MRS CONSULTANTS, LLC.

Cultural Resource Specialists   Archaeologists   NHPA Section 106 Consultants

Phase II Archaeological Testing and Historical Research for the SSSIC North Birmingham Furnaces Site (1Je808), Jefferson County, Alabama ALDOT Project HPP-1602(510) Jefferson County

by

Catherine C. Meyer

and

Jack R. Bergstresser

Principal Investigator

PERFORMED BY:

MRS Consultants, LLC.

P.O. Box 3146

Tuscaloosa, Alabama 35403

PERFORMED FOR:

Alabama Department of Transportation

Environmental Technical Section

1409 Coliseum Boulevard

Montgomery, Alabama 36110

November 9, 2016

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MANAGEMENT SUMMARY

MRS Consultants, LLC was contracted by the ALDOT to conduct Phase II archaeological testing and historical research for the Sloss-Sheffield Steel and Iron Company (SSSIC) North Birmingham Furnaces site in Jefferson County, Alabama. This site is recorded on the ASSF as Site 1Je808. A portion of the archaeological site is located in the proposed ROW of the proposed Finley Boulevard Extension, which will extend Finley Boulevard to the east from 26th Street North/U.S. Highway 31 in the North Birmingham community, across the Northfolk Southern Railroad, and connect to Shuttlesworth Drive in the Collegeville community. The project is associated with ALDOT Project HPP-1602(510) Jefferson County, which involves federal funding from the FHWA. The SSSIC North Birmingham Furnaces operated between 1888 and 1958, and contained the company's No. 3 and No. 4 furnaces. The industrial site was dismantled in the mid-1960s; therefore, very little remains of the massive facilities that once existed here. Phase II research was conducted to determine if Site 1Je808 was eligible for the National Register of Historic Places (NRHP). Field investigations recorded 16 structural features associated with the site, many of which are located outside of the project ROW. The majority of the features appear to be related to the later occupation of the site, post-dating 1916 and some post-dating 1930; however, a few features do date to an earlier time period. A GPR survey and shovel-testing program did not reveal any significant cultural deposits or subsurface features within the project ROW. The archaeological features that survive at Site 1Je808 lack sufficient archaeological integrity. Less than 10 percent of the site is estimated to survive. While some elements of the facility have survived, their capacity to yield significant information is questionable. The surviving archaeological remains are generic and in poor condition. Site 1Je808 was also compared to the renowned Sloss Furnaces site, which is another facility in Birmingham that was owned by the SSSIC and is listed on the NRHP and the National Historic Landmarks (NHL). The integrity of Site 1Je808 pales in comparison to the Sloss Furnaces NHL site. Considering the limited research potential and poor integrity, the archaeological remains of Site 1Je808 are recommended as not eligible for the NRHP under Criterion D. Because the site has a significant historical context, the site was also considered under Criterion A; however, the site does not convey its historic significance through well-preserved features. The setting has been completely impacted, and the archaeological remains do not evoke a historic sense. Due to the poor integrity, the industrial remains of Site 1Je808 are recommended as not eligible under Criterion A.

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Catherine C. Meyer
Jack R. Bergstresser

INTRODUCTION

MRS Consultants, LLC was contracted by the Alabama Department of Transportation (ALDOT) to conduct Phase II archaeological testing and historical research for the Sloss-Sheffield Steel & Iron Company's (SSSIC) North Birmingham Furnaces site in Jefferson County, Alabama. This site is recorded on the Alabama State Site File (ASSF) as Site 1Je808. A portion of the archaeological site is located in the proposed right-of-way (ROW) of the proposed Finley Boulevard Extension, which will extend Finley Boulevard to the east from 26th Street North/U.S. Highway 31 in the North Birmingham community, across the Northfolk Southern Railroad, and connect to Shuttlesworth Drive in the Collegeville community. The project is associated with ALDOT Project HPP-1602(510) Jefferson County, which involves federal funding from the Federal Highway Administration (FHWA). Therefore, Section 106 of the National Historic Preservation Act (NHPA) applies to the project.

The SSSIC North Birmingham Furnaces site (1Je808) was originally recorded in 2005 by Jerry Neilsen, an archaeologist with Volkert Environmental Group, Inc., and was reported in *Cultural Resources Assessment, Finley Boulevard Extension, Birmingham, Alabama* (Nielsen 2005). Located to the east of the intersection of Finley Boulevard and 27th Street North, the archaeological site is recorded in NW ¼ of Section 24, T17, R3W, and can be viewed on the USGS 7.5' Birmingham North, Alabama quadrangle (Figure 1). The recorded site boundaries are large, measuring approximately 440 m east-west by 280 m north-south, and were drawn to encompass all of the structures that once existed at the facility. This area encompasses approximately 26 acres of land (Figure 2); however, archaeological features are only known to exist in a much smaller area. The specific testing area was restricted to the site area that exists to the west of the Northfolk Southern Railroad, which encompasses the main facilities of the old plant. Nielsen (2005) identified the remains of two furnaces and several foundations during his survey that exist in the gravel parking lot and storage yard of the Birmingham Sanitation Department. The site is associated with the Sloss-Sheffield Steel & Iron Company (SSSIC), a renowned iron company that once operated in Birmingham. The North Birmingham Furnaces site operated between 1888 and 1958, and contained the company's No. 3 and No. 4 furnaces. Their No. 1 and No. 2 furnaces, located approximately two miles to the southeast of the North Birmingham Furnaces, were built earlier in 1881. The facilities of the No. 1 and No. 2 furnaces were closed in 1971, but are preserved today as the Sloss Furnaces National Historic Landmark (NHL), which is also listed on the National Register of Historic Places (NRHP).

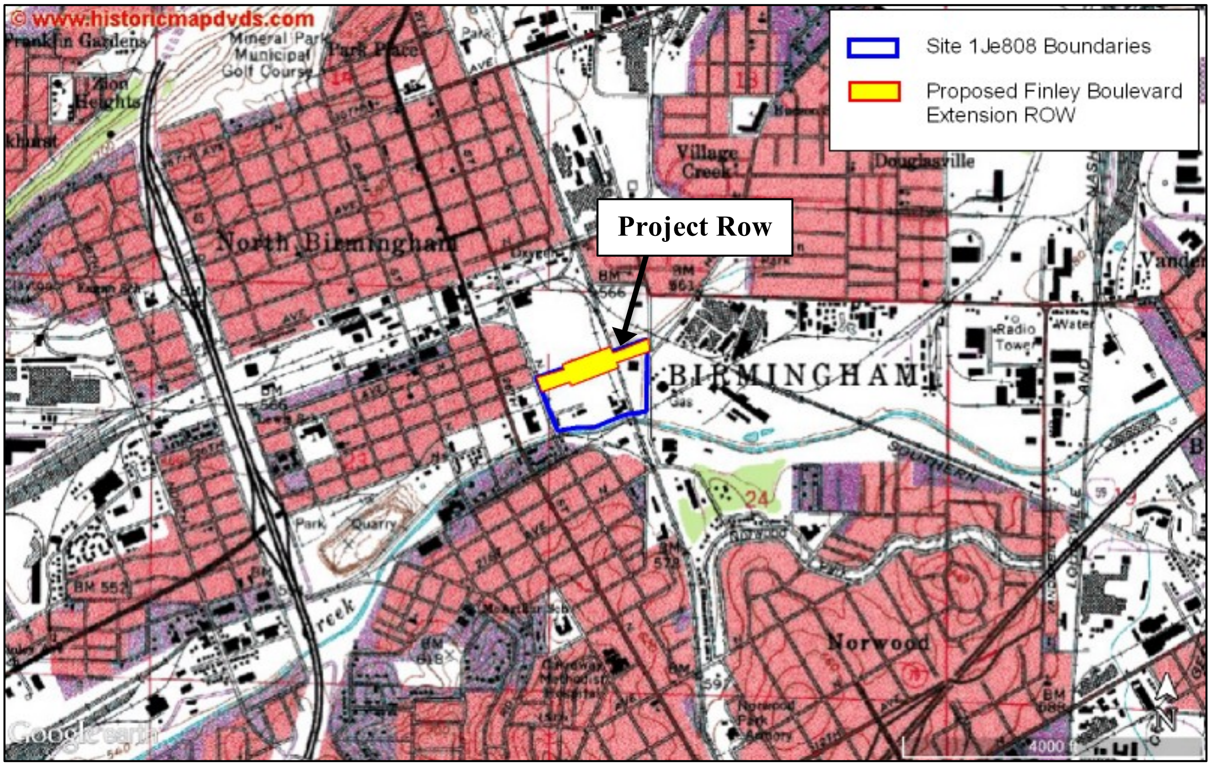

Figure 1. USGS 7.5' Birmingham North, Alabama Quadrangle Showing Site 1Je808 and the Project ROW.

Figure 2. Google Earth Aerial Photograph Showing the Study Area.

Nielsen (2005) recommended that additional research should be conducted at the SSSIC North Birmingham Furnaces site (1Je808) to determine if the site is eligible for the NRHP. The following report details the Phase II investigation of the archaeological site. Because this is an industrial site that had been dismantled in the mid-1960s, and most of the remains and project ROW are contained within a gravel parking lot and storage yard, standard Phase II testing techniques were not employed. Excavating shovel tests or test units within the parking lot was not feasible, nor would it provide valuable insight into what actually remains of the facility. The only area where shovel testing was possible within the project ROW was within a grassed field that borders the north side of the parking lot, although it is outside of the recorded site boundaries and proved to be an almost fruitless endeavor. Phase II research focused on the following tasks: 1) conduct background research on the industrial site and acquire historical maps, aerials, and photographs; 2) conduct a Ground Penetrating Radar (GPR) survey within the project ROW to determine if subsurface archaeological features exist; 3) measure and photograph the visible structural features that are present within and adjacent to the project ROW; 4) conduct shovel testing within the grassed field to determine if any archaeological deposits are present; 5) draw a site plan map of the structural remains within and adjacent to the project ROW; 6) overlay historical maps, aerials, and the site plan map to recognize correlations; 7) estimate what archaeological features could exist beneath the surface within the project ROW; 8) photograph structures at the Sloss Furnaces NHL site to make comparisons; and 9) assess the NRHP eligibility of the SSSIC North Birmingham Furnaces site (1Je808) using NRHP criteria.

Research for the project was overseen and undertaken by Jack Bergstresser, Ph.D. and Catherine C. Meyer (MRS Cultural Resource Specialist). Bergstresser served as the Principal Investigator of the project, and is an experienced industrial archaeologist with extensive knowledge of Birmingham's iron industry. Bergstresser conducted historical research and wrote the historical context for this report. Meyer served as the Project Manager, conducted background research, and coordinated all of the field investigations in conjunction with Bergstresser. Jeffery M. Meyer (Cultural Resource Specialist) and Linda A. Hollis (Research Assistant) assisted with the field investigation, and oversaw the removal of debris from the project ROW. The GPR survey was undertaken by Kent A. Schneider, Ph.D. (GPR Specialist) and Douglas E. Luepke (GPS-GIS Specialist) with Underground Imaging Solutions (UIS). Their GPR report is contained in Appendix A. Luepke also helped map the site using a sub-meter accuracy Global Positioning System (GPS). The following report details the investigations undertaken at the SSSIC North Birmingham (1Je808).

ENVIRONMENTAL SETTING

Site 1Je808 exists in the North Birmingham community in Birmingham, Alabama (Figure 1). It is set within a low valley bordering the north side of Valley Creek. The archaeological site resides in an industrial setting that is bordered to the west by 27th Street North, to the east by the Norfolk-Southern Railroad, to the south by Village Creek, and north by a grassed field (Figure 2). The majority of the site and project ROW is covered in a gravel parking lot and storage yard that is utilized by the Birmingham Sanitation Department. Construction equipment, landscaping materials, vehicles, massive streetlight poles, and trash/debris are stored on the site, much of which was eventually moved from the project ROW. The northern portion of the project ROW is contained within a grassed field, which had been industrial in previous years.

The general site area (Figure 3) resides within the Birmingham-Big Canoe Valley section of the Alabama Valley and Ridge physiographic province (Sapp and Emplaincourt 1975). The Valley and Ridge province developed on tightly folded and thrust-faulted layers rock, consisting of numerous zig-zagging ridges that are separated by deep, steep-sided valleys. This province was formed on Paleozoic sedimentary rocks, which range in age from Cambrian to Pennsylvanian (540-290 million years ago). The ridges are comprised of Pennsylvanian sandstone that belongs to the Pottsville Formation, while the valleys cut through shale, limestone, and dolomite formations. The Birmingham-Big Canoe district is the westernmost district of this province. It extends approximately 90 miles, extending from Tuscaloosa County near Vance and ending in Etowah County around Gadsden. This district is called the Jones Valley in the Birmingham area, which is eroded into folded and thrust-faulted Lower Paleozoic limestone and dolomite.

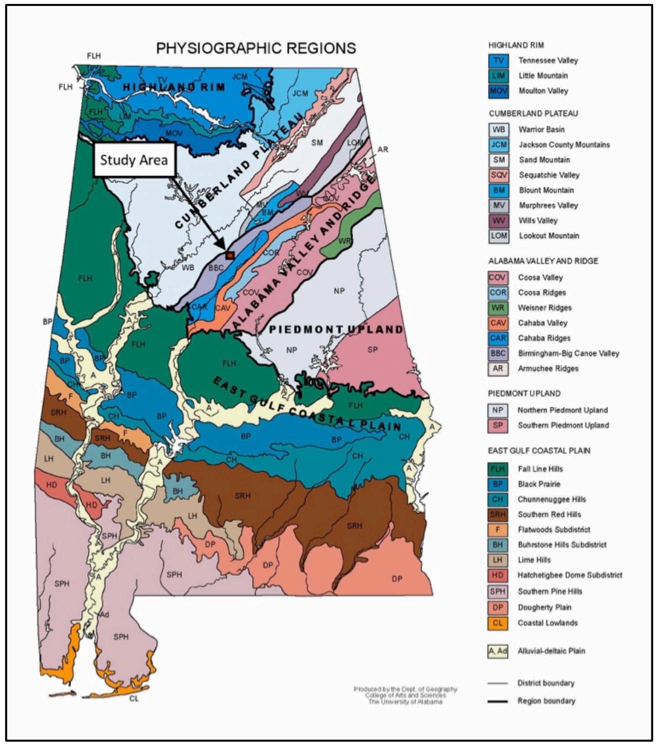

Figure 3. Physiographic District Map for Alabama (Source: The University of Alabama, Department of Geology).

Geologically, the study area exists near a divide between the Ketona Dolomite and Conasauga formations (Figure 4). The Ketona Dolomite is characterized by light to medium gray thick-bedded coarsely crystalline dolomite. The Conasauga formation is characterized by a medium bluish-gray fine-grained, thin-bedded argillaceous limestone and interbedded dark gray shale in varying portions (Szabo et al. 1988). Both of these formations would have provided the dolomite and/or limestone that was utilized in the furnaces.

The Birmingham area is often referred to as the Birmingham District. This district is a geological zone where the raw materials needed for making iron and steel are found in proximity to each other, including iron ore, coal, and limestone/dolomite. The district includes Red Mountain, the Warrior and Cahaba coalfields, and Jones Valley. Red Mountain is part of the Ridge and Valley province. It is a long southwest-northeast trending ridge that divides Jones Valley from Shades Valley, which is further to the south. Red Mountain is composed of layers of sandstone, iron ore, and shale. It contains Silurian-age iron ore that is exposed in several long crests, revealing rust-colored rock faces and seams of hematite, i.e. red iron ore. Red Mountain supplied much of the iron ore used at many the furnaces in Birmingham District. The narrow Cahaba Valley borders Jones Valley to the south, while the expansive Warrior Basin borders the valley to the north. Coal used in the furnaces was found in these physiographic districts. Jones Valley provided the limestone/dolomite. In fact, the dolomite quarry used for the SSSIC North Birmingham Furnaces is located less than one-half mile to the west-southwest of the site.

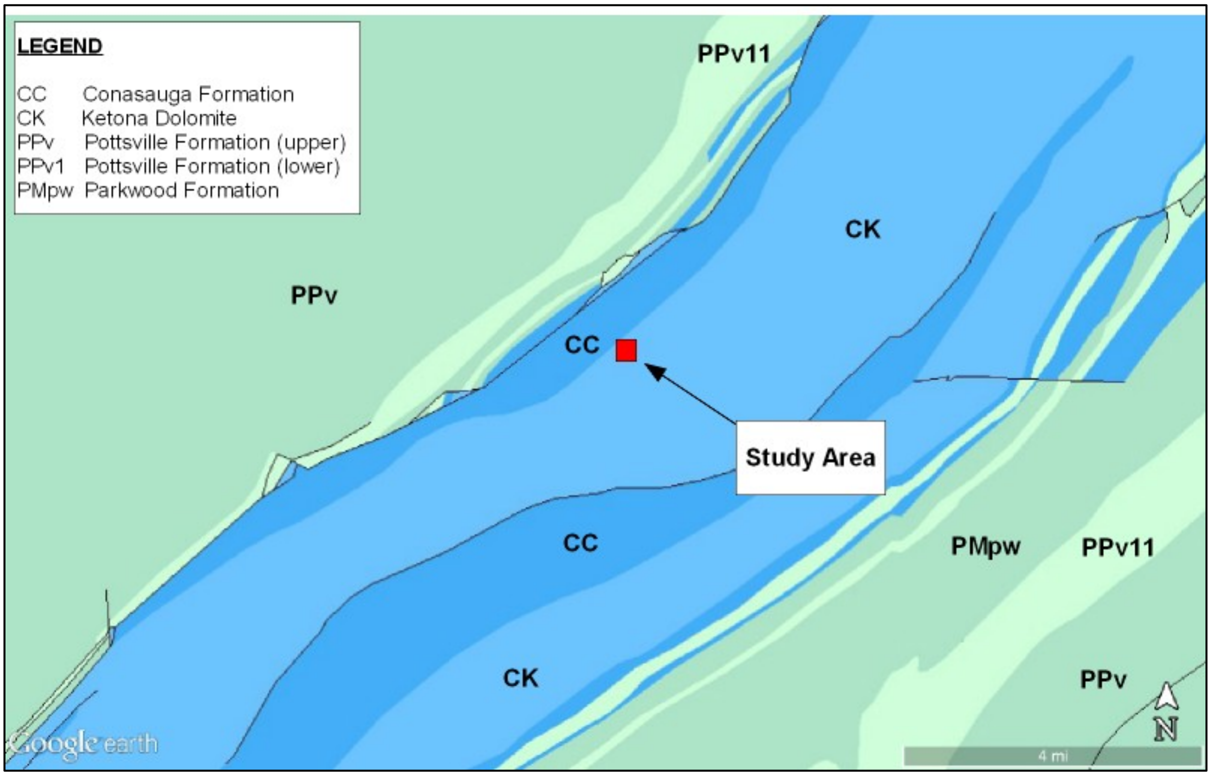

Figure 4. A Portion of the Szabo et al. (1988) *Geological Map of Alabama* Showing the Survey Area (Source: http://mrdata.usgs.gov/geology).

The Natural Resources Conservation Survey (NRCS) soil overlay in Google Earth was reviewed. Soils within the entire site area are classified as Urban Land, which is a disturbed soil association. The 1908 Jefferson County Soil Survey map was also consulted. This early soil map indicates that the Site 1Je808 is composed of Conasauga clay. This soil classification is no longer used for Jefferson County; however, a description of the soil was found in the 1913 *Soils of the United States, Bulletin No. 96* (Marbut et al. 1913). Conasauga clay is described as having a shallow topsoil of 6-8 inches (15-20 cm) light grayish yellow silt loam containing considerable clay that is underlain by a pale yellow heavy clay subsoil. Soils within the project ROW have been disturbed by historic industrial use, especially constructing the massive facilities that once existed here and, over the course of several decades, by moving and storing stock piles of industrial materials, i.e. slag, spoil, gravel, coke, iron ore, etc. Later, the site was heavily disturbed in the mid-1960s when the facilities were dismantled and the industrial stockpiles were removed. Aerial photographs dating to the 1970s to present-day indicate that the site area has undergone other transformations. The soil matrix of the site is contained within a very disturbed environment, which is not unexpected for an industrial site.

BACKGROUND RESEARCH

Catherine C. Meyer and Jack Bergstresser conducted background research, each covering various topics and sources. The Alabama State Site File (ASSF) and the Phase I Surveys website, maintained by The University of Alabama Museum's Office of Archaeological Research, was consulted regarding previous research for the archaeological site. Several online sources were consulted for historical maps and photographs, including the *Historical Map Archive* website by the University of Alabama Libraries, the Birmingham Public Library (BPL) Digital Collections, the Alabama Department of Archives and History (ADAH) Digital Collections, and *The National Map: Historical Topographic Map Collection* website at the U.S. Geological Service. Additional maps were obtained from EDR reports (Appendix B), a company that researches Sanborn maps, aerials, quadrangles, or other sources for due diligence reports. Materials were consulted at the University of Alabama's W.S. Hoole Special Collections Library and the BPL Department of Archives. Bergstresser also consulted Karen Utz, Sloss Furnaces Curator and Historian, and sifted through the archives at Sloss Furnaces museum.

A historical context for the site was derived from several sources pertaining to the history of Birmingham's iron and steel industry. Primary sources include those that specifically discuss the history of the SSSIC, such as *The Story of Coal and Iron in Alabama (*Armes 1987), *Sloss Furnaces and the Rise of the Birmingham District* (Lewis 1994), *Sloss Furnaces: National Historic Landmark* (Utz 2008), and *Images of America: Sloss Furnaces* (Utz 2009). It is notable that although there is an abundance of information about the Sloss City Furnaces, the same is not true for the North Birmingham Furnaces. References to the North Birmingham plant are more of a side note to the well-documented history of the City Furnaces. Regardless, the company's history is well documented. The reader is referred to the sources listed above. Bergstresser's historical context for the site is provided in the next section of this report.

Previous Research

The ASSF and Phase I Surveys website was referenced for previous archaeological research concerning the site. In 2005, Jerry Nielsen originally recorded the site on the ASSF as Site 1Je808. It was recorded as a result of a Phase I cultural resources assessment for the proposed Finley Boulevard Extension project and is reported in *Archaeological Resources Assessment, Finley Boulevard Extension, 26th Street to State Route 79 (Tallapoosa Street), Birmingham, Alabama* (Nielsen 2005). Site 1Je808 is located in NW ¼ of Section 24, T17, R3W, and can be viewed on the USGS 7.5' Birmingham North, Alabama quadrangle. The original site boundaries as recorded by Nielsen measure approximately 440 m east-west by 280 m north-south, which apparently were drawn to encompass all of the structures that once existed at the facility. Nielsen (2005) identified concrete/brick foundations and the bases of two furnaces on the site, which are on the Birmingham Sanitation Department's property. Background research conducted by Nielsen (2005) found Sanborn Fire Insurance maps for this parcel of property dating to 1888, 1891, 1902, and 1911, which was occupied by the Sloss-Sheffield Steel & Iron Company's No. 3 and No. 4 furnaces. Because the project ROW and archaeological site exist in a gravel parking lot, Nielsen (2005) was unable to conduct any subsurface shovel tests within the ROW. Investigations were limited to surface investigations and photographing some of the structural remains. It is also notable that the grassed field to the north of Site 1Je808 was not accessible during his Phase I survey; therefore, he was unable to conduct shovel tests in the grassed field to determine if any archaeological deposits existed in this area of the project ROW. Although the ASSF form for Site 1Je808 notes the site is *not eligible* for the NRHP, Nielsen's (2005) Phase I report states otherwise. He states that the site "has the potential for possessing significant archaeological information pertaining to the early iron industry in Birmingham and blast furnace, pig iron production specifically" (Nielsen 2005:21).

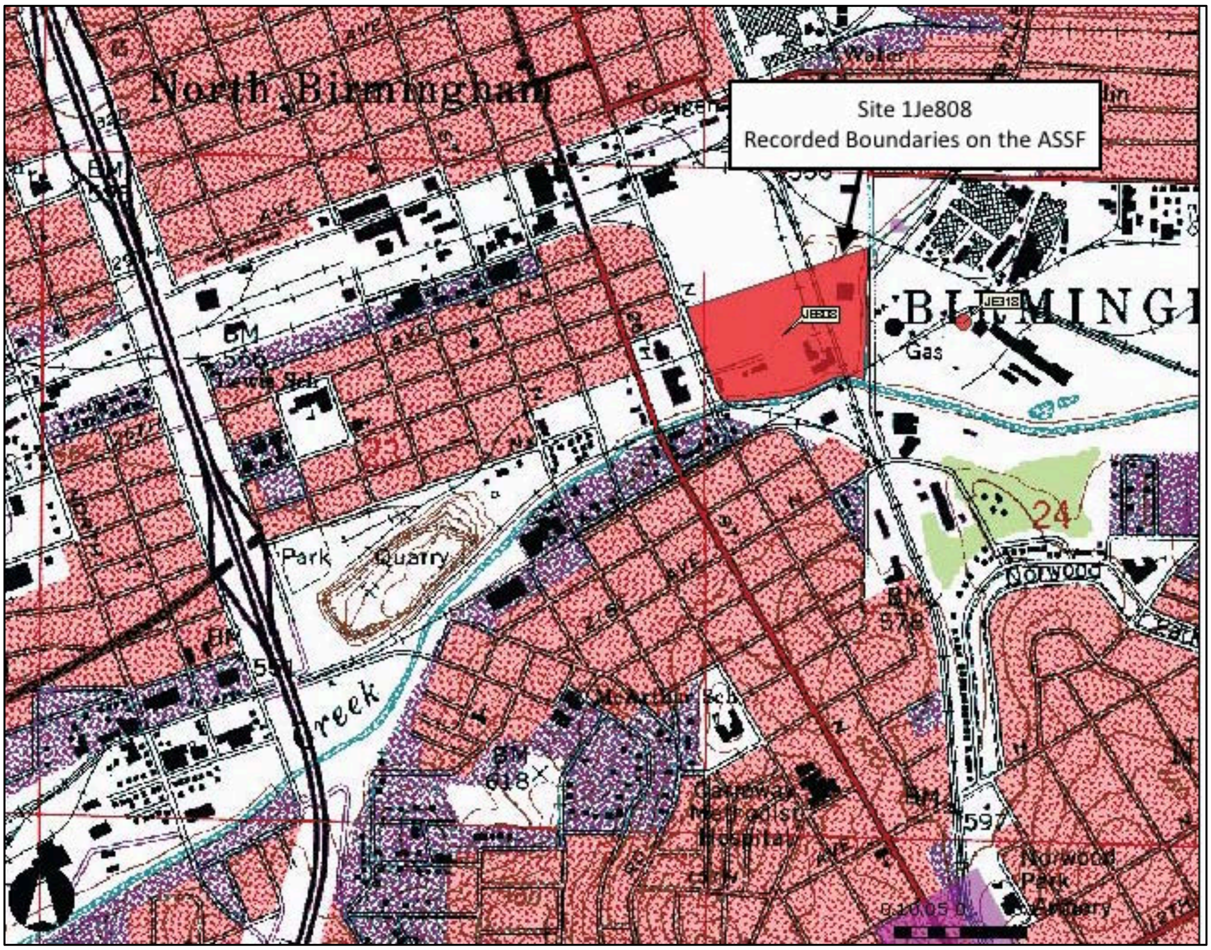

Figure 5. Map from the Phase I Surveys Website Showing Site 1Je808.

Historic Quadrangles

Several historic quadrangles were downloaded into .kmz files from *The National Map: Historical Topographic Map Collection* website (http://ngmdb.usgs.gov/maps/TopoView). The years available for download include: 1889 (Figure 6), 1892, 1895, 1901, 1906 (Figure 7), 1916, 1934 (Figure 8), 1943, 1961 (Figure 9), 1971, 1978, 1986, and 2001. Unfortunately, many of these quadrangles do not depict the facilities with any accuracy. The 1889, 1882, 1895, and 1901 quadrangles show the two casting sheds, but do not depict any other structures. The 1906 Birmingham Coal District quadrangle does not show the casting sheds, even though they existed, but shows a large structure that appears to represent the stock house. The photorevised 1916, 1934, and

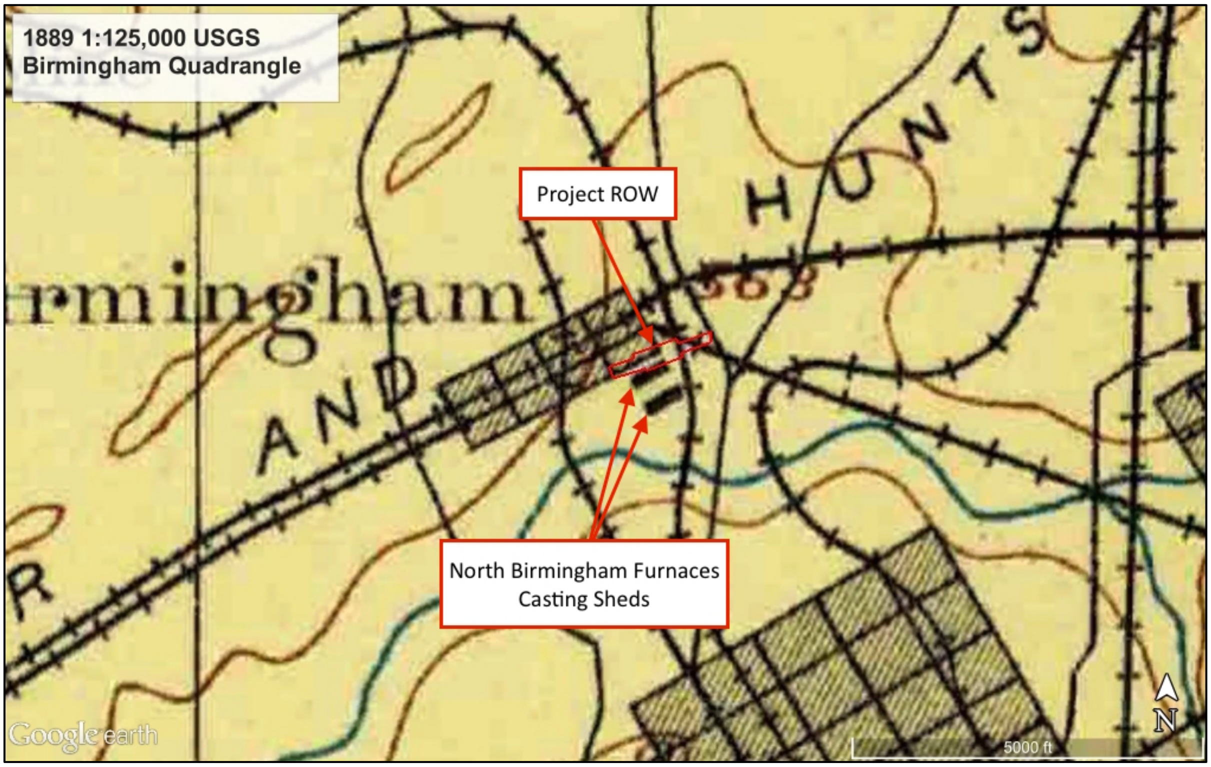

Figure 6. A Portion of the 1889 USGS 1:125,000 Scale Birmingham Quadrangle Showing the Project Area.

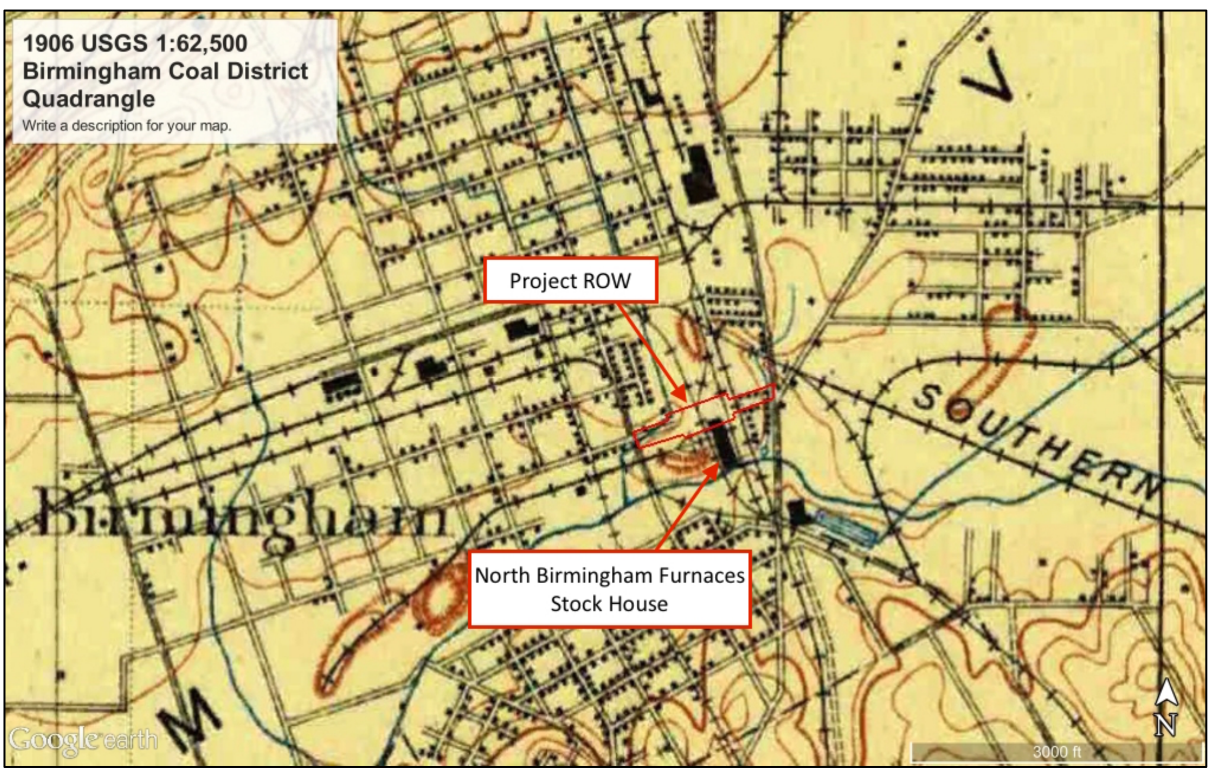

Figure 7. A Portion of the 1906 USGS 1:62,500 Scale Birmingham Coal District Quadrangle Showing the Project Area.

