Hangar 1 Rehabilitation Project
Consulting Parties Presentation

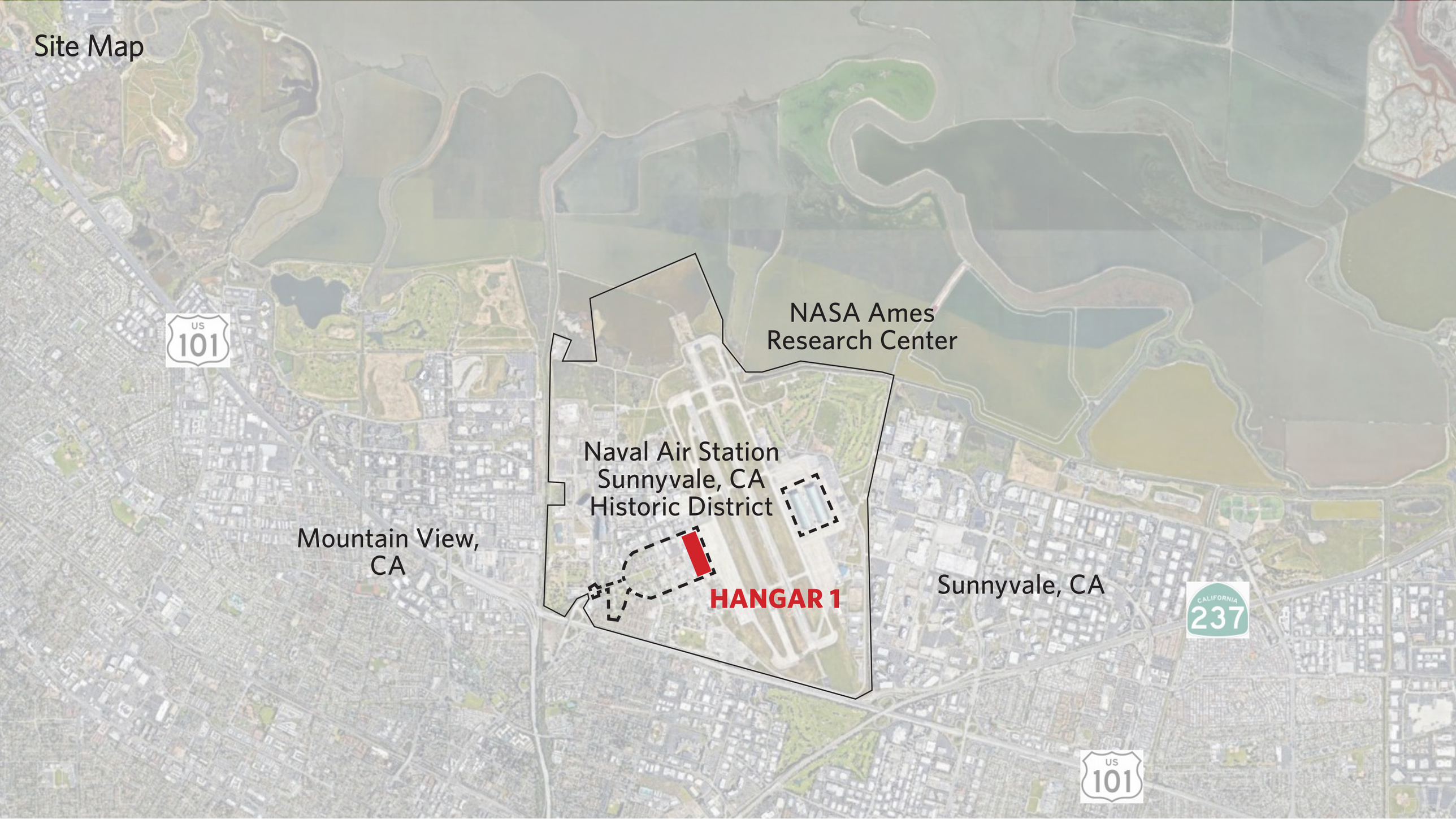
June 3, 2020

Hangar 1 Rehabilitation Project, Consulting Parties Presentation Agenda

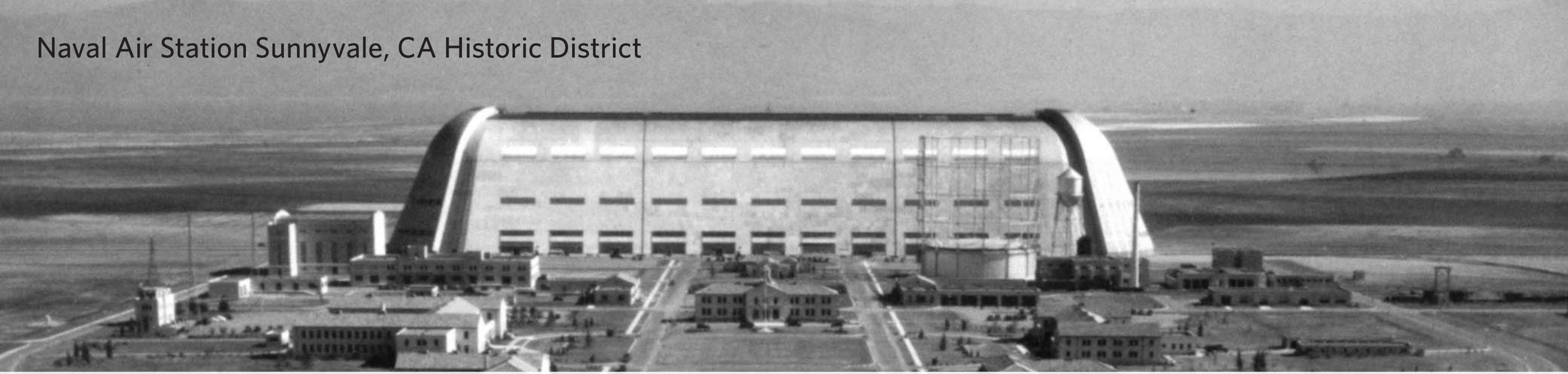
- Consulting Parties Presentation Intro
- Rehabilitation Project Introduction
- Rehabilitation Approach and Goals
- Exterior Reclad Approach, Shenandoah Plaza
- Exterior Reclad Approach, Airfield
- Interior Rehabilitation Approach
- Interior Illumination Rehabilitation Approach
- Building Performance: Daylighting and Glare
- Comparative Images: Historic and Proposed
- Comments and Questions

Project Introduction

Site Map

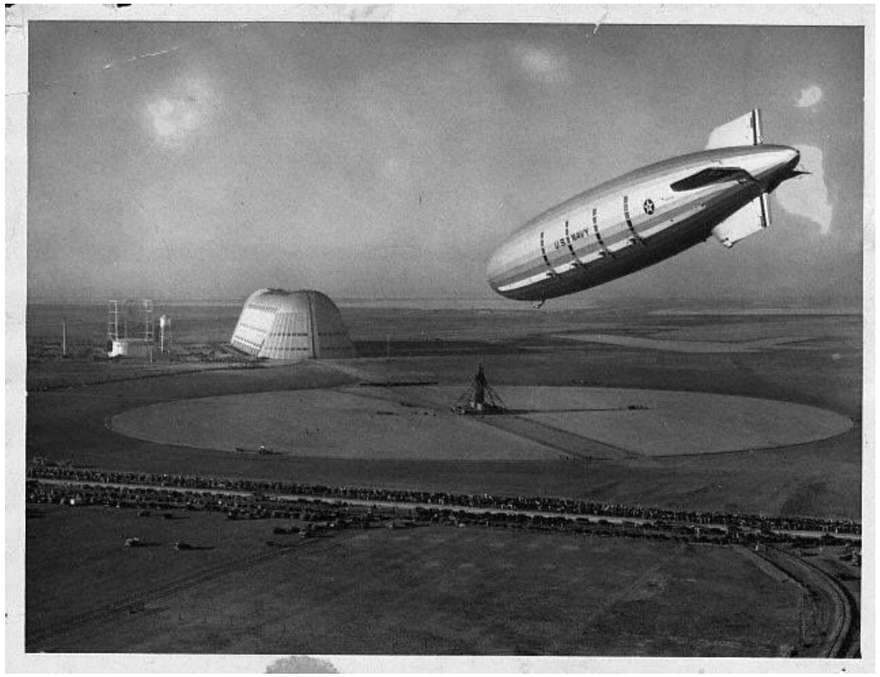

US 101
NASA Ames Research Center
Naval Air Station Sunnyvale, CA Historic District
Mountain View, CA
HANGAR 1
Sunnyvale, CA
CALIFORNIA 237
US 101

Naval Air Station Sunnyvale, CA Historic District

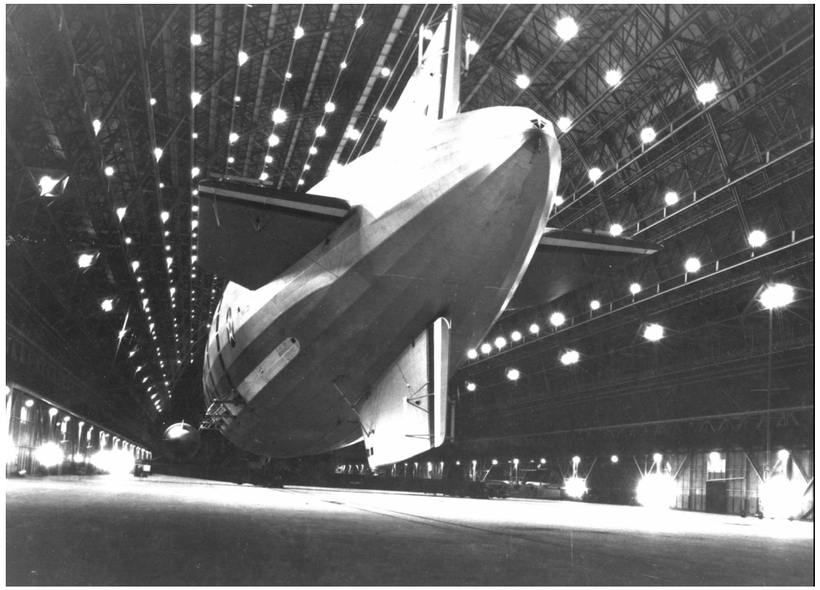


- **Listed in the NRHP 1994**
- **Listing includes Shenandoah Plaza Campus and Hangars 1-3**
- **Expanded District boundary, 2013**

Hangar 1, Buildings 032 and 033



- **Hangar 1: 1933**
- **Buildings 032 and 033: 1934**



Hangar 1 Rehabilitation Approach and Goals

Project Scope / Areas of Consideration

Secretary of the Interiors Standards Conformance

Hangar 1

- **Abatement**
- **Seismic strengthening**
- **Re-clad**
- **Interior Improvements**
- **Infrastructure Improvements and Limited Site Work**

B032 and 033

- **Repair and Maintenance**

Abatement

Structural Strengthening Approach

Intent: The design intent is to maintain loads that were historically present.

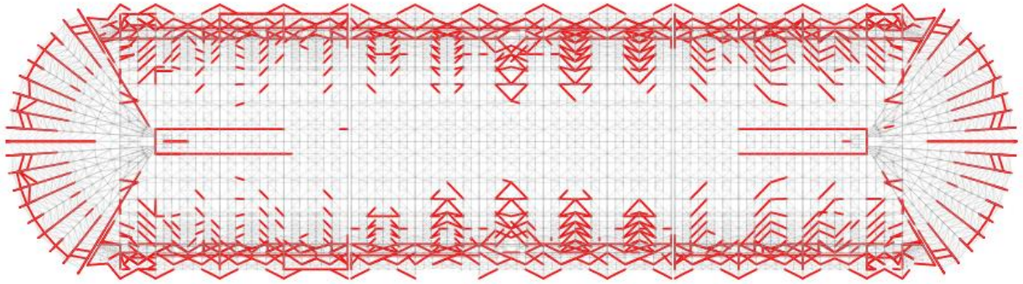
Structural condition assessment: Where no distress is evident and if the dead and live loads will not exceed those historically present, the structure may be deemed adequate.

Proposed rehabilitation action: Where loads exceed those historically present the provisions of CEBC Section 403 for Alterations would apply.

