

Office Overbuild: Building a Vertical Mass Timber Addition in Washington, DC

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hickok cole

Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.

80 M STREET

Washington, DC

FIRM

Hickok Cole

CLIENT

Columbia Property Trust

SIZE

100,000 SF

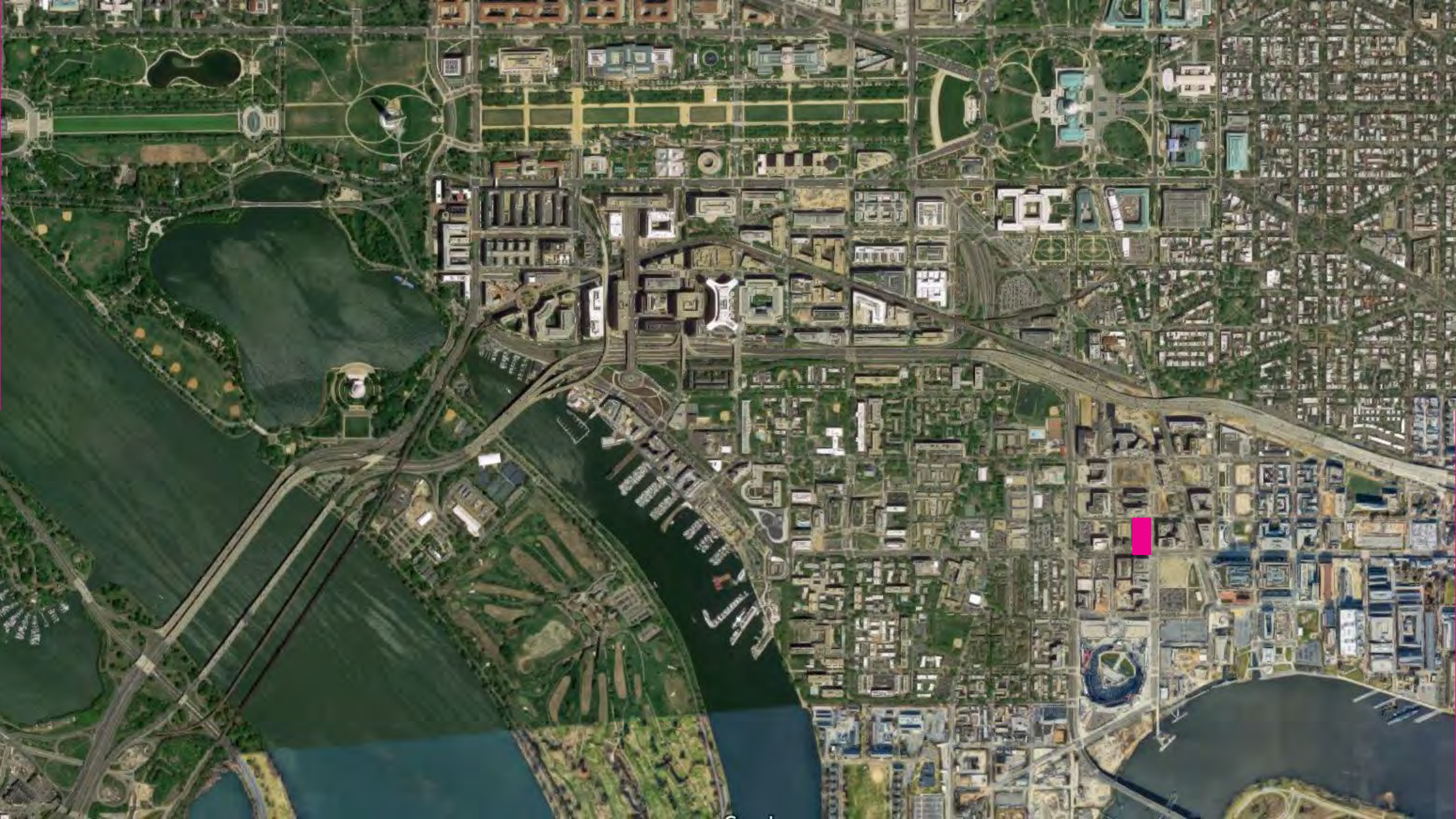
DETAILS

Vertical addition/extension to an existing seven-story building

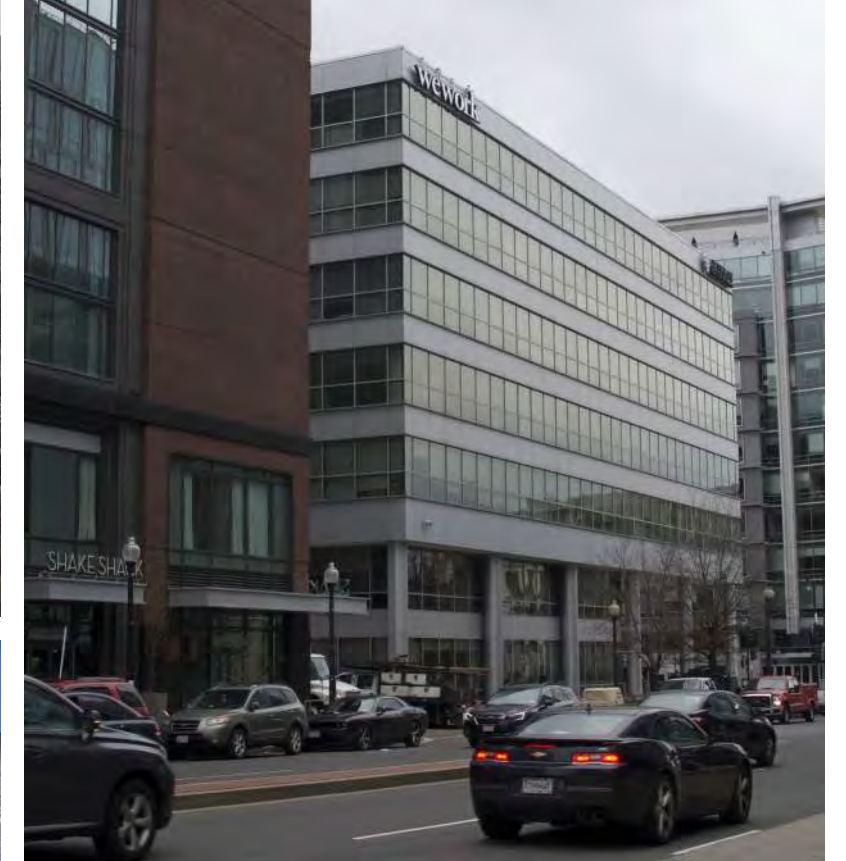
Adds two full floors of trophy class office space with 17'-0" ceiling heights

An occupied penthouse level will add additional office density as well as a roof top terrace and social space

