

CAPE CANAVERAL AIR FORCE STATION,  
LAUNCH COMPLEX 39,

HAER NO. FL-8-11-S-3

SOLID ROCKET BOOSTER DISASSEMBLY & REFURBISHMENT COMPLEX  
FIRST WASH BUILDING

(Hangar AF Complex-First Wash Building)  
(John F. Kennedy Space Center)

Cape Canaveral  
Brevard County  
Florida

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service  
Department of Interior  
100 Alabama St., SW  
Atlanta, Georgia 30303

HISTORIC AMERICAN ENGINEERING RECORD

CAPE CANAVERAL AIR FORCE STATION, LAUNCH COMPLEX 39,  
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HAER No. FL-8-11-S-3

Location: Cape Canaveral Air Force Station, Cape Canaveral,  
Brevard County, Florida.

USGS Orsino, Florida, Quadrangle, Universal  
Transverse Mercator Coordinates: E 540465.24 N  
3151325.46 Zone 17, NAD 1983.

Date of Construction: 1979

Present Owner: National Aeronautics and Space Administration (NASA)

Present Use: Solid Rocket Booster Disassembly & Refurbishment

Significance: The Solid Rocket Booster (SRB) Disassembly & Refurbishment Complex contains the First Wash Building and eight other facilities that played an essential role in the re-usability of the SRBs in the Space Shuttle Program (SSP). The district is considered eligible for the NRHP as a historic district in the context of the SSP (1969-2011) under Criterion A for Space Exploration. The First Wash Building has achieved exceptional significance within the past 50 years, so Criterion Consideration G also applies. The complex was originally designed or modified to process SRBs, from pre-launch manufacture and assembly to post-launch recovery, disassembly, cleaning, and refurbishment. The First Wash building maintains a high level of integrity.

Report Prepared by: New South Associates, Stone Mountain, Georgia

Date: October 16, 2012

## PART I. HISTORICAL INFORMATION

### A. INTRODUCTION

The First Wash Building (Building 66242) is located at the SRB Disassembly and Refurbishment Complex on Hangar Road in the Industrial Area of the Cape Canaveral Air Force Station (CCAFS). The district's boundaries are defined as the edges of the concrete hardscape that surrounds Hangar AF. The district contains nine contributing resources, including the First Wash Building (8BR2004). The remaining eight contributing resources are Hangar AF (8BR2001), the High Pressure Gas Building (8BR2002), the High Pressure Wash Building (8BR2003), the SRB Recovery Slip (8BR2005), the SRB Paint Building (8BR2006), the Robot Wash Building (8BR2007), the Thrust Vector Control Deservicing Building (8BR2008), and the Multi-Media Blast Facility (8BR2009).

The complex is a significant historic property for its association with the Space Transportation System (STS), commonly known as the "Space Shuttle." The STS was a unique breakthrough in the history of the U.S. Space Program because it was based on a design that made most of its major components reusable. This model decreased program costs and helped make orbital space flight a routine endeavor. Along with the orbiter spacecraft, the SRBs were two of the Space Shuttle's primary reusable elements, while the external tank (ET) was not reused. The SRBs' reusability was made possible by a number of facilities at Kennedy Space Center (KSC) and CCAFS, including the SRB Disassembly and Refurbishment Complex. The complex is the first place the SRBs were brought after their recovery from sea and where they were disassembled, cleaned, and processed before they were moved to other KSC facilities for buildup and assembly.

## B. HISTORICAL CONTEXT

A full historical context for the SRB Disassembly and Refurbishment Complex, as well as a summary of the entire disassembly and refurbishment process can be found in HAER NO. FL-8-11-S (Hangar AF Complex. A detailed explanation for the portions of that process that occurred in this resource is located in Section III of this document.

## C. PHYSICAL HISTORY

### 1. Date of Construction:

1979

### 2. Architects/Engineers:

Sverdrup & Parcel and Associates, Inc., Jacksonville, Florida.

