

National Aeronautics and Space Administration



**Ames Research Center**  
Moffett Field, California 94035

May 30, 2018

Ms. Julianne Polanco  
State Historic Preservation Officer  
Office of Historic Preservation  
Department of Parks & Recreation  
1725 23rd Street, Suite 100  
Sacramento, CA 95816

Attn: Mr. Mark Beason

**Subject: Section 106 Consultation for Building N206A Roof Access Stair Project at Ames Research Center, Moffett Field, California**

Dear Ms. Polanco:

The National Aeronautics and Space Administration (NASA) requests initiation of consultation under Section 106 of the National Historic Preservation Act (NHPA) for the Building N206A Roof Access Stair Project (project or undertaking) located at Ames Research Center (ARC) at Moffett Field, California. NASA determined that this project constitutes an undertaking under the NHPA. NASA requests your review and consultation concerning the attached analysis of the project, including the project description, the delineation of the Area of Potential Effects (APE), identification efforts, and effects analysis for the project.

NASA proposes to remove and replace steps on the roof of Building N206A, an auxiliary building to the 12-foot Pressure Wind Tunnel, which is currently non-operational. The steps were installed in the mid-1990s as part of a renovation, and are not considered a historic feature of the building. The project would also extend the stairs to a new landing installed at the exterior of the building to access an existing opening in the second story.

For the purposes of this undertaking, one resource in the APE, Building N206A, is being treated as a historic property. Based on the analysis conducted by an architectural historian who meets the Secretary of the Interior's professional qualifications standards in architectural history and history, NASA has determined that the undertaking's impact would not constitute an adverse effect due to its minimal impact on the ability of the potential historic property to convey its historical associations.

NASA requests the State Historic Preservation Officer's (SHPO) concurrence on NASA's finding of No Adverse Effect related to this project, pursuant to 36 Code of Federal Regulations (CFR) 800.5(b). NASA requests the SHPO's response within 30 days of receipt of this letter, as specified in 36 CFR 800.5(c).

Please contact me at [jonathan.d.ikan@nasa.gov](mailto:jonathan.d.ikan@nasa.gov) or at (650) 604-6859 with your comments or questions.

Sincerely,



Jonathan Ikan  
Center Cultural Resources Manager



**cc:**  
HQ/EMD/Ms. Klein, Ph.D., RPA

**Enclosure**

Memorandum, prepared by AECOM, dated May 30, 2018.

## Memorandum

To	Jonathan Ikan, Cultural Resources Manager, National Aeronautics and Space Administration (NASA)	Page	1
Subject	Ames Research Center (ARC) Building N206A Roof Access Stairs Project		
From	Trina Meiser, Senior Architectural Historian		
Date	May 30, 2018		

AECOM prepared this memorandum in support of NASA's responsibilities under Section 106 of the National Historic Preservation Act (NHPA) for the Building N206A Roof Access Stair Project (project or undertaking) located at ARC, Moffett Field, Santa Clara County, California (**Attachment A, Figures 1 and 2**). This memorandum includes a description of the undertaking and the Area of Potential Effects (APE), the methodology used to identify and evaluate historic properties within the APE, a description of the affected historic properties, and an assessment of potential effects resulting from the undertaking. This analysis was conducted by Trina Meiser, M.A., Historic Preservation Planning, who meets the Secretary of the Interior's Professional Qualification Standards (36 Code of Federal Regulations [C.F.R.] Part 61) for history and architectural history.

### Description of the Undertaking

Building N206A is located along King Road in the NASA Ames Campus. Built in 1946, it is an auxiliary building of the 12-foot Pressure Wind Tunnel (N206). NASA proposes to remove existing wooden steps on the roof that traverse piping systems and replace them with a new, metal stair system that would also provide access to the interior of the building. The new metal stairs would extend to a new landing on the exterior of Building N206A that would access an existing opening. The project includes removal of the existing steps and installation of new stairs and landing, as shown and described in the drawings found in **Attachment B**.

### Area of Potential Effects

To address direct effects within the limits of staging and construction for the project, and potential indirect effects to the entire facility, including Buildings N206 and N206A, the APE encompasses the entire 12-foot Pressure Wind Tunnel facility, which is not located in the Ames Wind Tunnel Historic District (**Attachment A, Figures 3 and 4**). The project involves exterior alterations located on the roof at the rear of the eastern side of Building N206A, facing inward to the interior of the wind tunnel facility. It is unlikely that this undertaking would have indirect effects on other nearby significant buildings or resources, because the improvements would not be perceptible from outside of the wind tunnel facility.