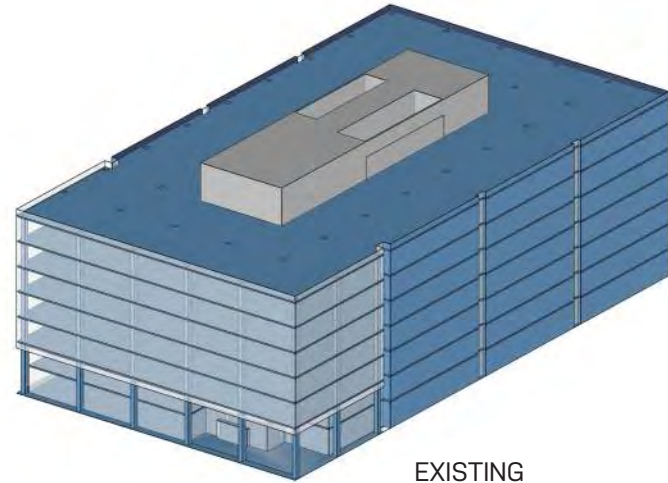




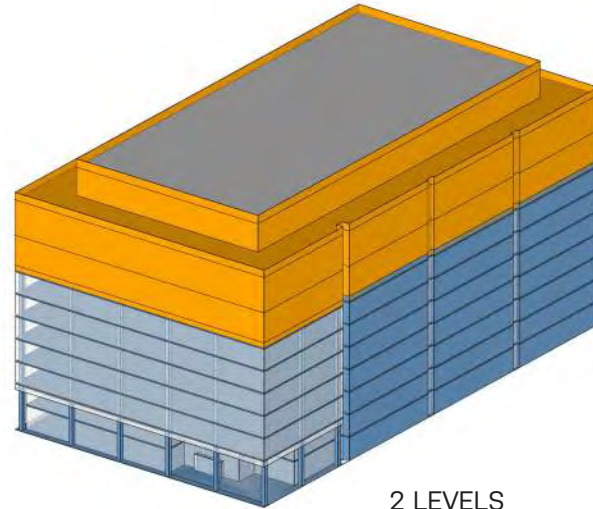
EXISTING CONDITIONS



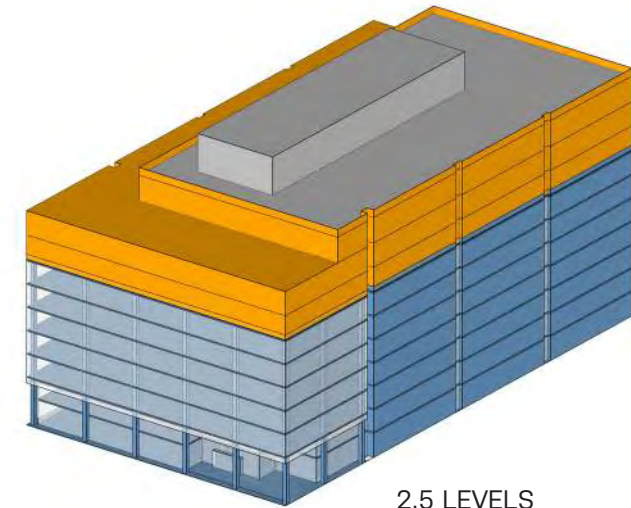
MASSING CONCEPTS



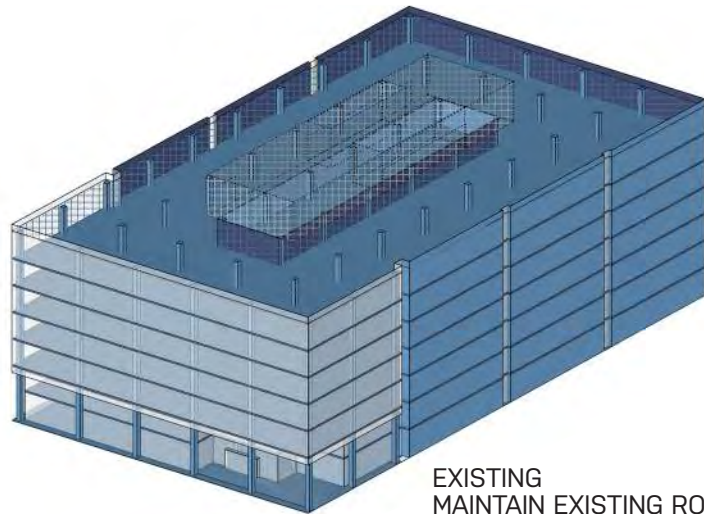
EXISTING
MAINTAIN EXISTING ROOF
MOVE MECHANICAL EQUIPMENT
UP



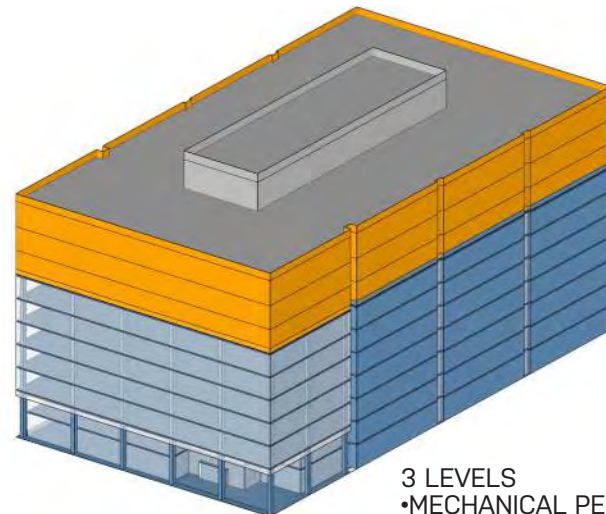
2 LEVELS
•20,000 SF HABITABLE
PENTHOUSE
•80,000 SF GFA
•10,000 SF ROOFTOP TERRACE



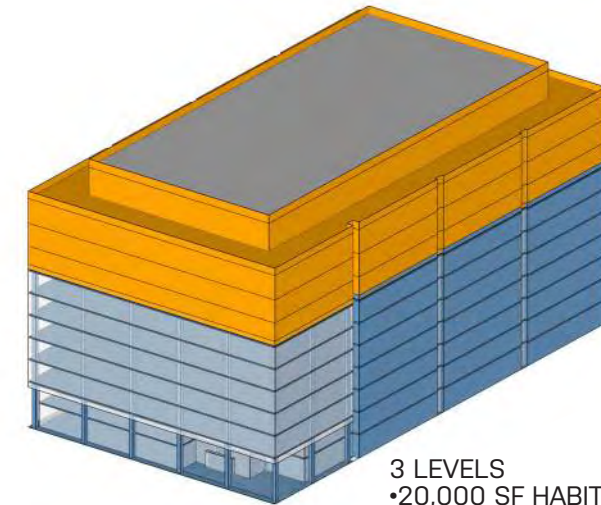
2.5 LEVELS
•MECHANICAL PENHOUSE
•108,000 SF GFA
•14,000 SF TERRACE ON LEVEL 10



