WHITE SANDS SPACE HARBOR AREA 1, HAER No. NM-28-M
PAPI CONTROL BUILDING
(Space Shuttle Landing Facility Area 1, Precision Approach Path Indicator Building)
White Sands Missile Range
West side of south end of Runway 17/35
White Sands vicinity
Doña Ana County
New Mexico

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
U.S. Department of the Interior
Intermountain Regional Office
12795 Alameda Parkway
Denver, CO 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD

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Location: White Sands Missile Range
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White Sands vicinity
Doňa Ana County
New Mexico

U.S.G.S. 7.5 Minute Las Cruces, New Mexico, Quadrangle, Universal Transverse Mercator Coordinates (center of runways): E 32.944408 N 106.41993 Zone 13S, NAD 1983

Construction: ca.1992

Architect: Not known

Builder: Not known

Present Owner: Commander, U.S. Army White Sands Missile Range, New Mexico 88002-5018

Present Use: Vacant

Significance: The Precision Approach Path Indicator Building, or PAPI Control Building, was an essential component of the White Sands Space Harbor (WSSH) from 1992-2011. It is considered to have national significance and is eligible for listing in the National Register of Historic Places (NRHP) under Criterion A for its association with the NASA Space Shuttle Program (SSP) with a period of significance of 1976-2011. Because it achieved significance within the past fifty years, Criterion Consideration G also applies.

Report
Prepared by: Robbie D. Jones, Senior Historian
New South Associates
118 South 11th Street
Nashville, TN 37206

Date: September 2013

LIST OF ACRONYMS

ABGR	Alamogordo Bombing and Gunnery Range
ABS	Anti-lock Braking System
ACHP	Advisory Council on Historic Preservation
ACI	Archaeological Consultants, Inc.
AIAA	American Institute of Aeronautics and Astronautics
APE	Area of Potential Effects
ATC	Air Traffic Control
BTT	Basic Training Target
CCC	Civilian Conservation Corps
CIT	California Institute of Technology
CONEX	Container Express
DC-X	Delta Clipper, Experimental
DoD	Department of Defense
GPS	Global Positioning System
HAFB	Holloman Air Force Base
HPO	Historic Preservation Officer
HPWG	Historic Preservation Working Group
HUB	Harbor Utility Building
IGS	Inter Glide Slope
IHA	InoMedic Health Applications, LLC
JSC	Johnson Space Center
KSC	Kennedy Space Center
LC	Launch Complex
MD	McDonnell Douglas
MSBLS	Microwave Scanning Beam Landing System
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NAVAIDS	Navigational Aids
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act

NPS	National Park Service
NRHP	National Register of Historic Places
NSA	New South Associates
OCC	Operations Control Center
ORD	Army Ordinance Department
PAPI	Precision Approach Path Indicator
RFP	Request for Proposal
SCAPE	Self Contained Atmospheric Protective Ensemble
SHPO	State Historic Preservation Officer
SSP	Space Shuttle Program
SSRT	Single Stage Rocket Technology
STA	Shuttle Training Aircraft
STS	Space Transportation System
TACAN	Tactical Air Navigation
TAL	Transoceanic Abort Landing
UHF	Ultrahigh Frequency
USAAF	United States Army Air Force
USAF	United States Air Force
VITT	Vehicle Integration Test Team
WPA	Works Progress Administration
WSMR	White Sands Missile Range
WSNM	White Sands National Monument
WSPG	White Sands Proving Ground
WSSH	White Sands Space Harbor
WSTF	White Sands Test Facility

PART I. HISTORICAL INFORMATION

A. PHYSICAL HISTORY

1. DATE OF CONSTRUCTION

Circa 1992

2. ENGINEER

Not known

3. BUILDER/CONTRACTOR/SUPPLIER

Not known

4. ORIGINAL PLANS

Not available

5. ALTERATIONS AND ADDITIONS

All electronic equipment was removed once the facility was vacated in 2011. The U.S. Army initiated occupation and reuse of the facility in the summer of 2012.

