

#706
12-15-2005

ORDINANCE NO.

AN ORDINANCE AMENDING CHAPTER 25-12 TO REPEAL AND REPLACE SECTIONS 25-12-1, 25-12-2, AND 25-12-3 OF ARTICLE 1 (BUILDING CODE) TO ADOPT THE 2003 INTERNATIONAL BUILDING CODE AND LOCAL AMENDMENTS; REPEAL ARTICLE 12 AND READOPT AS ARTICLE 13; AND ADOPT A NEW ARTICLE 12 TO READOPT THE 2000 INTERNATIONAL ENERGY CODE AND LOCAL AMENDMENTS.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

PART 1. Sections 25-12-1, 25-12-2 and 25-12-3 of Division 1 of Article 1 of Chapter 25-12 of the City Code is repealed and replaced to read as follows:

ARTICLE 1. BUILDING CODE.

Division 1. International Building Code and Local Amendments

§ 25-12-1 BUILDING CODE.

(A) The 2003 International Building Code published by the International Code Council is adopted and incorporated into this section with deletions and amendments in Subsection (B) and Section 25-12-3 (*Local Amendments to the Building Code*).

(B) The following provisions of the 2003 International Building Code are deleted:

Sec. 101.2	Sec. 101.4.1	Sec 101.4.2	Sec. 101.4.3
Sec. 101.4.4	Sec. 101.4.5	Sec. 101.4.7	Sec. 103
Sec. 105.1.1	Sec. 105.1.2	Sec. 105.2	Sec. 105.3
Sec. 106.1.2	Sec. 106.2	Sec. 109.3	Sec. 109.3.1
Sec. 109.3.2	Sec. 109.3.3	Sec. 109.3.4	Sec. 109.3.5
Sec. 109.3.6	Sec. 109.3.7	Sec. 109.3.8	Sec. 109.3.9
Sec. 109.3.10	Sec. 111.3	Sec. 112	Sec. 305.2
Table 302.1.1	Sec. 308.3.1	Sec. 308.5	Sec. 308.5.1
Sec. 308.5.2	Sec. 312.1	Sec. 403.3	Sec. 403.3.1

Sec. 403.3.2	Sec. 403.12.1	Sec. 404.1.1	Sec. 406.2.6
Sec. 406.3.8	Sec. 414.1.3	Sec. 501.2	Table 503
Sec. 507.1	Sec. 507.2	Sec. 508.4	Sec. 508.6
Table 601	Table 602	Sec. 706.1	Sec. 711.3.3
Sec. 713.2	Sec. 715.3.3	Sec. 717.3.3	Sec. 901.5
Sec. 903.2.5	Sec. 903.3.1.2.1	Sec. 905.5.3	Sec. 909.20
Table 1004.1.2	Sec. 1004.2	Sec. 1005.1	Table 1005.1
Sec. 1007.3	Sec. 1007.5	Sec. 1007.6.2	Sec. 1008.1.2
Sec. 1008.1.3.3	Sec. 1008.1.3.4	Sec. 1008.1.8.6	Sec. 1008.1.9
Sec. 1008.3	Sec. 1009.11.3	Sec. 1011.1	Table 1014.1
Sec. 1014.2.1	Sec. 1014.2.2	Sec. 1016.3	Sec. 1016.4
Sec. 1018.2	Table 1018.2	Sec. 1019.1.8.2	Sec. 1019.1.4
Sec. 1022.3	Sec. 1025.2	Sec. 1025.2.1	Sec. 1101.1
Sec. 1101.2	Sec. 1104.1	Sec. 1106.6	Sec. 1108.2.2
Sec. 1109.2.1.6	Sec. 1110.1	Chapter 13	Sec. 1507.8.4
Sec. 1507.9.5	Sec. 1603.1.3	Sec. 1603.1.4	Sec. 1603.4
Sec. 1612	Sec. 1704.1.1	Sec. 3109.3	Sec. 3109.4.1
Sec. 3201.1	Sec. 3202.2.1	Sec. 3202.3.3	Chapter 34
Sec. 712.3.1, Except. 1 and 2		Sec. 712.4, Exception	
Sec. 712.4.1, Except. 1 and 2		Sec. 712.4.2, Exception 1	
Sec. 1019.1, Exception 8		Sec. 1025.1, Exception 1	
Sec. 1104.3.1, Exception 1		Sec. 1104.4, Exception 1	
Sec. 502, Grade Plane; Height, Building			
Sec. 1002.1, Stair, Stairway Exterior			

(C) The city clerk shall file a copy of the 2003 International Building Code with the official ordinances of the City.

§ 25-12-2 CITATIONS TO THE BUILDING CODE.

In the City Code, "Building Code" means the 2003 International Building Code adopted by Section 25-12-1 (*Building Code*), as amended by Section 25-12-3 (*Local Amendments to the Building Code*).

1 § 25-12-3 LOCAL AMENDMENTS TO THE BUILDING CODE.

3 The following provisions are local amendments to the 2003 International Building
4 Code. Each provision in this section is a substitute for the identically numbered
5 provision deleted by Section 25-12-1(B) (*Building Code*) or is an addition to the 2003
6 International Building Code.

7 **101.2 Scope.** The provisions of this code shall apply to the construction, alteration or
8 addition, movement, enlargement, replacement, repair, equipment, use and occupancy,
9 including a change in occupancy, location, maintenance, removal and demolition of every
10 building or structure or any appurtenances connected or attached to such buildings or
11 structures.

12 **Exception:**

- 13
- 14 1. Detached one- and two-family dwellings and multiple single-family dwellings
15 (town houses) not more than three stories above grade plane in height with a
16 separate means of egress and their accessory structures shall comply with the
17 International Residential Code.
- 18
- 19 2. Existing buildings undergoing repair, alteration, additions, or a change of use shall
20 be permitted to comply with Chapter 34 of this Code.

21

22 **101.4.1 Electrical.** The provisions of the ICC Electrical Code and the Electrical Code
23 shall apply to the installation of electrical systems, including alterations, repairs,
24 replacement, equipment, appliances, fixtures fittings and appurtenances thereto. The
25 Electrical Code supersedes the ICC Electrical Code to the extent of conflict.

26

27 **101.4.2 Gas.** The International Fuel Gas Code and the Plumbing Code apply to the
28 installation of gas piping from the point of delivery, gas appliances and related
29 accessories as covered by this code. The Plumbing Code supersedes the International
30 Fuel Gas Code to the extent of conflict.

31

32 These requirements apply to gas piping systems extending from the point of
33 delivery to the inlet connections of appliances and the installation and operation of
34 residential and commercial gas appliances and related accessories.

35

36 **101.4.3 Mechanical.** The International Mechanical Code and the Mechanical Code
37 apply to the installation, alterations, repairs and alterations of mechanical systems,
38 including equipment, appliances, fixtures, fittings and/or appurtenances, including
39 ventilating, heating, cooling, air conditioning and refrigeration systems, incinerators and

1 other energy related systems. The Mechanical Code supersedes the International
2 Mechanical Code to the extent of conflict.

3
4 **101.4.4 Plumbing.** The International Plumbing Code and the Plumbing Code shall apply
5 to the installation, alterations, repairs and replacement of plumbing systems, including
6 equipment, appliances, fixtures, fittings and appurtenances, and where connected to a
7 water or sewage system and all aspects of a medical gas system. The Plumbing Code
8 supercedes the International Plumbing Code to the extent of conflict.

9
10 The International Private Sewage Disposal Code and the Plumbing Code shall apply to
11 private sewage disposal systems. The Plumbing Code supercedes the International
12 Private Sewage Code to the extent of conflict.

13
14 **101.4.7 Energy.** The provisions of the Energy Code shall apply to all matters governing
15 the design and construction of buildings for energy efficiency.

16
17 **103 Building official.** The City Manager shall appoint a building official to administer
18 and interpret this Code. The building official may appoint one or more deputy building
19 officials.

20
21 **105.2 Work exempt from permit.** Exemptions from permit requirements of this code
22 shall not be deemed to grant authorization for any work to be done in any manner in
23 violation of the provisions of this code or any other laws or ordinances of this
24 jurisdiction. Permits shall not be required for the following:

25
26 **Building:**

- 27
28 1. One-story detached accessory structures used as tool and storage sheds,
29 playhouses and similar uses, provided the floor area does not exceed 120
30 square feet (11.15 m²).
31 2. Fences not over 8 feet (2438 mm) high.
32 3. Oil derricks.
33 4. Retaining walls which are not over 4 feet (1219 mm) in height measured from
34 the bottom of the footing to the top of the wall, unless supporting a surcharge
35 or impounding Class I, II or III-A liquids.
36 5. Water tanks supported directly on grade if the capacity does not exceed 5,000
37 gallons (18 925 L) and the ratio of height to diameter or width does not
38 exceed 2 to 1.
39 6. Sidewalks and driveways not more than 30 inches (762 mm) above grade and
40 not over any basement or story below and which are not part of an accessible
41 route.

7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated swimming pools accessory to a Group R-3 occupancy, as applicable in Section 101.2 (*Scope*), which are less than 24 inches (610 mm) deep, do not exceed 5,000 gallons (18 925L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes and not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family dwellings.
12. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support of Group R-3, as applicable in Section 101.2 (*Scope*), and Group U occupancies.
13. Movable cases, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Electrical:

Repairs and maintenance: Minor repair work, including the replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed receptacles.

Radio and television transmitting stations: The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for power supply, the installations of towers and antennas.

Temporary testing systems: A permit shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part which does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (746 W) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

105.3 Application for permit. To obtain a permit, the applicant shall first file an application therefor in writing on a form furnished by the department of building safety for that purpose. Such application shall:

1. Identify and describe the work to be covered by the permit for which the application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by construction documents and other information as required in Section 106.3 (*Examination of documents*).
5. State the valuation of the proposed work.
6. Be signed by the applicant, or the applicant's authorized agent.

7. Give such other data and information as required by the building official.

8. Trench protection. An application must include certification by a registered professional engineer that trench safety systems have been designed in accordance with state law and OSHA standards.

105.8 Transfer of permit. The building official is authorized to establish a building permit transfer policy.

106.1.1.2 Fire protection at penetrations. Deferred submittal shop drawings and schedules that are submitted shall indicate the fire protective assemblies proposed for installation at all penetrations through fire and smoke construction in accordance with Sections 712 (*Penetrations*) and 713 (*Fire-Resistant Joint Systems*).

106.1.2 Means of Egress. The construction documents shall show in sufficient detail the location, construction, size and character of all portions of means of egress in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, as applicable in Section 101.2 (*Scope*) and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in every room or space that is part of an assembly occupancy.

106.2 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. For a building or structure involving below-grade construction, the site plan shall show the location of proposed earth retention system components allowed under Section 3202.1.4 (*Earth Retention System Components*). The building official is authorized to waive or modify the requirement of the site plan when the application for permit is for alteration or repair or when otherwise warranted.

107.5 Temporary earth retention systems. Temporary earth retention system components used to facilitate below-grade construction of a building or structure shall conform to Sections 1813 (*Earth Retention Systems*) and Section 3202.1.4 (*Earth retention system components*).

108.7 Plan review fees. An applicant must pay a plan review fee, adopted by separate ordinance when plans and specifications are submitted for review under Section 106

1 (*Construction and Documents*). The building official shall compute the building plan
2 review fees using the total value of all construction work for which the permit is issued as
3 well as the value of all finish work, painting, roofing, electrical, plumbing, heating, air
4 conditioning, elevators, fire-extinguishing systems, and other permanent equipment. The
5 building official shall charge an additional plan review fee if plans are incomplete or
6 changed so as to require additional plan review. The plan review fees referenced in this
7 section are in addition to the permit fees referenced in Section 108.1 (*Payment of fees*).
8

9 **109.3 Required inspections.** The building official, upon notification, shall make the
10 inspections set forth in Sections 109.3.1 (*Layout/building pre-construction inspection*)
11 through 109.3.11 (*Final inspection*).
12

13 **109.3.1 Layout/building pre-construction inspection.** This is the first inspection
14 conducted. The inspector verifies the permits that were issued for work at a site and
15 meets with the contractor or owner at the site to review plans and identify potential
16 issues. The inspector notifies the contractor of the inspector's work hours, identifies
17 required inspections, and leaves a green sign-off tag for future inspections.
18

19 **109.3.2 Footing and foundation inspection.** Footing and foundation inspections shall be
20 made after excavations for footings are complete and any required reinforcing steel is in
21 place. For concrete foundations, any required forms shall be in place prior to inspection.
22 Materials for the foundation shall be on the job, except where concrete is ready mixed in
23 accordance with ASTM C 94, the concrete need not be on the job.
24

25 **109.3.3 Concrete slab and under-floor inspection.** Concrete slab and under-floor
26 inspections shall be made after in-slab or under-floor reinforcing steel and building
27 service equipment, conduit, piping accessories and other ancillary equipment items are in
28 place, but before any concrete is placed or floor sheathing installed, including the
29 subfloor.
30

31 **109.3.4 Lowest floor elevation.** In flood hazard areas, upon placement of the lowest
32 floor, including the basement, and prior to further vertical construction, the elevation
33 certification required in Section 1612.5 (*Flood hazard documentation*) shall be submitted
34 to the building official.
35

36 **109.3.5 Frame inspection.** Framing inspections shall be made after the roof deck or
37 sheathing, all framing, fireblocking and bracing are in place and pipes, chimneys and
38 vents to be concealed are complete and the rough electrical, plumbing, heating wires,
39 pipes and ducts are approved.
40

1 **109.3.6 Lath and gypsum board inspection.** Lath and gypsum board inspections shall
2 be made after lathing and gypsum board, interior and exterior, is in place, but before any
3 plastering is applied or gypsum board joints and fasteners are taped and finished.

4
5 **109.3.7 Fire-resistant penetrations.** Protection of joints and penetrations in fire-
6 resistance-rated assemblies shall not be concealed from view until inspected and
7 approved.

8
9 **109.3.8 Energy efficiency inspections.** Inspections shall be made to determine
10 compliance with Chapter 13 (*Energy Efficiency*) and shall include, but not be limited to,
11 inspections for: envelope insulation R and U values, fenestration U value, duct system R
12 value, and HVAC and water-heating equipment efficiency.

13
14 **109.3.9 Other inspections.** In addition to the inspections specified above, the building
15 official is authorized to make or require other inspections of any construction work to
16 ascertain compliance with the provisions of this code and other laws that are enforced by
17 the building official.

18
19 **109.3.10 Special inspections.** For special inspections, see Section 1704 (*Special*
20 *Inspections*).

21
22 **109.3.11 Final inspection.** The final inspection shall be made after all work required by
23 the building permit is completed.

24
25 **109.7 Inspectors.** An inspection conducted under this Code may be performed by an
26 inspector employed by the City or by a non-city employee approved by the building
27 official. A person hired by the City as a building inspector must attain certification
28 within two years of the person's date of employment. under the certification established
29 by the International Code Council.

30
31 **110.5 Maintenance of records.** The building owner, or his authorized agent, must
32 maintain a copy of the certificate of occupancy on the premises and provide it to an
33 authorized official on request.

34
35 **111.3 Authority to disconnect service utilities.** The building official shall have the
36 authority to authorize disconnection of utility service to the building, structure, or service
37 system regulated by this Code and the codes referenced under this section.

38
39 **111.3.1 Circumstances for which utilities may be disconnected.** The building official
40 may disconnect utilities if the building official determines that:

1. disconnection is necessary to eliminate an immediate hazard to life or property;
2. an owner or occupant is in violation of a stop work order;
3. electrical work has been installed without a permit or;
4. plumbing or gas piping has been installed without a permit or;
5. development does not comply with the land development regulations.

111.3.2 Notice. This section prescribes notice requirements for disconnection of utilities.

111.3.2.1. Disconnection because of an immediate threat to life or property. If disconnection of utilities is necessary to eliminate an immediate hazard to life, the building official shall notify the serving utility and whenever possible, the owner and occupant of the building, structure, or service system of the decision prior to taking any action. If not notified prior to disconnecting, the owner or occupant of the, shall be notified in writing, by certified mail, return receipt requested, as soon as practical thereafter.

111.3.2.1 Disconnection for a reason other than an immediate threat to life or property. If the disconnection of utilities is for a reason other than to eliminate an immediate hazard to life, the building official shall give notice according to this section. Notice shall first be provided for the violation in accordance with the applicable section of Title 25 (*Land Development*). The notice of violation shall include a statement that the building official may authorize the disconnection of utilities if the violation is not cured within the timeframe established in the notice of violation. If the owner or occupant fails to comply with the notice of violation, the building official may issue a notice to the owner and occupant stating that utilities to the property will be disconnected not less than one week after the date that the notice is mailed. The notice must identify each utility that will be disconnected.

SECTION 112 BUILDING AND FIRE CODE BOARD OF APPEALS

Regulations regarding the Building and Fire Code Board of Appeals are found in Chapter 2-1 of the City Code.

SECTION 202 DEFINITIONS

STRUCTURAL FRAME. See Chapter 6, Table 601 Footnote a.

TABLE 302.1.1 INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION*
Furnace room where any piece of fuel fired equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with any boiler over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery rooms	1 hour or provide automatic sprinkler system
Parking garage (Section 406.2)	2 hours; or 1 hour and provide automatic fire-extinguishing system
Hydrogen cut-off rooms	1-hour fire barriers and floor/ceiling assemblies in Group B, F, H, M, S and U occupancies. 2-hour fire barriers and floor/ceiling assemblies in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Storage rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary lead-acid battery systems having a liquid capacity of more than 100 gallons used for facility standby power, emergency power or uninterrupted power supplies	1-hour fire barriers and floor/ceiling assemblies in Group B, F, H, M, S and U occupancies. 2-hour fire barriers and floor/ceiling assemblies in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m², 1 pound per square inch = 6.9 kPa,

1 British thermal unit = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

a. Where an automatic fire-extinguishing system is provided, it need only be provided in the incidental use room or area.

305.2 Day care. The use of a building or structure, or portion thereof, for educational, supervision or personal care services for more than six children in daycare, preschool, kindergarten, first grade, or second grade is a Group E occupancy. Rooms used for children in daycare, preschool, kindergarten, first grade, or second grade shall be located on a floor at the grade plane. A home with six or fewer unrelated individuals (excluding caregivers) shall comply with the Residential Code.