### Identification of Historic Properties

The APE has been previously studied for cultural resources. Buildings N206 and N206A were evaluated in 2005 (Page and Turnbull 2006). The survey found that N206 was not eligible for the NRHP due to loss of integrity. However, Building N206A was found eligible as a potential contributor to a district that appears eligible for local listing or designation through survey evaluation (recorded as NRHP Code 5D3) (Page and Turnbull 2006). Department of Parks and Recreation (DPR) 523 Forms are included in **Attachment C**. AECOM revisited Buildings N206 and N206A on May 14, 2018, to observe the existing conditions of Buildings N206 and N206A and determine if any alterations had occurred since the previous recording. No major alterations were observed.

## *Building N206 – 12-foot Pressure Wind Tunnel*

Building N206 was originally built in 1946 as the 12-foot Low Turbulence Pressure Wind Tunnel (**Plate 1**).



**Plate 1. The original 12-foot Low Turbulence Wind Tunnel, 1946. (Source: Hartman 1970)**

The wind tunnel was completely reconstructed from 1991 to 1994 and opened in 1995. The facility consists of a main building attached to a steel, wind tunnel structure (**Plate 2**). The building has a two-story façade along King Road that contains the main entrance. The front of the building is rectangular, with a concrete foundation, flat roof, and flush, horizontal, panel siding. Fenestration includes a ribbon of windows in the second story. Behind the front section, a three-story, high-bay building section connects to the steel structure of the wind tunnel, and has a low-pitched side-gable roof and corrugated metal siding. The top story of the section has a window course. The wind tunnel is about 300 feet long by 100 feet wide, with a 12-foot test section and a maximum diameter of 68 feet. It is powered by a 15,000 horsepower motor, and supported by Building N206A, an auxiliary building originally constructed to contain air-handling equipment.

Beginning in 1946, the facility was extensively used to test models of most U.S. commercial aircraft, including the Boeing 737, 757 and 767; Lockheed L-1011; and McDonnell Douglas DC-9 and DC-10. The pressurized wind tunnel allowed for high-speed and controlled turbulence model testing, and became "one of Ames' workhorse wind tunnels"(NASA 1995). By 1986, the wind tunnel structure "began to exhibit serious fatigue after 41 years of service" and developed cracks that reduced its pressurization capacity (NASA 1995). The wind tunnel was subsequently removed, and a new 12-foot pressurized wind tunnel with a closed-loop pressure vessel and an innovative air lock system was completed in November 1994. The new tunnel was designed to test aircraft models at airspeeds up to Mach 0.61 and up to six atmospheres of pressure, and was the only large-scale, pressurized, low turbulence, subsonic wind tunnel in the United States. It provided unique testing capabilities for the development of high-lift systems on commercial transport and military aircraft. The facility stopped

functioning as a wind tunnel in 2000, but was used for model preparation. The wind tunnel was officially closed in 2003 due to budgetary constraints, and has not operated as a wind tunnel since.

Although Building N206 is a unique facility that provided specific capabilities for research and development, it was substantially rebuilt in the 1990s, which compromised its historic integrity and, therefore, its NRHP eligibility, as either an individual resource or as a potential contributing resource to the Ames Wind Tunnel Historic District or an alternative historic district potentially based on unified architectural design on the Ames campus. It has not achieved exceptional significance since it reopened in 1995 and closed again in 2003. Although in future it may meet NRHP criteria, it does not currently exhibit exceptional significance under the NRHP criteria. It was not included in the Ames Wind Tunnel Historic District (listed January 2017) because of its lack of association and integrity within the period of significance of the district (1939-2011).



**Plate 2: Building N206, the 12-foot Pressure Wind Tunnel, view facing southeast.**

### *Building N206A – 12-foot Pressure Wind Tunnel Auxiliary Building*

Building N206A (**Plate 3**) is a two-story reinforced concrete building with a concrete foundation and a flat roof. The building has a rectangular plan with a square tower at the southeast corner that attaches to the 12-foot Pressure Wind Tunnel. The building, like others dating from the mid-20th century at Ames, exhibits Moderne architectural style influences. The exterior walls have scored horizontal bands and symmetrical and banded fenestration. Fenestration includes operable, multi-lite wood windows and metal louvered vents. The entrance to the building is on the east side facing the wind tunnel.

Built in 1946 as an auxiliary building for the 12-foot Low Turbulence Wind Tunnel, Building N206A contained the air-handling equipment for the wind tunnel, including pumps, air coolers, dehumidifiers, and electric motors (Hartman 1970) (**Plate 4**). The building was extensively renovated in the 1990s as

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part of the reconstruction of Building N206, but exterior features of the building remained relatively unchanged.

Building N206A was previously evaluated as an eligible resource through survey of the Ames campus in 2005 (Page and Turnbull 2006). The previous evaluation found that Building N206A was significant for its association with the 12-foot Pressure Wind Tunnel and as one of several research and support buildings built by the National Advisory Committee for Aeronautics (NACA) at Ames between 1940 and 1958 that expressed industrial, Moderne architectural details. It was identified as a possible contributor to a historic district based on these architectural qualities (Page and Turnbull 2006).

