

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
Visual Arts Facilities-Building C

CAAN #7495

433 Baskin Arts Service Road, Santa Cruz, CA 95064

UCSC Campus: Main Campus



Partial West 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	Category 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 A2.1, A2.3 and A3.1-A7.2 pertinent to Buildings ‘A’, ‘B’, ‘C’, and ‘D’.
- Structural drawings by E.G. Hirsch & Associates, “Visual Arts Facilities, University of California, Sant Cruz,” dated 14 December 1983, Sheets S1, S2, S4 and S6-S8 pertinent to Buildings ‘A’, ‘B’, ‘C’, and ‘D’.
- Architectural drawings by BOORA Architects, “University of California Santa Cruz – Teaching Facilities, Theater Arts, and Studio Arts,” dated 1 November 1996, Sheet A121, A141, A221, A311 and A321-A833 pertinent to north addition of Building ‘C’.
- Structural drawings by kpff Consulting Engineers, “University of California Santa Cruz – Teaching Facilities, Theater Arts, and Studio Arts,” dated 1 November 1996, Sheets S1, S121, S122, S201, S202 and S303 pertinent to north addition of Building ‘C’.

Additional building information known to exist

None

Scope for completing this form

Reviewed structural drawings for original and addition construction, made a brief site on May 23, 2019, and carried out ASCE 41-17 Tier 1 evaluation.

Brief description of structure

Baskin Building C 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 original construction, an approximately 24'-0" x 40'-0" rectangular section with the longer side running E-W, is estimated to have been completed in 1984. Then, in 1996, an addition of 32'-9" by 32'-0" was built to the north and was structurally connected to the original building. The original portion was designed by architects Marquis Associates, and E.G. Hirsch & Associates was the structural engineer. The addition is by Boora Architects and kpff consulting engineers.

The building has approximately 2,212 square feet. Buildings A and B are to the north and west across the North Courtyard; Buildings E and F are to the south across the Center Courtyard. The building site is sloping down to northeast. The first floors of both the original and addition are supported by floor beams spanning between concrete stem walls, and the south addition features two equipment rooms at the northeast corner on the lower level.

The original portion is a one-story structure and is comprised of diagonal wood braced frames and plywood shear walls in the E-W direction and plywood shear walls in the N-S direction. The first floor, due to the slope of the site, is supported by 2x10 floor joists that span in the N-S direction between exterior walls and a midspan interior cripple stud wall line. The roof diaphragm slopes from the upper beam of the braced frame on the north (22'-0" elevation) to the top of the exterior wood stud wall on the south (9'-3" elevation). The diagonal wood braced frame is comprised of a glulam beam at 22'-0" elevation, 5 1/8" wide x 7 1/2" deep, made of Douglas Fir that runs continuously between interior posts and end posts; a sawn lumber lower wind girt at 11'-7" elevation, 14" wide x 4" deep, made of Douglas Fir No.1 Grade or better that spans between posts and connects with exterior stud wall below; four 8"x4" diagonals made of Douglas Fir No.1 Grade or better that spans between glulam and wind girt/post work point; two 8x8 continuous interior posts and two 6x6 interior posts. Full-height wood stud wall, 2x6 at 24" o.c., span continuously from the concrete foundation to the roof at the east, west and south exterior of the building. However, at the north side, the exterior wall ends at the wind girt with glazing above to the bottom of the glulam beam.

The 1996 addition contains one story fully above grade and a daylight basement of two rooms accessible from the north side of the building. The first floor is supported over single-span 14" deep TJI floor joists that span in the E-W direction between the exterior wall and the interior wall. The roof is comprised of metal roof decking running E-W direction over two 5 1/8" wide x 19 1/2" deep glulam beams. The glulam beams are supported by TS4x4x1/4 steel posts on the north end and by the glulam girder of the same size on the south end. Additional shallower glulam beams are added around pop-up skylight. The glulam girder spans between the TS5x5x5/16 steel posts that align with the existing 8x8 posts, between which is the opening that connects the original and the addition. Existing wall studs and plywood within the opening were removed below the roof height of the addition – approximately 1'-0"

below the existing wind girt. New 2x double plates were added to the bottom of the remaining wall studs, and the studs are supported by two 16d nails in shear at each stud to a continuous 12 gauge bent plate that is screwed to the top of the glulam girder per Detail 17/S303.