Exceptions:

1. Basements or stories having floor levels located within 4 feet (1219mm), measured vertically, from adjacent ground level at the point of exit discharge, provided the basement or story has exits directly to the exterior at that level.
2. In a building equipped with an automatic sprinkler system throughout rooms used for daycare, preschool, kindergarten, first grade, or second grade may be located on the second story, if there are at least two exits directly to the exterior for the exclusive use of such occupants.
3. A daycare may be located above the first story of a building that is of Type I A or B construction, Type II A construction, or Type III A construction, subject to the height and area limitations of Chapter 5 and the following conditions.

1 3.1 A daycare with children under the age of seven or with more than 12
2 children per story may not be located above the fourth floor.

3
4 3.2 The entire story on which a daycare is located shall be equipped with an
5 approved manual fire alarm and smoke-detection system in accordance
6 with the Fire Code. Actuation of an initiating device shall sound an
7 audible alarm throughout the entire story. If a building fire alarm system is
8 required by other provisions of this code or the Fire Code, the alarm
9 system shall be connected to the building alarm system. An approved
10 alarm signal shall sound at an approved location in the daycare occupancy
11 to indicate a fire alarm or sprinkler flow condition in other portions of the
12 building.

13
14 3.3 If a daycare has an area of more than 1,000 square feet (92.9m²), the
15 facility shall be divided into at least two compartments of approximately
16 the same size by a smoke barrier. A door opening in the barrier shall be
17 protected by a smoke-control and draft-control assembly that has a fire-
18 resistive rating of not less than one hour and shall be constructed in
19 accordance with Section 302 (*Classification*).

20
21 3.4 Each compartment formed by the smoke barrier shall have at least two
22 exits, one of which may pass through the adjoining compartment.

23
24 3.5 At least one exit from the daycare shall be into a separate exiting system
25 without a common path of travel (see Chapter 10, *Means of Egress*).

26
27 3.6 The building shall be equipped with an automatic sprinkler system
28 throughout.

29
30 **308.3.1 Child care facility.** A child care facility that provides care on a 24-hour basis to
31 more than five children shall be classified as Group I-2.

32
33 **308.5 Group I-4, adult day care facilities.** This group shall include buildings and
34 structures occupied by adults who receive custodial care for less than 24 hours by
35 individuals other than parents or guardians, relatives by blood, marriage or adoption, and
36 in a place other than the home of the person cared for. A facility such as the above with
37 six or fewer persons shall be classified as a Group R-3 or shall comply with the
38 International Residential Code in accordance with Section 101.2 (*Scope*). Places of
39 worship during religious functions are not included.
40

1 **312.1 General.** Buildings and structures of an accessory character and miscellaneous
2 structures not classified in any specific occupancy shall be constructed, equipped and
3 maintained to conform to the requirements of this code commensurate with the fire and
4 life hazard incidental to their occupancy. Group U shall include, but not be limited to, the
5 following:

6
7 Agricultural buildings

8 Aircraft hangars, accessory to a one- or two-family residence (see Section 412.3,
9 *Residential aircraft hangers*)

10 Barns

11 Carports

12 Fences more than 8 feet (2468 mm) high

13 Grain silos, accessory to a residential occupancy

14 Greenhouses

15 Livestock shelters

16 Private garages

17 Retaining walls

18 Sheds

19 Stables

20 Tanks

21 Towers

22
23 **403.3 Reduction in fire-resistance rating.** The fire-resistance-rating reductions listed in
24 Section 403.3.1 shall be allowed in buildings that have sprinkler control valves equipped
25 with supervisory initiating devices and water-flow initiating devices for each floor.

26
27 **403.3.1 Type of construction.** The following reductions in the minimum construction
28 type allowed in table 601 shall be allowed as provided in Section 403.3 (*Reduction in*
29 *fire-resistance rating*):

- 30
31 1. Type 1A construction shall be allowed to be reduced to Type IB, except in
32 buildings over 12 stories or over 160 feet high.
33
34 2. In other than Groups F-1, M, and S-1, Type IB construction shall be allowed to be
35 reduced to Type IIB.
36
37 3. The height and area limitations of the reduced construction type shall be allowed to
38 be the same as for the original construction type.
39

40 **403.12.1 Stairway communications system.** A telephone or other two-way
41 communications system connected to an approved constantly attended station shall be

provided at every floor in each required stairway if the doors to the stairway are capable of being locked.

404.1.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. An opening connecting three or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505 (*Mezzanines*).

406.2.6 Floor surface. Parking surfaces shall be of concrete or similar noncombustible and nonabsorbent materials.

Exception: Asphalt parking surfaces are permitted at ground level.

406.3.8 Means of egress. Where persons other than parking attendants are permitted, open parking garages shall meet the means of egress requirements of Chapter 10 (*Means of Egress*). Lifts shall be permitted to be installed for use of employees only, provided they are completely enclosed by noncombustible materials.

414.1.3 Information required. Separate floor plans shall be submitted for buildings and structures with an occupancy in Group H, identifying the locations of anticipated contents and processes, so as to reflect the nature of each occupied portion of every building and structure. The floor plan shall identify the hazards associated with the contents and processes. A report identifying hazardous materials including, but not limited to, materials representing hazards that are classified in Group H to be stored or used, shall be submitted and the methods of protection from such hazards shall be indicated on the construction documents. The building official or fire marshal may also require a technical opinion that addresses the adequacy of the protective measures provided. The opinion and report shall be prepared by a qualified person, firm or corporation approved by the building official and fire marshal shall be provided without charge to the City of Austin.

501.2 Premises identification. Approved numbers or addresses shall be provided on new buildings in such a position as to be clearly visible and legible from the street or roadway fronting the property. Letters or numbers shall comply with the requirements set out in the Fire Protection Criteria Manual.

502 Definitions.

1
2
3
4 **GRADE PLANE.** The horizontal plane that passes through the lowest point of elevation
5 of the finished surface of the ground, paving, or sidewalk within the area between the
6 building and the property line or, when the property line is more than 10 feet (3048 mm)
7 from the building, between the building and a line 10 feet (3048 mm) from the building.

8 **HEIGHT, BUILDING.** The vertical distance above a reference datum measured to the
9 highest point of the coping of a flat roof, or to the deck line of a mansard roof, or to the
10 average height of the highest gable of a pitched or hipped roof. The reference datum
11 shall be selected by either of the following, whichever yields a greater height of building:

- 12 1. The elevation of the highest adjoining sidewalk or ground surface within a 10-
13 foot (3048 mm) horizontal distance of the exterior wall of the building when
14 such sidewalk or ground surface is not more than 10 feet (3048 mm) above the
15 grade plane.
- 16 2. An elevation 10 feet (3048 mm) higher than the lowest grade when the sidewalk
17 or ground surface described in Item 1 above is more than 10 feet (3048 mm)
18 above the grade plane.

19 The height of a stepped or terraced building is the maximum height of any segment
20 of the building.

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS

Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per floor.

GROUP	Hgt(feet) Hgt(S)	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
		UL	160	65	55	65	55	65	50	40
A-1	S	UL	5	3	2	3	2	3	2	1
	A	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-5	S	UL	12	2	1	2	1	2	2	1
	A	UL	39,800	18,000	12,100	18,000	12,100	18,000	14,000	8,000
B	S	UL	11	5	4	5	4	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	8,000
E	S	UL	5	3	2	3	2	3	1	1
	A	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
F-1	S	UL	11	4	2	3	2	4	2	1
	A	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
F-2	S	UL	11	5	3	4	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
H-1	S	1	1	1	1	1	1	1	1	NP
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
H-2	S	UL	3	2	1	2	1	2	1	1
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
H-3	S	UL	6	4	2	4	2	4	2	1
	A	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
H-4	S	UL	7	5	3	5	3	5	3	2
	A	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
H-5	S	3	3	3	3	3	3	3	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
I-1	S	UL	9	4	3	4	3	4	3	2
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500
I-2	S	UL	4	2	1	1	NP	1	1	NP
	A	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
I-3	S	UL	4	2	1	2	1	2	2	1
	A	UL	UL	15,000	11,000	10,500	7,500	12,000	7,500	5,000
I-4	S	UL	5	3	2	3	2	3	1	1
	A	UL	60,500	26,500	13,000	23,500	13,000	25,500	18,500	9,000
M	S	UL	11	4	4	4	4	4	3	1
	A	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000
R-1	S	UL	11	4	4	4	4	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-2 ^a	S	UL	11	4	4	4	4	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-3 ^a	S	UL	11	4	4	4	4	4	3	3
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
R-4	S	UL	11	4	4	4	4	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
S-1	S	UL	11	4	3	3	3	4	3	1
	A	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000
S-2 ^{a, b}	S	UL	11	5	4	4	4	5	4	2
	A	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500
U ^a	S	UL	5	4	2	3	2	4	2	1
	A	UL	35,500	19,000	8,500	14,000	8,500	18,000	9,000	5,500

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

UL = Unlimited, NP = Not permitted.

a. As applicable in Section 101.2.

b. For open parking structures, see Section 406.3.

c. For private garages, see Section 406.1.

1 **507.2 Sprinklered, one story.** The area of a one-story, Group B, F, M or S building or
2 a one-story Group A-4 building of other than Type V construction shall not be limited
3 when the building is provided with an automatic sprinkler system throughout in
4 accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*), and is surrounded and
5 adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.
6

7 **Exceptions:**
8

- 9 1. Buildings and structures of Type I and II construction for rack storage facilities
10 which do not have access by the public shall not be limited in height provided
11 that such buildings conform to the requirements of NFPA 231C.
12
13 2. The automatic sprinkler system shall not be required in the areas occupied for
14 indoor participant sports, such as tennis, skating, swimming, and equestrian
15 activities in occupancies in Group A-4 provided that:
16
17 2.1. Exit doors directly to the outside are provided for occupants of the
18 participant sports areas and
19
20 2.2. The building is equipped with a fire alarm system with manual fire alarm
21 boxes installed in accordance with Section 907 (*Fire Alarm and Detection*
22 *Systems*).
23
24 2.3. Accessory and ancillary spaces shall be fully protected in accordance with
25 NFPA 13.
26

27 **508.4 Parking beneath Group R.** Where a maximum one-story above grade plane
28 Group S-2 parking garage, enclosed or open or combination thereof, of Type I
29 construction, with grade entrance, is provided under a building of Group R, the number
30 of stories to be used in determining the minimum type of construction shall be measured
31 from the floor above such a parking area. The floor assembly between the parking garage
32 and the Group R above shall comply with the type of construction required for the
33 parking garage and shall also provide a fire-resistance rating not less than the mixed
34 occupancy separation required in Section 302.3.2 (*Separated uses*).
35
36
37
38
39

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

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A ^d	B	A ^d	B	HT	A ^d	B
Structural frame ^{a,d} <i>Including columns, girders, trusses</i>	3 ^b	2 ^b	1	0	1	0	HT	1	0
Bearing walls									
Exterior ^f	3	2	1	0	2	2	2	1	0
Interior	3 ^b	2 ^b	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions									
Exterior	See Table 602								
Interior ^a	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction									
Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction									
Including supporting beams and joists	1 1/2 ^e	1 ^e	1 ^e	0	1 ^e	0	HT	1 ^e	0

For SI: 1 foot = 304.8 mm.

- a. The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns shall be considered secondary members and not a part of the structural frame.
- b. Roof supports: Fire-resistance ratings of structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
- c.
 1. Except in Factory-Industrial (F-1), Hazardous (H), Mercantile (M) and Moderate-Hazard Storage (S-1) occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
 2. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
 3. In Type I and II construction, fire-retardant-treated wood shall be allowed in buildings including girders and trusses as part of the roof construction when the building is:
 - i. Two stories or less in height;
 - ii. Type II construction over two stories; or
 - iii. Type I construction over two stories and the vertical distance from the upper floor to the roof is 20 feet or more.
- d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
- e. Not less than the fire-resistance rating required by other sections of this code.
- f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).
- g. See Section 714 for fire-restrictive rating for structural members.

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE^{a and d}

FIRE SEPARATION DISTANCE (feet)	TYPE OF CONSTRUCTION	GROUP H	GROUP F-1, M, S-1	GROUP A, B, E, F-2, I, R ^b , S-2, U
< 3 ^a	All	3	2	1
≥ 3	IA	3	2	1
< 10	Others	2	1	1
≥ 10	IA, IB	2	1	1
< 30	IIB, VB	1	0	0
	Others	1	1	1
≥ 30	All	0	0	0

For SI: 1 foot = 304.8 mm.

- a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.
- b. Group R-3 and Group U when used as accessory to Group R-3, as applicable in Section 101.2 shall not be required to have a fire-resistance rating where the fire separation distance is 3 feet or more.
- c. See Section 503.2 for party walls.
- d. See Section 714.5 for exterior structural members.

1 **706.1 General.** Fire barriers used for separation of shafts, exits, exit passageways,
2 horizontal exits or incidental use areas, to separate different occupancies, to separate
3 single occupancy into different fire areas, or to separate other areas where a fire barrier is
4 required elsewhere in this code or the International Fire Code, shall comply with this
5 section. A fire barrier shall be labeled in accordance with the Fire Code.
6

7 **711.3.3 Unusable space.** In 1-hour fire-resistance-rated floor construction, the ceiling
8 membrane is not required to be installed over enclosed unusable floor spaces. In 1-hour
9 fire-resistance-rated roof construction, the floor membrane is not required to be installed
10 where unusable attic space occurs above.
11

12 **713.2 Installation.** Fire-resistant joint systems shall be securely installed in or on the
13 joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to
14 accommodate expected building movements and to resist the passage of fire and hot
15 gasses. A fire-resistant joint system shall be installed in accordance with manufacturer's
16 recommendations and test criteria.
17

18 **715.3.3 Door assemblies in corridors and smoke barriers.** Fire door assemblies
19 required to have a minimum fire protection rating of 20 minutes where located in corridor
20 walls or smoke barrier walls having a fire-resistance rating in accordance with Table
21 *715.3 (Fire Door and Fire Shutter Fire Protection Rating)* shall be tested in accordance
22 with NFPA 252 or UL 10C without the hose stream test. If a 20-minute fire door
23 assembly contains glazing material, the glazing material in the door itself shall have a
24 minimum fire protection rating of 20 minutes and be exempt from the hose stream test.
25 Glazing material in any other part of the door assembly, including transom lites and
26 sidelites, shall be tested in accordance with NFPA 257, including the hose stream test, in
27 accordance with Section 715.4 (*Fire-protection rated glazing*). Fire door assemblies shall
28 also meet the requirements for a smoke- and draft-control door assembly tested in
29 accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0
30 cfm per square foot ($0.01524 \text{ m}^3/\text{slm}^2$) of door opening at 0.10 inch (24.9 Pa) of water for
31 both the ambient temperature and elevated temperature tests. Louvers shall be prohibited.
32

33 **Exceptions:**
34

- 35 1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through
36 the door, have at least an 0.25-inch-thick (6.4 mm) glass disc and the holder is
37 of metal that will not melt out where subject to temperatures of 1,700°F
38 (927°C).
39 2. Corridor door assemblies in occupancies of Group I-2 shall be in accordance
40 with Section 407.3.1.

3. Unprotected openings shall be permitted for corridors in multitheater complexes where each motion picture auditorium has at least one-half of its required exit or exit access doorways opening directly to the exterior or into an exit passageway.

717.3.3 Other groups. In other groups draftstopping shall be installed so that the horizontal floor areas do not exceed 1,000 square feet (93 m²).

Exception: In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) draftstopping shall be installed so that horizontal floor areas do not exceed 3,000 square feet (279 m²).

717.4.3 Other groups. Draftstopping shall be installed in attics and concealed roof spaces, such that any horizontal area does not exceed 3,000 square feet (279 m²).

Exception: In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) draftstopping shall be installed in attics and concealed roof spaces so that the horizontal area does not exceed 9,000 square feet (837 m²).

901.5 Acceptance tests. Fire protection systems shall be tested in accordance with the requirements of this code and the International Fire Code. When required, tests shall be conducted in the presence of a Fire Department representative. Tests required by this code, the International Fire Code and the standards listed in this code shall be conducted at the expense of the owner or the owner's representative. It shall be unlawful to occupy portions of a structure until the required fire protection systems within the structure have been tested and approved.

903.2.8.3 High piled storage. An automatic sprinkler system shall be provided in accordance with the International Fire Code in a building in Group S occupancy where storage of merchandise is in high-piled or rack storage arrays.

903.3.1.2.1 Balconies. Sprinkler protection shall be provided for exterior balconies, ground floor patios, and associated exterior accessed closets of dwelling units where the building is Type V construction. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members, and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies that are constructed of open wood joist construction.

1 905.5.3 Class II system 1½-inch hose. A minimum 1½-inch (38 mm) hose shall be
2 permitted to be used for hose stations in light hazard occupancies where investigated and
3 listed for this service and where approved by a Fire Department representative.

4
5 909.20 Smokeproof enclosures. Where required by Section 1019.1.8 (*Smokeproof*
6 *enclosures*), a smokeproof enclosure shall be constructed in accordance with this section.
7 A smokeproof enclosure shall consist of a pressurized enclosed exit stairway that
8 conforms to Section 1019.1 (*Enclosures required*) and a pressurized vestibule meeting
9 the requirements of this section. Design of pressurization systems shall be in accordance
10 with Section 909 (*Smoke Control Systems*).

11
12 909.20.1 Access. Access to the stair shall be by way of a vestibule or an open exterior
13 balcony. The minimum dimension of the vestibule shall not be less than the required
14 width of the corridor leading to the vestibule but shall not have a width of less than 44
15 inches and shall not have a length of less than 72 inches in the direction of egress travel.

16
17 909.20.2 Construction. The smokeproof enclosure shall be separated from the remainder
18 of the building by not less than a 2-hour fire-resistance-rated fire barrier without openings
19 other than the required means of egress doors. The vestibule shall be separated from the
20 stairway by not less than a 2-hour fire-resistance-rated fire barrier. The open exterior
21 balcony shall be constructed in accordance with the fire-resistance-rating requirements
22 for floor construction.

23
24 909.20.2.1 Door closers. Doors in smokeproof enclosures shall be self-closing.

25
26 909.20.3 Stair Protection.

27
28 909.20.3.1 Vestibule doors. The door assembly from the building into the vestibule
29 shall be a fire door complying with Section 715.4 (*Fire-protection rated glazing*). The
30 door assembly from the vestibule to the stairway shall have not less than a 20-minute fire
31 protection rating in accordance with Section 715.4 (*Fire-protection rated glazing*). The
32 door from the building into the vestibule shall be provided with gaskets or other
33 provisions to minimize air leakage.

