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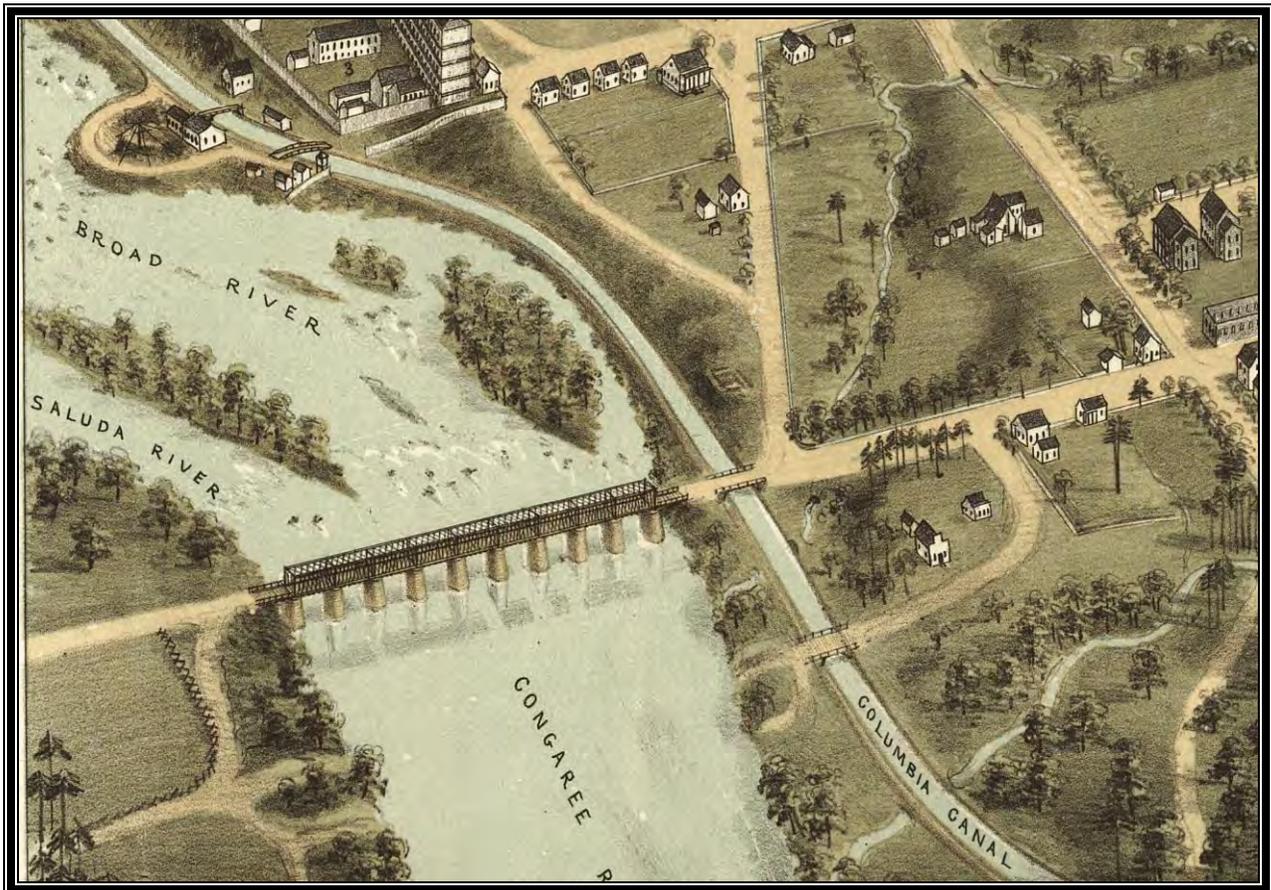
**CULTURAL RESOURCE IDENTIFICATION SURVEY,
ARCHAEOLOGICAL DATA RECOVERY PLAN,
DRAFT MEMORANDUM OF AGREEMENT AND CURRENT RECOVERY LICENSE**



CULTURAL RESOURCE IDENTIFICATION SURVEY FOR THE CONGAREE RIVER SEDIMENT REMOVAL PROJECT

RICHLAND COUNTY, SOUTH CAROLINA

Final Report



October 2014



**CULTURAL RESOURCE IDENTIFICATION SURVEY FOR THE
CONGAREE RIVER SEDIMENT REMOVAL PROJECT
RICHLAND COUNTY, SOUTH CAROLINA**

FINAL REPORT

Submitted to:
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COLUMBIA, SOUTH CAROLINA

Submitted by:
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A handwritten signature in black ink, appearing to read "Sean Norris", is centered on the page. The signature is fluid and cursive, with a long horizontal stroke at the end.

Sean Norris, Principal Investigator, Author

October 2014

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I. INTRODUCTION

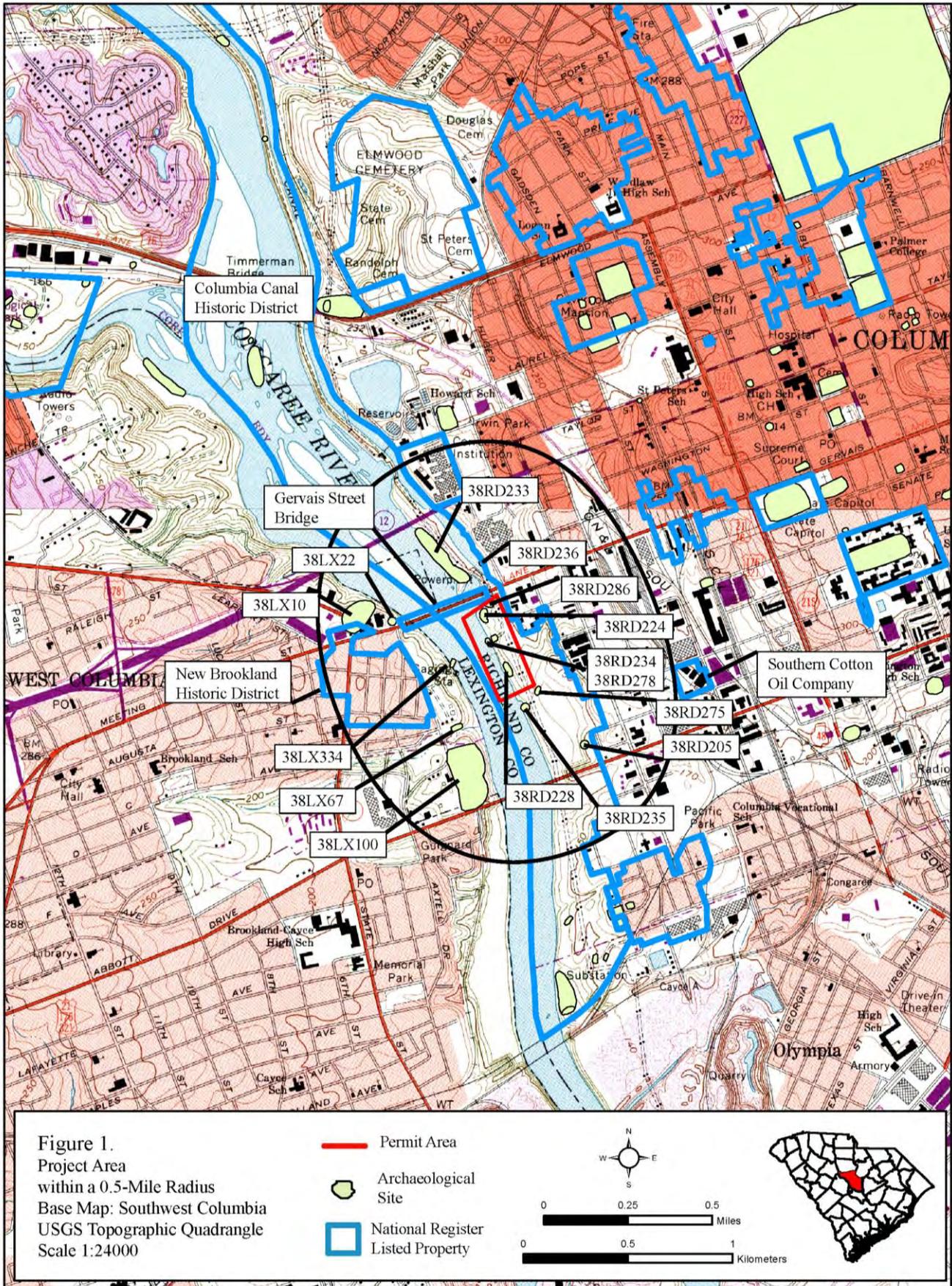
TRC conducted a cultural resource identification survey in anticipation of federal permits required for the Congaree River Remediation Project. The project area is in the City of Columbia within and on the eastern bank of the Congaree River (Figure 1). In June 2010, tarlike material (TLM) was reported near the eastern bank of the Congaree River directly downstream of the Gervais Street Bridge. The South Carolina Department of Health and Environmental Control (SCDHEC) began sampling material from the river and concluded that the source of the TLM was a manufactured gas plant (MGP) that operated on Huger Street in downtown Columbia from 1906 to the mid-1950s. During its period of operation the MGP had allowed coal tar runoff to empty into the Congaree River.

This MGP, after a series of mergers and acquisitions, became one of South Carolina Electric and Gas's (SCE&G) predecessor companies. As a result SCE&G owned the land the former MGP occupied. In 2002 SCE&G had entered into a Voluntary Cleanup Contract with SCDHEC to mitigate the former MGP site. Beginning in 2008 SCE&G removed over 125,000 tons of MGP impacted soil and debris from the Huger Street location. Since the discovery of tar in the river SCE&G has worked with SCDHEC in order to define the extent of the TLM contamination, and has conducted a series of surveys to establish the vertical and horizontal distribution of the TLM. The project area begins directly south of the Gervais Street Bridge and extends downstream for approximately 2,000 feet; it extends approximately 300 feet into the river from the eastern bank (Figure 1).

In 2013 SCDHEC approved the Project Delineation Report and tasked SCE&G to develop an appropriate plan for the removal and mitigation of the contaminated soil. In 2013 a report detailing four "removal action" options was submitted to SCDHEC. The four options were:

1. No Action – Leave the TLM in place.
2. Monitoring and Institutional Controls – Leave the TLM in place; restrict access to the area, and conduct annual monitoring.
3. Sediment Capping and Institutional Controls – Place a physical barrier on top of the contaminated sediment effectively burying the TLM and conduct annual monitoring.
4. Removal – Physically remove the TLM and contaminated sediment.

SCDHEC approved option four as the preferred method of dealing with the TLM. This method was deemed to be the most protective of human health and the environment because it would permanently remove the contaminated sediment. An average of two feet of sediment will need to be removed over the entire project area. This is equal to approximately 40,000 tons of sediment requiring removal and off-site treatment or disposal. The remediation and removal of the TLM and contaminated sediments will involve the following activities:



Cultural Resources Identification Survey for the Congaree Sediment Removal Project

- Conducting landside site setup activities;
- Installing a cofferdam of sufficient height to restrict river flow;
- Dewatering of the area to be excavated;
- Physically removing TLM-impacted sediment and debris using conventional equipment;
- Conditioning the sediment material for transportation to the landfill;
- Backfill as necessary; and
- Off-site disposal.

Prior to activities in the river, construction on the eastern shoreline to improve access to the project area for personnel, equipment and material transportation trucks will be conducted. These construction activities would include clearing and grading operations in the area of the Senate Street alluvial fan and along the eastern shoreline as well as improving and/or creating access roads (Figure 2). Access road improvements will raise the existing Senate Street Extension by trucking in a layer of fill from a local quarry and depositing it over the existing ground surface to level and widen the access road. Next a geotextile pad will be placed over the fill. Geotextile is a high tensile strength fabric that stabilizes the ground surface and prevents ruts and the intermixing of gravel with the existing ground surface. Geotextiles are commonly used on construction sites to prevent damage caused by heavy equipment. The fabric used will meet or exceed the South Carolina Department of Transportation's standards for geotextiles. This protective layer will be topped by eight to ten inches of compact gravel effectively raising the existing access road by approximately 12 inches (Figure 3). New access roads will be raised above the current grade using the same procedure. Portions of the riverbank may be excavated in order to create access to the dewatered area.

Site setup activities will also include the construction of a project compound with office trailers, support structures and associated electrical power and utilities. These facilities would be located within the existing utility line corridor. These structures will be temporary. An agreement with the current landowner dictates that no subsurface ground disturbance will be caused by the project compound. Consequently, all temporary structures will be raised above the current grade using layers of fill, geotextile and gravel. Protective fencing would also be installed to restrict access to the work areas by unauthorized personnel.

The first component of the sediment removal will be the construction of a cofferdam around the planned removal areas. The purpose of the coffer dam is to isolate and dewater the areas prior to initiating the removal operations. The coffer dam will be designed to be over-topped during high water events. At average water levels the dam will rise approximately eight feet above the waterline. The temporary dam will be constructed with an impermeable barrier covered by stone or rip rap. Figure 4 is a conceptual rendering showing the approximate height and attributes of the coffer dam.



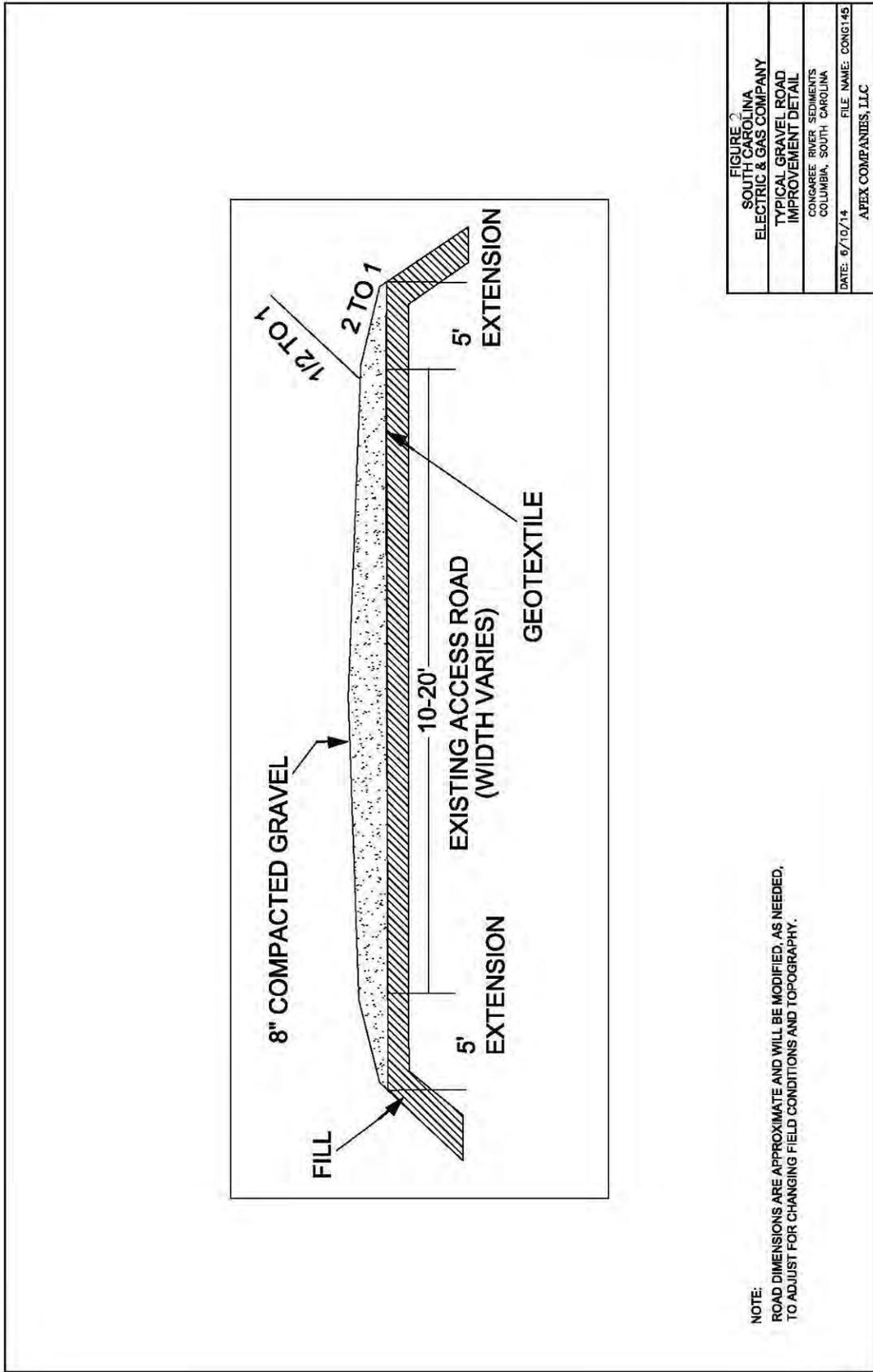


Figure 3. Conceptual construction plan for proposed access roads and improvements.



- 
 - INFORMATION BUOY WITH DANGER OR OTHER SYMBOL TO ALERT BOATERS OF COFFERDAM
- 
 - OBSTRUCTION LIGHTS WILL BE PLACED IN ACCORDANCE WITH 33 C.F.R. 07.05-1.

NOTES:

- DRAWING NOT TO SCALE AND IS FOR ILLUSTRATIVE PURPOSES ONLY.
- COFFERDAM STRUCTURE LOCATION AND CONFIGURATION IS APPROXIMATE.
- PHOTOGRAPH TAKEN FROM THE WEST BANK OF THE RIVER LOOKING EAST.

| | |
|---|--------------------|
| FIGURE 2 SOUTH CAROLINA ELECTRIC & GAS COMPANY | |
| PHASE 1 COFFERDAM ILLUSTRATION | |
| CONGAREE RIVER SEDIMENTS COLUMBIA, SOUTH CAROLINA | |
| DATE: 3/6/14 | FILE NAME: CONG109 |
| APEX COMPANIES, LLC | |

Figure 4. Conceptual drawing showing approximate height and style of proposed coffer dam.

Once the dam is in place there will be a period of dewatering and draining. After the area is dewatered sediment removal will begin. Due to the varying thickness of sediment, the uneven nature of the riverbed and changing conditions within the project area a number of different methodologies and equipment will be employed to complete the project. Generally speaking, heavy equipment/machine excavators coupled with vacuum removal or other techniques will be employed to remove the sediment to bedrock. The sediment will be removed in 50 × 50 foot grid squares.

Once removed, the sediment would likely require drying or solidification prior to transporting. Depending on the amount of TLM in the sediment the material will either be sent to an on-site sorting facility for screening or to an off-site facility for visual examination prior to disposal in a landfill. In order to minimize potential impacts on spawning migrations for threatened and/or endangered species a construction phase (for actual work in the river) would begin no earlier than May and need to end by October of each year. Because of this, and the amount of material to be removed, it is projected that multiple construction seasons or phases will be required. Once each construction phase is completed the river bottom would be restored to its approximate original conditions by the placement of imported fill sand or rock as may be required and the cofferdam would be removed, potentially to be reused as fill or erosion protection.

Due to the limited amount of ground disturbance proposed for this project the Area of Potential Effects (APE) for archaeology is considered to be the portion of the new access roads that will cut into the existing river bank and the dewatered portion of the Congaree River. Due to the low visual profile and temporary nature of the coffer dam a 0.5-mile radius has been used as the APE for above ground resources.

The cultural resource investigations were performed under the direction of TRC Program Manager-Archaeologist Sean Norris, M.A., RPA. Fieldwork was conducted on August 5 and 26, 2014 by Mr. Norris and TRC archaeologist Ramona Grunden.

This report has been prepared in compliance with the National Historic Preservation Act of 1966 (as amended); the Archaeological and Historic Preservation Act of 1979; and procedures for the Protection of Historic Properties (36 CFR Part 800); 36 CFR Parts 60 through 79, as appropriate. Field investigations and the technical report meet or exceed the qualifications specified in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (FR 48:44716–44742) and the *South Carolina Standards and Guidelines for Archaeological Investigations* (SHPO et al. revised 2013). All supervisory personnel meet or exceed the Secretary of the Interior's Professional Qualifications Standards set forth in 36 CFR Part 61.

II. ENVIRONMENTAL SETTING

PROJECT SETTING

The project area is in the Fall Line region of South Carolina. It is characterized by a natural levy overlooking the Congaree River to the west. The project corridor is generally flat and, as stated above, a cleared access, maintenance and utility easement corridor that has been disturbed by underground sewer and gas lines characterizes the project area. It begins at the intersection of Gist and Senate Streets and continues south for approximately 1500 feet. The eastern portion of the project area is in an existing power line and gas line utility easement (Figure 5). The western part of the project area is wooded and undeveloped. Surrounding this is the City of Columbia.

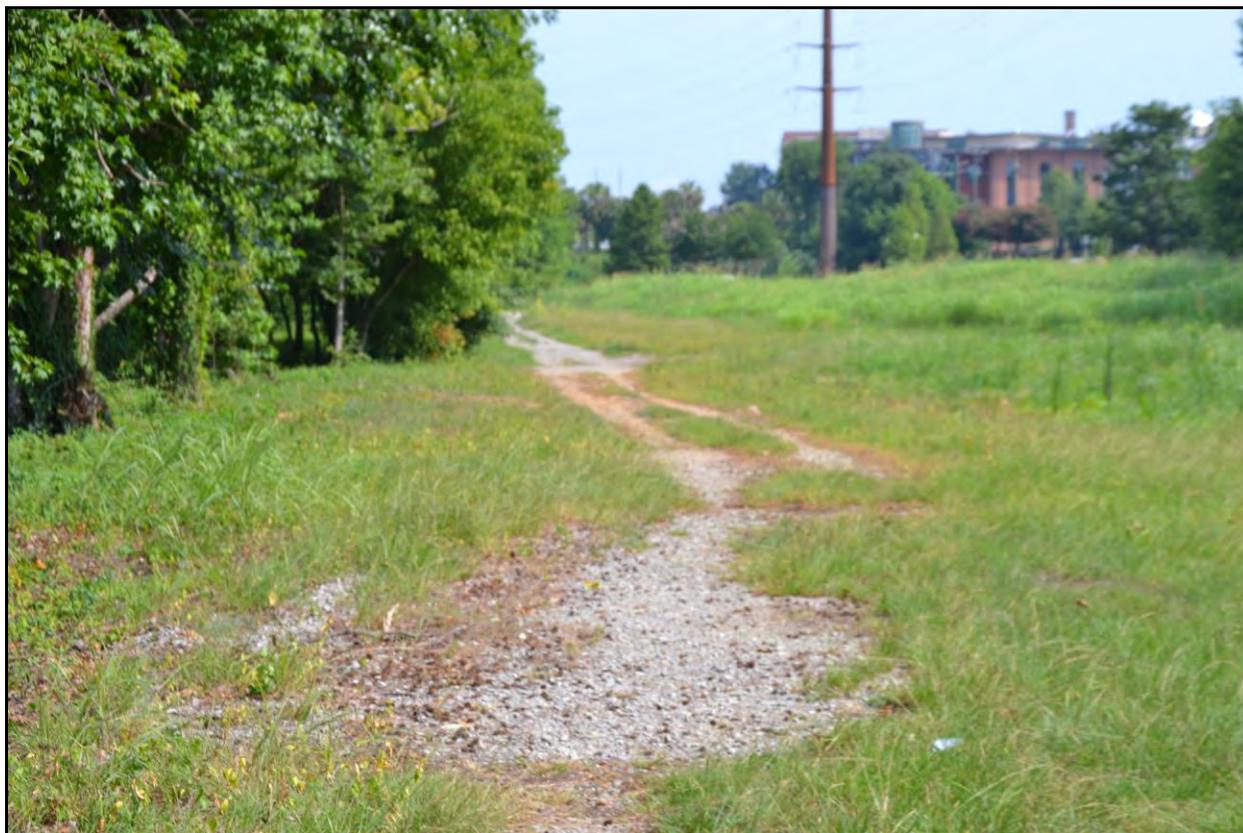


Figure 5. General conditions in the project area.

PALEOENVIRONMENT

The contemporary climate and vegetation of the study area are products of a long and complex process of natural and man-induced change. The average winter temperatures in the study area were obviously considerably colder during the last glacial period, which lasted from ca. 25,000 to 15,000 B.P. At that time, the study area was covered by a boreal forest in which pines and spruce were dominant (Delcourt and Delcourt 1983; Whitehead 1973). The climate warmed and precipitation increased during the Late Glacial Period (ca. 15,000 to 10,000 B.P.), the period during which the first humans arrived in the region. During the late Pleistocene, coniferous

forests were replaced by northern hardwoods as dominant canopy species (Bryson et al. 1970; Watts 1975, 1980; Whitehead 1973). The period ca. 10,000–5000 B.P., referred to as the Altithermal or Hypsithermal, was a period of continued warming but decreased precipitation (Bryson et al. 1970; Watts 1975). The dominant vegetation that survived was the oak-hickory forest (Watts 1975; Whitehead 1973). The climate since ca. 5000 B.P. has cooled slightly, with a possible increase in precipitation. The oak-hickory forests of earlier times decreased in size and became increasingly intermixed with pines (Wharton 1977). Although the earliest settlers reported large stands of yellow pine in the oak-hickory forests of the Piedmont, it is not known whether those stands were products of natural forces or of Native American hunting methods, which used fire to drive and concentrate game.

HISTORIC ENVIRONMENT

The project area is in the Oak-Pine Forest zone characteristic of the Piedmont and Fall Line (Braun 1950). Oaks and hickories are prevalent in this forest, with white oak the predominant species. Pines are also widespread in this zone (Braun 1950). However, the vegetation of the project area has been greatly modified in the past through climatic change, agricultural and silvicultural practices, and development.

Several sources suggest significant changes in the forest composition of the project region during historic times. Lowland vegetation in this area of the state has increased since European settlement. Valley sedimentation led to river and stream aggradation and a general rise of groundwater tables in the valleys. Formerly well-drained valleys with clear streams became swampy, and the streams themselves became muddy and sluggish.

The upland hardwoods probably exhibit the most change since European settlement. These forests, formerly dominant over most of South Carolina, were severely impacted by agricultural clearing in the 1700s and 1800s (Trimble 1974), and again by extensive timbering in the late 1800s and 1900s. In the past, the project area has been subjected to extensive land clearing that has severely altered the natural landscape and environment. Mixed hardwoods, situated along drainages, and loblolly pines mixed with deciduous secondary growth in the uplands, are found in areas that have suffered the least impact from these activities.

CLIMATE

The regional climate is characterized by long, hot, humid summers. The maximum daily temperature is usually near or above 90 degrees Fahrenheit with the minimum in the 65 to 70 degree range. The winter season is short, mild, and relatively dry. The average daily temperatures range from 40 to 45 degrees Fahrenheit. Precipitation is fairly heavy throughout the year and sustained droughts are uncommon. Rainfall is adequate for most crops during the peak-growing season of April–September. Because of the mild winters, precipitation in the form of snowfall is light, averaging about 10–13 inches annually (Kovacik and Winberry 1987).

PHYSIOGRAPHY AND HYDROLOGY

Relief in the project area is generally flat. Immediately west of the corridor the land slopes quickly to the Congaree River. Elevations at the site range from 140 feet Above Mean Sea Level

(AMSL) along the top of the levy to 130 feet AMSL along the tributary bottom and at the jurisdictional wetlands found near the southern terminus of the corridor.

SOILS

The project area contains two soil types:

Chastain Silty Clay Loam is poorly drained and found on floodplain associated with the unnamed tributary that will be spanned and the wetlands near the southern end of the corridor.

Toccoa Loam is found along the natural levy along which the corridor runs. It is deep, moderately well-drained soil found on floodplains and natural levees.

III. CULTURAL OVERVIEW

PRECONTACT AND CONTACT PERIOD OVERVIEWS

Paleoindian Period (ca. 12,500–10,000 B.P.)

The earliest definitive evidence of human occupation in the Southeastern United States has been dated to between 13,500 and 10,000 years before present (B.P.) (Anderson et al. 1996; Goodyear 1999). This time frame, known as the Paleoindian Period, is characterized by a social structure of small, highly mobile groups. Subsistence strategies relied on the hunting of large mammals (e.g., deer, elk, horse, wild pig) combined with the opportunistic hunting of smaller game and the collecting of wild plants and nuts. Megafauna such as mammoth, mastodon, and giant sloth, also would have been obtained, but the extent to which these animals were part of the Paleoindian diet is unknown. The only direct evidence for the exploitation of megafauna in South Carolina is a mammoth rib with cut marks that was found on Edisto Beach near Charleston (Anderson et al. 1992).

The artifacts left by these earliest inhabitants are comprised mostly of diagnostic projectile points, scrapers, graters, denticulates, specialized hafted unifacial knives, large bifacial knives and burins. The most common and widely recognized artifact associated with the Paleoindian period is the fluted point. One of the most recent inventories of Paleoindian artifacts indicated that approximately 350 fluted points have been reported in South Carolina (Anderson et al. 1996). Unfortunately, almost all of these points were recovered by amateur collectors or from surface contexts, making archaeological interpretation difficult. Within the last twenty years only a small amount of Paleoindian material has been recovered from intact contexts in South Carolina and surrounding areas (Anderson and Schuldenrein 1985; Elliott and Doyon 1981; Michie 1996; O'Steen 1994).

Regional variation in projectile point morphology began to emerge in portions of the Southeast by about 11,000 B.P., probably due to restricted movement and the formation of loosely defined social networks and habitual use areas (Anderson 1995). The common point types that have been found throughout South Carolina include Clovis, Cumberland, Suwannee, Quad and Dalton (Anderson et al. 1990; Justice 1987; Milanich and Fairbanks 1980). Some have suggested dividing the Paleoindian into Early, Middle and Late sub-periods based on differences in projectile point morphology (Anderson et al. 1990; O'Steen et al. 1986).

The arrival of new environmental conditions influenced how Paleoindians organized their society. Paleoindians were required to cope with environmental changes and the consequent social pressures that came about during the period of climatic transition associated with the onset of the Archaic Period.

Archaic Period (ca. 10,000–3000 B.P.)

The transition from Paleoindian to Archaic is loosely defined, and in the Southeast the chronological interface ranges from ca. 10,000 to 8500 B.P. In addition to changes in

environmental conditions, changes in technology, settlement patterns, and social organization were developed to cope with this climatic shift. The Archaic period is typically divided into Early, Middle, and Late subperiods based on changes in technology and subsistence through time. It should be emphasized, however, that these subdivisions are artificial constructs and the rate of change across the Southeast varied through time and from place to place.

The Early Archaic (10,000–8000 B.P.) is typically separated from the Paleoindian period by a warming climate and the emergence of seasonal occupation sites. Projectile points are similar to the previous period, but exhibit an increased sophistication through rejuvenation strategies. The typical forms are smaller than those of the Paleoindian period, and include Hardaway, Palmer, and Kirk, Big Sandy, and several bifurcate styles such as MacCorkle, St. Albans, Kanawha, and LeCroy. Wear patterns suggest that these tools were utilized for activities such as killing, butchering, skinning game, and woodworking.

Based on the increased number and size of Early Archaic sites, a population increase appears to have occurred during this period. Consequently, the social landscape became much more complex and settlement models for the Early Archaic period currently are under debate (e.g., Anderson 1992; Daniel 1996, 1998; Ward 1983).

The Middle Archaic (8000–5000 B.P.) marks the introduction of dart points, atlatl weights, and groundstone implements to the lithic tool assemblage. Diagnostic hafted biface types of this period include Stanly, Morrow Mountain, and Guilford points, followed by transitional Middle and Late Archaic Brier Creek and Allendale types. Also included in the Middle Archaic tool kits are groundstone artifacts such as metates and nutting stones, and there is a decrease in the diversity of chipped stone artifacts.

Middle Archaic sites in the Sandhills have been described as small, randomly distributed occupations exhibiting very little intersite technological variability. Local raw materials were used almost exclusively, and the vast majority of tools were technologically expedient (Blanton and Sassaman 1989; Sassaman 1993a).

The Late Archaic (ca. 5000–3000 B.P.) is transitional between the horticultural-based economies of the Woodland period and the previous hunter-gatherer cultures of the Early and Middle Archaic. Population was relatively dense, with large sites documented near major river systems along the fall line and in the Coastal Plain. A variety of imported materials such as copper and steatite, have been recovered from Late Archaic sites. This suggests an increasing complexity in trade relations.

The tool most commonly associated with the Late Archaic period in South Carolina is the Savannah River point. These bifaces, known by various names from Florida all the way into Canada, are often very large (12+ cm in length is not uncommon) and exhibit a straight stem, straight base, and triangular blade. These “points” were likely multifunctional tools used as both spear points and as knives for cutting and skinning.

Other Late Archaic varieties found in the project region include Appalachian Stemmed, small Savannah River Stemmed and Otarre Stemmed, (Sassaman 1985). Like Savannah River hafted bifaces, they are characterized by triangular blades, straight or slightly contracting stems, and

straight bases. The primary difference is size; Savannah River points tend to be longer and wider than the other types. For the most part these type names are more a product of parochial terminology than of actual morphological differences.

Fiber-tempered wares, known as Stallings Island, are found almost entirely along the Savannah River and on the southern South Carolina and northern Georgia coasts during this sub-period (Sassaman 1993b; Stoltman 1974). Inland and along the northern South Carolina coast, a coeval sand-tempered ware known as Thom's Creek is more common. In the Piedmont, pottery is not commonly found on Late Archaic sites, where soapstone vessels were utilized well after they were abandoned on the coast (Sassaman et al. 1990; Sassaman 1993b).

Woodland Period (ca. 3000–900 B.P.)

Whereas the stylistic typologies of projectile points are used to differentiate the Archaic subperiods, changes in ceramic types are used to define the divisions of the Woodland period. The Early Woodland begins at approximately 3000 B.P. with the adoption of pottery across most of the eastern United States. The progression from the Late Archaic to the Early Woodland was gradual, with an increase in the reliance on seeds and planting, and the development of a “big-man” social structure. Reflective of this development in social structure are the use of conical burial mounds and the elaboration of a widespread exchange network that occurs during this period. In the project area, ceramic artifacts dating to this period include the Yadkin and Deptford series (Anderson 1985, Blanton et al. 1986).

Mississippian Period (ca. A.D. 900–1670)

Social, economic, and technological manifestations that are associated with the Mississippian period became established by approximately A.D. 900. Unlike the transitions between the sub-phases of the Woodland period, these changes were dramatic, and some have argued that they occurred when the loosely integrated Late Woodland populations in the region were colonized and acculturated by the chiefdom-level societies that had emerged in the Etowah and Oconee River valleys (Anderson et al. 1996).

This time period represents cultures that were present at the time of initial European contact. The period is marked by a rise of ceremonialism, large public constructions such as pyramidal mounds, and a heavy reliance on the production of domesticated imports such as maize, beans and squash (Smith 1983).

A highly organized village structure developed during this period. Associated with the village lifestyle were rigid social, political and religious systems. Society was stratified and a ruling class exerted ascribed and achieved power over the general population. Central villages were typically located along terraces or levees of major rivers. Smaller villages, hamlets, and isolated family settlements are also characteristic of this period (Ferguson 1971). The increase in population put a strain on the amount of available resources and warfare became endemic. Central towns and villages were fortified with palisades, while small villages and farmsteads were located around the periphery, presumably to facilitate a safe retreat within the palisade in the event of an attack. Smaller villages and farmsteads also would have contributed resources and labor to the main towns.

