

Design Strategies for Podium and Wrapper Buildings

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ARCHITECTURE LANDSCAPE ARCHITECTURE INTERIOR DESIGN PLANNING

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

Podium and Wrapper Buildings

- 1- Understanding the Context of the Building Code
- 2- Applying Code Limitations to Podium and Wrapper Designs
- 3- Design Challenges with Type III Construction
- 4- Cost and Density Summary
- 5- Case Studies



Podium and Wrapper Buildings

GENERAL CONTEXT:

- Code References from 2021 International Building Code (for new construction)
- Multi-family (IBC Use Group R-2); multi-level

MIXED-USE BUILDING COMPONENTS/ USES INCLUDE:

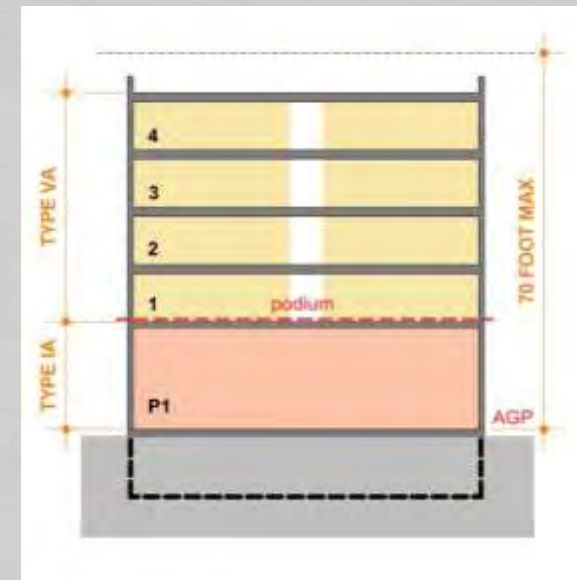
- RESIDENTIAL (R-2) and PARKING (S-2)
- Can also include RETAIL (M), RESTAURANT (A-2) and/or OFFICE (B)



Podium and Wrapper Buildings

TYPOLOGY DEFINITIONS:

- **“Wrapper”** typically refers to a parking garage **“wrapped”** by wood-framed residential; aka **“donut”** or **“Texas donut”**
- **“Podium”** typically refers to wood-framed, residential construction above a concrete (or steel-framed) **base** or **“podium”** ; aka **“pedestal”**
- Neither of these terms are found in IBC
- Both are cost effective strategies for moderate density, mid-rise, multi-family design (5 – 8 stories)



Building Code

CONSTRUCTION TYPES:

- **Types I and II:** non-combustible (NC); concrete, steel, metal stud
- **Type III:** non-combustible exterior + combustible interior; FRT allowed for Type III [602.3]
- **Type IV:** combustible; heavy timber (HT) and cross-laminated timber (CLT); 2021 IBC updates to expand limitations
- **Type V:** combustible; standard wood



Building Code

**TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE^a**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A, B, E, F, M, S, U	S	UL	180	85	75	85	75	270	180	85	85	70	60
R ^h	S13R	60	60	60	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	270	180	85	85	70	60

**TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE^{a, b}**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION													
	See Footnotes	Type I		Type II		Type III		Type IV				Type V		
		A	B	A	B	A	B	A	B	C	HT	A	B	
A-2	NS	11	11	4	3	4	3	18	12	6	4	3	2	
	S	UL	12	4	3	4	3	18	12	6	4	3	2	
B	NS	UL	11	5	3	5	3	18	12	9	6	4	3	
	S	UL	12	6	4	6	4	18	12	9	6	4	3	
M	NS	UL	11	4	2	4	2	12	8	6	5	4	2	
	S	UL	12	5	3	5	3	12	8	6	5	4	2	
R-2 ^h	NS ¹	UL	11	4	4	4	4	4	4	4	4	3	2	
	S13R	4	4	4	4	4	4	4	4	4	4	4	3	
	S	UL	12	5	5	5	5	18	12	8	5	4	3	
S-2	NS	UL	11	5	3	4	3	18	12	8	5	3	2	
	S	UL	12	6	4	5	4	12	8	8	5	5	3	

Building Code

Building Code Considerations for Typical Podium & Wrapper Buildings

	2021 IBC Ref.	R-2 (Residential) and Fully Sprinklered (NFPA 13)		
	Chapter 6	Type IA (NC)	Type IIIA (NC+C)	Type VA (C)
Construction Type (IBC)	Chapter 6	Type IA (NC)	Type IIIA (NC+C)	Type VA (C)
Number of Stories (max)	T504.4	Unlimited	5	4
Building Height (max)	T504.3	Unlimited	85 feet	70 feet
Allowable Area (SF) *	T506.2	Unlimited	72,000 *	36,000 *
Exterior Materials		(NC) Metal Stud, Concrete, Steel	(NC) FRT wood [602.3]	(C) Standard Wood
Interior Materials		(NC) Metal Stud, Concrete, Steel	(C) Standard Wood	(C) Standard Wood

(NC) = Non-combustible; (C) = Combustible

* not including frontage increase [506.3]

Wrapper Buildings

CONSIDERATIONS:

- Cost effective design employing structured *parking garages*
- “Open” garages [406.5] do not require mechanical ventilation or sprinklers
- For open garages, a minimum separation distance of 10 feet is required [406.5.6]
- “Enclosed” garages [406.6] require both mechanical ventilation [406.6.2] and sprinklers [406.6.3]

Although interesting, this is not a wrapper.