Sverdrup & Parcel was the engineering, architectural, and planning services branch of the larger Sverdrup Corporation, a broad-based engineering firm that worked throughout the United States and internationally.<sup>1</sup>

The company was founded as Sverdrup and Parcel in 1928 by Norwegian engineer Leif J. Sverdrup and John Ira Parcel, a professor at the University of Minnesota. Together, the men specialized in bridge design and construction and became one of the most respected bridge firms in the country by the 1940s. During World War II, the firm broadened its scope of services to include work for the U.S. Corps of Engineers in the Pacific theater, including a

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<sup>1</sup> Sverdrup Corporation: Company History, <http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html>. Accessed November 17, 2011.

chain of airfields in the South Pacific leading to the Philippines.<sup>2</sup>

Domestically, Sverdrup and Parcel continued to concentrate on somewhat routine bridge, railroad, and highway construction. In the late 1940s, however, the firm expanded into the design of military and aviation test facilities for the U.S. Government, including architectural and engineering services at the new Arnold Engineering Development Center (AEDC) in Tullahoma, Tennessee, and the Air Force's Joint Long-Range Proving Ground at Cape Canaveral, Florida. The work at Cape Canaveral opened the door for the firm to work in the 1960s with NASA and the Air Force, first in the development of rocket test stands, and then in 1977 with modifications to Hangar AF.<sup>3</sup>

### 3. Builder/Contractor/Supplier:

Holloway Construction

### 4. Original Plans and Construction:

The building retains its original appearance.

### 5. Alterations and Additions:

The original multi-part horizontal sliding doors of the First Wash Building were removed at an unknown date.

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<sup>2</sup> International Directory of Company Histories, *Sverdrup Corporation: Company History* (Farmington Hills, MI: St. James Press, 1996), <http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html>. Accessed November 17, 2011.

<sup>3</sup> International Directory of Company Histories, *Sverdrup Corporation: Company History* <http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html>. Accessed November 17, 2011.

PART II. STRUCTURAL/DESIGN/EQUIPMENT INFORMATION

A. GENERAL STATEMENT:

1. Character:

The First Wash Building is a one-story, concrete block building that resembles an outdoor carwash. It has a central water pump room and two wash bays equipped with high-pressure wash equipment. The wash bays originally had doors to keep water and TPS material contained but they are now open.

2. Condition of fabric:

The condition of the First Wash Building's fabric is excellent. The First Wash Building was regularly maintained throughout its lifespan and does not exhibit any major signs of neglect or deterioration.

B. BUILDING DESCRIPTION:

The First Wash Building was one of the new buildings completed during the 1977-79 modifications to the Hangar AF area. From the SRB Recovery Slip, the SRBs were lifted out of the water on a gantry crane that placed them on specially designed rail cars. Once onboard the rail cars, they are held on the pavement for the "safing" process, in which the ordinance ring and various other equipment is removed from the aft skirt. Once they are "safed," the SRBs are visually inspected before they are transported on the rail cars into the First Wash Building for hydrolase washing, which removes about 90 percent of the TPS.

## Exterior

The First Wash Building is a one-story car-wash type building that was used to give the SRBs an initial water hydrolase wash before proceeding to other steps in the refurbishment process. The building has a rectangular floor plan in three sections: a central closed pump/equipment room flanked by two open wash bays. It measures 97'-0" (W) x 54'-8" (D) x 24'-0" (H). The foundation is composed of reinforced concrete footers placed at a depth of approximately 2'-0". The roof is composed of 8'-0" precast pre-stressed hollow core concrete slabs. The roof slabs are slightly pitched over the north wash bay to create a slope for water runoff, though at first glance, the roof appears to be nearly flat. There are two metal exhaust fan stacks on the roof that rise out of the building's central pump/equipment room. Galvanized aluminum fascia strips surround the roofline, with galvanized gutters on the north and south sides of the roof.

The exterior of the building is composed of its exposed structural system of load-bearing concrete block panels separated by 16" x 16" precast concrete pilasters. These pilasters create an arrangement of eight wall sections on the west and east elevations, and four wall sections on the north and south elevations. The west and east elevations have identical arrangements of open wash bays on their north and south ends, with the enclosed pump/equipment room in between. At the building roofline on the west and east elevations, the pilasters rise to join cantilevered concrete beams, which originally held sliding horizontal bay doors. Each wash bay is accessible by two metal roll-up doors, along with four pedestrian entrance doors, one on each building elevation.

The central enclosed pump/equipment room is accessed by exterior pedestrian entrance doors and an interior metal roll-up door on the west elevation. There are also interior pedestrian doors that lead from the wash bays into the pump/equipment room. There are louvered exhaust fans over the exterior pump/equipment room doors on both sides of the building and other ventilation louvers throughout the building's exterior. All doors and ventilation louvers have a 1'-0" precast concrete lintel. The building has no windows.