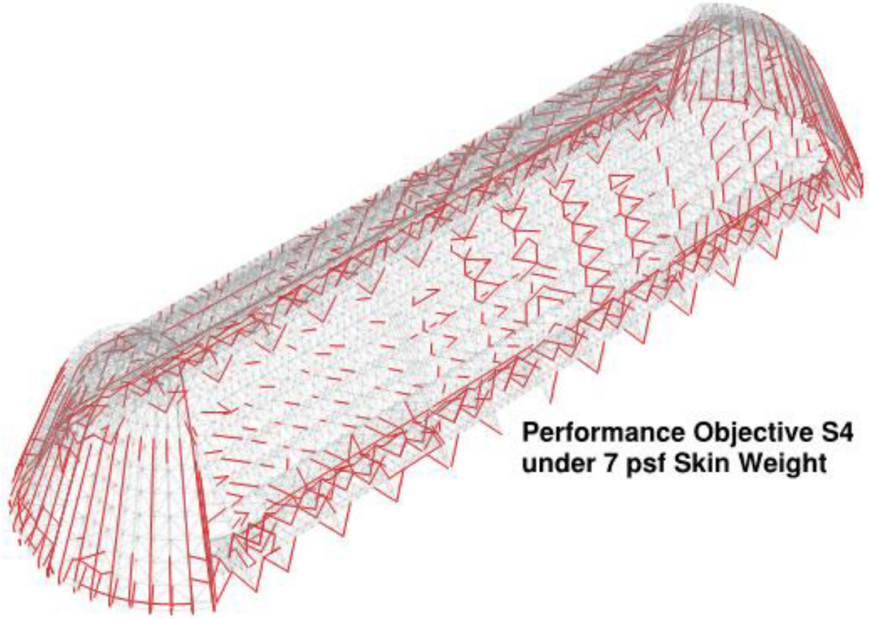
estimated number of members to be strengthened:
approximately 4,200 out of 56,500

projected percentage of members to be strengthened:
>1%

Typical Original V-Beam Horizontal Joint



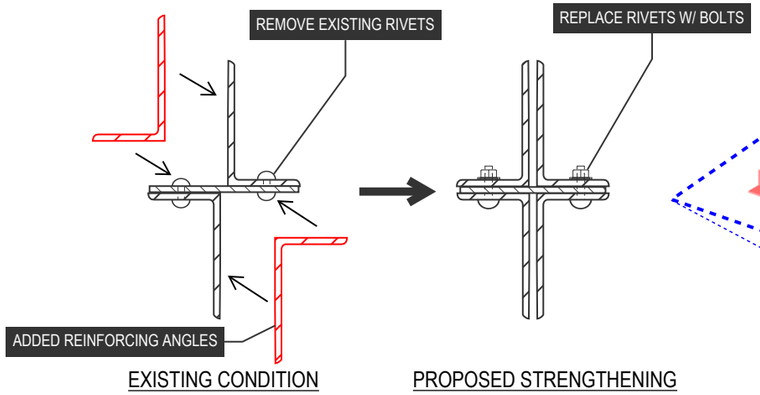
Performance Objective S4 under 7 psf Skin Weight

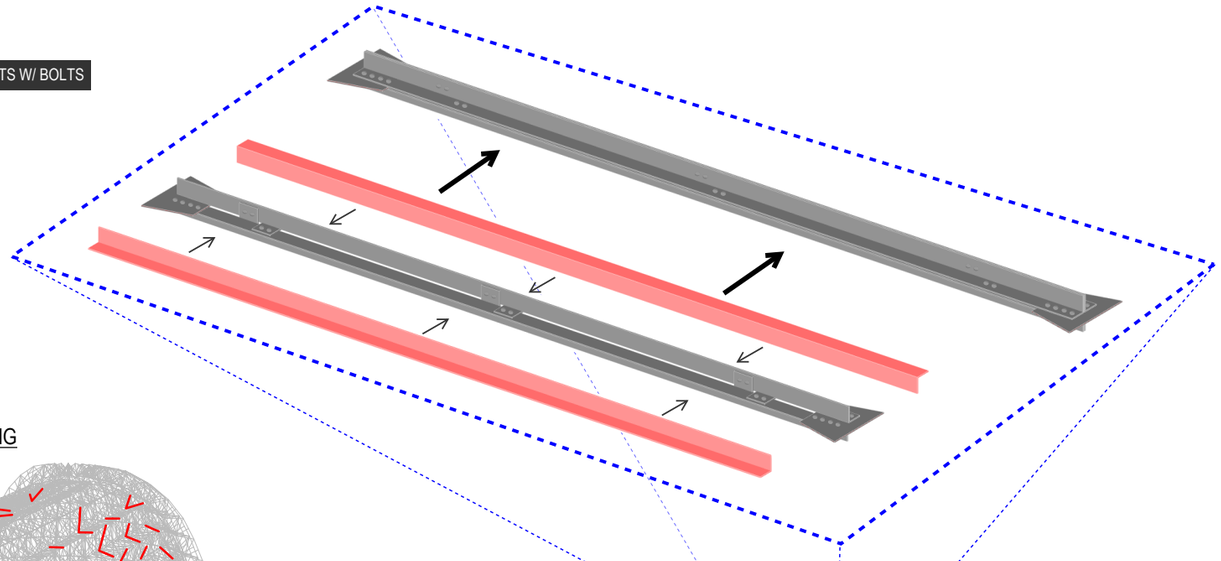


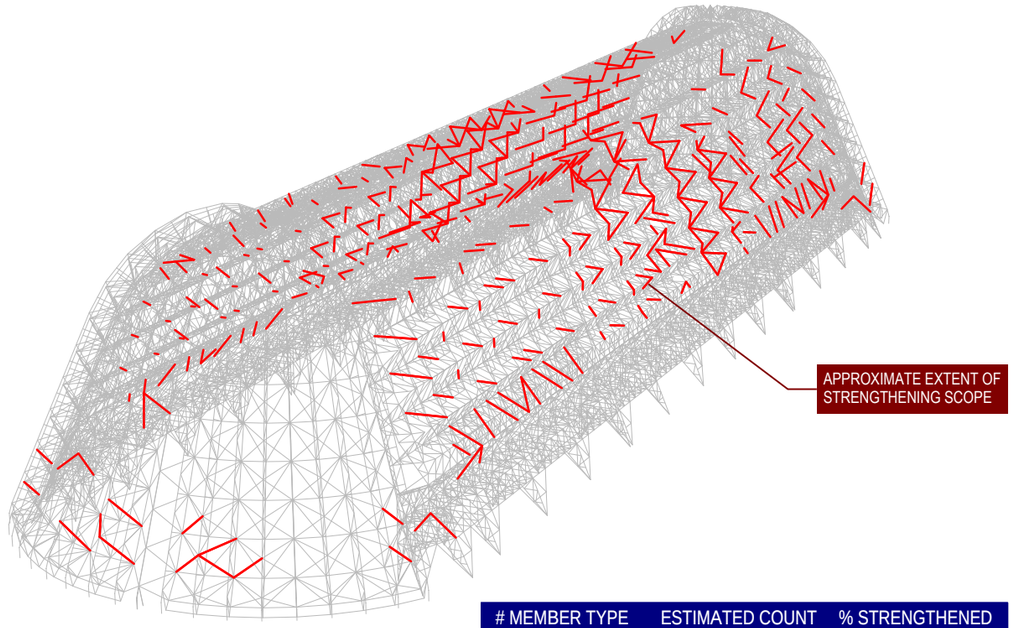
Performance Objective S4 under 7 psf Skin Weight

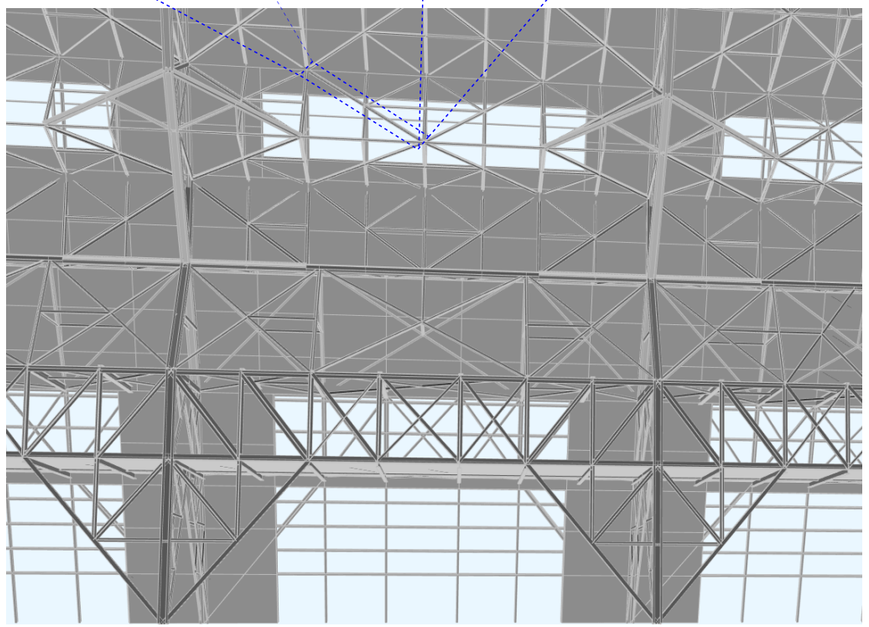
Proposed Typical Strengthening Detail: Double Angle

CONCEPTUAL STRUCTURAL STRENGTHENING



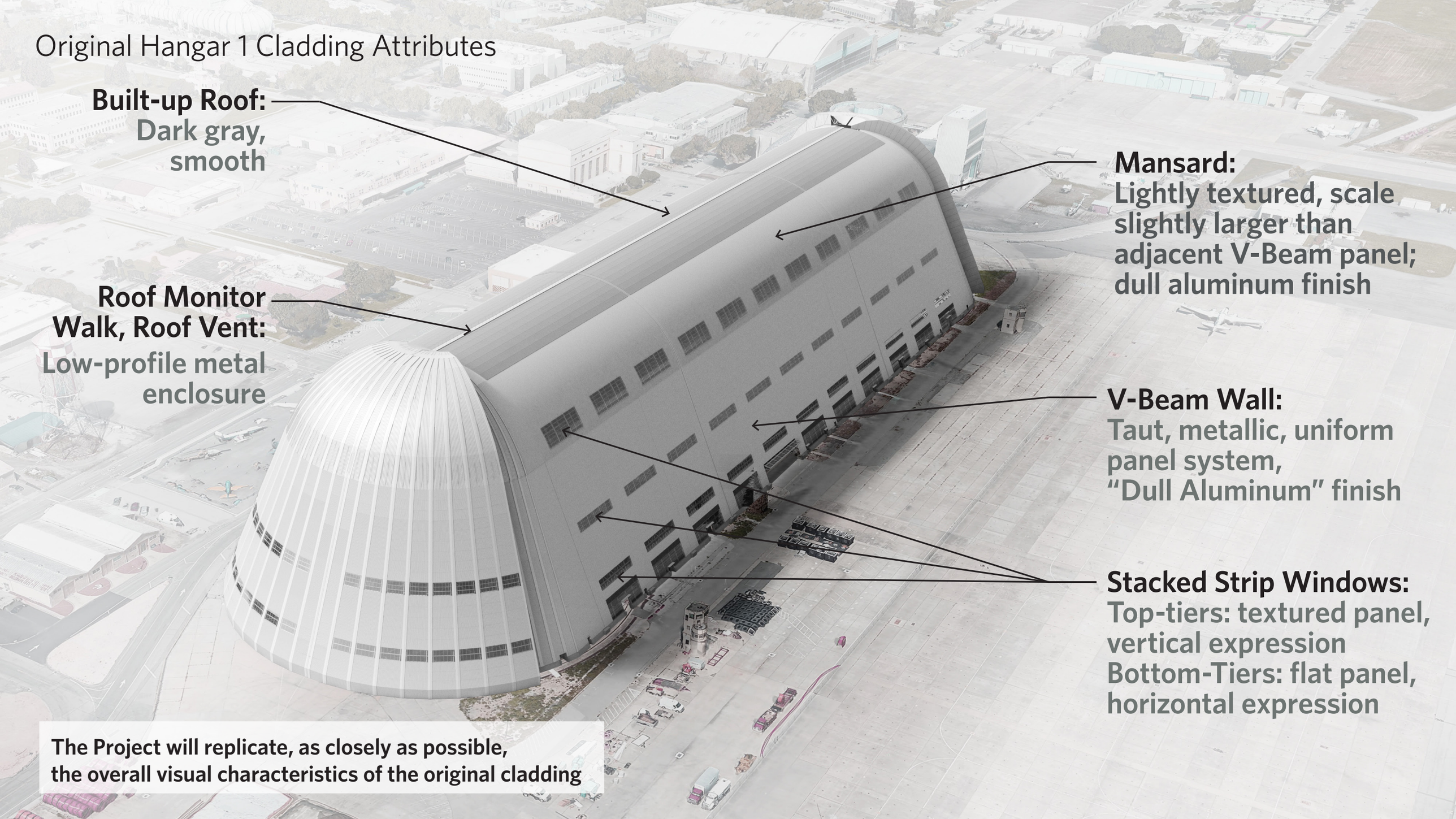






# MEMBER TYPE	ESTIMATED COUNT	% STRENGTHENED
13,200 TOTAL	650	5%

Original Hangar 1 Cladding Attributes



Built-up Roof:
Dark gray, smooth

Roof Monitor Walk, Roof Vent:
Low-profile metal enclosure

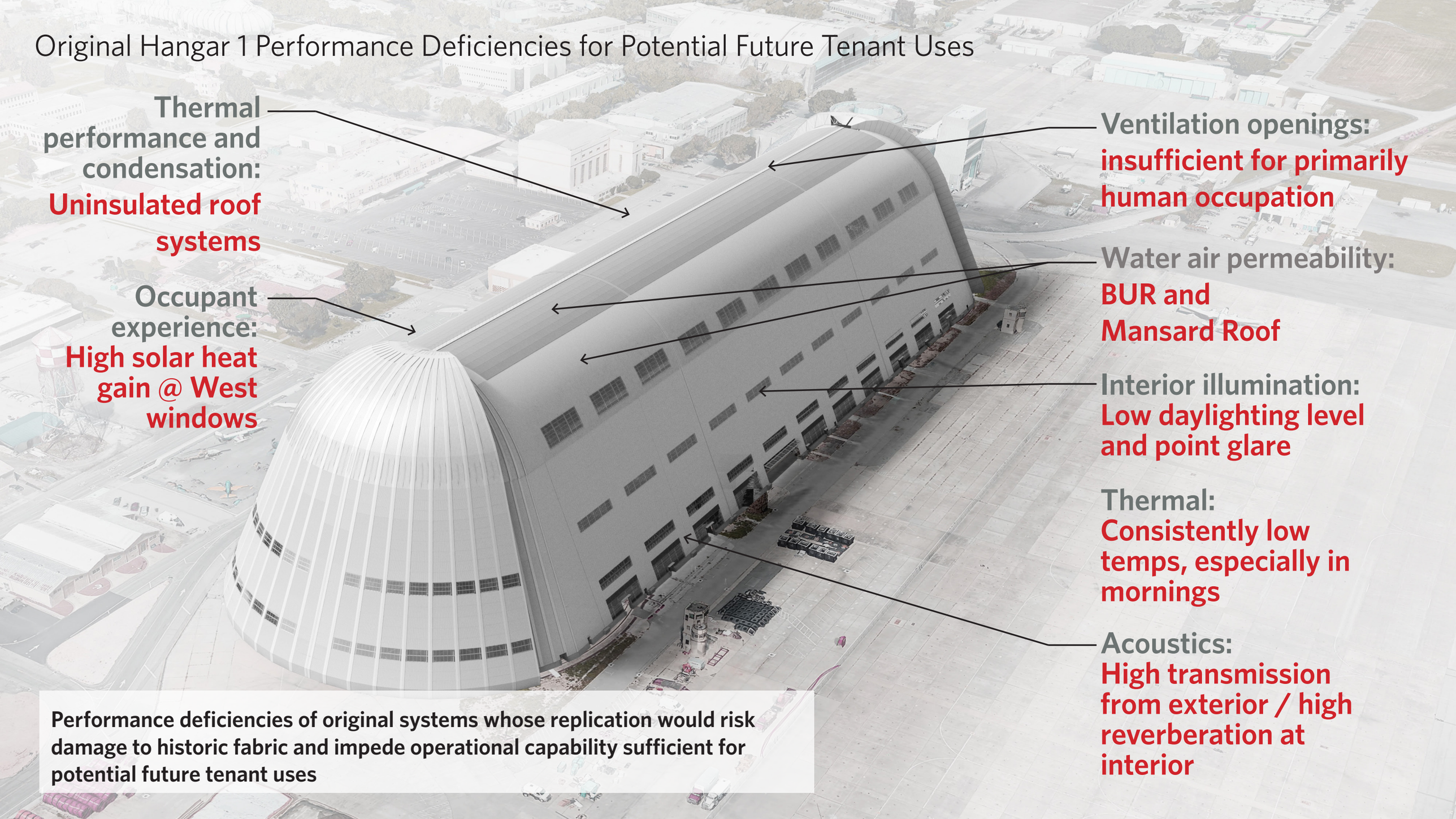
Mansard:
Lightly textured, scale slightly larger than adjacent V-Beam panel; dull aluminum finish