Due to loss of integrity, Building N206 is not eligible for the NRHP (Page and Turnbull 2006), and Building N206A, which was constructed as an auxiliary structure to Building N206, does not possess independent significance related to events, themes, or patterns in history. Although Building N206A is an original feature of the 12-foot Pressure Wind Tunnel facility, its integrity related to its associations with scientific research and development was compromised by the reconstruction of the wind tunnel in the 1990s. Although Building N206A may share the significance of the Ames Wind Tunnel Historic District and dates to the district's period of significance, it was not listed as a contributor to the district due to the lack of integrity of the 12-foot Pressure Wind Tunnel facility, as a whole. Building N206A is not significant under Criterion A.

Several NACA engineers contributed to the design of the original 12-foot Low Turbulence Pressure Wind Tunnel in the late 1930s and 1940s, but Carlton Bioletti, who was among the first NACA engineers to arrive at Ames when it was established in 1939, is credited with the overall design of the wind tunnel (Hartman 1970). However, Bioletti's contributions were lost when the wind tunnel was rebuilt in the 1990s. The original main office building section of N206 and N206A used the standard office building façade aesthetic used throughout the early Ames campus, and is not attributable to a specific designer. The enormous body of work conducted within the wind tunnel throughout its history is not specifically associated with important individuals. Building N206A is not significant under Criterion B.

Building N206A exhibits some of the Moderne architectural details that are characteristic of the Ames campus, including smooth and scored concrete exterior siding, rectilinear configurations, industrial windows, flat roofs, and horizontality. While not eligible for individual listing in the NRHP, Building N206A was identified for its contextual value in a potential historic district (Page and Turnbull 2006). To date, no historic district has been identified and evaluated, and it is beyond the scope of this evaluation to make an assessment of a potential historic district. Therefore, for the purposes of this undertaking, Building N206A will be treated as potentially eligible as a contributor to an as-yet unidentified historic district within Ames campus that would be unified by exterior Moderne architectural features and potentially eligible under Criterion C.

Building N206A is well documented and is unlikely to yield additional information important to history or prehistory. It is not eligible under Criterion D.

As an auxiliary structure of the 12-foot Pressure Wind Tunnel facility, Building N206A lost integrity when the original wind tunnel was replaced. It retains integrity of location and setting, and to some extent, design, materials, workmanship, feeling, and association. It remains an auxiliary building to a wind tunnel within the Ames campus, and retains the exterior architectural features that may make it a potential contributor to a historic district.

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Plate 3. Building N206A and the 12-foot Pressure Wind Tunnel (left), view facing south.

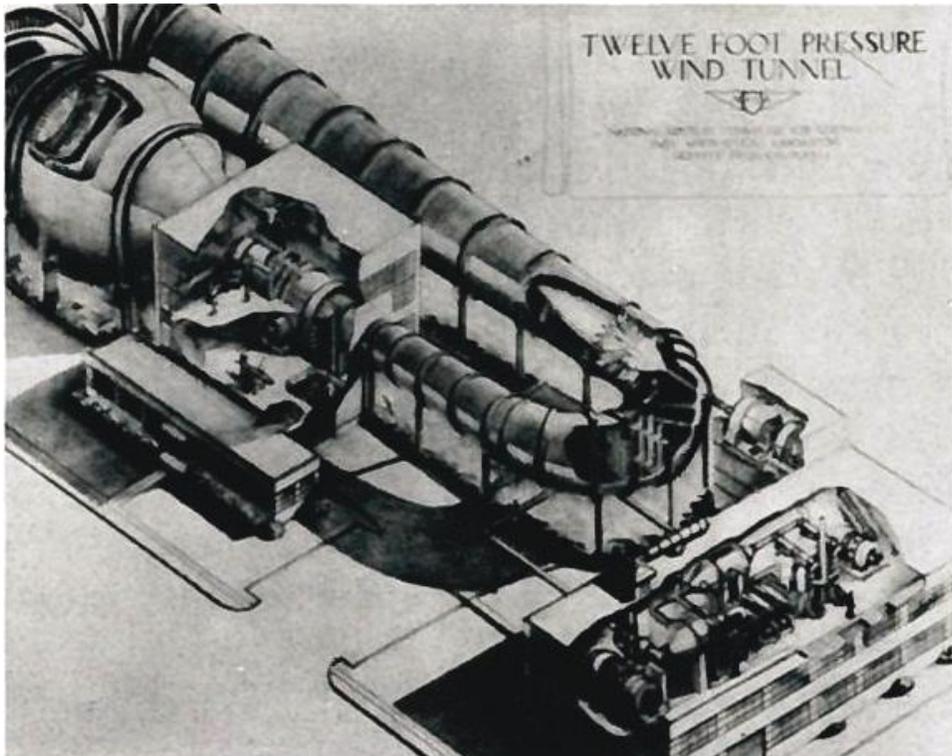


Plate 4. Cutaway drawing, Building N206A at bottom right. (Source: Hartman 1970)

