

**Minimum Design Standards for
New Construction of
Single Family & Multifamily Housing Units**



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Minimum Design Requirements

The following minimum design standards are for all newly constructed single family and multifamily attached units. These same standards also apply to accessibility improvements. Refer to Americans with Disability Act (ADA) Accessibility Guidelines or the International Code Council (ICC) ANSI A117.1 Code for technical requirements and standards when applicable.



Division I: General Requirements

1 Minimum Design Standards:

Minimum Design Standards shall apply when Tennessee Housing Development Agency (THDA) funding is used for all new construction of single family and multifamily housing. These funds are available through THDA's Community Programs Division.

THDA's Minimum Design Standards are provided in conformance with the requirements of 24 CFR 92.251 and are to be used as a guideline to meet and/ or exceed all applicable State, county, and local codes. These standards also serve as a vehicle to promote and enforce modern construction and design practices for builders, contractors, and design professionals who wish to utilize funding from the Tennessee Housing Development Agency's Community Programs Division. Other methods of construction and design may be acceptable on a case by case basis.

A complete set of construction documents must be submitted prior to the approval of the project. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by THDA. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that the work proposed will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by THDA. Manufacturer's installation instructions, as required by this code, shall be available on the job site at the time of inspection.

The construction documents submitted shall be accompanied by a site plan showing the size and location of new construction and existing structures on the site and distances from lot lines. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot.

2 Quality Assurance:

General Contractors and/or subcontractors shall furnish a written material and labor warranty on all units, materials and workmanship for a period not less than one full year after the date that the certificate of occupancy is issued or owner's final inspection acceptance.

3 Unit Size Requirements:

The following minimum square foot measurements are required for the different type of units. Net square feet are the heated and cooled area of the unit.

- **SRO units:** Shall contain at least 150 square feet (common kitchen/ bath)
- **Efficiency units:** Shall contain at least 400 square feet
- **One-bedroom units:** Shall contain at least 600 square feet
- **Two-bedroom units:** Shall contain at least 800 square feet.
- **Three-bedroom units:** Shall contain at least 1,000 square feet.
- **Four-bedroom units:** Shall contain at least 1,100 square feet.

4 Units for Elderly Residents:

All newly constructed units for elderly residents, age 62 or older, shall be located at the grade level or on an elevator accessible floor in compliance with ICC A117.1-2009 1005 Type C VISIBLE Units.

5 Universal Design:

Projects that receive funding from THDA for the purpose of constructing single family or multi-family housing are encouraged to use Universal Design principles to ensure the unit's viability for a range of future users. Information regarding Universal Design principles can be found at:

<http://www.huduser.org/Publications/PDF/remodel.pdf> and at
<https://www.ncsu.edu/ncsu/design/cud/>

6 Codes:

All construction shall comply with applicable State, county, and local codes, planning and zoning requirements, local authorities' rules and regulations. Federal regulations which may pertain to any specific project such as the Fair Housing Amendment Act of 1988, Section 504 of the Rehabilitation Act of 1973 and Americans with Disabilities Act of 2010, as amended, also apply. In the absence of local codes, the State of Tennessee adopted ICC codes and Uniform Physical Condition Standards shall apply.

7 Energy Efficiency:

All newly constructed residential building envelope designs shall exceed minimum energy efficiency requirements of the 2009 International Energy

Conservation Code (IECC). Documentation and/or calculations that the building envelope exceeds the code requirements must be provided from REScheck or other approved software that the building envelope exceeds 2009 IECC requirements. REScheck is a U.S. Department of Energy software package; free download can be found at:

<http://www.energycodes.gov/rescheck/>

8 Testing:

- a. All new construction shall require a blower door test in compliance with the currently adopted State of Tennessee International Energy Conservation Code; this shall be tested by a qualified HERS Rater/ BPI Building Analyst.
- b. All new construction shall require a post construction duct tightness test in compliance with the currently adopted State of Tennessee International Energy Conservation Code; this shall be tested by a qualified HERS Rater/ BPI Building Analyst.

Division 2: Existing Conditions

1 Soil boring and Testing:

All new construction which contains 12 or more units will be required to have a soils analysis test performed by a state of Tennessee approved testing laboratory. THDA reserves the right to require a soils test on any project regardless of construction type or unit size. Results of the test shall comply with THDA requirements.