PART II. STRUCTURAL/DESIGN INFORMATION

A. GENERAL DESCRIPTION

1. CHARACTER

The PAPI Control Building (NASA Inventory #56) is a prefabricated steel unit supported by concrete piers on the ground. A solid metal entrance door is located on the north elevation. The exterior is painted with a red and white checkerboard pattern to enhance visibility on the Alkali Flat.

The PAPI Control Building was used to control the PAPI light arrays located within the overruns at each end of Runway 17/35, the east end of Runway 23/05, and the north end of Runway 20/02. PAPI is a system of lights arranged to provide visual descent guidance information during the orbiter's approach to the runway. The PAPI array is installed at the center of the runway and adjusts to allow for a glide slope of 16 to 21 degrees and is used as the outer glide slope reference. In good visibility conditions, the arrays can be used at ranges up to five miles by day and twenty miles by night.

The original PAPI arrays were replaced ca.2005 with the current PAPI arrays, manufactured by the Barrel Lighting Company in England. Located equidistant, the four individual units are housed in metal light housing assemblies mounted on three metal legs supported by a concrete pad. The housings are painted yellow. Each light unit consists of three high-intensity, 200 watt 6.6 Amp incandescent lamps, anodized aluminum reflectors, red color filters to split the beam, and precision-ground lenses.

2. CONDITION OF FABRIC

When documented in March 2012, the PAPI Control Building had been abandoned for over six months, but was in fair condition. The interior equipment had been removed and the exterior was showing signs of neglect due to the harsh desert environment, which requires that facilities are constantly maintained and repaired

due to shifting sands, flash floods, and extreme temperature variations.

B. CONSTRUCTION

The PAPI Control Building is a prefabricated metal building.

C. MECHANICAL/OPERATION

The PAPI Control Building featured electricity to power interior lights and electronic navigational equipment.

PART III. Sources of Information:

A. ENGINEERING PLANS AND DRAWINGS

There are no known engineering plans or drawings of the PAPI Control Building.

B. EARLY VIEWS AND HISTORICAL DATA

Historic photographs and maps of the WSSH are very limited. Historical views of the PAPI Control Building and housing assembly can be found on pages 17 and 18 of this document. All views are captioned and dated as available. The other historical data comes from a variety of sources cited in the Bibliography below.

The historic photographs and most of the historical data used in this documentation came from sources within WSTF and WSSH. Other more current imagery was obtained from the online WSTF Media Archive. Many of the original photographs have been donated to the WSMR Museum for digitization and curation. A body of recent aerial photographs were located and photocopied for inclusion in the HAER document to supplement the current ground photography.

C. INTERVIEWS

The following NASA and WSMR employees were interviewed for this documentation.

Robert E. Mitchell, WSTF Manager, September 2011.

Frank Offutt, WSSH Manager, September 2011.

Timothy Davis, WSTF Historic Preservation Officer, September 2011 and March 2012.

Bill Godby, WSMR Historic Preservation Officer, September 2011.

Doyle Piland, WSMR Museum Archivist, September 2011.

Dennis G. Perrin, NASA Johnson Space Center, Houston, Texas, and WSTF Facility Manager (1975-1989), June 2013.

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Jennifer Ross-Nazzal." Las Cruces, New Mexico, August 10, 2009.

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E. LIKELY SOURCES NOT YET INVESTIGATED

Research was conducted at WSSH and WSTF using primary and secondary sources. Sources that were not investigated that may contain secondary information are archived at NASA's Lyndon B. Johnson Space Center in Houston, Texas.

