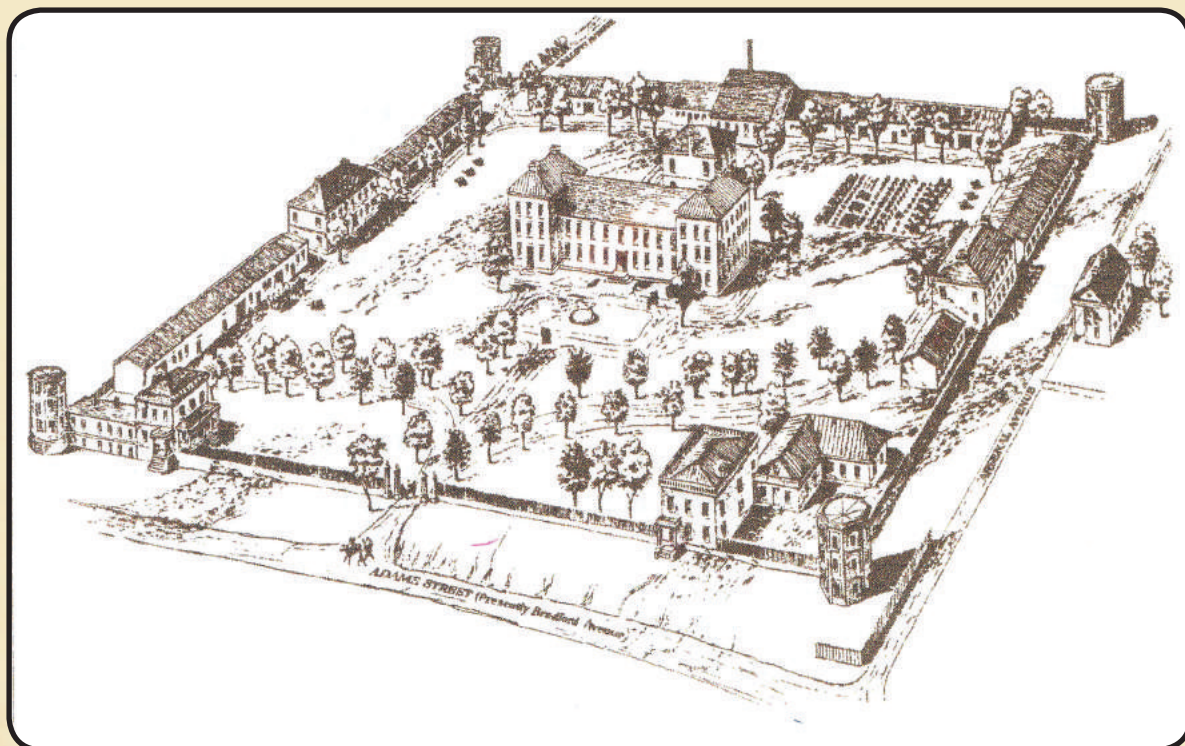


Geophysical and Archaeological Survey of Arsenal Park

Cumberland County, North Carolina



NEW SOUTH ASSOCIATES, INC.

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Cumberland County, North Carolina

Report submitted to:

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March 6, 2018 • **Final Report**
New South Associates Technical Report 2807

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MANAGEMENT SUMMARY

New South Associates, Inc. (New South), conducted geophysical survey and archaeological investigations at Arsenal Park, Fayetteville, North Carolina. The North Carolina Civil War History Center Foundation (The Center) plans to construct new facilities at this site. The Center is part of the Division of State History Museums, Office of Archives and History, North Carolina Department of Natural and Cultural Resources. A draft conceptual drawing showed the proposed undertaking and a survey map showed major existing site features and tax parcels, including property ownership. Probable ground-disturbing activities include construction of a main interpretative building, two parking lots, and the relocation/restoration of three Civil War-era houses already on the property. The study area measured approximately four acres.

Arsenal Park contains archaeological remains of the North Carolina Arsenal (authorized by Congress in 1836, built 1838-1856) and Fayetteville Arsenal (1861-1865). The North Carolina Arsenal was part of the Federal government's Atlantic Coast defensive system. Upon completion, however, it served primarily for the storage of arms. At the outbreak of the Civil War in 1861, locals seized the arsenal and turned it over to the State of North Carolina and the Confederate States of America (CSA). The CSA expanded the arsenal substantially beyond its original footprint and renamed it the Fayetteville Arsenal. Although an asset to the Confederate war effort through the production of arms and ammunition, the arsenal never functioned at full capacity owing to shortages of material and skilled labor. The arsenal was destroyed by William T. Sherman's Federal troops in March 1865 and subsequently, its materials were salvaged by local citizens and the military.

The Center requested a survey to identify archaeological features and deposits and to provide data for making recommendations with regard to mitigating potential adverse effects of the planned undertaking. New South proposed a combination of ground-penetrating radar (GPR) survey and targeted shovel testing to investigate specific GPR anomalies. The Phase I Survey was conducted in stages, beginning with GPR data collection and followed by data processing and analysis, and then shovel testing, laboratory analysis, and reporting.

The GPR and archaeological datasets generated by this study provided several findings about site 31CD280 (the North Carolina Arsenal) and site 31CD1884 (a residential lot on north side of Arsenal Park). First, both sites show extensive features and artifacts from the late nineteenth- to early twentieth century houses that were present in the post-arsenal period. Their high archaeological visibility is an indication of extensive land alteration that occurred after the arsenal was destroyed.

Second, the GPR survey identified features associated with the CSA Gun Carriage Shop. Although these were known from prior archaeological work, the GPR data revealed different configurations that could indicate interior wall supports and/or additional builders' or robbers' trenches.

Third, the GPR survey did not identify any intact segments of the Blacksmith Shop. This is somewhat unexpected given that its construction was identical to the Gun Carriage Shop and prior investigations had identified former wall segments and builders' trenches.

Fourth, the GPR survey identified additional features that are likely associated with the arsenal but were not known previously. Many of these were amorphous and were interpreted as probable debris scatters associated with the arsenal's destruction.

Based on the present study, additional work is recommended to mitigate potential adverse effects from the proposed development plans for Arsenal Park. These are summarized in the following table.

Summary of Recommendations for Additional Work at Arsenal Park

Recommendation	Level of Effort
Additional excavations of the Gun Carriage Shop.	<ul style="list-style-type: none"> • 3 machine excavated trenches * • 5 hand excavated units **
Archaeological testing of GPR anomaly 5.	<ul style="list-style-type: none"> • 2 hand excavated units
Excavations of non-anomalous areas between the Gun Carriage and Blacksmith Shops.	<ul style="list-style-type: none"> • 3 hand excavated units
Excavation of Sandstone-like Surface identified by Robinson et al. (2000).	<ul style="list-style-type: none"> • Machine stripping of 10x10 meter block
Public outreach.	<ul style="list-style-type: none"> • Archaeology Day • Site tours • Volunteers to assist with excavations
Popular report/synthesis of arsenal history and archaeological investigations.	<ul style="list-style-type: none"> • Book/pamphlet with abundant graphics and professional design

*Trenches would measure 3x10 feet.

**Units would measure 3x3 feet.

ACKNOWLEDGEMENTS

David Winslow with the North Carolina Civil War History Center managed the overall project. We thank him for his assistance and support.

Susan Myers at the Office of State Archaeology facilitated scanning of two large maps from the CAI report and Rosie Blewitt-Golsch assisted with finding missing maps from one of the previous reports. We appreciate their help.

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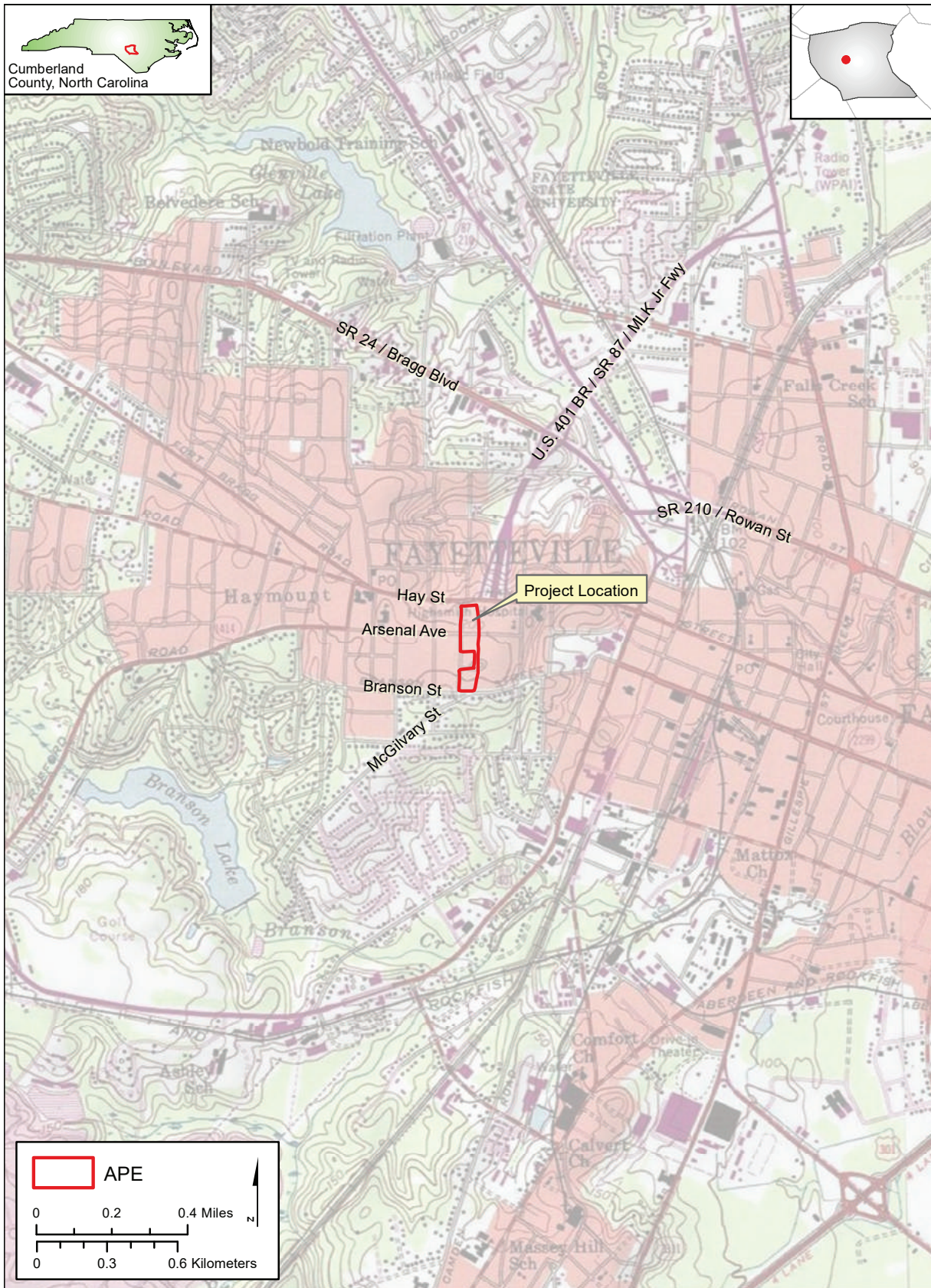
I. INTRODUCTION

New South Associates, Inc. (New South), conducted geophysical survey and archaeological investigations at Arsenal Park, Fayetteville, North Carolina (Figure 1). The North Carolina Civil War History Center Foundation (The Center) plans to construct new facilities at the site. The Center is part of the Division of State History Museums, Office of Archives and History, North Carolina Department of Natural and Cultural Resources. The undertaking would include construction of a main interpretative building, the addition of two parking lots, and the relocation/restoration of three Civil War-era houses that are already on the property. A draft conceptual drawing showed the proposed layout, while a comprehensive survey map showed all major existing site features and tax parcels, including property ownership (Figures 2-3). Arsenal Park is bounded on the south by Branson Street, on the west by Myrover Street, on the north by Hay Street, and on the east by Martin Luther King, Jr., Freeway (MLK Freeway). The MLK Freeway was designated in 1997 when the former Central Business District (CBD) Loop was renamed. Throughout this report, CBD Loop is used when referring to work conducted prior to 1997 and MLK Freeway is used when referring to work conducted since 1997. The study area site is approximately four acres (Figure 4). The study area shown in Figures 1 and 4 was drawn based on mapping provided by The Center in the request for proposal (RFP) and is presumed to represent the extent of ground disturbance activities.

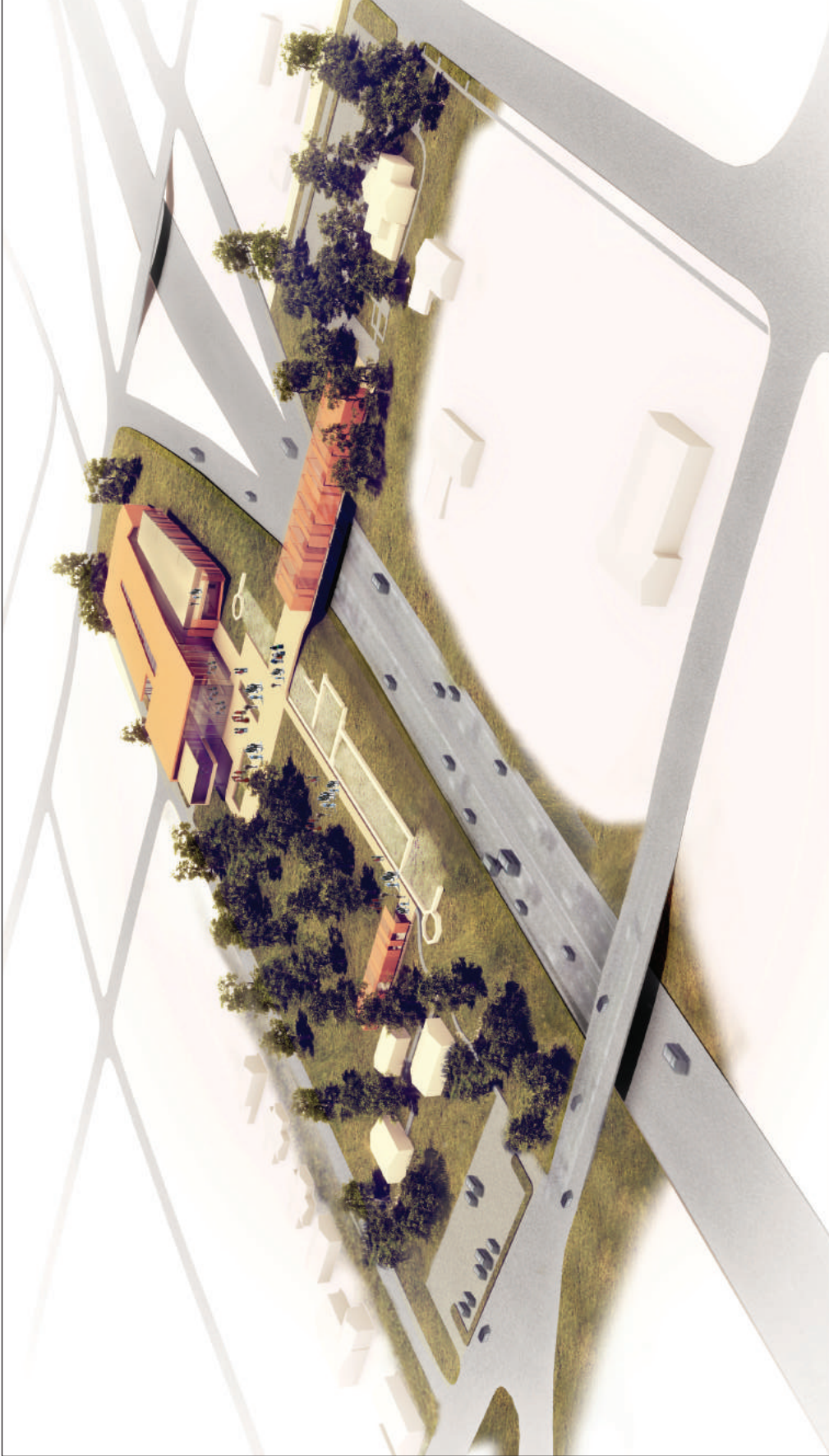
Arsenal Park contains archaeological remains of the North Carolina Arsenal (authorized by Congress in 1836) and Fayetteville Arsenal (1861-1865). The North Carolina Arsenal was constructed between 1838-1856 as part of the Federal government's Atlantic Coast defensive system. However, upon completion it was used primarily for storage. When the Civil War began in 1861, locals captured the arsenal and turned it over to the State of North Carolina and the Confederate States of America (CSA). The CSA renamed the facility the Fayetteville Arsenal and expanded it significantly. Although it produced arms and ammunition to supply the Confederate war effort, the arsenal never functioned at full capacity because of material and skilled labor shortages. The arsenal was completely demolished by William T. Sherman's army in March 1865 and its materials were salvaged by local citizens and the military.

The Center requested a Phase I Archaeological Survey to identify cultural features and deposits and provide recommendations for mitigating potential adverse effects of the planned undertaking. New South proposed a combination of ground-penetrating radar (GPR) survey and targeted shovel testing to investigate specific GPR anomalies. GPR is generally well suited to

Figure 1.
Study Area Location in Cumberland County, North Carolina



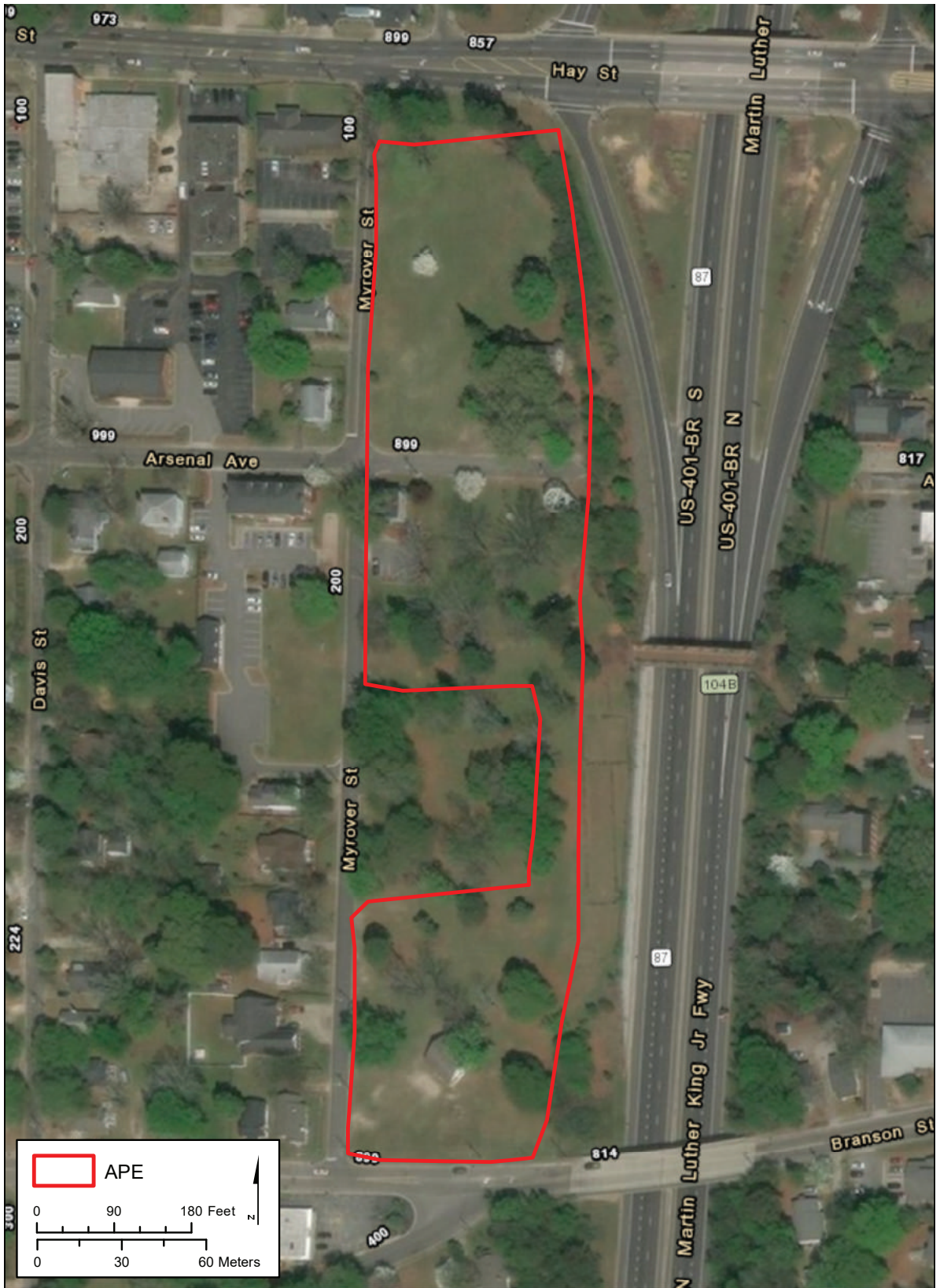
Source: USGS Topographic Quadrangle Map, Fayetteville, NC (1978)



Source: North Carolina Civil War History Center

Figure 2.
Draft Conceptual Plan Showing Planned Facilities

Figure 4.
Study Area Detail



Source: ESRI World Imagery (2018)

urban environments because of favorable surface conditions and high contrast features (Botwick et al. 2016; Lowry 2016; Lowry and Patch 2014; 2016; Patch 2015; Patch and Botwick 2012; Patch et al. 2012; Patch and Lowry 2013). It has the ability to produce high resolution imagery that can be compared with historic maps to classify anomalies as likely archaeological feature types. The Phase I survey included GPR data collection followed by data processing and analysis, and then shovel testing, laboratory analysis, and reporting.

Shawn Patch served as Principal Investigator. Fieldwork for the geophysical survey was conducted from December 11-15, 2017 by Maeve Herrick and Ari Lukas and required the equivalent of eight persondays. Archaeological investigations were conducted on January 25-26, 2018, by Javi Vasquez (Archaeologist) and John Hogg (Archaeological Technician) and required the equivalent of four persondays.

This report is divided into six chapters including this introduction. Chapter II discusses the environmental context and setting of the project. Chapter III presents an overview of previous research. Chapter IV discusses the methods used for the Phase I Survey. Chapter V presents the survey results and Chapter VI provides recommendations. Appendix A is the artifact catalog and Appendix B contains shovel test data.

II. ENVIRONMENTAL CONTEXT

The study area is located in the Upper Coastal Plain physiographic province in Cumberland County, North Carolina. Parts of Cumberland County are in the Sandhills, a sub-region that is characterized by high sand ridges and numerous drainages. Pine and mixed pine hardwoods are the dominant vegetation. The Cape Fear River is a major feature of the landscape and Fayetteville is located at the upper reaches of the navigable section.

Soils in the study area are classified as Wagram-urban land complex, 0-8 percent slopes (Soil Survey Staff 2018). A typical profile consists of a loamy sand Ap horizon (0-8 in.), a loamy fine sand E horizon (8-24 in.), a sandy clay loam Bt horizon (24-75 in.), and a sandy loam BC horizon (75-83 in.). This is a well-drained soil with parent material consisting of loamy marine deposits.

CURRENT CONDITIONS

Archaeological remains of the arsenal were first documented in the 1960s during planning efforts for the CBD Loop Highway through Fayetteville (South 1968). Today, Arsenal Park is characterized by open grounds with abundant green space (Figure 5). Portions of the western arsenal compound wall and two towers are preserved and interpreted for the public. The Culbreath House dates to the nineteenth century (relocated from its original location) and serves as office space for the North Carolina Civil War History Center close to Branson Street. A building that housed the former offices for Charles Morris (CD0025) sits at the corner of Myrover Street and Arsenal Avenue. Arsenal (McCall) House (CD0184) is a one-story building that dates to 1860 on the north side of Arsenal Avenue. The Davis House is a two-story frame building that also sits north of Arsenal Avenue but was moved to its current location prior to 1993. Portions of the study area are located in the Arsenal Avenue Historic District (CD0978).

Figure 5.
Photographs Showing Existing Conditions in Arsenal Park



A. View of Southern Portion of Arsenal Park Looking Northeast



B. View of Northern Portion of Arsenal Park Looking Northeast



C. View of Arsenal Compound Wall and Southwest Tower Looking Northeast

III. CONTEXT AND PREVIOUS RESEARCH

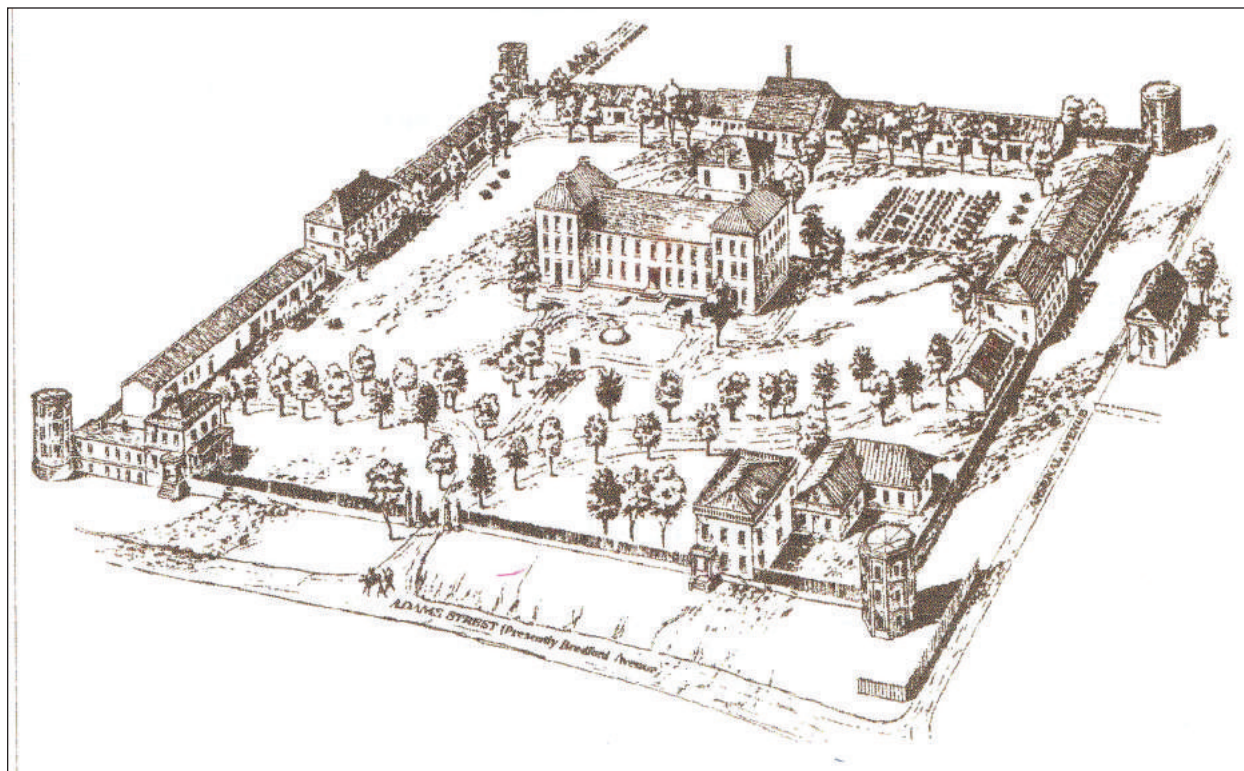
HISTORY OF THE NORTH CAROLINA ARSENAL

During the early nineteenth century, military and Congressional leaders were concerned about the need for a strong national defense. In response, Fayetteville was chosen for the site of an arsenal because it met many of the logistics and transportation needs identified by the military (CAI 1973:21–22). This location also filled a geographic gap along the Atlantic coast between existing facilities in Augusta, Georgia, and Washington, D.C. The U.S. Congress authorized the arsenal in 1836 and construction began in 1838. Military engineers chose Hay Mount, an elevated sand ridge on the western edge of town, because of a major road and anticipated rail access. The arsenal complex was massive, each of its four walls measuring 500 feet long with two-story towers (bastions) at each of the corners (Figure 6). Buildings were brick with slate roofs. The original plan called for 35 buildings, including barracks, magazines, and workshops for ordnance and arms. Due to transportation problems and ongoing debates about the utility of an arsenal in Fayetteville, construction was not completed until 1856. Moreover, the arsenal never fulfilled its promise and was of little to no value to the U.S.

Local citizens seized the arsenal at the outbreak of the Civil War and turned it over to the Confederacy. Renamed the Fayetteville Arsenal, the facility was enlarged and upgraded to produce the Fayetteville rifle, Fayetteville pistol carbine, and ammunition. From 1861-1865, it served as an important source of armaments for the CSA. But owing to shortages of skilled labor and materials, the arsenal never operated at full capacity. Because of its function, it became a target of William T. Sherman's march through the Carolinas. In March 1865, Sherman ordered the complete destruction of the entire arsenal compound and it was burned, exploded with gunpowder charges, and leveled with battering rams.

In the aftermath of the Civil War, building materials were salvaged by local citizens and later the military. The government estimated that by December 1865, up to one million bricks were available for auction and determined to charge the town and private citizens for bricks they had already used in local improvement projects. Various archaeological investigations have documented the systematic salvage efforts (Grunden et al. 1994; Smith et al. 1997). By 1872, the federal government finally auctioned the arsenal property and it became integrated into an urban neighborhood.

Figure 6.
Artist's Conception of the North Carolina Arsenal



Courtesy of the North Carolina Department of Natural and Cultural Resources

The only detailed map that has been identified to date was made by U.S. Army Captain Jasper Myers in March 1865. Only a small section of that map is known to exist. As noted, the CSA made substantial additions to the arsenal to expand its capacity (Figure 7). Of these additions, only the Gun Carriage Shop and Blacksmith's shop were located immediately adjacent to the existing walled compound. Most of the remaining additions were north and west of this area in what is now an urban neighborhood.

The North Carolina Arsenal was listed on the NRHP in 1983 (Scheitlin et al. 1983). The site boundary encompasses approximately 89 acres and was defined based on the jurisdictional boundaries ceded to the federal government in 1839. The NRHP boundary incorporates all the known buildings and features that were directly associated with the arsenal. The map attached to the NRHP nomination showed 38 major structures that were known through historical documentation or archaeological investigations (Figure 8). Geo-referencing of this map and digitization of individual features indicated the arsenal's scale; however, the precise locations of each feature, including the main arsenal building, are approximate (Figure 9). The site was nominated to the NRHP under Criterion A for its important role in armament supply and construction during the Civil War, Criterion C for its distinctive types and methods of military construction and organization during both the Federal and Confederate periods, and Criterion D for its potential to yield information about the manufacture of small arms and about military behavioral patterns. The NRHP nomination stated that intact, sealed archaeological deposits should be expected because of how the arsenal was destroyed and the site capped. The arsenal has been designated site 31CD280 by the North Carolina Office of State Archaeology (OSA).

