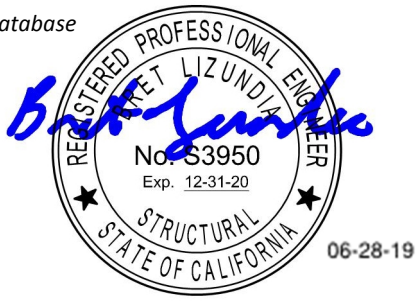
Rating form completed by:

RUTHERFORD + CHEKENE
ruthchek.com
Evaluator: MTN/EFA/BL
Date: 06/28/2019

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

DATE: 2019-06-28



UC Santa Cruz building seismic ratings

Elena Baskin Visual Arts Building J (Painting Studio)

CAAN #7822

Elena Baskin Visual Arts, Santa Cruz, CA 95064

UCSC Campus: Main Campus

Northeast Corner (Looking Southwest)

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 list assignment (UC Santa Cruz 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	To quantify the demands and capacities along the entire unusual roof diaphragm path

[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 Paulett Taggart Architects, "Painting Studio, Baskin Visual Arts Complex, University of California, Santa Cruz," dated 10 November 1992.
- Structural drawings by Lawrence Fowler and Associates, "Painting Studio, Baskin Visual Arts Complex, University of California, Santa Cruz," signed 31 December 1993.

Additional building information known to exist

None

Scope for completing this form

Reviewed structural drawings for original construction, made a brief site visit was performed on 23 May2019, and carried out ASCE 41-17 Tier 1 evaluation.

Brief description of structure

The Painting Studio Building was designed in 1992 by Paulett Taggart Architects; Lawrence Fowler and Associates was the structural engineer. Construction was completed in 1993.

The plan is rectangular with east-west dimension of 51'-4 1/2" and north-south dimension of 41'-1". There is a triangularly-shaped canopy on the north side with a north-south dimension of 9'-11 ¾" and an east-west direction 16'-9 ¾". The site slopes down slightly from north to south and from west to east. The soil is retained with concrete retaining walls on the north and west side of the building.

Building condition: in general, the building is in good structural condition. No significant damage in the structural system was observed during the site visit.

Identification of levels: One story.

Foundation System: The superstructure is founded on shallow strip footings located under plywood shear walls and concrete retaining walls on the north and west side of the building. The ground floor consists of a 4" thick reinforced concrete slab-on-grade.

Structural system for vertical (gravity) load: The roof is sawtooth in shape, framed with typical 2x6 at 24" o.c. rafters and ¾" plywood sheathing board with 8d at 3" o.c. at panel edges and 12" o.c. in field with all edges blocked. The top end of the rafters is supported by a 4x10 header spanning between 4x4 wood posts. The posts are supported by a 6-3/4"x27" glulam beam which also supports the bottom end of the rafters. There are six glulams which span diagonally in the NW-SE direction and bear at their ends on 6x6 wood posts integrated into the perimeter stud walls. The perimeter wood-framed walls are anchored to the strip footings and concrete retaining walls on the north and west side of the building.

Structural system for lateral forces: In both directions, the vertical elements of the lateral load-resisting system consist of plywood shear walls with 2x6 (at exterior walls) and 2x4 (at interior walls) studs at 16" o.c. The walls are sheathed with ½" plywood with typical 8d nails at 6" o.c. at edges and 12" o.c. in the field. The in-plane load transfer between the roof diaphragm to the plywood shear walls consists of edge nailing. The plywood shear walls are anchored to the concrete slab or concrete retaining wall with 5/8" diameter anchor bolts at 32" o.c.

The key architectural feature of the building are the sawtooth roofs which create large clerestory windows and interrupt the roof diaphragm and are oriented diagonally in plan with the perimeter walls. The structural approach taken to address this is unusual.

Lateral loads in the NE-SW direction will span through each monoslope plywood diaphragm roof segment to its ends on the NW and SE sides where the perimeter plywood walls are located. The aspect ratio of the roof segments is poor (ranging from about 3:1 to 6.5:1), but there are a set of struts parallel to the rafters (running NE-SW) made of a 4x6 in the plane of the sloped roof and a TS3x2x3/16 at the glulam level which will help link each roof segment together. The struts do not always align on each side of the glulam so the glulam will act in weak way bending.