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

PART IV. PROJECT INFORMATION

In 2011-2012, New South Associates (NSA), under contract with InoMedic Health Applications, LLC (IHA) of Kennedy Space Center, Florida, and in coordination with NASA and the U.S. Army, conducted background research and a historic architecture survey of resources at the NASA WSSH. The survey included the documentation and evaluation for NRHP eligibility for seventy-two resources located in four distinct areas. Based on this research, NSA determined that no properties remain at WSSH from the period prior to NASA acquisition in 1963 except for the footprint of the packed gypsum Runway 17/35. [1]

NSA recommended that the three NASA WSSH Runways and the Control Tower in Area 1 were individually eligible for listing in the NRHP and eligible as contributing resources to the "WSSH Shuttle Landing Facility District" under Criterion A and Criterion Consideration G for their association with the NASA SSP. None of the other sixty-eight inventoried properties were recommended individually eligible for listing in the NRHP due to lack of historical association with the NASA SSP or other historic contexts, lack of unique design or construction features, or insufficient integrity; however, nineteen of these properties, all of which lie within Area 1, were recommended as contributing resources to "WSSH Shuttle Landing Facility District," even though they were not recommended individually eligible for the NRHP. The historic district contains a total of twenty-eight resources: twenty-three are contributing and five are non-contributing.

After formally ending the SSP on August 31, 2011, NASA disposed of the WSSH and released use of the property to the U.S. Army WSMR. The property transfer was a federal undertaking on federally-owned property and subject to compliance with Section 106 of the NRHP Act of 1966, as amended. The undertaking resulted in an Adverse Effect to the NRHP-eligible WSSH Shuttle

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[1] Reed, Mary Beth, and Robbie D. Jones. "Historic Architecture Survey and National Register of Historic Places Evaluation of the NASA White Sands Space Harbor on the U.S. Army Whites Sands Missile Range, Doña Ana County, New Mexico." New South Associates, Stone Mountain, Georgia, 1998: 44-62. Unpublished report on file at NASA WSTF, Las Cruces, New Mexico.

Landing Facility District. To mitigate the adverse effects, NASA completed HAER Level II documentation of the historic district and relocated the Control Tower to the WSMR Museum for conservation, exhibition, and public interpretation.

The mitigation plan was defined in a Memorandum of Agreement (MOA), executed between NASA, the U.S. Army, and the NM-SHPO in August 2012. The properties within the historic district were documented with large format photography in March 2012.