34
35 909.20.3.2 Vestibules. The minimum pressure differences within the vestibule with the
36 doors closed shall be 0.05 inch water gage positive pressure relative to the fire floor and
37 0.05 inch water gage negative relative to the exit enclosure. No pressure difference is
38 required relative to a nonfire floor.

39
40 909.20.3.3 Stair pressurization system. The stair shaft shall be provided with a
41 dampered relief opening capable of discharging a minimum of 2,500 cubic feet per

minute of air at the design pressure difference of 0.05 inch water gage positive pressure relative to a pressurized stair vestibule. Stair pressurization fans shall be sized to compensate for the stair shaft ground floor exterior doors being open.

1002.1 Definitions.

STAIR. A change in elevation, consisting of two or more risers.

STAIRWAY, EXTERIOR. A stairway that is open on at least two adjacent sides. A side is open if at least 75 percent of the area is free of any obstructions, including, but not limited to columns, beams, walls, handrails and guards. The adjoining areas shall be either yards, courts or public ways. The other sides of the exterior stairway need not be open.

**TABLE 1004.1.2
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT**

OCCUPANCY	FLOOR AREA IN SQ. FT. PER OCCUPANT
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport Terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Assembly with fixed seats	See Section 1003.2.2.9
Assembly without fixed seats	
Concentrated	7 net
Standing space or queuing space	5 net ^a
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms—other than fixed seating areas	40 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
H-5 Fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross

Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mercantile	
Areas on other floors	60 gross
Basement and grade floor areas	30 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Accessory storage areas, mechanical	
Equipment room	300 gross
Warehouses	500 gross

* Posted occupant load shall be based on 7 net square feet per occupant.

1004.2 Increased occupant load. The occupant load permitted in any building or portion thereof is permitted to be increased from the number established for the occupancies in Table 1004.1.2 provided that all other requirements of the code are also based on such modified number and the overall occupant load for a building or portion of a building shall not exceed 7 square feet (0.65m²) of acceptable floor space. Where required by the building official an approved, aisle, seating or fixed equipment diagram substantiating any increase in occupant load shall be submitted. Where required by the building official such diagram shall be posted.

1005.1 Minimum required egress width. The means of egress width shall not be less than required by this section. The total width of exits in inches (mm) shall not be less than the total occupant load served by an exit multiplied by 0.3 inches (7.62 mm) for stairways and 0.2 inches (5.08 mm) for other exits and not less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity, the maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

Exception: Means of egress complying with Section 1024 (*Assembly*)

1007.3 Enclosed exit stairways. An enclosed exit stairway, to be considered part of an accessible means of egress, shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 (*Areas of refuge*) or a horizontal exit.

Exceptions:

1. Open exit stairways as permitted by Section 1019.1 (*Enclosures required*) are permitted to be considered part of an accessible means of egress.
2. Except for a building governed by Section 403 (*High-Rise Buildings*) or 405 (*Underground Buildings*), the area of refuge is not required at open stairways that are permitted by Section 1019.1 (*Enclosures required*) in buildings or facilities that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*).
3. Except for a building governed by Section 403 (*High-Rise Buildings*) or 405 (*Underground Buildings*), the clear width of 48 inches (1219 mm) between handrails and the area of refuge is not required at exit stairways in buildings or facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).
4. The clear width of 48 inches (1219 mm) between handrails is not required for enclosed exit stairways accessed from a horizontal exit.
5. Areas of refuge are not required at exit stairways serving open parking garages.

1007.5 Platform lifts. Platform (wheelchair) lifts shall not serve as part of an accessible means of egress, except where allowed as part of an accessible route in Section 1109.7 (*Lifts*) or the accessibility standards adopted by the State of Texas. Platform lifts in accordance with Section 2702 (*Emergency and Standby Power Systems*) shall be installed in accordance with ASME A18.1. Standby power shall be provided for platform lifts permitted to serve as part of a means of egress.

1007.6.2 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 709 (*Smoke Barriers*). Each area of refuge shall be designed to minimize the intrusion of smoke.

Exceptions:

1. Areas of refuge located within a stairway enclosure.

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2. Except for buildings governed by Section 403 (*High-Rise Buildings*) or 405 (*Underground Buildings*), areas of refuge where the area of refuge and areas served by the area of refuge are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).

1008.1.2 Door swing. Egress doors shall be side-hinged and swinging

Exceptions:

1. Private garages, office areas, darkrooms, factory and storage areas with occupant load of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Doors within or serving a single dwelling unit in Groups R-2 and R-3 as applicable in Section 101.2 (*Scope*).
4. In other than Group H occupancies, revolving doors complying with Section 1008.1.3.1 (*Revolving doors*).
5. Horizontal sliding doors complying with Section 1008.1.3.3 (*Horizontal sliding doors*) are permitted as a means of egress.
6. Power operated doors in accordance with Section 1008.1.3.2 (*Power operated doors*).

1008.1.3.3. Horizontal sliding doors. Horizontal sliding doors permitted to be a component of a means of egress in accordance with Exception 5 to Section 1008.1.2 (*Door swing*) shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.

4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable fire protection rating and, where rated, shall be self-closing or automatic-closing by smoke detection, shall be installed in accordance with NFPA80 and shall comply with Section 715 (*Opening Protectives*).
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

1008.1.8.6 Delayed egress locks. Approved, listed, delayed egress locks shall be permitted to be installed on doors serving any occupancy except Group A, E and H occupancies in buildings that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or an approved automatic smoke or heat detection system installed in accordance with Section 907 (*Fire Alarm and Detection Systems*); provided that the doors unlock in accordance with Items 1 through 6 below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an exit.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center.
4. The initiation of an irreversible process which will release the latch in not more than 15 seconds when a force of not more than 15 pounds (67 N) is applied for 1 second to the release device. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.

1 **Exception:** Where approved, a delay of not more than 30 seconds is
2 permitted.

3
4 5. A sign shall be provided on the door located above and within 12 inches (305
5 mm) of the release device reading: PUSH UNTIL ALARM SOUNDS. DOOR
6 CAN BE OPENED IN 15 (30) SECONDS. The letters on the sign shall be 1
7 inch (25 mm) high and shall be on a contrasting background.

8
9 6. Emergency lighting shall be provided at the door.

10
11 **1008.1.9 Panic and fire exit hardware.** Where panic and fire exit hardware is installed,
12 it shall comply with the following:

13
14 1. The actuating portion of the releasing device shall extend at least one-half of the
15 door leaf width.

16
17 2. A maximum unlatching force of 15 pounds (67 N).

18
19 Each door in a means of egress from an occupancy of Group A or E having an
20 occupancy load of 50 or more and any occupancy of Group H-1, H-2, H-3 or H-5 shall
21 not be provided with a latch or lock unless it is panic hardware or fire exit hardware.

22
23 If balanced doors are used and panic hardware is required, the panic hardware shall
24 be the push-pad type and the pad shall not extend more than one-half the width of the
25 door measured from the latch side.

26
27 **1008.3 Turnstiles.** Each turnstile or similar device that restricts travel to one direction
28 shall not be placed so as to obstruct any required means of egress.

29
30 **Exception:** Each turnstile or similar device shall be credited with no more than a
31 50-person capacity where all of the following provisions are met:

32
33 1. Each device shall turn free in the direction of egress travel when primary
34 power is lost or upon the manual release by an employee in the area.

35
36 2. Such devices are not given credit for more than 50 percent of the required
37 egress capacity.

38
39 3. Each device is not more than 39 inches (991 mm) high.
40

1 4. Each device has at least 16.5 inches (419 mm) clear width at and below a
2 height of 39 inches (991 mm) and at least 22 inches (559 mm) clear width at
3 heights above 39 inches (991 mm).
4

5 Where located as part of an accessible route, turnstiles shall have at least 36 inches
6 (914 mm) clear at and below a height of 34 inches (864 mm), at least 32 inches (813 mm)
7 clear width between 34 inches (864 mm) and 80 inches (2032mm) and shall consist of a
8 mechanism other than a revolving device.
9

10 **1009.11.3 Handrail graspability.** Handrails with a circular cross section shall have an
11 outside diameter of at least 1.25 inches (32 mm) and not greater than 1.5 inches (38 mm)
12 or shall provide equivalent graspability. If the handrail is not circular, it shall have a
13 perimeter dimension of at least 4 inches (102 mm) and not greater than 4.75 inches (121
14 mm) with a maximum cross-section dimension of 2.25 inches (57mm). Edges shall have
15 a minimum radius of 0.01 inch (0.25mm).
16

17 **1011.1 Where required.** Exits and exit access doors shall be marked by an approved
18 exit sign visible from any direction of egress travel. Access to exits shall be marked by
19 readily visible exit signs in cases where the exit or path of egress travel is not
20 immediately visible to the occupants. Exit sign placement shall be such that no point in
21 an exit access corridor is more than 100 feet (30,480 mm) or the listed viewing distance
22 from the sign, whichever is less, from the nearest visible exit sign.
23

24 **Exceptions:**

- 25
- 26 1. Exit signs are not required in rooms or areas which require only one exit or
27 exit access.
28
 - 29 2. Main exterior exit doors or gates which obviously and clearly are identifiable
30 as exits need not have exit signs where approved by the building official.
31
 - 32 3. Exit signs are not required in occupancies in Group U and individual sleeping
33 units or dwelling units in Group R-1, R-2 or R-3.
34
 - 35 4. Exit signs are not required in sleeping areas in occupancies in Group I-3.
36
 - 37 5. In occupancies in Groups A-4 and A-5, exit signs are not required on the
38 seating side of vomitories or openings into seating areas where exit signs are
39 provided in the concourse that are readily apparent from the vomitories.
40 Egress lighting is provided to identify each vomitory or opening within the
41 seating area in an emergency.

1
2 In a Group R-1 occupancy, a corridor serving guest rooms shall be provided with
3 additional low level exit signs. Each sign shall be internally or externally illuminated,
4 photo luminescent or self-illuminating. The bottom of the sign shall be not less than 6
5 inches (152mm) and not more than 8 inches (203mm) above the floor level and shall
6 indicate the path of exit travel. For an exit and exit access door, the sign shall be on the
7 door or adjacent to the door with the closest edge of the sign within 4" (102mm) of the
8 door frame.
9

10 **TABLE 1014.1**
11 **SPACES WITH ONE MEANS**
12 **OF EGRESS**
13

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E ^a , F, M, U	50
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	30

^a A day care facility may have a maximum
occupancy load of 10.

14
15 **1014.2.1. Two exits or exit access doorways.** Where two exits or exit access doorways
16 are required from any portion of the exit access, the exit access or exit access doorways
17 shall be placed at a distance apart equal to not less than one-half of the length of the
18 maximum overall diagonal dimension of the building or area to be served measured in a
19 straight line between exit doors or exit access doorways. Interlocking scissor stairs shall
20 be counted as one exit stairway.

21
22 **Exceptions:**
23

- 24
- 25 1. Where exit enclosures are provided as a portion of the required exit and are
26 interconnected by a 1-hour fire-resistance-rated corridor conforming to the
27 requirements of Section 101 (*General*), the required exit separation shall be
28 measured along the shortest direct line of travel within the corridor.
 - 29 2. For an exit and exit access doorway that is not the primary exit access into a
30 required fire stair and that is located in a building that is equipped throughout
31 with an automatic sprinkler system in accordance with Section 903.3.1 (*NFPA*

1 13 sprinkler systems) or 903.3.1.2 (NFPA 13R sprinkler systems), the separation
2 distance of the exit door or exit access doorway shall be not less than one-third
3 of the length of the maximum overall diagonal dimension of the area served.
4

5 **1014.2.2 Three or more exits or exit access doorways.** Where access to three or more
6 exits is required, at least two exit doors or exit access doorways shall be placed at a
7 distance apart equal to not less than one-half of the length of the maximum overall
8 diagonal dimension of the building or area to be served measured in a straight line
9 between such exit doors or exit access doorways. Additional exits or exit access
10 doorways shall be arranged a reasonable distance apart so that if one becomes blocked,
11 the others will be available.
12

13 **Exception:** For an exit and exit access doorway that is not the primary exit access
14 into a required fire stair and that is located in a building that is equipped
15 throughout with an automatic sprinkler system in accordance with Section 903.3.1
16 (NFPA 13 sprinkler systems) or 903.3.1.2 (NFPA 13R sprinkler systems), the
17 separation distance of the exist doors or exit access doorways shall be not less than
18 one-third of the length of the maximum overall diagonal dimension of the area
19 served.
20

21 **1016.3 Dead ends.** Where more than one exit or exit access doorway is required, the exit
22 access shall be arranged such that there are no dead ends in corridors more than 20 feet
23 (6096 mm) in length.
24

25 **Exceptions:**
26

- 27 1. In occupancies in Group I-3 of Occupancy Condition 2, 3 or 4 (see Section
28 308.4[Group I-3]), the dead end in a corridor shall not exceed 30 feet (9,136
29 mm).
30
- 31 2. In occupancies in Groups B and F where the building is equipped throughout
32 with an automatic sprinkler system in accordance with Section 903.3.1.1 (NFPA
33 13 sprinkler systems), the length of dead-end corridors shall not exceed 30 feet
34 (9,136 mm).
35
- 36 3. A dead-end corridor shall not be limited in length where the length of the dead-
37 end corridor is less than 2.5 times the least width of the dead-end corridor.
38

39 **1016.4 Air movement in corridors.** Exit access corridors shall not serve as supply,
40 return exhaust, relief or ventilation air ducts or plenums.
41

Exceptions:

1. Use of a corridor as a source of make-up air for exhaust systems in rooms that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted provided that such corridor is directly supplied with outdoor air at a rate greater than the rate of make-up air taken from the corridor.
2. Where located within a dwelling unit, the use of corridors for conveying air shall not be prohibited.

1018.2 Number of exits. An occupant in a basement and on a story above the first story shall have access to not less than two separate exits from the basement or story.

Exceptions:

1. A second story having an occupancy load of less than 10 may be provided with only one exit.
2. Two or more dwelling units on the second story or in a basement may have access to only one common exit when the total occupant load served by that exit does not exceed 10.
3. Except as provided elsewhere in this code only one exit need be provided from the second floor or basement within an individual dwelling unit or a Group R-2.
4. If the third floor within an individual dwelling unit or Group R-2 does not exceed 500 square feet (46.45 m²), then only one exit may be provided from that floor.
5. A floor or basement used exclusively for service of the building may have one exit. For this exception, a storage room, laundry room, maintenance office, or other similar use is not considered as providing service to the building.
6. A storage room, laundry room, or maintenance office not exceeding 300 square feet (27.45 m²) in floor area may be provided with only one exit.
7. An elevator lobby may have one exit if the use of the exit does not require keys, tools, special knowledge or effort.

1019.1 Exceptions:

- 1
2 8. In other than occupancy Groups H and I, egress stairways serving one
3 adjacent floor are not required to be enclosed, provided at least two means of
4 egress are provided from both floors served by the unenclosed stairways.
5 Any two such interconnected floors shall not be open to other floor.
6

7 **1019.1.4 Vertical enclosure exterior walls.** Exterior walls of a vertical exit enclosure
8 shall comply with the requirements of Section 704 (*Exterior Walls*) for exterior walls.
9 Where nonrated walls or unprotected openings enclose the exterior of the stairway and
10 the walls or openings are exposed to other parts of the building, the building walls within
11 10 feet (3048 mm) horizontally of a nonrated or unprotected opening shall be constructed
12 as required for a minimum 1-hour fire-resistive rating with $\frac{3}{4}$ - hour opening protectives.
13 This construction shall extend vertically from the ground to a point 10 feet (3048 mm)
14 above the topmost landing of the stairway or to the roof line, whichever is lower.
15

16 **1019.1.8.2 Enclosure access.** Access to the stairway within a smokeproof enclosure
17 shall be by way of a vestibule or an open balcony.
18

19 **1022.3 Open side.** Exterior exit ramps and stairways serving as an element of a required
20 means of egress shall be open on at least two adjacent sides. A side is open if at least 75
21 percent of the area is free of any obstructions, including, but not limited to columns,
22 beams, walls, handrails and guards.
23

24 **1025.2 Minimum size.** Emergency escape and rescue openings shall have a minimum
25 net clear opening of 5.7 square feet (0.53m²).
26

27 **1025.2.1 Minimum dimensions.** The minimum net clear opening height and width
28 dimension shall be 24 inches (610 mm). The net clear opening dimensions shall be the
29 result of normal operation of the opening.
30

31 **1101.1 Scope.** The provisions of this chapter shall control the design and construction of
32 facilities for accessibility to physically disabled persons that are not included in the scope
33 of the Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article
34 9102, Texas Civil Statutes, as amended. Existing buildings and facilities shall comply
35 with Section 3409 of this Code.
36

37 **1101.2 Design.** Buildings and facilities containing dwelling or sleeping units as defined
38 in Section 1107 of this Code that are not included in the scope of TAS shall be designed
39 and constructed to be accessible in accordance with this Code and ICC/ANSI A117.1-
40 2003. Buildings and facilities not covered by TAS shall be designed and constructed to
41 be accessible in accordance with this chapter. Buildings and facilities covered by TAS

1 shall be designed and constructed to be accessible in accordance with the Texas
2 Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas
3 Civil Statutes, as amended.

4
5 **1104.1 Site arrival points.** Accessible routes within the site shall be provided from
6 public transportation stops, accessible parking and accessible passenger loading zones
7 and public streets or sidewalks to the accessible building entrance served. An accessible
8 route shall be located so that a person using the route is not required to travel in a traffic
9 lane or behind a parked vehicle (except the vehicle the person operates or in which the
10 person is a passenger).

11
12 **1104.3.1 Employee work areas.** Common use circulation paths within employee work
13 areas shall be accessible routes.

14
15 **Exceptions:**

- 16
17 1. Common use circulation paths, located within employee work areas that are
18 less than 300 square feet (27.9 m²) in size and defined by counters, casework
19 or furnishings, shall not be required to be accessible routes.

20
21 **1104.4 Multilevel buildings and facilities.** At least one accessible route shall connect
22 each accessible level, including mezzanines, in multilevel buildings and facilities.

