt glazed stoneware
601	2	Kitchen	Ceramic	Salt glazed stoneware
601	1	Kitchen	Container Glass	Indeterminate
602	6	Activities	Tin sheet	Tin fragments
602	5	Architectural	Nail	Cut nail
602	12	Architectural	Nail	Cut nail
602	1	Arms	Ammunition	.54 cal Minie ball
602	6	Kitchen	Ceramic	Salt glazed stoneware
602	1	Kitchen	Ceramic	Salt glazed stoneware
602	1	Kitchen	Container Glass	Light aqua bottle
602	1	Kitchen	Container Glass	Light aqua
602	2	Kitchen	Container Glass	Light olive
602	1	Tobacco Pipe	Tobacco Pipe	Earthenware face pipe
603	5	Activities	Other	Ferrous fragments
603	6	Activities	Tin sheet	Tin fragments
603	2	Architectural	Brick	Handmade
603	1	Architectural	Window Glass	Blue/green
603	1	Architectural	Nail	Cut nail
603	2	Architectural	Nail	Cut nail
603	1	Kitchen	Ceramic	Alkaline glazed
603	2	Kitchen	Ceramic	Salt glazed stoneware
603	4	Kitchen	Container Glass	Blue/green bottle
603	1	Kitchen	Container Glass	Light aqua bottle
603	1	Kitchen	Container Glass	Light olive bottle
603	3	Kitchen	Container Glass	Olive bottle fragment
604	1	Architectural	Nail	Cut nail
604	2	Kitchen	Ceramic	Alkaline glazed
604	1	Personal	Combs	Vulcanite comb tine
605	1	Kitchen	Container Glass	Indeterminate

Florence Stockade Feature 540 Artifact List, cont.

Cat Number	Number	Artifact Group	Class	Description
620	2	Architectural	Nail	Cut nail
620	1	Architectural	Nail	Cut nail
620	1	Architectural	Nail	Cut nail
620	1	Kitchen	Container Glass	Light olive bottle
621	3	Kitchen	Ceramic	Salt glazed stoneware
621	1	Kitchen	Container Glass	Olive bottle fragment
622	1	Kitchen	Container Glass	Olive bottle fragment
622	1	Kitchen	Container Glass	Indeterminate
624	1	Kitchen	Container Glass	Olive bottle fragment
624	3	Kitchen	Container Glass	Olive indeterminate
638	2	Architectural	Nail	Cut nail
638	4	Architectural	Nail	Cut nail
638	1	Architectural	Nail	Cut nail
638	1	Arms	Other	Lead sheet
638	1	Kitchen	Ceramic	Alkaline glazed
639	4	Architectural	Nail	Cut nail
639	1	Arms	Other	sheet lead
639	1	Kitchen	Ceramic	Alkaline glazed
640	2	Activities	Other	Ferrous wire
640	1	Architectural	Nail	Cut nail
643	1	Kitchen	Container Glass	Olive bottle fragment

Table 24: List of artifacts from Florence Stockade feature 540

APPENDIX E – Magnetometer Survey Report

A MAGNETOMETER SURVEY AT THE CONFEDERATE POW CAMP SITE OF CAMP LAWTON IN JENKINS COUNTY, GEORGIA

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Draft report

May 2015

ABSTRACT

On February 15, 2015, a magnetometer survey was performed by Daniel Bigman on four test areas at the site of Camp Lawton on Magnolia Springs State Park property. The survey was carried out under the direction of Dr. Lance Greene, assistant professor at Georgia Southern University and director of the Camp Lawton archaeological project. The goal of the survey was to identify subsurface anomalies and artifacts associated with the Confederate occupation that occurred in October-November 1864. The survey successfully identified numerous anomalies that represent buried features and clusters of artifacts. While some of these undoubtedly are associated with the mid-20th century CCC occupation at the site, future testing will determine which of these, if any, are associated with the Civil War era occupation.

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CHAPTER 1. INTRODUCTION

On February 15, 2015, a magnetometer survey was performed by Dr. Daniel Bigman on four test areas at the site of Camp Lawton in Jenkins County, Georgia (Figure 1). The four test areas were previously established, and are associated with thesis research being carried out by a graduate student at Georgia Southern University (GSU). The magnetometer survey serves as one of several methods being used by the graduate student for his thesis research, which focuses on locating Confederate loci at Camp Lawton. However, the primary goal of the magnetometer survey was to guide test excavations, and will be an integral part of the larger archaeological research project. The magnetometer fieldwork was organized by Dr. Lance Greene, an assistant professor at GSU, who is in charge of the Camp Lawton archaeological project.

