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Date: 2020-04-13

## UCSF Building Seismic Ratings

### *Langley Porter Psychiatric Hospital and Clinics - Annex, Parnassus Avenue*

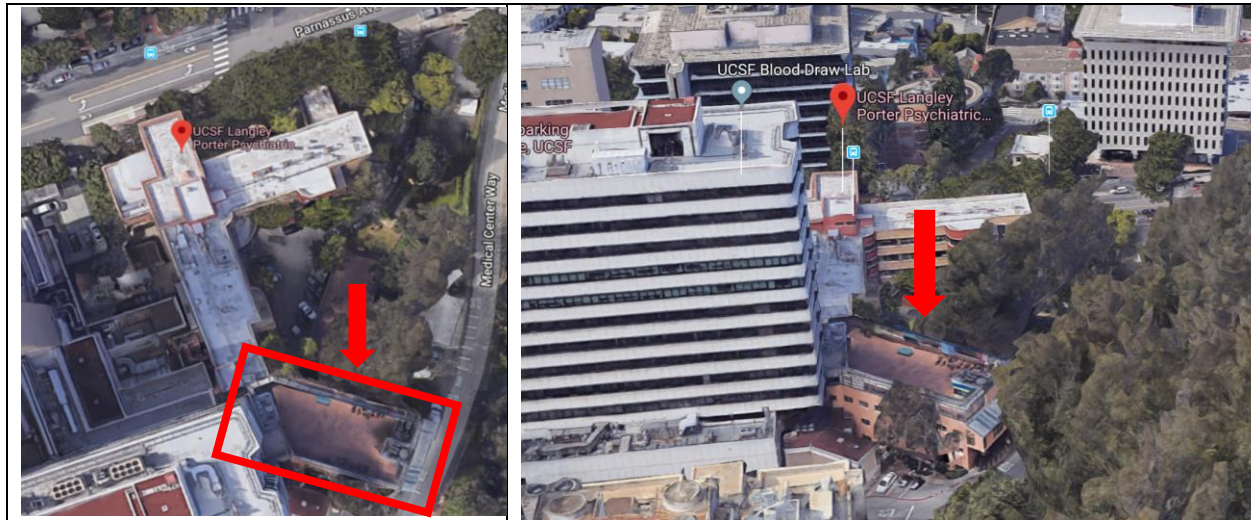
CAAN# 2290B

401 Parnassus Avenue, San Francisco, CA 94143

UCSF Campus Site: *Parnassus*



04/13/2020



Rating summary	Entry	Notes
UC Seismic Performance Level (rating)	V	Findings based on a drawing review and ASCE 41-17 Tier 1 evaluation <sup>1</sup>
Rating basis	Tier 1	ASCE 41-17
Date of rating	2019	
Recommended UCSF priority category for retrofit	N/A	Planned for demolition
Ballpark total project cost to retrofit to IV rating	N/A	
Is 2018-2019 rating required by UCOP?	Yes	Building is previously rated IV but does not have a fully documented review.
Further evaluation recommended?	N/A	

<sup>1</sup> The evaluations at UCSF translate the Tier 1 evaluation to a Seismic Performance Level rating using professional judgment discussed among the Seismic Review Committee. Non-compliant items in the Tier 1 evaluation do not automatically put a building into a particular rating category, but such items are evaluated 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.

**Building information used in this evaluation**

- Structure – Original Building Structural drawings by the California Department of Public Works Division of Architecture, 11 sheets, dated October 25, 1957.

**Additional building information known to exist**

- *Performance of UCSF Buildings During the October 17, 1989 Loma Prieta Earthquake*, Impell Corporation, dated 17 November 1989.

**Scope for completing this form**

Reviewed original structural construction drawings and performed an ASCE 41-17 Tier 1 evaluation.

**Brief description of structure**

The building is a four-story tall structure occupying approximately 35,000 sq ft of floor area with no basement. It is rectangular in plan, with a 45-degree kink at the west side where it interfaces with the existing building. A significant slope exists along the northeast elevation starting halfway between Level 2 and 3, dropping down to Level 1 towards the west side. The seismic base is assumed to align with Level 1 for the analysis. The building was constructed circa 1957.

Identification of Levels: The lowest level is referred to as first floor (Level 1) is on grade, with the second, third, fourth and roof levels above. The second floor is accessed on the east side of the building, while Level 1 is accessible via grade at the north elevation. The roof has two penthouses above the stair and elevator shaft.

Foundation System: The foundations comprise reinforced concrete shallow spread footings below the columns and reinforced concrete strip footings below the walls. The wall strip footing steps down from a high point at the east edge (EL. + 400.00) to the basement of the adjacent building (EL. + 391.50) at the west.

Structural System for Vertical (gravity) load: The floor on the north and south side of the central corridor comprises a one-way joist system supporting a 3 in. thick slab. The typical pan width and depth are 30 in. and 12 in. respectively, with rib width of 5.5 in. The joists are supported by concrete walls along the building perimeter and beams on the interior. Beams are supported by columns that are typically spaced at 20 ft on center. Type A columns have #3 rectangular hoops spaced at 10 in. on center. Type B are similar with an intermediate tie added in the short dimension of the column. The building has a stair shaft from Level 01 to Level 04 at the east end, comprising 8 in. thick concrete walls. An elevator shaft at the west side of the building has 10 in. thick concrete walls.

Structural System for Lateral Loads: The lateral load resisting system comprises steel reinforced concrete perimeter shear walls. Lateral loads are transferred to walls through the slab. The structure is generally symmetric with a continuous perimeter wall system.

**Brief description of seismic deficiencies and Expected Seismic Performance**

Identified seismic deficiencies of the building include the following:

- The adjacent building is within 2 in., which is 0.3% of overall height. This is less than the 1.5% requirement of the quick checklist at high seismicity zone.
- Reinforced concrete wall shear stress is larger than the greater of 100 psi or  $2\sqrt{f'_c}$  with the maximum DCR of 1.7.

The concrete shear wall stresses exceed the quick check allowable stresses, but this neglects the wall reinforcement contribution which is approximately equal to the concrete shear resistance. Additionally, the column shear strengths including the tie reinforcement are adequate to develop the column flexural strengths indicating that the columns will likely maintain gravity-carrying ability.

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	N		

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

A detailed assessment of nonstructural systems has not been performed, but could be performed as part of a Tier 2 evaluation. No life-safety concerns were observed through the drawing review.

UCOP non-structural checklist item	Life safety hazard?	UCOP non-structural 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 seismic performance level rating

The building rating of V can be attributed to the minimal amount of identified deficiencies and the steeply sloped site that may affect building response when subjected to seismic ground motion.

