STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NFIP REQUIREMENT: THE LOWEST FLOOR

Overview

Within the 100-year floodplain, a community must require the lowest floor, including the basement, of all new construction or substantial improvements be elevated to or above the base flood elevation (BFE). However, the acceptable method of meeting this requirement differs considerably from the A zone to the V zone.

A Zone

A zones are 100-year floodplains located along inland watercourses, or behind coastal V zone floodplains as wave action diminishes. In an A zone, elevating the lowest floor to or above the BFE can be accomplished in three ways: 1) elevation on fill, 2) elevation on piles, posts, or columns, or 3) elevation on walls. NFIP regulations allow fill to be used in an A zone, but placement of fill in a floodway is prohibited. Also, many communities limit the use of fill in the floodplain to protect flood storage capacity. Where fill is the method of elevation, it should be properly designed, installed in layers and compacted. Simply adding random fill to the site may result in differential settling over time. The fill should also be properly sloped and protected from erosion and scour during flooding. Although no specific distance for fill placement is required by FEMA, engineers and architects should consider extending fill 10 to 15 feet beyond the walls before it drops below the BFE.

Elevation on piles, posts or columns are appropriate where there is deeper flooding and fill is not feasible, or where flooding is likely to have higher velocities or wave activity (such as in coastal A zones).

The third elevation technique is to build on solid walls. When solid walls are used, care must be taken to ensure that hydrostatic and hydrodynamic pressure does not damage or collapse the walls. This can be accomplished in two ways. Stem walls can be used on two sides parallel to the flow of water. The other two sides are kept open which minimizes the obstruction to floodwaters and lessens the pressure on the foundation. Or, the walls can have openings (flood vents) large enough to allow floodwater to automatically flow in and out of the building, preventing differential pressures on the walls. The bottom of the openings must be no higher than one foot above grade. The total net area of the openings must not be less than one square inch for every square foot of enclosed area. The openings should be installed on at least two walls of the enclosed area to ensure that at least one will work if others get blocked. The floor of this area cannot be below grade on all four sides, otherwise it will be considered a basement under the NFIP and non-compliant.

Openings may be equipped with screens, louvers, or valves, however, they must permit the automatic flow of water in both directions. If appropriate floodwater openings are installed into the foundation and the area is unfinished and flood-resistant, the enclosed area below the BFE will not be considered the building's lowest floor by an insurance agent. This enclosed area below the BFE can be used solely for parking, building access or limited storage. Items stored in this area must be of low value or easily moved in the event of a flood since this enclosed area is designed to be floodable. Utilities servicing the building cannot be located within the enclosed area or must be elevated above the BFE within the enclosed area. Under the minimum NFIP requirement, the lowest floor in an A zone is measured from the top of the lowest floor. However, it is recommended that buildings on elevated foundations have supporting beams or floor joists above the BFE to add freeboard and protect them from flood damage.

V Zone

V zones (coastal high hazard areas) are subject to tidal surge flooding, high winds, and wave action. Unlike A zones, there is only one acceptable method of elevation in a V zone: all new construction and substantial improvements must be elevated on pilings, posts, piers or columns. This open construction allows waves to pass under the structure without transmitting the full forces of the waves to the foundation. Since V zones are also subject to erosion and scour, which can undercut building foundations, elevation on fill or solid walls is prohibited. Fill also presents an obstruction to wave action. While fill is not allowed for structural support of the building, limited fill is allowed for landscaping or drainage needs around the structure. In V zones, the lowest floor is measured from the bottom of the lowest horizontal structural member. (In comparison with A zones, the lowest floor is measured at the top of the lowest floor.) This is to keep the entire building above the anticipated breaking wave height of a base flood storm surge.

Any enclosed area below the lowest floor must be free of obstruction or be constructed with non-supporting breakaway walls. Breakaway walls shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Just as in A zones, this area is to be used solely for parking of vehicles, building access or limited storage. The areas enclosed by breakaway walls should be limited to less than 300 square feet when possible since insurance rates increase dramatically for larger enclosures in V zones. Also, larger enclosed areas encourage conversion to habitable living areas, which are difficult to detect and enforce as violations. Additionally, V zone structures cannot be located over water and must be landward of mean high tide. Flood-resistant materials must be used below the BFE. All utilities must be elevated above the BFE. The alteration of sand dunes is prohibited. The design of the supporting foundation must account for the combination of both water and wind loads, including scour. A registered professional engineer or architect must develop or review the structural design and

certify that the design and method of construction are in accordance with accepted engineering practice.

For More Information

For more information, go to the FEMA website: www.fema.gov, or consult the FEMA publications: *Elevated Residential Structures* (FEMA 54), *Coastal Construction Manual* (FEMA 55), *Protecting Building Utilities From Flood Damage* (FEMA 348), and *Technical Bulletins Openings in Foundation Walls* (TB-1), *Flood-Resistant Materials Requirements* (TB-2), *Free-of-Obstruction Requirements* (TB-5), *Below-Grade Parking Requirements* (TB-6), *Wet-Floodproofing Requirements* (TB-7), and *Breakaway Walls Below Elevated Coastal Buildings* (TB-9).

You may also contact Diane Ifkovic or Karen Michaels, CT DEP, at (860) 424-3706 with questions regarding lowest floor issues.

This overview is designed to answer general questions and provide basic information. You should refer to the appropriate federal, state or local statutes and regulations for the specific regulatory language and requirements. This document should not be relied upon to determine whether or not a permit is required. It is your responsibility to comply with applicable laws, and obtain and comply with all required permits.