ASCE 41-13 Tier 1 Seismic Evaluation of

NW Natural – Astoria Service Center

176 West Marine Drive
Astoria, OR 97103

August 5, 2016
KPFF Project No. 1600122

NW Natural – Astoria Service Center
ASCE 41-13 Tier 1 Seismic Evaluation

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Introduction

This report is to summarize the findings of our seismic evaluation of the NW Natural Astoria Service Center located at 176 West Marine Drive in Astoria, OR. The evaluation was performed using the procedures of ASCE 41-13 "Seismic Evaluation and Retrofit of Existing Buildings." Please note that this evaluation only relates to the seismic performance of the structure. It does not address issues related to gravity framing.

Scope and Intent

KPFF Consulting Engineers was contracted to perform a Tier 1 seismic evaluation of the NW Natural Astoria Service Center located in Astoria, Oregon. This evaluation is based on a site visit that was completed on May 18, 2016, and upon the procedures of ASCE 41-13 "Seismic Evaluation and Retrofit of Existing Buildings." The intent of the evaluation is to determine if the structure meets the acceptance criteria of the Basic Performance Objective for Existing Buildings (BPOE). For this evaluation, the building was considered a Risk Category II building (i.e. a standard building occupancy) as defined by the International Building Code and the Oregon Structural Specialty Code. Therefore, the BPOE requires meeting the Life Safety Structural Performance level at the BSE-1E seismic hazard level, and the Life Safety Nonstructural Performance level also at the BSE-1E seismic hazard level. The City of Portland, chapter 24.85, stipulates that the BSE-1E seismic hazard level shall not be taken as less than 75 percent of the BSE-1N seismic hazard level. This City of Portland requirement is being applied to all NW Natural evaluations as to provide a consistent evaluation process across all locations. Life Safety, BSE-1E, and BSE-1N are defined as follows:

- Life Safety is a structural performance level in which a structure has significantly damaged components but retains a margin against the onset of partial or total collapse. It is possible that the structure will be damaged to the extent that it is not practical to repair and re-occupy the building.

- BSE-1E is a seismic hazard level that represents an earthquake that has a probability of exceedance of 20% in a 50 year period. This can also be thought of as an earthquake that is not expected to be exceeded in a 225 year return period.

- BSE-1N is two thirds of a seismic hazard level that represents an earthquake that has a probability of exceedance of 2% in a 50 year period multiplied by a risk coefficient. This can also be thought of as two thirds of the ground acceleration of an earthquake that is not expected to be exceeded in a 2,475 year return period.

Site and Building Data

The NW Natural Astoria Service Center, located at 176 West Marine Drive in Astoria, Oregon, was originally constructed circa 1945. The overall building measures approximately 98 feet in the east-west direction by 77 feet in the north-south direction. The south face of the

building is canted such that the building is only 41 feet in the north-south direction at the west face. The south portion of the building is two stories, with the majority of the lower floor being below grade. The north portion of the building is primarily a single, tall story that functions as a warehouse. The building is approximately 10,500 square feet total.

The interior floors and ceilings are primarily wood-framed with wood bearing walls, wood beams, wood joists, and straight sheathing. A portion of the lower floor that housed large tanks is framed with concrete slabs supported by either concrete walls or concrete columns. The roof, over both the two-story office portion and the one-story warehouse, is frames with wood beams, wood joists, and straight sheathing. The exterior walls are cast-in-place concrete as serve as bearing walls. The basement floor and warehouse floor are concrete slabs on grade. The foundations consist of conventional concrete spread and strip footings. In general, the structure appeared to be in poor condition with areas of cracked/spalled concrete, cracked partition walls, and damaged corbels observed.

The lateral force resisting system consists of the wood diaphragms at the floor and roof levels along with the exterior concrete walls acting as shear walls.

In the 1981, a renovation added a new CMU wall entry vestibule and replaced some of the existing wood bearing walls with a steel post and beam system. Seismic improvements were not included in this work.

List of Criteria Used for Analysis

A geotechnical investigation was not performed for this evaluation. It was assumed that classification of the soils at the site as Site Class D and the following ground motions were used for the analysis:

Parameter	Value	Comments
$S_{X1,\ BSE\text{-}1E}$	0.503 g	Design spectral response acceleration parameter at 1 second for the BSE-1E seismic hazard level. (Includes the minimum of 75% of BSE-1N values)
$S_{XS,\ BSE\text{-}1E}$	0.656 g	Design short-period (0.2 seconds) spectral response acceleration parameter for the BSE-1E seismic hazard Level. (Includes the minimum of 75% of BSE-1N values)
T	0.170 s	Building fundamental period, as defined in Section 4.5.2.4.
S_a	0.656 g	Response spectral acceleration parameter. S_a = Minimum of ($S_{XS,\ BSE\text{-}1E}$ and $S_{X1,\ BSE\text{-}1E}$ / T)

The Level of Seismicity for the structure is therefore considered to be “High” as defined by Section 2.5 of ASCE 41. Please reference the full summary of the evaluation assumptions listed in the appendix.

