SAN FRANCISCO
PLANNING DEPARTMENT

MEMO

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DATE:	November 28, 2018
TO:	Historic Preservation Commission
FROM:	Natalia Kwiatkowska, Senior Preservation Planner, (415) 575-9185
REVIEWED BY:	Tim Frye, Historic Preservation Officer, (415) 575-6822
RE:	**Review and Comment: 1170 Harrison Street** **Case No. 2015-016239PRJ**

BACKGROUND

The Planning Department (Department) seeks the advice of the Historic Preservation Commission (HPC) on the proposed project at 1170 Harrison Street. 1170 Harrison Street is located within the WMUG (Western Soma Mixed Use-General) Zoning District, Western SoMa Special Use District, and a 55-X Height and Bulk District. The subject property, known as San Francisco Galvanizing Works, is on the Historic Preservation Commission's Landmark Designation Work Program.

The proposed project entails a change in use from industrial to office use. Within the WMUG Zoning District, office use is only permitted in qualified historic properties pursuant to Planning Code Section 803.9(b). As stated in Planning Code Section 803.9(b)(3):

> This subsection applies only to buildings in the WMUG District that are a designated landmark building per Article 10 of the Planning Code, buildings designated as Category I-IV pursuant to Article 11 of this Code and located within the Extended Preservation District, or a building listed in or determined individually eligible for the National Register of Historic Places or the California Register of Historical Resources by the State Office of Historic Preservation.
>
> (A) Office uses, as defined in Planning Code Section 890.70, are principally permitted, provided that:
>
> (i) Prior to the issuance of any necessary permits, the Zoning Administrator, with the advice of the Historic Preservation Commission, determines that allowing the use will enhance the feasibility of preserving the building.
>
> (ii) The Historic Preservation Commission shall review the proposed project for compliance with the Secretary of the Interior's Standards, (36 C.F.R.. § 67.7 (2001)) and any applicable provisions of the Planning Code.

The proposed project qualifies for use of Planning Code Section 803.9(b), since the subject building at 1170 Harrison Street has been determined to be individually eligible for listing in the

California Register of Historical Resources. As adopted by the Historic Preservation Commission in February 2011, the subject building was assigned a California Historic Resource Status Code (CHRSC) of "3B," which designates it as "appears eligible for NR both individually and as a contributor to a NR eligible district through survey evaluation." 1170 Harrison Street was also identified eligible for Article 10 and the HPC included the property on its Landmark Designation Work Program on August 17, 2016 with an identified period of significance from 1913 to 1929.

PROPERTY DESCRIPTION

1170 Harrison Street is located on a rectangular lot (measuring approximately 10,000 square feet) with 110 feet of frontage on Harrison Street and 100 feet of frontage on Berwick Place. Currently, the project site contains a one-story, industrial building, which was constructed in two phases resulting in an Art Moderne style:

1. The west section of the building was completed in 1913.
2. In 1929 an east addition unified the structures and represents the property as it's seen today, in particular the dynamic and highly-stylized Harrison Street elevation.

CHARACTER-DEFINING FEATURES

The character-defining features of 1170 Harrison Street, as described in National Park Service evaluation (included as an attachment), dated May 11, 2016, include:

- Double-height, one-story, scale and massing
- Emphasis on horizontality, including the flat roofline created by the concrete parapet
- Reinforced concrete construction
- Hip and gable roofs with twin monitor roofs
- Central nine-bay bank of windows at Harrison Street façade
- Multi-lite steel industrial windows, including the riveted steel mullions and pivot windows
- Stepped concrete detailing and horizontal banding at Harrison Street façade
- Incised lettering and raised medallions at the upper portion of the Harrison Street façade

The Department concurs with the character-defining features identified above by Page & Turnbull and would like to include the following features on the interior:

- Connected two open volumes
- Spatial relationship and visibility of the roof monitors on the interior of the space
- Steel frame truss systems supporting the roofs

PROJECT DESCRIPTION

The proposed project entails a change in use of approximately 10,000 square feet from industrial to office use, a one-story vertical addition, addition of a roof deck, insertion of a mezzanine floor, alterations to the Harrison Street and Berwick Place elevations, and other interior alterations, resulting with approximately 21,500 square feet of office use. The project also includes restoration of the deteriorated character-defining features associated with the historic resource.

As part of the proposed project, the Project Sponsor would remove non-historic features and would restore important exterior elements. The project would replace the existing non-historic garage roll-up doors with new powder-coated, aluminum-sash storefronts within restored historic openings with powder-coated security gates, restore window and storefront steel frames and replace single pane glazing, repair exterior concrete, and paint exterior wall.

To further support the preservation of the subject building, the Project Sponsor has also submitted a Historic Building Maintenance Plan, which outlines a program for the proposed work and regular maintenance and repair of the subject property, which is included as an attachment. The proposed work is described in more detail in the attached architectural plans and HBMP.

STAFF ANALYSIS

The Department would like the HPC to consider the following information:

Rehabilitation is the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

The project has been revised to fully address the recommendations provided by the Architectural Review Committee (ARC) on January 17, 2018, included as an attachment. In summary, these recommendations include further sculpting of the proposed vertical addition, addressing the removal of the roof monitor in an architectural matter that's reflected in the design, and further refinement of the relationship of the proposed mezzanine floor with the glazing facing Berwick Place. The proposal has been revised to address the recommendations, see details below:

- The proposed vertical addition was further sculpted with an approximately 25-foot setback from the front building wall, measuring approximately 60 feet in width and 53 feet in depth, consistent with the recommendations.
- The partial removal of one of the roof monitors is reflected in the design by the addition of a pitched skylight in the roof of the vertical addition and a custom brass metal inlay in the third-floor concrete at the location of the removed monitor.
- The proposed mezzanine along Berwick Place will be setback approximately 1-foot from the interior wall and will feature a mounted bent steel plate that aligns with the window sash. Please note, any floor opening over ½ inch is considered a hazard under the accessibility code and would require curbs or handrail. Additionally, the depth of the beam was reduced by the addition of another column; thereby obscuring less of the windows due to the reduced floor thickness.

Based upon a review of the proposed project per the Secretary of the Interior's Standards for Rehabilitation (Rehabilitation Standards), the change in use from industrial to office would be considered a compatible use with the former concrete warehouse. As noted in Rehabilitation Standard 1, "A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment." This new use requires minimal change to the defining characteristics of 1170 Harrison Street, and the property would maintain its status as an individually-eligible historic resource. Further, the Historic Building Maintenance Plan proposed by the Project Sponsor appropriately addresses a cyclical maintenance program for 1170 Harrison Street, and seeks to proactively correct any material deficiencies with exterior walls; door, windows and glazing; exterior details; and roof.

RECOMMENDATIONS

The Department finds the proposed project to be in compliance with the Secretary of the Interior's Standards for Rehabilitation. Further, the Department finds that the proposed project would enhance the feasibility of preserving the building by providing for a compatible new use, restoring important exterior elements and an on-going cyclical maintenance program. This maintenance plan would improve the viability of preserving the subject building. In addition, the building's new use would maintain and not impact the building's historic integrity and historic status. The Department recommends the Project Sponsor continue working with staff on further refinement of the proposed aluminum-sash storefront system to bring the project further in conformance with the Standards.

CONDITIONS OF APPROVAL

- The Project Sponsor shall continue working with staff on refinement of the proposed aluminum-sash storefront system to a simplified design in order to bring the project further in conformance with the Standards.

REQUESTED ACTION

The Department is requesting adoption of a resolution from the Historic Preservation Commission regarding the proposed project and its ability to enhance the feasibility of preserving the historic building, in order to assist the determination by the Zoning Administrator pursuant to Planning Code Section 803.9(b). In addition, the Department seeks confirmation on the project's compliance with the Secretary of the Interior's Standards for Rehabilitation.

ATTACHMENTS

- Draft Resolution
- Exhibits including:
    - Parcel Map
    - Sanborn Map

- Zoning Map
- Aerial Photo
- Site Photo

- Department of Parks and Recreation B Form, dated September 2009
- National Park Service Historic Preservation Certification Application, dated May 11, 2016
- Meeting Notes from January 17, 2018 ARC hearing
- Project Sponsor Submittal including:
  - Historic Building Maintenance Plan, dated October 29, 2018
  - Architectural Drawings, dated November 19, 2018

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Historic Preservation Commission
Draft Resolution

HEARING DATE: DECEMBER 5, 2018

Case No.:	**2015-016239PRJ**
Project Address:	**1170 Harrison Street**
Zoning:	WMUG (Western SoMa Mixed Use-General) Zoning District Western SoMa SUD (Special Use District)
Block/Lot:	3755/029
Project Sponsor:	Dan Frattin, Partner Rueben, Junius & Rose, LLP 1 Bush Street, Suite 600 San Francisco, CA 94104 dfrattin@reubenlaw.com
Staff Contact:	Natalia Kwiatkowska – (415) 575-9185 natalia.kwiatkowska@sfgov.org
Reviewed By:	Tim Frye – (415) 575-6822 tim.frye@sfgov.org

ADOPTING FINDINGS PURSUANT TO PLANNING CODE SECTION 803.9(B) REGARDING THE FEASBILITY OF PRESERVING A HISTORIC BUILDING AT 1170 HARRISON STREET (ASSESSOR'S BLOCK 3755, LOT 029), LOCATED WITHIN WMUG (WESTERN SOMA MIXED USE-GENERAL) ZONING DISTRICT, WESTERN SOMA SPECIAL USE DISTRICT AND 55-X HEIGHT AND BULK DISTRICT.

PREAMBLE

WHEREAS, on August 11, 2016, Rueben, Junius & Rose, LLP ("Project Sponsor") filed an application with the San Francisco Planning Department (hereinafter "Department") for a change of use of the subject property including: one-story vertical addition, addition of a roof deck, insertion of a mezzanine floor, alterations to the Harrison Street and Berwick Place elevations, and other interior alterations.

WHEREAS, the proposed project intends to utilize Planning Code Section 803.9(b) to allow a change in use of approximately 10,000 square feet from industrial to office, a one-story vertical addition, addition of a roof deck, insertion of a mezzanine floor, alterations to the Harrison Street and Berwick Place elevations, and other interior alterations, resulting with approximately 21,500 square feet of office use at 1170 Harrison Street. Pursuant to Planning Code Section 803.9(b), the following provision is intended to support the economic viability of buildings of historic importance within an Eastern Neighborhoods Mixed Use District:

> This subsection applies only to buildings in the WMUG District that are a designated landmark building per Article 10 of the Planning Code, buildings designated as Category I-IV pursuant to Article 11 of this Code and located within the Extended

Preservation District, or a building listed in or determined individually eligible for the National Register of Historic Places or the California Register of Historical Resources by the State Office of Historic Preservation.

(A) Office uses, as defined in Planning Code Section 890.70, are principally permitted, provided that:

(i) Prior to the issuance of any necessary permits, the Zoning Administrator, with the advice of the Historic Preservation Commission, determines that allowing the use will enhance the feasibility of preserving the building.

(ii) The Historic Preservation Commission shall review the proposed project for compliance with the Secretary of the Interior's Standards, (36 C.F.R.. § 67.7 (2001)) and any applicable provisions of the Planning Code.

WHEREAS, on December 5, 2018, the Department presented the proposed project to the Historic Preservation Commission. The Commission’s comments on the compliance of the proposed project with the Secretary of the Interior’s Standards for Rehabilitation and the ability of the proposed project to enhance the feasibility of the historic resource would be forwarded to the Zoning Administrator for consideration under Planning Code Section 803.9(b).

THEREFORE BE IT RESOLVED that the Historic Preservation Commission has reviewed the proposed project at 1170 Harrison Street, on Lot 029 in Assessor’s Block 3755, and this Commission has provided the following comments:

- The Project Sponsor shall continue working with staff on refinement of the proposed aluminum-sash storefront system to a simplified design in order to bring the project further in conformance with the Standards.
-

BE IT FURTHER RESOLVED that the Historic Preservation Commission hereby directs its Recording Secretary to transmit this Resolution, and other pertinent materials in the Case File No. 2015-016239PRJ to the Zoning Administrator.

I hereby certify that the foregoing Resolution was ADOPTED by the Historic Preservation Commission at its regularly scheduled meeting on December 5, 2018

Jonas P. Ionin
Commission Secretary

AYES:

NAYS:

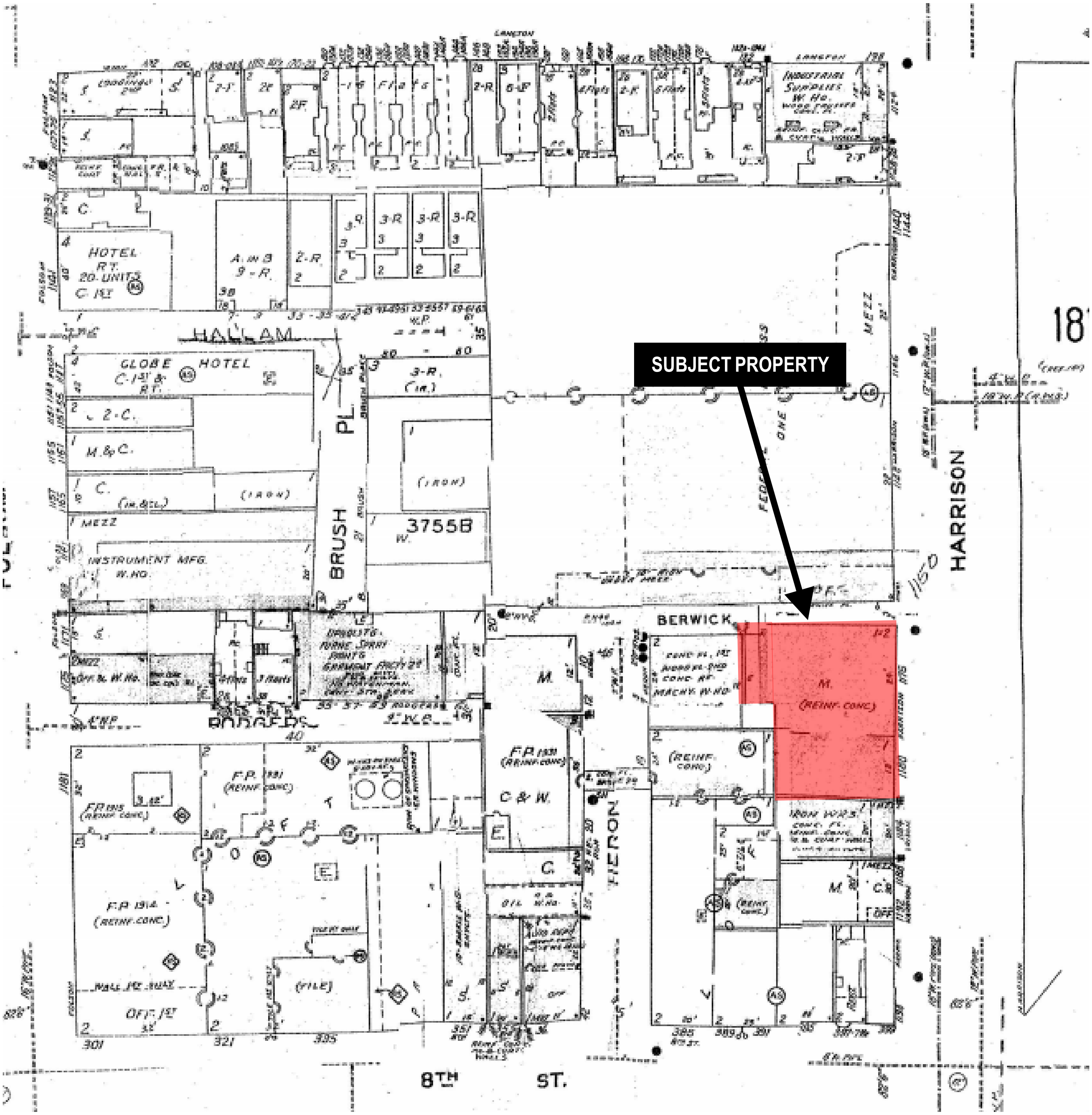
ABSENT:

ADOPTED: December 5, 2018

Parcel Map

Review and Comment
Case Number 2015-016239PRJ
1170 Harrison Street

Sanborn Map*

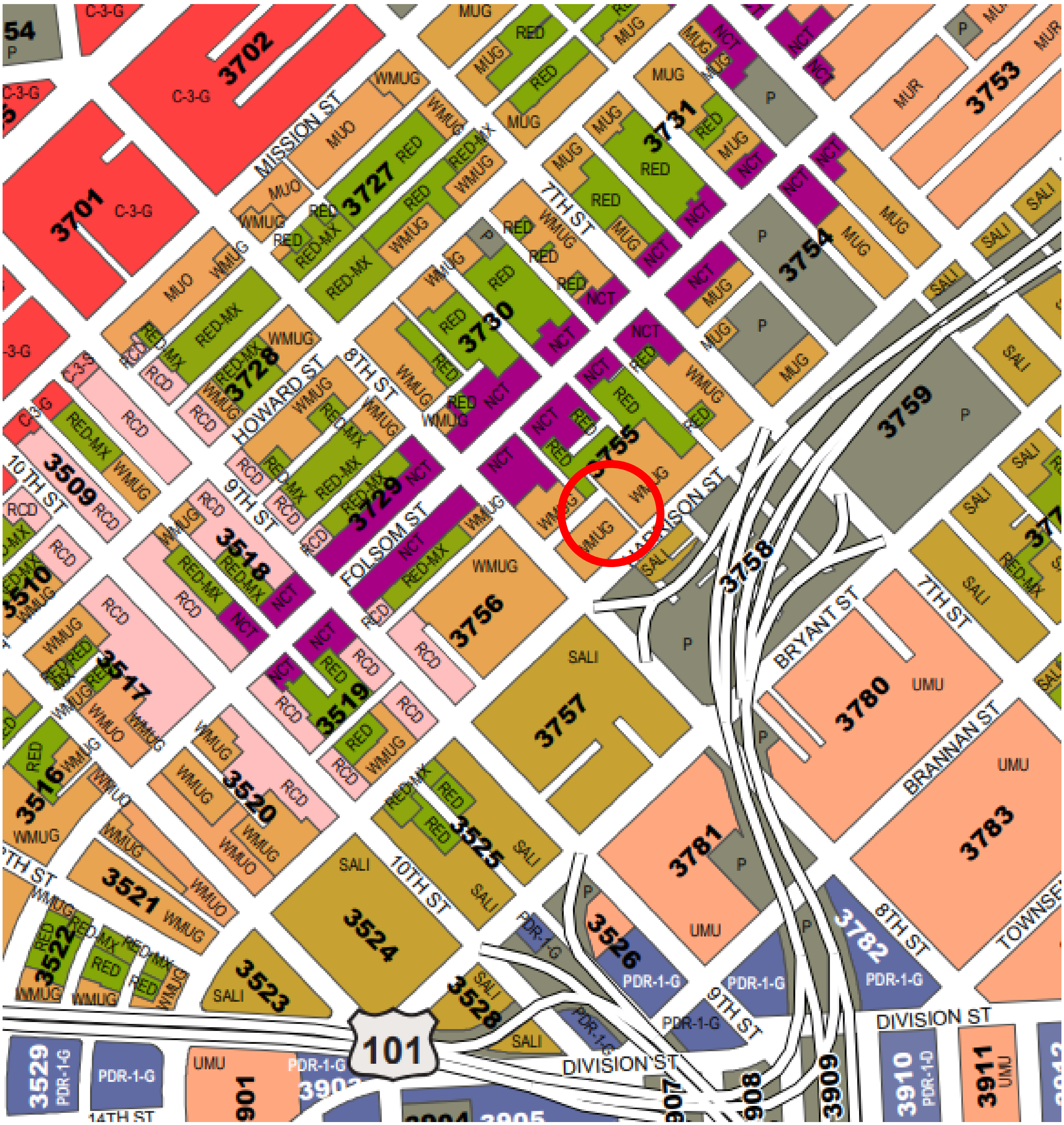


*The Sanborn Maps in San Francisco have not been updated since 1998, and this map may not accurately reflect existing conditions.

Review and Comment
Case Number 2015-016239PRJ
1170 Harrison Street

SAN FRANCISCO
PLANNING DEPARTMENT

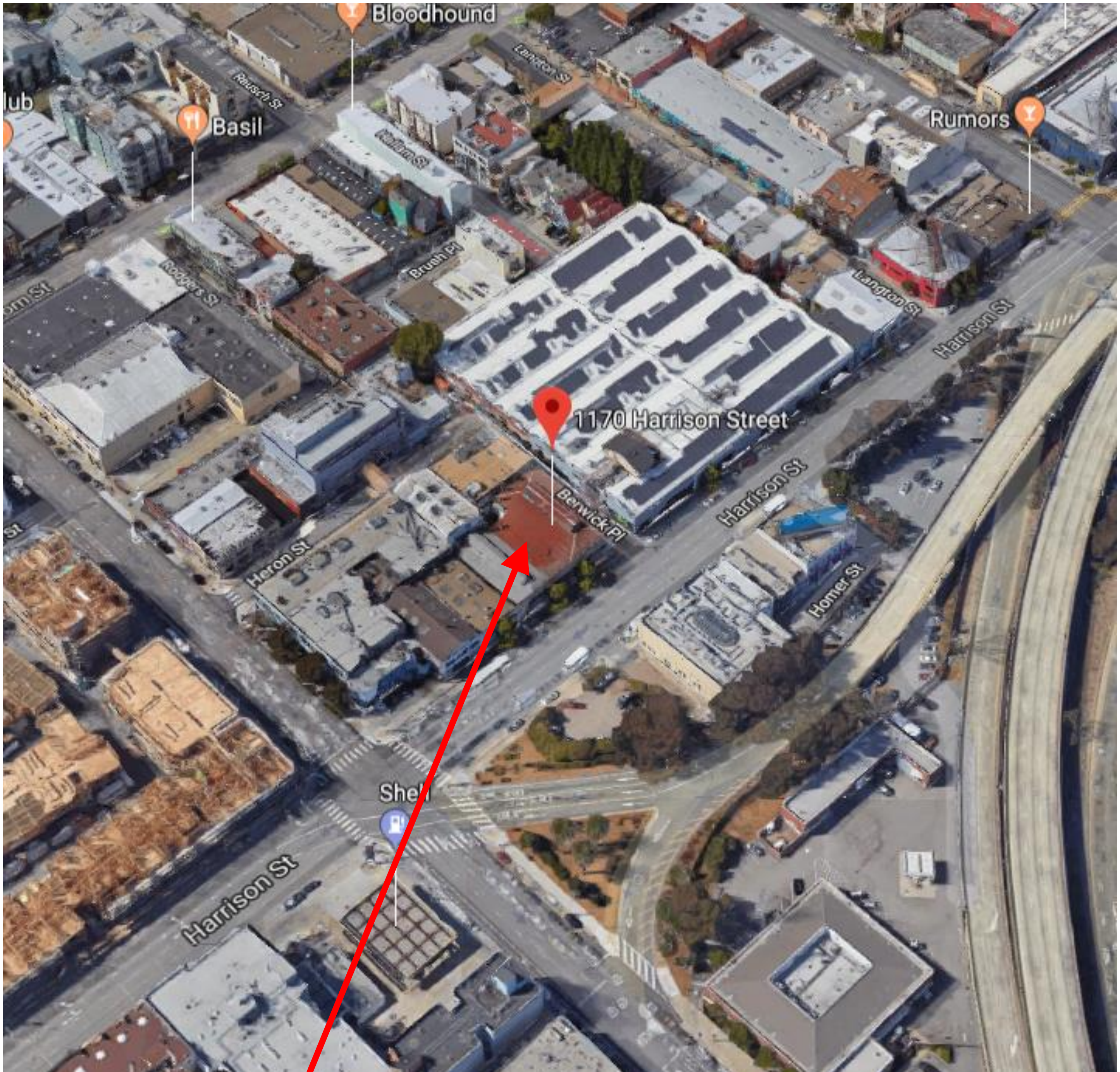
Zoning Map



Review and Comment
Case Number 2015-016239PRJ
1170 Harrison Street

SAN FRANCISCO
PLANNING DEPARTMENT

Aerial Photo



1170 HARRISON ST

Review and Comment
Case Number 2015-016239PRJ
1170 Harrison Street

Site Photo

Review and Comment
Case Number 2015-016239PRJ
1170 Harrison Street

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
CHR Status Code:

Other Listings
Review Code   Reviewer   Date

    Resource Name or #: (Assigned by recorder) **1170 HARRISON ST**

P1. Other Identifier: 1170 - 1176 Harrison Street; San Francisco Galvanizing Works

***P2. Location:** ☐ **Not for Publication** ☑ **Unrestricted**

***a. County:** San Francisco

***b. USGS Quad:** San Francisco North, CA **Date:** 1995

c. Address: 1170 HARRISON ST **City:** San Francisco **ZIP** 94103

d. UTM Zone: **Easting:** **Northing:**

e. Other Locational Data: Assessor's Parcel Number 3755 029

***P3a. Description:** (Describe resource and major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

1170 - 1176 Harrison Street is located on a 9,796 square-foot irregular-shaped lot on the northwest corner of Harrison Street and Berwick Place. 1170 - 1176 Harrison Street consists of 2 separate buildings; the east section was constructed in 1912 and the west section was constructed in 1929. The buildings were unified by the present façade in 1929, as well. 1170 - 1176 Harrison Street is a 1-story, steel and reinforced concrete industrial building designed in the Art Moderne style. The rectangular-plan building, clad in smooth concrete, is capped by a hip roof with a monitor above the east section and a gable roof with a monitor above the west section. The foundation is concrete. The primary façade faces south. Entrances include 2 partially-glazed metal doors and 2 roll-up metal garage doors. The secondary façade contains paired partially-glazed metal doors. Typical fenestration consists of fixed multi-light industrial steel-sash windows. Architectural details include an incised sign that reads "San Francisco Galvanizing Works," concrete beltcourses, a stepped recessed bay, galvanized metal rivets, and a parapet.

The building appears to be in good condition.

***P3b. Resource Attributes:** (List attributes and codes) HP8. Industrial Building

***P4. Resources Present:** ☑ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other

P5a. Photo

P5b. Description of Photo:
View of primary façade on Harrison Street. 3/9/2008

***P6. Date Constructed/Age:**
☑ Historic ☐ Prehistoric ☐ Both

1912; 1929 Original Building Permit

***P7. Owner and Address**
HOECK SUSAN 1993 TRUST THE
JEFFREY HOECK CO-TRUSTEE

SAN FRANCISCO CA 94103

***P8. Recorded By:**
Page & Turnbull, Inc. (CD/RS)
724 Pine Street
San Francisco, CA 94108

***P9. Date Recorded:** 6/18/2009

***P10. Survey Type:**
Reconnaissance

***P11. Report Citation:** (Cite survey report and other sources, or enter "None")
Eastern Neighborhoods SOMA Survey

***Attachments:** ☐ NONE ☐ Location Map ☐ Sketch Map ☑ Continuation Sheet ☑ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (list):

Primary #
HRI #
Trinomial

 Resource Name or #: (Assigned by recorder) 1170 HARRISON ST

***Recorded By:** Page & Turnbull, Inc. (CD/RS) ***Date Recorded:** June 2009 ☑ Continuation ☐ Update

Detail view of ornament on primary façade.
Source: Page and Turnbull

Detail view of entrance.
Source: Page and Turnbull

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI #
Trinomial

 Resource Name or #: (Assigned by recorder) 1170 HARRISON ST

***Recorded By:** Page & Turnbull, Inc. (CD/RS) ***Date Recorded:** June 2009 ☑ Continuation ☐ Update

View of secondary façade on Berwick Place.
Source: Page and Turnbull

Detail view of entrance on secondary façade.
Source: Page and Turnbull

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code 3S

 *Resource Name or # (assigned by recorder) 1170 – 1176 Harrison Street

B1. Historic name: San Francisco Galvanizing Works
B2. Common name: None
B3. Original Use: Industrial
B4. Present use Industrial
*B5. Architectural Style: Art Moderne

***B6. Construction History:** (Construction date, alterations, and date of alterations
Constructed in 1912. A 70' x 100' steel frame addition was made to the original building and a new front façade was designed in 1929.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** **Original Location:**

***B8. Related Features:** None.

B9a. Architect: Charles E.J. Rogers (1912); Dodge A. Riedy (1929) b. Builder: None

***B10. Significance: Theme** Commercial, Industrial, and Residential Development **Area:** South of Market, San Francisco, California
Period of Significance 1906 - 1929 **Property Type** Industrial **Applicable Criteria** 3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity)

1170 – 1176 Harrison Street was constructed in 1912 for Earl K. Cooley of San Francisco Galvanizing Works. The original portion of the building was designed by architect Charles E.J. Rogers, while Dodge A. Riedy redesigned the building with an addition in 1929. 1170 – 1176 Harrison Street possesses significance as an example of an Art Moderne industrial building in the South of Market Area, a mixed-use district of industrial, commercial, and residential buildings erected after the 1906 Earthquake and Fire. Prior to 1906, the site of 1170 Harrison Street was occupied by three single family dwellings, four small stores, and a flats building in a largely residential neighborhood. The area was rebuilt with a new industrial focus, and building booms occurred between 1906-13, 1918-20, and 1925-30.

(continued)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**
- The Foundation for San Francisco's Architectural Heritage: Field Survey Form- Buildings (1985)
- San Francisco Downtown Inventory Evaluation Sheet (1985)

(continued)

B13. Remarks:

***B14. Evaluator:** Christina Dikas, Page & Turnbull Inc.
***Date of Evaluation:** September 2009

(This space reserved for official comments.)

B10. Significance (continued)

1170 – 1176 Harrison Street first appears on the 1950 Sanborn Map as San Francisco Galvanizing Works, which was here from 1912 to 1971. Prior to this location, the company operated at 1160 Bryant Street. The original building was constructed in 1912 with a steel frame and corrugated iron. According to the 1913 Sanborn Map, the property was occupied by a building at 1180 Harrison Street and an iron foundry at the corner of Harrison Street and Berwick Place. A steel and reinforced concrete addition replaced the iron foundry in 1929. A continuous Moderne façade across the two buildings disguises the original section to the west, though the buildings feature separate roofs. Earl K. Cooley owned the property from at least 1912 to ca. 1946. Earlde W. Freitas and Sallie M. Heckscher were owners from ca. 1949 to at 1971. At this time, San Francisco Galvanizing Works vacated the building. Salvatore and Dorothy DeBella and family owned the property from 1971 to 1999, and operated the DeBella Wooden Barrel Factory. Jeffrey S. Hoeck and family have been owners from 1999 to 2008.

Little information was found on the original architect, Charles E.J. Rogers, at the San Francisco Public Library, the City of San Francisco, or SF Architectural Heritage. He designed at least three other buildings in San Francisco, worked at different locations in downtown San Francisco, and lived in Alameda.

Dodge A. Riedy, the designer of the 1929 addition, practiced in San Francisco from 1908 to 1953, and was City Architect of San Francisco from 1938 to 1953. Born and raised in San Francisco, Riedy began his career as a draftsman for William Curlett & Son from 1908 to 1912, worked for the Board of Public Works from 1913 to 1920, and ran a private practice from 1921 to 1937. He was director of the City Bureau of Architecture in 1944. He was known for designing schools and public buildings, and designed the Lawton, San Miguel, and West Portal schools. Though 1170 – 1176 Harrison Street was largely designed by Riedy, it is unclear whether it is a representative example of his work.

1170 – 1176 Harrison Street features a significant alteration, though it is now historic itself. A 70’ x 100’ steel frame addition was made to the original building and a new front façade was designed by Riedy in 1929. The project cost $16,000. The building has been little altered since then, and is still used for industrial purposes. Therefore, it retains integrity of location, design, setting, materials, workmanship, feeling, and association. Overall, the property retains historic integrity.

1170 – 1176 Harrison Street does not appear to be associated with events that have made a significant contribution to the broad patterns of our history such that it would be eligible under National Register Criterion A (California Register Criterion 1).

1170 – 1176 Harrison Street does not appear to be associated with any persons significant to the history of the State of California or the City of San Francisco such that it would be eligible under National Register Criterion B (California Register Criterion 2).

1170 – 1176 Harrison Street does appear eligible for local designation under National Register Criterion C (California Register Criterion 3) because it is an example of an industrial building that was constructed in the first building boom following the 1906 Earthquake and Fire, and redesigned in the Art Moderne style during the third building boom in the 1920s. The building features high artistic value in the riveted façade, stepped concrete and speedlines, and incised Art Moderne lettering. The design is very unique in the South of Market area. As discussed in the South of Market Area Context Statement:

> Small, one- and two-story concrete and masonry light industrial buildings are very common in the South of Market Area, so much that they define major street fronts along Howard, Folsom, Harrison and Bryant Streets. While their width depends on the size of the lot, the façades of this building type is quite consistent, consisting for the most part of a symmetrical arrangement of multi-lite steel sash windows and vehicular openings, often with an overhead rolling door occupying either the central bay or the end bays… Structurally, most buildings of this type are concrete with a grid of regularly spaced interior columns and either a gable or a bowstring truss roof supported by wood or steel trusses. Ornamentation is usually quite restrained, consisting for the most part of concrete or sheet metal string course moldings, shaped parapets, corbelling (if brick) and occasionally a simple classically detailed sheet metal cornice. Occasionally one will encounter more exotic revival styles such as Gothic, Byzantine, or Art Deco. (Page & Turnbull: 64).

The CHRSC of “3S” designates this property as “Appears eligible for NR as an individual property though survey evaluation.”

This property was not fully assessed for its potential to yield information important in prehistory or history, per National Register Criterion D (California Register Criterion 4).

Page 6 **of** 6 ***Resource Name or #** (Assigned by recorder) 1170 – 1176 Harrison Street

***Recorded by:** Page & Turnbull ***Date** September 2009 ☒ Continuation ☐ Update

B12. References (continued)

- Sanborn Fire Insurance Maps: 1899, 1913, 1950.
- San Francisco Assessor's Office, sales ledgers.
- San Francisco Block Books: 1906, 1909.
- San Francisco City Directories.
- San Francisco Dept. of Building Inspection, permit records and plans.
- Page & Turnbull, *Historic Context Statement: South of Market Area, San Francisco, California* (2 March 2007).

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

OMB Approved
No. 1024-0009
Form 10-168
Rev. 2014

HISTORIC PRESERVATION CERTIFICATION APPLICATION
PART 1 – EVALUATION OF SIGNIFICANCE

Instructions: This page must bear the applicant's original signature and must be dated. The National Park Service certification decision is based on the descriptions in this application form. In the event of any discrepancy between the application form and other, supplementary material submitted with it (such as architectural plans, drawings and specifications), the application form takes precedence. A copy of this form will be provided to the Internal Revenue Service.

1. Property Name 1170 Harrison Street (San Francisco Galvanizing Works)

Street 1170 Harrison Street

City San Francisco County SF State CA Zip 94103

Name of Historic District Western SOMA Light Industrial and Residential Historic District

☐ National Register district ☐ certified state or local district ☐ potential district

2. Nature of request (check only one box)

☐ certification that the building contributes to the significance of the above-named historic district or National Register property for rehabilitation purposes.
☐ certification that the building contributes to the significance of the above-named historic district for a charitable contribution for conservation purposes.
☐ certification that the building does not contribute to the significance of the above-named district.
☒ preliminary determination for individual listing in the National Register.
☐ preliminary determination that a building located within a potential historic district contributes to the significance of the district.
☐ preliminary determination that a building contributes to the significance of the district.

3. Project Contact (if different from applicant)

Name Carolyn Kiernat Company Page & Turnbull

Street 417 Montgomery Street, 8th Floor City San Francisco State CA

Zip 94104 Telephone (415) 593-4234 Email Address kiernat@page-turnbull.com

4. Applicant

I hereby attest that the information I have provided is, to the best of my knowledge, correct. I further attest that [check one or both boxes, as applicable] (1) ☒ I am the owner of the above-described property within the meaning of "owner" set forth in 36 CFR § 67.2 (2011), and/or (2) ☐ if I am not the fee simple owner of the above-described property, the fee simple owner is aware of the action I am taking relative to this application and has no objection, as noted in a written statement from the owner, a copy of which (i) either is attached to this application form and incorporated herein, or has been previously submitted, and (ii) meets the requirements of 36 CFR § 67.3(a)(1) (2011). For purposes of this attestation, the singular shall include the plural wherever appropriate. I understand that knowing and willful falsification of factual representations in this application may subject me to fines and imprisonment under 18 U.S.C. § 1001, which, under certain circumstances, provides for imprisonment of up to 8 years.

Name Ronaldo Cianciarulo Signature ______ Date ______

Applicant Entity Buddah Properties LLC SSN ______ or TIN 8-0447948

Street 827 De Haro Street City San Francisco State CA

Zip 94107 Telephone 415-793-3200 Email Address Ronaldo@rjcgroup.cpm

NPS Official Use Only

The National Park Service has reviewed the Historic Preservation Certification Application – Part 1 for the above-named property and has determined that the property:

☐ contributes to the significance of the above-named district or National Register property and is a "certified historic structure" for rehabilitation purposes.
☐ contributes to the significance of the above-named district and is a "certified historic structure" for a charitable contribution for conservation purposes.
☐ does not contribute to the significance of the above-named district.

Preliminary Determinations:

☐ appears to meet the National Register Criteria for Evaluation and will likely be listed in the National Register of Historic Places if nominated by the State Historic Preservation Officer according to the procedures set forth in 36 CFR Part 60.
☐ does not appear to meet the National Register Criteria for Evaluation and will likely not be listed in the National Register.
☐ appears to contribute to the significance of a potential historic district, which will likely be listed in the National Register of Historic Places if nominated by the State Historic Preservation Officer.
☐ appears to contribute to the significance of a registered historic district if the period or area of significance as documented in the National Register nomination or district documentation on file with the NPS is expanded by the State Historic Preservation Officer.
☐ does not appear to qualify as a certified historic structure.

Date ______ National Park Service Authorized Signature ______

☐ NPS comments attached

5. Description of physical appearance

1170 Harrison Street (also addressed as 1176 and 11780 Harrison Street, APN 3755/029) is an double-height one-story, steel and reinforced concrete industrial building designed in the Late Moderne style. The building is located on a 9,796 square-foot irregular-shaped lot on the north side of Harrison Street. The building is offset from the cardinal directions; for the purposes of this report, the nearest cardinal direction will be used. The Harrison Street façade will be referred to as the south façade, and the Berwick Place alley façade will be referred to as the east façade.

The building was constructed in two phases: the west section of the building was completed in 1913, and the east section was added in 1929. As part of this building expansion in 1929, the two buildings were unified by creation of the present Harrison Street facade. The building is L-shape in plan and sits on a concrete foundation. The building is capped by a hip roof with a monitor above the east section and a gable roof with a monitor above the west section. The hipped roof and monitor are clad with corrugated metal, although the north portion of the monitor is asphalt shingle. The gable roof and monitor are clad in asphalt shingle **(Figure A, Photos 10, 11)**.

Primary Façade
The primary (south) façade faces south towards Harrison Street **(Photo 1)**. This façade is clad in smooth concrete that has remnants of paint. The western and eastern sides of the façade feature six concrete belt courses and stepped concrete detailing leading to a recessed bank of windows. The upper portion of the facade features an incised writing that reads "San Francisco Galvanizing Works" with painted lettering and two painted raised concrete circles reading "1176" (the former address). The façade terminates in a flat, slightly recessed parapet.

At center is a wide bank of fixed multi-lite industrial steel-sash windows divided into nine bays. A riveted metal bulkhead extends across the bank of windows. The window grid is defined by steel mullions with galvanized metal rivets. Glazing is primarily textured or ribbed wire glass, with some panes of clear wire glass. Six-lite pivot windows are located at the center of the ground level windows at the third, fourth, sixth, and seventh bays (counting west to east). Six-lite awning windows are located in the upper portions of the transom windows at the fourth and fifth bays **(Photos 3-5)**.

Two large roll-up metal garage doors are located at each end of the bank of windows. The western door occupies the lower portion of the first and second bays **(Photo 2)**. The taller eastern door occupies the eight bay and part of the ninth bay, and extends into the transom windows. The primary pedestrian entrance is located in the center bay and is composed of a partially-glazed metal door. A secondary entrance (no longer operable) is located in the remaining portion of the ninth bay and is composed of a tall, partially-glazed hinged metal door **(Photo 5)**. Concrete collision bollards and metal supports are located at each side of the garage door openings and at the hinge side of the secondary entrance. A blade sign with faded numbering is located between the fourth and fifth bays.

East Façade
The east façade faces the alley of Berwick Place and is clad in board-formed concrete **(Photos 6, 7)**. The belt courses from the primary façade wrap around the southern edge of the east façade. The façade features five bays of multi-lite industrial steel-sash windows. Four of the five windows are divided by projecting steel mullions into three parts, each with a 4-lite pivot window. The southernmost window only contains two sections and pivot windows **(Photo 8)**. The lower portions of all the windows have been covered with metal panels. A set of paired partially glazed metal doors are located at center, partially intruding on the center window **(Photo 9)**.

North and West Façades
The north and west facades abut the adjacent buildings and are not visible.

Interior
The interior of 1170 Harrison Street is almost entirely open with the exception of two office enclosures. The steel ceiling truss and framing system is exposed throughout the whole interior **(Photos 12-15)**. Long I-beams span the interior space from the south to north walls. Two rows of square concrete-encased steel columns are located at the junction of the east and west sections of the building **(Photos 16, 17)**. The walls at the west section are clad in corrugated metal. An opening with a roll-up metal garage door at the west wall leads into the adjacent building. The ceiling of the west section is clad with wood sheathing. The clerestory windows at the roof monitor have been removed and the space covered. The walls at the east section of the

building are board-formed concrete. The ceiling is corrugated metal and features a monitor roof with steel-sash clerestory windows which have been covered from the exterior. The east ceiling is higher than the west ceiling.

A concrete, two-story office is located above the main pedestrian entrance at the center of the south façade **(Photos 18-20)**. At the pedestrian entrance is a concrete stair to access the second-story office and a wood-frame vestibule that leads underneath the office into the main interior. The elevated office area consists of a landing, a main room accessed by a multi-lite glazed metal door and multi-lite sidelights, a closet, and a restroom. The south wall of this office is the industrial windows of the primary façade. The second floor contains three 4-lite casement steel-frame casement windows that overlook the interior work area. A second small wood-frame office with horizontal wood siding and one multi-lite steel-sash windows is located in the southeast corner of the interior **(Photo 21)**.

Construction Chronology:
The following section provides a construction chronology of 1170 Harrison Street, compiled from available building permits and other resources:

Date	Permit Application Number	Description of Work
1912	46883	West section of the current building was originally constructed.
1929	None	Expansion of the building to its current footprint, including new construction of steel frame addition and new façade on Harrison Street.
1949	121404	Installation of a gas-fired high pressure boiler.
1963	8610825	Installation of a concrete vault for a sulfuric acid storage tank.
1990	9016272	Parapet reinforcing at Harrison Street and Berwick Place facades.
1995	9504841	Partial removal of existing roof and reroofing with a composition roofing.

1170 Harrison Street was constructed in two phases. The original building occupied the current west portion of the current building.[1] This building, addressed at 1176 Harrison Street, was completed in 1913 and consisted of one story steel and corrugated iron building measuring 40' by 80'. The building was capped with a steel truss roof and contained a wood-frame office in an unspecific location. The architect was Charles E. J. Rogers.[2]

According to the 1913-1915 Sanborn Fire Insurance map, an iron foundry was located on the lot at the corner of Harrison Street and Berwick Place prior to the expansion of the Galvanizing Works. The map depicts a building with a two-story center, office, and cupola and several one-story volumes **(Figure B)**. The building was iron-on-studding construction.[3] A 25' tall steel water softener tank was located in the vacant lot between the two buildings. No information was found regarding the appearance of either original building.

No building permit or architectural drawings were found for the 1929 building expansion. Notice of the project appeared in the *San Francisco Chronicle* and *Building and Engineering News*, describing the work as "a new front" and "a steel frame addition covering ground 70 by 100 feet on Harrison Street and Berwick Place."[4] The Galvanizing Works hired architect Dodge Reidy and contracting firm Sorensen & Haggmark to design the alterations and addition. The extent of the demolition of the iron foundry is presently unknown, but it appears to have been extensive.

The presence of the water softener tank on the lot dictated the L-shaped layout of the new building. An aerial photograph from 1938 shows the water tank and the unified galvanizing workshop **(Figure C)**. The water tank is not shown on the 1950 Sanborn Fire Insurance map, indicating that it was demolished between 1938 and 1950. The footprint of the galvanizing works appears to have remained unchanged since the 1929 work **(Figure D)**.

[1] The Department of Parks and Recreation "Primary Record" form that was completed for the subject building as part of the South of Market survey describes the east section as being constructed in 1912 and the west section following in 1929. However, close examination of the original building permit and available materials indicate that the west section was constructed first.
[2] Building Permit application #46883, San Francisco Department of Building Inspection.
[3] San Francisco Property Information Map; Sanborn Fire Insurance Map, 1913-15, San Francisco Public Library Digital Sanborn Map Collection.
[4] "Factories and Warehouses, Contract Awarded" *Building & Engineering News*, November 2, 1929; "Plant Seeks Permit," *San Francisco Chronicle*, November 2, 1929, 7.

Based on physical observation of the existing building, many alterations have occurred that are not reflected in the building permit history. Because of the lack of available information, architectural drawings related to the 1929 expansion, or historic photographs, the historic nature of some features and the dates of alteration for others are unknown. The two metal roll-up garage doors at the primary façade are not original features. Evidence of hinges was observed on the frame of the west opening, indicating that at least one (if not several) door assembly preceded the roll-up door **(Figure 22)**. It is unknown if this opening was part of the 1929 façade; a large opening could have been necessary to move galvanized products in and out of the factory.

The east garage door opening is not original to the 1929 façade, but the date of alteration is unknown. Roughly cut mullions at the transom windows and a collision bollard at the edge of the window bay indicate that this opening was enlarged **(Figure 23)**. The partially-glazed hinged door also does not appear to be original. It appears that an opening previously fit within the two facades bays and matched the west opening. However, it is unknown whether an opening in this location was installed in 1929.

New glazing units at the primary façade indicate that various replacements and repairs have occurred over time. The lower portions of the windows at the primary and east facades have been covered on the exterior. These panels prevent most of the pivot windows from being operable. At the monitor roofs, the clerestory windows have either been covered or removed completely.

The east façade is believed to be part of the 1929 alterations. The current façade retains no evidence of the series of volumes that made up the foundry building formerly on the site. The paired metal door located in the center window bay appears to be a later insertion into this façade. It is also presently believed that the blade sign at the primary façade is not an original feature. At the interior, the two office volumes do not appear to be original and no information is currently available to indicate when they were added.

Date(s) of building(s) 1913; 1929 Date(s) of alteration(s) See construction chronology above.

Has building been moved? ☒ no ☐ yes, specify date

1. Statement of significance

The building at 1170 Harrison Street was surveyed as part of the South of Market Area Historic Resource Survey and was determined to be eligible for the National Register both individually and as contributor to a National Register-eligible district.[5] The building appears to be significant under National Register Criterion A (Events) for its association with light industrial and manufacturing development in the South of Market neighborhood and under Criterion C (Design/Construction) as an early example of the Art Moderne style.

Western SOMA Light Industrial and Residential Historic District

1170 Harrison Street is a contributing resource to the National Register-eligible Western SOMA Light Industrial and Residential Historic District. This district was identified as part of the South of Market (SOMA) Historic Resource Survey that was conducted from 2007-2010.[6] The Western SOMA Light Industrial and Residential district was found to be significant under Criterion A (Events) and Criterion C (Design/Construction) with a period of significance from 1906 through 1936. The survey findings and the historic district were adopted by the San Francisco Planning Department's Historic Preservation Commission in February 2011.[7]

The Western SOMA Light Industrial and Residential Historic District is significant for the theme of industrial and residential reconstruction and development in the South of Market neighborhood of San Francisco. The significance was summarized in the district survey record forms as the following:

> The Western SoMa Light Industrial and Residential Historic District developed primarily between the years 1906 and ca. 1936, and consists of a group of resources that are cohesive in regard to scale, building typology, materials, architectural style, and relationship to the street. Contributors to the Western SoMa Light Industrial and Residential Historic District are mostly light industrial and residential properties, with some commercial properties. The Historic

[5] A California Historic Resource Status Code (CHRSC) of "3B" was assigned to the property during the survey. California State Office of Historic Preservation Department of Parks and Recreation, *Technical Assistance Bulletin #8: User's Guide to the California Historical Resource Status Code & Historic Resources Inventory Directory,* November 2004.
[6] "South of Market Area Historic Resource Survey: About the Survey," San Francisco Planning Department, accessed March 23, 2016. http://sf-planning.org/south-market-area-historic-resource-survey.
[7] Historic Preservation Commission Resolution No. 103, San Francisco Planning Department, February 16, 2011.

District is significant under Criterion A (Events) as a representation of a noteworthy trend in development patterns and the establishment of ethnic groups in San Francisco. It is also significant under National Register Criterion C (Design/Construction) as a representation of a group of properties that embody the distinctive characteristics of a type, period, or method of construction, and as a representation of a significant and distinguishable entity whose components may lack individual distinction.[8]

The district possesses a cohesive and unified building stock that includes a mix of industrial, commercial, and residential uses. The entire area was affected by the 1906 earthquake and fire, which destroyed or heavily damaged almost every building. The district's period of significance begins in 1906 to reflect this hugely formative event. Reconstruction efforts occurred over the next three decades. Construction within the district occurred in two distinct periods: initial reconstruction and recovery from 1906-1913, and a building boom following World War I from 1920-1929. By the mid-1930s the South of Market area was largely built out. Vacant parcels were scarce, economic difficulties caused by the Great Depression were impacting the construction industry, and large infrastructure projects such as the development of South Van Ness Avenue in 1933 and the San Francisco-Oakland Bay Bridge in 1936 changed the local traffic patterns and began diverting people away from the neighborhood. The end date for the period of significance (1936) reflects the slowing development in the South of Market area and corresponds to the end date of the period of significance for the nearby National Register-listed South End Historic District (1935).[9]

Criterion A (Events) Significance
1170 Harrison Street is significant as an industrial manufacturing building associated with the overall character and development pattern of the Western SOMA neighborhood. The two phases of the building's construction coincide with the two major construction periods of the district and the building has been continuously used for manufacturing since its initial construction. Industrial buildings are the most common building type in the South of Market neighborhood. Economic and bureaucratic factors slowed immediate reconstruction of the area after the 1906 earthquake and fire and drove the district to become predominantly industrial. The most widely-found type of industrial building are one- to two-story, multipurpose buildings usually constructed of brick or concrete.[10] 1170 Harrison Street is an excellent example of this prevalent building type and the continuity of light industrial activity within the neighborhood.

The production of metal items and building materials was an extremely common industry as San Francisco tried to rebuild itself and expand in the early decades of the 20th century, and most of these industries were located in SOMA. The first iteration of the building was completed in 1913 during the first period of recovery. The steel and iron construction reflected the new fire-resistant materials that were preferred in this area, and most of the industrial buildings constructed around this time were building in a similar manner. As indicated in the 1913-1915 Sanborn Fire Insurance map, the original Galvanizing Works was surrounded by laundries, some residences, and vacant lots. The subject block was interlaced with several alleys, another characteristic of the South of Market circulation patterns. The iron foundry building that was later subsumed into the current building also contributed to the industrial character of the area.

This cohesive service district with an industrial focus is unique among San Francisco neighborhoods, and 1170 Harrison Street is one of the best representatives of that historical development pattern. The building's highly visible location along Harrison Street, a major throughway, and the dominant incised lettering clearly communicates to the public the building's individual history and the character of the neighborhood.

Criterion C (Design/Construction) Significance
1170 Harrison Street is significant under Criterion 3 (Design/Construction) as an early example of the Art Moderne style. When the building was expanded in 1929, the new reinforced concrete structure featured an Art Moderne façade which incorporated detailing that would come to characterize the style. Art Moderne was inspired by the Art Deco style, which rose to popularity during the 1920s. The Art Deco style was distinguished by geometric ornamentation including chevrons, zigzags, and sunbursts. This highly-stylized architecture led to the more restrained and streamlined forms of Art Moderne.[11] The Art Moderne style

[8] Page & Turnbull, Western SOMA Light Industrial and Residential Historic District, District Record, 2009-2010, 1.
[9] Page & Turnbull, Western SOMA Light Industrial and Residential Historic District, District Record, 2009-2010, 83.
[10] Page & Turnbull, *South of Market Area Historic Context Statement,* June 30, 2009, 90.
[11] "Moderne Style 1930-1950," Pennsylvania Historical & Museum Commission, accessed March 28, 2016. http://www.phmc.state.pa.us/portal/communities/architecture/styles/moderne.html

contains many subtle permutations, including Streamline Moderne, PWA/WPA Moderne or Depression Moderne, and Late Moderne, and is often referenced by these names. The majority of Art Moderne buildings were constructed between 1930 and 1950.

The smooth surfaces, emphasis on horizontality including the horizontal banding, and restrained ornamentation at 1170 Harrison Street are typical of the Art Moderne style. The stepped detailing at the primary window bank and the incised sign typology are reminiscent of the Art Deco geometrical features, but exemplary characteristics of Art Moderne as well. Industrial Art Moderne buildings were often more restrained than commercial or residential buildings, and the bands of steel industrial windows are characteristic for the building's use. The open floor plan and the exposed steel trusses at the interior are typical features of the small-scale industrial buildings. The expansion of 1170 Harrison Street was completed just prior to the onset of the Great Depression, and prefigured a wider usage of Art Moderne and Streamline Moderne styles in San Francisco during the 1930s and onwards.[12]

The use of reinforced concrete in the 1920s and 30s was also characteristic of construction in the Western SOMA district and the Art Moderne style. The acceptance of reinforced concrete into San Francisco building codes spurred a proliferation of the material throughout remodeled and new buildings in the South of Market area. The following description is excerpted from the Western SOMA district survey forms:

> Concrete slowly became popular following inclusion into the fire codes and reclassification of buildings. By the 1920s, concrete had become the predominant building material due to its strength and durability, resistance to earthquake damage, and ability to provide large and unobstructed workspaces within structures. Concrete was also better-adapted to the architectural styles popular during the 1920s, including the Spanish Colonial Revival and Art Deco styles. Other concrete industrial buildings were generally simple, with ribbons of upper-story steel-sash industrial windows, but featured Classical Revival details including pilasters, friezes, and cornices.[13]

For the San Francisco Galvanizing Works, the new concrete façade allowed for a simple amount of ornamentation and transformed the pieced-together interior spaces into a solid and unified building on one of SOMA's main thoroughfares. Although the specific nature and dates of some alterations to 1170 Harrison Street are unknown, the building still effectively communicates its history and exhibits many essential design features of the Art Moderne style. It retains integrity of location, setting, feeling, association, design, workmanship, and materials. 1170 Harrison Street exemplifies the scale, materials, methods of construction, and use typical within the Western SOMA historic district. The original San Francisco Galvanizing Works signage simultaneously communicates the industrial history of the building and underscores the Art Moderne styling of the building.

The two architects associated with the property, Charles E. J. Rogers and Dodge Reidy, were active architects within San Francisco but are not considered master architects. They are known to have worked together on at least one building. Rogers is known to have designed commercial properties along Bush Street in 1920-21. Dodge Reidy worked with master architect Mario Joseph Ciampi from 1932-38 on projects including the W.P.A. project Lawton Elementary School (1940), which was also in conjunction with Charles Rodgers.[14] He also worked with Frederick H. Meyer and served as the San Francisco City Architect.[15] Neither architect appears to be have been prolific within the Western SOMA district.

Period of Significance and Character-Defining Features
The period of significance for 1170 Harrison Street has been determined to be 1913-1929. This time period reflect the building's original construction as a light industrial building in the South of Market neighborhood and the date of the building's expansion and remodeling into its characteristic Art Moderne style.

[12] Page & Turnbull, *South of Market Area Historic Context Statement*, June 2009, 66.
[13] Page & Turnbull, *Western SOMA ,* 97.
[14] Mary Brown, *San Francisco Modern Architecture and Landscape Design 1935-1970 Historic Context Statement*, September 2010, 209.
[15] SF Modernism Context, 238 and Appendix B: Additional Modern Architects, 5.

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

The character-defining features of 1170 Harrison Street have been identified as follows:

- Double-height one story scale and massing
- Emphasis on horizontality, including the flat roofline created by the concrete parapet
- Reinforced concrete construction
- Hip and gable roofs with twin monitor roofs
- Central nine-bay bank of windows at Harrison Street façade
- Multi-lite steel industrial windows, including the riveted steel mullions and pivot windows.
- Stepped concrete detailing and horizontal banding at Harrison Street façade
- Incised lettering and raised medallions at the upper portion of the Harrison Street façade

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

2. Photographs and maps. Send photographs and map with application.

See following continuation sheets for referenced maps and historic photographs, and photographic key maps corresponding to the current photographs included with this report.

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

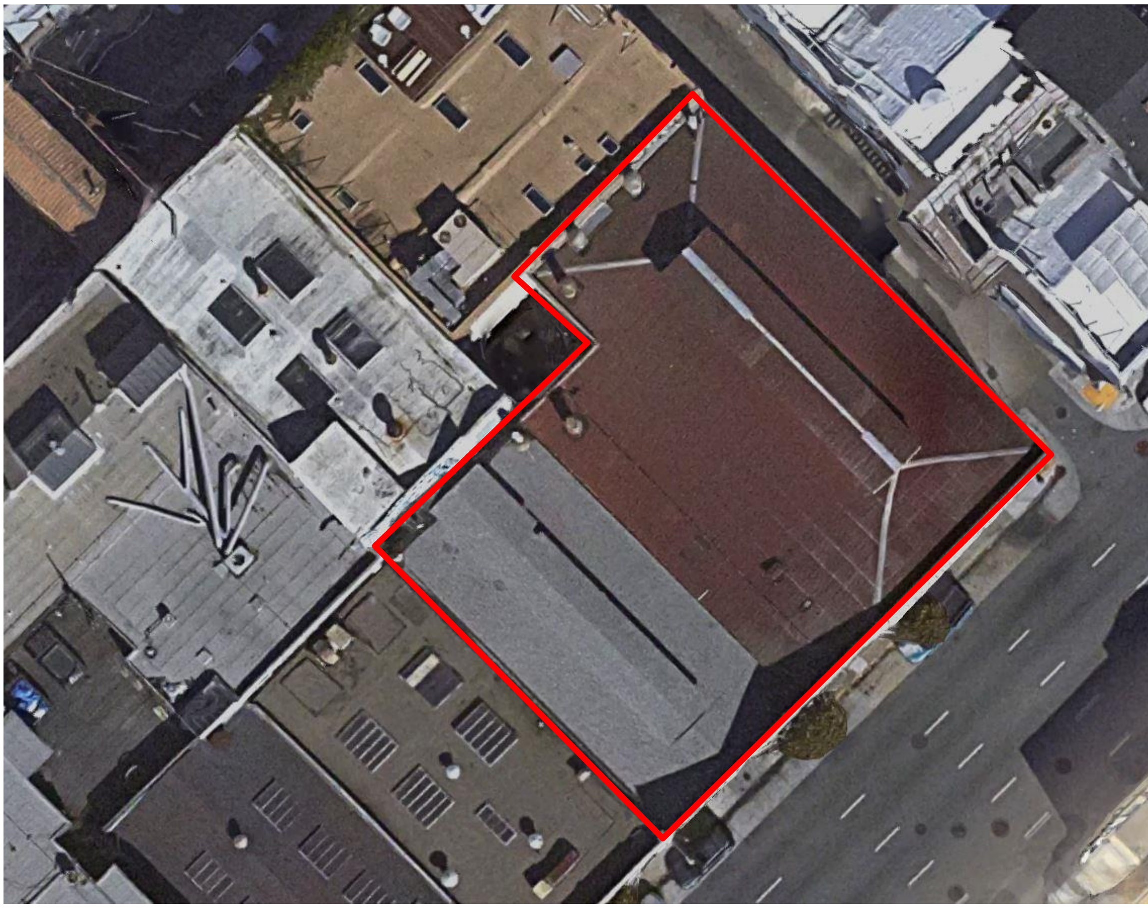


Figure A. Aerial view of 1170 Harrison Street (outlined in red). North is up. (Google Maps 2016, edited by author)

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

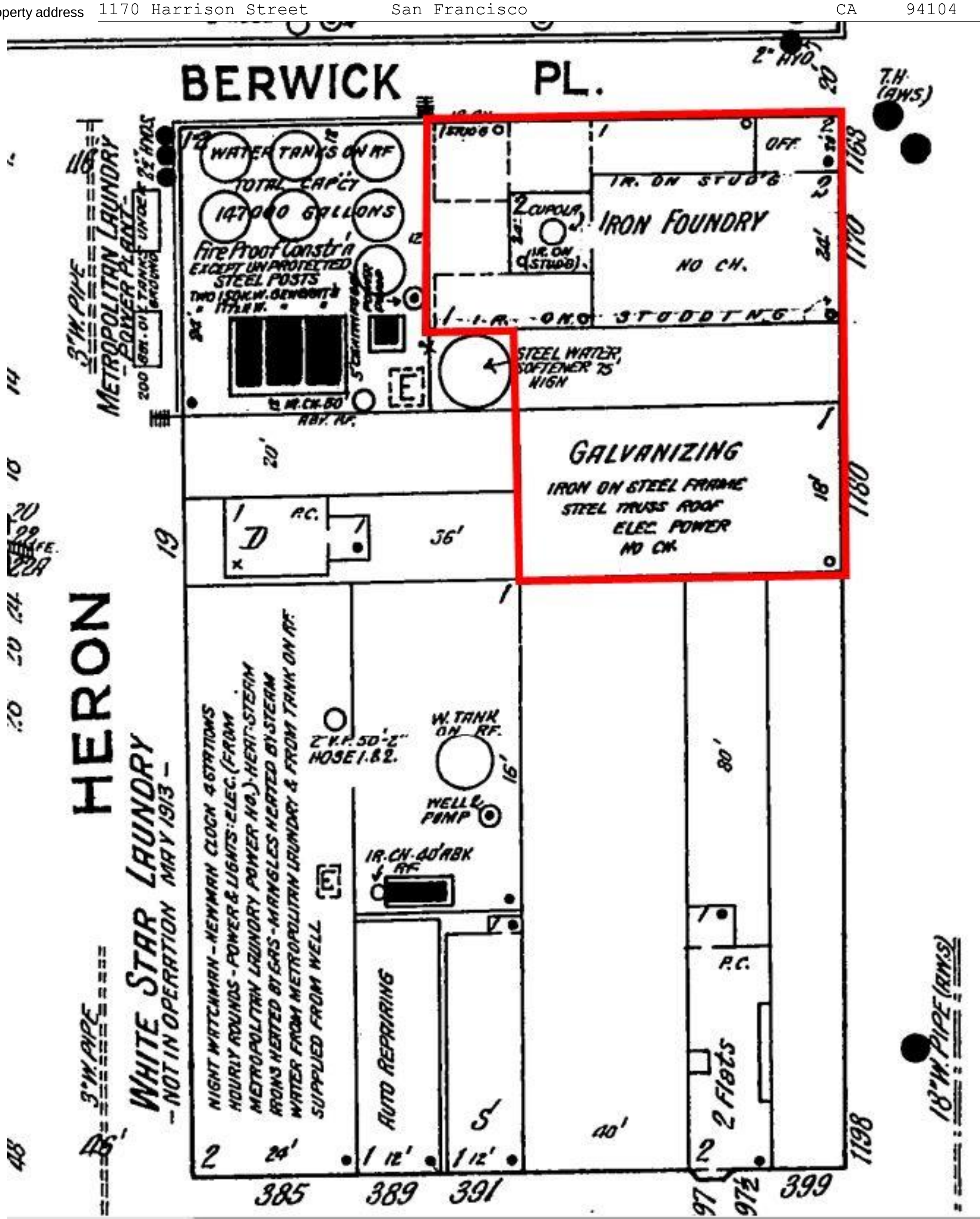


Figure B. 1913-1915 Sanborn Fire Insurance Map. North is left and Harrison Street is at right. The current building footprint is outlined in red. Source: San Francisco Public Library Digital Sanborn Collection.

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

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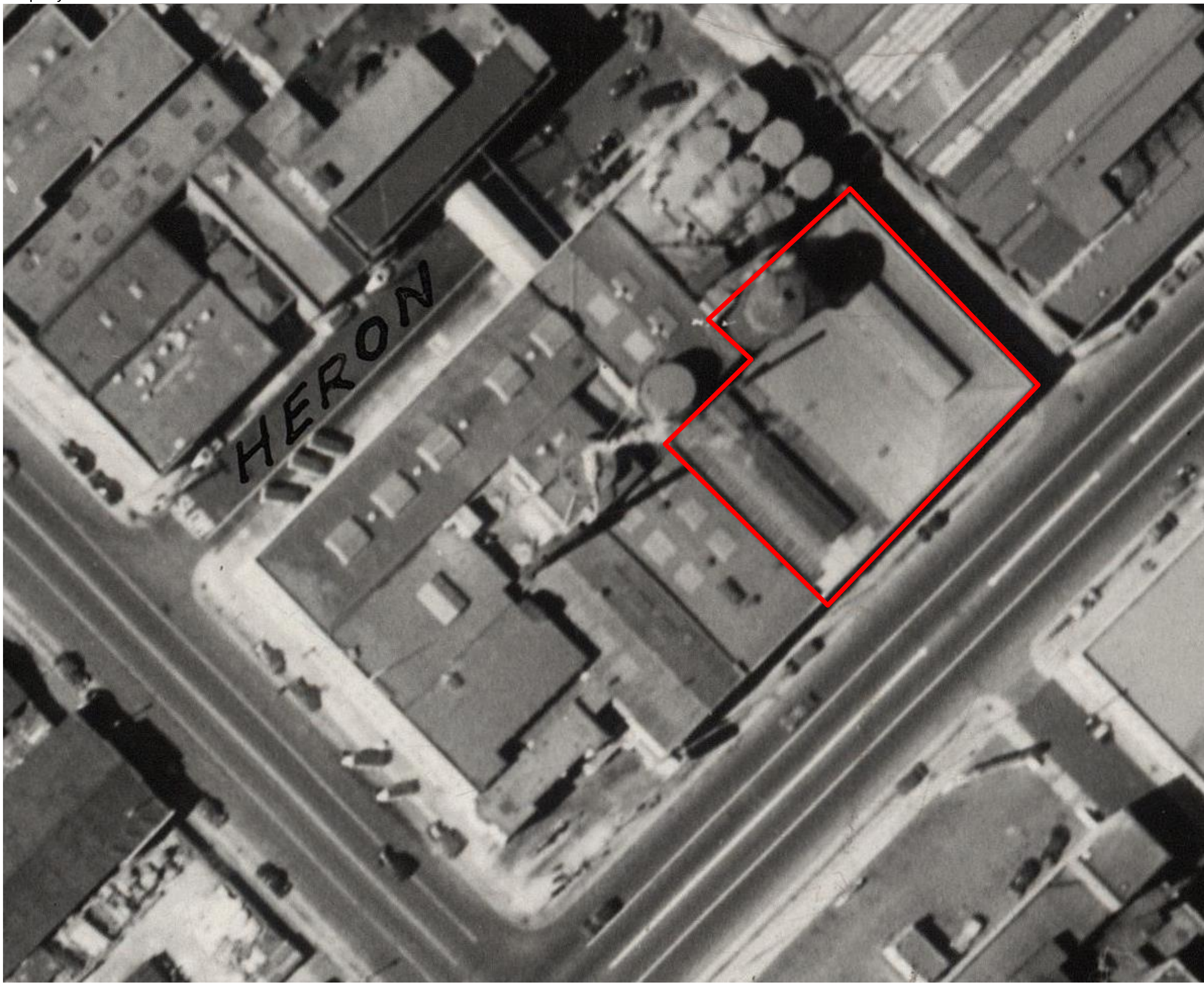

Figure C. 1938 aerial photograph of 1170 Harrison Street and water tank on lot (outlined in red). The double monitor roofs are visible. Source: David Rumsey Historical Map Collection.

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

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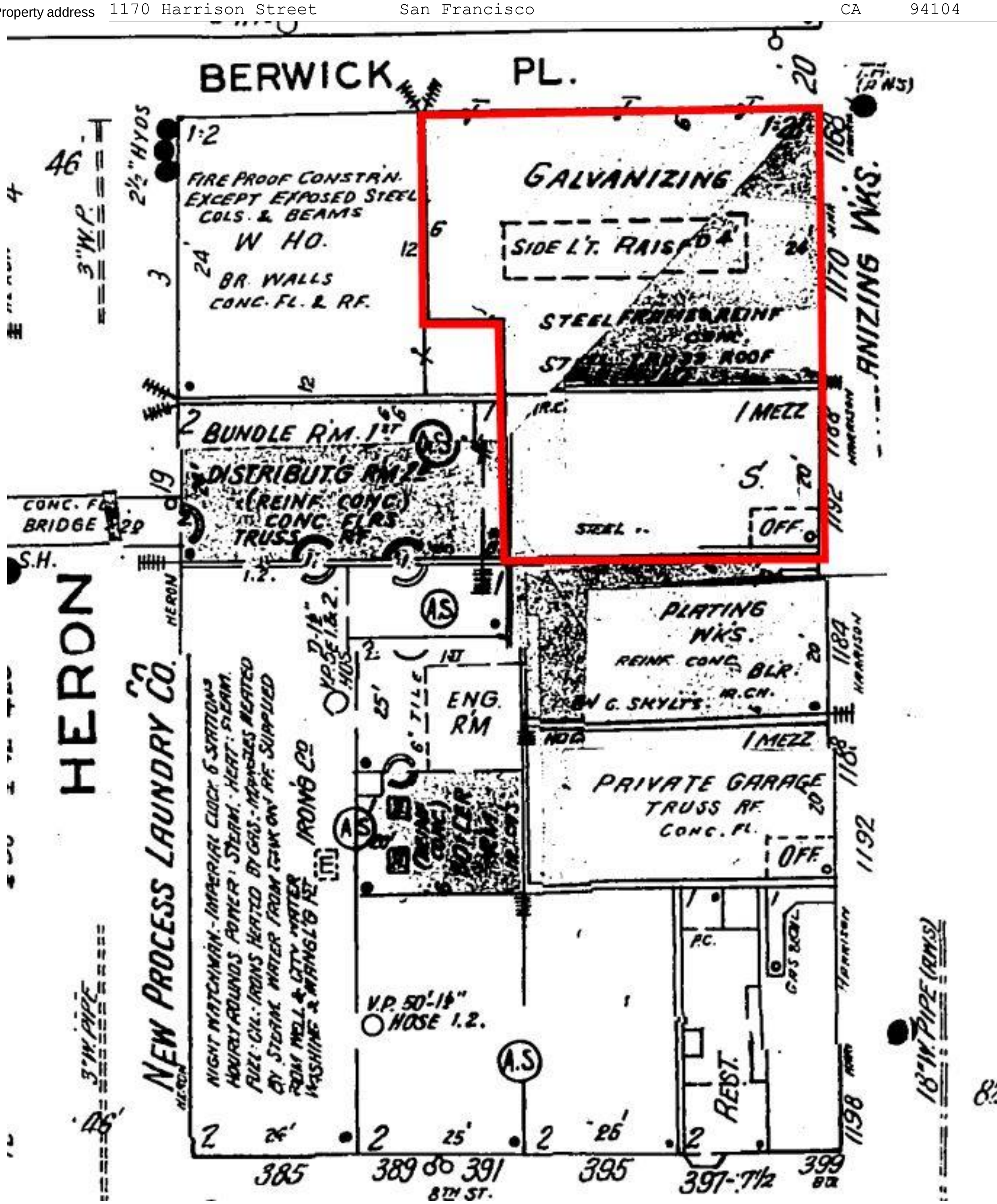


Figure D. 1950 Sanborn Fire Insurance Map. North is left and Harrison Street is at right. 1170 Harrison Street is outlined in red. Source: San Francisco Public Library Digital Sanborn Collection.

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

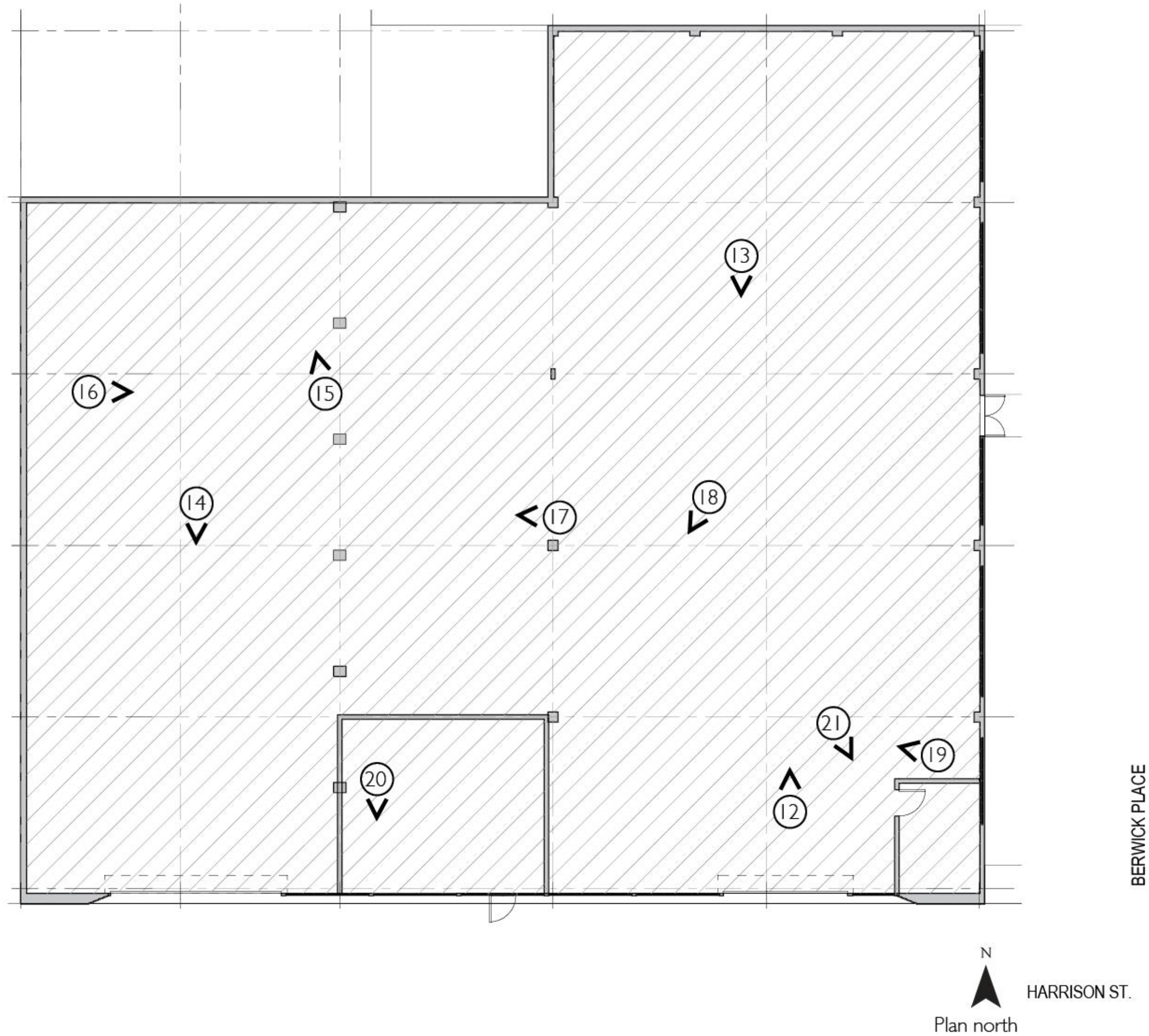
Key Map for Exterior Photographs:

HISTORIC PRESERVATION CERTIFICATION APPLICATION
PART 1 – EVALUATION OF SIGNIFICANCE

Property name 1170 Harrison Street (San Francisco Galvanizing Works) NPS Project Number

Property address 1170 Harrison Street San Francisco CA 94104

Key Map for Interior Photographs:



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DATE: February 6, 2018

TO: Daniel Frattin, Reuben, Junius & Rose, LLP

CC: Historic Preservation Commission

FROM: Natalia Kwiatkowska, Preservation Planner, (415) 575-9185

REVIEWED BY: Architectural Review Committee (ARC) of the Historic Preservation Commission (HPC)

RE: **Meeting Notes from the Review and Comment at the January 17, 2018 ARC hearing for 1170 Harrison Street**
Case No. 2015-016239ENV

At the request of the Planning Department, the Architectural Review Committee (ARC) of the Historic Preservation Commission (HPC) was asked to review and comment regarding the proposed project at 1170 Harrison Street. Representing the ARC were Commissioners Aaron Hyland and Jonathan Pearlman.