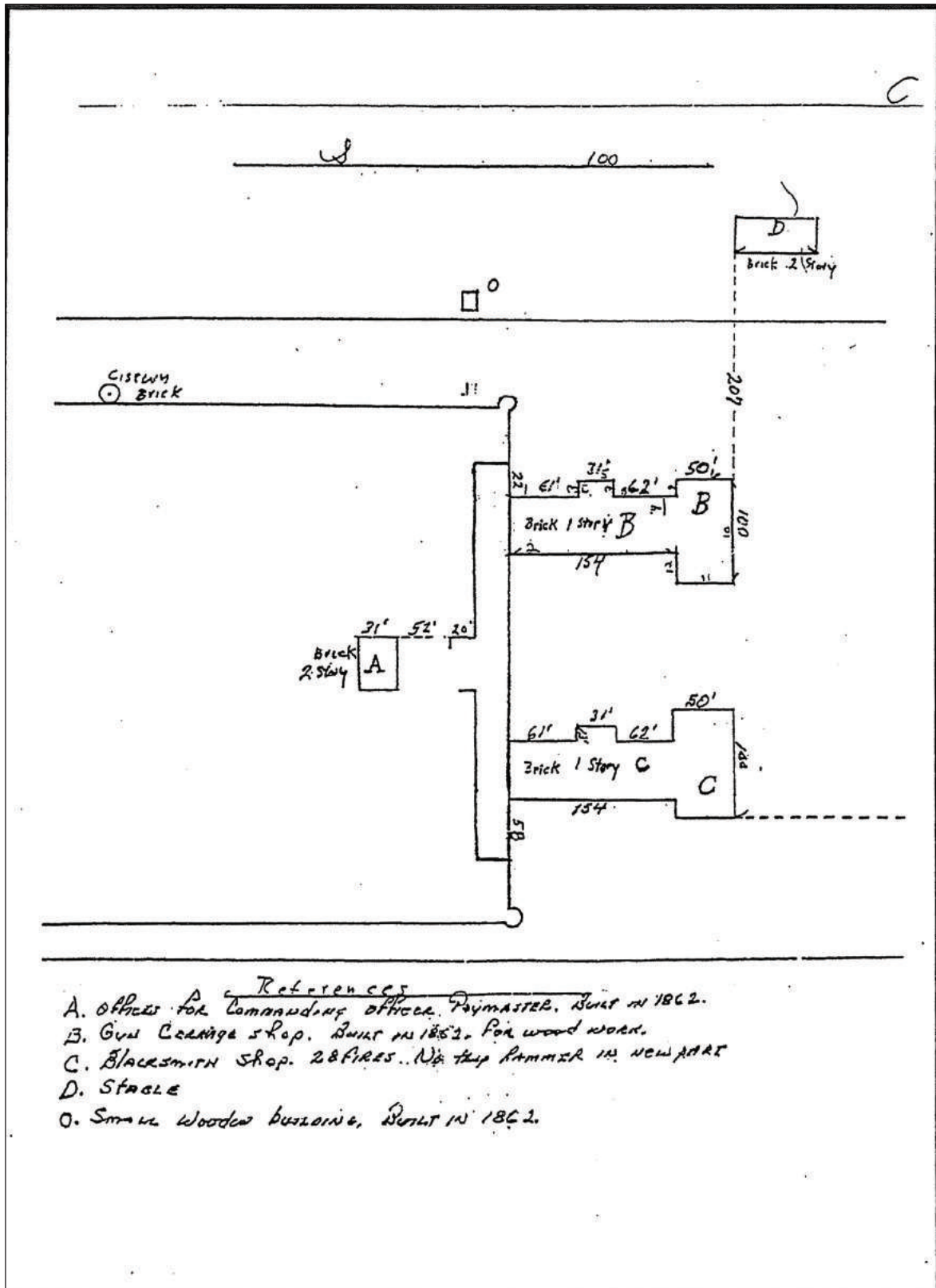
ARSENAL PARK NEIGHBORHOOD

Development of the arsenal neighborhood continued into the late nineteenth and early twentieth centuries (Figure 10). Numerous houses were located along Branson Street, Myrover Street, and Arsenal Avenue. Many of these buildings survived into the late 1990s and early 2000s but were demolished as the property was acquired by the City of Fayetteville in preparation for the development of Arsenal Park.

THE CENTRAL BUSINESS DISTRICT LOOP HIGHWAY

The Central Business District (CBD) Loop project was designed in 1965 prior to passage of the National Historic Preservation Act (NHPA) of 1966 and Department of Transportation (DOT) Act of 1966. Because it predated these laws, no environmental review was conducted. Once archaeological remains of the arsenal were identified, however, the project was redesigned to minimize its impacts and preserve a significant portion of the arsenal compound within existing right-of-way but outside construction limits. Construction was delayed in the 1970s because of funding shortages and new environmental analyses were conducted beginning in 1978.

Figure 7.
Portion of the 1865 Myers Map of Fayetteville Arsenal



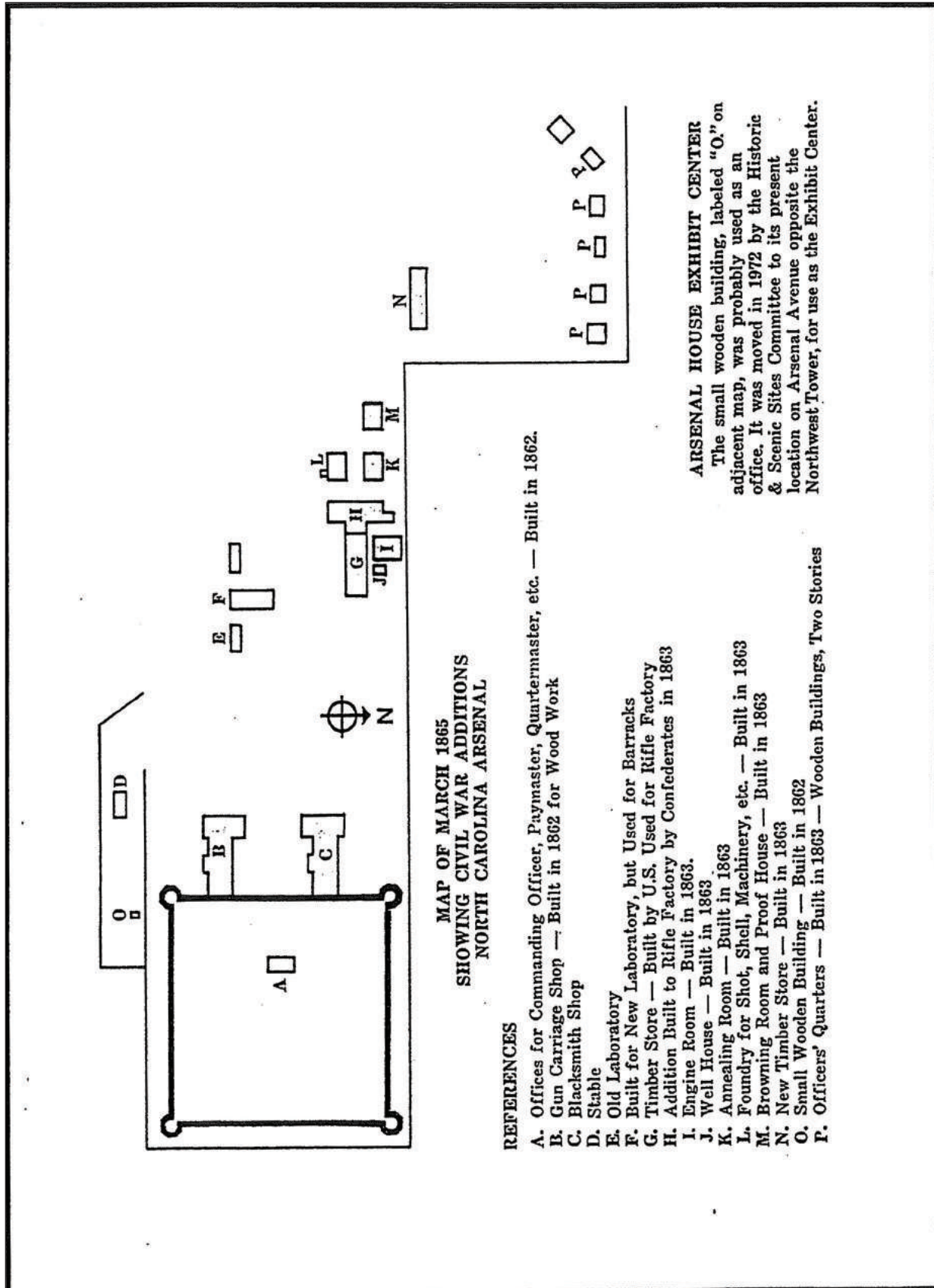
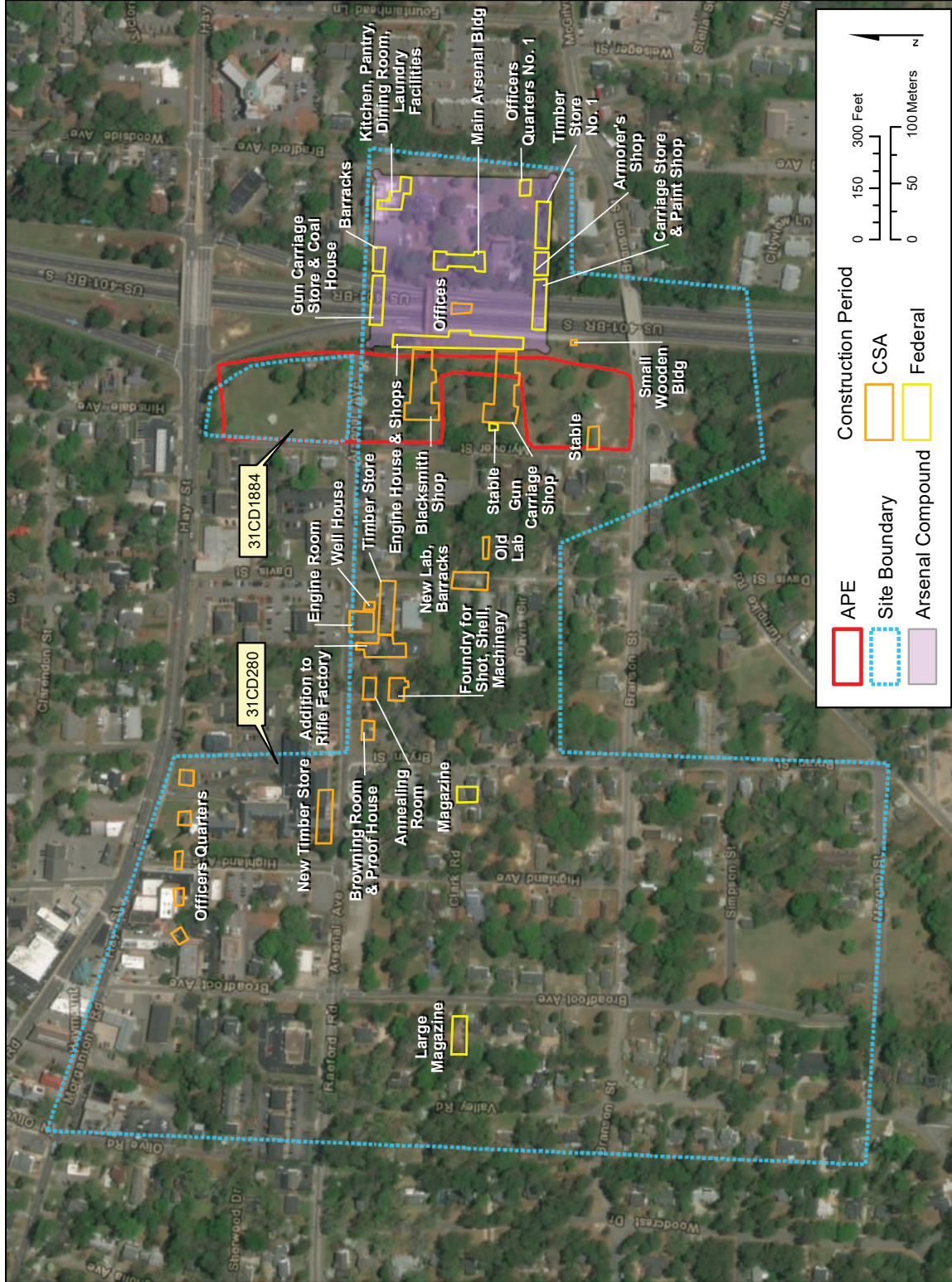


Figure 8. Map of Fayetteville Arsenal Showing Confederate Additions

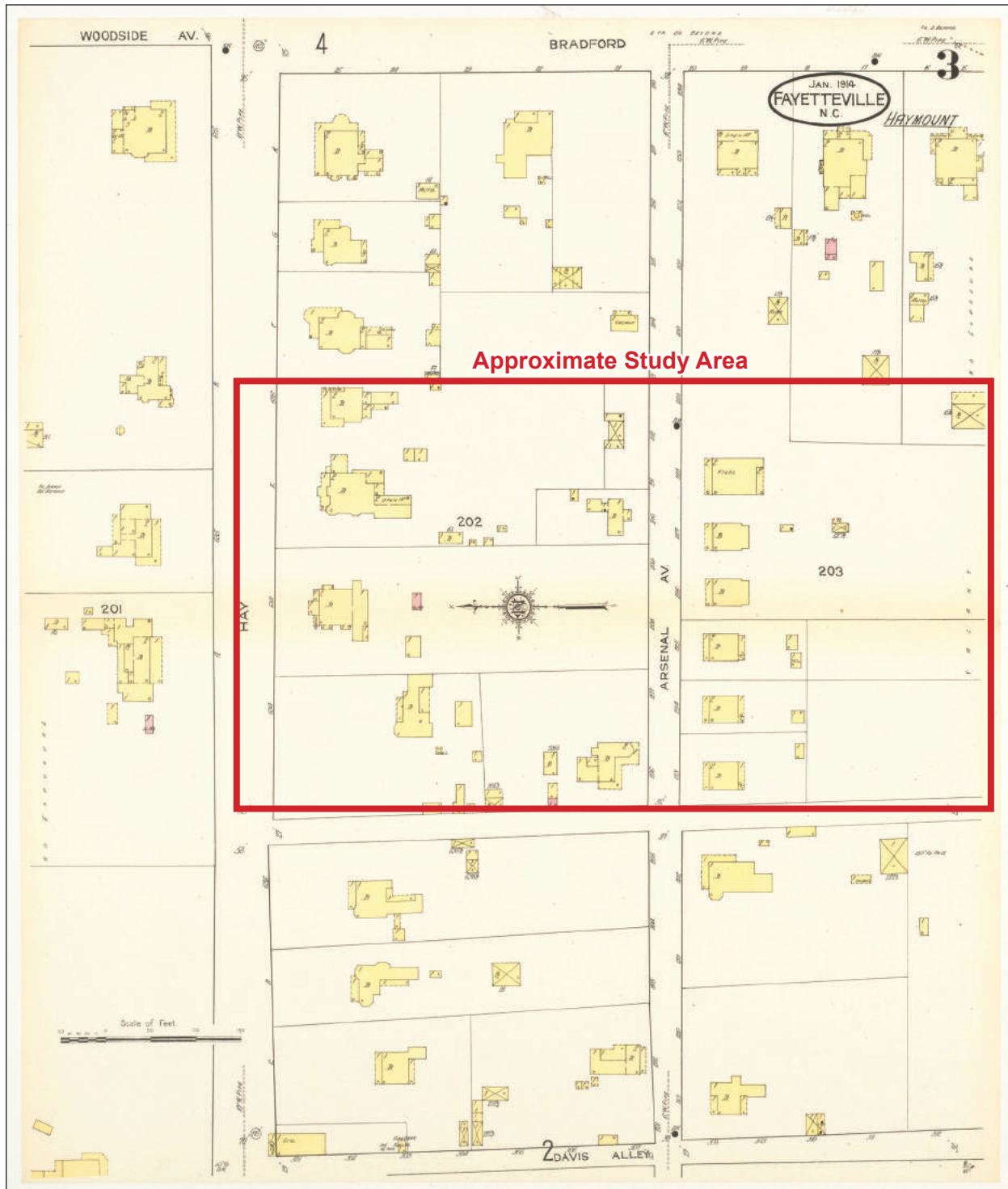
Source: Scheitlin et al. 1983



Source: ESRI World Imagery (2018)

Figure 9. Map Showing Digitized Locations of Arsenal Compound and Associated Features

Figure 10.
1914 Sanborn Fire Insurance Map



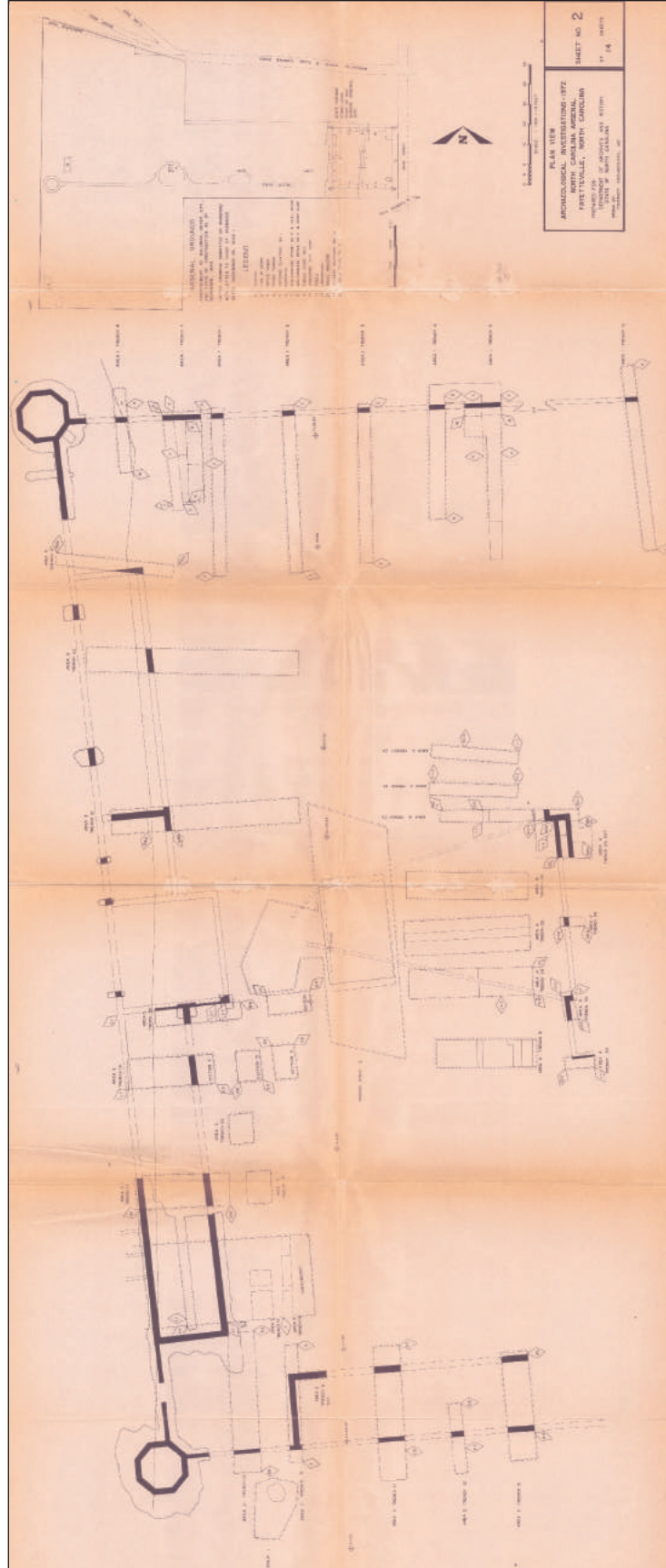
Numerous archaeological investigations have been conducted at Arsenal Park over the past 50 years (CAI 1973; Grunden et al. 1994; Padgett and Robinson 1991; Robinson 2008; Robinson et al. 2000; Smith 1996; Smith et al. 1997; South 1968). The results of this work have contributed significant information about the arsenal compound organization, its transformation from an above-ground resource to an archaeological site, and its physical condition.

CENTRAL BUSINESS DISTRICT LOOP HIGHWAY (NORTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY)

The earliest archaeological investigation associated with the CBD Loop was sponsored by the North Carolina Department of Archives and History in 1968 (South 1968). This work consisted of a salvage effort ahead of the planned construction. Fieldwork was conducted over one week using heavy machinery and revealed ruins of the 1838 arsenal. This work was subject to time and budget constraints and its scope was limited to correlating architectural features with historic maps and plans. Accordingly, little emphasis was placed on recovering artifacts from discrete deposits. Features that were identified included the arsenal wall, the northwest tower, the southwest tower, the line of shops on the west side of the arsenal wall, a probable cellar, and the carriage store and coal house along the north wall. The work also documented evidence of the demolition and salvage activities that were known from archival sources. Several alternatives were provided to avoid the site or mitigate its destruction (South 1968).

CENTRAL BUSINESS DISTRICT LOOP HIGHWAY (CAI PRESERVATION CONSULTANTS)

In 1971, additional work was performed along the preferred alternative for the CBD Loop (CAI 1973). This effort involved archaeological and archival research to provide a detailed physical description of the arsenal and chronology of its development and activities. Archival research revealed a rich collection of material related to the North Carolina Arsenal (1836-1861) period, but little of the Fayetteville Arsenal (1861-1865) period. The archival research produced little in the way of detailed drawings of the arsenal complex, annual reports, and monthly and quarterly reports. However, it did locate a detailed sketch of the entire arsenal complex showing all building locations related to the Confederate occupation that was made immediately after the Civil War. Archaeological investigations involved hand excavation and mechanical stripping, and focused on a section of the shops complex along the western wall, the Commanding Officer's building in the square, and a cistern, which yielded numerous artifacts indicative of daily activities (Figures 11-12). The archaeological findings were closely compared and interwoven with historical research to better understand the developmental history and physical condition of the arsenal remains (CAI 1973). After this work was completed, construction of the CBD Loop was delayed for several years because of funding issues and shifting priorities.



Source: CAI 1973

Figure 11.
CAI Plan View of Archaeological Investigations

CENTRAL BUSINESS DISTRICT LOOP HIGHWAY (NORTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY)

John Clauser (n.d.), with the North Carolina Department of Archives and History, conducted limited archaeological investigations in 1980 as part of the reactivated CBD Loop project. Time constraints did not allow for the research design to be fully implemented, so no new information was provided regarding the CSA additions. However, additional intact features were identified and the information was used to support the site's nomination to the NRHP.

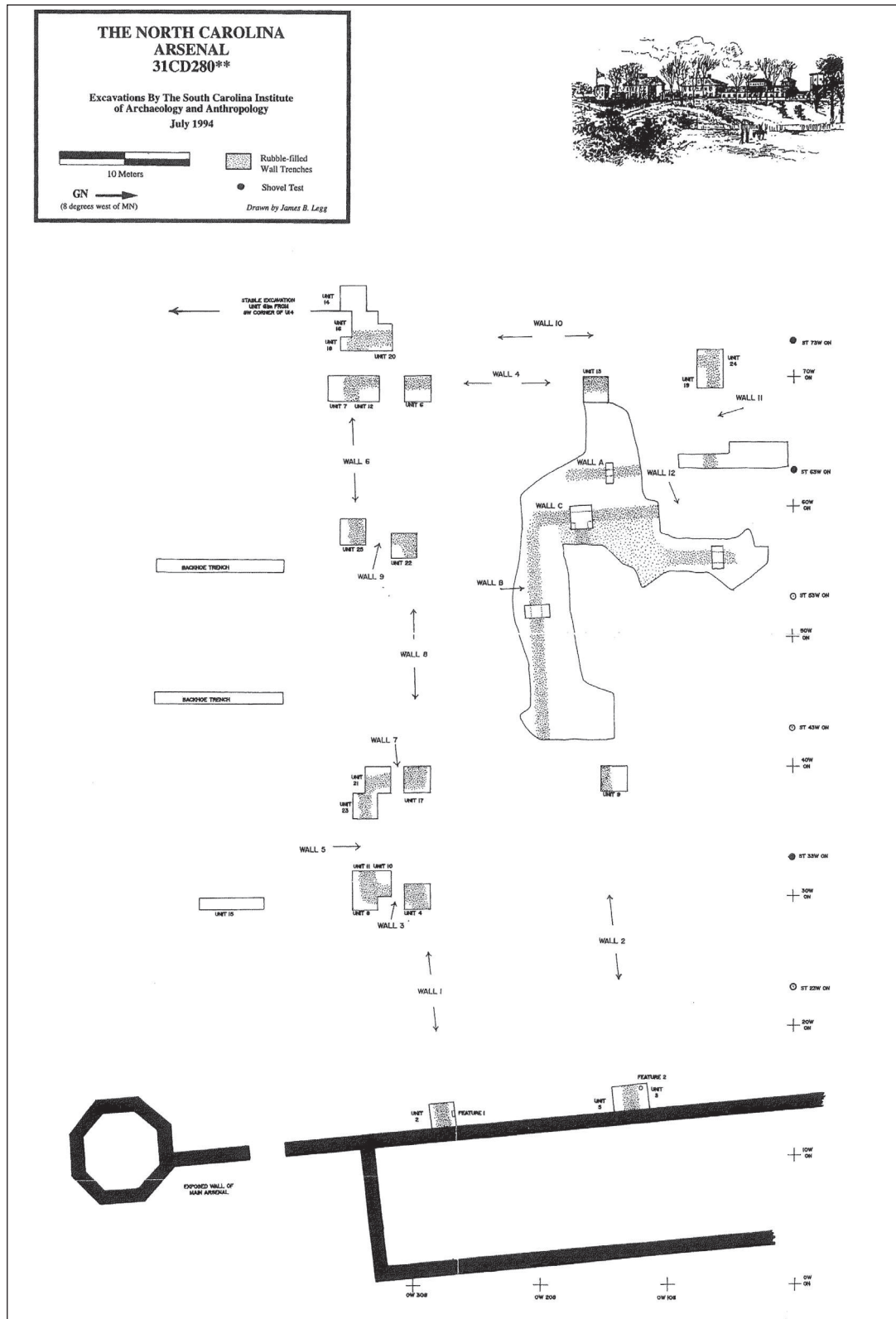
NCDOT PEDESTRIAN BRIDGE PROJECT

In 1991, NCDOT proposed a pedestrian bridge over the Central Business District Loop that would connect the Museum of the Cape Fear on the east side and a public park on the west side (Padgett and Robinson 1991). Bridge construction was considered an integral part of a larger preservation effort by the City of Fayetteville and the Museum of the Cape Fear. Fieldwork included monitoring the installation of slab platforms (Figure 13). On the east side of the CBD, parts of the main arsenal building foundation were uncovered along with a portion of a workshop foundation. Artifacts consisted of architectural items such as nails, brick, and glass. On the west side of the CDB, excavations revealed foundations associated with the gun carriage shop (built by 1842 and distinct from the later CSA Gun Carriage Shop). Several features of unknown origin were identified in this area (Padgett and Robinson 1991).

CSA GUN CARRIAGE SHOP INVESTIGATIONS

In 1994, the South Carolina Institute of Archaeology and Anthropology (SCIAA) conducted exploratory excavations at the arsenal (Figure 14). The main purpose of this work was to locate the Confederate expansion (within Arsenal Park) for use in interpretation. Another objective was to recover artifacts from the Confederate period that could be used in museum displays. The work revealed walls of the Confederate Gun Carriage Shop and located the Confederate stables (Grunden et al. 1994). The Gun Carriage Shop remains were highly uniform, with foundation trenches and robber's trenches. No intact wall segments were documented. Almost all the artifacts were architectural and consisted of broken brick, mortar, nails, and window glass, with very few other types represented. The shop was determined to have had a well-made, tightly constructed floor because very few features or artifacts were identified on its interior. The investigations did not find any evidence of military activities or the presence of the Union Army (other than building debris likely from the Union destruction episode).

Figure 14.
Map Showing Location of 1994 SCIAA Investigations



Source: Grunden et al. 1994

CSA BLACKSMITH'S SHOP INVESTIGATIONS

SCIAA archaeologists returned to investigate the arsenal's Confederate Blacksmith Shop after that area was acquired by the City of Fayetteville and Museum of the Cape Fear (Figure 15) (Smith 1996; Smith et al. 1997). Planning was underway to include this area into a larger interpretive park, and additional investigations were necessary because of the site's NRHP status. This study entailed intensive systematic archaeological investigations to determine the nature, boundaries, condition, and significance of any archaeological remains. The fieldwork identified fill deposits resulting from highway construction in various portions of the study area. Foundation walls were found to have been salvaged by the Federal government or private citizens after the war. As with the Confederate Gun Carriage Shop, no undisturbed sections of the blacksmith shop walls were identified. Few artifacts relating were found other than architectural remains (Smith 1996; Smith et al. 1997). Smith et al. (1997:61) did not recommend extensive data recovery. Instead they suggested long-term highly focused archaeological investigations along the north wall of the Gun Carriage Shop, as well as in areas of probable yard activities beyond the walls of the Blacksmith Shop, the interior of the Blacksmith Shop, and Confederate yard areas. They also recommended development of a popular report that synthesized the archaeological work and arsenal's history to aid in long-term interpretive goals.

