(2015 NC Existing Building Code Draft)
(NC Changes with Commentary)

PREFACE

Marginal and Text Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2009 edition. Deletion indicators in the form of an arrow (➡) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted. Underlining within the body of the code indicates a technical change to the 2012 NC Exiting Building Code from the requirements of the 2012 edition of the International Existing Building Code.

A single asterisk [*] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code. The following table indicates such relocations in the 2012 *International Existing Building Code.*

2012 LOCATION	2009 LOCATION
301.1	101.5
301.1.1	101.5.1
301.1.2	101.5.2
301.1.3	101.5.3
301.1.4	101.5.4
301.1.4.1	101.5.4.1
Table 301.1.4.1	Table 101.5.4.1
301.1.4.2	101.5.4.2
Table 301.1.4.2	Table 101.5.4.2
907.4.4	606.2.1 (706.2.1 in 2012 numbering)

Note that portions of Chapter 1 in the 2009 code, were moved to Chapter 3 in 2012, creating a new chapter. Therefore, all subsequent chapters were renumbered. There are single asterisks [*] and double asterisks [**] shown for this reorganization. The chapters affected are:

2012 LOCATION	2009 LOCATION
Chapter 4	Chapter 3
Chapter 5	Chapter 4
Chapter 6	Chapter 5
Chapter 7	Chapter 6
Chapter 8	Chapter 7
Chapter 9	Chapter 8
Chapter 10	Chapter 9
Chapter 11	Chapter 10
Chapter 12	Chapter 11
Chapter 13	Chapter 12
Chapter 14	Chapter 13
Chapter 15	Chapter 14
Chapter 16	Chapter 15

Effective Use of the International Existing Building Code

Arrangement and Format of the 2012 IEBC

Chapter 7 Alterations—Level 1 (Former Rehab Code designation - Renovation). This chapter provides the technical requirements for those existing buildings that undergo Level 1 alterations as described in Section 403, which includes replacement or covering of existing materials, elements, equipment or fixtures using new materials for the same purpose. This chapter, similar to other chapters of this code, covers all building-related subjects, such as structural, mechanical, plumbing, electrical and accessibility as well as the fire and life safety issues when the alterations are classified as Level 1. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 8 and 9 by only involving replacement of building components with new components. In contrast, Level 2 alterations involve more space reconfiguration and Level 3 alterations involve more extensive space reconfiguration, exceeding 50 percent of the building area.

Chapter 8 Alterations—Level 2 (Former Rehab Code designation - Alteration). Like Chapter 7, the purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system when a building is being altered. This chapter is distinguished from Chapters 7 and 9 by involving space reconfiguration that could be up to and including 50 percent of the area of the building. In contrast, Level 1 alterations (Chapter 7) do not involve space reconfiguration and Level 3 alterations (Chapter 9) involve extensive space reconfiguration that exceeds 50 percent of the building area. Depending on the nature of alteration work, its location within the building and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes.

Chapter 9 Alterations—Level 3 (Former Rehab Code designation - Reconstruction). This chapter provides the technical requirements for those existing buildings that undergo Level 3 alterations. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 7 and 8 by involving alterations that cover 50 percent of the aggregate area of the building. In contrast, Level 1 alterations do not involve space reconfiguration and Level 2 alterations involve extensive space reconfiguration that does not exceed 50 percent of the building area. Depending on the nature of alteration work, its location within the building and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes. At times and under certain situations, this chapter also intends to improve the safety of certain building features beyond the work area and in other parts of the building where no alteration work might be taking place.

CHAPTER 1
SCOPE AND ADMINISTRATION

PART 1—SCOPE AND APPLICATION

SECTION 101
GENERAL

[A] 101.1 Title.
These regulations shall be known as the *North Carolina Existing Building Code* as adopted by the North Carolina Building Code Council on Month Day, Year to be effective Month Day, Year. References to the *International Code* shall mean the *North Carolina Codes*. The North Carolina amendments to the *International Code* are underlined.

[A] 101.4.2 Buildings previously occupied.
The legal occupancy of any building existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Fire Code*, or as is deemed necessary by the *code official* for the general safety and welfare of the occupants and the public.

101.6 Appendices.
Provisions in the appendices shall not apply unless specifically adopted or referenced in this code.

101.8 Requirements of other State agencies, occupational licensing boards or commissions.
The North Carolina State Existing Building Codes do not include all additional requirements for buildings and structures that may be imposed by other State agencies, occupational licensing boards and commissions. It shall be the responsibility of a permit holder, registered design professional, contractor or occupational license holder to determine whether any additional requirements exist.

101.9 Mixed Use Buildings.
Each portion of a building shall be separately classified as to use. The requirements of this code shall apply to each portion of the building based on the *occupancy classification* of that portion, except that the most restrictive requirements of this code for fire suppression shall apply to the entire building.

Commentary: *This section clarifies that with the exception of fire suppression, mixed use building should be classified separately by occupancy. It emphasizes that the requirements for fire suppression for the most restrictive occupancy should be applied to the entire building. This is to ensure that the minimum fire suppression is provided throughout the building when there is no separation between occupancies.*

Exception: An automatic fire suppression system shall not be required for uses that would not otherwise require suppression provided that there is a 1-hour separation between the uses requiring suppression and the other uses in the same building. A 2-hour fire separation shall be required to apply this exception to Group H.

Commentary: *This exception provides relief for fire suppression requirements in occupancies that do not require fire suppression in mixed use buildings that are separated from other occupancies that require fire suppression.*

101.10 High-rise buildings

High-rise buildings constructed prior to 1978 shall at a minimum comply with North Carolina General Statute 143-138, Section (i). The statute may be viewed at the following web address: http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_143/GS_143-138.html

Commentary: *NC General Statute provides minimum requirements for existing high rise buildings constructed prior to 1978. The minimum requirements of this statute apply to these buildings in addition to the provisions of this code.*

SECTION 103
DEPARTMENT OF BUILDING SAFETY

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 104
DUTIES AND POWERS OF CODE OFFICIAL

104.1 through 104.9 deleted. See the North Carolina Administrative Code and Policies.

[A] 104.10.1 Flood hazard areas.

For *existing buildings* located in *flood hazard areas* for which *repairs*, *alterations* and *additions* constitute *substantial improvement*, the *code official* shall not grant modifications to provisions related to flood resistance unless a determination is made that:

1. The applicant has presented good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render compliance with the flood-resistant construction provisions inappropriate.

2. Failure to grant the modification would result in exceptional hardship.

3. The granting of the modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense nor create nuisances, cause fraud on or victimization of the public or conflict with existing laws or ordinances.

4. The modification is the minimum necessary to afford relief, considering the flood hazard.

5. A written notice will be provided to the applicant specifying, if applicable, the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and that construction below the design flood elevation increases risks to life and property.

Local ordinances more restrictive than the requirements of this section supersede these requirements.

SECTION 105
PERMITS

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 106
CONSTRUCTION DOCUMENTS

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 107
TEMPORARY STRUCTURES AND USES

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 108
FEES

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 109
INSPECTIONS

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 110
CERTIFICATE OF OCCUPANCY

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 111
SERVICE UTILITIES

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 112
BOARD OF APPEALS

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 113
VIOLATIONS

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 114
STOP WORK ORDER

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 115
UNSAFE BUILDINGS AND EQUIPMENT

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 116
EMERGENCY MEASURES

Deleted. See the North Carolina Administrative Code and Policies.

SECTION 117
DEMOLITION

Deleted. See the North Carolina Administrative Code and Policies.

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

ALTERATION. Any construction or renovation to an existing structure other than a *repair* or *addition*. Alterations are classified as Level 1 (Renovation - former NC Rehab designation), Level 2 (Alteration – former NC Rehab designation), and Level 3 (Reconstruction – former NC Rehab designation).

APPROVED. Acceptable to the code official or authority having jurisdiction for compliance with the provisions of the applicable code or reference.

BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

[B] EXISTING BUILDING. A building *legally occupied* or *legally occupied* immediately prior to a current vacant status.

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.

LEGALLY OCCUPIED. A building that has a current certificate of occupancy or equivalent documentation provided by the permit holder acceptable to the local code enforcement official.

> ***Commentary:*** *Proof of legal occupancy may be provided through existing certificate of occupancy or provided by equivalent documentation. When a certificate of occupancy is not available, equivalent documentation may include, but is not limited to, tax records or power bills.*

LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintain periodic inspections of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

OCCUPANCY CLASSIFICATION. A subset of the occupancy group as listed in Chapter 3 of the North Carolina Building Code (i.e. A-1, A-2, A-3, A-4, A-5, B, E, F-1, F-2, H-1, H-2, H-3, H-4, H-5, I-1, I-2, I-3, I-4, R-1, R-2, R-3, R-4, S-1, S-2, and U).

OCCUPANCY GROUP. Occupant type as listed in Chapter 3 of the North Carolina Building Code (i.e. A, B, E, F, H, I, M, R, S, U).

OCCUPANCY USE. The function of the space and not necessarily the *occupancy classification*.

OPERATIONAL ACCESS. Building access which allows use of a building during and after an emergency event.

> ***Commentary:*** *This definition was added to allow access to a building when the building needs to be utilized after an emergency event to maintain emergency operations. This will usually occur in buildings that are designated as essential facilities.*

[B] REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed. A design by a registered design professional is not required where exempt under the registration or license laws.

SYSTEM. Primary structural, mechanical, plumbing, electrical, fire protection, or occupant service components of a building including any equipment, fixtures, connections, conduits, wires, pipes, ducts, as well as any associated sensors, controls, distribution or safety elements.

UNSAFE. See the North Carolina Administrative Code and Policies.

CHAPTER 3
COMPLIANCE METHODS

SECTION 301
COMPLIANCE METHODS

301.1 General.
The *repair*, *alteration*, *change of occupancy*, *addition* or relocation of all *existing buildings* shall comply with one of the methods listed in Sections 301.1.1 through 301.1.3 as selected by the applicant. Application of a method shall be the sole basis for assessing the compliance of work performed under a single permit unless otherwise approved by the *code official*. Sections 301.1.1 through 301.1.3 shall not be applied in combination with each other. Where this code requires consideration of the seismic force-resisting system of an *existing building* subject to *repair*, *alteration*, *change of occupancy*, *addition* or relocation of *existing buildings*, the seismic evaluation and design shall be based on Section 301.1.4 regardless of which compliance method is used.

Exception: Structural *alterations* complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code unless the building is undergoing a substantial structural *alteration* as defined in Section 907.4.2. New structural members added as part of the *alteration* shall comply with the *International Building Code*. *Alteration*s of *existing buildings* in *flood hazard areas* shall comply with Section 701.3. Buildings constructed prior to the existence of an applicable North Carolina State building code and in structurally sound condition shall be considered "complying with the laws in existence at the time the building or the affected portion of the building was built".

Commentary: *This exception allows for compliance with laws in existence at the time the structure was originally built for small structural alterations. A building undergoing a substantial structural alteration, as defined in Chapter 9, does not fall under this exception. The exception also addresses how to approach buildings built prior to 1936 when NC State Building Code was initiated.*

[B] 301.1.4 Evaluation and design procedures.
The seismic evaluation and design shall be based on the procedures specified in the *International Building Code*, ASCE 31 or ASCE 41. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

Exception: Seismic requirements shall not apply to Detached One- and Two Family Dwellings.

Commentary: *The NC Residential Code does not address seismic provisions for detached one and two family dwellings. Therefore, this exception corresponds with the NC Residential Code provision that does not require detached one- and*

two-family dwellings to be evaluated for seismic loading due to low public risk and type of construction.

301.2 Additional codes.
Alterations, repairs, additions and *changes of occupancy* to, or relocation of, *existing buildings* and structures shall comply with the provisions for *alterations, repairs, additions* and *changes of occupancy* or relocation, respectively, in this code and the *International Energy Conservation Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code*, *International Residential Code* and NFPA 70. Where provisions of the other codes conflict with provisions of this code, the provisions of this code shall take precedence.

CHAPTER 4
PRESCRIPTIVE COMPLIANCE METHOD

SECTION 401
GENERAL

[B] 401.2.1 Existing materials.
Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building official to be unsafe per the NC Administrative Code and Policies.

SECTION 402
ADDITIONS

[B] 402.5 Smoke alarms in existing portions of a building.
Where an *addition* is made to a building or structure of a Group R or I-1 occupancy, the *existing building* shall be provided with smoke alarms in accordance with Section 907.2.11 of the *International Fire Code*. Smoke alarms for Group R occupancy may be radio frequency type appliances as allowed and installed by NFPA 72.

SECTION 403
ALTERATIONS

[B] 403.4 Existing structural elements carrying lateral load.
Except as permitted by Section 403.5, when the *alteration* increases design lateral loads in accordance with Section 1609 or 1613 of the *International Building Code*, or where the *alteration* results in a structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 and 1613 of the *International Building Code*.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is no more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

[B] 403.6 Smoke alarms.
Individual sleeping units and individual dwelling units in Group R and I-1 occupancies shall be provided with smoke alarms in accordance with Section 907.2.11 of the *International Fire Code*. Smoke alarms for Group R occupancy may be radio frequency type appliances as allowed and installed by NFPA 72.

SECTION 404
REPAIRS

[B] 404.1 General.
Buildings and structures, and parts thereof, shall be repaired in compliance with Section 401.2 and Section 404. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required by Section 401.2, ordinary repairs exempt from permit by North Carolina statute, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

[B] 404.2 Substantial structural damage to vertical elements of the lateral force-resisting system.
A building that has sustained *substantial structural damage* to the vertical elements of its lateral force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Sections 404.2.1 through 404.2.3.

Exceptions:

1. Buildings assigned to Seismic Design Category A, B or C whose substantial structural damage was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.

2. Other than townhouses, structures normally regulated by the North Carolina Residential Code need not be evaluated or rehabilitated for load combinations that include earthquake effects.

Commentary: *Exception 2 corresponds with the NC Residential Code provision that does not require detached one- and two-family dwellings to be evaluated for seismic loading due to low public risk.*

[B] 404.3.1 Lateral force-resisting elements.
Regardless of the level of damage to vertical elements of the lateral force-resisting system, if *substantial structural damage* to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall be evaluated in accordance with Section 404.2.1 and, if noncompliant, rehabilitated in accordance with Section 404.2.3.

Exceptions:

1. Other than townhouses, structures normally regulated by the North Carolina Residential Code need not be evaluated or rehabilitated for load combinations that include earthquake effects.

Commentary: *Exception 1 corresponds with the NC Residential Code provision that does not require detached one- and two-family dwellings to be evaluated for seismic loading due to low public risk.*

2. Buildings assigned to Seismic Design Category A, B or C whose substantial structural damage was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.

SECTION 405
FIRE ESCAPES

[B] 405.1 Where permitted.
Fire escapes shall be permitted only as provided for in Sections 405.1.1 through 405.1.3.

[B] 405.1.1 Existing fire escapes.
Existing fire escapes shall continue to be accepted as a component in the means of egress in *existing buildings* only.

[B] 405.1.2 New fire escapes.
New fire escapes for *existing buildings* shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

[B] 405.1.3 Limitations.
Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

[B] 405.5 Opening protectives.
Doors and windows along the fire escape shall be protected with 45-minute opening protectives.

SECTION 406
GLASS REPLACEMENT

[B] 406.1 Conformance.
The installation or replacement of glass shall be as required for new installations.

Exception: Replacement of a glazing pane shall not require compliance with the North Carolina Energy Conservation Code, but shall have an insulation value equal to or greater than the existing glazing.

Commentary: *The exception makes it possible to replace a pane of glass with glass that matches the existing and without changing the energy efficiency of the building.*

SECTION 407
CHANGE OF OCCUPANCY

[B] 407.1 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 the *International Building Code* for such division or group of occupancy. 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 of the requirements of this code for those groups, provided the new or proposed use is of equal or lesser hazard, based on Table 407.1, than the existing use.