### Recommendations for further evaluation or retrofit:

The building does not require further evaluation or retrofit.

### Peer review comments on rating

The structural members of the UCSF Seismic Review Committee (SRC) reviewed the evaluation on 8 January 2020 and unanimously concur with the Seismic Performance Level V rating.

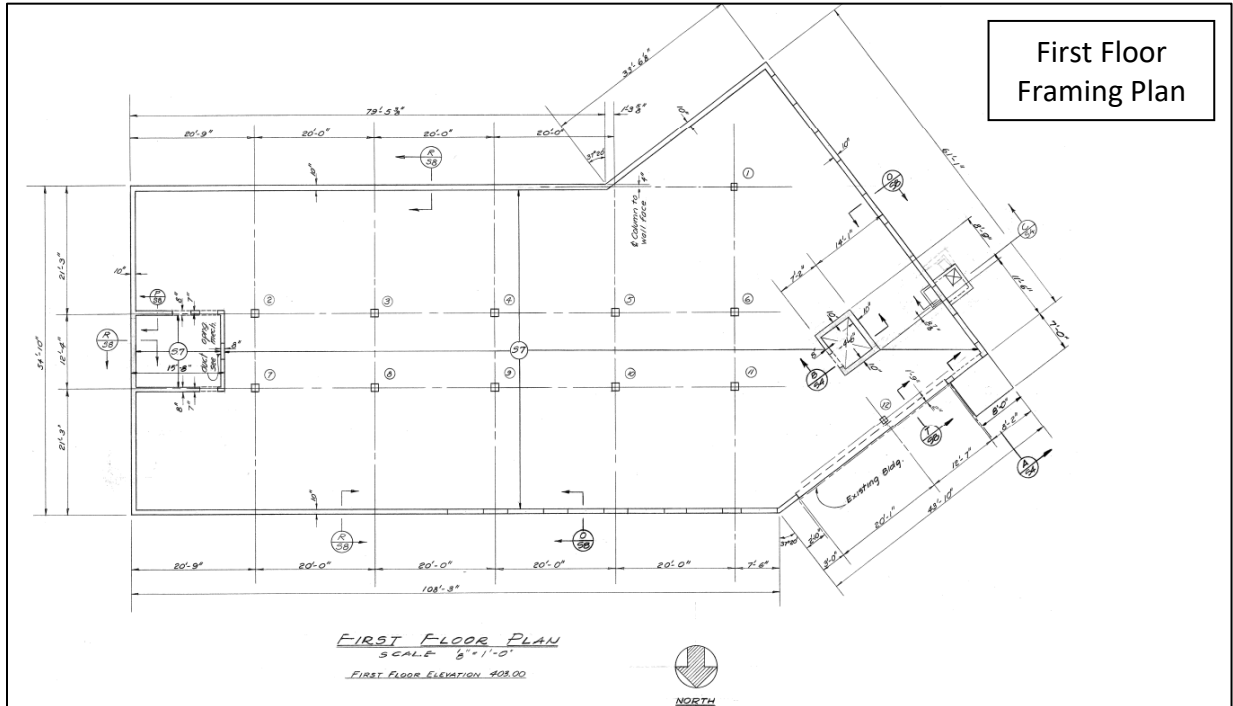
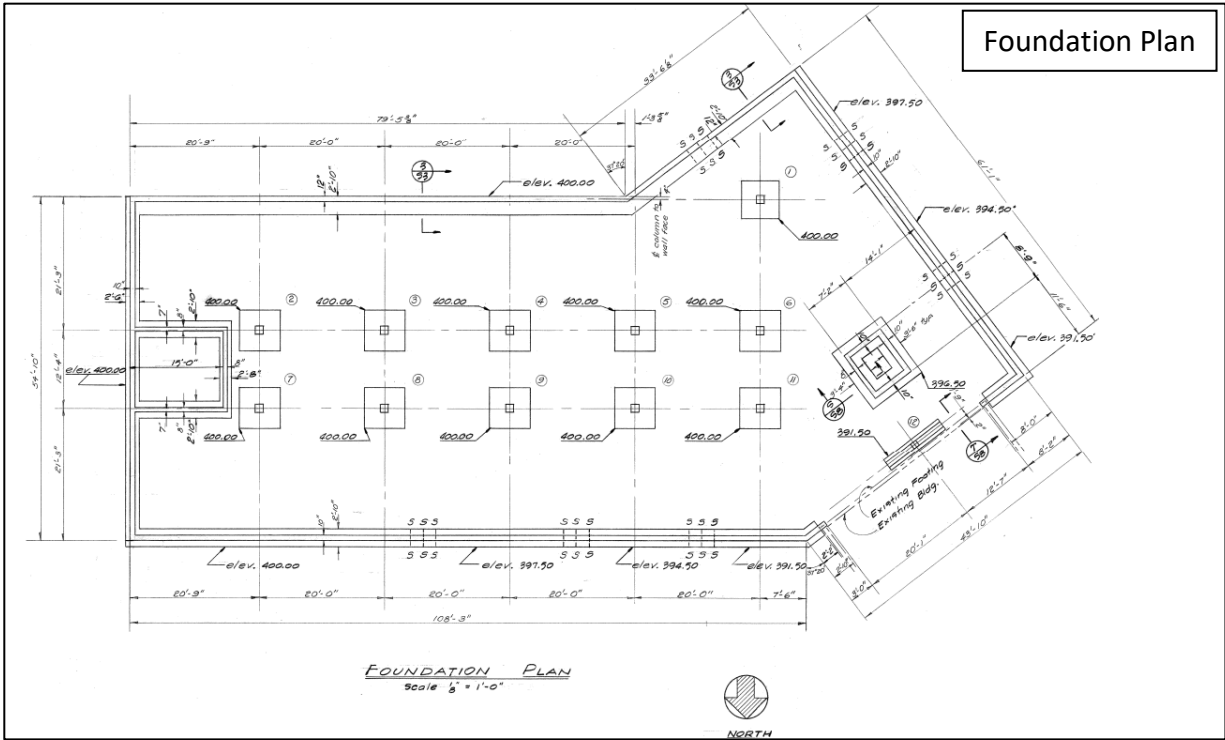
Additional building data	Entry	Notes
Latitude	37.7632917°	
Longitude	-122.4566337°	
Are there other structures besides this one under the same CAAN#	Yes	LPPI Original building constructed in 1940
Number of stories above lowest perimeter grade	4	
Number of stories (basements) below lowest perimeter grade	0	There is none below the lowest perimeter grade. However the highest perimeter grade is above 2 <sup>nd</sup> Story.
Building occupiable area (OGSF)	105,115	From UCSF Seismic Workplan spreadsheet (includes original LPPI building)
Risk Category per 2016 CBC 1604.5	III	
Building structural height, $h_n$	46 ft	As defined per ASCE 7-16 Section 11.2
Coefficient for period, $C_t$	0.02	ASCE 41-17 equation 4-4 and 7-18
Coefficient for period, $\zeta$	0.75	ASCE 41-17 equation 4-4 and 7-18
Estimated fundamental period	0.35 sec	ASCE 41-17 equation 4-4 and 7-18
Site data		
975 yr hazard parameters $S_s, S_1$	1.553, 0.628	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019) – LPPI Outpatient unit