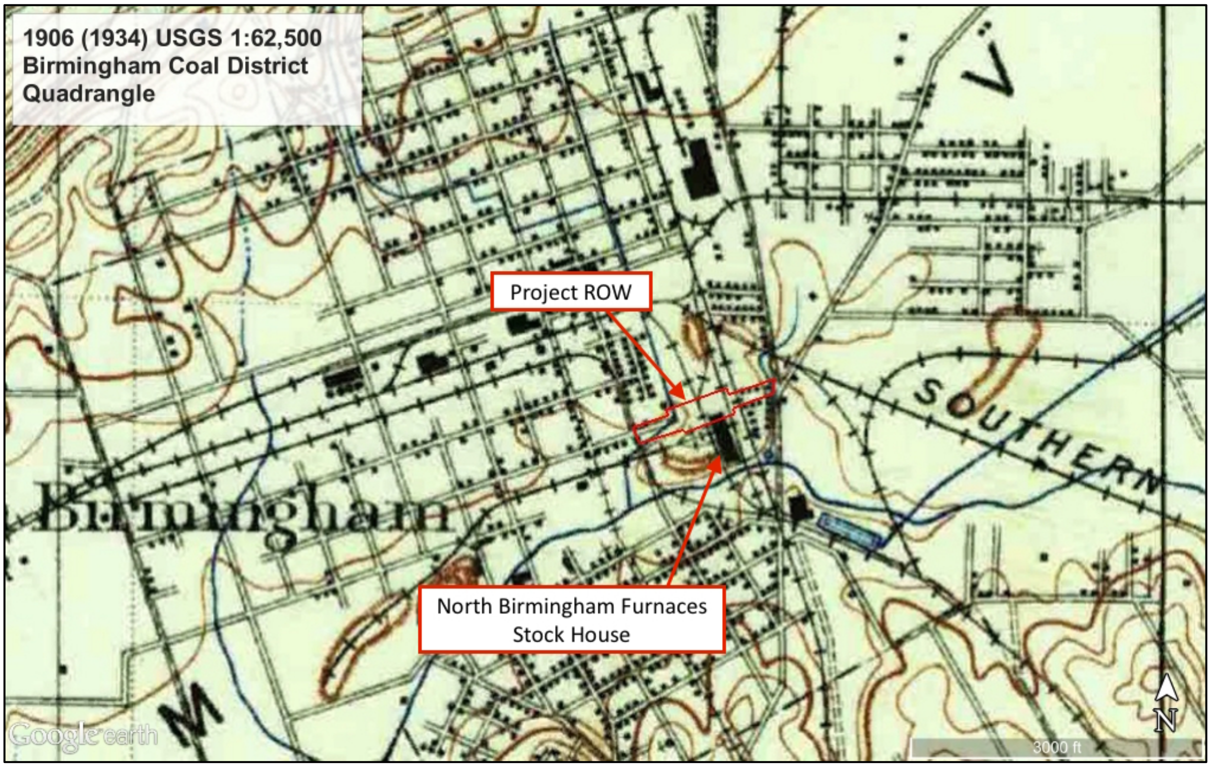

Figure 8. A Portion of the 1934 USGS 1:62,500 Scale Birmingham Coal District Quadrangle Showing the Project Area.

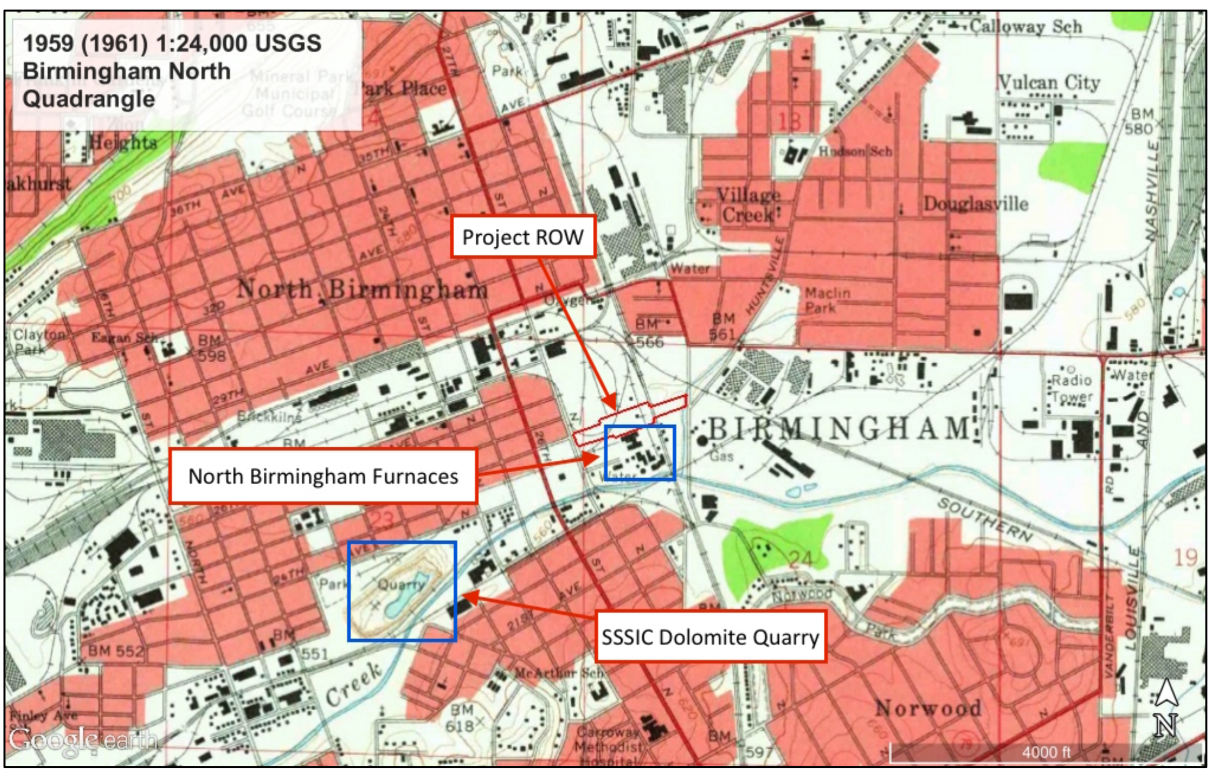

Figure 9. A Portion of the 1961 USGS 1:24,000 Scale Birmingham North Quadrangle Showing the Project Area.

1943 quadrangles depict the same image with the stock house, but do not depict any other buildings. The 1959 (photorevised 1961) USGS 7.5’ Birmingham North quadrangle is the most accurate depiction of the facilities, which corresponds well with aerial images dating to this time period.

Historic Sanborn Fire Insurance Maps

Late nineteenth to early twentieth century Sanborn Fire Insurance maps were acquired from the *Historical Map Archive* website of the University of Alabama Libraries, which are provided courtesy of the W.S. Hoole Special Collections Library. Maps dating to 1888, 1891, 1902 and 1911 were downloaded and are provided in Figures 10-15. Although there were additions and changes to the plant over time, all of the main facilities were positioned in the same location throughout time, including the two furnaces, two casting sheds, one stock house, stock trestles, stoves, engine house, and ovens (boilers). The plant is bordered on the east by the Georgia-Pacific Railroad on the 1888 and 1891 maps, which then changes to the Southern Railroad on the 1902 and 1911 maps. A few structures are located on the opposite (eastern) side of the railroad, which includes an office, laboratory, and a few dwellings.

A 1951 Sanborn map (Figures 14-15) was acquired from a *Certified Sanborn Map Report* by EDR (EDR Certification 5E8A-49DA-A390), which is provided in Appendix B. While there are substantial changes to the plant, the primary facilities are still shown in the same locations, including the two furnaces, casting sheds, stock trestles, engine house, and ovens (boilers). The most notable changes to the facility are: 1) the casting sheds are much longer; 2) there is a new set of stoves located to the northeast of the No. 4 Furnace; 3) the stock house is no longer present, although the railroad trestles are still in the same general location; and 4) there are auxiliary buildings to the southwest of the facility that include a bathhouse, large office/storeroom/laboratory structure, and store. Several structures are also shown on the opposite (eastern) side of the railroad tracks, including five dwellings, an oil house, storage building, supply house, and laboratory.

Other Maps

A railroad map dating to 1935 was acquired from the Birmingham Rails website (http://www.bhamrails.info/1935railmap.html). The map is from a large blueprint book that is entitled *Birmingham-Bessemer, Ala.: Map Showing Tracks and Facilities of Various Railroad within Birmingham-Bessemer Terminal Area* (Birmingham-Bessemer Terminal Area Coordinating Committee 1935). Map 3G shows the North Birmingham area (Figure 16). The SSSIC North Birmingham Furnace is shown with two casting sheds and large stock house. There are several industries in the surrounding area that are connected by a maze of railroads. Other notable industries in the area include the SSSIC By-Products Plant, U.S. Cast Iron Pipe and Foundry Company, American Radiator Company, Birmingham Stove & Range Company, Lamson & Sessions Bolt Company, and Finley Yard & Shops. The SSSIC North Birmingham Furnaces may have provided pig iron to some of these companies. One of the most notable features on the map is a railroad leading between the furnaces and the SSSIC Dolomite Quarry, which is found less than a mile to the west of the furnaces.

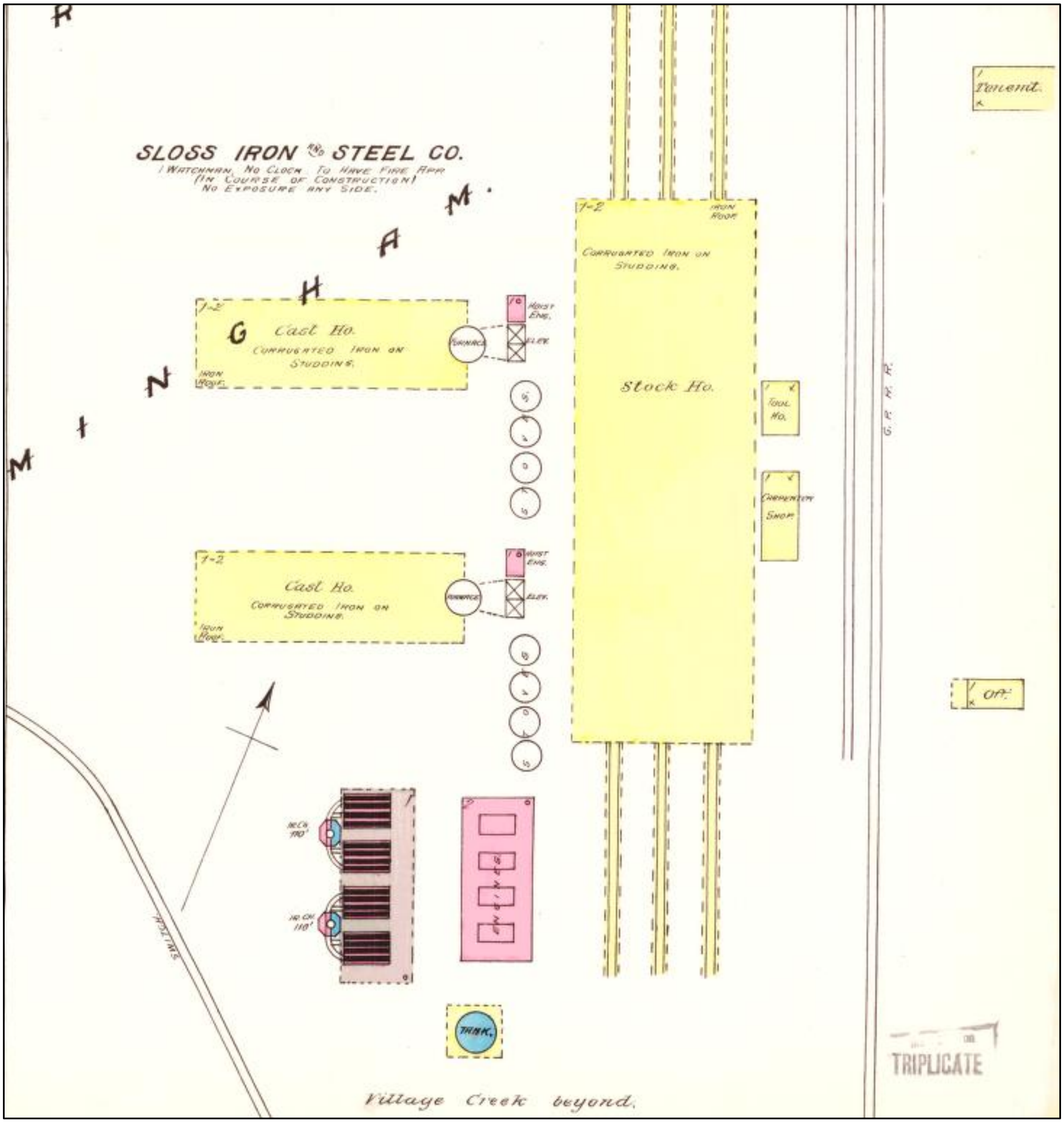

Figure 10. The 1888 Sanborn Fire Insurance Map, Sheet 24 (*Source: http://alabamamaps.ua.edu*).

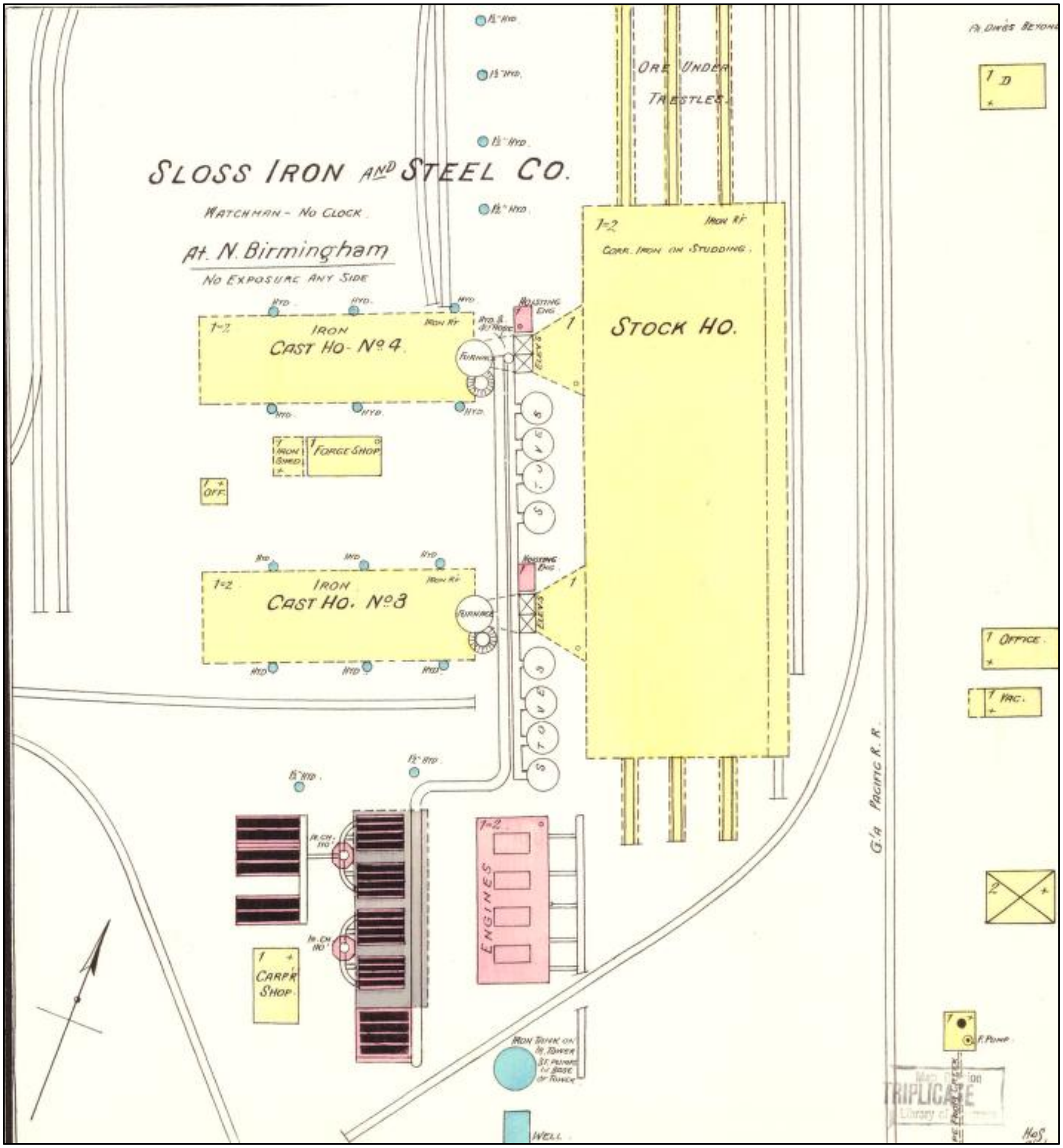

Figure 11. The 1891 Sanborn Fire Insurance Map, Sheet 31 (*Source: http://alabamamaps.ua.edu*).

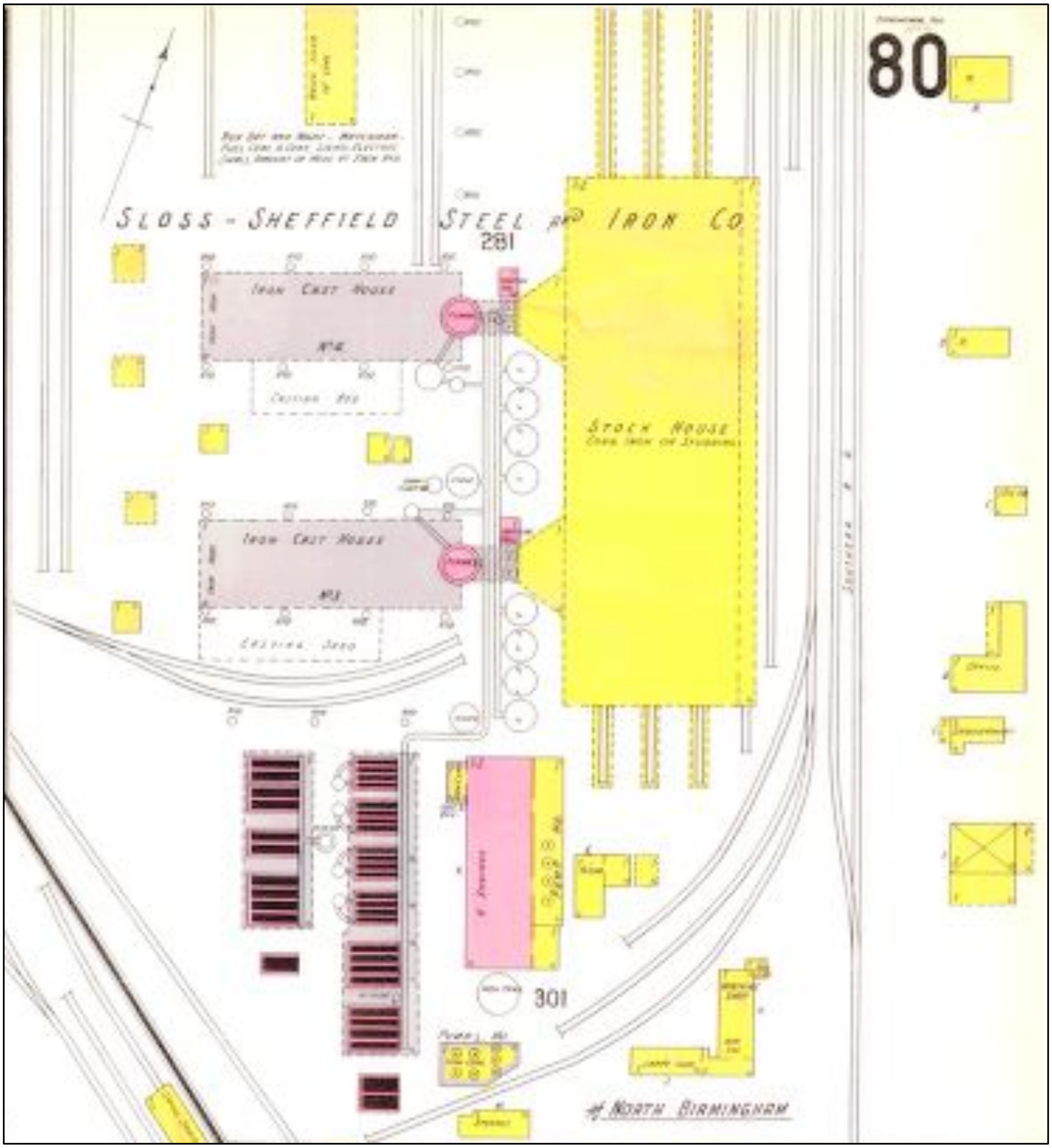

Figure 12. The 1902 Sanborn Fire Insurance Map, Sheet 80 (*Source: http://alabamamaps.ua.edu*).

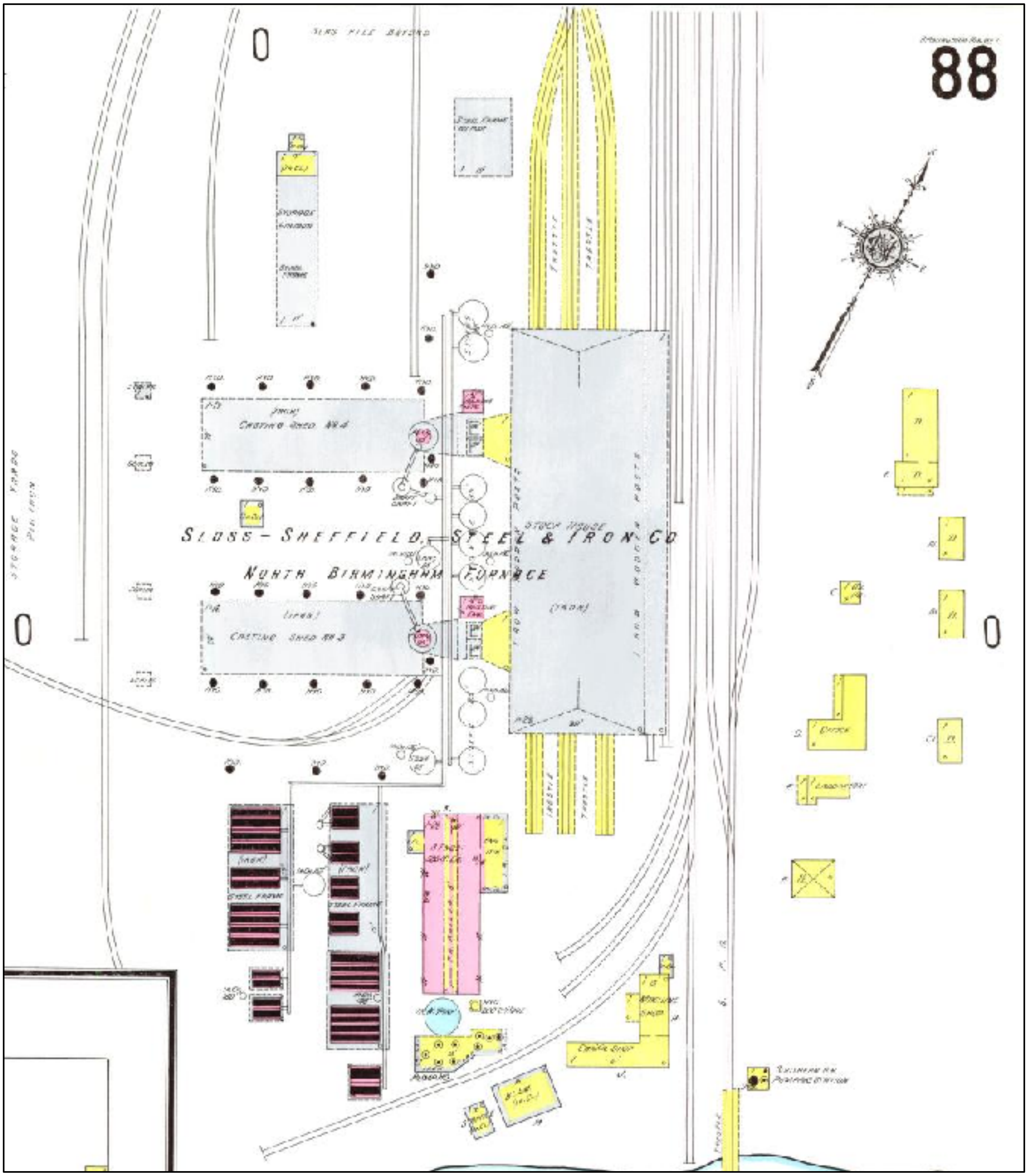

Figure 13. The 1911 Sanborn Fire Insurance Map, Sheet 88 (*Source: http://alabamamaps.ua.edu*).

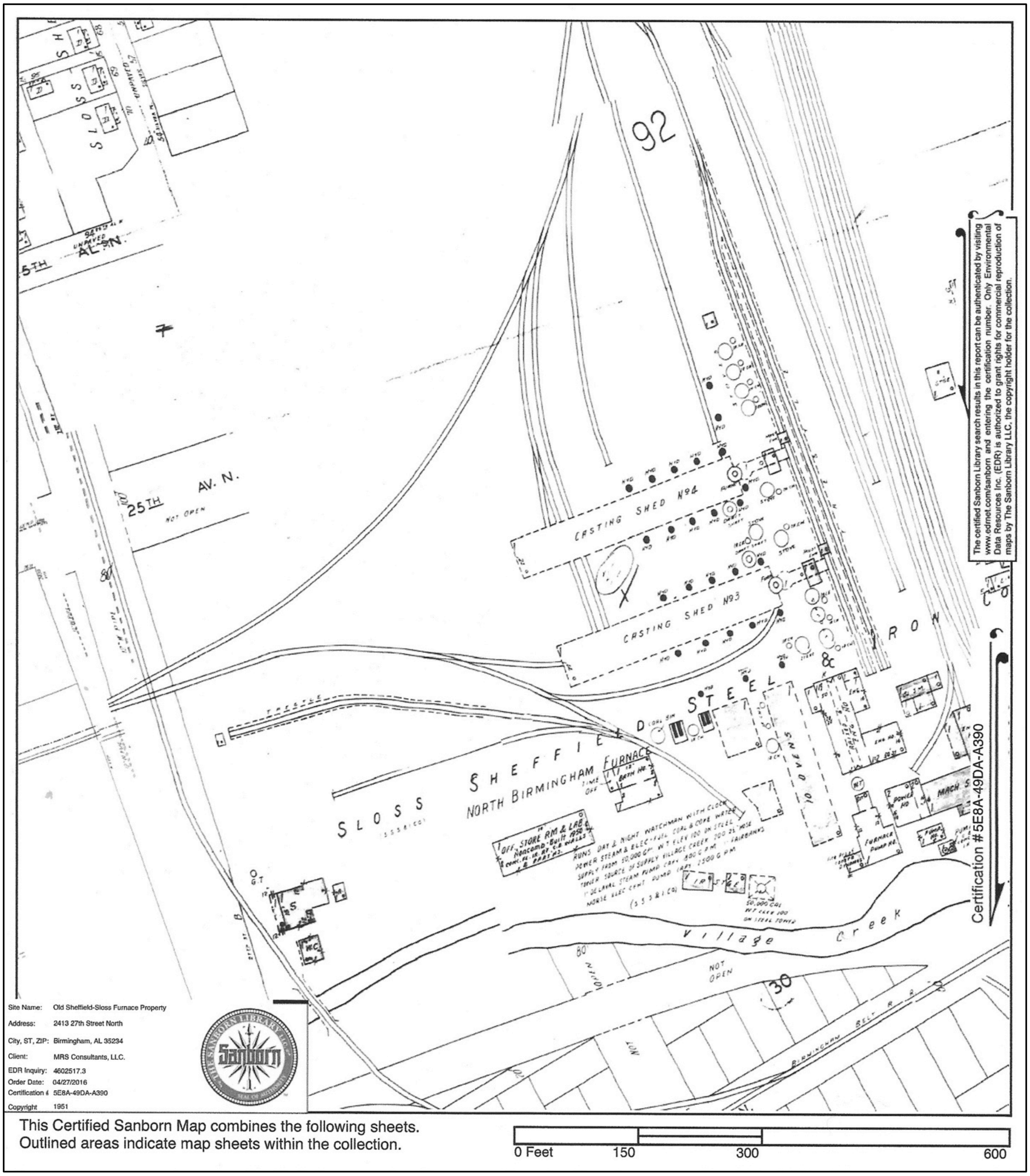

Figure 14. The Western Portion of the 1951 Certified Sanborn Map, Sheet 88 (*Source: EDR 2016*).

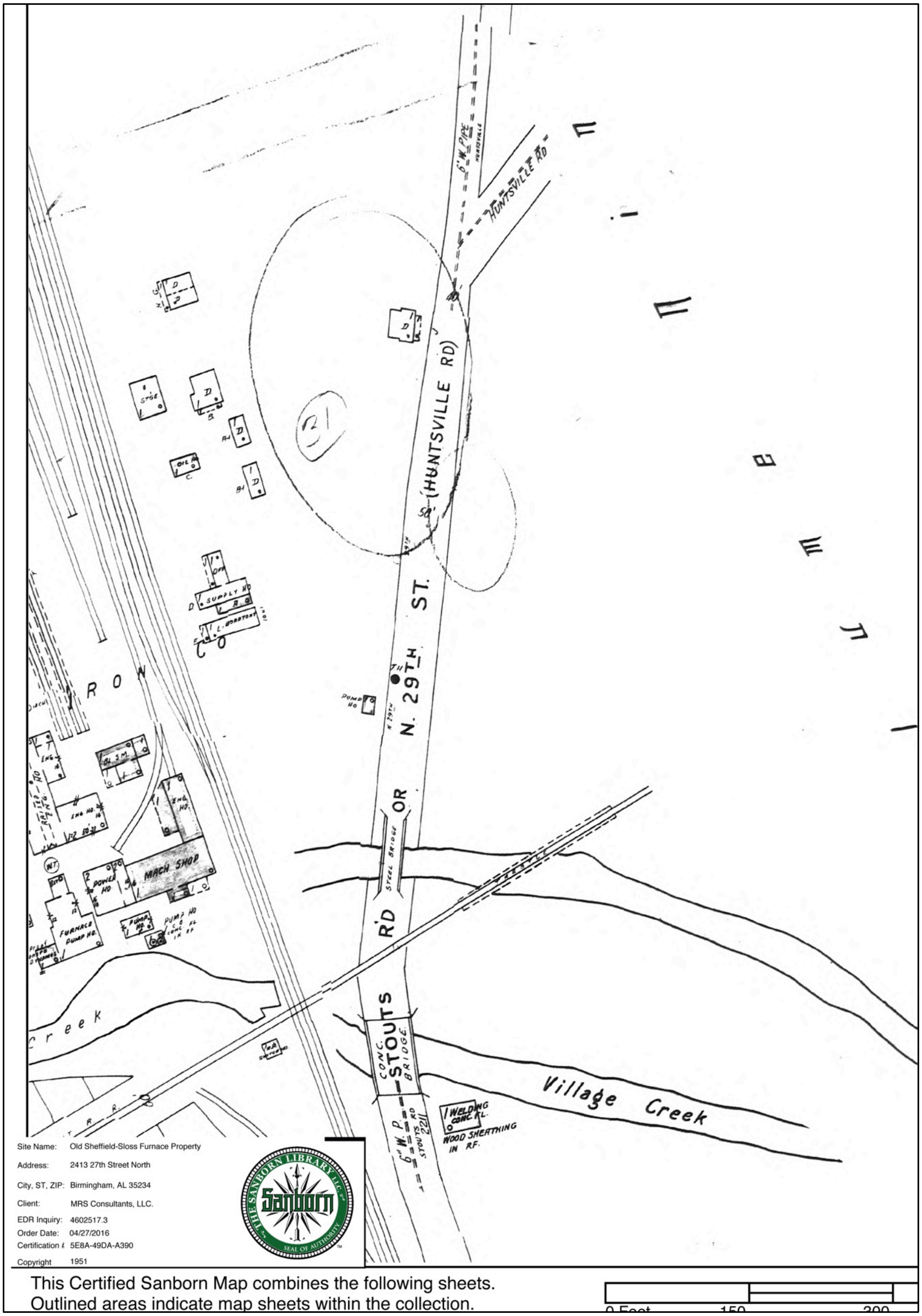

Figure 15. The Eastern Portion of the 1951 Certified Sanborn Map, Sheet 88 (*Source: EDR 2016*).

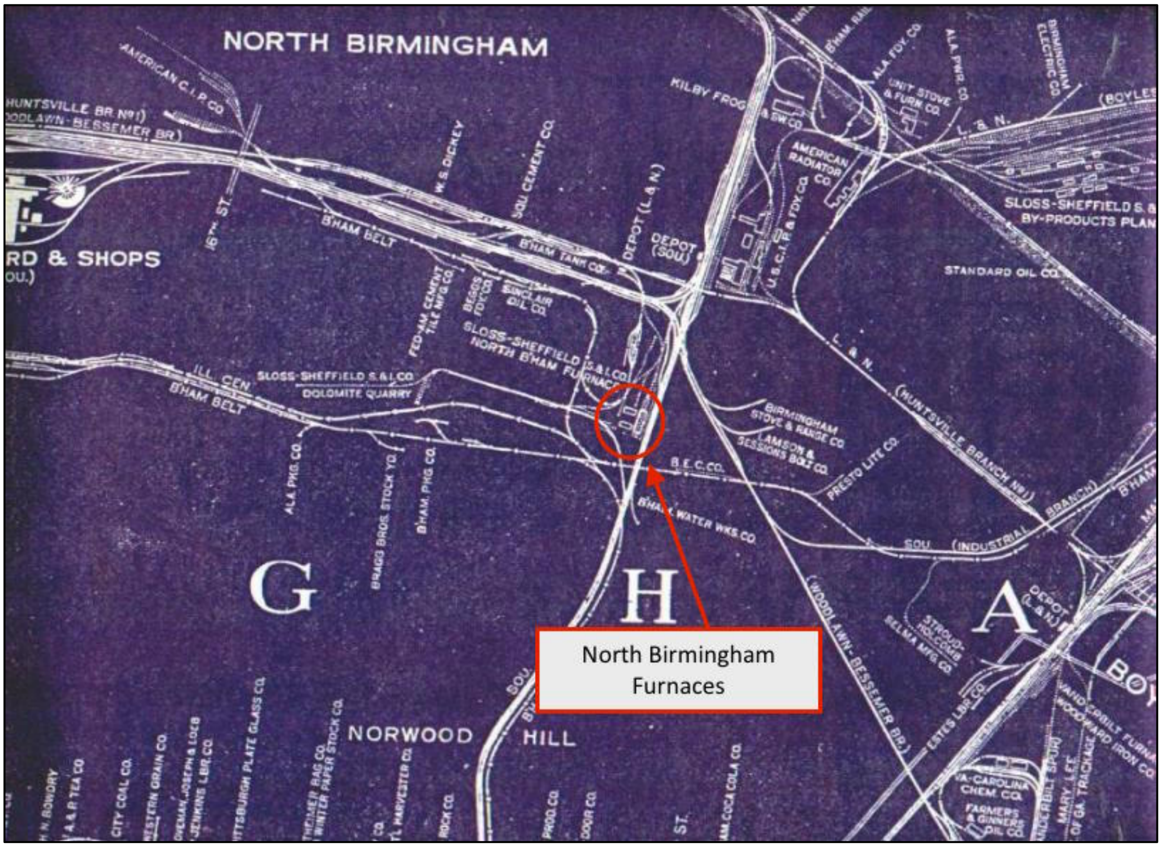

Figure 16. Site Shown on a 1935 Blueprint Map in Showing Tracks and Facilities of Various Railroad within Birmingham-Bessemer Terminal Area (*Source: http://www.bhamrails.info/1935railmap.html*).

Historical Aerial Photographs

Numerous aerials were obtained to understand how the project corridor and archaeological site have changed over the past 70 years. Many aerials were acquired through EDR, which is reported in *The EDR Aerial Photo Decade Package* in Appendix B. The following years were obtained: 1941 (Figure 17), 1947, 1951 (Figure 18), 1956, 1967 (Figure 19), 1970, 1977 (Figure 20), 1981 (Figure 21), 1988, 1990, 1992, 1997, 2002, 2005, 2006, and 2009 (Figure 22). Doug Luepke with UIS also attained a high quality digital image of the 1956 aerial photograph from the U.S. Department of Agriculture (USDA), Farm Service Agency, Aerial Photography Field Office (Figure 23). Google Earth provides modern aerial images dating from 1997 to the present. The SSSIC North Birmingham plant is visible on the 1941, 1947, 1951, and 1956 aerials, but apparently had been dismantled by the time of the 1967 aerial photograph. The 1967, 1970, and 1977 aerial photographs show the entire property and project ROW as severely disturbed. The gravel parking lot and buildings associated with the Birmingham Sanitation Department first appear on the 1981 aerial (Figure 21). The lot on the north side of the Sanitation Department parking lot is very disturbed and overgrowing in vegetation up to 1990. Between 1990 and 2005, the lot is overgrowing in vegetation, which is fairly mature and dense by 2005. By 2009, that lot had been completely cleared. Soils are exposed in the 2009 (Figure 22) and 2011 aerials. Google Earth aerials dating between 2012 and to the present show the lot is a grassed field.