Table 407.1
Relative Occupancy Hazard

Life and Fire Risk Hazard	Occupancy Category
1 (highest)	H-1, H-2, H-3
2	A-1, A-2 (w/ nightclub), H-4, F-1, I-3, M, S-1
3	A-2 (w/o nightclub), A-3, A-5, B, F-2, I-2, R-1, S-2
4	A-4, E, I-1, R-2 greater than two stories in height or greater than 4 dwelling units
5 (lowest)	R-2 two stories or less in height and four dwelling units or less, R-3, R-4, U, One- and Two Family Dwellings.

Commentary: *This table provides guidance in a change of occupancy on whether the new occupancy is considered to be of equal, more or less hazard than the existing occupancy.*

[B] 407.3 Stairway.
An existing stairway shall not be required to comply with the requirements of Section 1009 of the *International Building Code* where the existing space and construction does not allow a reduction in pitch or slope.

[B] 407.4 Structural.
When a *change of occupancy* results in a structure being reclassified to a higher risk category from Table 1604.5 of the NC Building Code, the structure shall conform to the seismic requirements for a new structure of the higher risk category.

Exceptions:

1. Specific seismic detailing requirements of Section 1613 of the *International Building Code* for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, overstrength, redundancy and ductility of the structure.

2. When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, S_{DS}, is less than 0.33, compliance with the seismic requirements of Section 1613 of the *International Building Code* is not required.

407.5 Energy conservation.
Spaces undergoing a change of occupancy shall comply with Sections 101.4.4 and 101.4.5 of the NC Energy Conservation Code.

Commentary: *When utilizing the prescriptive compliance method, the NC Energy Conservation Code should be referenced regarding minimum energy requirements in a change of occupancy which is based on the increase in demand for fossil fuel or electrical energy of the new occupancy or a change in space conditioning.*

SECTION 410
ACCESSIBILITY FOR EXISTING BUILDINGS

[B] 410.8.3.1 Inclined stairway chairlifts. Inclined stairway chairlifts that do not reduce the required means of egress and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route in alterations of existing occupancies in:

1. Religious organizations or entities controlled by religious organizations, including places of worship; or

2. Private clubs or establishments exempted under Title II of the Civil Rights Act of 1964.

Such inclined stairway chairlifts shall be approved for commercial use by the manufacturer and installed by approved factory trained installers.

[B] 410.8.5 Ramps.
Where slopes steeper than allowed by Section 1010.2 of the *International Building Code* are necessitated by space limitations, the slope of ramps in or providing access to existing facilities shall comply with Table 410.8.5.

[B] TABLE 410.8.5
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

For SI: 1 inch = 25.4 mm.

[B] 410.8.8 Type A dwelling or sleeping units.
Where 11 or more Group R-2 dwelling or sleeping units are being altered or added, the requirements of Section 1107 of the *International Building Code* for Type A units apply only to the quantity of the spaces being altered or added.

CHAPTER 5
CLASSIFICATION OF WORK

SECTION 503
ALTERATION—LEVEL 1 (Renovation)

503.1 Scope.
Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.

503.2 Application.
Level 1 *alterations* shall comply with the provisions of Chapter 7.

SECTION 504
ALTERATION—LEVEL 2 (Alteration)

504.1 Scope.
Level 2 *alterations* include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.

504.2 Application.
Level 2 *alterations* shall comply with the provisions of Chapter 7 for Level 1 *alterations* as well as the provisions of Chapter 8.

SECTION 505
ALTERATION—LEVEL 3 (Reconstruction)

Commentary: *Alteration Level 1 work that is performed in a work area greater than 50 percent of the building area is not intended to have to comply with the additional provisions of an Alteration Level 3. Due to the nature of the work being low impact (no reconfiguration of space, only replacement of finishes, fixtures and equipment), this scope of work does warrant the additional safety provisions an Alteration Level 3 would trigger.*

CHAPTER 6
REPAIRS

SECTION 602
BUILDING ELEMENTS AND MATERIALS

602.2 New and replacement materials.
Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted provided no *dangerous* or *unsafe* condition, as defined in Chapter 2, is created. Hazardous materials, such as asbestos and lead-based paint, shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

602.4 Wind-borne debris protection.
Replacement of window units shall require compliance with Section 1609.1.2 of the North Carolina Building Code or Section R612.9 of the North Carolina Residential Code. Replacement of individual glass panes or sashes shall not require compliance with Sections 1609.1.2 and R612.9.

> ***Commentary:*** *This section requires protection of openings in wind-borne debris regions in accordance with new construction when the entire window unit is replaced. When an individual pane or sash is replaced in a wind-borne debris region, it is not required to meet the protection requirements for new construction.*

SECTION 603
FIRE PROTECTION

603.1 General.
Repairs shall be done in a manner that maintains the level of fire protection that is existing.

SECTION 604
MEANS OF EGRESS

604.1 General.
Repairs shall be done in a manner that maintains the level of protection that is existing for the means of egress.

SECTION 605
ACCESSIBILITY

605.1 General.
Repairs shall be done in a manner that maintains the level of accessibility that is existing.

SECTION 606
STRUCTURAL

[B] 606.1 General.
Structural elements shall be repaired to the predamaged condition.

[B] 606.2 Flood hazard areas.
In *flood hazard areas*, buildings that have sustained *substantial damage* shall be brought into compliance with Section 1612 of the *International Building Code*.

SECTION 609
PLUMBING

609.1 General.
Existing plumbing systems undergoing *repair* shall not make the building less conforming than it was before the *repair* was undertaken.

> ***Commentary:*** *The provisions of Sections 609.2 and 609.3 still apply in addition to the general requirement of Section 609.1 requiring a repair to maintain the existing conformity of the plumbing system*.

609.2 Materials.
Plumbing materials and supplies shall not be used for repairs that are prohibited in the *International Plumbing Code*.

609.3 Water closet replacement.
The maximum water consumption flow rates and quantities for all replaced water closets shall be 1.6 gallons (6 L) per flushing cycle.

Exception: Blowout-design water closets [3.5 gallons (13 L) per flushing cycle].

SECTION 610
ENERGY CONSERVATION

610.1 General.
Repair of building insulation systems shall not make the building less conforming than it was before the *repair* was undertaken.

> ***Commentary:*** *When a repair involves the replacement of insulation, the new insulation should be of equivalent or greater R- value than what was existing. For example, in a repair project that involves exposing the cavity of an exterior wall, the exterior wall insulation being replaced should be equivalent to what is existing without having to meet the full requirements of the NC Energy Conservation Code.*

610.2 Materials.

Portions of walls that are part of the building thermal envelope shall be insulated in accordance with the North Carolina Energy Conservation Code when the repair requires the removal of either the interior or exterior wall membrane such that the wall cavity is exposed during the repair.

Commentary: *This section allows for only the portions of the wall exposed during a repair to meet the minimum insulation requirements of the NC Energy Conservation Code. Unexposed wall cavities are permitted to remain without requiring additional insulation*.

Exception: Wall cavities containing existing insulation material.

Commentary: *This exception provides relief from the full requirements for wall insulation in the NC Energy Conservation Code when the repair exposes an existing wall cavity and it already contains insulation.*

610.3 Glazing.

Repairs requiring the replacement of window units shall comply with the requirements of the North Carolina Energy Conservation Code. Repairs requiring the replacement of individual glass panes or sashes shall not require compliance with the insulation requirements of the North Carolina Energy Conservation Code.

Commentary: *This section requires replacement of an entire window unit to comply with current NC Energy Conservation Code requirements but allows for a single pane or sash to be replaced with glass that matches the existing without reducing the energy efficiency of the building.*

Exception: Historic structures where compliance with the North Carolina Energy Code would conflict with the historic nature of the structure are not required to comply with the North Carolina Energy Code but shall have an insulation value equal to or greater than the existing glazing.

Commentary: *This exception addresses historic structures where replacement glazing meeting the NC Energy Conservation Code would diminish the historic nature of the structure as indicated by the State Historic Preservation Office; however the replacement glazing should not provide less insulation than what exists.*

CHAPTER 7
ALTERATIONS—LEVEL 1

(Former Rehab Code designation - Renovation)

SECTION 703
FIRE PROTECTION

703.1 General.
Alterations shall be done in a manner that maintains the level of fire protection that is existing.

SECTION 704
MEANS OF EGRESS

704.1 General.
Alterations shall be done in a manner that maintains the level of protection that is existing for the means of egress.

SECTION 705
ACCESSIBILITY

(Relocated to Section 806)

Commentary: *The provisions for accessibility were moved to Level II Alteration work since they are not applicable in Level I Alteration work. Replacement of fixtures, removal of fixtures or other alteration of restrooms may constitute Level II Alteration work.*

SECTION 706
STRUCTURAL

[B] 706.3.2 Roof diaphragms resisting wind loads in high-wind regions. (Deleted)

CHAPTER 8
ALTERATIONS—LEVEL 2

(Former Rehab Code designation - Alteration)

SECTION 801
GENERAL

801.1 Scope.
Level 2 *alterations* as described in Section 504 shall comply with the requirements of this chapter.

Exception: (Deleted)

SECTION 802
SPECIAL USE AND OCCUPANCY

802.2 Paint shops.
Paint shops, not classified as Group H, located in occupancies other than Group F shall be 1-hour separated from the remainder of the building with fire barriers or provided with an automatic fire-extinguishing system.

802.3 Waste and soiled linen collection rooms.
Waste and soiled linen collection rooms over 100 square feet shall be 1-hour separated from the remainder of the building with fire barriers or provided with an automatic fire-extinguishing system.

802.4 Chute termination rooms.
Chute termination rooms shall be 1-hour separated from the remainder of the building with fire barriers or provided with an automatic fire-extinguishing system.

802.5 Incinerator rooms.
Incinerator rooms shall be 2-hour separated from the remainder of the building with fire barriers and provided with an automatic sprinkler system.

802.6 Group I-2 and I-3.
In Group I-2 and I-3, physical plant maintenance shops, laundries over 100 square feet, and padded cells shall be 1-hour separated from the remainder of the building with fire barriers or provided with an automatic sprinkler system.

Commentary: *The provisions of Sections 802.2 through 802.6 address specific uses and occupancies that have a need to be separated from the remainder of the building because of an increased fire hazard due to infrequency of occupants in that section of the building versus other parts of the building that are constantly occupied. The requirements are similar to the requirements for separation in Table 508.2.5 of the NC Building Code*.

SECTION 803
BUILDING ELEMENTS AND MATERIALS

803.2.1 Existing vertical openings.
All existing interior vertical openings connecting two or more floors shall be enclosed with approved assemblies having a fire-resistance rating of not less than 1 hour with approved opening protectives.

Exceptions:

1. Vertical opening enclosure is not required where the vertical opening enclosure meets the code requirements under which the building was constructed and/or previously altered.

   Commentary: *This exception allows for existing vertical opening enclosures to remain if properly constructed in accordance with the code requirements at the time of original construction or alteration. Allowing an existing opening enclosure code compliant at the time of construction does not increase the building hazard.*

2. Where vertical opening enclosure is not required by the *International Building Code* or the *International Fire Code.*

3. Interior vertical openings other than stairways may be blocked at the floor and ceiling of the *work area* by installation of not less than 2 inches (51 mm) of solid wood or equivalent construction.

4. The enclosure shall not be required where:

   4.1. Connecting the main floor and mezzanines; or

   4.2. All of the following conditions are met:

      4.2.1. The communicating area has a low hazard occupancy or has a moderate hazard occupancy that is protected throughout by an automatic sprinkler system.

      4.2.2. The lowest or next to the lowest level is a street floor.

      4.2.3. The entire area is open and unobstructed in a manner such that it may be assumed that a fire in any part of the interconnected spaces will be readily obvious to all of the occupants.

      4.2.4. Exit capacity is sufficient to provide egress simultaneously for all occupants of all levels by considering all areas to be a single floor area for the determination of required exit capacity.

4.2.5. Each floor level, considered separately, has at least one-half of its individual required exit capacity provided by an exit or exits leading directly out of that level without having to traverse another communicating floor level or be exposed to the smoke or fire spreading from another communicating floor level.

5. In Group A occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories.

6. In Group B occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 803.2.1, shall not be required in the following locations:

6.1. Buildings not exceeding 3,000 square feet (279 m^2) per floor.

6.2. Buildings protected throughout by an approved automatic fire sprinkler system.

7. In Group E occupancies, the enclosure shall not be required for vertical openings not exceeding three stories when the building is protected throughout by an approved automatic fire sprinkler system.

8. In Group F occupancies, the enclosure shall not be required in the following locations:

8.1. Vertical openings not exceeding three stories.

8.2. Special purpose occupancies where necessary for manufacturing operations and direct access is provided to at least one protected stairway.

8.3. Buildings protected throughout by an approved automatic sprinkler system.

9. In Group H occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where necessary for manufacturing operations and every floor level has direct access to at least two remote enclosed stairways or other approved exits.

10. In Group I-3 occupancies the vertical opening protection may be omitted if either of the following conditions is met:

10.1 The building is in compliance with NFPA 101, Chapter 15; or

10.2 The building is equipped throughout with an automatic fire suppression system.

11. In Group M occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 803.2.1, shall not be required in the following locations:

    11.1. Openings connecting only two floor levels.

    11.2. Occupancies protected throughout by an approved automatic sprinkler system.

12. In Group R-1 occupancies, the enclosure shall not be required for vertical openings not exceeding three stories in the following locations:

    12.1. Buildings protected throughout by an approved automatic sprinkler system.

    12.2. Buildings with less than 25 dwelling units or sleeping units where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and where:

        12.2.1. Any exit access corridor exceeding 8 feet (2438 mm) in length that serves two means of egress, one of which is an unprotected vertical opening, shall have at least one of the means of egress separated from the vertical opening by a 1-hour fire barrier; and

        12.2.2. The building is protected throughout by an automatic fire alarm system, installed and supervised in accordance with the *International Building Code*.

13. In Group R-2 occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 803.2.1, shall not be required in the following locations:

    13.1. Vertical openings not exceeding two stories with not more than four dwelling units per floor.

    13.2. Buildings protected throughout by an approved automatic sprinkler system.

    13.3. Buildings with not more than four dwelling units per floor where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and the building is protected throughout by an automatic fire alarm system complying with Section 804.4.

14. One- and two-family dwellings.

15. Group S occupancies where connecting not more than two floor levels or where connecting not more than three floor levels and the structure is equipped throughout with an approved automatic sprinkler system.

16. Group S occupancies where vertical opening protection is not required for open parking garages and ramps.

803.6 Fireblocking and Draftstopping.
When the work being performed exposes the framing of any wall, floor, ceiling or roof, the exposed framing shall comply with Section 717 of the North Carolina Building Code.

Commentary: *This section was added to address the need to provide fireblocking and draftstopping in existing framing when it is exposed during an alteration. This provision allows for the additional protection fireblocking and draftstopping provide for spread of fire in walls that did not originally require it.*

Exception: One- and two-family dwellings shall comply with Sections R302.11 and R302.12 of the North Carolina Residential Code.

Commentary: *This exception addresses the requirements for fireblocking and draftstopping in the NC Residential Code and allows for compliance with the NC Residential Code when framing is exposed in alterations to one- and two-family dwellings.*

803.7 Group R mixed use separation.
Any nonresidential occupancy that is located directly below Group R shall be 1-hour separated from the Group R occupancy. The 1-hour assembly is only required to be rated from the nonresidential side.

Commentary: *This section addresses the need for separation between a Group R occupancy and a nonresidential occupancy. In an existing building where there is no separation between a residential and nonresidential occupancy, a 1 hour minimum separation is required for the nonresidential ceiling assembly.*

Exception: If the work area of the nonresidential occupancy is less than 50% of the gross floor area of the nonresidential occupancy Section 803.7 shall not apply.

