PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Self-Certification 2024 International Building Code Architectural Provisions

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Rost Sapon, P.E.
Structural Plans Engineer
Architectural Technical Lead
Accessibility Technical Lead

City of Phoenix
Planning and Development Department

rost.sapon@phoenix.gov

602-262-7802

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Complete construction documents – Required

Accurate, detailed project scope – Required

Coordination of every discipline's documents – Required

List of every discipline's deferred submittals – Required
- On the architectural cover sheet, or
- On the cover sheet of each discipline responsible for the deferral

Every discipline's Special Inspection and Observation Certificates - Required

Points of discussion

This presentation will cover:

1. Occupancy classification
2. Construction type
3. Allowable height & area
4. Passive fire protection
5. Active fire protection
6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code requires every *structure,* or portion thereof, to be classified into one or more occupancy groups which are listed and described in Chapter 3.

Occupancy groups establish the LEVEL OF RISK to the occupants of a *structure* that is based on the *structure's* intended purpose.

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code divides the intended purpose of a structure into 10 main classifications.

A: Assembly

B: Business

E: Educational

F: Factory

H: High-Hazard

I: Institutional

M: Mercantile

R: Residential

S: Storage

U: Utility and Miscellaneous

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code further sub-divides some of these groups into more specific occupancy groups to capture the RISK associated with specific intended purposes.

An example is the Assembly Group A.

It is sub-divided into Group A-1, A-2, A-3, A-4, and A-5.

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

What distinguishes occupancy groups:

- Fuel load
- Occupant Load
- Type of activity
- Occupant level of situational awareness
- Occupant capability of self-preservation

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

MIXED OCCUPANCY

A *structure* can have a single occupancy group, or it can have several occupancy groups. This is known as mixed occupancy.

Clearly specify the occupancy group for each portion of the building or structure on the drawings.

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

MIXED OCCUPANCY

It is possible to have more than one occupancy group for a space.

The most restrictive classification group for the space must be specified on the drawings, and the design must comply with that classification group.

A *structure* with a Certificate of Occupancy for a Group E occupancy cannot be used for purposes classified as a Group A-3 occupancy, even occasionally.

1. Occupancy Classification

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

MIXED OCCUPANCY

The Code provides three methods for dealing with mixed occupancies.

The drawings must clearly identify the method used for each occupancy group in a mixed occupancy *structure*.

Accessory occupancy method (Section 508.2)
Non-separated occupancy method (Section 508.3)
Separated occupancy method (Section 508.4)

It is possible to use more than one method in a *structure.*

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

FIVE TYPES:

I: non-combustible *building elements*

II: non-combustible *building elements*

III: non-combustible *exterior walls* with combustible roof & floor *building elements*

IV: heavy timber with non-combustible *exterior walls;* and mass timber construction

V: *building elements* of any material permitted by the Code

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Each *structure* can have only one construction type (I, II, III, IV, or V)

Construction type determines the *structure's* ability to resist destruction by fire

Construction type accounts for *building element* participation in a fire

The *fire-resistance rating* of *building elements* is influenced by construction type

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

TYPES OF *FIRE-RESISTANCE RATINGS*:

To **maintain structural function** (Section 704)
for the sake of simplicity, I will refer to this type as ‘structural’

To **contain a fire** (provisions found throughout the Code)
for the sake of simplicity, I will refer to this type as ‘containment’

2. Construction Type

Table 601

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

TABLE 601 – FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame [f] (see Section 202)	3[a,b]	2[a,b,c]	1[b,c]	0[c]	1[b,c]	0	3[a]	2[a]	2[a]	HT	1[b,c]	0
Bearing walls												
Exterior [e,f]	3	2	2	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT [g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior [d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	0	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1½ [b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	1½ [b]	1	1	HT	1[b,c]	0

2. Construction Type

Table 705.5

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

TABLE 705.5 – FIRE-RESISTANCE RATING REQUIREMENTS FOR *EXTERIOR WALLS* BASED ON FIRE SEPARATION DISTANCE [a,d,g]				
FIRE SEPARATION DISTANCE = X (feet)	**TYPE OF CONSTRUCTION**	**OCCUPANCY GROUP H [e]**	**OCCUPANCY GROUP F-1, M, S-1 [f]**	**OCCUPANCY GROUP A, B, E, F-2, I, R [i], S-2, U [h]**
X < 5 [b]	All	3	2	1
5 ≤ X < 10	1A, IVA	3	2	1
	Others	2	1	1
10 < X < 30	1A, 1B, IVA, IVB	2	1	1 [c]
	IIB, VB	1	0	0
	Others	1	1	1 [c]
X ≥ 30	All	0	0	0