Camp Lawton was a Confederate POW camp constructed during the late summer of 1864. It was constructed to relieve overcrowding from Camp Sumter, more commonly known as Andersonville. Camp Lawton was built to hold tens of thousands of prisoners, and the stockade encompassed roughly 42 acres. The camp opened in early October, but was abandoned in late November, as Sherman's army approached from the northwest (Derden 2012).

The site of Camp Lawton is located three miles north of Millen, Georgia, about 45 miles south of Augusta. Much of the site is contained within the boundaries of U.S. Fish and Wildlife Service land and Magnolia Springs State Park. The four test areas, labeled test areas 4-7, range in size from 220m x 80m to 30m x 30m (Figure 2). The areas were identified as likely to contain Confederate occupations, based on Civil War era maps and on current landforms and proximity to the stockade, earthen fort, and the Magnolia Springs drainage.

The results of the magnetometer survey show, particularly in Test Area 4, numerous anomalies that represent buried archaeological features as well as single artifacts and clusters of artifacts. The temporal period for most of these anomalies is currently unknown. Many probably are associated with the CCC camp that was located at the park in the 1930-1940s. Future test unit excavations will hopefully determine which of these anomalies if any, date to the Civil War era.

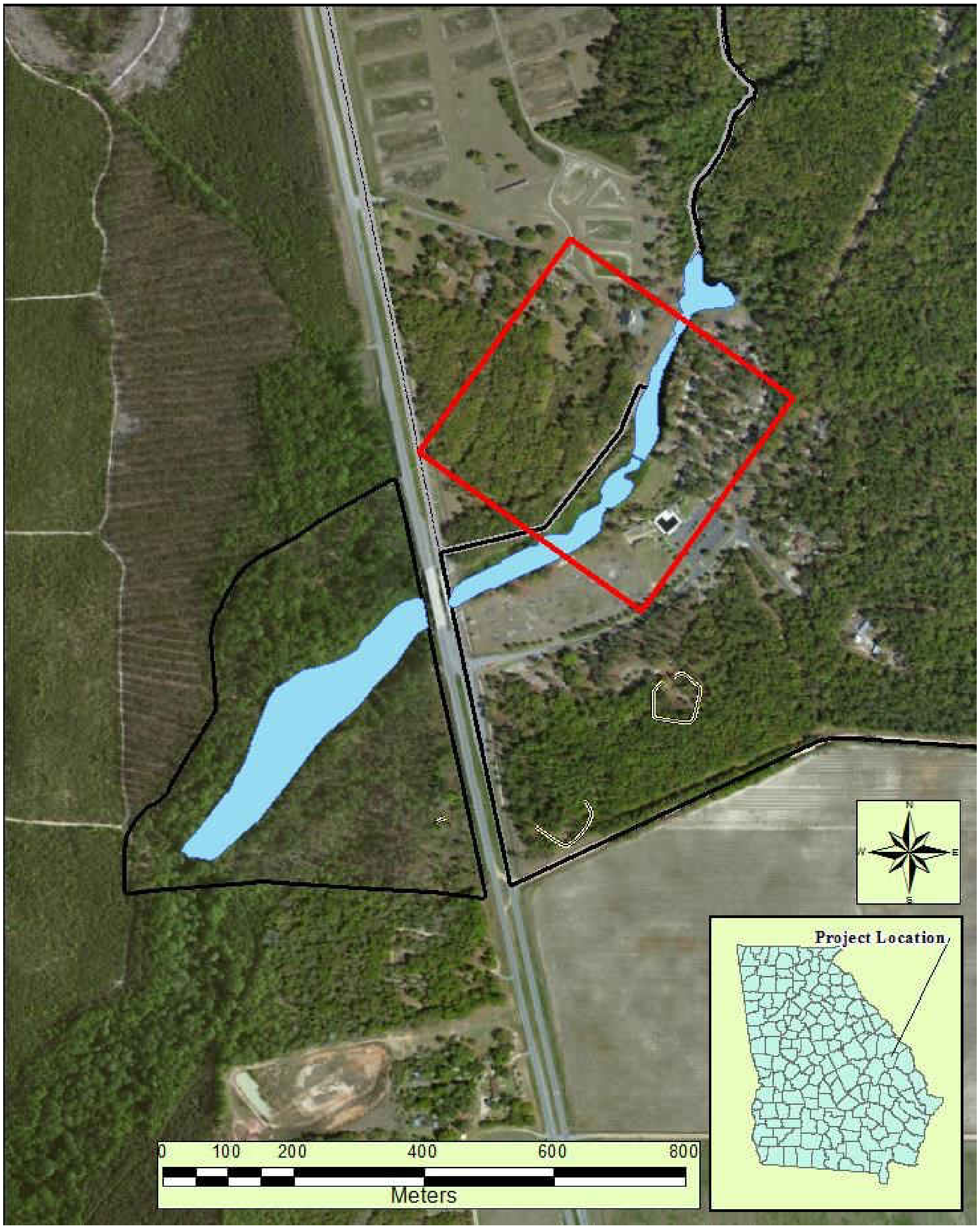

Figure 1. Location of Camp Lawton archaeological site.

Figure 2. Locations of Test Areas 4-7 on Magnolia Springs State Park.

CHAPTER 2. METHODS

Magnetometry measures local variations in the earth magnetic field strength. It is a passive method of prospection in that it records the earth's field rather than generating an artificial field and measuring the earth's response (such as electromagnetic induction). Often the goal of magnetometry in archaeology is to identify short-wavelength variations (anomalies) produced by archaeological sources (Kvamme 2006a:206).

There are two basic types of magnetism that produce variations in the earth's local field strength as a result of past human activity: thermoremanent magnetism and magnetic susceptibility (Aspinall et al. 2008). Thermoremanent magnetism occurs when soils or objects are fired above the Curie temperature and the magnetic moments become parallel. Upon cooling, the moments may remain parallel creating a permanent magnetic intensity. Parallel magnetic moments increase the overall field strength of the soil or object and is easily detectable with a magnetometer.

