Design Considerations for Multi-story Podium Projects

ARCHITECTS

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INCORPORATED

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Description

This presentation will introduce new language in the IBC that allows more than one story of above-ground podium with up to five stories of wood-frame construction above. Using built project examples, discussion will include impacts on design, building layout, height challenges and open space utilization.

Learning Objectives

1. Determine the potential density impacts of double or triple level podiums, with references to built project

2. Discuss Building Code implications of having more than one story in a concrete podium

3. Investigate framing and detailing options that can assist with layout and height challenges

4. Explore open space utilization techniques for high density mid-rise construction.

What is Wood Mid-Rise Construction?

Before 1990: 4 Stories and 50 Foot Maximum Height & 60 Units/Acre

Starting 2017: 8 Stories and 85 Foot Maximum Height & 160-180 Units/Acre

History of Mid-Rise Construction

1989 Uniform Building Code

- Type III Construction
- 5 Stories: 65 feet high

Typical Type III Construction

Casa Heiwa

Los Angeles, CA

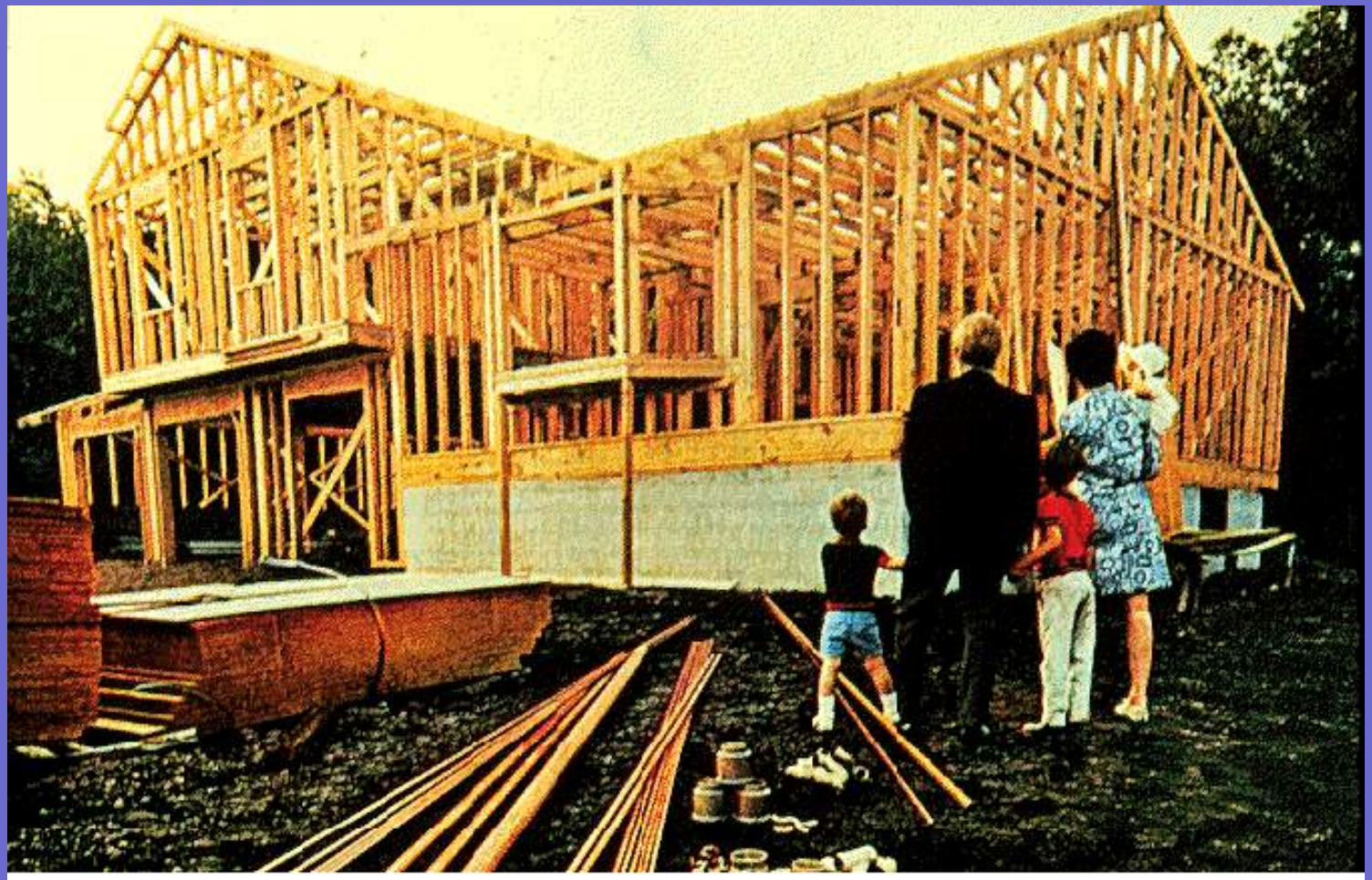
- **First 5 Story Wood Frame Building in California**
  - **The Beginning of Type III Construction**

1994: 6 Stories and 65 Feet High; 100 Units/Acre

Wood Mid-Rise Enters the Urban Cores

Social Change

From the Suburbs to the Urban Cores



Frame construction.

Housing Dream of ‘Baby Boomers’

Urban “European” Planning
Social Change to Living in the Urban Cores
Gen ‘X’ and Millennials have Arrived


BARNES & NOBLE
BARNES

2007: Adoption of International Building Code

- 5 Stories over 85 Foot High Podium

Mezzanine: 75 feet High

5 Stories
Type III

Type I
Podium
with Residential

7 Levels of Residential (120-140 Units/Acre)

2008: Alternate Means & Methods

- Double Podium

7 Stories Plus Wood Mezzanine (145-165 Units/Acre)

7 Stories Plus Concrete Mezzanine (145-170 Units/Acre)

2015: International Building Code

- 85 Foot High, 8 Stories
(with Multiple Podiums)

8 Stories with 3 level podium (160-180 units/acre)

Wrap Product Type

- 5 Story
- 6 Stories with Mezzanine
- 8 Story

5 Stories of Residential

Concrete Freestanding Garage

5 Story Wrap, 60-80 Units/Acre, Less Expensive to Build

6 Levels Plus Mezzanine, 75’ High

8 Stories with Triple Podium (117 Units/Acre)

Density Summary

(For Urban Projects)

5 story wrap & 4 story podium	60-80 units/acre
6 story wrap	80-90 units/acre
7 story wrap	90-105 units/acre
8 story wrap	105-120 units/acre
5 story with retail podium	100-120 units/acre
5 story + residential podium	120-140 units/acre
5 story with mezzanine + residential podium	125-145 units/acre
5 story with mezzanine + double residential podium	145-165 units/acre
5 story with triple podium	160-180 units/acre

Building Code Requirements for 85 Foot High, 8 Story Building

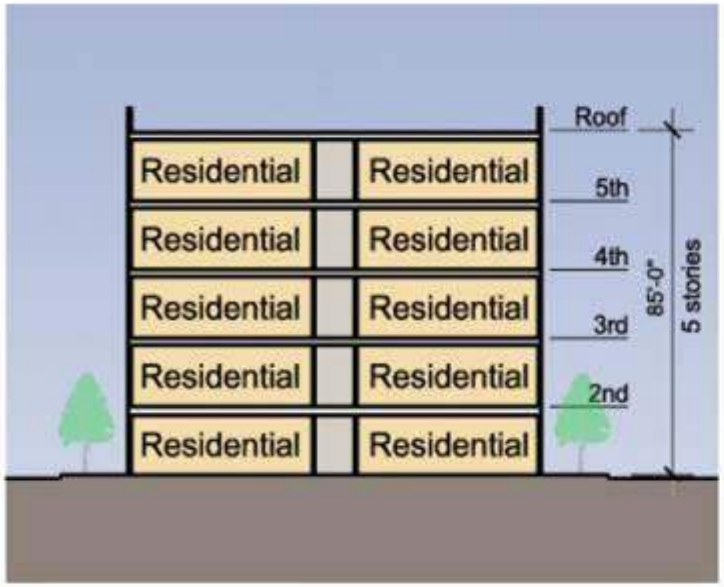
GENERAL BUILDING HEIGHTS AND AREAS

TABLE 504.3[a, f]
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE

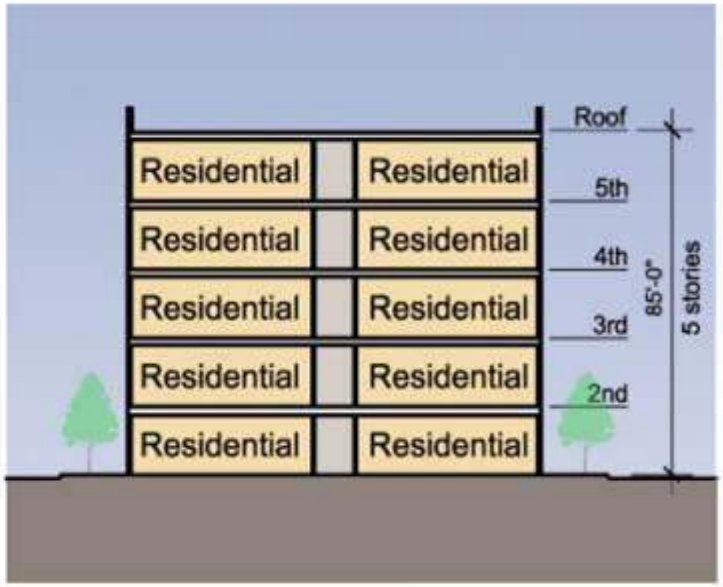
OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
B, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
A, E	NS[b]	UL	160	65	55	65	55	65	50	40
	S (without area increase)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	UL	160	65	55	65	55	65	50	40
H-1, H-2, H-3, H-5, I	NS[b, d]	UL	160	65	55	65	55	65	50	40
	S									
H-4	NS[b, d]	UL	160	65	55	65	55	65	50	40
	S (without area increase)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	UL	160	65	55	65	55	65	50	40
I-3	NS[b, e]	UL	160	NP	NP	NP	NP	NP	NP	NP
	S (without area increase)	UL	180	NP	NP	NP	NP	NP	NP	NP
	S (with area increase)	UL	160	NP	NP	NP	NP	NP	NP	NP
I-2, I-2.1	NS[b, d, g]	UL	160	65	55	65	55	65	50	40
	S (without area increase)	UL	180	85						
	S (with area increase)	UL	160	65						
I-4	NS[b, d]	UL	160	65	55	65	55	65	50	40
	S (without area increase)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	UL	160	65	55	65	55	65	50	50
R-1[h]	NS[c]	UL	160	65	55	65	55	65	50	40
	S13R	60	60	60	55	60	55	60	50	40
	S (without area increase)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	UL	160	65	55	65	55	65	50	40
R-2[h]	NS[c]	UL	160	65	55	65	55	65	50	40
	S13R	60	60	60	55	60	55	60	50	40
	S (without area increase)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	UL	160	65	55	65	55	65	60	40
R-3, R-3.1[h]	NS[c]	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60
R-2.1, R-4[h]	NS[c]	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	55	60	55	60	50	40
	S13R	60	60	60	55	60	55	60	50	40
	S	UL	160	65	55	65	55	65	50	40

