TIPPING
STRUCTURAL ENGINEERS

October 9, 2024

Alesia Strauch
City of Alameda, Base Reuse - Alameda Point
City Hall West
950 West Mall Square
Alameda, California 94501

Re: Alameda Point - Building 114 Evaluation Update (2024)
2450 Saratoga St.
Alameda, CA 94501
Job No. 2022.040.02

Dear Alesia,

We have completed our updated evaluation of the existing structure at Building 114 on the Naval Air Station at Alameda Point, including our updates based on a recent site visit to incorporate our findings regarding the ongoing deterioration of the structure. In preparing this report, we reviewed past reports regarding the development and preservation of the Naval Air Station, discussed the building with you and performed a site visit. The purpose of our evaluation was to (1) assess the current condition of the existing building and identify major areas of damage and ongoing deterioration, (2) comment upon the expected seismic performance of the existing lateral system, (3) provide recommendations for repairs necessary to return the structure to a serviceable condition in line with current code provisions and (4) comment on the structural viability of partially demolishing the eastern portions of the structure (high-bay maintenance shop spaces) which are the most damaged

DOCUMENTS REVIEWED

We reviewed the following documents to aide in our evaluation of the building's current condition:

- "Historic Architectural Resources Inventory for Naval Air Station, Alameda", dated 1992, prepared by Sally B. Woodbridge
- Building Upgrade Study – Building 114, dated January 27, 1997, prepared by Onyx
- "Memorandum of Agreement Among The United States Navy, The Advisory Council on Historic Preservation and The California State Historic Preservation Officer Regarding the Layaway, Caretaker Maintenance, Leasing, and Disposal of Historic Properties on the Former Naval Air Station, Alameda, California", dated September 1, 1999

1906 SHATTUCK AVENUE | BERKELEY, CA 94704
510 549-1906 WWW.TIPPINGSTRUCTURAL.COM

- "NAS Alameda Historic District, Historic District Assessment and Historic Preservation Strategy, Alameda Point Preliminary Development Concept", dated June 22, 2005, prepared by Page & Turnbull, Inc.
- Alameda Point Existing Buildings Map, dated August 13, 2014, prepared by Carlson, Barbee & Gibson, Inc.
- United States Department of the Interior, National Park Service/National Register of Historic Places Registration Form - Buildings, Structures, Objects, and Sites within the NAS Alameda Historic District List

Note, existing building drawings were not available at the time this report was written.

SITE VISITS

We performed a site visit on February 24, 2022 to observe the existing building. We were able to enter the office area and view both floors. We were able to view a portion of the existing roof framing and wall framing that was exposed in this area. On this site visit, we were unable to access the East side of the building, and only observed the partially collapsed roof area at the northeast wing of the building from the exterior.

We performed a second site visit on March 5, 2023 to observe the southeast wing of the building, where a fire had occurred in the summer of 2022, causing additional damage to the structure. We were able to view the exposed high-bay roof truss framing, perimeter wood columns, and roof sheathing in this area, at areas both with and without fire damage. We also noted the presence of what appear to be temporary shoring columns supporting the mid-span of some roof trusses.

We performed a third site visit on October 3, 2024 to walk around the perimeter of the building. We specifically reviewed the exterior wall along W. Midway Avenue, where the building has partially collapsed and the exterior wall is bowing out toward the street and newly placed sidewalk. We were able to look through open doors and broken windows to view the exposed high-bay roof truss framing at both the fire damage south wing and partially collapsed north wing. The extent of the roof collapse and damage at the north wing had visibly increased since our previous visits (see Appendix B for visual documentation of the progressive disrepair over time). The bowing and damage of the north perimeter wall along W. Midway clearly was more pronounced and more extensive in area than in years past. It appears that the extent of roof collapse had increased as well. We understand that the building has been given a "Declaration of Unsafe Building and Notice to Vacate" order by Alameda's Chief Building

Official, dated September 28, 2024. Based on our observations of the extensive disrepair, we certainly agree with the findings of the Chief Buidling Official.