Commentary: *This exception allows for alleviation of the requirements for a 1 hour separation between residential and nonresidential occupancies when less than half of the floor area of the nonresidential occupancy is part of the work area undergoing the alteration as provided by 2009 NC Rehabilitation Code Section 1.29.*

SECTION 804
FIRE PROTECTION

804.2 Automatic sprinkler systems.
Automatic sprinkler systems shall be provided in accordance with the requirements of Sections

804.2.1 through 804.2.3. Installation requirements shall be in accordance with the *International Building Code*.

804.2.1 High-rise buildings.
See Section 101.10.

804.2.2 Low-rise buildings.
Work areas that increase the fire area or calculated occupant load above the limits listed in Sections 903.2.1 through 903.2.10 of the *International Building Code* shall meet the requirements of those sections.

Commentary: *An alteration to a low-rise building where the work area increases the fire area or occupant load of the occupancy is subject to the minimum requirements for sprinklers provided in the NC Building Code.*

804.2.3 Windowless stories.

In all buildings, any windowless story located below the seventh story above grade which is created by the work being performed or any existing windowless story located below the seventh story in which the work area exceeds 50 percent of the gross enclosed floor area of the windowless story, shall be equipped throughout with an automatic fire suppression system installed in accordance with Section 903.2.11.1 of the *International Fire Prevention Code*.

Commentary: *This section provides for protection of windowless stories below the seventh story by requiring sprinklers in accordance with NC Fire Prevention Code and mirrors language from the 2009 NC Rehabilitation Code, Section 1.30c to address the need for sprinklers in existing buildings with windowless stories.*

Exceptions:

1. Stories or basement shall not be considered windowless where fire fighter access through openings meeting all of the following is provided:
   - 1.1. Openings such as a doors, windows, or access panels are located on at least one side of the story or basement;
   - 1.2. The openings on each story or basement shall be a minimum of 32 inches by 48 inches in size and located horizontally a maximum of 100 feet apart or 22 inches by 42 inches in size and located horizontally a maximum of 30 feet apart;
   - 1.3. Openings shall be unobstructed to allow firefighting and rescue operations from the exterior;
   - 1.4. Openings in stories above grade shall have a sill height of not more than 36 inches measured from the finished floor level. Openings in basements shall have no sill height restrictions;
   - 1.5. Openings shall be readily identifiable and openable from the outside; and
   - 1.6. Where openings are only provided on one wall of a story or basement the maximum distance to the opposite wall is 75 feet.
2. Windowless basements 3,000 gross square feet or less in area shall not require automatic fire suppression when a supervised automatic fire alarm is provided in accordance with Section 907 of the North Carolina Fire Prevention Code.

3. Windowless basements greater than 3,000 but less than 10,000 gross square feet shall be permitted to connect to the domestic water supply when all of the following conditions are met:
   3.1. The automatic fire suppression system shall be provided with a fire department connection, which shall be marked with a sign reading "Basement Area Sprinkler Water Supply" and
   3.2. A supervised automatic fire alarm system shall be installed in accordance with Section 907 of the *International Fire Prevention Code*.

804.2.4 Supervision.
All newly installed complete or partial sprinkler systems shall comply with Section 903.4 of the *International Building Code*.

Exception: Supervision is not required for the following:

1. Underground gate valve with roadway boxes.

2. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic and automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler system is not provided.

804.2.5 Group H.
An automatic sprinkler system shall be installed in all Group H occupancies complying with Section 903.2.5 of the *International Building Code*.

804.3 Standpipes. Deleted.

804.4 Fire alarm and detection.
Work areas shall meet the requirements of Sections 907.2.1 through 907.2.23 of the *Fire Prevention Code* and Section 804.4.3. For one- and two-family dwellings and townhouses an approved fire alarm system shall be installed in accordance with Sections 804.4.1 through 804.4.2.

Exception:
Buildings other than one- and two-family dwellings that do not have an existing fire alarm and detection system are not required to install a fire alarm and detection system.

804.4.1 Smoke alarms for detached one- and two-family dwellings and townhouses.
Detached one- and two-family dwellings and townhouses shall be provided with smoke alarms in accordance with Sections 804.4.1.1 through 804.4.1.4.

Commentary: *This section addresses smoke alarm requirements for one- and two-family dwellings and townhouses and mimics the requirements provided in the NC Residential Code for smoke alarms in existing detached one- and two-family dwellings and townhouses undergoing an alteration.*

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirement

2. Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.

Commentary: *These exceptions mimic the exceptions provided in the NC Residential Code for smoke alarms in existing detached one- and two-family dwellings and townhouses undergoing an alteration when work is on the exterior of the residence or only involves alteration or repair of a system.*

804.4.1.1. Smoke detection and notification.
All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

804.4.1.2. Smoke detection systems.
Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an approved supervising station and be maintained in accordance with NFPA 72.

Exception: Where smoke alarms are provided meeting the requirements of Section 804.4.1.4.

804.4.1.3. Location.
Smoke alarms shall be installed in the following locations:

1. In each sleeping room.

2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

3. On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

804.4.1.4. Power source.
Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. Smoke alarms shall be interconnected.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.

2. Interconnection and hard-wiring of smoke alarms in existing areas shall not be required where the alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure. Smoke alarm locations are required per Section R314.2 of the NC Residential Code, but may be battery powered and shall be designed to emit a recurring signal when batteries are low and need to be replaced.

804.4.2 Carbon monoxide alarms for detached one- and two-family dwellings and townhouses.
Detached one- and two family dwelling and townhouses requiring a permit for interior work or the replacement or addition of a fuel-fired appliance shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

Commentary: *This section addresses carbon monoxide alarm requirements for one- and two-family dwellings and townhouses and mimics the requirements provided in the NC Residential Code for carbon monoxide alarms in existing detached one- and two-family dwellings and townhouses undergoing an alteration.*

804.4.2.1 Alarm requirements.
The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

804.4.3 Smoke Detection Group R mixed use.
Any nonresidential occupancy work area located directly below Group R shall be provided with single or multi station smoke detectors complying with NFPA 72 and shall provide an audible alarm in each dwelling unit located on floors above the nonresidential work area. The detectors shall be AC powered with battery backup.

Exceptions:
1. Hardwired, interconnected smoke detectors installed throughout the building shall be accepted as complying with Section 804.4.3.
2. If the work area of the nonresidential occupancy is less than 50% of the gross floor area of the nonresidential occupancy Section 804.4.3 shall not apply.

SECTION 805
MEANS OF EGRESS

805.2.1 Means of egress capacity. The capacity of the means of egress in each work area shall be sufficient for the maximum permitted occupant load of the work area and any adjacent spaces served by that means of egress as calculated on a per floor basis. Means of egress shall be measured in units of exit width of 22 inches. The maximum permitted occupant load of a space shall be determined by the capacity of the means of egress serving the space as calculated in accordance with Table 805.2.1. The building owner shall have the option of establishing a reasonable restriction on the occupant load of the space based on the existing capacity of the means of egress or of providing additional egress capacity.

Commentary: *This section provides the unit width of measurement for calculating the required egress width. The 22 inch unit exit width originates from older code editions that allowed for this minimum exit width. The permitted occupant load of the space is determined using this egress width unit and the corresponding occupant load in Table 805.2.1.*

TABLE 805.2.1[a,b]
CAPACITY PER UNIT OF EGRESS WIDTH

Use Group	Number of Occupants			
	Without Fire Suppression		With Fire Suppression	
	Stairways	Doors, Ramps, and Corridors	Stairways	Doors, Ramps, and Corridors
A[c]	75	100	113	150
B	60	100	90	150
E	75	100	113	150
F	60	100	90	150
H	NA	NA	60	100
I-1	60	100	90	100
I-2	22	30	35	45
I-3	60	100	90	150
M	60	100	90	150
R	75	100	113	150
S	60	100	90	150

Unit of egress width = 22 inches
NA = Not Allowed

a. The occupant load may be equal to the total number of occupants for which exit capacity is provided as determined by Table 805.2.1 above.

b. Interpolation shall be allowed in determining capacity of egress width.

c. For Use Group A occupancies, the resulting total occupant load shall not exceed one occupant per five square feet of net floor area over the entire use.

Commentary: *This table, taken from the 2009 NC Rehabilitation Code, provides a quantitative amount for calculating egress width.*

Example:

Given: Occupancy: Business
Protection: unsprinklered
Existing stairway width: 36 inches
Existing door width: 36 inches

What is the capacity of the means of egress?
*Stairways: 60*36/22 = 98 occupants*
*Doors: 100*36/22 = 163 occupants*

805.3.1.1 Single-exit buildings.
Only one exit is required from buildings and spaces of the following occupancies:

1. In Group A, B, E, F, M, U and S occupancies, a single exit is permitted in the story at the level of exit discharge when the occupant load of the story does not exceed 49 and the exit access travel distance does not exceed 75 feet (22 860 mm).

   Commentary: *An occupant load of 49 for a single exit building corresponds with the requirements of Section 1015 of the NC Building Code.*

   Exception: Licensed Group E adult and child day care occupancies shall have a minimum of two exits. Rooms where occupants receive care are on the level of exit discharge and each of these rooms has an exit door directly to the exterior may have a single exit.

   Commentary: *This exception corresponds with NC daycare licensing requirements and corresponds with Section 426 of the NC Building Code.*

2. Group B, F-2, and S-2 occupancies not more than two stories in height that are not greater than 3,500 square feet per floor (326 m^2), when the exit access travel distance does not exceed 75 feet (22 860 mm). The minimum fire-resistance rating of the exit enclosure and of the opening protection shall be 1 hour.

3. Open parking structures where vehicles are mechanically parked.

4. In community residences for the developmentally disabled, the maximum occupant load excluding staff is 12.

5. Groups R-1 and R-2 not more than two stories in height, when there are not more than four dwelling units per floor and the exit access travel distance does not exceed 50 feet (15 240 mm). The minimum fire-resistance rating of the exit enclosure and of the opening protection shall be 1 hour.

6. In multilevel dwelling units in buildings of occupancy Group R-1 or R-2, an exit shall not be required from every level of the dwelling unit provided that one of the following conditions is met:

    6.1. The travel distance within the dwelling unit does not exceed 75 feet (22 860 mm); or

    6.2. The building is not more than three stories in height and all third-floor space is part of one or more dwelling units located in part on the second floor; and no habitable room within any such dwelling unit shall have a travel distance that exceeds 50 feet (15 240 mm) from the outside of the habitable room entrance door to the inside of the entrance door to the dwelling unit.

7. In Group R-2, H-4, H-5 and I occupancies and in <u>boarding</u> houses and child care centers, a single exit is permitted in a one-story building with a maximum occupant load of 10 and the exit access travel distance does not exceed 75 feet (22 860 mm).

8. In buildings of Group R-2 occupancy that are equipped throughout with an automatic fire sprinkler system, a single exit shall be permitted from a basement or story below grade if every dwelling unit on that floor is equipped with an approved window providing a clear opening of at least 5 square feet (0.47 m^2) in area, a minimum net clear opening of 24 inches (610 mm) in height and 20 inches (508 mm) in width, and a sill height of not more than 44 inches (1118 mm) above the finished floor.

9. In buildings of Group R-2 occupancy of any height with not more than four dwelling units per floor; with a smokeproof enclosure or outside stair as an exit; and with such exit located within 20 feet (6096 mm) of travel to the entrance doors to all dwelling units served thereby.

10. In buildings of Group R-3 occupancy equipped throughout with an automatic fire sprinkler system, only one exit shall be required from basements or stories below grade

11. <u>Licensed Group R-4 adult and child day care rooms where occupants receive care and that meet all of the following shall have a minimum of one means of egress:</u>

    <u>11.1 Located on the level of exit discharge, and</u>

    <u>11.2 The egress door discharges directly to the exterior.</u>

    Commentary: *This provision corresponds with NC residential day care licensing requirements and corresponds with Section 426 of the NC Building Code.*

805.3.1.2.1 Fire escape access and details.
Fire escapes shall comply with all of the following requirements:

1. Occupants shall have unobstructed access to the fire escape without having to pass through a room subject to locking.

2. Access to a new fire escape shall be through a door, except that windows shall be permitted to provide access from single dwelling units or sleeping units in Group R-1, R-2 and I-1 occupancies or to provide access from spaces having a maximum occupant load of 10 in other occupancy classifications.

    2.1. The window shall have a minimum net clear opening of 5.7 square feet (0.53 m^2) or 5 square feet (0.46 m^2) where located at grade.

    2.2. The minimum net clear opening height shall be 24 inches (610 mm) and net clear opening width shall be 20 inches (508 mm).

    2.3. The bottom of the clear opening shall not be greater than 44 inches (1118 mm) above the floor.

    2.4. The operation of the window shall comply with the operational constraints of the *International Building Code*.

3. Newly constructed fire escapes shall be permitted only where exterior stairs cannot be utilized because of lot lines limiting the stair size or because of the sidewalks, alleys, or roads at grade level.

4. Openings within 10 feet (3048 mm) of fire escape stairs shall be protected by fire assemblies having minimum $^3/_4$-hour fire-resistance ratings.

    Exception: Opening protection shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

5. In all buildings of Group E occupancy, up to and including the 12th grade, buildings of Group I occupancy, boarding houses and childcare centers, ladders of any type are prohibited on fire escapes used as a required means of egress.

805.3.2 Mezzanines.
Mezzanines in the *work area* and with an occupant load of more than 49 or in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have access to at least two independent means of egress.

Exception: Two independent means of egress are not required where the travel distance to an exit does not exceed 100 feet (30 480 mm) and the building is protected throughout with an automatic sprinkler system.

805.3.3 Main entrance—Group A.
Where the main entrance is included in the alteration buildings of Group A with an occupant load of 300 or more shall be provided with a main entrance capable of serving as the main exit with an egress capacity of at least one-half of the total occupant load. The remaining exits shall be capable of providing one-half of the total required exit capacity.

Commentary: *This requirement is limited to situations where the main entrance is part of the alteration work. If the main entrance is not otherwise being altered this section does not require the entrance to be altered or replaced. The code is assuming that the building was legally occupied for the existing Group A classification before the alteration and can remain as is unless it is physically altered by the scope of work for purposes outside the requirement of this section.*

Examples:

1. *The permit holder elects to move the main entrance to another location. The new location would have to comply with this section.*
2. *Replacement of door leafs, not including the door frame, would require compliance with Section 602 and would not require compliance with this section.*

Exception: Where there is no well-defined main exit or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total width of egress is not less than 100 percent of the required width.

805.4.1 Two egress doorways required.
Work areas shall be provided with two egress doorways in accordance with the requirements of Sections 805.4.1.1 through 805.4.1.3.

805.4.1.1 Occupant load and travel distance.
In any *work area*, all rooms and spaces having an occupant load of 50 or more in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have a minimum of two egress doorways.

Commentary: *An occupant load of 50 or more requiring a minimum of two egress doorways corresponds with the minimum requirements of the NC Building Code***.**

Exceptions:

1. Storage rooms having a maximum occupant load of 10.

2. Where the *work area* is served by a single exit in accordance with Section 805.3.1.1.

3. The occupant load of the space may be restricted to comply with North Carolina Building Code, Sections 1015, 1018, and 1021. Signage indicating

the allowed quantity of occupants shall be permanently mounted in the building at a location approved by the local fire marshal.

805.4.1.2 Group I-2.
In buildings of Group I-2 occupancy, any patient sleeping room or suite of patient rooms greater than 1,000 square feet (93 m^2) within the *work area* shall have a minimum of two egress doorways.

805.4.1.3 Group E Licensed Adult and Child Day Care.
Group E and R-4 adult and child day care facilities shall have two means of egress. Rooms where occupants receive care and that meet all of the following shall have a minimum of one means of egress:

1. Located on the level of exit discharge.
2. The egress door discharges directly to the exterior.

Commentary: *This section corresponds with the requirements in Section 426 of the NC Building Code for number of exits required in licensed adult and child day cares.*

805.4.4.1 Supplemental requirements for panic hardware. (Deleted)

805.4.5 Emergency power source in Groups I-2 and I-3.
Work areas in buildings of Groups I-2 and I-3 occupancies having remote power unlocking capability for more than 10 locks shall be provided with an emergency power source for such locks. Power shall be arranged to operate automatically upon failure of normal power within 10 seconds and for a duration of not less than 1 hour.