Rendering by Eric Owen Moss Architects

Wrapper Buildings

CONSIDERATIONS:

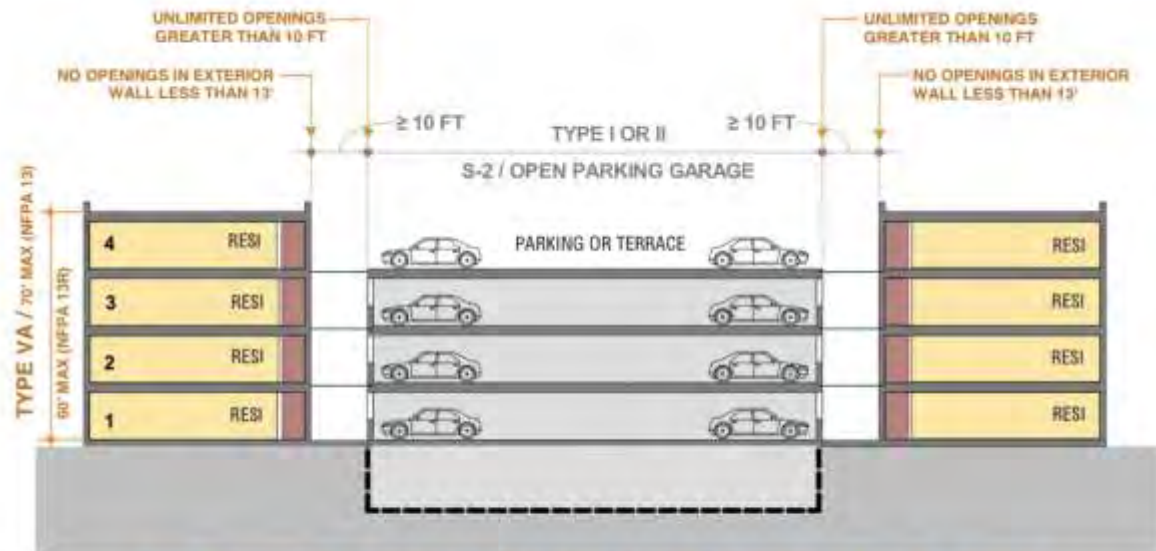
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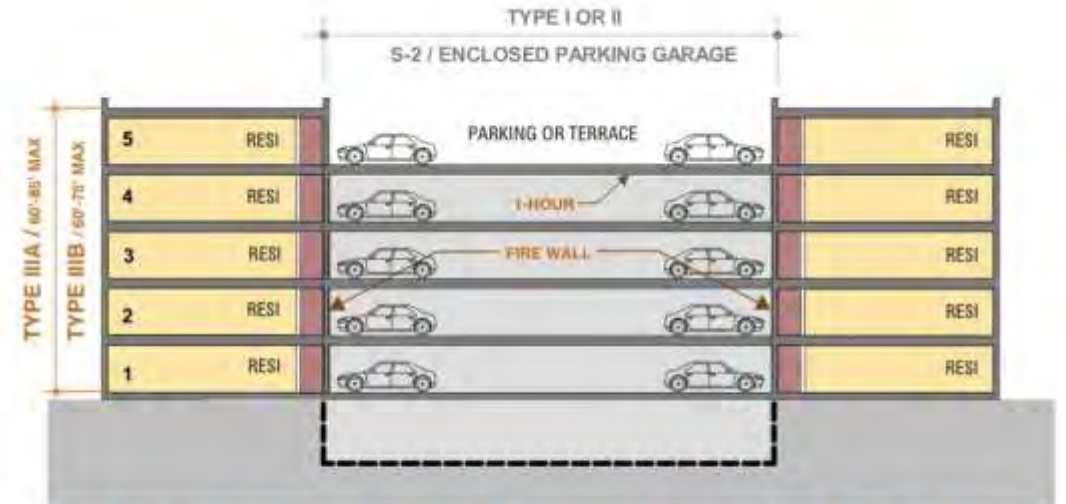
Wrapper Buildings

CONSIDERATIONS and CHALLENGES:

- Lot size, garage connection, construction phasing and inefficiency



**BUILDINGS SEPARATED BY MORE THAN 10 FEET
TYPE VA WRAP / OPEN GARAGE**



**SEPARATE BUILDINGS CONNECTED BY A FIRE WALL
TYPE IIIA WRAP / ENCLOSED GARAGE**

Podium Buildings

CONSIDERATIONS:

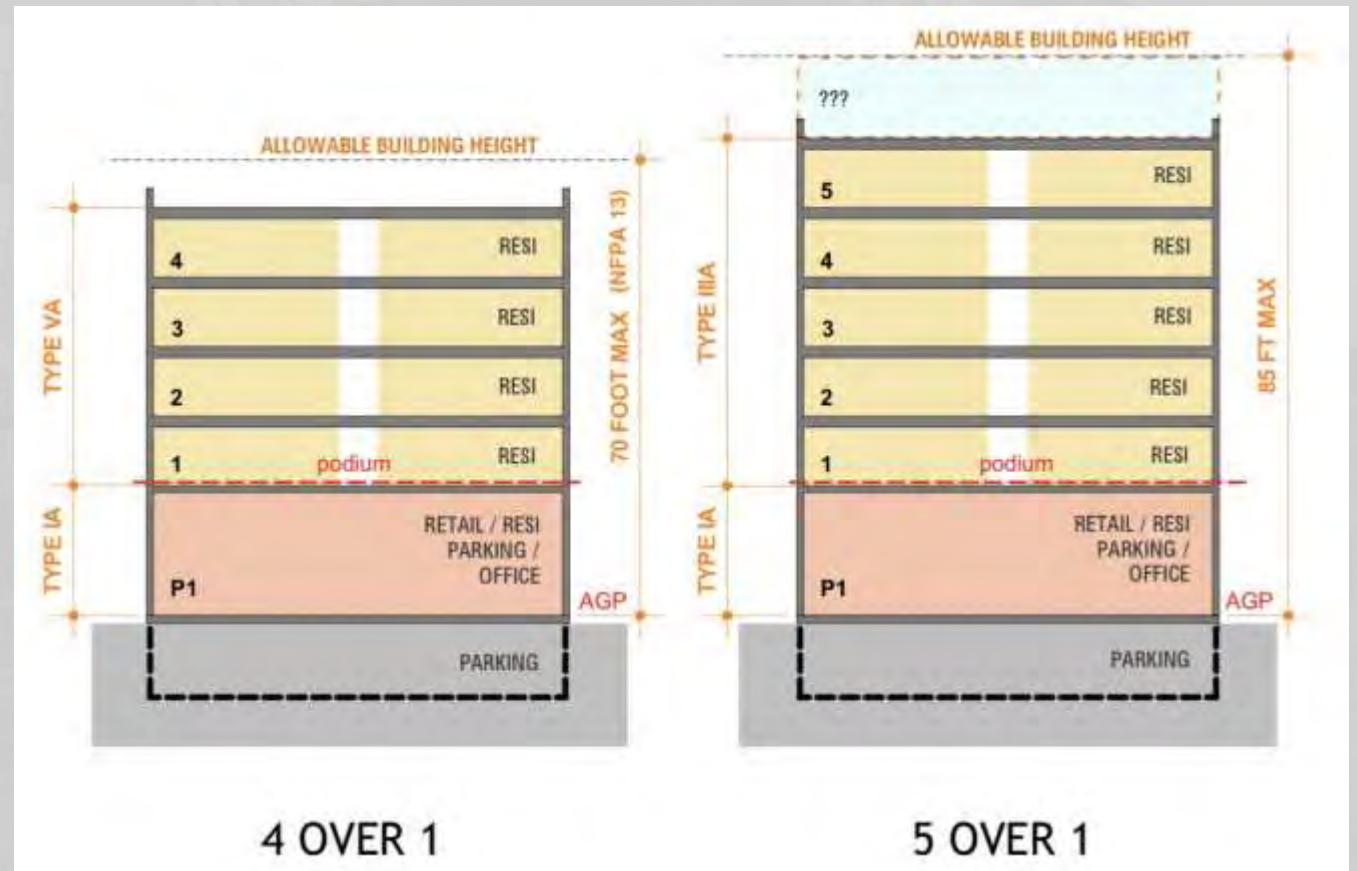
- Allows for construction of ***additional stories*** by separating a building by a 3-hour horizontal separation [510.2.1]
- Non-combustible, Type IA is required below the podium [510.2.2]
- Limited by the allowable height and stories by the lesser construction (Type III or Type V)
- Height is measured from the Average Grade Plane rather than from the top of the podium



Podium Buildings

CONSIDERATIONS (con't):