## Affected Historic Properties

For the purposes of this undertaking, Building N206A will be considered an eligible resource, as a potential contributor to an as-yet unidentified historic district within Ames campus that is significant under Criterion C for its Moderne architectural features. As identified in the 2005 survey (Page and Turnbull 2006), contributing features include:

“the concrete bands that articulate the first and second floors; the tripartite scoring at the concrete piers that align with the window mullions; the grouped, industrial style windows that form a consistent window plane; and the concrete canopies with rounded corners. The concrete banding that wraps around the buildings articulates a definite horizontality, a common language to Moderne and International style buildings. The buildings are expressed in concrete with a durable and solid nature, yet also portray an airy feel with the industrial ribbon windows.”

Character-defining features of the potential district exhibited in Building N206A include its rectilinear form, flat roof, industrial windows, concrete bands, and decorative scoring.

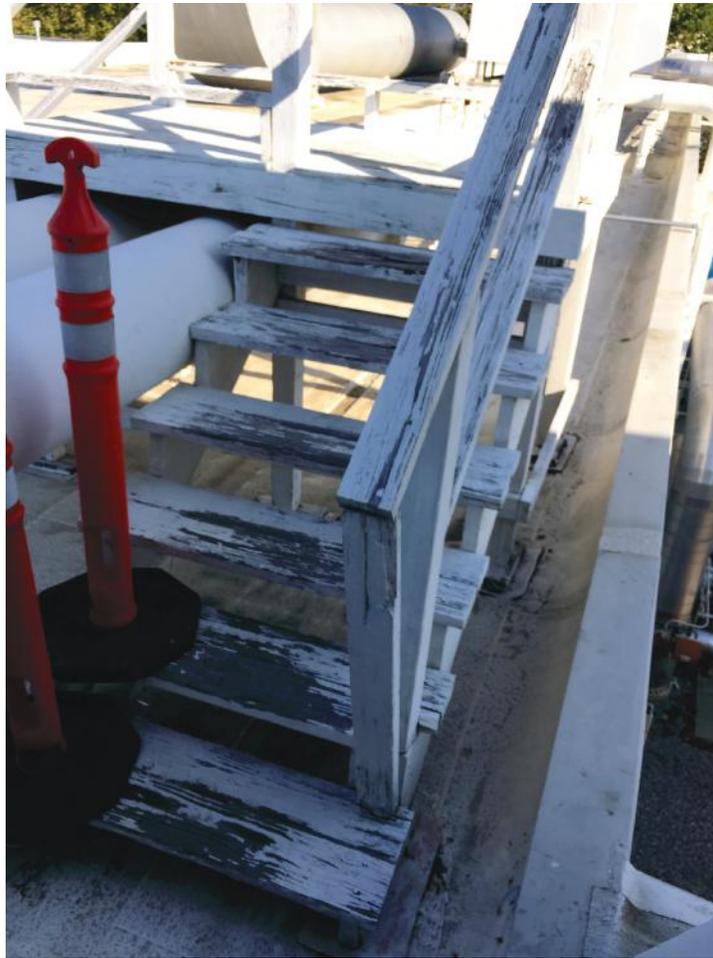
The existing wooden steps that would be replaced as a result of this project are located atop the roof of Building N206A towards the rear of the building (**Plates 5 through 7**). These steps were added to the building in the 1990s as part of the wind tunnel reconstruction. The project would also extend the stairs to allow direct access to the interior of the building through an existing opening in the southeast tower in the second story.



**Plate 5. Building N206A, view facing southwest, arrow indicates existing stair to be removed.**



**Plate 6. Existing stair to be removed.**



**Plate 7. Existing stair to be removed, terminates along the eastern edge of the roof.**

### **Assessment of Effects**

The Criteria of Adverse Effect pursuant to 36 C.F.R. 800.5(a)(1) are applied to assess effects of the undertaking on historic properties within the APE:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

Several examples of adverse effects are listed in 36 C.F.R. 800.5(a)(2). The following assessment examines the undertaking under each of those examples, including an analysis of compliance with the Secretary of the Interior's Standards for Rehabilitation (Standards) (36 C.F.R. Part 68).

***(i) Physical destruction of or damage to all or part of the property***

By virtue of the necessity to replace the existing steps, the project would remove the existing steps. Installation of the new stairs would require drilling into the side wall of the building to secure anchors for the stairs and exterior landing. These changes to historic materials would be minimal.

***(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 C.F.R. part 68) and applicable guidelines***

With the SHPO's agreement, if a property is restored, rehabilitated, repaired, maintained, stabilized, remediated, or otherwise changed in accordance with the Standards, then it will not be considered an adverse effect. The following is an assessment of the undertaking for compliance with the Standards and guidelines (NPS 2017).

