



## FLOOD INSURANCE AND DESIGN REQUIREMENTS

Flood losses are increasing nationwide. A community may take more than a decade to fully recover from a flood, and development that is constructed during the recovery phase can last more than a century. As a result, rebuilding decisions made in the aftermath of a flood event will last for generations.

Complex flood problems cannot be solved using a single approach, and it is not effective to rely on minimum standards alone to rebuild in a comprehensive and resilient way. Luckily, many strategies and tools are available for reducing flood risk. This briefing paper discusses the three most important steps that a community can take to set itself up for a successful—and resilient—long-term recovery from a flood event:

1. Take the time and plan, not react, for a successful rebuilding approach to reduce current and future flood risk.
2. Ensure key post-disaster National Flood Insurance Program (NFIP) requirements are met.
3. Rebuild for long-term resilience. Incorporate a variety of measures to reduce future flood losses.

### KEY POINT #1

***Take the time and plan, not react, for a successful rebuilding approach to reduce current and future flood risk.***

### KEY POINT #2

***Ensure key post-disaster NFIP requirements are met.***

### KEY POINT #3

***Rebuild for long-term resilience. Incorporate a variety of measures to reduce future flood losses.***



## KEY POINT #1

**Take the time and plan, not react, for a successful rebuilding approach to reduce current and future flood risk.**

In the aftermath of a flood, every community will ask, “What now?” either formally or informally. There will be pressure to rebuild, and there may be efforts to waive permit fees and/or floodplain management regulations. As the immediate response phase of a flood wanes, local officials should be thinking about

the flood recovery ahead. Important planning actions to consider include:

- *Implementing a temporary moratorium on permits for new or replacement construction to have enough time to gather information and make informed decisions about rebuilding.* Moratoria of several months to several years in duration have been upheld by courts. Communities often adopt temporary regulations pending the completion of detailed flood studies, adoption of comprehensive regulations, the preparation of a reuse plan, or construction of flood control structures.
- *Reviewing relevant plans, reports, or studies to provide insights into community redevelopment goals, priorities, and issues.* The primary plan that most communities have is a hazard mitigation plan, which may contain useful information on the flood hazard as part of the risk assessment, and prioritized hazard mitigation actions that have been developed previously (i.e., a hazard mitigation plan may identify a high-priority neighborhood where the goal is to acquire flood-prone homes). The comprehensive plan may have a future vision or goals that can be incorporated into the community’s rebuilding approach. For example, an area that was impacted by the flood may be identified as an area that needs more accessibility to open space in the comprehensive plan and could present an opportunity to rebuild differently to meet that goal. More recently, local, state, or regional plans that include impacts of climate change on flooding have data that should be relevant as well.
- *Creating additional plans (or amending existing plans), reports, and studies to better define a rebuilding ap-*

proach. For example, APA has developed resources to create a post-disaster recovery plan (see Resources). Sometimes additional perishable data, such as high-water marks, can be collected and later used to establish elevations for rebuilding. This is especially important when the event is a flood of record or the community does not have detailed flood elevation data on its floodplain maps.

*TIP: If possible, develop a report that documents the historical flood event and high-water marks and/or flood inundation areas. If done by an entity with the capability do such reports (i.e., an experienced engineering firm or federal agency such as the U.S. Geological Survey (USGS)) using accepted methodologies, the report can be used in the future for outreach, calibrating future flood studies, and even as a regulatory basis for flood loss reduction standards.*

- *Talking to state and federal agencies about rebuilding options, opportunities, and obstacles, especially if this is the community’s first major flood or if there hasn’t been a flood in a long time.* Each state has a floodplain management office, a state hazard mitigation office, USGS water science center, and state conservationist (as part of the Natural Resource Conservation Service). If a presidential disaster has been declared, many federal experts are more easily accessible.