Currently, the proposed project is undergoing environmental review pursuant to the California Environmental Quality Act (CEQA).

ARC RECOMMENDATIONS/COMMENTS:

Recommendations on Vertical Addition
The ARC concurs with the staff determination that the proposed vertical addition, although minimally visible from the public right-of-way, would partially remove some of the character-defining features of the building, including a portion of the roof and trusses. The ARC expressed that a 25 foot setback of the one-story vertical addition was sufficient to visually separate the addition from the historic building while removing a portion of the roof monitor and trusses, provided that the new design is further evolved to better reflect the removal of the roof monitor. Further, Commission Pearlman clarified that since the secondary monitor was never used as a light monitor, it's a vestigial element, and therefore, less impactful in terms of the current use, he stated: "if it were all about bringing light into a factory building, that's a little bit different than venting, and obviously venting is an important part of it from a historical standpoint, but it's less impactful in terms of the current use, because it's not like you're flooding the space with light, which was the idea of light monitors in industrial buildings".

- The ARC recommends an alternate option for the project, a hybrid between the preferred option by the Project Sponsor and one of the options recommended by the Department, which results in a one-story vertical addition setback a minimum 25 feet from the front building wall, measuring approximately 60 feet in width by 53 feet in depth.
- Further, the ARC stated that the proposed vertical addition should address the removal of the roof monitor in an architectural matter that's reflected in the design.

Recommendations on Other Scopes of Work

The ARC stated that overall; the proposed project meets the Standards. The Project Sponsor expressed a desire to provide a smaller setback of the inserted second floor from the Berwick Place elevation than the five foot setback recommended by staff. Commissioner Hyland expressed that he would prefer to see some gap between the historic façade and the inserted new floor and requested detailed drawings showing the face and finish of the floor, he stated: "the drawings as shown right now do not address that detail, whatever that detail is, I would prefer to see some gap, a foot or two, and detail it so it's clear that it's not altering the perception of the windows from the outside".

- The ARC stated they are open to a smaller setback of the second floor from the Berwick Place façade; however, the Project Sponsor should further evolve the design and detail the drawing so that the inserted floor is not interrupting the window.

Recommendations on Harrison Street Elevation

The ARC concurs with staff's determination and is supportive of the proposed restoration and alterations to the Harrison Street elevation. The Project Sponsor did not provide detailed drawings to demonstrate the proposed work for the ARC. Department staff will undertake a complete analysis per the applicable Standards as part of the environmental review and review of the building permit application per Planning Code Section 803.9, which will require a future HPC hearing.

- The ARC will provide feedback at a future hearing when presented with detailed drawings.

Recommendations on Berwick Place Elevation

The ARC concurs with staff's determination and is supportive of the proposed restoration and alterations to the Berwick Place elevation. The Project Sponsor did not provide detailed drawings to demonstrate the proposed work for the ARC. Department staff will undertake a complete analysis per the applicable Standards as part of the environmental review and review of the building permit application per Planning Code Section 803.9, which will require a future HPC hearing.

- The ARC will provide feedback at a future hearing when presented with detailed drawings.

Architectural
Resources Group

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Historic Building Maintenance Plan

1170 Harrison Street, San Francisco, CA

Revised October 29, 2018

EXECUTIVE SUMMARY

This report has been prepared by Architectural Resources Group, Inc. for Ronaldo Cianciarulo of Buddha Properties, LLC, and in response to comments issued by the San Francisco Planning Department on April 6, 2017, and updated to respond to comments issued on May 24, 2018. It identifies existing conditions at 1170 Harrison Street, and makes recommendations for issues to be addressed during the proposed building rehabilitation project and for future recurring maintenance tasks. A previous Historic Building Maintenance Plan by Page & Turnbull, dated August 10, 2016, has been attached to this report for reference only. This document supersedes all information contained within the reference report by Page & Turnbull.

The building is in fair condition overall, with moderate to heavy deterioration at many historic building materials, but no character-defining features are beyond repair. The exterior facades are in need of repairs to concrete walls and steel windows, and the original storefront assembly on Harrison Street has been altered at one of the large openings. Roofing assemblies appear in good to fair condition, although the roof monitors are not water tight in their current condition. Materials at the interior are utilitarian in nature but have also deteriorated due to their exposure to heavy industrial use.

CONTENTS

This report includes the following contents:

BACKGROUND AND APPROACH

ARG surveyed the exterior and interior of the building from the ground and from the roof, which was accessed via the roof hatch of a neighboring building. This report is intended to identify existing conditions, make recommendations for rehabilitation with consideration for the larger project designs, and to make recommendations for long-term maintenance procedures. All recommendations comply with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, following the *Standards for Rehabilitation:*

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.
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.
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.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property will be preserved.
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.
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.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
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.
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.

1170 Harrison Street has been determined eligible for the National Register of Historic Places and is considered a historic resources by the City of San Francisco Planning Department. The period of significance for 1170 Harrison Street has been determined to be 1913-1929. This time period reflects the building's original construction as a light industrial building in the South of Market neighborhood and the date of the building's expansion and remodeling into its characteristic Art Moderne style.

We have been unable to locate any historic photos of the property.

SUMMARY OF PROPOSED WORK

The following items are included in the proposed scope of work. Please reference the project drawing set for a full record of the proposed design.

Restore Building Facade:

- Repair exterior concrete
- Paint exterior wall
- Restore window and storefront steel frame
- Replace single pane glazing
- Restore two bay garage opening height with new distinct storefront window and entries.

Exterior Building Alterations:

- Remove a small section of existing steel frame and glass window, roughly 16 panes, to allow for new egress door exiting Berwick Place.
- New 3rd floor deck with partial retention of western roof monitor.
- New roof top mechanical systems on the new roof with screenings.
- One roof top unit on the existing roof directly above bathroom.
- New skylight on top of the 3rd floor roof to reflect the removal of the western monitor.
- Remove sheet metal chimneys at roof level.
- Remove two existing curb-cuts & roll up garage doors along Harrison Street
- Two new storefront entries within the existing two bay garage entry
- New safety railing as needed on the deck and third floor roof.

Interior Scope of Work:

- New 2nd floor addition within existing envelope, and additional partial third floor addition.
- 2nd floor is setback along Harrison street window facade to reduce the 2nd floor floor system visibility from Harrison Street.
- Remove existing uneven floor slab.
- New foundation and floor slab throughout, the existing walls to remain will tie into the new foundation for stability.
- New interior shotcrete walls per plan, two along Harrison concrete facade, one along stair well on grid 9, one along grid 10, and two by the elevator core.
- Two new steel braced frames, one behind Berwick Place facade at grid A.1 (9-10), one along grid i (6.5-8)
- New columns and floor system supporting the second and partial third floor addition.
- New 3rd floor deck with partial retention of western roof monitor.
- New double floor height lobby with open stair and elevator.
- One set of restrooms on each floor
- New exit stair well and corridors.
- Existing eastern roof structure to remain, asbestos tile to be removed and replaced with new standing seam metal roof.

BUILDING FEATURES AND RECOMMENDATIONS

Exterior Concrete Walls and Structural Concrete Columns

The two building facades, facing Harrison Street and Berwick Place, are made of board-formed, reinforced concrete. The northwest wall, which directly abuts several adjacent structures, is also made of concrete and is visible from the building interior. Concrete parapet walls extend above the roof line at the building perimeter. At the interior, structural steel columns have been encased in concrete.

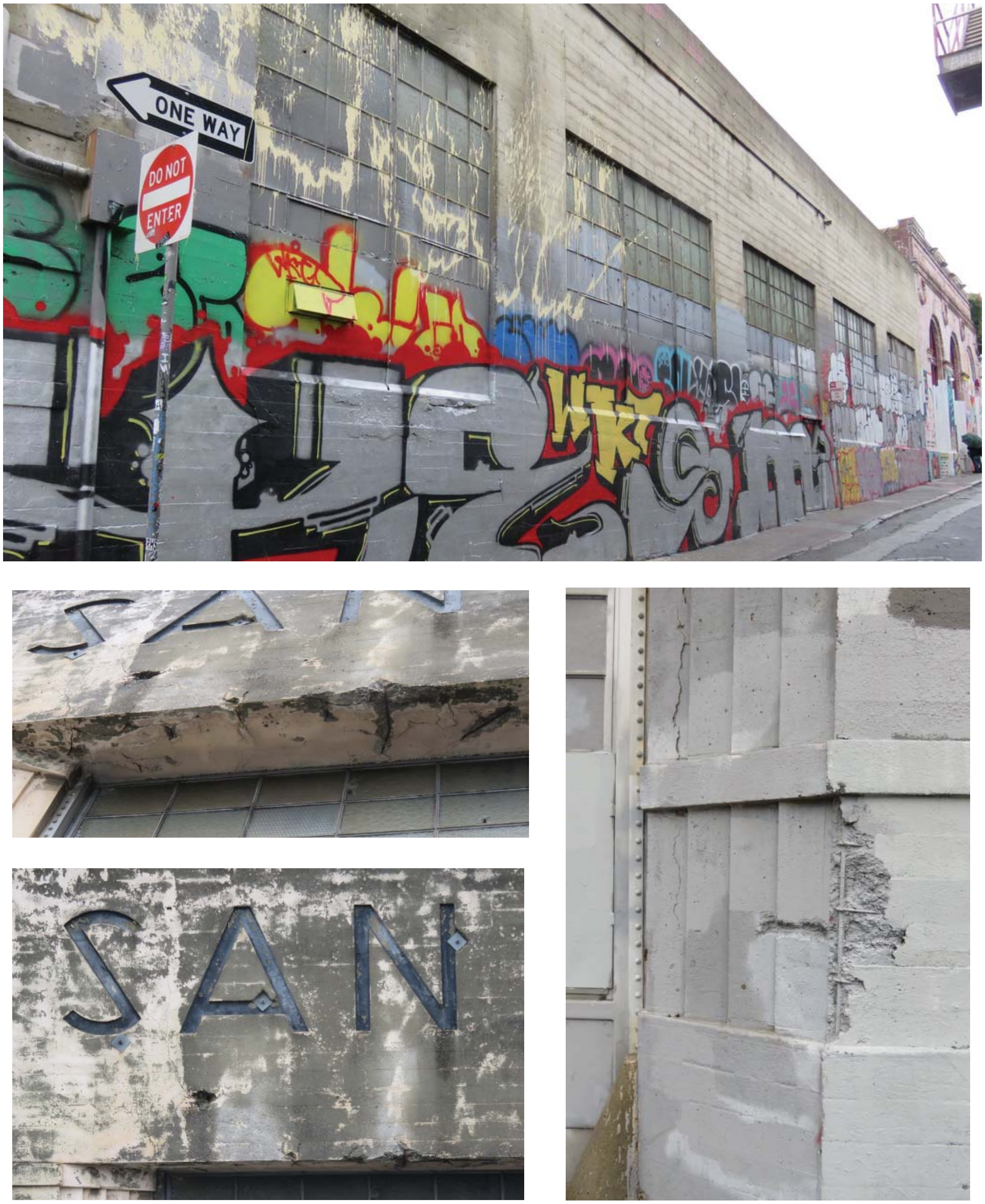
Overview of primary, Harrison Street façade of 1170 Harrison Street (ARG, 2018).

Existing Conditions

The concrete walls and columns are in fair to poor condition, with many locations of concrete damage and deterioration. The long concrete head at the storefront opening on Harrison Street has cracks, spalls, and exposed rebar along its length. Large spalls, typically at locations of shallow rebar, dot the Harrison and Berwick facades. Large cracks have occurred at all walls, with typical locations at heads, sills, and sides of window and storefront openings.

The Harrison Street façade has a heavily-weathered paint finish at its upper portions, and multiple layers of paint and graffiti at the lower third. The Berwick Place façade is unpainted at the top but has several layers of graffiti and overpaint at the lower half. The incised letters on the Harrison Street façade are painted in a contrasting color and have been damaged in several locations by parapet bracing through-wall ties.

The concrete parapet walls have been braced at several locations are in fair condition. Various conduit and cables have been attached to the front (Harrison Street) parapet wall, and biological growth and graffiti cover the surface. The center rear section of parapet wall (at the building north side, adjacent to the rear yard of an adjoining property) appears to lean out slightly from vertical. The leaning section of wall is also cracked and spalled at its outside corner.



Top: Overview of secondary façade at 1170 Harrison, on Berwick Place. Above upper left: detail view of concrete spalls and exposed rebar at header above storefront opening. Above lower left: detail view of concrete spalling and parapet anchors through incised lettering at Harrison Street façade. Above right: A severe concrete spall has been painted over at the east side of the Harrison Street façade. All photos by ARG, 2018.

The interior faces of exterior concrete walls also have multiple locations with surface spalls and some cracking.

Conditions are worst near the base of walls and adjacent to openings. There are also numerous attachments and penetrations, such as piping and conduit. Interior structural columns typically exhibit severe spalling and missing concrete near grade.

Rehabilitation Recommendations

The following remedial repair work is to be performed as part of the building rehabilitation project:

- Treat exposed rebar and patch spalled concrete at interior and exterior faces of concrete walls and at interior concrete columns. Patch exterior concrete cracks. Patches shall match existing concrete color and texture.
- Consult a structural engineer with historic concrete experience regarding through-wall cracking, penetrations, parapet wall conditions, and general structural repairs. Perform repair and maintenance work to comply with recommendations made by engineer.
- Following repairs, prepare and paint exterior facades. An anti-graffiti coating may be desirable if recurring graffiti remains a problem. The painted address numbers can be re-painted to show the correct address number.

Maintenance Recommendations

The following recurring maintenance tasks are recommended following a general rehabilitation of the building:

- Inspect concrete for new cracking, spalling, or other deterioration every 5 to 7 years and make repairs as necessary.
- Renew exterior coatings every 5 to 7 years or as necessary to maintain intact finishes and remove graffiti.

Doors, Windows and Storefront Assembly

The primary façade on Harrison Street is dominated by a galvanized steel storefront assembly, including a riveted steel frame, steel windows and doors, and corrugated steel garage doors. Sheet metal panels fill the few storefront panels that do not contain windows or doors. The Berwick Place façade also contains steel windows and a pair of steel doors. All windows are glazed with textured wire glass and most include a small operable sash within a larger fixed window assembly.

Above left: view of storefront assembly at west side of Harrison Street façade, including riveted frame and steel windows with textured wire glazing. Above right: detail view of missing glazing putty at Harrison Street window interior (ARG, 2018).

Existing Conditions

The storefront assembly has been altered to incorporate a larger garage door opening, but is in overall fair condition. There is visible rust and corrosion at a handful of locations, including near grade at the southern roll-up garage door opening, at the head of the southern roll-up door, and where the storefront frame has been cut around the oversized, northern roll-up door opening. The joint between the storefront assembly and the concrete wall is open at multiple locations around the perimeter.

The steel window assemblies are intact overall, but with many locations of broken glazing, deteriorated glazing putty, and graffiti and overpaint on the glass. There is some corrosion at the steel muntins, typically at and adjacent to the operable sash. Most windows are currently inoperable due to this corrosion. A window section has been removed at the second floor office to accommodate an air conditioner, and several sections of windows are missing where the storefront frame was altered to incorporate the larger roll-up door opening. Window hardware is typically missing or inoperable.

The primary entrance door at the Harrison façade remains operable but has broken glazing, dents at its sheet metal panels, and has been fully painted, including over glazing. There is no historic hardware remaining at the front door. The large roll-up doors at the Harrison façade have corrosion at their frames, and the smaller door is damaged along its sides near grade. The doors that open onto Berwick Place were not tested for operation, but are intact other than missing hardware, minor denting and displacement of the sheet metal panels, and heavy graffiti and overpaint.

Rehabilitation Recommendations

The following remedial repair work will be performed as part of the building rehabilitation project:

- Replace missing storefront frame assembly and partial window sections to match historic pattern and rehabilitate existing storefront frame, including removal of corrosion and new protective finishes.
- Seal joint between storefront assembly and concrete frame.
- Rehabilitate steel windows, including removal of corrosion, replacement of broken glazing, replacement of deteriorated window putty, and renewal of finishes.
- Rehabilitate steel doors, including new code-compliant hardware, replacement of broken glazing, and renewal of finishes.

Maintenance Recommendations

The following recurring maintenance tasks are recommended following a general rehabilitation of the building:

- Periodically inspect windows for broken glazing or deteriorated putty. A cycle of 5-10 is recommended for inspections, unless broken glazing is occurring more frequently due to vandalism. Replace broken glazing and missing putty as it occurs.
- Renew exterior coatings at storefront, windows and doors every 5 to 7 years or as necessary to maintain intact finishes.
- Inspect flexible sealant joints at window, door, and storefront openings during window inspections. Replace flexible sealants every 10-20 years or as required to maintain a watertight assembly.

Above left: existing conditions at primary entrance, at center of Harrison Street façade. Above right: nearly all glazing is damaged or broken at the Berwick Place façade (ARG, 2018).

Exterior Ornament

A wood-framed blade sign hangs near the center of the Harrison Street façade, attached to the storefront assembly. The sign is finished with sheet metal cladding that has been painted. For the following reasons, we do not believe the blade sign dates to the period of significance (which ends in 1929, the same year the existing façade was constructed):

- The sheet metal is of lesser quality and different construction than the other sheet metal used throughout the storefront assembly.
- The use of a wood frame assembly contradicts the otherwise consistent use of galvanized steel framing at this façade.
- The incised lettering across the top of the façade provides clear building signage and contributes to the intricately-designed façade. The simple blade sign, attached to the front of the storefront structure, does not match the level of design found elsewhere at the façade.

Concrete collision bollards frame the large openings at the Harrison Street façade, and there is one bollard at the operable storefront panel at the east end of the façade.

Existing Conditions

The blade sign is in very poor condition with missing and corroded sheet metal, and a rotting wood frame where exposed. The concrete collision bollards are in fair condition, with some cracking and spalling typical at the tops and along the inside edges facing the garage driveways. One of the bollards at the east door is almost entirely missing.

Above left: overview of blade sign remnant at Harrison Street façade. Above right: the concrete bollard at one side of the east garage door opening is nearly missing but is not historic (ARG, 2018).

Rehabilitation Recommendations

The following remedial repair work will be performed as part of the building rehabilitation project:

- Remove existing blade sign and repair storefront at attachment points if damage occurs during removal.
- Repair historic concrete collision bollards. Remove non-historic bollard to restore original east opening. Paint bollards following repair.

Maintenance Recommendations

The following recurring maintenance tasks are recommended following a general rehabilitation of the building:

- Inspect concrete bollards for new cracking, spalling, or other deterioration every 5 to 7 years and make repairs as necessary. This work can be coordinated with survey and repair of the primary facades.
- Renew exterior coating at bollards every 5 to 7 years or as necessary to maintain intact finishes and remove graffiti. This work can be coordinated with renewal of coatings at the primary facades.

Above: roof diagram showing two roof sections with different roofing materials (from Bing Maps, accessed and annotated by ARG, 2018).

Roofs and Monitors

The building is covered by two roof sections separated by a large gutter. Both roofs are sloped with a monitor at the ridge. The west roof has a gable shape and is covered with asphalt shingles. The east roof is hipped and covered with corrugated metal panels. The gutter between the two roofs appears to be lined with a bituminous roofing product. There are several sheet metal chimneys at the north side of the building.

The east roof monitor has been boarded up with sheet metal, but steel windows remain along both sides and are visible from the interior. The west roof monitor has also been boarded up with sheet metal, but does not have any windows or evidence of previously-installed windows. Like the east monitor, the west monitor has a steel frame, but the steel members have had a wood frame assembly attached at their exterior sides. The sheet metal protective paneling is attached to that wood frame, and the monitor assembly is otherwise open and does not show evidence of previous window attachment points or materials.

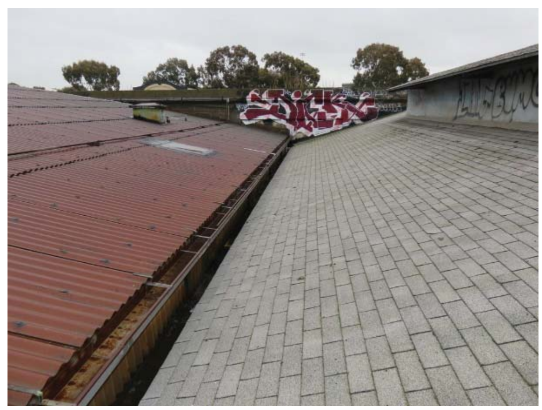
View from outside west monitor looking down into building. Note there is no evidence of previous window attachment at the steel frame (ARG, 2018, including annotation).

Existing Conditions

The roofing materials and assemblies are in fair condition. The asphalt shingle west roof has areas of moss growth on the north side of the monitor and some worn and lifting shingles on the south side. Only the west half of the metal east roof was accessible for survey, but it appears intact other than some minor biological growth and staining.

The east monitor windows and framing are only visible from the building interior, but generally appear intact and in fair condition with typical surface corrosion at steel members. The west monitor steel framing also exhibits typical surface corrosion and weathering of the wood framing as well. The protective sheet metal covering is bent at both monitors and is pulling away at several corners of the west monitor.

Three of four sheet metal chimneys exhibit heavy corrosion and are slightly bent. The fourth chimney appears fairly new and is in good condition. All chimneys are simple and utilitarian in design, making it difficult to identify their date of installation. Due to their utilitarian nature and concealed location at the rear of the building, we do not consider them to be potential character-defining features.



Above left: view looking east from neighboring building, showing both roof monitors, which have been enclosed with sheet metal. Above right: view looking south showing gutter between two roof sections and backside of Harrison Street parapet wall.

Rehabilitation Recommendations

The following remedial repair work will be performed as part of the building rehabilitation project:

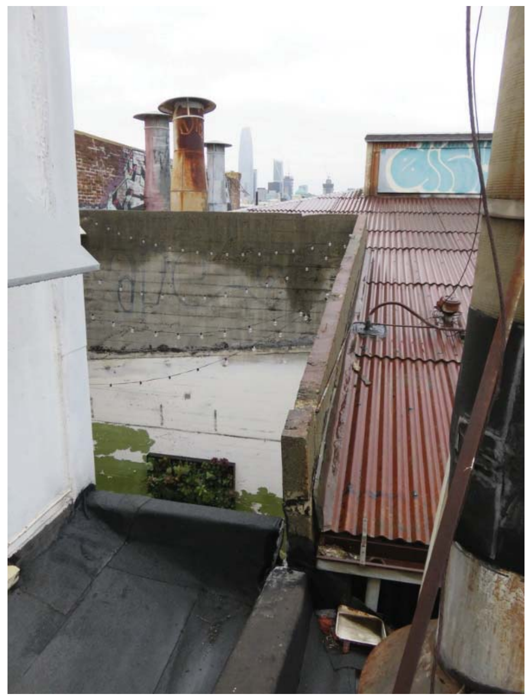
- Remove sheet metal protective panels from east monitor to expose windows and rehabilitate windows and monitor framing. Seal joints to ensure monitor assembly is watertight.
- At west roof areas not impacted by new roof addition and roof deck, replace worn roofing and infill open monitor areas with glazing to create a watertight assembly.
- Confirm any roof drainage systems to remain are functioning and properly waterproofed.
- Remove all sheet metal chimneys not needed in new design.
- Remove miscellaneous abandoned conduit, wiring, and other attachments from roofs and parapet walls.

Maintenance Recommendations

The following recurring maintenance tasks are recommended following a general rehabilitation of the building:

- Inspect roofing semi-annually to ensure the building enclosure remains water tight. Look for debris, deterioration, and roof deformation or damage. Clean drains and gutters. More frequent inspections may be warranted in advance of large storms or forecasted heavy rain.

- Inspect and touch-up flexible sealant joints at roof assembly every 3 to 5 years.
- Inspect any roof vents or metal roof components annually to ensure they are operating as designed. Inspect prior to heating season if use is seasonal.
- Renew coatings at painted metal roof accessories every 5 to 7 years.



Above left: view of chimneys at rear of building and miscellaneous attachments at roof and parapet wall. Above right: additional view at rear of building; note that parapet wall has spall at top and appears to be leaning out slightly (ARG, 2018).

Building Interior

The interior of 1170 Harrison Street is currently wide open, with the only individual rooms enclosing the Harrison Street entrance. Throughout the open interior space, the exterior concrete walls are exposed at the north, east and south sides of the building. At the west side of the building, which directly abuts up against adjacent buildings, the interior walls are covered with corrugated metal panels. The floor throughout is a concrete slab, and steel roof framing and exposed roofing or roof sheathing are visible at the ceiling.

Above left: overall view of building interior at east side. Above right: typical concrete floor conditions at interior, including spalls, uneven textures, and various stains (ARG, 2018).

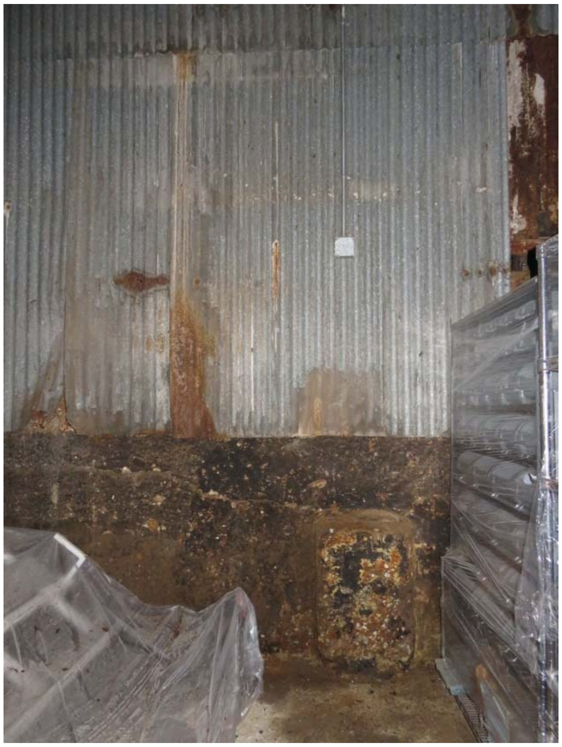
Existing Conditions

Like at the building exterior, the concrete walls are in fair to poor condition at the building interior as well. There is typically heavy coating build-up at the lower half of the walls, likely from previous industrial use. Cracks and spalls can be found at most walls, typically near window or door openings. There are various functioning and abandoned systems and attachments anchored to the interior wall faces.

The corrugated metal wall panels are in fair to poor condition, with several locations of heavy corrosion and deformation throughout the lower halves of the walls. Although we have not been able to locate any historical evidence one way or the other, the lack of more uniform corrosion leads us to believe that the corrugated metal is not original to the building and thus does not date to the period of significance. At locations where the concrete wall is partially exposed below the corrugated metal, the concrete appears substantially more worn than the metal, indicating the metal is likely much newer.

The concrete floor slab is in very poor condition, with frequent locations of cracking and spalling, and several areas of severe damage near the center of the building. Staining is typical at the floor slab, and in general the concrete appears to have weathered many years of heavy industrial use.

The exposed roof framing is intact but typically coated with a surface layer of corrosion. The wood roof sheathing at the west roof appears to be in good to fair condition, but was assessed from the ground only.




Above left interior wall at west side of building, including irregularly corroded corrugated metal paneling above a heavily stained concrete wall. Above right: typical surface corrosion at interior steel framing (ARG, 2018).

Rehabilitation Recommendations

The following remedial repair work will be performed as part of the building rehabilitation project:

- Treat exposed rebar and patch spalled concrete at interior and exterior faces of concrete walls and at interior concrete columns. Patches shall match existing concrete color and texture.
- Consult a structural engineer with historic concrete experience regarding through-wall cracking, penetrations, parapet wall conditions, and general structural repairs.
- Paint interior concrete wall surfaces. Advanced painting preparation may be required at locations with heavy build-up from past uses.
- Remove or conceal corrugated metal wall finishes as needed for new design.
- After new below-grade structural work is complete, replace concrete floor slab in kind to allow for safe and level floor finishes throughout building interior.
- Consult a structural engineer regarding the structural condition of roof framing. Perform repair and maintenance work to comply with recommendations made by engineer.
- Treat corrosion and paint all exposed interior steel trusses and framing members.
- If any roof sheathing is damaged at small area of west roof to remain, replace with salvaged sheathing from area of roof that will be replaced with roof addition.

Maintenance Recommendations

The following recurring maintenance tasks are recommended following a general rehabilitation of the building:

- Inspect concrete for new cracking, spalling, or other deterioration every 5 to 7 years and make repairs as necessary.
- Renew interior coatings every 7 to 10 years or as necessary to maintain intact finishes. Some steel framing locations near roof and at monitors may require more frequent coating applications.

CONCLUSIONS AND BEST PRACTICES FOR STRUCTURE LONGEVITY

Regular inspection of materials, features, and systems is vital in detecting incremental changes in condition. Timely inspections protect investments made in major repair and rehabilitation projects, and may prevent cumulative deterioration resulting in sudden or catastrophic loss of materials.

A maintenance program should be implemented that is guided by regular inspections of building systems. Periodic inspections detect gradual deterioration as well as sudden changes in building conditions, and thus aid in prioritizing and planning necessary repairs. Inspections trigger cyclical maintenance actions that protect investments in previous repair campaigns. Re-establishing regular maintenance of buildings helps to keep repair and rehabilitation projects small, resulting in costs savings over time.

Recommendations for implementation of regular maintenance and inspection program:

- Prepare written schedules and checklists for inspections and planned recurring maintenance tasks.
- Prepare written forms and blank base plans to be used during inspections and to record maintenance work.
- Maintain a collection of digital photographs showing baseline building conditions.

Timeline for Phase 1 - Proposed Rehab Work

Scope of Work	*Proposed Timeline*
Repair exterior and interior concrete	within 2 years of building permit issuance
Paint exterior and interior walls and structure	within 3 years of building permit issuance
Restore window and storefront steel frame	within 3 years of building permit issuance
Replace window glazing	within 3 years of building permit issuance
Restore garage opening width & height, remove garage door & replace with new storefront system	within 3 years of building permit issuance
Remove blade sign	within 2 years of building permit issuance
Install roofing/restore monitor windows to remain	within 3 years of building permit issuance
Install new concrete structure and slab	within 2 years of building permit issuance
Rehabilitation project complete	within 3 years of building permit issuance

Timeline for Phase 2 - Tenant Improvements

Scope of Work	*Proposed Timeline*
Interior tenant improvements	within 2 years of rehab project completion

Timeline for Maintenance Work

Maintenance Task	*First Occurrence*	*Recurrence Timeline*
Inspect concrete	within 7 years of project completion	every 5 to 7 years
Renew concrete coatings	within 7 years of project completion	every 5 to 7 years
Inspect windows	within 10 years of project completion	every 5 to 10 years
Renew coatings at windows and storefront	within 7 years of project completion	every 5 to 7 years
Inspect and maintain sealant joints at windows, doors and storefront	within 10 years of project completion; coordinate with window inspection	every 10 to 20 years

Inspect roofing	within 6 months of project completion	every 6 months
Inspect roofing sealant joints	within 5 years of project completion	every 5 to 7 years
Inspect equipment at roof	within 1 year of project completion	every year
Renew coatings at roof	within 7 years of project completion	every 5 to 7 years
Renew interior coatings	within 10 years of project completion	every 7 to 10 years

REFERENCES

The following previous reports are attached as reference to this report:

- Historic Building Maintenance Plan for 1170 Harrison Street by Page & Turnbull, dated August 10, 2016.

The following National Park Service references are attached to this report:

- Preservation Brief 13: The Repair and Thermal Upgrading of Historic Steel Windows
- Preservation Brief 15: Preservation of Historic Concrete
- Preservation Brief 47: Maintaining the Exterior of Small and Medium Size Historic Buildings

This report is included for reference only and will not determine compliance in the future.
The HBMP by ARG, which this report is attached to, supersedes this HBMP by P&T.

HISTORIC BUILDING MAINTENANCE PLAN for 1170 HARRISON STREET

The following report has been prepared for Ronaldo Cianciarulo of Buddha Properties, LLC.

1170 Harrison Street in San Francisco has previously been determined to be both individually eligible for listing in the National Register of Historic Places and a contributor to the National Register-eligible Western SOMA Light Industrial and Residential Historic District. The building was surveyed as part of the South of Market Historic Resource Survey. Department of Parks and Recreation (DPR) 523A (Primary Record) forms for 1170 Harrison Street and DPR 523D (District Record) for the identified historic district were completed for the survey. In February 2011, San Francisco's Historic Preservation Commission adopted the survey findings, and therefore 1170 Harrison Street is a qualified historic resource for the purposes of review under the California Environmental Quality Act (CEQA). The property is being rehabilitated and converted to office use in accordance with San Francisco Planning Code Section 803.9. Per San Francisco Planning Department requirements, qualified historic buildings in the Western SOMA district that are to be converted to office use are to submit an Historic Building Maintenance Plan (HBMB) for the property for review by the San Francisco Historic Preservation Commission (SFHPC).

Description:
This report addresses considerations for future work affecting historic elements and materials of the property located at 1170 Harrison Street, San Francisco, California. General observations of the exterior of the building were from street level and from a neighboring roof hatch. The interior was observed from each level. The project proposes to restore or rehabilitate missing or damaged historic elements.

Maintenance Plan Approach:
All future modifications are to comply with *The Secretary of the Interior's Standards for Rehabilitating Historic Buildings* (the 'Standards'): the benchmark by which Federal agencies and many local government bodies evaluate rehabilitative work on historic properties. The Standards are a useful analytic tool for understanding and describing the potential impacts of substantial changes to historic resources. Compliance with the Standards does not determine whether a project would cause a substantial adverse change in the significance of a historic resource. Rather, projects that comply with the Standards benefit from a regulatory presumption that they would have a less-than-significant adverse impact on a historic resource. Projects that do not comply with the Standards may or may not cause a substantial adverse change in the significance of a historic resource.

The Secretary of the Interior offers the following four sets of Standards to guide the treatment of historic properties: Preservation, Rehabilitation, Restoration, and Reconstruction. According to the

Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings, the four distinct treatments are defined as follows:

> **Preservation**: The *Standards for Preservation* "require retention of the greatest amount of historic fabric, along with the building's historic form, features, and detailing as they have evolved over time."
> **Rehabilitation**: The *Standards for Rehabilitation* "acknowledge the need to alter or add to a historic building to meet continuing new uses while retaining the building's historic character."
> **Restoration**: The *Standards for Restoration* "allow for the depiction of a building at a particular time in its history by preserving materials from the period of significance and removing materials from other periods."
> **Reconstruction**: The *Standards for Reconstruction* "establish a limited framework for re-creating a vanished or non-surviving building with new materials, primarily for interpretive purposes."

Typically, one set of standards is chosen for a project based on the project scope. A future project may include the removal of features that are not character-defining, alterations, and/or additions to 1170 Harrison Street, to meet the evolving use of the historic building. Therefore, the *Standards for Rehabilitation* are most appropriately applied to the subject property.

The Secretary of the Interior's Standards for Rehabilitation:

Standard 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.
Standard 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 the property will be avoided.
Standard 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 historical properties, will not be undertaken.
Standard 4: Changes to a property that have acquired significance in their own right will be retained and preserved.
Standard 5: Distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property will be preserved.
Standard 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.
Standard 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.

Standard 8: Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measure will be undertaken.

Standard 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 shall 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 environment.

Standard 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*.

EXTERIOR

Figure 1: (Left) Harrison Street façade; (Right) Berwick Place façade.

1170 Harrison Street is on a corner lot with Harrison Street to the southeast and Berwick Place to the northeast. The building is bounded by adjacent buildings to the northwest on Heron Street and to the southwest on Harrison Street. The primary façade on Harrison Street has a surround of board-formed concrete with sides comprised of horizontal banding detail. A flat board-formed concrete upper portion exhibits an incised sign reading ‘SAN FRANCISCO GALVANIZING WORKS’ along the top of the façade. Within the concrete surround is a glazed galvanized steel-framed wall, window, and door assembly including a small pedestrian door at the center (the main entrance), a tall hinged door at the east end of the façade, and two roll-up metal doors which appear to be later interventions. The secondary façade on Berwick Place is board-formed concrete with high-set galvanized steel-framed windows and a hollow metal pedestrian double door at the center of the façade.

The building is generally in fair condition. Specific concerns relative to existing conditions are detailed within individual sections that follow.

Building Feature: Exterior Concrete Walls

Figure 2: (Left) Spalled concrete above wall, window & door assembly is in poor condition; (Right) Concrete at the west end of the Harrison Street façade is in fair condition.

Description:
The board-formed concrete on Harrison Street forms a frame around a galvanized steel wall, window and door assembly. The ends of the façade step back to the window system and are separated by flat 6, horizontal bands. At the east, the bands wrap around to the Berwick Place façade. A sign incised in the concrete along the top of the Harrison Street façade reads ‘SAN FRANCISCO GALVANIZING WORKS’ with the letters painted black. At either end of the lettering is a projecting flat circular form painted black with ‘1176’ (the original property number) painted within each circle. The continuation of the banding detail onto the Berwick Place façade is limited to the corner, and the rest of the façade is flat with squared window openings. The lower edge of the window openings slope to shed water, but do not project. The Harrison Street façade appears to have had a pale-colored painted finish. It is unknown if the paints original or if the raw concrete was originally exposed. There is no evidence of a painted finish on the Berwick Place façade.

Existing Conditions:
The concrete walls are in fair condition with localized areas that are in poor condition. On the Harrison Street façade, the underside of the concrete head above the steel wall, window and door assembly has a high level of spalling associated with corroded rebar that has minimal concrete cover. The upper portion of the concrete on this façade is generally in fair condition, while a few spalls and incipient spalls associated with shallow rebar are present lower on at either side of the

façade. A few smaller concrete spalls are present on the Berwick Place façade. One long vertical crack was identified at the east end of the Harrison Street façade. Two long vertical cracks are present on the Berwick Place façade extending down from the top of the wall. Horizontal cracking is common below the windows at the Berwick Place façade. Numerous structural through-wall ties have been installed at the upper portion of both façades. The painted finish on the concrete at the Harrison Street façade is flaking and has been almost entirely lost, and paint has been applied to the lower six to eight feet of the concrete on both façades to cover graffiti.

Maintenance Plan:
Inspect concrete for spalling, cracking and other forms of deterioration. Undertake analysis of the concrete as required to determine condition of concrete. Consult a structural engineer to evaluate cracking and to confirm the appropriateness of all structural through-wall ties. Repair/replace structural ties as needed, and remove all redundant ties. Undertake all other structural repairs as required while maintaining the character and appearance of the building. Clean concrete using gentlest means possible to remove build-up of soiling, biological growth, flaking paint and graffiti. Prior to removing paint take measured record of '1176' painted numbers to enable replication in the future. Remove all deteriorated concrete and obsolete anchors and patch as required to match existing appearance in terms of color, texture and exposed aggregate using an appropriate restoration patching material. Preserve and/or replicate incised 'San Francisco Galvanizing Works' sign and all concrete detailing on the façade. Repair/replace corroded reinforcement as required. Conduct a finishes investigation and analysis to determine historic scheme. Restoration of original finish should be considered; use breathable, non-sealing coatings only if painting. Retain preservation architect to review cleaning, finishes and mockups.

Inspect concrete every five years to identify deterioration, and treat as outlined above. For additional information, refer to the National Park Service's Preservation Brief 15: Preservation of Historic Concrete.

Periodic Exterior Cleaning Recommendations:
All graffiti should be removed within two weeks of application on the building using the gentlest means possible. (Especially non-paint graffiti such as posters, etc.) Any 'ghosting' or remaining surface damage should be treated by reapplying surface finish at this location. Surface finish should be applied in a way that minimizes visual disturbance. Full exterior cleaning should be undertaken every 7-10 years to remove build-up of soiling and deposits and to prepare for paint if the concrete will be painted using the gentlest means possible. The type of dirt or paint on the surface should be identified and the expectations for cleaning results should be established before beginning cleaning work.

DOORS, WINDOWS AND GLAZING

Building Feature: Harrison Street Wall, Window and Door Assembly

Figure 3: (Left) Center of wall, window and door assembly showing main entrance; (Right) Operable awning window in upper panel.

Figure 4: (Left) Wide metal roll-up door at west end of façade and (right) tall metal roll-up door at east end of façade inserted into the original wall, window, and door assembly.

Description:
Within the concrete frame on the Harrison Street façade is a galvanized steel framed wall, window and door assembly. The riveted steel frame separates the assembly into 9 divisions horizontally and separates the upper third of the assembly from the lower two thirds. The glazing at the upper third of the assembly is fixed hexagonal wire glass. The panes are slightly more horizontal then vertical and are set in a regular pattern of six wide by seven high separated by narrow muntins. The wire glass observed is a combination of clear and patterned/textured glass. Some are replacement panels but others appear to have been deliberately selected to be clear or patterned/textured depending on location. Two of the upper panels have operable awning window sash. The central panel has a single operable sash three high while the panel left-of-center has one operable sash (west) unit and a second sash (east) that has been replaced by a Heating Ventilating and Air Conditioning (HVAC) unit.

The base of the lower portion of the assembly has a horizontal row of sheet metal panels within the riveted frames. The glazing below the horizontal steel mullion consists of fixed hexagonal wire glass similar to that above and is six lites wide by nine lites high. Each of these has a centered, operable window sash. The central panel/bay deviates from this configuration and has centered metal framed and glazed pedestrian door where the steel jamb framing at the sides extends up to the horizontal frame division about to create a transom about the door. The base of the door matches the adjacent sheet metal panels while the upper portion is glazed, replicating the surrounding fixed window glazing configuration. The lower panel at either end of the façade have been altered. At the east end of the façade is a tall hinged door the full height of the panel and half its width. The door appears to be original and is glazed in all but the base replicating the sheet metal panels at the base of the assembly. The glazing also conforms to the surrounding glazing pattern. Directly west of this door is, a roll-up metal door which appears to be a later intervention. Insertion of the roll-up metal door resulted in the alteration of the assembly by removal of the horizontal riveted frame separating the upper and lower panels and removal of the vertical riveted frame separating the panel with the tall east door from its neighboring panel to the west. A second roll-up metal door is located at the west end of the façade and is two full panels wide. The western door fits below the horizontal riveted frame separating the upper and lower panels but its insertion appears to have resulted in the loss of the vertical riveted frame between the two lower panels.

Existing Conditions:
Despite a high level of superficial surface damage, the assembly is in fair to good condition for its age. As identified above, original sections of the assembly appear to have been removed when the metal roll-up doors were inserted. On the exterior, only small areas of corrosion were identified at the base of one of the riveted vertical posts and at the ends of the members that were cut for the insertion of the roll-up doors. The non-historic frame inserted around the upper portion of the tall eastern roll-up door has surface corrosion. Superficial damage includes the boarding up of some of the lower windows, a small number of broken panes of glass, and the application of paint to the

lower six to eight feet of the assembly including the glazing (presumably to cover graffiti). The only window unit identified as currently operable is in the second floor office. The others have corrosion on the interior and could not be opened were not accessible from the interior to test the hardware was heavily corroded. The operability of the large hinged door at the east is unknown as it is blocked on the interior. The metal roll-up door at the west end of the façade is in poor condition. Operability of the two roll-up doors was not established. It is thought that the original finish may have been an exposed gray galvanized coating.

Maintenance Plan:
Where possible undertake repairs in situ, if not possible remove a portion of the assembly or parts of the assembly for repair, and reinstall in their original positions following rehabilitation. Undertake investigation to ensure a sound connection between the concrete and steel wall, window, and door assembly; repair as required. Remove all non-original exterior boarding, the two metal roll-up doors and associated non-original framing, and the HVAC unit from the second floor level. Using gentlest means possible, remove loose painted finishes from the window assembly as needed to prepare the substrate for paint - do not use abrasive methods for paint removal as this will damage the galvanized surface below. Identify locations of corrosion and treat as required. Consider restoration of the major window framing divisions and the glazing in the upper panels at the east end of the façade where the roll-up door was installed. Rehabilitate existing window sash, treating corrosion and splicing in new metal to match existing as needed. Refurbish existing hardware, and replace missing hardware to match original. Restore operability to all operable window sash. Remove deteriorated window putty and reglaze; abatement may be required. Restore original glass or replace with new compatible glass. Remove all sealant and provide new at perimeter of assembly. if original finish is confirmed to have been exposed galvanized metal, consider leaving galvanized coat exposed if feasible. A second option is to remove paint as needed to prepare the substrate for new compatible rust-inhibitive paint without damaging the galvanized finish below. Retain preservation architect to review finishes and mockups.

Any alterations required for the door hardware to meet accessibility requirements should be undertaken in a way that is compatible to the character of the building. If new openings are required for egress or accessibility consider installation/alteration at secondary facades or previously altered areas, such as at current locations of metal roll-up doors. Any new openings should be in keeping with the character and scale of the building and facade.

Undertake inspection of steel wall, window and door assembly every five years to identify damage and deterioration; treat as outlined above and as needed. Check sealant at perimeter of frame and glazing putty, and replace as required. Replace all broken panes of glass. Clean and lubricate all operable windows and doors as needed to ensure continuation of proper operation.

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Building Feature: Berwick Place Steel Windows

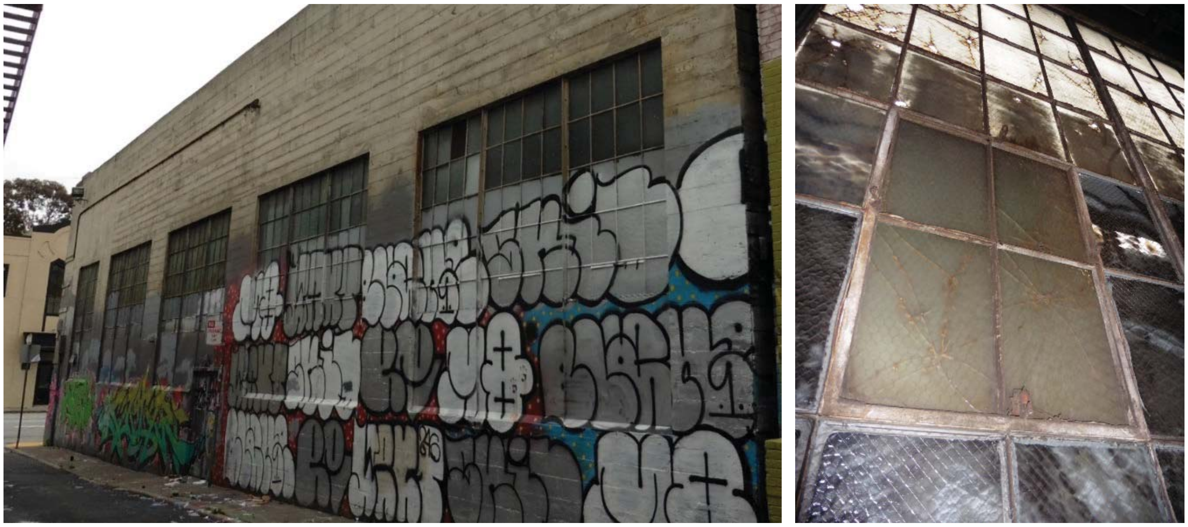

Figure 5: (Left) Berwick Place facade; (Right) Interior view of operable unit.

Description:
The Berwick Place façade has a row of five fixed lite galvanized steel window assemblies. Each window is divided into vertical panels; the window closest to Harrison Street is two panels wide and the other four are three panels wide. Each panel is four panes wide by seven high divided by narrow muntins. The panes are vertically oriented and are patterned/textured hexagonal wire glass. There is an operable sash centered near the base of each panel with a horizontal center pivot that is two panes wide by two panes high. A double door that has been inserted into the wall below the northern most panel of the central window assembly has resulted in the loss of the lower course of glazing (see 'Berwick Place Façade Steel Pedestrian Doors' Article below).

Existing Conditions:
The Berwick Place façade windows are in fair to poor condition. Two of the windows appear to be bowing outwards. The frames have significant corrosion on the interior, but relatively little corrosion was observed at the exterior. Approximately half of the operable units have had their sash removed and have been boarded-up. Not all were accessible, but none of the existing sash appear to be operable due to corrosion. On the exterior, the lower third of all windows have been boarded up. In addition, layers of paint and graffiti cover the majority of the exterior window surfaces and therefore the true condition of the components was obscured during assessment. Approximately half of the panes of glass are broken much of the damage appears to be due to vandalism. Some of the panes of glass have been replaced with sheet metal. A vent has been installed into the base of the

operable sash closest to Harrison Street. It is thought that the original finish may have been an exposed gray galvanized coating.

Maintenance Plan:
Evaluate apparent bulging of the window assemblies on the Berwick Place façade. Undertake investigation to ensure a sound connection between the concrete surrounding and window assembly, and repair as required. Where possible undertake repairs in situ, if not possible, remove the assembly for repair and reinstall in original position following rehabilitation. Remove all boarding from exterior and windows. Using gentlest means possible, remove loose painted finishes from the window assembly as needed to prepare the substrate for paint - do not use abrasive methods for paint removal as this will damage the galvanized surface below. Identify locations of corrosion and treat as required. Remove existing window sash, treat corrosion, patch or splice in new metal to match existing as needed, refurbish existing hardware, and replace missing hardware to match original. Replace all missing window sash and muntins to match original, and restore operability to all operable window sash. Remove deteriorated window putty and reglaze; abatement may be required. Restore original glass or replace with new compatible glass. Remove all sealant and provide new at perimeter of assembly. If original finish is confirmed to have been exposed galvanized metal, consider leaving galvanized coating exposed if feasible. A second option is to remove paint as needed to prepare the substrate for new compatible rust-inhibitive paint without damaging the galvanized finish below. Retain preservation architect to review finishes and mockups.

Undertake inspection of steel window assemblies every five years to identify damage and deterioration; treat as outlined above and as needed. Check sealant at perimeter of frame and glazing putty, and replace as required all broken panes of glass. Clean and lubricate all operable sash to ensure continuation of proper operation.

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Building Feature: Berwick Place Façade Steel Pedestrian Doors

Figure 6: Exterior (left) and interior (right) views of the Berwick Place façade pedestrian doors.

Description:
At the center of the Berwick Place façade is a pair of doors providing the only building access at this side of the building. The doors are hollow metal with an upper panel that was originally glazed (now blocked). The doors appear to post-date the neighboring window it interrupts and have been inserted so that the door leaves align with the window panel above.

Existing Conditions:
The door appears to be in fair condition with no identified deterioration of the metal panels. The upper panels have been boarded up from the exterior and when viewed from the interior, one has lost its original muntins (possibly the entire inset window assembly), and neither is glazed. Steel mesh covers the upper glass panel openings on the interior. Unidentified items have been affixed to the interior of the doors with bolts, although these connections are not visible at the exterior of the doors. Layers of paint and graffiti cover the majority of the exterior surface of the doors.

Maintenance Plan:
Remove door leaves for repair and reinstate in original position following rehabilitation. Remove the boards and steel mesh from the upper glass panels as well as the items affixed to the door interiors. Using the gentlest means possible, remove all painted finishes from doors, if possible. Do not use abrasive methods for paint removal as this will damage the galvanized surface below. Identify all locations of corrosion and treat as required. Reinstate the missing window sash to match original and install new glazing in both doors. If original finish is confirmed to have been exposed galvanized metal, consider leaving galvanized coating exposed or paint, pending further investigation and feasibility. Refurbish existing hardware and reinstate missing hardware to match original. Any alterations required for the door hardware to meet accessibility requirements should be undertaken

to be in keeping with the character of the building. Remove all sealant and provide new at perimeter of the assembly.

Undertake inspection of doors every five years to identify damage and deterioration; treat as outlined above and as needed. Check sealant at perimeter of frame and glazing putty, and replace as required. Replace all broken panes of glass. Clean and lubricate doors to ensure continuation of proper operation.

EXTERIOR ELEMENTS

Building Feature: Vertical Blade Sign, Harrison Street

Figure 7: (Left) East side of blade sign; (Right) View of lower part of blade sign from above showing deterioration of wood core.

Description:
Attached to the Harrison Street façade, just west of center, is a projecting vertical blade sign with a wood-framed core and sheet metal cladding. The sign is attached to a vertical riveted steel member of the wall, window and door assembly frame with a metal rod at the top and a bracket at the base. The sign is in contact with the concrete above. At the base of the sign on both sides are the painted building number '1176'. On the west side of the sign, an earlier version of the same building number can be seen underlying the current number. Large illegible 'ghost' lettering is present on the west side of the sign.

Existing Conditions:
The sign is in poor condition with its wooden core fully exposed along the outer edge and at the top of the two projecting surfaces. The wood appears to be heavily deteriorated. The sheet metal at the lower projecting part of the sign appears to be corroded along with the nails connecting the sheet metal to the wood. The painted finish on the sheet metal is flaking and the lower west side of the sign exhibits graffiti. The connections to the building appear to be stable, but the sign was not accessible during our observation.

Maintenance Plan:

The sign does not appear to date to the building's period of significance and is recommended to be removed. Following removal, repair to the metal framing member should be undertaken at the connection points.

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Building Feature: Collision Bollards, Harrison Street

Figure 8: (Left) Collision bollard at west end of Harrison Street façade beside roll-up door; (Right) Collision bollards at east end of façade beside large hinged door and metal roll-up door.

Description:
Concrete collision bollards with metal supports are present at either side of each of the metal roll-up doors and at the hinge side of the large hinged door at the east end of the Harrison Street façade (five bollards in total). These bollards are not likely an original feature of the façade.

Existing Conditions:
The collision bollards are in poor condition. The concrete is commonly damaged or deteriorated, and in the case of the east bollard at the east roll-up door, the concrete is almost entirely missing (Figure 8). The metal framing behind the bollards appears to be in fair condition. The four bollards at the metal roll-up doors have been painted.

Maintenance Plan:
The collision bollards are currently not thought to date from the period of significance. It is recommended that they be removed and the substrate behind repaired.

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ROOF

Figure 9: Aerial image of 1170 Harrison Street showing the relationship between the red-brown east roof & monitor and the gray west roof & monitor. Screen capture from Google Maps 2016.

Limited observations were made of the roof structures from a neighboring roof hatch. The roof structure at 1170 Harrison Street has two main pitched roof sections, referred to herein as the east roof and the west roof. Each has a roof monitor. The east roof is asymmetrical with its west side extending lower to meet the west roof. The concrete exterior south wall forms a parapet which is extends upwards at the Harrison Street façade and terminates with a deep concrete beam that projects a couple feet over the pitched roof. The east roof monitor has boarded-up clerestory windows while the west monitor is boarded up, and no evidence was seen of original windows or vents. Several roof vents and the furnace chimney penetrate the roofs. Per meter roof drainage appears to be integral gutters but could not be viewed from the observation point. Broad square gutters appear to be present when viewed from the interior at the roof perimeter walls and between the two roofs.

Building Feature: Concrete Roof Parapet

Figure 10: (Left) The west end of the rear side of the Harrison Street concrete parapet with asphalt shingle covered west roof and monitor (neighboring building in foreground); (Right) Close-up view of the parapet wall above a section of the east roof.

Description:

The back of the concrete parapet was observed from a distance from a neighboring roof hatch. The roof parapet is formed by the exterior concrete wall and extends two feet above the Harrison Street façade with a slight set-back and the bottom slopes back to the wall above the roof. The projecting concrete appears to be an integral structural beam. There is no clear slope or capping on the upper surface of the parapet. A single structural metal brace was observed between the parapet and apex of the west roof (the apex of the east roof was not observed). Brackets holding conduits are attached along the back (roof) side of the parapet wall.

Existing Conditions:

The concrete appears to be in fair condition with no significant spalls or damage observed. Painted graffiti covers approximately fifty percent of the observed area of the parapet. Biological growth can be seen on the concrete. Portions of the conduits and their supports are corroded. No corrosion or corrosion staining was observed at the structural brace, and the connections appeared to be in good condition.

Maintenance Plan:

Have a structural engineer perform an inspection to assess the structural stability of the parapet wall and confirm appropriateness of existing structural bracing/ties. Perform materials testing as required to establish strength and other required characteristics of materials. Upgrade structural bracing/ties as required by the structural engineer and/or treat corrosion on existing. All upgrades should attempt to utilize existing holes in façade or eliminate through penetrations where possible. Prepare, prime and paint all exposed through-wall ties.

Inspect concrete for spalling, cracking and other forms of deterioration. Clean concrete using gentlest means possible to remove build-up of soiling, biological growth, debris and graffiti. Remove all deteriorated concrete, and patch as required to match existing using an appropriate restoration patching material. Match appearance in terms of color, texture and exposed aggregate. Repair/replace corroded reinforcement as required. Consider application of a suitable graffiti barrier to concrete walls on the interior of parapet, paint to match façade or flash in conjunction with roof work. Consider a painted sheet metal parapet cap that does not detract from the facade.

Identify redundant conduits and brackets and remove. Upgrade remaining conduits and attachments as required to meet code. Remove and replace all corroded supports and features of conduits or treat corrosion.

Inspect concrete and structural bracing/ties every five years to identify deterioration; treat as outlined above and as needed. Reapply surface finish as required. Treat corrosion on existing structural bracing/ties, conduits and brackets, and prepare, prime and repaint as needed.

Building Feature: East Roof & Monitor

Figure 11: (Left) East roof monitor showing connection between corrugated metal and asphalt shingle roofing; (Right) Warping and gaps in the east roof monitor flashing and displacement of corrugated siding.

Description:
The east roof is pitched with a monitor at the roof apex. The east roof covering and monitor cladding is corrugated composite sheathing. The clerestory windows appear to have been covered by sheet metal panels (see "Clerestory Windows" Article below). The corrugated composite sheathing is secured with bolts which appear to have a putty/mastic covering. The corrugated composite sheathing has been replaced by asphalt shingles over wood sheathing at the west side of the north end of the monitor roof. A small portion of the east roof was observed where the roof is in contact with the parapet wall; in this location there appears to be a large flashing detail that extends up the parapet wall below the overhanging beam.

Existing Conditions:
The east roof and monitor appear to be in fair condition based on the limited area observed. The corrugated composite sheathing is consistently red-brown in color. Observation for penetrating corrosion or other issues could not be assessed. A couple of the corrugated sheets at the monitor cladding appears to be deformed/displaced (Figure 11). The connection between the asphalt and corrugated sheathing on the monitor roof appears to be good with a wide membrane covering between the two surfaces. The flashing cap at the central portion of the corrugated composite sheathing roof on the monitor is narrow and does not appear to be sufficient to prevent water penetration. The cap flashing at either end of the monitor roof, including the area with asphalt shingles, is wide and appears to provide sufficient coverage. The flashing between the east roof and the parapet wall appears to be in fair condition, despite surface corrosion. However, the bitumen/sealant between the flashing and the wall appears to be in poor condition. Graffiti covers a large portion of the monitor cladding observations were visual assessments only.

Maintenance Plan:
Remove asphalt shingle roofing and siding. Install rigid insulation and corrugated metal roofing similar to the existing corrugated sheathing over the existing corrugated roofing. Retain all existing roof lines with the exception of the western extended asymmetrical low-sloped portion of the east roof. This portion of the roof will be removed and replaced by a new roof deck. Detail suitable flashing to ensure proper drainage from the roof and new roof deck into appropriate roof drainage. Consider retaining and refurbishing existing integral drainage system if possible and if suitable for sufficient roof drainage, or provide new roof drainage as needed for proper water shed. Rehabilitate and restore clerestory windows at monitor (see “clerestory windows” article).

Inspect the corrugated metal roof for corrosion, warping, poor connections, and other defects and signs of deterioration every five years. Replace or patch all damaged panels. Inspect connecting bolts and replace/tighten as required. Inspect flashing and sealants to ensure a water-tight interior space. Undertake yearly inspections to remove build-up of debris / biological growth, to clear roof drains, and to address any water penetration issues.

Building Feature: West Roof & Monitor

Figure 12: (Left) Asphalt shingle-covered west roof and monitor; (Right) Connection between neighboring pitched roof with damaged gutter adjacent to west roof.

Description:
The west roof is an asphalt shingle covered pitched roof and monitor with wood sheathing below. A wood fascia is visible at the edge of the west monitor roof. A single pitched roof from the neighboring building behind 1170 Harrison Street, on Heron Street, slopes into the west roof connecting with the gable end of the roof monitor and overhanging the west roof. The detail/drainage at the base of the roof was not observed.

Existing Conditions:
The asphalt shingle roof covering appears to be in fair condition. The flashing detail where the roof connects to the parapet wall is heavily coated in graffiti and the condition of the underlying materials could not be determined. The flashing at the other end of the roof where it connects to the building behind appears to be in fair condition. The single pitched roof that slopes into the west roof has a failed gutter meaning that all water is transferred directly onto the west roof. The connection detail between the neighboring roof and the side of the roof monitor is unknown, but any failure here is likely to be contributing to water infiltration.

Maintenance Plan:
Remove and replace asphalt shingle roofing with rigid insulation and corrugated metal roofing to match east roofing. Retain wood sheathing below. Retain all existing roof lines. Detail suitable flashing to ensure proper drainage from the roof into the appropriate roof drainage. Consult with owner of neighboring property with roof sloping into west roof monitor to address the damaged gutter and any other water drainage issues at this connection point. Consider retaining and refurbishing existing integral drainage system if possible and if suitable for sufficient roof drainage, or provide new roof drainage as needed for proper water shed.

Every five years inspect the corrugated metal roof for corrosion, warping, poor connections, and other defects and signs of deterioration. Replace or patch all damaged panels. Inspect connecting bolts and replace/tighten as required. Inspect flashing for good detailing, improve as required to ensure water-tight interior space. Inspect neighboring single pitched roof to ensure appropriate drainage away from west roof and monitor. Undertake yearly inspections to remove build-up of debris / biological growth including at roof drains and address any water penetration issues.

Building Feature: Clerestory Windows


Figure 13: (Left) Boarded-up clerestory windows at east roof monitor; (Right) Existing boarded-up clerestory windows viewed from the east warehouse space.

Description:
Clerestory windows are present in a continuous stretch along both sides of the east roof monitor. They are covered at the exterior with sheet metal but visible from the interior. The windows appear to have metal frames and to be configured in panels of five panes wide by two panes high. The glazing appears to be hexagonal wire glass.

No evidence of clerestory windows and/or vents were observed at the west roof monitor. The sides of the west roof monitor are covered by sheet metal at the exterior and little could be seen from the interior.

Existing Conditions:
The existing condition of the clerestory windows at the east roof monitor is unknown due to lack of close access. Limited observation of the hexagonal wire glass indicates that it is in poor condition with many voids and cracks. Closer assessment of both roof monitors and extant clerestory windows is required. During roof work, exterior metal coverings should be removed for more clear observation. The original windows may have been an exposed gray galvanized coating.

Maintenance Plan:
Uncover boarded-up clerestory windows at east roof monitor and inspect for deterioration of the frames and sash, damage to wire glass, and connections of frames to monitor. Treat windows in situ if possible, otherwise remove, restore, and reinstate. Treat all corrosion, splice in new pieces as required to match existing, and patch metal as required where deteriorated. If windows are found to have originally been exposed galvanized steel, consider leaving galvanized coating exposed if feasible. A second option is to remove paint as needed to prepare the substrate for new compatible rust-inhibitive paint without damaging the galvanized finish below. Replace glass with new

compatible glazing. Improve connection of clerestory windows to monitor and monitor to roof as required.

Remove boards at west roof monitor. Undertake assessment of existing conditions to determine if the monitor originally had clerestory windows or vents. Consider replicating/restoring original feature. If missing, new windows or vents that have similar compatible size and pattern could be installed. New windows or vents should be in keeping with the character of the building.

Every five years undertake inspection of clerestory windows for deterioration of the frames, damage to glazing, and connection of clerestory windows to monitor. Treat all corrosion, and prepare, prime and paint windows using a rust-inhibitive paint system as required. Replace all broken panes of glass to match existing or with compatible new glass. Replace sealant and/or glazing putty as needed.

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Building Feature: Roof Vents & Furnace Chimney

Figure 14: (Left) Furnace chimney and roof vent showing above the west roof monitor viewed from the west; (Right) Roof vent showing above parapet wall on Berwick Place façade at the north corner of the building.

Description:
Several capped roof vents are present on the east and west roofs, and the furnace chimney appears to date from the period of significance. It appears to extend above the west roof monitor by approximately eight to ten feet. The furnace chimney also appears to be capped and has several cables extending from a band near the top of the chimney down towards the roof.

Existing Conditions:
The roof vents and furnace chimney were observed from a distance, and many were not visible at all. The vents and furnace chimney have a high level of corrosion and corrosion staining. It is unknown how many of these features are still functional.

Maintenance Plan:
The sheet metal chimney appears to date from the period of significance. While it is generally related to the former industrial function of the building, it is not considered character defining. The chimney may be retained and repaired, or removed. If retaining, inspect the chimney for structural stability, material defects, and water tightness. Undertake repairs as required. If not retaining, remove and patch roof during remaining roof work. Additionally, remove all obsolete roof vents or make air- and water-tight. Treat all corrosion on remaining roof vents and/or the furnace chimney. Prepare, prime and paint vents using a rust-inhibitive paint system as appropriate. New roofing should be suitably detailed to fit around all retained roof vents and/or the furnace chimney to prevent water ingress. Undertake inspection every 5 years of remaining roof vents and/or furnace chimney. Undertake repairs as required to mitigate deterioration.

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INTERIOR ELEMENTS

Figure 15: View of the east warehouse space from the south east corner of the building.

Building Feature: Board-Formed Concrete Walls


Figure 16: (Left) The rear (northwest) board-formed concrete wall of the east warehouse space with heavy corrosion staining; (Right) Large horizontal crack through the rear (northwest) low concrete wall of the west warehouse space.


Figure 17: (Left) Water penetration and associated efflorescence at the roof line on the interior of the concrete wall at the Berwick Place façade; (Right) Horizontal cracking through the interior window sills at the Berwick Place façade.

Description:

The board-formed concrete walls at the Harrison Street and Berwick Place façades are exposed on the interior with no surface finish. The full rear (northwest) wall in the east warehouse space is exposed board-formed concrete. In the west warehouse space, the rear (northwest) wall has an approximately four feet high concrete base/foundation, above which is a corrugated metal clad wall (see "Corrugated Metal Walls" Article). The lower concrete portion appears to be covered by an unknown overspray of material, perhaps galvanizing. The portion of the wall above at the west warehouse space is fully clad in corrugated metal. There is a concrete wall behind at the southwest wall, but it is only exposed from the interior space of the neighboring building to the west.

Existing Conditions:
The concrete exposed on the interior of the building is in fair to poor condition. The interior of the Berwick Place façade's concrete walls exhibits heavy cracking at sill level along with small spalls and corrosion staining. Horizontal cracking was also observed on the interior of the Harrison Street façade's concrete walls. There is heavy efflorescence at the roofline on all walls. Heavy rain occurred during the site visit and a large number of locations of water infiltration at the roofline were noted. The full-height northwest concrete wall (east warehouse) has several long horizontal cracks as well as large spalls, one of which exposed the embedded rebar at a 3-inch depth within the 6-inch thick wall. This wall has a high level of corrosion staining indicating corrosion of the embedded rebar. The low wall base/foundation below the corrugated metal in the west warehouse space is in poor condition with heavy accumulations of dark grey encrusted deposits which are believed to have been deposited during the galvanizing processes that previously took place within the warehouse. The northeast wall in the east work shop has a high level of corrosion staining which may be from corroded rebar, from corrosion of the corrugated metal above, or a combination of the two.

Maintenance Plan:
Inspect concrete for spalling, cracking and other forms of deterioration. Consult a structural engineer to evaluate all areas of cracking. Repair as required to ensure structural stability. Clean concrete using gentlest means possible to remove build-up of soiling, biological growth, efflorescence, and surface deposits. Remove all deteriorated concrete and obsolete anchors and patch as required to match existing using an appropriate restoration patching material, and match appearance in terms of color, texture and exposed aggregate. Repair/replace corroded reinforcement as required and recommended by the structural engineer. Apply painted finish if historic precedent, otherwise leave concrete un-coated. Retain preservation architect to review cleaning, finishes and mockups.

Inspect concrete every five years to identify deterioration, treat as outlined above.

Building Feature: Corrugated Metal Walls

Figure 18: Corrugated metal on the rear (northwest) wall (left) and the side (southwest) wall (right) of the west warehouse space.

Description:
The west warehouse space has corrugated metal cladding on its rear (northwest) and side (southwest) walls. The corrugated metal is full-height (floor to underside of roof structure) on the side wall. On the rear gabled wall, the corrugated metal is comprised of 2 layers. The outer (exposed) layer sits atop a concrete base/foundation that is approximated six feet high and extends up to the height of the adjacent side wall. The second layer of corrugated metal is situated behind the outer layer and extends from the top of the concrete base to the full height of the gabled roof. The second layer appears to be the exterior fabric of the building in this location.

Existing Conditions:
The existing corrugated metal is in fair to poor condition. The corrugated metal on the rear wall behind the exposed corrugated metal is in poor condition. It exhibits heavy corrosion and pieces that are failing and separating, and a piece of corrugated metal that has separated, presumably from the section of wall within the monitor, was hanging from a rafter. The exposed corrugated metal on the rear wall and side wall are in fair condition with isolated corrosion.

Maintenance Plan:
These walls require the installation of a fire-rated wall assembly. Remove the exposed layer of corrugated metal on the rear (northwest) wall in its entirety to expose the original materials and wall condition behind. Following assessment, remove the original layer of corrugated metal from both walls if needed for the construction of the fire-rated assembly. Following construction of the fire-rated assembly, consider the feasibility of reinstallation of salvaged or new corrugated metal as the interior finish. If removal of the original corrugated metal is not required for the fire-rated assemblies, repair/stabilize/patch or preserve the original material in place prior to covering with the

This report is included for reference only and will not determine compliance in the future. The HBMP by ARG, which this report is attached to, supersedes this HBMP by P&T.

fire-rated assembly and new interior finishes. Any new wall finishes applied over the top of the corrugated metal should provide sufficient ventilation to prevent the build-up of moisture around the existing materials. The existing roll-up metal door between west warehouse space and neighboring building should be covered or removed and infilled.

Building Feature: Structural Elements – Exposed Rafters, Trusses, Purlins & Concrete-Covered Columns

Figure 19: (Left) View into the east warehouse space from the west warehouse space showing the exposed rafters, trusses and purlins, and the concrete-covered structural steel columns; (Right) Structural ties (red) added to the Harrison Street façade concrete wall.

Description:
Both warehouse spaces have exposed roof structures with exposed rafters, trusses and purlins. Structural metal ties have been added at the top of the interior of the Harrison Street façade concrete wall. Square columns located between the east and west warehouse spaces are structural steel encased in concrete.

Existing Conditions:
The exposed rafters, trusses and purlins were viewed from the ground in addition to a few elevated locations within the warehouse spaces. These steel elements appeared to be sound but with some surface corrosion. Their original finish could not be determined, but it's possible that they were galvanized. The structural columns appear to be in fair condition and exhibit the exposed steel column within where the concrete encasement has broken away at the base. It is not clear whether this damage is a result of impact damage or material failure of the concrete. The steel appears to be in fair condition but with surface corrosion. Several of the concrete columns have dark grey encrusted deposits (similar to the concrete walls/base), which are believed to have been deposited during the galvanizing processes that previously took place within the warehouse.

Maintenance Plan:
A structural engineer should undertake assessment of the steel roof structure and concrete encased structural columns to determine the extent of structural repairs/upgrades required. Perform materials testing as needed to establish strength and other required characteristics of materials. Undertake all repairs/upgrades required by the structural engineer. Treat areas of corrosion, and remove and replace material to match existing where required. Prepare, prime and paint with rust-inhibitive paint

all steel rafters and purlins or consider retaining/restoring finish if originally galvanized based on further investigation and feasibility. Perform repairs in a manner compatible with retaining the character of the historic structure where possible. Inspect concrete for spalling, cracking, and other forms of deterioration. Clean concrete using gentlest means possible to remove build-up of soiling, biological growth, debris, and surface deposits. Remove all unsound/deteriorated concrete and patch as needed to match existing using an appropriate restoration patching material, and match appearance in terms of color, texture and exposed aggregate. Repair/replace corroded reinforcement within concrete as required. Apply painted finish if there is historic precedent, otherwise leave concrete un-coated. Perform repairs in a manner compatible with retaining the character of the historic structure and in a manner that will not damage the historic substrates. Retain preservation architect to review finishes and mockups.

Perform visual inspection of structural rafters, trusses, purlins & concrete-covered columns annually for signs of deterioration, especially for moisture infiltration that could advance corrosion and deterioration. Every five years, or as needed, prepare, prime, and paint exposed metal and undertake inspection and repairs to concrete. Remove all deteriorated concrete and patch as required to match existing using an appropriate restoration patching material, and match appearance in terms of color, texture and exposed aggregate. Repair/replace corroded reinforcement as needed.

