

# Village of Estral Beach

7194 Lakeview

P.O. Box 107

Newport, Michigan 48166

Phone: (734) 586-8380 Fax: (734) 586-2600

Page 1

## Section R 324 FLOOD—RESISTANT CONSTRUCTION

**R 324.1.1 Structural systems.** All structural systems of all buildings and structures shall be designed, connected and anchored to resist flotation, collapse or permanent lateral movement due to structural loads and stresses from flooding equal to the design flood elevation.

**R 324.1.2 Flood-resistant construction.** All buildings and structures erected in areas prone to flooding shall be constructed by methods and practices that minimize flood damage.

**R 324.1.4 Lowest floor.** The lowest floor shall be the floor of the lowest enclosed area, including basement, but excluding any unfinished flood—resistant enclosure that is useable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the building or structure in violation of this section.

**R 324.1.5 Protection of mechanical and electrical systems.** Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall be located at or above the design flood elevation. If replaced as part of a substantial improvement, electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

**Exception:** Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment are 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 the International Building Code. Electrical wiring systems are permitted to be located below the design flood elevation provided they conform to the provisions of the electrical part of this code for wet locations.

**R 324.1.6 Protection of water supply and sanitary sewage systems.** New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the systems in accordance with the plumbing provisions of this code. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into systems and discharges from systems into flood waters in accordance with the plumbing provisions of this code and Chapter 3 of the *International Private Sewage Disposal Code*.

**R 324.1.7 Flood—resistant materials.** Building materials used below the design flood elevation shall comply with the following:

1. All wood, including floor sheathing, shall be pressure preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay—resistant heartwood of redwood, black locust, or cedars. Preservatives shall be listed in section 4 of AWPA U1.
2. Materials and installation methods used for flooring and interior and exterior Walls and wall coverings shall conform to the provisions of FEMA/FIA—TB—2.

**R 324.1.9 As—built elevation documentation.** A registered design professional shall prepare and seal documentation of the elevations specified in Section R 324.2 or R324.3.

**R 324.2 Flood hazard areas (including A Zones).** Areas that have been determined to be prone to flooding but not subject to high velocity wave action shall be designated as flood hazard areas. All buildings and structures constructed in whole or in part in flood hazard areas shall be designed and constructed in accordance with Section R324.2.1 through R324.2.3

**R 324.2.1 Elevation requirements.**

- (1) Buildings and structures shall have the lowest floor including basements elevated so the lowest point of the floor's concrete or subfloor surface is 1 foot (305 mm) or more above the design flood elevation. The bottom of the lowest horizontal member of the floor system shall not be lower than the design flood elevation. Compliance with this elevation requirement shall be based upon measurement taken from the floor surface without the final floor covering and from the bottom of the lowest horizontal structural member of the floor system.
- (2) Crawl space interior floor grade elevation shall comply with R408.6 of the code.
- (3) Basement floors that are below grade on all sides shall be considered lowest floors and shall be elevated so that the lowest point of the floor surface is 1 foot (305mm) or more above the design flood elevation. Compliance with this elevation requirement shall be based upon measurement taken from the floor surface without the final floor covering.

**Exception;** Enclosed areas below the design flood elevation, including basements that have floors which are not below grade on all sides, shall meet the requirements of section R324.2.2 of this code.  
R 408.30521

**R 324.2.2 Enclosed area below design flood elevation.** Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

- (1) Be used solely for parking of vehicles, building access or storage.
- (2) Be provided with flood openings which shall meet the following criteria:
  - 2.1 There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
  - 2.2 The total net area of all openings shall be at least 1 square inch for each square foot of enclosed area, or the openings shall be designed and the construction documents shall include a statement that the design and installation will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters.
  - 2.3 The bottom of each opening shall be 1 foot (305mm) or less above the adjacent ground level.
  - 2.4 Openings shall be at least 3 inches (76mm) in diameter.
  - 2.5 Any louvers, screens or other opening covers shall allow the automatic flow of flood waters into and out of the enclosed area.
  - 2.6 Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

**R 324.2.3 Foundation design and construction.** Foundation walls for all buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4.

**Exception:** Unless designed in accordance with Section R404:

1. The unsupported height of 6 inches (152mm) plain masonry walls shall be no greater than 3 feet (914mm).
2. The unsupported height of 8 inches (203mm) plain masonry walls shall be no greater than 4 Feet (1219mm).
3. The unsupported height of 8 inches (203mm) reinforced masonry walls shall be no greater than 8 feet (2438mm).

For the purpose of this exception, unsupported height is the distance from the finished grade of the under—floor space and the top of the wall.

**AJ 102.5 Flood hazard areas.** Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of R105 .3.1.1.

**R 105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas.** For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R324.

## **Section R408 - UNDER-FLOOR SPACE**

**R 408.4 Access.** Access shall be provided to all under-floor spaces. Access opening through the floor shall be a minimum of 18 inches by 24 inches (457 mm by 610 mm). Openings through a perimeter wall shall be 16 inches by 24 inches (407mm by 610mm). When any portion of the through wall access is below grade, an areaway of not less than 16 inches by 24 inches shall be provided. The bottom of the areaway shall be below the threshold of the access opening. Through wall access openings shall not be located under a door to the residence. See Section M1305.1.4 for access requirements where mechanical equipment is located under floors.

**R 408.6 Finished grade.** The finished grade of under-floor surface may be located at the bottom of the footings; however, where there is evidence that the groundwater table can rise to within 6 inches (152mm) of the finished floor at the building perimeter or where there is evidence that the surface water does not readily drain from the building site, the grade in the under-floor space shall be as high as the outside finished grade, unless an approved drainage system is provided.

**R 408.6 Flood resistance.** For buildings located in areas prone to flooding as established in Table R301.2(1):

1. Walls enclosing the under-floor space shall be provided with flood openings in accordance with Section R324.2.2.
2. The finished ground level of the under-floor space shall be equal to or higher than the outside finished ground level.

**Exception:** Under-floor spaces that meet the requirements of FEMA/FIA TB 11-1.

## **Section R405 - Foundation Drainage**

**R 405.2.3 Drainage system.** In other than Group I soils, a sump shall be provided to drain the porous layer and footings. The sump shall be at least 24 inches (610 mm) in diameter or 20 inches square (0.0129 m<sup>2</sup>), shall extend at least 24 inches (610 mm) below the bottom of the basement floor and shall be capable of positive gravity or mechanical drainage to remove any accumulated water. The drainage system shall discharge into an approved sewer system or to daylight.