2 Hazardous Materials:

When federal funds obtained through THDA are utilized, all project sites shall be certified free of hazardous materials such as but not limited to: Lead, Asbestos, Radioactive Waste, Biological Hazards, PCBs, Mercury, Toxic Molds, Radon, or any other health threat to the prospective residents.

Division 3: Concrete

1 Exterior Concrete:

Shall conform to the latest revised Standard Specification for Portland cement, ASTM C595. All concrete shall have a minimum 28-day compressive strength of 3000 psi and be entrained with 5 percent air with a minimum cement content of 520 lbs. per cubic yard (5.5 sacks). Expansion-joint material shall be ½" thick asphalt-impregnated pre-molded fiber, ASTM D1752. Follow American Concrete Institute (ACI) 318. Minimum 4" thick for driveways, parking areas, sidewalks, porches and stoops. Driveways to have fiberglass mesh or 6x6 WWF or 6" thick.

2 Concrete Finishes:

Smooth formwork, no patterns, shall be used for all poured in place walls exceeding 3 feet or more exposure.

3 Concrete Testing:

All new construction containing twelve (12) or more units will be required to have concrete strength tests performed by a state of Tennessee approved testing laboratory. Results of the test shall comply with the THDA requirements.

Division 4: Masonry

1 Brick:

Siding material of all attached newly constructed units shall consist of a minimum of fifty percent (50%) brick, stone, or other THDA approved materials. The bricked area calculation of fifty percent shall not include window and door areas nor brick below finished grade.

2 Face Brick:

Shall be ASTM C 216, Type FBS, Grade SW, or equivalent, modular size.

3 Concrete Masonry Units (CMU):

Stucco or split face shall be used for all CMU walls exceeding 3 feet or more exposure.

Division 5: Metals

1 Metal Ties:

For newly constructed units, metal tie-down or “hurricane” straps shall be used at each bearing location of each floor, roof truss, rafter and ceiling joist. Correct nails and nailing pattern as required by the manufacturers’ installation requirements of the strap shall be used.

2 Steel Lintels:

Steel lintels, when specified for openings in masonry walls, shall be galvanized, primed and painted.

Division 6: Wood, Plastics, and Composites

1 Stair Riser and Tread Construction:

All newly constructed steps shall conform to the state of Tennessee currently adopted IRC requirements, having a riser not greater than 7 3/4” and a tread of 11”.

2 Wood Exposed to Weathering Elements:

All exterior wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground.

3 Wood Decking:

Exterior wood decking shall consist of composite, natural durable wood or pressure treated wood material.

4 Wood Stairs and Handrails:

Exterior wood stairs shall be constructed with properly treated dimensional lumber. Handrails shall be constructed of composite, natural durable wood or pressure treated wood material. Handrails shall meet the graspability and size standards in the International Residential Code.

Division 7: Thermal and Moisture Protection

1 Fascia:

a. Metal: 0.019” minimum thickness aluminum, factory finish (coil stock).

b. Exposed Wood: redwood, cedar, or pressure treated.

c. Composite: Cement fiber board or other durable material as approved by THDA.

2 Roof:

Shingles shall be 235 lb. seal tab type over 30 lb. felt with metal drip edge, with minimum 25-year product warranty.

3 Roof Construction:

Minimum roof slope on all newly constructed roofs except porch roofs shall be 4" vertical to 12" horizontal.

4 Gutters and Downspouts:

All structures shall have gutters and downspouts and be appropriately designed with a minimum 5" gutter and a 2"x 3" downspout. All downspouts shall empty onto splash blocks or be piped to an appropriate location.

5 Siding:

a. Composite: Fiber cement siding, primed, with two-coat minimum painted finish or factory finish.

b. Metal: 26 gauge minimum thickness aluminum or galvanized steel with factory finish.

c. Vinyl: 0.42" minimum thickness, UV protected.

d. Wood: Cedar or redwood stained or primed once with 2-coat minimum finish sealer.