*TIP: As soon as possible after a flood event, hold a meeting that includes key community department heads and elected officials, state officials, and federal officials (where applicable) to discuss the event, rebuilding requirements, funding, programs, and other resources that may be available for the rebuilding effort. Such a meeting may take several hours, but is invaluable in getting everyone on the same page and developing ideas for a rebuilding approach and engaging the public.*

*TIP: Federal agencies’ rebuilding efforts must, at a minimum, be consistent with Federal Executive Order (EO) 11988 on Floodplain Management. Each federal agency should have adopted a procedure and standards for compliance with the EO and those should be explained to and understood by local officials so future conflicts are avoided.*

- *Determining the needed capacity to ensure key post-disaster NFIP requirements are met.* Does the community have 100, 1,000, or 10,000 flooded buildings? As explained in Key Point #3, it is the community’s

responsibility under the NFIP to conduct substantial damage inspections. In some states, volunteer cadres of floodplain managers, engineers, and building officials have already been trained and can be mobilized to assist, most often through their state Association of State Floodplain Managers (ASFPM) chapter. The pressure to rebuild will come within a day or two after the water has receded. It is critical that the community has the capability ready to perform substantial damage inspections and to get the inspections done as soon as possible.

- *Creating a rebuilding approach.* Decide on rebuilding standards, including whether to go beyond those existing prior to the flood event. For example, if local codes require structures to be elevated to the base flood (100-year or one percent annual chance flood), the community may wish to consider adding more feet of freeboard (described by the Federal Emergency Management Agency (FEMA) as a “factor of safety usually expressed in feet above a flood level for purposes of floodplain management.”) At this point, there may also be several hazard mitigation approaches that the community wishes to pursue. The rebuilding approach will certainly be modified throughout the recovery from the flood, but it is important to identify a basic framework as soon as possible.

## KEY POINT #2

**Ensure key post-disaster NFIP requirements are met.**

During non-flood times, administration of local floodplain management regulations means that applicants come to the community for permit applications and community officials respond by processing permits and inspecting the development. In a post-flood situation, this dynamic is flipped.

Community floodplain managers are required under the NFIP to be proactive and conduct substantial damage determinations for any impacted building. Often this means proactively disseminating information to those with impacted buildings, explaining the rebuilding and

permitting requirements—including any information needed by the applicant to successfully obtain a permit application. For the community, this means a significant resource demand to conduct the substantial damage inspections, processing permits, and generally inspecting the flood-impacted areas to ensure that permits are being obtained.

*TIP: As soon as possible after the flood event, post information on your community’s website on repairing damaged buildings in the floodplain. Topics to address include substantial damage review requirements, clear instructions that subsequent permits cannot be obtained unless a substantial damage determination has been conducted, commonly applicable floodplain management regulations (i.e., the requirement to elevate substantially damaged residential structures), any necessary forms, and point-of-contact information for the floodplain manager.*

*TIP: Do not ignore the need to conduct substantial damage determinations or roll back or eliminate rebuilding requirements. Communities participating in the NFIP can be sanctioned, including being put on probationary status or being suspended from the program. Suspension from the NFIP means no flood insurance is available communitywide and it prohibits most forms of federal hazard mitigation assistance. Communities often choose to waive or reduce building permit fees after a disaster.*

The most common rebuilding requirements for flood-impacted development include:

- *Bringing substantially damaged buildings into full compliance with locally adopted floodplain management regulations.* FEMA gives great flexibility to local officials in the methods they use to determine the two key components of substantial damage: market value of the building and cost of repairs. It is important that the method used by the community is consistently applied. Also, while the NFIP threshold for a substantial damage determination is 50 percent or higher, communities may have adopted a lower threshold such as 35 percent or 25 percent.
- *Elevating the lowest floor of a building to or above the design flood elevation.* The minimum NFIP standard is the base flood. However, there are many good reasons for elevating even higher using a “freeboard” requirement. Communities in the United States have adopted freeboard elevations as high as five



feet above the base flood level. *TIP: By elevating with a freeboard of three feet or higher, flood insurance premiums can be reduced by as much as 70 percent versus rebuilding at the base flood level.*

