

Using Chicago's New Construction Codes for **Small Residential Buildings**

August 2019



CITY OF CHICAGO
DEPARTMENT OF
BUILDINGS

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

Learning Objectives

- 1 Chicago's consensus-based process for modernizing its construction codes with input from technical experts and industry stakeholders
- 2 Key dates for implementation of the Phase 2 ordinance, adopted in April 2019
- 3 Key changes that will impact 1-3 unit residential buildings

Introduction and Background



Grant Ullrich

Deputy Commissioner

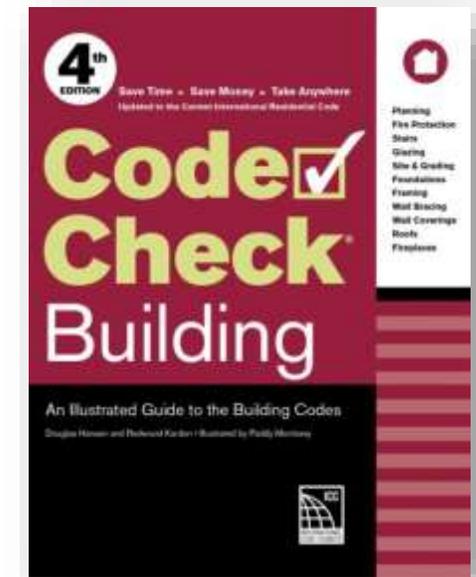
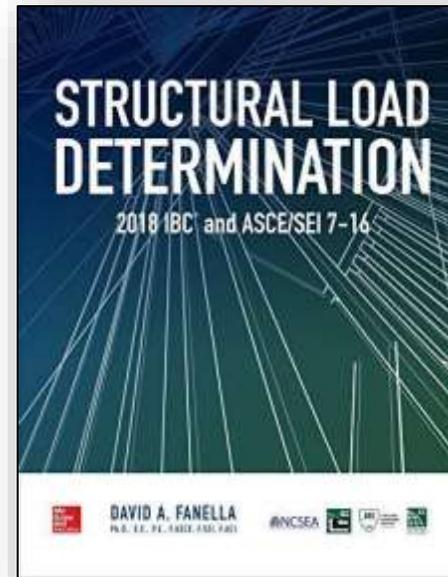
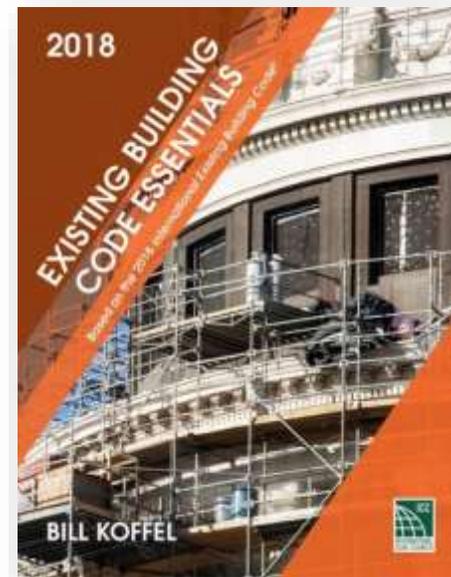
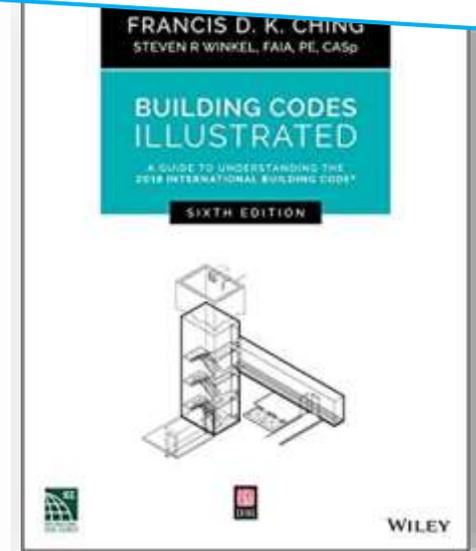
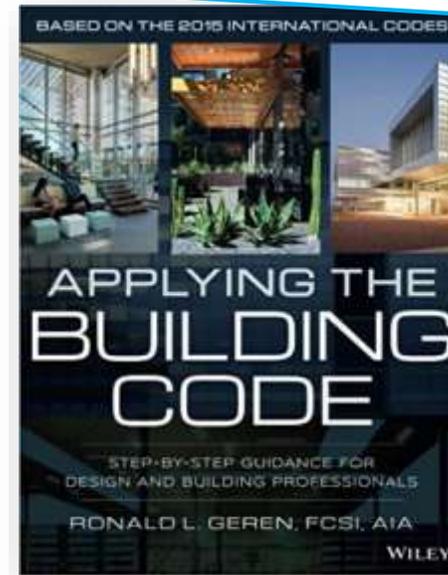
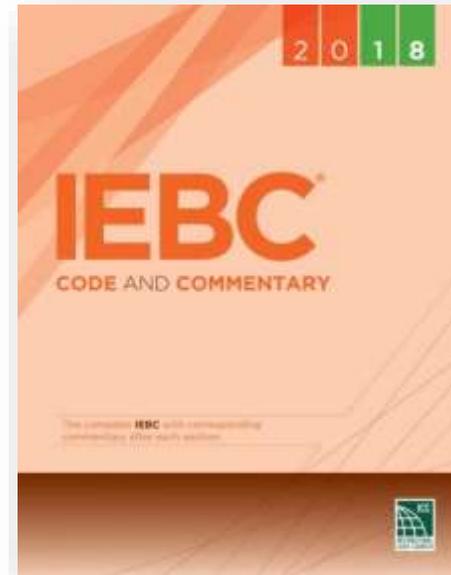
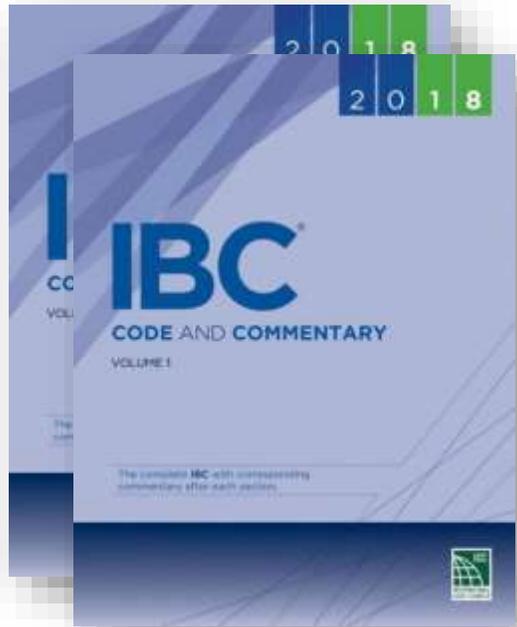
City of Chicago Department of Buildings

Course Description

This presentation will cover:

- 1 Chicago's recent code modernization efforts
- 2 Key dates for implementation of changes
- 3 Changes to architectural and structural requirements for small residential buildings
- 4 Changes to fire protection requirements for small residential buildings

Using Chicago's New Construction Codes for Small Residential Buildings



Using Chicago's New Construction Codes for Small Residential Buildings

chicago.gov/buildings

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Latest information on code modernization

City of Chicago | Mayor Lori E. Lightfoot

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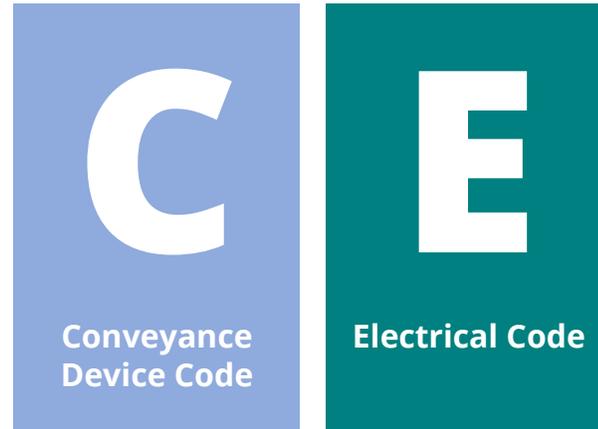
Related Links

- [AIC Elevator Information](#)
- [2019 Landlord Training Schedule](#)

