

KBC Chapter 34 :

Applying the Kentucky Building Code to Existing and Historic Buildings

Presented by:

Kentucky Department of Housing, Buildings, and Construction

Kentucky Heritage Council

**Louisville Metro Department of Codes & Regulations:
Inspections, Permits and Licenses**

Session 1: Key Concepts

- Historic buildings help define the character of a community, particularly in historic downtowns and city squares
- Continued renovation and re-use of these structures has significant real and positive impacts for communities and its citizens
- Building Codes have significant impacts for renovation projects
- A basic understanding of the building code, Chapter 34 in particular, will assist in positive and productive dialogue between property owner/developer and the local building official
- Thorough project planning and collaboration among property owners/developers and code officials will significantly increase the likelihood of project success

Historic town centers and the Kentucky Main Street Program

- Historic town centers are unique to the history and 'place' of a community.
- Thriving historic town centers have measureable impacts on local economies, particularly when programs support locally owned businesses.
- Main Street Program four point approach: Organization, Promotion, Design and Economic Restructuring
- Historic uses are often best blueprints for rehabilitation, and most synergistic with contemporary 'smart growth' development principles. Continued renovation and re-use of these structures has significant real and positive impacts for communities and its citizens
- Successful rehabilitations can have a systematic impact within a community. Master planning may be useful in guiding revitalization efforts to greatest return - with emphasis on 5-10 year time frame commitment.

Appropriate Rehabilitation of Historic Buildings and the role of the Kentucky Heritage Council

There are Standards for four distinct, but interrelated, approaches to the treatment of historic properties--preservation, rehabilitation, restoration, and reconstruction.

- **Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.
- **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.
- **Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods.
- **Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.

Appropriate Rehabilitation of Historic Buildings and the role of the Kentucky Heritage Council

- “Rehabilitation” is defined by the Secretary of Interior as “the process of returning a property to a state of utility, through repair or alteration, which make possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values.”

The Kentucky Heritage Council administers and offers assistance with the following programs.

- Federal and State tax credit programs
- Renaissance Façade Grant program
- Project assessment and planning assistance

<http://www.heritage.ky.gov>

<http://www.heritage.ky.gov/incentives>

The Secretary of the Interior's Standards for Rehabilitation

- Property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics.
- Historic character of a property shall be retained and preserved.
- New changes that create a false sense of historical development shall not be undertaken.
- Existing changes that have acquired historic significance in their own right shall be preserved.
- Distinctive features, finishes, and construction techniques that characterize a historic property shall be preserved.
- Deteriorated historic features shall be repaired rather than replaced.
- Treatments that cause damage to historic materials shall not be used.
- Significant archeological resources shall be protected and preserved.
- New additions shall not destroy historic materials that characterize the property. New work shall be differentiated from the old.
- New additions shall be done in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The Building Code and the local Building Official

- The Department of Housing Buildings and Construction is the State Building Official
- The state DHBC is authorized to recognize local jurisdictions and grant them authority to enforce the provisions of the code including:
 - Review construction plans
 - Issue permits
 - Inspect the work
 - Enforce compliance
- Kentucky Building Code is comprised of International Building Code + Kentucky Amendments

Section 122

122.1 All construction documents required by Section 106.1 are to be prepared by a design professional and bear the required signature and seals as indicated in Table 122.1.

Exception: Seals of design professional shall not be required for tenant space alterations unless the space itself is of a size that would require the seal if it were a new building.

**TABLE 122.1
DESIGN PROFESSIONAL SEALS**

NOTE: Projects involving new structures, additions or renovations require design professional services when the building size or calculated occupant load exceeds the limits indicated by Table 122.1.

GROUP CLASSIFICATION OR SPECIAL USE	BUILDING SIZE ^a (square feet)	CALCULATED ^a OCCUPANT LOAD	ARCHITECT	ENGINEER	EITHER	NONE
Assembly	—	100 ^a	X	X	—	—
Business	10,000	100	X	X	—	—
Educational	Any size	Any size	X	X	—	—
Factory & Industrial	20,000	—	—	—	X	—
High hazard	Any size	Any size	—	—	X	—
Institutional	Any size	Any size	X	X	—	—
Mercantile	—	100	X	X	—	—
Residential	12 dwelling units ^a	50 ^a	X	X	—	—
Storage ^a	20,000	—	—	—	X	—
Special Uses						
Church buildings ^f	8,000	400	X	X	—	—
Day care	3,500 ^b	100 ^b	X	X	—	—
Farm Structures	Any size	Any size	—	—	—	X
Mixed uses	Note c	Note c	X	X	—	—
Smaller buildings	Note d	Note d	—	—	—	X
Nonbuilding structures	—	—	—	—	—	X

For SI: 1 square foot = 0.093 m².