There is a one-story equipment "lean-to" on the north elevation of the building. It is composed of 3" pipe columns supporting a corrugated aluminum roof. It has a 4" concrete slab floor. Another notable exterior feature is a service ladder that leads to the roof on the south elevation.

The First Wash Building originally had four specially designed horizontal sliding doors that were replaced at an unknown date with standard motor-operated, rolling steel doors. The original doors featured large main panels that opened and closed to allow the SRBs entry into the interior workspace. These doors also contained smaller, secondary sliding doors that covered circular openings with a diameter that matched that of the SRBs. The effect of this was that the main doors could close with the ends of the SRBs extending outside of the building. Such a configuration allowed the workers to operate the building's hydrolase equipment in an enclosed environment.

#### Interior

Each of the building's wash bays offers 33'-0" x 54'-8" of workspace. They have concrete block walls and concrete ceilings and floors. In between the rail car tracks on the floor of each bay is a linear metal water drain covered

with a metal filter grate. Wastewater and TPS material flowed into these drains into the first of two sumps that pumped it over a mechanical roll filter to remove TPS solids. The water then flowed into a second sump that pumped it through paper cartridge filters. The water was then filtered a third time with chemicals before being pumped into an aboveground storage tank located just north of the First Wash Building.

The walls of each bay in the building are mounted with high-pressure plumbing pipes and fixtures that serve the hydrolase equipment. Each bay is lit with eighteen ceiling light fixtures.

The interior of the pump/equipment room also has concrete block walls and a concrete ceiling and floor. It contains three high-pressure water pumps, one serves the south bay, one the north bay, and the third is a stand-by pump. There is a hot surfactant tank along the south wall and a compressed air tank near the east wall. An electrical control panel is attached to the east wall and there are metal storage shelves along the south wall. Electrical conduits and plumbing pipes line the interior walls throughout the room.

## PART III: OPERATIONS AND PROCESS

### A. INTRODUCTION

The primary operations at Hangar AF involved separating all of the SRB segments, removing their electronic and mechanical components and protective TPS finishes, and preparing them for buildup and assembly at the ARF. The buildings and structures at the Hangar AF Complex processed the aft skirts, forward skirts, frustums, TVC systems, MPSS, ETA ring, and a variety of small metal parts contained in each of the segments. The boosters' four SRMs

were separated and cleaned at Hangar AF, but then shipped to their manufacturer for full refurbishment. Typically, the number of people working at Hangar AF during the Space Shuttle era was approximately 150 people. It took these workers from two to three weeks to fully process the SRB components from the time of their arrival.

#### B. THE FIRST WASH BUILDING

The SRBs were moved from the SRB Recovery Slip on rail cars into the First Wash Building for a high-pressure hydrolase water wash at 20,000 pounds of pressure per square inch. The boosters were hydrolased with both overhead spray bars and by manual hydrolase guns, which removed approximately 90 percent of their TPS. The wastewater is collected in a series of drains, sumps, and filters before it is cleaned and stored in an adjacent aboveground tank for future use.

While in the First Wash Building, the boosters' exit cones were removed and inspected. The exit cones were then shipped back to their manufacturer, a defense and aerospace company in Utah called ATK, for refurbishment.

### PART IV. SOURCES OF INFORMATION

#### A. ENGINEERING DRAWINGS AND PLANS

Sverdrup & Parcel and Associates. "Solid Rocket Booster Recovery & Disassembly Facility, Hangar AF, CCAFS, Industrial Area." Kennedy Space Center, Florida. Construction drawings, 1977.

B. EARLY VIEWS

Kennedy Space Center.

Photograph negative number 116-KSC-373c-548/16. 1973.  
On file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-378C-203/3. 1978. On  
file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-81PC-459. 1983. On  
file at Kennedy Space Center Archives.

Photograph negative number 116-KSC-383C-1256. 1983. On  
file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-378C-759. 1978. On  
file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-379C-1060/1. 1979.  
On file at Kennedy Space Center Archives.

C. INTERVIEWS

Christy, Howard, RPSF Manager, Personal Communication,  
February 24, 2010.

Morales, Art. George C. Marshall Space Flight Center  
Office of the Director Shuttle - ARES Transition Office.  
Interview with author. September 27, 2011.

Price, David. Hangar AF Facility Manager, United Space  
Alliance. Interview with the author. September 27, 2011.

