National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Ames Administration Building
Other names/site number: Building N-200
Name of related multiple property listing:
N/A
(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: Bush Circle, NASA Ames Research Center
City or town: Moffett Field State: California County: Santa Clara (085)
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this _X_ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property _X_ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

_X_national ___statewide ___local

Applicable National Register Criteria:

_X_A _X_B ___C ___D

[signature] 11 November 2016

Rebecca Klein, Federal Preservation Officer **Date**

National Aeronautics and Space Administration

State or Federal agency/bureau or Tribal Government

In my opinion, the property _x_ meets ___ does not meet the National Register criteria.

[signature] 10/13/16

Signature of commenting official: **Date**

Deputy State Historic Preservation Officer, California State Office of Historic Preservation

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) ______________________

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	
Public – Local	
Public – State	
Public – Federal	X

Category of Property

(Check only **one** box.)

Building(s)	X
District	
Site	
Structure	
Object	

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
1	0	buildings
0	0	sites
0	0	structures
0	0	objects
1	0	Total

Number of contributing resources previously listed in the National Register ___0______

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6. Function or Use
Historic Functions
(Enter categories from instructions.)
OTHER/Research and Experimentation Facilities

Current Functions
(Enter categories from instructions.)
OTHER/Research and Experimentation Facilities

7. Description

Architectural Classification
(Enter categories from instructions.)
MODERN MOVEMENT/Moderne, Streamlined Moderne

Materials: (enter categories from instructions.)
Principal exterior materials of the property:
Foundation – concrete
Walls – concrete
Roof – bitumen, built-up system

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Ames Administration Building (Building N-200) is located at the National Aeronautics and Space Administration (NASA) Ames Research Center (ARC) at the center of Bush Circle and is the focal point of the entrance to ARC, which is located at Moffett Field, in Santa Clara County, California. Originally designed in 1941, the building was completed in 1943. The building has elements of Moderne/Streamline Moderne design, being a reinforced concrete structure with a flat roof. It has a symmetrical, rectilinear plan that is 13 bays long and three bays wide, with three stories (including the basement level) encompassing approximately 36,360 square feet. The building is in excellent condition, has had few exterior alterations since its construction, and retains integrity.

Narrative Description

The Ames Administration Building (Building N-200) is an office building located at the center of Bush Circle and facing southwest towards Arnold Avenue as the focal point of the main entrance to ARC. Its setting in Bush Circle is a symmetrically designed landscape that includes a circular drive, walkways, a manicured lawn, ornamental trees and shrubs, and flagpoles in front of the building. Bush Circle also includes the Ames Auditorium (Building N-201), a separate building not included in this nomination, which is connected to Building N-200 on its northeast side by a covered walkway or loggia. Surface parking lots are behind Building N-200 and on each side of Building N-201. Bush Circle is surrounded by diagonal parking spaces at its outer curb and, beyond the street, several other buildings are concentrically oriented to face Bush Circle and Building N-200.

Building N-200 was designed in 1941with construction completed in 1943. It has a concrete foundation, full-story basement, and two stories above, covering approximately 12,120 square feet in each story. It has a symmetrical, rectilinear plan that is 202 feet (13 bays) long and 60 feet (three bays) wide. The exterior walls are reinforced concrete, with a smooth finish and texture. The finish is scored with narrow, shallowly grooved horizontal and vertical lines that accentuate the regularly spaced fenestration in each bay, forming a grid pattern. The exterior walls rise to a parapet with a simple cornice of four parallel, continuously grooved horizontal lines. The roof is flat and holds mechanical ducts and other ventilation equipment.

The façade (south elevation) of Building N-200 is symmetrical, with 13 bays, of which the three center bays are contained in a 42-foot-wide center vertical massing that projects slightly forward, forming the main entrance to the building. The main entrance features full-width granite steps and a porch, leading to double doors in the center bay. The porch is flanked with rectangular concrete planter boxes that project from the façade. The planter walls have a fluted finish. The three bays are recessed and vertically partitioned with unadorned pilasters. In the first story, the center bay features the entrance, with glazed double-doors, minimal visible hardware, and a fixed transom above. The side bays contain fixed windows with panes in a T-shape configuration. Below these windows, the side bays have decorative fluted panels that match the design of the adjacent planters. Above the windows, between the first and second stories, all the bays contain decorative precast panels that feature fluted, concentric squares. In the second story, each bay contains an operable window, composed of a fixed lower panel and an awning panel above, with a cross-shape configuration. A recessed downlight is in the soffit of the recessed area above each window. At the cornice line of the center vertical massing, the building is engraved with “AMES RESEARCH CENTER.” Originally, this read “AMES AERONAUTICAL LABORATORY,” but was changed by 1958. The remaining bays of the façade contain windows with a six-over-two configuration of fixed panes over operable hopper panes in the first story, and a four-over-two configuration in the second story. All windows are slightly recessed with simple concrete sills and surrounds.

The sides of Building N-200 (east and west elevations) contain three bays each, with the continuation of the exterior wall finish and fenestration design of the façade. The windows in the second story are replacement casement or fixed windows, but are designed with the same muntin configuration of the original second-story windows. At the cornice line of these elevations, two horizontal wall penetrations serve as gutters at the roofline.

The rear (north elevation) of Building N-200 is 13 bays wide, with two projecting wings at each end. Each wing is three bays wide, with a perpendicular bay in the interior return of each wing, and with the continuation of the exterior wall finish and fenestration design of the façade and the sides of the building. The central portion also repeats the exterior wall finish and general fenestration pattern of the façade, but does not have the accentuated parallel lines at the cornice. In the first story, the center bay contains a rear entrance of glazed doors with fixed transom and glazed surrounds, with granite steps and a porch similar to the front of the building, under a covered walkway added circa 1944. The walkway projects perpendicularly to connect to Building N-201, a separate auditorium building located northeast of Building N-200. The rear porch also is connected to a ramp that leads to an exterior elevator shaft to the east, added in 1999. The remaining first-story bays contain some windows with a six-over-two configuration of fixed panes over operable hopper panes, some that are filled with 7¾-inch glass blocks, and some with decorative fluted panels that match the design of the façade’s main entrance. In the second story, the windows generally have the four-over-two configuration of fixed panes over operable hoppers, with the exception of two window openings. The center window is wider than the other windows and has a three-over-three configuration of fixed and operable panes. The easternmost opening has been converted to accommodate a door with a covered walkway to the exterior elevator shaft and exterior staircase.