Building Feature: Wood Sheathing


Figure 20: (Left) Wood sheathing on the ceiling of the west warehouse space; (Right) wood sheathing on the limited section of the east roof monitor where the corrugated metal has been replaced by asphalt shingles.

Description:
Exposed wood sheathing is present at the ceiling of the west warehouse space below the asphalt shingles on the roof as well as at the monitor. The sheathing is wood plank and is painted. Wood sheathing was also observed in the east warehouse space below the limited area of asphalt shingles at the north end of the monitor this sheathing appears to be larger sheets of plywood or oriented strand board (OSB).

Existing Conditions:
The wood sheathing in both spaces was viewed from the ground. No significant issues of deterioration were identified, however if the roofs are not water tight above the sheathing, and there are likely to be issues related to water damage. The painted finish on the sheathing in the west warehouse space is patchy with large areas of missing paint.

Maintenance Plan:
Remove wood sheathing from east warehouse space during removal of asphalt shingles above and repair/replace roof to match the remainder of the existing roof per 'East Roof and Monitor'. In the west warehouse space, retain wood sheathing if it does not affect the attachment and function of the new roof above. If removal is required for proper waterproofing and new roof assembly, provide new or salvaged sheathing at underside to match the appearance of the existing sheathing. Where retaining existing sheathing, remove paint and prepare for new paint as needed. Undertake small scale epoxy repairs where wood can be salvaged and will be reused. Replace all deteriorated wood boards that cannot be salvaged or reused to match existing appearance. Repaint wood boards.

Building Feature: Poured Concrete Flooring

Figure 21: Section of poured concrete flooring within west warehouse space.

Description:
The flooring in both warehouse spaces is poured concrete.

Existing Conditions:
The poured concrete floor is in fair condition with some areas of cracking and small areas of localized damage, likely from impact.

Maintenance Plan:
Clean concrete flooring in a manner that will not damage the historic concrete. Inspect the poured concrete floor surface for areas of cracking and deterioration. Undertake compatible patch repairs as needed to match the adjacent original material and to return the floor to flat surface.

13 PRESERVATION BRIEFS

The Repair and Thermal Upgrading of Historic Steel Windows

Sharon C. Park, AIA

U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services

The Secretary of the Interior's "Standards for Rehabilitation" require that where historic windows are individually significant features, or where they contribute to the character of significant facades, their distinguishing visual qualities must not be destroyed. Further, the rehabilitation guidelines recommend against changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors which radically change the sash, depth of reveal, and muntin configuration; the reflectivity and color of the glazing; or the appearance of the frame.

Windows are among the most vulnerable features of historic buildings undergoing rehabilitation. This is especially the case with rolled steel windows, which are often mistakenly not deemed worthy of preservation in the conversion of old buildings to new uses. The ease with which they can be replaced and the mistaken assumption that they cannot be made energy efficient except at great expense are factors that typically lead to the decision to remove them. In many cases, however, repair and retrofit of the historic windows are more economical than wholesale replacement, and all too often, replacement units are unlike the originals in design and appearance. If the windows are important in establishing the historic character of the building (see fig. 1), insensitively designed replacement windows may diminish—or destroy—the building's historic character.

This *Brief* identifies various types of historic steel windows that dominated the metal window market from 1890-1950. It then gives criteria for evaluating deterioration and for determining appropriate treatment, ranging from routine maintenance and weatherization to extensive repairs, so that replacement may be avoided where possible.[1] This information applies to do-it-yourself jobs and to large rehabilitations where the volume of work warrants the removal of all window units for complete overhaul by professional contractors.

This *Brief* is not intended to promote the repair of ferrous metal windows in every case, but rather to insure that preservation is always the first consideration in a rehabilitation project. Some windows are not important elements in defining a building's historic character; others are highly significant, but so deteriorated that repair is infeasible. In such cases, the *Brief* offers guidance in evaluating appropriate replacement windows.

Fig. 1 Often highly distinctive in design and craftsmanship, rolled steel windows play an important role in defining the architectural character of many later nineteenth and early twentieth century buildings. Art Deco, Art Moderne, the International Style, and Post World War II Modernism depended on the slim profiles and streamlined appearance of metal windows for much of their impact. Photo: William G. Johnson.

[1] The technical information given in this brief is intended for most ferrous (or magnetic) metals, particularly rolled steel. While stainless steel is a ferrous metal, the cleaning and repair techniques outlined here must not be used on it as the finish will be damaged. For information on cleaning stainless steel and non-ferrous metals, such as bronze, Monel, or aluminum, refer to ***Metals in America's Historic Buildings*** (see bibliography).

HISTORICAL DEVELOPMENT

Although metal windows were available as early as 1860 from catalogues published by architectural supply firms, they did not become popular until after 1890. Two factors combined to account for the shift from wooden to metal windows about that time. Technology borrowed from the rolling industry permitted the mass production of rolled steel windows. This technology made metal windows cost competitive with conventional wooden windows. In addition, a series of devastating urban fires in Boston, Baltimore, Philadelphia, and San Francisco led to the enactment of strict fire codes for industrial and multistory commercial and office buildings.

As in the process of making rails for railroads, rolled steel windows were made by passing hot bars of steel through progressively smaller, shaped rollers until the appropriate angled configuration was achieved (see fig. 2). The rolled steel sections, generally 1/8'' thick and 1'' - 1 1/2'' wide, were used for all the components of the windows: sash, frame,and subframe (see fig. 3). With the addition of wire glass, a fire-resistant window resulted. These rolled steel windows are almost exclusively found in masonry or concrete buildings.

A byproduct of the fire-resistant window was the strong metal frame that permitted the installation of larger windows and windows in series. The ability to have expansive amounts of glass and increased ventilation dramatically changed the designs of late 19th and early 20th century industrial and commercial buildings.

The newly available, reasonably priced steel windows soon became popular for more than just their fire-resistant qualities. They were standardized, extremely durable, and easily transported. These qualities led to the use of steel windows in every type of construction, from simple industrial and institutional buildings to luxury commercial and apartment buildings. Casement, double-hung, pivot, projecting, austral, and continuous windows differed in operating and ventilating capacities. Figure 4 outlines the kinds and properties of metal windows available then and now. In addition, the thin profiles of metal windows contributed to the streamlined appearance of the Art Deco, Art Moderne, and International Styles, among others.

The extensive use of rolled steel metal windows continued until after World War II when cheaper, non-corroding aluminum windows became increasingly popular. While aluminum windows dominate the market today, steel windows are still fabricated. Should replacement of original windows become necessary, replacement windows may be available from the manufacturers of some of the earliest steel windows. Before an informed decision can be made whether to repair or replace metal windows, however, the significance of the windows must be determined and their physical condition assessed.

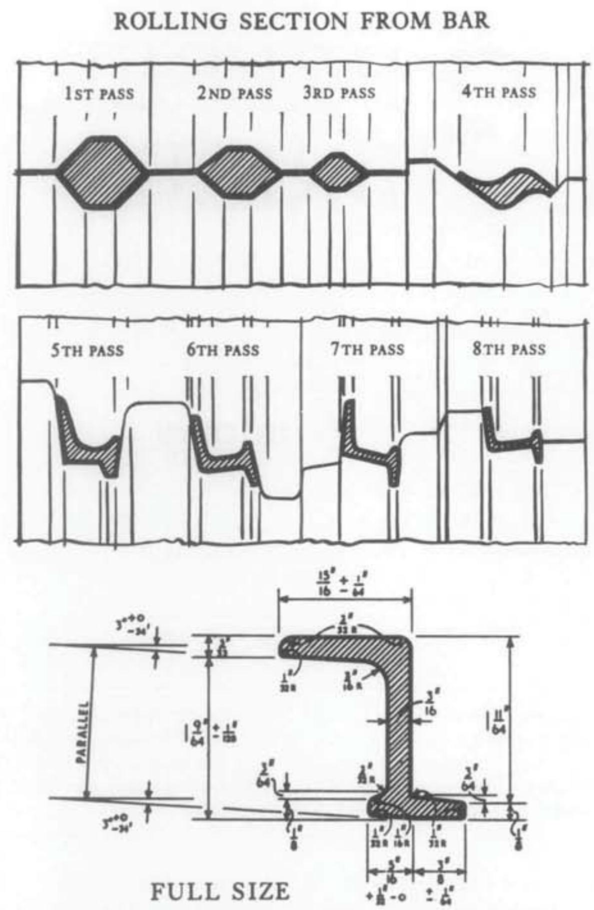


Fig. 2. The process of rolling a steel bar into an angled section is illustrated above. The shape and size of the rolled section will vary slightly depending on the overall strength needed for the window opening and the location of the section in the assembly: subframe, frame, or sash. The 1/8 '' thickness of the metal section is generally standard. Drawing: A Metal Window Dictionary. Used with permission.

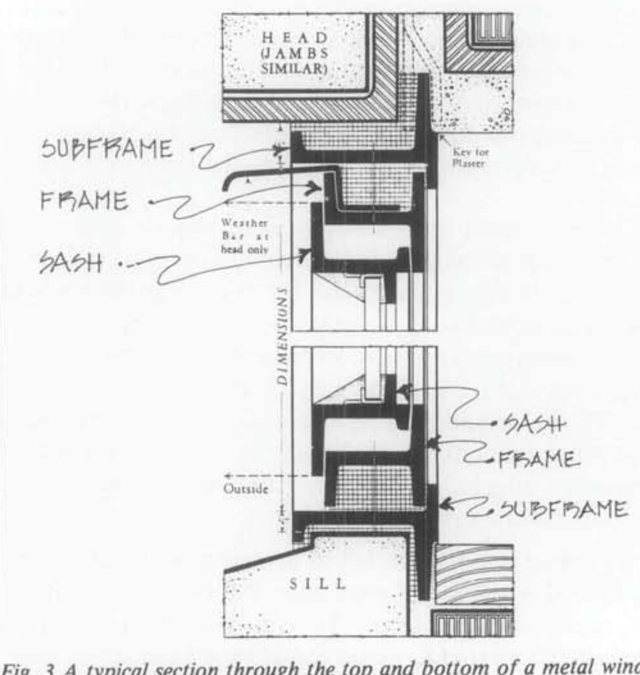


Fig. 3 A typical section through the top and bottom of a metal window shows the three component parts of the window assembly: subframe, frame, and sash. Drawings: Catalogue No. 15, January 1931; International Casement Co, Inc., presently Hope's Architectural Products, Inc., Jamestown, NY. Used with permission.

Cover illustration: from *Hope's Metal Windows and Casements: 1818-1926,* currently Hope's Architectural Products, Inc. Used with permission.

EVALUATION

Historic and Architectural Considerations

An assessment of the significance of the windows should begin with a consideration of their function in relation to the building's historic use and its historic character. Windows that help define the building's historic character should be preserved even if the building is being converted to a new use. For example, projecting steel windows used to introduce light and an effect of spaciousness to a warehouse or industrial plant can be retained in the conversion of such a building to offices or residences.

Other elements in assessing the relative importance of the historic windows include the design of the windows and their relationship to the scale, proportion, detailing and architectural style of the building. While it may be easy to determine the aesthetic value of highly ornamented windows, or to recognize the importance of streamlined windows as an element of a style, less elaborate windows can also provide strong visual interest by their small panes or projecting planes when open, particularly in simple, unadorned industrial buildings (see fig. 5).

One test of the importance of windows to a building is to ask if the overall appearance of the building would be changed noticeably if the windows were to be removed or radically altered. If so, the windows are important in defining the building's historic character, and should be repaired if their physical condition permits.

Physical Evaluation

Steel window repair should begin with a careful evaluation of the physical condition of each unit. Either drawings or photographs, liberally annotated, may be used to record the location of each window, the type of operability, the condition of all three parts—sash, frame and subframe—and the repairs essential to its continued use.

Specifically, the evaluation should include: presence and degree of corrosion; condition of paint; deterioration of the metal sections, including bowing, misalignment of the sash, or bent sections; condition of the glass and glazing compound; presence and condition of all hardware, screws, bolts, and hinges; and condition of the masonry or concrete surrounds, including need for caulking or resetting of improperly sloped sills.

Corrosion, principally rusting in the case of steel windows, is the controlling factor in window repair; therefore, the evaluator should first test for its presence. Corrosion can be light, medium, or heavy, depending on how much the rust has penetrated the metal sections. If the rusting is merely a surface accumulation or flaking, then the corrosion is light. If the rusting has penetrated the metal (indicated by a bubbling texture), but has not caused any structural damage, then the corrosion is medium. If the rust has penetrated deep into the metal, the corrosion is heavy. Heavy corrosion generally results in some form of structural damage,through delamination, to the metal section, which must then be patched or spliced. A sharp probe or tool, such as an ice pick, can be used to determine the extent of corrosion in the metal. If the probe can penetrate the surface of the metal and brittle strands can be dug out, then a high degree of corrosive deterioration is present.

In addition to corrosion, the condition of the paint, the presence of bowing or misalignment of metal sections, the amount of glass needing replacement, and the condition of the masonry or concrete surrounds must be assessed in the evaluation process. These are key factors in determining whether or not the windows can be repaired in place. The more complete the inventory of existing conditions, the easier it will be to determine whether repair is feasible or whether replacement is warranted.

Rehabilitation Work Plan

Following inspection and analysis, a plan for the rehabilitation can be formulated. The actions necessary to return windows to an efficient and effective working condition will fall into one or more of the following categories: routine maintenance, repair, and weatherization. The routine maintenance and weatherization measures described here are generally within the range of do-it-yourselfers. Other repairs, both moderate and major, require a professional contractor. Major repairs normally require the removal of the window units to a workshop, but even in the case of moderate repairs, the number of windows involved might warrant the removal of all the deteriorated units to a workshop in order to realize a more economical repair price. Replacement of windows should be considered only as a last resort.

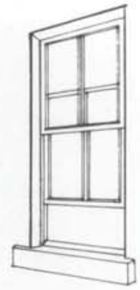
Since moisture is the primary cause of corrosion in steel windows, it is essential that excess moisture be eliminated and that the building be made as weathertight as possible before any other work is undertaken. Moisture can accumulate from cracks in the masonry, from spalling mortar, from leaking gutters, from air conditioning condensation runoff, and from poorly ventilated interior spaces.

Finally, before beginning any work, it is important to be aware of health and safety risks involved. Steel windows have historically been coated with lead paint. The removal of such paint by abrasive methods will produce toxic dust. Therefore, safety goggles, a toxic dust respirator, and protective clothing should be worn. Similar protective measures should be taken when acid compounds are used. Local codes may govern the methods of removing lead paints and proper disposal of toxic residue.

ROUTINE MAINTENANCE

A preliminary step in the routine maintenance of steel windows is to remove surface dirt and grease in order to ascertain the degree of deterioration, if any. Such minor cleaning can be accomplished using a brush or vacuum followed by wiping with a cloth dampened with mineral spirits or denatured alcohol.

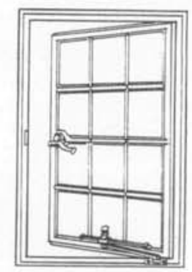
Double-hung industrial windows duplicated the look of traditional wooden windows. Metal double-hung windows were early examples of a building product adapted to meet stringent new fire code requirements for manufacturing and high-rise buildings in urban areas. Soon supplanted in industrial buildings by less expensive pivot windows, double-hung metal windows regained popularity in the 1940s for use in speculative suburban housing.



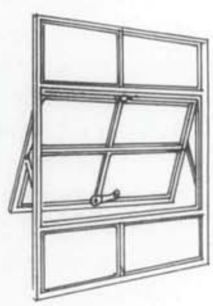
Austral windows were also a product of the 1920s. They combined the appearance of the double-hung window with the increased ventilation and ease of operation of the projected window. (When fully opened, they provided 70% ventilation as compared to 50% ventilation for double-hung windows.) Austral windows were often used in schools, libraries and other public buildings.

Pivot windows were an early type of industrial window that combined inexpensive first cost and low maintenance. Pivot windows became standard for warehouses and power plants where the lack of screens was not a problem. The window shown here is a horizontal pivot. Windows that turned about a vertical axis were also manufactured (often of iron). Such vertical pivots are rare today.

Casement windows adapted the English tradition of using wrought iron casements with leaded cames for residential use. Rolled steel casements (either single, as shown, or paired) were popular in the 1920s for cottage style residences and Gothic style campus architecture. More streamlined casements were popular in the 1930s for institutional and small industrial buildings.



Projecting windows, sometimes called awning or hopper windows, were perfected in the 1920s for industrial and institutional buildings. They were often used in "combination" windows, in which upper panels opened out and lower panels opened in. Since each movable panel projected to one side of the frame only, unlike pivot windows, for example, screens could be introduced.



Continuous windows were almost exclusively used for industrial buildings requiring high overhead lighting. Long runs of clerestory windows operated by mechanical tension rod gears were typical. Long banks of continuous windows were possible because the frames for such windows were often structural elements of the building.

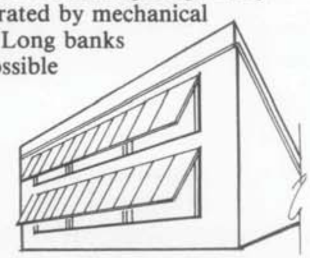


Fig. 4 Typical rolled steel windows available from 1890 to the present. The various operating and ventilating capacities in combination with the aesthetics of the window style were important considerations in the selection of one window type over another. Drawings: Sharon C. Park, AIA.

If it is determined that the windows are in basically sound condition, the following steps can be taken: 1) removal of light rust, flaking and excessive paint; 2) priming of exposed metal with a rust-inhibiting primer; 3) replacement of cracked or broken glass and glazing compound; 4) replacement of missing screws or fasteners; 5) cleaning and lubrication of hinges; 6) repainting of all steel sections with two coats of finish paint compatible with the primer; and 7) caulking the masonry surrounds with a high quality elastomeric caulk.

Recommended methods for removing light rust include manual and mechanical abrasion or the application of chemicals. Burning off rust with an oxy-acetylene or propane torch, or an inert gas welding gun, should never be attempted because the heat can distort the metal. In addition, such intense heat (often as high as 3800° F) vaporizes the lead in old paint, resulting in highly toxic fumes. Furthermore, such heat will likely result in broken glass. Rust can best be removed using a wire brush, an aluminum oxide sandpaper, or a variety of power tools

Fig. 5 Windows often provide a strong visual element to relatively simple or unadorned industrial or commercial buildings. This design element should be taken into consideration when evaluating the significance of the windows. Photo: Michael Auer.

adapted for abrasive cleaning such as an electric drill with a wire brush or a rotary whip attachment. Adjacent sills and window jambs may need protective shielding.

Rust can also be removed from ferrous metals by using a number of commercially prepared anti-corrosive acid compounds. Effective on light and medium corrosion, these compounds can be purchased either as liquids or gels. Several bases are available, including phosphoric acid, ammonium citrate, oxalic acid and hydrochloric acid. Hydrochloric acid is generally not recommended; it can leave chloride deposits, which cause future corrosion. Phosphoric acid-based compounds do not leave such deposits, and are therefore safer for steel windows. However, any chemical residue should be wiped off with damp cloths, then dried immediately. Industrial blow-dryers work well for thorough drying. The use of running water to remove chemical residue is never recommended because the water may spread the chemicals to adjacent surfaces, and drying of these surfaces may be more difficult. Acid cleaning compounds will stain masonry; therefore plastic sheets should be taped to the edge of the metal sections to protect the masonry surrounds. The same measure should be followed to protect the glazing from etching because of acid contact.

Measures that remove rust will ordinarily remove flaking paint as well. Remaining loose or flaking paint can be removed with a chemical paint remover or with a pneumatic needle scaler or gun, which comes with a series of chisel blades and has proven effective in removing flaking paint from metal windows. Well-bonded paint may serve to protect the metal further from corrosion, and need not be removed unless paint build-up prevents the window from closing tightly. The edges should be feathered by sanding to give a good surface for repainting.

Next, any *bare* metal should be wiped with a cleaning solvent such as denatured alcohol, and dried immediately in preparation for the application of an anti-corrosive primer. Since corrosion can recur very soon after metal has been exposed to the air, the metal should be primed immediately after cleaning. Spot priming may be required periodically as other repairs are undertaken. Anti-corrosive primers generally consist of oil-alkyd based paints rich in zinc or zinc chromate.[2] Red lead is no longer available because of its toxicity. All metal primers, however, are toxic to some degree and should be handled carefully. Two coats of primer are recommended. Manufacturer's recommendations should be followed concerning application of primers.

REPAIR

Repair in Place

The maintenance procedures described above will be insufficient when corrosion is extensive, or when metal window sections are misaligned. Medium to heavy corrosion that has not done any structural damage to the metal sections can be removed either by using the chemical cleaning process described under "Routine Maintenance" or by sandblasting. Since sandblasting can damage the masonry surrounds and crack or cloud the glass, metal or plywood shields should be used to protect these materials. The sandblasting pressure should be low, 80-100 pounds per square inch, and the grit size should be in the range of #10-#45. Glass peening beads (glass pellets) have also been successfully used in cleaning steel sections. While sandblasting equipment comes with various nozzle sizes, pencil-point blasters are most useful because they give the operator more effective control over the direction of the spray. The small aperture of the pencil-point blaster is also useful in removing dried putty from the metal sections that hold the glass. As with any cleaning technique, once the bare metal is exposed to air, it should be primed as soon as possible. This includes the inside rabbeted section of sash where glazing putty has been removed. To reduce the dust, some local codes allow only wet blasting. In this case, the metal must be dried immediately, generally with a blow-drier (a step that the owner should consider when calculating the time and expense involved). Either form of sandblasting metal covered with lead paints produces toxic dust. Proper precautionary measures should be taken against toxic dust and silica particles.

Bent or bowed metal sections may be the result of damage to the window through an impact or corrosive expansion. If the distortion is not too great, it is possible to realign the metal sections without removing the window to a metal fabricator's shop. The glazing is generally removed and pressure is applied to the bent or bowed section. In the case of a muntin, a protective 2 x 4 wooden bracing can be placed behind the bent portion and a wire cable with a winch can apply progressively more pressure over several days until the section is realigned. The 2 x 4 bracing is necessary to distribute the pressure evenly over the damaged section. Sometimes a section, such as the bottom of the frame, will bow out as a result of pressure exerted by corrosion and it is often necessary to cut the metal section to relieve this pressure prior to pressing the section back into shape and making a welded repair.

Once the metal sections have been cleaned of all corrosion and straightened, small holes and uneven areas resulting from rusting should be filled with a patching material and sanded smooth to eliminate pockets where water can accumulate. A patching material of steel fibers and an epoxy binder may be the easiest to apply. This steel-based epoxy is available for industrial steel repair; it can also be found in auto body patching compounds or in plumber's epoxy. As with any product, it is important to follow the manufacturer's instructions for proper use and best results. The traditional patching technique—melting steel welding rods to fill holes in the metal sections—may be difficult to apply in some situations; moreover, the window glass must be removed during the repair process, or it will crack from the expansion of the heated metal sections. After these repairs, glass replacement, hinge lubrication, painting, and other cosmetic repairs can be undertaken as necessary.

[2]Refer to Table IV. Types of Paint Used for Painting Metal in *Metals in America's Historic Buildings*, p. 139. (See bibliography).

To complete the checklist for routine maintenance, cracked glass, deteriorated glazing compound, missing screws, and broken fasteners will have to be replaced; hinges cleaned and lubricated; the metal windows painted, and the masonry surrounds caulked. If the glazing must be replaced, all clips, glazing beads, and other fasteners that hold the glass to the sash should be retained, if possible, although replacements for these parts are still being fabricated. When bedding glass, use only glazing compound formulated for metal windows. To clean the hinges (generally brass or bronze), a cleaning solvent and fine bronze wool should be used. The hinges should then be lubricated with a non-greasy lubricant specially formulated for metals and with an anti-corrosive agent. These lubricants are available in a spray form and should be used periodically on frequently opened windows.

Final painting of the windows with a paint compatible with the anti-corrosive primer should proceed on a dry day. (Paint and primer from the same manufacturer should be used.) Two coats of finish paint are recommended if the sections have been cleaned to bare metal. The paint should overlap the glass slightly to insure weathertightness at that connection. Once the paint dries thoroughly, a flexible exterior caulk can be applied to eliminate air and moisture infiltration where the window and the surrounding masonry meet.

Caulking is generally undertaken after the windows have received at least one coat of finish paint. The perimeter of the masonry surround should be caulked with a flexible elastomeric compound that will adhere well to both metal and masonry. The caulking used should be a type intended for exterior application, have a high tolerance for material movement, be resistant to ultraviolet light, and have a minimum durability of 10 years. Three effective compounds (taking price and other factors into consideration) are polyurethane, vinyl acrylic, and butyl rubber. In selecting a caulking material for a window retrofit, it is important to remember that the caulking compound may be covering other materials in a substrate. In this case, some compounds, such as silicone, may not adhere well. Almost all modern caulking compounds can be painted after curing completely. Many come in a range of colors, which eliminates the need to paint. If colored caulking is used, the windows should have been given two coats of finish paint prior to caulking.

Repair in Workshop

Damage to windows may be so severe that the window sash and sometimes the frame must be removed for cleaning and extensive rust removal, straightening of bent sections, welding or splicing in of new sections, and reglazing. These major and expensive repairs are reserved for highly significant windows that cannot be replaced; the procedures involved should be carried out only by skilled workmen. (see fig. 6a—6f.)

As part of the orderly removal of windows, each window should be numbered and the parts labelled. The operable metal sash should be dismantled by removing the hinges; the fixed sash and, if necessary, the frame can then be unbolted or unscrewed. (The subframe is usually left in place. Built into the masonry surrounds, it can only be cut out with a torch.) Hardware and hinges should be labelled and stored together.

The two major choices for removing flaking paint and corrosion from severely deteriorated windows are dipping in a chemical bath or sandblasting. Both treatments require removal of the glass. If the windows are to be dipped, a phosphoric acid solution is preferred, as mentioned earlier. While the dip tank method is good for fairly evenly distributed rust, deep set rust may remain after dipping. For that reason, sandblasting is more effective for heavy and uneven corrosion. Both methods leave the metal sections clean of residual paint. As already noted, after cleaning has exposed the metal to the air, it should be primed immediately after drying with an anti-corrosive primer to prevent rust from recurring.

Sections that are seriously bent or bowed must be straightened with heat and applied pressure in a workshop. Structurally weakened sections must be cut out, generally with an oxy-acetylene torch, and replaced with sections welded in place and the welds ground smooth. Finding replacement metal sections, however, may be difficult. While most rolling mills are producing modern sections suitable for total replacement, it may be difficult to find an exact profile match for a splicing repair. The best source of rolled metal sections is from salvaged windows, preferably from the same building. If no salvaged windows are available, two options remain. Either an ornamental metal fabricator can weld flat plates into a built-up section, or a steel plant can mill bar steel into the desired profile.

While the sash and frame are removed for repair, the subframe and masonry surrounds should be inspected. This is also the time to reset sills or to remove corrosion from the subframe, taking care to protect the masonry surrounds from damage.

Missing or broken hardware and hinges should be replaced on all windows that will be operable. Salvaged windows, again, are the best source of replacement parts. If matching parts cannot be found, it may be possible to adapt ready-made items. Such a substitution may require filling existing holes with steel epoxy or with plug welds and tapping in new screw holes. However, if the hardware is a highly significant element of the historic window, it may be worth having reproductions made.

Following are illustrations of the repair and thermal upgrading of the rolled steel windows in a National Historic Landmark (fig. 6). Many of the techniques described above were used during this extensive rehabilitation. The complete range of repair techniques is then summarized in the chart titled *Steps for Cleaning and Repairing Historic Steel Windows* (see fig. 7).

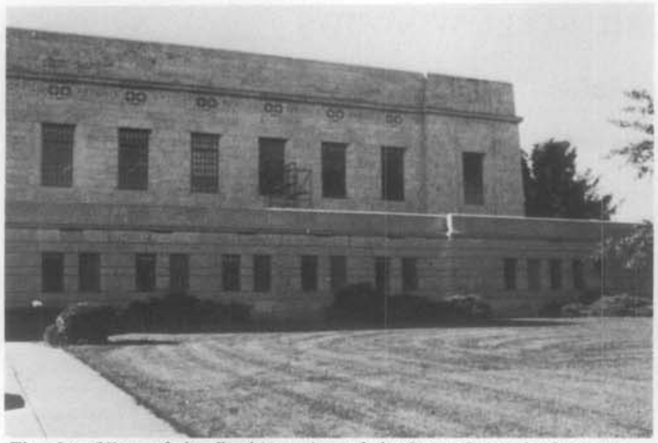


Fig. 6 a. View of the flanking wing of the State Capitol where the rolled steel casement windows are being removed for repair.

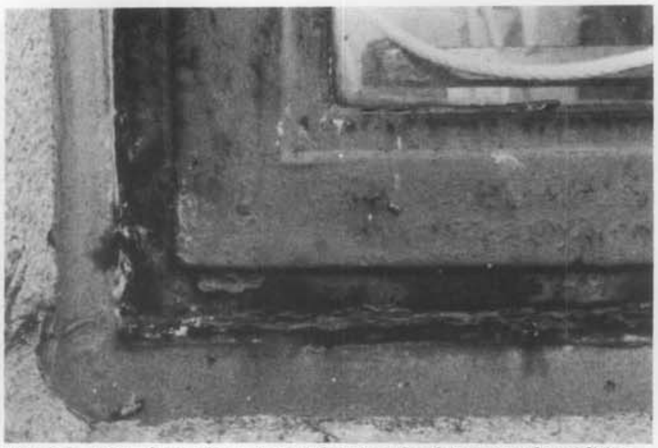


Fig. 6 b. View from the exterior showing the deteriorated condition of the lower corner of a window prior to repair. While the sash was in relatively good condition, the frame behind was rusted to the point of inhibiting operation.

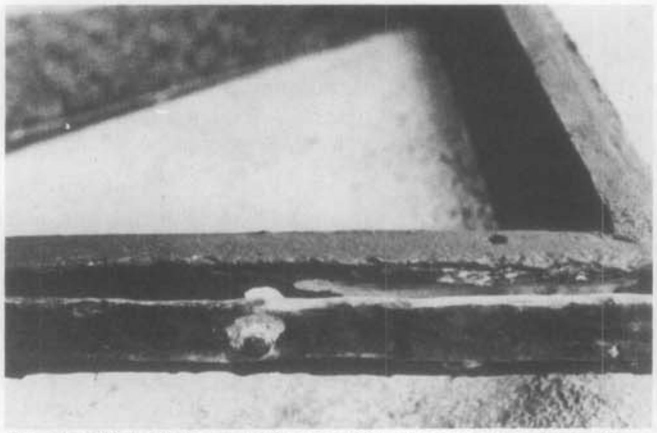


Fig. 6 c. View of the rusted frame which was unscrewed from the subframe and removed from the window opening and taken to a workshop for sandblasting. In some cases, severely deteriorated sections of the frame were replaced with new sections of milled bar steel.

Fig. 6 d. View looking down towards the sill. The subframes appeared very rusted, but were in good condition once debris was vacuumed and surface rust was removed, in place, with chemical compounds. Where necessary, epoxy and steel filler was used to patch depressions in order to make the subframe serviceable again.

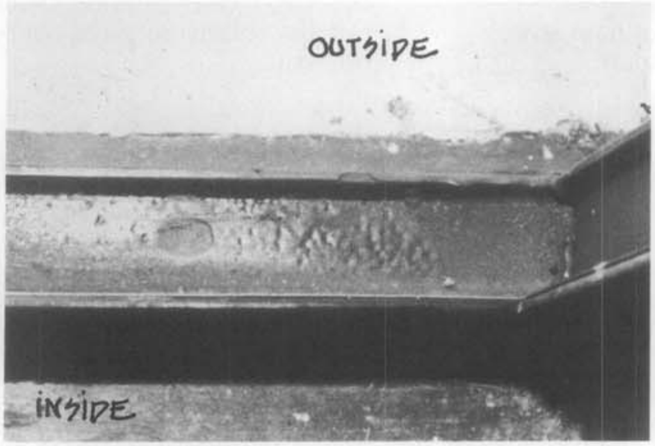


Fig. 6 e. View looking down towards the sill. The cleaned frame was reset in the window opening. The frame was screwed to the refurbished subframe at the jamb and the head only. The screw holes at the sill, which had been the cause of much of the earlier rusting, were infilled. Vinyl weatherstripping was added to the frame.

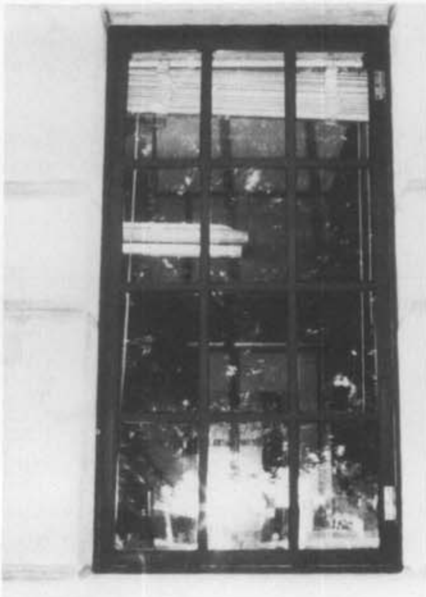


Fig. 6 f. View from the outside of the completely refurbished window. In addition to the steel repair and the installation of vinyl weatherstripping, the exterior was caulked with polyurethane and the single glass was replaced with individual lights of thermal glass. The repaired and upgraded windows have comparable energy efficiency ratings to new replacement units while retaining the historic steel sash, frames and subframes.

Fig. 6. The repair and thermal upgrading of the historic steel windows at the State Capitol, Lincoln, Nebraska. This early twentieth century building, designed by Bertram Goodhue, is a National Historic Landmark. Photos: All photos in this series were provided by the State Building Division.

STEPS FOR CLEANING AND REPAIRING HISTORIC STEEL WINDOWS

Work Item	Recommended Techniques	Tools, Products and Procedures	Notes
	*(Must be done in a workshop)		
1. Removing dirt and grease from metal	General maintenance and chemical cleaning	Vacuum and bristle brushes to remove dust and dirt; solvents (denatured alcohol, mineral spirits), and clean cloths to remove grease.	Solvents can cause eye and skin irritation. Operator should wear protective gear and work in ventilated area. Solvents should not contact masonry. Do not flush with water.
2. Removing Rust/ Corrosion			
Light	Manual and mechanical abrasion	Wire brushes, steel wool, rotary attachments to electric drill, sanding blocks and disks.	Handsanding will probably be necessary for corners. Safety goggles and masks should be worn.
	Chemical cleaning	Anti-corrosive jellies and liquids (phosphoric acid preferred); clean damp cloths.	Protect glass and metal with plastic sheets attached with tape. Do not flush with water. Work in ventilated area.
Medium	Sandblasting/abrasive cleaning	Low pressure (80-100 psi) and small grit (#10-#45); glass peening beads. Pencil blaster gives good control.	Removes both paint and rust. Codes should be checked for environmental compliance. Prime exposed metal promptly. Shield glass and masonry. Operator should wear safety gear.
Heavy	*Chemical dip tank	Metal sections dipped into chemical tank (phosphoric acid preferred) from several hours to 24 hours.	Glass and hardware should be removed. Protect operator. Deepset rust may remain, but paint will be removed.
	*Sandblasting/ abrasive cleaning	Low pressure (80-100 psi) and small grit (#10-#45).	Excellent for heavy rust. Remove or protect glass. Prime exposed metal promptly. Check codes for environmental compliance. Operator should wear safety gear.
3. Removing flaking paint.	Chemical method	Chemical paint strippers suitable for ferrous metals. Clean cloths.	Protect glass and masonry. Do not flush with water. Have good ventilation and protection for operator.
	Mechanical abrasion	Pneumatic needle gun chisels, sanding disks.	Protect operator; have good ventilation. Well-bonded paint need not be removed if window closes properly.
4. Aligning bent, bowed metal sections	Applied pressure	Wooden frame as a brace for cables and winch mechanism.	Remove glass in affected area. Realignment may take several days.
	*Heat and pressure	Remove to a workshop. Apply heat and pressure to bend back.	Care should be taken that heat does not deform slender sections.

Work Item	Recommended Techniques	Tools, Products and Procedures	Notes
	*(Must be done in a workshop)		
5. Patching depressions	Epoxy and steel filler	Epoxy fillers with high content of steel fibers; plumber's epoxy or autobody patching compound.	Epoxy patches generally are easy to apply, and can be sanded smooth. Patches should be primed.
	Welded patches	Weld in patches using steel rods and oxy-acetylene torch or arc welder.	Prime welded sections after grinding connections smooth.
6. Splicing in new metal sections	*Cut out decayed sections and weld in new or salvaged sections	Torch to cut out bad sections back to 45° joint. Weld in new pieces and grind smooth.	Prime welded sections after grinding connection smooth.
7. Priming metal sections	Brush or spray application	At least one coat of anti-corrosive primer on bare metal. Zinc-rich primers are generally recommended.	Metal should be primed as soon as it is exposed. If cleaned metal will be repaired another day, spot prime to protect exposed metal.
8. Replacing missing screws and bolts	Routine maintenance	Pliers to pull out or shear off rusted heads. Replace screws and bolts with similar ones, readily available.	If new holes have to be tapped into the metal sections, the rusted holes should be cleaned, filled and primed prior to redrilling.
9. Cleaning, lubricating or replacing hinges and other hardware	Routine maintenance, solvent cleaning	Most hinges and closure hardware are bronze. Use solvents (mineral spirits), bronze wool and clean cloths. Spray with non-greasy lubricant containing anti-corrosive agent.	Replacement hinges and fasteners may not match the original exactly. If new holes are necessary, old ones should be filled.
10. Replacing glass and glazing compound	Standard method for application	Pliers and chisels to remove old glass, scrape putty out of glazing rabbet, save all clips and beads for reuse. Use only glazing compound formulated for metal windows.	Heavy gloves and other protective gear needed for the operator. All parts saved should be cleaned prior to reinstallation.
11. Caulking masonry surrounds	Standard method for application	Good quality (10 year or better) elastomeric caulking compound suitable for metal.	The gap between the metal frame and the masonry opening should be caulked; keep weepholes in metal for condensation run-off clear of caulk.
12. Repainting metal windows	Spray or brush	At least 2 coats of paint compatible with the anti-corrosive primer. Paint should lap the glass about 1/8″ to form a seal over the glazing compound.	The final coats of paint and the primer should be from the same manufacturer to ensure compatibility. If spraying is used, the glass and masonry should be protected.

Fig. 7. STEPS FOR CLEANING AND REPAIRING HISTORIC STEEL WINDOWS. Compiled by Sharon C. Park, AIA.

WEATHERIZATION

Historic metal windows are generally not energy efficient; this has often led to their wholesale replacement. Metal windows can, however, be made more energy efficient in several ways, varying in complexity and cost. Caulking around the masonry openings and adding weatherstripping, for example, can be do-it-yourself projects and are important first steps in reducing air infiltration around the windows. They usually have a rapid payback period. Other treatments include applying fixed layers of glazing over the historic windows, adding operable storm windows, or installing thermal glass in place of the existing glass. In combination with caulking and weatherstripping, these treatments can produce energy ratings rivaling those achieved by new units.[3]

Weatherstripping

The first step in any weatherization program, caulking, has been discussed above under "Routine Maintenance." The second step is the installation of weatherstripping where the operable portion of the sash, often called the ventilator, and the fixed frame come together to reduce perimeter air infiltration (see fig. 8). Four types of weatherstripping appropriate for metal windows are spring-metal, vinyl strips, compressible foam tapes, and sealant beads. The spring-metal, with an integral friction fit mounting clip, is recommended for steel windows in good condition. The clip eliminates the need for an applied glue; the thinness of the material insures a tight closure. The weatherstripping is clipped to the inside channel of the rolled metal section of the fixed frame. To insure against galvanic corrosion between the weatherstripping (often bronze or brass), and the steel window, the window must be painted prior to the installation of the weatherstripping. This weatherstripping is usually applied to the entire perimeter of the window opening, but in some cases, such as casement windows, it may be best to avoid weatherstripping the hinge side. The natural wedging action of the weatherstripping on the three sides of the window often creates an adequate seal.

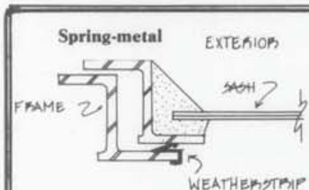
Vinyl weatherstripping can also be applied to metal windows. Folded into a "V" configuration, the material forms a barrier against the wind. Vinyl weatherstripping is usually glued to the frame, although some brands have an adhesive backing. As the vinyl material and the applied glue are relatively thick, this form of weatherstripping may not be appropriate for all situations.

Compressible foam tape weatherstripping is often best for large windows where there is a slight bending or distortion of the sash. In some very tall windows having closure hardware at the sash mid-point, the thin sections of the metal window will bow away from the frame near the top. If the gap is not more than 1/4", foam weatherstripping can normally fill the space. If the gap exceeds this, the window may need to be realigned to close more tightly. The foam weatherstripping comes either with an adhesive or plain back; the latter variety requires application with glue. Compressible foam requires more frequent replacement than either spring-metal or vinyl weatherstripping.

A fourth type of successful weatherstripping involves the use of a caulking or sealant bead and a polyethylene bond breaker tape. After the window frame has been thoroughly cleaned with solvent, permitted to dry, and primed, a neat bead of low modulus (firm setting) caulk, such as silicone, is applied. A bond breaker tape is then applied to the operable sash covering the metal section where contact will occur. The window is then closed until the sealant has set (2-7 days, depending on temperature and humidity). When the window is opened, the bead will have taken the shape of the air infiltration gap and the bond breaker tape can be removed. This weatherstripping method appears to be successful for all types of metal windows with varying degrees of air infiltration.

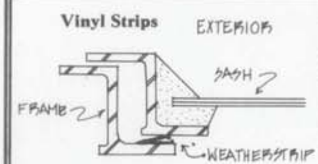
Since the several types of weatherstripping are appropriate for different circumstances, it may be necessary to use more than one type on any given building. Successful weatherstripping depends upon using the thinnest material adequate to fill the space through which air enters. Weatherstripping that is too thick can spring the hinges, thereby resulting in more gaps.

Spring-metal



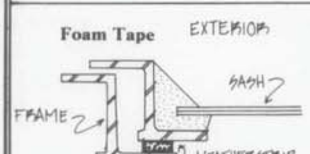
Spring-metal comes in bronze, brass or stainless steel with an integral friction-fit clip. The weatherstripping is applied after the repaired windows are painted to avoid galvanic corrosion. This type of thin weatherstripping is intended for windows in good condition.

Vinyl Strips



Vinyl strips are scored and fold into a "V" configuration. Applied adhesive is necessary which will increase the thickness of the weatherstripping, making it inappropriate for some situations. The weatherstripping is generally applied to the window after painting.

Foam Tape



Closed cell foam tape comes either with or without an adhesive backing. It is effective for windows with a gap of approximately 1/4" and is easy to install. However, this type of weatherstripping will need frequent replacement on windows in regular use. The metal section should be cleaned of all dirt and grease prior to its application.

Sealant Bead

This very effective type of weatherstripping involves the application of a clean bead of firm setting caulk on the primed frame with a polyethelene bond breaker tape on the operable sash. The window is then closed until the bead has set and takes the form of the gap. The sash is then opened and the tape is removed leaving the set caulk as the weatherstripping.

Fig. 8 APPROPRIATE TYPES OF WEATHERSTRIPPING FOR METAL WINDOWS. Weatherstripping is an important part of upgrading the thermal efficiency of historic steel windows. The chart above shows the jamb section of the window with the weatherstripping in place. Drawings: Sharon C. Park, AIA.

[3]One measure of energy efficiency is the U-value (the number of BTUs per hour transferred through a square foot of material). The lower the U-value, the better the performance. According to *ASHRAE HANDBOOK-1977 Fundamentals*, the U-value of historic rolled steel sash with single glazing is 1.3. Adding storm windows to the existing units or reglazing with 5/8" insulating glass produces a U-value of .69. These methods of weatherizing historic steel windows compare favorably with rolled steel replacement alternatives: with factory installed 1" insulating glass (.67 U-value); with added thermal-break construction and factory finish coatings (.62 U-value).

Thermal Glazing

The third weatherization treatment is to install an additional layer of glazing to improve the thermal efficiency of the existing window. The decision to pursue this treatment should proceed from careful analysis. Each of the most common techniques for adding a layer of glazing will effect approximately the same energy savings (approximately double the original insulating value of the windows); therefore, cost and aesthetic considerations usually determine the choice of method. Methods of adding a layer of glazing to improve thermal efficiency include adding a new layer of transparent material to the window; adding a separate storm window; and replacing the single layer of glass in the window with thermal glass.

The least expensive of these options is to install a clear material (usually rigid sheets of acrylic or glass) over the original window. The choice between acrylic and glass is generally based on cost, ability of the window to support the material, and long-term maintenance outlook. If the material is placed over the entire window and secured to the frame, the sash will be inoperable. If the continued use of the window is important (for ventilation or for fire exits), separate panels should be affixed to the sash without obstructing operability (see fig. 9). Glass or acrylic panels set in frames can be attached using magnetized gaskets, interlocking material strips, screws or adhesives. Acrylic panels can be screwed directly to the metal windows, but the holes in the acrylic panels should allow for the expansion and contraction of this material. A compressible gasket between the prime sash and the storm panel can be very effective in establishing a thermal cavity between glazing layers. To avoid condensation, 1/8" cuts in a top corner and diagonally opposite bottom corner of the gasket will provide a vapor bleed, through which moisture can evaporate. (Such cuts, however, reduce thermal performance slightly.) If condensation does occur, however, the panels should be easily removable in order to wipe away moisture before it causes corrosion.

The second method of adding a layer of glazing is to have independent storm windows fabricated. (Pivot and austral windows, however, which project on either side of the window frame when open, cannot easily be fitted with storm windows and remain operational.) The storm window should be compatible with the original sash configuration. For example, in paired casement windows, either specially fabricated storm casement windows or sliding units in which the vertical meeting rail of the slider reflects the configuration of the original window should be installed. The decision to place storm windows on the inside or outside of the window depends on whether the historic window opens in or out, and on the visual impact the addition of storm windows will have on the building. Exterior storm windows, however, can serve another purpose besides saving energy: they add a layer of protection against air pollutants and vandals, although they will partially obscure the prime window. For highly ornamental windows this protection can determine the choice of exterior rather then interior storm windows.

The third method of installing an added layer of glazing is to replace the original single glazing with thermal glass. Except in rare instances in which the original glass is of special interest (as with stained or figured glass), the glass can be replaced if the hinges can tolerate the weight of the additional glass. The rolled metal sections for steel windows are generally from 1" - 1 1/2" thick. Sash of this thickness can normally tolerate thermal glass, which ranges from 3/8" - 5/8". (Metal glazing beads, readily available, are used to reinforce the muntins, which hold the glass.) This treatment leaves the window fully operational while preserving the historic appearance. It is, however, the most expensive of the treatments discussed here. (See fig. 6f).

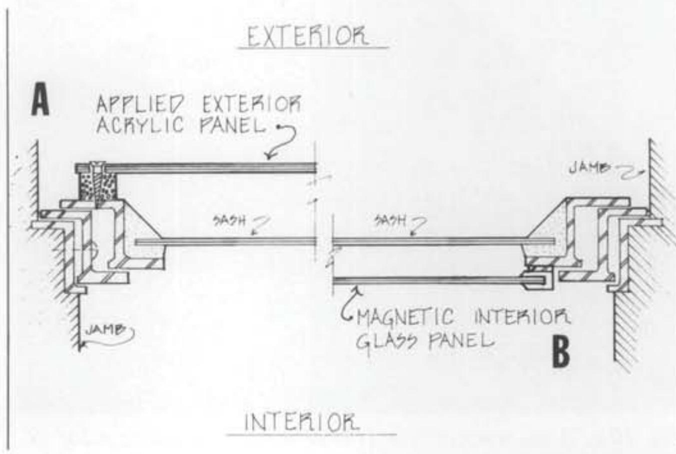


Fig. 9 Two examples of adding a second layer of glazing in order to improve the thermal performance of historic steel windows. Scheme A (showing jamb detail) is of a ¼" acrylic panel with a closed cell foam gasket attached with self-tapping stainless steel screws directly to the exterior of the outwardly opening sash. Scheme B (showing jamb detail) is of a glass panel in a magnetized frame affixed directly to the interior of the historic steel sash. The choice of using glass or acrylic mounted on the inside or outside will depend on the ability of the window to tolerate additional weight, the location and size of the window, the cost, and the long-term maintenance outlook. Drawing: Sharon C. Park, AIA.

WINDOW REPLACEMENT

Repair of historic windows is always preferred within a rehabilitation project. Replacement should be considered only as a last resort. However, when the extent of deterioration or the unavailability of replacement sections renders repair impossible, replacement of the entire window may be justified. In the case of significant windows, replacement in kind is essential in order to maintain the historic character of the building. However, for less significant windows, replacement with compatible new windows may be acceptable. In selecting compatible replacement windows, the material, configuration, color, operability, number and size of panes, profile and proportion of metal sections, and reflective quality of the original glass should be duplicated as closely as possible.

A number of metal window manufacturing companies produce rolled steel windows. While stock modern window designs do not share the multi-pane configuration of historic windows, most of these manufacturers can reproduce the historic configuration if requested, and the cost is not excessive for large orders (see figs. 10a and 10b). Some manufacturers still carry the standard pre-World War II multi-light windows using the traditional 12" x 18" or 14" x 20" glass sizes in industrial, commercial, security, and residential configurations. In addition, many of the modern steel windows have integral weatherstripping, thermal break construction, durable vinyl coatings, insulating glass, and other desirable features.

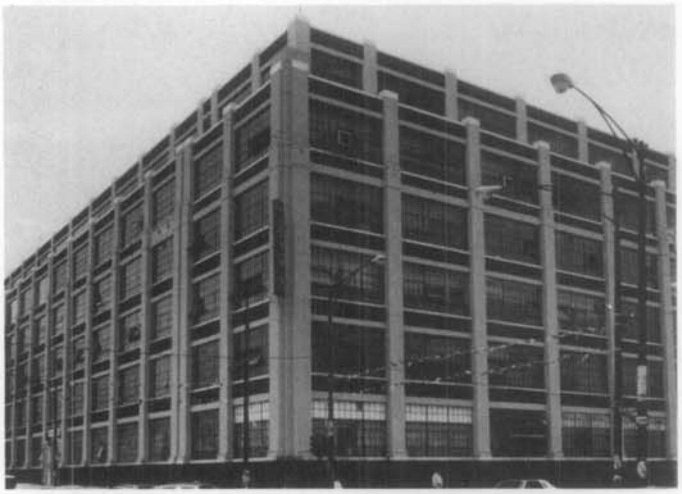


Fig. 10 a. A six-story concrete manufacturing building prior to the replacement of the steel pivot windows. Photo: Charles Parrott.

Fig. 10 b. Close-up view of the new replacement steel windows which matched the multi-lighted originals exactly. Photo: Charles Parrott.

Windows manufactured from other materials generally cannot match the thin profiles of the rolled steel sections. Aluminum, for example, is three times weaker than steel and must be extruded into a box-like configuration that does not reflect the thin historic profiles of most steel windows. Wooden and vinyl replacement windows generally are not fabricated in the industrial style, nor can they reproduce the thin profiles of the rolled steel sections, and consequently are generally not acceptable replacements.

For product information on replacement windows, the owner, architect, or contractor should consult manufacturers' catalogues, building trade journals, or the Steel Window Institute, 1230 Keith Building, Cleveland, Ohio 44115.

SUMMARY

The National Park Service recommends the retention of significant historic metal windows whenever possible. Such windows, which can be a character-defining feature of a historic building, are too often replaced with inappropriate units that impair rather than complement the overall historic appearance. The repair and thermal upgrading of historic steel windows is more practicable than most people realize. Repaired and properly maintained metal windows have greatly extended service lives. They can be made energy efficient while maintaining their contribution to the historic character of the building.

BIBLIOGRAPHY

ASHRAE Handbook - 1977 Fundamentals. New York: American Society of Heating, Refrigerating and Airconditioning Engineers, 1978.

Crittal, W. F. *A Metal Window Dictionary.* London:Curwen Press, 1926. Reprinted by B.T. Batsford, Ltd., 1953.

Gayle, Margot; David W. Look, AIA; John G. Waite.*Metals in America's Historic Buildings: Uses and Preservation Treatments.* Technical Preservation Services, U.S. Department of the Interior. Washington,D.C.: U.S.Government Printing Office, 1980.

Gillet, William. "Steel Windows." *Windows and Glass in the Exterior of Buildings.* National Academy of Sciences Publication 478. Washington, D.C.: 1957,75-78.

Sarton, R. H. "Selecting and Specifying an Appropriate Type of Steel Window." *Metalcraft.* Vol 6, No. 1 (January, 1931): 43-48, 64-65.

Sweet's Architectural Catalogue. 13th Edition, New York, Sweets Catalogue Service, Inc., 1918.

The author gratefully acknowledges the invaluable assistance of co-worker Michael Auer in preparing this brief for publication. This publication is an extension of research initiated by Frederec E. Kleyle. Special thanks are given to Hope's Architectural Products, Inc., Jamestown, NY, for their generous contribution of historic metal window catalogues which were an invaluable source of information. The following individuals are also to be thanked for reviewing the manuscript and making suggestions: Hugh Miller, Chief, Park Historic Architecture Division, National Park Service; Barclay L. Rogers, Museum Services, National Park Service; Susan M. Young, Steel Window Institute, and Danny Schlichenmaier, State Building Division, Lincoln, Nebraska. Finally, thanks go to Technical Preservation Services Branch staff and to cultural resources staff of the National Park Service Regional Offices, whose valuable comments were incorporated into the final text and who contributed to the publication of this brief.

This publication has been prepared pursuant to the Economic Recovery Tax Act of 1981, which directs the Secretary of the Interior to certify rehabilitations of historic buildings that are consistent with their historic character; the guidance provided in this brief will assist property owners in complying with the requirements of this law.

Preservation Briefs: 13 has been developed under the technical editorship of Lee H. Nelson, AIA, Chief, Preservation Assistance Division, National Park Service, U.S. Department of the Interior, Washington, D.C. 20240. Comments on the usefulness of this information are welcomed and can be sent to Mr. Nelson at the above address.

15 PRESERVATION BRIEFS

Preservation of Historic Concrete

Paul Gaudette and Deborah Slaton

National Park Service
U.S. Department of the Interior

Heritage Preservation Services

Introduction to Historic Concrete

Concrete is an extraordinarily versatile building material used for utilitarian, ornamental, and monumental structures since ancient times. Composed of a mixture of sand, gravel, crushed stone, or other coarse material, bound together with lime or cement, concrete undergoes a chemical reaction and hardens when water is added. Inserting reinforcement adds tensile strength to structural concrete elements. The use of reinforcement contributes significantly to the range and size of building and structure types that can be constructed with concrete.

While early twentieth century proponents of modern concrete often considered it to be permanent, it is, like all materials, subject to deterioration. This Brief provides an overview of the history of concrete and its popularization in the United States, surveys the principal causes and modes of concrete deterioration, and outlines approaches to repair and protection that are appropriate to historic concrete. In the context of this Brief, historic concrete is considered to be concrete used in construction of structures of historical, architectural, or engineering interest, whether those structures are old or relatively new.

Brief History of Use and Manufacture

The ancient Romans found that a mixture of lime putty and pozzolana, a fine volcanic ash, would harden under water. The resulting hydraulic cement became a major feature of Roman building practice, and was used in many buildings and engineering projects such as bridges and aqueducts. Concrete technology was kept alive during the Middle Ages in Spain and Africa. The Spanish introduced a form of concrete to the New World in the first decades of the sixteenth century, referred to as "tapia" or "tabby." This material, a mixture of lime, sand, and shell or stone aggregate mixed with water, was placed between wooden forms, tamped, and allowed to dry in successive layers. Tabby was later used by the English settlers in the coastal southeastern United States.

The early history of concrete was fragmented, with developments in materials and construction techniques occurring on different continents and in various countries. In the United States, concrete was slow in achieving widespread acceptance in building construction and did not begin to gain popularity until the late nineteenth century. It was more readily accepted for use in transportation and infrastructure systems.

The Erie Canal in New York is an example of the early use of concrete in transportation in the United States. The natural hydraulic cement used in the canal construction was processed from a deposit of limestone found in 1818 near Chittenango, southeast of Syracuse. The use of concrete in residential construction was

Figure 1. The Sebastopol House in Seguin, Texas, is an 1856 Greek Revival-style house constructed of lime concrete. Lime concrete or "limecrete" was a popular construction material, as it could be made inexpensively from local materials. By 1900, the town had approximately ninety limecrete structures, twenty of which remain. Photo: Texas Parks and Wildlife Department.

Figure 2. Chatterton House was the home of the post trader at Fort Fred Steel in Wyoming, one of several forts established in the 1860s to protect the Union Pacific Railroad. The walls of the post trader's house were built using stone aggregate and lime, without cement. The use of this material presents special preservation challenges.

publicized in the second edition of Orson S. Fowler's *A Home for All* (1853) which described the advantages of "gravel wall" construction to a wide audience. The town of Seguin, Texas, thirty-five miles east of San Antonio, already had a number of concrete buildings by the 1850s and came to be called "The Mother of Concrete Cities," with approximately ninety concrete buildings made from local "lime water" and gravel (Fig. 1).

Impressed by the economic advantages of poured gravel wall or "lime-grout" construction, the Quartermaster General's Office of the War Department embarked on a campaign to improve the quality of building for frontier military posts. As a result, lime-grout structures were constructed at several western posts soon after the Civil War, including Fort Fred Steele and Fort Laramie, both in Wyoming (Fig. 2). By the 1880s, sufficient experience had been gained with unreinforced concrete to permit construction of much larger buildings. A notable example from this period is the Ponce de Leon Hotel in St. Augustine, Florida.

Figure 3. The Lincoln Highway Association promoted construction of a high quality continuous hard surface roadway across the country. The Boys Scouts of America installed concrete road markers along the Lincoln Highway in 1928.

Extensive construction in concrete also occurred through the system of coastal fortifications commissioned by the federal government in the 1890s for the Atlantic, Pacific, and Gulf coasts. Unlike most concrete construction to that time, the special requirements of coastal fortifications called for concrete walls as much as 20 feet thick, often at sites that were difficult to access. Major structures in the coastal defenses of the 1890s were built of mass concrete with no internal reinforcing, a practice that was replaced by the use of reinforcing bars in fortifications constructed after about 1905.

The use of reinforced concrete in the United States dates from 1860, when S.T. Fowler obtained a patent for a reinforced concrete wall. In the early 1870s, William E. Ward built his own house in Port Chester, New York, using concrete reinforced with iron rods for all structural elements. Despite these developments, such construction remained a novelty until after 1880, when innovations introduced by Ernest L. Ransome made the use of reinforced concrete more practicable. Ransome made many contributions to the development of concrete construction technology, including the use of twisted reinforcing bars to improve bond between the concrete and the steel, which he patented in 1884. Two years later, Ransome introduced the rotary kiln to United States cement production. The new kiln had greater capacity and burned more thoroughly and uniformly, allowing development of a less expensive, more uniform, and more reliable manufactured cement. Improvements in concrete production initiated by Ransom led to a much greater acceptance of concrete after 1900.

The Lincoln Highway Association, incorporated in 1913, promoted the use of concrete in construction of a coast-to-coast roadway system. The goal of the Lincoln Highway Association and highway advocate Henry B. Joy was to educate the country in the need for good roads made of concrete, with an improved Lincoln

Figure 4. The highly ornamental concrete panels on the exterior facade of the Baha'i House of Worship in Wilmette, Illinois, illustrate the work of fabricator John J. Earley, known as "the man who made concrete beautiful."

Figure 5. Following World War II, architects and engineers took advantage of improvements in concrete production, quality control, and advances in precast concrete to design structures such as the Police Headquarters building in Philadelphia, Pennsylvania, constructed in 1961. Photo: Courtesy of the Philadelphia Police Department.

Highway as an example. Concrete "seedling miles" were constructed in remote areas to emphasize the superiority of concrete over unimproved dirt. The Association believed that as people learned about concrete, they would press the government to construct good roads throughout their states. Americans' enthusiasm for good roads led to the involvement of the federal government in road-building and the creation of numbered U.S. routes in the 1920s (Fig. 3).

During the early twentieth century, Ernest Ransome in Beverly, Massachusetts, Albert Kahn in Detroit, and Richard E. Schmidt in Chicago, promoted concrete for use in "Factory Style" utilitarian buildings with an exposed concrete frame infilled with expanses of glass. Thomas Edison's cast-in-place reinforced concrete homes in Union Township, New Jersey (1908), proclaimed a similarly functional emphasis in residential construction. From the 1920s onward, concrete began to be used with spectacular design results: examples include John J. Earley's Meridian Hill Park in Washington, D.C.; Louis Bourgeois' exuberant, graceful Baha'i Temple in Wilmette, Illinois (1920–1953), for which Earley fabricated the concrete (Fig. 4); and Frank Lloyd Wright's Fallingwater near Bear Run, Pennsylvania (1934). Continuing improvements in quality control and development of innovative fabrication processes, such as the Shockbeton method for precast concrete, provided increasing opportunities for architects and engineers. Wright's Guggenheim Museum in New York City (1959); Geddes Brecher Qualls & Cunningham's Police Headquarters building in Philadelphia, Pennsylvania (1961); and Eero Saarinen's soaring terminal building at Dulles International Airport outside Washington, D.C., and the TWA terminal at Kennedy Airport in New York (1962), exemplify the masterful use of concrete achieved in the modern era (Fig. 5).

Figure 6. The Bailey Magnet School in Jackson, Mississippi, was designed as the Jackson Junior High School by the firm of N.W. Overstreet & Town in 1936. The streamlined building exemplifies the applicability of concrete to creating a modern architectural aesthetic. Photo: Bill Burris, Burris/Wagnon Architects, P.A.

Figure 7. Detailed bas reliefs as well as sculptures, such as this lion at the Bailey Magnet School, could be used as ornamentation on concrete buildings. Sculptural concrete elements were typically cast in molds.

Throughout the twentieth century, a wide range of architectural and engineering structures were built using concrete as a practical and cost-effective choice—and concrete also became valued for its aesthetic qualities. Cast in place and precast concrete were readily adapted to the Streamlined Moderne style, as exemplified by the Bailey Magnet School in Jackson, Mississippi, designed as the Jackson Junior High School by N.W. Overstreet & Town in 1936 (Figs. 6 and 7). The school is one of many concrete buildings designed and constructed under the auspices of the Public Works Administration. Recreational structures and landscape features also utilized the structural range and unique character of exposed concrete to advantage, as seen in Chicago's Lincoln Park Chess Pavilion, designed by Morris Webster in 1956 (Fig. 8), and the Ira C. Keller Fountain in Portland Oregon, designed by Lawrence Halprin in 1969 (Fig. 9). Concrete was also popular for building interiors, with ornamental features and exposed structural elements recognized as part of the design aesthetic (See Figs. 10 and 11 in sidebar).

Historic Interiors

The expanded use of concrete provided new opportunities to create dramatic spaces and ornate architectural detail on the interiors of buildings, at a significant cost savings over traditional construction practices. The architectural design of the Berkeley City Club in Berkeley, California, expressed Moorish and Gothic elements in concrete on the interior of the building (Fig. 10). Used as a woman's social club, the building was designed by noted California architect Julia Morgan and constructed in 1929. The vaulted ceilings, columns, and ornamental capitals of the lobby and the ornamental arches and beamed ceiling of the "plunge" are all constructed of concrete.

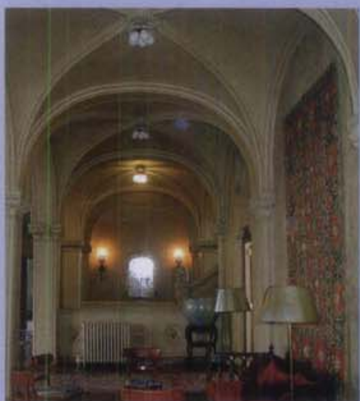


Figure 10. The Berkeley City Club has significant interior spaces and features of concrete construction, including the lobby and pool. Photos: Una Gilmartin (left) and Brian Kehoe (right), Wiss, Janney, Elstner Associates, Inc.

The historic character of a building's interior can also be conveyed in a more utilitarian manner in terms of concrete features and finishes (Fig. 11). The exposed concrete structure—columns, capitals, and drop panels—is an integral part of the character of this old commercial building in Minneapolis. In concrete warehouse and factory buildings of the early twentieth century, exposed concrete columns and formboard finish concrete slab ceilings are common features as seen in this warehouse, now converted for use as a parking garage and shops.

Figure 11. Whether in a circa 1925 office (left) or in a parking garage and retail facility (right), exposed concrete structures help characterize these building interiors. Photo: Minnesota Historical Society (left).

Concrete Characteristics

Concrete is composed of fine (sand) and coarse (crushed stone or gravel) aggregates and paste made of portland cement and water. The predominant material in terms of bulk is the aggregate. Portland cement is the binder most commonly used in modern concrete. It is commercially manufactured by blending limestone or chalk with clays that contain alumina, silica, lime, iron oxide and magnesia, and heating the compounds together to high temperatures. The hydration process that occurs between the portland cement and water results in formation of an alkali paste that surrounds and binds the aggregate together as a solid mass.

The quality of the concrete is dependent on the ratio of water to the binder; binder content; sound, durable, and well-graded aggregates; compaction during placement; and proper curing. The amount of water used in the mix affects the concrete permeability and strength. The use of excess water beyond that required in the hydration process results in more permeable concrete, which is more susceptible to weathering and deterioration. Admixtures are commonly added to concrete to adjust concrete properties such as setting or hardening time, requirements for water, workability, and other characteristics. For example, the advent of air entraining agents in the 1930s provided enhanced durability for concrete.

During the twentieth century, there was a steady rise in the strength of ordinary concrete as chemical processes became better understood and quality control measures improved. In addition, the need to protect embedded reinforcement against corrosion was acknowledged. Requirements for concrete cover over reinforcing steel, increased cement content, decreased water-cement ratio, and air entrainment all contributed to greater concrete strength and improved durability.

Mechanisms and Modes of Deterioration

Causes of Deterioration

Concrete deterioration occurs primarily because of corrosion of the embedded steel, degradation of the concrete itself, use of improper techniques or materials in construction, or structural problems. The causes of concrete deterioration must be understood in order to select an appropriate repair and protection system.

While reinforcing steel has played a pivotal role in expanding the applications of concrete in twentieth century architecture, corrosion of this steel has also caused deterioration in many historic structures. Reinforcing steel embedded in the concrete is normally surrounded by a passivating oxide layer that, when present, protects the steel from corrosion and aids in bonding the steel and concrete. When the concrete's normal alkaline environment (above a pH of 10) is compromised and the steel is exposed to water, water vapor, or high relative humidity, corrosion of the steel reinforcing takes place. A reduction in alkalinity results from carbonation, a process that occurs when the carbon dioxide in the atmosphere reacts with calcium hydroxide and moisture in the concrete. Carbonation starts at the concrete's exposed surface but may extend to the reinforcing steel over time. When carbonation reaches the metal reinforcement, the concrete no longer protects the steel from corrosion.

Corrosion of embedded reinforcing steel may be initiated and accelerated if calcium chloride was added to the concrete as a set accelerator during original construction to promote more rapid curing. It may also take place if the concrete is later exposed to deicing salts, as may occur during the winter in northern climates. Seawater or other marine environments can also provide large amounts of chloride, either from inadequately washed original aggregate or from exposure of the concrete to seawater.

Corrosion-related damage to reinforced concrete is the result of rust, a product of the corrosion process of steel, which expands and thus requires more space in the concrete than the steel did at the time of installation. This change in volume of the steel results in expansive forces, which cause cracking and spalling of the adjacent concrete (Fig. 12). Other signs of corrosion of embedded steel include delamination of the concrete (planar separations parallel to the surface) and rust staining (often a precursor to spalling) on the concrete near the steel.

Figure 8. The Chess Pavilion in Chicago's Lincoln Park was designed by architect Morris Webster and constructed in 1956. The pavilion is a distinctive landscape feature, with its reinforced concrete cantilevered slab that provides cover for chess players.

Figure 9. The Ira C. Keller Fountain in Portland, Oregon, was designed by Lawrence Halprin and constructed in 1969. The fountain is constructed primarily of concrete pillars with formboard textures and surrounding elements, patterned with geometric lines, which facilitate the path of water. Photo: Anita Washko, Wiss, Janney, Elstner Associates, Inc.

Lack of proper maintenance of building elements such as roofs and drainage systems can contribute to water-related deterioration of the adjacent concrete, particularly when concrete is saturated with water and then exposed to freezing temperatures. As water within the concrete freezes, it expands and exerts forces on the adjacent concrete. Repeated freezing and thawing can result in the concrete cracking and delaminating. Such damage appears as surface degradation, including severe scaling and micro-cracking that extends into the concrete. The condition is most often observed near the surface of the concrete but can also eventually occur deep within the concrete. This type of deterioration is usually most severe at joints, architectural details, and other areas with more surface exposure to weather. In the second half of the twentieth century, concrete has utilized entrained air (the incorporation of microscopic air bubbles) to provide enhanced protection against damage due to cyclic freezing of saturated concrete.

The use of certain aggregates can also result in deterioration of the concrete. Alkali-aggregate reactions—in some cases alkali-silica reaction (ASR)—occur when alkalis normally present in cement react with certain aggregates, leading to the development of an expansive crystalline gel. When this gel is exposed to moisture, it expands and causes cracking of the aggregate and concrete matrix. Deleterious aggregates are typically found only in certain areas of the country and can be detected through analysis by an experienced petrographer. Low-alkali cements as well as fly ash are used today in new construction to prevent such reactions where this problem may occur.

Problems Specifically Encountered with Historic Concrete

Materials and workmanship used in the construction of historic concrete structures, particularly those built before the First World War, sometimes present potential sources of problems. For example, where the aggregate consisted of cinder from burned coal or crushed brick,

Figure 12. The concrete lighthouse at the Kilauea Point Light Station, Kilauea, Kauai, Hawaii, was constructed circa 1913. The concrete, which was a good quality, high strength mix for its day, is in good condition after almost one hundred years in service. Deterioration in the form of spalling related to corrosion of embedded reinforcing steel has occurred primarily in areas of higher ornamentation such as projecting bands and brackets (see close-up photo).

the concrete tends to be weak and porous because these aggregates absorb water. Some of these aggregates can be extremely susceptible to deterioration when exposed to moisture and cyclic freezing and thawing. Concrete was sometimes compromised by inclusion of seawater or beach sand that was not thoroughly washed with fresh water, a condition more common with coastal fortifications built prior to 1900. The sodium chloride present in seawater and beach sand accelerates the rate of corrosion of the reinforced concrete.

Another problem encountered with historic concrete is related to poor consolidation of the concrete during its placement in forms, or in molds in the case of precasting. This problem is especially prevalent in highly ornamental units. Early twentieth century concrete was often tamped or rodded into place, similar to techniques used in forming cast stone. Poorly consolidated concrete often contains voids ("bugholes" or "honeycombs"), which can reduce the protective concrete cover over the embedded reinforcing bars, entrap water, and, if sufficiently large and strategically numerous, reduce localized concrete strength. Vibration technology has improved over time and flowability agents are also used today to address this problem.

A common type of deterioration observed in concrete is the effect of weathering from exposure to wind, rain, snow, and salt water or spray. Weathering appears as erosion of the cement paste, a condition more prevalent in northern regions where precipitation can be highly acidic. This results in the exposure of the aggregate particles on the exposed concrete surface. Variations may occur in the aggregate exposure due to differential erosion or dissolution of exposed cement paste. Erosion can also be caused by the mechanical action of water channeled over concrete, such as by the lack of drip grooves in belt courses and sills, and by inadequate drainage. In addition, high-pressure water when used for cleaning can also erode the concrete surface.

In concrete structures built prior to the First World War, concrete was often placed into forms in relatively short vertical lifts due to limitations in lifting and pouring techniques available at the time. Joints between different concrete placements (often termed cold joints or lift lines) may sometimes be considered an important part of the character of a concrete element (Fig. 13). However, wide joints may permit water to infiltrate the concrete, resulting in more rapid paste erosion or freeze-thaw deterioration of adjacent concrete in cold climates.

In the early twentieth century, concrete was sometimes placed in several layers parallel to the exterior surface. A base concrete was first created with formwork and then a more cement rich mortar layer was applied to the exposed vertical face of the

Figure 13. Fort Casey on Admiralty Head, Fort Casey, Washington, was constructed in 1898. The lift lines from placement of concrete are clearly visible on the exterior walls and characterize the finished appearance.

base concrete. The higher cement content in the facing concrete provided a more water-resistant outer layer and finished surface. The application of a cement-rich top layer, referred to in some early concrete publications as "waterproofing," was also used on top surfaces of concrete walls, or as the top layer in sidewalks. With this type of concrete construction, deterioration can occur over time as a result of debonding between layers, and can proceed very rapidly once the protective cement-rich layer begins to break down.

It is common for historic concrete to have a highly variable appearance, including color and finish texture. Different levels of aggregate exposure due to paste erosion are often found in exposed aggregate concrete. This variability in the appearance of historic concrete increases the level of difficulty in assessing and repairing weathered concrete.

Signs of Distress and Deterioration

Characteristic signs of failure in concrete include cracking, spalling, staining, and deflection. Cracking occurs in most concrete but will vary in depth, width, direction, pattern, and location, and can be either active or dormant (inactive). Active cracks can widen, deepen, or migrate through the concrete, while dormant cracks remain relatively unchanged in size. Some dormant cracks, such as those caused by early age shrinkage of the concrete during curing, are not a structural concern but when left unrepaired, can provide convenient channels for moisture penetration and subsequent damage. Random surface cracks, also called map cracks due to their resemblance to lines on a map, are usually related to early-age shrinkage but may also indicate other types of deterioration such as alkali-silica reaction.

Structural cracks can be caused by temporary or continued overloads, uneven foundation settling, seismic forces, or original design inadequacies. Structural cracks are active if excessive loads are applied to a structure, if the overload is continuing, or if settlement is ongoing. These cracks are dormant if the temporary overloads have been removed or if differential settlement has stabilized. Thermally-induced cracks result from stresses produced by the expansion and contraction of the concrete during temperature changes. These cracks frequently occur at the ends or re-entrant corners of older concrete structures that were built without expansion joints to relieve such stress.