23
24 **Exceptions:**

- 25
26 1. An accessible route is not required to stories and mezzanines above and
27 below accessible levels that have an aggregate area of not more than 2,000
28 square feet (185.9 m²). This exception shall not apply to:
29
30 1.1. Multiple tenant facilities of Group M occupancies containing five or
31 more tenant spaces;
32 1.2. Levels containing offices of health care providers (Group B or I); or
33 1.3. Passenger transportation facilities and airports (Group A-3 or B).

34
35 **1106.6 Location.** Accessible parking spaces shall be located on the shortest accessible
36 route of travel from adjacent parking to an accessible building entrance. An accessible
37 route shall be located so that a person using the route is not required to travel in a traffic
38 lane or behind a parked vehicle (except the vehicle the person operates or in which the
39 person is a passenger). Accessible parking spaces shall be dispersed among the various
40 types of parking facilities provided. In parking facilities that do not serve a particular
41 building, accessible parking spaces shall be located on the shortest route to an accessible

1 pedestrian entrance to the parking facility. Where buildings have multiple accessible
2 entrances with adjacent parking, accessible parking spaces shall be dispersed and located
3 near the accessible entrances.

4
5 **Exception:** In multilevel parking structures, van-accessible parking spaces are
6 permitted on one level.
7

8 **1108.2.2 Wheelchair spaces.** In theaters, bleachers, grandstands, stadiums, arenas and
9 other fixed seating assembly areas, accessible wheelchair spaces complying with ICC
10 A117.1 shall be provided in accordance with Sections 1108.2.2.1 (*General seating*)
11 through 1108.2.2.3 (*Other boxes*). Vertical viewing angles from wheelchair spaces to the
12 top and bottom of the element being viewed shall not exceed 35 degrees above or below
13 the horizontal plane. Lateral viewing angles from wheelchair spaces to the centerline of
14 the element being viewed shall not exceed 15 degrees measured perpendicular to the
15 seating position. All measurements are to be made from the standard line of sight.
16 Viewing angle criteria do not apply to sporting event facilities or specialty auditoriums
17 designed to show OMNI or IMAX type film presentations.
18

19 **1109.2.1.6 Clear floor space.** Where doors swing into a unisex toilet or bathing room, a
20 clear floor space not less than 30 inches by 48 inches (762mm by 1219 mm) shall be
21 provided, within the room, beyond the area of the door swing. The clear floor space shall
22 be located so that the occupant can open and close the door.
23

24 **1110.1 Signs.** Required accessible elements shall be identified by the International
25 Symbol of Accessibility at the following locations:
26

- 27 1. accessible parking spaces required by Section 1106.1 (*Required*);
- 28 2. accessible passenger loading zones;
- 29 3. accessible areas of refuge required by Section 1007.6 (*Areas of refuge*);
- 30 4. accessible rooms where multiple single-user toilet or bathing rooms are
31 clustered at a single location;
- 32 5. accessible entrances where not all entrances are accessible;
- 33 6. accessible check-out aisles where not all aisles are accessible; the sign,
34 where provided, shall be above the check-out aisle in the same location as
35 the check-out aisle number or type of check-out identification;
- 36 7. unisex toilet and bathing rooms; and
- 37 8. accessible dressing, fitting and locker rooms where not all such rooms are
38 accessible.
39
40

1 1507.8.4 Material standards. Wood shingles shall be of naturally durable wood, be fire
2 retardant treated, and comply with the requirements of Table 1507.8.4 (*Wood Shingle
Material Requirements*).

4
5 1507.9.5 Material standards. Wood shakes shall be fire retardant treated and comply
6 with the requirements of Table 1507.9.5 (*Wood Shake Material Requirements*).

7
8 1603.1.3 Roof snow load. The ground snow load, P_g , shall be indicated. In areas where
9 the ground snow load, P_g , exceeds 10 pounds per square foot (psf) (0.479 kN/m²), the
10 following additional information shall also be provided, regardless of whether snow loads
11 govern the design of the roof:

- 12 1. Flat-roof snow load, P_f .
- 13 2. Snow exposure factor, C_e .
- 14 3. Snow load importance factor, I_s .
- 15 4. Thermal factor, C_t .

16
17
18
19 Exception: Snow load information is only required when applicable.

20
21
22 1603.1.4 Wind design data. The following information related to wind loads shall be
23 shown, regardless of whether wind loads govern the design of the lateral-force-resisting
24 system of the building:

- 25 1. Basic wind speed (3-second gust), miles per hour (km/hr).
 - 26 2. Wind importance factor, I_W , and building category.
 - 27 3. Wind exposure, if more than one wind exposure is utilized, the wind exposure
28 and applicable wind direction shall be indicated.
 - 29 4. The applicable internal pressure coefficient.
 - 30 5. Components and cladding. The design wind pressures in terms of psf (kN/m²) to
31 be used for the design of exterior component and cladding materials not
32 specifically designed by the registered design professional.
- 33
34
35
36
37
38
39

1 **Exception:** A note indicating that the engineer of record has reviewed and
2 included wind design data in accordance with this section in his design analysis
3 may be included in lieu of notes 1 through 5.
4

5 **1603.4 Occupancy permits for changed loads.** Construction documents for other than
6 residential buildings filed with the building official with applications for permits shall
7 show on each drawing the live loads per square foot (m^2) of area covered for which the
8 building is designed.
9

10 **1607.4.1 Additional requirements.**
11

- 12 1. Garage loadings shall not include an impact factor for floors or roofs.
- 13 2. Ramp loadings shall be the same as floors.
- 14 3. Garage roofs used for passenger vehicles or trucks and bus parking shall be
15 designed for a non-reducible live load of 55 psf., which includes snow and
16 snow removal equipment. Garage roofs that provide access for fire trucks
17 shall be designed for the required fire truck loads.
- 18 4. Dining rooms and restaurants. A nonresidential kitchen shall be designed for
19 the same design load as the occupancy served. Use the weight of actual
20 equipment or stored materials when greater than the design load established in
21 ASCE7.
22

23 **1607.7.1 Handrails and guards.** Handrail assemblies and guards shall be designed to
24 resist a load of 50 plf (0.73 kN/m) applied in any direction at the top and to transfer this
25 load through the supports to the structure.
26

27 **1607.9.2 Alternate floor live load reduction.**
28

- 29 4. For structural members supporting more than 150 square feet in garages used
30 for the storage of passenger vehicles, the reduced live load shall not be less than
31 30 pounds per square foot.
32

33 **1607.14 Fire truck loading.** If fire department access requires travel over a structure or
34 loading of a structure by fire department vehicles, the structure shall be analyzed for the
35 three load cases indicated below. Structural members shall be designed for the most
36 severe case. The fire vehicle geometry is shown in Figure 1607.14.
37
38
39
40

1 1. Basic Load Case. The front axle load shall be 21,130 pounds (10,565 pounds
2 per tire) with a tire contact area of 12 in. x 13 in. The load on each rear axle shall be
3 25,700 pounds (12,850 pounds per tire) with a tire contact area of 14 in. x 16 in. Impact
4 and longitudinal forces imparted by the vehicle loads shall be in accordance with the
5 latest edition of AASHTO standards.
6

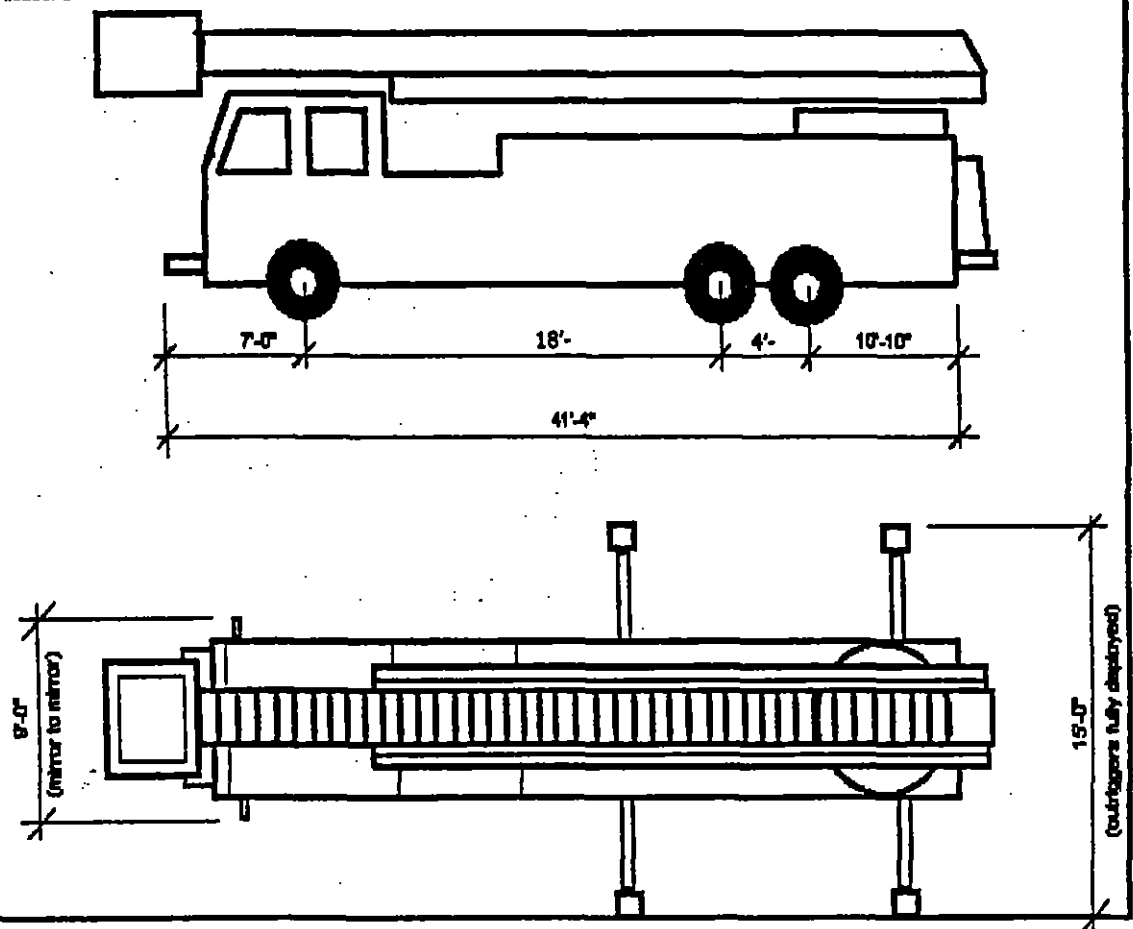
7 2. Static Load Case A. A load of 43,200 pounds on one outrigger. The contact
8 area of each outrigger is 24 in. x 24 in. The load is to be located so as to produce the
9 maximum stress in the member(s) being analyzed when applied according to the
10 geometry of Figure 1607.14.
11

12 3. Static Load Case B. A load of 28,600 pounds on each of two adjacent
13 outriggers (total load is 57,200 pounds). The contact area of each outrigger is 24 in. x 24
14 in. The load is to be located so as to produce the maximum stress in the member(s) being
15 analyzed when applied according to the geometry of Figure 1607.14.
16

17 The Fire Prevention Bureau shall determine the area around any building or
18 structure for which fire access is required and the provisions of this section are
19 applicable.
20

Figure 1607.14

2001 Pierce, Ladder 1 and Ladder 8



1 **1609.7.4 Reflectance requirement for certain roofs.** Roofs with slopes of 17 percent
2 (2 in 12 slope) or less on commercial structures and residential structures with more than
3 two dwelling units on a single lot shall comply with the standards of the U.S.
4 Environmental Protection Agency Energy Star Product Specifications for high-
5 reflectance and the Cool Roof Rating Council criteria for high emissivity roofing for a
6 minimum of 75% of the roof area. Roofs shall have an initial solar reflectance value of
7 0.65 (ASTM Standard E 903-96) or greater and have a reflectance value of 0.50 or
8 greater three years after installation under normal conditions and an emissivity of at least
9 0.9 when tested in accordance with ASTM E408-71(1996)e1.

10 11 **SECTION 1612 FLOOD LOADS**

12
13 **1612.1 General.** Within flood hazard areas as established in Section 1612.3,
14 (*Establishment of flood hazard areas*) all new construction of buildings, and alterations to
15 buildings and structures, structures and portions of buildings and structures, including
16 substantial improvements and restoration of substantial damage to buildings and
17 structures, shall be designed and constructed to resist the effects of flood hazards and flood
18 loads.

19
20 **1612.2 Definitions.** The following words and terms shall, for the purposes of this
21 section, have the meanings shown herein.

22
23 **BASE FLOOD.** A flood having a 1-percent chance of being equaled or exceeded in any
24 given year (100-year flood).

25
26 **BASE FLOOD ELEVATION.** The elevation of the base flood, including wave height,
27 relative to the National Geodetic Vertical Datum (NGVD), North American Vertical
28 Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM).

29
30 **BASEMENT.** The portion of a building having its floor subgrade (below ground level)
31 on all sides.

32
33 **DESIGN FLOOD.** The flood associated with an area with a flood plain subject to a 1-
34 percent or greater chance of flooding in any year (100-year flood) based on projected full
35 development in accordance with the City of Austin Drainage Criteria Manual.

36
37 **DESIGN FLOOD ELEVATION.** The elevation of the "design flood" relative to the
38 City of Austin vertical datum standard.

39
40 **DRY FLOODPROOFING.** A combination of design modifications that results in a
41 building or structure, including the attendant utility and sanitary facilities, being water

1 tight with walls substantially impermeable to the passage of water and with structural
2 components having the capacity to resist loads as identified in ASCE 7.

4 **EXISTING CONSTRUCTION.** Any buildings and structures for which the "start of
5 construction" commenced before September 2, 1981. "Existing construction" is also
6 referred to as "existing structures."

7
8 **EXISTING STRUCTURE.** See "Existing construction."

9
10 **FLOOD or FLOODING.** A general and temporary condition of partial or complete
11 inundation of normally dry land from:

- 12
13 1. the overflow of inland waters; or
14
15 2. the unusual and rapid accumulation or runoff of surface waters from any source.
16

17 **FLOOD DAMAGE-RESISTANT MATERIALS.** Any construction material capable
18 of withstanding direct and prolonged contact with floodwaters without sustaining any
19 damage that requires more than cosmetic repair.
20

21 **FLOOD HAZARD AREA.** The greater of the following two areas:

- 22
23 1. an area within a flood plain subject to a 1-percent or greater chance of flooding
24 in any year (100-year flood); or
25
26 2. an area with a flood plain subject to a 1-percent or greater chance of flooding in
27 any year (100-year flood) based on projected full development in accordance
28 with the City of Austin Drainage Criteria Manual.
29

30 **FLOOD INSURANCE RATE MAP (FIRM).** An official map of a community on
31 which the Federal Emergency Management Agency (FEMA) has delineated both the
32 special flood hazard areas and the risk premium zones applicable to the community.
33

34 **FLOOD INSURANCE STUDY.** The official report provided by the Federal Emergency
35 Management Agency containing the Flood Insurance Rate Map (FIRM), the Flood
36 Boundary Map, the water surface elevation of the base flood and supporting technical
37 data.
38

39 **FLOODWAY.** The channel of the river, creek or other watercourse and the adjacent land
40 areas that must be reserved in order to discharge the base flood without cumulatively
41 increasing the water surface elevation more than a designated height. An area with a

1 flood plain subject to a 4-percent or greater chance of flooding in any year (25-year
2 flood) based on projected full development in accordance with the City of Austin
3 Drainage Criteria Manual.

4
5 **LOWEST FLOOR.** The floor of the lowest enclosed area, including basement, but
6 excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking,
7 building access or limited storage provided that such enclosure is not built so as to render
8 the structure in violation of this section.

9
10 **NEW CONSTRUCTION.** Structures for which the start of construction commenced on
11 or after September 2, 1981 and includes any subsequent improvements to such structures
12 and improvements to all existing construction.

13
14 **REGULATORY FLOOD DATUM** means an established plane of reference from
15 which elevations and depth of flooding may be determined for specific locations of the
16 floodplain. It is the water level of the design flood plus a freeboard factor of one foot.
17 Design flood plus freeboard equals Regulatory Flood Datum.

18
19 **SPECIAL FLOOD HAZARD AREA.** The land area subject to flood hazards and
20 shown on a Flood Insurance Rate Map or other flood hazard map as Zone A, AE, A1-30,
21 A99, AR, AO, AH, V, VO, VE or V1-30.

22
23 **START OF CONSTRUCTION.** The date of permit issuance for new construction and
24 substantial improvements to existing structures, provided the actual start of construction,
25 repair, reconstruction, rehabilitation, addition, placement or other improvement is within
26 180 days after the date of issuance. The actual start of construction means the first
27 placement of permanent construction of a building (including a manufactured home) on a
28 site, such as the pouring of a slab or footings, installation of pilings or construction of
29 columns. Permanent construction does not include land preparation (such as clearing,
30 excavation, grading or filling), the installation of streets or walkways, excavation for a
31 basement, footings, piers or foundations, the erection of temporary forms or the
32 installation of accessory buildings such as garages or sheds not occupied as dwelling
33 units or not part of the main building. For a substantial improvement, the actual "start of
34 construction" means the first alteration of any wall, ceiling, floor or other structural part
35 of a building, whether or not that alteration affects the external dimensions of the
36 building.

37
38 **SUBSTANTIAL DAMAGE.** Damage of any origin sustained by a structure whereby
39 the cost of restoring the structure to its before-damaged condition would equal or exceed
40 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT. For the purpose of determining compliance with the flood hazard management provisions of this code, substantial improvement means any repair, alteration, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the current market value of the structure before the improvement or repair is started or, if the structure has been damaged and is being restored, before the damage occurred. The cost used in the substantial improvement determination shall be cumulative cost of all previous additions or improvements for a specific building or structure occurring during the immediate 10-year period. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:

1. any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions;
2. any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure; or
3. an aesthetic improvement if the value of the improvement does not exceed 10 percent of the current market value of the building or structure.

1612.3 Establishment of flood hazard areas. Flood hazard areas are established to include the following:

1. the flood hazard areas identified by the Federal Emergency Management Agency in a scientific and engineering report entitled, "The Flood Insurance Study for Austin, Texas," dated January 19, 2000, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps (FIRM and FBFM) and related supporting data along with any amendments or revisions thereto are hereby adopted by reference and declared to be a part of this section; and
2. the 100-year and 25-year floodplains based on projected full development as specified in the Austin City Code and Drainage Criteria Manual are adopted by reference and declared to be part of this section.

1612.4 Design and construction. The design and construction of buildings and structures, and additions and alterations to buildings and structures located in flood hazard areas, shall be in accordance with ASCE 24.