Please note that on our visits, we only observed structural elements that were readily visible and did not remove any existing finishes to expose concealed structural elements. We did not perform any calculations to verify the adequacy of any structural members.

BUILDING DESCRIPTION

Building 114 is a roughly 70,000 square foot, U-shaped building located at 2450 Saratoga Street in the Naval Air Station in Alameda Point. It was originally built in 1944 to serve as a Public Works and Maintenance Shop for use during World War II and had continued to be used as a Public Works facility for some time afterwards. The building has stood vacant for the last several years. A two-story office area is located at the West end of the building, while the maintenance shops are located at the East side of the building in double height spaces. According to the 1992 Architectural Inventory prepared by Sally Woodbridge, the building is representative of "utilitarian, semi-permanent" structures found on the base. Because it was built in the central core of base and served as a public works building for many years, the building contributes to the Naval Air Station Alameda Historic District.

Gravity System

The existing structure consists of wood framing and the roof appears to have built-up roofing over wood sheathing. The exterior wood stud walls have wood sheathing and are clad with weatherboard siding. Additionally, there is a parapet at the perimeter walls. At the two-story office area at the West end of the building, the floor and roof wood diaphragms are supported by woods joists that span to wood bearing walls. At the double height maintenance shop areas at the East side of the building, the roof wood diaphragm is supported by wood joists that span to long-span wood trusses. The trusses frame into intermediate wood columns. Interior intermediate wood columns have knee braces at the roof level. The ground floor has a concrete slab-on-grade. Due to limited access, we were unable to determine the foundation system. It is assumed the bearing walls and columns are founded on a light foundation system. Based on available records, it has been determined minor alterations were made at the openings in the exterior walls.

Lateral Force Resisting System

Based on our past experiences with structures of this type and our limited observations from our site visit, it is assumed the seismic forces are resisted by a flexible diaphragm at the roof and exterior walls with wood sheathing. There are several window and door openings in the exterior walls. It is assumed

these openings are framed with conventional header and jamb framing elements.

It is unlikely that modern wood sheathing materials (i.e. plywood) are used to provide seismic resistance at the roof diaphragm or perimeter walls; however, evidence of a plywood ceiling below the roof joists was visible on site. It is further unlikely that modern metal hardware (clip angles, hold downs and bolts) is used to ensure a continuous load path to the from the roof diaphragm, through the shearwalls, to the foundation. The sheathing used is likely to be straight or diagonal board sheathing, although this has not been verified. Lastly, the proportions of the foundations and their reinforcing have not been verified, but are unlikely to meet modern code requirements.

OBSERVATIONS AND DISCUSSION

Structural Damage

At the office area on the West side of the building, we were able to view a portion of the existing roof framing and wall framing that was exposed in this area. The joists, roof sheathing and wall studs all appeared to be in good condition (Figure A.1 and A.2). The slab-on-grade at the ground floor exhibited significant cracking and is worn down at the entrance area (Figure A.3). We were unable to observe the condition of the sheathing and studs at the exterior walls at the office area.

At the East side of the building, we observed a partial roof collapse at the north wing. It appears a wood truss has failed, causing several roof beams and roof sheathing to fall. The collapsed roof structure has also caused damage to an adjacent exterior wall (Figure A.4, and Appendix B), which has been getting progressively worse over the past several years, and poses a collapse hazard to the adjacent sidewalk and site areas if not properly shored.

At the south wing of the building, the 2022 fire led to the destruction of the roof structure over a whole bay of framing (Figure A.5). The remaining walls and framing in this bay were significantly charred leaving them in a state where structural integrity is questionable, and replacement is required (Figure A.6). Firefighting activities adjacent to the fire created additional damage to the roof structure in the vicinity (Figure A.7).