D. PRIMARY SOURCES

Brown, Joseph Andrew. *Bid Cost of Shuttle Facilities, Construction Bidding Cost of KSC's Space Shuttle Facilities*. Proceedings from the 23<sup>rd</sup> Annual American Association of Cost Engineers Meeting, Cincinnati, Ohio, July 15-18, 1979, 14. On file at Kennedy Space Center Archives.

Cape Canaveral Air Force Station Master Plan and Building Schedule. Department of the Air Force, Air Force Systems Command. Cape Canaveral, Florida, 1963.

Kennedy Space Center. *Technical Facilities Resume: Hangar AF*. Facility No. 10-00-22-00 (John F. Kennedy Space Center, Florida, 1966), 43-44. On file at Kennedy Space Center Archives.

E. SECONDARY SOURCES

Deming, Joan, and Patricia Slovinac. *NASA-Wide Survey and Evaluation of Historic Facilities in the Context of the U.S. Space Shuttle Program: Roll-Up Report*. Submitted to the National Aeronautics and Space Administration, Environmental Management Branch. Sarasota, Florida: Archaeological Consultants, Inc. February 2008, revised July 2008.

National Aeronautics and Space Administration (NASA)

*NASA Facts: Solid Rocket Boosters*. Kennedy Space Center, Florida. IS-2004-09-014-KSC, Revised 2006.

*NASA Facts: Solid Rocket Boosters and Post-Launch Processing*. Kennedy Space Center, Florida. FS-2004-07-012-KSC (Rev. 2006).

*Sverdrup Corporation: Company History.*

<http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html>.

Accessed November 17, 2011.

United Space Alliance

"Marine Operations, Revision J." (John F. Kennedy Space Center, n.d.), MO-1.

#### F. LIKELY SOURCES NOT YET INVESTIGATED

Research was conducted at KSC using primary and secondary sources. Sources that were not investigated that may contain secondary information include NASA Headquarters and at the offices of the various architects and contractors that constructed the buildings of the Hangar AF Complex.

Additional oral history interviews with other engineers and technicians could also prove useful.

#### V. PROJECT INFORMATION

NASA determined that the SRB Disassembly & Refurbishment Complex was eligible to the NRHP as a historic district under Criterion A in the area of Space Exploration. The First Wash Building is considered a contributing resource to the historic district. This determination was made by NASA's "Shuttle Transition Historic Preservation Working Group" or HPWG, which looked at 335 facilities at thirteen NASA Centers.<sup>4</sup> As a result of this work, seventy properties were identified as either listed, determined eligible, or were potentially eligible to the National Register. Out of twelve property types identified for NASA's SSP, the SRB Disassembly and Refurbishment Complex was identified as Type 2, which includes Resources Associated with Vehicle Processing

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<sup>4</sup> Deming and Slovinac, *Evaluation of Historic Facilities, Space Shuttle Program*, 5.11.

Facilities.<sup>5</sup> NASA completed this evaluation as the SSP is scheduled for termination in 2011.

A Programmatic Agreement (PA) was developed to document the identified eligible resources and streamline the Section 106 consultation process. Per Section V.A of the PA between NASA, the Advisory Council on Historic Preservation (ACHP), and the Florida State Historic Preservation Officer (SHPO), dated May 2009, and the Statement of Work provided to New South Associates by KSC/InoMedic Health Applications (IHA), as part of the Task Order Contract, dated August 2011, the documentation package for the SRB Disassembly & Refurbishment Complex includes the following items: a written narrative; a series of photographs showing both exterior and interior views using large format negatives; and a selection of existing drawings, which were photographed with large format negatives. This HAER documentation fulfills the recordation requirements of the PA for the district.