Identification of levels: The building site slopes down to the northeast. There is a small partial daylight basement at the north end of the addition for mechanical equipment, identified on the addition drawings as the “compressor floor.” The remainder of the lowest level is crawl space. The main or first floor level is the same for both the the original portion and the addition.

Foundation system:

- Original construction: The original perimeter walls bear on a curb supported by the thickened edge of the slab and then a continuous grade beam. The original interior bearing walls are supported by the thickened slab and then a continuous grade beam. These 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 8x8s intermediate posts are anchored into the concrete curbs and thickened slab with anchor bolts.
- Addition: All bearing walls in the addition, including both the perimeter walls and interior walls, bear on top of a 6” wide concrete stem wall, reinforced with #4 bars at 16” on center each way, that is supported by 8” thick x 1’-6” wide strip footing with three #4 longitudinal bars and matching dowels to the stem wall above.

Structural system for vertical (gravity) load:

- Original construction: The floor is comprised of 1 1/8” plywood sheathing atop 2x10 floor joist at 16” on center. Joists are single-span between the perimeter walls and butt joint at the interior bearing wall. The sawtooth roof is comprised of 5/8” plywood sheathing spanning atop 2x12 wood joists spaced at 16” on center, with a low end at the south side and a high end at to the north above a clerestory window. The north eave is supported by a wood truss. Joists are supported at the high end to wood braced frame glulam beams with face mount joist hangers and bearing on top of wood bearing wall on the other end. Glulam beams span continuously between end posts and over interior posts. Walls use 2x6 studs at 24” o.c. with 5/8-inch plywood sheathing.
- Addition: The floor is comprised of 1 1/8” plywood sheathing atop 14” TJI spaced at 16” o.c. The roof is framed with 5 -1/8” by 19 1/2” glulam beam framing and 3” deep 20 gauge cellular metal roof decking. Glulam beams are supported by TS4x4x1/4 structural steel tube posts or same-size glulam girder that bears on TS5x5x5/16 structural tube posts.

Structural system for lateral forces:

- Original Construction: At the floor level, lateral forces are transferred from the plywood floor diaphragm through Simpson L30 clips on each side of the joists to the 3x6 sill and then into the concrete stem wall with 3/8” diameter anchor bolts at 4’-0” o.c. in the N-S direction. In the E-W direction, lateral forces are transferred through 2x rim joist to the concrete stem wall with 3/8” diameter bolts at 4’-0” o.c. When the floor joist pulls away from the perimeter stem wall in the N-S direction, the 2x rim joist is in cross-grain bending. This connection is shown in Detail 19 on Sheet S-7. At the roof level, 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 north ridge and the shear wall at the south. 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 2x blocking on the top plate of the plywood shear walls (Detail 5 on Sheet S-8). The braced frame has two “Y” shapes each superimposed on a single center column. The top of the “Y” is connected to the top glulam beam and the midheight of the “Y” connects to the low wind girt which in turn is

connected to a plywood shear wall. The braces are connected to the center post and to the beam/girt with steel side plates and 3/4" diameter machine bolts typically in single shear. Details are on Sheet S-7.

- Addition: At the roof level, in-plane lateral forces from the metal roof decking are delivered through an L3x3x1/4 angle ledger either to the continuous 2x blocking or to the 2x2x1/4 angle strap spaced at 4'-0" o.c. (i.e. occur every other studs as the wall studs are spaced at 24" o.c. typ.) then into the exterior wood shear wall. Out-of-plane forces are transferred either through the #10 screws from the angle ledger to each wood shear wall studs directly or through the angle strap and 3/4" diameter through bolt into every other stud of the wood shear wall. This connection is shown in Detail 16 on Sheet S303. Except at the south, where the metal decking is supported atop the glulam girder, lateral forces is transferred through angle ledger to the wall sheathing directly per Detail 17 on Sheet S303. At the floor level, in N-S direction, lateral forces are transferred from the plywood floor diaphragm through TJI blockings between the floor joists into the plywood cripple wall and then into the concrete stem wall via the 3x6 sill with 3/4" diameter anchor bolts at 3'-0" o.c. (Details 17 and 19 on Sheet S201). In E-W direction, lateral forces are transferred from the diaphragm directly into the plywood shear wall per Detail 18 on Sheet S201 and then into concrete stem wall with the same sill and anchor bolts as N-S direction.

