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## **Cultural Landscape Analysis of Existing Historic Districts**

Picatinny Arsenal, New Jersey

Sunny E. Adams, Megan W. Tooker, and Adam D. Smith

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# **Cultural Landscape Analysis of Existing Historic Districts: Picatinny Arsenal, New Jersey**

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## Abstract

This study documents the cultural landscape at Picatinny Arsenal, focusing on five existing historic districts. This work looks at the historic development and discusses the existing conditions within each of the five districts. It analyzes the features within each district for their historic significance and integrity, and based on this analysis, makes treatment recommendations. This document meets the requirements for federal agencies to address their cultural resources which are defined as any pre-historic or historic district, site, building, structure, or object. Especially relevant is Section 110 of the National Historic Preservation Act, which requires federal agencies to inventory and evaluate their cultural resources.

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## Preface

This study was conducted for the Environmental Affairs Division of the U.S. Army Garrison, Picatinny Arsenal, NJ under Project 201221, “Cultural Landscape Analysis, Picatinny Arsenal, New Jersey.” Funding was provided by Military Interdepartmental Purchase Request (MIPR) MIPR2ILG3EB301. The Picatinny Arsenal technical monitor was Mr. Jason Huggan, Cultural Resource Manager, Environmental Affairs Division.

The work was performed by the Land and Heritage Conservation Branch (CN-C) of the Installations Division (CN), U.S. Army Engineer Research and Development Center – Construction Engineering Research Laboratory (ERDC-CERL). At the time of publication, Dr. Michael L. Hargrave was Chief, CEERD-CN-C; Ms. Michelle Hanson was Chief, CEERD-CN; and Mr. Alan Anderson was the Technical Director for Sustainable Ranges and Lands, CEERD-CV-T. The Deputy Director of ERDC-CERL was Dr. Kiran-kumar Topudurti, and the Director was Dr. Ilker Adiguzel.

The Commander of ERDC was COL Bryan S. Green, and the Director was Dr. Jeffery P. Holland.

## Unit Conversion Factors

Multiply	By	To Obtain
acres	4,046.873	square meters
degrees Fahrenheit	$(F-32)/1.8$	degrees Celsius
feet	0.3048	meters
gallons (U.S. liquid)	3.785412 E-03	cubic meters
inches	0.0254	meters
miles (U.S. statute)	1,609.347	meters
miles per hour	0.44704	meters per second
square feet	0.09290304	square meters
square miles	2.589998 E+06	square meters
square yards	0.8361274	square meters
yards	0.9144	meters



## Abbreviations

<b>Term</b>	<b>Spell-out</b>
AAL	Arsenal-At-Large
AETC	Air Education and Training Command
AMC	Army Materiel Command
ARDEC	Armament, Research, Development and Engineering Center
ATFP	Anti-terrorism force protection
APM	asbestos protected metal
CRM	cultural resources manager
CWA	Civilian Works Administration
ERDC- CERL	Engineer Research and Development Center–Construction Engineering Research Laboratory
FRP	Facility Reduction Program
gpm	gallons per minute
JATO	jet-assisted takeoff
LOX	liquid oxygen fuel
NAD	Naval Ammunition Depot
NARL	Naval Aeronautical Rocket Laboratory
NARTS	Naval Air Rocket Test Station
NHPA	National Historic Preservation Act of 1966
NJ HPO	New Jersey Historic Preservation Office
NRHP	National Register of Historic Places
PA	programmatic agreement
PICA	Picatinny Arsenal
psi	pounds per square inch (pressure)
R&D	research and development
RDECOM	Research, Development and Engineering Command
RMD	Reaction Motors Division
RMI	Reaction Motors, Inc.
WPA	Works Progress Administration

# 1 Methodology

## 1.1 Background

Congress codified the National Historic Preservation Act of 1966 (NHPA), the most effective cultural resources legislation to date, in order to provide guidelines and requirements for preserving tangible elements of our past. Benefits derived from this Act were the result of a broader need for preserving historic cultural resources. Resources were identified primarily through creation of the National Register of Historic Places (NRHP). Contained within the NHPA are Sections 106 and 110 which outline specific requirements for federal agencies to address their cultural resources. In the NHPA, cultural resources are defined as any prehistoric or historic district, site, building, structure, or object. Section 106 requires determining the effect of federal undertakings on properties deemed eligible or potentially eligible for the NRHP. Section 110 requires federal agencies to inventory and evaluate their cultural resources.

Picatiny Arsenal (PICA) is located in Rockaway and Jefferson Townships in Morris County, New Jersey. The installation is located 32 miles northwest of Newark and 42 miles west of New York City. Picatiny Arsenal began as a War Department powder depot in 1880 and evolved into one of the Army's most important armament research and development centers.

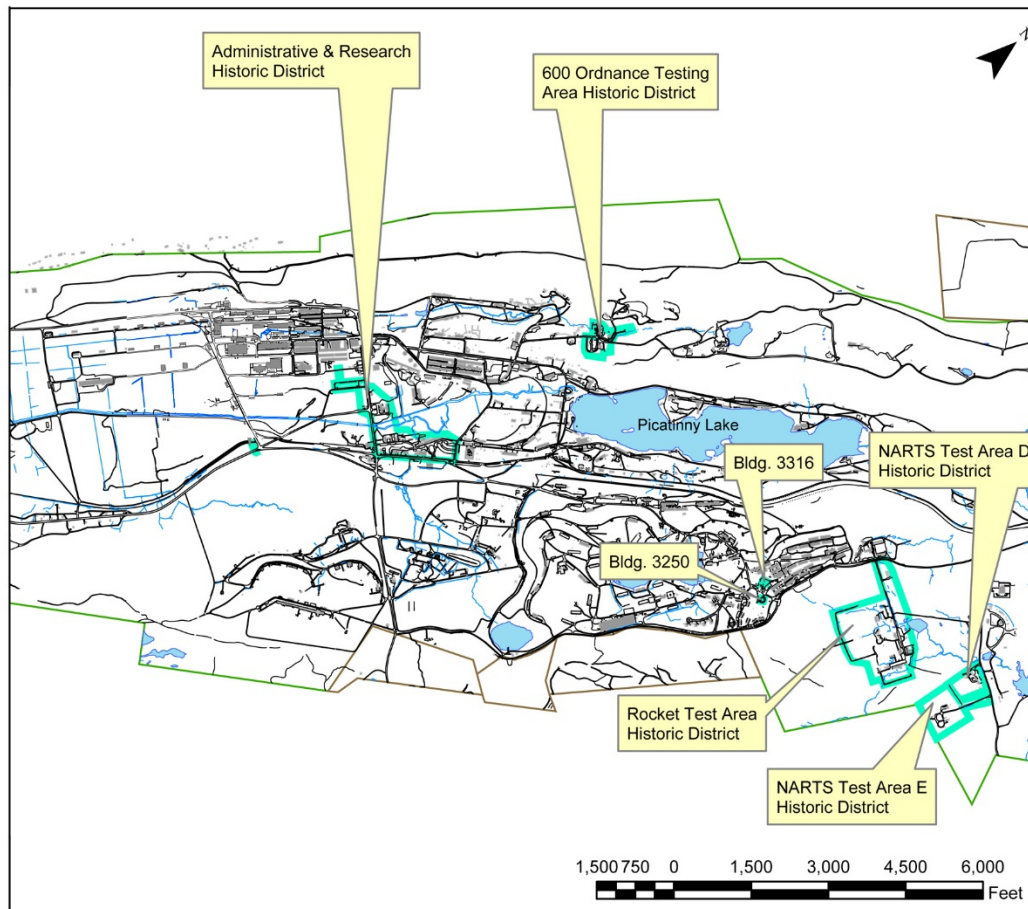
PICA has evaluated approximately 1,159 buildings, structures, and objects and found that 99 are eligible for inclusion on the NRHP.<sup>1</sup> Of these 99 resources, 97 are located within five historic districts—the Administrative and Research Historic District, the 600 Area Ordnance Testing Historic District, the Army Rocket Testing Historic District, NARTS<sup>2</sup> D, and NARTS E Historic Districts (Figure 1). Two of those 99, Building 3250 and Building 3316, are located outside the historic districts (Figure 1). Within the five districts, there are 22 noncontributing properties.

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<sup>1</sup> Conversation with Jason Huggan, Cultural Resources Manager at Picatiny, June 2013.

<sup>2</sup> Naval Air Rocket Test Station

Figure 1. Map showing locations of current Historic Districts and buildings at Picatinny Arsenal as noted in 2008 ICRMP (Chugach Industries 2008).



## 1.2 Objectives

The objective of this project is to perform a cultural landscape analysis of five historic districts at Picatinny Arsenal, New Jersey, as required by Section 110 and 106 of the NHPA and by the Real Property Master Plan and Facility Reduction Program Programmatic Agreement between Picatinny Arsenal and the New Jersey Historic Preservation Office (NJ HPO). Knowledge of the cultural landscape and potential impacts on these resources will aid in the NHPA process.

## 1.3 Approach

For a property to qualify for the NRHP, it must meet at least one of the National Register Criteria for Evaluation, must be significantly associated with an important historic context, and must retain sufficient integrity to convey its significance under that context.

This report establishes the process by which the historic landscapes of PICA are inventoried and evaluated according to the criteria set forth for the NRHP. To be eligible or listed on the NRHP, cultural resources must meet certain requirements establishing their importance to American history and heritage. The cultural importance of Picatinny's landscape is determined through the installation's historic context. Next, using the historic context as a reference point, the physical site is analyzed and inventoried to determine the original design intentions. In doing this, the historic landscapes are identified and their features are documented through mapping, diagramming, and image collection. With this information, the historic qualities are determined and evaluated according to NRHP criteria. This process establishes the historic importance of the landscape and determines its historic integrity. With the analytical results, recommendations are made that are appropriate for the preservation and maintenance of the historic landscape features.

### **1.3.1 Site visits**

An initial site visit was conducted in September 2012 and additional photos were taken in April 2013. During this visit, the team conducted a windshield survey while documenting the site with photographs. During this visit, researchers were also given a guided tour during which photography, sketches, and note-taking were used to compile an overall understanding of the built environment of Picatinny Arsenal.

### **1.3.2 Archival research**

The first phase of archival research established the historic context of PICA. This research included finding, gathering, and reviewing all sources relevant to the project. The next phase identified and located primary sources to document the original design and planning intentions of the installation. Sources were used to determine the development including published and unpublished materials held in the National Archives, and at PICA. During these visits, researchers collected archival information such as historic photographs, artwork, maps, and architectural plans. These documents were used to provide the historic context and original design intention, and to illustrate the challenges of planning and building PICA.

### 1.3.3 Analysis and evaluation

Using information from the historic context, an overarching NRHP integrity was determined. Cultural resources can retain or lose historic integrity, meaning that a resource either does or does not convey historic significance. By establishing a historic context, individual resources can be evaluated along similar physical metrics. The physical features of each component landscape were documented and evaluated to establish the character-defining features of the site and if they did or did not contribute to the established historic context. From this, a recommendation of eligibility to the National Register was made based on guidelines found in the following documents.

- *National Register Bulletin #15, How to Apply the National Register Criteria for Evaluation* <sup>3</sup>
- *National Register Bulletin #16, Part A: How to Complete the National Register Registration Form* <sup>4</sup>
- *National Register Bulletin #18: How to Evaluate and Nominate Designed Historic Landscapes* <sup>5</sup>
- *Bulletin #30: Guidelines for Documenting and Evaluating Rural Historic Landscapes* <sup>6</sup>
- *Preservation Brief #36: Protecting Cultural Landscapes* <sup>7</sup>
- *National Register Bulletin: How to Prepare National Historic Landmark Nominations* <sup>8</sup>
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* <sup>9</sup>
- *The National Park Service's Guide to Cultural Landscape Reports* <sup>10</sup>

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<sup>3</sup> National Park Service, 1997a.

<sup>4</sup> National Park Service, 1997b.

<sup>5</sup> National Park Service, 1987.

<sup>6</sup> National Park Service, 1999a.

<sup>7</sup> National Park Service, 2000.

<sup>8</sup> National Park Service, 1999b.

<sup>9</sup> Birnbaum and Peters, 1996.

<sup>10</sup> National Park Service, 1998.

- The Department of Defense guidance, *Guidelines for Documenting and Evaluating Historic Military Landscapes* (Loechl et al. 2009)

The guidelines presented in these documents provided the basis for the historic landscape evaluation. The guidelines were applied to identify and list the character-defining features of the Picatinny landscape while noting the cumulative loss of character, the alternation/masking of prominent features, or the introduction of new elements. Additionally, the landscapes were ranked high, medium, or low based on their significance to the overall history of Picatinny, the US military, and the United States, and then on their ability to convey historic significance.

#### **1.4 Researchers**

This project was conducted by the U.S. Army Corps of Engineers, Engineering Research Development Center, Construction and Engineering Research Laboratory (ERDC-CERL) based in Champaign, IL. The research team included Adam Smith, M.Arch, as project manager and lead historian; Megan Weaver Tooker, MLA, as historic landscape architect; and Sunny Adams, M.Arch, as assistant architect.

#### **1.5 Future projects**

This phase of the cultural landscape analysis concentrates on the five identified historic districts. Further evaluation is pending for the entire installation landscape to include a more in-depth historic context, overall landscape inventory, and discussion of how the historic districts relate to the Picatinny landscape as a whole.

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## 2 Criteria for Evaluating Historic Landscapes

Cultural landscapes express ideas and behaviors which have been committed to material reality. Cultural landscapes include elements such as roads, sidewalks, houses, lawns, parks, signs, buildings, and objects. Assessing the integrity of a growing and changing landscape is a complex matter.

This cultural landscape analysis will inventory the current features of the landscape at Picatinny, evaluate their historical significance, and determine their integrity. This report will look at each identified historic district individually, since each district is distinct in location, mission, and history.

Military installations such as PICA are discrete areas with clear boundaries that usually contain buildings, equipment/weapons storage, testing areas or training lands, open space, roads, utilities, and subsidiary features. Each installation will differ somewhat from the others, based on use and site characteristics. These functional considerations may be manifested in myriad ways through the built environment, land use patterns, and systems of spatial order.<sup>11</sup>

An installation is as much about change as it is about permanence. As a result, individual installations often exhibit a variety of time periods. When military missions have changed throughout history, so have the physical development and appearance of military installations. These changes can involve any combination of razing, building, rebuilding, acquiring, reclaiming, shaping, reusing, abandoning, or expanding. In addition, military installations often evolve through periods of rapid change in response to crises. They frequently appear as chaotic mixes of land-use areas and unrelated architectural styles. However, patterns are often visible that are the vestiges of an installation's former missions.

An understanding of the relationship between the changing mission of an installation and its landscape is the key to identifying the historical significance and identifying character-defining features. A cultural landscape

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<sup>11</sup> Suzanne Keith Loechl, et al., *Guidelines for Identifying and Evaluating Historic Military Landscapes*, ERDC/CERL TR-09-6 (Champaign, IL: Engineer Research and Development Center-Construction Engineering Research Lab, 2009), 22.



analysis can assist planning for the future, while preserving the historical character of the installation.

## 2.1 Landscape inventory

In historic landscape studies, the term "landscape characteristic" has a specific meaning. Landscape characteristics are defined as the "tangible evidence of the activities and habits of the people, who occupied, developed, used, and shaped the land to serve human needs; they may reflect the beliefs, attitudes, traditions, and values of these people."<sup>12</sup> Identifying the characteristics of the military landscape requires an understanding of the natural and cultural forces that have shaped it. This section will describe these processes and the resulting landscape features that together comprise the military landscape. The purpose of this section is to help define the overall character of the landscape and identify the many features which make it significant.

The National Park Service defines historic character-defining features of a landscape as "prominent or distinctive aspects, qualities, or characteristics of a cultural landscape that contribute significantly to its physical character."<sup>13</sup> Through the study of landscapes, the built environment is explained by the physical remains of the natural and cultural shaping forces. The historic landscapes of Picatinny are significant because they describe the adaption of the built environment to the military mission and the cultural values. Understanding the factors that influenced and composed the landscape informs the preservation of its historic qualities. The inventory identifies the historically significant features and characteristics of the Picatinny landscapes.

To identify the prominent or distinctive characteristics that make a landscape historic, the physical features of the site are divided into eight (8) areas as established by the National Park Service: site and layout, land use, expressions of military cultural values, transportation networks, views and viewsheds, buildings and structures, vegetation, and small-scale features.

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<sup>12</sup> Birnbaum, Charles and Christine Capella Peters, *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. (Washington, DC: National Park Service, U.S. Department of the Interior, 1996), 3.

<sup>13</sup> Ibid, 4.

These characteristics of the landscape combine to form the built environment that is the primary image of PICA.

## 2.2 Categories of historic properties

The identification of historically significant properties is achieved through evaluation of their position within a larger historic context. A historic property is determined significant or not significant by applying standardized National Register Criteria for Evaluation to property within its historical context. The NRHP categorizes significant properties as buildings, sites, districts, structures, or objects.<sup>14</sup> The definitions of these property types follow:

**Building:** A building is created principally to shelter any form of human activity. Examples of buildings include: administration building, house, barn, stable, train station, church, or shed.

**Structure:** Structures are distinguished from buildings by being functional constructions made for purposes other than creating human shelter. Examples of structures include: aircraft hangars, bandstands, bridges, canals, fences, kilns, or windmills.

**Object:** The term object is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment. Examples of objects include boundary markers, fountains, monuments, sculptures or statues.

**Site:** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure. Examples of sites include: battlefield, campsite, ceremonial site, designed landscape, rock shelter, or village site.

**District:** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. A district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points. A group of features lacking in individual distinction may even be considered eligible if the grouping achieves significance as a whole within its historic context. While a district derives its importance from being a unified entity, it can contain buildings, structures, sites, objects, or open spaces that do not contribute to the significance of the district if these properties do not adversely affect the district's integrity.

Throughout various historic building assessments, PICA and the NJ HPO have identified five historic districts to best comprehensively manage the

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<sup>14</sup> National Park Service 1997a, 4-5.

numerous and diverse resources at the Arsenal: the Administrative and Research Historic District, the 600 Area Ordnance Testing Historic District, Army Rocket Testing Historic District, and the NARTS D and E Historic Districts. These historic districts and their boundaries were defined based on careful consideration of historic and existing architectural character, current and past land uses, construction periods, and concentration of contributing resources.

### **2.3 Historic context**

The identification of historically significant properties can be achieved only through evaluation of their position within the larger historic context. According to the NRHP, historic contexts are defined as “...the patterns, themes, or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within prehistory or history is made clear”.<sup>15</sup>

The landscape at PICA can be divided into three general periods: (1) pre-historic subsistence activities; (2) pre-Arsenal industrial and agricultural activities associated with rural community settlement; and (3) Arsenal-related construction endeavors and subsequent military-industrial activities. The first period is characterized by subsistence activities conducted by Native Americans prior to the invasion of European traders/settlers (i.e., pre-historic camp and rock shelter sites have been identified in the vicinity). The second period reflects industrial activities associated with iron mining and production endeavors during the colonial/pre-Arsenal period by European-American settlers, and rural settlement activities which included the limited cultivation of grains and livestock prior to 1880. The third land use period—construction activities associated with the creation of Picatinny (Dover) Powder Depot beginning in 1880—involved the replacement or reuse of structures or remains associated with agricultural and early industrial periods of the area and the subsequent, dramatic land alterations inherent in the erection of a federal military reservation.

On the Arsenal's initial 1,866 acres in the Green Pond Brook valley, construction activities focused on the erection of storage magazines, officer's quarters, and service facilities. Then in June 1891, 315 acres of Picatinny's land near Lake Denmark was ceded to the U.S. Navy for the establishment

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<sup>15</sup> National Park Service 1997a, 7.

of the Lake Denmark Naval Ammunition Depot (NAD) to become its primary depot on the east coast. PICA and the Lake Denmark NAD expanded within the valley, their missions diversified to incorporate the manufacturing of increasingly more powerful explosives and ordnance, and involved significant construction and land moving activities.

The most dramatic alteration of the landscape occurred in July 1926 when a lightning strike caused explosions and fires at the Lake Denmark NAD. As a result, both PICA and Lake Denmark facilities were rebuilt based on newly devised procedures and building specifications. In 1960, PICA incorporated the Lake Denmark property (back) into its reservation.

Picatinny currently houses the Headquarters of the U.S. Army Research, Development and Engineering Command (RDECOM), Armament Research, Development and Engineering Center (ARDEC). RDECOM-ARDEC's mission is "researching and developing armament and weapon systems for a changing Army".<sup>16</sup> A major subordinate command of the U.S. Army Materiel Command (AMC), RDECOM is responsible for developing high quality weapons and munitions for US troops.

## 2.4 Significance

The National Register Criteria for Evaluation defines how historic properties are significant by categorizing a property's associations with important historic qualifiers. The *National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation*<sup>17</sup> lists four (4) major criteria to which a historic property can be associated: Criterion A—important events, Criterion B—Persons, Criterion C—importance in design and construction, and Criterion D—information potential. Although there are other criteria considerations, the four major criteria are described in more detail below:

- A. Event**—is associated with events that have made a significant contribution to the broad patterns of our history; or
- B. Person**—associated with the lives of persons significant in our past; or
- C. Design/Construction**—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

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<sup>16</sup> Chugach Industries, Inc. *Integrated Cultural Resources Management Plan Picatinny Arsenal, New Jersey: 2009-2013*. (Prepared for Picatinny Arsenal by Jason J. Huggan, Cultural Resource Coordinator, Chugach Environmental Office, Building 319 at Picatinny Arsenal, November 2008).

<sup>17</sup> National Park Service 1997a, 7.

and distinguishable entity whose components may lack individual distinction; or

**D. Information Potential**—yielded, or is likely to yield, information important in prehistory or history.

## 2.5 Aspects of historic integrity

Integrity in a cultural landscape relates to its ability to convey its significance. An integrity assessment evaluates the existence and condition of landscape features from a site's period of significance, using individual qualities of integrity as part of the overall assessment.

In addition to possessing historical significance, to be eligible to the NRHP properties must also retain sufficient physical integrity of features in order to convey their significance.<sup>18</sup> Historic properties both retain integrity and convey their significance, or they do not. The National Register recognizes seven (7) aspects or qualities of a property that define the concept of integrity. To retain historic integrity, a property must possess several, and usually most, of these aspects. The retention of specific aspects of historic integrity is paramount for a property to convey its significance. Determining which of these aspects are most important to a particular property requires knowing why, where, and when the property is significant. These aspects of integrity are again listed in *National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation*:<sup>19</sup>

### **Location**

Location is the place where the historic property was constructed or the place where the historic event occurred.

### **Design**

Design is the combination of elements that create the form, plan, space, structure, and style of a property. It results from conscious decisions made during the original conception and planning of a property (or its significant alteration) and applies to activities as diverse as community planning, engineering, architecture, and landscape architecture. Design includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials.

### **Setting**

Setting is the physical environment of a historic property. Setting refers to the character of the place in which the property played its historical role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space.

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<sup>18</sup> National Park Service 1997a, 44.

<sup>19</sup> *ibid.*, 44–45.

***Materials***

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form an historic property.

***Workmanship***

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.

***Feeling***

Feeling is a property's expression of the aesthetic or historic sense of a particular time period.

***Association***

Association is the direct link between an important historic event or person and a historic property.

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## 3 Administrative and Research Historic District

### 3.1 History

The Administrative and Research District combines two early, historically-related arsenal activities which are further united by one architectural style. During World War II, many important advances in new products or simplified methods of production were made at PICA in its newly constructed labs, testing facilities, and administrative buildings. The importance of Picatinny's research and development (R&D) activities grew, giving more emphasis to the R&D function which it would retain after the war. The job training methods, research projects, and improved work development originating at Picatinny, and passed along to other plants, saved the U.S. government more than \$3,000,000 in one year.<sup>20</sup>

It was the massive reconstruction after the Lake Denmark NAD explosion of 1926, which destroyed or damaged most buildings at Picatinny, which resulted in the consolidation of administration and research in this area. The installation's new focus on R&D was signified by the creation of "Chemistry Row," a series of laboratories distinctive for their Colonial Revival style matching that of the post's headquarters building. The administration and research responsibilities of Picatinny ballooned during World War II, requiring the major expansion of existing buildings as well as new construction. This district was long the ceremonial center of Picatinny, and it remains so today. The post's official flag staff stood in front of Building 151 from the 1930s through 1981, and the flag now stands in front of Building 1 (formerly Building 171).<sup>21</sup>

During the Great Depression, just at the time Picatinny was in the midst of a massive rebuilding effort following the nearby 1926 explosion, labor was provided through Roosevelt's New Deal agencies. The Civilian Works Administration (CWA) came in 1933, followed by the Works Progress Administration (WPA) from 1935 to 1939. The WPA assigned over 1,000 workers to the arsenal each year, with a peak of 1,903 workers in 1938, and spent

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<sup>20</sup> Excerpt from Nolte, Kelly, and Mark A. Steinback. *Definition of Historic Districts for Picatinny Arsenal, Morris County, New Jersey*, September 1999. (For a full historic context of the Administrative and Research Historic District, refer to this report.)

<sup>21</sup> Thurber and Norman, *Historic American Engineering Record, Picatinny Arsenal, New Jersey, HAER #NJ-36, Picatinny Arsenal, NJ, 1983.*



over \$2.1 million in total. These workers built and repaired roads and railroads, steam lines and sewers, and magazines and factory buildings, all of which met real needs as well as provided jobs. The infrastructure improvements made it possible for Picatinny to step up to huge new demands during World War II. WPA teams worked to repair, renovate, and replace several buildings in the Administrative and Research Historic District that had been damaged in the 1926 explosion, including Buildings 114, 115, 119, 151, and Building 1 (formerly Building 171).<sup>22</sup>

Some of Picatinny's earliest buildings are in this district, but their functions have changed over time. Building 114, for example, was built in 1884 as the first administrative headquarters, but was converted to officer's quarters in 1912. Building 115, also dating to 1884, was a guard and fire engine house, housed schoolrooms during World War I, and was rebuilt as officers' quarters in 1930. Building 119 started in 1887 as a shell filling house, was converted to a hospital during the 1917 influenza epidemic, and eventually also became military quarters; today, it houses administrative offices.<sup>23</sup>

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<sup>22</sup> Thurber and Norman 1983, 28.

<sup>23</sup> Harrell, Pauline Chase. *Evaluation of Structures Built Prior to 1946 at Picatinny Arsenal, New Jersey* (Fort Washington, MD: WCH Industries in association with Boston, MA: Boston Affiliates, Inc., 1996), E-72.

Figure 2. 1907 map (PICA Cultural Resources Office).

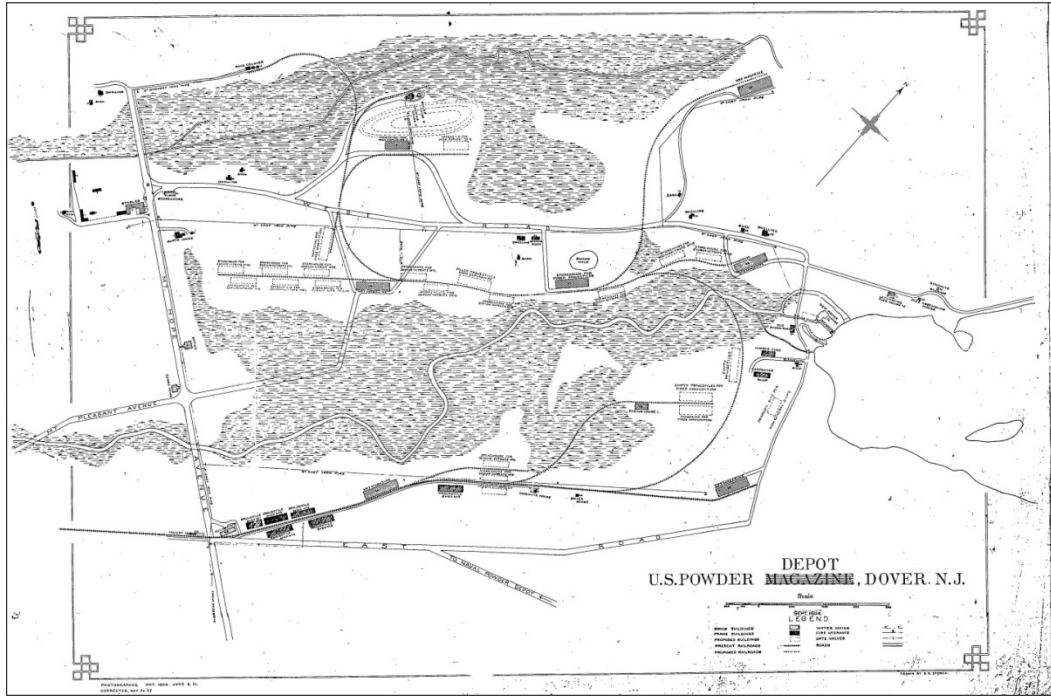


Figure 3. Crop of 1920 map of Picatinny (PICA Cultural Resources Office).

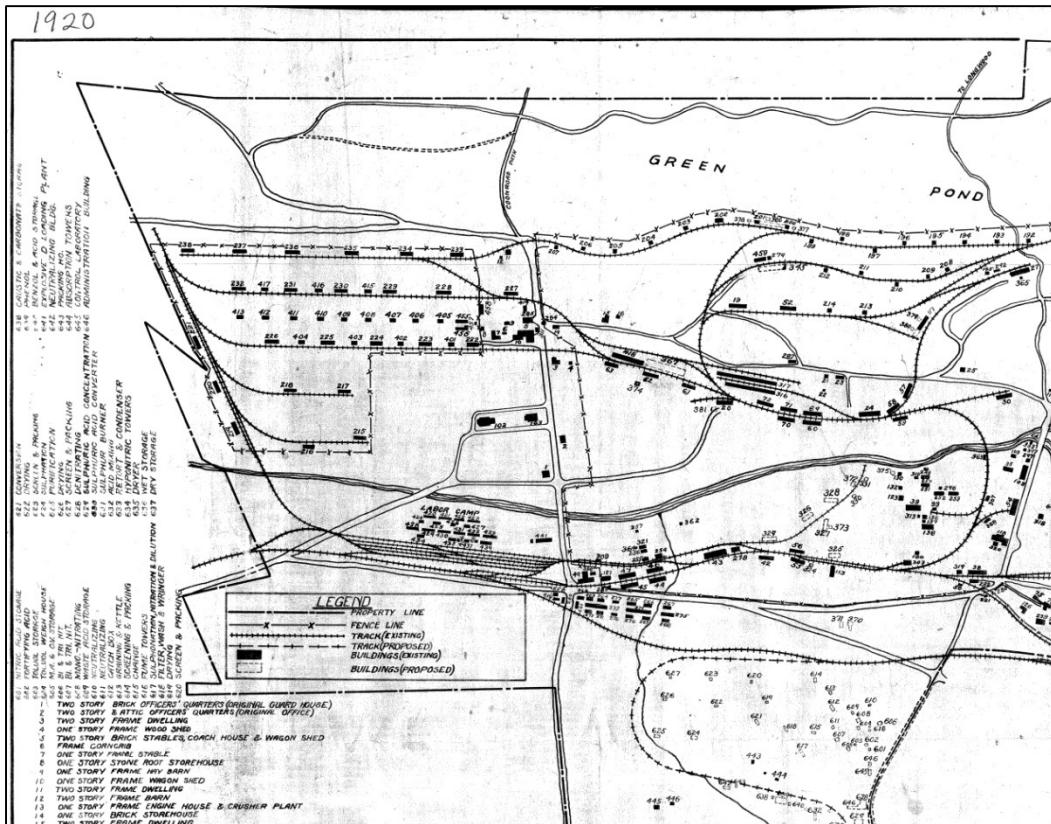


Figure 4. Crop of 1931 map of Picatinny (PICA Cultural Resources Office).

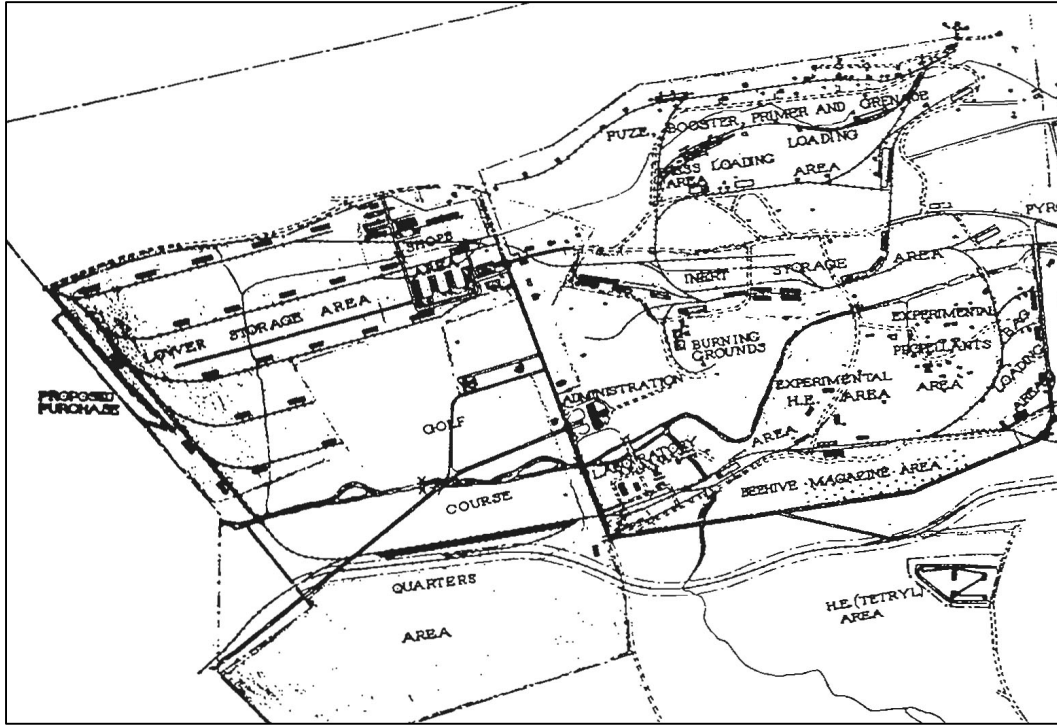
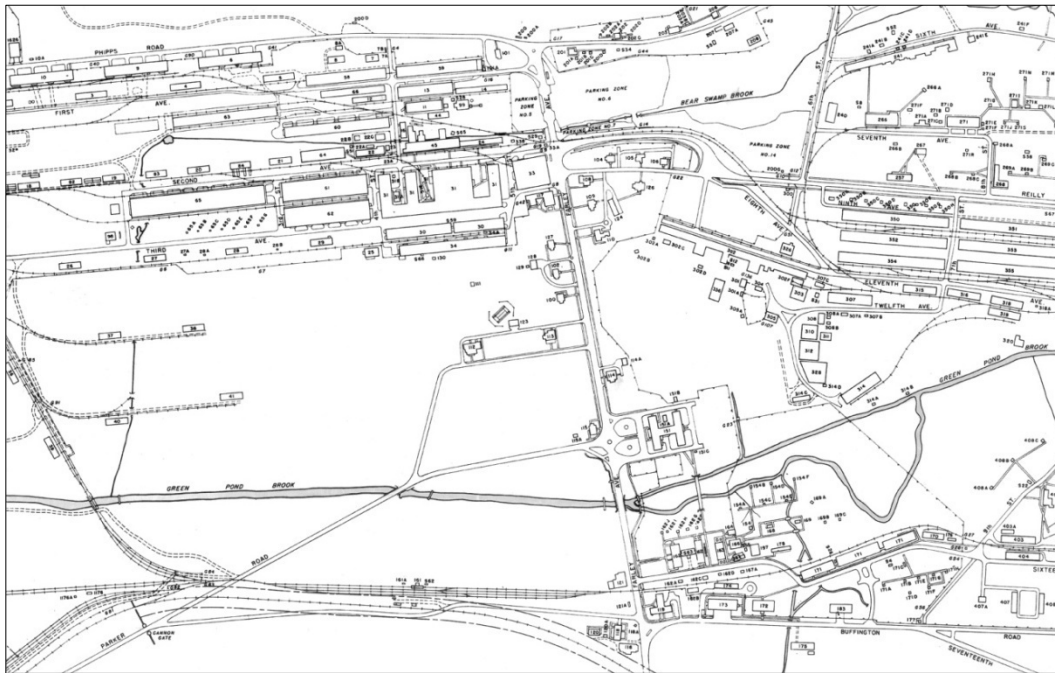


Figure 5. Crop of 1962 map of Administrative and Research Area (PICA Cultural Resources Office).





stately facade, is one of PICA's most distinctive historic buildings. Also in this historic district are the Commanding General's Quarters and the General's residence (former Assistant Officer's residence), both built in 1909 (Buildings 112 and 113). The styles and sizes of these dwellings convey the status of their tenants and the hierarchy of post command, and their location along Farley Avenue at the end of the Picatinny golf course (a former parade ground) lends formality to their setting - but they also serve all of the functions of family homes.<sup>24</sup>

The cluster of buildings housing the new research laboratories (which began construction in 1928), came to be known as "Chemistry Row." Here, cutting-edge basic research on the chemistry and physics of explosives and propellants was conducted under the direction of Picatinny's top scientific staff. Several buildings were built during 1928–1930. "The work of the Research Laboratories of Picatinny Arsenal forms the foundation upon which the entire development of propellants and explosives for the Army depends. Suitable equipment and housing for this equipment is essential for the proper performance of this work."<sup>25</sup> - from a 1928 report on new facilities at Picatinny The large main laboratory, home to the Chemistry Department of the Technical Group (former Technical Division), was prominently sited on Farley Avenue (Building 162). Laboratories performing hazardous operations were housed in separate buildings, including a high-explosives lab (facing Kibler Road and later incorporated into Building 162), another chemistry lab (Building 163), and a bit further removed was a stability lab (Building 164) and an explosives preparation and test lab (Building 167). Construction was placed "on hold" during the 1930s, but more buildings were added during World War II, including Buildings 166 (a propellant surveillance lab), and 168 (an ammunition and explosives magazine); Building 197 (a second surveillance lab) was completed shortly after the war's end.<sup>26</sup>

PICA underwent a huge expansion during World War II as its experimental and peace-time levels of production ramped up to meet wartime demand. After the United States' entry into the war, the work force grew to a peak of 17,900 in 1942, and it was highly diversified both in terms of technical skills and demographic profile. Thousands of women, as well as

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<sup>24</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html)

<sup>25</sup> Quartermaster Corps. *Completion Report on Construction and Completion of Buildings, Structures and Systems in Laboratory Area, Picatinny Arsenal, Dover, NJ, 1928.*

<sup>26</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html)

African American and Jamaican workers, worked the production lines. Maintaining and running this large facility and keeping track of its workers vastly increased the arsenal's administrative needs, as reflected in the construction of additional buildings in this historic district. At the same time, research and training programs were expanded. Picatinny was considered the "West Point" of ordnance because of its role in training engineers and supervisors for the national war effort, with over 20,000 ordnance personnel from all over the country visiting the installation for training during the WWII period. The arsenal also sent its staff far and wide to teach sampling inspection techniques and to supply technical plans to private industry nationwide when industry took over the bulk of ordnance production by the middle of the war. The arsenal's Chemistry Department concentrated on explosives including the development of Haleite; a new gasless fuze powder for use in delay detonators; new processes for manufacturing tetryl; flashless non-hygroscopic powder for antiaircraft guns; and many other products. Their work ensured that Picatinny was well-placed to lead basic research following the war.<sup>27</sup>

During the buildup and early part of the war, the central administration building (Building 151) was considerably enlarged, and the main laboratory (Building 162) was expanded and joined to the adjacent lab with an intervening addition. Building 1 (formerly Building 171 and originally a No. 2 magazine that was destroyed in an explosion and later rebuilt as a lab) was turned into an administration building. Buildings 166, 172, 173, and 174 were constructed in 1942–1943; Building 176 went up in 1944; Building 167 was enlarged in early 1945; and Building 183 was completed in July of 1945.<sup>28</sup>

### 3.2 Landscape inventory

To identify the prominent or distinctive characteristics that make a landscape historic, the physical features of the site are divided into eight (8) areas: site and layout, land use, expressions of military cultural values, transportation networks, views and viewsheds, buildings and structures, vegetation, and small-scale features. These characteristics of the landscape combine to form the built environment that is the primary image of PICA.

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<sup>27</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistrict/AdministrativeResearch/index.html)

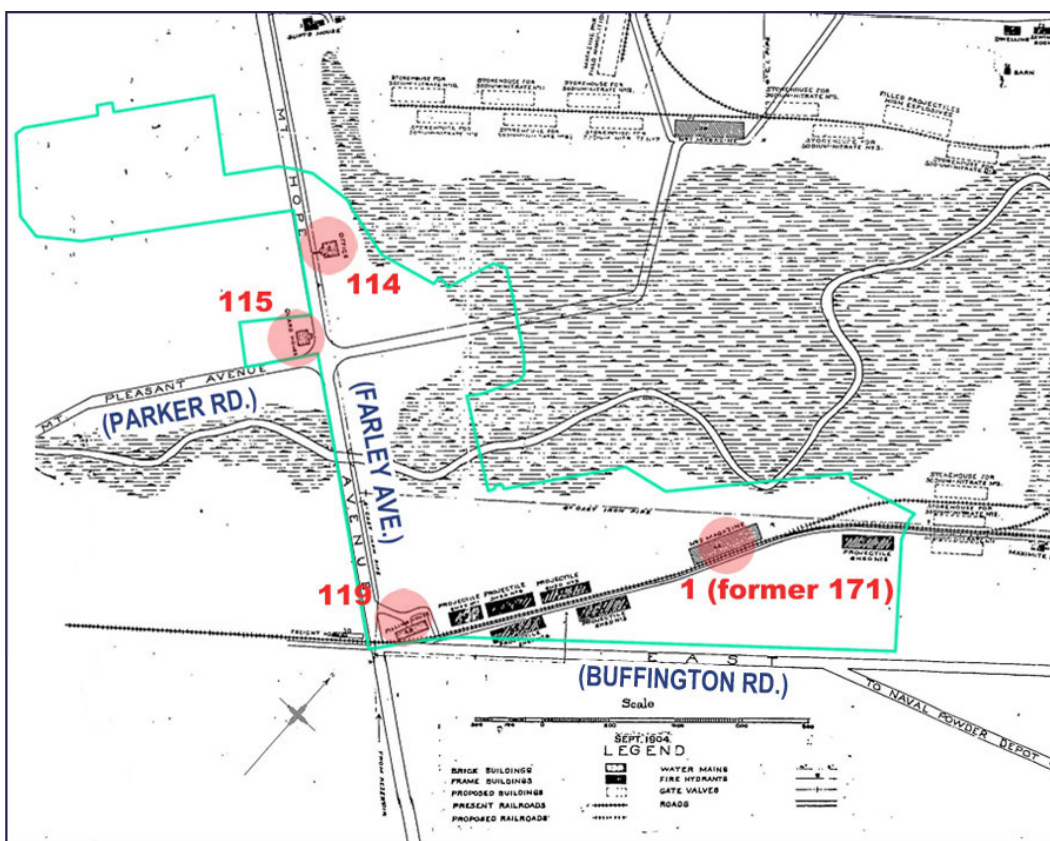
<sup>28</sup> *Ibid.*

### 3.2.1 Site and layout

Farley Avenue became the epicenter of Picatinny’s research and development program during the 1930s. Building 151, the original arsenal headquarters, stood at the nexus of the “Power Intersection” with Parker Road. This Colonial Revival-style building is prominently situated near an open area that has functioned as parade grounds, an airfield, and finally as the golf course. To the west are the Colonial Revival-style officers’ quarters. To the east are the chemistry facilities, referred to as “Chemistry Row”.<sup>29</sup>

The layout of the Administrative and Research Historic District is shown in Figure 8–Figure 11.

Figure 8. 1904 map showing the existing Administrative and Research District (outlined in green), on which buildings that are still standing are highlighted in red (PICA Cultural Resources Office).



<sup>29</sup> From historic marker located at the intersection of Parker Road and Farley Avenue in front of Building 151, Picatinny Arsenal.



Figure 9. 1920 map showing the existing Administrative and Research District, on which buildings that are still standing are highlighted in red (PICA Cultural Resources Office).