TABLE 504.4[a, b, n]—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE

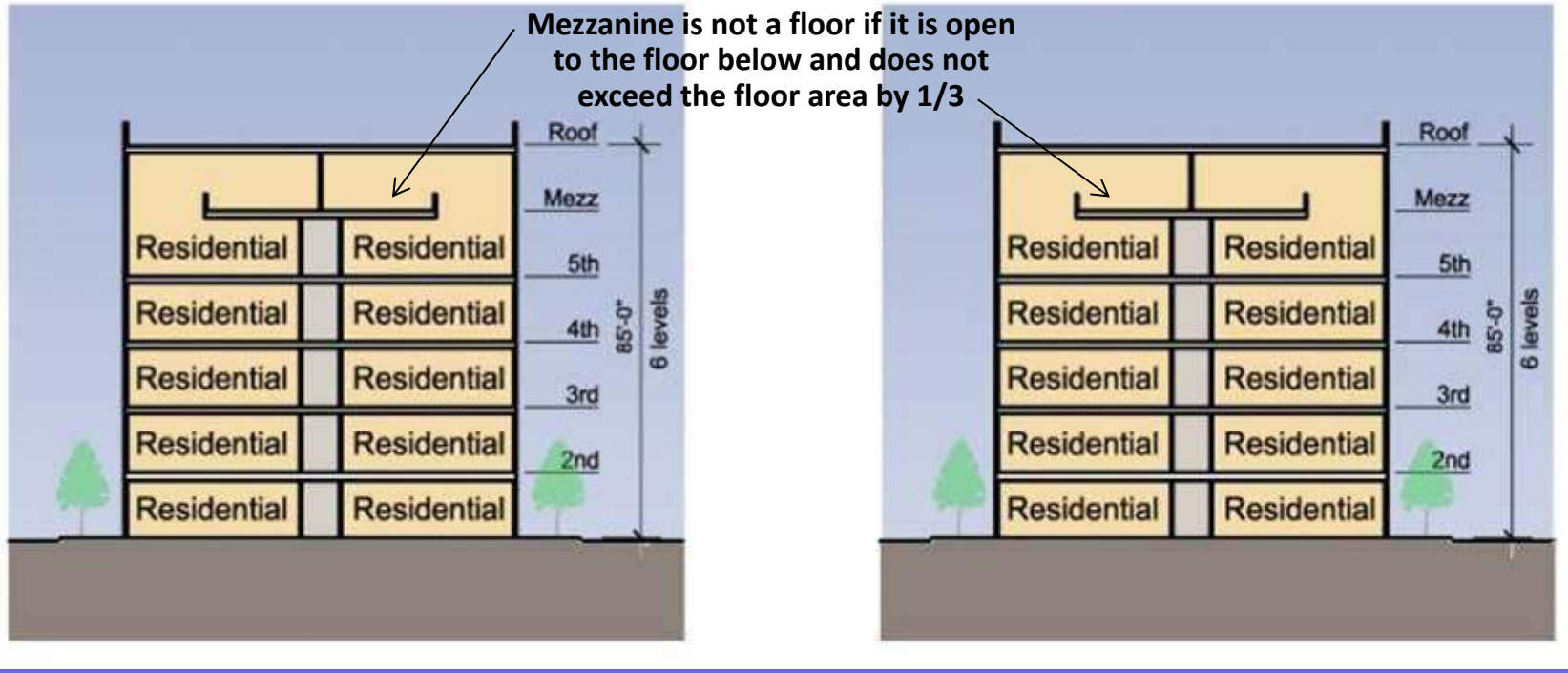
OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	3	2
	S13R	4	4						*3*	2
	S *(without area increase)*	UL	12	5	5	5	5	5	4	3
	S (with area increase)	*UL*	*11*	*4*	*4*	*4*	*4*	*4*	*3*	*2*
R-2[h]	NS[d]	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4					*3*	2
	S *(without area increase)*	UL	12	5	5	5	5	5	4	3
	S (with area increase)	*UL*	*11*	*4*	*4*	*4*	*4*	*4*	*4[c]*	*2*
R-2.1[h]	*NS*[d]	*UL*	*6*[f]	*3*[g]	*NP*	*3*[g]	*NP*	*NP*	*3*[g]	*NP*
	S13R	*UL*	*4*[f]	*3*[g]	*NP*	*3*[g]	*NP*	*NP*	*3*[g]	*NP*
	S	*UL*	*6*[f]	*3*[g]	*NP*	*3*[g]	*NP*	*NP*	*3*[g]	*NP*
R-3, *R-3.1*[h]	NS[d]	UL	11	4	4	4	4	4	3	3
	S13D	*4*	*4*						*3*	*3*
	S13R	4	4						4	4
	S	UL	12	5	5	5	5	5	4	4
R-4[h]	NS[d]	UL	11[j]	4[g]	4[m]	4[g]	4[m]	4[m]	3[d]	2[m]
	S13D	*4*	*4*[f]							
	S13R	4	4[f]							
	S	UL	*11*[j]							
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2[i]	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3
U	NS	UL	5	4	2	3	2	4	2	1
	S	UL	6	5	3	4	3	5	3	2



2012 – IBC
Type IIIA
Table 503 – 85’ High
Table 503 – 5 Stories

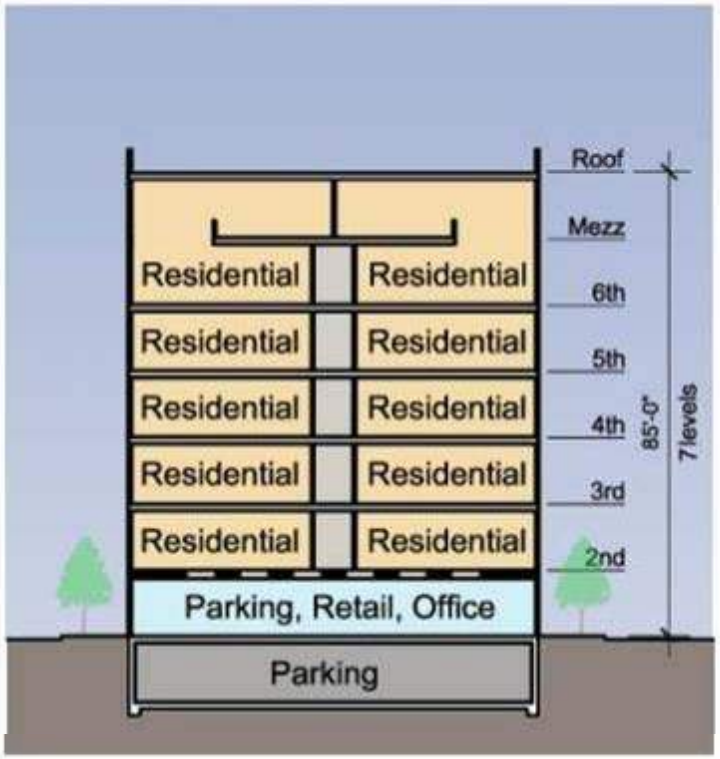


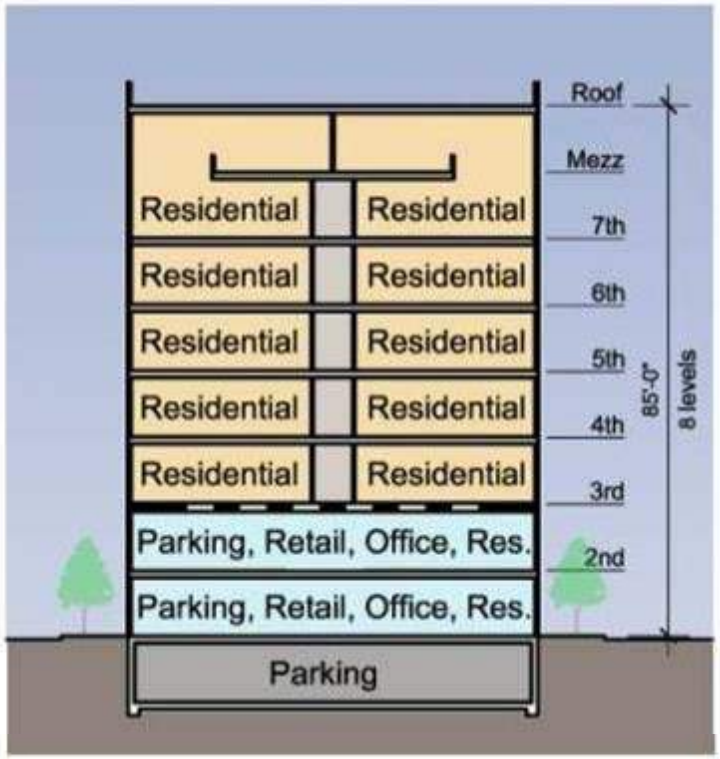
2015 – IBC
Type IIIA
Table 504.3 – 85’ High
Table 504.4 – 5 Stories



2012 – IBC
Type IIIA
Table 503 – 85' High
Table 503 – 5 Stories
Mezzanine Section 507

