

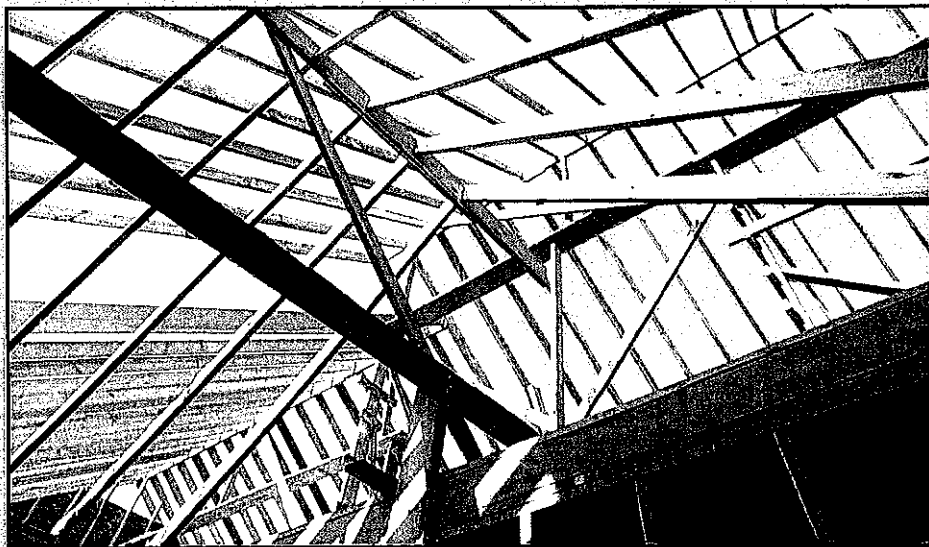
# HAMPSHIRE COUNTY

## **Building Codes Ordinance**

**2009**

**Amended—June 28, 2016**

**Effective—August 1, 2016**



# Hampshire County Commission

## Hampshire County Building Codes Ordinance

### Section I Legislative Rights

West Virginia Code 29-3-5b, mandated that as of the 1<sup>st</sup> day of July 1988, the State Fire Commission was obligated to promulgate comprehensive rules and regulations to safeguard life and property and to ensure the quality of construction of all structures erected or removed throughout this State and that said rules and regulation be known as the "State Building Codes";

West Virginia Code 7-1-3n, mandated on February 6, 1968, the county commissions are authorized and empowered to adopt building and housing codes establishing the regulating minimum building and housing standards.

Legislative Rule Title 87 – 4; Adopts the following State Building Code with amendments:

- 2015 International Building Code
- 2015 International Residential Code (delete Chapter 11)
- 2015 International Existing Building Code
- 2007 ANSI/ASHRAE/IESNA Standard 90.1
- 2015 International Plumbing Code
- 2015 International Mechanical Code
- 2015 International Fuel Gas Code
- 2009 International Energy Conservation Code
- 2009 ICC/ANSI A117.1 Accessible & Usable Buildings & Facilities
- 2015 International Property Maintenance Code
- 2014 NFPA 70, National Electric Code
- 2015 International Private Sewage Disposal Code

Including Appendices:

- 2015 International Building Code
  - Appendix G Flood-Resistant Construction
  - Appendix H Signs

- 2015 International Residential Code
  - Appendix E Manufactured Housing Used As Dwellings
  - Appendix F Radon Control Methods

### Section II Title

This Ordinance shall be known as the Hampshire County Building Code Ordinance.

### Section III Purpose

The purpose of this ordinance is to ensure the minimum building and housing standards for the purpose of improving health, safety, and well-being of Hampshire County citizens.

### Section IV Definitions

1. *ICC* means International Code Council , 5203 Leesburg Pike Suite 708, Falls Church, VA 22041-3401
2. *Building Code* means all aspects of safe building construction and mechanical operations and all safety aspects related to building construction and mechanical operations.
3. *County or Local Jurisdiction* means Hampshire County, West Virginia.
4. *Board of Appeals* is the body of which will consist of three to five individuals, each of which should be professionals of the building fields. Each should have knowledge in a different field or discipline and have at least ten years experience. Three individuals would form a quorum at any appeal hearing.
5. *Appeal Hearing* is a meeting with the Board of Appeals to hear grievances or issues pertaining to the Hampshire County Building Code.
6. *Hampshire County Building Code, HCBC*, is the entire contents of this ordinance and promulgated by West Virginia. Appendix G being attached in whole as part of this code.
7. *Building or Structure* is any improvement construction upon the land.

### Section V Permit

A building permit shall be required prior to the construction of any building or structure, residential or commercial. Any building or structure that is present at the time of adoption of this ordinance will be considered grandfathered. Whereas any improvement upon a grandfathered structure may take place then a permit will be required. No permit will be issued until all related materials are filed and conformity to all laws is adhered to. This ordinance exempts all appurtenant and agriculture structures.

### Section VI Application

An application must be filed with the building permit office before a building permit may be issued. The application shall have all pertinent information filed with it before progress can proceed to the building permit approval. Such information required may be site plans, architectural prints, material specifications, or any other information deemed necessary to make judgments on the proposed improvement.

## Section VII Inspection

It is the right of the citizen to have timely and professional inspections once the building permit is issued and construction begins. For this to be done the applicant must advise the inspector when the appropriate phases of construction are completed so that an inspection visit may be scheduled.

## Section VIII Use and Occupancy Permit

Once construction is completed and final inspection is conducted. A use and occupancy permit will be issued. The applicant can proceed with habitation or the intended usage of the building or structure.

## Section IX Stop Work Order

A stop work order may be issued upon discovery of a violation or violations of the Hampshire County Building Code. Applicants or contractors shall cease further building or construction until violations are improved to meet the code standards. Failure to adhere to a stop work order shall result in legal action taken by the Hampshire County Code Enforcement Officer.

## Section X Severability and County Liability

If any section, subsection, or paragraph, sentence, clause, phase, or word of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance which shall remain in full force and effect, and for this propose the provisions of this ordinance are hereby declared to be severable.

The granting of a permit or approval shall not constitute a representation, guarantee, or warranty of any kind by the Hampshire County Commission or by any other official, employee, or individual or company contracted thereof of the practicability or safety of the proposed use, and shall create no liability upon Hampshire County.

## Section XI Greater Requirements

Any existing ordinance that is more stringent or imposes a higher standard than is required by the codes enacted by this ordinance shall govern, provided such ordinance is not inconsistent with the laws of the State of West Virginia and is not contrary to recognized standards and good engineering practices. Any existing ordinance that is less stringent or imposes a lesser standard than is required by the codes of this ordinance is hereby amended to comply therewith.

Section XII                      Fee Schedule

A fee schedule will be enacted so that proper inspections will be made.

Section XIII                    Demolition

A building permit must be obtained for any demolition on an improvement in Hampshire County, West Virginia, whether the improvement exists prior the enacting date of this ordinance. No charge for a demolition permit will be administered.

Section XIV                    Refunds

It will be the policy of the Hampshire County Building Permit Office not to grant refunds on the fees enacted by this ordinance.

Section XV                    West Virginia State Fire Marshal Review

Commercial, Industrial, or other improvements not classified as residential or appurtenant structures shall have plans submitted to the West Virginia State Fire Marshal and followed by required inspections by the State Fire Marshal. A permit will not be issued by the Hampshire County Planning Office until approval from the State Fire Marshal is received and a use and occupancy permit will not be granted until signed off by the State Fire Marshal that the structure is ready for habitation.

Section XVI


Penalties

Any person who fails to comply with any or all of the requirements or provisions of this ordinance or direction of the Building Code Official or any other authorized employee of the county shall be guilty of an offense and, upon conviction, shall pay a fine to Hampshire County Commission of not less than fifty dollars (\$50.00) or more than five hundred dollars (\$500.00) plus cost of prosecution. Each day during which any violation of this Ordinance continues shall constitute a separate offense. In addition to the above penalties all other actions are hereby reserved including an action in equity for the proper enforcement of this Ordinance. The imposition of a fine or penalty for any violation of, or non-compliance with, this Ordinance shall not excuse the violation or non-compliance with the Ordinance or permit it to continue; and all such persons shall be required to correct or remedy such violations or non-compliances within a reasonable time. Any structure constructed, reconstructed, enlarged, altered or relocated in non-compliance with this Ordinance may be declared by Hampshire County to be a public nuisance and abatable as such.

This ordinance shall become effective August 1, 2016

  
Steve W. Slone, President,  
Hampshire County Commission

Passed this June 28, 2016.

Attest 



## APPENDIX G

# FLOOD-RESISTANT CONSTRUCTION

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

*User note: Code change proposals to this chapter will be considered by the IBC – Structural Code Development Committee during the 2016 (Group B) Code Development Cycle. See explanation on page iv.*

### 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 that may increase flood damage or erosion potential.
4. Prevent or regulate the construction of flood barriers that will divert floodwaters or that can increase flood hazards.
5. Contribute to improved construction techniques in the flood plain.

**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 of this code, including certain building work exempt from permit under Section 105.2.

**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 114.

### SECTION G102 APPLICABILITY

**G102.1 General.** This appendix, in conjunction with this code, provides minimum requirements for development located in flood hazard areas, including:

1. The subdivision of land.
2. Site improvements and installation of utilities.
3. Placement and replacement of manufactured homes.
4. Placement of recreational vehicles.
5. New construction and repair, reconstruction, rehabilitation or additions to new construction.
6. Substantial improvement of existing buildings and structures, including restoration after damage.
7. Installation of tanks.
8. Temporary structures.
9. Temporary or permanent storage, utility and miscellaneous Group U buildings and structures.
10. Certain building work exempt from permit under Section 105.2 and other buildings and development activities.

**G102.2 Establishment of flood hazard areas.** *Flood hazard areas* are established in Section 1612.3 of this code, adopted by the applicable governing authority on [INSERT DATE].

### SECTION G103 POWERS AND DUTIES

**G103.1 Permit applications.** All applications for permits must comply with the following:

1. The *building official* shall review all *permit* applications to determine whether proposed development is located in *flood hazard areas* established in Section G102.2.
2. Where a proposed development site is in a *flood hazard area*, all development to which this appendix is applicable as specified in Section G102.1 shall 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 ensure that approval of a proposed development shall not be given until proof that necessary permits have been granted by federal or state agencies having jurisdiction over such development.

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

1. Obtain, review and reasonably utilize data available from a federal, state or other source; or
2. Determine the design flood elevation in accordance with accepted hydrologic and hydraulic engineering techniques. Such analyses shall be performed and sealed by a *registered design professional*. Studies, analyses and computations shall be submitted in sufficient detail to allow review and approval by the *building official*. The accuracy of data submitted for such determination shall be the responsibility of the applicant.

**G103.4 Activities in riverine flood hazard areas.** In riverine *flood hazard areas* where design flood elevations are specified but *floodways* have not been designated, the *building official* shall not permit any new construction, substantial improvement or other development, including fill, unless the applicant submits an engineering analysis prepared by a *registered design professional*, demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated *flood hazard area* encroachment, will not increase the design flood elevation more than 1 foot (305 mm) at any point within the community.

**G103.5 Floodway encroachment.** Prior to issuing a *permit* for any *floodway* encroachment, including fill, new construction, substantial improvements and other development or land-disturbing activity, the *building official* shall require submission of a certification, prepared by a *registered design professional*, along with supporting technical data, demonstrating that such development will not cause any increase of the base flood level.

**G103.5.1 Floodway revisions.** A *floodway* encroachment that increases the level of the base flood is authorized if the applicant has applied for a conditional Flood Insurance Rate Map (FIRM) revision and has received the approval of the Federal Emergency Management Agency (FEMA).

**G103.6 Watercourse alteration.** Prior to issuing a *permit* for any alteration or relocation of any watercourse, the *building official* shall require the applicant to provide 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, prepared by a *registered design professional*, demonstrating 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 that preserves the channel's flood-carrying capacity.

**G103.7 Alterations in coastal areas.** Prior to issuing a *permit* for any alteration of sand dunes and mangrove stands in coastal high-hazard areas and coastal A zones, the *building official* shall require submission of an engineering analysis, prepared by a *registered design professional*, demonstrating that the proposed alteration will not increase the potential for flood damage.

**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.

**G103.9 Inspections.** Development for which a *permit* under this appendix is required shall be subject to inspection. The *building official* or the *building official's* designee shall make, or cause to be made, inspections of all development in *flood hazard areas* authorized by issuance of a *permit* under this appendix.