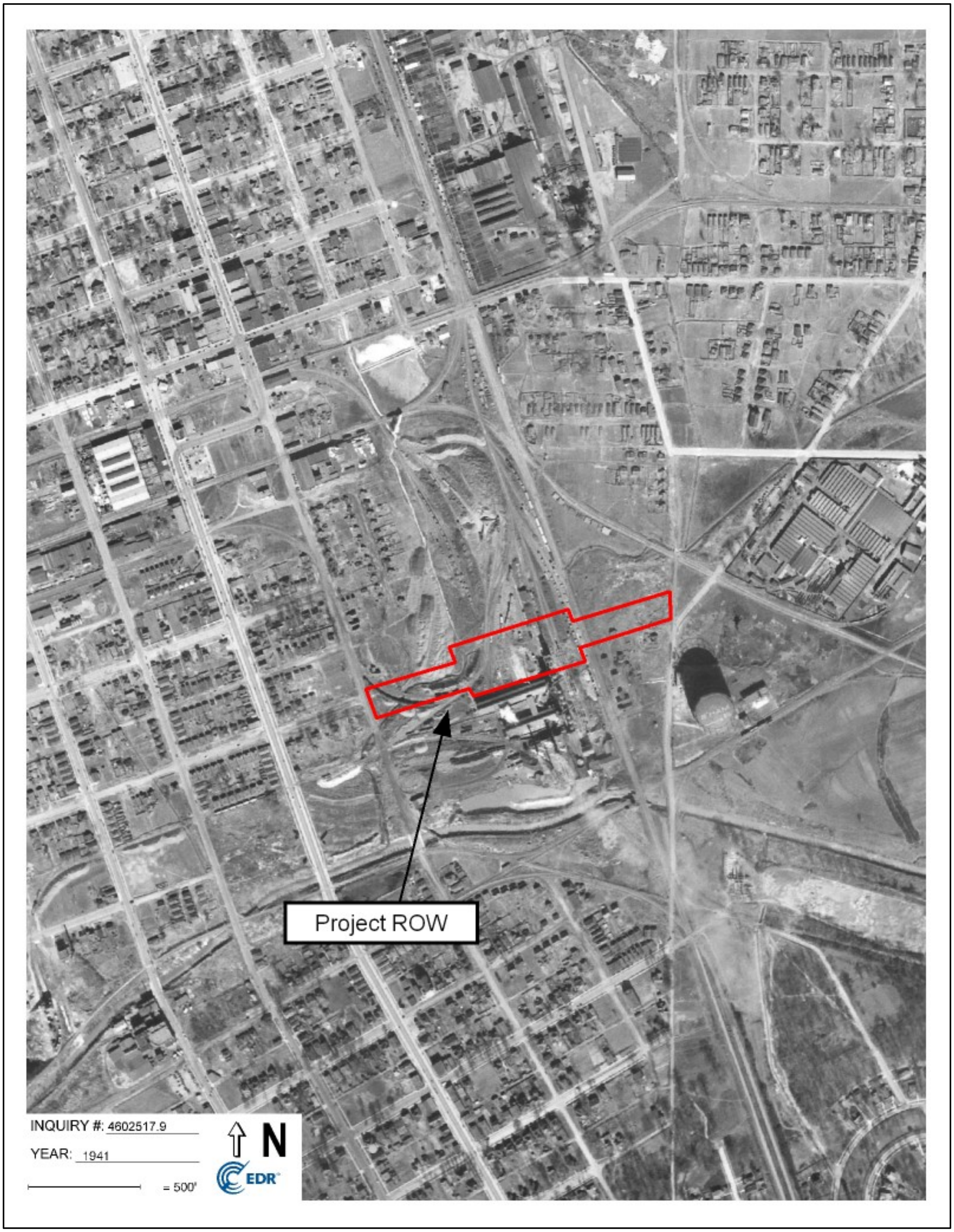

Figure 17. A 1941 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

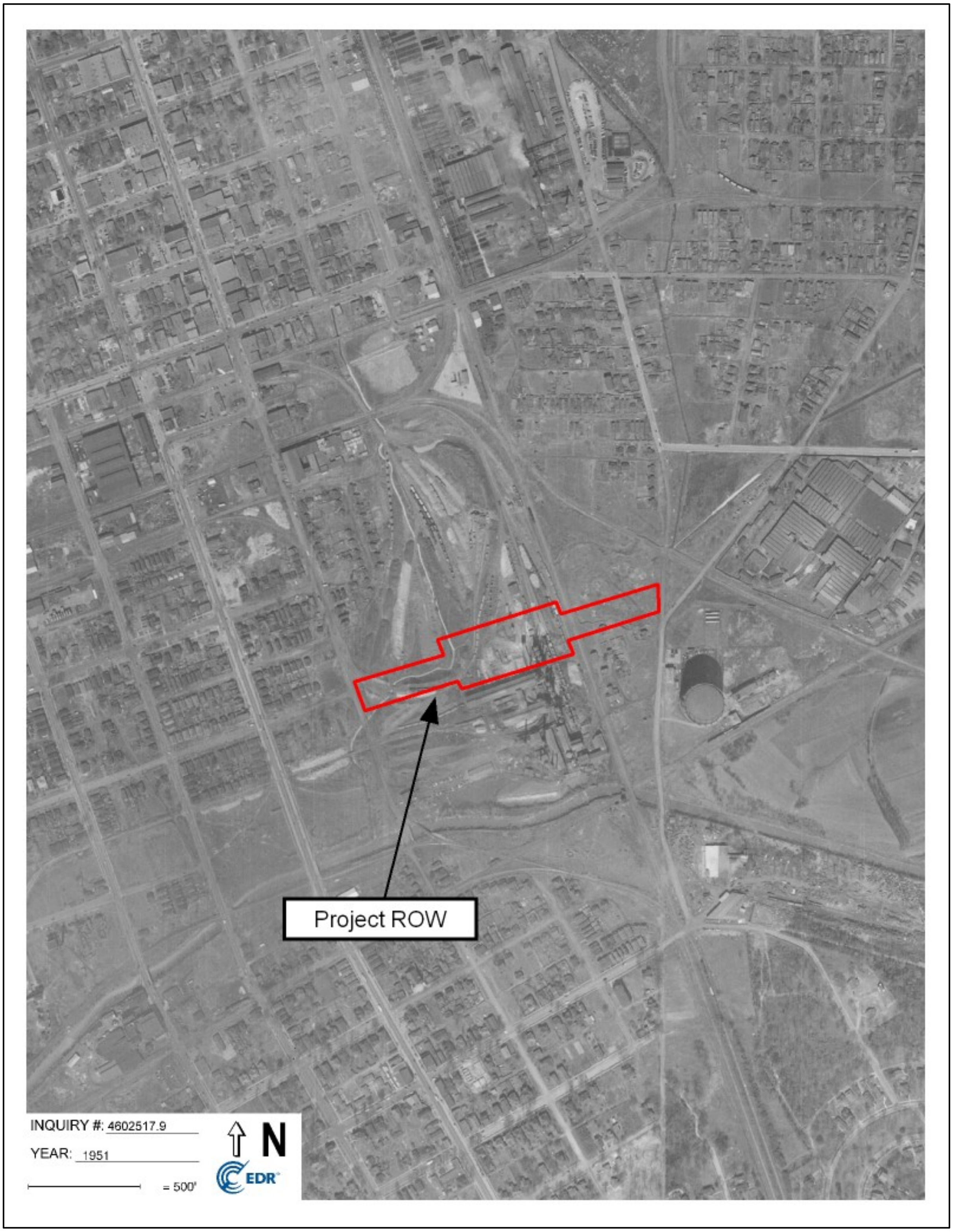

Figure 18. A 1951 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

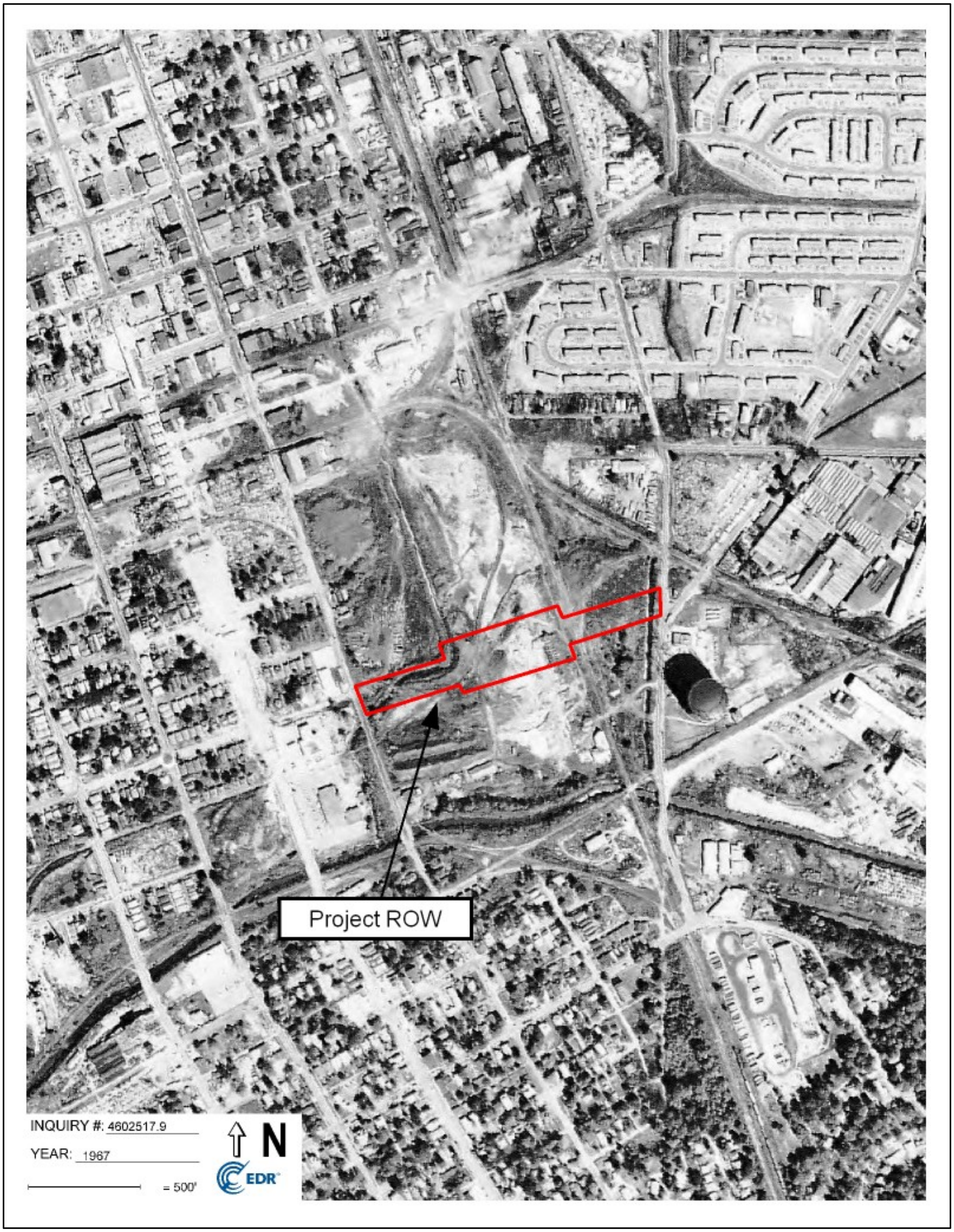

Figure 19. A 1967 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

Figure 20. A 1977 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

Figure 21. A 1981 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

Figure 22. A 2009 Aerial Photograph Showing the Project Area (*Source: EDR 2016*).

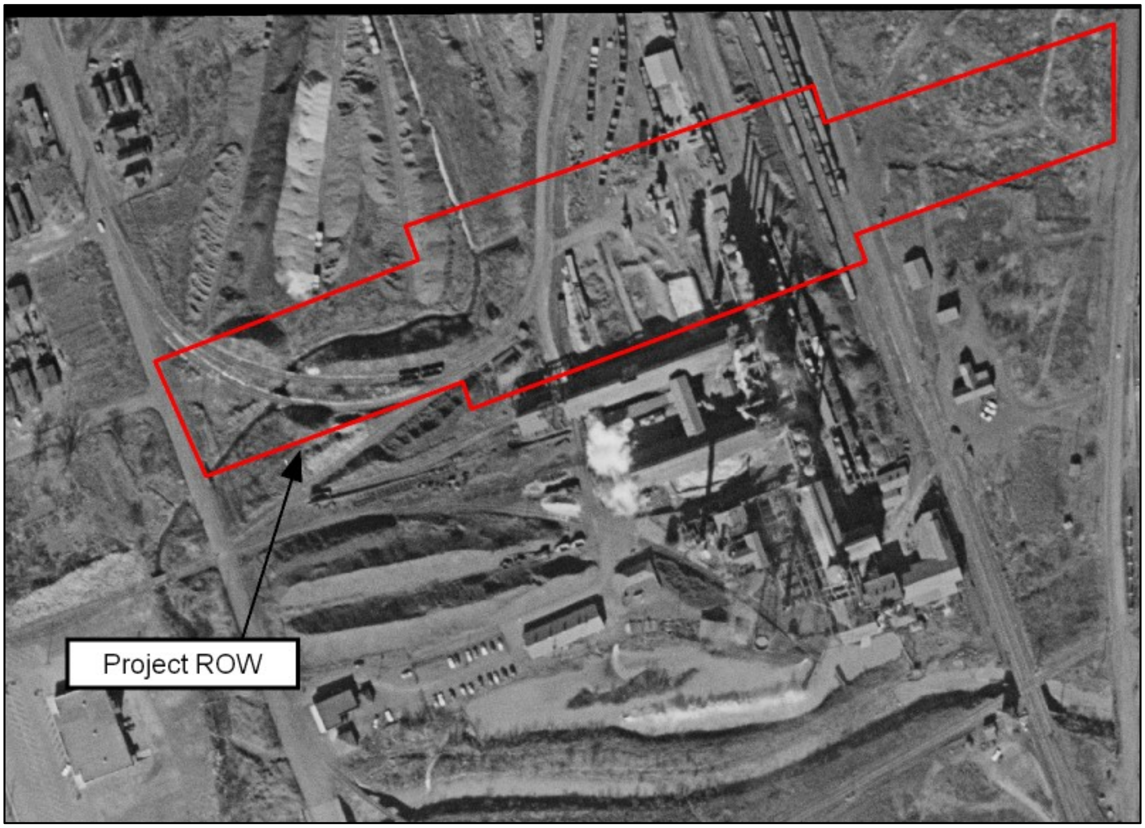

Figure 23. A 1956 Aerial Photograph Showing the Project Area from the U.S. Department of Agriculture (USDA), Farm Service Agency, Aerial Photography Field Office (*Source: EDR 2016*).

Historical Photographs

While the SSSIC Sloss City furnaces are well documented, and many historical photographs are available for that facility, the same is not true for the SSSIC North Birmingham Furnaces. Nevertheless, a few photographs and one postcard were found online or in the BPL archives. These photographs were valuable for helping to understand the facility, and were used by Bergstresser in writing a historical context for the site.

Three early images of the facilities were obtained from online sources: a photograph dating to the 1890s (Figure 24) from the Alabama Iron Works Source Book website (http://www.alaironworks.com); a 1908 photograph (Figure 25) from the BPL Digital Collections (http://www.bplonline.org); and a 1908 postcard (Figure 26) from the ADAH Digital Collections (http://digital.archives.alabama.gov). These images correlate very well with the 1891 and 1902 Sanborn maps. All three of these images depict: 1) two blast furnaces; 2) two vertical elevators; 3) two casting sheds with metal frames and roofing; 4) a large stock house with metal siding and roofing; 5) a large, two-story, brick engine house; 6) two sets of ovens (boilers) sheltered by metal frames and roofing; 7) a large, metal water tank; 8) railroad tracks and railcars bordering the west side of the facilities; and 9) massive amounts of pig iron stored on the west side of the facilities. The 1890s photograph shows eight (two sets of four) 3-pass Gordon Whitwell Cowper stoves with chimney pipes extending upward from the tops of the silo-shaped stoves. The 1908 photograph and

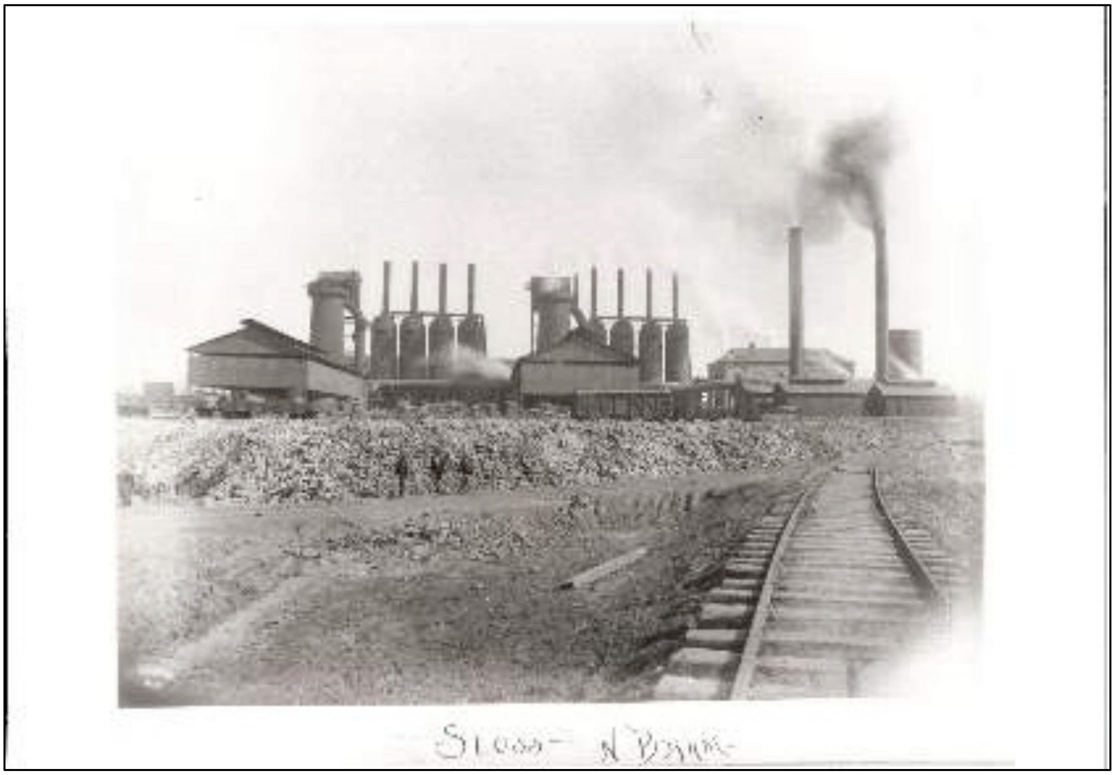

Figure 24. 1890s Photograph of the North Birmingham Furnaces (*http://www.alaironworks. com*).

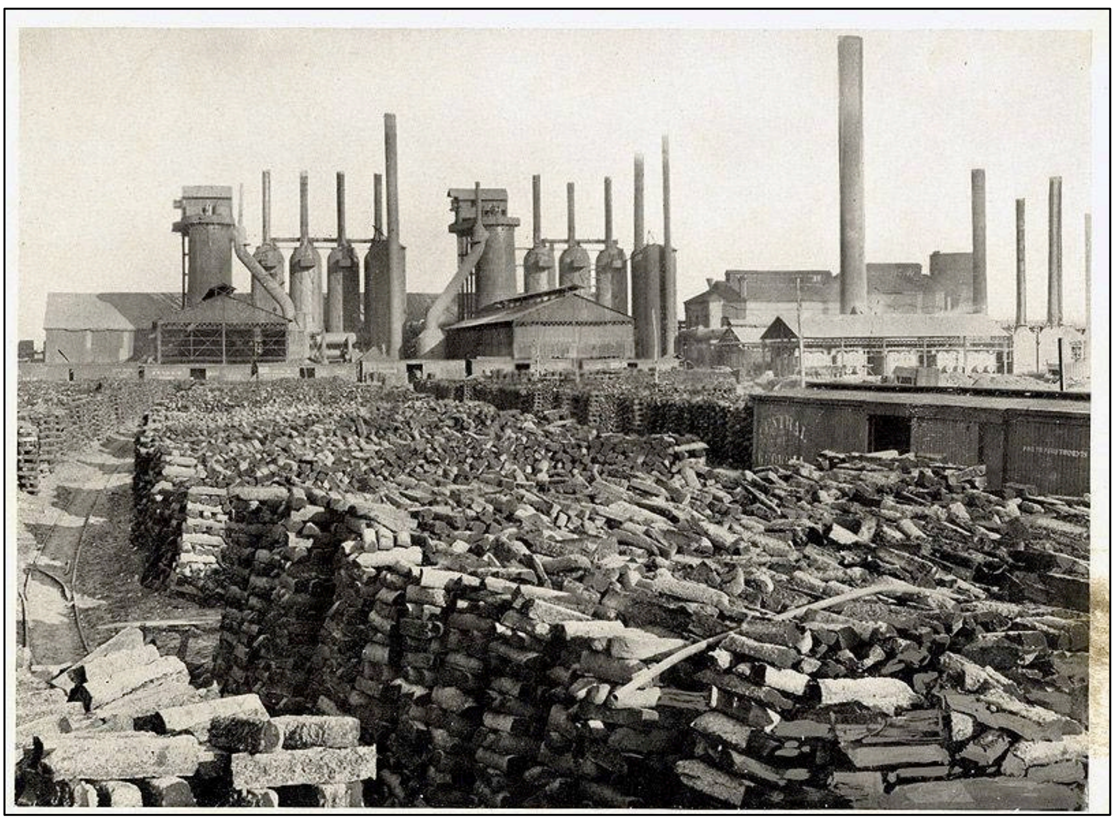

Figure 25. 1908 photograph of the North Birmingham Furnaces (*http://www.bplonline.org*)

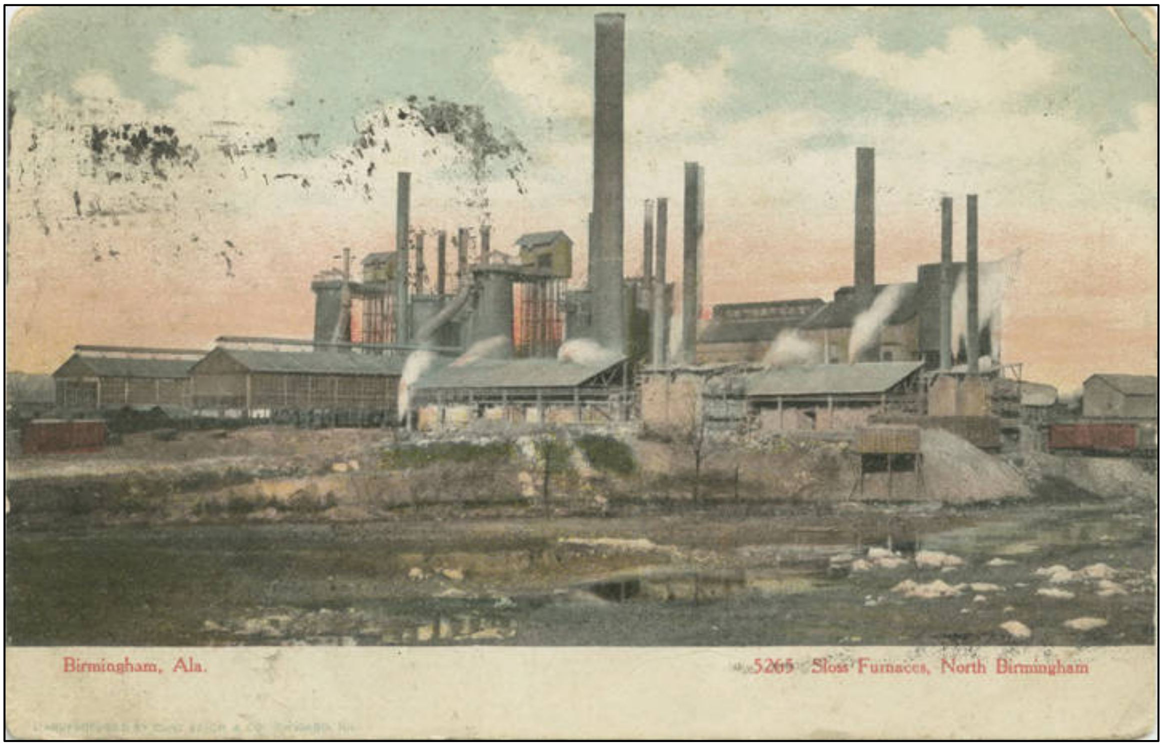

Figure 26. 1908 Postcard of the North Birmingham Furnaces (*http://digital.archives.alabama.gov*).

postcard show the same stoves along with two 2-pass stoves with side exhaust stacks, which totals ten stoves (two sets of five).

An undated photograph that likely dates to the early 1900s shows the interior of what is believed to be the No. 3 casting shed (Figure 27). The photograph shows a few men working inside an open, steel frame building that surrounds a sand casting floor where pig molds are impressed. Molten iron would flow from the blast furnace, through the sand-lined runner in the center, and into the sand casting molds on each side of the runner. It is also notable that the casting floor is set at ground level. No other photographs were discovered for the following decades, leaving a huge gap in the photographic history of the SSSIC North Birmingham plant.

A set of four photographs (Figures 28-31) dating to 1964 was found in the BPL Department of Archives. These photographs appear to have been taken from an airplane at different vantage points around the facility. The facility was shut down around 1958. The 1964 photographs suggest that the facilities had been vacant for some time, based on the condition of the some of the roofs. It is suspected that these photographs were taken shortly before the facility was dismantled by U.S. Pipe and Foundry Company, which merged with SSSIC in 1952. These photographs show how much the facility had changed since the early 1900s. These images correlate very well with the 1951 Sanborn map. The most notable features at the facility include: 1) two skip hoists have replaced the earlier vertical elevators; 2) the casting sheds are approximately twice the length of the original sheds, are on ground level, and are still constructed with metal frames and roofing (but the roofing is only partially intact); 3) two smaller sheds exist between the casting sheds, which are likely a ladle mixer shed and a pig casting machine shed; 4) the stock shed no longer exists, although a double, stock trestle is still positioned behind (east) the furnaces; 5) the only sizable brick structures noted at the facility include the two-story engine house and two-story power house; 6) smaller brick structures existed to the southwest of the facility, including a bathhouse, the office/laboratory/ storeroom building, and possibly a company store; 7) two sets of boilers (called ovens on the 19541 Sanborn) are still contained within metal frame structures, but the metal roofs are no longer intact; 8) there are two elevated water tanks, which includes the large, metal water tank positioned behind the engine house; and 9) there is a slag granulator and storage shed on the north side of the facilities. It is notable that sizable stockyards filled with slag and/or spoil piles border the west and north sides of the facility. It is also noteworthy that the casting sheds are built at ground level and are not elevated or sloped, which is unlike the casting sheds at the Sloss Furnaces NHL. This may also suggest that the furnaces at the North Birmingham plant were built at ground level, unlike the furnaces at Sloss Furnaces NHL.

Figure 27. An Undated Photograph that Likely Dates to the Early 1900s Showing the Interior of What is Believed to be the No. 3 Casting Shed (*http://www.encyclopediaofalabama.org/article/m-4467*).

Figure 28. 1964 Photograph Showing the North Birmingham Furnaces, View to the Southeast (*Source: Birmingham Public Library*).

Figure 29. 1964 Photograph Showing the North Birmingham Furnaces, View to the North (*Source: Birmingham Public Library*).

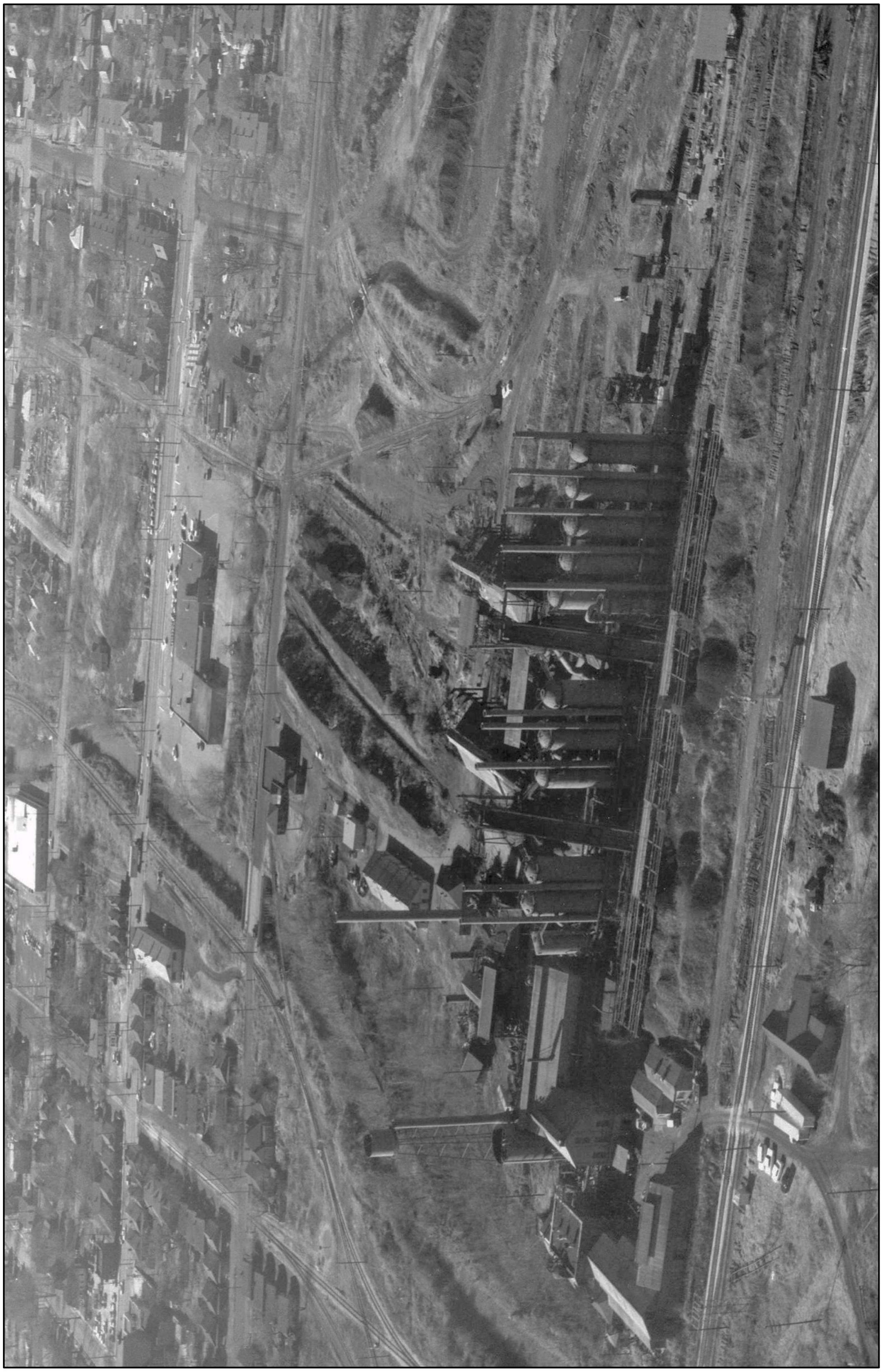

Figure 30. 1964 Photograph Showing the North Birmingham Furnaces, View to the West (*Source: Birmingham Public Library*).

Figure 31. 1964 Photograph Showing the North Birmingham Furnaces, View to the East (*Source: Birmingham Public Library*).

HISTORICAL CONTEXT

By Jack Bergstresser

The Sloss Furnace Company, known for most of its near century long corporate history as the Sloss-Sheffield Steel and Iron Company (SSSIC) was a leading producer of foundry pig iron. The two-coke fired blast furnaces of its North Birmingham Plant, referred to by it managers simply as No. 3 and No. 4, were two of its most prolific and profitable stacks among the company's holdings that at times numbered to as many as seven blast furnaces. Table 1 provides a general chronology for the Sloss-Sheffield company and the North Birmingham Furnaces.

To understand their significance it is important to note that the North Birmingham Furnaces produced foundry pig iron. A blast furnace could smelt iron ore into essentially two types of pig iron; basic pig iron which could be used to make steel for rolling or hammering or, foundry pig iron which could be used by foundries to remelt and pour into molds to make water and sewer pipes, pots and pans, engine blocks, radiators and a variety of other cast products. While at times during their early history the North Birmingham Furnaces made and sold some basic pig iron, by far their most enduring and important product was foundry pig iron.

The SSSIC never made steel but along with the Woodward Iron Company and the Thomas Works they transformed Jones Valley, in the heart of central Alabama's Birmingham Industrial District, into the nation's leading center for foundry iron production. For close to a century, this triumvirate weathered the ups and downs of the volatile iron and steel market to sell their pig iron at a profit on an open market that steadily grew from a regional to a national scale. In order to be near this excellent product, cast iron pipe makers moved to the district and continued to expand the capacities of their foundries until the district also became the nation's largest cast iron pipe maker (Dyer 1916; Moore 1939; Noble 1940). By 1927 the district was producing sixty percent of the cast iron pipe made in the United States and shipping 81 percent of its product to regions outside the south (Moore 1927).

Since they sold their output to the highest bidder rather than use it in company-owned foundries they were known as merchant pig iron companies. Throughout the late 19th and into the second half of 20th centuries the merchant pig iron producers of the Birmingham District continued to refine their technology and practices, and strengthen their command of their niche within the expanding American iron and steel industry (Dyer 1916, 1921). By 1924 fifteen of the district's twenty-four furnaces were devoted to producing foundry pig iron, all of which was cast in sand beds (Mussey 1925). The blast furnaces of Sloss, Woodward and Thomas emerged as a distinct type within the American iron and steel industry.

The Birmingham District: Historical Background

The United States became world's leading economic and industrial power around the middle of the 19th century. The iron and steel industry was a primary driver of this growth, which was accelerated by the introduction of large coke-fired furnaces introduced by iron makers around

Table 1. Chronology for the SSSIC and North Birmingham Furnaces Site.