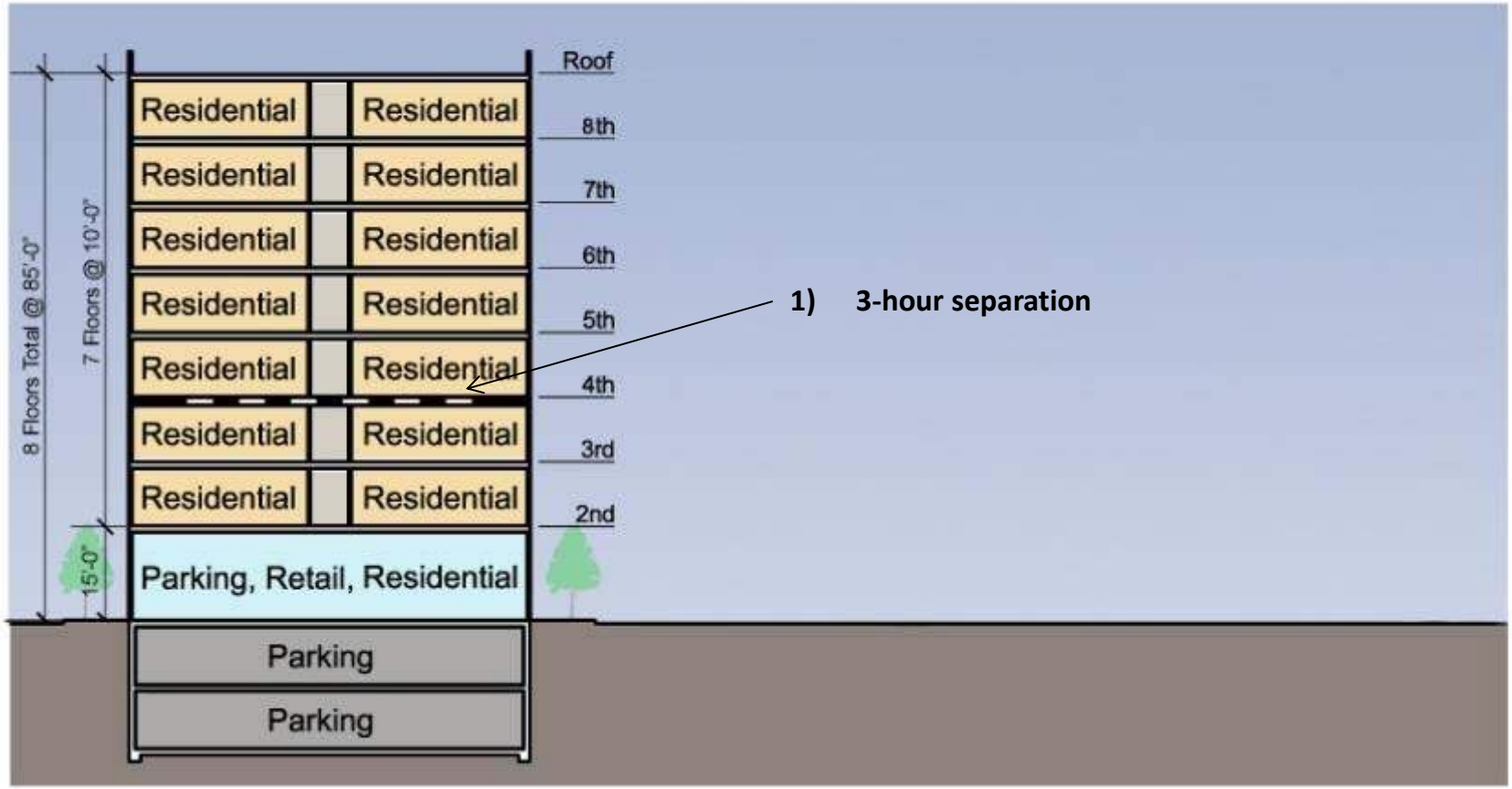
2015 – IBC
Type IIIA
Table 504.3 – 85' High
Table 504.4 – 5 Stories
Mezzanine Section 505.2



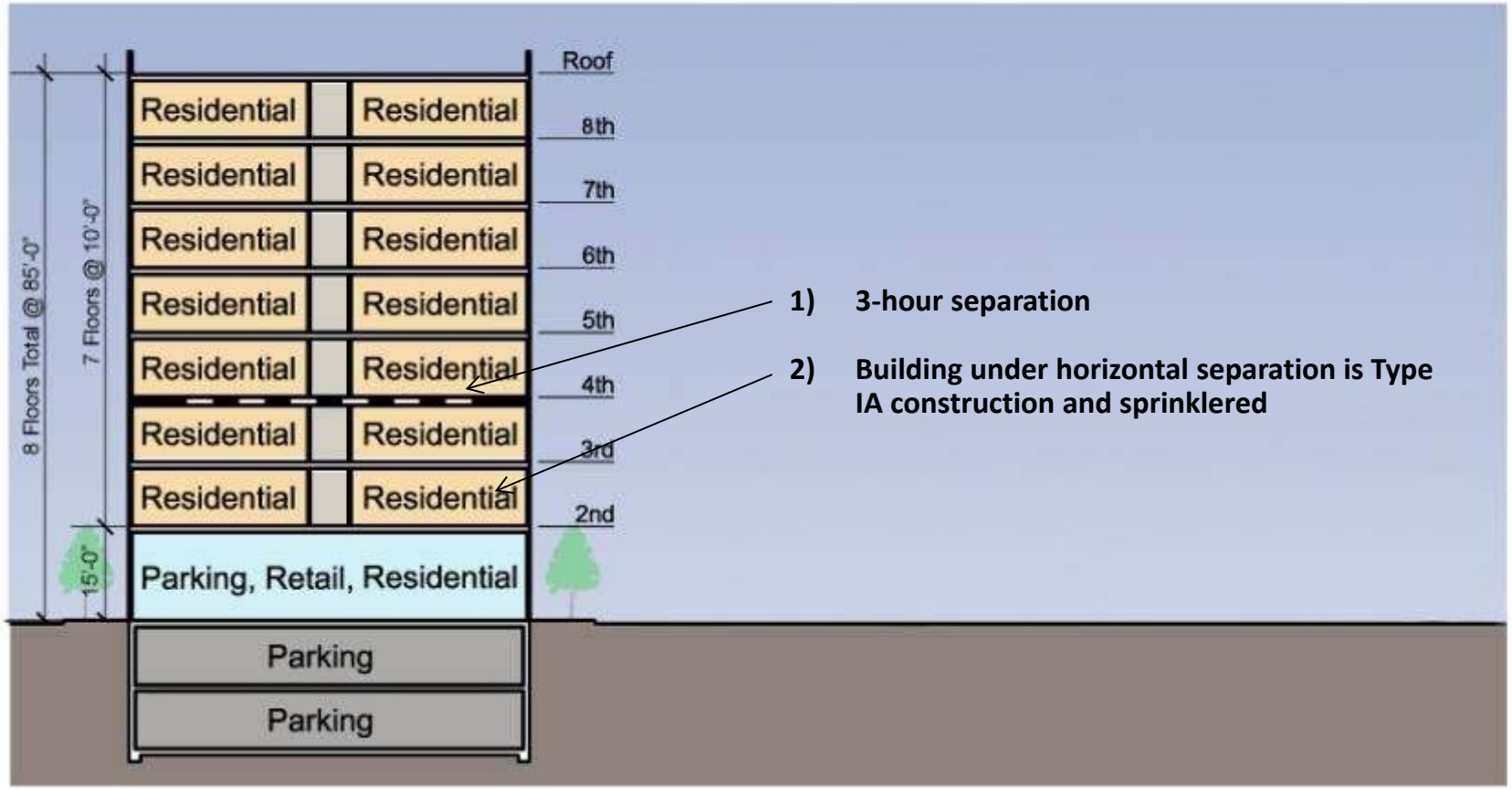


2012 – IBC
Basic Code Height – Table 5B
Sprinkler Increase – Section 506
Mezzanine – Section 507
Podium – Section 509.2
Separate Buildings for Area & Stories
Podium is Only One Story
Podium Type I Construction

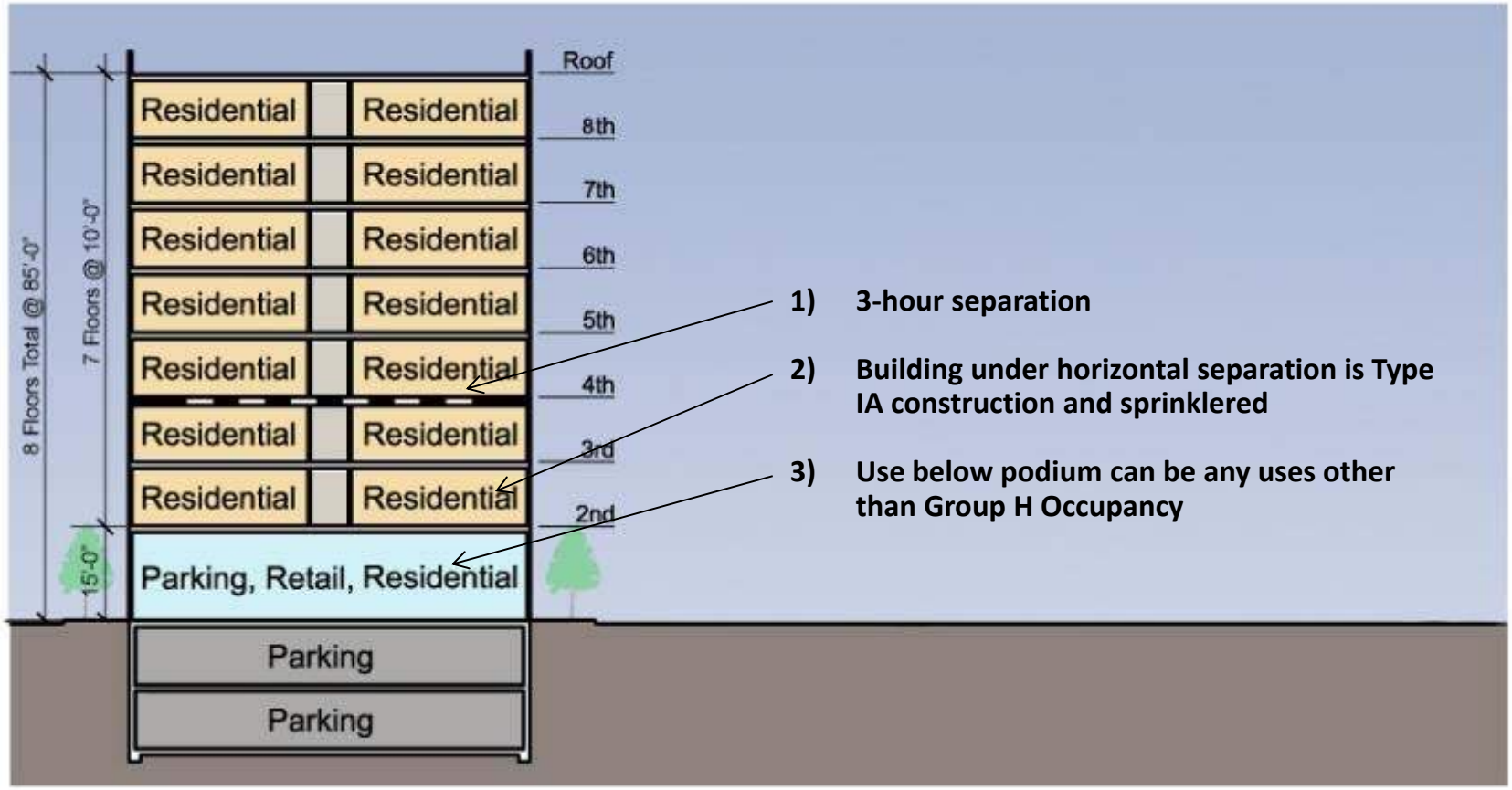
2015 – IBC
Basic Code Height – Table 503
Sprinkler Increase – Section 504
Mezzanine – Section 505
Podium – Section 510.2
Separate Buildings for Area & Stories
Unlimited Number of Stories for Podium
Podium Type I Construction



