Nonstructural Flood Risk Management Measures

Nonstructural flood risk management measures are proven methods and techniques for reducing flood risk and flood damages incurred within floodplains. Thousands of structures across the nation are subject to reduced risk and damages or no risk and no damage due to implementation of nonstructural measures. Besides being very effective for both short and long term flood risk and flood damage reduction, nonstructural measures can be very cost effective when compared to structural measures. A particular advantage of nonstructural measures when compared to structural measures is the ability of nonstructural measures to be sustainable over the long term with minimal costs for operation, maintenance, repair, rehabilitation, and replacement.

The following nonstructural measures represent techniques commonly utilized in reducing flood risk and the damages associated with flooding. These measures vary from removing an entire structure from the floodplain to insuring a structure which is permanently located within the floodplain. The costs associated with implementing a measure are variable, where reduction of flood damages is proportional to the cost of the measure (i.e. removal of a structure from the floodplain will eliminate all future damages associated with flooding, while purchasing flood insurance for a structure will assist in making the structure whole after a flood event, it does not eliminate future flood damages to that structure).

Elevation
This nonstructural technique lifts an existing structure to an elevation which is at least equal to or greater than the 1% annual chance flood elevation. In many elevation scenarios, the cost of elevating a structure an extra foot or two is less expensive than the first foot, due to the cost incurred for mobilizing equipment. Elevation can be performed using fill material, on extended foundation walls, on piers, post, piles and columns. Elevation is also a very successful technique for slab on grade structures.

Fill Basement with Main Floor Addition
This nonstructural technique consists of filling in the existing basement without elevating the remainder of the structure. This could occur if the structure's first floor was located above the base flood elevation or above the design elevation, whichever is higher. With this measure, placing an addition on to the side of the structure could compensate for the lost basement space to the owner. If the addition could not be done because of limited space within the lot or because the owner did not want it, compensation for the lost basement space would be in order to the owner. This measure would only be applicable where the design flood depth is relatively small and the first floor elevation is already located above the design depth. Hydrodynamic forces would also be a consideration.

Relocation
This nonstructural technique requires physically moving the at-risk structure and buying the land upon which the structure is located. It makes most sense when structures can be relocated from a high flood hazard area to an area that is located completely out of the floodplain.

Acquisition
This nonstructural technique consists of buying the structure and the land. The structure is either demolished or is sold to others and relocated to a site external to the floodplain.. Development sites, if needed, can be part of a proposed project in order to provide locations where displaced people can build new homes within an established community.

Wet Floodproofing
This nonstructural technique is applicable as either a stand-alone measure or as a measure combined with other measures such as elevation. As a stand-alone measure, all construction materials and finishing materials need to be water resistant and all utilities must be elevated above the design flood elevation. Wet floodproofing is quite applicable to commercial and industrial structures when combined with a flood warning and flood preparedness plan. This measure is generally not applicable to large flood depths and high velocity flows.

Dry Floodproofing
This nonstructural technique consists of waterproofing the structure. This can be done to residential homes as well as commercial and industrial structures. This measure achieves flood risk reduction but it is not recognized by the NFIP for any flood insurance premium rate reduction if applied to a residential structure. Based laboratory tests, a "conventional" built structure can generally only be dry floodproofed up to 3-feet in elevation. A structural analysis of the wall strength would be required if it was desired to achieve higher protection. A sump pump and perhaps French drain system should be installed as part of the measure. Closure panels are used at openings. This concept does not work with basements nor does it work with crawl spaces. For buildings with basements and/or crawlspaces, the only way that dry floodproofing could be considered to work is for the first floor to be made impermeable to the passage of floodwater.

Berms and Floodwalls
This nonstructural technique is applicable on a small-scale basis. As nonstructural measures, berms and floodwalls should be constructed to no higher than 6 feet above grade and should not be considered for certification through the NFIP, meaning that flood insurance and floodplain management requirements of the NFIP are still applicable in areas were these berms or floodwalls are constructed. These nonstructural measures are intended to reduce the frequency of flooding but not eliminate floodplain management and flood insurance requirements. These measures can be placed around a single structure or a small group of structures. Since application of these measures are considered nonstructural in nature, they cannot raise the water surface elevation of the 100-year flood by any more than 0.00 feet.

Flood Warning System
This nonstructural technique relies upon streamgage, rain gages, and hydrologic computer modeling to determine the impacts of flooding for areas of potential flood risk. A flood warning system, when properly installed and calibrated, is able to identify the amount of time available for residents to implement emergency measures to protect valuables or to evacuate the area during serious flood events.

Flood Plain Management Plans
Section 202; Flood Control Policy, subsection (c) of WRDA 1996, requires the development of Flood Plain Management Plans (FPMP). The FPMP assures that the integrity of a Federal project will not be diminished during the life of the project and that impacts of future flood events in the project area have been reduced. The FPMP should address potential measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding and to preserve and enhance natural floodplain values.

Flood Emergency Preparedness Plans
Local governments, through collaboration with USACE, FEMA and other interested federal partners, are encouraged to develop and maintain a Flood Emergency Preparedness Plan (FEPP) that identifies flood hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, and encourages the development of local mitigation. The FEPP should incorporate the community's response to flooding, location of evacuation centers, primary evacuation routes, and post flood recovery processes.

Land Use Regulations
Land use regulations within a designated floodplain are effective tools in reducing flood risk and flood damage. The basics principles of these tools are based nationally in the National Flood Insurance Program (NFIP) which requires minimum standards of floodplain regulation for those communities that participate in the NFIP. For example, land use regulations may identify where development can and cannot occur, or the minimum elevation of the lowest habitable floor.