Dates	Significant Events
1830s-1865	Pig iron was produced at several charcoal blast furnaces and forges operating in Alabama, especially in the Valley and Ridge region.
1865	Led by Pittsburgh, the United States enters an era of unprecedented iron and steel production following the Civil War, which is based on pig iron made in coke-fired blast furnaces.
1876	The Oxmoor Furnace in Jefferson County, Alabama, produces the first pig iron from locally made coke and iron ore. Coke begins to replace charcoal as the fuel for furnaces. The era of coke fired smelting begins in the Birmingham Industrial District.
1881	James W. Sloss organizes the Sloss Furnace Company.
1882	The Sloss No. 1 and No. 2 furnaces were erected near downtown Birmingham (also referred to as the Sloss City furnaces). These furnaces were built by J.P. Witherow and Company of New Castle, Pennsylvania, a company that had erected the industry's leading blast furnaces in the Pittsburgh District. Among the innovations at the new plant were English-designed Whitwell hot blast stoves, the third such installation in the United States following closely behind their initial introduction at Rising Fawn Iron Works in Dade County, Georgia.
1887-1889	The Sloss No. 3 and No. 4 Furnaces (referred to as North Birmingham Furnaces) were erected. The North Birmingham plant was built by Gordon Strobel and Laureau of Philadelphia, Pennsylvania, which erected several plants in Alabama, including the four furnaces of the Tennessee Coal, Iron and Railroad Company (TCI).
1880-1900	There was a boom in furnace building in the Birmingham District between 1880 and 1900. By 1890, Alabama ranks third in the United States with 45 newly erected coke-fired blast furnaces.
1890s	Birmingham furnaces begin devising mechanized processes of sand casting, including overhead cranes for breaking and loading pigs.
1899	The company reorganizes and changes its name to Sloss-Sheffield Steel and Iron Company (SSSIC).
Early 1900s	Led by Woodward Iron Company and the Thomas Works, the Birmingham District increases momentum toward specialization in foundry pig iron. Sloss abandons the goal of steel production in favor of foundry iron. As the shift is completed, the district emerges as the nation's top foundry iron producer.
1900 onward	More and more foundries are attracted to the district drawn by high quality, cheaply produced foundry iron. As cast iron pipe foundries multiply, Alabama becomes the largest cast iron pipe maker in the country.
ca. 1919-1924	The North Birmingham No. 3 and No. 4 Furnaces are modernized. Hand loading by elevator is replaced by a fully mechanized loading system featuring skip hoists. Also featured are improvements invented by company engineer James P. Dovel, including Dovel's patented pig breaking and loading system.
1918-1920	SSSIC builds the North Birmingham By-Product Coke Oven Plant (approximately one mile to the northeast of the North Birmingham Furnaces), which replaces beehive coke ovens with 120 Semet-Solvey and 30 Koppers by-products ovens. The first coke is produced in 1920.
1923	SSSIC acquired Sheffield Iron Corporation (Sheffield, Alabama) and Alabama Corporation (Gadsden, Alabama), gaining five additional furnaces.
1927-1931	Sloss City furnaces (No. 1 and No. 2) are modernized.
ca. Mid-1930s	Ladle cars and pig casting machine installed.
Late-1930s	Sand casting era ends and is fully replaced by pig casting machines.
1952	SSSIC merges with the U.S. Pipe and Foundry Company.
1958	U.S. Pipe closes the North Birmingham Furnaces.
1965	The North Birmingham facilities are dismantled.
1969	The Jim Walter Corporation acquired U.S. Pipe.
1971	The Sloss City furnaces are closed. Due to public outcry to preserve the plant site, the facilities are donated to the Alabama State Fair Authority.
1974	Sloss Furnaces (Sloss City furnaces) is placed on the National Register of Historic Places. Bonds were issued to convert the furnaces into an industrial museum.
1981	Sloss Furnaces is established as the Sloss Furnace National Historic Landmark.

Pittsburgh, Pennsylvania during the 1870s. These furnaces were capable of yielding the pig iron needed to make steel and cast products, in ever increasing volumes that matched the needs of the rapidly developing economy. As demand increased at unprecedented rates, investors sought to expand steel production into every region of the country that possessed the raw materials needed to make pig iron (Hogan 1971, Temin 1964).

Following the Civil War a coalition of northern investors and southern entrepreneurs turned their attention to upland central Alabama because of its fortuitous geology which offered abundant deposits of iron ore, coal, limestone and dolomite more closely juxtaposed than anywhere else in the country. The Confederacy had encouraged the wartime development of a charcoal fired blast furnace industry based upon these resources but the endeavor was short-lived, succumbing quickly to advancing Union forces. However briefly it survived, its strategically significant and often high quality pig iron quickly turned attention to the hill country's raw material endowment following the war (McKenzie 1972).

The seminal effort to launch a post war iron industry focused on revitalizing the Confederate era Red Mountain Ironworks, rechristening it the Oxmoor furnaces, and converting its fuel base from charcoal to coke. The experiment was closely watched by many key entrepreneurial and financial interests eager to follow up on a successful result; if it materialized. After the expected few fits and starts, the venture proved that it was possible to convert the region's coal into coke that could profitably smelt iron ore from Red Mountain's thick hematite seams (Armes 1987:255-261).

Following the successful experiments a growing number of coke fired blast furnaces were erected in Jones Valley, the broad, eroded base of an Appalachian anticline flanked along its southeastern edge by Red Mountain and on its northwestern edge by broken hills (Du Bose 1886). The broken hills contained surface outcrops of metallurgical coal seams that sloped gently underground into the vast Warrior Coal Basin to the northwest. The massive bluff of hematite which gave Red Mountain it name marked the out crop of thick seams of ore that dipped under the mountain before leveling out and extending for miles below the surface of Shades Valley to the southeast (Bruchard et al. 1910). Deposits of limestone and dolomite outcropped on the surface in the middle of the valley providing excellent fluxing stone, essential for proper iron smelting. The most viable new furnace plants were erected virtually atop these exposures and linked by rail to nearby ore and coal deposits (Bergstresser 1993:1-2).

The first of the new ironworks erected following the Oxmoor success was the Alice Furnaces plant, a two-stack operation that was quickly followed by the two Sloss City Furnaces. Other important early plants were established by the Woodward family of West Virginia and the Thomas family of eastern Pennsylvania (Woodward Iron Company 1940, 1950). Soon the new Birmingham District was growing at a pace equal to the northern industrial centers around Chicago and eastern and western Pennsylvania. By 1890 the state of Alabama counted 45 blast furnaces; the third largest number in the United States following Ohio in second place with 53 furnaces and Pennsylvania in first with 148 (Hogan 1971:211-212).

Such rapid development inspired commercial and industrial boosters to dub Birmingham "The Magic City." Their elation led them to envision the district as the Pittsburgh of the South, claiming that its raw material reserves were so abundant and so optimally juxtaposed that it would one day surpass that great industrial center. This never happened but the district did grow into an important regional steel producer (Armes 1987:232).

The growth of Birmingham steel began with a period of consolidation around the turn of the 20th century. The Tennessee Coal and Iron Company started the process when it merged some of the early furnace plants that had been erected during the preceding two decades and built the Ensley steel mill. The United States Steel Corporation bought out TCI in 1907 and further extended the expansion by constructing the Fairfield Steel Works. These two mills, along with another plant in Gadsden, were the only large steel producers in the district. They turned out a variety of steel products for decades but their output never rivaled the productive capacity of the array of mills along Pittsburgh‘s Monongahela River valley (Bowron 1914; Longnecker 1939:791-834; Fuller 1966).

While most eyes were focusing on the microcosm of the national steel industry growing at a seemingly laggardly pace at Ensley and Fairfield it was becoming increasing apparent to Sloss that foundry iron was an equally profitable and sought after product (Bergstresser 1993:221-223). This had not been a recent revelation for the owners of the Thomas and Woodward companies. Before extending their enterprises to the south, these companies had established long and venerable traditions in the foundry iron trade (Woodward Iron Company 1940). They quickly brought this experience to bear during the immediate aftermath of the Oxmoor experiments, immediately recognizing that a characteristic of Red Mountain ore that made it relatively less desirable for steel making; its high phosphorus content, would yield excellent foundry pig. The less experienced entrepreneurs backing the Sloss Company initially remained enamored by the mystique of steel and only turned to the foundry iron alternative after a few decades of experience (Lewis 1994).

The high phosphorous content of Red Mountain ore was only one of a combination of idiosyncrasies inherent in the district's raw material endowment that retarded the growth of the steel industry but encouraged the growth of the foundry iron industry. Another was the ore's high silicon content (Crockard 1936; Bowron 1940).

A key aspect of the explosive grow of the American steel industry during the last quarter of the 19th and the first quarter of the 20th century was the absence of any major impediments to the development of ever larger blast furnaces during what noted authority J.E. Johnston dubbed the "Duquesne Revolution" (Sweetzer 1938; Johnson 1917:15-16). At the heart of this revolution was an innovative body of blast furnace practice known as "hard driving" (Sabadaz 1990). Hard driven furnaces produced unprecedented tonnages of pig iron, which in turn allowed Pittsburgh steel mills to steadily increase their production. High volume production resulted in economy of scale, which yielded profit margins sufficient to provide the capital for erecting larger furnaces, and more mechanized plants. This self-sustaining cycle could continue indefinitely as long larger furnaces could be erected with each new level of mechanization (Hogan 1950:34-35, 1971; Temin 1964: 153-193 passim).

Red Mountain ore's high silicon content was an impediment to hard driving. Removing this troublesome by product required the district's iron makers to provide their furnaces with the most efficient hot blast stoves available. Instead of pushing these modern stoves to their maximum capacity, however, their air volume and temperature had to be carefully held in check to produce optimum results. Y. A. Dyer (1921a), a nationally recognized expert on foundry iron, stated the situation most succinctly in 1921:

> Excessive driving or blowing of a furnace has its bad effect on the grade of metal by creating the tendency to 'drive the life' out of it.... The slow-driven blast furnace -- small or medium in size.... produced the most desirable grades of foundry pig irons.

The Birmingham District's iron makers who committed foundry pig devised plants that simultaneously featured the latest and best hot blast stoves alongside the smallest blast furnaces in the country. Unfortunately smaller furnaces could not produce the volume of pig iron needed to achieve economy of scale.

Nor did the district's coal and ore deposits have the necessary carrying capacity to support large, hard driven furnaces. On the one hand the coal seams of the Warrior field were relatively thin, broken by faults and riddled with thin layers of impurities called partings. This meant it took more time and labor to mine the coal. Then, once it was brought to the surface, the coal had to be subjected to time consuming washing to remove the impurities (Fies 1924; Gandrud 1931). Meanwhile, the ore seams of Red Mountain, while quite thick, dropped to only around 35 percent metallic iron content within a few hundred feet of their outcrops. They were also frequently interrupted by faults. As the slopes progressed further underground ever more elaborate underground handling practices were required to deal with the faulted seams steadily increasing the time and cost of bringing the relatively low grade ore to the surface (De Sollar 1937; Crane 1926, 1927; McDonald 1914).

Paradoxically these seeming limitations, which contributed to the district never displacing Pittsburgh as the nation's leading steel producer, synchronized well with the dynamics of its extractive and processing systems devoted to smelting merchant pig iron for the foundry industry.

An additional aspect of this dialectic was a preference for sand cast pig retained by many foundry men well into the 1920s (Dovel 1921). An exceptionally high volume flow of raw materials was not required to smelt sand cast pig because the casting floor could only handle a limited amount of freshly tapped molten iron. At the same time, lower raw materials flow and smaller taps of molten iron could be optimally handled with less mechanization if it could be supplemented by the selective use of low cost, labor intensive practices (Hassler 1937). The Birmingham District possessed an abundant supply of native born African American and poor white workers eager to abandon sharecropping and tenant farming in favor of cash paid industrial work (U.S. Government 1885, Vol. 4: 413). When Sloss joined with Woodward and Thomas specializing in sand cast foundry iron, they launched a trajectory that would extend into the early 1930s until demand outstripped the capacity of sand casting sheds, low wage labor became scarcer, laboratory analysis became more sophisticated (Dyer 1921a, 1921b), and foundry men turned away from sand casting in favor of mechanically cast pig (Kulik 1976:3).

History of the North Birmingham Plant

The North Birmingham Furnaces were erected between 1887 and 1889, nearly a full decade after their two counterparts at Sloss' City Furnaces plant, which is still standing and now recognized as a National Historic Landmark. All four furnaces were coke-fired and furnished with a hot-air blast that was provided by firebrick stoves. All were fed iron ore, coke and fluxing stone that had been delivered by rail to the raw material handling facility at the rear of the plant. All were fitted with casting floors housed in sheds that extended outward on a perpendicular line from the iron tapping notch where molten pig iron was run out of the furnace into sand molds at regular intervals.

The differing features of the two plants were due to the fact that they were erected under the direction of two different engineering firms. Rather than build their own plants many companies during the last quarter of the 19th century contracted with large firms to do the work, because these establishments had their own engineering teams and could provide a full range of appliances and equipment ensuring well designed plants customized to their customer's needs (Casey and White 1990:121-141; Bergstresser 1993; Lewis 1994; Utz 2008).

The City Furnaces was installed by J. P. Witherow and Company of New Castle, Pennsylvania. Witherow had established its reputation by building Andrew Carnegie's famed Lucy furnaces in Pittsburgh as well as their equally famed competitors; the Isabella furnaces across the Allegheny River from Carnegie's plant. A principle feature of Witherow's appliance package at the time was the Whitwell hot blast stove; the first generally adopted fire-brick stove in the U.S. (Pennsylvania Historical Review 1888: 94). The engineering firm's expertise insured that the City Furnaces were as modern as any in the country at the time.

The North Birmingham plant was built by another prestigious firm: Gordon Strobel and Laureau of Philadelphia, Pennsylvania (Lewis 1994:148). In addition to North Birmingham, Gordon Strobel and Laureau erected other southern plants including the four furnaces of the TCI (Philadelphia Engineering Works 1893). The Philadelphia firm could offer one of the best blast furnaces in the country, a design that lead engineer Fred W. Gordon had been systematically improving at the company's Philadelphia Machine Works. The two North Birmingham furnaces almost certainly included features patented by Gordon and resembling the model illustrated in the company's 1893 product catalogue (Figure 32).

While their reliance on leading engineering firms to erect their new plants ensured that Sloss remained on the cutting edge of American iron making technology, it must be noted that these contracting firms would "cut corners" to hold down the overall cost of construction. Such expediency sometimes resulted in poor workmanship and shoddily constructed appliances (Lewis 1994:162).

As the industry progressed into the early twentieth century, furnace companies began to employ their own engineers to oversee plant improvements. As the district's industrial infrastructure grew, local foundries and machine shops developed the expertise and product line to supply their needs. The influence of nationally oriented firms declined in favor of blast furnaces, and plants adapted to the characteristics of local raw materials. While they were still likely to turn to national suppliers for major pieces of capital equipment such as blowing engines, electrical generators and

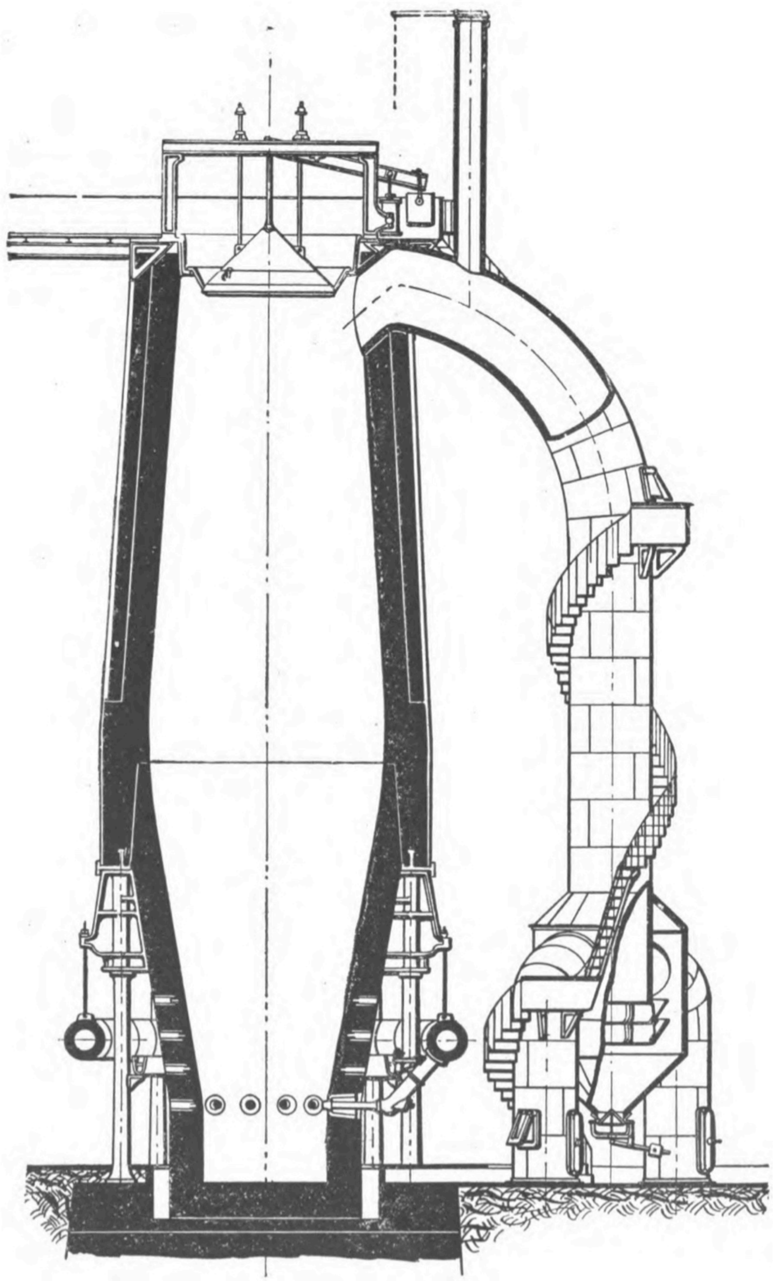

FIG. 2.—BLAST FURNACE.

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Figure 32. Blast Furnace in the 1893 *Catalog of the Manufactures of the Philadelphia Engineering Works (*Philadelphia Engineering Works 1893:6).

steam boilers, companies came to rely more and more on their own in-house engineers who contracted locally for most construction projects. Sloss engineer James P Dovel, for example, designed nearly every component of the City Furnaces' two new stacks erected from scratch in the late 1920s (Dovel 1927, 1928, 1930b, 1931; *Birmingham Age Herald* 1940:6).

Men like Dovel crafted operations optimally adapted to local conditions, they creating distinctive regional identities for their iron making systems. These company men who did so much to keep their plants in top shape are an asset to historians and industrial archaeologists because they often contributed articles to professional journals discussing new designs and other aspects of their iron making experiences. They were less likely, however, to leave behind a paper trail in the form of trade catalogs and comprehensive engineering drawings.

As far as could be documented within the scope of this project, only once, during its entire operating history from 1887 through some time in the mid 1960s, did Sloss conduct a total renovation of its North Birmingham Furnaces. This major renovation was conducted over a five-year period beginning in 1919. Gaps in company records make it difficult to determine if this upgrade included the erection of new furnaces, but according to company president McQueen, the completion of improvements at No. 4 in 1924 made the two furnaces "modern in every way." If the construction of the first furnaces between 1887 and 1889 had been orchestrated by Gordon Strobel and Laureau who provided not only two furnaces of their own design but also hot blast stoves, blowing engines and most of the other appliances, the 1919-1924 modernization was an internal affair coordinated by Sloss managers and engineers.

This upgrade brought North Birmingham to the highest state of sand casting ever achieved in the history of iron smelting in the United States (Hunt 1927a, 1927b). It was matched and improved upon in some ways by the modernization of the City Furnaces at the end of the decade. But, ironically these advances at both plants were achieved on the eve of the obsolescence of sand casting. By the middle of the next decade, SSSIC would abandon the practice all together (Kulick 1976, Bergstresser 1993, Lewis 1924).

In addition to the major upgrade of the late teens and early 1920s, periodic improvements or replacements of appliances along with minor furnace rebuilds were performed throughout the plant's operating history. A 1909 reference in *Southern Machinery* for examples indicates that Sloss was preparing to rebuild the No. 3 Furnace replacing hot blast stoves, and adding new hearth jacket and tuyere jacket linings (*Southern Machinery* 1909).

Sanborn insurance maps of the North Birmingham plant document many of these changes, but they are far from comprehensive. As provided earlier in the report, a sequence of four Sanborn maps dating to 1888, 1891, 1902 and 1911 (Figures 10-13) provide much insight into the evolution of the original plant, but the next available Sanborn map was produced in 1951 (Figures 14-15). It was during this four decade hiatus that the most significant event in the history of the plant transpired; the company's abandonment of sand casting. The 1951 map documents the vastly larger cast shed and the radical changes made to the stock handling system, but they show none of the features of the mechanical system introduced to replace the old sand casting system. Fortunately, these new components can be documented using aerial photographs and company records.

The biggest change introduced during the 1920s upgrade was in the system for receiving iron ore, coke and fluxing stone at the plant and hoisting this raw material from ground level to the top of the furnaces (Lewis 1993:365-366). The hoists for the original furnaces employed vertical elevators. The raw materials were stockpiled in a large shed (stock house) where they were hand loaded into barrows and pushed on to the elevators. Loaders rode with the barrows to the top of the furnace where they dumped the individual loads into the furnace.

The new hoist was fully mechanized. It employed twin stock cars known as skip cars that were pulled to the top of the furnace on an inclined ramp. The skip cars rode on rails attached to the ramp and were pulled by cables drawn by electric hoisting engines. They were counter balanced so that part of the energy required to pull a loaded car to the top was provided by the weight of the empty car descending to receive its next load.

Historical photographs of the early facilities (Figures 24-26) and modern facilities (Figures 28-31) depict distinctively different silhouettes. Figure 33 diagrams a 1908 photograph of the plant. Figures 34-35 diagram the facilities as they existed in 1964, shortly before they were dismantled. The original furnaces were loaded with elevator shafts that were comprised of open steel frames. They rose vertically on an axis that paralleled the furnace. The top of the shaft was enclosed in a shed that connected to the furnace top via a horizontal platform. The skip hoist was distinguished by its inclined ramp that rose from the stock loading area on a steep angle and attached to the top edge of the furnace. It was served by an elaborate framework of structural steel that rose directly atop the furnace and anchored the large wire rope sheaves that guided the cable pulling the skip, and housed the apparatus that tipped the cars and dumped their contents into the furnace.

The stock receiving and loading area was altered substantially to accommodate the new skip hoist. Originally railroad car loads of stock were brought in under the stock shed (Figure 33) and dumped. The material was then loaded by hand into the barrows, pushed manually to the elevators, and then to the top of the furnace.

When the skip hoists were installed, a long tunnel paralleling the rear of the plant was built and equipped with loading cars that ran on tracks. A row of large concrete bins was built atop the tunnel with hoppers that extended into the tunnel. The loading cars could be pulled directly beneath a hopper that could be opened to discharge iron ore, coke or fluxing stone into the car.

A large loading pit was built at the base of each skip hoist where the skip cars could be lowered to a level beneath the track carrying the loading cars. The loading cars were pulled to the pits and stopped where their load could be discharged into a skip car and hoisted to the top of the furnace.

Trestles were erected over the concrete bins and mounted with tracks for receiving bottom dumping railroad cars. The large shed that had protected the stock piles during the hand-loading era were torn down leaving only small covering over the skip car loading pits. The open stock bins and the inclined planes of the skip hoist are clearly visible in photos (Figures 34-35).

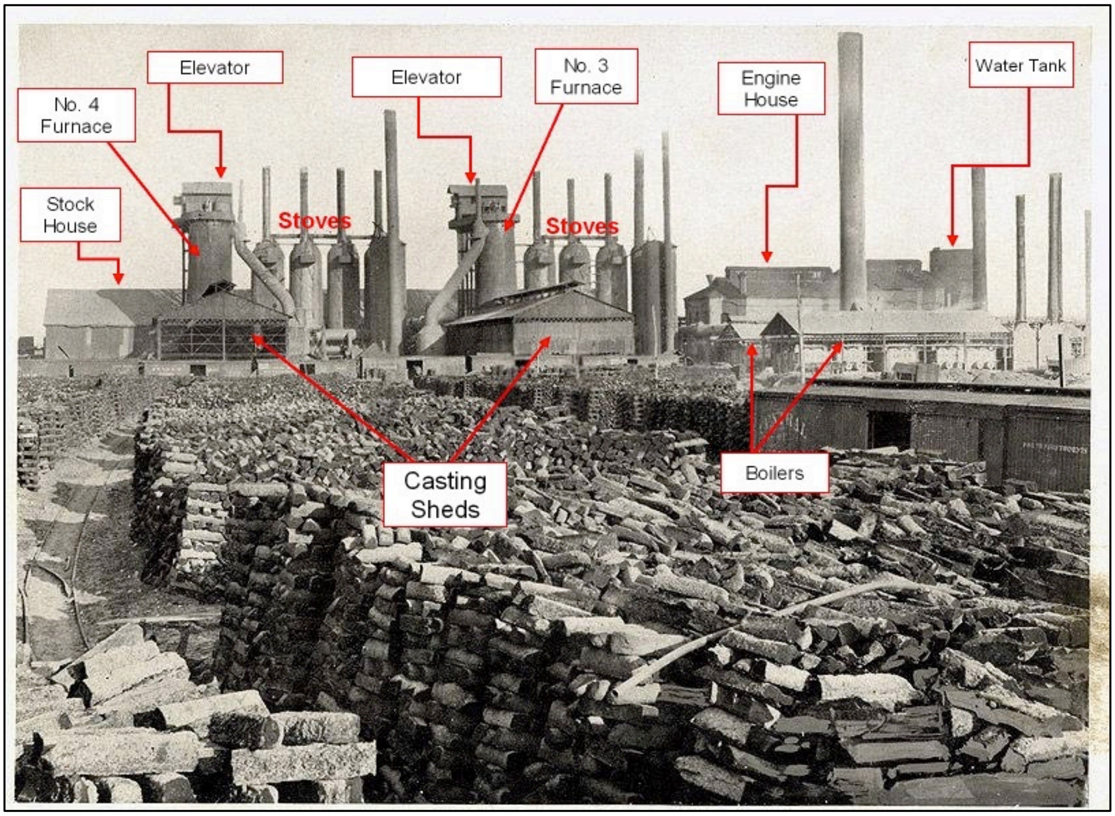

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Figure 33. Diagram of the Facilities Using the 1908 Photograph.

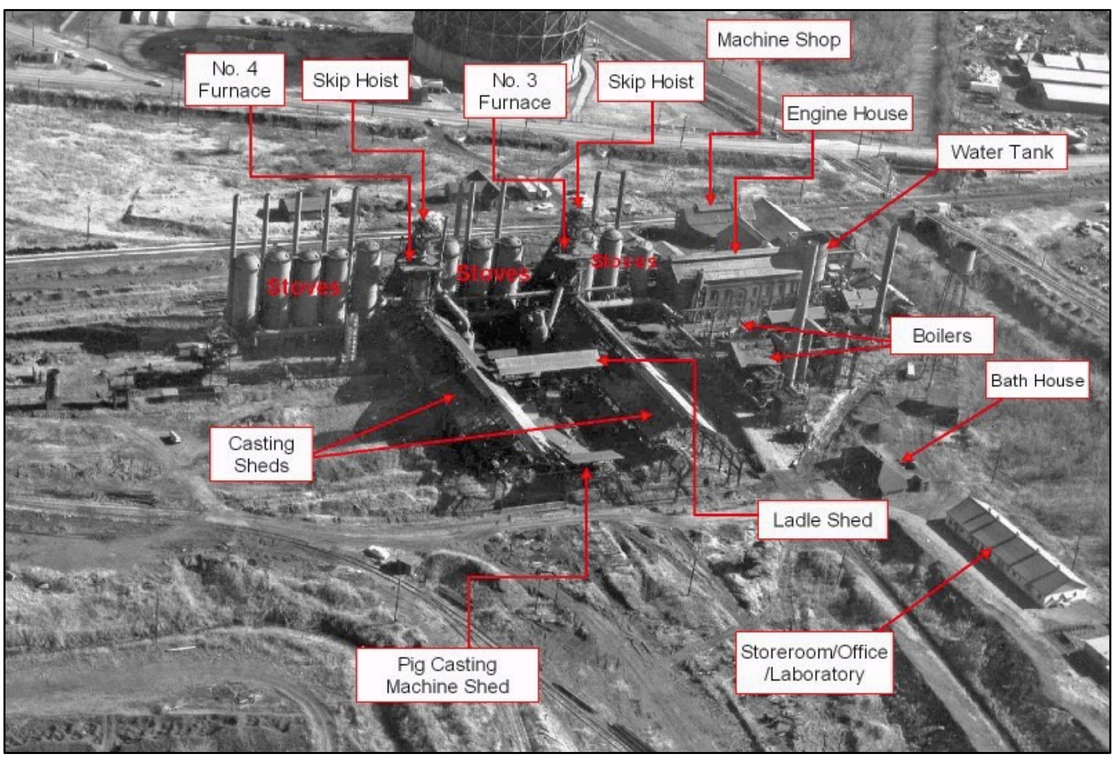


Figure 34. Diagram of the Facilities Using the 1964 East-Southeast View Photograph.

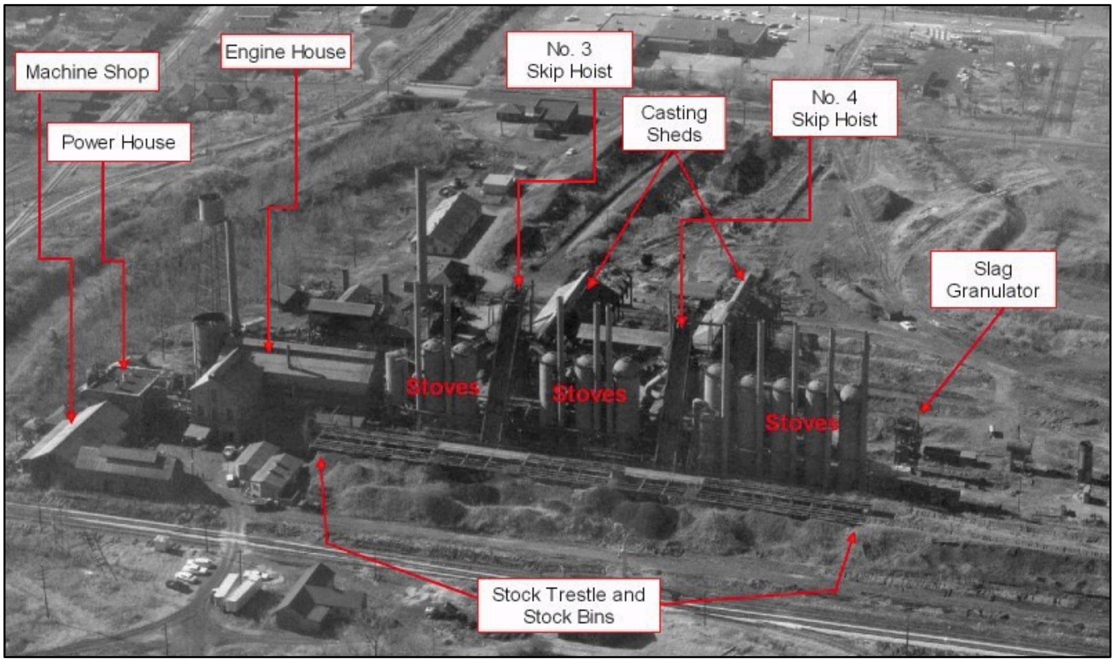


Figure 35. Diagram of the Facilities Using the 1964 West View Photograph.

In addition to this major rebuild, periodic modifications resulted in ever growing productive capacity but never matched the increase achieved when the new stock loading systems were installed. Spotty documentation by Sloss and changing recording practices by such national organizations as the American Iron and Steel Institute make it difficult to produce a finely tuned graph of increasing production. The original North Birmingham Furnaces smelted around 80 tons of pig iron per day and by 1900 were probably producing in line with most furnaces in the district with yields of much less than 300 tons per day. By the time North Birmingham and the City Furnaces were blown out for the last time in the 1950s and 1960s, they were each capable of producing over 475 tons per day (Bergstresser 1993: 179-180).

Hot Blast Stoves

One of the plant's components that underwent regular upgrades was the hot blast stoves. Describing the series of changes made to these stoves between 1891 and 1911, as shown on Sanborn maps, provides one of the best examples of the way in which incremental improvements were made and the way in which evidence of these changes may be preserved in the archaeological record.

A prominent feature of the new plants erected in the 1880s by the Philadelphia firm were Gordon Whitwell Cowper stoves used to heat the air blast before it was injected into the base of the blast furnace. This design was among the latest available and had largely supplanted the Whitwell stove, which had been very up-to-date for its time when installed at the City Furnaces a decade earlier. The North Birmingham stoves with their three-part name were indicative of the growing complexity of late 19th century blast furnace appliances. They were essentially a hybrid design of the

Cowper regenerative stove improved by Thomas Whitwell into the Whitwell stove, which was improved even further to produce the Gordon Whitwell Cowper design. An unmistakable feature of this design was the chimney pipe that extended upward from the top of the silo-shaped stove (Figure 36).

These new designs were firebrick stoves, which replaced earlier iron pipe stoves. They were based on what was known as the regenerative process whereby flues made of firebrick were heated to a very high temperature by burning gas then an air blast was passed through the flues and heated by the brick to temperatures in excess of 1000 degrees. The hot air blast was then routed to the base furnace where its greatly elevated temperature facilitated the smelting of iron ore.

The original North Birmingham stoves were know as three-pass stoves because the burning gas passed through the stove three times first from the bottom to the top of the stove, then back to the bottom, and then back to the top where it was exhausted through the chimney. Two and three pass stoves were the most common designs in use and each have diagnostic structural features that can leave a distinct archaeological footprint. The most notable aspect of these footprint results from the structural components that exhausted gas after it had served its purpose. Since the three-pass stove exhausted its gas out of the top of the stove they featured a prominent superstructure element; the chimney extending from the top of the stove, but no foundation remnants associated with the exhausting process. Two-pass models, on the other hand, expelled exhaust gas from the bottom of the stove, which necessitated a chimney outside of its circular foundation. There were two options available, individual chimneys near the base of each stove, or one larger chimney that could be connected to as many as four stoves. In the latter case, an underground flue usually ran from the bases of the stoves to the centrally located chimney.

Comparing the 1890s and 1908 photographs (Figures 24-25), the rebuilding of the two blast furnaces included an at least partial, if not complete, replacement of the original Gordon Whitwell Cowper array of eight three-pass stoves with ten two-pass stoves. The later photograph depicts that these ten stoves were separated into two banks of four stoves, one bank of two stoves and two stand-alone stoves. One chimney is indicated with each four and two bank arrays. The two strand-alone stoves have adjacent chimneys.

Sand Casting

The sand casting sheds installed with the original North Birmingham Furnaces had been standard features of iron making operations for centuries. Molds were impressed into the sand floor of the shed to receive the molten iron when it was tapped from the furnace. The molds were small, to match the low volume of pig iron, and shaped in the form of an oval. As furnace capacities increased, side molds were added along the long axis of the oval to catch the additional iron. According to legend, the oval with attached side molds resembled a sow hog lying on its side feeding its piglets. From that time forward the main runner in a casting floor was called a sow and the increasing numbers of side runners were called pigs, establishing forever the name pig iron for the product of the blast furnace.