## SECTION G104 PERMITS

**G104.1 Required.** Any person, owner or owner's 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 fill and excavation and drainage patterns and facilities.
4. Include in subdivision proposals and other proposed developments with more than 50 lots or larger than 5 acres (20 234 m<sup>2</sup>), base flood elevation data in accordance with Section 1612.3.1 if such data are not identified for the *flood hazard areas* established in Section G102.2.
5. Indicate the use and occupancy for which the proposed development is intended.
6. Be accompanied by construction documents, grading and filling plans and other information deemed appropriate by the *building official*.
7. State the valuation of the proposed work.
8. Be signed by the applicant or the applicant's authorized agent.

**G104.3 Validity of permit.** The issuance of a *permit* under this appendix shall not be construed to be a *permit* for, or approval of, any violation of this appendix or any other ordi-

nance of the jurisdiction. The issuance of a *permit* based on submitted documents and information shall not prevent the *building official* from requiring the correction of errors. The *building official* is authorized to prevent occupancy or use of a structure or site that is in violation of this appendix or other ordinances of this jurisdiction.

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

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

## SECTION G105 VARIANCES

**G105.1 General.** The *board of appeals* established pursuant to Section 113 shall hear and decide requests for variances. The *board of appeals* shall base its determination on technical justifications, and has the right to attach such conditions to variances as it deems necessary to further the purposes and objectives of this appendix and Section 1612.

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

**G105.3 Historic structures.** A variance is authorized to be issued for the repair or rehabilitation of a historic structure upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure, and the variance is the minimum necessary to preserve the historic character and design of the structure.

**Exception:** Within *flood hazard areas*, *historic structures* that do not meet one or more of the following designations:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
3. Designated as *historic* under a state or local historic preservation program that is approved by the Department of Interior.

**G105.4 Functionally dependent facilities.** A variance is authorized to be issued for the construction or substantial improvement of a functionally dependent facility provided the criteria in Section 1612.1 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.

**G105.5 Restrictions.** The *board of appeals* shall not issue a variance for any proposed development in a floodway if any increase in flood levels would result during the base flood discharge.

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

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.
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 *board of appeals* where all of the following criteria are met:

1. A technical showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site renders the elevation standards inappropriate.
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.
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 up to amounts as high as \$25 for \$100 of insurance coverage, 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 of this code for general definitions.

#### G201.2 Definitions.

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

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

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

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

**RECREATIONAL VEHICLE.** A vehicle that is built on a single chassis, 400 square feet (37.16 m<sup>2</sup>) or less when measured at the largest horizontal projection, designed to be self-propelled or permanently towable by a light-duty truck, and designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect-type utilities and security devices and has no permanently attached additions.

**VARIANCE.** A grant of relief from the requirements of this section that permits construction in a manner otherwise prohibited by this section where specific enforcement would result in unnecessary hardship.

**VIOLATION.** A development that is not fully compliant with this appendix or Section 1612, as applicable.

### 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 verify all of the following:

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.
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*, coastal high-hazard areas and coastal A zones, 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*.
4. The design criteria for utilities and facilities set forth in this appendix and appropriate International Codes 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 in accordance with standard engineering practice, and prepared by a *registered design professional*, that the proposed encroachment will not result in any increase in the base flood level.

**G401.2 Coastal high-hazard areas and coastal A zones.** In coastal high-hazard areas and coastal A zones:

1. New buildings and buildings that are substantially improved shall only be authorized landward of the reach of mean high tide.
2. The use of fill for structural support of buildings is prohibited.

**G401.3 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 7, ASCE 24, to minimize or eliminate infiltration of flood-

waters into the facilities and discharge from the facilities into floodwaters, or impairment of the facilities and systems.

**G401.4 Water facilities.** All new or replacement water facilities shall be designed in accordance with the provisions of Chapter 7, ASCE 24, to minimize or eliminate infiltration of floodwaters into the systems.

**G401.5 Storm drainage.** Storm drainage shall be designed to convey the flow of surface waters to minimize or eliminate damage to persons or property.

**G401.6 Streets and sidewalks.** Streets and sidewalks shall be designed to minimize potential for increasing or aggravating flood levels.

### SECTION G501 MANUFACTURED HOMES

**G501.1 Elevation.** All new and replacement manufactured homes to be placed or substantially improved in a *flood hazard area* shall be elevated such that the lowest floor of the manufactured home is elevated to or above the design flood elevation.

**G501.2 Foundations.** All new and replacement manufactured homes, including substantial improvement of existing manufactured homes, shall be placed on a permanent, reinforced foundation that is designed in accordance with Section R322 of the *International Residential Code*.

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

**G501.4 Protection of mechanical equipment and outside appliances.** Mechanical equipment and outside appliances shall be elevated to or above the *design flood elevation*.

**Exception:** Where such equipment and appliances are designed and installed to prevent water from entering or accumulating within their components and the systems are constructed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to the elevation required by Section R322 of the *International Residential Code*, the systems and equipment shall be permitted to be located below the elevation required by Section R322 of the *International Residential Code*. Electrical wiring systems shall be permitted below the *design flood elevation* provided they conform to the provisions of NFPA 70.

**G501.5 Enclosures.** Fully enclosed areas below elevated manufactured homes shall comply with the requirements of Section R322 of the *International Residential Code*.

### SECTION G601 RECREATIONAL VEHICLES

**G601.1 Placement prohibited.** The placement of recreational vehicles shall not be authorized in coastal high-hazard areas and 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 Tanks.** Underground and above-ground tanks shall be designed, constructed, installed and anchored in accordance with ASCE 24.

### SECTION G801 OTHER BUILDING WORK

**G801.1 Garages and accessory structures.** Garages and accessory structures shall be designed and constructed in accordance with ASCE 24.

**G801.2 Fences.** Fences in floodways that may block the passage of floodwaters, such as stockade fences and wire mesh fences, shall meet the requirement of Section G103.5.

**G801.3 Oil derricks.** Oil derricks located in *flood hazard areas* shall be designed in conformance with the flood loads in Sections 1603.1.7 and 1612.

**G801.4 Retaining walls, sidewalks and driveways.** Retaining walls, sidewalks and driveways shall meet the requirements of Section 1804.4.

**G801.5 Swimming pools.** Swimming pools shall be designed and constructed in accordance with ASCE 24. Above-ground swimming pools, on-ground swimming pools and in-ground swimming pools that involve placement of fill in *floodways* shall also meet the requirements of Section G103.5.

**G801.6 Decks, porches, and patios.** Decks, porches and patios shall be designed and constructed in accordance with ASCE 24.

**G801.7 Nonstructural concrete slabs in coastal high-hazard areas and coastal A zones.** In coastal high-hazard areas and coastal A zones, nonstructural concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses are permitted beneath or adjacent to buildings and structures provided that the concrete slabs shall be constructed in accordance with ASCE 24.

**G801.8 Roads and watercourse crossings in regulated floodways.** Roads and watercourse crossings that encroach into regulated *floodways*, including roads, bridges, culverts, low-water crossings and similar means for vehicles or pedestrians to travel from one side of a watercourse to the other, shall meet the requirement of Section G103.5.

**SECTION G901  
TEMPORARY STRUCTURES AND  
TEMPORARY STORAGE**

**G901.1 Temporary structures.** Temporary structures shall be erected for a period of less than 180 days. Temporary structures 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. Fully enclosed temporary structures shall have flood openings that are in accordance with ASCE 24 to allow for the automatic entry and exit of floodwaters.

**G901.2 Temporary storage.** Temporary storage includes storage of goods and materials for a period of less than 180 days. Stored materials shall not include hazardous materials.

**G901.3 Floodway encroachment.** Temporary structures and temporary storage in floodways shall meet the requirements of G103.5.

**SECTION G1001  
UTILITY AND MISCELLANEOUS GROUP U**

**G1001.1 Utility and miscellaneous Group U.** Utility and miscellaneous Group U includes buildings that are accessory in character and miscellaneous structures not classified in any specific occupancy in this code, including, but not limited to, agricultural buildings, aircraft hangars (accessory to a one- or two-family residence), barns, carports, fences more than 6 feet (1829 mm) high, grain silos (accessory to a residential occupancy), greenhouses, livestock shelters, private garages, retaining walls, sheds, stables and towers.

**G1001.2 Flood loads.** Utility and miscellaneous Group U buildings and structures, including substantial improvement of such buildings and structures, shall be anchored to prevent flotation, collapse or lateral movement resulting from flood loads, including the effects of buoyancy, during conditions of the design flood.

**G1001.3 Elevation.** Utility and miscellaneous Group U buildings and structures, including substantial improvement of such buildings and structures, shall be elevated such that the lowest floor, including basement, is elevated to or above the design flood elevation in accordance with Section 1612 of this code.

**G1001.4 Enclosures below design flood elevation.** Fully enclosed areas below the design flood elevation shall be constructed in accordance with ASCE 24.

**G1001.5 Flood-damage-resistant materials.** Flood-damage-resistant materials shall be used below the design flood elevation.

**G1001.6 Protection of mechanical, plumbing and electrical systems.** Mechanical, plumbing and electrical systems, including plumbing fixtures, shall be elevated to or above the design flood elevation.

**Exception:** Electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances; plumbing fixtures, duct systems and other service equipment shall be permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in compliance with the flood-resistant construction requirements of this code. Electrical wiring systems shall be permitted to be located below the design flood elevation provided they conform to the provisions of NFPA 70.

**SECTION G1101  
REFERENCED STANDARDS**

ASCE 24—13	Flood Resistant Design and Construction	G103.1, G401.3, G401.4, G701.1, G801.1, G801.5, G801.6, G801.7, G901.1, G1001.4
HUD 24 CFR Part 3280 (2008)	Manufactured Home Construction and Safety Standards	G201
IBC—15	<i>International Building Code</i>	G102.2, G1001.1, G1001.3
IRC—15	<i>International Residential Code</i>	G501.2, G501.4, G501.5
NFPA 70—11	<i>National Electrical Code</i>	G501.4, G1001.6

## APPENDIX H

### SIGNS

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

#### SECTION H101 GENERAL

**H101.1 General.** A sign shall not be erected in a manner that would confuse or obstruct the view of or interfere with exit signs required by Chapter 10 or with official traffic signs, signals or devices. Signs and sign support structures, together with their supports, braces, guys and anchors, shall be kept in repair and in proper state of preservation. The display surfaces of signs shall be kept neatly painted or posted at all times.

**H101.2 Signs exempt from permits.** The following signs are exempt from the requirements to obtain a *permit* before erection:

1. Painted nonilluminated signs.
2. Temporary signs announcing the sale or rent of property.
3. Signs erected by transportation authorities.
4. Projecting signs not exceeding 2.5 square feet (0.23 m<sup>2</sup>).
5. The changing of moveable parts of an approved sign that is designed for such changes, or the repainting or repositioning of display matter shall not be deemed an alteration.

#### SECTION H102 DEFINITIONS

**H102.1 General.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

**COMBINATION SIGN.** A sign incorporating any combination of the features of pole, projecting and roof signs.

**DISPLAY SIGN.** The area made available by the sign structure for the purpose of displaying the advertising message.

**ELECTRIC SIGN.** A sign containing electrical wiring, but not including signs illuminated by an exterior light source.

**GROUND SIGN.** A billboard or similar type of sign that is supported by one or more uprights, poles or braces in or upon the ground other than a combination sign or pole sign, as defined by this code.

**POLE SIGN.** A sign wholly supported by a sign structure in the ground.

**PORTABLE DISPLAY SURFACE.** A display surface temporarily fixed to a standardized advertising structure that is

regularly moved from structure to structure at periodic intervals.

**PROJECTING SIGN.** A sign other than a wall sign that projects from and is supported by a wall of a building or structure.

**ROOF SIGN.** A sign erected on or above a roof or parapet of a building or structure.

**SIGN.** Any letter, figure, character, mark, plane, point, marquee sign, design, poster, pictorial, picture, stroke, stripe, line, trademark, reading matter or illuminated service, which shall be constructed, placed, attached, painted, erected, fastened or manufactured in any manner whatsoever, so that the same shall be used for the attraction of the public to any place, subject, person, firm, corporation, public performance, article, machine or merchandise, whatsoever, which is displayed in any manner outdoors. Every sign shall be classified and conform to the requirements of that classification as set forth in this chapter.

**SIGN STRUCTURE.** Any structure that supports or is capable of supporting a sign as defined in this code. A sign structure is permitted to be a single pole and is not required to be an integral part of the building.

**WALL SIGN.** Any sign attached to or erected against the wall of a building or structure, with the exposed face of the sign in a plane parallel to the plane of said wall.

#### SECTION H103 LOCATION

**H103.1 Location restrictions.** Signs shall not be erected, constructed or maintained so as to obstruct any fire escape or any window or door or opening used as a *means of egress* or so as to prevent free passage from one part of a roof to any other part thereof. A sign shall not be attached in any form, shape or manner to a fire escape, nor be placed in such manner as to interfere with any opening required for ventilation.