- *The option of dry-floodproofing* (making watertight) nonresidential buildings to or above the base flood elevation. This is also the NFIP minimum standard. The option of dry-floodproofing nonresidential buildings is allowed because there are minimal life-safety concerns should the floodproofing measures fail to work correctly.
- *Elevating or making flood-resistant vulnerable utilities* to or above the 100-year flood level. Often overlooked, utilities supporting buildings, such as air conditioning compressor units or electrical service panels, need to be elevated or made flood resistant.
- *Restrictions on rebuilding* in especially high-hazard velocity (V) zones and floodways. Under both the NFIP and several states' standards, rebuilding in these very high-hazard areas may have significant restrictions including on allowed uses, size, location, and construction techniques. For example, substantially damaged residential structures in the floodway in Wisconsin cannot be rebuilt.

Planners and floodplain managers need to work together to resolve the typical redevelopment issues that emerge after a flood. One common issue is building height requirements. In high-risk flood hazard areas, the

needed elevation for rebuilt structures can exceed allowed maximum building heights in building or zoning codes. Some of the development or redevelopment principles of new urbanism may be incompatible with some of the design requirements for high-risk flood hazard areas. Finally, future land-use maps, especially those areas planned for high-intensity uses or future economic development, should be reviewed, with consideration given to appropriate densities and uses in high-risk flood hazard areas, including those that were discovered during the flood.

### KEY POINT #3

**Rebuild for long-term resilience. Incorporate a variety of measures to reduce future flood losses.**

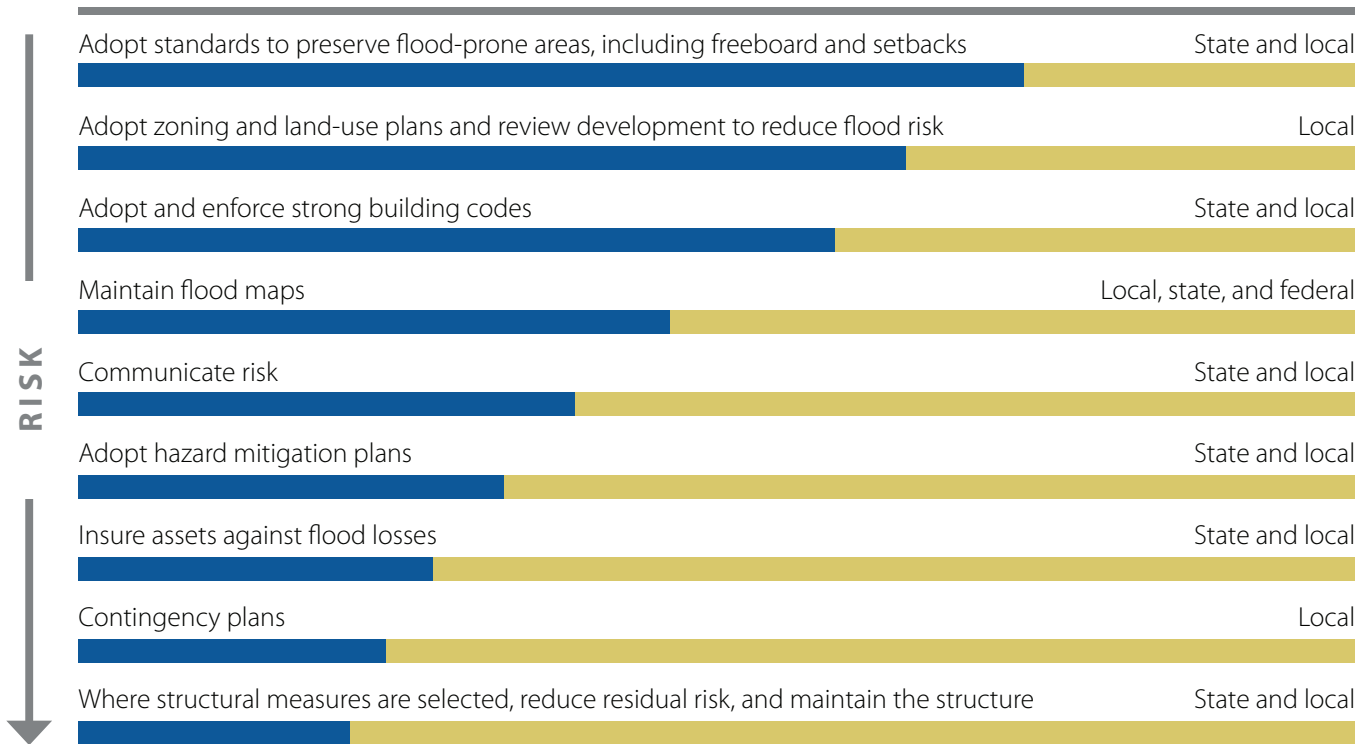
There are four typical strategies for managing floodplains and multiple actions and tools to implement them:

1. *Modify human susceptibility to flood damage by avoiding hazardous, un-economic, or unwise use of floodplains.* Actions and tools include floodplain, subdivision,

building, and zoning regulations; establishing development policies regarding public services, utilities, and critical facilities; acquiring land to preserve open space and relocate buildings; elevating or floodproof-



## INITIAL RISK



## RISK REDUCTION TOOLS (CUMULATIVE)

**BUYING DOWN RISK:** Communities and states have a wide range of tools available to manage and reduce risks associated with flood hazards.

ing buildings; and using flood warning systems. FEMA Hazard Mitigation Assistance (HMA) programs (Hazard Mitigation Grant Program, Pre-Disaster Mitigation Assistance, and Flood Mitigation Assistance) fund projects that largely fit into this category.

One of the most common and effective actions communities take to reduce susceptibility to flood damage is to acquire and relocate, or acquire and demolish, flood-prone buildings. Since 1993, more than 40,000 properties have been acquired using FEMA’s HMA programs alone. These properties are permanently restricted to uses compatible with open space, which results in negligible future flood losses. When a contiguous group of these properties is acquired, the land can be used as a park, for green infrastructure, and for other similar uses. When a more piecemeal approach is used, which can result in “checkerboarding,” a community must

plan for future maintenance of the vacant lot. An issue raised by communities when considering large-scale acquisition projects is the loss of taxable property. However, other communities have determined that the cumulative risk and costs to community personnel including first responders, maintenance of infrastructure, and repeated diversion of other community funds to assist affected property owners outweigh the loss of the taxable property.

2. *Modify the impact of flooding on the community.* Actions and tools include education and outreach efforts to inform self-help and protection measure; emergency measures such as temporary dikes to protect people and property; disaster assistance, flood insurance, tax adjustments (i.e., income and/or property tax rebates), and post-flood recovery planning.

The most widespread and easiest action that can be taken is the purchase of flood insurance. Data

from recent flood disasters, such as the September 2013 flood in Colorado and in New York City in October 2012 due to Superstorm Sandy, found that more than half of the flood damage from those events occurred in areas outside the mapped floodplain. Nearly one-third of all disaster assistance and one-fourth of NFIP claims are for losses outside mapped flood hazard areas. Flood insurance can be purchased to cover a building and/or contents through the NFIP anywhere in the 21,000-plus NFIP participating communities.