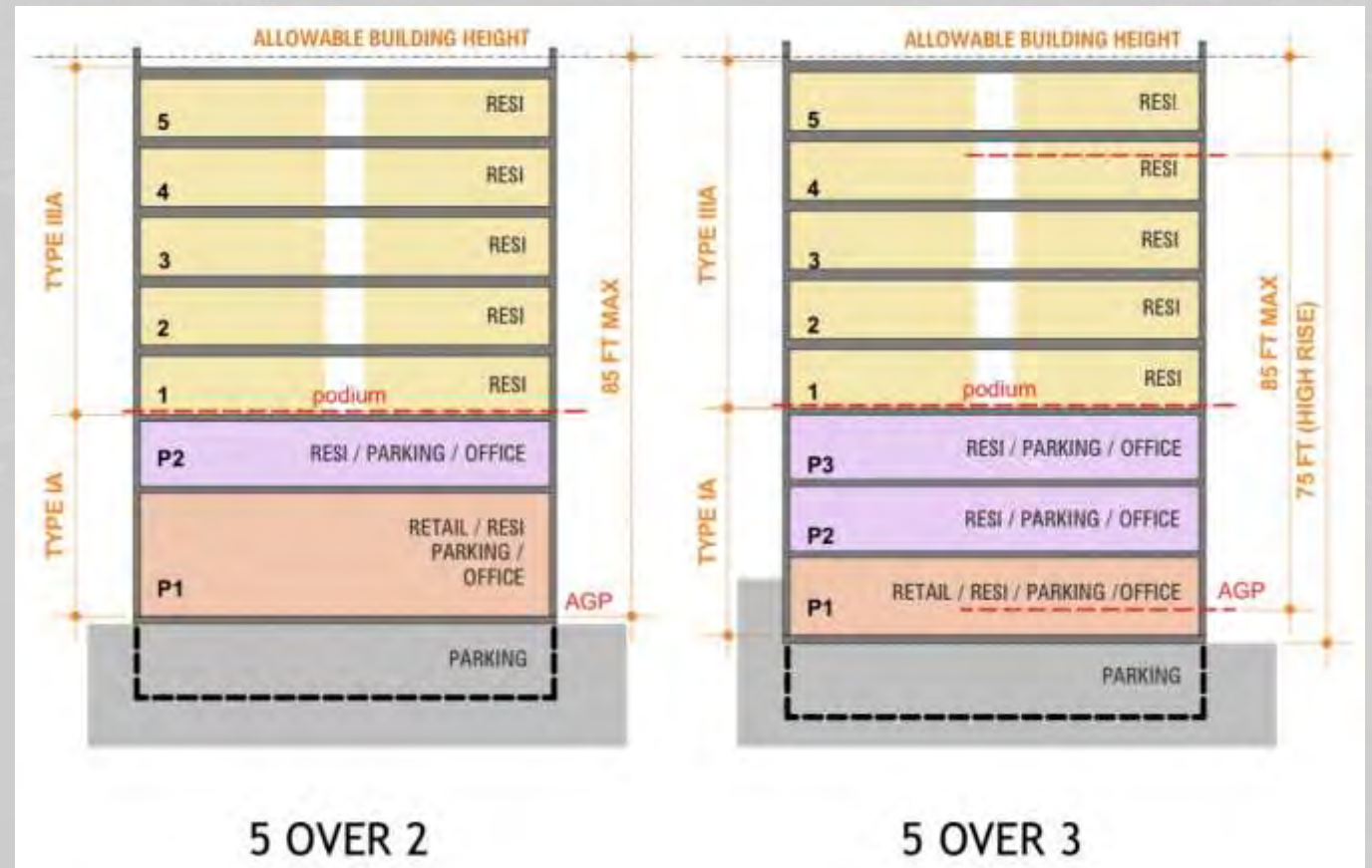
- Podiums typically also serve as structural transfer slab
- Fire walls (if incorporated) are allowed to terminate at the podium
- Both allow open floor plan to benefit non-residential uses (parking, retail, office) but also dramatic amenity spaces and unique apartment design



Podium Buildings

CONSIDERATIONS (con't):

- 2015 IBC was revised to not limit the number of stories allowed below the podium
- Prevalence of many more Type IIIA podium structures
- High rise classification becomes a significant consideration



Podium Buildings

DESIGN OPPORTUNITIES:

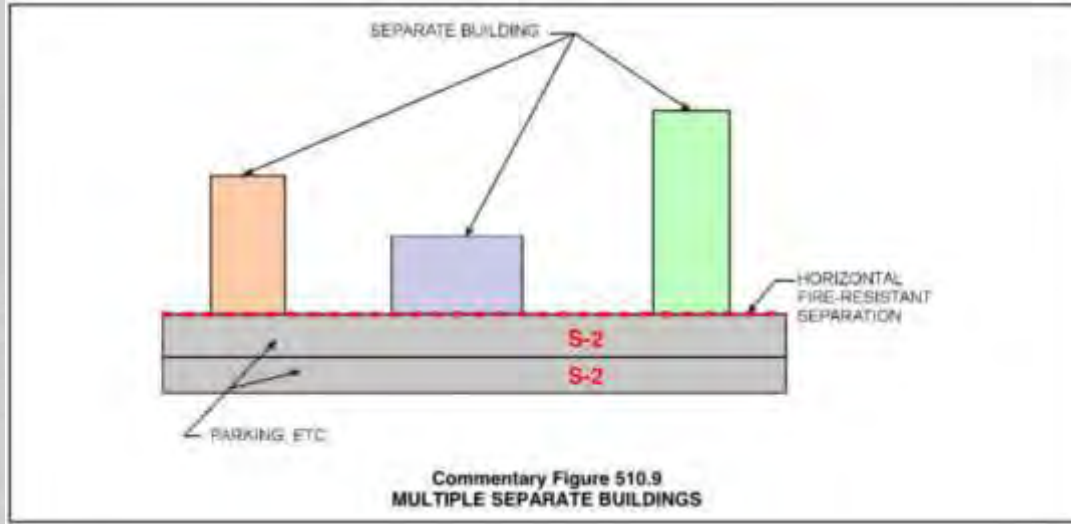
- Tall and open ground level spaces for retail, restaurants, office or residential amenity



