Rating form completed by:

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Date: 06/28/2019

Text in green is to be part of UC Santa Cruz building database and may be part of UCOP database

REGISTERED PROFESSIONAL ENGINEER
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Exp. 12-31-20
STRUCTURAL
STATE OF CALIFORNIA
06-28-19

DATE: 2019-06-28

UC Santa Cruz building seismic ratings

Visual Arts Facilities-Building E

CAAN #7497
Elena Baskin Visual Arts, Santa Cruz, CA 95064
UCSC Campus: Main Campus

Northwest Elevation (Looking Southeast)

Plan

Rating summary	Entry	Notes
UC Seismic Performance Level (rating)	V (Poor)	
Rating basis	Tier 1	ASCE 41-17[1]
Date of rating	2019	
Recommended UC Santa Cruz priority category for retrofit	Priority B	Priority A=Retrofit ASAP Priority B=Retrofit at next permit application
Ballpark total construction cost to retrofit to IV rating[2]	Medium ($50-200/sf)	See recommendations on further evaluation and retrofit.
Is 2018-2019 rating required by UCOP?	Yes	Building was not previously rated.
Further evaluation recommended?	Yes	Focused on analysis of wood braced frames and their connections and possible retrofit measures if needed.

[1] We translate this Tier 1 evaluation to a Seismic Performance Level rating using professional judgment. Non-compliant items in the Tier 1 evaluation do not automatically put a building into a particular rating category, but we evaluate such items along with the combination of building features and potential deficiencies, focused on the potential for collapse or serious damage to the gravity supporting structure that may threaten occupant safety. See Section III.B of the 19 May 2017 *UC Seismic Safety Policy* and Method B of Section 321 of the 2016 *California Building Code*.

[2] Per Section III.A.4.i of the 26 March 2019 *UC Seismic Program Guidebook, Version 1.3*, the cost includes all construction cost necessitated by the seismic retrofit, including restoration of finishes and any triggered work on utilities or accessibility. It does not include soft costs such as design fees or campus costs. The cost is in 2019 dollars.

Building information used in this evaluation

- Architectural drawings by Marquis Associates, "Visual Arts Facilities, University of California, Sant Cruz," dated 14 December 1983, Sheets A2.2, A2.4 and A3.1-A7.2 pertinent to Buildings 'E','F', and 'G'.
- Structural drawings by E.G. Hirsch & Associates, "Visual Arts Facilities, University of California, Sant Cruz," dated 14 December 1983, Sheets S1, S3, S5 and S6-S8 pertinent to Buildings 'E','F', and 'G'.

Additional building information known to exist

None

Scope for completing this form

Reviewed structural drawings for original construction, made brief site on 16 May 2019, and carried out ASCE 41-17 Tier 1 evaluation.

Brief description of structure

Baskin Building E is one of a cluster of seven similar buildings that form the visual art studios for the Department of Art. The Theater Arts complex is to the west; McHenry Library is to the northeast; and the Digital Arts Research Center is to the south. The Baskin complex was designed in 1983 by architects Marquis Associates. E.G. Hirsch & Associates was the structural engineer. The construction completion date is unknown, but it is assumed to be 1984.

The building is a single-story wood-frame structure that contains approximately 6,370 sf, plus about 1,029 sf for an attached canopy. Counting the canopy as half yields 6,370 sf + 1,029 x 0.5 = 6,885 sf. Building E is linked by an open corridor across a courtyard to the east to Buildings F and G. In plan, Building E is comprised of seven rectangular sections, each measuring 20 ft deep in the N-S direction by various widths in the E-W direction. Each rectangular section is constructed with diagonal wood braced frames in the E-W directions and plywood shear walls in the N-S directions. Adjacent sections share the same line of diagonal wood braced frames. The roof diaphragm of each rectangular section slopes from the upper beam of the braced frame on the north (19'-8" average elevation) to the lower beam of the braced frame on the south (8'-6" average elevation). Wood joists sloping with the roof are spaced at 16" on center and supported by braced frame beams on each end. The upper and lower braced frame beams, 5 1/8" wide x 7 ½" deep and 5 1/8" wide x 16 ½" deep respectively, are Douglas Fir glued laminated beams that run continuously between 6x6 end posts and over 6x8 or 8x8 interior posts. A 4" thick reinforced concrete slab-on-grade is exposed in most of the rooms.

The attached covered walk to the east of the building is constructed with plywood roof atop wood joist framing extending between exterior wall of the buildings and built-up wood posts. The floor of the covered walk is a slab-on-grade exposed to weather. Concrete stair treads and a landing at the south end of the covered walk were observed.

Building condition: The building appears to be in relatively good condition. The viewed exposed connections and braces appeared to be generally consistent with the structural drawings.

Identification of levels: The building has one story above a slab-on-grade. Grade around the building site gently slopes down to the south and southwest.