V-Beam Wall:
Taut, metallic, uniform panel system, "Dull Aluminum" finish

Stacked Strip Windows:
Top-tiers: textured panel, vertical expression
Bottom-Tiers: flat panel, horizontal expression

The Project will replicate, as closely as possible, the overall visual characteristics of the original cladding

Original Hangar 1 Performance Deficiencies for Potential Future Tenant Uses



Thermal performance and condensation: Uninsulated roof systems

Occupant experience: High solar heat gain @ West windows

Ventilation openings: insufficient for primarily human occupation

Water air permeability: BUR and Mansard Roof

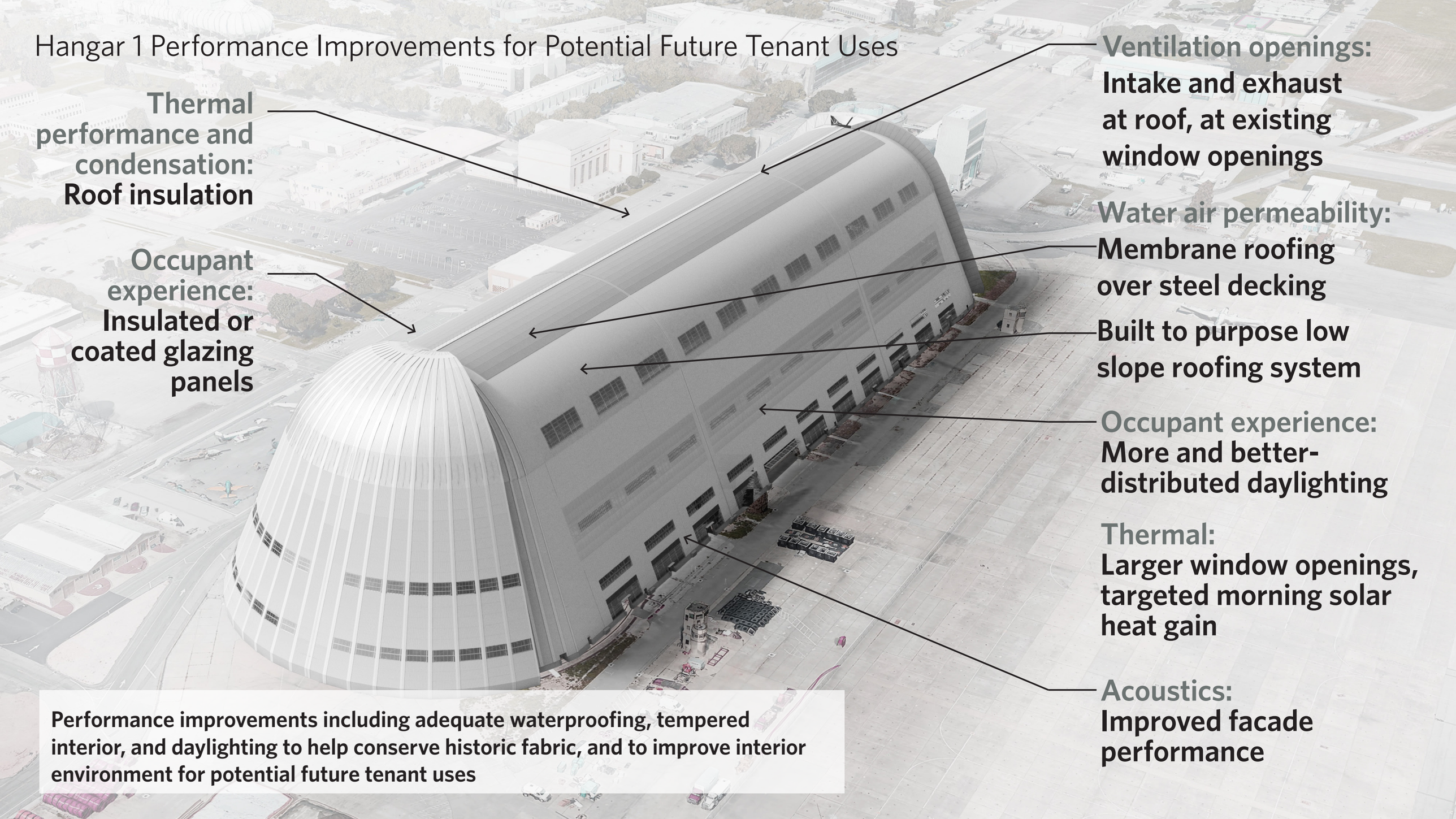
Interior illumination: Low daylighting level and point glare

Thermal: Consistently low temps, especially in mornings

Acoustics: High transmission from exterior / high reverberation at interior

Performance deficiencies of original systems whose replication would risk damage to historic fabric and impede operational capability sufficient for potential future tenant uses

Hangar 1 Performance Improvements for Potential Future Tenant Uses



Thermal performance and condensation:
Roof insulation

Occupant experience:
Insulated or coated glazing panels

Ventilation openings:
Intake and exhaust at roof, at existing window openings

Water air permeability:
Membrane roofing over steel decking

Built to purpose low slope roofing system

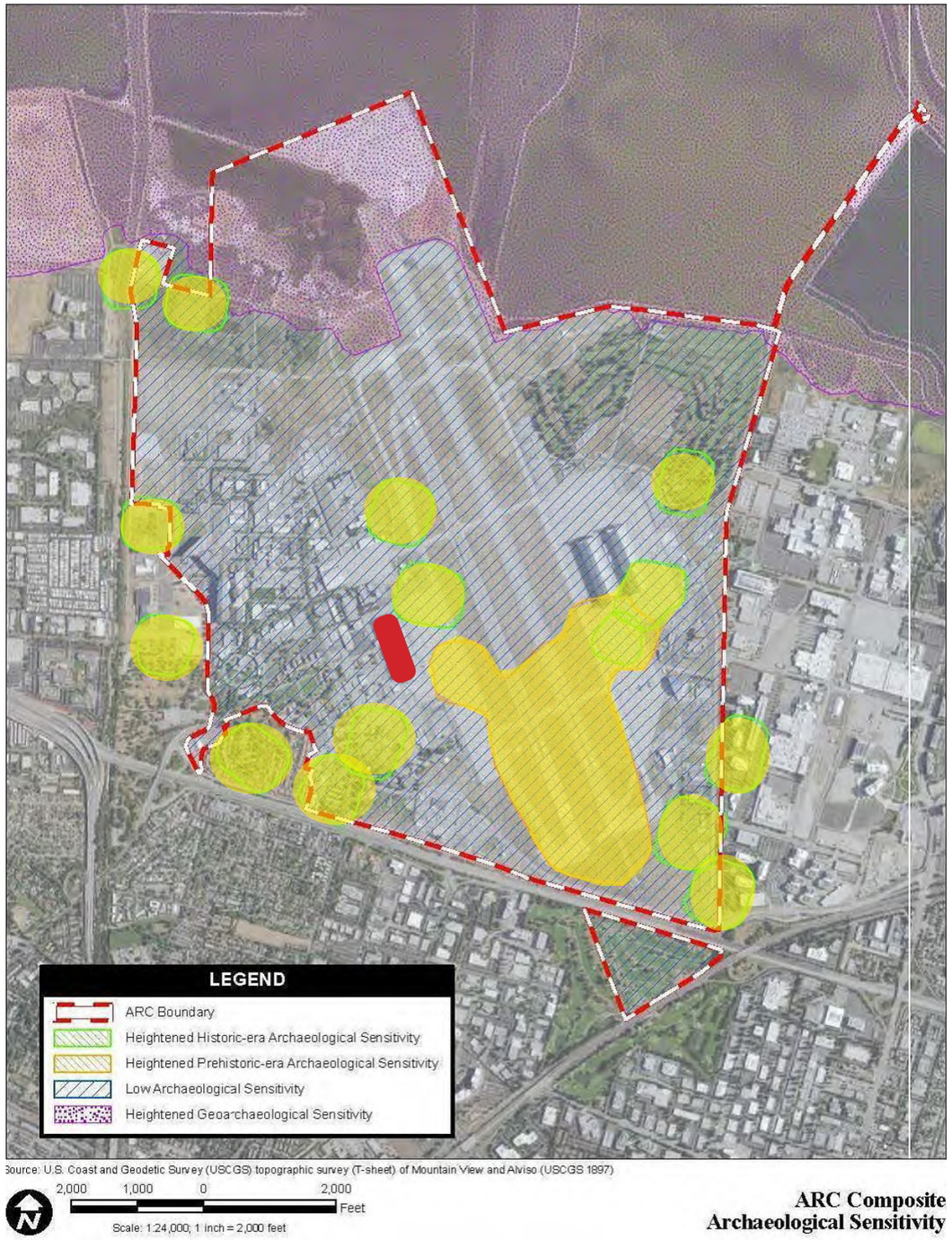
Occupant experience:
More and better-distributed daylighting

Thermal:
Larger window openings, targeted morning solar heat gain

Acoustics:
Improved facade performance

Performance improvements including adequate waterproofing, tempered interior, and daylighting to help conserve historic fabric, and to improve interior environment for potential future tenant uses

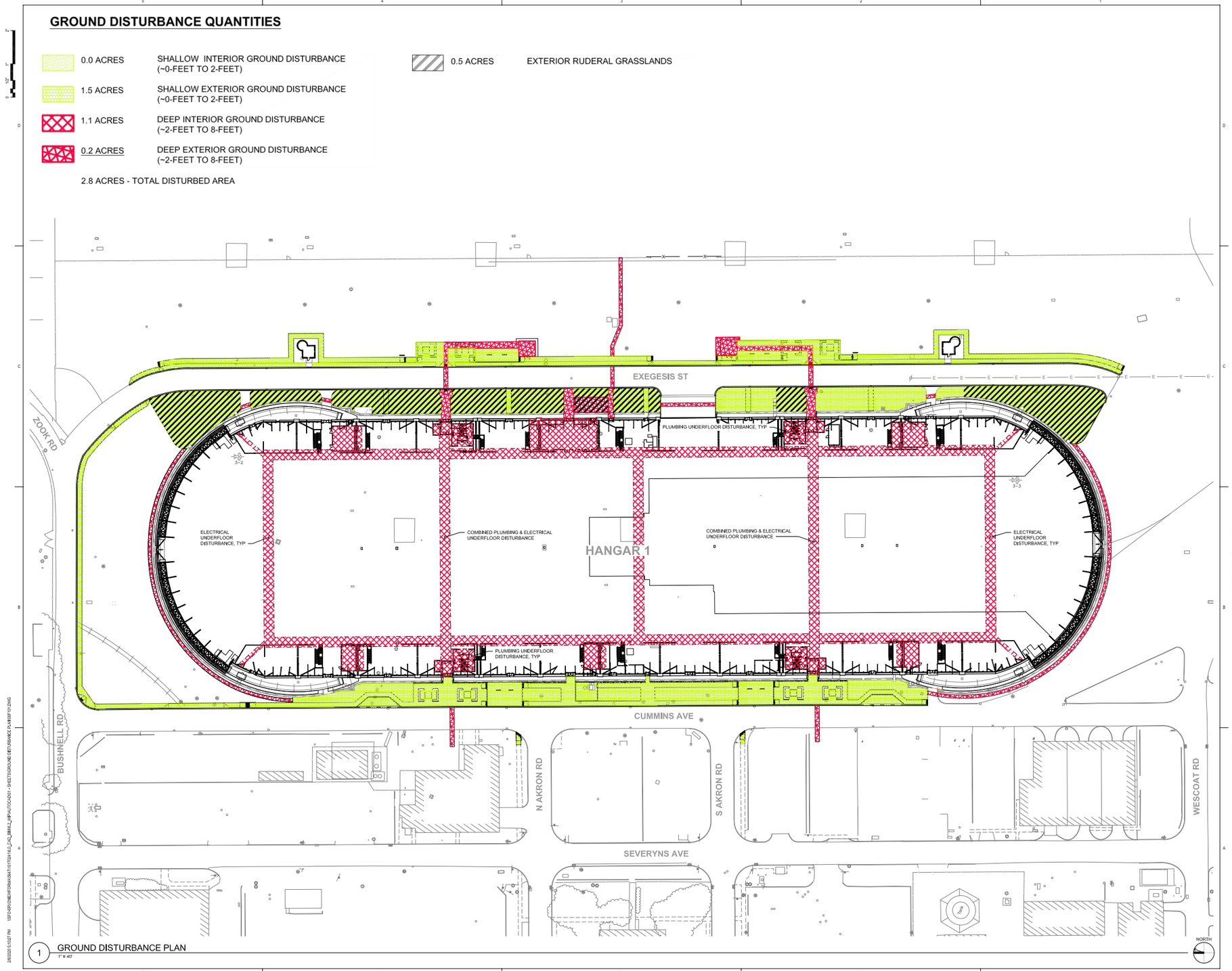
Areas of Archeological Sensitivity



- **Limited ground disturbance for infrastructure and site improvements**
- **Vertical APE of 10 feet**
- **Designed to avoid known sensitivity areas**