Podium Buildings



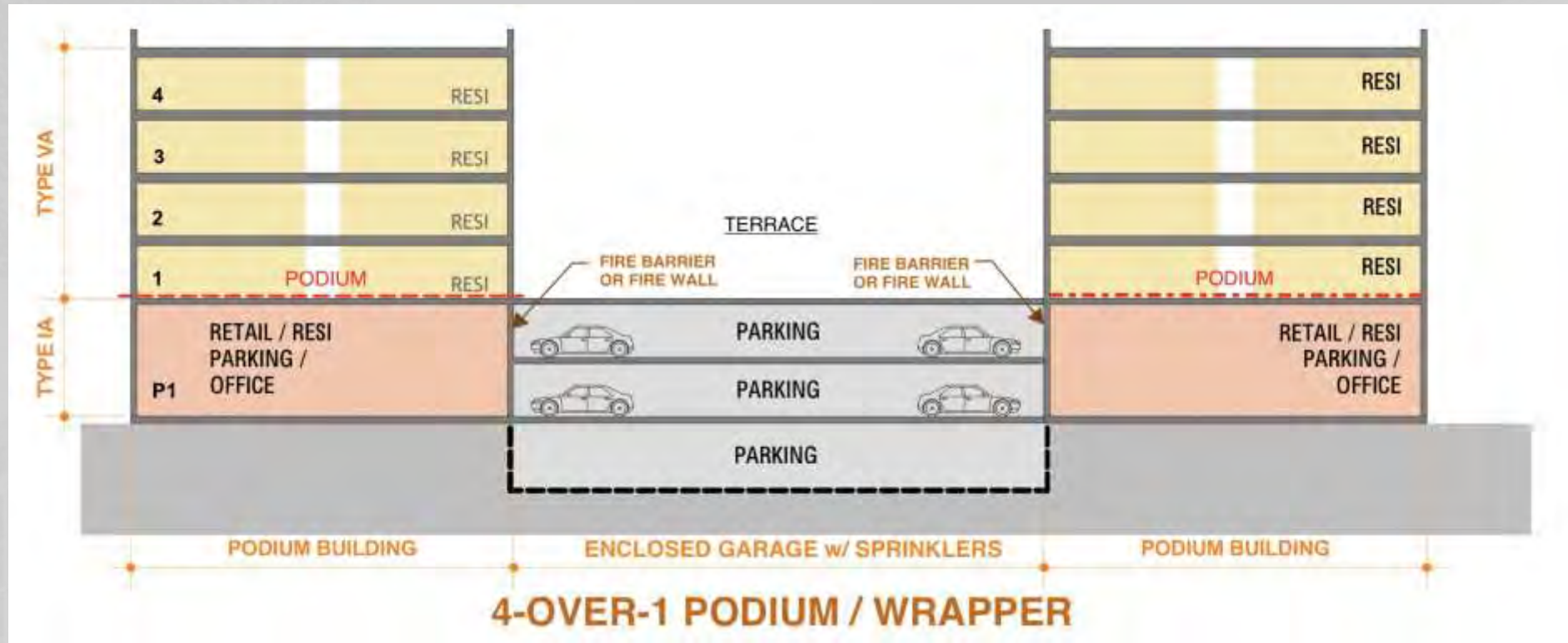
Podium Buildings



- Multiple buildings of differing construction types above a podium [510.9]
- S-2 parking garage below