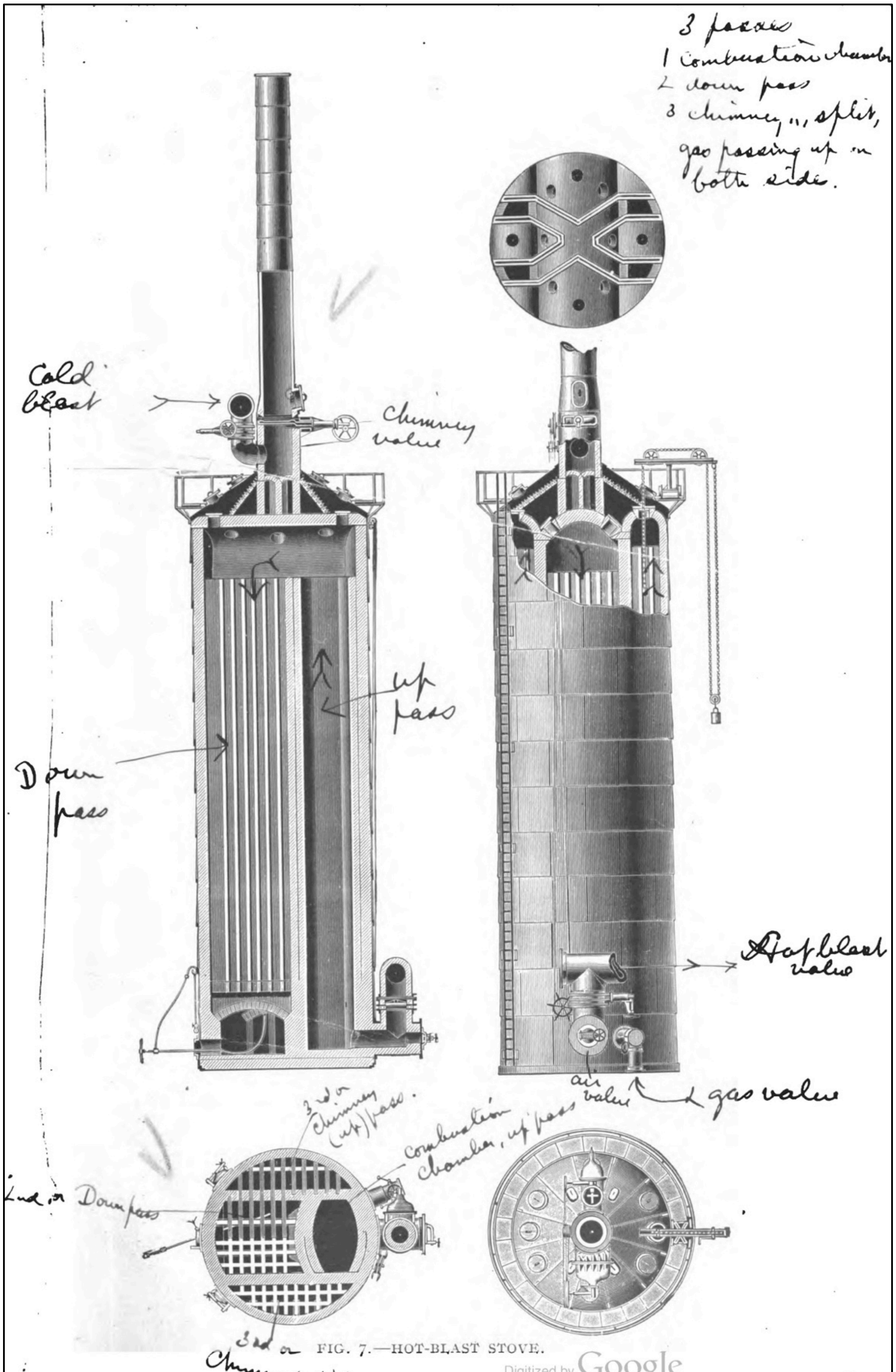


FIG. 7.—HOT-BLAST STOVE.

Figure 36. Hot Blast Stove in the 1893 *Catalog of the Manufactures of the Philadelphia Engineering Works (*Philadelphia Engineering Works 1893).

From the beginning the task of breaking and loading the pig iron after it had cooled and solidified was extremely arduous. The process became even more challenging as larger furnaces began making more iron at faster rates. Flawless coordination and timing was required to cool, break and load a batch of iron as quickly as possible so that the sand casting floor could be leveled and impressed with new molds in time to receive the next batch of molten iron. The problem increased in urgency with the advent of large batch steel furnaces that consumed unprecedented volumes of pig iron. Devising mechanical methods for handling pig iron became an absolute necessity for the larger blast furnaces required to meet the needs of steel mills. It was one of the factors in the complex equation involving hard driving furnace practice and the Duquesne revolution. Before long the practice of casting the newly tapped iron into pigs was abandoned in favor of transferring it while still molten directly to the steel furnace (Johnson 1917, Sweetzer 1938).

As long as foundry men preferred sand cast pig iron, an alternative system was required. Their market led the merchant pig iron makers of the Birmingham District to diverge from the mainstream focus on developing systems that transferred molten iron out of the furnace plant in favor of technology and practice that would allow them to efficiently produce more pig iron in their casting sheds and ship it in ever increasing volumes that matched the demand from foundries.

This was the path followed at North Birmingham over the next four decades. A pervasive image often depicted in accounts of the early Birmingham furnace industry is one of large gangs of black workers fresh out of the cotton fields toiling to in the cast house to break up pig iron while it was still hot, lift it out of its sand mold, and carry it by hand to waiting rail cars. This may have been the practice early on, but as demand for sand cast pig continued to grow large labor gangs disappeared in favor of a minimum number of manual laborers working under the direction of technicians. These technicians operated equipment designed to prepare the sand beds to receive molten iron from the furnace then break it into individual pigs and load it for shipment to customers.

The district had been employing mechanical pig breaking machines as early as 1894 when Pittsburgh inventor John S. Kennedy visited the district, observed the machines and immediately patented a design that he began marketing to northern iron makers. Sloss and Woodward continued to improve their methods of handling sand-cast pig iron as the years passed. They frequently borrowed pre-existing technology, such as the Ladd and Backer pig breaker, but also devised equipment of their own design. Woodward for instance, developed a long, square-shaped harrow that could be dragged across a sand bed to create identical, exactly spaced imprints of pig beds. After the molten pig iron had been run into the big beds and allowed to cool, the entire pig beds were removed as separate units and carried by a crane to automatic pig breakers. At that point the pigs were broken and allowed to fall into railroad cars for immediate shipment. James P. Dovel also devised a mechanical pig breaker that was originally installed at Sloss' North Birmingham plant.

Overhead cranes were key to these new systems. They were used not only to move the equipment that prepared the sand beds to receive a cast of molten pig iron, but also to handle the iron once it had cooled down and solidified. Large rollers resembling the rolling pins used by bakers were developed to prepare the casting floor. They were studded with projecting nodes the exact size of a pig so that when pulled across the sand floor by the overhead cranes the roller pressed uniformly spaced pig molds in the sand. Once cooled, the pigs were lifted in groups while still attached to main runners and moved into position over mechanical breakers. Called combs, because of their resemblance to hair combs, these groups of pigs would be broken into individual pigs and conveyed to gondola railroad cars (Bergstresser 1993:184-185; Kennedy 1884:184-85).

Sloss had so refined the sand molding process to make molds of precisely the same size that the company began marketing its product as the "Unipig." A January 1929 edition of its *Pig Iron Rough Notes* featured a photograph of one of its sand casting floors with one side of the sand bed molded by hand, and the other molded by the unipig machine (Figure 37).

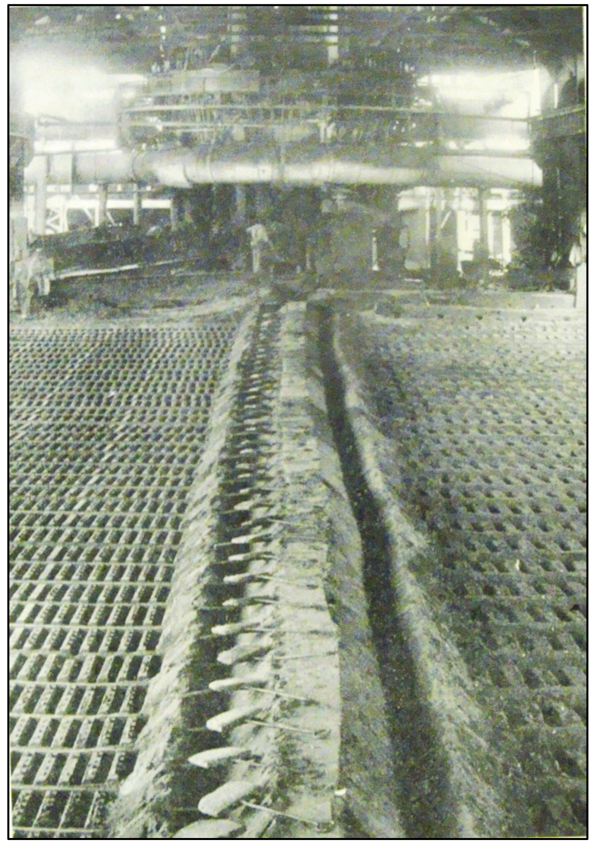


Figure 37. 1929 Photograph of a Unipig Bed (Left) and an Old Pig Bed (Right) at Sloss City Furnaces (*Pig Iron Rough Notes* January 1929).

By the early 1920s the mechanized pig handling processes had become so efficient that they could handle more pig iron than could be cast in the original casting sheds built in the late 1880s. This and other factors dictated the erection of longer casting sheds at North Birmingham between 1919 and 1924. Company records are so sketchy for this period that it is impossible to determine the exact date of their construction but references to the installation of the new stock loading bins and skip hoisting systems strongly suggest that larger furnaces and greatly expanded cast sheds were erected during this period. Comparing the 1951 Sanborn map to the 1891 and 1911 maps show that the cast sheds had more than doubled in length. Fully mechanized, the new shed would have been capable of handling much greater tonnage than its predecessor and it probably operated throughout the last half of the 1920s at this increased capacity.

Ironically, it was during this latter period that the movement away from sand-cast pig iron was gaining momentum. While Sloss would go on to build very large casting sheds in the late 1920s to serve its new City Furnaces, a growing number of problems with sand cast pig were becoming clear to most foundry men. One example was the significant amount of sand that remained attached to the pigs and ended up in the bottom of railroad cars after they were loaded (Dyer 1921b). Discounts could be provided to customers so that foundries did not pay for the unwanted sand, but it still had to be removed before the pigs could be charged into a cupola furnace. Another, more decisive problem was quality control: producing pigs of consistent analysis. The analysis of a load of molten pig in the furnace varied from top to bottom. This variance remained after the pigs were cast. The first pigs cast provided a significantly different analysis from the last. This variability had become a major issue with foundry men who needed uniformity in the pigs they remelted in their cupolas to insure that their products such as cast iron pipe met consistent specifications

This problem could be overcome by abandoning sand casting in favor of a system that employed ladle cars and casting machines. If an entire batch of molten iron from the furnace were run into a ladle car it would be mixed into a uniform blend. For this reason iron makers often referred to ladle cars as mixers (Figure 38). Once its contents were blended, the ladle car could be tilted to pour molten iron into metal molds coated with a mixture, which prevented the cooling pig from sticking to the mold. The molds were linked to form a conveyor belt that was the principle component of a pig-casting machine. Once filled, the molds traveled slowly so that the molten iron could cool down enough to solidify and be dumped into a railroad car at the end of the conveyor. The new system would have been in place by the middle of the 1930s. Sheds for the pig-casting and ladle car mixer were added between the two casting sheds at the North Birmingham furnaces (Figure 39).

When they completed their transition from sand to mechanically cast pig, Sloss and the other merchant pig iron producers in the Birmingham District were the last to do so in the country. While a few small specialty suppliers may have continued to sell sand cast pig iron after this date, when Sloss abandoned the process they essentially brought to a close over five centuries of sand casting. The company had advanced the technology to its highest expression at their North Birmingham and City furnaces. The sanding sheds they erected were the largest ever constructed in the United States, if not the world. The North Birmingham sheds are gone but the two at the City Furnaces still stand. They are two of the most significant features contributing to the plant's designation as a National Historic Landmark.

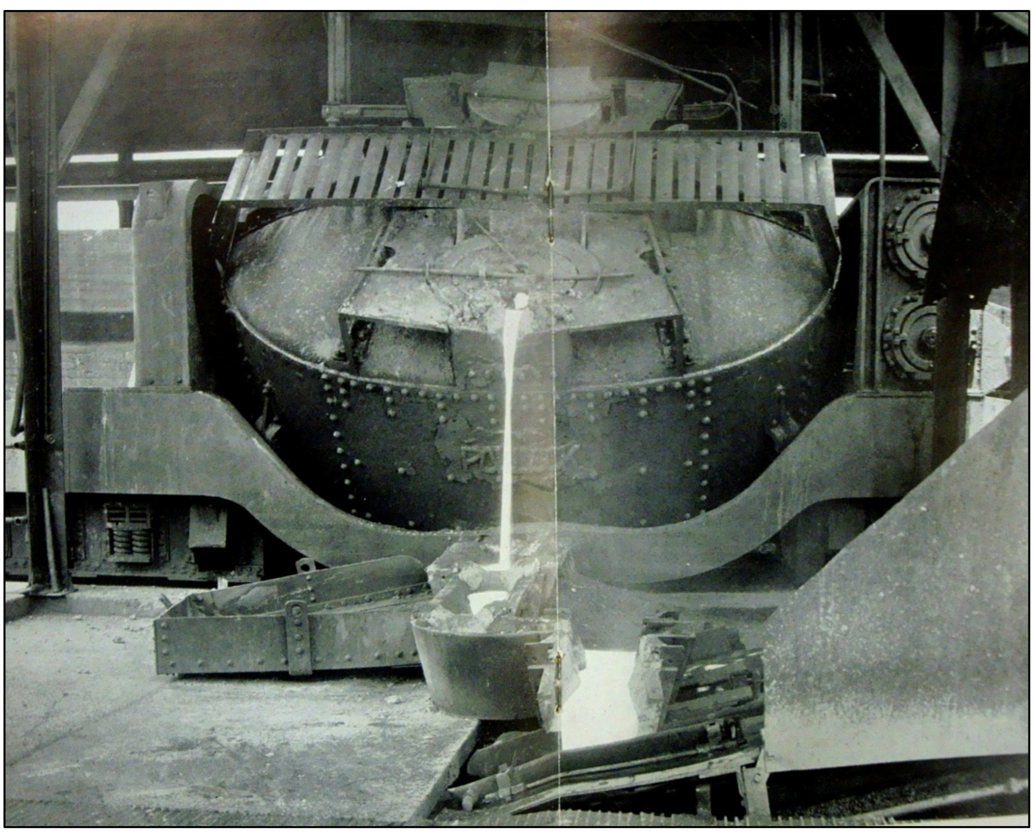


Figure 38. 1929 Photograph of a 175-ton Ladle Mixer with the Pig Conveyor Belt in the Foreground at Sloss City Furnaces (*Pig Iron Rough Notes* January 1929).

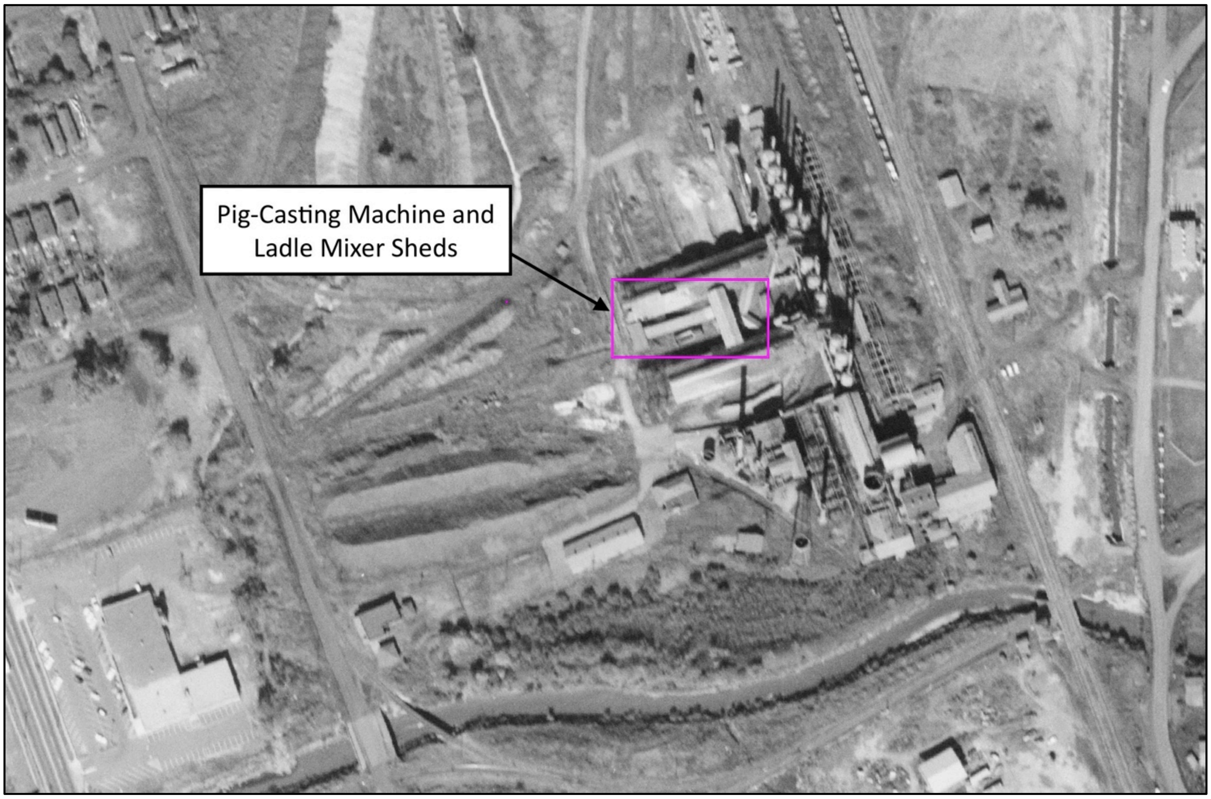


Figure 39. A 1960 Aerial Photograph Showing the Pig-Casting Machine and Ladle Mixer Sheds.

FIELD AND LABORATORY METHODS

Archaeological field investigations involved four basic tasks: 1) conduct a GPR survey within the project ROW, including the parking lot/storage yard and the grassed field; 2) document the structural features present atop the surface of the parking lot/storage yard; 3) conduct systematic shovel testing in the grassed field; and 4) generate a site plan map of the site. Figures 40-52 are general photographs of the project ROW.

Prior to beginning the fieldwork, a large amount of refuse, equipment, and other materials had to be removed from the project ROW. This was a task that had to be completed by the City of Birmingham; therefore, our schedule was contingent upon their assistance. The Sanitation Department was able to clear their portion of the lot in March 2016. A small Bobcat skid-steer loader was used to scrape the surface of the ROW and push refuse outside of the ROW, or push it into more discrete areas. Archaeologists monitored these activities to insure that none of the concrete structural remains were impacted, and to insure that only the top few centimeters of soil were scraped (<3 cm). Once this portion of the ROW was cleared of debris, the GPR survey and recording of structural remains proceeded. The area to the south of the ROW where structural features also exist was not cleared of debris or materials, but those features were documented as well.

Three of the structural features, however, could not be adequately documented until the City's fenced storage yard could be cleared of the large streetlight poles and other equipment, which did not occur until September 2016. This meant that the GPR survey was unable to include the fenced storage compound. The logistics of moving the streetlight poles was very complicated, and involved the use of two crane trucks and six men working for the City's Transportation Department. The crew worked for more than a week to remove the poles from the western portion of the storage yard. Because of the costs and time allocation to relocate all of the materials in the fenced compound, a joint decision was made between the ALDOT, the City of Birmingham, and MRS to only remove materials from the area where structural features were known to exist at the surface. The remaining area of the storage yard was inspected for other structural features, but none were identified. Also, by this time in the project, the archaeologists suspected that no other structures existed in this area based on Sanborn maps and historical aerials, except the stock bins and stock tunnel; therefore, moving the materials was not warranted.

No subsurface testing was conducted within the gravel parking lot and storage yard. Overlying soil was shovel-skimmed and swept from atop the features existing within the ROW (Features 8-13); however, the removal of soils generally only involved removing 1-3 cm of overburden. Soils overlying Feature 13 were slightly deeper in some areas, especially along its south side bordering Feature 12. But the soil removal process was still shallow and did not qualify as an excavation. There were several reason why no subsurface testing was employed within the ROW in the gravel parking lot and storage yard: 1) shovel tests nor test units could have extended into or below the fill layer; 2) shovel tests within an industrial site have limited research value; 3) Sanborn maps and historic aerials depict where the facilities existed, which were consistent with the structural features identified on the surface; and 4) the GPR survey did not reveal any anomalies that were worthy of exploration, especially when compared with Sanborn maps and historic aerials.

Schneider and Luepke conducted the GPR survey over the course of two days (March 28-29, 2016) with the assistance of MRS. GPR is a non-invasive technique for determining what lies beneath the surface. The goal of the GPR was to identify structural remains and other features that exist within the project ROW. A summary of the GPR survey follows in another section of this report, while the full report is provided in Appendix A.

Figure 53 is a site plan map for Site 1Je808. Sixteen structural features were recorded on the surface of the parking lot and storage yard, including the bases of two blast furnaces, several concrete platforms/foundations that once supported equipment, and walls/foundations associated with the stock trestle or stock bins. The structural features were initially documented by photographing each feature, designating each with a feature number, taking preliminary measurements of each feature, and pulling measuring tapes to draw an initial sketch map of the site. Later, a more accurate map of the site was drawn using data collected on a Trimble Geo7 unit, which Luepke collected in the field. Luepke took center points and/or walked the outlines of the features. Soil was later removed from the tops of the features existing within the ROW, then the features were measured again and photographed. It is notable that two of the features, Features 8-9, identified during the preliminary fieldwork were thought to be two separate features. Once the thin layer soil was removed, they were discovered to be part of the same feature; therefore, Feature 9 was deleted from the list of features.

Figure 40. View to the North of the Project ROW Before the Refuse was Removed from the Gravel Parking Lot.

Figure 41. View to the East-North East of the Project ROW Before the Refuse was Removed from the Gravel Parking Lot.

Figure 42. View to the East-North East of the Project ROW Before the Refuse was Removed from the Gravel Parking Lot and the Light Poles were Removed from a Portion of the Storage Yard.

Figure 43. View to the Southeast of the Project ROW Before the Refuse was Removed from the Gravel Parking Lot and the Light Poles were Removed from a Portion of the Storage Yard.

Figure 44. View to the Southeast of One of the Blast Stove Platforms Before the Refuse was Removed from the Gravel Parking Lot.

Figure 45. View to the North of One of the Blast Stove Platforms Before the Refuse was Removed from the Gravel Parking Lot.

Figure 46. View to the East of Feature 16 Before the Fence and Light Poles were Removed from the Storage Yard.

Figure 47a. View to the Southwest of Feature 17 Before the Light Poles were Removed from the Storage Yard.

Figure 47b. View to the South of Feature 17 Before the Light Poles were Removed.

Figure 48. View to the North While Refuse and Soil was Being Skimmed from the ROW.

Figure 49. View to the North While Refuse and Soil was Being Skimmed from the ROW.

Figure 50. View to the East After Refuse and Soil was Skimmed from the ROW.

Figure 51. View to the South of Light Poles Being Removed from the ROW.

Figure 52. View to the North of Light Poles Being Removed from the ROW.

The only subsurface testing that was conducted during the testing project was shovel tests in the grassed field. The field was bush-hogged by the ALDOT prior to the GPR survey and shovel testing. The grid that was laid out in the grassed field for the GPR survey was utilized for the shovel-testing program. Shovel tests were conducted at 10 m intervals and were excavated as deep as they could be excavated into the disturbed clay loam soils. Shovel tests typically measured between 10-25 cm deep, but sometimes extended as deep as 32-34 cm. Soils were sifted through a 6 mm mesh screen to search for cultural materials.

Materials collected from shovel testing were bagged by provenience and returned to the MRS laboratory for processing and analysis. Artifacts were washed, analyzed, tabulated, and then placed in plastic bags in preparation for curation. All materials and documentation related to the project eventually will be curated at a curational facility that meets Department of Interior 36 CFR Part 79 standards.

Artifact recovery from the shovel tests was rather dismal and was all recovered from the disturbed clay loam soils. The majority of shovel tests contained limestone or dolomite gravel, most of which was not saved because some of it is related to modern fill and others were associated with old industrial stock piles of materials. Nearly all of the shovel tests contained slag, a glass-like byproduct from the smelting process, which is associated with massive slag piles that were once stored in the stockyards of the industrial facility. Only a sample of slag was collected from the shovel tests. A few fragments of coke were also recovered, which is a fuel made from coal that was stocked at the facility for use in the furnaces. Aside from gravel, slag, and coke, a small amount of other materials were recovered, including brick fragments, bottle glass, metal, one terracotta fragment, and one whiteware fragment.

ARCHAEOLOGICAL FINDINGS

Fieldwork involved three primary phases: 1) the GPR survey; 2) shovel testing the grassed field; and 3) recording the aboveground structural feature remains. The following sections describe each stage of the field investigations.

GPR Survey

Kent A. Schneider and Douglas Luepke conducted the GPR survey for the project with the assistance of MRS (Figure 54). Their survey was conducted to determine if any intact subsurface features exist within the project ROW. Their investigation was restricted to the project ROW; however, they were unable to include the storage yard where the massive light poles and other materials were stored because the City of Birmingham was unable to move the materials within the project's allotted schedule. Schneider and Luepke's (2005) report is contained within Appendix A.

The project area was divided into two separate grids, which were separated by a fence line. The North Grid included the grassed field on the north side of the project ROW. The South Grid included the gravel parking lot on the south side of the project ROW. Leupke laid out the grid in the

Figure 54. Photographs of the GPR Survey.

project ROW using a submeter accuracy GPS. He collected data using: System US State Plane 1983; Zone Alabama West 0102; and Datum NAD83 (Conus). The corner pin grid coordinates for each grid are provided in Table 2.

Table 2. Coordinates of the Corner Pins for the GPR Grids.

Corner Pin Grid Coordinates for North Grid	
NE Corner: E 2178417.7’ N 1291223.2’	SE Corner: E 2178466.2’ N 1291101.6’
NW Corner: E 2178006.3’ N 1291060.1’	SW Corner: E 2178054.4’ N 1290938.6’
Corner Pin Grid Coordinates for North Grid	
NE Corner: E 2178321.8’ N 1291020.7’	SE Corner: E 2178360.9’ N 1290920.6
NW Corner: E 2178062.5’ N 1290917.1’	SW Corner: E 2178102.5’ N 1290817.3’

Schneider utilized an encoder-equipped cart-mounted GSSI SIR3000 digital control unit and a 400MHz antenna to collect the data. The time window was set to 50ns after test runs to observe signal attenuation and optimum penetration depth for the features sought. Radar profiles were acquired in forward and reverse directions on alternate lines. Measuring tapes were pulled to guide antenna travel and to make survey notes. GPR data was collected along the profile traverses at 40 scans per meter. A total of 8213 linear meters (26,945.5 ft) was surveyed. Data was post processed using GPR-Slice software. The radar data was composited into 20 amplitude slice maps to depths of approximately 2.19 m (7.2 ft). Two GPR maps were selected for data presentation, which are found in their report (Appendix A). Figure 55 provides the processed data overlaid atop an aerial photograph.

The North Grid in the grassed field measured 0 m to 135 m west-east and 40 m to 80 m south-north. A total of 135 transects of GPR data was collected using 1-m line spacings with each transect measuring 40 m in length. Seven anomalies appear in the GPR data in the North Grid. While Schneider and Leupke (2005) project that the anomalies could be related to an industrial function, they also admit that they might be the result of soil or vegetation. However, Bergstresser and Meyer later compared the processed data to the historical maps and aerials. There are no correlations between the anomalies and the structures that are known to have existed at the facility.

The South Grid in the parking lot measured 0 m to 85 m west-east and 0 m to 33 m south-north. The surface of the parking lot was littered with refuse, including a sundry of small plastic and metal objects, which were picked up by hand before and during the GPR survey. A total of 85 transects of GPR data was collected using 1-m line spacings with each transect measuring 33 m in length. Three anomalies of unknown origin appear in the data, which Schneider and Leupke (2005) thought could be worth exploring. However, Bergstresser and Meyer later compared the processed data to the historical maps and aerials. There are no correlations between the anomalies and the structures that are known to have existed at the facility.

Historical Sanborn maps, aerials, and photographs suggest that the project ROW covered by the GPR survey was once occupied by the stockyards. The 1902 and 1911 Sanborn maps suggest that a storage shed existed to the south of the grassed field, but may have extended into the field. The 1951 Sanborn map shows only one small shed structure and several railroad tracks in the grassed field. Aerials dating to the late 1900s and early 2000s also reveal how disturbed this area was, which was filled with spoil piles and railroad tracks in the 1940s, 1950s, and early 1960s, and mechanically

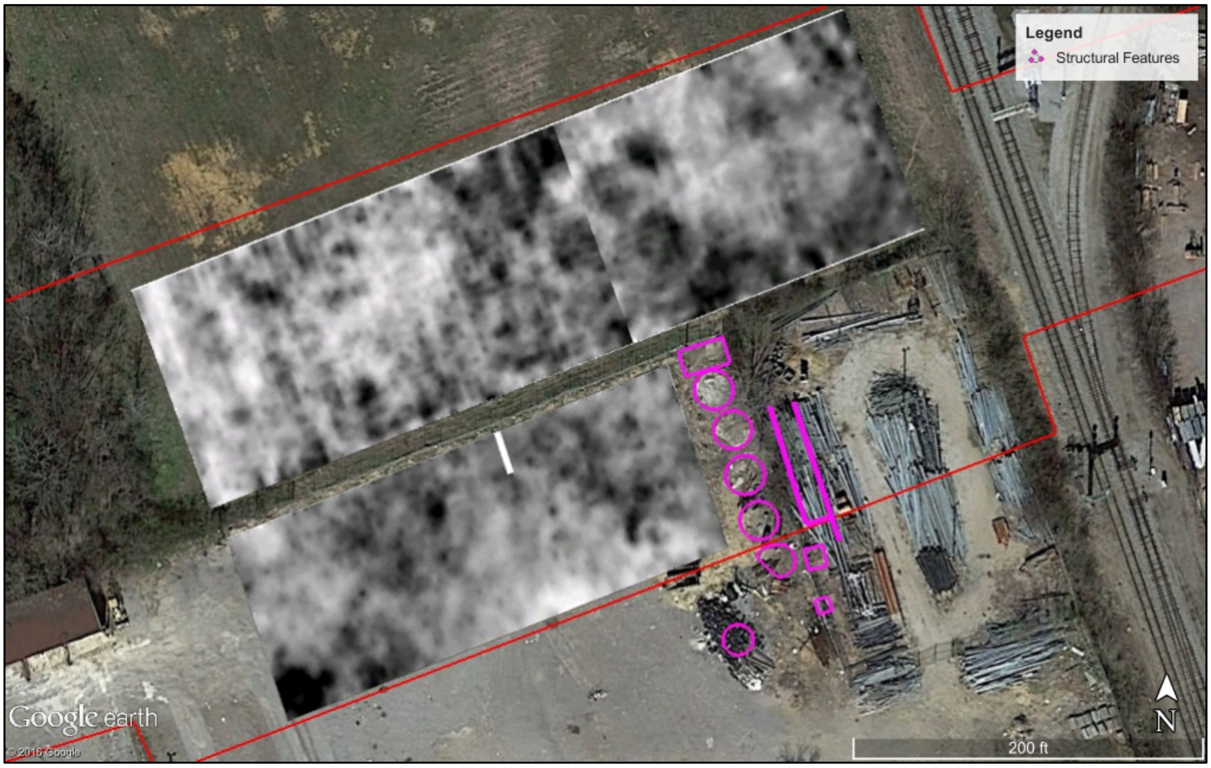


Figure 55. GPR Image Overlays on Aerial Photographs.

Figure 56. 2011 Aerial Photograph.

cleared in the mid 1960s when the facility was dismantled. The gravel parking lot was present by the early 1980s. Recent aerials indicate that the grassed field was cleared, filled, and bulldozed between 2009 and 2011 (Figure 56). In fact, some of the anomalies appear to be related to soil disturbances and fill materials that can be seen on these aerial photographs. Considering the fact that the facility was dismantled in the mid 1960s, then underwent mechanical disturbances over the next few decades, and was bulldozed and filled within the past few years, it was concluded that the anomalies identified by the GPR survey were unlikely to be associated with any intact structural remains associated with the SSSIC North Birmingham facilities. They are more likely to be associated with filling activities that have occurred within the recent past.

Shovel Testing in Project ROW

Following the GPR survey, systematic shovel testing was conducted within the grassed field in the northern portion of the ROW. This area was shovel tested because Nielsen (2005) was unable to access this field during the Phase I survey. There were concerns that worker's housing or other structures could have been located in this area; however, those concerns were later dismissed once we acquired such a large collection of historical quadrangles, Sanborn maps, aerial photographs, and a few photographs. Unfortunately, we did not acquire all of this information until after the shovel testing had been completed. Otherwise, the plan for shovel testing may have been aborted. It is also notable that while shovel testing was underway, a gentleman named Donny Capps who works for the current landowner visited the field crew (personal communication, April 4, 2016). Mr. Capps stated that he was involved in the clearing, bulldozing and filling of the grassed field that occurred within the past six years. He reported dumping and bulldozing many truckloads of fill, gravel, and rock onto the property to fill in the many depressions in the field. A few fragments of disarticulated concrete were also noted at the surface in some areas of the grassed field, which may be have been brought in with fill or were bulldozed remains that were pushed into the field in previous years.

Jeffery M. Meyer and Catherine C. Meyer completed the shovel-testing program within two days. The North Grid that was laid out by UIS for the GPR survey (Schneider and Luepke 2005) was utilized for the shovel-testing program. A total of 70 shovel test pits (STPs) were excavated along the grid at 10-m intervals (Figure 57). All of the shovel tests were fairly shallow due to the disturbed, often compact, and mottled soil matrixes. Soil strata varied across the site, which appears to be the result of recent dumping of various materials within the field, as well as the historic use of the area for storing large berms of materials and spoil piles. Limestone gravel was often intermixed with the clay loam soils, most of which appeared to be modern fill material; however, some of the gravel fragments could be dolomite that was stored in the stockyards to use in the furnaces. Gravel from the STPS was not collected. Nine of the STPs were No Digs because the shovel could not penetrate into the ground due to a compact layer of fill. Slag was noted in or collected from many of the STPs. Two shovel tests, STP N80 E0 and STP N40 E10, contained a dark brown to black layer of industrial fill, which likely is associated with a remnant of one of the industrial stockpiles. Table 3 contains the stratigraphy for each STP.

Table 3. Shovel Test Profiles.