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 601

TABLE 601 – FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame [f] (see Section 202)	3[a,b]	2[a,b,c]	1[b,c]	0[c]	1[b,c]	0	3[a]	2[a]	2[a]	HT	1[b,c]	0
Bearing walls												
Exterior [e,f]	3	2	2	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT [g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior [d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	0	2	2	HT	1	0
Roof construction and associated secondary structural (see Section 202)											1[b,c]	0

Type VB
Office Building
8ft F.S.D.
wood stud framed bearing *exterior wall*

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 601

TABLE 601 – FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame [f] (see Section 202)	3[a,b]	2[a,b,c]	1[b,c]	0[c]	1[b,c]	0	3[a]	2[a]	2[a]	HT	1[b,c]	0
Bearing walls												
Exterior [e,f]	3	2	2	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT [g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated structural members (see Section 202)											1	0
Roof construction and associated structural members (see Section 202)											1[b,c]	0

e, f

Type VB
Office Building
8ft F.S.D.
wood stud framed *exterior wall*

2. Construction Type

Table 705.5

PLANNING & DEVELOPMENT
PRESERVE SHAPE BUILD

TABLE 705.5 – FIRE-RESISTANCE RATING REQUIREMENTS FOR *EXTERIOR WALLS* BASED ON FIRE SEPARATION DISTANCE [a,d,g]				
FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H [e]	OCCUPANCY GROUP F-1, M, S-1 [f]	OCCUPANCY GROUP A, B, E, F-2, I, R [i], S-2, U [h]
X < 5 [b]	All	3	2	1
5 ≤ X < 10	1A, IVA	3	2	1
	Others	2	1	1
10 < X < 30	1A, 1B, IVA, IVB	2	1	1 [c]
	IIB, VB	1	0	0
	Others	1	1	1 [c]
X ≥ 30	All	0	0	0

Type VB
Office Building
8ft F.S.D.
wood stud framed *exterior wall*

2. Construction Type

Table 601

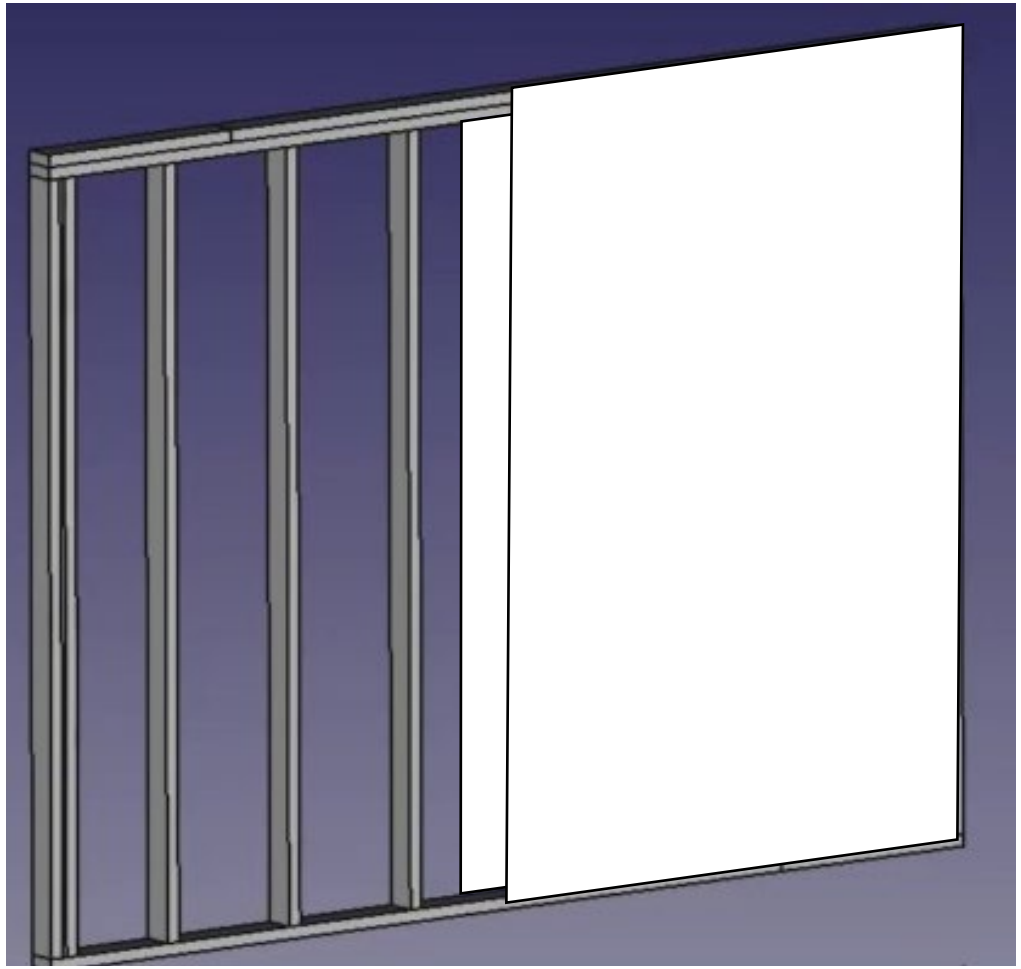
PLANNING & DEVELOPMENT
PRESERVE SHAPE BUILD

