

O W E O' N E I L A S S O C I A T E S

S T R U C T U R A L E N G I N E E R S

4 1 0 1 E M E R A L D S T R E E T  
O A K L A N D , C A . 9 4 6 0 9  
(510)658-8601 FAX (510) 658-8555

March 27, 2017

Dana Dean  
Law Offices of Dana Dean  
283 East H Street  
Benicia, CA 94510

Re: Report pertaining to March 28, 2017 Benicia City Council Meeting concerning Shipping Office and Foundry buildings, 670 East H Street

The referenced unsafe and deteriorated buildings are in need of demolition. In this regard, your office as asked us to perform inspections, evaluate strength capacities, and render opinions concerning structural safety.

On-Site Field Investigation and Condition Assessment - March 6, 2017

We were unable to access the interior of both buildings due to their unsafe conditions; nevertheless, partial viewing of interiors was possible through exterior doors and windows. Both buildings were built in the early 1850s. No material testing was performed.

Shipping Office

Plates 1 and 2 show the building's plan and elevations. It has one story of offices with storage above the ceiling and a basement. Exterior walls are 12in unreinforced brick with lime mortar. Some of the mortar has been repaired with Portland cement pointing, and the walls appear to be in fair condition. Foundations weren't visible; we assume they are unreinforced brick. The roof, storage area, floor and walls are wood frame that has been ravaged by fire. The condition of this building is extremely poor and hazardous.

Foundry

Plates 3 through 5 show the building's plan and three elevations (the 20<sup>th</sup> century wall with corrugated siding was omitted). The three masonry walls are 16in unreinforced brick with lime mortar. The mortar and brick are in very poor condition due to lack of maintenance, weathering and repeated assaults from awkward remodels, vandals, impacts, etc. The roof framing is of mid 20<sup>th</sup> century corrugated steel decking over 2X rafters at 4ft centers. Rafters are supported by "A frame" rod and pin wood trusses that span the building's width. Wood posts support the trusses. Timber bridge crane girders run along both building sides, and are supported by timber posts. Foundations weren't visible and presumed brick. Interior wood frame offices at the rear have been destroyed by fire. The condition of this building is extremely poor and hazardous.

## ASCE 41-13 Tier 1 Analysis

The California Building Code<sup>1</sup> provides for analysis and retrofit of new and existing buildings, and the California Historical Building Code<sup>2</sup> provides a 25% reduction in seismic force for historical buildings. Our analysis for both buildings is per ASCE 41<sup>3</sup> with the 25% force reduction; for which, we used life safety performance standards. Analysis summary data sheet, Tier 1 checklist and supporting calculations for both buildings are attached. Non-structural (architectural) Tier 1 checks were not performed.

The Shipping Office fails most check list items and the Foundry fails all applicable items.

Our on-site field investigation, condition assessment and ASCE-41 Tier 1 Analysis have shown severe life threatening instabilities for both buildings. Additionally, two recent reports<sup>4,5</sup> by two different certified building officials who used the Office of Emergency Services Safety Assessment Program (SAP) evaluation criteria have convincingly shown that both buildings are hazardous and threaten public safety. Based on our findings showing life safety instabilities and our concurrence with the two corroborative SAP reports, we recommend that both structures be demolished immediately.

Sincerely,  
OWEN O'NEIL ASSOCIATES



Owen O'Neil



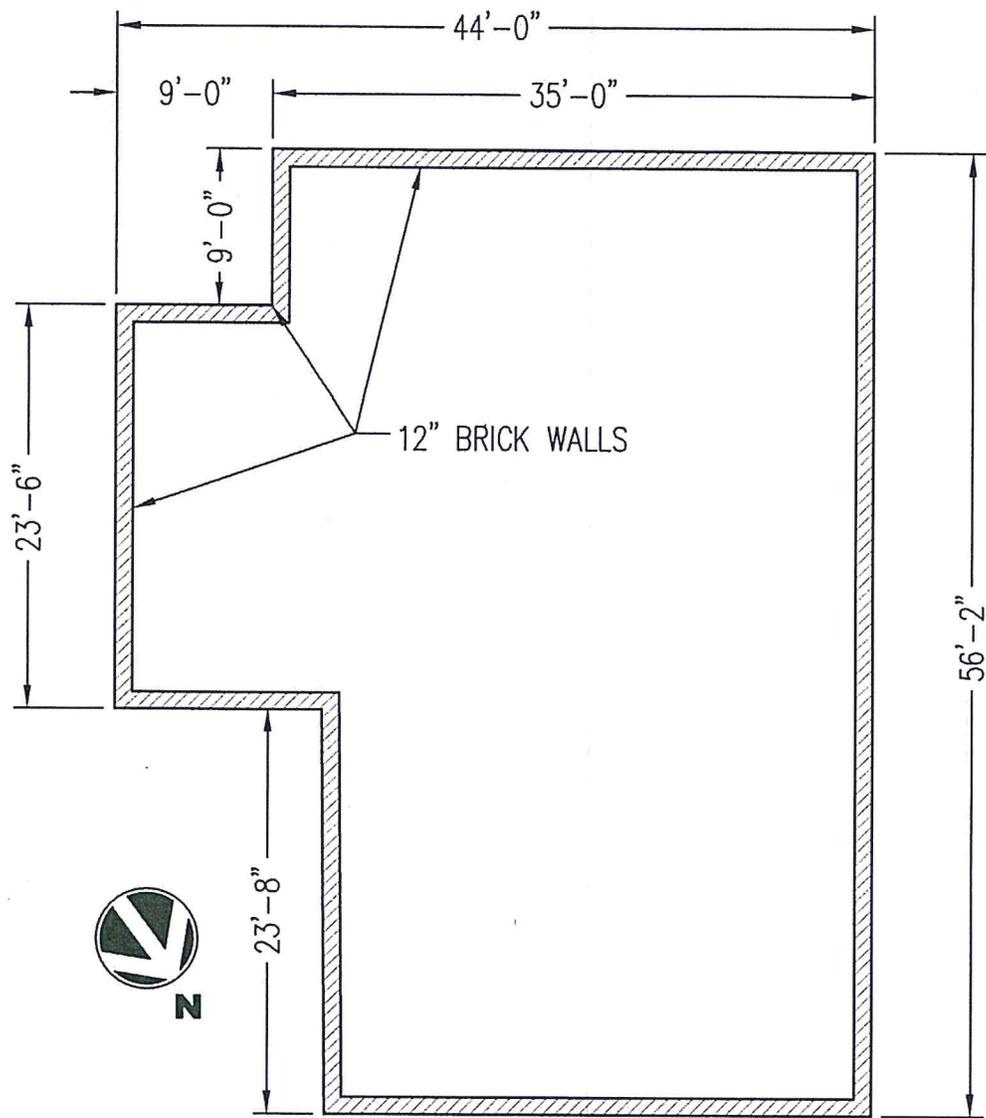
<sup>1</sup> 2016 California Building Code, Title 24, Part 2