#### SECTION H104 IDENTIFICATION

**H104.1 Identification.** Every outdoor advertising display sign hereafter erected, constructed or maintained, for which a permit is required, shall be plainly marked with the name of the person, firm or corporation erecting and maintaining such sign and shall have affixed on the front thereof the permit number issued for said sign or other method of identification approved by the *building official*.

## SECTION H105 DESIGN AND CONSTRUCTION

**H105.1 General requirements.** Signs shall be designed and constructed to comply with the provisions of this code for use of materials, loads and stresses.

**H105.2 Permits, drawings and specifications.** Where a permit is required, as provided in Chapter 1, construction documents shall be required. These documents shall show the dimensions, material and required details of construction, including loads, stresses and anchors.

**H105.3 Wind load.** Signs shall be designed and constructed to withstand wind pressure as provided for in Chapter 16.

**H105.4 Seismic load.** Signs designed to withstand wind pressures shall be considered capable of withstanding earthquake loads, except as provided for in Chapter 16.

**H105.5 Working stresses.** In outdoor advertising display signs, the allowable working stresses shall conform to the requirements of Chapter 16. The working stresses of wire rope and its fastenings shall not exceed 25 percent of the ultimate strength of the rope or fasteners.

### Exceptions:

1. The allowable working stresses for steel and wood shall be in accordance with the provisions of Chapters 22 and 23.
2. The working strength of chains, cables, guys or steel rods shall not exceed one-fifth of the ultimate strength of such chains, cables, guys or steel.

**H105.6 Attachment.** Signs attached to masonry, concrete or steel shall be safely and securely fastened by means of metal anchors, bolts or approved expansion screws of sufficient size and anchorage to safely support the loads applied.

## SECTION H106 ELECTRICAL

**H106.1 Illumination.** A sign shall not be illuminated by other than electrical means, and electrical devices and wiring shall be installed in accordance with the requirements of NFPA 70. Any open spark or flame shall not be used for display purposes unless specifically approved.

**H106.1.1 Internally illuminated signs.** Except as provided for in Sections 402.16 and 2611, where internally illuminated signs have facings of wood or approved plastic, the area of such facing section shall be not more than 120 square feet (11.16 m<sup>2</sup>) and the wiring for electric lighting shall be entirely enclosed in the sign cabinet with a clearance of not less than 2 inches (51 mm) from the facing material. The dimensional limitation of 120 square feet (11.16 m<sup>2</sup>) shall not apply to sign facing sections made from flame-resistant-coated fabric (ordinarily known as "flexible sign face plastic") that weighs less than 20 ounces per square yard (678 g/m<sup>2</sup>) and that, when tested in accordance with NFPA 701, meets the fire propagation performance requirements of both Test 1 and Test 2 or that, when tested in accordance with an approved test method, exhibits an average burn time of 2 seconds or less

and a burning extent of 5.9 inches (150 mm) or less for 10 specimens.

**H106.2 Electrical service.** Signs that require electrical service shall comply with NFPA 70.

## SECTION H107 COMBUSTIBLE MATERIALS

**H107.1 Use of combustibles.** Wood, approved plastic or plastic veneer panels as provided for in Chapter 26, or other materials of combustible characteristics similar to wood, used for moldings, cappings, nailing blocks, letters and latticing, shall comply with Section H109.1 and shall not be used for other ornamental features of signs, unless approved.

**H107.1.1 Plastic materials.** Notwithstanding any other provisions of this code, plastic materials that burn at a rate no faster than 2.5 inches per minute (64 mm/s) when tested in accordance with ASTM D 635 shall be deemed approved plastics and can be used as the display surface material and for the letters, decorations and facings on signs and outdoor display structures.

**H107.1.2 Electric sign faces.** Individual plastic facings of electric signs shall not exceed 200 square feet (18.6 m<sup>2</sup>) in area.

**H107.1.3 Area limitation.** If the area of a display surface exceeds 200 square feet (18.6 m<sup>2</sup>), the area occupied or covered by approved plastics shall be limited to 200 square feet (18.6 m<sup>2</sup>) plus 50 percent of the difference between 200 square feet (18.6 m<sup>2</sup>) and the area of display surface. The area of plastic on a display surface shall not in any case exceed 1,100 square feet (102 m<sup>2</sup>).

**H107.1.4 Plastic appurtenances.** Letters and decorations mounted on an approved plastic facing or display surface can be made of approved plastics.

## SECTION H108 ANIMATED DEVICES

**H108.1 Fail-safe device.** Signs that contain moving sections or ornaments shall have fail-safe provisions to prevent the section or ornament from releasing and falling or shifting its center of gravity more than 15 inches (381 mm). The fail-safe device shall be in addition to the mechanism and the mechanism's housing that operate the movable section or ornament. The fail-safe device shall be capable of supporting the full dead weight of the section or ornament when the moving mechanism releases.

## SECTION H109 GROUND SIGNS

**H109.1 Height restrictions.** The structural frame of ground signs shall not be erected of combustible materials to a height of more than 35 feet (10 668 mm) above the ground. Ground signs constructed entirely of noncombustible material shall not be erected to a height of greater than 100 feet (30 480 mm) above the ground. Greater heights are permitted where

approved and located so as not to create a hazard or danger to the public.

**H109.2 Required clearance.** The bottom coping of every ground sign shall be not less than 3 feet (914 mm) above the ground or street level, which space can be filled with platform decorative trim or light wooden construction.

**H109.3 Wood anchors and supports.** Where wood anchors or supports are embedded in the soil, the wood shall be pressure treated with an approved preservative.

### SECTION H110 ROOF SIGNS

**H110.1 General.** Roof signs shall be constructed entirely of metal or other approved noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. Roof signs shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the sign and shall have at least 5 feet (1524 mm) clearance between the vertical supports thereof. No portion of any roof sign structure shall project beyond an exterior wall.

**Exception:** Signs on flat roofs with every part of the roof accessible.

**H110.2 Bearing plates.** The bearing plates of roof signs shall distribute the load directly to or upon masonry walls, steel roof girders, columns or beams. The building shall be designed to avoid overstress of these members.

**H110.3 Height of solid signs.** A roof sign having a solid surface shall not exceed, at any point, a height of 24 feet (7315 mm) measured from the roof surface.

**H110.4 Height of open signs.** Open roof signs in which the uniform open area is not less than 40 percent of total gross area shall not exceed a height of 75 feet (22 860 mm) on buildings of Type 1 or Type 2 construction. On buildings of other construction types, the height shall not exceed 40 feet (12 192 mm). Such signs shall be thoroughly secured to the building upon which they are installed, erected or constructed by iron, metal anchors, bolts, supports, chains, stranded cables, steel rods or braces and they shall be maintained in good condition.

**H110.5 Height of closed signs.** A closed roof sign shall not be erected to a height greater than 50 feet (15 240 mm) above the roof of buildings of Type 1 or Type 2 construction or more than 35 feet (10 668 mm) above the roof of buildings of Type 3, 4 or 5 construction.

### SECTION H111 WALL SIGNS

**H111.1 Materials.** Wall signs that have an area exceeding 40 square feet (3.72 m<sup>2</sup>) shall be constructed of metal or other approved noncombustible material, except for nailing rails and as provided for in Sections H106.1.1 and H107.1.

**H111.2 Exterior wall mounting details.** Wall signs attached to exterior walls of solid masonry, concrete or stone shall be safely and securely attached by means of metal anchors, bolts or expansion screws of not less than  $\frac{3}{8}$  inch (9.5 mm) diameter and shall be embedded at least 5 inches (127 mm). Wood blocks shall not be used for anchorage, except in the case of wall signs attached to buildings with walls of wood. A wall sign shall not be supported by anchorages secured to an unbraced parapet wall.

**H111.3 Extension.** Wall signs shall not extend above the top of the wall or beyond the ends of the wall to which the signs are attached unless such signs conform to the requirements for roof signs, projecting signs or ground signs.

### SECTION H112 PROJECTING SIGNS

**H112.1 General.** Projecting signs shall be constructed entirely of metal or other noncombustible material and securely attached to a building or structure by metal supports such as bolts, anchors, supports, chains, guys or steel rods. Staples or nails shall not be used to secure any projecting sign to any building or structure. The *dead load* of projecting signs not parallel to the building or structure and the load due to wind pressure shall be supported with chains, guys or steel rods having net cross-sectional dimension of not less than  $\frac{3}{8}$  inch (9.5 mm) diameter. Such supports shall be erected or maintained at an angle of at least 45 percent (0.78 rad) with the horizontal to resist the *dead load* and at angle of 45 percent (0.78 rad) or more with the face of the sign to resist the specified wind pressure. If such projecting sign exceeds 30 square feet (2.8 m<sup>2</sup>) in one facial area, there shall be provided at least two such supports on each side not more than 8 feet (2438 mm) apart to resist the wind pressure.

**H112.2 Attachment of supports.** Supports shall be secured to a bolt or expansion screw that will develop the strength of the supporting chains, guys or steel rods, with a minimum  $\frac{5}{8}$ -inch (15.9 mm) bolt or lag screw, by an expansion shield. Turnbuckles shall be placed in chains, guys or steel rods supporting projecting signs.

**H112.3 Wall mounting details.** Chains, cables, guys or steel rods used to support the live or dead load of projecting signs are permitted to be fastened to solid masonry walls with expansion bolts or by machine screws in iron supports, but such supports shall not be attached to an unbraced parapet wall. Where the supports must be fastened to walls made of wood, the supporting anchor bolts must go through the wall and be plated or fastened on the inside in a secure manner.

**H112.4 Height limitation.** A projecting sign shall not be erected on the wall of any building so as to project above the roof or cornice wall or above the roof level where there is no cornice wall; except that a sign erected at a right angle to the building, the horizontal width of which sign is perpendicular to such a wall and does not exceed 18 inches (457 mm), is permitted to be erected to a height not exceeding 2 feet (610 mm) above the roof or cornice wall or above the roof level where there is no cornice wall. A sign attached to a corner of a building and parallel to the vertical line of such corner shall be deemed to be erected at a right angle to the building wall.



**H112.5 Additional loads.** Projecting sign structures that will be used to support an individual on a ladder or other servicing device, whether or not specifically designed for the servicing device, shall be capable of supporting the anticipated additional load, but not less than a 100-pound (445 N) concentrated horizontal load and a 300-pound (1334 N) concentrated vertical load applied at the point of assumed or most eccentric loading. The building component to which the projecting sign is attached shall also be designed to support the additional loads.

**SECTION H113  
MARQUEE SIGNS**

**H113.1 Materials.** Marquee signs shall be constructed entirely of metal or other approved noncombustible material except as provided for in Sections H106.1.1 and H107.1.

**H113.2 Attachment.** Marquee signs shall be attached to approved marquees that are constructed in accordance with Section 3106.

**H113.3 Dimensions.** Marquee signs, whether on the front or side, shall not project beyond the perimeter of the marquee.

**H113.4 Height limitation.** Marquee signs shall not extend more than 6 feet (1829 mm) above, nor 1 foot (305 mm) below such marquee, but under no circumstances shall the sign or signs have a vertical dimension greater than 8 feet (2438 mm).

**SECTION H114  
PORTABLE SIGNS**

**H114.1 General.** Portable signs shall conform to requirements for ground, roof, projecting, flat and temporary signs where such signs are used in a similar capacity. The requirements of this section shall not be construed to require portable signs to have connections to surfaces, tie-downs or foundations where provisions are made by temporary means or configuration of the structure to provide stability for the expected duration of the installation.

**TABLE 4-A  
SIZE, THICKNESS AND TYPE OF GLASS PANELS IN SIGNS**

MAXIMUM SIZE OF EXPOSED PANEL		MINIMUM THICKNESS OF GLASS (inches)	TYPE OF GLASS
Any dimension (inches)	Area (square inches)		
30	500	1/8	Plain, plate or wired
45	700	3/16	Plain, plate or wired
144	3,600	1/4	Plain, plate or wired
> 144	> 3,600	1/4	Wired glass

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm<sup>2</sup>.

**TABLE 4-B  
THICKNESS OF PROJECTION SIGN**

PROJECTION (feet)	MAXIMUM THICKNESS (feet)
5	2
4	2.5
3	3
2	3.5
1	4

For SI: 1 foot = 304.8 mm.