TABLE 601 – FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame [f] (see Section 202)	3[a,b]	2[a,b,c]	1[b,c]	0[c]	1[b,c]	0	3[a]	2[a]	2[a]	HT	1[b,c]	0
Bearing walls												
Exterior [e,f]	3	2	2	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT [g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior [d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)								2	2	HT	1	0
Roof construction and associated secondary str (see Section 202)								1	1	HT	1[b,c]	0

This zero changes to 1 hour for this example of a Type VB Office Building with an 8ft F.S.D. with wood stud framed *exterior wall.*

2. Construction Type



PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Because this is a light-framed bearing *exterior wall*, Section 704.4 allows membranes applied to the wall to provide the ‘structural’ type fire-resistance rating. This is convenient for our example because these same membranes will also provide the required ‘confinement’ type rating.

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

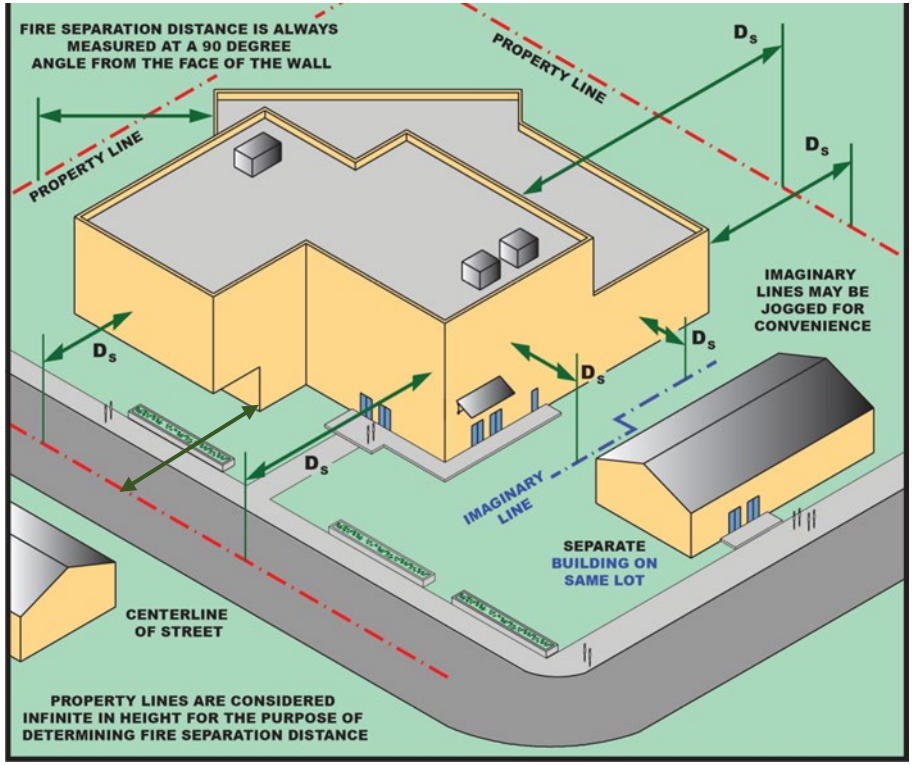
TYPES OF *FIRE-RESISTANCE RATINGS*:

It is very important to know when a ‘confinement’ type or a ‘structural’ type of *fire-resistance rating* is required by the Code.

Sometimes an element will require both types.

2. Construction Type

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD



A site plan is required.

Show property lines, lot lines, and imaginary lines

Show the *fire separation distances* to all the lines

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code regulates the size of a building based on specific hazards associated with the occupancy group, construction type, and the presence of fire sprinklers.