Modernizing Chicago's Construction Codes - Phase 2

2015-2021 Code Modernization Process

Phase 1: 2015-2018



Phase 2: 2017-2020 *(based on 2018 I-Codes)*



Phase 3: 2019-2021



Using Chicago's New Construction Codes for **Small Residential Buildings**



Using Chicago's New Construction Codes for **Small Residential Buildings**

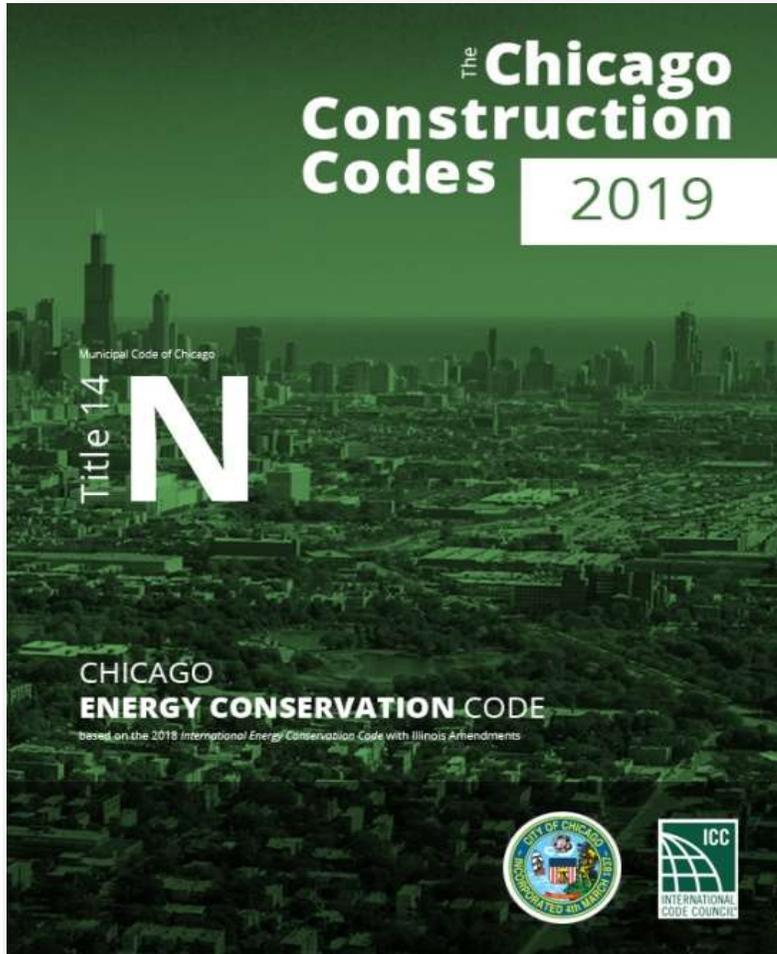


Using Chicago's New Construction Codes for **Small Residential Buildings**

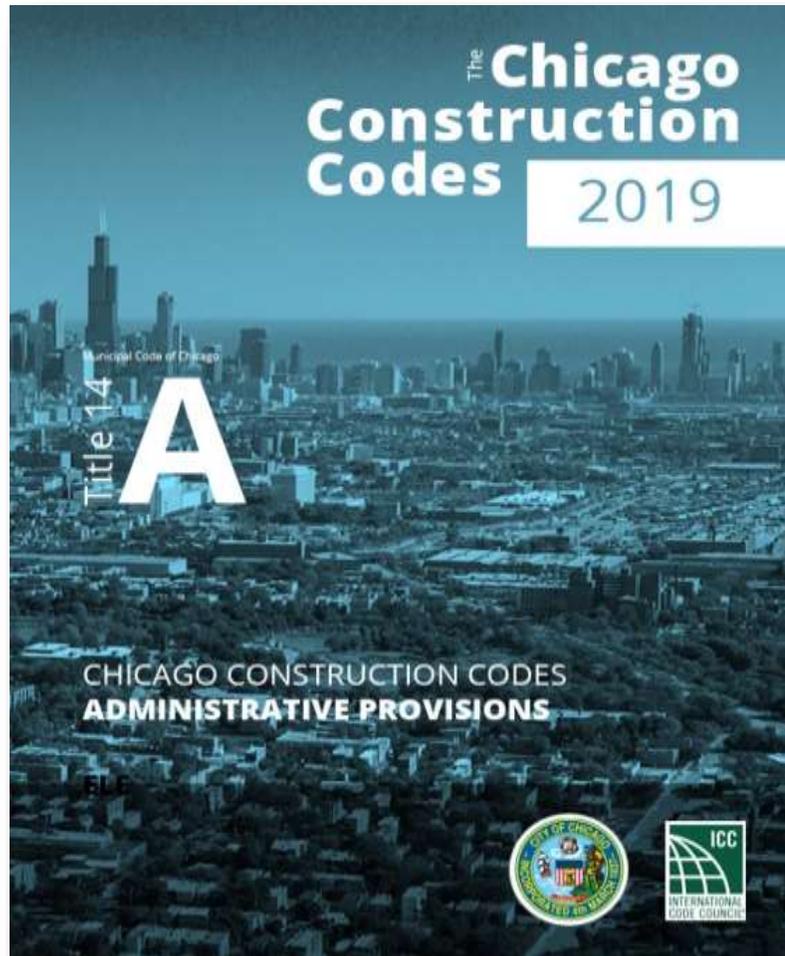


Chicago Energy Conservation Code

- Based on 2018 *International Energy Conservation Code*
- Incorporates Illinois Amendments
- Chicago roof reflectivity requirements relocated to building code, roofing chapter
- Amendments online now, book to be published mid-October



Effective June 1, 2019



Effective July 1, 2019

Administrative Provisions

- Streamlined and standardized administrative rules
- Addresses code enforcement, permits, inspections, occupancy placards, alternative code approval, etc.
- Similar to Chapter 1 of the model *International Codes*

Building and Rehabilitation Codes

- Based on *International Codes* with Chicago amendments
- Small residential requirements are integrated (no separate residential code for 1 and 2-unit buildings)
- Amendments online now, books to be published mid-October



Optional: Dec. 1, 2019 *
Mandatory: Aug. 1, 2020

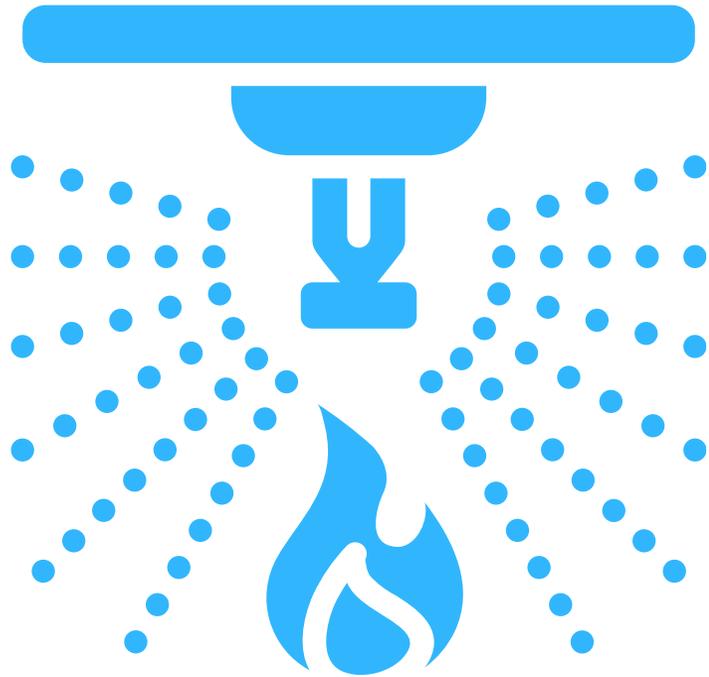
**** Accessibility Requirements ****

- Generally, not applicable to 1-3 unit buildings
- Provisions integrated throughout code, scoping in Chapter B-11
- Aligned with 2018 *Illinois Accessibility Code* (IAC)
- References **2009** A117.1 standard
- Greater clarity on IAC kitchen storage

Mandatory: **Dec. 1, 2019**



**** Sprinkler Requirement ****



Mandatory: **Jan. 1, 2020**

- Every new building containing 4 or more dwelling units
- Change to co-living with 4 or more bedrooms in suite
- May apply to other change of use (warehouse to apartments)
- Resolves confusion over interaction between Illinois Fire Code and Chicago Building Code

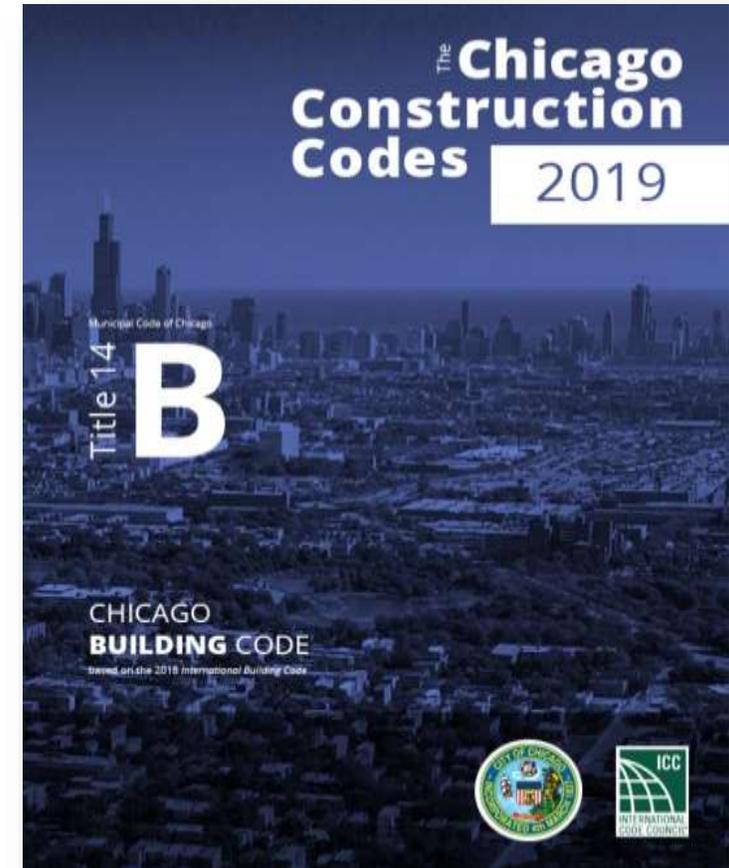
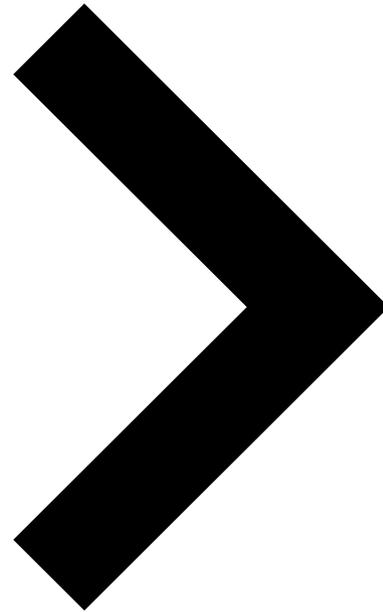
Using Chicago's New Construction Codes for **Small Residential Buildings**