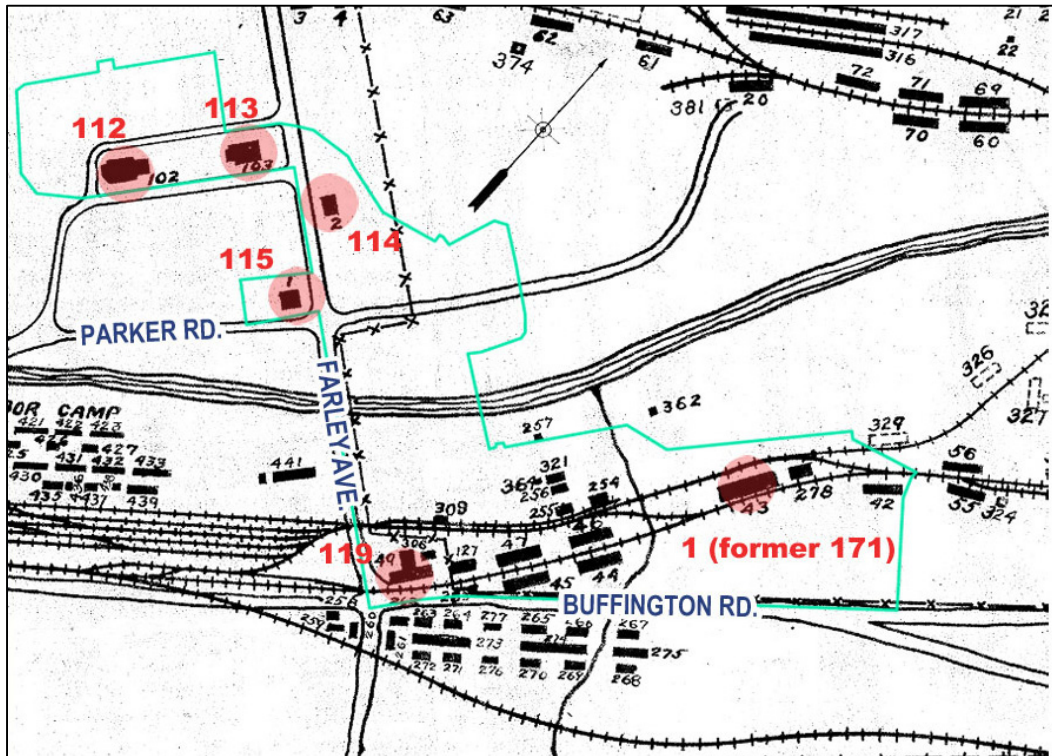




Figure 10. Aerial photograph of Administrative and Research Historic District, 1940. Note that north is at the top of this photo. (PICA Cultural Resources Office).



Figure 11. 2012 map of Administrative and Research Area Historic District with existing boundary line in dark red.



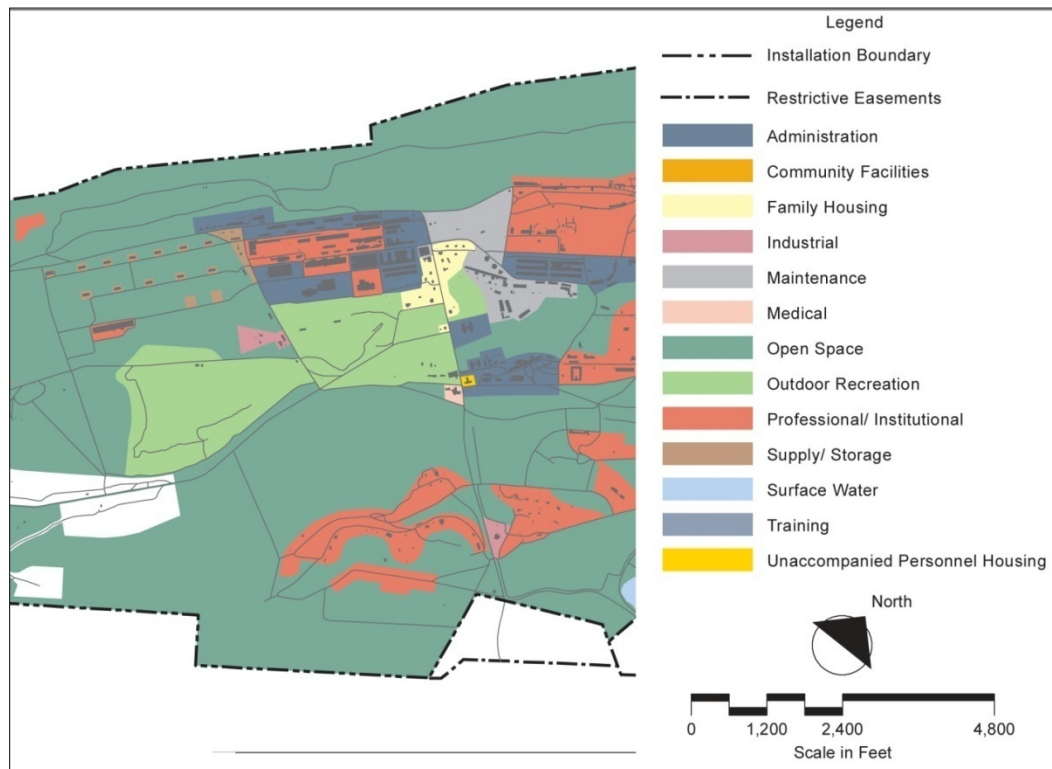
### 3.2.2 Land use

The Administrative and Research District encompasses the historic housing area, both the old and new general administration area on Farley Avenue and Buffington Road, and “Chemistry Row.” Current land uses are shown in Figure 12.

#### 3.2.2.1 Historic quarters

The historic housing area has been and currently is the center of military housing at PICA. The quarters are clustered along Farley Avenue (called Mount Hope Avenue outside the Mount Hope Gate); Farley Avenue which appears to predate military occupation of the area.<sup>30</sup> Figure 13 through Figure 15 show historic photographs of the quarters buildings in this area.

**Figure 12.** Land use map containing areas of Administrative and Research District; note that legend contains other areas of PICA. (PICA Cultural Resources Office).



<sup>30</sup> Harrell 1996, 27.



Figure 13. Historic photograph of Building 112, 1913 (PICA Cultural Resources Office).



Figure 14. Historic photograph of Building 114, 1913 (PICA Cultural Resources Office).



Figure 15. Historic photograph of Building 115, circa 1940 (PICA Cultural Resources Office).



### 3.2.2.2 “Chemistry Row”

Prior to the 1926 explosion, this area contained small-scale magazines and test buildings that supported powder and explosives testing and manufacturing. The small-scale buildings were dispersed throughout the area to ensure safety in case of accidental explosion. After the 1926 explosion, the creation and construction of the administrative and research facilities in this area reflected a shift in the Arsenal’s focus to research and development. This area is characterized by several matching brick and cast stone Georgian Revival style buildings that were built after the 1926 explosion. The early laboratory area was also called “Chemistry Row.”<sup>31</sup>

Figure 16–Figure 25 are photographs documenting various buildings in this area over time.

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<sup>31</sup> Harrell 1996, 29.

Figure 16. Historic photograph of "Chemistry Row", circa 1945 (PICA Cultural Resources Office).



Figure 17. Historic photograph of the new "Technical Building", circa 1945 (PICA Cultural Resources Office).





Figure 18. Construction of Building 173, 1942 (PICA Cultural Resources Office).



Figure 19. Completion of Building 173, 1942 (PICA Cultural Resources Office).



Figure 20. Historic photograph of Building 167, ca. 1940 (PICA Cultural Resources Office).



Figure 21. Building 119 after late 1930s rehabilitation (PICA Cultural Resources Office).





Figure 22. Building 119 after addition of wheelchair lifts in 2010 (ERDC-CERL, 2013).



Figure 23. Historic photograph of Building 151, circa 1930s (PICA Cultural Resources Office).





Figure 24. Aerial view of Building 151, 1970s (PICA Cultural Resources Office).



Figure 25. Aerial view of "Chemistry Row," 2013 (Bingmaps.com).



### 3.2.2.3 Golf course/open space

An installation often exhibits open spaces and on most installations, typically the largest planned open landscape is the golf course. According to previous research, the current 18-hole golf course at PICA was completed in the 1950s after the purchase of the Spicertown land on the west side of

Parker Road and south of 1<sup>st</sup> Street. However, its architect and official start date of construction is not known. Nevertheless, it is known that holes 16 and 17 were originally the site of the parade grounds.<sup>32</sup>

The first golf course at PICA was created in 1921 as a four-hole course in the general area of the present 16th hole. Located in front of the commander's house, the course was laid out on a small area on the parade ground along Parker Road and Farley Avenue (Figure 26 and Figure 27). The Picatinny Historical Office does not have photographs on file of the course's early years, except for a photograph from the late 1930s. According to the Picatinny historian, the golf course during the late 1930s also served as the Arsenal's airfield (Figure 28).<sup>33</sup>

Within a couple years, Picatinny's golf course expanded from a four-hole course to a nine-hole course. In 1925, the first tournament was held on the enlarged course.<sup>34</sup> The course remained unchanged until the late 1940s when improvements were made and five more holes were added to the course (Figure 29). In 1957, the course was completed as an 18-hole, par 72 course and remains so today (Figure 30). At present, the Picatinny Golf Course is located on the edge of the Administrative and Research Historic District.

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<sup>32</sup> Panamerican Consultants, *Historic Building Assessment and Determination of Eligibility for Inclusion in the National Register of Historic Places for Picatinny Golf Course* (Buffalo, NY: Panamerican Consultants, Draft May 2009), 10.

<sup>33</sup> Ibid.

<sup>34</sup> Ibid, 31.



Figure 26. Photo of open space in front of Quarters 112 and 113 from 1936  
Picatinny Yearbook (PICA Cultural Resources Office).

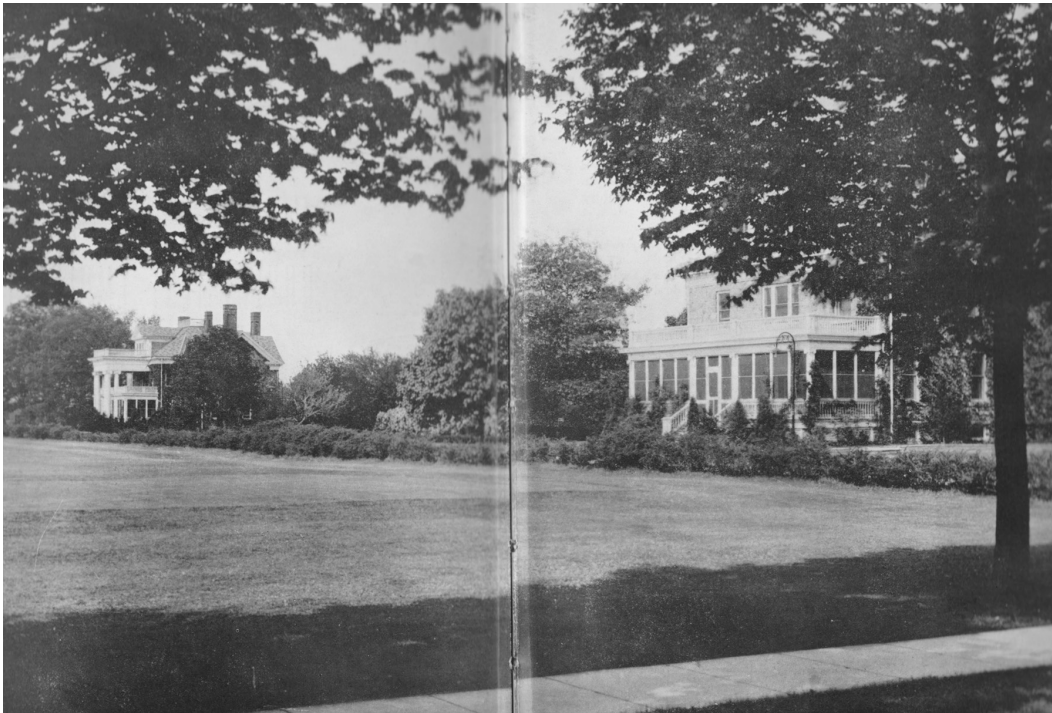


Figure 27. Open space in front of Quarters 112 and 113 (ERDC-CERL, 2013).



Figure 28. Historic photograph of the landing field (now the golf course) from the western edge of the parade field looking east (with Buildings 112 and 113 in the background on the left), no date (PICA Cultural Resources Office).





Figure 29. 1925 Plan of Picatinny Arsenal's nine-hole golf course (PICA Cultural Resources Office).

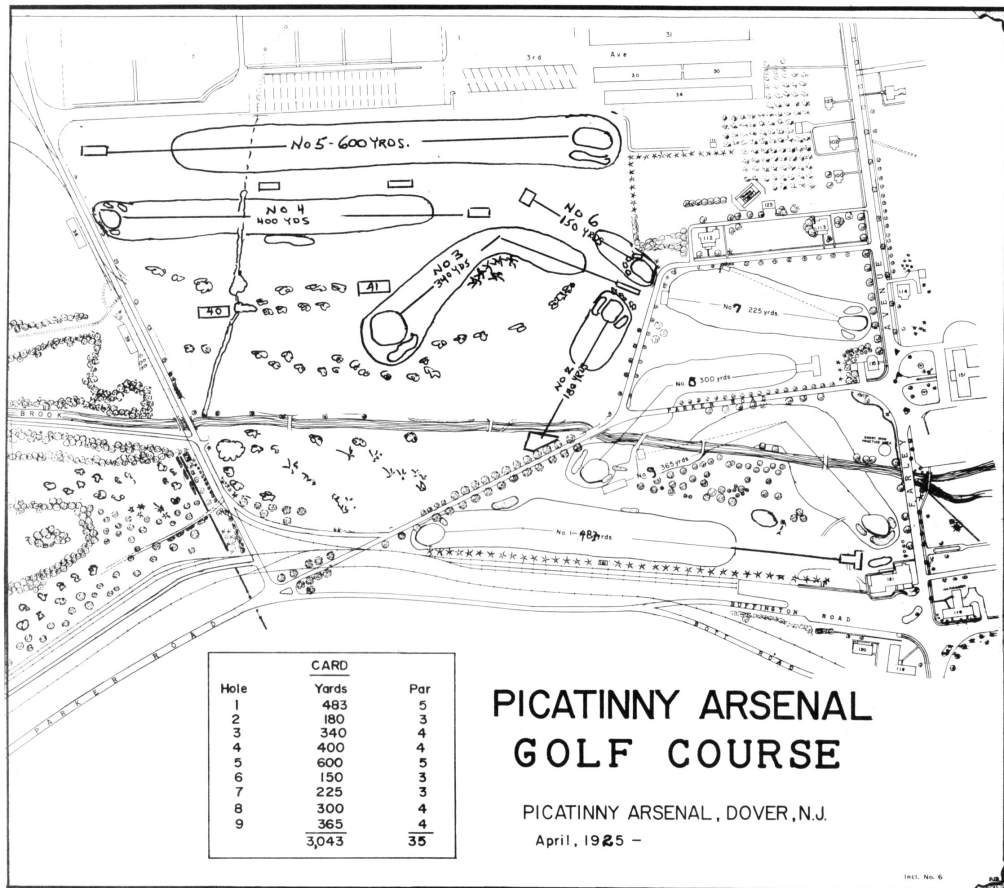
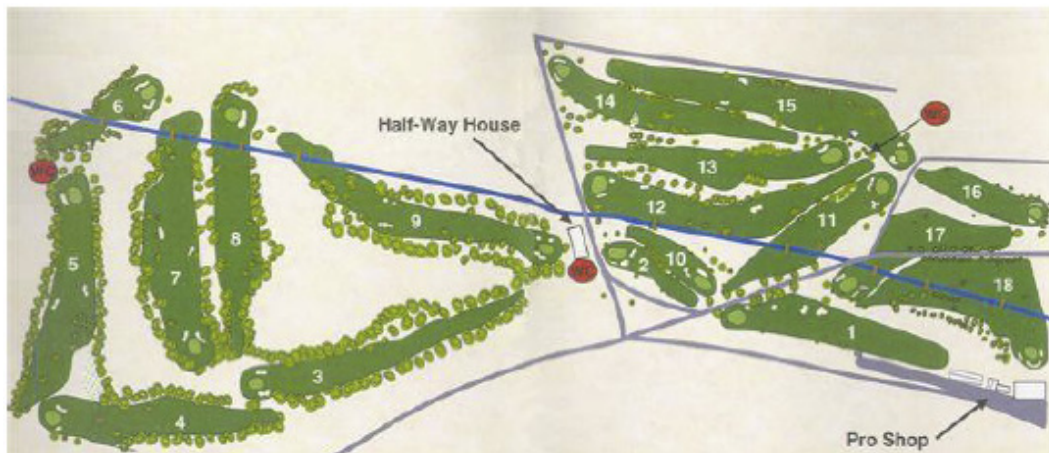


Figure 30. Course layout as depicted on the Picatinny Golf Club scorecard, 2008 (Panamerican 2009).



### 3.2.3 Transportation networks

When military installations are designed and built, a primary concern is transportation of troops, civilians, supplies, and materials on and off the base. Roads are usually the first items to be built. A number of early toll roads existed in the area around PICA and several were expanded, without the tolls, for use through the facility. Initially, the Army spent \$481,000 on the construction and improvement of PICA's roads and grounds.<sup>35</sup>

#### 3.2.3.1 Roads

Early plans from 1885 for the installation featured the road junction of Farley Avenue and Parker Road as the heart of the installation. According to a Morris County Iron Mines map from 1867, Farley Avenue was the only one of the two roads in existence at that time (Figure 31). By 1887, Parker Road is depicted on maps, showing that this significant intersection and the layout of the historic district have been present since the beginning of the installation (Figure 32).

Today, Parker Road provides access to the Administrative and Research District from the installation's main entrance at Route 15. The road runs north-south starting at the installation boundary with the Cannon Gates and terminates at Farley Avenue and Building 151 (original post headquarters; Figure 33). The road crosses through the golf course and is lined on either side with a row of street trees (Figure 34).

Farley Avenue, a major east-west artery, provides access west to the original residential, storage, and operations core as well as to the administration and machine shops area. Trees and homes line Farley Avenue throughout the residential area, terminating at Phipps Road (Figure 35). Farley Avenue provides access east to the laboratory area located on its north side and the golf course on its south side (Figure 36). Buffington Road connects Farley Avenue with the north end of the installation. Currently, there are more than 85 miles of paved roads within Picatinny Arsenal.

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<sup>35</sup> Nolte et al. *Architectural Assessment of Historic Structures at Picatinny Arsenal, Morris County, New Jersey* (Depew, NY: Panamerican Consultants, Inc. August 1999), 102.

Figure 31. Map of iron mines in Morris County, 1867 (PICA Cultural Resources Office).



Figure 32. Map from 1887 showing Picatinny Powder Depot (PICA Cultural Resources Office).

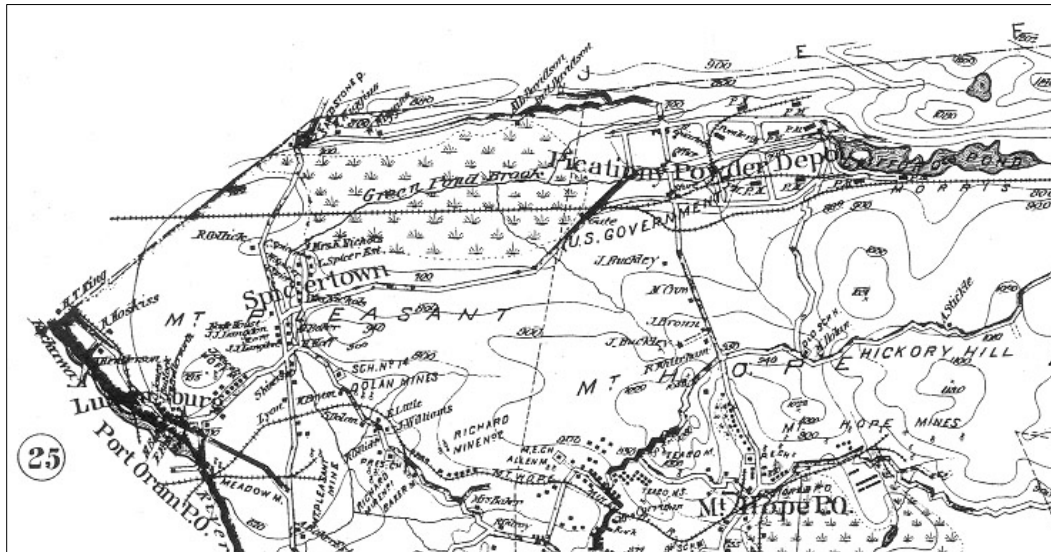




Figure 33. Intersection of Farley Avenue and Parker Road from Building 151, circa 1958 (PICA Cultural Resources Office).



Figure 34. Looking north along Parker Road (ERDC-CERL, 2012).





Figure 35. Buses at the northwest termination of Farley Avenue where it intersects with Phipps Road, no date (PICA Cultural Resources Office).



Figure 36. Sidewalk on the north side of the golf course along Farley Avenue (ERDC-CERL, 2012).



### 3.2.3.2 Railroads

Accessibility to a railway was a criterion for site selection for powder depots on the East Coast in the 1860s and 1870s. Land for the Picatinny Powder Depot was purchased in 1880. By 1887, 23.5 miles of track—called the Wharton & Northern Railroad—connected the Army depot with the Delaware Lackawanna and Western Railroad and the Dover and Central Railroad of New Jersey at Wharton. The track was laid out by the Morris County Railroad Company of New Jersey, under the terms of a nine-acre right-of-way granted by 99-year lease.<sup>36</sup> Rail links, both within and outside Picatinny Arsenal, were an essential part of its operability.

After the 1926 explosion, the WPA workers replaced and rehabilitated the tracks at Picatinny.<sup>37</sup> By 1930, the arsenal had approximately 25 miles of railroad tracks; 20.4 miles of standard gauge and one mile of narrow gauge government owned trackage, as well as three and one-half miles of the privately owned Wharton and Northern Railroad tracks running through the installation.<sup>38</sup>

The railroad system was a vital part of the mission at Picatinny, with track covering the largest area during World War II (Figure 37–Figure 38). After the war, the requirement for such extensive trackage lessened. In 1964, Picatinny undertook an extensive rehabilitation of the Arsenal's railroad system and more than 21 miles of track was restored, reconstructed, or under consideration for reconstruction. Three railroad bridges (Bridges 11, 12, and 13) and a turnout were replaced, and slightly more than three miles of abandoned track were removed. Some abandoned tracks became the bed for walking and jogging paths.<sup>39</sup> Most of the rail lines were ripped up in 1979 with the exception of those near the gate.<sup>40</sup>

Today portions of the railroad system are found throughout the Administrative and Research District (Figure 39). The earliest portions of the system, which ran roughly down Parker Road, are now completely covered in asphalt, used as walkways, or torn up to accommodate the golf

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<sup>36</sup> Harrell 1996, E-464.

<sup>37</sup> Rae, John. *Picatinny Arsenal*, Images of America Series (Charleston, SC: Arcadia Publishing, 1999), 55-56.

<sup>38</sup> Harrell 1996, E-464.

<sup>39</sup> Nolte et al., August 1999, 103.

<sup>40</sup> Rae 1999, 14.

course (Figure 40–Figure 41). The railroad system is noncontributing to the Administrative and Research Historic District.<sup>41</sup>

Figure 37. Train taking passengers (workers) to Back Line, 1940s (PICA Cultural Resources Office).



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<sup>41</sup> Nolte et al. August 1999, 103.



Figure 38. Train cars taking employees from the gate to the far end of the loading area, 1943 (PICA Cultural Resources Office).



Figure 39. Road and track to Spicertown (ERDC-CERL, 2012).





Figure 40. Looking south near the intersection of 1st Street and Parker Road at the modified railroad track, now used as a walking path (ERDC-CERL, 2012).



Figure 41. Looking eastward near the intersection of 1st Street and Parker Road at the modified railroad track, now used as a walking path (ERDC-CERL, 2012).



### 3.2.3.3 Bridges

Bridges were an integral part of Picatinny's road system, which traverses large swampy areas. Bridge B-4 was originally constructed in 1917 as part of a continuing road-building effort (Figure 42). By 1966 this small, narrow, poured concrete bridge was inadequate for modern traffic. A major widening and renovation effort was undertaken to upgrade it. Bridge B-4 has undergone extensive alterations (shown in Figure 43), thereby degrading its integrity and, further, it lacks significant historical or architectural merit. Bridge B-4 is noncontributing to the Administrative and Research District.<sup>42</sup>

Although concerns for vehicular traffic are important at military installations, pedestrian traffic must also be considered. Large tracts of Picatinny are in low-lying, swampy areas. Over the years, many of these areas were drained and used for a number of purposes, among them recreation. For example, a pedestrian footbridge is located next to vehicular bridge B-4 and connects Building 151 and 162 (Figure 44). Bridge B-19 was created as a footbridge across Green Pond Brook on the golf course. Several footbridges of the same type as B-19 can be found on the golf course. These bridges have no historical or architectural merit and are noncontributing to the district.<sup>43</sup>

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<sup>42</sup> Nolte et al. August 2009, 102.

<sup>43</sup> Nolte et al. August 2009, 106.



Figure 42. Historic photograph of the stone bridge (Bridge B-4) by Building 151, circa 1930 (PICA Cultural Resources Office).



Figure 43. Current stonework for Bridge B-4; note that stonework on one side (left in this photo), has been replaced with concrete (ERDC-CERL, 2013),





Figure 44. Bridge connecting Buildings 151 to 162 (ERDC-CERL, 2012).



#### 3.2.3.4 Sidewalks

Concrete sidewalks exist throughout the historic district along Farley Avenue (Figure 45 and Figure 46), Kibler Road, and Buffington Roads. Walkways also exist connecting Building 151 to Chemistry Row.



Figure 45. Sidewalk on the north side of the golf course looking northwest along Farley Avenue (ERDC-CERL, 2012).



Figure 46. Sidewalk along Farley Avenue, looking northeast (ERDC-CERL, 2013).



### 3.2.4 Expression of military cultural traditions

Military cultural traditions are reflected on military installations through both spatial organization and design aesthetics. The military is a unique culture that values hierarchy, discipline, utility, and patriotism. These ideologies are physically reinforced in the landscape, giving military installations a distinct appearance and a sense of place that makes their design easily recognizable.<sup>44</sup>

The Administrative and Research Historic District is prominently located near the entrance to the installation, with the headquarters building at the terminus of the Parker Road. This district includes officers' housing, recreation, headquarters and administration, and laboratory space. The district is a highly landscaped area, with rows of street trees and views of stately officers' quarters and lush, green, open space provided by the golf course. The hierarchy so prevalent in the military is clearly evidenced in this historic district, the visitors' first view of the installation.

The main principle of military installation development was to accommodate the mandated mission as quickly and efficiently as possible.<sup>45</sup> This often led to a utilitarian landscape in which function was emphasized over aesthetics. At Picatinny, much of the installation's 6,500 total acres are dedicated to the R&D of explosives and ordnance as dictated by the Arsenal's mission. In contrast to the Administrative and Research Historic District, these areas are seldom landscaped and lack street trees and mowed lawns. Traditionally, the buildings are lacking in architectural ornamentation as well.

It is also a military tradition that the flagpole be placed in front of the headquarters building. The flagpole at PICA was originally located at the intersection of Farley Avenue and Parker Road in front of Building 151 (the original headquarters building, Figure 47). When the headquarters were moved to Building 1 in 1941 (Building 1 was formerly designated as Building 171), the location of the flagpole was also moved (Figure 48).

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<sup>44</sup> Loechl et al. 2009, 73.

<sup>45</sup> Ibid, 70.



Figure 47. Historic photograph of guns and flagpole, 1913  
(PICA Cultural Resources Office).



Figure 48. Flagpole near Headquarters, 1963 (PICA Cultural Resources Office).



By the 1920s, a parade ground was added on the flat high area in front of Buildings 112 and 113 and to the side of Building 115. During the 1930s, the area around Farley Avenue became the epicenter of Picatinny's research and development program. The new post headquarters, Building 151, stood at the nexus of the new power intersection at the arsenal—Parker Road and Farley Avenue. This gleaming, new, Colonial Revival-style building looked straight ahead over a large open area that traditionally was open and remains open, serving as Picatinny's golf course (Figure 49).<sup>46</sup>

<sup>46</sup> Panamerican Consultants Draft 2009, 77.

Figure 49. Golf course and open space from Parker Road, looking west towards Quarters 112 and 113 (ERDC-CERL, 2012).



### 3.2.5 Buildings and clusters

After the Lake Denmark NAD explosion in 1926, the administration and research area was consolidated in this area. As the PICA website states, “The installation’s new focus on research and development was signified by the creation of ‘Chemistry Row,’ a series of laboratories distinctive for their Colonial Revival style, matching that of the post headquarters building.”<sup>47</sup> Using this architectural style gave this central area of the Arsenal the look of an academic institution.

The Administrative and Research Area Historic District currently consists of 18 contributing and 3 noncontributing buildings and structures and 1 object, the Middle Forge Monument, which are eligible for the NRHP under Criteria A and C as determined by the NJ HPO<sup>48</sup>. These resources are listed below in Table 1.

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<sup>47</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoric Districts/AdministrativeResearch/index.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoric%20Districts/AdministrativeResearch/index.html)

<sup>48</sup> Nolte et al. September 1999, 35-37; 2015 table Picatinny Cultural Resources Office.



Table 1. List of buildings in the Administrative and Research Area Historic District (taken from PICA real property records).

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
1	1940	Administration Building	Administration/ Post Headquarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; completed 1999	Former Building 171; many renovations, interior no longer historically significant
111	1909	Root Storage/ Greenhouse	Storage/ Greenhouse	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Scheduled for demo
112	1909	Commanding General's Quarters	Family Housing General	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
112A	1925	Tennis Court	Court Area (Tennis)	Contributing	Completed 2009	
113	1909	Family Housing General	Family Housing General	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
114	1884	Administrative/ Headquarters Commanding Officer's Quarters	Family Housing Colonel	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
114A	1937	Garage	Garage	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
115	1884	Guardhouse/ Fire Engine House/ School/ Officers' Quarters	Quarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Majority of interior is historically significant, except bathroom and kitchen area; scheduled for renovation
115A	1943	Garage	Garage	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
119	1887	Officers' Quarters/ Fill Plant/ Hospital	Quarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated and in 2010
123	1939	Garage	Garage	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
151	1929-1941	Post Headquarters	Administrative Building/ General Purpose Administrative	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Many renovations exist; front and portions of the rear entrance are historically significant
151A	1985	HVAC Building	HVAC Building	Not evaluated: not 50 years of age	Not evaluated	
151M	ca. late 1700s to early 1800	Middle Forge artifacts and other various memorials/ monuments	Middle Forge artifacts and other various memorials/ monuments	Contributing	Evaluated 1982-83 HABS; completed 2008	
162	1930-1942	Physics/ Chemistry Laboratory	Applied Instrument Building	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Many renovations exist; front entrance is historically significant
163	1930	High Explosives Research Laboratory	Signal Photo Laboratory	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in 2011
171B	1969	Incinerator	Derelict Incinerator	Noncontributing	Completed 2009	Scheduled for demo
172	1942	Ordnance Administration Building	Engineering Administration Building	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in 2005
173	1942	Guard House/ Transformer Station	Police Station and Communication Center	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Scheduled for renovation
174	1942	Service Magazine	Administration	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
176	1944	Laboratory Equipment/ Sampling of Ammunition	Administration	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in late 1980s
183	1943-1963	Steam Flow Meter House	Non Metal Materials Facility/ Administration Building R & D	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated during the early 2000s

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### 3.2.5.1 Descriptions of contributing buildings to the Administrative and Research Area Historic District

#### **Building 1: Administration Building (completed 1940)**

The current Building 1 (formerly Building 171) is an extremely large, long, two-story brick structure that presents a relatively flat facade broken in the center by a front pediment, two-story porch supported by Doric columns (Figure 50). The long line of the roof is broken by a hexagonal cupola that sports a weather vane. The window features concrete sills and pediments and are surrounded by decorative shutters. While the start date of the building's construction is uncertain, a blueprint detailing the structure's front door shows that this building was in existence by June 18, 1940. Portions of the exterior of the building are remnants of Magazine No. 2, which was built circa 1885. The building is approached off Buffington Road through an oval driveway system.<sup>49</sup>

Figure 50. Building 1, Administration Building/Post Headquarters (ERDC-CERL 2012).



<sup>49</sup> Nolte et al. August 1999, 71.



**Building 111: Root Storage / Greenhouse (1909)**

Building 111 is a small, one-story building, with a concrete foundation, masonry bearing walls, an overhanging, gable roof with composition shingles and a square footprint. Concrete steps lead down into the semi-subterranean interior. Constructed in 1909, Building 111 served as a root house for the Commanding General's House. In 1938, the building was rehabilitated by the WPA. The building retains original siting, massing, and construction and has an enclosed wooden entry on the south side (Figure 51).<sup>50</sup> This building is listed for demolition.

Figure 51. Root storage (ERDC-CERL, 2012).



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<sup>50</sup> Ibid., 48.

**Building 112: Commanding General's Quarters (1909)**

Constructed from locally-quarried pudding stone, this Colonial Revival residence has a central four-square plan with adjacent, gable-front side ell. The house was built in 1909 and has served continuously since 1911 as the Commanding General's Quarters. Building 112 is intact with limited alterations. It has a two-story front portico; rough-finished puddingstone facade with dressed pudding stone window surrounds; hipped, dormered central roof with flared ends; flared gables on side ell; enclosed front and rear porches and bay windows (side and rear elevations); and a glass-enclosed conservatory. Both exterior (Figure 52) and interior are richly embellished with decorative architectural elements. The original floor plan remains, except for alterations to the kitchen, bathrooms and enclosed porch.<sup>51</sup>

Figure 52. East elevation of Building 112 (ERDC-CERL, 2012).



<sup>51</sup> Ibid., 48. (For further information please refer to the HABS/HAER Inventory card from 1982 on file NJ HPO.)

### Building 112A: Tennis Courts (1925)

Building 112A is located between the two pergolas that are near Buildings 112 and 113. The tennis court is oriented north to south, is finished with green asphalt surface, and surrounded with a chain-link fence (Figure 53). A tennis court is depicted on a golf course map from 1925 (Figure 29). The court is seen in its current location and configuration in aerial maps from 1931. It is likely that the court began as a lawn court before it was covered with asphalt.<sup>52</sup>

Figure 53. Looking north towards Building 112A, Tennis Courts (ERDC-CERL, 2012).



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<sup>52</sup> Grandine and Riggle. *Historic Building Assessment and Determination of Eligibility for Inclusion in the National Register of Historic Places of 22 Buildings, Picatinny Arsenal, Rockaway and Jefferson Township, Morris County, New Jersey*. (Frederick, MD: R. Christopher Goodwin & Associates, Inc., November 2009), 22.



**Building 112B: Pergola / Picnic Shelter (1911); Demolished**

Building 112B is located north of the Commanding General's Quarters (Building 112). It has six pairs of tapered square wood piers that are bolted onto concrete footers. The tops of the piers feature simple, square capitals. Two bays are open, while three bays are enclosed with square-pattern wood lattice (Figure 54). The piers support double-board beams that are bolted together along the length of the structure. The beams support rafters with decorative ends. Cross beams span the width of the structure at each end and are bolted to the piers below the capitals. A similar pergola is seen in the same location but with rounded piers in a 1911 photo. It is possible the original structure was damaged in the 1926 explosion and was rebuilt on the same site.<sup>53</sup> This structure was demolished in 2015 with SHPO consultation. Mitigation included completed architectural drawings so structure could be rebuilt in future depending on funding.

Figure 54. View of Building 112B, pergola (ERDC-CERL, 2012).



<sup>53</sup> Grandine and Riggle November 2009, 22, 19.

**Building 113: Family Housing, General (1909)**

Building 113 is a Colonial Revival structure built in 1909 of locally quarried pudding stone, with a shingled roof (Figure 55). Originally constructed in 1909 as an Assistant Officer's residence, the house was used for many years as a general's residence. Building 113 remains intact with limited alterations. The exterior walls are coursed puddingstone; the shingled hipped roof has flat roof dormers with central pediment (front and rear elevations), and pedimented dormers (north and south elevations). Windows are double-hung and there is an oval window at the head of the maid's stairway. It has an enclosed front porch, balustrade second floor balcony, and conservatory. Building 113 has its original floor plan, except for alterations to the bathroom.<sup>54</sup>

Figure 55. East elevation of Building 113 (ERDC-CERL, 2012).



<sup>54</sup> Nolte et al. August 1999, 52.



**Building 113A: Pergola / Picnic Shelter (ca. 1930); Demolished**

Building 113A is located north of the Assistant Officers' Quarter (Building 113) and is similar to the pergola near Building 112. It is possible that this pergola was constructed in the 1930s at the same time that pergola 112A was replaced. The pergola has six pairs of tapered square wood piers that rest directly on the ground. The tops of the piers feature simple square capitals. Two bays are open, while three bays have wood lattice between the piers (Figure 56). The piers support double-board beams that are bolted together along the length of the structure. The beams support raters with decorative ends.<sup>55</sup> This structure was demolished in 2015 with SHPO consultation. Mitigation included completed architectural drawings so structure could be rebuilt in future depending on funding.

Figure 56. Building 113A (ERDC-CERL, 2013).



<sup>55</sup> Grandine and Riggle November 2009, 22.

**Building 114: Administrative / Headquarters Commanding Officer's Quarters (1884)**

Building 114 is a two-story brick building. It was built in 1884 to serve as the Arsenal's administrative headquarters but was converted to officer's quarters in 1912. The Commanding Officer lived here in 1937-38 while Building 112 was being renovated. Then in 1938-39, the WPA remodeled Building 114. A wooden porch that extended along the front facade was removed, the back porch was replaced, a chimney was removed, and an east-wing sunroom was added. The interior was also refurbished.

Building 114 is intact with limited alterations. Its eclectic architectural style combines Second Empire decorative elements and proportions with Colonial Revival hipped and dormered roof and central projecting bow (Figure 57). Each facade is divided into three bays by the articulation of brick pilasters and recessed, corbelled panels. Remaining from the original structure are the steel-frame arched windows; decorative brickwork (recessed window surrounds and brick corbelling); and curved, central projecting bay with front porch, segmented arch transom, and side lights at the front entrance. The structure's 1913 interior layout is intact, with finishes and woodworking dating from 1938.<sup>56</sup>

Figure 57. Southwest elevation of Building 114 (ERDC-CERL, 2013).



<sup>56</sup> Nolte et al. August 1999, 52



**Building 114A: Garage (1937)**

Building 114A is a small, one-story, three-door garage for Building 114. It sits on a concrete foundation and has galvanized iron on a wood roof (Figure 58). The garage was built in 1937 in connection with other improvements to Building 114.<sup>57</sup>

Figure 58. Southwest elevation of Building 114A (ERDC-CERL, 2013).



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<sup>57</sup> Nolte et al. August 1999, 57.



**Building 115: Guardhouse / Fire Engine House / School / Officers' Quarters (1884)**

Built in 1884 as Building No. 1, Building 115 was successively a guard house, a fire engine house, a school house (for Rockaway Township during World War I) and then officers' quarters. It was one of the earliest administrative structures built at Picatinny. However, it was damaged in the 1926 explosion and was gutted, with most of the third floor removed. In the early 1930s, the third floor was rebuilt above the second story and has since been used for officers' quarters. Building 115 is located at the intersections of Farley Avenue and Parker Road. An added gable on the front façade gives extra height to the structure. Building 115 is a two-and-one-half-story, rectangular, pitch roof, brick building (Figure 59).<sup>58</sup>

Figure 59. Northeast oblique of Building 115 (ERDC-CERL, 2012).



<sup>58</sup> Nolte et al. August 1999, 57.

### Building 115A: Garage (1943)

Building 115A is a one-story, rectangular, gable roof, two-car garage (Figure 60) situated near Building 115. It was built in 1943 as a garage and is still used as such. It has a number of Colonial Revival style features including a hipped roof, common bond brick construction, and 6/6 double-hung windows (vinyl replacement windows per SHPO consultation). The building has wood sills, wood lintels, and two new aluminum roll-up garage doors on the north side.<sup>59</sup>

Figure 60. Northwest oblique of Building 115A (PICA Cultural Resources Office).



<sup>59</sup> Nolte et al. August 1999, 58.



**Building 119: Officers' Quarters / Fill Plant / Hospital (1887)**

Building 119 is a large two-and-one-half-story, T-plan building, which is built with brick bearing walls upon a stone foundation (Figure 61). The building has a pitched roof clad with asphalt shingles and is painted white. It was built as a shell filling house in 1887. It was converted to a hospital for the 1918 influenza epidemic. Although damaged in the 1926 explosion, it was used for temporary offices until the completion of Building 151 in 1930. It then became enlisted quarters and a furniture storehouse until the 1930s WPA renovation for multi-family quarters. It was previously used for military housing, but is now used for administration of Army Community Services and contains the Chaplain's office. Building 119 retains its original siting, massing, and construction, including brick exterior walls and 6/6 wood sash windows (recently replaced with SHPO concurrence). A number of minor changes appear to have been introduced ca. 1940, including new concrete stair platforms, new concrete water table, and new garage doors at the rear.<sup>60</sup> More recent changes include wheelchair lifts added in 2010, fencing along Farley Avenue, and sidewalk upgrades.

Figure 61. Southeast oblique of Building 119 (ERDC-CERL, 2013).



<sup>60</sup> Nolte et al. August 1999, 59.

### **Building 151: Post Headquarters (1929-1941)**

Building 151 is a large, two-story plus basement, red brick, hip roof, H-plan building. The front (south) “I” portion of the building was built in 1929 as the major Administration Building at Picatinny Arsenal. Two linear additions were built to the north in 1941 by Francisco and Jacobus, Architects and Engineers of New York and Chicago, giving the building its present H-plan configuration. The building is still used for administrative and office use. Building 151 retains original siting, massing, and most of it is original construction. Important Colonial Revival architecture features include Flemish bond patterning in the brickwork, limestone quoining at the corners, a formal plan with symmetrical composition, central pavilion at the front entrance, front portico, Colonial Revival style lanterns (front and back), “PICATINNY ARSENAL” sign in Roman block letters, ornamented Classical pediment in the front pavilion, hipped roof, and six-over-six windows (Figure 62). The 1941 additions were sympathetic to the original in design and style, setting a precedent that allowed for further expansion in the future. The building has recently had some alterations to its original roof profile, as well as insertion of replacement windows with filler panels and snap-in mullions.<sup>61</sup> Other recent changes include new doors (to match historic doors), awnings over side doors with lighting, and solar lights currently being installed in parking lot (black poles to blend with the other existing poles).

**Figure 62. Southwest elevation of Building 151 (ERDC-CERL, 2012).**



<sup>61</sup> Nolte et al. August 1999, 59.



**Building 162: Physics / Chemistry Laboratory (1930-1942)**

Building 162 is a large, H-shaped building with one-, two-, and three-story sections. It is in the Georgian style, with a concrete foundation, brick walls, and hipped roofs (Figure 63). It was built in 1930, and the link and rear additions apparently date from 1942. It was renovated in 1980. Building 162 is mostly intact, except for some features changed in the 1980 rehabilitation. The building had brick quoins and cast stone entrance surrounds, string courses, keystones, cornices, and pediment. The sills are cast concrete, and the flat arches are brick. The many chimneys are brick with cast stone capping. The stairs at each of the four side entrances are granite with iron railings (currently being replaced), with lantern lights hanging in front of some of the entrance doors. The entrance screen at the main entrance appears to be glazed cast iron. Replacements include asphalt shingles to the roof (originally slate). Metal windows (probably double-hung wood, originally), anodized aluminum entrances doors, concrete stairs at the main entrances, and a two-story metal addition on the front left-hand side.<sup>62</sup>

Figure 63. South elevation of Building 162 (ERDC-CERL, 2013).



<sup>62</sup> Nolte et al. August 1999, 61.

### Building 163: High-Explosives Research Laboratory (1930)

Building 163 is a two-story, hip-roofed, brick building with stone trim and details (Figure 64). It was built in 1930 as a chemistry laboratory building and was recently used as a photographic laboratory; its new use is administration. Building 163 retains original siting, massing, and construction. Significant Colonial Revival-style architectural features include the formal, symmetrical composition; Flemish bond brick exterior; hipped roof; six-over-six replacement windows; double exterior granite stairways; wrought iron replacement railings with brick repointing; and stone keystones.<sup>63</sup>

Figure 64. Southeast elevation of Building 163 (ERDC-CERL, 2012).