805.4.6 Group I-2 Locks and Latches.
Remote locking shall comply with Section 407.10 of the NC Building Code.

805.11 Emergency Escape and Rescue Openings.
When the work being performed creates a bedroom below the fourth floor in a Group R occupancy, at least one sleeping room window or exterior door shall comply with Section 805.11.1 through 805.11.3.

Commentary: *This section and subsections correspond with the requirements in Section 1029 of the NC Building Code for emergency escape and rescue openings in Group R occupancies.*

Exception: Emergency escape and rescue openings are not required to comply with this section where the sleeping room is provided with a door to a corridor having access to two remote exits or in a building equipped throughout with an automatic fire suppression system.

805.11.1 Operation.
Emergency escape and rescue openings shall be operational from the inside without the use of keys or tools.

805.11.2 Sill height.

The opening shall have a sill height not greater than 44 inches measured from the floor.

805.11.3 Minimum size.
The minimum net clear opening shall be 5.7 square feet. The minimum net clear opening width shall be 20 inches. The minimum net clear opening height shall be 24 inches. The clear opening dimensions shall be the result of normal operation of the opening.

SECTION 806
ACCESSIBILITY

806.1 General.
A *facility* that is altered shall comply with the applicable provisions in Sections 806.1.1 through 806.1.14, 806.2 through 806.6, and Chapter 11 of the *International Building Code* unless it is *technically infeasibl*e. Where compliance with this section is *technically infeasible*, the alteration shall provide access to the maximum extent that is technically feasible.

A *facility* that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Commentary: *The requirements for accessibility originally located in Section 705 were relocated to this section because the requirements of this section do not apply to the scope of work in Chapter 7 and are appropriate for the scope of work in Chapter 8.*

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 806.2.

2. Accessible means of egress required by Chapter 10 of the *International Building Code* are not required to be provided in existing *facilities*.

3. Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in existing facilities undergoing less than a Level 3 *alteration.*

4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units.

5. Accessibility improvements outside the *work area* are not required unless required by Section 806.2.

806.1.1 Entrances.
Where an *alteration* includes alterations to an entrance, and the *facility* has an accessible entrance on an accessible route, the altered entrance is not required to be accessible unless required by Section 806.2. Signs complying with Section 1110 of the *International Building Code* shall be provided.

806.1.2 Elevators.
Altered elements of existing elevators shall comply with ASME A17.1/CSA B44 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.

806.1.3 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.

806.1.4 Ramps.
Where steeper slopes than allowed by Section 1010.3 of the *International Building Code* are necessitated by space limitations, the slope of ramps in or providing access to existing facilities shall comply with Table 806.1.4.

TABLE 806.1.4
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

For SI: 1 inch = 25.4 mm.

806.1.5 Dining areas.
An accessible route to raised or sunken dining areas or to outdoor seating areas is not required provided that the same services and decor are provided in an accessible space usable by any occupant and not restricted to use by people with a disability.

806.1.6 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.

806.1.7 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 ramp or lift access poses a hazard by restricting or projecting into a required means of egress.

806.1.8 Accessible dwelling or sleeping units.
Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered, the requirements of Section 1107 of the *International Building Code* for accessible units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of the spaces being altered.

806.1.9 Type A dwelling or sleeping units.
Where more than 20 Group R-2 dwelling or sleeping units are being altered, the

requirements of Section 1107 of the *International Building Code* for Type A units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of the spaces being altered.

806.1.10 Toilet rooms.
Where it is technically infeasible to alter existing toilet and bathing rooms to be accessible, an accessible family or assisted-use toilet or bathing room constructed in accordance with Section 1109.2.1 of the *International Building Code* is permitted. The family or assisted-use toilet or bathing room shall be located on the same floor and in the same area as the existing toilet or bathing rooms.

806.1.11 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.

806.1.12 Fuel dispensers.
Operable parts of replacement fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

806.1.13 Thresholds.
The maximum height of thresholds at doorways shall be $^{3}/_{4}$ inch (19.1 mm). Such thresholds shall have beveled edges on each side.

806.1.14 Extent of application.
An *alteration* of an existing element, space, or area of a *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 *facility* or portion of a *facility.*

806.2 Alterations affecting an area containing a primary function.
Where an *alteration* affects the accessibility to a, 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.*

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 a *facility.*

5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

806.3 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 of the *International Building Code*.

806.4 Accessible dwelling units and sleeping units.
Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the *International Building Code* for accessible units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of spaces being added.

806.5 Type A dwelling or sleeping units.
Where 11 or more Group R-2 dwelling or sleeping units are being added, the requirements of Section 1107 of the *International Building Code* for Type A units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of the spaces being added.

806.7 Type B dwelling or sleeping units.
Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the *International Building Code* for Type B units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of the spaces being added.

SECTION 807
STRUCTURAL

807.5 Existing structural elements resisting lateral loads.
The work shall not cause any diminution of existing structural strength below that which exists at the time of application for a permit or that which is required by the applicable codes of the North Carolina State Building Code, whichever is lower.

807.5.1 Newly introduced fixed loads.
Newly introduced fixed loads shall not exceed the uniformly distributed live loads or concentrated live load criteria of Table 1607.1 of the North Carolina Building Code and shall not create deflection that exceeds the standards set forth below. As used in this section, fixed loads shall mean uniform or concentrated loads and shall include equipment, files, library stacks, or similar loading conditions.

1. For wood frame construction, deflection shall not exceed L/180 for roofs with a slope of 3 in 12 or less or L/120 for roofs with a slope of greater than 3 in 12 and for floors.

2. For steel frame construction, deflection shall not exceed L/240 for roofs with a slope of 3 in 12 or less or L/180 for roofs with a slope of greater than 3 in 12 and for floors.

3. For concrete construction, deflection shall not exceed L/180 for roofs or L/240 for floors.

Commentary: *This section addresses existing lateral structural systems and emphasizes the need to maintain the existing structural strength that exists. It also provides limitations on deflection when a new fixed load is introduced to the existing building. This language mirrors the provisions of Section 1.6c1 of the 2009 NC Rehabilitation Code to clarify requirements in regards to strength and capacity of existing structural systems.*

CHAPTER 9
ALTERATIONS—LEVEL 3

(Former Rehab Code designation - Reconstruction)

SECTION 902
SPECIAL USE AND OCCUPANCY

902.1 High-rise buildings.
Any building having occupied floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with the requirements of Sections 902.1.1 through 902.1.3.

902.1.3 Luminous egress path markings.
Luminous egress markings shall be installed as required by Section 1024 of the International Building Code.

902.2 Boiler and furnace equipment rooms.
Boiler and furnace equipment rooms shall be enclosed by 1-hour fire-resistance-rated construction.

Exceptions:

1. Furnace and boiler equipment of low-pressure type, operating at pressures of 15 pounds per square inch gauge (psig) (103.4 KPa) or less for steam equipment or 170 psig (1171 KPa) or less for hot water equipment, when installed in accordance with manufacturer recommendations.

2. Furnace and boiler equipment with 200,000 British thermal units (Btu) (2.11 × 108 J) per hour input rating or less is not required to be enclosed.

3. Furnace rooms protected with automatic sprinkler protection.

4. One- and two-family dwellings and townhouses as constructed under the North Carolina Residential Code.

902.3 Group H.
Where the work area includes a Group H occupancy, the building shall comply with all the requirements of the *International Building Code* for the Group H occupancy.

SECTION 903
BUILDING ELEMENTS AND MATERIALS

903.2 Fire separation in Group R-3.
Fire separation in Group R-3 occupancies shall be in accordance with Section 903.2.1.

903.2.1 Separation required.
Where the *work area* is in any attached dwelling unit in Group R-3, any multiple single-family dwelling (townhouse) or any two-family dwellings, walls separating the dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. All work shall be performed on the side of the dwelling unit wall that is part of the *work area*.

Exceptions:
1. Where *alterations* or *repairs* do not result in the removal of wall or ceiling finishes exposing the structure, walls are not required to be continuous through concealed floor spaces.
2. If not currently existing, separation is not required in the crawl space of two-family dwellings.

SECTION 904
FIRE PROTECTION

904.1.1 Other required automatic sprinkler systems.
In buildings and areas listed in Table 903.2.11.6 of the *International Building Code*, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions:

1. The *work area* is required to be provided with an automatic sprinkler system in accordance with the *International Building Code* applicable to new construction;

2. The building has sufficient municipal water supply for design of an automatic sprinkler system available to the floor without installation of a new water storage tank; and

3. The work area is separated from the remainder of the building with fire barriers complying with the *International Building Code*.

904.2 Standpipes.
Where the *work area* includes exits or corridors shared by more than one tenant and is located more than 30 feet (15 240 mm) above or below the lowest level of fire department access, a standpipe system shall be provided. Standpipes shall have an approved fire department connection with hose connections at each floor level above or below the lowest level of fire department access. Standpipe systems shall be installed in accordance with the *International Building Code*. Standpipes systems shall be provided for high-rise buildings as required by North Carolina General Statute 143-138, Section (i).

Exception: The interconnection of multiple standpipe risers shall not be required.

904.3 Fire alarm and detection systems.
Fire alarm and detection systems complying with Sections 804.4.1, 804.4.2, and this section shall be provided in accordance with the *International Building Code or the International Residential Code*, whichever is applicable.

904.3.1 Manual fire alarm systems.
Where required by the *International Building Code,* a manual fire alarm system shall be provided throughout the *work area*. Alarm notification appliances shall be automatically activated as required by the *International Building Code*. Visual alarm notification appliances are not required, except where an existing alarm system is upgraded or replaced or where a new fire alarm system is installed.

904.3.2 Automatic fire detection.
Where required by the *International Building Code* or *International Residential Code* for new buildings, automatic fire detection systems shall be provided throughout the *work area*.

SECTION 906
ACCESSIBILITY

906.1 General.
A building, *facility* or element that is altered shall comply with this section and Section 806.

SECTION 907
STRUCTURAL

907.4 Existing structural elements resisting lateral loads.
Existing structural elements resisting lateral loads shall comply with Section 807.5. Sections 907.4.1 through 907.4.5 shall apply when existing elements of the lateral force resisting system have been damaged due to a wind or seismic event. Repair work such as but not limited to termite or rot damage shall comply with Section 606.1.

Exception: Buildings of Group R occupancy used solely for residential purposes with no more than five dwelling or sleeping units that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.

Commentary: *This section addresses existing lateral structural systems and emphasizes the need to maintain the existing structural strength that exists. It addresses the evaluation and analysis of existing lateral systems that have been damaged due to a wind or seismic event.*

SECTION 908
ENERGY CONSERVATION

908.1.1 Unconditioned to conditioned space.
In addition to the requirement of Section 908.1, projects changing unconditioned space to conditioned space and costing more than $10,000 shall require 10 percent of the project cost be used toward meeting the minimum requirements of Chapter 11 of the North Carolina Residential Code for one- and two family dwellings and townhouses or the North Carolina Energy Conservation Code. Project cost for purposes of this section is the total project cost listed on all permits related to the work required to convert the unconditioned space to conditioned space and excludes the 10 percent added from this section. Under this section, existing building envelope elements that become a part of the building thermal envelope and are not changed are not required to be upgraded. The additional 10 percent of the project cost shall be appropriated for additional energy conservation features of choice that are addressed in Chapter 11 of the North Carolina Residential Code for one- and two- family dwellings and townhouses or the North Carolina Energy Conservation Code. In addition to the 10 percent project cost, any existing ceiling, wall, or floor cavities becoming a part of the building thermal envelope that are exposed during construction shall at a minimum be insulated to comply with Chapter 11 of the North Carolina Residential Code for one- and two- family dwellings and townhouses or the North Carolina Energy Conservation Code or be insulated to the fill the cavity, whichever is less.

Commentary: *This section requires 10% of the project cost to be allocated towards meeting the minimum requirements of the NC Energy Conservation Code when the cost of changing unconditioned to conditioned space costs more than $10,000. The 10% should be in addition to the requirements of Section 908.1 for minimum NC Energy Conservation Code provisions for the alteration being performed and the selection of upgraded components is at the discretion of the permit holder. The following energy allocation form may be used as a guideline for what to provide the jurisdiction to indicate what energy conservation features have been selected for the additional 10% requirement.*

2015 NC Existing Building Code

Energy Code Allocation Form for Alteration Level 3 – Unconditioned to Conditioned Space

Project Name		Permit #
Project Address		
☐ 2015 NC Existing Bldg. Code Ch. 9 –Alteration Level 3 – Section 908 - Unconditioned to Conditioned Space		
This is to identify that … (check all that apply below)		
☐	This building is undergoing an Alteration – Level 3 (Reconstruction).	
☐	The work area is changing from unconditioned to conditioned space and costs more than $10,000.	
	Provide an itemized list of components complying with Chapter 11 of the NC Residential Code or the NC Energy Conservation Code in addition to the requirements for the alteration as required by Section 908.1. Item: Cost: $ Item: Cost: $ Item: Cost: $ _____ Total Cost: $	
☐	Cost of the project: $_____ 10% of the Cost Value: $_____ *Note: Cost of project is the total project cost listed on all permits related to the work required to convert the unconditioned space to conditioned space.	Date
Priority given to elements indicated above acknowledged hereby:		
☐	Owner	Date
☐	Tenant	Date
☐	Designer	Date
NO WARRANTY OR GUARANTEE IMPLIED OR INTENDED		

CHAPTER 10
CHANGE OF OCCUPANCY

SECTION 1001
GENERAL

1001.1 Scope.
The provisions of this chapter shall apply where a *change of occupancy* occurs, as defined in Section 202, including:

1. Where the occupancy use is changed; or

2. Where there is a change in occupancy classification or the occupancy group designation changes.

Construction work related to the change of use shall conform to the other applicable chapters of this code.

1001.3 Change or partial change of *occupancy classification*.
Where the *occupancy classification* changes, the provisions of Sections 1002 through 1012 shall apply. This includes a *change of occupancy* classification within a group as well as a *change of occupancy* classification from one group to a different group.

> ***Commentary:*** *A general change of occupancy hazard table is not included in this section because unlike Chapter 4, Chapter 10 provides tables for each individual safety component regarding hazard level for the occupancies.*

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1001.3.1 Partial change of occupancy classification. (Deleted)

1001.4 Certificate of occupancy required.
A new certificate of occupancy shall be required where a *change of occupancy* occurs that results in a different *occupancy classification* as determined by Chapter 3 of the *International Building Code*.

SECTION 1006
ACCESSIBILITY

1006.1 General.
Accessibility in portions of buildings undergoing a *change of occupancy* classification shall comply with Section 1012.9.

SECTION 1007
STRUCTURAL

1007.1 Structural Requirements.
Structural requirements for occupancy changes shall comply with Sections 1007.2 through 1007.4.

Table 1007.1
Structural Load Categories

Load Category	Occupancy Classification
1 (highest)	F-1, F-2, S-1, S-2, stack areas in libraries, stages and platforms, areas subject to vehicular loads, queuing areas
2	All loading conditions not listed in category 1 or 3
3 (lowest)	B, E, I-1, I-2, I-3, R-1, R-2, R-3, R-4, U

[B] 1007.2 Gravity loads.
Buildings or portions thereof subject to a *change of occupancy* where such change in the nature of occupancy results in higher uniform or concentrated loads based on Table 1607.1 of the *International Building Code* shall comply with the gravity load provisions of the *International Building Code*.

Exception:
1. Structural elements whose stress is not increased by more than 5 percent.

2. If the Building Code official determines that the number of occupants and the placement and weight of equipment can be controlled by the occupants, Group F areas designed for reduced live load shall be posted with the approved live load. Placards stating the allowable live loads shall be posted. Placards may state loads in forms usable by the occupants, in addition to posting the allowable load in pounds per square foot. Such information shall be developed by a licensed design professional and be approved by the code official.