<sup>2</sup> 2016 California Historical Building Code, Title 24, Part 8

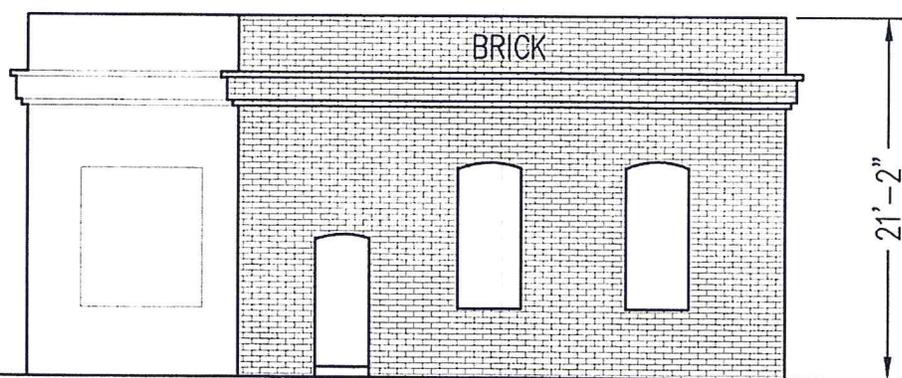
<sup>3</sup> Seismic Evaluation and Retrofit of Existing Buildings, ASCE/SEI 41-13 (incorporated in the 2016 California Building Code by reference)

<sup>4</sup> 4 Leaf, Inc., Inspector Field Report, Chris Gale, CBO 12/17/2015, pg. 114-117

<sup>5</sup> 4 Leaf, Inc., Safety Assessment Program Evaluation of 670 East H Street, Fred Cullum, CBO 12/20/1016, pg 10-11