Magnetic susceptibility refers to the ability of a material to become magnetized (Kvamme 2006a:208). This primarily depends on the presence of magnetizable minerals, which in soil essentially consists of hematite, magnetite, and maghemite (however, only the last two are significantly magnetic) (Clark 1997). There are four different processes that can enhance the magnetic susceptibility in soils: (1) iron accumulates naturally in topsoils, (2) alternating periods of wetness and dryness can transmutate hematites to maghemites, (3) fires reduce hematite to magnetite, and (4) some colonizing bacteria in organic soils can excrete maghemite (Kvamme 2006a). Human activity can exacerbate these processes and enhance the magnetic susceptibility of soils (Dalan 2006).

This project collected data for areas 4, 5, and 7 using three Ferex fluxgate gradiometers mounted on a pushcart with a survey wheel. Due to the multiple sensors and the cart system, this survey was able to collect very high-resolution data. The sensors were spaced 0.5 m apart with a transect interval of 0.5 m. The surveyor collected data at a sampling interval of 20 cm, with an automatic fiduciary marker recorded every 1 m with the survey wheel in order to limit error. The project attempted to collect data in 40m x 40m grids, but grid sizes had to be reduced on occasion due to surface obstructions. Such obstructions included trees, civil war earthworks, and park infrastructure such as the entrance gate.

Magnetic data for test areas 4, 5, and 7 were processed using Data2Line software. Our processing procedure generally followed the suggestion of Kvamme (2006b), where we filtered data first and enhanced images second. Individual grids were de-staggered to correct for shifts in data locations due to inconsistencies in surveyor speed or lags in recording from the instrument. Next, we applied a zero-mean traverse filter to each transect to compensate for heading errors and instrument drift. Finally, we smoothed the data using a 5m x 5m low-pass filter to remove noise and facilitate interpretation.

The survey collected data in Test Area 6 using a G-858 cesium-vapor total field magnetometer manufactured by Geometrix. Data were collected in continuous mode with readings recorded every 1/10 of a second and the surveyor collected transects at a spacing of 1 m. All data from Area 6 were processed using MagPick software. A zero-median traverse filter was applied to each transect to correct for diurnal drift, variation in topography, and variation in background susceptibility.

CHAPTER 3. RESULTS

The survey recorded magnetic anomalies in each area with varying signatures, each representing changes in the local field strength from different sources. The signatures of these anomalies fall into three categories, 1) localized clusters of magnetic highs and lows which are interpreted as artifact clusters likely consisting in part of metal sources, 2) isolated dipolar anomalies of approximately equal positive and negative responses created by single metal objects of historic or modern origin, and 3) positive (what some call mono-polar) magnetic anomalies that likely represent pits, burials, organic remains, filled in ditches, etc.