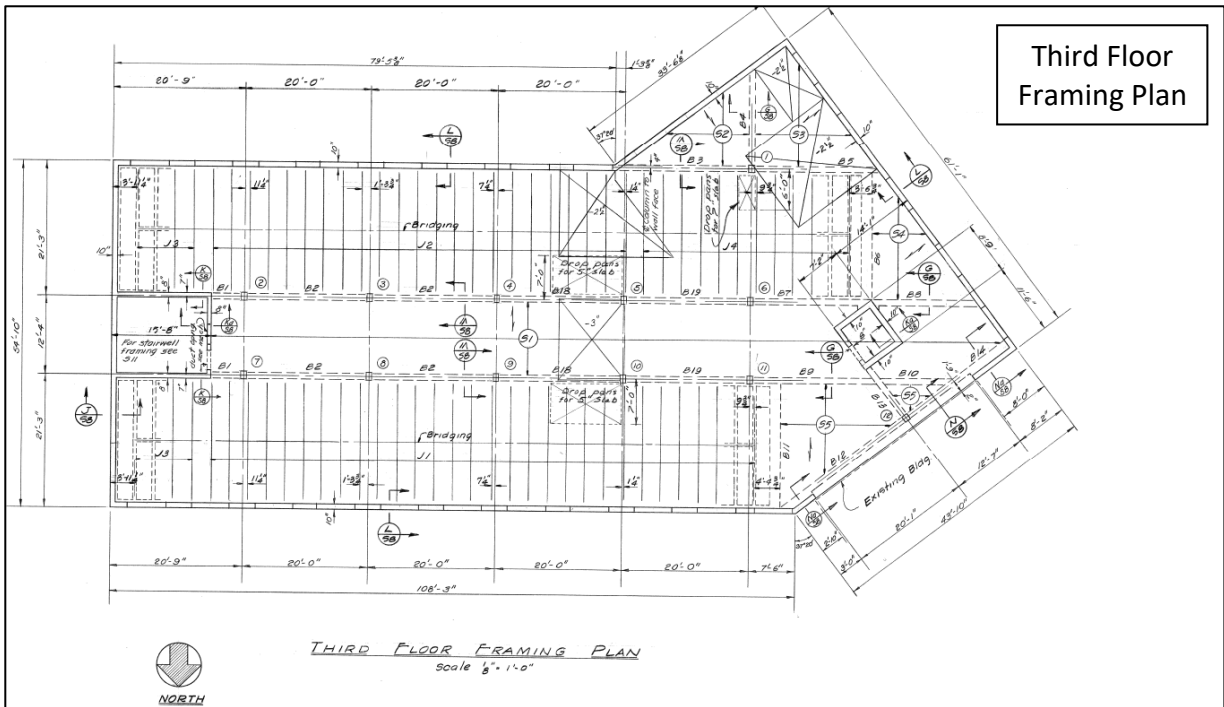
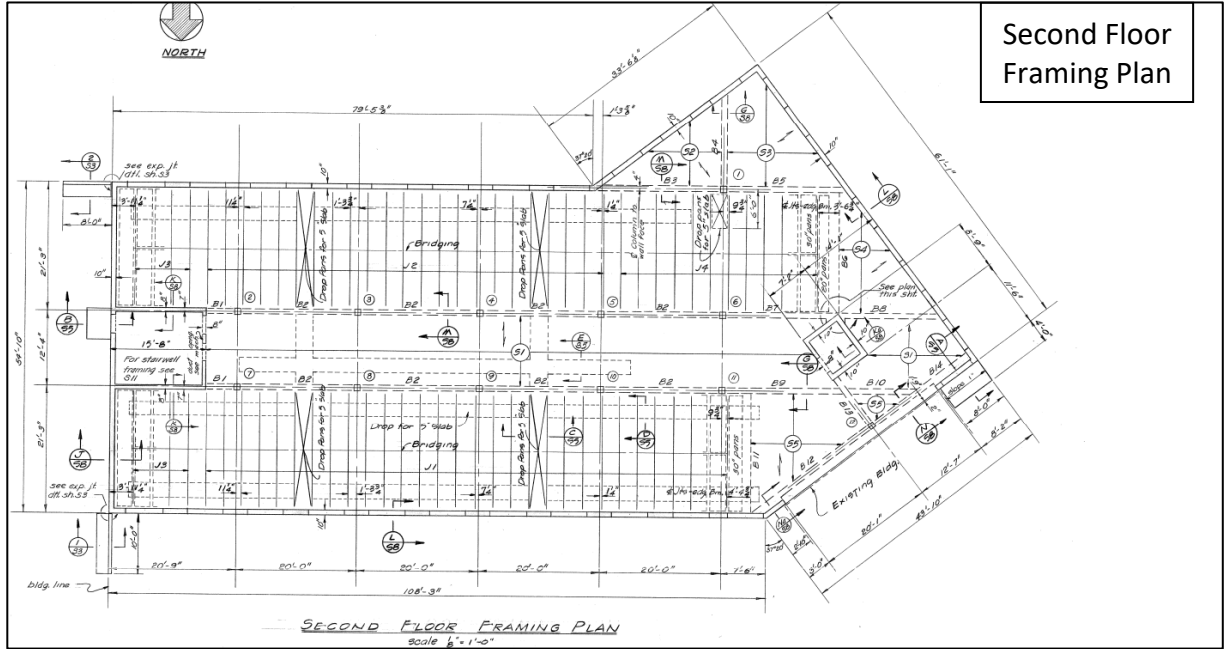
Additional building data	Entry	Notes
Site class	C	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site class basis	Estimated	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site parameters $F_a, F_v$	1.2, 1.4	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Ground motion parameters $S_{cs}, S_{c1}$	1.843, 0.847	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
$S_o$ at building period	1.843	Calculated
Site $V_{s30}$	360 m/s	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
$V_{s30}$ basis	Estimated	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
Liquefaction potential	No	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
Liquefaction assessment basis	Estimated	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
Landslide potential	No	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
Landslide assessment basis	Sloping Site	Rutherford + Chekene Study, 2006
Active fault-rupture hazard identified at site?	No	UCSF Group 2 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site-specific ground motion study?	No	
<b>Applicable code</b>		
Applicable code or approx. date of original construction	Original Building Drawings Dated 1957	
Applicable code for partial retrofit	None	No partial retrofit known
Applicable code for full retrofit	None	No full retrofit known
<b>Model building data</b>		
Model building type North-South	C2	
Model building type East-West	C2	
FEMA P-154 score	N/A	Not included here because we performed ASCE 41 Tier 1 evaluation.
<b>Previous ratings</b>		
Most recent rating	IV	UCSF Building Seismic Survey and Ratings
Date of most recent rating	-	2013
2 <sup>nd</sup> most recent rating	-	
Date of 2 <sup>nd</sup> most recent rating	-	
<b>Appendices</b>		
ASCE 41 Tier 1 checklist included here?	Yes	Refer to attached checklist file