The building exterior has several features characteristic of Moderne/Streamline Moderne design. The overall concrete finish, including a smooth texture; continuous cornice and grid lines; and precast fluted and concentric square decorative panels are elements of Building N-200 that reflect Moderne design. The sans-serif lettering style of the signage at the cornice is another distinguishable Moderne element. The verticality of the pane configuration and the sleek and low profile of the muntins and moldings of the building's windows also convey the Moderne aesthetic.

The interior plan of the building has a main lobby, spanning between the front and rear doors and double-loaded halls in each wing, with offices and other administrative spaces on both sides of each hall. The interior finish of the lobby and halls, altered most recently in 1999, is contemporary, with decorative wall panels and tile floors. The current appearance of the interior has been altered substantially from its original design, with changes to the finishes and floor plan.

Alterations

Exterior

Relatively few alterations have been made to the exterior of Building N-200. Shortly after its construction in 1943, the Ames Auditorium (Building N-201) was constructed adjacent and perpendicular to the rear of Building N-200, and was completed in 1944. The two-story building was designed with the same Moderne characteristics as Building N-200, including a smooth concrete exterior finish, a grooved cornice, and steel windows. Building N-201's bays exhibit the same spacing and verticality as Building N-200. The two buildings are connected by a narrow loggia or covered walkway. The loggia, composed of concrete posts and roof, also features the parallel lines of the grooved cornice on Building N-200. Building N-201 and the loggia were complementary to the design of Building N-200 and were planned before its completion, but are separate from the original design of Building N-200.

When the National Advisory Committee for Aeronautics (NACA) was subsumed into NASA in 1958, ARC was transferred from the NACA to NASA. As a result, by the end of 1958, the signage atop Building N-200 that read “AMES AERONAUTICAL LABORATORY” was removed and was replaced with precast panels, reading “AMES RESEARCH CENTER” in similar Moderne-style lettering.

In compliance with the American with Disabilities Act of 1990 and concurrent with an interior renovation campaign, a ramp and an elevator were installed at the rear of Building N-200 in 1999. A concrete ramp and handrail along with a freestanding, two-story elevator shaft were installed east of the rear entrance. The elevator shaft has a solid exterior, with a smooth concrete or stucco finish with thin horizontal striations, matching the overall exterior finish of Building N-200. The elevator shaft is connected to the building via a covered walkway at a second-story window opening, thus altering the window to serve as a door and providing access from the elevator. An exterior staircase also wraps around the elevator shaft.

Several windows have been replaced in Building N-200. The original windows generally consisted of steel six-over-two and four-over-two fixed panes over hopper windows, and other steel windows with casement or awning-operable panels. Windows in the east, west, and north elevations of the building have been replaced with contemporary windows configured to mimic the muntin configuration of the original windows. These changes were concurrent with a major renovation in 1999.

Interior
Since its completion in 1943, several alterations have been made to the interior of Building N-200. Multiple changes to mechanical, heating, air conditioning, and ventilation systems and equipment have occurred from the late 1940s through the present (2016), but this has not altered the appearance or configuration of the interior spaces substantially. Two major renovations of the interior occurred in the 1970s and the 1990s. As a result of these campaigns, the majority of original interior finishes have been removed and replaced with contemporary finishes.

The first substantial alteration was a major renovation of the interior between 1971 and 1974, costing approximately $500,000, which was part of a campaign to upgrade several of the facilities at ARC. Phased modifications allowed for the continuous use of the building during renovation of the ground level and basement to accommodate ARC's communication center. In addition, in 1974, the interior office spaces were reconfigured to integrate the offices of each of ARC's directorates and staff. Despite changes to the internal walls between office spaces, particularly on the second floor, the floor plan retains a double-loaded hall plan with offices.

In 1999, along with installation of the new elevator, the interior finishes of the main lobby and throughout the building, including wall finishes and flooring, were removed and replaced with a contemporary design and materials. Second-floor offices, meeting rooms, and bathrooms also were renovated, and new plumbing as well as new mechanical, lighting, and electrical systems were installed. These were primarily cosmetic changes.

Integrity

Building N-200 retains integrity of location, design, setting, materials, workmanship, feeling, and association.

Location. Building N-200 remains in its original location, at the center of Bush Circle at ARC, as the focal point of the entrance to the campus from Arnold Avenue.

Design. Designed in 1941, the exterior of the building has not had any substantial alterations to compromise the original intent of the design. Decorative elements and other character-defining features reflect Moderne/Streamline Moderne style, including replacement elements. Replacement elements, such as the windows and the signage at the cornice, complement the historic design by using similar configurations and profiles. Two direct additions to the building have altered its design: construction of the loggia or covered walkway to connect to Building N-201, and installation of the elevator shaft at the northeast side of the building. However, these additions were at the rear of the building and connect to Building N-200 in a way that does not obscure its original design significantly. Although changes have substantially altered the interior finishes of the building, it retains its design as an office building, with its original general floorplan including a central lobby and double-loaded halls with offices on either side. Overall, Building N-200 retains a high level of integrity of design.

Setting. The setting of Building N-200 has changed moderately since it was completed in 1943. Its immediate setting within Bush Circle has not changed significantly since the 1940s, when the adjacent auditorium (Building N-201), parking lots, and other landscape features were added. By the mid-1980s, new symmetrical walkways and the front lawn flagpoles had been added within the circle, but the general monumental setting remained unchanged. Surrounding Bush Circle, the buildings to the north were built in the 1960s to line the circle, but they were designed to complement Bush Circle and Building N-200.

The buildings to the south were built in 2005 and 2012. Although the open space that once surrounded Bush Circle has been infilled with newer buildings, Bush Circle itself as the setting for Building N-200 is virtually unchanged. The newer buildings also are research facilities that reflect the position of Building N-200 at the center of the scientific research campus. Building N-200 retains a good degree of its original setting.

Materials. Very few alterations have been made to the exterior of Building N-200, with little material replacement, including some windows and doors, and the engraved signage. However, these features were replaced with similar materials. Interior finishes have been replaced, resulting in the loss of decorative materials in the former lobby, library, and Director's office. Overall, the building retains a high level of its original materials.