Area 4

Area 4 is a rectangular block measuring 220m x 80m, located in a large field bordering the south side of Magnolia Springs creek (see Figure 1). The most overwhelming feature mapped with the magnetometer is the probable historic drainage system located in the approximate center of Area 4. This feature consists of a grid of positive magnetic anomalies on the eastern side of the feature, each approximately 1 m in diameter, surrounded by negative magnetic readings. The western side of this feature consists of liner magnetic anomalies oriented approximately northeast-southwest. These are interpreted as trenches.

Numerous isolated dipolar anomalies are distributed across Area 4. It is impossible to distinguish between historic and modern sources for these anomalies. However, the magnetometer recorded seven possible artifact clusters in Area 4 possibly historic in date. It appears that the trenches of the historic drainage system disturbed the archaeological record and at least one artifact cluster extends into this feature. Finally, numerous mono-polar magnetic anomalies interpreted as pits are located throughout the survey area and range in size. While the smaller mono-polar anomalies recorded here with the magnetometer may indicate remains of graves, fire pits or decayed post holes, it is likely that at least some are the products of bioturbation. The larger examples likely do represent pits or ditches possibly of Civil War date in origin.

Figure 3. Results of Test Area 4 Magnetometer survey.

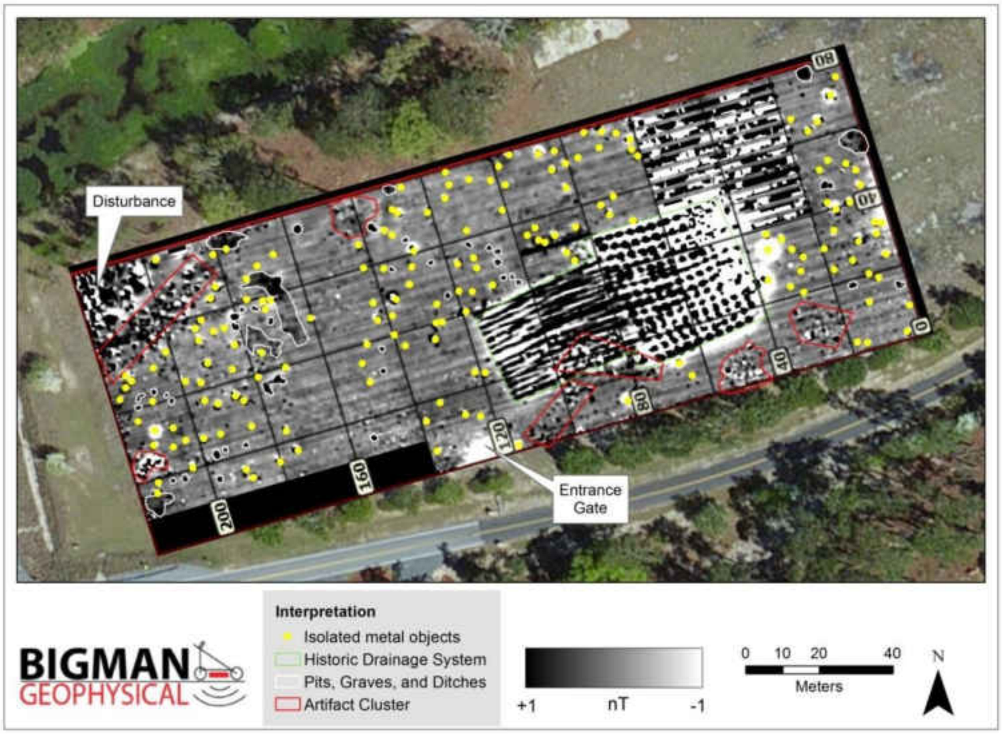

Figure 4. Results of Test Area 4 Magnetometer survey with anomalies highlighted.

Area 5

Test Area 5 measures 40m x 40m, and is located west of Highway 25 and north of the creek. The data collected in this forested area is virtually un-interpretable. The magnetometer recorded significant variation across the entire grid; however, some of this variation is likely the result of root disturbance, bushes, and other obstructions limiting the quality of data collection. In addition, historic objects, modern trash, and concrete were distributed across the survey grid and several small cavities were present in shallow subsurface. Mid-20th century aerial photographs show that the CCC had erected several small buildings in the vicinity, and many of the anomalies undoubtedly are associated with these disturbances. The magnetometer data provide little useful information to help better understand this area of the site.