Ceramic styles have allowed for the differentiation of this period into subdivisions and at least two possible cultural areas. Trinkley (1983) has presented a discussion of the ceramic variability for this period in the South Carolina Coastal Plain and coast, while Anderson and Joseph (1988) have presented one applicable to the South Carolina Piedmont. There is increasing evidence that territorial boundaries between chiefdoms were closely maintained during the Mississippian period.

Evidence of Mississippian chiefdoms has been identified in Georgia, North Carolina, South Carolina, and across much of the southeast. Current research identifies a number of major Mississippian centers along the Fall Line including Hollywood and Lawton near Augusta, Santee Indian Mound on the Santee River, Mulberry and Adamson near Camden, and Town Creek along the Pee Dee River in North Carolina. In addition, one or more small chiefdoms, dating from A.D. 1225–1375, may have been present in the Broad River Valley of the South Carolina Piedmont, not far from the current study area (Green and Bates 2003). In terms of settlement organization, these mound centers formed the center of political power. The ruling elite and a resident population permanently occupied these villages. As political control waxed and waned among elite factions in this politically turbulent era, mound centers were periodically constructed, maintained, and abandoned (Anderson 1990). Many mound centers were abandoned and then reoccupied several times.

HISTORICAL OVERVIEW OF THE PROJECT VICINITY

Early Settlement in the South Carolina Midlands

The South Carolina Midlands, for the purposes of this section, are defined as the City of Columbia and the surrounding counties of Richland, Newberry, Saluda, and Lexington.

In the early eighteenth century, the majority of European settlements remained in the state's Lowcountry. A trading post/fort was erected at "Congaree" in the vicinity of present-day Cayce in the first quarter of the eighteenth century, but there was no large-scale civilian settlement until the 1730s. To protect coastal interests from Spanish and Indian incursion, and to attract European immigrants in the hopes of balancing the ever-growing African slave population, Governor Robert Johnson created 11 townships across the state's northern frontier in the 1730s (Figure 6). The townships were located along rivers in the northern portion of the colony. Saxe-Gotha Township was established on the west side of the Congaree River south of the confluence of the Saluda River. The promise of new land and opportunities brought a large influx of immigrants to South Carolina (Edgar 1998).

The land along the Congaree River became an inviting location for settlement. The area was very appealing to the settlers for the richness of its landscape, which consisted of forests with little undergrowth and large hickory, oak, and pine trees. Most of the new settlers took up farming, along with cattle-grazing, milling, and commercial endeavors including operating ferries and Indian Trade (Salley 1898).

In an effort to attract settlers those arriving in Saxe-Gotha were eligible for a town lot and 50 acres of land per family member (Kovacik and Winberry 1987). Colonists in the Midlands

created settlements that were largely independent of the Lowcountry. Coastal settlements were strongly Anglican, whereas the Midlands people were for the most part dissenters who were often seeking sanctuary to practice their faith unmolested. The coastal citizens were often several generations past the rigors of colonization, unlike the newcomers to the interior. Language, religion, economics, and geography created a barrier of sorts that was not breached until the late eighteenth century and the Revolution.

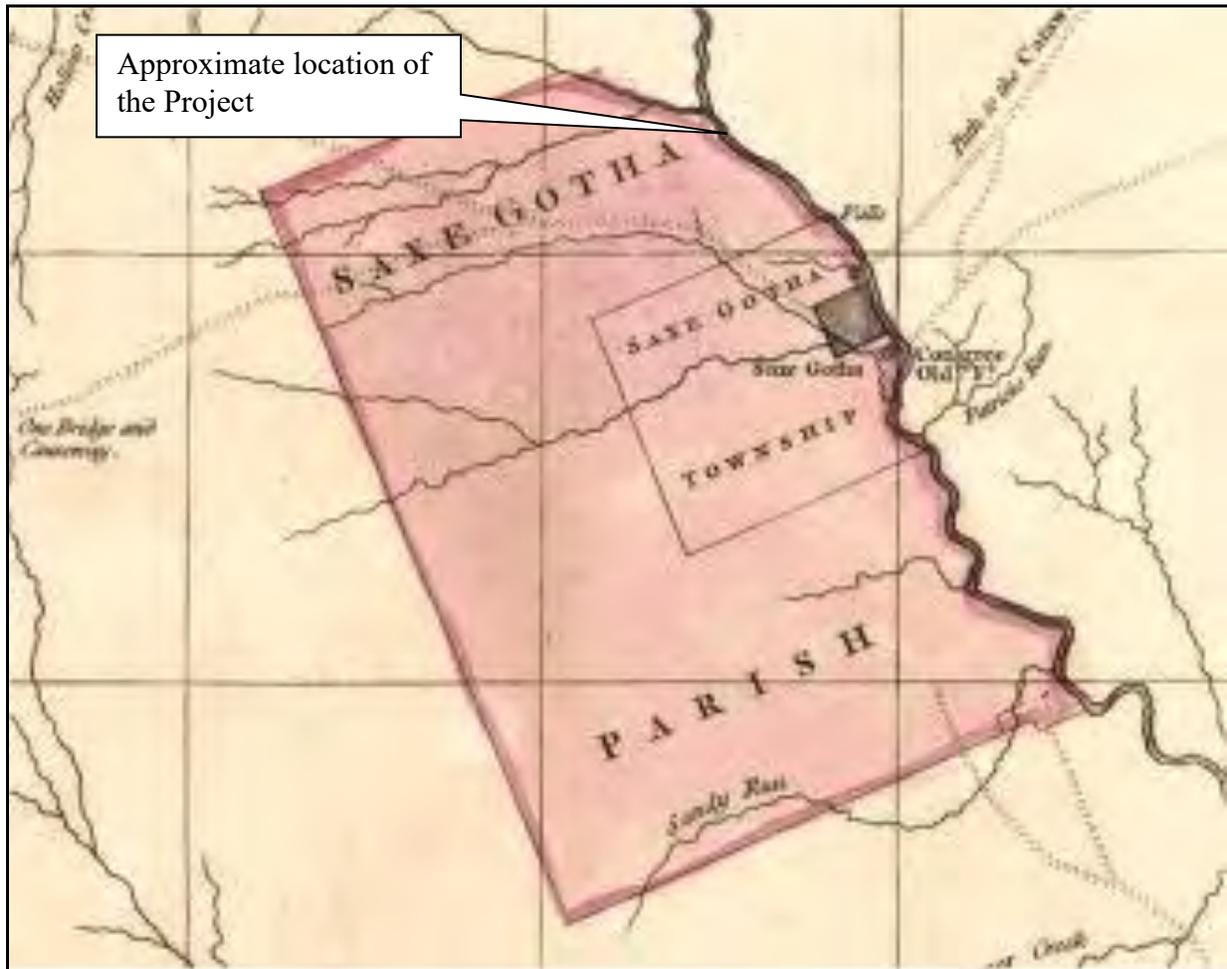


Figure 6. Saxe-Gotha in 1757 (DeBrahms 1757).

The American Revolution

Poor soils and lack of transportation improvements slowed the growth of the Saxe-Gotha Township until after the Revolutionary War. Prior to the start of the war, the township was virtually abandoned. A small trading center called Granby on the west bank of the Congaree River below the shoals at Columbia was established prior to 1774, and the fort constructed there during the Revolution was active in supplying the military. Located at the head of navigation of the Congaree River, the town became an important shipping point for goods produced on the surrounding agricultural lands, including cotton, indigo, hemp ropes, corn, and beeswax. Likewise, manufactured goods such as fabrics and household wares, and staples such as salt and

coffee were shipped upriver and distributed throughout the Upcountry (Central Midlands Regional Planning Council [CMRPC] 1982).

As the Revolution neared, the dissatisfaction felt by the colonists toward their British leaders was largely concentrated in the coastal areas. Residents of the Midlands and Upcountry became a source of concern for the delegates, however, since they were more disillusioned with the government in Charleston than that of the Royal government. In an attempt to win support from the backcountry settlers, a group of representatives from the Provincial Congress were sent to talk with the area's inhabitants. The first of three meetings took place in the Dutch Fork at McLaurin's Store in present-day Newberry County. William Drayton, leader of the group, later noted in his journal that the meeting went poorly. In the end, the two parties reached an accord; representatives from the South Carolina Midlands and Upcountry regions would sign an agreement stating that they would remain neutral in exchange for the promise that they would no longer be bothered with talk of revolution (Edgar 1998).

At the war's conclusion, South Carolina slowly began the process of reestablishing its government. After the Revolution, Ninety-Six, Orangeburg, Cheraw, and Camden Districts, created in 1769, had become too large to effectively govern. In 1783 the state government decided to divide the existing districts into smaller counties of no more than 40 square miles. Richland County was formed from that part of Camden District located between the Congaree and Wateree rivers. In 1786 vote by the legislature to move the state's capital from Charleston to a new town that would be constructed in a centralized location along the banks of the Congaree River in Richland County. After a great deal of debate, it was decided that the new town would be named Columbia, a name that symbolized the new nation (Edgar 1998).

The site for the capital was chosen because it was centrally located between the upcountry regions and the former capital of Charleston. The location proved to be well situated for the promotion of trade as well. Although it lay beyond the head of navigation by about two miles, the presence of the state and county governments, banks, law offices, and South Carolina College (established in 1801), encouraged growth of the capital. The Columbia Canal, completed in 1824, brought boats into the city, and a series of canals on the Broad, Wateree, and Saluda rivers was constructed to further facilitate trade. For the most part, the use of these canals did not justify the enormous cost to the state for their construction, since they were often inoperable because of a lack of water, damage caused by freshets, or structural and mechanical problems. Nevertheless, they were important in attracting business and industry to the Columbia area. By 1830 the town had a population of 3,310 and could boast of a thriving state college, a State House, town hall and marketplace, numerous churches, a Masonic Hall, two public libraries and a third at the college, a series of bridges spanning its three rivers, and a modest but active spirit of commerce and industry (Moore 1993).

Antebellum Agriculture in the Midlands

The introduction of the cotton gin in the late 1790s transformed the Midlands' economy. Short staple cotton and the cotton gin allowed Midlands farmers access to the wealth and opportunities that had been previously reserved for coastal planters. The possibility of making a large profit from the sale of their cotton crop was a driving reason behind the shift in interest. As a result,

Midlands planters began to invest in infrastructure, educational institutions, and commercial enterprises.

Accompanying the cotton boom during the first portion of the nineteenth century was a statewide effort supporting internal improvements, including new roads and canals to connect the upper and lower parts of the state that had been separated for years both physically and economically. In 1818, the General Assembly established a Board of Internal Improvements to oversee a \$1 million program of roads and canals to improve the state's transportation network (Edgar 1998). Construction started on a system of canals was begun on the Saluda, Broad, Congaree, Catawba, and Wateree rivers.

The state's canal system was largely a disappointment. The plan proposed by the Board of Internal Improvements called for eight canals. Four were to be located on the Catawba and Wateree Rivers above Camden. The Lockwood and Columbia Canals along the Broad River were intended to open up traffic 110 miles north of Columbia, and the Saluda and Dreher Canals along the Saluda River were meant to open up river traffic to Laurens and Abbeville west of Columbia (Edgar 1998). All eight canals were completed and totaled 25 miles of canals and 59 locks that connected every district in the state except Greenville.

The entire canal system was plagued with problems from the outset. Shoddy construction and damage from flooding resulted in the poor operation of the locks. Public disinterest added to operational problems. Lack of use by the public resulted in a failure to generate enough revenue to pay the lock keepers' salaries (Ford 1988). The Saluda River Canals were infrequently used, and their operation was often plagued by either too much or too little water from upstream. No tolls had been collected at the Dreher Canal by 1824, and it was not until 1827 that any evidence has been found of revenues from the canal. Twenty-one boats used the canal that year, carrying 578 bales of cotton. The Columbia Canal can be seen on Mills' 1825 Atlas of Richland District on the east side of the Congaree River (Figure 7).

Despite these setbacks, the area managed to prosper during the first quarter of the nineteenth century, as a result of the cotton boom. Besides the business generated by the state government, Columbia supported a large, but dispersed agricultural community in surrounding Richland and Lexington districts. Merchants, bankers, plantation owners, and real estate speculators capitalized on the flow of goods through Columbia, where cotton from the countryside was loaded onto barges for shipment to Charleston, and manufactured goods from New England and abroad was sold to farmers, peddlers, and storeowners. The new money from the trade encouraged investment, and some of the leading businessmen began to invest in manufacturing enterprises, in hopes of decreasing the state's dependency on imports and improving the return on their money (Lansdell 2003). With a ready supply of cotton available, and a slave labor force to work in the factories, many felt that the South could become the next great textile center.

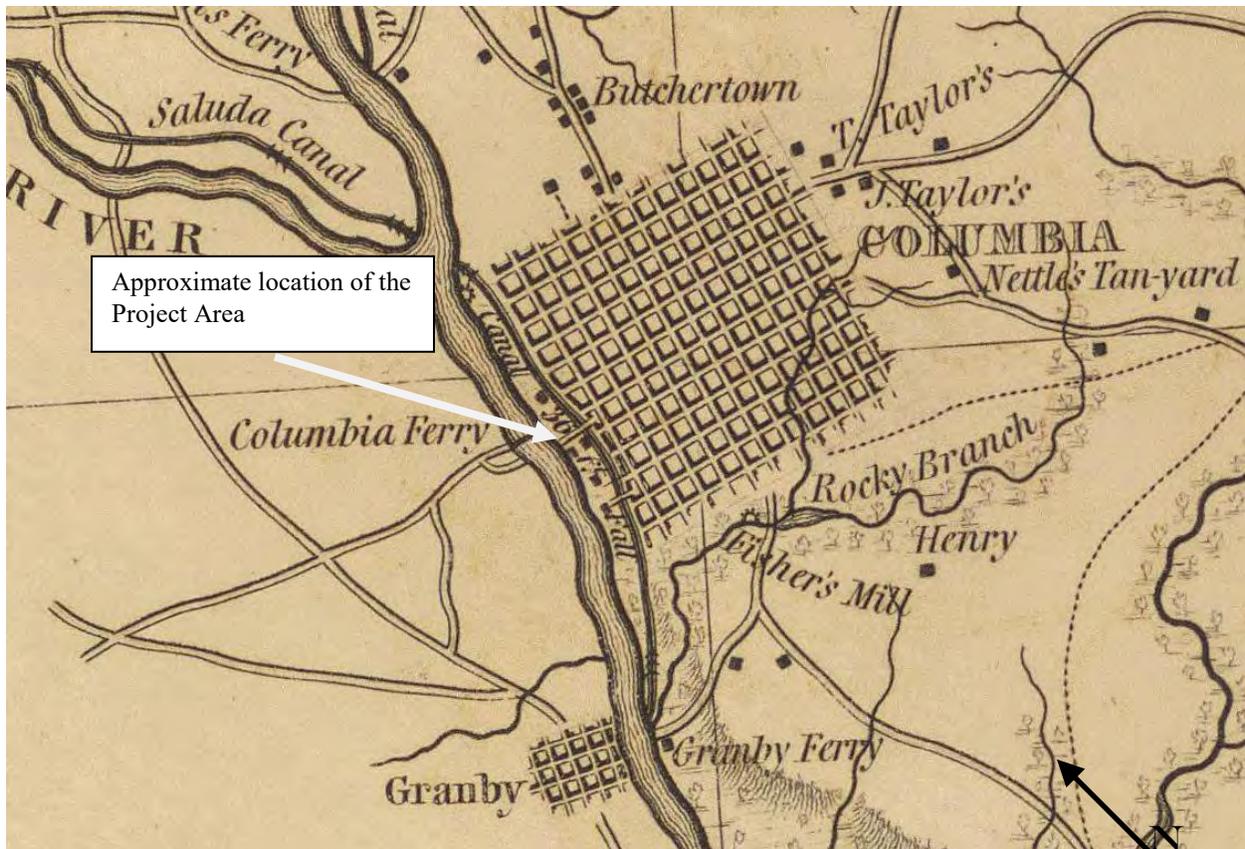


Figure 7. Mills' 1825 map of the Richland District depicting the approximate location of the project area.

Civil War

South Carolinians worried that Abraham Lincoln's victory in the 1860 election would lead to freedom for the black population and the end to wealth that relied heavily on slave labor. Upon hearing of Lincoln's victory, communities across South Carolina convened to discuss what action would be taken in retaliation. On 17 December 1860 delegates from communities across the state unanimously voted to draft an Ordinance of Secession. Following an outbreak of smallpox in Columbia, the convention reconvened in Charleston where the Ordinance was signed on 20 December 1860, and Francis W. Pickens of Edgefield District was elected governor (Pope 1992; Moore 1993).

The Midlands of South Carolina did not witness any military action until the waning months of the war, but the effects of the hostilities were keenly felt. Nearly every man of fighting age was pressed into service, leaving the farms to be run by old men, wives, children, and slaves. Many of the men who served never returned, or were permanently disabled.

Late in 1864, as Union troops moved into Georgia from the north, Confederate authorities began to move prisoners of war from Andersonville and other stockades to what was perceived as more secure territory. The ultimate destinations included Florence, South Carolina for enlisted men and Columbia for officers. It is a sign of the stress war had placed on the Confederate

infrastructure that housing, feeding, and guarding the prisoners was left to the state. In both Florence and Columbia the guards were for the most part too young or too old for active military service. In Columbia the prisoners were first kept at “Camp Sorghum”, so named for the sorghum molasses that made up the bulk of the food supply. Camp Sorghum was located on the west side of the Saluda River in a field near the Saluda Factory. The camp was not fortified and escapes were common, becoming so prevalent that the prisoners were moved in December 1864 to the grounds of the South Carolina Lunatic Asylum.

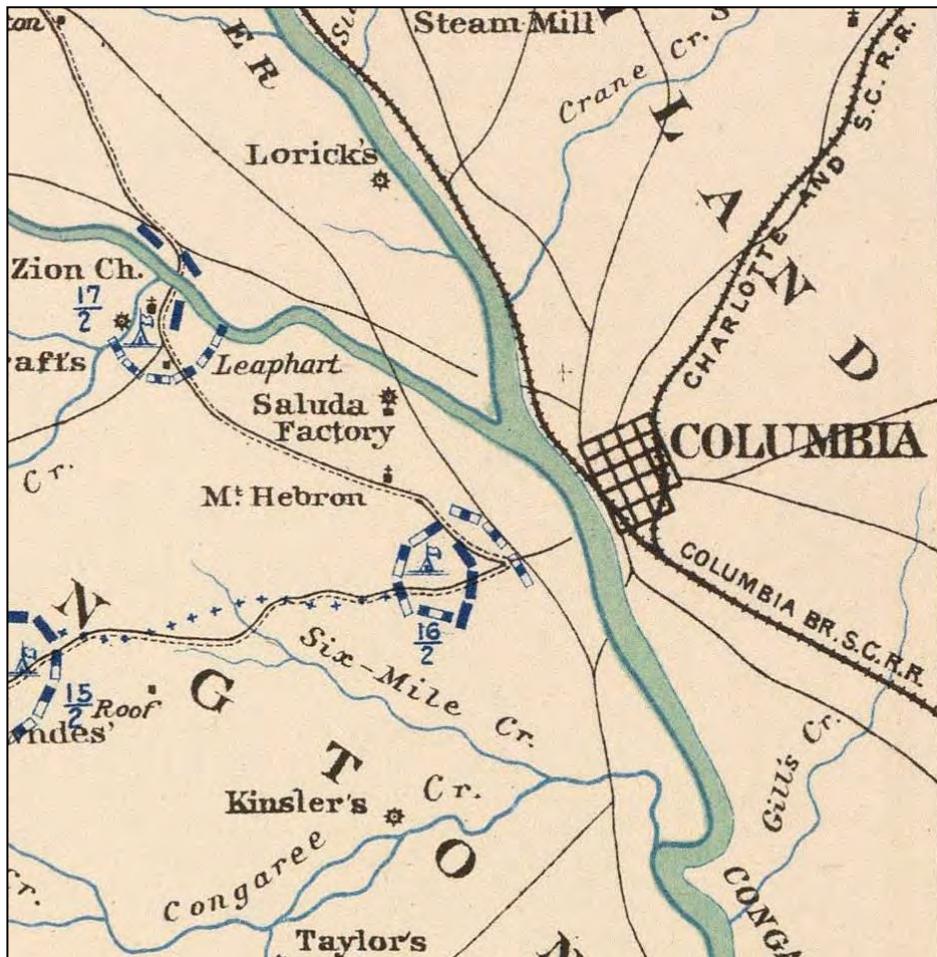


Figure 8. Union Troop locations February 15, 16 and 17, 1865

The infamous “March to the Sea” made by Union troops under the command of General William T. Sherman concluded with the surrender of Savannah in late December, 1864. Some troops remained in coastal Georgia while others were transported to Beaufort and its environs. In mid-January, 1865 the troops were again on the move, this time heading north in what became known as the “Campaign of the Carolinas”. The left wing of Sherman’s army (that is, those furthest west) crossed the

Savannah River at several points, the bulk regrouping at Robertsville (in present day Jasper County) at the end of January, 1865. Heavy rains during the winter caused swollen streams and creeks and often bridges had been burned before the Union forces arrived, slowing the pace of the advance. Nonetheless, the troops averaged approximately 15 miles per day, skirmishing with Confederate troops before them and destroying railroads along the way.

By February 16, 1865 the First, Second and Third Divisions as well as Kirkpatrick’s Cavalry were camped on the west bank of the Congaree River directly across from Columbia (Figure 8). Meanwhile, Columbia’s citizens were trying to evacuate the city, and bales of cotton were dragged into the street to be carried off and burned to keep them from falling into enemy hands.

Wade Hampton, hastily promoted to lieutenant general, was left to defend the city with General Joseph Wheeler's cavalry. Sensing the futility of the defense, Wheeler's men began looting the city, ostensibly to prevent capture by the Union army.

On the night of the 16th, Hampton announced that he planned to evacuate on the following morning, leaving behind the cotton, which he was unable to transport. Sherman's troops began shelling the city, which surrendered the following day. That evening, fueled by spirits dispensed without restriction, Union troops created more mischief through the city. When the cotton in the streets caught fire, they were unable or unwilling to contain the blazes, in some cases probably fanning the flames. The result was the near complete destruction of Columbia (Moore 1993). Having the run of the countryside for several days, Union troops burned many homes and farms in region.

Postbellum Agricultural Practices

Lee's surrender at Appomattox in April 1865 sealed the fate of the Confederacy and launched the South on a difficult course to remodel its social structure around free labor. Soldiers returned home to the Midlands to find desolation. Farmland was barren and plantation houses stood overgrown and decaying. Production and livestock holdings were still below 1860 levels by the time of the 1870 census; widespread corruption in state and local government during Reconstruction further hampered recovery. By 1880, however, cotton production had reached antebellum levels (Kennedy 1990).

The rapid increase in cotton production in the post-war years led to the abandonment of food crops and eventually to a statewide agricultural crisis. Prior to the introduction of cotton, farms had been small and self-sufficient, producing their own food. Eager to make a profit, most farmers reclaimed fields that had previously been reserved for food crops to grow more cotton. When prices began to fall, farmers became desperate to pay off overdue bank loans and in turn over-planted fields, used substandard land for planting, and heavily fertilized their crops in the hopes that increased production would lead to increased profits. In 1860, South Carolina produced 353,412 bales of cotton; by 1890 the figure had reached 747,190 bales. Eventually, the market became flooded with cotton resulting in a drop in the price per pound. Prices fell gradually, but consistently from 1881 through 1886 (Edgar 1998).

African-American farmers faced even greater hurdles in the postbellum period than did their white counterparts. Blocked from owning land by discriminatory banking and real estate practices, blacks generally took up as sharecroppers, sometimes on their old plantations, sometimes in a new location. The sharecropping system proved fundamentally detrimental to both tenants and landlords because of the opportunity for abuse by the landlords in the distribution of the proceeds and the lack of incentives for tenants to make improvements to the land. As lands became exhausted, tenants sought new arrangements, moving from farm to farm, but seeing no improvement in their situation.

A worldwide agricultural depression and the arrival of the boll weevil during the 1920s further eroded the established agricultural regime of the region. By 1930, tenancy levels in South Carolina had begun to stabilize, but the number of farms decreased as tenants left farming for other employment (Edgar 1998).

Although the tenant system led to widespread poverty in the region over the long run, cotton farming and the associated textile industry formed the basis of the region's economy from the end of the Civil War until the beginning of World War II.

Industrialization and Expansion in the Postbellum Era

While agriculture was the mainstay of the Midlands' economy until the mid-twentieth century, the late nineteenth and early twentieth centuries saw rapid changes in transportation and manufacturing. The post-Civil War years saw the continuing development of the state's railway system. By 1880, cities such as Columbia began to once again grow and prosper as the cotton market continued to expand. Many of these towns became major cotton markets as trains running through the area allowed the easy shipment of cotton and other agricultural products.

The opening of the improved Columbia Canal in 1891 resulted in new mills and factories being constructed, and between 1880 and 1900 the population of Columbia doubled to 21,108. The South Carolina textile industry saw a dramatic increase with 61 mills either built or expanded between 1895 and 1907, becoming the largest textile producing state in the South. Columbia Mills, on the east side of the Congaree River at Columbia, became the first mill in the state to operate solely on hydroelectric power generated from the Columbia Canal, and a host of other mills soon followed suit.

An Agricultural Depression and a National Depression

An economic depression hit South Carolina in 1921, almost a decade before it was felt throughout the rest of the country. The collapse of cotton and tobacco prices, overseas competition, and the advance of the boll weevil took a heavy toll on the local economy. The boll weevil arrived in South Carolina in 1917, but it was not until 1922 that short staple cotton crops were affected (Edgar 1998). The price would rebound slightly, but remained low until World War II.

The arrival of the 1930s saw an agricultural system on the brink of collapse. Farmland and associated buildings stood at half of their original value and many farms across the state were mortgaged with owners surviving on borrowed money. Over-planted and over-fertilized land caused major erosion problems (most notably in the upstate) and by 1934, eight million of the state's farming acreage had been declared useless (Edgar 1998). The agricultural crisis of the 1920s and 1930s triggered a mass exodus of residents from the state. Because of the growth of Columbia, Richland County did not see a large decline in population, but residents were moving from the rural areas to the more urbanized areas close to the capital (Moore 1993).

It took some time for the effects of the nationwide Depression that came on the heels of the 1929 Stock Market Crash to be felt in the South Carolina Midlands. The construction of Lake Murray and the active cotton mills kept employment high until the end of 1930. New Deal work programs such as the Civilian Conservation Corps, Works Progress Administration, and Public Works Agency helped bridge the gap until the material and personnel demands of World War II pulled the country out of economic collapse (Moore 1993).

A New Era in a Diversified Economy

World War II finally brought an end to the Depression in the region. The war years saw an increase in agricultural production and manufactured products, as many South Carolina businesses became government contractors. Fort Jackson, established in Richland County during World War I, but virtually abandoned since the end of that war, was revived during World War II for infantry training. In 1940, a site between Six Mile Creek and Congaree Creek in Lexington County was chosen by the U.S. Army for an airfield, which was completed that same year. After World War II, the facility was turned over to the local governments for a regional airport to serve the Columbia area. At the war's close, veterans came home with renewed ambition and many quickly stepped forward as leaders of their communities. Soldiers took advantage of the G.I. Bill, obtaining an education and utilizing their newly developed skills throughout the community. In the years immediately following World War II, veterans opened businesses throughout the area, some of which are still in operation today (Pope 1992; Moore 1993).

Previous Investigations in the Project Area

An examination of materials on file at the SCDAH and SCIAA revealed one project that has a bearing on the current survey. In 1981 the South Carolina Institute of Archaeology and Anthropology (SCIAA) conducted a preliminary archaeological assessment of the Riverfront Park area and adjacent portions of the Historic Columbia Canal (Canouts and Harmon, 1981). The work consisted of a background literature review and a field reconnaissance survey with limited subsurface testing. The goal of the work was to document specifics of the canal and its features that were not well defined in the National Register Nomination Form. Recommendations for further archaeological studies were provided.

The report found that the area south of Gervais Street “has been drastically altered by the construction of a transmission line and other activities” (Canouts and Harmon, 1981). Despite the disturbance a number of archaeological resources were identified. These resources will be discussed in Chapter IV. Interestingly, the report notes that the National Register nomination form for the Columbia Canal Historic District states that portions of the canal are visible from Gervais Street south to Green Street, however they were unable to locate the canal bed itself and state that the canal route disappears in the area of Bicentennial Park. The report recommended further study.

IV. METHODS AND RESULTS

METHODS

The APE for archaeology for this project is considered to be the areas to be impacted by the proposed project. This includes the dewatered portion of the Congaree River and the upland locations of access roads and project compound. Repeated requests to shovel test the APE were denied by the property owner. Consequently no subsurface testing was conducted during the course of the project. A pedestrian survey was carried out along the existing dirt and gravel access road and the wooded area adjacent to the project compound. The entire road was walked on two separate occasions. The road surface was visually inspected for cultural material. Transects spaced approximately 15 meters apart were walked within the wooded portion of the project boundary. Photographs were taken at the locations of previously recorded sites.

RESULTS

Background and Literature Search

Prior to fieldwork, TRC conducted background research at the site files of the South Carolina Office of State Archaeology housed at SCIAA. This research included examination of archaeological sites, structures, and National Register of Historic Places (NRHP) files. The background research gathered information concerning the presence of known archaeological sites, historic structures or cemeteries, or potential sites on or in close proximity to the project area. Previous Recorded Archaeological Sites

Background research established that there are five previously recorded sites within the permit area. Site 38RD223 is a large nineteenth to twentieth century dump/sanitary landfill site located on a bluff overlooking the Congaree River (Canouts and Harmon, 1981). It is noted that the site has been disturbed by pot hunters although portions of it may be in good condition. This site was not assessed as to its National Register eligibility.

Site 38RD224 is interpreted as the possible ruins of Briggs' sawmill. Canouts and Harmon (1981) note a building foundation adjacent to a small tributary of the Congaree River. This site has not been assessed for the National Register.

Site 38RD278 is an underwater discovery of historic ceramics and metal artifacts. It is adjacent to site 38RD234 and may be a dump site from that structure.

38RD286 is Civil War era ordnance dump site. Its boundaries are currently defined as being localized to a small unnamed tributary of the Congaree River just south of the Gervais Street Bridge. Historic documentation indicates that the site extends beyond its currently defined boundaries. Recent side scan sonar magnetometer surveys conducted in advance of the Congaree River Cleanup project support this notion. Currently the site has not been formally investigated by professional archaeologists. The South Carolina State Underwater Archaeologist has issued salvage licenses in the past to recreational divers to conduct recovery work at this site. Log reports associated with these salvages confirm the presence of Civil War ordnance.

Site 38RD234 was recorded as the ruins of a late nineteenth to early twentieth century house with a visible brick porch house footings and a “square brick enclosure that could be a house well” (SCIAA Site Form 1982). No evaluation of this site was made at the time it was recorded.

Table 1. Archaeological Sites within a 0.5-Mile Radius of the Project Tract.

| Site No. | Description | NRHP Status |
|----------|---|--------------|
| 38LX10 | Paleoindian through Late Archaic Campsite | Not Assessed |
| 38LX22 | Woodland Period Lithic and Ceramic Scatter | Not Assessed |
| 38LX67 | Lithic Scatter | Not Eligible |
| 38LX100 | Guignard Brick Works | Listed |
| 38LX334 | Underwater Shipwreck Site | Not Assessed |
| 38RD205 | Middle-Late Archaic Lithic Scatter, destroyed | Not Eligible |
| 38RD223 | 19 th -20 th Century bottle dump, land fill | Not Assessed |
| 38RD224 | Briggs Saw Mill | Not Assessed |
| 38RD233 | 19 th – 20 th Century Artifact Scatter | Not Eligible |
| 38RD234 | Late 19 th Early 20 th Century structure foundation | Not Assessed |
| 38RD235 | V-shaped wooden object eroding out of river bank | Not Assessed |
| 38RD236 | Historic Period Dugout Canoe in Riverbank | Not Assessed |
| 38RD275 | Unknown Prehistoric lithic scatter, 20 th century | Not Eligible |
| 38RD278 | Underwater deposit of historic ceramics | Not Assessed |
| 38RD286 | Underwater Ordnance Dump Site | Not Assessed |

Including the five sites mentioned above there are 15 previously recorded archaeological sites located within a 0.5-mile radius of the project area (Figure 1, Table 1). On the project side of the Congaree River,

Site 38RD205 is just north of Blossom Street in what is currently a parking lot. It was recorded in 1979 as a surface scatter of quartz thinning flakes and two quartz bifaces. The bifaces were dated to the Middle and Late Archaic Period. The South Carolina Site Form indicates that the artifacts were recovered from an active construction site and no further work was recommended for the site.

38RD233 is late nineteenth to early twentieth century dump site on an island across from the Columbia Canal Power House and the Gervais Street Bridge. It is not eligible for the National Register.

Canouts and Harmon (1981) initially identified site 38RD235 as an isolated find, it was later assigned an official site number. It is described as “V-shaped wooden object” measuring approximately 3.5 meters in length and 60 cm in width. They interpret this as being either a fragment from a boat or an industrial trough of some sort that was dumped in the river.

Site 38RD236 is on the same island as 38RD233. It is an historic period dugout canoe that was observed by Canouts and Harmon (1981) eroding out of the canal side of the island.

Site 38RD275 is a small surface scatter consisting of two prehistoric lithic flakes and a scatter of twentieth century brick fragments. It was noted as being disturbed and not recommended for additional work (SCIAA site form 1982).

On the opposite side of the river from the project area site 38LX10 is a large site investigated in the late 1930's by Robert Wauchope (SCIAA site form). It was recorded as containing a Clovis Point and net weights and a pipe carved out of steatite. The exact location of the site is unknown. 38LX22 and 38LX67 are prehistoric artifacts recovered by amateur collectors in the 1970's. They have not been formally assessed and their locations are approximate. 38LX100 is the Guignard Brick Works. This site is on the National Register of Historic Places. It is located on the west side of the Blossom Street Bridge. The brick works were active for the first half of the twentieth century. Structures associated with the brick works including "beehive" or circular kilns, and a one-story, brick office building are still standing. The brick works are approximately 0.28 mile southwest of the project area. A large, modern apartment complex and tall trees lie between this site and the project area. The project will have no effect on this NRHP listed site.

38LX334 is an underwater resources identified by Canouts and Harmon (1981). It is the wreck of the City of Columbia, a steamship that sank in the early twentieth century. This wreck has not been evaluated. Underwater investigation and special conservation methods would be necessary to fully assess this site.