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Regulating the height and size provides for a reasonable time to evacuate.

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 504.3 (height), Table 504.4 (stories), and Table 506.2 (area)

.

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Allowable Area Factors specified in Table 506.2 may be tweaked based on the building's frontage conditions by provisions found in Section 506.3

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Unlimited area buildings are possible in more construction types than what is shown in Table 506.2 when complying with provisions in Section 507.

Section 507 is limited to specific primary occupancy groups. Mixed occupancy for unlimited area buildings using Section 507 is limited.

Unlimited area buildings using Section 507 must be surrounded by large open spaces.

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 506.2

TABLE 506.2 – ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET [a, b]													
OCUPANCY CLASSIFICATION	SEE FOOT NOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 506.2

TABLE 506.2 – ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET [a, b]													
OCUPANCY CLASSIFICATION	SEE FOOT NOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000

3. Allowable Height & Area

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Table 506.2

TABLE 506.2 – ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET [a, b]													
OCUPANCY CLASSIFICATION	SEE FOOT NOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000

Equation 5-1 $$A_a = [A_t + (NS \times I_f)]$$

Equation 5-2 $$A_a = [A_t + (NS \times I_f)] \times S_a$$

4. Passive Fire Protection

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Does not need to be deployed. Ready to go as-is.

Provided to

- Maintain structural function, and/or
- Contain a fire

Fire-resistance rating is determined by methods specified in Section 703.2

- *Approved* tested & listed assemblies
- Prescriptive assemblies specified in Section 721
- Calculated assemblies specified in Section 722
- Engineering analysis using information from already tested and listed assemblies

4. Passive Fire Protection

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Design factors:

- Type of *fire-resistance rating* required
  - Structural
  - Containment
- Amount of fire-resistance rating required
  - Protection time
- Continuity of the assembly
  - Openings, penetrations, and joints
- Type of materials allowed for the construction type
- Structural support required for the rated assembly

5. Active Fire Protection

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Deploys during a fire.

Fire sprinklers

NFPA 13 - Save the building, put fire out (903.3.1.1)

NFPA 13R - Save the occupants, slow down fire to allow evacuation (903.3.1.2)

Fire alarm

Smoke detection

Carbon monoxide gas detection

Smoke control system

5. Active Fire Protection

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Intumescent materials are also active fire protection.

These materials must expand, when the heat from a fire activates them.

Sufficient space must be provided for intumescent materials to properly expand so they can provide the insulative properties necessary to isolate the protected item from the flames and high temperatures.

Intumescent materials are not a solution where there is not enough space to apply a sprayed fire-resistant material. The required space for each of these materials must be included in the design.

6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

A continuous and unobstructed path of travel from any occupied portion of a building or structure to the public way

6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Three components of a *Means of Egress*:

Exit Access >>>>>>>> ***Exit*** >>>>>>>> ***Exit Discharge***

These are separate and distinct for each person based on where travel starts.

A person can only proceed one way through these components. From *exit access* to *exit*, to *exit discharge*.

With *horizontal exits*, and *atriums*, you can have a mix of people. Some can be in the *exit* component while others right beside them are still in the *exit access* component. One person's *exit access* can be another person's *exit*.

6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code specifies limits on the distance a person can travel within the *exit access* component before they reach an *exit* component.

Exit access travel distance varies based on the occupancy classification group of the space where the *exit access* travel distance started.

The Code also specifies limits on the aggregate *common path of egress travel* distance within the *exit access* travel distance.

6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Egress plan is required

Egress plan shall show:

1. Occupancy group, function, and quantity of occupants in each space

Occupancy Group **B**,
Assembly (15 net)
34 Occupants

2. Entire egress travel paths to the *exit discharge*
3. Quantity of occupants using each *exit* feature
4. Required egress width, and provided egress width
5. *Exit* separation distance
6. Aggregate *common path of egress travel* distance
7. Total *exit access* travel distance

6. Means of Egress

Required quantity of *exits* is based on:

1. Occupant load
2. Maximum *common path of egress travel*
3. Occupancy group of the space

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

TABLE 1004.5
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal Baggage claim Baggage handling Concourse Waiting areas	 20 gross 300 gross 100 gross 15 gross
Assembly Gaming floors (keno, slots, etc.) Exhibit gallery and museum	 11 gross 30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats Concentrated (chairs only—not fixed) Standing space Unconcentrated (tables and chairs)	 7 net 5 net 15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas Concentrated business use areas	150 gross See Section 1004.8