1 **1612.4.1 Freeboard.** A minimum freeboard of one (1) foot shall be added where
2 the design flood elevation or other elevation requirements are specified.

3
4 **1612.4.2 Provisions of Safe Refuge.**

- 5
6 1. Buildings or structures constructed in the flood hazard area where the
7 ground surface is below the design flood elevation, or where flood water
8 velocities at the building may exceed five feet per second, shall be provided
9 with an enclosed refuge space one (1) foot or more above the design flood
10 elevation of sufficient area to provide for the occupancy load with a
11 minimum of 12 square feet per person. The refuge space shall be provided
12 to an exterior platform and stairway not less than three feet wide.
- 13 2. Existing buildings and structures in flood hazard areas which are enlarged,
14 extended, or altered, or where a change of use or occupancy is made, shall
15 conform to the requirements of Subsection 1.
- 16 3. No floor level or portion of a building or structure that is lower than one (1)
17 foot above the design flood elevation, regardless of the structure or space
18 classification, shall be used residentially, or for storage of any property,
19 materials, or equipment that might constitute a safety hazard when contacted
20 by flood waters.

21
22 **1612.4.3 Means of Egress.** Normal access to the building shall be by direct
23 connection with an area that is a minimum of one (1) foot above the design flood
24 elevation, unless otherwise approved by the building official.
25

26 **1612.5 Flood hazard documentation.** The following documentation shall be prepared
27 and sealed by a registered design professional and submitted to the building official:
28

- 29 1. for construction in flood hazard areas:

- 30
31 1.1. the elevation of the lowest floor, including basement, as required by the
32 lowest floor elevation inspection in Section 109.3.3 (*Lowest floor*
33 *elevation*);
34
- 35 1.2. for fully enclosed areas below the design flood elevation where provisions
36 to allow for the automatic entry and exit of floodwaters do not meet the
37 minimum requirements in Section 2.6.1.1, ASCE 24, construction
38 documents shall include a statement that the design will provide for
39 equalization of hydrostatic flood forces in accordance with Section 2.6.1.2,
40 ASCE 24; and
41

1.3. for dry floodproofed nonresidential buildings, construction documents shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.

1704.1.1 Building permit requirements. The permit applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge in accordance with Section 106.1 (*Submittal documents*) as a condition for permit issuance. This statement shall include a complete list of materials and work requiring special inspections by this section and the inspections to be performed. The owner or owner's agent shall submit, for the building official's review, a list of the individuals, agencies, or firms intended to be retained for conducting such inspections.

SECTION 1716 REGISTERED INDUSTRIAL PLANT

Section 1716.1 Definition. A registered industrial plant is one or more buildings registered with the building official under Section 1716.3 used for manufacturing, processing, research and development, education, health care or service that requires specialized buildings, utilities, and equipment.

Section 1716.2 Requirements. The following requirements apply to a registered industrial plant:

1. A registered industrial plant may not have less than 100,000 square feet of floor area in a building or buildings at locations within the city limits and used for manufacturing, processing, research and development, or service that requires specialized building, utilities, and equipment and where no fewer than 200 persons are employed.
2. A registered industrial plant must employ full time personnel for the operation and maintenance of buildings, utilities, and equipment; and must comply with all requirements of this code.
3. The owner of a registered industrial plant must designate a full time employee (the "responsible official") who is responsible for ensuring compliance with all code provisions enforced by the building official. The responsible official must be an engineer registered in the State of Texas or a person approved by the building official.

Section 1716.3 Application and fee. An applicant for registration under this section must file an application on a form required by the building official. The application fee is calculated at \$550 per 100,000 square feet of floor area in the building or buildings to be registered. The application fee is refunded if the application is denied. The application must include both the name of the person with the authority to act for and on behalf of the

owner of the plant, and the name of the person proposed by the applicant to be the responsible official under this section.

Exception: A registered industrial plant may include leased buildings if both the entire building is leased by the owner of the plant and the maintenance and operation of the leased building is under the control of the responsible official.

The building official shall provide written notice to the applicant if the application is denied or disapproved pending receipt of additional information. The notice must include a statement of the building official's reasons for denying or disapproving the application under this section.

A registration under this section expires on December 31 of the year it is approved. The registration may be renewed on or before December 31 for a one year period by payment of a renewal fee at a rate of \$550 per 100,000 square feet of floor area of buildings registered under this section.

Section 1716.4 Exemption from plan review and permit fees. The owner of a registered industrial plant is not required to obtain a permit otherwise required by this Code if the owner complies with Section 1716.5 and the work:

1. does not alter a bearing wall or other structural elements;
2. does not require a change to an exit system;
3. does not alter fire-resistive construction;
4. is performed on a building or structure for which a certificate of occupancy for the existing occupancy had been issued by the building official;
5. does not alter natural gas piping or medical gas piping systems;
6. does not alter hazardous production material (HPM) supply or waste piping in areas of the building not currently classified as an H occupancy;
7. does not remove, relocate, replace, or install a backflow prevention device;
8. does not increase the existing square footage of a building; and
9. otherwise complies with all other applicable provisions of this title.
10. is performed by licensed contractors under the registered industrial plant provisions of the Plumbing Code, Electrical Code or Mechanical Code.

Section 1716.5 Work reports and inspections. A brief description of all work performed under this section must be maintained by the responsible official and must be

1 available to the building official during periodic inspections. The building official shall
2 inspect work performed under this section at least every six months.

3 **Section 1716.6 Change of responsible official.** If the responsible official leaves the
4 full-time employment of the registrant, an acting responsible official who is qualified
5 under Section 1716.2 shall be designated by the registrant not later than seven days after
6 the employee leaves full-time employment fewer than seven days notice to the building
7 official. An acting responsible official may serve for a period not to exceed 45 days. If a
8 new responsible official is not designated within the 45 day period, registration under this
9 section will be suspended until a new responsible official is designated.

10 **Section 1716.7 Revocation or termination of registration.** The building official may
11 suspend or revoke a registration under this section if the registrant fails to comply with
12 any of the requirements of Section 1716 or with any requirement of an applicable code
13 with respect to work performed under these sections. A suspension or revocation is not
14 effective until the building official has provided written notice to the registrant of the
15 suspension or revocation. The notice shall include a statement of the building official's
16 reasons for the action.

17 Suspension or revocation of a registration under this section may be appealed to
18 the Building and Fire Code Board in accordance with the provisions of Chapter 25-1,
19 Article 7, Division 1 (*Appeals*). The decision of the Building and Fire Code Board on an
20 appeal may be appealed to the city council in accordance with the provisions of Chapter
21 25-1, Article 7, Division 1 (*Appeals*).

22 A registrant may terminate its registration by delivering written notice of
23 termination to the building official.

24 **SECTION 1813 EARTH RETENTION SYSTEMS**

25 **1813.1 Tieback anchors and soil and rock nails.** Tieback anchors and soil and rock
26 nails that are allowed in the public right-of-way as components of earth retention systems
27 as provided in Section 3202.1.4 (Earth retention system components) shall comply with
28 Sections 1813.1.1 (*Depth of tiebacks anchors and soil and rock nails*) through 1813.1.3
29 (*Length of tiebacks anchors and soil and rock nails*).

30 **1813.1.1 Depth of tieback anchors and soil and rock nails.** At the right-of-way line,
31 tieback anchors and soil and rock anchors must be at least 6 feet (1829 mm) below the
32 elevation of the adjacent street curb.

33 **1813.1.2 Separation distance from buried utilities.** Tieback anchors and soil and rock
34 nails must be below and at least five feet (1524 mm) away from the nearest outside
35 surface of any existing or planned buried utility in the public right-of-way.
36

1
2 **1813.1.3 Length of tieback anchors and soil and rock nails.** Tieback anchors and soil
3 and rock nails that extend beyond the center of the public right-of-way are prohibited.
4

5 **2108.5 ACI 530/ASCE 5/TMS402, Section 3.1.7.2.2.** Modify Section 3.1.7.2.2 as
6 follows:
7

8 **3.1.7.2.2 In plane bending** – For masonry subjected to in-plane loads, the modulus of
9 rupture, f_r , normal and parallel to the bed joints shall be taken from Table 3.1.7.2.1. For
10 grouted stack bond masonry, tension parallel to the bed joints shall be assumed to be
11 resisted only by the continuous horizontal grout section.
12

13 **3103.5 Portable classrooms.** Portable classroom buildings may be moved into or within
14 this jurisdiction or within a public school district without conforming to the currently
15 adopted Energy Code.
16

17 **3103.6 Moved residential buildings.** Residential buildings or structures moved into or
18 within the City's zoning jurisdiction shall be sited in compliance with applicable
19 provisions of Title 25 of the City Code. Foundations of relocated residential buildings or
20 structures must comply with the provisions of this code for new buildings or structures.
21 All other building elements must comply with the requirements of the International
22 Residential Code.
23

24 **3103.7 Moved non-residential buildings.** Non-residential buildings moved into or
25 within the City's zoning jurisdiction must comply with the provisions of this code for
26 new buildings or structures.
27

28 **3109.3 Public swimming pools.** Public swimming pools shall be completely enclosed
29 by a fence at least 6 feet (1935 mm) in height or a screen enclosure. Openings in the
30 fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or
31 screen enclosure shall be equipped with self-closing and self-latching gates.
32

33 **3109.4.1 Barrier height and clearances.** The top of the barrier shall be at least 6 feet
34 (1935 mm) above grade measured on the side of the barrier that faces away from the
35 swimming pool. The maximum vertical clearance between grade and the bottom of the
36 barrier shall be 2 inches (51 mm) measured on the side of the barrier that faces away from
37 the swimming pool. Where the top of the pool structure is above grade, the barrier is
38 authorized to be at ground level or mounted on top of the pool structure, the maximum
39 vertical clearance between the top of the pool structure and the bottom of the barrier shall
40 be 4 inches (102 mm).
41

3110 AERIAL PASSAGEWAYS

3110.1 Defined. An aerial passageway is a structure located over an alley or street connecting two buildings on opposite sides of the alley or street.

3110.2 Requirements. An aerial passageway shall comply with this section.

1. The structure shall be used for access only and not for storage or occupancy.
2. The structure shall be constructed entirely of non-combustible materials.
3. Self closing Class A doors shall be placed at each end of the passageway.
4. If the structure interferes with any public utility facilities, all costs associated with relocation and remediation shall be borne by the Owner.
5. No electric, gas, or water shall be attached to or be permitted to cross on or in the aerial passageway. Telephone and other communication utilities may be allowed subject to the execution of a license a license agreement.
6. Except as otherwise provided in the section, a minimum clearance of 17.5 feet above the surface of the alley or street is required. The building official may allow a height that is less than 17.5 feet but not less than 16.5 feet if he determines that the lower height will result in an equivalent installation.
7. A license agreement required by Chapter 14-11 is executed.

3201.1 Scope. The provisions of this chapter shall govern the encroachment of structures into the public right-of-way, including components of earth retention systems used to facilitate below-grade construction of a building or structure.

3202.1 Encroachments below grade. Encroachments below grade shall comply with Sections 3202.1.1 (*Structural support*) through 3202.1.4 (*Earth retention system components*).

3202.1.4 Earth retention system components. Components of earth retention systems that are required for structural support of a building or structure are prohibited in the public right-of-way. Components of earth retention systems that are needed only during construction of the below-grade portion of a building or structure are subject to the following conditions:

1. Approval of the Director of the Public Works Department is required before construction of earth retention system components in public right-of-way commences.
2. All components of an earth retention system are prohibited in the public right-of-way except for (1) tieback anchors that are part of a soldier pile and lagging system; (2) tieback anchors that are part of a diaphragm or slurry wall system; (3) tieback anchors that are part of a sheet pile wall system; (4) tieback anchors that are part of a secant wall system; and (5) soil or rock nails that are part of a nail wall.
3. Tieback anchors or soil or rock nails that are necessary as functional components of the earth retention system for longer than 12 months are prohibited in the public right-of-way.
3. Tieback anchors and soil and rock nails allowed in the public right-of-way must be designed according to the criteria in Section 1813 (*Earth Retention Systems*).

CHAPTER 34 EXISTING STRUCTURES

- (A) The Uniform Code for Building Conservation, 1997 edition, published by the International Conference of Building Officials is adopted and incorporated into this section with deletions and amendments in Subsections (B) and (C).
- (B) The following provisions of the 1997 Uniform Code for Building Conservation are deleted:

Section 301, Building Code	Section 504.1
Section 402.2	Section 504.2
Section 403	Tables 5A through 5E
Section 501.2	Section 702
- (C) Section 3409 of the 2003 International Building Code, published by the International Code Council is adopted and incorporated by reference into this section in its entirety.
- (D) The following provisions are local amendments to the 1997 Uniform Code for Building Conservation. Each provision in this section is a substitute for the identically numbered provision deleted by Section (B) or is an addition to the 1997 Uniform Code for Building Conservation.

1
2 105.5 In a flood hazard area established in Section 1612.3 (*Establishment of flood*
3 *hazard areas*), an addition, alteration, or repair that constitutes the substantial
4 improvement of an existing building or structure, as defined in Section 1612.2
5 (*Definitions*), shall comply with the flood design requirements for new construction. All
6 aspects of the existing structure shall be brought into compliance with the requirements
7 for new construction for flood design.
8

9 **301 Definitions.**

10
11 **BUILDING CODE** is the Building Code adopted in Section 25-12-1 (*Building Code*) of
12 the City Code.
13

14 **402.4 Corridors.** Corridors serving as a part of the means of egress system that have an
15 occupant load of 30 or more in a Group A, B, E, F, I, H, M or S Occupancy or an
16 occupant load of 10 or more in a Group R, Divisions 1 and 2 Occupancy shall have walls
17 and ceilings of not less than one-hour fire-resistive construction. Existing walls and
18 ceilings surfaced with wood lath and plaster or ½-inch-thick (12.7 mm) gypsum
19 wallboard may be permitted in lieu of one-hour fire-resistive construction, provided the
20 surfaces are in good condition.
21

22 Door openings into such corridors shall be protected by a tightfitting smoke- and draft-
23 control assembly having a fire-protection rating of not less than 20 minutes when such
24 opening protection was required by the code under which the building was constructed.
25 Door-closing devices, door gaskets and other requirements imposed by the code under
26 which the building was constructed shall be maintained. When the building was
27 constructed under a code that did not require 20-minute smoke- and draft-control
28 assemblies, doorway openings shall be protected by doors having a fire-protection rating
29 of not less than 20 minutes or by a minimum 1 3/8-inch-thick (34.9 mm) solid-bonded
30 wood-core door or an equivalent insulated steel door. In such case, the frames need not
31 have a fire-resistive time period. Doors shall be maintained self-closing or shall be
32 automatic closing by activation of a smoke detector.
33

34 Transoms and openings other than doors from corridors to rooms shall be protected as
35 required by the Building Code. When the code under which the building was constructed
36 permitted unprotected transoms or other unprotected openings, other than doors, such
37 transoms or openings shall be covered with a minimum of ¾-inch-thick (19.1 mm) wood
38 structural panel or ½-inch-thick (12.7 mm) gypsum wallboard or equivalent material on
39 the room side. Openings with fixed wired glass set in steel frames are permitted in
40 corridor walls and ceilings.
41

1 **Exception:** Existing corridor walls, ceilings and opening protection not in
2 compliance with the above may be continued when the building is protected with
3 an approved automatic sprinkler system throughout. Such sprinkler system may be
4 supplied from the domestic water-supply system, provided the system is of
5 adequate pressure, capacity and sizing for the combined domestic and sprinkler
6 requirements.

7 8 **SECTION 403 – STRUCTURAL SAFETY**

9
10 A building or structure or its individual structural members that exceed the limits
11 established by the Dangerous Buildings Code shall be replaced or strengthened in order
12 that the building, structure or individual structural members will comply with the
13 requirements of the Building Code for new construction. Roofs, floors, walls,
14 foundations and all structural components of such buildings or structures shall be capable
15 of resisting the forces and loads specified in Chapter 16 (*Structural Design*) of the
16 Building Code.

17
18 **501.2 Hazard Category Classifications.** The relative degree of hazard between
19 different occupancy groups or between divisions of the same group shall be as set forth in
20 the hazard category classifications, Tables 5-A through 5-E. An existing building may
21 have its occupancy changed to an occupancy within the same hazard group or to an
22 occupancy in a lesser hazard group without complying to all the provisions of this
23 chapter. An existing building shall comply with the requirements of the Building Code,
24 except as specified in this chapter, when a change in occupancy will place it in a higher
25 hazard group or when the occupancy is changed to Group A, or Group E, H or I.

26
27 **504.1 Fire Resistance of Walls.** Exterior walls shall have fire resistance and opening
28 protection as set forth in the Building Code. This provision shall not apply to walls at
29 right angles to the property line.

30 31 **Exceptions:**

- 32
33 1. Where a fire-resistive rating greater than two hours is required for a building of
34 any type of construction, existing noncombustible exterior walls having a fire-
35 resistive rating equivalent to two hours as determined by UCBC Guideline 2
36 may be accepted, provided:
- 37
38 1.1 The building is classified as a Group A, less than 300 occupants; Group B;
39 Group F; Group M; and Group S, Divisions 1 and 2; and
40
41 1.2 The building does not exceed three stories in height.

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2. Existing exterior walls shall be accepted if the occupancy is changed to a hazard group, which is equal to or less than the existing occupancy as defined in Table 5-D.

504.2 Opening Protection. Openings in exterior walls shall be protected as required by the Building Code. When openings in the exterior walls are required to be protected due to distance from the property line, the sum of the area of such openings shall not exceed 50 percent of the total area of the wall in each story.

Exceptions:

1. Protected openings shall not be required for Group R, Divisions 1 and 2. Occupancies that do not exceed three stories in height and that are located not less than 3 feet (914 mm) from the property line.
2. Where opening protection is required, an automatic fire-extinguishing system throughout may be substituted for opening protection.
3. Opening protection may be omitted when the change of occupancy is to an equal or lower hazard classification in accordance with Table 5-D.