<sup>63</sup> Nolte et al. August 1999, 63.



**Building 164: Chemistry / Stability Laboratory (1930); Demolished**

Building 164 was built during 1928–30 as part of the Arsenal's rehabilitation project following damage from the 1926 explosion. Like the other buildings of "Chemistry Row," it was designed in the Colonial Revival style, featuring a symmetrical facade, hipped roof, Flemish bond brickwork, brick quoins at the corners, copper gutters and flashing, six-over-six windows, splayed lintels, a formal Georgian pedimented front door (Figure 65). In addition, the building had a granite sill on the south side and a wrought-iron stair railing on the west side. The east and west sides each had a door and three windows, and a concrete exterior stairway and fourth door were located on the north side. The large front (south) room contained a lab bench with a continuous fume hood along the west side and a lab table in the center. The sample preparation room was behind this room at the northwest corner of the building. A third room, containing a sink, had no access to the other rooms and was entered from the east side exterior door.<sup>64</sup> It was demolished recently per consultation with the NJ HPO.

Figure 65. Southwest elevation of Building 164 (ERDC-CERL, 2012).



<sup>64</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No164.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No164.html)

### **Building 166: Test Conditioning Chamber (1943); Demolished**

Building 166 was designed in 1941 and built in 1943, during the wartime expansion of research facilities at Picatinny. The 1941 plans called for a second structure identical to Building 166 (to be Building 197), which would eventually be built adjacent to Building 166. Like its neighbors on what would come to be called “Chemistry Row,” Building 166 was designed in the Colonial Revival style (though somewhat simpler overall). The design features a symmetrical façade, Georgian door surrounds on both the front and rear doors, Flemish bond brickwork, and hipped roof (Figure 66). The east and west façades (front and rear) had central doorways with windows to each side. The interior consisted of control rooms at front and rear, connected by a narrow passageway with four windows along one side of the building and a large, central space containing four self-contained, double-walled, circular surveillance chambers with reinforced concrete ceilings, each with its own entrance.<sup>65</sup> It was demolished recently per consultation with the NJ HPO.

Figure 66. Southeast oblique of Building 166 (ERDC-CERL, 2013).



<sup>65</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No166.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No166.html)



**Building 167: High-Explosives Preparation and Test Laboratory (1930); Demolished**

Building 167 (originally Building 256) was an experimental preparation and testing laboratory for explosives, designed in 1928 as part of the Arsenal's rehabilitation project following the 1926 explosion and completed in 1930. The style was Colonial Revival to match its neighboring buildings and featured a symmetrical south facade with a Georgian door surround, hipped roof, Flemish bond brickwork, brick quoins at the corners, copper gutters and flashing, and six-over-six windows. A 1938 remodeling included an addition to the structure, and the proportions and scale were further altered when the building was enlarged around 1948. The design was fairly faithful to the original style, with the new north bay on the street façade matching the original one, though the ridged hipped roof was not carried across (Figure 67). In 1951, the building was repurposed to function as a nuclear chemistry research laboratory, due to the United States having entered the Cold War era and Picatinny turning to innovative, high-tech research. New ventilation stacks protruded from the original roof line, but otherwise the exterior was little changed.<sup>66</sup> It was demolished recently per consultation with the NJ HPO.

Figure 67. Southeast oblique of Building 167 (ERDC-CERL, 2012).



<sup>66</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No166.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No166.html)

### **Building 168: Ammunition and Explosives Magazine (1930) Demolished**

Building 168 was constructed in 1930 as an ammunition and explosives magazine. It was a one-story, pitch-roofed, concrete and hollow clay tile building with corrugated asbestos-covered metal roofing and concrete foundations (Figure 68). It contained five small storage chambers, which were separated into two areas by concrete, blast-resistant, divider wall. The building had five metal vents on the roof, concrete loading docks on each end (north and south), and was separated from others buildings to the north and east by a V-shaped barricade constructed of vertical telephone poles and vertical board siding, attached by wood framing.<sup>67</sup> The building was located in the area north of the row of chemical laboratories that front to Kibler Road. It was demolished recently per consultation with the NJ HPO.

Figure 68. Look north at Building 168 (ERDC-CERL, 2012).



<sup>67</sup> Nolte et al. August 1999, 70. (For more information please refer to the HABS/HAER documentation on Building 168 available at the Library of Congress.)



### Building 172: Ordnance Administration Building (1942)

Building 172 is a two-story building and basement, with a concrete foundation, structural steel frame encased in concrete, brick walls, and a hipped roof. It was built in 1942 by Francisco and Jacobus, Architects and Engineers of New York and Chicago, as an ordnance administration building, and it continues to be used for administrative purposes. Building 172 is mostly intact. The building has a concrete foundation, a structural steel frame encased in concrete forming piers and beams, brick spandrels and panels, and metal windows with cast stone sills (Figure 69); the hipped roof is covered with asphalt shingles, and there are two copper-clad dormer vents front and back. The front entrance stairs are concrete, with iron railings and standard lamps topped with eagles. The handicap walkway, rear wheelchair lift, and the awning were installed in 2008. Modifications to the original building include aluminum entrance doors, anodized aluminum windows, metal gutters and downspouts, and a metal entrance canopy at the basement entrance. The interior has been renovated.<sup>68</sup>

Figure 69. East elevation of Building 172 (ERDC-CERL, 2012).



<sup>68</sup> Nolte et al. August 1999, 71.

**Building 173: Guard House / Transformer Station (1942)**

Building 173 is a two-story, flat-roofed, concrete structure which occupies a central position at Picatinny Arsenal. Building 173 was built in 1942 as a transformer station. It was later used as a fire station, before Picatinny Arsenal acquired the Navy property. It currently is used both as a police station (main building) and a communications center (concrete block addition on the east side). Building 173 retains original siting, massing, and construction (Figure 70). The building has a large, concrete block addition on the east, three small additions on the west, and a group of new HVAC chillers on the north. Many of the original windows openings have been filled in with concrete panels. Many of the original wood elements (sash windows and doors) have been replaced with aluminum doors and windows.<sup>69</sup>

Figure 70. Southeast oblique of Building 173 (ERDC-CERL, 2012).



<sup>69</sup> Nolte et al. August 1999, 75.



### **Building 174: Service Magazine (1942)**

Building 174 was built in 1942 as a service magazine. It is an eleven-bay building with a concrete foundation, load-bearing brick and hollow tile construction, covered with metal siding (Figure 71). There are replacement doors and windows and a gable roof. While recently used for administrative offices, it is currently vacant and awaiting funds for renovation. Building 174 retains original siting, massing, and construction. There are wooden eaves with ventilated soffits. One end elevation is gabled; the other is hipped.<sup>70</sup>

Figure 71. East elevation of Building 174 (ERDC-CERL, 2012).



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<sup>70</sup> Nolte et al. August 1999, 75.

### **Building 176: Laboratory Equipment / Sampling of Ammunition (1944)**

Building 176 is a single-story building with nine bays, load-bearing brick walls laid in common bond, and concrete block additions with vinyl siding. There are replacement windows, a central doorway, and a gabled roof. It was built in 1944 as a laboratory and for sampling batches of ammunition. Additions were built in 1959, 1961, and 1962. The building is now used for administration. Building 176 retains its original siting, massing, and construction (Figure 72). There is no longer a wooden walkway connecting Building 176 to Building 1 (formerly Building 171).<sup>71</sup>

Figure 72. East elevation of Building 176 (ERDC-CERL, 2013).



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<sup>71</sup> Nolte et al. August 1999, 78.



### Building 183: Steam Flow Meter House (1943)

Building 183 is a combined building of an older one-story section and newer, T-shaped, two-story section; both sections have brick walls and gable roofs. The older section of Building 183 was built in 1943 as the Steam Meter Flow House with an addition in 1963 (designed by Lawrence Picone and Associates of Metuchen, New Jersey). The building is now used as a materials facility and for administrative purposes. The older section of Building 183 is a Georgian style with a concrete foundation, brick walls, six-over-six double-hung replacement sash windows, brick sills and soldier-course lintels, and a gable roof covered with asphalt shingles (Figure 73). The east facade has two sets of double wood doors with five-light rectangular transoms; the west facade had a central entrance with double wood doors topped with a semicircular fanlight, all set in a pedimented entrance bay. The newer section of the building has brick walls, metal windows with soldier brick lintel and concrete sills, spaced similarly to those on the original building, and a gable roof. A metal stairway leads to the upper doorway in the gable end.<sup>72</sup> The building was fully renovated in the early 2000s and in 2010, when a handicap access and a pushbutton door were added.

Figure 73. Southeast elevation of Building 183 (ERDC-CERL, 2012).



<sup>72</sup> Nolte et al. August 1999, 78.

### **Building 197: Laboratory and Test Building (1945); Demolished**

Building 197 was designed in 1941 but was not built until 1945. It was essentially identical to Building 166 except for its shingle roof. Like its earlier neighbors at “Chemistry Row,” Building 197 was designed in the Colonial Revival Style (though somewhat simpler overall), featuring a symmetrical facade, Georgian door surrounds on both front and rear doors, Flemish bond brickwork, and a hipped roof. The front and rear facades had central doorways with windows to each side (Figure 74), and the longer side walls had four windows each. The interior consisted of control rooms at front and rear connected by a narrow passageway with four windows along one side of the building, and a large central space containing four self-contained, double-walled circular surveillance chambers with reinforced concrete ceilings, each with its own entrance.<sup>73</sup> It was demolished recently per consultation with the NJ HPO.

Figure 74. East elevation of Building 197 (ERDC-CERL, 2012).



<sup>73</sup> [www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No197.html](http://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/AdministrativeResearch/PhotoInventory/MoreInformation/No197.html)



### Steam distribution system

The steam distribution system is a network of metal or asbestos-protected metal (APM) conduit that run above and below ground from the power plants throughout PICA. A centralized system of steam throughout Picatinny Arsenal and the Lake Denmark NAD provided a source of heating and allowed production facilities throughout the installation to use pressurized steam as a sparkless form of energy. The steam was created as a by-product of electricity production at the Power Plant (Building 506), built in 1906 and the Boiler House (Building 3013), built in 1901. Water from Picatinny Lake was heated, and the resulting steam forced through turbines to produce energy. Pressurized steam was then sent to production facilities via conduit. On site buildings were fitted with pressure-reducing valves and steam-powered equipment, which reduced the risk of explosion. Overall, the Steam Distribution System consists of a network of conduit, supporting structures, and pressure-reducing valves. Most of the system that was visible has been replaced, but there are remnants of an earlier system of conduit supported on cast stone pier such as the example in Figure 75–Figure 77.<sup>74</sup> A map of steam lines is shown in Figure 78.

Figure 75. Steam line infrastructure, center, behind Building 151 (ERDC-CERL, 2012).



<sup>74</sup> Harrell 1996, E-465.



Figure 76. Steam line infrastructure between Buildings 197 and 178, which has been removed since this photo was taken (ERDC-CERL, 2012).



Figure 77. Steam line infrastructure behind Building 1 (ERDC-CERL, 2012).







3.2.5.2 *Noncontributing structures in the Administrative and Research Historic District*

There are currently three noncontributing structures within the Administrative and Research Historic District boundary; they are listed in Figure 79.

Figure 79. Noncontributing structures in the Administrative and Research Historic District Boundary (ERDC-CERL, 2012).



Building 123 – Garage (1939) (ERDC-CERL, 2012).



Building 151A – HVAC Building (1985) (PICA, 2011).



Building 171B – Incinerator (1969) (ERDC-CERL, 2012).



### 3.2.6 Vegetation

Vegetation is a characteristic of the landscape that has a relationship to land-use patterns. Differences in vegetation patterns can delineate boundaries, land-use areas, and natural areas such as streams or ravines. In the military context, how vegetation is used may connote ceremonial, residential, training, or industrial areas. For example, residential neighborhoods are often the most heavily planted areas on military installations, while open spaces allow for gatherings or training. Additionally, prominent support buildings such as headquarters, chapels, hospitals, and officers' clubs tend to have more decorative landscaping than utilitarian buildings such as motor pools, flight lines, and the warehouse and shop areas. Because pests, disease, and death are inherent in vegetation over time, the study of historic landscapes looks at continuity in terms of design, style, material, and form.

In the 1885 plan for Picatinny Arsenal (Figure 80), street trees were depicted on all the streets featured. While not all the proposed streets were constructed, street trees were planted throughout the administration and research area, especially up Parker Road from the entrance gates (Cannon Gates). Today, street trees exist in the administration and research area, most heavily along Farley Avenue, Parker Road, and one side of Buffington Road. There are also remnants of the same age trees up and down Farley Lane. These trees were historically oak (Figure 81), replaced with Norway Maple trees, probably in the 1960s.

A root cellar and orchard were built behind Quarters 112 and 113 during their construction from 1909 to 1911. Coincidentally, a grid of planted trees is depicted in the same location on an early 1883 plan for the installation (Figure 82), even though Quarters 112 and 113 were not planned during this first phase of construction. Review of the early maps does not show an orchard marked, so the orchard is dated by the construction date of the associated root cellar. Only thirteen or so of these trees remain, and most are in poor condition (Figure 84). A tall row of mature cedar trees separates the quarters from the orchard, root cellar, and the dirt Orchard Lane. A tall row of cedars also separates the rear yards of the quarters from the golf course (Figure 84). It is assumed that the cedar trees were added for privacy in the 1960s, when the golf course expanded to the south.

Historically, landscaping would have depended on building use. Figure 85–Figure 86 show foundation plantings located along the front facades of

the Farley Avenue quarters, and Figure 87 shows more intensive plantings located in front of the historic quarters (Quarters 112, 113, 114, and 115), depicting the hierarchy of rank inherent in the military. However, all the quarters along Farley Avenue and Farley Lane have some plantings (at least evergreen shrubs) along the front facades (Figure 88). A row of cherry and crabapple trees is located along Larned Terrace, separating Quarters 112 and 113 from the golf course and former parade ground (Figure 89). A list of the landscape plants found at Picatinny is shown in Table 2.

In contrast, “Chemistry Row” along Kibler Road does not have any foundation plantings. As laboratory space and utilitarian buildings, these historically would not have had shrubs and planting beds, only grass. The same lack of landscaping would have applied to Building 174 as a magazine. The new buildings added in the 1940s, and those converted to administrative space (Building 1, 119, 162, 172, 176, and 183) all have some foundation plantings today (Figure 90). Building 173 has no foundation plantings, only ornamental trees planted in front. Building 151, as a headquarters, would have historically had showy, formal plantings. A good example of formal plantings is the traffic oval and evergreens in front of Building 1 (Figure 91).

Figure 80. 1885 Plan for US Powder Depot showing heavily planted street trees along Parker Road and Farley Avenue (PICA Cultural Resources Office).

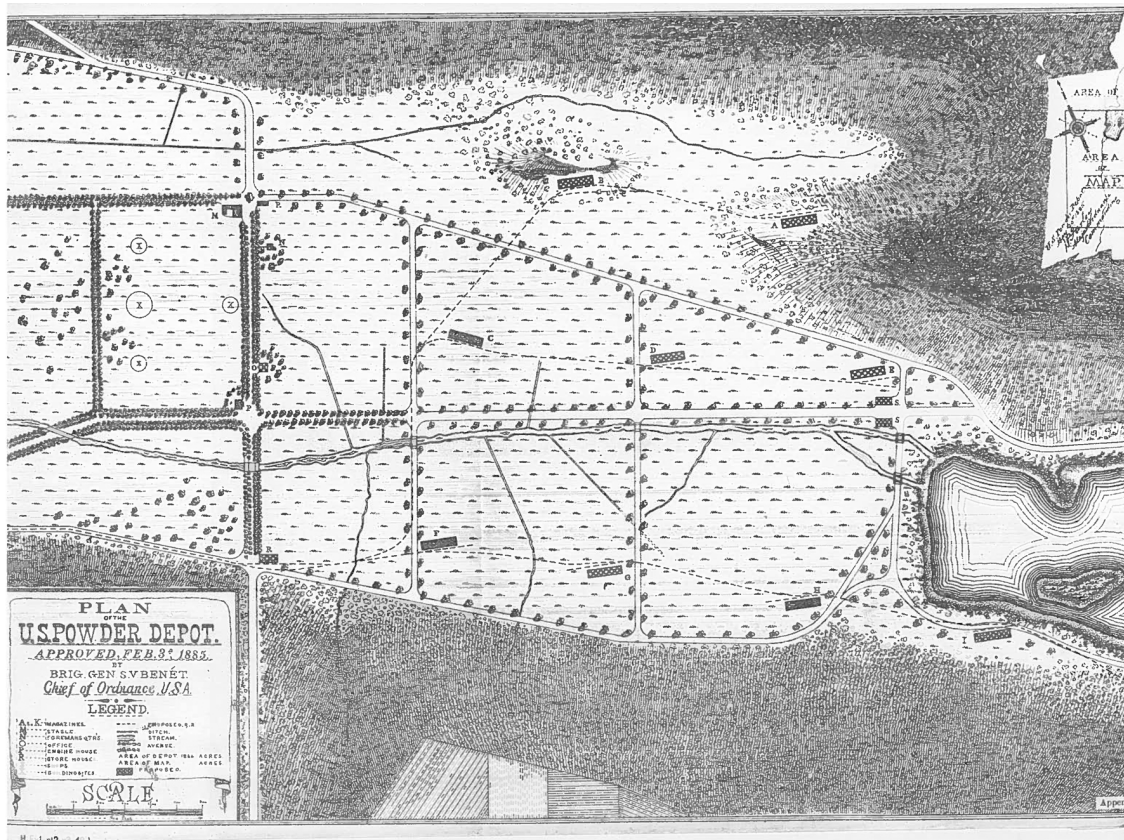


Figure 81. Historic photograph of an oak tree near Building 117, circa 1905 (PICA Cultural Resources Office).



Figure 82. 1883 proposed plan for “U.S. Powder Depot,” with note, “This plan has been changed. See plan approved 1885.” (PICA Cultural Resources Office).

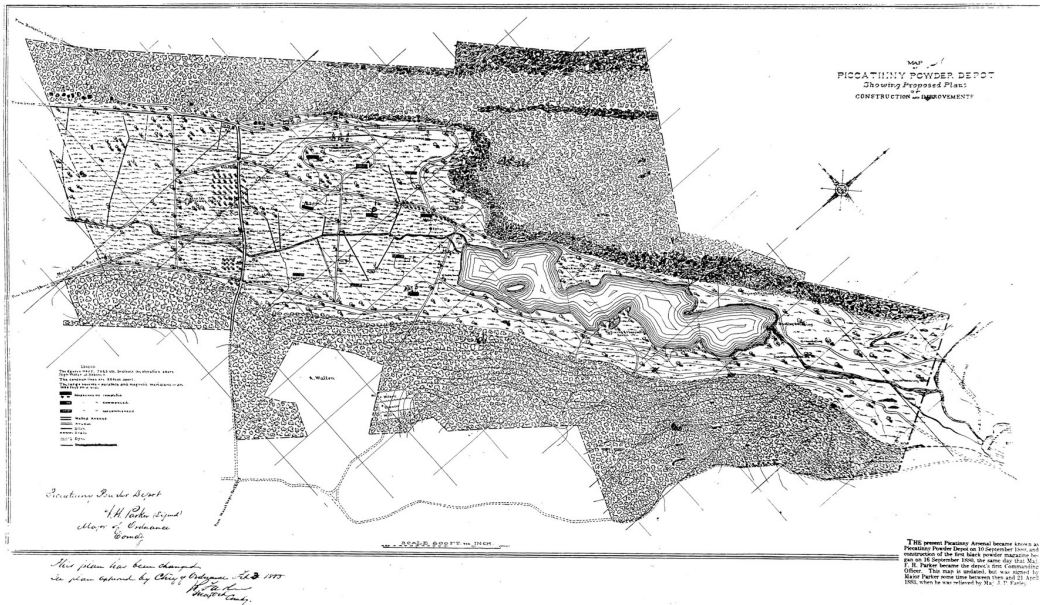




Figure 83. Orchard area behind Building 34 (ERDC-CERL, 2012).



Figure 84. Row of cedar trees behind Quarters 112 (ERDC-CERL, 2012). Five of these were lost during Hurricane Sandy in 2013.





Figure 85. Shade trees line Farley Road in the Administrative and Research Area (ERDC-CERL, 2012).



Figure 86. Another view of shade trees lining Farley Road in the Administrative and Research Area (ERDC-CERL, 2012).





Figure 87. Foundation plantings around Quarters 112 (ERDC-CERL, 2012).



Figure 88. New flower beds in front of Building 151 (ERDC-CERL, 2012).





Figure 89. A row of cherry and dogwood trees separates the golf course and the quarters (ERDC-CERL, 2012).



Figure 90. Historic photo of typical tree wells for tree protection on north side Building 172, 1943 (PICA Cultural Resources Office).





Figure 91. Evergreen shrubs planted around flagpole in front of Building 1 (ERDC-CERL, 2012).



Table 2. List of landscape plants found at Picatinny Arsenal (Picatinny NRMP).

Landscape Plants	Common Name	Scientific Name	
Grasses	Redtop	Agrostis alba	
	Kentucky 31 Tall Fescue	Festuca arundinacea	
	Creeping Red Fescue	Festuca rubra	
	Japanese Blood Grass	Imperata cylindrica var 'RED BARON'	
	Perennial Ryegrass	Lolium perenne	
	Giant Chinese Grass	Miscanthus floridulus	
	Maiden Grass	Miscanthus sinensis var gracillimus	
	Switchgrass	Panicum virgatum	
	Heavy Metal Grass	Panicum virgatum var 'HEAVY METAL'	
	Dwarf Fountain Grass	Pennisetum alopecuroides var 'HAMLEN'	
	Kentucky Bluegrass	Poa pratensis	
	Groundcovers	Moonbeam Grass	Coreopsis sp? var 'MOONBEAM'
Crown Vetch		Coronilla varia	
Ivy Varieties		Hedera spp.	
Japanese Creeper		Parthenocissus tricuspidata	
Pachysandra		Pachysandra terminalis	
Periwinkle □		Vinca minor	
Trees	Maple	Acer spp.	
	Birch	Betula spp.	
	Hickory	Carya spp.	
	Atlas Cedar	Cedrus atlantica	
	'Kousa' Dogwood	Cornus chinensis var 'KOUSA'	
	'Scarlet' Hawthorn	Crataegus laevigata var ?	
	Ash	Fraxinus spp.	
	Ginkgo	Ginkgo biloba	
	'Sunburst' Locust	Gleditsia tricacanthos var inermis	
	American Holly	Ilex opaca	
Goldenchain Tree	Laburnum x watereri		

<b>Landscape Plants</b>	<b>Common Name</b>	<b>Scientific Name</b>
	American Larch	Larix laricina
	Magnolia	Magnolia spp.
	Flowering Crabapple Varieties	Malus sp? var ?
	Dawn Redwood	Metasequoia glyptostroboides
	Colorado Spruce	Picea pungens
	Norway Spruce	Picea abies
	'Koster' Blue Spruce	Picea glauca
	Dwarf Alberta Spruce	Picea glauca var 'CONICA'
	Serbian Spruce	Picea omorika
	Austrian Pine	Pinus nigra
	White Pine	Pinus strobus
	Scotch Pine	Pinus sylvestris
	Japanese Cherry Varieties	Prunus serrulata var ?
	Douglas Fir	Psuedotsuga taxifolia
	Pear	Pyrus spp.
	Oak	Quercus spp.
	Willow	Salix spp.
	Mountain Ash	Sorbus spp.
	Arborvitae Varieties	Thuja occidentalis var ?
	Littleleaf Linden	Tilia cordata
	Hemlock	Tsuga canadensis
	American 'Liberty' Elm	Ulmus americanus var libertas
<b>Shrubs</b>	Serviceberry (a.k.a. Shadblow)	Amelanchier spp.
	Azalea Varieties	Azalea spp.
	Barberry	Berberis spp.
	Common Boxwood	Buxus sempervirens
	Flowering Quince	Chaenomeles japonica
	Summersweet	Clethra spp.
	Rock Cotoneaster	Cotoneaster horizontalis
	Cryptomeria	Cryptomeria spp.
	Slender Deutzia	Deutzia gracilis
	Burning Bush	Euonymus alatus



Landscape Plants	Common Name	Scientific Name
	Forsythia	Forsythia x intermedia
	Rose-Of-Sharon	Hibiscus syriacus
	Hydrangea Varieties	Hydrangea spp.
	Japanese Holly	Ilex crenata
	Juniper Varieties	Juniperus spp.
	Mountain Laurel	Kalmia latifolia
	Privet	Ligustrum spp
	Sweet Mockorange	Philadelphus coronarius
	Andromeda	Pieris japonica
	Mountain Andromeda	Pieris floribunda
	Flowering Almond	Prunus glandulosa
	White Fountain Weeping Cherry	Prunus subhirtella
	Weeping Higan Cherry	Prunus subhirtella var pendula
	Scarlet Firethorn	Pyracantha coccinea
	Rhododendron Varieties	Rhododendron spp.
	Spiraea Varieties	Spiraea spp.
	Common Lilac	Syringa vulgaris
	Yew Varieties	Taxus spp.
	Viburnum Varieties	Viburnum spp.
	Village Green Zelkova	Zelkova serrata
<i>Vines</i>	Wisteria	Wisteria floribunda

### 3.2.7 Small-scale features

Small-scale features are found throughout the Administrative and Research Historic District and help define the character of the cultural landscape. Developed in association with the roadways, buildings, and the occupancy of the site, these features often reflect the influence of the period in which they were added. Many of these miscellaneous small-scale features' character and feel contribute to the cultural landscape of the district.

#### 3.2.7.1 Cannon Gates and wall

Cannon Gates located at the main entry on the south side of PICA (Figure 92). Cannon Gates provided an appropriate entrance for the initial plan of

the Picatinny Powder Depot that included storage magazines, stable, foreman's quarters and office, engine house, store, shop, and other sites planned for future buildings.<sup>75</sup> The Cannon Gates were manufactured by the Cornell (NY) Iron Works in 1885 and used a heavy cannon mounted on stone foundation as the post for the wrought-iron gates. The gate insignia is the badge of the Ordnance Corps. The gates are bordered by a 3 ft stone wall (Figure 93), but two entrances break up the wall – one for the tracks of the Wharton & Northern Railroad and Picatinny's rails, the other for a road paralleling the tracks. The road went to a former housing area, Spicertown, along Parker Road that today is just a wooded area.<sup>76</sup> Gates were widened when the three lane entrance road was built 1941. The wall was rebuilt using the existing stone with matching mortar in 2012. The wall behind the Gunpowder Grill is dry-laid, as was the original wall prior to being moved.

Figure 92. Cannon Gates (ERDC-CERL, 2013).



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<sup>75</sup> Harrell 1996, E-49.

<sup>76</sup> Rae 1999, 11.

Figure 93. The west portion of the stone wall adjacent to Cannon Gates (ERDC-CERL, 2013).



### 3.2.7.2 Monuments

The Middle Forge Monument and memorial (151M) is located within the landscaped area of the Administrative and Research Historic District and in front of Building 151 at the intersection of Parker Road and Farley Avenue (Figure 95 and Figure 96). It was previously located in front of Building 114 adjacent to the golf course, in almost the same location as 114M (discussed below). The monument is an Army memorial that commemorates the history of the Middle Forge with a display of eighteenth-century ironworking tools.<sup>77</sup> The forge and tools in the monument were recovered at the actual Middle Forge site which was operational from 1749 to 1880 near Picatinny Peak. The Middle Forge supplied ordnance material to the Continental Army during the American Revolution. The monument is first seen in a 1912 photograph as configured in Figure 94 at a location that is

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<sup>77</sup> Chugach Industries 2008, 5-23.

unknown, but could be the former parade ground/golf course location. Remains of the actual Middle Forge still exist as a remote archaeological site at the outlet of Picatinny Lake.

Monument 114M is located on the north side of the former parade grounds along Farley Avenue (Figure 97). It is a memorial to all employees, military personnel, and retirees of Picatinny, date June 1984. Monuments 153M and 154M are located in front of Building 161 on either side of the Middle Forge Monument (Figure 98). They are Civil War-era, six-pound Napoleon cannons from Frankford Arsenal which was located in northeast Philadelphia. Field cannons were used by the U.S. Artillery until 1868. This type of gun was the most common Army field piece used during the Mexican-American War and at the start of the Civil War. It is unknown when they were moved to this location but they have been at PICA since 1911 when they were relocated from Rock Island Arsenal.

Since monuments and memorials can be moved around the landscape, they are typically not eligible unless they were added to the landscape during the period of significance. Dates should be established as to when these monuments were added to the landscape. Since the Middle Forge Monument is significant to the area as well as to the establishment of PICA and the cannons have been at PICA since 1911, justification can be made that they are tied to the historic district.



Figure 94. Middle Forge Monument in a 1912 photograph at an undocumented, unknown location (PICA Cultural Resources Office).



Figure 95. Current location of the Middle Forge Monument (151M) in front of Building 151. Monument's configuration and base have changed with new location. (ERDC-CERL, 2012).





Figure 96. Close view of Middle Forge Monument (ERDC-CERL, 2012).





Figure 97. Monument 114M, located on sidewalk adjacent to Farley Avenue (ERDC-CERL, 2012).



Figure 98. One of the two cannons that comprise Monuments 153M and 154M, located in front of Building 151 (ERDC-CERL, 2012).





### 3.2.7.3 Flagpole

The flagpole is a significant feature within the historic district (Figure 99–Figure 100). It is also a military tradition that the flagpole be placed in front of the headquarters building. The flagpole at PICA was originally located at the intersection of Farley Avenue and Parker Road in front of Building 151 (the original headquarters building). When the headquarters was moved to Building 1 (formerly Building 171), the location of the flagpole was also moved.

**Figure 99. Flagpole in front of Building 151 (original headquarters building), no date (PICA Cultural Resources Office).**



Figure 100. View of the flagpole in front of Building 1 (current headquarters) (ERDC-CERL, 2012).



#### 3.2.7.4 *Historic marker*

A historic marker for the NRHP-eligible historic district is used to identify and highlight significant areas (Figure 101). The marker allows for military and civilian personnel and installation visitors to be more aware of the installation's historical heritage and to ensure the long-term preservation of its significant areas. The marker was funded by the Environmental Affairs Division of PICA and produced by Lake Shore Industries of Erie, Pennsylvania. Text was developed by Cultural Resources Manager (CRM), NJ HPO, and the Morris County Heritage Commission. The marker was put in place in 2012.



Figure 101. Historic marker identifying the Administrative and Research Historic District (ERDC-CERL, 2012).



### 3.2.7.5 Miscellaneous features

Other miscellaneous features around the historic district include railings, posts, street lamps, granite posts, and stone and brick garage door openers (Figure 102–Figure 105).



Figure 102. Original cast-iron handrails located in Chemistry Row in the Administrative and Research Historic District (ERDC-CERL, 2012).



Figure 103. Garage door openers embedded in post located behind Quarters 112 and 113 (ERDC-CERL, 2012).





Figure 104. Granite post along west side of Farley Ave by former parade grounds (ERDC-CERL, 2012).



Figure 105. Various styles of lamp posts found throughout the Administrative and Research Area Historic District (ERDC-CERL, 2012).



#### 3.2.7.6 Antiterrorism force protection features

In 2009, planters and large boulders were added along Buffington Road in front and along the sides of Buildings 172, 173, and 174 to comply with Antiterrorism Force Protection (ATFP) requirements (Figure 106–Figure 107). Remote-controlled drop gates were also added for access to the front



and rear of Building 173. These are not historic features, and there is no precedent in the historic district for such materials.

Figure 106. Force protection planters in front of Building 172 (ERDC-CERL, 2012).



Figure 107. Force-protection boulders that are located near Buildings 172, 173, and 174 (PICA Cultural Resources Office).

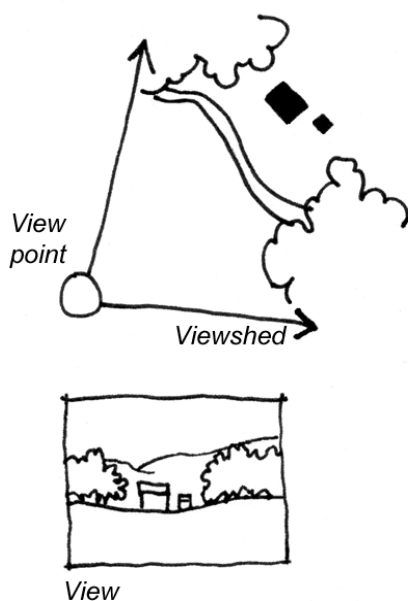




### 3.2.8 Views and vistas

Cultural landscapes are a relatively new field of inquiry, and as a consequence, the idea of documenting and preserving historically-planned views and viewsheds is also a new idea in landscape studies. Views and viewsheds are intentionally designed features in a landscape. Although they are intangible, physical encroachment on them significantly alters the aesthetics of the design.

Views and viewsheds are created by landscape-scale physical elements. In the process of identifying and evaluating historic views and viewsheds, the historic physical elements are compared with the contemporary site context.



**Viewshed:** Viewshed refers to all visible elements that can be seen from a certain viewpoint. Viewsheds are both external and internal. External viewsheds are those with views from viewpoints outside of PICA, while internal viewsheds are viewpoints from within base grounds.

**View:** A scene or vista that can be seen when looking in one direction standing at a certain viewpoint.

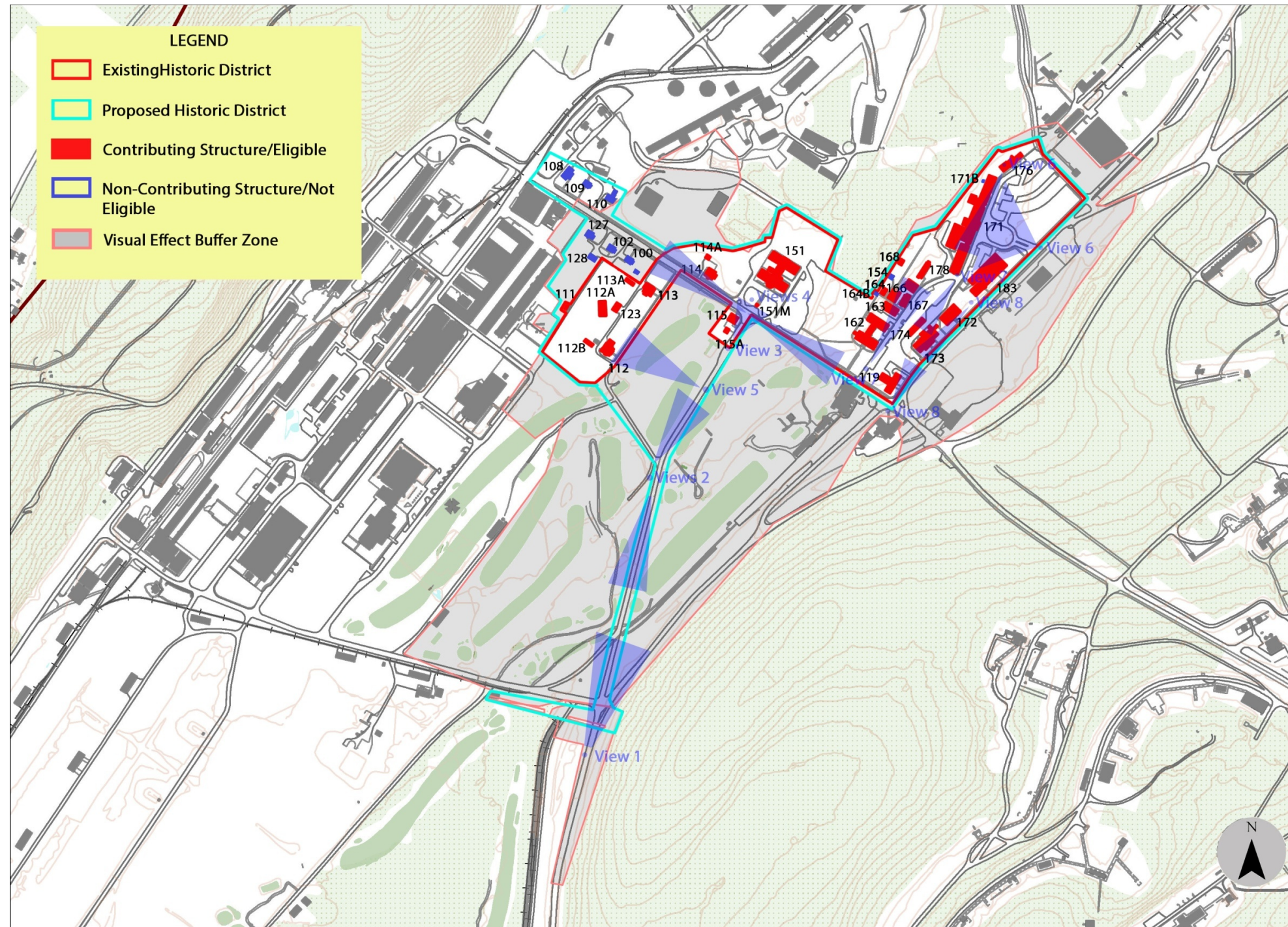
**Viewpoint:** is the exact point where a person is standing when looking at a view.

A map of the significant view at PICA is shown in Figure 108 and further discussed in the subsection that follows.

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Figure 108. Map of significant views in the Administrative and Research Historic District (ERDC-CERL).







### *3.2.8.1 Significant views within Administrative and Research Historic District*

Views and viewsheds are contributing features to a historic district. The following view have been identified as contributing elements to Administrative and Research Historic District, based on historic photos and current integrity.

1. View toward Cannon Gates
2. Views north and south along Parker Road
3. View Of Headquarters (Building 151)
4. Views along Farley Avenue
5. View across golf course to Quarters 112 and 113
6. Views of Former Headquarters (Building 1)
7. Views along “Chemistry Row”
8. Views along Buffington Road

#### *3.2.8.1.1 View toward Cannon Gates*

The Cannon Gates have been at their current location on either side of Parker Road at the intersection with 1<sup>st</sup> Street and Buffington Road since 1885. These gates have been the symbol of the arsenal in photographs and documents over the years and have served as the historical entrance to the installation. The current main entrance with guard gates today is farther south from the Cannon Gates. This view, as well as gate and wall location, has changed over time because the road has been widened, First Street was added, and the railroad removed—all to accommodate more and more vehicular traffic. The loss of street trees also affects the integrity of this view. Figure 109–Figure 113 show the historical and current views toward Cannon Gates.

Figure 109. View toward Cannon Gates, 1908–1940 (PICA Cultural Resources Office).





Figure 110. View toward Cannon Gates, 1940s (PICA Cultural Resources Office).



Figure 111. View toward Cannon Gates prior to removal of railroad in 1979 (PICA Cultural Resources Office).





Figure 112. View toward Cannon Gates after removal of railroad in 1979 (PICA Cultural Resources Office).



Figure 113. Current view toward Cannon Gates, looking north from outside the installation's boundary (ERDC-CERL, 2013).



### *3.2.8.1.2 Views north and south along Parker Road*

Parker Road has been the historic entrance corridor to the installation. The street trees, first noted on plans from the 1880s, are an important feature of this viewshed corridor as is the open space (now the golf course) on either side of the street (Figure 114–Figure 116). Daily installation traffic over the years has been rerouted away from this road, preserving Parker Road’s scale, width, and intersection at Farley Avenue within the historic district.

**Figure 114.** Looking north up Parker Road (ERDC-CERL, 2012).





Figure 115. Looking south down Parker Road, just past Farley Avenue (ERDC-CERL, 2012).



Figure 116. Another view looking farther south down Parker Road just after Larned Terrace (ERDC-CERL, 2012).





### 3.2.8.1.3 View of Headquarters (Building 151)

The former Headquarters building, built in 1929, is prominently sited at the intersection of Parker Road with Farley Avenue, the terminus of the entrance road (Figure 117). Building 151 served as the installation's headquarters until 1941, but today is an administrative building. The Middle Forge Monument (151M) and Civil War-Era cannons(153M and 154M) are prominently displayed in front of the building; parking is visible on the sides of the building but is mostly hidden behind the building (Figure 118).

Figure 117. View north on Parker Road looking at Building 151 (ERDC-CERL, 2013).



Figure 118. Looking north from Farley Avenue at the south elevation of Building 151 (ERDC-CERL, 2013).



#### *3.2.8.1.4 Views along Farley Avenue*

Farley Avenue has been historically the site of officers' quarters and administration buildings. Much care has been taken to preserve the historic architecture, street trees, open space, sidewalks, and views along this road. The road has only been widened slightly over the years, but the flagpole has been moved and the circle lost in front of Building 151 after it was no longer serving as Headquarters. Portions of the sidewalks have been replaced over time for safety purposes and do not match color or styles of prior sidewalks. Yellow truncated domes at the edge of the sidewalks at certain intersections were added in 2011.

In addition, Building 162 occupies a prominent position on Farley Avenue in the former Chemistry Row area. The building's Georgian style is carried consistently throughout all sides of the H-shaped structure, and the landscaped lawn with large trees adds to the dignified public appearance of Farley Avenue.<sup>78</sup> The flowering trees and other vegetation in front of Building 162 most likely date from the 1980 renovations.

Figure 119–Figure 126 present historic and contemporary photos of these views.

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<sup>78</sup> Nolte et al. September 1999, 63.



Figure 119. Historic photograph of the flagpole, circa 1905 (PICA Cultural Resources Office).



Figure 120. View from Building 151 of intersection of Farley Avenue and Parker Road, ca. 1958 (PICA Cultural Resources Office).



Figure 121. 1971 view of the flagpole (PICA Cultural Resources Office).

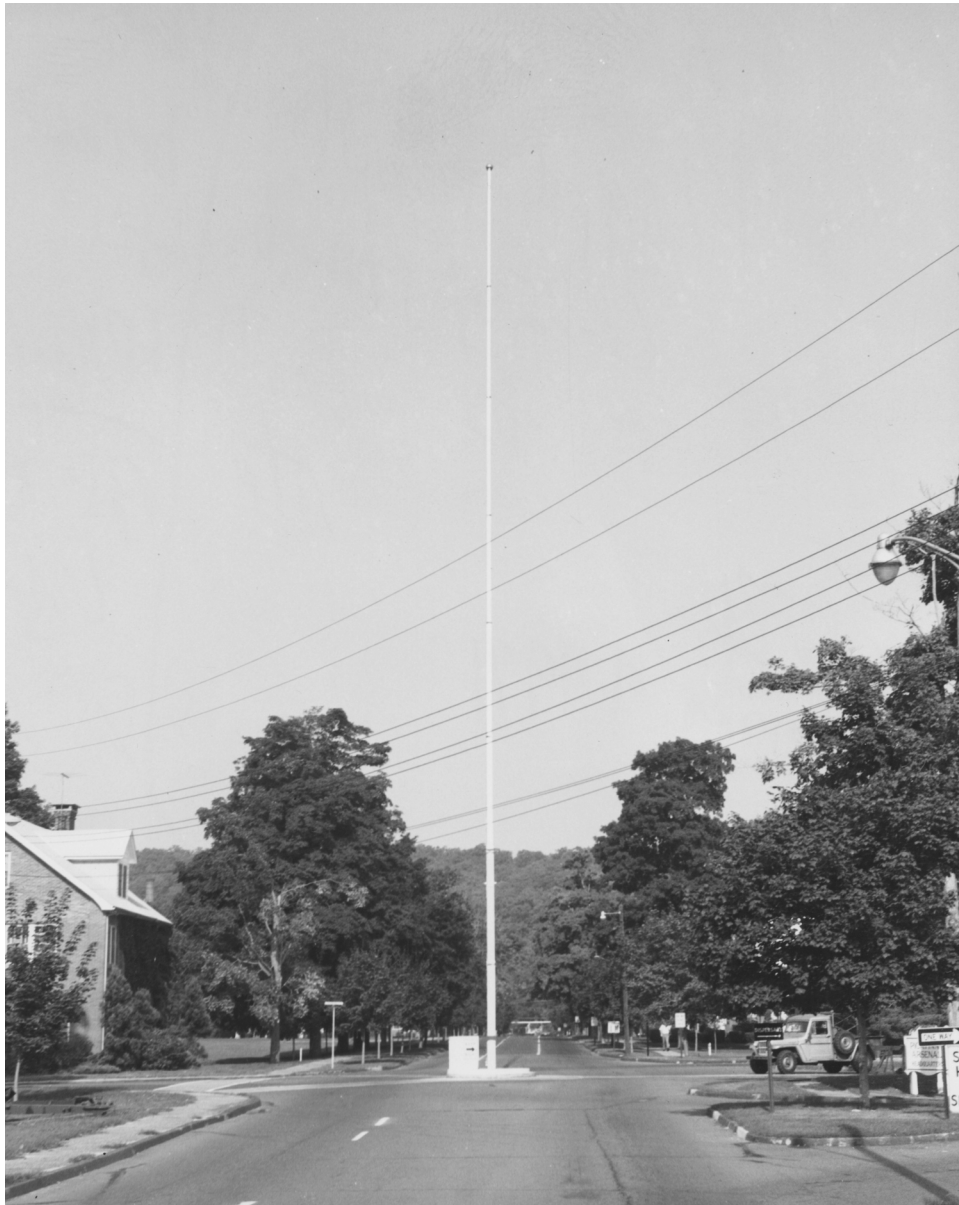




Figure 122. View looking southeast at the intersection of Parker Road and Farley Avenue (ERDC-CERL, 2012).