**SECTION H115  
REFERENCED STANDARDS**

ASTM D 635—10	Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	H107.1.1
NFPA 70—11	National Electrical Code	H106.1, H106.2
NFPA 701—10	Methods of Fire Test for Flame Propagation of Textiles and Films	H106.1.1

## APPENDIX E

# MANUFACTURED HOUSING USED AS DWELLINGS

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

### SECTION AE101 SCOPE

**AE101.1 General.** These provisions shall be applicable only to a *manufactured home* used as a single *dwelling unit* installed on privately owned (nonrental) lots and shall apply to the following:

1. Construction, *alteration* and repair of any foundation system that is necessary to provide for the installation of a *manufactured home* unit.
2. Construction, installation, *addition*, *alteration*, repair or maintenance of the building service *equipment* that is necessary for connecting *manufactured homes* to water, fuel, or power supplies and sewage systems.
3. *Alterations*, *additions* or repairs to existing *manufactured homes*. The construction, *alteration*, moving, demolition, repair and use of accessory buildings and structures, and their building service *equipment*, shall comply with the requirements of the codes adopted by this *jurisdiction*.

These provisions shall not be applicable to the design and construction of *manufactured homes* and shall not be deemed to authorize either modifications or *additions* to *manufactured homes* where otherwise prohibited.

**Exception:** In addition to these provisions, new and replacement *manufactured homes* to be located in flood hazard areas as established in Table R301.2(1) of the *International Residential Code* shall meet the applicable requirements of Section R322 of the *International Residential Code*.

### SECTION AE102 APPLICATION TO EXISTING MANUFACTURED HOMES AND BUILDING SERVICE EQUIPMENT

**AE102.1 General.** *Manufactured homes* and their building service *equipment* to which *additions*, *alterations* or repairs are made shall comply with all the requirements of these provisions for new facilities, except as specifically provided in this section.

**AE102.2 Additions, alterations or repairs.** *Additions* made to a *manufactured home* shall conform to one of the following:

1. Be certified under the National Manufactured Housing Construction and Safety Standards Act of 1974 (42 U.S.C. Section 5401, et seq.).
2. Be designed and constructed to comply with the applicable provisions of the National Manufactured Housing

Construction and Safety Standards Act of 1974 (42 U.S.C. Section 5401, et seq.).

3. Be designed and constructed in compliance with the code adopted by this *jurisdiction*.

*Additions* shall be structurally separated from the *manufactured home*.

**Exception:** A structural separation need not be provided when structural calculations are provided to justify the omission of such separation.

*Alterations* or repairs may be made to any *manufactured home* or to its building service *equipment* without requiring the existing *manufactured home* or its building service *equipment* to comply with all the requirements of these provisions, provided the *alteration* or repair conforms to that required for new construction, and provided further that no hazard to life, health or safety will be created by such *additions*, *alterations* or repairs.

*Alterations* or repairs to an existing *manufactured home*, which are nonstructural and do not adversely affect any structural member or any part of the building or structure having required fire protection, may be made with materials equivalent to those of which the *manufactured home* structure is constructed, subject to approval by the *building official*.

**Exception:** The installation or replacement of glass shall be required for new installations.

Minor *additions*, *alterations* and repairs to existing building service *equipment* installations may be made in accordance with the codes in effect at the time the original installation was made, subject to the approval of the *building official*, and provided such *additions*, *alterations* and repairs will not cause the existing building service *equipment* to become unsafe, insanitary or overloaded.

**AE102.3 Existing installations.** Building service *equipment* lawfully in existence at the time of the adoption of the applicable codes may have their use, maintenance or repair continued if the use, maintenance or repair is in accordance with the original design and no hazard to life, health or property has been created by such building service *equipment*.

**AE102.4 Existing occupancy.** *Manufactured homes* that are in existence at the time of the adoption of these provisions may have their existing use or occupancy continued if such use or occupancy was legal at the time of the adoption of these provisions, provided such continued use is not dangerous to life, health and safety.

The use or occupancy of any existing *manufactured home* shall not be changed unless evidence satisfactory to the *building official* is provided to show compliance with all applica-

ble provisions of the codes adopted by this *jurisdiction*. Upon any change in use or occupancy, the *manufactured home* shall cease to be classified as such within the intent of these provisions.

**AE102.5 Maintenance.** All *manufactured homes* and their building service *equipment*, existing and new, and all parts thereof, shall be maintained in a safe and sanitary condition. All devices or safeguards which are required by applicable codes or by the *Manufactured Home Standards* shall be maintained in conformance to the code or standard under which it was installed. The owner or the owner's designated agent shall be responsible for the maintenance of *manufactured homes*, accessory buildings, structures and their building service *equipment*. To determine compliance with this section, the *building official* may cause any *manufactured home*, accessory building or structure to be reinspected.

**AE102.6 Relocation.** *Manufactured homes* which are to be relocated within this *jurisdiction* shall comply with these provisions.

### SECTION AE201 DEFINITIONS

**AE201.1 General.** For the purpose of these provisions, certain abbreviations, terms, phrases, words and their derivatives shall be construed as defined or specified herein.

**ACCESSORY BUILDING.** Any building or structure or portion thereto, located on the same property as a *manufactured home*, which does not qualify as a *manufactured home* as defined herein.

**BUILDING SERVICE EQUIPMENT.** Refers to the plumbing, mechanical and electrical *equipment*, including piping, wiring, fixtures and other accessories which provide sanitation, lighting, heating, ventilation, cooling, fire protection and facilities essential for the habitable occupancy of a *manufactured home* or accessory building or structure for its designated use and occupancy.

**MANUFACTURED HOME.** A structure transportable in one or more sections which, in the traveling mode, is 8 body feet (2438 body mm) or more in width or 40 body feet (12 192 body mm) or more in length or, when erected on site, is 320 or more square feet (30 m<sup>2</sup>), and which is built on a permanent chassis and designed to be used as a *dwelling* with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air-conditioning and electrical systems contained therein; except that such term shall include any structure which meets all the requirements of this paragraph, except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the Secretary of the U.S. Department of Housing and Urban Development (HUD) and complies with the standards established under this title.

For mobile homes built prior to June 15, 1976, a *label* certifying compliance with the *Standard for Mobile Homes*, NFPA 501, ANSI 119.1, in effect at the time of manufacture,

is required. For the purpose of these provisions, a mobile home shall be considered a *manufactured home*.

**MANUFACTURED HOME INSTALLATION.** Construction which is required for the installation of a *manufactured home*, including the construction of the foundation system, required structural connections thereto and the installation of on-site water, gas, electrical and sewer systems and connections thereto which are necessary for the normal operation of the *manufactured home*.

**MANUFACTURED HOME STANDARDS.** The *Manufactured Home Construction and Safety Standards* as promulgated by the HUD.

**PRIVATELY OWNED (NONRENTAL) LOT.** A parcel of real estate outside of a *manufactured home* rental community (park) where the land and the *manufactured home* to be installed thereon are held in common ownership.

### SECTION AE301 PERMITS

**AE301.1 Initial installation.** A *manufactured home* shall not be installed on a foundation system, reinstalled or altered without first obtaining a *permit* from the *building official*. A separate *permit* shall be required for each *manufactured home* installation. When *approved* by the *building official*, such *permit* may include accessory buildings and structures, and their building service *equipment*, when the accessory buildings or structures will be constructed in conjunction with the *manufactured home* installation.

**AE301.2 Additions, alterations and repairs to a manufactured home.** A *permit* shall be obtained to alter, remodel, repair or add accessory buildings or structures to a *manufactured home* subsequent to its initial installation. *Permit* issuance and fees therefor shall be in conformance to the codes applicable to the type of work involved.

An *addition* made to a *manufactured home*, as defined in these provisions, shall comply with these provisions.

**AE301.3 Accessory buildings.** Except as provided in Section AE301.1, *permits* shall be required for all accessory buildings and structures, and their building service *equipment*. *Permit* issuance and fees therefor shall be in conformance to the codes applicable to the types of work involved.

**AE301.4 Exempted work.** A *permit* shall not be required for the types of work specifically exempted by the applicable codes. Exemption from the *permit* requirements of any of said codes shall not be deemed to grant authorization for any work to be done in violation of the provisions of said codes or any other laws or ordinances of this *jurisdiction*.

### SECTION AE302 APPLICATION FOR PERMIT

**AE302.1 Application.** To obtain a *manufactured home* installation *permit*, the applicant shall first file an application, in writing, on a form furnished by the *building official* for

that purpose. At the option of the *building official*, every such application shall:

1. Identify and describe the work to be covered by the *permit* for which 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 or occupancy for which the proposed work is intended.
4. Be accompanied by plans, diagrams, computations and specifications, and other data as required in Section AE302.2.
5. Be accompanied by a soil investigation when required by Section AE502.2.
6. State the valuation of any new building or structure; or any *addition*, remodeling or *alteration* to an existing building.
7. Be signed by the permittee, or permittee's authorized agent, who may be required to submit evidence to indicate such authority.
8. Give such other data and information as may be required by the *building official*.

**AE302.2 Plans and specifications.** Plans, engineering calculations, diagrams and other data as required by the *building official* shall be submitted in not less than two sets with each application for a *permit*. The *building official* may require plans, computations and specifications to be prepared and designed by an engineer or architect licensed by the state to practice as such.

Where no unusual site conditions exist, the *building official* may accept *approved* standard foundation plans and details in conjunction with the manufacturer's *approved* installation instructions without requiring the submittal of engineering calculations.

**AE302.3 Information on plans and specifications.** Plans and specifications shall be drawn to scale on substantial paper or cloth, and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and shown in detail that it will conform to these provisions and all relevant laws, ordinances, rules and regulations. The *building official* shall determine what information is required on plans and specifications to ensure compliance.

### SECTION AE303 PERMITS ISSUANCE

**AE303.1 Issuance.** The application, plans and specifications, and other data filed by an applicant for *permit* shall be reviewed by the *building official*. Such plans may be reviewed by other departments of this *jurisdiction* to verify compliance with any applicable laws under their *jurisdiction*. If the *building official* finds that the work described in an application for a *permit*, and the plans, specifications and other data filed therewith, conform to the requirements of these provisions, and other data filed therewith conform to

the requirements of these provisions and other pertinent codes, laws and ordinances, and that the fees specified in Section AE304 have been paid, the *building official* shall issue a *permit* therefor to the applicant.

When the *building official* issues the *permit* where plans are required, the *building official* shall endorse in writing or stamp the plans and specifications *APPROVED*. Such *approved* plans and specifications shall not be changed, modified or altered without authorization from the *building official*, and all work shall be done in accordance with the *approved* plans.

**AE303.2 Retention of plans.** One set of *approved* plans and specifications shall be returned to the applicant and shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress. One set of *approved* plans, specifications and computations shall be retained by the *building official* until final approval of the work.

**AE303.3 Validity of permit.** The issuance of a *permit* or approval of plans and specifications shall not be construed to be a *permit* for, or an approval of, any violation of any of these provisions or other pertinent codes of any other ordinance of the *jurisdiction*. No *permit* presuming to give authority to violate or cancel these provisions shall be valid.

The issuance of a *permit* based on plans, specifications and other data shall not prevent the *building official* from thereafter requiring the correction of errors in said plans, specifications and other data, or from preventing building operations being carried on thereunder when in violation of these provisions or of any other ordinances of this *jurisdiction*.

**AE303.4 Expiration.** Every *permit* issued by the *building official* under these provisions shall expire by limitation and become null and void if the work authorized by such *permit* is not commenced within 180 days from the date of such *permit*, or if the work authorized by such *permit* is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work can be recommenced, a new *permit* shall be first obtained, and the fee therefor shall be one-half the amount required for a new *permit* for such work, provided no changes have been made or will be made in the original plans and specifications for such work, and provided further that such suspension or abandonment has not exceeded 1 year. In order to renew action on a *permit* after expiration, the permittee shall pay a new full *permit* fee.

Any permittee holding an unexpired *permit* may apply for an extension of the time within which work may commence under that *permit* when the permittee is unable to commence work within the time required by this section for good and satisfactory reasons. The *building official* may extend the time for action by the permittee for a period not exceeding 180 days upon written request by the permittee showing that circumstances beyond the control of the permittee have prevented action from being taken. No *permit* shall be extended more than once.

**AE303.5 Suspension or revocation.** The *building official* may, in writing, suspend or revoke a *permit* issued under these provisions whenever the *permit* is issued in error or on

the basis of incorrect information supplied, or in violation of any ordinance or regulation or any of these provisions.

## SECTION AE304 FEES

**AE304.1 Permit fees.** The fee for each *manufactured home installation permit* shall be established by the *building official*.

When *permit* fees are to be based on the value or valuation of the work to be performed, the determination of value or valuation under these provisions shall be made by the *building official*. The value to be used shall be the total value of all work required for the *manufactured home* installation plus the total value of all work required for the construction of accessory buildings and structures for which the *permit* is issued, as well as all finish work, painting, roofing, electrical, plumbing, heating, air conditioning, elevators, fire-extinguishing systems and any other permanent *equipment* which is a part of the accessory building or structure. The value of the *manufactured home* itself shall not be included.