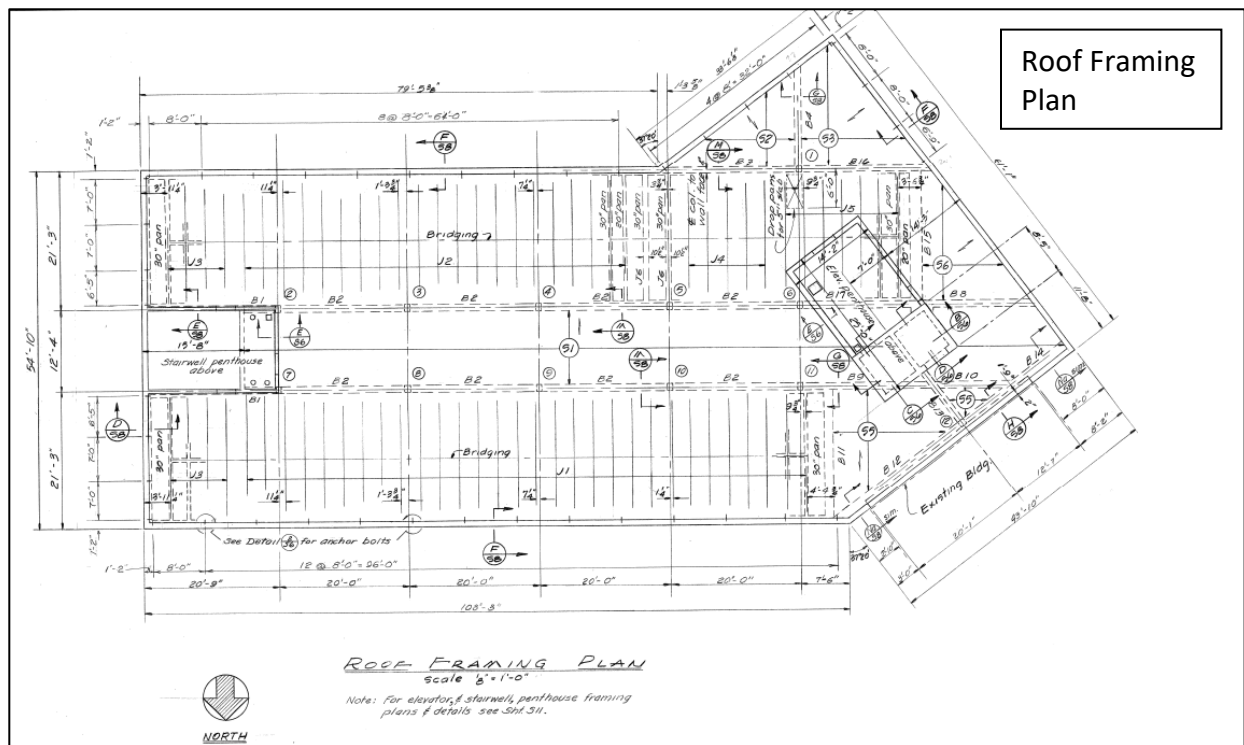
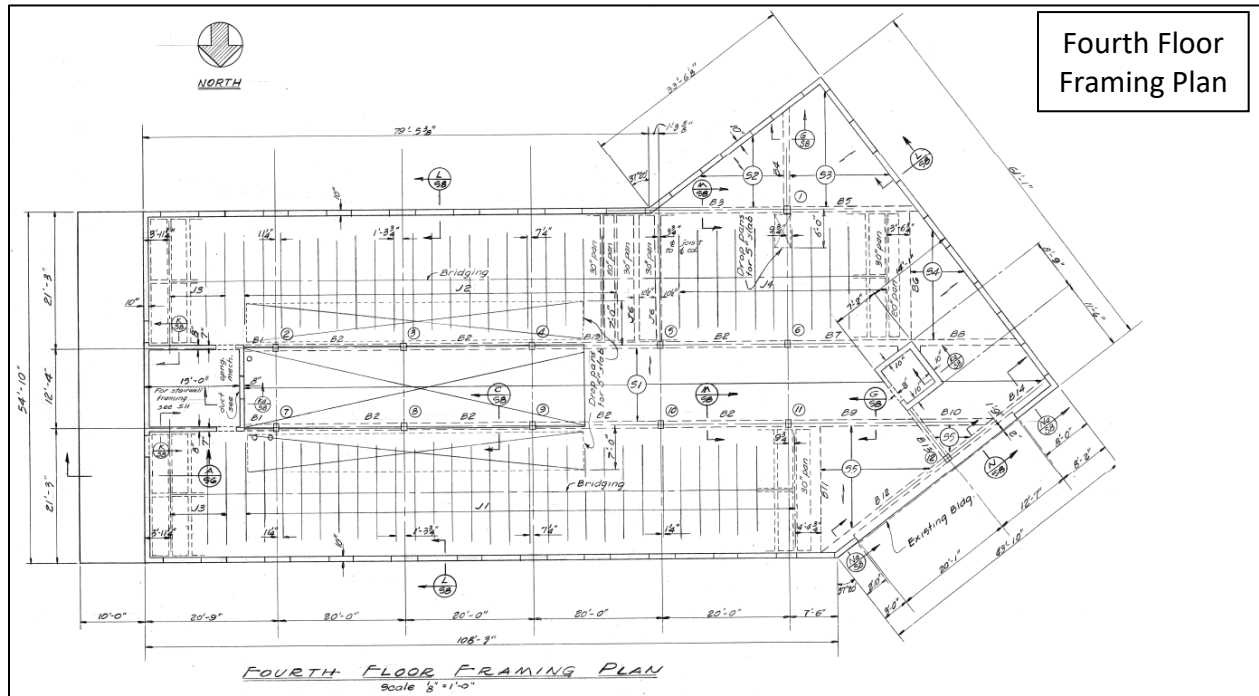
# **Appendix A**