Findings

The building was evaluated using the Tier 1 checklists, including the "Life Safety Non-structural Checklist," as required in Section 4.4 of ASCE 41-13. The building in its existing condition does not meet the requirements of the Basic Performance Objective for Existing Buildings (i.e. Life Safety structural performance at the BSE-1E, or three-quarters of BSE-1N, seismic hazard level, as amended by the City of Portland Chapter 24.85). The following table summarizes the deficiencies that were identified for the building per the Tier 1 checklists. Reference Appendix A for the summary data sheet and completed checklists.

Structural Deficiencies

No.	Item	Tier 1 Ref.	Comments
1	Wall Anchorage	A.5.1.1	The floor and roof diaphragms are only nominally connected to the exterior concrete walls. This could lead to the wall pulling away from the floor and losing vertical support.
2	Complete Frames	A.3.1.6.1	The exterior concrete walls support gravity loads but are not adequate to also resist seismic loads. This could lead to a loss of vertical support of the floors/roof.
3	Shear Stress Check	A.3.2.2.1	The exterior concrete walls are over-stressed and are not able to resist the anticipated seismic loads.
4	Reinforcing Steel	A.3.2.2.2	The concrete walls are only very minimally reinforced.
5	Transfer to Shear Walls	A.5.2.1	The diaphragms are not adequately connected to the exterior concrete shear walls to transfer the anticipated seismic loads.
6	Deflection Compatibility	A.3.1.6.2	The interior concrete columns and framing do not have the ability to accommodate the amount of displacement/drift that is anticipated for the building.
7	Cross Ties	A.4.1.2	The wood diaphragms do not have tension elements that will adequately connect the exterior walls for out-of-place forces.
8	Straight Sheathing	A.4.2.1	The wood diaphragms, which consist of straight sheathing, lack adequate capacity to resist the anticipated seismic loads.
9	Spans (Diaphragms)	A.4.2.2	The wood diaphragms lack adequate capacity to resist the anticipated seismic loads due to the length of the spans.
10	Diagonally Sheathed and Unblocked Diaphragms	A.4.2.3	The wood diaphragms lack adequate capacity to resist the anticipated seismic loads.

Note: While the structural deficiencies are identified in the table above, the following is a list of structural unknowns that may contain noncompliant items if evaluation was possible.

Structural Unknowns

No.	Item	Tier 1 Ref.	Comments
1	Liquefaction	A.6.1.1	A geotechnical report was not available for review. However, the Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Viewer does provide information on site hazards. Per DOGAMI's Hazard Viewer, this building site has a "high" earthquake liquefaction hazard.
2	Slope Failure	A.6.1.2	A geotechnical report was not available for review. However, the Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Viewer does provide information on site hazards. Per DOGAMI's Hazard Viewer, this building site has a "moderate" landslide hazard.
3	Surface Fault Rupture	A.6.1.3	A geotechnical report was not available for review. However, the Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Viewer does provide information on site hazards. Per DOGAMI's Hazard Viewer, there are no identified active faults located immediately adjacent to the site.

Nonstructural Deficiencies

No.	Item	Tier 1 Ref.	Comments
1	Shut-Off Valves	A.7.13.3	It did not appear that the gas lines have a shut-off valve.
2	Flexible Couplings	A.7.15.4	It did not appear that the gas lines have flexible couplings.
3	Drift (Partitions)	A.7.1.2	Lath and plaster partitions were observed that did not have a gap to accommodate movement. Damaged partitions could collapse.
4	Suspended Lath and Plaster (Ceilings)	A.7.2.3	Lath and plaster ceilings were observed. These ceilings were not braced or jointed to accommodate movement and could collapse.
5	Canopies	A.7.8.2	While not technically a canopy, the entry vestibule structure at the west side appears unbraced. If damaged, it could block building egress.
6	Industrial Storage Racks	A.7.11.1	Some instances of tall storage racks over 12 feet tall that were not braced were observed.
7	Tall Narrow Contents	A.7.11.2	Some instances of tall, narrow contents were observed. These elements are susceptible to over-turning.
8	Fall-Prone Contents	A.7.11.3	Some instances of contents were observed on high shelves that were not restrained.

No.	Item	Tier 1 Ref.	Comments
9	Fall-Prone Equipment	A.7.12.4	Some instances of equipment were observed on high shelves that were not restrained.

Conceptual Seismic Upgrade Work

The structure in its current state has many significant seismic deficiencies, both structural and non-structural. In order to mitigate these deficiencies, a comprehensive upgrade would be required that would include new foundations, new seismic force resisting elements such as concrete shear walls or braced frames, diaphragm strengthening, and providing positive connections between the walls and diaphragms. This work would be quite extensive and would likely have a significant impact on the non-structural components. It may be most effective to remove and replace many of the non-structural components as part of a holistic seismic upgrade.