Hangar 1 Ground Disturbance

- **Disturbance exterior and adjacent to Hangar primarily shallow (~0 - 2 feet deep)**
- **Deep disturbance (~2 - 8 feet deep) almost entirely within Hangar interior, at previously disturbed locations**



HDR Architecture
201 California St.
Suite 1500
San Francisco CA 94111

PLANETARY VENTURES LLC CBRE
Hangar 1

Moffett Federal Airfield
Mountain View, California

Project Manager	Greg Haskell (HDR)
Project Designer	Michael Bordin (HDR)
Project Architect	Andrew Russell (HDR)
Landscape Architect	-
CivilEngineer	Chad Drago (HDR)
Structural Engineer	KPFF Consulting Engineers
Mechanical Engineer	Bilkit Pedberg (HDR)
Electrical Engineer	Paul Durbin (HDR)
Plumbing Engineer	-
Fire Protection Engineer	Robert Richter (HDR)
Facade Engineer	Arup
Sheet Reviewer	-

Project Number 10170241
Original Issue __/__/2020

Sheet Name
GROUND DISTURBANCE PLAN

Sheet Number
F-101

Project Status
SCHEMATIC DESIGN - OCCUPIABLE SCOPE

Hangar 1 Exterior Reclad Approach, Shenandoah Plaza

Historic Image: Shenandoah Plaza

Proposed View from Shenandoah Plaza

The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes

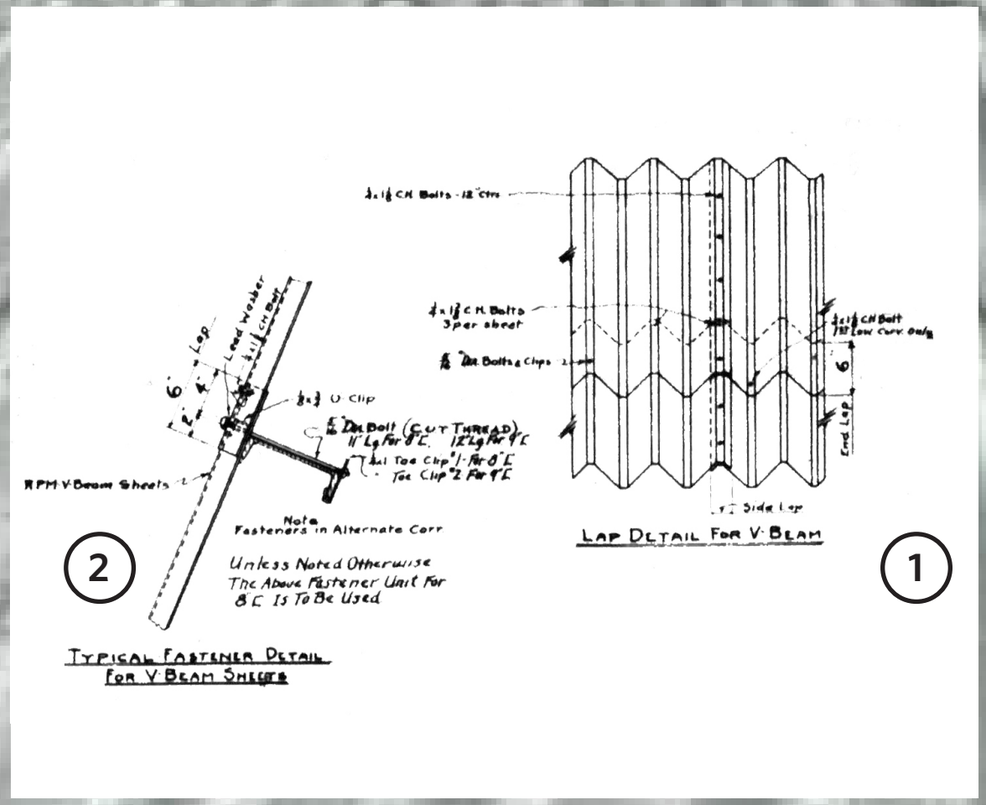
Proposed View from Shenandoah Plaza

The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes

Typical Original Metal V-Beam Wall Siding Details

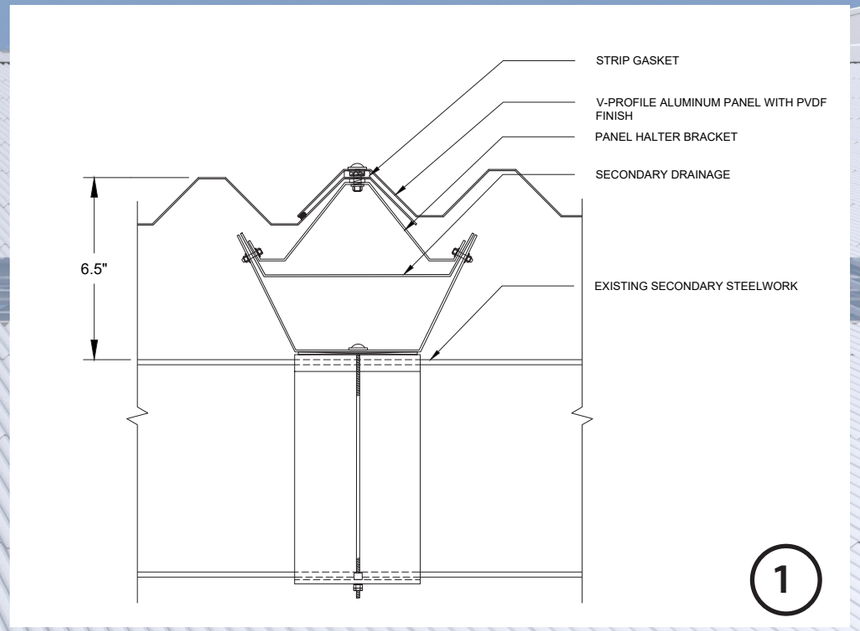
Typical Original V-Beam Horizontal Joint 1

Typical Original V-Beam Vertical Joint 2

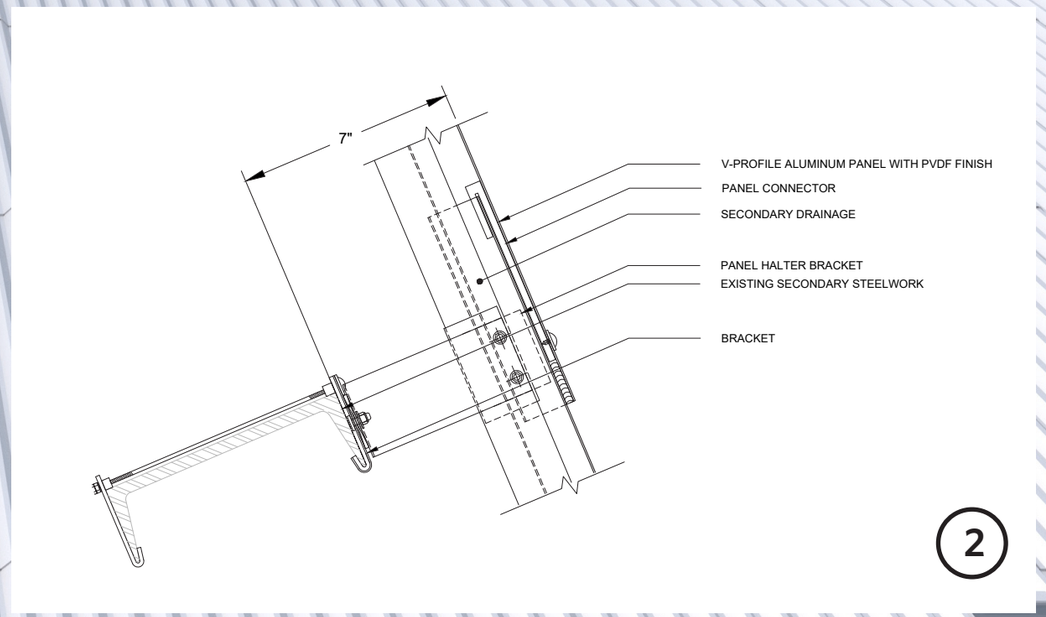


Proposed Typical Metal V-Beam Wall Siding Details

Typical Original V-Beam Horizontal Joint 1



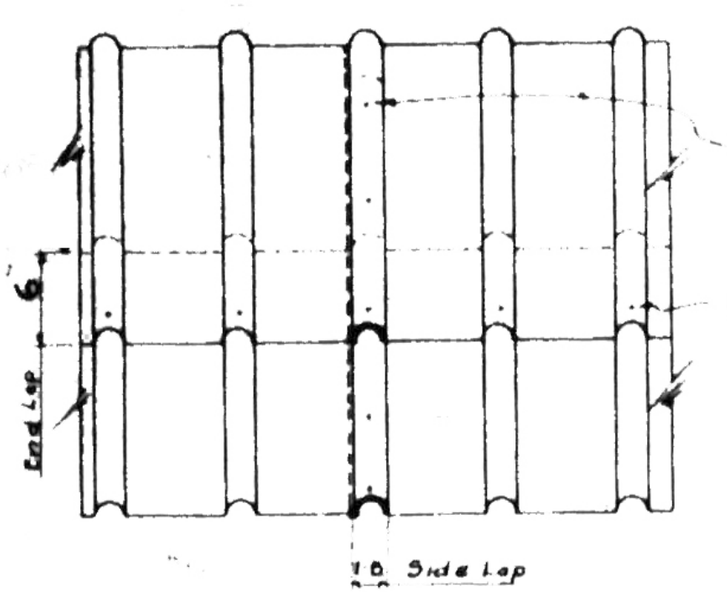
Typical Original V-Beam Vertical Joint 2