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 through 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.
- Possible damage to the 2x rim joist at the floor level in the original drawing due to cross-grain bending.

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	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	N		

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

A dust collector was observed standing close to the east exterior wall of the building and is self-anchored into the concrete pad below; however, due to its weight and configuration, deflection of the unit under earthquake loading may need to be limited to avoid pounding damage to the exterior wall of Building C. Two basement rooms were not observed during the site visit and are therefore excluded from the scope of the nonstructural review.

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.

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 C based on the absence of an ASCE 41-17 Tier 1 quick check procedure for wood braced frame, the limited ductility in the braced frames, and the poor out-of-plane connection of the wood floor to concrete stem 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. We assign the building to Priority Category B, as the retrofit of the building should be done when there are any plans for modifying or change of occupancy. Deflection of the duct collector under extreme seismic event should be limited to avoid pounding.

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 Engineers. Comments from the reviewers have been incorporated into this report. The reviewers agreed with the assigned rating.

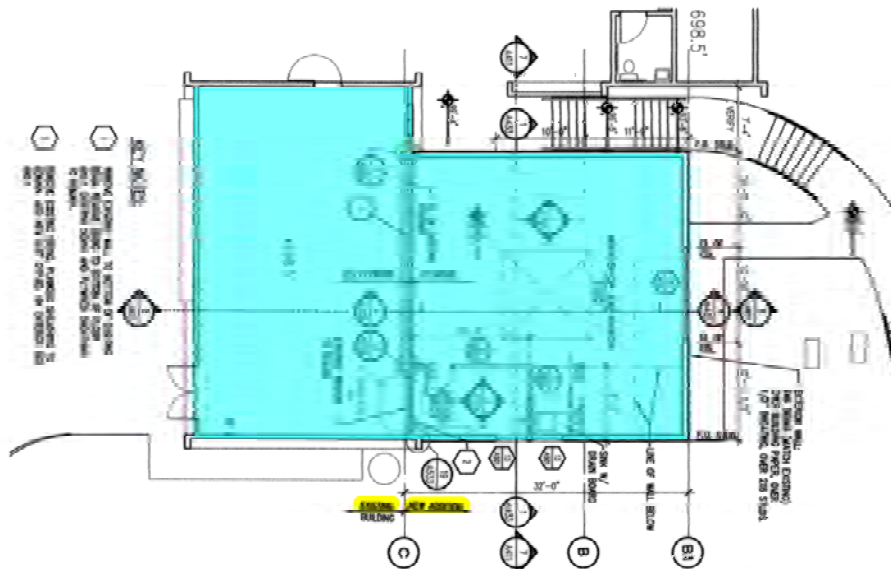
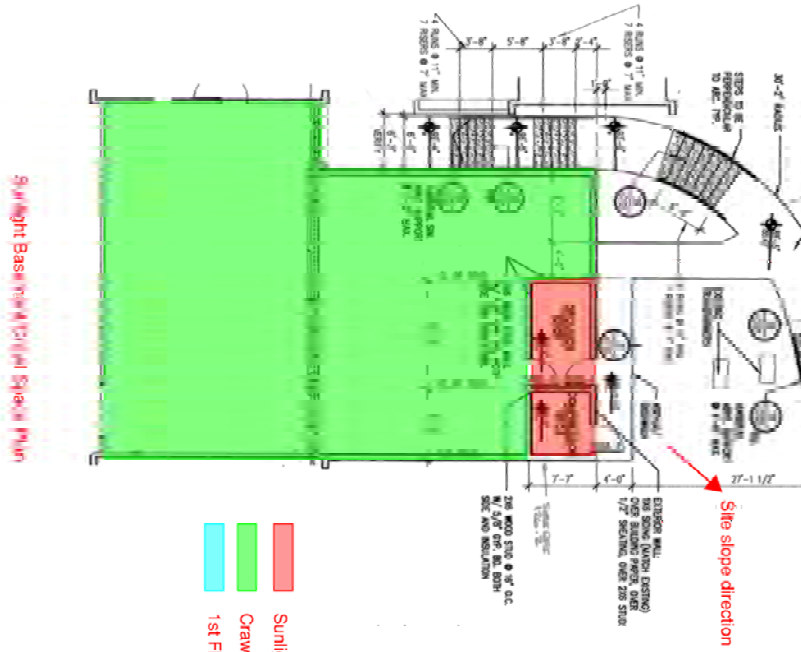
Additional building data	Entry	Notes
Latitude	36.994750	
Longitude	-122.060600	
Are there other structures besides this one under the same CAAN#	No	
Number of stories above lowest perimeter grade	1	There is also a small partial daylight basement on the north side for a pair of small rooms.
Number of stories (basements) below lowest perimeter grade	0	
Building occupiable area (OGSF)	2,212	From 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, 0.485	From SEAOC/OSHPD 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}	1.281, 0.881	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
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	Original Built: 1984 (Estimated) Code: 1982 UBC Addition: 1996 Code: 1991 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/W2-Wood 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.