**PLAN** 3/32' = 1'-0'

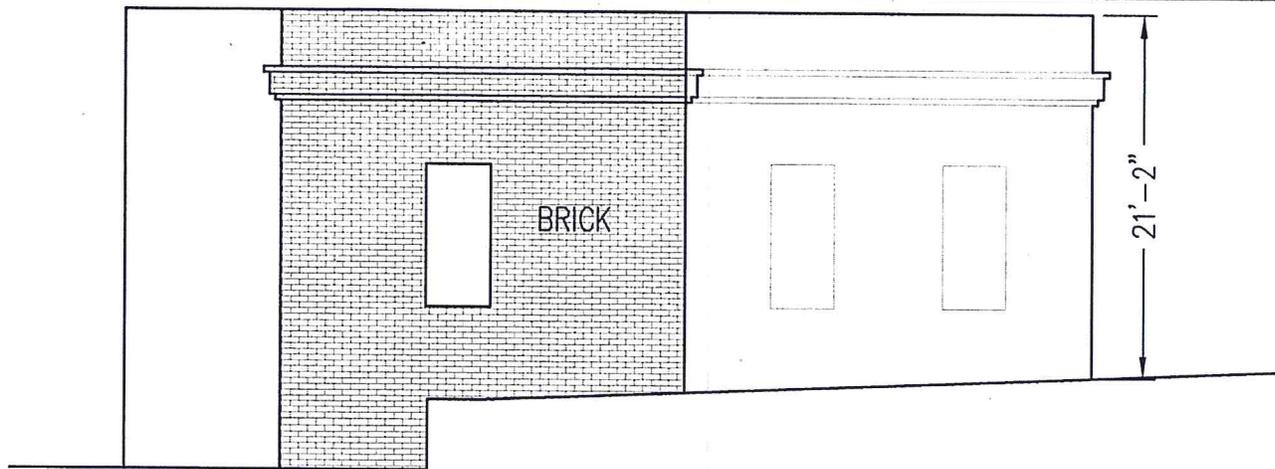


**NORTH ELEVATION** 3/32' = 1'-0'

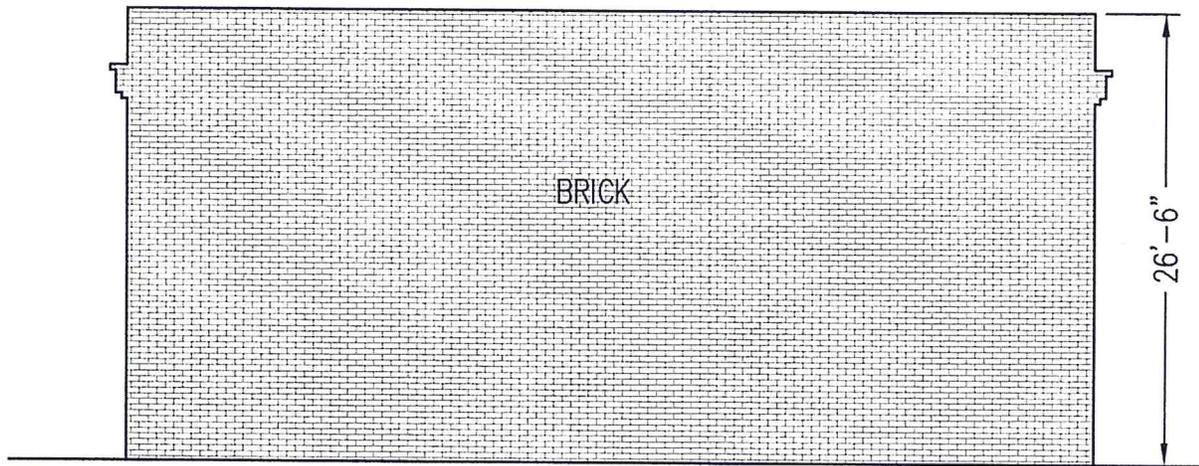
**SHIPPING OFFICE**  
670 WEST H STREET, BENICIA, CA

