ASCE 41-17 Tier 1 Seismic Evaluation
Building Name: Beverly Cleary Hall South
CAAN ID: 1002
Auxiliary Building ID: N/A
Address: 2424 Channing Way, Berkeley, CA
Site location coordinates: Latitude 37.8664 Longitudinal -122.2595

Aerial Photo

UCOP SEISMIC PERFORMANCE LEVEL (OR “RATING”) BASED ON TIER 1 EVALUATION FINDINGS: IV

BUILDING DATA
ASCE 41-17 Model Building Type (Governing Building Type bolded for Seismic Risk Model when multiple types exist):
   a. Longitudinal Direction: W1A: Wood Light Frame, over C2: Conc. SW and RM2: Masonry SW
   b. Transverse Direction: W1A: Wood Light Frame, over C2: Conc. SW and RM2: Masonry SW

Square Footage: 32,774 ft² (Includes BSMT) out of 58,668 ft² total
Building Length: 246’ – 4”
Building Width: 107’ – 8”
Building Height: 57’-4 ½” (to roof ridgeline)
Story Height: 11’-3” (1st), 9’-2 ½” (2nd-4th), 9’ (5th)
Number of stories above grade: 4
Number of basement stories below grade: 1 podium level, partially below grade

Year of Original Construction and Code Year: 1992, 1988 UBC
Year of Later Constuction and Code Year: N/A
COST RANGE TO RETROFIT (if applicable): N/A

BUILDING DESCRIPTION
General
This building completed construction in 1992 and is situated on a North to South sloping site. The building has four liveable stories with an attic space above and one partially below grade podium level. The total structure height is approximately 57 feet tall. The building is rectangular in shape with a footprint of about 246 feet in the NS direction and 108 feet in the EW direction. The building area is approximately 37,300 square feet and is used as residential housing with parking in the podium level.

Structural System
The structure is a concrete/masonry podium structure with timber framing above. The typical gravity structural system above the podium consists of plywood deck over engineered timber joists supported by stud bearing walls. The floors have a 1” thick Gypcrete topping slab. The first floor is a reinforced two-way concrete slab supported by concrete and masonry walls with secondary concrete columns all founded on spread footings. The lateral system above the podium consists of horizontal plywood diaphragms and vertical plywood shear walls. The podium portion of the structure utilize a +12” thick concrete diaphragm at the ground level to transfer lateral forces to masonry and concrete shear walls along the perimeter of the garage level.

Building Condition
Good, building manager indicated water damage in the community bathroom locations

Date of Site Visit: 02/15/2019, Ray Pugliesi & Torrey Bolden, Degenkolb Engineers
Limitations of walk-through: none

SITE INFORMATION
Site Class (A-F): D
Basis: Default per ASCE41-17
Site Specific Ground Motion Study? No
BSE-1N Spectral Accelerations: Basis: https://seismicmaps.org/
Sds: 1.606 S01: 1.003
BSE-2E Spectral Accelerations: Basis: https://seismicmaps.org/
Sxs: 2.412 Sx1: 1.368
Level of Seismicity: High
Performance Level: Collapse Prevention Structural Performance

Geologic Hazards:
Fault Rupture No
Basis: Earthquake Zones of Required Investigation- Oakland West Quadrangle
https://maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/
Liquefaction No
Basis: Earthquake Zones of Required Investigation- Oakland West Quadrangle
https://maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/
Landslide No
Basis: Earthquake Zones of Required Investigation- Oakland West Quadrangle
https://maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/
PREVIOUS RATINGS SUMMARY
1. Good – 1997 Preliminary Seismic Evaluation (SAFER), Rutherford & Chekene
2. Fair – 10/26/07 – Interactive Resources, “Preliminary Seismic Assessment (ASCE 31-03 Evaluation) of Beverly Cleary Hall”

DOCUMENTATION
Architectural Drawings: Haste/Channing Student Housing & Parking, Cygna Engineers, Tai Associates/Architects, 5/10/91, A0.0-A9.9
Structural Drawings: Haste/Channing Student Housing & Parking, Cygna Engineers, 5/10/91, S0.0-S4.3
Seismic Evaluations:
“1997 Preliminary Seismic Evaluation (SAFER)”, Rutherford & Chekene, 07/17/97, Tier 1
“Preliminary Seismic Assessment (ASCE 31-03 Evaluation) of Beverly Cleary Hall located at 2525 Channing, Berkeley, CA IR 2007-044-01”, Donald A Cushing Jr., 10/26/07, ASCE 31-03 Tier 1 with Limited Tier 2
Geotechnical Reports: N/A
Other Documents: N/A

CONSTRUCTION DATA
Gravity Load Structural System: Plywood sheathing on timber joists supported by stud bearing walls
Exterior Transverse Walls: Plywood Sheathing w/ Plaster Opening(s)? Yes
Exterior Longitudinal Walls: Plywood Sheathing w/ Plaster Opening(s)? Yes
Roof Materials/Framing: Composition Shingles over ⅜” Plywood on 2x12 Rafters
Intermediate Floors/Framing: 1” Gypcrete over ¾” Plywood on TJI25 Typ.
Ground Floor: 12” – 15” Concrete Slab
Columns: N/A Foundation: Spread footings
General Condition of Structure: Good Evidence of Settling?: No
Special Features & Comments: This structure is on top of a CMU/concrete podium. The podium level to the North of the site is completely below grade and slopes to the south so that south elevation is completely above grade