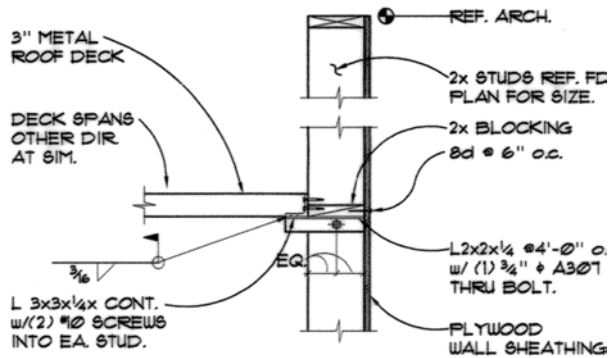
⁴ Determination of site class and assessment of geotechnical hazards are based on correspondence with Pacific Crest Geotechnical Engineers and Nolan, Zinn, and Associates Geologists. [Revised Geology and Geologic Hazards, Santa Cruz Campus, University of California, Job # 04003-SC 13 May 2005]. Site 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>

Previous ratings		
Most recent rating	-	Not evaluated before.
Date of most recent rating	-	
2 nd most recent rating	-	
Date of 2 nd most recent rating	-	
3 rd most recent rating	-	
Date of 3 rd most recent rating	-	
Appendices		
ASCE 41 Tier 1 checklist included here?	Yes	Refer to attached checklist file.

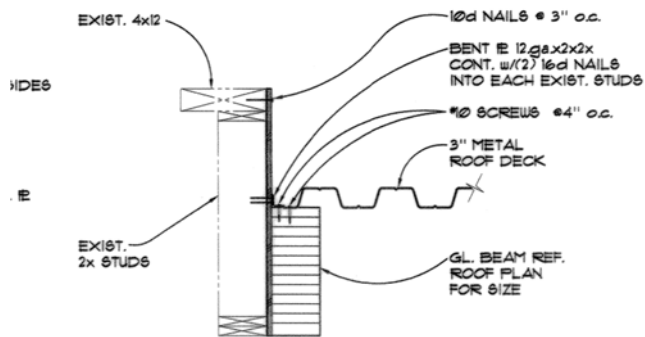
Color Coded Floor Plan



Metal Deck to Perimeter Roof-to-Wall Tie in Addition
Detail 16/S303 is the Typical Condition; Detail 17/S303 is the Connection from the Addition
(on the Right) to the Original Building (on the Left)



16 TYP. METAL
ROOF DECK TO 2X STUDS
1"=1'-0" S122



17 TYP. ROOF DECK
TIE TO GL. BEAM
1"=1'-0" S122



Rating form
completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: JY/WAL/BL