A review of Archsite website (online GIS database of recorded South Carolina cultural resources) indicates that the project area is within the Columbia Canal Historic District. The Columbia Canal Historic District encompasses an approximately 4.1 mile long area along the eastern bank of the Broad and Congaree Rivers. The northern boundary of the district is defined as the dam of the Columbia Reservoir approximately 0.5-mile upstream from the Broad River Road Bridge. The southern boundary is effectively at the railroad trestles and quarry on the south side of Granby Park. The National Register Nomination form defines this area as the "minimum acreage necessary to protect the historic integrity of the canal". The Nomination form indicates that the nominated area of the canal follows the area outlined in the *Columbia Canal Study* (Wilbur Smith and Associates 1979). The western boundary line of the district was delineated as the western bank of the Broad River until it meets the Saluda River and becomes the Congaree. From there south, the western boundary is defined as the Richland/Lexington County Line. The eastern boundary of the district was determined by using the property lines as they existed in 1979. Property lines were used to define the district since a complete appraisal of the area by archaeologists and a surveyor was not feasible. In the project area the district boundary follows the property lines of land belonging to Guignard Estates.

There are four other National Register listed districts or structures, including the previously mentioned Guignard Brick Works (38LX100), within a 0.5-mile radius of the project area.

Table 2. National Register Listed Resources within a 0.5-Mile Radius of the Project Tract.

| Resource | Description | NRHP Status |
|------------------------------------|---|--------------------|
| Columbia Canal | 1824 and 1891 Canal and Associated Recouces | Listed |
| Gervais Street Bridge | Circa 1928 Bridge | Listed |
| Guignard Brick Works | 20 th Century Brick Kilns and facility | Listed |
| New Brookland Historic District | Early 20 th Century Mill Village | Listed |
| Southern Cotton Oil Company | Early 20 th Century Cotton Oil Mill | Listed |

The Gervais Street Bridge overlooks the project area from the north. This is an open spandrel arch bridge constructed between 1926 and 1928. Ferry crossings and bridges have historically been present in this approximate location since the 1790's. During the Union invasion of Columbia in 1865 the wooden bridge that was at this location was burned in an attempt to slow Sherman's troop advancement into the city.

The New Brookland Historic District is approximately 0.2 miles west of the project area. This is a mill village constructed for the employees of the Columbia Duck Mill, the mill that was hydroelectrically powered by the Columbia Canal. A large number of commercial buildings and residences associated with the various growth phases of the mill are still present and in good condition.

The Southern Cotton Oil Company is approximately 0.50 miles east of the project corridor. This was one of the first and one of the largest cottonseed and cotton oil mills in the country. Similar to olive oil, cottonseed oil saw a boom period in the early 1900's thanks to aggressive promoters of the cotton oil industry. In 1994 there were seven extant structures associated with the Southern Cotton Oil Company. Subsequent to its listing on the National Register all seven buildings were demolished and removed.

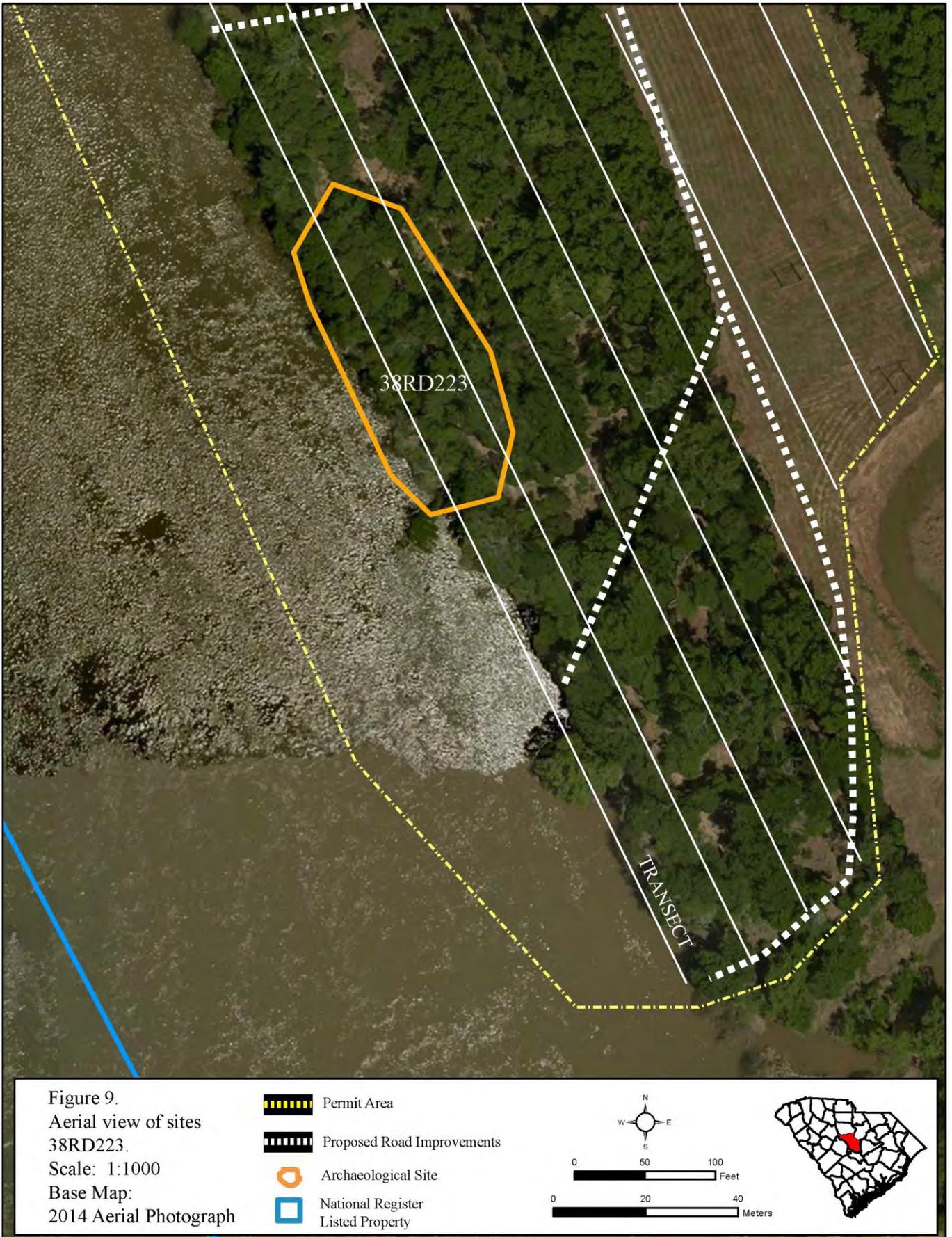
Field Survey

Previously Recorded Resources

38RD223 – According to Canouts and Harmon (1981) this is a relatively large site measuring approximately 3000 square meters. This late nineteenth to early twentieth century bottle dump was located in a stand of hardwoods and dense undergrowth (Figure 9). They note that approximately 25% of the site was disturbed by pot hunters. A visit to the site identified an area relatively clear of undergrowth. The site has continued to be a dumping ground for the past 30 years. Plastic glass and metal containers, articles of clothing and modern refuse has been spread over and mixed with the bottle dump. It appears that the vegetation in the area is regularly mowed to minimize the undergrowth. It is unknown how much this grounds keeping has disturbed the site. No shovel tests were excavated at the site. It is believed that historic bottles may still be present. The plans for the Congaree River Sediment Removal Project call for the avoidance of this site. As seen in Figure 2 access roads are proposed to the north and south of this site. Monitoring during construction of the access roads is recommended to ensure that no significant artifact deposits are disturbed during the undertaking. The site remains unevaluated for the National Register. Further work in the form of subsurface shovel testing and artifact identification is necessary to determine the NRHP eligibility of this site.

38RD224 – In 1981 Canouts and Harmon located a building foundation approximately 60 meters downstream of a small unnamed tributary of the Congaree River (Figure 10). The ruins were noted as being in good condition and were assumed to be the remains of Briggs sawmill, a mill utilized by the Confederate government and burned by Union Troops in 1865. The site was considered significant and recommended for additional work.

This site was visited and an attempt to locate the foundation and any historic artifacts visible on the ground surface. A picture of the foundation shows stacked, large granite blocks. Transects



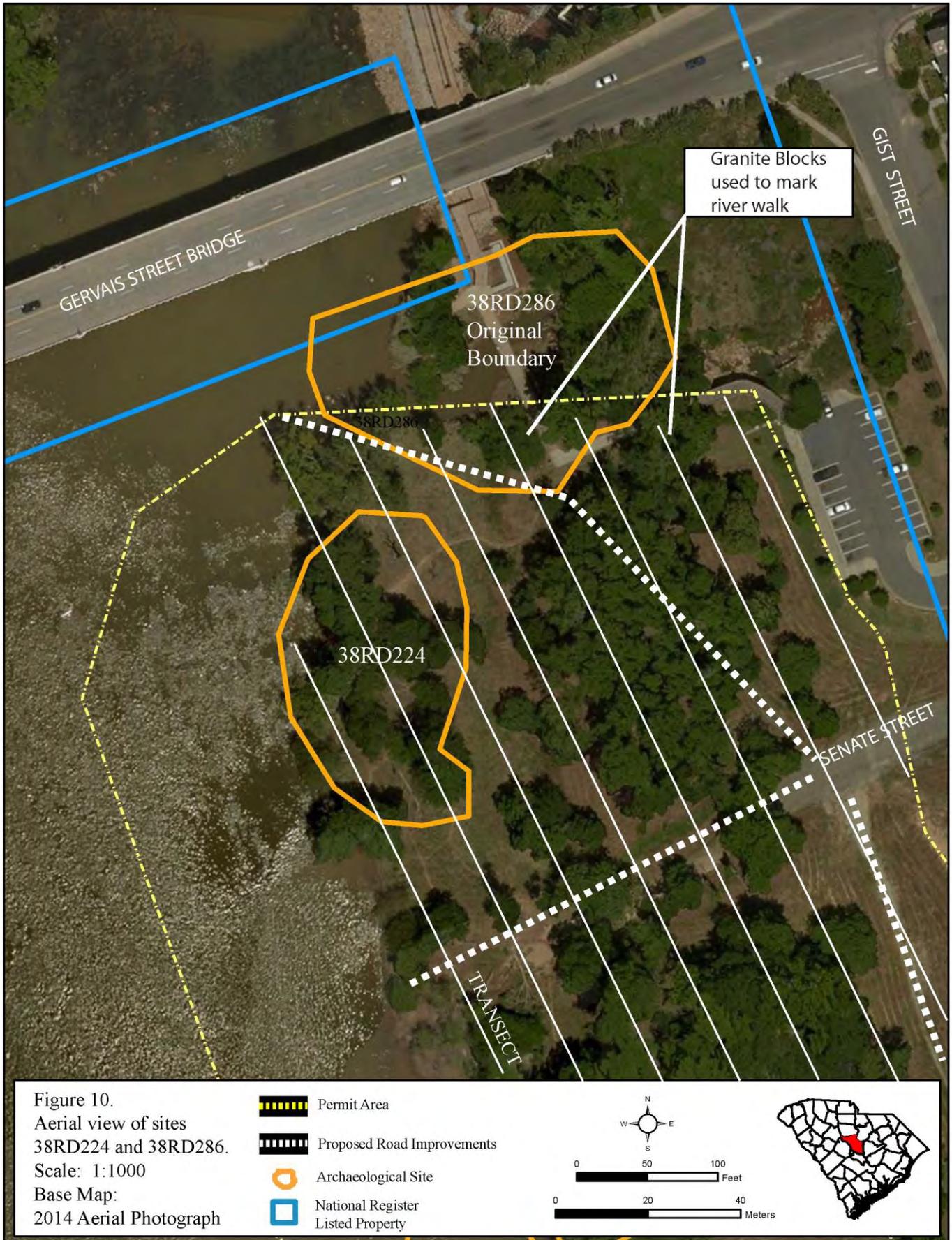




Figure 11. Conditions at 38RD224.



Figure 12. Historic granite blocks used as river walk border.

separated by a 15 meter interval were walked in the mapped location of the site. Vegetation consisted of manicured grass in the upland portion of the site and shin high grasses and undergrowth closer to the river's edge (Figure 11). No trace of an intact granite foundation was found. While accessing the site via the City of Columbia River Walk large granite blocks were noted lining the pathway and marking drainage areas (Figure 12). These blocks are presumed to be the foundation stones identified in 1981 now repurposed as decorative elements to the river walk.

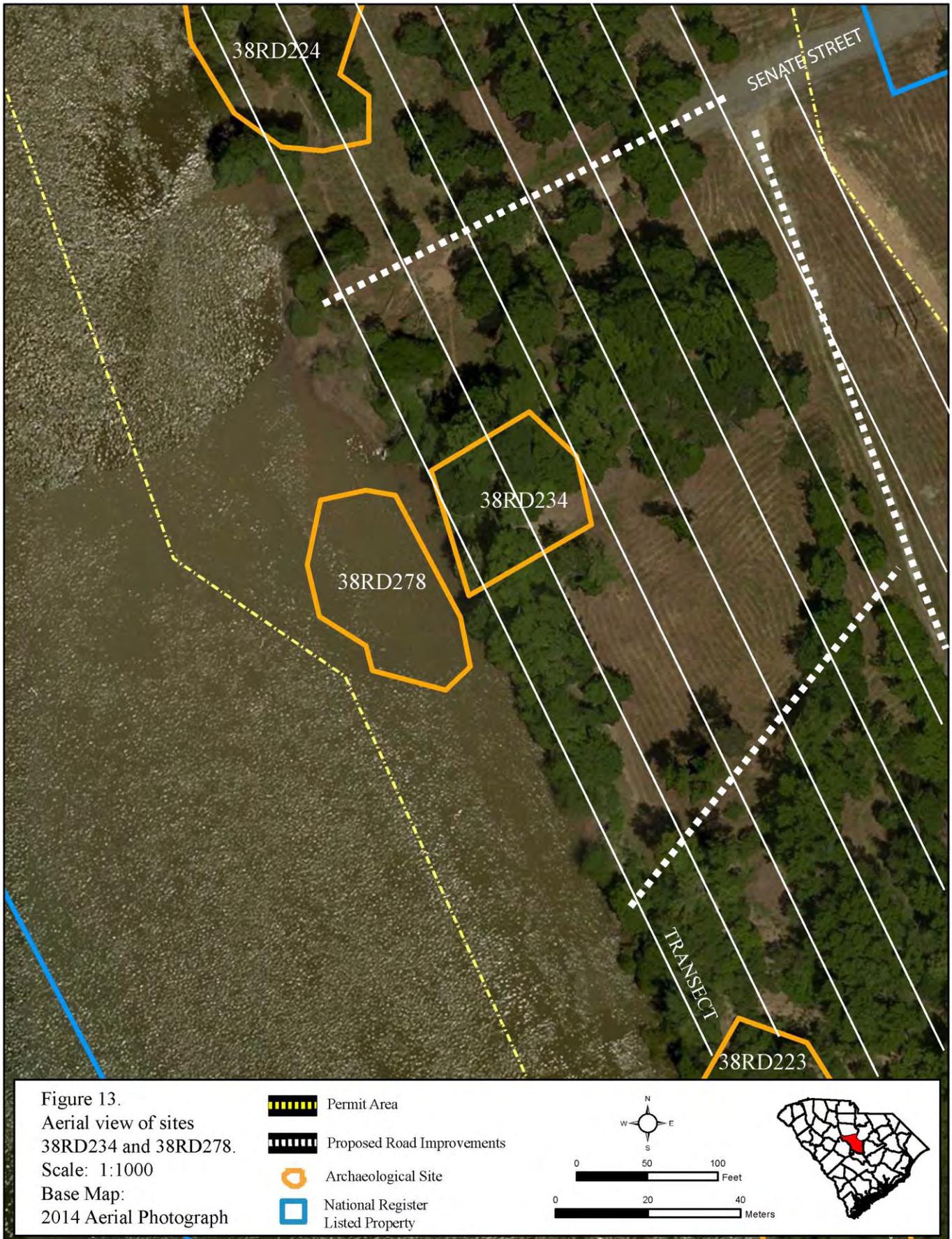
The foundation of the possible sawmill has been disturbed. However, it is possible that intact, subsurface features related to the mill are present. Currently the Congaree River Sediment Removal Project plans to avoid this area. An access road to facilitate dam construction is proposed just north of this site (see Figure 10). It is recommended that monitoring during construction of this road take place to ensure that no significant resources be impacted. Orange construction fencing may be needed to ensure that no activities take place within the boundaries of this site.

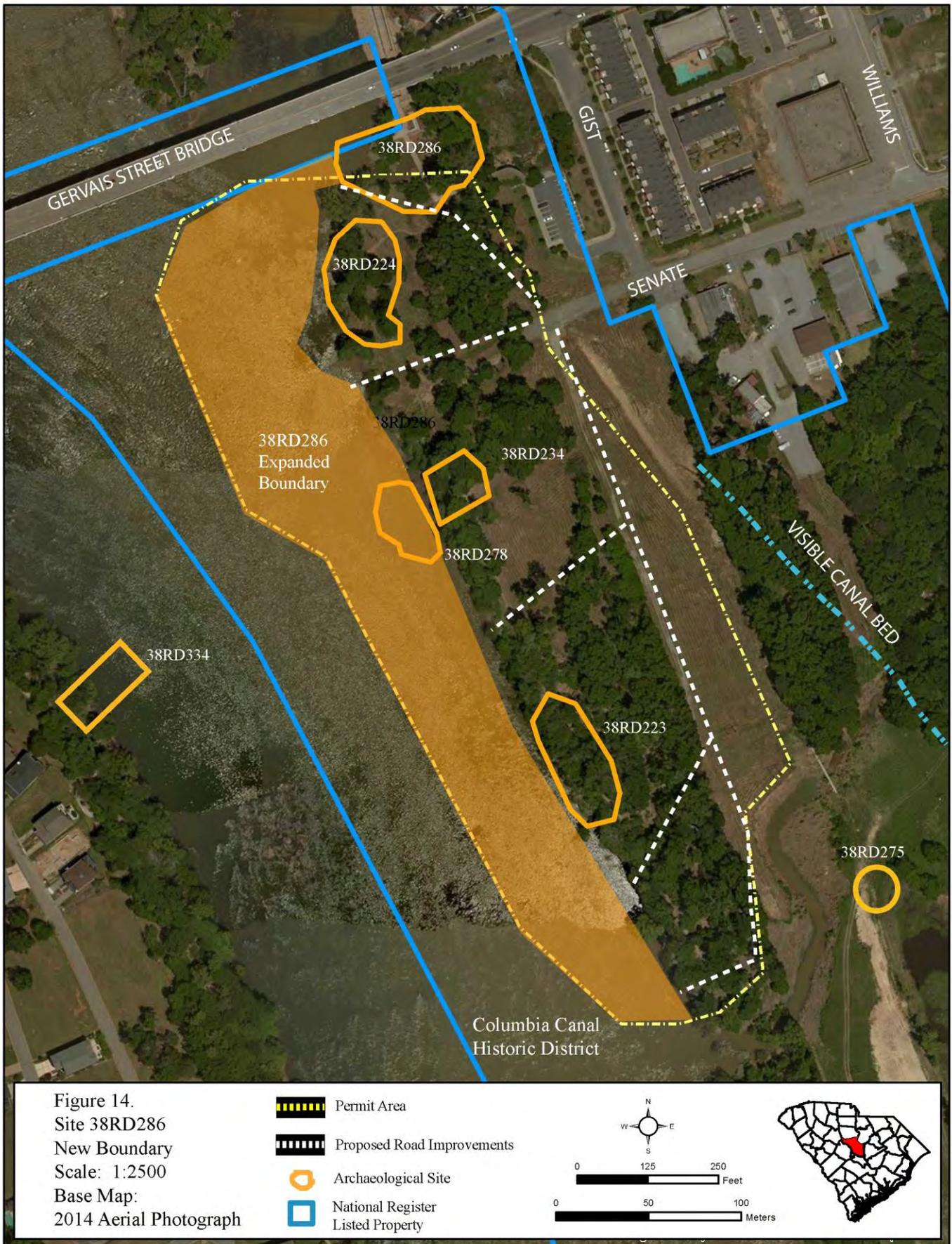
38RD234 – Was identified during a reconnaissance survey of the proposed Bicentennial Park. There is no official report of this survey however the SCIAA site form indicates that the site was recorded by SCIAA/Harmon in 1981. The site is recorded as nineteenth century architectural remains that include house footings, a partially intact brick porch and a square brick enclosure which was interpreted as a well house. Woodland Period pottery was also recovered. The site is located approximately 100 feet south of the Senate Street Landing (Figure 13). Similar to Site 38RD224 the area around this site has been periodically cleared over the last 30 years. Pedestrian transects within the boundaries of the site were unable to relocate the well house, brick porch or house footings. The site remains unassessed as to its National Register eligibility. Plans call for the avoidance of this site during the proposed undertaking. It is recommended that monitoring occur during any road construction in the vicinity of this site.

38RD278 -- This site is an underwater resource located immediately west of 38RD234 (see Figure 13). The site was examined in the early 1980s by Cleveland Huey under South Carolina Underwater Salvage License 26. Historic ceramics, a pewter spoon and prehistoric ceramics were reportedly recovered. It is likely that this site represents a dumping area for the structure associated with 38RD334. This site has not been evaluated for the National Register and due to it being underwater was not revisited. The site is in the permit area and will be impacted by the Congaree River Sediment Removal Project. The boundaries of this site will be encompassed within the newly expanded boundary of site 38RD286 (see below). Recovery and evaluation of artifacts associated with this site should occur concurrently with the mitigation of 38RD286.

38RD286 The Ordnance Dump Site – This site was originally recorded as being within an unnamed tributary of the Congaree River, immediately south of the Gervais Street Bridge (Figure 14). It is the recorded location of where munitions captured by the Union during the invasion of Columbia were dumped.

On February 17, 1865 General Sherman's troops captured Columbia. During the two day occupation, live munitions and other weapons of war housed at the Palmetto Armory were





dumped into the Congaree River near the Gervais Street Bridge. According to Civil War Records:

A detail of 500 men each from the First and Second Brigades, properly officered for fatigue duty, together with the pioneer corps and fifty wagons, reported to Captain Buel, chief ordnance officer, to destroy public works, machinery, ordnance, ordnance stores, and ammunition, of which there were large quantities.

General John. E. Smith

According to General Smith it took 1200 men and 50 wagons from 1 P.M. February 18 to 6 P.M. February 19 to destroy the machinery, ordnance, ordnance stores and ammunition. Figure 15 provides a list of the ordnance captured.

Soon after Union troops departed Columbia ordnance recovery began. The accounts of J. F. Williams indicated that industrious citizens of Columbia were quick to salvage powder from the boxes of paper cartridges that had been left on the bank and for years after the war people would dive into the river and recover cannon balls and shells (Williams 1929).

Newspaper articles dating to the 1930s and more formal recovery attempts conducted in the 1970s and 1980s provide supporting evidence that Civil War ordnance is still present in the river. In June 1930, *The State* reported that two fishermen recovered ammunition from the area of a small tributary near the base of the Gervais Street Bridge. The discovery motivated New Brookland Mayor L. Hall and Councilman D. A. Spigner to organize a project to recover the artifacts. Their recovery was extensive and labor intensive. A coffer dam was erected approximately where Senate Street terminates at the river. After digging through the mud and silt the project collected six 10-inch cannonballs, 1,010 round rifle balls, 767 pointed rifle balls, a number of cast-iron copper fused explosive cannon shells; and cast iron lead butt explosive shells; three cast-iron cannon balls; one brass cap explosive, 11 3½-inch round cannon balls, 51 2-inch cannon balls; 2 6-inch cannon balls; 3 3½-inch time fuse explosive bombs; and an artillery axe (*The State* 1930). According to the article Hall and Spigner believed they had recovered practically all the ammunition that was deposited in the river. Based on the inventory presented in Figure 3, however, the 1930s recovery accounts for only a fraction of what may be present.

Eight years after the Hall and Spigner conducted their recovery, the *Spartanburg Herald* reported that two New Brookland high school boys found an artillery projectile in the Congaree River. The boys, Luther J. Morris and Knowiton Jeffcoat, apparently attempted to melt lead out of the round causing a minor explosion that brought the find to the attention of New Brookland authorities (*The Spartanburg Herald* 1938).

Beginning in the 1970s a number of formal recovery and salvage projects have been conducted at the sites. A majority of these projects have been conducted with licenses provided by the South Carolina Institute of Archaeology and Anthropology (SCIAA) under the Underwater Antiquities Act, providing a precedent for conducting the currently proposed project under a similar Salvage License. In the winter of 1976 an acoustic survey in the Congaree River below the Gervais Street Bridge was conducted to identify concentrations of ordnance and artifacts. Although conditions were not ideally suited for an acoustic survey the project identified a concentration of ferrous material below the Gervais Street Bridge (Finkelstein 1976).

Inventory of ordnance and ordnance stores captured in Columbia, S. C., February 17, 1865.

| | |
|--|-------------|
| Ball cartridges (no caps)..... | 1, 200, 000 |
| Percussion caps..... | 100, 000 |
| Powder..... pounds.. | 26, 150 |
| 12-pounder gun ammunition, fixed..... rounds.. | 1, 007 |
| 6-pounder gun ammunition, fixed..... do..... | 3, 852 |
| 24-pounder gun ammunition, fixed..... do..... | 546 |
| 8-inch shot and shell..... do..... | 2, 364 |
| 10-inch shot and shell..... do..... | 1, 320 |
| Stands of arms..... | 10, 410 |
| Unfinished arms..... | 6, 000 |
| 6-pounder guns..... | 14 |
| James guns..... | 2 |
| 12-pounder mountain howitzers..... | 5 |
| Blakely guns..... | 4 |
| 18-pounder rifled guns..... | 3 |
| Wiard gun..... | 1 |
| 3-inch rifle..... | 1 |
| 10-pounder guns..... | 2 |
| 4-inch gun..... | 1 |
| 4-inch mortars..... | 2 |
| 6-inch Coehorn..... | 1 |
| Bronze guns, caliber 1½ and 2 inches..... | 4 |
| 4-inch gun, smooth-bore..... | 1 |
| 10-pounder Parrotts..... | 2 |
| Repeating battery..... | 1 |
| Gun carriages..... | 9 |
| Gun caissons..... | 14 |
| Gun (mountain howitzer) caissons..... | 3 |
| Forges..... | 2 |
| Anvils..... | 4 |
| Blacksmiths' vises..... | 20 |
| Sponges and rammers..... | 1, 125 |
| Sabers, cavalry, artillery, and naval..... | 3, 100 |
| Saber knots..... | 700 |
| Pairs cavalry pistol holsters..... | 300 |
| Saber belts..... | 800 |
| Bayonet scabbards..... | 4, 000 |
| Cartridge-boxes (infantry)..... | 5, 150 |
| Cartridge-box plates..... | 3, 500 |
| Cartridge-box belts and plates..... | 2, 500 |
| Waist-belts..... | 2, 900 |
| Waist-belt plates..... | 3, 600 |
| Ball screws..... | 2, 000 |
| Pistol cartridge-boxes..... | 550 |
| Gunners' shot-pouches..... | 600 |
| Knapsacks..... | 1, 100 |
| Haversacks..... | 900 |
| Slow match..... yards.. | 500 |
| 10-inch fuses..... | 900 |
| Tents..... | 58 |

PHILIP MacCAHILL,

Lieut. and Actg. Ordnance Officer, First Div., Fifteenth Army Corps.

Figure 15. Inventory of ordnance captured during the occupation of Columbia.

Under a salvage license issued in 1980, diver Gerald Mahle discovered a cache of 10-inch cannon balls at the site. Mahle and his team estimated that 50 to 100 additional shot lay in the river. However, by the time they were able to return to the river divers associated with the Savannah River Dive Club in Hampton, South Carolina had removed the ordnance (Salvage License No. 26 file SCIAA).

Mahle continued work under the SCIAA permit from February through September 1981. Using a dragline, a backhoe and a gold dredge, Mahle and his team removed and screened sediment from

the river bed and apparently the alluvial fan near the foot of Senate Street. Fieldwork resumed in August 1981 using the backhoe for excavation. The project recovered numerous Civil War artifacts including a 3.5-inch shell, a 24-pound cannonball, two 10-inch shells and a post-Civil War projectile. Apparently the work did not produce sufficient material to justify continuation of the project (Salvage License No. 27 file SCIAA).

In 1983 a SCIAA Salvage License was issued for a metal detecting survey in the Congaree immediately south of the Gervais Street Bridge. Recovered artifacts associated with the Armory consist of 12 explosive shot for a 6-pounder cannon and one explosive shot for a 4-pounder (Salvage License No. 30 file SCIAA). Since the 1980s there are anecdotal reports of Civil War related artifacts being discovered in the river and on the alluvial fan at the terminus of Senate Street but there have been no additional formal recoveries.

Based on this information, there is sufficient documentary and formal survey evidence to establish the continuing presence of ordnance in this section of the river. With this in mind a series of magnetometer and side scan sonar surveys were conducted in advance of the Congaree River Sediment Clean-up project to determine the possible extent of ordnance within the contaminated area.

Over a period of 18 months, from 2010 to 2012, Tidewater Atlantic Research, Inc. conducted remote sensing surveys within the course of the river and on the eastern bank (Tidewater Atlantic Research 2010, 2011a, 2011b, 2012). The first phase of this work focused on the area from the Gervais Street to approximately 1500 feet downstream. The magnetometer survey identified 218 anomalies that were consistent with unexploded ordnance (UXO). Phase II of the survey began where Phase I ended and extended another 400 feet downstream. Ten anomalies that could be could represent UXO were identified in this phase. Phase III of the survey focused on the area from Unnamed Tributary 2 to just south of the Blossom Street Bridge. One hundred and twenty-two hits consistent with potential ordnance were recorded in this phase. Phase IV was the continuation of a terrestrial metal detector survey along the river bank and alluvial fan at the end of Senate Street. An additional 67 potential instances of UXO were recorded along the shoreline. Figure 16 is a map of the location of the magnetic anomalies. Attachment A provides a summary of magnetic anomaly survey along with a map detailing the precise locations of the possible UXO.

Based on the underwater survey work the boundaries of Site 38RD286 have expanded. The site now measures 90 meters east to west by 500 meters north to south. Historic documentation clearly indicates that disposal of the ordnance was a significant event associated with the capture and burning of Columbia. Historic accounts are clear and consistent as to the location of this site. Previous underwater salvage operations have confirmed the presence of Civil War ordnance and the underwater survey has confirmed the likelihood of additional artifacts. This site is recommended Eligible for the National Register of Historic Places under Criterion A based on its association with significant events related to the Civil War and Criterion D based on its potential to yield information important to history. This site will be adversely affected by the proposed undertaking. Mitigation will be required.

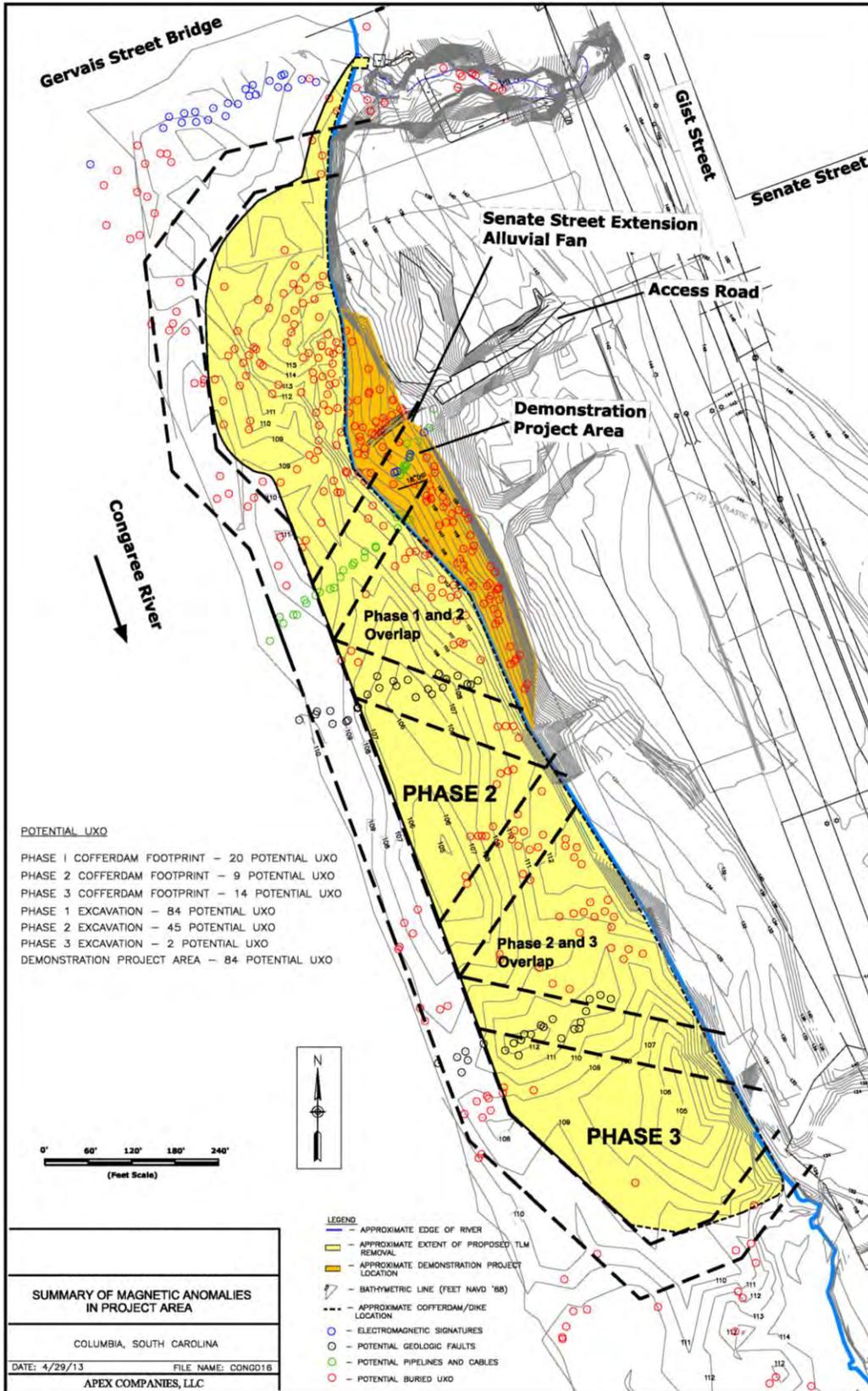


Figure 16. Locations of potential ordnance base on side magenetic anomalies.

National Register Listed Resources

New Brookland Historic District – The New Brookland District is approximately 0.25 miles west of the project area. This is a mill village constructed for the employees of the Columbia Duck Mill, the mill that was hydroelectrically powered by the Columbia Canal. A large number of commercial buildings and residences associated with the various growth phases of the mill are still present and in good condition. The mill district is screened by large trees that line the western bank of the Congaree River. The district cannot be seen from the project area (Figure 17) and will not be affected by the proposed undertaking.