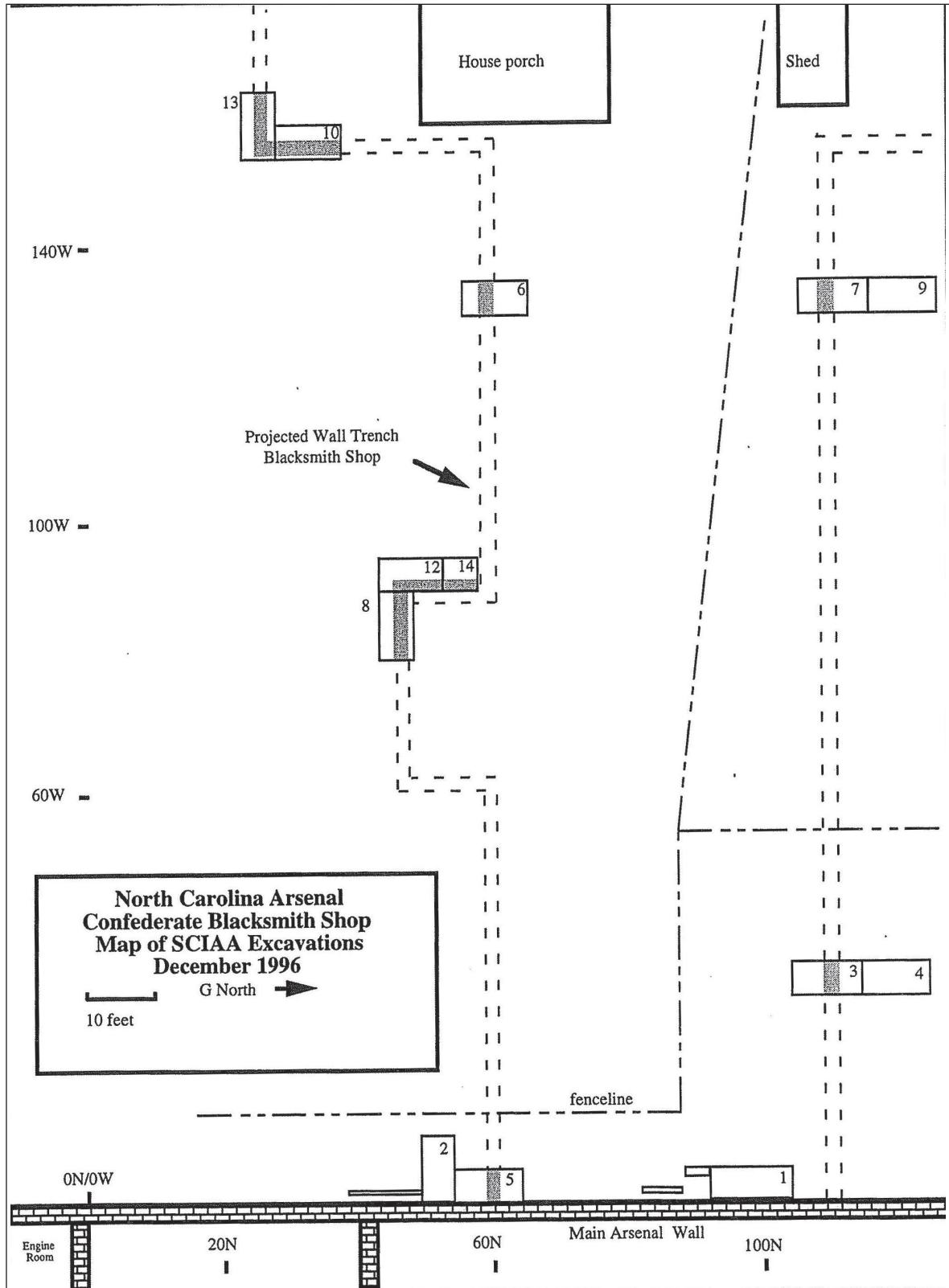
NORTH SIDE OF ARSENAL PARK

In 2000, the Wake Forest University Archaeological Laboratories investigated a residential lot on the north side of Arsenal Park (Figure 16). A circa-1910 house had been demolished on the property and there was an expectation that archaeological remains related to the arsenal might be preserved there. The investigations exposed three large features including two brick pavements and one area of hard-packed material that resembled sandstone or crushed brick, which appeared to be a floor or surfacing of an industrial activity area related to the construction or use of the arsenal (Robinson et al. 2000). These results demonstrated that large archaeological features from the arsenal period were preserved outside the main compound in the area of Confederate additions. This section of the arsenal site remained poorly known and Robinson et al. (2000) recommended full excavation of the features prior to any major construction.

RESIDENTIAL LOTS NORTH OF ARSENAL AVENUE

Wake Forest University Archaeological Laboratories conducted investigations of several state-owned lots north of Arsenal Avenue in 2007 (Figure 17). This study focused on identifying structural remains and features related to the arsenal during the pre-Civil War and Confederate periods. Shovel testing, extensive backhoe stripping, feature excavation, and artifact analysis

Figure 15.
Map Showing Location of 1996 SCIAA Investigations



Source: Smith et al. 1997

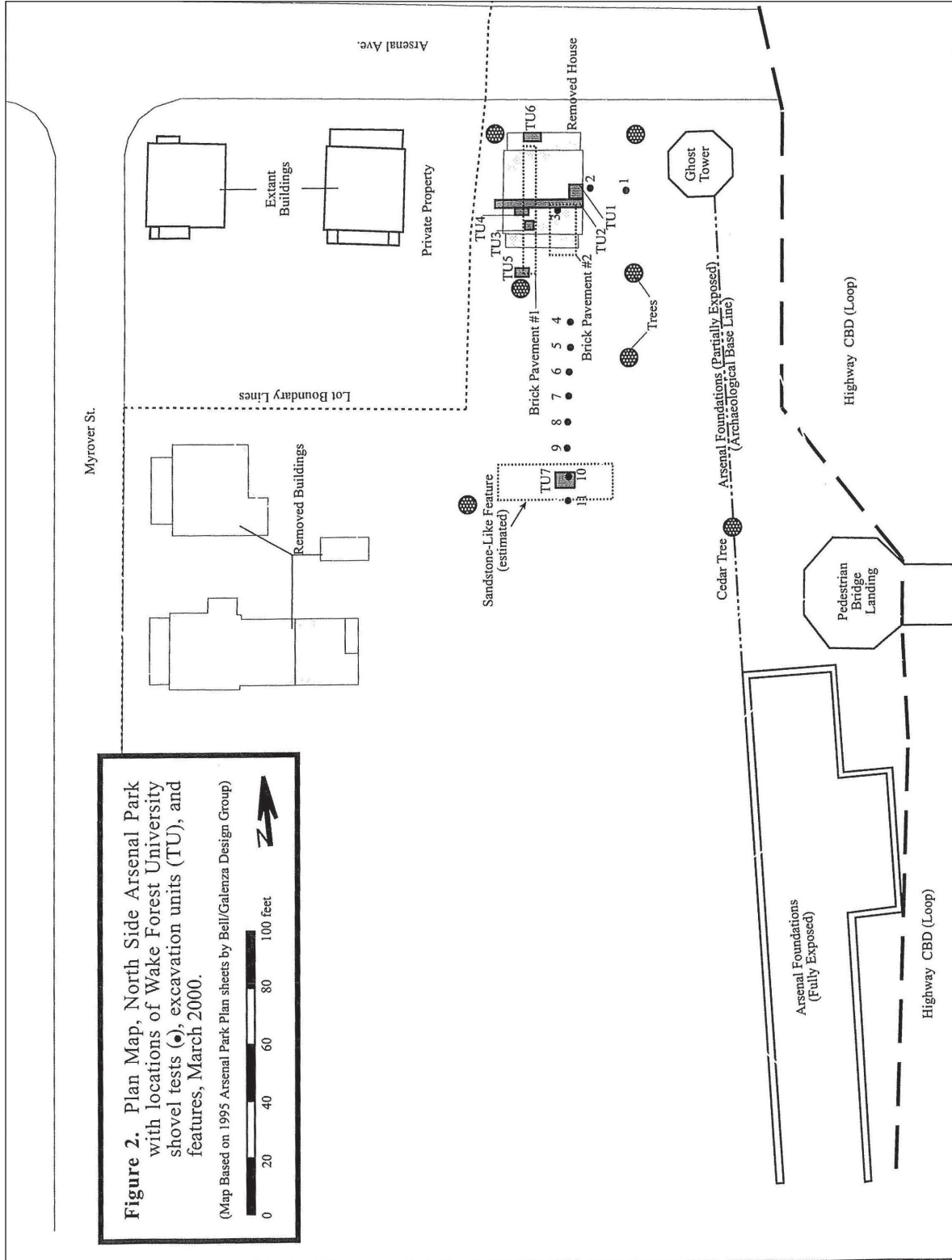
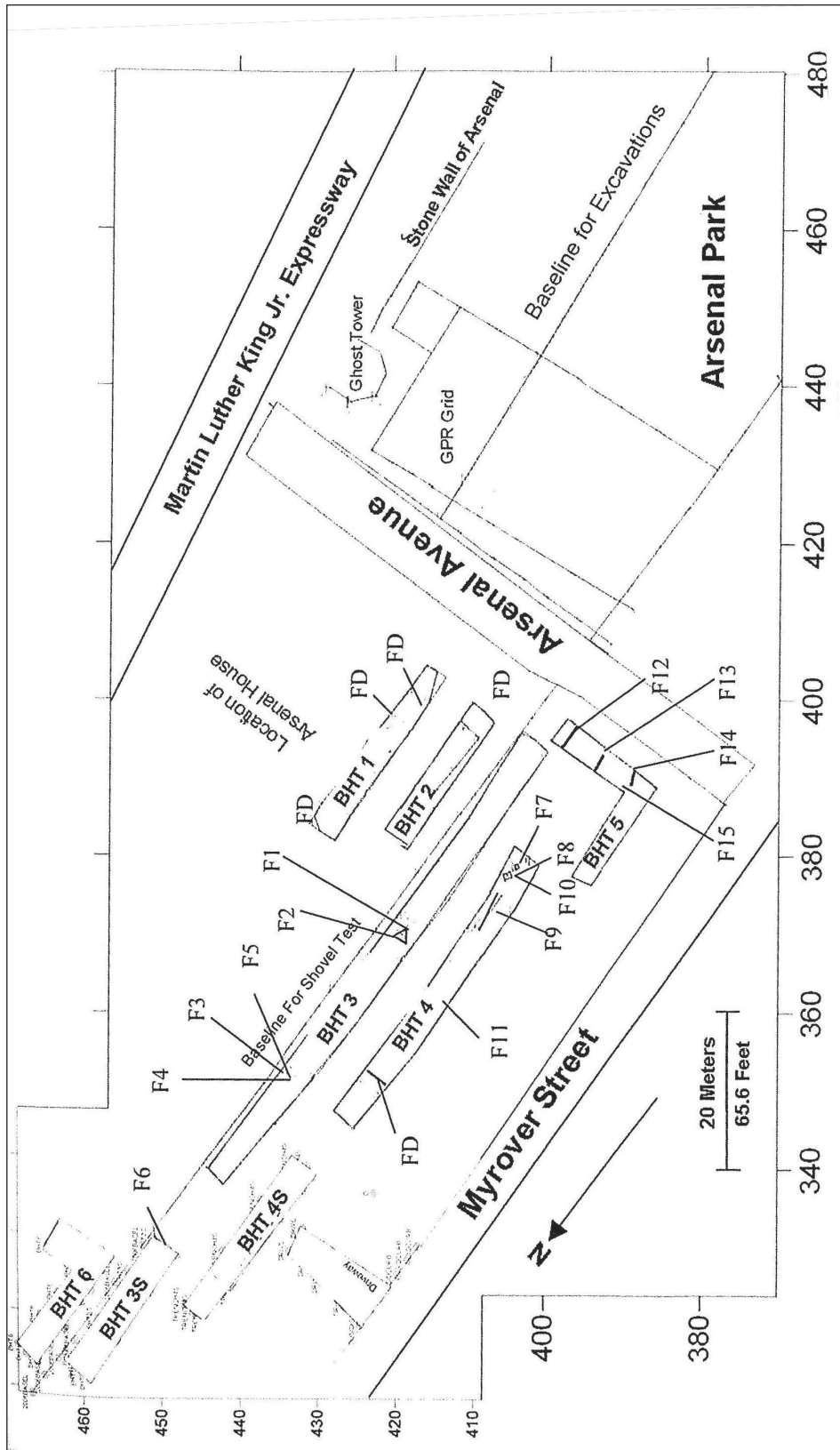


Figure 2. Plan Map, North Side Arsenal Park with locations of Wake Forest University shovel tests (●), excavation units (TU), and features, March 2000.
(Map Based on 1995 Arsenal Park Plan sheets by Bell/Galenza Design Group)

Source: Robinson et al. 2000

Figure 16. Map Showing Location of 1999 Wake Forest University Investigations



Source: Robinson et al. 2008

Figure 17.
Map Showing Location of 2007 Wake Forest University Investigations

discovered a number of archaeological features, foundations, and debris from several nineteenth- and twentieth-century houses that occupied the block. A great deal of information was obtained about those occupations, but there was no archaeological evidence directly related to the arsenal. Features 1, 2, and 3 were all refuse pits located in rear yards that contained abundant ceramics and faunal remains dating from the middle to late-nineteenth and early-twentieth centuries, but they could not be associated with specific dwellings (Robinson 2008).

MUSEUM OF THE CAPE FEAR ARCHAEOLOGICAL FIELD SCHOOLS

The Museum of the Cape Fear sponsored annual archaeological field schools between 2004-2009. These were directed by Kenneth Robinson, Director of Public Archaeology at Wake Forest University.

Investigations in 2004 focused on the Blacksmith Shop with a focus on identifying the walls and area inside the structure where a floor might have been located along with evidence of blacksmithing activities (Robinson 2005:5). Six 5x5-foot test units were placed. Artifacts included a high frequency of brick, mortar, slate, and nails from the blacksmith shop. Most of the non-architectural artifacts (e.g., glass and ceramics) post-dated the arsenal period, although the presence of pearlware suggested an occupation prior to the 1830s. No intact building foundations were identified in any of the units.

Investigations in 2005 focused on exposing a part of the blacksmith shop ruins (Robinson 2006). Excavations covered 100 square feet and recovered large quantities of brick and mortar rubble and slate roofing material, along with an assortment of nails and other iron artifacts. A small portion of an intact wall segment was found in Units 311 and 312 at a depth of almost six feet. The intact wall segment was an unexpected surprise and led Robinson (2006) to suggest that it might have supported a chimney or other non-wall feature.

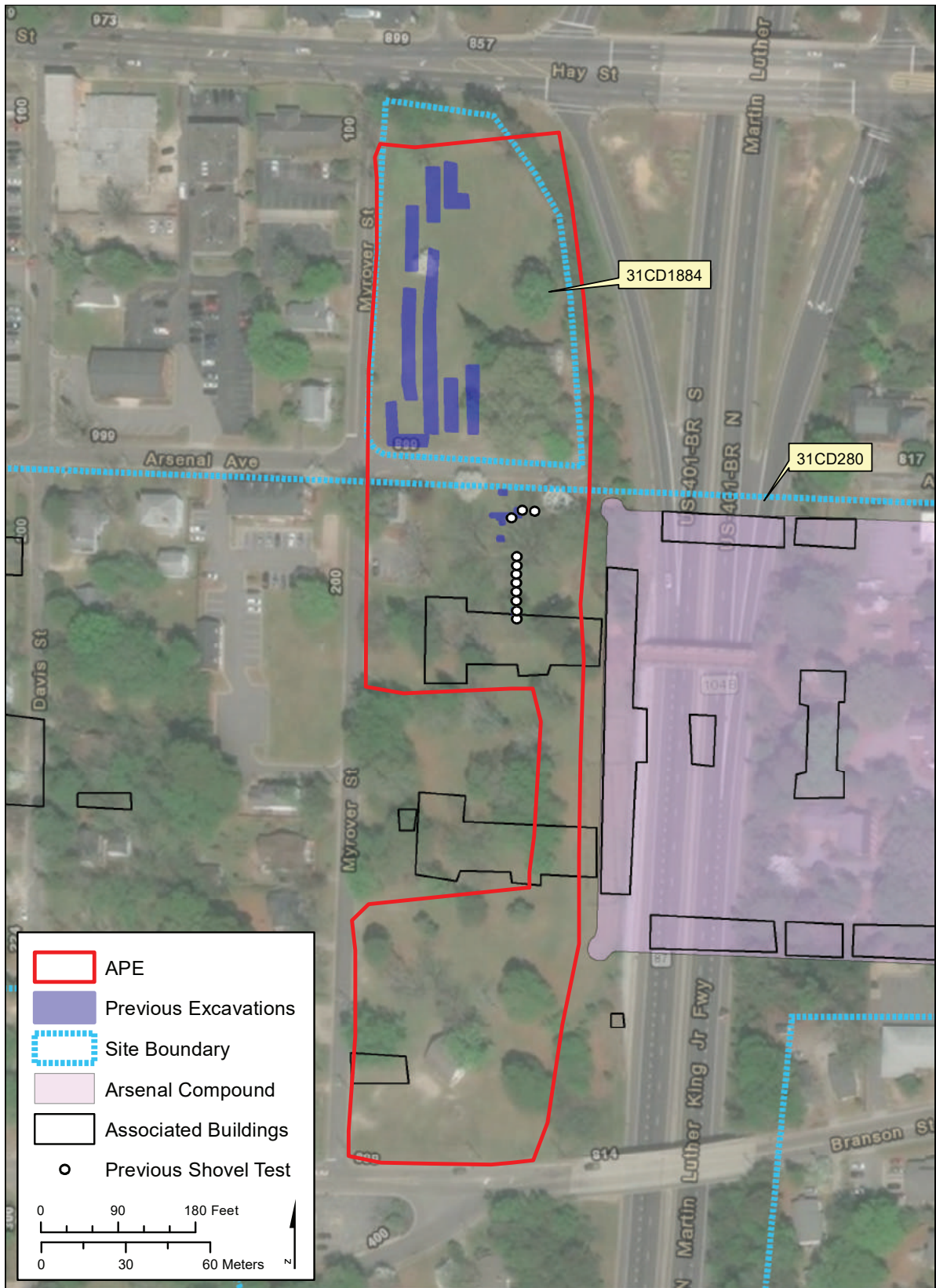
Investigations in 2006 were focused on two areas that had not been previously studied archaeologically: a lot on the north side of Arsenal Avenue and a lot south of Arsenal Avenue on the north side of Arsenal Park (Robinson 2007). Fieldwork included shovel testing at 20-foot intervals and test units. Results indicated high artifact density and feature potential on both sides of Arsenal Avenue. Although many of these were related to the early twentieth century occupation, the presence of arsenal-related deposits could not be ruled out at that time. Robinson (2007:25) indicated the high probability that features from the arsenal period were preserved in both lots.

Investigations in 2007 again focused on the Blacksmith Shop with a primary goal of exposing its north wall (Robinson 2009). Three large test units covering approximately 75 square feet were excavated on the north side of the rubble mound approximately 30-35 feet west of the locations

that were excavated in 2000, 2004, and 2005. Large quantities of brick and mortar rubble and slate roofing material were recovered along with non-architectural artifacts such as nails, glass, ceramics, and metal.

The previous investigations of the arsenal site were extensive, but the locations of specific excavations had not been synthesized. Therefore, New South made an effort to geo-reference this prior work. This was complicated by variations in scale and, in some cases, a lack of sufficient detail to correlate the excavation maps with current landmarks. The results are displayed on the 2017 survey map and should be considered an approximation of previous archaeological investigations for visual purposes only (Figure 18).

Figure 18.
Map Showing Approximate Locations of Previous Investigations



Source: ESRI World Imagery (2018)

IV. METHODS

SURVEY DESIGN

Arsenal Park is located in an urban environment and is known to have buried archaeological deposits. Because of the conditions, New South's approach to the Phase I Archaeological survey involved GPR survey followed by shovel testing to investigate specific GPR anomalies.

GEOPHYSICS

Current trends in geophysical archaeology are moving toward expanding the interpretive value of geophysical data to explicitly address anthropological questions (Aspinall et al. 2008; Conyers 2012; Kvamme 2003; Thompson et al. 2011). There is a growing recognition among practitioners that geophysical data can provide unique and highly detailed perspectives on archaeological sites that goes beyond simply identifying subsurface features. This may be particularly applicable to larger sites, urban settings, and cultural landscapes, where traditional methods might provide only a small window on broader patterns. Technological advances in recent years have demonstrated the effectiveness of various equipment and methods.

Kvamme (2003) promoted the idea that geophysical surveys can provide primary data for the study of cultural structures and features at the landscape scale (e.g., tens of hectares). The goal is to collect high quality data over a large area and to computer process the data to clarify culturally formed patterns in the deposits (Kvamme 2003:438). Geophysical surveys can map entire villages and surrounding landscapes, allowing examination of interrelationships between individual site components such as houses or house clusters, dumping grounds, public structures, storage and borrow pits, gardens, plazas, and fortifications (Gaffney et al. 2000; Kvamme 2003; Toom and Kvamme 2002). Archaeo-geophysical mapping is sometimes the best way to obtain information about site plans, structures, and layout (Toom and Kvamme 2002:45).

Geophysical methods can provide an alternative to, and complement of, traditional archaeological methods. Geophysical detection of features can reduce the amount of excavation needed to effectively evaluate a site because specific types or classes can be investigated directly (Kvamme 2003:453). In these situations, significant savings can be realized in both time and money. The smaller archaeological collections resulting from these kinds of investigations would also be less expensive to curate.

The goal of geophysical survey is to identify anomalies and make interpretations about their archaeological significance (Kvamme et al. 2006:45). Contrast is the single most important variable for detecting cultural features. The physical, chemical, or electrical properties of features must stand out from its surrounding matrix. Their detectability can be influenced by factors such as soil type, particle size, soil density, and moisture content.

Clutter is another variable to consider in geophysical survey. Clutter consists of interference, such as animal burrows, tree roots, plow scars, previous excavations, randomly distributed rocks, recent trash, and modern utilities, that are not of interest to an archaeological study. All of these can be detected by geophysical methods and must be separated from the features of interest.

Detecting buried features depends on matching the physical properties of the features with the appropriate sensor, the amount of physical contrast between the feature and surrounding matrix, the size of the feature relative to the spatial resolution of the measurements, the depth of the feature with respect to signal attenuation and noise factors that might obscure it, the degree of patterning the feature exhibits, and the use of multiple sensors that allow detection of different physical properties (Kvamme et al. 2006:13). The resolution of certain instruments (e.g., sensitivity, sampling density, etc.) will determine the size of archaeological features that can be detected. Not surprisingly, larger features (e.g., foundations, basements) are more easily detected than smaller features (e.g., posts). Feature depth is also important because the increased soil volume can degrade signal strength and detection ability.

In general, the application of geophysics to archaeological site identification and evaluation is based in part on the following parameters (Kvamme et al. 2006:13–14): many sites are large, exhibit spatial organization and patterning, cultural features occur in high frequency on certain site types, and soils and other archaeological deposits have different physical properties.

An archaeological geophysics survey includes data collection, data processing, GIS organization, identification of geophysical anomalies, and classification of anomalies into potential archaeological feature types (Kvamme et al. 2006:18). One of the many goals of the survey is to produce clear imagery that represents the buried cultural deposits. Under ideal circumstances the geophysical results would be used to plan archaeological fieldwork and field validation based on a well-designed testing and sampling plan.

Geophysical data are typically evaluated through subjective interpretations of the data combined with deductive reasoning. This process requires knowledge of the kinds of features that might occur in a particular site (Kvamme et al. 2006:234). Successful interpretations rely on expertise in local archaeology and knowledge of corresponding archaeological signatures in geophysical

data (Kvamme et al. 2006:163). This method relies on visual interpretation of geophysical maps and manually digitizing cultural anomalies in GIS. The product is a series of interpretive maps depicting likely cultural features. More advanced methods can be employed that involve statistical and algorithmic operations as a more automated means for data integration (Kvamme et al. 2006:163–164).

GROUND PENETRATING RADAR SURVEY GRIDS

New South used GPR at Arsenal Park to prospect for historic features. GPR Survey grids were arranged to cover the entire park where the terrain and vegetation were conducive for access. Survey grids omitted locations of standing buildings, areas with dense vegetation, or roadways. Particular care was taken to ensure that the areas to be disturbed by construction were surveyed.

GPR grids were established using metric measuring tapes and a Trimble R-19 RTK GPS system (with an accuracy of 0.03 cm or better). Grid corners were placed to cover a total survey area of 5.83-acres (23,593.12 sq. m) (Figure 19, Table 1).

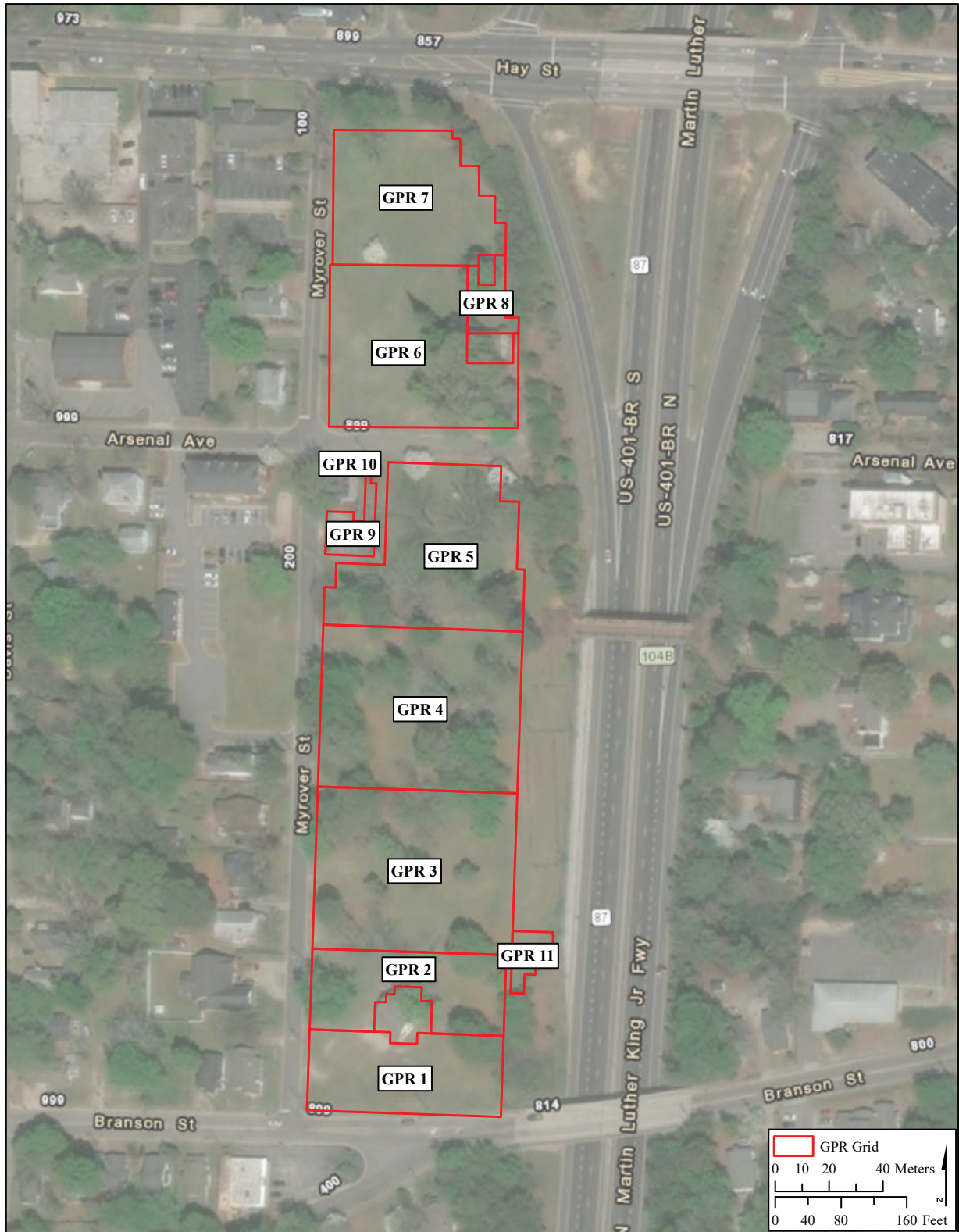
Table 1. GPR Grids

GPR Grid	Acres	Square Meters
GPR 1	0.52	2,120.00
GPR 2	0.46	1,856.00
GPR 3	1.10	4,440.00
GPR 4	1.10	4,440.00
GPR 5	0.85	3,437.00
GPR 6	0.87	3,538.12
GPR 7	0.69	2,780.00
GPR 8	0.09	354.00
GPR 9	0.08	328.00
GPR 10	0.02	64.00
GPR 11	0.06	236.00
Total	5.83	23,593.12

GROUND PENETRATING RADAR (GPR)

GPR is a remote sensing technique used by archaeologists to investigate a wide range of research questions. In archaeological applications, GPR is used to prospect for potential subsurface cultural features. Because GPR is a remote sensing technique, it is non-invasive, non-destructive, relatively quick, efficient, and highly accurate when used in appropriate situations.

Figure 19.
GPR Grid Map



Imagery Source: DigitalGlobe, Vivid - USA 2016

As noted, GPR identifies potential archaeological features on the basis of contrast or differences in physical, electrical, or chemical properties between an object or feature and its surrounding matrix. GPR data are acquired by transmitting pulses of radar energy into the ground from a surface antenna, the energy reflects off buried objects, features, or bedding contacts, and the reflected waves are recorded at the ground surface with a receiving antenna (Conyers 2004a). When collecting radar reflection data, surface radar antennas are moved along the ground in transects, typically within a survey grid, and a large number of subsurface reflections are collected along each line. As radar energy moves through various materials, the velocity of the waves will change depending on the physical and chemical properties of the material through which they are traveling (Conyers and Lucius 1996). The greater the contrast in electrical and magnetic properties between two materials at an interface, the stronger the reflected signal, and, therefore, the greater the amplitude of reflected waves (Conyers 2004b).

When travel times of energy pulses are measured, and their velocity through the ground is known, distance (or depth in the ground) can be accurately measured (Conyers and Lucius 1996). Each time a radar pulse traverses a material with a different composition or water saturation, the velocity will change and a portion of the radar energy will reflect back to the surface and be recorded. The remaining energy will continue to pass into the ground to be further reflected, until it finally dissipates with depth.

The depths to which radar energy can penetrate, and the amount of resolution that can be expected in the subsurface, are partially controlled by the frequency (and therefore the wavelength) of the radar energy transmitted (Conyers 2004b). Standard GPR antennas emit radar energy varying from about 10 to 1,000 megahertz (MHz) in frequency. Low frequency antennas (10-120 MHz) generate long wavelength radar energy that can penetrate up to 50 meters in certain conditions but resolve only very large buried features. In contrast, the maximum depth of penetration of a 900 MHz antenna is about one meter or less in typical materials, but its generated reflections can resolve features with a maximum dimension of a few centimeters. Thus, a trade-off exists between depth of penetration and subsurface resolution.