Date: 06/28/2019

APPENDIX A

Additional Photos



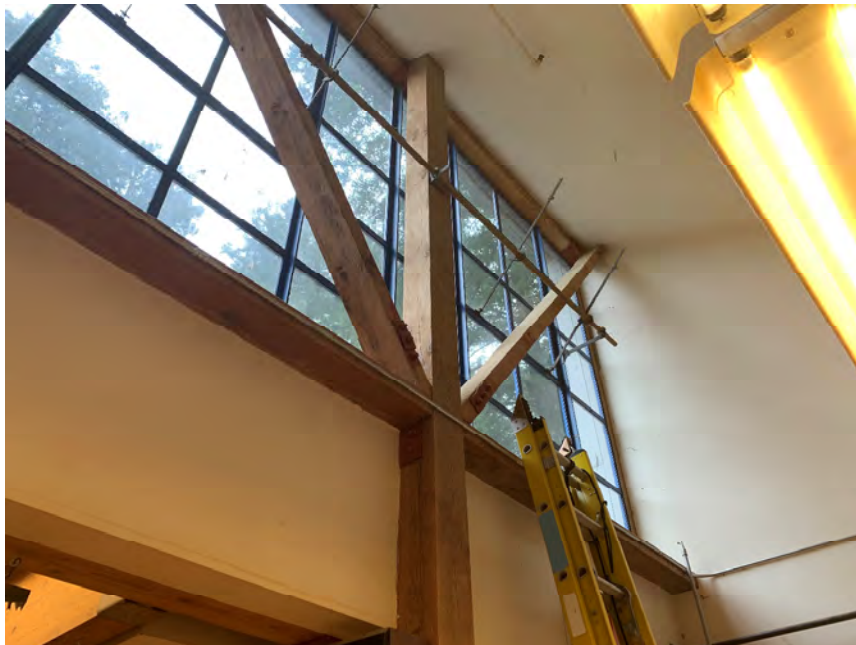
South Elevation (Looking North)



Partial West Elevation (Looking Southeast)



The Dust Collector near the East Wall (Looking North)



Wood Braced Frame (Looking Northeast)



Glulam Beams in the 1996 Addition (Looking North)



Rating form
completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: JY/WAL/BL

Date: 06/28/2019

APPENDIX B

ASCE 41-17 Tier 1 Checklists (Structural)

UC Campus:	Santa Cruz		Date:	06/28/2019		
Building CAAN:	7495	Auxiliary CAAN:	By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building C		Initials:	JY	Checked:	WAL/BL
Building Address:	433 Baskin Arts Service Road, Santa Cruz, CA 95064		Page:		of	

ASCE 41-17 Collapse Prevention Basic Configuration Checklist

LOW SEISMICITY

BUILDING SYSTEMS - GENERAL

	Description
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	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: Roof diaphragms deliver loads to wood shear walls over strip footings around the building perimeter and to wood diagonal braces and wood columns over spread footings.
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	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: There are no adjacent structures.
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	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

	Description
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	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. A.2.2.2. Tier 2: Sec. 5.4.2.1) Comments: Same wood shear wall at partial basement.
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	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: Same wood shear wall at partial basement.

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

UC Campus:	Santa Cruz		Date:	06/28/2019		
Building CAAN:	7495	Auxiliary CAAN:	By Firm:	Rutherford + Chekene		
Building Name:	Elena Baskin Visual Arts Building C		Initials:	JY	Checked:	WAL/BL
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ASCE 41-17 Collapse Prevention Basic Configuration Checklist

C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	<p>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)</p> <p>Comments: All lateral force-resisting system elements are continuous to the foundation.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	<p>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)</p> <p>Comments: Same wood shear wall at partial basement</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	<p>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)</p> <p>Comments: Partial basement has a small footprint.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	<p>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)</p> <p>Comments: Flexible diaphragm</p>

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

GEOLOGIC SITE HAZARD

	Description
C <input type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input checked="" type="checkbox"/>	<p>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)</p> <p>Comments: Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LiquifactionMap2009.pdf</p>
C <input type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input checked="" type="checkbox"/>	<p>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)</p> <p>Comments: Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LandslideMap2009.pdf</p>

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

UC Campus:	Santa Cruz		Date:	06/28/2019		
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**ASCE 41-17
Collapse Prevention Basic Configuration Checklist**

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

GEOLOGIC SITE HAZARD

C	NC	N/A	U	<p>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)</p> <p>Comments: Per 2009 County map at https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/FaultZoneMap2009.pdf</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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

FOUNDATION CONFIGURATION

				Description
C	NC	N/A	U	<p>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)</p> <p>Comments: Building width $B = 40'$, Building average height is $H = 14'$, $B/H = 2.86$ $S_a = 1.28g$ per ATC at BSE-2E $0.6 \times S_a = 0.77$ $B/H > 0.6 S_a$</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
C	NC	N/A	U	<p>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)</p> <p>Comments: Site Class D assumed. The wood floor provides limited constraint to tie the perimeter concrete footings together from lateral spreading. As the site slopes to the northeast, the floor diaphragm is even further away from the foundation and will offer less restraint</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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UC Campus:	Santa Cruz		Date:	06/20/2019		
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Building Name:	Elena Baskin Visual Arts Building C		Initials:	YJ	Checked:	WAL/BL
Building Address:	433 Baskin Arts Service Road, Santa Cruz, CA 95064		Page:		of	