- Assembly uses having 700 square feet to 1,500 square feet may actually have calculated occupant load exceeding 100 persons depending on the specific use of assembly areas.
- Net floor area occupied by clients is 35 square feet per client and calculated occupant load is actually client load.
- Buildings having two or more different uses require both architect and engineer when the combined calculated occupant loads exceed 100 persons unless the mixed uses are exclusively used for factory, high hazard or storage.
- Smaller buildings of any use having total area or calculated occupant load less than specified for that use do not require design professional services.
- Projects involving additions to existing buildings shall include existing building areas and/or calculated occupant loads when determining requirements for design professional services. Use the actual occupant load if it is greater than the calculated occupant load.
- No architect or engineer is required unless the church building size reaches 8,000 total square feet and a calculated occupant load of 400 persons.
- The number of dwelling units shall be the determining factor except where dormitories or boarding homes are concerned. In these cases, the occupant load shall be determined by area or actual occupant load.

Role of Chapter 34, KBC

- Chapter 34 provides a method and guidance for the code official to use discretion in the application of the Building Code to projects affecting existing buildings primarily by:
 - Recognizing and evaluating existing conditions
 - Is the building usable as it is?
 - Evaluating new work on its own
 - All new work must comply with current codes
 - Impacts of the new work on existing conditions
 - New work cannot reduce code compliance of the existing
 - Primary focus is life safety