Based on our experience with seismic upgrades of similar buildings, the probable cost of an upgrade of this type related to direct structural costs would be less than approximately $35 - $40 per square foot. This does not include costs associated with nonstructural deficiencies, soft costs, impacts to architectural or mechanical, electrical, and plumbing (M/E/P) systems, business interruption, etc. It is assumed that an M/E/P designer or contractor would address costs associated with the identified nonstructural deficiencies.

Summary

This ASCE 41-13 Tier 1 seismic evaluation was prepared for the NW Natural – Astoria Service Center. It was found that the aforementioned building, in its current state, does not achieve the desired seismic performance objective for Life Safety Structural Performance at the BSE-1E seismic hazard or 0.75 x BSE-1N seismic hazard as amended by the City of Portland's Chapter 24.85.

The building also does not achieve the desired seismic performance objective for Life Safety Nonstructural Performance at the same seismic hazard as stated above.

It is our opinion that conventional seismic upgrade work could be employed to reduce/mitigate this seismic risk. However, this upgrade work would be quite extensive and have a large impact on the building's structural and non-structural systems.

It should also be noted that while not explicitly checked by the methodologies in ASCE 41-13, the building is in an area that is highly susceptible to damage from a tsunami that would be associated with an earthquake due to the Cascadia Subduction Zone.

Appendix

ASCE 41-13 Summary Data Sheet and Checklists

Appendix C: Summary Data Sheet

BUILDING DATA

Building Name: NW Natural - Astoria Service Center Date: 8/3/2016
Building Address: 176 W Marine Dr., Astoria, OR
Latitude: 46.1906 Longitude: -123.8468 By: MWT

Year Built: circa 1945 Year(s) Remodeled: 1981 Original Design Code: Unknown
Area (sf): 10,500 Length (ft): 98 Width (ft): 77
No. of Stories: 2 Story Height: approx. 9 ft. Total Height: approx. 22 ft.

USE ☐ Industrial ☑ Office ☑ Warehouse ☐ Hospital ☐ Residential ☐ Educational ☐ Other: _____

CONSTRUCTION DATA

Gravity Load Structural System: Wood frame, concrete bearing walls, steel posts, areas of concrete slabs
Exterior Transverse Walls: Cast in place concrete Openings? Yes
Exterior Longitudinal Walls: Cast in place concrete Openings? Yes
Roof Materials/Framing: Wood framed, straight sheathing
Intermediate Floors/Framing: Wood framed, some areas of concrete slab
Ground Floor: slab on grade
Columns: Wood and Steel Posts Foundation: Spreads
General Condition of Structure: Poor - damaged corbels, spalled concrete, cracked partition walls, etc.
Levels Below Grade? Day-lit basement
Special Features and Comments: None

LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	C2 - Concrete Shear Walls	C2 - Concrete Shear Walls
Vertical Elements:	Concrete shear walls	Concrete shear walls
Diaphragms:	Primarily wood	Primarily wood
Connections:	Minimal	Minimal

EVALUATION DATA

Soil Factors: Class= D
BSE-1E Spectral Response Accelerations: S_{XS}= 0.656 S_{X1}= 0.503
Level of Seismicity: High Performance Level: Life Safety
Building Period: T= 0.20
Spectral Acceleration: S_a= 0.656
Modification Factor: $C_mC_1C_2$= C = 1.2 Building Weight: W= 680 k
Pseudo Lateral Force: $V = C_mC_1C_2S_aW$= 540 k

BUILDING CLASSIFICATION: C2

REQUIRED TIER 1 CHECKLISTS

	Yes	No
Basic Configuration Checklist	☑	☐
Building Type C2 Structural Checklist	☑	☐
Nonstructural Component Checklist	☑	☐

FURTHER EVALUATION REQUIREMENT: _____

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ASCE 41-13 Tier 1 Checklists

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SEISMICITY LEVEL:	High
PROJECT NUMBER:	1600122
COMPLETED BY:	MWT
DATE COMPLETED:	August 3, 2016
REVIEWED BY:	IKE
REVIEW DATE:	August 5, 2016

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

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16.1 Basic Checklist

Very Low Seismicity

Structural Components

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☒	☐	☐	☐	LOAD PATH: The structure shall contain 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)	
C	NC	N/A	U		
☐	☒	☐	☐	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.5.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)	Existing drawings indicate only minimal connections.

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Project Number 1600122

16.1.2LS Life Safety Basic Configuration Checklist

Low Seismicity

Building System

General

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☒	☐	☐	☐	LOAD PATH: The structure shall contain 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)	
C	NC	N/A	U		
☒	☐	☐	☐	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 4% of the height of the shorter building. This statement need not apply for the following building types: W1, W1A, and W2. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)	
C	NC	N/A	U		
☐	☐	☒	☐	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)	None present.