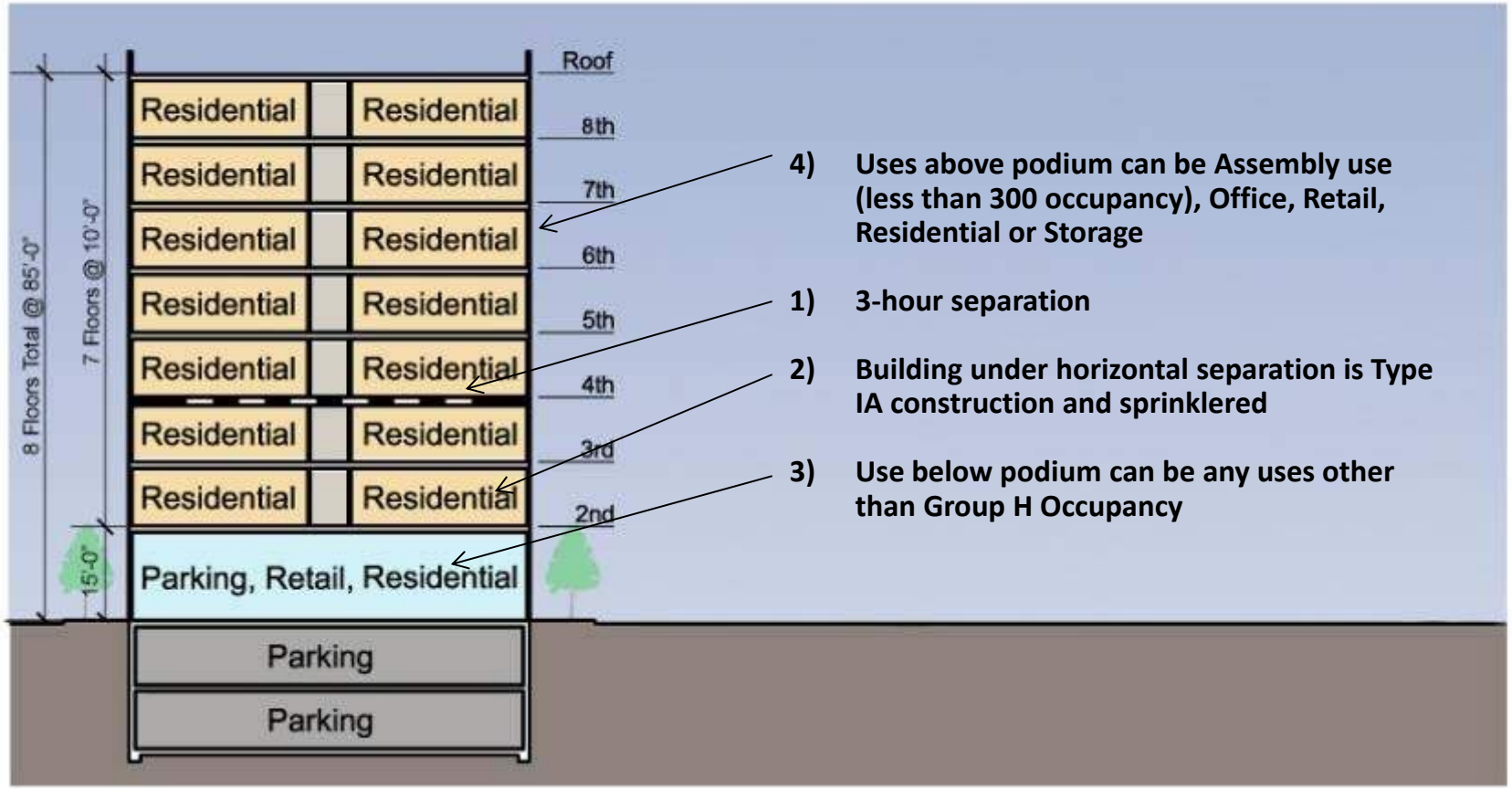
Separate Building for Purposes of Area, Continuity of Fire Walls and Stories



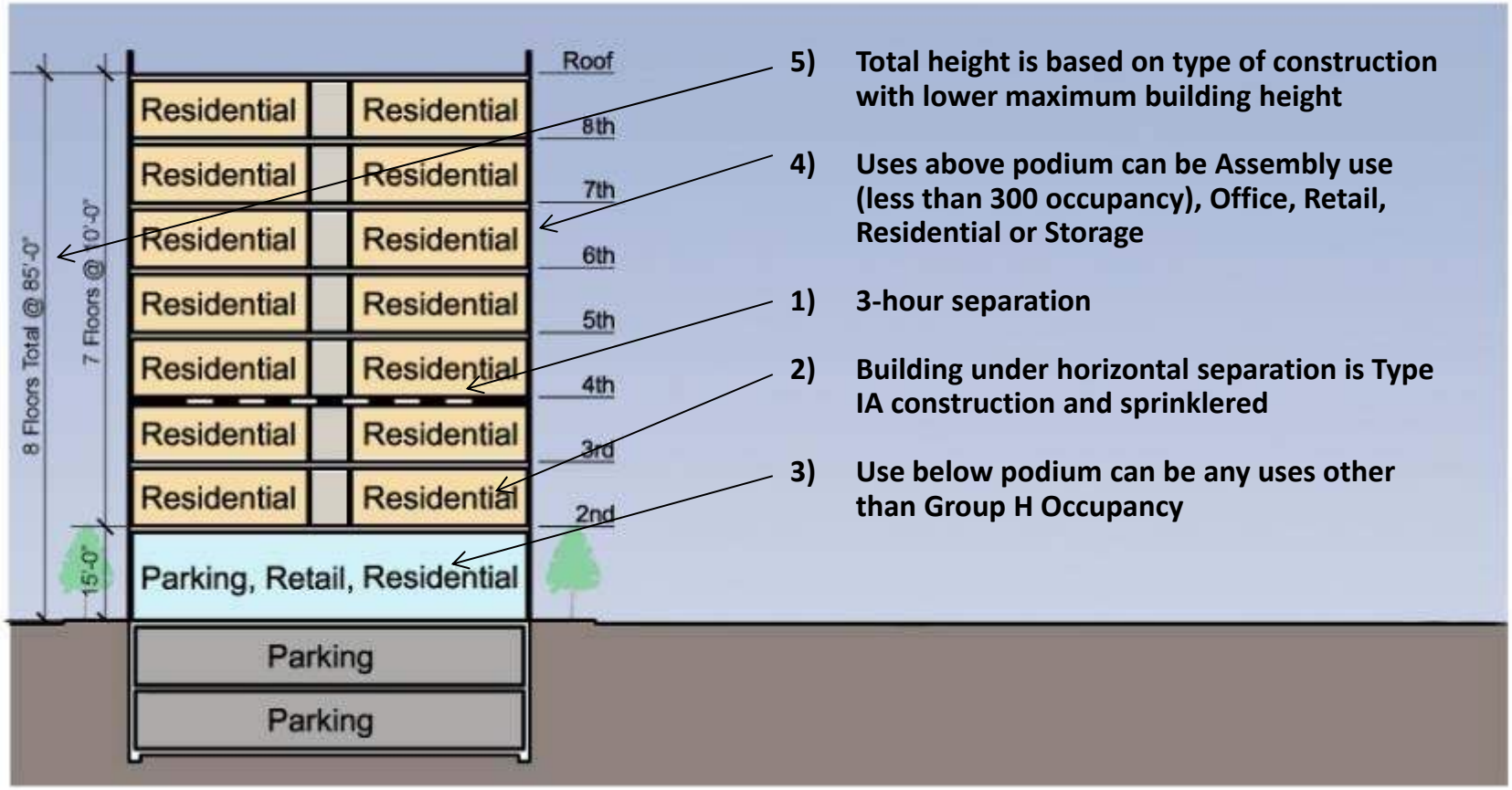
Separate Building for Purposes of Area, Continuity of Fire Walls and Stories



Separate Building for Purposes of Area, Continuity of Fire Walls and Stories

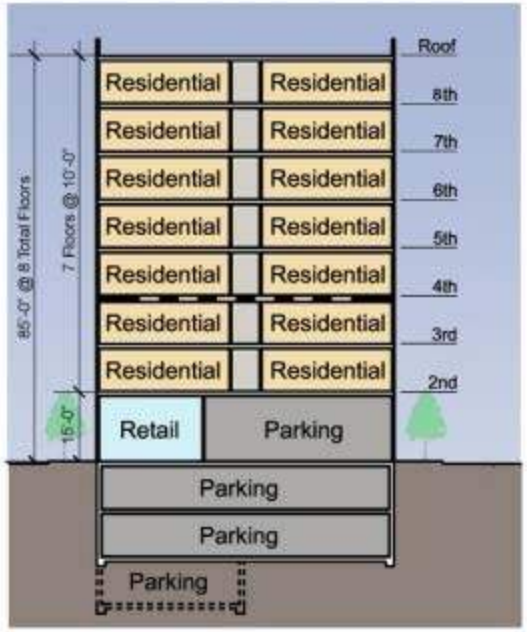


Separate Building for Purposes of Area, Continuity of Fire Walls and Stories

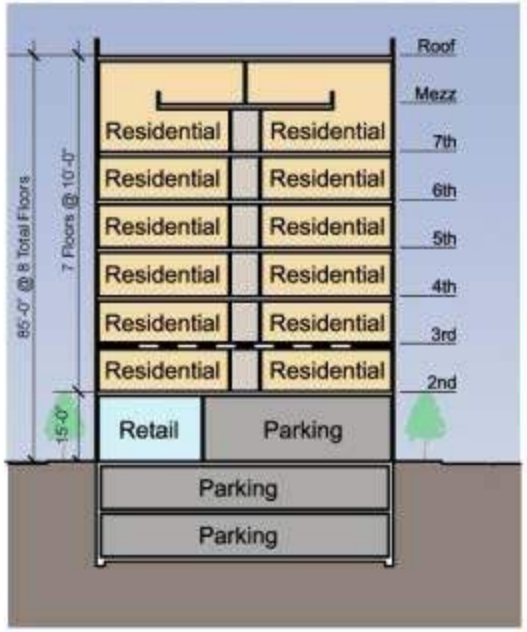


Separate Building for Purposes of Area, Continuity of Fire Walls and Stories

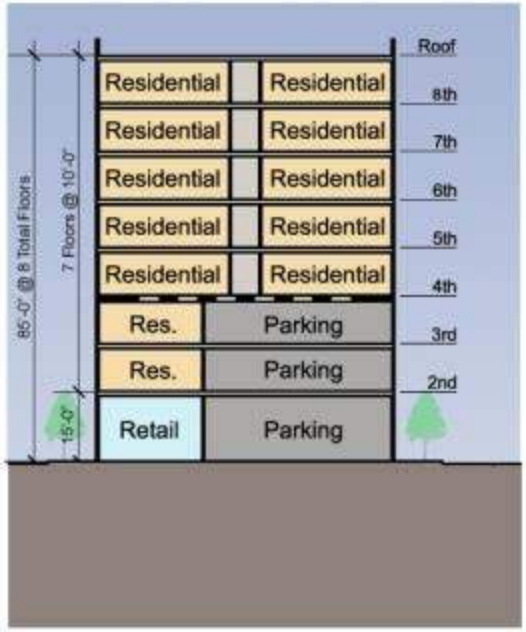
Fire Department Access is 75 Feet to Floor Level



160-180 Units/Ac



145-165 Units/Ac



100-120 Units/Ac

Examples of Where We are Headed

Building Code Requirements

- For Type III-A vs. Type V-A Construction
- Exterior Bearing Walls

Type V and III Construction

Type V-A
(Type V-1 hour)

Type of construction in which the structural elements, exterior walls and interior walls are of any materials permitted by CBC.