Lateral loads in the NW-SW direction have a series of nominally connected roof segments because of the clerestory window. At each end of the glulam, there is a ½" diameter tie rod in Detail 8/S4 which vertically connects the 4x10 header at the top of the clerestory window down to the glulam at the bottom of the window. Internal load transfer within the diaphragm through the tie rods will be small, but the tie rods are also relatively small. The combined plywood and tie-rod bracing diaphragm connects to the perimeter walls and transfers loads into the walls and down to the foundation.

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

Identified seismic features and deficiencies of the building include the following:

- The only deficiency is that of the roof diaphragm discontinuity created by the sawtooth roof segments. In The NE-SW direction, this creates high diaphragm aspect ratios. In the NW-SE direction, the unusual combination of plywood and tension rods in the windows limits diaphragm capacity in the load path and increases diaphragm flexibility.

Structural deficiency	Affects rating?	Structural deficiency	Affects rating?
Lateral system stress check (wall shear, column shear or flexure, or brace axial as applicable)	N	Openings at shear walls (concrete or masonry)	N
Load path	N	Liquefaction	N
Adjacent buildings	N	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]

No significant nonstructural life-safety concerns were observed during our site visit.

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

We assign a Seismic Performance Level rating of V to this building. The walls have relatively low demands, but the sawtooth roof diaphragm has limited capacity to adequately resist loads, particularly in the NW-SE direction. A more

[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.

detailed analysis beyond the scope of the Tier 1 evaluation is needed to evaluate the adequacy of the system, including the tie rods, their connections, and the struts

Recommendations for further evaluation or retrofit

We recommend that at Tier 2 evaluation be performed to investigate in detail the adequacy of the segmented roof diaphragm including the tie rods, their connections, the struts, and weak way bending of the wood members. If these are found to be adequate, this could lead to an improvement in the rating from level V to Level IV.

None. Comments on rating

The key issues with the sawtooth roof and the adequacy of the diaphragm are similar to issues with the Baskin Buildings E, F, and G (CAAN #7497, #7498, and #7499) which also have sawtooth roofs, but use a heavy timber brace to connect the high and low roofs at the clerestory windows. The peer review of those buildings, carried out on 28 May 2019, confirmed a Level V rating and recommendation for a Tier 2 evaluation, and can be extended to this Building J. Reviewers present were Joe Maffei of Maffei Structural Engineering and Holly Razzano and Jay Yin of Degenkolb Engineers.

Additional building data	Entry	Notes
Latitude	36.994360	
Longitude	-122.060200	
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)	2,201	
Risk Category per 2016 CBC Table 1604.5	II	
Building structural height, h_n	16 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	0.16 sec	Estimated using ASCE 41-17 equation 4-4 and 7-18
Site data		
975-year hazard parameters S_s, S_1	1.281, 0.485	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 OSHPD/SEAOC website

[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

Ground motion parameters S_{cs}, S_{c1}	1.281, 0.881	From OSHPD/SEAOC 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
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: 1993 Code: UBC 1988	Per drawings, Sheet A 1
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 Frames	
Model building type East-West	W2-Wood Frames	
FEMA P-154 score	N/A	Not included here because we performed ASCE 41 Tier 1 evaluation.
Previous ratings		
Most recent rating	-	Building was not previously rated.
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

Rating form completed by:

RUTHERFORD + CHEKENE
ruthchek.com

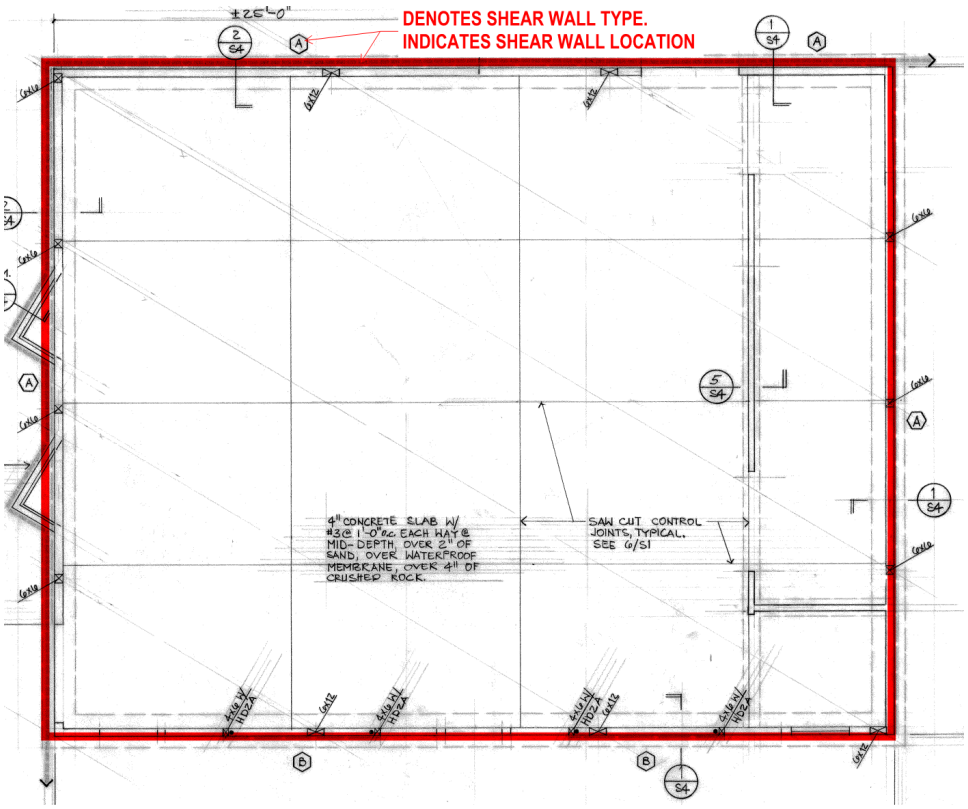
Evaluator: MTN/EFA/BL

Date: 06/20/2019

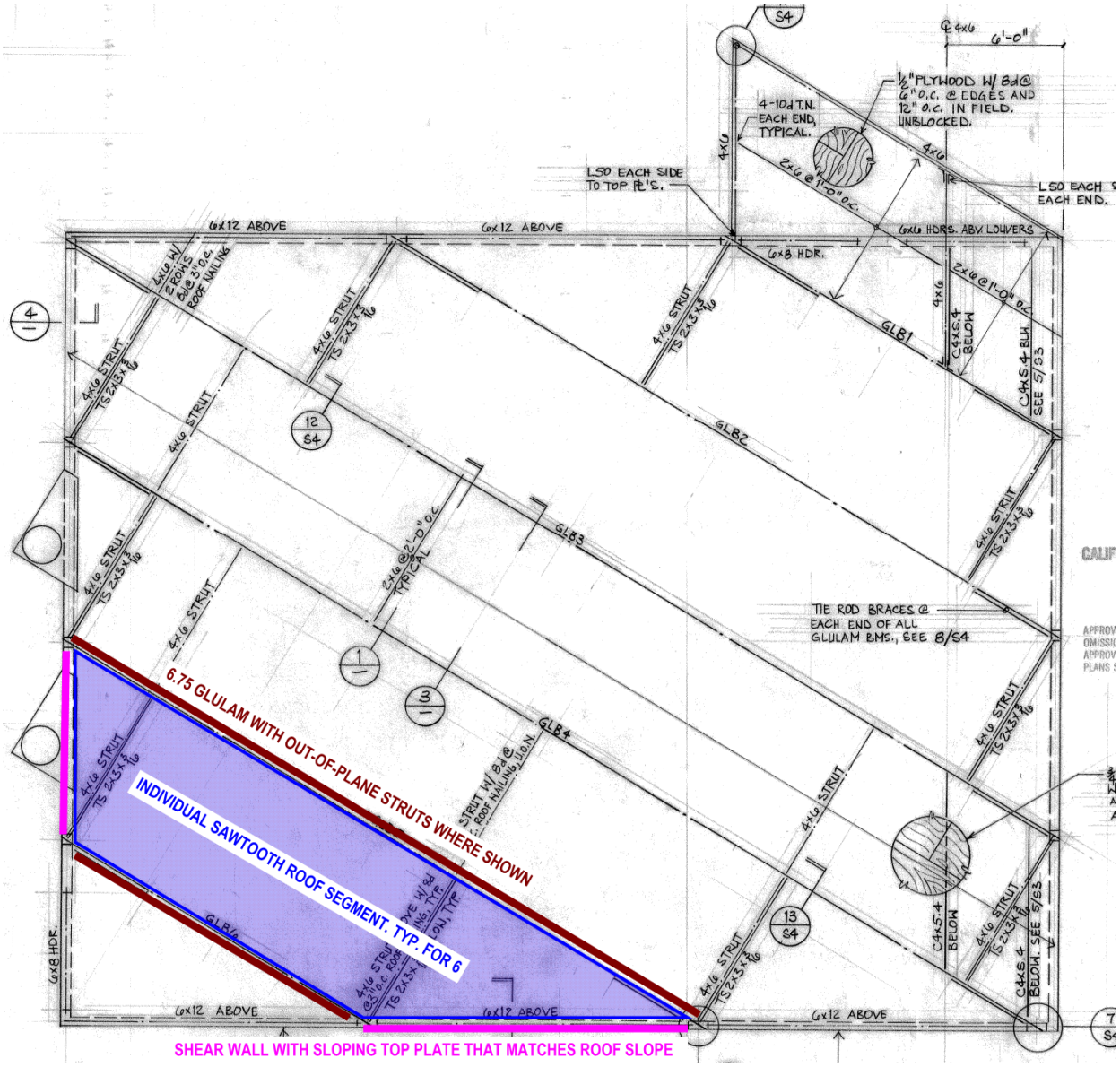
Color Coded Floor Plan:

Roof

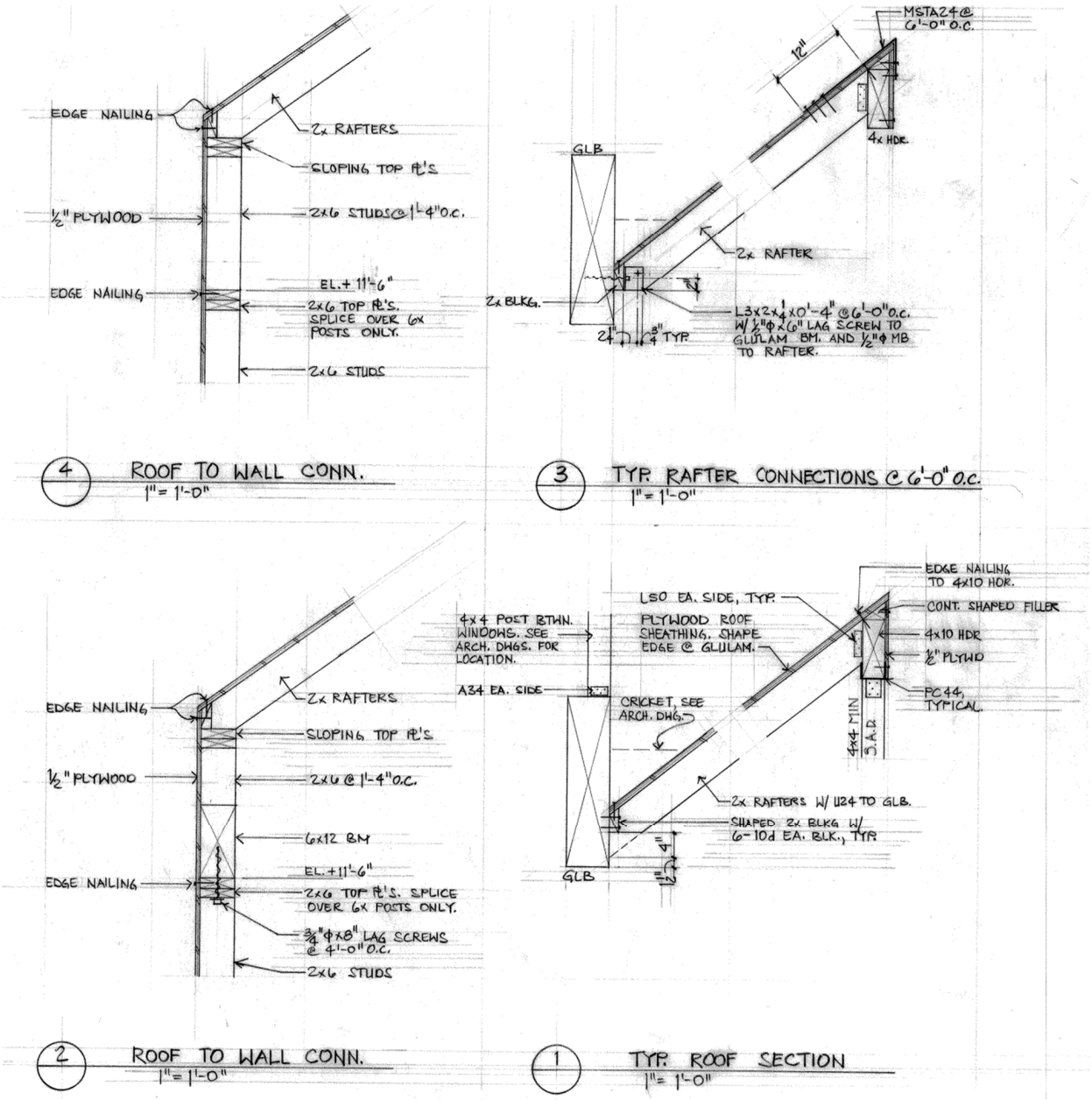
Slab on grade and shear wall location