   2.1 Analysis and test methods for evaluation of existing structural members shall use methods specified in the code in effect at the time the building was originally constructed.

1007.2.1 Change to Higher Load Category. When the use or character of use of a building is changed to a higher load category as shown in Table 1007.1, then the structure shall be capable of supporting the load requirement for the new use or character of use.

Exception: The corridor and lobby loading requirements of Table 1607.1 shall be met only if the corridor exceeds six feet in width or if the lobby or corridor area is used for queuing purposes.

1007.2.2 Change to Equal or Lower Load Category. Where the use or character of use within an existing building is changed to an equal or lower load category as shown in Table 1007.1, then the existing structure may be used without modification, provided that the building is structurally sound and in good structural repair. When a change of use results in a building being reclassified as a Seismic Use Group III, the building shall comply with the seismic design requirements of Section 1613 of the North Carolina Building Code.

[B] 1007.3 Snow and wind loads.
Buildings and structures subject to a *change of occupancy* where such change in the nature of occupancy results in higher risk categories based on Table 1604.5 of the *International Building Code* shall be analyzed and shall comply with the applicable wind or snow load provisions of the *International Building Code*.

Exception: Where the new occupancy with a higher risk category is less than or equal to 10 percent of the total building floor area. The cumulative effect of the area of occupancy changes shall be considered for the purposes of this exception.

[B] 1007.4 Seismic loads.
Existing buildings with a *change of occupancy* shall comply with the seismic provisions of Sections 1007.4.1 and 1007.4.2.

[B] 1007.4.1 Compliance with the International Building Code level seismic forces. Where a building or portion thereof is subject to a *change of occupancy* that results in the building being assigned to a higher risk category based on Table 1604.5 of the *International Building Code*; or where such *change of occupancy* results in a reclassification of a building to a higher hazard category as shown in Table 1007.1, the building shall comply with the requirements for *International Building Code* level seismic forces as specified in Section 301.1.4.1 for the new risk category.

Exceptions:

1. Where approved by the *code official*, specific detailing provisions required for a new structure are not required to be met where it can be shown that an equivalent level of performance and seismic safety is obtained for the applicable risk category based on the provision for reduced *International Building Code* level seismic forces as specified in Section 301.1.4.2.

2. Where the area of the new occupancy with a higher hazard category is less than or equal to 10 percent of the total building floor area and the new occupancy is not classified as Risk Category IV. For the purposes of this exception, buildings occupied by two or more occupancies not included in the same Risk category, shall be subject to the provisions of Section 1604.5.1 of the *International Building Code*. The cumulative effect of the area of occupancy changes shall be considered for the purposes of this exception.

3. Unreinforced masonry bearing wall buildings in Risk Category III when assigned to Seismic Design Category A or B shall be allowed to be strengthened to meet

the requirements of Appendix Chapter A1 of this code [Guidelines for the Seismic Retrofit of Existing Buildings (GSREB)].

[B] 1007.4.2 Access to Risk Category IV.
Where a *change of occupancy* is such that compliance with Section 1007.4.1 is required and the building is assigned to Risk Category IV, the *operational access* to the building shall not be through an adjacent structure, unless that structure conforms to the requirements for Risk Category IV structures. Where *operational access* is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided by the owner of the Risk Category IV structure.

SECTION 1008
ELECTRICAL

1008.3 Service upgrade.
Where the occupancy of an *existing building* or part of an *existing building* is changed such that the new load requires an increase in service, the electrical service shall be upgraded to meet the requirements of NFPA 70 for the new occupancy.

SECTION 1011
OTHER REQUIREMENTS

1011.1 Natural light and natural ventilation.
Natural light and natural ventilation shall comply with the requirements of the *International Building Code* or NC Residential Code for the new occupancy.

SECTION 1012
CHANGE OF OCCUPANCY CLASSIFICATION

1012.1 General.
The provisions of this section shall apply to buildings or portions thereof undergoing a change of occupancy classification. This includes a change of occupancy classification within a group as well as a change of occupancy classification from one group to a different group. Such buildings shall also comply with Sections 1002 through 1011. The application of requirements for the change of occupancy shall be as set forth in Sections 1012.1.1 through 1012.1.4. A *change of occupancy*, as defined in Section 202, without a corresponding change of occupancy classification shall comply with Section 1001.2. For purposes of this section Group R-3 will also include detached one- and two-family dwellings and townhouses.

1012.1.1 Separation and Compliance with Chapter 9 of this code.
Where alteration work is required by the change of occupancy classification the requirements of Chapter 9 of this code shall be applied throughout the building for the most restrictive occupancy classification.

Exception: Where a portion of an *existing building* that is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barriers having a fire-resistance rating as required in the *International Building Code* for

the separate occupancy, that portion shall comply with all of the requirements of Chapter 9 of this code for the most restrictive occupancy in the fire area and with the requirements of this chapter.

1012.1.4 Accessibility.
All buildings undergoing a change of occupancy classification shall comply with Section 1012.9.

1012.2.1 Fire sprinkler system.
Hazard categories in regard to fire sprinkler requirements shall be in accordance with Table 1012.2.1.

Commentary: *This section was amended to address requiring sprinklers based on the hazard of the occupancy type as the NC Rehabilitation Code does. Table 1012.2.1 and Sections 1012.2.1.1 through 1012.2.1.3 were mirrored from Section 1.31g of the 2009 Rehabilitation Code.*

Table 1012.2.1
Hazard Categories and Classifications

Relative Hazard	Use Classification
1 (highest)	H, I, *Nightclub*
2	A-2, R-1, R-2
3	A-1, A-3
4	F-1, M, S-1
5	A-4, E
6 (lowest)	B, F-2, R-3, R-4, S-2, U

1012.2.1.1 Change to higher hazard category. When a change of use is made to a higher hazard category as shown in Table 1012.2.1, the building shall be provided with an automatic fire suppression system as required by Section 903 of the North Carolina Building Code.

Exceptions: When an area of a building is changed to a higher hazard category and the proposed use is separated from the existing use(s) by assemblies that meet the applicable fire rating in Table 508.4 of the North Carolina Building Code, an automatic fire suppression system as required above shall be installed only in the area changed.

1012.2.1.2 Change to equal or lesser hazard category. When a change of use is made to an equal or lesser hazard category as shown in Table 1012.2.1, there is no requirement to install an automatic fire suppression system.

Exceptions:

1. In areas where work being performed in connection with the change of use triggers a requirement for suppression.

2. In windowless stories an automatic fire suppression system shall be installed as required by Section 903 of the North Carolina Building Code.

1012.2.1.3 Change in NFPA 13 hazard level. Notwithstanding the relative hazard as determined by Table 1012.2.1, when a change in the character of the use is made to a higher degree of hazard as defined by NFPA 13 (Light Hazard, Ordinary Hazard Group 1, Ordinary Hazard Group 2, Extra Hazard Group 1, Extra Hazard Group 2 and Special Occupancy Hazards), the sprinkler system shall be evaluated and, where required by NFPA 13, altered to conform to the required density and maximum sprinkler protection area per head for the proposed occupancy.

1012.2.2 Fire alarm and detection system and Carbon Monoxide detection system. Where a change in occupancy classification occurs that requires a fire alarm and detection system or a carbon monoxide detection system to be provided based on the new occupancy in accordance with Chapter 9 of the *International Building Code*, such system shall be provided throughout the area where the *change of occupancy* occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the *change of occupancy* occurs and shall be automatically activated.

TABLE 1012.4
MEANS OF EGRESS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	I-2, I-3, I-4
3	A, E, I-1, M, R-1, R-2, R-4
4	B, F-1, R-3[a], S-1
5 (Lowest Hazard)	F-2, S-2, U

a. Detached one- and two-family dwellings and townhouses are relative hazard 5.

1012.4.1 Means of egress for change to higher hazard category. When a change of occupancy classification is made to a higher hazard category (lower number) as shown in Table 1012.4, the means of egress shall comply with the requirements of Chapter 10 of the *International Building Code*.

Exceptions:

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 903.1.

2. Existing stairways including handrails and guards complying with the requirements of Chapter 9 shall be permitted for continued use subject to approval of the *code official.*

3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.

4. Existing corridor walls constructed on both sides of wood lath and plaster in good condition or 1/2-inch-thick (12.7 mm) gypsum wallboard shall be permitted where 1-hour rated separation is required. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.

5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 805.5.1, 805.5.2 and 805.5.3.

6. Existing dead-end corridors shall comply with the requirements in Section 805.6.

7. An existing operable window with clear opening area no less than 4 square feet (0.38 m^2) and minimum opening height and width of 22 inches (559 mm) and 20 inches (508 mm), respectively, shall be accepted as an emergency escape and rescue opening.

1012.4.3 Egress capacity.
Egress capacity shall meet or exceed the occupant load as specified in the *International Building Code* for the new occupancy.

Exception: The occupant load of the space may be restricted to comply with North Carolina Building Code, Sections 1015, 1018, and 1021. Signage indicating the allowed quantity of occupants shall be permanently mounted in the building at a location approved by the local fire marshal.

Commentary: *This exception comes from language in NC Rehabilitation Code Section 1.31 (c) regarding restriction of occupant load to comply with exits, exit access, corridors and number of exits required by the NC Building Code.*

TABLE 1012.5
HEIGHTS AND AREAS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H[a]
2	A-1, A-2, A-3, A-4, I[a]
3	E, F-1, R-1, R-2, S-1, M, R-4
4(Lowest Hazard)	B, F-2, S-2, A-5, R-3, U

a. H-1 and I-2 are not permitted in Type VB construction.

1012.5.1.1 Fire wall alternative.
In other than Groups H, F-1 and S-1, fire barriers and horizontal assemblies constructed in accordance with Sections 707 and 712, respectively, of the *International Building Code* shall be permitted to be used in lieu of fire walls to subdivide the building into separate buildings for the purpose of complying with the area limitations required for the new occupancy where all of the following conditions are met:

1. The buildings are protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.

2. The maximum allowable area between fire barriers, horizontal assemblies, or any combination thereof shall not exceed the maximum allowable area determined in accordance with Chapter 5 of the *International Building Code* without an increase allowed for an automatic sprinkler system in accordance with Section 506 of the *International Building Code*.

3. The fire-resistance rating of the fire barriers and horizontal assemblies shall not be less than that specified for fire walls in Table 706.4 of the *International Building Code.*

   Exception: Where horizontal assemblies are used to limit the maximum allowable area, the required fire-resistance rating of the horizontal assemblies shall be permitted to be reduced by 1 hour provided the height and number of stories increases allowed for an automatic sprinkler system by Section 504.2 of the *International Building Code* are not used for the buildings.

TABLE 1012.6
EXPOSURE OF EXTERIOR WALLS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	F-1, M[a], S-1
3	A, B, E, I, R
4(Lowest Hazard)	F-2, S-2, U

a. Group M occupancy of 12,000 square feet or less shall be relative hazard category 3.

Commentary: *12,000 sf or less mercantile occupancies should be considered less hazardous because of the lesser fuel load in the smaller area.*

1012.7.1 Minimum requirements.
Vertical shafts shall be designed to meet the *International Building Code* requirements for atriums or the requirements of this section.

Exception: Shafts for Group M occupancies in buildings that are less than 3,000 square feet or less per floor and three stories or less are not required to be enclosed.

Commentary: *Mercantile occupancies less than 3,000 sf per floor and three stories or less should be considered less hazardous and are permitted without vertical shaft protection.*

1012.7.4 Openings.
All openings into existing fire-resistant-rated vertical shaft enclosures shall be protected by

fire assemblies having a fire protection rating of not less than 1 hour and shall be maintained self-closing or shall be automatic-closing by actuation of a smoke detector. All other openings shall be fire protected in an approved manner. Existing fusible link-type automatic door-closing devices shall be permitted in all shafts except stairways if the fusible link rating does not exceed 135°F (57°C).

1012.8 Dwelling unit separation.

1012.8.1 Townhouses.
Existing buildings that establish new townhouse dwelling units shall comply with separation requirements of Section R302.2 of the North Carolina Residential Code and related subsections.

1012.8.2 Two-family dwellings.
Existing buildings that establish new detached two-family dwelling units shall comply with separation requirements of Section R302.3 of the North Carolina Residential Code and related subsections.

1012.8.3 Group I-1, R-1, R-2 or R3.
Existing buildings that establish new Group I-1, R-1, R-2 or R-3 dwelling or sleeping units shall comply with separation requirements of Section 420 of the North Carolina Building Code.

1012.9 Accessibility.
Existing buildings that undergo a change of group or occupancy classification shall comply with this section.

Exception: Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in existing buildings and facilities undergoing a *change of occupancy* in conjunction with less than a Level 3 *alteration*.

1012.9.1 Partial change in occupancy.
Where a portion of the building is changed to a new occupancy classification, any *alteration* shall comply with Sections 705, 806 and 906, as applicable.

1012.9.2 Complete change of occupancy.
Where an entire building undergoes a *change of occupancy*, it shall comply with Section 1012.9.1and 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 of the *International Building Code*.

4. Accessible parking, where parking is provided.

5. At least one accessible passenger loading zone, where loading zones are provided.

6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

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.

Exception: The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.

CHAPTER 11
ADDITIONS

SECTION 1102
HEIGHTS AND AREAS

1102.3 Fire protection systems.
Existing fire areas increased by the *addition* shall comply with Chapter 9 of the *International Building Code*.

Exception: This requirement shall not apply to increases to the allowable fire area of five percent or less.

Commentary: *The 5% increase in fire area is permitted to allow for a small addition to the existing building without being penalized for exceeding the fire area and not having sprinklers. Some examples would be a stairway, elevator or drive thru addition. In most occupancies where the fire area is limited to 12,000 sq. ft., the addition allowed would be 600 sq. ft. or less.*

SECTION 1103
STRUCTURAL

[B] 1103.5 Flood hazard areas.
Additions and foundations in *flood hazard areas* shall comply with the following requirements:

1. For horizontal *additions* that are structurally interconnected to the *existing building*:

    1.1. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

    1.2. If the *addition* constitutes *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

2. For horizontal *additions* that are not structurally interconnected to the *existing building*:

    2.1. The *addition* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

    2.2. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with

Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

3. For vertical additions and all other proposed work that, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

4. For a new, replacement, raised, or extended foundation, if the foundation work and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

SECTION 1104
SMOKE ALARMS AND CARBON MONOXIDE DETECTORS IN ONE- AND TWO-FAMILY DWELLINGS

1104.1 Smoke alarms in existing portions of a building.
Where an *addition* is made to a building or structure of a one- and two-family dwelling occupancy, the *existing building* shall be provided with smoke alarms as required by Section R314.3.1 of the *International Residential Code* as applicable.

1104.2 Carbon monoxide alarms in existing portions of a building.
Where an *addition* is made to a building or structure of a one- and two-family dwelling, the *existing building* shall be provided with carbon monoxide alarms as required Section R315.2 of the *North Carolina Residential Code* as applicable.

SECTION 1105
ACCESSIBILITY

1105.1 Minimum requirements.
Accessibility provisions for new construction shall apply to additions. An addition that affects the accessibility to an area of *primary function*, or contains an area of~~,~~ *primary function* shall comply with the requirements of Sections 705, 806 and 906, as applicable.

CHAPTER 12
HISTORIC BUILDINGS

SECTION 1201
GENERAL

[B] 1201.4 Flood hazard areas.
In *flood hazard areas*, if all proposed work, including repairs, work required because of a *change of occupancy*, and *alterations*, constitutes *substantial improvement*, then the *existing building* shall comply with Section 1612 of the *International Building Code* or Section R322 of the *North Carolina Residential Code*.