The effectiveness of GPR surveys in archaeology is largely dependent on soil and sediment mineralogy, ground moisture, subsurface material moisture retention, the depth of buried features, feature preservation, and surface topography and vegetation. Electrically conductive or highly magnetic materials will quickly attenuate radar energy and prevent its transmission to depth. Depth penetration varies considerably depending on local conditions. Subsurface materials that absorb and retain large amounts of water can effect GPR depth penetration because of their low relative dielectric permittivity (RDP). In practical applications, this generally results in shallower than normal depth penetration because the radar signal is absorbed (attenuated) by

the materials regardless of antenna frequency (Conyers 2004a; 2012; Conyers and Lucius 1996). Differential water retention can also positively affect data when a material of interest, such as a burial, retains more water than the surrounding soils and, therefore, presents a greater contrast.

The basic configuration for a GPR survey consists of an antenna (with both a transmitter and receiver), a harness or cart, and a wheel for calibrating distance. The operator then pulls or pushes the antenna across the ground surface systematically (a grid) collecting data along transects. These data are then stored by the receiver and available for later processing.

The “time window” within which data were gathered was 45 nanoseconds (ns). This is the time during which the system is “listening” for returning reflections from within the ground. The greater the time window, the deeper the system can potentially record reflections. To convert time in nanoseconds to depth, it is necessary to determine the elapsed time it takes the radar energy to be transmitted, reflected, and recorded back at the surface by doing a velocity test. Hyperbolas were found on reflection profiles and measured to yield a relative dielectric permittivity (RDP), which is a way to calculate velocity. The shape of hyperbolas generated in programs is a function of the speed at which electromagnetic energy moves in the ground, and can therefore be used to calculate velocity (Conyers and Lucius 1996). The RDP for soils in the study area was approximately 11.16, which, when converted to one-way travel time, (the time it takes the energy to reach a reflection source), is approximately nine centimeters/nanosecond. All profiles and processed maps were converted from time in nanoseconds (ns) to depth in centimeters using this average velocity.

GROUND PENETRATING RADAR FIELD METHODS

The first step was to calibrate the antenna to local conditions by walking the survey area and adjusting the instrument’s gain settings. This allows the user to obtain an average set of readings based on subtle changes in the RDP (Conyers 2004b). Field calibration was repeated as necessary to account for changes in soil and/or moisture conditions (Conyers 2004a). Effective depth penetration was approximately two meters (6.6 ft.). This is excellent depth penetration for a 400 MHz antenna, although slight signal attenuation occurred at the bottom of the profile.

The field survey was conducted with a GSSI SIR-3000 using a 400 MHz antenna over all areas suitable for GPR grids within the study area. It is generally standard practice to orient transects perpendicular to the long axis of suspected features. In this case, because feature orientation was unknown, data were collected roughly north to south. Transect spacing was 50 centimeters, an interval that has been demonstrated to generate the best resolution possible while still maintaining field efficiency (Pomfret 2005). Transects were collected in a zig-zag pattern, alternating starting direction, and started in the southwest grid corner.

GPR DATA PROCESSING

All data were downloaded from the control unit to a laptop computer for post-processing. Radar signals are initially recorded by their strength and the elapsed time between their transmission and receipt by the antenna. The first task in the data processing was to set “time zero,” which tells the software where in the profile the true ground surface was. This is critical to getting accurate results when elapsed time is converted to target depth. Background noise can make it difficult to visually interpret reflections. Therefore, a background filter was applied to the data, to remove the horizontal banding that can result from antenna energy “ringing” and outside frequencies such as cell phones and radio towers.

The next data processing step involved the generation of amplitude slice-maps (Conyers 2004b). Amplitude slice-maps are a three-dimensional tool for viewing differences in reflected amplitudes across a given surface at various depths. Reflected radar amplitudes are of interest because they measure the degree of physical and chemical differences in the buried materials. Strong, or high amplitude reflections often indicate denser (or different) buried materials. Such reflections can be generated at pockets of air or from slumping sediments. Amplitude slice-maps are generated through comparison of reflected amplitudes between the reflections recorded in vertical profiles. Amplitude variations, recorded as digital values, are analyzed at each location in a grid of many profiles where there is a reflection recorded. The amplitudes of all reflection traces are compared to the amplitudes of all nearby traces along each profile. This database can then be “sliced” horizontally and displayed to show the variation in reflection amplitudes at a sequence of depths in the ground. The result is a map that shows amplitudes in plan view with associated depths.

Slicing of the data was done using the mapping program *Surfer 8*. Slice maps are a series of x, y, z values, with x (east) and y (north) representing the horizontal location on the surface within each grid and z representing the amplitude of the reflected waves. All data were interpolated using the Inverse Distance Weighted method and then image maps were generated from the resulting files.

From the original .dzt files (raw reflection data), a series of image files was created for cross-referencing to the amplitude slice maps that were produced. Two-dimensional reflection profiles were also analyzed to determine the nature of the features identified on the amplitude slice maps. The reflection profiles show the geometry of the reflections, which can lend insight into whether the radar energy is reflecting from a flat layer (seen as a distinct band on profile) or a single object (seen as a hyperbola in profile). Individual profile analysis was used in conjunction with amplitude slice maps to provide stronger interpretations about possible historic features.

The final step in data processing is to integrate the depth slices with other spatial data. This was done using ArcGIS 10, which can display and manipulate all forms of spatial data created for this project, including GPR results, surface features, grid data, and base graphics such as aerial photography and topographic maps. The resulting anomalies were digitized as individual features and referenced to the UTM coordinate system.

GEOPHYSICAL SIGNATURES FOR EXPECTED FEATURE TYPES

The study area is known to contain features associated with the arsenal compound and the subsequent late nineteenth to early twentieth century neighborhood. The types of features that might be detected with GPR include building foundations, wells, privies, cisterns, basements, debris scatters, paths, road traces, landscape elements, and utilities (both modern and historic). Twentieth-century building remains, in particular, should have a strong contrast with the surrounding matrix. The nineteenth-century arsenal remains may be more subtle than post-war features and may have been obscured or destroyed by later use of the property.

SHOVEL TESTING

Shovel test locations were chosen to investigate specific GPR anomalies. Coordinates for each location were exported from GIS and then uploaded to the RTK GPS system. Each shovel test was assigned a unique number and its location was marked on the ground using the RTK GPS system, which allowed for highly accurate placement.

Shovel tests measured approximately 30 centimeters in diameter and were excavated to sterile (non-cultural) levels. All soils were screened through 0.25-inch mesh hardware cloth for systematic artifact recovery and all tests were backfilled upon completion. Artifacts were bagged by provenience. Brick fragments occurred in such high frequencies in certain shovel tests that only representative samples were collected. Modern artifacts less than 50 years old were not be collected but were noted in field documentation.

DIGITAL DATA RECORDING

New South has developed and successfully implemented procedures for digitally recording standard field data using Motorola Moto G cell phones and *Memento* database. The electronic documentation process is driven by spatial data and has the ability to not only increase fieldwork efficiency but also generate a range of digital data. During the field visit, shovel tests and their corresponding attributes such as soil texture and color, depth, and artifacts recovered were recorded using a predefined data structure with dependent fields. Digital recording has several added benefits. First, photographs of shovel tests, artifacts, and other features can be taken using

the phone and linked to individual records along with spatial information. This allows for automated generation of photo logs. Second, the shovel test data are automatically populated in a spreadsheet that can then be used to create summary logs and other tables based on any combination of attributes. Third, it promotes consistency for data recording and minimizes errors.

GIS DATA INTEGRATION

All spatial datasets (vector and raster) were incorporated into GIS. Individual shapefiles were created for GPR grids, GPR anomalies, shovel tests, previous excavation areas, and known features from historic maps. Several historic maps and aerial photographs, as well as maps showing previous archaeological work, were scanned and geo-referenced.

LABORATORY ANALYSIS

All artifacts were taken to New South's laboratory in Stone Mountain, Georgia where they were washed, cleaned, and stabilized. Analysis focused on identifying artifact type, material, age, affiliation, and quantification according to standard techniques/typologies for historic material.

HISTORIC ARTIFACTS

Analysis of historic artifacts was based on methods outlined by South (1977). For purposes of this study, artifact classification helped organize the data into meaningful analytic units and to provide consistency with previous studies. Artifacts were sorted into functional groups that included Kitchen (ceramics, glassware, cooking utensils, etc.), Architecture (brick, mortar, stone, nails, window glass, construction hardware, roofing material, etc.), Furniture (knobs, pulls, bed parts, etc.), Arms (rifle parts, bullets, shotgun shells, cartridges, etc.), Clothing (buttons, snaps, buckles, pins, beads, etc.), Personal (coins, keys, combs, eyeglasses, etc.), Activities (farm tools, toys, fishing gear, etc.), and Miscellaneous (unidentified metal, etc.). Other analytical approaches were used to supplement this information (Orser et al. 1987). Artifacts were also identified by material type, function, and presumed date range using sources such as Noel-Hume (1970), Miller (2000), and Toulouse (1971) (Appendix A).

Historic ceramics were classified by type (e.g., creamware, pearlware, whiteware, etc.), many of which have known manufacturing date ranges that provide information about site chronology. It must be remembered that the dates for ceramics at a particular site may be highly variable depending on whether or not it was in an urban or rural setting, how much access site occupants had to markets, and how long the site was used, among other factors.

Pearlware was introduced by the Wedgwood factory in 1779. It is typically identified by its bluish glaze. Decorations were similar to those used on creamware. Approximate date ranges for this type are 1779-1830s (Majewski and O'Brien 1987; Miller 1987; 1991).

Whiteware is a refined earthenware type that emerged in Britain around 1820. Variations of this type were manufactured throughout the nineteenth and twentieth centuries, making its usefulness as a dating tool problematic in the absence of other artifact types. Specific design elements have more temporal sensitivity. Maker's marks became common on whiteware and are helpful for dating.

Ironstone refers to dense semi-vitrified white ceramic type (Majewski and O'Brien 1987). Also known as white granite, this type appeared around 1842 and became popular as tableware for both individual and institutional use, particularly restaurants and hotels. Decorated ironstone was more common in the late nineteenth century and plain types dominated into the twentieth century.

Porcelain is a vitreous white-bodied ware (Ketchum 1983; Majewski and O'Brien 1987). It has a lengthy date range, making it problematic as a dating tool. Developed in China, porcelain's cost kept it from widespread use in America. By the later nineteenth century, however, American and British manufacturers dominated the domestic markets with less expensive alternatives.

Stoneware refers to a dense, hard-bodied ceramic fired at very high temperatures. It was commonly used for utilitarian forms, such as crocks, jugs, and jars, throughout the United States in the eighteenth and nineteenth centuries. Salt glazing was a common exterior finish. Interiors were generally finished with slips, while Albany slip and alkaline glaze were used on the exterior during the nineteenth century.

Glass was used for a variety of containers, tablewares, and furnishings, as well as windowpanes (Lorrain 1968). Early forms of glass were blown by hand and were relatively expensive to produce and transport (Miller and Sullivan 1984). By the mid-nineteenth century, manufacturing improvements led to higher output and less expensive options. Container glass forms depend on the vessel type, manufacturing method, decorations and labeling, and color. Bottles were available in a range of styles and for different purposes (Munsey 1970). Amethyst-colored glass is common on many historic sites and is the product of manganese minerals in the glass reacting to sunlight. Glass containers are amenable to dating based on changes in style, function, and technology (Baugher-Perlin 1982; Stell 1970).

Nails are important chronological indicators (Edwards and Wells 1993; Journey 1987; Nelson 1968; Wells 1998). Hand forged nails were the only type available until the end of the eighteenth century. Machine-made cut nails were introduced around 1805 that time and quickly

spread in popularity because they were mass produced and relatively inexpensive (Nelson 1968). Wire nails appeared during the 1850s but did not become common until the 1890s. Nails are important for assessing chronology. Morphologically, they can be distinguished based on their shafts, cross sections, tapers, and to a certain extent, their heads (Wells 1998).

Bricks are common on historic sites and were known to occur in high frequencies in the study area. They are often highly fragmentary in archaeological sites as a result of material salvage and recycling (Steen 2008). Prior to the mid-nineteenth century, bricks were made by hand (Howe et al. 1997). Machine-made bricks appeared at that time and quickly gained popularity.

CURATION

The archaeological collections from this project, including artifacts and associated documentation, were prepared for curation according to NC OSA's *Archaeological Curation Standards and Guidelines*. Artifacts were washed, dried, inventoried, and marked with a permanent accession number assigned by OSA and then were stored in archival quality bags labeled with provenience, level, data, and other information, as appropriate. Materials will be packaged for curation with a corresponding inventory and returned to The Center upon project completion.

Updated North Carolina Archaeological Site Forms were completed for each revisited site and submitted to the Office of State Archaeology (OSA).

NATIONAL REGISTER OF HISTORIC PLACES (NRHP) CRITERIA

Historic properties, defined as districts, sites, buildings, objects, or structures, are evaluated based on four criteria specified by the Department of Interior Regulations 36 CFR Part 60: National Register of Historic Places. Historic properties can be defined as significant if they “possess integrity of location, design, setting, materials, workmanship, feeling, and association,” and if they are 50 years of age or older and:

Criterion A. are associated with events that have made a significant contribution to the broad patterns of our history (history); or

Criterion B. are associated with the lives of persons significant in our past (person); or

Criterion C. embody the distinctive characteristic of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that components may lack individual distinction (architecture); or

Criterion D. have yielded, or may be likely to yield, information important in prehistory or history (archaeology).

NR Bulletin 15 recommends the following sequence for NRHP evaluation (National Register of Historic Places 1997):

1. Categorize the property;
2. Determine which historic context(s) the property represents;
3. Determine whether the property is significant under the NRHP Criteria;
4. Determine if the property represents a type usually excluded from the NRHP;
5. Determine whether the property maintains integrity.

SIGNIFICANCE

Under Criteria A, B, and C, an archaeological property must have demonstrated its ability to convey its significance, while under Criterion D, only the potential to yield information is required (Hardesty and Little 2000:33; King 1998:77–80). Under Criterion A, the strength of the property’s specific association must be considered important (Hardesty and Little 2000:33). Typically, significance is conveyed through the presence of visible remains, although sites with buried (i.e., non-visible) intact features and patterning might represent important events or themes events. According to Hardesty and Little (2000:33), the required steps necessary to establish significance under Criterion A include: 1) identifying the associated historical pattern or event, 2) documenting the importance of the pattern or event to national, state, or local history, 3) demonstrating the strength of association between the event or pattern and the archaeological remains of the site, and 4) assessing the integrity of the archaeological remains.

Criterion B requires that there are no other properties that represent the person in question (Hardesty and Little 2000:34). Sufficient information must be provided about the important person and the strength of the connection to the archaeological site in question. Hardesty and Little (2000:34–35) list the steps required to establish significance under Criterion B as: 1) identify the important person(s) associated with the property, 2) document the importance of the person in the context of national, state, and local history, 3) demonstrate the strength of the association between the person(s) and the property, and 4) assess the property’s integrity.

Under Criterion C, archaeological sites may be significant if they are needed to convey to the present, illustrate, or interpret a historic property that is strongly associated with a distinctive architectural or engineering pattern or style or type (Hardesty and Little 2000:35). Visible

remains more easily convey their significance, although a well-preserved archaeological site with evidence for buildings, features, activity areas, and community organization might be considered as having a distinctive design. According to Hardesty and Little (2000:35–36), the steps required to establish significance under Criterion C are: 1) identifying the distinctive architectural or engineering characteristics of the property, 2) documenting the importance of the architectural or engineering pattern or type or style in the context of national, state, or local history, 3) evaluating the how strongly the property illustrates the distinctive architectural or engineering characteristics, and 4) assessing the property’s integrity.

Under Criterion D, archaeological sites may be significant if they are important to scientific or scholarly research (Hardesty and Little 2000:37). Information is defined as the datasets that a site contains, such as artifacts, ecofacts, and features. According to Hardesty and Little (2000:37–38) list the steps necessary to determine significance under this criterion as: 1) identify the property’s datasets or categories of information, 2) identify the appropriate historical and archaeological contexts, 3) document why the information is important to scientific and scholarly research, and 4) assess the property’s integrity.

In general, several factors influence evaluations of eligibility, particularly under Criterion D. The most important include sites with sufficient artifact density and diversity to generate information regarding spatial patterning, technology, adaptations, behavior, and lifeways. The presence of clear spatial patterning, either vertically or horizontally, and stratigraphic context are important variables. The presence or absence of known or suspected features can also be critical because of the information they often contain or because of what their absence says regarding the site’s data content and/or integrity. Sites that represent types, components, or periods that are rare or relatively unknown can be important, even if they lack other variables such as high artifact density. Specialized locations such as seeps or raw material outcrops may have been important as well.

INTEGRITY

The NRHP defines seven aspects of integrity: location, design, setting, workmanship, feeling, and association (National Register of Historic Places 1997; Townsend et al. 1993). Although the evaluation of integrity is somewhat subjective, it must be grounded in an understanding of the site’s physical features/condition and how they relate to its significance (Townsend et al. 1993). The importance of each aspect of integrity varies depending on which criteria the property meets. As Townsend et al. (1993:36) noted, “assessment of integrity must come after an assessment of significance: significance + integrity = eligibility.” To properly assess integrity, one must first define the essential physical qualities that must be present for the property to represent its significance. For archaeological sites, integrity is generally considered to be high when soils, artifact deposits, spatial patterning, and features are intact and relatively unaltered.

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V. RESULTS

The study area encompassed two previously recorded archaeological sites: 31CD280 (North Carolina Arsenal) and 31CD1884, containing approximately 89 and two acres, respectively. Arsenal Avenue forms a boundary between the sites. In consultation with John Mintz at OSA, GPR results are discussed for the entire study area and archaeological results are discussed by individual site for consistent association of recovered artifacts with their appropriate context.

GPR RESULTS

GPR results were based on analysis of the 400MHz data, including individual reflection profiles and amplitude slice maps (Figures 20-30). Colors on the amplitude slice maps represent a scale from low amplitudes shown in blue (little to no reflected energy) to high amplitudes shown in red (strong reflections caused by objects in the ground). Using the GPR results, 132 unique anomalies were interpreted and classified into eight separate categories based on their geometry and historic context. Identified anomaly categories include building, basement, debris, large object, linear feature, path, surface, and utility (Figure 30, Tables 2-3). The primary purpose of the GPR survey was to identify anomalies consistent with the expected signatures of historic features, such as structure foundations, basements, paths or roads, and buried debris. Sites 31CD280 and 31CD1884 contain nineteenth- and twentieth-century components and it can be difficult to determine the chronology of features based on geophysical data alone. However, New South sorted GPR anomalies into four probable temporal categories: arsenal (n=11), probable arsenal (n=11), post-arsenal (n=108), and unknown (n=2).

Table 2. Summary of GPR Anomalies by Interpretive Class and Temporal Affiliation

Anomaly Category	Temporal Affiliation				Total
	Arsenal	Probable Arsenal	Post Arsenal	Unknown	
Building	1	3	2		6
Basement			13		13
Debris		2	25		27
Large Object			11		11
Linear Feature	9				9
Path			3		3
Surface	1	6	22	2	31
Utility			32		32
Total	11	11	108	2	132

Figure 20.
GPR Slice Map of Arsenal Park, Southern Section, 0-15 Centimeters below Surface (cmbs)