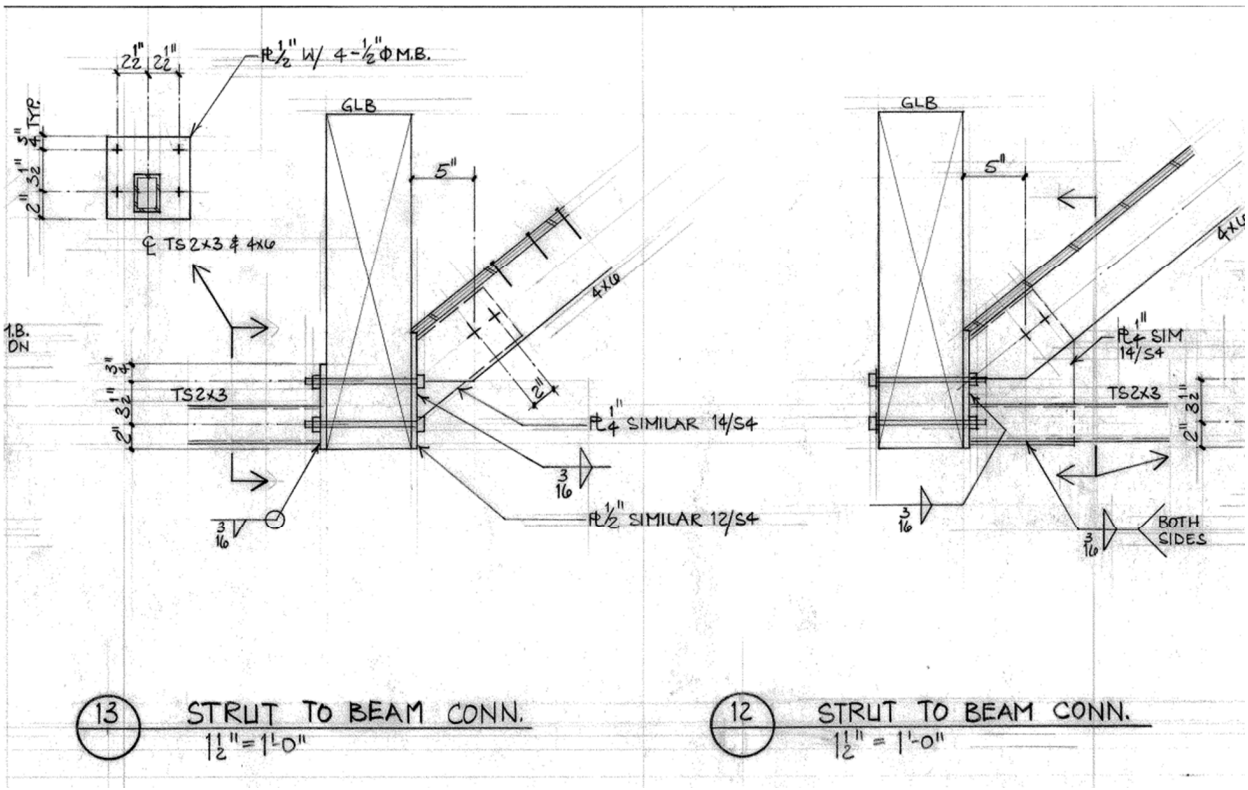
Roof framing and description of typical sawtooth segment