The exposed wall studs, wall sheathing, roof framing and roof sheathing appear to be in poor to fair condition at the surrounding areas of the East wings not directly impacted by the partial roof collapse and fire.

Nonstructural Damage

There is extensive nonstructural damage at Building 114 as a result of a lack of maintenance and

vandalism during its vacancy. The exterior siding is deteriorating and peeling at all sides of the building. The glass in many of the windows at the exterior walls are broken (Figures A.8 and A.9). There are holes in the gypsum board at the interior walls and ceiling in many locations (Figure A.1 and A.2). The floor finishes in the office areas are damaged (Figure A.10).

Existing Structure Seismic Performance Overview

Based on industry guidelines for the retrofit of existing buildings, our past experiences with structures of this type and our observations from our site visit, we have provided an overview of the structure's expected seismic performance and have listed typical seismic deficiencies for this type of building:

- **Lack of Strength and Stiffness:** Older wood structures tend to lack sufficient overall strength and stiffness to meet current seismic demands. These structures contain old materials that may have deteriorated over time and exhibit a lose of strength. Also, older buildings were often not designed to have as strong of a lateral force resisting system as required by modern code standards. These deficiencies will result in damage under a strong seismic event.
- **Horizontal Building Irregularity – Reentrant Corners:** Building 114 has several reentrant corners due to its U-shape and the architectural setbacks at the corners at the West side of the building. This irregularity can cause significant twisting of the building in response to a seismic event, leading to damage.
- **Lack of Interconnection:** Light frame wood buildings built during this time period tend to lack sufficient metal hardware to provide a continuous load path from diaphragms, to shearwalls, to foundations. This lack of connection could cause unanticipated shear, overturning, or sliding failures during a large seismic event.

RECOMMENDATIONS

In order to address structural damage and retrofit the existing structure to meet current code standards, we recommend the following structural repairs:

- **Remove and Replace Damaged Roof Framing and Additional Fire Damage:** Repair the roof framing that was damaged due the partial collapse (north wing), fire (south wing), and other water-damaged framing elements. At the partially collapsed north wing, and fire damaged south wing, framing, trusses and damaged wall and column supports should be replaced in the same configuration and designed to meet current code provisions.
- **Add Roof Sheathing:** Provide a new plywood sheathing overlay with sufficient nailing to provide a modern-code compliant diaphragm. This will improve the overall strength and stiffness of the

structure.

- **Add Roof Collector or Chord Elements:** To address the increased seismic demands at the reentrant corners, add either wood or steel collector/tie members above or below the diaphragm. This will strengthen the diaphragm and improve load distribution to lateral force resisting elements.
- **Remove and Replace Wall Sheathing at Perimeter and Select Interior Walls:** Remove the existing interior face wall sheathing and replace it with plywood sheathing, fasteners and hardware. This will improve the overall strength and stiffness of the structure.
- **Add Floor Sheathing:** Provide a new plywood sheathing overlay with sufficient nailing to provide a modern-code compliant diaphragm at the second floor office area at the west side of the building. This will improve the overall strength and stiffness of the structure.
- **Add New Anchorage from Ground Floor Shearwalls to Foundation:** The addition of new anchors between plywood sheathed shearwall elements and their foundations will improve structural interconnection, resist sliding shear and prevent uplift.
- **Strengthened Foundations:** Providing new concrete footings doweled to the existing footings at select locations will provide additional overturning resistance.

ROUGH ORDER OF MAGNITUDE PRICING

As part of this evaluation, we are providing rough order of magnitude, preliminary pricing for the structural repairs recommended above. Please note that this estimate does not include costs to remediate any hazardous materials, or rehabilitate non-structural or architectural elements, including demo and put-back required to install the structural elements described. The figures below represent estimates of construction "hard costs"; they do not include estimates of project "soft costs" such as design, management, permitting, etc.