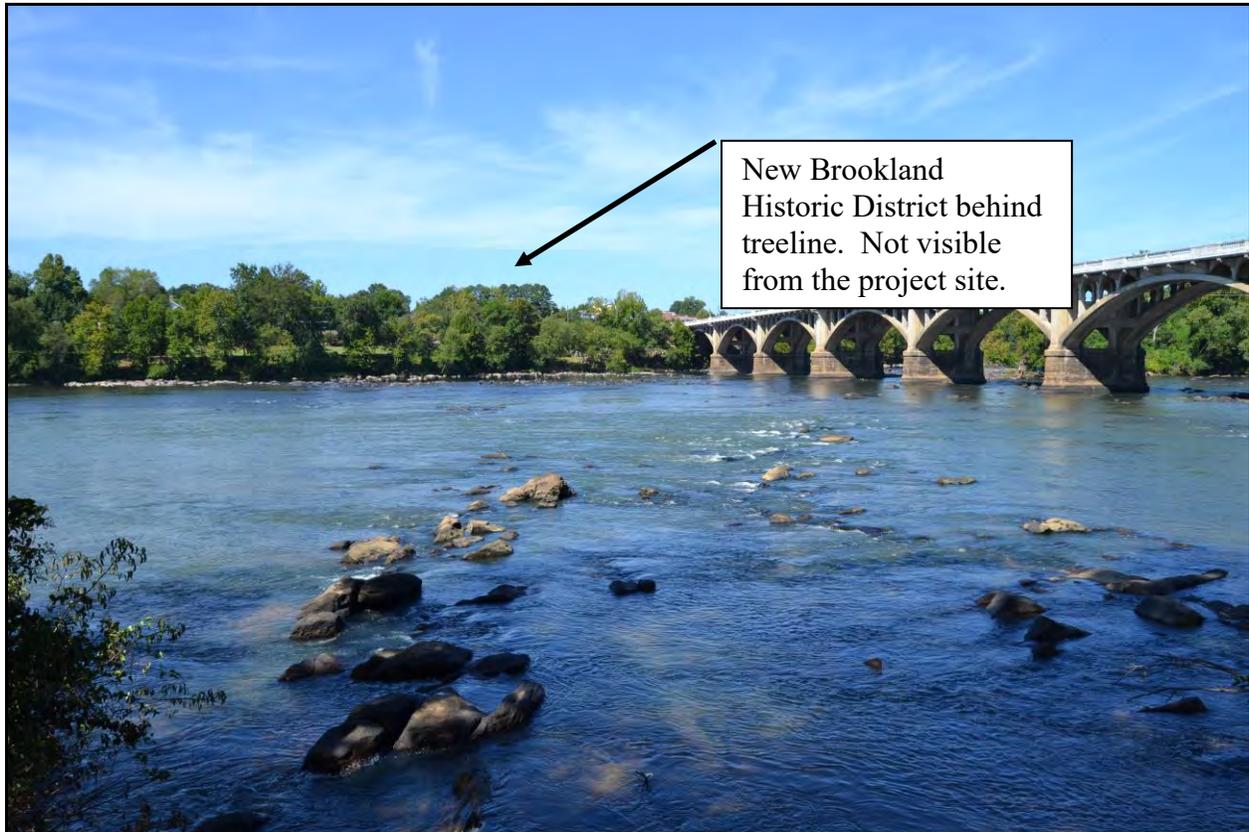


Figure 17. From the project area to the New Brookland Historic District.

Gervais Street Bridge – The Gervais Street Bridge is adjacent to the north side of the project area. Ferry crossings and bridges have historically been present in this approximate location since the 1790's. During the Union invasion of Columbia in 1865 the wooden bridge that was at this location was burned in an attempt to slow Sherman's troop advancement into the city. Another bridge was built at the same location and was owned privately until 1912 when it was purchased by Richland County (Figure 18). This bridge was demolished with completion of the current Gervais Street Bridge. Construction began on the current bridge 1926 and was completed in 1928. The 1415 foot bridge has nine open spandrel arch segments with closed arch spandrels at each end. Other than removal and repaving activities there have been no alterations to the bridge.

The bridge is one of four open spandrel arch bridges in South Carolina. It is significant for its design and its association with transportation and the growth of Columbia. It was listed on the National Register in 1978 as part of the Columbia Multiple Resource Area (National Register of Historic Places Nomination Form 1978).



Figure 18. Previous Gervais Street Bridge circa 1900 (photo courtesy of the Carolina Library).

The Congaree River Sediment Removal project proposes a temporary coffer dam immediately downstream of the the bridge. As stated previously the coffer dam will be constructed of rock/rip rap and will stand between 0 and 10 feet above the water line depending on river fluctuations. The coffer dam and the remediation project will have no effect on the design of the bridge nor will affect the bridge’s significant role in transportation. There is little remaining of any historic viewshed that may have been associated with the bridge. Billboards are present at both ends of the bridge and a large modern apartment building is located on its western side (Figure 19). Development and the skyline of downtown Columbia are also clearly visible from the bridge. The coffer dam will be a temporary construction and will provide no significant visual impact to an already compromised historic viewshed.

Columbia Canal – The Columbia Canal Historic District was listed on the National Register in 1979 under a number of areas of significance. It is considered archaeologically/historically significant based on the likelihood that excavation around intact portions of the canal could obtain detailed information on the construction of the canal bed and associated features. This information could, in turn, be compared to work done on other canals of the period. Excavation of the canal beds could also recover artifacts that would help interpret how the canal was utilized when it was active. The engineering techniques utilized in the construction of both the original 1824 canal and 1891 improvement are considered significant.

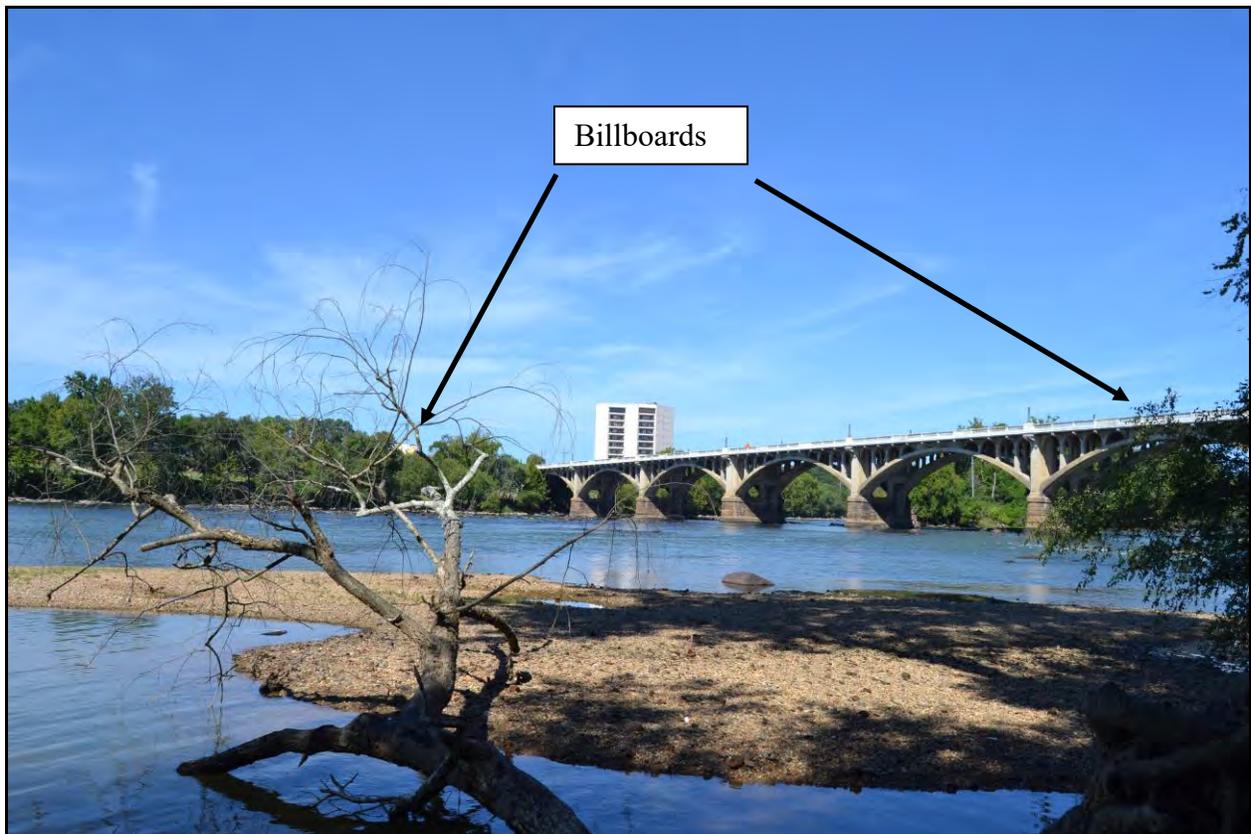


Figure 19. From project area to Gervais Street Bridge. Note modern apartment building.

The canal is also considered significant for the role it played in transportation and commerce. Because it was integral to the largest cotton shipping center in the state, the canal played a crucial role in the development of South Carolina's railroad system and the growth of Columbia. Expanding on the canal's role in commerce it was significant for its role in advancing industry in the state. From supporting ancillary small industries such as saw and grist mills to eventually becoming a valuable power source to larger mills the canal supported industry in Columbia. Finally the canal is considered significant under the category of "invention". In 1894 a large textile mill became the first in the country to use electrically generated power directly from a canal over a distance rather than an on-site power system like a waterwheel.

The original canal was constructed between 1820 and 1824. It was initially intended as a means of circumventing the unnavigable confluence of the Broad and Saluda rivers. This canal was over three miles long. It began above Richland Street on the Broad River and ended at Granby Ferry south of the project area. It had five turning basins with the largest being at the south end of Senate Street just north of the project tract. North of the Senate Street Turning Basin the canal was 12 feet wide and contained two and half feet of water. South of Senate Street, in the vicinity of the project area, the canal was 18 feet, contained four feet of water and was flanked by eight foot wide tow paths (Nomination Form 1978). With the increasing reliance on the railroad for shipping the 1824 canal was gradually allowed to deteriorate and by 1842 was used primarily to power waterwheels for mill sites rather than transport goods. Its route is visible on Russell's 1850 map of Columbia (Figure 20) and the 1870 Tingle map of the Columbia Canal (Figure 21).

In 1888 the Board of Trustees for the Columbia Canal approved a plan to develop the portion of the canal north of Gervais Street into a new power source for the city. This project involved widening the canal to 150 feet across and dredging it to a depth of 10 feet (Wilbur Smith and Associates 1979). The expanded canal was completed on November 21, 1891. Power houses and the associated Hydro Plant used for generating electricity for the Duck Mill opened up north of Gervais Street. South of Gervais the canal was abandoned.



Figure 20. Location of the Canal bed in relation to the project area in 1850.

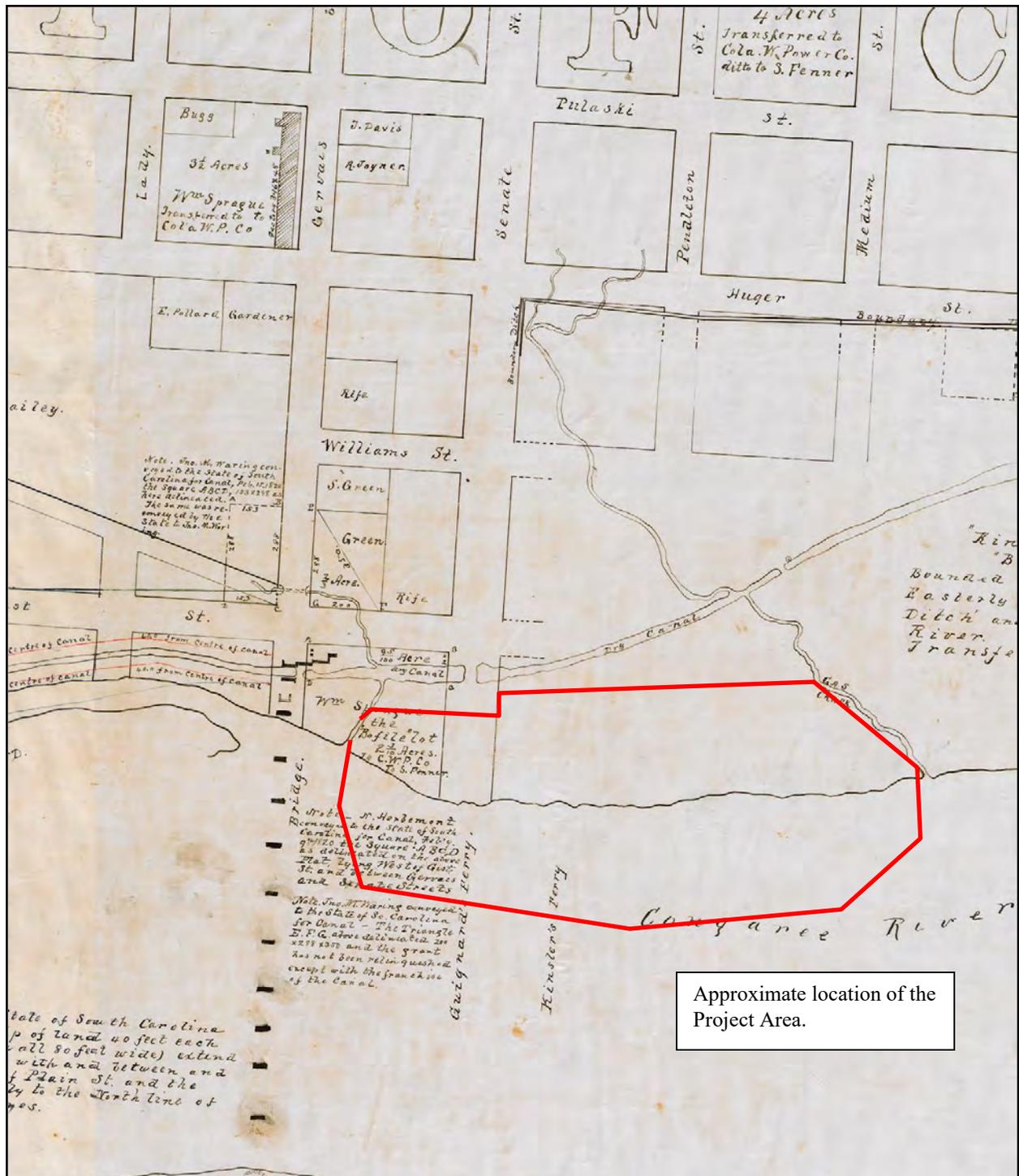


Figure 21. Location of the canal bed in relation to the project area in 1870.

The Hydro Plant was built in 1896. It furnished electricity for lights in the city of Columbia, as well as supplied current for public and private manufacturing and the Street Railway System. The plant is still operational and provides a large portion of power for the city. While the internal workings of the Hydro Plant have been updated and modified to meet today's demand for electricity the building itself remains much as it was when it was first built. It is a brick

structure with symmetrical arches that allow the canal to flow back into the river. The plant can be seen from the northern edge of the project area (Figure 22).



Figure 22. View from project location to Canal Hydro Plant, facing north.

The plant is part of the Columbia Canal Historic District and adds to the district's significant contribution to Industry and Invention. The proposed coffer dam will not affect those areas of significance. The historic viewshed of the Hydro Plant will also not be affected by the proposed undertaking.

The temporary coffer dam will be similar in appearance to the existing rip rap and stone embankment that currently abuts the Hydro Plant (Figure 23). The coffer dam will in fact be similar in construction to the canal itself. Canouts and Harmon (1981) note that an 1867 profile drawing shows the canal banks as rip rap along the river's edge. They also indicate that the 1891 canal had rip rap placed along erosional areas. Additionally there are numerous modern intrusions to the Hydro Plant's viewshed. The Edventure Children's Museum with its modern three story glass façade is adjacent to the plant compromising the historic integrity of Canal District (Figure 24). The proposed project will have no impact on the visual landscape of the Columbia Canal Historic District.



Figure 23. View from Columbia Canal Hydro Plant to project area. Note rip rap.



Figure 24. Example of modern buildings adjacent to the Canal Hydro Plant.

V. SUMMARY AND RECOMMENDATIONS

Five archaeological sites and three National Register Listed properties/districts were identified within or adjacent to the permit area. A background study and pedestrian survey were employed to determine if the proposed project would have any effect on significant cultural resources.

Project plans have been designed to avoid impacts to archaeological sites 38RD223, 38RD224 and 38RD234. These are upland, terrestrial sites that fall within the permit area. These sites were identified 33 years ago during a reconnaissance survey. At the time they were recorded all three sites had clearly visible, above ground components. In the intervening years periodic land clearing and maintenance appear to have displaced and removed the structural ruins associated with 38RD224 and 38RD234. Modern dumping has obscured the historic nature of the late nineteenth to early twentieth century bottle dump at 38RD223. These three sites potentially have intact subsurface deposits. Avoidance of these sites is recommended as they have not been evaluated for the NRHP. Monitoring is recommended during construction activities in the vicinity of these sites to ensure that no significant cultural deposits be impacted.

There are two underwater archaeological sites that were previously recorded in the project area. 38RD278 is a small scatter of historic and prehistoric artifacts. The historic artifacts may be associated with the historic structure recorded as site 38RD234. This site was not evaluated for the NRHP. It will be adversely impacted by the proposed undertaking. Site 38RD286 is the location where Union troops dumped ordnance from the Palmetto Armory during the capture and burning of Columbia. Recent magnetometer and side-scan SONAR surveys have led to an expansion of the boundary of this site. The site now measures 90 by 500 meters and encompasses site 38RD278. 38RD278 is effectively a component of the ordnance dump site. Historic accounts, past salvage operations and recent underwater survey work have led to the recommendation that this site is eligible for the NRHP. If this site cannot be avoided additional archaeological work will be required to mitigate the adverse effects of the Congaree Sediment Removal Project.

The project area is within the Columbia Canal Historic District. The project will not affect the integrity or National Register significance of the district nor will affect any individual components of the district such as the extant canal bed and the Columbia Canal Hydro Plant.

The Gervais Street Bridge is adjacent to the project area. The bridge is significant for its contribution to transportation and for its design. The project will cause no alteration to the bridge's design nor affect its role in transportation. The bridge is flanked by the City of Columbia to the east and Cayce to the west. The modern skyline associated with this metropolitan area is clearly visible from the bridge. The proposed project will have no effect on the viewshed of the bridge.

The New Brookland Historic District is across the river from the project area. This is a mill village for its intact architectural elements and its association with the Columbia Duck Mill, the mill that was hydroelectrically powered by the Columbia Canal. The project will be screened by large trees along the river banks and will have no effect on the significant elements of this district.

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ATTACHEMENT 1 – ANOMALY SUMMARY

DRAFT

Congaree River Anomaly Summary Congaree River Project Columbia, SC

Site Location

The report summarizes the results of the magnetometer surveying activities conducted in support of the South Carolina Electric and Gas (SCE&G) Company Congaree River Project located in Columbia, SC. The Congaree River begins at the confluence of the Saluda River and the Broad River in Columbia, SC. The portion of the Congaree relevant to this project is the approximate eastern third of the river beginning directly south of the Gervais Street Bridge and extending for approximately 3,700 feet downstream to approximately 500 feet below the Blossom Street Bridge. Figure 1 provides the location of the area in question.

Background Information

In June 2010, the South Carolina Department of Health and Environmental Control (SCDHEC) noted tar-like material (TLM) near the eastern shoreline of the Congaree River directly downstream of the Gervais Street Bridge. SCDHEC collected samples of this material and the analytical results indicated that the source of the TLM might be attributable to the former manufactured gas plants (MGP) that operated in Columbia starting in the mid-1800s and ending in the late 1940's to early 1950's. Predecessor companies of SCE&G operated the Huger Street manufactured gas plant (Huger Street MGP). Its location is provided on Figure 1. SCE&G has recently completed a removal action at the Huger Street site where over 125,000 tons of MGP impacted soil and debris was excavated and removed with oversight provided by SCDHEC.

SCE&G submitted a Project Delineation Report (PDR) [MTR, March 2012] to SCDHEC on March 23, 2012. SCDHEC approved the PDR on April 23, 2012. The PDR presented the results of delineation activities completed to determine the extent of the TLM within the river. The delineation work was completed in five separate phases over approximately 18 months. The magnetometer surveying operations described in this summary report were a component of the investigative activities and were necessary due to the potential presence of Civil War era explosive ordnance within the project area. Details pertaining to the ordnance are provided below.

Potential Presence of Historical Items and Unexploded Ordnance (UXO)

It has been confirmed that in 1865, during the Civil War, live munitions and other articles of war produced by the Confederacy were dumped into the Congaree River near the Gervais Street Bridge by Union forces under the direction of General Sherman. This activity took place during Sherman's occupation and subsequent destruction of Columbia. A list of munitions and other Confederate items captured by the Union forces is provided in Attachment A. The Union Army kept some of these items for its own use and the remainder was destroyed. One of the methods for destruction was dumping the items into the river.

Archeological investigations, conducted as late as 1980, recovered some live and unstable munitions or unexploded ordnance (UXO) from the area as well as some other potentially historically significant artifacts. Specifically this work was focused in and adjacent to the unnamed tributary that enters the river just south of the Gervais Street Bridge. Figure 2 shows this location and a daily activity log documenting some of the archeological work is provided in the initial Tidewater Atlantic Research Inc. report (Attachment B). Several live cannonballs were identified during this operation and properly disposed of by trained explosive ordnance disposal (EOD) personnel located at nearby Fort Jackson.

Due to the potential presence of live munitions within the project area, an additional reconnaissance and screening of the area in question was conducted as part of the investigative activities. Acoustic (side scan sonar) and magnetic (magnetometer) remote sensing surveying activities were completed in order to determine if potential munitions were present prior to conducting the sediment sampling activities. A description of these activities and their subsequent results are provided below.

Surveying Activities

Magnetometer surveying of the project area was conducted over four separate phases. The first phase was focused on the area directly downstream of the Gervais Street Bridge (grid lines 1 through 16 on Figure 2) and included some limited shoreline surveying near the Senate Street Extension Alluvial Fan (Figure 2). A sidescan sonar survey was also performed during Phase I. The purpose of the side scan sonar was to complement the magnetometer survey by potentially visually identifying objects (e.g., ordnance) that may be lying on the Congaree River bottom. The sidescan sonar survey results were inconclusive and it was not utilized in the subsequent phases.

Magnetometer surveying progressed downstream in conjunction with the continuing investigation activities with Phase II extending the survey area from grid line 16 to grid line 20. Survey of the unnamed tributary that is located south of the Gervais Street Bridge was also conducted during Phase II. Phase III encompassed the portions of the project area between grid lines 20 and 37 and Phase IV completed the shoreline surveying in the vicinity of the Senate Street Extension Alluvial Fan that was not conducted during the other phases due to access constraints.

The specific details pertaining to the surveying equipment and methodology are provided in the phase specific reports produced by Tidewater Atlantic Research Inc. provided in Attachment B. In general, depending on the area to be surveyed and the presence of rock outcrops and water level conditions, either a small boat with an outboard motor or an inflatable boat was utilized to carry the surveying equipment. The inflatable boat was pushed through areas where water levels and the presence of rocks precluded the use of the motorboat. Terrestrial surveying was done on foot with handheld and backpack mounted equipment.

The magnetometer surveys were generally run on north-south trending lines and were controlled via a differential global positioning system (DGPS) using a Trimble AgCPS 132 navigation system. HYPACK navigation software was used to translate the DGPS data into real-time data that was used to direct the survey along a predetermined grid or transects. In general, the magnetometer transects lines were located approximately 20 feet apart. In some areas of the river where obstructions were encountered and navigation had to be altered, the distance between the transect lines varied and could be decreased to less than 10 feet.

The magnetometer survey was performed with an EG&G Geometrics G-858 cesium magnetometer that is capable of +/- 0.001 gamma resolution. The magnetic data was collected at a frequency of six samples per second. The locations of the magnetic readings were determined from the DGPS.

The side scan sonar survey was performed from approximately the 4 to 16 Lines and boulders and shallow water prevented performing the survey above the 4 Line. A 445/900 kHz Klein System 3900 digital side scan sonar was employed. The side scan sonar data was horizontally tied to the DGPS and reconciled with the HYPACK survey software. Where navigation was possible, a total of five side scan sonar survey passes were made on a 50-foot transect spacing.

The magnetometer detects changes in earth's magnetic field that may be attributed to buried anthropogenic influences (e.g., UXOs, electrical cables, etc.) or naturally occurring geologic features (e.g., remnant thermal magnetism, ore bodies, etc.). Once the magnetometer data was collected it was systematically analyzed to identify potential targets. A variety of characteristics of the targets including configuration, areal extent, intensity and contrast with background were analyzed and compared to signature characteristics previously found to be reliable indicators of historic ordnance. The results are discussed below.

Results

Following each phase of fieldwork the accumulated data was analyzed and the potential UXO locations were identified. Table 1 provides the results of the magnetometer surveying activities by investigation phase and Figure 3 provides the anomaly locations for the project area. Each phase is also described in more detail in the phase specific reports provided in Attachment B. Table 2 provides a summary of the anomaly locations and interpretation and Table 3 provides a summary of the anomalies located within the planned project area and located in the planned cofferdam footprint.

As the historical and anecdotal evidence suggested, the majority of anomalies were located in the Phase I survey area nearest the Gervais Street Bridge and the boat apron. A total of 323 anomalies were detected in the Phase I area with 218 of those locations exhibiting signature characteristics that could be associated with ordnance. Some of the non-ordnance anomalies included discarded debris and appliances, an electrical cable crossing and a geologic feature.

Phase II produced 10 potential UXOs in grid lines 16 through 20 and an additional 8 in the unnamed tributary. For Phase III the number of anomalies continued to be relatively low from grid line 20 to 31 but increased directly downstream of the Blossom Street Bridge. This increase can be potentially attributable to more recent objects being thrown from the bridge and not necessarily historical UXO. The total number of targets for Phase III was 145 with 121 exhibiting signature characteristics that could be associated with ordnance.

Finally, Phase IV was conducted to obtain information in the area directly downstream of the boat apron, which was not completed during Phase I due to access constraints. A total of 84 anomalies were detected with 67 exhibiting signature characteristics that could be associated with ordnance. The total for all four phases of magnetometer surveying is 570 anomalies located within the investigated area with 425 or 75 percent of those potentially being ordnance.

Due to the nature of the potential historical objects and UXO deposited within the study area and their real or perceived value and/or potential hazard to public safety, the information contained in this summary report must remain confidential. This information was compiled by SCANA for use during completion of the investigative and subsequent remedial activities associated with the Congaree River Project. Any use or dissemination of the information for other purposes is not permitted and may be subject to legal action.

TABLE 1
MAGNETOMETER STUDY RESULTS SUMMARY

**Congaree River Sediments
Columbia, South Carolina**

| Study | Dates | Study Area | Total Magnetic Anomalies | Potential Ordnance (UXO) | Other Anomalies |
|--------------------------------------|-------------------------------|---|---------------------------------|---------------------------------|------------------------|
| Phase I | Aug. 25-26, 2010 | Congaree River - Grid Lines: 1 thru 16 | 323 | 218 | 105 |
| Phase II | Jan. 4-5, 2011 | Congaree River - Grid Lines: 16 thru 20 | 10 | 10 | 0 |
| | | Unnamed Tributary #1 - Outfall to River | 8 | 8 | 0 |
| Phase III | June 30, 2011 | Congaree River - Grid Lines: 20 thru 37 | 145 | 122 | 23 |
| Phase IV | January 31 - February 2, 2012 | Senate Street Extension / Alluvial Fan Area | 84 | 67 | 17 |
| Total Anomalies | | | 570 | 425 | 145 |
| Percentage with UXO Potential | | | | 75% | |

Notes:

1. All magnetometer work was completed by Tidewater Atlantic Research, Inc of Washington, North Carolina.
2. Magnetic Anomalies - As determined by Tidewater by the magnetic, remote-sensing survey.
3. UXO - Unexploded Ordnance
4. UXO Potential - Referring to Magnetic Anomalies that "have signature characteristics that could be associated with ordnance" and "those anomalies should be considered potentially hazardous until material generating the signatures can be identified".
5. Other - Other magnetic anomalies include pipelines, geologic features, modern debris etc.

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

Congaree River Sediments
Columbia, South Carolina

| Designation | Characteristics | Potential Interpretation |
|-------------|------------------|--------------------------|
| 1 | 078-1-nm262g175f | Geological Feature |
| 2 | 078-2-dp280g49f | Pipeline |
| 3 | 078-3-mc48g59f | Possible Ordnance |
| 4 | 078-5-mc1854g71f | Possible Ordnance |
| 5 | 077-1-nm758g34f | Possible Ordnance |
| 6 | 077-2-mc40g45f | Possible Ordnance |
| 7 | 077-3-mc52g76f | Possible Ordnance |
| 8 | 077-4-pm203g68f | Pipeline |
| 9 | 077-5-pm320g176f | Geological Feature |
| 10 | 077-6-30g18f | Possible Ordnance |
| 11 | 077-7-dp57g58f | Possible Ordnance |
| 12 | 077-8-dp63g83f | Geological Feature |
| 13 | 077-9-mc149g71f | Possible Ordnance |
| 14 | 076-1-pm130g44f | Possible Ordnance |
| 15 | 076-2-pm137g288f | Possible Ordnance |
| 16 | 076-3-nm31g37f | Possible Ordnance |
| 17 | 076-4-nm34g49f | Possible Ordnance |
| 18 | 076-5-pm307g190f | Geological Feature |
| 19 | 076-6-pm510g66f | Pipeline |
| 20 | 076-7-mc76g69f | Possible Ordnance |
| 21 | 076-8-mc627g66f | Possible Ordnance |
| 22 | 075-1-dp116g50f | Possible Ordnance |
| 23 | 075-2nm18g40f | Possible Ordnance |
| 24 | 075-3-dp52g65f | Possible Ordnance |
| 25 | 075-4-dp70g65f | Possible Ordnance |
| 26 | 075-5-pm301g60f | Pipeline |
| 27 | 075-5-pm289g178f | Geological Feature |
| 28 | 075-7-dp36g30f | Possible Ordnance |
| 29 | 075-8-nm59g80f | Possible Ordnance |
| 30 | 075-9-pm48g35f | Geological Feature |
| 31 | 075-10-pm125g70f | Possible Ordnance |
| 32 | 074-1-dp207g40f | Possible Ordnance |
| 33 | 074-2-dp121g40f | Geological Feature |
| 34 | 074-3-pm32g20f | Possible Ordnance |
| 35 | 074-4-pm288g215f | Geological Feature |
| 36 | 074-5-nm861g50f | Pipeline |
| 37 | 074-6-pm27g20f | Possible Ordnance |
| 38 | 074-7-dp42g40f | Possible Ordnance |
| 39 | 074-8-dp71g65f | Possible Ordnance |
| 40 | 074-9-nm58g90f | Possible Ordnance |
| 41 | 073-1-nm36g22f | Possible Ordnance |
| 42 | 073-2-nm21g30f | Possible Ordnance |
| 43 | 073-3-dp21g40f | Possible Ordnance |
| 44 | 073-4-dp149g65f | Possible Ordnance |
| 45 | 073-5-dp527g60f | Pipeline |
| 46 | 073-6-pm302g199f | Geological Feature |
| 47 | 073-7-pm41g18f | Possible Ordnance |
| 48 | 073-8-nm60g70f | Possible Ordnance |
| 49 | 073-9-dp64g31f | Geological Feature |
| 50 | 073-10-dp42g17f | Possible Ordnance |
| 51 | 072-1-pm46g11f | Possible Ordnance |
| 52 | 072-2-pm88g23f | Geological Feature |
| 53 | 072-3-pm310g167f | Geological Feature |
| 54 | 072-4-pm2310g36f | Pipeline |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 55 | 072-5-dp62g49' | Possible Ordnance |
| 56 | 071-1-nm28g10f | Possible Ordnance |
| 57 | 071-2-pm46g62f | Possible Ordnance |
| 58 | 071-3-pm170g55f | Possible Ordnance |
| 59 | 071-4-dp494g96f | Pipeline |
| 60 | 071-5-pm324g202f | Geological Feature |
| 61 | 071-6-pm117g97f | Geological Feature |
| 62 | 071-7-pm70g33f | Possible Ordnance |
| 63 | 070-1-pm66g25f | Possible Ordnance |
| 64 | 070-2-pm251g132f | Geological Feature |
| 65 | 070-3-dp235g21f | Possible Ordnance |
| 66 | 070-4-nm549g33f | Pipeline |
| 67 | 070-5-pm159g46f | Possible Ordnance |
| 68 | 070-6-nm36g18f | Possible Ordnance |
| 69 | 070-7-dp48g55f | Possible Ordnance |
| 70 | 070-8-nm44g15f | Possible Ordnance |
| 71 | 069-1-dp23g10f | Possible Ordnance |
| 72 | 069-2-dp78g44f | Possible Ordnance |
| 73 | 069-3-nm1841g50f | Pipeline |
| 74 | 069-4-dp252g53f | Possible Ordnance |
| 75 | 069-5-pm214g155f | Geological Feature |
| 76 | 069-6-pm63g17f | Geological Feature |
| 77 | 068-1-pm72g94f | Geological Feature |
| 78 | 068-2-dp238g167f | Possible Ordnance |
| 79 | 068-3-nm402g55f | Pipeline |
| 80 | 068-4-dp38g40f | Possible Ordnance |
| 81 | 067-1-dp32g38f | Possible Ordnance |
| 82 | 067-2-mc181g93f | Pipeline |
| 83 | 067-3-pm221g300f | Geological Feature |
| 84 | 067-5-mc68g90f | Geological Feature |
| 85 | 067-6-dp22g30f | Possible Ordnance |
| 86 | 066-1-dp61g40f | Geological Feature |
| 87 | 066-2-pm182g193f | Geological Feature |
| 88 | 066-3-nm190g95f | Pipeline |
| 89 | 066-4-dp127g77f | Possible Ordnance |
| 90 | 066-5-dp48g18f | Possible Ordnance |
| 91 | 066-6-nm43g42f | Possible Ordnance |
| 92 | 066-7-pm27g10f | Possible Ordnance |
| 93 | 066-8-dp9g10f | Possible Ordnance |
| 94 | 065-1-dp143g31f | Possible Ordnance |
| 95 | 065-2-nm19g10f | Possible Ordnance |
| 96 | 065-3-pm11g7f | Possible Ordnance |
| 97 | 065-4-dp32g60f | Possible Ordnance |
| 98 | 065-5-dp127g20f | Possible Ordnance |
| 99 | 065-6-nm363g52f | Pipeline |
| 100 | 065-7-pm176g186f | Geological Feature |
| 101 | 065-8-pm24g38f | Possible Ordnance |
| 102 | 065-9-pm44g37f | Possible Ordnance |
| 103 | 065-10-mc69g110f | Geological Feature |
| 104 | 064-1-pm108g121f | Geological Feature |
| 105 | 064-2-mc67g61f | Possible Ordnance |
| 106 | 064-3-pm27g21f | Possible Ordnance |
| 107 | 064-4-pm193g210f | Geological Feature |
| 108 | 064-5-nm363g63f | Pipeline |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 109 | 064-6-pm63g16f | Possible Ordnance |
| 110 | 064-7-dp415g60f | Possible Ordnance |
| 111 | 063-1-dp395g68f | Possible Ordnance |
| 112 | 063-2-pm67g14f | Possible Ordnance |
| 113 | 063-3-nm188g73f | Possible Ordnance |
| 114 | 063-4-nm334g26f | Pipeline |
| 115 | 063-5-pm224g187f | Geological Feature |
| 116 | 063-6-pm111g143f | Geological Feature |
| 117 | 062-1-pm99g136f | Geological Feature |
| 118 | 062-2-pm203g163f | Geological Feature |
| 119 | 062-3-nm257g48f | Pipeline |
| 120 | 062-4-dp373g110f | Possible Ordnance |
| 121 | 062-5-mc68g107f | Possible Ordnance |
| 122 | 062-6-pm59g55f | Possible Ordnance |
| 123 | 061-1-pm127g57f | Possible Ordnance |
| 124 | 061-2-pm182g43f | Possible Ordnance |
| 125 | 061-3-pm113g52f | Possible Ordnance |
| 126 | 061-4-nm198g67f | Pipeline |
| 127 | 061-5-pm225g210f | Geological Feature |
| 128 | 061-6-pm112g147f | Geological Feature |
| 129 | 060-1-pm109g18f | Geological Feature |
| 130 | 060-2-pm66g46f | Possible Ordnance |
| 131 | 060-3-pm246g205f | Geological Feature |
| 132 | 060-4-nm107g38f | Pipeline |
| 133 | 060-5-dp288g93f | Possible Ordnance |
| 134 | 059-1-nm124g99f | Possible Ordnance |
| 135 | 059-2-dp73g64f | Possible Ordnance |
| 136 | 059-3-pm240g200f | Geological Feature |
| 137 | 059-4-dp76g55f | Possible Ordnance |
| 138 | 059-5-dp140g102f | Possible Ordnance |
| 139 | 059-6-dp241g37f | Geological Feature |
| 140 | 058-1-dp114g101f | Geological Feature |
| 141 | 058-2-nm65g51f | Possible Ordnance |
| 142 | 058-3-pm87g33f | Possible Ordnance |
| 143 | 058-4-mc248g200f | Geological Feature |
| 144 | 058-5-nm44g15f | Possible Ordnance |
| 145 | 058-6-dp137g91f | Possible Ordnance |
| 146 | 057-1-pm144g94f | Pipeline |
| 147 | 057-2-pm67g62f | Possible Ordnance |
| 148 | 057-3-dp54g14f | Possible Ordnance |
| 149 | 057-4-mc231g180f | Geological Feature |
| 150 | 057-5-pm55g57f | Possible Ordnance |
| 151 | 057-6-nm30g36f | Possible Ordnance |
| 152 | 057-7-dp138g78f | Possible Ordnance |
| 153 | 057-8-dp135g41f | Geological Feature |
| 154 | 056-1-pm144g157f | Geological Feature |
| 155 | 056-2-nm36g22f | Possible Ordnance |
| 156 | 056-3-pm129g33f | Possible Ordnance |
| 157 | 056-4-dp34g15f | Possible Ordnance |
| 158 | 056-5-dp83g70f | Possible Ordnance |
| 159 | 056-6-mc210g153f | Geological Feature |
| 160 | 056-7-dp53g21f | Possible Ordnance |
| 161 | 056-8-dp103g46f | Possible Ordnance |
| 162 | 056-9-mc178g110f | Pipeline |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 163 | 055-1-pm277g110f | Pipeline |
| 164 | 055-2-nm75g32f | Possible Ordnance |
| 165 | 055-3-dp54g15f | Possible Ordnance |
| 166 | 055-4-pm127g62f | Possible Ordnance |
| 167 | 055-5-pm195g58f | Geological Feature |
| 168 | 055-6-dp221g64f | Possible Ordnance |
| 169 | 055-7-dp28g10f | Possible Ordnance |
| 170 | 055-8-pm146g36f | Possible Ordnance |
| 171 | 055-9-dp18g20f | Possible Ordnance |
| 172 | 055-10-pm136g123f | Geological Feature |
| 173 | 054-1-dp65g44f | Possible Ordnance |
| 174 | 054-2-dp66g30f | Possible Ordnance |
| 175 | 054-3-dp62g38f | Possible Ordnance |
| 176 | 054-4-pm196g90f | Geological Feature |
| 177 | 054-5-dp100g48f | Possible Ordnance |
| 178 | 054-6-dp106g20f | Possible Ordnance |
| 179 | 054-7-dp47g15f | Possible Ordnance |
| 180 | 054-8-pm479g50f | Pipeline |
| 181 | 053-1-nm71g18f | Possible Ordnance |
| 182 | 053-2-nm21g26f | Possible Ordnance |
| 183 | 053-3-mn90g46f | Possible Ordnance |
| 184 | 053-4-dp26g17f | Possible Ordnance |
| 185 | 053-5-nm32g15f | Possible Ordnance |
| 186 | 053-6-pm71g56f | Possible Ordnance |
| 187 | 053-7-pm199g57f | Geological Feature |
| 188 | 053-8-nm111g38f | Iron Pipe |
| 189 | 053-9-nm51g20f | Possible Ordnance |
| 190 | 0543-10-dp43g40f | Possible Ordnance |
| 191 | 053-11-nm70g66f | Possible Ordnance |
| 192 | 053-12-pm115g105f | Geological Feature |
| 193 | 052-1-pm129g142f | Geological Feature |
| 194 | 052-2-dp99g63f | Possible Ordnance |
| 195 | 052-3-mc292g160f | Iron Pipe |
| 196 | 052-4-dp60g42f | Possible Ordnance |
| 197 | 052-5-pm63g30f | Possible Ordnance |
| 198 | 052-6-dp47g12f | Possible Ordnance |
| 199 | 052-7-dp251g53f | Possible Ordnance |
| 200 | 051-1-mc601g117f | Iron Pipe |
| 201 | 051-2-nm97g26f | Possible Ordnance |
| 202 | 050-1-nm94g33f | Possible Ordnance |
| 203 | 050-2-dp102g45f | Possible Ordnance |
| 204 | 050-3-pm50g17f | Possible Ordnance |
| 205 | 050-4-pm818g20fEOL | Possible Ordnance |
| 206 | 049-1-pm112g64f | Possible Ordnance |
| 207 | 049-2-pm111g78f | Possible Ordnance |
| 208 | 049-3-dp74g66f | Possible Ordnance |
| 209 | 049-4-dp75g70f | Possible Ordnance |
| 210 | 048-1-nm74g38f | Possible Ordnance |
| 211 | 048-2-dp13g14f | Possible Ordnance |
| 212 | 049-3-nm104g28f | Possible Ordnance |
| 213 | 048-4-pm127g53f | Possible Ordnance |
| 214 | 048-5-pm22g28f | Possible Ordnance |
| 215 | 047-1-nm119g46fEOL | Possible Ordnance |
| 216 | 047-2-dp13g15f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