**AE304.2 Plan review fees.** When a plan or other data are required to be submitted by Section AE302.2, a plan review fee shall be paid at the time of submitting plans and specifications for review. Said plan review fee shall be as established by the *building official*. Where plans are incomplete or changed so as to require additional plan review, an additional plan review fee shall be charged at a rate as established by the *building official*.

**AE304.3 Other provisions.**

**AE304.3.1 Expiration of plan review.** Applications for which no *permit* is issued within 180 days following the date of application shall expire by limitation, and plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the *building official*. The *building official* may extend the time for action by the applicant for a period not exceeding 180 days upon request by the applicant showing that circumstances beyond the control of the applicant have prevented action from being taken. No application shall be extended more than once. In order to renew action on an application after expiration, the applicant shall resubmit plans and pay a new plan review fee.

**AE304.3.2 Investigation fees—work without a permit.**

**AE304.3.2.1 Investigation.** Whenever any work for which a *permit* is required by these provisions has been commenced without first obtaining said *permit*, a special investigation shall be made before a *permit* may be issued for such work.

**AE304.3.2.2 Fee.** An investigation fee, in addition to the *permit* fee, shall be collected whether or not a *permit* is then or subsequently issued. The investigation fee shall be equal to the amount of the *permit* fee required. The minimum investigation fee shall be the same as the minimum fee established by the *building official*. The payment of such investigation fee shall not exempt any person from compliance with all other pro-

visions of either these provisions or other pertinent codes or from any penalty prescribed by law.

**AE304.3.3 Fee refunds.**

**AE304.3.3.1 Permit fee erroneously paid or collected.** The *building official* may authorize the refunding of any fee paid hereunder which was erroneously paid or collected.

**AE304.3.3.2 Permit fee paid when no work done.** The *building official* may authorize the refunding of not more than 80 percent of the *permit* fee paid when no work has been done under a *permit* issued in accordance with these provisions.

**AE304.3.3.3 Plan review fee.** The *building official* may authorize the refunding of not more than 80 percent of the plan review fee paid when an application for a *permit* for which a plan review fee has been paid is withdrawn or canceled before any plan reviewing is done.

The *building official* shall not authorize the refunding of any fee paid, except upon written application by the original permittee not later than 180 days after the date of the fee payment.

## SECTION AE305 INSPECTIONS

**AE305.1 General.** All construction or work for which a *manufactured home installation permit* is required shall be subject to inspection by the *building official*, and certain types of construction shall have continuous inspection by special inspectors as specified in Section AE306. A survey of the *lot* may be required by the *building official* to verify that the structure is located in accordance with the *approved* plans.

It shall be the duty of the *permit* applicant to cause the work to be accessible and exposed for inspection purposes. Neither the *building official* nor this *jurisdiction* shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

**AE305.2 Inspection requests.** It shall be the duty of the person doing the work authorized by a *manufactured home installation permit* to notify the *building official* that such work is ready for inspection. The *building official* may require that every request for inspection be filed at least one working day before such inspection is desired. Such request may be in writing or by telephone at the option of the *building official*.

It shall be the duty of the person requesting any inspections required, either by these provisions or other applicable codes, to provide access to and means for proper inspection of such work.

**AE305.3 Inspection record card.** Work requiring a *manufactured home installation permit* shall not be commenced until the *permit* holder or the *permit* holder's agent shall have posted an inspection record card in a conspicuous place on the premises and in such position as to allow the *building official* conveniently to make the required entries thereon regarding inspection of the work. This card shall be maintained in

such position by the *permit* holder until final approval has been issued by the *building official*.

**AE305.4 Approval required.** Work shall not be done on any part of the *manufactured home* installation beyond the point indicated in each successive inspection without first obtaining the approval of the *building official*. Such approval shall be given only after an inspection has been made of each successive step in the construction as indicated by each of the inspections required in Section AE305.5. There shall be a final inspection and approval of the *manufactured home* installation, including connections to its building service *equipment*, when completed and ready for occupancy or use.

**AE305.5 Required inspections.**

**AE305.5.1 Structural inspections for the manufactured home installation.** Reinforcing steel or structural framework of any part of any *manufactured home* foundation system shall not be covered or concealed without first obtaining the approval of the *building official*. The *building official*, upon notification from the *permit* holder or the *permit* holder's agent, shall make the following inspections and shall either approve that portion of the construction as completed or shall notify the *permit* holder or the *permit* holder's agent wherein the same fails to comply with these provisions or other applicable codes:

1. Foundation inspection: To be made after excavations for footings are completed and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. All materials for the foundation shall be on the job, except where concrete from a central mixing plant (commonly termed "transit mixed") is to be used, the concrete materials need not be on the job. Where the foundation is to be constructed of *approved* treated wood, additional framing inspections as required by the *building official* may be required.
2. Concrete slab or under-floor inspection: To be made after all in-slab or under-floor building service *equipment*, conduit, piping accessories and other ancillary *equipment* items are in place but before any concrete is poured or the *manufactured home* is installed.
3. Anchorage inspection: To be made after the *manufactured home* has been installed and permanently anchored.

**AE305.5.2 Structural inspections for accessory building and structures.** Inspections for accessory buildings and structures shall be made as set forth in this code.

**AE305.5.3 Building service equipment inspections.** All building service *equipment* which is required as a part of a *manufactured home* installation, including accessory buildings and structures authorized by the same *permit*, shall be inspected by the *building official*. Building service *equipment* shall be inspected and tested as required by the applicable codes. Such inspections and testing shall be limited to site construction and shall not include building

service *equipment* which is a part of the *manufactured home* itself. No portion of any building service *equipment* intended to be concealed by any permanent portion of the construction shall be concealed until inspected and *approved*. Building service *equipment* shall not be connected to a water, fuel or power supply, or sewer system, until authorized by the *building official*.

**AE305.5.4 Final inspection.** When finish grading and the *manufactured home* installation, including the installation of all required building service *equipment*, is completed and the *manufactured home* is ready for occupancy, a final inspection shall be made.

**AE305.6 Other inspections.** In addition to the called inspections specified in Section AE305.5.4, the *building official* may make or require other inspections of any construction work to ascertain compliance with these provisions or other codes and laws which are enforced by the code enforcement agency.

## SECTION AE306 SPECIAL INSPECTIONS

**AE306.1 General.** In addition to the inspections required by Section AE305, the *building official* may require the owner to employ a special inspector during construction of specific types of work as described in this code.

## SECTION AE307 UTILITY SERVICE

**AE307.1 General.** Utility service shall not be provided to any building service *equipment* which is regulated by these provisions or other applicable codes, and for which a *manufactured home* installation *permit* is required by these provisions, until *approved* by the *building official*.

## SECTION AE401 OCCUPANCY CLASSIFICATION

**AE401.1 Manufactured homes.** A *manufactured home* shall be limited in use to a single *dwelling unit*.

**AE401.2 Accessory buildings.** Accessory buildings shall be classified as to occupancy by the *building official* as set forth in this code.

## SECTION AE402 LOCATION ON PROPERTY

**AE402.1 General.** *Manufactured homes* and accessory buildings shall be located on the property in accordance with applicable codes and ordinances of this *jurisdiction*.

## SECTION AE501 DESIGN

**AE501.1 General.** A *manufactured home* shall be installed on a foundation system which is designed and constructed to

sustain within the stress limitations specified in this code and all loads specified in this code.

**Exception:** When specifically authorized by the *building official*, foundation and anchorage systems which are constructed in accordance with the methods specified in Section AE600 of these provisions, or in the HUD, *Permanent Foundations for Manufactured Housing*, 1984 Edition, Draft, shall be deemed to meet the requirements of this appendix.

**AE501.2 Manufacturer's installation instructions.** The installation instructions as provided by the manufacturer of the *manufactured home* shall be used to determine permissible points of support for vertical loads and points of attachment for anchorage systems used to resist horizontal and uplift forces.

**AE501.3 Rationality.** Any system or method of construction to be used shall submit to a rational analysis in accordance with well-established principles of mechanics.

### SECTION AE502 FOUNDATION SYSTEMS

**AE502.1 General.** Foundation systems designed and constructed in accordance with this section may be considered a permanent installation.

**AE502.2 Soil classification.** The classification of the soil at each *manufactured home* site shall be determined when required by the *building official*. The *building official* may require that the determination be made by an engineer or architect licensed by the state to conduct soil investigations.

The classification shall be based on observation and any necessary tests of the materials disclosed by borings or excavations made in appropriate locations. Additional studies may be necessary to evaluate soil strength, the effect of moisture variation on soil-bearing capacity, compressibility and expansiveness.

When required by the *building official*, the soil classification design-bearing capacity and lateral pressure shall be shown on the plans.

**AE502.3 Footings and foundations.** Footings and foundations, unless otherwise specifically provided, shall be constructed of materials specified by this code for the intended use and in all cases shall extend below the frost line. Footings of concrete and masonry shall be of solid material. Foundations supporting untreated wood shall extend at least 8 inches (203 mm) above the adjacent finish *grade*. Footings shall have a minimum depth below finished *grade* of 12 inches (305 mm) unless a greater depth is recommended by a foundation investigation.

Piers and bearing walls shall be supported on masonry or concrete foundations or piles, or other *approved* foundation systems which shall be of sufficient capacity to support all loads.

**AE502.4 Foundation design.** When a design is provided, the foundation system shall be designed in accordance with the

applicable structural provisions of this code and shall be designed to minimize differential settlement. Where a design is not provided, the minimum foundation requirements shall be as set forth in this code.

**AE502.5 Drainage.** Provisions shall be made for the control and drainage of surface water away from the *manufactured home*.

**AE502.6 Under-floor clearances—ventilation and access.** A minimum clearance of 12 inches (305 mm) shall be maintained beneath the lowest member of the floor support framing system. Clearances from the bottom of wood floor joists or perimeter joists shall be as specified in this code.

Under-floor spaces shall be ventilated with openings as specified in this code. If combustion air for one or more heat-producing *appliance* is taken from within the under-floor spaces, ventilation shall be adequate for proper *appliance* operation.

Under-floor access openings shall be provided. Such openings shall be not less than 18 inches (457 mm) in any dimension and not less than 3 square feet (0.279 m<sup>2</sup>) in area, and shall be located so that any water supply and sewer drain connections located under the *manufactured home* are accessible.

### SECTION AE503 SKIRTING AND PERIMETER ENCLOSURES

**AE503.1 Skirting and permanent perimeter enclosures.** Skirting and permanent perimeter enclosures shall be installed only where specifically required by other laws or ordinances. Skirting, when installed, shall be of material suitable for exterior exposure and contact with the ground. Permanent perimeter enclosures shall be constructed of materials as required by this code for regular foundation construction.

Skirting shall be installed in accordance with the skirting manufacturer's installation instructions. Skirting shall be adequately secured to ensure stability, minimize vibration and susceptibility to wind damage, and compensate for possible frost heave.

**AE503.2 Retaining walls.** Where retaining walls are used as a permanent perimeter enclosure, they shall resist the lateral displacements of soil or other materials and shall conform to this code as specified for foundation walls. Retaining walls and foundation walls shall be constructed of *approved* treated wood, concrete, masonry or other *approved* materials or combination of materials as for foundations as specified in this code. Siding materials shall extend below the top of the exterior of the retaining or foundation wall, or the joint between the siding and enclosure wall shall be flashed in accordance with this code.

### SECTION AE504 STRUCTURAL ADDITIONS

**AE504.1 General.** Accessory buildings shall not be structurally supported by or attached to a *manufactured home* unless

engineering calculations are submitted to substantiate any proposed structural connection.

**Exception:** The *building official* may waive the submission of engineering calculations if it is found that the nature of the work applied for is such that engineering calculations are not necessary to show conformance to these provisions.

#### SECTION AE505 BUILDING SERVICE EQUIPMENT

**AE505.1 General.** The installation, *alteration*, repair, replacement, *addition* to or maintenance of the building service equipment within the *manufactured home* shall conform to regulations set forth in the *Manufactured Home Standards*. Such work which is located outside the *manufactured home* shall comply with the applicable codes adopted by this *jurisdiction*.

#### SECTION AE506 EXITS

**AE506.1 Site development.** Exterior stairways and ramps which provide egress to the public way shall comply with the applicable provisions of this code.

**AE506.2 Accessory buildings.** Every accessory building or portion thereof shall be provided with exits as required by this code.