Further, please note that Tipping Structural Engineers has limited experience and does not have expertise in the field of cost estimating, nor does our contract with the City of Alameda include fees to engage a subconsultant with cost estimating expertise. These estimates are provided based on our experience and familiarity with other projects of similar scope. However, the information provided must be recognized as preliminary and we recommend that an independent cost estimator should be engaged if greater confidence in the numbers is warranted at this time.

Below are our pricing estimates for the proposed structural repairs:

Repair Item	Cost
Replace Damaged Roof Framing (Fire and Collapse)	$1,750,000
Add Plywood Roof Sheathing	398,000
Roof Collectors and Ties	58,000
Plywood Wall Sheathing Retrofit	1,135,000
Add Plywood Floor Sheathing	455,000
Shear Wall Foundation Anchorage	400,000
Strengthened Foundations	570,000
Total	$4,766,000

STRUCTURAL FEASIBILITY OF PARTIAL DEMOLITION

As can be seen in the above pricing estimate, a large percentage of the cost associated with rehabilitating this structure comes from the work at the east maintenance shop wings of the building. Given their disrepair and fairly extensive areas of partial collapse, the work to rehabilitate those portions of the structure is essentially a reconstruction effort, rather than a retrofit effort. As such, we have been asked to opine on whether it is structurally feasible to partially demolish the building, by removing the high-bay east wings, and leaving the two story administration office structure at the west end of the site.

This option is structurally feasible, with only localized structural modifications required at the office structure. If the high-bay maintenance shops were removed, the main structural modification to the offices would be to provide a wood stick framed wall (perhaps with a new footing) to act as an exterior closure/facade where the maintenance shops were removed.

FIELD INVESTIGATIONS AND TESTING

As noted above, during our site visit, we only observed structural elements that were readily visible and did not remove any existing finishes to expose concealed structural elements. Given that no structural drawings have been provided, we have limited information to document the actual structural framing assemblies used. As such, we have made assumptions as necessary. Should a more detailed understanding of the actual framing assemblies be required, we recommend engaging a testing lab and/or contractor to perform non-destructive testing and removal of finishes so as to expose more of the existing structure. Further investigation would also allow for a more precise understanding of the extend of water damaged wood framing. We would be happy to work with you to coordinate such work

at your request.

LIMITATIONS

The recommendations provided herein are general and qualitative in nature. We emphasize that this is a cursory review intended to guide preliminary planning. The conclusions and recommendations outlined herein may be subject to revision on the basis on new information as it becomes available.

Our professional services have been performed exercising the degree of care and skill ordinarily used in like cases by reputable members of the same profession practicing in the same or similar locality under similar circumstances, and using reasonable diligence and judgment in the exercise of professional skill and care. No other warranties, expressed or implied, are made as to the professional advice included in this report. This report has been prepared for the City of Alameda, to be used solely for the referenced project. This report has not been prepared for use by other parties and may contain insufficient information for the purposes of other parties or other uses.

Please call if you have any questions.