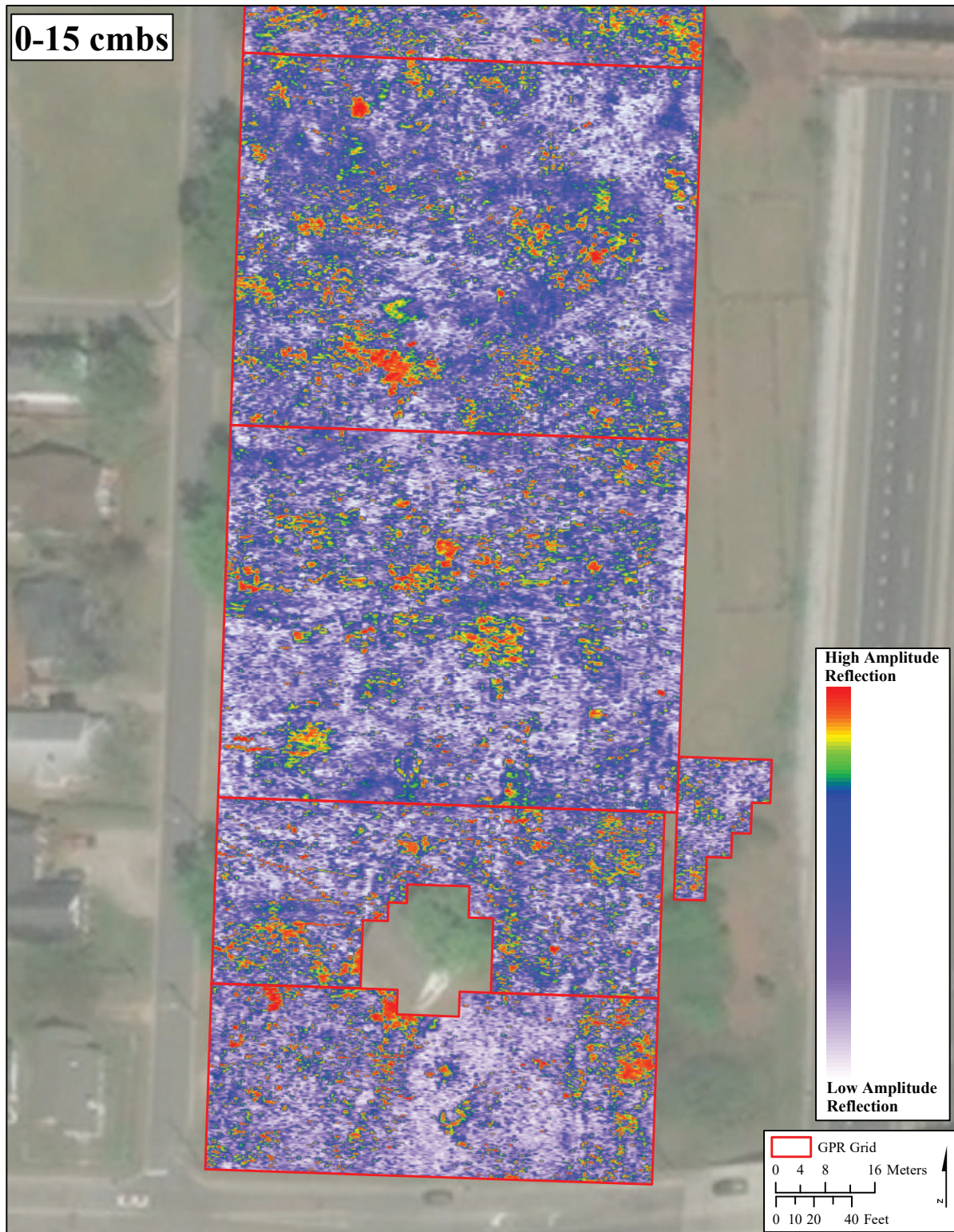


Figure 21.
GPR Slice Map of Arsenal Park, Southern Section, 15-45 cmbs

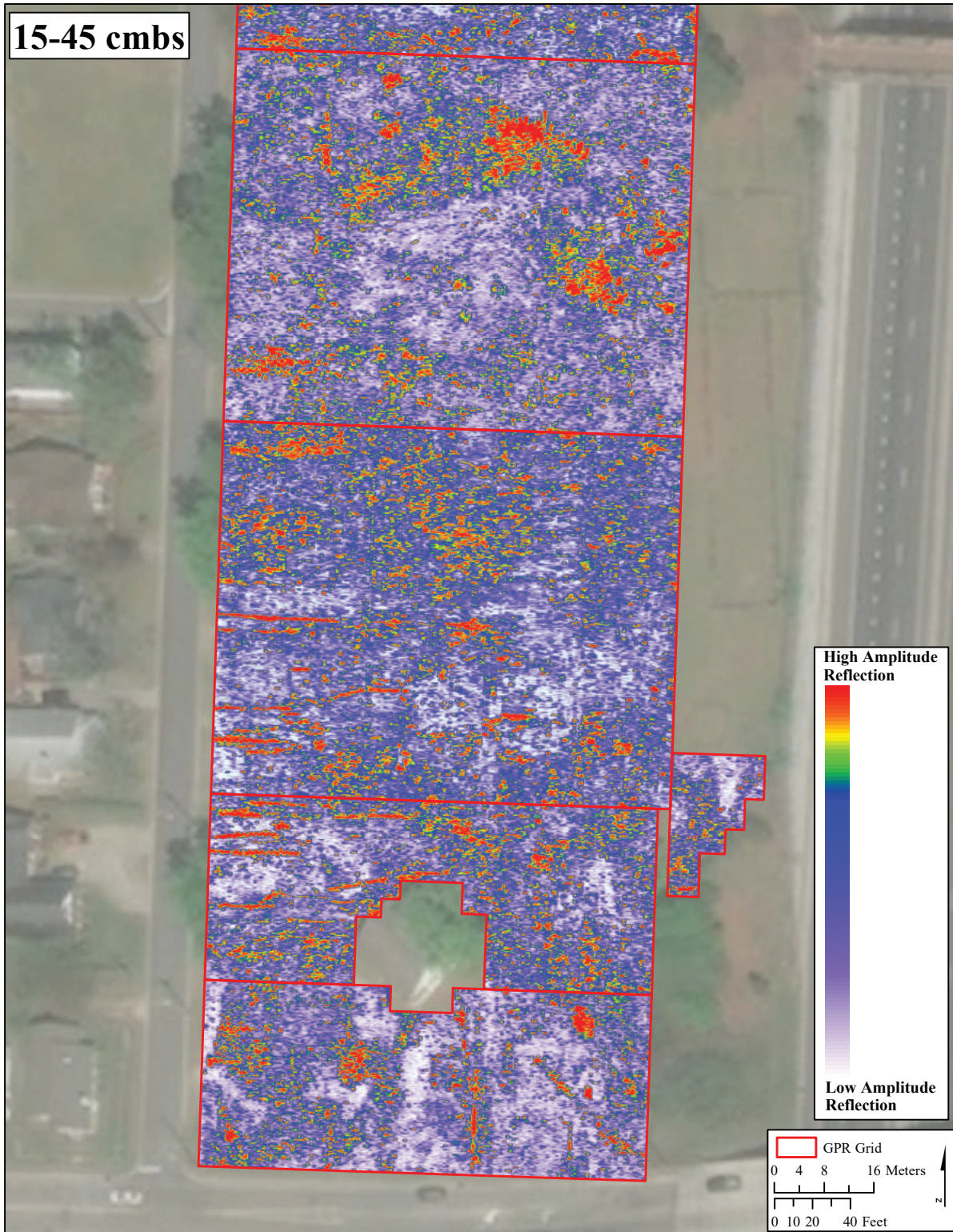


Figure 22.
GPR Slice Map of Arsenal Park, Southern Section, 45-75 cmbs

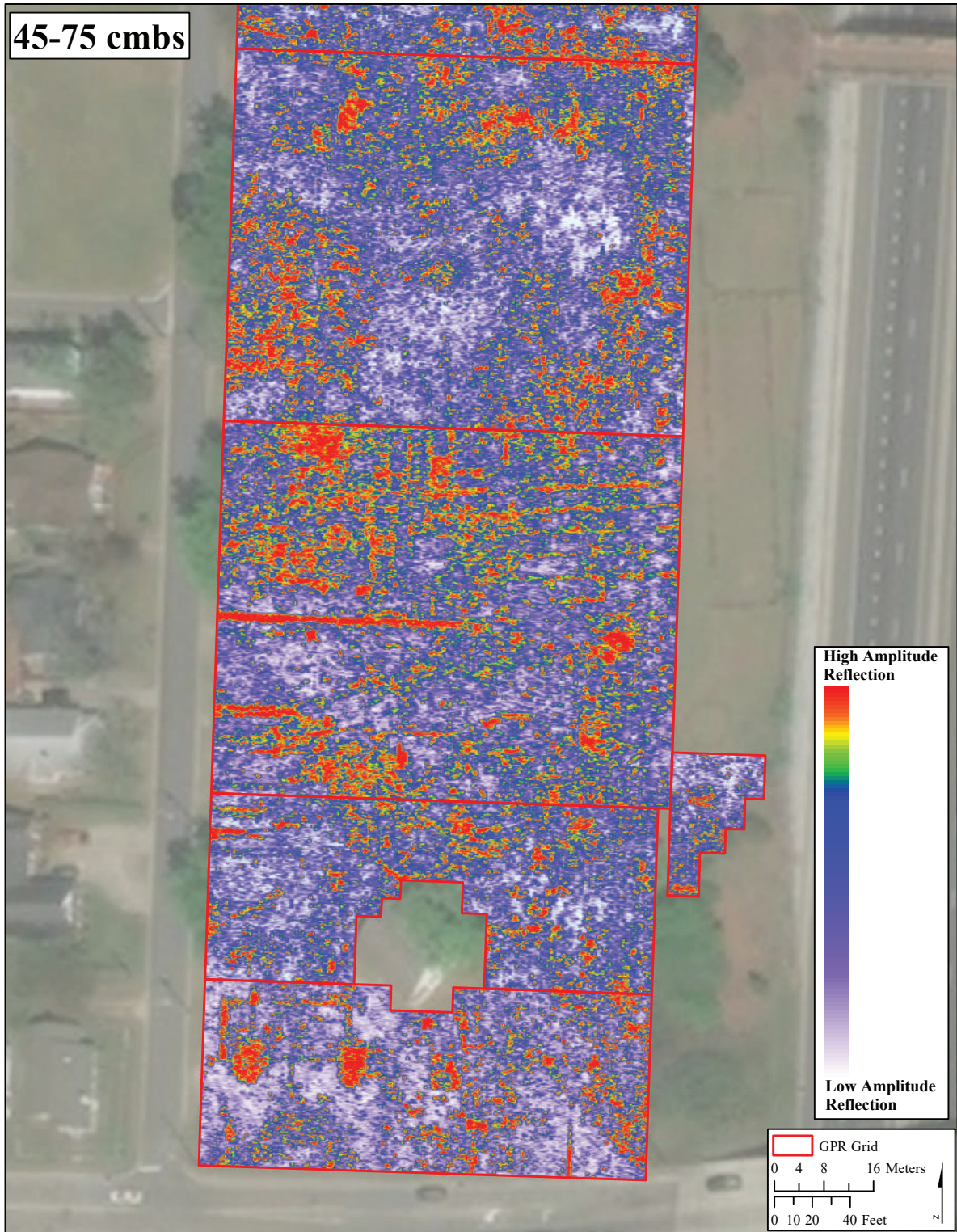


Figure 23.
GPR Slice Map of Arsenal Park, Southern Section, 75-105 cmbs

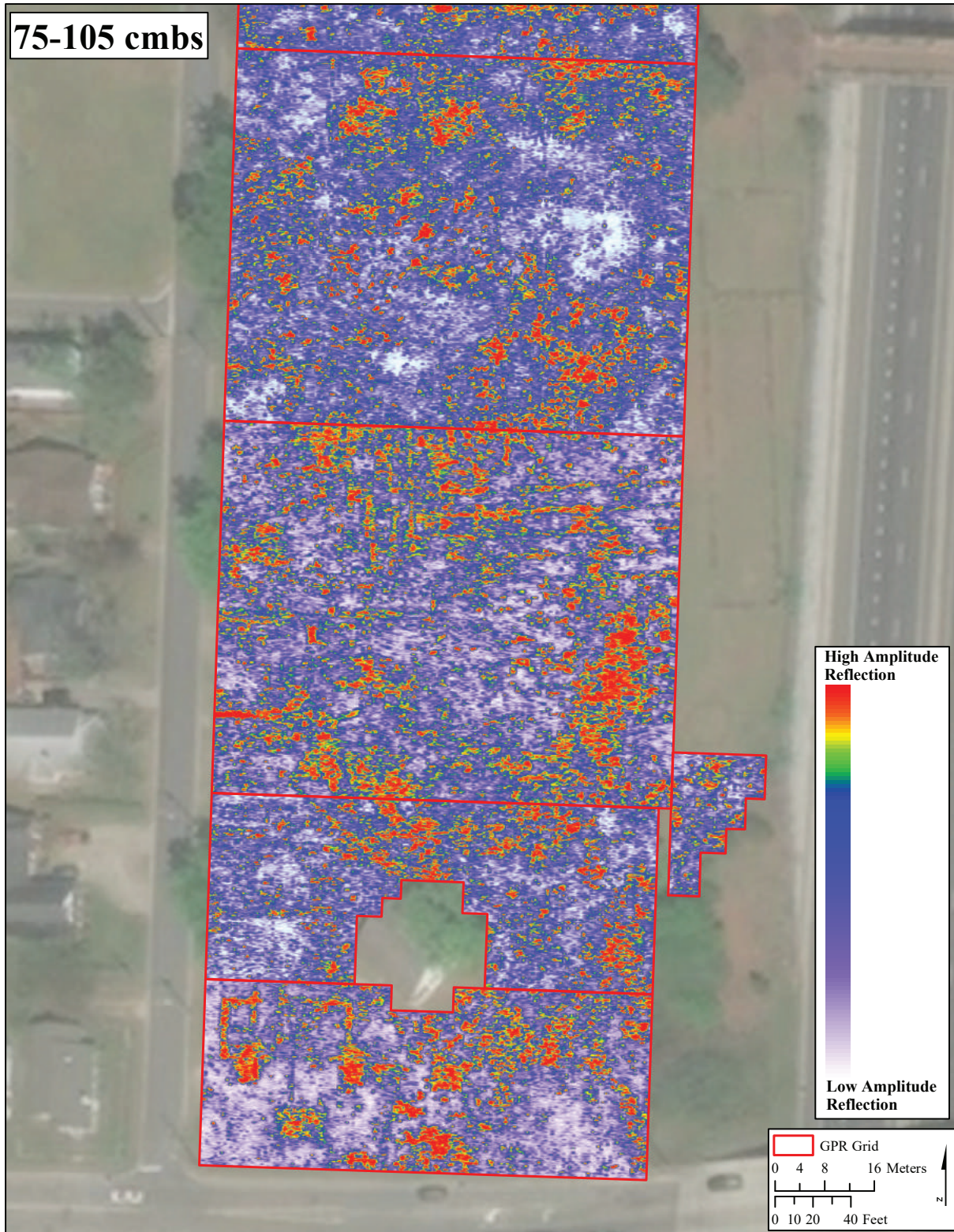


Figure 24.
GPR Slice Map of Arsenal Park, Southern Section, 105-135 cmbs

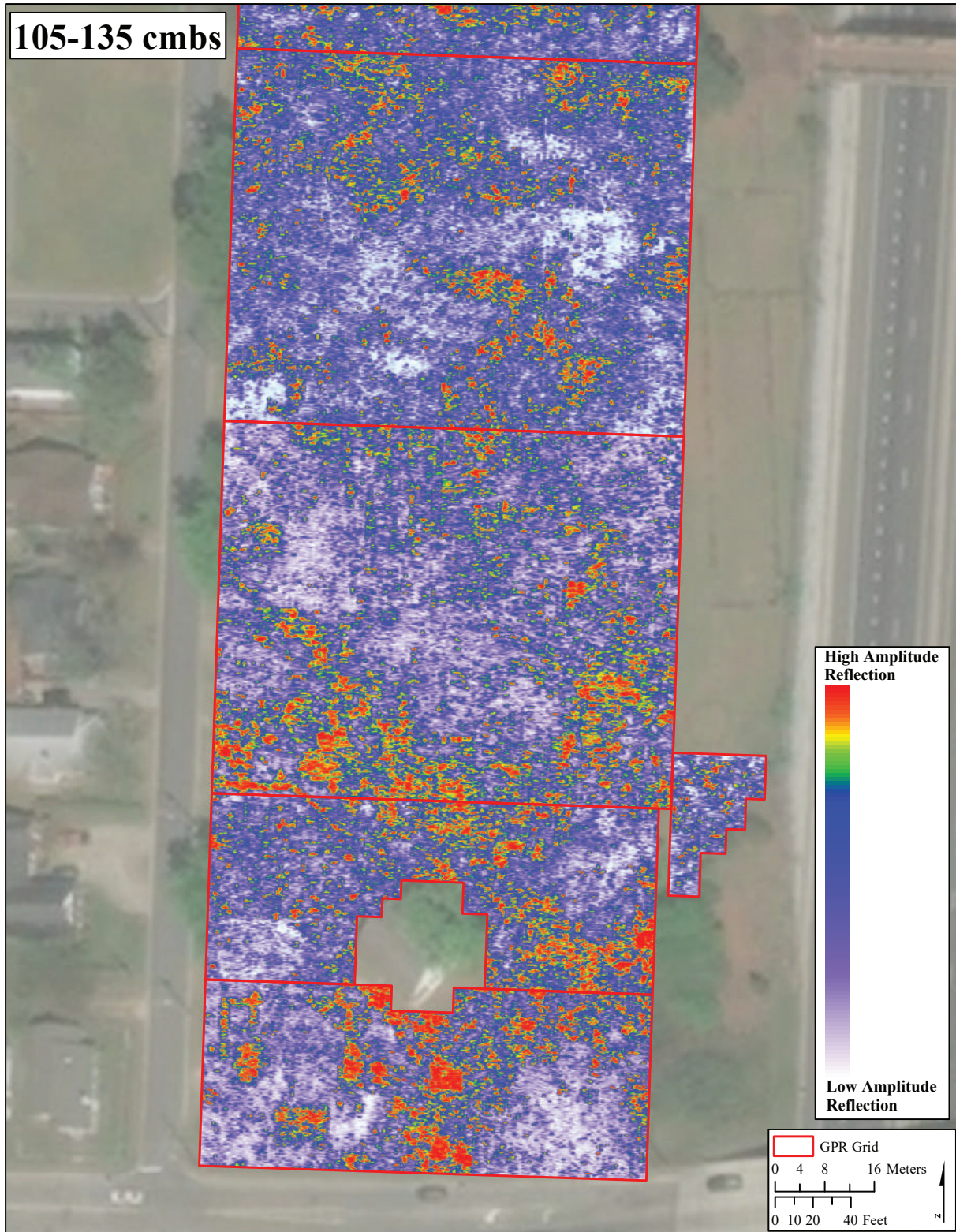


Figure 25.
GPR Slice Map of Arsenal Park, Northern Section, 0-15 cmbs



Figure 26.
GPR Slice Map of Arsenal Park, Northern Section, 15-45 cmbs



Figure 27.
GPR Slice Map of Arsenal Park, Northern Section, 45-75 cmbs

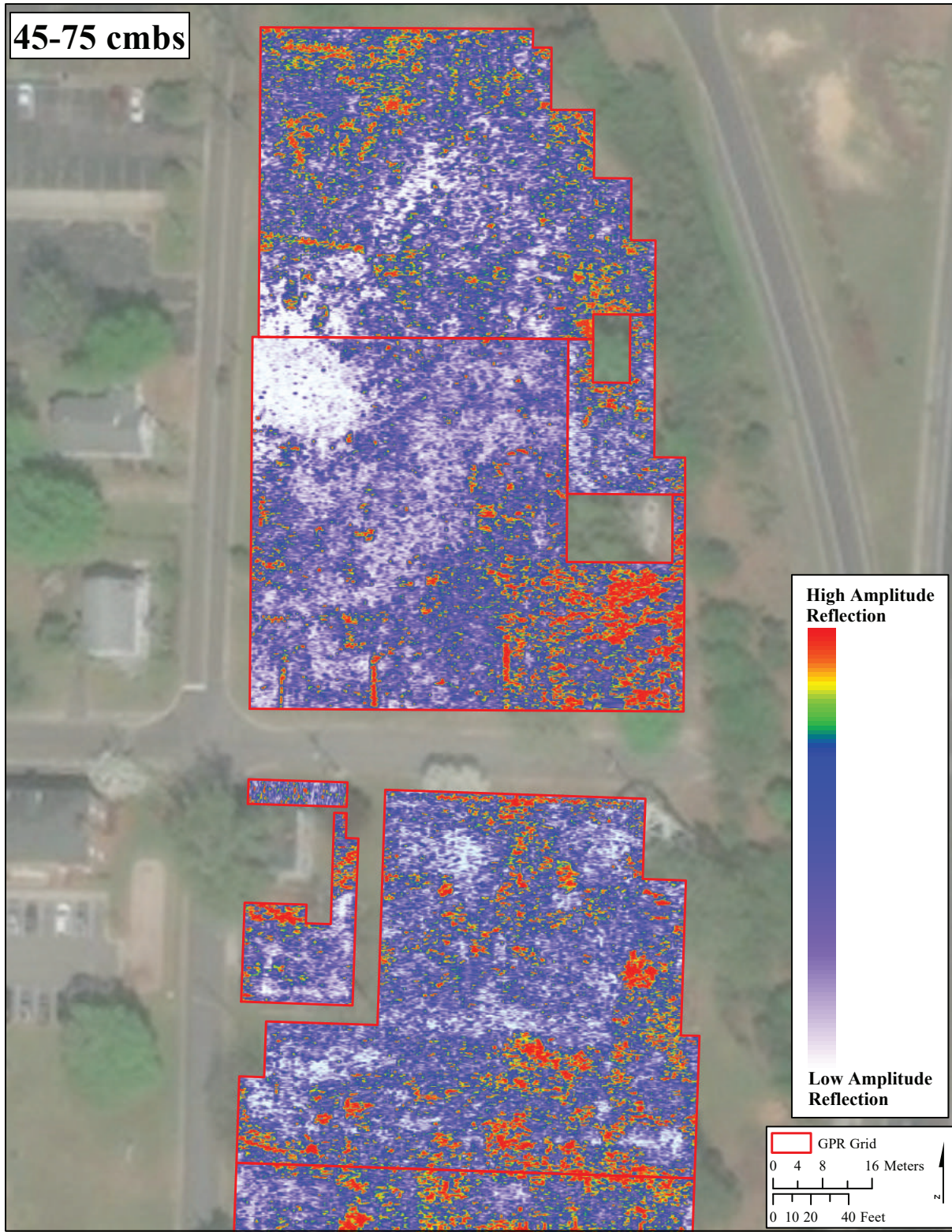


Figure 28.
GPR Slice Map of Arsenal Park, Northern Section, 75-105 cmbs



Figure 29.
GPR Slice Map of Arsenal Park, Northern Section, 105-135 cmbs

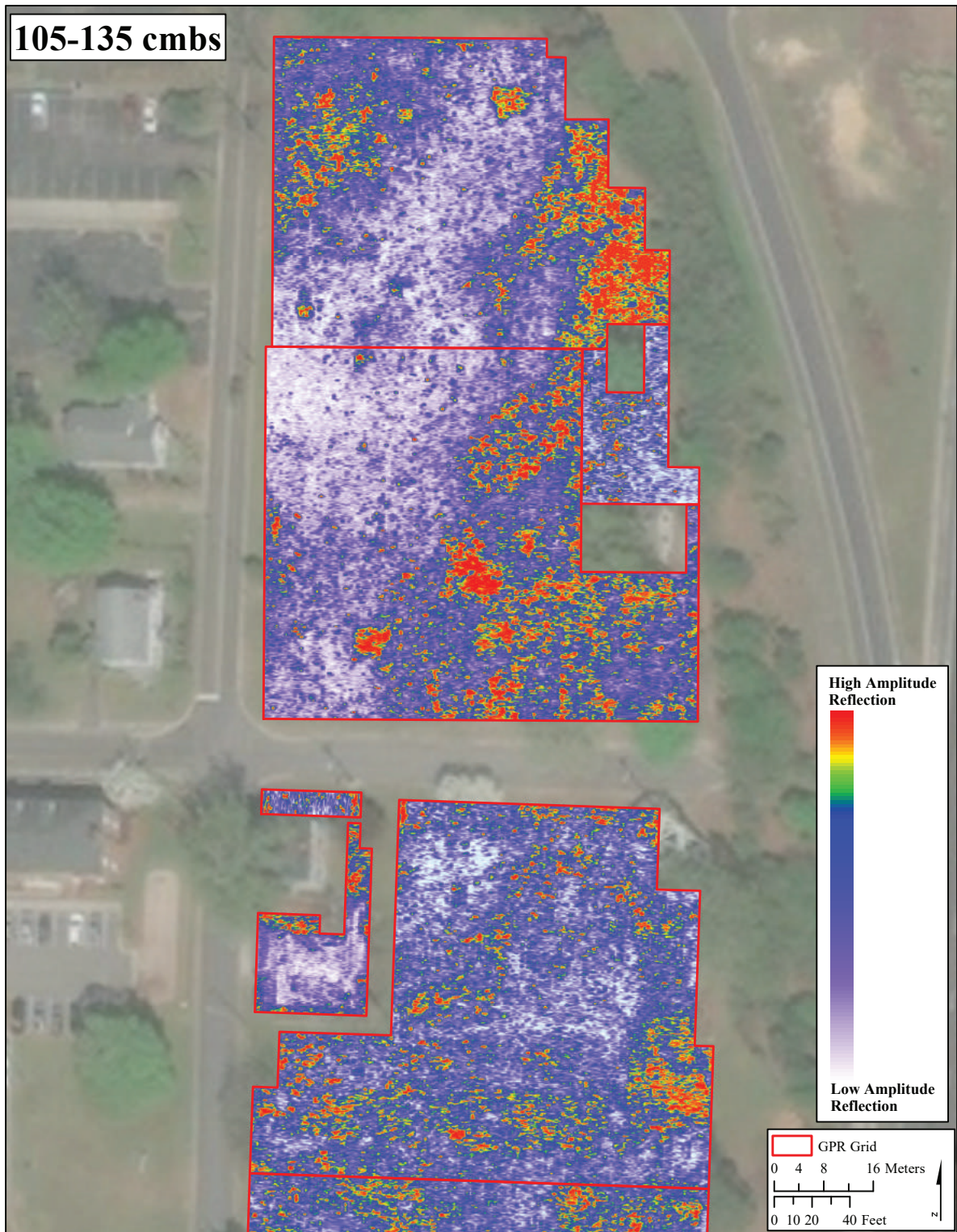


Figure 30.
GPR Results



Imagery Source: DigitalGlobe, Vivid - USA 2016

Table 3. GPR Anomalies

Anomaly	Anomaly Category	Description	Estimated Depth	Temporal Affiliation
1	Building	Building rubble or midden	5-70 cm	Post Arsenal
2	Building	Building rubble or midden	10-30 cm	Post Arsenal
3	Building	Structural Remains	20-50 cm	Probable Arsenal
4	Building	Structural Remains	5-15 cm	Probable Arsenal
5	Building	Foundation	25-100 cm	Arsenal
6	Building	Structure	50-100 cm	Probable Arsenal
7	Basement	Basement filled with rubble	20-80 cm	Post Arsenal
8	Basement	Basement filled with rubble	5-25 cm	Post Arsenal
9	Basement	Basement filled with rubble	5-25 cm	Post Arsenal
10	Basement	Basement filled with rubble, floor visible	10-30 cm, 55-65 cm	Post Arsenal
11	Basement	Basement filled with rubble	5-35 cm	Post Arsenal
12	Basement	Basement filled with rubble	15-35 cm	Post Arsenal
13	Basement	Rubble, possible basement	5-85 cm	Post Arsenal
14	Basement	Rubble, possible basement	25-80 cm	Post Arsenal
15	Basement	Basement, rubble, floor visible	20-60 cm	Post Arsenal
16	Basement	Basement filled with debris	25-120 cm	Post Arsenal
17	Basement	Basement filled with rubble	15-45 cm	Post Arsenal
18	Basement	Basement, possibly stone-lined	15-100 cm	Post Arsenal
19	Basement	Basement filled with rubble	10-100 cm	Post Arsenal
20	Debris	Building Debris	30-50 cm	Post Arsenal
21	Debris	Debris	15-35 cm	Post Arsenal
22	Debris	Debris	5-25 cm	Post Arsenal
23	Debris	Rubble	5-20 cm	Post Arsenal
24	Debris	Rubble, debris	10-35 cm	Post Arsenal
25	Debris	Rubble	0-30 cm	Post Arsenal
26	Debris	Rubble/debris	10-60 cm	Probable Arsenal
27	Debris	Rubble	10-45 cm	Post Arsenal
28	Debris	Debris	0-50 cm	Post Arsenal
29	Debris	Debris	5-70 cm	Post Arsenal
30	Debris	Rubble/debris	10-50 cm	Post Arsenal
31	Debris	Debris	0-65 cm	Post Arsenal
32	Debris	Debris	0-60 cm	Post Arsenal
33	Debris	Debris	0-45 cm	Post Arsenal

Table 3. GPR Anomalies

Anomaly	Anomaly Category	Description	Estimated Depth	Temporal Affiliation
34	Debris	Rubble, large objects	20-40 cm	Post Arsenal
35	Debris	Building debris, rubble	25-50 cm	Post Arsenal
36	Debris	Debris	15-25 cm	Post Arsenal
37	Debris	Debris	5-30 cm	Post Arsenal
38	Debris	Metal and building rubble, no discernible features	0-65 cm	Post Arsenal
39	Debris	Metal, debris	15-45 cm	Post Arsenal
40	Debris	Debris	5-40 cm	Post Arsenal
41	Debris	Metal, debris	5-45 cm	Post Arsenal
42	Debris	Metal, debris	5-45 cm	Post Arsenal
43	Debris	Debris	10-40 cm	Post Arsenal
44	Debris	Debris	20-70 cm	Probable Arsenal
45	Debris	Debris	10-60 cm	Post Arsenal
46	Debris	Debris	25-90 cm	Post Arsenal
47	Large Object	Large object	25-50 cm	Post Arsenal
48	Large Object	Large object	20-60 cm	Post Arsenal
49	Large Object	Large object	20-60 cm	Post Arsenal
50	Large Object	Large object or utility	0-25 cm	Post Arsenal
51	Large Object	Large object	10-25 cm	Post Arsenal
52	Large Object	Large object	20-50 cm	Post Arsenal
53	Large Object	Large object	20-45 cm	Post Arsenal
54	Large Object	Large object	30-50 cm	Post Arsenal
55	Large Object	Large object, possible utility	15-25 cm	Post Arsenal
56	Large Object	Large object	10-40 cm	Post Arsenal
57	Large Object	Large object	5-25 cm	Post Arsenal
58	Linear Feature	Linear feature	15-50 cm	Arsenal
59	Linear Feature	Linear feature	15-50 cm	Arsenal
60	Linear Feature	Linear feature	15-50 cm	Arsenal
61	Linear Feature	Linear feature	15-50 cm	Arsenal
62	Linear Feature	Linear feature	15-50 cm	Arsenal
63	Linear Feature	Linear feature	20-60 cm	Arsenal
64	Linear Feature	Linear feature	30-80 cm	Arsenal
65	Linear Feature	Linear feature	35-75 cm	Arsenal
66	Linear Feature	Linear feature	35-65 cm	Arsenal
67	Path	Path	15-55 cm	Post Arsenal
68	Path	Path	15-35 cm	Post Arsenal
69	Path	Path	25-55 cm	Post Arsenal

Table 3. GPR Anomalies

Anomaly	Anomaly Category	Description	Estimated Depth	Temporal Affiliation
70	Surface	Surface	40-60 cm	Post Arsenal
71	Surface	Surface	30-45 cm	Post Arsenal
72	Surface	Surface with debris	15-45 cm	Post Arsenal
73	Surface	Surface with debris	15-35 cm	Post Arsenal
74	Surface	Surface, debris	5-50 cm	Post Arsenal
75	Surface	Surface and debris	0-30 cm	Post Arsenal
76	Surface	Surface, large object	20-55 cm	Post Arsenal
77	Surface	Surface and debris	15-40 cm	Post Arsenal
78	Surface	Surface and debris	15-50 cm	Post Arsenal
79	Surface	Surface and debris	15-45 cm	Post Arsenal
80	Surface	Surface	85-100 cm	Post Arsenal
81	Surface	Surface	10-50 cm	Post Arsenal
82	Surface	Surface	30-50 cm	Post Arsenal
83	Surface	Surface	30-45 cm	Arsenal
84	Surface	Surface	30-45 cm	Unknown
85	Surface	Surface	0-20 cm	Post Arsenal
86	Surface	Surface/road	0-20 cm	Post Arsenal
87	Surface	Surface	10-30 cm	Post Arsenal
88	Surface	Planar surface	35-75 cm	Probable Arsenal
89	Surface	Planar surface	45-60 cm	Post Arsenal
90	Surface	Surface	15-50 cm	Probable Arsenal
91	Surface	Surface	15-35 cm	Probable Arsenal
92	Surface	Surface	5-30 cm	Unknown
93	Surface	Surface	35-65 cm	Post Arsenal
94	Surface	Surface	35-90 cm	Probable Arsenal
95	Surface	Surface	40-75 cm	Probable Arsenal
96	Surface	Surface	30-60 cm	Post Arsenal
97	Surface	Surface	30-50 cm	Probable Arsenal
98	Surface	Surface	35-90 cm	Post Arsenal
99	Surface	Surface	55-100 cm	Post Arsenal
100	Surface	Surface	45-80 cm	Post Arsenal
101	Utility	Utility	20-45 cm	Post Arsenal
102	Utility	Utility	10-30 cm	Post Arsenal
103	Utility	Utility	15-25 cm	Post Arsenal
104	Utility	Utility	0-15 cm	Post Arsenal
105	Utility	Utility	20-30 cm	Post Arsenal
106	Utility	Utility	5-25 cm	Post Arsenal

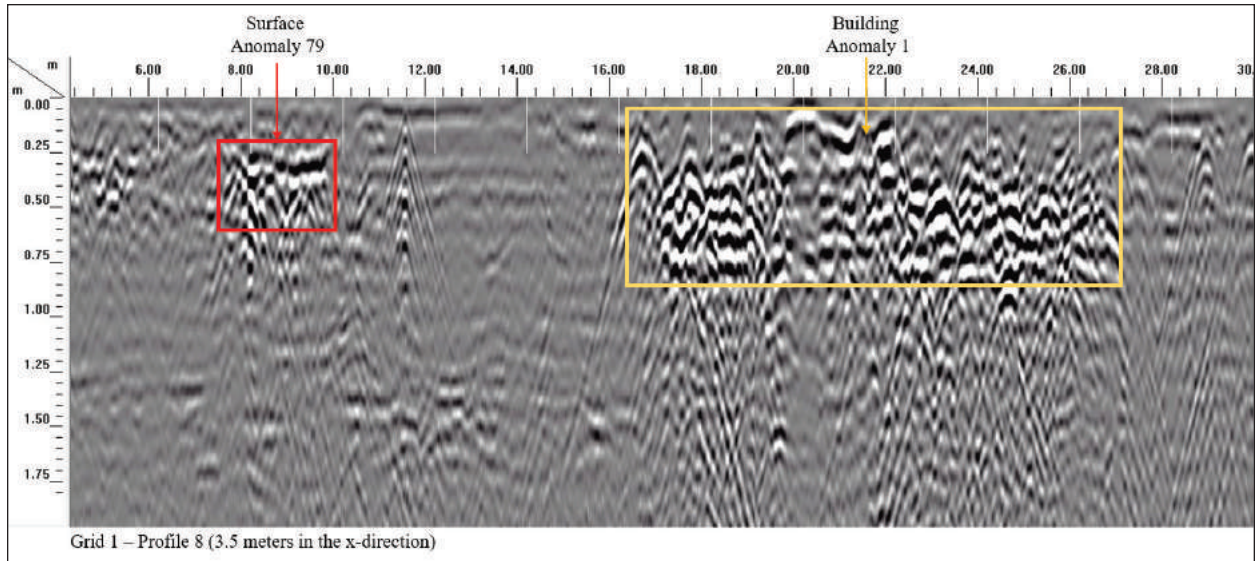
Table 3. GPR Anomalies

Anomaly	Anomaly Category	Description	Estimated Depth	Temporal Affiliation
107	Utility	Utility	15-35 cm	Post Arsenal
108	Utility	Utility	0-20 cm	Post Arsenal
109	Utility	Utility	0-25 cm	Post Arsenal
110	Utility	Utility	5-25 cm	Post Arsenal
111	Utility	Utility	0-25 cm	Post Arsenal
112	Utility	Utility	0-20 cm	Post Arsenal
113	Utility	Utility	15-35 cm	Post Arsenal
114	Utility	Utility	10-40 cm	Post Arsenal
115	Utility	Utility	25-50 cm	Post Arsenal
116	Utility	Utility	10-30 cm	Post Arsenal
117	Utility	Utility	20-45 cm	Post Arsenal
118	Utility	Utility	15-45 cm	Post Arsenal
119	Utility	Utility	20-50 cm	Post Arsenal
120	Utility	Utility	10-55 cm	Post Arsenal
121	Utility	Utility	5-75 cm	Post Arsenal
122	Utility	Utility	0-10 cm	Post Arsenal
123	Utility	Utility	0-10 cm	Post Arsenal
124	Utility	Utility	25-50 cm	Post Arsenal
125	Utility	Utilities	10-50 cm	Post Arsenal
126	Utility	Utility	20-50 cm	Post Arsenal
127	Utility	Utility	25-50 cm	Post Arsenal
128	Utility	Utility	25-45 cm	Post Arsenal
129	Utility	Utility	15-50 cm	Post Arsenal
130	Utility	Utility	35-60 cm	Post Arsenal
131	Utility	Utility	15-35 cm	Post Arsenal
132	Utility	Utility	0-25 cm	Post Arsenal

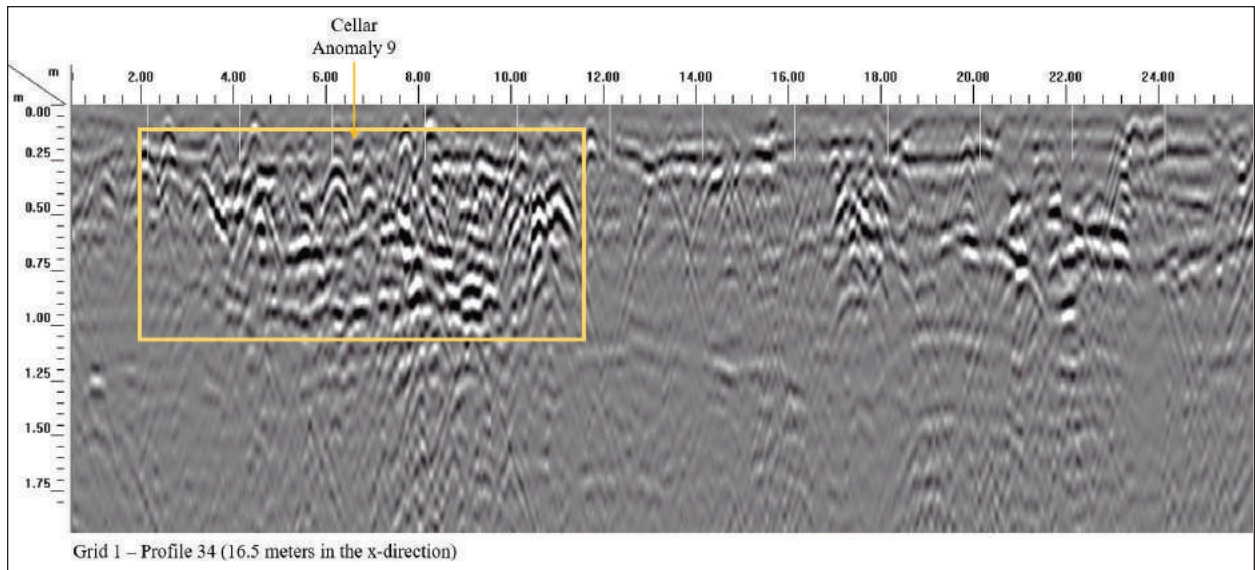
BUILDING (N=6)

Six possible building foundations (Anomalies 1-6) were identified in the GPR results (Figure 31a). These are roughly rectilinear and consist of collections of point reflections that probably indicate the brick, concrete, and debris from building foundations. All six features are located south of Arsenal Avenue. Their ages and types are generally unknown. The 1914 Sanborn map (which only covered the north side of Arsenal Avenue) and aerial photographs between 1959 and 1984 showed several houses and outbuildings along Branson Street, Myrover Street, and Arsenal Avenue. The number of GPR anomalies is relatively low given the number of buildings located on these two blocks during the twentieth century. This discrepancy suggests possible construction differences, such as the use of piers, and/or more complete demolition in some areas.

Figure 31.
Example GPR Profiles, 1 of 4



A. Building Foundation, Grid 1



B. Cellar, Grid 1

Anomalies 1 and 2 clearly related to twentieth-century dwellings. Anomalies 3, 4, 5, and 6 had no clear associations. These anomalies may reflect residential occupations or structures that are not visible on the map. They are also near the arsenal foundation remains and could be connected to the nineteenth-century occupation.

BASEMENT (N=13)

Thirteen possible basement features (Anomalies 7-19) were interpreted in the GPR results (Figure 31b). Each possible basement is an excavated area filled with point reflection debris and having a surface at the base. These anomalies could be basements and/or crawlspaces below the foundations of the structures. They are probably associated with the twentieth-century residential structures, but the Sanborn maps did not provide any information regarding this possibility.