Publication: October 2019



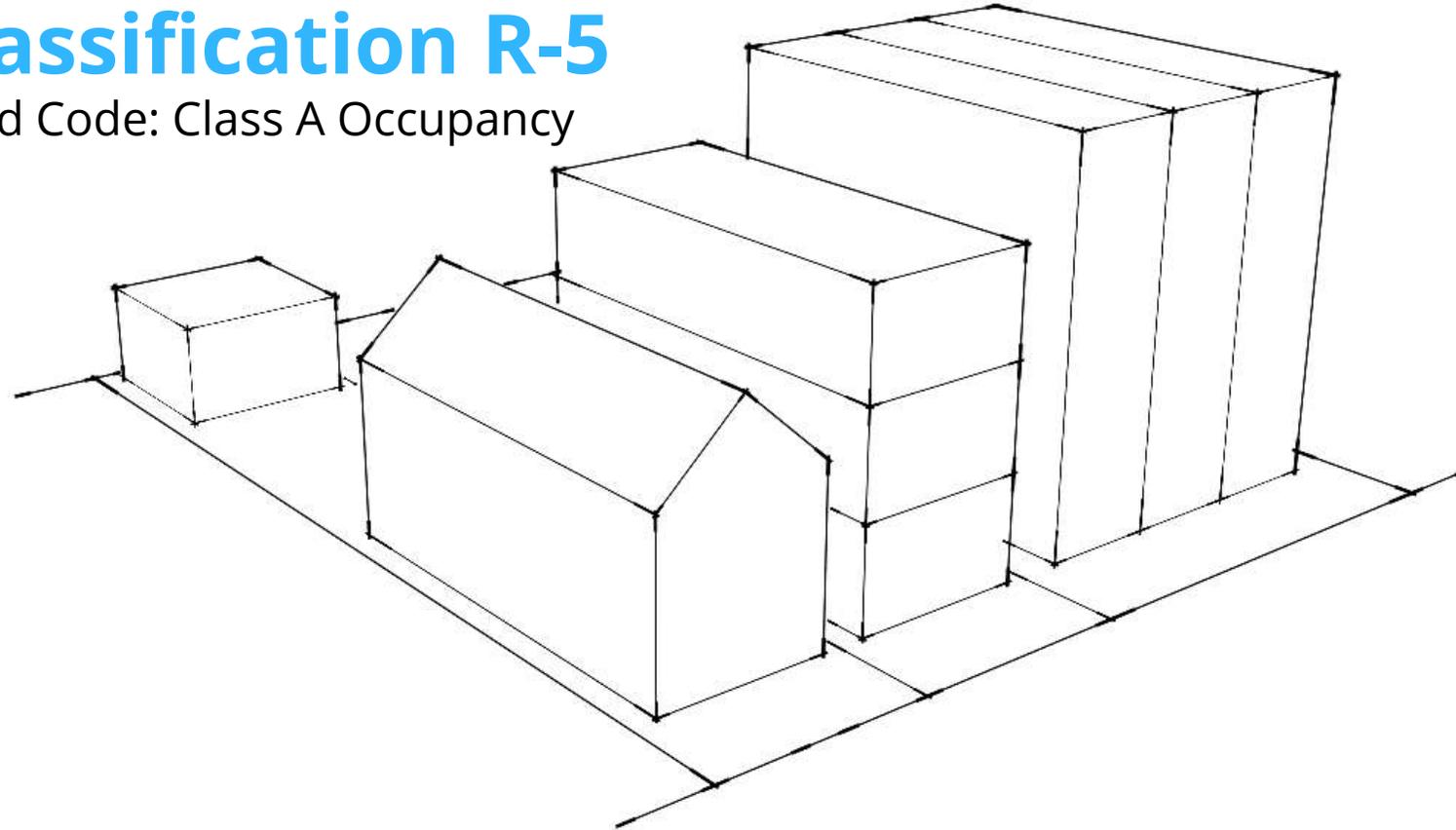
Small Residential Highlights

Using Chicago's New Construction Codes for **Small Residential Buildings**

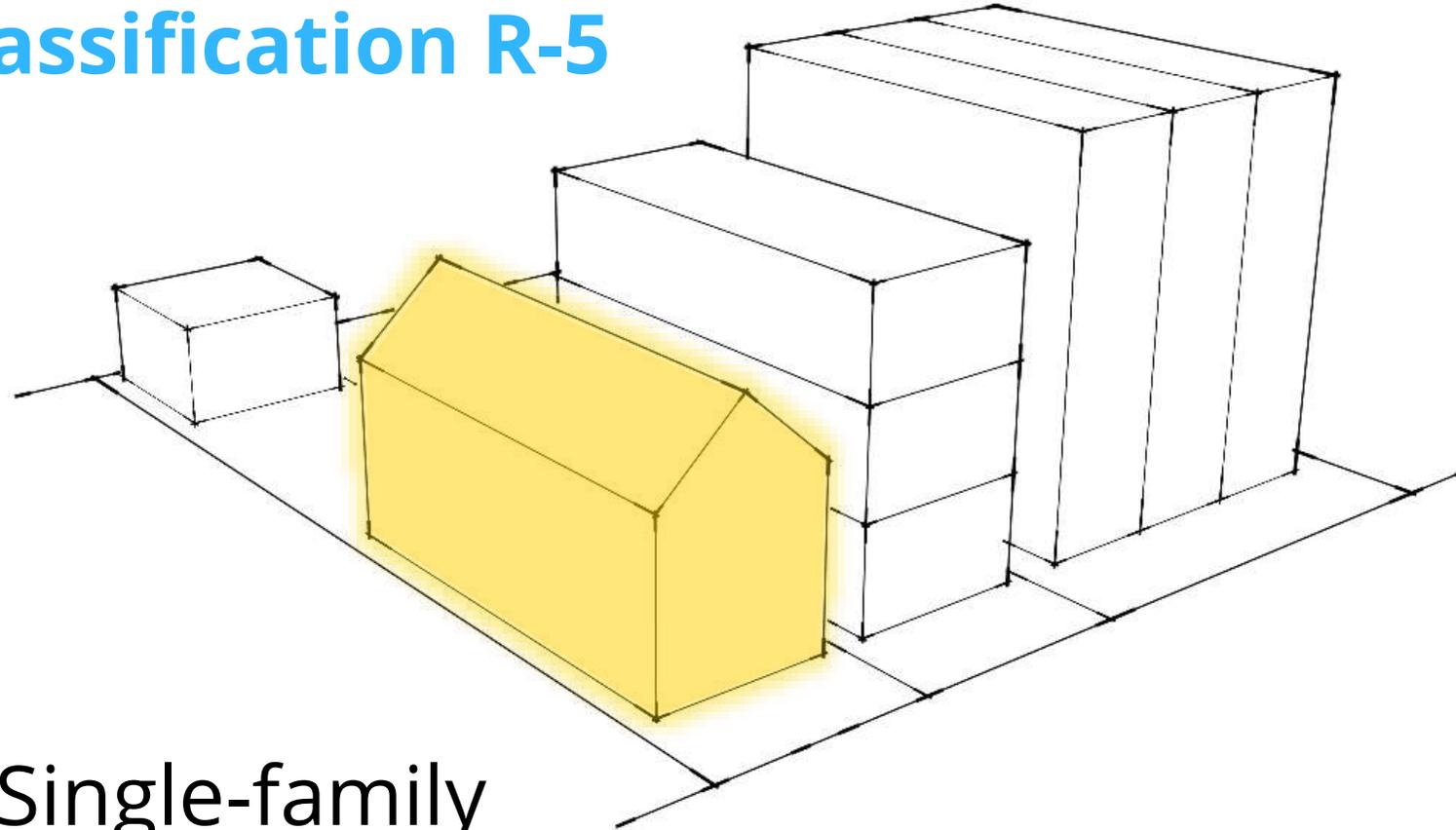


Chicago Occupancy Classification R-5

Old Code: Class A Occupancy

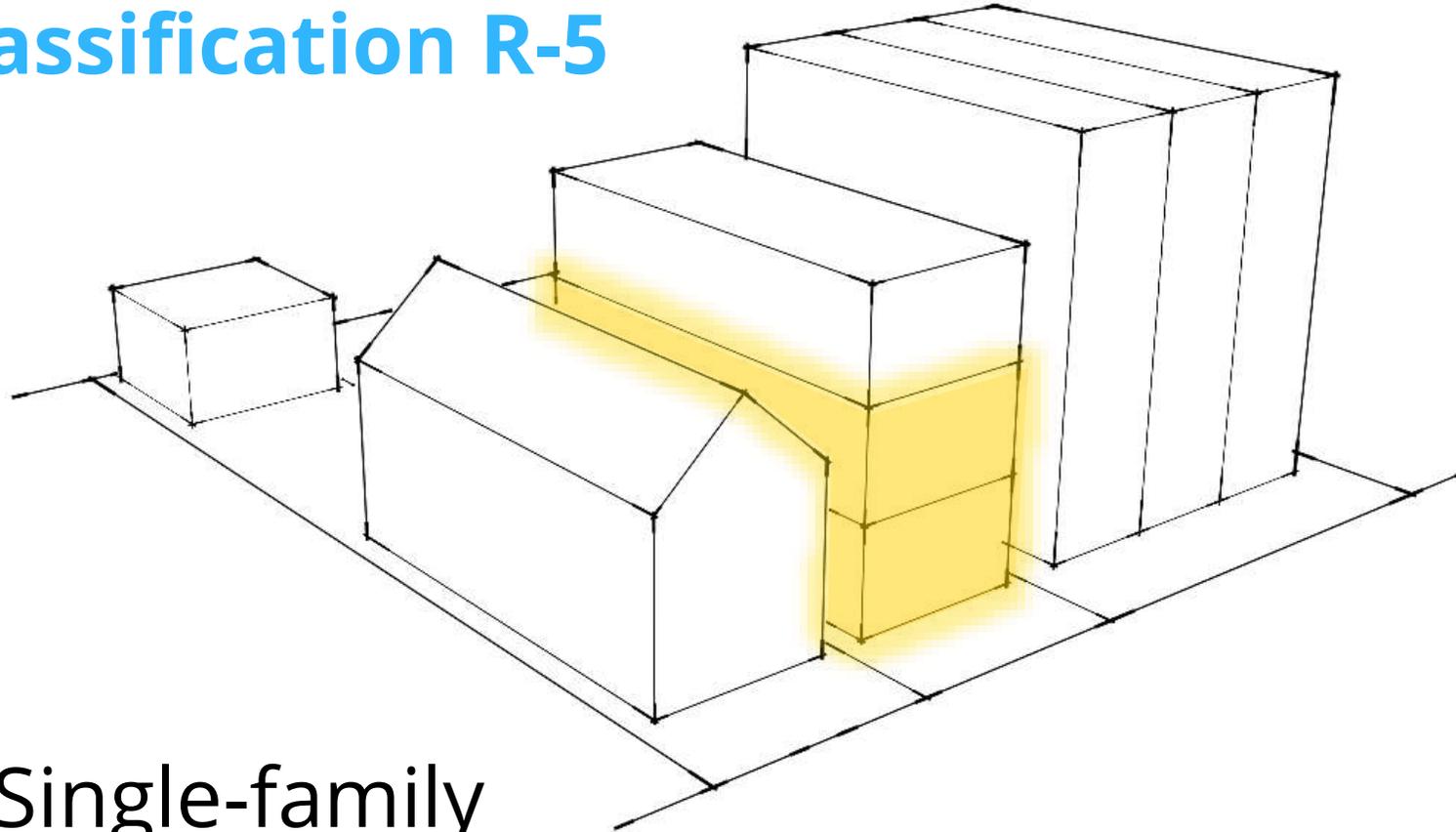


Chicago Occupancy Classification R-5



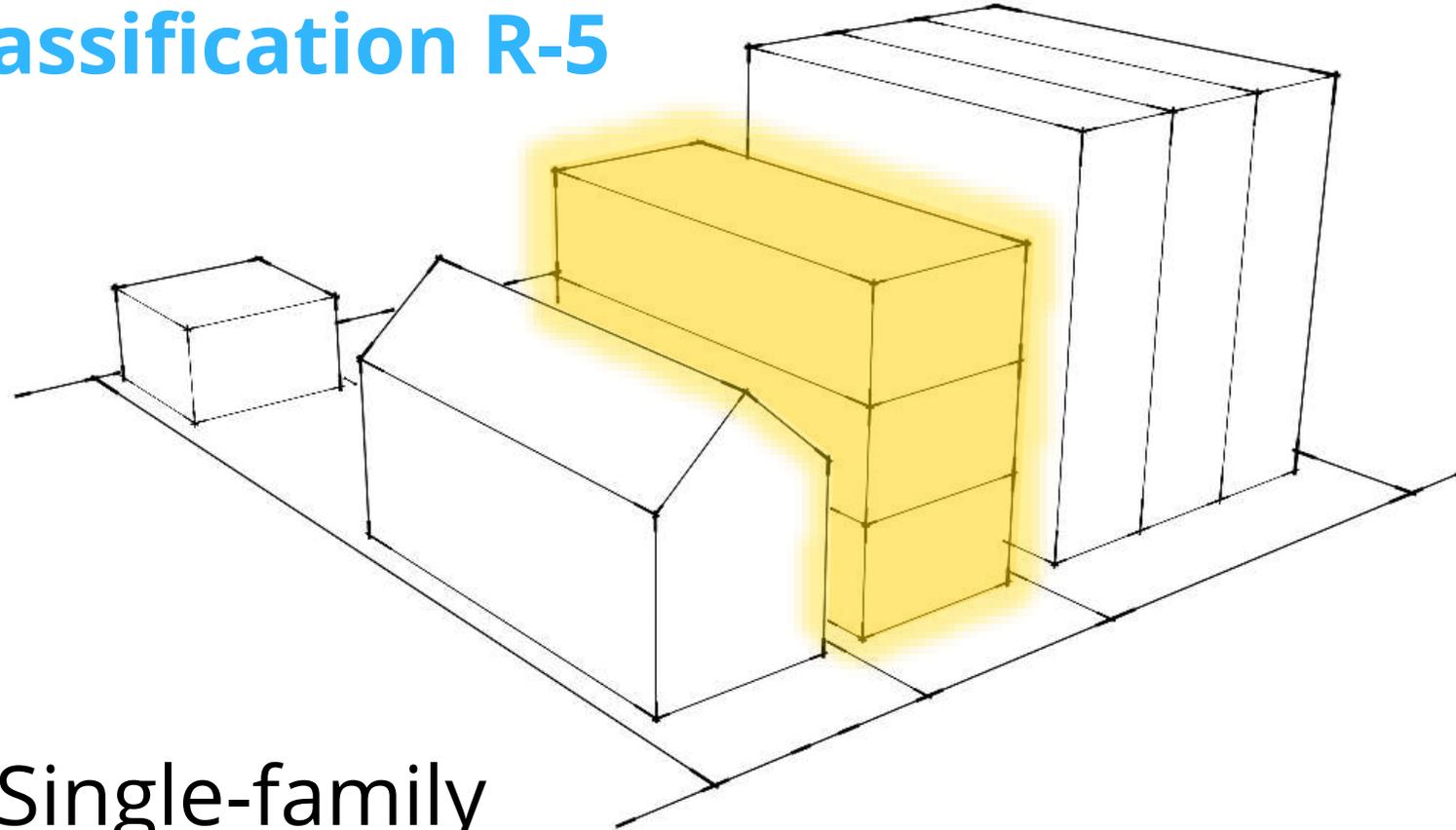
- Single-family

Chicago Occupancy Classification R-5