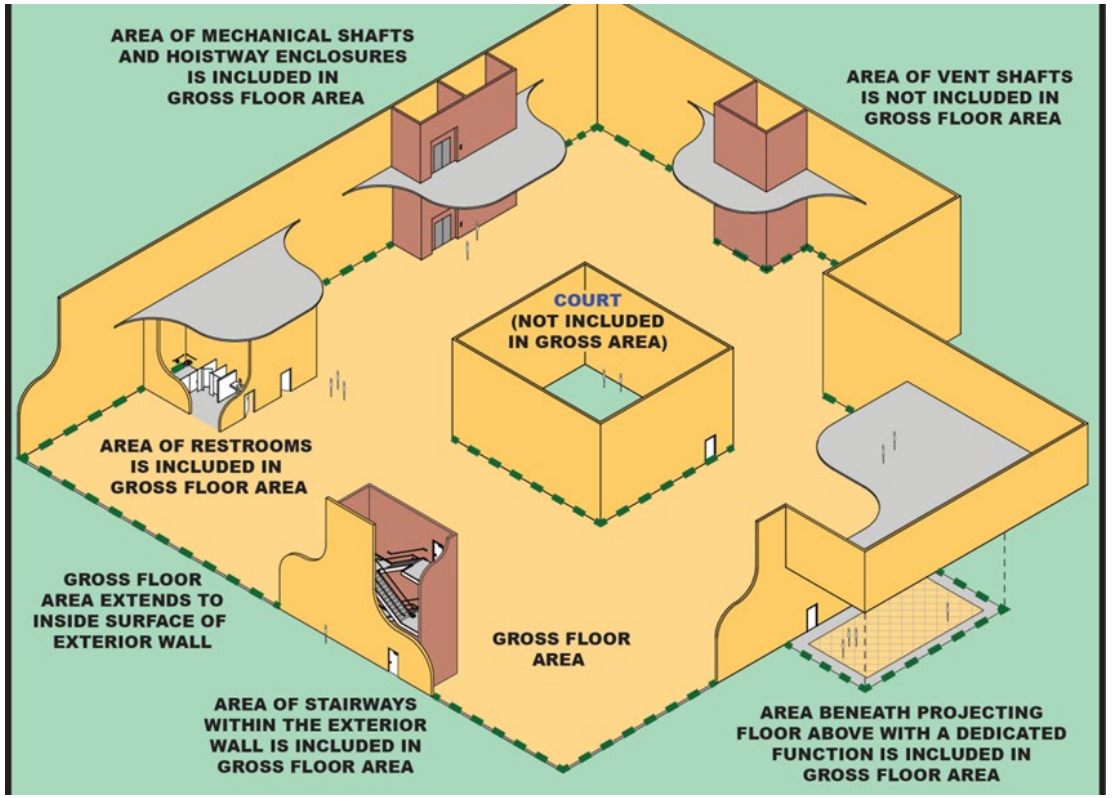
6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Gross floor area includes:

The area within the exterior walls and areas beneath projecting floors that have a dedicated function.

Ventilation shafts and courts open to the sky are not included in the gross floor area.



6. Means of Egress

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

Net floor area:

Actual occupiable area including aisles and aisle accessways.

Does not include walls, corridors, mechanical rooms, stairways, restrooms, closets, and areas occupied by built-in cabinetry.