Sincerely,

Marc Steyer, SE
Principal

2024-10-08 Alameda Point - Building 114 Updated Evaluation - 2024.odt

Appendix A

ALAMEDA POINT – BUILDING 114 UPDATED EVALUATION

2450 Saratoga St.
Alameda, CA 94501

October 9, 2024
Job No. 2022.040.02

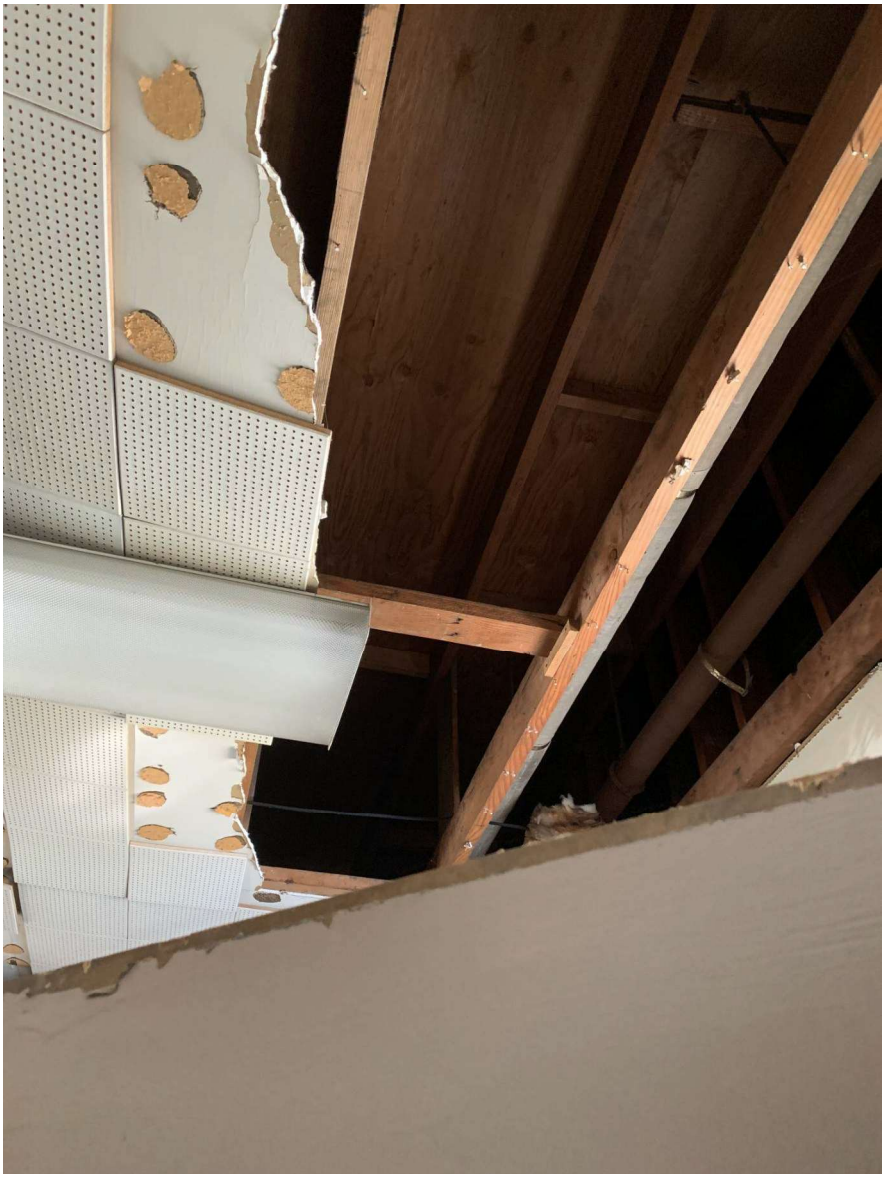

Figure A.1 – Exposed roof framing and sheathing.

Figure A.2 – Exposed wall studs.