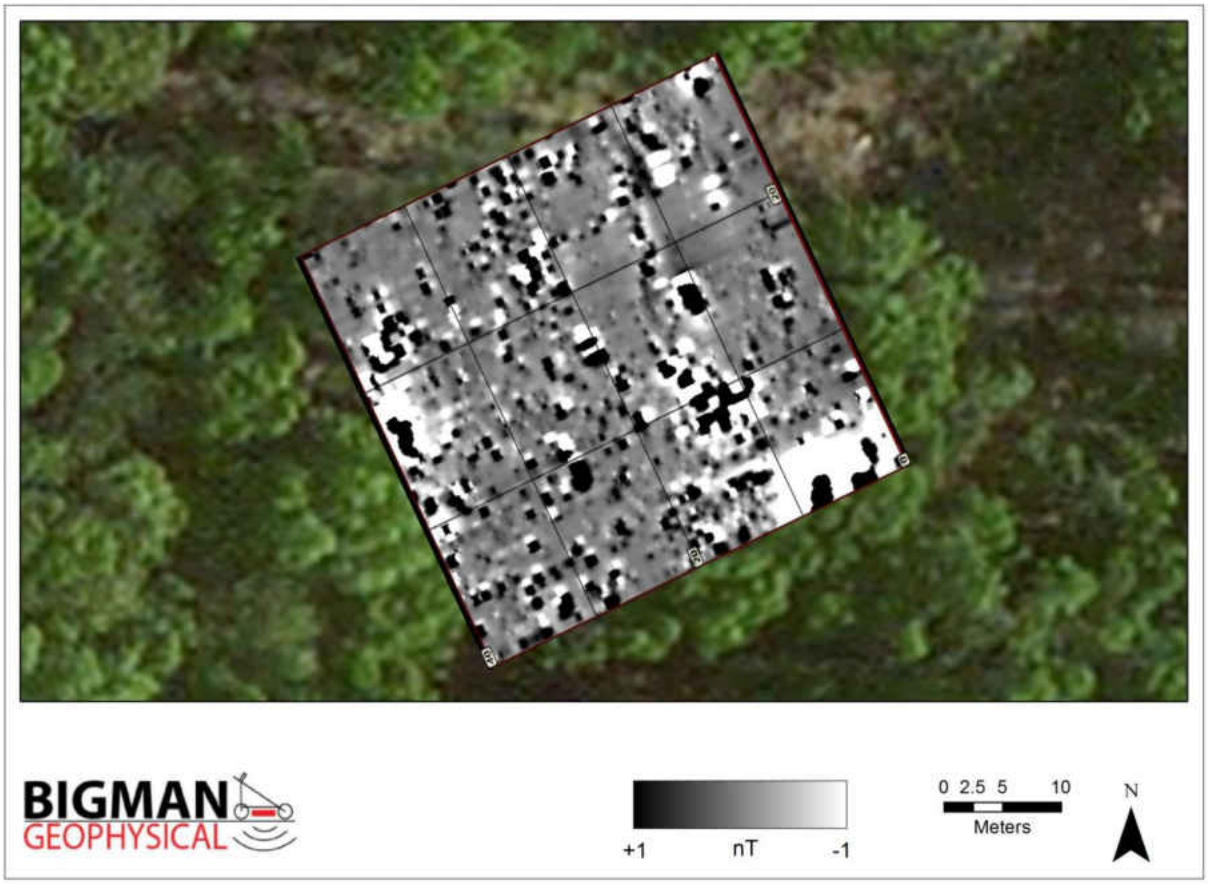

Figure 5. Results of Test Area 5 Magnetometer survey.

Area 6

Test Area 6 is located south of Test Area 4 and the entrance road to the MSSP. It measures 60m x 20m, and encompasses a narrow, deep drainage ditch that descends from near the breastworks to the south. It is likely that this landscape feature represents a natural spring drainage that flowed into the Magnolia Springs creek. Data collected in Area 6 (Figure *) revealed little information directly attributable to Civil War activity. A cluster of anomalous readings located in the southeastern corner of the survey grid likely reflect more recent historical activity. Archaeological evidence indicates that the CCC used this area as a dump for architectural debris.