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

LOW AND MODERATE SEISMICITY

SEISMIC-FORCE-RESISTING SYSTEM

	Description								
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <p>Comments: There are two lines of shear walls in each principal direction.</p>								
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Structural panel sheathing</td> <td>1,000 lb/ft</td> </tr> <tr> <td>Diagonal sheathing</td> <td>700 lb/ft</td> </tr> <tr> <td>Straight sheathing</td> <td>100 lb/ft</td> </tr> <tr> <td>All other conditions</td> <td>100 lb/ft</td> </tr> </table> <p>Comments: 5/8-inch structural panel sheathing provided at all perimeter shear walls. The average shear stress in N-S direction is 277 plf at the main story and 355 plf at lower story. The average shear stress in E-W direction is 277 plf max at the main story and 394 plf at lower story.</p>	Structural panel sheathing	1,000 lb/ft	Diagonal sheathing	700 lb/ft	Straight sheathing	100 lb/ft	All other conditions	100 lb/ft
Structural panel sheathing	1,000 lb/ft								
Diagonal sheathing	700 lb/ft								
Straight sheathing	100 lb/ft								
All other conditions	100 lb/ft								
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <p>Comments: No stucco.</p>								
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <p>Comments: Gypsum boards are not used as shear diaphragm.</p>								
C NC N/A U <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <p>Comments: All wall panel satisfy the ratio limit.</p>								
C NC N/A U <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>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)</p> <p>Comments: In the original portion, plywood is discontinued at the floor level. Shear transfer is provided per Detail 21/S-7. There is no positive holdown or strap for overturning, but the demands will be low.</p>								

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

C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	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) <p>Comments: The site slopes by more than one-half story from main floor to the floor of the partial basement, but the piers on the downslope, north façade typically have wider aspect ratios that 1V:1H.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	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) <p>Comments: Wall panels and anchored sills are shown in Detail 19 on Sheet S-7.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	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) <p>Comments: No large openings observed in wood shear walls.</p>

CONNECTIONS

	Description
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	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) <p>Comments: Simpson CB-68 or CB-88 are used for column base connection to concrete foundation per Detail 12 on Sheet S-7.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3) <p>Comments: Wood sills are bolted 5/8" dia. anchor bolts on 4'-0" o.c. per Detail 16 on Sheet S-7.</p>
C <input checked="" type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	GIRDER/COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1) <p>Comments: Structural steel angle w/ 3/4" dia. through bolts are used to connect girder and column per Detail 2 and 7 on Sheet S-7 in the original. Steel bucket with two 3/4" diameter through bolts are used to connect the glulam beams in the addition to the steel posts below.</p>

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ASCE 41-17 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

	Description								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: Wood sills are bolted 5/8" dia. anchor bolts on 4'-0" o.c. per Detail 16 on Sheet S-7</p>
C	NC	N/A	U						
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

DIAPHRAGMS

	Description								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: First floor is level, and there is no expansion in the floor and roof diaphragm.</p>
C	NC	N/A	U						
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: Chord discontinuity occur at roof offset at the original and addition intersection.</p>
C	NC	N/A	U						
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: No large opening observed in the roof diaphragm.</p>
C	NC	N/A	U						
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: Roof diaphragm is plywood.</p>
C	NC	N/A	U						
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">NC</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	C	NC	N/A	U	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>Comments: 5/8" plywood per Detail 12 on Sheet S-1</p>
C	NC	N/A	U						
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

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UC Campus:	Santa Cruz			Date:	06/20/2019		
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ASCE 41-17 Collapse Prevention Structural Checklist For Building Type W2

C <input type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (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" blocked plywood in original portion.
C <input type="checkbox"/> NC <input type="checkbox"/> N/A <input type="checkbox"/> U <input type="checkbox"/>	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 plywood in the original portion and metal deck in the addition.