OWEN O'NEIL ASSOCIATES  
CONSULTING STRUCTURAL ENGINEERS

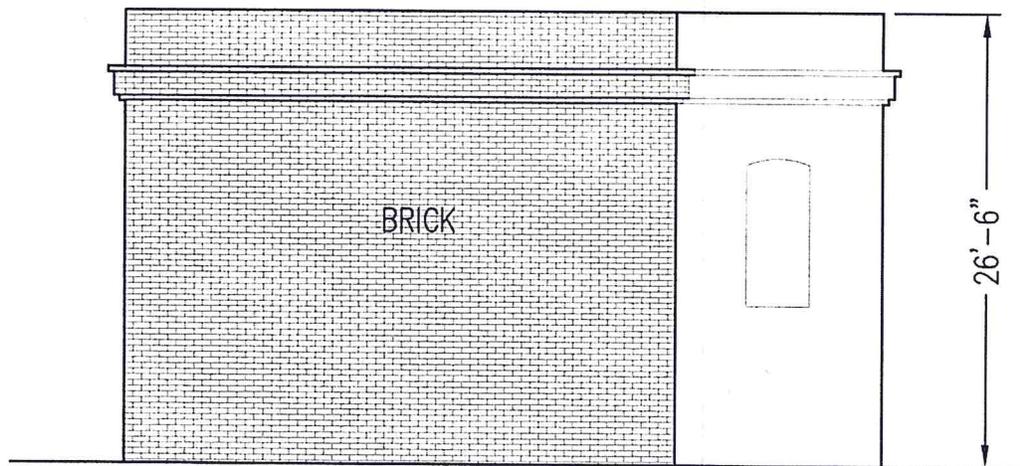
Date: 3-27-2017  
Drawing No. PLATE 1



**EAST ELEVATION**      $3/32' = 1'-0'$



**WEST ELEVATION**      $3/32' = 1'-0'$

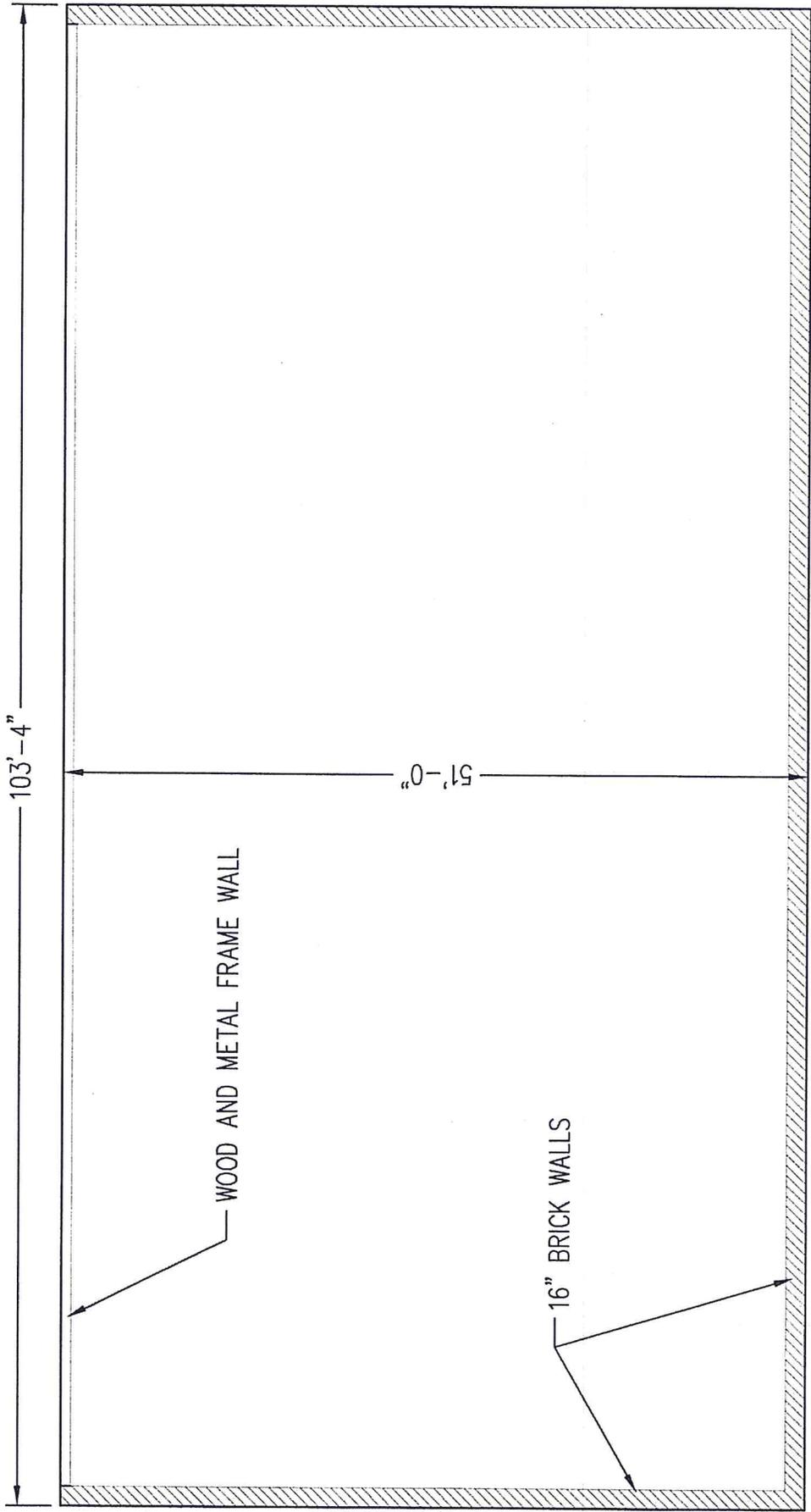


**SOUTH ELEVATION**      $3/32' = 1'-0'$

**SHIPPING OFFICE**  
670 WEST H STREET, BENICIA, CA

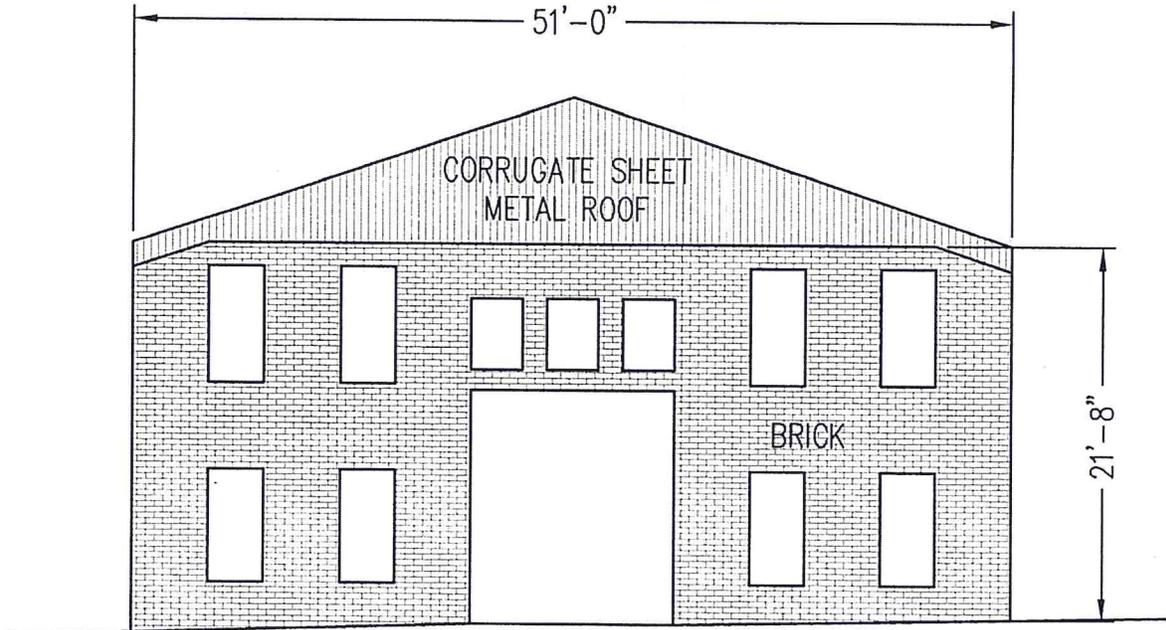
OWEN O'NEIL ASSOCIATES  
CONSULTING     STRUCTURAL     ENGINEERS