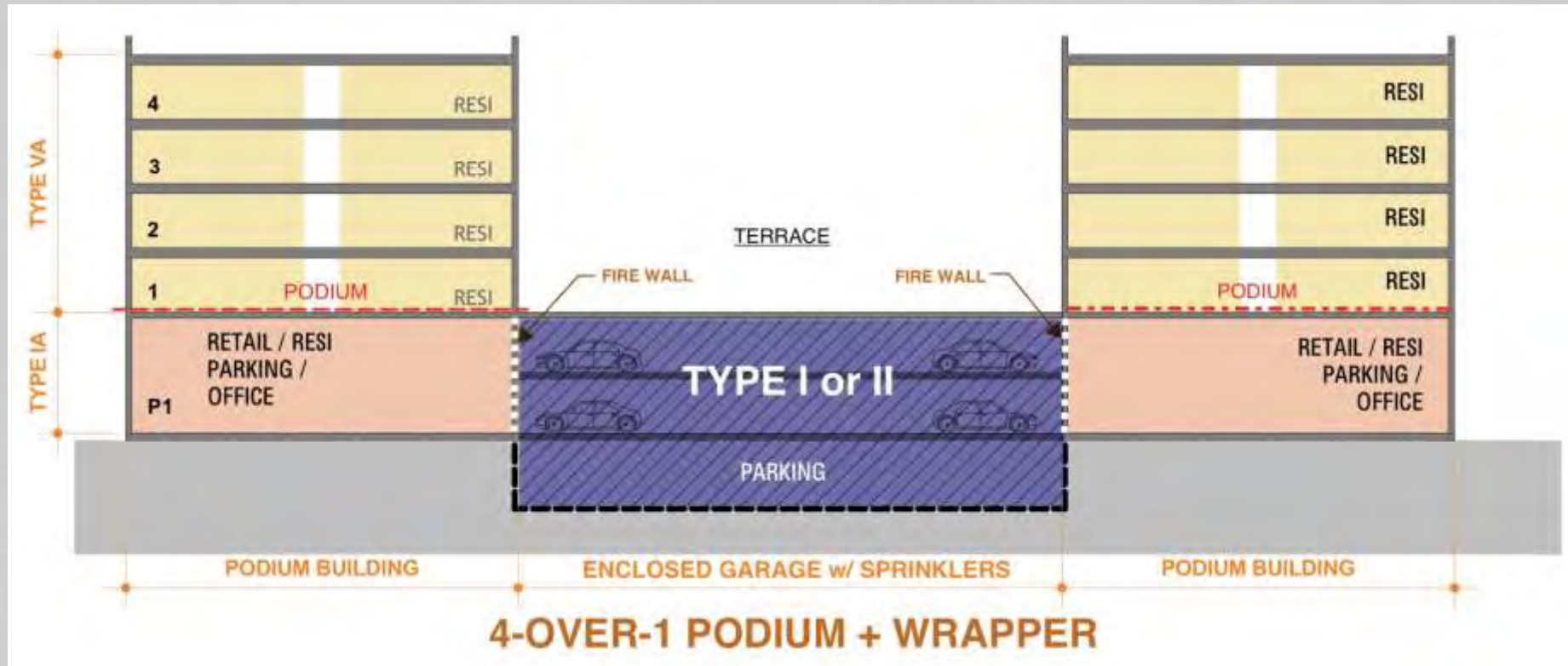


Combination Podium & Wrapper Building



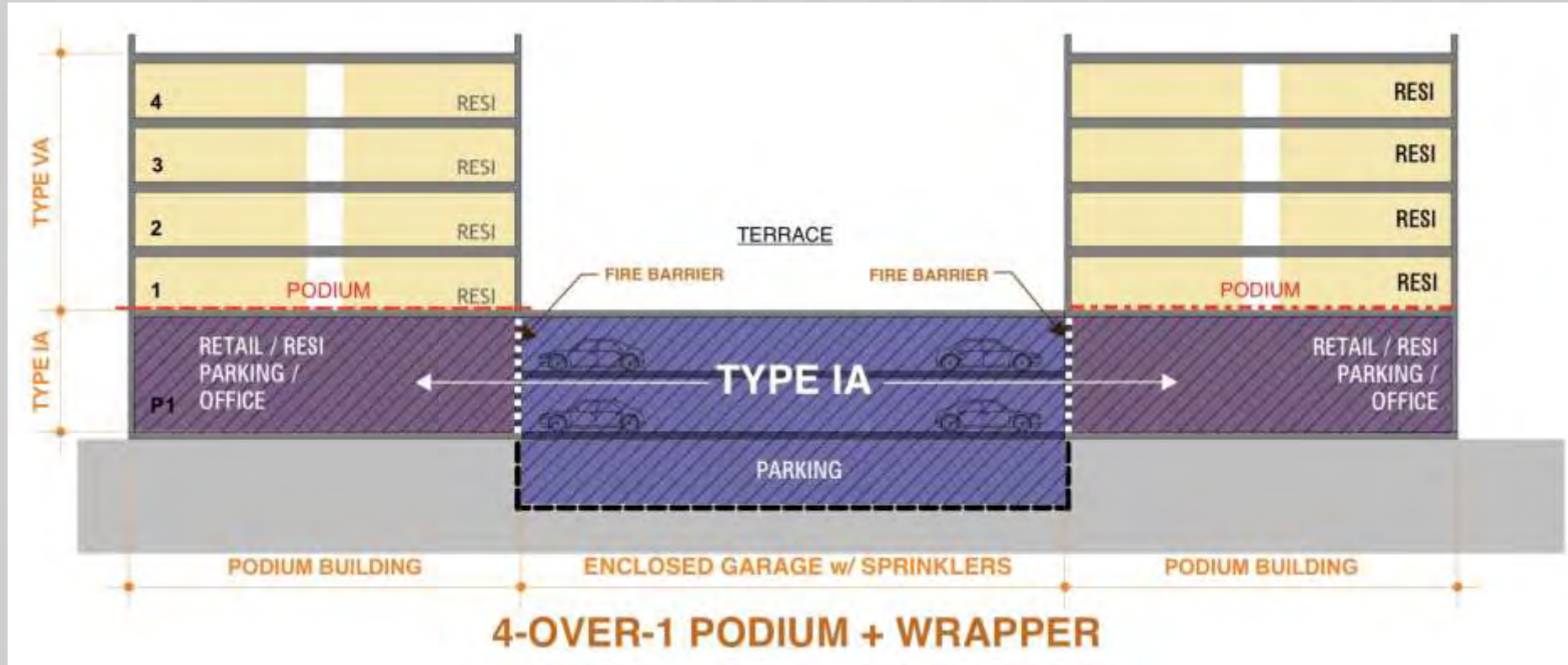
- Various strategies to combine mixed use podium with centralized parking