Congaree River Sediments
Columbia, South Carolina

| Designation | Characteristics | Potential Interpretation |
|-------------|--------------------|--------------------------|
| 217 | 047-3-nm89g33f | Possible Ordnance |
| 218 | 046-1-nm223g37f | Possible Ordnance |
| 219 | 078-1-pm1949g7f | Possible Ordnance |
| 220 | 068-1-dp311g7f | Possible Ordnance |
| 221 | 045-1-mc6548g8f | Electromagnetic Anomaly |
| 222 | 062L-1-pm150g5f | Possible Ordnance |
| 223 | 062L-2-nm109g11f | Possible Ordnance |
| 224 | 061L-1-nm135g4f | Possible Ordnance |
| 225 | 061L-2-pm95g6f | Possible Ordnance |
| 226 | 061L-3-dp105g20f | Possible Ordnance |
| 227 | 060L-1-pm113g3f | Possible Ordnance |
| 228 | 060L-2dp93g27f | Possible Ordnance |
| 229 | 059L-1-nm150g25f | Possible Ordnance |
| 230 | 058L-1-pm302g11f | Possible Ordnance |
| 231 | 058L-2-pm79g16f | Possible Ordnance |
| 232 | 057L-1-dp257g7f | Possible Ordnance |
| 233 | 056L-dp150g11f | Possible Ordnance |
| 234 | 056L-2-pm43g10f | Possible Ordnance |
| 235 | 055L-1-dp201g11f | Possible Ordnance |
| 236 | 054L-1-nm166g9f | Possible Ordnance |
| 237 | 001SL-1-pm4902g20 | Boiler |
| 238 | 001SL-2-pm4554g4f | Possible Ordnance |
| 239 | 001SL-3-mc8907g11f | Electromagnetic Anomaly |
| 240 | 002SL-1-dp8978g9f | Possible Ordnance |
| 241 | 002SL-2-dp3987g7f | Possible Ordnance |
| 242 | 002SL-3-mc7345g7f | Possible Ordnance |
| 243 | 003SL-1-pm269g10f | Possible Ordnance |
| 244 | 003SL-2-pm515g7f | Possible Ordnance |
| 245 | 003SL-3-nm80g5f | Possible Ordnance |
| 246 | 003SL-4-dp168g19f | Boiler |
| 247 | 003SL-5-pm129g6f | Washing Machine |
| 248 | 060L-1-nm105g20f | Possible Ordnance |
| 249 | 059L-1-nm279g5f | Possible Ordnance |
| 250 | 059L-2-pm423g34f | Possible Ordnance |
| 251 | 058L-1-dp209g6f | Possible Ordnance |
| 252 | 058L-2-pm35g11f | Possible Ordnance |
| 253 | 057L-1-nm17g11f | Possible Ordnance |
| 254 | 057L-2-pm98g8f | Possible Ordnance |
| 255 | 057L-3-pm37g9f | Possible Ordnance |
| 256 | 057L-4-pm38g11f | Possible Ordnance |
| 257 | 057L-5-dp75g10f | Sign |
| 258 | 056L-1-mc8186g11f | Possible Ordnance |
| 259 | 055L-1-mc5360g20f | Possible Ordnance |
| 260 | 055L-2-nm357g19f | Possible Ordnance |
| 261 | 054L-1-261g11f | Possible Ordnance |
| 262 | 054L-2-pm312g8f | Possible Ordnance |
| 263 | 053L-1-nm110g9f | Possible Ordnance |
| 264 | 053L2-dp109g16f | Possible Ordnance |
| 265 | 052L-1-dp286g3f | Manhole |
| 266 | 052L-2-pm327g9f | Possible Ordnance |
| 267 | 052L-3-nm248g21f | Possible Ordnance |
| 268 | 052L-4-dp259g26f | Possible Ordnance |
| 269 | 051L-1-nm109g13f | Possible Ordnance |
| 270 | 067-1-dp48g33f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 271 | 067-2-dp142g44f | Possible Ordnance |
| 272 | 0701-dp480g13f | Possible Ordnance |
| 273 | 070-2-pm49g11f | Possible Ordnance |
| 274 | 072-1-pm89g13f | Possible Ordnance |
| 275 | 073-1-nm80g5f | Possible Ordnance |
| 276 | 073-2-nm356g23f | Possible Ordnance |
| 277 | 075-1-nm364g11f | Possible Ordnance |
| 278 | 075-2-dp1039g39f | Possible Ordnance |
| 279 | 077-1-dp123g14f | Possible Ordnance |
| 280 | 077-2-dp776g30f | Possible Ordnance |
| 281 | 078R-3mc8302g20f | Electromagnetic Anomaly |
| 282 | 068-1-dp320g7f | Possible Ordnance |
| 283 | 068R-2-mc9213g15f | Electromagnetic Anomaly |
| 284 | 066R-1-mc8334g15f | Electromagnetic Anomaly |
| 285 | 065R-1-mc8486g18f | Electromagnetic Anomaly |
| 286 | 064R-1-mc9633g18f | Electromagnetic Anomaly |
| 287 | 063R-1-mc9404g19f | Electromagnetic Anomaly |
| 288 | 062R-2-mc9746g18f | Electromagnetic Anomaly |
| 289 | 061R-1-mc7773g16f | Electromagnetic Anomaly |
| 290 | 060R-1-mc8127g8f | Electromagnetic Anomaly |
| 291 | 059R-1-mc5961g11f | Electromagnetic Anomaly |
| 292 | 058R-1-mc6758g17f | Electromagnetic Anomaly |
| 293 | 057R-1-mc7119g24f | Electromagnetic Anomaly |
| 294 | 056R-1-mc7891g16f | Electromagnetic Anomaly |
| 295 | 055R-1-mc6461g17f | Electromagnetic Anomaly |
| 296 | 054R-1-mc9645g16f | Electromagnetic Anomaly |
| 297 | 053R-1-mc6680g13f | Electromagnetic Anomaly |
| 298 | 052R-1-mc9795g10f | Electromagnetic Anomaly |
| 299 | 051R-1-mc6531g15f | Electromagnetic Anomaly |
| 300 | 050R-1-mc6531g14f | Electromagnetic Anomaly |
| 301 | 049R-1-mc9574g7f | Electromagnetic Anomaly |
| 302 | 048R-1-mc6550g12f | Electromagnetic Anomaly |
| 303 | 047BR-1-mc6477g7f | Electromagnetic Anomaly |
| 304 | 045R-1mc6548g8f | Electromagnetic Anomaly |
| 305 | 003-4-dp103g12f | Possible Ordnance |
| 306 | 004-1-pm93g10f | Possible Ordnance |
| 307 | 003-3-pm58g16f | Possible Ordnance |
| 308 | 002-1-dp38g9f | Possible Ordnance |
| 309 | 003-2-pm96g11f | Possible Ordnance |
| 310 | 004-3-pm95g12f | Possible Ordnance |
| 311 | 001-1-pm54g6f | Possible Ordnance |
| 312 | 006-2-nm207g12f | Possible Ordnance |
| 313 | 004-2-pm81g9f | Possible Ordnance |
| 314 | 003-1-pm19g4f | Possible Ordnance |
| 315 | 004-4-pm78g8f | Possible Ordnance |
| 316 | 006-1-dp191g16f | Possible Ordnance |
| 317 | 002-2-dp53g11f | Possible Ordnance |
| 318 | 004-5-pm85g11f | Possible Ordnance |
| 319 | 004-6-pm71g10f | Possible Ordnance |
| 320 | 004-7-pm82g12f | Possible Ordnance |
| 321 | 004-8-dp156g19f | Possible Ordnance |
| 322 | 002-3-nm32g8f | Possible Ordnance |
| 323 | 053L-4-dp437g70f | Iron Pipe |
| 324 | 022-1-pm100g25f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 325 | 021-2-nm400g25f | Possible Ordnance |
| 326 | 021-2-pm70g20f | Possible Ordnance |
| 327 | 012-1-pm270g23f | Possible Ordnance |
| 328 | 011-1-dp225g75f | Possible Ordnance |
| 329 | 010-1-nm50g15f | Possible Ordnance |
| 330 | 020-1-dp22g15f | Possible Ordnance |
| 331 | 016-1-pm38g37f | Possible Ordnance |
| 332 | 020-2-dp23g13f | Possible Ordnance |
| 333 | 020-3-dp18g16f | Possible Ordnance |
| 334 | A | Possible Ordnance |
| 335 | B | Possible Ordnance |
| 336 | C | Possible Ordnance |
| 337 | D | Possible Ordnance |
| 338 | E | Possible Ordnance |
| 339 | F | Possible Ordnance |
| 340 | G | Possible Ordnance |
| 341 | H | Possible Ordnance |
| 342 | 1-1-mc806g44f | Possible Ordnance |
| 343 | 1-2-pm100g9f | Possible Ordnance |
| 344 | 1-3-dp533g47f | Possible Ordnance |
| 345 | 1-4-dp233g24f | Possible Ordnance |
| 346 | 1-5-pm73g13f | Possible Ordnance |
| 347 | 1-6-dp210g33f | Possible Ordnance |
| 348 | 22-1-dp544g65f | Pipeline |
| 349 | 21-1-pm323g42f | Possible Ordnance |
| 350 | 21-2-dp1330g64f | Pipeline |
| 351 | 20-1-dp94g25f | Possible Ordnance |
| 352 | 20-2-dp2601g102f | Pipeline |
| 353 | 19-1-pm79g8f | Possible Ordnance |
| 354 | 19-2-pm113g18f | Possible Ordnance |
| 355 | 19-3-dp154g31f | Possible Ordnance |
| 356 | 19-3-dp1419g86f | Pipeline |
| 357 | 18-1-dp333g16f | Possible Ordnance |
| 358 | 18-2-dp40g17f | Possible Ordnance |
| 359 | 18-3-dp105g24f | Possible Ordnance |
| 360 | 18-4-dp196g34f | Possible Ordnance |
| 361 | 18-5-pm13g8f | Possible Ordnance |
| 362 | 18-6-dp2092g60f | Pipeline |
| 363 | 18-6-dp83g22f | Possible Ordnance |
| 364 | 18-7-dp?1687+g18+f | Pipeline |
| 365 | 17-1-dp1497g47f | Pipeline |
| 366 | 17-2-dp47g44f | Possible Ordnance |
| 367 | 17-3-pm29g16f | Possible Ordnance |
| 368 | 17-4-mc53g35f | Possible Ordnance |
| 369 | 16-1-nm61g10f | Possible Ordnance |
| 370 | 16-2-dp136g17f | Possible Ordnance |
| 371 | 16-3-pm50g27f | Possible Ordnance |
| 372 | 16-5-dp10g6f | Possible Ordnance |
| 373 | 16-6-pm47g26f | Possible Ordnance |
| 374 | 15-1-dp59g30f | Possible Ordnance |
| 375 | 15-2-pm43g16f | Possible Ordnance |
| 376 | 15-3-dp304g29f | Possible Ordnance |
| 377 | 14-1-dp136g21f | Possible Ordnance |
| 378 | 14-2-dp185g32f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 379 | 14-4-pm95g31f | Possible Ordnance |
| 380 | 10-1-nm29g25f | Possible Ordnance |
| 381 | 10-2-dp31g260f | Possible Ordnance |
| 382 | 10-2-nm57g13f | Possible Ordnance |
| 383 | 13-1-dp66g23f | Possible Ordnance |
| 384 | 13-2-pm40g21f | Possible Ordnance |
| 385 | 13-3-pm27g17f | Possible Ordnance |
| 386 | 13-4-dp46g10f | Possible Ordnance |
| 387 | 12-1-dp40g30f | Possible Ordnance |
| 388 | 12-2-pm46g33f | Possible Ordnance |
| 389 | 11-1-pm22g39f | Possible Ordnance |
| 390 | 11-2-pm39g31f | Possible Ordnance |
| 391 | 10-1-dp95g21f | Possible Ordnance |
| 392 | 9-1-dp78g23f | Possible Ordnance |
| 393 | 8-1-dp247g13f | Possible Ordnance |
| 394 | 7-1-dp180g23f | Possible Ordnance |
| 395 | 7-2-dp145g20f | Possible Ordnance |
| 396 | 6-1-dp138g15f | Possible Ordnance |
| 397 | 6-2-dp235g26f | Possible Ordnance |
| 398 | 5-1-pm103g31f | Possible Ordnance |
| 399 | 5-2-dp53g57f | Possible Ordnance |
| 400 | 4-1-pm103g15f | Possible Ordnance |
| 401 | 4-2-dp49g12f | Possible Ordnance |
| 402 | 2-1-pm110g13f | Possible Ordnance |
| 403 | 15-1-mc16g4f | Possible Ordnance |
| 404 | 14-1-dp68g16f | Possible Ordnance |
| 405 | 13-1-dp53g7f | Possible Ordnance |
| 406 | 13-2-dp188g28f | Possible Ordnance |
| 407 | 12-1-pm11g29f | Possible Ordnance |
| 408 | 11-1-dp528g20f | Possible Ordnance |
| 409 | 9-1-dp342g22f | Possible Ordnance |
| 410 | 8-1-dp135g24f | Possible Ordnance |
| 411 | 8-2-dp72g23f | Possible Ordnance |
| 412 | 8-1-dp34g16f | Possible Ordnance |
| 413 | 6-1-pm32g5f | Possible Ordnance |
| 414 | 5-1-dp47g21f | Possible Ordnance |
| 415 | 4-1-dp218g25f | Possible Ordnance |
| 416 | 4-2-dp80g21f | Possible Ordnance |
| 417 | 3-1-dp146g27f | Possible Ordnance |
| 418 | 3-2-pm123g17f | Possible Ordnance |
| 419 | 3-3-dp85g22f | Possible Ordnance |
| 420 | 1-1-dp112g18f | Possible Ordnance |
| 421 | 22-1-dp122g37f | Possible Ordnance |
| 422 | 22-3-nm28g10f | Possible Ordnance |
| 423 | 22-2-pm17g10f | Possible Ordnance |
| 424 | 1-1-pm73g12f | Possible Ordnance |
| 425 | 1-2-pm215g23f | Possible Ordnance |
| 426 | 2-1-dp185g16f | Possible Ordnance |
| 427 | 2-2-mc287g46f | Possible Ordnance |
| 428 | 2-3-dp107g24f | Possible Ordnance |
| 429 | 1-1-dp55g16f | Possible Ordnance |
| 430 | 1-2-dp223g45f | Possible Ordnance |
| 431 | 1-3-dp700g35f | Possible Ordnance |
| 432 | 1-4-dp97g25f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 433 | 5-1-dp89g22f | Possible Ordnance |
| 434 | 13-1-dp44g15f | Possible Ordnance |
| 435 | 13-2-dp37g24f | Possible Ordnance |
| 436 | 14-1-dp28g14f | Possible Ordnance |
| 437 | 11-1-dp52g44f | Possible Ordnance |
| 438 | 11-2-dp72g43f | Possible Ordnance |
| 439 | 10-1-pm41g18f | Possible Ordnance |
| 440 | 10-2-pm20g11f | Possible Ordnance |
| 441 | 10-3-dp72g35f | Possible Ordnance |
| 442 | 10-4-pm74g23f | Possible Ordnance |
| 443 | 9-1-dp281g31f | Possible Ordnance |
| 444 | 7-1-dp208g20f | Possible Ordnance |
| 445 | 7-2-dp125g23f | Possible Ordnance |
| 446 | 7-3-pm115g10f | Possible Ordnance |
| 447 | 6-1-dp152g34f | Possible Ordnance |
| 448 | 6-2-mc175g49f | Possible Ordnance |
| 449 | 5-1-pm60g11f | Possible Ordnance |
| 450 | 5-2-pm32g6f | Possible Ordnance |
| 451 | 5-3-pm63g12f | Possible Ordnance |
| 452 | 5-4-pm50g7f | Possible Ordnance |
| 453 | 5-5-dp65g4f | Possible Ordnance |
| 454 | 5-6-mc6558g70f | Possible Ordnance |
| 455 | 4-1-dp164g41f | Possible Ordnance |
| 456 | 4-2-pm177g20f | Possible Ordnance |
| 457 | 4-3-nm220g17f | Possible Ordnance |
| 458 | 11-1-dp208g48f | Possible Ordnance |
| 459 | 11-2-dp28g17f | Possible Ordnance |
| 460 | 14-1-pm293g50f | Possible Ordnance |
| 461 | 14-1-pm153g18f | Possible Ordnance |
| 462 | 15-1-pm136g14f | Possible Ordnance |
| 463 | 001-1-mc30093g25f | Possible Ordnance |
| 464 | 022-1-mc31539g13f | Possible Ordnance |
| 465 | 021-1-mc28767g12f | Possible Ordnance |
| 466 | 020-1-mc31683g35f | Possible Ordnance |
| 467 | 018-1-mc31942g23f | Possible Ordnance |
| 468 | 018-1-mc31657g24f | Possible Ordnance |
| 469 | 017-1-mc26003g23f | Possible Ordnance |
| 470 | 017-1-dp67g14f | Possible Ordnance |
| 471 | 014-1-mc26324g17f | Electromagnetic Anomaly |
| 472 | 013-1-mc31252g8f | Electromagnetic Anomaly |
| 473 | 013-2-mc16747g7f | Electromagnetic Anomaly |
| 474 | 012-1-mc27653g21f | Electromagnetic Anomaly |
| 475 | 011-1-mc34257g22f | Electromagnetic Anomaly |
| 476 | 010-1-mc26761g24f | Electromagnetic Anomaly |
| 477 | 009-1-mc29279g28f | Electromagnetic Anomaly |
| 478 | 008-1-mc30182g22f | Electromagnetic Anomaly |
| 479 | 07-1-mc21762g7f | Electromagnetic Anomaly |
| 480 | 006-1-mc27687g21f | Electromagnetic Anomaly |
| 481 | 005-1-mc30284g22f | Electromagnetic Anomaly |
| 482 | 004-1-mc26874g21f | Electromagnetic Anomaly |
| 483 | 003-1-mc28428g18f | Electromagnetic Anomaly |
| 484 | 002-1-mc30321g12f | Electromagnetic Anomaly |
| 485 | 007-1-pm6g10f | Tire |
| 486 | 010-1-pm38g15f | Lamp |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

Congaree River Sediments
Columbia, South Carolina

| Designation | Characteristics | Potential Interpretation |
|-------------|------------------|--------------------------|
| 487 | 01-1-nm77g7f | Possible Ordnance |
| 488 | 01-2-mc187g13f | Pipeline Associated |
| 489 | 02-1-dp662gEOL | Pipeline Associated |
| 490 | 03-1-mc795g52f | Pipeline Associated |
| 491 | 03-2-nm47g6f | Pipeline Associated |
| 492 | 03-3-nm321g45f | Possible Ordnance |
| 493 | 03-4-pm190g2f | Possible Ordnance |
| 494 | 03-5-dp2178gEOL | Possible Ordnance |
| 495 | 03-6-dp156g18f | Possible Ordnance |
| 496 | 04-1-dp2770g35f | Pipeline Associated |
| 497 | 04-2-dp44891g35f | Electromagnetic Anomaly |
| 498 | 04-3-mc44891g7f | Electromagnetic Anomaly |
| 499 | 05-1-pm2582g30f | Possible Ordnance |
| 500 | 05-2-pm705g21f | Pipeline Associated |
| 501 | 05-3-pm139g13f | Possible Ordnance |
| 502 | 05-4-nm169g17f | Possible Ordnance |
| 503 | 06-1-pm1537g21f | Possible Ordnance |
| 504 | 06-2-dp216g15f | Possible Ordnance |
| 505 | 06-3-dp2658g33f | Pipeline Associated |
| 506 | 06-4-pm96g13f | Possible Ordnance |
| 507 | 06-5-pm90g10f | Possible Ordnance |
| 508 | 06-6-dp109g12f | Possible Ordnance |
| 509 | 06-7-pm36g4f | Possible Ordnance |
| 510 | 07-1-dp1681g38f | Possible Ordnance |
| 511 | 07-2-pm70g6f | Possible Ordnance |
| 512 | 07-3-mc3436g43f | Pipeline Associated |
| 513 | 07-4-dp608g39f | Possible Ordnance |
| 514 | 08-1-nm61g14f | Possible Ordnance |
| 515 | 08-2-mc138g24f | Possible Ordnance |
| 516 | 08-3-dp2380g51f | Pipeline Associated |
| 517 | 08-4-pm1479g40f | Possible Ordnance |
| 518 | 08-5-nm20g2f | Possible Ordnance |
| 519 | 08-6-mc244gEOL | Possible Ordnance |
| 520 | 09-1-nm157g9f | Possible Ordnance |
| 521 | 09-2-pm2592g48f | Possible Ordnance |
| 522 | 09-3-dp129g6f | Possible Ordnance |
| 523 | 09-4-dp4790g50f | Pipeline Associated |
| 524 | 09-5-pm23864g4f | Electromagnetic Anomaly |
| 525 | 09-6-pm34g13f | Possible Ordnance |
| 526 | 10-1-pm37g24f | Possible Ordnance |
| 527 | 10-2-dp6063g73f | Pipeline Associated |
| 528 | 10-3-mc34109g1f | Electromagnetic Anomaly |
| 529 | 10-4-pm2385g43f | Possible Ordnance |
| 530 | 10-5-mc92g2f | Possible Ordnance |
| 531 | 11-1-pm1474g41f | Possible Ordnance |
| 532 | 11-2-dp2385g29f | Pipeline Associated |
| 533 | 11-3-mc207g22f | Possible Ordnance |
| 534 | 11-4-dp52g19f | Possible Ordnance |
| 535 | 12-1-pm52g7f | Possible Ordnance |
| 536 | 12-2-nm398g18f | Possible Ordnance |
| 537 | 12-3-pm75g7f | Possible Ordnance |
| 538 | 12-4-nm29g4f | Possible Ordnance |
| 539 | 12-5-nm24g3f | Possible Ordnance |
| 540 | 12-6-nm115g3f | Possible Ordnance |

TABLE 2

MAGNETIC ANOMALY LOCATION AND INTERPRETATION

**Congaree River Sediments
Columbia, South Carolina**

| Designation | Characteristics | Potential Interpretation |
|--------------------|------------------------|---------------------------------|
| 541 | 12-7-nm23g8f | Possible Ordnance |
| 542 | 12-8-mc457g25f | Possible Ordnance |
| 543 | 12-9-mc613g30f | Possible Ordnance |
| 544 | 12-10-nm642g43f | Possible Ordnance |
| 545 | 13-1-dp244g28f | Possible Ordnance |
| 546 | 13-2-nm213g24f | Possible Ordnance |
| 547 | 13-3-nm224g18f | Possible Ordnance |
| 548 | 13-4-nm156g14f | Possible Ordnance |
| 549 | 13-5-dp25g9f | Possible Ordnance |
| 550 | 14-1-nm61g15f | Possible Ordnance |
| 551 | 14-2-nm234g18f | Possible Ordnance |
| 552 | 14-3-dp193g23f | Possible Ordnance |
| 553 | 14-4-dp462g36f | Possible Ordnance |
| 554 | 14-5-nm19g6f | Possible Ordnance |
| 555 | 14-6-dp646g26f | Possible Ordnance |
| 556 | 14-7-dp1357g24f | Possible Ordnance |
| 557 | 16-1-dp400g18f | Possible Ordnance |
| 558 | 16-2-pm160g17f | Possible Ordnance |
| 559 | 16-3-dp368g20f | Possible Ordnance |
| 560 | 16-4-mc403g30f | Possible Ordnance |
| 561 | 16-5-pm36g11f | Possible Ordnance |
| 562 | 16-6-pm12g4f | Possible Ordnance |
| 563 | 16-7-pm35g13f | Possible Ordnance |
| 564 | 17-1-dp273g42f | Possible Ordnance |
| 565 | 18-1-dp527g12f | Possible Ordnance |
| 566 | 18-2-pm91g8f | Possible Ordnance |
| 567 | 19-1-dp528g38f | Possible Ordnance |
| 568 | 19-2-pm166g7f | Possible Ordnance |
| 569 | 19-3-dp1000g33f | Possible Ordnance |
| 570 | 20-1-mc48849g8f | Electromagnetic Anomaly |

TABLE 3
ANOMALIES BY PLANNED PROJECT AREA

**Congaree River Sediments
Columbia, South Carolina**

| Construction Phase | Potential Ordnance (UXO) | Potential UXO Under the Footprint of the Cofferdam | Other Anomalies | Total Magnetic Anomalies |
|----------------------------------|---------------------------------|---|------------------------|---------------------------------|
| Field Demonstration Project Area | 84 | 0 | 17 | 101 |
| Phase I | 84 | 20 | 14 | 118 |
| Phase II | 45 | 9 | 16 | 70 |
| Phase III | 2 | 14 | 17 | 33 |
| Outside of Project Area | 210 | 0 | 38 | 248 |
| Total Anomalies | 425 | 43 | 102 | 570 |

Notes:

Please refer to Figures 2 and 3.

1. All magnetometer work was completed by Tidewater Atlantic Research, Inc of Washington, North Carolina.
2. Magnetic Anomalies - As determined by Tidewater by the magnetic, remote-sensing survey.
3. UXO - Unexploded Ordnance
4. UXO Potential - Referring to Magnetic Anomalies that *"have signature characteristics that could be associated with ordnance"* and *"those anomalies should be considered potentially hazardous until material generating the signatures can be identified"*.
5. Other - Other magnetic anomalies include pipelines, geologic features, modern debris etc.