LATERAL-FORCE-RESISTING SYSTEM
ASCE 41-17 Building Type: Longitudinal
Diaphragms: W1A: Wood Light Frames
Vertical Elements: Plywood w/ 1” Gyp Topping
Connections: Nailing, Sill Bolts, HDs
Details: 9/S0.2 Wall Sheathing 5/S0.2 Diaphragm Sheathing
Estimated Fundamental Period, T (sec): 0.363
BSE-2E Spectral Acceleration, S_a: 2.41g

W1A: Wood Light Frames
Plywood Stud Shear Walls
Nailing, Sill Bolts, HDs
9/S0.2 Wall Sheathing 5/S0.2 Diaphragm Sheathing

W1A: Wood Light Frames
Plywood Stud Shear Walls
Nailing, Sill Bolts, HDs
9/S0.2 Wall Sheathing 5/S0.2 Diaphragm Sheathing

2.41g
### Significant Structural Deficiencies, Potentially Affecting Seismic Performance Level Designation:

- ✔ Lateral System Stress Check (wall shear, column shear or flexure, or brace axial as applicable)
- ✔ Load Path
- ✔ Adjacent Buildings
- □ Weak Story
- □ Soft Story
- □ Geometry (vertical irregularities)
- □ Torsion
- ✔ Mass – Vertical Irregularity
- □ Cripple Walls
- □ Wood Sills (bolting)
- □ Diaphragm Continuity
- □ Openings at Shear Walls (concrete or masonry)
- □ Liquefaction
- □ Slope Failure
- □ Surface Fault Rupture
- □ Masonry or Concrete Wall Anchorage at Flexible Diaphragm
- □ URM wall height to thickness ratio
- □ URM Parapets or Cornices
- □ URM Chimney
- □ Heavy Partitions Braced by Ceilings
- □ Appendages

### OVERALL SEISMIC DEFICIENCIES & EXPECTED SEISMIC PERFORMANCE

The below items have been identified as non-compliant:

1. *Walls connected through floors:* various locations at the second floor do not call for hold-downs where there are hold downs specified at the stories above and below. At these locations the
walls lack flexural continuity up the height of the building. If the hold downs are not present there is potential for increased deformations and damage at the walls toe due to unrestrained uplift.

2. **CMU Shear Wall Stress Check:** In the east west direction loading of the building both CMU and Concrete walls are utilized to resist seismic forces in the podium level. The average shear stress of the wall is 119 psi which is greater than the 70 psi prescribed by the quick check procedure. When the CMU wall contribution is taken from the base shear and the remaining concrete wall is evaluated the wall stress is less than the $2\sqrt{f'_c}$ and greater than $2\sqrt{f'_c}$. The inadequacy of the CMU wall in the lateral system is not believed to be a hazard to the overall stability of the system, as the concrete wall can support the resulting shear demand.

3. **Wood Shear Wall Stress Check:** The shear stresses in the walls at the first timber framing story are slightly over the allowable stress value of 1000 plf. This overstressing of the shear walls would result in increased damage to the wall finish, but is not expected to be considerable life-safety hazard.

4. **Adjacent Buildings:** The timber structures atop the podium are structurally separated by a 4” seismic gap between the North and South superstructures and 2” between the North and multipurpose structure. These gap dimensions are insufficient to preclude pounding during an intense seismic event. These structures benefit from the floor levels aligning with the adjacent structure, which is expected to mitigate structural damage. This deficiency is not considered to be a life-safety issue.

5. **Discontinuous roof chord:** The roof lacks sub-chords where dormers interrupt the diaphragm. The dormers are typical located next the transverse walls, and is not considered to be a diaphragm flaw.

The lateral system of the South portion of the Beverly Cleary Residence Hall has a high level of redundancy, and therefore likely capable of spreading the damage during a large seismic event. The lack of the wall hold-downs at the second floor and the slight overstressing of the wall is not expected to be a life safety hazard. The walls are expected to rock at the second floor, and experience increased damage at the lower floors but not develop a structural instability. The pounding hazard is not expected to affect the structural response as the floors align at each level. In the podium level, the concrete shear walls are capable of compensating for the CMU walls that do not meet the criteria for the quick check procedures. For these reasons, the deficiencies are not expected to cause a life safety hazard and this structure has been assigned a SPL rating of IV. This was concurred by the peer review group comprising of Rutherford + Chekene, Degenkolb Engineers, and Forell/Elsesser Engineers on February, 28, 2019.

The building manager indicated there has been on-going plumbing issues in the community restrooms. A portion of the bathroom was exposed during the site visit and did not appear to have any significant structural deterioration due to the related plumbing issues. This is not believed to be structural issue at this time.
Appendices

A. Additional Photos

B. ASCE 41-17 Tier 1 Checklists (Structural)

C. UCOP Seismic Safety Policy Falling Hazards Assessment Summary

D. Quick Check Calculations
APPENDIX A
Additional Photos

Exposed Plywood Shear Wall in Community Bathroom, 3rd Floor

Seismic Joint, North Elevation
Typical Residence Hall Corridor
APPENDIX B

ASCE 41-17 Tier 1 Checklist (Structural)
### LOW SEISMICITY

#### BUILDING SYSTEMS - GENERAL

<table>
<thead>
<tr>
<th>Description</th>
<th>C</th>
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<th>N/A</th>
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<tbody>
<tr>
<td>LOAD PATH: The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<tr>
<td><strong>Comments:</strong> The structural drawings are missing hold-downs at the second timber framing level. The lack of hold downs is a lapse in the load path of the structure.</td>
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<tr>
<td>ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<tr>
<td><strong>Comments:</strong> The seismic gap between structures is inadequate at the upper stories.</td>
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<tr>
<td>MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<td><strong>Comments:</strong></td>
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#### BUILDING SYSTEMS - BUILDING CONFIGURATION