Basic Project Considerations

Physical assessments of the building

Historic preservation

Use groups/ occupancy

Height/area

Construction type

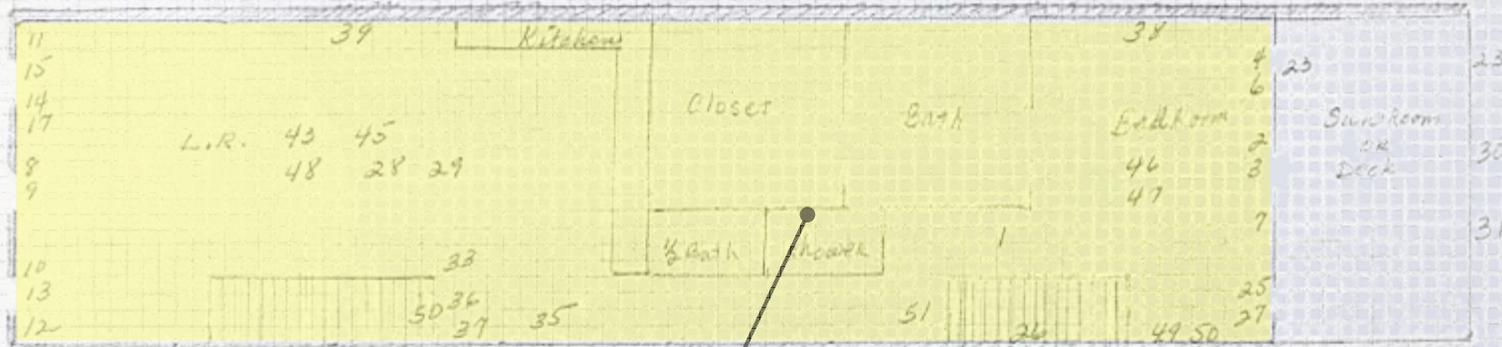
Louisville's Experience

Session 2: 3401 thru 3408

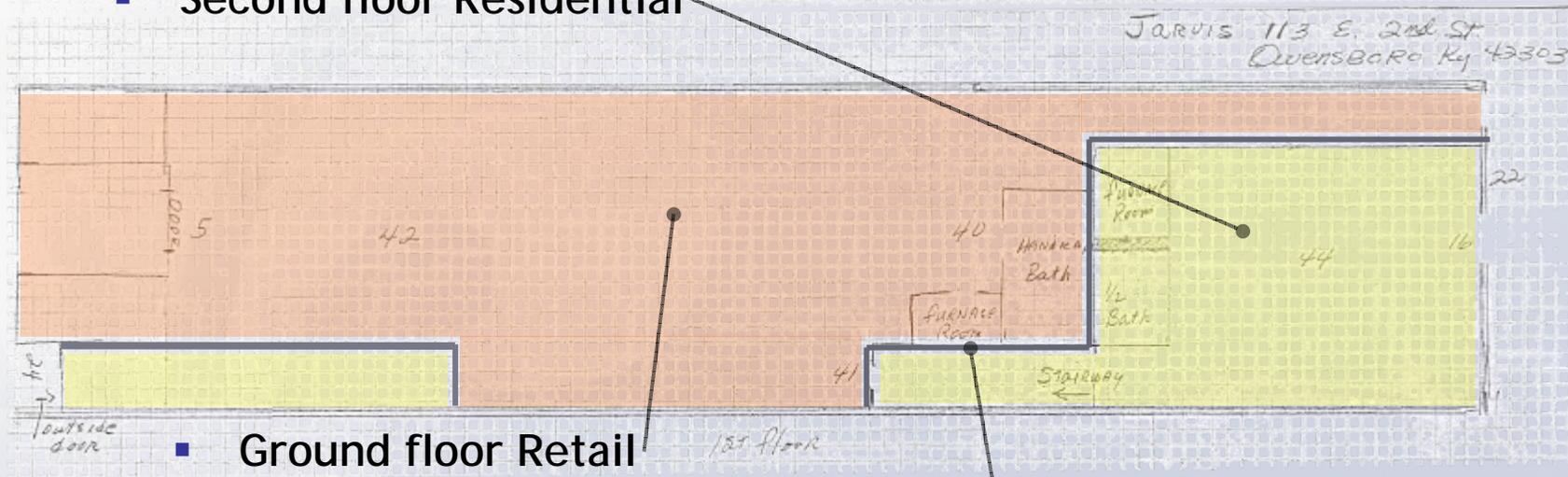
- 3401 - General.
 - Scope- alteration, repair, addition, and change of occupancy v. maintenance

Example

113 E. 2nd Street, Owensboro, KY



- Second floor Residential



- Ground floor Retail

Rated separation

Example

113 E. 2nd Street, Owensboro, KY



- Ground floor Retail w/
Second floor Residential

Example

113 E. 2nd Street, Owensboro, KY



- Existing guardrail raised to conforming height at existing back stair.



- Gypsum board fire separation at ceiling added above finished metal ceiling

- Existing 22" landing permitted at base of existing front stair

Session 2: 3401 thru 3408

- 3402 - Definitions.
 - Primary Function
 - Technically Infeasible

Session 2: 3401 thru 3408

- 3403 - Additions, Alterations, Repairs.

- 3403.1.1 Flood Hazard Areas

- Most of the larger, and all of the older cities in Kentucky are along a major waterway

- 3403.2 Structural

- 3403.2.3 Seismic

- The prevalence of differing seismic categories (western, along rivers, the karst areas) makes site specific determination a must

- 3403.4 Stairways

Example

113 E. 2nd Street, Owensboro, KY



- Second floor Residential

Session 2: 3401 thru 3408

3404 – Fire Escapes.

Fire Escapes and exterior stairs on old buildings often are less than current codes would require. The ability of code officials and designers to accommodate the current code, the existing conditions and obvious safety concerns is at the heart of the process. Chapter 34 and its “technical feasibility”, historic preservation and compliance alternatives allow many previously lost features to be retained.

Session 2: 3401 thru 3408



Photo #55 Plaza Theatre Glasgow, Kentucky June 2, 2003 Exterior Auditorium Lobby Doors and Stairway

Session 2: 3401 thru 3408

- 3405 - Glass Replacement.

There are essentially no exceptions to these requirements, which are detailed in Chapter 24.

Session 2: 3401 thru 3408

- 3406 - Change of Occupancy

- 3406.1 Conformance.

No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancy.