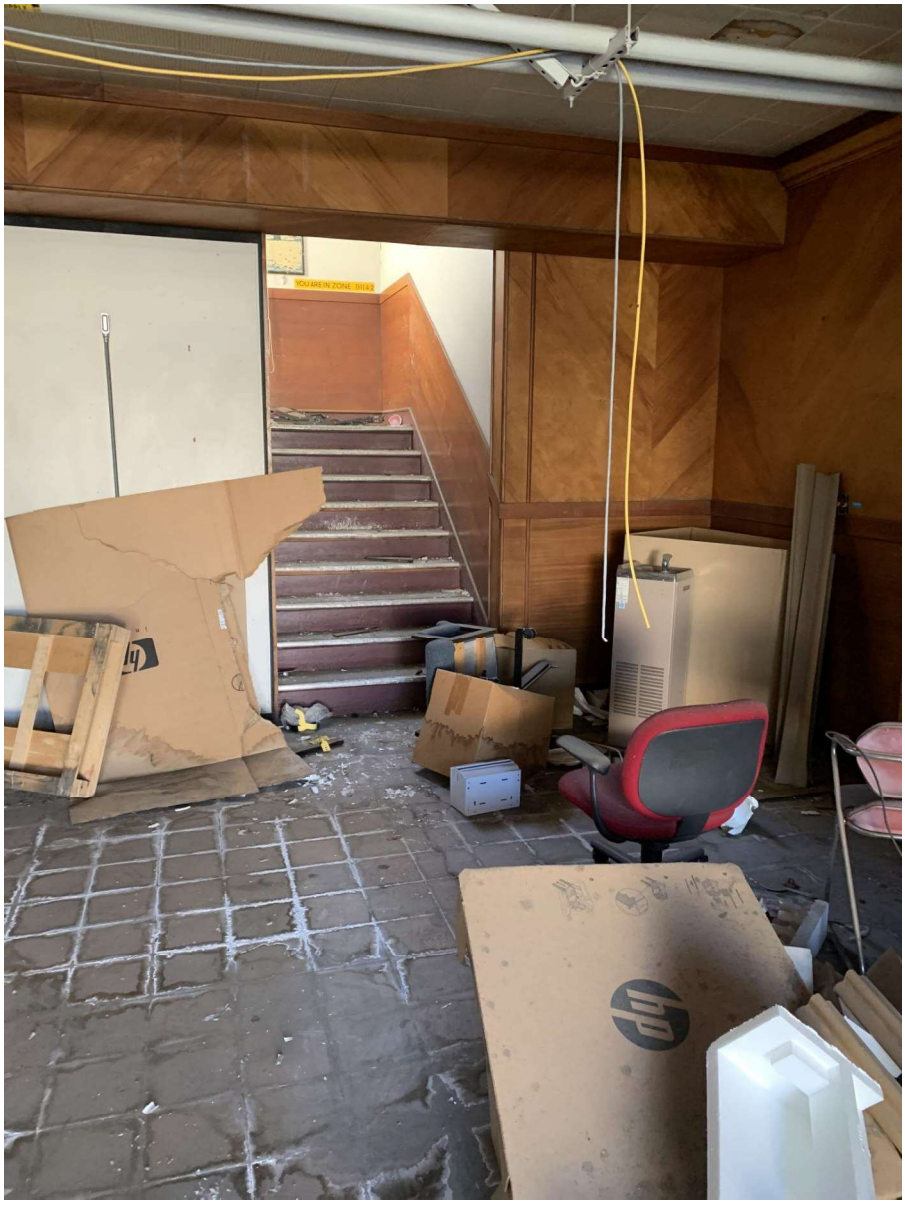

Figure A.3 – Slab-on-grade at ground floor.

Figure A.4 – Collapsed roof at East side of building.

Figure A.5 – Fire damaged roof bay at East end of South wing.

Figure A.6 – Fire damaged wall framing at East end of South wing.