Figure 123. View looking west along Farley Avenue from the intersection with Parker Road (ERDC-CERL, 2012).





Figure 124. Looking east along Farley Avenue from in front of Quarters 114 (ERDC-CERL, 2012).



Figure 125. Looking east along Farley Avenue from the intersection of Buffington Road (ERDC-CERL, 2013).



Figure 126. View of Building 162 looking north from Farley Avenue (ERDC-CERL, 2013).

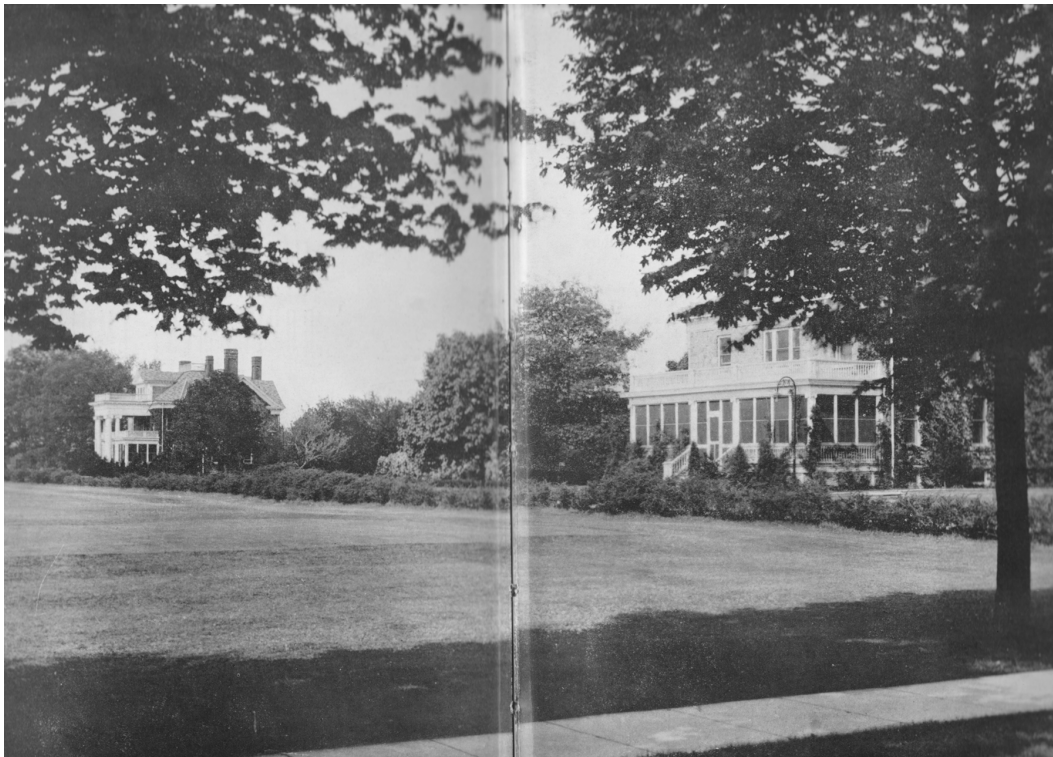




### *3.2.8.1.5 View across golf course toward Quarters 112 and 113*

The golf course is sited on a “large open space area that has supported a number of military activities, including a parade ground and landing field.”<sup>79</sup> The open space of the golf course has historically been maintained as an open space throughout the installation’s history, especially in front of Quarters 112 and 113 (Figure 127–Figure 130). This parcel of the golf course has been linked to the district and the quarters during the entire period of significance, first as a parade field, second as the first four holes of the golf course, and third as visual open space.

**Figure 127.** Photo of open space in front of Quarters 112 and 113, taken from the 1936 Picatinny Yearbook (PICA Cultural Resources Office).



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<sup>79</sup> Nolte et al. Draft May 2009, 81.

Figure 128. View from Parker Road, looking west across open space of the golf course towards Quarters 112 (ERDC-CERL, 2012).



Figure 129. View looking west from open space of the golf course towards Buildings 112 and 113 (ERDC-CERL, 2013).





Figure 130. View from the Building 112 looking east towards the golf course (ERDC-CERL, 2012).



#### *3.2.8.1.6 Views of Building 1 (former Building 171)*

Building 1 anchors the northern end of the district and serves as a focal point off Buffington Road at 9<sup>th</sup> Street. The building is approached from Buffington Road through an oval driveway system with the installation flagpole in the center. The oval entrance was added in 1970s but historic views still exist along 5<sup>th</sup> Street.

Figure 131–Figure 134 show the historic and current building elevations and views associated with Building 1.



Figure 131. 1940s historic photograph of the east elevation of Building 1 (PICA Cultural Resources Office).



Figure 132. East elevation of Building 1 (Headquarters) (ERDC-CERL, 2012).





Figure 133. Looking south towards Building 1 along 5th Street (ERDC-CERL, 2013).



Figure 134. Looking north towards Building 1 along 5th Street (ERDC-CERL, 2013).



### *3.2.8.1.7 Views along “Chemistry Row”*

The views along “Chemistry Row” are characterized by: closely-set buildings adjacent to Kibler Road that are of Georgian and Colonial Revival style architecture and brick in material (Figure 135–Figure 139). A sidewalk lines the road, with neatly mowed strips of lawn as the only vegetation in front of the buildings. There are some shade trees on the east side of Kibler Road, adjacent to parking, which appear in historic photographs below. Building 163 is virtually identical to the north portion of Building 162 which stands parallel and nearby on the south; both are prominent structures in the historic “Chemistry Row.”

**Figure 135. Historic photograph of view towards Building 167, 1943 (PICA Cultural Resources Office).**





Figure 136. Historic photograph of "Chemistry Row," ca. 1945 (PICA Cultural Resources Office).



Figure 137. Chemistry Row, looking north showing the east sides of Buildings 167 (left) and 197 (right) along Kibler (ERDC-CERL, 2012).





Figure 138. Looking south along Kibler Road in Chemistry Row (ERDC-CERL, 2013).



Figure 139. Looking south on 5<sup>th</sup> Avenue in Chemistry Row area (ERDC-CERL, 2012).



### 3.2.8.1.8 Views of Buffington Road

Views along Buffington Road include Buildings 119, 172, 173, and 183, with each building in a different architectural style. Some street trees are present along Buffington Road, but many have been lost and not replaced. Force-protection barriers, planters, and boulders are visible in front and along the sides of Buildings 172 and 173, breaking up the streetscape somewhat.

Figure 140–Figure 142 present various views related to Buffington Road.

Figure 140. Aerial view looking north at the buildings along Buffington Road and "Chemistry Row".





Figure 141. Looking north down Buffington Road from intersection at Farley Avenue (ERDC-CERL, 2013).



Figure 142. Looking south along Buffington Road (Building 183 is on the right) (ERDC-CERL, 2012).



### 3.3 Landscape evaluation

Landscaping, like plants and trees, are very fluid elements of a historic property and district, and they have constantly changed over the years so that obviously, most of the original landform features and plantings historically part of Picatinny Arsenal have been removed or added to over time. Original site features at least 50 years of age and retaining their original condition should be repaired or replaced in kind. These features include but are not limited to: curbing and sidewalks, benches, fountains, stone walls, fences, lanterns and post lights, and posts, pillars and gates. Some of the sidewalks have been replaced over the years, but it is their placement (not their materials) that is important to the historic district. Individual features in a property's landscape should never be viewed in isolation, but rather in relationship to their surrounding setting and overall fabric.<sup>80</sup>

New plantings and landscaping should be in keeping with the original design intent for the facility. Historic maps and site plans of individual structures may serve as a guide to determining historic configurations. Mature plantings should be maintained to the extent possible; where replacement is necessary, it should be done in species matching the original.

#### 3.3.1 Historic significance

The Administrative and Research Historic District combines two, early, historically-related arsenal activities, which are further united by one architectural style. During World War II many important advances in new products or simplified methods of production were made in PICA's newly constructed labs, testing facilities, and administration buildings. Thus, the importance of Picatinny's R&D activities grew and gave more emphasis to this R&D function, an importance which PICA would retain after the war. For example, in one year the job training methods, research projects, and improved work developments originating at Picatinny and passed along to other plants saved the United States more than \$3 million.<sup>81</sup>

#### 3.3.2 Integrity

*Street trees:* Originally, the street trees were oak (Figure 143); currently they are Norway Maple (Figure 144). To maintain the historic character of

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<sup>80</sup> Chugach Industries 2008, 6-16.

<sup>81</sup> Nolte et al. August 1999, iii.



the historic district, the street trees along Farley Avenue, Parker Road, and Buffington Road (ideally, Farley Lane as well) should be replaced whenever they have been removed due to poor condition (Figure 145–Figure 146). It is recommended that they be replaced with a native oak species that does well in the area—one with no pest or disease problems and a tolerance to road salt. Removal and replacement should be spaced in time to best maintain a consistent canopy.

**Figure 143. Looking west along Farley Avenue from Parker Road, 1944 (PICA Cultural Resources Office).**





Figure 144. Looking west down Farley Avenue at the tree-lined street (ERDC-CERL, 2012).



Figure 145. A tree located along Farley Avenue that is tagged for removal should be replaced with a native oak tree (ERDC-CERL, 2012).





Figure 146. An example of a damaged or dead tree in the historic district that should be replaced (PICA Cultural Resources Office).



*Orchard and root cellar area:* Only a few apple trees remain in the orchard located behind Quarters 113 and adjacent to the root cellar. Those trees that do remain are in poor condition and are deteriorating (Figure 147). Existing trees should be maintained or mitigated with NJ HPO.

Figure 147. Left: 1938 photograph showing a corner of the apple orchard (website). Right: current condition of apple trees in the orchard (ERDC-CERL, 2012).



*Cannon Gates and wall:* Street trees along Farley Avenue were removed during projects to widen the street and intersection (Figure 148); the trees should be replaced in this area to maintain the historic character of the area surrounding the Cannon Gates. Wall visible by motorists has been repaired along First Street (Figure 149). Weeds should be removed south of gate and wall (Figure 150).

Figure 148. View looking north from outside the installation toward Cannon Gates (ERDC-CERL, 2012).





Figure 149. East side of Cannon Gate structure (ERDC-CERL, 2012).



Figure 150. Stone wall that extends west from Cannon Gates along First Street (ERDC-CERL, 2012).





*Street lamps:* Many different street lamp styles exist throughout the historic district (Figure 151). A single style should be chosen for consistency.

**Figure 151.** Various styles of replacement street light fixtures are located in the Administrative and Research district (ERDC-CERL, 2012).



*Vegetation:* A consistent palate of plants and mulching types is needed throughout this historic district. A cohesive plan is needed for removal and replacement of the vegetation in the historic district (Figure 152).

**Figure 152.** Replacement planting and mulch (ERDC-CERL, 2012).



*Steam lines:* While the vegetation needs to be cleared and removed off and around exposed and elevated steam lines in the historic district, these lines are no longer in use (Figure 153 and Figure 154). These lines will be documented in whole as part of this report, and their removal will be completed as part of the Real Property Master Plan and Facility Reduction Program (FRP) Programmatic Agreement (PA).



Figure 153. Fallen tree damaging elevated steam line near Building 154 (ERDC-CERL, 2012).



Figure 154. Overgrown vegetation around the steam lines in the Administrative and Research Historic District (ERDC-CERL, 2012).





### 3.3.3 Character-defining features

The National Park Service defines historic character-defining features of a landscape as “prominent or distinctive aspects, qualities, or characteristics of a cultural landscape that contribute significantly to its physical character”.<sup>82</sup> Through the study of landscapes, the built environment is explained by the physical remains of the natural and cultural shaping forces. The historic districts of Picatinny are significant because they describe the adaptation of the built environment to the cultural values and the educational and military mission of Picatinny. Understanding the factors that influenced and composed the landscape informs the preservation of its historic qualities.

The character-defining features of PICA are landscape features that were part of the initial design, present throughout the period of significance as established in the National Register nomination, and continue to be evident in the district today. In Table 3, character-defining features of the Administrative and Research Historic District are listed along with summaries of their historical significance and integrity and indication of NRHP eligibility.

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<sup>82</sup> Birnbaum and Peters 1996, 4.

Table 3. Character-defining features within Administrative and Research Historic District at Picatinny Arsenal.

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
<b>Circulation and roadways</b>	The road system, planned in 1880s, provides the layout of the Administrative and research area	<ul style="list-style-type: none"> <li>• Parker Road still provides entrance from south</li> <li>• Farley Avenue still provides entrance from east</li> <li>• Street widths</li> <li>• Farley Avenue vehicular bridge adjacent to Building 151 retains some stonework; railing and one side replaced</li> </ul>	Yes
<b>Parade Field/Golf Course</b>	Historically a parade ground, then a golf course in the 1920s	<ul style="list-style-type: none"> <li>• Views toward Quarters 112 and 113</li> <li>• Mature trees</li> <li>• Open space</li> </ul>	Yes
<b>Headquarters</b>	Prominently located at the terminus of entrance road (Parker Road).	<ul style="list-style-type: none"> <li>• Location still prominent; surrounded by officers' quarters</li> <li>• Mature street trees</li> <li>• Flagpole removed</li> <li>• Parking lots added, but to rear of building out of view</li> </ul>	Yes
<b>"Chemistry Row"</b>	Row of brick Georgian and Colonial Revival style buildings along Kibler Road	<ul style="list-style-type: none"> <li>• Architecture retains integrity</li> <li>• Massing of buildings and laboratories</li> <li>• Setbacks, cluster of buildings retains integrity</li> <li>• Some buildings slated for demolition</li> </ul>	Yes
<b>Officers' quarters</b>	Officers' quarters along Farley Avenue part of 1880s layout and design	<ul style="list-style-type: none"> <li>• Varied styles of housing</li> <li>• Consistent setbacks, yard size, masses</li> <li>• Vegetation: foundation plantings, shade, and ornamental trees</li> <li>• Views along streets</li> <li>• Relationship to headquarters and administration space</li> </ul>	Yes

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
<b>Monuments and memorials</b>	Monuments and memorials significant to military culture	<ul style="list-style-type: none"> <li>Consistently located in prominent and ceremonial locations of old headquarters and former parade ground.</li> </ul>	Yes
<b>Flagpole</b>	Flagpole was originally located in front of the Headquarters building during the period of significance.	<ul style="list-style-type: none"> <li>Moved to current location in the 1970s, when Headquarters building location was changed.</li> </ul>	No
<b>Orchard and root cellar</b>	Root cellar was built at same time as Quarters 112 and 113: most likely that the orchard dates to this time as well.	<ul style="list-style-type: none"> <li>Orchard planted in a grid in line with Farley Avenue and Quarters 112 and 113.</li> <li>Only a few trees remain; those that remain in poor condition.</li> </ul>	Yes
<b>Cannon Gates and associated wall</b>	Built in 1885. Has served as historic entrance to the installation and symbolic image of installation through the years.	<ul style="list-style-type: none"> <li>Gates widened over time, no longer in historic locations</li> <li>Roads widened</li> <li>Street trees missing</li> <li>Portions of wall need restoration</li> </ul>	Yes
<b>Street trees</b>	Street trees depicted in 1880s plans for the depot	<ul style="list-style-type: none"> <li>Some street trees are in need of replacement</li> <li>Species not the same as original</li> </ul>	Yes



Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
<b>Vegetation</b>	Presence of vegetation around historically and culturally significant quarters and administration buildings	<ul style="list-style-type: none"> <li>• The presence of foundation plantings (may include replaced vegetation of same character) for historic quarters and Buildings 1, 119, 151, 162, 172, and 173 where historically verified.</li> <li>• Ornamental trees used around historic district (aged 50 years of age and those trees that replaced trees 50 years or older).</li> </ul>	Yes
<b>Tennis courts</b>	Built in 1925 for the officers' quarters, Buildings 112 and 113	<ul style="list-style-type: none"> <li>• Lighting and backstop added</li> </ul>	Yes
<b>Views and viewsheds</b>	Eight significant views identified around administration and research area	<ul style="list-style-type: none"> <li>• Loss of some street trees</li> <li>• Road widening at Cannon Gates</li> <li>• ATFP planters in front of Buildings 172 and 173</li> </ul>	Yes
<b>Steam lines</b>	Steam lines existed historically throughout installation	<ul style="list-style-type: none"> <li>• In disrepair and slated for removal</li> </ul>	Yes
<b>Street lamps</b>	Historic street lamps add to the character of the district	<ul style="list-style-type: none"> <li>• Many different styles exist</li> <li>• Only those 50 years or older are eligible for NRHP</li> </ul>	Yes

### 3.3.4 Final determinations

On July 2, 1999, the NJ HPO ruled that the Administrative and Research Historic District was eligible under Criteria A and C. The district's historic

context is: World War I; the Inter-War era, World War II mobilization; World War II; and the Cold War.<sup>83</sup>

The findings of this report propose to extend the Administrative and Research Historic District boundary to include Parker Road, the rows of street trees on either side of the road, and the Cannon Gates. This tree-lined street, as proposed in 1885 during the initial design of the installation, is a character-defining feature of the historic district. The historic gates and the tree-lined street serve as an entrance corridor to the installation, and they have been documented in historic photographs over the years.

Picatiny is currently observing a visual buffer boundary, based on the recommendation by Panamerican Consultants, that the golf course be included as a contributing element of the historic district as a “large open space area that has supported a number of military activities, including a parade ground and landing field.” The NJ HPO concluded, in a letter dated 24 March 2010, that the submitted documentation did not provide sufficient justification for altering the boundary at this time, and they asked for further consultation. Specifically, they requested additional research to clearly demonstrate the linkages between the district’s areas of significance, the installation’s period of significance, and the historic development of the open space within the recommended boundary extension.<sup>84</sup>

This report agrees with the Panamerican Consultants report that the open space created by the golf course contributes to the district (Figure 155). A historic photograph of the airfield exists (see Figure 28), although no maps noting the airfield were located during this research. The open space of the golf course and the street trees along Parker Road have long served as the formal entryway of the installation. Given the role that open space has played in the history of the installation, and the fact that the course is inadvertently included in the Administrative and Research Historic District, the portion of the golf course north of 1<sup>st</sup> Street, as an open space, should be considered a contributing element to the historic district. In addition, the inclusion of this open space within the existing historic district will

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<sup>83</sup> Nolte et al. Draft May 2009, 79.

<sup>84</sup> New Jersey Historic Preservation Office, letter to Picatiny Cultural Resources, 24 March 2010.

connect it to the historically significant Cannon Gates. The proposed district enlargement would include these three important landscape features.

This report proposes that, at the least, the original site of the parade ground (currently part of the golf course) be added to the historic district. This area is clearly defined by the historic roads—Parker Road, Farley Avenue, and Larned Terrace—as boundaries. This area has been maintained as visual open space over the years and is a crucial character-defining feature of the historic district. Historically, parade grounds were the heart of military installations both in terms of their prominent locations at the center of historic post and cantonment designs and as formal ceremonial spaces. This parcel of the golf course has been inextricably linked to the district and the quarters during the entire period of significance—first as a parade field (Figure 156), second as the first four holes of the golf course (Figure 157), and third as visual open space (Figure 158). While the northern half of the golf course is associated open space to the historic district, the historic parade ground also holds some historical ceremonial significance beyond visual open space.

Figure 155. Open space being used as a golf course (ERDC-CERL, 2012).





Figure 156. A 13-gun salute on parade ground, 1946 (Rae 1999).

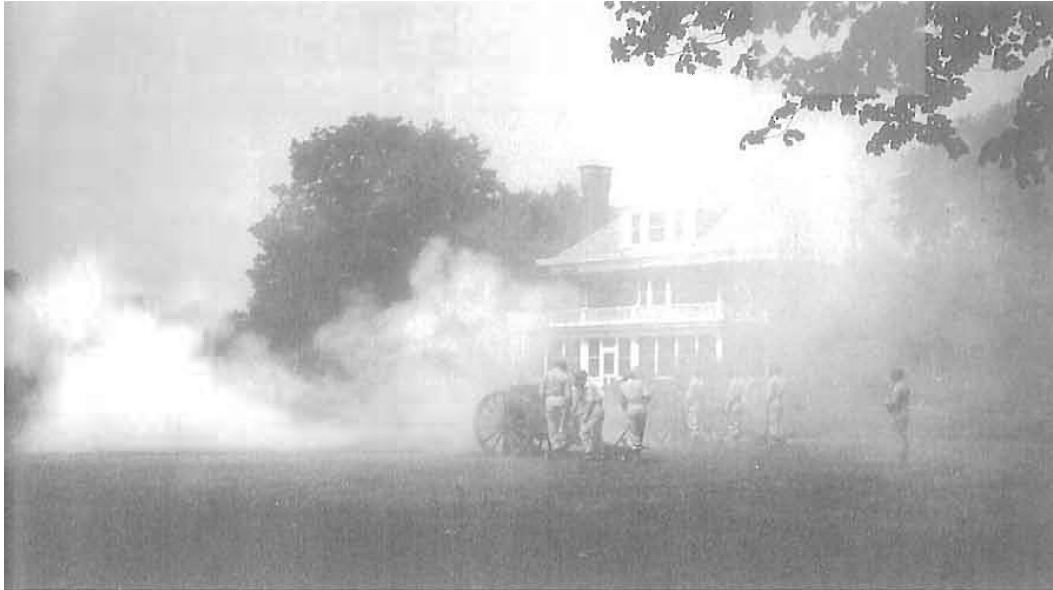


Figure 157. Map of early golf course, 1920s (PICA Cultural Resources Office).

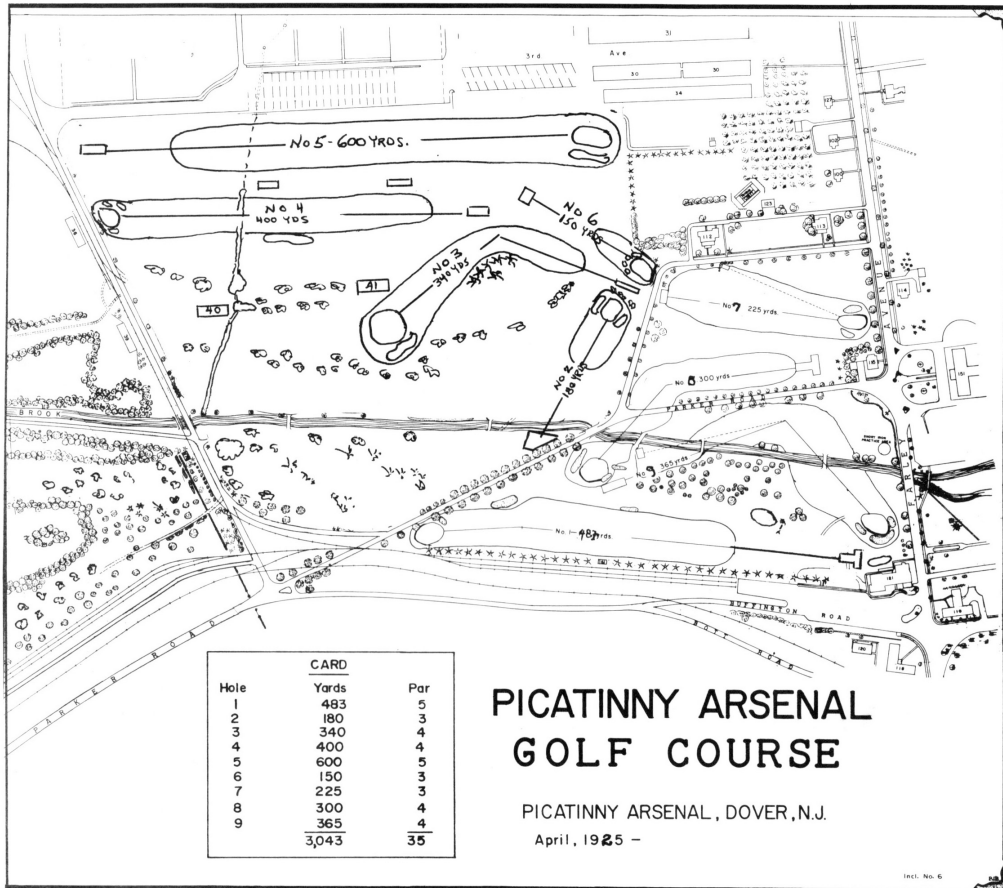


Figure 158. Open space of the golf course is in the center of the photo, taken from Picatinny Peak (ERDC-CERL, 2012).



Also included in the historic district should be the orchard and root cellar located in the backyards of Quarters 112 and 113 (Figure 159). This garden area is a historic landscape feature associated with the quarters. The remaining trees are in declining health but should be maintained. While other current vegetation behind Quarters 112 and 113 visually separates the quarters' "rear yards" from this garden landscape, much of this vegetation was most likely a result of the increase in size and development of the golf course during the 1950s and 1960s, so it does not fall within the period of significance of the district and is not contributing (Figure 160 and Figure 161). Although the noncontributing vegetation serves as a separation between the root cellar and the orchard, those areas are still an important character-defining feature.



Figure 159. Root cellar (Building 111) and orchard located behind Building 112 (ERDC-CERL, 2012).



Figure 160. Row of trees behind Building 112 was added after the period of significance (ERDC-CERL, 2012).





Figure 161. Open space in the backyards behind quarters, Buildings 112 and 113 (ERDC-CERL, 2012).



Lastly, it is proposed that the historic district should extend along Farley Avenue to Farley Lane. The street trees along Farley Avenue clearly connect this area with the historic district. While the quarters in this section of Farley Avenue have previously been determined to lack architectural integrity, the houses, the road, and the tree-lined character all date from the period of significance. It is possible these same street trees continued down Farley Lane at one time based on available stump size (Figure 162). However, since these trees are not visible on available historic maps and the quarters have been determined to lack significance and/or integrity, Farley Lane has not been included in the historic district.

In addition, Buildings 108 and 117, while outside the current historic district, are clearly seen on early historic maps and it is recommended that they be reevaluated for eligibility based on their historic significance and dates of construction. Building 108, which dates to 1882, was the original

storehouse (Figure 163). Circa 1922 it was converted for use as a schoolhouse before becoming quarters in 1936. It was recommended as contributing in earlier assessments<sup>85</sup>.

Building 117 was originally built as a stable, coach house, wagon shed and scale house (Figure 164). Later it was used as a storehouse, as noted in a 1931 publication. In 1937, a sun porch was added on the south end of the building, and it was assumed converted to quarters at this time. It was also recommended as contributing in earlier reports<sup>86</sup>. If determined contributing, these two historic buildings from the start of the arsenal would create the northern boundary of the historic district. The southern boundary would be Building 119, the former shell filling house, and the eastern boundary would be the Cannon Gates, all from the same period of construction.

Figure 162. Looking north down Farley Lane at quarters and street trees (ERDC-CERL, 2012).



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<sup>85</sup> Harrell 1996, E-56.

<sup>86</sup> Ibid., E-69.



Figure 163. View of front and northwest facades of Building 108, former storehouse (ERDC-CERL, 2013).



Figure 164. View of front of Building 117, former stables (ERDC-CERL, 2013).





This historic district extension will add six additional noncontributing buildings to the historic district; Building 100, Officers' Quarters (1939); Building 102, Officers' Quarters (1939); Building 109, Officers' Quarters (1939); Building 110, Former Superintendent's house now Visitors' Quarters (ca. 1860); Building 127, Officers' Quarters (1939); and Building 128, Garage (1939). The same streets trees along Farley Avenue continue in front of these quarters linking them with the rest of the historic district. However, in front of most of these quarters (Buildings 100, 102, 109, 110 and 127) are two large evergreen Spruce trees planted to either side of the front walk (Figure 165). In addition, most of these quarters have low evergreen foundation plants along the front and side facades.

It is also recommended that these quarters (Buildings 100, 102, 109, and 127), all built during the period of significance, be re-evaluated since they are a contributing part of the Historic District landscape. Previous reports have stated that these buildings are non-contributing since they were built during WWII. Since these are not temporary structures, they are not eligible under the WWII Programmatic Agreement. This applies to the two garages (Buildings 123 and 128) as well.

**Figure 165. Spruce trees planted in front of Building 102, Officers' Quarters (ERDC-CERL, 2013).**



For the Administrative and Research Historic District, new construction must conform with a similar and in-kind design to the surrounding architectural style. For example, new structures being built, within or adjacent to the Administrative and Research Historic District, should conform with brick construction and be patterned similar to major contributing surrounding buildings (e.g., Buildings 1, 151, 162, and 183), including scale and massing. If new housing is to be constructed, depending on location, it should conform to surrounding architectural styles of current housing.

The simplest means of preserving landscape features and plantings is replacement in-kind or with similar types of plants, if feasible. Replacements should be selected from an approved palate of plant materials consisting of pest-free and disease-free species that are hardy to the region and climate. The replacement of shrubs, herbaceous or woody plants or perennials, and even small deciduous trees with a different variety or exotic species in their place should involve coordination with the CRM and ideally be completed within a NJHPO-approved plan or palate of materials. Any reformation or change to manicured lawns and the surrounding landscape features, replacement of sidewalks, installation of exterior lighting, fencing, and realigning of cul-de-sacs and road patterns within historic districts should involve coordination with the CRM and consultation with NJHPO. Overall, foundation plantings and landscaping should not overwhelm a property, nor conceal or obscure its primary facades or the properties adjacent to it.<sup>87</sup>

Several smaller buildings along Chemistry Row were recently demolished (Figure 166). Loss of these buildings affects the integrity of this area as well as the viewsheds. Any replacement buildings should be of consistent mass, style, craftsmanship, and materials to the remaining buildings.

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<sup>87</sup> Chugach Industries 2008, 6-16.

Figure 166. Buildings 167 and 197 located in the Chemistry Row area of the district have been recently demolished. (ERDC-CERL, 2012).



With the proposed district boundary expansion to include the Cannon Gate and Parker Road, the former parade ground, and the housing to Farley Lane, the final determination concludes that the district should include 20 contributing buildings, 10 noncontributing buildings, 4 objects. Table 4 below provides a list of the contributing and non-contributing buildings after the proposed district boundary expansion.

Maps in Figure 167 depict the existing boundary and the proposed boundary for the Administrative and Research Historic District.



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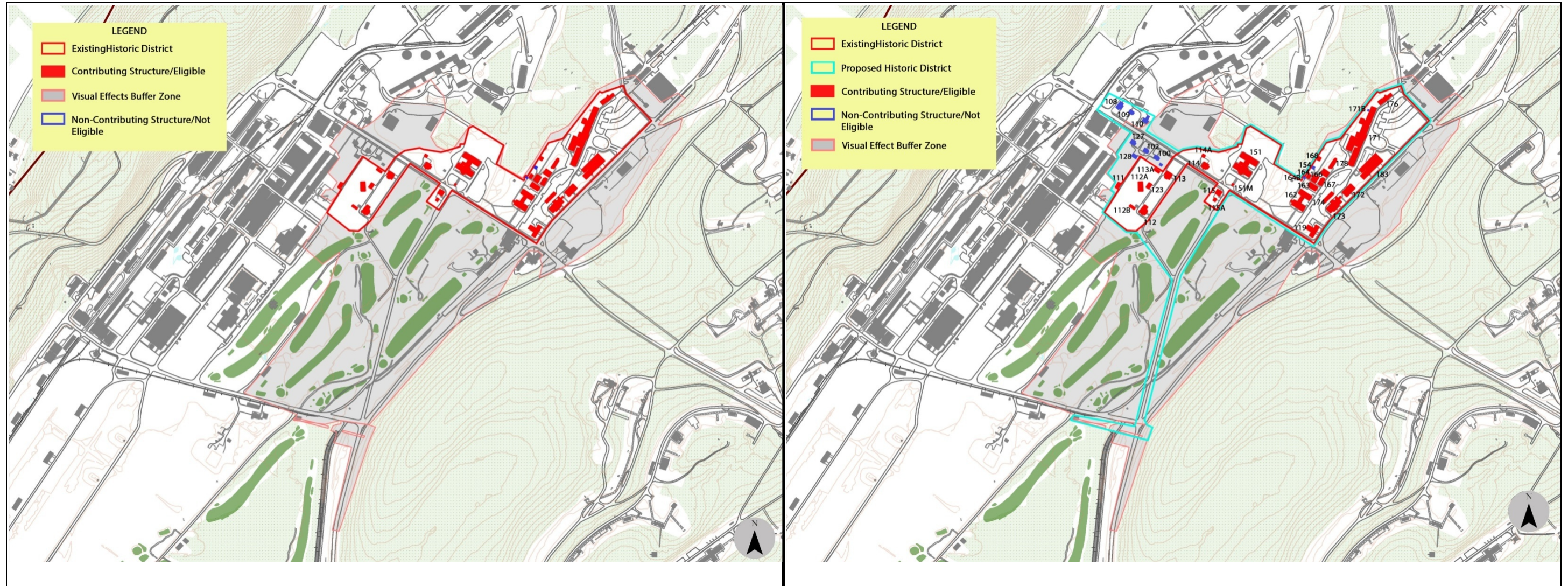
Table 4. Proposed list of buildings in the Administrative and Research Area Historic District after historic district expansion (taken from PICA real property records).

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
1	1940	Administration Building	Administration/ Post Headquarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; completed 1999	Former Building 171; many renovations, interior no longer historically significant
100	1939	Officers' Quarters	Quarters (Col)	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Slated for demo; SHPO completed via final programmatic agreement (PA), signature May 2010. Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
102	1939	Officers' Quarters	Quarters (Col)	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
108	1882	Storehouse/ Schoolhouse / Quarters	Quarters (LC MJ)	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
109	1939	Officers' Quarters	Quarters (MJ)	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
110	Ca. 1860	Superintendent's House	Distinguished Visitor's Quarters/ Guest Quarters	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Potential Wiggins homestead.
111	1909	Root Storage/ Greenhouse	Storage/ Greenhouse	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Scheduled for demo
112	1909	Commanding General's Quarters	Family Housing General	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
112A	1925	Tennis Court	Court Area (Tennis)	Contributing	Completed 2009	
112B	1911	Pergola / Picnic Shelter	Pergola / Picnic Shelter	Contributing/ Criteria A & C	Completed 2009	Scheduled for demo
113	1909	Family Housing General	Family Housing General	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
113A	Ca. 1930	Pergola / Picnic Shelter	Pergola / Picnic Shelter	Contributing/ Criteria A & C	Completed 2009	Scheduled for demo
114	1884	Administrative/ Headquarters Commanding Officer's Quarters	Family Housing Colonel	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Entire interior is historically significant, except bathroom and kitchen area
114A	1937	Garage	Garage	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
115	1884	Guardhouse/ Fire Engine House/ School/ Officers' Quarters	Quarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Majority of interior is historically significant, except bathroom and kitchen area; scheduled for renovation
115A	1943	Garage	Garage	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
119	1887	Officers' Quarters/ Fill Plant/ Hospital	Quarters	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated and in 2010
123	1939	Garage	Garage	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
127	1939	Officers' Quarters	Quarters (Col)	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
128	1939	Garage	Garage	Noncontributing	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Should be re-evaluated since it was built during period of significance and it not covered under WWII PA. Contributes to Historic District landscape.
151	1929-1941	Post Headquarters	Administrative Building/ General Purpose Administrative	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Many renovations exist; front and portions of the rear entrance are historically significant

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
151A	1985	HVAC Building	HVAC Building	Not evaluated: not 50 years of age	Not evaluated	
151M	ca. late 1700s to early 1800	Middle Forge artifacts and other various memorials/ monuments	Middle Forge artifacts and other various memorials/ monuments	Contributing	Evaluated 1982-83 HABS; completed 2008	
153M and 154 M	1868/1911	Civil War Era Cannons	Monuments in front of Building 151	Not evaluated;	Potentially Eligible	Transferred to PICA from Rock Island in 1910
162	1930-1942	Physics/ Chemistry Laboratory	Applied Instrument Building	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Many renovations exist; front entrance is historically significant
163	1930	High Explosives Research Laboratory	Signal Photo Laboratory	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in 2011
171B	1969	Incinerator	Derelict Incinerator	Noncontributing	Completed 2009	Scheduled for demo
172	1942	Ordnance Administration Building	Engineering Administration Building	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in 2005
173	1942	Guard House/ Transformer Station	Police Station and Communication Center	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Scheduled for renovation
174	1942	Service Magazine	Administration	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	
176	1944	Laboratory Equipment/ Sampling of Ammunition	Administration	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated in late 1980s
183	1943-1963	Steam Flow Meter House	Non Metal Materials Facility/ Administration Building R & D	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; reevaluated 1994; completed 1999	Gutted and renovated during the early 2000s
1100M	1885	Cannon Gates	Cannon Gates	Contributing/ Criteria A & C	District should be expanded to include gates and street trees along Parker Road.	Have been moved out from original location over time, still at same intersection.
75040	1880s	Parade Ground/Golf Course	Golf Course	Contributing/Criteria A & C	District should be expanded to include section of golf course as defined by Parker Road, Farley Avenue, and Larned Terrace.	Should be maintained as visual open space.



Figure 167. Comparing the existing boundary line for the Administrative and Research historic district (left) and the proposed district boundary line for the Administrative and Research Historic District (right).





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## 4 600 Ordnance Testing Area Historic District

### 4.1 History

The 600 Ordnance Testing Area Historic District<sup>88</sup> (1928–1948) was constructed after the 1926 Lake Denmark NAD explosion and several other accidents that destroyed the arsenal’s cannon blenders. The complete planning of this area in 1928 was carried out by the Engineering Department of the arsenal with the assistance of the US Army Quartermaster and outside contractors.

World War II blueprints show that structure designs were created by *The War Plans Division, Ordnance Department, Picatinny Arsenal*. These facilities were built to withstand shock and blast from indoor testing of military explosives. No similar grouping of explosive testing-related structures is known to exist at any other former industrial arsenal.<sup>89</sup>

PICA conducted a significant number of testing operations. All testing related to the sensitivity, brisance, stability, rapidity of reaction, energy content, and type of intensity of the initial impulse of explosives conducted in the 600 Area. This testing involved not only the manufacture of armaments but most importantly, the research and development of most types of ammunition (except machine guns).<sup>90</sup> Testing was a critical part of the weapons R&D work carried out at Picatinny, and was a service provided to other military branches, other Army installations, and private industry. These tests define properties which military explosives must possess.

The portion of the 600 Area that makes up the historic district includes a wide range of specialized structures. Some of the components tested in this area historically were M1 and M3 flashless, non-hydroscopic cannon

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<sup>88</sup> Referred to in short name as “600 Area.”

<sup>89</sup> From the historic marker located at the entrance into the 600 Area off 20<sup>th</sup> Avenue.

<sup>90</sup> Nolte et al. September 1999, 82.



powders; bomb fuses; artillery fuses, boosters and grenades; and pyrotechnic devices.<sup>91</sup>

## 4.2 Landscape inventory

To identify the prominent or distinctive characteristics that make a landscape historic, the physical features of the site are divided into eight areas: site and layout, land use, expressions of military cultural values, transportation networks, views and viewsheds, buildings and structures, vegetation, and small-scale features. These characteristics of the landscape combine to form the built environment that is the primary image of PICA.

### 4.2.1 Site and layout

The 600 Area is located on a ridge above Picatinny Lake and lies on the slope beneath Picatinny Peak on the north side of the Arsenal (Figure 171). For safety following the explosion of 1926, ordnance and testing was moved to this location due to its relative isolation. All of the major indoor ordnance test facilities were located in one area immediately off 20th Avenue.<sup>92</sup> Farther along the ridge are a series of isolated ranges for test firing guns (both barrel tests and shell flight tests), testing armor-piercing shells and bombs, and testing anti-personnel weapons.<sup>93</sup>

Various views of the 600 Area site are shown in Figure 168–Figure 170.

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<sup>91</sup> Excerpt from <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/OrdnanceTesting/index.html>

<sup>92</sup> Nolte et al. September 1999, 83.

<sup>93</sup> Thurber and Norman 1983, 125.

Figure 168. Map of area prior to construction of 600 Area, 1922 (PICA Cultural Resources Office).

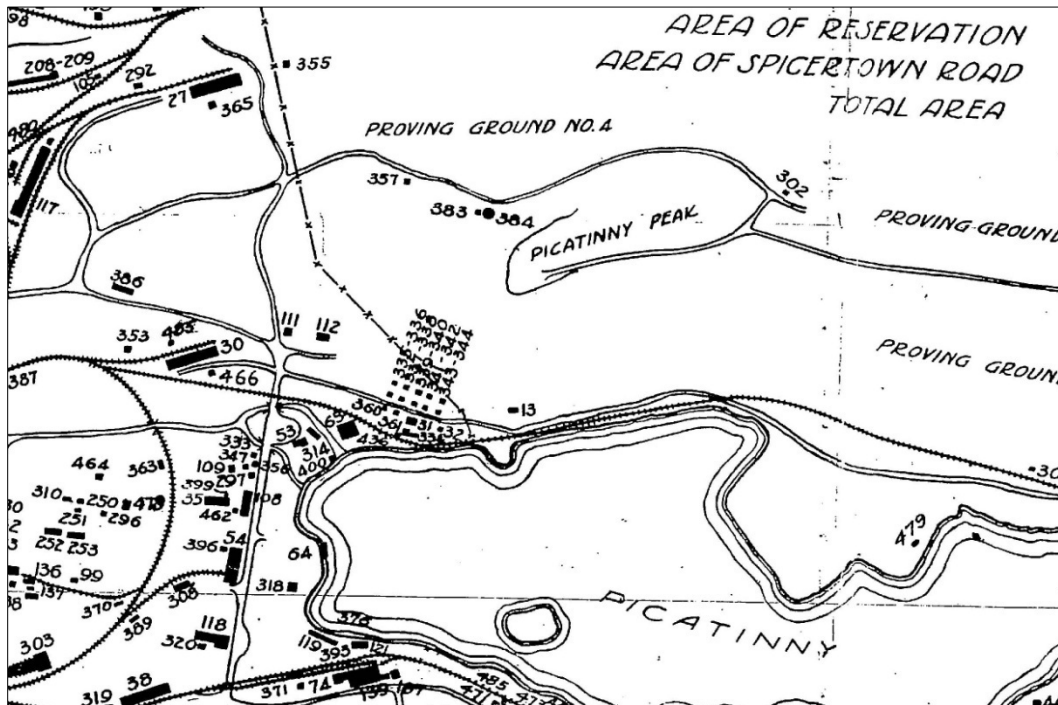


Figure 169. 600 Area, 1930–1957 from Thurber and Norman HAER Record NJ-36 (PICA Cultural Resources Office).