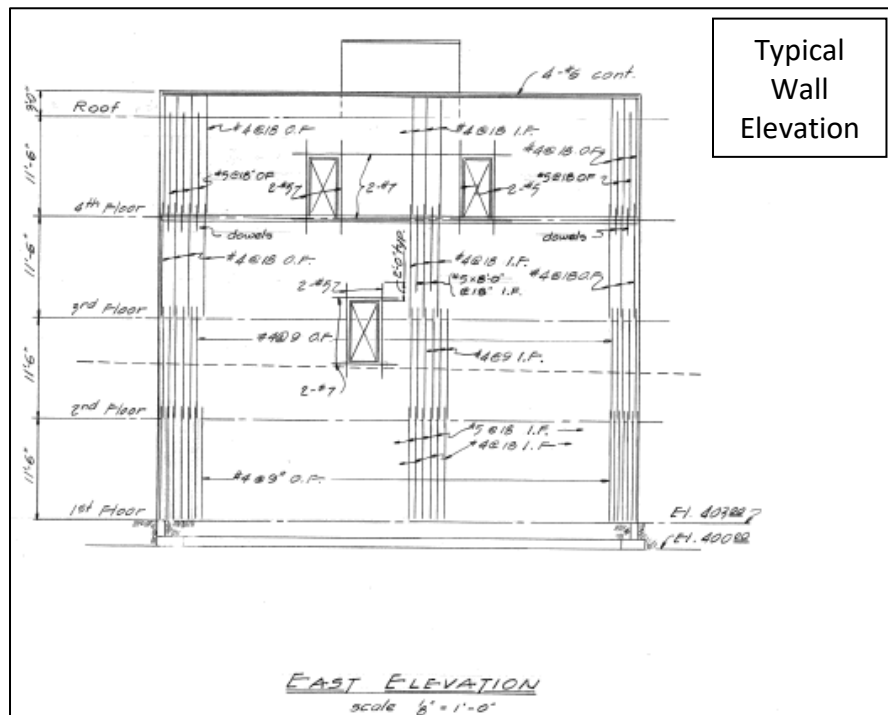
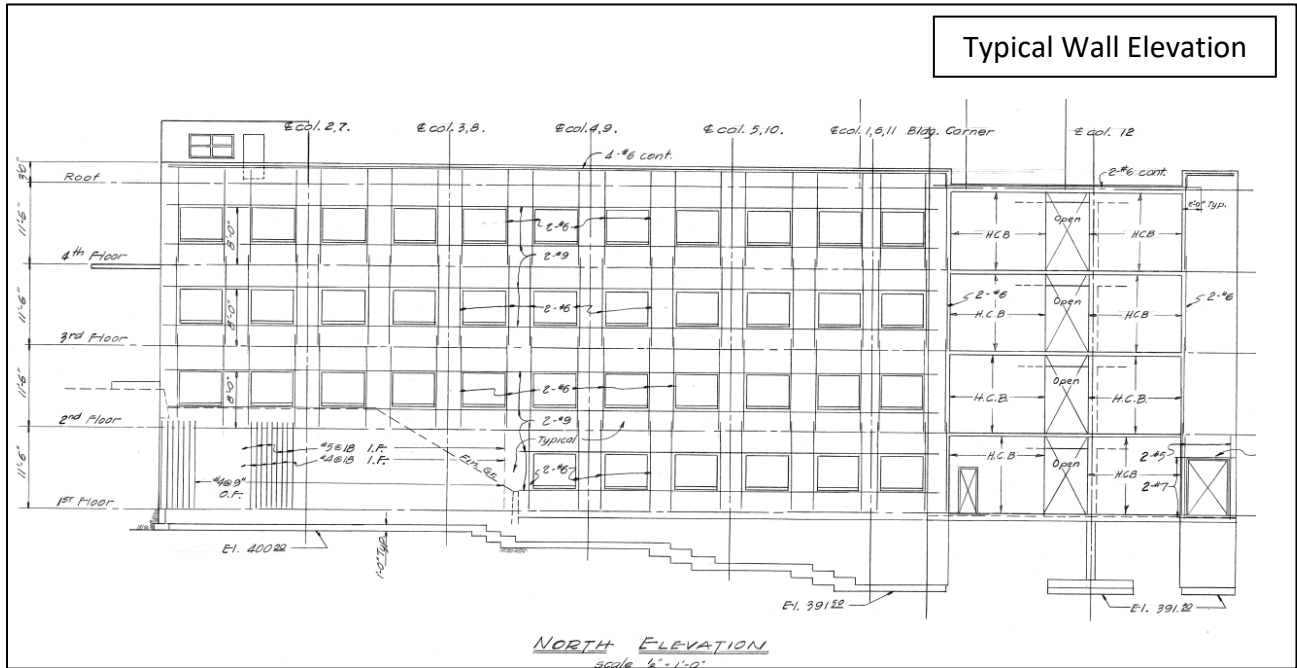
## Drawing Images