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Building Configuration

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☒	☐	☐	☐	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)	
C	NC	N/A	U		
☒	☐	☐	☐	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)	
C	NC	N/A	U		
☒	☐	☐	☐	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)	
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)	

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C	NC	N/A	U		
☒	☐	☐	☐	MASS: There is no change in effective mass 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)	
☒	☐	☐	☐	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)	

Moderate Seismicity

Geologic Site Hazards

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 ft under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1)	Based on a review of DOGAMI's hazard maps.
☒	☐	☐	☐	SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be 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)	

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C	NC	N/A	U		
☒	☐	☐	☐	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)	Based on a review of DOGAMI's hazard maps.

High Seismicity

Foundation Configuration

RATING				DESCRIPTION	COMMENTS
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)	
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)	

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ASCE 41-13 Tier 1 Checklists

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16.10LS Life Safety Structural Checklist for Building Types C2: Concrete Shear Walls with Stiff Diaphragms and C2A: Concrete Shear Walls with Flexible Diaphragms

Low and Moderate Seismicity

Seismic-Force-Resisting System

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	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)	Exterior concrete shear walls support gravity loads.
C	NC	N/A	U		
☒	☐	☐	☐	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)	
C	NC	N/A	U		
☐	☒	☐	☐	SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than the greater of 100 lb/in.^{2} or $2\sqrt{f'_c}$. (Commentary: Sec. A.3.2.2.1. Tier 2: Sec. 5.5.3.1.1)	Limited amount of concrete shear wall.
C	NC	N/A	U		
☐	☒	☐	☐	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)	Existing drawings indicated bar spacing as large as 36" o.c.

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Connections

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	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 adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.5.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)	Drawings show only minimal connections.
C	NC	N/A	U		
☐	☒	☐	☐	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)	Drawings do not indicate a positive connection, which is common for the building's era.
C	NC	N/A	U		
☒	☐	☐	☐	FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation with vertical bars equal in size and spacing to the vertical wall reinforcing immediately above the foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)	

High Seismicity

Seismic-Force-Resisting System

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	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)	

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C	NC	N/A	U		
☒	☐	☐	☐	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)	Appears compliant per existing drawings.
☐	☐	☒	☐	COUPLING BEAMS: The stirrups in coupling beams over means of egress are spaced at or less than *d*/2 and are anchored into the confined core of the beam with hooks of 135 degrees or more. 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)	None Present.

Connections

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	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)	None Present.

Diaphragms (Flexible or Stiff)

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☒	☐	☐	☐	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)	

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C	NC	N/A	U		
☒	☐	☐	☐	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)	

Flexible Diaphragms

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)	
C	NC	N/A	U		
☐	☒	☐	☐	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)	
C	NC	N/A	U		
☐	☒	☐	☐	SPANS: All wood diaphragms with spans greater than 24 ft consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	

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C	NC	N/A	U		
☐	☒	☐	☐	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)	
C	NC	N/A	U		
☒	☐	☐	☐	OTHER DIAPHRAGMS: The diaphragm does 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)	

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16.17 Nonstructural Checklist

The Performance Level is designated LS for Life Safety or PR for Position Retention. The level of seismicity is designated as "not required" or by L, M, or H, for Low, Moderate, and High.

All Seismicity Levels

Life Safety Systems

RATING				DESCRIPTION	COMMENTS
C ☐	NC ☐	N/A ☒	U ☐	LS-LMH; PR-LMH. FIRE SUPPRESSION PIPING: Fire suppression piping is anchored and braced in accordance with NFPA-13. (Commentary: Sec. A.7.13.1. Tier 2: Sec. 13.7.4)	None present.
C ☐	NC ☐	N/A ☒	U ☐	LS-LMH; PR-LMH. FLEXIBLE COUPLINGS: Fire suppression piping has flexible couplings in accordance with NFPA-13. (Commentary: Sec. A.7.13.2. Tier 2: Sec. 13.7.4)	None present.
C ☐	NC ☐	N/A ☒	U ☐	LS-LMH; PR-LMH. EMERGENCY POWER: Equipment used to power or control life safety systems is anchored or braced. (Commentary: Sec. A.7.12.1. Tier 2: Sec. 13.7.7)	None present.
C ☐	NC ☐	N/A ☒	U ☐	LS-LMH; PR-LMH. STAIR AND SMOKE DUCTS: Stair pressurization and smoke control ducts are braced and have flexible connections at seismic joints. (Commentary: Sec. A.7.14.1. Tier 2: Sec. 13.7.6)	None present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. SPRINKLER CEILING CLEARANCE: Penetrations through panelized ceilings for fire suppression devices provide clearances in accordance with NFPA-13. (Commentary: Sec. A.7.13.3. Tier 2: Sec. 13.7.4)	None present.
☐	☐	☒	☐	LS-not required; PR-LMH. EMERGENCY LIGHTING: Emergency and egress lighting equipment is anchored or braced. (Commentary: Sec. A.7.3.1. Tier 2: Sec. 13.7.9)	This check is not required for the Life Safety Performance Level.