Date: 3-27-2017  
Drawing No.  
**PLATE 2**

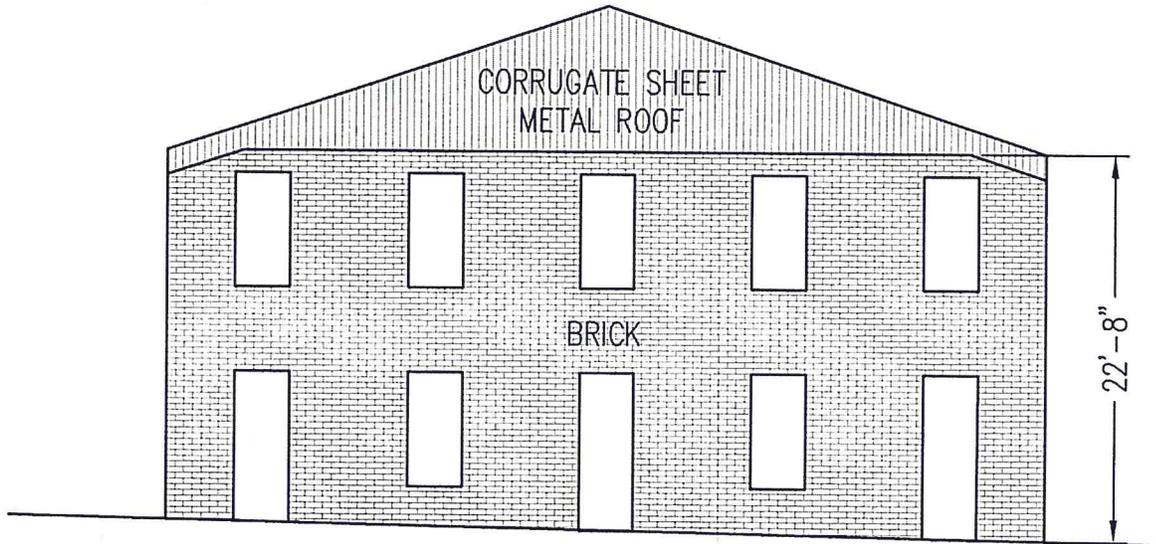


**PLAN**  $\frac{3}{32} = 1'-0"$

Date: 3-27-2017	Drawing No. <b>PLATE 3</b>
<p><b>OWEN O'NEIL ASSOCIATES</b>          CONSULTING STRUCTURAL ENGINEERS</p>	<p><b>FOUNDRY</b>          670 WEST H STREET, BENICIA, CA</p>



**EAST ELEVATION**  $3/32' = 1'-0'$

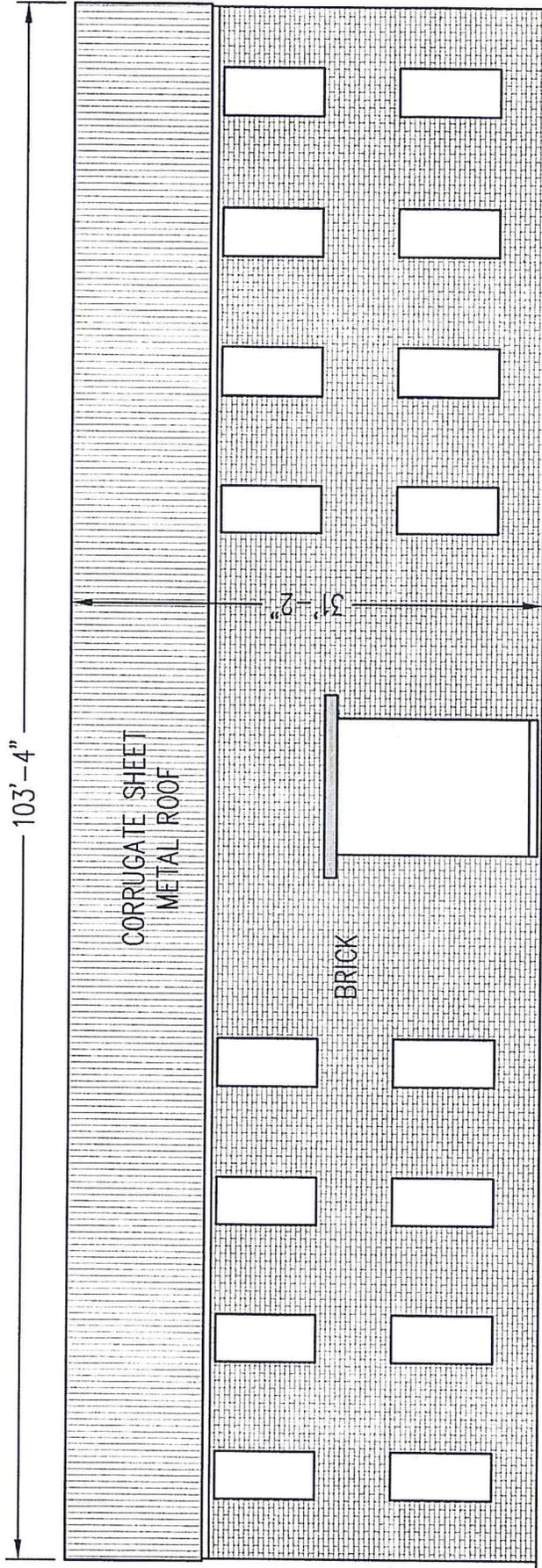


**WEST ELEVATATON**  $3/32' = 1'-0'$

**FOUNDRY**  
670 WEST H STREET, BENICIA, CA

OWEN O'NEIL ASSOCIATES  
CONSULTING STRUCTURAL ENGINEERS

Date: 3-27-2017  
Drawing No. PLATE 4



**SOUTH ELEVATION** 3/32' = 1'-0'

Date: 3-27-2017	Drawing No. <b>PLATE 5</b>
<b>FOUNDRY</b> 670 WEST H STREET, BENICIA, CA	<b>OWEN O'NEIL ASSOCIATES</b> CONSULTING STRUCTURAL ENGINEERS