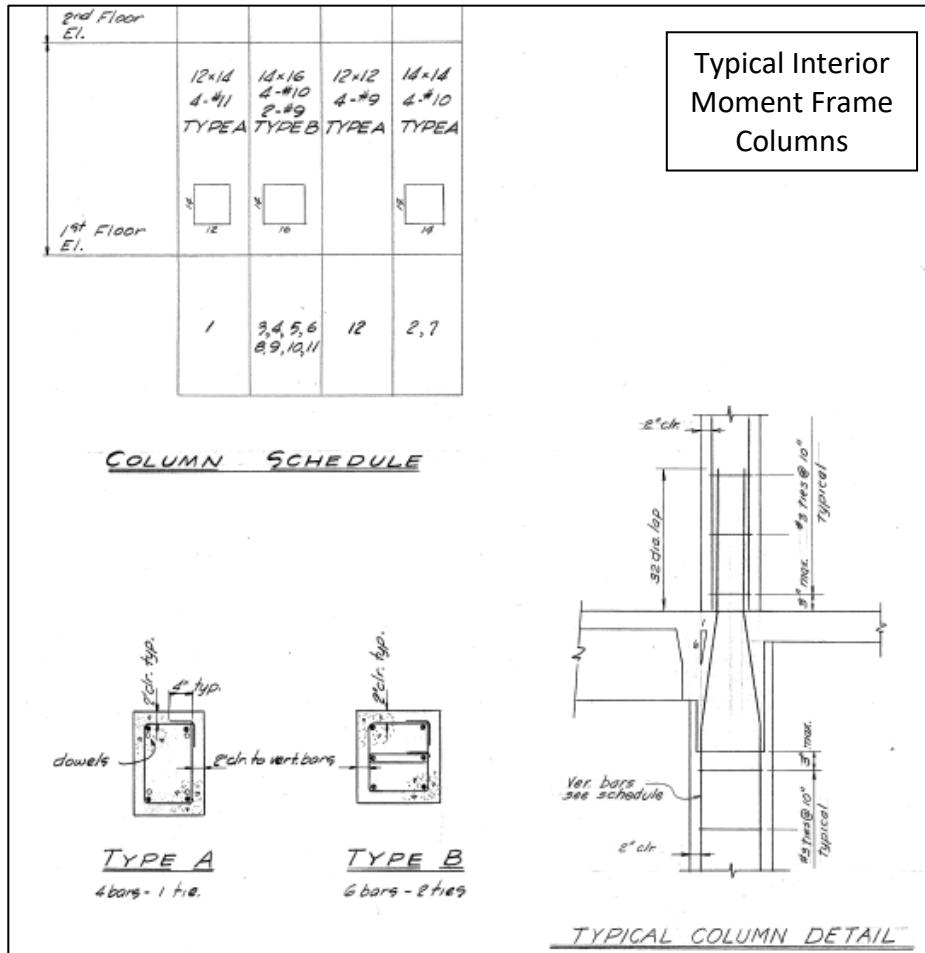














## **Appendix B**

### Checklists

UC Campus:	Parnassus			Date:	01-08-2020		
Building CAAN:	2290	Auxiliary CAAN:		By Firm:	Simpson Gumpertz & Heger		
Building Name:	Langley Porter Psychiatric Hospital and Clinics - Annex, Parnassus Avenue			Initials:	AS	Checked:	KDP
Building Address:	401 Parnassus Avenue, San Francisco, CA 94143			Page:	1	of	3

## ASCE 41-17 Collapse Prevention Basic Configuration Checklist

### LOW SEISMICITY

#### BUILDING SYSTEMS - GENERAL

	Description
<b>C NC N/A U</b> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p><b>Comments: Concrete diaphragms transfer loads to the walls, and the walls transfers load to the foundations.</b></p>
<b>C NC N/A U</b> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p><b>Comments: 2 inch gap between the two buildings, which is only 0.3 % . However the buildings are of same height with same floor elevations.</b></p>
<b>C NC N/A U</b> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	<p>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)</p> <p><b>Comments: No mezzanines.</b></p>

#### BUILDING SYSTEMS - BUILDING CONFIGURATION

	Description
<b>C NC N/A U</b> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p><b>Comments: Shear strength in a story is greater or similar to the story above.</b></p>
<b>C NC N/A U</b> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p><b>Comments: Walls and frames are of similar geometry and configuration from story to story.</b></p>

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

UC Campus:	Parnassus			Date:	13 April 2020		
Building CAAN:	2290	Auxiliary CAAN:		By Firm:	Simpson Gumpertz & Heger		
Building Name:	Langley Porter Psychiatric Hospital and Clinics - Annex, Parnassus Avenue			Initials:	AS	Checked:	KDP
Building Address:	401 Parnassus Avenue, San Francisco, CA 94143			Page:	2	of	3

## ASCE 41-17 Collapse Prevention Basic Configuration Checklist

<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: All vertical elements continuous to foundation.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: The wall lengths and floor plans are fairly consistent over the height.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: The mass does not change more than 10% on any adjacent levels except for the penthouse.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: Perimeter walls and almost rectangular shape.</b></p>

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

#### GEOLOGIC SITE HAZARD

	Description
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: Liquefaction potential is negligible.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: Slope failure not likely to affect the building.</b></p>

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Building CAAN:	2290	Auxiliary CAAN:		By Firm:	Simpson Gumpertz & Heger		
Building Name:	Langley Porter Psychiatric Hospital and Clinics - Annex, Parnassus Avenue			Initials:	AS	Checked:	KDP
Building Address:	401 Parnassus Avenue, San Francisco, CA 94143			Page:	3	of	3

## 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

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<b>Comments: Faults are adequately distant and do not pose a risk at this site.</b>				

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

#### FOUNDATION CONFIGURATION

				Description
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<b>Comments: Wall lengths are of adequate length.</b>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<b>Comments: Site Class C.</b>				

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Building Address:	401 Parnassus Avenue, San Francisco, CA 94143			Page:	1	of	3

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

Low And Moderate Seismicity							
Seismic-Force-Resisting System							
				Description			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<p>COMPLETE FRAMES: Steel or concrete frames classified as secondary components form a complete vertical-load-carrying system. (Commentary: Sec. A.3.1.6.1. Tier 2: Sec. 5.5.2.5.1)</p> <p><b>Comments: The joists and beams are supported by walls and columns.</b></p>			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<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><b>Comments: There are two lines of shear walls, one at each end on the perimeter.</b></p>			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<p>SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the greater of 100 lb/in.<sup>2</sup> (0.69 MPa) or <math>2\sqrt{f'_c}</math>. (Commentary: Sec. A.3.2.2.1. Tier 2: Sec. 5.5.3.1.1)</p> <p><b>Comments: Maximum shear stress is calculated to be 170 lb/in<sup>2</sup> &gt; 100 lb/in<sup>2</sup></b></p>			
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<p>REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area is not less than 0.0012 in the vertical direction and 0.0020 in the horizontal direction. (Commentary: Sec. A.3.2.2.2. Tier 2: Sec. 5.5.3.1.3)</p> <p><b>Comments: Typ. vertical and horizontal is 0.003 and 0.0028 for 8" and 10" wall respectively.</b></p>			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Connections							
				Description			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<p>WALL ANCHORAGE AT FLEXIBLE DIAPHRAGMS: Exterior concrete or masonry walls that are dependent on flexible diaphragms for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)</p> <p><b>Comments: Diaphragms are concrete.</b></p>			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<p>TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls. (Commentary: Sec. A.5.2.1. Tier 2: Sec. 5.7.2)</p> <p><b>Comments: Joists and beams are connected to the walls.</b></p>			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