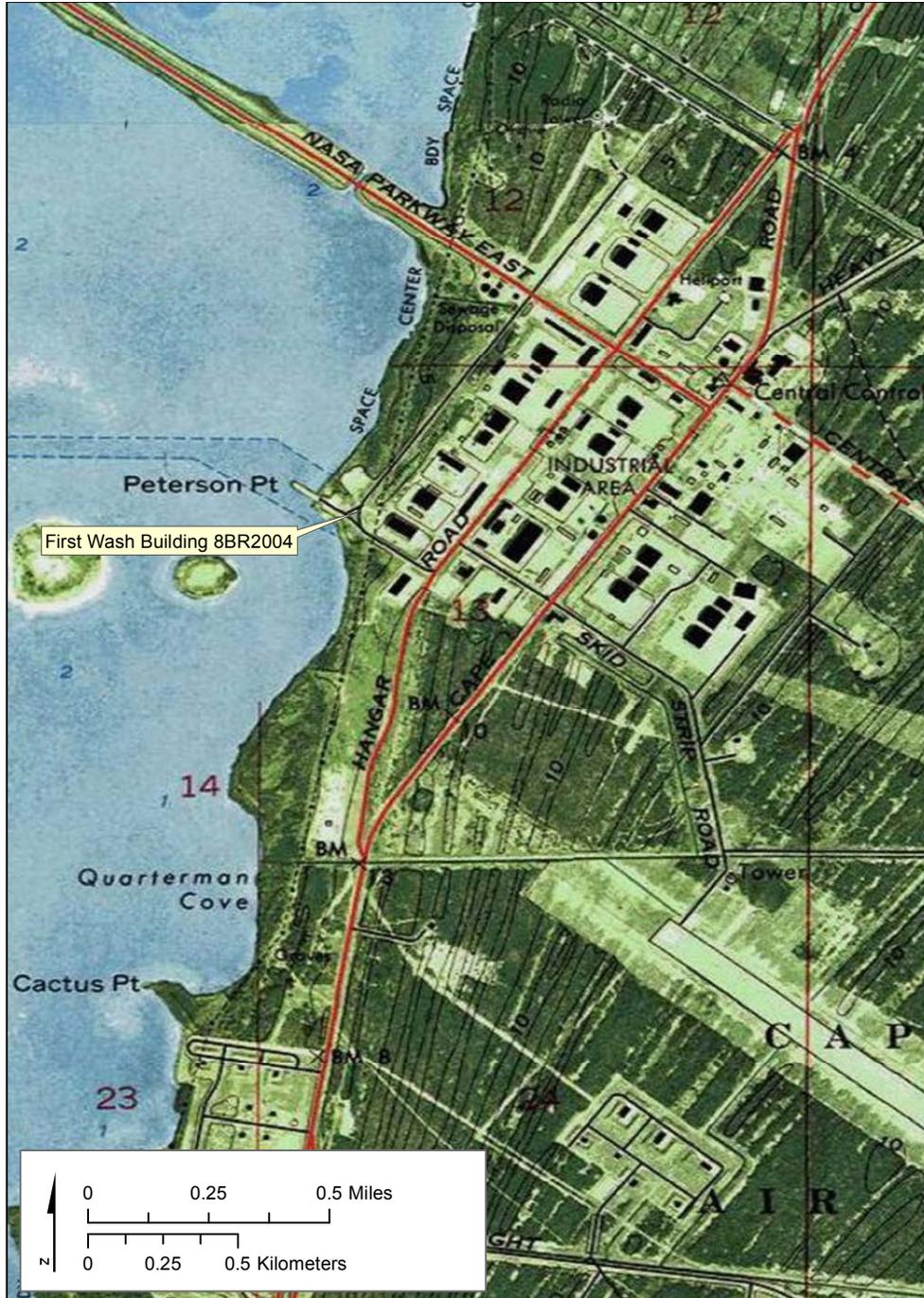
New South Associates, under contract with IHA, a subcontractor to NASA, conducted the HAER documentation and historic research for this project in September and October 2011. Therefore, NASA is completing HAER documentation of the historic district and other KSC properties to record these as they appear and as they existed during the SSP. David Diener served as the project photographer. Julie Coco served as Principal Investigator, while David L. Price served as Project Historian.

In order to complete the project, New South Associates personnel were allowed full access to the facility, under the supervision of Barbara Naylor, KSC Historic Preservation Officer, and Nancy English, Cultural Resources Specialist. Photographs were taken of each building's interior, exterior, and context. David L. Price conducted a limited number of oral interviews and otherwise compiled the historic

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<sup>5</sup> Deming and Slovinac, *Evaluation of Historic Facilities, Space Shuttle Program*, 5.11.

documentation required for the project. The following people were interviewed for this project: David Price, Hangar AF Facility Manager, United Space Alliance; Art Morales, George C. Marshall Space Flight Center, Office of the Director Shuttle - ARES Transition Office; and Dave Pappalardo, United Space Alliance, TVC Technician. Elaine Liston, KSC Archivist, provided a wealth of information from her office in the KSC Headquarters Building.