The new aluminum wall siding will retain the shape and profile of the original

Original Mansard Siding Details

Original Typical Mansard Detail ③



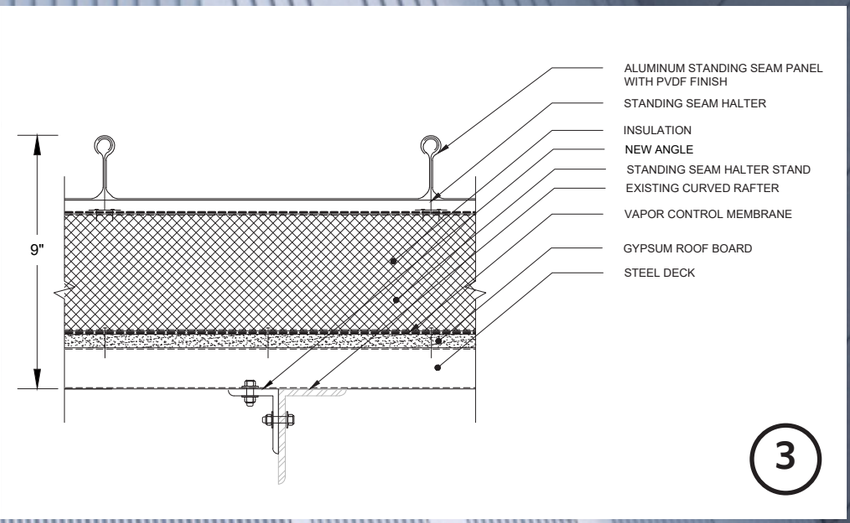
LAP DETAIL FOR MANSARD

③

Proposed Typical Mansard Siding Details

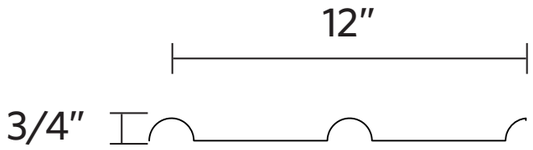
Proposed Typical Mansard Detail

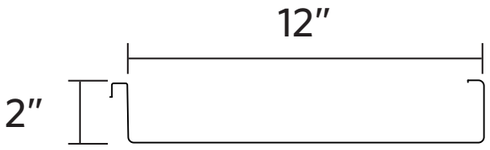
3

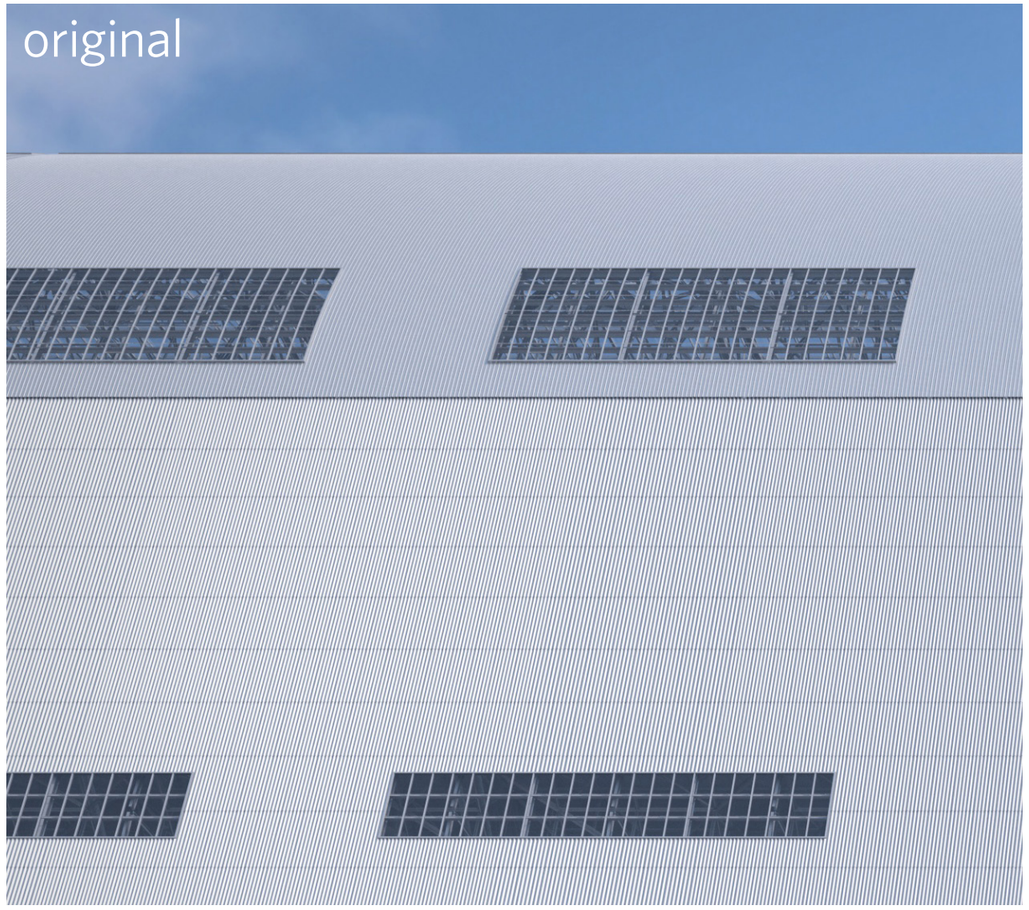


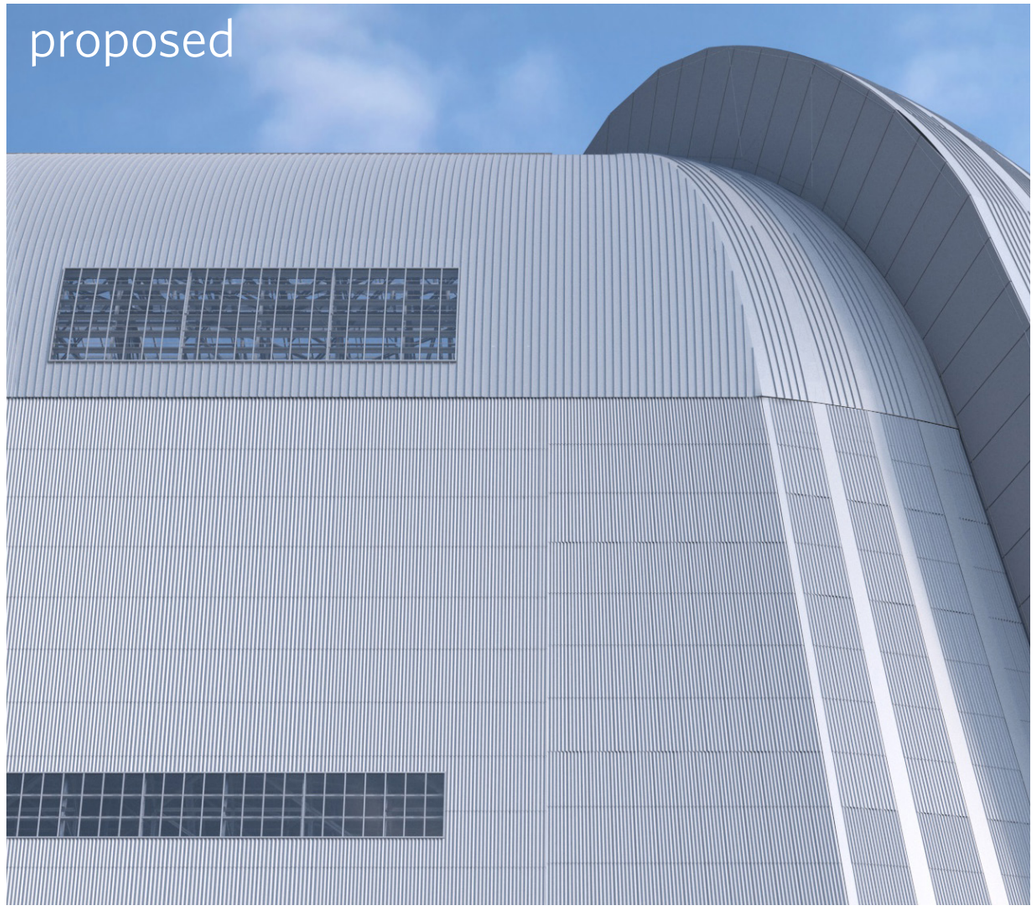
New Mansard siding will be a sheet standing seam product with the seam size and spacing reflecting a similar character to the original with a smooth surface and regular pattern of seams

Comparison of Original and Proposed Mansard Siding Profiles



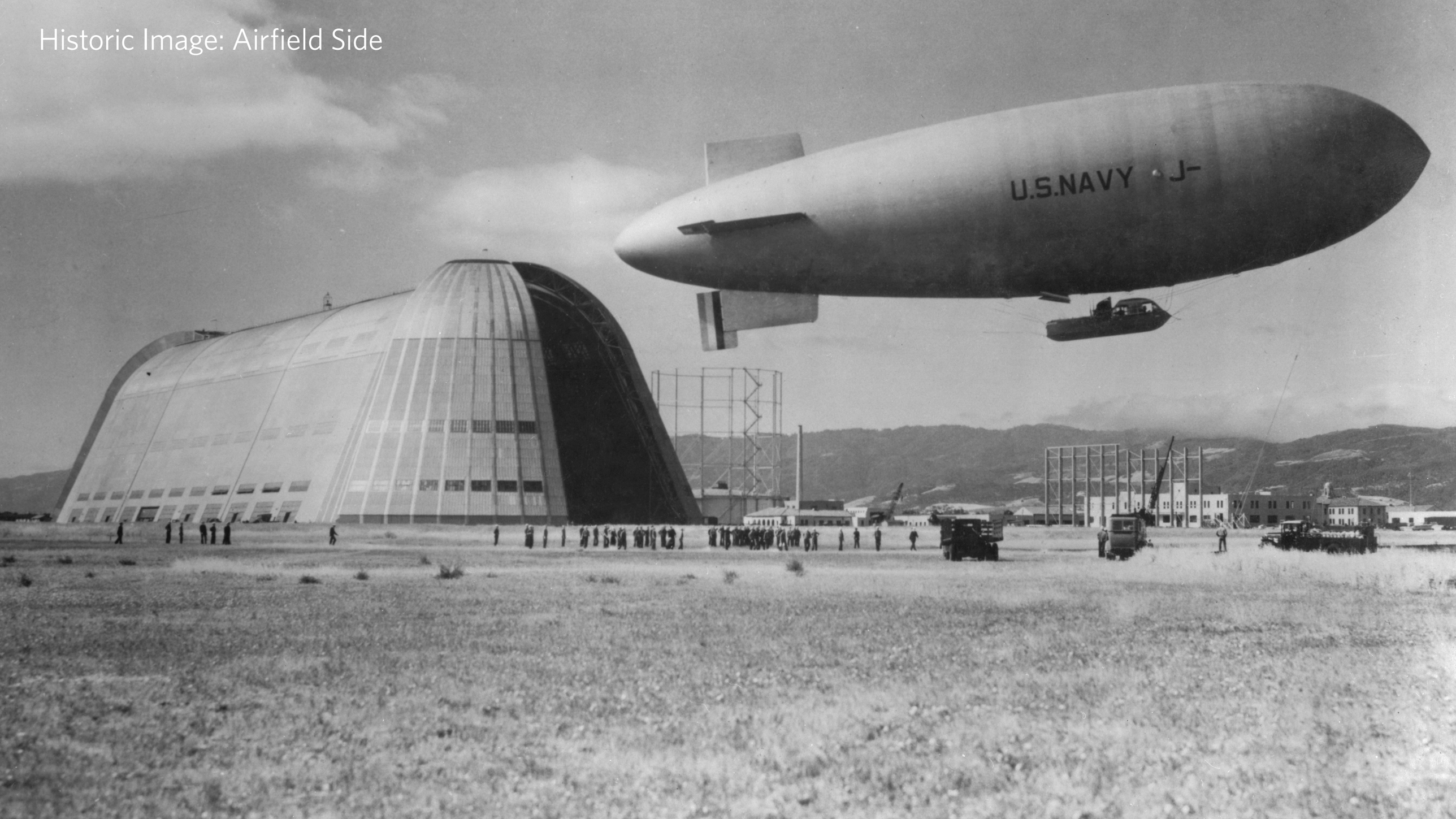






Hangar 1 Exterior Reclad Approach, Airfield

Historic Image: Airfield Side



Proposed View from Airfield Side

Airfield side historic openings will be retained within an expanded window area.

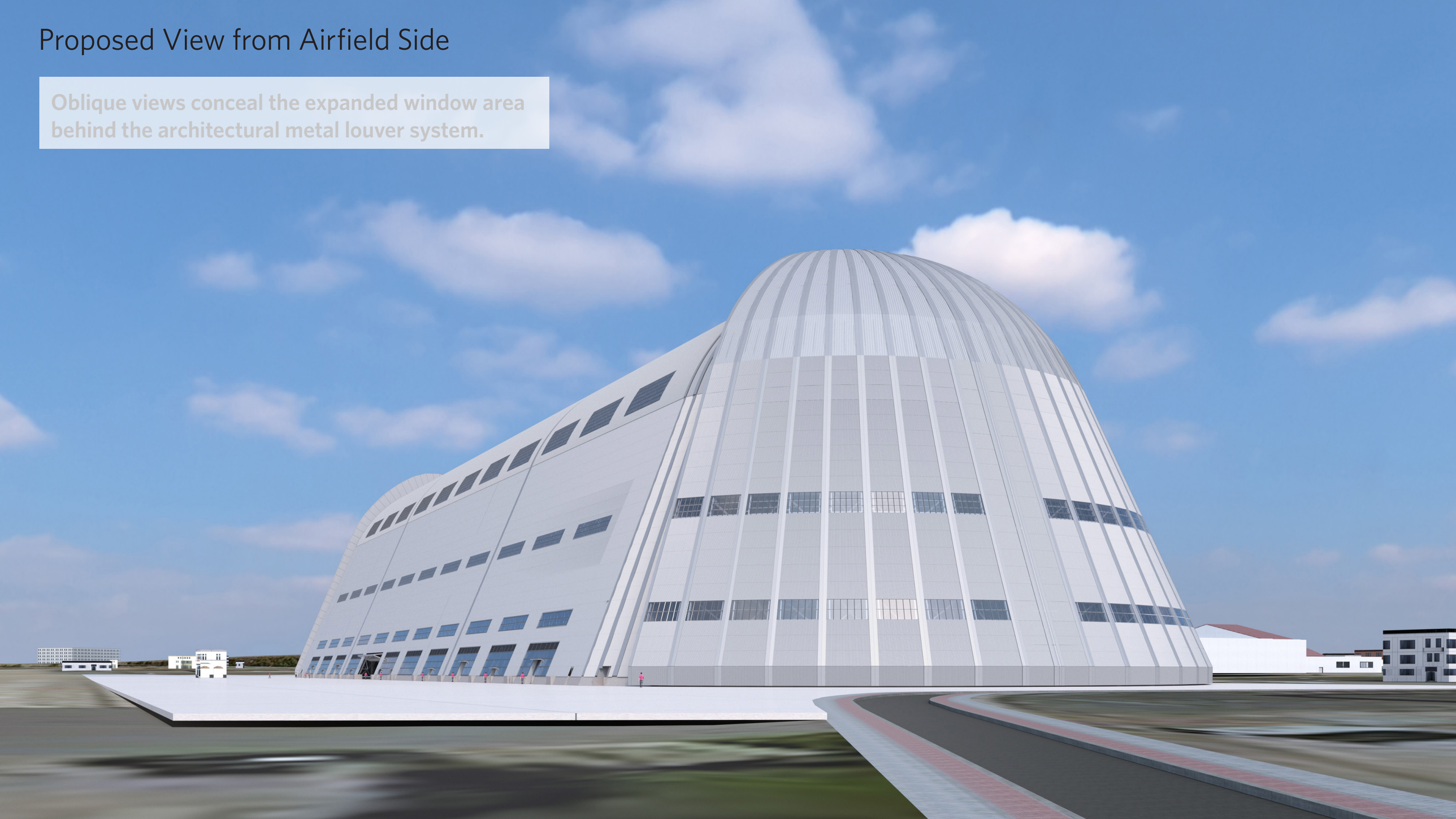
An architectural metal louver system is designed to visually integrate the enlarged glazed opening with the surrounding profiled metal panels in order to minimize visual impact, and which becomes less visible as the view becomes more oblique