Exception: If an *historic building* will continue to be an *historic building* after the proposed work is completed, then the proposed work is not considered a *substantial improvement.* For the purposes of this exception, an *historic building* is:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places;

2. Determined by the Secretary of the U.S. Department of Interior to contribute to the historical significance of a registered historic district or a district preliminarily determined to qualify as a historic district; or

3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

1201.5 Ceiling Height.
Existing ceiling heights shall be permitted to remain.

SECTION 1202
REPAIRS

1202.4.1 Wind-borne debris protection.
Replacement of window units shall require compliance with Section 1609.1.2 of the North Carolina Building Code or Section R612.9. of the North Carolina Residential Code. Replacement of individual glass panes or sashes shall not require compliance with Section 1609.1.2 of the North Carolina Building Code or R612.9 of the North Carolina Residential Code.

Commentary: *This section requires protection of openings in wind-borne debris regions in accordance with new construction when the entire window unit is replaced. When an individual pane or sash is replaced in a wind-borne debris region, it is not required to meet the protection requirements for new construction.*

SECTION 1203
FIRE SAFETY

1203.2 General.
Every *historic building* that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct life safety hazard as identified by the *code official* shall be provided with an approved automatic fire-extinguishing system as determined appropriate by the *code official*. However, an automatic fire-extinguishing system shall not be used to substitute for, or act as an alternative to, the required number of exits from any *facility*.

1203.12 Automatic fire-extinguishing systems. (Deleted)

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SECTION 1204
ALTERATIONS

1204.1.1 Site arrival points.
At least one *accessible* route from a site arrival point to an *accessible* entrance shall be provided.

SECTION 1205
CHANGE OF OCCUPANCY

1205.15 Accessibility requirements.
The provisions of Section 1012.9 shall apply to facilities designated as historic structures that undergo a *change of occupancy*, unless *technically infeasible*. Where compliance with the requirements for accessible routes, ramps, entrances, or toilet rooms would threaten or destroy the historic significance of the building or *facility*, as determined by the authority having jurisdiction, the alternative requirements of Sections 1204.1.1 through 1204.1.4 for those elements shall be permitted.

Exception: Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in historical buildings.

SECTION 1206
STRUCTURAL

CHAPTER 13
RELOCATED OR MOVED BUILDINGS

SECTION 1301
GENERAL

1301.2 Conformance.
The building shall be safe for human occupancy as determined by the *International Fire Code* Any *repair*, *alteration*, or *change of occupancy* undertaken within the moved structure shall comply with the requirements of this code applicable to the work being performed. Any field-fabricated elements shall comply with the requirements of the *International Building Code* or the *International Residential Code* as applicable.

SECTION 1302
REQUIREMENTS

[B] 1302.4 Seismic loads.
Buildings shall comply with *International Building Code* or *International Residential Code* seismic provisions at the new location as applicable.

Exceptions:

1. Structures in Seismic Design Categories A and B and townhouses in Seismic Design Category C where the seismic loads at the new location are not higher than those at the previous location.

2. Structural elements whose stress is not increased by more than 10 percent.

[B] 1302.6 Flood hazard areas.
If relocated or moved into a *flood hazard area*, structures shall comply with Section 1612 of the *International Building Code* or Section R322 of the *International Residential Code*.

Commentary: *Local flood plain ordinances should be referenced in regards to minimum flood elevation provisions for relocated buildings.*

CHAPTER 14
PERFORMANCE COMPLIANCE METHODS

SECTION 1401
GENERAL

[B] 1401.2.2 Partial change in occupancy.
Where a portion of the building is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barrier or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the *International Building Code* or Section R302 of the *International Residential Code* for the separate occupancies, or with approved compliance alternatives, the portion changed shall be made to conform to the provisions of this section.

Where a portion of the building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the *International Building Code* or Section R302 of the *International Residential Code* for the separate occupancies, or with approved compliance alternatives, the provisions of this section which apply to each occupancy shall apply to the entire building. Where there are conflicting provisions, those requirements which secure the greater public safety shall apply to the entire building or structure.

[B] 1401.2.5 Accessibility requirements.
Additions, *alterations* and all portions of the buildings proposed for *change of occupancy* shall conform to the accessibility provisions of Section 410.

[B] 1401.3.2 Compliance with other codes.
Buildings that are evaluated in accordance with this section shall comply with the *International Fire Code*.

[B] 1401.6.4.1 Categories.
The categories for tenant and dwelling unit separations are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing.

2. Category b—Fire partitions or floor assemblies with less than 1-hour fire-resistance ratings or not constructed in accordance with Section 709 or712 of the *International Building Code,* respectively.

3. Category c—Fire partitions with 1-hour or greater fire-resistance ratings constructed in accordance with Section 709 of the International Building Code and floor assemblies with 1-hour but less than 2-hour fire-resistance ratings

constructed in accordance with Section 712 of the *International Building Code* or with only one tenant within the floor area.

4. Category d—Fire barriers with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 707 of the *International Building Code* and floor assemblies with 2-hour or greater fire-resistance ratings constructed in accordance with Section 712 of the *International Building Code*.

5. Category e—Fire barriers and floor assemblies with 2-hour or greater fire-resistance ratings and constructed in accordance with Sections 707 and 712 of the *International Building Code,* respectively.

[B] 1401.6.5.1 Categories.
The categories for corridor walls are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; or doors not self-closing.

2. Category b—Less than 1-hour fire-resistance rating or not constructed in accordance with Section 709.4 of the *International Building Code.*

3. Category c—1-hour to less than 2-hour fire-resistance rating, with doors conforming to Section 715 of the *International Building Code* or without corridors as permitted by Section 1018 of the *International Building Code.*

4. Category d—2-hour or greater fire-resistance rating, with doors conforming to Section 715 of the *International Building Code*.

[B] 1401.6.6 Vertical openings.
Evaluate the fire-resistance rating of exit enclosures, hoistways, escalator openings, and other shaft enclosures within the building, and openings between two or more floors. Table 1401.6.6(1) contains the appropriate protection values. Multiply that value by the construction-type factor found in Table 1401.6.6(2). Enter the vertical opening value and its sign (positive or negative) in Table 1401.7 under Safety Parameter 1401.6.6, Vertical Openings, for fire safety, means of egress, and general safety. If the structure is a one-story building or if all the unenclosed vertical openings within the building conform to the requirements of Section 708 of the *International Building Code*, enter a value of 2. The maximum positive value for this requirement shall be 2.

[B] 1401.6.10.1 Categories.
The categories for smoke control are:

1. Category a—None.

2. Category b—The building is equipped throughout with an automatic sprinkler system. Openings are provided in exterior walls at the rate of 20 square feet (1.86 m^2) per 50 linear feet (15 240 mm) of exterior wall in each story and distributed around the building perimeter at intervals not exceeding 50 feet (15 240 mm). Such openings shall be readily openable from the inside without a key

or separate tool and shall be provided with ready access thereto. In lieu of operable openings, clearly and permanently marked tempered glass panels shall be used.

3. Category c—One enclosed exit stairway, with ready access thereto, from each occupied floor of the building. The stairway has operable exterior windows, and the building has openings in accordance with Category b.

4. Category d—One smokeproof enclosure and the building has openings in accordance with Category b.

5. Category e—The building is equipped throughout with an automatic sprinkler system. Each floor area is provided with a mechanical air-handling system designed to accomplish smoke containment. Return and exhaust air shall be moved directly to the outside without recirculation to other floor areas of the building under fire conditions. The system shall exhaust not less than six air changes per hour from the floor area. Supply air by mechanical means to the floor area is not required. Containment of smoke shall be considered as confining smoke to the floor area involved without migration to other floor areas. Any other tested and approved design that will adequately accomplish smoke containment is permitted.

6. Category f—Each stairway shall be one of the following: a smokeproof enclosure in accordance with Section 1022.9 of the *International Building Code;* pressurized in accordance with Section 909.20.5 of the *International Building Code*; or shall have operable exterior windows.

[B] 1401.6.11 Means of egress capacity and number.
Evaluate the means of egress capacity and the number of exits available to the building occupants. In applying this section, the means of egress are required to conform to the following sections of the *International Building Code:* 1003.7, 1004, 1005, 1014.2, 1014.3, 1015.2, 1021, 1024.1, 1027.2, 1027.6, 1028.2, 1028.3, 1028.4 and 1029. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the means of egress when conforming to Section 405.

Under the categories and occupancies in Table 1401.6.11, determine the appropriate value and enter that value into Table 1401.7 under Safety Parameter 1401.6.11, Means of Egress Capacity, for means of egress and general safety.

[B] 1401.6.19 Incidental uses.
Evaluate the protection of incidental uses in accordance with Section 508.2.5.2 of the *International Building Code*. Do not include those where this code requires automatic sprinkler systems throughout the building including covered and open mall buildings, high-rise buildings, public garages and unlimited area buildings. Assign the lowest score from Table 1401.6.19 for the building or floor area being evaluated and enter that value into Table 1401.7 under Safety Parameter 1401.6.19, Incidental Uses, for fire safety, means of egress and general safety. If there are no specific occupancy areas in the building or floor area being evaluated, the value shall be zero.

[B] TABLE 1401.6.19
INCIDENTAL USE AREA VALUES

PROTECTION REQUIRED BY TABLE 508.2.5 OF THE *INTERNATIONAL BUILDING CODE*	PROTECTION PROVIDED						
	None	1 hour	AS	AS with SP	1 hour and AS	2 hours	2 hours and AS
2 hours and AS	-4	-3	-2	-2	-1	-2	0
2 hours, or 1 hour and AS	-3	-2	-1	-1	0	0	0
1 hour and AS	-3	-2	-1	-1	0	-1	0
1 hour	-1	0	-1	-1	0	0	0
1 hour, or AS with SP	-1	0	-1	-1	0	0	0
AS with SP	-1	-1	-1	-1	0	-1	0
1 hour or AS	-1	0	0	0	0	0	0

AS = Automatic sprinkler system;
SP = Smoke partitions (See IBC Section 508.2.5).
Note: For Table 1401.7, see page 68.

CHAPTER 15
CONSTRUCTION SAFEGUARDS

SECTION 1501
GENERAL

[B] 1501.5 Fire safety during construction.
Fire safety during construction shall comply with the applicable requirements of the *International Building Code* and the applicable provisions of Chapter 14 of the *International Fire Code.*

SECTION 1507
AUTOMATIC SPRINKLER SYSTEM

[F] 1507.1 Completion before occupancy.
In portions of a building where an automatic sprinkler system is required by this code, it shall be unlawful to occupy those portions of the building until the automatic sprinkler system installation has been tested and approved, except as provided in NC General Statutes 153A-363 and 16-A-423.

CHAPTER 16
REFERENCED STANDARDS

ASME

American Society of Mechanical Engineers
3 Park Avenue
New York, NY 10016

Standard Reference Number	Title	Referenced in code section number
ASME/ A17.1—2007/ CSA B44—2007	Safety Code for Elevators and Escalators—with A17.1a/CSA B44a—08 Addenda	410.8.2, 806.1.2, 902.1.3
A17.3—2008	Safety Code for Existing Elevators and Escalators	902.1.3
A18.1—2008	Safety Standard for Platform Lifts and Stairway Chair Lifts	410.8.3,806.1.3

ASTM

(Deleted)

DOC

(Deleted)

ICC

International Code Council, Inc.
500 New Jersey Avenue, NW, 6th Floor
Washington, DC 20001

Standard Reference Number	Title	Referenced in code section number
IBC—09	International Building Code®	101, 202, 301, 407, 410, 501, 601, 602, 606, 701, 702, 705, 706, 801, 802, 803, 804, 805, 806, 807, 904, 905, 907, 1001, 1002, 1007, 1011, 1012, 1102, 1103, 1104, 1201, 1202, 1203, 1204, 1205, 1301, 1302, 1401, 1501, 1506

ICC A117.1—2009	Accessible and Usable Buildings and Facilities	410.8.2, 806.1.2, 806.1.3
IFC—09	International Fire Code®	101.4.2, 301.1.1, 803.2.1, 803.2.3, 1301.2, 1401.3.2, 1401.6.8.1, 1401.6.14, 1401.6.14.1, 1501.5, 1504.1, 1504.2
IFGC—09	International Fuel Gas Code®	702.4.1
IMC—09	International Mechanical Code®	702.4, 809.1, 902.1.2, 1009.1, 1401.6.7.1, 1401.6.8, 1401.6.8.1
IPC—09	International Plumbing Code®	609.2, 702.4, 810.1, 1010, 1501.7
IPMC—12	(Deleted)	
IRC—09	International Residential Code®	101.4.1, 602.3, 706.2, 707.1, 807.4, 808.3, 811.1, 907.4, 908.1, 1103.2, 1103.3, 1103.4, 1104.1, 1301.2, 1302.1, 1302.2, 1302.2.1, 1302.3, 1302.4, 1302.5, 1401.2.2, 1401.2.3

NFPA

National Fire Protection Agency
1 Batterymarch Park
Quincy, MA 02269-9101

Standard Reference Number	Title	Referenced in code section number
NFPA 13R—10	Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height	904.1.5
NFPA 70—11	National Electrical Code	607.1.1, 607.1.2, 607.1.3, 607.1.4, 607.1.5. 702.4

403.6, 804.4.1.1,
804.4.1.2

Appendix A: Guidelines for the Seismic Retrofit of Existing Buildings

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

CHAPTER A1
SEISMIC STRENGTHENING PROVISIONS FOR UNREINFORCED MASONRY BEARING WALL BUILDINGS

SECTION A105
GENERAL REQUIREMENTS

[B] A105.4 Structural observation, testing and inspection.
Structural observation, in accordance with Section 1714 of the *International Building Code*, shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter. Structural observation shall include visual observation of work for conformance with the approved construction documents and confirmation of existing conditions assumed during design.

Structural testing and inspection for new construction materials shall be in accordance with the building code, except as modified by this chapter.

CHAPTER A2
EARTHQUAKE HAZARD REDUCTION IN EXISTING REINFORCED CONCRETE AND REINFORCED MASONRY WALL BUILDINGS WITH FLEXIBLE DIAPHRAGMS

SECTION A205
GENERAL REQUIREMENTS

[B] A205.4 Structural observation, testing and inspection.

Structural observation, in accordance with Section 1714 of the *International Building Code*, shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter. Structural observation shall include visual observation of work for conformance to the approved construction documents and confirmation of existing conditions assumed during design.

CHAPTER A4
EARTHQUAKE RISK REDUCTION IN WOOD-FRAME RESIDENTIAL BUILDINGS WITH SOFT, WEAK OR OPEN FRONT WALLS

SECTION A401
GENERAL

[B] A401.1 Purpose.
The purpose of this chapter is to promote public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing wood-frame, multiunit residential buildings. The ground motions of past earthquakes have caused the loss of human life, personal injury and property damage in these types of buildings. This chapter creates minimum standards to strengthen the more vulnerable portions of these structures. When fully followed, these minimum standards will improve the performance of these buildings but will not necessarily prevent all earthquake-related damage.

[B] A401.2 Scope.
The provisions of this chapter shall apply to all existing Occupancy Group R-1 and R-2 buildings of wood construction or portions thereof where the structure has a soft, weak, or open-front wall line, and there exists one or more stories above.

SECTION A402
DEFINITIONS

Notwithstanding the applicable definitions, symbols and notations in the building code, the following definitions shall apply for the purposes of this chapter:

[B] ASPECT RATIO. The span-width ratio for horizontal diaphragms and the height-length ratio for shear walls.

[B] GROUND FLOOR. Any floor whose elevation is immediately accessible from an adjacent grade by vehicles or pedestrians. The ground floor portion of the structure does not include any floor that is completely below adjacent grades.

[B] NONCONFORMING STRUCTURAL MATERIALS. Wall bracing materials other than wood structural panels or diagonal sheathing.

[B] OPEN-FRONT WALL LINE. An exterior wall line, without vertical elements of the lateral force-resisting system, that requires tributary seismic forces to be resisted by diaphragm rotation or excessive cantilever beyond parallel lines of shear walls. Diaphragms that cantilever

more than 25 percent of the distance between lines of lateral force-resisting elements from which the diaphragm cantilevers shall be considered excessive. Exterior exit balconies of 6 feet (1829 mm) or less in width shall not be considered excessive cantilevers.