Workmanship. The workmanship of Building N-200 is best demonstrated in the exterior concrete finish, including the grid striations across the smooth concrete surface, the grooved cornice, and the precast fluted and concentric square panels. These elements all remain in good condition and reflect the building's integrity of workmanship.

Feeling. Building N-200 retains a monumental feeling that is reflected in its massing and position as the focal point of the main entrance to ARC. These elements convey the feeling that this is the headquarters of ARC, as it has served since it was constructed in 1943. It retains a high level of integrity in its historic sense of place or feeling.

Association. Building N-200 has functioned as the administration building for the Ames campus since its construction in 1943. The office of the ARC Director and other administrative leaders' offices are within the building. It retains a high level of integrity, related to its historic associations.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [X] B. Property is associated with the lives of persons significant in our past.
- [ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Science

Period of Significance
1943–1965

Significant Dates
1943 – Date of construction
1963 – Major changes in administrative organization
1965 – Retirement of Smith J. DeFrance

Significant Person
(Complete only if Criterion B is marked above.)
DeFrance, Smith J.

Cultural Affiliation
N/A

Architect/Builder
National Advisory Committee on Aeronautics
Ames Aeronautical Laboratory Construction Division

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Ames Administration Building (Building N-200) is eligible for listing in the National Register at the national level of significance for its contributions in the area of science related to the diverse research that occurred at the NACA's Ames Aeronautical Laboratory, later NASA's Ames Research Center, under the leadership operating from this building. The property is eligible under Criterion A for its association with the administration of research and development at this key research facility that made strides in the fields of aeronautics, aeronautical theory, aviation, and space exploration. Under Criterion A, the period of significance begins in 1943, with the completion of the building, and continues through 1963, the end of the first ARC administrative organization spanning from inception under the NACA through the transition to NASA. Building N-200 is also eligible under Criterion B for its association with Smith J. DeFrance, a pioneer in aeronautical research and development and the figurehead of Ames, first as the accomplished Engineer-in-Charge for the development of the research facility and then seamlessly as the first Director of Ames Aeronautical Laboratory. Under Criterion B, the period of significance begins in 1943 and continues through 1965, the year that DeFrance retired as the NASA Center Director.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

The Ames Administration Building (Building N-200) was constructed from September 28, 1942 to November 16, 1943. The Ames Construction Division, including approximately 25 design engineers, draftsmen, and inspectors supervised by Parsons, designed the building. Its function was to house all administrative and office space and to serve as the headquarters for the NACA's second aeronautical laboratory. It became the formal visage of the laboratory and the centerpiece of the campus. The building contained the offices of the Director and other administrative offices for personnel, procurement, and files. In its nascent years, it also held some of the research divisions. The main lobby reflected the mission and sophistication of the laboratory, and featured a display model of the laboratory campus and its wind tunnel facilities. The building also originally housed communal spaces, including the reference library and the cafeteria. Building N-200 has served as the administrative offices of the ARC Director to the present.

SIGNIFICANCE

Building N-200 is eligible for listing in the National Register at the national level of significance for its contributions in the area of science under Criterion A for its association with the administration of research and development at Ames, a key research facility that made strides in the fields of aeronautics, aeronautical theory, and space exploration through applied research. Ames's contributions in the area of science, specifically in the fields of aeronautics, aeronautical theory, aviation, and space exploration, transcend national boundaries, as they contributed to humankind's body of academic and practical knowledge of flight. Ames was the second of the NACA's aeronautical laboratories, after Langley Memorial Aeronautical Laboratory in Virginia, and one of four total research centers. Ames conducted unique research programs related to airplane wing deicing; swept-back wing design; hypersonic, supersonic, and transonic aeronautical experimentation; flight simulation; and atmospheric reentry that inform the practical application of aviation apparatuses across the world to this day. Building N-200 physically represents the hub of theoretical and scientific research conducted at Ames that contributed to revolutionary scientific advances, first in aeronautics and flight research, and then in space flight and exploration.

As the headquarters of Ames, Building N-200 represents an internationally significant scientific facility that evolved in tandem with unprecedented advances in aeronautics in the 20th century. At the time Ames was established, World War II had created urgency for research to support the war effort. Due to the need to immediately initiate research in response to that urgency, several research facilities were constructed at Ames prior to Building N-200. However, the completion of Building N-200 marked the consolidation of the research center's administration led by Smith J. DeFrance, and other Division Chiefs under DeFrance. Unified administrative facilities supported the organization and direction of Ames to fulfill its scientific mission and to contribute to national defense efforts. In the postwar era, Ames's mission shifted towards space flight and exploration as the NACA transitioned to NASA, and was guided by the centralized administration in Building N-200 under DeFrance. The decisions of the administration led Ames as it evolved from a laboratory focused on wind tunnel research to an expanded research center working on space sciences. The exceptional and invaluable scientific research and development at Ames were fostered by the planning and prerogative of the administration.

Representing the important programmatic and managerial direction of Ames's critical research facilities for the advancement of science in support of national defense and space flight, Building N-200 is eligible under Criterion A for a period of significance from 1943, the year it was completed, until 1963, when Ames's administrative directorates were substantially reorganized to address the changing requirements of NASA. This period of significance covers the foundation of Ames's administration under the NACA that set the precedent for how the research center would be administered, and the association of Building N-200 with the NACA and an early period of NASA research. The building, despite some interior changes, retains integrity and clearly represents this period of significance, as well as the continuing administration of Ames to the present.