Spalling (the loss of surface material) is often associated with freezing and thawing as well as cracking and delamination of the concrete cover over embedded reinforcing steel. Spalling occurs when reinforcing bars corrode and the corrosion by-products expand, creating high stresses on the adjacent concrete, which cracks and is displaced. Spalling can also occur when water absorbed by the concrete freezes and thaws (Fig. 14). In addition, surface spalling or scaling may result from the improper finishing, forming, or other surface

Figures 14. Layers of architectural concrete that have debonded (spalled) from the surface were removed from a historic water tank during the investigation performed to assess existing conditions. Photos: Anita Washko, Wiss, Janney, Elstner Associates, Inc.

phenomena when water-rich cement paste (laitance) rises to the surface. The resulting weak material is vulnerable to spalling of thin layers, or scaling. In some cases, spalling of the concrete can diminish the load-carrying capacity of the structure.

Deflection is the bending or sagging of structural beams, joists, or slabs, and can be an indication of deficiencies in the strength and structural soundness of concrete. This condition can be produced by overloading, corrosion of embedded reinforcing, or inadequate design or construction, such as use of low-strength concrete or undersized reinforcing bars.

Staining of the concrete surface can be related to soiling from atmospheric pollutants or other contaminants, dirt accumulation, and the presence of organic growth. However, stains can also indicate more serious underlying problems, such as corrosion of embedded reinforcing steel, improper previous surface treatments, alkali-aggregate reaction, or efflorescence, the deposition of soluble salts on the surface of the concrete as a result of water migration (Fig. 15).

Planning for Concrete Preservation

The significance of a historic concrete building or structure—including whether it is important for its architectural or engineering design, for its materials and construction techniques, or both—guides decision making about repair and, if needed, replacement methods. Determining the causes of deterioration is also central to the development of a conservation and repair plan. With historic concrete buildings, one of the more difficult challenges is allowing for sufficient time during the planning phase to analyze the concrete, develop mixes, and provide time for adequate aging of mock-ups for matching to the original concrete.

An understanding of the original construction techniques (cement characteristics, mix design, original intent of assembly, type of placement, precast versus cast in place, etc.) and previous repair work performed on the concrete is important in determining causes of existing deterioration and the susceptibility of the structure to potential other types of deterioration. For example, concrete placed in short lifts (individual concrete placements) or constructed in precast segments will have numerous joints that can provide entry points for water infiltration. Inappropriate prior repairs, such as installation of patches using an incompatible material, can affect the future performance of the concrete. Such prior repairs may require corrective work.

As with other preservation projects, three primary approaches are usually considered for historic concrete structures: ***maintenance, repair,*** or ***replacement.*** Maintenance and repair best achieve the preservation goal of minimal intervention and the greatest retention of existing historic fabric. However, where elements of the building are severely deteriorated or where inherent problems with the material lead to ongoing failures, replacement may be necessary.

During planning, information is gathered through research, visual survey, inspection openings, and laboratory studies. The material should then be reviewed by professionals experienced in concrete deterioration to help evaluate the nature and causes of the concrete problems, to assess both the short-term and long-term effects of the deterioration, and to formulate proper repair approaches.

Condition Assessment

A condition assessment of a concrete building or structure should begin with a review of all available documents related to original construction and prior repairs. While plans and specifications for older concrete buildings are not always available, they can be an invaluable resource and every attempt should be made to find them. They may provide information on the composition of the concrete mix or on the type and location of reinforcing bars. If available, documents related to past repairs should also be reviewed to

Figure 15. Evidence of moisture movement through concrete is apparent in the form of mineral deposits on the concrete surface. Cyclic freezing and thawing of entrapped moisture, and corrosion of embedded reinforcement, have also contributed to deterioration of the concrete column on this fence at Crocker Field in Fitchburg, Massachusetts, designed by the Olmsted Brothers.

understand how the repairs were made and to help evaluate their anticipated performance and service life. Archival photographs can also provide a valuable source of information about original construction.

A visual condition survey will help identify and evaluate the extent, types, and patterns of distress and deterioration. The American Concrete Institute offers several useful guides on how to perform a visual condition survey of concrete. Generally, the condition assessment begins with an overall visual survey, followed by a close-up investigation of representative areas to obtain more detailed information about modes of deterioration.

A number of nondestructive testing methods can be used in the field to evaluate concealed conditions. Basic techniques include sounding with a hand-held hammer (or for horizontal surfaces, a chain) to help identify areas of delamination. More sophisticated techniques include impact-echo testing (Fig. 16), ground penetrating radar, pulse velocity, and other methods that characterize concrete thickness and locate voids or delaminations. Magnetic detection instruments are used to locate embedded reinforcing steel and can be calibrated to identify the size and depth of reinforcement. Corrosion measurements can be taken using copper-copper sulfate half-cell tests or linear polarization techniques to determine the probability or rate of active corrosion of the reinforcing steel.

To further evaluate the condition of the concrete, samples may be removed for laboratory study to determine material components and composition, and causes of deterioration. Samples need to be representative of existing conditions but should be taken from unobtrusive locations. Laboratory studies of the concrete may include petrographic evaluation following ASTM C856, *Practice for Petrographic Examination of Hardened Concrete.* Petrographic examination, consisting of microscopical studies performed by a geologist specializing in the evaluation of construction materials, is performed to determine air content, water-cement ratio, cement content, and general aggregate characteristics. Laboratory studies can also include chemical analyses to determine chloride content, sulfate content, and alkali levels of the concrete; identification of deleterious aggregates; and determination of depth of carbonation. Compressive strength studies can be conducted to evaluate the strength of the existing concrete and provide information for repair work. The laboratory studies provide a general identification of the original concrete's components and aggregates, and evidence of damage due to various mechanisms including cyclic freezing and thawing, alkali-aggregate reactivity, or sulfate attack. Information gathered through laboratory studies can also be used to help develop a mix design for the repair concrete.

Cleaning

As with other historic structures, concrete structures are cleaned for several reasons: to improve the appearance of the concrete, as a cyclical maintenance measure, or in preparation for repairs. Consideration should first be given to whether the historic concrete structure needs to be cleaned at all. If cleaning is required, then the gentlest system that will be effective should be selected.

Three primary methods are used for cleaning concrete: water methods, abrasive surface treatments, and chemical surface treatments. Low-pressure water (less than 200 psi) or steam cleaning can effectively remove surface soiling from sound concrete; however, care is required on fragile or deteriorated surfaces. In addition, water and steam methods are typically not effective in removing staining or severe soiling. Power washing with high-pressure water is sometimes used to clean or remove coatings from sound, high-strength concrete, but high-pressure water washing is generally damaging to and not appropriate for concrete on historic structures.

When used with proper controls and at very low pressures (typically 35 to 75 psi), microabrasive surface treatments using very fine particulates, such as dolomitic limestone powder, can sometimes clean effectively. However, microabrasive cleaning may alter the texture and surface reflectivity of concrete. Some concrete can be damaged even by fine particulates applied at very low pressures.

Figure 16. Impact echo testing is performed on a concrete structural slab to help determine depth of deterioration. In this method, a short pulse of energy is introduced into the structure and a transducer mounted on the impacted surface of the structure receives the reflected input waves or echoes. These waves are analyzed to help identify flaws and deterioration within the concrete.

Chemical surface treatments can clean effectively but may also alter the appearance of the concrete by bleaching the concrete, removing the paste, etching the aggregate, or otherwise altering the surface. Detergent cleaners or mild, diluted acid cleaners may be appropriate for removal of staining or severe soiling. Cleaning products that contain strong acids such as hydrochloric (muriatic) or hydrofluoric acid, which will damage concrete and are harmful to persons, animals, site features, and the environment, should not be used.

For any cleaning process, trial samples should be performed prior to full-scale implementation. The intent of the cleaning program should not be to return the structure to a like new appearance. Concrete can age gracefully, and as long as soiling is not severe or deleterious, many structures can still be appreciated without extensive cleaning.

Methods of Maintenance and Repair

The maintenance of historic concrete often is thought of in terms of appropriate cleaning to remove unattractive dirt or soiling materials. However, the implementation of an overall maintenance plan for a historic structure is the most effective way to help protect historic concrete. For examples, the lack of maintenance to roofs and drainage systems can promote water related damage to adjacent concrete features. The repeated use of deicing salts in winter climates can pit the surface of old concrete and also may promote decay in embedded steel reinforcements. Inadequate protection of concrete walls adjacent to driveways and parking areas can result in the need for repair work later on.

The maintenance of historic concrete involves the regular inspection of concrete to establish baseline conditions and identify needed repairs. Inspection tasks involve monitoring protection systems, including sealant joints, expansion joints, and protective coatings; reviewing existing conditions for development of distress such as cracking and delaminations; documenting conditions observed; and developing and implementing a cyclical repair program.

Sealants are an important part of maintenance of historic concrete structures. Elastomeric sealants, which have replaced traditional oil-resin based caulks for many applications, are used to seal cracks and joints to keep out moisture and reduce air infiltration. Sealants are commonly used at windows and door perimeters, at interfaces between concrete and other materials, and at attachments to or through walls or roofs, such as with lamps, signs, or exterior plumbing fixtures.

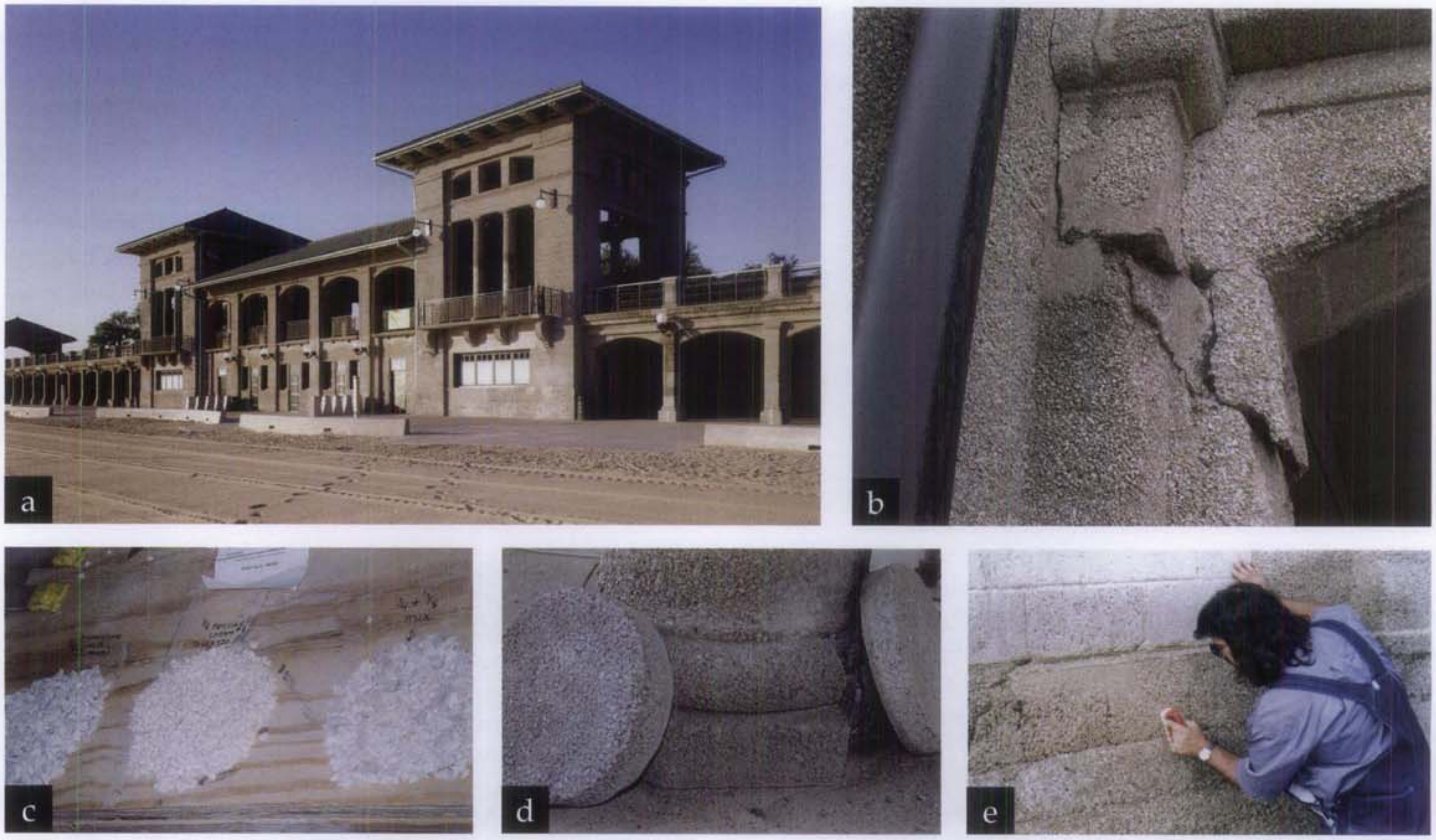


Figure 17. (a) The 63rd Street Beach House was constructed on the shoreline of Chicago in 1919. The highly exposed aggregate concrete of the exterior walls of the beach house was used for many buildings in the Chicago parks as an alternative to more expensive stone construction. Photo: Leslie Schwartz Photography. (b) Concrete deterioration included cracking, spalling, and delamination caused by corrosion of embedded reinforcing steel and concrete damage due to cyclic freezing and thawing. (c) Various sizes and types of aggregates were reviewed for matching to the original concrete materials. (d) Mock-ups of the concrete repair mix were prepared for comparison to the original concrete. Considerations included aggregate type and size, cement color, proportions, aggregate exposure, and surface finish. (e) The craftsman finished the surface to replicate the original appearance in a mock-up on the structure. Here, he used a nylon bristle brush to remove loose paste and expose the aggregate, creating a variable surface to match the adjacent original concrete.

Where used for crack repairs on historic facades, the finished appearance of the sealant application must be considered, as it may be visually intrusive. In some cases, sand can be broadcast onto the surface of the sealant to help conceal the repair.

Urethane and polyurethane sealants are often used to seal joints and cracks in concrete structures, paving, and walkways; these sealants provide a service life of up to ten years. High-performance silicone sealants also are often used with concrete, as they provide a range of movement capabilities and a service life of twenty years or more. Some silicone sealants may stain adjacent materials, which may be a problem with more porous concrete, and may also tend to accumulate dust and dirt. The effectiveness of sealants for sealing joints and cracks depends on numerous factors including proper surface preparation and application. Sealants should be examined as part of routine maintenance inspections, as these materials deteriorate faster than their substrates and must be replaced periodically as a part of cyclical maintenance.

Repair of historic concrete may be required to address deterioration because the original design and construction did not provide for long-term durability, or to facilitate a change in use of the structure. Examples include increasing concrete cover to protect reinforcing steel and reducing water infiltration into the structure by repair of joints. Any such improvements must be thoroughly evaluated for compatibility with the original design and appearance. Care is required in all aspects of historic concrete repair, including surface preparation; installation of formwork; development of the concrete mix design; and concrete placement, consolidation, and curing.

An appropriate repair program addresses existing distress and reduces the rate of future deterioration, which in many cases involves moisture-related issues. The repair program should incorporate materials and methods that are sympathetic to the existing materials in character and appearance, and which provide good long-term performance. In addition, repair materials should age and weather similarly to the original materials. In order to best achieve these goals, concrete repair projects should be divided into three phases: development of trial repair procedures, trial repairs and evaluation, and production repair work.

For any concrete repair project, the process of investigation, laboratory analysis, trial samples, mock-ups, and full-scale repairs allows ongoing refinement of the repair work as well as implementation of quality-control measures. The trial repair process provides an opportunity for the owner, architect, engineer, and contractor to evaluate the concrete mix design and the installation and finishing techniques for the repairs from both technical and aesthetic standpoints. The final repair materials and procedures should match the original concrete in appearance while meeting the established criteria for durability. Information gathered through trial repairs and mock-ups is invaluable in refining the construction documents prior to the start of the overall repair project (Fig. 17).

Surface Preparation

In undertaking surface preparation for historic concrete repair, care must be taken to limit removal of existing material while still providing an appropriate substrate for repairs. This is particularly important where ornamentation and fine details are involved. Preparation for localized repairs usually begins with removal of the loose concrete to determine the general extent of the repair, followed by saw-cutting the perimeter of the repair area. The repair area should extend beyond the area of concrete deterioration to a sufficient extent to provide a sound substrate. When repairing concrete with an exposed aggregate or other special surface texture, a sawcut edge may be too visually evident. To hide the repair edge, techniques such as lightly hand-chipping the edge of the patch may be used to conceal the joint between the original concrete and the new repair material. The depth to which the concrete needs to be removed may be difficult to determine without invasive probing in the repair area. Removal of concrete should typically extend beyond the level of the reinforcing steel, if present, so that the patch encapsulates the reinforcing steel, which provides mechanical attachment for the repair.

If the concrete was originally of lower strength and quality, the assessment of present soundness is more difficult. Deteriorated and unsound concrete is typically removed using pneumatic chipping hammers. Removal of concrete in historic structures is better controlled by using smaller chipping hammers or hand tools. The area of the concrete to be repaired and the exposed reinforcing steel are then cleaned, usually by careful sandblast and air blast procedures applied only within the repair area. Adjacent original concrete surfaces should be protected during this work. In some cases, project constraints such as dust control may limit the ability to thoroughly clean the concrete and steel. For example, it may be necessary to use needle scaling (a small pneumatic impact device) and wire brushing instead of sandblasting.

Supplemental steel may be needed when existing reinforcing steel is severely deteriorated, or if reinforcing steel is not present in repair areas. Exposed existing reinforcing and other embedded steel elements can be cleaned, primed, and painted with a corrosion-inhibiting coating. The patching material should be reinforced and mechanically attached to the existing concrete. Reinforcement materials used in repairs most often include mild steel, epoxy-coated steel, or stainless steel, depending on existing conditions.

Formwork and Molds

Special formwork is needed to recreate ornamental concrete features—which may be complex, in high relief, or architecturally detailed—and to provide special surface finishes such as wood form board textures. Construction of the formwork itself requires particular skill and craftsmanship. Reusable forms can be used for concrete ornamentation that is repeated across a building facade, or precast concrete elements may be used to replace missing or unrepairable architectural features. Formwork for ornamental concrete is often created using a four-step process: a casting of the original concrete is taken; a plaster replica of the unit is prepared; a mold or form is made from the plaster replica; and a new concrete unit is cast. Custom formwork and molds are often the work of specialty companies, such as precasters and cast stone fabricators.

The process of forming architectural features or special surface textures is particularly challenging if early age stripping (removal of formwork early in the concrete curing process) is needed to perform surface treatment on the concrete. Timing for formwork removal is related to strength gain, which in turn is partly dependent on temperature and weather conditions. Early age removal of formwork in highly detailed concrete can lead to damage of the new concrete that has not yet gained sufficient strength through curing.

Selection of Repair Materials and Mix Design

Selection and design of proper repair materials is a critical component of the repair project. This process requires evaluation of the performance, characteristics, and limitations of the repair materials, and may involve laboratory testing of proposed materials and trial repairs. The materials should be selected to address the specific type of repair required and to be compatible with special characteristics of the original concrete. Some modern repair materials are designed to have a high compressive strength and to be impermeable. Even though inherently durable, these newer materials may not be appropriate for use in repairing a low strength historic concrete.

The concrete's durability, or resistance to deterioration, and the materials and methods selected for repair depend on its composition, design, and quality of workmanship. In most cases, a mix design for durable replacement concrete should use materials similar to those of the original concrete mix. Prepackaged materials are often not appropriate for repair of historic concrete. The concrete patching material can be air entrained or polymer-modified if subject to exterior exposure, and should incorporate an appropriate selection of aggregate and cement type, and proper water content and water

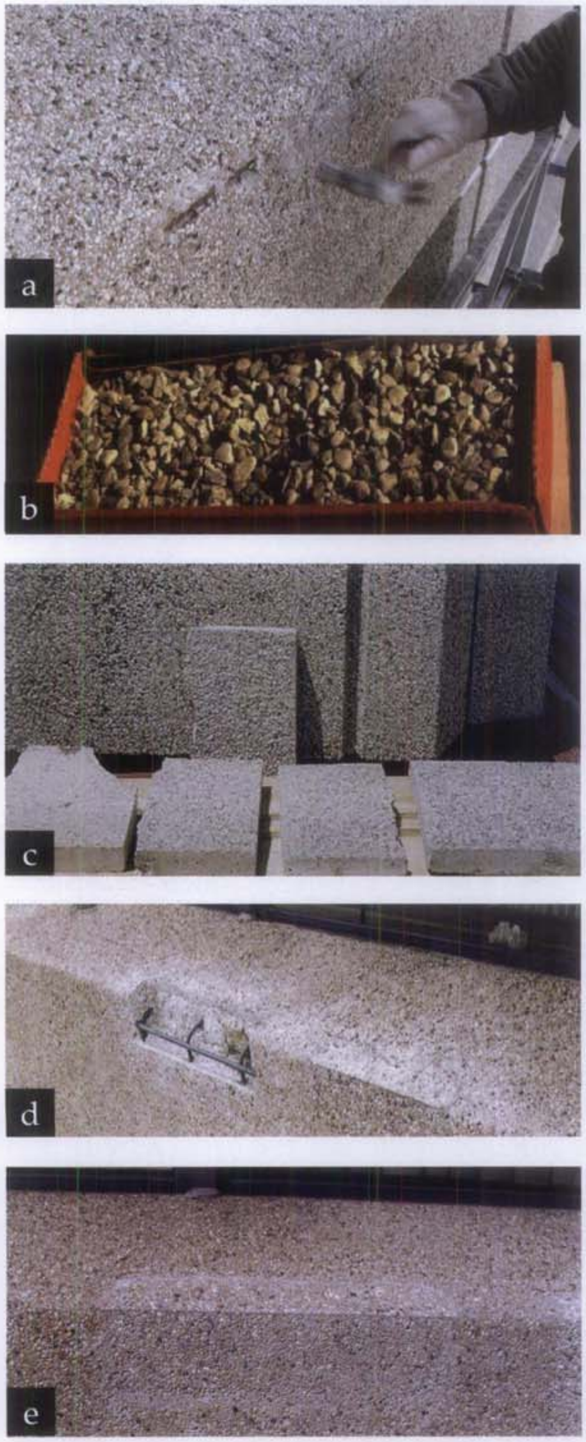


Figure 18. (a) Exposed aggregate precast concrete is sounded with a hammer to detect areas of deterioration. Corrosion of the exposed reinforcing steel bar has led to spalling of the adjacent concrete. (b) Samples of aggregate considered for use in repair concrete are compared to the original concrete materials in terms of size, color, texture, and reflectance. (c) Various sample panels are made using the selected concrete repair mix design for comparison to the original concrete on the building, and the mix design is adjusted based on review of the samples. (d) After removal of the spall, the concrete surface is prepared for installation of a formed patch. (e) Prior to placement of the concrete, a retarding agent is brush-applied to the inside face of the formwork to slow curing at the surface. After the concrete is partially cured, the forms are removed and the surface of the concrete is rubbed to remove some of the paste and expose the aggregate to match the original concrete.

to cement ratio. Some admixtures, including polymer modifiers, may change the appearance of the concrete mix. Design of the concrete patching material should address characteristics required for durability, workability, strength gain, compressive strength, and other performance attributes. During installation of the repair, skilled workmanship is required to ensure proper mixing procedures, placement, consolidation, and curing.

Matching and Repair Techniques for Historic Concrete

Repair measures should be selected that retain as much of the original material as possible, while providing for removal of an adequate amount of deteriorated concrete to provide a sound substrate for a durable repair. The installed repair must visually match the existing concrete as closely as possible and should be similar in other aspects such as compressive strength, permeability, and other characteristics important in the mix design of the concrete (Fig. 18).

Understanding the original construction techniques often provides opportunities in the design of repairs. For example, joints between the new and old concrete can be hidden in changes in surface profile and cold joints. The required patching mix for the concrete to be used in the repair will likely need to be specially designed to replicate the appearance of the adjacent historic concrete. A high level of craftsmanship is required for finishing of historic concrete, in particular to create the sometimes inconsistent finish and variation in the original concrete in contrast to the more even appearance required for most non-historic repairs.

To match the various characteristics of the original concrete, trial mixes should be developed. These mixes need to take into account the types and colors of aggregates and paste present in the original concrete. Different mixes may be needed because of variations in the appearance and composition of the historic concrete. The trials should utilize different forming and finishing techniques to achieve the best possible match to the original concrete. Initial trials should first take place on site but off the structure. The mix designs providing the best match are then installed as trial repairs on the structure, and assessed after they have cured.

Achieving compatibility between repair work and original concrete may be difficult, especially given the variability often present in historic concrete materials and finishes. Formed rather than trowel-applied patch repairs are recommended for durability, as forming permits better ranges of mix ingredients (such as coarse aggregates) and improved consolidation as compared to trowel-applied repairs. Parge coatings usually are not recommended as they do not provide as durable repair as formed concrete. However, in some cases parge coatings may be appropriate to match an original parged surface treatment. Proper placement and finishing of the repair are important to obtain a match with the original concrete. To minimize problems associated with rapid curing of concrete, such as surface cracking, it is important to use proper curing methods and to allow for sufficient time.

Hairline cracks that show no sign of increasing in size may often be left unrepaired. The width of the crack and the amount of movement usually limits the selection of crack repair techniques that are available. Although it is difficult to determine whether cracks are moving or non-moving, and therefore most cracks should be assumed to be moving, it is possible to repair non-moving cracks by installation of a cementitious repair mortar matching the adjacent concrete. It is generally desirable not to widen cracks prior to the mortar application. Repair mortar containing sand in the mix may be used for wider cracks; unsanded repair mortar may be used for narrower cracks.

When it is desirable to re-establish the structural integrity of a concrete structure involving dormant cracks, epoxy injection repair has proven to be an effective procedure. Such a repair is made by first sealing the crack on both sides of a wall or structural member with epoxy, polyester, wax, tape, or cement slurry, and then injecting epoxy through small holes or ports drilled in the concrete. Once the epoxy in the crack has hardened, the surface sealing material may be removed; however, this type of repair is usually quite apparent. Although it may be possible to inject epoxy without leaving noticeable residue, this process is difficult and, in general, the use of epoxy repairs in visible areas of concrete on historic structures is not recommended.

Active structural cracks (which move as loads are added or removed) and thermal cracks (which move as temperatures fluctuate) must be repaired in a manner that will accommodate the anticipated movement. In some more extreme cases, expansion joints may have to be introduced before crack repairs are undertaken. Active cracks may be filled with sealants that will adhere to the sides of the cracks and will compress or expand during crack movement. The design, detailing, and execution of sealant repairs require considerable attention, or they will detract from the appearance of the historic building. The routing and cleaning of a crack, and installation of an elastomeric sealant to prevent water penetration, is used to address cracks where movement is anticipated. However, unless located in a concealed area of the concrete, this technique is often not acceptable for historic structures because the repair will be visually intrusive (Fig. 19). Other approaches, such as installation of a cementitious crack repair, may need to be considered even though this type of repair may be less effective or have a shorter service life than a sealant repair.

Figure 19. A high-speed grinder ia used to widen a crack in preparation for installation of a sealant. This process is called "routing." After the crack is prepared, the sealant is installed to prevent moisture infiltration through the crack. Although sealant repairs can provide a durable, watertight repair for moving cracks, they tend to be very visible.

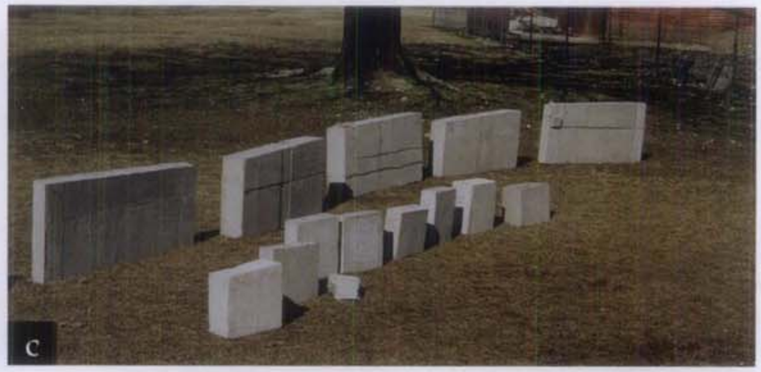
Replacement

If specific components of historic concrete structures are beyond repair, replacement components can be cast to match historic ones. Replacement of original concrete should be carefully considered and viewed as a method of last resort. In some cases, such as for repeated ornamental units, it may be more cost-effective to fabricate precast concrete units to replace missing elements. The forms created for precast or cast-in-place units can then be used again during future repair projects.

Careful mix formulation, placement, and finishing are required to ensure that replacement concrete units will match the historic concrete. There is often a tendency to make replacement concrete more consistent in appearance than the original concrete. The consistency can be in stark contrast with the variability of the original concrete due to original construction techniques, architectural design, or differential exposure to weather. Trial repairs and mock-ups are used to evaluate the proposed replacement concrete work and to refine construction techniques (Fig 20).

Protection Systems

Coatings and Penetrating Sealers. Protection systems such as a penetrating sealers or film forming coating are often used with non-historic structures to protect the concrete and increase the length of the service life of concrete repairs. However, film-forming coatings are often inappropriate for use on a historic structure, unless the structure was coated historically. Film-forming coatings will often change the color and appearance of a surface, and higher build coatings can also mask architectural finishes and ornamental details. For example, the application of a coating on concrete having a formboard finish may hide the wood texture of the surface. Pigmented film-forming coatings are also typically not appropriate for use over exposed aggregate concrete, where the uncoated exposed surface contributes significantly to the historic character of



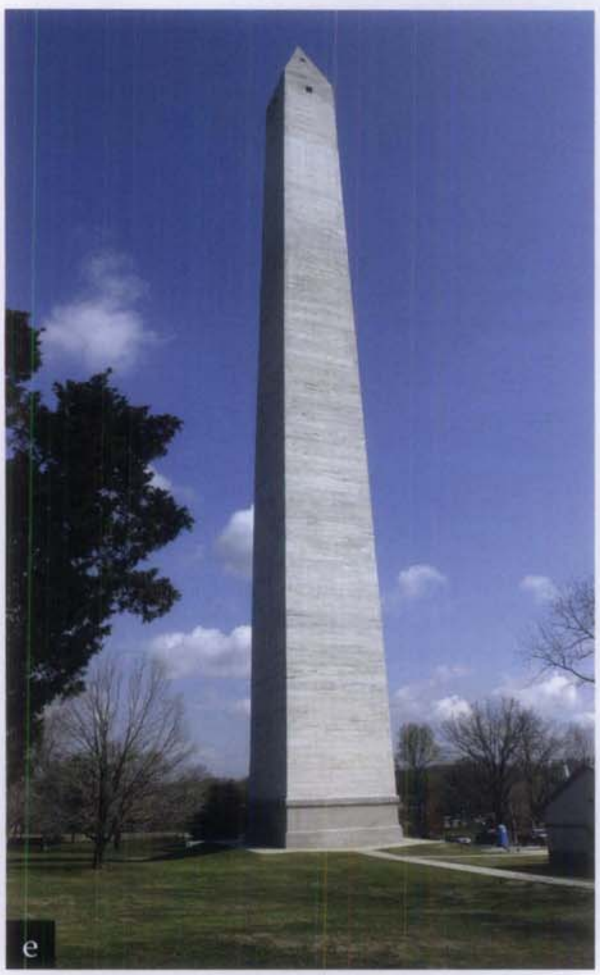


Figure 20. (a) The Jefferson Davis Memorial in Fairview, Kentucky, constructed from 1917–1924, is 351 feet tall and constructed of unreinforced concrete. The walls of the memorial are 8 feet thick at the base and 2 feet thick at the top of the wall. Access to the monument for investigation was provided by rappelling techniques, while ground supported and suspended scaffolding was used to access the exterior during repairs. (b) The concrete was severely deteriorated at isolated locations, with spalling and damage from cyclic freezing and thawing of entrapped water. In addition, previous repairs were at the end of their service life and removal of deteriorated concrete and failed previous repairs was required. Light duty chipping hammers were used to avoid damage to adjacent material when removing deteriorated concrete to the level of sound concrete. (c) Field samples were performed to match the color, finish, and texture of the original concrete. A challenge in matching of historic concrete is achieving variability of appearance. (d) The completed surface after repairs exhibits intentional variability of the concrete surface to match the appearance of the original concrete. Some formwork imperfections that would normally be removed by finishing were intentionally left in place, to replicate the highly variable finish of the original concrete. (e) The Jefferson Davis Memorial after completion of repairs in 2004. Photo e: Joseph Lenzi, Senler, Campbell & Associates, Inc.

concrete. In cases where the color of a substrate needs to be changed, such as to modify the appearance of existing repairs, an alternative to pigmented film-forming coatings is the use of pigmented stains.

Many proprietary clear, penetrating sealers are currently available to protect concrete substrates. These products render fine cracks and pores within the concrete hydrophobic; however, they do not bridge or fill cracks. Clear sealers may change the appearance of the concrete in that treated areas become more visible after rain in contrast to the more absorptive areas of original concrete. Once applied, penetrating sealers cannot be effectively removed and are therefore considered irreversible. They should not be used on historic concrete without thorough prior consideration. However, clear penetrating sealers provide an important means of protection for historic concrete that is not of good quality and can help to avoid more extensive future repairs or replacement. Thus they are sometimes appropriate for use on historic concrete. Once applied, these sealers will require periodic re-application.

Waterproofing membranes are systems used to protect concrete surfaces such as roofs, terraces, plazas, or balconies, as well as surfaces below grade. Systems range from coal tar pitch membranes used on older buildings, to asphalt or urethane-based systems. On historic buildings, membrane systems are typically used only on surfaces that were originally protected by a similar system and surfaces that are not visible from grade. Waterproofing membranes may be covered by roofing, paving, or other architectural finishes.

Laboratory and field testing is recommended prior to application of a protection system or treatment on any concrete structure; testing is even more critical for historic structures because many such treatments are not reversible. As with other repairs, trial samples are important to evaluate the effectiveness of the treatment and to determine whether it will harm the concrete or affect its appearance.

Cathodic Protection. Corrosion is an electrochemical process in which electrons flow between cathodic (positively charged) and anodic (negatively charged) areas on a metal surface; corrosion occurs at the anodes. Cathodic protection is a technique used to control the corrosion of metal by making the whole metal surface the cathode of an electrochemical cell. This technique is used to protect metal structures from corrosion and is also sometimes used to protect steel reinforcement embedded in concrete. For reinforced concrete, cathodic protection is typically accomplished by connecting an auxiliary anode to the reinforcing so that the entire reinforcing bar becomes a cathode. In sacrificial anode (passive) systems, current flows naturally by galvanic action between the less noble anode (such as zinc) and the cathode. In impressed-current (active) systems, current is impressed between an inert anode (such as titanium) and the cathode. Cathodic protection is intended to reduce the rate of corrosion of embedded steel in concrete, which in turn reduces overall deterioration. Protecting embedded steel from corrosion helps to prevent concrete cracking and spalling.

Impressed-current cathodic protection is the most effective means of mitigating steel corrosion and has been used in practical structural applications since the 1970s. However, impressed-current cathodic protection systems are typically the most costly to install and require substantial ongoing monitoring, adjustment, and maintenance to ensure a proper voltage output (protection current) over time. Sacrificial anode cathodic protection dates back to the 1800s, when the hulls of ships were protected using this technology. Today many industries utilize the concept of sacrificial anode cathodic protection for the protection of steel exposed to corrosive environments. It is less costly than an impressed-current system, but is somewhat less effective and requires reapplication of the anode when it becomes depleted.

Re-alkalization. Another technique currently available to protect concrete is realkalization, which is a process to restore the alkalinity of carbonated concrete. The treatment involves soaking the concrete with an alkaline solution, in some cases forcing it into the concrete to the level of the reinforcing steel by passage of direct current. These actions increase the alkalinity of the concrete around the reinforcement, thus restoring the protective alkaline environment for the reinforcement. Like impressed-current cathodic protection methods, it is costly. Other corrosion methods are also available but have a somewhat shorter history of use.

Careful evaluation of existing conditions, the causes and nature of distress, and environmental factors is essential before a protection method is selected and implemented. Not every protection system will be effective on each structure. In addition, the level of intrusion caused by the protection system must be carefully evaluated before it is used on a historic concrete structure.

Summary

In the United States, concrete has been a popular construction material since the late nineteenth century and recently has gained greater recognition as a historic material. Preservation of historic concrete requires a thorough understanding of the causes and types of deterioration, as well as of repair and replacement materials and methods. It is important that adequate time is allotted during the planning phase of a project to provide for trial repairs and mock-ups in order to evaluate the effectiveness and aesthetics of the repairs. Careful design is essential and, as with other preservation efforts, the skill of those performing the work is critical to the success of the repairs. The successful repair of many historic concrete structures in recent years demonstrates that the techniques and materials now available can extend the life of such structures and help ensure their preservation.

Selected Reading

American Concrete Institute. *Guide for Making a Condition Survey of Concrete in Service*. ACI Committee 201, ACI 201.1R-92.

American Concrete Institute. *Guide to Evaluation of Concrete Structures before Rehabilitation*. ACI Committee 364, ACI 364.1R-07.

American Concrete Institute. *Concrete Repair Guide*. ACI Committee 546, ACI 546R-04.

American Concrete Institute. *Guide for Evaluation of Existing Concrete Buildings*. ACI Committee 437, ACI 437R-03.

Childe, H.L. *Manufacture and Uses of Concrete Products and Cast Stone*. London: Concrete Publications Limited, 1930.

Collins, Peter. *Concrete: The Vision of a New Architecture*. New York, New York: Faber and Faber, 1959.

Cowden, Adrienne B., comp. *Historic Concrete: An Annotated Bibliography*. Washington, D.C.: National Park Service, 1993.

Komandant, August E. *Contemporary Concrete Structures*. New York, New York: McGraw Hill, 1972.

Erlemann, Gustav G. "Steel Reinforcing Bar Specification in Old Structures." *Concrete International*, April 1999, 49–50.

Federal Highway Administration. *Guide to Nondestructive Testing of Concrete*. FHWA Publication Number FHWA-SA-97-105.

Gaudette, Paul E. "Special Considerations in Repair of Historic Concrete." *Concrete Repair Bulletin*, January/February 2000, 12–13.

Jester, Thomas C., ed. *Twentieth Century Building Materials*. New York, New York: McGraw-Hill, 1995.

Johnson, Arne P., and Seung Kyoung Lee. "Protection Methods for Historic Concrete at Soldier Field." *Preserve and Play: Preserving Historic Recreation and Entertainment Sites*. Washington, D.C.: Historic Preservation Education Foundation, National Council for Preservation Education, and National Park Service, 2006.

Macdonald, Susan, ed. *Concrete: Building Pathology*. Osney Mead, Oxford, U.K.: Blackwell Science, 2003.

McGovern, Martin S. "A Clear View of Sealers." *Concrete Construction*, January 2000, 53–58.

Morton, W. Brown III, Gary L. Hume, Kay D. Weeks, H. Ward Jandl, and Anne E. Grimmer. *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings*. Washington, D.C.: National Park Service, 1983, reprinted 1997.

"Repairing Cracks." *Concrete Repair Digest*, August/September 1992, 160–164. Condensed from ACI document 224.1R-93.

Slaton, Deborah. "Cleaning Historic Concrete." *Concrete Repair Bulletin*, January/February 2000, 14–15.

Acknowledgements

Paul Gaudette is an engineer with Wiss, Janney, Elstner Associates, Inc., in Chicago, Illinois. Deborah Slaton is an architectural conservator with Wiss, Janney, Elstner Associates, Inc., in Northbrook, Illinois. All photographs by Paul Gaudette unless otherwise stated. Front cover image: Kyle Normandin, Wiss, Janney, Elstner Associates, Inc.

The authors wish to thank William Bing Coney, author of the first edition of this preservation brief, who served as a peer reviewer for the current edition. In addition, the authors gratefully acknowledge the assistance of the following individuals as peer reviewers of this brief: Arne Johnson and Una Gilmartin, Wiss, Janney, Elstner Associates, Inc.; Robert Joyce, Quality Restorations, Inc.; Susan Macdonald, New South Wales Heritage Office; Miles T. Murray, Restruction Corporation; and Jack Pyburn, OJP/Architect, Inc. Anne E. Grimmer, Chad Randl, and former staff Sharon C. Park, FAIA, of the Technical Preservation Services, National Park Service, offered valuable comments during development of the brief. Charles E. Fisher of the National Park Service was the technical editor for this publication project.

ISBN: 978-0-16-078946-5
U.S. Government Printing Office Stock Number: 024-005-01253-2 2007

47 PRESERVATION BRIEFS

Maintaining the Exteriors of Small and Medium Size Historic Buildings

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U.S. Department of the Interior
Heritage Preservation Services

Preservation is defined as "the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the *ongoing maintenance and repair* of historic materials and features rather than extensive replacement and new construction."[1]

Maintenance helps preserve the integrity of historic structures. If existing materials are regularly maintained and deterioration is significantly reduced or prevented, the integrity of materials and workmanship of the building is protected. Proper maintenance is the most cost effective method of extending the life of a building. As soon as a building is constructed, restored, or rehabilitated, physical care is needed to slow the natural process of deterioration. An older building has already experienced years of normal weathering and may have suffered from neglect or inappropriate work as well.

Decay is inevitable but deterioration can accelerate when the building envelope is not maintained on a regular basis. Surfaces and parts that were seamlessly joined when the building was constructed may gradually become loose or disconnected; materials that were once sound begin to show signs of weathering. If maintenance is deferred, a typical response is to rush in to fix what has been ignored, creating additional problems. Work done on a crisis level can favor inappropriate treatments that alter or damage historic material.

There are rewards for undertaking certain repetitive tasks consistently according to a set schedule. Routine and preventive care of building materials is the most effective way of slowing the natural process of deterioration. The survival of historic buildings in good condition is primarily due to regular upkeep and the preservation of historic materials.

Well-maintained properties tend to suffer less damage from storms, high winds, and even small earthquakes. Keeping the roof sound, armatures and attachments such as shutters tightened and secured, and having joints and connections functioning well, strengthens the ability of older buildings to withstand natural occurrences.

Over time, the cost of maintenance is substantially less than the replacement of deteriorated historic features and involves considerably less disruption. Stopping decay before it is widespread helps keep the scale and complexity of work manageable for the owner.

This *Preservation Brief* is designed for those responsible for the care of small and medium size historic buildings, including owners, property administrators, in-house maintenance staff, volunteers, architects, and maintenance contractors. The Brief discusses the benefits of regular inspections, monitoring, and seasonal maintenance work; provides general guidance on maintenance treatments for historic building exteriors; and emphasizes the importance of keeping a written record of completed work.

Getting Started

Understanding how building materials and construction details function will help avoid treatments that are made in an attempt to simplify maintenance but which may also result in long-term damage. It is enticing to read about "maintenance free" products and systems, particularly waterproof sealers, rubberized paints, and synthetic siding, but there is no such thing as maintenance free when it comes to caring for historic buildings. Some approaches that initially seem to reduce maintenance requirements may over time actually accelerate deterioration.

Exterior building components, such as roofs, walls, openings, projections, and foundations, were often constructed with a variety of functional features, such as overhangs, trim pieces, drip edges, ventilated cavities, and painted surfaces, to protect against water infiltration, ultraviolet deterioration, air infiltration, and

Figure 1. Maintenance involves selecting the proper treatment and protecting adjacent surfaces. Using painter's tape to mask around a brass doorknocker protects the painted door surface from damage when polishing with chemical compounds. On the other hand, hardware with a patinated finish was not intended to be polished and should simply be cleaned with a damp cloth.

Cautions During Maintenance Work

All maintenance work requires attention to safety of the workers and protection of the historic structure. Examples include the following:

• Care should be taken when working with historic materials containing lead-based paint. For example, damp methods may be used for sanding and removal to minimize air-borne particles. Special protection is required for workers and appropriate safety measures should be followed.

• Materials encountered during maintenance work, such as droppings from pigeons and mice, can cause serious illnesses. Appropriate safety precautions need to be followed. Services of a licensed contractor should be obtained to remove large deposits from attics and crawlspaces.

• Heat removal of paint involves several potential safety concerns. First, heating of lead-containing paint requires special safety precautions for workers. Second, even at low temperature levels, heat removal of paint runs the risk of igniting debris in walls. Heat should be used only with great caution with sufficient coverage by smoke detectors in work areas. Work periods need to be timed to allow monitoring after completion of paint removal each day, since debris will most often smolder for a length of time before breaking out into open flame. The use of torches, open flames, or high heat should be avoided.

• Many chemical products are hazardous and volatile organic compounds (VOC) are banned in many areas. If allowed, appropriate respirators and other safety precautions are essential for use.

• Personal protection is importan and may require the use of goggles, gloves, mask, closed-toed shoes, and a hard hat.

• Electrical service should be turned off before inspecting a basement after a flood or heavy rain, where there is high standing water.

pest infestation. Construction assemblies and joints between materials allow for expansion and contraction and the diffusion of moisture vapor, while keeping water from penetrating the building envelope. Older buildings use such features effectively and care must be taken to retain them, avoiding the temptation to reduce air infiltration or otherwise alter them.

Monitoring, inspections, and maintenance should all be undertaken with safety in mind. Besides normal safety procedures, it is important to be cognizant of health issues more commonly encountered with older buildings, such as lead-based paint, asbestos, and bird droppings, and to know when it is necessary to seek professional services (see sidebar).

Original building features and examples of special craftsmanship should be afforded extra care. The patina or aging of historic materials is often part of the charm and character of historic buildings. In such cases, maintenance should avoid attempts to make finishes look new by over-cleaning or cladding existing materials. As with any product that has the potential to harm historic materials, the selection of a cleaning procedure should always involve testing in a discreet location on the building to ensure that it will not abrade, fade, streak, or otherwise damage the substrate (Fig 1).

Maintenance Plan, Schedules and Inspection

Organizing related work into a written set of procedures, or a Maintenance Plan, helps eliminate duplication, makes it easier to coordinate work effort, and creates a system for prioritizing maintenance tasks that takes into account the most vulnerable and character-defining elements.

The first time a property owner or manager establishes a maintenance plan or program, it is advisable to have help from a preservation architect, preservation consultant, and/or experienced contractor. Written procedures should outline step-by-step approaches that are custom- tailored to a building. No matter how small the property, every historic site should have a written guide for maintenance that can be as simple as:

1) Schedules and checklists for inspections;

2) Forms for recording work, blank base plans and elevations to be filled in during inspections and upon completion of work;

3) A set of base-line photographs to be augmented over time;

4) Current lists of contractors for help with complex issues or in case of emergencies;

5) Written procedures for the appropriate care of specific materials, including housekeeping, routine care, and preventive measures;

6) Record-keeping sections for work completed, costs, warranty cards, sample paint colors, and other pertinent material.

This information can be kept in one or more formats, such as a three-ring binder, file folders, or a computer database. It is important to keep the files current with completed work forms to facilitate long-term evaluations and planning for future work (Fig 2).

Proper maintenance depends on an organized plan with work prescribed in manageable components. Regular maintenance needs to be considered a priority both in terms of time allotted for inspections and for allocation of funding.

Maintenance work scheduling is generally based on a variety of factors, including the seriousness of the problem, type of work involved, seasonal appropriateness, product manufacturer's recommendations, and staff availability. There are other variables as well. For example, building materials and finishes on southern and western exposures will often weather faster than those on northern or eastern exposures. Horizontal surfaces facing skyward usually require greater maintenance than vertical ones; in regions with moderate or heavy rainfall, wood and other materials in prolonged shadow are subject to more rapid decay.

Maintenance costs can be controlled, in part, through careful planning, identification of the amount of labor required, and thoughtful scheduling of work. Maintenance schedules should take into account daily and seasonal activities of the property in order to maximize the uninterrupted time necessary to complete the work. Institutions generally need to budget annually between 2 and 4 percent of the replacement value of the building to underwrite the expense of full building maintenance.[2] Use of trained volunteers to undertake maintenance can help reduce costs.

Exterior inspections usually proceed from the roof down to the foundation, working on one elevation at

Cyclic Building Inspection Checklist: Horse Stable			**Inspection date: 04/24/05**	
Building Feature	*Material(s)*	*Condition Description*	*Maintenance Action Required*	*Work Done*
ROOF:				
Covering	Clay tile	Two slipped tiles	Reattach tiles	5/4/05
	Painted metal standing seam	Slight corrosion; blistering paint on metal roof section	Sand and repaint area that is peeling	6/8/05
Flashing	Painted metal	Flashing in good condition	N/A	N/A
Gutters/ Downspouts	6" half round galvanized metal	Gutter sagging; downspouts OK	Realign gutter and put on new hanger strap	5/4/05
			Flush out downspouts	5/5/05
Chimneys	No masonry chimney	N/A	N/A	N/A
Attachments/ Penetrations	Metal vent stack and weathervane	Vent stack hood has some peeling paint; vane OK	Sand and repaint vent stack	6/8/05

Figure 2. All personnel associated with a historic structure need to become acquainted with how existing building features should appear and during their daily or weekly routines look for changes that may occur. This will help augment the regular maintenance inspection that will occur at specified intervals based on seasonal changes, use, and other factors. A segment of an inspection form showing the roof elements of a horse stable is shown. The inspection report should be kept along with the maintenance plan and other material in notebook, file or electronic form.

a time, moving around the building in a consistent direction. On the interior, the attic, inside surfaces of exterior walls, and crawlspaces or basements should be examined for signs of potential or existing problems with the building envelope.

The following chart lists suggested inspection frequencies for major features associated with the building's exterior, based on a temperate four-season climate and moderate levels of annual rainfall. For areas of different climate conditions and rainfall, such as in the more arid southwest, the nature of building decay and frequency of inspections will vary. For buildings with certain inherent conditions, heavy use patterns, or locations with more extreme weather conditions, the frequency of inspections should be altered accordingly.

Note: All building features should be inspected after any significant weather event such as a severe rainstorm or unusually high winds.

INSPECTION FREQUENCY CHART

Feature	Minimum Inspection Frequency	Season
Roof	Annually	Spring or fall; every 5 years by roofer
Chimneys	Annually	Fall, prior to heating season; every 5 years by mason
Roof Drainage	6 months; more frequently as needed	Before and after wet season, during heavy rain
Exterior Walls and Porches	Annually	Spring, prior to summer/fall painting season
Windows	Annually	Spring, prior to summer/fall painting season
Foundation and Grade	Annually	Spring or during wet season
Building Perimeter	Annually	Winter, after leaves have dropped off trees
Entryways	Annually; heavily used entries may merit greater frequency	Spring, prior to summer/fall painting season
Doors	6 months; heavily used entry doors may merit greater frequency	Spring and fall; prior to heating/ cooling seasons
Attic	4 months, or after a major storm	Before, during and after wet season
Basement/ Crawlspace	4 months, or after a major storm	Before, during and after rain season

Survey observations can be recorded on a standardized report form and photographs taken as a visual record. All deficient conditions should be recorded and placed on a written schedule to be corrected or monitored.

BUILDING COMPONENTS

For purposes of this discussion, the principal exterior surface areas have been divided into five components and are presented in order from the roof down to grade. While guidance for inspection and maintenance is provided for each component, this information is very general in nature and is not indeed to be comprehensive in scope. Examples have been selected to address some typical maintenance needs and to help the reader avoid common mistakes.

Roofs/chimneys

The roof is designed to keep water out of a building. Thus one of the principal maintenance objectives is to ensure water flows off the roof and into functional gutters and downspouts directly to grade and away from the building—and to prevent water from penetrating the attic, exterior walls, and basement of a building. (Note: Some buildings were designed without gutters and thus assessments must be made as to whether rain water is being properly addressed at the foundation and perimeter grade.) Keeping gutters and downspouts cleared of debris is usually high on the list of regular maintenance activities (Fig 3). Flashing around chimneys, parapets, dormers, and other appendages to the roof also merit regular inspection and appropriate maintenance when needed. The material covering the roof—wood shingles, slate, tile, asphalt, sheet metal, rolled roofing—requires maintenance both to ensure a watertight seal and to lengthen its service life; the type and frequency of maintenance varies with the roofing material. Older chimneys and parapets also require inspection and maintenance. With the exception of cleaning and minor repairs to gutters and downspouts, most roof maintenance work will necessitate use of an outside contractor.

Inspection:

The functioning of gutters and downspouts can be safely observed from the ground during rainy weather and when winter ice has collected. Binoculars are a useful tool in helping to identify potential roofing problems from the same safe vantage point. Careful observation from grade helps to identify maintenance needs between close-up inspections by an experienced roofer. Observation from the building interior is also important to identify possible leak locations. When access can be safely gained to the roof, it is important to wear shoes with slip-resistant soles and to use safety ropes.

Figure 3. Keeping gutters clean of debris can be one of the most important cyclical maintenance activities. On this small one-story addition, a garden hose is being used to flush out the trough to ensure that the gutter and downspouts are unobstructed. Gutters on most small and medium size buildings can be reached with an extension ladder and a garden hose. Photo: Bryan Blundell.

Depending on the nature of the roof, some common conditions of concern to look for are:

- sagging gutters and split downspouts;
- debris accumulating in gutters and valleys;
- overhanging branches rubbing against the roof or gutters
- plant shoots growing out of chimneys;
- slipped, missing, cracked, bucking, delaminating, peeling, or broken roof coverings;
- deteriorated flashing and failing connections at any intersection of roof areas or of roof and adjacent wall;
- bubbled surfaces and moisture ponding on flat or low sloped roofs;
- evidence of water leaks in the attic;
- misaligned or damaged elements, such as decorative cresting, lightning rods, or antennas; and
- cracked masonry or dislodged chimney caps.

Maintenance:

• Remove leaves and other debris from gutters and downspouts. Utilize a ladder with a brace device, if necessary, to keep the ladder from crushing the gutter. Use a garden hose to flush out troughs and downspouts. Patch or repair holes in gutters using products such as fiberglass tape and epoxy adhesive in metal gutters. Avoid asphalt compounds since acidic material can cause further deterioration of metal gutters.

• Correct misaligned gutters and adjust, if necessary, so that water flows to drains and does not pond. If gutter edges sag, consider inserting wooden wedges between the fascia board and the back of the gutter to add support. Seal leaking seams or pinholes in gutters and elbows.

• Broom sweep branch or leaf debris away from shingles, valleys, and crickets, particularly around chimneys and dormers.

• Where mechanical equipment is mounted on flat or low-sloped roofs, ensure that access for maintenance can be provided without damaging the roof. Clean out trapped leaves and debris from around equipment base and consider adding a protective walkway for access.

• Remove biological growth where it is causing erosion or exfoliation of roofing. Use low-pressure garden hose water and a natural or nylon scrubbing brush to remove such growth, scraping with a plastic putty knife or similar wood or plastic tool as needed on heavier buildup. Most growth is acidic and while there are products designed to kill spores, such as diluted chlorine bleach, they should be avoided. Even fairly weak formulas can still cause unexpected color changes, efflorescence, or over-splash damage to plantings or surfaces below the roof. Where appropriate, trim adjacent tree branches to increase sunlight on the roof since sunlight will deter further biological growth.

• Re-secure loose flashing at the dormers, chimneys or parapets. Clean out old mortar, lead, lead wool, or fastening material and make sure that flashing is properly inserted into reglet (slot) joints, taking care not to damage the substrate. Avoid installing new step flashing as a single metal component where multiple pieces are required to provide proper waterproofing. Also avoid attaching step flashing with mastic or sealant. Properly re-bed all step flashing. Use appropriate non-ferrous flashing metal or painted metal if needed. Since cap, step, valley, cricket, and apron flashings each have specific overlap and extension requirements, replacement flashing should match the existing material unless there has been a proven deficiency.

Figure 4. Damage to roofs often requires immediate attention. As a temporary measure, this damaged roof tile could be replaced with a brown aluminum sheet wedged between the existing tiles. Photo: Chad Randl.

Figure 5. The use of a sealant to close an exposed joint is not always an effective long-term solution. Where this decorative wood element connects to the slate roof, the sealant has failed within a short time and a proper metal flashing collar is being fitted instead. Photo: Bryan Blundell.

• Repoint joints in chimneys, parapet, or balustrade capping stones using a hydraulic lime mortar or other suitable mortar where the existing mortar has eroded or cracked, allowing moisture penetration. In general, a mortar that is slightly weaker than the adjacent masonry should be used. This allows trapped moisture in the masonry to migrate out through the mortar and not the masonry. Spalled masonry is often evidence of the previous use of a mortar mix that was too hard.

• Use professional services to repair chimneys and caps. Avoid the use of mortar washes on masonry since they tend to crack, allowing moisture to penetrate and promoting masonry spalling. Repoint masonry with a durable mortar that is slightly weaker than the adjacent masonry. Slope the masonry mortar cap to insure drainage away from the flue. If a chimney rain cap is installed, ensure adequate venting and exhaust.

• As a temporary measure, slip pieces of non-corrosive metal flashing under or between damaged and missing roofing units until new slate, shingles, or tile can be attached. Repair broken, missing or damaged roofing units with ones that match. Follow roofing supplier and industry guidance on inserting and attaching replacement units (Fig 4). Avoid using temporary asphalt patches as it makes a proper repair difficult later on.

• For long-term preservation of wooden shingle roofs coated with a preservative, recoat every few years following the manufacturer's recommendations. Be aware of environmental considerations.

• Scrape and repaint selected areas of coated ferrous metal roofing as needed; repaint on a regularly scheduled basis. Ferrous metal roofs can last a long time if painted regularly. Alkyd coatings are generally used on metal roofs; be sure to wash and properly prepare the area beforehand. Environmental regulations may restrict the use of certain types of paints. Apply the coating system in accordance with manufacturer's recommendations. Prepare the surface prior to application to obtain good adhesion with the prime coat. Apply both a prime coat and a topcoat for good bonding and coverage; select primer and topcoat products from the same manufacturer.

• Re-secure loose decorative elements, such as finials and weathervanes. Seek professional advice if decorative elements exhibit considerable corrosion, wood rot, or structural instability. Small surface cracks may benefit from a flexible sealant to keep moisture out; sealants have a limited life and require careful inspection and periodic replacement (Fig 5).

Exterior Walls

Exterior walls are designed to help prevent water infiltration, control air infiltration, and serve as a barrier for unwanted animals, birds and insects. The primary maintenance objective is to keep walls in sound condition and to prevent water penetration, insect infestation, and needless decay (Fig 6). Depending on the materials and construction methods, walls should have an even appearance, free from unwanted cracks, and should be able to shed excess moisture. Where surfaces are significantly misaligned or where there are bulging wall sections or cracks indicative of potential structural problems, seek professional guidance as to the cause of distress and appropriate corrective measures. Wood-frame construction generally will require more frequent maintenance than buildings constructed of brick, stone, or terra cotta (Fig 7).

Inspections:

It is best to inspect walls during dry as well as wet weather. Look for moisture patterns that may appear on the walls after a heavy or sustained rainfall or snow, recording any patterns on elevation drawings or standard recording forms. Monitoring the interior wall for moisture or other potential problems is important as well. Look for movement in cracks, joints, and around windows and doors and try to establish whether movement is seasonal in nature (such as related to shrinkage of wood during dry weather) or signs of an ongoing problem. For moderate size buildings, a ladder or mechanical lift may be necessary, though in some cases the use of binoculars and observations made from windows and other openings will be sufficient. When examining the walls, some common conditions of concern to look for are:

- Misaligned surfaces, bulging wall sections, cracks in masonry units, diagonal cracks in masonry joints, spalling masonry, open joints, and nail popping;
- Evidence of wood rot, insect infestation, and potentially damaging vegetative growth;
- Deficiencies in the attachment of wall mounted lamps, flag pole brackets, signs, and similar items;
- Potential problems with penetrating features such as water spigots, electrical outlets, and vents;
- Excessive damp spots, often accompanied by staining, peeling paint, moss, or mold; and
- General paint problems (Fig 8).

Maintenance:

• Trim tree branches away from walls. Remove ivy and tendrils of climbing plants by first cutting at the base of the vine to allow tendrils to die back, and later using a plastic scraper to dislodge debris and an appropriate digging tool to dislodge and remove root systems. Be cautious if using a commercial chemical to accelerate root decay; follow safety directions and avoid contact of chemicals with workers and wall materials.

• Wash exterior wall surfaces if dirt or other deposits are causing damage or hiding deterioration; extend

Figure 6. Stucco applied to an exterior wall or foundation was intended to function as a watertight surface. Unless maintained, rainwater will penetrate open joints and cracks that may occur over time. A spalled section of stucco indicates some damage has occurred and a wooden mallet is being used to tap the surface to determine whether the immediate stucco has lost adhesion. Photo: Bryan Blundell.

Figure 7. One of the advantages of wood shingles as a wall covering is that individual shingles that are damaged can easily be replaced. On this highly exposed corner, worn shingles have been selectively replaced to help safeguard against water damage. The new shingles will be stained to match the existing shingles.

Figure 8. The paint on the siding of this south-facing wall needs to be scraped, sanded, primed and repainted. Postponing such work will lead to further paint failure, require greater preparatory costs, and could even result in the need to replace some siding. Photo: Charles Fisher.

Figure 9. To help extend a repainting cycle, dirt and spider webs should be removed before permanent staining occurs. In this case, a natural bristle brush and a soft damp cloth are being used to remove insect debris and refresh the surface appearance.

scheduled times for cleaning for cosmetic purposes to reduce frequency (Fig 9). When cleaning, use the gentlest means possible; start with natural bristle brushes and water and only add a mild phosphate-free detergent if necessary. Use non-abrasive cleaning methods and low-pressure water from a garden hose. For most building materials, such as wood and brick, avoid abrasive methods such as mechanical scrapers and high-pressure water or air and such additives as sand, natural soda, ice crystals, or rubber products. All abrasives remove some portion of the surface and power-washing drives excessive moisture into wall materials and even into wall cavities and interior walls. If using a mild detergent, two people are recommended, one to brush and one to prewet and rinse. When graffiti or stains are present, consult a preservation specialist who may use poultices or mild chemicals to remove the stain. If the entire building needs cleaning other than described above, consult a specialist.

• Repoint masonry in areas where mortar is loose or where masonry units have settled. Resolve cause of cracks or failure before resetting units and repointing. Rake out joints by hand, generally avoiding rotary saws or drills, to a depth of 2 ½ times the width of the joint (or until sound mortar is encountered), to make sure that fresh mortar will not pop out. Repointing mortar should be lime-rich and formulated to be slightly weaker than the masonry units and to match the historic mortar in color, width, appearance, and tooling. Off-the-shelf pre-mixed cement mortars are not appropriate for most historic buildings. Avoid use of joint sealants in place of mortar on vertical masonry wall surfaces, as they are not breathable and can lead to moisture-related damage of the adjacent masonry (Fig 10).

• Correct areas that trap unwanted moisture. Damaged bricks or stone units can sometimes be removed, turned around, and reset, or replaced with salvaged units. When using traditional or contemporary materials for patching wood, masonry, metal, or other materials, ensure that the materials are compatible with the substrate; evaluate strength, vapor permeability, and thermal expansion, as well as appearance.

• When patching is required, select a compatible patch material. Prepare substrate and install patch material according to manufacturer's recommendations; respect existing joints. Small or shallow surface defects may not require patching; large or deep surface defects may be better addressed by installation of a dutchman unit than by patching.

• Where a damaged area is too large to patch, consider replacing the section with in-kind material. For stucco and adobe materials, traditional patching formulas are recommended.

• When temporarily removing wood siding to repair framing or to tighten corner boards and loose trim, reuse the existing siding where possible. Consider using stainless steel or high strength aluminum nails as appropriate. Putty or fill nail holes flush with siding prior to repainting. Back-prime any installed wood with

Figure 10. Repointing of masonry should usually be approached as repair rather than maintenance work in part because of the need for a skilled mason familiar with historic mortar. In this case, a moisture condition was not corrected and the use of a waterproof coating and off-the-shelf Portland cement mortar trapped water and resulted in further damage to these 19th century bricks. Photo: NPS files.

one coat of primer and coat end grain that might be exposed with two coats of primer.

• Prepare, prime, and spot paint areas needing repainting. Remember that preparation is the key to a successful long lasting paint job. Ensure beforehand the compatibility of new and existing paints to avoid premature paint failure. Remove loose paint to a sound substrate; sand or gently rough surface if needed for a good paint bond; wipe clean; and repaint with appropriate primer and topcoats. Follow manufacturer's recommendations for application of coatings, including temperature parameters for paint application. Use top quality coating materials. Generally paint when sun is not shining directly onto surfaces to be painted.

• Remove deteriorated caulks and sealants, clean, and reapply appropriate caulks and sealants using backer rods as necessary. Follow manufacturer's instructions regarding preparation and installation.

• Correct deficiencies in any wall attachments such as awning and flag pole anchors, improperly installed electrical outlets, or loose water spigots.

Openings

Exterior wall openings primarily consist of doors, windows, storefronts, and passageways. The major maintenance objectives are to retain the functioning nature of the opening and to keep in sound condition the connection between the opening and the wall in order to reduce air and water infiltration.

Inspection:

Wall openings are typically inspected from inside as well as out. Examinations should include the overall material condition; a check for unwanted water penetration, insect infiltration, or animal entry; and identification of where openings may not be properly functioning. Frames should be checked to make sure they are not loose and to ascertain whether the intersection between the wall and the frame is properly sealed. Secure connections of glazing to sash and between sash and frames are also important. Particular attention should be placed on exposed horizontal surfaces of storefronts and window frames as they tend to deteriorate much faster than vertical surfaces. Inspections should identify:

- loose frames, doors, sash, shutters, screens, storefront components, and signs that present safety hazards;
- slipped sills and tipped or cupped thresholds;
- poorly fitting units and storm assemblies, misaligned frames, drag marks on thresholds from sagging doors and storm doors;
- loose, open, or decayed joints in door and window frames, doors and sash, shutters, and storefronts;
- loose hardware, broken sash cords/chains, worn sash pulleys, cracked awning, shutter and window hardware, locking difficulties, and deteriorated weatherstripping and flashing;
- broken/cracked glass, loose or missing glazing and putty;
- peeling paint, corrosion or rust stains; and
- window well debris accumulation, heavy bird droppings, and termite and carpenter ant damage.

Maintenance:

• Replace broken or missing glass as soon as possible; in some cases cracked glass may be repaired using specialty glues. For historic crown glass and early cylinder glass, a conservation approach should be considered to repair limited cracks. Where panes with a distinct appearance are missing, specialty glass should be obtained to match, with sufficient inventory kept for future needs. Avoid using mechanical devices to remove old putty and match historic putty bevels or details when undertaking work.

• Reputty window glazing where putty is deteriorated or missing. Take care in removing putty so as not to crack or break old glass or damage muntins and sash frames. Re-glaze with either traditionally formulated

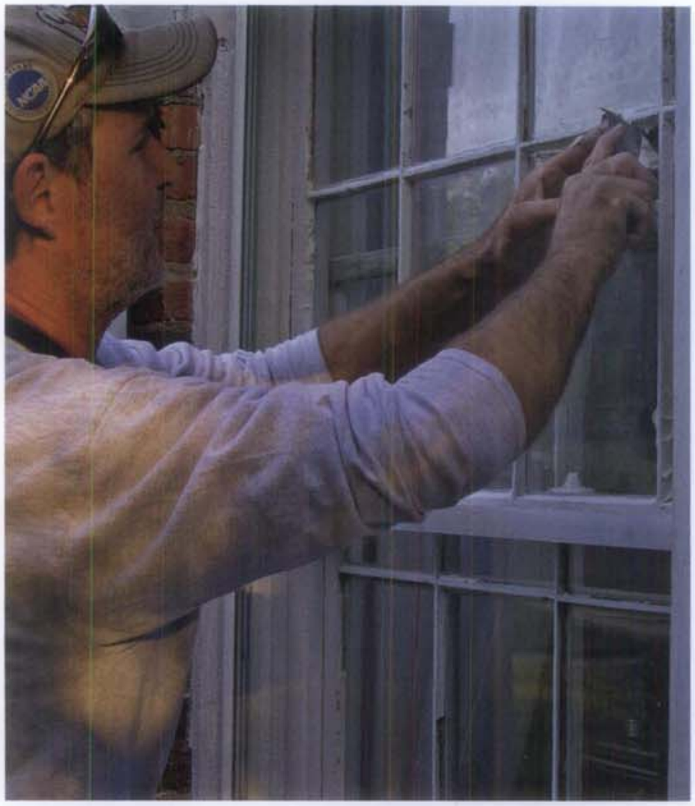

Figure 11. Glazing putty should be maintained in sound condition to prevent unwanted air infiltration and water damage. New glazing putty should be pulled tight to the glass and edge of the wood, creating a clean bevel that matches the historic glazing.

oil putties or modern synthetic ones, making sure to properly bed the glass and secure with glazing points (Fig 11).

• Clean window glass, door glazing, storefronts, transom prism lights, garage doors, and storm panels using a mild vinegar and water mixture or a non-alkaline commercial window cleaner. Be cautious with compounds that contain ammonia as they may stain brass or bronze hardware elements if not totally removed. When using a squeegee blade or sponge, wipe wet corners with a soft dry cloth. Avoid high-pressure washes.

• Clean handles, locks and similar hardware with a soft, damp cloth. Use mineral spirits or commercial cleaners very sparingly, as repeated use may remove original finishes. Most metal cleaners include ammonia that can streak and stain metal, so it is important to remove all cleaning residue. Polished hardware subject to tarnishing or oxidation, particularly doorknobs, often benefits from a thin coat of paste wax (carnauba), hand buffed to remove extra residue. Avoid lacquer finishes for high use areas, as they require more extensive maintenance. Patinated finishes should not be cleaned with any chemicals, since the subtle aged appearance contributes to the building's character.

• Remove and clean hardware before painting doors and windows; reinstall after the paint has dried.

• Tighten screws in doorframes and lubricate door hinges, awning hardware, garage door mechanisms, window sash chains, and pulleys using a graphite or silicone type lubricant.

Contracting Maintenance and Repair Work

Many contractors are very proficient in using modern construction methods and materials; however, they may not have the experience or skill required to carry out maintenance on historic buildings. The following are tips to use when selecting a contractor to work on your historic building:

1. Become familiar with work done on similar historic properties in your area so that you can obtain names of possible preservation contractors.
2. Be as specific as possible in defining the scope of work you expect to undertake.
3. Ask potential contractors for multiple references (three to five) and visit previous work sites. Contact the building owner or manager and ask how the job proceeded; if the same work crew was retained from start to finish; if the workers were of a consistent skill level; whether the project was completed in a reasonable time; and whether the person would use the contractor again.
4. Be familiar with the preservation context of the work to be undertaken. Use the written procedures in your maintenance plan to help define the scope of work in accordance with preservation standards and guidelines. Always request that the gentlest method possible be used. Use a preservation consultant if necessary to ensure that the work is performed in an appropriate manner.
5. Request in the contract proposal a detailed cost estimate that clearly defines the work to be executed, establishes the precautions that will be used to protect adjoining materials, and lists specific qualified subcontractors, if any, to be used.
6. Insure that the contractor has all necessary business licenses and carries worker compensation.

• Check weather stripping on doors and windows and adjust or replace as necessary. Use a durable type of weather stripping, such as spring metal or high quality synthetic material, avoiding common brush and bulb or pile weather stripping that require more frequent replacement.

• Adjust steel casement windows as needed for proper alignment and tight fit. Avoid additional weather stripping as this may lead to further misalignment, creating pathways for air and water infiltration.

• Check window sills for proper drainage. Fill cracks in wood sills with a wood filler or epoxy. Follow manufacturer's instructions for preparation and installation. Do not cover over a wood sill with metal panning, as it may trap moisture and promote decay.

• Repair, prime, and repaint windows, doors, frames, and sills when needed. Clean out putty debris and paint chips from windows using a wet paper towel and dispose of debris prior to repair or repainting. Take appropriate additional precautions when removing lead-based paint. Sand and prepare surfaces and use material-specific patching compounds to fill any holes or areas collecting moisture (Fig 12). Avoid leaving exposed wood unpainted for any length of time, as light will degrade the wood surface and lead to premature failure of subsequent paint applications. Immediately prime steel sash after paint is removed and the substrate prepared for repainting.

Figure 12. Good surface preparation is essential for long lasting paint. Scraping loose paint, filling nail holes and cracks, sanding, and wiping with a damp cloth prior to repainting are all important steps whether touching up small areas or repainting an entire feature. Always use a manufacturer's best quality paint. Windows and shutters may need repainting every five to seven years, depending on exposure and climate.

• Adjust wood sash that bind when operated. Apply beeswax, paraffin, or similar material to tracks or sash runs for ease of movement. If sash are loose, replace worn parting beads. Sash runs traditionally were unpainted between the stop and parting bead; removing subsequent paint applications will often help improve sash operation.

• Correct perimeter cracks around windows and doors to prevent water and air infiltration. Use traditional material or modern sealants as appropriate. If fillers such as lead wool have been used, new wool can be inserted with a thin blade tool, taking care to avoid damage to adjacent trim. Reduce excess air infiltration around windows by repairing and lubricating sash locks so that windows close tightly.

Figure 13. Window air conditioning units can cause damage to surfaces below when condensation drips in an uncontrolled manner. Drip extension tubes can sometimes be added to direct the discharge.

• Remove debris beneath window air conditioning units and ensure that water from units does not drain onto sills or wall surfaces below (Fig 13). Removal of air conditioning units when not in season is recommended.

• Adjust storm panels and clean weep holes; check that weep holes at the bottom of the panels are open so water will not be trapped on the sill. Exterior applied storm windows are best attached using screws and not tightly adhered with sealant. Use of sealant makes storm units difficult to remove for maintenance and can contribute to moisture entrapment if weep holes become clogged.

• Remove weakened or loose shutters and store for later repair. Consider adding a zinc or painted metal top to shutters as a protective cap to cover the wood's exposed end grain. This will extend the life of the shutters.

Figure 14. When inspecting connections between projections and the main building, look for areas where birds, bees and pests may enter or nest. Birds have been nesting in this porch roof and the area is being cleaned of their debris. Where an opening exists, it may be necessary to cover it with a trim piece, screening, or sealant. Photo: Bryan Blundell.

Projections

Numerous projections may exist on a historic building, such as porches, dormers, skylights, balconies, fire escapes, and breezeways. They are often composed of several different materials and may include an independent roof. Principal maintenance objectives include directing moisture off these features and keeping weathered surfaces in good condition. Secondary projections may include brackets, lamps, hanging signs, and similar items that tend to be exposed to the elements.

Inspection:

In some cases, projections are essentially independent units of a building and so must be evaluated carefully for possible settlement, separation from the main body of the building, and materials deterioration. Some electrical features may require inspection by a electrician or service technician. Common conditions of concern to look for are:

- damaged flashing or tie-in connections of projecting elements;
- misaligned posts and railings;
- deteriorated finishes and materials, including peeling paint, cupped and warped decking, wood deterioration, and hazardous steps;
- evidence of termites, carpenter ants, bees, or animal pests (Fig 14);
- damaged lamps, unsafe electrical outlets or deteriorated seals around connections;
- loose marker plaques, sign, or mail boxes; and
- rust and excessive wear of structural, anchorage, and safety features of balconies and fire escapes.