# Summary Data Sheet

## BUILDING DATA

Building Name: Shipping Office Date: 3-27-2017  
 Building Address: 670 East H Street, Benicia, CA  
 Latitude: 38.044422 Longitude: -122.146567 By: OHO  
 Year Built: Circa 1860 Year(s) Remodeled: Unknown Original Design Code: Unknown  
 Area (sf): 2,100 Length (ft): 57 Width (ft): 44  
 No. of Stories: 1 + Story Height: 21 Total Height: 21

**USE**    Industrial    Office    Warehouse    Hospital    Residential    Educational    Other: \_\_\_\_\_

## CONSTRUCTION DATA

Gravity Load Structural System: Bearing wall  
 Exterior Transverse Walls: Yes Openings? Yes  
 Exterior Longitudinal Walls: Yes Openings? Yes  
 Roof Materials/Framing: 1X sheathing and wood joists  
 Intermediate Floors/Framing: Wood frame  
 Ground Floor: Wood frame  
 Columns: N/A Foundation: Concrete  
 General Condition of Structure: Poor  
 Levels Below Grade? One  
 Special Features and Comments: \_\_\_\_\_

## LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	<u>Ordinary plain masonry shear walls</u>	<u>Ordinary plain masonry shear walls</u>
Vertical Elements:	<u>Plain masonry walls and wood frame</u>	<u>Plain masonry walls and wood frame</u>
Diaphragms:	<u>Plank wood sheathing</u>	<u>Plank wood sheathing</u>
Connections:	<u>Nails</u>	<u>Nails</u>

## EVALUATION DATA

BSE-1N Spectral Response Accelerations:  $S_{D3} =$  1.025  $S_{D1} =$  0.6  
 Soil Factors: Class= D  $F_a =$  1.0  $F_v =$  1.5  
 BSE-1E Spectral Response Accelerations:  $S_{X5} =$  1.005  $S_{X1} =$  0.548  
 Level of Seismicity: High Performance Level: Life safety  
 Building Period:  $T =$  0.19  
 Spectral Acceleration:  $S_s =$  1.0  
 Modification Factor:  $C_m C_1 C_2 =$  1.1 Building Weight:  $W =$  279Kip  
 Pseudo Lateral Force:  $V =$  1.1 X 1.0 X 270 X 0.75(CHC) = 230Kip  
 $C_m C_1 C_2 S_s W =$  \_\_\_\_\_

**BUILDING CLASSIFICATION:** Unreinforced bearing walls with flexible diaphragm (URM)

## REQUIRED TIER 1 CHECKLISTS

	Yes	No
Basic Configuration Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Building Type <u>IS</u> Structural Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nonstructural Component Checklist	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**FURTHER EVALUATION REQUIREMENT:** Yes

Project Name Shipping Office  
Project Number 1712

## ASCE 41-13 Tier 1 Checklists

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FIRM:	Owen O'Neil Associates
PROJECT NAME:	Shipping Office
SEISMICITY LEVEL:	High
PROJECT NUMBER:	1712
COMPLETED BY:	Owen O'Neil
DATE COMPLETED:	3-27-2017
REVIEWED BY:	
REVIEW DATE:	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

**16.16LS Life Safety Structural Checklist for Building Types URM:  
 Unreinforced Masonry Bearing Walls with Flexible Diaphragms  
 and URMA: Unreinforced Masonry Bearing Walls with Stiff Diaphragms**

**Low and Moderate Seismicity**

**Seismic-Force-Resisting System**

RATING				DESCRIPTION	COMMENTS
C <input checked="" type="checkbox"/>	NC <input type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	SHEAR STRESS CHECK: The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than 30 lb/in. <sup>2</sup> for clay units and 70 lb/in. <sup>2</sup> for concrete units. (Commentary: Sec. A.3.2.5.1. Tier 2: Sec. 5.5.3.1.1)	

**Connections**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.5.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Commentary: Sec. A.5.1.2. Tier 2: Sec. 5.7.1.3)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls. (Commentary: Sec. A.5.2.1. Tier 2: Sec. 5.7.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input type="checkbox"/>	U <input checked="" type="checkbox"/>	GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)	

**High Seismicity**

**Seismic-Force-Resisting System**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than the following (Commentary: Sec. A.3.2.5.2. Tier 2: Sec. 5.5.3.1.2): Top story of multi-story building 9 First story of multi-story building 15 All other conditions 13	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U	MASONRY LAYUP: Filled collar joints of multiwythe masonry walls have negligible voids. (Commentary: Sec. A.3.2.5.3, Tier 2: Sec. 5.5.3.4.1)	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

**Diaphragms (Flexible or Stiff)**

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4, Tier 2: Sec. 5.6.1.3)	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
C	NC	N/A	U	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft long. (Commentary: Sec. A.4.1.6, Tier 2: Sec. 5.6.1.3)	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

**Flexible Diaphragms**

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2, Tier 2: Sec. 5.6.1.2)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C <input checked="" type="checkbox"/>	NC <input type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	SPANS: All wood diaphragms with spans greater than 24 ft consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)	
C <input checked="" type="checkbox"/>	NC <input type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