Proposed View from Airfield Side

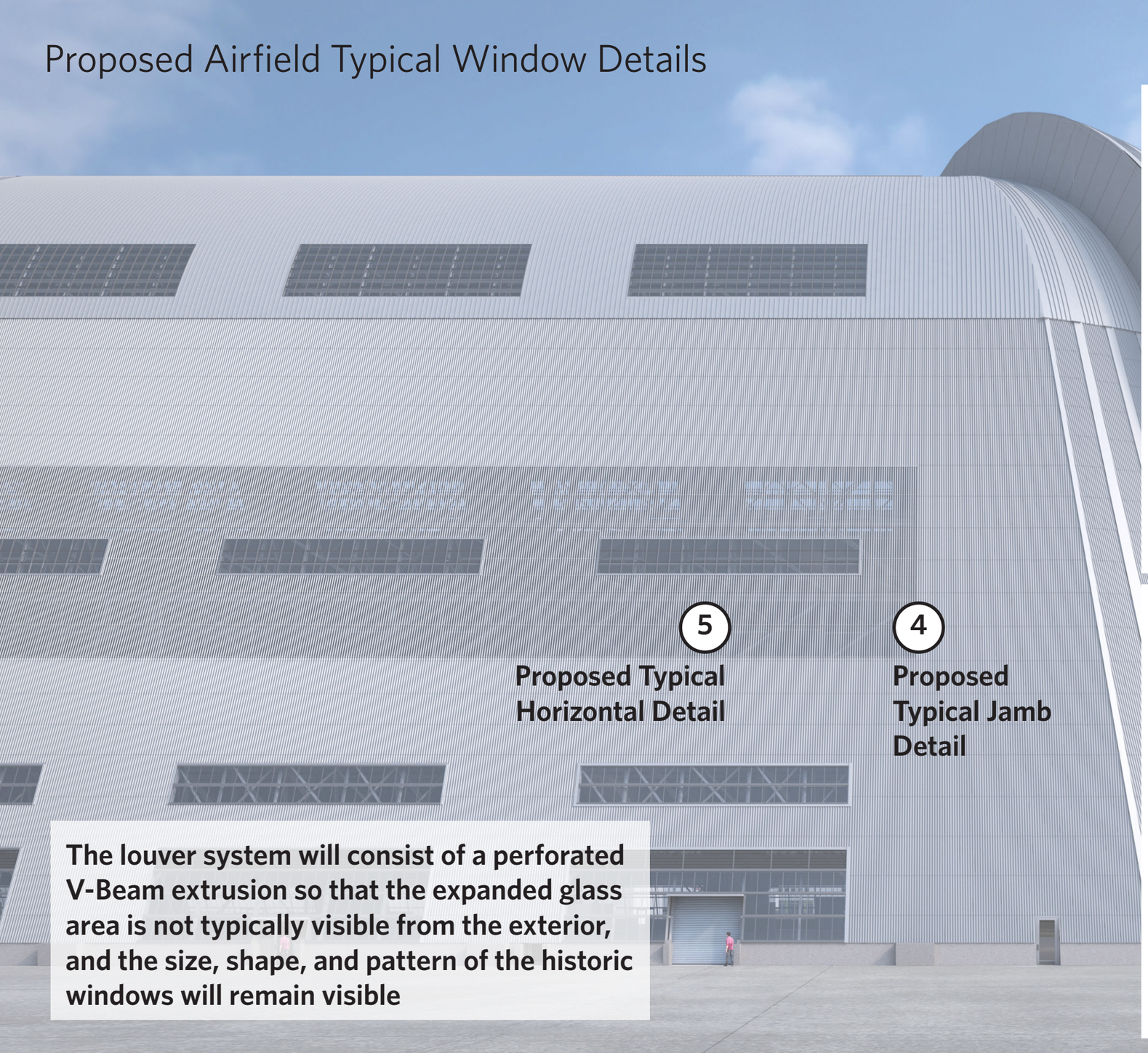
Oblique views conceal the expanded window area behind the architectural metal louver system.

Proposed View from Airfield Side

Oblique views conceal the expanded window area behind the architectural metal louver system.



Proposed Airfield Typical Window Details



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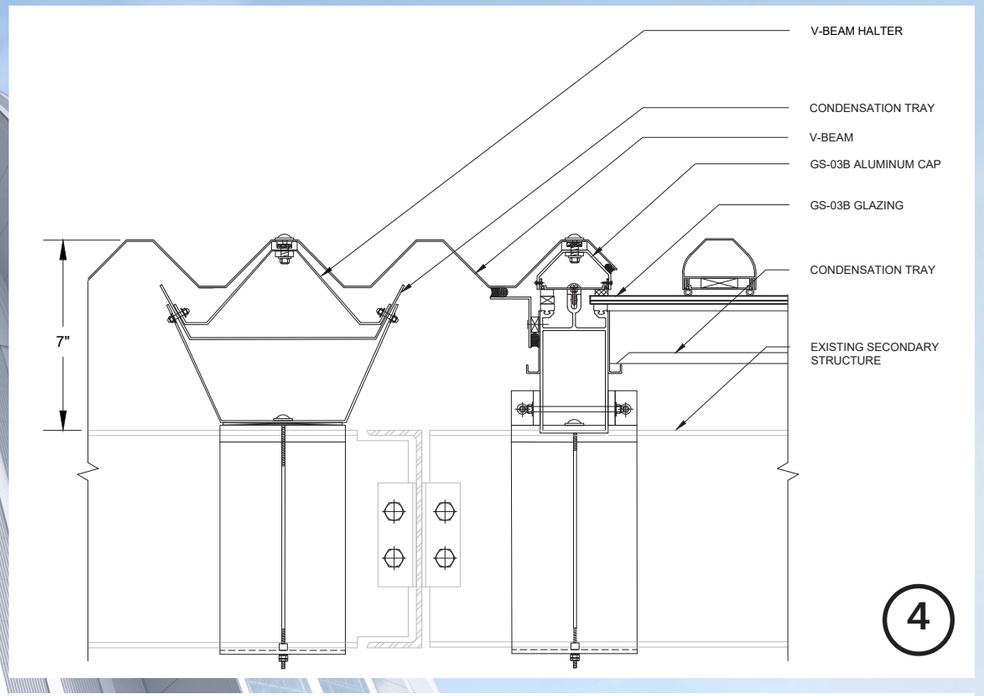
Proposed Typical Horizontal Detail

4

Proposed Typical Jamb Detail

The louver system will consist of a perforated V-Beam extrusion so that the expanded glass area is not typically visible from the exterior, and the size, shape, and pattern of the historic windows will remain visible



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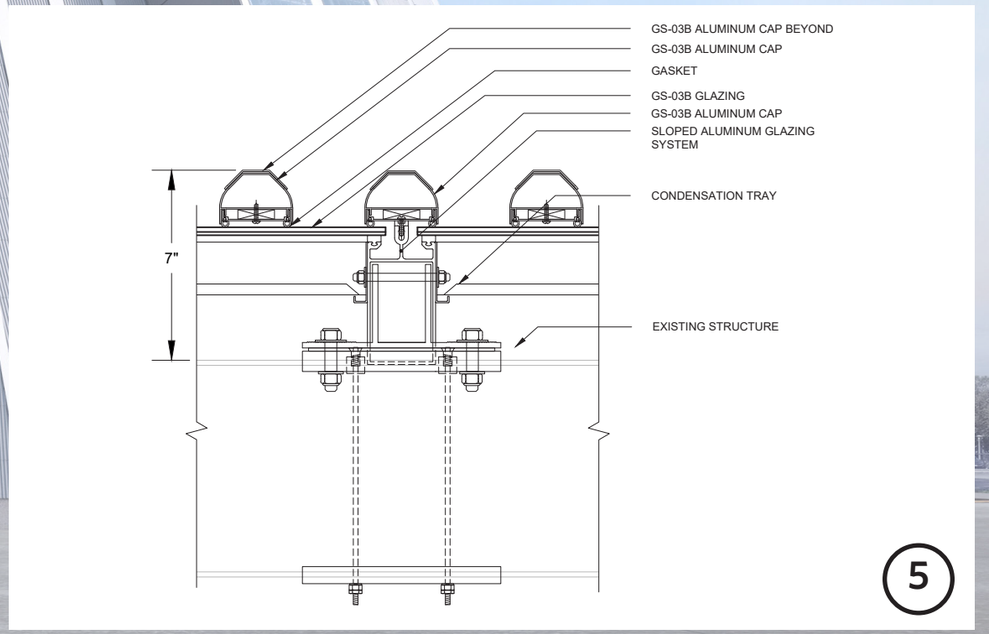

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Proposed View from Airfield Side

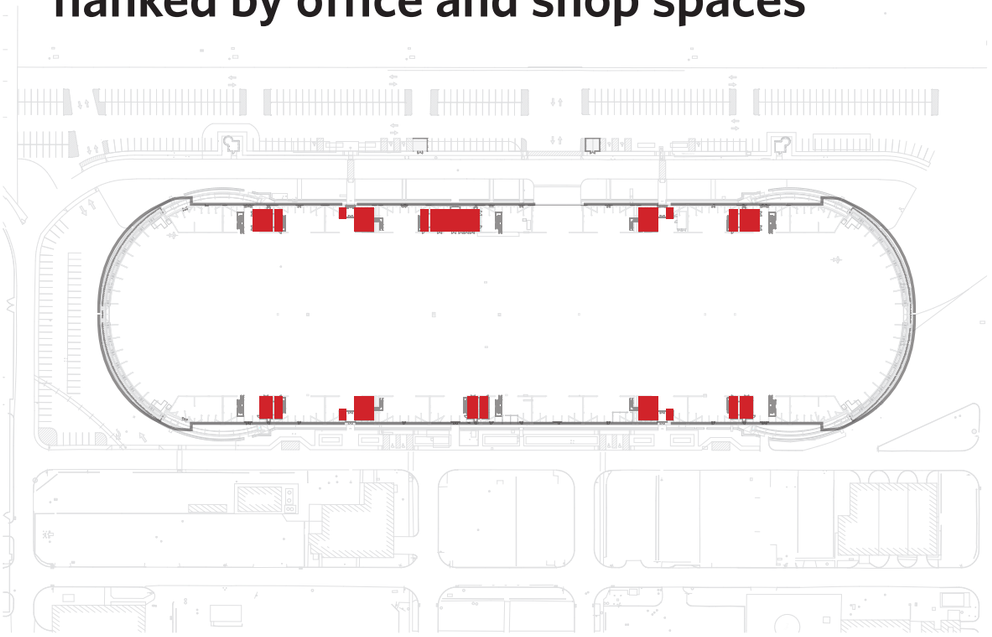
Hangar 1 Interior Rehabilitation Approach

Interior Rehabilitation / Occupiable Upgrades Approach

Original arrangement of interior spaces:
Central volume flanked by office and shop spaces

Original Plan

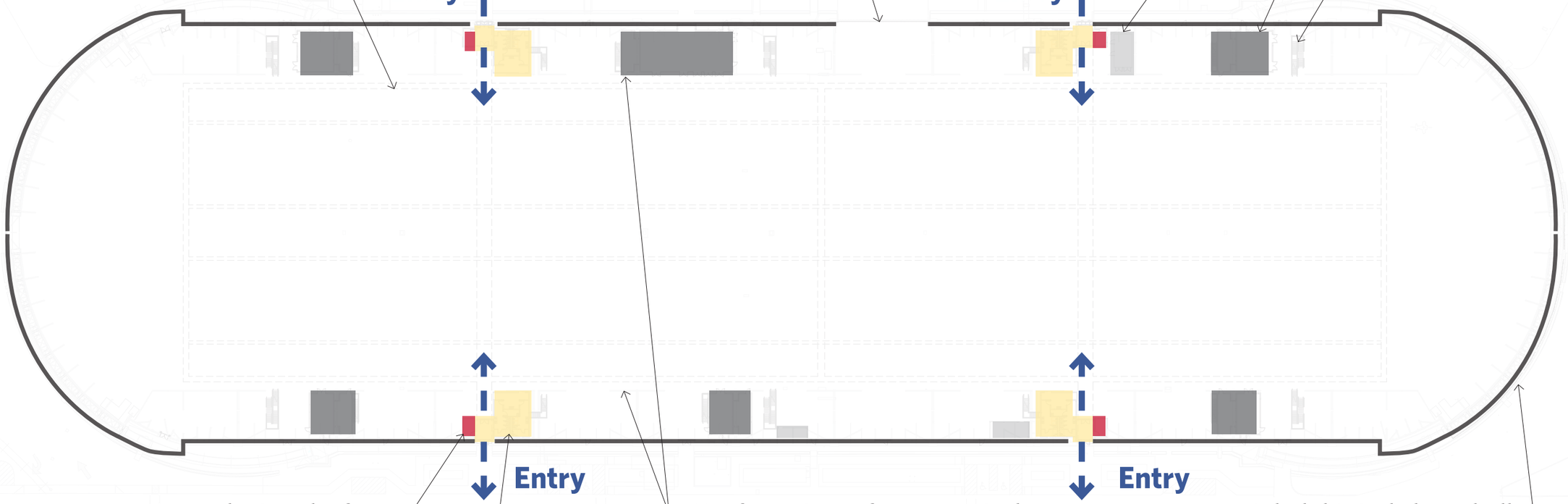
Proposed arrangement of interior spaces:
Central volume flanked by office and shop spaces



Proposed Plan

N

Interior Rehabilitation Approach / Occupiable Upgrades Approach



Grid of utility (power, mechanical piping, data and comms) distribution trenching provides utility access for all "Neighborhoods"

Rehabilitated aviation door provides access for vehicles, small aircraft

Existing fabric features to remain

New electrical / comms rooms at six (6) locations

Reconfigured stairs at six (6) locations

New electrical / fire riser rooms at four (4) locations

New entry vestibule / toilet rooms at four (4) locations

Configuration of open central volume flanked by fuunctional spaces and mezzanine preserves intact Character

Rehabilitated clam shell doors provide access for extremely large objects

N

Typical Entrance Core

To maintain the overall visual effect of the hangar's interior, new entries will be located at building sides with structural frame exposed, as it was historically.

Rehabilitated Stair

New cast-in-place concrete cores containing building services will be constructed at multiple locations along the east and west sides of the building, under the mezzanine/ level two; equipment will be screened from view by walls and / or parapets.