Maintenance:

• Selectively repair or replace damaged roofing units on porches and other projections. Ensure adequate drainage away from the building. Repair flashing connections as needed; clean and seal open joints as appropriate.

• Secure any loose connections, such as on porch rails or fire escapes.

• Maintain ferrous metal components by following manufacturer's recommendation for cleaning and repainting. Remove rust and corrosion from porch handrails, balconies, fire escapes, and other metal features; prepare, prime, and repaint using a corrosion-inhibitive coating system. Apply new primer before new corrosion sets in, followed by new topcoat. Take appropriate safety measures when dealing with existing lead-based paint and in using corrosion-removal products (Fig 15).

• Reattach loose brackets, lamps, or signs. With electrical boxes for outlets or lighting devices, ensure that cover plates are properly sealed. Prime and paint metal elements as needed.

• Keep porch decks and steps free from dust, dirt, leaf debris, and snow as soon at it accumulates using a broom or plastic blade shovel.

• Repair areas of wood decay or other damage to railings, posts, and decorative elements. Repair with wood dutchman, wood putty, or epoxy filler, as appropriate; replace individual elements as needed.

Figure 15. Metal projecting elements on a building, such as sign armatures and railings, are easily subject to rust and decay. Proper surface preparation to remove rust is essential. Special metal primers and topcoats should be used.

Prime and repaint features when necessary and repaint horizontal surfaces on a more frequent basis.

• Sand and repaint porch floorboards to keep weather surfaces protected. The exposed ends of porch floorboards are especially susceptible to decay and may need to be treated every year or two.

• Carefully cut out damaged or buckled porch flooring and replace with wood to match. Back-prime new wood that is being installed; treat end grain with wood preservative and paint primer. Ensure that new wood is adequately kiln or air-dried to avoid shrinkage and problems with paint adherence.

• Repair rotted stair stringers; adjust grade or add stone pavers at stair base to keep wooden elements from coming into direct contact with soil.

• Consider durable hardwoods for replacement material where beading, chamfering, or other decorative work is required in order to match existing features being replaced. Although appropriate for certain applications, pressure treated lumber is hard to tool and may inhibit paint adherence if not allowed to weather prior to coating application.

• Clean out any debris from carpenter bees, ants, termites, and rodents, particularly from under porches. Replace damaged wood and add screening or lattice to discourage rodents. Consider treating above ground features with a borate solution to deter termites and wood rot and repaint exposed surfaces.

Foundations and Perimeter Grades

The foundation walls that penetrate into the ground, the piers that support raised structures, and the ground immediately around a foundation (known as grade) serve important structural functions. To help sustain these functions, it is important that there is good drainage around and away from the building. The maintenance goal is to prevent moisture from entering foundations and crawl spaces and damaging materials close to the grade, and to provide ventilation in damp areas.

Inspection:

Inspections at the foundation should be done in conjunction with the inspection of the downspouts to ensure that water is being discharged a sufficient distance from the building perimeter to avoid excessive dampness in basements or crawl spaces. In addition, crawl spaces should be adequately vented to deter mold and decay and should be screened or otherwise secured against animals. Look for:

- depressions or grade sloping toward the foundation; standing water after a storm;

Figure 16. This chronically wet area has a mildew bloom brought on by heat generated from the air-conditioning condenser unit. The dampness could be caused be a clogged roof gutter, improper grading, or a leaking hose bibb.

Sealants and Caulks

Using sealants and caulks has become a familiar part of exterior maintenance today. As the use of precision joinery and certain traditional materials to render joints more weathertight has waned in recent years, caulks and more often elastomeric sealants are used to seal cracks and joints to keep out moisture and reduce air infiltration. Where cracks and failing joints are indicators of a serious problem, sealants and caulks may be used as a temporary measure. In some cases they may actually exacerbate the existing problem, such as by trapping moisture in adjacent masonry, and lead to more costly repairs.

Manufacturer's recommendations provide instructions on the proper application of caulks and sealants. Special attention should be placed on ensuring that the subsurface or joint is properly prepared and cleaned. Backer rods may be necessary for joints or cracks. Tooling of the caulk or sealant is usually necessary to ensure contact with all edge surfaces and for a clean and consistent appearance.

Caulks generally refer to older oil resin-based products, which have relatively limited life span and limited flexibility. Contemporary elastomeric sealants are composed of polymer synthetics. Elastomeric sealants are more durable than caulks and have greater flexibility and wider application. Caulks and sealants can become maintenance problems, as they tend to deteriorate faster than their substrates and must be replaced periodically as a part of cyclical maintenance of the structure.

The selection criteria for caulks and sealants include type of substrate, adhesion properties, size and configuration of joint, intended appearance/color and paintability, movement characteristics, and service life. Both one-part and two-part sealants are available; the latter require mixing as part of the application process. Sealants are commonly used for a variety of places on the exterior of a building such as around windows and doors, at interfaces between masonry and wood, between various wood features or elements, and at attachments to or through walls or roofs, such as with lamps, signs, or exterior plumbing fixtures. Their effectiveness depends on numerous factors including proper surface preparation and application. Applications of sealants and caulks should be examined as part of routine maintenance inspection, irrespective of their projected life expectancy.

Installation of caulks and sealants often can be undertaken by site personnel. For large and more complex projects, a contactor experienced in sealant installation may be needed. In either case, the sealant manufacturer should be consulted on proper sealant selection, preparation, and installation procedures.

- material deterioration at or near the foundation, including loss of mortar in masonry, rotting wood clapboards, or settlement cracks in the lower sections of wall;
- evidence of animal or pest infestation;
- vegetation growing close to the foundation, including trees, shrubs and planting beds;
- evidence of moisture damage from lawn and garden in-ground sprinkler systems;
- evidence of moss or mold from damp conditions or poorly situated downspout splash blocks (Fig 16); and
- blocked downspout drainage boots or clogged areaway grates.

Maintenance:

• Remove leaves and other debris from drains to prevent accumulation. Detach drain grates from paved areas and extract clogged debris. Flush with a hose to ensure that there is no blockage. Use a professional drain service to clear obstructions if necessary.

• Conduct annual termite inspections. Promptly address termite and other insect infestations. Use only licensed company for treatment where needed.

• Keep the grade around the foundation sloping away from the building. Add soil to fill depressions particularly around downspouts and splash blocks. Make sure that soil does not come too close to wooden or metal elements. A 6" separation between wooden siding and the grade is usually recommended.

• Avoid use of mulching material immediately around foundations as such material may promote termite infestation, retain moisture or change existing grade slope.

• Reset splash blocks at the end of downspouts or add extender tubes to the end of downspouts as necessary (Fig 17).

• Lubricate operable foundation vent grilles to facilitate seasonal use; paint as needed.

• Manage vegetation around foundations to allow sufficient air movement for wall surfaces to dry out during damp periods. Trim plantings and remove weeds and climbing vine roots. Be careful not to scar foundations or porch piers with grass or weed cutting equipment. If tree roots appear to be damaging a foundation wall, consult an engineer as well as a tree company.

• Wash off discoloration on foundations caused by splash-back, algae, or mildew. Use plain water and a soft natural or nylon bristle brush. Unless thoroughly researched and tested beforehand on a discreet area of the wall, avoid chemical products that may discolor certain types of stone. If cleaning products are used, test beforehand in a discreet area; and avoid over splash to plantings and adjacent building materials.

• Selectively repoint unit masonry as needed. Follow guidance under the wall section in regard to compatible mix, appearance, and texture for pointing mortar.

• Avoid using salts for de-icing and fertilizers with a high acid or petro-chemical content around foundations, as these materials can cause salt contamination of masonry. Use sand or organic materials without chloride additives that can damage masonry. Where salt is used on icy walks, distribute it sparingly and sweep up residual salt after walks have dried.

• Use snow shovels and brooms to clean snow from historic paths and walkways. Avoid blade-type snow removers as they may chip or abrade cobblestones, brick, or stone paving. Note that use of steel snow removal tools in areas where salt-containing snow melters are used may result in rust staining from steel fragments left on the paving.

Figure 17. Extending downspouts at their base is one of the basic steps to reduce dampness in basements, crawl spaces and around foundations. Extensions should be buried, if possible, for aesthetics, ease of lawn care, and to avoid creating a tripping hazard. Photo: NPS files.

Conclusion

Maintenance is the most important preservation treatment for extending the life of a historic property. It is also the most cost effective. Understanding the construction techniques of the original builders and the performance qualities of older building materials, using traditional maintenance and repair methods, and selecting in-kind materials where replacements are needed will help preserve the building and its historic character.

Maintenance can be managed in small distinct components, coordinated with other work, and scheduled over many years to ensure that materials are properly cared for and their life span maximized. A written maintenance plan is the most effective way to organize, schedule, and guide the work necessary to properly care for a historic building. The maintenance plan should include a description of the materials and methods required for each task, as well as a schedule for work required for maintenance of different building materials and components.

Historic house journals, maintenance guides for older buildings, preservation consultants, and preservation maintenance firms can assist with writing appropriate procedures for specific properties. Priorities should be established for intervening when unexpected damage occurs such as from broken water pipes or high winds.

Worker safety should always be paramount. When work is beyond the capabilities of in-house personnel and must be contracted, special efforts should be made to ensure that a contractor is both experienced in working with historic buildings and utilizes appropriate preservation treatments.

A well-maintained property is a more valuable property and one that will survive as a legacy for generations to come.

Endnotes

1. T*he Secretary of the Interior's Standards for the Treatment of Historic Properties.* Washington, D.C.: U.S. Department of the Interior, National Park Service, 1995.

2. Committee on Advanced Maintenance Concepts for Buildings et al, *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings*, Washington, D.C.: National Academy Press, 1990.

Further Reading

Chambers, J. Henry. *Cyclical Maintenance for Historic Buildings*. Washington, D.C.: National Park Service, 1976,

Fisher, Charles E. and Hugh C. Miller, eds. *Caring For Your Historic House*. New York, NY: Harry N. Abrams, Inc., 1998.

Fisher, Charles E., Deborah Slaton, and Rebecca Shiffer, eds. *Window Rehabilitation Guide for Historic Buildings*. Washington, D.C.: Historic Preservation Education Foundation, 1997.

Fram, Mark. *Well-Preserved: The Ontario Heritage Foundation's Manual of Principles and Practice for Architectural Conservation*. Erin, Ontario: The Boston Mills Press, 1988.

Gayle, Margot, David W. Look, AIA, and John G. Waite, FAIA. *Metals in America's Historic Buildings: Use and Preservation Treatments*. Washington, D.C.: National Park Service, 1992.

Grimmer, Anne E. *Keeping It Clean: Removing Exterior Dirt, Paint, Stains & Graffiti from Historic Masonry Buildings*. Washington, D.C.: National Park Service, 1988.

Jester, Thomas C., ed. *Twentieth Century Building Materials: History and Conservation*. New York, NY: McGraw-Hill, 1995.

Leeke, John C. *Practical Restoration Reports Compendium*. Portland, ME: Historic HomeWorks, 2005.

London, Mark. *Masonry: How to Care for Old and Historic Brick and Stone.* Washington, D.C.: The Preservation Press, 1988.

Preservation Briefs. Washington, D.C.: National Park Service. The collection of Preservation Briefs assist owners and developers of historic buildings in recognizing and resolving common preservation, maintenance and repair problems.

Preservation Tech Notes. Washington, D.C.: National Park Service. The collection of Preservation Tech Notes provides guidance and case studies on the care and maintenance of historic structures.

Yapp, Bob and Rich Binsacca. *About Your House with Bob Yapp*. San Francisco, CA: KQED Books & Tapes, 1997.

Acknowledgements

Sharon C. Park FAIA, is the former Chief of Technical Preservation Services, Heritage Preservation Services, National Park Service, in Washington, D.C. and currently is the Associate Director for Architectural History and Historic Preservation, Smithsonian Institution.

The author wishes to thank Mike Seibert of the National Park Service for research on the project and the development of the charts; and Lauren Burge, AIA, of the firm of Chambers, Murphy & Burge, and Michael Emerick, AIA, for sharing their expertise on maintenance and providing early guidance. Thanks go to Deborah Slaton of the firm of Wiss, Janney, Elstner Associates, Inc., for her insightful contributions and also to Rebecca Stevens of the National Park Service, Dominque Hawkins, AIA, of Preservation Design Partnership, J. Bryan Blundell of Dell Corporation, and Michael Scheffler and Kenneth Itle of Wiss, Janney, Elstner Associates, Inc. Also gratefully acknowledge for their assistance in the technical review and editing of this publication are Charles E. Fisher, Anne E. Grimmer, and Chad Randl of the National Park Service's Technical Preservation Services, and former staff Kay D. Weeks. Numerous other National Park Service staff and partners commented on the manuscript and made substantial contributions.

This publication has been prepared pursuant to the National Historic Preservation Act, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments about this publication should be made to: Charles Fisher, Technical Publications Program Manager, Technical Preservation Services-2255, National Park Service, 1849 C Street, NW, Washington, D.C. 20240. Additional information offered by Technical Preservation Services is available on our website at <www.nps.gov/history/hps/tps>. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the author and the National Park Service are appreciated. Unless otherwise noted, photographs in this Brief are by Sharon C. Park, FAIA. Except for the author's photos, the photographs used in this publication may not be used to illustrate other publications without permission of the owner.

ISSN: 978-0-16-078974-8
U.S. Government Printing Office Stock Number: 024-005-01252-4

June 2007

workshop[1]

[1] development, architecture and brokerage in one practice.

1170 Harrison Street

1170 Harrison St., San Francisco, CA 94107

Issues/ Revisions

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Scale:

Cover Sheet

A0

GENERAL NOTES

1. THE CONTRACTOR SHALL EXECUTE THE WORK OF THIS PROJECT IN FULL COMPLIANCE WITH THE FOLLOWING CODE EDITIONS; 2016 CBC, 2016 CMC, 2016 CPC, 2016 CFC, 2016 CEC, 2013 TITLE 24 ENERGY STANDARDS AND THE 2016 CAL GREEN BUILDING STANDARDS CODE, AS AMENDED BY THE CITY OF BERKELEY. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL APPLICABLE REGULATIONS, LAWS, ORDINANCES AND ORDERS BY ANY PUBLIC AUTHORITY HAVING JURISDICTION OVER THE PROJECT. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ARCHITECT IN A TIMELY FASHION ANY DISCREPANCIES OR CONFLICTS BETWEEN THE REQUIREMENTS OF APPLICABLE CODES AND THE DRAWINGS OF WHICH THE CONTRACTOR IS OR BECOMES AWARE.

2. THE CONTRACTOR SHALL STUDY THE CONTRACT DOCUMENTS AND REPORT TO THE ARCHITECT IN WRITING ALL INCONSISTENCIES AND OMISSIONS HE FINDS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE EXISTING CONDITIONS OF THE SITE AND PROJECT PRIOR TO COMMENCING WORK. IF THE CONTRACTOR PROCEEDS WITH ANY OF THE WORK WITHOUT INSTRUCTIONS OF THE ARCHITECT, WHERE SUCH INSTRUCTIONS ARE REQUIRED BY THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL MAKE GOOD AT HIS OWN COST ANY RESULTING ERROR, DAMAGE, OR DEFECTS.

3. WRITTEN DIMENSIONS ON DRAWINGS SHALL TAKE PRECEDENCE OVER DIMENSIONS SCALED FROM DRAWINGS. CONTRACTOR SHALL NOT SCALE DRAWINGS. IF A DIMENSION(S) HAS BEEN OMITTED THE CONTRACTOR SHALL BRING THIS TO THE ATTENTION OF THE ARCHITECT IN A TIMELY FASHION.

4. CONTRACTOR SHALL VERIFY DIMENSIONS AND DETAILS OF ALL PROJECT COMPONENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION CLEARANCES OF ALL ITEMS, INCLUDING BUT NOT LIMITED TO MECHANICAL AND ELECTRICAL EQUIPMENT, AND CABINET WORK, TO BE INSTALLED IN THE PROJECT.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTION PROGRAMS IN CONNECTION WITH WORK, AND FOR MAINTAINING APPROPRIATE INSURANCE TO PROTECT THE CONTRACTOR, THE OWNER AND THE ARCHITECT.

6. CONTRACTOR SHALL PROTECT THE ADJACENT PROPERTY, THE PUBLIC AND SHALL BE RESPONSIBLE FOR ANY DAMAGE OR INJURY DUE TO HIS NEGLECT.

7. THE ARCHITECT WILL ASSIST THE OWNER IN SUBMITTING PLANS TO THE DEPARTMENT OF BUILDINGS FOR BUILDING PERMIT APPLICATION; ARCHITECT WILL ANSWER BUILDING DEPARTMENT'S PLAN CHECK COMMENTS AND RE SUBMIT AS REQUIRED. THE OWNER WILL SECURE AND PAY FOR THE BUILDING PERMIT. OWNER WILL PAY FOR ALL OTHER PERMITS (INCLUDING ANY REQUIRED SIDEWALK SHED PERMITS, PARKING OR DUMPSTER PERMITS), LICENSES, INSPECTIONS AND THE LIKE REQUIRED TO EFFECT THE WORK OF THE CONTRACT DOCUMENTS THROUGH RECEIPT OF A CERTIFICATE OF OCCUPANCY.

8. CONTRACTOR SHALL CONSULT WITH REPRESENTATIVES OF APPLICABLE UTILITIES, INCLUDING BUT NOT LIMITED TO GAS, WATER, POWER, SEWER, TELEPHONE, AND CABLE TELEVISION, DETERMINE EXACT LOCATIONS AND AVAILABILITY OF UTILITIES, AND DETERMINE CONDITION OF EXISTING SERVICE PRIOR TO COMMENCING WORK. CONTRACTOR SHALL ADVISE ARCHITECT AND OWNER OF UNANTICIPATED CHANGES TO THE EXISTING SERVICES REQUIRED FOR THE SUCCESSFUL COMPLETION AND OPERATION OF THE PROJECT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION.

9. CONTRACTOR SHALL ERECT AND MAINTAIN TEMPORARY BARRICADES AND DUST-PROOF PARTITIONS AS NEEDED FOR PROTECTION AGAINST NUISANCE AND ACCIDENT, AND SHALL CONTINUOUSLY MAINTAIN ADEQUATE PROTECTION OF HIS WORK AND THE OWNER'S PROPERTY FROM DAMAGE OR LOSS ARISING IN CONNECTION WITH THE WORK OF THIS PROJECT.

10. IMPROVEMENTS ON THE SITE, WORK IN PROGRESS, STORED MATERIALS ON PROPERTY SHALL BE PROTECTED BY THE CONTRACTOR FROM DAMAGE ARISING FROM THE WORK AND FROM NORMAL USE OF THE SITE DURING THE COURSE OF THE WORK WHETHER BY THE CONTRACTOR OR ANY OTHER PARTY. ALL ITEMS DAMAGED DUE TO INSUFFICIENT PROTECTION SHALL BE FULLY RESTORED TO THEIR PRIOR CONDITION BY THE CONTRACTOR AT NO COST TO THE OWNER.

11. PARTITION DIMENSIONS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE. OTHER COMPONENTS ARE DIMENSIONED TO DIMENSION POINTS SHOWN ON DETAILS, OR AS NOTED ON THE DRAWINGS.

12. NO PART OF THE STRUCTURE SHALL BE OVERLOADED BEYOND ITS SAFE CARRYING CAPACITY BY THE PLACING OF MATERIALS, EQUIPMENT, TOOLS, MACHINERY OR ANY OTHER ITEMS DURING THE COURSE OF THE CONTRACTOR'S WORK.

13. AT THE COMPLETION OF THE WORK, THE CONTRACTOR SHALL CLEAN HIS AND THE SURROUNDING AREA, REMOVE ALL WASTE MATERIALS AND RUBBISH FROM THE PROJECT AS WELL AS HIS OR HER TOOLS, CONSTRUCTION EQUIPMENT, MACHINERY AND SURPLUS MATERIALS. THE CONTRACTOR SHALL REMOVE PUTTY AND PAINT FROM ALL GLASS, MIRRORS, AND WASH AND POLISH SAME; REMOVE ALL LABELS, TAGS, GREASE, DIRT, STAINS, ETC. AND CLEAN ALL FIXTURES AND EQUIPMENT TO THE EXTENT OF RESTORING THEM TO THE ORIGINAL FINISH.

14. THE CONTRACTOR SHALL MAINTAIN A CURRENT COPY OF THE CBC ON SITE.

15. CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE, CONSTRUCTION-IN-PROGRESS, AND STORED MATERIALS AND EQUIPMENT, WHETHER ON- OR OFF-SITE.

16. THE OWNER SHALL PAY FOR TESTING OF ANY MATERIALS DISCOVERED ON THE SITE BY THE ARCHITECT, OWNER OR CONTRACTOR SUSPECTED OF CONTAINING TOXIC SUBSTANCES REQUIRING SPECIAL REMOVAL AND DISPOSAL. CHANGES TO THE CONTRACT RESULTING FROM THE DISCOVERY, TESTING, OR REMOVAL OF SUCH MATERIALS (IF ANY) SHALL BE EFFECTED BY A CHANGE ORDER.

17. GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL WORK PROVIDED BY ANY AND ALL SUBCONTRACTOR'S. GENERAL NOTES THAT REFER TO "CONTRACTOR" INCLUDE ALL WORK PROVIDED BY SUBCONTRACTORS. CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY ALL GRADES, DIMENSIONS, AND CONDITIONS IN FIELD PRIOR TO THE START OF PROJECT AND AT APPROPRIATE TIMES DURING THE COURSE OF CONSTRUCTION BEFORE RELATED PROJECT PHASES.

18. EACH SUBCONTRACTOR IS CONSIDERED A SPECIALIST IN HIS RESPECTIVE FIELD AND SHALL, PRIOR TO THE SUBMISSION OF HIS BID AND THE PERFORMANCE OF WORK, NOTIFY THE CONTRACTOR OF ANY WORK CALLED OUT IN THE CONSTRUCTION DOCUMENTS WHICH CANNOT BE EXECUTED AS INDICATED OR CANNOT BE FULLY GUARANTEED. THE CONTRACTOR WILL THEN NOTIFY THE OWNER AND ARCHITECT PRIOR TO ACCEPTANCE OF SUBCONTRACTOR'S BID.

19. THE ARCHITECT HAS MADE THE ASSUMPTION THAT EXISTING CONCEALED CONDITIONS ARE STANDARD. THE CONTRACTOR WILL BE EXPECTED TO PERFORM THE NECESSARY WORK TO COMPLETE THE INDICATED CONSTRUCTION. IN THE EVENT THAT DEMOLITION REVEALS UNEXPECTED CONDITIONS, THE CONTRACTOR MUST INFORM THE OWNER AND ARCHITECT OF ANTICIPATED CHANGE ORDERS IN ADVANCE.

20. CONTRACTOR IS TO PROVIDE SAMPLES OF REQUESTED SUBMITTALS AND OF ALL PROPOSED MATERIAL SUBSTITUTIONS TO THE ARCHITECT FOR REVIEW. THE ARCHITECT WILL REQUIRE FIVE WORKING DAYS FOR REVIEW OF ALL SUBMITTALS INCLUDING SHOP DRAWINGS. SHOP DRAWINGS AND MATERIALS TO THE ARCHITECT WILL HAVE BEEN REVIEWED AND APPROVED BY THE CONTRACTOR. BY SUBMITTING SHOP DRAWINGS AND SUBMITTALS TO THE ARCHITECT, THE CONTRACTOR REPRESENTS THAT THE CONTRACTOR HAS DETERMINED AND VERIFIED MATERIAL, FIELD MEASUREMENTS, AND FIELD CONSTRUCTION RELATED THERETO, AND HAS CHECKED AND COORDINATED THE INFORMATION CONTAINED WITHIN SUCH SUBMITTALS WITH THE REQUIREMENTS OF THE WORK AND OF THE CONTRACT DOCUMENTS. THE ARCHITECT'S REVIEW OF SUBMITTALS AND SHOP DRAWINGS IS FOR CONFIRMATION OF DESIGN INTENT ONLY.

21. THESE CONTRACT DOCUMENTS INTEND TO DESCRIBE A FINISHED PROJECT READY FOR LEGAL USE.

22. ANY CHANGE, MODIFICATION OR INTERPRETATION OF THE SCOPE OR REQUIREMENTS OF THESE DOCUMENTS, UNDERTAKEN WITHOUT CONSULTATION WITH THE ARCHITECT (AND ANY UNFORESEEN CONDITIONS RESULTING THEREFROM) SHALL BE THE RESPONSIBILITY OF THE OWNER OR CONTRACTOR AS THE CASE MAY BE. AS STIPULATED IN THE OWNER/ARCHITECT AGREEMENT, TRACHTENBERG ARCHITECTS SHALL BE HELD HARMLESS FROM ANY CLAIMS RESULTING FROM SUCH ACTIVITY

ABBREVIATIONS

&	AND	JT.	JOINT
L	ANGLE		
@	AT	LAM.	LAMINATE
CL	CENTER LINE	LT.	LIGHT
#	POUND OR NUMBER		
d	PENNY	M.B.	MACHINE BOLT
		MAX.	MAXIMUM
ACOUS.	ACOUSTIC	MECH.	MECHANICAL
ADJ.	ADJUSTABLE	MEMB.	MEMBRANE
APPROX.	APPROXIMATE	MET./MTL.	METAL
A.F.F.	ABOVE FINISH FLOOR	MFR.	MANUFACTURER
ALT.	ALTERNATE	MIN.	MINIMUM
ALUM.	ALUMINUM	MISC.	MISCELLANEOUS
A.B.	ANCHOR BOLT	M.O.	MASONRY OPENING
		MTD.	MOUNTED
BD.	BOARD	MUL.	MULLION
BITUM.	BITUMINOUS		
BLDG.	BUILDING	(N)	NEW
BLK.	BLOCK	N	NORTH
BLK'G.	BLOCKING	N.I.C.	NOT IN CONTRACT
B.O.T.	BOTTOM OF TRUSS	NO.	NUMBER
BRS	BACKER ROD AND SEALANT	N.T.S.	NOT TO SCALE
CLG.	CEILING	O/	OVER
C.T.	CERAMIC TILE	O.C.	ON CENTER
CLK'G.	CAULKING	O.F.C.I.	OWNER FURNISHED, CONTRACTOR INSTALLED
CLR.	CLEAR		
CONC.	CONCRETE		
CONN.	CONNECTION	P. LAM.	PLASTIC LAMINATE
CONSTR.	CONSTRUCTION	PLYWD.	PLYWOOD
C.J.	CONTROL JOINT	P.T.	PRESSURE-TREATED
CONT.	CONTINUOUS	PTD.	PAINTED
CTSK.	COUNTERSUNK	PTN.	PARTITION
CMU	CONCRETE MASONRY UNIT		
		Q.T.	QUARRY TILE
D	DEPTH		
DBL.	DOUBLE	R.	RISER
DET./DTL.	DETAIL	RAD.	RADIUS
D.F.	DOUGLAS FIR	REF.	REFRIGERATOR
DIA.	DIAMETER	REINF.	REINFORCED
DIM.	DIMENSION	REQ.	REQUIRED
DN.	DOWN	RESIL.	RESILIENT
DWG.	DRAWING	RM.	ROOM
		R.O.	ROUGH OPENING
EA.	EACH	RWD.	REDWOOD
ELEC.	ELECTRICAL	RWL.	RAINWATER LEADER
ELEV.	ELEVATION		
E.P.	ELECTRICAL PANEL	SQ. FT.	SQUARE FEET
EQ.	EQUAL	SHT.	SHEET
(E)	EXISTING	SQ. IN.	SQUARE INCH
EXP.JT.	EXPANSION JOINT	SIM.	SIMILAR
EXT.	EXTERIOR	S.L.D.	SEE LANDSCAPE DRAWING
		S.M.D.	SEE MECHANICAL DRAWING
F.A.C.P	FIRE ALARM CONTORL PANEL	SPEC.	SPECIFICATIONS
F.D.	FLOOR DRAIN	SQ.	SQUARE
F.E.	FIRE EXTINGUISHER	S.S.	STAINLESS STEEL
F.F.	FINISH FLOOR	STD.	STANDARD
F.F.E.	FINISH FLOOR ELEVATION	STL.	STEEL
FIN.	FINISH	STOR.	STORAGE
FL.	FLOOR	S.S.D.	SEE STRUCTURAL DRAWING
F.O.C.	FACE OF CONCRETE		
F.O.F.	FACE OF FINISH	TEL.	TELEPHONE
F.O.M.	FACE OF MASONRY	T&G	TONGUE AND GROOVE
F.O.S.	FACE OF STUD	T.	TREAD
F.O.SH.	FACE OF SHEATHING	THK.	THICK
F.S.D.	FIRE SEPARATION DISTANCE	TYP.	TYPICAL
FT.	FOOT	T.O.	TOP OF
FTG.	FOOTING	T.O.C.	TOP OF CURB
FURR.	FURRING	T.O.O.	TOP OF OUTRIGGER
		T.O.P.	TOP OF PLATE
GA.	GAUGE	T.O.S.	TOP OF SLAB
G.C.	GENERAL CONTRACTOR	T.O.T.	TOP OF TRUSS
GL.	GLASS		
GSM.	GALVANIZED SHEET METAL	U.O.N.	UNLESS OTHERWISE NOTED
GYP. BD./ GWB.	GYPSUM WALL BOARD		
		VERT.	VERTICAL
		V.I.F.	VERIFY IN FIELD
H	HEIGHT	V.G.	VERTICAL GRAIN
H.B.	HOSE BIB		
H.C.	HOLLOW CORE	W	WIDTH
HDWD.	HARDWOOD	W/	WITH
HDWR.	HARDWARE	WD.	WOOD
HORIZ.	HORIZONTAL	WDW	WINDOW
HR.	HOUR	W/O	WITHOUT
HW	HARDWOOD	WP	WATERPROOF
IN.	INCH	WRC	WESTERN RED CEDAR
INTM.	INTERMEDIATE		
INSUL.	INSULATION		
INT.	INTERIOR		

SYMBOL LEGEND

- ELEVATION/CONTROL POINT
- # REVISION NUMBER
- A1 / X WALL CONSTRUCTION TYPE / FLOOR CONSTRUCTION TYPE
- A WINDOW — SEE WINDOW SCHEDULE
- 101 DOOR — SEE DOOR SCHEDULE
- 101 ROOM NUMBER
- A' REFERENCE GRID - CONCRETE — COLUMN CENTER U.O.N.
- A REFERENCE GRID - WOOD FRAMING — EDGE OF FRAMING U.O.N.
- INDICATES DROPPED CEILING ABOVE
- X / AX.1 DETAIL CALLOUT — DETAIL NUMBER, DETAIL SHEET
- X / AX.1 ELEVATION/SECTION CALLOUT — DETAIL NUMBER, DETAIL SHEET
- A, B, C, D, X / AX.1 INTERIOR ELEVATION CALLOUT — DETAIL NUMBER, DETAIL SHEET

PROJECT DESCRIPTION

PROJECT ADDRESS:
1170 HARRISON STREET
SAN FRANCISCO, CA 94103
BLOCK 3755 / LOT 029

PROJECT DESCRIPTION:
- THE OVERALL PROJECT INCLUDES A ONE-STORY VERTICAL ADDITION, INSERTION OF A MEZZANINE FLOOR, ALTERATIONS TO THE HARRISON AND BERWICK PLACE ELEVATIONS, AND OTHER INTERIOR ALTERATIONS. THE PROJECT ALSO INCLUDES RESTORATION OF THE DETERIORATED CHARACTER-DEFINING FEATURES ASSOCIATED WITH THE HISTORIC RESOURCE.
- THE PROPOSAL INCLUDES A CONVERSION OF THE EXISTING INDUSTRIAL BUILDING INTO OFFICE USE

ZONING CODE ANALYSIS
ZONING: WMUG (WSOMA Mixed Use-General) Zoning District and 55-X Height and Bulk Limit.

EXISTING USE: INDUSTRIAL USE

PROPOSED USE: OFFICE

PARKING: NONE (NONE REQUIRED PER PLANNING CODE SECTION 844.10)

SETBACKS	EXISTING	PROPOSED	PERMITTED/REQUIRED
FRONT:	0'	26'-8" (ADDITION)	0'
SIDE (STREET):	0'	48'-11(ADDITION)	0'
SIDE (LEFT):	0'	0' (ADDITION)	0'
REAR:	0'	0' (ADDITION)	0'
BUILDING HEIGHT:	30'-0"	41'-0" (ADDITION)	55'
BUILDING STORIES:	2	3 (ADDITION)	
LOT AREA (SF):	4,811 SF		
FLOOR AREA GROSS :	10,088 SF	21,682 SF	
FLOOR AREA OCCUPIABLE:	10,088 SF	20,537 SF	
USEABLE OPEN SPACE:	0 SF	942 SF	

PROJECT DIRECTORY

OWNER:
Buddha Properties, LLC
Ronaldo Cianciarulo, Member
829 De Haro Street
San Francisco CA 94107

ARCHITECT:
workshop 1
953 West MacArthur Blvd
Oakland CA 94608
(415) 523-0304

VICINITY MAP

DRAWING INDEX

workshop1
development, architecture and brokerage in one practice.

1170 Harrison Street

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Issues/ Revisions

Issue #	Description	Date
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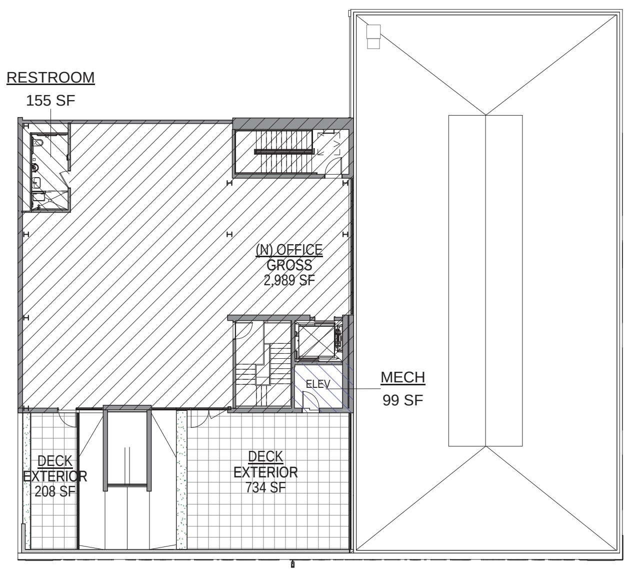
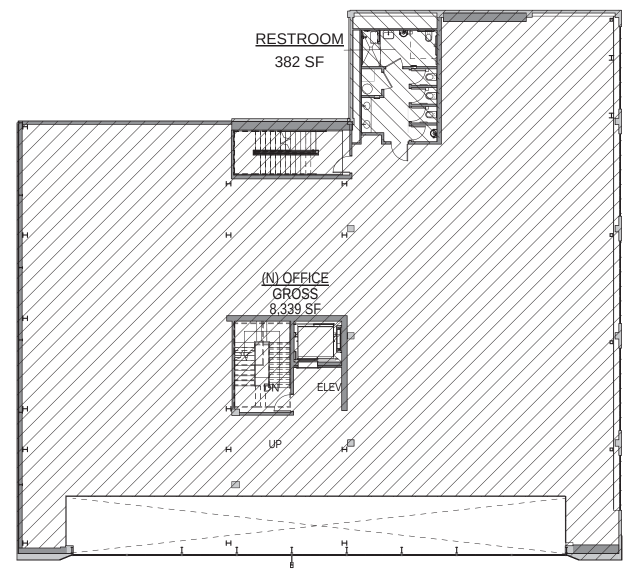
Title Sheet & Index

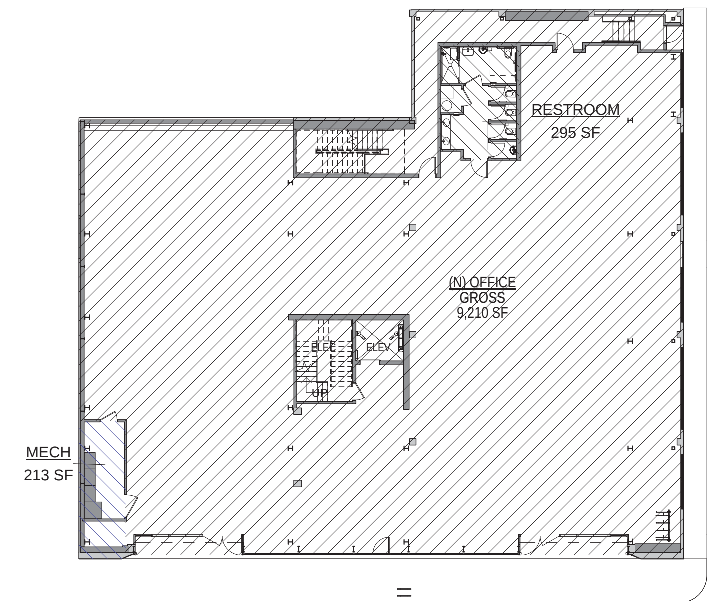
A0.1



3 Proposed Level 3 - Zoning Gross Areas
1/16" = 1'-0"



2 Proposed Level 2 - Zoning Gross Areas
1/16" = 1'-0"



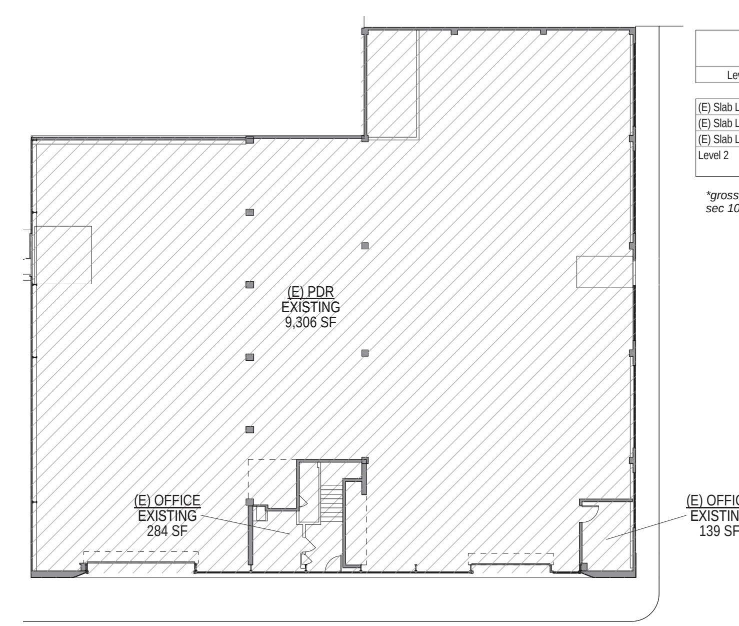
1 Proposed Level 1 - Zoning Gross Areas
1/16" = 1'-0"

SHELL & CORE PROPOSED AREAS - GROSS		
Level	Name	Area
(E) Slab Level	(N) OFFICE	9,210 SF
(E) Slab Level	MECH	213 SF
(E) Slab Level	RESTROOM	295 SF
Level 2	(N) OFFICE	8,339 SF
Level 2	RESTROOM	382 SF
Level 3	(N) OFFICE	2,989 SF
Level 3	MECH	99 SF
Level 3	RESTROOM	155 SF
		21,682 SF

SHELL & CORE PROPOSED AREAS - OCCUPIED		
Level	Name	Area
(E) Slab Level	(N) OFFICE	9,210 SF
Level 2	(N) OFFICE	8,339 SF
Level 3	(N) OFFICE	2,989 SF
		20,537 SF

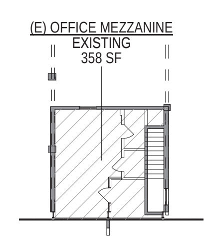
gross and occupied defined under sf planning code sec 102.10

SHELL & CORE USABLE OPEN SPACE		
Level	Name	Area
Level 3	DECK	734 SF
Level 3	DECK	208 SF
		942 SF



EXISTING FLOOR AREA - GROSS		
Level	Name	Area
(E) Slab Level	(E) PDR	9,306 SF
(E) Slab Level	(E) OFFICE	284 SF
(E) Slab Level	(E) OFFICE	139 SF
Level 2	(E) OFFICE MEZZANINE	358 SF
		10,088 SF

gross and occupied defined under sf planning code sec 102.10



2E Existing Mezzanine - Zoning Gross Areas
1/16" = 1'-0"

1E Existing Level 1 - Zoning Gross Areas
1/16" = 1'-0"

workshop[1]

[1]development, architecture and brokerage in one practice.

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Scale: 1/16" = 1'-0"

Areas - Gross & Occupiable

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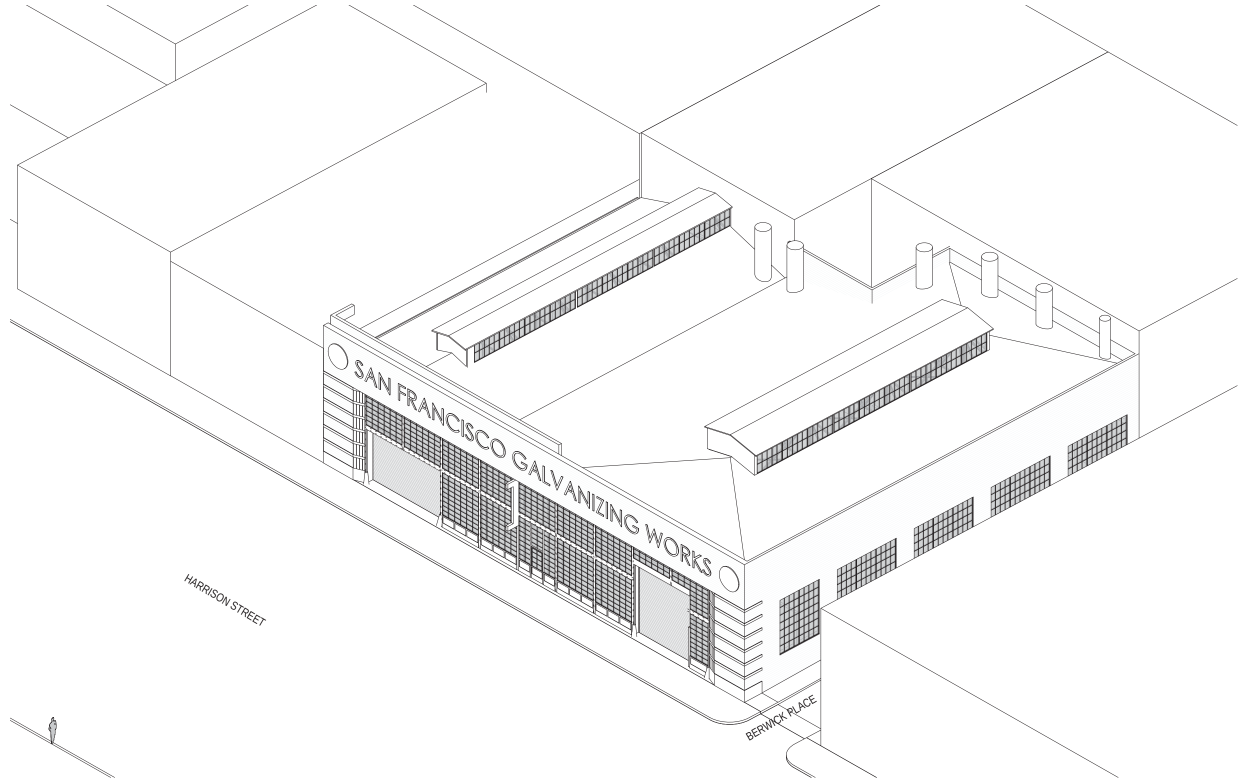
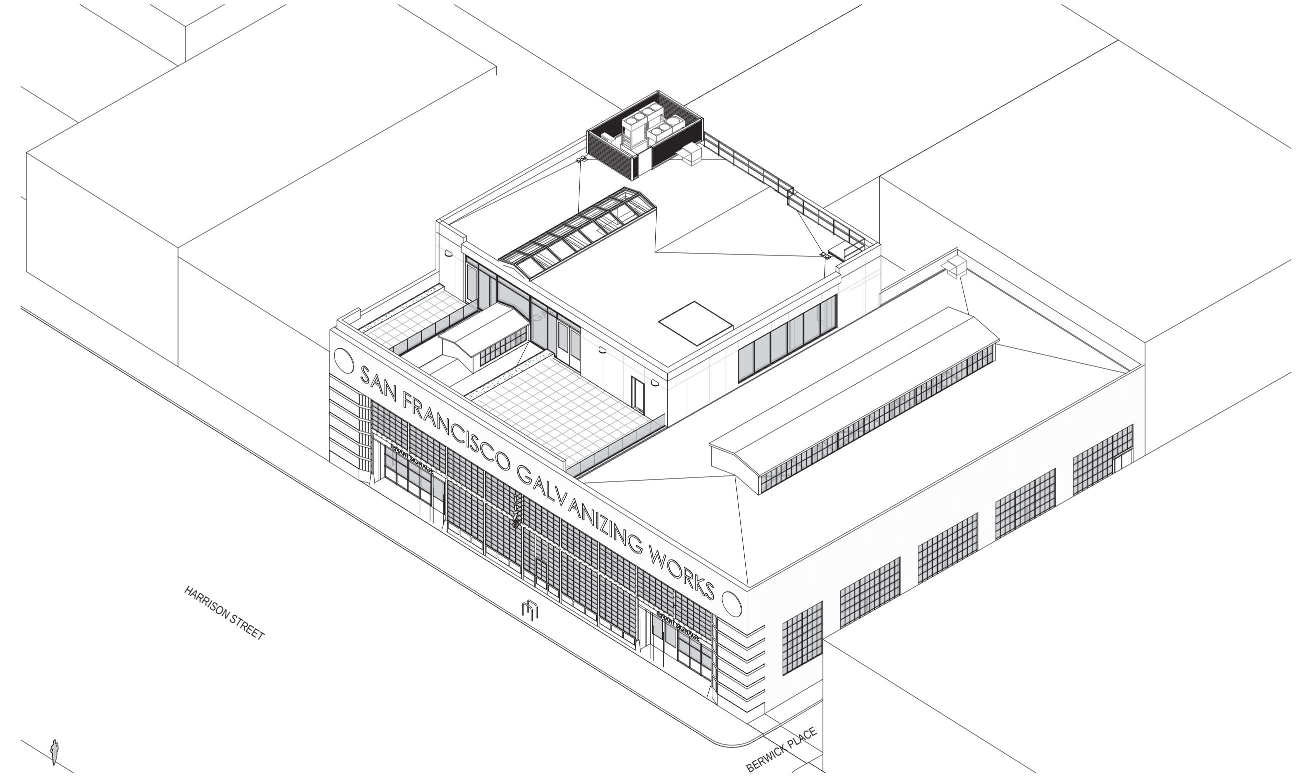


4 Axonometric View- Existing



3 Axonometric View- Proposed

2 Harrison Street View Looking North- Existing

1 Harrison Street View Looking North- Existing

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3D Views

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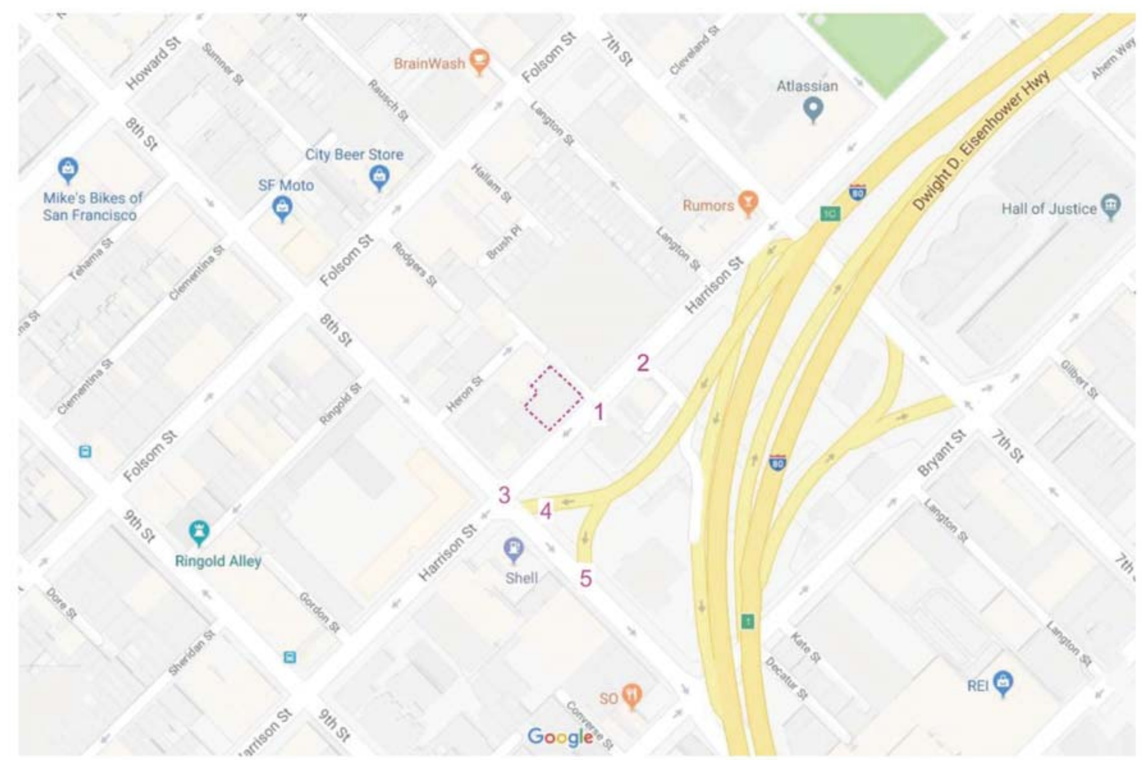
workshop[1] view 1 – ARC Review 1170 Harrison Street

workshop[1] view 1 original 1170 Harrison Street

workshop[1] view 1 - Proposed 1170 Harrison Street



workshop[1] locations of street views – June 06, 2018 1170 Harrison Street

workshop[1]

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workshop[1] view 3 - Existing 1170 Harrison Street

workshop[1] view 2 - Proposed 1170 Harrison Street

workshop[1] view 2 – ARC Review 1170 Harrison Street

workshop[1] view 2 - Before 1170 Harrison Street

workshop[1]

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workshop[1] view 4 - Proposed 1170 Harrison Street

workshop[1] view 3 – ARC Review 1170 Harrison Street

workshop[1] view 4 - Existing 1170 Harrison Street

workshop[1] view 3 Proposed 1170 Harrison Street

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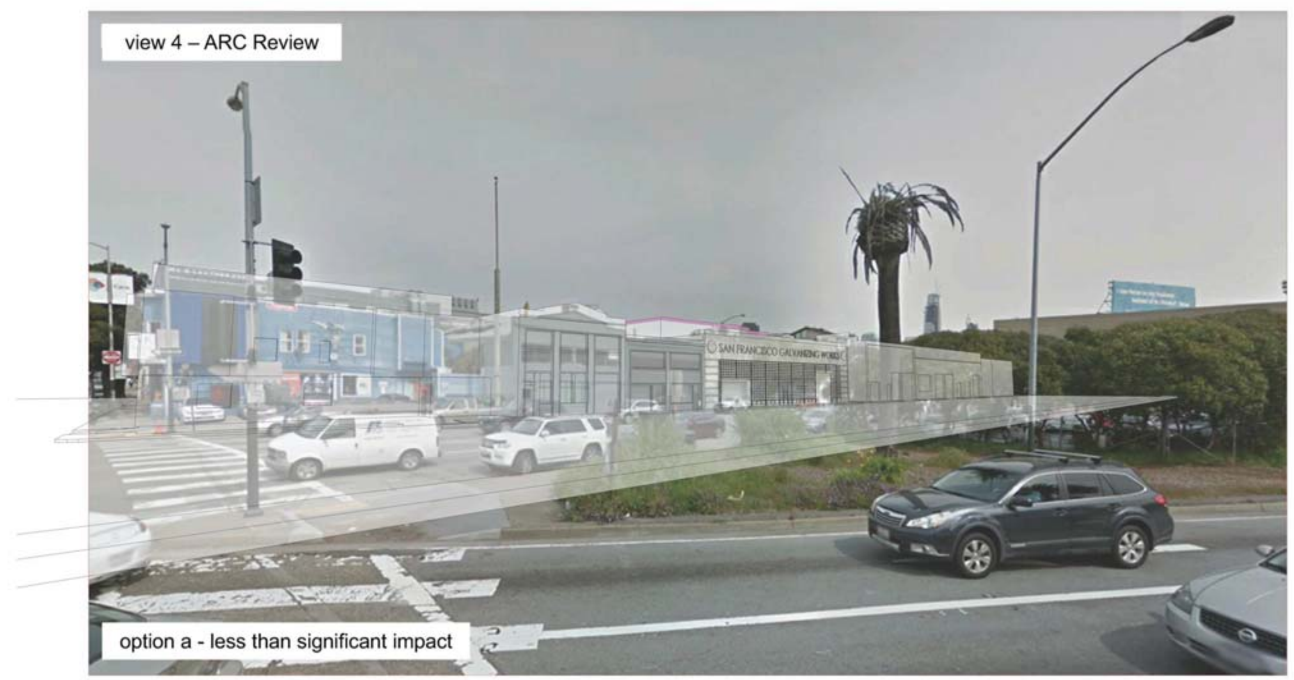
SITELINES

A0.3.3

workshop[1] | view 5 - Existing | 1170 Harrison Street

workshop[1] | view 5 – Proposed same as ARC Review | 1170 Harrison Street



workshop[1] | view 4 – ARC Review | 1170 Harrison Street

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Checked By: Checker

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SITELINES

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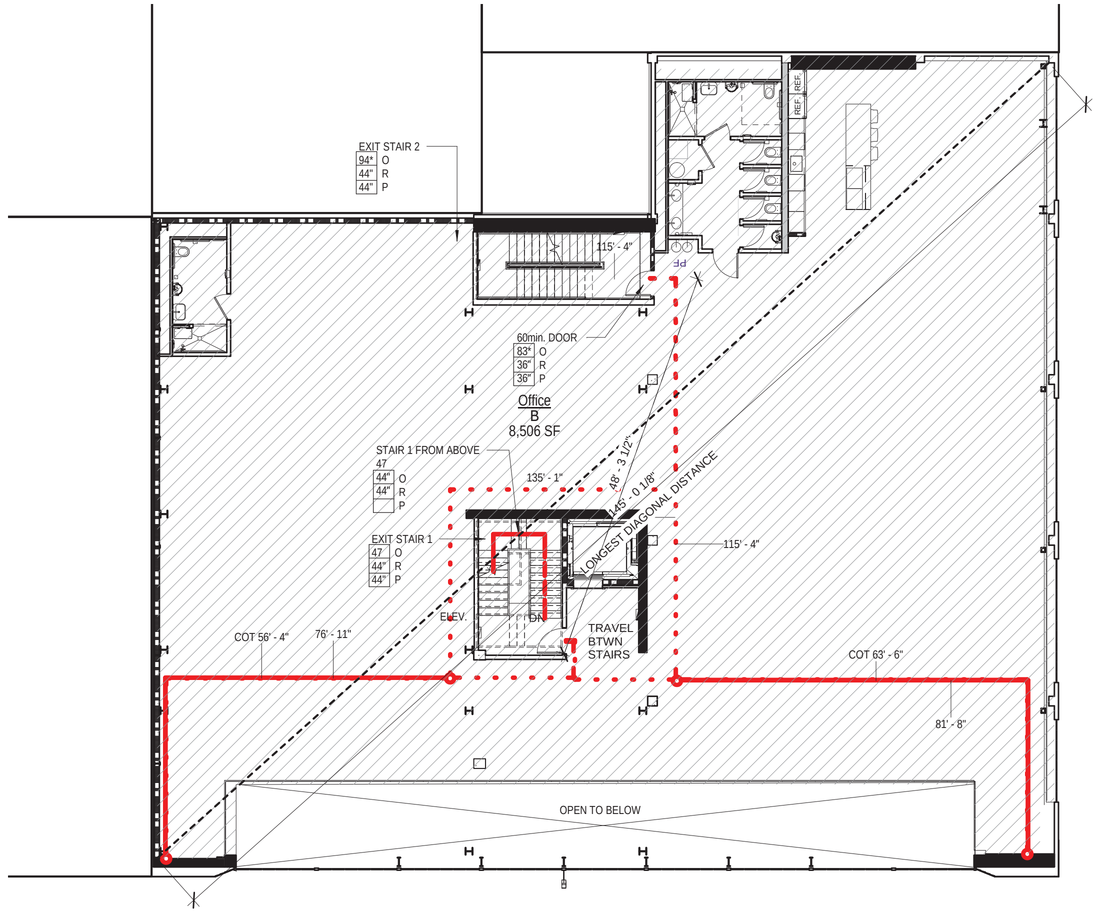
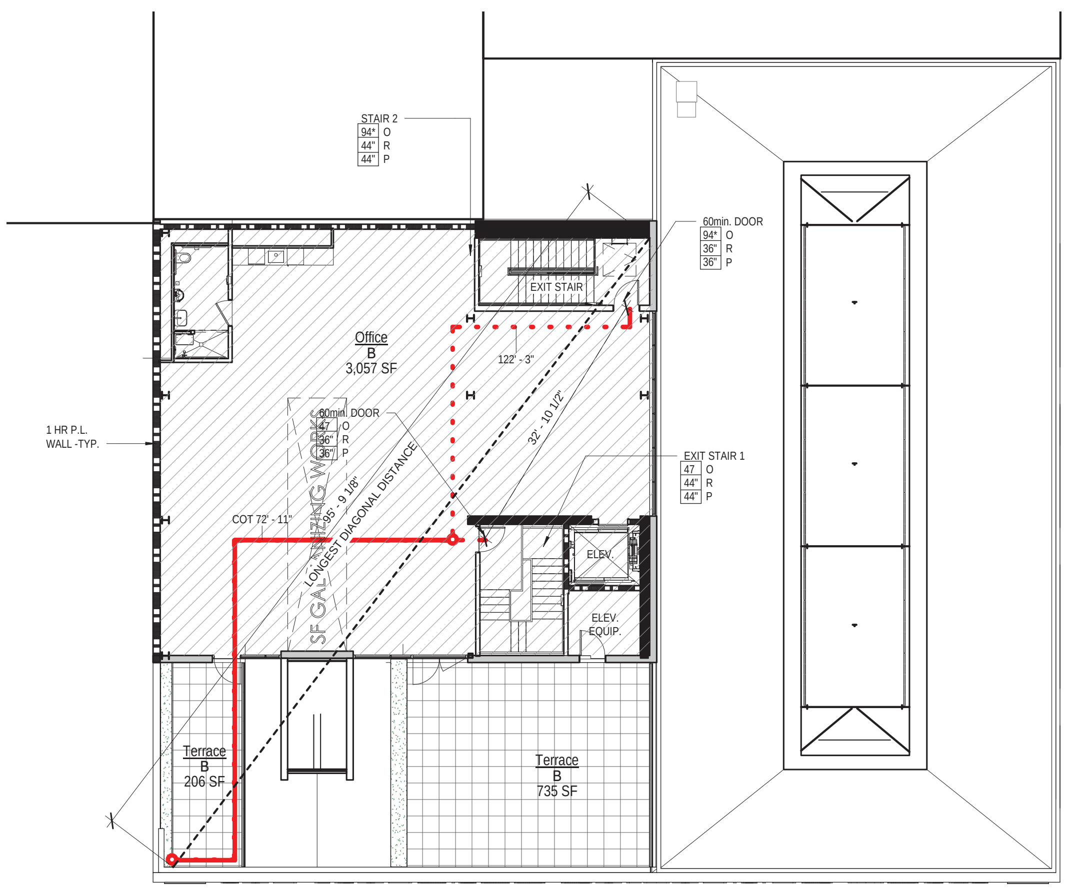
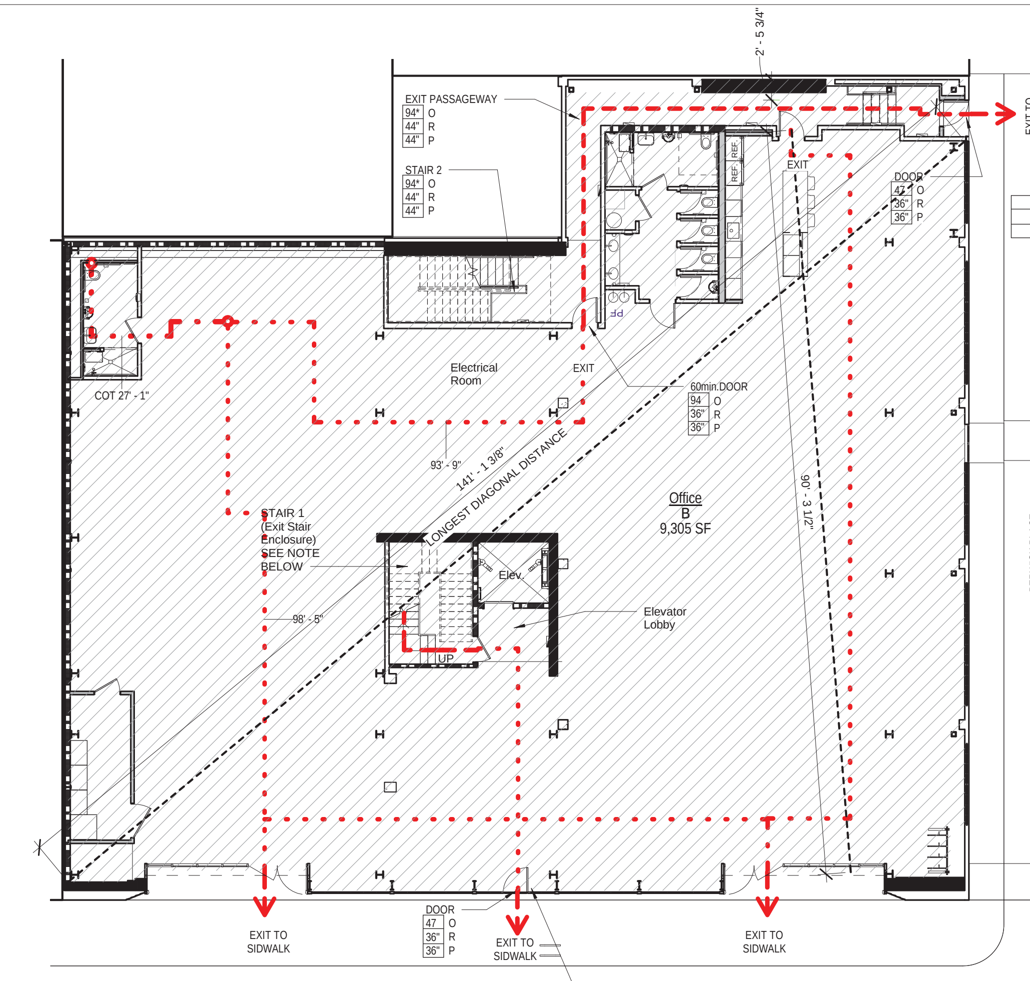


Level 2
3/32" = 1'-0"



Level 3
3/32" = 1'-0"



HARRISON STREET

Existing Main Entry
Existing swing in direction opposite direction means of egress as allowed by California Historic Building Code 8-502.4:

8-502.4 Main entry doors. The front or main entry doors need not be rehung to swing in the direction of exit travel, provided other means or conditions of exiting, as necessary to serve the total occupant load, are provided.

Rear exit stair and exit passageway and means of egress sized to accomodate full occupant load from each floor. Occupant Load Factor for rear exit stair and exit passageway calculated using full occupant load of that floor and identified with an " * "

Level 1
3/32" = 1'-0"

EXITING DIAGRAM LEGEND

COMMON PATH OF TRAVEL (C.O.T.)

EXIT ACCESS PATH OF TRAVEL

TRAVEL WITHIN EXIT TO DISCHARGE

CONCRETE WALL

1 HOUR RATED WALL

NON-RATED PARTITION

DOOR
47 O — OCCUPANT LOAD
36" R — WIDTH REQUIRED BASED ON OCCUPANY LOAD MULTIPLIER (CBC 1005.1)
36" P — WIDTH PROVIDED
EGRESS ELEMENT

EGRESS OCCUPANCY LOAD SCHEDULE

Level	Name	Occ. Type	Use	Area	Load Factor	Occupanct Load
(E) Slab Level						
(E) Slab Level	Office	B	Office	9,305 SF	100	94
						94
Level 2						
Level 2	Office	B	Office	8,506 SF	100	86
						86
Level 3						
Level 3	Office	B	Office	3,057 SF	100	31
Level 3	Terrace	B	Terrace	206 SF	15	14
Level 3	Terrace	B	Terrace	735 SF	15	49
						94

PLUMBING FIXTURE LOAD

Use	Area	Load Factor	Occupant Load
LEVEL 1-(N) OFFICE	2,353 SF	200	12
LEVEL 2-(N) OFFICE	8,361 SF	200	42
LEVEL 3-(N) OFFICE	7,242 SF	200	36
			90

TOTAL PLUMBING OCCUPANT LOAD: 90 (45 MALE + 45 FEMALE)

WATERCLOSETS:	REQUIRED MALE	REQ'D FEMALE	TOTAL
URINALS REQ'D:	1	3	4 (11 UNISEX PROVIDED)
LAVATORIES REQ'D:	1	1	2 (3 UNISEX PROVIDED)
DRINKING FOUNTAINS REQ'D			1 (2 PROVIDED)

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[1]development, architecture and brokerage in one practice.

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Issues/ Revisions

Issue #	Description	Date
		11/19/2018

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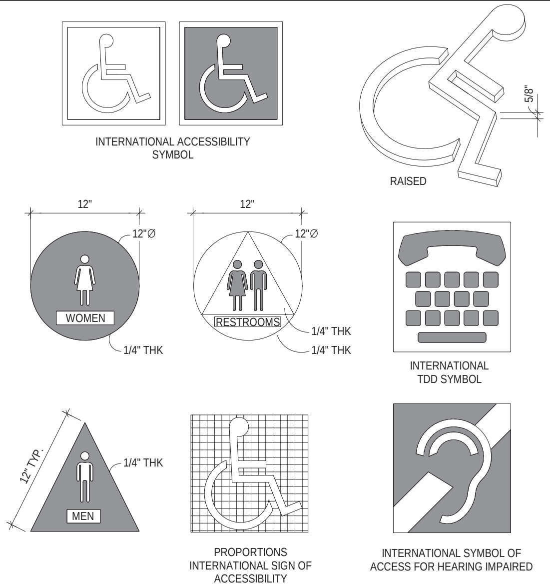
Occupancy, Egress, and Fixture Count

A0.4

SIGNS / PICTOGRAMS



<u>CBC CHAPTER 11A & 11B SIGNAGE REQUIREMENTS (PUBLIC AND COMMON USE AREAS)</u>
<u>VISUAL LETTERS AND NUMBERS:</u>
1143A.5.1 & 11B-703.5.1 FINISH AND CONTRAST - CHARACTERS / SYMBOLS SHALL HAVE A NON-GLARE FINISH AND CONTRAST WITH THEIR BACKGROUND. CHARACTERS AND SYMBOLS SHALL CONTRAST WITH THEIR BACKGROUND, EITHER LIGHT ON A DARK BACKGROUND OR DARK ON A LIGHT BACKGROUND.
1143A.5.3& 1143.5.6 & 11B-703.5.4 & 11B703.5.7 PROPORTIONS. CHARACTERS SHALL BE SELECTED FROM FONTS WHERE THE WIDTH OF THE UPPERCASE LETTER "O" IS 60 PERCENT MINIMUM AND 110 PERCENT MAXIMUM OF THE HEIGHT OF THE UPPERCASE LETTER "I"., AND A STROKE THICKNESS OF THE UPPERCASE LETTER "I" SHALL BE 10 PERCENT MINIMUM AND 20 PERCENT MAXIMUM OF THE HEIGHT OF THE CHARACTERS.
1143A.5.4 & 11B-703.5.5 CHARACTER HEIGHT. MINIMUM CHARACTER HEIGHT SHALL COMPLY WITH TABLE 1143A04 AND 11B-703.5.5 (BELOW). VIEWING DISTANCE SHALL BE MEASURED AS THE HORIZONTAL DISTANCE BETWEEN THE CHARACTER AND AN OBSTRUCTION PREVENTING FURTHER APPROACH TOWARDS THE SIGN. CHARACTER HEIGHT SHALL BE BASED ON THE UPPERCASE LETTER "I".

Character Baseline FFE	Horizontal Viewing Distance	Minimum Character Height
40" minimum to less than 70"	less than 72"	5/8"
	greater than or equal 72"	5/8" + 1/8 inch 12"of viewing distance above 72"
less than or equal 120"	less than 180"	2"
	greater than or equal 180"	2" + 1/8 inch 12"of viewing distance above 180"
greater than 120"	less than 21'	3"
	greater than or equal 21'	3" + 1/8 inch 12"of viewing distance above 21'

<u>RAISED CHARACTERS AND PICTORIAL SYMBOLS</u>
WHEN RAISED CHARACTERS ARE REQUIRED OR WHEN PICTORIAL SYMBOLS (PICTOGRAMS) ARE USED ON SUCH SIGNS, THEY SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

1143A.6. & 11B-703.2 CHARACTER TYPE: CHARACTERS ON SIGNS SHALL BE RAISED 1/32" MIN. AND SHALL BE SANS SERIF UPPERCASE CHARACTERS ACCOMPANIED BY GRADE 2 BRAILLE COMPLYING WITH SECTION 1143A.9 & 11B-703.3.
1. CHARACTER SIZE: RAISED CHARACTERS SHALL BE A MIN. OF 5/8" AND A MAX. OF 2" HIGH.
2. PICTORIAL SYMBOLS SIGNS (PICTOGRAMS): PICTORIAL SYMBOL SIGNS (PICTOGRAMS) SHALL BE ACCOMPANIED BY THE VERBAL DESCRIPTION PLACED DIRECTLY BELOW THE PICTOGRAM. THE OUTSIDE DIMENSION OF THE PICTOGRAM FIELD SHALL BE A MIN. OF 6" IN HEIGHT.
3. CHARACTER PLACEMENT: CHARACTERS AND BRAILLE SHALL BE IN A HORIZONTAL FORMAT. BRAILLE SHALL BE PLACED A MIN. OF 3/8" AND A MAX. OF 1/2" DIRECTLY BELOW THE TACTILE CHARACTERS, FLUSH LEFT OR CENTERED. WHEN TACTILE TEXT IS MULTI-LINED, ALL BRAILLE SHALL BE PLACED TOGETHER BELOW ALL LINES OF TACTILE TEXT.

1143A.7 &11B-703.3 BRAILLE - CONTRACTED GRADE 2 BRAILLE SHALL BE USED WHEREVER BRAILLE IS REQUIRED IN OTHER PORTIONS OF THESE STANDARDS. DOTS SHALL BE 1/10" ON CENTER IN EACH CELL WITH 2/10" SPACE BETWEEN CELLS, MEASURED FROM THE SECOND COLUMN OF DOTS IN THE FIRST CELL TO THE FIRST COLUMN OF DOTS IN THE SECOND CELL. DOTS SHALL BE RAISED A MIN. OF 1/40" ABOVE THE BACKGROUND. BRAILLE DOTS SHALL BE DOMED OR ROUNDED.

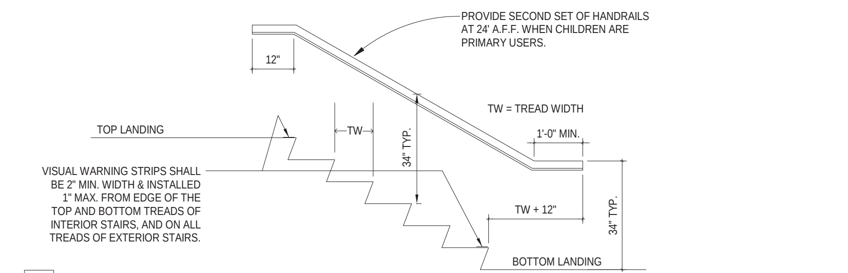
1143A.6.8 & 11B-7.3.4.2 MOUNTING LOCATION AND HEIGHT - WHERE PERMANENT IDENTIFICATION SIGNS ARE PROVIDED FOR ROOMS AND SPACES, SIGNS SHALL BE INSTALLED ON THE WALL ADJACENT TO THE LATCH SIDE OF THE DOOR. WHERE THERE IS NO WALL SPACE ON THE LATCH SIDE, INCLUDING AT DOUBLE LEAF DOORS, SIGNS SHALL BE PLACED ON THE NEAREST ADJACENT WALL, PREFERABLY ON THE RIGHT.
1143A.6.8 & 11B-7.3.4.2 WHERE PERMANENT IDENTIFICATION SIGNAGE IS PROVIDED FOR ROOMS AND SPACES THEY SHALL BE LOCATED ON THE APPROACH SIDE OF THE DOOR AS ONE ENTERS THE ROOM OR SPACE. SIGNS THAT IDENTIFY EXITS SHALL BE LOCATED ON THE APPROACH SIDE OF THE DOOR AS ONE EXITS THE ROOM OR SPACE.
1143A.6.8 & 11B-703.4.1 HEIGHT/ SIGNS WITH RAISED CHARACTERS SHALL BE LOCATED 48 " MINIMUM ABOVE THE FINISH FLOOR, MEASURED FROM THE BASELINE OF THE LOWEST BRAILLE CELLS AND 60" MAXIMUM ABOVE THE FINISH FLOOR, MEASURED FROM THE BASELINE OF THE HIGHEST LINE OF RAISED CHARACTERS.