**Connections**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors. (Commentary: Sec. A.5.1.4. Tier 2: Sec. 5.7.1.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	BEAM, GIRDER, AND TRUSS SUPPORTS: Beams, girders, and trusses supported by unreinforced masonry walls or pilasters have independent secondary columns for support of vertical loads. (Commentary: Sec. A.5.4.5. Tier 2: Sec. 5.7.4.4)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

# Summary Data Sheet

## BUILDING DATA

Building Name: Foundry Date: 3-27-2017  
 Building Address: 670 East H Street, Benicia, CA  
 Latitude: 38.044422 Longitude: -122.146567 By: OHO  
 Year Built: Circa 1860 Year(s) Remodeled: Unknown Original Design Code: Unknown  
 Area (sf): 5,270 Length (ft): 103 Width (ft): 51  
 No. of Stories: 1 Story Height: 21ft-8in Total Height: 21ft-8in

**USE**  Industrial  Office  Warehouse  Hospital  Residential  Educational  Other: \_\_\_\_\_

## CONSTRUCTION DATA

Gravity Load Structural System: Bearing wall  
 Exterior Transverse Walls: Yes Openings? Yes  
 Exterior Longitudinal Walls: Yes Openings? Yes  
 Roof Materials/Framing: Wood trusses, wood rafters and corrugated sheet metal  
 Intermediate Floors/Framing: N/A  
 Ground Floor: N/A  
 Columns: N/A Foundation: Concrete  
 General Condition of Structure: Poor  
 Levels Below Grade? No  
 Special Features and Comments: Interior office improvements have been excluded from this survey

## LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	<u>Unknown</u>	<u>Ordinary plain masonry shear walls</u>
Vertical Elements:	<u>Plain masonry walls and wood posts</u>	<u>Plain masonry walls</u>
Diaphragms:	<u>Rods and turn buckles</u>	<u>Rods and turn buckles</u>
Connections:	<u>steel plates to wood trusses and ledgers</u>	<u>steel plates to wood trusses and ledgers</u>

## EVALUATION DATA

BSE-1N Spectral Response Accelerations:  $S_{Ds} =$  1.025  $S_{D1} =$  0.6  
 Soil Factors: Class= D  $F_a =$  1.0  $F_v =$  1.5  
 BSE-1E Spectral Response Accelerations:  $S_{x5} =$  1.005  $S_{x1} =$  0.548  
 Level of Seismicity: High Performance Level: Life safety  
 Building Period:  $T =$  0.20  
 Spectral Acceleration:  $S_a =$  1.0  
 Modification Factor:  $C_m C_1 C_2 =$  1.1 Building Weight:  $W =$  530Kip  
 Pseudo Lateral Force:  $C_m C_1 C_2 S_a W =$   $1.1 \times 1.0 \times 482 \times 0.75(\text{CHC}) = 437\text{Kip}$

**BUILDING CLASSIFICATION:** Unreinforced bearing walls with flexible diaphragm (URM)

## REQUIRED TIER 1 CHECKLISTS

	Yes	No
Basic Configuration Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Building Type <u>IS</u> Structural Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nonstructural Component Checklist	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**FURTHER EVALUATION REQUIREMENT:** Yes

Project Name Foundry  
Project Number 1712

## ASCE 41-13 Tier 1 Checklists

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FIRM:	Owen O'Neil Associates
PROJECT NAME:	Foundry
SEISMICITY LEVEL:	High
PROJECT NUMBER:	1712
COMPLETED BY:	Owen O'Neil
DATE COMPLETED:	3-27-2017
REVIEWED BY:	
REVIEW DATE:	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

**16.16LS Life Safety Structural Checklist for Building Types URM:  
 Unreinforced Masonry Bearing Walls with Flexible Diaphragms  
 and URMA: Unreinforced Masonry Bearing Walls with Stiff Diaphragms**

**Low and Moderate Seismicity**

**Seismic-Force-Resisting System**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1, Tier 2: Sec. 5.5.1.1)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	SHEAR STRESS CHECK: The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than 30 lb/in. <sup>2</sup> for clay units and 70 lb/in. <sup>2</sup> for concrete units. (Commentary: Sec. A.3.2.5.1, Tier 2: Sec. 5.5.3.1.1)	

**Connections**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.5.3.7. (Commentary: Sec. A.5.1.1, Tier 2: Sec. 5.7.1.1)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Commentary: Sec. A.5.1.2. Tier 2: Sec. 5.7.1.3)	
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls. (Commentary: Sec. A.5.2.1. Tier 2: Sec. 5.7.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input type="checkbox"/>	U <input checked="" type="checkbox"/>	GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)	

**High Seismicity**

**Seismic-Force-Resisting System**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	U <input type="checkbox"/>	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than the following (Commentary: Sec. A.3.2.5.2. Tier 2: Sec. 5.5.3.1.2): Top story of multi-story building 9 First story of multi-story building 15 All other conditions 13	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U	MASONRY LAYUP: Filled collar joints of multiwythe masonry walls have negligible voids. (Commentary: Sec. A.3.2.5.3, Tier 2: Sec. 5.5.3.4.1)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

**Diaphragms (Flexible or Stiff)**

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4, Tier 2: Sec. 5.6.1.3)	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
C	NC	N/A	U	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft long. (Commentary: Sec. A.4.1.6, Tier 2: Sec. 5.6.1.3)	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