Foundation system: The perimeter walls bear on a curb supported by the thickened edge of the slab and then a continuous grade beam. The interior bearing walls are supported by the thickened slab and then a continuous grade beam. The grade beams are 1'0" wide x 1'4" minimum deep grade beam reinforced with #3 stirrups at 12" o.c. Braced frame posts are supported by 1'0"x1'0" pedestals integrated with the slab on 2'6"x2'6"x 1'4" minimum deep spread footings. All wood posts, 6x6s end posts, and 6x8s intermediate posts are anchored into the concrete curbs and thickened slab with anchor bolts. In the covered walk, the built-up columns are anchored to continuous concrete grade beams below similar to the typical building perimeter.

Structural system for vertical (gravity) load: The sawtooth roofs are comprised of 5/8-inch plywood sheathing spanning atop 2x10 wood joists. Joists are supported at each end to wood braced frame glulam beams with face mount joist hangers. Glulam beams span continuously between end posts and over interior posts. Walls use 2x6 studs at 24" o.c.

The attached covered walk is framed with 2x8 wood joist framing and 5/8-inch plywood sheathing. Joists are supported by a continuous 3x8 ledger screwed to the exterior wall of the building on one end and bearing on top of built-up wood beam sections on the other end. The built-up wood beams are supported by built-up columns.

Structural system for lateral forces: In N-S direction, lateral forces are transferred from the plywood roof diaphragm through blocking at the eave to the top plate of the plywood shear walls per Detail 6 on Sheet S-8. The 5/8" plywood has 10d at 6" o.c. edge nailing. Loads at the base of the wall go into the continuous curb from the 3x6 sill through 5/8" diameter anchor bolts at 4'0" o.c. per Detail 16 on Sheet S-7. In the E-W direction, the plywood roof diaphragm spans between the upper beam of the wood braced frame at the ridge and the lower beam of adjacent wood braced frame at the bottom of the roof slope. More specifically, at the ridge, shear in the plywood is delivered into the upper beams through 2x blocking between each rafter (Detail 1 on Sheet S-8). At the low end, the plywood is nailed to 2x blocking and which is in turn face nailed to the glulam beam. An additional path for shear transfer at the low end is through a built-up roof that has a cross-slope for drainage. Plywood sheathing wraps over the built-up roof comprised of 2x4s and then to the face of continuous parapet walls built on top of the lower beam (Detail 3 on Sheet S-8). The braced frames typically have two "Y" shapes. The top of the "Y" is connected to the top glulam beam and the midheight of the "Y" connects to the low glulam beam which in turn is connected to a plywood shear wall. A clerestory above the low beam brings northern light to the studios. The braces are connected to the center post and to the glulam with steel side plates and ¾" diameter machine bolts typically in single shear. Details are on Sheet S-7.

At the attached covered walk, plywood sheathing stops at the inner face of the built-up columns per Detail 7 on Sheet S-8. All N-S direction lateral force is expected to be transferred through a continuous 3x8 ledger anchored to the face of the building exterior wall. In the E-W direction, lateral forces toward the building push the joists against the ledger onto the perimeter studs placing the studs in bending. When the canopy pulls away from the perimeter walls, the ledger is in cross-grain bending.

Brief description of seismic deficiencies and expected seismic performance including mechanism of nonlinear response and structural behavior modes

Identified seismic deficiencies of the building include the following:

- The braced frames rely on a complicated set of force transfer details that include bolts in shear in the wood. These details have reduced end distances (4D rather than 7D) and limited ductility compared to a plywood shear wall that dissipates energy though nails in bending, and they are ultimately likely to lead to longitudinal splitting of the wood. This is an unusual structural system not covered by the wood frame Tier 1 checklists of ASCE 41-17. A Tier 2 deficiency-based analysis of the frames, their internal connections, and their connections to the shear walls is needed to understand better the capacity and performance of this lateral force-resisting system.
- At the canopy, transverse loads pulling the canopy away from the building will place the supporting ledger at the building stud walls in cross-grain bending. This could lead to loss of gravity support.
- Building E is connected by the canopy of the walkway to Building F without any seismic separation or collectors at either end. Out-of-phase movement between the buildings could lead to loss of gravity support.

Structural deficiency	Affects rating?	Structural deficiency	Affects rating?
Lateral system stress check (wall shear, column shear or flexure, or brace axial as applicable)	Y	Openings at shear walls (concrete or masonry)	N
Load path	N	Liquefaction	N
Adjacent buildings	Y	Slope failure	N
Weak story	N	Surface fault rupture	N
Soft story	N	Masonry or concrete wall anchorage at flexible diaphragm	N
Geometry (vertical irregularities)	N	URM wall height-to-thickness ratio	N
Torsion	N	URM parapets or cornices	N
Mass – vertical irregularity	N	URM chimney	N
Cripple walls	N	Heavy partitions braced by ceilings	N
Wood sills (bolting)	N	Appendages	N
Diaphragm continuity	Y		

Summary of review of nonstructural life-safety concerns, including at exit routes.[3]

Small light storage mezzanines inside office spaces were observed during the brief site visit performed on 16 May 2019. Items stored on the mezzanines are considered as falling hazard during an earthquake event. Lockers s in the corridor should be properly braced to avoid tipping over.