6 Insulation:

All crawl spaces shall contain cavity floor insulation equal to or greater than R-19. Combined wall insulation value shall be equal to or greater than R-13. Combined attic insulation value shall be equal to or greater than R-38. As per

NAIMA standards or ICC Energy Conservation Code as currently adopted by the State of Tennessee.

Division 8: Openings

1 Exterior Doors:

Exterior Doors shall be 1 ¾" thick 6 panel, or with limited panes of glass, steel material, insulated and be appropriately finished as recommended by the manufacturer. All opaque exterior doors shall have a U-factor equal to or less than 0.40.

a. Exterior hardware:

All exterior doors, except sliding glass doors, shall have a lever key-lock latch and security accessories (eyelet peep hole, if the door is solid, and a deadbolt lock).

2 Interior Doors:

Interior Doors shall be solid Wood, Composite or hollow core panel doors. Interior doors shall be a minimum of 1 ⅜" thick.

a. Interior Hardware:

All doors, except bi-fold and bypass type doors, shall be equipped with passage lever-handle hardware. All bedrooms and bathrooms shall be equipped with privacy locks.

3 Windows:

- a.** All window frames must be solid vinyl. Double hung or Single hung type with a removable bug screen for lower section.
- b.** All glazing shall be double-paned with low E with Argon.
- c.** The vapor seal on the glazing must have a minimum ten-year warranty.
- d.** All windows shall have a minimum one-year warranty on the operation of the window.

- e. All windows shall have a National Fenestration Rating meeting minimum energy code requirements for the proper Zone as shown in the currently adopted State of Tennessee International Energy Conservation Code..

Division 9: Finishes

1 Exterior Ceiling:

Solid backing to be used when using vinyl or aluminum material for porch ceilings, provide a rigid, solid backing such as ½” OSB or plywood.

2 Exterior Finishes:

- a. **Wood:** All exterior exposed wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground. All structural posts below grade shall have the factory treated end of the post below grade. Use of CCA Treated lumber shall be prohibited.
- b. **Posts and Columns:** All posts columns and guardrails at deck level and above shall be factory made and finished, or meet the wood finishes in Section “a”.
- c. **Handrails:** Rails shall be smooth, splinter-free, painted or factory finished, withstanding weather, and resisting checking and splintering. All handrails shall meet the graspability standards as required by the International Residential Code as currently adopted by the State of Tennessee.
- d. **Fiber Cement Siding:** Shall be factory finished or be painted with at least two coats of exterior grade paint.

3 Finished Floor Treatments:

- a. **Carpet Padding:** 7/16” thick, 6-lb. minimum re-bond polyurethane.
- b. **Sheet Carpet:** 25 oz. minimum, 100 percent nylon. Other options include Berber type with blended fiber.
- c. **Sheet Vinyl:** Shall be Armstrong or equivalent minimum 10 mil wear layer. Provide product adhesive and underlayment as recommended by the manufacturer. All surfaces shall be clean, dry, and appropriate

temperature during installation. Vinyl sheet flooring shall conform to the requirements of ASTM F 1303, Type I.

- d. **Vinyl Composition Tile (VCT)**: Shall be Armstrong or other approved equal, 1/8" x 12" x 12". Provide product adhesive and underlayment as recommended by the manufacturer. All surfaces shall be clean, dry, and appropriate temperature during installation. Follow manufacture's recommendation for pattern layout.
- e. **Wood Flooring**: Flooring shall be tongue and groove hardwood; factory finished, or have a minimum of three coats of site-applied, UV-protective polyurethane.
- f. **Laminate Wood Flooring**: Composite panel(s) comprised of four main components: a high pressure decorative laminate surface, an Aqua Resist high density fiberboard (HDF) core, a high pressure balancing backer, and an attached high density polyethylene underlayment.

Typical size: 7.6" x 47.55" x .385". Aluminum locking system for glue-free installation. Wax-impregnated edges. The floor shall be resistant to stains and reagents. The floor shall have a horizontal joint strength of not less than 1,000 lbs./lineal ft. and Ball Impact Resistance (ANSI/NEMA LD3-2000, 3.8).

4 Other Flooring Products: Ceramic tile and laminates

At the interior side of the main entry door within each dwelling unit, there shall be an uncarpeted, finished floor area. This area shall be no less than sixteen (16) square feet.