<u>SYMBOLS OF ACCESSIBILITY.</u>
1143A.8 & 11B-703.7 THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE THE STANDARD USED TO IDENTIFY FACILITIES THAT ARE ACCESSIBLE TO AND USABLE BY PHYSICALLY DISABLED PERSONS.
1143A.8.1 & 11B-703.7.2.1 COLOR OF SYMBOL. THE SYMBOL SPECIFIED ABOVE SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595B.
1110A.2 & 11B-216.6 ENTRANCE SIGNS. ENTRANCES TO BUILDINGS AND FACILITIES THAT ARE ACCESSIBLE TO AND USABLE BY PERSONS WITH DISABILITIES SHALL BE IDENTIFIED WITH A MINIMUM OF ONE INTERNATIONAL SYMBOL OF ACCESSIBILITY AND WITH ADDITIONAL DIRECTIONAL SIGNS, UTILIZING THE SYMBOL, AT JUNCTIONS WHERE THE ACCESSIBLE ROUTE OF TRAVEL DIVERGES FROM THE REGULAR CIRCULATION PATH, TO BE VISIBLE TO PERSONS ALONG APPROACHING CIRCULATION PATHS. IN EXISTING BUILDINGS AND FACILITIES, ENTRANCES WHICH ARE NOT ACCESSIBLE SHALL HAVE DIRECTIONAL SIGNAGE COMPLYING WITH SECTION 11B-703.5, WHICH INDICATES THE LOCATION OF AND ROUTE TO THE NEAREST ACCESSIBLE ENTRANCE.
11B-216 INFORMATION POSTED. BUILDINGS THAT PROVIDE SPECIFIC SANITARY FACILITIES AND/OR ELEVATORS FOR PUBLIC USE THAT CONFORM TO THESE BUILDING STANDARDS SHALL HAVE THIS INFORMATION POSTED IN THE BUILDING LOBBY, PREFERABLY AS PART OF THE BUILDING DIRECTORY. THE INFORMATION SHALL BE ACCOMPANIED BY THE INTERNATIONAL SYMBOL OF ACCESSIBILITY. INACCESSIBLE SANITARY FACILITIES SHALL HAVE DIRECTIONAL SIGNAGE COMPLYING WITH SECTION 11B-703.5, TO INDICATE THE LOCATION OF THE NEAREST ACCESSIBLE SANITARY FACILITY.

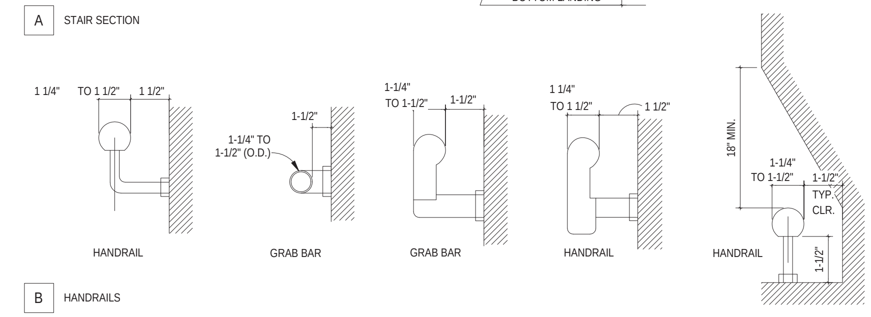
<u>TACTILE FLOOR IDENTIFICATION SIGNS IN STAIRWAYS:</u>

11B-504.8 TACTILE FLOOR IDENTIFICATION SIGNS THAT COMPLY WITH SECTION 11B-703.5, SHALL BE LOCATED AT EACH FLOOR LEVEL LANDING IN ALL ENCLOSED STAIRWAYS IN BUILDINGS TWO OR MORE STORIES IN HEIGHT TO IDENTIFY THE FLOOR LEVEL. AT EXIT DISCHARGE LEVEL, THE SIGN SHALL INCLUDE A RAISED FIVE-POINTED STAR LOCATED TO THE LEFT OF THE IDENTIFYING FLOOR LEVEL.THE OUTSIDE DIAMETER OF THE STAR SHALL BE THE SAME AS THE HEIGHT OF THE RAISED CHARACTERS.

STAIR AND HANDRAIL DETAILS



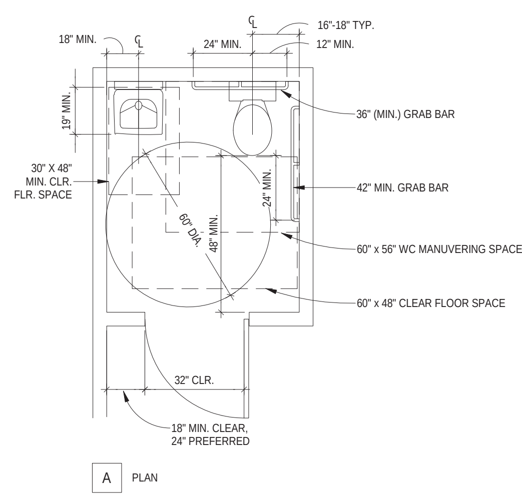
A STAIR SECTION



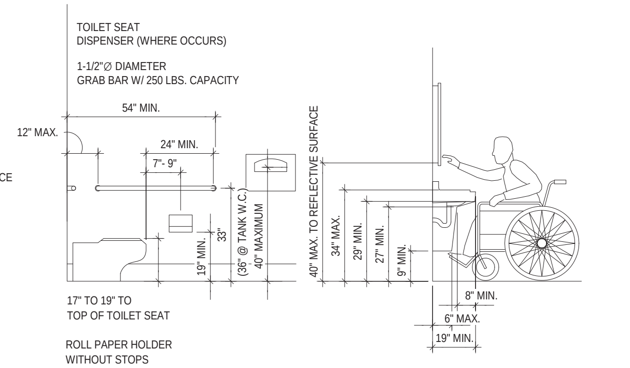
B HANDRAILS

PRIVACY / UNISEX TOILET ROOM

<u>NOTES:</u>
1. PROVIDE PRIVACY DOOR LOCK WHEN IT IS A PRIVATE TOILET OR FOR UNISEX USE.
2. PROVIDE 1/4" THICK 12" MEN'S, WOMEN'S, AND UNISEX GEOMETERIC SIGNAGE 60" ABOVE FLOOR ON RESTROOMENTRANCE DOOR AND RAISED LETTER BRAILLE SIGNS ON THE LATCH SIDE OF THE WALL OUTSIDE OF RESTROOM ENTRANCE DOOR MOUNTED 60" ABOVE THE FLOOR, ALLOWING APPROACH TO WITHIN 3"
(SEC. 11B-703.4). SEE ACCESSIBILITY NOTE #9 'SIGNS / PICTOGRAMS' AND ENLARGED BATHROOM PLANS FOR ADDITIONAL INFORMATION.

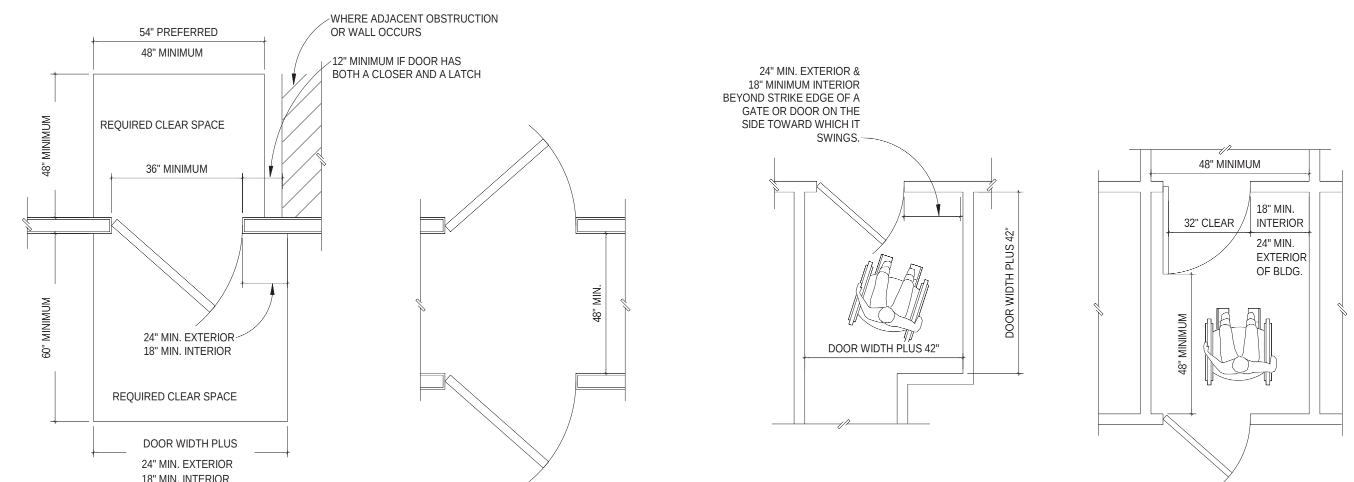


A PLAN



B ELEVATIONS

DOOR CLEAR SPACE



A PLAN

C CORRIDOR PLAN

B RAMP LANDING AT DOORWAY PLAN

D VESTIBULE PLAN

PROTRUDING OBJECTS

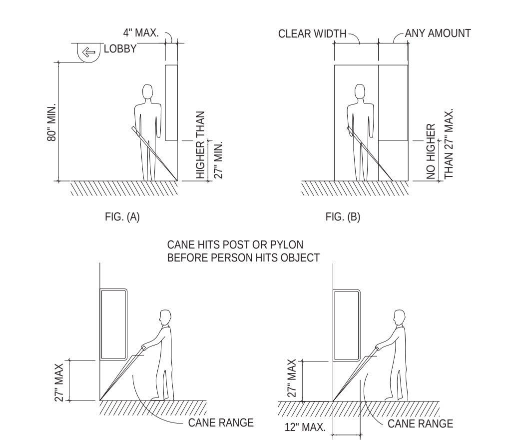


FIG. (A)

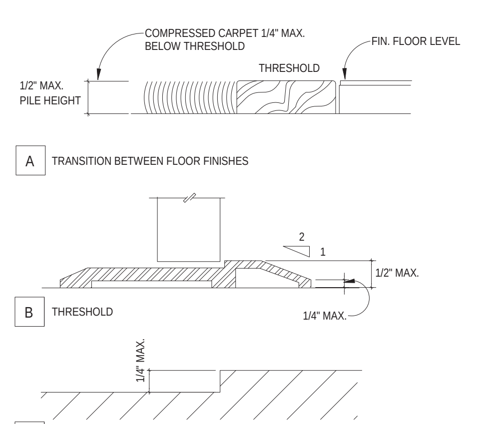
FIG. (B)

FIG. (A)

FIG. (B)

THRESHOLD/ LEVEL CHANGES

<u>NOTES:</u>
1. 1/2" MAXIMUM TOTAL HEIGHT WITH 1/4" MAXIMUM VERTICAL CHANGE AT EDGE.
2. 1 : 2 SLOPED BEVEL REQUIRED IF LEVEL CHANGE IS OVER 1/4" VERITCAL LEVEL CHANGE.
3. 1/4" MAXIMUM VERTICAL LEVEL CHANGE.



A TRANSITION BETWEEN FLOOR FINISHES

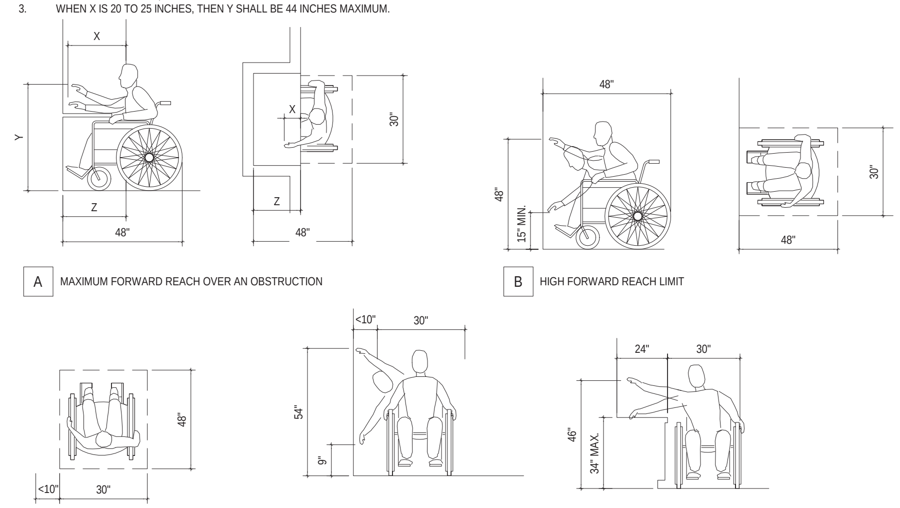
B THRESHOLD

C LEVEL CHANGES

REACH REQUIREMENTS

<u>NOTES:</u>

<u>NOTES:</u>
1. X SHALL BE < 25 INCHES; Z SHALL BE > X.
2. WHEN X < 20 INCHES, THEN Y SHALL BE 48 INCHES MAXIMUM.
3. WHEN X IS 20 TO 25 INCHES, THEN Y SHALL BE 44 INCHES MAXIMUM.



A MAXIMUM FORWARD REACH OVER AN OBSTRUCTION

B HIGH FORWARD REACH LIMIT

C CLEAR FLOOR SPACE PARALLEL APPROACH

D HIGH AND LOW SIDE REACH LIMITS

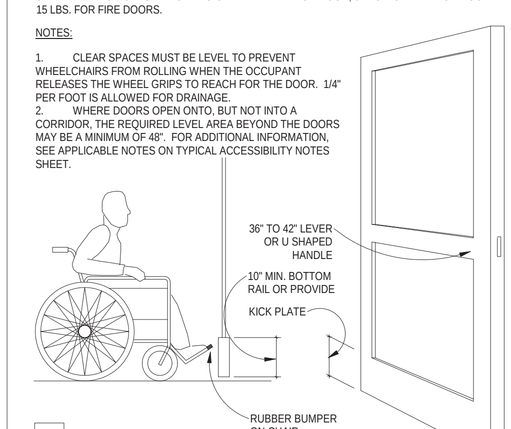
E MAXIMUM SIDE REACH OVER AN OBSTRUCTION

DOOR

<u>DOOR TYPE:</u>
1. MINIMUM 10" HIGH SMOOTH SURFACE AT DOOR BOTTOM, EITHER ATTACHED PANEL OR BOTTOM RAIL.

<u>HARDWARE:</u>
2. OPENABLE FROM INSIDE WITHOUT USE OF KEY OR SPECIAL KNOWLEDGE OR EFFORT.
3. OPENABLE BY SINGLE EFFORT LEVER-TYPE DEVICE (NOT REQUIRING GRASPING).
4. MOUNTED 36" TO 42".
5. MAXIMUM 5 LBS. EFFORT TO OPERATE EXTERIOR DOOR, 5 LBS. FOR INTERIOR DOOR AND 15 LBS. FOR FIRE DOORS.

<u>NOTES:</u>
1. CLEAR SPACES MUST BE LEVEL TO PREVENT WHEELCHAIRS FROM ROLLING WHEN THE OCCUPANT RELEASES THE WHEEL GRIPS TO REACH FOR THE DOOR. 1/4" PER FOOT IS ALLOWED FOR DRAINAGE.
2. WHERE DOORS OPEN ONTO, BUT NOT INTO A CORRIDOR, THE REQUIRED LEVEL AREA BEYOND THE DOORS MAY BE A MINIMUM OF 48". FOR ADDITIONAL INFORMATION, SEE APPLICABLE NOTES ON TYPICAL ACCESSIBILITY NOTES SHEET.



A DETAIL

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[1]development, architecture and brokerage in one practice.

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Issues/ Revisions

Issue #	Description	Date
		11/19/2018

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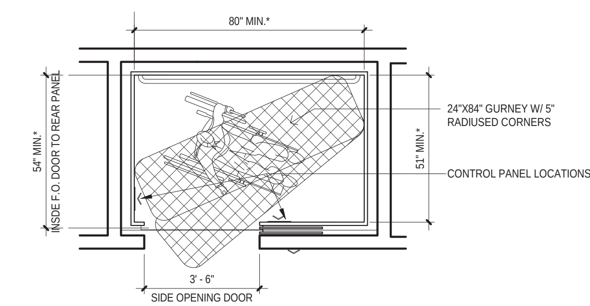
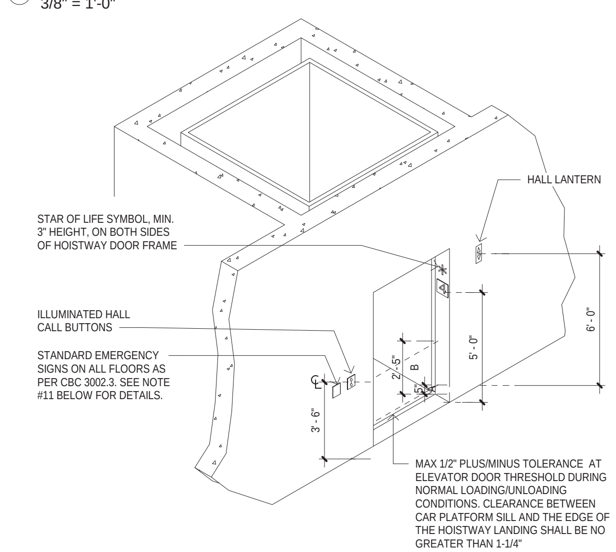
ADA TYPICAL NOTES AND DETAILS

A0.5.1



MINIMUM DIMENSIONS OF ELEVATOR CARS
* DIMENSION INDICATE MINIMUM ALLOWED DIMENSION PER CBC
ADDITIONAL WIDTH MAY BE REQUIRED TO ACCOMODATE GURNEY

② MINIMUM CAB DIMENSION
3/8" = 1'-0"



HOISTWAY AND ELEVATOR ENTRANCES

NOTES:

1. THE AUTOMATIC DOOR REOPENING DEVICE IS ACTIVATED IF AN OBJECT PASSES THROUGH EITHER LINE A OR LINE B. LINE A AND LINE B REPRESENT THE VERTICAL LOCATIONS OF THE DOOR REOPENING DEVICE NOT REQUIRING CONTACT.

2. THE ELEVATOR SHALL BE AUTOMATIC AND SELF LEVELING.SELF-LEVELING SHALL BE INDEPENDENT OF THE OPERATING DEVICE AND SHALL CORRECT FOR OVERTRAVEL OR UNDERTRAVEL. THE CAR SHALL BE MAINTAINED APPROXIMATELY LEVEL WITH THE LANDING, IRRESPECTIVE OF LOAD.

3. DOOR JAMB MARKINGS: PASSENGER LANDING JAMBS SHALL HAVE THE NUMBER OF THE FLOOR ON WHICH THE JAMB IS LOCATED DESIGNATED BY RAISED CHARACTER (MIN 2" IN HEIGHT) CONFORMING TO SEC 1117B.5.5. AND GRADE 2 BRAILLE BELOW CONFORMING TO SEC 1117B.5.6 LOCATED 60" ON CENTER AFF. ON BOTH SIDES OF DOOR. ON GRADE LEVEL A FIVE POINTED STAR (OUTSIDE DIA. 2") SHALL BE PLACED TO LEFT OF RAISED CHARACTER.

4. HANDRAIL: A HANDRAIL SHALL BE PROVIDED ON ONE WALL OF THE CAR, PREFERABLE THE REAR. THE RAIL SHALL BE SMOOTH AND THE INSIDE SURFACE AT LEAST 1-1/2" CLEAR OF WALLS AT 32" (±1") AFF.

5. HALL LATERN:VISUAL/AUDIBLE SIGNAL MOUNTED AT EACH HOIST WAY ENTRANCE AT A LOCATION VISIBLE FROM THE HALL INDICATING THE CAR ANSWERING THE CALL AND ITS DIRECTION OF TRAVEL. VISUAL SYMBOLS SHALL BE MIN. 21/2" TALL BY 21/2" WIDE (ARROW SHAPES PREFERRED).

6. HALL CALL BUTTONS: ILLUMINATED BUTTONS SHALL BE MIN. 3/4" IN DIAMETER. VISUAL INDICATION SHALL BE PROVIDED TO SHOW EACH CALL REGISTERED AND EXTINGUISHED WHEN ANSWERED.

7. VISUAL CAR POSITION INDICATOR: AS CAR PASSES OR STOPS AT A FLOOR SERVED BY THE ELEVATOR THE CORRESPONDING NUMERALS SHALL ILLUMINATE AND AN AUDIBLE SIGNAL SHALL SOUND. A VERBAL ANNOUNCEMENT MAY BE SUBSTITUTED FOR THE AUDIBLE SIGNAL. NUMERAL SHALL BE MIN 1/2" HIGH.

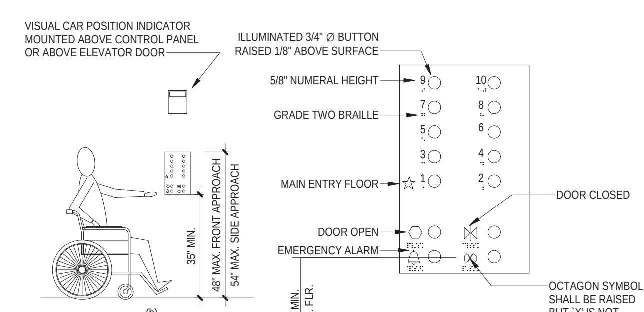
8. TWO-WAY COMMUNICATION WILL BE PROVIDED AT THE ELEVATOR LANDINGS ABOVE AND BELOW THE LEVEL OF EXIT DISCHARGE IN ACCORDANCE WITH CBC 1007.8.

9. ELEVATOR SHALL BE PROVIDED FOR FIRE DEPARTMENT EMERGENCY ACCESS TO ALL FLOORS. THE ELEVATOR CAR SHALL BE OF SUCH A SIZE AND ARRANGEMENT TO ACCOMMODATE AN AMBULANCE STRETCHER 24 INCHES BY 84 INCHES WITH NOT LESS THAN 6 INCH RADIUS CORNERS, IN THE HORIZONTAL, OPEN POSITION AND SHALL BE IDENTIFIED BY THE INTERNATIONAL SYMBOL FOR EMERGENCY MEDICAL SERVICE (STAR OF LIFE). THE SYMBOL SHALL NOT BE LESS THAN 3 INCHES HIGH AND SHALL BE PLACED INSIDE ON BOTH SIDES OF THE HOISTWAY DOOR FRAME. CBC 3002.4a

10. ELEVATOR SHALL HAVE A DOOR CLOSING DELAY AND MINIMUM 5 SECONDS FULLY OPEN.

11. CBC 3002.3 EMERGENCY SIGNS: AN APPROVED PICTORIAL SIGN OF A STANDARDIZED DESIGN SHALL BE POSTED ADJACENT TO EACH ELEVATOR CALL STATION ON ALL FLOORS INSTRUCTING OCCUPANTS TO USE THE EXIT STAIRWAYS AND NOT TO USE THE ELEVATORS IN CASE OF FIRE. THE SIGN SHALL READ: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS.

① HOISTWAY AND ELEV. ENTRANCE
1/4" = 1'-0"



CAR CONTROL HEIGHT

PANEL DETAIL

SEE ACCESSIBILITY DTL. 11 SIGN/PICTOGRAMS FOR MORE INFORMATION

③ CONTROL PANEL
3/32" = 1'-0"

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Print Date: 11/19/2018 4:49:11 PM

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ADA TYPICAL NOTES AND DETAILS

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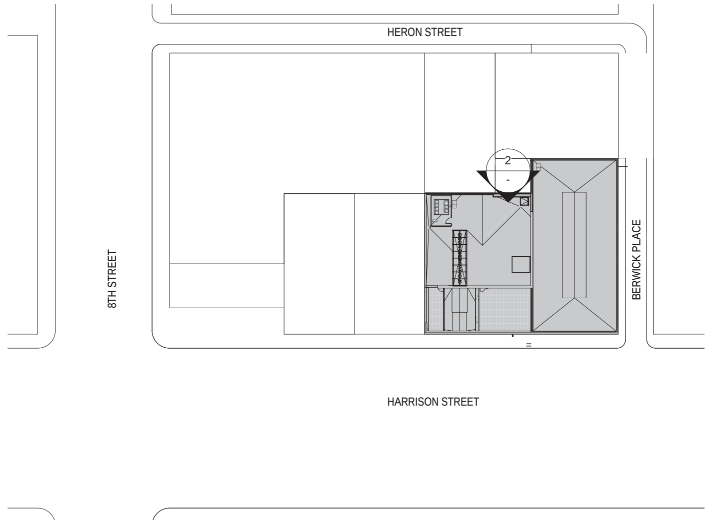
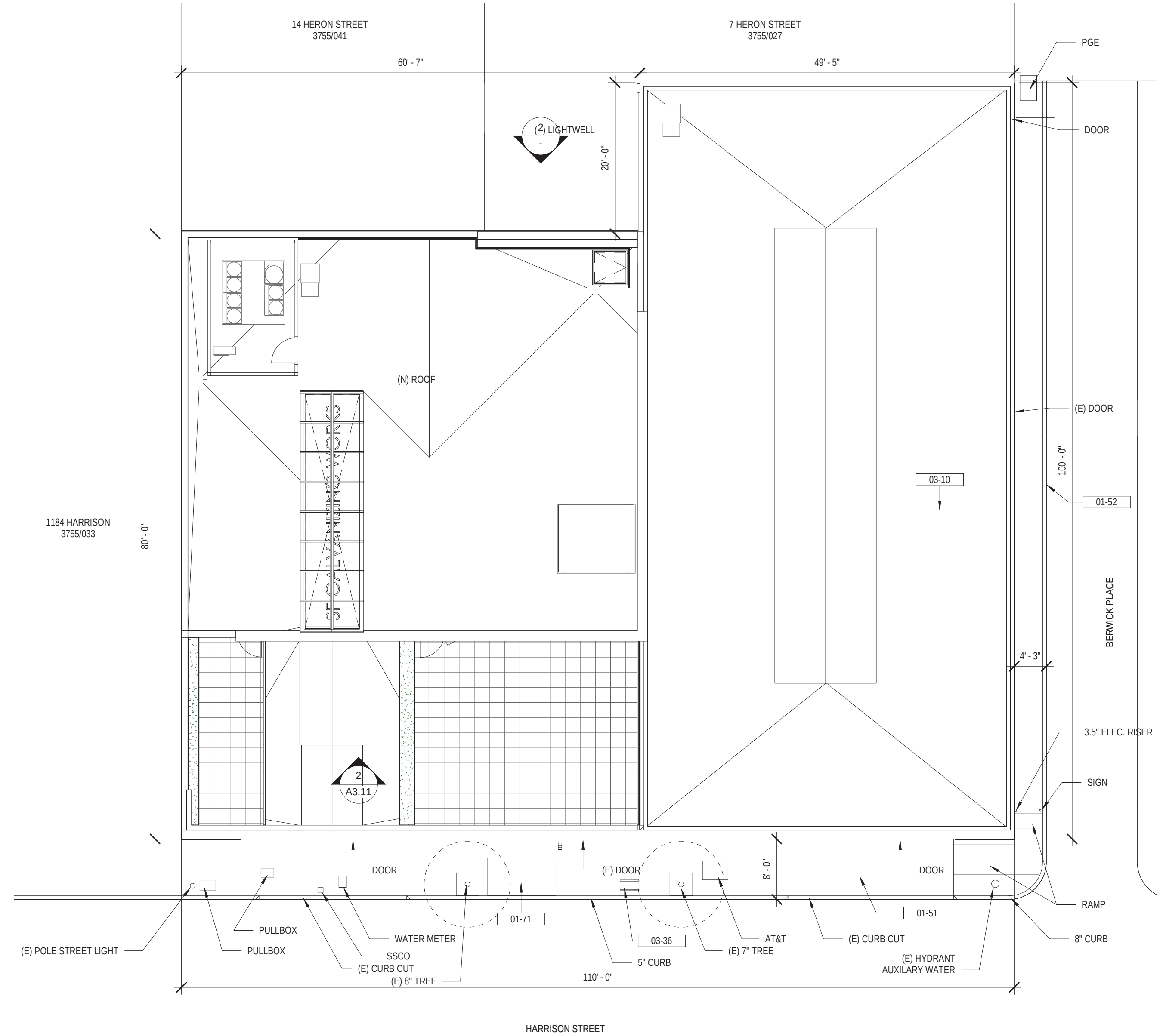
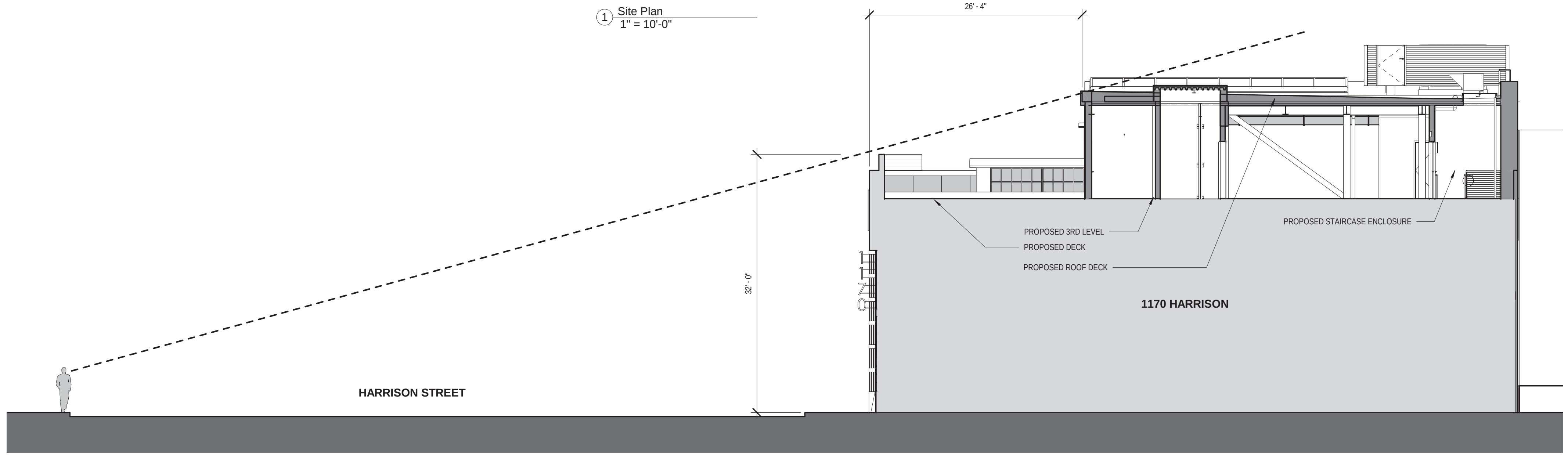


2 Vicinity Plan
1" = 50'-0"



1 Site Plan
1" = 10'-0"



3 Section N-S Height Diagram
1/8" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-10	REPLACE ROOF MEMBRANE INCLUDING ALL CLERESTORIES, PARAPETS & CURBS- INCLUDE INSULATION IN NEW ROOF ASSEMBLY. REPAIR AND REPLACE ROOFING AS NECESSARY
03-36	(N) CLASS 2- BICYLE PARKING- 2 SPACES

KEYNOTES - SITE

01-51	ALL SIDEWALK FEATURES, UTILITIES SHOWN ARE EXISTING. UON.
01-52	BUILDING DIMENSIONS ARE FOR REFERENCE ONLY. VERIFY ALL DIMENSIONS IN FIELD
01-71	(N) PROPOSED PG&E UNDERGROUND VAULT LOCATION - SEE ELECTRICAL DRAWINGS

KEYNOTES - STAIRS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

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Site Plan

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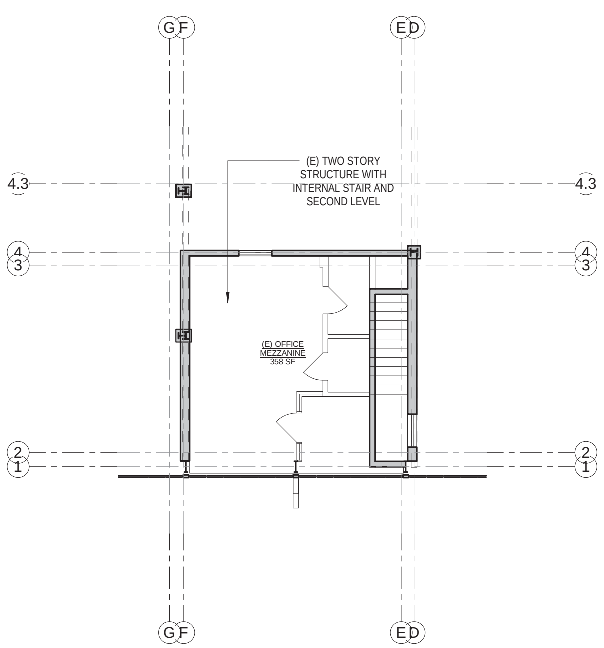
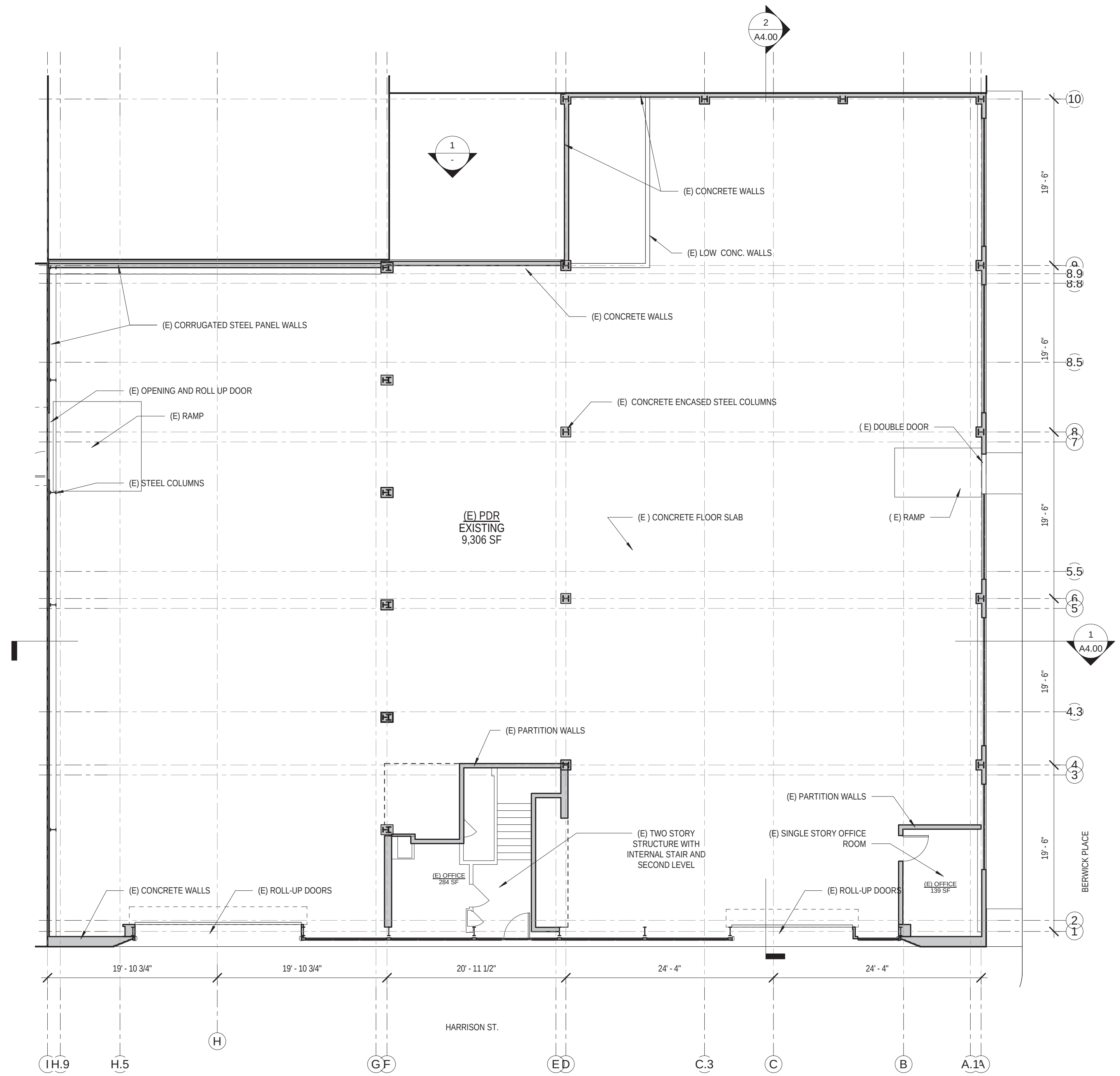


2 (E) Mezzanine
1/8" = 1'-0"



1 (E) Level 1
1/8" = 1'-0"

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Existing Plan

A1.10

KEYNOTES - GENERAL

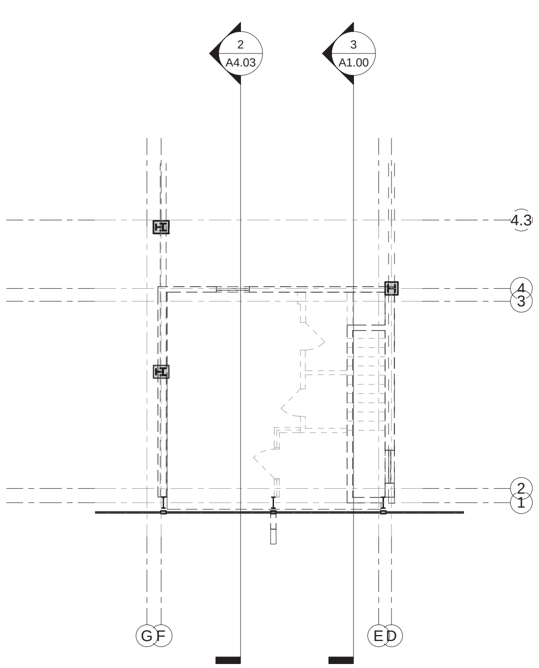
KEYNOTES - BUILDING SHELL & CORE

KEYNOTES - STAIRS

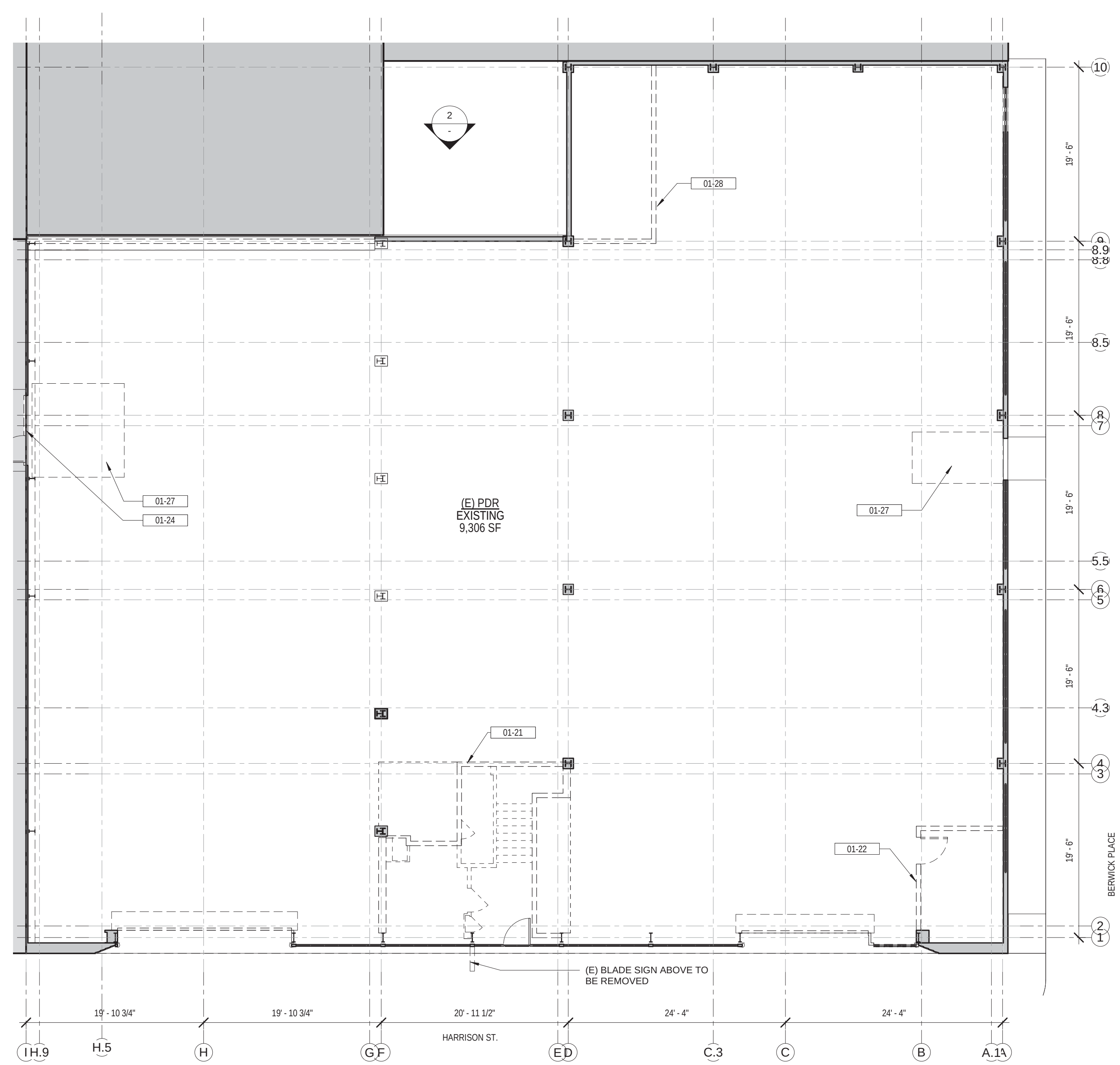
KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - DEMOLITION

01-21	DEMOLISH (E) TWO STORY INCLUDING (E) MEZZANINE LEVEL & (E) STAIR. KEEP (E) STEEL BUILDING STRUCTURE
01-22	E) OFFICE ROOM
01-24	DREMOVE (E) ROLL-UP DOOR
01-27	REMOVE (E) RAMP
01-28	REMOVE (E) CONCRETE LOW WALLS
01-51	ALL SIDEWALK FEATURES, UTILITIES SHOWN ARE EXISTING. UON.
01-52	BUILDING DIMENSIONS ARE FOR REFERENCE ONLY. VERIFY ALL DIMENSIONS IN FIELD
01-71	(N) PROPOSED PG&E UNDERGROUND VAULT LOCATION - SEE ELECTRICAL DRAWINGS
01-72	EXISTING EAST ROOF MONITOR TO BE REHABILITATED, SEE HBMP (HISTORIC BUILDING MAINTENANCE PLAN). (E) ROOF MONITOR ROOFING TO BE REMOVED
01-73	EXISTING WEST ROOF MONITOR TO BE REHABILITATED, SEE HBMP (HISTORIC BUILDING MAINTENANCE PLAN). (E) ROOF MONITOR ROOFING TO BE REMOVED AND SHEET METAL SIDE WALL CLADDING TO BE REMOVED AND REPLACED WITH NEW STEEL SASH GLAZING TO MATCH EAST MONITOR
01-74	(E) ROOF SLOPES TO REMAIN; (E) ROOF STEEL STRUCTURE TO REMAIN; (E) ASBESTOS TILE ROOF COVERING TO BE REMOVED



2 (E) Mezzanine
1/8" = 1'-0"



1 (E) Level 1
1/8" = 1'-0"

WALL TYPE LEGEND

EXISTING BUILDING ELEMENT WALL TO REMAIN

ELEMENTS SHOWN DASHED TO BE REMOVED

N

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Issues/ Revisions

Issue #	Description	Date
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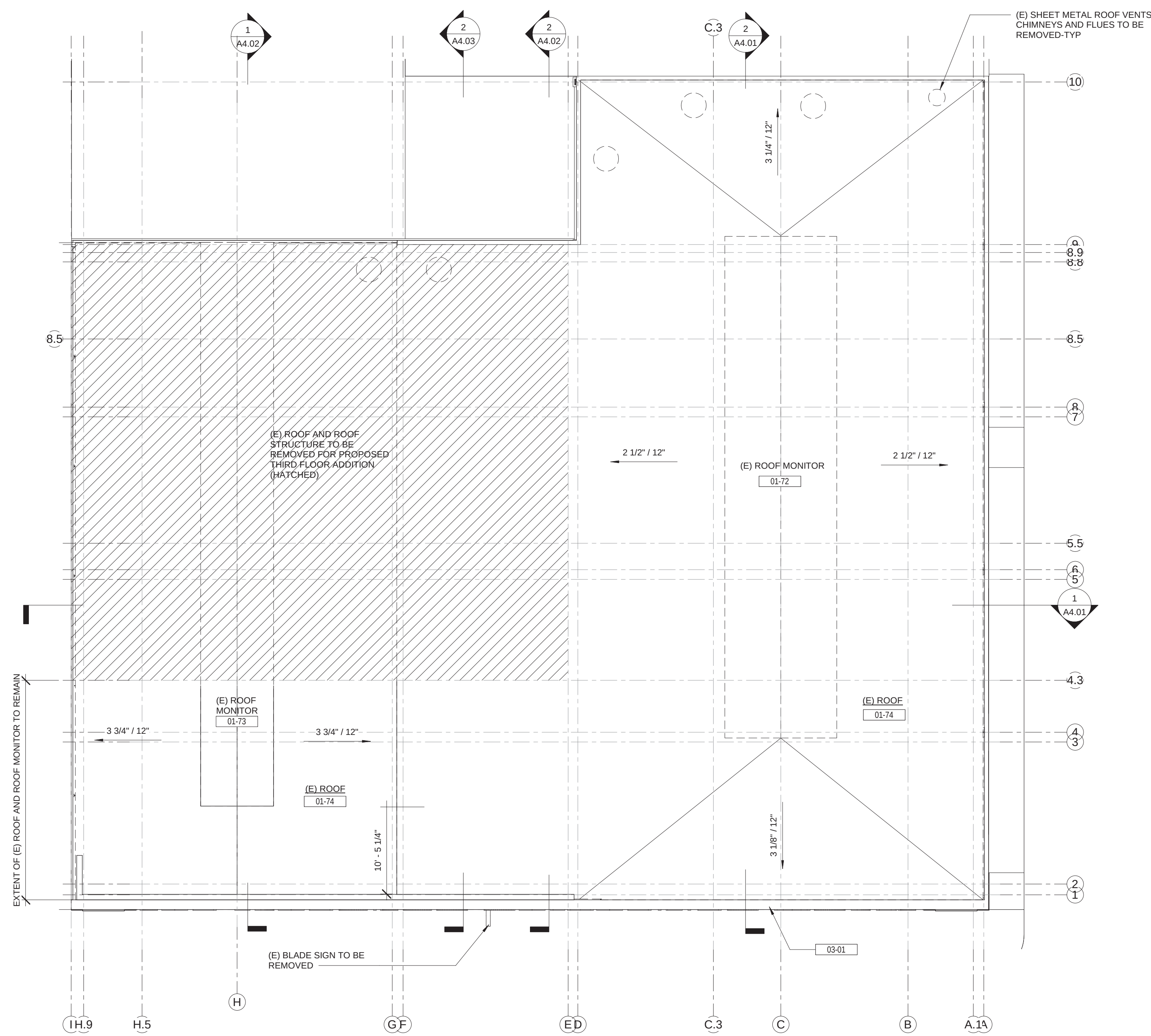
Scale: 1/8" = 1'-0"

Demolition Plan

A1.20



1 Roof Plan-Demo
1/8" = 1'-0"

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600

KEYNOTES - DEMOLITION

01-21	DEMOLISH (E) TWO STORY INCLUDING (E) MEZZANINE LEVEL & (E) STAIR. KEEP (E) STEEL BUILDING STRUCTURE
01-22	E) OFFICE ROOM
01-24	DREMOVE (E) ROLL-UP DOOR
01-27	REMOVE (E) RAMP
01-28	REMOVE (E) CONCRETE LOW WALLS
01-51	ALL SIDEWALK FEATURES, UTILITIES SHOWN ARE EXISTING. UON.
01-52	BUILDING DIMENSIONS ARE FOR REFERENCE ONLY. VERIFY ALL DIMENSIONS IN FIELD
01-71	(N) PROPOSED PG&E UNDERGROUND VAULT LOCATION - SEE ELECTRICAL DRAWINGS
01-72	EXISTING EAST ROOF MONITOR TO BE REHABILITATED, SEE HBMP (HISTORIC BUILDING MAINTENANCE PLAN). (E) ROOF MONITOR ROOFING TO BE REMOVED
01-73	EXISTING WEST ROOF MONITOR TO BE REHABILITATED, SEE HBMP (HISTORIC BUILDING MAINTENANCE PLAN). (E) ROOF MONITOR ROOFING TO BE REMOVED AND SHEET METAL SIDE WALL CLADDING TO BE REMOVED AND REPLACED WITH NEW STEEL SASH GLAZING TO MATCH EAST MONITOR
01-74	(E) ROOF SLOPES TO REMAIN; (E) ROOF STEEL STRUCTURE TO REMAIN; (E) ASBESTOS TILE ROOF COVERING TO BE REMOVED

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		11/19/2018

Print Date: 11/19/2018 4:49:22 PM
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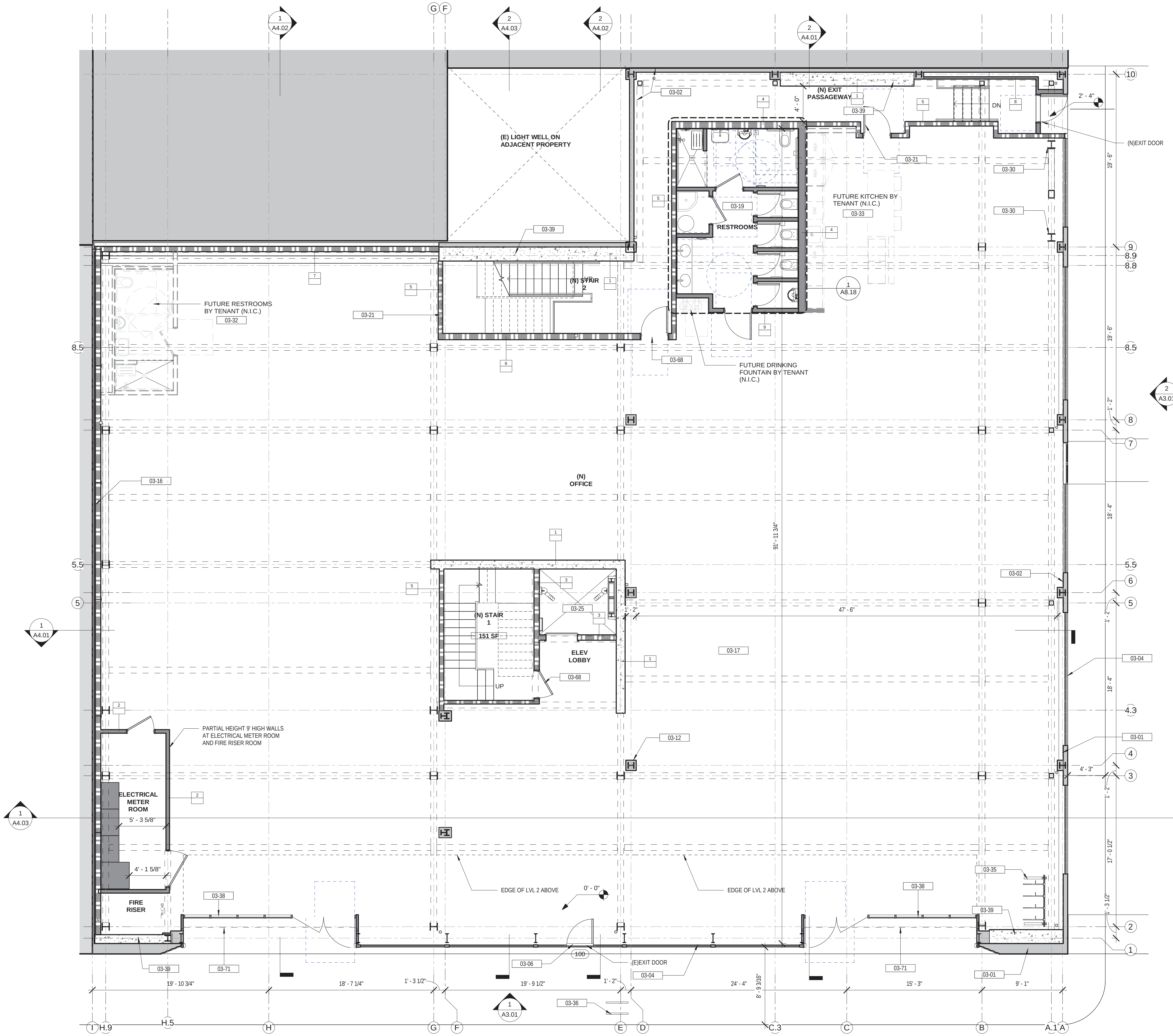
Scale: 1/8" = 1'-0"

Demolition Plan-Roof

A1.21



1 Level 1- Shell & Structure
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600
03-02	CLEAN INTERIOR (E) CONCRETE WALLS PER CONSULTANT'S RECOMMENDATION AND LEAVE EXPOSED - U.O.N.
03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-06	(E) EXTERIOR DOOR TO REMAIN AND TO BE ADA ACCESSIBLE. REPAIR DOOR FRAME AND HINGES. REPLACE GLAZING W/ CLEAR PANES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-12	KEEP (E) BUILDING STRUCTURE - REPAIR AND SEISMICALLY UPGRADE AS NECESSARY. (E) ROOF STRUCTURE & TRUSSES TO BE EXPOSED AND PAINTED BLACK
03-16	KEEP (E) EXTERIOR CORRUGATED METAL WALL PANELS AND BUILD (N) FIRE RATED MTL. STUD & DRYWALL WALL ASSEMBLY FROM INSIDE
03-17	KEEP (E) CONCRETE SLAB - REPAIR, LEVEL & SEAL
03-19	(N) ACCESSIBLE RESTROOMS W/ ACCESSIBLE SHOWERS - FULLY FINISHED W/ FIXTURES, PORCELAIN TILE FLOORS, WALLS AND PAINTED GYPSUM CEILINGS - FINAL FINISHES & FIXTURES TBD
03-21	(N) INTERIOR PARTITIONS WALLS & SOFFITS - TAPED AND READY FOR FINISH
03-25	(N) ACCESSIBLE ELEVATOR AND SHAFT- OTIS GEN2 ELEVATOR 3500 CAPACITY WITH FRONT AND BACK OPENINGS
03-30	(N) STRUCTURAL MOMENT FRAME - FINAL DESIGN TO BE COORDINATED - SSD
03-32	FUTURE RESTROOM BY TENANT - PROVIDE ROUGH-IN FOR FUTURE, VENITLATION, WATER AND SANITARY DRAINAGE HOOK-UP - LAYOUT TBD
03-33	FUTURE KITCHEN BY TENANT - PROVIDE ROUGH-IN FOR FUTURE VENTILATION, WATER AND SANITARY DRAINAGE HOOK-UP - LAYOUT TBD
03-35	4'(N) CLASS 1- BICYCLE PARKING- 4 SPACES
03-36	(N) CLASS 2- BICYLE PARKING- 2 SPACES
03-38	(N) ALUMINUM STOREFRONT SYSTEM AND ENTRY DOOR (SEE SHEET A8.17) TO MATCH FINISH AND MULLION SPACING OF ADJACENT SECTIONAL DOOR (SEE SHEET A8.16)
03-39	(N) STRUCTURAL SHOTCRETE WALL- FINAL DESIGN TO BE COORDINATED- SSD
03-68	60 MIN. DOOR
03-71	OVERHEAD SECURITY GRILLE CONCEALED IN OVERHEAD SOFFIT (OVERHEAD SECURITY GRILLE 676) - SECURITY GRILL SWITCH BE LOCATED IN THE INTERIOR FOR EXITING

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FINISHES

WALL TYPE LEGEND

- PROPOSED PARTIAL HEIGHT WALL
- PROPOSED FULL HEIGHT WALL
- PROPOSED 1- HOUR RATED WALL
- CONCRETE WALL-SSD
- EXISTING BUILDING WALL TO REMAIN

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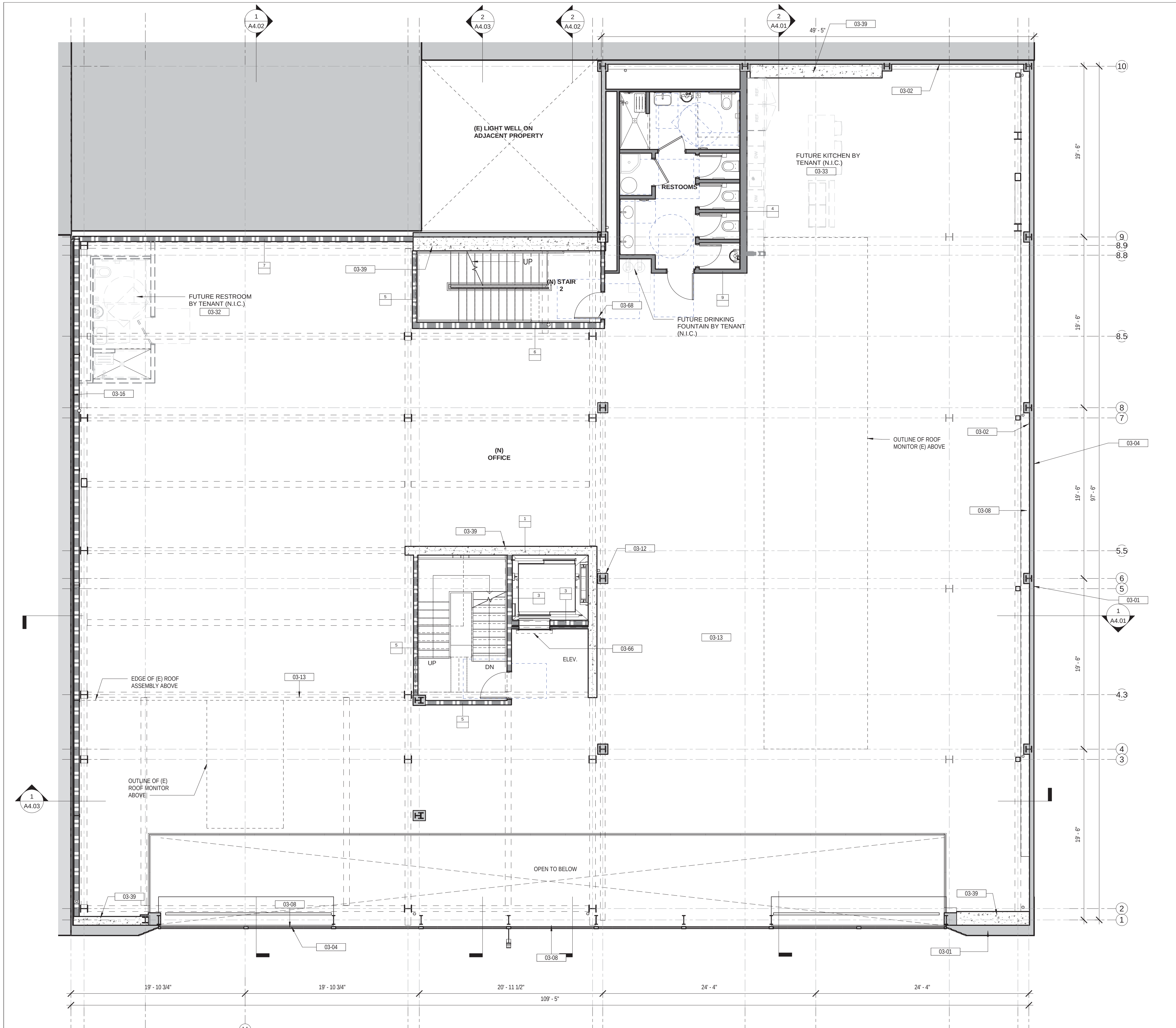
Proposed Plans- Shell & Core

A2.01



1 Level 2 - Shell & Structure
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600
03-02	CLEAN INTERIOR (E) CONCRETE WALLS PER CONSULTANT'S RECOMMENDATION AND LEAVE EXPOSED - U.O.N.
03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-08	EDGE OF FLOOR RECESSED FROM GLAZING; OPEN TO BELOW
03-12	KEEP (E) BUILDING STRUCTURE - REPAIR AND SEISMICALLY UPGRADE AS NECESSARY. (E) ROOF STRUCTURE & TRUSSES TO BE EXPOSED AND PAINTED BLACK
03-13	(N) LEVEL 2 STRUCTURE- SEE STRUCTURAL DRAWINGS - EXPOSED U.O.N.
03-16	KEEP (E) EXTERIOR CORRUGATED METAL WALL PANELS AND BUILD (N) FIRE RATED MTL. STUD & DRYWALL WALL ASSEMBLY FROM INSIDE
03-32	FUTURE RESTROOM BY TENANT - PROVIDE ROUGH-IN FOR FUTURE, VENITLATION, WATER AND SANITARY DRAINAGE HOOK-UP - LAYOUT TBD
03-33	FUTURE KITCHEN BY TENANT - PROVIDE ROUGH-IN FOR FUTURE VENTILATION, WATER AND SANITARY DRAINAGE HOOK-UP - LAYOUT TBD
03-39	(N) STRUCTURAL SHOTCRETE WALL- FINAL DESIGN TO BE COORDINATED- SSD
03-66	60 MIN. FIRE/SMOKE CURTAIN ICC APPROVED
03-68	60 MIN. DOOR

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

KEYNOTES - FINISHES

WALL TYPE LEGEND

- PROPOSED PARTIAL HEIGHT WALL
- PROPOSED FULL HEIGHT WALL
- PROPOSED 1- HOUR RATED WALL
- CONCRETE WALL-SSD
- EXISTING BUILDING WALL TO REMAIN

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Issues/ Revisions

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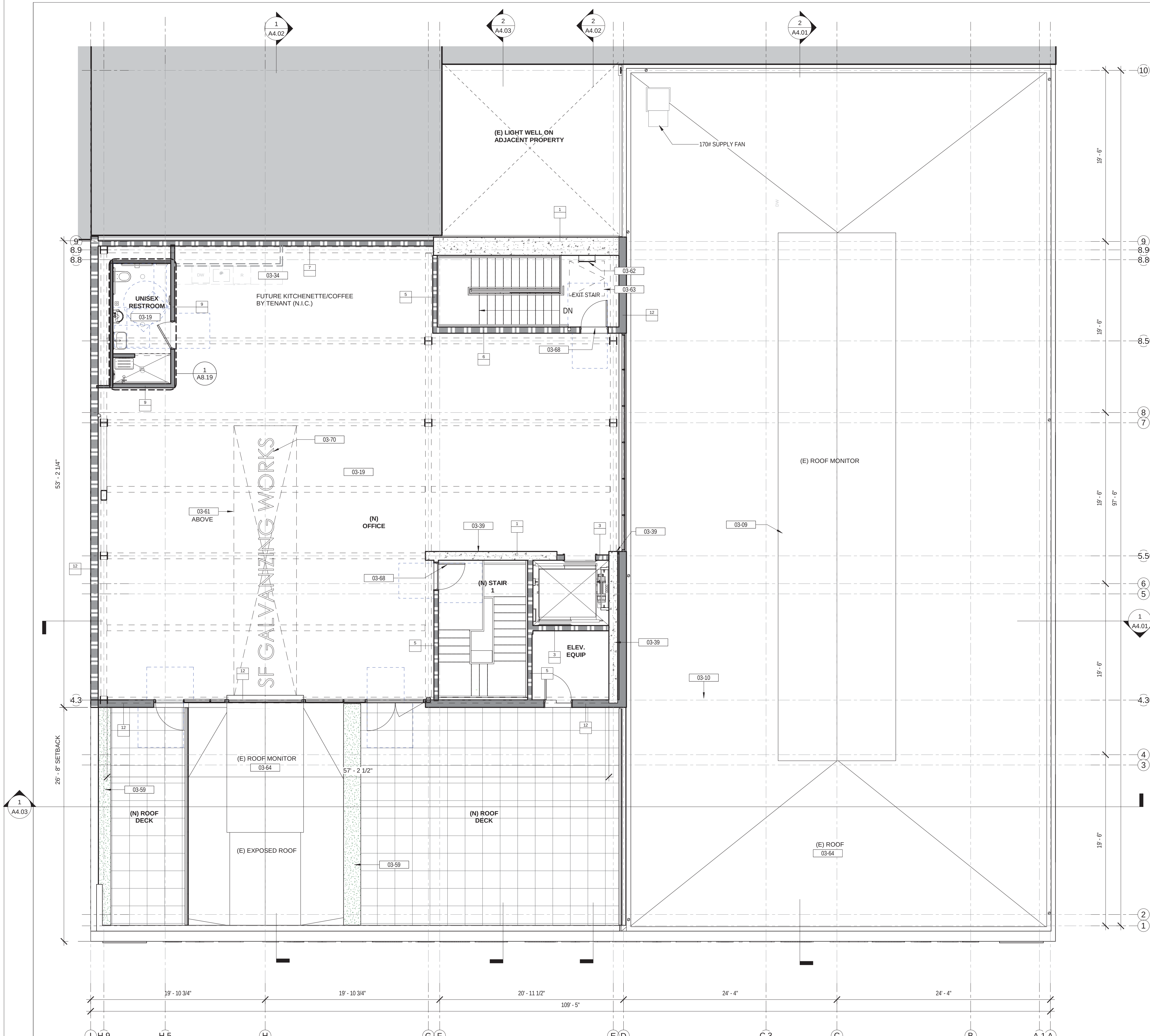
Scale: As indicated

Proposed Plans- Shell & Core

A2.02



1 (N) Level 3 - Shell & Structure
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-09	(E) CLERESTORY WINDOW OPENINGS AND FRAMES TO REMAIN - RESTORE IF MISSING. TYP. - REPLACE (E) GLAZING W/ INSULATED CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-10	REPLACE ROOF MEMBRANE INCLUDING ALL CLERESTORIES, PARAPETS & CURBS- INCLUDE INSULATION IN NEW ROOF ASSEMBLY. REPAIR AND REPLACE ROOFING AS NECESSARY
03-19	(N) ACCESSIBLE RESTROOMS W/ ACCESSIBLE SHOWERS - FULLY FINISHED W/ FIXTURES, PORCELAIN TILE FLOORS, WALLS AND PAINTED GYPSUM CEILINGS - FINAL FINISHES & FIXTURES TBD
03-34	FUTURE KITCHENETTE BY TENANT - PROVIDE ROUGH-IN FOR FUTURE VENTILATION, WATER AND SANITARY DRAINAGE HOOK-UP - LAYOUT TBD
03-39	(N) STRUCTURAL SHOTCRETE WALL- FINAL DESIGN TO BE COORDINATED- SSD
03-59	PLANTER, TYP.
03-61	GABLE SKYLIGHT
03-62	(N) ROOF ACCESS LADDER
03-63	(N) 4'X4' ROOF ACCESS HATCH (16SQFT MIN.)
03-64	(N) STANDING SEAM ROOF COVERING
03-68	60 MIN. DOOR
03-70	CUSTOM BRASS FLOOR INLAY-TEXT FONT AND STYLE TO MATCH EXISTING "SAN FRANCISCO GALVANIZING WORKS" SIGNAGE ON SOUTH ELEVATION - SEE SHEET A8.2 FOR REFERENCE

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FINISHES

WALL TYPE LEGEND

- PROPOSED PARTIAL HEIGHT WALL
- PROPOSED FULL HEIGHT WALL
- PROPOSED 1- HOUR RATED WALL
- CONCRETE WALL-SSD
- EXISTING BUILDING WALL TO REMAIN

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Issues/ Revisions

Issue #	Description	Date
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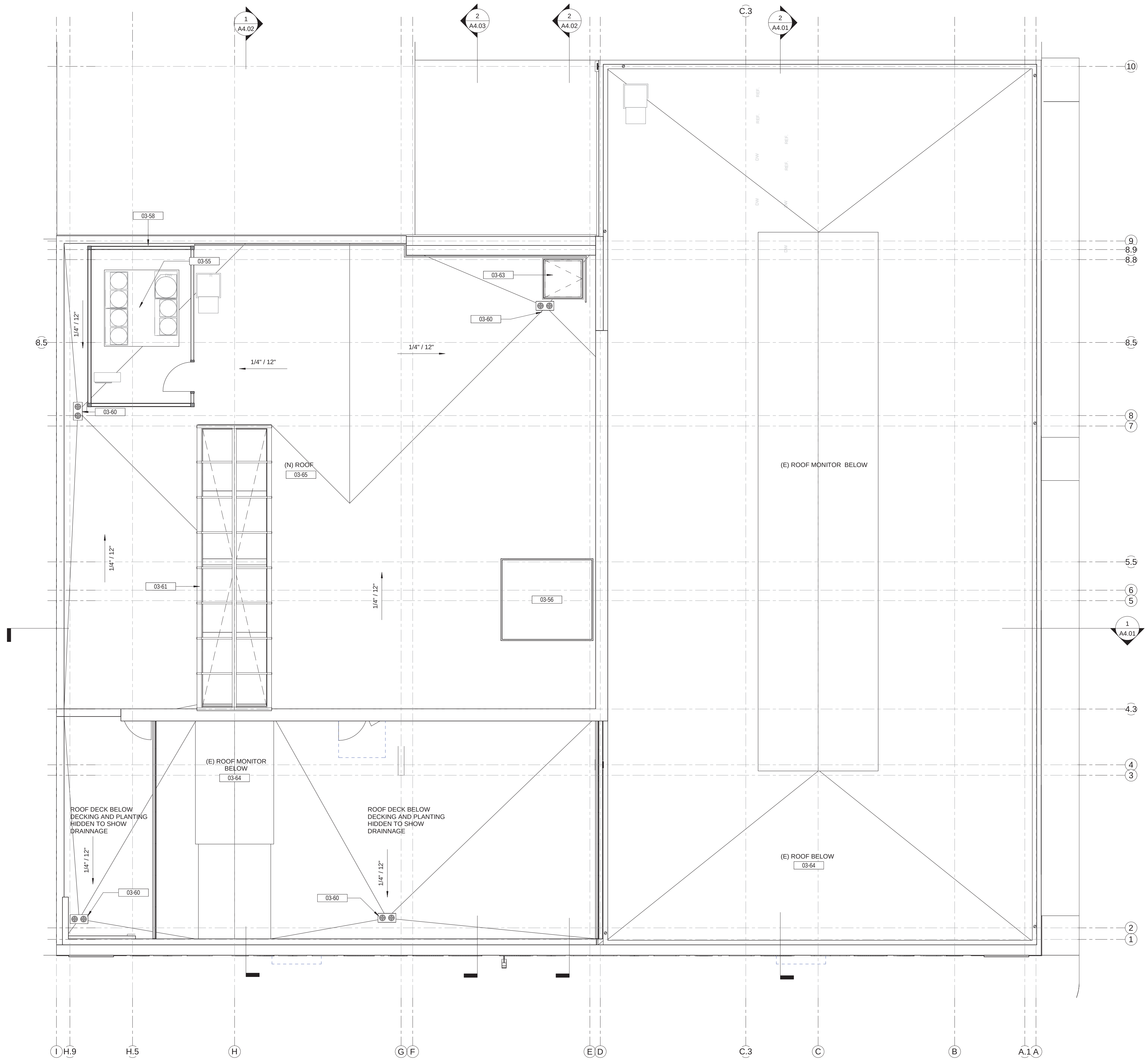
Scale: As indicated

Proposed Plan - Shell & Core

A2.03



1 ROOF PLAN
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-55	MECHANICAL EQUIPMENT
03-56	ELEVATOR OVERRUN PENTHOUSE
03-58	42" TALL OSHA COMPLIANT GUARD RAIL AROUND ROOFTOP EQUIPMENT FOR FALL PROTECTION
03-60	ROOF DRAIN WITH OVERFLOW-SEE PLUMBING DRAWINGS
03-61	GABLE SKYLIGHT
03-63	(N) 4'X4' ROOF ACCESS HATCH (16SQFT MIN.)
03-64	(N) STANDING SEAM ROOF COVERING
03-65	(N) BUILT-UP ROOF

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FINISHES

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Issues/ Revisions

Issue #	Description	Date
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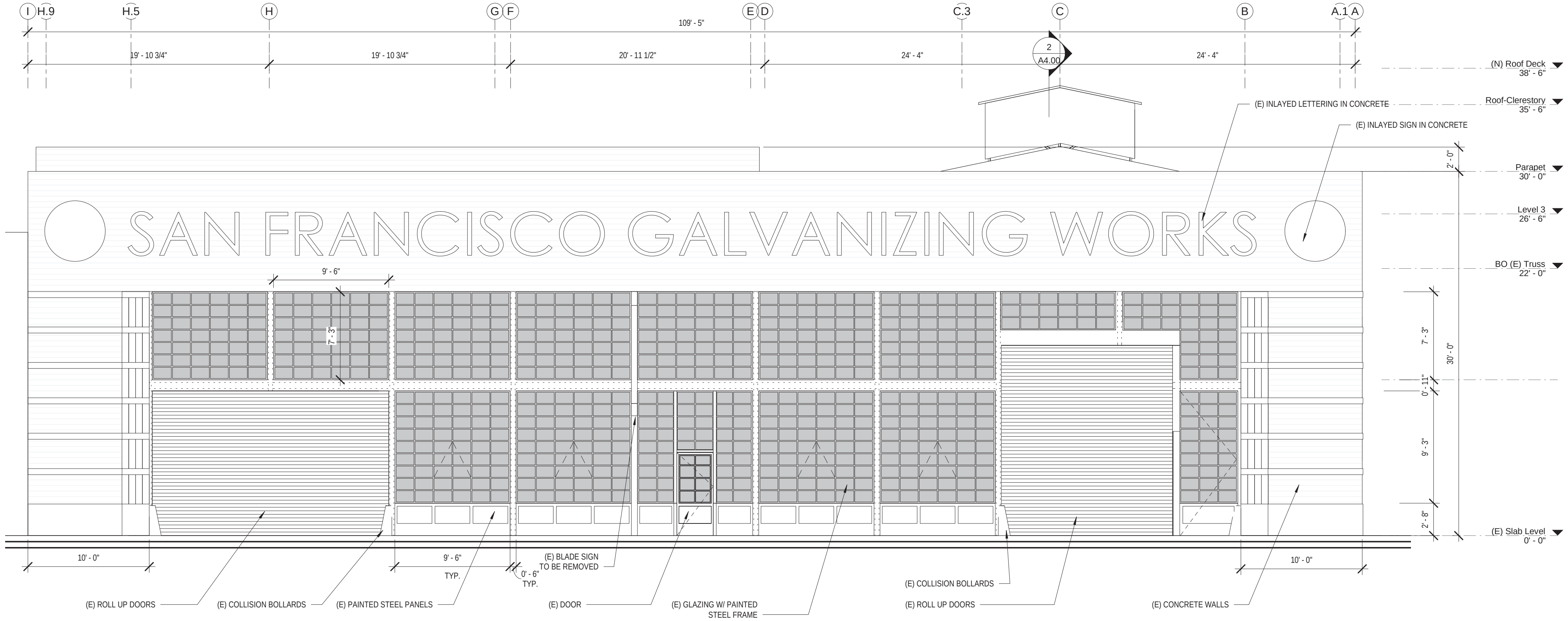
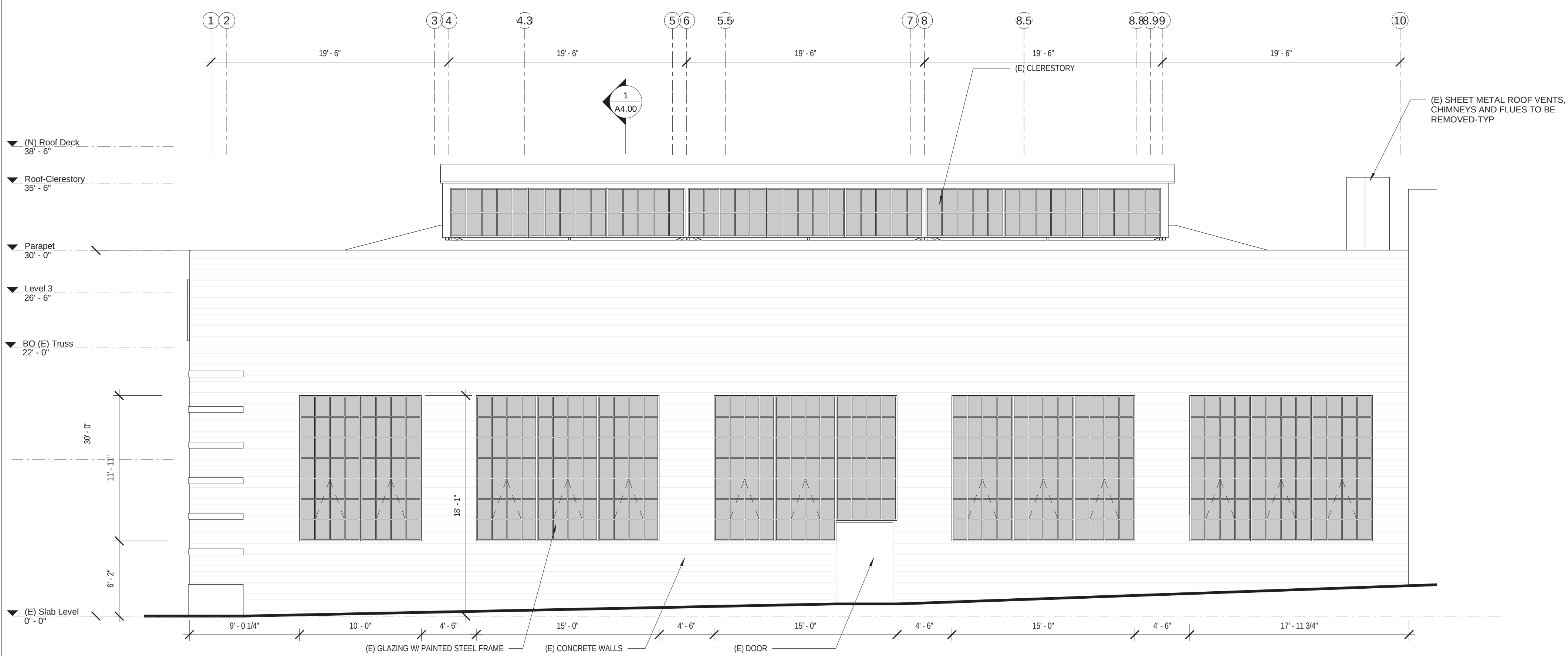
Scale: 3/16" = 1'-0"