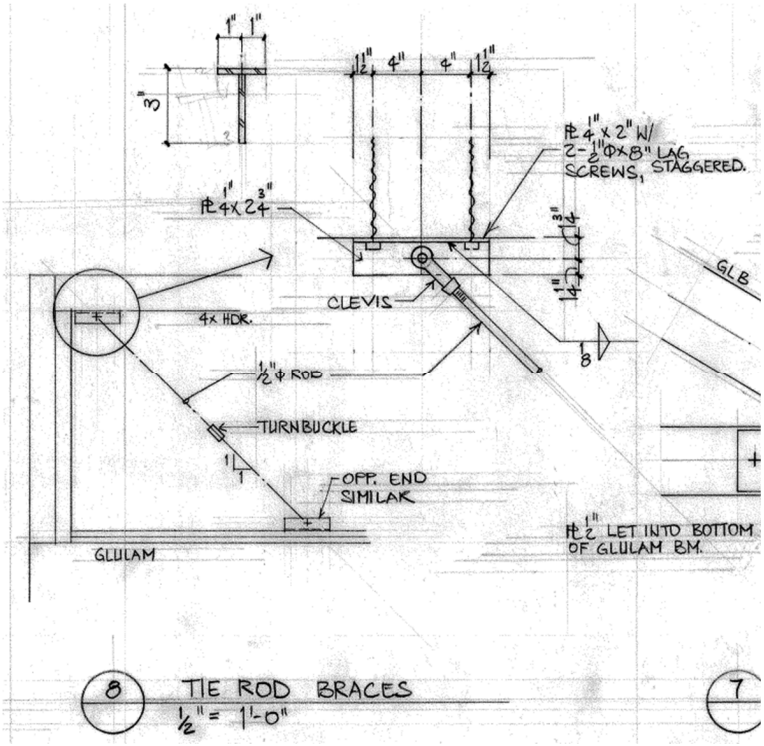


Typical roof details

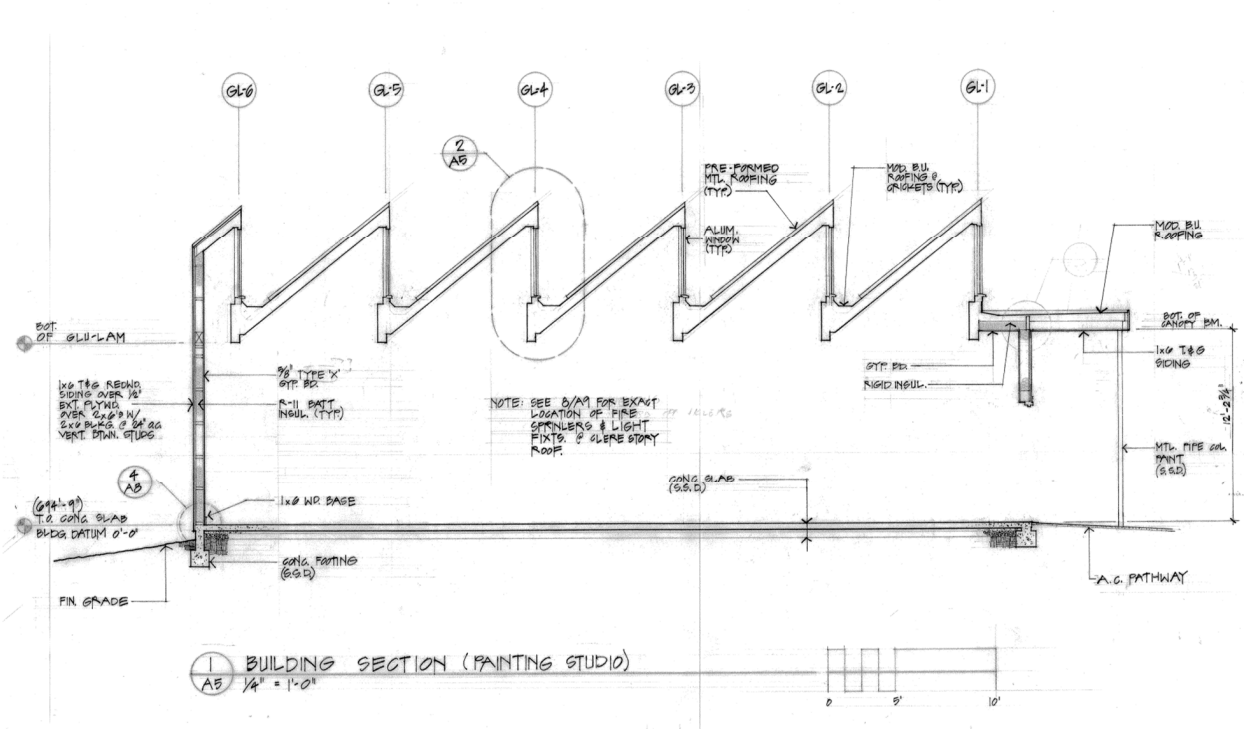


Details for the roof struts and tie rods





Architectural cross section



APPENDIX A

Additional Photos

Northeast corner (looking southwest)

Northwest corner (looking southeast)

Southeast corner (looking northwest)

Southwest corner (looking northeast)

Glulam beams supporting clerestory windows.
Note the tie rod in the upper left corner running from the bottom of 4x10 header over the windows to the top of the 6-3/4”x27” glulam at the bottom chord. The TX3x2x3/16 struts are also visible at the bottom chord level.