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<tr>
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<tr>
<td>WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Commentary: Sec. A2.2.2. Tier 2: Sec. 5.4.2.1)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<tr>
<td><strong>Comments:</strong></td>
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<tr>
<td>SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<tr>
<td><strong>Comments:</strong></td>
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<tr>
<td>VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3)</td>
<td>C</td>
<td>C</td>
<td>N/A</td>
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<tr>
<td><strong>Comments:</strong> Structure is regular on top of the podium. Change is SFRS dimensions at the podium level.</td>
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</table>

**Note:**  
C = Compliant  NC = Noncompliant  N/A = Not Applicable  U = Unknown
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<th>Berkeley</th>
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<td>Building CAAN:</td>
<td>1002</td>
<td>Auxiliary CAAN:</td>
<td>1002.0</td>
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<tr>
<td>Building Name:</td>
<td>Cleary Hall South</td>
<td>By Firm:</td>
<td>Degenkolb Engineers</td>
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<tr>
<td>Building Address:</td>
<td>2424 Channing Way, Berkeley, CA</td>
<td>Initials:</td>
<td>TAB</td>
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**Collapsible Prevention Basic Configuration Checklist**

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**Description**

**GEOMETRY:** There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4)

**Comments:**
Structure is regular on top of the podium. Change is SFRS dimensions >30% at the podium level.

**MASS:** There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5)

**Comments:**
The structure is regular above the podium level. Change is mass at the podium level relative to superstructure level.

**TORSION:** The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6)

**Comments:**

**MODERATE SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR LOW SEISMICITY)**

**GEOLOGIC SITE HAZARD**

<table>
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<tr>
<th>Description</th>
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<tr>
<td><strong>Liquefaction:</strong> Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building’s seismic performance do not exist in the foundation soils at depths within 50 ft (15.2m) under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1)</td>
</tr>
<tr>
<td><strong>Comments:</strong></td>
</tr>
<tr>
<td><strong>Slope Failure:</strong> The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1)</td>
</tr>
<tr>
<td><strong>Comments:</strong></td>
</tr>
<tr>
<td><strong>Surface Fault Rupture:</strong> Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1)</td>
</tr>
<tr>
<td><strong>Comments:</strong></td>
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</table>

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## ASCE 41-17
Collapse Prevention Basic Configuration Checklist

### HIGH SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR MODERATE SEISMICITY)

#### FOUNDATION CONFIGURATION

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<tbody>
<tr>
<td>OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than 0.6Sₐ. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3)</td>
<td>C</td>
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**Comments:**

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<tr>
<td>TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4)</td>
<td>C</td>
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**Comments:**

Spread footings tied together with 6” slab on grade.

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### LOW AND MODERATE SEISMICITY

#### SEISMIC-FORCE-RESISTING SYSTEM

<table>
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<tr>
<th>Description</th>
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<tr>
<td>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)</td>
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<td><strong>Comments:</strong></td>
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<tr>
<td>SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1)</td>
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<tr>
<td>Structural panel sheathing  1,000 lb/ft (14.6 kN/m)</td>
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<tr>
<td>Diagonal sheathing  700 lb/ft (10.2 kN/m)</td>
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</tr>
<tr>
<td>Straight sheathing  100 lb/ft (1.5 kN/m)</td>
<td>C</td>
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<tr>
<td>All other conditions  100 lb/ft (1.5 kN/m)</td>
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<tr>
<td><strong>Comments:</strong> Maximum Stress &gt; 1000 plf. See Quick Checks</td>
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<tr>
<td>STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)</td>
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<tr>
<td>GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1)</td>
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<tr>
<td>NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)</td>
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<tbody>
<tr>
<td>WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec. 5.5.3.6.2)</td>
<td>Various locations at the 2nd floor do not have a hold down specified when there is a hold down specified on the stories above and below.</td>
</tr>
<tr>
<td>HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-1. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3)</td>
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</tr>
<tr>
<td>CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4)</td>
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</tr>
<tr>
<td>OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5)</td>
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**CONNECTIONS**

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<tr>
<th>Description</th>
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<tbody>
<tr>
<td>WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3)</td>
<td>Detail 2/S0.5</td>
</tr>
<tr>
<td>WOOD SILLs: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3)</td>
<td>Detail 2/S0.2</td>
</tr>
<tr>
<td>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)</td>
<td>Steel beam to wood post detail 10/S4.2. Typical framing is TJI joists between load bearing walls</td>
</tr>
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</table>
### ASCE 41-17
Collapse Prevention Structural Checklist For Building Type W1-W1A

**HIGH SEISMICITY** (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR LOW AND MODERATE SEISMICITY)

#### CONNECTIONS

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>WOOD SILL BOLTS: Sill bolts are spaced at 6 ft or less with acceptable edge and end distance provided for wood and concrete. (Commentary: Sec. A.5.3.7. Tier 2: Sec. 5.7.3.3)</td>
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**Comments:**
Detail 2/S0.2

#### DIAPHRAGMS

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<tbody>
<tr>
<td>DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1)</td>
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</tbody>
</table>

**Comments:**

#### ROOF CHORD CONTINUITY

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Commentary: Sec. A.4.1.3. Tier 2: Sec. 5.6.1.1)</td>
</tr>
</tbody>
</table>