EXISTING
MAINTAIN EXISTING ROOF
MOVE MECHANICAL EQUIPMENT UP



3 LEVELS
•MECHANICAL PENHOUSE
•120,000 SF GFA

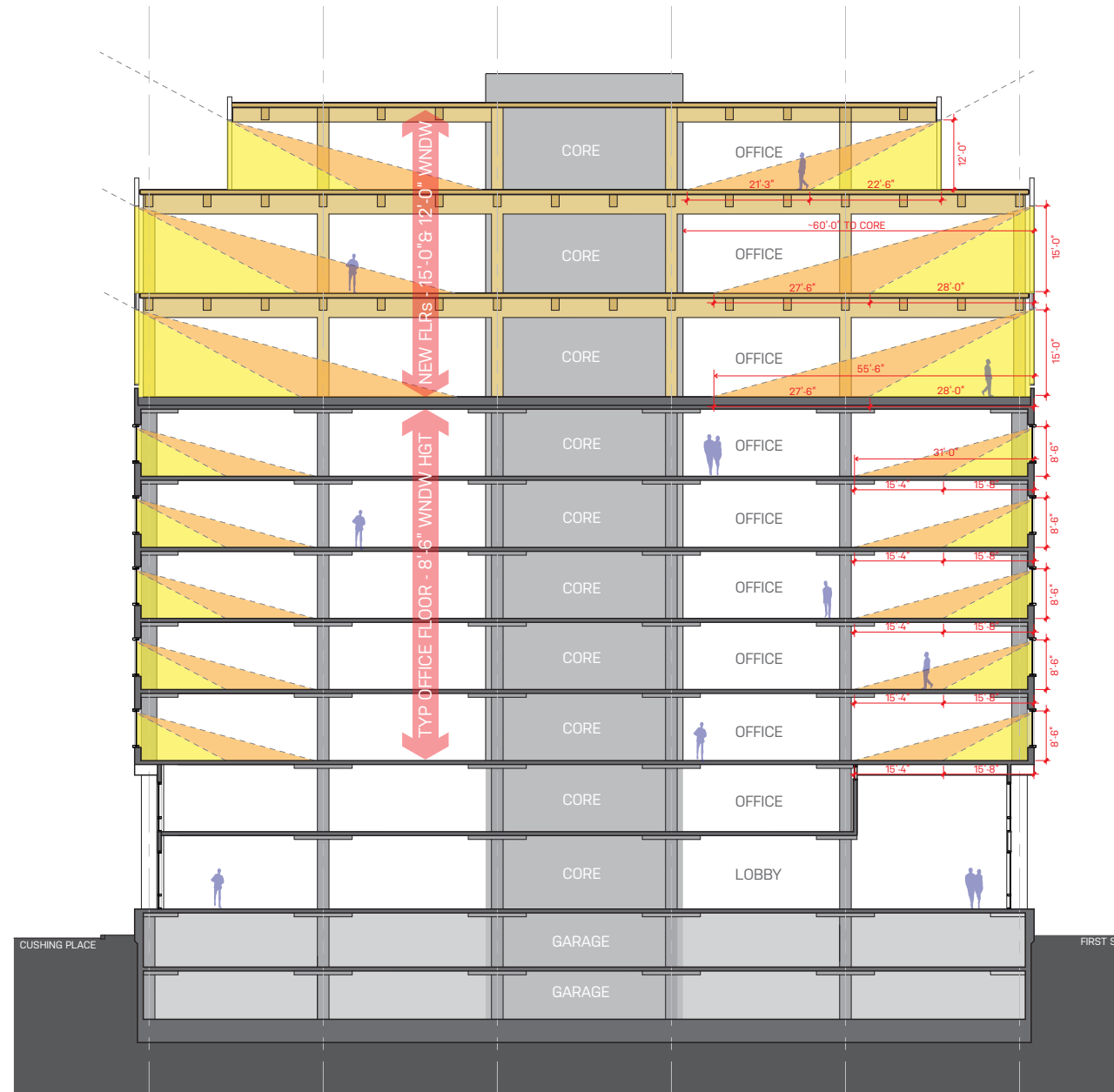


3 LEVELS
•20,000 SF HABITABLE PENTHOUSE
•120,000 SF GFA
•10,000 SF ROOFTOP TERRACE

CONCEPTUAL SECTION



CONCEPTUAL SECTION



IBC 2021 NEW CONSTRUCTION TYPES



18 STORIES
 BUILDING HEIGHT 270 FT
 ALLOWABLE BUILDING AREA 972,000 SF
 AVERAGE AREA PER STORY 54,000 SF



12 STORIES
 BUILDING HEIGHT 180 FT
 ALLOWABLE BUILDING AREA 648,000 SF
 AVERAGE AREA PER STORY 54,000 SF



9 STORIES
 BUILDING HEIGHT 85 FT
 ALLOWABLE BUILDING AREA 405,000 SF
 AVERAGE AREA PER STORY 45,000 SF

TYPE IV-A	
Primary Structural Frame:	3HR Fire Rated
Required Noncombustible Protection:	
Ceilings:	100% Protection 0% Exposed Timber
Floors:	1" Minimum Coverage
Interior Surfaces:	Always Required 2/3 of FRR, 80 mins min
Redundant water main feed at Fire Pump	
Fire Safety Procedures During Construction	
Other High Rise Requirements	

TYPE IV-B	
Primary Structural Frame:	2HR Fire Rated
Required Noncombustible Protection:	
Ceilings:	80% Protection 20% Exposed Timber
Floors:	1" Minimum Coverage
Interior Surfaces:	Always Required 2/3 of FRR, 80 mins min
Redundant water main feed at Fire Pump	
Fire Safety Procedures During Construction	
Other High Rise Requirements	

TYPE IV-C	
Primary Structural Frame:	2HR Fire Rated
Required Noncombustible Protection:	
Ceilings:	Not Required
Floors:	Not Required
Interior Surfaces:	Not Required
Redundant water main feed at Fire Pump	
Fire Safety Procedures (Over 4 Stories)	
Other High Rise Requirements (Over 75 FT)	

NEW CONSTRUCTION TYPES



18 STORIES
 BUILDING HEIGHT 270 FT
 ALLOWABLE BUILDING AREA 972,000 SF
 AVERAGE AREA PER STORY 54,000 SF

TYPE IV-A



12 STORIES
 BUILDING HEIGHT 180 FT
 ALLOWABLE BUILDING AREA 648,000 SF
 AVERAGE AREA PER STORY 54,000 SF

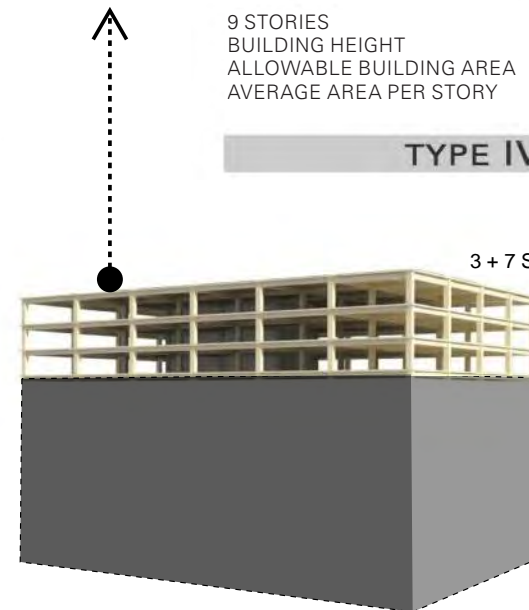
TYPE IV-B



9 STORIES
 BUILDING HEIGHT 85 FT
 ALLOWABLE BUILDING AREA 405,000 SF
 AVERAGE AREA PER STORY 45,000 SF

TYPE IV-C

OUR DESIGN:
 10 STORIES (9 STORIES + PENTHOUSE)
 BUILDING HEIGHT 130 FT
 7 EXISTING STORIES, TYPE 1B
 3 STORIES OF MASS TIMBER
 ADDITION OF 100,000 SF
 AVERAGE AREA PER STORY 33,000 SF

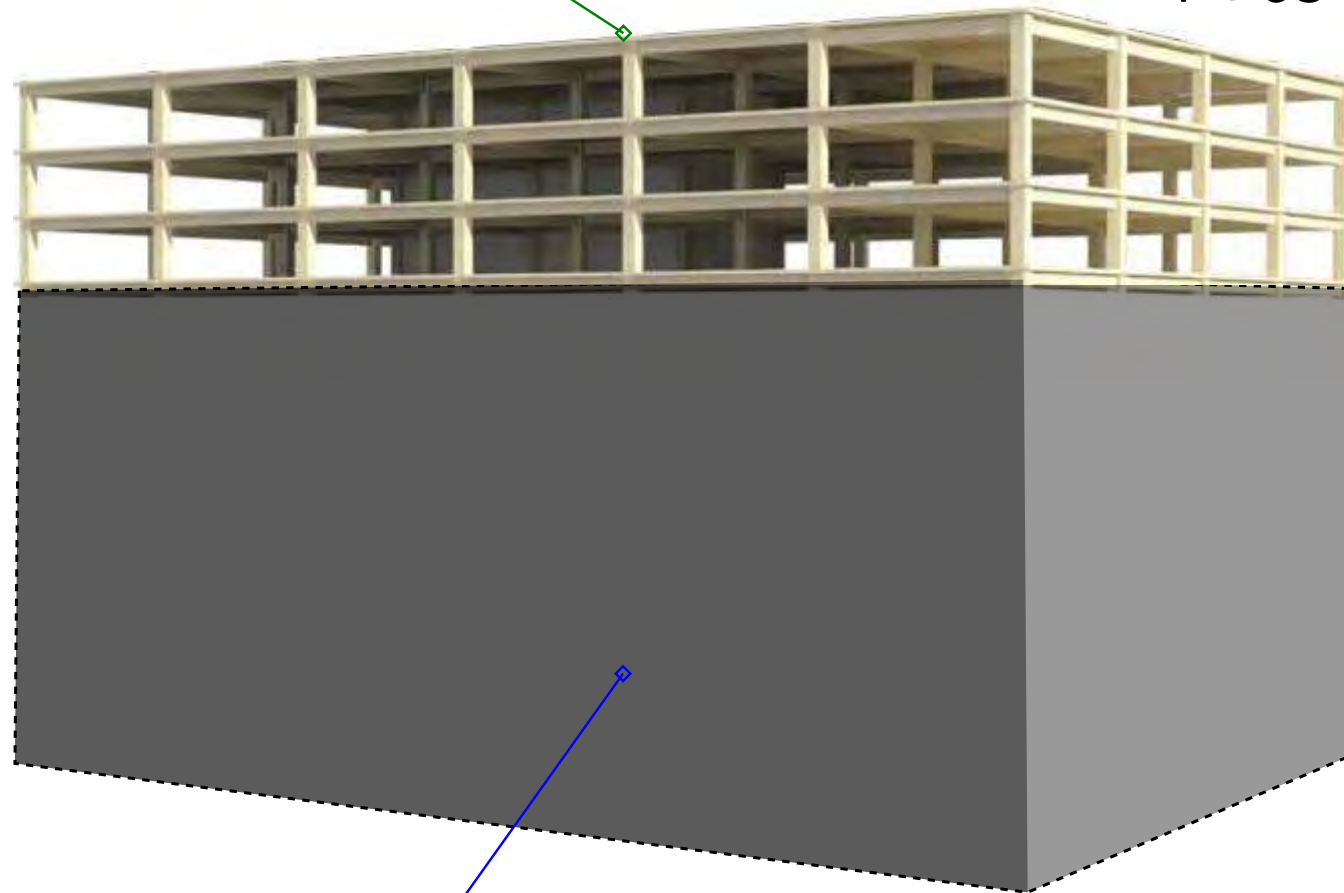


PROPOSED CODE MODIFICATION

ADDITION:

3 Stories of Mass Timber
(2 stories + Penthouse)

7 + 3S



EXISTING BUILDING:
7 Stories of Concrete
Construction

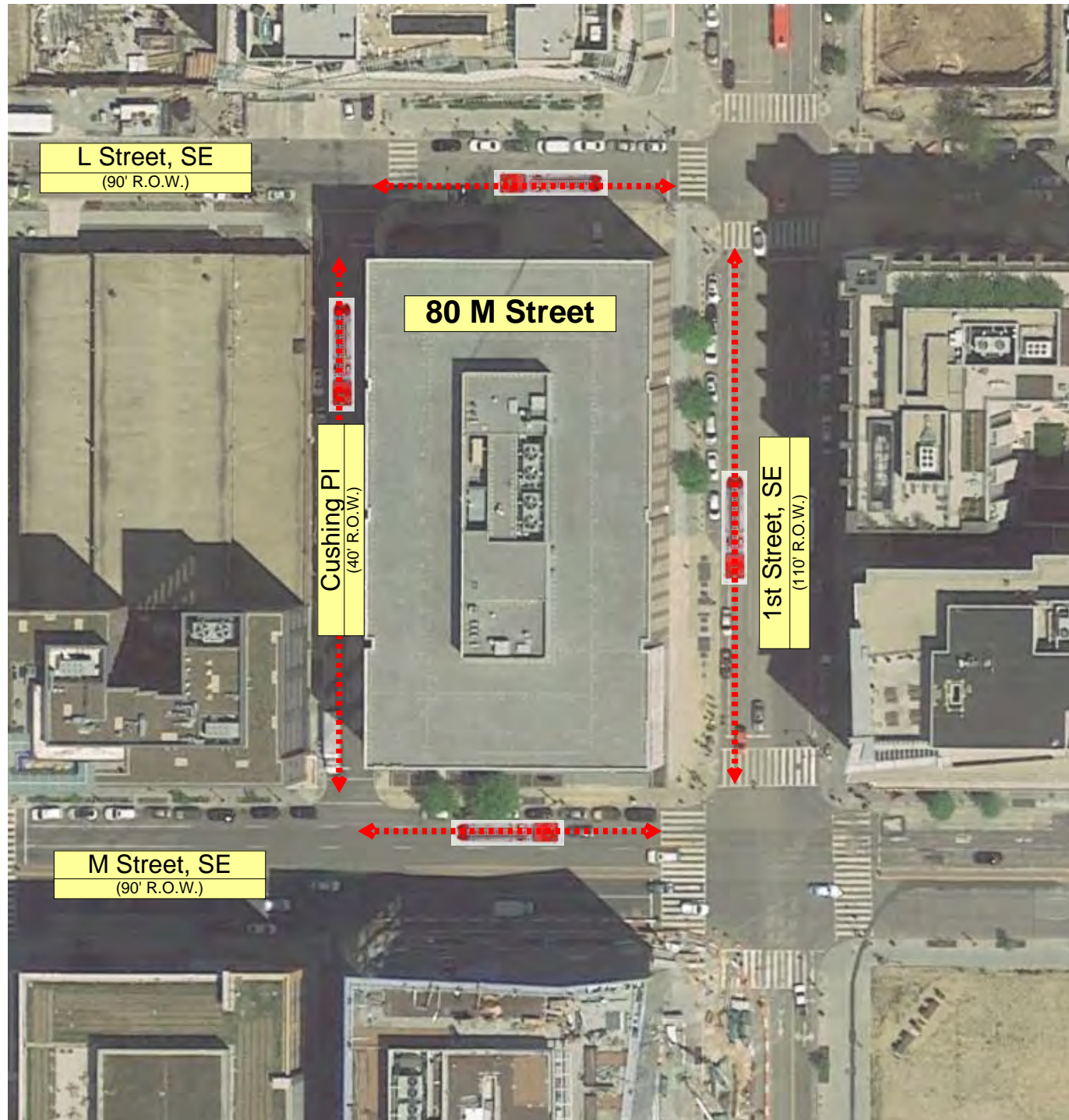
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To incorporate mass timber construction, we proposed a code modification to the DC Building Code under the Alternative Materials, Design and Methods permitted in Chapter 1 of DCMAR 12A:

Over height Type IV-C, at a building height of 130ft, with 3 floors mass timber, over 7 floors of concrete construction with additional fire protection.

In support of the proposed code modification, we offer the following information:

- All Four sides of the building allow fire department access.
- The existing seven story building is Type 1B construction, non-combustible concrete.
- The existing non-combustible egress stairs are 48" wide. (wider than the Code Min. 44" width)
- The proposed three story addition would incorporate 2 hour fire rated, exposed mass timber.
 - » Glulam meeting Chapter 23 of 2018 IBC
 - » CLT meeting Chapter 23 of 2018 IBC and PRG-320 (using non-heat delaminating adhesives)
- With the Mass Timber Addition, the building core and egress stairs would be constructed of non-combustible steel and concrete.
- Three Hour Fire Separation between Type IB and Type IV-C.



FIRE DEPARTMENT ACCESS ON ALL FOUR SIDES OF THE BUILDING

100% of the building's facades are accessible to fire trucks.