APPENDIX B

ASCE 41-17 Tier 1 Checklists (Structural)

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7822	Auxiliary CAAN:		By Firm:	RUTHERFORD + CHEKENE		
Building Name:	Elena Baskin Visual Arts Building J			Initials:	MN	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:** Wood-framed roof diaphragm with ¾" plywood sheathing deliver loads to wood-frame walls and wood columns over strip footing in both directions. Transfer within the roof diaphragm include steel tie rods at the sawtooth segments from the members above and below the windows.
●	○	○	○	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:** Clear distance between the building being evaluated and adjacent building, d = 7' (approx.) height of the shorter building, h = 14' (approx.) d > 0.015*h = 0.21'
○	○	●	○	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 no mezzanines.

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 vertical elements in the seismic-force-resisting system are continuous to the foundation.

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

UC Campus:	Santa Cruz			Date:	06/28/2019		
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Building Address:	Santa Cruz, CA 95064			Page:	2	of	3

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

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

UC Campus:	Santa Cruz			Date:	06/28/2019		
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Building Address:	Santa Cruz, CA 95064			Page:	3	of	3

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:** Least horizontal dimension of the seismic-force resisting system: B = 40'-11 1/2", Building Height: H = 16' B/H = 2.55 Sa = 1.281 per SEAOC at BSE-2E 0.6x Sa = 0.77 B/H > 0.6 Sa → OK
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 is assumed. The slab-on-grade restrains strip footings.

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

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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:** There are two lines of shear walls in each principal direction.
●	○	○	○	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 /ft **Comments:** - Average shear stress in N-S direction: 250 plf < 1000 plf → OK - Average shear stress in E-W direction: 201 plf < 1000 plf → OK
○	○	●	○	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:** Single-story building.
●	○	○	○	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:** No narrow wood shear walls.
○	○	●	○	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 building.
○	○	●	○	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:** Site slope is smaller than one-half of a story height.

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Building Address:	Santa Cruz, CA 95064			Page:	2	of	3

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

C	NC	N/A	U	
○	○	◉	○	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:** 4x6 wood posts on the south side of the building are positively connected to the footing with HD2A ties per structural drawings, Sheet S-2. The connection detail for other wood posts is not specifically called out but is assumed similar.
◉	○	○	○	WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3) **Comments:** All wood sills are bolted to the foundation with 5/8” Φ A.B. @ 32” o.c.
◉	○	○	○	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:** There is a positive connection between the girder and the column support per Details 7- and 15-S4.

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:** All wood sills are bolted to the foundation with 5/8” Φ A.B. @ 32” o.c. and 9” from the ends per 4/S-1.

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

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7822	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building J			Initials:	MN	Checked:	WAL/BL
Building Address:	Santa Cruz, CA 95064			Page:	3	of	3

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

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:** The entire roof is composed of 6 plan-rectangular individual sawtooth segments. Sheet S3 shows that the load generated in the NE-SW direction at individual segments is transferred at short sides directly to perimeter shear walls. Aspect ratios within the segments range from 3:1 to about 6.5:1, but struts connect the top and bottom edges of the segments and will help link segments together. In the NW-SE direction tension tie rods link the wood header at the top of one segment to the glulam at the bottom of another segment. Evaluation of adequacy is beyond the scope of the Tier 1 evaluation.
○	◉	○	○	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:** Per Details 2,4/S3, short sides of sawtooth roof segments connect to continuous sloping double top plates. Per Details 1,3/S3, long sides of sawtooth roof segments connect to continuous 4x headers or to 6 ¾ glulam beams with tie rods spanning between the header and glulam. There is no defined chord at the bottom level of the sawtooth segment in the perimeter walls.
○	○	◉	○	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 (except for the clerestory windows covere by other checklist questions).
○	○	◉	○	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:** 3/4" plywood per S-3.
◉	○	○	○	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:** All wood diaphragms consist of wood structural panels (3/4" plywood per S3.)
◉	○	○	○	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:** Unblocked wood structural panel diaphragm at canopy has horizontal span less than 40 ft and have aspect ratio less than or equal to 4-to-1. The main roof diaphragm is blocked.
◉	○	○	○	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:** All wood diaphragms consist of wood structural panels (3/4" plywood per S3.)