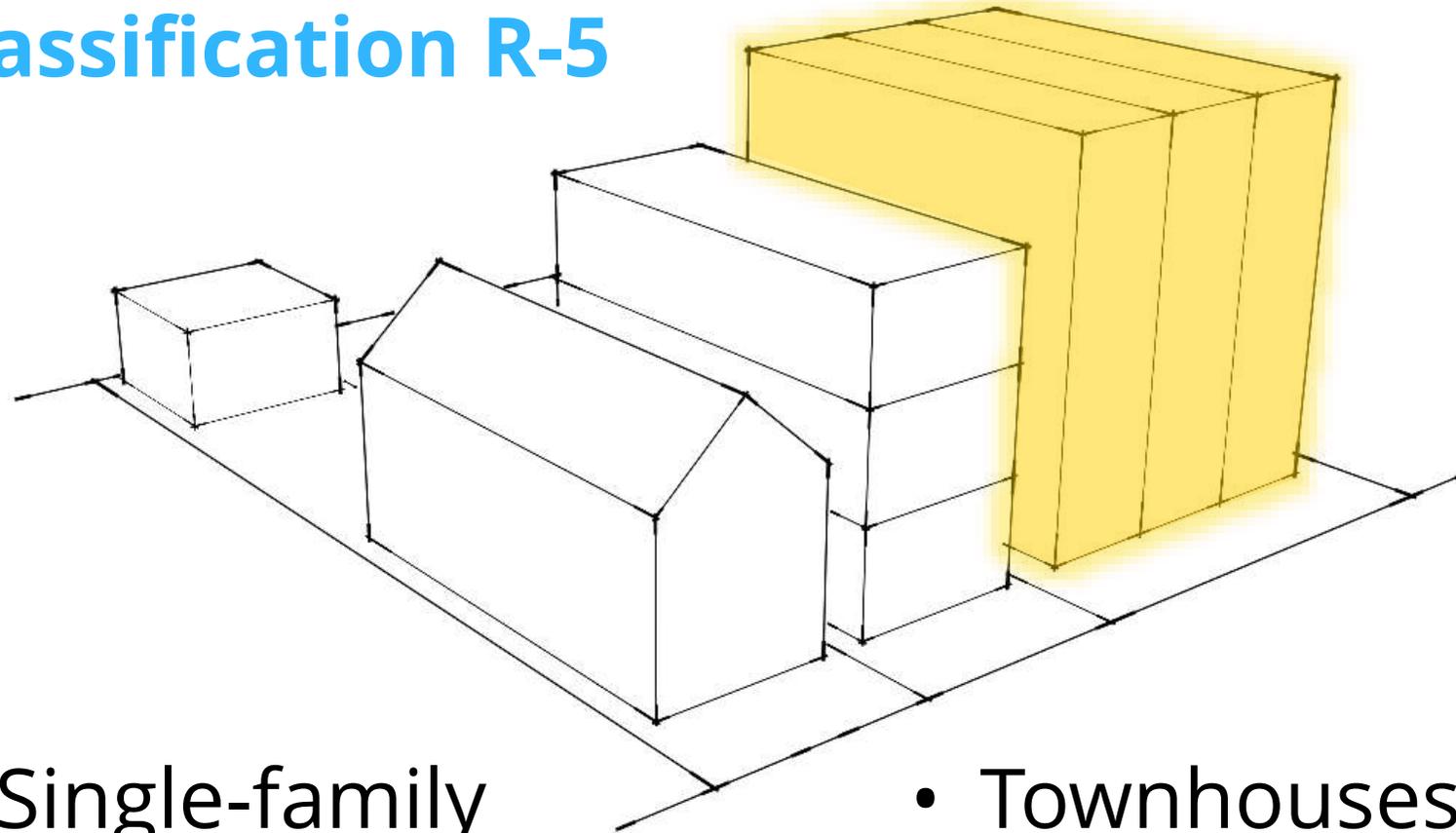
- Single-family
- Two-flats

Chicago Occupancy Classification R-5



- Single-family
- Two-flats
- Three-flats

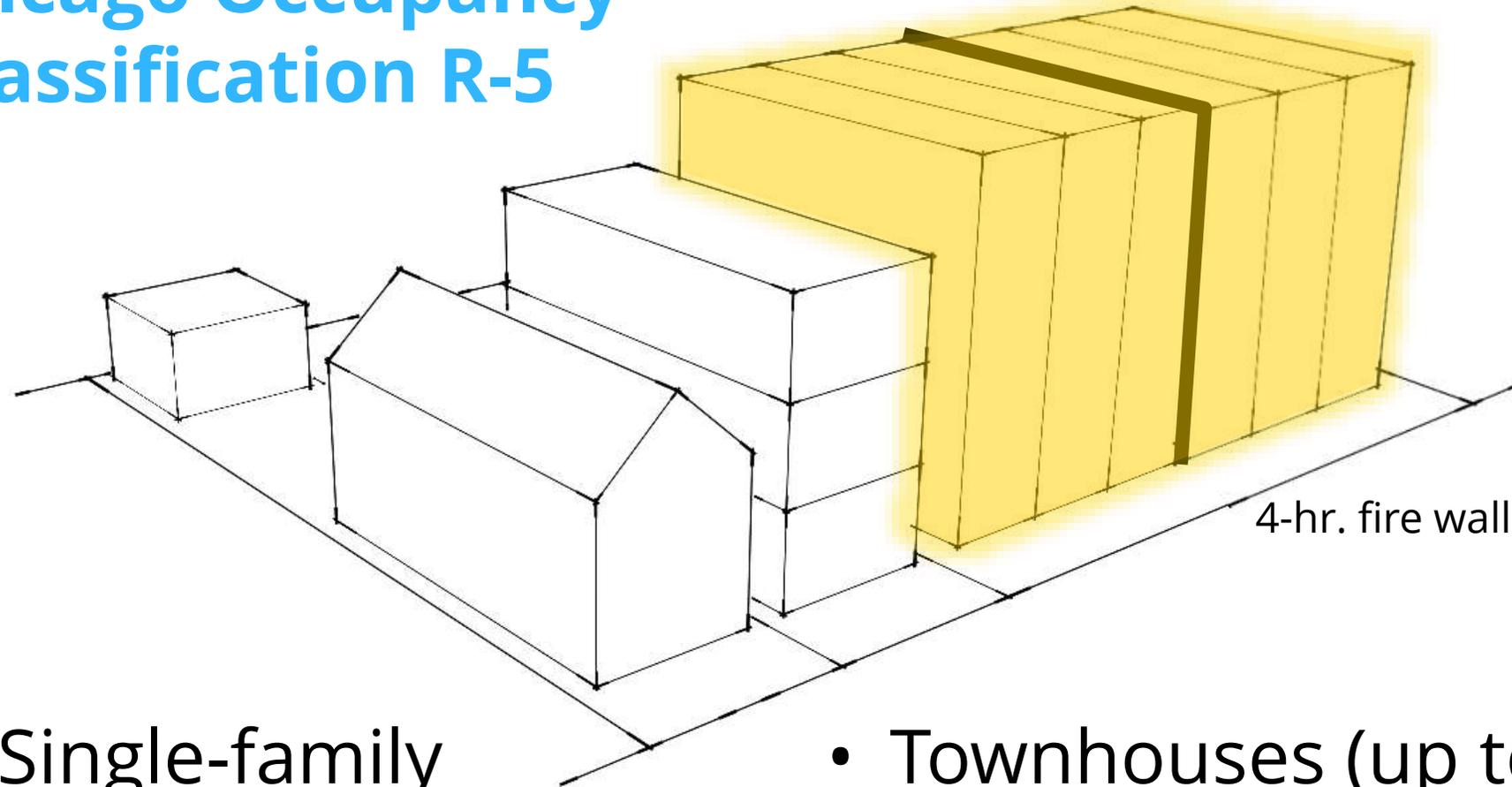
Chicago Occupancy Classification R-5



- Single-family
- Two-flats
- Three-flats

- Townhouses (up to 3)

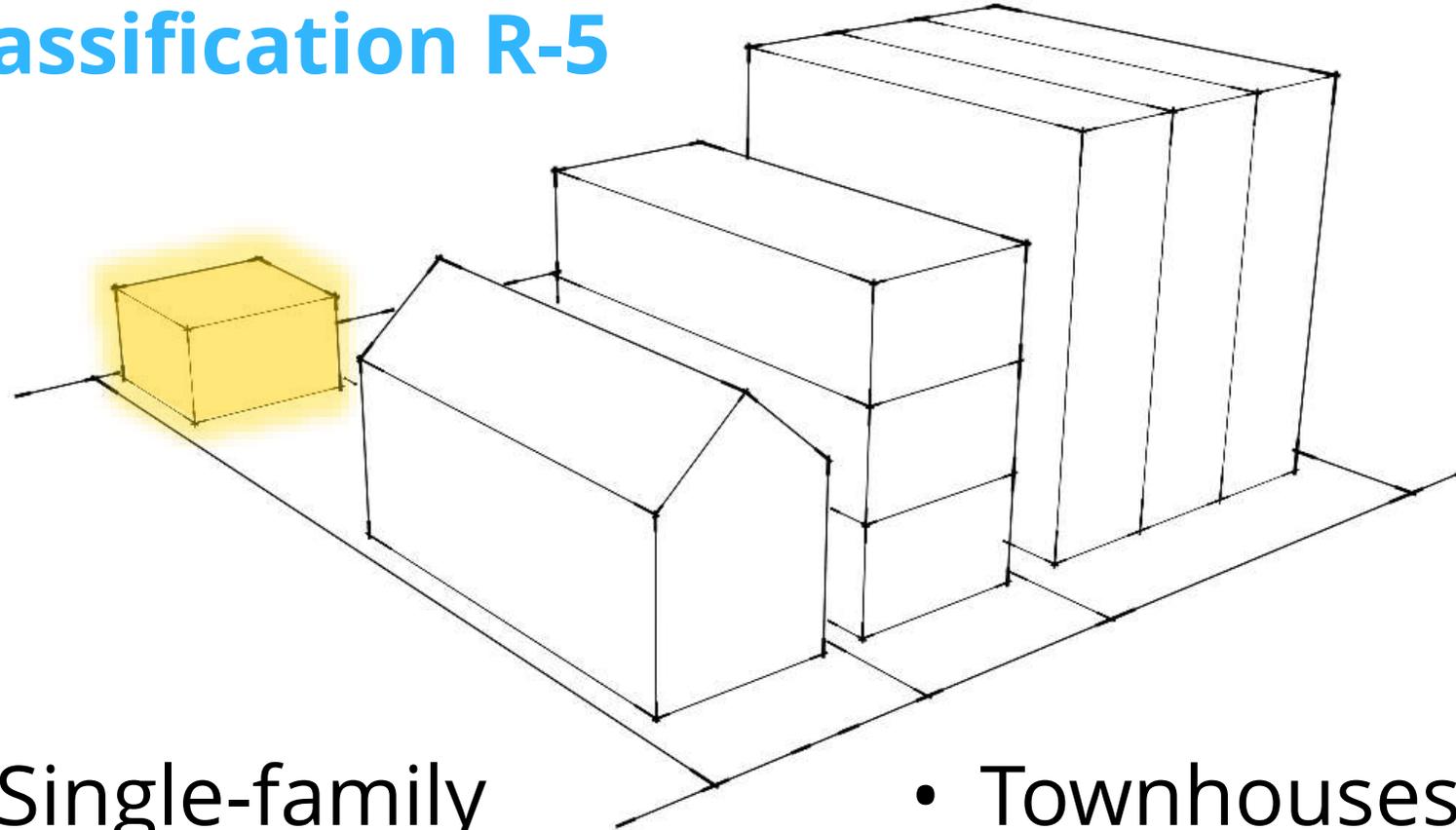
Chicago Occupancy Classification R-5



- Single-family
- Two-flats
- Three-flats

- Townhouses (up to 3)