Building N-200 is also eligible under Criterion B for its association with Smith J. DeFrance, specifically his 25-year tenure as the de facto figurehead of Ames, first as Engineer-in-Charge for the initial development of the research facility, and then as the first Director of the NACA aeronautical laboratory through its transition into a NASA research center. An accomplished aeronautical engineer, DeFrance was instrumental in the establishment of Ames Aeronautical Laboratory in 1939. In 1929, DeFrance was involved in the creation of the NACA's first full-scale wind tunnel at Langley Memorial Aeronautical Laboratory in Virginia. He designed the gigantic 40-by-80-foot full-scale wind tunnel (Building N-221) at Ames a decade later, and was involved in all aspects of design and construction of all the early research facilities at Ames. While DeFrance made contributions in the area of science through the development of unique wind tunnel facilities for applied research that advanced the fields of aeronautics, aeronautical theory, and aviation, his greatest achievements derived from his leadership and guidance of the aeronautical laboratory and research center. With seamless transition, he was named the first Director of Ames and remained until he retired in 1965. Under DeFrance's administration, Ames's research programs produced important scientific advances related to airplane wing deicing, swept-back wing design, high-speed flight, flight simulation, and atmospheric reentry that changed aviation. While several other important scientists operated at Ames and contributed major research on these topics, DeFrance orchestrated the programs that enabled applied research and theoretical breakthroughs. DeFrance's offices were located in Building N-200, and from there he led Ames, making Building N-200 the best representation of his long and contributory career at Ames. Building N-200 is eligible under Criterion B for a period of significance that extends from 1943, the year that DeFrance's office was installed in the building, until 1965, the year of DeFrance's retirement. The building, despite some interior changes, retains integrity and clearly represents this period of significance in which it was connected to DeFrance.

In summary, Building N-200 is eligible for the National Register under Criteria A and B, and retains integrity of location, design, setting, materials, workmanship, feeling, and association to convey its historical importance as the headquarters of a critical scientific research and development facility, and the contributions of DeFrance.

NASA previously determined Building N-200 eligible for the National Register and a National Register nomination was produced in 2004 (Tinsley 2004). The State Historic Preservation Officer signed the nomination on June 25, 2008, but the nomination was not submitted to the Keeper of the National Register.

HISTORIC CONTEXT

The following context describes the development of the NACA and NASA, the role of Ames in the development of these programs, and the contributions of DeFrance, to illustrate the significance of Building N-200.

The NACA and NASA

NASA originated from the NACA. The NACA was created in 1915, as a civilian agency of the federal government (Rosholt 1966:3). Even after the first flight of Orville and Wilbur Wright in 1903, the United States failed to develop a long-term, committed interest in aviation. Europeans, however, recognized the utility of aeronautics and promoted its advancement and use of this new technology, particularly for military purposes. For example, at the start of World War I, thousands of aircraft existed in Europe but only 23 were in the United States (Chambers 2014:1). The Secretary of the Smithsonian Institution, Charles D. Wolcott, encouraged Congress to create an agency devoted to research and design in aeronautics. In 1915, Congress attached a rider to the Naval Appropriations Act to create the Advisory Committee for Aeronautics, modeled after a similar committee in England. At the first meeting, the committee renamed itself the NACA (Chambers 2014:1; Rosholt 1966:20). The President appointed 12 members to the NACA, including members from the U.S. Army, U.S. Navy, the Smithsonian Institute, the National Bureau of Standards, and the Weather Bureau. The NACA reported directly to the President (Chambers 2014:1).

The NACA was allocated only $5,000 for its first year, which allowed it to hold occasional meetings and encourage research projects at some universities (Rosholt 1966:20). In 1916, the NACA proposed the need for a joint Army-Navy-NACA experimental field and aeronautical research laboratory and considered 15 potential sites for the new laboratory. In 1917, the War Department, acting on the NACA's recommendations, purchased more than 1,600 acres in Virginia and began construction of the first civilian research laboratory, the Langley Memorial Aeronautical Laboratory (Langley) (Chambers 2014:2).

As war approached in Europe, the importance of the NACA grew. The number of personnel increased from 130 in 1925, to 300 in 1935. In 1939, Congress authorized a second research laboratory and, in 1939, a new laboratory was established at Naval Air Station Sunnyvale (Moffett Field) in California, followed in 1942 by the Lewis Flight Propulsion Laboratory in Cleveland, Ohio (Rosholt 1966:21). The work performed at these facilities contributed greatly to the air success of the Allies during World War II, building on the aeronautical research done in the 1930s. During the war years, much of the NACA's work focused on perfecting and improving existing aircraft, based on information at the time. After the war, the NACA was able to redirect its focus on advancing aeronautical research, including speed, high altitudes, and jet and rocket engines (Rosholt 1966:21). To aid in this research, the NACA built the Pilotless Aircraft Research Station at Wallops Island, Virginia, in 1945. This new facility was used for launching rockets. In 1947, the High Speed Flight Station was established at Edwards Air Force Base in southern California (Rosholt 1966:21). Post-World War II research by the NACA contributed to the success of transonic and supersonic flight, particularly the flights of the X-I and the X-15 rocket research aircraft (Rosholt 1966:21). By 1957, nearly 50 percent of the NACA's work was devoted to space-related research.

In October 1957, Russia launched *Sputnik I*, the first artificial satellite to orbit Earth. In November of that year, Russia launched *Sputnik II*. In response, Congress held several hearings, centered on developing a space program. In July 1958, President Eisenhower signed the National Aeronautics and Space Act (Van Nimmen et al. 1976:3). This act created NASA and arranged for the transfer of personnel, functions, and facilities from the NACA to NASA.

NASA officially began functioning on October 1, 1958. In its infancy, NASA focused on organizing itself, building a national program out of several existing programs to create a fully integrated research and development agency. This reorganization included the transfer of the Advanced Research Projects

Agency (ARPA) from the U.S. Department of Defense (DOD) to NASA; creation of the International Geophysical Year Satellite program, Vanguard; and establishment of the Army-owned Jet Propulsion Laboratory, operated by the California Institute of Technology in Pasadena (Van Nimmen et al. 1976:4).

Project Mercury, NASA's manned space flight program, was the agency's top priority and, by 1959, it made significant progress in its effort to send the first American into space orbit. That same year, NASA worked on scientific investigations in space and launched eight scientific Earth satellites and two lunar probes. It also developed engines, including the F-1, constructed tracking networks, and continued aeronautical research programs started by the NACA (Rosholt 1966:77). In November 1959, DOD transferred its Saturn rocket booster program from the ARPA to NASA (Rosholt 1966:1144).