APPENDIX- LOCATION MAPS AND HISTORICAL VIEWS

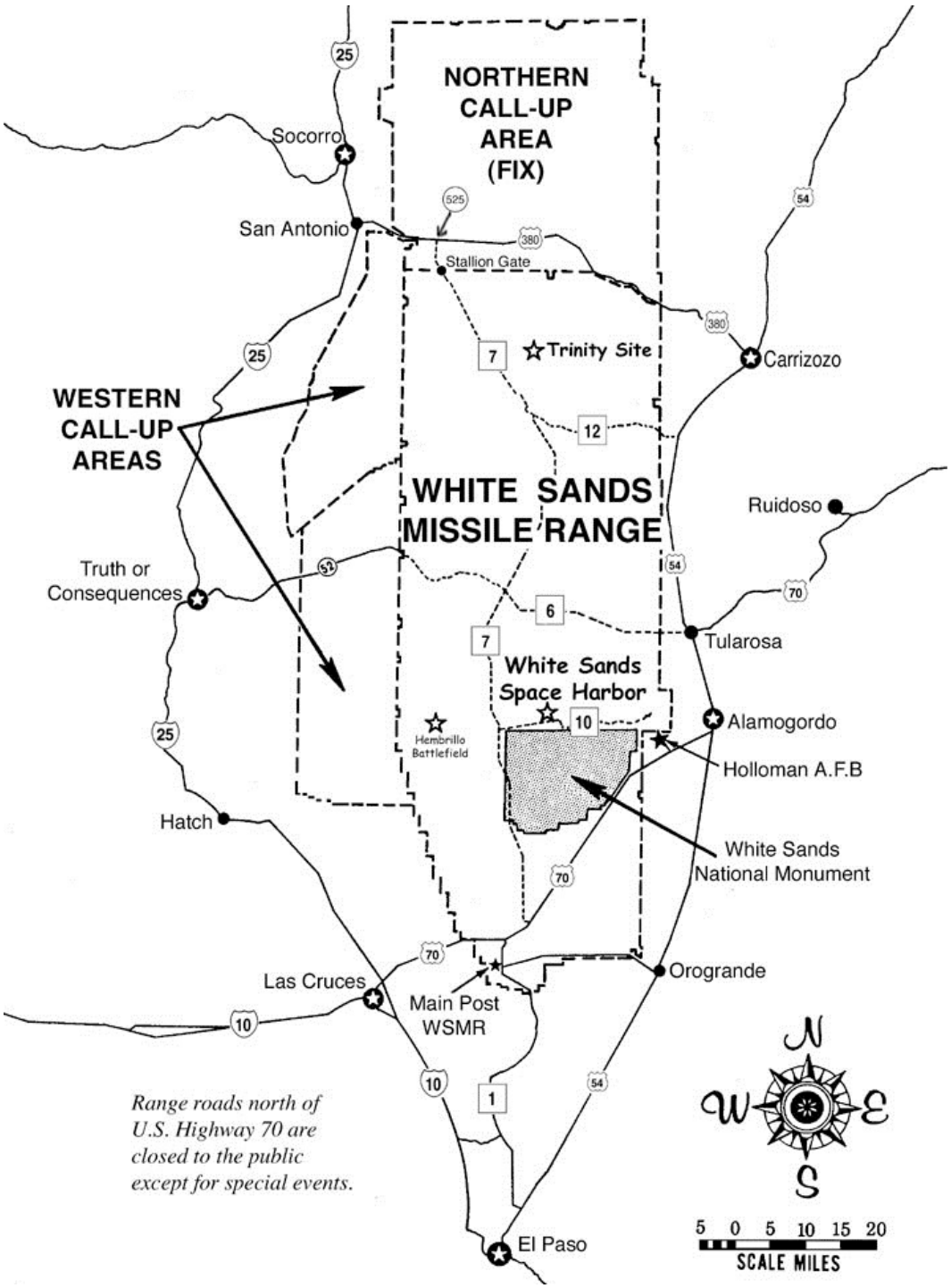

Figure 1. Map of White Sands Military Reservation showing White Sands Space Harbor (Source: U.S. Army).