DEBRIS (N=27)

Twenty-seven debris scatters (Anomalies 20-46) were interpreted in the GPR results (Figure 32a). This anomaly type described a series of point reflections of varying sizes that formed no obvious pattern. They were primarily clustered north of Arsenal Avenue and most likely result from the demolition of the twentieth-century neighborhood and grading during construction of the Martin Luther King Jr. Freeway. Historic aerial photographs indicate substantial alteration of the historic landscape during this period.

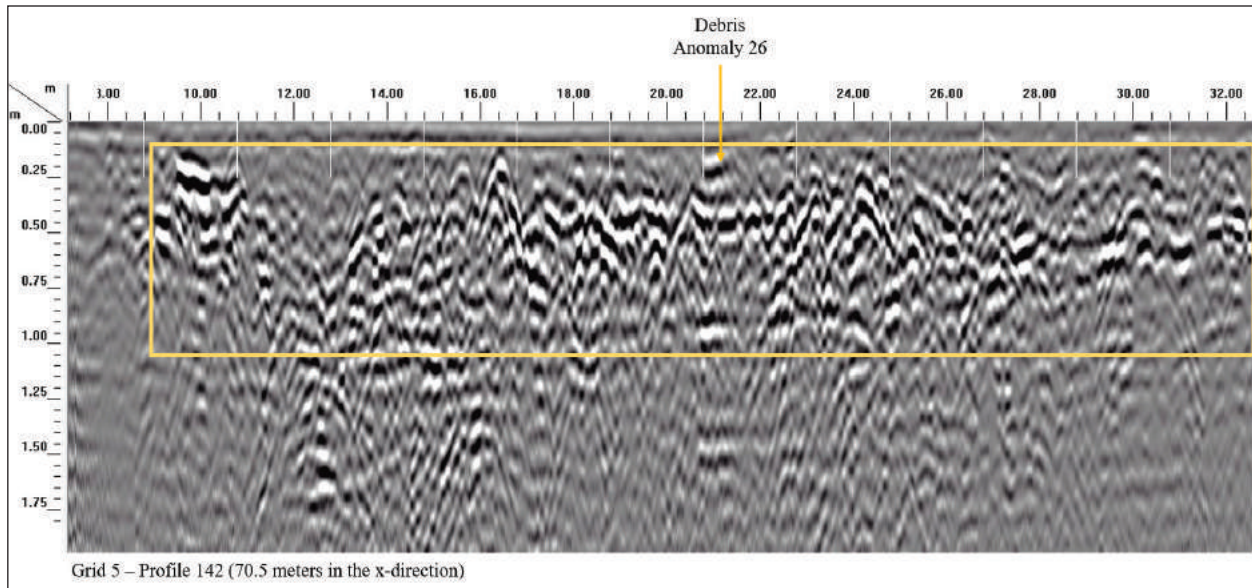
LARGE OBJECT (N=11)

Eleven large objects (Anomalies 47-57) were identified south of Arsenal Avenue (Figure 32b). These anomalies all represent single objects that measured more than 0.5 meter and that were identified as single adjacent point reflections in multiple profiles. They are likely large pieces of debris associated with the twentieth-century occupation and are located in close proximity to the former house locations.

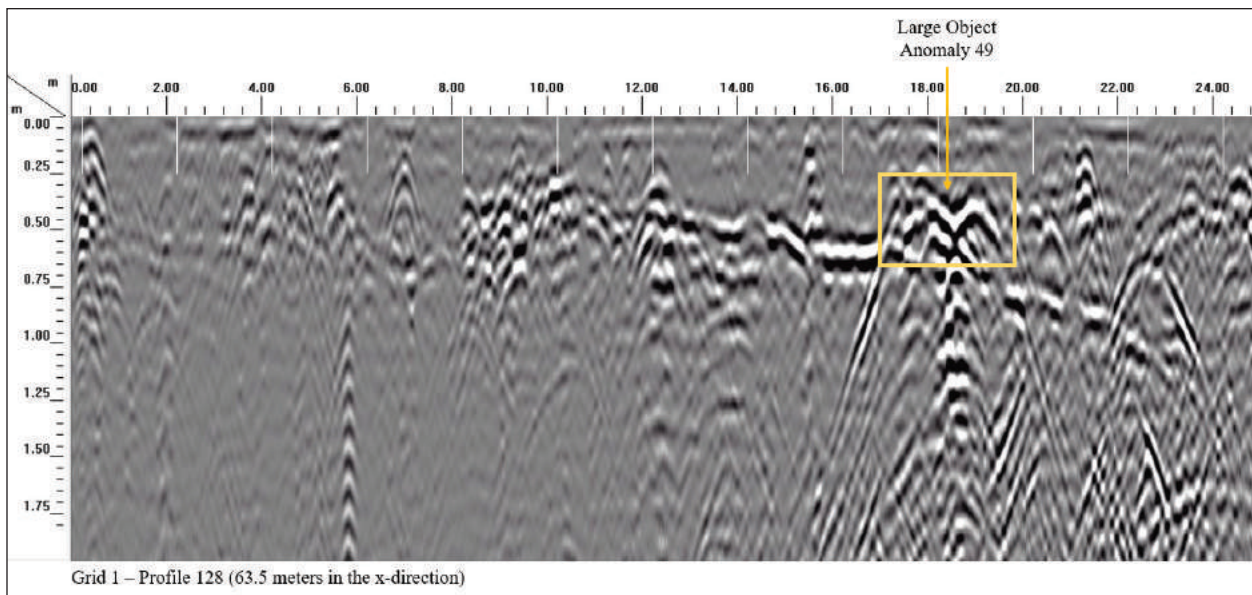
LINEAR FEATURE (N=9)

Nine linear anomalies (Anomalies 58-66) were identified in the interpreted GPR results (Figure 33a). These were all located in one cluster between Branson Street and Arsenal Avenue. They extend from east to west and some turn corners to run north-south. These anomalies were directly adjacent to the arsenal foundation remains. They shared some characteristics of utilities, such as their straight-line shape and the fact that they were small point reflections in profile. However, they did not appear to be utilities because they ran parallel and historic aerial images showed no apparent structures in this area.

Figure 32.
Example GPR Profiles, 2 of 4

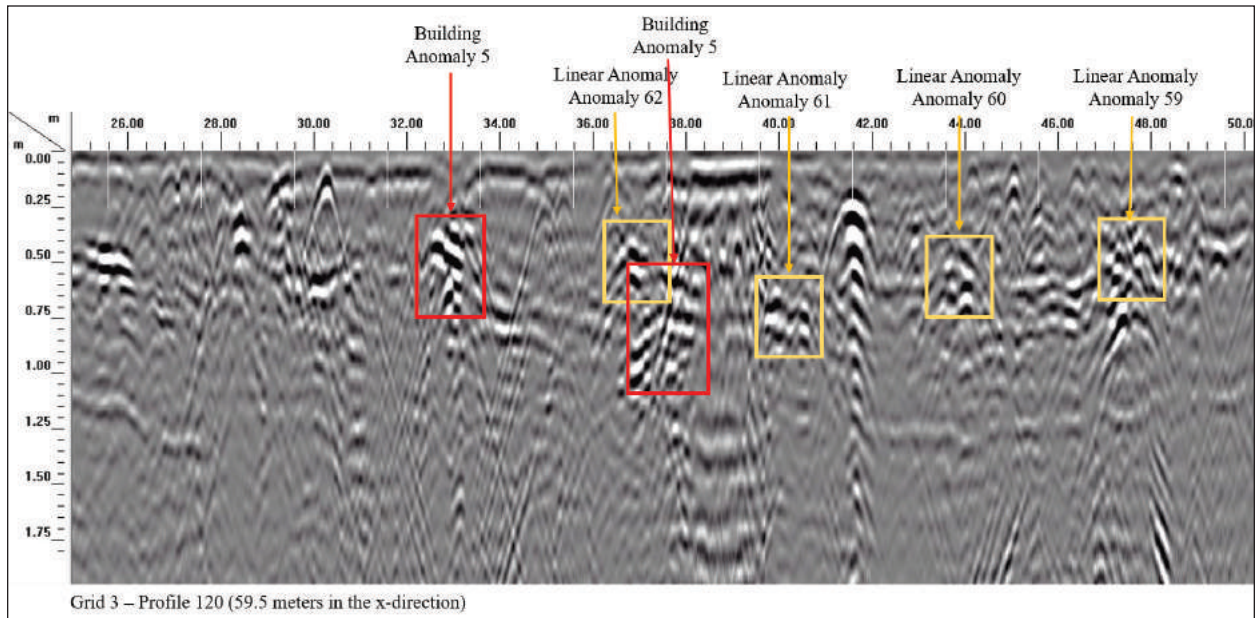


A. Debris, Grid 5

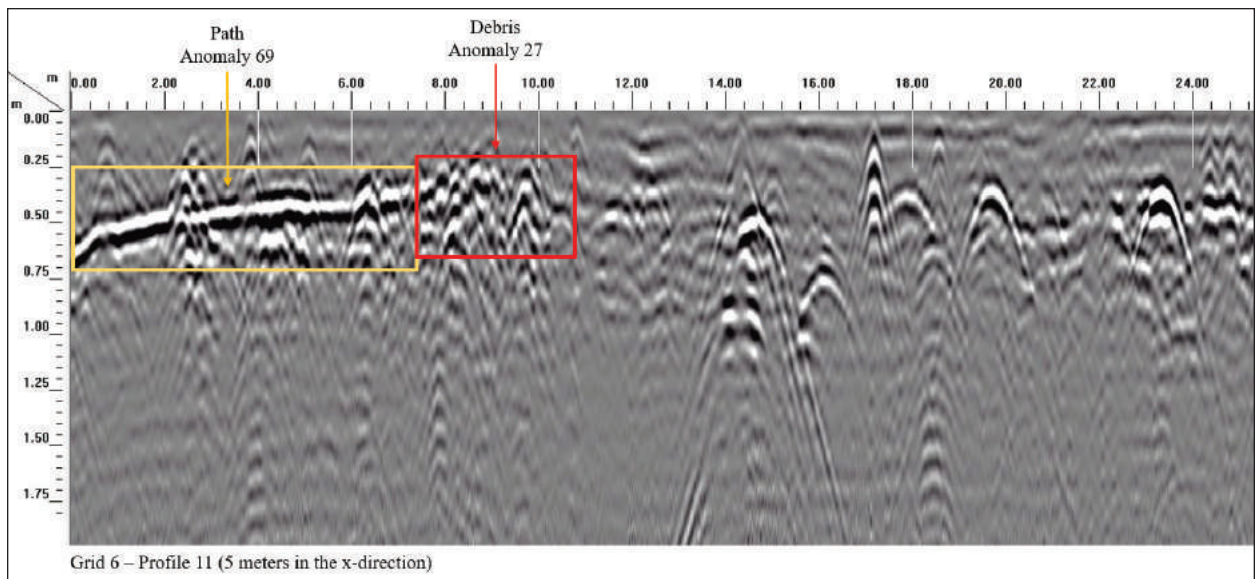


B. Large Object, Grid 1

Figure 33.
Example GPR Profiles, 3 of 4



A. Linear Features, Grid 3



B. Path Feature, Grid 6

Their sizes, shapes, and locations suggested these features reflected the CSA Gun Carriage Shop walls. However, the GPR data implied additional wall segments that were not shown on the CSA-era map or discussed in the excavation report by Grunden et al. (1994). The reasons for this discrepancy could be due to additional wall segments being built for support or the GPR data might have imaged both wall segments and robber trenches. Grunden et al. (1994) did not identify any intact wall segments, but it is possible that the GPR data reflect some intact walls or foundations.

PATH (N=3)

Three path features (Anomalies 67-69) were identified in the GPR interpretations (Figure 33b). These consisted of narrow, hard surfaces. All three correspond with former twentieth-century structures and extend to them from Arsenal Avenue. The material they are constructed of was not determined, but they may be brick, concrete, asphalt, or compacted earth.

SURFACE (N=31)

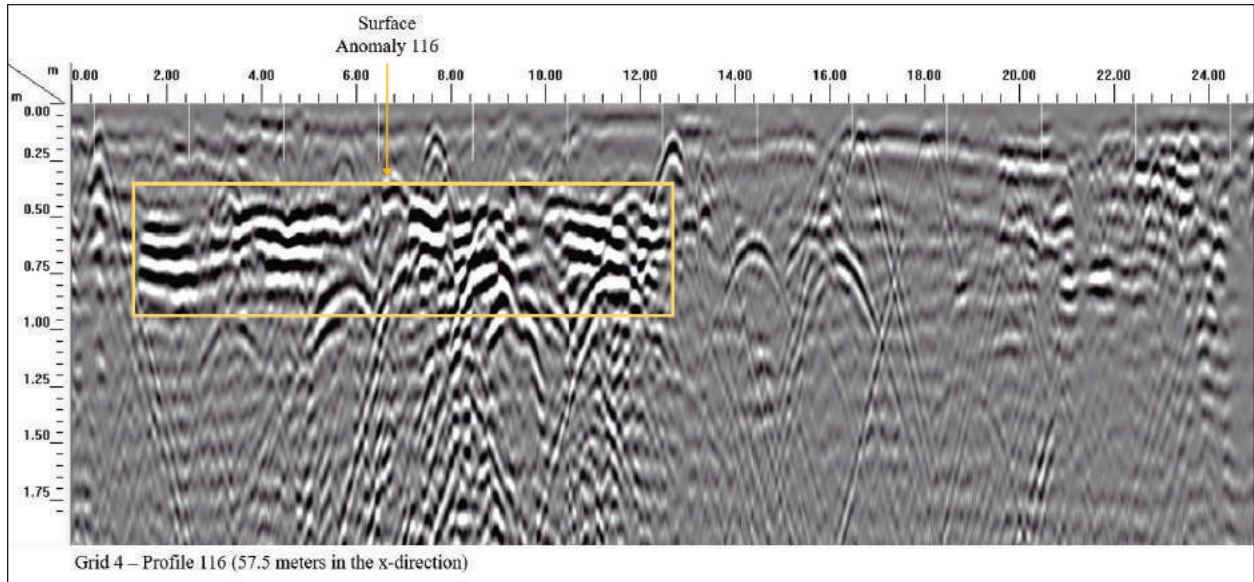
Thirty-one surface anomalies (Anomalies 70-100) were identified in the interpreted GPR results (Figure 34a). They were evenly distributed across the survey area and consisted of planar reflections, which are typically the result of a compacted, flat, constructed surface. These anomalies could be driveways, building construction footprints, or areas that were compacted through heavy use. Based on their locations and comparison to the historic aerial photographs, they are mostly associated with the twentieth-century occupation of the area. Anomalies 90-91 and 93-97 did not appear associated with any known twentieth-century structures, but were close to the arsenal foundation remains. Anomalies 91 and 97, in particular, were in the approximate location of the Blacksmith Shop. Anomaly 93 was immediately adjacent to multiple linear anomalies that probably relate to the Gun Carriage Shop.

UTILITY (N=32)

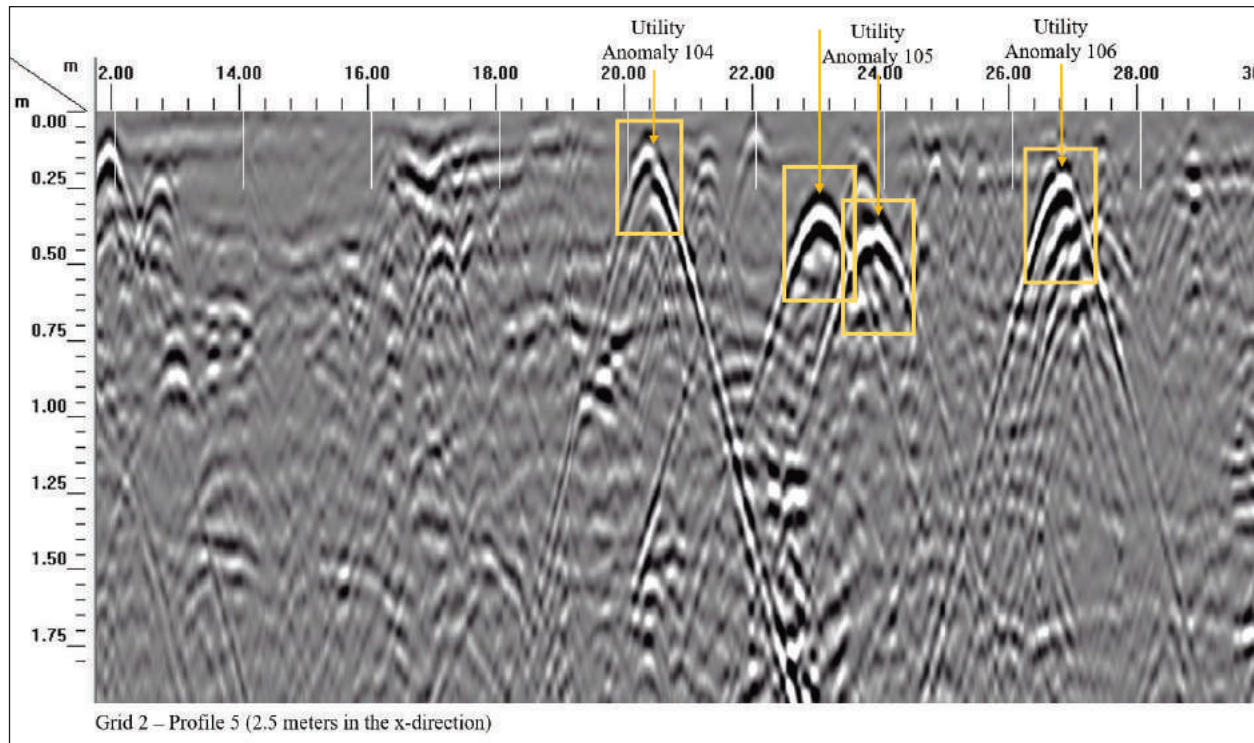
Thirty-two possible utility anomalies (Anomalies 101-132) were identified in the interpreted GPR results (Figure 34b). Utility anomalies were distributed across the surveyed areas. In plan view, they were linear features located adjacent to, or intersecting with, roads and had shallow point reflections in profile. These anomalies were all associated with twentieth century or present-day occupations and not with the nineteenth-century arsenal.

Superimposing the GPR results on historical maps and aerial photographs indicated that many of the anomalies correlate with individual houses from the post-arsenal period (Figures 35-39). This is not surprising given their high visibility and regular patterning. Moreover, the anomalies

Figure 34.
Example GPR Profiles, 4 of 4



A. Surface Feature, Grid 4



B. Utility Feature, Grid 2

Figure 35.
GPR Results on 1914 Sanborn Fire Insurance Map

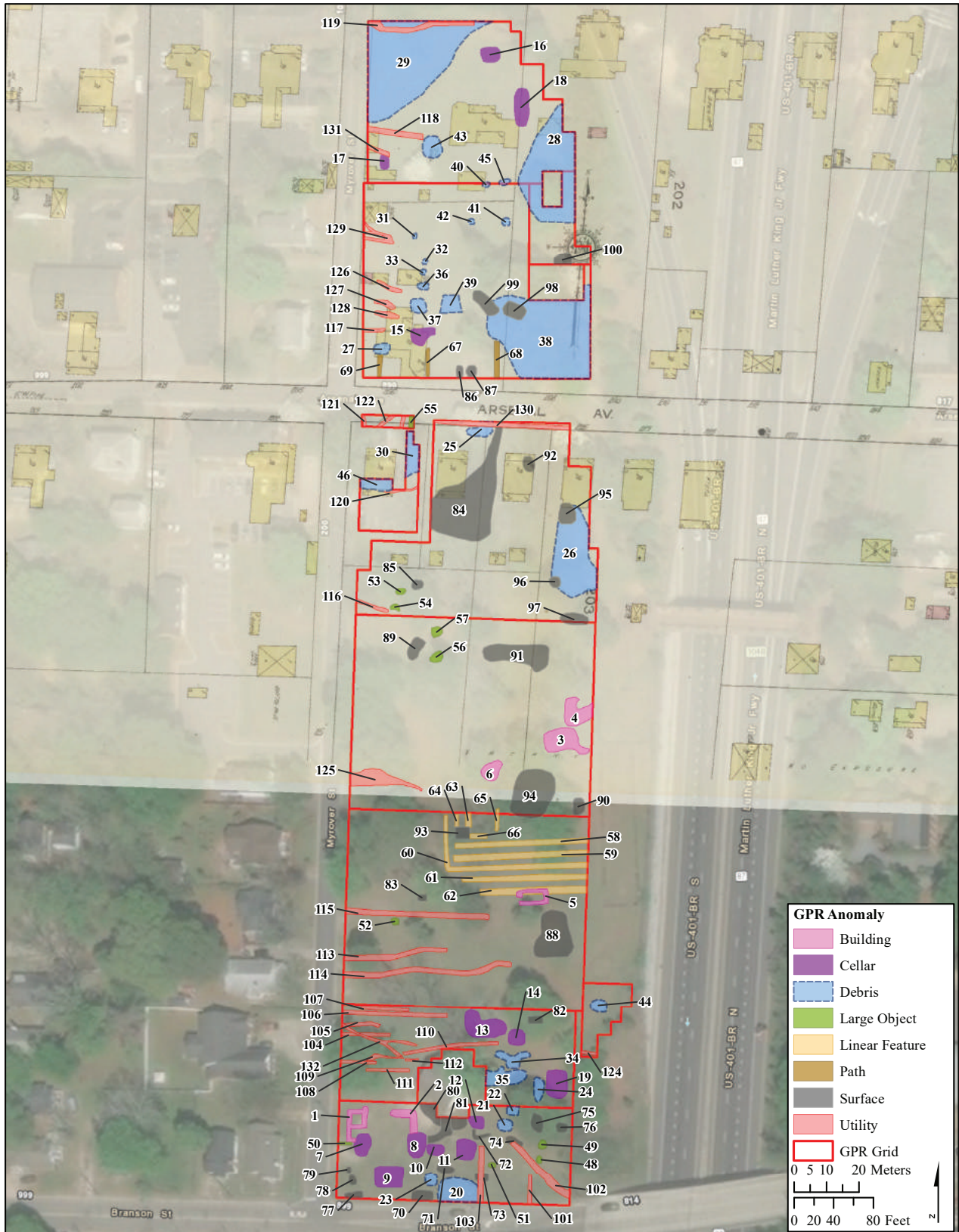
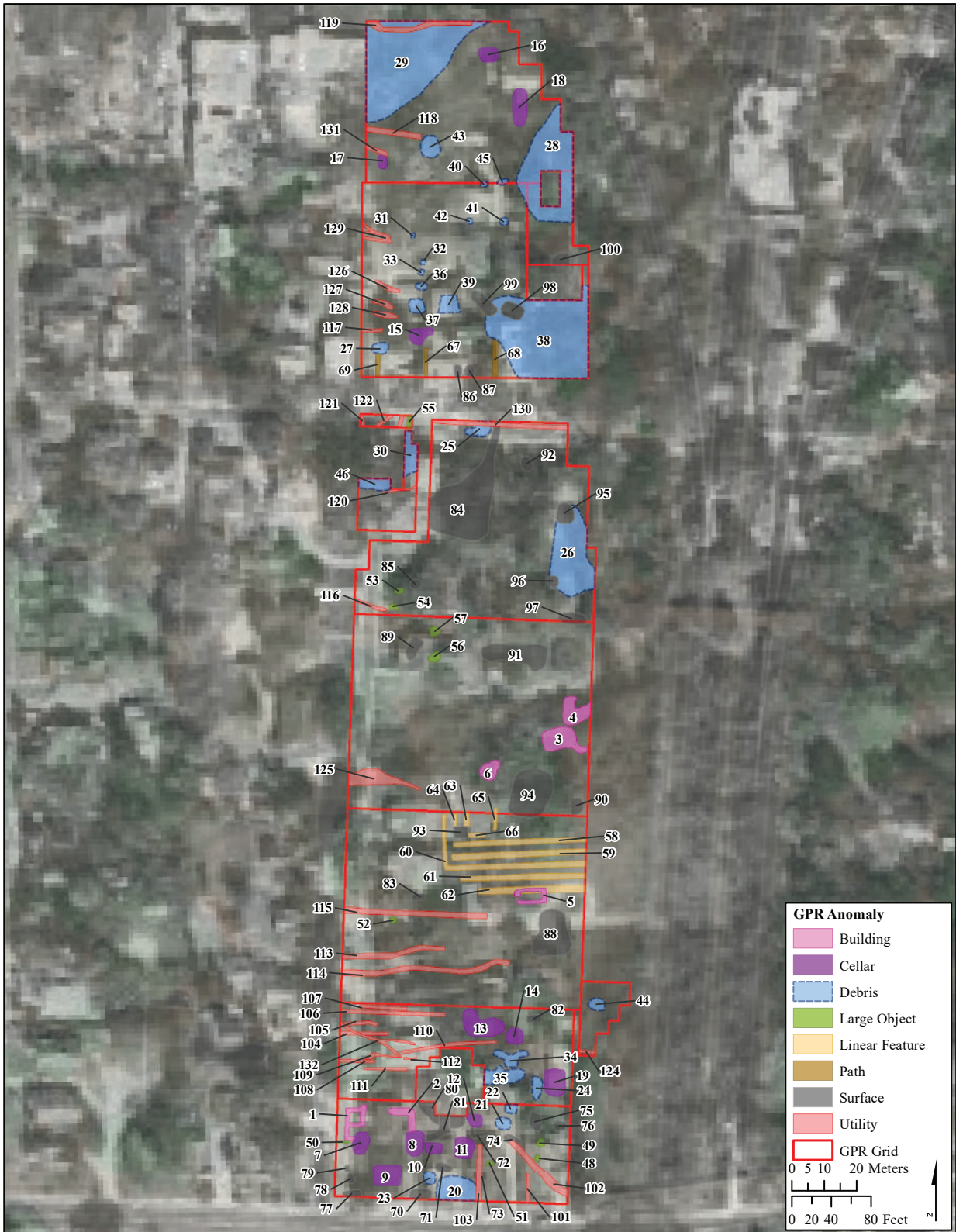
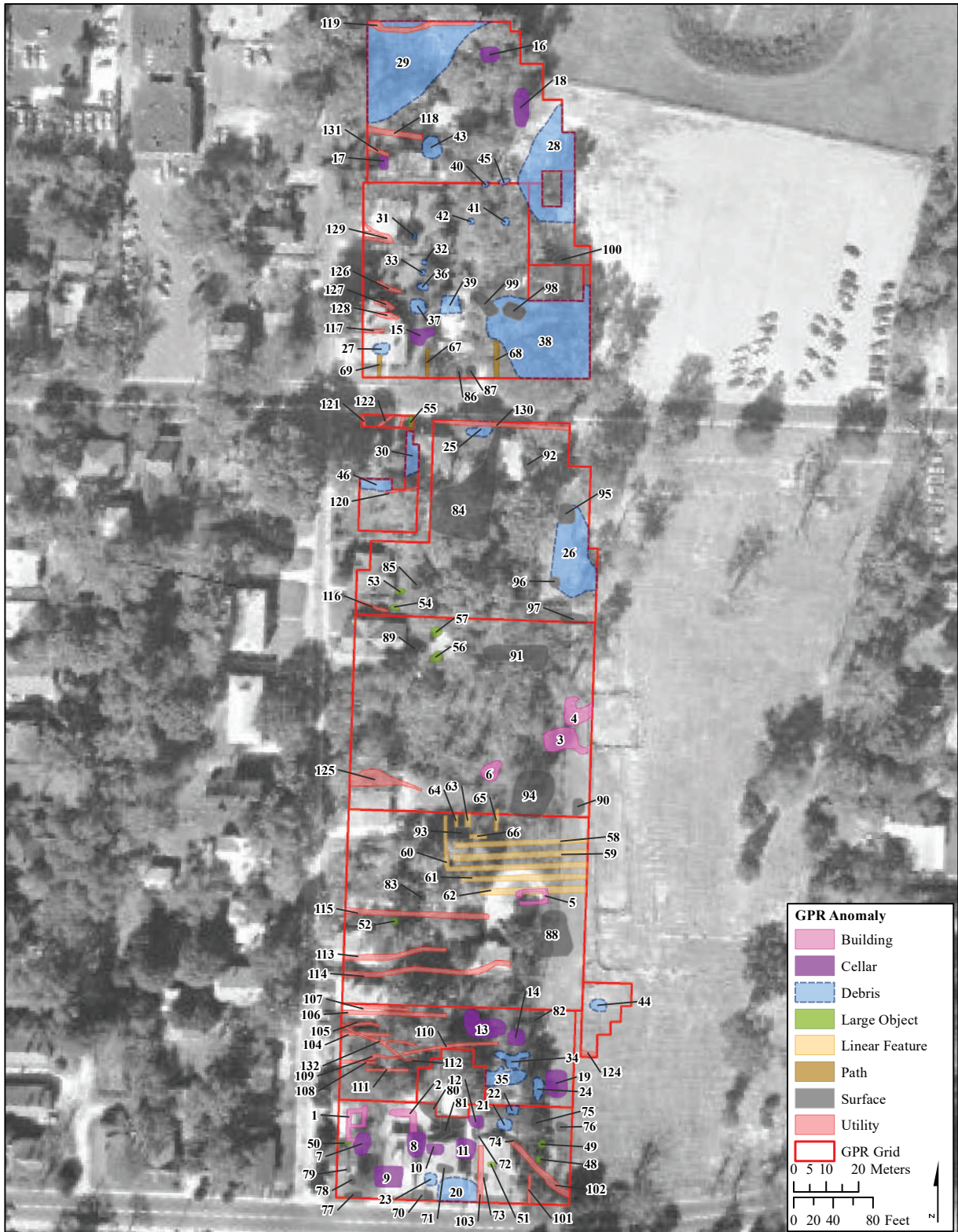