**Comments:**
Sub-chord at dormer openings not present, but chord at attic floor level is continuous.

#### STRAIGHT SHEATHING

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>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)</td>
</tr>
</tbody>
</table>

**Comments:**

#### SPANS

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)</td>
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</tbody>
</table>

**Comments:**
<p>| | | | | |</p>
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<tbody>
<tr>
<td><strong>C</strong></td>
<td><strong>NC</strong></td>
<td><strong>N/A</strong></td>
<td><strong>U</strong></td>
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</tbody>
</table>
| **DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS:** All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12 m) and have aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)
| Comments: |   |   |   |   |

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</tbody>
</table>
| **OTHER DIAPHRAGMS:** The diaphragms do 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)
| Comments: |   |   |   |   |
Low And Moderate Seismicity

Seismic-Force-Resisting System

<table>
<thead>
<tr>
<th>Description</th>
<th>C</th>
<th>NC</th>
<th>N/A</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETE FRAMES: Steel or concrete frames classified as secondary components form a complete vertical-load-carrying system. (Commentary: Sec. A.3.1.6.1. Tier 2: Sec. 5.5.2.5.1)</td>
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<tr>
<td>Comments:</td>
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</tr>
<tr>
<td>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)</td>
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<tr>
<td>Comments:</td>
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</tr>
<tr>
<td>SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the greater of 100 lb/in.² (0.69 MPa) or 2√f'c. (Commentary: Sec. A.3.2.2.1. Tier 2: Sec. 5.5.3.1.1)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area is not less than 0.0012 in the vertical direction and 0.0020 in the horizontal direction. (Commentary: Sec. A.3.2.2.2. Tier 2: Sec. 5.5.3.1.3)</td>
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<tr>
<td>Comments:</td>
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</tbody>
</table>

Connections

<table>
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<tr>
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<th>N/A</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALL ANCHORAGE AT FLEXIBLE DIAPHRAGMS: Exterior concrete or masonry walls that are dependent on flexible diaphragms 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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)</td>
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<td>Comments:</td>
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</tr>
<tr>
<td>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)</td>
<td></td>
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<tr>
<td>Comments:</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: C = Compliant  NC = Noncompliant  N/A = Not Applicable  U = Unknown
### Building Address:
2424 Channing Way, Berkley, CA

### Building CAAN:
1002

### Auxiliary CAAN:
-  

### UC Campus:
Berkeley

### Building Name:
Beverly Cleary Hall, Podium

### Initials:
TAB

### Checked:
2/20/2019

### ASCE 41-17
Collapse Prevention Structural Checklist For Building Type C2-C2A

**C** = Compliant  **NC** = Noncompliant  **N/A** = Not Applicable  **U** = Unknown

<table>
<thead>
<tr>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation with</td>
<td>Wall reinforcement is doweled into the foundation with vertical bars equal</td>
</tr>
<tr>
<td>vertical bars equal in size and spacing to the vertical wall reinforcing</td>
<td>in size and spacing to the vertical wall reinforcing directly above the</td>
</tr>
<tr>
<td>directly above the foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)</td>
<td>foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)</td>
</tr>
</tbody>
</table>

**High Seismicity (Complete The Following Items In Addition To The Items For Low And Moderate Seismicity)**

#### Seismic-Force-Resisting System

<table>
<thead>
<tr>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFLECTION COMPATIBILITY: Secondary components have the shear capacity to</td>
<td>Secondary components have the shear capacity to develop the flexural</td>
</tr>
<tr>
<td>develop the flexural strength of the components. (Commentary: Sec. A.3.1.6.2.</td>
<td>strength of the components. (Commentary: Sec. A.3.1.6.2. Tier 2: Sec.</td>
</tr>
<tr>
<td>Tier 2: Sec. 5.5.2.5.2)</td>
<td>5.5.2.5.2)</td>
</tr>
<tr>
<td>Comments:</td>
<td>Columns have adequate shear capacity to develop shear demands from</td>
</tr>
<tr>
<td></td>
<td>flexural mechanism. See quick checks.</td>
</tr>
<tr>
<td>FLAT SLABS: Flat slabs or plates not part of the seismic-force-resisting</td>
<td>Flat slabs or plates not part of the seismic-force-resisting system</td>
</tr>
<tr>
<td>system have continuous bottom steel through the column joints. (Commentary:</td>
<td>system have continuous bottom steel through the column joints. (Commentary:</td>
</tr>
<tr>
<td>Sec. A.3.1.6.3. Tier 2: Sec. 5.5.2.5.3)</td>
<td>Sec. A.3.1.6.3. Tier 2: Sec. 5.5.2.5.3)</td>
</tr>
<tr>
<td>Comments:</td>
<td>Proper lap splice length provided at the column joints.</td>
</tr>
<tr>
<td>COUPLING BEAMS: The ends of both walls to which the coupling beam is</td>
<td>The ends of both walls to which the coupling beam is attached are</td>
</tr>
<tr>
<td>attached are supported at each end to resist vertical loads caused by</td>
<td>supported at each end to resist vertical loads caused by overturning.</td>
</tr>
<tr>
<td>overturning. (Commentary: Sec. A.3.2.2.3. Tier 2: Sec. 5.5.3.2.1)</td>
<td>(Commentary: Sec. A.3.2.2.3. Tier 2: Sec. 5.5.3.2.1)</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