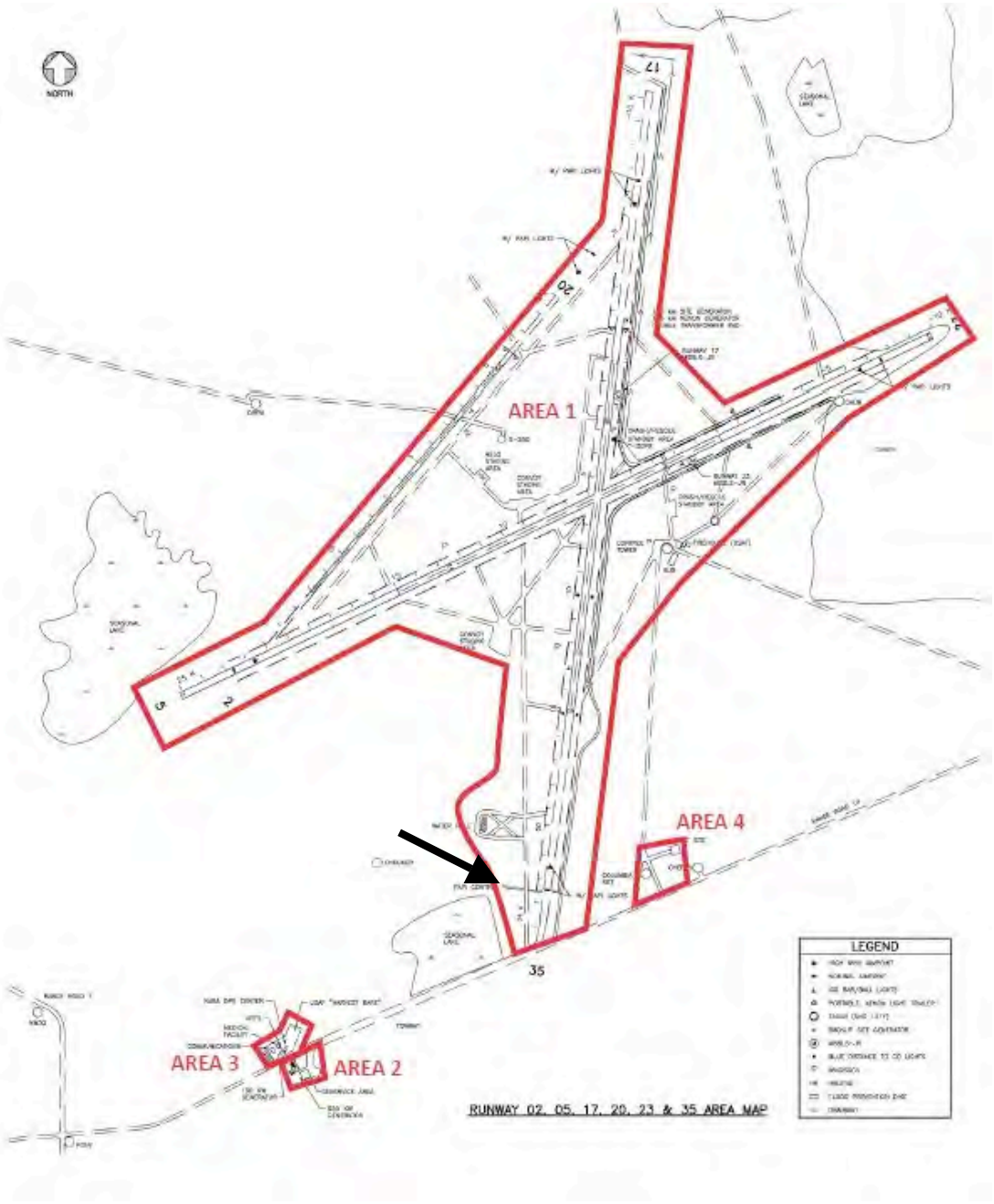

Figure 2. Map of WSSH showing location of the PAPI Control Building in Area 1, which delineates the NRHP boundaries of the WSSH Shuttle Landing Facility District (Base Map Source: NASA WSTF).

Figure 3A. View of an individual PAPI housing assembly at north end of Runway 23/05, looking west with the San Andres Mountain Range in background, ca.2005 (Source: NASA WSTF).

Figure 3B. View of an original PAPI housing assembly, looking west with San Andres Mountains in background, ca.2005 (Source: NASA WSTF).

Figure 4A. View of the original PAPI Control Building, looking East with Sacramento Mountain Range in background; this repurposed trailer was replaced around 1992 with the current PAPI Control Building, undated (Source: NASA WSTF).

Figure 4B. View of the interior of the original PAPI Control Building, undated (Source: NASA WSTF).

HISTORIC AMERICAN ENGINEERING RECORD

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White Sands vicinity
Doña Ana County
New Mexico