Rehabilitated Stair

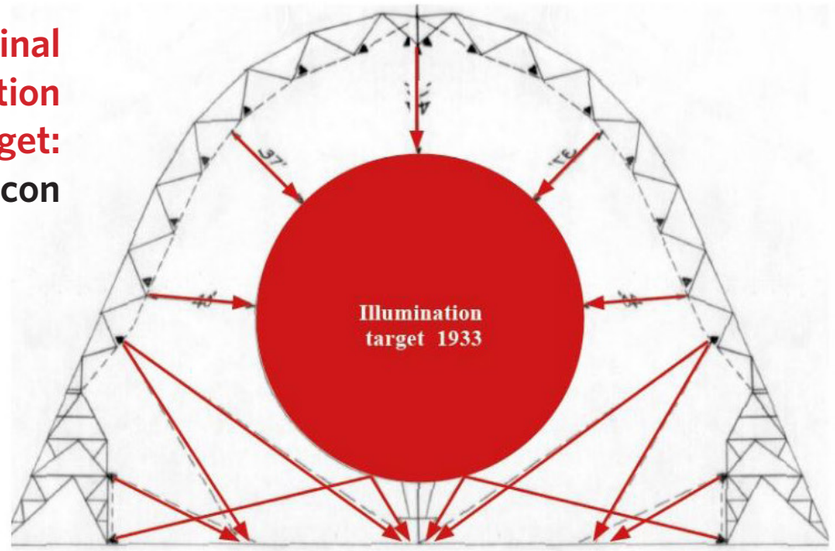
Stairs will be reconstructed and reconfigured to provide required clearances and railings, using similar concrete and metal fabrications in similar locations as the originals, with finish colors easily distinguished from historic fabric.

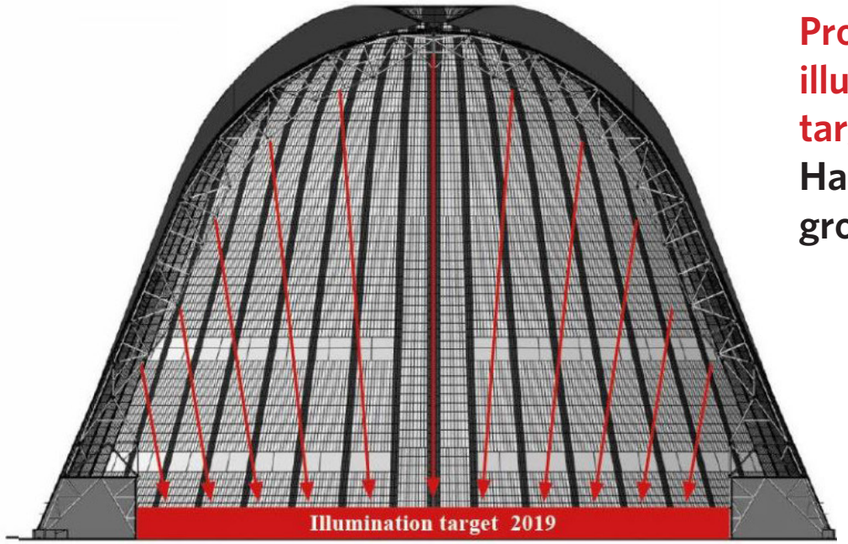
Hangar 1 Interior Illumination Rehabilitation Approach

Interior Lighting

The original interior lighting scheme of Hangar 1 was designed to illuminate the cylindrical hull of the USS Macon from all sides. To provide illumination necessary for occupancy and maintenance, artificial illumination will be directed toward the ground floor surface.

Original illumination target:
U.S.S. Macon



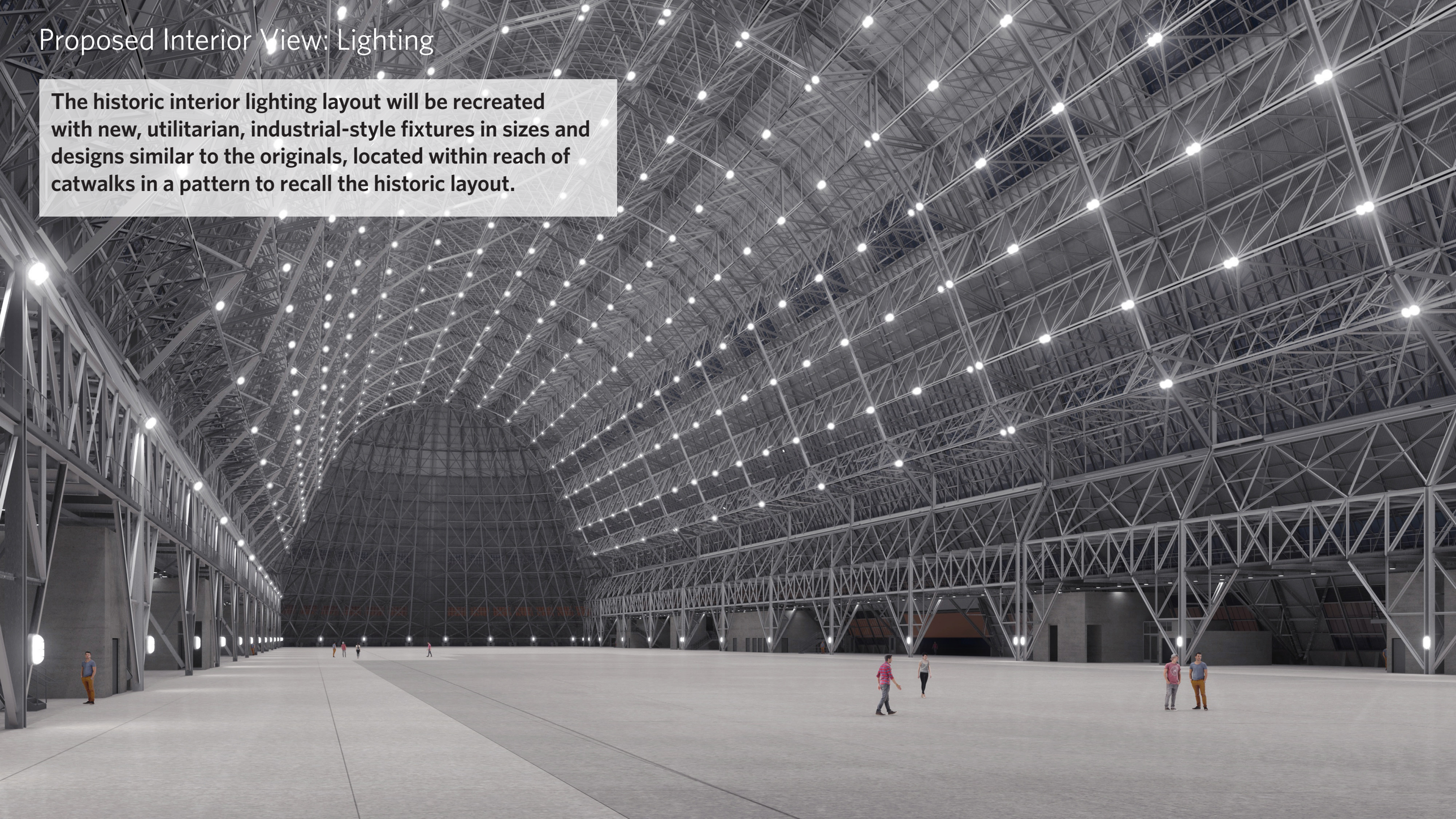


Proposed illumination target:
Hangar 1 occupied ground floor level

Hangar 1 Historic View: Interior

Proposed Interior View: Lighting

The historic interior lighting layout will be recreated with new, utilitarian, industrial-style fixtures in sizes and designs similar to the originals, located within reach of catwalks in a pattern to recall the historic layout.

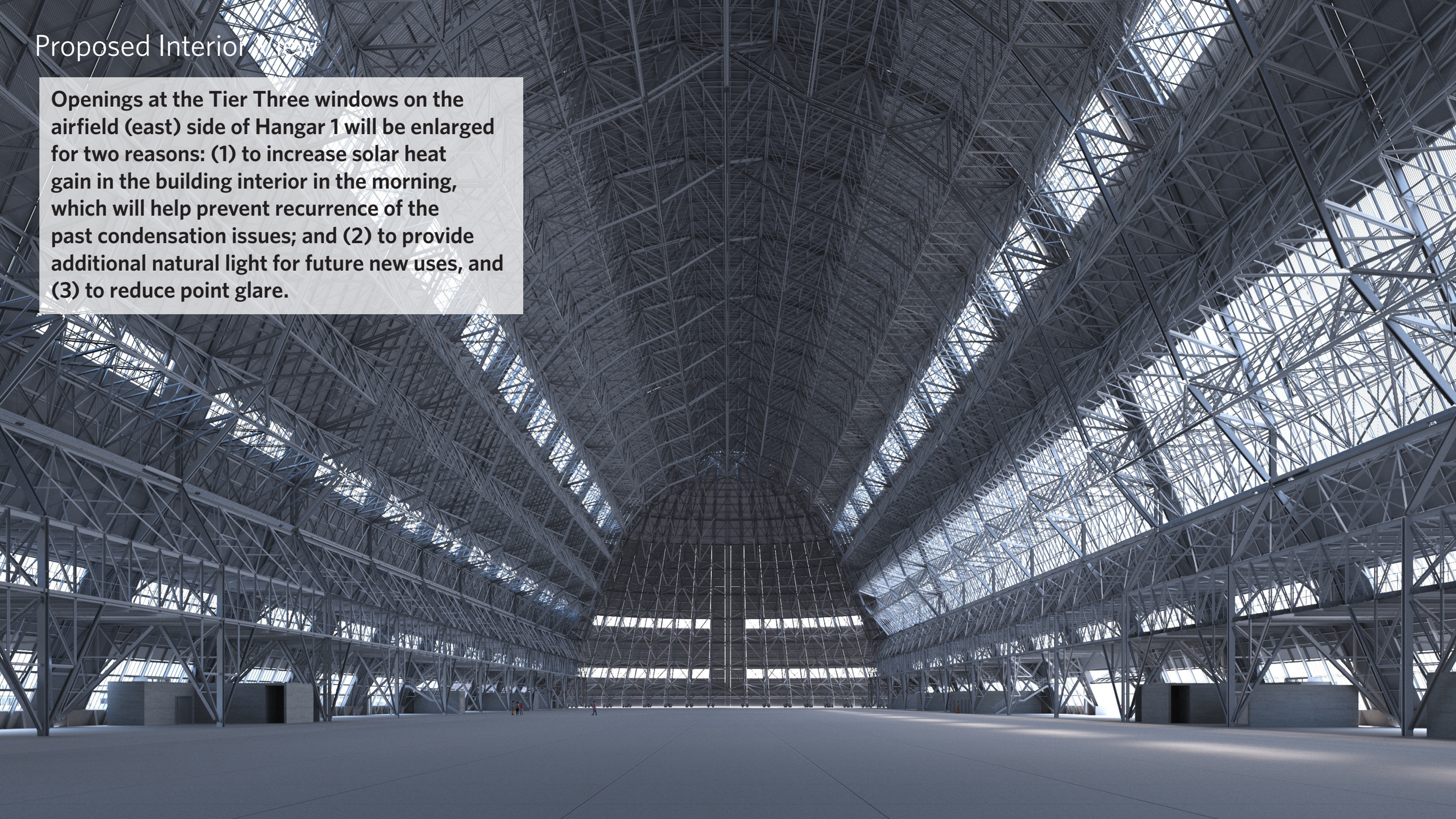


Hangar 1 Building Performance: Daylighting and Glare

Hangar 1 Historic View: Interior

Proposed Interior View

Openings at the Tier Three windows on the airfield (east) side of Hangar 1 will be enlarged for two reasons: (1) to increase solar heat gain in the building interior in the morning, which will help prevent recurrence of the past condensation issues; and (2) to provide additional natural light for future new uses, and (3) to reduce point glare.



Hangar 1 Comparative Images, Historic and Proposed

Hangar 1 Historic View: Shenandoah Plaza

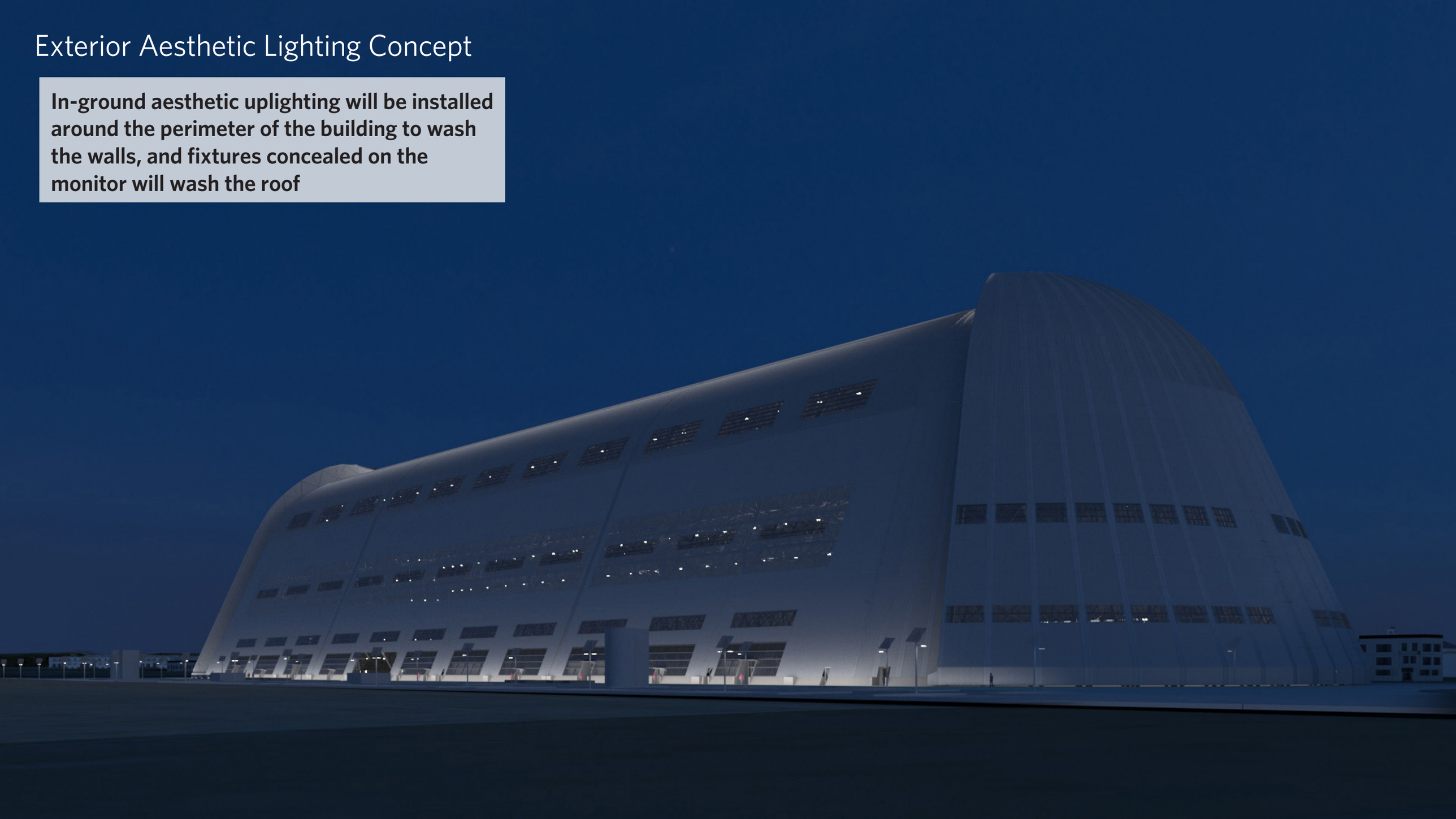
Proposed Shenandoah Plaza View

Exterior Aesthetic Lighting Concept

In-ground aesthetic uplighting will be installed around the perimeter of the building to wash the walls, and fixtures concealed on the monitor will wash the roof