STP Grid No.	**Depth (cmbs)**	**Description of Soil Matrix**	**Artifact Recovery**
N40 E0	0-10	medium brown fine sandy clay loam	
	10-34+	mottled yellowish orange/gray clay fill	slag, dolomite, brick fragments
N50 E0	0-14 14+	medium brown fine sandy clay loam impenetrable mottled fill	
N60 E0	0-10 10-32+	medium brown fine sandy clay loam mottled yellowish orange/gray clay fill with gravel	 slag, clear bottle glass
N70 E0	0-7 7-32+	medium brown fine sandy clay loam mottled yellowish orange/gray clay fill with gravel	
N80 E0	0-19 19-32	yellowish red clay fill dark brown/black industrial fill (slag/spoil)	
N40 E10	0-15 15-34+	yellowish red clay fill dark brown/black industrial fill (slag/spoil)	 slag, dolomite, brick, aluminun
N50 E10	0-10 10+	yellowish red clay fill Impenetrable yellowish red clay fill with gravel	
N60 E10	0-20+ cm	mottled yellowish orange/gray clay fill with gravel	thick terracota frag, whiteware frag
N70 E10	0-5 cm 5-32+	light brown fine sandy clay loam yellowish red clay fill with gravel	
N80 E10	0-3 3-25+	medium brown fine sandy clay loam yellowish red clay fill with gravel	
N40 E20	0-20 20+	yellowish red clay fill thick slag or asphalt	
N50 E20	0-20+	yellowish red clay fill	slag, amber glass
N60 E20	0-10 10-29+	medium brown fine sandy clay loam yellowish red clay fill	
N70 E20	0-20+	yellowish red clay fill	slag
N80 E20	0-8 8-34+	medium brown fine sandy clay loam yellowish red clay fill	
N40 E30	0-27+	yellowish red clay fill with slag and gravel	fire brick fragments
N50 E30	0-23	yellowish red clay fill	
N60 E30	0-20+	yellowish red clay fill	
N70 E30	0-19+	yellowish red clay fill	
N80 E30	0-26+	yellowish red clay fill	
N40 E40	0-18	yellowish red clay fill	slag
N50 E40	0-14+	yellowish red clay fill with gravel	
N60 E40	No Dig	impenetrable - gravel at surface	
N70 E40	0-17+	yellowish red clay fill with gravel	
N80 E40	0-18+	yellowish red clay fill with gravel	brick fragments
N40 E50	0-28+	yellowish red clay fill with slag and gravel	
N50 E50	0-30+	yellowish red clay fill with gravel	slag and brick fragments

Table 3. Shovel Test Profiles (continued).

STP Grid No.	Depth (cmbs)	Description of Soil Matrix	Artifact Recovery
N60 E50	0-10 10+	medium brown clay fill with gravel impenetrable - medium brown clay fill with gravel	
N70 E50	No Dig	impenetrable - limestone gravel at surface	
N80 E50	0-18+	mottled medium brown/orange clay fill with gravel	slag, brick fragments
N40 E60	0-27+	mottled medium brown/orange clay fill with gravel	bottle glass, aluminum
N50 E60	No Dig	impenetrable - gravel below grass	
N60 E60	0-28+	mottled medium brown/orange clay fill	slag and coke
N70 E60	No Dig	impenetrable - medium brown clay fill with gravel	
N80 E60	0-27+	yellowish red clay fill with gravel	slag
N40 E70	0-17+	medium brown clay loam with gravel	
N50 E70	0-23	mottled medium brown/orange clay fill	slag and coke
N60 E70	0-8 8+	medium brown clay fill with gravel impenetrable - medium brown clay fill with gravel	
N70 E70	0-21+	yellowish red clay fill with gravel	
N80 E70	No Dig	Impenetrable yellowish red clay fill with gravel	
N40 E80	0-25+	medium brown clay fill with gravel	
N50 E80	No Dig	impenetrable - medium brown clay fill with gravel	
N60 E80	0-20+	yellowish red clay fill	
N70 E80	0-12+	yellowish red clay fill	
N80 E80	0-10+	yellowish red clay fill	
N40 E90	0-7 7-27+	medium brown clay with gravel yellowish red clay fill with gravel	
N50 E90	0-18 18-22+	medium brown clay loam with gravel yellowish red clay fill	
N60 E90	0-20+	reddish brown clay fill with gravel	
N70 E90	0-15	reddish brown clay fill with gravel	
N80 E90	0-12+	reddish brown clay fill with gravel	
N40 E100	0-17+	mottled medium brown/orange clay fill	
N50 E100	0-9 9-27+	yellowish brown clay with gravel yellowish brown clay with gravel	brick fragments
N60 E100	No Dig	Impenetrable yellowish red clay fill with gravel	
N70 E100	0-8+	compact red sandy clay fill with gravel	
N80 E100	No Dig	impenetrable layer of gravel	
N40 E110	0-10 10-24+	medium brown fine sandy clay loam yellowish red clay fill	
N50 E110	No Dig	impenetrable - medium brown clay fill with gravel	
N60 E110	0-4 4-21+	medium brown fine sandy clay loam yellowish red sandy clay fill with gravel	

Table 3. Shovel Test Profiles (continued).

STP Grid No.	Depth (cmbs)	Description of Soil Matrix	Artifact Recovery
N70 E110	0-20+	yellowish red sandy clay fill with gravel	
N80 E110	0-27+	yellowish red sandy clay fill with gravel (and one large rock)	
N40 E120	0-4 4-16+	medium brown fine sandy clay loam yellowish brown silty clay loam with gravel	
N50 E120	0-25+	mottled medium brown/orange clay fill with gravel	
N60 E120	0-23+	mottled medium brown/orange clay fill with gravel	
N70 E120	0-25+	mottled medium brown/orange clay fill with gravel	
N80 E120	0-23+	red fine sandy clay fill	
N40 E130	0-2 2-26+	medium brown fine sandy clay loam mottled light yellow/light gray clay loam	
N50 E130	0-25+	mottled medium brown/orange clay fill with gravel	
N60 E130	0-25+	red fine sandy clay fill	
N70 E130	0-25+	red fine sandy clay fill	
N80 E130	0-22+	mottled light yellow/light gray clay loam	

Figure 57. Shovel Test Grid Map.

A total of 16 STPs were positive with regard to artifacts, which yielded a total of 69 artifacts. All of the materials were collected from disturbed soil matrixes. Table 4 provides a list of materials recovered from each STP. Table 5 lists the count/weight for each type of artifact. Slag (N=38) was recovered from 11 of the STPs. Aerial photographs dating to 1941, 1947, 1951, and 1956 indicate that the grassed field was once a large stockyard that was covered in spoil piles and railroad tracks. Many of the spoil piles would have contained slag, which is a byproduct extracted from the furnaces. A few STPs contained coke fragments (N=7) and dolomite (N=6), which may have been contained within some of the stockpiles. Aside from slag, coke, and dolomite, other materials recovered from the STPs included brick fragments (N=9), firebrick (N=2), bottle glass (N=3), metal (N=2), a terracotta pipe fragment (N=1), and an undecorated whiteware fragment (N=1). Two STPs contained sizable brick fragments. STP N40 E30 yielded two large fragments of firebrick, which was used to construct and repair stove platforms, furnace hearths, and other structures requiring fire-resistant brick. STP N80 E40 also yielded a large fragment of brick. These brick fragments were contained within disturbed soil matrixes. They do not appear to be related to any *in situ* structural remains.

Although shovel testing was unable to penetrate below the various pockets of disturbed clay fill, it is unlikely that any cultural zones exist beneath the fill. The ROW existed in the stockyards of the facility, which contained large stockpiles of materials and railroad tracks. Historically, the stockyards would have been a dynamic and environmentally disturbed zone, especially between the 1930s to late 1950s when mechanical earth-moving equipment would have been used. When the facilities were dismantled in the mid 1960s, the spoil piles were removed from the property, which would have required large-scale earth moving activities. Aerial photographs dating to 1967, 1970, 1977, 1981 and 1988 show a very disturbed environment before the property began to overgrow in vegetation. The field was densely vegetated in 2006, but was cleared and leveled by 2010. Only two STPs (STP NE80 E0, STP N40 E10) appear to have revealed the remnants of some of the old spoil piles, and other pockets could exist deeper below the fill; however, the remnants of industrial spoil piles should not be considered significant except to note their position in relation to the entire industrial property. Considering historical and modern disturbances, there is a low probability that significant, intact cultural deposits or structural features could have survived within this area of the ROW. Shovel testing and remote sensing certainly did not reveal that any such deposits exist in the grassed field.

Structural/Foundation Features Recorded in and Adjacent to the ROW

Sixteen features were recorded within and adjacent to the ROW (Figure 58). Table 6 lists the features recorded at Site 1Je808, their suspected function/association, and their relationship to the ROW. Six of the features are positioned within the ROW, including Features 8, 10, 11, 12, 13 and 17. These features will be directly affected by the proposed project ROW. The other features are recorded to the south of the ROW in the gravel parking lot owned by the City of Birmingham. These features will only receive indirect visual effects from the proposed ROW. It is notable that structural remains and three standing structures associated with the SSSIC North Birmingham plant exist further to the south on property that is fenced and privately owned. Following is a description of the features

Table 4. Materials Recovered from the Positive Shovel Tests.

STP Grid No.	Count	Weight (g)	Description
N40 E0	11	142.4	slag
	3	61.1	dolomite
	1	26.6	brick fragments
N40 E10	7	119.4	slag
	3	156.6	dolomite
	1	309.5	brick fragment
	1	98.8	metal, twisted aluminum strip
N40 E30	2	1437.5	firebrick fragments
N40 E40	4	24.7	slag
N40 E60	1	2.5	bottle glass, light green
	1	22.5	metal, twisted aluminum strip
N50 E20	2	40.4	slag
	1	4.7	bottle glass, amber
N50 E50	2	111.3	slag
	3	13.9	brick fragments
N50 E70	6	130.8	coke
	1	8.8	slag
N50 E110	1	4.8	brick fragment
N60 E0	2	18.9	slag
	1	3.9	bottle glass, clear
N60 E10	1	58.6	thick terracotta pipe fragment
	1	2.5	undecorated whiteware fragment
N60 E60	3	71.4	slag
	1	16.8	coke
N70 E20	1	65.6	slag
N80 E40	1	949.1	brick fragment
N80 E50	2	34.6	slag
	2	86.1	brick fragment
N80 E60	3	364.7	slag
Total	**69**	**4388.5**	

Table 5. Artifact Types Recovered from Shovel Testing.

Artifact Type	**Count**	**Weight (g)**
Bottle glass	3	11.1
Brick fragments	9	1390.0
Brick fragments, firebrick	2	1437.5
Coke	7	147.6
Dolomite	6	217.7
Metal, twisted aluminum strips	2	121.3
Slag	38	1002.2
Terracotta pipe fragment	1	58.6
Whiteware fragment, undecorated	1	2.5
Total Count/Weight	**69**	**4388.5**

Table 6. List of Features Recorded in the Project ROW and APE.

Feature No.	**Function**	**Position to ROW**
Feature 1	Remains of No. 3 Furnace	Outside of ROW
Feature 2	Foundation of Skip Hoist Engine House	Outside of ROW
Feature 3	Skip Hoist Foundation	Outside of ROW
Feature 4	Remains of Stock Bins	Outside of ROW
Feature 5	Remains of No. 4 Furnace	Outside of ROW
Feature 6	Currently Undetermined	Outside of ROW
Feature 7	Platform for Stove	Outside of ROW
Feature 8	Platform for Stove	Inside of ROW
Feature 9	Discarded	NA
Feature 10	Platform for Stove	Inside of ROW
Feature 11	Platform for Stove	Inside of ROW
Feature 12	Platform for Stove	Inside of ROW
Feature 13	Foundation for Small Ancillary Shed Structure	Inside of ROW
Feature 14	Associated with Pig-casting Machine Shed?	Outside of ROW
Feature 15	Platform for Stove (and curb?)	Outside of ROW
Feature 16	Foundation for Gas Cleaning System?	Outside of ROW
Feature 17	Coal Bin or Stock Bin Bordering Stock Trestle?	Inside of ROW

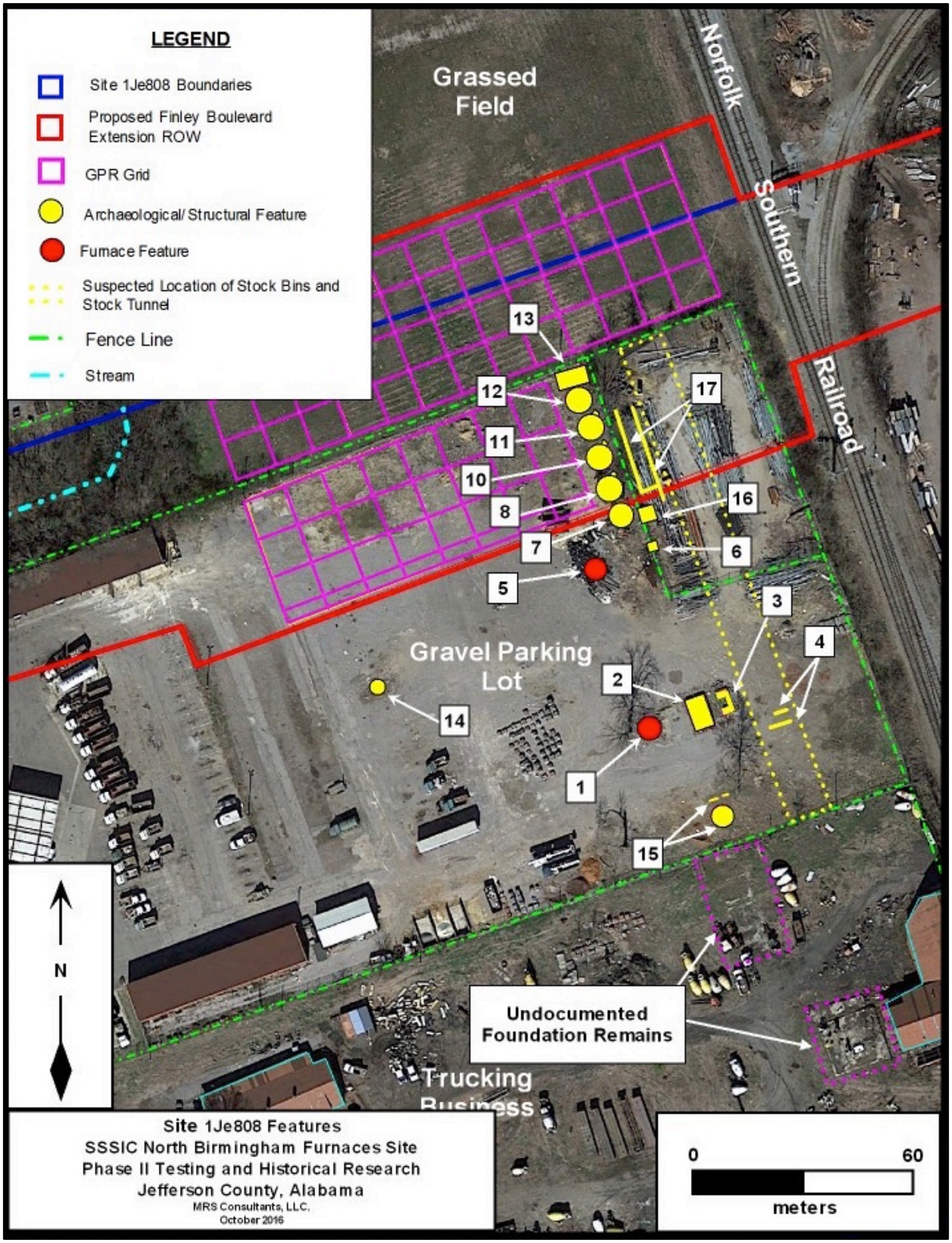


Figure 58. Site Plan Map Showing the Features.

recorded during the research. Brief discussions are also provided at the end of this section regarding the standing structures and possible archaeological features that exist outside of the project area in other areas of the Site 1Je808 boundaries, which were not involved in this Phase II research.

<u>Feature 1</u>

UTM Coordinates (Approximate Center): 16S 517538E 3711873N

Location: ±53 m south-southeast of the southern edge of ROW

Dimensions: 5.65 m diameter, 65 cm tall (maximum height above ground level)

General Description: Feature 1 (Figure 59) is a large circular, iron wall and stone-lined hearth, which exists well outside of the construction ROW. Because the feature is well outside of the project ROW, no debris or materials were removed to expose the feature. The top of the feature is covered in soil, gravel, leaves, trash, as well as several large creosote poles. The exterior of the feature consists of a thick wall of iron with riveted seams. The interior of the feature is composed of a brick-lined hearth and the overlying salamander, which is a conglomeration of solidified iron, slag, and coke that forms on the hearth of a furnace below the tap hole.

Function/Historical Context: Based on Sanborn maps, Feature 1 is the remains of the No. 3 Furnace, which was the southernmost furnace at the facility. The 1888, 1891, 1902, 1911, and 1951 Sanborn maps depict the No. 3 Furnace and casting shed in the same location throughout its history. The dimensions of the original No. 3 Furnace are reported to have measured 22.3 m (73 ft) tall and 5.2 m (17 ft) wide (Phillips 1912). The No. 3 Furnace was rebuilt in 1901 and again in 1909. The 1909 rebuild replaced the hearth jacket and tuyere jacket (WRC Smith Publishing Company 1909). The furnace was either replaced or rebuilt again during the 1919-1924 upgrades and was reported to measure 24.4 m (80.1 ft) tall by 3.9 m (12.8 ft) wide at the hearth, and 5.2 m (17.1 ft) at the bosh. Although Feature 1 measures slightly larger than these measurements, it could be because the furnace was rebuilt again at a later date. It is undetermined if the furnace was rebuilt in the same position each time; however, the furnace is always aligned at the eastern end of the casting shed, which appear to remain in the same position throughout history.

<u>Feature 2</u>

UTM Coordinates (Approximate Center): 16S 517551E 3711877N

Location: ±53 m south-southeast of southern edge of ROW

Dimensions: 8.6 m long by 5.25 m wide by 1.02 m tall (maximum height above ground level)

General Description: Feature 2 (Figure 60) is a rectangle-shaped, poured concrete foundation that sits between Feature 1 and Feature 3. This feature is positioned approximately 7.6 m to the east of Feature 1 (No. 3 Furnace) and approximately 3.1 m west of Feature 3 (skip hoist foundation). A small rectangular platform (measuring approximately 133 cm wide x 94 cm long x 50 cm tall) exists on top of the northwest corner of the foundation. Another molded piece of poured concrete sits atop the platform, which is not attached to the feature and may have been placed here more recently.

West-Southwest View

South-Southeast View

North-Northeast View Showing the Interior Hearth

Figure 59. Feature 1, Remains of the No. 3 Furnace.


East-Northeast View


North-Northwest View


North-Northwest View of Feature 2 (left) and Feature 3 (right)

Figure 60. Feature 2, Foundation of Skip Hoist Engine House.

Function/Historical Context: Feature 2 may have been a foundation for a structure to support the skip hoist, or skip hoist engine house. This postulation is based on the feature's proximity to the No. 3 Furnace (Feature 1) and skip hoist foundation (Feature 3). It also appears to correlate to a structure shown on the 1951 Sanborn map. If it were associated with the skip hoist, Feature 2 would have been added during the 1919-1924 upgrades.

Feature 3

UTM Coordinates (Approximate Center): 16S 517559E 3711880N

Location: ±53 m south-southeast of southern edge of ROW

Dimensions: Outer walls -- 5.75 m long by 3.0 m wide by 1.28 m tall (maximum height)
Inner walls – 3.0 m long by 2.1 m wide by 1.28 m tall (maximum height)

General Description: Feature 3 (Figure 61) is a square U-shaped, poured concrete foundation that sits adjacent to Feature 2. It is positioned approximately 3.0 m to the east of Feature 2 (foundation for skip hoist engine house). Large iron brackets are mounted to the top of the foundation on the northern and eastern walls, which indicates that a large piece of machinery once was anchored on top of the foundation.

Function/Historical Context: Feature 3 appears to be the foundation for the skip hoist associated with the No. 3 Furnace. This is consistent with what is depicted on the 1951 Sanborn map and historic aerial photographs. Skip hoists were added to the facility during the 1919-1924 upgrades, which replaced the stock elevators used for the original furnaces (Lewis 1994). Inclined skip hoists typically had two skip cars that were powered by steam-driven pulleys. The skip cars would haul raw materials (iron ore, limestone/dolomite, and coke) from the scale car in a subterranean pit or tunnel, which would have been below the stock trestle and stock bins. The process of loading the raw materials into the top of the furnace was called charging.

Feature 4

UTM Coordinates (Approximate Center): 16S 517572E 3711875N

Location: ±64 m south-southeast of southern edge of ROW

Dimensions: 4a – 4.0 m long by 20 cm wide
4b – 5.5 m long by 20 cm wide

General Description: Feature 4 (Figure 62) consists of two linear, poured concrete features that are situated on the ground surface (just below the gravel layer). These features were not uncovered to any extent because they are situated outside of the project ROW, and they sit in an area where the sanitation department empties their street cleaners and vacuum trucks. The linear features are parallel to each other, and measure approximately 2.7 m apart.

North-Northwest View

East-Northeast View

West-Southwest View of Feature 3 (foreground), Feature 2 (middle), and Feature 1 (background)

Figure 61. Feature 3, Skip Hoist Foundation.

South-Southeast View

Figure 62. Feature 4, Suspected Remains of Stock Bins.

Function/Historical Context: Feature 4 is near the skip hoist foundation (Feature 3). It is situated in the area where all of the Sanborn maps and historic aerials indicate the stock trestle once existed. The feature may be the remains of stock bins that would have existed below the stock trestle. Raw materials (iron ore, limestone/dolomite, coke) used in the furnaces were transported in railcars along the stock trestle, and materials were dumped into the stock bins near the furnace. Before the installation of the skip hoist, raw materials were manually unloaded from the stock bins into buggies, which were brought to the top of the furnace using vertical elevators. Once the skip hoist was installed during the 1919-1924 upgrades, materials from the stock bins were dumped into a scale car in a subterranean pit or tunnel. The scale car loaded materials into the skip hoist cars, which then sent the materials up the skip hoist to charge into the furnace. When comparing the 1941 and 1956 aerials with modern-day aerials that show the stock trestle at the Sloss City furnaces, the stock trestle that existed at the North Birmingham facility is nearly identical. An underground stock tunnel exists beneath the stock bins at the Sloss City furnaces; therefore, it is very possible that a stock tunnel exists beneath the stocks bins at Site 1Je808. It is also noteworthy that the 1941 and 1956 aerials indicate that the stock bins and the possible stock tunnel were restricted to the area that is now owned by the City of Birmingham. The shadow that represents the stock bins does not extend into the area that is now occupied by the grassed field, which appears to explain why the GPR did not identify any anomalies related to the stock bins.

Feature 5

UTM Coordinates (Approximate Center): 16S 517525E 3711913N

Location: ±10.5 m south of the southern edge of ROW

Dimensions: 5.4 m diameter and <10 cm above ground level

General Description: Feature 5 (Figure 63) is a circular, iron wall that appears to be the base of the No. 4 Furnace, which was the northernmost furnace at the facility. It exists outside of the construction ROW and is contained within a compact layer of fill. Gravel was scraped away from the iron walls to better expose the feature. The exposed segments of the iron wall measure approximately 10 cm thick. Although little of the feature is exposed on the ground surface, it should be similar in scale to Feature 1 (No. 3 Furnace). This area of the parking lot has a thicker layer of fill than the area surrounding Feature 1; therefore, the majority of the furnace remnants are covered by fill.

Function/Historical Context: Based on Sanborn maps, Feature 5 is the remains of the No. 4 Furnace, which was the northernmost furnace at the facility. The 1888, 1891, 1902, 1911, and 1951 Sanborn maps depict the No. 4 Furnace and casting shed in the same location throughout its history. The dimensions of the original No. 4 Furnace are reported to have measured 22.3 m (73 ft) tall and 5.2 m (17 ft) wide (Phillips 1912). The No. 3 Furnace was rebuilt in 1901 and again in 1909. The 1909 rebuild replaced the hearth jacket and tuyere jacket (WRC Smith Publishing Company 1909). The furnace was either replaced or rebuilt again during the 1919-1924 upgrades and was reported to measure 24.4 m (80.1 ft) tall by 3.7 m (12.2 ft) wide at the hearth, and 5.2 m (17.11 ft) at the bosh. Although Feature 5 measures slightly larger than these measurements, it could be because the furnace was rebuilt again at a later date. It is undetermined if the furnace was rebuilt in the same position each time; however, the furnace is always aligned at the eastern end of the casting shed, which appears to remain in the same position throughout history.

Feature 6

UTM Coordinates (Approximate Center): 16S 517539E 3711919N

Location: ±11.7 m south of southern edge of ROW

Dimensions: 4.0 m long by 3.75 m wide (at ground surface)

General Description: Feature 6 (Figure 64) is a poured concrete and brick foundation that is exposed at the ground surface, which is located outside of the project ROW. The entire foundation could not be uncovered because of overlying fill and material (light poles, rebar, etc.). The foundation likely extends further to the south and east. This feature is positioned approximately 12.0 m to the east of Feature 5 (No. 4 Furnace) and is a few meters to the west of where the stock trestle once existed.

Function/Historical Context: The function of Feature 6 is undetermined. It sits in an area where the skip hoist, skip hoist engine house, and dust catcher would have existed. It could be a foundation associated with one of these structures; however, it could have served another function.

Feature 7

UTM Coordinates (Approximate Center): 16S 517531E 3711927N

Location: <1.0 m south of southern edge of ROW

Dimensions: 6.4 m in diameter (at ground surface)

East View

North View

Remnant of Furnace Visible at the Surface

Figure 63. Feature 5, Remains of the No. 4 Furnace.

South-Southeast View

East-Northeast View

Figure 64. Feature 6, Undetermined Function.

General Description: Feature 7 (Figure 65) is a circular, poured concrete foundation that is exposed at the ground surface. It is situated outside of the ROW. The entire foundation was not uncovered because it was partially obscured by fill and a broken vehicle trailer that could not be moved. The eastern, northern, and southern edges of the feature were exposed, showing the feature is circular in shape, and is nearly identical to Features 8, 10, 11, and 12. There are four lines of circles impressed into the center of the poured concrete foundation, which suggests that something was bolted to the foundation. Although no brickwork was observed within this feature, bricks may exist below the poured concrete, as it was observed with the adjacent circular features.

Function/Historical Context: Features 7, 8, 10, 11, and 12 are the foundation remains for the blast stoves. Feature 7 is the first (southernmost) stove foundation in a line of five, which were associated with the No. 4 Furnace (Feature 5). Feature 7 appears to be associated with a stove shown on the 1911 Sanborn map, but none on earlier Sanborn maps. Although it does not correlate to any stoves shown on the 1951 Sanborn map, this may be an error because there are five stoves shown on

Figure 65. Feature 7, Blast Stove Platform.

the 1956 aerial and 1964 photographs. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is possible that an underground flue could have extended along the backside (east) of the stoves.

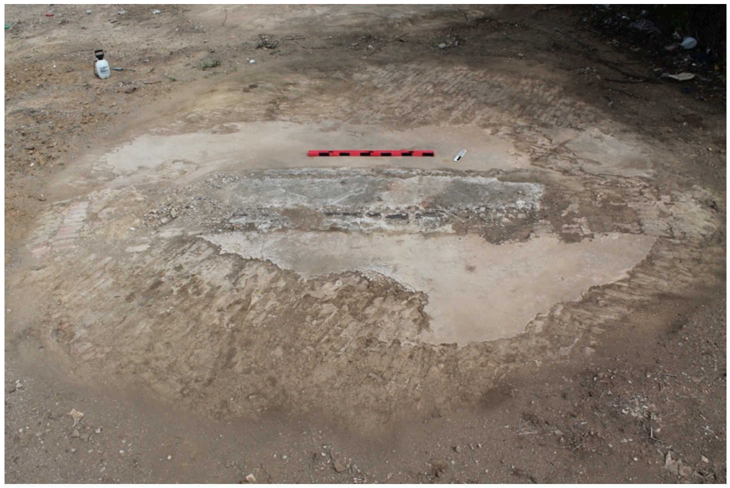
Feature 8

UTM Coordinates (Approximate Center): 16S 517528E 3711933N

Location: within the project ROW

Dimensions: 6.6 m in diameter (at ground surface)

General Description: At the onset of the fieldwork, this feature was originally identified as two separate features (8 and 9). Upon removing debris from the area and skimming/sweeping a shallow overburden (approximately 1-3 cm of soil and gravel), it was determined that they were part of the same feature; therefore, this is designated as Feature 8, and 9 was discarded. Feature 8 (Figure 66) is a circular, brick and poured concrete foundation that is exposed at the ground surface. The shape and size of the feature is nearly identical to Features 7, 10, 11, and 12. The base of the foundation is made of brick. A thin layer of poured concrete covers the center of the foundation. The poured concrete is chipping away, which makes it difficult to determine if the poured concrete once covered the entire brick foundation. Metal rivets and a long piece of metal are visible beneath the poured concrete, in an area measuring approximately 4.3 m long by 1 m wide, which suggests that something was bolted to the foundation.



North-Northwest View

North-Northwest View with Other Stove Features in Background

North-Northwest View of the Center of the Platform Where the Stove was Anchored

Figure 66. Feature 8, Blast Stove Platform.

Function/Historical Context: Features 7, 8, 10, 11, and 12 are the foundation remains for the blast stoves. Feature 8 is the second stove foundation in a line of five, which were associated with the No. 4 Furnace (Feature 5). Feature 8 appears to be associated with a stove shown on the 1911 Sanborn map, but not on earlier Sanborn maps. It also correlates to a stove shown on the 1951 Sanborn map. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is possible that an underground flue could have extended along the backside (east) of the stoves.

<u>Feature 10</u>

UTM Coordinates (Approximate Center): 16S 517526E 3711941N

Location: within the project ROW

Dimensions: 6.7 m in diameter (at ground surface)

General Description: Feature 10 (Figure 67) is a circular, brick and poured concrete foundation that is exposed at the ground surface. The shape and size of the feature is nearly identical to Features 7, 8, 11, and 12. The base of the foundation is made of brick. A thin layer of poured concrete covers portions of the foundation's center; however, the poured concrete is chipping away, which makes it difficult to determine if the poured concrete once covered the entire brick foundation. A small, square brick platform is connected to the northeastern edge of the circular feature, which measures approximately 1.6 m wide by 1.55 m long. Some of the Feature 10 bricks have manufacturer stamps. Stamps identified on bricks include: "Imperial Steel," "Solid Crown," and "R. Jenkins," which were brands of fire brick produced by brick factories owned by the Harbinson-Walker Refractories Company that was established in 1902 (Cottrell 2016); and "Ensley" brick, which was locally made by the Ensley Brick Company that was established in Ensley, Alabama in 1898 (Alabama Secretary of State 2016, Entity I.D. Number 739-992).

Function/Historical Context: Features 7, 8, 10, 11, and 12 are the foundation remains for the blast stoves. Feature 10 is the third stove foundation in a line of five, which were associated with the No. 4 Furnace (Feature 5). Feature 10 does not appear to be associated with any stoves shown on the 1888, 1891, 1902, or 1911 Sanborn maps; however, it is associated with a stove shown on the 1951 Sanborn map. This stove may have been added to the facility before or during the 1919-1924 upgrades. The small, square platform connected to the northeastern edge of the stove platform is likely associated with the stove's exhaust stack. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is possible that an underground flue could have extended along the backside (east) of the stoves.

Cleaning off the Feature, North-North View

Small Brick Platform Attached to the Northern Edge of the Stove Platform

Detail of the Stove Platform Brick

Figure 67. Feature 10, Blast Stove Platform.

<u>Feature 11</u>

UTM Coordinates (Approximate Center): 16S 517524E 3711949N

Location: within the project ROW

Dimensions: 6.75 m in diameter (at ground surface)

General Description: Feature 11 (Figure 68) is a circular, brick and poured concrete foundation that is exposed at the ground surface. The shape and size of the feature is nearly identical to Features 7, 8, 10, and 12. The base of the foundation is made of brick, a small area of which is exposed on the southwestern edge of the feature. The majority of the feature is covered in a thin layer of poured concrete. A small, rectangular poured concrete platform is connected to the northeastern edge of the circular feature, which measures approximately 1.5 m wide by 2.0 m long. Some of the Feature 11 bricks have manufacturer stamps. Stamps identified on the bricks include "Franklin Crown" and "Anglo Saxon," which were brands of fire brick produced by brick factories owned by the Harbinson-Walker Refractories Company that was established in 1902 (Cottrell 2016).

Function/Historical Context: Features 7, 8, 10, 11, and 12 are the foundation remains for the blast stoves. Feature 11 is the fourth stove foundation in a line of five, which were associated with the No. 4 Furnace (Feature 5). Feature 11 does not appear to be associated with any stoves shown on the 1888, 1891, 1902, or 1911 Sanborn maps; however, it is associated with a stove shown on the 1951 Sanborn map. This stove may have been added to the facility before or during the 1919-1924 upgrades. The small, rectangular platform connected to the northeastern edge of the stove platform is likely associated with the stove's exhaust stack. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is possible that an underground flue could have extended along the backside (east) of the stoves.

<u>Feature 12</u>

UTM Coordinates (Approximate Center): 16S 517524E 3711949N

Location: within the project ROW

Dimensions: 6.9 m in diameter (at ground surface)

General Description: Feature 12 (Figure 69) is a circular poured concrete foundation that is exposed at the ground surface. The shape and size of the feature is nearly identical to Features 7, 8, 10, and 11; however, unlike the other circular features, Feature 11 appears to be composed entirely of poured concrete. No underlying brick foundation was identified. Soil on the northern edge of the feature was removed to determine if underlying brick existed, which revealed the poured concrete platform to measure approximately 32 cm in thickness.

North-Northeast View

Detail of Brick, North-Northeast View

Small Concrete Platform Attached to the Northern Edge of the Stove Platform

Figure 68. Feature 11, Blast Stove Platform.

North View

Profile of the Concrete Platform, South-Southwest View

South-Southeast View of Feature 12 and Other Stove Platforms

Figure 69. Feature 12, Blast Stove Platform.

Function/Historical Context: Features 7, 8, 10, 11, and 12 are the foundation remains for the blast stoves. Feature 11 is the fifth (northernmost) stove foundation in a line of five, which were associated with the No. 4 Furnace (Feature 5). Feature 11 does not appear to be associated with any stoves shown on the 1888, 1891, 1902, or 1911 Sanborn maps; however, it is associated with a stove shown on the 1951 Sanborn map. It is interesting to note that it is the northernmost stove foundation, and the only one that is constructed solely of poured concrete. This may suggest that this is the latest stove foundation, and may have been added to the facility during or after the 1919-1924 upgrades. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is possible that an underground flue could have extended along the backside (east) of the stoves.

Feature 13

UTM Coordinates (Approximate Center): 16S 517519E 3711962N

Location: within the project ROW

Dimensions: 4.35 m wide by 7.9 m long (at ground surface)

General Description: Feature 13 (Figure 70) is a rectangular, poured concrete foundation that was partially exposed at the ground surface to the north of Feature 12. Overlying fill was skimmed from the surface to fully expose the feature. The edges and surface of the concrete foundation are very rough, which may be a result of aging and/or their haphazard construction. The northern and eastern edges of the foundation are bordered by fencelines, but their edges were exposed below the fill to make certain that the foundation did not extend further beyond the fences. The southern edge of the feature abuts the northern edge of Feature 12; however, it sits at a slightly lower elevation than the adjacent feature. In fact, the top surface of Feature 13 sits at the same elevation as the bottom of Feature 12, which is 32 cm thick. It is also notable that three metal objects were found in the shallow overburden laying atop the feature, including a narrow metal pipe (<10 cm in diameter) that extended into the surrounding soil, a possible fragment of an industrial rail (<30 cm in length), and an identified object. The later two objects were very heavy, and the pipe was buried and could not be removed; therefore, they were not collected. Photographs were taken of the metal objects (Figure 70). It is undetermined if they are associated with the historical industrial use of the site, or if they are the result of modern trash dumping, which is abundant across the site.