PROPOSED ADDITION:
3 Stories of Mass Timber
Construction.
Type IV-C

**BUILDING CORE
AND EGRESS STAIRS:**
Steel Framing with
Composite Decks, 2HR FR

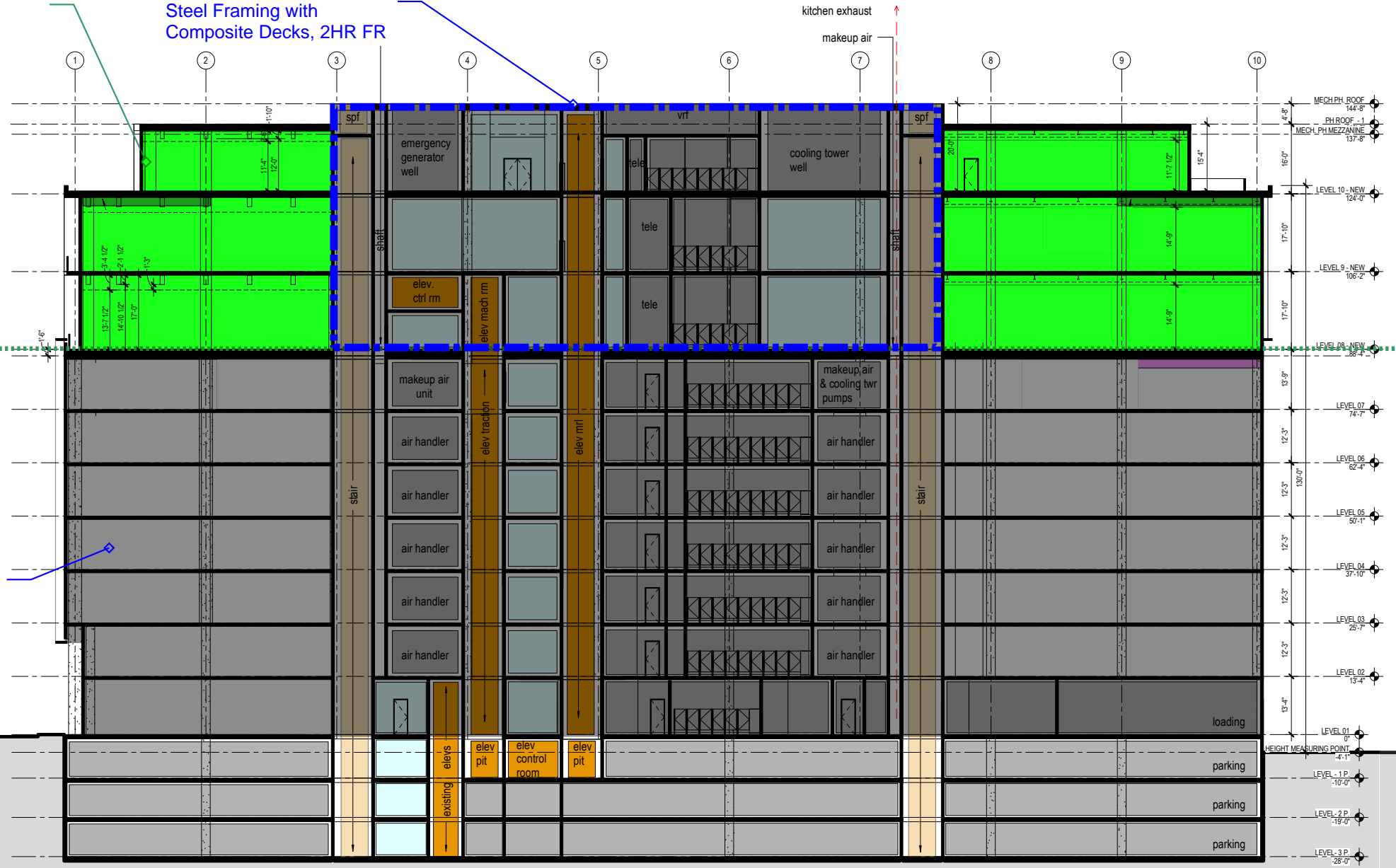
PROPOSED

EXISTING

EXISTING BUILDING:
7 Stories of Concrete
Construction.
Type 1B

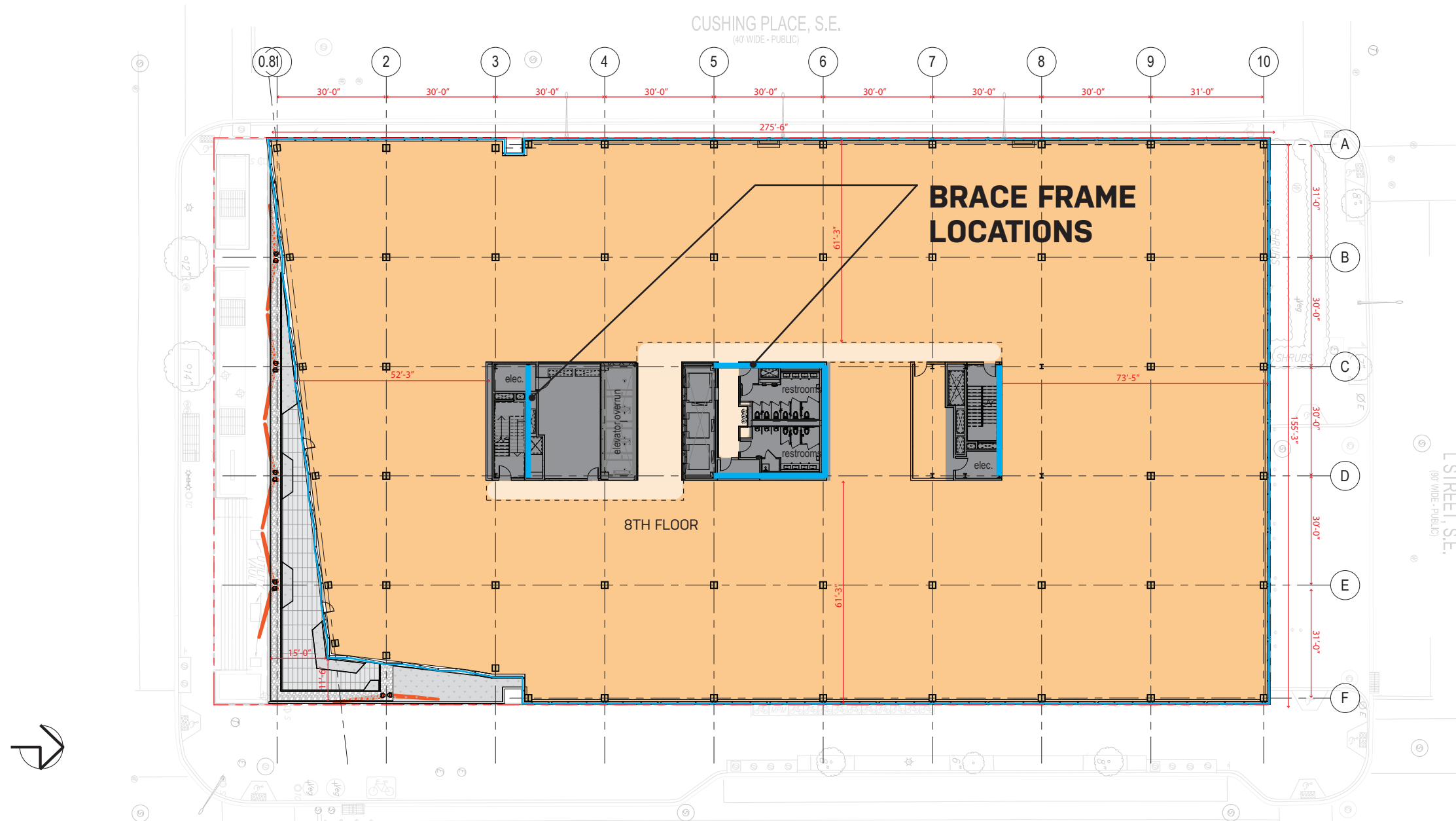
M STREET SE

L STREET SE

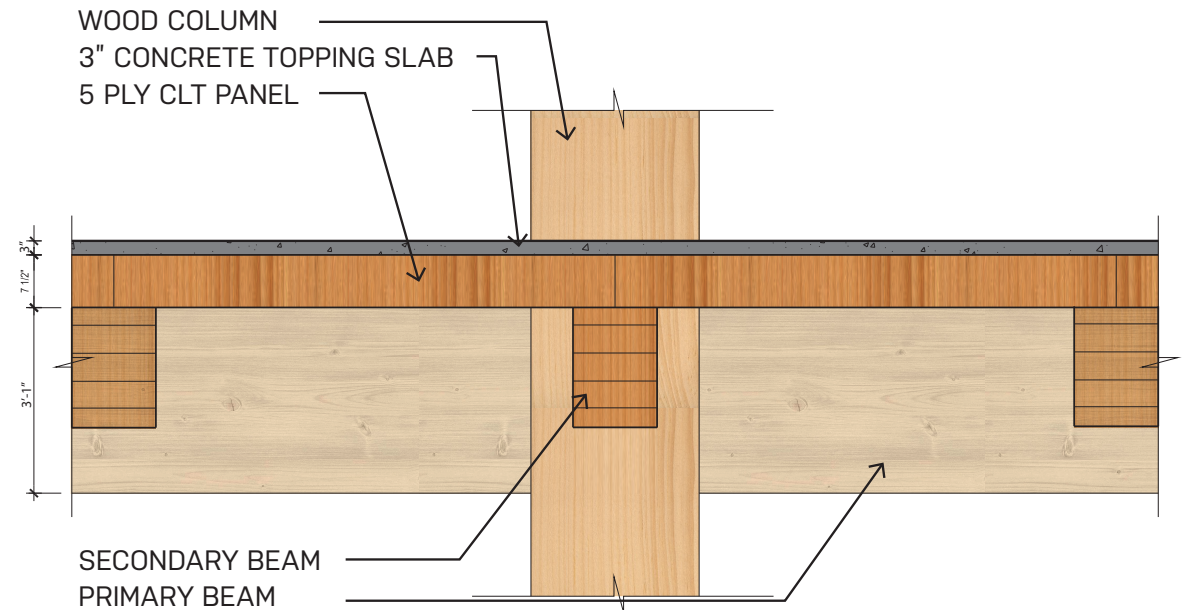
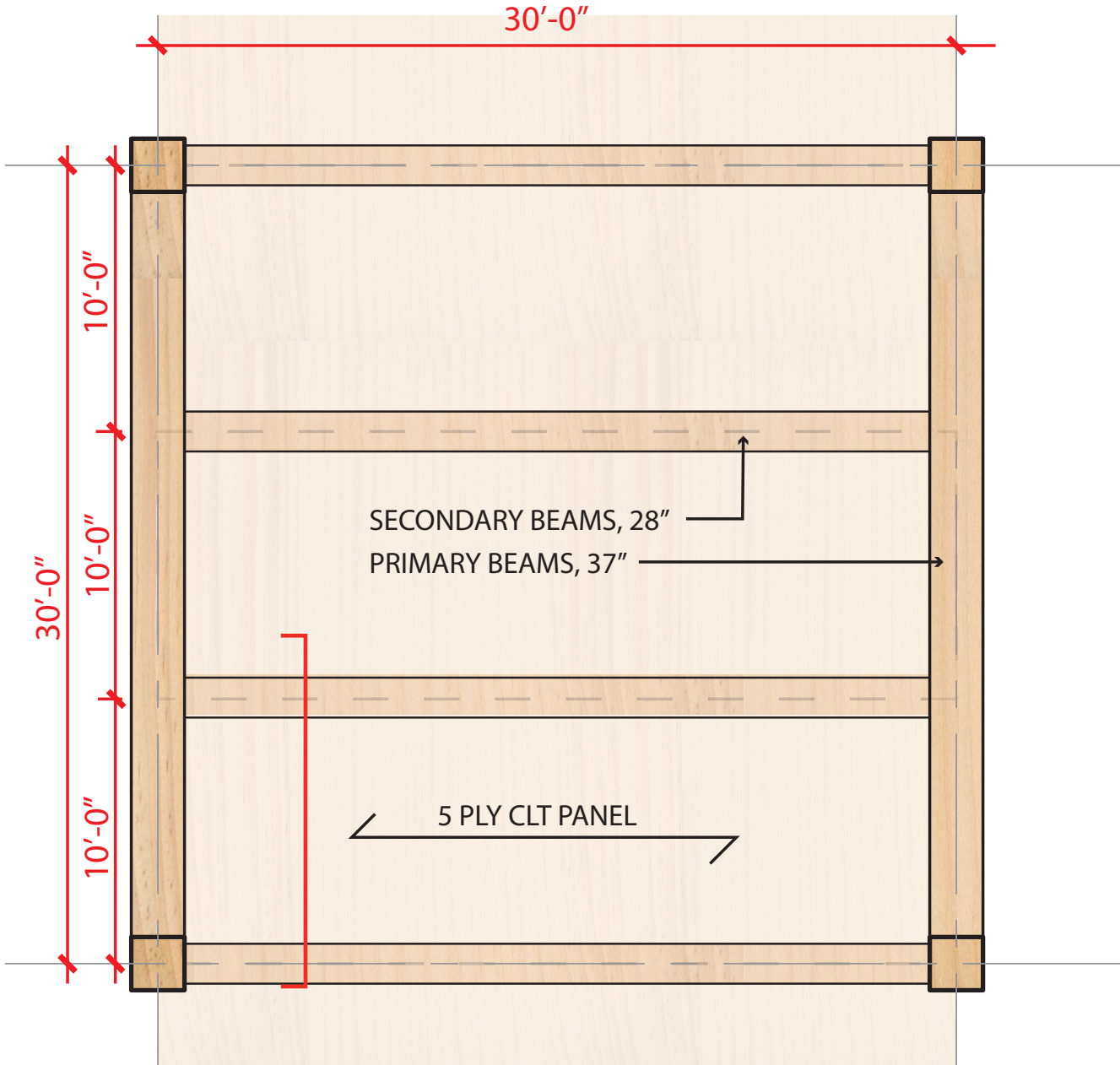