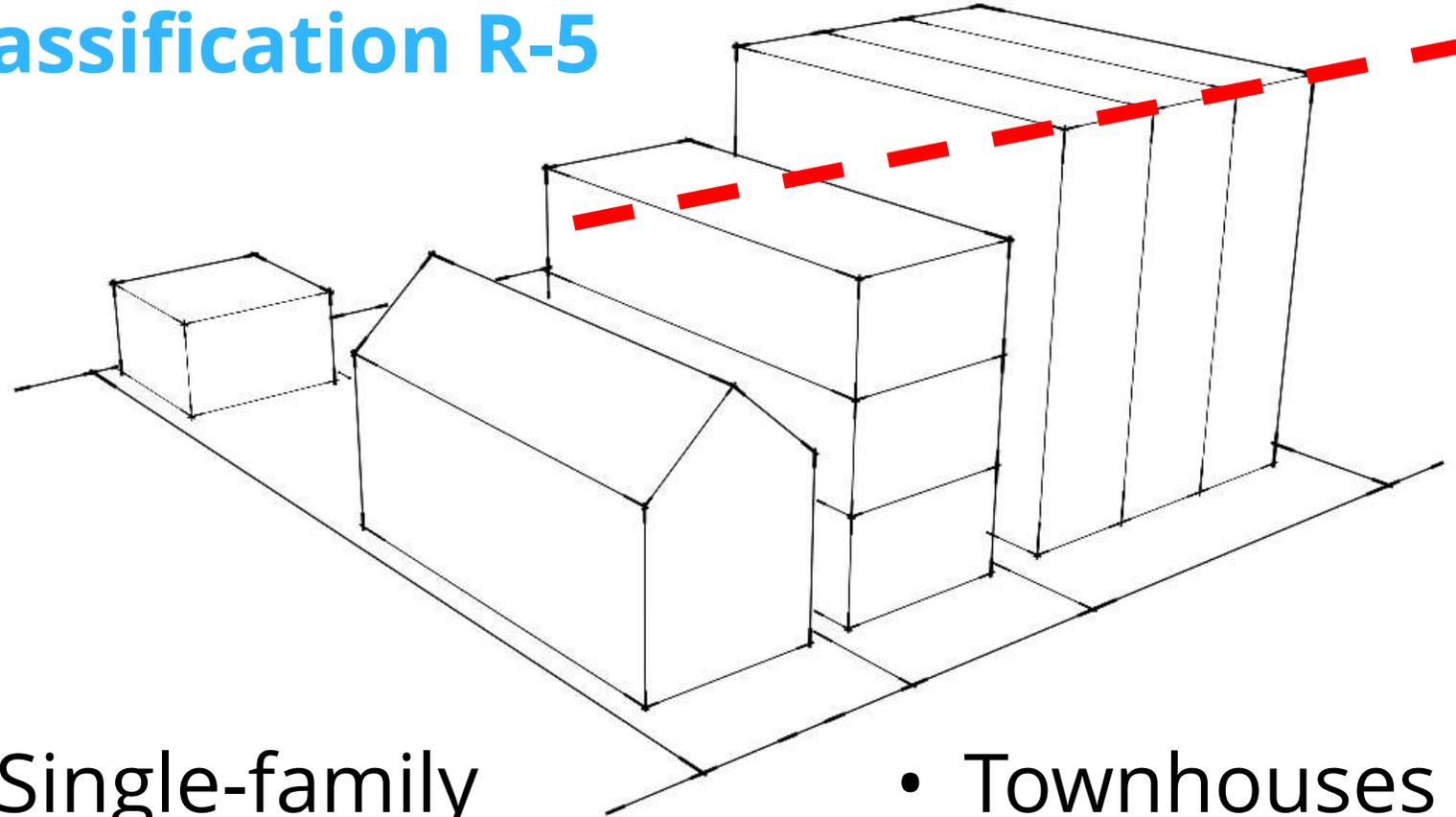
Chicago Occupancy Classification R-5



- Single-family
- Two-flats
- Three-flats

- Townhouses (up to 3)
- Accessory private garages

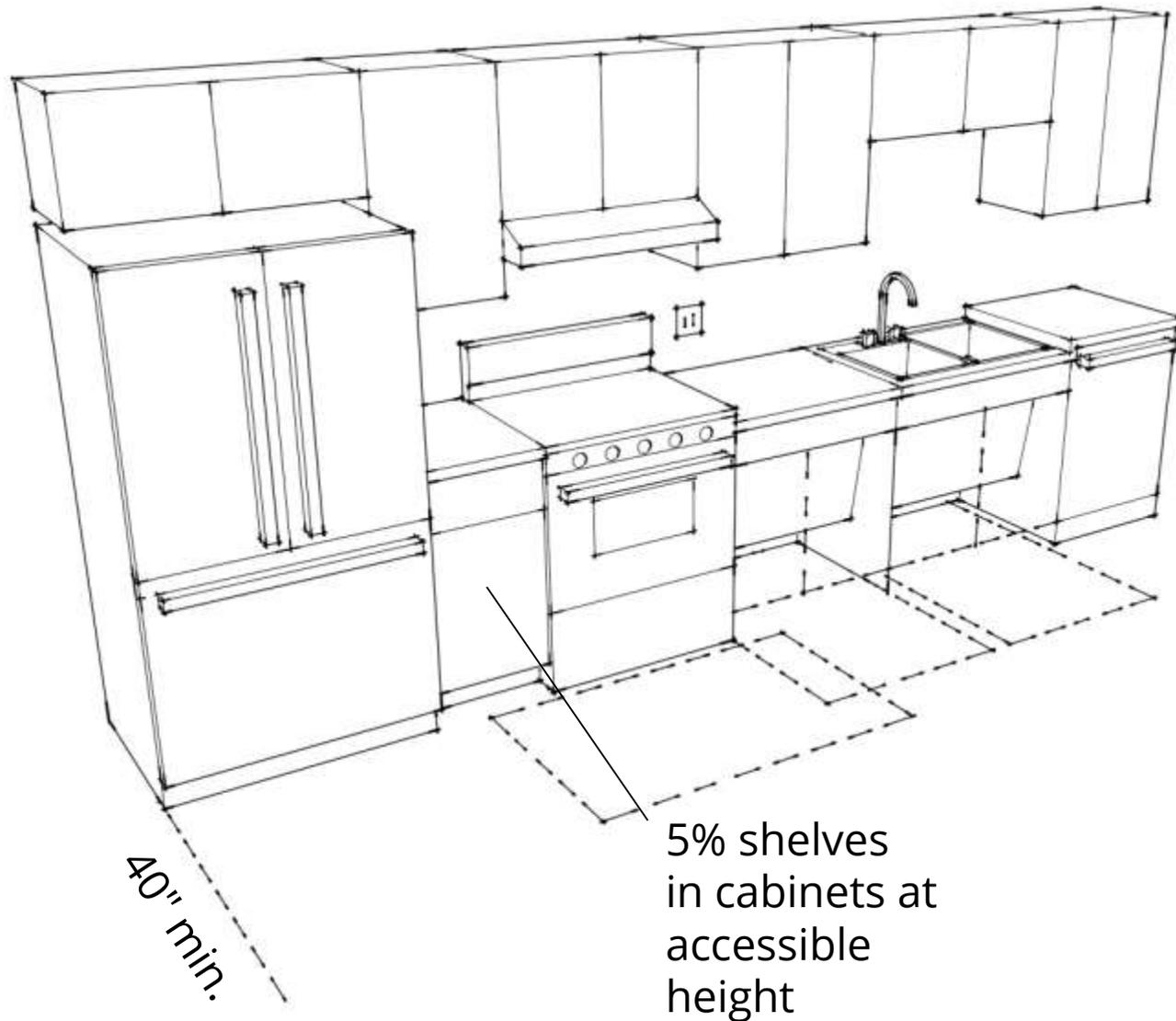
Chicago Occupancy Classification R-5



- Single-family
- Two-flats
- Three-flats
- Townhouses (up to 3)
- Accessory private garages
- 4 stories max

Accessibility

- Generally not applicable to 1-3 unit buildings
- May apply where zoning required Planned Development (PD)
- New solution to kitchen storage re: upper cabinets



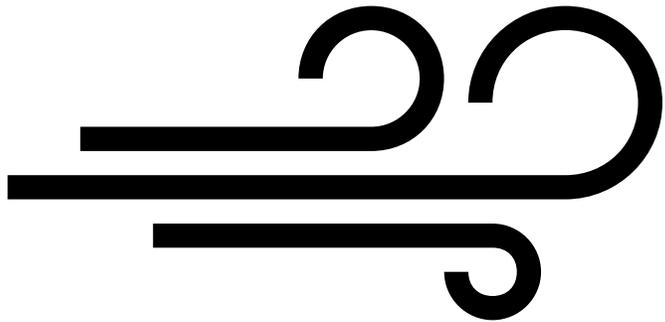


Sprinkler Systems

- Not required for Group R-5
- Allows 3rd floor up to 1,600 ft² with one exit
- NFPA 13 or 13R allows protected frame construction (Type V-A) up to 4 stories
- NFPA 13D allowed for 1-3 unit buildings up to 3 stories

Structural Design

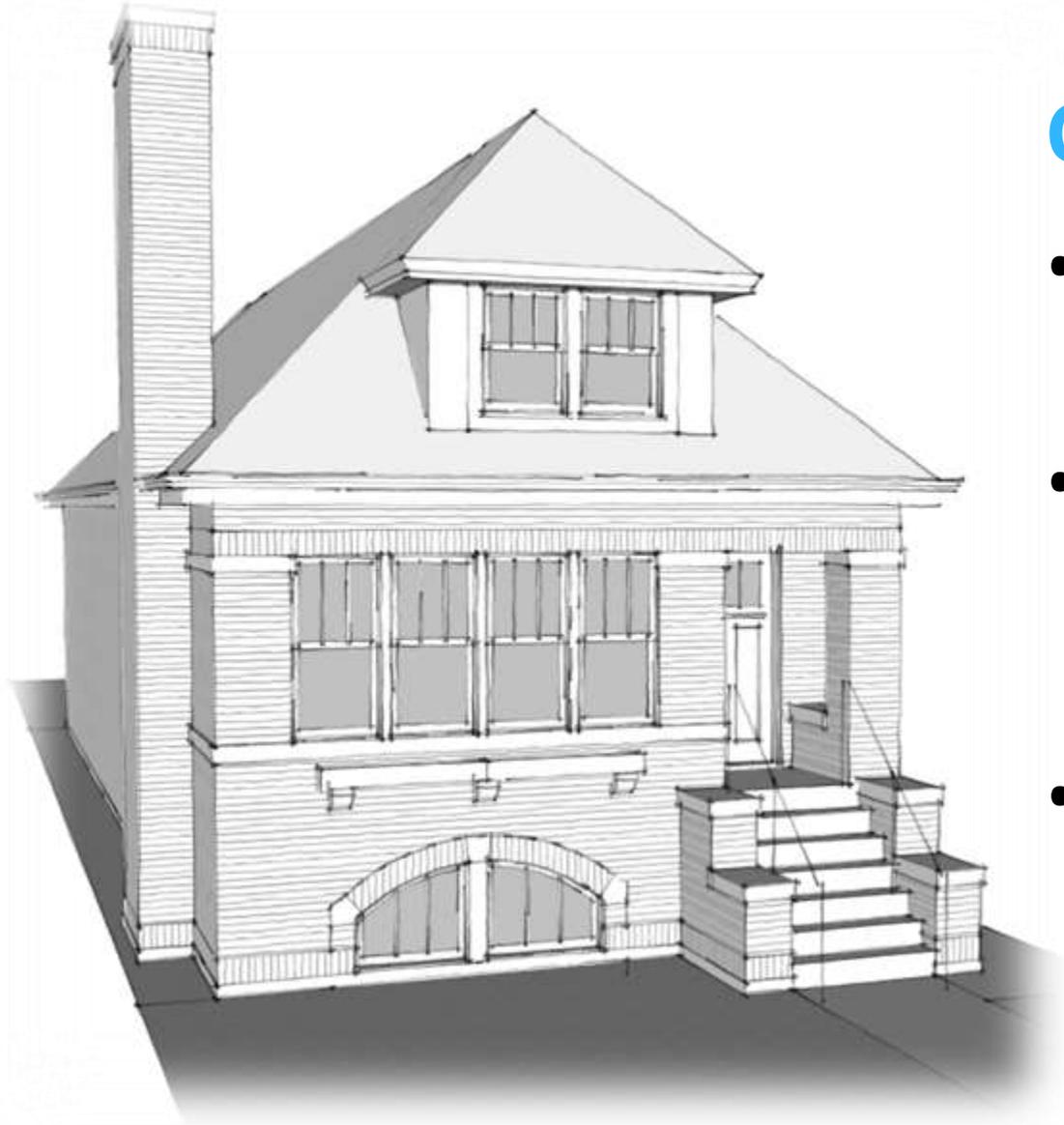
- Approximately 20% reduction in design wind loads for small residential buildings. (Note: 2018 IBC wind loads are *ultimate loads*, not service loads.)
- Seismic will not govern design for buildings less than 60 ft.
- Prescriptive options for wood and metal framed buildings