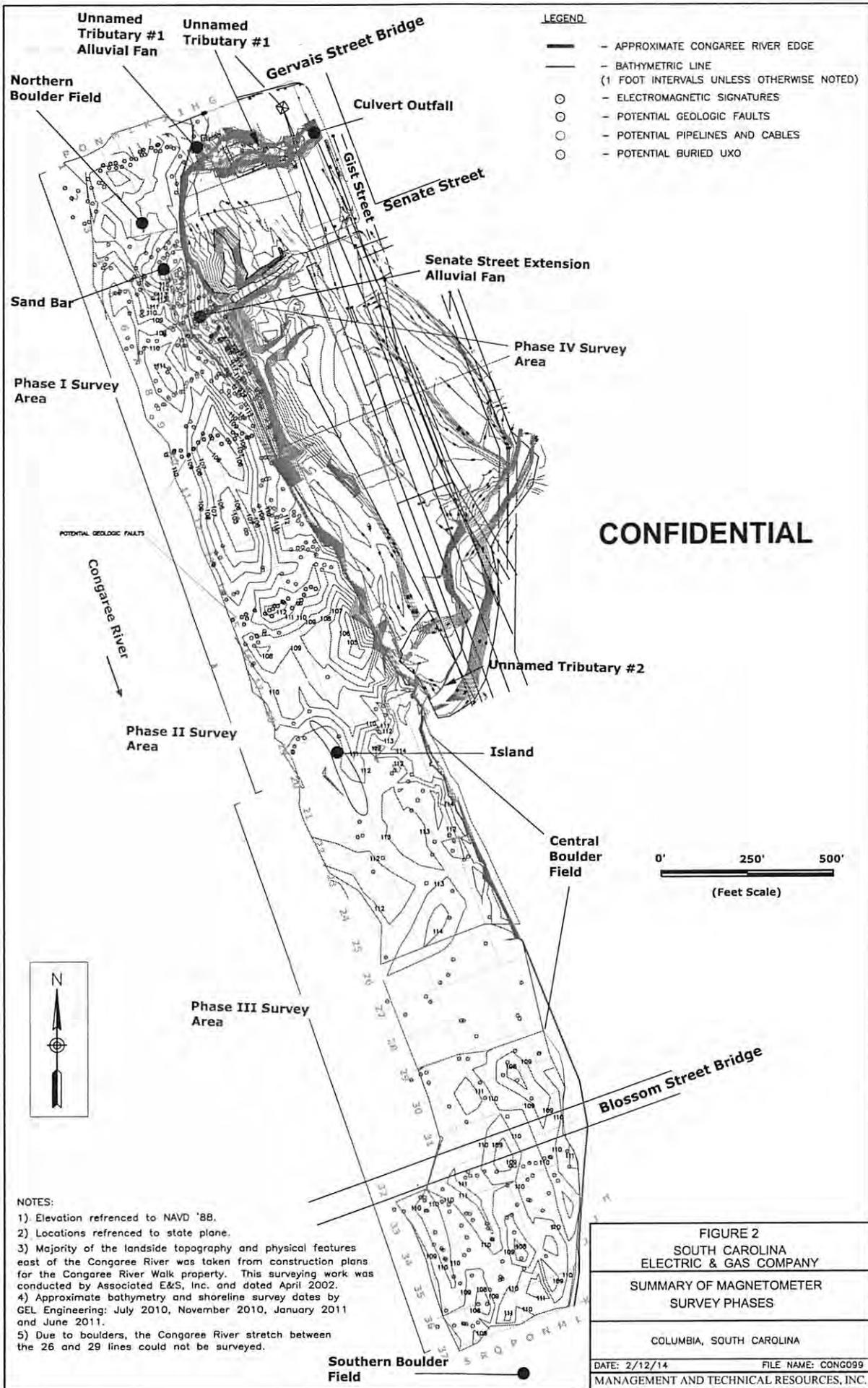
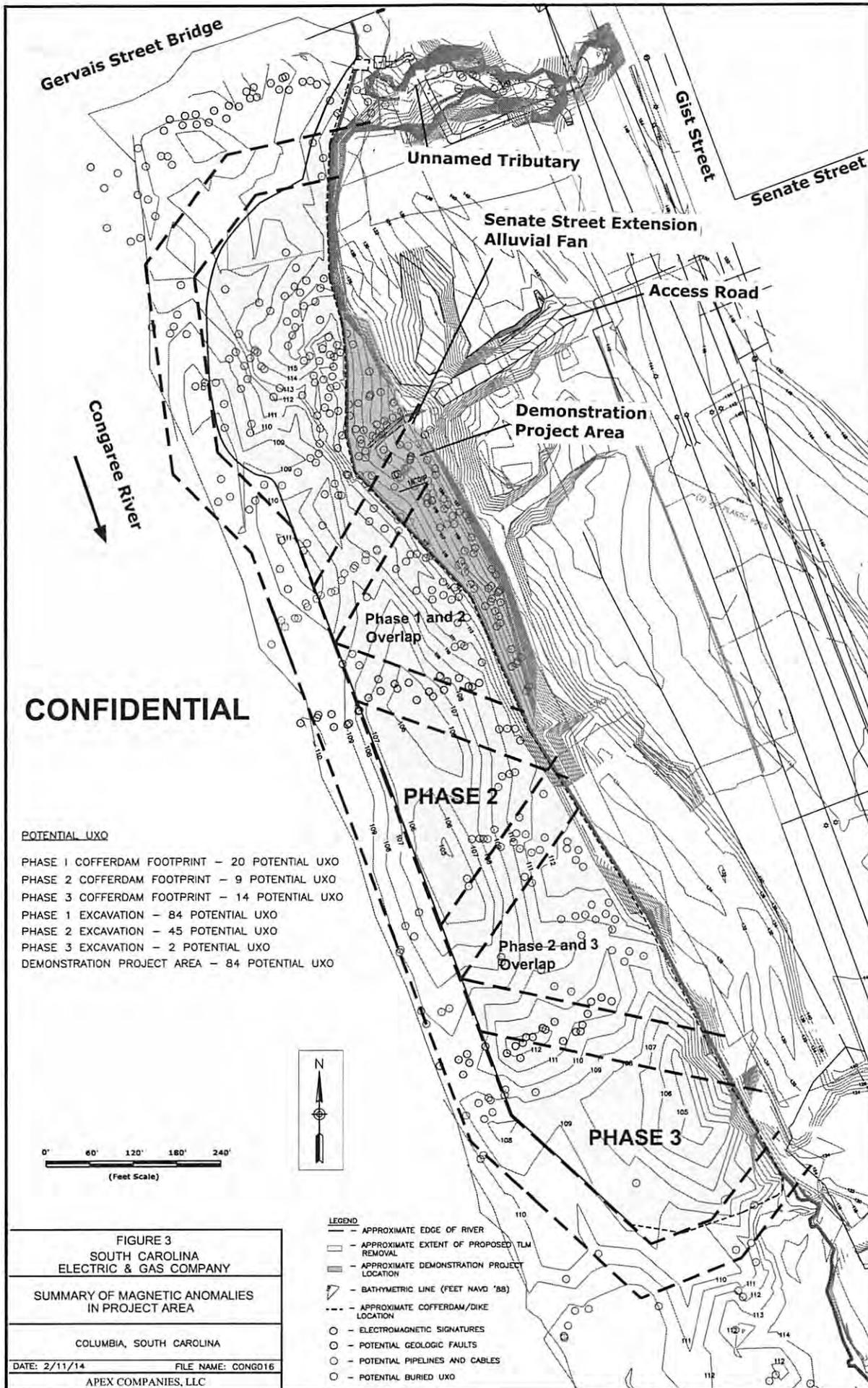


FIGURE 2
SOUTH CAROLINA
ELECTRIC & GAS COMPANY
SUMMARY OF MAGNETOMETER
SURVEY PHASES

COLUMBIA, SOUTH CAROLINA

DATE: 2/12/14 FILE NAME: CONG099
 MANAGEMENT AND TECHNICAL RESOURCES, INC.



CONFIDENTIAL

POTENTIAL UXO

- PHASE 1 COFFERDAM FOOTPRINT - 20 POTENTIAL UXO
- PHASE 2 COFFERDAM FOOTPRINT - 9 POTENTIAL UXO
- PHASE 3 COFFERDAM FOOTPRINT - 14 POTENTIAL UXO
- PHASE 1 EXCAVATION - 84 POTENTIAL UXO
- PHASE 2 EXCAVATION - 45 POTENTIAL UXO
- PHASE 3 EXCAVATION - 2 POTENTIAL UXO
- DEMONSTRATION PROJECT AREA - 84 POTENTIAL UXO



FIGURE 3
 SOUTH CAROLINA
 ELECTRIC & GAS COMPANY

SUMMARY OF MAGNETIC ANOMALIES
 IN PROJECT AREA

COLUMBIA, SOUTH CAROLINA

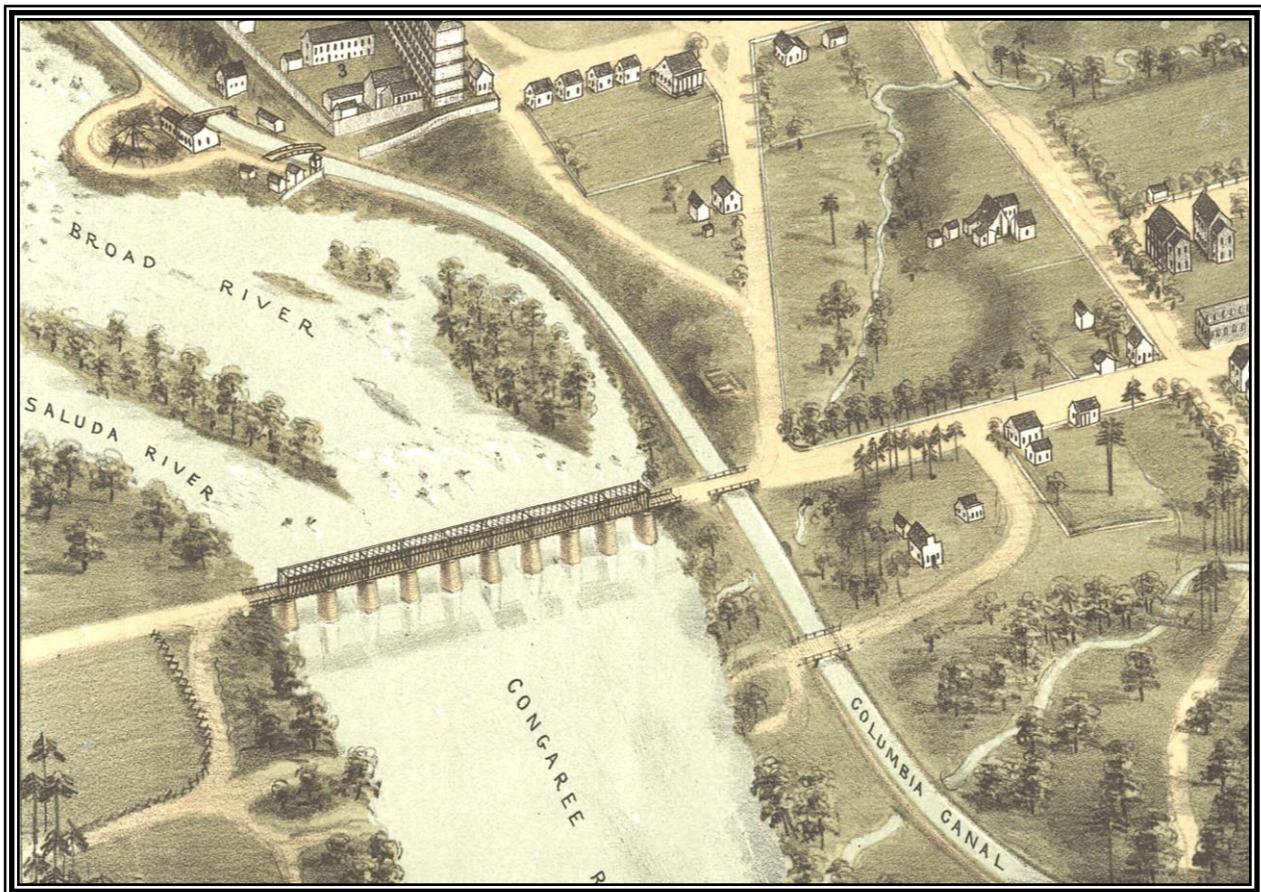
DATE: 2/11/14 FILE NAME: CONG016

APEX COMPANIES, LLC

- LEGEND**
- - - APPROXIMATE EDGE OF RIVER
 - APPROXIMATE EXTENT OF PROPOSED TLM REMOVAL
 - APPROXIMATE DEMONSTRATION PROJECT LOCATION
 - ▽ BATHYMETRIC LINE (FEET NAVD '88)
 - - - APPROXIMATE COFFERDAM/DIKE LOCATION
 - ELECTROMAGNETIC SIGNATURES
 - POTENTIAL GEOLOGIC FAULTS
 - POTENTIAL PIPELINES AND CABLES
 - POTENTIAL BURIED UXO



**ARCHAEOLOGICAL DATA RECOVERY PLAN FOR THE
MITIGATION OF SITE 38RD286/38RD278, THE ORDNANCE
DUMP SITE, FOR THE CONGAREE RIVER SEDIMENT
REMOVAL PROJECT, COLUMBIA, SOUTH CAROLINA**



Birdseye View of the city of Columbia showing the Gervais Street Bridge (C. Drie, 1872).

September 2020

**ARCHAEOLOGICAL DATA RECOVERY PLAN FOR THE
MITIGATION OF SITE 38RD286/38RD278, THE ORDNANCE
DUMP SITE, FOR THE CONGAREE RIVER SEDIMENT
REMOVAL PROJECT, COLUMBIA, SOUTH CAROLINA**

Submitted to:

DOMINION ENERGY SOUTH CAROLINA, INC.
200 Operation Way
Cayce, South Carolina 29033

By:

TRC ENVIRONMENTAL CORPORATION
621 Chatham Avenue
Columbia, South Carolina 29205



Sean Norris, Program Manager Archaeology

September 2020

INTRODUCTION

TRC Environmental Corporation (TRC) is pleased to provide the following information for Artifact Recovery and Artifact Conservation for Site 38RD286/38RD278 as related to the Congaree River Sediment Removal Project. This plan is being submitted as one the stipulations agreed upon in a Memorandum of Agreement between the U.S. Army Corps of Engineers, the State Historic Preservation Officer (SHPO) and Dominion Energy South Carolina, Inc. (Dominion). It also serves as the application for an Exclusive Commercial Data Recovery Salvage License as pursuant to the Underwater Antiquities Act of 1991 (Article 5, Chapter 7, Title 54, Code of Laws of South Carolina, 1976). Due to the extensive nature of the undertaking a one-year license is being requested with the expectation that up to three additional year-long extensions will be requested.

The excavation and recovery of submerged artifacts will be conducted in support of and concurrently with a large-scale environmental remediation project. The project involves the remediation of contaminated sediments in the Congaree River. In June 2010, tarlike material (TLM) was reported near the eastern shoreline of the Congaree River directly downstream of the Gervais Street Bridge. The South Carolina Department of Health and Environmental Control (SCDHEC) began sampling material from the river and concluded that the source of the TLM was a manufactured gas plant (MGP) that operated on Huger Street in downtown Columbia from 1906 to the mid-1950s. During its period of operation, the MGP had allowed coal tar runoff to empty into the Congaree River.

This MGP, after a series of mergers and acquisitions, became one of South Carolina Electric and Gas's (SCE&G now Dominion) predecessor companies. As a result, SCE&G/Dominion owned the land the former MGP occupied. In 2002 SCE&G/Dominion had entered into a Voluntary Cleanup Contract with SCDHEC to mitigate the former MGP site. Beginning in 2008 SCE&G/Dominion removed over 125,000 tons of MGP impacted soil and debris from the Huger Street location. Since the discovery of tar in the river SCE&G/Dominion has worked with SCDHEC in order to define the extent of the TLM contamination and has conducted a series of surveys to establish the vertical and horizontal distribution of the TLM. The project area begins directly south of the Gervais Street Bridge and extends downstream for approximately 2,000 feet; it extends approximately 300 feet into the river from the eastern bank (Figure 1).

In 2013 SCDHEC approved the Project Delineation Report and tasked SCE&G/Dominion to develop an appropriate plan for the removal and mitigation of the contaminated soil. In 2013 a report detailing four "removal action" options was submitted to SCDHEC. The four options were:

1. No Action – Leave the TLM in place.
2. Monitoring and Institutional Controls – Leave the TLM in place, restrict access to the area, and conduct annual monitoring.
3. Sediment Capping and Institutional Controls – Place a physical barrier on top of the contaminated sediment effectively burying the TLM and conduct annual monitoring.
4. Removal – Physically remove the TLM and contaminated sediment.

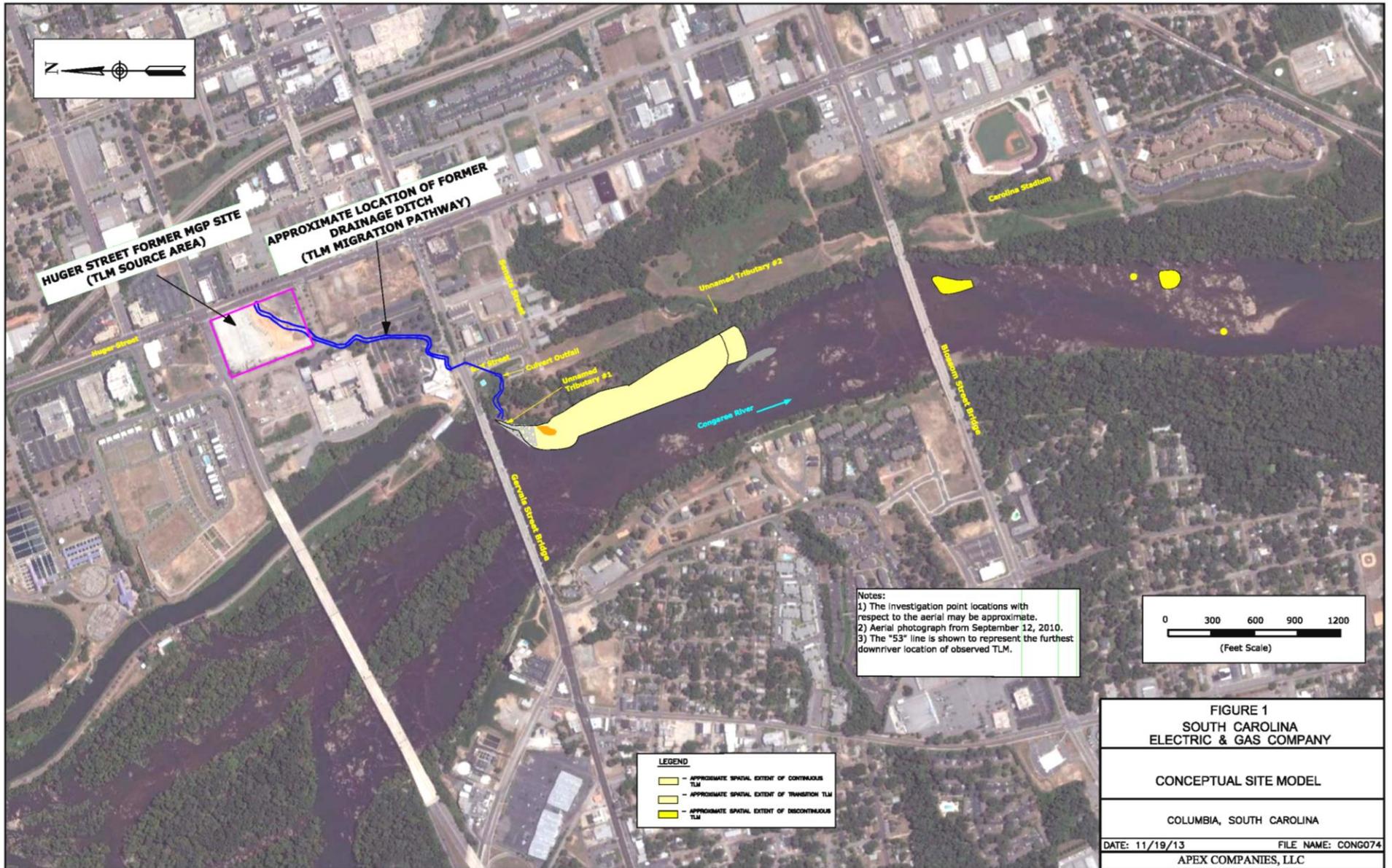


Figure 1. Project location map.

SCDHEC approved option four as the preferred method of dealing with the TLM. This method was deemed to be the most protective of human health and the environment because it would permanently remove the contaminated sediment.

PROJECT DESCRIPTION

The project will mitigate adverse effects to the portions of Site 38RD286/38RD278 affected by the undertaking through a combination of preservation in place and data recovery (Figure 2). The portions of the site outside the impact area will be left in place and naturally protected by the river and sediment.

The sediment that is removed will be subject to data recovery. The recovery of archaeologically significant artifacts will take place concurrently with the proposed environmental remediation project. The remediation of the TLM and contaminated sediments will involve the following activities:

- Conducting landside clearing, grading and site setup activities;
- Physically removing sediment and debris using conventional equipment;
- Conditioning the removed sediment material, as needed, for transportation to the landfill; and
- Off-site disposal.

Prior to activities in the river, construction on the eastern shoreline to improve access to the project area for personnel, equipment and material transportation trucks will be conducted. These construction activities would include improving and/or creating access roads by using fill, gravel and geotextile over the existing landscape. A project compound with office trailers, support structures and associated electrical power and utilities would be required. Protective fencing would also be installed to restrict access to the work areas by unauthorized personnel. In accordance with the Memorandum of Agreement between Dominion, SHPO and the USACE these activities will not affect known cultural resources. Layers of geotextile, gravel and fill will be placed above the existing ground surface to level areas as need. An archaeological monitor will be present during site preparation to ensure that no significant cultural resources are impacted by construction.

Due to the varying thickness of sediment, the uneven nature of the riverbed and changing conditions within the project area a number of different methodologies and equipment may be employed to complete the project. Generally speaking, heavy equipment/machine excavators coupled with vacuum removal or other techniques will be employed to remove the sediment to as necessary. The removed sediment will be stored on-site for screening, visual examination and artifact recovery. In order to minimize potential impacts on spawning migrations for threatened and/or endangered species a construction phase (for actual work in the river) would begin no earlier than May and need to end by October. Because the removal areas will be isolated from the river through the installation of cofferdams, work within the cofferdams after installation may extend beyond this timeframe although the potential for overtopping events increases.

ARCHAEOLOGICAL SIGNIFICANCE

On February 17, 1865 General Sherman's troops captured Columbia. During the two day occupation, live munitions and other weapons of war housed at the Palmetto Armory were dumped into the Congaree River near the Gervais Street Bridge. According to Civil War Records:

A detail of 500 men each from the First and Second Brigades, properly officered for fatigue duty, together with the pioneer corps and fifty wagons, reported to Captain Buel, chief ordnance officer, to destroy public works, machinery, ordnance, ordnance stores, and ammunition, of which there were large quantities.
General John. E. Smith

According to General Smith it took 1200 men and 50 wagons from 1 P.M. February 18 to 6 P.M. February 19 to destroy the machinery, ordnance, ordnance stores and ammunition. Figure 3 provides a list of the ordnance captured.

Soon after Union troops departed Columbia ordnance recovery began. The accounts of J. F. Williams indicated that industrious citizens of Columbia were quick to salvage powder from the boxes of paper cartridges that had been left on the bank and for years after the war people would dive into the river and recover cannon balls and shells (Williams 1929).

Newspaper articles dating to the 1930s and more formal recovery attempts conducted in the 1970s and 1980s provide supporting evidence that Civil War ordnance is still present in the river. In June 1930, *The State* reported that two fishermen recovered ammunition from the area of a small tributary near the base of the Gervais Street Bridge. The discovery motivated New Brookland Mayor L. Hall and Councilman D. A. Spigner to organize a project to recover the artifacts. Their recovery was extensive and labor intensive. A coffer dam was erected approximately where Senate Street terminates at the river. After digging through the mud and silt the project collected six 10-inch cannonballs, 1,010 round rifle balls, 767 pointed rifle balls, a number of cast-iron copper fused explosive cannon shells; and cast iron lead butt explosive shells; three cast-iron cannon balls; one brass cap explosive, 11 3½-inch round cannon balls, 51 2-inch cannon balls; 2 6-inch cannon balls; 3 3½-inch time fuse explosive bombs; and an artillery axe (*The State* 1930). According to the article Hall and Spigner believed they had recovered practically all the ammunition that was deposited in the river. Based on the inventory presented in Figure 3, however, the 1930s recovery accounts for only a fraction of what may be present.

Eight years after the Hall and Spigner conducted their recovery, the *Spartanburg Herald* reported that two New Brookland high school boys found an artillery projectile in the Congaree River. The boys, Luther J. Morris and Knowiton Jeffcoat, apparently attempted to melt lead out of the round causing a minor explosion that brought the find to the attention of New Brookland authorities (*The Spartanburg Herald* 1938).

Beginning in the 1970s a number of formal recovery and salvage projects have been conducted at the sites. A majority of these projects have been conducted with licenses provided by the South Carolina Institute of Archaeology and Anthropology (SCIAA) under the Underwater Antiquities Act, providing a precedent for conducting the currently proposed project under a similar Salvage License. In the winter of 1976 an acoustic survey in the Congaree River below

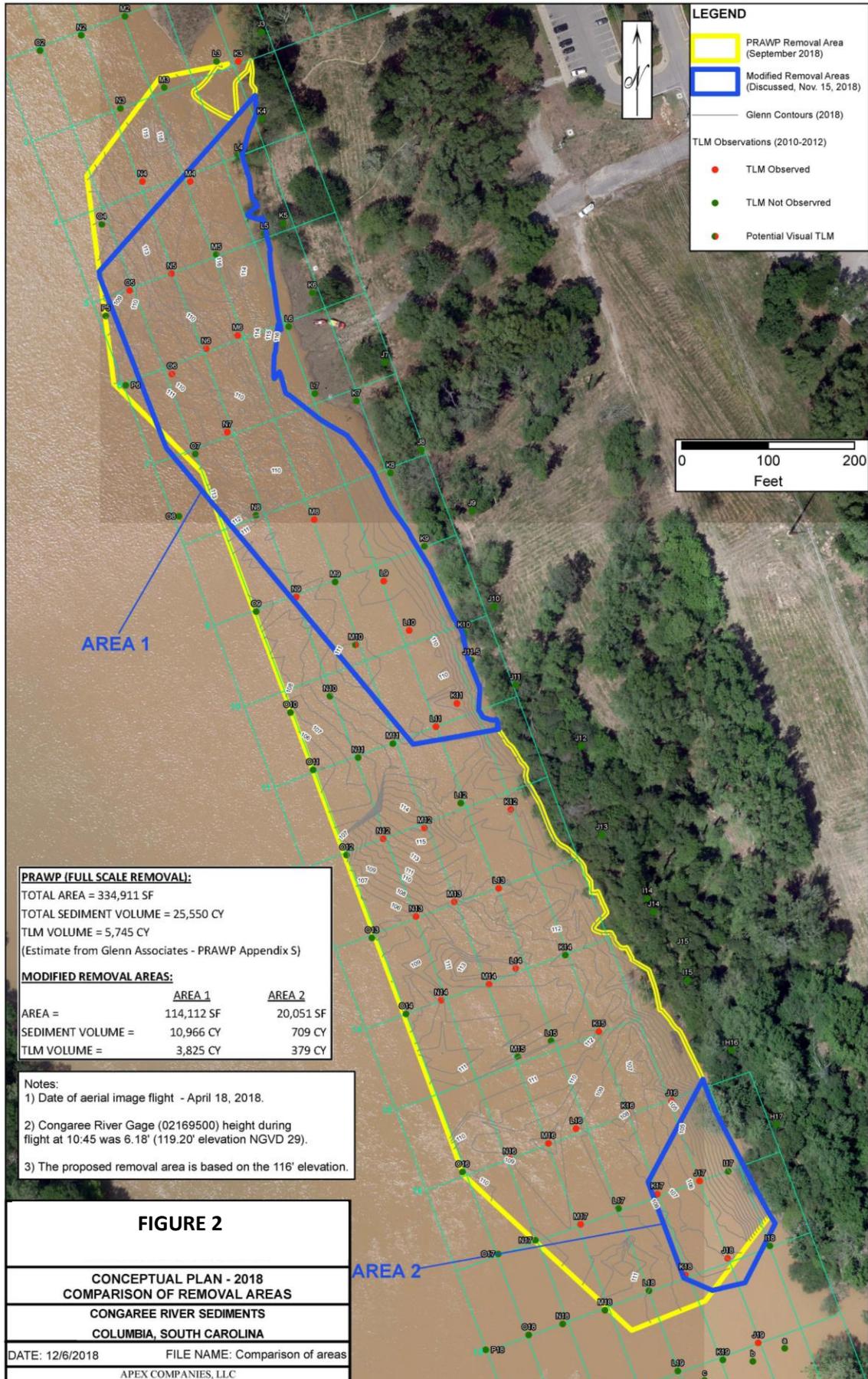


Figure 2. Extent of the proposed capping project.

the Gervais Street Bridge was conducted to identify concentrations of ordnance and artifacts. Although conditions were not ideally suited for an acoustic survey the project identified a concentration of ferrous material below the Gervais Street Bridge (Finkelstein 1976).

| <i>Inventory of ordnance and ordnance stores captured in Columbia, S. C., February 17, 1865.</i> | |
|--|-----------|
| Ball cartridges (no caps)..... | 1,200,000 |
| Percussion caps..... | 100,000 |
| Powder..... pounds..... | 26,150 |
| 12-pounder gun ammunition, fixed..... rounds..... | 1,007 |
| 6-pounder gun ammunition, fixed..... do..... | 3,852 |
| 24-pounder gun ammunition, fixed..... do..... | 546 |
| 8-inch shot and shell..... do..... | 2,364 |
| 10-inch shot and shell..... do..... | 1,320 |
| Stands of arms..... | 10,410 |
| Unfinished arms..... | 6,000 |
| 6-pounder guns..... | 14 |
| James guns..... | 2 |
| 12-pounder mountain howitzers..... | 5 |
| Blakely guns..... | 4 |
| 18-pounder rifled guns..... | 3 |
| Wiard gun..... | 1 |
| 3-inch rifle..... | 1 |
| 10-pounder guns..... | 2 |
| 4-inch gun..... | 1 |
| 4-inch mortars..... | 2 |
| 6-inch Coehorn..... | 1 |
| Bronze guns, caliber 1½ and 2 inches..... | 4 |
| 4-inch gun, smooth-bore..... | 1 |
| 10-pounder Parrotts..... | 2 |
| Repeating battery..... | 1 |
| Gun carriages..... | 9 |
| Gun caissons..... | 14 |
| Gun (mountain howitzer) caissons..... | 3 |
| Forges..... | 2 |
| Anvils..... | 4 |
| Blacksmiths' vises..... | 20 |
| Sponges and rammers..... | 1,125 |
| Sabers, cavalry, artillery, and naval..... | 3,100 |
| Saber knots..... | 700 |
| Pairs cavalry pistol holsters..... | 300 |
| Saber belts..... | 800 |
| Bayonet scabbards..... | 4,000 |
| Cartridge-boxes (infantry)..... | 5,150 |
| Cartridge-box plates..... | 3,500 |
| Cartridge-box belts and plates..... | 2,500 |
| Waist-belts..... | 2,900 |
| Waist-belt plates..... | 3,000 |
| Ball screws..... | 2,000 |
| Pistol cartridge-boxes..... | 550 |
| Gunners' shot-pouches..... | 600 |
| Knapsacks..... | 1,100 |
| Haversacks..... | 900 |
| Slow match..... yards..... | 500 |
| 10-inch fuses..... | 900 |
| Tents..... | 58 |

PHILIP MacCAHILL,
Lieut. and Actg. Ordnance Officer, First Div., Fifteenth Army Corps.

Figure 3. Inventory of ordnance captured during the occupation of of Columbia.

Under a salvage license issued in 1980, diver Gerald Mahle discovered a cache of 10-inch cannon balls at the site. Mahle and his team estimated that 50 to 100 additional shot lay in the river. However, by the time they were able to return to the river divers associated with the Savannah River Dive Club in Hampton, South Carolina had removed the ordnance (Salvage License No. 26 file SCIAA).

Mahle continued work under the SCIAA permit from February through September 1981. Using a dragline, a backhoe and a gold dredge, Mahle and his team removed and screened sediment from the river bed and apparently the alluvial fan near the foot of Senate Street. Fieldwork resumed in August 1981 using the backhoe for excavation. The project recovered numerous Civil War

artifacts including a 3.5-inch shell, a 24-pound cannonball, two 10-inch shells and a post-Civil War projectile. Apparently, the work did not produce sufficient material to justify continuation of the project (Salvage License No. 26 file SCIAA).

In 1983 a SCIAA Salvage License was issued for a metal detecting survey in the Congaree immediately south of the Gervais Street Bridge. Recovered artifacts associated with the Armory consist of 12 explosive shot for a 6-pounder cannon and one explosive shot for a 4-pounder (Salvage License No. 30 file SCIAA). Since the 1980s there are anecdotal reports of Civil War related artifacts being discovered in the river and on the alluvial fan at the terminus of Senate Street but there have been no additional formal recoveries. The site was designated 38RD286.

Based on this information, there is sufficient documentary and formal survey evidence to establish the continuing presence of ordnance in this section of the river. With this in mind a series of magnetometer and side scan sonar surveys were conducted in advance of the Congaree River Sediment Clean-up project to determine the possible extent of ordnance within the contaminated area.

Over a period of 18 months, from 2010 to 2012, Tidewater Atlantic Research, Inc. conducted remote sensing surveys within the course of the river and on the eastern bank (Tidewater Atlantic Research 2010, 2011a, 2011b, 2012). The first phase of this work focused on the area from the Gervais Street to approximately 1500 feet downstream. The magnetometer survey identified 218 anomalies that were consistent with unexploded ordnance (UXO). Phase II of the survey began where Phase I ended and extended another 400 feet downstream. Ten anomalies that could be could represent UXO were identified in this phase. Phase III of the survey focused on the area from Unnamed Tributary 2 (as seen in figure 1) to just south of the Blossom Street Bridge. One hundred and twenty-two hits consistent with potential ordnance were recorded in this phase. Phase IV was the continuation of a terrestrial metal detector survey along the river bank and alluvial fan at the end of Senate Street. An additional 67 potential instances of UXO were recorded along the shoreline. Attachment A provides a summary of magnetic anomaly survey along with a map detailing the precise locations of the possible UXO.

The Historic Columbia Canal was breached during the October 2015 flood event. This breach deposited a significant amount of sediment on site 38RD286 that potentially contains artifacts related to the construction of the canal. A portion of this newly deposited material will be removed during the project. This sediment will be screened and examined for artifacts. If artifacts are recovered an attempt will be made to determine whether they are related to the canal or to site 38RD278, an underwater resource that may be related to a possible mill site.

SCOPE OF WORK

The following Scope of Work outlines our approach to artifact recovery and conservation at the Congaree River Project. The design will outline the goals of the salvage project followed by a detailed methodology for the proposed stages of artifact recovery. Laboratory and artifact conservation methods will be outlined and initial plans for project deliverables, public outreach and the final disposition of the artifacts will be discussed.

PROJECT GOALS

Historic documents, previous salvage projects and intensive remote sensing surveys have confirmed the presence of artifacts related to the burning of Columbia and destruction of the stores at the State Armory in 1865. This previous work has also established that ordnance in the river may not possess locational or depositional integrity. In other words, the location of the artifacts may not be able to provide any pertinent or useful information as allowing interpretation of intra and inter-site feature patterns or depositional positioning however, grid recovery and unexploded ordnance recovery will provide information on depositional positioning. The main goal and value of this project is the recovery of the artifacts and their final inventory and analysis. Secondary goals of the project will be to document the TLM as a man-made artifact and address the events that led to its deposition in the river, determine if there are artifacts related to the Columbia Canal and make a formal evaluation of Site 38RD278, an underwater resource that is also within the project boundaries. The Project is designed in such a way that the removal of sediment that may contain significant artifacts will be necessary. Recognizing the presence of artifacts invaluable to the history of South Carolina and the nation, recovering them has become a priority to Dominion. Because of the lack of depositional integrity and the nature of the remediation project, the recovery of artifacts will focus on salvage and collection of as many artifacts as possible rather than the collection of traditional archaeological data.

In addition to satisfying salvage objectives and essential rescue of artifacts that would otherwise be confined to a landfill, it is expected that the cataloging of the ordnance will provide substantive contributions to the archaeology of the Civil War. Archaeological inquiry applied to this collection will not only corroborate or refute the historical record but ideally also provide what Smith (1994) describes as the relevant facts upon which to build the discipline of Civil War archaeology. This is vital in defining history because historical records are often confusing, disorganized, contradictory, incomplete, and biased (Smith 1994). For example in Sherman's memoirs he mentions that the ordnance from the Columbia Armory:

...were hauled in wagons to the Saluda River, under the supervision of Colonel Baylor, chief of ordnance, and emptied into deep water, causing a very serious accident by the bursting of a percussion-shell, as it struck another on the margin of the water. The flame followed back a train of powder which had sifted out, reached the wagons, still partially loaded, and exploded them, killing sixteen men and destroying several wagons and teams of mules. (Sherman 2006: 443)

We know from other historic documents that it was the Congaree River and that one commissioned officer (Captain William Davis, whose tombstone stands in Florence National Cemetery, Florence, SC) and three enlisted men (Jesse Johnson, James Kilpatrick and Coleman Wright) were killed by the explosion. By drawing on both the historical record and archaeological evidence a more informed account of the past will be established. Consequently, the data gathered during each phase of this project will be used as far as possible to address research questions specific to this site as well as pertinent to Civil War archaeology in general. These include the following topics:

- A comparison of the reported inventories and the collected material;
 - The 1930 salvage inventory lists an “artillery axe”, which is presumably a pickaxe or axe carried by a caisson. No axes are listed in the official Civil

War inventories. Are there items in the river that were not identified in the historic inventories?