[B] RETROFIT. An improvement of the lateral force-resisting system by *alteration* of existing structural elements or *addition* of new structural elements.

[B] SOFT WALL LINE. A wall line whose lateral stiffness is less than that required by story drift limitations or deformation compatibility requirements of this chapter. In lieu of analysis, a soft wall line may be defined as a wall line in a story where the story stiffness is less than 70 percent of the story above for the direction under consideration.

[B] STORY. A story as defined by the building code, including any basement or underfloor space of a building with cripple walls exceeding 4 feet (1219 mm) in height.

[B] STORY STRENGTH. The total strength of all seismic-resisting elements sharing the same story shear in the direction under consideration.

[B] WALL LINE. Any length of wall along a principal axis of the building used to provide resistance to lateral loads. Parallel wall lines separated by less than 4 feet (1219 mm) shall be considered one wall line for the distribution of loads.

[B] WEAK WALL LINE. A wall line in a story where the story strength is less than 80 percent of the story above in the direction under consideration.

SECTION A403
ANALYSIS AND DESIGN

[B] A403.1 General.

All modifications required by the provisions in this chapter shall be designed in accordance with the *International Building Code* provisions for new construction, except as modified by this chapter.

Exception: Buildings for which the prescriptive measures provided in Section A404 apply and are used.

No *alteration* of the existing lateral force-resisting system or vertical load-carrying system shall reduce the strength or stiffness of the existing structure, unless the altered structure would remain in conformance to the building code and this chapter.

[B] A403.2 Scope of analysis.

This chapter requires the *alteration*, *repair*, replacement or *addition* of structural elements and their connections to meet the strength and stiffness requirements herein. The lateral-load-path analysis shall include the resisting elements and connections from the wood diaphragm immediately above any soft, weak or open-front wall lines to the foundation soil interface or to the uppermost story of a podium structure comprised of steel, masonry, or concrete structural systems that supports the upper, wood-framed structure. Stories above the uppermost story with a soft, weak, or open-front wall line shall be considered in the analysis but need not be

modified. The lateral-load-path analysis for added structural elements shall also include evaluation of the allowable soil-bearing and lateral pressures in accordance with the building code. Where any portion of a building within the scope of this chapter is constructed on or into a slope steeper than one unit vertical in three units horizontal (33-percent slope), the lateral force-resisting system at and below the base level diaphragm shall be analyzed for the effects of concentrated lateral forces at the base caused by this hillside condition.

> **Exception:** When an open-front, weak or soft wall line exists because of parking at the ground floor of a two-story building and the parking area is less than 20 percent of the ground floor area, then only the wall lines in the open, weak or soft directions of the enclosed parking area need comply with the provisions of this chapter.

[B] A403.3 Design base shear and design parameters.
The design base shear in a given direction shall be permitted to be 75 percent of the value required for similar new construction in accordance with the building code. The value of *R* used in the design of the strengthening of any story shall not exceed the lowest value of *R* used in the same direction at any story above. The system overstrength factor, Ω_0, and the deflection amplification factor, C_d, shall not be less than the largest respective value corresponding to the *R* factor being used in the direction under consideration.

Exceptions:

1. For structures assigned to Seismic Design Category B, values of *R*, Ω_0 and C_d shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening.

2. For structures assigned to Seismic Design Category C or D, values of *R*, Ω_0 and C_d shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening, provided that when the strengthening is complete, the strengthened structure will not have an extreme weak story irregularity defined as Type 5b in ASCE 7 Table 12.3-2.

3. For structures assigned to Seismic Design Category E, values of *R*, Ω_0 and C_d shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening, provided that when the strengthening is complete, the strengthened structure will not have an extreme soft story, a weak story, or an extreme weak story irregularity defined, respectively, as Types 1b, 5a and 5b in ASCE 7 Table 12.3-2.

[B] A403.4 Story drift limitations.
The calculated story drift for each retrofitted story shall not exceed the allowable deformation compatible with all vertical load-resisting elements and 0.025 times the story height. The calculated story drift shall not be reduced by the effects of horizontal diaphragm stiffness but shall be increased when these effects produce rotation. Drift calculations shall be in accordance with the building code.

[B] A403.4.1 Pole structures.
The effects of rotation and soil stiffness shall be included in the calculated story drift where lateral loads are resisted by vertical elements whose required depth of embedment is determined by pole formulas. The coefficient of subgrade reaction used in deflection calculations shall be based on a geotechnical investigation conducted in accordance with the building code.

[B] A403.5 P Δ effects.
The requirements of the building code shall apply, except as modified herein. All structural framing elements and their connections not required by design to be part of the lateral force-resisting system shall be designed and/or detailed to be adequate to maintain support of design dead plus live loads when subjected to the expected deformations caused by seismic forces. The stress analysis of cantilever columns shall use a buckling factor of 2.1 for the direction normal to the axis of the beam.

[B] A403.6 Ties and continuity.
All parts of the structure included in the scope of Section A403.2 shall be interconnected as required by the building code.

[B] A403.7 Collector elements.
Collector elements shall be provided that can transfer the seismic forces originating in other portions of the building to the elements within the scope of Section A403.2 that provide resistance to those forces.

[B] A403.8 Horizontal diaphragms.
The strength of an existing horizontal diaphragm sheathed with wood structural panels or diagonal sheathing need not be investigated unless the diaphragm is required to transfer lateral forces from vertical elements of the seismic force-resisting system above the diaphragm to elements below the diaphragm because of an offset in placement of the elements.

Wood diaphragms with stories above shall not be allowed to transmit lateral forces by rotation or cantilever except as allowed by the building code; however, rotational effects shall be accounted for when unsymmetric wall stiffness increases shear demands.

Exception: Diaphragms that cantilever 25 percent or less of the distance between lines of lateral load-resisting elements from which the diaphragm cantilevers may transmit their shears by cantilever, provided that rotational effects on shear walls parallel and perpendicular to the load are taken into account.

[B] A403.9 Wood-framed shear walls.
Wood-framed shear walls shall have strength and stiffness sufficient to resist the seismic loads and shall conform to the requirements of this section.

[B] A403.9.1 Gypsum or cement plaster products.
Gypsum or cement plaster products shall not be used to provide lateral resistance in a soft or weak story or in a story with an open-front wall line, whether or not new elements are added to mitigate the soft, weak or open-front condition.

[B] A403.9.2 Wood structural panels.

[B] A403.9.2.1 Drift limit.
Wood structural panel shear walls shall meet the story drift limitation of Section A403.4. Conformance to the story drift limitation shall be determined by approved testing or calculation. Individual shear panels shall be permitted to exceed the maximum aspect ratio, provided the allowable story drift and allowable shear capacities are not exceeded.

[B] A403.9.2.2 Openings.
Shear walls are permitted to be designed for continuity around openings in accordance with the building code. Blocking and steel strapping shall be provided at corners of the openings to transfer forces from discontinuous boundary elements into adjoining panel elements. Alternatively, perforated shear wall provisions of the building code are permitted to be used.

[B] A403.9.3 Hold-down connectors.

[B] A403.9.3.1 Expansion anchors in tension.
Expansion anchors that provide tension strength by friction resistance shall not be used to connect hold-down devices to existing concrete or masonry elements.

[B] A403.9.3.2 Required depth of embedment.
The required depth of embedment or edge distance for the anchor used in the hold-down connector shall be provided in the concrete or masonry below any plain concrete slab unless satisfactory evidence is submitted to the *code official* that shows that the concrete slab and footings are of monolithic construction.

SECTION A404
PRESCRIPTIVE MEASURES FOR WEAK STORY

[B] A404.1 Limitation.
These prescriptive measures shall apply only to two-story buildings and only when deemed appropriate by the *code official*. These prescriptive measures rely on rotation of the second floor diaphragm to distribute the seismic load between the side and rear walls of the ground floor open area. In the absence of an existing floor diaphragm of wood structural panel or diagonal sheathing, a new wood structural panel diaphragm of minimum thickness of $^{3}/_{4}$ inch (19 mm) and with 10d common nails at 6 inches (152 mm) on center shall be applied.

[B] A404.1.1 Additional conditions.
To qualify for these prescriptive measures, the following additional conditions need to be satisfied by the retrofitted structure:

1. Diaphragm aspect ratio *L/W* is less than 0.67, where *W* is the diaphragm dimension parallel to the soft, weak or open-front wall line and *L* is the distance in the orthogonal direction between that wall line and the rear wall of the ground floor open area.

2. Minimum length of side shear walls = 20 feet (6096 mm).

3. Minimum length of rear shear wall = three-fourths of the total rear wall length.

4. No plan or vertical irregularities other than a soft, weak or open-front wall line.

5. Roofing weight less than or equal to 5 pounds per square foot (240 N/m^2).

6. Aspect ratio of the full second floor diaphragm meets the requirements of the building code for new construction.

[B] A404.2 Minimum required retrofit.

[B] A404.2.1 Anchor size and spacing.

The anchor size and spacing shall be a minimum of $^3/_4$ inch (19 mm) in diameter at 32 inches (813 mm) on center. Where existing anchors are inadequate, supplemental or alternative approved connectors (such as new steel plates bolted to the side of the foundation and nailed to the sill) shall be used.

[B] A404.2.2 Connection to floor above.

Shear wall top plates shall be connected to blocking or rim joist at upper floor with a minimum of 18-gage galvanized steel angle clips $4^1/_2$ inches (114 mm) long with 12-8d nails spaced no farther than 16 inches (406 mm) on center, or by equivalent shear transfer methods.

[B] A404.2.3 Shear wall sheathing.

The shear wall sheathing shall be a minimum of $^{15}/_{32}$ inch (11.9 mm) 5-Ply Structural I with 10d nails at 4 inches (102 mm) on center at edges and 12 inches (305 mm) on center at field; blocked all edges with 3 by 4 board or larger. Where existing sill plates are less than 3- by thick, place flat 2-by on top of sill between studs, with flat 18-gage galvanized steel clips $4^1/_2$ inches (114 mm) long with 12-8d nails or $^3/_8$-inch-diameter (9.5 mm) lags through blocking for shear transfer to sill plate. Stagger nailing from wall sheathing between existing sill and new blocking. Anchor new blocking to foundation as specified above.

[B] A404.2.4 Shear wall hold-downs.

Shear walls shall be provided with hold-down anchors at each end. Two hold-down anchors are required at intersecting corners. Hold-downs shall be approved connectors with a minimum $^5/_8$-inch-diameter (15.9 mm) threaded rod or other approved anchor with a minimum allowable load of 4,000 pounds (17.8 kN). Anchor embedment in concrete shall not be less than 5 inches (127 mm). Tie-rod systems shall not be less than $^5/_8$ inch (15.9

mm) in diameter unless using high-strength cable. Threaded rod or high-strength cable elongation shall not exceed $^{5}/_{8}$ inch (15.9 mm) using design forces.

SECTION A405
MATERIALS OF CONSTRUCTION

[B] A405.1 New materials.
New materials shall meet the requirements of the *International Building Code*, except where allowed by this chapter.

[B] A405.2 Allowable foundation and lateral pressures.
The use of default values from the building code for continuous and isolated concrete spread footings shall be permitted. For soil that supports embedded vertical elements, Section A403.4.1 shall apply.

[B] A405.3 Existing materials.
The physical condition, strengths, and stiffnesses of existing building materials shall be taken into account in any analysis required by this chapter. The verification of existing materials conditions and their conformance to these requirements shall be made by physical observation, material testing or record drawings as determined by the registered design professional subject to the approval of the *code official*.

[B] A405.3.1 Wood-structural-panel shear walls.

[B] A405.3.1.1 Existing nails.
When the required calculations rely on design values for common nails or surfaced dry lumber, their use in construction shall be verified by exposure.

[B] A405.3.1.2 Existing plywood.
When verification of the existing plywood is by use of record drawings alone, plywood shall be assumed to be of three plies.

[B] A405.3.2 Existing wood framing.
Wood framing is permitted to use the design stresses specified in the building code under which the building was constructed or other stress criteria approved by the *code official.*

[B] A405.3.3 Existing structural steel.
All existing structural steel shall be permitted to be assumed to comply with ASTM A 36. Existing pipe or tube columns shall be assumed to be of minimum wall thickness unless verified by testing or exposure.

[B] A405.3.4 Existing concrete.
All existing concrete footings shall be permitted to be assumed to be plain concrete with a compressive strength of 2,000 pounds per square inch (13.8 MPa). Existing concrete compressive strength taken greater than 2,000 pounds per square inch (13.8 MPa) shall be verified by testing, record drawings or department records.

[B] A405.3.5 Existing sill plate anchorage.
The analysis of existing cast-in-place anchors shall be permitted to assume proper anchor embedment for purposes of evaluating shear resistance to lateral loads.

SECTION A406
INFORMATION REQUIRED TO BE ON THE PLANS

[B] A406.1 General.
The plans shall show all information necessary for plan review and for construction and shall accurately reflect the results of the engineering investigation and design. The plans shall contain a note that states that this retrofit was designed in compliance with the criteria of this chapter.

[B] A406.2 Existing construction.
The plans shall show existing diaphragm and shear wall sheathing and framing materials; fastener type and spacing; diaphragm and shear wall connections; continuity ties; and collector elements. The plans shall also show the portion of the existing materials that needs verification during construction.

[B] A406.3 New construction.

[B] A406.3.1 Foundation plan elements.
The foundation plan shall include the size, type, location and spacing of all anchor bolts with the required depth of embedment, edge and end distance; the location and size of all shear walls and all columns for braced frames or moment frames; referenced details for the connection of shear walls, braced frames or moment-resisting frames to their footing; and referenced sections for any grade beams and footings.

[B] A406.3.2 Framing plan elements.
The framing plan shall include the length, location and material of shear walls; the location and material of frames; references on details for the column-to-beam connectors, beam-to-wall connections and shear transfers at floor and roof diaphragms; and the required nailing and length for wall top plate splices.

[B] A406.3.3 Shear wall schedule, notes and details.
Shear walls shall have a referenced schedule on the plans that includes the correct shear wall capacity in pounds per foot (N/m); the required fastener type, length, gauge and head size; and a complete specification for the sheathing material and its thickness. The schedule shall also show the required location of 3-inch (76 mm) nominal or two 2-inch (51 mm) nominal edge members; the spacing of shear transfer elements such as framing anchors or added sill plate nails; the required hold-down with its bolt, screw or nail sizes; and the dimensions, lumber grade and species of the attached framing member.

Notes shall show required edge distance for fasteners on structural wood panels and framing members; required flush nailing at the plywood surface; limits of mechanical penetrations; and the sill plate material assumed in the design. The limits of mechanical penetrations shall also be detailed showing the maximum notching and drilled hole sizes.

[B] A406.3.4 General notes.
General notes shall show the requirements for material testing, special inspection and structural observation.

SECTION A407
QUALITY CONTROL

[B] A407.1 Structural observation, testing and inspection.
Structural observation, in accordance with Section 1714 of the *International Building Code*, shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter. Structural observation shall include visual observation of work for conformance to the approved construction documents and confirmation of existing conditions assumed during design.

Structural testing and inspection for new construction materials shall be in accordance with the building code, except as modified by this chapter.

CHAPTER A5
EARTHQUAKE HAZARD REDUCTION IN EXISTING CONCRETE BUILDINGS

SECTION A501
PURPOSE

[B] A501.1 Purpose.
The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury that may result from the effects of earthquakes on concrete buildings and concrete frame buildings.

The provisions of this chapter are intended as minimum standards for structural seismic resistance, and are established primarily to reduce the risk of life loss or injury. Compliance with the provisions in this chapter will not necessarily prevent loss of life or injury or prevent earthquake damage to the rehabilitated buildings.