UCOP nonstructural checklist item	Life safety hazard?	UCOP nonstructural checklist item	Life safety hazard?
Heavy ceilings, feature or ornamentation above large lecture halls, auditoriums, lobbies or other areas where large numbers of people congregate	None observed	Unrestrained hazardous materials storage	None observed
Heavy masonry or stone veneer above exit ways and public access areas	None observed	Masonry chimneys	None observed
Unbraced masonry parapets, cornices or other ornamentation above exit ways and public access areas	None observed	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.	None observed

Basis of rating

A Seismic Performance Level rating of V is assigned to Building E based on the absence of an ASCE 41-17 Tier 1 quick check procedure for wood braced frames, the limited ductility in the braced frames, and the poor out-of-plane transfer detail at the canopy to perimeter wall that relies on cross-grain bending.

Recommendations for further evaluation or retrofit

We recommend that the campus perform a Tier 2 evaluation to review the lateral force-resisting capacity of the wood braced frame members, internal connections, and connections to the plywood shear wall. While ductility is low, it may be that there is sufficient capacity due to low demands. If the braced frames were found to be inadequate, connections could be strengthened or supplemental lateral resistance could be added, such steel moment frames to help continue to preserve the clerestory light. Retrofits would also include positive anchorage at the canopy to perimeter stud walls to prevent cross-grain bending. We assign the building to Priority Category B, as the retrofit of the building should be done when there are any plans for renovation

[3] For these Tier 1 evaluations, we do not visit all spaces of the building; we rely on campus staff to report to us their understanding of if and where nonstructural hazards may occur.

Peer review of rating

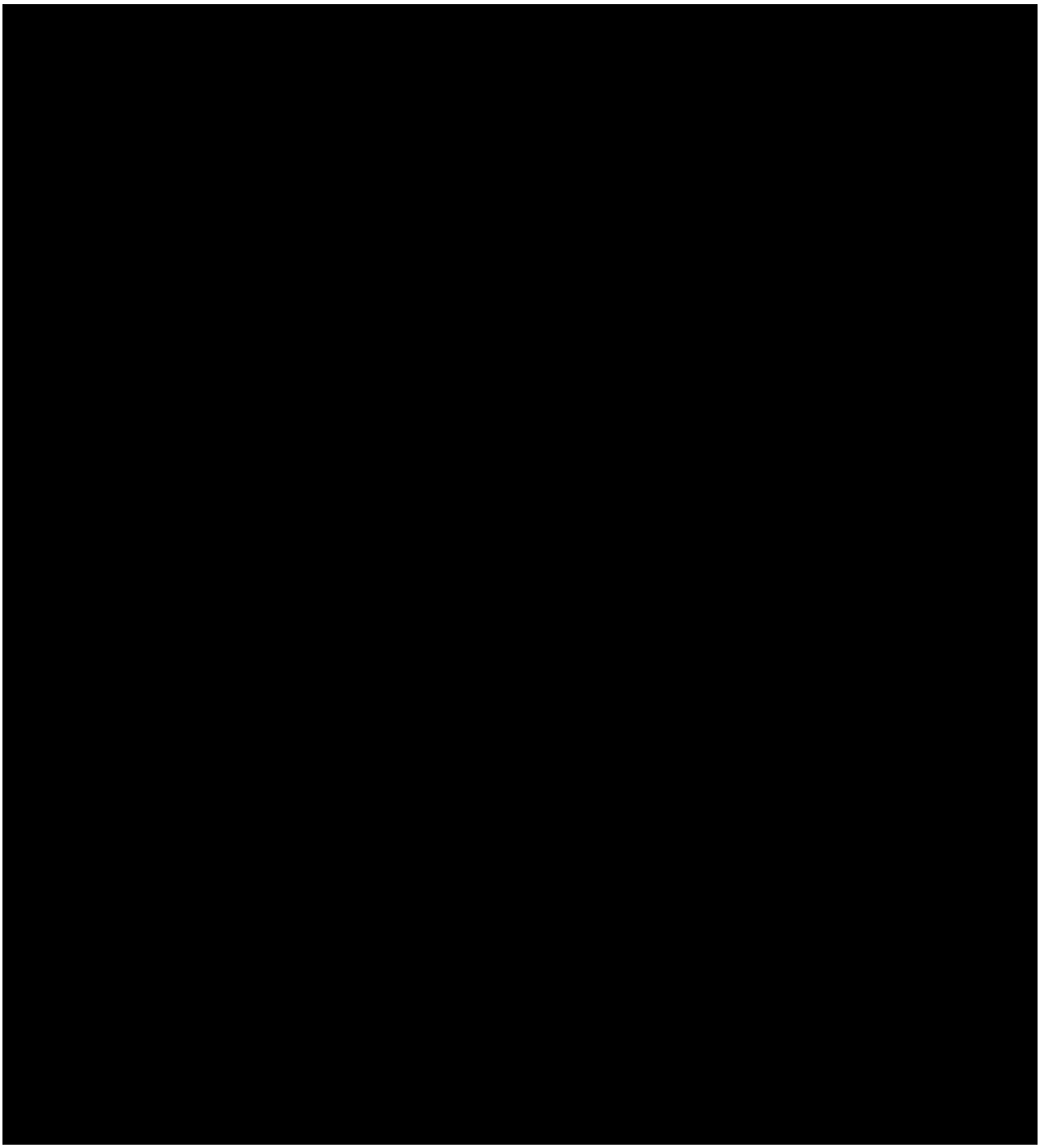
This seismic evaluation was discussed in a peer review meeting on 28 May 2019. Reviewers present were Joe Maffei of Maffei Structural Engineering and Holly Razzano and Jay Yin of Degenkolb. Comments from the reviewers have been incorporated into this report. The reviewers agreed with the assigned rating.