#### SECTION AE507 OCCUPANCY, FIRE SAFETY AND ENERGY CONSERVATION STANDARDS

**AE507.1 General.** *Alterations* made to a *manufactured home* subsequent to its initial installation shall conform to the occupancy, fire safety and energy conservation requirements set forth in the *Manufactured Home Standards*.

#### SECTION AE600 SPECIAL REQUIREMENTS FOR FOUNDATION SYSTEMS

**AE600.1 General.** This section is applicable only where specifically authorized by the *building official*.

#### SECTION AE601 FOOTINGS AND FOUNDATIONS

**AE601.1 General.** The capacity of individual load-bearing piers and their footings shall be sufficient to sustain all loads specified in this code within the stress limitations specified in this code. Footings, unless otherwise *approved* by the *building official*, shall be placed level on firm, undisturbed soil or an engineered fill which is free of organic material, such as weeds and grasses. Where used, an engineered fill shall provide a minimum load-bearing capacity of not less than 1,000 pounds per square foot (48 kN/m<sup>2</sup>). Continuous footings shall conform to the requirements of this code. Section AE502 of

these provisions shall apply to footings and foundations constructed under the provisions of this section.

#### SECTION AE602 PIER CONSTRUCTION

**AE602.1 General.** Piers shall be designed and constructed to distribute loads evenly. Multiple-section homes may have concentrated roof loads which will require special consideration. Load-bearing piers may be constructed utilizing one of the following methods listed. Such piers shall be considered to resist only vertical forces acting in a downward direction. They shall not be considered as providing any resistance to horizontal loads induced by wind or earthquake forces.

1. A prefabricated load-bearing device that is listed and labeled for the intended use.
2. Mortar shall comply with ASTM C 270, Type M, S or N; this may consist of one part Portland cement, one-half part hydrated lime and four parts sand by volume. Lime shall not be used with plastic or waterproof cement.
3. A cast-in-place concrete pier with concrete having specified compressive strength at 28 days of 2,500 pounds per square inch (17 225 kPa).

Alternative materials and methods of construction may be used for piers which have been designed by an engineer or architect licensed by the state to practice as such.

Caps and leveling spacers may be used for leveling of the *manufactured home*. Spacing of piers shall be as specified in the manufacturer's installation instructions, if available, or by an *approved* designer.

#### SECTION AE603 HEIGHT OF PIERS

**AE603.1 General.** Piers constructed as indicated in Section AE602 may have heights as follows:

1. Except for corner piers, piers 36 inches (914 mm) or less in height may be constructed of masonry units, placed with cores or cells vertically. Piers shall be installed with their long dimension at right angles to the main frame member they support and shall have a minimum cross-sectional area of 128 square inches (82 560 mm<sup>2</sup>). Piers shall be capped with minimum 4-inch (102 mm) *solid masonry* units or equivalent.
2. Piers between 36 and 80 inches (914 and 2032 mm) in height and all corner piers greater than 24 inches (610 mm) in height shall be at least 16 inches by 16 inches (406 mm by 406 mm) consisting of interlocking masonry units and shall be fully capped with minimum 4-inch (102 mm) *solid masonry* units or equivalent.
3. Piers greater than 80 inches (2032 mm) in height may be constructed in accordance with the provisions of Item 2, provided the piers shall be filled solid with grout and reinforced with four continuous No. 5 bars. One bar shall be placed in each corner cell of hollow



masonry unit piers or in each corner of the grouted space of piers constructed of *solid masonry* units.

4. Cast-in-place concrete piers meeting the same size and height limitations of Items 1, 2 and 3 may be substituted for piers constructed of masonry units.

#### SECTION AE604 ANCHORAGE INSTALLATIONS

**AE604.1 Ground anchors.** Ground anchors shall be designed and installed to transfer the anchoring loads to the ground. The load-carrying portion of the ground anchors shall be installed to the full depth called for by the manufacturer's installation instructions and shall extend below the established frost line into undisturbed soil.

Manufactured ground anchors shall be listed and installed in accordance with the terms of their listing and the anchor manufacturer's instructions, and shall include the means of attachment of ties meeting the requirements of Section AE605. Ground anchor manufacturer's installation instructions shall include the amount of preload required and load capacity in various types of soil. These instructions shall include tensioning adjustments which may be needed to prevent damage to the *manufactured home*, particularly damage that can be caused by frost heave. Each ground anchor shall be marked with the manufacturer's identification and listed model identification number which shall be visible after installation. Instructions shall accompany each listed ground anchor specifying the types of soil for which the anchor is suitable under the requirements of this section.

Each *approved* ground anchor, when installed, shall be capable of resisting an allowable working load at least equal to 3,150 pounds (14 kN) in the direction of the tie plus a 50-percent overload [4,725 pounds (21 kN) total] without failure. Failure shall be considered to have occurred when the anchor moves more than 2 inches (51 mm) at a load of 4,725 pounds (21 kN) in the direction of the tie installation. Those ground anchors which are designed to be installed so that loads on the anchor are other than direct withdrawal shall be designed and installed to resist an applied design load of 3,150 pounds (14 kN) at 40 to 50 degrees from vertical or within the angle limitations specified by the home manufacturer without displacing the tie end of the anchor more than 4 inches (102 mm) horizontally. Anchors designed for the connection of multiple ties shall be capable of resisting the combined working load and overload consistent with the intent expressed herein.

When it is proposed to use ground anchors and the *building official* has reason to believe that the soil characteristics at a given site are such as to render the use of ground anchors advisable, or when there is doubt regarding the ability of the ground anchors to obtain their listed capacity, the *building official* may require that a representative field installation be made at the site in question and tested to demonstrate ground-anchor capacity. The *building official* shall approve the test procedures.

**AE604.2 Anchoring equipment.** Anchoring *equipment*, when installed as a permanent installation, shall be capable of

resisting all loads as specified within these provisions. When the stabilizing system is designed by an engineer or architect licensed by the state to practice as such, alternative designs may be used, providing the anchoring *equipment* to be used is capable of withstanding a load equal to 1.5 times the calculated load. All anchoring *equipment* shall be listed and labeled as being capable of meeting the requirements of these provisions. Anchors as specified in this code may be attached to the main frame of the *manufactured home* by an *approved*  $\frac{3}{16}$ -inch-thick (4.76 mm) slotted steel plate anchoring device. Other anchoring devices or methods meeting the requirements of these provisions may be permitted when *approved* by the *building official*.

Anchoring systems shall be so installed as to be permanent. Anchoring *equipment* shall be so designed to prevent self-disconnection with no hook ends used.

**AE604.3 Resistance to weather deterioration.** All anchoring *equipment*, tension devices and ties shall have a resistance to deterioration as required by this code.

**AE604.4 Tensioning devices.** Tensioning devices, such as turnbuckles or yoke-type fasteners, shall be ended with clevis or welded eyes.

#### SECTION AE605 TIES, MATERIALS AND INSTALLATION

**AE605.1 General.** Steel strapping, cable, chain or other *approved* materials shall be used for ties. All ties shall be fastened to ground anchors and drawn tight with turnbuckles or other adjustable tensioning devices or devices supplied with the ground anchor. Tie materials shall be capable of resisting an allowable working load of 3,150 pounds (14 kN) with no more than 2-percent elongation and shall withstand a 50-percent overload [4,750 pounds (21 kN)]. Ties shall comply with the weathering requirements of Section AE604.3. Ties shall connect the ground anchor and the main structural frame. Ties shall not connect to steel outrigger beams which fasten to and intersect the main structural frame unless specifically stated in the manufacturer's installation instructions. Connection of cable ties to main frame members shall be  $\frac{5}{8}$ -inch (15.9 mm) closed-eye bolts affixed to the frame member in an *approved* manner. Cable ends shall be secured with at least two U-bolt cable clamps with the "U" portion of the clamp installed on the short (dead) end of the cable to ensure strength equal to that required by this section.

Wood floor support systems shall be fixed to perimeter foundation walls in accordance with provisions of this code. The minimum number of ties required per side shall be sufficient to resist the wind load stated in this code. Ties shall be as evenly spaced as practicable along the length of the *manufactured home* with the distance from each end of the home and the tie nearest that end not exceeding 8 feet (2438 mm). When continuous straps are provided as vertical ties, such ties shall be positioned at rafters and studs. Where a vertical tie and diagonal tie are located at the same place, both ties may be connected to a single anchor, provided the anchor used is capable of carrying both loads. Multiple-section *manufactured homes* require diagonal ties only. Diagonal ties shall be installed on the exterior main frame and slope to the exterior

at an angle of 40 to 50 degrees from the vertical or within the angle limitations specified by the home manufacturer. Vertical ties which are not continuous over the top of the *manufactured home* shall be attached to the main frame.

**SECTION AE606  
REFERENCED STANDARDS**

ASTM C 270—04	Specification for Mortar for Unit Masonry . . . . .	AE602
NFPA 501—03	Standard on Manufactured Housing . . . . .	AE201



## APPENDIX F

# PASSIVE RADON GAS CONTROLS

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

### SECTION AF101 SCOPE

**AF101.1 General.** This appendix contains requirements for new construction in *jurisdictions* where radon-resistant construction is required. These requirements are intended to provide a passive means of resisting radon gas entry and prepare the *dwelling* for post-construction radon mitigation, if necessary (see Figure AF102). Active construction techniques, rather than passive techniques, shall be permitted to be used where approved.

Inclusion of this appendix by *jurisdictions* shall be determined through the use of locally available data or determination of Zone 1 designation in Figure AF101 and Table AF101(1).

### SECTION AF102 DEFINITIONS

**AF102.1 General.** For the purpose of these requirements, the terms used shall be defined as follows:

**DRAIN TILE LOOP.** A continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a *basement* or crawl space footing.

**ENCLOSED CRAWL SPACE.** A crawl space that is enclosed with foundation walls inclusive of any windows, doors, access openings and required vents.

**GAS-PERMEABLE LAYER.** A gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate that is not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a 1/4-inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill) that is not less than 4 inches (102 mm) thick and that is overlain by a soil gas collection mat or soil gas matting installed in accordance with the manufacturer's instructions.

**RADON GAS.** A naturally occurring, chemically inert, radioactive gas.

**SOIL-GAS-RETARDER.** A continuous membrane of 6-mil (0.15 mm) polyethylene used to retard the flow of soil gases into a *dwelling*.

**SUBMEMBRANE DEPRESSURIZATION SYSTEM.** A system designed to achieve lower submembrane air pressure relative to basement or crawl space air pressure by use of a vent drawing air from beneath the soil-gas-retarder membrane.

**SUBSLAB DEPRESSURIZATION SYSTEM (Passive).** A system designed to achieve lower subslab air pressure rela-

tive to indoor air pressure by use of a vent pipe drawing air from beneath concrete floor slabs or other floor assemblies that are in contact with the ground.

**VENT PIPE.** Not less than a 3-inch-diameter (76 mm) ABS or PVC gas-tight pipe extending from the gas permeable layer through the roof.

### SECTION AF103 PASSIVE RADON-RESISTANT SYSTEM REQUIREMENTS

**AF103.1 General.** The following components of a passive submembrane or subslab depressurization system shall be installed during construction.

**AF103.2 Entry routes.** Potential radon entry routes shall be closed in accordance with Sections AF103.2.1 through AF103.2.8.

**AF103.2.1 Floor openings.** Openings around bathtubs, showers, water closets, pipes, wires or other objects that penetrate concrete slabs, or other floor assemblies, shall be filled with a polyurethane caulk or expanding foam applied in accordance with the manufacturer's instructions.

**AF103.2.2 Sumps.** Sumps open to soil or serving as the termination point for subslab or exterior drain tile loops shall be covered with a gasketed or sealed lid. Sumps used as the suction point in a subslab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet.

**AF103.2.3 Foundation walls.** Hollow block masonry foundation walls shall be constructed with a continuous course of *solid masonry*, one course of masonry grouted solid, or a solid concrete beam at or above *grade*. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be *solid masonry*, one course of masonry grouted solid, or a solid concrete beam. Joints, cracks or other openings around penetrations of both exterior and interior surfaces of foundation walls below *grade* shall be filled with polyurethane caulk.

**AF103.2.4 Dampproofing.** The exterior surfaces of foundation walls below *grade* shall be dampproofed in accordance with Section R406.

**AF103.2.5 Air-conditioning systems.** Entry points, joints or other openings into air-conditioning systems in enclosed crawl spaces shall be sealed.

**Exception:** Systems with gasketed seams or that are otherwise sealed by the manufacturer.

**AF103.2.6 Ducts.** Ductwork passing through or beneath a slab within a *dwelling* shall be of seamless material unless the air-conditioning system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed.

Ductwork located in enclosed crawl spaces shall have seams and joints sealed by closure systems in accordance with Section M1601.4.1.