Combination Podium & Wrapper Building



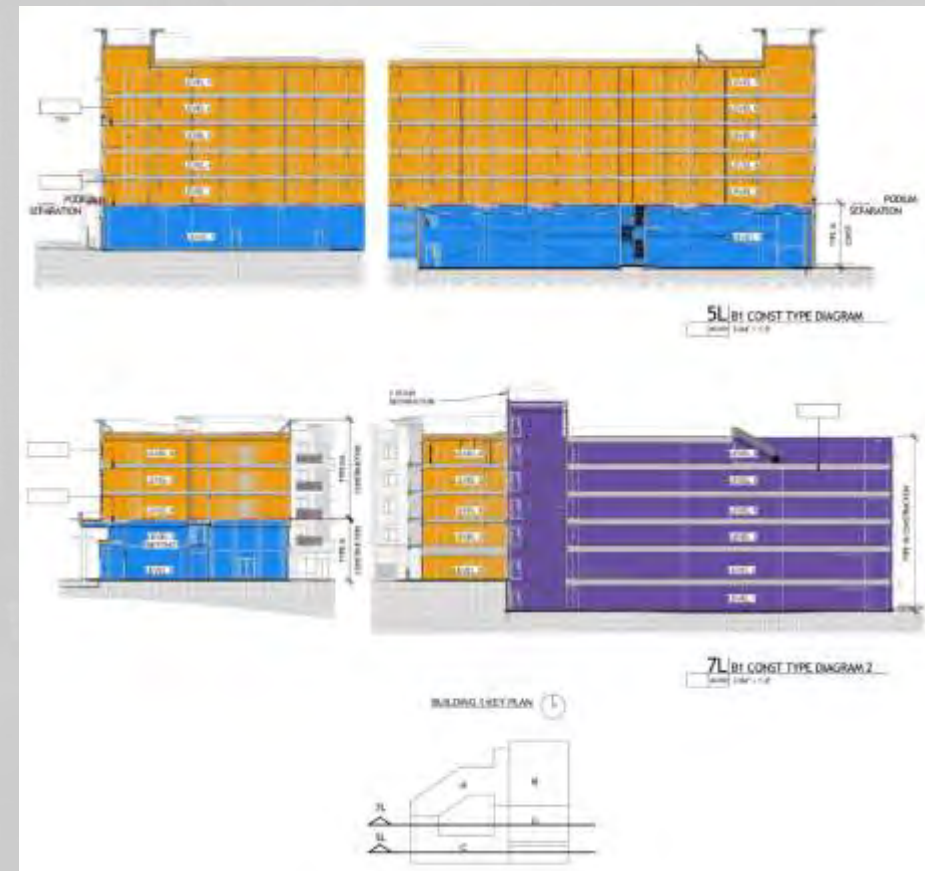
- Separated mixed-use buildings employing fire walls [706]