Additional building data	Entry	Notes
Latitude	36.994539	
Longitude	-122.061018	
Are there other structures besides this one under the same CAAN#	No	
Number of stories above lowest perimeter grade	1	
Number of stories (basements) below lowest perimeter grade	0	
Building occupiable area (OGSF)	6,885	8,887 sf in UCSC facilities database.
Risk Category per 2016 CBC Table 1604.5	II	
Building structural height, h_n	14 ft	Structural height defined per ASCE 7-16 Section 11.2
Coefficient for period, C_t	0.020	Estimated using ASCE 41-17 equation 4-4 and 7-18
Coefficient for period, β	0.75	Estimated using ASCE 41-17 equation 4-4 and 7-18
Estimated fundamental period	0.14 sec	Estimated using ASCE 41-17 equation 4-4 and 7-18
Site data		
975-year hazard parameters S_s, S_1	1.281, 0.88	From OSHPD/SEAOC website
Site class	D	
Site class basis	Geotech[4]	See footnote below
Site parameters F_a, F_v	1.0, 1.815	From SEAOC/OSHPD website
Ground motion parameters S_{cs}, S_{c1}	1.631, 0.625	From SEAOC/OSHPD website
S_a at building period	1.28	
Site V_{s30}	900 ft/s	
V_{s30} basis	Estimated	Estimated based on site classification of D.
Liquefaction potential	Low	
Liquefaction assessment basis	County map	See footnote below
Landslide potential	Low	
Landslide assessment basis	County map	See footnote below

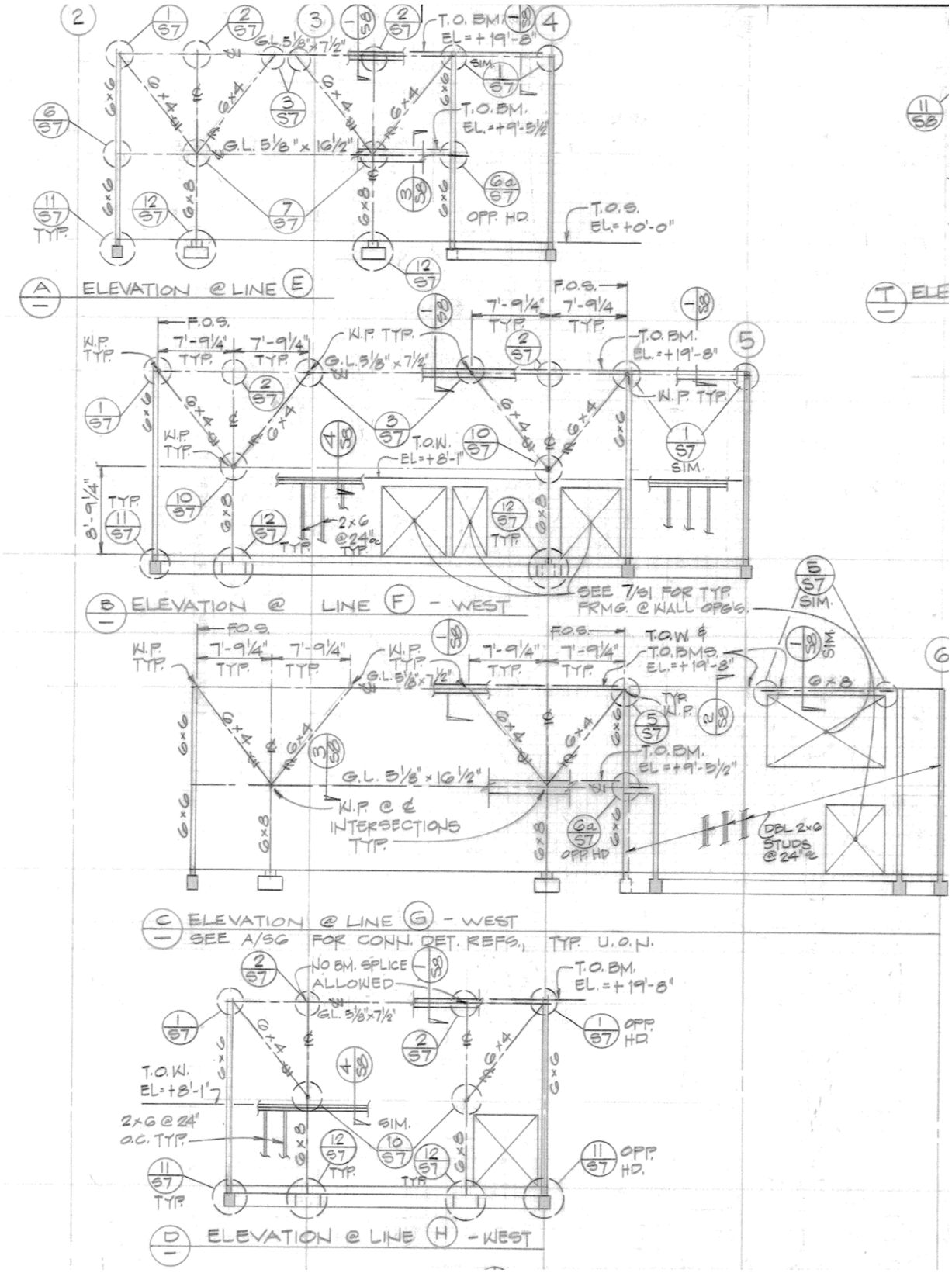
[4] Determination of site class and assessment of geotechnical hazards are based on correspondence with Pacific Crest Geotechnical Engineers and Nolan, Zinn, and Associates Geologists. [*Revised Geology and Geologic Hazards, Santa Cruz Campus, University of California*, Job # 04003-SC 13 May 2005]. Site class is taken as D throughout the main campus of UC Santa Cruz. The following links provide hazard maps for liquefaction, landslide, and fault rupture:
https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LiquifactionMap2009.pdf
https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LandslideMap2009.pdf
https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/FaultZoneMap2009.pdf