- Identification of different styles and types of ordnance and ammunition;
 - During the Civil War more varieties of artillery were used than in another conflict in history. Can it be determined if the ammunition present was created at the Columbia Armory?
 - Are there shells and munitions present that were shipped to Columbia during this latter stage of the war from other armories?
 - Can an evolution or timeline of ordnance types be identified?
 - Are there shells from the beginning of the war as well as well as more technologically advanced material from later in the war?
- Identification of military rank or distinction between the quality of side arms, personal weaponry and miscellaneous items that may be deposited in the river;
 - At the start of the war high quality French and British arms and armaments were purchased and utilized by officers. Are examples of these weapons present?
 - Were higher quality items appropriated and distributed to Union troops during the initial destruction of the State Armory or were all items deposited in the river?
 - Reports indicate that muskets and sabers were destroyed at the site of the Armory itself. Might any of these destroyed weapons have made it to the wagons that were depositing material in the river?
 - A number of side arms and weapons were present at the Citadel Arsenal Academy and listed on some inventories of the captured and destroyed items from Columbia. Did any of these items make it into the river and can it be determined if they were cadet issued items?

FIELD METHODS

Based on previous archaeological work conducted at manufactured gas plants (e.g., Cherau and Bannister 2006; Stratton et al. 2004; Warren et al. 2002) and consultation with Dominion on the nature of the project the following recovery plan for this unique project is proposed. Artifact recovery will take place in two different locations (see Figure 2) pending the disposition of the material: *in situ*, an on-site processing station, and if necessary, an off-site location. The flow chart presented in Figure 4 provides a guide to how artifacts will be identified and recovered at various locations during the course of the project. All sediment removed from the project area will be evaluated as to its level of TLM contamination. Sediment determined to be lightly impacted or “clean” will be sent to the on-site screening facility for sorting and artifact recovery. Sediment determined to be too viscous to effectively screen will be sent to an off-site location where it will be spread out in thin layers and subject to visual inspection and/or metal detecting to facilitate artifact recovery. It is expected that reviewers and monitors from SCIAA and SHPO will periodically visit the recovery operations and provide feedback on the recovery methods.

Removal of the sediment will be conducted in controlled sequences, within a limited area per sequence. Each area will be marked and numbered on an overall project map. Sediment from each open area will be removed by backhoe or other equipment, as needed, and temporarily staged prior to loading or placed directly into a truck for transport. The truck will transport the

sediment to the on-site sorting area where it will be deposited. The piles will be marked as to their recovery location and a visual boundary will be utilized to the extent practical to segregate material from differing locations. Each pile will be examined for artifacts. Removing the soil in this way accomplishes two goals. It provides an organized system that expedites the removal of contaminated soil. It also provides additional provenience for use in assessing the distribution of the artifacts.

The overarching goal of the project is the timely removal of the contaminated soil rather than the recovery of the artifacts themselves. As stated earlier the material in the river possesses no depositional context. Locational information for the artifacts will not result in the identification of any patterns or organizational system that can be applied to any other Civil War site or archaeological context. Given these facts, sediment removal in controlled sequences within limited areas constitutes a practical method that will facilitate recovery and processing of the materials and artifacts.

In Situ Recovery/Ordnance Removal Demonstration

In October 2015, an *in situ* recovery of artifacts present on the alluvial fan found at the terminus of State Street (see Figure 2) was conducted. The recovery was a demonstration phase that tested project methods for ordnance and artifact removal and provided preliminary information on the type and quantity of artifacts that were submerged in the river. The demonstration/testing phase was primarily conducted by the UXO contractor and supported by archaeologists. This recovery was terminated early due to historic flooding that resulted in a breach of the Columbia Canal, immediately upstream from the site. No Civil War related materials were recovered during the limited recovery project.

On-Site Recovery

Heavy equipment will be utilized to remove the sediment. If saturated the soil will be either be placed in roll off containers or in discrete piles. It will then be allowed to dry (or processed with a drying agent such as cement dust) in preparation for transport. At the time of the removal a project manager familiar with the excavation and characteristics of TLM will assess the soil and make a determination whether the soil is too contaminated to pass through a screen. If the soil is “clean” it will be transported to the on-site artifact processing area (Figure 4) and screened for artifacts. Once in the processing area soil will be stored in discrete piles based on grid square. The soil from each grid square will then undergo the screening process. The screening process may be conducted through various methods dependent on the type of soil and artifacts present. The first possible method will be to sort the material with Bobcat outfitted with a skid steer rock bucket attachment that has finger tines spaced 4 inches apart (Figure 5). The rock bucket will be used to remove items, including modern debris (tires, bottles, etc.), over four inches in diameter. It is assumed that any potential ordnance over four inches will be recovered with this method. All material that does not fall through the tines will be visually inspected before being loaded

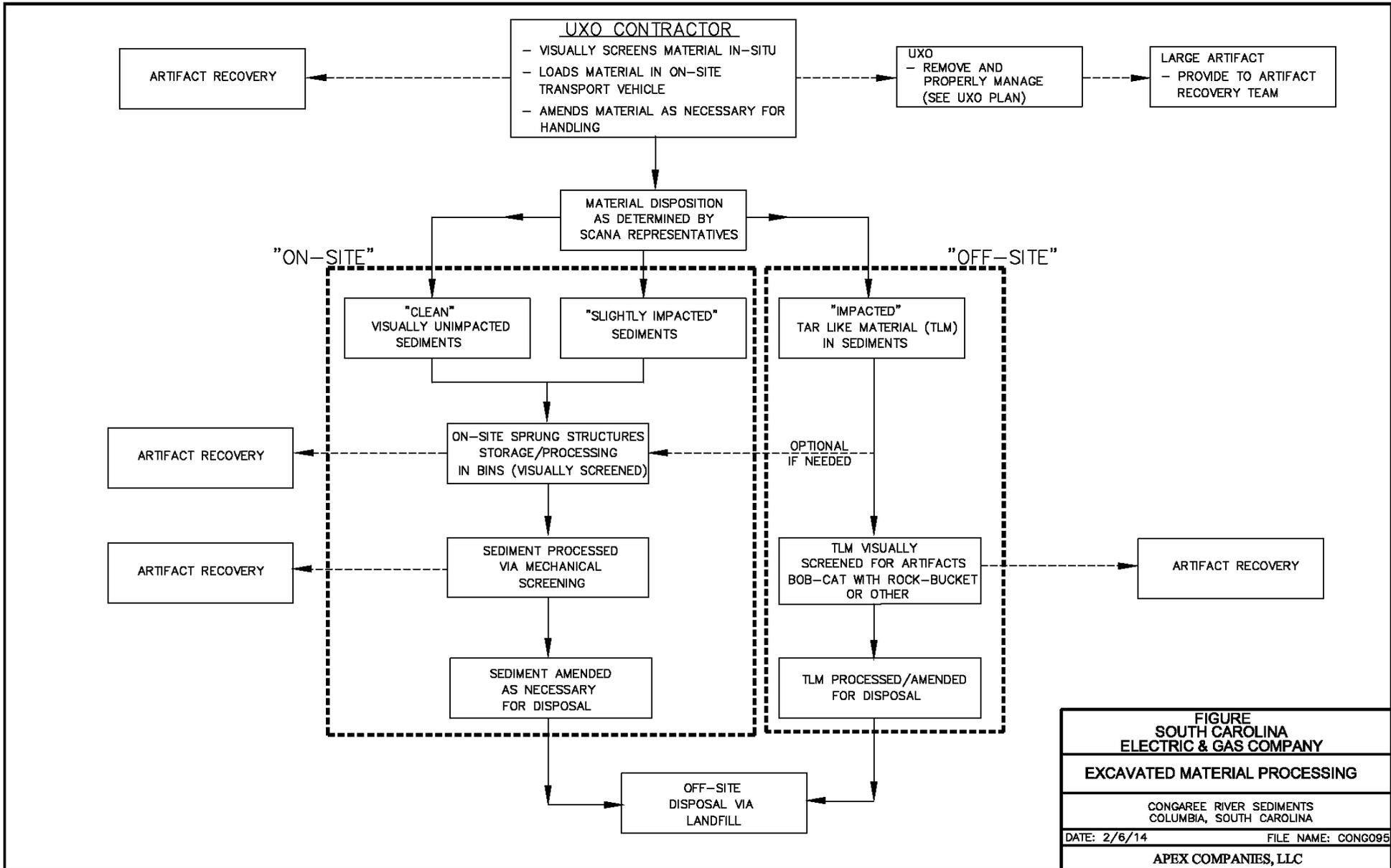


Figure 4. Process for recovering artifacts during sediment removal.



Figure 5. Example of a rock bucket to sort larger artifacts and sort rocks and debris.

into a roll off container for removal to the landfill. Any larger artifacts identified during this phase will be set aside for processing. If an artillery shell or potential UXO is identified safety protocols will be implemented and the UXO contractor and SCIAA will be immediately notified. Material that falls through the tines of the rock bucket may be subject to a second sort through a narrower gauge 2-inch bar sorter (Figure 6) similar to those used to sort rock and gravel. Material that does not fall through the bars will be visually examined. This sort is designed to recover items smaller ordnance and items or fragments of items that may have been broken up prior to disposal in the river (sabers, rifles, side arms, tools, buckles). The castoff material will be place in roll-off containers for disposal.

The remaining material will be taken to a screening and sorting station. This final stage of on-site recovery will be designed to recover the smaller artifacts. The soil will be sifted through various methods depending on the nature of the material and amount of time available for recovery. Options include 1/2-inch or 1/4-inch mesh screens set up on sawhorses where the sediment can be manually screened. Water screening stations, metal detecting and standard archaeological shaker screens are also options. Artifacts recovered on-site will be bagged and labeled according to grid square and any other pertinent provenience.

Off-Site Recovery

The viscous nature of the TLM in the river requires a creative solution to artifact recovery. Above a certain threshold of TLM in the sediment screening will result in clogged mesh, soil consolidating into large tar balls and ineffectual artifact recovery. The amount of contaminated soil removed from the site is expected to be minimal. If possible the contaminated sediment will be processed on site. If the quantity of contaminate soil is greater than expected the odor it

produces may necessitate the need for an off-site processing location. The Columbia landfill has tentatively been identified as the off-site recovery location. The examination of contaminated soil will take place visually and through geophysical methods.



Figure 6. Example of a bar sorter

When it arrives at the off-site facility the soil will once again be stored according to grid location. An area measuring up to 50 feet by 50 feet (final dimensions will depend on the amount of open land available) will be covered with heavy, industrial plastic sheeting. A backhoe will be used to spread the sediment from a selected grid square in a thin layer, up to 2 inches thick, on the sheeting. Five-foot-wide lanes will be established across the examination area. A crew of archaeological field technicians will then walk the lanes and make a visual survey of the sediment collecting artifacts as they are encountered.

In the early stages of the recovery process a metal detector will be employed on every other lane. A comparison will be made of the amount and type of artifacts recovered from the metal detected lanes and the visually inspected lanes. If there is a large discrepancy the method found to recover the most artifacts will be employed throughout the remainder of the project. If there is no discernable difference the method found to be the most effective use of time and personnel will be the procedure of choice for the project.

Artifacts recovered from this facility will be more contaminated. They will be safely bagged, labeled and stored until they can be effectively cleaned and conserved.

Recovery Conclusions

If reported inventories are correct nearly 1.5 million items were potentially discarded into the river over a two-day period. Official recovery projects account for around 2000 of those artifacts. Unofficial recoveries dating back to the Civil War have likely accounted for thousands if not tens of thousands more. That only accounts for a fraction of the potential material that may be present. Since only a small portion of the site will be subject to recovery the proposed plan is focused on recovering as many artifacts as possible. Visual examination and bar screening are expected to identify larger artifacts. Smaller items like Minié balls, round shot and percussion caps will be collected through standard archaeological screening. Artifacts not related to the Civil War and of a smaller size, including prehistoric tools and projectiles, prehistoric ceramics, and historic artifacts dating from the populating of Columbia to the early twentieth century, will be collected with the proposed strategy. While these artifacts are not the primary focus of the salvage every effort will be made to recover significant diagnostic material.

ARTIFACT ANALYSIS AND CONSERVATION

Civil War documents indicate that artifacts recovered during this project may include lead ammunition, rifle barrels and wood stocks, percussion caps, sabers and cutlasses, artillery shells, cannons, scabbards, and munitions containers. Other artifacts may be present in addition to the military artifacts. There are a number of sites adjacent to the project area, including a 19th century sawmill and a possible ferry crossing (Figure 8). Likewise, prehistoric Native American artifacts have been recorded as being present on the shoreline adjacent to the project area. Artifacts from these sites may have eroded or been deposited into the river and may be present in the project area as well; the condition of potential artifacts from these sites is unknown.

The Artifact Analysis and Conservation Plan has been designed to accommodate this broad range of materials. The laboratory operations from the time a specimen is delivered to its ultimate place of storage or exhibition can be separated into five basic stages:

1. Initial documentation.
2. Storage prior to conservation process.
3. Encrustation removal.
4. Analysis.
5. Curation.

Initial Documentation

As an artifact is recovered, it will be bagged, labeled and recorded on the site log sheet documenting its associated unique provenience number (grid square). In this manner the recovered material can be roughly tracked and artifact density information by proveniences can be monitored. Inert and defused materials recovered during the in situ/ordnance removal phase will be similarly bagged and labeled according to grid square.

At this stage artifacts may be lightly washed or dry brushed to remove excess sediment and TLM. Based on information provided by Dominion, some artifacts may be entirely encased in TLM. The time and effort needed to clean and conserve these artifacts may be cost prohibitive. Depending on the information collected as the project goes on, it may be appropriate to propose sorting criteria based on the amount of tar affecting an artifact and the type of artifact as part of the conservation plan. For example if thousands of rounds of ammunition are recovered and found to be entirely encased in TLM an initial cleaning might remove as much material as possible, the lab crew would add the artifact type, quantities, and description to the field excavation forms and the items (or a percentage of the items) would be discarded. The details of a triage procedure such as this will be determined through consultation with Dominion and SCIAA personnel.

Storage Prior to Treatment

Removal of TLM will take place at this stage. In order to remove potentially hazardous contaminants artifacts will be lightly brushed and bathed in a solution of BioSolve. This is a water-based, biodegradable formulation of surfactants and performance additives. It is used in soil remediation projects and been found to be effective in cleaning oily residue and TLM from heavy equipment used in MGP remediation projects. This process will likely take place in TRC's Treatability Lab in Greenville, SC or in a designated area at the on-site processing facility where contaminants can be disposed of with the overburden.

Once the TLM has been removed the artifacts will be stored and conserved according to methods outlined in *Methods of Conserving Archaeological Material from Underwater Sites* (Hamilton 1999). Due to the potential volume of artifacts it is anticipated that some materials may need to be stored for a time before they can be properly cleaned and conserved. As part of this storage stage any adhering encrustation or corrosion layers will largely be left intact until the objects are treated, since they form a protective coating which retards further corrosion. Therefore all metal objects determined to be suitable for analysis will initially be kept in tap water with an inhibitor added to prevent further corrosion. For long-term storage, an oxidizing solution of potassium dichromate and sodium hydroxide or an alkaline inhibitive solution may be used (Hamilton 1999).

Encrustation Removal/Conservation

For most metal items, this will consist of thorough reduction in electrolysis, alternating with manual cleaning. After the rust has been removed, the artifact will be boiled in distilled water to remove salts, and then dried. The artifacts will finally be sealed with microcrystalline wax. Non-ferrous or fragile items may be treated by boiling in distilled water, drying, and sealing. Below are more details of possible cleaning and conservation methods based on expected material types.

IRON/FERROUS OBJECTS

Iron artifacts will be stored in an aqueous solution until they are subject to electrolysis. Electrolysis will take place in tanks specially equipped with a battery charger and a copper pipe; alligator clips are used to suspend the artifacts in a solution of tap water and sodium bicarbonate. A low voltage electric current is passed through the tank, removing the rust from the artifacts.

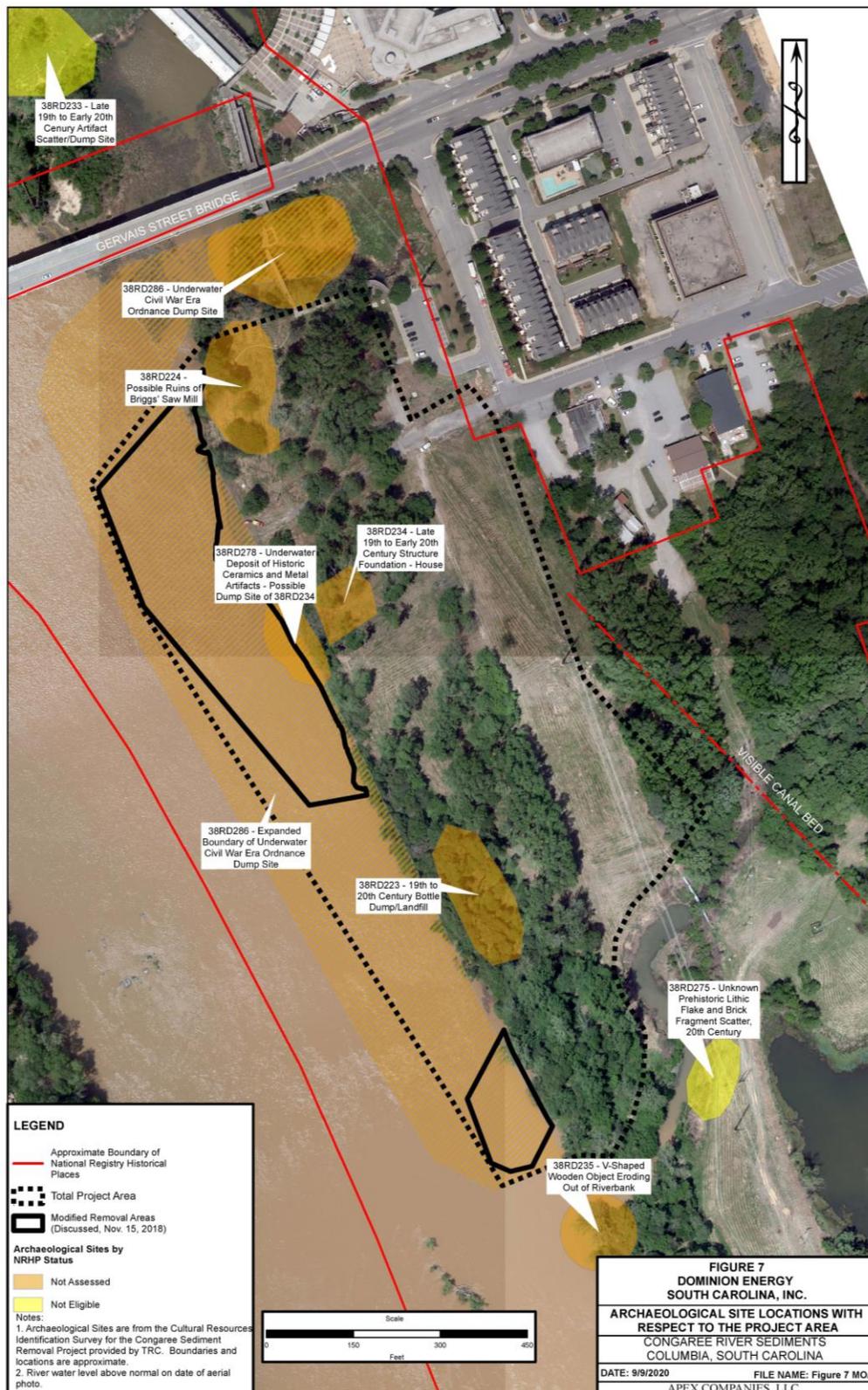


Figure 7. Previously recorded archaeological sites in the vicinity of the project area.

Electrolysis is continued in the tap water electrolyte until the chloride level of the electrolyte approximates the level found in the tap water. The artifacts will remain in the tanks for as long as it takes to remove all rust.

The artifact is then rinsed thoroughly in several changes of alternate boiling and cold de-ionized water to remove any residuum. The artifact will be submerged in the last vat of rinse water for a minimum of 24 hours. After rinsing, the moisture absorbed by the artifact must be removed before any sealant is applied. The artifact may be baked or if exposure to air is found to cause too much oxidation the object may be submerged in water-free isopropanol to dehydrate for a minimum of 24 hours. It may also be expedient to eliminate the drying process altogether and simply towel off the artifacts before dipping them in microcrystalline wax (Hamilton 1999). If larger object such as cannons are recovered a wax sealant may not be feasible. In such a case coats of polyurethane or Rustoleum may be appropriate.

LEAD

A majority of the artifacts recovered will presumably be made of lead. Lead will initially be stored in a tap water and sodium sesquicarbonate solution. In the case of lead artifacts, use of electrolysis is minimal. The lead will be immersed in 10 percent hydrochloric acid, which will remove any adhering marine encrustation, along with lead carbonates, lead monoxide, lead sulfide, calcium carbonate, and ferric oxide. This will be followed by a rinsing and gentle removal of adhering materials. Lead objects will be allowed to dry and finally sealed with microcrystalline wax.

COPPER, BRONZE AND BRASS

Artifacts made of copper and its alloys will be subject to the same electrolysis procedures as described for iron. The main variations in treatment involve the fact that the duration of electrolysis for cupreous objects is significantly shorter than that for comparable iron objects. Small cupreous artifacts, such as coins, require only a couple of hours in electrolysis (Hamilton 1999). Following electrolytic cleaning, the artifacts will be put through a series of hot rinses in de-ionized water until the pH of the last rinse bath is neutral. Because copper tarnishes in water, a wet paste of sodium bicarbonate may be used as polish. After polishing, a coat of benzotriazole (BTA), commercially known as KrylonClear Acrylic Spray will be applied.

WOOD

Waterlogged wood artifacts in the form of gun stocks, pistol butts or wagon/caisson wheels or parts may be recovered. Wood artifacts will be assessed as to their preservation potential and either discarded after being documented or submerged to await conservation. If wood is to be conserved it will be done with the Polyethylene glycol (PEG) method. This process simultaneously removes water from the object while also strengthening and consolidating the wood. The procedure is simple but time consuming. The wood artifact is placed in a solution of PEG and water or alcohol where it is allowed to sit. Over a period of months or years (depending on the size of the artifact) the PEG level is gradually raised until the solution consists of at least 70% PEG. At this level wood will remain stable and no further treatment of the wood should be necessary.

CERAMICS, STONE AND GLASS

Ceramic artifacts, stone tools or projectiles and glass objects that have been submerged in water do not typically require special treatment. Glazed and hard fired historic ceramics such as

stoneware and porcelain are impervious to water. Low fired earthenware and prehistoric ceramics may encounter some erosion but will remain structurally solid. Glass and lithic material may become discolored but will largely remain unaffected. Rinsing with tap water and light brushing to remove excess sediment is typically all that will be required. A mild detergent may be used in an attempt to remove deep stains. Care will be taken not to remove paint or surface treatments. The artifacts will then be allowed to air dry on rack. Reconstruction or re-fitting of vessel or container fragments may be attempted using proper fixatives. No sealant is required.

LEATHER

Leather conservation will follow the same procedures as detailed for ceramic items. Rinsing with tap water and light brushing to remove ingrained soil is typically all that will be required. If leather is waterlogged it can be subject to the same PEG treatment as wood. Treating leather with PEG will generally take less time than wood.

Analysis

Artifacts will be separated into functional groups that are then subdivided by use category and object type. The artifact pattern model, as devised by South (1977) and revised by Garrow (1982) is the basic formatting procedure for all artifacts. This model offers a rational approach for the organization of artifacts on a provenience to provenience level, or all the way up to total site contents. This system also allows for analytical modifications when collections of a specialized nature are recovered and was used to generate the functional categories outlined above for the Civil War artifacts.

This system will consolidate large quantities of like artifacts under descriptive headings and facilitate interpretation. A final and compelling reason to use the artifact pattern model is that it provides a good format within which to present the contents of the site, and can lead to cross-comparisons with other sites formatted in that manner. Functional groups, categories and sub-categories will consist of:

- Arms
 - Artillery
 - Cannons
 - Howitzer/Mortar
 - Ordnance - Fixed
 - Shot (24-pounder, 12-pounder, 6-pounder)
 - Case (24-pounder, 12-pounder, 6-pounder)
 - Fuse (24-pounder, 12-pounder, 6-pounder)
 - Grape (24-pounder, 12-pounder, 6-pounder)
 - Canister (24-pounder, 12-pounder, 6-pounder)
 - Ordnance – Not Fixed
 - Shot (10 inch, 8 inch)
 - Shell (10 inch, 8 inch)
 - Artillery Accoutrements
 - Carriages and parts
 - Caissons and parts
 - Tools
 - Fuses

- Firearms
 - Small Arms (pistols, pistol parts)
 - Small Arms Ammunition (shot)
 - Small Arms Accoutrements (holsters, belts, cartridge boxes, tools)
 - Long Arms (muskets, rifles, parts)
 - Long Arms Ammunition (shot, Minié balls)
 - Long Arms Accoutrements
- Edged Weapons
 - Sabers
 - Cavalry
 - Artillery
 - Naval
 - Bayonets
 - Cavalry
 - Edged Weapon Accoutrements
 - Saber knots
 - Saber scabbards
 - Bayonet scabbards
- Clothing
 - Button
 - Buckles
 - Insignias/Pins
 - Knapsacks
 - Haversacks
 - Other
- Tools
 - Anvil
 - Forge
 - Vise
 - Other
- Personal – Civil War
 - Jewelry
 - Writing
 - Food storage, preparation and consumption
 - Indulgence (alcohol and tobacco related items)
 - Medicine

Information recorded during the analysis of the Civil War related artifacts will vary depending on what objects are recovered. It is anticipated that a majority of artifacts recovered will be lead shot. These will be weighed and measured, perpendicular to the ball's mold seam, for diameter (*not caliber*) to 1000ths of an inch. The catalog description will include a conclusion regarding each shot's function based on its diameter or former diameter as implied by weight. Shot and shell will similarly be measured and weighed. Distinguishing characteristics that denote armory or metalworks of origin, and when possible range of manufacture, will be noted and photographed. Guns and fire arm parts as well as saber parts will be identified, photographed and cataloged.

Clothing items will be weighed and measured. Photographs will be taken. Detailed photographs of insignias or devices apparent on the durable clothing items will be documented and attempts will be made to identify insignias by military unit. Since their presence in the river is not necessarily documented and their recovery is not anticipated we are collapsing some material culture categories outlined by Legg and Smith (1989) into the single category of Personal Items. These items are items that would be in the possession of an individual soldier.

Historic artifacts will be analyzed by functional groups according to the procedures outlined in South (1977). Historic ceramic artifacts will be classified according to recognized types (e.g., pearlware, ironstone), and by decorative technique (e.g., hand-painted, transfer print, decal) and vessel form. Bottles are described by type, color, size, and closure type. Where possible, standard references such as Miller (2000), Noel Hume (1970), Jones and Sullivan (1985) and South (1977), as well as more specific published and on-line references for particular artifact types will be used to obtain date ranges for historic ceramics and glass.

The prehistoric artifact analysis will focus on identifying assemblages and/or technological attributes diagnostic of particular temporal and geographical cultural trends. The artifacts will be identified according to established regional types or styles. In the case of projectile points, morphological attributes will be used as typological markers. Ceramics will be typed according to paste, temper, and surface decoration.

The following descriptions define the categories in the lithic artifact typology to be used in the lithic analysis. Lithics refer to stone tools and debris from producing stone tools. The following categories are derived in part from those developed by Blanton et al. (1986) and Garrow (1982), which have been used with excellent success on many projects in South Carolina.

The two major groups of lithics are debitage and functional artifacts. Debitage can be divided into the following categories:

Biface Thinning Flakes. Biface thinning flakes are relatively thin and flat to slightly curved in cross section. Secondary flake scars are frequently present on the dorsal surface. The platform may be faceted and may exhibit a distinct lip, and the bulb of percussion is usually diffuse. These features are characteristic of soft hammer percussion, and the flakes of this type are most often the result of late stage biface reduction and maintenance.

Blades and Bladelike Flakes. These flakes approach or exceed a length-to-width ratio of 2:1. Blades and bladelike flakes frequently have a ridge oriented along the dorsal surface. They are typically manufactured for a specific purpose, such as replacing edges in cutting or grating implements.

Bipolar Flakes. Bipolar flakes exhibit a bulb of percussion on the ventral surface of both the distal and proximal ends. They are often curved in cross section. These flakes are manufactured by placing the raw material on a hard surface, such as an anvil stone, and striking its superior surface with a hard implement.

Unspecialized Flakes. These flakes are relatively thick and wide with little or no indication of having a particular function or representing a specific stage of manufacture.

Flake Fragment. This category includes those flakes that have only nondiagnostic medial or distal portions. Any flake lacking a proximal end will be placed in this category.

Shatter. Shatter is debitage that is angular and blocky. Specimens in this category cannot be oriented in relation to their proximal or distal end.

Chipping debris also will be subdivided based on the amount of cortex present on the dorsal surface. Classifications are assigned based on whether more than half (>50%), less than half (<50%), or no cortex was present on the dorsal surface. This measure should give an approximate indication of the stage of reduction represented in the assemblage. All lithic artifacts will be identified as to debitage class and raw material.

The second major lithic group is functional artifacts. The categories in this group are defined as follows:

Bifaces. This category comprises artifacts that are bifacially flaked and do not have haft elements. They can be finished tools, projectile points, knives, scrapers, or preforms. Bifaces usually cannot be given an established type name.

Hafted Bifaces. Hafted bifaces are bifacially worked artifacts that have a hafting element (i.e., stem and notches). They are often described as projectile points or knives and may conform to established type names.

Cobble Tools. Cobble tools are altered or unaltered cobbles used as hammerstones, nutting stones, anvils, and other similar tools.

Cores. Cores consist of parent raw material and are the remnants of flake manufacture. They can be blocky or discoidal in appearance and exhibit one or more flake scars.

Ground Stone. Artifacts in this category are manufactured by polishing or grinding stone into a desired shape—celts, axes, and manos, for example. These tools are often used in woodworking and food processing.

Manuports. Manuports are unaltered pieces of stone that are not indigenous to the area and obviously have been transported to the site by humans.

Retouched, Used, or Modified (RUM) Flakes. The category of RUM flakes includes all flakes that have been retouched into a unifacial tool, exhibit use wear, or have been modified by undetermined means. This category includes scrapers and utilized flakes.

Soapstone. Soapstone is a very soft stone that is easily worked. Artifacts frequently constructed of soapstone include bowls, pipes, and beads.

Fire-Cracked Rock. Although fire-cracked rock is not a tool per se, these are rocks that exhibit evidence of having been in or near a fire due to human activity. Alteration in color and/or luster, angular fractures, and pitted surfaces are diagnostic of fire-cracked rock.

The analysis of prehistoric sherds will begin with a basic characterization of the entire assemblage. Sherds smaller than 2 × 2 cm will be counted, weighed, and examined to determine the presence of surface treatments or vessel forms that could prove useful in the analysis. If not, they will receive no further analysis. All larger sherds will be classified by surface decoration and aplastic content. The aplastic content will be documented as the type (or raw material) and size of the major aplastics. Size will be determined through comparison with the Wentworth scale, used by most archaeologists to standardize aplastic descriptions. Aplastic size will be recorded as no apparent temper, fine, medium, coarse, and very coarse. Surface decoration will be recorded by type (e.g., incised), and major decorative mode characteristics will be recorded.

The preliminary analysis will allow a characterization of the sherd assemblage. During this initial analysis, sherds will be labeled and pulled for cross-mending, so the subsequent analyses can focus on the vessel assemblage. The surface decoration–aplastic content classes from the

preliminary analysis will be compared to published type descriptions; type names will be applied where possible.

Surface decoration, aplastic content, thickness, and interior surface treatment will be considered in cross-mending the sherds. The analysis will seek to reconstruct as many vessels as possible to help determine vessel form and function. The following attributes will be recorded for each vessel to provide a detailed technological description of the wares. They will be examined to determine technological patterns within and between types.

- Type, size, shape, and density of major aplastics
- Type and size of minority aplastics
- Degree of carbon core retention
- Sherd core cross-section configuration
- Thickness 3 cm below rim
- Rim form
- Presence of coil breaks
- Dominant paste color
- Interior surface treatment

Curation

Dominion realizes a disposition agreement with SCIAA regarding the percentage of artifacts to be received is required as part of the application process. Dominion is committed to displaying and making the artifacts recovered from this site available to the public. At the conclusion of the analysis the artifacts will be prepared for curation following accepted guidelines. Copies of all records, including, but not limited to, field notes, maps, catalog sheets, and representative photographs shall be submitted for curation with the artifacts. After project clearance has been obtained, artifacts and relevant notes will be curated in accordance with the selected repository. It has not yet been determined where the material will be curated, but it is anticipated that all or most of the Civil War related material will be curated at the South Carolina State Museum Confederate Relic Room. It is possible that due to the volume and type of material expected multiple curation facilities may be needed. The preference will be for the artifacts to remain in the state and local if possible. Options include the Cayce History Museum, The Cayce Historical Park and other state and local museums. Other curation options include the SC Office of the State Archaeologist Curation Facility. Moundville, Alabama Curation Facility.

DOCUMENTATION

Daily logs and records will be kept at each artifact processing area during the recovery phase. These logs will be available for review by COE, SHPO and SCIAA personnel during monitoring visits. Interim reports/management summaries will be provided documenting each phase of the remediation project. These management summaries will minimally include maps depicting the area cleared during the related field season, a description of the work completed to date, a preliminary inventory of the artifacts recovered and a status update that will provide detail of the next field season.

At the conclusion of the remediation project a draft technical report will be produced and delivered to review agencies. The report will follow the format and content specified in the *South*

Carolina Standards and Guidelines for Archaeological Investigations, including a description of past archaeological research in the project vicinity, a discussion of local history, an explanation of the research design, the field methods employed, evaluation methods, findings, conclusions, and recommendations. TRC will promptly address all comments and revisions provided in writing by SHPO and SCIAA in a final technical report.

All maps and drawings will be high quality and produced in a professional manner. Project maps will be produced in color using ArcGIS software, CAD or other appropriate mapping programs. These maps will depict each phase of the project and include grid square boundaries. Individual maps of grid squares may be used to identify the locations of ordnance removed during the UXO recovery stages of the project. Overlays of historic maps and plats may be used where appropriate. High quality color photographs or measured drawings, as appropriate, will be provided that show details of representative diagnostic or other interesting artifacts. The report will be bound in a durable cover (minimum 80 lbs cover stock), and contain an identifying label. The paper will be high quality laser printed paper, minimum 24 lbs stock, and will be acid free. Pages will be printed on both sides and project maps and photographs will be produced in color. Electronic copies of the final report in Adobe Portable Document File (PDF) format will be provided to SHPO and SCIAA and outside reviews as appropriate. In addition, a CD or DVD with photographs of the artifacts will be provided if desired.