Under the Eisenhower administration, NASA's programs competed with many of the President's other long-range national programs. The administration viewed NASA's progress as adequate and determined that no "space race" was being waged against the Soviet Union. This changed with the election of President John F. Kennedy, who very much believed in the "space race" and that the United States was losing. He wanted the situation reversed (Rosholt 1966:183–184). After the Soviet Union successfully sent a cosmonaut into space on April 12, 1961, President Kennedy gave the directive that NASA was to put a man on the moon within the decade. This accelerated NASA's Apollo program and substantially increased NASA's budget to accomplish Kennedy's goal (Van Nimmen et al. 1976:4). It also increased NASA's personnel by 50 percent from early 1962 to the mid-1963. NASA hired nearly 18,000 new employees, mostly scientists, engineers, and aerospace professionals (Rosholt 1966:243–244).

In 1963, the successful Project Mercury was completed. All facilities and staff associated with the Mercury program turned their focus on the Gemini and Apollo programs (Rosholt 1966:247). During the early 1960s, NASA continued to make achievements in space science, research, and development.

ARC

In 1936, the Special Committee on the Relations of the NACA to National Defense in Time of War was established by the U.S., in anticipation of potential international hostilities. The committee recommended a second NACA aeronautical laboratory to supplement Langley, because of its vulnerability to attack and its need for expansion (Hartman 1970:5–9; Muenger 1985:3). Langley was quickly outgrowing its facilities, with a labor force that had grown from three employees in 1918 to almost 500 in 1938 (Muenger 1985:3). By late 1938, the NACA's Special Research Committee of Future Research Facilities was seeking a new site for the NACA's second aeronautical laboratory and recommended Moffett Field between Mountain View and Sunnyvale, California, as the preferred location to the NACA's governing Executive Committee. Shortly after, the NACA requested appropriations of $11 million for the new facility from Congress. Congress initially demurred from the appropriation request, but after persuasive arguments were delivered by NACA representatives George Lewis, Charles Abbott, and Charles Lindbergh, the bill for the second laboratory was passed on August 9, 1939. The NACA representatives' arguments were driven by their knowledge of German progress in aviation technology that was superior to U.S. research and development at the time (Hartman 1970:18).

The Moffett Field location was selected for several reasons, including the proximity of the site to the burgeoning aviation industry on the West Coast (Hartman 1970:20–21; Muenger 1985:4). Moffett Field was an operating airfield and military base under Army Air Corps command that had the advantages of good weather and limited air traffic. In addition, electrical power was an important consideration for the operation of wind tunnels and other facilities critical for experiments conducted in the aeronautical laboratory; Sunnyvale's new electric station was an important consideration in the siting process. The West Coast also had an expanding industrial sphere with connections to academic institutions, including the California Institute of Technology's Guggenheim Aeronautical Laboratory in Pasadena, with which the NACA had developed a rivalry (Muenger 1985:5).

In 1939, the NACA officially selected Moffett Field for its new site, and planning for new buildings and wind tunnels commenced with fervor at Langley. The Army leased 62 acres of the installation to the NACA in December 1939 (Hartman 1970:25). In addition, the NACA purchased 40 acres of adjacent, undeveloped agricultural lands from local farmers. The location had specific geographical issues, including a high water table and high potential for seismic activity that were taken into account in the design of the facilities. Smith DeFrance, the assistant chief of aerodynamics, led the design team from Langley, while Russell Robinson worked on-site to coordinate industry relations and oversee initial construction. The new laboratory was named the Ames Aeronautical Laboratory in April 1940, in honor of former NACA chairman and physicist Joseph S. Ames.

The NACA created its Western Coordination Office at Ames, led by Robinson, as liaison between the new laboratory and the military, the aviation industry, and academic institutions. Defense-related aeronautical research was in high demand, and the purpose of the new laboratory, particularly its proposed wind tunnels, was to lead or supplement military and industrial research. An important connection with nearby Stanford University had been developed previously, with Stanford faculty and graduates (including Robinson, William Durand, Elliott Reid, H. Julian Allen, and John Parsons working with the NACA and at Langley). The new Ames laboratory also focused on recruiting graduates from several other West Coast universities.

DeFrance led the design effort from Langley, while a contingent of Langley staff, including Parsons and Edward R. Sharp, made the move to California in late 1939 and early 1940 to lead the construction effort. Ground-breaking occurred on December 20, 1939. The first NACA building constructed in 1940 was a utilitarian building that served as the construction office. A research hangar, an electrical substation supplying 40,000 horsepower (approximately 30,000 kilowatts), two 7-by-10-foot wind tunnels, and a 16-foot wind tunnel were the first major facilities designed for the site. By August 1940, the Flight Research Building (Building N-210), containing the flight research engineering staff, an airplane hangar, and a maintenance shop was completed, and three wind tunnels were under construction. The construction effort lasted over a year at an urgent and anxious pace because of the onset of war in Europe, with the technical staff from the flight research engineering and theoretical aerodynamics departments involved in several aspects of the effort (Hartman 1970:32; Muenger 1985:16). The NACA named DeFrance as engineer-in-chief of the facility in June 1940.

In April 1941, the first 7-by-10-foot wind tunnel (Building N-215) started operating, followed by the second wind tunnel (Building N-216) (no longer extant) four months later. The scale of these tunnels was in high demand for both industry and military testing, which made it practical to build two identical tunnels. The tunnels functioned using models to test "for drag, lift lateral force, and pitch, yaw, and rolling moment," with airspeeds between 400 and 480 kilometers per hour (Muenger 1985:16). In October 1941, the high-speed 16-foot tunnel (Building N-218) started operating. The scale of this tunnel allowed for testing full-scale aircraft components at airspeeds up to 1,100 kilometers per hour. The experimental design of this tunnel, along with a similar 16-foot wind tunnel at Langley, was new and therefore required some adjustments to achieve its desired level of functionality (Hartman 1970:36).

As progress continued on the first three wind tunnels, DeFrance led the design of the world's largest low-speed wind tunnel for testing full-scale aircraft at Ames. DeFrance previously designed a 30-by-60-foot low-speed wind tunnel at Langley. The Pittsburgh–Des Moines Steel Company bid approximately $6 million to build the tunnel and, in March 1942, construction began on the 40-by-80-foot structure at Ames (Building N-221) (Muenger 1985:17). The 40-by-80-foot wind tunnel was not completed until June 1944, at which time the high-speed 1-by-3.5-foot wind tunnel (no longer extant) also was completed.