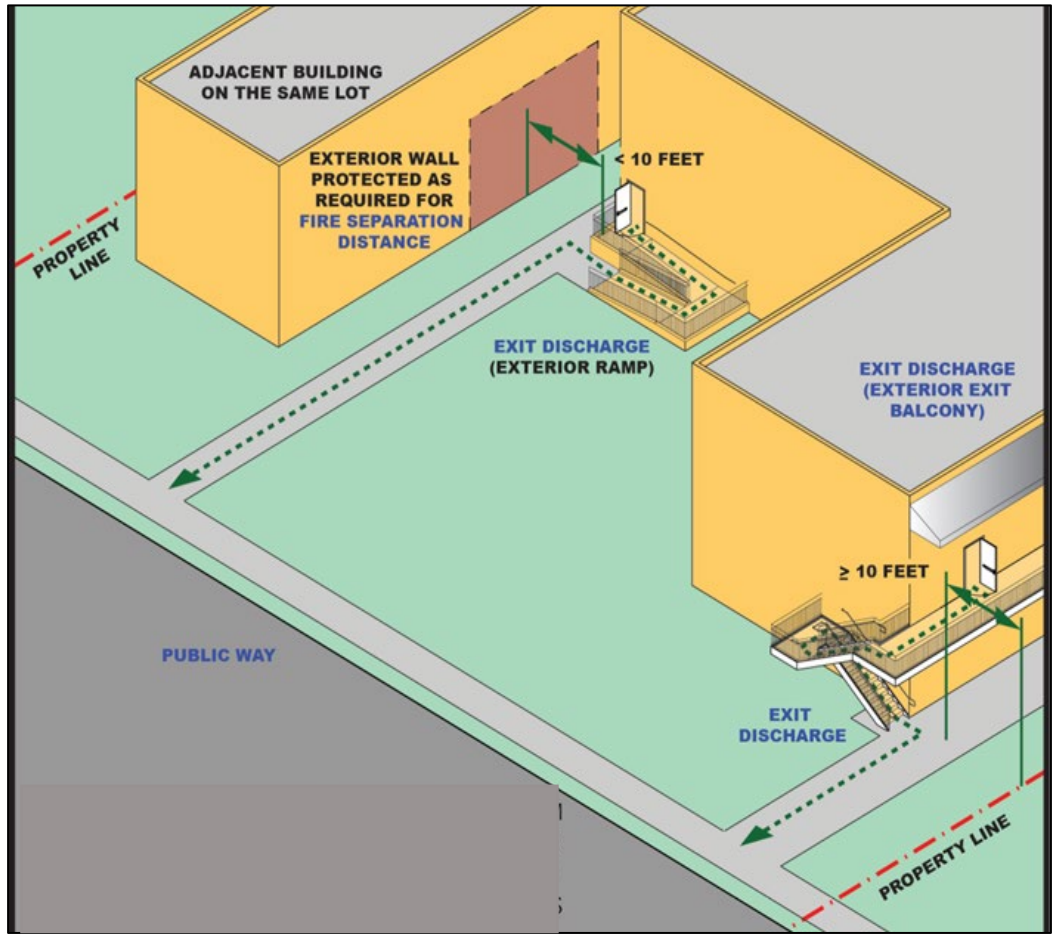
6. Means of Egress

***Exit Discharge*:**

The architectural site plan shall:

Show all *exit discharge* paths.