David Diener, Photographer March 27-29, 2012

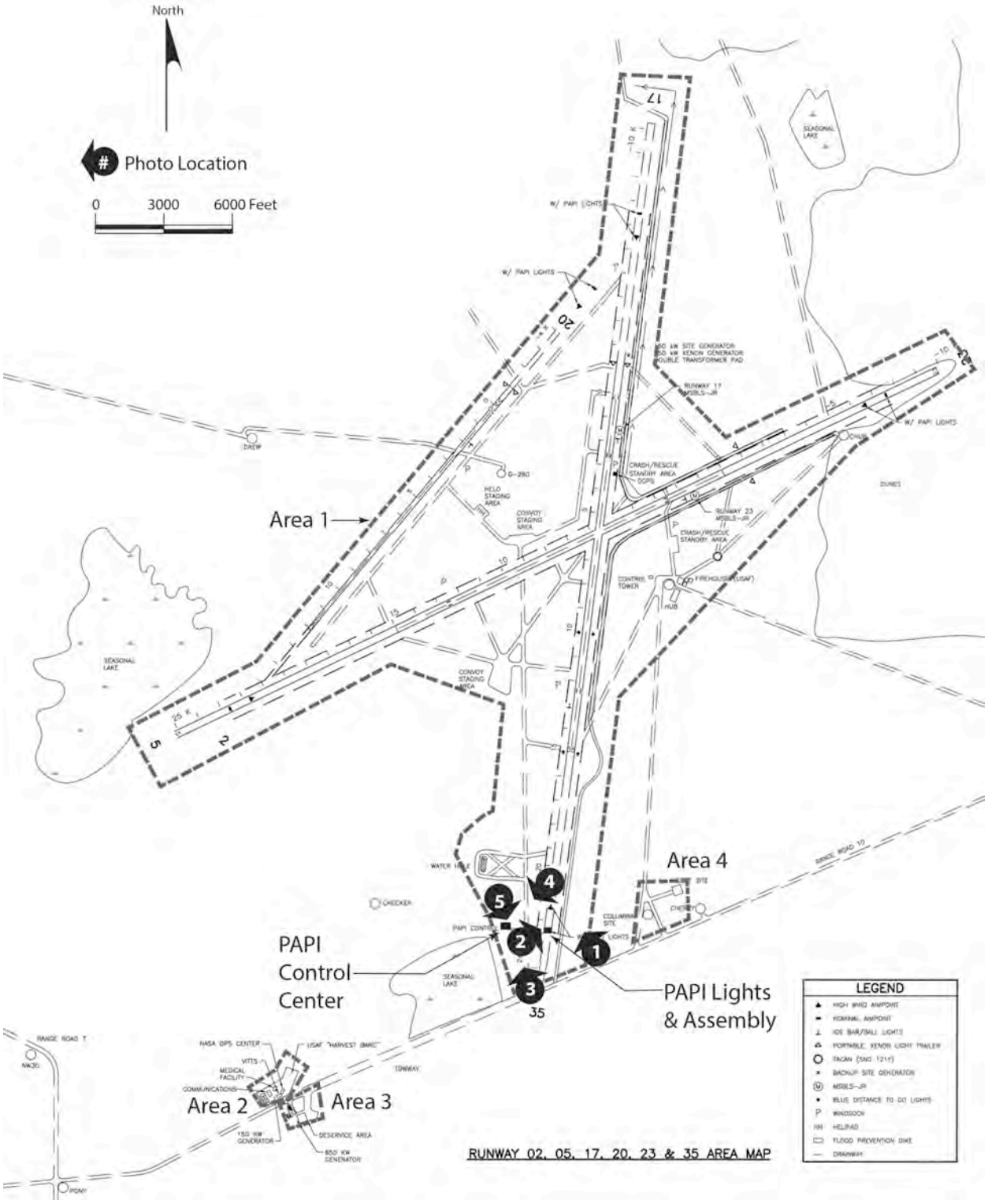
NM-28-M-1 VIEW OF RUNWAY PAPI LIGHT ARRAY LOOKING NORTHWEST AT SOUTH END OF RUNWAY 17/35 WITH SAN ANDRES MOUNTAIN RANGE IN BACKGROUND.

NM-28-M-2 VIEW OF A TYPICAL PAPI LIGHT ASSEMBLY LOOKING NORTHWEST AT SOUTH END OF RUNWAY 17/35.

NM-28-M-3 VIEW OF PAPI CONTROL STATION LOOKING NORTHWEST, LOCATED AT SOUTHWEST CORNER OF SOUTH END OF RUNWAY 17/35.

NM-28-M-4 VIEW OF PAPI CONTROL STATION LOOKING SOUTHWEST, LOCATED AT SOUTHWEST CORNER OF SOUTH END OF RUNWAY 17/35.

NM-28-M-5 VIEW OF INTERIOR OF PAPI CONTROL STATION LOOKING WEST, LOCATED AT SOUTHWEST CORNER OF SOUTH END OF RUNWAY 17/35.


North
Photo Location
0
3000
6000 Feet
Area 1
Area 2
Area 3
Area 4
PAPI Control Center
PAPI Lights & Assembly
1
2
3
4
5
35
LEGEND
RUNWAY 02, 05, 17, 20, 23 & 35 AREA MAP

Kodak 100TMX

Kodak 100TMX

Kodak 100TMX

Kodak 100TMX
FLAMMABLES
NO SMOKING
85