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

<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<p>FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation with vertical bars equal in size and spacing to the vertical wall reinforcing directly above the foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)</p> <p><b>Comments: In typical foundation details, dowel same size and spacing as the vertical wall reinforcement is used.</b></p>
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**High Seismicity (Complete The Following Items In Addition To The Items For Low And Moderate Seismicity)**

**Seismic-Force-Resisting System**

	Description
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<p>DEFLECTION COMPATIBILITY: Secondary components have the shear capacity to develop the flexural strength of the components. (Commentary: Sec. A.3.1.6.2. Tier 2: Sec. 5.5.2.5.2)</p> <p><b>Comments: <math>2M_p/L &lt; (V_c + V_s)</math></b></p>
<b>C</b> <input type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input checked="" type="radio"/> <b>U</b> <input type="radio"/>	<p>FLAT SLABS: Flat slabs or plates not part of the seismic-force-resisting system have continuous bottom steel through the column joints. (Commentary: Sec. A.3.1.6.3. Tier 2: Sec. 5.5.2.5.3)</p> <p><b>Comments: No flat slabs in the building.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<p>COUPLING BEAMS: The ends of both walls to which the coupling beam is attached are supported at each end to resist vertical loads caused by overturning. (Commentary: Sec. A.3.2.2.3. Tier 2: Sec. 5.5.3.2.1)</p> <p><b>Comments: Walls are supported vertically at the ends and coupling beams aren't true coupling beams, walls are punched with deep "coupling beams."</b></p>

**Diaphragms (Stiff Or Flexible)**

	Description
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<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><b>Comments: Diaphragms are continuous with no steps.</b></p>
<b>C</b> <input checked="" type="radio"/> <b>NC</b> <input type="radio"/> <b>N/A</b> <input type="radio"/> <b>U</b> <input type="radio"/>	<p>OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)</p> <p><b>Comments: The elevator opening is not adjacent to shear wall. Stair openings are less than 25%.</b></p>

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

UC Campus:	Parnassus			Date:	13 April 2020		
Building CAAN:	2290	Auxiliary CAAN:		By Firm:	Simpson Gumpertz & Heger		
Building Name:	Langley Porter Psychiatric Hospital and Clinics - Annex, Parnassus Avenue			Initials:	AS	Checked:	KDP
Building Address:	401 Parnassus Avenue, San Francisco, CA 94143			Page:	3	of	3

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

Flexible Diaphragms							
				Description			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<b>Comments: Diaphragms are concrete.</b>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<b>Comments: Diaphragms are concrete.</b>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<b>Comments: Diaphragms are concrete.</b>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<b>Comments: Diaphragms are concrete.</b>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Comments: Diaphragms are concrete.</b>			
Connections							
				Description			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	UPLIFT AT PILE CAPS: Pile caps have top reinforcement, and piles are anchored to the pile caps. (Commentary: Sec. A.5.3.8. Tier 2: Sec. 5.7.3.5)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<b>Comments: Foundations are shallow.</b>			

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

# Appendix C

## Tier 1 Calculations

CLIENT UCSF  
SUBJECT LPPI – 4 Story Annex: Flat Load

SHEET NO. \_\_\_\_\_  
PROJECT NO. 197042.00  
DATE 11.18.2019  
BY AS  
CHECKED BY KDP

Typ Floor							Floor Area
Level	Material	Slab (psf)	Beam (psf)	Column (psf)	Seismic (psf)	Gr. Cols (psf)	Remarks
L01-L05	Concrete Floor	-	-	-	-		ref eff. slab weight table
"	Floor Finish (arch.)	5.0	5.0	5.0	5.0		
"	Walls	-	-	-	-		ref. wall weight calculation
"	Columns	-	-	-	-		ref. column weight calculation
"	Ceiling and MEP (From Strl drawing)	5.0	5.0	5.0	5.0		
"	Partition (From structural drawing)	20.0	20.0	20.0	10.0		
"	Miscellaneous	0.0	0.0	0.0	0.0		
<i>Live Loads</i>		<b>60.0</b>	<b>60.0</b>	<b>60.0</b>	-		

**TABLE 1607.1**  
**MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS,  $L_o$ ,**  
**AND MINIMUM CONCENTRATED LIVE LOADS<sup>a</sup>**

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
17. Hospitals		
Corridors above first floor	80	1,000
Operating rooms, laboratories	60	1,000
Patient rooms	40	1,000



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SUBJECT LPPI - 4 story annex: Typ Slab weight

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DATE 11/18/2019

BY AS

CHECKED KDP

Slab Effective Weight		
Floor Type	Effective Thickness (in)	Net Weight (psf)
Type A (J1, J2, J3, J4, J5)	5.1	63.2
Type B (J6)	6.7	84.0
Type C (Type A - 5" slab)	7.1	88.2
Type 1 (S7)	4.5	56.3
Type 2 (S2, 3, 6)	5.0	62.5
Type 3 (S1, 4, 5)	5.5	68.8

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SUBJECT LPPI - 4 Story Annex: Self weight Floor

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Floor	Floor slab type	Net Area sq. ft.	Net weight psf	Total weight kips	
Floor 2	Type A	4478	63.2	283	
	Type B	0	84.0	0	
	Type C	255	88.2	22	
	Type 1	0	56.3	0	
	Type 2	432.8	62.5	27	
	Type 3	2261	68.8	155	
			<b>Length (ft)</b>	<b>Weight (plf)</b>	
	Bridging	226	45.3	10	
	Int. beams	421	300.0	126	
	SUM	7427		624	
Floor 3	Type A	4576	63.2	289	
	Type B	0	84.0	0	
	Type C	157.5	88.2	14	
	Type 1	0	56.3	0	
	Type 2	432.8	62.5	27	
	Type 3	2261	68.8	155	
			<b>Length (ft)</b>	<b>Weight (plf)</b>	
	Bridging	226	45.3	10	
	Int. beams	421	300.0	126	
	SUM	7427		622	
Floor 4	Type A	3844	63.2	243	
	Type B	154	84.0	13	
	Type C	735	88.2	65	
	Type 1	0	56.3	0	
	Type 2	432.8	62.5	27	
	Type 3	2261	68.8	155	
	10' cantilever	549	93.8	514	
			<b>Length (ft)</b>	<b>Weight (plf)</b>	
	Bridging	226	45.3	10	
	Int. beams	421	300.0	126	
SUM	7976		1154		
Roof	Type A	4579	63.2	289	
	Type B	154	84.0	13	
	Type C	0	88.2	0	
	Type 1	0	56.3	0	
	Type 2	614	62.5	38	
	Type 3	2080	68.8	143	
	Penthouse			40	
			<b>Length (ft)</b>	<b>Weight (plf)</b>	
	Bridging	226	45.3	10	
	Int. beams	421	300.0	126	
SUM	7427		660		