Proposed Roof Plan- Shell & Structure

A2.04



2 Harrison Street Elevation
3/16" = 1'-0"



1 Berwick Place Elevation
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

KEYNOTES - FINISHES

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Issues/ Revisions

Issue #	Description	Date
		11/19/2018

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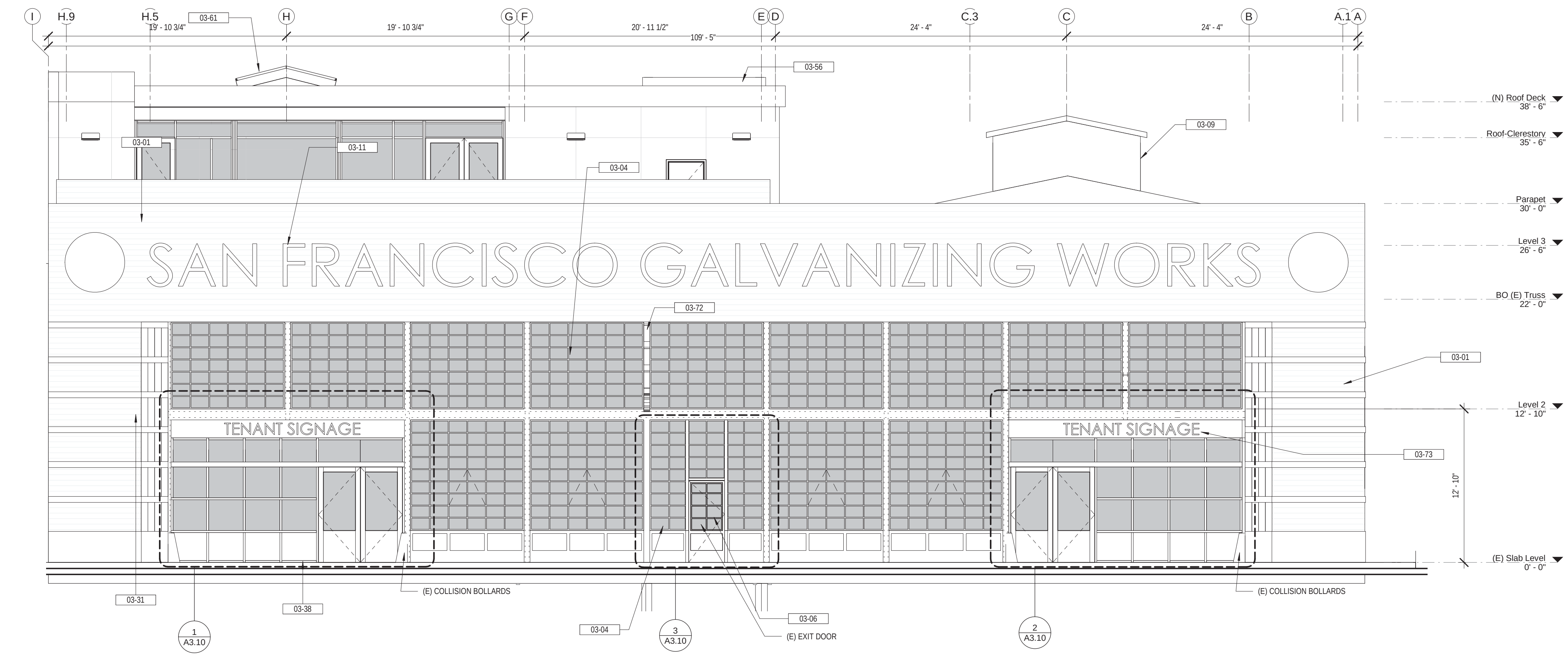
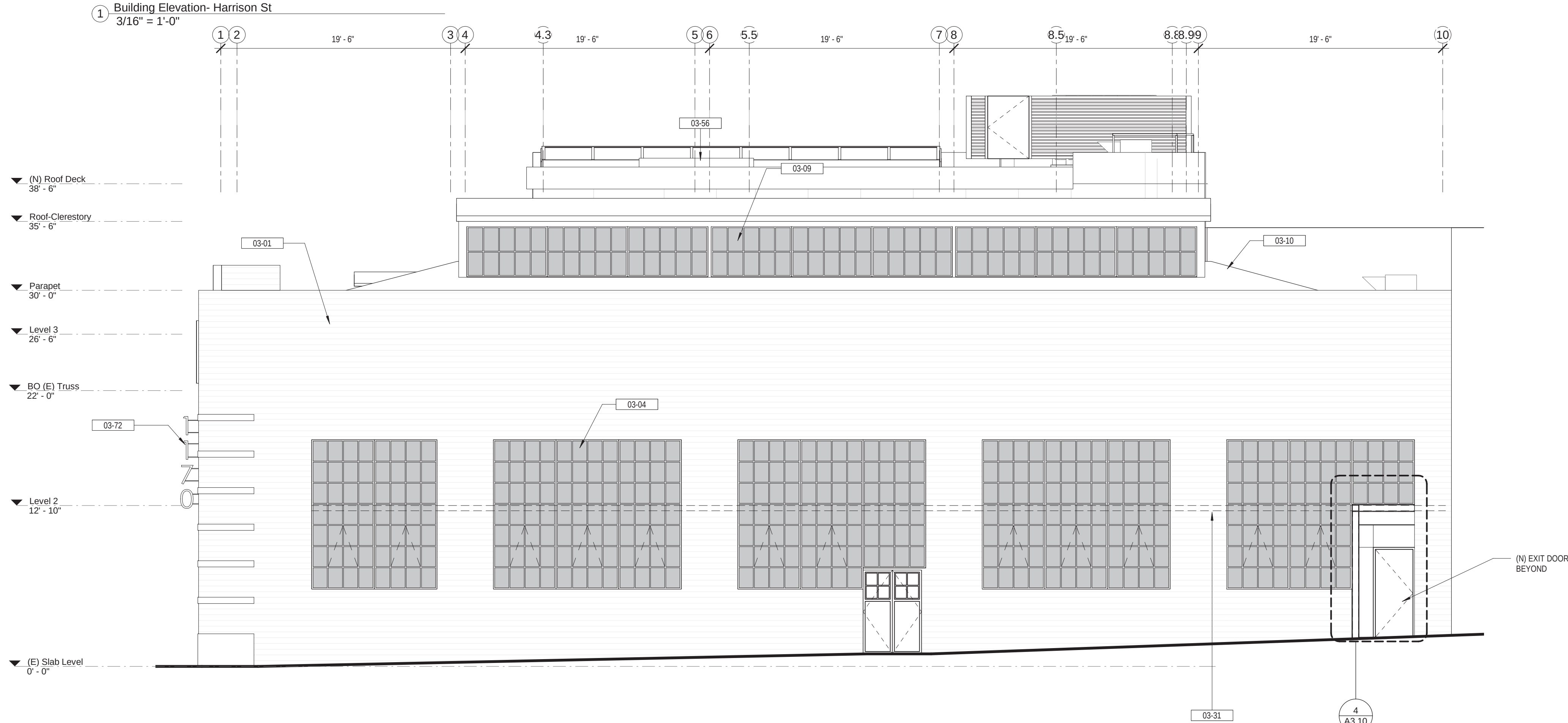
Scale: 3/16" = 1'-0"

Exterior Elevations - Existing

A3.00



1 Building Elevation- Harrison St
3/16" = 1'-0"



2 Building Elevation - East
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600
03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-06	(E) EXTERIOR DOOR TO REMAIN AND TO BE ADA ACCESSIBLE. REPAIR DOOR FRAME AND HINGES. REPLACE GLAZING W/ CLEAR PANES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-09	(E) CLERESTORY WINDOW OPENINGS AND FRAMES TO REMAIN - RESTORE IF MISSING. TYP. - REPLACE (E) GLAZING W/ INSULATED CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-10	REPLACE ROOF MEMBRANE INCLUDING ALL CLERESTORIES, PARAPETS & CURBS- INCLUDE INSULATION IN NEW ROOF ASSEMBLY. REPAIR AND REPLACE ROOFING AS NECESSARY
03-11	(E) INLAYED LETTERING IN (E) CONCRETE TO REMAIN. REPAIR AND PAINT DARK GRAY
03-31	LINE OF (N) LEVEL 2 MEZZANINE
03-38	(N) ALUMINUM STOREFRONT SYSTEM AND ENTRY DOOR (SEE SHEET A8.17) TO MATCH FINISH AND MULLION SPACING OF ADJACENT SECTIONAL DOOR (SEE SHEET A8.16)
03-56	ELEVATOR OVERRUN PENTHOUSE
03-61	GABLE SKYLIGHT
03-72	PROJECTING ADDRESS SIGN-18"T NUMERALS
03-73	TENANT SIGNAGE TO BE APPROVED BY OWNER AND PLANNER

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

KEYNOTES - FINISHES

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Issue #	Description	Date
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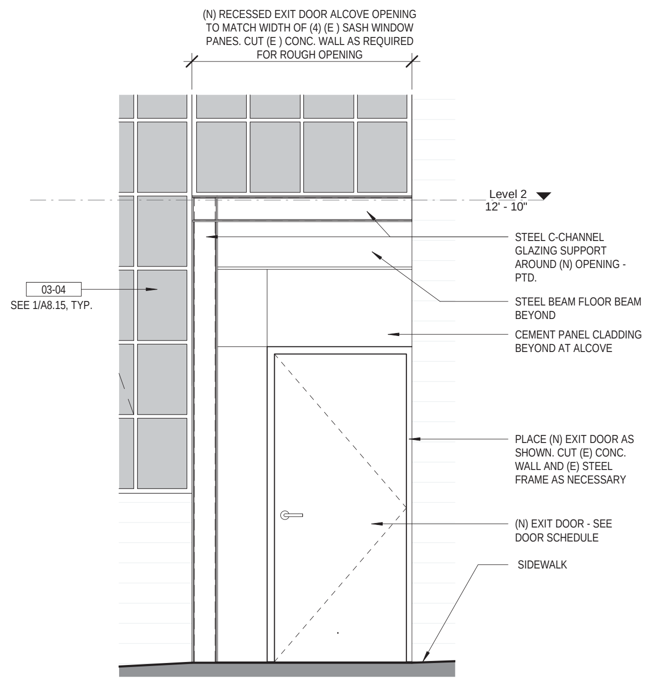
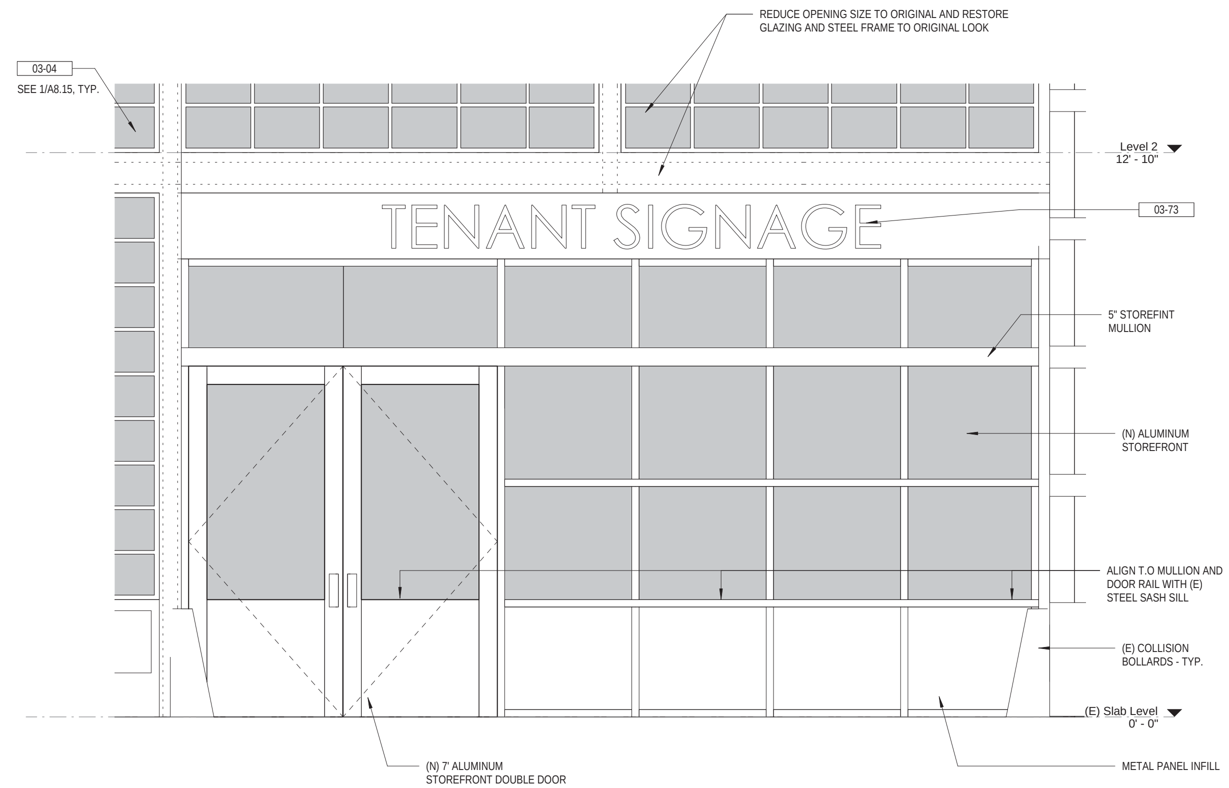
Scale: 3/16" = 1'-0"

Exterior Elevations - Shell & Core

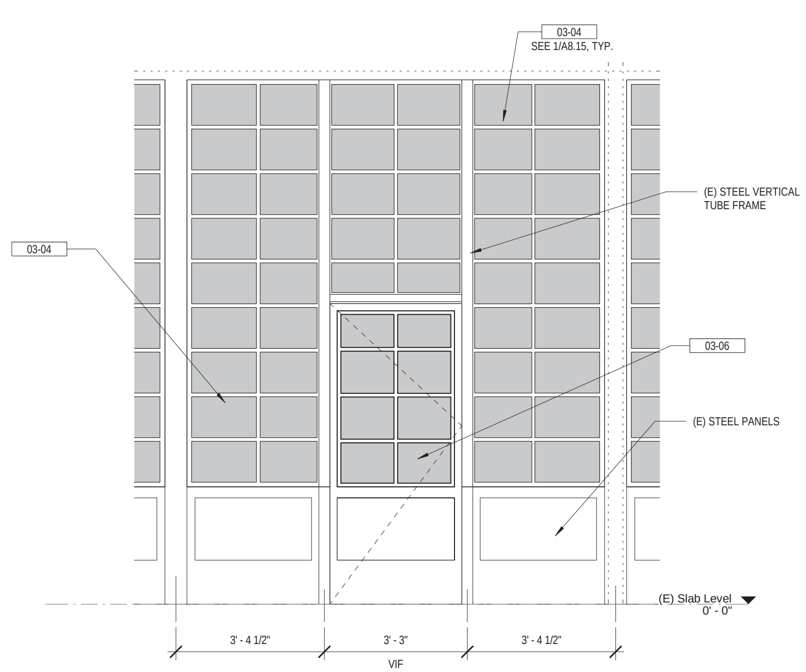
A3.01



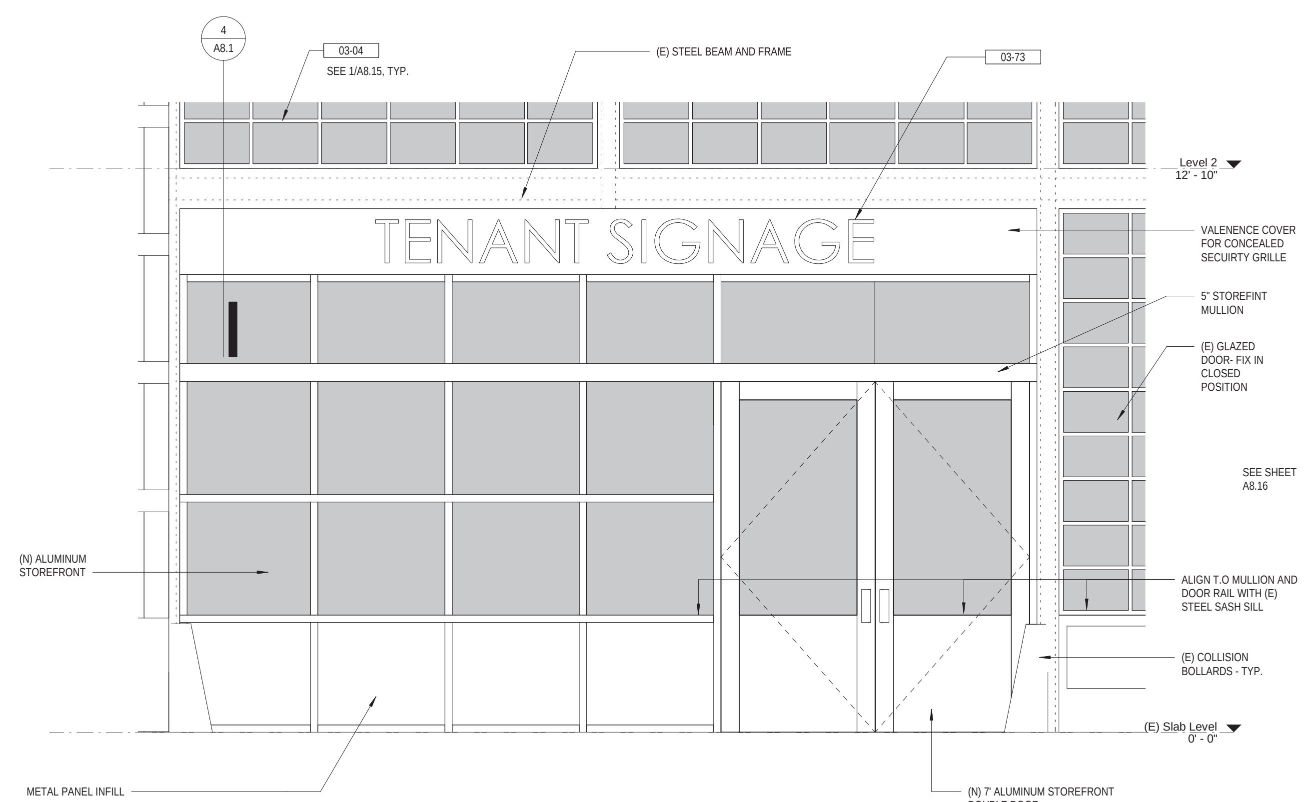
4 Exterior Exit Door
1/2" = 1'-0"



2 Storefront and Double Doors
1/2" = 1'-0"



3 Entry door
1/2" = 1'-0"



1 Storefront and Double Doors
1/2" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-06	(E) EXTERIOR DOOR TO REMAIN AND TO BE ADA ACCESSIBLE. REPAIR DOOR FRAME AND HINGES. REPLACE GLAZING W/ CLEAR PANES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-73	TENANT SIGNAGE TO BE APPROVED BY OWNER AND PLANNER

KEYNOTES - FINISHES

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		11/19/2018

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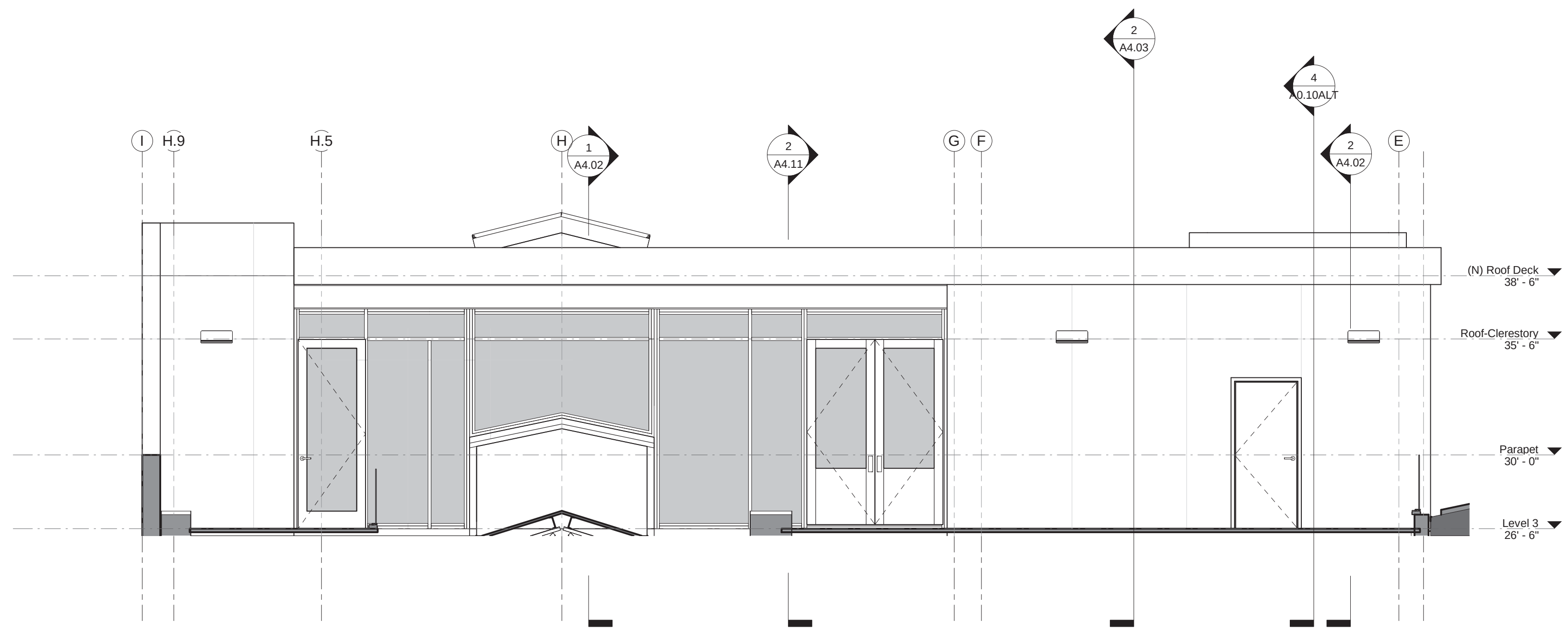
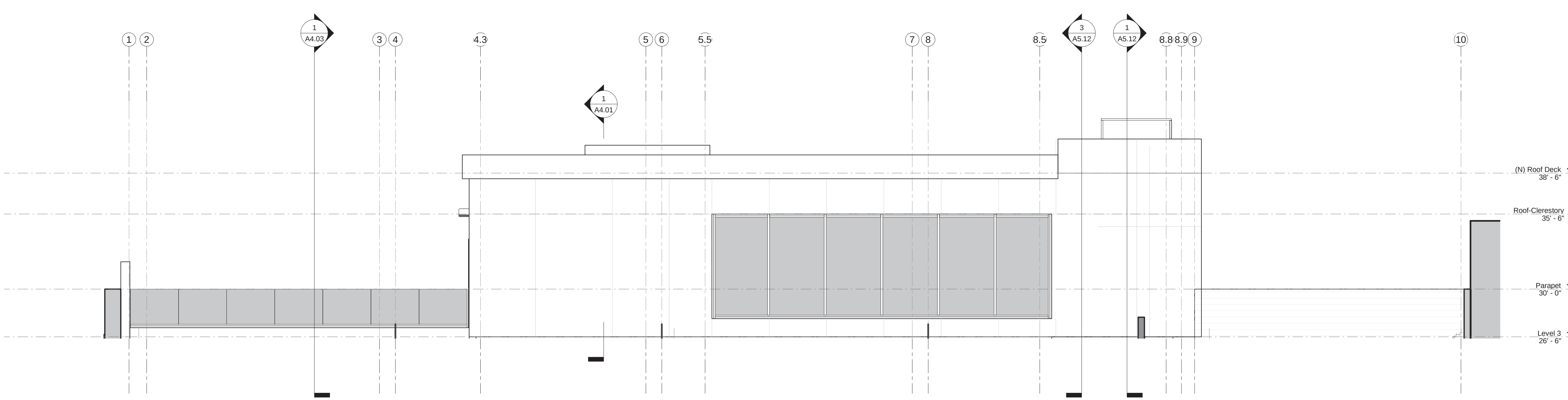
Scale: 1/2" = 1'-0"

Enlarged Exterior Elevations

A3.10



2 Enlarged Building Elevation - Harrison St
1/4" = 1'-0"



1 Enlarged Building Elevation - East
1/4" = 1'-0"

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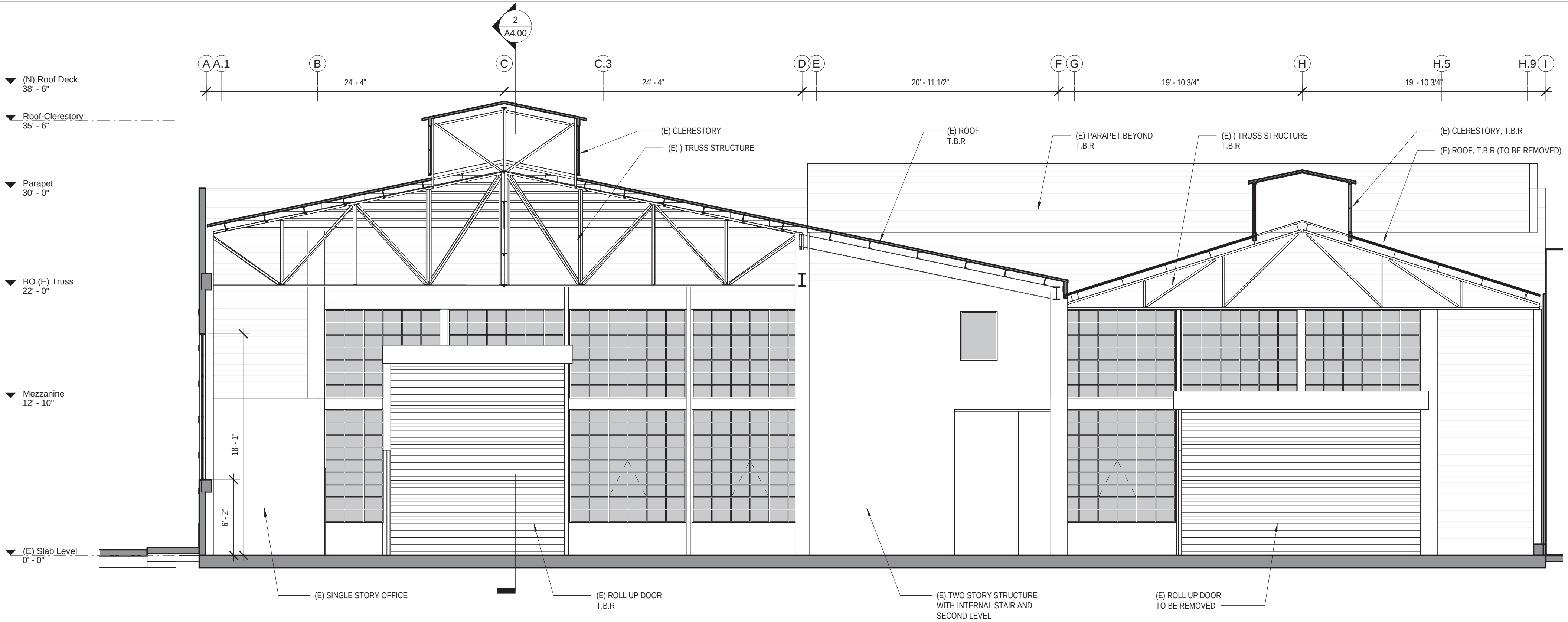
Checked By: -

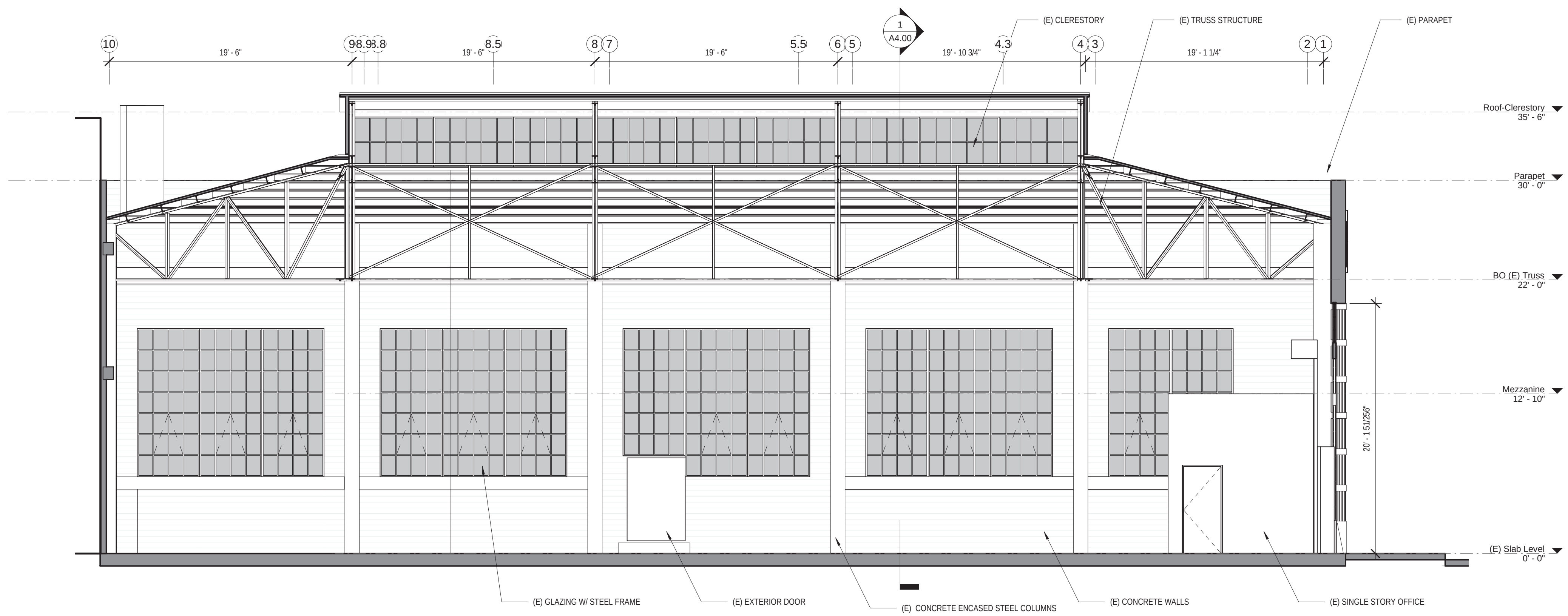
Scale: 1/4" = 1'-0"

Enlarged Exterior Elevations - Cont.

A3.11



1 (E) Building Section E-W
3/16" = 1'-0"



2 (E) Building Section N-S
3/16" = 1'-0"

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1170 Harrison Street

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Issues/ Revisions

Issue #	Description	Date
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Print Date: 11/19/2018 4:50:00 PM

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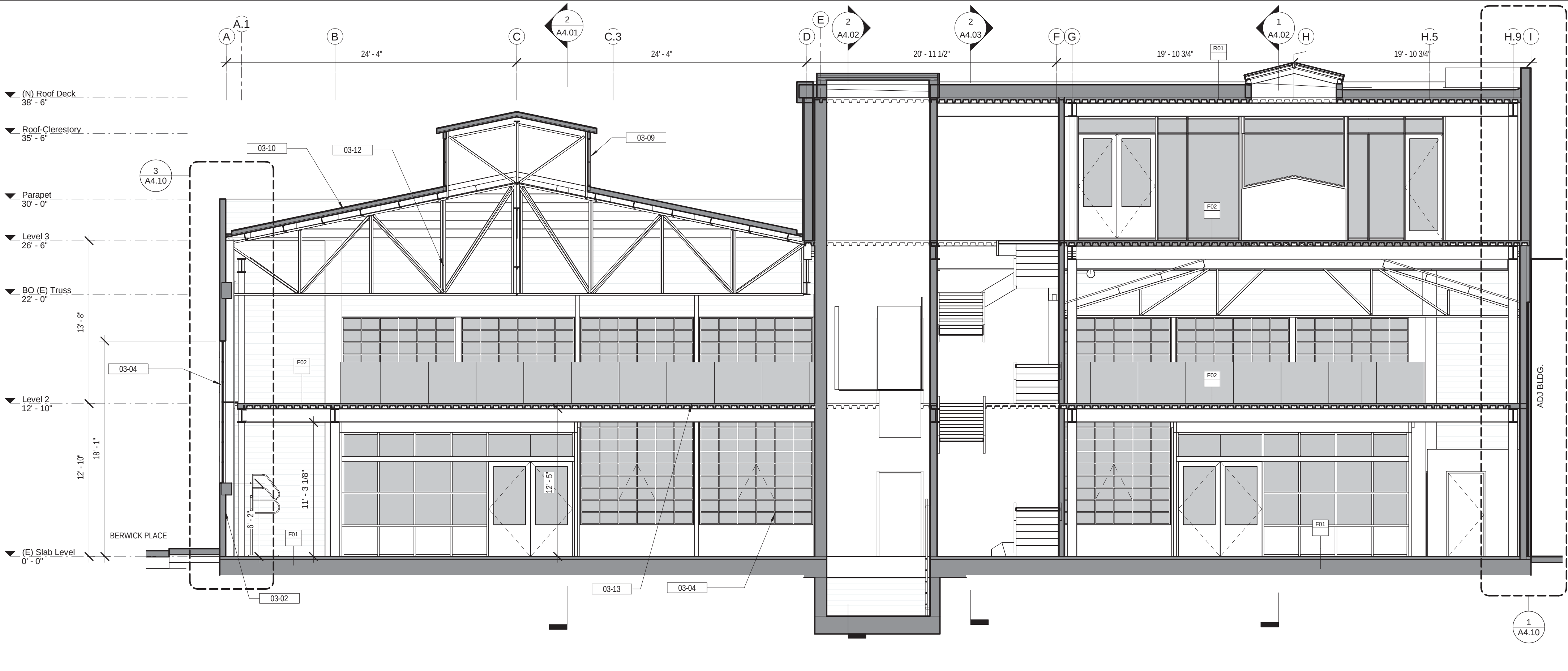
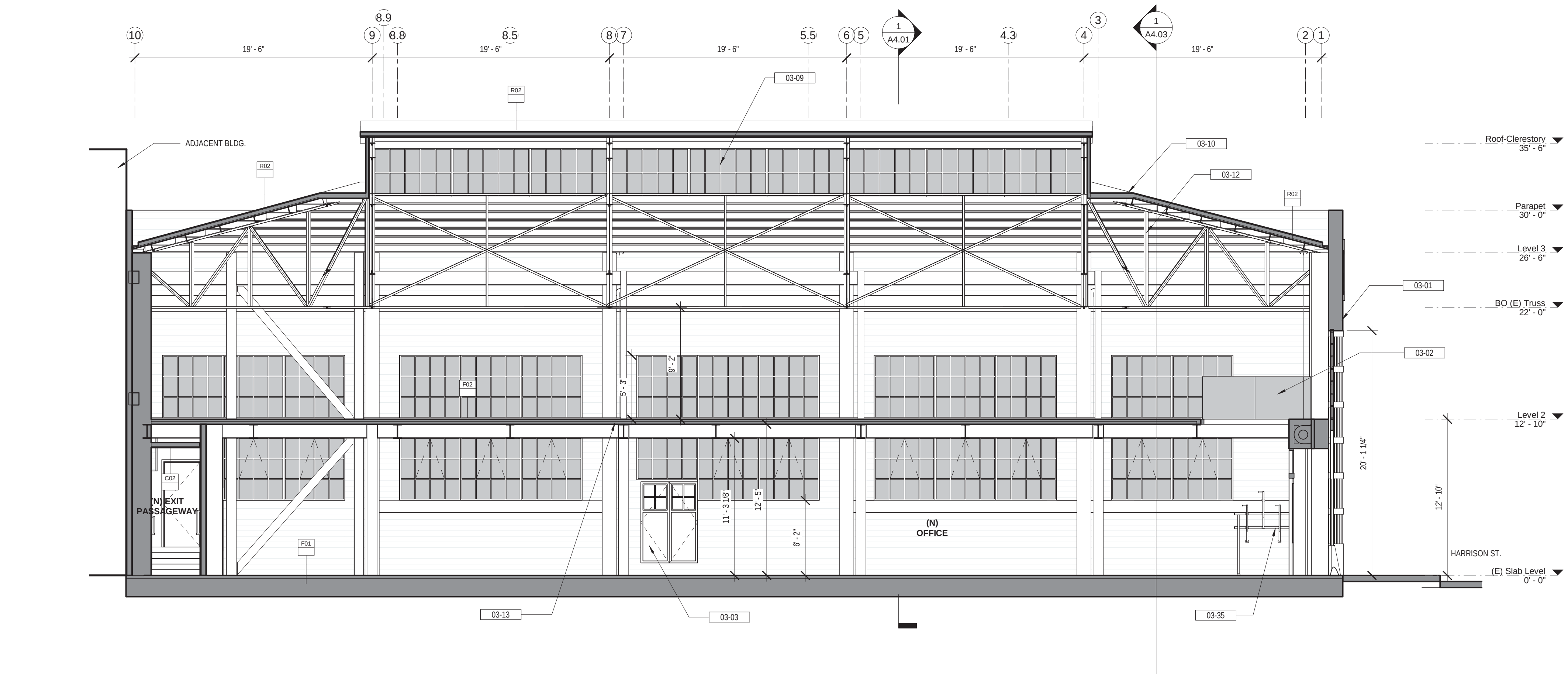
Scale: 3/16" = 1'-0"

Building Sections- Existing

A4.00



1 Building Section E-W - Shell & Core
3/16" = 1'-0"



2 Building Section N-S - 1- Shell & Core
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600
03-02	CLEAN INTERIOR (E) CONCRETE WALLS PER CONSULTANT'S RECOMMENDATION AND LEAVE EXPOSED - U.O.N.
03-03	REMOVE EXISTING DOORS AND BUILD A GAS METER ALCOVE FOR 4 METERS IN PLACE OF THE DOOR OPENING. ALCOVE ENCLOSURE TO BE CONCRETE INCLUDING CEILING AND OPEN TO OUTSIDE. MATCH CONCRETE COLOR TO EXISTING CONC. WALLS
03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-09	(E) CLERESTORY WINDOW OPENINGS AND FRAMES TO REMAIN - RESTORE IF MISSING. TYP. - REPLACE (E) GLAZING W/ INSULATED CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-10	REPLACE ROOF MEMBRANE INCLUDING ALL CLERESTORIES, PARAPETS & CURBS- INCLUDE INSULATION IN NEW ROOF ASSEMBLY. REPAIR AND REPLACE ROOFING AS NECESSARY
03-12	KEEP (E) BUILDING STRUCTURE - REPAIR AND SEISMICALLY UPGRADE AS NECESSARY. (E) ROOF STRUCTURE & TRUSSES TO BE EXPOSED AND PAINTED BLACK
03-13	(N) LEVEL 2 STRUCTURE- SEE STRUCTURAL DRAWINGS - EXPOSED U.O.N.
03-35	4'(N) CLASS 1- BICYCLE PARKING- 4 SPACES

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

KEYNOTES - FINISHES

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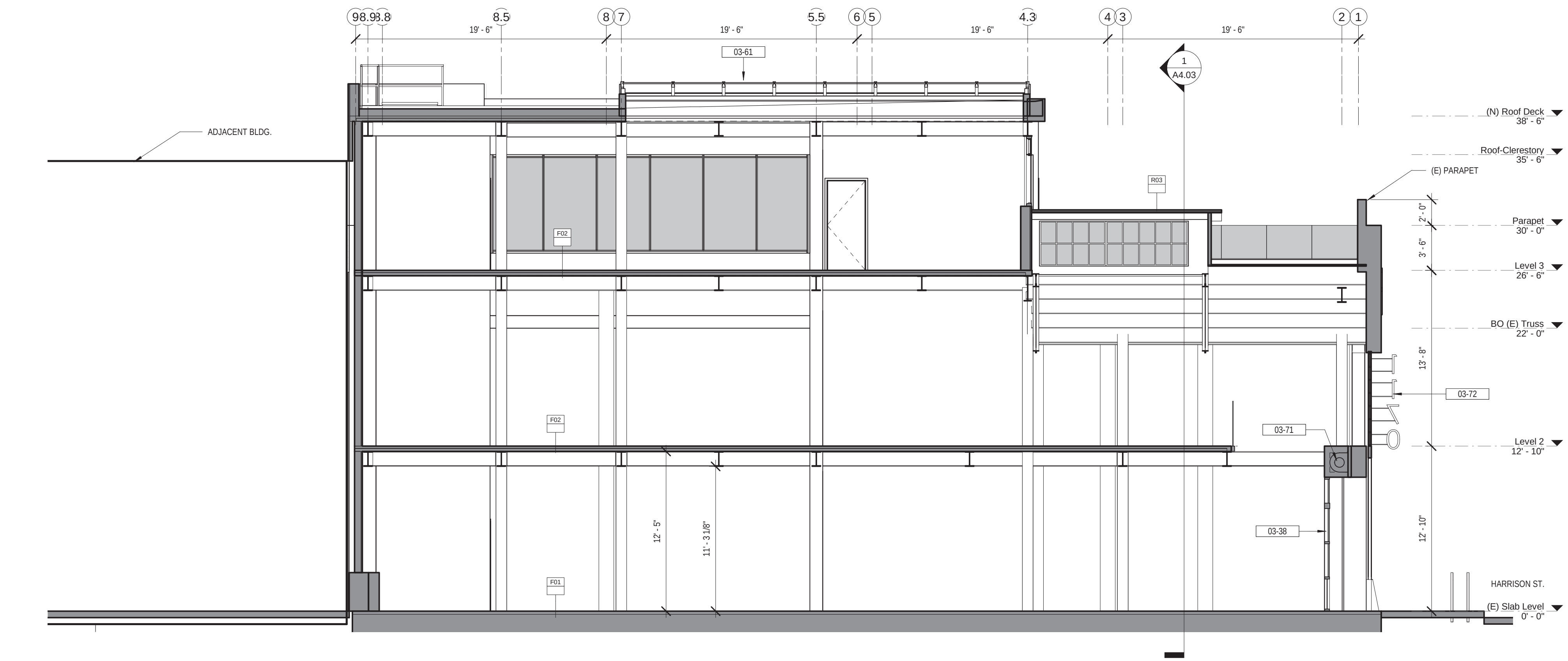
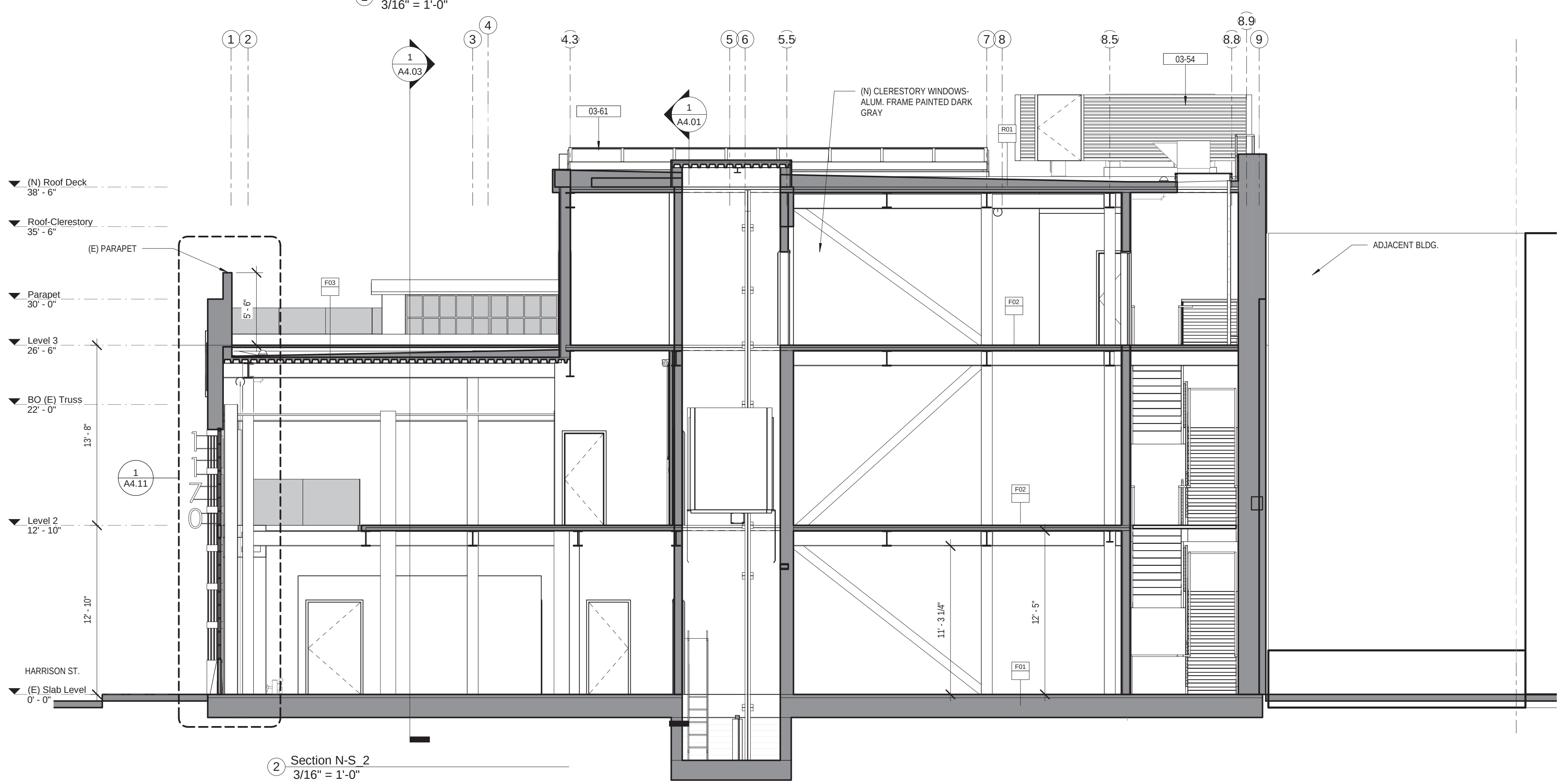
Scale: 3/16" = 1'-0"

Building Sections- Shell & Core

A4.01



1 Section N-S - S&C - 2
3/16" = 1'-0"



2 Section N-S_2
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-38	(N) ALUMINUM STOREFRONT SYSTEM AND ENTRY DOOR (SEE SHEET A8.17) TO MATCH FINISH AND MULLION SPACING OF ADJACENT SECTIONAL DOOR (SEE SHEET A8.16)
03-54	ROOF TOP EQUIPMENT SCREEN
03-61	GABLE SKYLIGHT
03-71	OVERHEAD SECURITY GRILLE CONCEALED IN OVERHEAD SOFFIT (OVERHEAD SECURITY GRILLE 676) - SECURITY GRILL SWITCH BE LOCATED IN THE INTERIOR FOR EXITING
03-72	PROJECTING ADDRESS SIGN-18"T NUMERALS

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

KEYNOTES - FINISHES

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Issues/ Revisions

Issue #	Description	Date
		11/19/2018

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Drawn By: -

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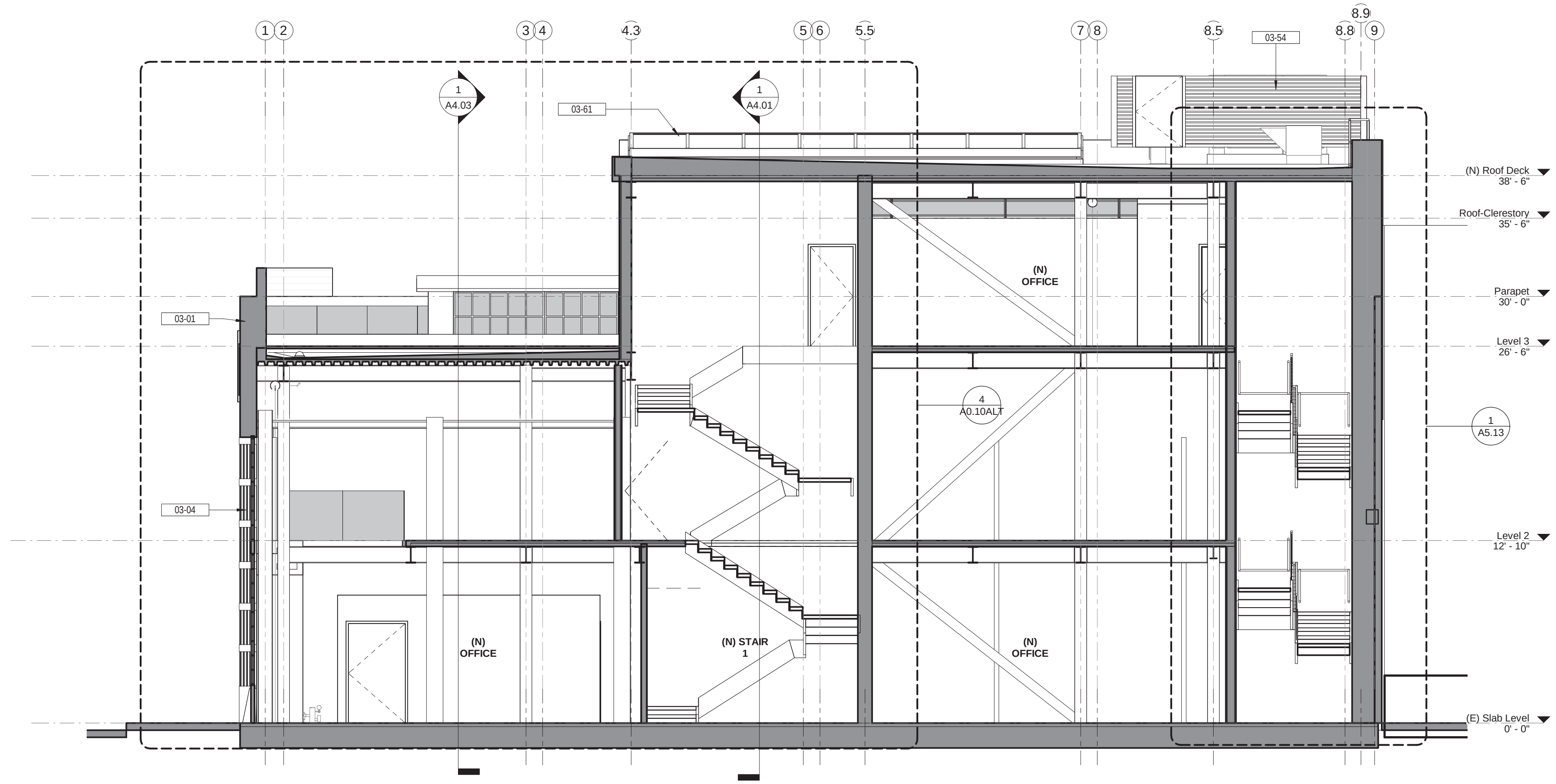
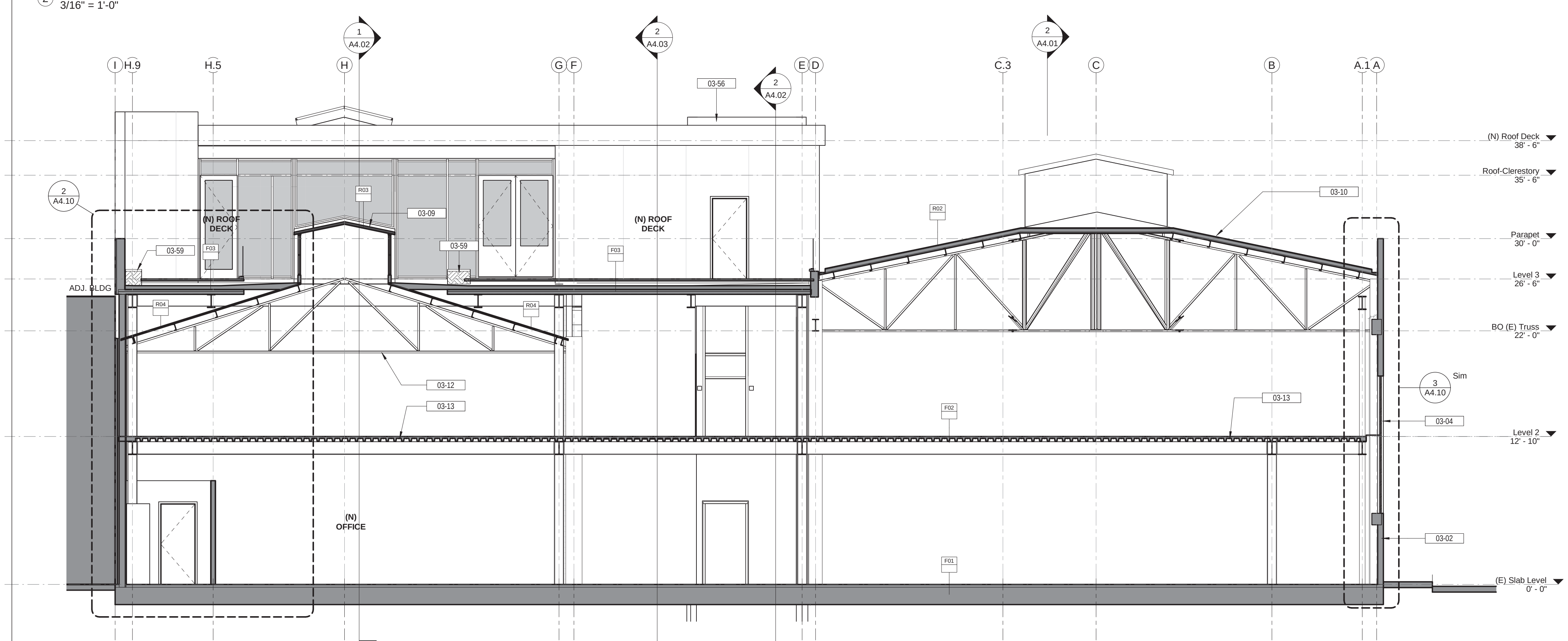
Scale: 3/16" = 1'-0"

Building Sections- Shell & Core

A4.02



2 Building Section N-S - Shell & Core
3/16" = 1'-0"



1 Building Section E-W - Shell & Core
3/16" = 1'-0"

KEYNOTES - GENERAL

KEYNOTES - BUILDING SHELL & CORE

03-01	(E) CONCRETE WALL EXTERIOR FACE - CLEAN AND SCRAPE AWAY ALL LOOSE MATERIAL. GRIND OUT ALL HORIZONTAL COLD JOINTS, APPLY BOND BREAKER & SEAL. GRIND OUT ALL LOCATIONS WHERE STEEL DOOR & WINDOW FRAMES OR SUPPORTS MEET CAST WALL, APPLY BOND BREAKER & SEAL . APPLY BREATHABLE MASONRY PAINT COATING TO EXTERIOR SURFACE. PAINT COLOR: BENJAMIN MOORE 'TIMBER WOLF' #1600
03-02	CLEAN INTERIOR (E) CONCRETE WALLS PER CONSULTANT'S RECOMMENDATION AND LEAVE EXPOSED - U.O.N.
03-04	(E) HISTORIC WINDOW OPENINGS AND FRAMES TO REMAIN - TYP. REPLACE (E) GLAZING W/ 1/4" CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES AND SASH. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-09	(E) CLERESTORY WINDOW OPENINGS AND FRAMES TO REMAIN - RESTORE IF MISSING. TYP. - REPLACE (E) GLAZING W/ INSULATED CLEAR PANES. SPOT PRIME & PAINT ALL METAL FRAMES. PAINT FRAMES. PAINT COLOR: BENJAMIN MOORE 'NIGHTFALL' #1596
03-10	REPLACE ROOF MEMBRANE INCLUDING ALL CLERESTORIES, PARAPETS & CURBS- INCLUDE INSULATION IN NEW ROOF ASSEMBLY. REPAIR AND REPLACE ROOFING AS NECESSARY
03-12	KEEP (E) BUILDING STRUCTURE - REPAIR AND SEISMICALLY UPGRADE AS NECESSARY. (E) ROOF STRUCTURE & TRUSSES TO BE EXPOSED AND PAINTED BLACK
03-13	(N) LEVEL 2 STRUCTURE- SEE STRUCTURAL DRAWINGS - EXPOSED U.O.N.
03-54	ROOF TOP EQUIPMENT SCREEN
03-56	ELEVATOR OVERRUN PENTHOUSE
03-59	PLANTER, TYP.
03-61	GABLE SKYLIGHT

KEYNOTES - STAIRS

KEYNOTES - DOORS, WINDOWS, & LOUVERS

KEYNOTES - FURNITURE, FIXTURE, & EQUIPMENT

KEYNOTES - FINISHES

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Issues/ Revisions

Issue #	Description	Date
		11/19/2018

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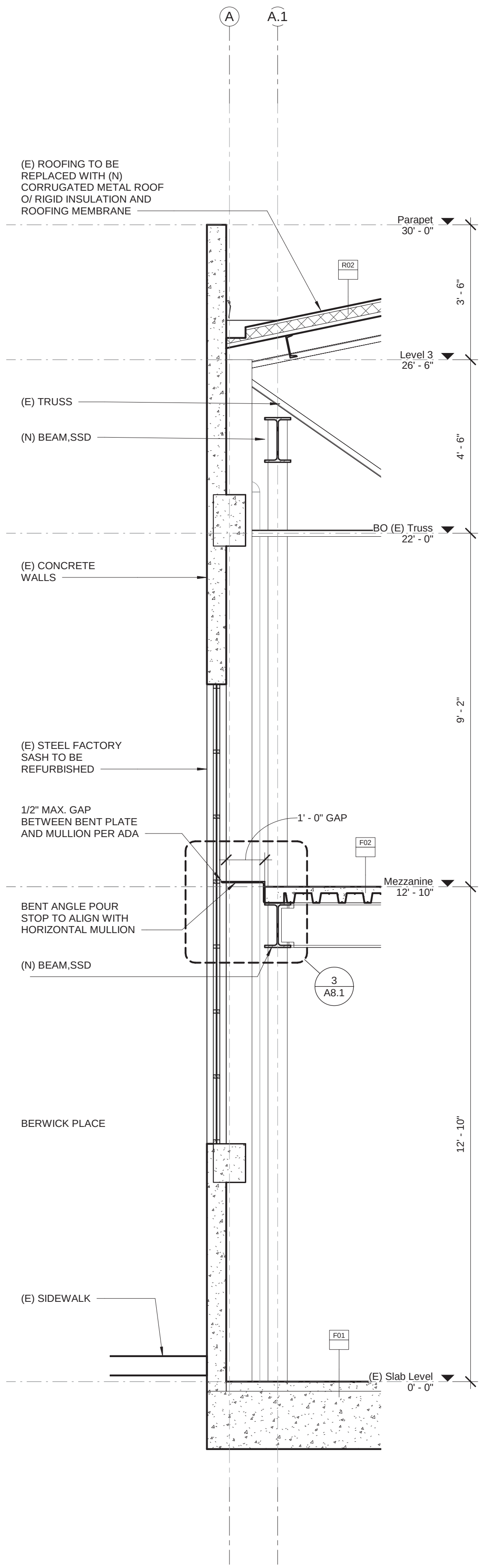
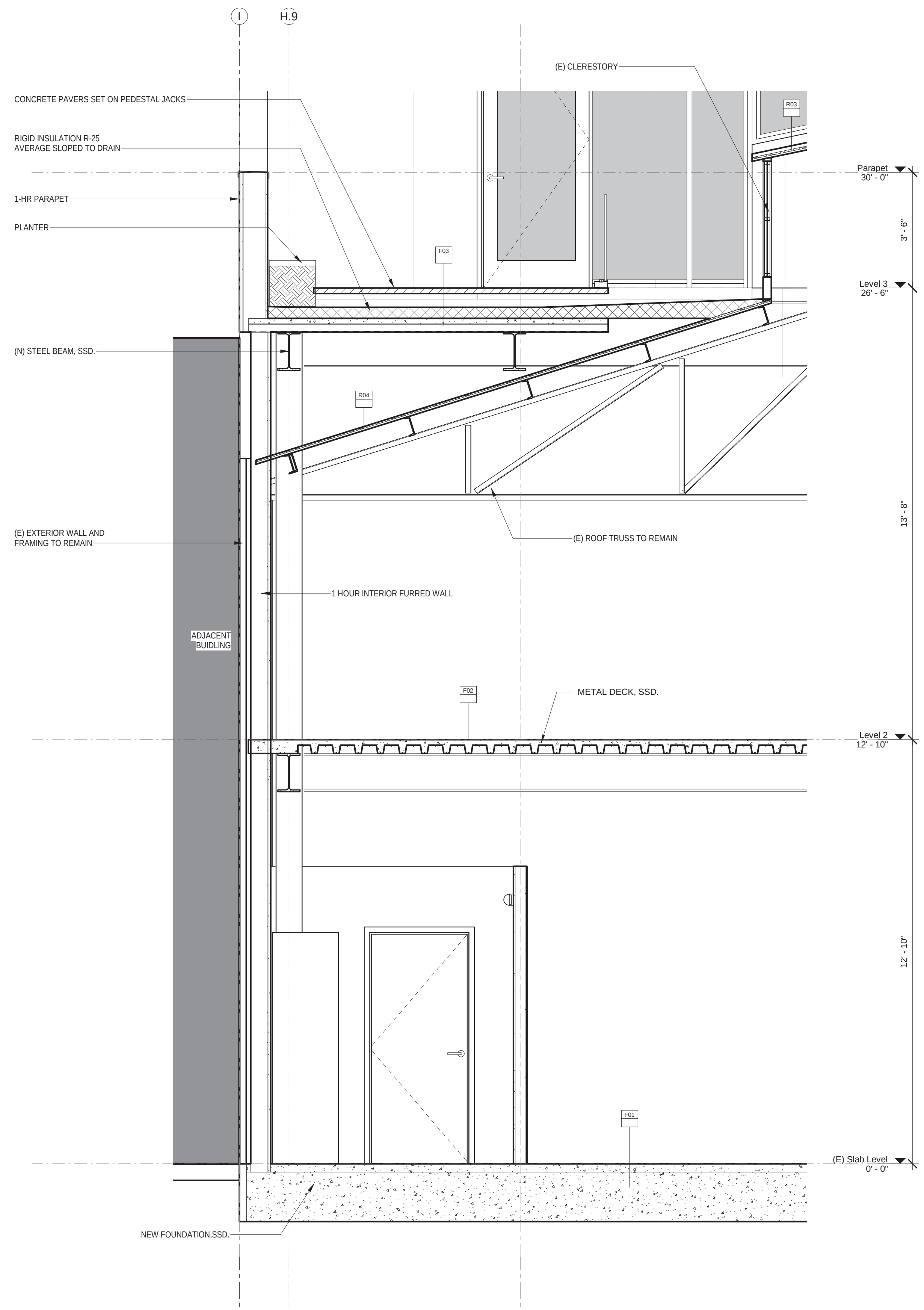
Scale: 3/16" = 1'-0"

Building Sections- Shell & Core

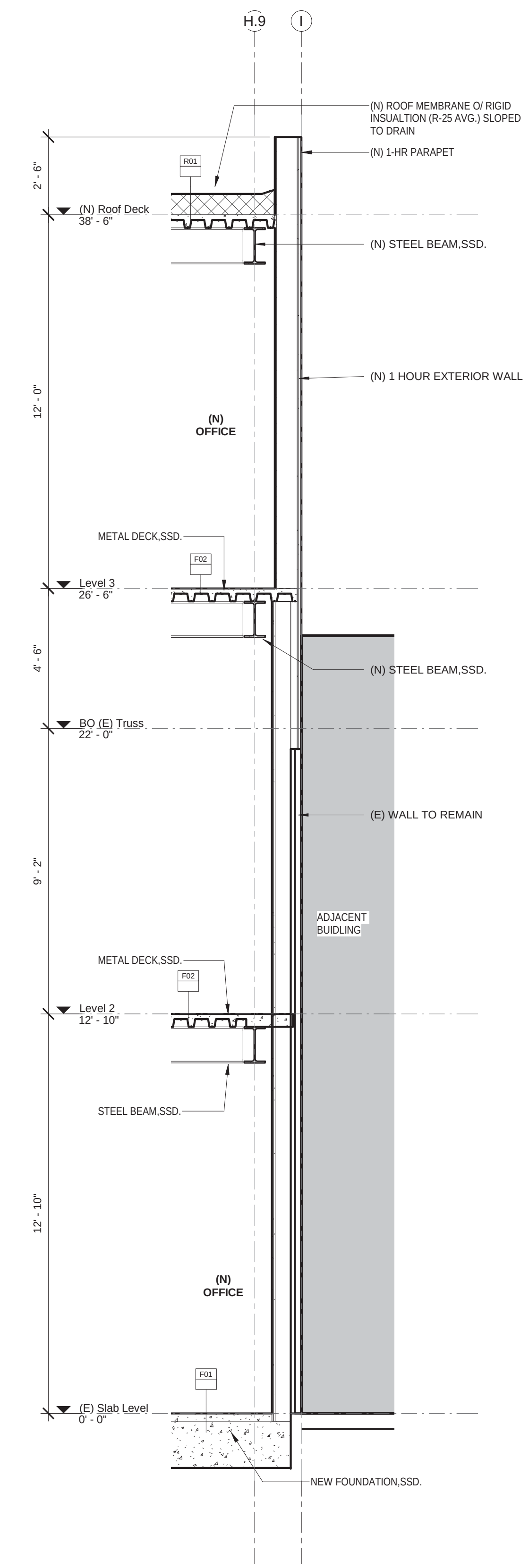
A4.03



3 Wall Section E-W - Gridline A
1/2" = 1'-0"



2 Wall Section E-W - Third Floor Terrace
1/2" = 1'-0"



1 Wall Section E-W - Gridline I
3/8" = 1'-0"

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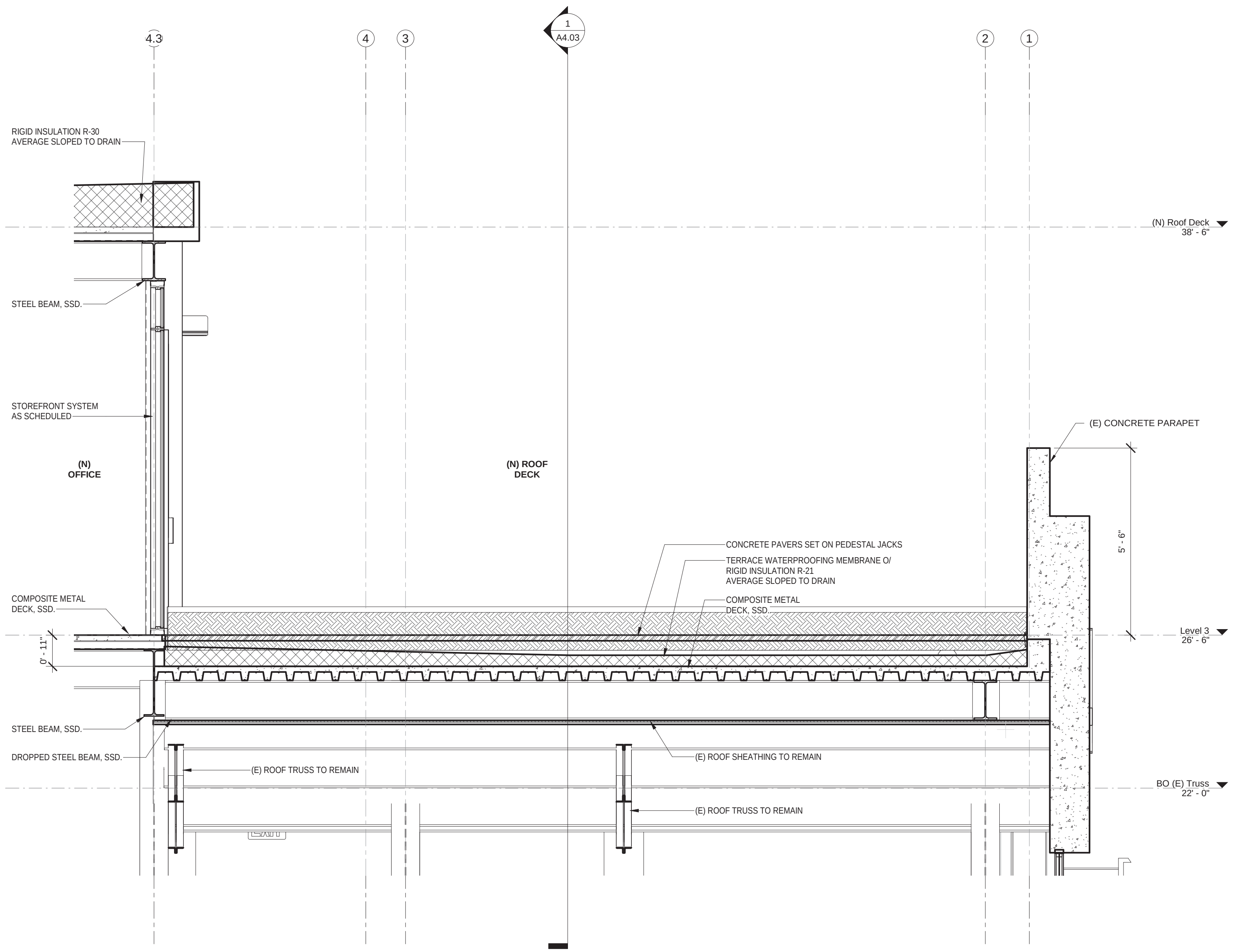
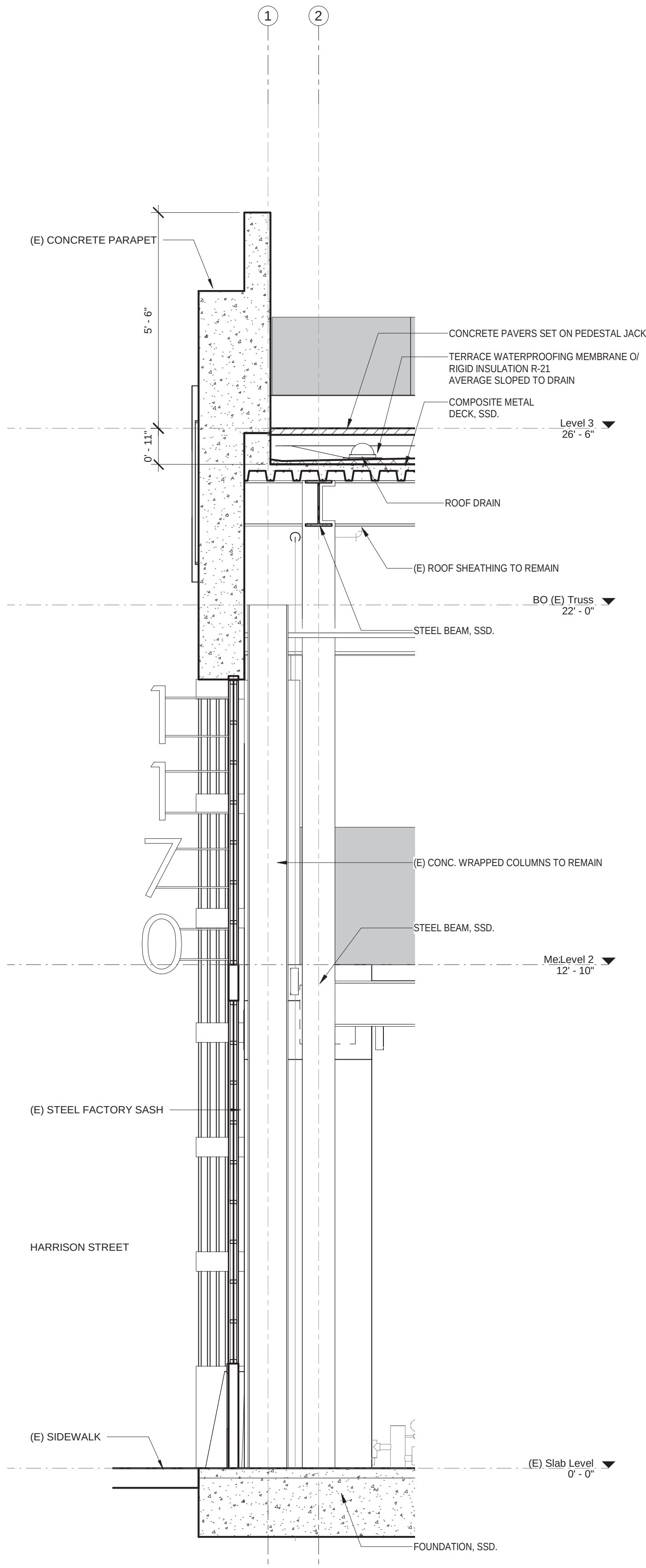
Scale: As indicated

Wall Sections

A4.10



2 Wall Section N-S - Roof Deck
1/2" = 1'-0"



1 Wall Section N-S - Lobby
1/2" = 1'-0"

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Scale: 1/2" = 1'-0"

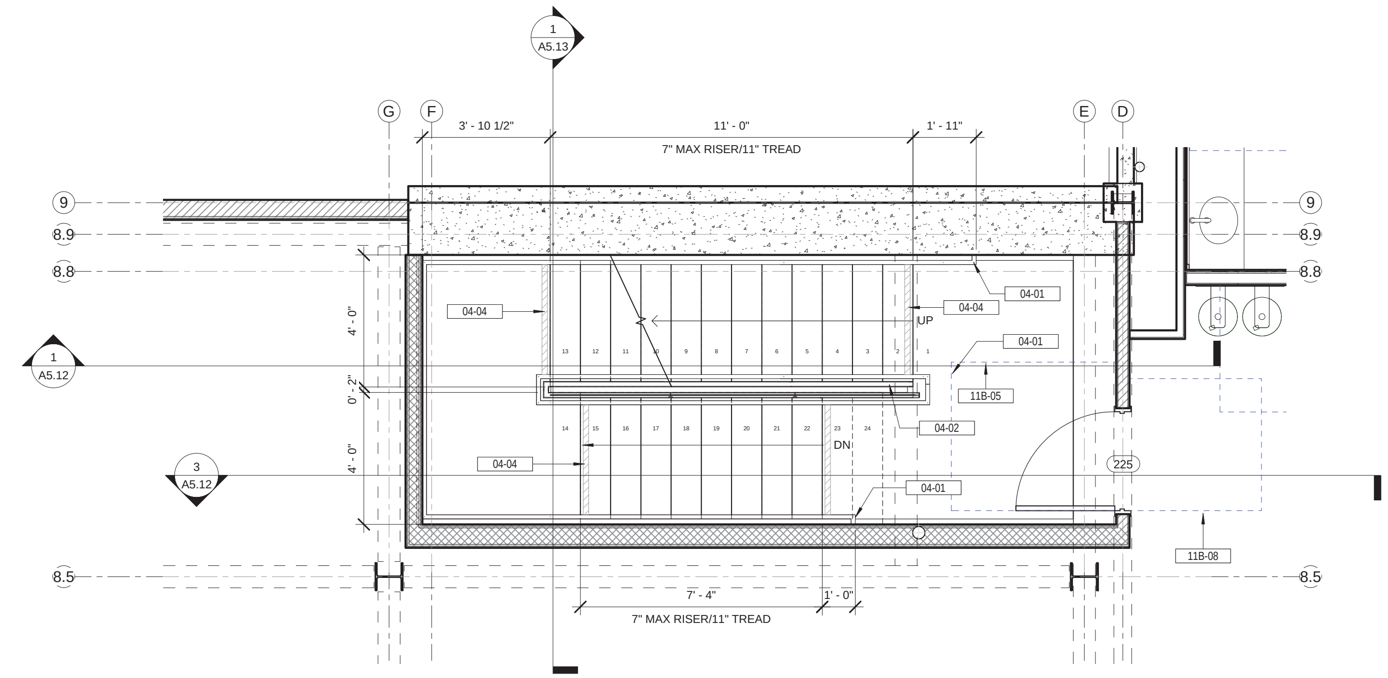
Wall Sections

A4.11

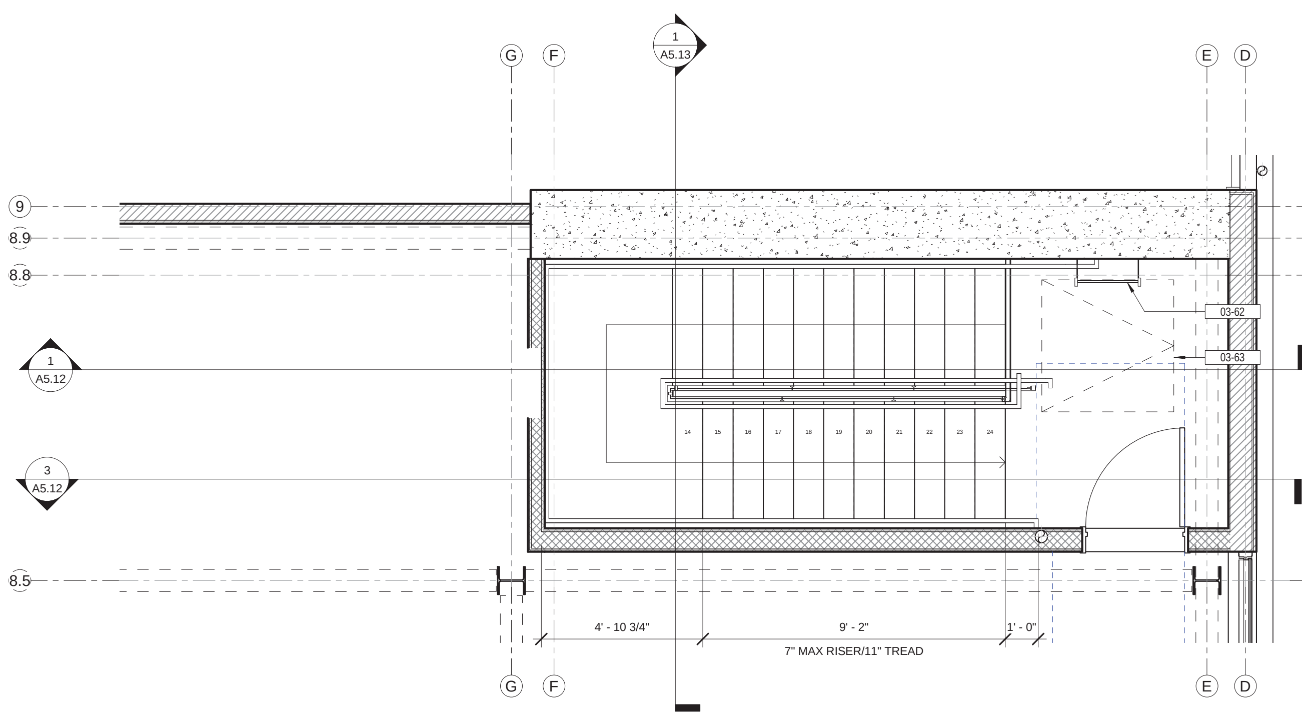
KEYNOTES - BUILDING SHELL & CORE	
03-62	(N) ROOF ACCESS LADDER
03-63	(N) 4'X4' ROOF ACCESS HATCH (16SQFT MIN.)