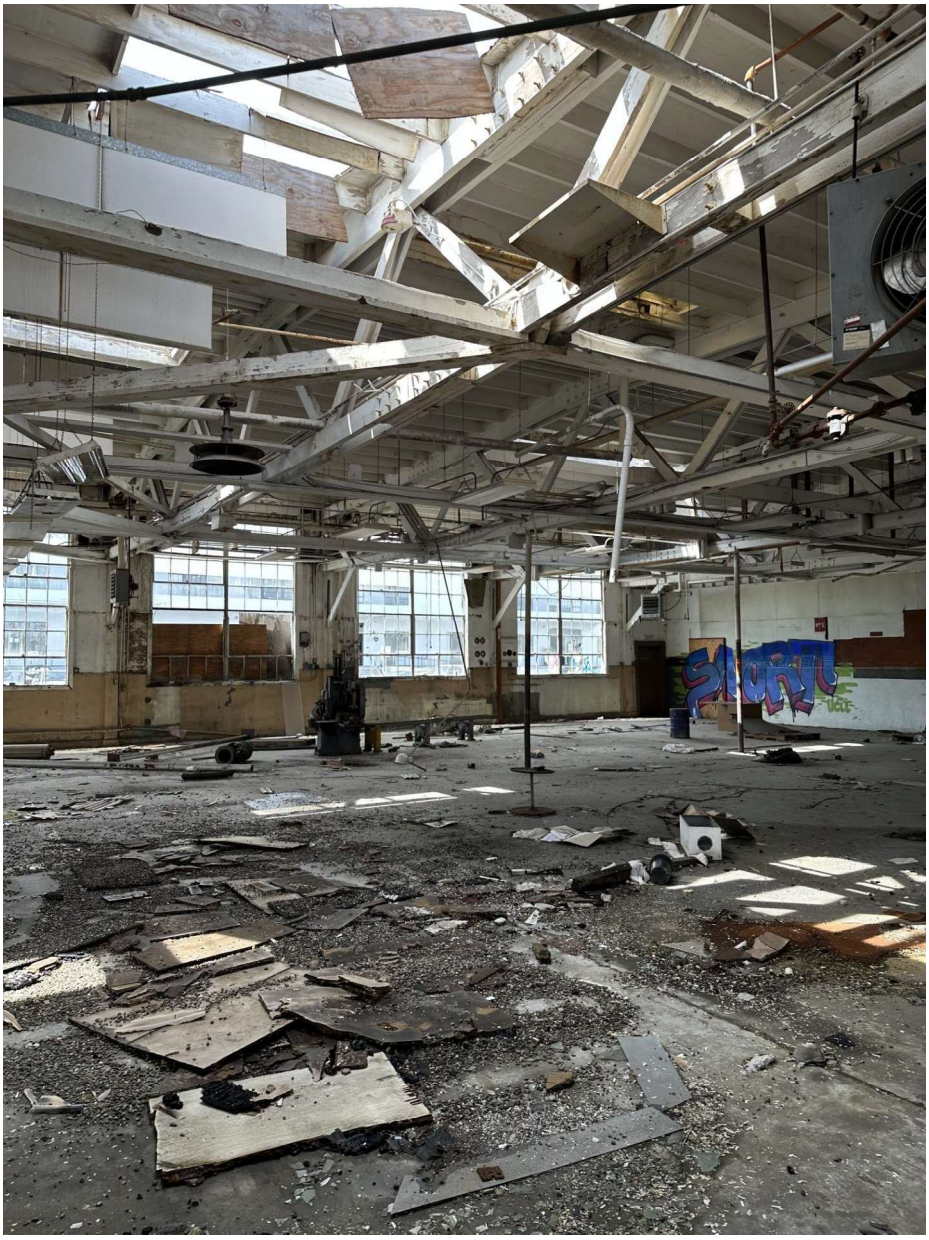

Figure A.7 – South wing high bay typical structure and damage from firefighting activity; suspected temporary truss shoring columns in view.

Figure A.8 – Exterior siding and windows.

Figure A.9 – Exterior Siding and Windows.

Figure A.10 – Interior floor finishes.

Appendix B

ALAMEDA POINT – W. MIDWAY AVENUE FACADE & ROOF DETERIORATION TIMELINE

2450 Saratoga St.
Alameda, CA 94501

October 9, 2024
Job No. 2022.040.02

Figure B.1 - West Midway Avenue Facade Photo Taken October 3, 2024

22

Figure B.2 - West Midway Avenue Google Street View Photo Taken May 2022

Figure B.3 - West Midway Avenue Google Street View Photo Taken June, 2021

Figure B.4 - West Midway Avenue Google Street View Photo Taken March, 2018

Figure B.5 - Aerial Google Earth Photo Taken April, 2024

Figure B.6 - Aerial Google Earth Photo Taken May, 2023

Figure B.7 - Aerial Google Earth Photo Taken February, 2022

Figure B.8 - Aerial Google Earth Photo Taken September, 2021