While not directly related to the Civil War, the history of the CCC is valuable in its own right. The gully descends northward down the slope. Anomalous magnetic readings trail the locus of historic artifacts into the gully. This indicates that erosion is moving historical artifacts from their original location. The magnetometer also located several isolated metal objects, but the temporal association is unclear. These may be the remains of modern debris or trash dropped by tourists.

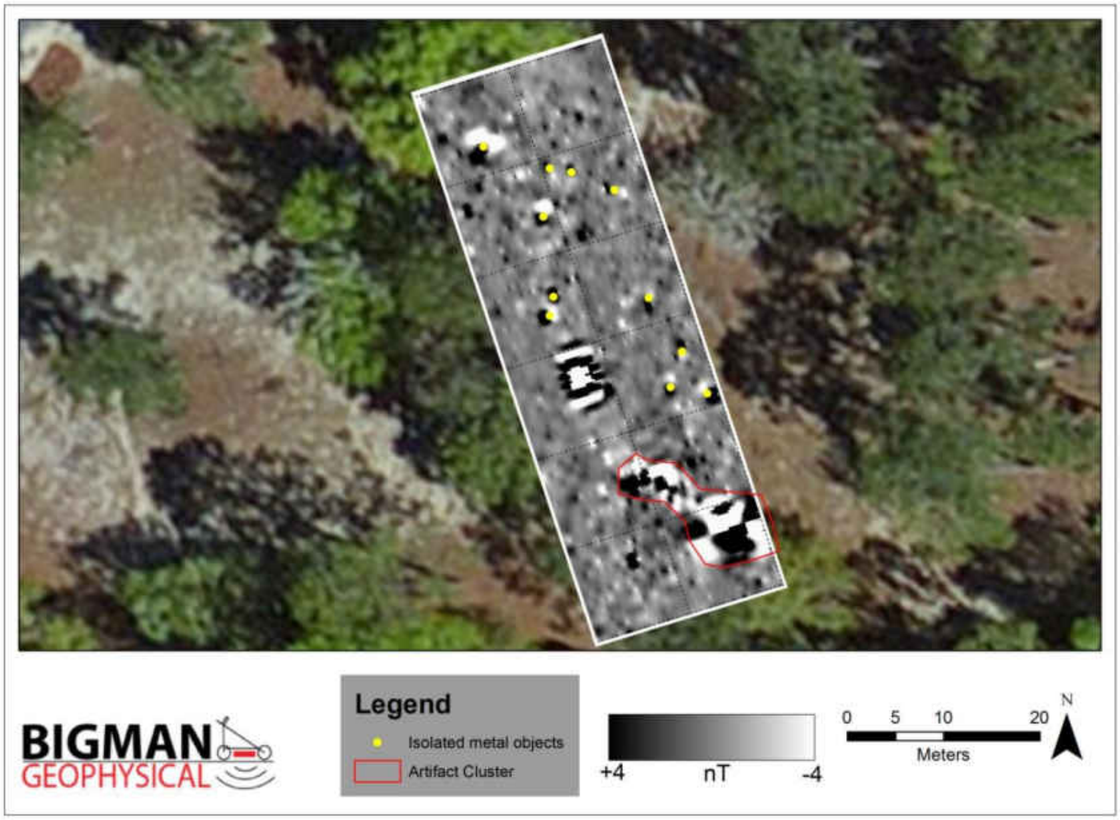

Figure 6. Results of Test Area 6 Magnetometer survey with anomalies highlighted.

Area 7

Test Are 7 is a 30m x 30m block situated within the earthen fort. There is little to no evidence inside the earthen embankment indicative of a building. There is generally a variable distribution of magnetic values in the southwestern portion of the survey block, but it is unclear if this represents a cluster of artifacts or disturbance. There are two distinct high amplitude di-polar anomalies in the northwestern portion of the survey block (near the entrance) which likely derive from metal sources. Finally, there is a cluster of generally positive magnetic anomalies in the northeastern portion of the survey block, near the gun ramp. This may represent pits or artifact clustering. However, the location near the bottom of the ramp may indicate eroded soils of a more organic origin and higher magnetic susceptibility.