Structural Frame	1 Hr
Exterior Bearing Walls	**1 Hr**
Exterior Non-Bearing	Depends of distance to PL
Interior Bearing Walls	1 Hr
Interior Non-Bearing	0
Floor Construction	1 Hr
Roof Construction	1 Hr
Shafts	2 Hr when 4 stories or more
Fire Walls	**2 Hr**

Type III-A
(Type III-1 hour)

Type of construction in which the exterior walls are of non-combustible materials and the interior building elements are of any materials permitted by CBC.

Structural Frame	1 Hr
Exterior Bearing Walls	**2 Hr**
Exterior Non-Bearing	Depends of distance to PL
Interior Bearing Walls	1 Hr
Interior Non-Bearing	0
Floor Construction	1 Hr
Roof Construction	1 Hr
Shafts	2 Hr when 4 stories or more
Fire Walls	**3 Hr**

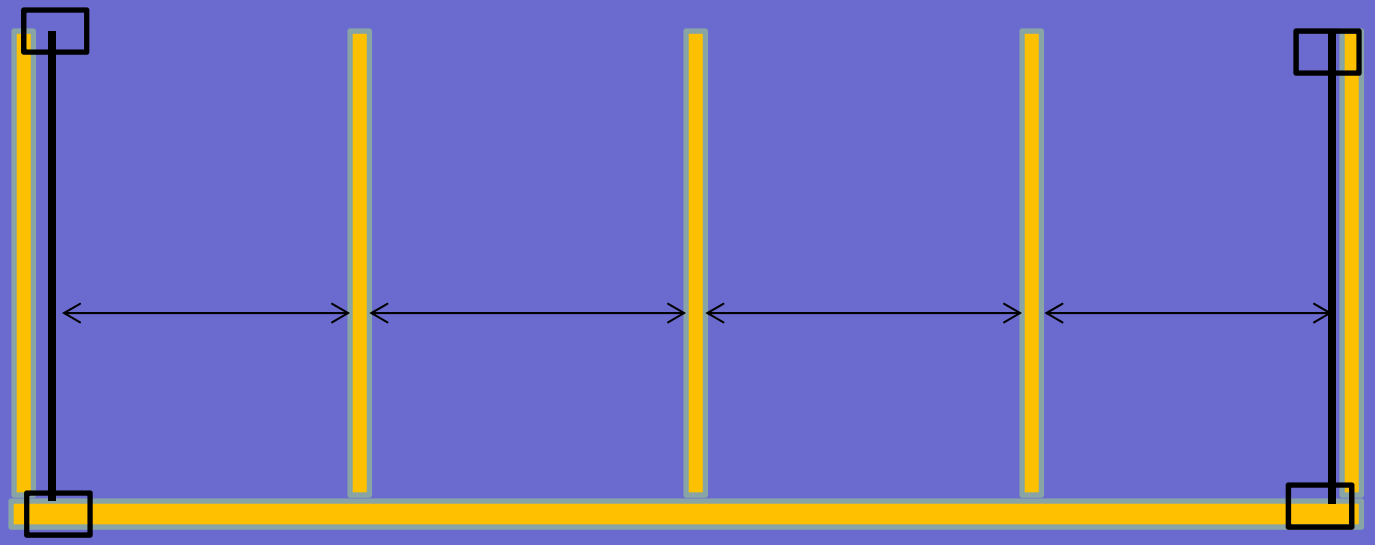
Fire-retardant wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less.*

*** All hardware to be galvanized or hot dipped.**

Fire Protection

Other Alternatives:

- Frame to demising walls rather than exterior walls.
- At last exterior walls frame to beams/columns.



2-hour Bearing Walls

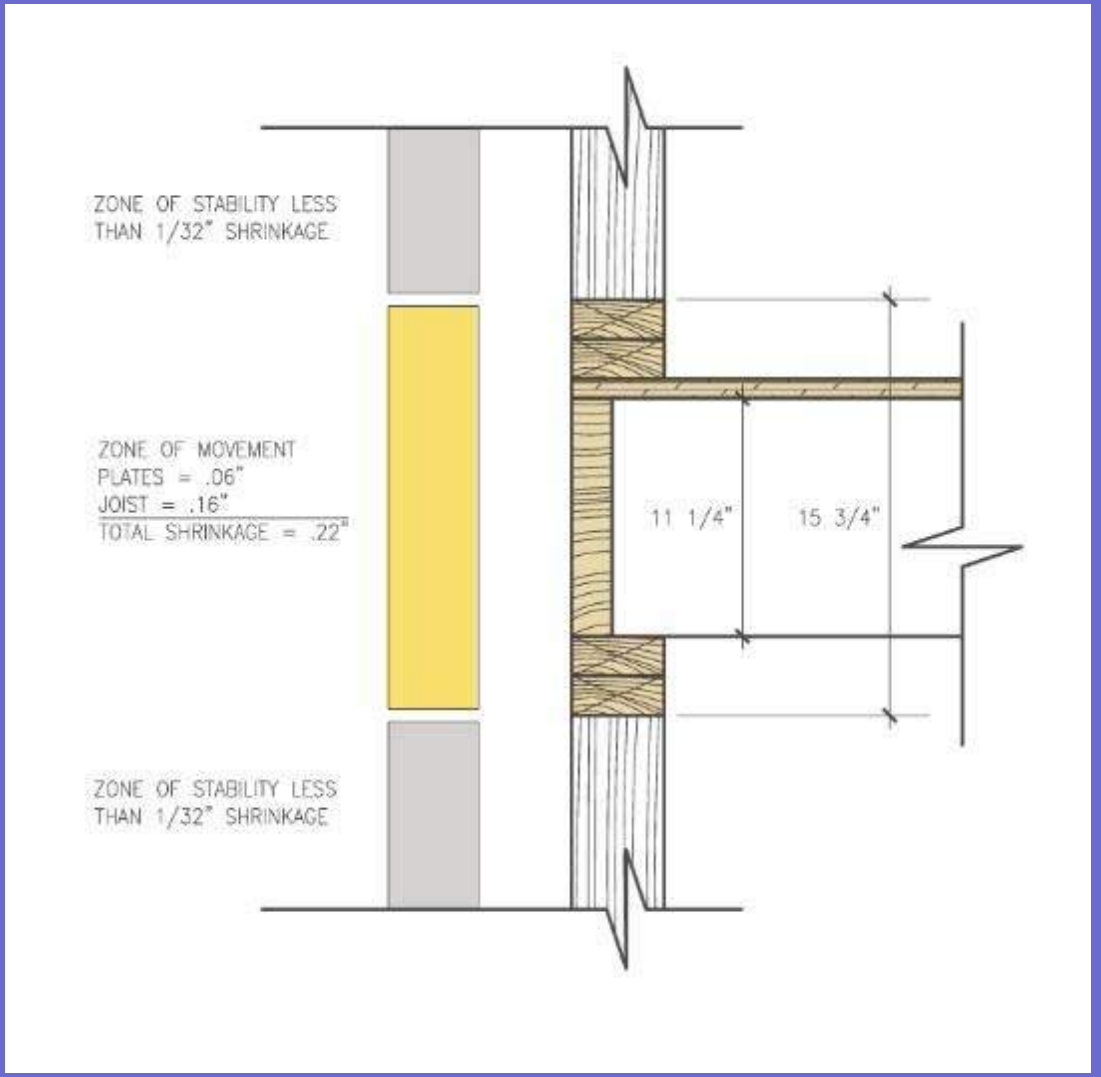
1-hour Non-Bearing Walls

Technical Requirements

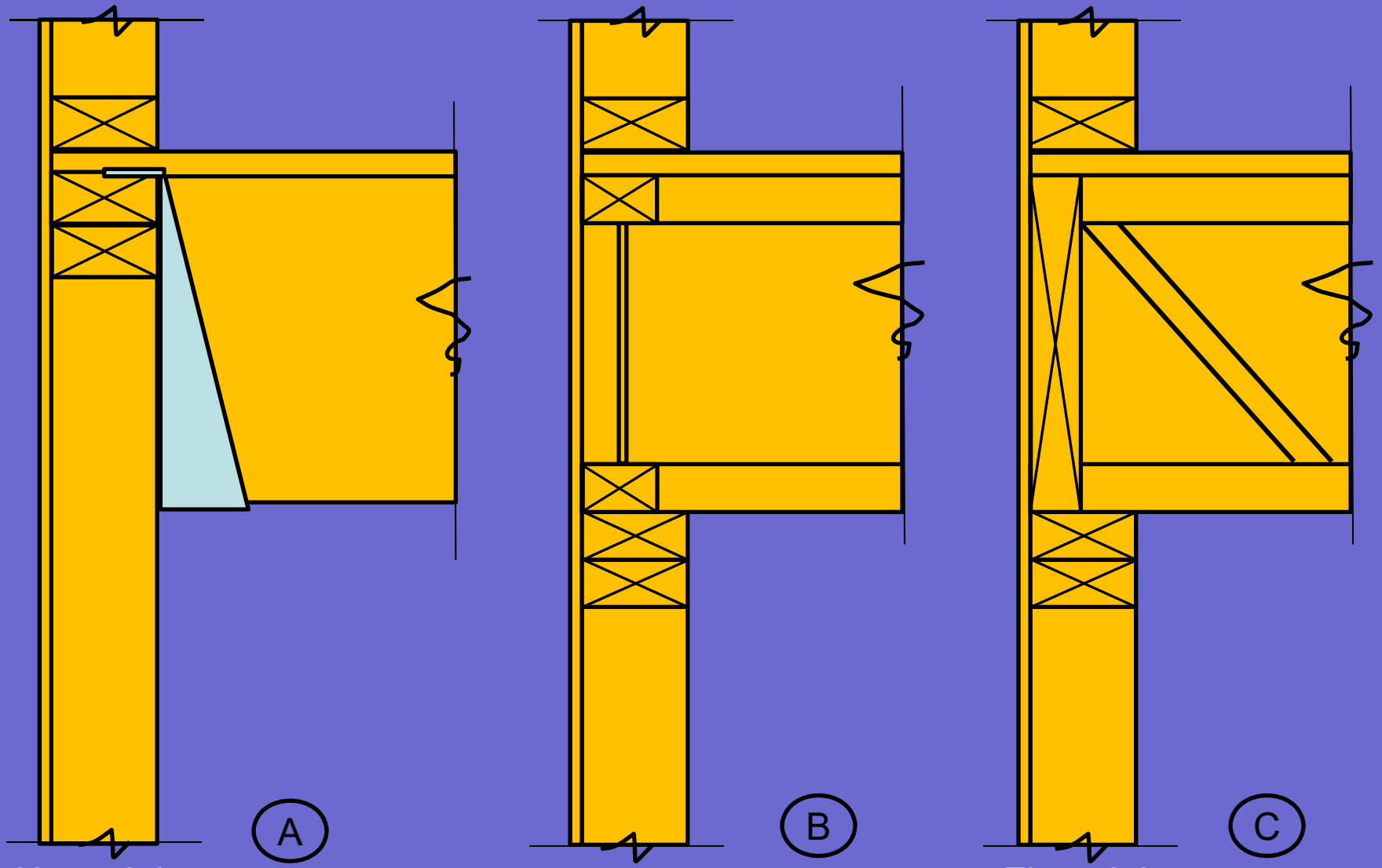
- Shrinkage
- Shear Walls
- MPE Coordination
- Stud Spacing
- Waterproofing
- Façade Access