5 Interior Doors:

- a. **Paint**: Primed once, with two-coat semi-gloss finish on all sides and faces. No VOC.
- b. **Stain**: Stain or oil on all sides and faces, with three-coat varnish, polyurethane finish. Low VOC.
- c. **Factory Finished**: Factory finish doors are acceptable with factory warranty.

6 Water-Resistant Drywall:

Water-resistant gypsum board (commonly called “green board”) or equivalent must be used on all walls in the bathroom and within six feet of wall surfaces where the drywall can be splashed such as kitchen sink, next to water heater and/or washer. Water-resistant/ mold resistant gypsum board or equivalent shall be provided behind any tub/shower unit located on an exterior wall. Water-resistant gypsum, when used on ceilings must be rated for the span. Prefer non-paper faced drywall or a product that meets ASTM D3273 for mold resistance above and immediately around tubs, showers.

7 Interior Wall Finishes:

Primed once and two finish coats of flat, eggshell or satin. Use semi-gloss, or satin finish for bathrooms, laundry, and kitchens. No VOC.

Division 10: Specialties

1 Storage areas:

Exterior storage areas are required on all newly constructed units except SROs and efficiency units. The storage area shall be a minimum of twenty-five (25) square feet. Structures must satisfy applicable building code requirements. Prefabricated plastic structures are prohibited. All storage areas shall match exterior building veneer, trim and possess identical shingles.

2 Roof Offsets:

Projects of four (4) or more attached units shall be designed in such a way as to vary the roof line with offsets, gable porch roofs, etc.

3 Entries:

The main common entry to each group of newly constructed dwellings or each main exterior entry to individual dwellings shall have a concrete, treated wood, or other hard surface exterior stoop, porch or deck, a minimum of 5' x 5'. All main entries shall have a roof or awning over the entry area. The roof shall cover at least a 5' x 5' area.

4 Closet Storage/Accessories:

Closets shall include a 12” deep vinyl wrapped wire shelf in coat, laundry and bedroom closets. Minimum of (4) 24” deep vinyl wrapped wire shelves for kitchen pantries.

5 Mailboxes:

All units shall have a USPS approved mailbox either at each individual unit, common area, or a designated location per USPS post master.

6 Bath Accessories:

All bathrooms shall have:

- a. Medicine cabinet with mirror 16” wide by 20” tall (minimum)
- b. Wall hung toilet paper dispenser
- c. 24” (minimum) towel bar
- d. Shower rod
- e. Mirror above lavatory backsplash. Other combinations of mirror and storage may be acceptable at the approval of THDA.

Division 11: Equipment

1 Refrigerator:

A refrigerator shall be minimum 18 cubic foot frost free provided in all dwelling units to match manufacturer and model line with the dishwasher and range on all projects including new construction and rehabilitation projects where identified in the PCNA (physical/capital needs assessment). All refrigerators must be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer’s Internet site.

2 Dishwasher:

A dishwasher shall be 24” under counter mount unit to match manufacturer and model line with the refrigerator and range including new construction and rehabilitation projects where identified in the PCNA (physical/capital needs assessment). Standard dishwashers shall use less than 4.25 gallons per cycle and 295 kWh per year. All dishwashers must be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer’s Internet site.

3 Range:

An electric range shall be minimum 30" 4 burner with self-cleaning oven provided in all dwelling units to match manufacturer and model line with the refrigerator and dishwasher on all projects including new construction and rehabilitation projects where identified in the PCNA (physical/capital needs assessment).

4 Laundry:

All newly constructed units, except SROs and efficiencies, shall be equipped with washer dryer hookups. All clothes washers supplied in individual units shall have an MEF equal to or greater than 2.0 and a WF equal to or less than 6.0. (NOTE: clothes washers and dryers are not eligible costs in THDA's HOME program).

All laundry facilities located inside any habitable space shall be equipped with a properly installed washer overflow pan indirectly discharging to an overflow waste receptor, floor drain, or to the exterior of the building. Water supply shut off valve to be single throw cutoff.

5 Trash Collection:

Provisions for dumpsters or trash cans are required. Screening of trash cans and/or dumpsters shall be provided for multi-family units.