APPENDIX C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7822	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building J			Initials:	MN	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:** There are no heavy ceilings, features or ornamentation above the painting studio.
P ☐ N/A ☒	**Heavy masonry or stone veneer above exit ways or public access areas** **Comments:** Masonry or stone veneer is not present in this building.
P ☐ N/A ☒	**Unbraced masonry parapets, cornices, or other ornamentation above exit ways or public access areas** **Comments:** Masonry is not present in this building.
P ☐ N/A ☒	**Unrestrained hazardous material storage** **Comments:** No hazardous material storage was observed.
P ☐ N/A ☒	**Masonry chimneys** **Comments:** Masonry is not present in this building.
P ☐ N/A ☒	**Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.** **Comments:** Equipment featured cable bracing.
P ☒ N/A ☐	**Other:** **Comments:**
P ☐ N/A ☐	**Other:** **Comments:**
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 Roof	**psf**	**psf**	**Remarks**
Roofing	3	3	Metal roof per arch. Dwg.; Product specification not available
Sheathing Board	2.1	2.1	3/4" plywood
Rafter	1.0	1.0	2x6 @ 2' o.c.
Ceiling	2	2	typ. gypboard ceiling panels
Lighting and misc.	5	5	
Columns	0.468	0.468	
Beams	5.563	5.563	Glu-lam beams
Partition+Plywood shear walls	7.5	7.5	Half of 15 psf
Total	27	27	

	Seismic Weight	Dead Load	
Canopy Roof	**psf**	**psf**	**Remarks**
Roofing	2	2	Modified Bitumen Roofing per arch. Dwg.; Product specification not available
Sheathing Board	1.4	1.4	1/2" plywood
Rafter	2.0	2.0	2x6 @ 1' o.c.
Ceiling	2	2	1x6 T&G siding (at 36 pcf)
Columns	0.908	0.908	2 1/2" STD pipe
misc.+lighting	2.0	2.0	Half of 15 psf
Total	10	10	

Story Weights

Floor Levels	Floor Area (ft2)	Floor Weight (psf)	Additional Weight (kips)	Total Seismic Weight (kips)
Main Roof	2,042	27		54
Canopy	83	10		1
			Total Weight (kips) =	**55**

Notes:
1 - Seismic base is set at the 1st floor. Soil-structure interaction is ignored for ASCE 41-17 Tier 1.

Period

C_t=	0.02
h_n (ft) [1]=	16.08
B=	0.75

1 - Average of the low and high point of the slopped roof

T=	0.16	sec

Notes:
1- The period calculated per ASCE 41-17 Equation 4-4.

$$T = C_t \cdot h_n^{\,B}$$

2- Ct and B are for "all other framing system" per ASCE 41-17 Section 4.4.2.4.
3- The building height is taken from the 1st floor to the roof.

BSE-2E Response Spectrum

6/10/2019 U.S. Seismic Design Maps

OSHPD

Latitude, Longitude: 36.994360, -122.060200

Date	6/10/2019, 10:51:30 AM
Design Code Reference Document	ASCE41-17
Custom Probability	
Site Class	D - Default (See Section 11.4.3)

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)	1.537
S_{X1}	site-modified spectral response (1.0 s)	0.881
f_a	site amplification factor (0.2 s)	1.2
f_v	site amplification factor (1.0 s)	1.815

Rating form completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: EB/EFA/BL

Date: 06/28/2019

Story Shears

Sa=	1.281	
W=	55	kips
C=	1.3	ASCE 41-17 Table 4-7

1 - Modification Factor, C, per ASCE 41-17, Table 4-7 for single story W2 shear wall building type is used.

V=	92	kips

k=	1.00	

Floor Levels	Story Height	Total Height, H	Weight, W	W x H^k	coeff	Fx	Story Shear, V
	(ft)	(ft)	(kips)			(kips)	(kips)
Main Roof	16.08	16.08	55	889	1.00	92	92
				889	1	92	

Notes:

1- The base of building is assumed to be at the 1st floor.

Rating form completed by:
RUTHERFORD + CHEKENE
ruthchek.com
Evaluator: EB/EFA/BL
Date: 06/28/2019

Average Stress in Wood-framed Wall

Average Stresses

Ms =	4.5

Direction	Story Shear	Wall Length	Opening ratio	Average Shear Stress	Tier 1 Shear Stress Limit	Wall OK?
	(kips)	(ft)		(plf)	(plf)	
E-W direction	92	102	1.00	184	1000	OK
N-S direction	92	82	1.00	229	1000	OK