TABLE 5-A HAZARD CATEGORIES AND CLASSIFICATIONS: LIFE SAFETY AND EXITS RELATIVE HAZARD OCCUPANCY CLASSIFICATION

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1	H (Highest Hazard Group)
2	I-2, I-3, I-4, A, E
3	I-1, M, R-1, R-2, R-4
4	B, F-1, R-3, S-1
5	F-2, S-2, U (lowest Hazard group)

TABLE 5-B HAZARD CATEGORIES AND CLASSIFICATIONS: HEIGHTS AND AREAS RELATIVE HAZARD OCCUPANCY CLASSIFICATIONS

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1	H (Highest Hazard Group)
2	A-1, A-2, A-3, A-4, I
3	E, F-1, S-1, M, R-1, R-2, R-4
4	B, F-2, S-2, A-5, R-3, U (lowest Hazard group)

TABLE 5-C HAZARD CATEGORIES AND CLASSIFICATIONS: EXPOSURE OF EXTERIOR WALLS RELATIVE HAZARD OCCUPANCY CLASSIFICATIONS

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1	H (Highest Hazard Group)
2	F-1, M, S-1
3	A, E, I
4	B, R
5	F-2, S-2, U (lowest Hazard group)

609 Flood hazard areas. Within flood hazard areas established in accordance with Section 1612.3 (*Establishment of flood hazard areas*), where the work proposed constitutes substantial improvement as defined in Section 1612.2 (*Definitions*), the building shall be brought into conformance with Section 1612 (*Flood Loads*).

Exception: Historic buildings that are:

- a. listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or
- b. determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
- c. designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

CHAPTER 36 STRAW BALE CONSTRUCTION

Section 3601 PURPOSE

This chapter establishes minimum prescriptive standards of safety for the construction of structures that use baled straw as a load-bearing or non-load-bearing material.

Section 3602 SCOPE

This chapter applies to all straw bale wall construction, including privacy and landscape walls. Load-bearing straw bale walls are limited to use in Occupancy Group R, Division 3 (one and two-family dwellings) and Occupancy Group U (accessory structures).

Section 3603 - DEFINITIONS

In this chapter:

STRAW means the dry stems of cereal grains left after the seed heads have been removed.

BEARING BALE WALL or **LOAD-BEARING BALE WALL** means a straw bale wall that supports more than 100 lbs. per linear foot of superimposed load.

BALES mean rectangular compressed blocks of straw, bound by strings or wire.

FLAKES mean slabs of straw removed from an untied bale that are used to fill small gaps between the ends of stacked bales.

LAI D FLAT refers to stacking bales so that the sides with the largest cross-sectional area are horizontal and the longest dimension of this area is parallel with the wall plane.

LAI D ON-EDGE refers to stacking bales so that the sides with the largest cross-sectional area are vertical and the longest dimension of this area is horizontal and parallel with the wall plane.

O.C. means on center.

PINS mean vertical stakes used to attach a bale to the course of bales above and below it and include construction grade 1 x 2 wooden stakes 24" (minimum) in length or #4 rebar and other materials approved by the building official.

Section 3604 MATERIALS

Section 3604.1 Specifications for bales.

1 **Section 3604.1.1 Type of straw.** Bales of various types of straw, including, but not
2 limited to, wheat, rice, rye, barley, oats and similar plants, may be used in bales if they
3 meet the minimum requirements for density, shape, moisture content, and ties prescribed
4 by this section.

5
6 **Section 3604.1.2 Shape.** Bales must be rectangular in shape.

7 **Section 3604.1.3 Dimensions.** Bales used within a continuous wall must be of
8 consistent height and width to ensure even distribution of loads within wall systems.

9 **Section 3604.1.4 Ties.** Bales must be bound with ties of either polypropylene string or
10 baling wire. Bales with broken or loose ties may not be used unless the broken or loose
11 ties are replaced with ties that restore the original degree of compaction of the bale.

12 **Section 3604.1.5 Moisture content.** Moisture content of bales, may not exceed 20
13 percent of the total weight of the bale at the time interior and exterior finish materials are
14 applied. Moisture content of bales may be determined by either of the following methods
15 prescribed in this section.

16 **Section 3604.1.5.1 Field method.** A suitable moisture meter, designed for use with
17 baled straw or hay, and equipped with a probe of sufficient length to reach the center of
18 the bale, may used to determine the average moisture content of 5 bales randomly
19 selected from the bales to be used.

20 **Section 3604.1.5.2 Laboratory method.** A total of 5 samples, taken from the center of
21 each of 5 bales randomly selected from the bales to be used, may be tested for moisture
22 content by a recognized testing lab.

23 **Section 3604.1.6 Density.** Bales must have a minimum calculated dry density of 7.0
24 pounds per cubic foot. The calculated dry density is determined after reducing the actual
25 bale weight by the weight of the moisture content, as determined in Section 3604.1.5
26 (*Moisture Content*). The calculated dry density is determined by dividing the calculated
27 dry weight of the bale by the volume of the bale.

28 **Section 3604.1.7 Custom size bales.** Custom made partial bales must be of the same
29 density, 7.0 pounds per cubic foot as measured in 3604.1.6, same string or wire tension,
30 and, use the same number of ties as the standard size bales.

31 **Section 3605 CONSTRUCTION AND GENERAL REQUIREMENTS**

32 **Section 3605.1 General.** Bale walls, when covered with plaster, drywall, or stucco are
33 considered to have the equivalent fire resistive rating as wood frame construction with
34 the same wall-finishing system.

1 **Section 3605.2 Wall thickness.** Nominal minimum bale wall thickness must be 14
2 inches.

3 **Section 3605.3 Wall height.** Bale walls may not exceed one story in height and the bale
4 portion may not exceed a height to width ratio of 5.6:1, unless the structure is designed
5 by an engineer or architect licensed by the State to practice as such, and approved by the
6 building official. For example, the maximum height for the bale portion of a 23-inch
7 thick wall would be 10 feet - 8 inches, unless designed by an engineer or architect and
8 approved by the building official.

9 **Exception:** In the non-load-bearing exterior end walls of structures with gable or
10 shed roofs, an approved continuous assembly is required at the roof bearing
11 assembly level.

12 **Section 3605.4 Unsupported wall length.** The ratio of unsupported wall length to
13 thickness, for bale walls, may not exceed 15.7:1, unless the structure is designed by an
14 engineer or architect licensed by the State to practice as such, and approved by the
15 building official. For example, for a 23 inch thick wall, the maximum unsupported
16 length allowed is 30 feet, unless designed by an engineer or architect and approved by the
17 building official.

18 **Section 3605.5 Allowable loads.** The allowable vertical load (live and dead load) on the
19 top of load-bearing bale walls may not exceed 400 pounds per square foot (psf) and the
20 resultant load shall bear at the center of the wall. Bale structures must be designed to
21 withstand all vertical and horizontal loads as specified in the Building Code.

22 **Section 3605.6 Foundations.** Foundations must be sized to accommodate the thickness
23 of the bale wall and the load created by the wall and roof live and dead loads.
24 Foundation (stem) walls that support bale walls must extend to an elevation of not less
25 than 8 inches above adjacent ground at all points. The minimum width of the footing
26 must be the width of the bale it supports, with the following exceptions:

- 27 1. the bales may overhang the exterior edge of the foundation by not more than 3
28 inches, provided protection from weather and infestation has been installed; and
29 2. pier and Beam Foundations require a 12" wide (minimum) footing.

30 **Section 3605.7 Wall and roof bearing assembly anchorage.**

31 **Section 3605.7.1 General.** Vertical reinforcing bars with a minimum diameter of 1/2"
32 must be securely embedded in the foundation and must extend above foundation a
33 minimum of 12 inches. These vertical bars must be located along the centerline of the
34 bale wall, spaced not more than 2 feet part. A vertical bar must also be located within 1
35 foot of any opening or corner, except at locations occupied by anchor bolts.

Section 3605.7.2 Intersecting walls. Walls of other materials intersecting bale walls must be attached to the bale wall by means of one or more of the following methods or an acceptable equivalent:

1. Wooden dowels at least 5/8" in diameter of sufficient length to provide 12 inches of penetration into the bale, driven through holes bored in the abutting stud, and spaced to provide one dowel connection per bale.
2. Pointed wooden stakes, at least 12 inches in length and 1-1/2" by 3-1/2" at the exposed end, fully driven into each course of bales, as anchorage points.
3. Bolted or threaded rod connection of the abutting wall, through the bale wall, to a steel nut and steel or plywood plate washer, a minimum of 6 inches square and a minimum thickness of 3/16" for steel and 1/2" for plywood, in at least three locations.

Section 3605.7.3 Anchoring. Load bearing bale walls and roof bearing assemblies must be anchored to the foundation by methods that are adequate to resist uplift forces resulting from the design wind load and are approved by the building official. There must be at least two points of anchorage per wall, spaced not more than 6 feet apart, with one located within 36 inches of each end of each wall. Two acceptable anchoring methods are listed below. Other methods may be used if approved by the building official.

Method #1. Load-bearing bale walls must be anchored to the foundation by 1/2" diameter steel anchor bolts embedded at least 7 inches in the foundation at intervals of 6 feet or less. A minimum of two anchor bolts per wall must be provided with one bolt located within 36 inches of each end of each wall. Sections of 1/2" diameter threaded rod must be connected to the anchor bolts, and to each other, by means of threaded coupling nuts and must extend through the roof bearing assembly and be fastened with a steel washer and nut.

Method #2. Wire tie-downs shall be placed 4'-0" o.c. and at each side of any openings. The wire must be a minimum 12 gauge galvanized high tensile wire (commonly called No. 3 Agricultural Wire) and must run through the foundation, up both sides of the walls and over the top plate. The wire must be secured by using wire locks. Wire locks must be uniformly tensioned. Where the wire comes in contact with the wood top plate, the top plate must be shielded by metal to protect the wood from shattering. The dead load of the roof and ceiling systems will produce vertical compression of the bales. Regardless of the anchoring system used to attach the roof bearing assembly to the foundation, before installation of wall finish materials, the anchoring system must be re-tensioned to compensate for this compression.

1 **Section 3605.7.4 Moisture barrier.** A moisture barrier must be used between the top of
2 the foundation and the bottom of the bale wall to prevent moisture from migrating
through the bottom course of bales. This barrier must consist of one of the following:

- 4 1. cementitious waterproof coating;
- 5 2. 30 pound felt or an asphalt emulsion;
- 6 3. sheet metal flashing, sealed at joints; or,
- 7 4. other building moisture barrier approved by the building official.

8 All penetrations through the moisture barrier, as well as all joints in the barrier, must be
9 sealed with asphalt, caulking or an approved sealant.

10 **Section 3605.7.5 Stacking and pinning.** Bales in load-bearing walls must be laid flat
11 and stacked in running bond where possible, with each bale overlapping the two bales
12 beneath it. Bales in non-loading-bearing walls may be laid either flat or on-edge and
13 stacked in running bond where possible. Overlaps must be at least 12 inches. Gaps
14 between the ends of bales that are less than 6 inches in width may be filled by an untied
15 flake inserted into the gap.

16 The first course of bales must be laid by impaling the bales on the vertical bars or
17 threaded rods, extending from the foundation. As each subsequent course is laid, two
18 pins, long enough to extend through the course being laid and a minimum of 8" into the
19 course immediately below it, must be driven down through each bale 18" in length or
20 longer. Bales less than 18" in length and greater than 12" in length must have a minimum
21 of one pin per bale.

22 Only full-length bales may be used at corners of load-bearing walls, unless exceptions
23 are designed by an engineer or architect licensed by the state, and approved by the
24 building official.

25 A pin must be located 1 foot or less from all corners or door openings.

26 Staples, made of #3 or larger rebar formed into "U" shape, at least 18 inches long with
27 two 6 inch legs, must be used at all corners of every course, driven with one leg into the
28 top of each abutting corner bale. Instead of staples, corner bales may be tied together by
29 a method approved by the building official. Two alternative pinning methods are listed
30 below. Other methods may be used if approved by the building official.

31 **Alternative Method #1.** When the fourth course has been laid, #4 rebar pins, or an
32 acceptable equivalent, long enough to extend through all four courses, must be driven
33 down through the bales, two in each bale, located so that they do not pass within six
34 inches of, or through the space between the ends of any two bales. The layout of these
35 pins must approximate the layout of the vertical bars extending from the foundation. As

1 each subsequent course is laid, two pins, long enough to extend through the course being
2 laid and the three courses immediately below it, must be driven down through each bale.
3 This pinning method must be continued to the top of the wall. In walls seven or eight
4 courses high, pinning at the fifth course may be eliminated.

5 Alternative Method #2. When the third course has been laid, vertical #4 rebar pins, or an
6 acceptable equivalent, long enough to extend through all three courses, must be driven
7 down through the bales, two in each bale, located so that they do not pass within 6 inches
8 of, or through, the space between the ends of any two bales. The layout of these rebar
9 pins must approximate the layout of the rebar pins extending from the foundation. As
10 each subsequent course is laid, two pins, long enough to extend through that course and
11 the two courses immediately below it, shall be driven down through each bale. This
12 pinning method must be continued to the top of the wall.

13 **Section 3605.7.6 Roof bearing assembly.** Load-bearing bale walls must have a roof
14 bearing assembly at the top of the wall to bear the roof load and to provide a means of
15 connecting the roof structure to the foundation. The roof bearing assembly must be
16 continuous along the tops of structural walls.

17 Acceptable roof bearing assemblies are listed below. Other systems may be used if
18 approved by the building official.

19 **Method #1-Wood Roof Bearing Assembly #1**

20 The roof bearing assembly must consist of two 2" x 6", or larger, framing members
21 placed on edge, one located at the inner edge of the wall and the other at the outer edge.
22 The framing members must be supported on a continuous ½" thick (minimum) plywood
23 or OSB base which is within 2" of the width of the bales below, i.e., 21" wide (minimum)
24 for a 23" bale. The base must be fastened to the vertical framing members with 8d nails
25 to 8" o.c.. Splices in the vertical framing members must be staggered and connected with
26 metal plates. Connecting the two vertical framing members and located horizontally and
27 perpendicular to the length of the wall must be 2" x 4" (minimum) cross members spaced
28 no more than 24" o.c.. The cross members must be face nailed to the vertical framing
29 members with two 16d nails at each end. Corner connections must include overlaps
30 nailed as provided in UBC Table 23-1-Q or an acceptable equivalent such as plywood
31 gussets or metal plates.

32 **Method #2-Wood Roof Bearing Assembly #2**

33 The roof bearing assembly must consist of two double 2" x 6", or larger, horizontal top
34 plates, one located at the inner edge of the wall and the other at the outer edge.
35 Connecting the two doubled top plates and located horizontally and perpendicular to the
36 length of the wall must be 2" x 6" cross members spaced no more than 72 inches center to
37 center, and as required to align with the threaded rods or cables extending from the

1 foundation. The double 2"x 6" top plates must be face nailed with 16d nails staggered at
2 16 inches on center, with laps and intersections face nailed with four 16d nails. The cross
4 members must be face nailed to the top plates with four 16d nails at each end. Corner
5 connections must include overlaps nailed as provided in UBC Table 23-1-Q or an
acceptable equivalent such as plywood gussets or metal plates.

6 Method #3-Concrete Bond Beam Roof Bearing Assembly Form Work

7 Two 2" x 4" framing members placed on edge, connected by 1" x 4" stretchers at 3'- 0"
8 o.c. maximum assembly must be within 2" of the width of the bales below, i.e., 21" wide
9 (minimum) for a 23" bale. Splices in the 2" x 4" framing members must be staggered
10 and connected with metal plates. The 2" x 4" framing members must have lag bolts or
11 wood screws placed on the interior of the assembly at 6" o.c. to lock the forms to the
12 concrete. Number 3 rebar pins 18" (minimum) in length must be driven into the top of the
13 bale wall at 2'- 0" o.c. (maximum) and must extend above the bale wall 3" to bond the
14 concrete top plate to the bale wall.

15 Concrete and reinforcing steel: Concrete must be reinforced with 2- #4 rebars continuous
16 with #3 ties at 48" o.c. Concrete must reach a compressive strength of 3000 p.s.i. after 28
17 days.

18 Alternatives to this roof bearing assembly option must provide equal or greater vertical
19 rigidity and provide horizontal rigidity equivalent to the aforementioned systems and
20 must be approved by the building official. The connection of roof framing members to
21 the roof bearing assembly must comply with the Building Code.

22 **Section 3605.7.7 Openings.** All openings in load-bearing bale walls must be a
23 minimum of one full bale length from any outside corner, unless exceptions are designed
24 by an engineer or architect licensed by the State to practice as such, and approved by the
25 building official.

26 Openings in exterior bale walls must not exceed 50 percent of the total wall area, based
27 on interior dimensions, where the wall is providing resistance to lateral loads, unless the
28 structure is designed by an engineer or architect licensed by the state and approved by
29 the building official. Wall and/or roof load above any opening must be supported or
30 transferred to the bales.

31 **Section 3605.7.8 Moisture protection for walls.** All weather-exposed bale walls must
32 be protected from water damage. A moisture barrier may be used to protect the bottom
33 course of the bales. The barrier must be water vapor permeable and must cover no more
34 than the lower one-third of the vertical exterior wall surface, in order to allow natural
35 transpiration of moisture from the bales. The moisture barrier must have its upper edge
36 inserted at least 6 inches into the horizontal joint between two courses of bales, and must
37 extend at least 3 inches below the top of the foundation. Bale walls must have special

1 moisture protection provided at all window sills and other openings. Unless protected by
2 a roof, the tops of walls must also be protected. This moisture protection must consist of
3 a waterproof membrane, such as asphalt-impregnated felt paper, polyethylene sheeting,
4 or other acceptable moisture barrier, installed in such manner as to prevent water from
5 entering the wall system at window sills, other openings, or at the tops of the walls.

6 **Section 3605.7.9 Wall finishes.** Interior and exterior surfaces of bale walls must be
7 protected from mechanical damage, flame, animals, and prolonged exposure to water.
8 Bale walls adjacent to bath and shower enclosures must be protected by an approved
9 moisture barrier, or a 3½" air gap.

10 Cement stucco must be reinforced with galvanized wire mesh, 20 gauge minimum or an
11 acceptable equivalent. The reinforcement must be secured to the wall at a maximum
12 spacing of 24 inches horizontally and 16 inches vertically, using a method approved by
13 the building official.

14 Where bales abut other materials the plaster/stucco must be reinforced with galvanized
15 expanded metal lath, or an acceptable equivalent, extending a minimum of 6 inches onto
16 the bales.

17 Earthen and lime-based plasters may be applied directly onto the exterior and interior
18 surface of bale walls without reinforcement, except where applied over materials other
19 than straw. Weather-exposed earthen plasters must be stabilized using a method
20 approved by the building official.