Provide continuous *exit discharge* paths all the way to the *public way*



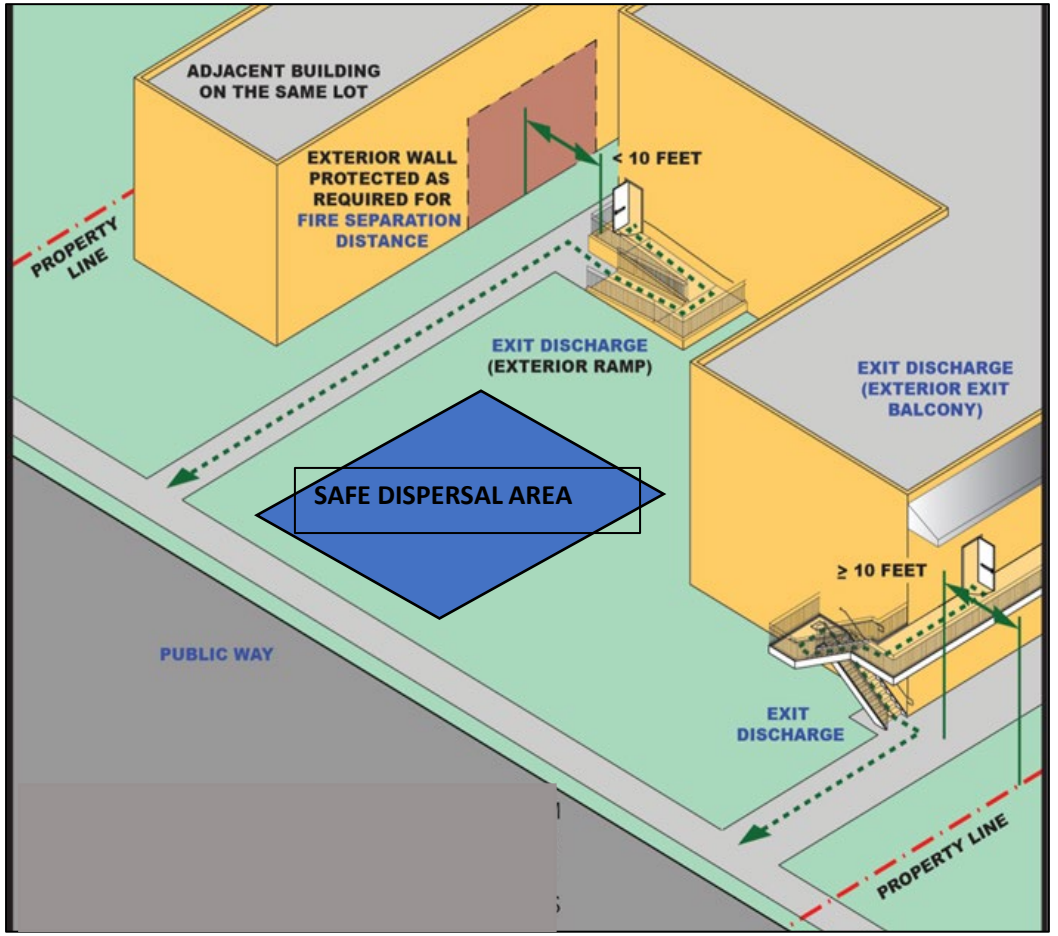
6. Means of Egress

***Exit Discharge*:**

Provide a Safe Dispersal Area when an *exit discharge* path cannot be provided to the *public way*.

Provide detailing and signage to clearly delineate and identify the Safe Dispersal Area.

Safe Dispersal Areas cannot be used for any other purpose and must always remain clear and available.



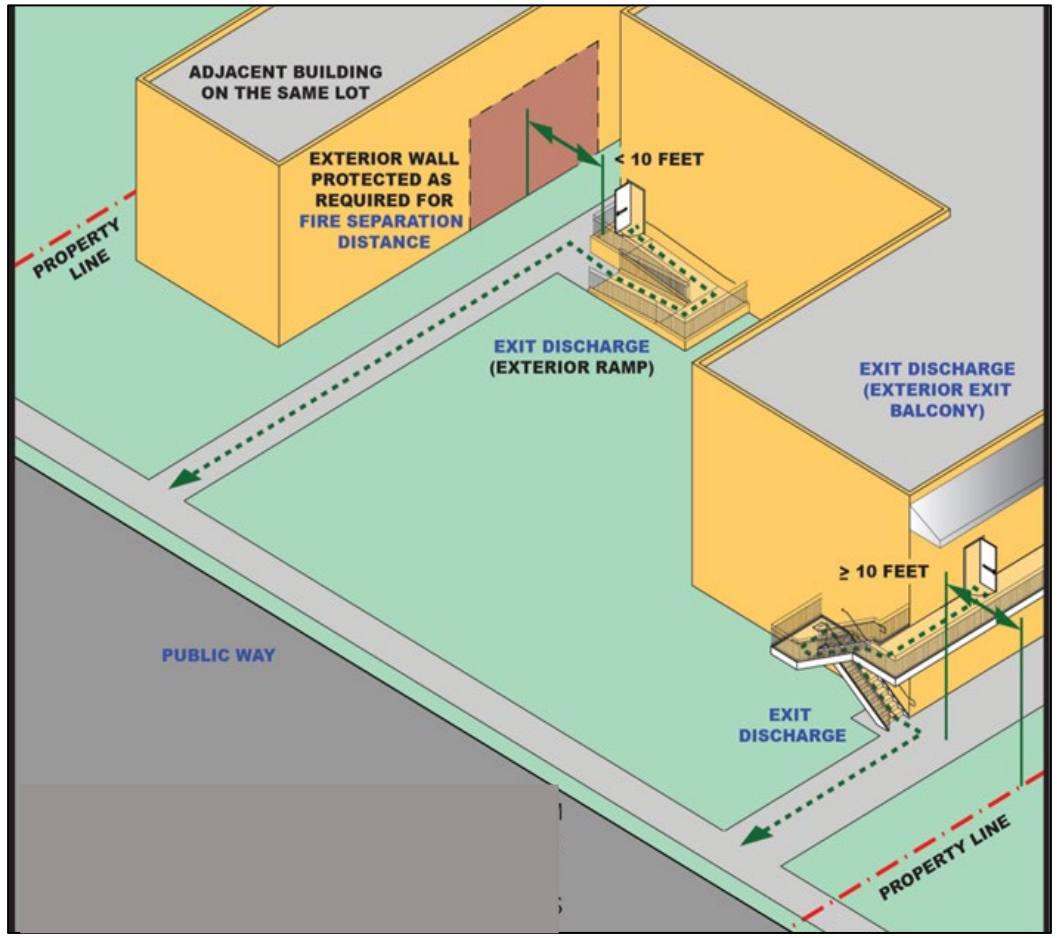
6. Means of Egress

***Accessible Exit Discharge*:**

The architectural site plan shall:

Provide a continuous *accessible route* for each *accessible exit discharge* all the way to the *public way*

Show all *accessible exit discharge* paths.