Figure 36.
GPR Results on 1959 Aerial Photograph



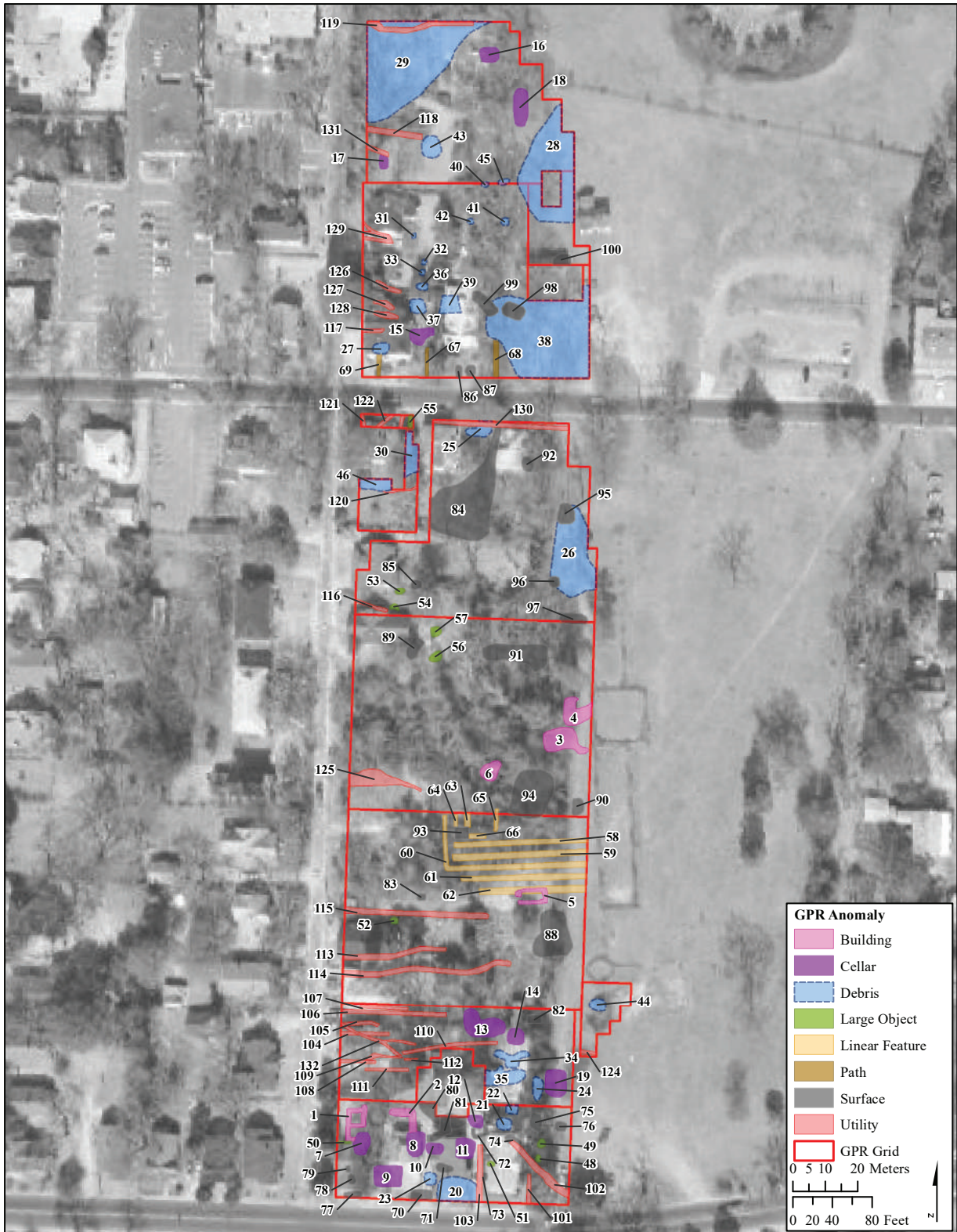
Imagery Source: DigitalGlobe, Vivid - USA 2016

Figure 37.
GPR Results on 1975 Aerial Photograph



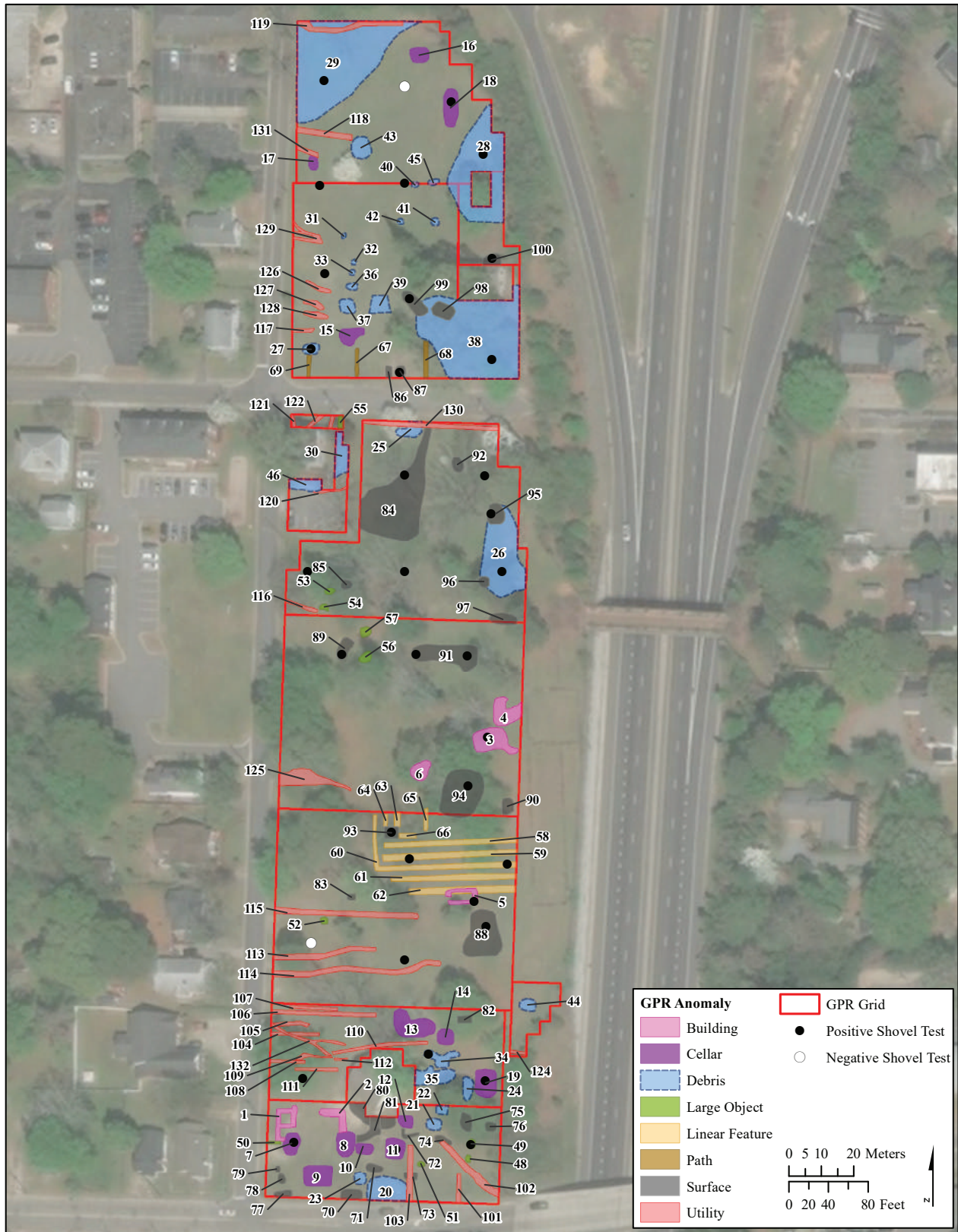
Imagery Source: DigitalGlobe, Vivid - USA 2016

Figure 38.
GPR Results on 1982 Aerial Photograph



Imagery Source: DigitalGlobe, Vivid - USA 2016

Figure 39.
GPR Results on 2017 Survey Map



Imagery Source: DigitalGlobe, Vivid - USA 2016

clustered in the northern and southern ends of the study area in locations that were heavily impacted by post-arsenal development. There were noticeably fewer anomalies in the central portion of the study area where arsenal features would be expected. The exception to this pattern is the presence of numerous linear features (Anomalies 58-66) that are almost certainly associated with the CSA Gun Carriage Shop, three possible buildings (Anomalies 3, 4, and 6), one debris scatter (Anomaly 26), and several surfaces (Anomalies 88, 90, 91, 93-97). The GPR data did not provide any direct evidence of the Blacksmith Shop, which was unexpected given its construction style and similar archaeological manifestation to the Gun Carriage Shop.

ARCHAEOLOGICAL RESULTS

Shovel test placement was guided by the GPR interpretations (Figure 40, Table 4). Certain anomaly categories were investigated to verify their interpretations, assess the potential for intact deposits, and assess overall site integrity, while a small sample of shovel tests served as controls in non-anomalous areas. In total, 36 shovel tests were excavated, 34 of which yielded artifacts. The shovel tests generally revealed extensive evidence of architectural debris. However, because of their small size, they did not provide enough data to further refine the initial GPR interpretations.

Table 4. Shovel Tests and GPR Anomalies

Site	Shovel Test	GPR Anomaly	GPR Interpretation	Estimated Depth
31CD280	1	None	Large Object	20-60 cm
31CD280	2	19	Basement	10-100 cm
31CD280	3	88	Surface	35-75 cm
31CD280	4	60	Linear Feature?	15-50 cm
31CD280	5	3	Structural Remains	20-50 cm
31CD280	6	91	Surface	15-35 cm
31CD280	7	26	Rubble/Debris	10-60 cm
31CD280	8	None	None	
31CD280	13	11	Basement	5-35 cm
31CD280	14	7	Basement	20-80 cm
31CD280	15	None	None	
31CD280	16	34	Rubble	20-40 cm
31CD280	17	None	None	
31CD280	18	None	None	
31CD280	19	59	Linear Feature?	15-50 cm
31CD280	20	94	Surface	35-90 cm
31CD280	21	89	Surface	45-60 cm

Table 4. Shovel Tests and GPR Anomalies

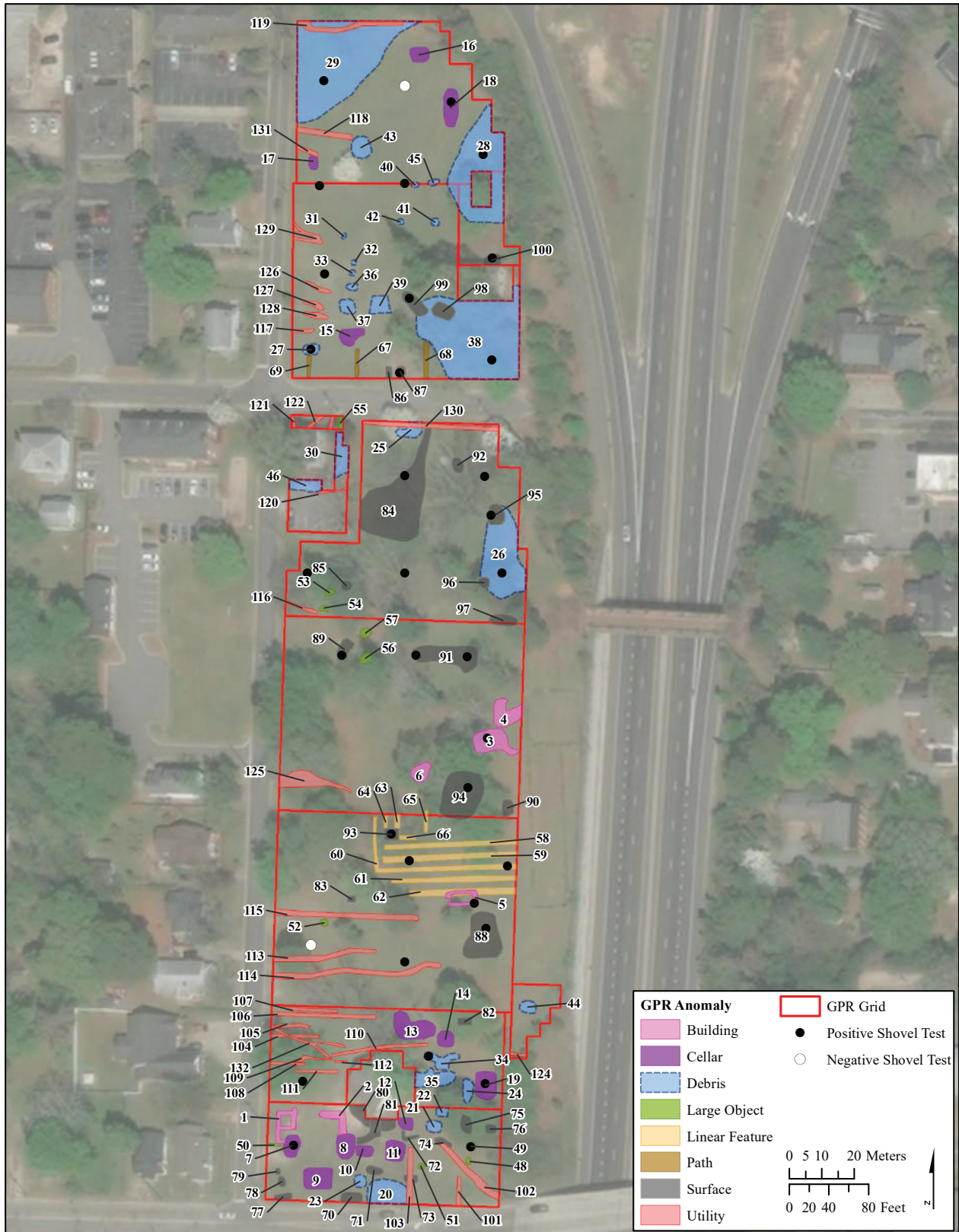
Site	Shovel Test	GPR Anomaly	GPR Interpretation	Estimated Depth
31CD280	22	91	Surface	15-35 cm
31CD280	23	None	None	
31CD280	24	None	None	
31CD280	25	84	Surface	30-45 cm
31CD280	34	93	Surface	35-65 cm
31CD280	35	95	Surface	40-75 cm
31CD280	36	5	Foundation	
31CD1884	9	38	Rubble/Debris	0-65 cm
31CD1884	10	100	Surface	45-80 cm
31CD1884	11	28	Debris	0-50 cm
31CD1884	12	18	Basement	15-100 cm
31CD1884	26	87	Surface	10-30 cm
31CD1884	27	27	Rubble	10-45 cm
31CD1884	28	None	None	
31CD1884	29	99	Surface	55-100 cm
31CD1884	30	None	None	
31CD1884	31	None	None	
31CD1884	32	29	Debris	5-70 cm
31CD1884	33	None	None	

Shovel test profiles varied across the study area (Appendix B). All tests encountered sandy soils and approached depths of 70-80 cmbs if there were no obstructions. Shovel Tests 3, 18, and 32 exposed relatively undisturbed natural profiles resembling the description of Wagram-urban land (Figure 41). Shovel Tests 5, 6, 21, 22, 24, 26, 28, 31, and 36 all showed evidence of substantial disturbance from burning, construction, and demolition (Figures 42-44).

31CD280 (NORTH CAROLINA ARSENAL) ARTIFACTS

The artifacts from site 31CD280 (n=246) came from 22 positive shovel tests (Tables 5 and 6, Appendix A). The assemblage was sorted into the Kitchen (n=100, 40.7%), Architecture (n=95, 38.6%), Miscellaneous (n=27, 11%), and Activities (n=24, 9.8%) groups. The most common artifact types include container glass, flat glass, cut and wire nails, and indeterminate metal (Figures 45). No military, personal, or clothing-related artifacts were identified. In general, the artifact assemblage is consistent with expectations for late nineteenth- and early twentieth-century domestic occupations and probably reflects the houses that were demolished in the 1990s and 2000s.

Figure 40.
Map Showing Shovel Tests and GPR Anomalies



Imagery Source: DigitalGlobe, Vivid - USA 2016

Figure 41.
Photographs of Shovel Tests 3, 18, and 32



A. Shovel Test 3



B. Shovel Test 18



C. Shovel Test 32

Figure 42.
Photographs of Shovel Tests 5, 6, and 21



A. Shovel Test 5



B. Shovel Test 6



C. Shovel Test 1

Figure 43.
Photographs of Shovel Tests 22, 24, and 26



A. Shovel Test 22



B. Shovel Test 24



C. Shovel Test 26

Figure 44.
Photographs of Shovel Tests 28, 31, and 36



A. Shovel Test 28



B. Shovel Test 31



C. Shovel Test 36

Figure 45.
Artifact Photographs from Site 31CD280



A. Container Glass, Amethyst Color; B. Nail, Cut Common, Unmeasured; C. Nail, Wire Common, Unmeasured; D. Whiteware, Dipped; E. Whiteware, Transfer Print, Blue

Table 5. Artifacts Recovered from Shovel Tests at Site 31CD280

Shovel Test	Activities		Architecture		Kitchen		Miscellaneous		Total	
	#	%	#	%	#	%	#	%	#	%
1	2	5.13%	6	15.38%	9	23.08%	22	56.41%	39	100.00%
2		0.00%	4	36.36%	4	36.36%	3	27.27%	11	100.00%
3		0.00%	2	50.00%	2	50.00%		0.00%	4	100.00%
4		0.00%	1	5.88%	16	94.12%		0.00%	17	100.00%
5		0.00%	4	80.00%		0.00%	1	20.00%	5	100.00%
6	1	10.00%	6	60.00%	3	30.00%		0.00%	10	100.00%
7		0.00%	2	40.00%	3	60.00%		0.00%	5	100.00%
8		0.00%	2	33.33%	3	50.00%	1	16.67%	6	100.00%
13	1	14.29%	4	57.14%	2	28.57%		0.00%	7	100.00%
14		0.00%	16	84.21%	3	15.79%		0.00%	19	100.00%
15		0.00%	1	20.00%	4	80.00%		0.00%	5	100.00%
16		0.00%	7	50.00%	7	50.00%		0.00%	14	100.00%
17		0.00%	1	20.00%	4	80.00%		0.00%	5	100.00%
19		0.00%	5	83.33%	1	16.67%		0.00%	6	100.00%
20	2	40.00%	2	40.00%	1	20.00%		0.00%	5	100.00%
21		0.00%	2	100.00%		0.00%		0.00%	2	100.00%
22	2	7.14%	4	14.29%	22	78.57%		0.00%	28	100.00%
23		0.00%	4	80.00%	1	20.00%		0.00%	5	100.00%
24		0.00%	4	40.00%	6	60.00%		0.00%	10	100.00%
34	1	14.29%	4	57.14%	2	28.57%		0.00%	7	100.00%
35	15	60.00%	5	20.00%	5	20.00%		0.00%	25	100.00%
36		0.00%	9	81.82%	2	18.18%		0.00%	11	100.00%
Total	24	9.76%	95	38.62%	100	40.65%	27	10.98%	246	100.00%

Table 6. Artifact Groups and Types for Site 31CD280

Artifact Group and Description	Count	Percent
Activities	24	9.76%
Barbed Wire	2	0.81%
Chimney Glass, Body, Unidentified	1	0.41%
Iron/ Steel Metal Rod	1	0.41%
Marble, Machine Made Glass	1	0.41%
Metal Object, Unidentified	2	0.81%
Non-Electrical Wire	4	1.63%
Plastic Item, Unidentified	2	0.81%
Sheet Iron/Steel	10	4.07%

Table 6. *Artifact Groups and Types for Site 31CD280*

Artifact Group and Description	Count	Percent
Strap Iron/Metal	1	0.41%
Architecture	95	38.62%
Asphalt Roofing	2	0.81%
Glass, Unmeasured Flat	51	20.73%
Hinge, Iron/ Steel	1	0.41%
Nail, Cut Common	15	6.01%
Nail, Tack	3	1.22%
Nail, Unidentified,	1	0.41%
Nail, Wire Common	9	3.66%
Other Clay/Ceramic Tile	9	3.66%
Slate, Roofing	3	1.22%
Spike	1	0.41%
Kitchen	100	40.65%
Canning Jar Glass, Mason Screw Cap	3	1.22%
Coarse Earthenware, Unidentified	1	0.41%
Container Glass, Amber	7	2.85%
Container Glass, Amethyst Color	2	0.81%
Container Glass, Aqua	2	0.81%
Container Glass, Clear	50	20.33%
Container Glass, Green	18	7.32%
Container Glass, Light Green	3	1.22%
Container Glass, Machine Made, Green	1	0.41%
Container Glass, Milk Glass	1	0.41%
Container Glass, Olive Green	3	1.22%
Crown Cap	1	0.41%
Refined Earthenware, Colored Glazes	1	0.41%
Stoneware, Unidentified	1	0.41%
White Bodied Earthenware, Unidentified	1	0.41%
Whiteware, Dipped	1	0.41%
Whiteware, Plain	3	1.22%
Whiteware, Transfer Print, Blue	1	0.41%
Miscellaneous	27	10.98%
Iron/ Steel, Unidentified/ Corroded	6	2.44%
Miscellaneous, Unidentified Material	17	6.91%
Plastic, Indeterminate	1	0.41%
Slag	3	1.22%
Total	246	100.00%

31CD280 (NORTH CAROLINA ARSENAL) NRHP ASSESSMENT

Site 31CD280 was listed in the NRHP under Criteria A, C, and D (Scheitlin et al. 1983). Its period of significance is 1800-1899 and its area of significance is Archeology-Historic and Military. Multiple archaeological investigations have yielded additional important information and refined what is known about the site's physical integrity. Geophysical and archaeological datasets generated as a result of this project generally confirm and support earlier studies. In particular, the site possesses intact features from the Confederate period, the archaeological remains have significant information potential, and portions of the site possess sufficient integrity to convey their significance. Additional work is recommended and is discussed in more detail below.

31CD1884 ARTIFACTS

Eleven shovel tests at site 31CD1884 yielded 89 artifacts (Tables 7 and 8). In order of frequency, artifact groups represented in the assemblage were Architecture (n=44, 49.4%), Kitchen (n=29, 32.6%), Miscellaneous (n=9, 10.1%), Activities (n=6, 6.7%), and Clothing (n=1, 1.1%). Common artifact types include container glass, flat glass, cut and wire nails, and corroded metal (Figure 46). No military or personal artifacts were identified, although one button was recovered. In general, the artifact assemblage closely mirrors the expected pattern for late nineteenth and early twentieth century dwellings that were demolished in the 1990s and 2000s.

Table 7. Artifacts Recovered from Shovel Tests at Site 31CD1884

Shovel Test	Activities		Architecture		Clothing		Kitchen		Miscellaneous		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
9		0.00%	1	50.00%		0.00%	1	50.00%		0.00%	2	100.00%
10		0.00%		0.00%		0.00%	9	100.00%		0.00%	9	100.00%
11	5	18.52%	16	59.26%	1	3.70%	4	14.81%	1	3.70%	27	100.00%
12		0.00%	1	33.33%		0.00%	2	66.67%		0.00%	3	100.00%
26		0.00%	2	25.00%		0.00%	4	50.00%	2	25.00%	8	100.00%
27	1	6.25%	14	87.50%		0.00%	1	6.25%		0.00%	16	100.00%
28		0.00%	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
29		0.00%	3	27.27%		0.00%	3	27.27%	5	45.45%	11	100.00%
30		0.00%	2	50.00%		0.00%	2	50.00%		0.00%	4	100.00%
31		0.00%	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
32		0.00%	3	42.86%		0.00%	3	42.86%	1	14.29%	7	100.00%
Total	6	6.74%	44	49.44%	1	1.12%	29	32.58%	9	10.11%	89	100.00%

Figure 46. Artifact Photographs from Site 31CD1884

Table 8. *Artifact Groups and Types for Site 31CD1884*

Artifact Group and Description	Total	Percent
Activities	6	6.74%
Bakelite Object, Unidentified	1	1.12%
Chimney Glass, Body, Unidentified	4	4.49%
Metal Object, Unidentified	1	1.12%
Architecture	44	49.44%
Asbestos Siding	7	7.87%
Asphalt Roofing	2	2.25%
Glass, Unmeasured Flat	9	10.11%
Nail, Cut Common, Unmeasured	8	8.99%
Nail, Cut fragment	7	7.87%
Nail, Unidentified Fragment	3	3.37%
Nail, Wire Common, Unmeasured	1	1.12%
Other Clay/ Ceramic Tile	5	5.62%
Screw, Pointed Wood	2	2.25%
Clothing	1	1.12%
Button, Porcelain, Prosser	1	1.12%
Kitchen	29	32.58%
Beer/Soda Pull Tab	1	1.12%
Container Glass, Amber	1	1.12%
Container Glass, Clear	12	13.48%
Container Glass, Green	2	2.25%
Container Glass, Light Green	3	3.37%
Container Glass, Milk Glass	1	1.12%
Container Glass, Olive Green	1	1.12%
Porcelain, Plain	1	1.12%
Stoneware, Bristol Slipped	1	1.12%
White Bodied Earthenware, Unidentified	2	2.25%
Whiteware, Plain	2	2.25%
Whiteware, Transfer Print Red/Green/Purple/ Black or Brown	2	2.25%
Miscellaneous	9	10.11%
Cinder/Clinker	1	1.12%
Iron/ Steel, Unidentified/ Corroded	7	7.87%
Plastic, Indeterminate	1	1.12%
Grand Total	89	100.00%

31CD1884 NRHP ASSESSMENT

Robinson (2008) concluded that no significant archaeological remains at site 31CD1884 would be affected by proposed development and recommended no further work. His study did not evaluate the entire site and his recommendations were based on the following findings: 1) the lack of any features or artifacts related to the arsenal; 2) most, if not all, of the major features had been identified; 3) a representative sample of artifacts and features from the mid- to late nineteenth century was recovered; and 4) there was a low potential for any additional important archaeological features. Robinson (2008), however, thought that the site could contain additional features, particularly on the east side of the property in the areas around the buildings that were extant at that time. The geophysical and archaeological datasets generated by the present study generally support Robinson’s conclusions and recommendations. No new data were recovered that have provided significant information and no further work is recommended.

INTER-SITE COMPARISONS

The GPR and artifact datasets provided comparable information for sites 31CD280 and 31CD1884. GPR anomalies were distributed in similar types and frequencies across both sites and, except for linear anomalies associated with the CSA Gun Carriage Shop, apparently relate to the post-arsenal period. Artifact recovery was similar at both sites, with slightly more variation at site 31CD1884. The primary differences were in the Architecture and Kitchen groups. For the Architecture group, site 31CD1884 had 49.4 percent and site 31CD280 had 38.6 percent. For the Kitchen group, site 31CD1884 had 32.6 percent and site 31CD280 had 40.7 percent (Table 9). These differences are likely due to sampling rather than differential patterning.

Table 9. Comparison of Artifact Frequencies for Sites 31CD280 and 31CD1884

Site	Activities		Architecture		Clothing		Kitchen		Miscellaneous		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
31CD1884	6	6.74%	44	49.44%	1	1.12%	29	32.58%	9	10.11%	89	100.00%
31CD280	24	9.76%	95	38.62%		0.00%	100	40.65%	27	10.98%	246	100.00%
Total	30	8.96%	139	41.49%	1	0.30%	129	38.51%	36	10.75%	335	100.00%

SUMMARY

The GPR and archaeological datasets generated by this study provided new information about site 31CD280, representing the North Carolina Arsenal, and site 31CD1884, a residential occupation on the north side of Arsenal Park. There were four principal findings of this Phase I Archaeological Survey. First, both sites contain extensive features and artifacts from the late

nineteenth/early twentieth century houses that were present in the post-arsenal period. Their high archaeological visibility is a direct indication of the intensity of land use and modification following the destruction of the arsenal and its subsequent development as urban space.

Second, the GPR survey identified features associated with the CSA Gun Carriage Shop. Although such features were known from prior archaeological work, the GPR data indicated different configurations that might indicate possible intact wall segments, interior wall supports, and/or additional builders' or robbers' trenches.

Third, the GPR survey did not identify any intact features related to the Blacksmith Shop. To an extent, this finding was unexpected given that this facility was constructed in an identical manner as the CSA Gun Carriage Shop and prior investigations had identified wall segments and builders' trenches of the latter. It is possible that the Blacksmith Shop foundations were more thoroughly salvaged than the CSA Gun Carriage Shop foundations.

Fourth, the GPR survey identified additional features that are likely associated with the arsenal but were not known previously. Many of these are amorphous and are interpreted as probable debris scatters associated with the arsenal's destruction.

VI. RECOMMENDATIONS

Previous archaeological investigations have documented intact features related to the arsenal, especially the CSA additions. Various researchers made recommendations for additional work that are summarized in Table 10. With one exception, it does not appear that any of these recommendations have been implemented. Many of these recommendations are still valid today and are discussed in greater detail below.

Table 10. Summary of Recommendations from Previous Archaeological Investigations at Arsenal Park

Reference	Recommendation	Status
Grunden 1994	Excavations outside Gun Carriage Shop foundations to identify other features and artifacts related to arsenal construction, possible Union encampment.	Not implemented
Grunden 1994	Hand excavations at the Gun Carriage Shop to fully expose all walls and search for entrances, investigate additional suspected walls along northwest side.	Not implemented
Grunden 1994	Additional efforts to locate the original Myers map (1865) so museum can have a copy for interpretive and research purposes.	Initiated with multiple attempts to locate map including following leads from local citizens and visit to National Archives. Map still not located.
Grunden 1994	Long-term research and archaeological field school.	Field schools conducted by Wake Forest University from 2005-2009
Grunden 1994	Produce a public-oriented synthesis of the history and archaeology of the arsenal that would be an interpretive aid and possibly be sold in a museum store or other repositories.	Not implemented
Smith et al. 1997	Archaeological investigations of 1) north wall of Gun Carriage Shop “T” extension, 2) same area of the Blacksmith Shop with evidence for yard activities beyond the walls, 3) interior of the Blacksmith Shop, and 4) Confederate yard areas (Locus C).	Not implemented
Smith et al. 1997	Popular historical synthesis of the arsenal that includes results of archaeological work and focus on site’s history. Publication would provide an overall context for future interpretation.	Not implemented
Robinson 2000	Additional archaeological work to include 1) excavation of three large features and 2) investigation of other areas of Arsenal Park to identify potential intact features.	Partial; Robinson (2008) and present study both investigated additional areas.

The present GPR and archaeological surveys have generated new datasets that build upon and refine the earlier work (Table 11, Figure 47). Twenty-two anomalies are likely related to the arsenal, including buildings (n=4), debris scatters (n=2), linear features (n=9), and surfaces (n=7). Anomalies classified as linear features are almost certainly associated with the Gun Carriage Shop.

Debris scatters and surfaces are probably residue from arsenal demolition and material salvaging and are expected to consist of extensive scatters of brick, mortar, and slate. Anomalies classified as buildings may also overlap with debris scatters and surfaces. However, Anomaly 5 appears to have a regular outline with possible walls and may represent an intact feature. No additional work is recommended for the debris scatters or surfaces. They are expected to contain dense concentrations of construction and demolition materials. Previous excavations have shown that recovery of non-architectural artifacts is unlikely. Therefore, these anomalies are not expected to contain data that would assist with overall interpretation.