Active fault rupture identified at site	No	
Fault rupture assessment basis	County map	See footnote below
Site-specific ground motion study?	No	
Applicable code		
Applicable code or approx. date of original construction	Built: 1984 (Estimated) Code: 1982 UBC	
Applicable code for partial retrofit	None	No partial retrofit.
Applicable code for full retrofit	None	No full retrofit
FEMA P-154 data		
Model building type North-South	W2 Wood Frame	
Model building type East-West	Wood Braced Frame	No checklist is available in ASCE 41-17. Even though the building is wood frame and designed to a code after the 1982 UBC, the building was not benchmarked since the braced frames are not consistent with the W2 definition.
FEMA P-154 score	N/A	Not included here because we performed ASCE 41 Tier 1 evaluation.
Previous ratings		
Most recent rating	-	Not evaluated before.
Date of most recent rating	-	
2nd most recent rating	-	
Date of 2nd most recent rating	-	
3rd most recent rating	-	
Date of 3rd most recent rating	-	
Appendices		
ASCE 41 Tier 1 checklist included here?	Yes	Refer to attached checklist file.

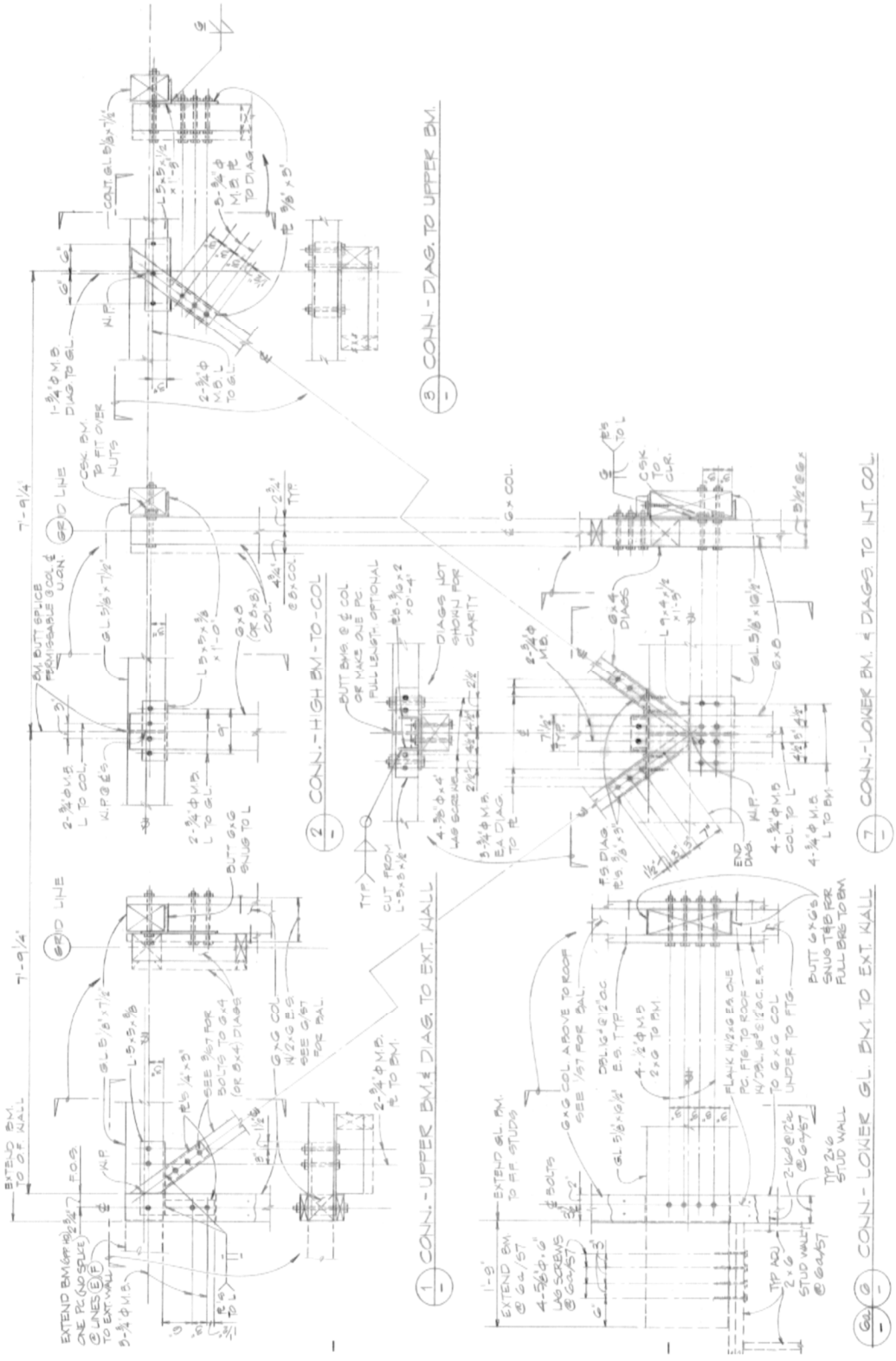
Color Coded Floor Plan



Example Braced Frame Elevations



Connection Detail between Main Elements of the Wood Diagonal Braced Frames



APPENDIX A

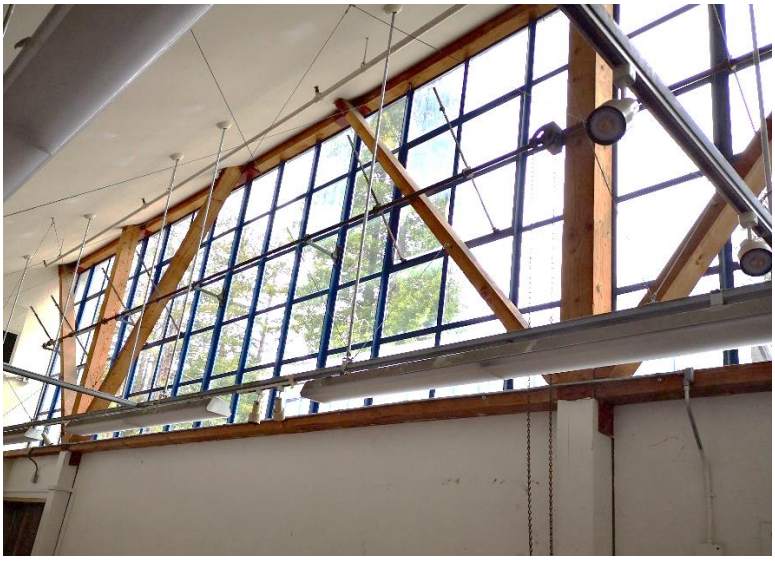
Additional Photos

West Elevation (Looking Southeast)

Southeast Corner (Looking Southwest from South Courtyard)

Partial East Elevation (Looking East from Middle Courtyard)

South Elevation (Looking Northeast)