Initially, one research division was at Ames, the Research Division (Hartman 1970:40). Subdivisions took shape organically as facilities became available, centering around the wind tunnels and various research design issues. One research group focused on 7-by-10-foot wind tunnel research and one around 16-foot wind tunnel research; one concentrated on theoretical aerodynamics; and another dealt with small flight research. Staff and jobs often combined and separated on an improvisational basis as research groups were "shuffled for maximum efficiency," and "very loosely organized." This pattern of institutional fluidity would persist throughout Ames history under DeFrance's management (Muenger 1985:18–19).

After construction of the 40-by-80-foot wind tunnel, the topical division of aeronautical research at Ames branched into two major subsets: theoretical high-speed aerodynamics and applied research. The high-speed aerodynamics section, the Theoretical and Applied Research Division under Allen, concentrated its research on the 7-by-10-foot and the 16-foot wind tunnels and modeling. The applied research section, the Full-Scale and Flight Research Division under Parsons, used the 40-by-80-foot wind tunnel and full-scale aircraft. The symbiosis between theoretical and applied research sections became very important as research shifted to designing and testing for military needs during World War II.

When the United States entered World War II in December 1941, research at Ames immediately shifted to solving specific problems with military aircraft that were assigned by the NACA to its laboratories. This research included testing military aircraft prototypes, evaluating aerodynamics and handling, and refining designs for immediate application. One critical need was accelerating research into thermal methods for deicing aircraft. Deicing research had been conducted at Langley since the 1920s, and lead researcher Lewis A. Rodert continued his study on the subject at Ames. Between Rodert's work at Ames and in Minnesota, an applicable solution for deicing was developed, and airplanes immediately were fitted with the deicing technology, in effect solving the aircraft icing problem. Although unrelated to the wind tunnels, this was a major success for Ames and established its reputation for coordination and effectiveness within the aviation industry, the military, and the public (Hartman 1970:69–77; Muenger 1985:20–22).

The World War II period was significant in Ames's development and in the level of intensity of its research at the time. During the war, the wind tunnels were in high demand and in constant operation. Although Ames personnel had increased from 51 in September 1940 to 844 in August 1945, the facility still had a shortage of manpower, even with the Navy assigning 200 men from its V-12 college program to assist the laboratory (Muenger 1985:24).

Ames supported five wind tunnels at the end of World War II and, in light of the need for higher speed research, started design work on a 12-foot pressure tunnel and two new supersonic wind tunnels. Allen led the advanced planning and design of the 1-by-3-foot supersonic wind tunnels constructed between February and September 1945. The Navy also funded a larger 6-by-6-foot supersonic wind tunnel (Facility N226) that started construction in May 1945. The shift towards high-speed research resulted in a third main research division at Ames, the High-Speed Research Division. DeFrance appointed Allen to head the division, which centered on research conducted in the 1-by-3.5-foot wind tunnel, the two 1-by-3-foot tunnels, and the 6-by-6-foot supersonic tunnel.

In the post-war period, the government dedicated itself to maintaining the level of scientific and technological progress seen during World War II. As a result, Ames reverted to its progressive aeronautical research on a steady and encouraging platform of coordinated industrial and scientific interests and research efforts. In 1946, Robert Thomas (R.T.) Jones arrived at Ames from Langley. While at Langley, Jones produced the theory of sweepback to avoid high drag of straight wings at transonic speeds, but his findings were not publicized until they were confirmed by experimentation. At Ames, Jones continued to refine the narrow and swept-wing performance at supersonic and high-subsonic speeds (Vincenti 2001:145–149).

Under DeFrance's continued leadership, Ames's research organization remained somewhat nebulous, but new attempts were made to standardize operational practices and formalize the organizational structure, particularly as the aeronautical field grew and became more complex (Muenger 1985:58). The NACA became more geared towards collaboration with other agencies, the industry, and academic institutions for more unified research. In the late 1940s, the NACA spearheaded the Unitary Plan, to unify and coordinate research and development among the national stakeholders in aeronautical research (Hartman 1970:150–151).

The Unitary Plan Act was passed by Congress on October 27, 1949. The appropriations for the Unitary Plan allocated $136 million to each of the three NACA laboratories to build a supersonic wind tunnel (Launius et al. 2002:5). At Ames, the Unitary Plan Wind Tunnel complex was designed and under construction by 1950, at a cost of $27 million. Completed in 1956, the complex was powered by a new power plant that generated up to 240,000 horsepower to operate three wind tunnels (Butowsky 1984; Muenger 1985:54). For versatility, three tunnels were constructed—an 11-by-11-foot transonic, a 9-by-7-foot supersonic, and an 8-by-7-foot supersonic wind tunnel—with 20-foot valves connecting them (Butowsky 1984). The complex was in high demand from the industry, military, and university partners for the capabilities of the complex, including tests for Boeing and Douglas commercial airplanes and military airplanes (Butowsky 1984). Eventually in the 1960s and 1970s, the Unitary Plan Wind Tunnel complex was used to test almost all crewed space vehicles (Butowsky 1984).

In the 1950s, Ames continued to build off its wartime expansion, with double the staff and facilities at the end of World War II (Muenger 1985:47). However, compromises had to be made because of financial restrictions on the Ames operating and development budget. The early 1950s were a low point in the enthusiasm of the research facility, because of an excess of research obligations and limited funding for Ames-originated research, and because of a lack of funding for new facilities (Hartman 1970:175). The facility also was understaffed and the wind tunnels were underused, operating with a single shift instead of a double shift. The lack of availability created a backup of work and delayed development tests, requested by the aviation industry.

Despite the seeming slowdown of operations, the fields of transonic and supersonic flight were burgeoning, and the field of automatic control became a new challenge (Muenger 1985:65). Ames had been conceived more as a theoretical research laboratory than as a full-scale testing laboratory, but World War II had shifted the balance to applied research on actual aircraft. In the 1950s, the research direction at Ames included theoretical aerodynamics research, centered on the six transonic or supersonic wind tunnels under the High-Speed Research Division: the two 1-by-3-foot tunnels, the 1-by-3.5-foot tunnel, the 6-by-6-foot tunnel, the 10-by-14-inch hypersonic tunnel, and the free-flight tunnel (Muenger

1985:73). Research under both the high speed and full-scale divisions focused on fundamental research and specific industry concerns, most notably in sweptback wing design, remote control, and vertical and short take-off and landing. Also at this time, computer-based systems were being implemented.