6 Playgrounds:

Playgrounds shall be comprised of construction grade equipment approved by THDA prior to installation. The area immediately in and around the playground shall be mulched with 6" of appropriate material such as cypress mulch, pine bark or rubber mulch.

Division 12: Furnishings

1 Casework:

Cabinet fronts shall be made of solid wood (not particleboard); doors, draws and fronts shall be factory finished. Cabinet ends shall be finished with

appropriate veneer. All cabinets shall be Kitchen Cabinet Manufacturers Association (KCMA) approved.

2 Countertops:

Tops shall be post form plastic laminate, bullnose front edge, rolled backsplash, finished exposed ends and sealed at the cut out for sink and the backsplash at the wall. Other appropriate materials may be used such as solid surface, and cultured marble for bathroom vanities. Any other types of countertops must be approved by THDA.

Division 13: Special Construction

1 Office/ Laundry/ Maintenance Building:

Unless individual units are supplied with laundry facilities, all new projects consisting of four (4) or more units shall provide common laundry facilities including a minimum of one (1) washer and one (1) dryer per every twelve units up to a maximum total of four (4) washers and four (4) dryers. All clothes washers in common areas shall have a Modified Energy Factor (MEF) equal to or greater than 2.2 and a Water Factor (WF) equal to or less than 4.5.

Division 14- 20: Reserved for Future Use

Division 21: Fire Suppression

1 Fire Suppression and Alarms:

All new construction must comply with the International Residential, Building and Fire Codes as currently adopted by the State of Tennessee.

Division 22: Plumbing

All plumbing, including piping, fixtures and appurtenances must meet or exceed the standards of the International Residential or Plumbing Code.

1 Bath Tub:

Tubs shall be 30" deep white porcelain finish steel, or cultured marble.

2 Shower:

Showers shall be 36" x 36" minimum with 4" curb; made of fiberglass, acrylic, or cultured marble. Shower head flow not to exceed 2.5 gpm.

3 Tub/ Shower Surround:

Tub/ shower surrounds shall be 3 piece integral panels of plastic, fiberglass, or cultured marble minimum 72" above flood rim.

4 Lavatories:

Sinks shall be 15" minimum diameter; made of white porcelain finish steel or cultured marble.

5 Faucets:

Polished chrome finish two handle with pop-up stopper. Lever handle type shall be used when ADA requirements apply. Faucets containing plastic material for exterior housing are prohibited. Flow not to exceed 1.5 gpm.

6 Water Closets:

Water closets shall be white porcelain elongated bowls with acrylic seat maximum 1.6 GPF.

7 Kitchen Sink:

Sinks shall be a minimum eight inches (8") deep, 33 x 20 stainless steel double bowl. For ADA compliance when applicable, roll under sink depth shall be shallower as required in mobility impaired dwelling units

8 Plumbing Accessories:

Water heaters located in any interior space shall have a metal 2" deep overflow pan with discharge pipe indirectly plumbed into DWV receptor, floor drain or to the exterior. Discharge pipe end shall have a bug screen.

9 Piping:

Potable water lines shall be copper or PEX material. Installation in exterior walls must be centered within the insulation. Hose bibs must be of the freeze

proof kind. All piping located in attic or crawl space shall be insulated. All hot water lines shall be insulated equal to or greater than R-4 pipe wrap.

10 Water Heater:

Water Heater shall be minimum 40 gallon electric with a minimum Energy Factor (EF) equal to or greater than .92. Gas fired water heaters shall an EF equal to or greater than .59. Instantaneous gas water heaters shall have an EF equal to or greater than .94 (96%AFUE). Prefer direct vent on gas water heaters or sealed combustion.

11 Radon Reduction:

Radon venting is required as a "Passive System" unless otherwise specified by local codes or regulations. Refer to 2006 IRC Appendix F.

Division 23: Heating Ventilating and Air Conditioning

All mechanical systems, shall be regulated, including the design, installation, maintenance, and alteration of mechanical systems that are permanently installed and used to control environmental conditions within buildings to meet or exceed the standards of the International Residential or Mechanical Code.