Wood Braced Frame at Exterior Wall

Interior Wood Braced Frame

Close-up of Brace-to-Column Details (Detail C/S6)

Storage Mezzanine in Room E110

APPENDIX B

ASCE 41-17 Tier 1 Checklists (Structural)

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7497	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building E			Initials:	JY	Checked:	WAL/BL
Building Address:	Santa Cruz, CA 95064			Page:	1	of	3

ASCE 41-17
Collapse Prevention Basic Configuration Checklist

LOW SEISMICITY

BUILDING SYSTEMS - *GENERAL*

C	NC	N/A	U	Description
●	○	○	○	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) **Comments:** 5/8" plywood roof diaphragms deliver loads to wood shear walls over strip footings in transverse direction and to wood diagonal braces and wood columns over spread footings.
○	●	○	○	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) **Comments:** The canopy over the walkway connects Building E to Building F. There are no seismic separations or collectors on either side.
○	●	○	○	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) **Comments:** There are some light storage mezzanines that are not seismically braced.

BUILDING SYSTEMS - *BUILDING CONFIGURATION*

C	NC	N/A	U	Description
●	○	○	○	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) **Comments:** Single story structure.
●	○	○	○	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) **Comments:** Single story structure.
●	○	○	○	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) **Comments:** All lateral force-resisting system elements are continuous to the foundation.