#### Diaphragms (Stiff Or Flexible)

<table>
<thead>
<tr>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors</td>
<td>The diaphragms are not composed of split-level floors and do not have</td>
</tr>
<tr>
<td>and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec.</td>
<td>expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1)</td>
</tr>
<tr>
<td>5.6.1.1)</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the</td>
<td>Diaphragm openings immediately adjacent to the shear walls are less than</td>
</tr>
<tr>
<td>shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4.</td>
<td>25% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)</td>
</tr>
<tr>
<td>Tier 2: Sec. 5.6.1.3)</td>
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<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

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### Flexible Diaphragms

<table>
<thead>
<tr>
<th>Description</th>
<th>C</th>
<th>NC</th>
<th>N/A</th>
<th>U</th>
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</thead>
<tbody>
<tr>
<td>CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>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)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>OTHER DIAPHRAGMS: Diaphragms do 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)</td>
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<td>Comments:</td>
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### Connections

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</tr>
</thead>
<tbody>
<tr>
<td>UPLIFT AT PILE CAPS: Pile caps have top reinforcement, and piles are anchored to the pile caps. (Commentary: Sec. A.5.3.8. Tier 2: Sec. 5.7.3.5)</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>Shallow spread footings</td>
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# ASCE 41-17
Collapse Prevention Structural Checklist For Building Type RM1-RM2

## LOW AND MODERATE SEISMICITY

### SEISMIC-FORCE-RESISTING SYSTEM

<table>
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<tr>
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<tbody>
<tr>
<td>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)</td>
<td>C</td>
<td>NC</td>
<td>N/A</td>
<td>U</td>
</tr>
<tr>
<td>SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in.² (0.48 MPa). (Commentary: Sec. A.3.2.4.1. Tier 2: Sec. 5.5.3.1.1)</td>
<td>C</td>
<td>NC</td>
<td>N/A</td>
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</tr>
<tr>
<td>STIFF DIAPHRAGMS</td>
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</tr>
<tr>
<td>TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Commentary: Sec. A.4.5.1. Tier 2: Sec. 5.6.4)</td>
<td>C</td>
<td>NC</td>
<td>N/A</td>
<td>U</td>
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<tr>
<td>CONNECTIONS</td>
<td></td>
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</tr>
<tr>
<td>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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)</td>
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### Notes
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<tbody>
<tr>
<td>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)</td>
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<tr>
<td>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)</td>
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</tr>
<tr>
<td>TOPPING SLAB TO WALLS OR FRAMES: Reinforced concrete topping slabs that interconnect the precast concrete diaphragm elements are doweled for transfer of forces into the shear wall or frame elements. (Commentary: Sec. A.5.2.3. Tier 2: Sec. 5.7.2)</td>
<td></td>
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<tr>
<td>FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)</td>
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<tr>
<td>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)</td>
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**HIGH SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR LOW AND MODERATE SEISMICITY)**

**STIFF DIAPHRAGMS**

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<thead>
<tr>
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<tbody>
<tr>
<td>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)</td>
<td></td>
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</tr>
<tr>
<td>OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Commentary: Sec. A.4.1.6. Tier 2: Sec. 5.6.1.3)</td>
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<td>CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2, Tier 2: Sec. 5.6.1.2)</td>
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<tr>
<td>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)</td>
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<tr>
<td>OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Commentary: Sec. A.4.1.6, Tier 2: Sec. 5.6.1.3)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>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)</td>
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</tr>
<tr>
<td>SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2, Tier 2: Sec. 5.6.2)</td>
<td></td>
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</tr>
<tr>
<td>DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3, Tier 2: Sec. 5.6.2)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OTHER DIAPHRAGMS: Diaphragms do 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)</td>
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### CONNECTIONS

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<th>N/A</th>
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</tr>
</thead>
<tbody>
<tr>
<td>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. (3 mm) before engagement of the anchors. (Commentary: Sec. A.5.1.4, Tier 2: Sec. 5.7.1.2)</td>
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</tbody>
</table>

**Comments:**

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APPENDIX C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary
UCOP SEISMIC SAFETY POLICY
Falling Hazard Assessment Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>P</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy ceilings, features or ornamentation above large lecture halls, auditoriums, lobbies, or other areas where large numbers of people congregate (50 ppl or more)</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy masonry or stone veneer above exit ways or public access areas</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbraced masonry parapets, cornices, or other ornamentation above exit ways or public access areas</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestrained hazardous material storage</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masonry chimneys</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
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</tbody>
</table>

Falling Hazard Risk: Low
APPENDIX D

ASCE 41-17 Quick Check Calculations
### Roof

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (ft²)</th>
<th>Length (ft)</th>
<th>Height (ft)</th>
<th>Area Weight (psf)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>4600.0</td>
<td></td>
<td>21</td>
<td>96600.0</td>
<td></td>
</tr>
<tr>
<td>Exterior Walls</td>
<td>397</td>
<td>4.6</td>
<td>18</td>
<td>32871.6</td>
<td></td>
</tr>
<tr>
<td>Interior Bearing</td>
<td>475</td>
<td>4.6</td>
<td>10</td>
<td>21850.0</td>
<td></td>
</tr>
<tr>
<td>Interior Non-Bearing</td>
<td>210</td>
<td>4.6</td>
<td>7</td>
<td>6762.0</td>
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</tr>
<tr>
<td><strong>Σ W&lt;sub&gt;floor&lt;/sub&gt;</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>158.1</strong></td>
<td><strong>kip</strong></td>
</tr>
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### Fourth Floor