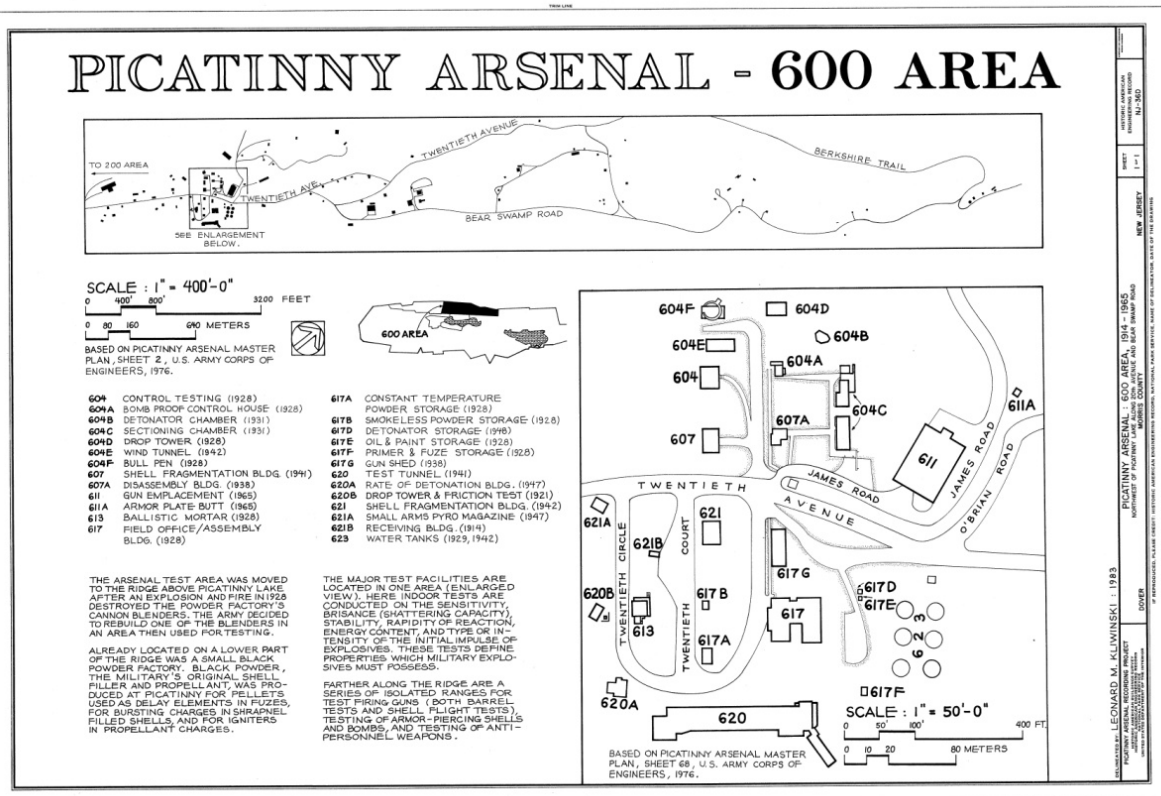
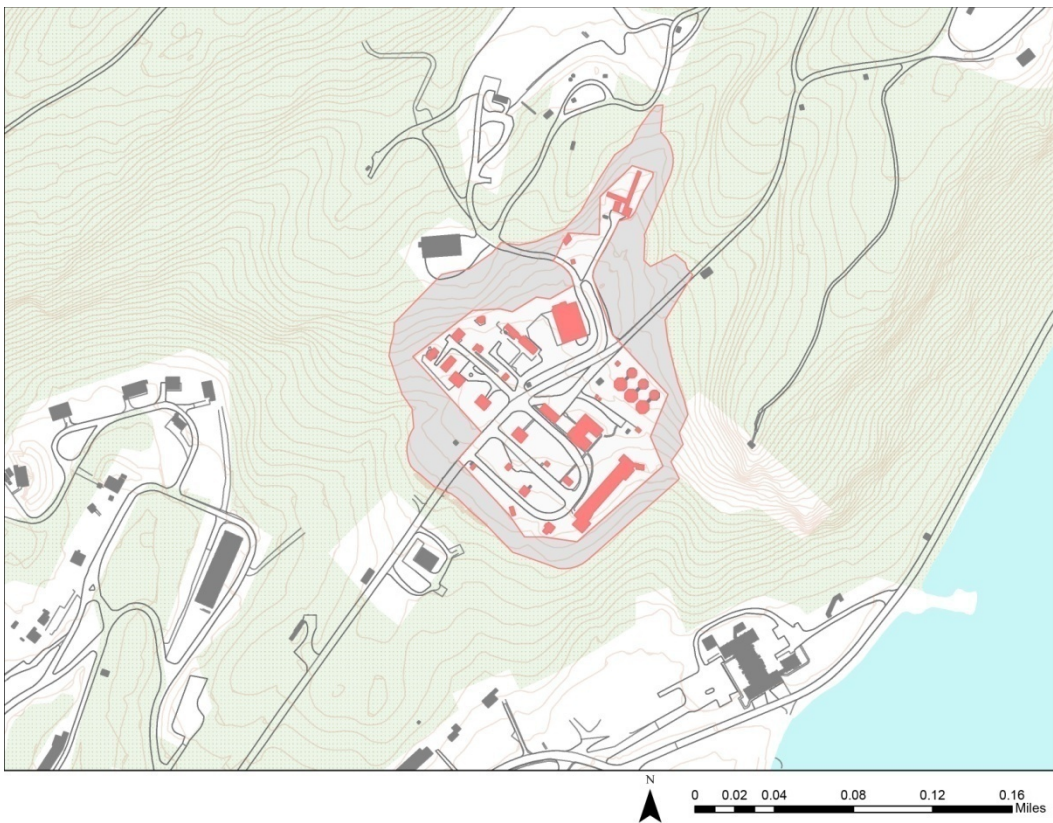


Figure 170. Map of the 600 Area with existing boundary line for historic district (PICA Cultural Resources Office).



The 600 Ordnance Testing Area is approximately 20 acres. Large, well-lit open areas surrounded oddly configured buildings which stand in stark simplicity. No attempt has ever been made to landscape this group of buildings.<sup>94</sup> Various photos of the area are shown in Figure 171–Figure 173.

<sup>94</sup> Nolte et al. September 1999, 83.



Figure 171. View looking north at Picatinny Lake and Picatinny Peak, ca. early 1900s. Building in photo is no longer extant. (PICA Cultural Resources Office).

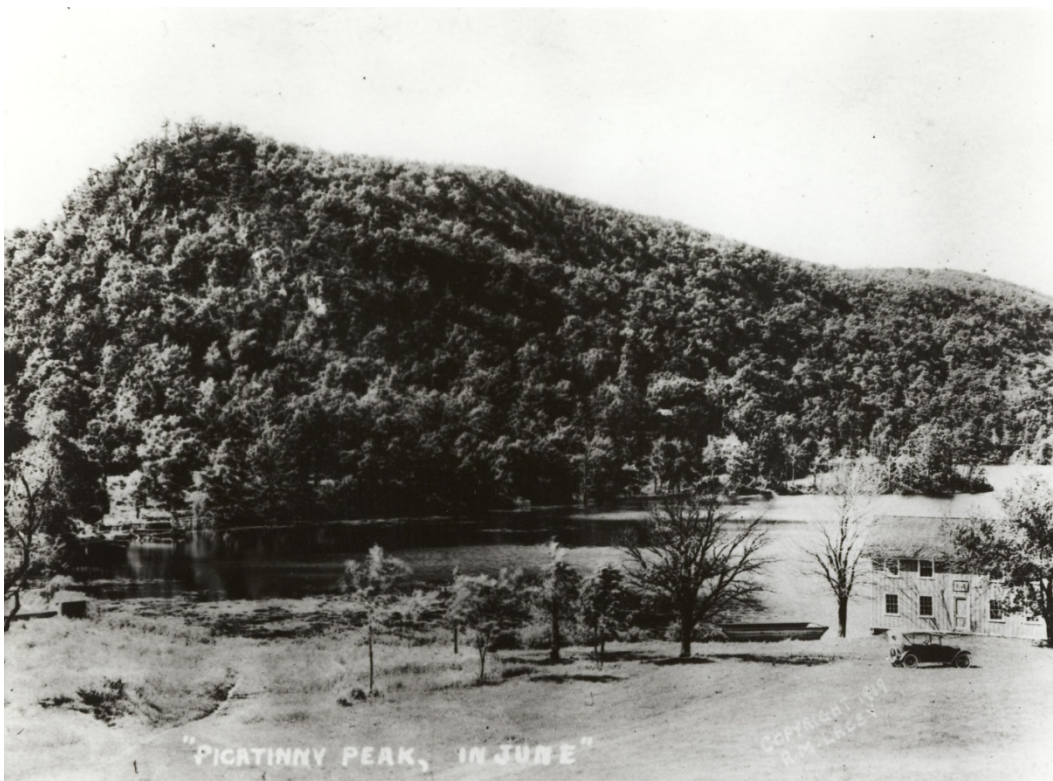


Figure 172. View from lookout tower at Picatinny Peak, looking southwest to 600 Area (ERDC-CERL, 2012).





Figure 173. View from same lookout tower, also looking southwest toward 600 Area, 2008 (PICA Cultural Resources Office).



#### 4.2.2 Land use

Before the 1926 explosion, ordnance testing was conducted all over the Arsenal, usually just outside the building where research was being conducted. Such impromptu testing caused numerous accidents and fires within the production areas.<sup>95</sup> Ordnance testing was consolidated and relocated in the 600 Area following the 1926 explosion at the Lake Denmark NAD.

Final relocation of the test area to the ridge produced a number of important benefits for the facility. The relocation removed all activities except storage from the extreme northern end of the Arsenal (south side of the lake), thereby freeing the east and west shores of Picatinny Lake from the hazards of test firing across the lake into the mountain. Eliminating the firing hazards near the lake also meant that all roads around the lake would have uninterrupted service.<sup>96</sup>

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<sup>95</sup> Ibid., 82.

<sup>96</sup> Ibid.

Various view of building locations and building photos are shown in Figure 174–Figure 176 and as referenced in text.

Figure 174. Detail of 600 Area showing building locations, 1976 (Thurber and Norman 1983).

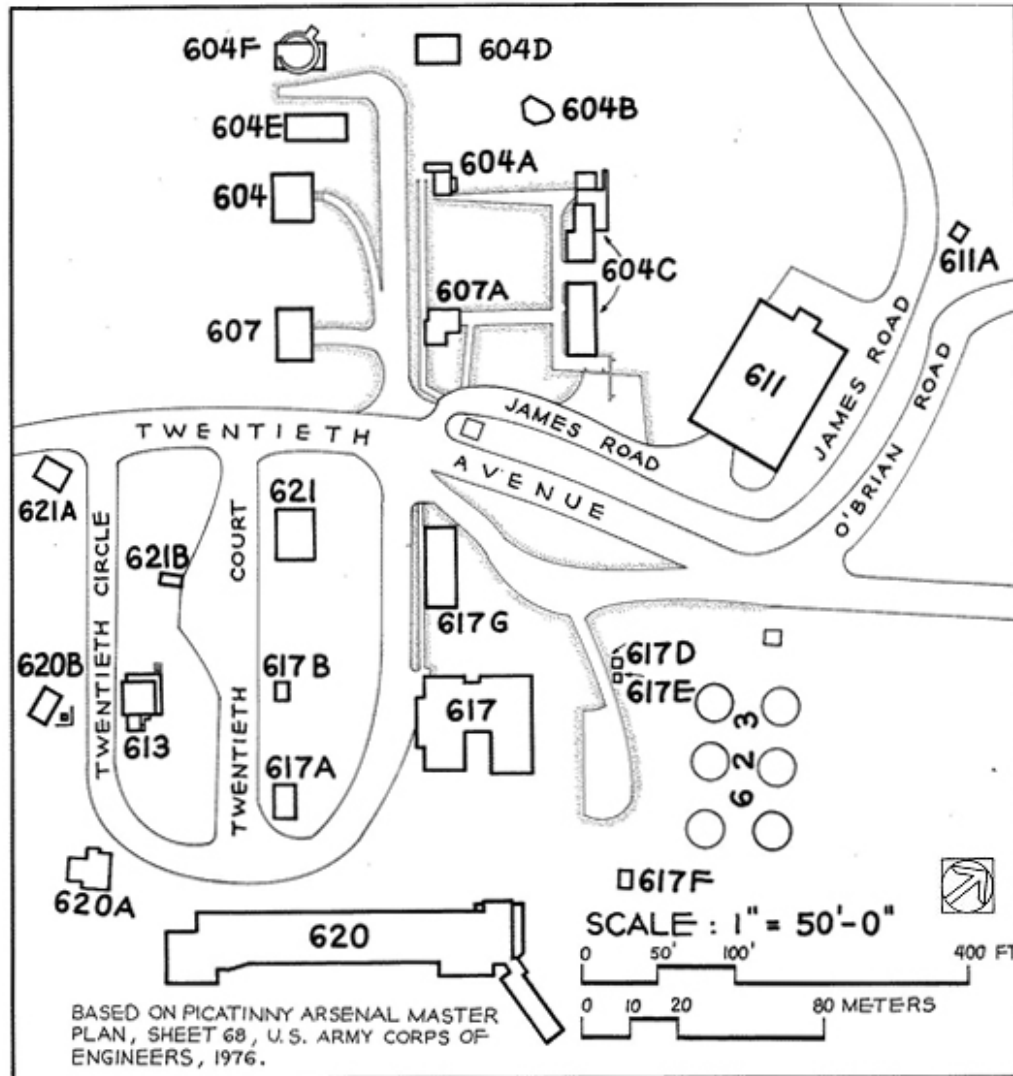




Figure 175. View from hillside, looking south on 20th Avenue (PICA Cultural Resources Office).



Figure 176. View looking north on 20th Avenue; Building 611 is on the left (ERDC-CERL, 2012).





The administration observed that the new location was “well-suited for practically all activities and tests which are usually assigned to a small proving ground.”<sup>97</sup>

Wooded areas surround the 600 Area, with some of the buildings nestled in the woods like Building 611B (Figure 177).

Figure 177. Looking north towards Building 611B (ERDC-CERL, 2012).



#### 4.2.3 Transportation networks

One main road, 20<sup>th</sup> Avenue, runs through the center of the district in what is basically a north-south direction (Figure 178–Figure 180). Other roads provide access to various structures located throughout the wooded area on either side of 20<sup>th</sup> Avenue (Figure 181–Figure 182).

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<sup>97</sup> Ibid., 82.



Figure 178. Looking north 20th Avenue leading to the 600 Test Area; Building 611 is at the left behind the parked car (ERDC-CERL, 2012).



Figure 179. Looking south on 20th Avenue from in front of Building 611 (ERDC-CERL, 2012).





Figure 180. Looking to the north along 20<sup>th</sup> Avenue from Building 611 (ERDC-CERL, 2012).



Figure 181. Looking northwest on 20<sup>th</sup> Court which is located between Buildings 613, 617A, and 617B which are not visible in this photo (ERDC-CERL, 2012).





Figure 182. View looking south at 20<sup>th</sup> Circle and Building 620 (ERDC-CERL, 2012).



#### 4.2.4 Expression of military cultural traditions

The district contains a variety of structures designed for testing the various ammunition components and explosives produced at PICA. The special requirements of such activities have resulted in a number of unique structures. It is this uniqueness of design, as well as sharing the same basic function, which ties these buildings together.<sup>98</sup> Since it was an ordnance testing area, for safety the buildings had to be far apart from each other.

#### 4.2.5 Buildings and clusters

The 600 Area structures were specifically designed to withstand shock and blast effects, and they were built in a variety of shapes and sizes. The structures are utilitarian design in the extreme, with all construction features being dictated by the testing to be conducted within (Figure 183). Building

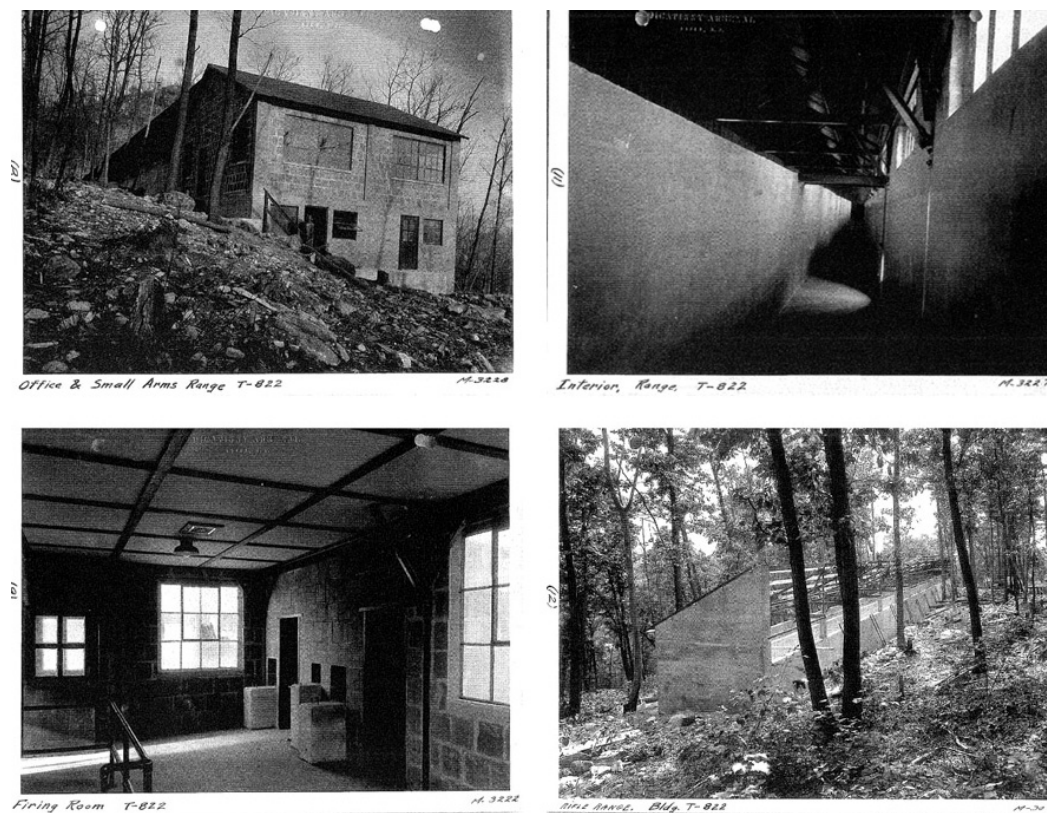
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<sup>98</sup> U.S Department of the Army Draft 1982, 15.

materials included wood, brick, concrete, galvanized steel, and tile. Framing styles and materials also differed with the structure's testing intent.<sup>99</sup>

A firing range with gun emplacements, velocity screens, and a recovery butt were constructed to permit the testing of pilot lots of smokeless powder for velocity and pressure. Other structures provided for the safe explosion of a number of different ordnance types of items.

**Figure 183. Historic photographs of Building 620, original Small Arms Range, 1929 (PICA Cultural Resources Office).**



The main indoor testing buildings were supported by a variety of small-scale, short-term storage buildings. Items requiring short-term storage comprised explosives, oil and grease, paint, primer, fuses, and detonators. These types of buildings served a minor role in the testing activities that occurred in the indoor testing facilities in the 600 Area.<sup>100</sup>

<sup>99</sup> Nolte et al. September 1999, 83.

<sup>100</sup> Grandine and Riggle, *HABS-HAER Documentation for Picatinny Arsenal Building 617D* (Frederick, MD: R. Christopher Goodwin & Associates, December 2009), 4.



Two small clusters of buildings are located at the southwest end of the area. One of these groups houses the black powder factory, a facility that produced black powder for use in the fuze assembly lines and as an igniter in gun powder bags.

The portion of the 600 Area that makes up the historic district includes a wide range of specialized structures, including fragmentation tub buildings, a drop tower, wind and fuze test tunnels, a “bull pen” for exploding ordnance, slug butts (Figure 184), and an indoor firing range.<sup>101</sup>

Since the construction of the complex in 1928, structures continued to be added until 1965 (Figure 185 and Figure 186). Buildings 611 and 611A, a gun emplacement and an armor plate-butt, were built in 1965. These two structures are noncontributing buildings to the district. Buildings 604 through 621 contain the control rooms, testing chambers, and other facilities used in the indoor testing of explosives.<sup>102</sup>

**Figure 184. Comparison photographs of a slug butt (611B); on the left is historic photograph (taken from Picatinny website, undated), and on the right is a current photograph of the same structure which is now partially obstructed by debris (ERDC-CERL, 2012).**



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<sup>101</sup> Nolte et al. September 1999, 83.

<sup>102</sup> Ibid.

Figure 185. Looking northwest from 20<sup>th</sup> Avenue in order from left foreground towards Buildings 607, 604, 604E (on left of street), and 604A and 607A (on right) (ERDC-CERL, 2012).



Figure 186. Locational relationship of Buildings 621 (foreground), 607 (middle ground), and 604 (background) (ERDC-CERL, 2013).



The 600 Ordnance Testing Area Historic District consists of 20 contributing which are eligible for the NRHP under Criteria A and C, and 8 non-contributing buildings and structures as determined by the NJ HPO. They are all listed below in Table 5.



Table 5. List of buildings in the 600 Ordnance Testing Area Historic District.

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
604	1928	Environmental Testing	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
604A	1928	Control House for Drop Tower (604D)	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
604B	1931	Detonating Chamber	Ordnance Facility ("Detonating Chamber")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
604C	1928	Sectioning Chamber	Ordnance Facility ("Sectioning; Teardown Facility")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
604D	1928	Drop Tower	Drop Tower/ Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	47 ft above grade to top of 3 <sup>rd</sup> floor platform; addition of tower was also known as 604G
604E	1942	Wind Tunnel	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	2012-13 Renovations
604F	1928	Bull Pen	Ordnance Facility ("Bull Pen; Rifling Chamber")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	Also labeled IFS AS R604F (1980); 2012-13 renovations
607	1940	Fragmentation Tub Bldg	Ordnance Facility ("Fragmentation Tub Bldg")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
607A	1938	Testing Facility	Ordnance Facility ("Testing Facility")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
611	ca. 1959-1963	Terminal Effects Evaluation Facility and Gun Emplacement	Ordnance Facility; Range Control Admin	Noncontributing	Evaluated 1982-83 HABS; Completed 1999	Within Historic District Boundary
611A	1965	Armor Plate-Butt	Ordnance Facility	Noncontributing	Evaluated 1982-83 HABS; Completed 1999	Within Historic District Boundary
611B	1929	Gas Gun Test Tunnel	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
611D	ca. 1940	Slug Butt	Vacant; Derelict	Noncontributing	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	Within Historic District; Demo SHPO complete via Final signature 17 May 10
613	1928	Mortar Powder Bldg; Ballistic Mortar Testing	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	Interior renovations occurred in 2009 (HPO-F2008-131)
617	1928	Fragment Cleaning, Reconstruction and Photography Bldg	Admin General Purpose	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	2009-10 interior renovations, addition, and new stucco exterior
617A	1928	High Explosives Magazine	High Explosives Magazine	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	2012-13 Renovations
617B	1928	Magazine	General Storehouse	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
617F	1928	Magazine	Fuze and Detonator Magazine	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	Relocated September 2012 next to 621B due to new water tank and cul-de-sac- NJHPO-E21012-285
617G	1938	Gun and Powder Shed	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
618	2011	Pump House	Pump House	Noncontributing		Not evaluated; likely to be noncontributing; within historic district
620A	1921	Ordnance Facility	Test Bldg	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Completed 2008	Attached to Building 620 (northeast corner); Demo NJ HPO complete pending narrative completion
620B	1921	Test Range; Tower	Ordnance Facility ("Test Range; Tower")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
621	1941	Fragmentation Tub Bldg	Ordnance Facility ("Fragmentation Tub Bldg")	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
621A	1947	Small Arms Pyrotechnic Magazine	Vacant; Derelict	Noncontributing	Completed 2007	Within Historic District boundary
621B	1914	Shipping and Receiving Bldg	Ordnance Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999	
623F	1957	Valve House	Valve House	Noncontributing		
623G	2008	Pump/Valve House	Pump/Valve House	Noncontributing		Not evaluated; likely to be noncontributing; within historic district
626	2013	Water Tank	Water Tank	Noncontributing		Not evaluated; likely to be noncontributing; within historic district

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#### *4.2.5.1 Descriptions of contributing buildings to the 600 Ordnance Testing Area Historic District*

##### **Building 604: Environmental Testing (1928)**

Building 604 is of concrete (first floor) and wood frame (second floor) construction on a concrete foundation that includes a basement (Figure 187). Constructed in 1928 and similar to Buildings 607 and 621, Building 604 originally contained a fragmentation tub supported by steel columns and concrete piers in the basement. Live shells were detonated inside the hopper which was filled with sand to absorb the shock of the blast, and the shell fragments were retrieved by a screen for examination. The sand, which could be reused, was stored in the basement and lifted to the hopper by means of a bucket elevator. In 1943, the fragmentation tub and the elevator were removed, and the louvered (which served to alleviate structural stress during explosions) on the second floor were replaced by wooden lap siding. The building is currently used for storage.<sup>103</sup>

The exterior shell is intact. The rectangular, two-story structure has an asbestos-protected corrugated metal gable roof and stands almost 35 ft high. The north (front) elevation has a center door flanked by two metal industrial windows on the first story and two more on the second story. The south (rear) elevation is similar to the front minus the center door, and it contains a basement door. East and west (side) elevations have one second-story window each. One wood lighting pole is located to the building's east side.<sup>104</sup>

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<sup>103</sup> Nolte et al. September 1999, 84.

<sup>104</sup> Ibid., 85.



Figure 187. Building 604, northeast oblique (ERDC-CERL, 2012).



### Building 604A: Control House for Drop Tower (1928)

Building 604A is a one-story, rectangular structure with a concrete foundation, concrete walls, and a concrete with tar and gravel low shed roof (Figure 188). It was constructed in 1928 as a control house for Building 604D, the drop tower. The interior and exterior are intact, with original wood door and windows. An L-shaped concrete barricade shields a door on the south side; a half-story above-grade basement with concrete walls and a concrete shed roof is attached to the west. A cable runs from an opening in the basement to Building 604D (the drop tower) via a wood A-frame with pulleys that elevate the cable.<sup>105</sup>

Figure 188. East elevation of Building 604A (ERDC-CERL, 2012).



<sup>105</sup> Ibid.



### Building 604B: Detonating Chamber (1931)

Building 604B is a one-story, irregularly shaped hexagonal structure with a concrete foundation, tie rod-reinforced concrete walls, and a flat concrete roof (Figure 189). It was constructed in 1932 as a detonating chamber to test explosives. The entire structure of Buildings 604B is intact and unaltered. The roof projects on two sides to form an overhang supported by steel brackets. The entrance to the chamber is shielded on the outside by a concentric concrete wall and on the inside by a concrete barrier wall.<sup>106</sup>

Figure 189. South elevation of Building 604B (ERDC-CERL, 2012).



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<sup>106</sup> Ibid., 86.



### Building 604C: Sectioning Chamber (1928)

Building 604C is a row of one-story operating rooms with concrete foundations, concrete walls, and concrete shed roofs (Figure 190). It was constructed in 1928 as a teardown facility for the disassembly of ammunition. It consisted of a control room flanked by two operating rooms, and a separate chamber to the west that housed a lathe. In 1942, a saw room with its own control room was added and in 1958, a milling machine room was added. Both additions, with their buttressed concrete blast walls, unified Building 604C into one structure. Its interior and exterior are intact. The original building's two operating rooms which open to the north are faced with wood-framed cel-o-glass blowout walls.<sup>107</sup>

Figure 190. North elevation of Building 604C, Sectioning Chamber; drop-tower is visible behind it (PICA Cultural Resources Office, 2011).



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<sup>107</sup> Ibid.

### Building 604D: Drop Tower (1928)

Building 604D consists of two connected drop towers (Figure 191). The original drop tower was constructed in 1928 for artillery detonation testing. In 1946, an enclosed multiple-impact test chute was inserted in the middle of the tower; the chute contained several steel plates placed at varying heights to interrupt the fall of the object being tested. Each plate ledge could be accessed from the exterior by a sliding steel gate. In 1949 another tower was built, with a steel-walled detonating enclosure at its base. The entire structure of Building 604D is intact, including the monitoring shed. The original tower has a concrete foundation, concrete blast wall at its base, open steel frame, three platforms accessible by a ladder running up the north end, and a multiple drop chute that rises to the third platform which is 47 feet above grade. The second tower has a concrete foundation, steel-walled drop chamber at its base, open steel frame, and two platforms accessible by stairs. The second platform is 40 feet above grade. An enclosed monitoring shed, with a metal frame and transite and Cel-O-Glass walls, is located beneath the original tower.<sup>108</sup>

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<sup>108</sup> *Ibid.*, 87.



Figure 191. Building 604D, Drop Tower (ERDC-CERL, 2012).





### Building 604E: Wind Tunnel (1942)

Building 604E is a one-story, rectangular structure with a concrete foundation, load-bearing brick walls, and a flat roof of tar and gravel (replaced in kind, 2013; Figure 192). It was constructed in 1942 as a wind tunnel but was converted to an office structure in 1961. The building is intact with multi-pane metal windows.<sup>109</sup> Doors replaced in 2013 to meet safety standards with NJ HPO approval.

Figure 192. Southeast elevation of Building 604E (ERDC-CERL, 2012).



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<sup>109</sup> Ibid., 89.

### Building 604F: Bull Pen (1928)

Building 604F is a one-story, round structure with a concrete foundation, concrete walls (lined on the inside with tarred timber, replaced continuously as needed for explosives testing), and an open roof that is protected by a steel-wire mesh hung from the walls. It was constructed in 1928 as a firing chamber.<sup>110</sup> A “bull pen” is a structure that contains a test explosion within its thickly reinforced concrete circular walls lined on the interior with heavy oak timbers allowing shrapnel to embed in the wood (Figure 193).<sup>111</sup> Building 604F, as well as the metal superstructure, was painted Concrete Gray in 2013 with SHPO concurrence. Also with SHPO concurrence, the shed in front was replaced.

Figure 193. Images of a “bull pen” in the 600 Area (ERDC-CERL, 2012 [left] and Picatinny Arsenal, 2011 [right]).



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<sup>110</sup> Ibid.

<sup>111</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/OrdnanceTesting/index.html>.



### Building 607, Fragmentation Tub Building (1940)

Building 607 is a two-story gable-roofed structure, with elevator head-houses projecting above the roof (Figure 194). The building has a steel frame, with concrete walls on the first floor and corrugated metal above. The upper floor contains large panels of metal louvers. Building 607 was built in 1940 as part of Picatinny Arsenal's testing program. Shells to be tested were placed in a large hopper surrounded by sawdust, and the shells were detonated. During the blast, the metal louvers ("blast louvers") opened. The roof of the building was reportedly built on flanges so that it could expand with the detonation. After the detonation, the sawdust was sifted and the metal fragments recovered for examination. A further magnetic process recovered small fragments that had passed through the sieve. Then the sawdust was collected in buckets on a conveyor belt and lifted to the top of the building where it was dumped into a storage hopper above the fragmentation tubs, ready for re-use. Building 607 was designed for shells up to 105 mm. The building is intact with limited alterations.<sup>112</sup>

Figure 194. Northeast oblique of Building 607 (ERDC-CERL, 2012).



<sup>112</sup> Ibid., 90.



### Building 607A: Testing Facility (1938)

Building 607A is a one-story, pitched-roof building constructed with a concrete foundation, steel frame encased in concrete, hollow-tile infill, and an APM roof on a steel frame (Figure 195). It was built in 1938 as a testing facility in conjunction with Building 607. Building 607A retains original siting, original massing, and construction.<sup>113</sup>

Figure 195. Northeast oblique of Building 607A (ERDC-CERL, 2012).



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<sup>113</sup> Ibid., 92.

### Building 611B: Gas Gun Test Tunnel (1929)

Building 611B originally consisted of a one-story, rectangular firing range (373 ft.9 in. long) with a concrete foundation, low concrete walls, and a semicircular, corrugated metal roof that gave way to a series of wood barricades mounted on top of the walls (Figure 196 and Figure 197). It was constructed in 1929 as a test tunnel for firing artillery rounds. A drawing from 1955<sup>114</sup> shows a 75-mm gun and labels the structure as a “fuze test tunnel,” and it calls for repairs to the wood barricades, liners, and concrete walls. In 1959, a gas gun was installed and a concrete barricade end wall with sand fill was inserted into the tunnel, dramatically decreasing the length of the range. That same year another tunnel was constructed, and an instrumentation room was added to the front of the old structure. Building 611B retains its original siting, massing, and construction. There are angled barricades that acted like fixed louvers to absorb the force of the shell’s impact and direct it up and away from the walls into the open air. The test tunnel walls were lined with timber and the end of the range was filled with sand. A second tunnel addition (40 feet long), constructed of five sections of concrete sewer pipes, intersects the original tunnel from the west. A wood-framed instrumentation room, on concrete piers with a shed roof and two double wood loading doors, fronts the original tunnel from the south.<sup>115</sup>

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<sup>114</sup> Drawing available at Picatinny Cultural Resources Office.

<sup>115</sup> Nolte et al. September 1999, 92.



Figure 196. Looking north at Building 611B, Gas Gun Test Tunnel (ERDC-CERL, 2012).



Figure 197. Comparison photographs of the original fuze test tunnel to the altered test tunnel (PICA Cultural Resources Office).





### Building 613: Mortar Powder Building; Ballistics Mortar Testing (1928)

Building 613 is a one-story, rectangular structure with a concrete foundation, brick and concrete load-bearing walls, and a corrugated asbestos protected metal saltbox roof supported by a steel truss and covered in spray foam in 2008 (Figure 198). A small concrete shed with a concrete roof is attached to the main building on the east side. It was constructed in 1928 for Ballistics Mortar Testing. Plans indicate overhead mortar support beams inside, and the walls and floor of the concrete shed are lined with wood planks; more research is needed to determine the function of Building 613 regarding these interior features. In 1944, a brick addition was constructed on the north side, giving the structure its current saltbox shape. The building retains its original siting, massing, and construction. There are metal double loading doors, a concrete loading dock, and metal awning windows.<sup>116</sup> Doors and windows recently replaced with NJ HPO consultation.

Figure 198. Southwest oblique of Building 613 (ERD-CERL, 2012).



<sup>116</sup> Ibid., 95.

### Building 617: Fragment Cleaning, Reconstruction and Photography Building (1928)

Building 617 is a one-story, H-plan building with a concrete foundation, load-bearing hollow clay tile walls, and a gable roof covered with asphalt shingles and supported by steel purlins (Figure 199). Stucco covers the old hollow clay tile of the structure similar to 171A. The east-facing courtyard contains a concrete moat which is used to direct rainwater away from the site. It was constructed in 1928 as a Fragment Cleaning, Reconstruction, and Photography Building. It is currently used as an Administrative Office Building. Building 617 retains original siting, massing, and construction. The building has lightning protection. Alterations include new windows and metal siding for the exterior, and 2 x 4 ft-tile suspended acoustical ceiling for the interior.<sup>117</sup> Building was renovated in 2009-10 and a new HVAC area was added in the rear.

Figure 199. South elevation of Building 617 (ERDC-CERL, 2012).



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<sup>117</sup> Ibid.



### Building 617A: High Explosives Magazine (1928)

Building 617A is a small, one-story, white building with a concrete foundation, steel frame enclosed in concrete, hollow clay-tile walls, and a gable roof supported by steel frame and covered with corrugated asbestos (Figure 200). It was constructed in 1928 as a high explosives magazine, but it is currently used for storage. Building 617A retains original siting, massing, and construction. There are steel-sash windows, painted galvanized metal doors, and lightning rods. There are also exterior electric controls, exterior steam heater controls, and an unused concrete pad adjacent to the south end of the building.<sup>118</sup> Recently painted adobe red to match original tile with NJ HPO approval.

Figure 200. West elevation of Building 617A (PICA Cultural Resources Office).



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<sup>118</sup> Ibid., 96.



### Building 617B: Magazine; Smokeless Powder Storage (1928)

Building 617B is a small, one-story white building with a concrete foundation, steel frame, corrugated asbestos walls, and a gable roof covered with corrugated asbestos (Figure 201). It was constructed in 1928 for use as a smokeless powder magazine, but it is currently used for general storage. Building 617B retains its original siting, massing, and construction. The building has a rooftop ventilator, a single steel-sash window, and a painted galvanized metal door with wire-glass vision lights. It has two lightning rods on the roof.<sup>119</sup>

Figure 201. Northwest oblique of Building 617B (ERDC-CERL, 2012).



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<sup>119</sup> Ibid.

### Building 617F: Magazine (1928)

Building 617F is a small, one-story white building with a concrete foundation, steel frame, corrugated asbestos walls, and a gable roof covered with corrugated asbestos (Figure 202). It was constructed in 1928 as a magazine, but it is currently used for storage. Building 617F was relocated adjacent to 621B in 2012. The building has a rooftop ventilator, a single steel-sash window, and a painted galvanized metal door with wire-glass vision lights.<sup>120</sup>

Figure 202. North elevation of Building 617F (ERDC-CERL, 2012).



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<sup>120</sup> Ibid.

### Building 617G: Gun and Powder Shed (1938)

Building 617G is a one-story, shed roof, six-bay, garage-like building that is finished with a thin coat of concrete or stucco and painted Richmond Bisque in 2008. It was constructed in 1938, and was altered in 1956 and 1964. It was originally used for storing howitzers used in the nearby firing range and for storing pallets of powder. Building 617G retains its original siting, massing, and construction. The exterior includes a concrete foundation, load-bearing hollow clay tile and poured concrete walls, concrete roofing beams, and concrete roof. The building has lightning rods on a copper-clad roof, and a non-conductive floor made of concrete with an asphalt coating. The building appears to have evolved through three phases—Phase 1: one-bay structure (westernmost bay) built with load-bearing hollow clay tile walls, concrete roof, garage type vehicular doors; Phase 2: five bays added to the west side of the original building, built with poured concrete walls, concrete roof, concrete roof beams with integrated braces, and five additional sets of vehicular doors; Phase 3: converted to steam form of energy. The steam was created as a by-product of electricity production at the Power Plant (Building 506, originally Building 1906) and the Boiler House (Building 3013, originally Building 1901). Water from Picatinny Lake was heated, and the steam was forced through turbines to produce energy. Pressurized steam was then sent to production facilities via conduit. On site, buildings were fitted with pressure reducing valves and steam powered equipment, which reduced the risk of explosion. Overall the Steam Distribution System consists of a network of conduit, supporting structures, and pressure reducing valves. Most of the system visible has been replaced, but there are remnants of an earlier system of conduit supported on cast stone pier.<sup>121</sup>

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<sup>121</sup> Harrell 1996, E-485.



### Building 620A, Ordnance Facility (1921)

Building 620A is a one-story, structure with a concrete foundation, tie-rod-reinforced concrete walls, and a flat concrete roof (Figure 203). The building is partially depressed in the side of the hill and fenced off. The building is currently unused and is covered in vines.

Figure 203. Northeast elevation of Building 620A (ERDC-CERL, 2012).



### Building 620B, Drop Tower and Friction Tower (1921)

Building 620B is a one-story, rectangular structure with a concrete foundation, steel frame, corrugated asbestos protected metal exterior walls, and a corrugated APM shed roof (Figure 204). A 25' tall steel tower in front of the building has a concrete base that is used as an impact anvil, and an impact hammer above. A steel plate wall, 5'-6" tall, screens the tower base on three sides from the adjacent road. It was constructed in 1921. The tower tested an explosive's sensitivity to direct impact, comparable to normal handling under worst conditions. The hammer was operated remotely from the building via a cable and pulley. The building contains a steel A-frame with a swinging pendulum centered over an anvil; the device was used to test friction resistance of explosive compounds. The controls were located behind a semi-circular steel shield (along with the tower controls). Building 620B retains its original siting, massing, and construction.<sup>122</sup>

Figure 204. Drop Tower and Friction Test (pendulum) (ERDC-CERL, 2012).



<sup>122</sup> Nolte et al. September 1999, 98.



### Building 621, Fragmentation Tub Building (1941)

Building 621 is a two-story gable roofed structure, with elevator head-houses projecting above the roof (Figure 205). The building has a steel frame, with concrete walls on the first floor and corrugated metal above. The upper floor contains large panels of metal louvers. It was built in 1941 as part of the Arsenal's testing program. Shells to be tested were placed in a large hopper surrounded by sand, and the shells were detonated. During the blast the louvers ("blast louvers") opened. The roof of the building was reportedly built on flanges so that it could expand with the detonation. After the detonation, the sand was sifted and the metal fragments reverved for examination. A further magnetic process reverved small fragments that had passed through the sieve. Then the sand was collected in buckets on a conveyor belt and lifted to the top of the building where it was dumped into a storage hopper above the fragmentation tubs, ready for re-use. Building 621 was designed for shells up to 105 155mm.<sup>123</sup>

Figure 205. Southwest oblique of Building 621 (ERDC-CERL, 2012).



<sup>123</sup> Ibid., 90.



### Building 621B, Shipping and Receiving Building (1914)

Building 621B is a one-story, rectangular structure with concrete foundation, corrugated asbestos walls on a steel frame and corrugated, APM gable roof (Figure 206). It was constructed in 1914 for the storage of ammunition and used as a shipping and receiving facility for the 600 Test Area. It retains its original siting, massing, and construction. Its exterior includes: concrete foundation; steel frame; asbestos walls; and a gable roof covered with APM.<sup>124</sup>

Figure 206. View of front façade of Building 621B (ERDC-CERL, 2012).



### Buildings 620, 623, 623A, 623B, 623D, 623E and 623G (Demolished)

A set of 6 water tanks were demolished in 2013. Building 623 and 623A were constructed in 1929, while the rest were constructed in 1942. All tanks were replaced in 1970.<sup>125</sup> Building 620, a long firing range constructed in 1928, currently vacant is slated for demolition.

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<sup>124</sup> Ibid, 99.

<sup>125</sup> According to 1982 HABS/HAER property card on file at PICA Cultural Resources Office.

### Steam lines distribution system

The steam distribution system is a network of metal or APM conduit that run above and below ground from the power plants throughout PICA. A centralized system of steam throughout Picatinny Arsenal and the Lake Denmark NAD provided a source of heating and allowed production facilities throughout the installation to use pressurized steam as a sparkless form of energy. The steam was created as a by-product of electricity production at the Power Plant (Building 506), built in 1906 and the Boiler House (Building 3013), built in 1901. Water from Picatinny Lake was heated, and the resulting steam forced through turbines to produce energy. Pressurized steam was then sent to production facilities via conduit. On site, buildings were fitted with pressure reducing valves and steam powered equipment, which reduced the risk of explosion. Overall the Steam Distribution System consists of a network of conduit, supporting structures, and pressure-reducing valves. Most of the system visible has been replaced, but there are remnants of an earlier system of conduit supported on cast stone pier.<sup>126</sup> Steam lines exist throughout the 600 Area (Figure 207—Figure 209).

Figure 207. Elevated steam lines stretch over 20<sup>th</sup> Avenue (ERDC-CERL, 2012).



<sup>126</sup> Harrell 1996, E-465.



Figure 208. Steam lines located throughout the 600 Test Area (ERDC-CERL, 2012).



Figure 209. Replacement steam lines placed high above the paved roads in the 600 Test Area (ERDC-CERL, 2012).



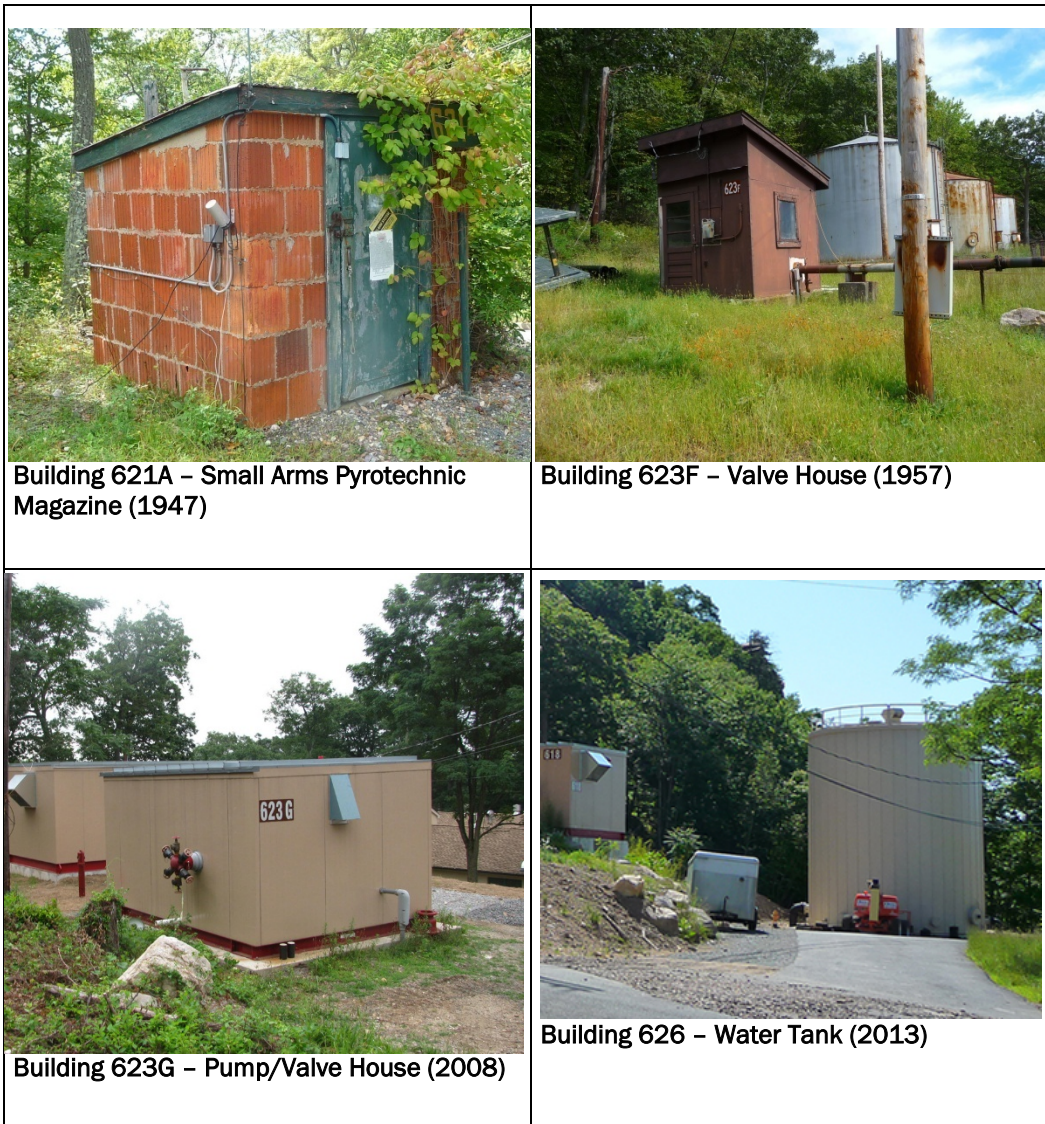


4.2.5.2 Noncontributing structures in the 600 Ordnance Testing Area Historic District

There are eight (8) noncontributing structures within the 600 Ordnance Testing Area Historic District boundaries. The structures are listed below (Figure 210).