At the discretion of Dominion, a popular report suitable for public distribution may be produced. This report may also be reviewed and commented on by review agencies prior to publication. This report, if produced, will be part of the public outreach program that Dominion is committed to in order to inform and educate the public on this significant find.

PUBLIC INFORMATION

Salvage of the Civil War material deposited in the Congaree River offers an amazing opportunity to educate and involve the public about a historically significant site. The recovery of tangible evidence of the capture of Columbia will take place almost exactly 150 years from when it occurred. There will be multiple opportunities for the general public to benefit from this project. Initial plans call for an on-site structure dedicated to exhibiting the history of the site, the on-going work and the interpretation of the artifacts. This structure will be open to the public and will tentatively be staffed by Dominion personnel and an archaeological docent.

An electronic presentation or social media site suitable for hosting by Dominion or other appropriate website may be created to present the on-going recovery process. Museum quality artifact displays and/or traveling artifact shows at museums throughout the state can be generated. A book/booklet depicting the artifacts and history of the site suitable for presentation to the general public can be authored. Additional public outreach may involve professional papers and presentations at national and regional archaeological conferences, tours and talks for school age children as well as avocational groups is also an option. Some or all of these potential public outreach approaches will be completed as a result of this project.

QUALIFICATIONS

Company Profile

A pioneer in groundbreaking scientific and engineering developments since the 1960s, TRC is a national engineering and consulting firm providing integrated services to the energy, environmental, and infrastructure markets. We serve a broad range of clients in government and industry, implementing complex projects from initial concept to operations. TRC employs over 2,600 technical professionals and support personnel at more than 70 offices throughout the U.S.

TRC's cultural resource group in the Southeast originated as Garrow and Associates, an Atlanta-based small business that was founded in 1983 and acquired by TRC in 1997. We offer a complete range of cultural resource services in the Southeast from our offices in Atlanta, Georgia; Chapel Hill, North Carolina; Columbia, South Carolina; and Nashville, Tennessee; including archaeological investigations, historic structure surveys and evaluations, and cemetery studies. Our local office in Columbia is within a ten-minute drive of the Congaree River Project site. With the Principal Project Manager and Key Project Team members being local to Columbia, we will be able to respond quickly to all Dominion's needs. Our office provides us rapid access to SCIAA, SHPO, the South Carolina Department of Archives and History (SCDAH), the University of South Carolina at Columbia, and other regulatory offices and research facilities. Our organizational depth will allow us to draw on resources from our nearby offices to support this project as needed.

TRC's core cultural resources staff in the Southeast consists of approximately 55 professional archaeologists, crew chiefs, preservation planners, historians, and support personnel. Our archaeologists possess M.A. or Ph.D. degrees in Anthropology, meet the Secretary of the Interior's standards, and are Register of Professional Archaeologists (RPA) certified or eligible.

Our Columbia office contains 2,400 square feet of laboratory, office, and storage space. It possesses wet lab and dry lab capabilities and has ample room to conduct electrolysis and metal conservation operations. TRC's Atlanta facility includes 2,500 square feet of fully equipped laboratory space that includes tanks capable of conserving metal objects up to four feet in length, and the Chapel Hill office has similar lab and storage capabilities. Our Greenville office contains a wet lab and research/treatability laboratories complete with ventilation hoods and resources for preparing and storing solvents for use in cleaning coal tar from artifacts.

Key Personnel

TRC's proposed key staff for the Congaree River Sediment Removal Project includes highly experienced researchers with extensive experience managing and directing large scale projects that require consultation with multi-disciplinary teams as well as state and Federal agencies. Our team also has experience with both complex projects that involve creative approaches to archaeological issues and with Civil War era projects that involve recovery and conservation of artifacts similar to those anticipated for the Congaree River Project.

TRC Columbia Program Manager Sean Norris, M.A., RPA, will serve as Principal Project Manager for the project. Ms. Ramona Grunden, Senior Archaeologist in our Columbia office will serve as the Assistant Project Manager.

Principal Project Manager

Mr. Sean Norris is the Program Manager for Archaeology at the Columbia Office of TRC. He handles administrative duties and manages all projects and contracts that originate in that office. Mr. Norris will serve as Principal Project Manager and will attend meetings with Dominion and other team members, lead the development of the Artifact Recovery/Salvage and Artifact Conservation and Stabilization plans, and act as TRC's point of contact for this project. Mr. Norris has over 15 years of experience in the eastern U.S. and is RPA certified. Mr. Norris has served as Principal Investigator on numerous projects in South Carolina and has experience in project planning, the development and implementation of research designs and field and laboratory methodologies, and technical and popular reporting. Mr. Norris is President of the Council of South Carolina Professional Archaeologists and routinely interacts and sits on committees with employees of SCIAA and the South Carolina SHPO. He has authored Memorandums of Agreement (MOAs) and Memorandums of Understanding (MOUs) as well as Protective Covenants for significant archaeological sites that have included the SHPO, SCDHEC, and the COE as signatories.

Assistant Project Manager

Ms. Ramona Grunden is a Senior Archaeologist and Laboratory Director in TRC's Columbia Office. She will serve as the Assistant Project Manager. Her duties for this phase of the project will include providing input on artifact recovery strategies related to Civil War sites, she will also be present to attend meetings should Mr. Norris be unavailable. Ms. Grunden has over 30 years of experience in South Carolina archaeology including seven years as an archaeologist at SCIAA. Ms. Grunden has conducted and managed numerous large-scale projects in the Southeast. She has extensive experience in all phases of historic sites investigations, and has worked on numerous Civil War projects and others involving military installations and military components.

Senior Technical Advisor

Mr. Paul Webb is TRC's Cultural Resource Program Leader, and is stationed in the Chapel Hill office. He has over 25 years of experience in cultural resource management, including planning, implementing, and reporting all aspects of cultural resource studies. His qualifications include extensive experience with large and technically complex archaeological projects, and in assisting multidisciplinary teams in developing creative approaches to cultural resource issues. Mr. Webb will assist in the development of the artifact recovery/salvage and conservation and stabilization plans, and will also assist in agency negotiations as appropriate. Mr. Webb's background includes service to public, tribal, and private-sector clients, including the North Carolina Department of Transportation; Federal Highway Administration Eastern Federal Lands Highway Division (FHWA EFLHD); National Park Service (NPS); National Forests in North Carolina; Eastern Band of Cherokee Indians; U.S. Army Corps of Engineers; U.S. Army Construction Engineering Research Laboratory (USACERL); U.S. Army Environmental Center; Maryland State Highway Administration; Iroquois Gas Transmission System; Duke Energy; Piedmont

Natural Gas; North Carolina Natural Gas; Spectra Energy; and Progress Energy; along with numerous engineering and environmental firms.

Laboratory Director

Mr. Thomas Garrow is the Laboratory Manager for TRC's Atlanta office, a position he has held since 1993. Mr. Garrow is responsible for artifact processing, analysis, conservation, and cataloging, as well as specialized recovery techniques such as flotation. Mr. Garrow has nearly 30 years of experience in cultural resource management, including field and laboratory work across the eastern United States. Mr. Garrow has participated in numerous archaeological investigations covering a wide range of site types, including those dating to the Civil War. Mr. Garrow has received training in artifact conservation techniques and curation standards, and few cultural resource practitioners in the region can match his depth of experience in metal conservation. Mr. Garrow will assist in development of the Artifact Recovery/Salvage and Conservation and Stabilization plans.

Senior Scientific Advisor

Dr. Karen Saucier has over 25 years of experience, and has worked extensively in the areas of CERCLA- and RCRA-mandated investigations, risk evaluations and remediations. Dr. Saucier will act as TRC's in-house technical advisor with experience on Manufactured Gas Plant sites. Her expertise includes providing strategic technical services, and assessing regulatory and business implications of environmental remediations and historic liabilities. Dr. Saucier supports client/agency negotiations with respect to risk-based decision making, sediment, soil and groundwater remediation approaches, and liability portfolio life-cycle costing and management. She routinely serves as Project Manager with responsibility for coordination and integration of multidisciplinary technical resources through the various stages of liability project life cycles. She advises on and leads project communications to corporate, regulatory and community stakeholders.

Additional Consultants/Staff

TRC will retain the services of Mr. James Legg as an archaeologist and consultant to assist in the General Consulting and planning tasks requested in this RFP. Mr. Legg currently works as a project archaeologist for SCIAA and has more than 40 years of experience in archaeological research involving battlefields and other military sites. He has worked with Ms. Grunden on a number of those sites. He has a particular interest in 18th and 19th century ordnance, including both small arms and artillery ammunition. He is a recognized expert who has handled all of the major types of Civil War ammunition and has disarmed and conserved many examples.

Mr. Legg has 32 years of experience in archaeological metal detecting, and has a regional reputation as an authority on the subject. Mr. Legg is also highly experienced in metal conservation. Over the last 35 years he has conserved several thousand metal artifacts from private collections as well as significant archaeological collections including those from 16th century Santa Elena, the Camden Battlefield, and a number of other projects conducted by SCIAA and other research entities.

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ATTACHMENT A – SUMMARY OF UNDERWATER ANOMALIES

**MEMORANDUM OF
AGREEMENT**

**AMONG THE U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT;
THE SOUTH CAROLINA STATE HISTORIC PRESERVATION OFFICE; AND
DOMINION ENERGY SOUTH CAROLINA, INC.
REGARDING THE CONGAREE RIVER REMEDIATION PROJECT, RICHLAND
COUNTY, SOUTH CAROLINA**

WHEREAS, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344), an application (P/N # 2011-1356-6IO) has been submitted to the U. S. Army Corps of Engineers, Charleston District (Corps) by Dominion Energy South Carolina, Inc. (Dominion) for a Department of the Army (DA) permit to authorize impacts to waters of the United States associated with the construction a cofferdam and removal of a Tar-Like Material that is comingled with sediment in the Congaree River, Richland County, South Carolina (undertaking), and

WHEREAS, the Corps has defined the undertaking's Permit Area as a 0.50-acre site, as illustrated in the Attached Figure 1; and

WHEREAS, the Corps has determined that the undertaking will adversely affect Archaeological Site 38RD286/38RD278 (the Ordnance Dump Site/historic underwater site), which is eligible for listing in the National Register of Historic Places and Archaeological Sites 38RD223, 38RD224, and 38RD234 (Figure 2); and

WHEREAS, the Corps has consulted with the South Carolina State Historic Preservation Officer (SHPO) and the South Carolina Institute of Archaeology and Anthropology pursuant to Section 106 of the National Historic Preservation Act (NHPA), as amended (54 U.S.C § 306108, previously codified at 16 U.S.C. § 470f); and

WHEREAS, the Corps has notified federally-recognized tribes about the Undertaking's anticipated impacts on historic properties, as required by 36 C.F.R. § 800.6; and

WHEREAS, the Corps has consulted with Dominion regarding the effects of the undertaking on sites 38RD286/38RD273, 38RD223, 38RD224, and 38RD234 and has invited Dominion to sign this Memorandum of Agreement (MOA) as an invited signatory; and

WHEREAS, the Corps has consulted with the SHPO and Dominion in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 306108, previously codified at 16 U.S.C. § 470f), its implementing regulations (36 C.F.R. Part 800), and 33 C.F.R. Part 325, Appendix C to resolve the potential adverse effects of the Undertaking; and

WHEREAS, in accordance with the USACE "Interim Guidance for Implementing Appendix C of 33 CFR part 325 with the revised Advisory Council on Historic Preservation Regulations at 36 CFR part 800" (Apr. 25, 2005); 33 C.F.R. Part 325, Appendix C, Par. 8.; 36

C.F.R. § 800.6(a)(1); and 36 C.F.R. § 800.6(b)(1)(iv), , the Corps has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP has chosen *not* to participate in the consultation pursuant to 36 CFR Part 800.6(a)(1)(iii);

NOW, THEREFORE, the Corps, the SHPO and Dominion agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic artifacts.

STIPULATIONS

The Corps will monitor the progress of the following stipulated tasks to ensure that the Undertaking is carried out in accordance with this MOA, and Dominion will ensure that the following stipulations are implemented:

I. INSPECTION

Dominion and any successors or assigns engaged in the removal of the contaminated sediment shall allow representatives from the Corps and the SHPO to inspect the authorized activity at any time that is deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of this MOA. During any inspection the Corps and the SHPO will follow all safety protocols established at the work site.

II. PLANS AND REPORTS

All plans and reports developed for the salvage of historic artifacts shall incorporate guidance provided by the Secretary of Interior's *Standards and Guidelines for Archaeological Documentation* (48 FR 44734-37) and the President's Advisory Council on Historic Preservation publication, *Treatment of Archaeological Properties* (ACHP 1980). In addition, these materials will be consistent with *South Carolina Standards and Guidelines for Archaeological Investigations* (Council of South Carolina Professional Archaeologists, et al. revised 2013).

III. PROTECTIONS

Dominion's archaeological consultant will develop a recovery plan (Plan) for the portions of Archaeological Site 38RD286/38RD278 contained within the project area and identified in Attachment A. The recovery plan will include a description of the undertaking's research design and methodology for artifact recovery. The recovery plan will be submitted to the Corps and the SHPO for review and approval prior to any fieldwork. The Corps and the SHPO will be afforded thirty (30) days to review the recovery plan and provide comments.

Dominion will protect and preserve the areas labeled as Archaeological Sites 38RD223, 38RD224 and 38RD234 as shown in Exhibit A by completing the requirements stated in Stipulation IV below until such time as sites are determined not eligible for the

NRHP or potential adverse effects to those Sites determined eligible are mitigated with data recovery in accordance with this MOA and the Plan.

IV. SURVEY

No less than ten (10) days prior to any land disturbing activities Dominion shall ensure that:

- a. Archaeological Sites 38RD223, 38RD224 and 38RD234 are marked on construction and maintenance plans with treatment notes and this MOA referenced.
- b. All newly constructed roads in the vicinity of site 38RD223, 38RD224 and 38RD234 will be elevated above grade with successive layers of fill, geotextile matting and gravel in order to protect potential subsurface deposits.
- c. The boundaries of Archaeological Sites 38RD223, 38RD224 and 38RD234 are cordoned off in the field with orange safety fencing, or a similar highly visible barrier which shall remain in place until all construction activity is complete.
- d. An archaeologist will be present to monitor construction activities in the vicinity of Archaeological Sites 38RD223, 38RD224 and 38RD234.

V. COPIES OF DRAFT TECHNICAL REPORT

At least one copy of the draft technical report of data recovery operations and final public information plans will be submitted to the SHPO for review and approval within two (2) years from the last day of fieldwork. The draft technical report will be consistent with the standards outlined in *South Carolina Standards and Guidelines for Archaeological Investigations* (Council of South Carolina Professional Archaeologists, et al. revised 2013). The SHPO reserves the right to submit the draft technical report to qualified professional archaeologists for peer review. If the SHPO elects to utilize this option, Dominion's archaeological consultant will be advised, and additional report copies may be requested. If revisions of the draft report are recommended, Dominion is responsible for ensuring that these revisions are addressed in the final report. The final report will be submitted to the SHPO within three (3) months of the receipt of all agency and peer review comments.

VI. PUBLIC EDUCATION

Dominion, and the SHPO will consult to determine the appropriate format for a public education component. Dominion will ensure that a public education plan is developed and submitted to the SHPO with the draft technical report. All public education materials will be implemented within two (2) years of the last day of fieldwork.

VII. FINAL DISPOSTION

Dominion and the SHPO will consult to determine the final disposition of the artifacts recovered in accordance with the Underwater Antiquities Act of 1991 (Article 5, Chapter 7, Title 54, Code of Laws of South Carolina, 1976). Dominion will ensure that artifacts are stabilized and processed prior to their final disposition.

VIII. DURATION

This MOA will expire if its terms are not carried out within five (5) years from the issuance date of the DA permit, or when all stipulations are met, whichever comes first. Prior to such time, the Corps may consult with the other signatories to reconsider the terms of the MOA and amend in accordance with the “Amendments” paragraph below.

IX. POST-REVIEW DISCOVERIES

If any unanticipated cultural materials (e.g. large, intact artifacts or animal bones, large clusters of artifacts or animal bones, large soil stains or patterns of soil stains, buried brick or stone structures, or clusters of brick or stone indicating a former structure) in the project area prior to or during construction activities (a “Late Discovery”), then Dominion will temporarily halt any activities in the vicinity of such Late Discovery and will notify the SHPO and the Corps as soon as practical of the Late Discovery. The halt will afford the Corps and the SHPO the opportunity to assess the situation and recommend a course of action within two (2) business days after such notification.

A buffer will be established around the Late Discovery by the construction project manager. The buffer will be flagged by appropriate personnel and posted with signage indicating that no land altering activities will be allowed within this buffer zone until the course of action hereinafter described has been established.

If unanticipated human remains are found or suspected, they should be left in place and protected until appropriate consultation is completed. DOMINION is responsible for notifying the Corps, the SHPO, and the local authorities to initiate consultation. Human remains are subject to South Carolina law that addresses abandoned cemeteries and burials including but not limited to S.C. Code Ann. §§ 27-43-10 to 27-43-30, 16-16-600 and 61-19-28 to 61-19-29.

X. MONITORING AND REPORTING

Every one (1) year following the execution of this agreement, for the life of the agreement, Dominion will provide the Corps and the SHPO a written report describing all work begun or accomplished during the past year under this agreement. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received relating to the efforts to carry out the terms of this MOA. Dominion will also report on plans for the next year. This report may be submitted to the Corps via e-mail and to the SHPO in hard copy format.

XI. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the Corps shall consult with such party to resolve the objection. If the Corps determines that such objection cannot be resolved, the Corps will:

- A. Forward all documentation relevant to the dispute, including the Corps' proposed resolution to the ACHP. The ACHP shall provide the Corps with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the Corps shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and signatories and provide them with a copy of this written response. The Corps will then proceed according to its final decision.
- B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the Corps may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the Corps shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the MOA, and provide them and the ACHP with a copy of such written response.
- C. The Corps' responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

XII. AMENDMENTS AND MODIFICATIONS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP. Amendment of this MOA may require a concurrent request to amend applicable permits and easements of restrictive covenants.

XIII. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation XII, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

If the MOA is terminated, the Applicant must halt work and prior to work continuing on the undertaking, Corps must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. Corps shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by the Corps and the SHPO and implementation of its terms

evidence that the Corps has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

XIV. EXECUTION AND COUNTERPARTS

This MOA may be executed in counterparts. A copy with all original executed signature pages affixed shall constitute the original MOA. The date of the execution shall be the date of the signature of the last party to sign.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have caused this MOA to be executed by their duly authorized representative of the last signed date.

SIGNATORIES:

U.S. Army Corps of Engineers, Charleston District

By: _____ Date _____

Print Name: _____

Title: _____

South Carolina Department of Archives and History, SHPO

By: _____ Date _____

Print Name: _____

Title: _____

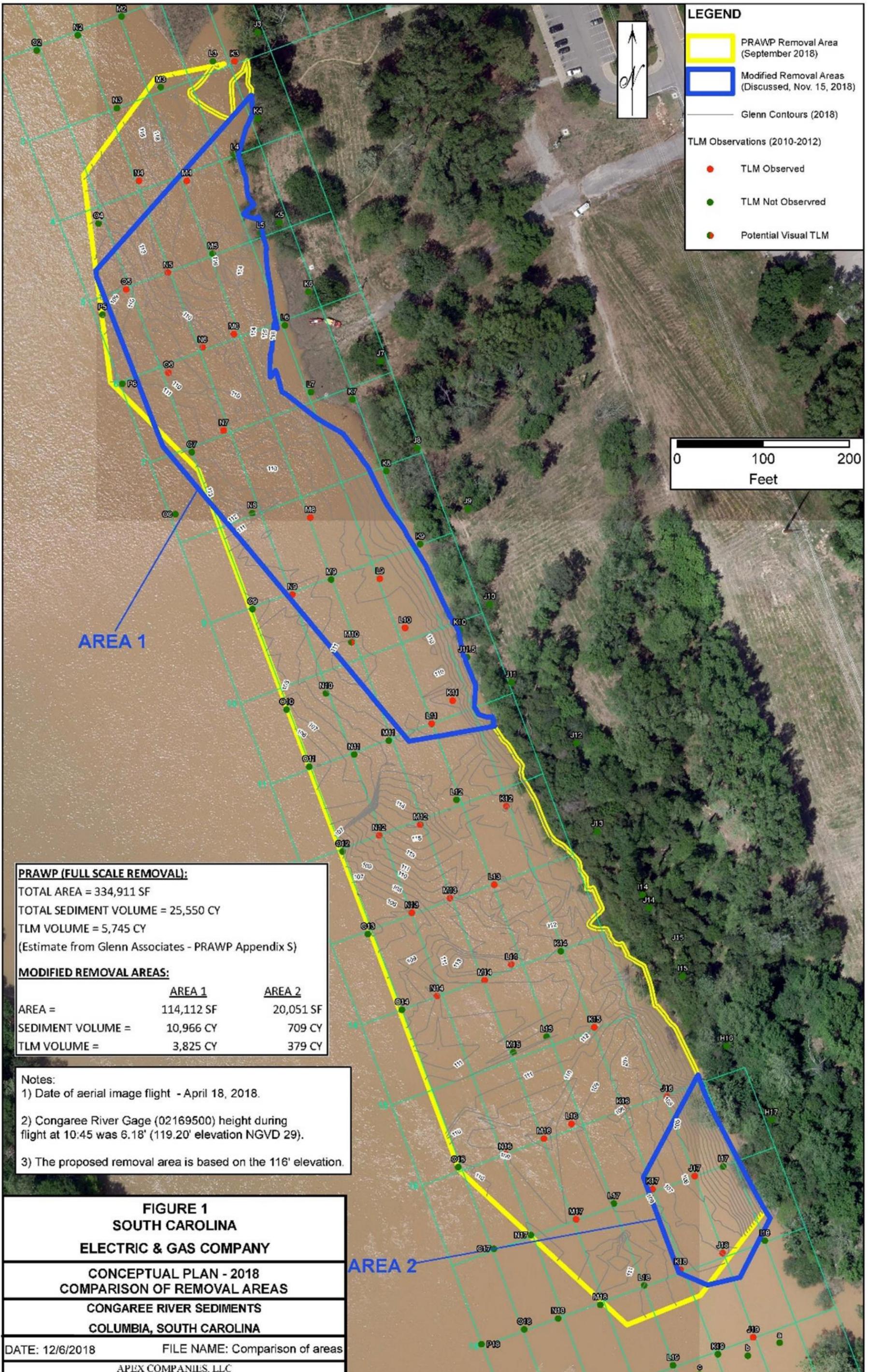
Dominion Energy South Carolina, Inc. - Dominion

By: _____ Date _____

Print Name: _____

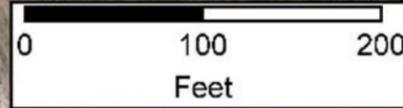
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ATTACHMENTS



LEGEND

- PRAWP Removal Area (September 2018)
- Modified Removal Areas (Discussed, Nov. 15, 2018)
- Glenn Contours (2018)
- TLM Observed
- TLM Not Observed
- Potential Visual TLM



PRAWP (FULL SCALE REMOVAL):
 TOTAL AREA = 334,911 SF
 TOTAL SEDIMENT VOLUME = 25,550 CY
 TLM VOLUME = 5,745 CY
 (Estimate from Glenn Associates - PRAWP Appendix S)

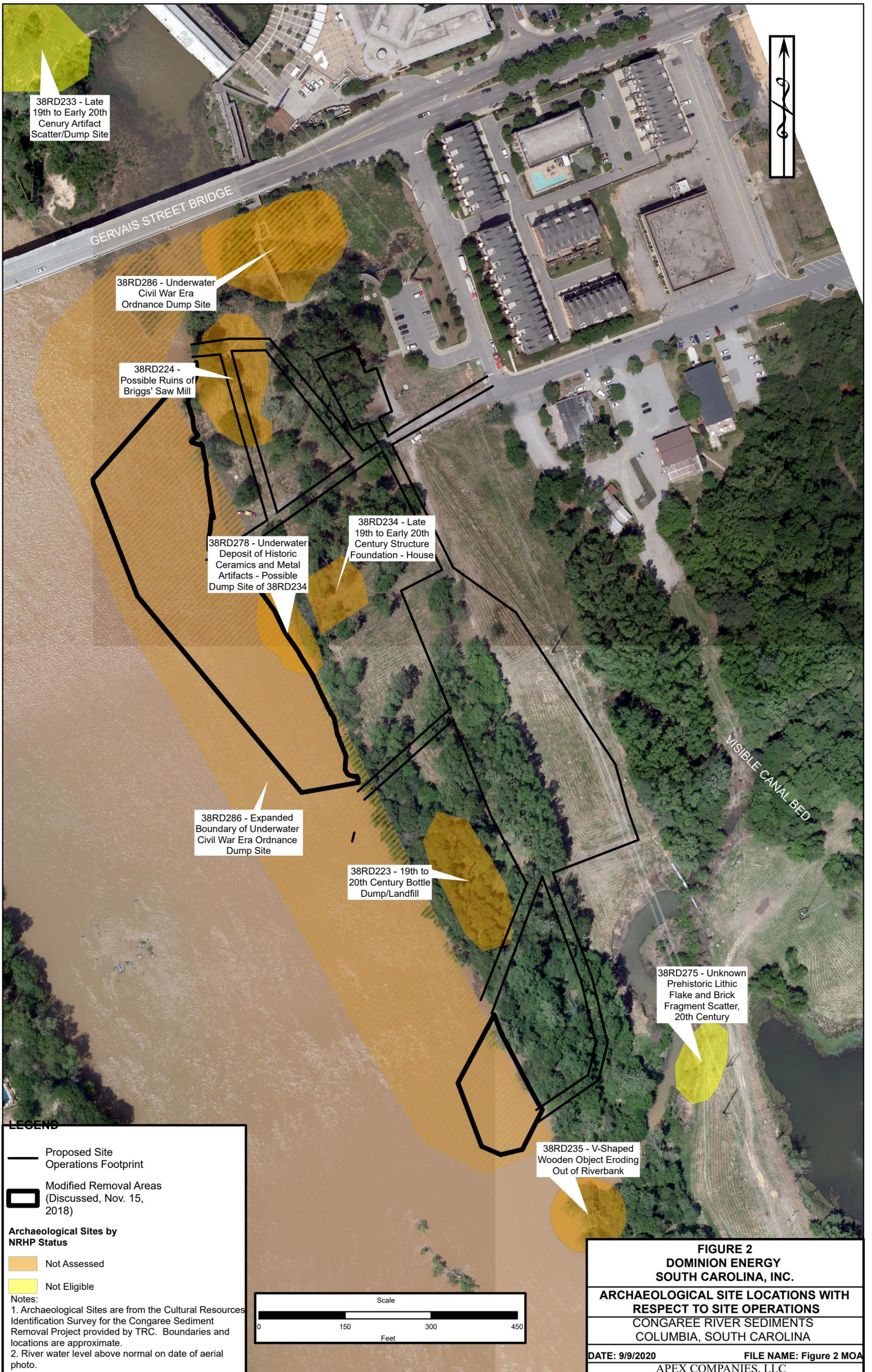
MODIFIED REMOVAL AREAS:

| | AREA 1 | AREA 2 |
|-------------------|------------|-----------|
| AREA = | 114,112 SF | 20,051 SF |
| SEDIMENT VOLUME = | 10,966 CY | 709 CY |
| TLM VOLUME = | 3,825 CY | 379 CY |

Notes:
 1) Date of aerial image flight - April 18, 2018.
 2) Congaree River Gage (02169500) height during flight at 10:45 was 6.18' (119.20' elevation NGVD 29).
 3) The proposed removal area is based on the 116' elevation.

FIGURE 1
SOUTH CAROLINA
ELECTRIC & GAS COMPANY
CONCEPTUAL PLAN - 2018
COMPARISON OF REMOVAL AREAS
CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA

DATE: 12/6/2018 FILE NAME: Comparison of areas
 APEX COMPANIES, LLC



38RD233 - Late 19th to Early 20th Century Artifact Scatter/Dump Site

38RD286 - Underwater Civil War Era Ordnance Dump Site

38RD224 - Possible Ruins of Briggs' Saw Mill

38RD278 - Underwater Deposit of Historic Ceramics and Metal Artifacts - Possible Dump Site of 38RD234

38RD234 - Late 19th to Early 20th Century Structure Foundation - House

38RD286 - Expanded Boundary of Underwater Civil War Era Ordnance Dump Site

38RD223 - 19th to 20th Century Bottle Dump/Landfill

38RD275 - Unknown Prehistoric Lithic Flake and Brick Fragment Scatter, 20th Century

38RD235 - V-Shaped Wooden Object Eroding Out of Riverbank

LEGEND

— Proposed Site Operations Footprint

▭ Modified Removal Areas (Discussed, Nov. 15, 2018)

Archaeological Sites by NRHP Status

■ Not Assessed

■ Not Eligible

Notes:

1. Archaeological Sites are from the Cultural Resources Identification Survey for the Congaree Sediment Removal Project provided by TRC. Boundaries and locations are approximate.

2. River water level above normal on date of aerial photo.

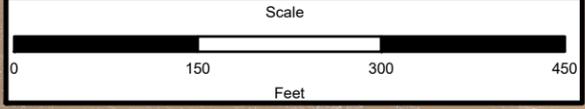


FIGURE 2
DOMINION ENERGY
SOUTH CAROLINA, INC.
ARCHAEOLOGICAL SITE LOCATIONS WITH
RESPECT TO SITE OPERATIONS
CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA
 DATE: 9/9/2020 FILE NAME: Figure 2 MOA
 APEX COMPANIES, LLC



UNIVERSITY OF SOUTH CAROLINA

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

DATA RECOVERY LICENSE

Licensee

Dominion Energy South Carolina, Inc./TRC Environmental Corporation c/o Rusty Harris, project principal

Project name

Congaree River Remediation Project

Project work area

Congaree River below Gervais Street Bridge, Columbia SC (See attached map)

Permitted Activity

This license grants to the licensee the right to conduct archaeological recovery of artifacts encountered during the removal of tar-like materials from the project work area and subject to approved research plan on file at SCIAA.

Date original application received

09/10/2015

Application received by

James Spirek

Application complete incomplete _____

Assurance: Escrowed funds _____ Letter of credit _____ Performance bond _____
Other **N/A**

Date of State assessment of archaeological historic property or paleontological property **1 September 2015**

Hearing required _____ not required

Hearing date and location **N/A**

Approved Rejected _____

James D. Spirek
State Underwater Archaeologist
Maritime Research Division

Date

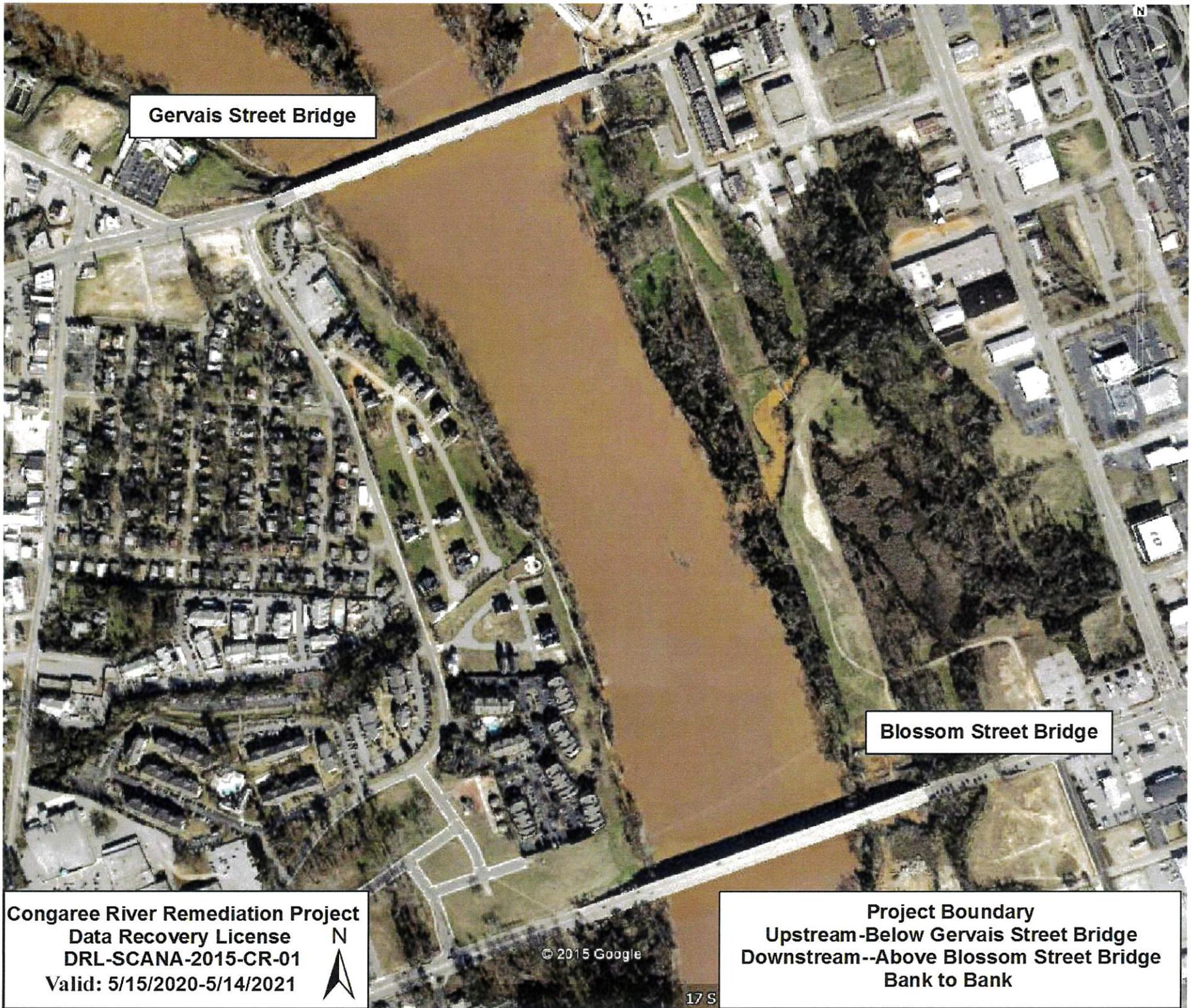
13 May 2020

License Number

DRL-SCANA-2015-CR-01

Effective Dates

15 May 2020 through 14 May 2021 (one-year)



Gervais Street Bridge

Blossom Street Bridge

Congaree River Remediation Project
Data Recovery License
DRL-SCANA-2015-CR-01
Valid: 5/15/2020-5/14/2021



© 2015 Google

17 S

Project Boundary
Upstream-Below Gervais Street Bridge
Downstream--Above Blossom Street Bridge
Bank to Bank