One of the most significant research developments from this period was Allen's work on atmospheric reentry in the High-Speed Research Division. Allen developed a theory on blunt body heating that led to the discovery that blunt-nosed bodies, rather than conical-nosed bodies, dissipated heat more efficiently on reentry. This blunt-body concept had far-reaching implications for all vehicles reentering Earth's atmosphere and on space exploration (Vincenti et al. 2007:5–10).

In the 1950s, the Full-Scale and Flight Research Division also transformed under Harry Goett to include six research branches: flight operations, flight research, the 40-by-80-foot wind tunnel (N-221), the new 8-inch low-density tunnel, the new 10-inch by 10-inch heat-transfer tunnel, and dynamics analysis research (Muenger 1985:72). Research in the division took on vehicles at supersonic speeds, again supporting theoretical progress with applied experimentation. This division also laid the groundwork for developing flight simulators and computer-based modeling.

With construction of new tunnels in the mid-1950s, obsolete tunnels were closed, including replacement of the 1-by-3.5-foot supersonic tunnel with a new 2-by-2-foot transonic tunnel and the reduced operation of the original two 7-by-10-foot tunnels (Facilities N215 and N216). New facilities also were constructed to support the growing complexities of aerothermodynamics and hypervelocity ballistics research.

After Sputnik in 1957, the United States was propelled into the space age, and Ames along with the other NACA laboratories turned towards the technological challenges of space travel on the foundation of their long-standing aeronautical and aerodynamics research. The NACA sought to be the leader of the planned space agency, based on its dramatic discoveries and long-standing dedication to fundamental research, and as a service institution to serve industrial, military, and academic research, transitioning naturally to lead newly formed NASA in 1958 (Muenger 1985:81–83).

NASA began officially operating on October 1, 1958, and began restructuring its assets, including the NACA's former facilities. Ames, then NASA's Ames Research Center, continued its programs in applied research related to testing and improving aircraft in the early years of NASA, as NASA organized to address the unprecedented directive to achieve a lunar landing. The former NACA laboratory research programs remained relatively unchanged until the early 1960s, when NASA Headquarters restructured the organization of its field centers to report to Headquarters technical divisions, the Office of Advanced Research and Technology, the Office of Space Science and Applications, and the Office of Manned Space Flight. This reorganization divided Ames's research programs, thus loosening DeFrance's administration of the research center. At the same time, the space-related demands of NASA introduced new types of research to Ames, which as an aeronautical laboratory traditionally focused on the physical science and engineering of aviation research and initially resisted the new space research programs. In 1963, Ames started the real shift from aeronautical laboratory to an interdisciplinary research center with a focus on contracted project management for specific development needs. This shift due to national trends in research under NASA marked the end of Ames's identity as a research oasis organized around its specific research facilities (Hartman 1970:395–408).

Smith J. DeFrance

The establishment of Ames and its excellent reputation was largely thanks to DeFrance. DeFrance was involved with every step of planning the new laboratory, even before it was approved and funded by Congress. DeFrance was an important engineering designer and researcher and, beyond that, was a significant leader for Ames and its research community.

Born in Michigan in 1896, DeFrance trained as an aviator with the Canadian Flying Corps and then flew with the U.S. 139th Aero Squadron during World War I. He returned to Michigan to earn his degree in aeronautical engineering, and then was hired at Langley. At Langley, DeFrance was tasked with designing the 30-by-60-foot wind tunnel, the world's largest full-scale wind tunnel, to test entire airplanes. By 1939, he was the assistant chief of aerodynamics. He developed a reputation at Langley as "a fine engineer, a hard worker, and a thoroughly professional civil servant," and as a disciplined, highly efficient manager of resources (Muenger 1985:13). DeFrance enforced strict but high standards and gained widespread respect for his principles. DeFrance's design team operated from Langley, working on plans for several new NACA facilities.

DeFrance first was sent to Moffett Field to scope its appropriateness as the site for a second NACA laboratory. The NACA officially appointed DeFrance to be the engineer-in-charge of planning and design of the second NACA laboratory in June 1940. It was "considered a plum" to be chosen by DeFrance for design of the new laboratory because it generally implied a transfer to California, to be part of the new facility under DeFrance (Muenger 1985:11). The NACA gave DeFrance leeway to choose his staff for the new laboratory, among the engineers working with him at Langley (Muenger 1985:8). Although ground-breaking at Moffett Field occurred in December 1939, DeFrance stayed at Langley with a portion of his staff, to continue design on other NACA facilities while the remainder of his staff moved to California. DeFrance finally arrived at Ames in August 1940. DeFrance continued to plan and supervise construction of the Ames's wind tunnel complex, and his title was changed to Director in 1947.

DeFrance's distinctive personality and uncompromising attitudes were influential on the overall development of Ames culture. DeFrance fostered a sense of unity and higher purpose among the Ames staff, and he garnered respect for his strict standards and loyalty for his leadership. He was dedicated to excellence and frugality, and set high standards for the purpose, operation, and performance of the research laboratory. DeFrance adamantly sought the best personnel for the new laboratory and demanded professionalism, self-reliance, and self-motivation from them, but he also recognized his staff's achievements (Muenger 1985:13).

Despite his strictness in quality and professionalism, DeFrance also was responsible for the institutional culture of avoiding rigid organization and bureaucracy. He protected his staff from bureaucratic and organizational boundaries, allowing them to innovate and explore ideas without the distraction of excessive bureaucratic procedures (Hartman 1970:179–182). DeFrance supervised Ames's deicing research and design improvements on a wide variety of military aircraft during World War II and was involved in all aspects of activities at Ames. He had a reputation of outstanding integrity, demanding expectations, conscientiousness, and fairness (Muenger 1985:12–14). DeFrance set the standards of excellence that shaped Ames and endured beyond his retirement in 1965.