Porches and Decks

- Reduce live load design standard from 100 psf to 60 psf for private porches, decks, balconies (serving single unit)
- Reduce required residential guardrail height from 42" to 36" up to 3 stories



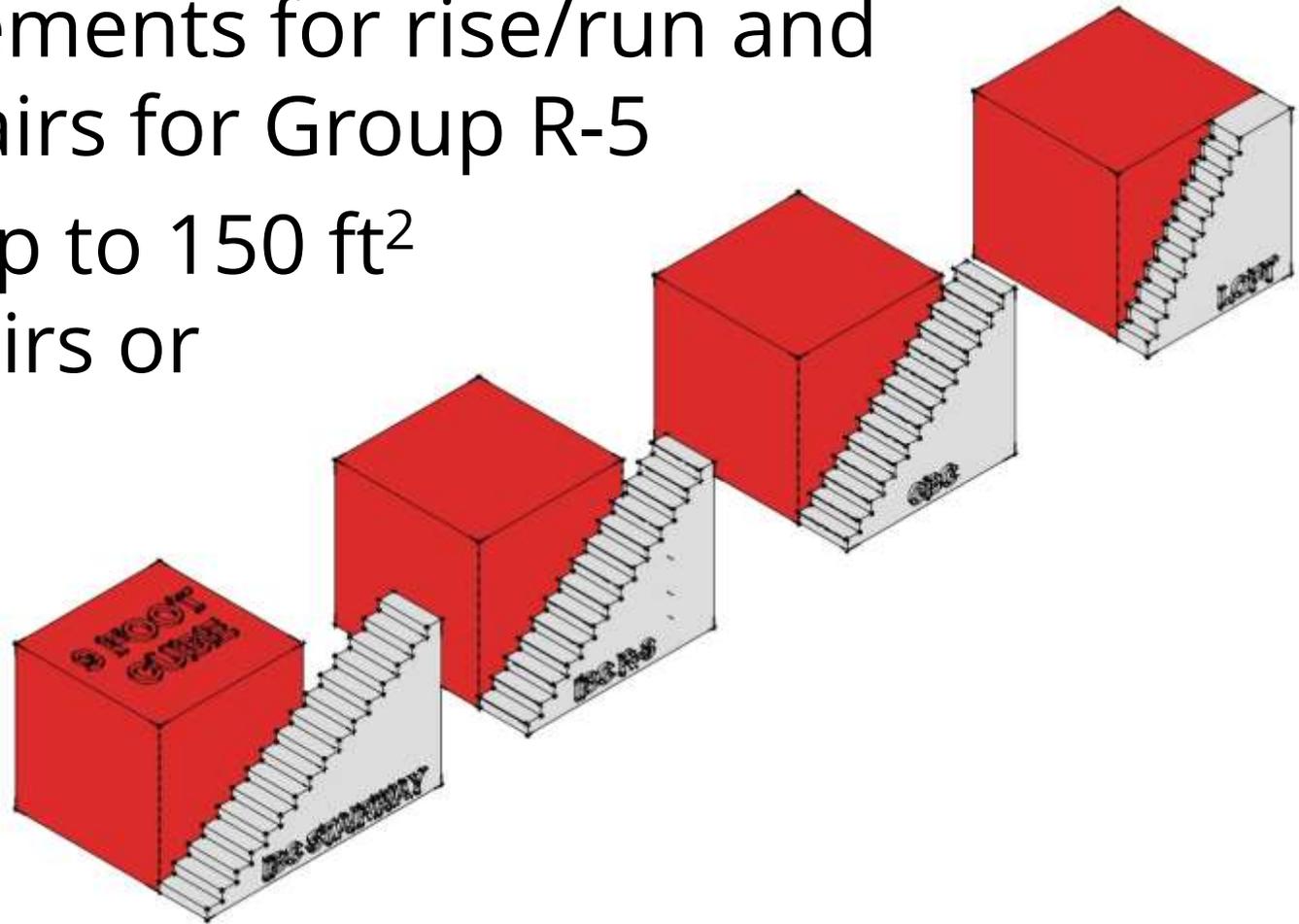


Ceiling Height

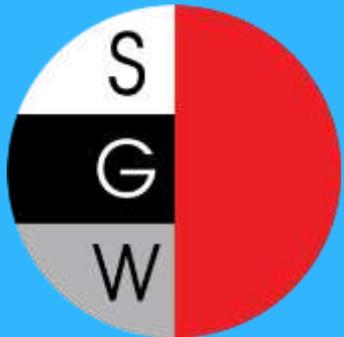
- Minimum ceiling height reduced from 7'-6" to 7'-0"
- Facilitate conversion of basements and attics without excavation or dormers
- Reduced ceiling heights available for lofts

Residential Exiting

- Maintain existing requirements for rise/run and winder dimensions in stairs for Group R-5
- New provision for lofts up to 150 ft² accessible by steeper stairs or ladder
- No requirement for "egress windows"



An Architect's Perspective



Lew Wilson

Principal

Sullivan Goulette & Wilson, Ltd.

Building Construction Types

- Fire Resistive: Type 1C → 2A
- Ordinary/ Exterior Protected: Type 3B → 3A
- Combustible Frame: Type 4A → 5A

Building Construction Types

- Fire Protected: Type 1C → 2A

Midrise Residential: Steel frame and studs, concrete and metal deck floors, and non-combustible exterior skin

4-6 Stories

Chicago Construction Type 2A

- Mid-Rise Residential



Building Construction Types

- Exterior Protected: Type 3B → 3A
Bricks and Sticks: Masonry or protected steel stud frame with a non-combustible exterior skin, interior wood studs and solid or open web wood joist decked floors

Up to 4 stories

Chicago Construction Type 3A

- Single-family
- Two-flats
- Three-flats



Building Construction Types

- Combustible Frame : Type 4A → 5A

The structural elements, including enclosing walls, are built in part, or entirely, of wood or other materials not more combustible than wood

1 to 3 Stories

Chicago Construction Type 5A

- Single-family and smaller Residential



Residential Height Limits (stories / feet)

Current CBC

2020 CBC

Type 1C : 6 / 80'	→	2A (NS): 6 / 65' (R-5: 4/65')
		2A (S): 6 / 85' (R-5: 4/85')
Type 3B : 4 / 55'	→	3A (NS) : 4 / 55' (R-5: 4/55')
		3A (S): 5 / 70' (R-5: 4/70')
Type 4A : 3 / 40'	→	5A (NS) : 2 / 40' (R-5: 3/40')
		5A (S): 4 / 55' (R-5: 4/55')

Building Construction Types

Allowable Area: Current CBC (sf per Flr/3sty/4sty)

- Type 1C : 20,000 / 18,000 / 17,000
- Type 3B : 8,000 / 7,200 / 6,800
- Type 4A: 4,000 (w/800 sf 3rd Floor)

Building Construction Types

Allowable Area (sf per Floor/3sty/4sty)

- Type 1C : 20,000 / 18,000 / 17,000
Sprinklered: 40,000 / 36,000 / 34,000
- Type 3B : 8,000 / 7,200 / 6,800
Sprinklered: 16,000 / 14,400 / 13,600
- Type 4A: 4,000 (w/800 sf 3rd Floor)

Building Construction Types

Allowable Area: CBC 2020

(Tabular sf - nonsprinkler / multistory sprinkler factors)

- Type 2A : 24,000 / 72,000
- Type 3A : 10,000 / 30,000
- Type 5A: 5,000 / 15,000

Total building area is limited to 3x area factor.

Building Construction Types

Allowable Area Increase

Non-Sprinklered

- Type 2A : (R-2) $72,000 \times 2.0 = 144,000 \text{ sf}$
- Type 3A : (R-5) $30,000 \times 2.0 = 60,000 \text{ sf}$
- Type 5A: (R-5) $15,000 \times 2.0 = 30,000 \text{ sf}$

Building Construction Types

Allowable Area Increase:

Sprinklered

- Type 2A : (R-2) $72,000 \times 3.0 = 216,000$ sf
- Type 3A : (R-5) $30,000 \times 3.0 = 90,000$ sf
- Type 5A: (R-5) $15,000 \times 3.0 = 45,000$ sf

Building Construction Types

Allowable Area Increase: Non Sprinklered

Allowable Area With Increases

= (Base Area) x (Frontage/Perimeter) x (NS=1)

= (1) x (100/100) x (1) = Factor of 1 + Base Area

= 2.0 Increase Maximum

Building Construction Types

Allowable Area Increase: Sprinklered

Allowable Area With Increases

= (Base Area) x (Frontage/Perimeter) x (S=2)

= (1) x (100/100) x (2) = Factor of 2 + Base Area

= 3.0 Increase Maximum

Building Construction Types

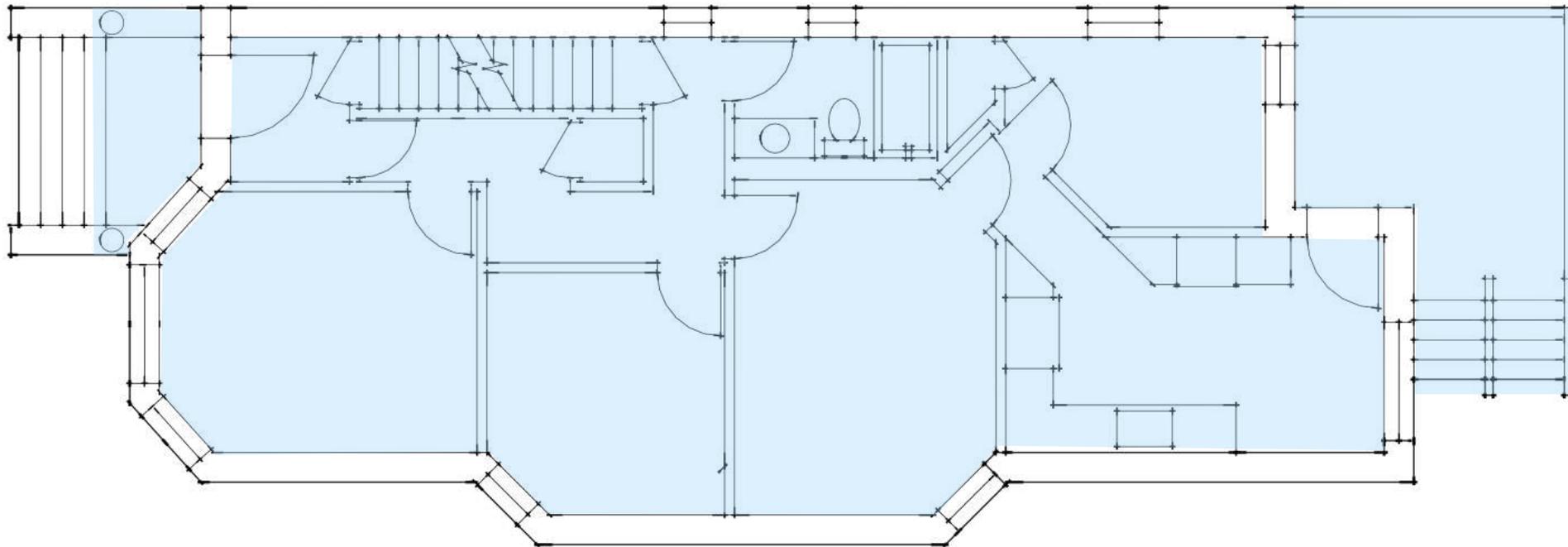
Allowable Area Qualifications

- Sprinklering will be required in all but R-5 occupancies (1, 2 or 3 units and 4 or less stories)
- Frontage increases will decrease from 150% increase to 100% maximum increase
- Open, but covered areas, will count as Area

Building area

Building code excludes thickness of exterior walls.