Hazardous Materials

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers. (Commentary: Sec. A.7.12.2. Tier 2: 13.7.1)	None present.
☐	☐	☒	☐	LS-LMH; PR-LMH. HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires, or other methods. (Commentary: Sec. A.7.15.1. Tier 2: Sec. 13.8.4)	None present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release. (Commentary: Sec. A.7.13.4. Tier 2: Sec. 13.7.3 and 13.7.5)	None present.
☐	☒	☐	☐	LS-MH; PR-MH. SHUT-OFF VALVES: Piping containing hazardous material, including natural gas, has shut-off valves or other devices to limit spills or leaks. (Commentary: Sec. A.7.13.3. Tier 2: Sec. 13.7.3 and 13.7.5)	
☐	☒	☐	☐	LS-LMH; PR-LMH. FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, has flexible couplings. (Commentary: Sec. A.7.15.4, Tier 2: Sec.13.7.3 and 13.7.5)	
☐	☐	☒	☐	LS-MH; PR-MH. PIPING OR DUCTS CROSSING SEISMIC JOINTS: Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A.7.13.6. Tier 2: Sec.13.7.3, 13.7.5, and 13.7.6)	None present.

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Partitions

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. UNREINFORCED MASONRY: Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft in Low or Moderate Seismicity, or at most 6 ft in High Seismicity. (Commentary: Sec. A.7.1.1. Tier 2: Sec. 13.6.2)	None present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. HEAVY PARTITIONS SUPPORTED BY CEILINGS: The tops of masonry or hollow-clay tile partitions are not laterally supported by an integrated ceiling system. (Commentary: Sec. A.7.2.1. Tier 2: Sec. 13.6.2)	None present.
C	NC	N/A	U		
☐	☒	☐	☐	LS-MH; PR-MH. DRIFT: Rigid cementitious partitions are detailed to accommodate the following drift ratios: in steel moment frame, concrete moment frame, and wood frame buildings, 0.02; in other buildings, 0.005. (Commentary A.7.1.2 Tier 2: Sec. 13.6.2)	Lath and plaster with no gap observed.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. LIGHT PARTITIONS SUPPORTED BY CEILINGS: The tops of gypsum board partitions are not laterally supported by an integrated ceiling system. (Commentary: Sec. A.7.2.1. Tier 2: Sec. 13.6.2)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. STRUCTURAL SEPARATIONS: Partitions that cross structural separations have seismic or control joints. (Commentary: Sec. A.7.1.3. Tier 2. Sec. 13.6.2)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-MH. TOPS: The tops of ceiling-high framed or panelized partitions have lateral bracing to the structure at a spacing equal to or less than 6 ft. (Commentary: Sec. A.7.1.4. Tier 2. Sec. 13.6.2)	This check is not required for the Life Safety Performance Level.

Ceilings

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	LS-MH; PR-LMH. SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft^2 of area. (Commentary: Sec. A.7.2.3. Tier 2: Sec. 13.6.4)	
☐	☐	☒	☐	LS-MH; PR-LMH. SUSPENDED GYPSUM BOARD: Suspended gypsum board ceilings have attachments that resist seismic forces for every 12 ft^2 of area. (Commentary: Sec. A.7.2.3. Tier 2: Sec. 13.6.4)	None observed.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. INTEGRATED CEILINGS: Integrated suspended ceilings with continuous areas greater than 144 ft^2, and ceilings of smaller areas that are not surrounded by restraining partitions, are laterally restrained at a spacing no greater than 12 ft with members attached to the structure above. Each restraint location has a minimum of four diagonal wires and compression struts, or diagonal members capable of resisting compression. (Commentary: Sec. A.7.2.2. Tier 2: Sec. 13.6.4)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-MH. EDGE CLEARANCE: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft^2 have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in.; in High Seismicity, 3/4 in. (Commentary: Sec. A.7.2.4. Tier 2: Sec. 13.6.4)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-MH. CONTINUITY ACROSS STRUCTURE JOINTS: The ceiling system does not cross any seismic joint and is not attached to multiple independent structures. (Commentary: Sec. A.7.2.5. Tier 2: Sec. 13.6.4)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. EDGE SUPPORT: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft^2 are supported by closure angles or channels not less than 2 in. wide. (Commentary: Sec. A.7.2.6. Tier 2: Sec. 13.6.4)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. SEISMIC JOINTS: Acoustical tile or lay-in panel ceilings have seismic separation joints such that each continuous portion of the ceiling is no more than 2500 ft^2 and has a ratio of long-to-short dimension no more than 4-to-1. (Commentary: Sec. A.7.2.7. Tier 2: 13.6.4)	This check is not required for the Life Safety Performance Level.