There are some flood insurance-related considerations in a post-flood scenario that community officials must consider. First, for property that has been declared substantially damaged due to flooding in a FEMA-identified floodplain, it is possible to access a part of the NFIP policy called Increased Cost of Compliance (ICC) to provide funding to elevate, floodproof, relocate, or demolish a property that needs to be brought into compliance with flood loss reduction standards. ICC funds can also be used to match federal hazard mitigation grants. Second, when property owners (including local communities) receive financial assistance from the federal government following a presidentially declared disaster, there may be a requirement to purchase and maintain flood insurance. Otherwise, future disaster assistance can be reduced significantly.

3. *Modify flooding through projects that control floodwater.* Actions and tools include building dams and reservoirs to store excess water upstream from development; building dikes, levees, and floodwalls; altering channels to make them more efficient; and employing high-flow diversions, on-site detention, and shoreline protection measures.

It is important to understand that flood control structures will result in residual risk or induced risk. Residual risk is the risk that remains on a protected property after a flood-control measure is in place. All structures are designed to a specific level; events that exceed that design level can result in catastrophic failure of the structure, resulting in significant damages to the protected property. Induced risk encompasses the potential consequences that increase due to future development and redevelopment in an area protected from a flood control

structure due to the perception that the area is safe. Tools for managing residual and induced risk include education and outreach, resiliency standards for flood-control structures when the design flood is exceeded, land-use controls in protected areas, flood insurance, and flood warning systems.

4. *Preserve and restore the natural resources and functions of floodplains.* Actions and tools include removal of functionally obsolete and dangerous dams, using green infrastructure approaches to stormwater management, stream channel and floodplain restoration, and a living shoreline approach to shoreline protection.

Community flood issues are complex, and the solution almost always requires multiple strategies and actions to reduce the risk of flooding to acceptable levels. By selecting the best mix of these strategies and actions, communities can tailor a floodplain management approach to the characteristics of the specific flood hazard areas and the needs of their citizens.

## RESOURCES

### APA

*Planning for Post-Disaster Recovery:*

*Next Generation:* [www.planning.org/research/postdisaster](http://www.planning.org/research/postdisaster)

### ASFPM

ASFPM Chapter websites: [www.floods.org/index.asp?menuID=195&firstlevelmenuID=179&siteID=1](http://www.floods.org/index.asp?menuID=195&firstlevelmenuID=179&siteID=1).

State Floodplain Managers: [www.floods.org/index.asp?menuID=274&firstlevelmenuID=185&siteID=1](http://www.floods.org/index.asp?menuID=274&firstlevelmenuID=185&siteID=1).

State Hazard Mitigation Officers: [www.floods.org/index.asp?menuID=767](http://www.floods.org/index.asp?menuID=767).

*Addressing your Community's Flood Problems—A Guide for Elected Officials:* [www.floods.org/PDF/Addressing\\_Communitys\\_Flood\\_Problems.pdf](http://www.floods.org/PDF/Addressing_Communitys_Flood_Problems.pdf).

**FEMA**

FloodSmart site for all things flood insurance: [www.floodsmart.gov/floodsmart](http://www.floodsmart.gov/floodsmart).

Increased Cost of Compliance Fact Sheet: [www.fema.gov/media-library/assets/documents/1130](http://www.fema.gov/media-library/assets/documents/1130).

*Substantial Improvement / Substantial Damage Desk Reference (P-758)*: [www.fema.gov/media-library/assets/documents/18562](http://www.fema.gov/media-library/assets/documents/18562).

*Flood Insurance Requirements for Recipients of Federal Disaster Assistance*: [www.fema.gov/media-library/assets/documents/18562](http://www.fema.gov/media-library/assets/documents/18562).

**U.S. Army Corps of Engineers**

Flood Damage Reduction Matrix : [www.usace.army.mil/Portals/2/docs/civilworks/Project%20Planning/nfpc/nfpc\\_measures\\_matrix.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/Project%20Planning/nfpc/nfpc_measures_matrix.pdf).

**U.S. Geological Survey**

Water Science Centers for each state: [http://water.usgs.gov/district\\_chief.html](http://water.usgs.gov/district_chief.html).

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