Zone of Shrinkage

Shrinkage occurs primarily in horizontal members such as wall plates and floor joists



Detail 1 - Type III Framing



Hang Joist
No Scale

Floor Joist

Exterior Plywood Shear Walls


Buckle Your
Seatbelts
02/28/2007

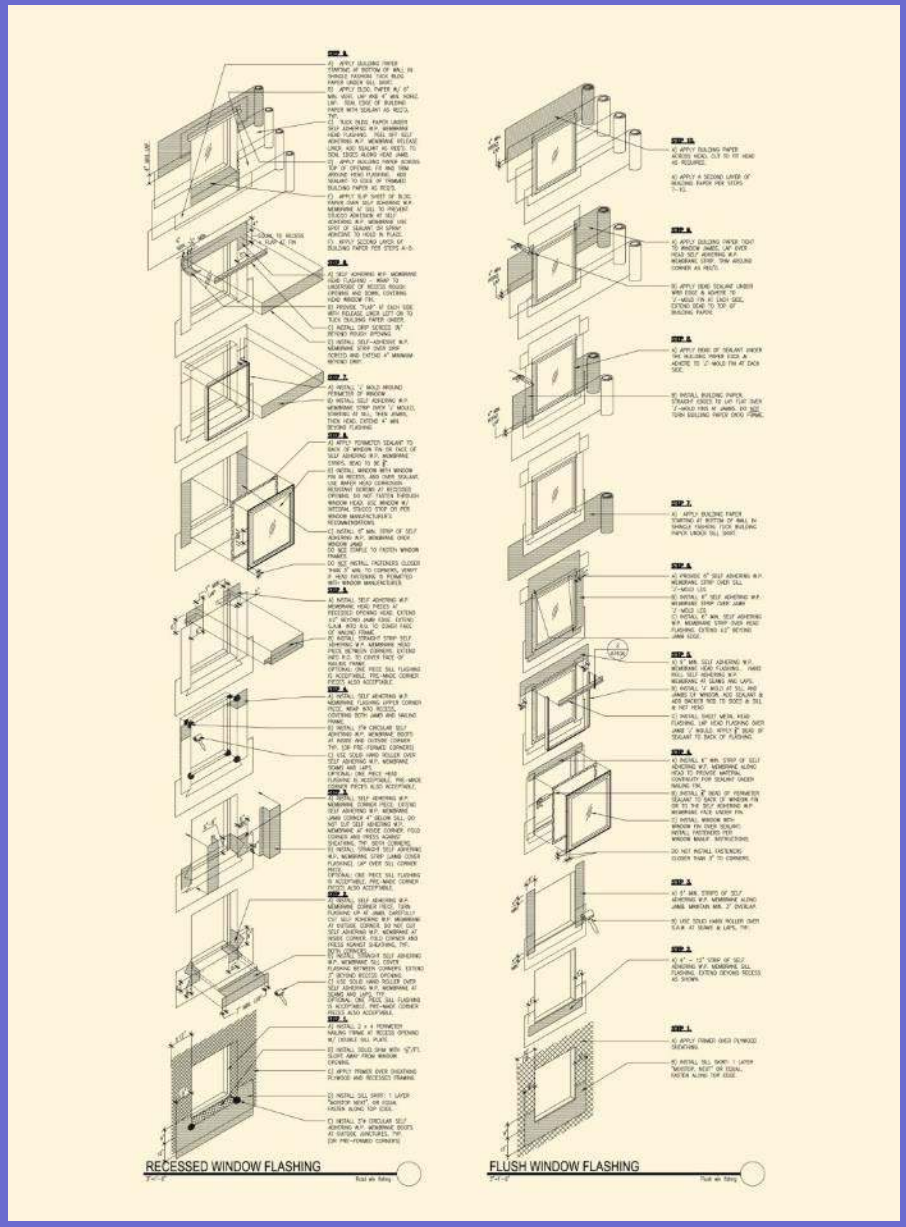
Tie Rods & Compression Studs at Shear Panels

Separate Shear Walls & Plumbing Walls

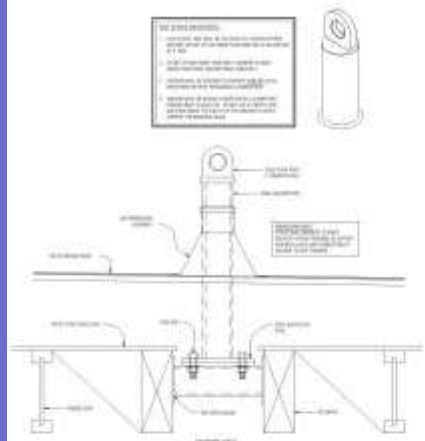
Vent Penetrations in Shear Walls


2x at 16” o.c.
2x at 12” o.c.
Double 2x at 12” o.c.
Triple 2x at 12” o.c.