New building code includes covered porches, balconies, etc.



Building Construction Types

Fire Ratings of Exterior Bearing Walls:

	Current CBC	2020 CBC
Public Way	1C= 2 hr	2A = 2 / 1 / 0*
	3B= 3 hr	3A = 2 / 1 / 0*
	4A= 1 hr	5A = 2 / 1 / 0*

*Distance to lot line @ : 0'-3' / 3'-30' / 30'+

Building Requirements

Townhome Fire Separations:

- Up to 3 Units in a row with exterior wall fire ratings per last slide.
- 1 hour ratings will be required between individual units, rather than 3 hours.
- Additional blocks of up to 3 Units each, must be separated by a 4 hour firewall or all must be fully sprinklered

Building Construction Types

Fire Ratings Exterior Non-Bearing Walls:

	Current CBC	2020 CBC
Public Way	1C= 2 hr	2A = 2 / 1 / 0*
	3B= 1hr	3A = 2 / 1 / 0*
	4A= 1 hr	5A = 2 / 1 / 0*

*Distance to lot line @ : 0'-3' / 3'-30' / 30'+

Building Construction Types

Fire Ratings Exterior Non-Bearing Walls:

- Type 3 Construction currently requires a parapet above the roof; in 2020, a Class C roof covering and a 4' fire protected deck at the perimeter of the roof can replace the parapet.

Building Requirements

Single Exit from the Third Floor:

- Current Code allows a single exit from a Third Floor that is under 800 sf or if the building is fully sprinklered
- Single-exit rules in the new code are very similar to today

Building Requirements

Guardrail Heights:

- Current Code requires a 42" high guardrails
- New R-5 allows 36" high guardrails

Building Requirements

Live Load Reduction at Private Porches:

- The Live Load for privately accessed porches and decks will be reduced from the current 100 psf Live Load to 60 psf

Building Requirements

Seismic and Lateral Requirements:

- R-5 Occupancy will not be required to comply with the new Seismic Requirements, and the Wind load Requirements will be reduced from current standards

Building Requirements

Sidewall Opening Restrictions:

- R-5 Occupancy will have now opening size requirements for windows and glazing, limiting the percentage of opening based upon the distance from an interior Property Line

Max. Area of Openings

Residential-only, up to 4 stories

Fire separation distance

Protected Opening or
Sprinklered Bldg.

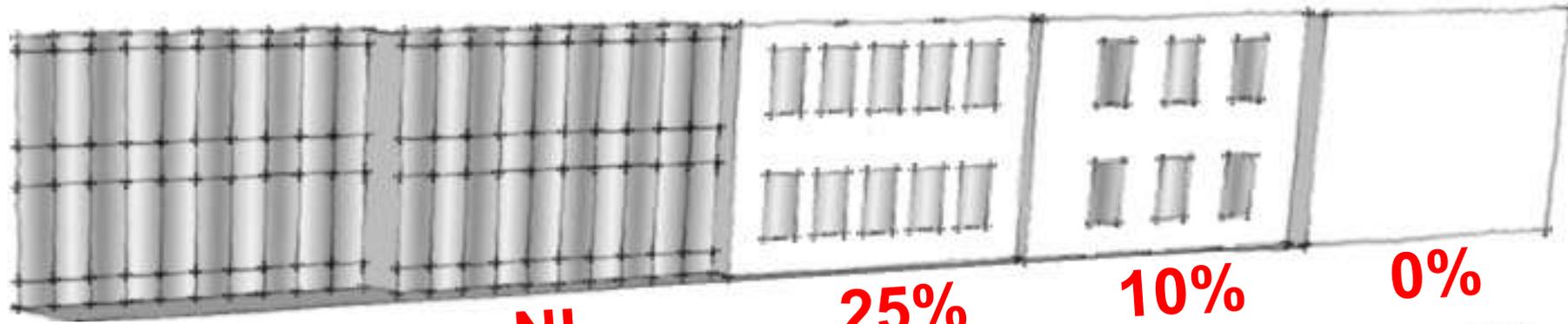
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5'

3'

2'

0'



NL

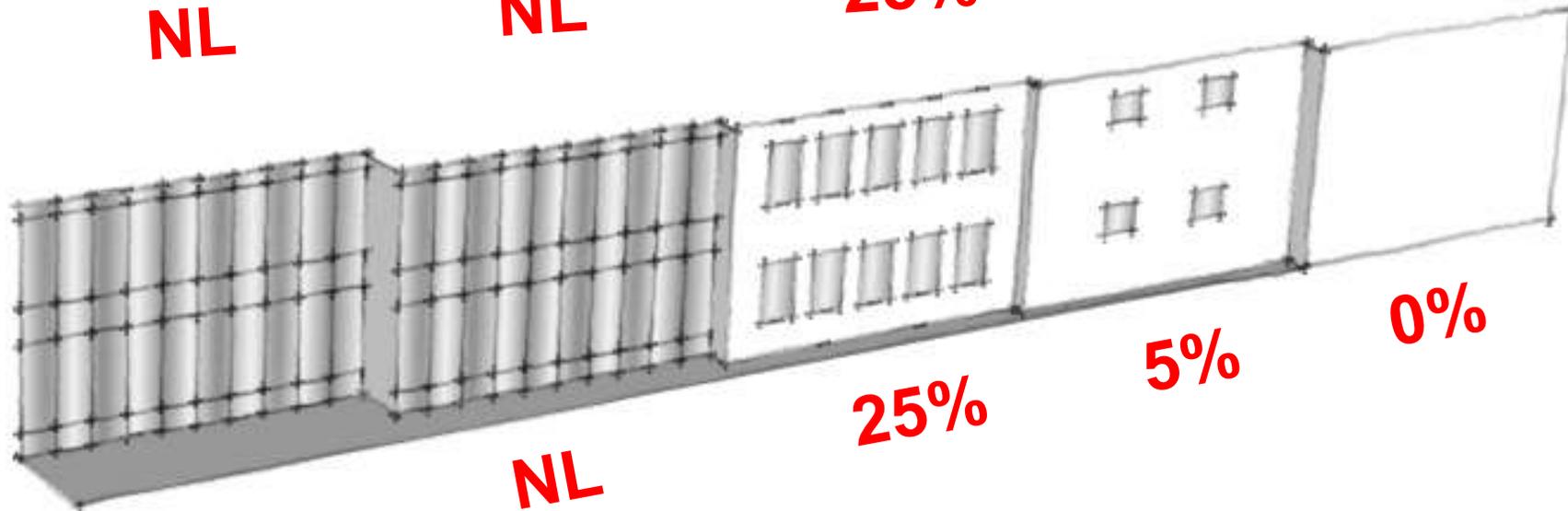
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25%