Figure 210. Noncontributing structures in the 600 Ordnance Testing Area Historic District.





#### 4.2.6 Vegetation

The 600 Area is nestled on the hillside and surrounded by wooded land. The vegetation located inside the boundary of the 600 Area is minimal. The landscape is dotted with mature deciduous trees concentrated mainly around the court area on either side of 20<sup>th</sup> Court. Grasses surrounding the buildings are kept mowed (Figure 211 and Figure 212).



Figure 211. Trees line the curved road near Building 617 (ERDC-CERL, 2012).



Figure 212. Drainage swales (ERDC-CERL, 2012).





#### 4.2.7 Small-scale features

Small-scale features, such as drainage swales, walls, signage, and flagpoles are found throughout the 600 Area and help to define the character of the cultural landscape. Developed in association with the roadways, buildings, and the occupancy of the site, these features often reflect the influence of the period in which they were added. Many of these miscellaneous small-scale features' character and feel contribute to the cultural landscape of the district.

##### 4.2.7.1 Drainage swales; Demolished

Concrete-formed drainage swales are found around Buildings 620 and 617 (Figure 213). The swales were designed and incorporated into the original layout and function of the area. While the 600 Area is built into the side of a steep hill, no documentation was found detailing the need for extensive swales in this area. These swales were removed during the demolition of Building 620, and a new parking lot was installed with sidewalks leading to Building 617.

Figure 213. Drainage swales (ERDC-CERL, 2012).



#### 4.2.7.2 Flagpole

The significance of the flagpole located at the entrance into the 600 Area (Figure 214) is that it alerts people of testing being conducted within the buildings.

Figure 214. Testing flagpole (ERDC-CERL, 2012).





#### 4.2.7.3 *Lightning rods*

Lightning rods are located adjacent to or on all buildings within the 600 Area (Figure 215).

Figure 215. Large lightning rod adjacent to Building 607A (ERDC-CERL, 2012).





#### 4.2.7.4 Historic marker

A historic marker is located along 20<sup>th</sup> Avenue, describing the significance of the 600 Area Ordnance Testing Historic District (Figure 216). The historic markers for the NRHP-eligible historic district are used to identify and highlight these significant areas. The markers allow for military and civilian personnel and visitors to the installation to be more aware of the installation's historical heritage to ensure the long-term preservation of these significant areas. The markers were funded by the Environmental Affairs Division and produced by Lake Shore Industries. Text was developed by CRM, NJ HPO, and the Morris County Heritage Commission. Placement of the markers was carried out in 2012.

Figure 216. Historic marker identifying the 600 Area (ERDC-CERL, 2012).



#### **4.2.8 Views and vistas**

The design and layout of the 600 Area was mission-specific. Views and viewsheds would not have been part of this design unless needed for visibility.

### **4.3 Landscape evaluation**

Landscaping such as plants and trees are very fluid elements of a historic property and district. These elements have constantly changed over the years to the point that obviously, most of the original landform features and plantings historically part of PICA have been removed or added to over time. In the 600 Area, the planting of existing large shade trees was most likely not designed, but remaining trees were allowed to grow in the parking areas and court for shade. Drawings on file at the DPW office show some of these trees date to the 1940s. Original site features obtained with at least 50 years of age and retaining their original condition should be repaired or replaced in kind. These features include curbing and sidewalks, retaining walls, fences and gates, and lighting. Individual features in a property's landscape should never be viewed in isolation, but rather in relationship to the property's surrounding setting and overall fabric.<sup>127</sup>

New plantings and landscaping should be in keeping with the original design intent of the facility. Historic maps and site plans of individual structures may serve as a guide to determining historic configurations. Mature plantings should be maintained to the extent possible; where replacement is necessary, it should be done in species matching the original.

#### **4.3.1 Historic significance**

Located on the north side of Lake Picatinny, the 600 Area is the largest area in the arsenal. The 600 Area contains the buildings and testing areas used for the explosive testing of guns, shells, powders, and other explosives. The buildings within the 600 Area test zone were specifically designed to withstand shock and blast effects, and they were built in a variety of shapes and sizes. The special requirements of such activities have resulted in a number of unique structures. It is the uniqueness of design, as well as the same basic function, which ties these buildings together.<sup>128</sup>

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<sup>127</sup> Chugach Industries 2008, 6–16.

<sup>128</sup> Nolte et al. September 2009, 83.

The 600 Area Ordnance Testing Historic District is full of unique structures specifically designed for various testing functions. Because the testing function dictated the design, the result has been a number of unusual structures and interesting architectural features. The collection also reflects Picatinny's role in the production and R&D of ammunition. The district historically assumed an integral position at PICA by providing the facilities to test the ammunition being developed and produced there. The 600 Area has been carefully documented by a 1983 Historic American Engineering Record (HAER) report<sup>129</sup> and consistently highlighted in previous architectural reports as being significant.<sup>130</sup>

#### **4.3.2 Integrity**

A few buildings in this area are still in use for ammunition production and testing. Many of the structures are now vacant or used for storage. The infrastructure such as curbs, drainage swales, parking areas, and steam lines are still present, as are the large shade trees scattered around the site. These features still provide a setting for the historic testing mission, although it appears they are no longer being maintained.

#### **4.3.3 Character-defining features**

The National Park Service defines historic character-defining features of a landscape as “prominent or distinctive aspects, qualities, or characteristics of a cultural landscape that contribute significantly to its physical character.”<sup>131</sup> Through the study of landscapes, the built environment is explained by the physical remains of the natural and cultural shaping forces. The historic districts of Picatinny are significant because they describe the adaption of the built environment to the cultural values and educational and military mission of Picatinny. Understanding the factors that influenced and composed the landscape informs the preservation of its historic qualities.

The character-defining features of PICA are landscape features that were part of the initial design, present throughout the period of significance as established in the National Register nomination, and continue to be evi-

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<sup>129</sup> Thurber and Norman 1983.

<sup>130</sup> Nolte et al. September 1999, iv.

<sup>131</sup> Birnbaum and Peters 1996, 4.



dent in the district today. Character-defining features of the 600 Area Ordinance Testing Historic District are listed in Table 6 along with summaries of their historical significance, integrity, and NRHP eligibility.

Table 6. 600 Area character-defining features.

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
<b>Circulation and roadways</b>	A circular drive, Twentieth Circle with inner court provides access to buildings.	<ul style="list-style-type: none"> <li>• Drive and court still in use; good condition</li> </ul>	Yes
<b>Clustering of buildings</b>	Historically a testing area, building separations are based on building functions and safety	<ul style="list-style-type: none"> <li>• Spacing between buildings remains the same</li> </ul>	Yes
<b>Lightning rods</b>	Some rods located on poles adjacent to buildings; support the testing mission.	<ul style="list-style-type: none"> <li>• Rusted</li> </ul>	Yes
<b>Vegetation</b>	Vegetation consists of mature shade trees not planted during site design; either left in place during construction or allowed to grow later.	<ul style="list-style-type: none"> <li>• Mowed lawns are maintained</li> <li>• Trees in court area should remain; do not need to be replaced.</li> </ul>	No
<b>Steam lines</b>	Steam lines existed historically throughout installation	<ul style="list-style-type: none"> <li>• Still in use as needed. Boilers-in-a-box not allowed in explosive areas.</li> </ul>	Yes
<b>Testing flagpole</b>	Original flagpole is located along the main road to warn of testing.	<ul style="list-style-type: none"> <li>• Rusted</li> </ul>	Yes (new ones at Blgs 613 and 604F, no)
<b>Fencing</b>	Built to restrict access for security and safety.	<ul style="list-style-type: none"> <li>• Some fencing still remains in place; rusted and in disrepair.</li> </ul>	Yes

*Steam lines:* the vegetation needs to be cleared and removed off and around exposed and elevated steam lines (Figure 217). Their alignment, stanchions, and steam stations are significant.

Figure 217. Remove vegetation from steam lines (ERDC-CERL, 2012).



*Fencing:* Portions of the 600 Area are surrounded by chain-link fencing to provide security for testing conducted in the buildings.

#### 4.3.4 Final determinations

This World War II testing area has been well documented. First with the HAER documentation completed in 1982 and 1983<sup>132</sup>. A second report conducted by Panamerican Consultants in September 1999, *Definition of Historic Districts for Picatinny Arsenal, Morris County, New Jersey*, concluded that the 600 Area Ordnance Testing Historic District was made up of 29 contributing buildings and three noncontributing structures (Figure 218).<sup>133</sup> On July 2, 1999, the NJHPO ruled that the 600 Ordnance Test

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<sup>132</sup> Thurber and Norman 1983, 116-127.

<sup>133</sup> Ibid.

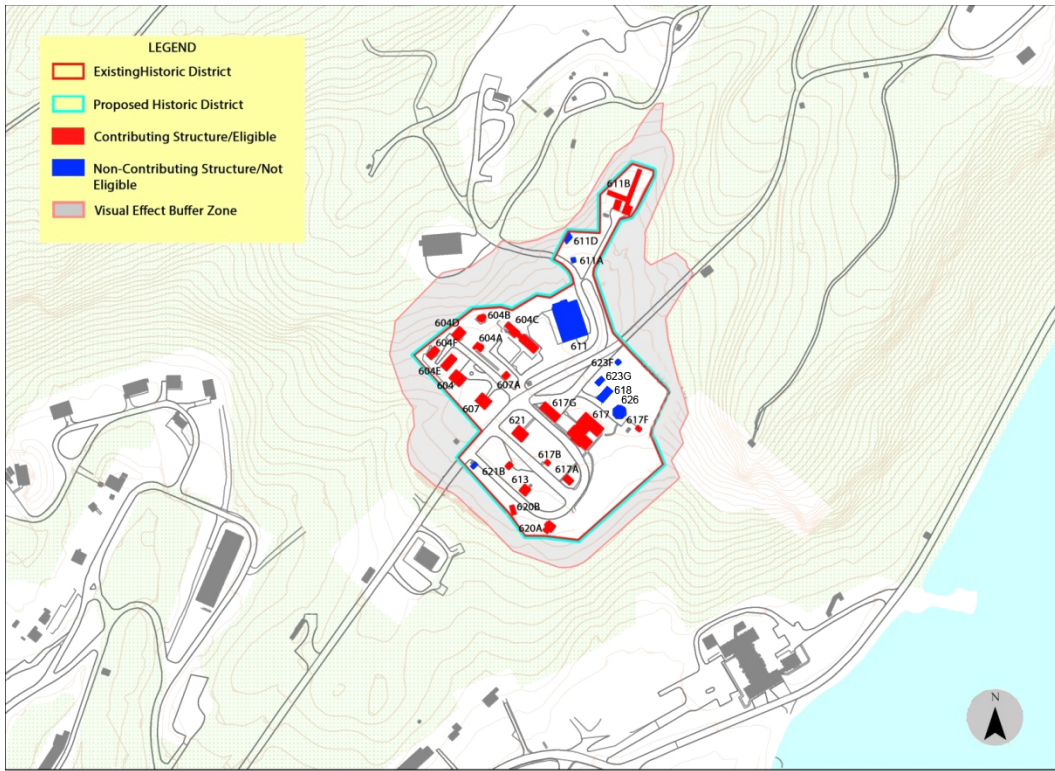
Area District is eligible to the NRHP under Criteria A and C. The 600 Ordnance Test Area District's historic context is: the Inter-War era; World War II mobilization; and World War II.

The findings of this current report concur with the earlier report's existing district boundary but conclude the district today contains 20 contributing structures and 8 noncontributing structures for reasons of either newer construction or demolition as a result of Section 106 mitigation on previously contributing buildings (Figure 218).

For the 600 Area Ordnance Testing Historic District, new construction must conform with a similar and in-kind design to the surrounding architectural style. For example, new structures being built within or adjacent to the 600 Area Ordnance Testing Historic District, should conform to concrete construction and be patterned similar to contributing surrounding buildings including their scale and massing. Additionally, new structures within the remaining historic district should be painted white, concrete gray, or tan/beige. The installation prefers a tan/beige exterior with dark green trim on most test range buildings, and an adobe red color on the clay tile buildings. Several of the buildings have been repainted recently with NJ HPO consultation.



Figure 218. The 600 Ordnance Testing Area Historic District boundary (green outline) and eligibility status for the structures within the proposed boundary, 2012.



## 5 Army Rocket Test Area Historic District (1500 Area)

### 5.1 History

The Army Rocket Test Area Historic District (also known as the “1500 Area”)<sup>134</sup> was built over a period spanning the late 1940s to the 1960s (Figure 219 through Figure 221); the district includes the remnants of two Cold War Army testing facilities. One is a set of test stands, conditioning chambers, and support buildings for testing jet-assisted takeoff (JATO), rockets and missile components, located in the central part of the district. The Army’s rocket and missile testing program served basic research purposes and was part of the broader U.S. response to a perceived Soviet threat following World War II, but this was a time when outsourcing to private industry and academic institutions increasingly came to dominate military spending on both R&D and production projects.<sup>135</sup>

Picatinny was one of the Army’s six old-line manufacturing arsenals that participated in major weapons programs after World War II, and the assignment to this installation in 1950 of nuclear munitions development ensured that PICA would continue its rocket testing program throughout the ensuing decade. Important weapons systems for which components are known to have been tested in the 1500 Area include LOKI (1951), SAGE (1951), HONEST JOHN (1952), REDSTONE (1953), NIKE AJAX (1954), SHILLELAGH (1958), and PERSHING I (1960). Other systems that PICA participated in developing such as the CORPORAL, LACROSSE, NIKE HERCULES, HAWK, LITTLEJOHN, SERGEANT, LANCE, PATRIOT, and PERSHING II, also probably underwent components testing here. Following the Cold War, the test stands of this historic district continued to be used for static testing of thrusters, for a variety of tests on projectiles in development at Picatinny, and for Explosive Ordnance Disposal (EOD) tests.<sup>136</sup>

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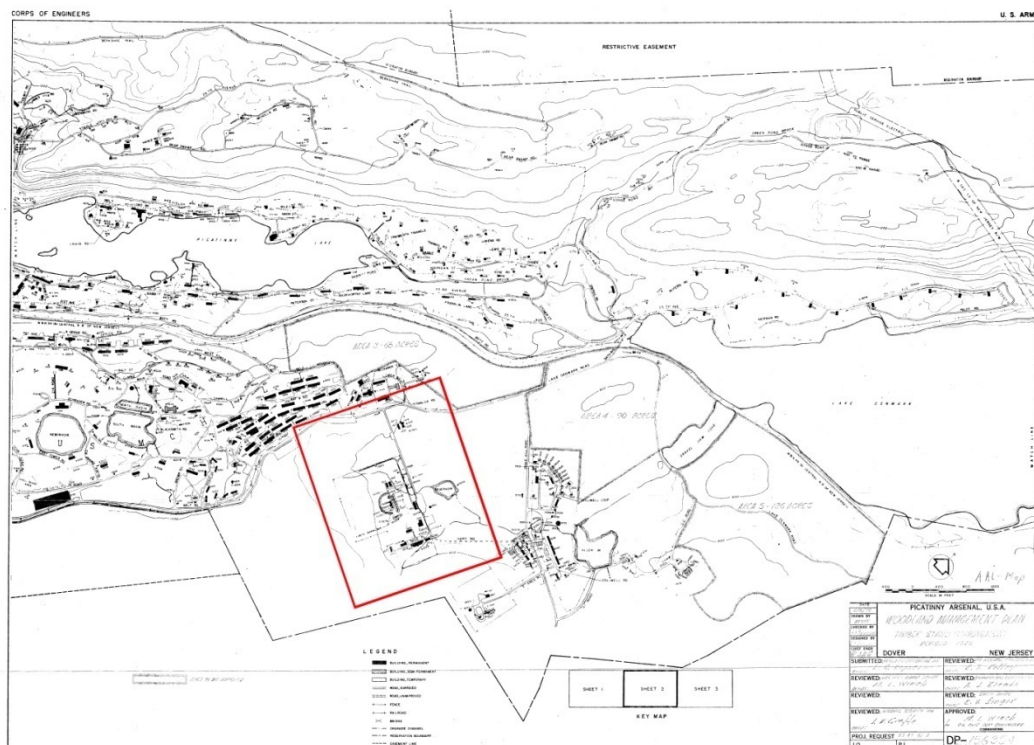
<sup>134</sup> NOTE: Rocket Test Area Historic District has gone by a number of names including the Rocket Propellant Power Plant (late 1940s), the Liquid Rocket Propulsion Laboratory Test Area (early 1960s), and the 1500 Area (present).

<sup>135</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/FormerRocketTest/index.html>

<sup>136</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/FormerRocketTest/index.html>

The second constituent of the district is a group of pyrotechnics research facilities. These structures stood in two locations within the district: high-altitude simulation test chambers and related buildings were on the west end of the district near the entrance off Lake Denmark Road, and a group of research laboratories and storage buildings were at the east end of the district. Picatinny had led pyrotechnics development for the Army from the time the War Department created the Pyrotechnic Board after World War I, and the Arsenal was given oversight of national programs after World War II. The 1950s facilities were sited within the relatively remote rocket test area partly for safety reasons. The pyrotechnic facilities built there were state-of-the-art for their time, but were largely obsolete by the end of the 1970s.<sup>137</sup>

**Figure 219. 1972 Picatinny Arsenal map with the 1500 Area indicated within the red box (PICA Cultural Resources Office).**



<sup>137</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/FormerRocketTest/index.html>.



Figure 220. Map of the 1500 Area, circa 1960s (PICA Cultural Resources Office).



Figure 221. Historic photograph of the 1500 Area, May 1951 (PICA Cultural Resources Office).



## 5.2 Landscape inventory

To identify the prominent or distinctive characteristics that make a landscape historic, the physical features of the site are divided into eight (8) areas: site and layout, land use, expressions of military cultural values, transportation networks, views and viewsheds, buildings and structures, vegetation, and small-scale features. These characteristics of the landscape combine to form the built environment that is the primary image of Picatinny Arsenal.

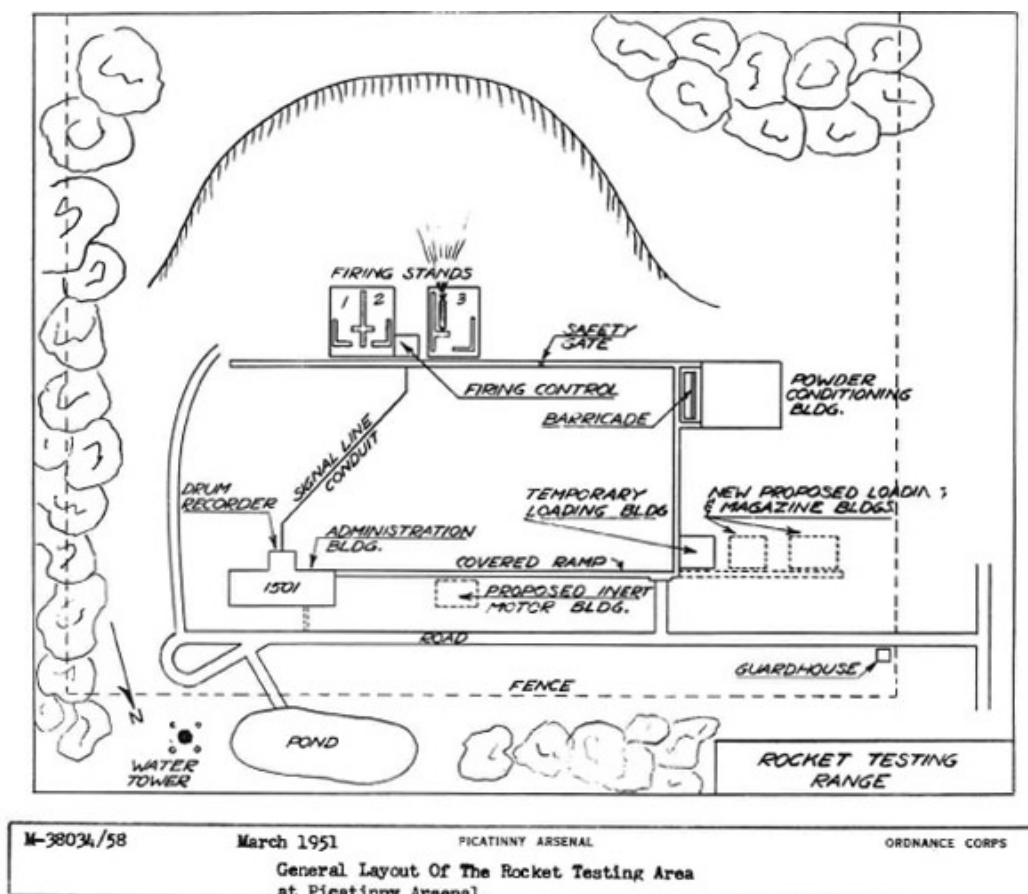
### 5.2.1 Site and layout

The Army Rocket Test Area Historic District lies along Hart Road in a wooded area off Lake Denmark Road adjacent to the far northeast part of Picatinny Arsenal, although off the installation proper (Figure 222). The 1500 Area is a 20-acre site currently used for storage, assembly, research, development, and testing of high explosives, propellants, and projectiles.<sup>138</sup>

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<sup>138</sup> Nolte, Kelly, Mark A. Steinback, and Mark Drumlevitch. *HABS Survey Documentation of Pyrotechnic R&D Laboratory #1510 and General Storage Building #1510B, Picatinny Arsenal, NJ*. (Buffalo, NY: Panamerican Consultants, Inc., 2008), 26.

Figure 222. General layout of the 1500 Area at Picatinny Arsenal, May 1951 (PICA Cultural Resources).



Although the 1500 Area is traditionally divided into the eastern and western sections, the area really consists of three distinct building groupings: Extreme Environment Testing Area, the Testing Area, and the Storage and Laboratory Area. All of the 1500 Area is enclosed within a chain-link fence. In addition there is a path or sidewalk used for security monitoring just inside the fence and visible on aerial photographs.<sup>139</sup> Within the 1500 Area fence, the Testing Area and portions of the Storage and Laboratory Area are also within additional chain-link fences.<sup>140</sup>

The boundary of the Army Rocket Test Area Historic District, begins at Lake Denmark Road on the west and extends easterly behind Buildings 1519 and 1520 to Building 1530 north of Hart Road. The boundary turns south and extends to encompass Buildings 1511, 1515 and 1513, east of Sage Place. From Building 1513, the boundary turns west and runs behind the

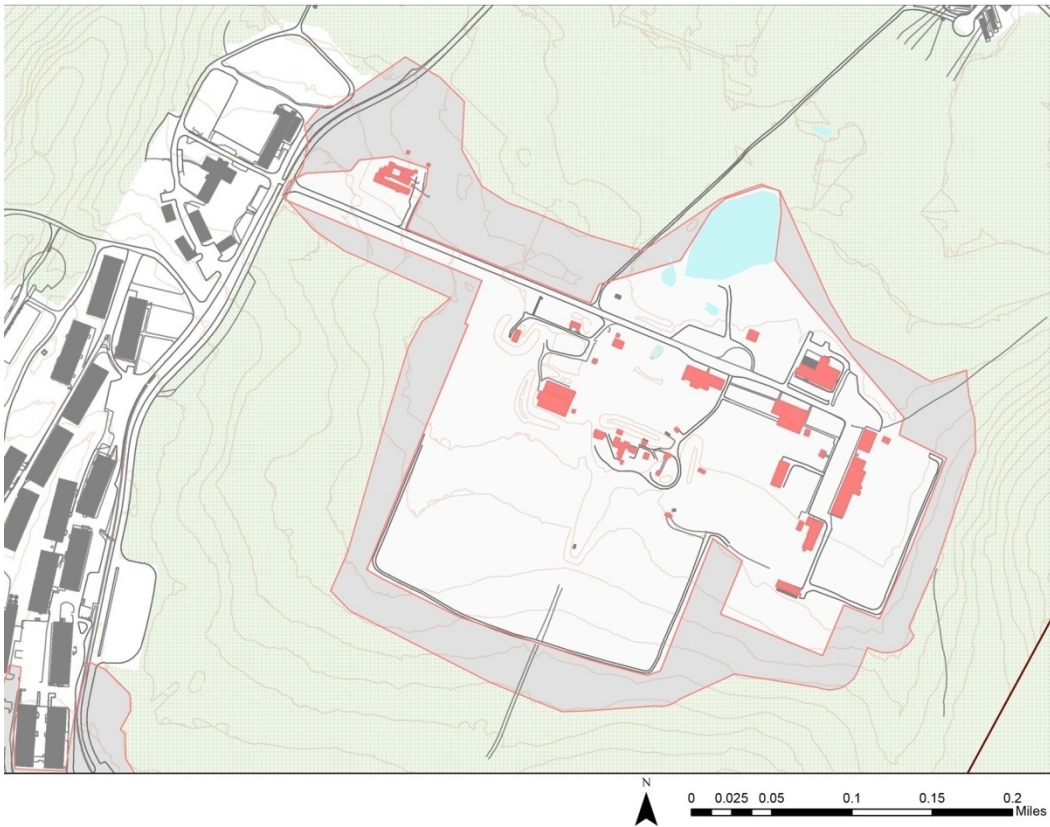
<sup>139</sup> Chugach Industries 2008, 5-15.

<sup>140</sup> Nolte et al. 2008, 35.



buildings along the south side of Hart Road to the end of the chain-link fence, where the boundary turns north and extends to Hart Road. The boundary continues westerly along Hart Road to Lake Denmark Road (Figure 223).<sup>141</sup>

**Figure 223.** The Army Rocket Test Area Historic District (1500 Area) boundary is outlined in red. Red areas indicate buildings, blue area is wetland, and shaded area is a buffer zone. Lake Denmark road is on the left side of this figure (ERDC-CERL, 2013).



### 5.2.2 Land use

A wooded area to the south of the buildings separates buildings and structures from a number of pyrotechnic magazines (Figure 224 and Figure 225). The wooded area serves as a type of blast protection and helps delineate the use areas within the 1500 Area.

<sup>141</sup> Ibid., 43.

Figure 224. Historic aerial view of the 1500 Area, no date (PICA Cultural Resources Office).



Figure 225. Historic photograph of the placement of the Rocket Test Area with a row of trees for protection, May 1951 (PICA Cultural Resources Office).





### 5.2.3 Transportation networks

A single road, Hart Road, provides access from Lake Denmark Road to the 1500 Area (Figure 226 through Figure 228). Today, access to the 1500 Area is through a gate on Hart Road, but historic maps depict a guard house which is no longer extant. No rail lines were discovered during field work. Walkways (some covered) connect the buildings and testing areas (Figure 229 and Figure 230).

Figure 226. Hart Road is the main east access road into the 1500 Area from Lake Denmark Road on the area's west side (ERDC-CERL, 2012).





Figure 227. Hart Road (main access road to the Rocket Test Area), looking west towards Lake Denmark Road; note entrance gates in far background of photo (ERDC-CERL, 2012).



Figure 228. Paved road leading from the main access road (Hart Road) to the Testing Area in the district (ERDC-CERL, 2012).





Figure 229. Concrete walkways connect the test stands in the Testing Area of the historic district (ERDC-CERL, 2102).



Figure 230. Covered walkways near the test stand area in the Testing Area of the historic district (ERDC-CERL, 2012).





#### 5.2.4 Expression of military cultural traditions

The Army Rocket Test Area, as with most military industrial areas, was designed to efficiently and cost effectively support the mission. The buildings are uniformly laid out along the access road. The use of concrete block construction and lack of aesthetic extras support this efficiency (e.g., no landscaping or high-end building materials).

In the 1500 Area, rockets were moved from buildings to be placed in test positions in the firing test bays. The design of the covered walkways was a typical industrial feature within this area (Figure 231).

Figure 231. An Honest John rocket is carried down a covered walkway near Building 1503 in 1953 (PICA Cultural Resources Office).



#### Buildings and clusters

The 1500 Area is divided into three distinct building groups: (1) Storage and Laboratory Area, (2) the Testing Area, and (3) Extreme Environment Testing Area.

The 1950s Contemporary style resembled the International style in having flat roofs and no decorative detail; however, it lacked the stark, white stucco surfaces of the International style, instead choosing combinations



of wood, masonry, and stone. In the case of the Army, the building material of choice was concrete block. Concrete block is cheap, has superior tensile strength, and provides great flexibility in its use. During World War II, the Army had been partial to hollow-clay tile, which had many of the same features as concrete block and created a familiarity with hollow supporting units. The majority of the buildings within the Rocket Test Area Historic District have Contemporary style touches—asymmetry, flat roofs, and wide overhanging eaves.<sup>142</sup>

#### 5.2.4.1 Storage and Laboratory Area

The Storage and Laboratory Area is located off Hart Road on the east side of the district. In this section of the district, laboratories (chemistry, pyrotechnic, physics), R&D buildings (chemistry, pyrotechnic, physics, ordnance), and different types of storage structures are found. Some testing was done inside a building as opposed to the test area where live fire was tested primarily outside.<sup>143</sup>

The buildings in this area and their current uses include 1500 (Water Tower), 1509 (Ordnance Test Facility), 1509A (HVAC Building), 1510A (Storage), 1511 (Conditioning Building), 1512 (Chemistry Laboratory), 1512A (Flammable Materials Storehouse), 1513 (Pyrotechnic R&D Laboratory), 1514 (Pyrotechnic R&D Laboratory), and 1515 (Physics Laboratory and Administrative R&D; Figure 232).

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<sup>142</sup> Nolte et al. 2008, 36-37.

<sup>143</sup> Nolte, Kelly, Kelly Mahar, Mark A. Steinback. *Determination of Eligibility for 318 Buildings and Structures for inclusion on the National Register of Historic Places, Picatinny Arsenal, Rockaway Township, Morris County, New Jersey*. (Buffalo, NY: Panamerican Consultants, Inc., 2007), 4-126.

Figure 232. Buildings 1512 (left) and 1515 (right) in the Storage and Laboratory Area on the east side of the district (ERDC-CERL, 2012).



#### 5.2.4.2 Testing Area

Built over a period spanning the late 1940s to the 1960s, the district includes the remnants of two Cold War Army testing facilities. During that time period, this area conducted fully instrumented tests on a wide variety of munitions systems and components, including gun and rocket propellants, projectiles, warheads, igniters, primers, detonators, fuzes, flares, and mines. The test generally involved explosives detonations or propellant burning but were not ballistic in nature since free flight of the test item was limited to a few feet.<sup>144</sup> One is a set of test stands, conditioning chambers, and support buildings for testing jet-assisted takeoff (Jato), rocket, and missile components, located in the central part of the district.<sup>145</sup>

This area, well away from the active test firing of propellants, was set aside for laboratories and longer term storage of explosives and other materials. Chemistry, physics and pyrotechnics laboratories were found in this area as were flammable, HE, and general storage facilities.<sup>146</sup>

Buildings in this area and their current uses include 1501 (R&D Administration), 1502 (Ordnance Facility), 1503 (Powder Conditioning Building), 1504 (Ordnance Facility), 1504A (Storage), 1505 (Test Cell and Control

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<sup>144</sup> Nolte et al. 2007, 4-110.

<sup>145</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/FormerRocketTest/index.html>

<sup>146</sup> Nolte et al. 2007, 4-134.

Room), 1505A (Test Cell and Control Room), 1505B (Test Cell), 1505C (Control House), 1505D (Test Cell), 1505E (Control Spin Room), 1505F (Storage and Wind Tunnel), 1505N (Open Back Blast Area), 1506 (Assembly Building), 1507 (High Explosives Earth-Barricaded Magazine), 1508 (Derelict Storage), 1527 (Vacant), 1528 (Barricade), 1529 (General Purpose Warehouse), and 1530 (Administration Building; R&D Laboratories).

Figure 233 through Figure 235 provide historic photos of Buildings 1506, 1503, and 1505, respectively.

**Figure 233. Historic photograph of Building 1506 (Ordnance Facility), 1954 (Chugach Industries 2008, 5-14).**





Figure 234. Historic photograph of Building 1503 (Temperature Conditioning Building), May 1951 (PICA Cultural Resources Office).



Figure 235. Historic photograph of Rocket Velocity Testing Facility (Building 1505), no date (PICA Cultural Resources Office).



#### 5.2.4.3 *Extreme Environment Testing Area*

High-altitude simulation test chambers and related buildings were on the west end of the district, near the entrance off Lake Denmark Road. Buildings in this area, Buildings 1517 (High Altitude Test Chamber), 1518 (Vacant), 1519 (High Explosives Magazine), 1520 (High Explosives Magazine), 1521 (Component Propellant Building), and 1522 (Ordnance Facility) were demolished recently in consultation with the NJ HPO.

In total, the Army Rocket Test Area District consists of 25 contributing and five noncontributing buildings and structures, which are eligible for the NRHP under Criteria A and C as well under Criterion Consideration G, as determined by the NJ HPO. These buildings and structures are listed below in Table 7.

Table 7. List of buildings currently in the Army Rocket Test Area Historic District.

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
1500	1947	Water Tower	Water Tower	Contributing/ Criteria A & C	Completed 2007	
1501	1948	Electronic Equip; R&D Admin; CML Equip Material Facility; Service Bldg	R&D Admin. Bldg	Contributing/ Criteria A & C	Completed 2007	
1502	1948	Powder Conditioning Bldg; Service Bldg; Ordnance Facility; AC Plant; Compressor, Altitude Chamber	Ordnance Facility	Contributing/ Criteria A & C	Completed 2007	
1503	1948	Powder Conditioning Bldg; Ordnance Facility; Conditioning Bldg; Salt Spray Facility	Powder Conditioning Bldg	Contributing/ Criteria A & C	Completed 2007	
1504	1948	Storage Shed; Repair and Storage Bldg	Ordnance Facility	Contributing/ Criteria A & C	Completed 2007	
1504A	1948	Test Stand #3; HP Storage Bottle Stand and Manifold; Gen Purpose Warehouse; Storage Shed; Ordnance Facility; Conditioning Bldg	Storage	Contributing/ Criteria A & C	Completed 2007	
1505	1948	Ordnance Facility; Rocket Static Test Bldg	Test Cell and Control Room	Contributing/ Criteria A & C	Completed 2007	
1505A	1948	Test Cell	Test Cell and Control Room	Contributing/ Criteria A & C	Completed 2007	
1505B	1948	Test Cell	Test Cell	Contributing/ Criteria A & C	Completed 2007	
1505C	1958	Control House	Derelict Control House	Contributing/ Criteria A & C	Completed 2007	
1505D	1965	Test Cell	Test Cell	Contributing/ Criteria A & C	Completed 2007	
1505E	1966	Control Spin Room	Control Spin Room	Contributing/ Criteria A & C	Completed 2007	
1505F	1959	Storage and Wind Tunnel	Storage and Wind Tunnel	Contributing/ Criteria A & C	Completed 2007	
1505N	1948	Open Back Blast Area	Open Back Blast Area	Contributing/ Criteria A & C	Completed 2007	
1506	ca. 1946	Ordnance Facility: Loading	Assembly Bldg	Contributing/ Criteria A & C	Completed 2007	Building relocated to site in 1946 moved from Loki test facility, exact construction date unknown
1507	1946	Gen Purpose Magazine	High Explosives Earth-Barricaded Magazine	Contributing/ Criteria A & C	Completed 2007	
1508	1952	Gen Purpose Magazine; Boiler House; High Explosives Magazine	Derelict Storage (Spill Materials)	Contributing/ Criteria A & C	Completed 2007	Emergency Demo -(NJHPO-H2012-049); relocated within District to present location in 1967
1509	1950	Pyrotechnic Pressing Bldg and Lab	Ordnance Test Facility	Contributing/ Criteria A & C	Completed 2007	
1509A	1950	HVAC Bldg	HVAC Bldg	Contributing/ Criteria A & C	Completed 2007	
1511	1952	Gen Purpose Storehouse; Inert Storehouse; Neutralizing and Pump Station	Conditioning Bldg	Contributing/ Criteria A & C	Completed 2007	Demo SHPO complete pending narrative completion; Demo per FRP from PYRO facility
1512	1952	Physics Lab; Hyd Inj Caliber Stand; Basic Chemistry Research Lab; Laser Lab	Chemistry Laboratory	Contributing/ Criteria A & C	Completed 2007	Demo SHPO complete pending narrative completion; Demo per FRP from PYRO facility
1512A	1958	General Purpose Storehouse	Flammable Materials Storehouse	Contributing/ Criteria A & C	Completed 2007	Demo SHPO complete pending narrative completion; Demo per FRP from PYRO facility
1513	1968	Gen Purpose Magazine; Pyrotechnic R&D Lab; Engineering Lab	Gen Purpose Magazine	Contributing/ Criteria A & C	Completed 2007	
1514	1968	Liquid Storage Non-Purpose; Flame and Incendiary Reactory Dissemination Facility; Flammable Materials Storehouse	Pyrotechnic R&D Lab	Contributing/ Criteria A & C	Completed 2007	
1515	1961	Radiation Lab; Electronic Lab; Physics Lab; Propellant Mixing Station; Electrical Equip Facility	Physics Lab; Admin R&D	Contributing/ Criteria A & C	Completed 2007	
1516	2010	Ordnance Facility	Ordnance Facility	Not evaluated; not 50 years of age	Not evaluated	
1527	1960	Barricade	Vacant; Derelict	Noncontributing	Completed 2007	Within Historic District Boundary; Demo NJ HPO complete via Final PA signature 17 May 10
1528	1963	Barricade; Explosives Flammable Materials Storehouse	Barricade	Noncontributing	Completed 2007	Within historic district boundary; Demo NJ HPO complete via Final PA signature 17 May 10
1529	1964	Gen Purpose Warehouse	Gen Purpose Warehouse	Noncontributing	Completed 2007	Within Historic District Boundary; Demo NJHPO complete via Final PA signature 17 May 10
1530	1982	Admin Bldg; R&D Labs	Admin Bldg; R&D Labs	Noncontributing	Completed 2007	Within Historic District Boundary



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#### 5.2.4.4 Contributing structures of the Army Rocket Test Area Historic District

##### Building 1500: Water Tower (1947)

The water tower originally had a red-and-white-checked pattern painted on the metal surface. It is located off Hart Road and is a steel tank on a steel frame (Figure 236).

Figure 236. Current condition of the water tower, Building 1500 (ERDC-CERL, 2012).



**Building 1501: Electronic Equipment; R&D Administrative; Equipment Material Facility; Service Building (1948)**

Building 1501 was constructed in 1948 and is located along Hart Road (Figure 237). It was previously used as an electronic equipment building, R&D administration building, equipment material facility, service building, and office. It is a long, rectangular, gable-roofed structure with a covered walkway incorporated under the main roof line. The building sits on a concrete foundation, has concrete-block walls, and a roll roof.<sup>147</sup>

**Figure 237. Left side of the north elevation of Building 1501 (ERDC-CERL, 2012).**



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<sup>147</sup> Nolte et al. 2007, 4-111.



**Building 1502: Powder Conditioning Building; Service Building; Ordnance Facility; Altitude Chamber Plant Compressor (1948)**

Building 1502 was constructed in 1948. It was previously used as powder conditioning service building, ordnance facility, and altitude chamber plant compressor. Located off Hart Road, it is a long, rectangular, flat-roofed structure along a covered walkway. The building sits on a concrete foundation, has hollow tile walls, and built-up roof (Figure 238).<sup>148</sup>

**Figure 238. Northeast side of Building 1502 (PICA Cultural Resources Office).**



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<sup>148</sup> Ibid.

**Building 1503: Powder Conditioning Building; Ordnance Facility; Conditioning Building; Salt Spray Facility (1948)**

Building 1503 was constructed in 1948. It was previously used as powder conditioning building and ordnance facility. Located off Hart Road, it is a long, rectangular, flat-roofed structure with a covered walkway (Figure 239). The building sits on a concrete foundation, has concrete block walls, and a roll roof.<sup>149</sup>

**Figure 239. Southwest side of Building 1503 (PICA Cultural Resources Office).**



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<sup>149</sup> Ibid.

**Building 1504: Storage Shed; Repair and Storage Building (1948)**

Building 1503 was constructed in 1948. It was previously used as an ordnance facility, and a repair and storage shed. Situated along Hart Road, it is a long, rectangular, gable-roofed structure. The building sits on a concrete foundation, has corrugated aluminum walls, and a corrugated aluminum pitched roof (Figure 240).<sup>150</sup>

**Figure 240. West elevation of Building 1504 (ERDC-CERL, 2013)).**



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<sup>150</sup> Ibid.



**Building 1504A: Test Stand #3; High pressure Storage Bottle Stand and Manifold; General Purpose Warehouse; Storage Shed; Ordnance Facility; Conditioning Building (1948)**

Building 1504A was constructed in 1948. It was previously used as test stand #3, high pressure storage bottle stand and manifold, general purpose warehouse, storage shed, and ordnance facility. Located off Hart Road, it is a small, square, shed-roofed structure with double doors. The building sits on a concrete foundation, has APM walls, and an APM corrugated-aluminum roof (Figure 241).<sup>151</sup>

**Figure 241. Southwest oblique of Building 1504A [Building 1504 is to right] (ERDC-CERL, 2012).**



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<sup>151</sup> Ibid.

### Building 1505: Ordnance Facility; Rocket Static Test Building (1948)

Building 1505 was constructed in 1948. It was previously used as an ordnance facility and a rocket static test building. Located off Hart Road, it is rectangular, flat-roofed structure with a covered walkway along the north side. The building sits on a concrete foundation, has concrete walls, and a built-up roof (Figure 242). To the rear of the building is a rocket-test bay with concrete walls.<sup>152</sup>

Figure 242. South elevation of Building 1505 (PICA Cultural Resources Office).



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<sup>152</sup> Ibid., 4-121.



### Buildings 1505A and 1505B: Test Cells (1948)

Test cells were generalized structures in which a variety of equipment could be set up as needed for specific types of tests. The warhead for PERSHING I was developed at Picatinny, and components of the motor were tested there as well. In what is now Building 1505A (it was then identified as Static Firing Test Bay No. 4), the PERSHING underwent static spin testing.<sup>153</sup>

Building 1505A was constructed in 1948 as a test cell. It is a rectangular, flat-roofed structure located along a covered walkway. The building sits on a reinforced concrete foundation, has reinforced concrete and steel, open-back wall, and a reinforced concrete and steel roof. To the rear of the building is a rocket test bay with concrete walls. Building 1505B was constructed in 1948 as test cell. It is a rectangular, shed-roofed structure supported by two I-beams. The building sits on a reinforced concrete foundation, has a reinforced concrete and steel, open-back wall, and a reinforced concrete and steel roof (Figure 243). To the rear of the building is a rocket test bay with concrete walls.

Figure 243. Building 1505A (left) and Building 1505B (right), Test Cells (ERDC-CERL, 2012).