PROPOSED 8TH FLOOR PLAN

*All floor plans are illustrative & final layout is subject to adjustment prior to permit review



TYPICAL STRUCTURAL BAY

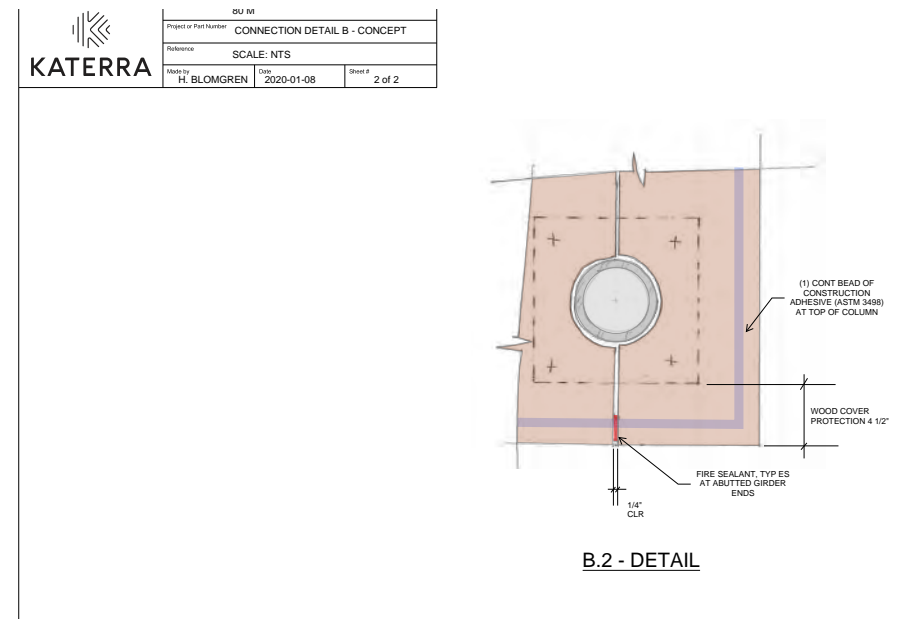
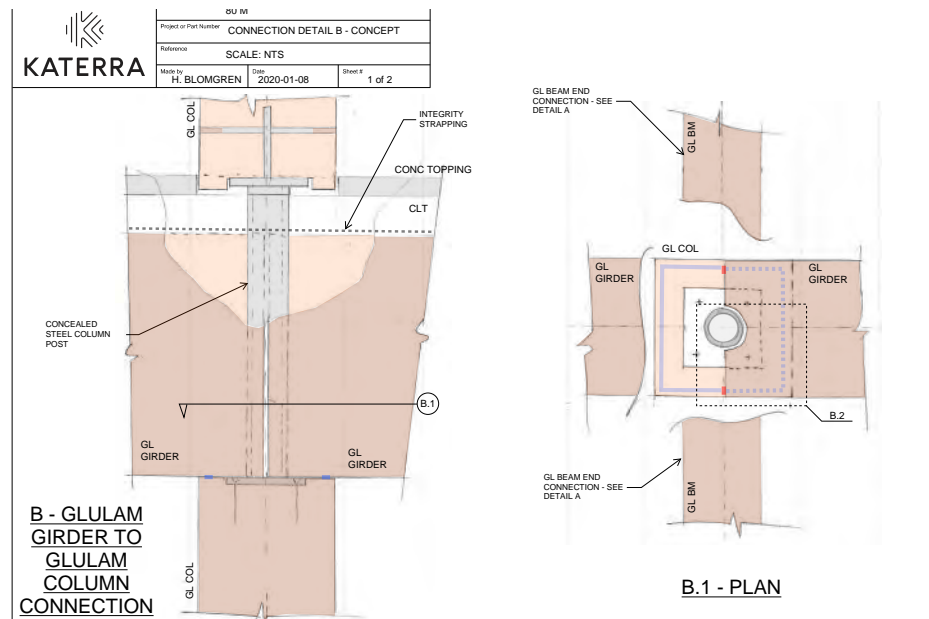
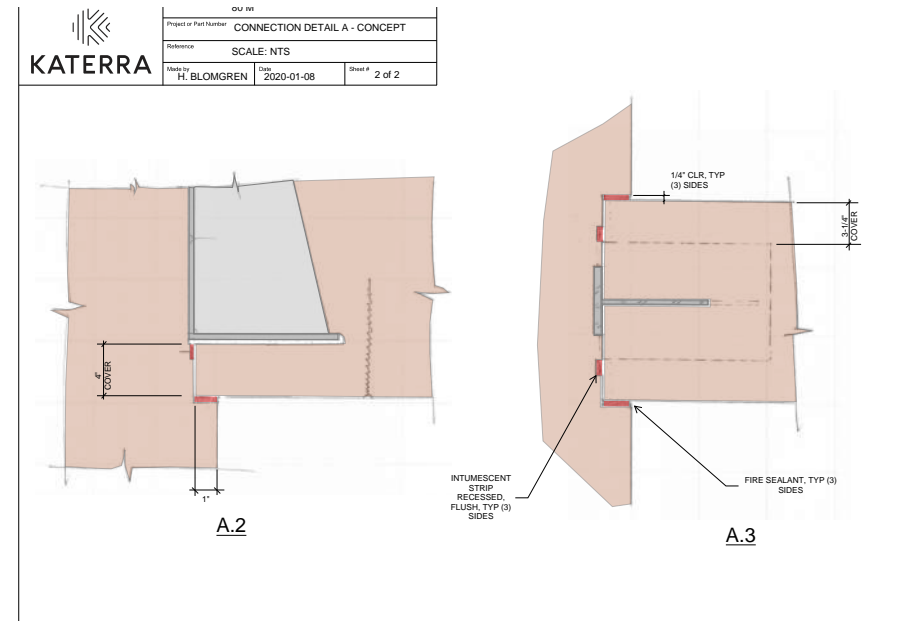
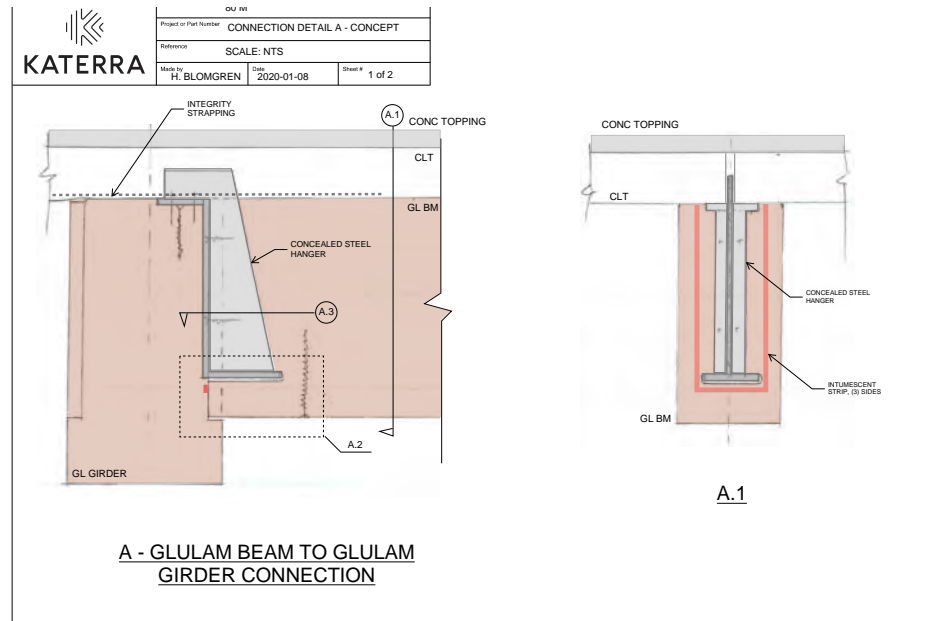