1. *A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces and spatial relationships.*

The project would have no change on the use of the building.

2. *The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.*

The project would not change the historic character of the potential historic property. The existing steps are not a distinctive feature of the facility, and their removal and replacement would not impair the building's ability to convey its potential significance. No significant materials, spaces or spatial relationships of the potential historic property would be modified as a result of this project.

3. *Each property will be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.*

Not applicable.

4. *Changes to a property that have acquired historic significance in their own right will be retained and preserved.*

Not applicable.

5. *Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.*

The existing steps that would be removed are not original, distinctive, or character-defining.

6. *Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.*

The existing steps are not historic features.

7. *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.*

Not applicable.

8. *Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.*

Not applicable.

9. *New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.*

This project proposes to install new stairs that would be compatible with the existing facility in materials and design. Installation of the new stairs and roof access would require drilling into the exterior wall to secure the new system. The changes would be minimal and would not compromise the integrity of the historic materials (concrete exterior wall). Also, the new stair system would be located in a discreet corner of the facility.

10. *New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.*

Installation of the new stairs and roof access would be permanent, but the scale of the change is minor in comparison with the essential form of the potential historic property and its environment. The installation of the stairway would have minimal structural and visual intrusion on the building, and its removal would have a similarly minimal effect.

In summary, the project meets the Standards, as it proposes to remove a non-significant, non-character-defining feature of the building and to install a compatible feature that would have minimal physical or visual intrusion on the building. The impact of this project would be negligible on the essential form and integrity of the building.

***(iii) Removal of the property from its historic location***

Not applicable.

***(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance***

Not applicable.

***(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features***

The installation of the new stair system would be located in a visually discreet area of the facility, and is compatible with the industrial nature of the building.

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***(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization***

Not applicable.

***(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance***

Not applicable.

## **Conclusion**

Based on this analysis, the project would conform to the Standards and does not present other potential adverse effects or meet the Criteria of Adverse Effects. The undertaking as proposed would result in No Adverse Effect on Building N206A, a potential historic property in the APE.

## **References**

NASA. 1995. "Refurbished Wind Tunnel to Open at Ames Research Center." Press Release 95-143, dated August 21, 1995. Available at <https://www.nasa.gov/home/hqnews/1995/95-143.txt>.

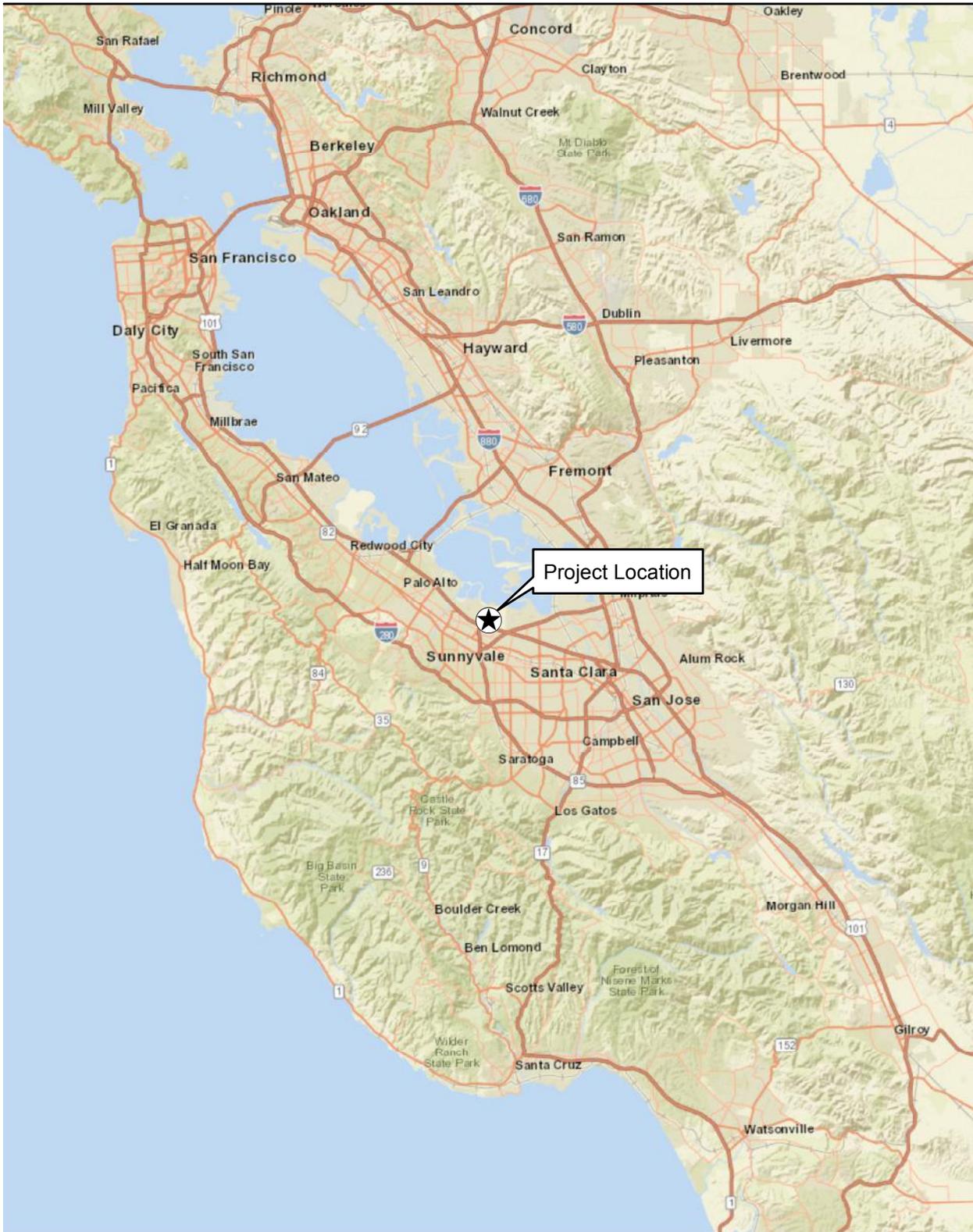
NPS (National Park Service). 2017 (revised). *The Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings*.

