



## OSAGE COUNTY EMERGENCY MANAGEMENT AGENCY

### FLOODPLAIN MANAGEMENT FACT SHEET

#### *(NON-RESIDENTIAL STRUCTURES IN THE FLOODPLAIN)*

#### **Do commercial buildings have the same requirements as residential buildings?**

In a nut shell, yes, but commercial development has one additional option available to them for meeting the minimum elevation standard of the National Flood Insurance Program (NFIP). Whereas residential buildings have to be elevated to meet the elevation standard of the NFIP, commercial buildings (non-residential) have the option of elevation or floodproofing, to meet the elevation standard of the NFIP. This is sometimes referred to as “Dry Floodproofing” since the inside of the commercial structure below the Base Flood Elevation (BFE) must remain free of flood damage during the flooding event. Dry floodproofing is completely different than the wet floodproofing allowed in Accessory or Agricultural Structures construction.

#### **What is Dry Floodproofing?**

Dry floodproofing is engineering the building to withstand the hydrostatic and hydrodynamic forces associated with flooding events. So the walls below the BFE not only have to be made of flood resistant materials, but must also be able to resist the hydrostatic pressure and hydrodynamic force that water has on obstructions. This means normal stick and mortar construction techniques will not be able to be used and a design professional will need to determine the forces expected to be exerted on the structure to properly design the walls to withstand such pressures. This is an additional requirement in addition to the normal design considerations of making sure the building is properly anchored to resist the effects of flotation and lateral movements. Certified documentation from the design professional that the building has been designed to be a dry floodproof structure must be provided prior to being issuing the Floodplain Development Permit (FPDP) for the development.

The dry floodproofing documentation must also contain an operations plan on how any openings below the BFE will be sealed during off hours or during a flooding event. For example, doorways below BFE will probably need to be able to provide access during operational hours for egress in case of a fire during business hours. But depending upon the unique flooding conditions at the site, those doorways might need to be sealed with a metal plate or other floodproofing device, at the close of business each day. It is the responsibility of the design professional to create this document since it will be an intricate part of their certification that the building will be dry floodproofed. This operations plan must once again be submitted prior to issuing the FPDP for the development.

One final consideration about dry floodproofing is the insurance side of the program requires the floodproofing measures to be one foot higher than the BFE. This is because the flood insurance rating for floodproof structures is one foot lower than the top of the floodproof elevation.

In many cases, after doing the cost analysis for the additional building design costs, the additional construction materials costs, the additional construction costs, the creation of the operations plan, and the potential daily operation of implementing this plan, it is often determined to be cheaper to elevate the structure instead of dry floodproofing. However, depending on the nature of the business, sometimes elevation is not a feasible option for the proposed development.

## **Where can I find out more about dry floodproofing?**

Fortunately FEMA has provided some design consideration guidelines to be used by the design profession for meeting the requirements of a dry floodproof structure. FEMA publication 102, titled "*Floodproofing Non-Residential Structures*" dated May 1986 is available at the FEMA.gov website or at: [www.osagecountyema.com/pages/floodprogram.htm](http://www.osagecountyema.com/pages/floodprogram.htm)

The United States Army Corps of Engineers is also very active in the research and evaluation of dry floodproofing techniques. They have created a document titled "*Flood Proofing – How to Evaluate Your Options*" dated July 1993 to assist the design professional in the feasibility of dry floodproofing the proposed structure. Once again this document can be found at the Osage County EMA website listed above.

Other than having the additional option of dry floodproofing a non-residential building, all other aspects of the floodplain management ordinance still apply. Building utilities servicing the structure must also be elevated or protected from flood damages, a FPDP must be issued for the proposed development prior to beginning construction, and proof that the building was elevated or floodproofed to the correct elevation must be submitted upon the completion of the project.

### **Other Sources of Information**

To assist with the protection of the building utilities so that they also comply with the floodplain ordinance, FEMA Publication 348 titled "*Protecting Building Utilities from Flood Damage – Principals and Practices for the Design and Construction of Flood Resistant Building Utility Systems*" dated November 1999 was created.

For information about dry floodproofing of an enclosure, FEMA has created Technical Bulletin 3-93 titled "*Non-Residential Floodproofing – Requirements and Certification*", that address the certifying requirements.

Three fact sheets created by FEMA titled "*Building with Flood Damage Resistant Materials*", "*Raise Electrical System Components*", and "*Install Sewer Backflow Valves*" will also assist those who are designing a dry floodproofed structure.

All of these documents can be found at the FEMA.gov website or at:

[www.osagecountyema.com/pages/floodprogram.htm](http://www.osagecountyema.com/pages/floodprogram.htm)