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

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ASCE 41-17
Collapse Prevention Basic Configuration Checklist

C	NC	N/A	U	
◉	○	○	○	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:** Single story structure.
◉	○	○	○	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:** Single story structure.
◉	○	○	○	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:** Flexible diaphragm.

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

GEOLOGIC SITE HAZARD

C	NC	N/A	U	Description
◉	○	○	○	LIQUEFACTION: 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) **Comments:** Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LiquifactionMap2009.pdf
◉	○	○	○	SLOPE FAILURE: 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) **Comments:** Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LandslideMap2009.pdf
◉	○	○	○	SURFACE FAULT RUPTURE: 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) **Comments:** Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/FaultZoneMap2009.pdf

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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

	Description
C ● NC ○ N/A ○ U ○	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 $0.6S_a$. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3) **Comments:** Building width B = 48', Building Height is H = 14', B/H = 3.43 Sa = 1.54g per ATC at BSE-2E 0.6 x Sa = 0.924 B/H > 0.6 Sa
C ● NC ○ N/A ○ U ○	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) **Comments:** Site Class D assumed. Reinforced slab ties the footings together.

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ASCE 41-17
Collapse Prevention Structural Checklist For Building Type W2

LOW AND MODERATE SEISMICITY

SEISMIC-FORCE-RESISTING SYSTEM

C	NC	N/A	U	Description
●	○	○	○	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) **Comments:**
●	○	○	○	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) Structural panel sheathing: 1,000 lb/ft Diagonal sheathing: 700 lb/ft Straight sheathing: 100 lb/ft All other conditions: 100 lb/ft **Comments:** The average shear stress in N-S direction is 238 plf which is below the 1,000 plf limit. In the E-W direction is not applicable as the lateral force-resisting system is wood diagonal braced frames.
●	○	○	○	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) **Comments:** Single-story building.
●	○	○	○	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) **Comments:** Plywood and wood braced frames are used to resist lateral forces.
●	○	○	○	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) **Comments:** Piers typically have aspect ratios of less than 2V:1H.
○	○	●	○	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) **Comments:** Single story structure.

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ASCE 41-17
Collapse Prevention Structural Checklist For Building Type W2

C	NC	N/A	U	
○	○	◉	○	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) **Comments:** No sloping site.
○	○	◉	○	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) **Comments**: No cripple walls.
◉	○	○	○	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) **Comments:** No large openings observed in wood shear walls.

CONNECTIONS

C	NC	N/A	U	Description
◉	○	○	○	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) **Comments:** Simpson CB-68 or CB-88 connections are used for column base connection to concrete foundation per Detail 12 on Sheet S-7.
◉	○	○	○	WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3) **Comments:** Wood sills are bolted 5/8” dia. anchor bolts on 4’-0” o.c. per Detail 16 on Sheet S-7.
◉	○	○	○	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) **Comments:** Structural steel angle w/ ¾” dia. through bolts are used to connect girder and column per Detail 2 and 7 on Sheet S-7

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Building CAAN:	7497	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building E			Initials:	JY	Checked:	WAL/BL
Building Address:	Santa Cruz, CA 95064			Page:	3	of	4

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Collapse Prevention Structural Checklist For Building Type W2

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

CONNECTIONS

C	NC	N/A	U	Description
●	○	○	○	WOOD SILL BOLTS: Sill bolts are spaced at 6 ft (1.8 m) or less with acceptable edge and end distance provided for wood and concrete. (Commentary: A.5.3.7. Tier 2: Sec. 5.7.3.3) **Comments:** Wood sills are bolted 5/8" dia. anchor bolts on 4'-0" o.c. per Detail 16 on Sheet S-7

DIAPHRAGMS

C	NC	N/A	U	Description
○	○	●	○	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) **Comments:** Single story structure.
○	●	○	○	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) **Comments:** Chord discontinuity occurs at each roof offset locations.
○	○	●	○	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5) **Comments:** No large opening observed in the roof diaphragm.
●	○	○	○	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) **Comments:** Roof is sheathed with plywood.
●	○	○	○	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) **Comments:** 5/8" plywood per Detail 12 on Sheet S-1.

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C	NC	N/A	U	
○	○	◉	○	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 have aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2) **Comments:** 5/8" plywood
○	○	◉	○	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:** 5/8" plywood

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

APPENDIX C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7497	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	EBASK BLDG E			Initials:	JY	Checked:	WAL/BL
Building Address:	Santa Cruz, CA 95064			Page:	1	of	1