Page and Turnbull, Inc. 2006. *NASA Ames Research Center, Moffett Field, California, Survey and Rehabilitation Recommendations*. On file at NASA Ames Research Center.

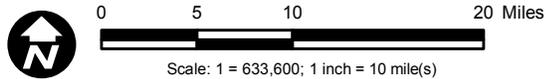
## Attachments

- A. Figures
- B. Architectural Drawings (AECOM 2018)
- C. DPR 523 Forms

**ATTACHMENT A**  
**FIGURES**



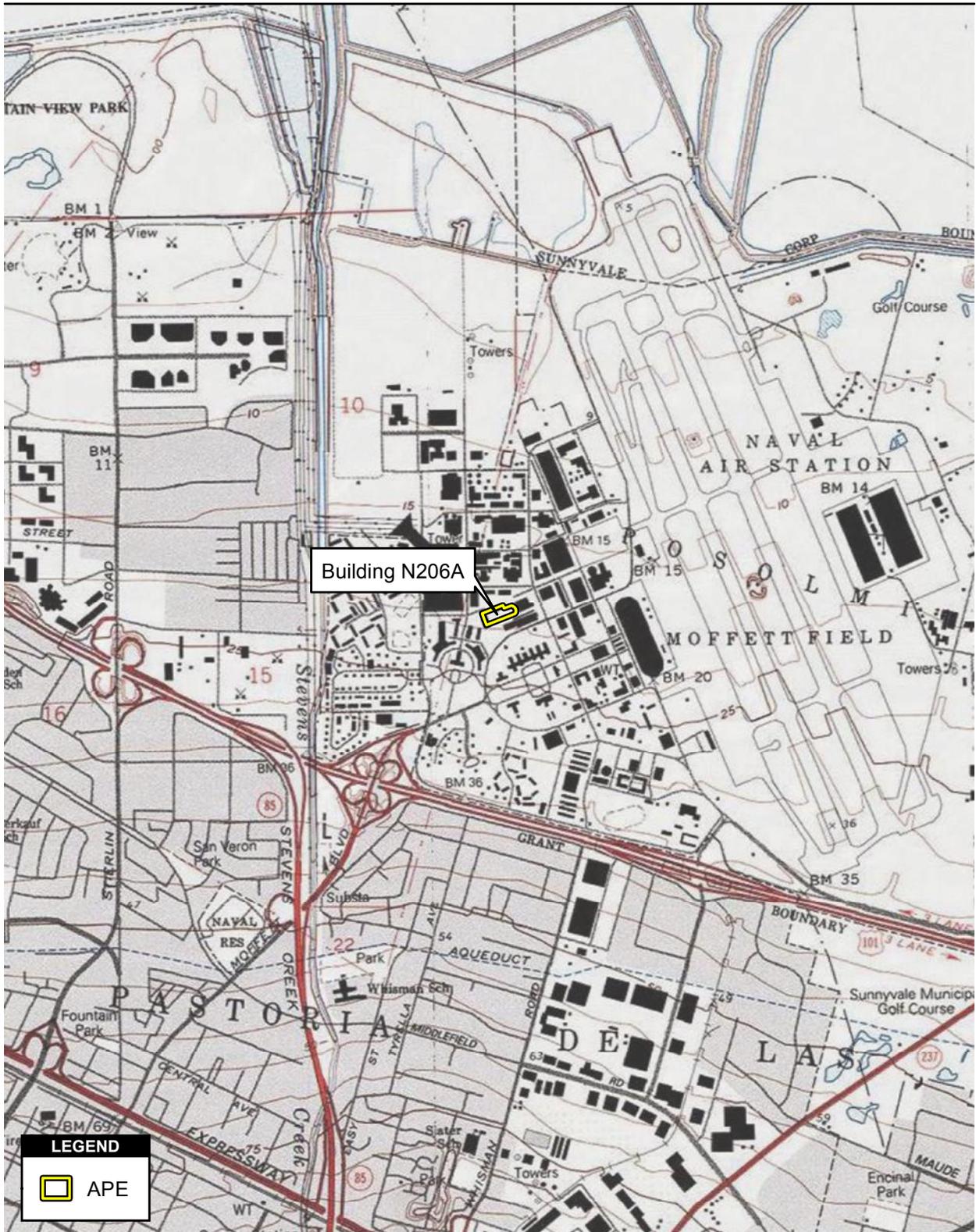