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (ft²)</th>
<th>Length (ft)</th>
<th>Height (ft)</th>
<th>Area Weight (psf)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>4600.0</td>
<td></td>
<td>19</td>
<td>87400.0</td>
<td></td>
</tr>
<tr>
<td>Exterior Walls</td>
<td>397</td>
<td>9.2</td>
<td>18</td>
<td>65743.2</td>
<td></td>
</tr>
<tr>
<td>Interior Bearing</td>
<td>475</td>
<td>9.2</td>
<td>10</td>
<td>43700.0</td>
<td></td>
</tr>
<tr>
<td>Interior Non-Bearing</td>
<td>210</td>
<td>9.2</td>
<td>7</td>
<td>13524.0</td>
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</tr>
<tr>
<td><strong>Σ W&lt;sub&gt;floor&lt;/sub&gt;</strong></td>
<td></td>
<td></td>
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<td><strong>210.4</strong></td>
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### Third Floor

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (ft²)</th>
<th>Length (ft)</th>
<th>Height (ft)</th>
<th>Area Weight (psf)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>4600.0</td>
<td></td>
<td>19</td>
<td>87400.0</td>
<td></td>
</tr>
<tr>
<td>Exterior Walls</td>
<td>397</td>
<td>9.2</td>
<td>18</td>
<td>65743.2</td>
<td></td>
</tr>
<tr>
<td>Interior Bearing</td>
<td>475</td>
<td>9.2</td>
<td>10</td>
<td>43700.0</td>
<td></td>
</tr>
<tr>
<td>Interior Non-Bearing</td>
<td>210</td>
<td>9.2</td>
<td>7</td>
<td>13524.0</td>
<td></td>
</tr>
<tr>
<td><strong>Σ W&lt;sub&gt;floor&lt;/sub&gt;</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>210.4</strong></td>
<td><strong>kip</strong></td>
</tr>
</tbody>
</table>

### Second

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (ft²)</th>
<th>Length (ft)</th>
<th>Height (ft)</th>
<th>Area Weight (psf)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>4600.0</td>
<td></td>
<td>19</td>
<td>87400.0</td>
<td></td>
</tr>
<tr>
<td>Exterior Walls</td>
<td>397</td>
<td>9.2</td>
<td>18</td>
<td>65743.2</td>
<td></td>
</tr>
<tr>
<td>Interior Bearing</td>
<td>475</td>
<td>9.2</td>
<td>10</td>
<td>43700.0</td>
<td></td>
</tr>
<tr>
<td>Interior Non-Bearing</td>
<td>210</td>
<td>9.2</td>
<td>7</td>
<td>13524.0</td>
<td></td>
</tr>
<tr>
<td><strong>Σ W&lt;sub&gt;floor&lt;/sub&gt;</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>210.4</strong></td>
<td><strong>kip</strong></td>
</tr>
</tbody>
</table>

**Building Weight = 789.2 kip**
ASCE 41-17 Linear Static Base Shear & Vertical Force Distribution
Tier 1

INPUT DATA

C: Modification factor (Table 4-7) = 1

$S_1$: Spectral Response Acceleration @ 1 sec. = 1.00 (from MCE maps or Site Specific)

$S_s$: Short Period Response Acceleration = 2.41 (from MCE maps or Site Specific)

SC: Soil Class = C (A through F), 1.6.1.4.1

Table 1-5:

<table>
<thead>
<tr>
<th>Soil Class C</th>
<th>$S_1 = 0.1$</th>
<th>$S_1 = 0.2$</th>
<th>$S_1 = 0.3$</th>
<th>$S_1 = 0.4$</th>
<th>$S_1 = 0.5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_v$</td>
<td>1.7</td>
<td>1.6</td>
<td>1.5</td>
<td>1.4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

$F_v$: Site Coefficient for $S_1 = 1.30$ (Table 11.4-1)

Table 1-4:

<table>
<thead>
<tr>
<th>Soil Class C</th>
<th>$S_s = 0.25$</th>
<th>$S_s = 0.50$</th>
<th>$S_s = 0.75$</th>
<th>$S_s = 1.00$</th>
<th>$S_s = 1.25$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_a$</td>
<td>1.2</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

$F_a$: Site Coefficient for $S_s = 1.00$ (Table 11.4-2)

$S_{xx}$: Spectral Response Acceleration @ 1 sec. = 1.30 (2-2)

$S_{xs}$: Short Period Acceleration = $F_a \times S_s = 2.41$ (2-1)

$\beta$: Building System Exponent = 0.75 (4.4.2.4)

$C_t$: Building System Coefficient = 0.02 (4.4.2.4)

W: Total Building Weight = 789 kips

hn: Total Building Height = 47.6 feet

n: Number of Stories = 4

CALCULATE BASE SHEAR FOR BSE-2 (MCE)

T: Fundamental Period of Vibration = $C_t \times h^n = 0.363$ sec. (4-4)

$S_a$: Spectral Acceleration at Building Period = 2.41 (4-3)

V: Pseudo Seismic Force = 1902 kips (4-1)
Considering Wall with hold down both ends of wall
Double Double Counts when Wall Double Sided

**North-South Loading**

- $L_{wall} = 401$ ft
- $M_s = 4.5$ for wood wall, Collapse Prevention
- $A_w = 401$

- $V_{base} = 1902$ kip

- $v_j-avg = 1054$ plf

**East-West Loading**

- $L_{wall} = 405$ ft
- $M_s = 4.5$ for wood wall, Collapse Prevention
- $A_w = 405$

- $V_{base} = 1902$ kip

- $v_j-avg = 1044$ plf
### Subject: Weight Take Off  
### Job Number: B8114004.00  
### Date: 7/11/2019  
### Job: Cleary Hall Podium  
### By: TAB  
### Section:  
### Checked By:  
### Page/of: 