KEYNOTES - ACCESSIBILITY	
11B-02	60" TURNING CIRCULAR SPACE PER 11B-304.3.1
11B-05	DOOR PULLSIDE FRONT APPROACH CLEARANCE: 60" DEEP LEVEL LANDING WITH 18" STRIKESIDE CLEARANCE
11B-08	DOOR PUSHSIDE FRONT APPROACH PUSHSIDE CLEARANCE: 48" DEEP LEVEL LANDING WITH 12" STRIKESIDE CLEARANCE

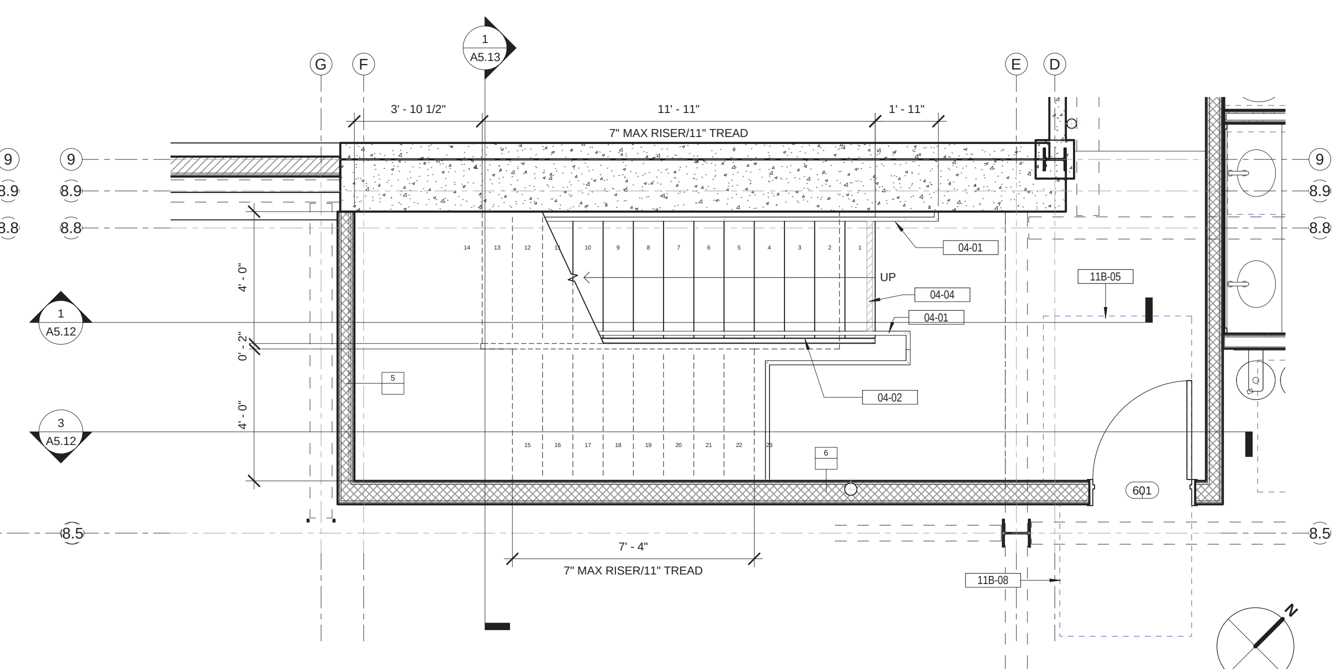
KEYNOTES - STAIRS	
04-01	HANDRAIL @ 36" ABOVE LINE OF STAIR NOSING
04-02	GUARDRAIL @ 42" ABOVE FINISH FLOOR OR LINE OF STAIR NOSING
04-04	2" WIDE VISUAL STRIPPING AT LOWER AND UPPER TREAD OF EACH STAIR FLIGHT PER CBC 11B-504.4.1



3 Enlarged Stair Plan - Level 2
3/8" = 1'-0"



2 Enlarged Stair Plan - Level 3
3/8" = 1'-0"



1 Enlarged Stair Plan - Level 1
3/8" = 1'-0"

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Issue #	Description	Date
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Scale: 3/8" = 1'-0"

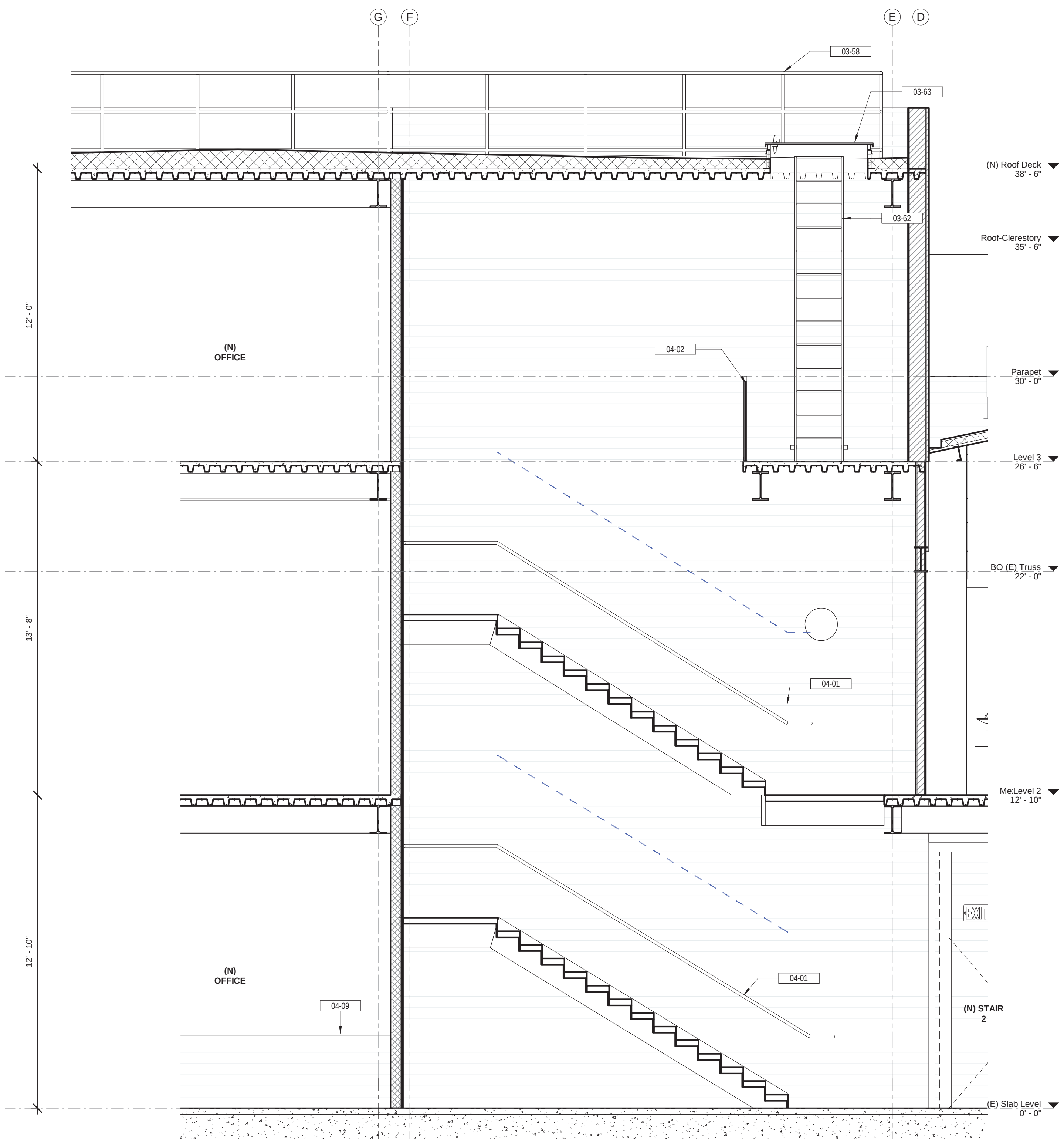
Enlarged Stair Plans

A5.11

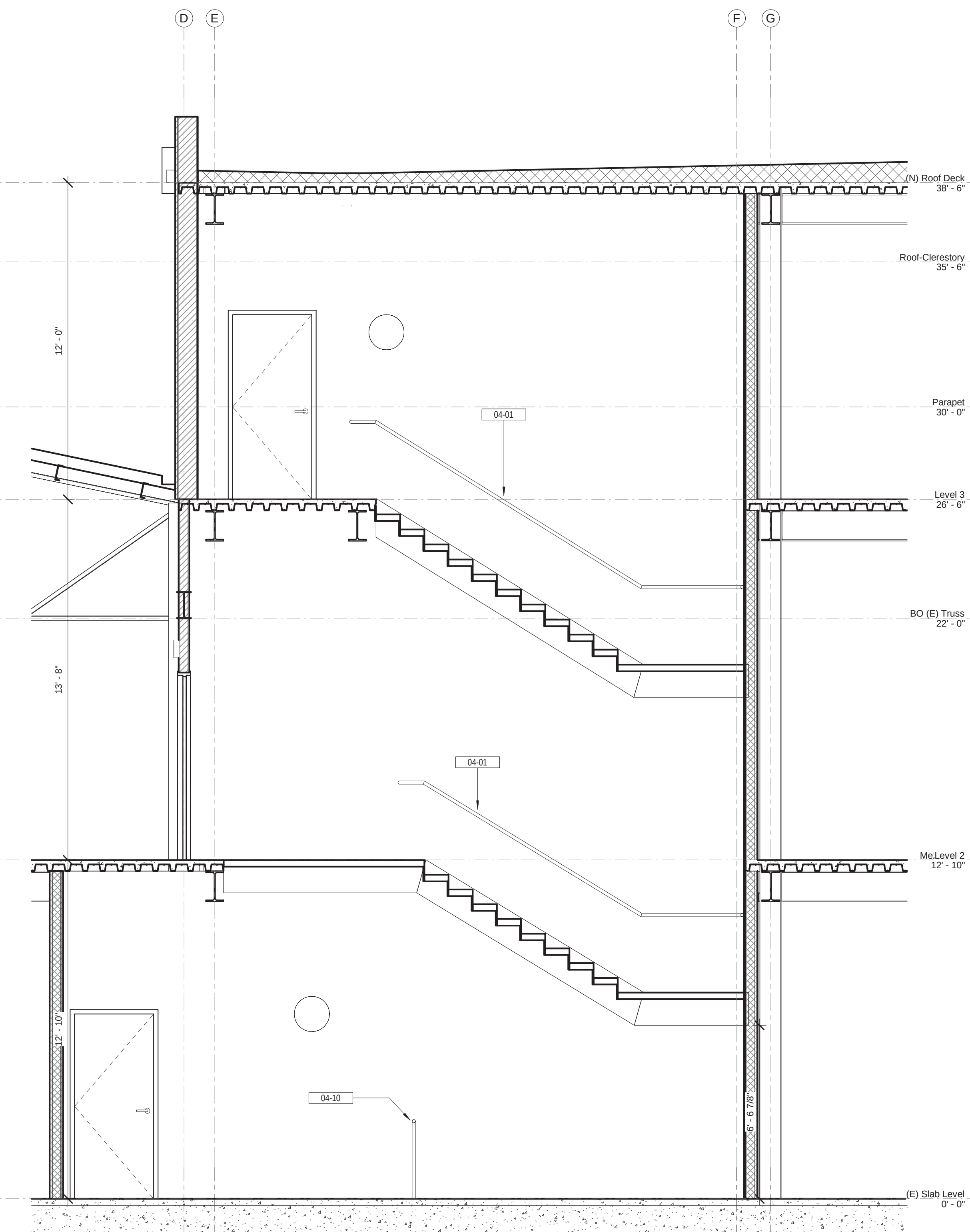
KEYNOTES - BUILDING SHELL & CORE	
03-58	42" TALL OSHA COMPLIANT GUARD RAIL AROUND ROOFTOP EQUIPMENT FOR FALL PROTECTION
03-62	(N) ROOF ACCESS LADDER
03-63	(N) 4'X4' ROOF ACCESS HATCH (16SQFT MIN.)

KEYNOTES - STAIRS	
04-01	HANDRAIL @ 36" ABOVE LINE OF STAIR NOSING
04-02	GUARDRAIL @ 42" ABOVE FINISH FLOOR OR LINE OF STAIR NOSING
04-09	CONC. RETAINING WALL - SSD.
04-10	CANE RAIL

KEYNOTES - ACCESSIBILITY	
11B-02	60" TURNING CIRCULAR SPACE PER 11B-304.3.1
11B-05	DOOR PULLSIDE FRONT APPROACH CLEARANCE: 60" DEEP LEVEL LANDING WITH 18" STRIKESIDE CLEARANCE
11B-08	DOOR PUSHSIDE FRONT APPROACH PUSHSIDE CLEARANCE: 48" DEEP LEVEL LANDING WITH 12" STRIKESIDE CLEARANCE



1 ENLARGED STAIR SECTION 1
3/8" = 1'-0"



3 ENLARGED STAIR SECTION 2
3/8" = 1'-0"

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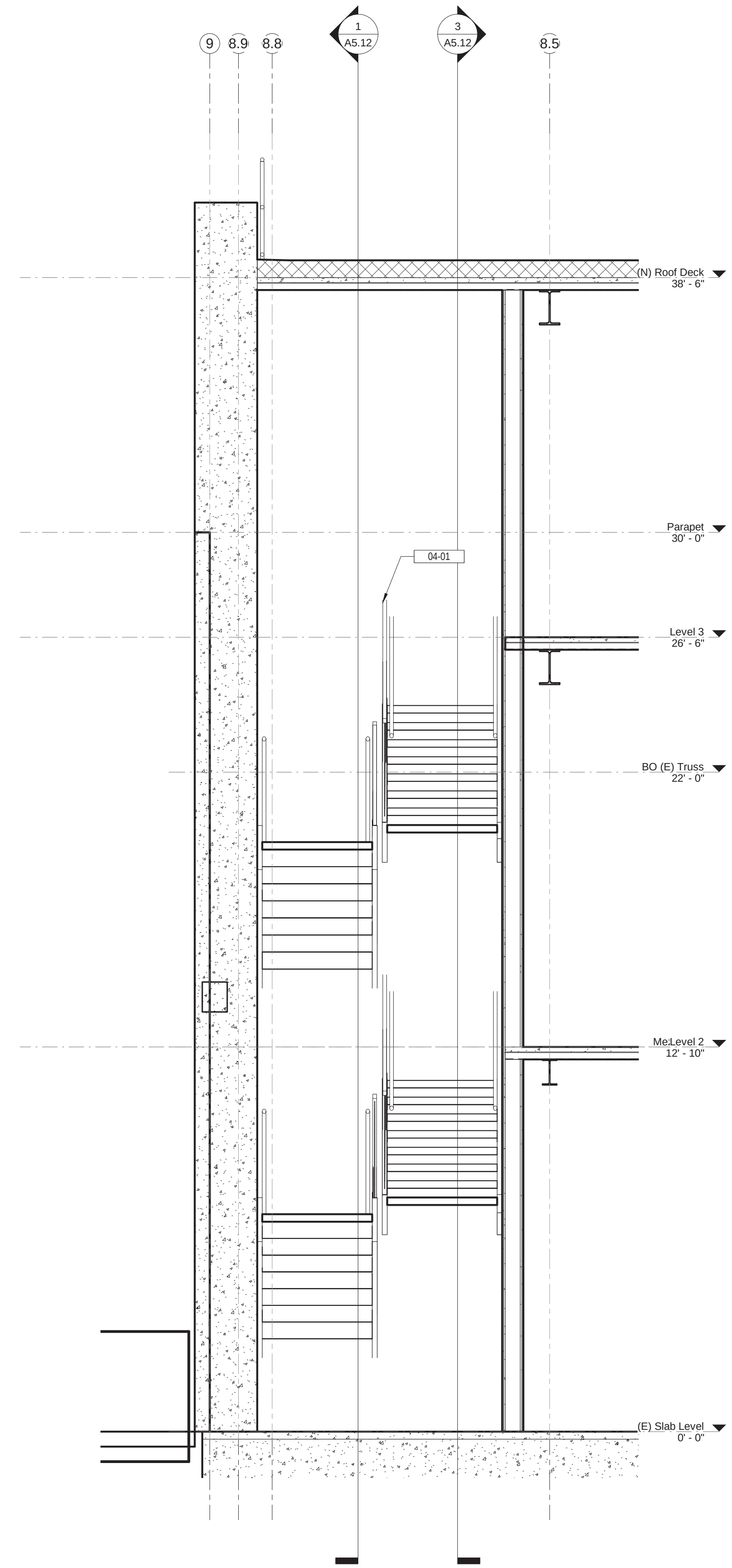
Scale: 3/8" = 1'-0"

Enlarged Stair Sections

A5.12

KEYNOTES - STAIRS	
04-01	HANDRAIL @ 36" ABOVE LINE OF STAIR NOSING

KEYNOTES - ACCESSIBILITY	
11B-02	60" TURNING CIRCULAR SPACE PER 11B-304.3.1
11B-05	DOOR PULLSIDE FRONT APPROACH CLEARANCE: 60" DEEP LEVEL LANDING WITH 18" STRIKESIDE CLEARANCE
11B-08	DOOR PUSHSIDE FRONT APPROACH PUSHSIDE CLEARANCE: 48" DEEP LEVEL LANDING WITH 12" STRIKESIDE CLEARANCE



1 ENLARGED STAIR SECTION 3
3/8" = 1'-0"

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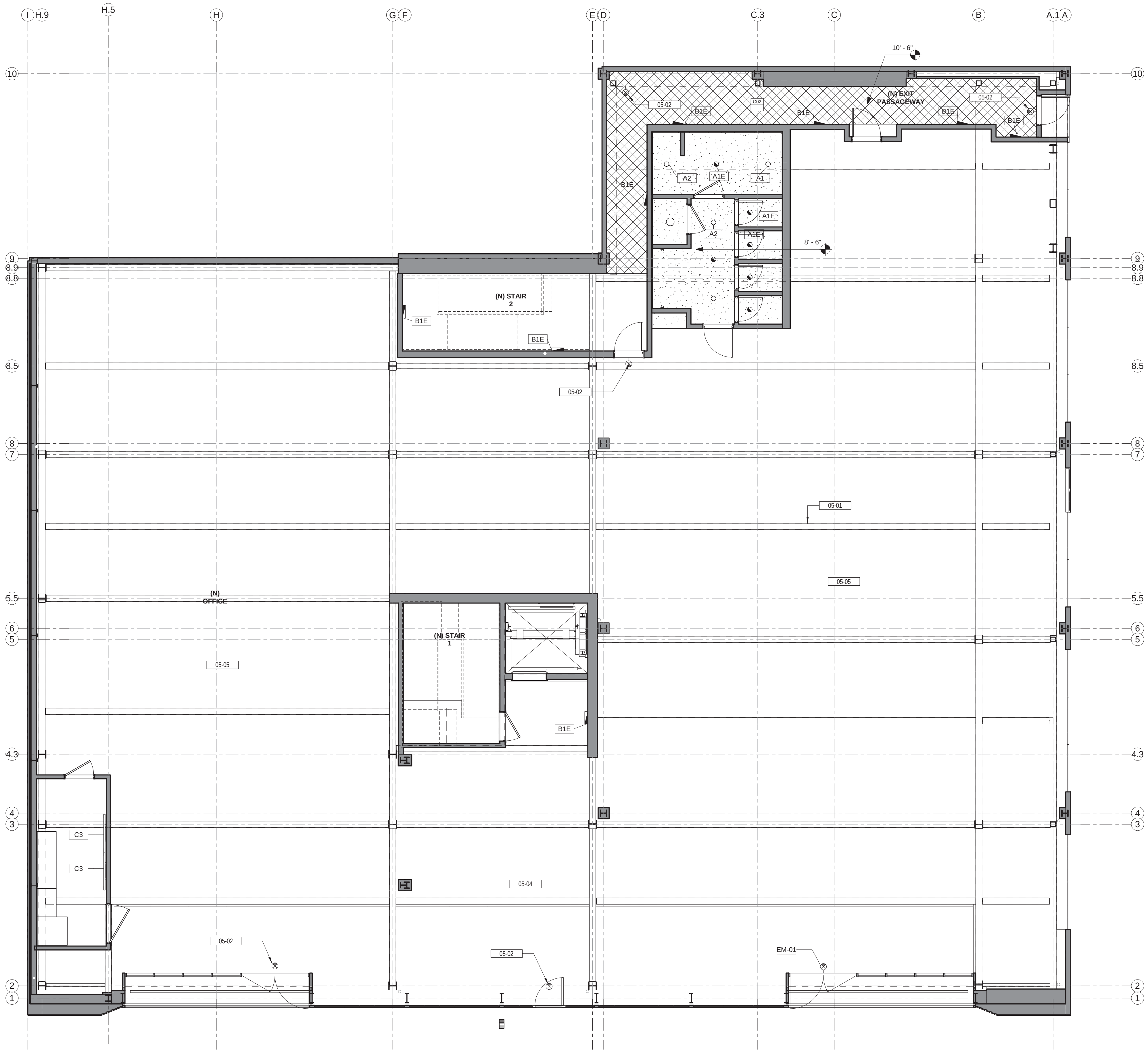
Scale: 3/8" = 1'-0"

Enlarged Stair Section

A5.13



1 Level 1- Reflected Ceiling Plan
3/16" = 1'-0"

REFLECTED CEILING PLAN LEGEND

SEE ELECTRICAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS AND SPECIFICATIONS

DROPPED GWB SOFFIT

1-HOUR RATED GWB SOFFIT

REFLECTED CEILING PLANS GENERAL NOTES

1. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION (IE. LIGHT FIXTURE TYPES, SWITCHING, EXHAUST AND HEAT DUCTING.)
2. CEILING HEIGHTS ARE MEASURED FROM FINISH FLOOR.
3. IF NO LIGHT FIXTURE LOCATING DIMENSIONS ARE PROVIDED CENTER LIGHT FIXTURE IN ROOM OR WALL.
4. LIGHTING FIXTURE MOUNTING HEIGHTS ARE FROM CENTERLINE OF FIXTURE TO FROM FINISH FLOOR., U.O.N.
5. ALL RECESSED LUMINARIES IN INSULATED CEILINGS TO BE IC RATED AND AIR-TIGHT (AT).
6. SEE DETAILS 1&2 /A9.3 FOR RATED DUCT AND RECESSED LIGHT PENETRATIONS IN RATED CEILING CONSTRUTION.

KEYNOTES - REFLECTED CEILING PLAN

05-01	STEEL BEAMS OVERHEAD - SSD.
05-02	ILLUMINATED EMERGENCY EXIT SIGN
05-03	EXISTING ROOF TRUSSES AND PURLINS TO REMAIN
05-04	LOBBY LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-05	TENANT LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-07	ROOF HATCH ABOVE
05-08	SKYLIGHT ABOVE

EXHAUST FAN SCHEDULE

Type Mark	Description	Type Comments

LIGHT FIXTURE SCHEDULE

Type Mark	Description	Qty	Manufacturer	Model	Finish	Lamp	Wattage	Initial Color Temperature	Efficacy	Type Comments
A1	Recessed 6" LED Downlight-Damp Location Listed	5	BeveLED	1251		LED	80 W	3000 K	52 lm/W	Damp Location Rated
A1E	Recessed 6" LED Downlight with Emergency Battery Backup	15	BeveLED	1251		LED	80 W	3000 K	52 lm/W	
A2	Recessed 6" LED Downlight-Wet Location Listed	9	HALO	SLD 6068		LED	27 W	3000 K	66 lm/W	
B1E	Wall Sconce with Emergency Battery Backup	14	BEGA	33 192		LED	16 W	3000 K	55 lm/W	
C1	Surface Mounted LED	2	TBD			LED	[redacted]	3500 K	[redacted]	Damp Location Rated
C3	Surface Mounted Linear LED - 48"	2	TBD			LED	[redacted]	3500 K	[redacted]	
C4	Surface Mounted Linear LED - 48"	1	TBD			LED	[redacted]	3500 K	[redacted]	
D1	Bathroom Vanity Sconce Surface Mounted Linear LED - 48"	4	TBD			LED	[redacted]	3500 K	[redacted]	By Future Tenant - provide J-box only
E1	16 LED's, 1 Module, 700mA, Neutral White, 4000K, 70 CRI, Type 3	3	Philips Gardco	104L-16L-700-NW-G1-3		LED	23 W	4000 K	149 lm/W	
EM-01	Illuminated Emergency exit sign	13	TBD	TBD		LED				

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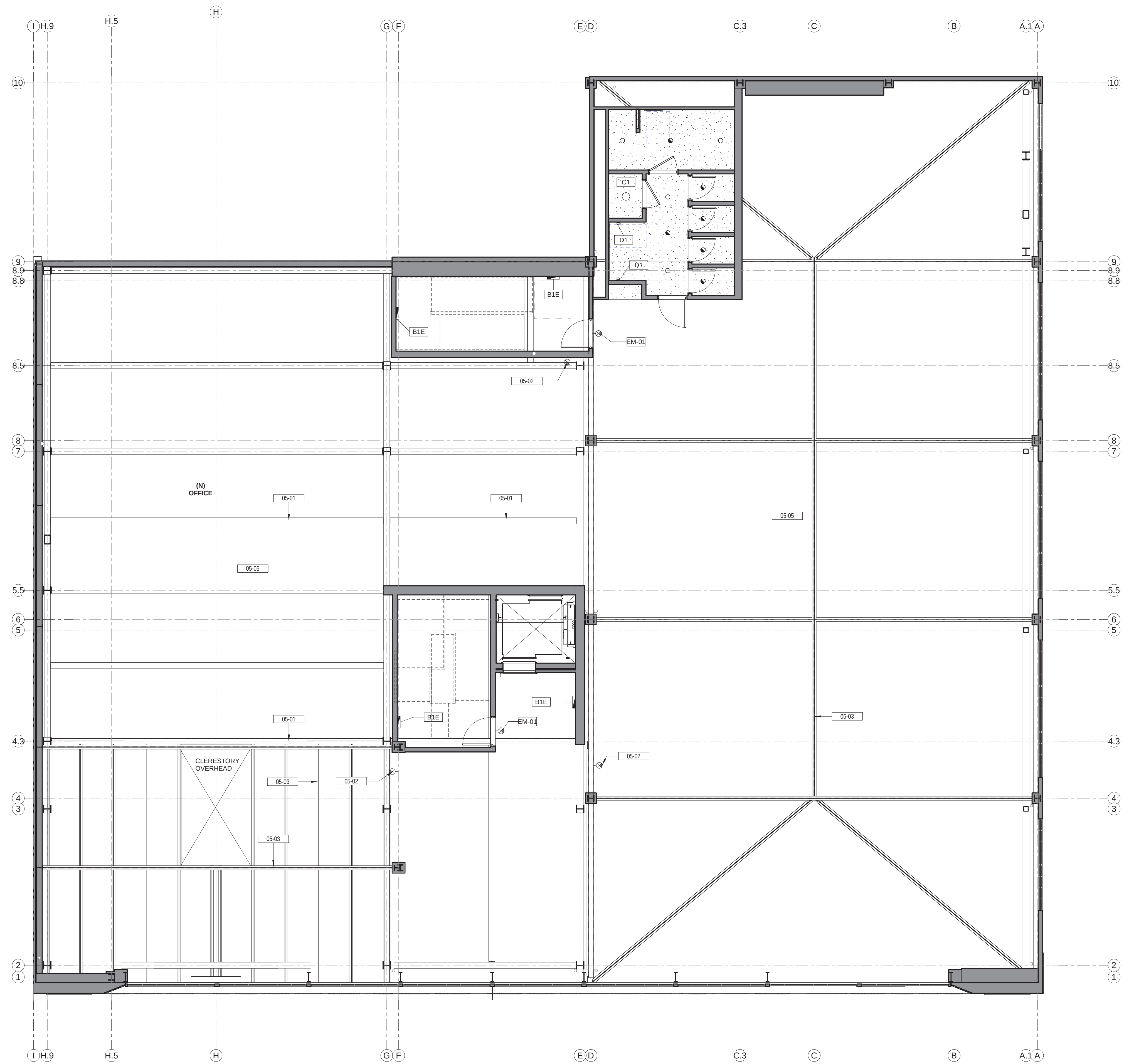
Scale: As indicated

Reflected Ceiling Plan - Level 1

A6.01



1 Level 2 - Reflected Ceiling Plan
3/16" = 1'-0"

REFLECTED CEILING PLAN LEGEND

SEE ELECTRICAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS AND SPECIFICATIONS

DROPPED GWB SOFFIT

1-HOUR RATED GWB SOFFIT

REFLECTED CEILING PLANS GENERAL NOTES

1. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION (IE. LIGHT FIXTURE TYPES, SWITCHING, EXHAUST AND HEAT DUCTING.)
2. CEILING HEIGHTS ARE MEASURED FROM FINISH FLOOR.
3. IF NO LIGHT FIXTURE LOCATING DIMENSIONS ARE PROVIDED CENTER LIGHT FIXTURE IN ROOM OR WALL.
4. LIGHTING FIXTURE MOUNTING HEIGHTS ARE FROM CENTERLINE OF FIXTURE TO FROM FINISH FLOOR., U.O.N.
5. ALL RECESSED LUMINARIES IN INSULATED CEILINGS TO BE IC RATED AND AIR-TIGHT (AT).
6. SEE DETAILS 1&2 /A9.3 FOR RATED DUCT AND RECESSED LIGHT PENETRATIONS IN RATED CEILING CONSTRUTION.

KEYNOTES - REFLECTED CEILING PLAN

05-01	STEEL BEAMS OVERHEAD - SSD.
05-02	ILLUMINATED EMERGENCY EXIT SIGN
05-03	EXISTING ROOF TRUSSES AND PURLINS TO REMAIN
05-04	LOBBY LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-05	TENANT LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-07	ROOF HATCH ABOVE
05-08	SKYLIGHT ABOVE

EXHAUST FAN SCHEDULE

Type Mark	Description	Type Comments

LIGHT FIXTURE SCHEDULE

Type Mark	Description	Qty	Manufacturer	Model	Finish	Lamp	Wattage	Initial Color Temperature	Efficacy	Type Comments
A1	Recessed 6" LED Downlight-Damp Location Listed	5	BeveLED	1251		LED	80 W	3000 K	52 lm/W	Damp Location Rated
A1E	Recessed 6" LED Downlight with Emergency Battery Backup	15	BeveLED	1251		LED	80 W	3000 K	52 lm/W	
A2	Recessed 6" LED Downlight-Wet Location Listed	9	HALO	SLD 6068		LED	27 W	3000 K	66 lm/W	
B1E	Wall Sconce with Emergency Battery Backup	14	BEGA	33 192		LED	16 W	3000 K	55 lm/W	
C1	Surface Mounted LED	2	TBD			LED	[redacted]	3500 K	[redacted]	Damp Location Rated
C3	Surface Mounted Linear LED - 48"	2	TBD			LED	[redacted]	3500 K	[redacted]	
C4	Surface Mounted Linear LED - 48"	1	TBD			LED	[redacted]	3500 K	[redacted]	
D1	Bathroom Vanity Sconce Surface Mounted Linear LED - 48"	4	TBD			LED	[redacted]	3500 K	[redacted]	By Future Tenant - provide J-box only
E1	16 LED's, 1 Module, 700mA, Neutral White, 4000K, 70 CRI, Type 3	3	Philips Gardco	104L-16L-700-NW-G1-3		LED	23 W	4000 K	149 lm/W	
EM-01	Illuminated Emergency exit sign	13	TBD	TBD		LED				

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Issue #	Description	Date
		11/19/2018

Print Date: 11/19/2018 4:50:29 PM

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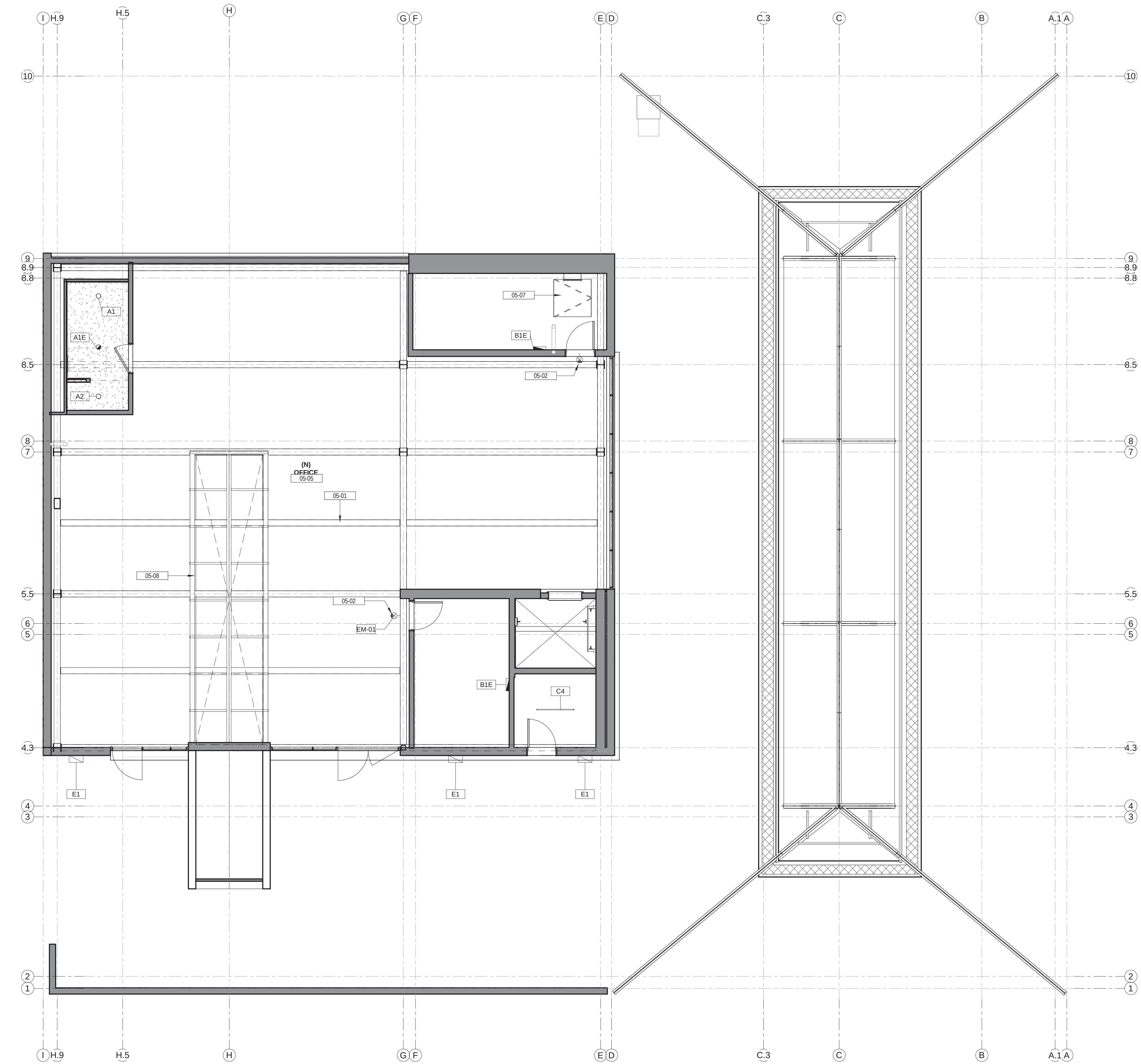
Scale: As indicated

Reflected Ceiling Plan- Level 2

A6.02



1 Level 3 - Reflected Ceiling Plan
3/16" = 1'-0"

REFLECTED CEILING PLAN LEGEND

SEE ELECTRICAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS AND SPECIFICATIONS

DROPPED GWB SOFFIT

1-HOUR RATED GWB SOFFIT

REFLECTED CEILING PLANS GENERAL NOTES

1. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION (IE. LIGHT FIXTURE TYPES, SWITCHING, EXHAUST AND HEAT DUCTING.)
2. CEILING HEIGHTS ARE MEASURED FROM FINISH FLOOR.
3. IF NO LIGHT FIXTURE LOCATING DIMENSIONS ARE PROVIDED CENTER LIGHT FIXTURE IN ROOM OR WALL.
4. LIGHTING FIXTURE MOUNTING HEIGHTS ARE FROM CENTERLINE OF FIXTURE TO FROM FINISH FLOOR., U.O.N.
5. ALL RECESSED LUMINARIES IN INSULATED CEILINGS TO BE IC RATED AND AIR-TIGHT (AT).
6. SEE DETAILS 1&2 /A9.3 FOR RATED DUCT AND RECESSED LIGHT PENETRATIONS IN RATED CEILING CONSTRUTION.

KEYNOTES - REFLECTED CEILING PLAN

05-01	STEEL BEAMS OVERHEAD - SSD.
05-02	ILLUMINATED EMERGENCY EXIT SIGN
05-03	EXISTING ROOF TRUSSES AND PURLINS TO REMAIN
05-04	LOBBY LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-05	TENANT LIGHTING BY TENANT UNDER SEPARATE PERMIT
05-07	ROOF HATCH ABOVE
05-08	SKYLIGHT ABOVE

EXHAUST FAN SCHEDULE

Type Mark	Description	Type Comments

LIGHT FIXTURE SCHEDULE

Type Mark	Description	Qty	Manufacturer	Model	Finish	Lamp	Wattage	Initial Color Temperature	Efficacy	Type Comments
A1	Recessed 6" LED Downlight-Damp Location Listed	5	BeveLED	1251		LED	80 W	3000 K	52 lm/W	Damp Location Rated
A1E	Recessed 6" LED Downlight with Emergency Battery Backup	15	BeveLED	1251		LED	80 W	3000 K	52 lm/W	
A2	Recessed 6" LED Downlight-Wet Location Listed	9	HALO	SLD 6068		LED	27 W	3000 K	66 lm/W	
B1E	Wall Sconce with Emergency Battery Backup	14	BEGA	33 192		LED	16 W	3000 K	55 lm/W	
C1	Surface Mounted LED	2	TBD			LED	[redacted]	3500 K	[redacted]	Damp Location Rated
C3	Surface Mounted Linear LED - 48"	2	TBD			LED	[redacted]	3500 K	[redacted]	
C4	Surface Mounted Linear LED - 48"	1	TBD			LED	[redacted]	3500 K	[redacted]	
D1	Bathroom Vanity Sconce Surface Mounted Linear LED - 48"	4	TBD			LED	[redacted]	3500 K	[redacted]	By Future Tenant - provide J-box only
E1	16 LED's, 1 Module, 700mA, Neutral White, 4000K, 70 CRI, Type 3	3	Philips Gardco	104L-16L-700-NW-G1-3		LED	23 W	4000 K	149 lm/W	
EM-01	Illuminated Emergency exit sign	13	TBD	TBD		LED				

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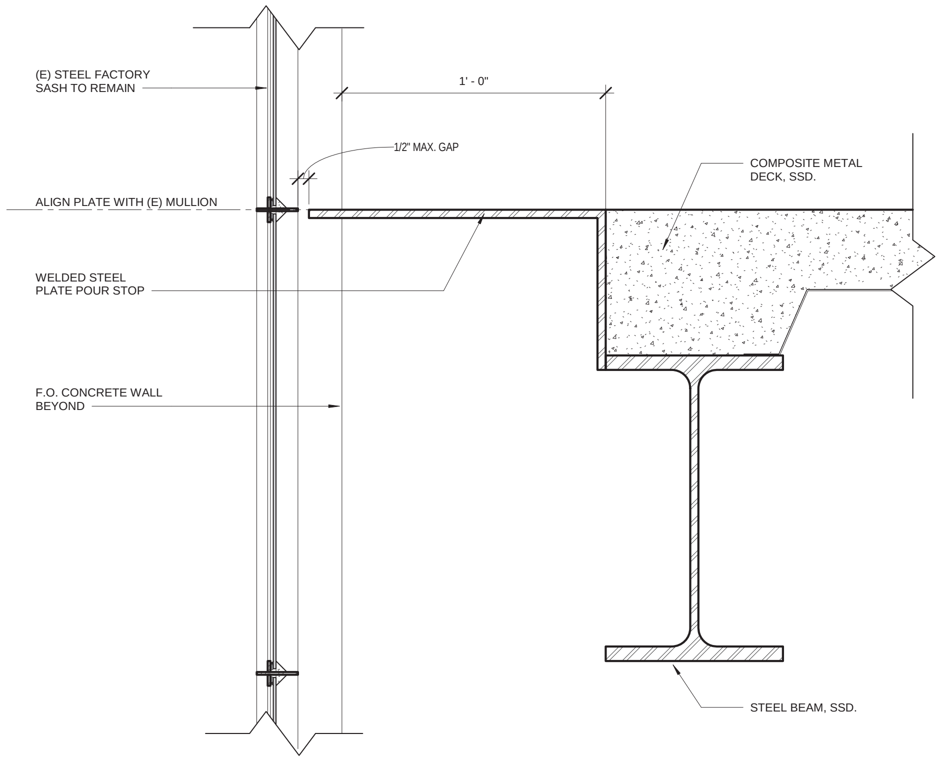
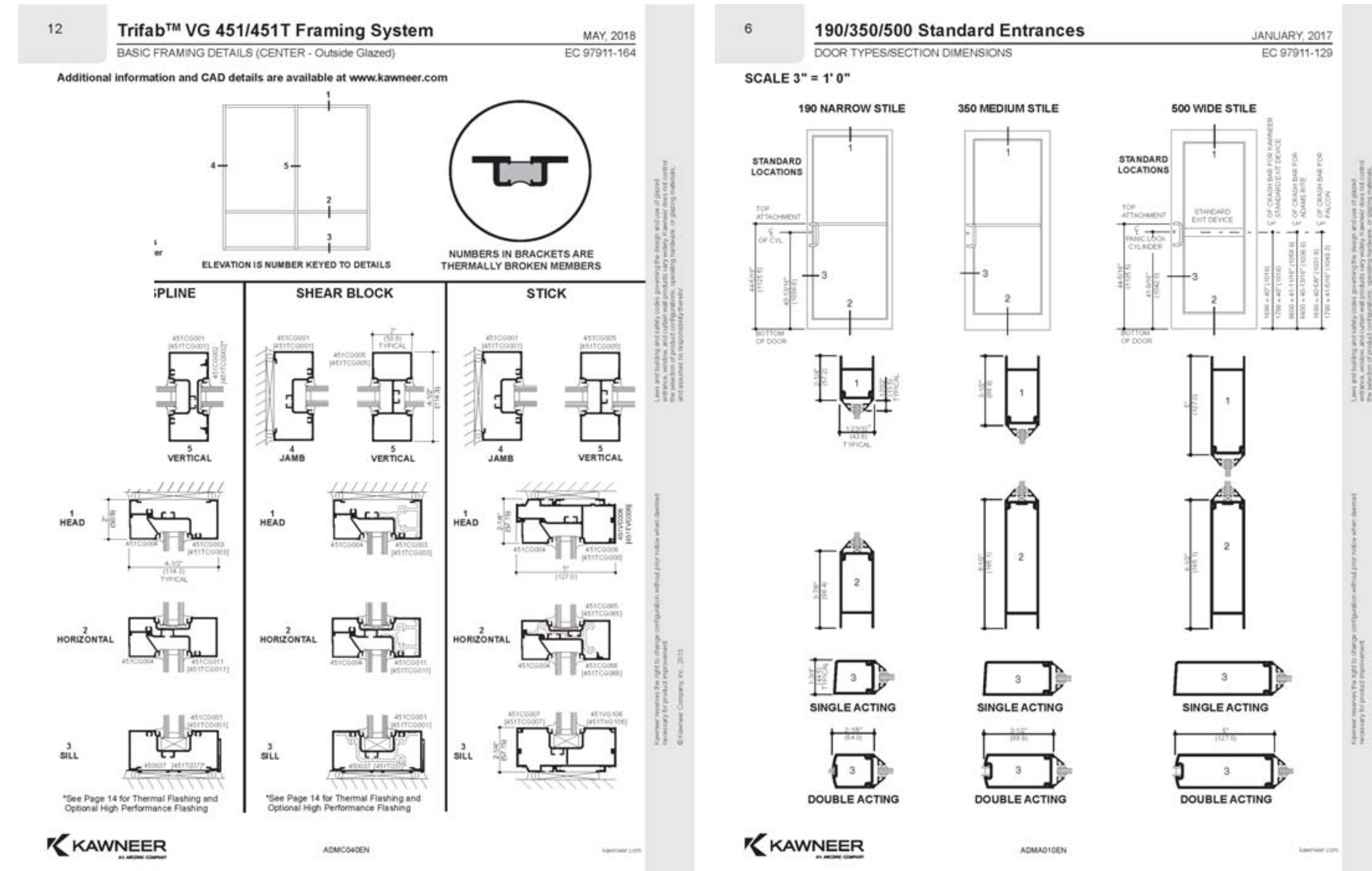
Reflected Ceiling Plan- Level 3

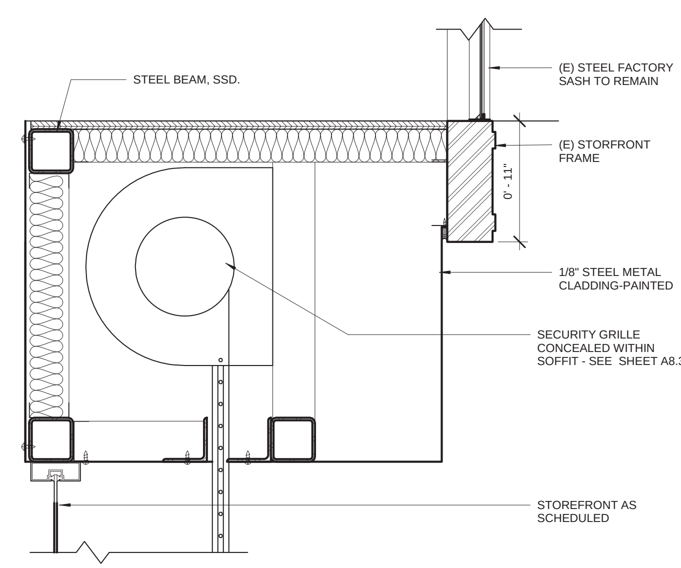
A6.03



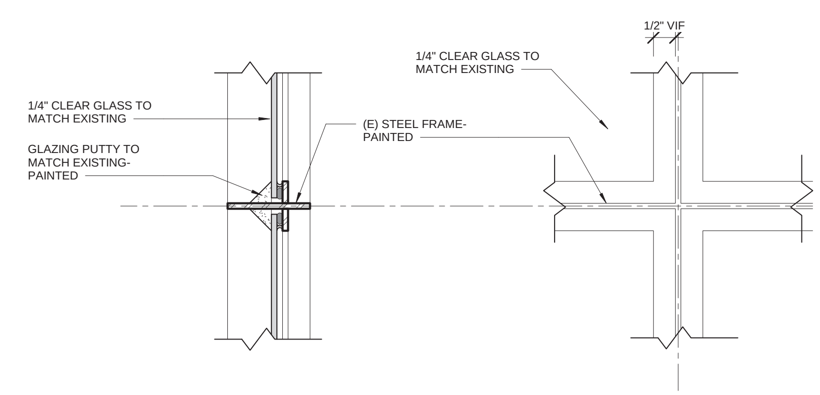
3 FLOOR GAP @ BERWICK PLACE
3" = 1'-0"



2 ALUMINUM STOREFRONT GLAZING SYSTEM CUTSHEETS
NTS



4 STOREFRONT VALANCE
1 1/2" = 1'-0"



1 Glazing Detail @ Existing Window Frame, TYP.
6" = 1'-0"

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Details

A8.1

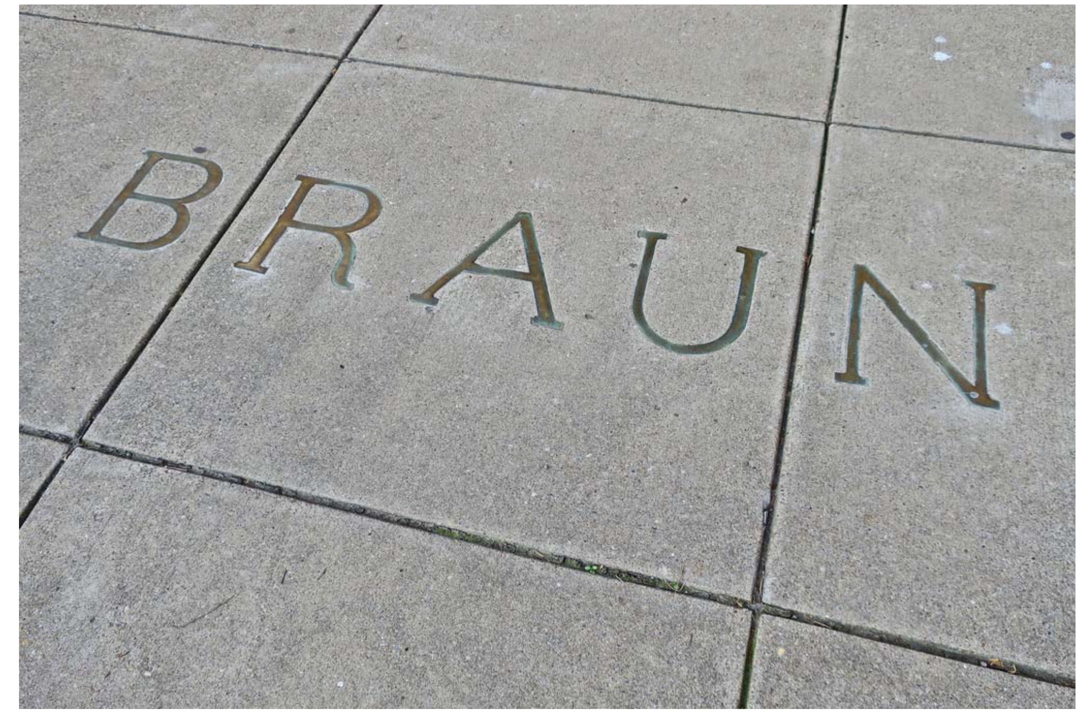

FIGURE 2. REFERENCE BRASS INLAY IN CONCRETE

FIGURE 3. EXISTING 'SAN FRANCISCO GALVANIZING WORKS' FACADE LETTERING

FIGURE 1. REFERENCE BRASS INLAY IN CONCRETE

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Brass Inlay Reference

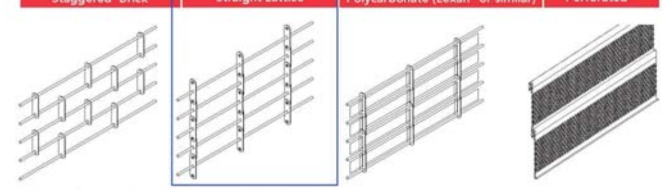
A8.2

Security Grille Systems

PRODUCT LINE		MODELS
	UPWARD-COILING	670/671/674
	SIDE-FOLDING FULL CLOSURE	675/677/678/679
	SIDE-FOLDING OPEN AIR	681/683

Grille patterns

Staggered Brick | Straight Lattice | Polycarbonate (Lexan® or similar) | Perforated



Note: These products allow air infiltration and are not weather tight.

Benefits

Choice of aluminum, galvanized or stainless steel
The Model 670 features an aluminum curtain, with optional fire-retardant polycarbonate inserts.

The Model 671 is fabricated of galvanized steel. Stainless steel and fire retardant polycarbonate inserts are also options. The standard curtain pattern for both the Model 670 and 671 is a straight lattice configuration. A staggered brick design is optional.

The Model 674 features a perforated aluminum curtain that provides increased security, visibility and light infiltration in an attractive design. Ideal for interior applications, the aluminum construction of the Model 674 is lightweight - while the perforated design enhances security without hindering air infiltration and visibility.

High-performance, low maintenance
The counterbalance assembly features heavy-duty helical torsion springs in a steel tube or pipe barrel to provide long and reliable service. Guides feature silicon woolpile strips or PVC inserts for ease of operation and noise reduction. Surfaces are factory pre-finished to minimize field preparation and enhance the durability of the finish. Optional crank or electric motor further simplifies grille operation. An optional heavy usage package (670, 671) provides extended life in applications requiring higher cycles, such as parking garages and service access gates.

Optional electric operation
Available with an electric operator to provide automatic passage for a variety of commercial and industrial uses, including schools, hospitals, libraries, public access buildings and parking garages.

Our commercial operators are designed to work with these grilles to ensure precise, smooth and safe operation.

Options include:
- Entrapment protection, including monitored electric or photoelectric sensors
- Emergency egress allows for remote activation and notification of power failure
- Push-button, key or combination stations; surface or flush-mounted for interior or exterior locations
- Vehicle detectors, key card readers, door timer controls
- Treadle or pull-switch stations
- Keypad entry

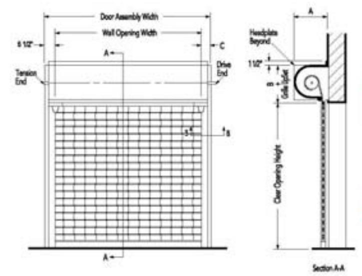
Emergency egress options
For public building applications an emergency egress may be necessary to prevent entrapment in the event of emergency or power failure. Hospitals, schools, office buildings and libraries are ideal for adding this safety option to the door system. In the event of an alarm condition or power failure, the emergency egress option allows for safe pedestrian exit. This feature avoids entrapment as well as provides immediate access to emergency personnel. We offer two ways to implement the emergency egress option. Both methods meet IBC 2018 402.8.8 Security Grilles and Doors, IBC 2018 1010.1.4.5 Security Grilles, and DASMA TDS355 Access Controlled Egress Doors standards. One option is the auto unlock and auto release option using an egress electric operator system designed specifically to work with Overhead Door™ emergency egress (670, 671). The other option is the auto unlock and manual release which can be operated with standard Overhead Door® commercial operators.

Face-of-wall mounted

Grille clearance elevation

Operation: Push-up, chain hoist, crank or electric.

For clearance details on electrically operated grilles, see motor operator details on page 18.



If motor operated add 2 ¼" (57 mm) to B.
If Safety Edge add 3 ¾" (95 mm) to B.

Headroom and sideroom clearance dimensions

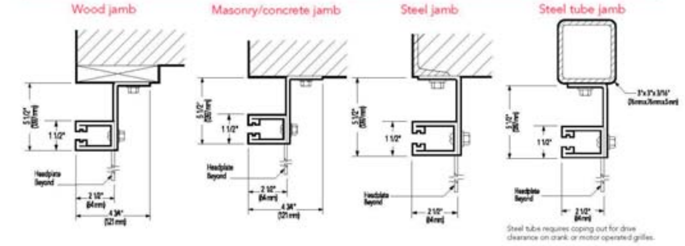
Dimensions A and B	Models 670/671/674	
Opening Height	A	B
Thru 6'7" (2006 mm)	15" (381 mm)	16" (406 mm)
Thru 10'10" (3302 mm)	17" (432 mm)	18" (457 mm)
Thru 15'10" (4826 mm)	19" (483 mm)	20" (508 mm)
Thru 19'6" (5944 mm)	21" (533 mm)	22" (559 mm)
Thru 22'6" (6858 mm)	23" (584 mm)	24" (610 mm)
Thru 24'0" (7315 mm)	25" (609 mm)	26" (660 mm)

Grille Upsets	Models 670/671/674			
	Manual w/o weather strip	Manual with weather strip	Electric w/o safety edge	Electric with safety edge
Double angle bottom bar	1 3/4" (45 mm)	2 3/4" (70 mm)	3 3/4" (95 mm)	5 1/4" (133 mm)
Tubular	2 1/2" (64 mm)	3 3/4" (95 mm)	4 3/4" (121 mm)	6 1/4" (159 mm)
Extruded "T"	1 3/4" (45 mm)	2 3/4" (70 mm)	3 3/4" (95 mm)	5 1/4" (133 mm)

Dimension C	Models 670/671/674	
Operation	C	Add to A
Chain STD	9 1/4" (235 mm)	
F.O.H. chain	5 1/2" (140 mm)	+10" (254 mm)
Awning cra.k	5 1/2" (140 mm)	+12" (305 mm)
Push-Up	5 1/2" (140 mm)	
Electric model RMX®	9 1/4" (235 mm)	
Electric model RSX®	9 1/4" (235 mm)	
Electric model RHX® (standard mounting)	6 3/4" (172 mm)	
Electric model RHX® (3" sideroom bracket mounting)	5 1/2" (140 mm)	

Face-of-wall mounted guide details (Section B-B)

Wood jamb | Masonry/concrete jamb | Steel jamb | Steel tube jamb



Steel tube requires coping out for drive clearance on crank or motor operated grilles.

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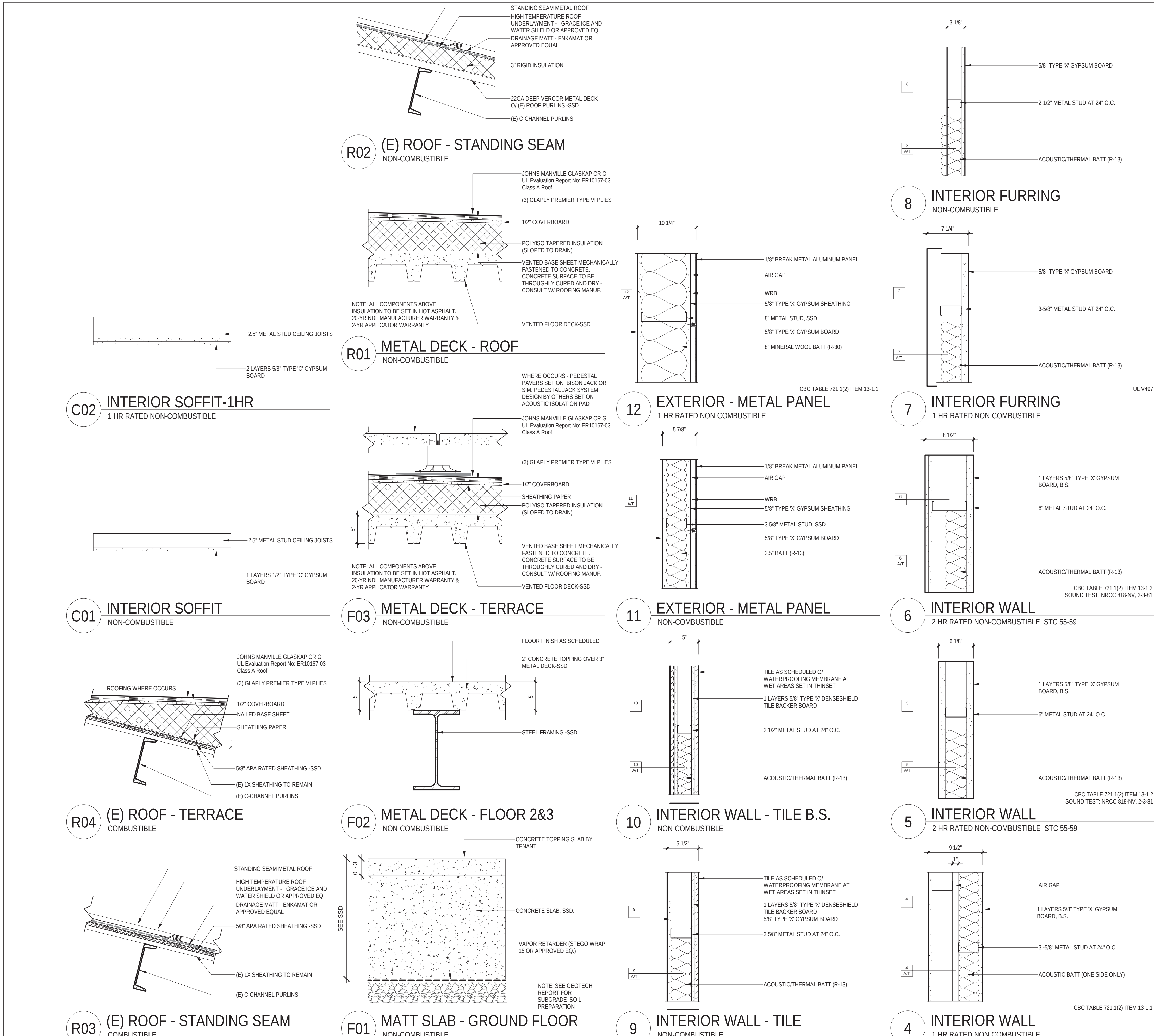
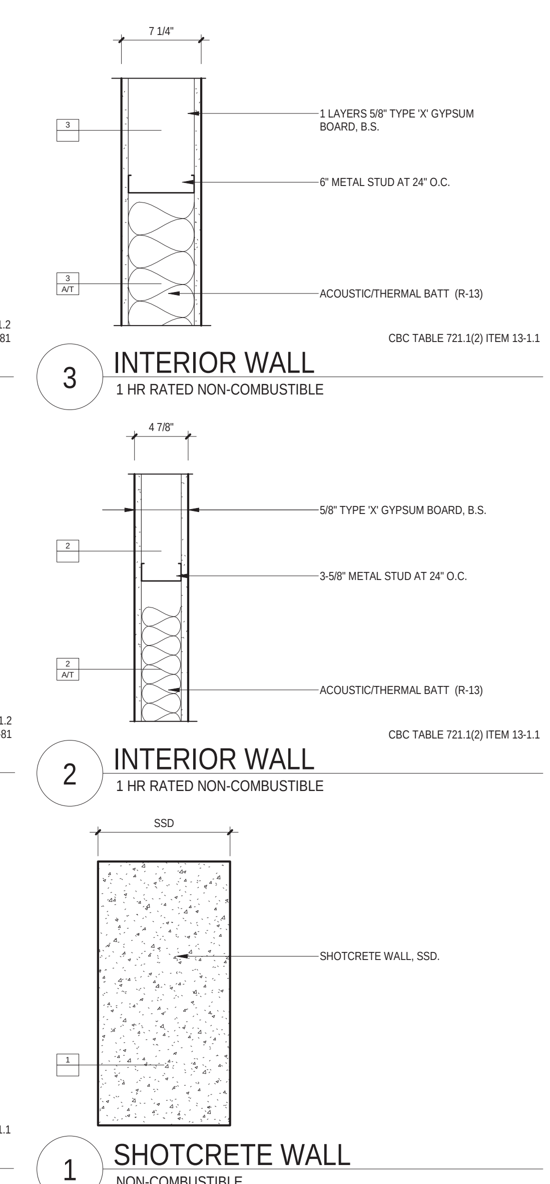
Security Grille Cutsheet

A8.3



GENERAL SHEET NOTES

1. GYP BD. JOINTS ON OPPOSITE SIDES OF STUDS SHALL BE STAGGERED TO AVOID SOUND LEAK.
2. WHERE DOUBLE LAYERS OF GYP. BD. OCCUR, JOINTS SHALL BE STAGGERED TO AVOID SOUND LEAK.
3. ADDITIONAL LAYER OF GYP. BE. WILL BE REQUIRED AT ADJACENT, DIFFERING WALL TYPES TO ALIGN FINISHES. SURFACES TO BE FLUSH & CONTINUE UNBROKEN IN ROOMS, U.O.N.
4. PROVIDE BACKING AS REQUIRED AT ALL WALLS SUPPORTING EQUIPMENT, RAILS, GRAB BARS, CASEWORK, SHELVING, SIGNAGE, MAILBOXES, LIGHT FIXTURES, PLUMBING, ACCESSORIES, FIXTURES, ETC. SHOWN ON THE PLANS, INTERIOR ELEVATIONS, AND IN THE SPECIFICATIONS.
5. AT CERAMIC TILE WALLS, PROVIDE CONTINUOUS BEAD OF SEALANT AT ALL INTERIOR CORNERS.
6. SEE STRUCTURAL DWGS. FOR LOCATION OF PLYWOOD SHEATHING FOR SHEAR WALLS.
7. PROVIDE 5/8" DENSESHIELD TILE BACKER BOARD BEHIND TILE IN LIEU OF 5/8" GYP. BRD. AT ALL NON-RATED BATHROOM AND POWDER ROOMS WALLS, U.O.N. PROVIDE PROVIDE 5/8" DENSESHIELD TILE BACKER BOARD OVER RATED WALLS BATHROOM AND POWDER ROOMS WALLS, U.O.N. PROVIDE WATERPRROFING MEMBRANE (IE. REDGUARD OR LATICRETE WATER PROOFING MEMBRANE IUNSTALLED PER TCNA STANDARDS) AT ALL TILED WET LOCATION. SEE INTERIOR ELEVATIONS FOR TILED LOCATIONS.
8. PROVIDE FIRESTOPPING AT ALL CONCEALED SPACES AT 10' O.C. HORRIZONTALLY & VERTICALLY.
9. FOR EXTENT OF FIRE-RATED ASSEMBLIES, SEE FLOOR PLANS. RATED PARTITIONS SHALL BE CONTINUOUS FROM FLOOR TO UNDERSIDE OF ROOF OR RATED STRUCTURE ABOVE. PARTITIONS SHALL BE TIGHT FITTING AROUND ALL STRUCTURAL SHAPES AND PENETRATIONS. ALL PENETRATIONS SHALL BE SEALED W/ ACOUSTIC OR FIRE RATED SEALANT. PROVIDE FIRESTOPPING, SEE SPECIFICATIONS FOR FIRESTOPPING MATERIALS & SHOP DWG. SUBMITTAL REQUIREMENTS.
10. ALL RATED ASSEMBLIES TO CONFORM TO THE REQUIREMENTS OF THE AGENCY AND DESIGN PACKAGE NOTED.
11. 2016 CBC 2510.6 WATER-RESISTIVE BARRIERS. WATER-RESISTIVE BARRIERS SHALL BE INSTALLED AS REQUIRED IN SECTION 1404.2 AND, WHERE APPLIED OVER WOOD-BASED SHEATHING, SHALL INCLUDE A WATER-RESISTIVE VAPOR-PERMEABLE BARRIER WITH A PERFORMANCE AT LEAST EQUIVALENT TO TWO LAYERS OF GRADE D PAPER. THE INDIVIDUAL LAYERS SHALL BE SEPARATED CONTINUOUSLY SUCH THAT EACH LAYER PROVIDES A SEPARATE CONTINUOUS PLANE AND ANY FLASHING (INSTALLED IN ACCORDANCE WITH SECTION 1405.4) INTENDED TO DRAIN IN THE WATER-RESISTIVE BARRIER IS DIRECTED BETWEEN THE LAYERS. EXCEPTION: WHERE THE WATER-RESISTIVE BARRIER THAT IS APPLIED OVER WOOD-BASED SHEATHING HAS A 60-MINUTE GRADE D PAPER AND IS SEPARATED FROM THE STUCCO BY AN INTERVENING, SUBSTANTIALLY NONWATER-ABSORBING LAYER OR DRAINAGE SPACE.
12. FIRE-RETARDANT-TREATED LUMBER TO BE LABELED AS SPECIFIED IN CBC SECTION 2303.2.4 AND TO BEAR THE IDENTIFICATION MARK OF AN APPROVED AGENCY IN ACCORDANCE WITH CBC SECTION 1703.5.
13. ALL FASTENERS USED FOR FIRE-RETARDANT-TREATED WOOD MUST COMPLY WITH PROVISIONS OF CBC SECTION N2304.9.5.3
14. AT ALL RATED EXTERIOR AND INTERIOR WALL ASSEMBLIES WHERE GYPSUM SHEATHING IS INSTALLED OVER PLYWOOD PANELS, PLEASE SPECIFY ON THE PLANS THAT THE LENGTH OF FASTENERS SHALL BE INCREASED BY AN AMOUNT AT LEAST EQUAL TO THE THICKNESS OF THE PLYWOOD PANELS. *CBC TABLE 721.1(2) FOOTNOTE L*



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Wall/ Floor/ Roof/ Ceiling Types

A9.1.1