21 Lime based plasters may be applied directly onto the exterior surface of bale walls
22 without reinforcement, except where applied over materials other than straw.

23 **Section 3605.7.10 Electrical.** All wiring within or on bale walls must meet all
24 provisions of the National Electrical Code adopted by this jurisdiction. Type NM or UF
25 cable may be used, or wiring may be run in metallic or non-metallic conduit systems.
26 Electrical boxes must be securely attached to wooden stakes driven a minimum of 12
27 inches into the bales, or an acceptable equivalent.

28 **Section 3605.7.11 Plumbing.** Water or gas pipes within bale walls must be encased in a
29 continuous pipe. Where mounts are mounted on bale walls, they must be isolated from
30 the bales by a moisture barrier.

31 **Section 3606 PRIVACY AND LANDSCAPE WALLS**

32 **Section 3606.1 General.** This section covers free- standing or attached bale privacy or
33 landscape walls, not exceeding 6 feet in height, from final grade to top of wall. Bales
34 may be stacked either flat or on-edge. Alternate methods, other than those listed in this
35 section, may be approved by the building official.

1 **Section 3606.2 Foundations.** The minimum foundation must consist of an 8 inch thick
2 reinforced concrete stem wall, over an approved footing. Minimum width of the stem
3 wall must be equal to the width of the bottom bale. Stem walls must have continuous
4 horizontal reinforcement consisting of two #4 bars with 24 inches minimum lap at
5 splices.

6 **Section 3606.2.1 Reinforcement.** Vertical reinforcing bars, a minimum 3/8" in
7 diameter, must be placed in the center of the stem wall, two per bale, and extend up a
8 minimum of 24 inches, and be embedded a minimum of 4 inches into the concrete stem
9 wall. Bales must be pinned per Section 3605.7.5. or using two 3/8" diameter bars per
10 bale, and use pins long enough to provide at least one vertical bar from stem wall to top
11 of wall, with a minimum of one full bale overlap where not continuous.

12 Wire mesh must be mechanically attached to the wall. An acceptable method must be
13 12d or larger common duplex nails embedded in the concrete a minimum of 1 inch below
14 the top of the stem wall, with the heads embedded a minimum of 2 inches into the
15 concrete, and the points extending a minimum of 3/4" from the face of the stem wall, and
16 spaced a minimum of 6" on center on both sides of the wall.

17 **Section 3606.2.2 Moisture barrier.** An approved moisture barrier must be used
18 between the top of the stem wall and the first course of bales. A moisture barrier must be
19 used to protect the tops of bales at the top of walls, and must extend 6 inches down on
20 either side of the wall.

21 **Section 3606.2.3 Stucco mesh.** Stucco mesh, 20 gauge or heavier, must be attached by
22 means of clinching the embedded nails on one side of the wall, stretching a continuous
23 piece of netting tightly over the top of the wall, and fastening the netting the same
24 manner on the opposite wide of the wall.

25 **Section 3606.2.4 Wall finish.** Walls must be finished with cement stucco, or stabilized
26 mud plaster, with a minimum thickness of 7/8".

27 **APPENDIX G FLOOD-RESISTANT CONSTRUCTION**

28 The provisions contained in this appendix are mandatory.

29 **SECTION G100 STATUTORY AUTHORIZATION**

30 As a home-rule city, the City of Austin has the responsibility and power to adopt
31 regulations designed to minimize flood losses. The Legislature of the State of Texas has
32 in Sections 16.3145 and 16.315 of the Texas Water Code authorized local government
33 units to adopt regulations designed to minimize flood losses.
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SECTION G101 ADMINISTRATION

G101.1 Purpose. The purpose of this appendix is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific flood hazard areas through the establishment of comprehensive regulations for management of flood hazard areas designed to:

1. Prevent unnecessary disruption of commerce, access and public service during times of flooding;
2. Manage the alteration of natural flood plains, stream channels and shorelines;
3. Manage filling, grading, dredging and other development which may increase flood damage or erosion potential;
4. Prevent or regulate the construction of flood barriers which will divert floodwaters or which can increase flood hazards; and
5. Contribute to improved construction techniques in the flood plain.
6. Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities;
7. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction.

G101.2 Objectives. The objectives of this appendix are to protect human life, minimize the expenditure of public money for flood control projects, minimize the need for rescue and relief efforts associated with flooding, minimize prolonged business interruption, minimize damage to public facilities and utilities, help maintain a stable tax base by providing for the sound use and development of flood-prone areas, contribute to improved construction techniques in the flood plain and ensure that potential owners and occupants are notified that property is within flood hazard areas.

G101.3 Scope. The provisions of this appendix shall apply to all proposed development in a flood hazard area established in Section 1612 (*Flood Loads*) of this code.

G101.4 Violations. Any violation of a provision of this appendix, or failure to comply with a permit or variance issued pursuant to this appendix or any requirement of this appendix, shall be handled in accordance with Section 113 (*Violations*).

SECTION G102 APPLICABILITY

G102.1 General. This appendix, in conjunction with the Building Code, provides minimum requirements for development located in flood hazard areas, including the subdivision of land, installation of utilities, placement and replacement of manufactured homes, new construction and repair, reconstruction, rehabilitation, or additions to new construction and substantial improvement of existing buildings and structures, including restoration after damage.

G102.2 Establishment of flood hazard areas. Flood hazard areas are established in Section 1612.3 (*Establishment of flood hazard areas*).

G102.3. Nonconforming Uses.

A structure, or the use of a structure or premises, which was lawful before the adoption of the Building Code, but which does not conform with the requirements of these regulations, may be continued subject to the following conditions:

1. No such use shall be expanded, changed, enlarged, or altered in a way which increases its nonconformity.
2. No substantial improvement of the structure shall be made unless the structure is changed to conform to these regulations.
3. If a nonconforming use is discontinued for a period of 90 days, any future use of the building or premises shall conform to these regulations.
4. Any nonconforming use or structure which is destroyed by means, including floods, to an extent of 50 percent or more of its market value, shall not be reconstructed except in conformance with the provisions of these regulations.

SECTION G103 POWERS AND DUTIES

G103.1 Permit applications. The building official shall review all permit applications to determine whether proposed development sites will be reasonably safe from flooding. If a proposed development site is in a flood hazard area, all site development activities, including grading, filling, utility installation and drainage modification, and all new construction and substantial improvements (including the placement of prefabricated buildings and manufactured homes) shall, at a minimum, be designed and constructed with methods, practices and materials that minimize flood damage and that are in accordance with this code and ASCE 24.

G103.2 Other permits. It shall be the responsibility of the building official to assure that approval of a proposed development shall not be given until proof that necessary

1 permits have been granted by federal or state agencies having jurisdiction over such
2 development.

3
4 **G103.3 Determination of design flood elevations.** If design flood elevations are not
5 specified, the building official is authorized to require the applicant to:

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7 1. Obtain, review and reasonably utilize data available from a federal, state or
8 other source, or
9
10 2. Determine the design flood elevation in accordance with the 100-year
11 floodplain based on projected full development in accordance with the City of
12 Austin Drainage Criteria Manual. Such analyses shall be performed and sealed
13 by a Professional Engineer licensed by the State of Texas. Studies, analyses
14 and computations shall be submitted in sufficient detail to allow review and
15 approval by the building official. The accuracy of data submitted for such
16 determination shall be the responsibility of the applicant.
17

18 **G103.4 Activities in riverine flood hazard areas.** In riverine situations, the building
19 official shall not permit any new construction, substantial improvement or other
20 development, including fill, unless the applicant demonstrates that the cumulative effect
21 of the proposed development, when combined with all other existing and anticipated
22 development, will not increase the design flood elevation at any point that results in
23 additional adverse flooding on other property.
24

25 **G103.5 Floodway encroachment.** Prior to issuing a permit for any floodway
26 encroachment, including fill, new construction, substantial improvements and other
27 development or land-disturbing activity, the building official shall require submission of
28 a certification by a Professional Engineer licensed by the State of Texas, along with
29 supporting technical data in accordance with the City of Austin Drainage Criteria
30 Manual, that demonstrates that such development will not cause any increase of the level
31 of the design flood.
32

33 **G103.5.1 Floodway revisions.** A floodway encroachment that increases the level of the
34 design flood may be considered for a variance only if the applicant has applied for a
35 conditional Flood Insurance Rate Map (FIRM) revision and has received the approval of
36 the Federal Emergency Management Agency (FEMA).
37

38 **G103.6 Watercourse alteration.** Prior to issuing a permit for any alteration or
39 relocation of any watercourse, the building official shall require the applicant to provide
40 notification of the proposal to the appropriate authorities of all affected adjacent

government jurisdictions, as well as appropriate state agencies. A copy of the notification shall be maintained in the permit records and submitted to FEMA.

G103.6.1 Engineering analysis. The building official shall require submission of an engineering analysis in accordance with the City of Austin Drainage Criteria Manual performed and sealed by a Professional Engineer licensed by the State of Texas which demonstrates that the flood-carrying capacity of the altered or relocated portion of the watercourse will not be decreased. Such watercourses shall be maintained in a manner which preserves the channel's flood-carrying capacity.

G103.8 Records. The building official shall maintain a permanent record of all permits issued in flood hazard areas, including copies of inspection reports and certifications required in Section 1612 (*Flood Loads*).

SECTION G104 PERMITS

G104.1 Required. Any person, owner or authorized agent who intends to conduct any development in a flood hazard area shall first make application to the building official and shall obtain the required permit.

G104.2 Application for permit. The applicant shall file an application in writing on a form furnished by the building official. Such application shall:

1. Identify and describe the development to be covered by the permit.
2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitely locate the site.
3. Include a site plan showing the delineation of flood hazard areas, floodway boundaries, flood zones, design flood elevations, ground elevations, proposed lowest floor elevation, proposed fill and excavation and drainage patterns and facilities.
4. Indicate the use and occupancy for which the proposed development is intended.
5. Be accompanied by construction documents, grading and filling plans and other information deemed appropriate by the building official.
6. State the valuation of the proposed work.

1
2 7. Be signed by the applicant or the applicant's authorized agent.
3

4 **G104.3 Validity of permit.** The issuance of a permit under this appendix shall not be
5 construed to be a permit for, or approval of, any violation of this appendix or any other
6 ordinance of the jurisdiction. The issuance of a permit based on submitted documents and
7 information shall not prevent the building official from requiring the correction of errors.
8 The building official is authorized to prevent occupancy or use of a structure or site
9 which is in violation of this appendix or other ordinances of the City of Austin.
10

11 **G104.4 Expiration.** A permit shall become invalid if the proposed development is not
12 commenced within 180 days after its issuance, or if the work authorized is suspended or
13 abandoned for a period of 180 days after the work commences. Extensions shall be
14 requested in writing and justifiable cause demonstrated. The building official is
15 authorized to grant, in writing, one or more extensions of time, for periods not more than
16 180 days each.
17

18 **G104.5 Suspension or revocation.** The building official is authorized to suspend or
19 revoke a permit issued under this appendix wherever the permit is issued in error or on
20 the basis of incorrect, inaccurate or incomplete information, or in violation of any
21 ordinance or code of the City of Austin.
22

23 **SECTION G105 VARIANCES** 24

25 **G105.1 General.** The City Council shall hear and decide requests for variances. The
26 City Council shall base its determination on technical justifications, and has the right to
27 attach such conditions to variances as it deems necessary to further the purposes and
28 objectives of this appendix and Section 1612 (*Flood Loads*).
29

30 **G105.2 Records.** The building official shall maintain a permanent record of all variance
31 actions, including justification for their issuance.
32

33 **G105.3 Historic structures.** A variance may be issued for the repair or rehabilitation of
34 a historic structure upon a determination that the proposed repair or rehabilitation will not
35 preclude the structure's continued designation as a historic structure, and the variance is
36 the minimum necessary to preserve the historic character and design of the structure.
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38 **Exception:** Within flood hazard areas, historic structures that are not:
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- 40 a. Listed or preliminarily determined to be eligible for listing in the National
41 Register of Historic Places; or

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- b. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
 - c. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

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G105.4 Functionally dependent facilities. A variance may be issued for the construction or substantial improvement of a functionally dependent facility provided the criteria in Section 1612.1 (*General*) are met and the variance is the minimum necessary to allow the construction or substantial improvement, and that all due consideration has been given to methods and materials that minimize flood damages during the design flood and create no additional threats to public safety.

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G105.5 Restrictions. The City Council shall not issue a variance for any proposed development in a floodway if any increase in flood levels would result during the design flood discharge.

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G105.6 Considerations. In reviewing applications for variances, the City Council shall consider all technical evaluations, all relevant factors, all other portions of this appendix and the following:

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- 1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage;
 - 2. The danger to life and property due to flooding or erosion damage;
 - 3. The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners;
 - 4. The importance of the services provided by the proposed development to the community;
 - 5. The availability of alternate locations for the proposed development that are not subject to flooding or erosion;
 - 6. The compatibility of the proposed development with existing and anticipated development;

7. The relationship of the proposed development to the comprehensive plan and flood plain management program for that area;
8. The safety of access to the property in times of flood for ordinary and emergency vehicles;
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and
10. The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

G105.7 Conditions for issuance. Variances shall only be issued by the City Council upon:

1. A technical showing of good and sufficient cause based on the unique characteristics of the size, configuration or topography of the site;
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable;
3. A determination that the granting of a variance 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 local laws or ordinances;
4. A determination that the variance is the minimum necessary, considering the flood hazard, to afford relief; and
5. Notification to the applicant in writing over the signature of the building official that the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance, and that such construction below the base flood level increases risks to life and property.

SECTION G201 DEFINITIONS

G201.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

1 **G201.2 Definitions.**

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4 **DEVELOPMENT.** Any man-made change to improved or unimproved real estate,
5 including but not limited to, buildings or other structures, temporary or permanent storage
6 of materials, mining, dredging, filling, grading, paving, excavations, operations and other
7 land disturbing activities.

8 **FUNCTIONALLY DEPENDENT FACILITY.** A facility which cannot be used for its
9 intended purpose unless it is located or carried out in close proximity to water, such as a
10 docking or port facility necessary for the loading or unloading of cargo or passengers,
11 shipbuilding or ship repair. The term does not include long-term storage, manufacture,
12 sales or service
13 facilities.

14
15 **MANUFACTURED HOME.** A structure that is transportable in one or more sections,
16 built on a permanent chassis, designed for use with or without a permanent foundation
17 when attached to the required utilities, and constructed to the Federal Mobile Home
18 Construction and Safety Standards and rules and regulations promulgated by the U.S.
19 Department of Housing and Urban Development. The term also includes mobile homes,
20 park trailers, travel trailers and similar transportable structures that are placed on a site
21 for 180 consecutive days or longer.

22 **MANUFACTURED HOME PARK OR SUBDIVISION.** A parcel (or contiguous
23 parcels) of land divided into two or more manufactured home lots for rent or sale.

24
25 **RECREATIONAL VEHICLE.** A vehicle that is built on a single chassis, 400 square
26 feet (37.16 m²) or less when measured at the largest horizontal projection, designed to be
27 self-propelled or permanently towable by a light-duty truck, and designed primarily not
28 for use as a permanent dwelling but
29 as temporary living quarters for recreational, camping, travel or seasonal use. A
30 recreational vehicle is ready for highway use if it is on its wheels or jacking system, is
31 attached to the site only by quick disconnect-type utilities and security devices and has no
32 permanently attached additions.
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35 **VARIANCE.** A grant of relief from the requirements of this section which permits
36 construction in a manner otherwise prohibited by this section where specific enforcement
37 would result in unnecessary hardship.

38
39 **VIOLATION.** A development that is not fully compliant with this appendix or Section
40 1612 (*Flood Loads*), as applicable.
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SECTION G301 SUBDIVISIONS

G301.1 General. Any subdivision proposal, including proposals for manufactured home parks and subdivisions, or other proposed new development in a flood hazard area shall be reviewed to assure that:

1. All such proposals are consistent with the need to minimize flood damage;
2. All public utilities and facilities, such as sewer, gas, electric and water systems are located and constructed to minimize or eliminate flood damage; and
3. Adequate drainage is provided to reduce exposure to flood hazards.

G301.2 Subdivision requirements. The following requirements shall apply in the case of any proposed subdivision, including proposals for manufactured home parks and subdivisions, any portion of which lies within a flood hazard area:

1. The flood hazard area, including floodways, as appropriate, shall be delineated on tentative and final subdivision plats;
2. Design flood elevations shall be shown on tentative and final subdivision plats;
3. Residential building lots shall be provided with adequate buildable area outside the floodway; and
4. The design criteria for utilities and facilities set forth in this appendix, Section 1612 of ASCE 24, the City of Austin Drainage Criteria Manual, and applicable FEMA design criteria shall be met.

SECTION G401 SITE IMPROVEMENT

G401.1 Development in floodways. Development or land disturbing activity shall not be authorized in the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed and sealed by a Professional Engineer licensed by the State of Texas in accordance with the City of Austin Drainage Criteria Manual that the proposed encroachment will not result in any increase in the level of the design flood.

G401.2 Sewer facilities. All new or replaced sanitary sewer facilities, private sewage treatment plants (including all pumping stations and collector systems) and on-site waste disposal systems shall be designed in accordance with Chapter 8, ASCE 24, to minimize

1 or eliminate infiltration of floodwaters into the facilities and discharge from the facilities
2 into floodwaters, or impairment of the facilities and systems.

4 **G401.3 Water facilities.** All new replacement water facilities shall be designed in
5 accordance with the provisions of Chapter 8, ASCE 24, to minimize or eliminate
6 infiltration of floodwaters into the systems.

8 **G401.4 Storm drainage.** Storm drainage shall be designed to convey the flow of
9 surface waters to minimize or eliminate damage to persons or property.

11 **G401.5 Streets and sidewalks.** Streets and sidewalks shall be designed to minimize
12 potential for increasing or aggravating flood levels.

14 **SECTION G501 MANUFACTURED HOMES**

16 **G501.1 Elevation.** All new and replacement manufactured homes to be placed or
17 substantially improved in a flood hazard area shall be elevated such that the lowest floor
18 of the manufactured home is elevated to a minimum of one (1) foot above the design
19 flood elevation. Elevation certification required by Section 1612.5 (Flood hazard
20 documentation) shall be submitted to the building official.

22 **G501.2 Foundations.** All new and replacement manufactured homes, including
23 substantial improvement of existing manufactured homes, shall be placed on a
24 permanent, reinforced foundation that is designed in accordance with Section 1612
25 (Flood Loads).