INTERIOR VIEW

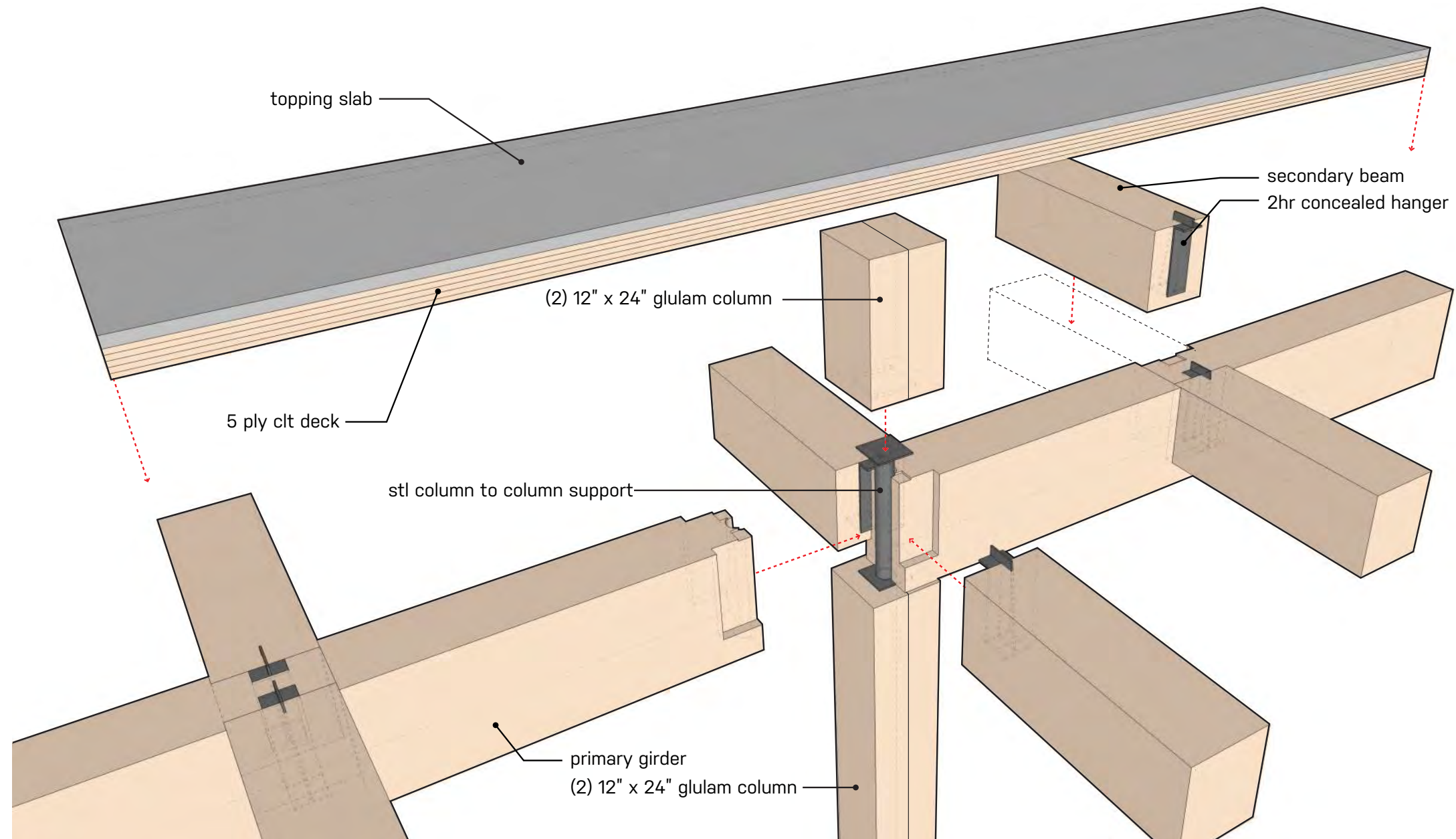


CONNECTION CONCEPTS

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CONNECTION CONCEPT DIAGRAM



INTERIOR VIEW



VIBRATION ANALYSIS

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Synchronization

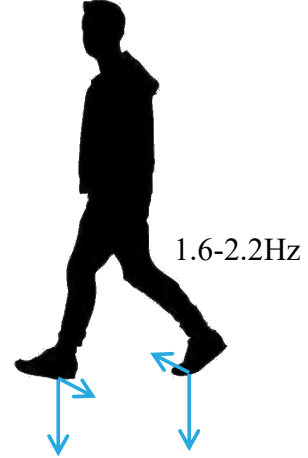
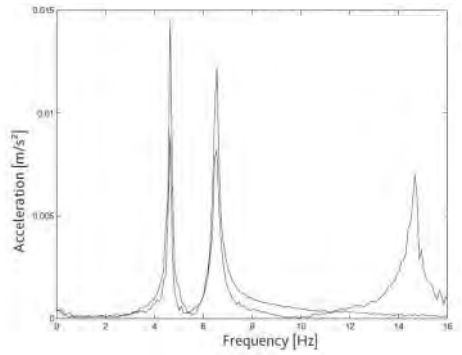
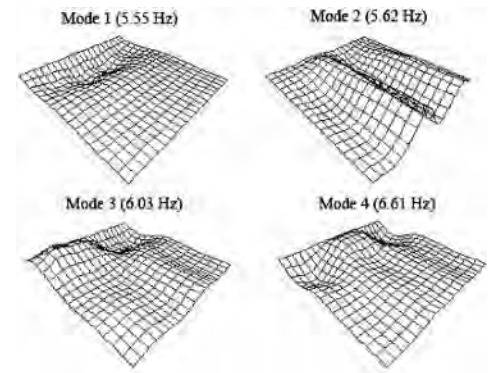