**AF103.2.7 Crawl space access.** Access doors and other openings or penetrations between *basements* and adjoining crawl spaces shall be closed, gasketed or sealed.

**AF103.3 Basements or enclosed crawl spaces with soil floors.** In *dwelling*s with *basements* or enclosed crawl spaces with soil floors, the following components of a passive sub-membrane depressurization system shall be installed during construction.

**Exception:** *Basements* or enclosed crawl spaces that are provided with a continuously operated mechanical exhaust system in accordance with Section R408.3.

**AF103.3.1 Soil-gas-retarder.** The soil in *basements* and enclosed crawl spaces shall be covered with a soil-gas-retarder. The soil-gas-retarder shall be lapped not less than 12 inches (305 mm) at joints and shall extend to foundation walls enclosing the *basement* or crawl space. The soil-gas-retarder shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

**AF103.3.2 "T" fitting and vent pipe.** A 3- or 4-inch "T" fitting shall be inserted beneath the soil-gas-retarder and be connected to a vent pipe. The vent pipe shall extend through the *conditioned space* of the *dwelling* and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point.

**AF103.4 Basements or enclosed crawl spaces with concrete floors or other floor systems and slab-on-grade dwellings.** The following components of a passive subslab depressurization system shall be installed during construction in slab-on-grade *dwellings* or in *dwellings* with *basements* or crawl spaces with concrete or other floor systems.

**AF103.4.1 Sub-slab preparation.** A layer of gas-permeable material shall be placed under concrete slabs and other floor systems that directly contact the ground and are within the walls of the dwelling.

**AF103.4.2 Soil-gas-retarder.** A soil-gas-retarder shall be placed on top of the gas-permeable layer prior to casting

the slab or placing the floor assembly. The soil-gas-retarder shall cover the entire floor area with separate sections lapped not less than 12 inches (305 mm). The soil-gas-retarder shall fit closely around any pipe, wire, or other penetrations of the material. Punctures or tears in the material shall be sealed or covered.

**AF103.4.3 "T" fitting and vent pipe.** Before a slab is cast or other floor system is installed, a "T" fitting shall be inserted below the slab or other floor system and the soil-gas-retarder. The "T" fitting shall be connected to a vent pipe. The vent pipe shall extend through the *conditioned space* of the *dwelling* and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point.

**AF103.5 Drain tile and sump used for depressurization.** As an alternative to inserting a vent pipe into a "T" fitting, a vent pipe shall be permitted to be inserted directly into an interior perimeter drain tile loop or through a sump cover where the drain tile or sump is exposed to the gas-permeable layer.

**AF103.6 Multiple vent pipes.** In *dwellings* where interior footings or other barriers separate the gas-permeable layer, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates above the roof or each individual vent pipe shall terminate separately above the roof.

**AF103.7 Combination foundations.** Where *basement* or crawl space floors are on different levels, each level shall have a separate vent pipe. Multiple vent pipes shall be permitted to be connected to a single vent pipe that terminates above the roof.

**AF103.8 Vent pipe drainage.** Components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the soil-gas-retarder.

**AF103.9 Vent pipe identification.** Exposed and visible interior vent pipes shall be identified with not less than one *label* on each floor and in accessible *attics*. The *label* shall read: "Radon Reduction System."

**AF103.10 Power source and access for future radon fan.** To provide for future installation of a radon fan, an electrical circuit terminated in an *approved* box shall be installed during construction in the anticipated location of the radon fans. An accessible clear space 24 inches (610 mm) in diameter by 3 feet (914 mm) in height adjacent to the vent pipe shall be provided at the anticipated location of a future radon fan.

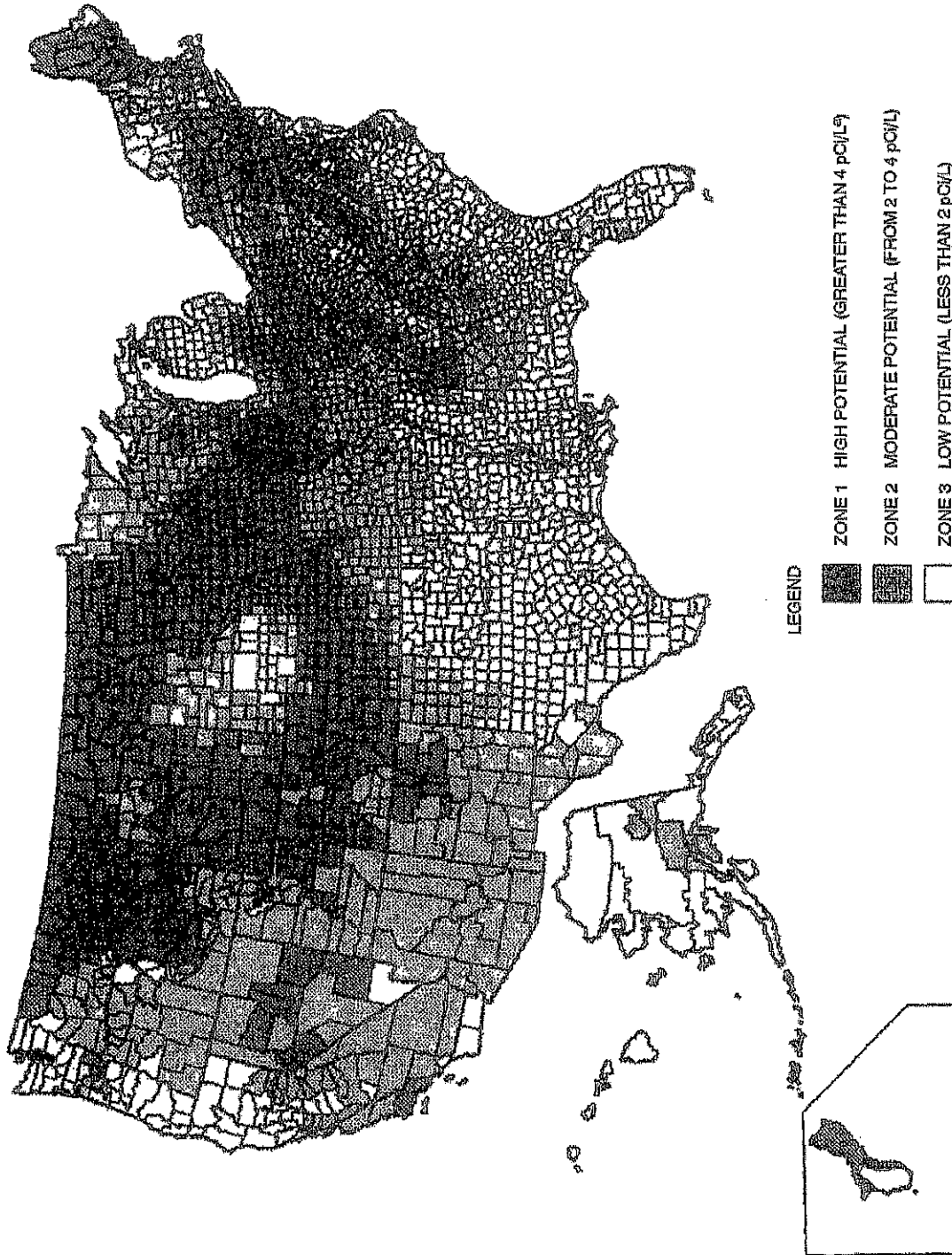


FIGURE AF101  
EPA MAP OF RADON ZONES

a. pCi/L standard for picocuries per liter of radon gas. The U.S. Environmental Protection Agency (EPA) recommends that homes that measure 4 pCi/L and greater be mitigated. The EPA and the U.S. Geological Survey have evaluated the radon potential in the United States and have developed a map of radon zones designed to assist *building officials* in deciding whether radon-resistant features are applicable in new construction. The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Each zone designation reflects the average short-term radon measurement that can be expected to be measured in a building without the implementation of radon-control methods. The radon zone designation of highest priority is Zone 1. Table AF101 lists the Zone 1 counties illustrated on the map. More detailed information can be obtained from state-specific booklets (EPA-402-R-93-021 through 070) available through State Radon Offices or from EPA Regional Offices.

TABLE AF101(1)  
HIGH RADON-POTENTIAL (ZONE 1) COUNTIES<sup>a</sup>

<b>ALABAMA</b>	<b>CONNECTICUT</b>	Morgan	Wabash	Trego	Hillsdale	Watsonwan
Calhoun	Fairfield	Moultrie	Warren	Wallace	Jackson	Wilkin
Clay	Middlesex	Ogle	Washington	Washington	Kalamazoo	Winona
Cleburne	New Haven	Peoria	Wayne	Wichita	Lenawee	Wright
Colbert	New London	Piatt	Wells	Wyandotte	St. Joseph	Yellow Medicine
Coosa	<b>GEORGIA</b>	Pike	White		Washtenaw	
Franklin	Cobb	Putnam	Whitley	<b>KENTUCKY</b>		<b>MISSOURI</b>
Jackson	De Kalb	Rock Island		Adair		Andrew
Lauderdale	Fulton	Sangamon	<b>IOWA</b>	Allen	<b>MINNESOTA</b>	Atchison
Lawrence	Gwinnett	Schuyler	All Counties	Barren	Becker	Buchanan
Limestone		Scott		Bourbon	Big Stone	Cass
Madison	<b>IDAHO</b>	Stark		Boyle	Blue Earth	Clay
Morgan	Benewah	Stephenson	<b>KANSAS</b>	Bullitt	Brown	Clinton
Talladega	Blaine	Tazewell	Atchison	Casey	Carver	Holt
<b>CALIFORNIA</b>	Boise	Vermilion	Barton	Clark	Chippewa	Iron
Santa Barbara	Bonner	Warren	Brown	Cumberland	Clay	Jackson
Ventura	Boundary	Whiteside	Cheyenne	Clay	Cottonwood	Nodaway
<b>COLORADO</b>	Butte	Winnebago	Clay	Fayette	Dakota	Platte
Adams	Camas	Woodford	Cloud	Franklin	Dodge	
Arapahoe	Clark	<b>INDIANA</b>	Decatur	Green	Douglas	<b>MONTANA</b>
Baca	Clearwater	Adams	Dickinson	Harrison	Faribault	Beaverhead
Bent	Custer	Allen	Douglas	Hart	Fillmore	Big Horn
Boulder	Elmore	Bartholomew	Ellis	Jefferson	Freeborn	Blaine
Chaffee	Fremont	Benton	Ellsworth	Jessamine	Goodhue	Broadwater
Cheyenne	Gooding	Blackford	Finney	Lincoln	Grant	Carbon
Clear Creek	Idaho	Boone	Ford	Marion	Hennepin	Carter
Crowley	Kootenai	Carroll	Geary	Mercer	Houston	Cascade
Custer	Latah	Cass	Gove	Metcalfe	Hubbard	Chouteau
Delta	Lemhi	Clark	Graham	Monroe	Jackson	Custer
Denver	Shoshone	Clinton	Grant	Nelson	Kanabec	Daniels
Dolores	Valley	De Kalb	Gray	Pendleton	Kandiyohi	Dawson
Douglas	<b>ILLINOIS</b>	Decatur	Greeley	Pulaski	Kittson	Deer Lodge
El Paso	Adams	Haskell	Hamilton	Robertson	Lac Qui Parle	Fallon
Elbert	Boone	Hodgeman	Haskell	Russell	Le Sueur	Fergus
Fremont	Brown	Jackson	Hogeman	Scott	Lincoln	Flathead
Garfield	Fayette	Jewell	Jackson	Taylor	Lyon	Gallatin
Gilpin	Fountain	Johnson	Jewell	Warren	Mahnomen	Garfield
Grand	Fulton	Kearny	Johnson	Woodford	Marshall	Glacier
Gunnison	Grant	Kingman	Kearny		Martin	Granite
Huerfano	Hamilton	Kiowa	Kingman	<b>MAINE</b>	McLeod	Hill
Jackson	Hancock	Lane	Kiowa	Androscoggin	Meeker	Jefferson
Jefferson	Harrison	Leavenworth	Lane	Aroostook	Mower	Judith Basin
Kiowa	Hendricks	Lincoln	Leavenworth	Cumberland	Murray	Lake
Kit Carson	Henry	Logan	Lincoln	Franklin	Nicollet	Lewis and Clark
Lake	Howard	Marion	Logan	Hancock	Nobles	Madison
Larimer	Huntington	Marshall	Marion	Kennebec	Norman	McCone
Las Animas	Jay	McPherson	Marshall	Lincoln	Olmsted	Meagher
Lincoln	Jennings	Meade	Marshall	Oxford	Otter Tail	Missoula
Logan	Johnson	Mitchell	Marshall	Penobscot	Pennington	Park
Mesa	Kosciusko	Nemaha	Marshall	Piscataquis	Pipestone	Phillips
Moffat	LaGrange	Ness	Marshall	Somerset	Pope	Pondera
Montezuma	Lawrence	Norton	McPherson	York	Ramsey	Powder River
Montrose	Madison	Osborne	McPherson	<b>MARYLAND</b>	Red Lake	Powell
Morgan	Marion	Ottawa	Meade	Baltimore	Redwood	Prairie
Otero	Marshall	Pawnee	Mitchell	Calvert	Renville	Ravalli
Ouray	Miami	Phillips	Phillips	Carroll	Rice	Richland
Park	Monroe	Pottawatomie	Phillips	Frederick	Rock	Roosevelt
Phillips	Montgomery	Pratt	Pottawatomie	Harford	Roseau	Rosebud
Pitkin	Noble	Rawlins	Pottawatomie	Howard	Scott	Sanders
Prowers	Orange	Republic	Pottawatomie	Montgomery	Sherburne	Sheridan
Pueblo	Putnam	Rice	Pottawatomie	Washington	Sibley	Silver Bow
Rio Blanco	Randolph	Riley	Pottawatomie		Stearns	Stillwater
San Miguel	Rush	Rooks	Pottawatomie	<b>MASS.</b>	Steele	Teton
Summit	Rush	Rush	Pottawatomie	Essex	Stevens	Toole
Teller	Scott	Saline	Pottawatomie	Middlesex	Swift	Valley
Washington	Shelby	Scott	Pottawatomie	Worcester	Todd	Wibaux
Weld	St. Joseph	Sheridan	Pottawatomie		Traverse	Yellowstone
Yuma	Steuben	Sherman	Pottawatomie	<b>MICHIGAN</b>	Wabasha	
	Tippecanoe	Smith	Pottawatomie	Branch	Wadena	
	Tipton	Stanton	Pottawatomie	Calhoun	Waseca	
	Union	Thomas	Pottawatomie	Cass	Washington	
	Vermillion		Pottawatomie			