27 **G501.3 Anchoring.** All new and replacement manufactured homes to be placed or
28 substantially improved in a flood hazard area shall be installed using methods and
29 practices which minimize flood damage. Manufactured homes shall be securely anchored
30 to an adequately anchored foundation system to resist flotation, collapse and lateral
31 movement. Methods of anchoring are authorized to include, but are not limited to, use of
32 over-the-top or frame ties to ground anchors. This requirement is in addition to applicable
33 state and local anchoring requirements for resisting wind forces.

35 **SECTION G601 RECREATIONAL VEHICLES**

37 **G601.1 Placement prohibited.** The placement of recreational vehicles shall not be
38 authorized in floodways.

G601.2 Temporary placement. Recreational vehicles in flood hazard areas shall be fully licensed and ready for highway use, and shall be placed on a site for less than 180 consecutive days.

G601.3 Permanent placement. Recreational vehicles that are not fully licensed and ready for highway use, or that are to be placed on a site for more than 180 consecutive days, shall meet the requirements of Section G501 for manufactured homes.

SECTION G701 TANKS

G701.1 Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

Above-ground tanks. Above-ground tanks in flood hazard areas shall be elevated to or above the design flood elevation or shall be anchored or otherwise designed and constructed to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

Tank inlets and vents. In flood hazard areas, tank inlets, fill openings, outlets and vents shall be:

1. At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood.
2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

SECTION G702 REFERENCED STANDARDS

ASCE 24-98	Flood Resistance Design And Construction	G103.1 G401.3, G401.4
HUD 24 CFR Part 3280-94	Manufactured Home Construction and Safety Standards, 1994	G201
IBC-2003	International Building Code	G102.2

PART 2. Chapter 25-12 is amended to renumber Article 12 (*Administration of Technical Codes*) as Article 13 and to readopt the 2000 International Energy Code as a new Article 12 to read as follows:

ARTICLE 12. ENERGY CODE.

§ 25-12-261 ENERGY CODE

(A) The International Energy Conservation Code, 2000 edition, published by the International Code Council, Inc., is adopted and incorporated by reference into this section with the deletions and amendments in Subsections (B) and Section 25-12-263 (*Local Amendments to the Energy Code*).

(B) The following provisions of the 2000 International Energy Conservation Code are deleted:

Section 102.5.1.1	Section 503.3.3.4.1	Section 802.2.8
Section 201.3	Section 503.3.3.4.2	Section 802.2.9
Table No. 302.1	Section 601.3.1	Table 802.2(1)
Section 402.1.1	Section 801.2	Table 802.2(2)
Section 402.2	Section 802.1	Table 802.2(3)
Section 402.2.1	Section 802.2	Table 802.2(4)
Section 402.2.2	Section 802.2.1	Section 803.2.6
Section 402.2.3	Section 802.2.3	Section 803.3.4
Section 502.1.1	Section 802.2.4	Section 803.3.8.1
Table 502.2	Section 802.2.5	Chapter 9 – ASHRAE
Section 503.1	Section 802.2.6	Chapter 9 – ICC
Section 503.3.3.4	Section 802.2.7	

(C) The City Clerk shall file a copy of the 2003 International Building Code with the official ordinances of the City.

§ 25-12-262 CITATIONS TO THE ENERGY CODE.

In the City Code, "Energy Code" means the International Energy Conservation Code adopted by Section 25-12-261 (*Energy Code*).

§ 25-12-263 LOCAL AMENDMENTS TO THE ENERGY CODE

The Energy Code adopted by Section 25-12-261 (*Energy Code*) is amended to add the following provisions as local amendments. Each provision of this section is a substitute for the identically numbered provisions deleted by Section 25-12-261 (*Energy Code*) or an addition to the Energy Code.

201.3 Terms defined in other codes. Terms not defined in this Code that are defined in the Building Code, Electrical Code, Fire Code, Mechanical Code or the Plumbing Code, have the meaning ascribed to them as in those codes.

**TABLE 302.1
EXTERIOR DESIGN CONDITIONS**

CONDITION	VALUE
Winter ^a , Design Dry-bulb (°F)	28
Summer ^a , Design Dry-bulb (°F)	98
Summer ^a , Design Wet-bulb (°F)	74
Degree days heating ^b	1735
Degree days cooling ^b	2862
Climate Zone ^c	5B

For SI: °C = [(°F)-32]/1.8.

- a. The outdoor design temperature shall be selected from the columns of 0.4 percent values for winter and 0.4 percent values for summer from tables in the Handbook of Fundamentals published by ASHRAE. Adjustments shall be permitted to reflect local climates, which differ from the tabulated temperatures, or local weather experience determined by the building official.
- b. The degree-days heating (base 65°F) and cooling (base 65°F) shall be selected from the Energy Conservation Design Standards for New State Buildings, State Energy Conservation Office, State of Texas (effective June 1, 1989, as revised May 10, 1990 and February 1, 1993).
- c. The climate zone shall be selected from Figure 302.1(44).

402.1.1 Standard design. A building designed in accordance with this chapter complies with this Code if the calculated annual energy cost is not greater than a similar building (defined as a "Standard design") whose enclosure elements and energy-consuming systems are designed in accordance with Chapter 5. The annual energy costs shall be

estimated using either energy rates published by the serving energy supplier that would apply to the actual building or the Department of Energy State-Average Energy Prices published by Department of Energy's Energy Information Administration that would apply to the actual building.

502.1.1 Moisture control. The design shall not create conditions of accelerated deterioration from moisture condensation. A vapor barrier (less than 1.0 perm) may not be installed. The vapor retarder shall have a permanence rating greater than 1.0 perm ($5.72 \times 10^{-8} \text{ g/Pa} \cdot \text{s} \cdot \text{m}^2$) when tested in accordance with Procedure A of ASTM E 96.

502.1.6 Attic ventilation. Attic ventilation shall be installed in accordance with the most recently adopted Building Code or the One and Two Family Dwelling Code. Ventilation shall not be provided when it introduces unconditioned air into locations inside the thermal envelope of the building.

TABLE 502.2^a
HEATING AND COOLING CRITERIA

ELEMENT	MODE	TYPE A-1 RESIDENTIAL BUILDINGS	TYPE A-2 RESIDENTIAL BUILDINGS
		U_o	U_o
Walls	Heating or Cooling	0.21	0.31
Roof/ceiling	Heating or Cooling	0.036	0.036
Floors over unheated spaces	Heating or Cooling	0.07	0.07
Heated slab on grade ^{b, f}	Heating	R-6	R-6
Unheated slab on grade ^{c, d, f}	Heating	None required	None required
Basement wall ^{c, f}	Heating or Cooling	0.17	0.17
Crawl space wall ^{c, f}	Heating or Cooling	0.15	0.15

For SI: $1 \text{ Btu/h} \cdot \text{ft}^2 \cdot ^\circ\text{F} = 5.678 \text{ W}/(\text{m}^2 \cdot \text{K})$, $^\circ\text{C} = (^\circ\text{F} - 32)/1.8$.

- Values shall be determined by using the graphs [Figures 502.2(1), 502.2(2), 502.2(3), 502.2(4), 502.2(5), 502.2(6)] using HDD as specified in Section 302.
- There are no insulation requirements for heated slabs in locations having less than 500 Fahrenheit HDD.
- There are no insulation requirements for unheated slabs in locations having less than 2,500 Fahrenheit HDD.

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- d. Slab edge insulation is not required for unheated slabs in areas of very heavy termite infestation probability in accordance with Section 502.2.1.4 and as shown in Figure 502.2(7).
 - e. Basement and crawl space U-factors shall be based on wall components and surface air films. Adjacent soil shall not be considered in the determination of the U-factor.
 - f. Typical foundation insulation techniques are provided in the DOE Building Foundation Design Handbook.

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503.1 General. This section covers mechanical systems and equipment used to provide heating, ventilating, and air-conditioning functions. This section assumes that residential buildings an dwelling units in residential buildings will be designed with individual HVAC systems. If equipment not shown in Table 503.2 is specified, the equipment shall meet the provisions of Section 803.2.2 and 803.3.2.

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503.1.1 Space Heating. In all Type A-1 and individually metered Type A-2 units in excess of 500 square feet, the primary source of space heating may not be electric resistance.

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503.3.3.4 Duct construction. Ductwork shall be constructed and erected in accordance with the Mechanical Code.

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503.3.3.4.1 High and medium pressure duct systems. All ducts and plenums operating at static pressures greater than 2 in. w.g. (500 Pa) shall be insulated and sealed in accordance with Section 803.2.8 of this Code. Documentation of leak testing shall be provided for ducts operating at static pressures in excess of 3 in. w.g. (750 Pa). Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the Mechanical Code.

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503.3.3.4.2 Low pressure duct systems. All longitudinal and transverse joints, seams, and connections of supply and return ducts operating at static pressures less than or equal to 2 in. w.g. (500 Pa) shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, or tapes installed in accordance with the manufacturer's installation instructions. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the Mechanical Code.

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Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches w.g. (500 Pa) pressure classification.

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504.2.1.1 Water Heating. In all Type A-1 and individually metered Type A-2 units in excess of 500 square feet, the primary source of hot water may not be electric resistance. An electric resistance system is permitted if piped in series with the primary system.

1 **601.3.1 Insulation.** The thermal resistance (R-value) shall be indicated on all insulation
2 and the insulation installed so that the R-value can be verified during inspection, or a
3 certification of the installed R-value shall be provided at the job site by the insulation
4 installer. When blown-in or sprayed insulation is applied in walls, the installer shall
5 provide a certification of the installed density and R-value. When blown-in or sprayed
6 insulation is applied in the roof/ceiling assembly, the installer shall provide a certification
7 of the initial thickness, settled thickness, coverage area, and number of bags of insulating
8 material installed.
9

10 **801.2 Application.** The requirements in Sections 802, 803, 804, and 805 shall each be
11 met. If one or more of these sections is not satisfied, compliance for that section shall be
12 demonstrated in accordance with the applicable provisions of ASHRAE/IES 90.1.
13

14 **Exception:** Buildings that comply with Section 806 if the following provisions are
15 met, as applicable: 802.1.2, 802.3, 803.2.1, 803.3.1, 803.2.2, 803.3.2, 803.2.3,
16 803.3.3, 803.2.8, 803.3.6, 803.2.9, 803.3.7, 804, 805.2, 805.3, and 805.5.
17

18 **802.1 General.** Walls, roof assemblies, floors, glazing, and slabs on grade which are
19 part of the building envelope for buildings where the window and glazed door area is not
20 greater than 50 percent of the gross area of above-grade walls shall meet the requirements
21 of Sections 802.2.1 through 802.2.8, as applicable. Buildings with more glazing shall
2 meet the applicable provisions of ASHRAE/IES 90.1.
23

24 **802.2 Criteria.** The building envelope components shall meet the applicable
25 requirements in Table 802.2(15) based on the percentage of wall that is glazed. The
26 percentage of wall that is glazed shall be determined by dividing the aggregate area of
27 rough openings for glazing (windows and glazed doors) in all the above-grade walls
28 associated with the building envelope by the total gross area of all above-grade exterior
29 walls that are a part of the building envelope. In buildings with multiple types of
30 building envelope construction, each building envelope construction type shall be
31 evaluated separately. If Table 802.2(15) does not list a particular construction type, the
32 applicable provisions of ASHRAE/IES 90.1 shall be used instead of Section 802 of this
33 Code.
34

35 **802.2.1 Above-grade walls.** The minimum Thermal resistance (R-value) of the
36 insulating material(s) installed in the wall cavity between the framing members and
37 continuously on the walls shall be as specified in Table 802.2(15), based on framing type
38 and construction materials used in the wall assembly. When both cavity and continuous
39 insulation values are provided in Table 802.2(15), both requirements shall be met.
40 Concrete masonry units (CMU) at least 8-inch (203 mm) nominal thickness with
41 essentially equal amounts of mass on either side of the insulation layer are considered as

1 having integral insulation, however, the thermal resistance of that insulation shall not be
2 considered when determining compliance with Table 802.2(15). "Other masonry walls"
3 includes walls weighing at least 35 lb/ft² (170kg/m²) of wall surface area and do not
4 include CMUs less than 8 inches (203 mm) nominal thickness.

5
6 **802.2.3 Windows and glass doors.** The maximum solar heat gain coefficient (SHGC)
7 and thermal transmittance (U-factor) of window assemblies and glass doors located in the
8 building envelope shall be as specified in Table 802.2(15), based on the window
9 projection factor.

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11 The window projection factor shall be determined in accordance with Equation 8-1.

12
13 $PF = A/B$ (Equation 8-1)

14
15 Where:

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17 PF = Projection factor (decimal).

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19 A = Distance measured horizontally from the furthest continuous extremity of any
20 overhang, eave, or permanently attached shading device to the vertical surface of the
21 glazing.

22
23 B = Distance measured vertically from the bottom of the glazing to the underside of the
24 overhang, eave, or permanently attached shading device.

25
26 When different windows or glass doors have different PF values, they shall be evaluated
27 separately, or an area-weighted PF value shall be calculated and used for all windows
28 and glass doors.

29
30 **802.2.4 Roof assembly.** The minimum thermal resistance (R-value) of the insulating
31 material installed either between the roof framing or continuously on the roof assembly
32 shall be as specified in Table 802.2(15), based on construction materials used in the roof
33 assembly.

34
35 **802.2.5 Skylights.** Skylights located in the building envelope shall be limited to 3
36 percent of the gross roof assembly area and shall have a maximum thermal transmittance
37 (U-factor) of the skylight assembly as specified in Table 802.2(15).

38
39 **802.2.6 Floors over outdoor air or unconditioned space.** The minimum thermal
40 resistance (R-value) of the insulating material installed either between the floor framing

1 or continuously on the floor assembly shall be as specified in Table 802.2(15), based on
2 construction materials used in the floor assembly.

4 **802.2.9 Interior walls.** The minimum thermal resistance (R-value) of the insulating
5 material installed in the wall cavity or continuously on the interior walls shall be as
6 specified in Table 802.2(15) for above-grade walls, regardless of glazing area, based on
7 framing type and construction materials used in the wall assembly.

9 **803.2.6 Cooling with outdoor air.** Each system over 90,000 Btu/h (26 379 W) cooling
10 capacity or 3000 cfm (1416 L/s) located in other than Climate Zones 1, 2, or 3b as shown
11 in Table 302.1 shall have an economizer that will automatically shut off the cooling
12 system and allow all of the supply air to be provided directly from outdoors.

14 Economizers shall be capable of operating at 100 percent outside air, even if additional
15 mechanical cooling is required to meet the cooling load of the building. When a single
16 room or space is supplied by multiple air systems, the aggregate capacity of those
17 systems shall be used in applying this requirement.

19 **Exceptions:**

- 21 1. When the cooling equipment is covered by the minimum efficiency
22 requirements of Tables 803.2.2(1) or 803.2.2(2) and meets the efficiency
23 requirements of Table 803.2.6.
- 25 2. Systems with air or evaporatively cooled condensers and which serve spaces
26 with open case refrigeration or that require filtration equipment in order to meet
27 the minimum ventilation requirements of Chapter 4 of the Mechanical Code.

29 **803.3.4 Requirements for complex mechanical systems serving multiple zones.**
30 Systems serving multiple zones shall be VAV systems which, during periods of
31 occupancy, are designed and capable of being controlled to reduce primary air supply to
32 each zone to a minimum before reheating, recooling, or mixing takes place. Sections
33 803.3.4.1 through 803.3.4.4 of this Code apply to complex mechanical systems.

35 **Exceptions:**

- 37 1. Zones where special pressurization relationships or cross-contamination
38 requirements are such that VAV systems are impractical.

2. When at least 75 percent of the energy for reheating or for providing warm air in mixing systems is provided from a site-covered or site-solar energy source.
3. Zones where special humidity levels are required to satisfy process needs.
4. Zones with a peak supply air quantity of 300 cfm (142L/s) or less and where the flow rate is less than 10 percent of the total fan system supply airflow rate.
5. Zones where the volume of air to be reheated, recooled, or mixed is not greater than the volume of outside air required to meet the minimum ventilation requirements of Chapter 4 of the Mechanical Code.
6. Systems with zone thermostatic and humidistatic controls capable of operating the supply of heating and cooling energy to the zone in sequence and which are capable of preventing reheating, recooling, mixing or simultaneous supply of air that has been previously mechanically cooled and air that has been previously mechanically heated.

803.3.8.1 Air system balancing. Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with Chapter 6 of the Mechanical Code. Discharge dampers are prohibited on constant volume fans and variable fans with motors 25 hp and larger.

Chapter 9 – Referenced Standards

AHSRAE American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, NE
Atlanta, Georgia 30329-2305

Standard Reference Number	Title	Referenced in code section number
55 – 92	Thermal Environmental Conditions	202
62 – 89	Ventilation for Acceptable Indoor Air Quality	202

136 - 93	Method of Determining Air Change Rates in Detached Dwellings	402.1.1.10
ASHRAE/TES 90.1	Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings- 1999 Edition	503.1, 701.1, 801.2, 802.1, 802.2
ASHRAE 97	Handbook of Fundamentals	Table 302.1, 402.3.2, 502.2.1, 502.2.2, 503.3.1 803.2.1
ASHRAE 87	HVAC Systems and Applications Handbook	402.3.2, 504.2.2
ASHRAE 75	Energy Calculation I; Procedures for Determining Heating and Cooling Loads for Computerizing Energy Calculations, Algorithms, for Building Heat Transfer Subsystems	402.3.2
ASHRAE 75	Energy Calculations II; Procedures for Simulating the Performance of Components and Systems for Energy Calculations	402.3.2
ICBO	International Conference of Building Officials Whittier, CA 90601-2298	
	Title	Reference in code section number
	Electrical Code ¹	202
	Building Code ¹	202
	Uniform Fire Code ¹	202
	Mechanical Code ¹	202
	Plumbing Code ¹	202, 503.3.3.4, 803.2.5, 803.2.6, 803.3.4, 803.3.8.1
	One and Two Family Dwelling Code ¹	202

¹ The code referenced is the most recently adopted edition, including local amendments.

PART 3. This ordinance takes effect on December 31, 2005, at 11:59 p.m.

PASSED AND APPROVED

_____, 2005

§
§
§

Will Wynn
Mayor

APPROVED:

David Allan Smith
City Attorney

ATTEST:

Shirley A. Gentry
City Clerk