Photo credit



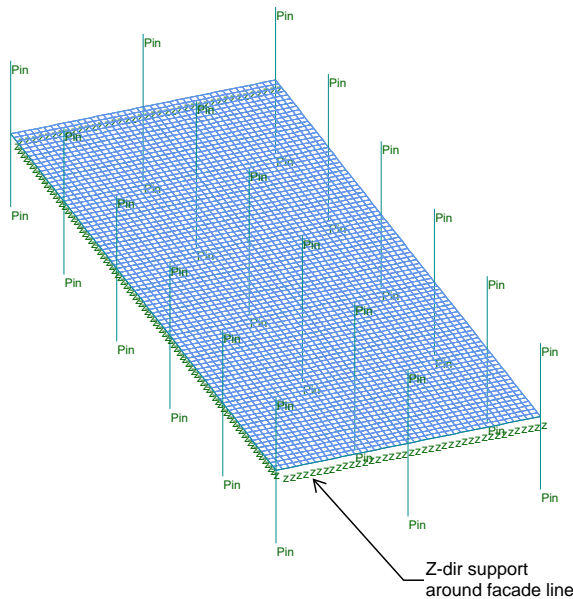
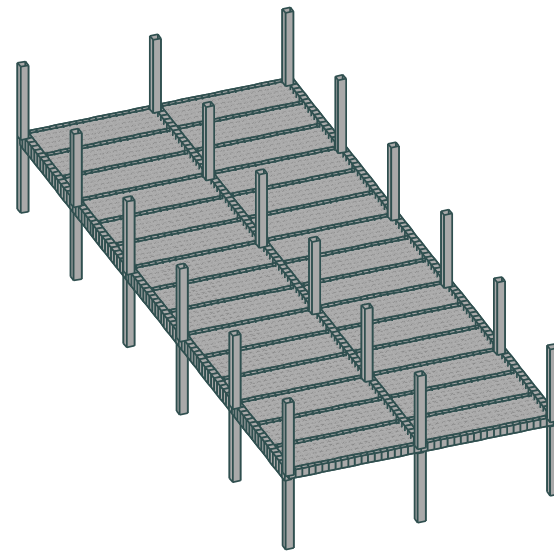
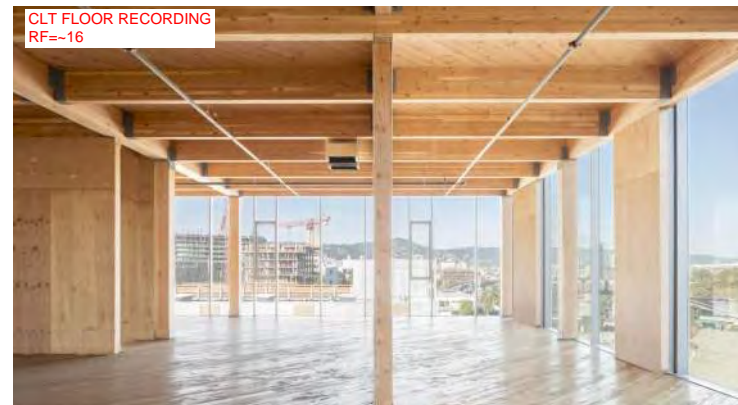
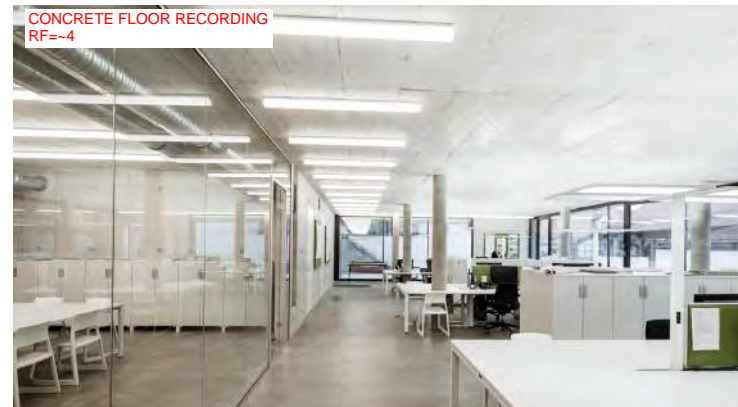
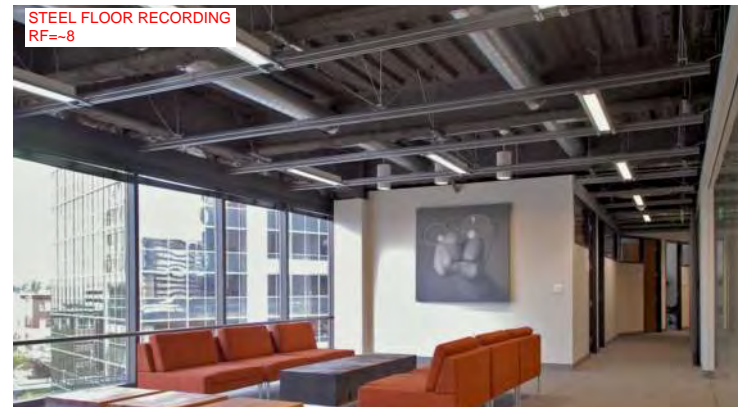
Structural Transmission

Mass
Stiffness
Damping

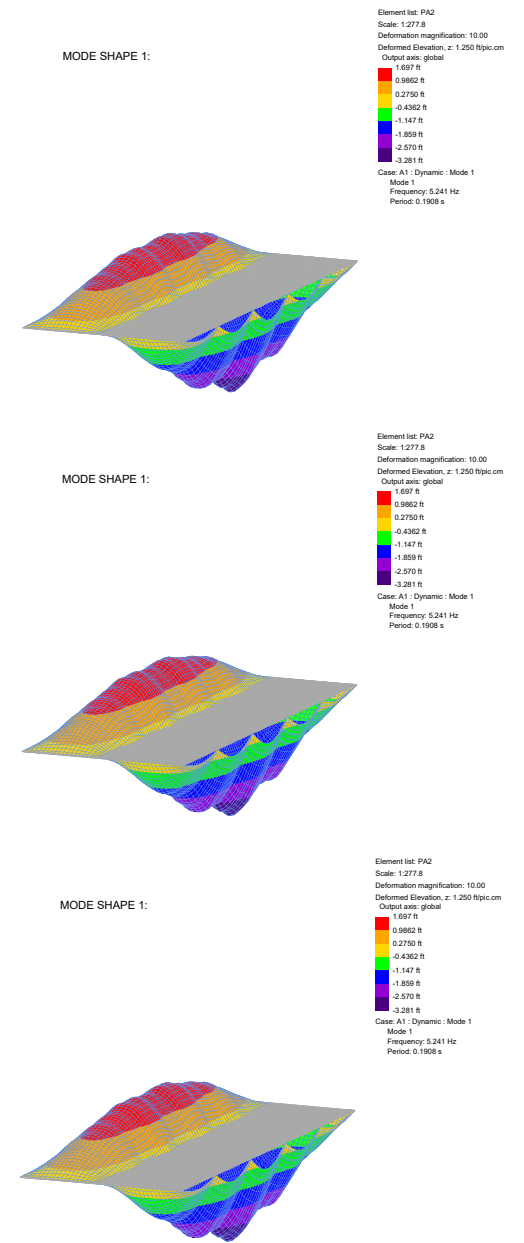
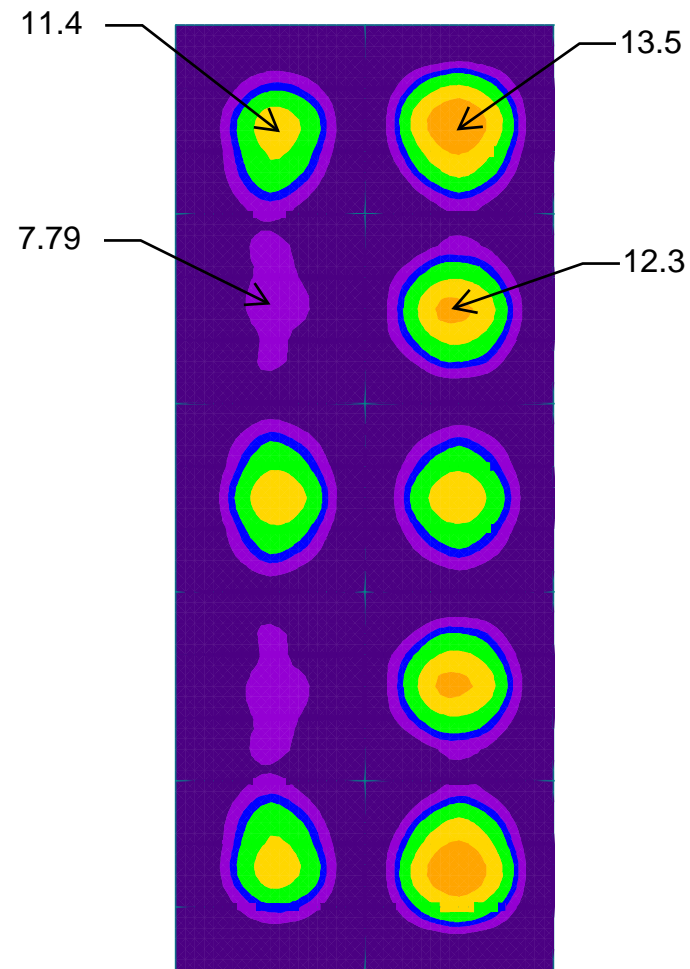


VIBRATION ANALYSIS

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TARGET MAXIMUM RESPONSE FACTOR OF 8



INTERIOR VIEW – CONCEPT



THANK YOU!

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