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



Rating form
completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: JY/WAL/BL

Date: 06/28/2019

APPENDIX C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary

UC Campus:	Santa Cruz		Date:	06/28/2019	
Building CAAN:	7495	Auxiliary CAAN:	By Firm:	Rutherford + Chekene	
Building Name:	Elena Baskin Visual Arts Building C		Initials:	JY	Checked: WAL/BL
Building Address:	433 Baskin Arts Service Road, Santa Cruz, CA 95064		Page:	1	of 1

UCOP SEISMIC SAFETY POLICY Falling Hazard Assessment Summary

		Description
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	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 in Building C.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Heavy masonry or stone veneer above exit ways or public access areas Comments: There is no masonry or stone veneer.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Unbraced masonry parapets, cornices, or other ornamentation above exit ways or public access areas Comments: There are no unbraced masonry parapets, cornices or other ornamentation.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Unrestrained hazardous material storage Comments: No hazardous material storage was observed.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Masonry chimneys Comments: There are no masonry chimneys.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc. Comments: No unrestrained natural gas-fueled equipment was observed.
P <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Other: Comments:
P <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Other: Dust Collector Comments: Weight and configuration of the dust collector make it possible that it can pound into the building wall.

Falling Hazards Risk: **Low**

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



Rating form
completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: JY/WAL/BL

Date: 06/28/2019

APPENDIX D

Quick Check Calculations

Unit Weights:

	Seismic Weight	Dead Load	
Original Portion Roof	psf		Remarks
roofing	3	3	Asphalt shingles
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	
Total	18	21	

	Seismic Weight	Dead Load	
Addition Portion Roof	psf		Remarks
roofing	3	3	Asphalt shingles
3" 20ga cellular metal roof decking	4.1	4.1	3" cellular type 'N' per Verco manuf. Catalog
Glulam Beam	3	3	
misc.+lighting	2	2	
Total	12	10	

	Seismic Weight	Dead Load	
Floor	psf		Remarks
Flooring	3	3	Exposed 1 1/8-inch plywood
Floor joists	4	4	2x10 @ 16" o.c.
misc.+lighting	2	2	
Woodwork equipment	10	10	
Total	19	19	

Story Weights

Level	Area (ft ²)	Unit Weight (psf)	Seismic Weight (kips)
Original Roof	1050	18	19
Addition Roof	1050	12	13
Floor	2010	19	38
			70

Note:

1- Roof area in the original portion is calculated accounting for the slope

Period

C ₁ =	0.02
h _n (ft)=	14
B=	0.75

T=	0.14 sec
----	----------

BSE-2E Response Spectrum



7495

Latitude, Longitude: 36.994750, -122.060600



Date	5/31/2019, 8:50:11 AM
Design Code Reference Document	ASCE41-17
Custom Probability	
Site Class	D - Stiff Soil

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)	0.881
f_a	site amplification factor (0.2 s)	1
f_v	site amplification factor (1.0 s)	1.815

Story Shears

Sa=	1.28	
W=	70	kips
C=	1.3	from Table 4-7

V=	116	kips
----	-----	------

k= 1.00 Per ASCE 41-17 Section 4.4.2.2, K = 1.0 for periods less than 0.5 sec and K = 2.0 for T > 2.5 sec. It varies linearly

Floor Levels	Story Height (ft)	Total Height, H (ft)	Weight, W (kips)	W x H ^k	coeff	Fx (kips)	Story Shear, V (kips)
Roof	14.00	18.3	32	577	0.78	91	91
1st Floor	4.25	4.3	38	162	0.22	26	116
Sunlight Basement				739	1	116	

Average Stress:

Ms= 4.5 CP of wood shear wall

E-W direction (Longitudinal)			
Level	Force (kips)	Length of wall (ft) ¹	Average shear stress (plf)
Roof-1st Floor (CASE 1) ¹	91	88.75	227
Roof-1st Floor (CASE 1) ²	91	72.75	277
1st Floor-Sunlight Basement ³	116	32.75	394

N-S direction (Transverse)			
Level	Force (kips)	Length of wall (ft)	Average shear stress (plf)
Roof-1st Floor	91	72.75	277
1st Floor-Sunlight Basement	116	72.75	355

Note:

1. In case 1, the shear force is assumed to be taken by the north, south exterior walls and the remaining interior shear wall panels.
2. In case 2, the shear force is assumed to be taken by the exterior walls only, i.e. ignore the interior wall panels.
3. 1/2 of the shear force in the lower story is taken by the north wood shear wall of the addition