Light Fixtures

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. INDEPENDENT SUPPORT: Light fixtures that weigh more per square foot than the ceiling they penetrate are supported independent of the grid ceiling suspension system by a minimum of two wires at diagonally opposite corners of each fixture. (Commentary: Sec. A.7.3.2. Tier 2: Sec. 13.6.4 and 13.7.9)	None observed.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. PENDANT SUPPORTS: Light fixtures on pendant supports are attached at a spacing equal to or less than 6 ft and, if rigidly supported, are free to move with the structure to which they are attached without damaging adjoining components. (Commentary: A.7.3.3. Tier 2: Sec. 13.7.9)	This check is not required for the Life Safety Performance Level.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. LENS COVERS: Lens covers on light fixtures are attached with safety devices. (Commentary: Sec. A.7.3.4. Tier 2: Sec. 13.7.9)	This check is not required for the Life Safety Performance Level.

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Cladding and Glazing

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. CLADDING ANCHORS: Cladding components weighing more than 10 lb/ft^2 are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in Moderate Seismicity, 6 ft; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 ft. (Commentary: Sec. A.7.4.1. Tier 2: Sec. 13.6.1)	No cladding - exposed concrete.
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. CLADDING ISOLATION: For steel or concrete moment frame buildings, panel connections are detailed to accommodate a story drift ratio of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02. (Commentary: Sec. A.7.4.3. Tier 2: Section 13.6.1)	No cladding - exposed concrete.
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. MULTI-STORY PANELS: For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicty, 0.02. (Commentary: Sec. A.7.4.4. Tier 2: Sec. 13.6.1)	No cladding - exposed concrete.
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. PANEL CONNECTIONS: Cladding panels are anchored out-of-plane with a minimum number of connections for each wall panel, as follows: for Life Safety in Moderate Seismicity, 2 connections; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections. (Commentary: Sec. A.7.4.5. Tier 2: Sec. 13.6.1.4)	No cladding - exposed concrete.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. BEARING CONNECTIONS: Where bearing connections are used, there is a minimum of two bearing connections for each cladding panel. (Commentary: Sec. A.7.4.6. Tier 2: Sec. 13.6.1.4)	No cladding - exposed concrete.
☐	☐	☒	☐	LS-MH; PR-MH. INSERTS: Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel. (Commentary: Sec. A.7.4.7. Tier 2: Sec. 13.6.1.4)	No cladding - exposed concrete.
☐	☐	☒	☐	LS-MH; PR-MH. OVERHEAD GLAZING: Glazing panes of any size in curtain walls and individual interior or exterior panes over 16 ft^2 in area are laminated annealed or laminated heat-strengthened glass and are detailed to remain in the frame when cracked. (Commentary: Sec. A.7.4.8: Tier 2: Sec. 13.6.1.5)	No cladding - exposed concrete.

Masonry Veneer

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. TIES: Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft^2, and the ties have spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 36 in.; for Life Safety in High Seismicity and for Position Retention in any seismicity, 24 in. (Commentary: Sec. A.7.5.1. Tier 2: Sec. 13.6.1.2)	None Present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. SHELF ANGLES: Masonry veneer is supported by shelf angles or other elements at each floor above the ground floor. (Commentary: Sec. A.7.5.2. Tier 2: Sec. 13.6.1.2)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. WEAKENED PLANES: Masonry veneer is anchored to the backup adjacent to weakened planes, such as at the locations of flashing. (Commentary: Sec. A.7.5.3. Tier 2: Sec. 13.6.1.2)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. UNREINFORCED MASONRY BACKUP: There is no unreinforced masonry backup. (Commentary: Sec. A.7.7.2. Tier 2: Section 13.6.1.1 and 13.6.1.2)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. STUD TRACKS: For veneer with metal stud backup, stud tracks are fastened to the structure at a spacing equal to or less than 24 in. on center. (Commentary: Sec. A.7.6.1. Tier 2: Section 13.6.1.1 and 13.6.1.2)	None Present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-MH; PR-MH. ANCHORAGE: For veneer with concrete block or masonry backup, the backup is positively anchored to the structure at a horizontal spacing equal to or less than 4 ft along the floors and roof. (Commentary: Sec. A.7.7.1. Tier 2: Section 13.6.1.1 and 13.6.1.2)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. WEEP HOLES: In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing. (Commentary: Sec. A.7.5.6. Tier 2: Section 13.6.1.2)	This check is not required for the Life Safety Performance Level.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. OPENINGS: For veneer with metal stud backup, steel studs frame window and door openings. (Commentary: Sec. A.7.6.2. Tier 2: Sec. 13.6.1.1 and 13.6.1.2)	This check is not required for the Life Safety Performance Level.

Parapets, Cornices, Ornamentation, and Appendages

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. URM PARAPETS OR CORNICES: Laterally unsupported unreinforced masonry parapets or cornices have height-to-thickness ratios no greater than the following: for Life Safety in Low or Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5. (Commentary: Sec. A.7.8.1. Tier 2: Sec. 13.6.5)	No URM present.