Function/Historical Context: The function of Feature 13 is undetermined. It sits on the northern edge of the facility, immediately north of the northernmost stove foundation that likely dates during or after the 1919-1924 upgrades. Feature 13 may date to the same time period. Although small, ancillary buildings are shown in this general area on the 1911 and 1951 Sanborn maps, none of those structures correspond to the size and/or location of this foundation. However, the 1964 flyover photographs (Figures 28-31) of the facility do show a small, ancillary building in this location. It appears that Feature 13 corresponds to that small structure. Regardless, its function is still undetermined.

East View

West View

Metal Objects Found in the Overburden Laying Atop the Concrete Foundation

Figure 70. Feature 70, Undetermined Function (Possibly Associated with an Ancillary Building).

Feature 14

UTM Coordinates (Approximate Center): 16S 517469E 3711883N

Location: ±20 m south of southern edge of ROW

Dimensions: 3.2 m in diameter by 1.0 m in height

General Description: Feature 14 (Figure 71) is a circular, poured concrete foundation that sits a considerable distance from the other structural features. The feature is located approximately 59 m to the west-southwest of Feature 5 (No. 4 Furnace). The foundation measures 3.2 m in diameter and is 1.0 m in height above the ground surface. The interior of the foundation is segmented into three sections, which are filled with soil and debris. There is an opening into the interior segment of the feature, on the southern side of the foundation, which could have supported something like a drain, pipe, mechanical device, or served some other function. It appears that the poured concrete foundation was once lined with brick on its top, as brick still survives in a portion of the foundation.

Function/Historical Context: Feature 14 sits a considerable distance from the remains of the furnaces, stoves, and other features. It does not correspond to any structures shown on the 1888, 1891, 1911, or 1951 Sanborn maps; however, the 1941 and 1954 aerials, and 1964 flyover photographs indicate that Feature 14 exists in an area that would have housed the automatic pig caster, which was attached to the south side of Casting Shed No. 4. The original facility used the large, sand casting sheds to pour the molten iron into pig molds, which was a laborious and time-consuming process. The facilities were eventually upgraded to utilize a ladle car and automatic pig caster in place of the casting sheds, and were likely installed in the 1930s. The pig-casting machine not only reduced the workforce at the furnaces, but also increased the speed that pigs could be produced. The process would have started with molten iron being poured into a 125-ton ladle machine, which would have been positioned between the casting sheds. Molten iron was poured from the ladle machine into a conveyor belt of individual pig molds. The filled molds would travel up the inclined conveyor belt, while water was sprayed onto the molds to cool and solidify the iron. When the molds reached the top of the incline, the cooled pigs were shaken loosen and dumped into waiting railcars sitting below the conveyor belt. Feature 14 appears to have been located halfway along the automatic pig-casting shed, although its function is undetermined. However, it also exists in an area where a small square for a scale is drawn on the 1902 Sanborn map. Based on its shape, it unlikely to have been associated with the scale.

Feature 15

UTM Coordinates (Approximate Center): 16S 517557E 3711850N

Location: ±81 m south of southern edge of ROW

Dimensions: 5.65 m in diameter (at ground surface)

North-Northwest View

Southeast View

South-Southwest View

Figure 71. Feature 17, Undetermined Function (Possibly Associated with Pig-Casting Machine Shed).

General Description: Feature 15 (Figure 72) is exposed at the ground surface and includes a circular, poured concrete foundation that is bordered on one side by two granite foundation blocks. It is situated well outside of the project ROW on the southern edge of the Sanitation Department's lot. The circular foundation is positioned approximately 23 m to the southeast of Feature 1 (No. 3 Furnace). The feature was difficult to identify, as it is largely obscured by fill, gravel, and debris. No brickwork was observed within the circular feature; however, it is possible that bricks may exist below the poured concrete. The granite blocks border the north side of the circular feature. Based on their position and dimensions, they may be the remnants of a foundation, or the edge of a sidewalk or platform.

Function/Historical Context: The circular feature appears to be the foundation remains for a blast stove. Feature 15 is the only identifiable stove foundation associated with the No. 3 Furnace (Feature 1), which is shown on all of the Sanborn maps (1888, 1891, 1902, 1911 and 1951). The stoves associated with the No. 3 Furnace were lined to the north and south of the furnace. Feature 15 represents the southernmost stove at the facility. The stoves provided a regenerative heat exchange to the furnace. Historic photographs indicate that the early stoves included eight 3-pass Gordon Whitwell Cowper stoves, which had a chimney pipe extending upward from the top of the silo-shaped stove. The 1964 photographs show more modern stoves, consisting of ten 2-pass stoves with side exhaust stacks. Historic photographs also indicate that much of the flue work between the stoves and furnace was above ground; however, it is also possible that an underground flue could have extended to the stove. It is undetermined if the granite blocks bordering the north side of the circular feature are associated. They could simply represent the edge of a sidewalk or platform.

<u>Feature 16</u>

UTM Coordinates (Approximate Center): 16S 517538E 3711927N

Location: ±3 m south of southern edge of ROW

Dimensions: 3.4 m long by 3.4 m wide by 0.83 m tall (maximum height above ground level)

General Description: Feature 16 (Figure 73) is a square-shaped, poured concrete foundation with beveled edges that sits to the north of Feature 7 (stove platform) and south of Feature 17. This feature is positioned approximately 15 m to the northeast of Feature 5 (No. 4 Furnace). The top of the foundation is covered in fill and debris. At the beginning of fieldwork, the feature was positioned within a fenced storage yard that could not be accessed. The fence surrounding the storage yard was removed within the last two weeks of fieldwork when the light poles were being removed from the project area. The feature was photographed and measured while city crews were removing the light poles. Only the western facade of Feature 16 was fully exposed, while the northern and southern facades were partially covered in fill. The eastern façade was entirely covered in fill. Iron bolts are anchored into the top of the foundation, which indicates that some sort of mechanical equipment was mounted atop of the foundation.

South View (Stove Platform is Difficult to Discern Beneath the Refuse and Spoil)

Figure 72. Feature 15, Stove Platform and Adjacent Foundation Stone or Curb Stone.

Function/Historical Context: Feature 16 appears to have been a foundation where mechanical equipment was mounted. The feature does not appear to be associated with any structures shown on the 1888, 1891, 1902, or 1911 Sanborn maps; however, it could be associated with an engine hoist depicted on the 1951 Sanborn map, which would have been associated with the nearby skip hoist associated with the No. 4 Furnace (Feature 50). But the 1964 photographs of the facility show the gas cleaning system for the No. 4 Furnace sitting between one of the stoves (Feature 7) and the stock trestle. Based on this photograph, Feature 16 is likely the foundation for the gas cleaning system. The gas cleaning system was connected to the furnace and the stoves, and is part of the regenerative heat exchange to the furnace. As iron ore melted and collected at the base of the furnace, gas would leave through the top of the furnace, flow through the gas cleaning system, and then flow into the stoves.

<u>Feature 17</u>

UTM Coordinates (Approximate Center): 16S 517535E 3711943N

Location: within project ROW

Dimensions: maximum 25.5 m long by 4.12 m wide by >3.0 m tall (height above ground surface)

General Description: Feature 17 (Figures 74-75) is a long, rectangular-shaped poured concrete foundation. The feature runs parallel to the nearby stove foundations (Features 7, 8, 10, 11, 12), and sits approximately 3.8 m to their east. This feature was originally contained within the fenced storage yard and was barely visible below a massive pile of streetlight poles. A crew from the City of Birmingham removed more than 100 poles from the project area, which were essentially concealing the poured concrete feature. Once the poles were removed from the project during the last two weeks of fieldwork, the feature could be photographed and measured. The walls of the poured concrete feature had been partially removed when the facility was dismantled in the 1960s. While the feature was originally thought to include two separate walls, removing the light poles revealed that it is part of one large feature.

East-Southeast View Before the Fence was Removed

South-Southeast View After the Fence was Removed

West-Southwest View

Figure 73. Feature 16, Suspected Foundation for the Gas Cleaning System Equipment. Notice the Amount of Fill on the West Side of the Feature.

East View Towards the Western Facade

North View from the Southwestern Edge of the Feature

South-Southeast View from the Northern Edge of the Feature

Figure 74. Feature 17, Bin/Walls Bordering the Stock Trestle.

South View of the Eastern Wall from the Northwestern Edge of the Feature

North View of the Eastern Wall from the Southwestern Edge of the Feature

West View of Lighting Equipment Hanging on the Eastern Wall

Figure 75. Feature 17, Bin/Walls Bordering the Stock Trestle.

The feature is constructed of poured concrete and reinforced with rebar. The east wall measures approximately 25.5 m long and is approximately 25 cm thick (although the base of the wall may be thicker). The maximum height of the wall measures approximately 3.0 m tall on the inside of the feature, but only 2.1 m on its exterior. The west wall is shorter in length and height, measuring approximately 21.25 m long, at least 1.7 m tall, and approximately 21 cm thick. The top of this wall has molded holes, which suggest something was mounted to the top of the wall. The surface within the feature is somewhat loose and very uneven, and appears to have been filled; therefore, it is undetermined what the actual height of the walls measure. The walls could extend much deeper beneath the fill. A poured concrete support, measuring approximately 3.9 m long, exits near the southern end of the feature, which supports the east wall and connects to the west wall. A rectangular opening, measuring 1.83 cm long by 0.31 m wide, is found near the base of the support, and an iron grate that fits inside the opening had fallen to the ground near the support. The northern wall of the structure no longer exists, but the corners of the east and west walls indicate that they were once connected. It is possible the connecting wall would have been a support similar to the one on the south side of the feature.

Metal equipment is hanging from the top of the east wall, which appears to be *in situ*. The metal equipment includes rails lining the wall, plastic power boxes sitting atop the wall, and four poles that extend down the side of the exterior wall. One of the poles has a light attached to the bottom (near the ground surface), and the other three poles appear to have had similar equipment. Although the lights currently sit near the surface of the ground, it appears that they would have light something beneath the surface. The soil surrounding the exterior wall has an undulating surface, suggesting that the area has been filled. It is also notable that similar lighting equipment was identified on the surface of the storage yard. While the majority of light poles in the storage yard are obviously of modern origin, and are long streetlight poles that have been pulled from streets of Birmingham, the smaller lighting equipment attached to the wall and stored nearby appears to have been associated with the furnace facilities.

Function/Historical Context: Feature 17 may be associated with the stock trestle and stock bins that lined the east side of the furnaces and stoves; however, it could also be a storage bin for something like coal that bordered the west side of the stock trestle. Regardless of its specific function, it almost certainly lined the edge of the stock trestle. The stock trestles existed in the same area throughout the history of the facility. The 1888, 1891, 1902, and 1911 Sanborn maps depict a large stock house over the stock trestles, which was framed with wooden posts and clad in corrugated metal. While the stock trestles are still present on the 1951 Sanborn map, the stock house is no longer present. The 1941 and 1956 aerial photographs depict a dark, narrow, linear shadow where the trestle and storage bins would have existed. The 1964 photographs show the stock trestles, which are bound by the facility to the west and stocks piles of materials to the east. The stock bins held the raw materials that were to be loaded into the furnaces, i.e. iron ore, coke, and limestone/dolomite. The railcars would transport the materials near the furnaces and dump the materials into the stock bins beneath the railroad trestle. Prior to the 1919-1924 upgrades of the facility, the materials would have been loaded by hand into buggies, which were then taken to the top of the furnaces by vertical elevators. When skip hoists replaced the elevators, the materials could be loaded into skip cars from near the stock bins. The loading area for materials to the elevators, and later the skip hoists, would have been in a subterranean pit or tunnel that would have been between the stock trestle and furnaces. At the City Furnaces, a long stock tunnel was installed beneath the stock bins during the late 1920s upgrade of that facility, which served both furnaces (No. 1 and No. 2). It is undetermined if a long stock tunnel exists beneath the stock bins at Site 1Je808, but it is likely. A GPR survey had been planned in this area to search for subterranean features, but the logistics of moving the light poles and other materials from the storage yard prevented such an investigation. However, the lighting equipment that was mounted to the east wall of Feature 17 (Figure 75), which appears to have lighted something below the surface, suggests that stock bins and/or a subterranean work area associated with the skip hoist existed beneath the railroad trestle.

Features and Structures to the South of the Study Area

A large piece of property exists to the south of the Birmingham Sanitation Department parking lot, which is privately owned and serves as a storage yard for large trucks/vehicles and concrete mixer tanks. The property is fenced and was not accessible during research; however, photographs were taken through the fence of the few historic structures that still exist. Three historic structures related to the SSSIC North Birmingham Furnaces still exist on this property, including the old machine and carpenter shop, the office/storeroom/laboratory, and an old commissary. Figure 53 shows the location of the structures. Although these structures exist outside of the parameters of the Phase II testing and research, these structures are related to the SSSIC facility and are the only intact vestiges of the industrial site. The historic structures were originally reported by Gregory Jeane (2006), and have already been reviewed by the ALDOT and SHPO.

The machine and carpenter shop building (Figure 76) is a large, L-shaped, metal-clad warehouse that was previously recorded by Gregory Jeane (Architectural Historian) in 2005 during a Phase I historic structures assessment of the Finley Boulevard Extension project (Jeane 2006). The structure is shown on the 1941 and 1951 aerials, as well as the 1951 Sanborn map. It is also shown on the 1902 and 1911 Sanborn maps, although it does not correlate in size; however, this may be a problem with the scale of the Sanborn maps (several of the auxiliary buildings do not appear accurate in scale). The structure is one of the few intact remnants of the old furnace site, and appears to date back to the early history of the site. The structure is in fairly good condition considering its age, and it still retains its historic fabric; however, its setting is no longer intact. The machine and carpenter shop building is considered eligible for the NRHP under Criterion A, its association with the SSSIC North Birmingham furnace, which made an important contribution to Birmingham's iron industry. The structure is positioned approximately 120 m (393.7 ft) to the south of the proposed ROW. The ALDOT has determined that the undertaking will have no effect on the historic structure, and the SHPO has concurred with those findings.

The office/storeroom/laboratory (Figure 76) also exists on the adjacent property. The structure is first shown on the 1951 Sanborn map, which denotes its multifunction and construction date of 1950. The structure is a long, one-story, side-gabled concrete block building with a metal roof, four steel cupola ventilators, and a shed metal roof on one side. There appear to be entrances at the center of each façade and steel-barred windows line each façade. The historic fabric of the exterior appears to be fairly well intact. With a construction date of 1950, the use of this structure by the SSSIC would have been very brief (only eight years); however, it does represent one of the final

Old SSSIC Machine and Carpentry Shop, South View

Old SSSIC Storeroom/Office/Laboratory, East-Southeast View

Old SSSIC Commissary on 27th Street North, Southeast View

Figure 76. Historic Standing Structures in the APE.

building episodes and upgrades at the facility. The office/storeroom/laboratory is considered eligible for the NRHP under Criterion A, its association with the SSSIC North Birmingham Furnaces, which made an important contribution to Birmingham's iron industry. The structure is positioned approximately 103 m (337.9 ft) to the south of the proposed ROW. The ALDOT has determined that the undertaking will have no effect on the historic structure, and the SHPO has concurred with those findings.

One other historic structure sits on the western edge of this property, but is outside of the fenced compound. The address of the structure is 2400 27th Street North, which is just south of the entrance road to the Birmingham Sanitation Department property. The one-story, brick structure (Figure 76) is the old company store for the SSSIC. The store is first shown on the 1941 aerial photograph. The 1951 Sanborn map denotes it as a store. *The EDR-City Directory Abstract* (EDR 2016) shows that the SSSIC Commissary occupied this address in 1925 and 1930; therefore, the commissary dates to at least the 1920s, if not earlier. Although the structure is in good condition, its historic fabric has been modified. Siding has been placed over portions of the front façade (covering the windows), the front entry way is boarded with plywood, a smaller door has been added to the side of the front façade, and a modern addition has been attached to the south façade of the structure. Based on these non-historic modifications, the structure is not considered eligible for NRHP nomination. The commissary exists approximately 120 m (393.7 ft) to the south of the proposed ROW. The undertaking will have no effect on the structure.

Sanborn maps, historic aerials, and photographs indicate that several other structures and facilities once existed on this property, including engine house, boilers, blacksmith, pump house, powerhouse, bath house, and water tanks. The 1941 and 1951 aerial photographs also indicate that a large sediment pond existed on the southern edge of this property, bordering Village Creek. This sediment pond was where the many gallons of water that were expelled from the furnace plant were drained. The structures that once existed on this property where dismantled in the mid 1960s, with the exception of the aforementioned standing structures. The foundation outlines for some of these structures are still visible on modern aerials (Figure 58), especially those associated with the engine house and powerhouse, which were constructed of brick; therefore, archaeological remains associated with the furnace facilities exist further to the south.

<u>Area to the East of the Railroad</u>

The project area was restricted to the site area that exists between 27th Street North and the Northfolk Southern Railroad tracks, which is where the primary facilities once existed. Although the eastern portion of the ROW on the east side of the railroad is included in the Site 1Je808 boundaries as defined by Nielson (2005), it is undetermined if any archaeological deposits actually exist in this area. Exploration of the ROW on this side of the railroad was not included in this testing project because River Bottom Pine, Inc. currently occupies the ROW (Figure 53), which is a custom floor and milling company. It is an active lumberyard. Sanborn maps, historic aerials, and the 1964 photographs depict several structures on east side of the railroad, variously including dwellings, an office, oil house, and laboratory at different times; however, most of these structures would have been to the south of the ROW. Only one dwelling is shown to exist in or near the ROW on the 1888, 1891, and 1902 Sanborn maps (Figures 10-12), as well as the 1941 aerial photograph. However, the 1906

USGS (1:62,500 Scale) Birmingham Coal District quadrangle (Figure 7) shows two lines of structures within or near the ROW. These structures are also shown on the photorevised versions of this quadrangle, dating to 1916 and 1934 (Figures 8-9), but these quadrangles do not appear to have been updated (based on the absence of facilities that are known to have existed), so it is undetermined if those quadrangles are reliable sources. But the original 1907 quadrangle should be reliable. The quality of the quadrangle is poor, especially when zoomed in close to the project area, and the accuracy of this quadrangle may have some issues.

The 1907 quadrangle (Figure 7) shows between six to eight structures in the vicinity of the ROW (east of the railroad), which could be associated with worker's housing. If privies, wells, or other intact features exist in this area of the ROW, they could yield significant information pertaining to the lives of the worker's that lived here. The SSSIC was renowned for building and owning large communities of worker's housing, which often housed poor African American families. The Sloss Quarters was an infamous collection of 48 houses that was constructed adjacent to the Sloss City furnaces and were designed specifically for African American workers. The Sloss Quarters were typically composed of shotgun-style structures, with two rooms set on foundation posts and no indoor plumbing. It is likely that similar communities existed near the SSSIC North Birmingham Furnaces. This collection of buildings may be one of those communities.

It is undetermined what, if any, archaeological deposits associated with those dwellings survive in the ROW. The area where they would have existed certainly has industrial impacts. According to Bill Turner (ALDOT Technical Section), testing of the soils has revealed very high levels of lead in this area of the project ROW (personal communication, November 7, 2016). Some of the tests revealed 2000+ ppm total lead. Clean up levels generally range from 400-800 ppm, so these readings are excessive. Excavations in this area would require archaeologists to wear hazmat suits and respirators; therefore, this area of the ROW will not be explored.

MAP OVERLAYS

A considerable amount of time was dedicated to overlaying the 1941 and 1956 aerial photographs, Sanborn maps (1888, 1891, 1902, 1911, and 1951), structural features recorded in the field, and GPR images into Google Earth. This was done to try to determine exactly where the facilities existed in relation to the project ROW and correlate features with specific structures. It also assisted in measuring the approximate size of some of the structures, especially the casting sheds. The early Sanborn maps, in particular, were difficult to overlay because they are not measured engineer's drawings; therefore, there is a certain margin of error in positioning and scaling the Sanborn maps. The structural features and three remaining buildings (machine shop, office/storeroom/laboratory, and store) were also overlaid atop the aerials and Sanborn maps. The structural remains correlate well with what is shown on the 1941 and 1956 aerials as well as the 1951 Sanborn map. Some of features also correlate with the earlier Sanborn maps.

The easiest images to overlay were the 1941 and 1956 aerial photographs (Figures 77-78). Many of the roads and other features in the surrounding area still correlate to the roads and features that exist today; therefore, the overlay of the 1941 and 1956 aerials should be very accurate. Based on

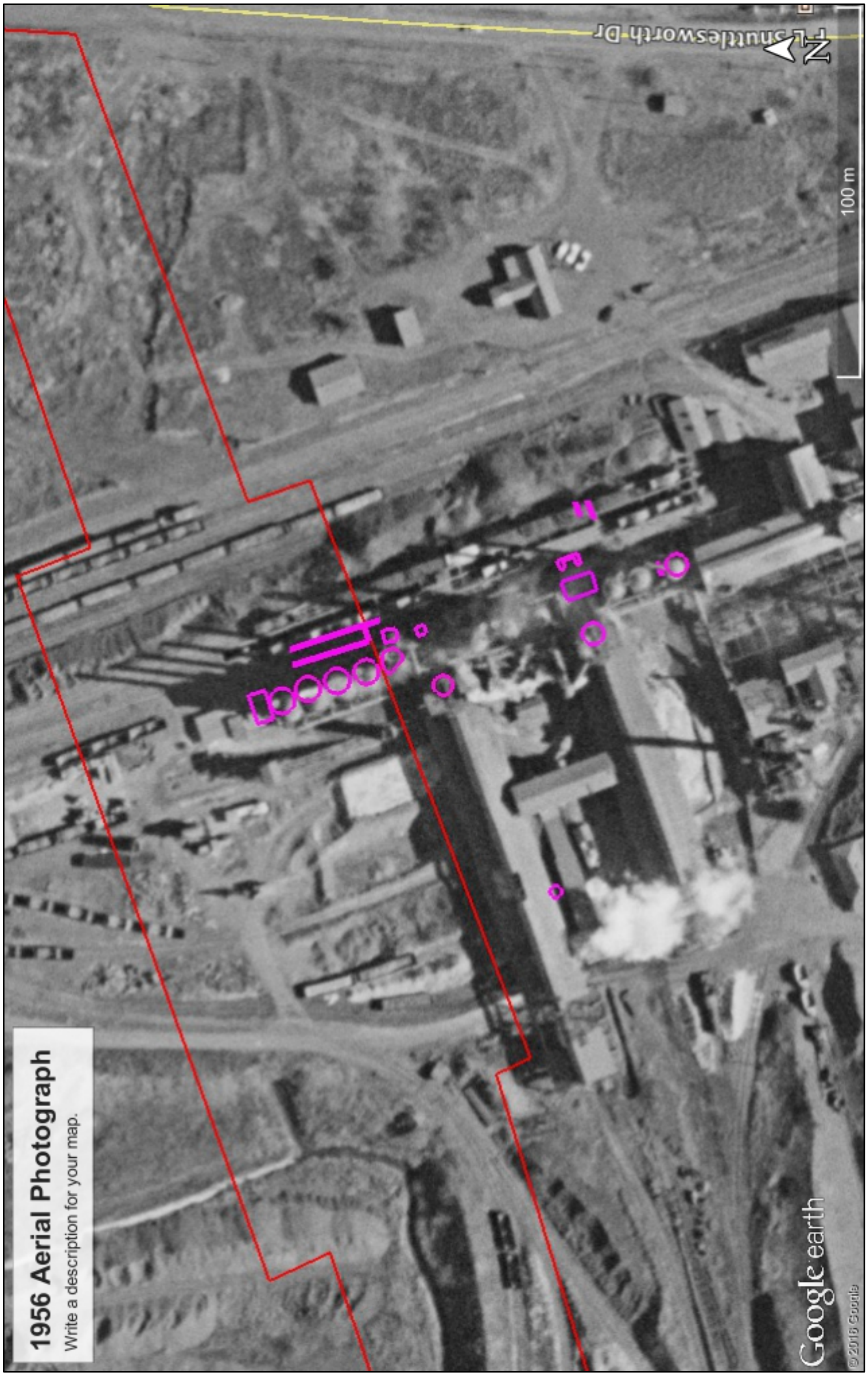


Figure 77. Project Corridor and Features Shown on the 1956 Aerial Photograph Overlay.

Figure 78. Project Corridor and Features Shown on the 1941 Aerial Photograph Overlay.

these aerial photographs, it is evident that the majority of the SSSIC North Birmingham facility existed outside and south of the project ROW. The only features present within the ROW included the northern bank of stoves associated with the No. 4 Furnace, the northern portion of the stock trestle and stock bins, as well as a few minor auxiliary structures. The majority of the ROW was occupied by the stockyards, containing slag or spoil piles and railroad tracks. All of the major facilities, including the furnaces, casting sheds, pig-machine casting shed, ladle shed, engine house, powerhouse, pump house, ovens (boilers) and machine shop, were positioned outside of the ROW. The casting sheds are very prominent features at the site. Casting Shed No. 3 measured approximately 91.4 m (300 ft) long by 15.2 m (50 ft) wide, and Casting Shed No. 4 measured approximately 113.4 m (370 ft) long by 15.2 m (50 ft) wide. The facility also had two parallel stock trestles that measured approximately 131 m (430 ft in) length. The stock trestles appear to have concrete stock bins below the trestle (represented by the dark, linear shadow), like those that survive at the Sloss Furnaces NHL. We suspect that a stock tunnel would have existed below the stock bins, like the one surviving at Sloss Furnaces NHL. The 1941 and 1956 aerials indicate that the stock bins and the possible stock tunnel were restricted to the area that is now occupied owned by the City of Birmingham. The shadow that represents the stock bins does not extend into the area that is now occupied by the grassed field, which appears to explain why the GPR did not identify any anomalies related to the stock bins in the field.

The 1951 Sanborn map (Figure 79) was overlaid atop the 1956 aerial, which is a better image than the 1941 aerial. This map proved more difficult to align. Although it is a well-drawn schematic, it is not drawn as a measured engineer's drawing. Several of the structures to the south and southwest of the casting sheds do not align properly, especially the buildings furthest to the southeast (i.e. bathhouse, office/storeroom/laboratory, and store). Nevertheless, the casting sheds, furnaces, stoves, and stock trestle align fairly well. One notable difference between the 1951 Sanborn and the 1956 aerial is Casting Shed No. 4 is shorter, measuring only 91.4 m (300 ft) in 1951, which is 21.3 m (70 ft) shorter than it is on the 1956 aerial. It is also notable that the 1951 Sanborn does not show the ladle shed and pig-casting machine shed between the casting sheds, even though they most certainly would have existed.

The earlier Sanborn maps were overlaid atop the 1951 Sanborn map in descending order, i.e. 1911, 1902, 1891, and 1888 (Figures 80-83). As noted earlier, it was difficult to align these maps, and there is some degree of error in their exact position and scale. The casting sheds and engine house were the best landmarks to focus on aligning. It is notable that the engine house was positioned in the same location throughout its history, although there were additions to the building. Regardless, the overlain Sanborn maps do provide a somewhat accurate portrayal of the position of the facilities during the early years of the plant. First, it appears that the majority of the facilities were positioned outside (south) of the project ROW, and the casting sheds and furnaces were always positioned in the same general location, possibly the same exact location. The casting sheds, furnaces, most of the stoves, ovens (boilers), and engine house existed south of the ROW. It is notable that casting sheds were much shorter than they were in 1951 and 1956, measuring approximately 48.8 m (160 ft) long. The stock house is shown to the south of the project ROW although the northern edge of the stock house could have extended into the southern portion of the ROW. Based on the Sanborn maps, the

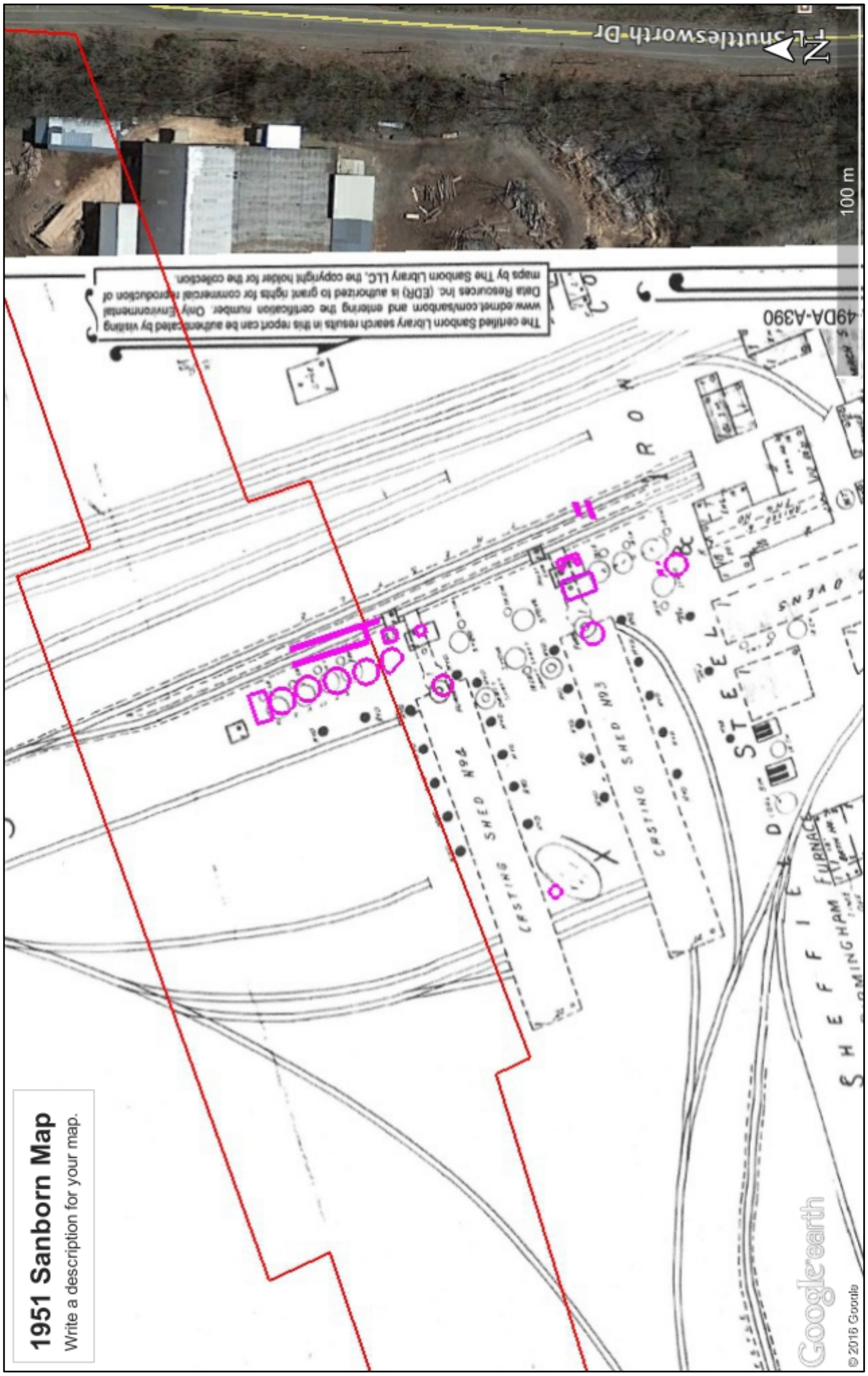


Figure 79. Project Corridor and Features Shown on the 1951 Sanborn Map Overlay.

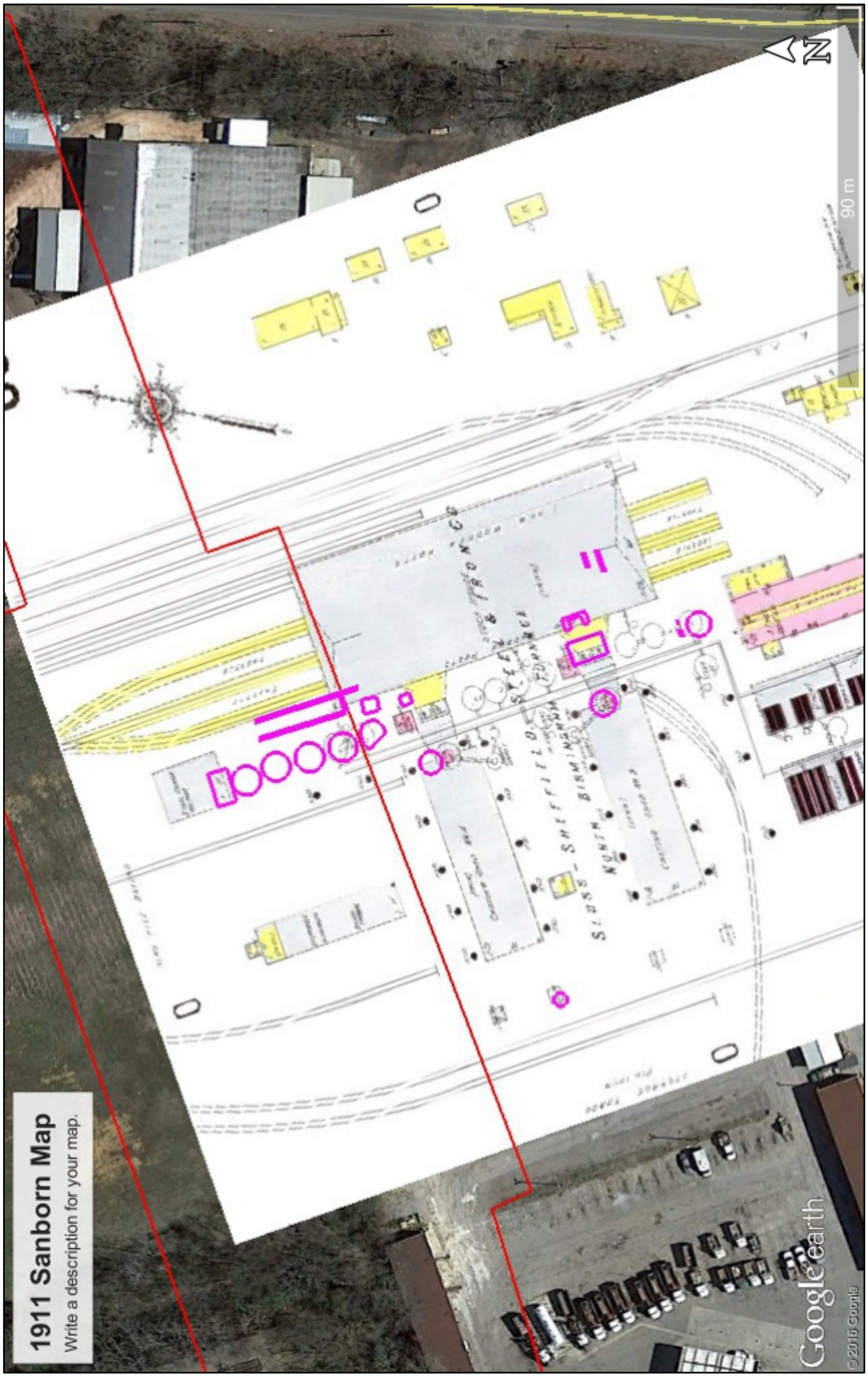


Figure 80. Project Corridor and Features Shown on the 1911 Sanborn Map Overlay.