1 Heating Ventilating and Air Conditioning Equipment:

All units shall have a central HVAC system comprised of a split system heat pump with emergency heat strips for heating and cooling using high-efficiency equipment. Units with gas shall be a split system air conditioner and furnace. Heat pump/ AC systems shall have a minimum SEER (Seasonal Energy Efficiency Rating) rating of 14.5 with a minimum HSPF (Heating Seasonal Performance Factor) rating of 8.5. Fuel oil, gas fired furnaces and boilers shall have an Annual Fuel Utilization Efficiency (AFUE) equal to or greater than ninety-two percent (92%). Electric-resistance-only heat systems are prohibited. Alternative HVAC systems may be approved by THDA. Prefer direct vent on gas furnace or sealed combustion.

2 Ducting:

Duct system can be a mix of; hard duct main trunk lines (sheet metal) from the air handlers with flex duct branching out to the individual vents. All duct must be insulated with a minimum R-5, unconditioned space R-8 and installed

per SMACNA standards. All joints and connections shall be sealed tight compliant with UL 181 and pass pressure testing. Exhaust vent piping shall be insulated. All ducts shall be installed per manufactures requirements and free of restrictions. Vent louvers shall be white adjustable type. Dryer vent shall be through wall weather type with damper. All supply ducts shall have individual dampers enabling supply air adjustments at each register grill and repositioning damper. All HVAC systems shall be Tested and Balanced within 20% of the ACCA Manual J, S and D calculations.

3 Thermostat:

All individual HVAC systems shall be controlled by a digital thermostat.

4 Range Hoods:

All units shall be equipped with a minimum 200 CFM range hood. All range hoods shall be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site.

Recirculation hoods shall be equipped with an activated charcoal filter. Gas appliances must be ducted to the exterior. Minimum 200cfm labeled.

5 Fans:

Ceiling fans shall be minimum 42" 4 paddle with light kit located in all bedrooms and a 52" 5 paddle with light kit in the living room. Fans shall be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site. Minimum 120 cfm/watt at medium speed setting. Fans are required to accept CFL or LED bulbs.

Division 26: Luminaries / Electrical

All electrical work must conform to the currently adopted National Electrical Code (NFPA 70), as adopted by the State of Tennessee. All electrical work will require the obtaining of electrical permits and receiving a passing final inspection by a Tennessee Licensed Electrical Inspector for that jurisdiction or area.

1 Exterior Luminaries:

Luminaries shall be located at all entrances and common areas. All on-site parking areas shall be lighted. The electrical supply for all-common areas, stairways, walkways and parking areas shall not originate from an individual unit. Each fixture should have dusk/ dawn and motion sensor capabilities with CFL or LED lamp.

2 Interior Luminaries:

Each room, hall, stair, and walk in closet shall have a minimum of one switched overhead light (color to match door hardware) with energy efficient CFL or LED lamp and globe (ceiling fan light kit is acceptable in bedrooms and living room). Kitchens shall include adequate lighting over the counter top, appliances, and sink. Bathrooms shall be equipped with adequate lighting over the vanity sink with CFL or LED lamps and a combination exhaust fan light in the ceiling near the water closet/ tub.

Division 27: Communications

1 Telephone and Cable:

All dwelling units shall be wired with CAT6 cable for telephone and internet jacks, as well as cable for television in each bedroom and living room. Common areas, community rooms and on-site management offices shall have communications lines as required.

Division 28: Electronic Safety and Security

1 Fire Alarm & Smoke Detectors:

Smoke detectors and Fire Alarm Systems shall be provided as required by NFPA 72, and the International Fire Code as adopted by the State of Tennessee. Hardwired with battery back-up smoke detectors shall be provided in all bedrooms and hallways. No bedroom door shall be more than eight (8) feet from a hallway smoke detector. Install devices per manufactures installation requirements. Instructions for specific locations and other details shall be strictly observed and tested. All building areas must comply with all State, county, and local codes.

2 Carbon Monoxide Detectors:

UL listed carbon monoxide detectors shall be installed outside each sleeping area in the immediate vicinity of all bedrooms if the dwelling contains fuel burning appliances or has an attached garage.