**Flexible Diaphragms**

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2, Tier 2: Sec. 5.6.1.2)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	SPANS: All wood diaphragms with spans greater than 24 ft consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

**Connections**

RATING				DESCRIPTION	COMMENTS
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors. (Commentary: Sec. A.5.1.4. Tier 2: Sec. 5.7.1.2)	
C <input type="checkbox"/>	NC <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	U <input type="checkbox"/>	BEAM, GIRDER, AND TRUSS SUPPORTS: Beams, girders, and trusses supported by unreinforced masonry walls or pilasters have independent secondary columns for support of vertical loads. (Commentary: Sec. A.5.4.5. Tier 2: Sec. 5.7.4.4)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

BUILDING SHIPPING OFFICE  
 JOB NO. 1712 BY OHO

DATE 3-11-16  
 SHEET 1 OF 3

SHIPPING OFFICE BUILDING TYPE URM  
 PERIOD =  $C_t h^R = 0.02 \times 26^1 (0.75) = 0.19 \text{ sec}$   
 $R_f = 4 / (5.6 - \ln(100R)) = 4 (5.6 - \ln(100 \times 5))$   
 $= 1.0$

WEIGHTS	ROOF	ROOFING	3.9
		1x SHEATHING	3.0
		2x6 JOISTS @ 24	1.1
		INSULATION	1.0
		MISC	2.0
			<hr/>
			11.0
	CEILING	1x SHEATHING	3.0
		2x10 @ 24	2.0
		INSULATION	1.0
		PLASTER	8.0
		MISC	1.0
			<hr/>
			15.0
		INTERIOR PLASTER WALLS -	15 PSF
		EXTERIOR WALLS	130 PSF

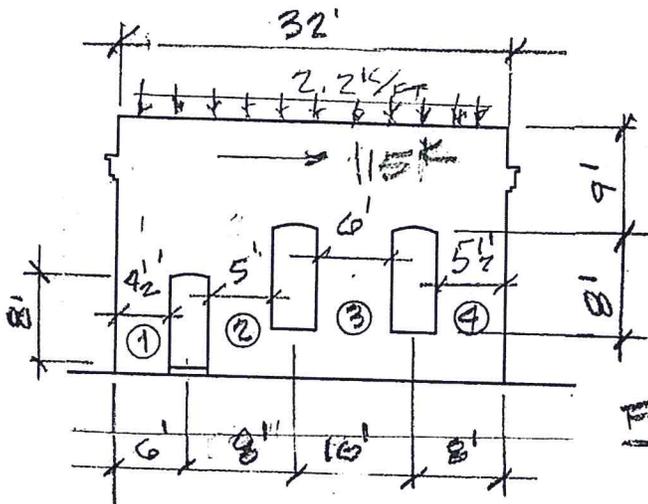
$W = 2100 \text{ lb}' \times (11 + 15 + 7.5) + 130 \times (44 + 56 \times 2) \times 12'$   
 $= 70\text{K} + 209\text{K} = 279\text{K}$

$V = C_m C_i C_a S_a W_e \times 0.75 C_{hc} = 1.1 \times 279 \times 0.75 = 230\text{K}$

BUILDING SHIPPING OFFICE  
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DATE 3-11-16  
 SHEET 2 OF 3

CBC APPENDIX CHAPTER A1



$V_p = 230K / 2 = 115K$   
 $P = 17' \times 130 \text{ PSF} = 2.2K/FT$

FRONT WALL

PIR	P <sub>IPS</sub>	H	D/H	R/D	0.9P/D
1	13.2	8'	0.56	7.4	6.7
2	17.6	8'	0.63	11.1	10.0
3	22.0	8'	0.75	16.5	14.9
4	17.6	8'	0.69	12.1	10.9
	<u>70.4</u>		<u>2.63</u>	<u>47.1</u>	<u>42K</u>

$V_a = V_m^A / 1.5 @ 30P$

23K OK.

42K VS 115K ROCKING CAPACITY = 0.37 ASCE 41 FORCE  
 VS NEW BLDGS  $SD_1 = 0.6$

NEEDS IN-PLANE BRACING

# OWEN O'NEIL ASSOCIATES

4101 EMERALD STREET, OAKLAND, CA 94609

BUILDING FOUNDRY BUILDING

JOB NO. 1712 BY OHO

# CONSULTING STRUCTURAL ENGINEERS

510-658-8601 owenoneil@aol.com

DATE 3-11-16

SHEET 3 OF 3

FOUNDRY BUILDING TYPE URM

$$PERIOD T = 0.2 \times 21.66^{(0.75)} = 0.20$$

WTS: ROOF

SHEET METAL DECK	3.0
2x10 JOISTS @ 4'-0"	1.2
4x8 TRUSSES @ 25'	1.3
X BRACING	1.0
MISC	2.0
CRANE RAIL GIRDER & POSTS	1.5
	<hr/>
	10.0

WOOD WALL WT ~ 10 PSF

URM " " 170 PSF

$$W = 5170 \times 10 + 170(103' + 102')12' + 10 \times 103 \times 12'$$

$$= 52 + 418 + 12 = 530K$$

$$V = C_m C_1 C_2 S_a W \times 0.75_{CHC} = 1.1 \times 530 \times 0.75$$

$$= \underline{\underline{437K}}$$