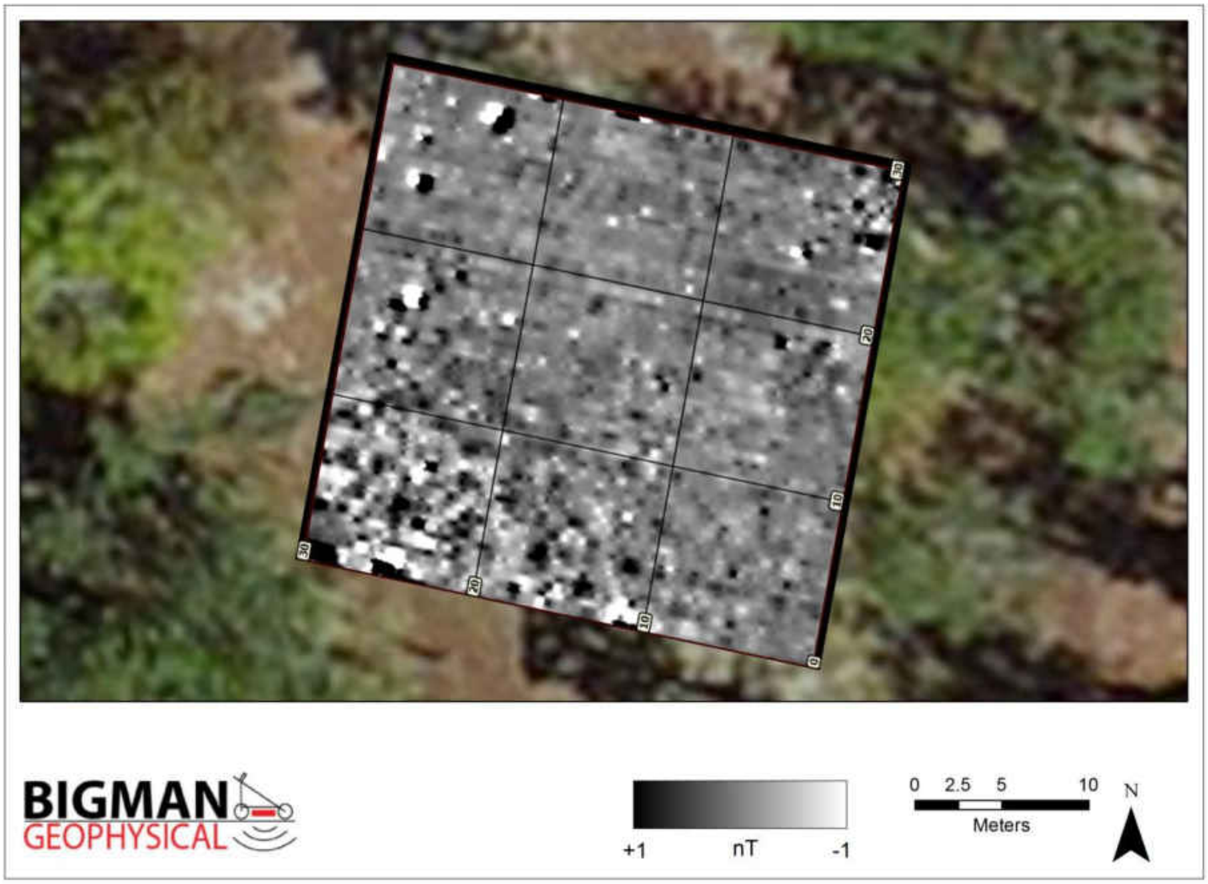

Figure 7. Results of Test Area 7 Magnetometer survey.