10%

0%

Nonsprinklered Bldg.
Unprotected opening



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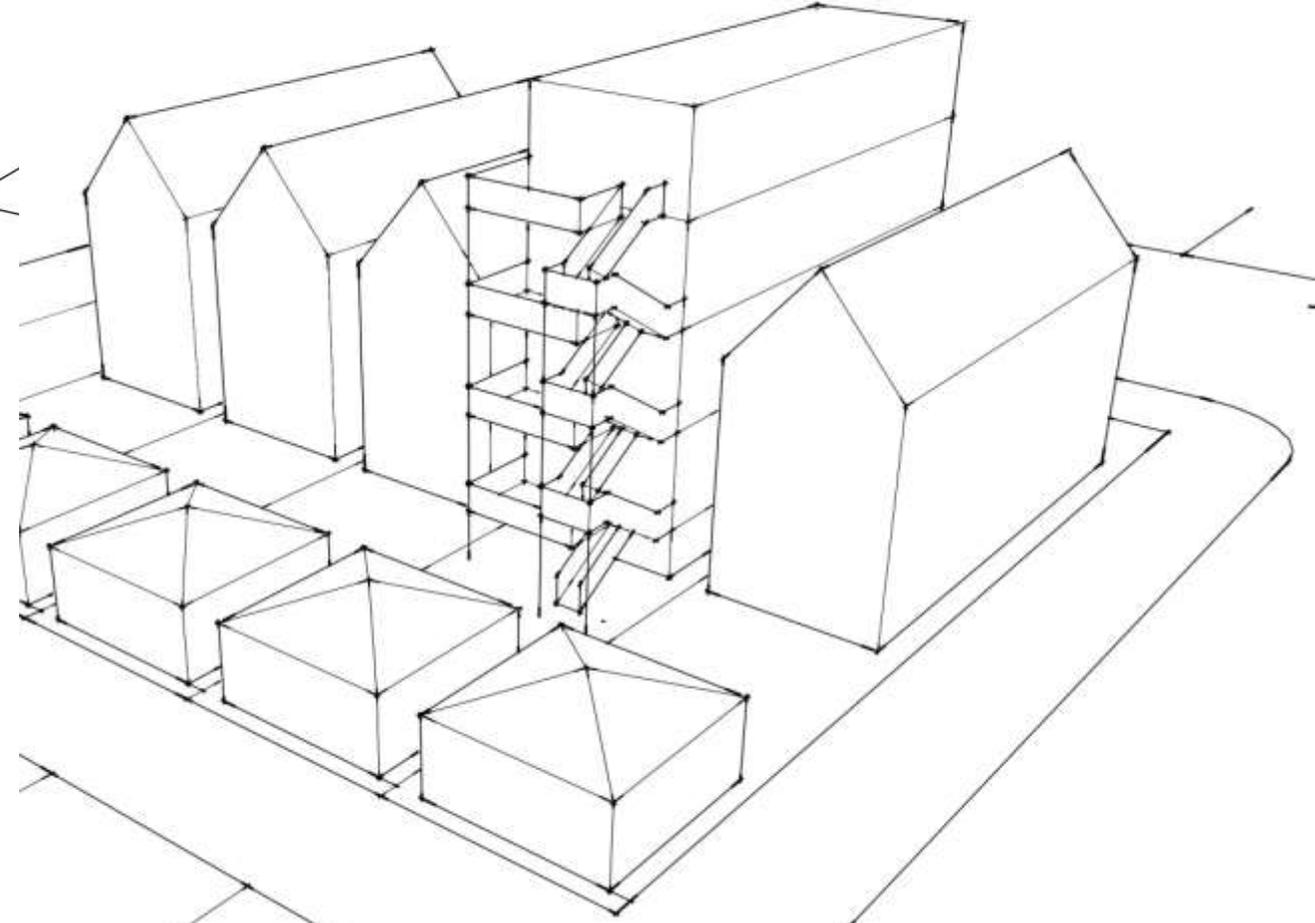
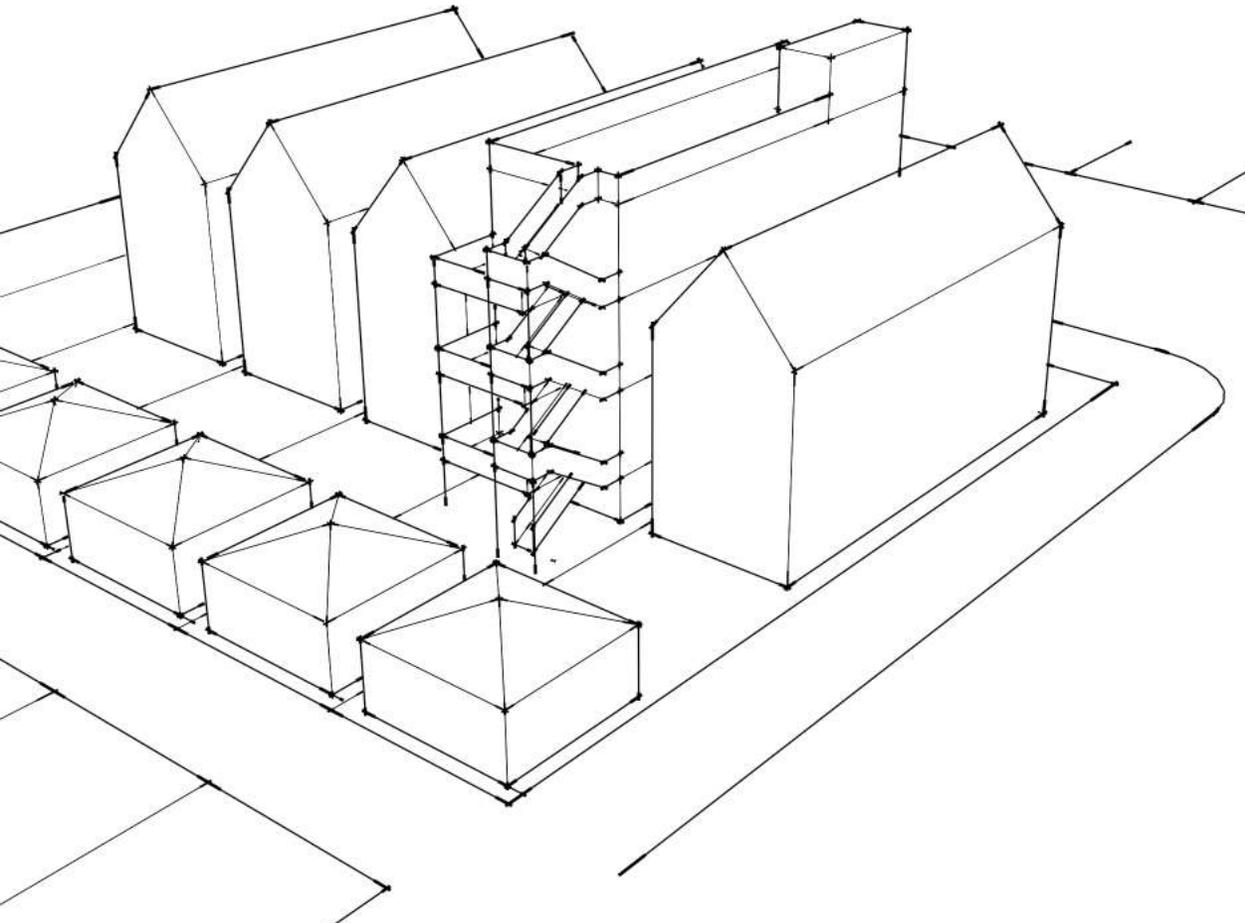
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Exterior Stairs

Currently Allowed to 30'- 2020 CBC will allow to 45'.



Fire and Life Safety



Carl Baldassara, P.E., FSFPE

Principal and Unit Manager, Fire Protection
Wiss, Janney, Elstner Associates, Inc.

State Fire Marshal Regulations

- Illinois Public Act 101-0082 clarifies that Fire Prevention and Safety Rules adopted by OSFM do not apply within City of Chicago, except for:
 - State-owned buildings
 - State-licensed facilities, e.g., Health Care, Day Care



Unique Definitions

Certain definitions reflect unique CBC needs

- Fire separation distance measured to opposite side of public way (exterior wall ratings and opening protection)
- Fire walls remain 4-hour rated; without ICC's structural integrity criteria
- New Use Group R-5



Unique Definitions

310.6 Residential Group R-5.

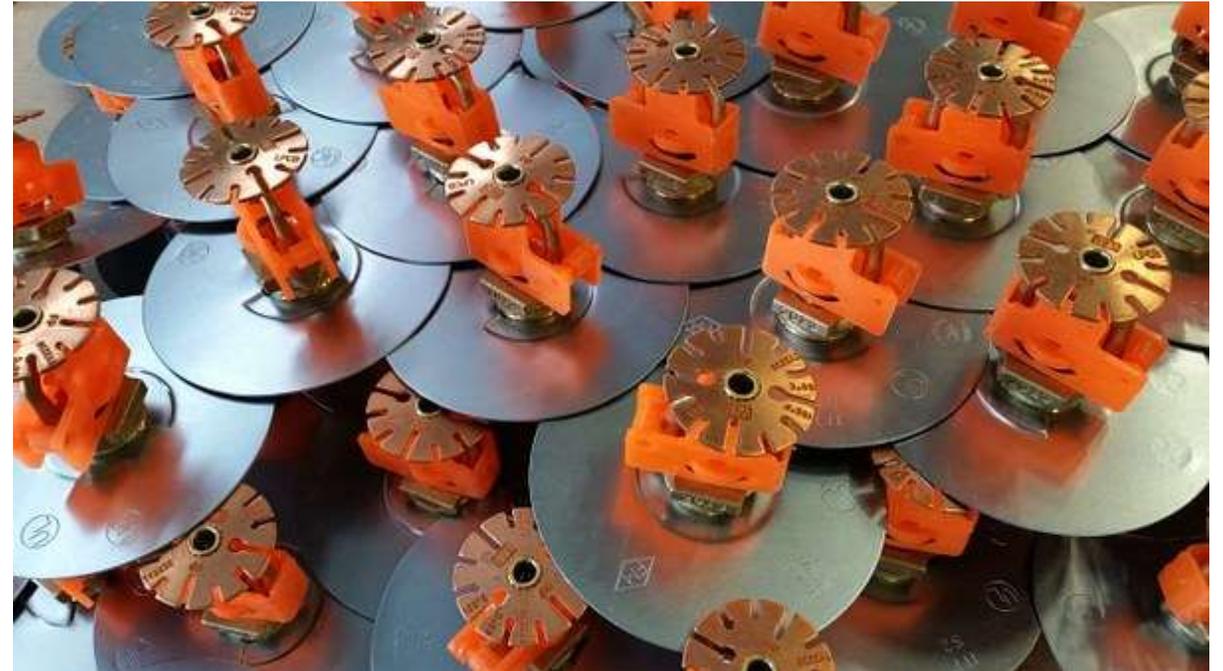
Residential Group R-5 occupancy shall include buildings with no more than four stories above grade plane containing one, two or three dwelling units (including live/work units), with or without an attached private garage, and no other occupancy, where each dwelling unit is primarily occupied on a non-transient basis by a single household. Group R-5 shall also include accessory buildings with no more than two stories above grade plane located on the same lot as Group R-5 dwelling units.



Fire Protection Requirements: General

New CBC consistent with fundamental fire safety approach of the IBC

- Move from largely passive protection to more active protection systems
- Adoption of current NFPA standards for standard terminology and design flexibility
- Lower installation costs



Fire Protection Requirements: General

Fire sprinkler, fire alarm and standpipe system requirements of the IBC are harmonized with the new CBC to reflect CFD operations



Fire Protection Requirements: General

- Electrical code requirements for fire pumps relaxed; consistent with model codes
- CO detection requirements consistent with IBC, including Use Group R



Automatic Sprinklers - Required

- Effective **January 1, 2020**, whether permitted under the **old or new code**
- All new residential buildings having 4 or more units
- No supervising (off-site) monitoring station required

EXCEPTION: R-2 occupancies ≤ 4 stories above grade, where ≤ 2 units per fire area and all vertical exits are interior stairways (Section 903.2.8, Exception 2)



Allowable Height – Stories vs. Construction Type (R-5)

	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
No/partial sprinklers	4*	4*	4	1	4	3	4	3	2
NFPA 13D	3	3	3	3	3	3	3	3	2
NFPA 13R	4	4	4	3	4	3	4	4	2
NFPA 13	4*	4*	4*	3	4*	3	4*	4	2

* Group R-5 occupancies limited to 4 stories

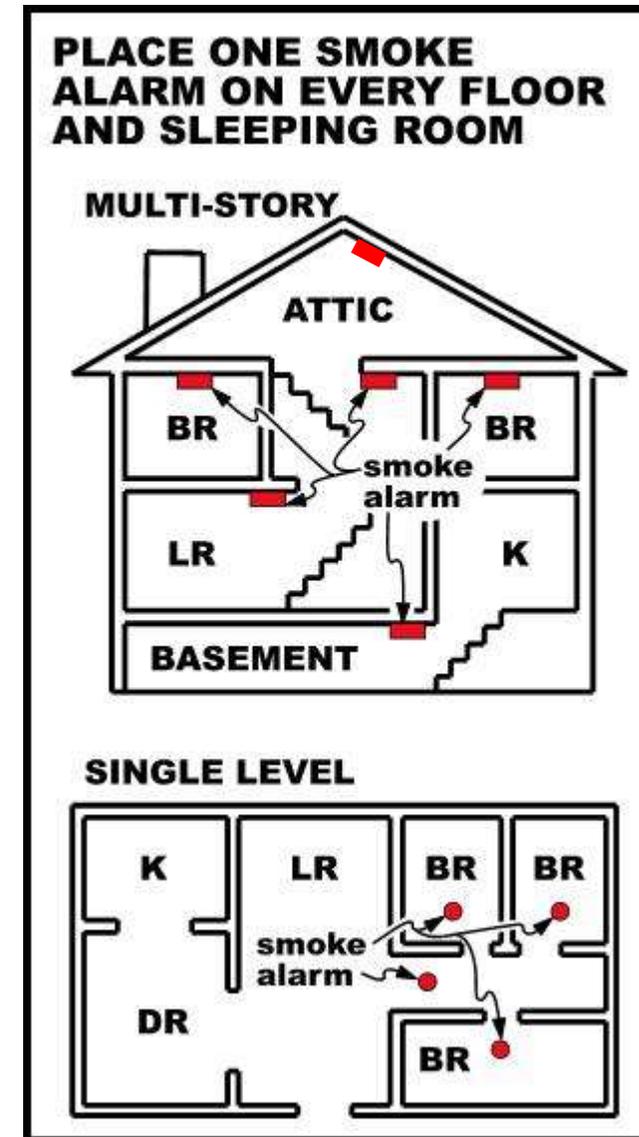
Smoke Alarms – Required

Locations

- In each sleeping room
- Outside of and within 15 feet of sleeping rooms
- In each story within a dwelling unit
 - Attic with clear height ≥ 81 " is a story
- At the top of each interior exit stairway (multi-family)

Features

- Hard-wired to AC power
- Interconnected within dwelling unit
- Combined smoke/CO detectors allowed



Thank You.



CITY OF CHICAGO
DEPARTMENT OF
BUILDINGS



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