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C	NC	N/A	U		
☐	☒	☐	☐	LS-LMH; PR-LMH. CANOPIES: Canopies at building exits are anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 ft; for Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft. (Commentary: Sec. A.7.8.2. Tier 2: Sec. 13.6.6)	Entry "vestibule" appears un-braced.
☒	☐	☐	☐	LS-MH; PR-LMH. CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement. (Commentary: Sec. A.7.8.3. Tier 2: Sec. 13.6.5)	
☐	☒	☐	☐	LS-MH; PR-LMH. APPENDAGES: Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to or less than 6 ft. This checklist item does not apply to parapets or cornices covered by other checklist items. (Commentary: Sec. A.7.8.4. Tier 2: Sec. 13.6.6)	Entry "vestibule" appears un-braced.

Masonry Chimneys

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. URM CHIMNEYS: Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension of the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney. (Commentary: Sec. A.7.9.1. Tier 2: 13.6.7)	None Present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. ANCHORAGE: Masonry chimneys are anchored at each floor level, at the topmost ceiling level, and at the roof. (Commentary: Sec. A.7.9.2. Tier 2: 13.6.7)	None Present.

Stairs

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. STAIR ENCLOSURES: Hollow-clay tile or unreinforced masonry walls around stair enclosures are restrained out-of-plane and have height-to-thickness ratios not greater than the following: for Life Safety in Low or Moderate Seismicity, 15-to-1; for Life Safety in High Seismicity and for Position Retention in any seismicity, 12-to-1. (Commentary: Sec. A.7.10.1. Tier 2: Sec. 13.6.2 and 13.6.8)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-LMH; PR-LMH. STAIR DETAILS: In moment frame structures, the connection between the stairs and the structure does not rely on shallow anchors in concrete. Alternatively, the stair details are capable of accommodating the drift calculated using the Quick Check procedure of Section 4.5.3.1 without including any lateral stiffness contribution from the stairs. (Commentary: Sec. A.7.10.2. Tier 2: 13.6.8)	Not a moment frame structure.

Contents and Furnishings

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	LS-MH; PR-MH. INDUSTRIAL STORAGE RACKS: Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/MH 16.1 as modified by ASCE 7 Chapter 15. (Commentary: Sec. A.7.11.1. Tier 2: Sec. 13.8.1)	Some observed.

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C	NC	N/A	U		
☐	☒	☐	☐	LS-H; PR-MH. TALL NARROW CONTENTS: Contents more than 6 ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 are anchored to the structure or to each other. (Commentary: Sec. A.7.11.2. Tier 2: Sec. 13.8.2)	Observed in some areas.
C	NC	N/A	U		
☐	☒	☐	☐	LS-H; PR-H. FALL-PRONE CONTENTS: Equipment, stored items, or other contents weighing more than 20 lb whose center of mass is more than 4 ft above the adjacent floor level are braced or otherwise restrained. (Commentary: Sec. A.7.11.3. Tier 2: Sec. 13.8.2)	Observed in some areas.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. ACCESS FLOORS: Access floors more than 9 in. high are braced. (Commentary: Sec. A.7.11.4. Tier 2: Sec. 13.8.3)	This check is not required for the Life Safety Performance Level.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. EQUIPMENT ON ACCESS FLOORS: Equipment and other contents supported by access floor systems are anchored or braced to the structure independent of the access floor. (Commentary: Sec. A.7.11.5. Tier 2: Sec. 13.7.7 and 13.8.3)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. SUSPENDED CONTENTS: Items suspended without lateral bracing are free to swing from or move with the structure from which they are suspended without damaging themselves or adjoining components. (Commentary. A.7.11.6. Tier 2: Sec. 13.8.2)	This check is not required for the Life Safety Performance Level.