Source: USGS 7.5 Minute Topographic Quadrangle Map, Orsino, FL (1976)

Figure 1. USGS Map Showing the Location of the First Wash Building.



Source: ESRI Resource Data, Imagery Layer

Figure 2. Aerial Photograph Showing the Location of the First Wash Building.

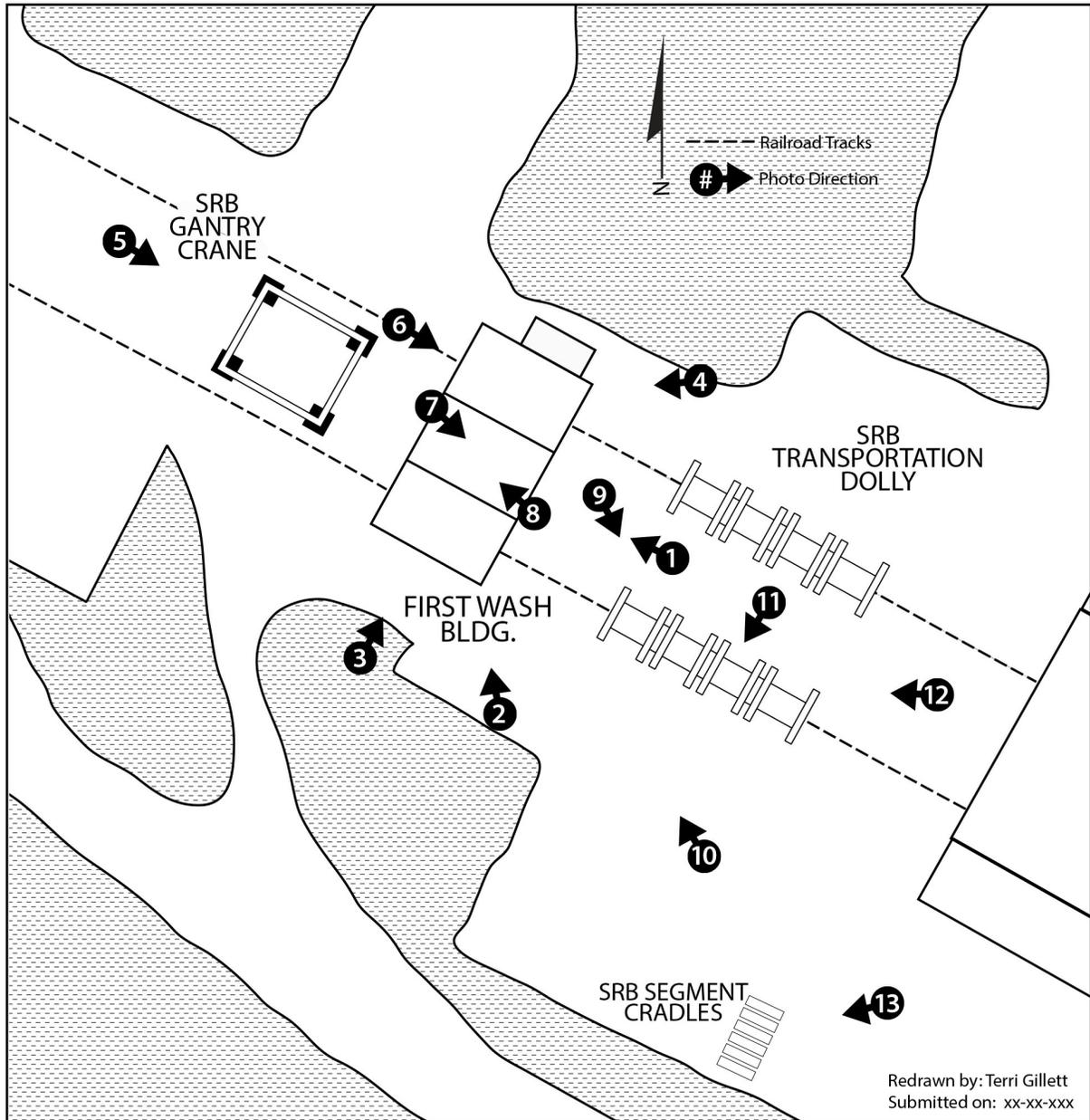


Figure 3. Photograph key for HAER NO. FL-8-11-S-3.