UCOP SEISMIC SAFETY POLICY
Falling Hazard Assessment Summary

	Description
P ☐ N/A ☒	Heavy ceilings, features or ornamentation above large lecture halls, auditoriums, lobbies, or other areas where large numbers of people congregate (50 ppl or more) **Comments:**
P ☐ N/A ☒	Heavy masonry or stone veneer above exit ways or public access areas **Comments:**
P ☐ N/A ☒	Unbraced masonry parapets, cornices, or other ornamentation above exit ways or public access areas **Comments:**
P ☐ N/A ☒	Unrestrained hazardous material storage **Comments:**
P ☐ N/A ☒	Masonry chimneys **Comments:**
P ☐ N/A ☒	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc. **Comments:**
P ☒ N/A ☐	Other: Lockers in corridor and in rooms **Comments:** Existing lockers are not properly anchored to the structural walls.
P ☒ N/A ☐	Other: Storage mezzanine **Comments:** Items on the mezzanine are falling hazards during an earthquake event.
P ☐ N/A ☐	Other: **Comments:**

Falling Hazards Risk: Low

Note: P= Present, N/A = Not Applicable

APPENDIX D

Quick Check Calculations

Unit Weights:

	Seismic Weight	Dead Load	
Main BLDG Roof	psf		Remarks
roofing	3	3	Metal roof per arch dwg; Product specification not available
5/8" plywood	1.5	1.5	at 36 pcf
rafter	4	4	2x10 @ 16" o.c.
MEP	3	6	
ceiling	2	2	typ. gypboard ceiling panels
misc+lighting	5	5	
partition including shear walls	7.5		half of 15 psf
Total	26	21	

	Seismic Weight	Dead Load	
Storage Mezzanine	psf		Remarks
3/4" plywood	2	2	at 33 pcf
joists	3.5	3.5	2x10 @16
misc+lighting	6	6	
Storage	35	35	Assumed weight
Total	47	47	

	Seismic Weight	Dead Load	
Canopy Roof	psf		Remarks
roofing	3	3	Metal roof per arch dwg; Product specification not available
5/8" plywood	1.5	1.5	at 36 pcf
rafter	3	3	2x8 @ 24" o.c.
misc.+lighting	2	2	
Total	10	8	

Story Weights

Level	Area (ft^2)	Unit Weight (psf)	Seismic Weight (kips)
Typ. Roof	6310	26	161
Storage Mezz	60	47	3
Canopy Roof	1029	10	10
			173

Period

C_t=	0.02
h_n (ft)=	14
B=	0.75

T=	0.14	sec

Ct and B are from "all other framing systems."

BSE-2E Demands

OSHPD

CAAN 7497

Latitude, Longitude: 36.994539, -122.061018

Date	5/29/2019, 4:00:16 PM
Design Code Reference Document	ASCE41-17
Custom Probability	
Site Class	D - Stiff Soil

Type	Description	Value
Hazard Level		BSE-2N
S_S	spectral response (0.2 s)	1.631
S_1	spectral response (1.0 s)	0.625
S_{XS}	site-modified spectral response (0.2 s)	1.631
S_{X1}	site-modified spectral response (1.0 s)	1.063
F_a	site amplification factor (0.2 s)	1
F_v	site amplification factor (1.0 s)	1.7
ssuh	max direction uniform hazard (0.2 s)	1.754
crs	coefficient of risk (0.2 s)	0.93
ssrt	risk-targeted hazard (0.2 s)	1.631
ssd	deterministic hazard (0.2 s)	3.017
s1uh	max direction uniform hazard (1.0 s)	0.686
cr1	coefficient of risk (1.0 s)	0.911
s1rt	risk-targeted hazard (1.0 s)	0.625
s1d	deterministic hazard (1.0 s)	1.027

Type	Description	Value
Hazard Level		BSE-1N
S_{XS}	site-modified spectral response (0.2 s)	1.087
S_{X1}	site-modified spectral response (1.0 s)	0.708

Type	Description	Value
Hazard Level		BSE-2E
S_S	spectral response (0.2 s)	1.281
S_1	spectral response (1.0 s)	0.485
S_{XS}	site-modified spectral response (0.2 s)	1.281
S_{X1}	site-modified spectral response (1.0 s)	0.88
f_a	site amplification factor (0.2 s)	1
f_v	site amplification factor (1.0 s)	1.815

Type	Description	Value
Hazard Level		BSE-1E
S_S	spectral response (0.2 s)	0.689
S_1	spectral response (1.0 s)	0.242
S_{XS}	site-modified spectral response (0.2 s)	0.86
S_{X1}	site-modified spectral response (1.0 s)	0.513
F_a	site amplification factor (0.2 s)	1.249
F_v	site amplification factor (1.0 s)	2.115

Type	Description	Value
Hazard Level		T-Sub-L Data
T-Sub-L	Long-period transition period in seconds	12

Story Shears

				Sx1	T	Sxs
Sa=	1.28		BSE 2E	0.88	0.14	1.281
W=	173	kips				
C=	1.3	from Table 4-7				

V=	289	kips

k= 1.00

Story Shears							
Floor Levels	**height**	**total height**	**Weight**	**weight*height^k**	**coeff**	**Fx**	**Story Shear**
Roof	14.33	14.3	173	2486	1.00	289	289
				2486		289	

Average Stress:

Ms=	4.5	CP of wood shear wall

N-S direction (Transverse)			
Level	**Force (kips)**	**length of wall (ft)**	**average shear stress (plf)**
Roof	289	270	238