<sup>153</sup> Nolte et al. 2008, page 31.



### Building 1505C: Control House (1958)

Building 1505C was constructed in 1958 as a control house. It is a rectangular, shed-roofed structure with a central entry flanked by two one-over-one windows. The building sits on a concrete foundation, has wood walls, and a rolled roof (Figure 244).<sup>154</sup>

Figure 244. Building 1505C (ERDC-CERL, 2012).



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<sup>154</sup> Nolte et al. 2007, 4-121.

### Building 1505D: Test Cell (1965)

Building 1505D was constructed in 1965 as a test cell off Hart Road, is a rectangular, flat-roofed structure supported by two I-beams. The building sits on a reinforced-concrete foundation, has a reinforced-concrete and steel open-back wall, and a reinforced-concrete and steel roof (Figure 245). To the rear of the building is a rocket-test bay with concrete walls.<sup>155</sup>

Figure 245. Building 1505D, Test Cell (ERDC-CERL, 2012).



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<sup>155</sup> Nolte et al. 2007, 4-121.



### Building 1505E: Control Spin Room (1966)

Building 1505E was constructed in 1966 as a control spin room. It is a rectangular, gable-roofed structure. The building sits on a concrete foundation, has corrugated-aluminum walls, and a corrugated-aluminum roof which was recently replaced in kind (Figure 246).<sup>156</sup> Building is still in use today.

Figure 246. East elevation of Building 1505E and covered walkway (ERDC-CERL, 2012).



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<sup>156</sup> Nolte et al. 2007, 4-121.



### Building 1505F: Storage and Wind Tunnel (1959)

Building 1505F was constructed in 1959 as a storage facility. A rectangular, shed-roofed structure along a concrete blast wall, the building sits on a dirt foundation, has wood walls, and a wood and asbestos roof (Figure 247).<sup>157</sup>

Figure 247. North elevation of Building 1505F (ERD-CERL, 2012).



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<sup>157</sup> Ibid.

### Building 1505N: Open Back Blast Area (1948)

Building 1505N was built in 1948 as an open top and back-blast area. It is a three-sided structure with a reinforced-concrete foundation, reinforced-concrete walls (Figure 248).<sup>158</sup>

Figure 248. Building 1505N, Storage Building and Wind Tunnel (ERDC-CERL, 2012).



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<sup>158</sup> Ibid.



### Building 1506: Ordnance Facility and Loading Building (ca. 1946)

Building 1506, an ordnance facility and a loading and assembly building, was moved to this site in 1946 from the Loki Test Facility. The initial construction date is unknown. It is a rectangular, gable-roofed structure that sits on a concrete foundation, has corrugated-aluminum walls, and a corrugated-aluminum pitched roof (Figure 249).<sup>159</sup>

Figure 249. Southwest oblique of Building 1506 (ERDC-CERL, 2012).



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<sup>159</sup> Ibid.



### Building 1507: General Purpose Magazine (1946)

Building 1507 was constructed in 1946. It was previously used as a high explosive (HE) and general purpose magazine. The building is a rectangular, flat-roofed structure with interior blast walls extending above the main roof line. The building sits on a concrete foundation, has transite walls, and a tar paper on wood roof (Figure 250).<sup>160</sup>

Figure 250. North elevation of Building 1507 (ERDC-CERL, 2012).



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<sup>160</sup> Ibid.

**Building 1508: General Purpose Magazine; Boiler House; High Explosives Magazine (1952)**

Building 1508 was constructed in 1952 as a boiler house for Building 1505. It was located to the east of 1505. In 1963 it was relocated near 1505E and reserviced for Class 9 inert storage. In 1967, it was moved to its current location adjacent to 1502 and 1503 and used for Class 7 powder storage. It was recently damaged in a wind storm and is slated for demolition. The building is a rectangular, shed-roofed structure that sits on a concrete foundation, has transite walls, and a transite roof (Figure 251).<sup>161</sup>

**Figure 251. Building 1508, High Explosives Magazine (ERDC-CERL, 2012).**



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<sup>161</sup> Ibid., 4-122.



### Building 1509: Pyrotechnic Pressing Building and Laboratory (1950)

Building 1509 was constructed in 1950. It was previously used as an ordnance facility and a pyrotechnic pressing (placing under pressure [literally pressing] explosive elements so that they would detonate evenly and with great force) building and laboratory off Sage Place. It is a rectangular, flat-roofed structure, with two one-story bays with exterior stairs that flank the main two-story entrance. A series of blast bays with the blast walls extending above the one-story roofline is south of the building. The building sits on a reinforced-concrete foundation, has reinforced-concrete walls, and a build-up reinforced-concrete roof (Figure 252).<sup>162</sup>

Figure 252. North elevation of Building 1509 (ERDC-CERL, 2012).



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<sup>162</sup> Ibid., 4-126.



### Building 1509A: HVAC Building (1950)

Building 1509A is associated with Building 1509, an Ordnance Test Facility, that had been used at various times for pyrotechnic pressing, a laboratory, and as a general ordnance facility. Building 1509A is the heating building for 1509, and it is connected by a series of shared pipes (Figure 253).<sup>163</sup>

Figure 253. North elevation of Building 1509A (right), with pipes connecting it to Building 1509 (left) (ERDC-CERL, 2012).



<sup>163</sup> Ibid., 4-126.

### Building 1510A: Storage (1960); Demolished

Building 1510A was a storage facility for the pyrotechnics laboratories and was constructed in 1960 to replace two temporary storage buildings that stood in the same general location (these were labeled 1510A and 1510B). It was demolished recently. The building consisted of two separate, mirror-image, hollow-tile structures that shared a common roof (Figure 254). It was oriented toward Buildings 1512 and 1515 across the parking area, and a concrete walkway led from the parking area to doors that were slightly offset toward each other on the east façade of each section. Six-pane windows were set centrally in the west façade of each section. The interior of each section consisted of a single room lined with plywood shelving.<sup>164</sup>

Figure 254. East elevation of Building 1510A, which was recently demolished (ERDC-CERL, 2012).



<sup>164</sup> <https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1510a.html>



### Building 1511: General Purpose Warehouse; Inert Storehouse; Neutralizing and Pump Station (1952)

Building 1511 was a small, rectangular, flat-roofed structure (Figure 255), located at the far eastern end of the district and behind Building 1512. It was listed as a conditioning building and a storehouse on building records, and was identified as a neutralizing and pump station in the architectural survey. A door was located in the west bay of the north façade (front) of the building, and the adjacent east bay had a raised opening with a roll-up steel door (a loading dock). Windows were located in each bay of each of the other sides of the building. The east half of the building interior had an upper level, labeled as a "high pressure laboratory" on a 1976 electrical plan. It had exterior access via the loading dock door, and inside access via a set of metal steps and a door located just to the left of the building entryway. Steps also led down from the entryway into the semi-subterranean basement level, which extended the entire length of the building. A small stream flows through the district just east of the building, causing flooding in the basement.<sup>165</sup> Building is slated for demolition.

Figure 255. Northwest oblique of Building 1511 (PICA Cultural Resources Office, 2012).



<sup>165</sup> <https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1511.html>



**Building 1512: Physics Laboratory; Hydraulic Injection Caliber Stand; Basic Chemistry Research Laboratory; Laser Laboratory (1952)**

Building 1512 was built in 1956 to house an additional laboratory for the existing pyrotechnics R&D facility. It is rectangular shaped with a concrete foundation and glazed-tile walls. The building has a central double doorway on the west (front) façade (later replaced with a single door), flanked by large windows, plus windows at the rear. The building contained four laboratory rooms equipped with fume hoods, an office, and a small conference room. In 1964, an extension was built on the south side, adding two additional laboratory rooms, each with an exterior entrance door and window. A bin for storing gas cylinders was later added to the south side of the addition. Building 1512 housed chromatography and spectroscopy instrumentation in the 1950s and 1960s but circa 1970, the majority of the building was in use as a laser laboratory. Laser technology, developed at the end of the 1950s and first operated successfully in 1960, was soon under study in the military for use in igniting pyrotechnic devices (as well as for weapons guidance systems). Building 1512 was being used for equipment storage prior to being vacated for demolition (Figure 256).<sup>166</sup> Building 1512 is slated for demolition.

**Figure 256. Building 1512, Physics Laboratory northwest elevation (ERDC-CERL, 2012).**



<sup>166</sup> <https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1512.html>

### Building 1512A: General Purpose Storehouse (1958)

Building 1512A was built in 1958 for flammable materials storage. It is a small square building with a central doorway and a louvered vent on one side. The building once stood at the rear of Building 1512 near its south corner. When the extension was built on the south side of Building 1512 in 1964, Building 1512A had to be moved; it was placed between Buildings 1512 and 1513, with its door oriented to Building 1512 (Figure 257). As was typical at Picatinny, flammable or explosive materials were stored separately from the laboratories where they were used for experiments.<sup>167</sup> Building is slated for demolition.

Figure 257. View south of Building 1512A, General Purpose Storehouse (PICA Cultural Resources Office, 2012).



<sup>167</sup> <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1512a.html>

**Building 1513: General Purpose Magazine; Pyrotechnic R&D Laboratory; Engineering Laboratory (1968)**

Building 1513 was constructed in 1968. It was previously used as a general purpose magazine, pyrotechnic R&D laboratory, and an engineering laboratory. Located off Sage Place, it is a long, rectangular, flat-roofed structure with interior blast walls extending above the main roof line. The building sits on a reinforced-concrete foundation, has concrete-block walls, and a build-up on wood roof (Figure 258).<sup>168</sup>

**Figure 258. View south at Building 1513, General Purpose Magazine (PICA Cultural Resources Office, 2012).**



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<sup>168</sup> Nolte et al. 2007, 4-133.



**Building 1514: Liquid Storage Non-Purpose; Flame and Incendiary Reactory Dissemination Facility; Flammable Materials Storehouse; Pyrotechnic R&D Laboratory (1968)**

Building 1514 was constructed in 1968. It was previously used as a liquid storage non-propellant flame and incendiary trajectory dissemination facility, pyrotechnic R&D laboratories, and flammable materials storehouse. Situated off Sage Place, it is a long, rectangular, flat-roofed structure with interior blast walls extending above the main roof line (Figure 259). The building sits on a reinforced-concrete foundation, has concrete-block walls, and a build-up on wood roof. An addition was made in 1968 by Rouse, Dublin & Ventura Architect and Engineers of New York.<sup>169</sup>

**Figure 259. View south of Building 1514, Pyrotechnic R&D Laboratory (ERDC-CERL, 2012).**



<sup>169</sup> Nolte et al. 2007, 4-133.

**Building 1515: Radiation Laboratory; Electronic Laboratory; Physics Laboratory; Propellant Mixing Station; Electrical Equipment Facility (1961)**

Building 1515 was built in 1961 and previously used as a laboratory, propellant mixing station, and electrical equipment facility. Located along Sage Place, it is a long, rectangular, flat-roofed structure with a central smokestack. The building sits on a reinforced-concrete foundation, has concrete block walls, and a build-up on wood roof (Figure 260). An addition was made in 1968 by Rouse, Dublin & Ventura Architect and Engineers of New York.<sup>170</sup>

Figure 260. View south of Building 1515 (ERDC-CERL, 2012).



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<sup>170</sup> Nolte et al. 2007, 4-133.

**Building 1517: High Altitude Test Chamber (1956); Demolished**  
**Building 1517A: Electric Equipment Facility (1963); Demolished**  
**Building 1518: Instrumentation Building (1956); Demolished**

This pyrotechnics testing complex sat in a well-protected location surrounded by natural berms, just inside the Former Rocket Test Area Historic District. Reflecting the military's Cold-War era readiness agenda, the facility was designed to simulate conditions of high-altitude flight. It consisted of two steel cone-shaped altitude test chambers, and the buildings housing the pumps and instrumentation used to operate the chambers and monitor the tests conducted in them. The first structures, erected in 1956 (based on plans drawn in 1953–54), included one 75 ft-long test chamber (Chamber No. 1) and the long, narrow pump room adjacent to its south side (both were considered Building 1517; Figure 261); a frame instrument room behind the chamber (Building 1518; Figure 262); a frame electrical control room (later referred to as 1517A) adjacent to the instrument room and abutting the rear corner of the pump room; and small magazines set off in the woods nearby (Buildings 1519 and 1520; Figure 263) (see building inventory in Table 7). Six vacuum pumps were installed in the pump room and connected to the chamber. A conditioning room, to house equipment used to bring test items to temperature specifications, was added immediately behind the pump room in 1957 or 1958. This structure, sometimes labeled as Building 1517A (but not to be confused with the adjacent electrical control room), was no longer standing at the time the complex was surveyed for historic architecture in 2007. Plans for a second steel test chamber, Chamber No. 2, were drawn up in 1957, and construction was completed circa 1960. At that time, the instrument room at the rear was expanded to encompass the back of the second chamber. In 1964 a new concrete-block observation room (Building 1518A) was constructed between the two test chambers, toward the front. A new exhaust system for the chambers was installed in 1968, including a dome on Chamber No. 2 to facilitate the dispersion of smoke and powder from flare tests.<sup>171</sup>

In the end high-altitude test chambers were costly and difficult to maintain. They were used less and less through the 1970s and by the 1980s,

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<sup>171</sup> [https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1517\\_18.html](https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1517_18.html)



they were essentially obsolete.<sup>172</sup> All three buildings have been demolished.

**Figure 261.** Building 1517, now demolished, consisted of two large, connected chambers and a number of associated, connected buildings (ERDC-CERL, 2012).



**Figure 262.** Building 1518, now demolished, connected Chambers #1 and #2 with Building 1517A in the middle (PICA Cultural Resources Office, 2011).



<sup>172</sup> [https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1517\\_18.html](https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1517_18.html)



### Buildings 1519 and 1520: Ready Magazines (1956); Demolished

These small, square structures were built in 1956 for use as ready magazines to store items being tested in the high-altitude chambers. Records indicate that these buildings were part of the original complex, though not typically shown on plans. The buildings were sited in the woods, well away from the test chambers for safety; Building 1519 stood 72 feet north of the front of the Chamber No. 1, and Building 1520 (Figure 263) stood 80 feet to the northeast.<sup>173</sup>

Figure 263. Building 1520, now demolished, was identical to 1519 (ERDC-CERL, 2012).



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<sup>173</sup> [https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1519\\_20.html](https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No1519_20.html)

### Building 1521: Ordnance Facility (1960); Demolished

Building 1521 was a salvaged ordnance shed placed in front of Chamber No. 1 in 1960 and used for preparing pyrotechnic components for testing. It was a small, square, plywood structure with a shed roof, a door and two windows, and an electrical connection for lighting (Figure 264).<sup>174</sup>

Figure 264. Building 1521, now demolished (ERDC-CERL, 2013).



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<sup>150</sup> <https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No151>



### Building 1522: Ordnance Facility (1970); Demolished

Like Building 1521, Building 1522 was an ordnance shed salvaged from elsewhere on the base. It was placed in front of Chamber No. 2 in 1970 and used for preparing pyrotechnic components for testing. The small, square, shed-roofed structure had a door on the north (front) elevation and windows on the east and west sides (Figure 265).<sup>175</sup>

Figure 265. East elevation of Building 1522, now demolished (ERDC-CERL, 2012).



<sup>175</sup> <https://www.pica.army.mil/ead/Cultural/PicatinyHistoricDistricts/FormerRocketTest/PhotoInventory/MoreInformation/No151>

## Steam Line Distribution System

The Steam Line Distribution System is a network of metal or asbestos-protected metal conduit running above ground from the power plants throughout PICA. A centralized system of steam throughout PICA and the Lake Denmark NAD provided a source of heating and also allowed production facilities throughout the installation to use pressurized steam as a sparkless form of energy. The steam was created as a by-product of electricity produced at the Power Plant (Building 506, originally Building 1906) and the Boiler House (Building 3013, originally Building 1901). Water from Picatinny Lake was heated, and the steam was forced through turbines to produce energy. Pressurized steam was then sent to production facilities via metal conduit. On site, buildings were fitted with pressure-reducing valves and steam-powered equipment to reduce the risk of explosion. Overall, the Steam Line Distribution System consists of a network of metal conduit, supporting structures, and pressure-reducing valves. Most of the system visible has been replaced, but there are remnants of an earlier system of conduit supported on cast stone piers and on metal structures when crossing over roads (Figure 266 and Figure 267).<sup>176</sup>

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<sup>176</sup> Harrell 1996, E-485.



Figure 266. Remnants of steam conduit supported on cast stone piers (ERDC-CERL, 2012).



Figure 267. Steam lines supported by metal structure over the paved road (ERD-CERL, 2012).





### 5.2.5 Vegetation

Today the vegetation in the Rocket Testing Area is overgrown, most likely since the 1980s and 1990s as the mission uses changed (Figure 268). Historically this area would have been cleared back to a line that allowed for visibility and for fire breaks. For example, in the 1505 area, line of sight ranges were a 1000 ft x 10 ft swath (for Class 9 explosives) through the woods towards portable barricades (Figure 269).<sup>177</sup> The overgrowth has affected the integrity of the barricades (1527 and 1528) which are no longer visually associated with the testing area (Figure 270).

Historically, testing areas had minimal ground vegetation or would have been mowed. Few trees would have been allowed to remain in the area, and those few would be adjacent to buildings and parking areas. Areas and buildings still in use today are being mowed (Figure 271).

Figure 268. Overgrown vegetation on an earthen barricade (ERDC-CERL, 2012).



<sup>177</sup> Image of Line of Sight range at Building 1505 from 1960s on file with PICA Cultural Resources Office.



Figure 269. Arrangement of velocity screens for use with 57 mm gun at range at Building 1505, 1951 (Picatinny Arsenal Cultural Resources).



Figure 270. Wooded area surrounding Building 1527, a noncontributing building to the Rocket Test Area (ERDC-CERL, 2012).





Figure 271. Example of grasses kept mowed when adjacent to buildings or structures in current use (ERDC-CERL, 2012).





### 5.2.5.1 Earth barricades

Earth barricades or berms were built for protection. They were found in the test area and were constructed around propellant magazines (Figure 272 through Figure 274).

Figure 272. Earth barricade constructed around high explosives magazine (Building 1507), 1964 (PICA Cultural Resources Office).

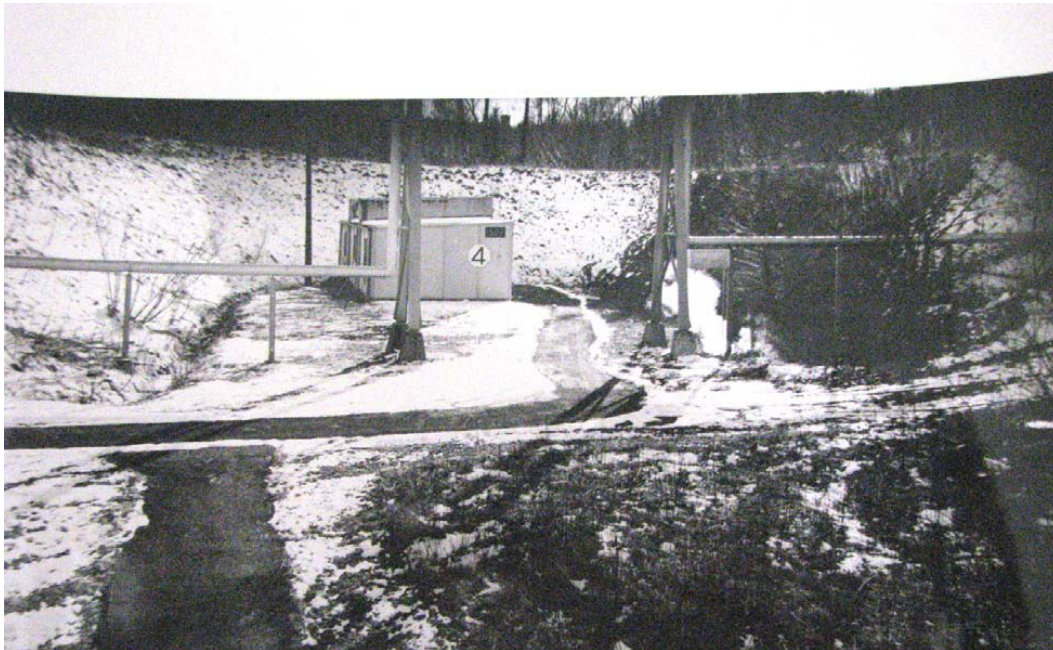


Figure 273. Earth barricades around Building 1507 (ERDC-CERL, 2012).





Figure 274. Relationship of building and earth barricade (ERDC-CERL, 2012).



### 5.2.6 Small-scale features

Small-scale features found within the Rocket Testing Area include fencing and gates, covered walkways, and historic markers.

#### 5.2.6.1 Chain-link fencing and gates

The entire 1500 Area is fenced. Controlled entry to the area is at the intersection of Lake Denmark Road and Hart Road (Figure 275). Once inside the 1500 Area, the Testing Area is also fenced to restrict access for security and safety purposes (Figure 276).



Figure 275. Main entry point into the Rocket Test Area through gate off Lake Denmark Road (ERDC-CERL, 2012).



Figure 276. Another chain-link gate and fencing providing controlled access to the Rocket Test Area (ERDC-CERL, 2012).





### 5.2.6.2 Historic marker

A historic marker describing the significance of the Army Rocket Test Area is located outside the entrance gate at Hart Road (Figure 277). The historic markers for the NRHP-eligible historic district are used to identify and highlight these significant areas. The markers allow for military and civilian personnel and visitors to the installation to be more aware of the installations' historical heritage, to ensure the long-term preservation of these significant areas. The markers were funded by the Environmental Affairs Division and produced by Lake Shore Industries. Text was developed by CRM, NJ HPO, and the Morris County Heritage Commission. Placement of the markers was carried out in 2012.

Figure 277. Historic marker located near main entry to the Rocket Test Area (ERDC-CERL, 2012).



### 5.2.7 Views and vistas

Views and vistas would not have been part of the design and layout of the Rocket Testing Area, however, they were much needed to provide visibility at the ranges during the testing process. Mission-specific industrial areas on military installations rarely followed the design principles that are visible in high-profile areas such as housing and administration.

### 5.3 Landscape evaluation

Original site features of the Army Rocket Test Area can provide historical information on the testing process at Picatinny, and they are eligible to the National Register as features within the historic district. Ideally, the features with at least 50 years of age and retaining their original condition should be preserved. These features include, but are not limited to: walkways, benches, walls, fences, lighting, posts, pillars, and gates. Individual features in a property's landscape should never be viewed in isolation, but rather in relationship to the landscape's surrounding setting and overall fabric.<sup>178</sup>

#### 5.3.1 Historic significance

Activities occurring in the Army Rocket Test Area Historic District played a significant part of the United States' and the Army's initial forays into space. Picatinny served in key roles for some of the most important rocket programs and missile systems ever devised including those programs that involved the adaptation of rockets to accommodate nuclear warheads. Nuclear warhead-adapted rockets include the HONEST JOHN, REDSTONE, LITTLE JOHN, and NIKE AJAX.<sup>179</sup>

The construction dates of the buildings within the Rocket Test Area span a broad spectrum from 1946–1980, all of which fall within the Cold War period, 1946–1989. According to Army Cold War Guidelines for deciding building/structure significance, the determination of significance is made only after a resource is shown to be important to one or more of the Army Cold War Themes. The Rocket Test Area meets two of the Army's broad themes: Technological Imperative and Survival and Preparation for a Hot War. Specific Army themes the area meets include: Mission Focus, Technology, and Militarization of Space.<sup>180</sup>

#### 5.3.2 Integrity

The area at the time of this investigation was mostly overgrown with vegetation and run down (Figure 278). Some of the buildings and structures

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<sup>178</sup> Chugach Industries 2008, 6-16.

<sup>179</sup> Nolte et al. 2008, 33.

<sup>180</sup> Ibid.



are derelict, but some portions of the area are still used for testing today. Old testing equipment is strewn all over the wooded area (Figure 279).

Figure 278. Overgrown vegetation on structure for steam line distribution pipes (ERDC-CERL, 2012).





Figure 279. Remnant testing materials in the landscape (ERDC-CERL, 2012).



### 5.3.3 Character-defining features

Character-defining features are landscape features that were part of the initial design, present throughout the period of significance as established in the National Register nomination, and continue to be evident in the district today. Character-defining features of the Army Rocket Test Area Historic District are listed in Table 8, along with summaries of their historical significance, integrity, and NRHP eligibility.

Table 8. 1500 Area character-defining features.

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
Circulation and roadways	A straight drive, Hart Road, provides access to test areas and laboratories at end.	<ul style="list-style-type: none"> <li>Hart Road still in good condition; smaller drives to unused testing areas in disrepair.</li> </ul>	Yes

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
<b>Clustering of buildings</b>	Historically a testing area, building separations are based on building functions and safety	<ul style="list-style-type: none"> <li>• Spacing between buildings remains the same</li> </ul>	Yes
<b>Covered walkways and walkways</b>	Provided access from magazines and laboratories to test cells and blast areas.	<ul style="list-style-type: none"> <li>• Paint peeling, rusted and in disrepair; poor condition.</li> </ul>	Yes
<b>Berms/earthen barricades</b>	Built to provide blast protection and containment.	<ul style="list-style-type: none"> <li>• Most overgrown</li> </ul>	Yes
<b>Vegetation</b>	Historically all vegetation in this area was cleared for safety and fire prevention. The lack of vegetation is the significant feature.	<ul style="list-style-type: none"> <li>• Mowed lawns are maintained</li> <li>• Unused test areas and some berms are overgrown.</li> <li>• Tree line used to buffer adjacent areas</li> </ul>	Yes
<b>Steam lines</b>	Steam lines existed historically throughout installation	<ul style="list-style-type: none"> <li>• Still in use</li> <li>• Has been replaced as needed</li> </ul>	Yes
<b>Testing flagpole</b>	Flagpole is located along the main road to warn of testing.	<ul style="list-style-type: none"> <li>• Rusted</li> </ul>	Yes
<b>Fencing and sidewalk</b>	Built to restrict access for security and safety.	<ul style="list-style-type: none"> <li>• Entrance gate is newer; entire area fenced.</li> </ul>	Yes

#### 5.3.4 Final determinations

The buildings in the Army Rocket Test Area were used to meet a perceived Soviet military threat and to influence Soviet objectives and policy through the development of rockets and missile systems that could and would militarize space or change the traditional battlefield into a nuclear one. The implied or actual use of nuclear war material is considered one of the most significant aspects of the Cold War. Certainly, the Army Rocket Test Area meets these criteria.<sup>181</sup>

The Army Rocket Test Area Historic District (1500 Area) is eligible as a district for the NRHP under Criterion A (contributing to the broad patterns of history) and Criterion C (architectural/engineering features) as well as satisfying Criteria Consideration G, a property achieving significance within the past 50 years that is of exceptional importance.<sup>182</sup>

In 2007, Panamerican Consultants recommended the Army Rocket Test Area Historic District was eligible for listing to the NRHP, and the NJ HPO concurred (Figure 280).<sup>183</sup>

While the landscape in the 1500 Area still conveys the mission, the circulation networks, the relationships between the buildings and structures, the covered walkways, the steam lines, the security fencing, berms and barricades, and the overgrown vegetation and derelict appearance affect the integrity of the landscape.

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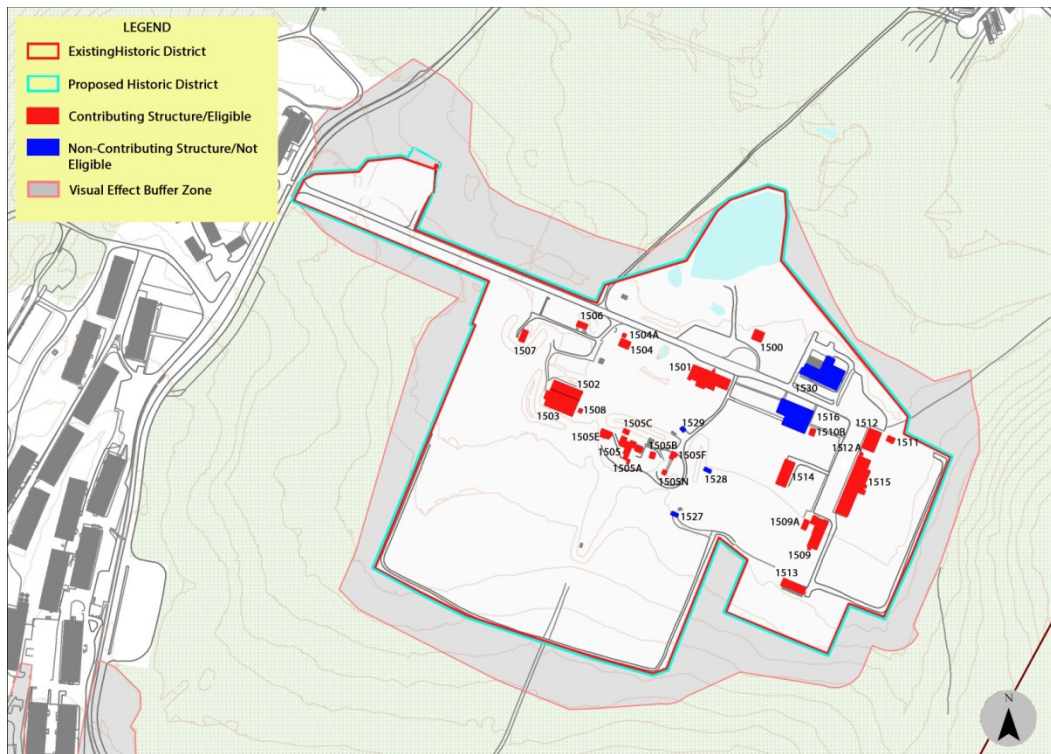
<sup>181</sup> Nolte et al. 2008, 33.

<sup>182</sup> Ibid.

<sup>183</sup> Nolte et al. 2007, 4-134.



Figure 280. Existing Rocket Test Area Historic District boundary (PICA Cultural Resources Office).



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## 6 NARTS Test Areas D and E Historic Districts

### 6.1 History

A separate Navy installation stood adjacent to the north and east of Picatinny Arsenal until 1960. This was the Lake Denmark Powder Depot (famous for the 1926 explosion), later named the Naval Ammunition Depot, which became obsolete after World War II. In 1946, the Navy leased land to a local, private firm, Reaction Motors, Inc. (RMI), and partly by the Navy for its in-house rocket research program. Reaction Motors, seeking a secluded site in the Denville area, first leased land and buildings here from the Navy in mid-1946. RMI was founded in 1941 (absorbed by the Thiokol Corporation in 1958, becoming the Reaction Motors Division [RMD], later becoming Thiokol Propulsion until being acquired by Alliant Techsystems [ATK] in 2001). Seeking a secluded area, RMI built 9 rocket test stands and related facilities on the north side of Snake Hill Road, and continued work on their 6000 series engines, including the 6000C4 (later called the XLR-11), which would power the Bell X-1 aircraft that broke the sound barrier in 1947. Their work led to the development of both the XLR-II and the XLR-99 engine. Tested at Lake Denmark, the XLR-99 liquid rocket engine was the first large, throttle-able, restartable, liquid propellant rocket engine. The XLR-99 was used for the X-15, the experimental hypersonic aircraft, and a preliminary design for the Space Shuttle called for its use.<sup>184</sup>

The Navy's Bureau of Aeronautics, which wanted a rocket-engine test center on the east coast, established the Naval Aeronautical Rocket Laboratory (NARL) at Lake Denmark in 1948. The advantages of this location included the installation's existing infrastructure; excellent transportation connections; relative proximity to Washington, D.C.; and access to specialized personnel and materials procurement in this highly-industrialized region of the country.<sup>185</sup> The Navy's relationship with its tenant, Reaction Motors, was also an important factor. NARL built 11 more test stands and related facilities, infrastructure, and interim labs. The name was changed to the Naval Air Rocket Test Station (NARTS) in April 1950 (Figure 281 and Figure 282). The NARTS was established for testing and evaluating

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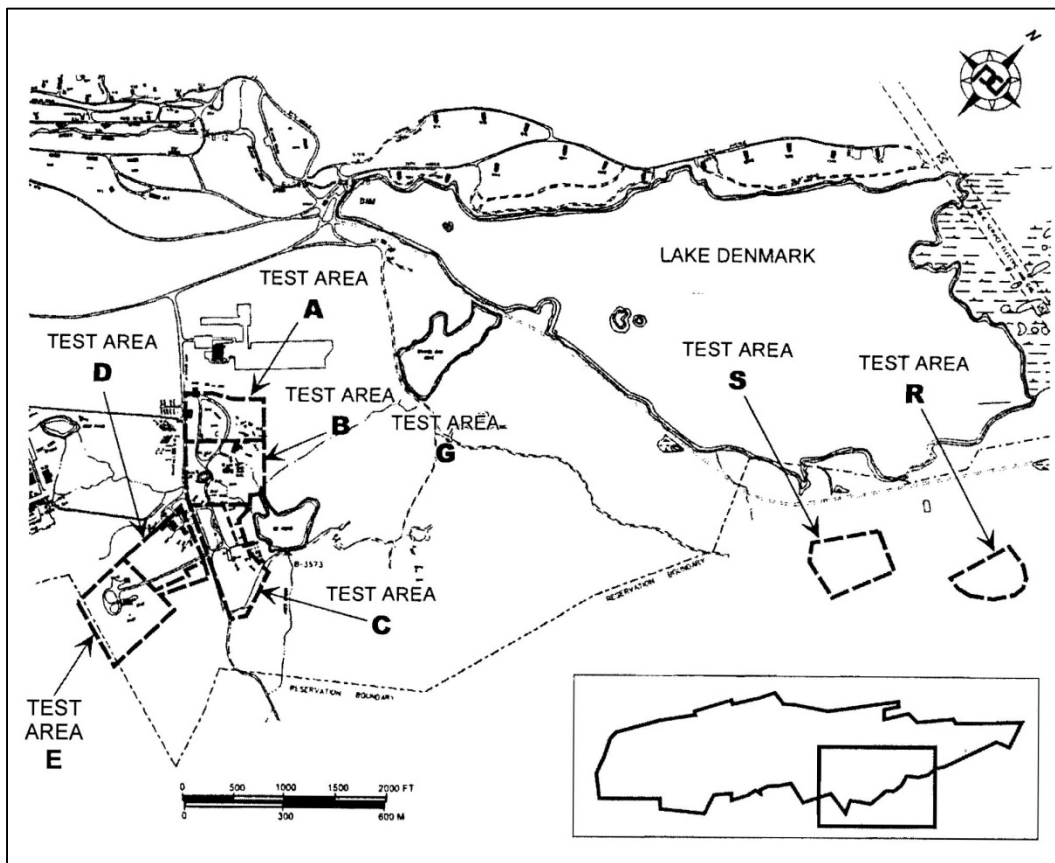
<sup>184</sup> Chugach Industries 2008, 4-22.

<sup>185</sup> <http://www.pica.army.mil/ead/cultural/picatinnyhistoricdistricts/NARTS/index.html>



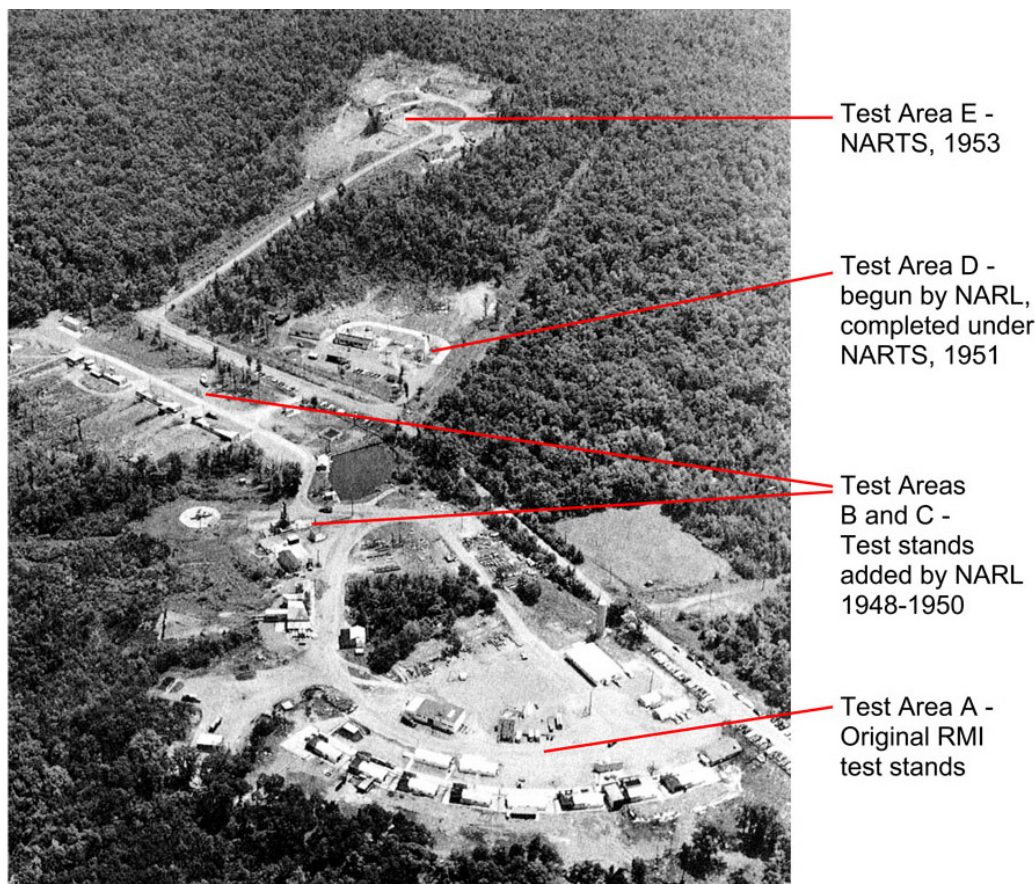
“rocket engines, components and propellants, and training service personnel in handling, servicing, and operating rocket engines.”<sup>186</sup> Later decommissioned by the Navy, the Lake Denmark installation reverted to PICA in August 1960, enlarging the installation to its present size.

Figure 281. NARTS Test Areas map, no date (PICA Cultural Resources Office).



<sup>186</sup> Chugach Industries 2008, 4-22.

Figure 282. The rocket test areas built between 1946 and 1953 are shown in this 1960s aerial. The view is to the south (PICA Cultural Resources Office).



#### 6.1.1.1 NARTS Test Area D Historic District

NARTS Test Area D was completed in 1951. It is here, presumably, that the Navy tested its contractors' work, conducted independent tests, wrote guidelines, and experimented with any number of rocket-related activities such as the decay time for hydrogen peroxide. It was the area where the majority of the NARTS projects were conducted. In connection with Test Area E, the largest static rocket test stand on the East Coast, Area D served as the nerve center for various Navy rocket projects, the most important of which was the testing of the XLR-99 rocket engine, which was conducted with RMD.<sup>187</sup> Figure 283 through Figure 286 show historic and current views of Test Area D along with a map indicating the area's boundaries.

<sup>187</sup> Nolte et al. June 2009, 41.

Figure 283. Historic view of NARTS Test Area D, 1962 (PICA Cultural Resources Office).

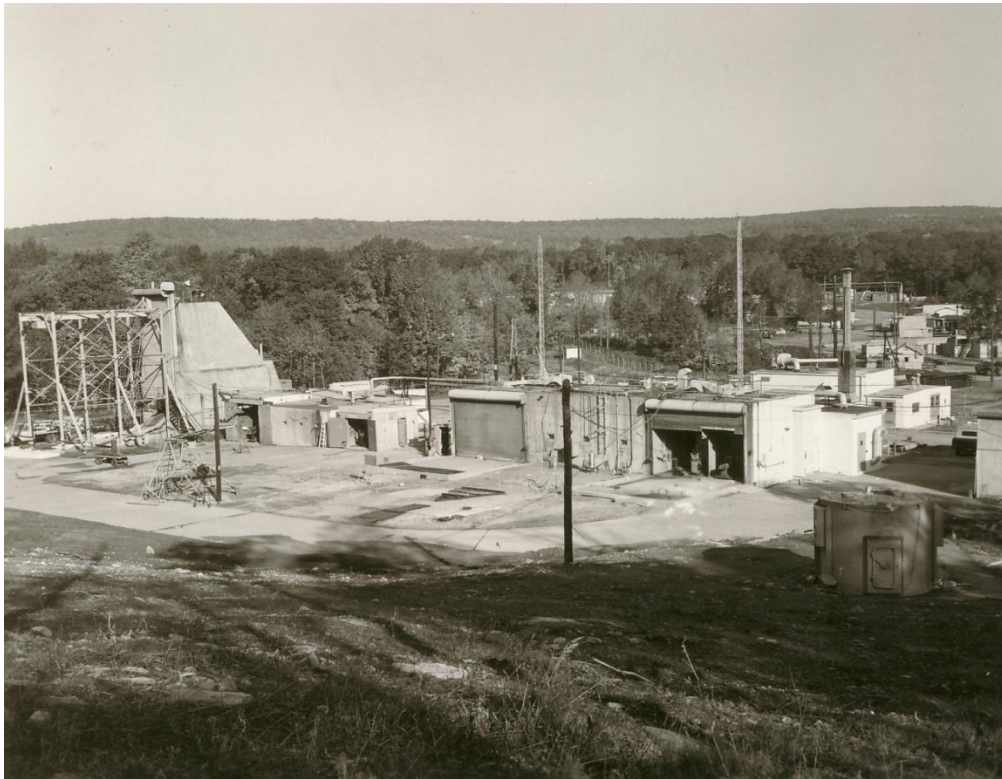


Figure 284. Historic photograph of rocket motor tests at Building 3606, no date (PICA Cultural Resources Office).

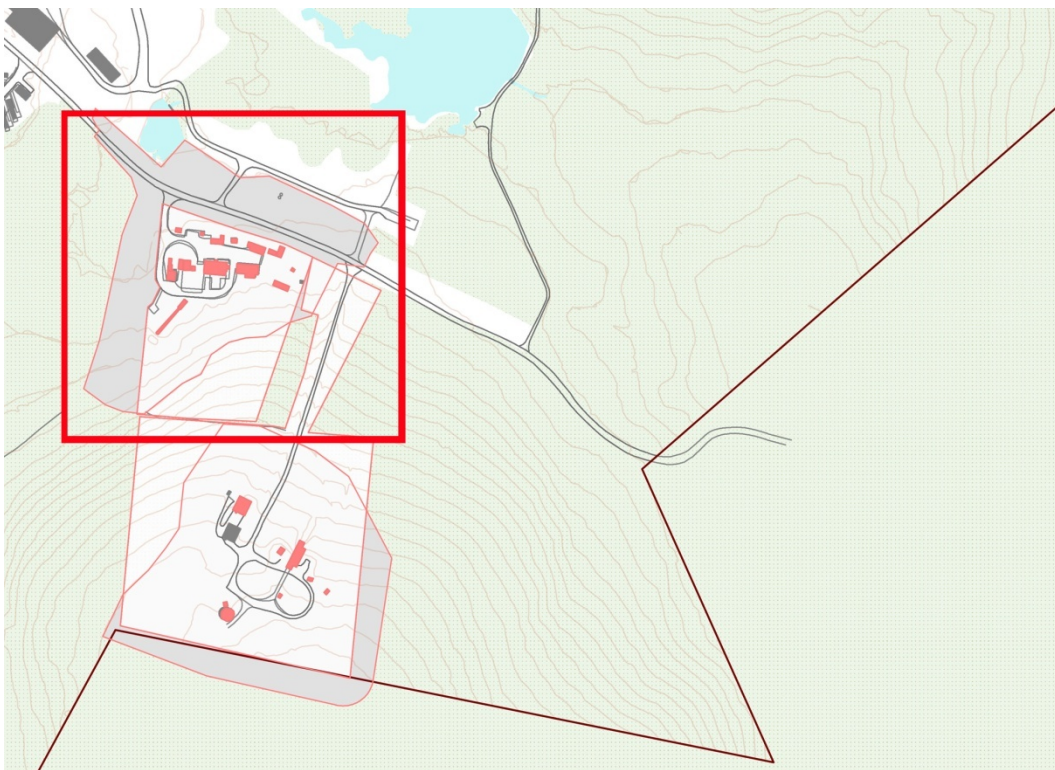




Figure 285. Entrance sign for NARTS Test Area D with historic plaque (ERDC-CERL, 2012).



Figure 286. Map showing NARTS Test Area D Historic District, located in center of red box (PICA Cultural Resources Office).