Division 29-30 Reserved for Future Use

Division 31: Earthwork

1 Site Layout:

Property line, setbacks, easements, right-of-way and clearances must be properly identified prior to staking the building footprint on site. If there is a conflict where the building is proposed to be placed on site, then refer to the State, county, local codes, and utility companies for resolution. Other engineered designs may be presented to THDA for consideration.

2 Soil Boring Test:

All new construction that contain 12 or more units shall have a soil-boring test performed by a qualified engineer to complete a geotechnical report. This report must be submitted to THDA. Projects containing less than 12 units may also be required to have a soil boring test performed should the test be determined necessary by THDA.

3 Soil Testing:

All new construction that contains 12 or more units will be required to have soil compaction test performed by a State of Tennessee approved testing laboratory. Projects containing less than 12 units may also be required to have a soil compaction test performed should the test be determined necessary by THDA. Results of the test shall comply with the applicable building code requirements and geotechnical report.

Division 32: Exterior Improvements

1 Landscaping:

Adequate landscaping is required on all multifamily projects. The developer shall submit a landscape plan as part of final plans and specifications. Each building shall include a minimum landscaping package.

2 Turf:

All lawn areas shall be seeded with the seed variety, lime, and fertilizer application rate, which is appropriate to establish a good lawn cover. All slopes in excess of 3:1 within 10 feet of the building, driveway and/or walkway shall receive sod or other approved erosion control materials which will enhance the establishment of a permanent ground cover.

3 Sodded Areas:

Sod is optional in building front yards and common areas for all projects.

4 Fencing:

All multifamily projects shall be fenced to provide security around the site boundaries.

5 Parking/Driveways:

All multifamily buildings shall have adequate parking as required by local zoning or building code. Unless prohibited by local code, jurisdiction or structural constraints, all projects shall have a minimum of one parking space per unit. Single Family Dwellings shall have a minimum parking space for 2 vehicles.

6 Parking Lots:

All on-site parking lots and access drives are to be paved and parking spaces shall have bumper stops or curbs. If walkways are used as bumper stops, the walkway shall be 6' wide.

7 Concrete pads and walks:

All entry walks shall be a minimum of 3' wide, 3000 psi concrete, and shall be provided at all units from the entry to parking area. Provide ¼ inch per foot crown or cross slope in the direction of drainage. Expansion-joint material shall be ½" thick asphalt-impregnated pre-molded fiber, ASTM D1752. Follow ACI 318. Minimum concrete thickness shall be 4".

8 Walkways:

All units shall have a 3' wide 3,000 psi concrete with broom finish walkway from the parking area to the main entrance.

9 Ramps:

All newly constructed accessible ramps shall be a minimum 42" wide with 5' turning areas at each landing, a maximum slope of 1:12, maximum rise 30" and a minimum load capacity of 1500 lbs. Existing ramps may be no steeper than 1:8.

- a. **Composite:** Wood/ fiberglass with non-skid surface.
- b. **Concrete:** With non-skid surface.
- c. **Metal:** Galvanized steel, or aluminum with non-skid surface.
- d. **Wood:** All exterior wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground. Use of CCA treated lumber is prohibited. Portable or temporary ramps are prohibited.

10 Asphalt:

Asphalt shall consist of a hot-mix asphaltic concrete pavement complying with TDOT design mix standards for parking areas. Batching and placement of the asphalt may be tested at the request of THDA. Placement of the asphalt in 2 lifts. 2 1/2" base course with a 1 1/2" finish course. Pavement striping to be completed within 30 days after asphalt placement.

11 Soil Treatment-Termite Protection:

A proper and complete termite inspection of all properties is required. The inspection must be completed by a licensed exterminator who shall report any activity located and treatment applied. A warranty for a period of a minimum one year on all inspections is required.

Division 33: Utilities

1 Electric:

Electrical service to newly constructed units shall be installed underground except in cases where deemed structurally infeasible. Overhead service is allowed for infill sites.

2 Water:

Water service to newly constructed units shall be installed with methods and materials as approved by the IRC and the International Plumbing Code.

3 Sanitary Sewer / Private Septic:

Sanitary Sewer / Private Septic service to newly constructed units shall be installed with methods and materials as approved by the IRC, the International Plumbing Code, The Private Sewer Disposal Code and the State of Tennessee Department of Environment and Conservation rules and regulations.