#### Roof

<table>
<thead>
<tr>
<th>South Building</th>
<th>North Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>158.1 kip</td>
<td>149 kip</td>
</tr>
<tr>
<td><strong>Σ W_{floor}</strong></td>
<td><strong>307 kip</strong></td>
</tr>
</tbody>
</table>

#### Fourth Floor

<table>
<thead>
<tr>
<th>South Building</th>
<th>North Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>210.4 kip</td>
<td>193 kip</td>
</tr>
<tr>
<td><strong>Σ W_{floor}</strong></td>
<td><strong>403 kip</strong></td>
</tr>
</tbody>
</table>

#### Third Floor

<table>
<thead>
<tr>
<th>South Building</th>
<th>North Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>210.4 kip</td>
<td>227 kip</td>
</tr>
<tr>
<td><strong>Σ W_{floor}</strong></td>
<td><strong>438 kip</strong></td>
</tr>
</tbody>
</table>

#### Second Floor

<table>
<thead>
<tr>
<th>South Building</th>
<th>North Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>210.4 kip</td>
<td>215 kip</td>
</tr>
<tr>
<td><strong>Σ W_{floor}</strong></td>
<td><strong>425.8 kip</strong></td>
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</tbody>
</table>

#### First Floor

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Area</th>
<th>Length</th>
<th>Height</th>
<th>Area Weight</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>ft²</td>
<td>ft</td>
<td>ft</td>
<td>psf</td>
<td>lbf</td>
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<tr>
<td>Exterior Walls - Main</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>731</td>
<td>4.6</td>
<td>18</td>
<td>18</td>
<td>60527</td>
<td></td>
</tr>
<tr>
<td>Exterior Walls - Aux</td>
<td>137</td>
<td>4.6</td>
<td>18</td>
<td></td>
<td>11344</td>
<td></td>
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<tr>
<td>Interior Bearing</td>
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<td>4.6</td>
<td>10</td>
<td></td>
<td>42596</td>
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<tr>
<td>Interior Non-Bearing</td>
<td>342</td>
<td>4.6</td>
<td>7</td>
<td></td>
<td>11012</td>
<td></td>
</tr>
<tr>
<td>12.5&quot; Conc. Slab</td>
<td>32000</td>
<td>1.04</td>
<td>156.25</td>
<td>5000000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5&quot; Conc. Topping</td>
<td>14500</td>
<td>0.21</td>
<td>31.25</td>
<td>453125</td>
<td></td>
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<tr>
<td>18&quot; Ø Column</td>
<td>400.25</td>
<td>6.13</td>
<td>150</td>
<td>367730</td>
<td></td>
<td></td>
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<tr>
<td>Concrete Wall</td>
<td>475.75</td>
<td>6.13</td>
<td>150</td>
<td>437095</td>
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<td></td>
</tr>
<tr>
<td>CMU Wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Σ W_{floor}** | **6413 kip** |

### Total Building Weight = 7986 kip
ASCE 41-17 Linear Static Base Shear & Vertical Force Distribution
Tier 1

INPUT DATA

C: Modification factor (Table 4-7) = 1
S1: 1.00 (from MCE maps or Site Specific)
Ss: Short Period Response Acceleration = 2.41 (from MCE maps or Site Specific)
SC: Soil Class = D (A through F), 1.6.1.4.1

<table>
<thead>
<tr>
<th>Table 1-5:</th>
<th>S1 &lt;=</th>
<th>S1 =</th>
<th>S1 =</th>
<th>S1 =</th>
<th>S1 &gt;=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Class D</td>
<td>2.4</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Fv:</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Fv: Site Coefficient for S1 = 1.50 (Table 11.4-1)

<table>
<thead>
<tr>
<th>Table 1-4:</th>
<th>Ss &lt;=</th>
<th>Ss =</th>
<th>Ss =</th>
<th>Ss =</th>
<th>Ss &gt;=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Class D</td>
<td>1.6</td>
<td>1.4</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Fa:</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Fa: Site Coefficient for Ss = 1.00 (Table 11.4-2)

Sx1: Spectral Response Acceleration @ 1 sec. = 1.50 (2-2)
Sxs: Short Period Acceleration = Fv*Ss = 2.41 (2-1)
β: Building System Exponent = 0.75 (4.4.2.4)
Ct: Building System Coefficient = 0.02 (4.4.2.4)
W: Total Building Weight = 7986 kips
hn: Total Building Height = 67.9 feet
n: Number of Stories = 4

CALCULATE BASE SHEAR FOR BSE-2 (MCE)

T: Fundamental Period of Vibration = Ct * h^n = 0.473 sec. (4-3)
Sx: Spectral Acceleration at Building Period = 2.41 g (4-1)
V: Pseudo Seismic Force = 19247 kips
Considering CMU and Concrete Wall

**North-South Loading**

- \( L_{wall} = 679 \text{ ft} \)
- \( t_{wall} = 12 \text{ in} \)
- \( M_s = 4.5 \text{ for Concrete o/ CMU wall, Collapse Prevention} \)
- \( A_w = 97776 \text{ in}^2 \)
- \( V_{base} = 19247 \text{ kip} \)
- \( v_j-avg = 44 \text{ psi} \)