Session 2: 3401 thru 3408

The building must comply with the provisions of the code. This means all the previous chapters, except as allowed in chapter 34.

Session 2: 3401 thru 3408

Subject to the approval of the building official, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

Session 2: 3401 thru 3408

- 3406 - Change of Occupancy
3406.3 Stairways.

Existing stairways in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

Plaza Theater, Glasgow, Kentucky



Photo #9 Plaza Theatre Glasgow, Kentucky June 2, 2003 Auditorium
Lobby/Stairway to Balcony and Mezzanine

Session 2: 3401 thru 3408

- **3407.1 Historic buildings.**

The restoration or renovation of a building on a federal, state or local historic register solely to return the building to its original design shall not require the remainder of the building to comply with this code, except for alterations or changes of occupancy governed by Section 3403 or 3406.

Even being historic will not waive all requirements.
Section 3406 gives fairly broad discretion to the AHJ.

Session 2: 3401 thru 3408

■ 3408 - Moved Buildings

3408.1 Conformance.

Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

Can we move a structure which is historic?

What happens to the building once it is moved?

Can Chapter 34 be used for moved structures?

Let's have lunch!

Session 3: 3409

3409.2 Maintenance of facilities.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

3409.3 Extent of application.

An alteration of an existing element, space or area of a building or facility shall not impose a requirement for greater accessibility than that which would be required for new construction.

Alterations shall not reduce or have the effect of reducing accessibility of a building, portion of a building or facility.

Session 3: 3409

3409.4 Change of occupancy.

Existing buildings, or portions thereof, that undergo a change of group or occupancy shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is being provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Session 3: 3409

3409.4 Change of occupancy (cont'd).

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

Session 3: 3409

3409.4 Change of occupancy (cont'd).

Change of group or occupancy that incorporates any alterations or additions shall comply with this section and Sections 3409.5, 3409.6, 3409.7 and 3409.8.

Session 3: 3409

3409.5 Additions.

Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3409.7.

Session 3: 3409

PRIMARY FUNCTION.

A primary function is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer service lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors and restrooms are not areas containing a primary function.

Session 3: 3409

3409.6 Alterations.

A building, facility or element that is altered shall comply with the applicable provisions in Chapter 11 and ICC A117.1, unless technically infeasible. Where compliance with this sections technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Session 3: 3409

3409.6 Alterations (cont'd).

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3409.7.
2. Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities.
3. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provision for a Type B dwelling unit and shall comply with the applicable provisions in Chapter 11 and ICC/ANSI A117.1.

Session 3: 3409

3409.7 Alterations affecting an area containing a primary function.

Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Session 3: 3409

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.

Session 3: 3409

3409.8 Scoping for alterations.

The provisions of Sections 3409.8.1 through 3409.8.12 shall apply to alterations to existing buildings and facilities.

Session 3: 3409

3409.8.1 Entrances.

Accessible entrances shall be provided in accordance with Section 1105.

Session 3: 3409

3409.8.2 Elevators.

Altered elements of existing elevators shall comply with ASME A17.1 and ICC A117.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

Session 3: 3409

3409.8.3 Platform lifts.

Platform (wheelchair) lifts complying with ICC A117.1 and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.



Session 3: 3409

3409.8.4 Stairs and escalators in existing buildings.

In alterations where an escalator or stair is added where none existed previously, an accessible route shall be provided in accordance with Sections 1104.4 and 1104.5.

Session 3: 3409

3409.8.5 Ramps.

Where steeper slopes than allowed by Section 1010.2 are necessitated by space limitations, the slope of ramps in or providing access to existing buildings or facilities shall comply with Table 3409.8.5.

This severely limits ramp construction in many older buildings where elevation changes larger than this are relatively common.

TABLE 3409.8.5
RAMPS

SLOPE	MAXIMUM RISE
Steeper than 1:10 but not steeper than 1:8	3 inches
Steeper than 1:12 but not steeper than 1:10	6 inches

Session 3: 3409

3409.8.6 Performance areas.

Where it is technically infeasible to alter performance areas to be on an accessible route, at least one of each type of performance area shall be made accessible.

3409.8.7 Dwelling or sleeping units.

Where I-1, I-2 , I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Accessible or Type A units and Section 907 for accessible alarms apply only to the quantity of spaces being altered or added.