Total floor area	30257 sq.ft.
Total floor weight	3060 kip

Partition psf	MEP psf	Floor finish and Misc psf
10	5	5
74	37	37

Partition psf	MEP psf	Floor finish and Misc psf
10	5	5
74	37	37

Partition psf	MEP psf	Floor finish and Misc psf
10	5	5
80	40	40

Partition psf	MEP psf	Floor finish and Misc psf
5	5	5
37	37	37

Partition	MEP	Floor finish and Misc
265	151	151

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SUBJECT Flat Load Table

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PROJECT NO. 197042.00

DATE 11/05/2019

BY AS

CHECKED KDP

Calculations below are used to estimate unit weight of walls per foot

Level	exterior wall elevation	avg height ft	Gross vol wall cu.ft	openings cu.ft	net weight kip	unit load kip/ft
Typical	punched wall	11.5	95.8	19.5	11.5	1.15
	10" wall	11.5	95.8	0	14.4	1.44
	8" wall	11.5	76.7	0	11.5	1.15
Roof	punched wall	8.75	72.9	9.7	9.5	0.95
	10" wall	8.75	72.9	0	10.9	1.09
	8" wall	8.75	58.3	0	8.8	0.88

Column	Level	Height ft	Cross section sq.ft.	net weight kip per Col
	Typ	11.5	1.56	2.68
	Roof	8.75	1.17	1.53

Using the UDL, below is the self weight of walls and columns

	Number of columns	unit weight kip/column	net weight kip
	12	2.68	32

Estimate of exterior wall/column weight			
Floor 2	Total length ft	unit load kip/ft	Net Weight kips
	293.50	1.15	336
	77.92	1.44	112
	51.25	1.15	59
	156 cu.ft.	150 psf	23

no opening zones

	Number of columns	unit weight kip/column	net weight kip
	12	2.68	32

Estimate of exterior wall/column weight			
Floor 3	Total length ft	unit load kip/ft	Net Weight kips
	293.50	1.15	336
	77.92	1.44	112
	51.25	1.15	59
	88 cu.ft.	150 psf	13

no opening zones

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SUBJECT Flat Load Table

SHEET NO. \_\_\_\_\_

PROJECT NO. 197042.00

DATE 11/05/2019

BY AS

CHECKED KDP

	Number of columns	unit weight kip/column	net weight kip
	12	2.68	32
<b>Estimate of exterior wall/column weight</b>			
Floor 4	<b>Total length ft</b>	<b>unit load kip/ft</b>	<b>Net Weight kips</b>
	293.50	1.15	336
	77.92	1.44	112
	51.25	1.15	59
	88 cu.ft.	150 psf	13

no opening zones

	Number of columns	unit weight kip/column	net weight kip
	12	1.53	18
<b>Estimate of exterior wall/column weight</b>			
Roof	<b>Total length ft</b>	<b>unit load kip/ft</b>	<b>Net Weight kips</b>
	293.50	0.95	278
	77.92	1.09	85
	51.25	0.88	45

Total weight of vertical elements	2094 kips
-----------------------------------	-----------

Seismic Weight per Floor

Floor	Weight kips	Total Seismic Weight kips	(10% added for staircase and other unaccounted items)
Floor 2	1336	1469	
Floor 3	1323	1455	
Floor 4	1866	2052	
Roof	1198	1318	
Total Seismic Weight		6295	

Total Self weight of the building	5670 kips
Partition	292 kips
MEP	166 kips
Floor finish	166 kips
<b>Net Seismic Weight</b>	<b>6,295 kips</b>



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SUBJECT LPPI - 4 Story Annex: General building information

SHEET NO. \_\_\_\_\_

PROJECT NO. 197042.00

DATE 11/19/2019

BY AS

CHECKED KDP

General Building Information			
	Value	Units	Reference Document
Total building height	46.0	ft	Including penthouse
Effective Seismic Weight	6295	kips	
Compliance (per CBC)			2016 CBC 3412A.2.3
Structural Performance Level	S-5	BSE - C	2019 CBC Table 317.5
Non-structural	N-D		
Lateral System per ASCE 41	C2		
Risk Category	III		CBC 1604.5
$S_{XS, BSE-C}$	1.843	g	
$S_{X1, BSE-C}$	0.847	g	
Site Class	C		
Ct	0.02		
beta	0.75		
height	46	ft	Including penthouse
Time Period T	0.35	s	
Sa	1.843	g	
C	1		ASCE 41-17, Table 4-7
Base Shear	11601	kips	Base Shear

Floor	Wi kip	(hi) <sup>k</sup> ft	Wi (hi) <sup>k</sup>	Cvi	Fi kip	Vi kip
Roof	1318	11.5	15155.5	0.21	2,429	2,429
Floor 4	2052	11.5	23601.8	0.33	3,782	6,211
Floor 3	1455	11.5	16734.9	0.23	2,682	8,893
Floor 2	1469	11.5	16895.1	0.23	2,708	11,601
			72387.3	1.00	11,601	

\*K = 1 for 6 stories or lower per 4.4.2.2

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SUBJECT LPPI - 4 Story Annex: General building information

SHEET NO. \_\_\_\_\_

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CHECKED KDP

Shear Stress in Shear Walls  
per ASCE 41-17 4.4.3.3

Ms 4.5

Floor	Story Shear at level j ( $V_j$ ) kips	N-S Loading		E-W Loading	
		Area sq.ft	$v_j^{avg}$ ksi	length of wall ft	$v_j^{avg}$ ksi
Roof	2,429	84.8	0.04	113	0.03
Floor 4	6,211	98.3	0.10	124	0.08
Floor 3	8,893	89.6	0.15	113	0.12
Floor 2	11,601	103.1	0.17	190	0.09

ok

ok

NG

NG

ok

ok

NG

ok

**Column Shear Capacity Check**

**Square Columns**

side in	vertical bars	bar size in	Mpr k-ft	2Mp/L	Vc kips	Av sq in	spacing in	Vs kips	V kips	
14	4	1.25	115	24.2	16.1	0.22	10	10.2	26.3	ok
12	4	1.125	71	14.9	10.2	0.22	10	8.7	18.9	ok

**Rectangular Columns**

L	16	6	1.25	150	31.6	18.9	0.44	10	23.2	42.1	ok
B	14		1.125	150	31.6	18.4	0.44	10	20.3	38.7	ok