SECTION A502
SCOPE

[B] A502.1 Scope.
The provisions of this chapter shall apply to all buildings having concrete floors or roofs supported by reinforced concrete walls or by concrete frames and columns. This chapter shall not apply to buildings with roof diaphragms that are defined as flexible diaphragms by the building code, and shall not apply to concrete frame buildings with masonry infilled walls.

Buildings that were designed and constructed in accordance with the seismic provisions of the 1993 *BOCA National Building Code*, the 1994 *Standard Building Code*, the 1976 *Uniform Building Code*, the 2000 *International Building Code* or later editions of these codes shall be deemed to comply with these provisions, unless the seismicity of the region has increased since the design of the building.

Exception: This chapter shall not apply to concrete buildings where Seismic Design Category A is permitted.

SECTION A503
GENERAL REQUIREMENTS

[B] A503.1 General.
This chapter provides a three-tiered procedure to evaluate the need for *seismic rehabilitation* of existing concrete buildings. The evaluation shall show that the *existing building* is in compliance with the appropriate part of the evaluation procedure as described in Sections A505, A506 and A507, or shall be modified to conform to the respective acceptance criteria. This chapter does not preclude a building from being evaluated or modified to conform to the acceptance criteria using other well-established procedures, based on rational methods of analysis in accordance with principles of mechanics and approved by the authority having jurisdiction.

[B] A503.2 Properties of cast-in-place materials.
Except where specifically permitted herein, the stress-strain relationship of concrete and reinforcement shall be determined from published data or by testing. All available information, including building plans, original calculations and design criteria, site observations, testing and records of typical materials and construction practices prevalent at the time of construction, shall be considered when determining material properties.

For Tier 3 analysis, expected material properties shall be used in lieu of nominal properties in the calculation of strength, stiffness and deformabiltity of building components.

The procedure for testing and determination of material properties shall be from Section 6.2 of ASCE 41-06.

[B] A503.3 Structural observation, testing and inspection.
Structural observation, in accordance with Section 1709 of the *International Building Code* shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter. Structural observation shall include visual observation of work for conformance to the approved construction documents and confirmation of existing conditions assumed during design.

Structural testing and inspection for new construction materials shall be in accordance with the building code, except as modified by this chapter.

SECTION A504
SITE GROUND MOTION

[B] A504.1 Site ground motion for Tier 1 analysis.
The earthquake loading used for the determination of demand on elements of the structure shall correspond to that required by ASCE 31 Tier 1.

[B] A504.2 Site ground motion for Tier 2 analysis.
The earthquake loading used for the determination of demand on elements and the structure shall conform to 75 percent of that required by the building code.

[B] A504.3 Site ground motion for Tier 3 analysis.
The site ground motion shall be an elastic design response spectrum prepared in conformance to the building code but having spectral acceleration values equal to 75 percent of the code design response spectrum. The spectral acceleration values shall be increased by the occupancy importance factor when required by the building code.

SECTION A505
TIER 1 ANALYSIS PROCEDURE

[B] A505.1 General.
Structures conforming to the requirements of the ASCE 31 Tier 1, Screening Phase, are permitted to be shown to be in conformance to this chapter by submission of a report to the building official as described in this section.

[B] A505.2 Evaluation report.
The registered design professional shall prepare a report summarizing the analysis conducted in compliance with this section. As a minimum, the report shall include the following items:

1. Building description.
2. Site inspection summary.
3. Summary of reviewed record documents.
4. Earthquake design data used for the evaluation of the building.
5. Completed checklists.
6. Quick-check analysis calculations.
7. Summary of deficiencies.

SECTION A506
TIER 2 ANALYSIS PROCEDURE

[B] A506.1 General.
A Tier 2 analysis includes an analysis using the following linear methods: Static or equivalent lateral force procedures. A linear dynamic analysis may be used to determine the distribution of the base shear over the height of the structure. The analysis, as a minimum, shall address all potential deficiencies identified in Tier 1, using procedures specified in this section.

If a Tier 2 analysis identifies a nonconforming condition, such condition shall be modified to conform to the acceptance criteria. Alternatively, the design professional may choose to perform a Tier 3 analysis to verify the adequacy of the structure.

[B] A506.2 Limitations.
A Tier 2 analysis procedure may be used if:

1. There is no in-plane offset in the lateral force-resisting system.

2. There is no out-of-plane offset in the lateral force-resisting system.

3. There is no torsional irregularity present in any story. A torsional irregularity may be deemed to exist in a story when the maximum story drift, computed including accidental torsion, at one end of the structure transverse to an axis is more than 1.2 times the average of the story drifts at the two ends of the structure.

4. There is no weak story irregularity at any floor level on any axis of the building. A weak story is one in which the story strength is less than 80 percent of that in the story above. The story strength is the total strength of all seismic-resisting elements sharing the story shear for the direction under consideration.

Exception: Static or equivalent lateral force procedures shall not be used if:

1. The building is more than 100 feet (30 480 mm) in height.

2. The building has a vertical mass or stiffness irregularity (soft story). Mass irregularity shall be considered to exist where the effective mass of any story is more than 150 percent of the effective mass of any adjacent story. A soft story is one in which the lateral stiffness is less than 70 percent of that in the story above or less than 80 percent of the average stiffness of the three stories above.

3. The building has a vertical geometric irregularity. Vertical geometric irregularity shall be considered to exist where the horizontal dimension of the lateral force-resisting system in any story is more than 130 percent of that in an adjacent story.

4. The building has a nonorthogonal lateral force-resisting system.

[B] A506.3 Analysis procedure.
A structural analysis shall be performed for all structures in accordance with the requirements of the building code, except as modified in Section A506. The response modification factor, *R*, shall be selected based on the type of seismic force-resisting system employed and shall comply with the requirements of Section 301.1.4.1.

[B] A506.3.1 Mathematical model.
The three-dimensional mathematical model of the physical structure shall represent the spatial distribution of mass and stiffness of the structure to an extent that is adequate for the calculation of the significant features of its distribution of lateral forces. All concrete and masonry elements shall be included in the model of the physical structure.

Exception: Concrete or masonry partitions that are isolated from the concrete frame members and the floor above.

Cast-in-place reinforced concrete floors with span-to-depth ratios less than three-to-one may be assumed to be rigid diaphragms. Other floors, including floors constructed of precast elements with or without a reinforced concrete topping, shall be analyzed in conformance to the building code to determine if they must be considered semi-rigid diaphragms. The effective in-plane stiffness of the diaphragm, including effects of cracking and discontinuity between precast elements, shall be considered. Parking structures that have ramps rather than a single floor level shall be modeled as having mass appropriately distributed on each ramp. The lateral stiffness of the ramp may be calculated as having properties based on the uncracked cross section of the slab exclusive of beams and girders.

[B] A506.3.2 Component stiffness.
Component stiffness shall be calculated based on the approximate values shown in Table 6-5 of ASCE 41.

[B] A506.4 Design, detailing requirements and structural component load effects.
The design and detailing of new components of the seismic force-resisting system shall comply with the requirements of the *International Building Code*, unless specifically modified herein.

[B] A506.5 Acceptance criteria.
The calculated strength of a member shall not be less than the load effects on that member.

[B] A506.5.1 Load combinations.
For load and resistance factor design (strength design), structures and all portions thereof shall resist the most critical effects from the combinations of factored loads prescribed in the building code.

Exception: For concrete beams and columns, the shear effect shall be determined based on the most critical load combinations prescribed in the building code. The shear load effect, because of seismic forces, shall be multiplied by a factor of *Cd,* but combined shear load effect need not be greater than *Ve*, as calculated in accordance with Equation A5-4. M_{pr1} and M_{pr2} are the end moments, assumed to be in the same direction (clockwise or counter clockwise), based on steel tensile stress being equal to 1.25 f_y, where f_y is the specified yield strength.

$$V_e = \frac{M_{pr1} + M_{pr2}}{L} \pm \frac{W_g}{2} \qquad \textbf{(Equation A5-1)}$$

where:

W_g = Total gravity loads on the beam

[B] A506.5.2 Determination of the strength of members.
The strength of a member shall be determined by multiplying the nominal strength of the member by a strength reduction factor, ϕ. The nominal strength of the member shall be determined in accordance with the building code.

SECTION A507
TIER 3 ANALYSIS PROCEDURE

[B] A507.1 General.
A Tier 3 evaluation shall be performed using the nonlinear procedures of Section 6.3.1.2.2. of ASCE 41. The general assumptions and requirements of Section 6.0, excluding concrete frames with in-fills shall be used in the evaluation. Site-ground motions in accordance with Section A504.3 are permitted for this evaluation.

CHAPTER A6
REFERENCED STANDARDS

ASCE/SEI

American Society of Civil Engineers
Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191-4400

Standard reference number	Title	Referenced in code section number
7—-05	Minimum Design Loads for Buildings and Other Structures with Supplement No. 1	A104, A403.3
31—-03	Seismic Evaluation of Existing Buildings	A504.1, A505.1
41—06	Seismic Rehabilitation of Existing Buildings	A503.2, A506.3.2, A507.1

ASTM

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Standard Reference Number	Title	Referenced in code section number
A653/A653M—08	Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process	A304.2.6
C90—2003	(Deleted)	
C496—96	Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens	A104, A106.3.3.2
E519—00e1	Standard Test Method for Diagonal Tension (Shear) in Masonry Assemblages	A104, A106.3.3.2

DOC

U.S. Department of Commerce
National Institute of Standards and Technology
100 Bureau Drive Stop 3460
Gaithersburg, MD 20899

Standard Reference Number	Title	Referenced in code section number
PS-1—95	Construction and Industrial Plywood	A302
PS-2—92	Performance Standard for Wood-based Structural-use Panels	A302

ICC

International Code Council
500 New Jersey Avenue, NW, 6th Floor
Washington, DC 20001

Standard Reference Number	Title	Referenced in code section number
BNBC—93	BOCA National Building Code®	A502
BNBC—96	BOCA National Building Code®	A502
BNBC—99	BOCA National Building Code®	A202, A502
IBC—00	International Building Code®	A202, A502
IBC—03	International Building Code®	
IBC—06	International Building Code®	A202, A502 A102.2, A105.4, A108.2, A202, A203, A204.1, A205.1, A205.4, A206.1, A206.3, A206.9, A403.1, A405.1, A407.1, A408.1, A502.1, A503.3, A506.4, A508.4
IBC—09	International Building Code®	
SBC—94	Standard Building Code®	A502
SBC—97	Standard Building Code®	A502
SBC—99	Standard Building Code®	A202, A502

UBC—76	Uniform Building Code®	A502
UBC—97	Uniform Building Code®	A103, A104, A108.2, A202, A502
UBC—Standard 21-4	Hollow and Solid Load-bearing Concrete Masonry Units	A106.2
UBC—Standard 21-6	In-place Masonry Shear Tests	A104
UBC—Standard 21-7	Tests of Anchors in Unreinforced Masonry	A105.3, A107.3, A107.4, Table A1-E
UBC—Standard 21-8	Pointing of Unreinforced Masonry Walls	A103, A106.3.3.9
UBC—Standard 23-2	(Deleted)	

APPENDIX B
SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS FOR EXISTING BUILDINGS AND FACILITIES

The provisions contained in this appendix are adopted as part of this code.

SECTION B101
QUALIFIED HISTORICAL BUILDINGS AND FACILITIES

B101.1 General.
Qualified historic buildings and facilities shall comply with Sections B101.2 through B101.5.

B101.2 Qualified historic buildings and facilities.
These procedures shall apply to buildings and facilities designated as historic structures that undergo alterations or a *change of occupancy*.

B101.3 Qualified historic buildings and facilities subject to Section 106 of the National Historic Preservation Act.
Where an *alteration* or *change of occupancy* is undertaken to a qualified *historic building* or facility that is subject to Section 106 of the National Historic Preservation Act, the federal agency with jurisdiction over the undertaking shall follow the Section 106 process. Where the state historic preservation officer or Advisory Council on Historic Preservation determines that compliance with the requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility, the alternative requirements of Section 410.9 for that element are permitted.

B101.4 Qualified historic buildings and facilities not subject to Section 106 of the National Historic Preservation Act.
Where an *alteration* or *change of occupancy* is undertaken to a qualified *historic building* or facility that is not subject to Section 106 of the National Historic Preservation Act, and the entity undertaking the alterations believes that compliance with the requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility, the entity shall consult with the state historic preservation officer. Where the state historic preservation officer determines that compliance with the accessibility requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historical significance of the building or facility, the alternative requirements of Section 410.9 for that element are permitted.

B101.4.1 Consultation with interested persons.
Interested persons shall be invited to participate in the consultation process, including state or local accessibility officials, individuals with disabilities, and organizations representing individuals with disabilities.

B101.4.2 Certified local government historic preservation programs.
Where the state historic preservation officer has delegated the consultation responsibility for purposes of this section to a local government historic preservation program that has been certified in accordance with Section 101 of the National Historic Preservation Act of 1966 [(16 U.S.C. 470a(c)] and implementing regulations (36 CFR 61.5), the responsibility shall be permitted to be carried out by the appropriate local government historic preservation program.

B101.5 Displays.
In qualified historic buildings and facilities where alternative requirements of Section 1105 are permitted, displays and written information shall be located where they can be seen by a seated person. Exhibits and signs displayed horizontally shall be 44 inches (1120 mm) maximum above the floor.

SECTION B102
FIXED TRANSPORTATION FACILITIES AND STATIONS

B102.1 General.
Existing fixed transportation facilities and stations shall comply with Section B102.2.

B102.2 Existing facilities—key stations.
Rapid rail, light rail, commuter rail, intercity rail, high-speed rail and other fixed guideway systems, altered stations, and intercity rail and key stations, as defined under criteria established by the Department of Transportation in Subpart C of 49 CFR Part 37, shall comply with Sections B102.2.1 through B102.2.3.

B102.2.1 Accessible route.
At least one accessible route from an accessible entrance to those areas necessary for use of the transportation system shall be provided. The accessible route shall include the features specified in Appendix E109.2 of the *International Building Code*, except that escalators shall comply with *International Building Code* Section 3005.2.2. Where technical unfeasibility in existing stations requires the accessible route to lead from the public way to a paid area of the transit system, an accessible fare collection machine complying with *International Building Code* Appendix E109.2.3 shall be provided along such accessible route.

B102.2.2 Platform and vehicle floor coordination.
Station platforms shall be positioned to coordinate with vehicles in accordance with applicable provisions of 36 CFR Part 1192. Low-level platforms shall be 8 inches (250 mm) minimum above top of rail.

Exception: Where vehicles are boarded from sidewalks or street-level, low-level platforms shall be permitted to be less than 8 inches (250 mm).

B102.2.3 Direct connections.
New direct connections to commercial, retail, or residential facilities shall, to the maximum extent feasible, have an accessible route complying with Section 705.2 from the point of

connection to boarding platforms and transportation system elements used by the public. Any elements provided to facilitate future direct connections shall be on an accessible route connecting boarding platforms and transportation system elements used by the public.

SECTION B103
DWELLING UNITS AND SLEEPING UNITS

B103.1 Communication features.
Where dwelling units and sleeping units are altered or added, the requirements of Section E104.3 of the *International Building Code* shall apply only to the units being altered or added until the number of units with accessible communication features complies with the minimum number required for new construction.

SECTION B104
REFERENCED STANDARDS

Y3.H626 2P National Historic Preservation J101.2, 43/933 Act of 1966, as amended J101.3, 3rd Edition, Washington, DC: J101.3.2 US Government Printing Office, 1993.

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49 CFR Part 37.43 (c), Alteration of Transportation Facilities by Public Entities, Department of Transportation, 400 7th Street SW, Room 8102, Washington, DC 20590-0001.

36 CFR Part 1192, Americans with Disabilities Act (ADA) Accessibility Guidelines for Transportation Vehicles

APPENDIX C: Guidelines for the Wind Retrofit of Existing Buildings

(Deleted)