Source: ESRI, AECOM, NASA



**Figure 1**  
**Project Location**

**Building N206A Roof Stair Access Project**

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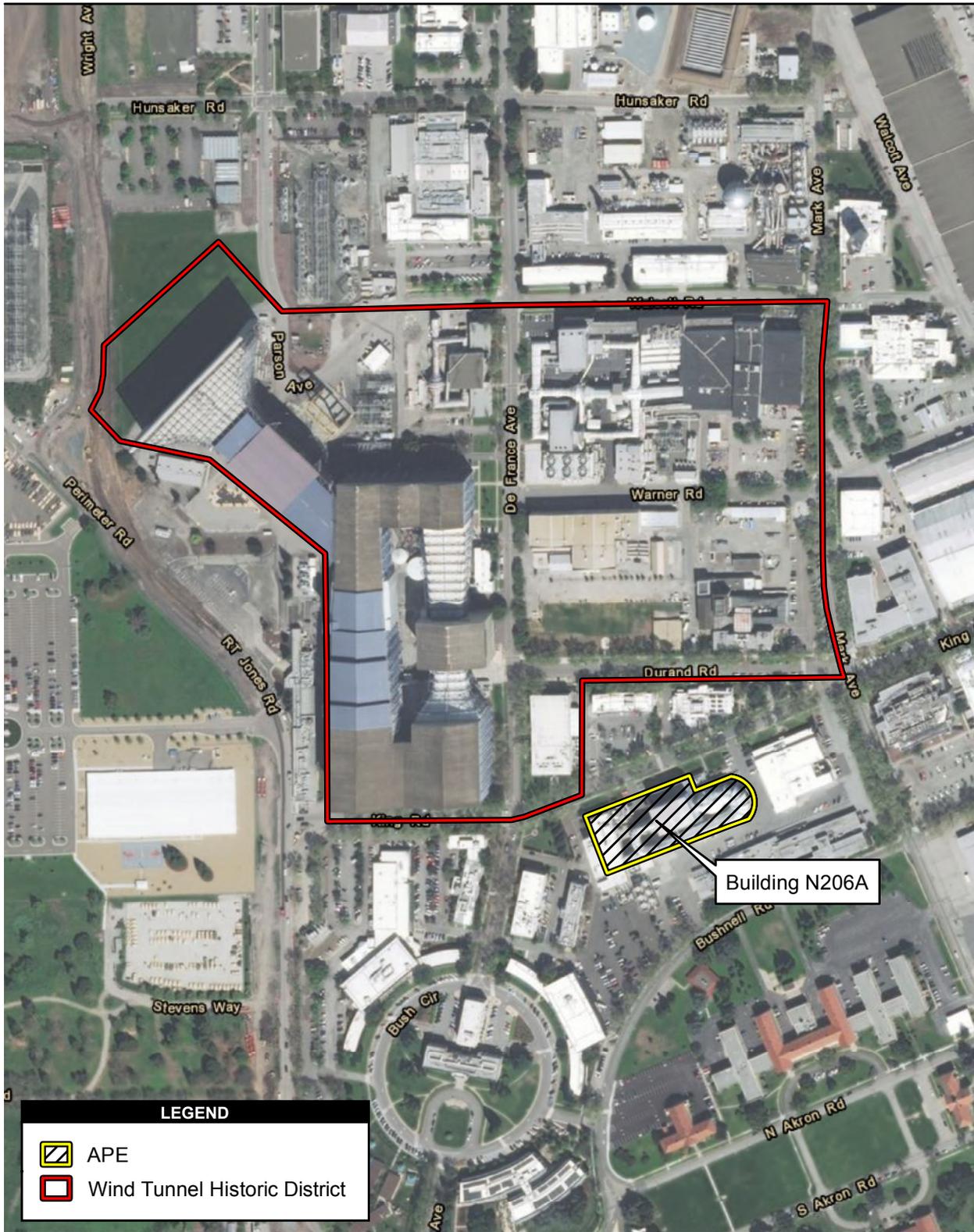
Source: ESRI, AECOM, NASA, National Geographic Society; USGS 7.5' Topographic Quadrangle: Mountain View