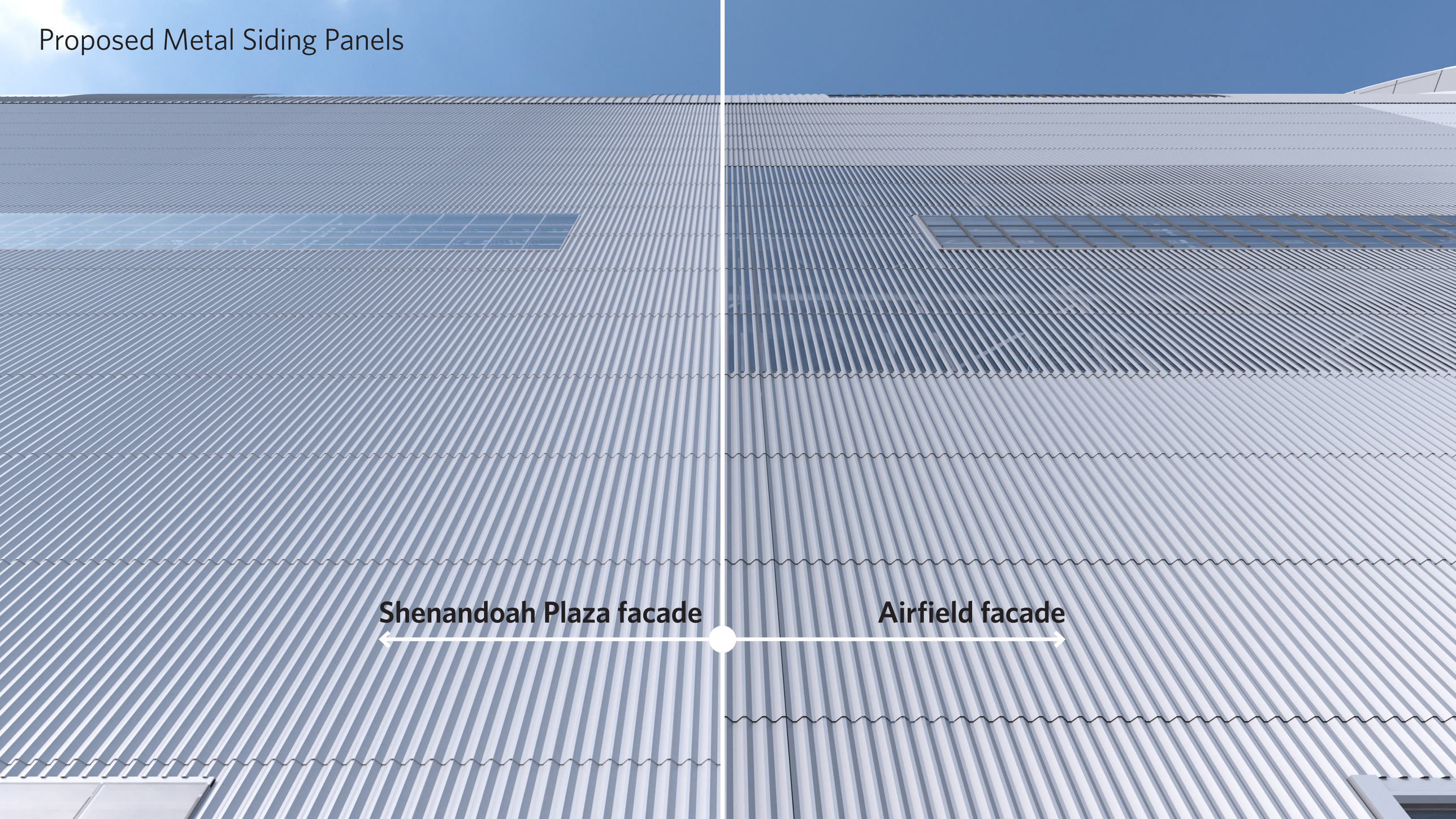
Exterior Aesthetic Lighting Concept

In-ground aesthetic uplighting will be installed around the perimeter of the building to wash the walls, and fixtures concealed on the monitor will wash the roof



Hangar 1 Historic View: Profiled metal panel

Proposed Metal Siding Panels

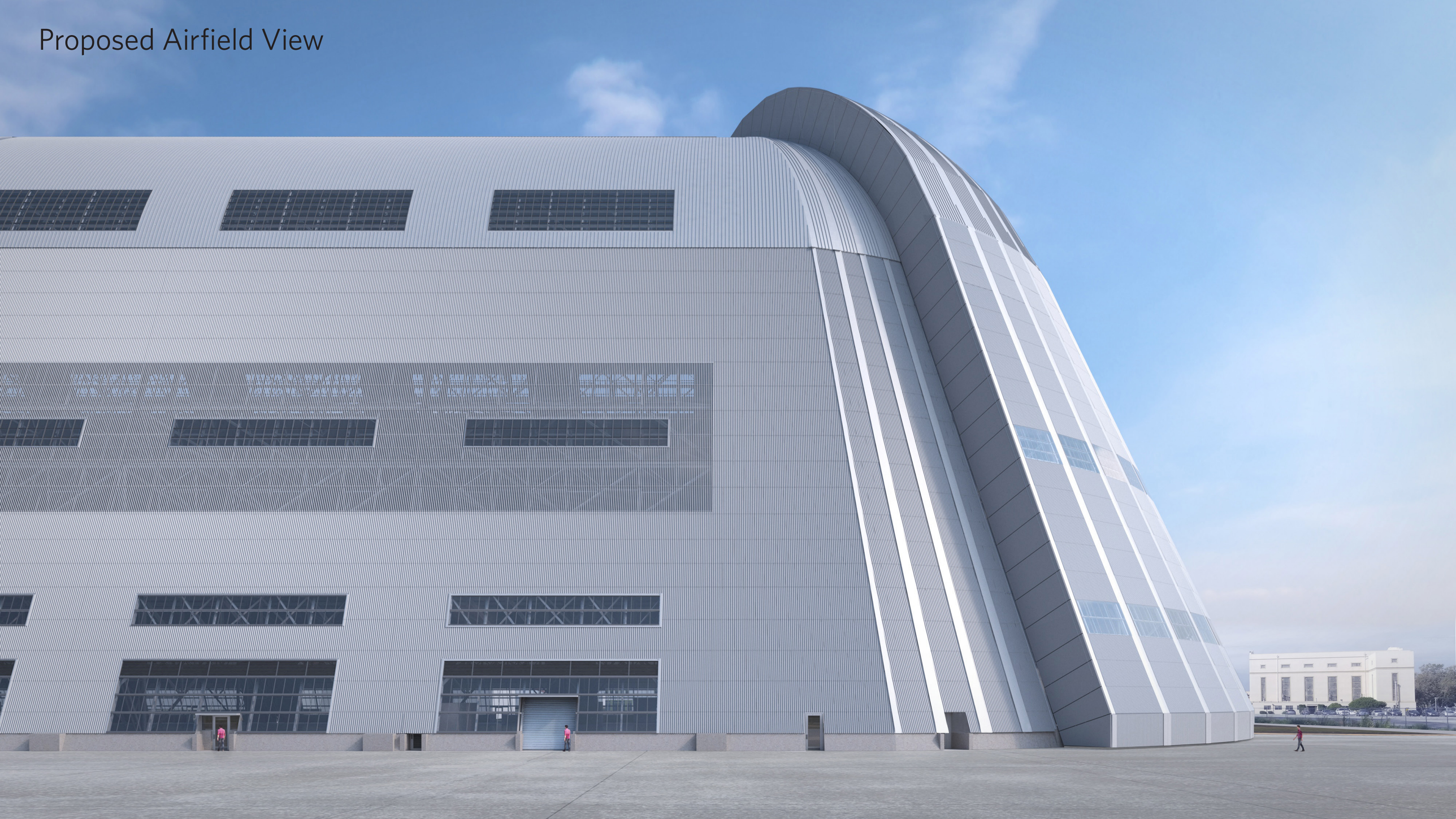


Hangar 1 HABS View: Airfield

Proposed Airfield View

Hangar 1 HABS View: Airfield Facade

Proposed Airfield View

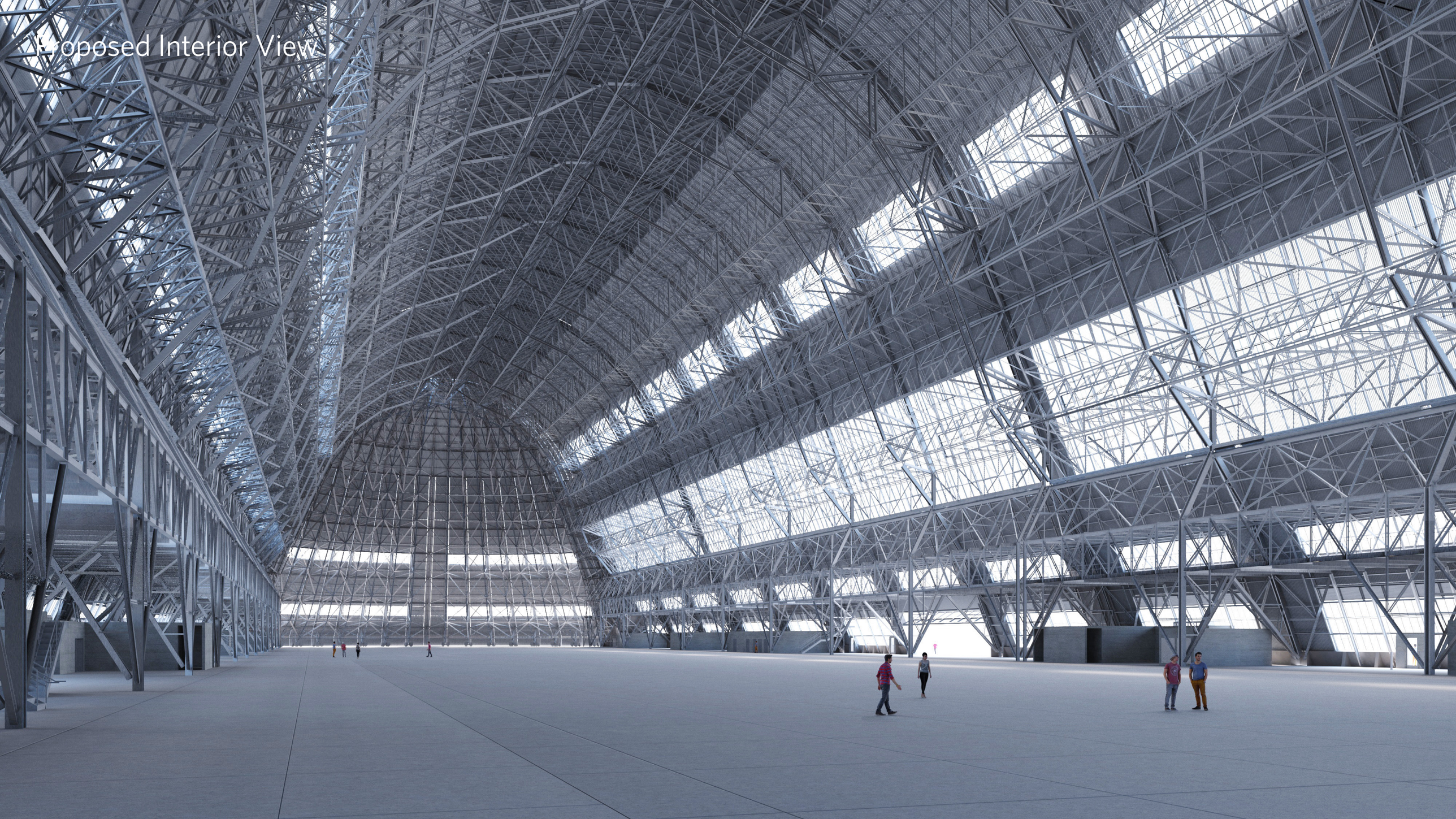


Hangar 1 HABS View: Window and Aviation Door Detail

Proposed Window and Aviation Door View

Hangar 1 View: Interior

Proposed Interior View



Hangar 1 Historic View: Shenandoah Plaza

Proposed View from Shenandoah Plaza

Hangar 1 Historic View: Shenandoah Plaza

Proposed View from Shenandoah Plaza

Questions and Comments

Please direct formal comments regarding this presentation to Jonathan Ikan, NASA Cultural Resources Manager

jonathan.d.ikan@nasa.gov