Mechanical and Electrical Equipment

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☒	☐	☐	LS-H; PR-H. FALL-PRONE EQUIPMENT: Equipment weighing more than 20 lb whose center of mass is more than 4 ft above the adjacent floor level, and which is not in-line equipment, is braced. (Commentary: A.7.12.4. Tier 2: 13.7.1 and 13.7.7)	Furnaces and some roof-top equipment appeared to be un-braced.
C	NC	N/A	U		
☐	☐	☒	☐	LS-H; PR-H. IN-LINE EQUIPMENT: Equipment installed in-line with a duct or piping system, with an operating weight more than 75 lb, is supported and laterally braced independent of the duct or piping system. (Commentary: Sec. A.7.12.5. Tier 2: Sec. 13.7.1)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-H; PR-MH. TALL NARROW EQUIPMENT: Equipment more than 6 ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 is anchored to the floor slab or adjacent structural walls. (Commentary: Sec. A.7.12.6. Tier 2: Sec. 13.7.1 and 13.7.7)	None Present.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-MH. MECHANICAL DOORS: Mechanically operated doors are detailed to operate at a story drift ratio of 0.01. (Commentary: Sec. A.7.12.7. Tier 2: Sec. 13.6.9)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. SUSPENDED EQUIPMENT: Equipment suspended without lateral bracing is free to swing from or move with the structure from which it is suspended without damaging itself or adjoining components. (Commentary: Sec. A.7.12.8. Tier 2: Sec. 13.7.1 and 13.7.7)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. VIBRATION ISOLATORS: Equipment mounted on vibration isolators is equipped with horizontal restraints or snubbers and with vertical restraints to resist overturning. (Commentary: Sec. A.7.12.9. Tier 2: Sec. 13.7.1)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. HEAVY EQUIPMENT: Floor-supported or platform-supported equipment weighing more than 400 lb is anchored to the structure. (Commentary: Sec. A.7.12.10. Tier 2: 13.7.1 and 13.7.7)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. ELECTRICAL EQUIPMENT: Electrical equipment is laterally braced to the structure. (Commentary: Sec. A.7.12.11. Tier 2: 13.7.7)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. CONDUIT COUPLINGS: Conduit greater than 2.5 in. trade size that is attached to panels, cabinets, or other equipment and is subject to relative seismic displacement has flexible couplings or connections. (Commentary: Sec. A.7.12.12. Tier 2: 13.7.8)	This check is not required for the Life Safety Performance Level.

Piping

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. FLEXIBLE COUPLINGS: Fluid and gas piping has flexible couplings. (Commentary: Sec. A.7.13.2. Tier 2: Sec. 13.7.3 and 13.7.5)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. FLUID AND GAS PIPING: Fluid and gas piping is anchored and braced to the structure to limit spills or leaks. (Commentary: Sec. A.7.13.4. Tier 2: Sec. 13.7.3 and 13.7.5)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. C-CLAMPS: One-sided C-clamps that support piping larger than 2.5 in. in diameter are restrained. (Commentary: Sec. A.7.13.5. Tier 2: Sec. 13.7.3 and 13.7.5)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. PIPING CROSSING SEISMIC JOINTS: Piping that crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A7.13.6. Tier 2: Sec.13.7.3 and Sec. 13.7.5)	This check is not required for the Life Safety Performance Level.

Ducts

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. DUCT BRACING: Rectangular ductwork larger than 6 ft^2 in cross-sectional area and round ducts larger than 28 in. in diameter are braced. The maximum spacing of transverse bracing does not exceed 30 ft. The maximum spacing of longitudinal bracing does not exceed 60 ft. (Commentary: Sec. A.7.14.2. Tier 2: Sec. 13.7.6)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. DUCT SUPPORT: Ducts are not supported by piping or electrical conduit. (Commentary: Sec. A.7.14.3. Tier 2: Sec. 13.7.6)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. DUCTS CROSSING SEISMIC JOINTS: Ducts that cross seismic joints or isolation planes or are connected to independent structures have couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A.7.14.5. Tier 2: Sec. 13.7.6)	This check is not required for the Life Safety Performance Level.

Elevators

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☒	☐	LS-H; PR-H. RETAINER GUARDS: Sheaves and drums have cable retainer guards. (Commentary: Sec. A.7.16.1. Tier 2: 13.8.6)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-H; PR-H. RETAINER PLATE: A retainer plate is present at the top and bottom of both car and counterweight. (Commentary: Sec. A.7.16.2. Tier 2: 13.8.6)	None Present.
C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. ELEVATOR EQUIPMENT: Equipment, piping, and other components that are part of the elevator system are anchored. (Commentary: Sec. A.7.16.3. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. SEISMIC SWITCH: Elevators capable of operating at speeds of 150 ft/min or faster are equipped with seismic switches that meet the requirements of ASME A17.1 or have trigger levels set to 20% of the acceleration of gravity at the base of the structure and 50% of the acceleration of gravity in other locations. (Commentary: Sec. A.7.16.4. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. SHAFT WALLS: Elevator shaft walls are anchored and reinforced to prevent toppling into the shaft during strong shaking. (Commentary: Sec. A.7.16.5. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. COUNTERWEIGHT RAILS: All counterweight rails and divider beams are sized in accordance with ASME A17.1. (Commentary: Sec. A.7.16.6. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. BRACKETS: The brackets that tie the car rails and the counterweight rail to the structure are sized in accordance with ASME A17.1. (Commentary: Sec. A.7.16.7. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.

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C	NC	N/A	U		
☐	☐	☒	☐	LS-not required; PR-H. SPREADER BRACKET: Spreader brackets are not used to resist seismic forces. (Commentary: Sec. A.7.16.8. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.
☐	☐	☒	☐	LS-not required; PR-H. GO-SLOW ELEVATORS: The building has a go-slow elevator system. (Commentary: Sec. A.7.16.9. Tier 2: 13.8.6)	This check is not required for the Life Safety Performance Level.

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