(continued)

TABLE AF101(1)—continued  
HIGH RADON-POTENTIAL (ZONE 1) COUNTIES<sup>a</sup>

<b>NEBRASKA</b>	Morris	Columbiana	Lehigh	Union	Fairfax	Crawford
Adams	Somerset	Coshocton	Luzerne	Walworth	Falls Church	Dane
Boone	Sussex	Crawford	Lycoming	Yankton	Fluvanna	Dodge
Boyd	Warren	Darke	Mifflin		Frederick	Door
Burt		Delaware	Monroe	<b>TENNESSEE</b>	Fredericksburg	Fond du Lac
Butler	<b>NEW MEXICO</b>	Fairfield	Montgomery	Anderson	Giles	Grant
Cass	Bernalillo	Fayette	Montour	Bedford	Goochland	Green
Cedar	Colfax	Franklin	Northampton	Blount	Harrisonburg	Green Lake
Clay	Mora	Greene	Northumberland	Bradley	Henry	Iowa
Colfax	Rio Arriba	Guernsey	Perry	Claiborne	Highland	Jefferson
Cuming	San Miguel	Hamilton	Schuylkill	Davidson	Lee	Lafayette
Dakota	Santa Fe	Hancock	Snyder	Giles	Lexington	Langlade
Dixon	Taos	Hardin	Sullivan	Grainger	Louisa	Marathon
Dodge		Harrison	Susquehanna	Greene	Martinsville	Menominee
Douglas	<b>NEW YORK</b>	Holmes	Tioga	Hamblen	Montgomery	Pepin
Fillmore	Albany	Huron	Union	Hancock	Nottoway	Pierce
Franklin	Allegany	Jefferson	Venango	Hawkins	Orange	Portage
Frontier	Broome	Knox	Westmoreland	Hickman	Page	Richland
Furnas	Cattaraugus	Licking	Wyoming	Humphreys	Patrick	Rock
Gage	Cayuga	Logan	York	Jackson	Pittsylvania	Shawano
Gosper	Chautauqua	Madison		Jefferson	Powhatan	St. Croix
Greeley	Chemung	Marion	<b>RHODE ISLAND</b>	Knox	Pulaski	Vernon
Hamilton	Chenango	Mercer	Kent	Lawrence	Radford	Walworth
Harlan	Columbia	Miami	Washington	Lewis	Roanoke	Washington
Hayes	Cortland	Montgomery		Lincoln	Rockbridge	Waukesha
Hitchcock	Delaware	Morrow	<b>S. CAROLINA</b>	Loudon	Rockingham	Waupaca
Hurston	Dutchess	Muskingum	Greenville	Marshall	Russell	Wood
Jefferson	Erie	Perry		Maury	Salem	
Johnson	Genesee	Pickaway	<b>S. DAKOTA</b>	McMinn	Scott	<b>WYOMING</b>
Kearney	Greene	Pike	Aurora	Meigs	Shenandoah	Albany
Knox	Livingston	Preble	Beadle	Monroe	Smyth	Big Horn
Lancaster	Madison	Richland	Bon Homme	Moore	Spotsylvania	Campbell
Madison	Onondaga	Ross	Brookings	Perry	Stafford	Carbon
Nance	Ontario	Seneca	Brown	Roane	Staunton	Converse
Nemaha	Orange	Shelby	Brule	Rutherford	Tazewell	Crook
Nuckolls	Otsego	Stark	Buffalo	Smith	Warren	Fremont
Otoe	Putnam	Summit	Campbell	Sullivan	Washington	Goshen
Pawnee	Rensselaer	Tuscarawas	Charles Mix	Trousdale	Waynesboro	Hot Springs
Phelps	Schoharie	Union	Clark	Union	Winchester	Johnson
Pierce	Schuyler	Van Wert	Clay	Washington	Wythe	Laramie
Platte	Seneca	Warren	Codington	Wayne		Lincoln
Polk	Steuben	Wayne	Corson	Williamson	<b>WASHINGTON</b>	Natrona
Red Willow	Sullivan	Wyandot	Davison	Wilson	Clark	Niobrara
Richardson	Tioga		Day		Ferry	Park
Saline	Tompkins	<b>PENNSYLVANIA</b>	Deuel	<b>UTAH</b>	Okanogan	Sheridan
Sarpy	Ulster	Adams	Douglas	Carbon	Pend Oreille	Sublette
Saunders	Washington	Allegheny	Edmunds	Duchesne	Skamania	Sweetwater
Seward	Wyoming	Armstrong	Faulk	Grand	Spokane	Teton
Stanton	Yates	Beaver	Grant	Piute	Stevens	Uinta
Thayer		Bedford	Hamlin	Sanpete		Washakie
Washington	<b>N. CAROLINA</b>	Berks	Hand	Sevier		
Wayne	Alleghany	Blair	Hanson	Uintah	<b>W. VIRGINIA</b>	
Webster	Buncombe	Bradford	Hughes		Berkeley	
York	Cherokee	Bucks	Hutchinson	<b>VIRGINIA</b>	Brooke	
	Henderson	Butler	Hyde	Alleghany	Grant	
<b>NEVADA</b>	Mitchell	Cameron	Jerauld	Amelia	Greenbrier	
Carson City	Rockingham	Carbon	Kingsbury	Appomattox	Hampshire	
Douglas	Transylvania	Centre	Lake	Augusta	Hancock	
Eureka	Watauga	Chester	Lincoln	Bath	Hardy	
Lander		Clarion	Lyman	Bland	Jefferson	
Lincoln	<b>N. DAKOTA</b>	Clearfield	Marshall	Botetourt	Marshall	
Lyon	All Counties	Clinton	McCook	Bristol	Mercer	
Mineral		Columbia	McPherson	Brunswick	Mineral	
Pershing	<b>OHIO</b>	Cumberland	Miner	Buckingham	Monongalia	
White Pine	Adams	Dauphin	Minnehaha	Buena Vista	Monroe	
	Allen	Delaware	Moody	Campbell	Morgan	
<b>NEW HAMPSHIRE</b>	Ashland	Franklin	Perkins	Chesterfield	Ohio	
Carroll	Auglaize	Fulton	Potter	Clifton Forge	Pendleton	
	Belmont	Huntingdon	Roberts	Covington	Pocahontas	
<b>NEW JERSEY</b>	Butler	Indiana	Sanborn	Craig	Preston	
Hunterdon	Carroll	Juniata	Spink	Cumberland	Summers	
Mercer	Champaign	Lackawanna	Stanley	Danville	Wetzell	
Monmouth	Clark	Lancaster	Sully	Dinwiddie	<b>WISCONSIN</b>	
	Clinton	Lebanon	Turner		Buffalo	

a. The EPA recommends that this county listing be supplemented with other available State and local data to further understand the radon potential of a Zone 1 area.



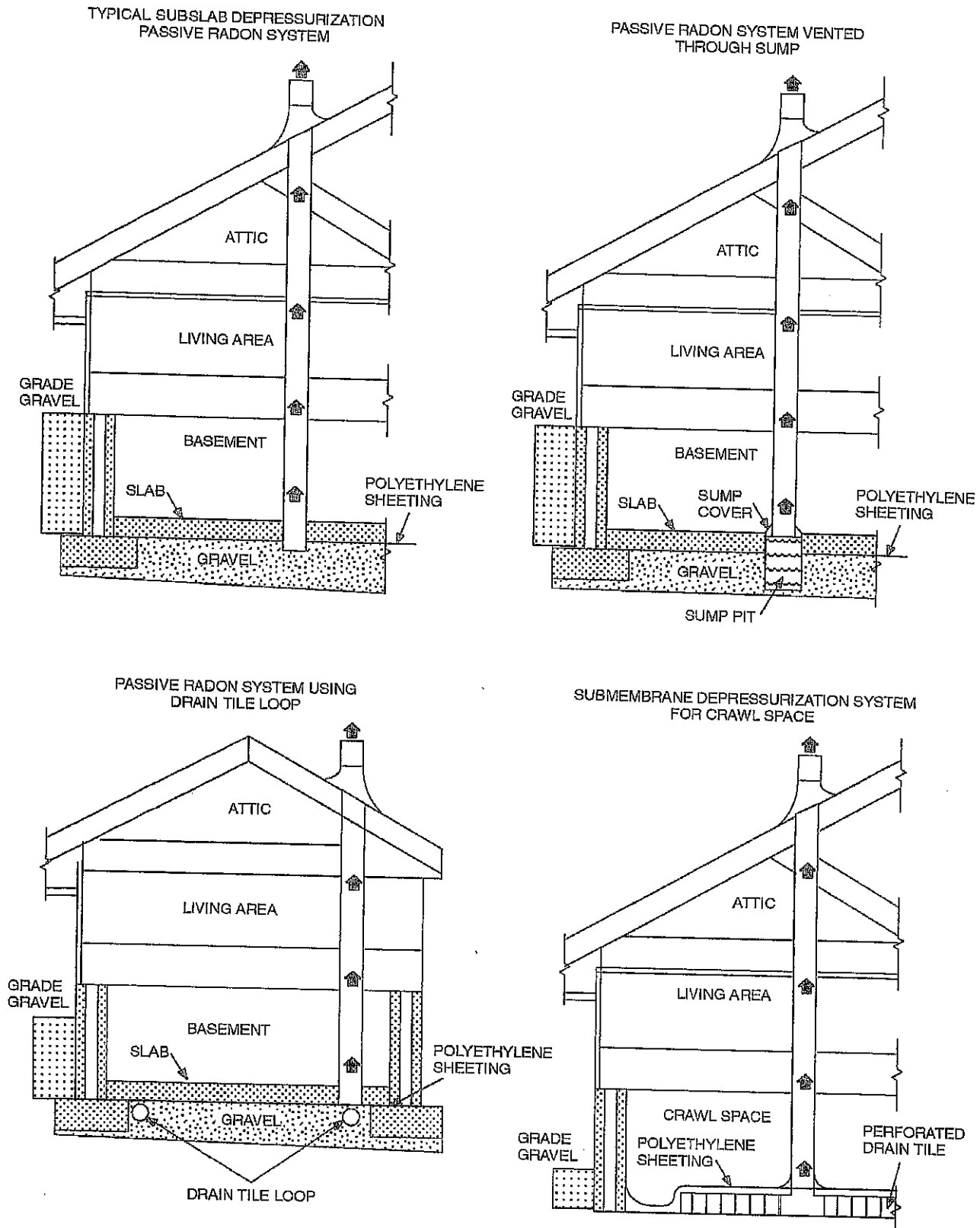


FIGURE AF102  
RADON-RESISTANT CONSTRUCTION DETAILS FOR FOUR FOUNDATION TYPES