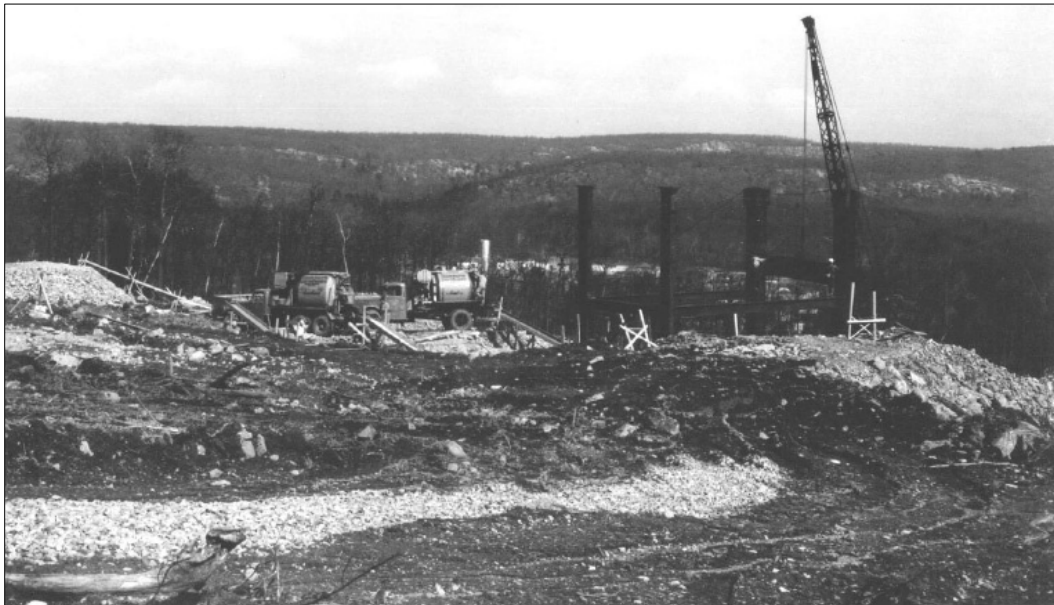


### 6.1.1.2 NARTS Test Area E Historic District

NARTS Test Area E was created in 1948 and completed in 1953 (Figure 287 and Figure 288). The earliest work at NARTS was devoted primarily to liquid propulsion, but it eventually encompassed a wide range of activities including evaluation of rocket engines and rocket systems, development of methods for analyzing rocket propellants, and the collaboration with private industry on a wide range of experiments and safety manuals. All these function were part of the NARTS missions as assigned by the Chief of Naval Operations: “to test, evaluate and conduct studies pertaining to rocket engines, their components and propellants.”<sup>188</sup> Test Area E was considered the most “elite” among the many facilities at NARTS.

In 1960–1962, Lake Denmark NAD was disestablished, and its land and facilities were fully transferred to the Army’s Picatinny Arsenal. Testing at the NARTS Test Area E would end in the early 1970s. The Rail Gun at NARTS Test Area D was still used in the 1980s for x-ray testing.

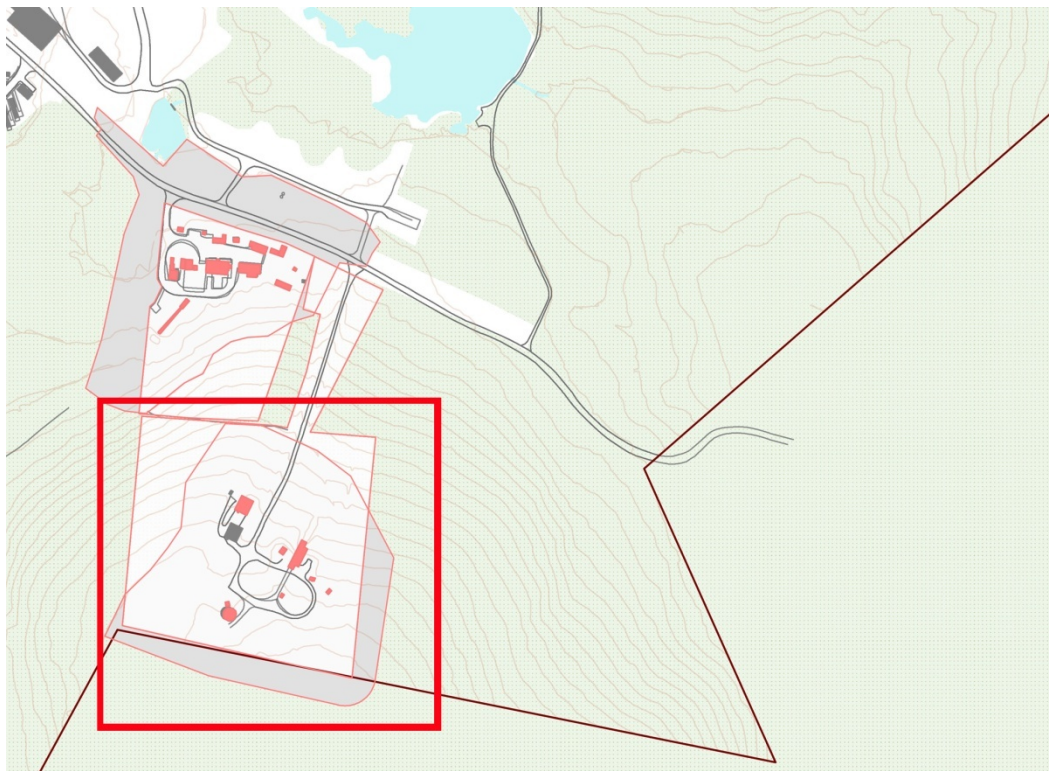
**Figure 287. Early construction activities and site overview in Test Area E, 1952 (Nolte et al. June 2009).**



<sup>188</sup> Nolte et al. September 1999, iv.



Figure 288. Former NARTS Test Area E Historic District prior to demolition, centered in red box (only 3622 and 3623 remain) (ERDC-CERL).



## 6.2 Landscape inventory

### 6.2.1 Site and layout

#### 6.2.1.1 Site and layout of NARTS Test Area D

NARTS Test Area D is located off Picatinny installation proper, in the Snake Hill Road area of the former Lake Denmark NAD on the south side of Snake Hill Road (Figure 289). Directly east of NARTS Area D is E Road, which runs south to the NARTS Test Area E. NARTS Area D was used primarily for the Navy's in-house evaluation and development of rocket engines and propellants by the renowned team at the NARTS Rocket Propulsion Laboratory.<sup>189</sup>

<sup>189</sup> Excerpt from Picatinny Website. For full documentation please refer to <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/index.html#>



Figure 289. Aerial view of NARTS Test Area D, no date (PICA Cultural Resources Office).



#### 6.2.1.2 Site and layout of NARTS Test Area E

NARTS Test Area E was located on E Road south of Snake Hill Road south east of NARTS Test Area D. The test area occupied 14 acres on a precipitous slope that was used to advantage in the construction of Buildings 3617 and 3618.<sup>190</sup>

The Naval depot had everything needed for a successful testing facility. It was located in a fairly isolated area but had excellent transportation connections up and down the east coast. The depot was situated in a highly industrialized portion of the country that facilitated the hiring of specialized personnel and the procurement of materials.<sup>191</sup>

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<sup>190</sup> Nolte et al. June 2009, 40.

<sup>191</sup> Nolte et al. September 1999, 101.

The HAER report from 2009 concluded that the entire NARTS Test Area E formed a single district with Building 3617 and 3618, which were still surrounded by their original landscape design, as the two most important structures within it.<sup>192</sup>

The entire area is enclosed in a chain-link fence that is now secured with a padlock. The chain link fence forms the boundary of the district. NARTS Area E was demolished in 2014-2015.

## **6.2.2 Land use**

### *6.2.2.1 Land use NARTS Test Area D*

Test Area D was used primarily for the Navy's in-house evaluation and development of rocket engines and propellants by the renowned team at the NARTS Rocket Propulsion Laboratory. The buildings clustered around a drive off Snake Hill Road (Figure 290) and included a number of test stands, bunkers, control rooms, water flow facility, and a few small shops, a lunch room/change house and toilet.

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<sup>192</sup> Nolte et al. June 2009, 16.

Figure 290. Cluster of buildings near the entrance into the NARTS Area D (ERDC-CERL, 2013).



#### 6.2.2.2 Land use NARTS Test Area E

The natural slope of the landscape is the defining landscape element of the district. The slope was utilized in the designs of Buildings 3617 and 3618. For example, the slope was used to shield the first floor of Building 3617 from blast/engine emissions stemming from the test stand. The test stand also used the slope of the area to advantage. A rocket engine was actually cantilevered from the test stand and fired down the side of the slope into a pit area dug deeply into the slope. The slope itself provides insulation and protection from the blast.<sup>193</sup>

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<sup>193</sup> Ibid., 50.



## 6.2.3 Transportation networks

### 6.2.3.1 Transportation networks NARTS Test Area D

NARTS Test Area D is located along Snake Hill Road. An entrance is located at the northern end of the site. A circular drive connects all the buildings and structures with the entrance gate (Figure 291).

Figure 291. Curved road that provides access to the NARTS Testing Area D from Snake Hill Road (ERDC-CERL, 2013).



### 6.2.3.2 Transportation networks NARTS Test Area E

NARTS Test Area E site is accessed by E Road (Figure 292), an asphalt road off Snake Hill Road that climbs the slope and circles around the rear (south) of the Rocket Test Stand, passing under the bridge that extends from the liquid oxygen fuel (LOX) pad to the rear entry of the test stand.<sup>194</sup> The path of the road passed all of the primary structures within Test Area E and is a defining man-made landscape element.<sup>195</sup>

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<sup>194</sup> Ibid., 40.

<sup>195</sup> Ibid., 50.

Figure 292. Single-lane road that provides access to NARTS Testing Area E from Snake Hill Road (ERDC-CERL, 2013).



#### **6.2.4 Expression of military cultural traditions**

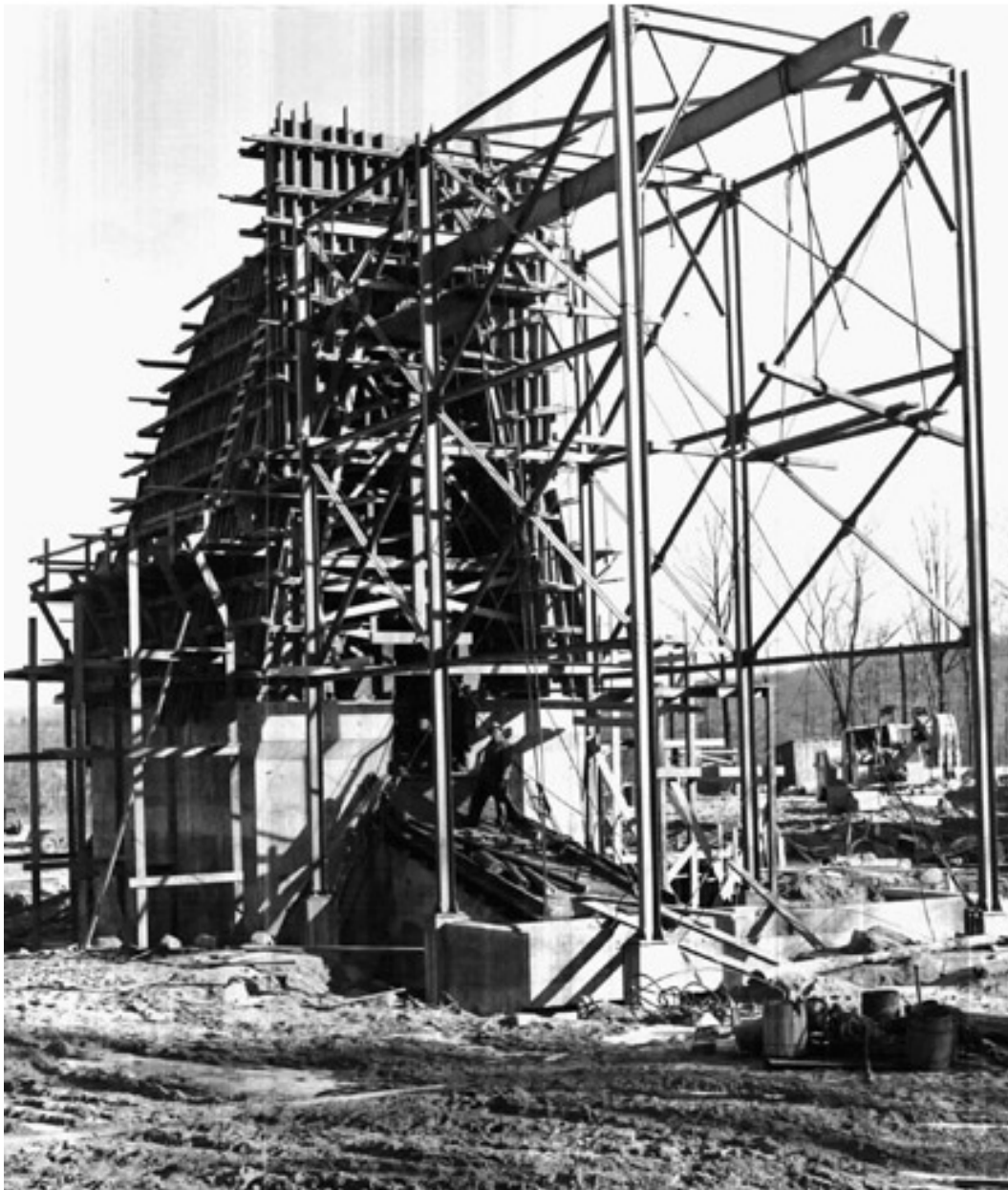
The NARTS Test Areas D and E were designed, as were most military industrial areas, to efficiently and cost-effectively support the military mission (Figure 293). The buildings are uniformly laid out along the access road. The use of concrete-block construction and the lack of aesthetic extras such as landscaping or high-end building materials, support this efficiency.

#### **6.2.5 Buildings and clusters**

##### *6.2.5.1 Buildings and clusters in NARTS Test Area D*

The NARTS Test Area D Historic District currently consists of four contributing buildings and structures, which are eligible for the NRHP under Criteria A and D (as determined by the NJ HPO), and four noncontributing structures (Table 9). Several buildings and structures were demolished recently.

Figure 293. Historic photograph showing the construction of Building 3603 (Test Stand D-1), 1950 (PICA Cultural Resources Office).





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Table 9. List of buildings in the NARTS Test Area D Historic District.

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
3602	1952	NARTS Oxidizer Bunker; Liquid Propellant Storage; Detection Facility; Radar Equipment Storage	Liquid Propellant Storage	Contributing/ Criteria A & C	Completed 2004	Prior Navy Bldg 792
3607	1950	NARTS Test Cell 2-D and 3-D Central Control Room; Electronic Equipment Facility	Central Control Room	Contributing/ Criteria A & C	Completed 2004	Prior Navy Bldg 766; Demo NJ HPO complete pending narrative
3610	1952	NARTS Liquid Propellant Storage; Ready Storage Shed; Radar and Detection Equipment Storage	Propellant Systems Facility	Contributing/ Criteria A & C	Completed 2004	Prior Navy Bldg 793
3614	ca. 1973	Open Test Cell	Open Test Cell	Noncontributing to District/Determined Not Eligible	Completed 2004	Within District Boundary
3616	ca. 1950; walls framed in 1959	NARTS Environmental Test Bldg	Environmental Test Bldg	Contributing/ Criteria A & C	Completed 2004	Demo NJ HPO complete pending narrative
3620	1973	Ballistic Rail Gun	Ballistic Rail Gun	Noncontributing to District/Determined Not Eligible	Completed 2004	Within Historic District boundary; US Army Stock No. 10, 7148074, Mechanism recoil M6A2, No. 2125, US 1944, Rock Island Arsenal, Overhauled by Lead 6169
3628	NA	Navy Gun Turret	Navy Gun Turret	Noncontributing to District	Completed 2004	Within Historic District boundary;

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**Building 3602: NARTS Oxidizer Bunker; Liquid Propellant Storage; Detection Facility; Radar Equipment Storage (1952)**

Building 3602 was constructed in 1952 as a NARTS Oxidizer Bunker. It is a small rectangular structure with metal walls and a flat corrugated-metal roof (Figure 294). Chain-link fencing surrounds the building.

**Figure 294. Building 3602, NARTS Liquid Propellant Storage (ERDC-CERL, 2013).**



### Building 3603: NARTS Stand D-1; Test Cell Booster (1950) Demolished

Built in 1949–1950, Test Stand D-1 was the largest rocket test stand and stood at the west end of Test Area D (Figure 295). It was a massively constructed reinforced-concrete structure standing 37 feet 9 inches tall. The stand had a working/utility floor at ground level and an upper firing floor. A concrete-block room attached to the north side contained an internal stairway which provided access to the firing floor via a double steel door. There was also an external ramp to the firing floor on the south side of the building. A large steel gantry crane was attached to the south side of the structure, and a 5-ton electric hoist mounted on the ceiling of the building was used to lift rockets into firing position. A rectangular fuel-neutralizing pit for receiving rocket exhaust during vertical test firings was built into the ground at the south side of the stand (beneath the gantry).

Test Stand D-1, designed by the Bureau of Yards and Docks, was under construction when Naval Aeronautical Rocket Laboratory (NARL) published its January 1950 progress report. It was considered the most up-to-date and best-equipped static test stand of its kind in the country at that time, with a thrust capacity of 100,000 pounds (exceeded only by the large test stand at White Sands in California). Firings could be from either horizontal or vertical attitudes for durations of up to five seconds, and rockets up to 20 feet long by 30 inches in diameter could be mounted.

D-1 was one of the first three test stands built by the Navy in Test Area D. The other two, D-2 and D-3 (called the “small scale test stands,” with a thrust capacity of 20,000 pounds), stood farther east and flanked a control room for all three stands. Firings at Test Stand D-1 were controlled and viewed by remote control from this part of the facility. Test stands D-2 and D-3 and the control room collectively make up present-day Building 3607.<sup>196</sup>

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<sup>196</sup> Edited excerpt from Picatinny Website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3603.html>

Figure 295. View west at Buildings 3603 (PICA Cultural Resources Office, 2010).



**Building 3604: NARTS Test Cell D-4 (1953); Demolished**

This test stand was built in 1953. It was 14 foot square and made of heavy reinforced concrete with large double doors which were opened for horizontal firings out the south side (Figure 296). Engine mounts were attached to steel rails in the floor during testing. Apparently firings in D-4 were controlled and monitored from the Central Control Room (Building 3607) for the first few years. Then in 1956, a new control room (Building 3605) and test stand (Building 3606, Test Stand D-6) were built immediately to the east, forming a three-building unit. In 1958, plans were drawn up to convert both D-4 and the adjacent large vertical test stand (D-1) to specialized stands for testing liquid-propellant engines. The conversion of D-1 was never carried out, but D-4 was altered substantially. An 18 foot, reinforced-concrete addition was built on the north side, resulting in two main sections. One large section (14 x 14 feet) was divided into two rooms, with a north-south wall separating them. The west bay was for fuel tanks, the east for oxidizer tanks. New wall pockets were cut into the concrete wall between the test bay and the tank rooms. Two smaller valve rooms (each 4 feet deep) were located on the north side of the tank bays with exterior doors at the sides, and there was a 5 feet-deep rectangular concrete-



block neutralization pit with a steel cover, located adjacent to the north exterior to provide access to piping. Tanks were pressurized with nitrogen that was piped throughout Test Area D. According to a ca. 1959 description of Test Stand D-4, it could be used for testing engines with up to 30,000 pounds of thrust.<sup>197</sup>

Figure 296. View south at Building 3604 (ERDC-CERL, 2013).



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<sup>197</sup> Edited excerpt from Picatinny website. For full documentation, please refer to:  
<https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3604.html>

**Building 3605: NARTS Control House for D-4 and D-6; Electronic Equip Facility (1956); Demolished**

This control chamber (Figure 297), dating to 1956, was built along with Test Stand D-6, which stood immediately to the east. It was also connected to Test Stand D-4 which stood to the immediate west. From here, tests conducted at the flanking stands were controlled, monitored by closed-circuit TV, and recorded. The original building was 14 x 21 feet with concrete foundation and walls, a central rear (north) door, and a central viewing port on the south side. In 1958, as part of the conversion of Test Stand D-4 to liquid propellant testing, the control room was more than doubled in size when a 14 foot north extension was built, including a small (4 feet) ell. The new addition had two windows on the north facade and exterior doors on the east and west.<sup>198</sup>

**Figure 297. Southeast oblique of Building 3605, NARTS Control House (PICA Cultural Resources Office, 2010).**



<sup>198</sup> Edited excerpt from Picatinny website. For full documentation please refer to <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3604.html>

**Building 3606: NARTS Small Scale Test Stand; Propellant Systems Facility (1956); Demolished**

This test stand was built in 1956 along with a control room immediately to the west (Building 3605). D-6 was a 12 x 14 ft reinforced concrete structure used for testing solid propellant motors and jet-assisted takeoff units (JATOs) up to a thrust capacity of 40,000 pounds. JATOs were mounted on a roller frame and bolted to rails imbedded in the floor. Firing was done horizontally or at slight angles using special mounts. The firing bay had double set of steel doors to the south that opened for testing. The interior was divided by 1/2-in. thick steel partitions into three rooms—a large full-width firing room and two smaller rooms behind it, each with an exterior door on the side. The roof was slightly pitched down to the north. There were small louvered vents situated high-up on each side of the firing bay. In 1960, Test Stand D-6 was destroyed in a failed liquid-fueled rocket motor test; evidently, the stand was completely rebuilt, though not until 1964 (Figure 298).<sup>199</sup> It was recently demolished.

**Figure 298. Southeast oblique of Building 3606 (PICA Cultural Resources Office).**



<sup>199</sup> Edited excerpt from Picatinny Website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3606.html>



**Building 3607: Central Control Room for Test Cell D-1 and D-2; Electronic Equip Facility (1950)**

Building 3607 was renovated in 2011 (Figure 299). New doors were added, and window was replaced on the western façade. The interior was renovated slightly for new control room uses.

**Figure 299. Building 3607, Central Control Room (ERDC-CERL, 2013).**



**Building 3608: NARTS Heating Plant (Oil-Fired); Boiler House (1958); Demolished**

Building 3608 was a small (10 sq ft) boiler room built in 1958 to service the adjacent Building 3609, a “Passivation Facility.” Building 3608 had a concrete foundation and slab floor, concrete block walls, flat roof, and a metal-framed door centered on the west side. A tall sheet-steel chimney pipe emerged from the south wall (Figure 300).<sup>200</sup>

**Figure 300. Southeast oblique of Building 3608, NARTS Test Area D Boiler House (PICA Cultural Resources Office, 2010).**



<sup>200</sup> Edited excerpt from Picatinny website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3608.html>

**Building 3609: NARTS Oxidizer Bunker; Propellant Handling Facility; Passivation Facility; Water Flow Facility; Ordnance Facility with Neutralizing Pit (1958); Demolished**

The 1958 plans for this building call it a “Passivation Facility,” and a 1959 NARTS brochure refers to it simply as a new hazardous-propellant handling building. Passivation (also referred to as “pickling”) is the preparation of a metal surface with chemicals so that it becomes more passive (or resistant) to further chemical reactions that cause corrosion (e.g., from stored liquids). An important aspect of the work NARTS did on propellants involved finding ways to handle and store oxidizers and fuels that were potentially highly corrosive and combustible. The building also had facilities for conducting flow calibrations and small-scale hazardous blending tests, and it was equipped with two fume hoods. The L-shaped structure included the Passivation Room section (31 x 16 ft), which was oriented east-west, and two 11 x 12 ft storage bunkers on the east side (Figure 301). The latter held hydrogen peroxide used for treating metal. The height of the main section was 13 ft 4 in., and the height of the bunker rooms was 8 feet 10 in. The main section had a concrete entrance ramp on the west end, three evenly spaced windows on the north façade, and an entrance door and window on the rear (south) façade. A “monorail” (presumably for moving tanks) ran down the center of the floor, and the fume hoods stood against the north and south walls. The drainage system included a 6 foot-square neutralization pit built into the ground outside the north side of the building. In 1969, the building was converted to a water flow facility and two large cylindrical tanks (26 x 4 ft) were installed below ground on the north exterior. The Passivation Room became the Flow Room, the north bunker became the Pump Room, and the south bunker became the Control Room.<sup>201</sup>

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<sup>201</sup> Edited excerpt from Picatinny website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3609.html>



Figure 301. Building 3609, now demolished (PICA Cultural Resources Office, 2010).



Building 3610: NARTS Liquid Propellant Storage; Ready Storage Shed; Radar and Detection Equip Storage (1952)

Building 3610 was constructed in 1952 as a NARTS Liquid Propellant Storage Bunker. It is a small rectangular structure with concrete block walls and a flat corrugated-metal roof (Figure 302).

Figure 302. Building 3610, NARTS Liquid Propellant Storage (PICA Cultural Resources Office, 2010).



**Building 3611: NARTS Instrument Shop; Electronic Equipment Facility (1956-7); Demolished**

The Instrument Shop was built in 1956–1957. It contained an electronic workshop, storage room, instrument calibration room, office, and boiler room. The shop handled fabrication of instruments designed by the NARTS Instrumentation Branch and the repair, overhaul, and storage of all instruments and spare parts used for Test Area D static firing tests. The main section of the building was 49 ft 4 in. x 23 ft 4 in., constructed of concrete block. It had an entrance door and three windows on the south facade (Figure 303), two windows on the east, and four windows on the north. A small 10 x 12 ft ell on the west side contained the boiler room. Plans were drawn up for a small shed-roofed extension on the north side in 1963, but there is no evidence that this addition was built.<sup>202</sup> It was demolished recently.

**Figure 303. Southeast oblique of Building 3611, NARTS Electronic Equipment Facility (PICA Cultural Resources Office, 2010).**



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<sup>202</sup> Edited excerpt from Picatinny website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3611.html>

### Building 3612: NARTS Components Testing (1953); Demolished

Also known as testing facility D-5, the 1953 Components Workshop was divided into nonhazardous and hazardous areas. The reinforced-concrete-walled hazardous portion was on the building's west side, in an L configuration. A 12 x 27 ft gas flow room spanned the width of the building, and a 14 ft x 7 ft 6 in.-high-pressure tank room lay perpendicular to it on the south side of the building. Tests of high-pressure inert gas equipment, ignition delay, and gas generator performance were conducted in this part of the building. The remaining nonhazardous section of the building, of concrete block construction, contained a large assembly-disassembly area, an office, and a storage room. This section was used for testing rocket engine components, and had a flow-test system that delivered water at pressures up to 1200 pounds per square inch (psi) and flow rates up to 500 gallons per minute (gpm). A centrally located instrument and control area served the entire building. Circa 1959, instruments typically in use in the building included six high-speed potentiometer chart recorders; oscillographs and other recorders were installed as needed.

There were no windows in the hazardous side of the building, but two sets of double doors on the south façade provided access to the gas flow room and the tank room. The nonhazardous side of the building had large windows on the north, south, and east sides, and on the north façade there was a doorway and a bay with an overhead roll-up steel door. The westernmost double door on the south side of the building as well as the roll-up door on the north side were later replaced with aluminum roll-up doors. Sometime before ca. 1960, an extension consisting of two concrete-block shed structures was added to the south side of the building at the east end. The function of this extension is not known. It was in place by the time of publication of the "All About NARTS" brochure (ca. 1959). A 1969 building list mentions "X-3612" as a barricade on the south side of Building 3612, and it is possible this actually refers to the extension, though "X" typically designated open storage.<sup>203</sup> Figure 304 shows one view of Building 3612 in 2010.

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<sup>203</sup> Edited excerpt from Picatinny website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3612.html>



Figure 304. Building 3612, NARTS Components Testing (PICA Cultural Resources Office, 2010).



**Building 3613: NARTS Area D Lunch Room; Storage; Electronic Equipment Facility (1960, moved 1971); Demolished**

This small structure is atypical for Test Area D. It is clad with asbestos shingles and has a side gable roof covered with sheet metal. The Army accessioned the building in 1960, but a plan drawing indicates it was moved to its latest recorded location at Test Area D in 1971, with a new foundation and slab poured at that time. It is a simple rectangle, with three bays (Figure 305). The south façade has a door and 2 windows, and the north façade has 3 windows. It is possible this building was kit-built.<sup>204</sup>

**Figure 305. North elevation of Building 3613, NARTS Area D Lunch Room (ERDC-CERL, 2013).**



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<sup>204</sup> Edited excerpt from Picatinny website. For full documentation, please refer to: <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3613.html>

**Building 3615: NARTS Utility House; Public Toilet; Electronic Equip Facility  
(unknown; ca. 1962); Demolished**

The original date of construction for the building now designated 3615 is not known. It was not shown in a circa 1960 photograph of Test Area D dated ca. 1959. The building was present by 1962, however, as records indicate that it was transferred to the Army from the Navy in that year. It was front-gabled, with a concrete block foundation, stuccoed walls, and a slate roof. There was an entry door centered on the front (south) façade, and small, square windows on each of the other three sides. The building interior contained a sink, shower, and urinal, all against the rear (north) wall. In 1966, the building was nearly doubled in size with construction of a north addition. An interior connecting door was built in the center of the rear wall (the sink had to be relocated). The addition had a centrally-placed exterior door on the north side, and windows on the west and east sides. The addition's roof line was slightly below that of the original building (Figure 306).<sup>205</sup>

**Figure 306. Northwest oblique of Building 3615, NARTS Utility House (ERDC-CERL, 2013).**



<sup>205</sup> Excerpt from Picatinny Website. For full documentation please refer to <https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/index.html>



**Building 3616: NARTS Environmental Test Building (ca. 1950, enclosed 1959)**

The NARTS Area D Temperature Conditioning Pad was originally a concrete pad with a roof supported by lally columns (construction date unknown, but prior to 1955). It was enclosed in 1959 with corrugated aluminum siding, and at that time was called the Environmental Conditioning Pad. The facility included a hot box, a cold box and an ambient temperature box for conditioning test items — typically JATO units, igniters, starter cartridges, etc. — prior to test firing. The enclosure had a roll-up overhead door and loading platform on the south side; an exterior door, ventilation panel, and removable siding panels on the west side; and two aluminum-sash windows, a louvered ventilation panel, and an exterior door on the north side (Figure 307). A barricade stood just to the west of the building. Plans drawn up in 1955 called for a sand-filled frame barricade to be built around the north and east sides, but it is not clear that this was accomplished.<sup>206</sup> Building is slated for demolition.

**Figure 307. North elevation of Building 3616 (background), Environmental Test Building (a noncontributing gun turret, also demolished is in the foreground) (ERDC-CERL, 2013).**



<sup>206</sup> Excerpt from Picatinny website. For full documentation, please refer to:

<https://www.pica.army.mil/ead/Cultural/PicatinnyHistoricDistricts/NARTS/PhotoInventory/MoreInformation/No3616.html>

### 6.2.5.2 Buildings and clusters NARTS Test Area E

Test Area E was considered by the Navy to be its premier rocket engine testing area. NARTS engineers completely designed the original plan for Test Area E. They drew up the preliminary specifications and maintained an active role during the final architectural detailing and construction. The architectural and engineering firm chosen was Frank Grad & Sons, an old firm with an outstanding reputation from Newark, New Jersey. This project was considered one of the major accomplishments of the NARTS engineering staff. When the stand was first put into use, it was one of the largest test stands on the East Coast.<sup>207</sup>

Building 3617 (Control House; Figure 308) and Building 3618 (Test Stand; Figure 309), while two separate buildings, had an efficacious relationship; both structures were conceived as essential components of the same operation: to test rockets and motors.<sup>208</sup> In addition to its two major buildings (3617 and 3618), the area also included the following noncontributing buildings and structures: the remnants of Building 3619, the LOX tank pad and remaining tank supports at the foot of the bridge portion of Building 3618; Buildings 3622 and 3623, a 400,000-gal Water Tower and attached support building; Building 3625, Maintenance Facility; Building 3626, Ordnance Facility; and Building 3627 (EID Control Room), made from an old Navy gun turret.

For more in-depth analysis of Buildings 3617 and 3618, the two contributing buildings, refer to the HAER documentation found in “Historic American Engineering Record, Documentation of the Control House (Building 3617) and the Static Rocket Test Stand (Building 3618)” from June 2009.<sup>209</sup> Since these buildings were demolished, no further documentation is needed.

A list of buildings and structures in the NARTS Test Area E is included in Table 10.

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<sup>207</sup> Nolte et al September 1999, 105.

<sup>208</sup> Nolte et al. June 2009, 5

<sup>209</sup> Nolte et al. June 2009.

Figure 308. Oblique view of northwest and northeast elevations, Building 3617-  
Control House (Nolte et al. June 2009).



Figure 309. View of rear and southeast side of Static Rocket Test Stand (Building  
3618) (ERDC-CERL, 2013).





Table 10. List of buildings in the NARTS Test Area E Historic District.

Building Number	Date Built	Historic Use	Current Use	National Register District Eligibility	Assessment Info	Comments
3617	1953	Control House Facility	Propellant Systems Facility	Contributing/ Criteria A & C	Evaluated 1994; Completed 1999; HAER 2009	Demolished 2015.
3618	1953	Test Cell E-1 (Test Stand)	Propellant Systems Facility	Contributing/ Criteria A & C	Evaluated 1982-83 HABS; Reevaluated 1994; Completed 1999; HAER 2009	Demolished 2014.
3622	1962	Water Tank	Water Tank	Noncontributing	Completed 1999	Within Historic District; demolition approved and pending.
3623	1953	Water Tank	Water Tank	Noncontributing	Completed 1999	Within Historic District; demolition approved and pending.
3625	1961	Propellant Systems Facility	Maintenance Facility	Noncontributing	Completed 1999	Demolished 2015.
3626	1960	Ordnance Facility	Ordnance Facility	Noncontributing	Completed 1999	Demolished 2015..
3627	1960	Control Room	Control Room	Noncontributing	Completed 1999	Demolished 2015.

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### 6.2.6 Vegetation

The forested landscape was clear cut around the buildings in both NARTS Test Areas D and E (Figure 310). When completed and in use, the areas around the Test Stand and the Control House were completely devoid of trees and shrubs; anything that could burn or get in the way of observing an engine test was removed. The bare ground was probably seeded to prevent erosion, but everything else was cut down. The Control House (Building 3617) had a bituminous paved area on the southwest side of building and a concrete paved area on its northwest side.<sup>210</sup> However, currently the area is completely overgrown with vegetation, which makes it difficult to comprehend and understand the site as a whole.

Figure 310. Historic photograph of men working to clear the land in NARTS Test Area D in preparation for building construction, January 1950 (PICA Cultural Resources Office).



### 6.2.7 Small-scale features

Small-scale features common to both NARTS Testing Area D and E include gates and fencing, flagpoles, and signage.

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<sup>210</sup> Nolte et al. June 2009, 51.



### 6.2.7.1 Fencing

Fencing in both testing areas was used to restrict access for security and safety (Figure 311 and Figure 312).

**Figure 311. Chain-link fencing and security gate at the entrance to NARTS Test Area D (ERDC-CERL, 2013).**



**Figure 312. Chain-link fencing and gate at the entrance to NARTS Test Area E (ERDC-CERL, 2013).**





### 6.2.7.1 Historic markers

A historic marker is located outside the entrance to NARTS Test Area D along Snake Hill Road adjacent to the area's identification sign (Figure 313). Historic markers for the NRHP-eligible historic districts are used to identify and highlight these significant areas. The markers allow for military and civilian personnel and visitors to the installation to be more aware of the installations' historical heritage to ensure the long-term preservation of these significant areas. The markers were funded by the Environmental Affairs Division and produced by Lake Shore Industries. Text was developed by CRM, NJ HPO, and the Morris County Heritage Commission. Placement of the markers was carried out in 2012.

Figure 313. Historic marker located at the entrance to NARTS Test Area D & E Historic Districts (ERDC-CERL, 2013).



### 6.2.7.2 Flagpole

A flagpole is located immediately inside the fence at the entrance to NARTS Test Area D (Figure 314). The flagpole was initially used to alert people of testing being conducted within the buildings.

**Figure 314.** Flagpole located near entrance into the NARTS Test Area D (ERDC-CERL, 2013).





In addition to the road, other landscape features that comprise the district include: the Test Stand firing pit; rock and concrete retaining walls; and a number of concrete drains and earth-fast ventilation shafts.<sup>211</sup>

### **6.2.8 Views and vistas**

Views and vistas would not have been part of the design and layout of the NARTS Test Areas D and E (Figure 315). Mission-specific industrial areas on military installations rarely followed the design principles visible in the high-profile areas such as housing and administration.

## **6.3 Landscape evaluation**

There is still testing taking place in NARTS Area D using the rail gun. The Area is no longer used for rocket testing. NARTS Area E has been documented as part of the Section 106 process and the buildings are demolished.<sup>212</sup>

### **6.3.1 Historic significance NARTS Test Areas D and E**

NARTS Area D and E Historic Districts are associated with a much larger NARTS complex, frequently called the Lake Denmark Test Area, which is located off Snake Hill Road in the extreme southeastern end of Picatinny. The Lake Denmark Test Area was broken into smaller test area segments called Areas A, B, C, D, E, G and later S and R (refer to Figure 281), all of which were operated by RMI/RMD with the exception of Area D.<sup>213</sup> Area D is significant for its role by the Navy and private company RMI to test rocket engines including the Bell X-1 rocket engine which Chuck Yeager used to break the sound barrier in 1947. Area D is still used as a rail gun testing facility.

The NARTS Test Area E was both nationally and regionally significant for the role it played in the Cold War military-industrial complex and the creation and testing of liquid and solid rocket fuels and engines, particularly the XLR-11 and XLR-99 rocket engines, the latter being the workhorse engine of the early rocket era.<sup>214</sup>

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<sup>211</sup> Nolte et al. June 2009, 40.

<sup>212</sup> Per RPMP FRP PA (On file with PICA Cultural Resources Office and NJ HPO), 2010.

<sup>213</sup> Nolte et al. June 2009, 41.

<sup>214</sup> Ibid., 40.

Figure 315. Aerial view of cleared landscape for NARTS Test Areas D (foreground) and E (background), no date (PICA Cultural Resources Office).



### 6.3.2 Integrity

Despite the significance of the NARTS Testing Areas D and the contributing structures within the historic district, the condition of the structures is poor, with each building having fallen into a state of disrepair. The landscape is also in a state of disrepair due to lack of use and maintenance of the areas and a number of the buildings have been demolished affecting the integrity of the landscape. Since the contributing buildings at the NARTS Testing Area E have been demolished, there is no integrity remaining of the landscape. The remaining structures, 3622 and 3623, are noncontributing.

### 6.3.3 Character-defining features

Character-defining features are landscape features that were part of the initial design, present throughout the period of significance as established in the National Register nomination, and continue to be evident in the district today. Character-defining features of the NARTS Area D Historic District are listed in Table 11 and for NARTS Test Area E in Table 12 along with summaries of their historical significance and integrity, and indications of NRHP eligibility.

Table 11. NARTS Test Area D, character-defining features.

<b>Character-Defining Features</b>	<b>Historical Significance</b>	<b>Integrity</b>	<b>NRHP Eligibility</b>
<b>Circulation and roadways</b>	A circular drive to site is accessed from Snake Hill Road.	Asphalt drive not in use; poor condition	Yes
<b>Clustering of buildings</b>	Historically a testing area, building separations are based on building functions and safety	Spacing between buildings remains the same; but many structures have been demolished.	Yes
<b>Testing flagpole</b>	Flagpole is located along the main road to warn of testing.	Rusted	Yes
<b>Fencing</b>	Built to restrict access for security and safety.	Entire area fenced; poor condition.	Yes
<b>Vegetation</b>	Historically area was cleared of any vegetation other than grass for fire suppression. The lack of vegetation is significant.	Vegetation is now overgrown.	No



Table 12. NARTS Test Area E, character-defining features.

Character-Defining Features	Historical Significance	Integrity	NRHP Eligibility
Circulation and roadways	Long, straight drive ends in circle.	Drive not in use; poor condition	No
Topography	Natural topography used for blast protection.	Still evident but no contributing buildings present.	No
Vegetation	Historically, area was cleared of any vegetation other than grass for fire suppression. The lack of vegetation is significant.	Vegetation is now overgrown.	No
Fencing	Built to restrict access for security and safety.	Entrance gate is newer; entire area is still fenced.	No
Concrete retaining walls and drains	Features part of initial design.	May still be evident after demolition.	No
Earth-fast ventilation shafts	Features part of initial design.	May still be evident after demolition.	No

#### 6.3.4 Final determinations

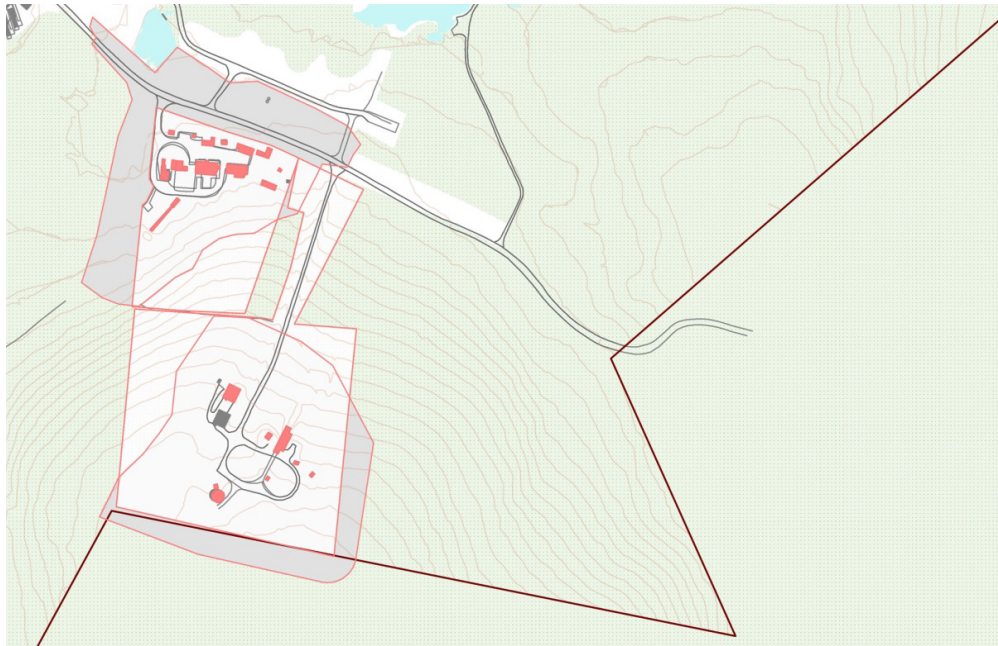
In 2004, the NJ HPO concurred that NARTS Test Area D (Figure 316) was eligible for listing to the NRHP as a district under Criteria A (contributing to the broad patterns of history), Criteria C (architecture/industrial significance), and Criteria D (providing information about a little-known or understood period of history), and Criteria Consideration G (exceptional importance for a property less than 50 years of age).<sup>215</sup> Many of the buildings

<sup>215</sup> Nolte et al. June 2009, 41.

at NARTS Test Area D have been demolished, and there is a loss of integrity of the landscape.

On 2 July 1999, the NJ HPO ruled that NARTS Test Area E (Figure 316) was eligible for listing to the NRHP and the New Jersey Register of Historic Places as a district under Criteria A and D. The site illustrates the symbiotic relationship of private industry and government agencies in the creation of the vital military industrial complex that sent the United States to space. NARTS Test Area E District's historical context is the Cold War 1950–1969.<sup>216</sup> Buildings have been fully documented by HABS/HAER as mitigation for demolition. The contributing buildings have been demolished, and the landscape no longer has integrity. Remaining structures 3622 and 3623 are non-contributing.

Figure 316. NARTS Testing Areas D (upper) and E (lower) Historic Districts map. NARTS Testing Area E is now demolished (ERDC-CERL).



<sup>216</sup> Nolte et al, September 1999, 119.

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<b>14. ABSTRACT</b> This study documents the cultural landscape at Picatinny Arsenal, focusing on five existing historic districts. This work looks at the historic development and discusses the existing conditions within each of the five districts. It analyzes the features within each district for their historic significance and integrity, and based on this analysis, makes treatment recommendations. This document meets the requirements for federal agencies to address their cultural resources which are defined as any prehistoric or historic district, site, building, structure, or object. Especially relevant is Section 110 of the National Historic Preservation Act, which requires federal agencies to inventory and evaluate their cultural resources.						
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