**East-West Loading**

- \( L_{wall} = 249 \text{ ft} \)
- \( t_{wall} = 12 \text{ in} \)
- \( M_s = 4.5 \text{ for Concrete o/ CMU wall, Collapse Prevention} \)
- \( A_w = 35856 \)
- \( V_{base} = 19247 \text{ kip} \)
- \( v_j-avg = 119 \text{ psi} \)

**East-West Loading**

- \( L_{wall} = 196 \text{ ft} \) Only Considering Concrete
- \( t_{wall} = 12 \text{ in} \)
- \( M_s = 4.5 \text{ for Concrete o/ CMU wall, Collapse Prevention} \)
- \( A_w = 28224 \)
- \( V_{base} = 19247 \text{ kip} \)
- \( V_{eff} = 18710 \text{ kip} \)  
  - \( V_{eff} = V_{base} - \) subtracted CMU contribution based on 70psi
- \( v_j-avg = 147 \text{ psi} \)

\( f'ce = 6000 \text{ psi} \)
\( f'ce = 4000 \text{ psi} \)

\( 2 \sqrt{f'c} = 155 \text{ psi} \)
\( 2 \sqrt{f'c} = 126 \text{ psi} \)
Concrete Walls

Wall Type 'A'

Vertical: #4 at 12" o.c., each way, both faces

- $t_{wall} = 12$ in
- $A_{bar} = 0.2$ in$^2$
- $sp^c = 12$ in
- $\rho = 0.0028$ OK $> 0.0012$ vertical minimum ratio

Wall Type 'E'

Vertical: #4 at 12" o.c., each way, both faces

- $t_{wall} = 12$ in
- $A_{bar} = 0.2$ in$^2$
- $sp^c = 12$ in
- $\rho = 0.0028$ OK $> 0.0012$ vertical minimum ratio

- $t_{wall} = 12$ in
- $A_{bar} = 0.2$ in$^2$
- $sp^c = 12$ in
- $\rho = 0.0028$ OK $> 0.002$ horizontal minimum ratio
## CMU Walls

### Wall Type 'B'

<table>
<thead>
<tr>
<th>Vertical: #4 at 16&quot; o.c., each way, both faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>twall = 12 in</td>
</tr>
<tr>
<td>Abar = 0.2 in²</td>
</tr>
<tr>
<td>spacing = 16 in</td>
</tr>
<tr>
<td>( \rho = 0.0021 ) OK &gt; 0.0007 minimum ratio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Horizontal #4 at 24&quot; o.c., each way, both faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>twall = 12 in</td>
</tr>
<tr>
<td>Abar = 0.2 in²</td>
</tr>
<tr>
<td>spacing = 24 in</td>
</tr>
<tr>
<td>( \rho = 0.0014 ) OK &gt; 0.0007 minimum ratio</td>
</tr>
</tbody>
</table>

\( \rho_{\text{total}} = 0.0035 \) > 0.002 combined horz/vert

### Wall Type 'C'

<table>
<thead>
<tr>
<th>Vertical: #4 at 16&quot; o.c., each way, both faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>twall = 12 in</td>
</tr>
<tr>
<td>Abar = 0.2 in²</td>
</tr>
<tr>
<td>spacing = 16 in</td>
</tr>
<tr>
<td>( \rho = 0.0021 ) OK &gt; 0.0007 minimum ratio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical: #4 at 24&quot; o.c., each way, both faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>twall = 12 in</td>
</tr>
<tr>
<td>Abar = 0.2 in²</td>
</tr>
<tr>
<td>spacing = 24 in</td>
</tr>
<tr>
<td>( \rho = 0.0014 ) OK &gt; 0.0007 minimum ratio</td>
</tr>
</tbody>
</table>

\( \rho_{\text{total}} = 0.0035 \) > 0.002 combined horz/vert
Material Properties

\[ f_y = 60 \text{ ksi} \quad f_{ye} = 75 \text{ ksi} \]
\[ f_c = 4000 \text{ psi} \quad f_{ce} = 6000 \text{ psi} \]

Section Moment Capacity

Using Expected Material Properties

\[ M_{\text{max}} = 322 \text{ k-ft} \quad @ \ 242 \text{ k} \quad \text{Axially} \]
\[ l = 10.25 \text{ ft} \]
\[ V_{\text{lsa}} = 62.8 \text{ kip} \]
\[ \varnothing = 18 \]

Shear Capacity

Shear Design @ Hinge

3 #3 @ 12" oc

\[ A_v = 0.33 \text{ in}^2 \]
\[ s = 12 \text{ in} \]
\[ d = 14.4 \text{ in} \quad 0.8 \times \varnothing \quad \text{(column diameter)} \]
\[ f_{yE} = 75 \text{ ksi} \]
\[ \lambda = 1 \]
\[ k_{nl} = 1 \quad \text{displacement ductility factor} \]
\[ \text{Mud/Vud} \times d = 4 \]
\[ a_{col} = 1 \]
\[ A_{g} = 254 \text{ in}^2 \]
\[ V_{\text{col}} = 111.7 \text{ kip} \quad \text{ASCE 41-17, EQ (10-3)} \]

Axial Load

<table>
<thead>
<tr>
<th>Timber Structure</th>
<th>172</th>
<th>psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podium Weight</td>
<td>200</td>
<td>psf</td>
</tr>
</tbody>
</table>

| L1 | 22 | ft |
| L2 | 25.66 | ft |
| $A_{\text{trib}}$ | 565 | ft$^2$ |

\[ W_{\text{struct}} = 97 \text{ kip} \]
\[ W_{\text{podium}} = 113 \text{ kip} \]
\[ W_{\text{column}} = 210 \text{ kip} \]