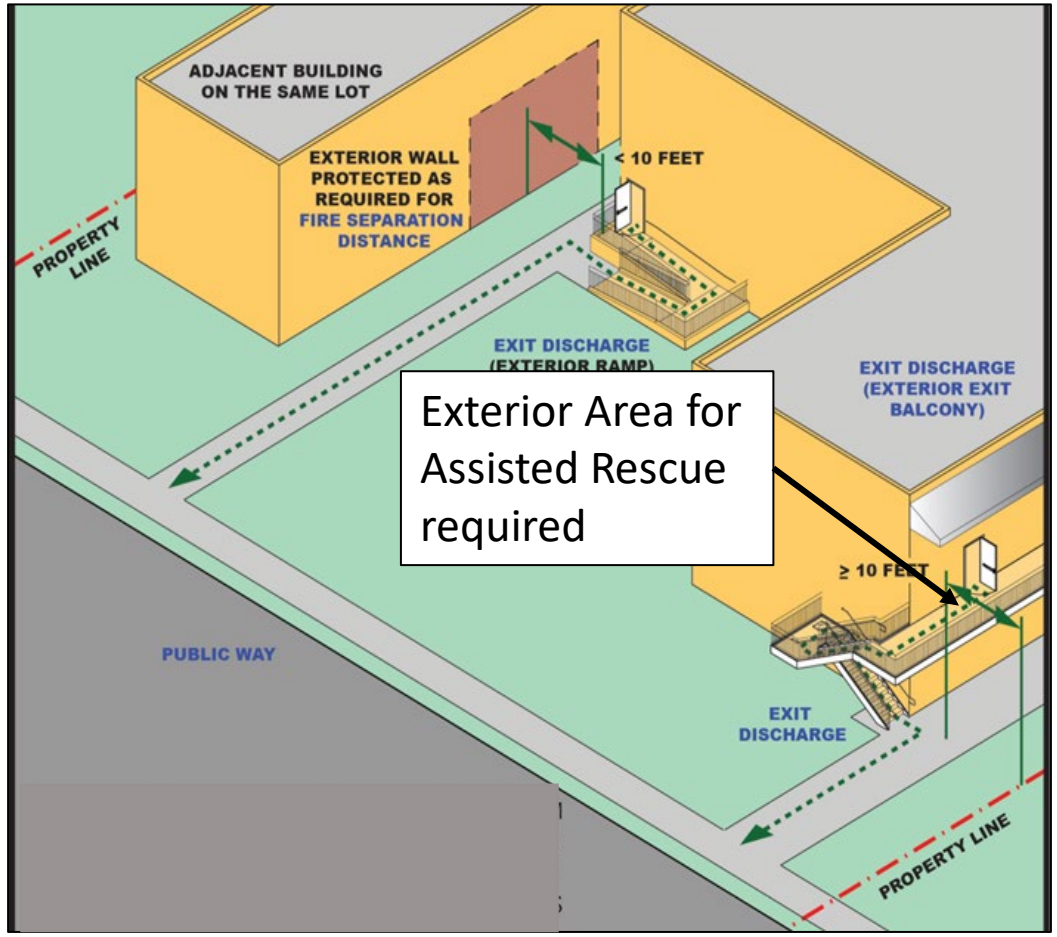
6. Means of Egress

***Accessible Exit Discharge*:**

When two *accessible means of egress* are required, each must have a separate continuous *accessible exit discharge* route to the *public way*.

A Safe Dispersal Area cannot be used for an *accessible exit discharge*.

If an *accessible route* is not available to the *public way*, an Exterior Area for Assisted Rescue must be specified, detailed, and signed at the *exit* door.



PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

The Code specifies only the minimum requirements !!

Compliance is required to ALL provisions in the Code.

If it is in the Code, it is ALWAYS required!

Plan review comments DO NOT amend the adopted Code.

PLANNING & DEVELOPMENT
PRESERVE
SHAPE
BUILD

QUESTIONS?

Rost Sapon
Structural Plans Engineer
Architectural Technical Lead
Accessibility Technical Lead
602-262-7802
rost.sapon@phoenix.gov