3409.8.8 Jury boxes and witness stands.

In alterations, accessible wheelchair spaces are not required to be located within the defined area of raised jury boxes or witness stands and shall be permitted to be located outside these spaces where the ramp or lift access restricts or projects into the means of egress.

Session 3: 3409

3409.8.9 Toilet rooms.

Where it is technically infeasible to alter existing toilet and bathing facilities to be accessible, an accessible unisex toilet or bathing facility is permitted. The unisex facility shall be located on the same floor and in the same area as the existing facilities.

3409.8.10 Dressing, fitting and locker rooms.

Where it is technically infeasible to provide accessible dressing, fitting or locker rooms at the same location as similar types of rooms, one accessible room on the same level shall be provided. Where separate-sex facilities are provided, accessible rooms for each sex shall be provided. Separate-sex facilities are not required where only unisex rooms are provided.

3409.8.11 Check-out aisles.

Where check-out aisles are altered, at least one of each check-out aisle serving each function shall be made accessible until the number of accessible check-out aisles complies with Section 1109.12.2.

3409.8.12 Thresholds.

The maximum height of thresholds at doorways shall be $\frac{3}{4}$ inch (19.1 mm). Such thresholds shall have beveled edges on each side.

Session 3: 3409

3409.9 Historic buildings.

These provisions shall apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, ramps, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the authority having jurisdiction, the alternative requirements of Sections 3409.9.1 through 3409.9.4 for that element shall be permitted.

Session 3: 3409

3409.9.1 Site arrival points.

At least one accessible route from a site arrival point to an accessible entrance shall be provided.

3409.9.2 Multilevel buildings and facilities.

An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

3409.9.3 Entrances.

At least one main entrance shall be accessible.

Exceptions:

1. If a main entrance cannot be made accessible, an accessible nonpublic entrance that is unlocked while the building is occupied shall be provided; or
2. If a main entrance cannot be made accessible, a locked accessible entrance with a notification system or remote monitoring shall be provided.

Signs complying with Section 1110 shall be provided at the primary entrance and the accessible entrance.

Session 3: 3409

3409.9.4 Toilet and bathing facilities.

Where toilet rooms are provided, at least one accessible toilet room complying with Section 1109.2.1 shall be provided.

this section allows a unisex toilet. it should be remembered that plumbing requirements may add more toilet rooms. this section refers to the requirements for accessible toilets.

Session 4: 3410

3410 – Compliance Alternatives

Purpose: Fundamental improvement to safety

The date of the adoption of the Kentucky Building code in 1982 is the threshold date for use of Section 3410 for evaluation of a project.

Role of the developer, architect, building official

Using the worksheet and scoring

Investigating options and re-evaluation of approach to increase score

Significant role of sprinkler

Session 4: 3410

The key to the use of Chapter 34 is the process of computing the score for the building.

The combination of height and area allowances, credit for superior construction type and compartmenting can add points to the score for a building which allows for reductions in some other, more difficult modernizations. Often, main street buildings are solidly constructed brick structures, usually only two , maybe three stories. This construction type lends itself favorably to gaining extra points, since compartmenting is more easily accomplished if the ceilings allow.

Session 4: 3410

3410.6 Evaluation process.

The evaluation process specified herein shall be followed in its entirety to evaluate existing buildings. Table 3410.7 shall be utilized for tabulating the results of the evaluation. References to other sections of this code indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined.

In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section 3410.6.16, the score for each occupancy shall be determined and the lower score determined for each section of the evaluation process shall apply to the entire building.

Session 4: 3410

3410.7 Building score.

After determining the appropriate data from Section 3410.6, enter those data in Table 3410.7 and total the building score.

A zero or positive score is required for the approval of the project. Once the score is determined, and adjustments are not available, there is no appeal from this process. Decisions of the building official in allowing points are appealable, but mutually arrived at scores are final.