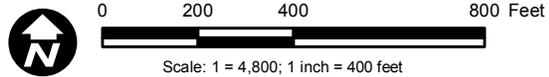
**Figure 2**  
**APE Map**

**Building N206A Roof Stair Access Project**

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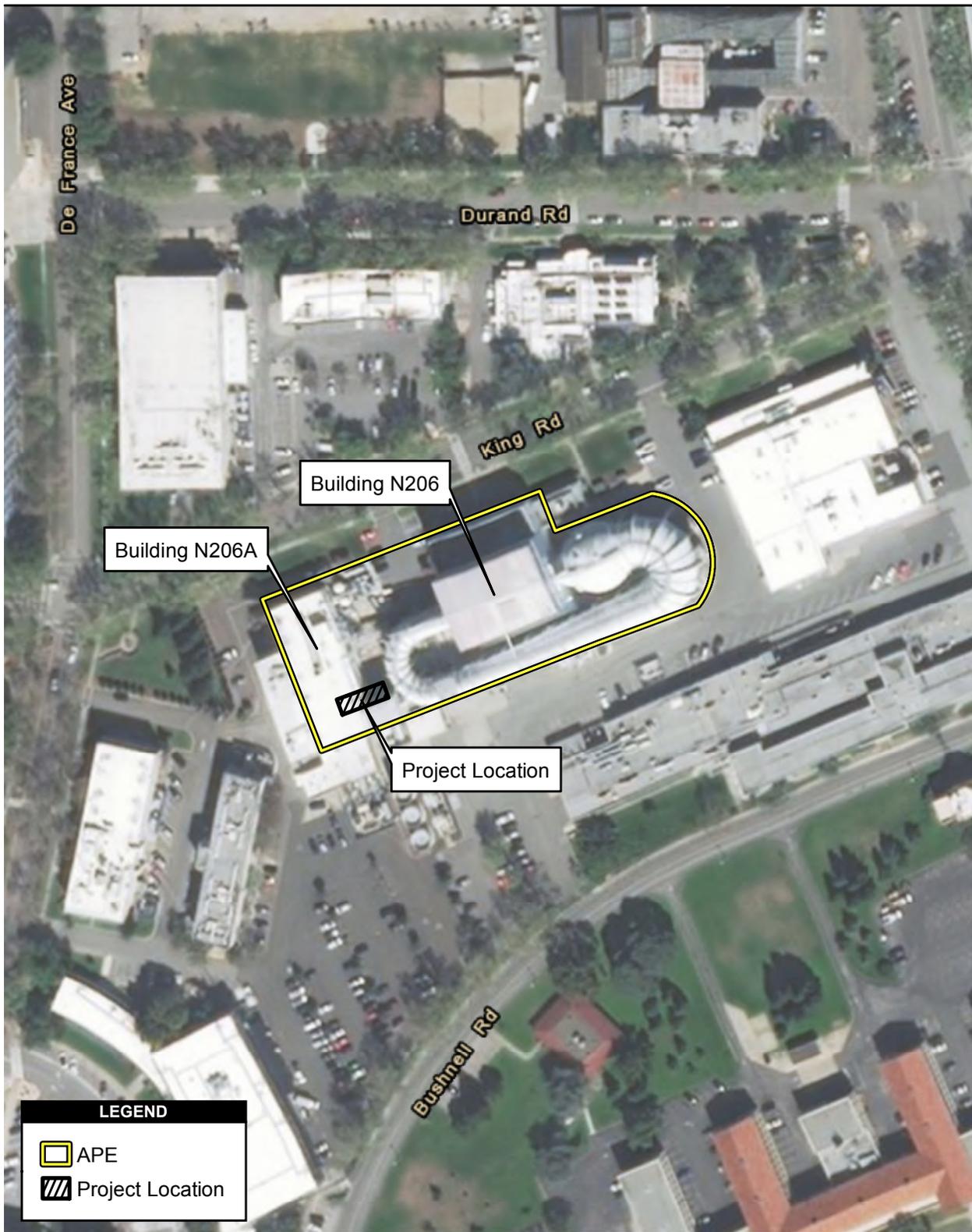
Source: ESRI, AECOM, NASA, United States Department of the Interior National Park Service



**Figure 3**  
**Wind Tunnel Historic District**

**Building N206A Roof Stair Access Project**

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Source: ESRI, AECOM, NASA

**Figure 4**  
**Building N206A APE**

**Building N206A Roof Stair Access Project**

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**The following content was redacted from this public posting:**

Attachment B. Architectural Drawings  
Attachment C: DPR 523 Forms