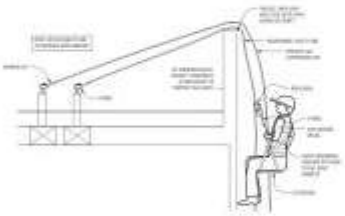
Waterproofing



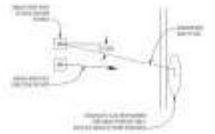
Attention to Detail



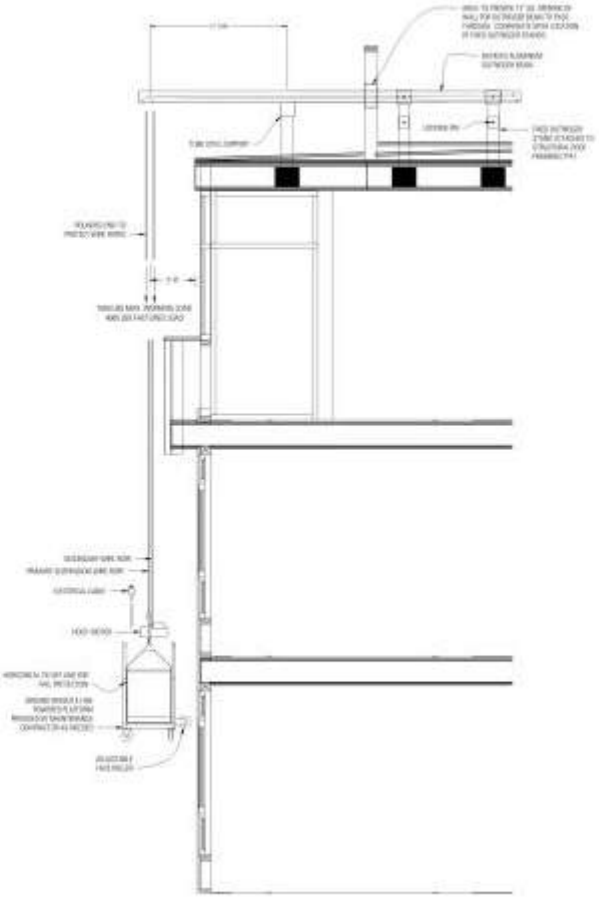
1 ROOF ANCHOR DETAIL



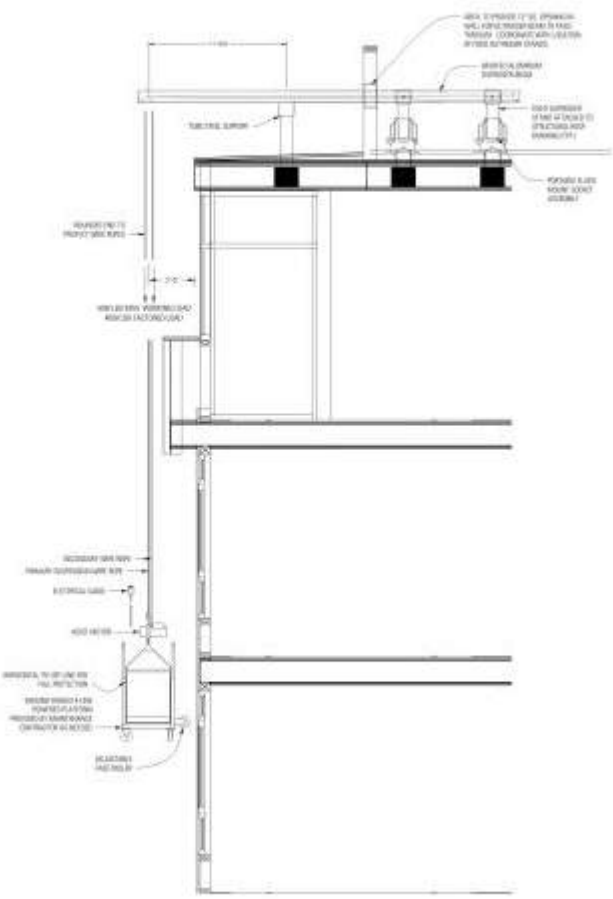
1 CDA DROP SECTION



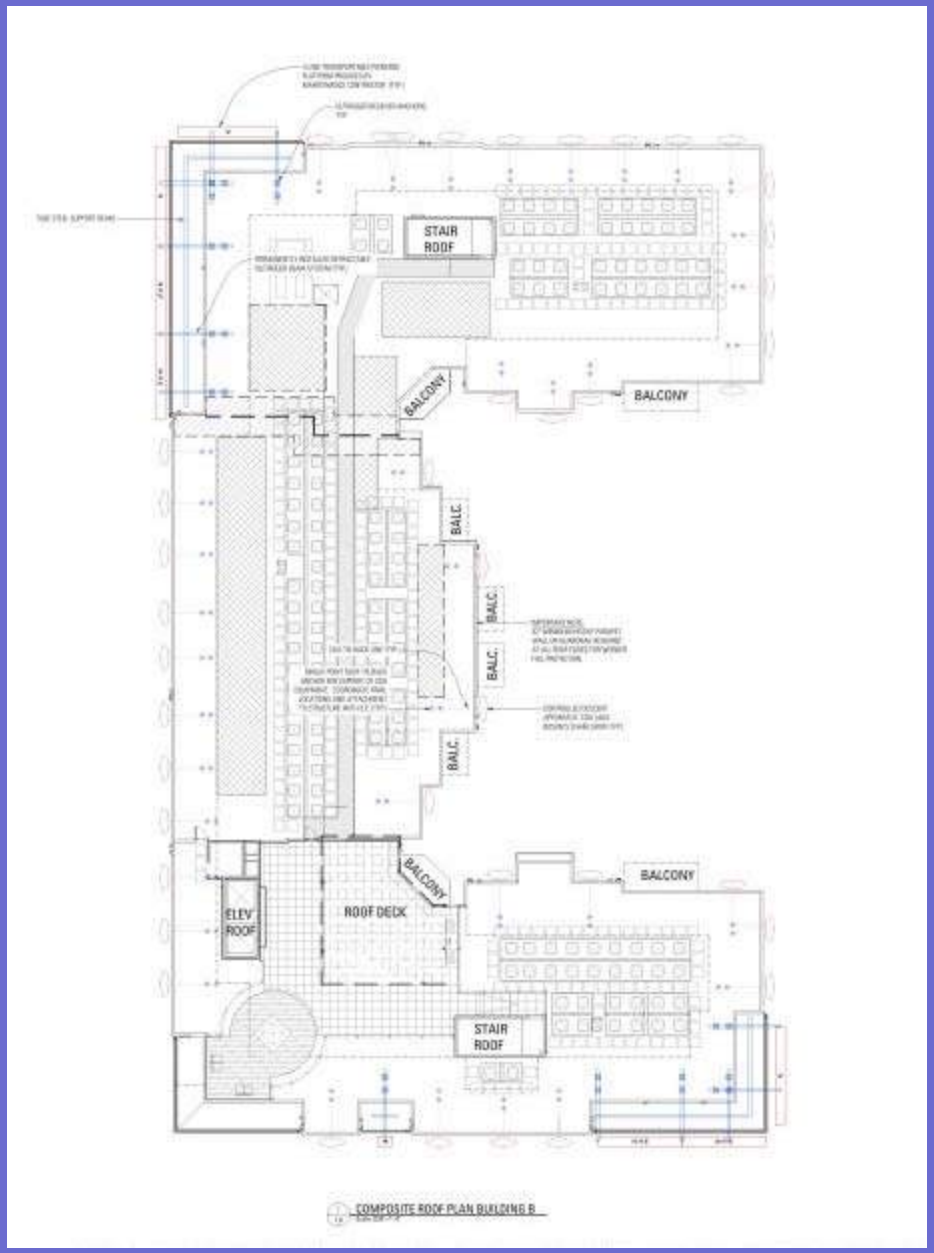
1 CDA DROP DETAIL



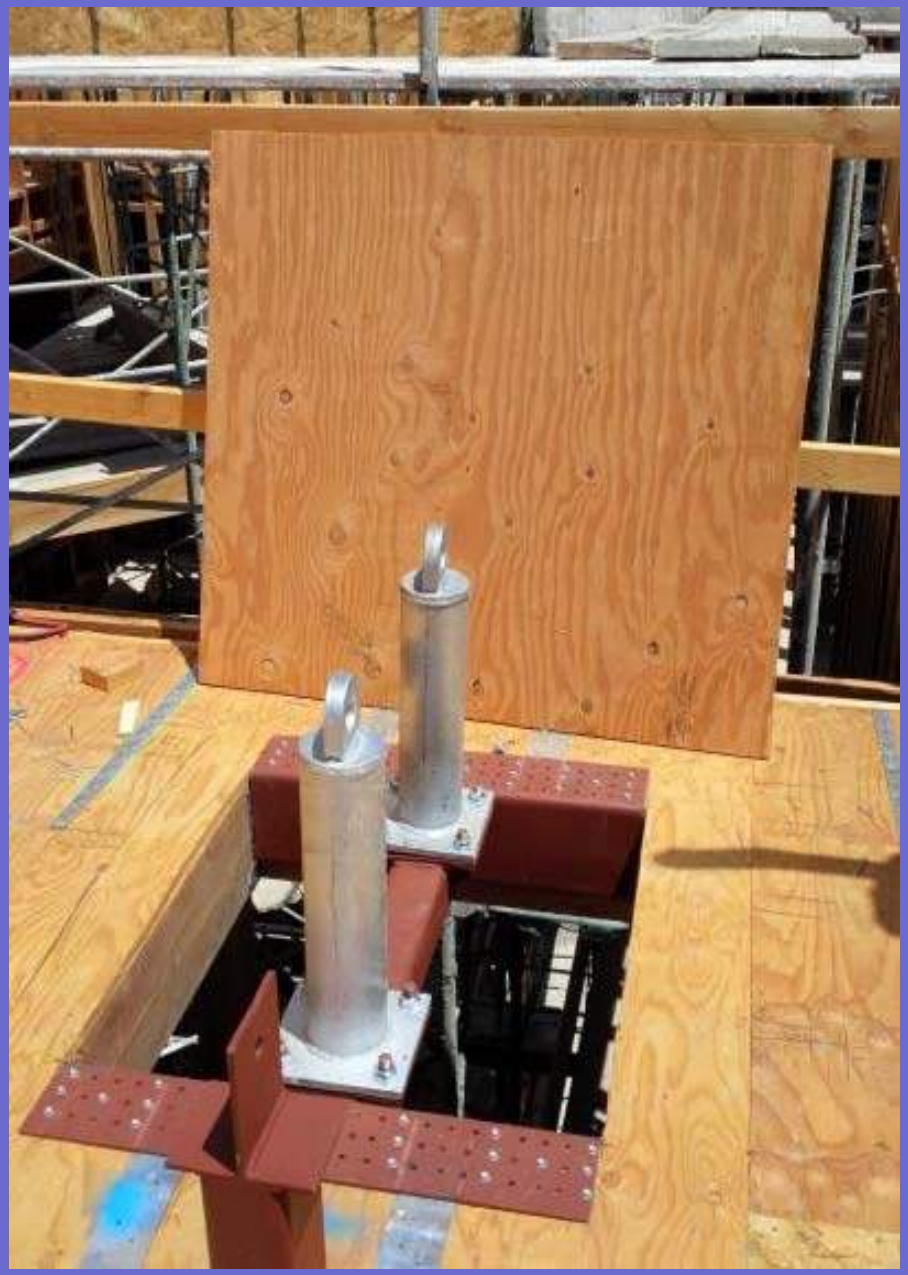
1 SECTION AT FIXED OUTRIGGER



1 SECTION AT FIXED OUTRIGGER FLUSH MOUNTED

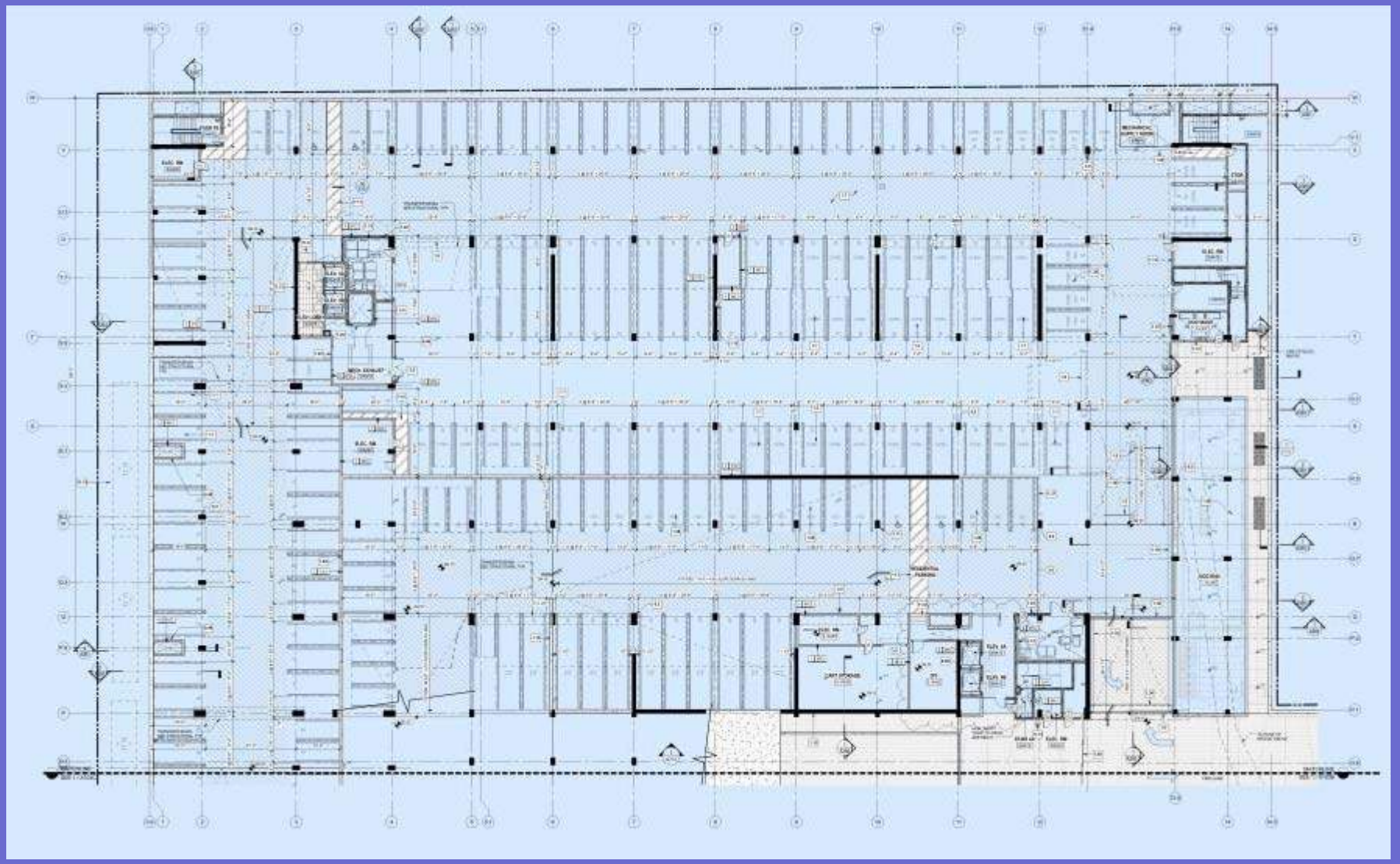


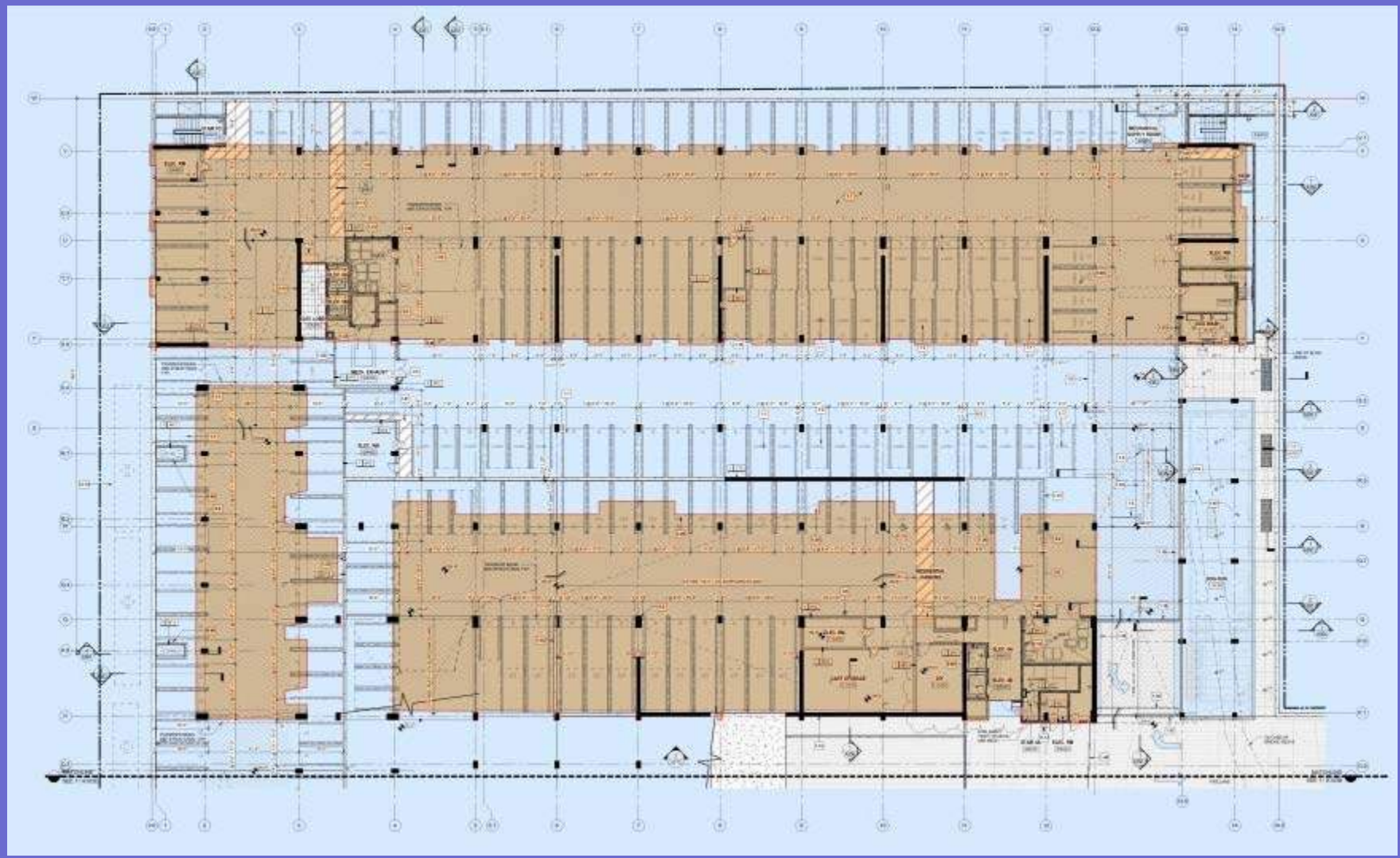
1 COMPOSITE ROOF PLAN BUILDING B



Alignment of Columns & Slab Edge Grid with Columns Parking Grid Below


Pico





Open Space Trends

- Podium Projects
- Wrap Projects

TABLE 504.4[a, b, c]
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
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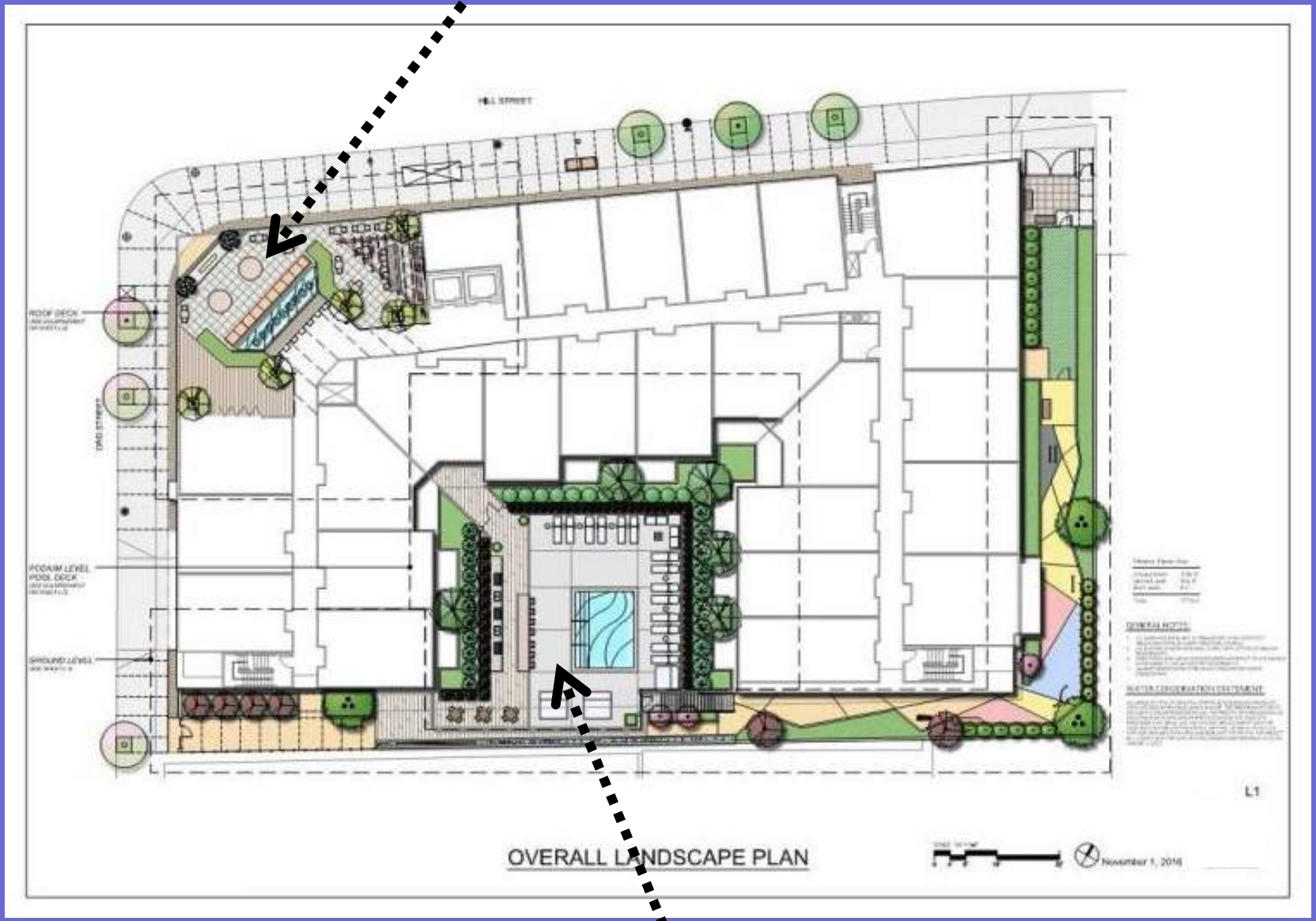
	S (with area increase)	UL	5	3	2	3	2	3	2	1
A-2	NS	UL	11	3	2	3	2	3	2	1
	S (without area increase)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	UL	11	3	2	3	2	3	2	1
A-3	NS	UL	11	3	2	3	2	3	2	1
	S (without area increase)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	UL	11	3	2	3	2	3	2	1
A-4	NS	UL	11	3	2	3	2	3	2	1
	S (without area increase)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	UL	11	3	2	3	2	3	2	1
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
E	NS	UL	5	3	2	3	2	3	1	1
	S (without area increase)	UL	6	4	3	4	3	4	2	2
	S (with area increase)	UL	5	3	2	3	2	3	1	1
F-1	NS	UL	11	4	2	3	2	4	2	1
	S	UL	12	5	3	4	3	5	3	2
F-2	NS	UL	11	5	3	4	3	5	3	2