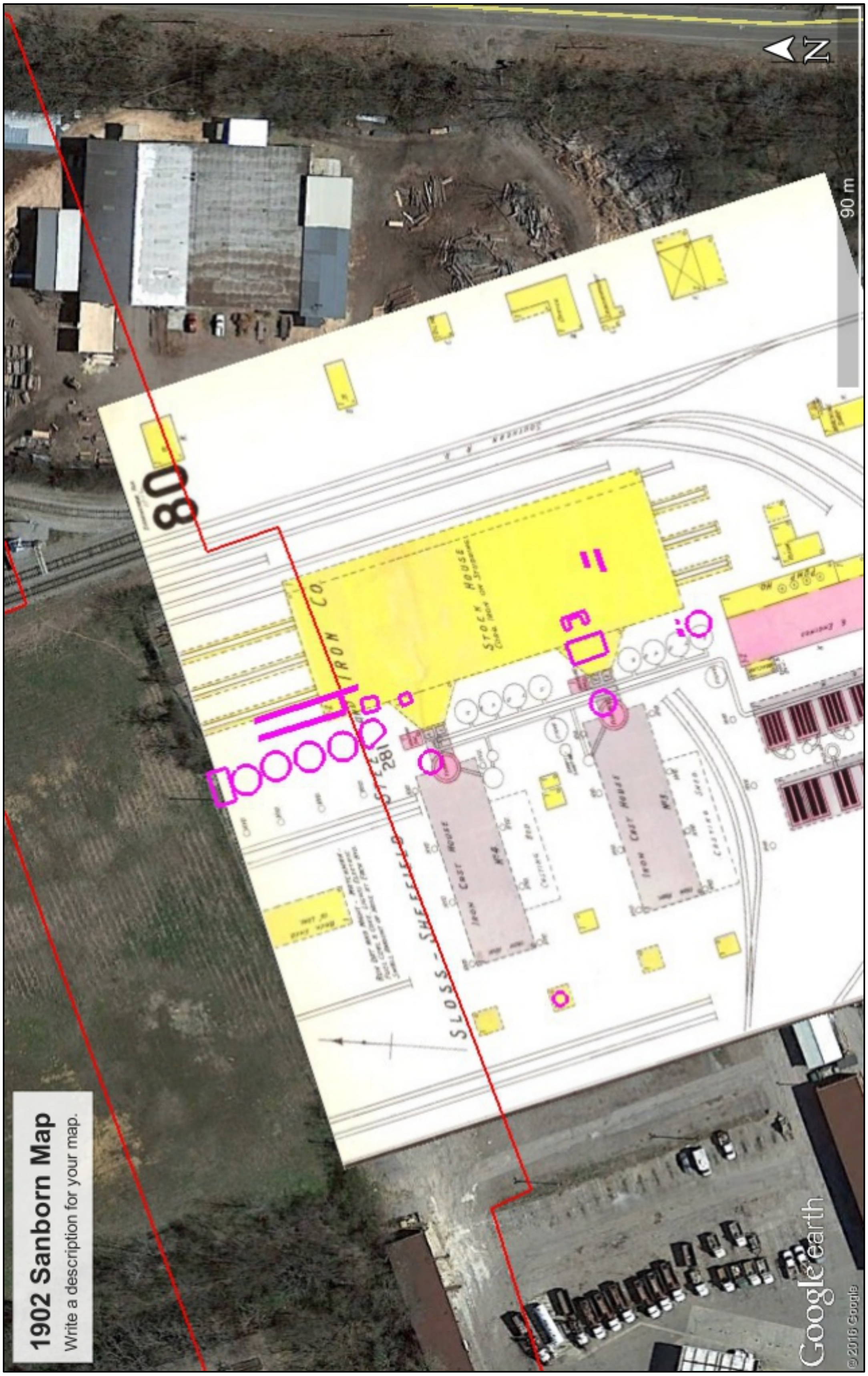


Figure 81. Project Corridor and Features Shown on the 1902 Sanborn Map Overlay.

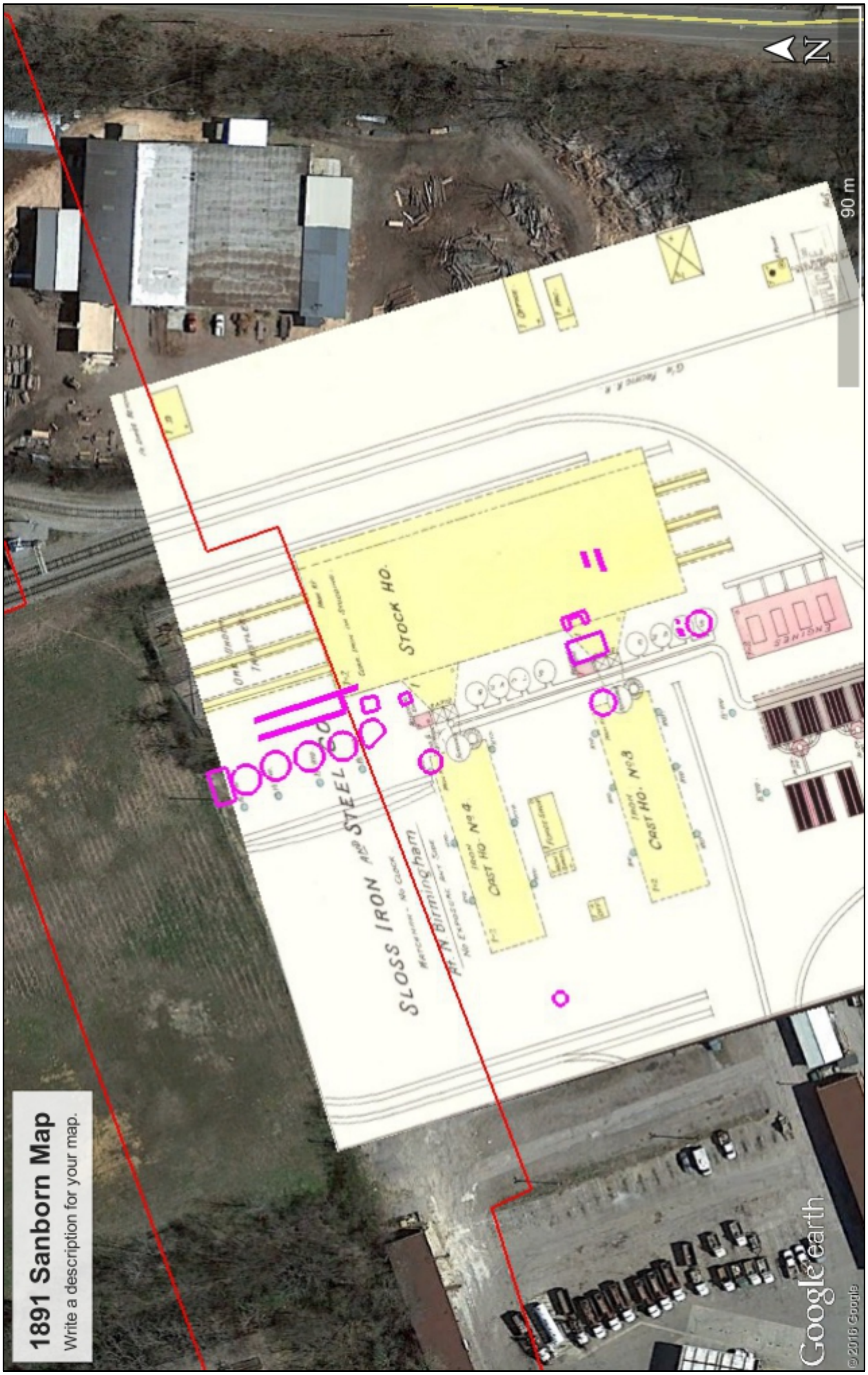


Figure 82. Project Corridor and Features Shown on the 1891 Sanborn Map Overlay.

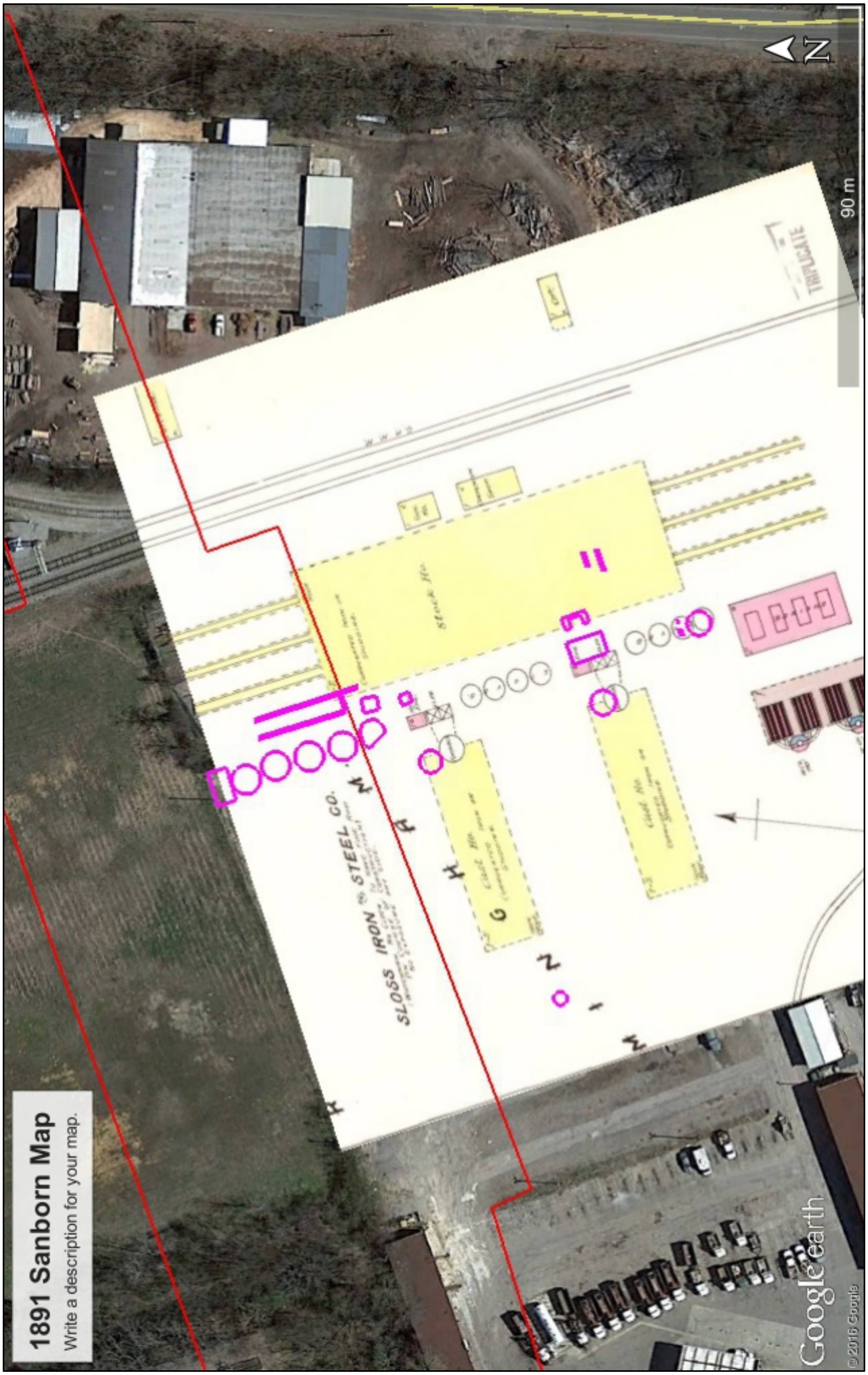


Figure 83. Project Corridor and Features Shown on the 1888 Sanborn Map Overlay.

stock house would have measured between 79.2-85.3 m (260-280 ft) in length and was approximately 33.5 m (110 ft) in width. Three, parallel stock trestles extended through the stock house. Few structures are shown to have existed within project ROW, although railroad tracks, stock trestles, and water hydrants existed in the ROW. The 1902 Sanborn shows one brick shed in the ROW, which probably was to store brick (not constructed of brick). The 1911 map shows this same shed, but notes it is of steel frame construction and for use as pig iron storage. The 1911 map shows one other shed in the ROW, as well as two stoves associated with the No. 4 Furnace. It is also notable that the 1888, 1891, and 1902 Sanborn maps show one dwelling near the ROW on the opposite (east) side of the Georgia Pacific/Southern Railroad.

All of the structural features recorded at Site 1Je808 appear to correlate with structures/facilities depicted on the 1951 Sanborn map and 1956 aerial. Some of the features may also correlate with structures/facilities depicted on the earlier Sanborn maps. Feature 1 and Feature 5 are the remains of the No. 3 and No. 4 furnaces. It is undetermined if these furnace remains only relate to the upgraded facilities depicted on the 1951 Sanborn and 1956 aerial, or if they also represent the earlier furnaces shown on the 1888, 1891, 1902, and 1911 Sanborn maps. The furnaces were rebuilt at least three times in their history (1901, 1909, and ca. 1919), and were probably rebuilt again in later years. SSSIC may have rebuilt the furnaces in the same exact positions, or they could have shifted them slightly. If they were shifted, they may have shifted them further to the east-northeast or west-southwest. Of course, it is also possible that they rebuilt the casting sheds in the 1920s. If they shifted the furnaces and casting sheds at any time, the remains of the earlier facilities could be contained beneath the gravel parking lot; however, they do not appear to have existed within the project ROW based on historical maps, nor were they identified during the GPR survey. A few other recorded features may be associated with structures shown on early Sanborn maps. Feature 7 and Feature 8 are stove platforms that are associated with stoves shown on the 1911 Sanborn maps, as well as the later maps and aerials. Feature 15 is also a stove platform that is shown on all of the early and late Sanborn maps. While it appears that Feature 13, a circular concrete foundation, may have been associated with the pig-casting machine shed that is shown on the 1941 and 1956 aerials, it also falls in the same location as a scale that is shown on the 1911 Sanborn. Based on its construction, it seems more likely that it is a later addition to the facility.

Finally, the GPR depth slice map provided by Schneider and Luepke (2005) was downloaded into Google Earth. The few anomalies that were identified in their report were compared to the Sanborn maps, and 1941 and 1956 aerial images to see if there were any correlations. None of the anomalies appear to correspond with any structures that are depicted on the historical maps or aerials. All indications suggest that no primary facilities existed in the project ROW.

SITE COMPARISONS AND NRHP ELIGIBILITY

It is fortunate that we have the preserved Sloss City furnace facilities to compare with the SSSIC North Birmingham Furnaces site (1Je808), which is just two miles away from the project area. The Sloss Furnaces site was added to the NRHP in 1974, added to the NHL in 1981, and then opened as a public museum in 1983 (Utz 2008). The Historic American Engineering Record (HAER) also

Figure 84. A Modern Aerial Photograph Showing the Sloss Furnaces NHL Site. Unlike the North Birmingham Furnaces, the Casting Sheds at Sloss Furnaces Parallel the Stock Trestle.

conducted a detailed survey of the facilities in 1976. The scaled drawings and photographs (HAER ALA, 37-BIRM, 4-) are available for download at the Library of Congress HABS/HAER/HALS Collection website (http://www.loc.gov/pictures/collection/hh/). Although the 1956 Sanborn map, 1941 and 1951 aerials, and 1964 photographs of the North Birmingham Furnaces (1Je808) indicate that the layout of the facilities is different from that of the Sloss Furnaces NHL site, the facilities are still very comparable in form. Figure 84 shows a current aerial photograph depicting the Sloss Furnaces. For almost every piece of equipment and structure that once existed at the North Birmingham site, a comparable piece of equipment or structure still survives today at the Sloss Furnaces site. The photographs in Figures 85-89 depict the existing facilities at Sloss Furnaces, which are virtually equivalent to what once existed at the North Birmingham Furnaces site.

The Sloss Furnaces site is the only twentieth-century merchant pig furnace site in the United States to be preserved and interpreted as a historic industrial site (Utz 2008). The furnace site was added to the NRHP for its significance in engineering and industry during the late 1800s and early-mid 1900s. It was placed on the NHL because it represents Alabama's preeminence during the early 1900s in the production of pig iron and cast iron, and it is an example of the post-Civil War effort to industrialize the agrarian South. Nothing remains above ground of the original furnace complex that was constructed in 1881; however, the archaeological remains of one of the original furnaces do still exist beneath the surface at Sloss. Based on early Sanborn maps (1899, 1891, 1902, 1911) of the Sloss Furnaces site, the original facilities were similar in layout to the North Birmingham Furnaces site (1Je808), having two parallel (north-south) casting sheds that were perpendicular to the stock trestles. The furnaces and casting sheds at Sloss were later rebuilt between 1927 and 1931, which is when the casting sheds were repositioned to run parallel (east-west) with the stock trestles, as they still exist today. While no buildings of the original furnace complex remain today, the oldest building at the Sloss Furnaces site dates to 1902, which houses the steam-driven blowing-engines (http://www.slossfurnaces.com). The engines date to 1900-1902 and are considered a unique and important collection, which represents the sort of engines that powered America's Industrial Revolution. The boilers at Sloss Furnaces were installed in 1906 and 1914, and produced steam for the operation until it closed. Sloss Furnaces underwent a concentrated program of mechanization between 1927 and 1931 (http://www.slossfurnaces.com). Most of its major operation equipment, especially the blast furnaces and the charging and casting machinery, was replaced during this time. In 1927-28, the two furnaces were rebuilt, enlarged, and equipped with mechanical charging equipment that doubled the plant's production capacity. Although the Sloss Furnaces site primarily reflects the changes that were made during the 1927-1931 upgrade, some of the technology is more modern, such as: a dehumidification plant that was constructed during World War II to reduce the consumption of coke; two-turbo blowers that replaced the old blowing engines in 1949 and 1951; and two slag granulators that were added in the late 1940s to process slag for use in structural poured concrete, mineral wool, and other products. The integrity of Sloss Furnaces, having so many of its buildings and equipment still intact, is a unique relic of Birmingham's industrial history. Sadly, the integrity of Site 1Je808 cannot compare to the Sloss Furnaces.

The historical context provided by Bergstresser earlier in the report demonstrates the shared histories of both the Sloss City and North Birmingham sites. While the furnaces have a shared history, they had their own unique paths and successes. It is interesting to note that the history of the Sloss City furnaces is well documented, and has been the focal point for those researching the history

General View of Sloss Furnaces

View Showing the Stock Trestle, No. 1 Furnace, Skip Hoist, and Casting Shed

View Showing the No. 2 Furnace, Gas Cleaning System, Blast Stoves, and Stock Trestle

Figure 85. Facilities at Sloss Furnaces.

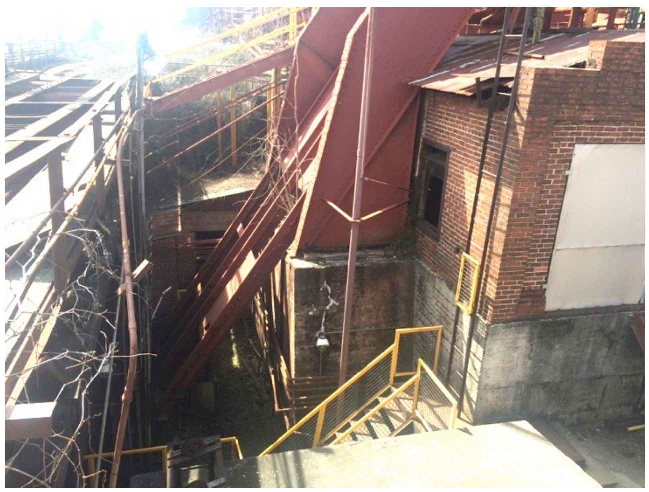
View of Blast Stoves

Interior View of the No. 1 Casting Shed

Exterior View of the No. 2 Casting Shed

Figure 86. Facilities at Sloss Furnaces.

Base of No. 1 Furnace



View of Skip Hoist Going Down into the Pit

Skip Hoist Engine House

Figure 87. Facilities at Sloss Furnaces.

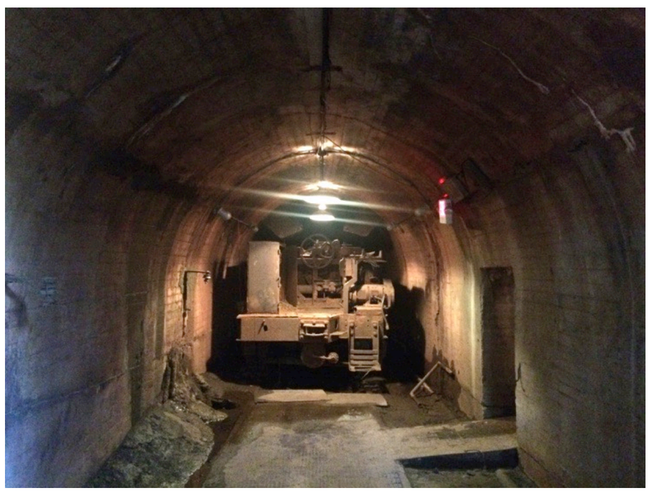
View Beneath the Stock Trestle

Stock Bins Beneath the Stock Trestle

Stock Bin

Figure 88. Stock Trestle and Stock Bins at Sloss Furnaces.

View of the Stock Tunnel at the Skip Hoist Pit



Scale Car in the Stock Tunnel

Chutes in the Tunnel Where Material from the Stock Bins Would Slide into the Scale Car

Figure 89. Stock Tunnel at Sloss Furnaces.

of the SSSIC; however, the North Birmingham Furnaces are but a footnote in their company history. There is little doubt that the history of the North Birmingham Furnaces is equally important. It played an important role in the success of the company between 1887 and 1958. Therefore, it makes sense to consider the NRHP eligibility of the North Birmingham Furnaces site (1Je808) for the same areas of significance. Site 1Je808 could also be considered historically significant as the embodiment of a distinctive regional type, i.e. an iron blast furnace site that is associated with a successful southern merchant.

NRHP Eligibility

The purpose of the Phase II testing and historical research was to determine if cultural deposits or structural remains exist at Site 1Je808 that would be considered eligible for nomination to the NRHP. As stated in the NHPA, "the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association." To be considered significant, a property must meet one or more of the four NRHP criteria:

A. *Be associated with events that have made a significant contribution to the broad patterns of our history; or*

B. *Be associated with the lives of persons significant in our past; or*

C. *Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*

D. *Have yielded, or may be likely to yield, information important in prehistory or history.*

Occasionally archaeological sites may qualify under Criteria A, B, or C; however, Criterion D is most often applied to archaeological sites. Criterion D can be very broadly applied, but to be eligible, the site must have the potential to yield important information about the prehistory or history of the area, region, state, or nation (U.S. Department of the Interior 1995). However, Site 1Je808 has a significant history that is comparable to that of the Sloss Furnaces site, which is listed on the NRHP and NHL. Therefore, Site 1Je808 was considered for NRHP eligibility under two criteria: 1) Criterion D, potential to yield significant data to the history of the region; and 2) Criterion A, associated with events that have made a significant contribution to the broad patterns of our history.

The Sloss Furnaces NHL site and museum were visited several times to help understand and interpret the structural remains surviving at Site 1Je808. Special attention was paid to the existing facilities at Sloss Furnaces that compare to the structural remains at Site 1Je808, especially the blast furnaces, casting sheds, stoves, stock trestles, stock bins, and stock tunnel. The first thing that is striking when comparing the two sites is what little remains of the North Birmingham Furnaces site (1Je808) as compared to the Sloss Furnaces NHL site. All of the major components of the North Birmingham facilities were dismantled in the mid-1960s. A walkover of the site clearly reveals that well over 90 percent of the superstructure of the once imposing array of furnaces, hot blast stoves, blowing engines and other components have been razed and hauled away. The only things that remain at the surface are some of the foundations associated with the facilities, most of which appear to date to the upgraded facility post-dating 1916. None of the significant industrial equipment and facilities survive at the site.

Historical Sanborn maps, aerials, and photographs indicate that the project ROW extended along the northern edge of the facility. The only facilities that appear to have existed within the ROW include: 1) four to five stoves, only two of which date to ca. 1911 and the others dating later; 2) the northern edge of the stock house during the early years (before the early 1930s); 3) the northern edge of the stock bins and stock tunnel (1930s); 4) a few small, auxiliary buildings at different times throughout history; 5) a slag granulator dating to late 1940s-1950s; 6) several water hydrants that probably had underground pipes; and 7) numerous railroad tracks and stock piles of materials throughout history. Although the northern end of the stock house is shown to extend into the ROW on the 1888, 1892, 1902 and 1911 Sanborn maps, the archaeological remains of this facility are not likely to have survived. The Sanborn maps indicate that the frame of the structure was constructed of wooden poles and the façade was covered in corrugated metal. The poles would have been removed when the facility was dismantled and replaced with the stock bins and stock tunnel. The adjacent railroad line to the west also expanded into this area. The auxiliary buildings that once existed in the ROW appear to have been temporary facilities, built with wooden or iron frames. These auxiliary structures were dismantled. Concrete slab foundations, like Feature 13, are likely all that would remain of these sorts of structures. The slag granulator seen in the 1964 photographs is an aboveground steel frame structure, similar to one that still exists at the Sloss Furnaces site. That structure would have been scrapped or sold to another facility.

One of the few things that could potentially survive at the site and within the ROW are the stock bins and stock tunnel that existed beneath the stock trestles, which bordered the east side of the facilities on the 1951 Sanborn map, and 1941 and 1956 aerial photographs. The stock bins and stock tunnel would have been associated with upgrades dating to the 1930s. These remains could survive within the project ROW buried beneath the gravel parking lot/storage yard owned by the Birmingham Sanitation Department (see Figure 53). Unfortunately, the GPR survey was unable to cover this area of the ROW because a large amount of equipment and light poles was stored in this area, which could not be removed until several months after the GPR survey was conducted. Although the stock bins and stock tunnel could survive within the fill, removing fill from these features would be very complicated, potentially dangerous, and the reward is estimated to be of limited value. These features are expected to be nearly identical to the stock bins and stock tunnel that exist at the Sloss Furnaces NHL site, and their condition would not be nearly as pristine.

One other question that remains looming after our investigation is whether the furnaces were ever repositioned during any of the upgrades. Although Sanborn maps and historical aerials indicate that the facilities were always located in the same general positions, it is likely that the furnaces were shifted slightly to rebuild them. If they had been shifted, the bases of those earlier furnaces could lay buried beneath the gravel parking lot. It is undetermined if the casting sheds were ever rebuilt at the North Birmingham Furnaces site (1Je808), like they were at the Sloss Furnaces NHL site. They may have been rebuilt during the 1919-1924 upgrades of the facility. The casting sheds were either rebuilt or added onto to increase their length. The sheds in the 1906 photograph are similar in construction to the ones shown in 1964 photographs, except for the length, of course. The No. 4 Furnace and casting shed is located closest to the ROW. If an earlier furnace or remnants of the original casting shed are positioned near the furnace base that survives at the surface (Feature 5), the GPR survey did not identify any anomalies that could be associated with an older furnace or shed. If older furnaces do exist at the site, they should be outside of the project ROW. It is notable that this research question has been explored by Bergstresser at the Sloss Furnaces NHL site, who found the original No. 2 Furnace below the surface near the existing furnace. While this question could be explored at the North Birmingham Furnaces (1Je808) site, the research value may be limited, especially compared to the value offered at the Sloss Furnaces site.

The archaeological features that survive at Site 1Je808 lack sufficient archaeological integrity. Because the facility was dismantled in the mid-1906s, less than 10 percent of the site is estimated to survive. The remains that do survive are generic in nature, rather than diagnostic. It is possible that some elements of the site have survived, such as remnants of the old sand casting floors, support piers for the casting sheds, flue work for the hot blast stoves, stock bins, and stock tunnel, but their capacity to yield significant information is questionable, especially as compared to the surviving features of the Sloss City furnaces, which is preserved as a NHL site. The archaeological features that may survive below the surface at Site 1Jeu808 are expected to be marginal as compared to Sloss Furnaces, and their recovery through excavation does not seem warranted. Referencing National Register Bulletin 36 (Little et al. 2000), for an archaeological site to be considered eligible under Criterion D, two basic requirements must be met: 1) the site must have, or have had, information that can contribute to our understanding of human history of any time period; and 2) the information must be considered important. The surviving archaeological remains at Site 1Je808 are generic and in poor condition. They do not compare to the structural remains and features that exist at the Sloss Furnaces NHL site, which are diagnostic for the time period and are very comparable to the facilities that once existed here. Sanborn maps, historic aerials, and historic photographs have provided more information about Site 1Je808 than any of the surviving structural features have provided. The structural remains certainly have confirmed what has been derived from existing historical documentation, but dismantling the site in the 1960s had a profound impact on the integrity of the site. Considering their limited research potential and poor integrity, the archaeological remains associated with the SSSIC North Birmingham facilities are recommended as not eligible for the NRHP under Criterion D.

Site 1Je808 has a significant history that is related to the Sloss Furnaces NHL site; therefore, the site was also considered under Criterion A, its association with events that have made a significant contribution to the broad patterns of our history. National Register Bulletin 36, entitled *Guidelines for Evaluating and Registering Archaeological Properties* (Little et al. 2000), was consulted to determine if Site 1Je808 was eligible under Criterion A. The guidelines state that the mere association with historic events or trends is not enough to qualify under Criterion A. The site's specific association also must be considered important. The historical context present earlier in the report demonstrates the site's association with specific significant events related to Birmingham's iron industry from the 1880s to 1950s. However, a site's integrity is also a factor in considering Criterion A. The site "must convey its historic significance through well-preserved features, artifacts, intra-site patterning in order to illustrate a specific event or pattern of events in history" (Little et al. 2000:22). The seven aspects/qualities of integrity should be applied to the site: location, design, setting, materials, workmanship, feeling, and association. Because the facilities were dismantled in the mid-1960s, little of the site survives today. The superstructure that includes the furnaces, stoves, skip hoists, engine house, boilers, etc. needs to present for an industrial site like this to have integrity. The archaeological features that survive today are only vaguely representative of what once existed here. The setting has been completely impacted, and the archaeological remains do not evoke a historic sense. The industrial construction elements no longer exist. Due to the poor integrity of the structural remains, Site 1Je808 is recommended as not eligible under Criterion A.

SUMMARY AND RECOMMENDATIONS

MRS Consultants, LLC was contracted by the ALDOT to conduct Phase II archaeological testing and historical research for the SSSIC North Birmingham Furnaces site in Jefferson County, Alabama. This site is recorded on the ASSF as Site 1Je808. A portion of the archaeological site is located in the proposed ROW of the proposed Finley Boulevard Extension, which will extend Finley Boulevard to the east from 26th Street North/U.S. Highway 31 in the North Birmingham community, across the Northfolk Southern Railroad, and connect to Shuttlesworth Drive in the Collegeville community. The project is associated with ALDOT Project HPP-1602(510) Jefferson County, which involves federal funding from the FHWA. Therefore, Section 106 of the NHPA applies to the project. Research for the project was overseen and undertaken by Jack Bergstresser (Principal Investigator) and Catherine C. Meyer (MRS Cultural Resource Specialist).

The SSSIC North Birmingham Furnaces site (1Je808) was originally recorded in 2005 by Jerry Neilsen (2005). The site is associated with the Sloss-Sheffield Steel & Iron Company, a renowned iron company that once operated in Birmingham. The North Birmingham Furnaces site operated between 1888 and 1958, and contained the company's No. 3 and No. 4 furnaces. The recorded site boundaries are large, encompassing approximately 26 acres, and were drawn by Nielsen to encompass all of the structures that once existed at the facility. The industrial site was dismantled in the mid-1960s; therefore, very little remains of the massive facilities that once existed here. The area addressed during this project was restricted to the site area within and immediately adjacent the project ROW that exists between 26th Street North and the Northfolk Southern Railroad.

The southern portion of the project ROW and APE exist within a gravel parking lot and storage yard utilized by the Birmingham Sanitation Department. The northern portion crosses through a grassed field, although it is reclaimed industrial land. Phase II research focused on the following tasks: 1) conduct background research on the industrial site and acquiring historical maps, aerials, and photographs; 2) conduct a Ground Penetrating Radar (GPR) survey within the project ROW to determine if subsurface archaeological features exist; 3) measure and photograph the visible structural features that are present within and adjacent to the project ROW; 4) conduct shovel testing within the grassed field to determine if any archaeological deposits are present; 5) draw a site plan map of the structural remains within and adjacent to the project ROW; 6) overlay historical maps, aerials, and the site plan map to recognize correlations; 7) estimate what archaeological features could exist beneath the surface within the project ROW; 8) photograph structures at the Sloss Furnaces NHL site to make comparisons; and 9) assess the NRHP eligibility of the SSSIC North Birmingham Furnaces site (1Je808) using NRHP criteria.

Field investigations recorded 16 structural features associated with the site. The majority of the features appear to be related to the later occupation of the site, post-dating 1916 and some post-dating 1930; however, a few features do date to an earlier time period. The GPR survey and shovel-testing program did not reveal any significant cultural deposits or subsurface features within the project ROW. Aerial photographs dating to the past several decades reveal a significant degree of disturbance has occurred within the project ROW since the industrial facility was dismantled. Considering the fact that the facility was dismantled in the mid 1960s, then underwent mechanical disturbances over the next few decades, and was bulldozed and filled within the past few years, it was concluded that none of the GPR anomalies or cultural materials recovered from shovel tests were associated with any intact structural remains or significant cultural deposits associated with the site. They are more likely to be associated with disturbances and/or filling activities that have occurred within the recent past.

Due to logistics, the area where the stock trestle, stock bins, and stock tunnels should exist could not be covered by the GPR survey. This area was filled with soil and gravel when the City acquired the property in the early 1980s. It is likely that these features remain intact, or partially intact, beneath the surface of the City's storage yard. In fact, the ground surface within Feature 17 and on its east side is loose, and small holes are abundant. One larger hole was noted within the project ROW where a concrete beam could be seen (Figure 90), which may be associated with the stock trestle and/or a stock bin. Figure 58 shows the corridor where these remains may exist. This is something that the engineering and construction companies working on this project need to know before they begin construction. Even if the stock bins and stock tunnels still exist here, they should be similar in construction to the ones that exist at the Sloss Furnaces NHL site (Figures 88-89); however, their integrity almost certainly could not compare.

Figure 90. Hole in the Project ROW Where Concrete Structural Remains are Visible Beneath the Fill. These May be Associated with the Stock Trestle and/or Stock Bins.

The archaeological features that survive at Site 1Je808 lack sufficient archaeological integrity. Less than 10 percent of the site is estimated to survive. While some elements of the site have survived, their capacity to yield significant information is questionable. The surviving archaeological remains are generic and in poor condition. They do not compare to the structural remains and features that exist at the Sloss Furnaces NHL site, which are diagnostic for the time period and are very comparable to the facilities that once existed here. Sanborn maps, historic aerials, and historic photographs have provided more information about Site 1Je808 than any of the surviving structural features have provided. The structural remains certainly have confirmed what has been derived from existing historical documentation, but dismantling the site in the 1960s had a profound impact on the integrity of the site. Considering their limited research potential and poor integrity, the archaeological remains associated with the SSSIC North Birmingham facilities are recommended as not eligible for the NRHP under Criterion D. Because the site has a significant historical context, the site was also considered under Criterion A; however, the site does not convey its historic significance through well-preserved features. The superstructure that includes the furnaces, stoves, skip hoists, engine house, boilers, etc. no longer exist. The setting has been completely impacted, and the archaeological remains do not evoke a historic sense. Due to the poor integrity, the industrial remains of Site 1Je808 are recommended as not eligible under Criterion A.

The Section 106 staff at the ALDOT, FHWA, and AHC should review the findings and recommendations of this project. All recommendations are contingent upon their approval.

All materials and documentation related to projects conducted by MRS Consultants will be periodically curated at a curational facility that meets Department of Interior 36 CFR Part 79 standards. Curation agreement attached.

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