Table 11. Summary of GPR Anomalies Likely Associated with Arsenal

Anomaly Category and ID	Arsenal	Probable Arsenal	Total
Building	1	3	4
3		1	1
4		1	1
5	1		1
6		1	1
Debris		2	2
26		1	1
44		1	1
Linear Feature	9		9
58	1		1
59	1		1
60	1		1
61	1		1
62	1		1
63	1		1
64	1		1
65	1		1
66	1		1
Surface	1	6	7
83	1		1
88		1	1

Table 11. Summary of GPR Anomalies Likely Associated with Arsenal

Anomaly Category and ID	Arsenal	Probable Arsenal	Total
90		1	1
91		1	1
94		1	1
95		1	1
97		1	1
Total	11	11	22

**Bold denotes anomaly recommended for additional archaeological work.*

New South offers the following recommendations (Table 12):

1. Additional excavations of portions of the CSA Gun Carriage Shop to investigate the possibility for intact wall segments/foundations and determine their configuration. The GPR data show clear linear features in the same location as the CSA Gun Carriage Shop, but the number of linear features does not precisely match map depictions. Smith et al. (1997) suggested the possibility of interior supports and partitions at the Blacksmith Shop and the same may be true for the CSA Gun Carriage Shop. Excavations by Grunden et al. (1994) and Smith et al. (1997) indicated that salvaging of building materials after the arsenal was destroyed had completely removed the walls. Therefore, the potential for intact segments would have significant information potential regarding construction techniques and may also have interpretive value similar to the exposed arsenal compound wall.

The recommended level of effort for these investigations includes machine scraping to expose large areas followed by hand excavation. Machine scraping would consist of up to three (3) trenches placed perpendicular to the long axis of the linear anomalies, each measuring approximately 3x10 feet. Ten wall segments are shown and New South recommends selecting five of these and placing a single 3x3-foot test unit per wall. The locations of units would be determined on the basis of trench excavations and initial unit results.

2. Archaeological testing of GPR Anomaly 5, which is a probable building located immediately adjacent to the CSA Gun Carriage Shop walls. No buildings are shown on maps from the period, so the origin and function of this anomaly are unknown.

The recommended approach is a small block of hand-excavated units or individual units placed across walls and at corners. New South recommends up to two (2) units.

Figure 47. Map Showing GPR Anomalies Likely Associated with Fayetteville Arsenal

3. Additional excavations between the CSA Gun Carriage Shop and Blacksmith Shop. This follows up on recommendations made by Grunden et al. (1994) and Smith et al. (1997). The potential for intact archaeological deposits dating to the Federal or Confederate periods cannot be ruled out. To date, almost no military artifacts have been recovered from any of the professional investigations. The lack of military artifacts puzzled previous researchers and has been attributed to either 1) placement of excavations in areas where these activities did not take place, or 2) strict enforcement of regulations covering refuse disposal. However, during construction of the CBD Loop in 1988, local citizens collected by military and other artifacts from the construction zones and returned them to the Museum of the Cape Fear, where they were labeled, boxed, and stored. It is unclear if any of these artifacts have been fully inventoried and reported.

The recommended level of effort for these investigations is a series of test units and/or small excavation blocks. A maximum of three (3) units should be sufficient to recover potential artifacts. Placement of these units would be at the discretion of the field archaeologist.

4. Robinson et al. (2000) identified two large brick features (Brick Pavements 1 and 2) and a third feature, a sandstone-like surface, as possibly associated with the arsenal. Examination of the excavation map and the 1914 and 1930 Sanborn maps suggests that Brick Pavements 1 and 2 are likely associated with a former house. Only the sandstone-like surface, located approximately 42 meters (140 ft.) south of Arsenal Avenue, appears to be associated with the arsenal. There were no corresponding GPR anomalies in these areas, so there are no additional data that can provide clarity on the dimensions, origins, or function of this feature.

New South recommends machine stripping a single block, measuring approximately 10x10 meters (30x30 ft.), around the sandstone-like surface. Shovel skimming would be required to clean the feature for drawing and photography.

5. Public outreach is viewed as an important component to any additional research. This could take a variety of forms depending on timing, duration of investigations, and the level of public interest. Public tours are currently offered each Friday at 10 A.M., 12, 2, and 4 P.M., and at various other times in the past when volunteers were available and with the help of the Arsenal Park Education Coordinator.

Potential options for public outreach to coincide with future archaeological work may include: 1) “archaeology day” when visitors could observe the excavations, 2) dedicated

tours to local schools and other groups, and 3) accommodating volunteers to assist with the excavations (subject to appropriate waivers).

6. Popular history/synthesis. Both Grunden et al. (1994) and Smith et al. (1997) suggested developing a synthesis of the arsenal's history and previous archaeological work. New South agrees with this recommendation. There are multiple benefits to such an approach, including aiding in interpretation, generating public interest and support, and providing a modest revenue source if the document were sold in a museum shop or local retailers.

The recommended product would be a book written for the public. It would contain sections on the initial arsenal development by the Federal government, an overview of its construction, its operation during the Civil War, its demolition, a summary of previous archaeological investigations, and how archaeology has contributed to understanding and interpreting the resource. It should be heavily illustrated with maps and images.

Table 12. Summary of Recommendations for Additional Work at Arsenal Park

Recommendation	Level of Effort
Additional excavations of the Gun Carriage Shop.	<ul style="list-style-type: none"> • 3 machine excavated trenches * • 5 hand excavated units **
Archaeological testing of GPR anomaly 5.	<ul style="list-style-type: none"> • 2 hand excavated units
Excavations of non-anomalous areas between the Gun Carriage and Blacksmith Shops.	<ul style="list-style-type: none"> • 3 hand excavated units
Excavation of Sandstone-like Surface identified by Robinson et al. (2000).	<ul style="list-style-type: none"> • Machine stripping of 10x10 meter block
Public outreach.	<ul style="list-style-type: none"> • Archaeology Day • Site tours • Volunteers to assist with excavations
Popular report/synthesis of arsenal history and archaeological investigations.	<ul style="list-style-type: none"> • Book/pamphlet with abundant graphics and professional design
*Trenches would measure 3x10 feet. **Units would measure 3x3 feet.	

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APPENDIX A. SPECIMEN CATALOG

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Specimen Catalog

County: Cumberland County
 State: North Carolina
 Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	1 (51.4g)	Strap Iron/ Metal, nail and washer attached	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	16 (22g)	Miscellaneous, Unidentified Material, paper/cardboard?	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	3 (161.9g)	Slag	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	3 (37.5g)	Canning Jar Glass, Mason Screw Cap	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	1 (17.6g)	Iron/ Steel Metal Rod	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	3 (9.6g)	Iron/ Steel, Unidentified/ Corroded	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	1 (1.7g)	Crown Cap	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	3 (4g)	Container Glass, Clear	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	2 (8.3g)	Container Glass, Light Green	1/26/18
31CD280	1	STP 1		Level 1 to 6, 0-60 cmbs	6 (4.7g)	Glass, Unmeasured Flat	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (0.5g)	Asphalt Roofing	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (3.5g)	Plastic Item, Unidentified, clear, flat, likely acrylic	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (6.4g)	Nail, Cut Common, Unmeasured	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (2.9g)	Slate, Roofing	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (2.6g)	Nail, Other, Tack	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (2.4g)	Container Glass, Light Green	1/26/18
31CD280	2	STP 13		Level 1 to 3, 0-35 cmbs	1 (1.7g)	Container Glass, Amber	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	2 (4.7g)	Nail, Other, Tack	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	3 (28.9g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	7 (143.9g)	Other Clay/ Ceramic Tile, painted green	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	4 (9.3g)	Glass, Unmeasured Flat	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	2 (4g)	Container Glass, Amethyst Color	1/26/18
31CD280	3	STP 14		Level 1 to 3, 0- cmbs	1 (5.9g)	Container Glass, Clear	1/26/18
31CD280	4	STP 15		Level 1 to 3, 0-25 cmbs	1 (4.3g)	Coarse Earthenware, Unidentified	1/26/18
31CD280	4	STP 15		Level 1 to 3, 0-25 cmbs	1 (3.4g)	Nail, Cut Fragment	1/26/18
31CD280	4	STP 15		Level 1 to 3, 0-25 cmbs	2 (2.5g)	Container Glass, Clear	1/26/18
31CD280	4	STP 15		Level 1 to 3, 0-25 cmbs	1 (0.2g)	Container Glass, Green	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	2 (18.6g)	Nail, Cut Common, Unmeasured	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	1 (9.8g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	1 (14.4g)	Slate, Roofing	1/26/18

Specimen Catalog

County: Cumberland County

State: North Carolina

Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	1 (5.3g)	Container Glass, Olive Green	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	2 (6.2g)	Container Glass, Green	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	2 (3g)	Glass, Unmeasured Flat	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	4 (13.8g)	Container Glass, Clear	1/26/18
31CD280	5	STP 16		Level 1 to 4, 0-40 cmbs	1 (0.2g)	Asphalt Roofing	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	1 (1.2g)	Nail, Cut Common, Unmeasured	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	1 (1.2g)	Stoneware, Unidentified	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	1 (25.5g)	Spike, cut nail/spike	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	2 (2.6g)	Iron/ Steel, Unidentified/ Corroded	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	1 (0.2g)	Plastic, Indeterminate	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	3 (8.2g)	Container Glass, Clear	1/26/18
31CD280	6	STP 2		Level 1 to 4, 0-40 cmbs	2 (11g)	Glass, Unmeasured Flat	1/26/18
31CD280	7	STP 17		Level 1 to 4, 0-40 cmbs	1 (0.3g)	Whiteware, Plain	1/26/18
31CD280	7	STP 17		Level 1 to 4, 0-40 cmbs	1 (5g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	7	STP 17		Level 1 to 4, 0-40 cmbs	3 (10.1g)	Container Glass, Clear	1/26/18
31CD280	8	STP 3		Level 1 & 2, 0-20 cmbs	1 (0.5g)	Container Glass, Amber	1/26/18
31CD280	8	STP 3		Level 1 & 2, 0-20 cmbs	1 (28g)	Slate, Roofing	1/26/18
31CD280	8	STP 3		Level 1 & 2, 0-20 cmbs	1 (2g)	Glass, Unmeasured Flat	1/26/18
31CD280	8	STP 3		Level 1 & 2, 0-20 cmbs	1 (4.4g)	Container Glass, Clear	1/26/18
31CD280	8	STP 3		Level 1 & 2, 0-20 cmbs	1 (1.1g)	shell, oyster *pull for analysis*	1/26/18
31CD280	9	STP 36		Level 1 to 3, 0-30 cmbs	9 (15.7g)	Glass, Unmeasured Flat	1/26/18
31CD280	9	STP 36		Level 1 to 3, 0-30 cmbs	2 (4.5g)	Container Glass, Clear	1/26/18
31CD280	10	STP 4		Level 1 to 3, 0-30 cmbs	13 (38.6g)	Container Glass, Clear	1/26/18
31CD280	10	STP 4		Level 1 to 3, 0-30 cmbs	3 (22.7g)	Container Glass, Clear, base fragments with stippling and embossed letters 'C.I.' and numbers '92'	1/26/18
31CD280	10	STP 4		Level 1 to 3, 0-30 cmbs	1 (3.5g)	Nail, Cut Fragment	1/26/18
31CD280	11	STP 19		Level 1 to 5, 0-50 cmbs	5 (13.4g)	Glass, Unmeasured Flat	1/26/18
31CD280	11	STP 19		Level 1 to 5, 0-50 cmbs	1 (3.6g)	Container Glass, Aqua, embossed: likely 'Ball' canning jar fragment, based on partial logo	1/26/18

Specimen Catalog

County: Cumberland County

State: North Carolina

Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD280	12	STP 34		Level 1 to 4, 0-45 cmb	1 (9.6g)	Metal Object, Unidentified, loop of iron/steel, possible buckle fragment	1/26/18
31CD280	12	STP 34		Level 1 to 4, 0-45 cmb	4 (6g)	Glass, Unmeasured Flat	1/26/18
31CD280	12	STP 34		Level 1 to 4, 0-45 cmb	1 (3.7g)	Container Glass, Clear	1/26/18
31CD280	12	STP 34		Level 1 to 4, 0-45 cmb	1 (3.8g)	Container Glass, Amber, Beer bottle: embossed with Anheuser Busch logo	1/26/18
31CD280	13	STP 20		Level 1 & 2, 0-20 cmb	1 (3.2g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	13	STP 20		Level 1 & 2, 0-20 cmb	1 (1.6g)	Container Glass, Amber	1/26/18
31CD280	13	STP 20		Level 1 & 2, 0-20 cmb	2 (12.3g)	Barbed Wire	1/26/18
31CD280	13	STP 20		Level 1 & 2, 0-20 cmb	1 (67.5g)	Hinge, Iron/ Steel, fragment	1/26/18
31CD280	14	STP 5		Level 1 to 6, 0-60 cmb	1 (3g)	Glass, Unmeasured Flat	1/26/18
31CD280	14	STP 5		Level 1 to 6, 0-60 cmb	1 (9.1g)	Nail, Cut Common, Unmeasured	1/26/18
31CD280	14	STP 5		Level 1 to 6, 0-60 cmb	1 (21.6g)	Nail, Unidentified, Unmeasured	1/26/18
31CD280	14	STP 5		Level 1 to 6, 0-60 cmb	1 (11g)	Nail, Cut Fragment	1/26/18
31CD280	14	STP 5		Level 1 to 6, 0-60 cmb	1 (3.5g)	Non Iron/ Steel, Unidentified, sheet metal	1/26/18
31CD280	15	STP 6		Level 1 to 5, 0-50 cmb	1 (3.2g)	Chimney Glass, Body, Unidentified	1/26/18
31CD280	15	STP 6		Level 1 to 5, 0-50 cmb	2 (11.3g)	Nail, Cut Fragment	1/26/18
31CD280	15	STP 6		Level 1 to 5, 0-50 cmb	4 (9.9g)	Glass, Unmeasured Flat	1/26/18
31CD280	15	STP 6		Level 1 to 5, 0-50 cmb	3 (3.9g)	Container Glass, Clear	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (117.2g)	Metal Object, Unidentified, curved 'cuff' shaped piece of iron/steel (corroded)	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (30g)	Container Glass, Machine Made, Green, finish and partial neck	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	15 (23g)	Container Glass, Green	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (1.5g)	Whiteware, Dipped	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (5g)	Container Glass, Milk Glass, green tint	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (0.6g)	Plastic Item, Unidentified	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	2 (13.9g)	Other Clay/ Ceramic Tile	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (4.5g)	Glass, Unmeasured Flat	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	4 (7.2g)	Container Glass, Clear	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (7.6g)	Nail, Cut Fragment	1/26/18
31CD280	16	STP 22		Level 1 to 4, 0-40 cmb	1 (1.8g)	bone, UID *pulled for analysis*	1/26/18

Specimen Catalog

County: Cumberland County

State: North Carolina

Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD280	17	STP 21		Level 1 to 4, 0-40 cmb	1 (5.1g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	17	STP 21		Level 1 to 4, 0-40 cmb	1 (0.9g)	Glass, Unmeasured Flat	1/26/18
31CD280	18	STP 23		Level 1 to 3, 0-30 cmb	1 (0.7g)	Whiteware, Transfer Print, Blue	1/26/18
31CD280	18	STP 23		Level 1 to 3, 0-30 cmb	3 (6g)	Glass, Unmeasured Flat	1/26/18
31CD280	18	STP 23		Level 1 to 3, 0-30 cmb	1 (7.1g)	Nail, Cut Fragment	1/26/18
31CD280	19	STP 24		Level 1 to 4, 0-45 cmb	3 (33g)	Container Glass, Amber, one piece embossed '...ILLE, N.C.'	1/26/18
31CD280	19	STP 24		Level 1 to 4, 0-45 cmb	2 (3.4g)	Glass, Unmeasured Flat	1/26/18
31CD280	19	STP 24		Level 1 to 4, 0-45 cmb	2 (19.4g)	Nail, Wire Common, Unmeasured	1/26/18
31CD280	19	STP 24		Level 1 to 4, 0-45 cmb	2 (45.4g)	Whiteware, Plain, mend, 1 rim fragment	1/26/18
31CD280	19	STP 24		Level 1 to 4, 0-45 cmb	1 (2.2g)	Container Glass, Clear	1/26/18
31CD280	20	STP 7		Level 1 to 4, 0-40 cmb	2 (3g)	Glass, Unmeasured Flat	1/26/18
31CD280	20	STP 7		Level 1 to 4, 0-40 cmb	3 (18.7g)	Container Glass, Clear, one fragment is stippled, one embossed '12.7'	1/26/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	1 (5.8g)	Container Glass, Olive Green	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	2 (7.2g)	Nail, Cut Common, Unmeasured	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	4 (7.5g)	Non-Electrical Wire	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	10 (24.2g)	Sheet Of Iron/Steel	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	1 (0.8g)	Refined Earthenware, Colored Glazes, pink glaze	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	3 (7g)	Glass, Unmeasured Flat	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	2 (6.4g)	Container Glass, Clear	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	1 (1.8g)	Container Glass, Aqua	1/27/18
31CD280	21	STP 35		Level 1 to 6, 0-60 cmb	1 (5.3g)	Marble, Machine Made Glass, blue swirl decoration	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (0.3g)	Glass, Unmeasured Flat	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (0.9g)	Container Glass, Clear	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (1.1g)	Container Glass, Olive Green	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (2.8g)	Nail, Cut Fragment	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (0.6g)	White Bodied Earthenware, Unidentified, possibly pearlware	1/27/18
31CD280	22	STP 8		Level 1 to 4, 0-40 cmb	1 (32.1g)	Iron/ Steel, Unidentified/ Corroded	1/27/18

Specimen Catalog

County: Cumberland County
 State: North Carolina
 Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD1884	24	STP 26		Level 1, 0-10 cmbs	1 (1.2g)	Container Glass, Clear	1/27/18
31CD1884	25	STP 9		Level 1 & 2, 0-20 cmbs	1 (0.2g)	Glass, Unmeasured Flat	1/27/18
31CD1884	25	STP 9		Level 1 & 2, 0-20 cmbs	1 (46.7g)	Container Glass, Light Green, embossed on base 'N...'	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	1 (2g)	Stoneware, Bristol Slipped	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	1 (0.4g)	Container Glass, Clear	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	1 (0.3g)	Container Glass, Amber	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	1 (0.5g)	Plastic, Indeterminate	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	2 (2g)	Asphalt Roofing	1/27/18
31CD1884	26	STP 26		Level 3 to 5, 23-56 cmbs	1 (4g)	Cinder/Clinker	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	3 (21.2g)	Other Clay/ Ceramic Tile, white glaze	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	2 (2.5g)	Other Clay/ Ceramic Tile, green color	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	2 (1.8g)	Glass, Unmeasured Flat	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	7 (20.2g)	Asbestos Siding	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	1 (3.4g)	Bakelite Object, Unidentified	1/27/18
31CD1884	27	STP 27		Level 1 & 2, 0-25 cmbs	1 (3.6g)	Container Glass, Light Green	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (3.9g)	Nail, Cut Fragment	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (12g)	Nail, Cut Common, Unmeasured	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (1.9g)	Whiteware, Plain	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (0.7g)	Container Glass, Olive Green	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (0.7g)	Container Glass, Clear	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	1 (0.3g)	Glass, Unmeasured Flat	1/27/18
31CD1884	28	STP 29		Level 1 & 2, 0-20 cmbs	5 (5.3g)	Iron/ Steel, Unidentified/ Corroded	1/27/18
31CD1884	29	STP 30		Level 1, 0-30 cmbs	1 (1.5g)	Nail, Wire Common, Unmeasured	1/27/18
31CD1884	29	STP 30		Level 1, 0-30 cmbs	1 (1.7g)	White Bodied Earthenware, Unidentified, light blue glaze	1/27/18
31CD1884	29	STP 30		Level 1, 0-30 cmbs	1 (3.4g)	Container Glass, Clear	1/27/18
31CD1884	29	STP 30		Level 1, 0-30 cmbs	1 (0.6g)	Glass, Unmeasured Flat	1/27/18
31CD1884	30	STP 28		Level 3, 25-35 cmbs	1 (3.2g)	Nail, Cut Fragment	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	1 (200.7g)	Metal Object, Unidentified, iron/steel, possible fence post cap	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	7 (36.5g)	Nail, Cut Common, Unmeasured	1/27/18

Specimen Catalog

County: Cumberland County

State: North Carolina

Project: Arsenal Park Survey (2018)

State Site #	Field Bag #	Excavation Unit	Horizontal Location	Vertical Location	Count/Weight	Artifact Description	Field Date
31CD1884	31	STP 11		Level 1, 0-20 cmbs	1 (7.5g)	Iron/ Steel, Unidentified/ Corroded	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	1 (2.8g)	Container Glass, Milk Glass	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	2 (3.2g)	Container Glass, Clear	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	2 (3.9g)	Glass, Unmeasured Flat	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	4 (2.3g)	Chimney Glass, Body, Unidentified	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	1 (0.5g)	Button, Porcelain, Prosser	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	1 (0.7g)	Whiteware, Transfer Print Red/Green/Purple/Black Or Brown, black	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	2 (15.4g)	Screw, Pointed Wood	1/27/18
31CD1884	31	STP 11		Level 1, 0-20 cmbs	5 (16.8g)	Nail, Cut Fragment	1/27/18
31CD1884	32	STP 31		Level 1 & 2, 0-20 cmbs	1 (3.3g)	Nail, Unidentified Fragment	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	1 (1g)	Container Glass, Clear	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	2 (3.1g)	Glass, Unmeasured Flat	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	1 (0.4g)	Porcelain, Plain	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	1 (1.1g)	Nail, Unidentified Fragment	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	1 (0.6g)	Beer/Soda Pull Tab	1/27/18
31CD1884	33	STP 32		Level 1, 0-10 cmbs	1 (5.2g)	Iron/ Steel, Unidentified/ Corroded	1/27/18
31CD1884	34	STP 10		Level 1 & 2, 0-20 cmbs	1 (0.5g)	White Bodied Earthenware, Unidentified	1/27/18
31CD1884	34	STP 10		Level 1 & 2, 0-20 cmbs	4 (6.3g)	Container Glass, Clear	1/27/18
31CD1884	34	STP 10		Level 1 & 2, 0-20 cmbs	1 (6.7g)	Container Glass, Light Green	1/27/18
31CD1884	34	STP 10		Level 1 & 2, 0-20 cmbs	1 (3.6g)	Whiteware, Transfer Print Red/Green/Purple/Black Or Brown, purple	1/27/18
31CD1884	34	STP 10		Level 1 & 2, 0-20 cmbs	2 (5g)	Container Glass, Green	1/27/18
31CD1884	35	STP 12		Level 1 to 3, 0-30 cmbs	1 (0.8g)	Whiteware, Plain	1/27/18
31CD1884	35	STP 12		Level 1 to 3, 0-30 cmbs	1 (1.4g)	Nail, Unidentified Fragment	1/27/18
31CD1884	35	STP 12		Level 1 to 3, 0-30 cmbs	1 (0.3g)	Container Glass, Clear	1/27/18

APPENDIX B. SHOVEL TEST DATA

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APPENDIX B. Shovel Test Data

Shovel Test	Site	Result	Stratum	Depth (cmbs)	Munsell	Color Name	Texture	Comments
1	31CD280	Positive	I	0-66	10YR 3/3	Dark Brown	Sandy Loam	
2	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	
			II	40-60	10YR 6/3	Pale Brown	Sandy Loam	
3	31CD280	Positive	I	0-20	10YR 3/3	Dark Brown	Sandy Loam	
			II	20-70	10YR 6/3	Pale Brown	Sandy Loam	
			III	70-75	7.5YR 5/6	Strong Brown	Clay Loam	
4	31CD280	Positive	I	0-30	10YR 3/3	Dark Brown	Sandy Loam	
			II	30-70	10YR 6/3	Pale Brown	Sandy Loam	
			III	70-80	7.5YR 5/6	Strong Brown	Clay Loam	
5	31CD280	Positive	I	0-60	10YR 3/3	Dark Brown	Sandy Loam	
			II	60-65	10YR 6/3	Pale Brown	Sandy Loam	
6	31CD280	Positive	I	0-50	10YR 3/3	Dark Brown	Sandy Loam	
			II	50-70	10YR 6/3	Pale Brown	Sandy Loam	
7	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	Full of red brick fragments, hard to dig.
			II	40-50	10YR 6/3	Pale Brown	Sandy Loam	
8	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	
			II	40-75	10YR 6/3	Pale Brown	Sandy Loam	
9	31CD1884	Positive	I	0-20	10YR 3/1	Very Dark Gray	Sandy Loam	
			II	20-60	10YR 6/3	Pale Brown	Sandy Loam	
10	31CD1884	Positive	I	0-20	10YR 3/4	Dark Yellowish Brown	Sandy Loam	Shovel test was offset 20 cm to the north
			II	20-40	10YR 3/1	Very Dark Gray	Sandy Loam	
			III	40-55	10YR 6/3	Pale Brown	Sandy Loam	
11	31CD1884	Positive	I	0-20	10YR 3/3	Dark Brown	Sandy Loam	
			II	20-45	10YR 4/6	Dark Yellowish Brown	Sand	
			III	45-80	10YR 6/4	Light Yellowish Brown	Sand	

APPENDIX B. Shovel Test Data

Shovel Test	Site	Result	Stratum	Depth (cmbs)	Munsell	Color Name	Texture	Comments
12	31CD1884	Positive	I	0-30	10YR 3/4	Dark Yellowish Brown	Sandy Loam	
			II	30-70	10YR 6/3	Pale Brown	Sandy Loam	
13	31CD280	Positive	I	0-35	10YR 3/3	Dark Brown	Sandy Loam	Shallow, lots of brick.
14	31CD280	Positive	I	0-30	10YR 3/3	Dark Brown	Sandy Loam	Excavation stopped by bricks.
15	31CD280	Positive	I	0-25	10YR 3/3	Dark Brown	Sandy Loam	Huge old tree, roots everywhere. End excavation at 25.
16	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	
			II	40-80	10YR 6/3	Pale Brown	Sandy Loam	
17	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	
			II	40-60	10YR 6/3	Pale Brown	Sandy Loam	
			III	60-70	7.5YR 5/6	Strong Brown	Clay Loam	
18	31CD280	Negative	I	0-25	10YR 3/3	Dark Brown	Sandy Loam	
			II	25-60	10YR 6/3	Pale Brown	Sandy Loam	
			III	60-75	7.5YR 5/6	Strong Brown	Clay Loam	
19	31CD280	Positive	I	0-50	10YR 3/3	Dark Brown	Sandy Loam	Brick was concentrated throughout the first five levels. Very difficult to excavate.
			II	50-60	10YR 6/3	Pale Brown	Sandy Loam	
20	31CD280	Positive	I	0-20	10YR 3/3	Dark Brown	Sandy Loam	
			II	20-50	10YR 6/3	Pale Brown	Sandy Loam	
			III	50-60	7.5YR 5/6	Strong Brown	Clay Loam	
21	31CD280	Positive	I	0-40	10YR 3/3	Dark Brown	Sandy Loam	Really mottled. Only a few brick fragments.
			II	40-50	10YR 5/6	Yellowish Brown	Clay Loam	
22	31CD280	Positive	I	0-40	2.5YR 2/1	Reddish Black	Sandy Loam	Lots of historic artifacts. A burn zone is mottled into the strat 1 around 45 cmbs.
			II	40-55	10YR 5/6	Yellowish Brown	Clay Loam	
23	31CD280	Positive	I	0-30	10YR 3/3	Dark Brown	Sandy Loam	

APPENDIX B. Shovel Test Data

Shovel Test	Site	Result	Stratum	Depth (cmbs)	Munsell	Color Name	Texture	Comments
24	31CD280	Positive	I	0-38	10YR 2/1	Black	Sandy Loam	Lots of brick fragments, plastic, and gravel.
25	31CD280	Positive	I	0-10	10YR 3/3	Dark Brown	Sandy Loam	Too many bricks to continue.
			II	10-28	10YR 6/3	Pale Brown	Sandy Loam	
26	31CD1884	Positive	III	28-50	7.5YR 5/6	Strong Brown	Clay Loam	
			I	0-23	10YR 3/3	Dark Brown	Sandy Loam	
			II	23-56	10YR 3/1	Very Dark Gray	Sandy Loam	
			III	56-68	10YR 6/3	Pale Brown	Sandy Loam	
27	31CD1884	Positive	I	10-25	10YR 3/4	Dark Yellowish Brown	Sandy Loam	Tiles found here probably from a floor, maybe a fireplace. Also a few pieces of ceramic.
			II	25-40	10YR 6/3	Pale Brown	Sandy Loam	
28	31CD1884	Positive	I	0-23	10YR 3/4	Dark Yellowish Brown	Sandy Loam	
			II	23-25	7.5YR 5/8	Strong Brown	Clay Loam	
29	31CD1884	Positive	I	0-40	10YR 3/4	Dark Yellowish Brown	Sandy Loam	
			II	40-75	10YR 6/3	Pale Brown	Sandy Loam	
30	31CD1884	Positive	I	0-30	10YR 3/3	Dark Brown	Sandy Loam	
			II	30-48	10YR 6/4	Light Yellowish Brown	Sand	
			III	48-60	7.5YR 4/6	Strong Brown	Clay	
31	31CD1884	Positive	I	0-20	10YR 6/3, 3/3	Pale Brown	Sandy Loam	Shallow
			II	20-35	7.5YR 5/8	Strong Brown	Clay Loam	
32	31CD1884	Positive	I	0-23	10YR 3/4	Dark Yellowish Brown	Sandy Loam	
			II	23-60	10YR 6/3	Pale Brown	Sandy Loam	
33	31CD1884	Negative	I	0-10	10YR 3/4	Dark Yellowish Brown	Sandy Loam	
			II	10-65	10YR, 6/3	Pale Brown	Sandy Loam	
			III	65-75	7.5YR 5/8	Strong Brown	Clay Loam	

APPENDIX B. Shovel Test Data

Shovel Test	Site	Result	Stratum	Depth (cmbs)	Munsell	Color Name	Texture	Comments
34	31CD280	Positive	I	0-45	10YR 4/4, 2/1	Dark Yellowish Brown	Sandy Loam	Mottled all the way. Mixed with lots of red brick fragments and shale mortar. Gravel inclusions.
35	31CD280	Positive	I	0-60	10YR 3/3	Dark Brown	Sandy Loam	Mottled all the way down.
36	31CD280	Positive	I	0-10	10YR 3/3	Dark Brown	Sandy Loam	Nearly broke the shovel trying to get the brick out and dig deeper.
			II	10-30	10YR, 6/3	Pale Brown	Sandy Loam	More brick here than anywhere to the south so far.