	S	UL	12	6	4	5	4	6	4	3
H-1	NS[c, d]	1	1	1	1	1	1	1	1	NP
	S									
H-2	NS[c, d]	20	3	2	1	2	1	2	1	1
	S									
H-3	NS[c, d]	20	6	4	2	4	2	4	2	1
	S									
H-4	NS[c, d]	20	7	5	3	5	3	5	3	2
	S (without area increase)	20	8	6	4	6	4	6	4	3
	S (with area increase)	20	7	5	3	5	3	5	3	2
H-5	NS[c, d]	4	4	3	3	3	3	3	3	2
	S									
I-2/I-2.1[e]	NS[d, f]	UL	4	2	1	1	NP	1	1	NP
	S (without area increase)	UL	5	3						
	S (with area increase)	UL	4	2						
I-3	NS[d, f]	NP	NP	NP	NP	NP	NP	NP	NP	NP
	S (without area increase)	UL	3	NP	NP	NP	NP	NP	NP	NP
	S (with area increase)	UL	2	NP	NP	NP	NP	NP	NP	NP
I-4	NS[d, g]	UL	5	3	2	3	2	3	1	1
	S (without area increase)	UL	6	4	3	4	3	4	2	2
	S (with area increase)	UL	5	3	2	3	2	3	1	1
L	NS	NP	NP	NP	NP	NP	NP	NP	NP	NP
	S	20	6	5	3	5	3	5	3	2
M	NS	UL	11	4	2	4	2	4	3	1
	S	UL	12	5	3	5	3	5	4	2

(continued)

Open Space at Roof



Open Space at Podium

KEYNOTES:

1. POOL
2. PRECAST CONCRETE UNIT PAVERS ON PEDESTALS
3. RUBBER MULCH
4. RAISED PLANTER
5. WOOD DECKING ON PEDESTALS
6. BBQ COUNTER
7. ORNAMENTAL TREES IN OVERSIZED FIBERGLASS POTTERY
8. EQUIPMENT ENCLOSURE FEATURE
9. INTEGRATED SEATWALL
10. SYNTHETIC TURF

Scale: 1" : 16'

ROOF DECK: SCHEME 2

January 23, 2014

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Open Space on Full Garage Level

Open Space on Full Garage Level


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QUESTIONS?

This concludes The American Institute of Architects Continuing Education Systems Course

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