Session 4: 3410

**TABLE 3410.7
SUMMARY SHEET — BUILDING CODE**

Existing occupancy _____	Proposed occupancy _____
Year building was constructed _____	Number of stories _____ Height in feet _____
Type of construction _____	Area per floor _____
Percentage of open perimeter _____%	Percentage of height reduction _____%
Completely suppressed: Yes _____ No _____	Corridor wall rating _____
Compartmentation: Yes _____ No _____	Required door closers: Yes _____ No _____
Fire-resistance rating of vertical opening enclosures _____	
Type of HVAC system _____, serving number of floors _____	
Automatic fire detection: Yes _____ No _____,	Type and location _____
Fire alarm system: Yes _____ No _____,	Type _____
Smoke control: Yes _____ No _____,	Type _____
Adequate exit routes: Yes _____ No _____	Dead ends: _____ Yes _____ No _____
Maximum exit access travel distance _____	Elevator controls: Yes _____ No _____
Means of egress emergency lighting: Yes _____ No _____	Mixed occupancies: Yes _____ No _____

Session 4: 3410

**TABLE 3410.7
SUMMARY SHEET — BUILDING CODE**

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
3410.6.1 Building Height 3410.6.2 Building Area 3410.6.3 Compartmentation			
3410.6.4 Tenant and Dwelling Unit Separations 3410.6.5 Corridor Walls 3410.6.6 Vertical Openings			
3410.6.7 HVAC Systems 3410.6.8 Automatic Fire Detection 3410.6.9 Fire Alarm System			
3410.6.10 Smoke control 3410.6.11 Means of Egress 3410.6.12 Dead ends	**** **** ****		
3410.6.13 Maximum Exit Access Travel Distance 3410.6.14 Elevator Control 3410.6.15 Means of Egress Emergency Lighting	**** ****		
3410.6.16 Mixed Occupancies 3410.6.17 Automatic Sprinklers 3410.6.18 Incidental Use		**** + 2 =	
Building score — total value			

Session 4: 3410

**TABLE 3410.8
MANDATORY SAFETY SCORES^a**

OCCUPANCY	FIRE SAFETY (MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
A-1	16	27	27
A-2	19	30	30
A-3	18	29	29
A-4, E	23	34	34
B	24	34	34
F	20	30	30
M	19	36	36
R	17	34	34
S-1	15	25	25
S-2	23	33	33

- a. MFS = Mandatory Fire Safety;
MME = Mandatory Means of Egress;
MGS = Mandatory General Safety.

Session 4: 3410

3410.9 Evaluation of building safety.

The mandatory safety score in Table 3410.8 shall be subtracted from the building score in Table 3410.7 for each category. Where the final score for any category equals zero or more, the building is in compliance with the requirements of this section for that category. Where the final score for any category is less than zero, the building is not in compliance with the requirements of this section.

Session 4: 3410

3410.6.16 Mixed occupancies.

Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 3410.6.16.1, the building shall be evaluated as indicated in Section 3410.6 and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table 3410.6.16, determine the appropriate value and enter that value into Table 3410.7 under Safety Parameter 3410.6.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero.

Session 4: 3410

3410.6.16.1 Categories.

The categories for mixed occupancies are:

1. Category a — Minimum 1-hour fire barriers between occupancies.
2. Category b — Fire barriers between occupancies in accordance with Section 508.3.3
3. Category c — Fire barriers between occupancies having a fire-resistance rating of not less than twice that required by Section 508.3.3

Session 4: 3410

TABLE 3410.9
EVALUATION FORMULAS^a

FORMULA	T.3410.7	T.3410.8	SCORE	PASS	FAIL
$FS - MFS \geq 0$	_____ (FS)	- _____ (MFS) =	_____	_____	_____
$ME - MME \geq 0$	_____ (ME)	- _____ (MME) =	_____	_____	_____
$GS - MGS \geq 0$	_____ (GS)	- _____ (MGS) =	_____	_____	_____

- a. FS = Fire Safety MFS = Mandatory Fire Safety
 ME = Means of Egress MME = Mandatory Means of Egress
 GS = General Safety MGS = Mandatory General Safety

Key Concepts

- Historic buildings help define the character of a community, particularly in historic downtowns and city squares
- Continued renovation and re-use of these structures has significant real and positive impacts for communities and its citizens
- Building Codes have significant impacts for renovation projects
- A basic understanding of the building code, Chapter 34 in particular, will assist in positive and productive dialogue between property owner/developer and the local building official
- Thorough project planning and collaboration among property owners/developers and code officials will significantly increase the likelihood of project success