



Interim Guidance Regarding Openings in Shallow Flooded Areas

April 20, 2015

Background

Technical Bulletin 1 / August 2008 **Openings in Foundation Walls and Walls of Enclosures** explains the National Flood Insurance Program (NFIP) requirements for flood openings in A Zones. While the lowest floor of an elevated residential building or elevated non-residential building is required to be at or above the Base Flood Elevation (BFE), the foundation and any enclosed area below the BFE may be exposed to flood forces. Enclosed areas below the BFE (including crawlspace) are permitted if used only for parking of vehicles, building access, and storage. These enclosed areas which are subject to flooding must be designed to automatically equalize hydrostatic flood forces on exterior walls by the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: a minimum of two openings having a total net area of not less than one square inch per square foot of enclosed area subject to flooding shall be provided [44 CFR 60.3(c)(5)]. Openings are also required in attached garages, detached garages, and accessory buildings.

In addition to the above requirements, the bottom of all openings shall be no higher than one foot above grade [44 CFR 60.3(c)(5)]. The purpose of this requirement is to satisfy the performance expectation that the difference in water levels between the interior and exterior will not exceed 1 foot as water begins to rise and as floodwaters recede from the site. Air vents at the top part of a crawl space must not be used to calculate flood openings to protect the enclosure from hydrostatic pressure, unless the air vents are compliant devices and are no higher than one foot above grade. Because the bottom of openings must be no higher than one foot above grade, under most circumstances, the openings are below BFE. This interim guidance provides information on how to address openings in shallow flooding areas in accordance with the NFIP Regulations and Technical Bulletin 1.

Openings in Shallow Flooding Areas in A Zones

Openings (or those portions that count towards the required net open area) must be located below the BFE. Some Flood Insurance Rate Maps (FIRMs) show mapped Special Flood Hazard Areas (SFHAs) where the depth of water will be one foot deep or less. In these shallow SFHAs, the difference in water depth between the outside and inside of the enclosure beneath an elevated building or outside or inside an attached garage, detached garage, or an accessory building will not exceed 1 foot during the base flood.

In areas of shallow flooding where the BFE is below the one foot height above grade, the NFIP still requires openings even if the BFE is less than one foot. In areas with shallow flood depths, this may require positioning the openings closer to grade than the maximum one foot height above grade allowed. The NFIP requirement for openings stipulates a maximum height above

grade of one foot; however openings may be located lower than the one foot maximum height above grade.

Each enclosed area, including those in shallow flooded areas, is required to have a minimum of two openings on exterior walls to allow floodwaters to enter directly. In order to meet the requirement, the openings must be located so that the portion of the opening intended to allow for inflow and outflow is below the BFE. Openings that are entirely above the BFE will not serve the intended purpose during base flood conditions and thus are not counted towards the compliance with the flood opening requirements. Openings located in structures in areas of shallow flooding where the BFE is at or below the one foot height above grade shall be located to the maximum extent possible below the BFE.

There are at least two solutions to the situation described above in areas that have shallow flooding. The first is to elevate the floor of the enclosure to the necessary height so that it is at or above the BFE. As a result, there would be no need for openings. The second solution is to install openings, taking care to ensure, to the maximum extent possible, that all of the necessary open area is below the BFE. This can be accomplished by positioning the bottom of the openings at or very close to grade, rather than the maximum of one foot above grade. Using this solution, the walls will not experience excessive differential hydrostatic pressure when floodwaters rise higher than the BFE.

If the prescriptive requirement above cannot be met, an engineered solution is an option that can be used to meet the openings requirement. For example where local data or analyses indicate rates of rise and fall are less than 5 feet per hour then the number or size of openings may be decreased. This may provide some relief in dealing with the height limitations noted above. Consult the design requirements for engineered openings in Technical Bulletin 1 for more information about an engineered solution.

The guidance provided for openings in shallow flooded areas is FEMA's guidance on meeting the NFIP requirements for openings and for structures to "be constructed by methods and practices that minimize damages" in accordance with 44 CFR 60.3(a)(iii). If the guidance in Technical Bulletin 1 and this Interim Guidance cannot be met, the local floodplain official will need to demonstrate how the requirement at 44 CFR 60.3(iii) to minimize flood damages to new and substantially improved structures can be met. If the local floodplain official cannot identify methods and practices that minimize flood damages for structures with the BFE below the one foot height above grade for openings, the structure must meet one of the requirements specified in Technical Bulletin 1 and this Interim Guidance.

The Elevation Certificate and Insurance Implications

The Elevation Certificate is an important administrative tool of the NFIP. It can be used to provide elevation information for the building necessary for local floodplain official to ensure compliance with community floodplain management ordinances, to determine the proper insurance premium rate, and to support a request for a Letter of Map Amendment (LOMA) or Letter of Map Revision based on fill (LOMR-F).

The Elevation Certificate requires the certifier to measure all openings that are no higher than one foot above grade. If the crawlspace or enclosure(s) have no permanent flood openings, or if the openings are not within 1.0 foot above adjacent grade, the certifier is instructed to enter "0"

(zero) on the Certificate which may have implications for the insurance rate for the structure and may result in a compliance determination by the community.

In the case of shallow flooding, the Elevation Certificate does not require the certifier to determine if the area of the openings is below the BFE, only if the bottom of the openings is no higher than 1 foot above the grade. Flood openings are normally installed within the height of BFE allowing FEMA to exclude the unfinished enclosure used for parking, building access, or storage for insurance rating. In areas of shallow flooding where only a portion of the opening can be located below the BFE, but meets the requirement of no higher than one foot above grade, the entire area of the opening less louvers, screens and obstructions may be counted towards the required net open area on the Elevation Certificate. The height of openings and other aspects of the openings should be checked by the local floodplain official during inspections to ensure they comply the requirements under 44 CFR 60.3(c)(5).

Property Owners

Property owners should review the Technical Bulletin 1 / August 2008 **Openings in Foundation Walls and Walls of Enclosures** which is located on FEMA's website before construction and contact the local floodplain official for assistance and permits as required by the community. The NFIP State Coordinator and the FEMA Regional Office are also available for assistance concerning enclosures and openings in A Zones identified on a Flood Insurance Rate Map. The information in FEMA's Technical Bulletins and other NFIP guidance is provided to help local floodplain officials insure that all new construction and substantial improvements are constructed by methods and practices that minimize flood damage.