9. Major Bibliographical References

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Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____ previously determined eligible by the National Register
____ designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #__________
____ recorded by Historic American Engineering Record # __________
____ recorded by Historic American Landscape Survey # __________

Primary location of additional data:

____ State Historic Preservation Office
____ Other State agency
_X_ Federal agency
____ Local government
____ University
_X__ Other
Name of repository: NASA Headquarters, Washington, D.C.; NASA Ames Archives

10. Geographical Data

Acreage of Property Less than 1 acre

Latitude/Longitude Coordinates (decimal degrees)
Datum if other than WGS84:__________
(enter coordinates to 6 decimal places)

1. Latitude: 37.411983 Longitude: -122.062342

Verbal Boundary Description (Describe the boundaries of the property.)

The boundary for the Ames Administration Building is the footprint of Building N-200.

Boundary Justification (Explain why the boundaries were selected.)

The boundary is historically associated with the Ames Administration Building and excludes structures and buildings that are not directly associated with the executive offices of ARC. The boundary does not include the covered walkway located northeast of Building N-200, or Building N-201, which is a separate building,

11. Form Prepared By

name/title: Maria Katharina Meiser, Patricia Ambacher, and Madeline Bowen
organization: AECOM
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date: September 2016

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property:	Ames Administration Building
City or Vicinity:	Moffett Field
County:	Santa Clara
State:	California
Photographer:	Mark Bowen and Patricia Ambacher
Date Photographed:	December 8 and 9, 2014
Location of Original Digital Files:	AECOM, 401 W. A Street, Suite 1200, San Diego, CA 92101

Description of Photograph(s) and number, include description of view indicating direction of camera:

Photograph #1 (CA_Santa Clara County_Ames Administration Building_0001)
Main façade and entrance, south elevation, camera facing north.

Photograph #2 (CA_Santa Clara County_Ames Administration Building_0002)
Main façade, south elevation, camera facing northeast.

Photograph #3 (CA_Santa Clara County_Ames Administration Building_0003)
East elevation, camera facing northwest.

Photograph #4 (CA_Santa Clara County_Ames Administration Building_0004)
West elevation, camera facing northeast.

Photograph #5 (CA_Santa Clara County_Ames Administration Building_0005)
North elevation, western portion, camera facing west.

Photograph #6 (CA_Santa Clara County_Ames Administration Building_0006)
Rear elevator tower and accessible ramp addition, north elevation, camera facing east.

Photograph #7 (CA_Santa Clara County_Ames Administration Building_0007)
Interior lobby with remodeled interior finish.

Figure 1. Location Map

Latitude: 37.411983 Longitude: -122.062342

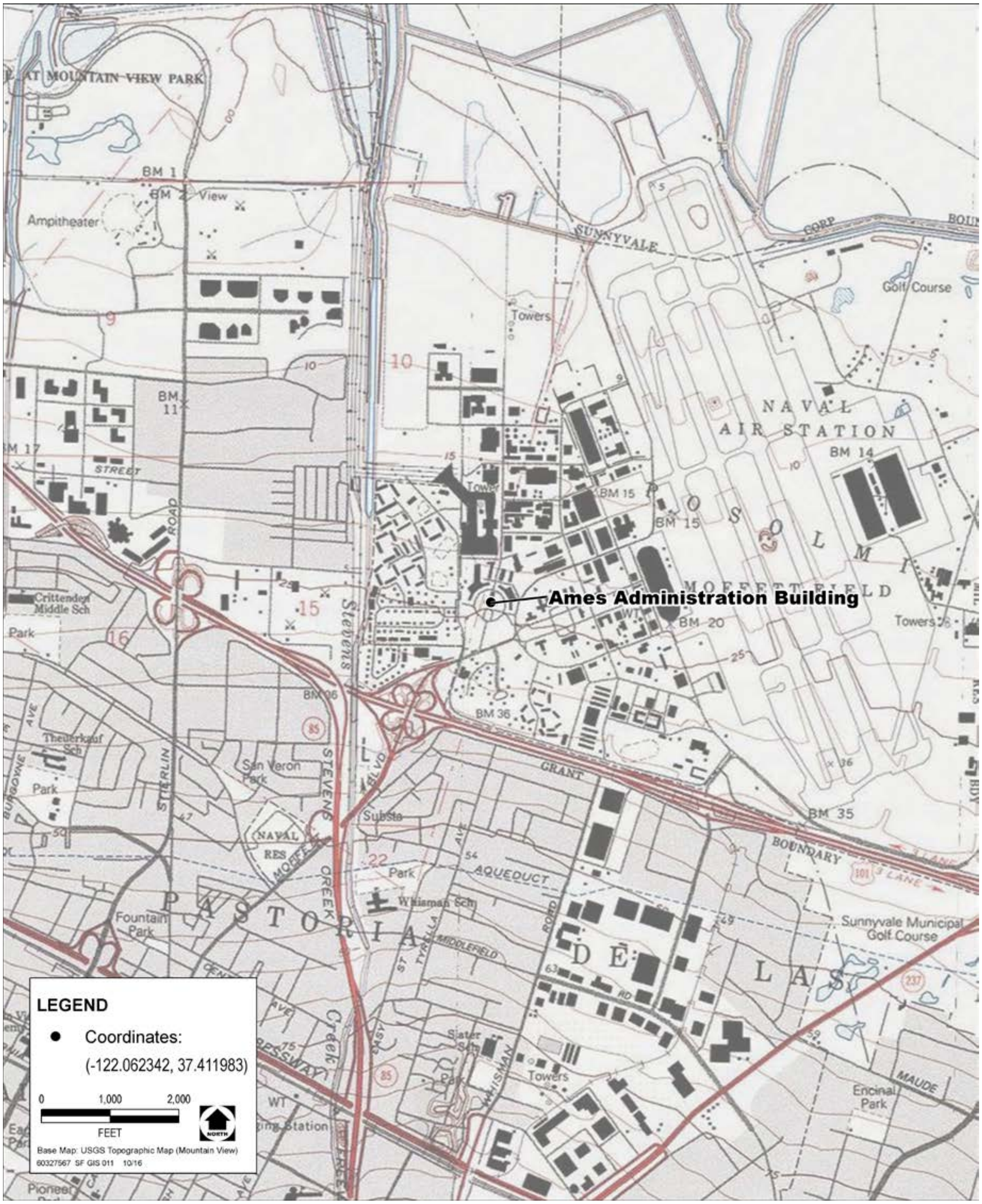

Figure 2. Boundary Map