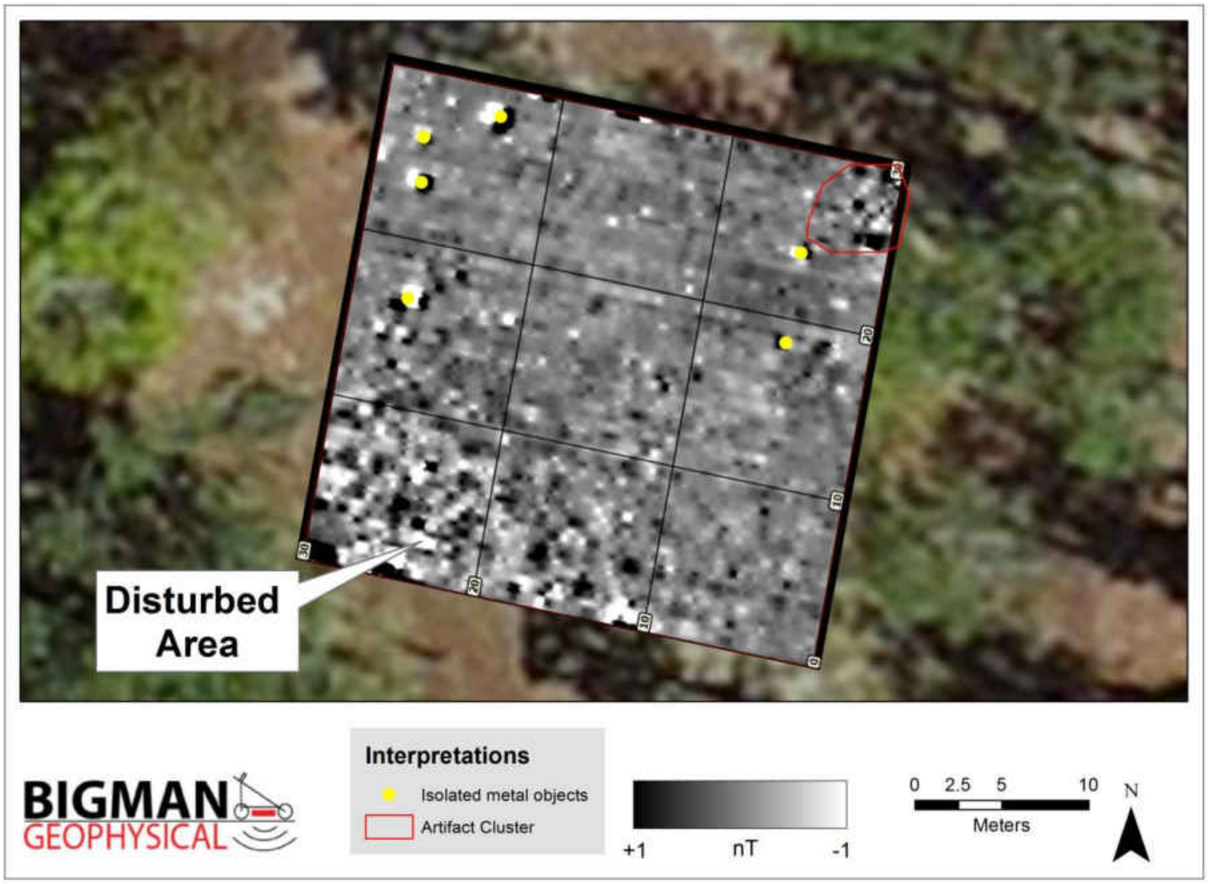

Figure 8. Results of Test Area 7 Magnetometer survey with anomalies highlighted.

CHAPTER 4. CONCLUSIONS

A magnetometer survey was performed on four test areas of the Camp Lawton site on MSSP property. The goal of the survey was to identify subsurface deposits associated with the Confederate occupation at the site.

In test areas 4, 6, and 7, subsurface anomalies were identified that represent both cultural features and artifacts/artifact clusters. The mid-20th century drain fields in Test Area 4 are the most clearly identified anomalies. Other anomalies, such as those in Test Area 6, have been identified, through archaeological testing, as CCC related. However, numerous anomalies in Test Area 4, and a smaller number in Test Area 7, may represent Civil War era cultural features and artifacts. The magnetometer data from Test Area 5 are inconclusive. This is probably due to the ground disturbance caused by construction in this area by the

CCC in the mid-20th century. The magnetometer data provide clear evidence of subsurface deposits and artifacts, particularly in Test Area 4. These data should be used to guide future excavations in these areas.

I would like to thank Dustin Fuller of the MSSP and Bryan Tucker of the Georgia DNR Historic Preservation Division for making this investigation possible.

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APPENDIX A

Test Area UTM coordinates (NAD 27)

E	N	Area	corner
410088.925	3637561.979	4	NE
410009.073	3637547.788	4	NW
410031.59	3637471.152	4	SW
410113.713	3637486.669	4	SE
409766.003	3637580.881	5	NE
409735.011	3637557.108	5	NW
409759.282	3637524.996	5	SW
409790.896	3637550.138	5	SE
410172.183	3637460.745	6	NE
410152.504	3637455.825	6	NW
410172.561	3637399.248	6	SW
410192.051	3637404.168	6	SE
410349.106	3637424.036	7	NE
410318.831	3637429.902	7	NW
410311.64	3637400.762	7	SW
410341.348	3637394.707	7	SE