Combination Podium & Wrapper Building



- Non-separated mixed-use employing fire barriers

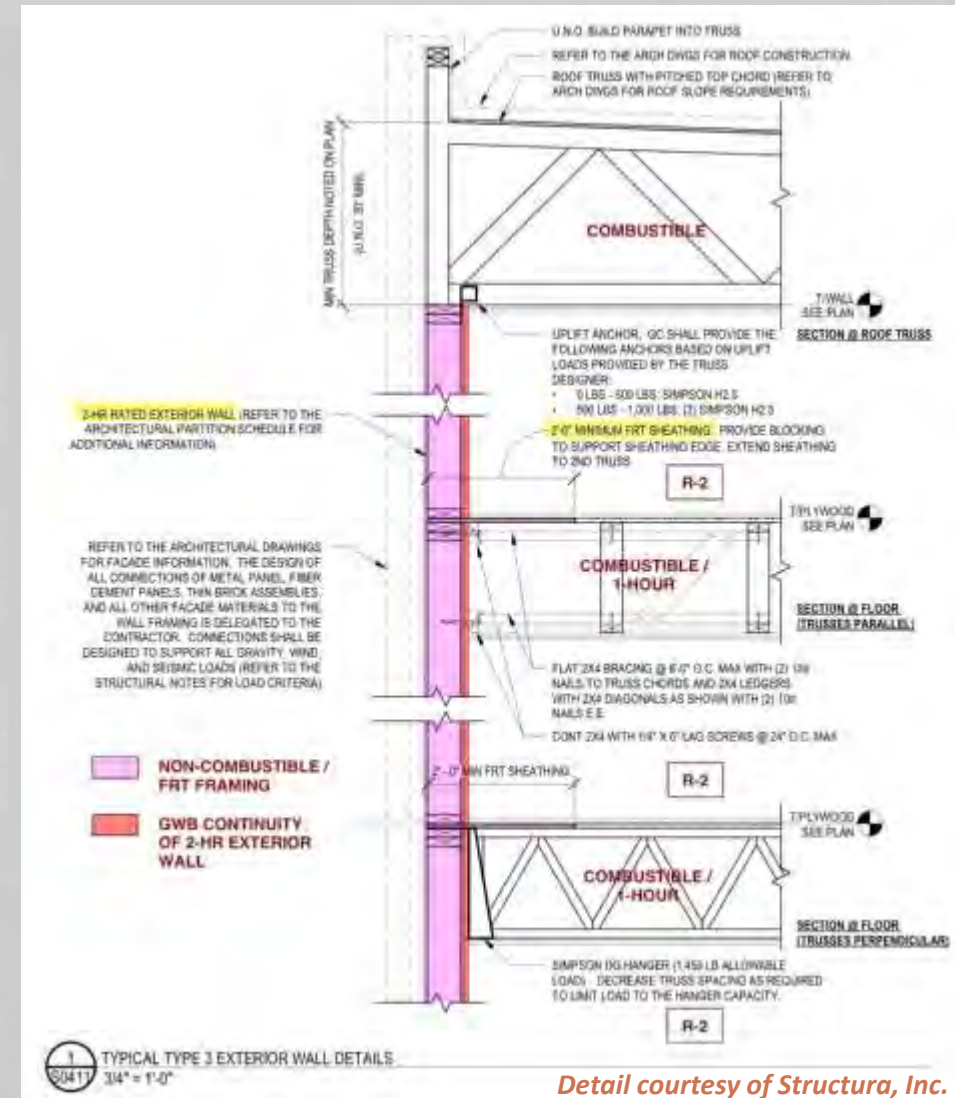
Combination Podium & Wrapper Building



Type III Construction

CHALLENGES:

- Load-bearing exterior walls are required to be 2-hours (Type IIIA) [T601]
- Continuity of 2-hour (NC) walls with 1-hour (C) floor assemblies
- Structural 'gymnastics' vs additional layer of GWB becomes a cost consideration
- NFPA 285



Detail courtesy of Structura, Inc.

Type III Construction

TYPICAL ASSEMBLIES:

- **Exterior walls/ 2HR for Type IIIA:
UL Design W408**
 - **Non-combustible vs Fire-rated**
- **Floors/ 1HR: UL Designs L521 &
L528**
 - ***Interstitial* sprinkler elimination
(NFPA 13) if filled with insulation**
- **Roofs/ 1HR: UL Design P522**



Cost and Density Summary



Typology Comparison

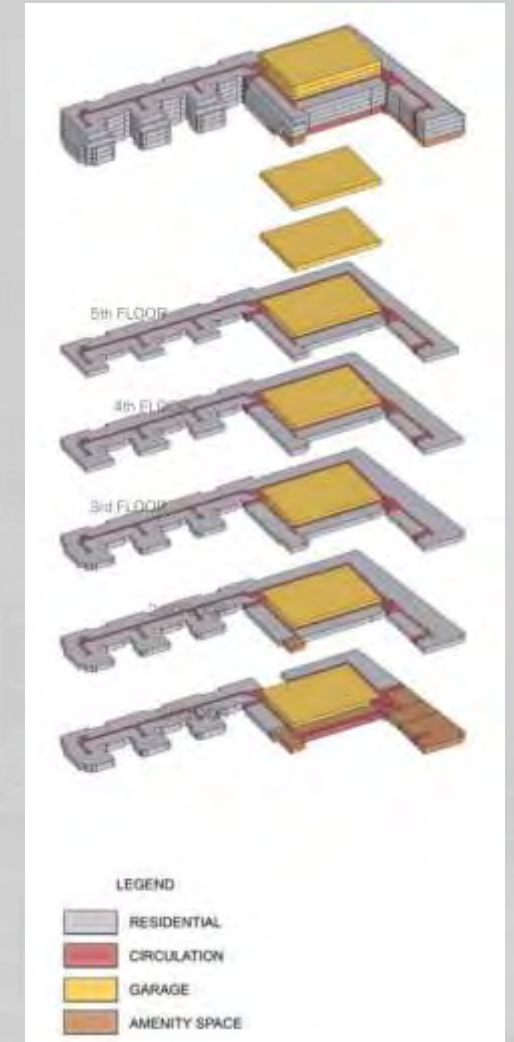
	PODIUM	WRAPPER
Site Area	requires less	requires more
Site Density / Yield	higher (130 - 170 units / acre)	lower (70 - 100 units / acre)
Overall Cost *	more costly (\$ 125 - 150 / SF) *	less costly (\$ 105 - 120 / SF) *
Parking Garage	cast-in-place / sprinklers required	precast / sprinklers may not be required
Efficiency	higher / double-loaded corridors	lower / single-loaded corridors
Concrete construction	yes below podium	at garage only

* "blended" cost including all building components (residential, parking & shell retail/office); pre-pandemic pricing

Case Studies

Union Wharf / Baltimore, MD

combination podium and wrapper



Case Studies

Novel Deep Ellum / Dallas, TX



5-over-2 podium with roof top amenity terrace



Case Studies

Glasshouse / Pittsburgh, PA

5-over-2 podium



Case Studies

Bainbridge Federal Hill / Baltimore, MD

5-over-2 plus ground level loft



> QUESTIONS?

This concludes The American Institute
of Architects Continuing Education
Systems Course

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