

Using a Digital Flood Insurance Rate Map (DFIRM)

Purpose: To explain the purpose of Flood Insurance Rate Maps (FIRMs), Digital Flood Insurance Rate Maps (DFIRMs), highlight features that are important to coastal builders, and explain how to obtain FIRMs, DFIRMs, and Flood Insurance Studies (FISs).

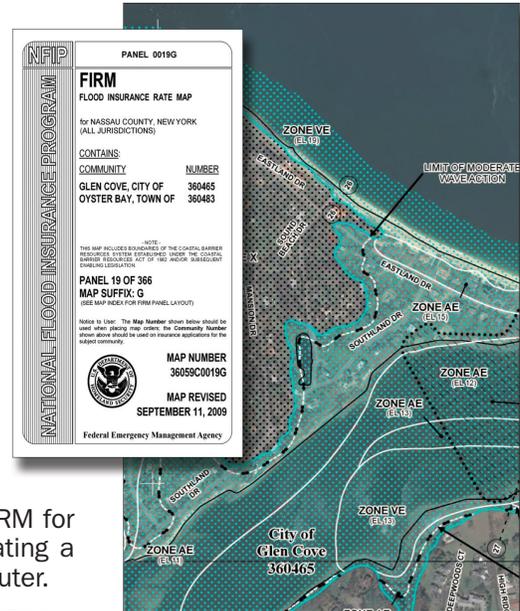
What Is a FIRM?

Flood-prone areas are studied by engineers and hydrologists that specialize in analysis of streams, rivers, tidal shorelines, and their adjacent floodplain or coastal area. These published studies, known as the community's **FIS**, provide detailed information on the study area that facilitates the creation of flood maps. FISs are usually produced for the highest risk streams, most rivers, and almost all coastal reaches.

FEMA has mapped flood hazards for nearly 20,000 communities in the United States, most commonly on FIRMs. Most of the nation's FIRMs were converted during the past five years through the Map Modernization Program into a digital product that depicts flood-prone areas for a community. These are known as **Digital Flood Insurance Rate Maps**, or **DFIRMs**.

Effective October 1, 2009, FEMA discontinued the distribution of paper maps. Paper FIRMs were replaced with DFIRMs. The FIRM for your specific site can be viewed online and reproduced by creating a printable **FIRMette**¹ that can be downloaded to a personal computer.

DFIRMs show the delineation of the **Special Flood Hazard Areas (SFHAs)** – land areas subject to inundation by a flood that has a 1-percent probability of being equaled or exceeded in any given year (hence, the terms “1-percent-annual-chance flood” and “100-year flood”). SFHAs are shaded on the DFIRM and are divided into different flood zones, depending on the nature and severity of the flood hazard. DFIRM datasets have been provided to your local community and are available for viewing at the local National Flood Insurance Program (NFIP) coordinator's office.



FIRMs and DFIRMs Are Used By:

- **Communities**, to regulate new construction* (e.g., foundation type, lowest floor elevation, use of the enclosed areas below the lowest floor).
- **Designers and Builders**, to determine flood hazards and plan new construction per community ordinance and code requirements.
- **Lenders**, to determine whether flood insurance is required for federally backed mortgages.
- **Insurance Agents**, to establish flood insurance premiums.
- **Land surveyors and engineers**, to complete National Flood Insurance Program (NFIP) elevation certificates (see Fact Sheet No. 1.4, *Lowest Floor Elevation*).

* Note that new construction may include some additions, improvements, repairs, and reconstruction. Consult the community about substantial improvement and substantial damage requirements.

1 FIRMettes are user-selected portions of flood maps available through the FEMA Map Service Center.



Why Are FIRMs and DFIRMs Important?

- FIRMs and DFIRMs show the boundaries of modeled flood hazard areas in a community.
- SFHAs shown on the maps are used to set flood insurance rates and premiums.
- The 1-percent-annual-chance flood elevations and flood depths shown on FIRMs and DFIRMs are the minimum regulatory elevations on which community floodplain management ordinances and building codes are based.
- The information shown on these maps can affect the design and construction of new buildings and infrastructure, the improvement and repair of existing buildings, and additions to existing buildings (see Fact Sheet Nos. 1.2, *Summary of Coastal Construction Requirements and Recommendations for Flood Effects*, and 8.3, *Protecting Utilities*).

What Are Flood Zones and Base Flood Elevations, and How Do They Affect Coastal Buildings?

- **BFEs** are typically shown on DFIRMs for riverine flood zones (Zone A, AE, AO, and AH) and coastal flood zones (Zone V and VE). **The BFE is the predicted elevation of flood waters and wave effects during the 1-percent-annual-chance flood (also known as the base flood).** The BFE is referenced to the vertical datum shown on the DFIRM. Most have been updated to the 1988 North American Vertical Datum.
- The minimum **lowest floor elevation and the foundation type and design** for new construction* are determined by the BFE and flood zone, as required in the community's floodplain management ordinance and building code (see Fact Sheet Nos. 1.4, *Lowest Floor Elevation*, and 3.1, *Foundations in Coastal Areas*). This ordinance, along with the most current DFIRM and FIS, are adopted by resolution to meet NFIP participation requirements. Use of these tools supports community planning, zoning, and building inspection programs that require specific structure design and new construction* in high-hazard coastal floodplains.

Some communities have adopted higher standards for coastal construction (e.g., lowest floor elevations above the BFE [freeboard], restrictions on foundation types, and enclosures in Zone A). *Builders should consult their local jurisdiction for details.*

* Note that new construction may include some additions, improvements, repairs, and reconstruction. Consult the community about substantial improvement and substantial damage requirements.

Flood Hazard Zones in Coastal Areas

(See the sample DFIRM that follows)

Zone V: Areas closest to the shoreline including the Primary Frontal Dune (PFD), subject to storm wave action, high-velocity flow, and erosion during 100-year storm events. Elevations are not provided.

Zone VE: Base Flood Elevations (BFEs) are provided on the DFIRM and an additional hazard can be present associated with storm waves greater than 3 feet and including the PFD. BFEs are derived from detailed analyses shown in the FIS.

Zone A: Areas subject to flooding during the 1-percent-annual-chance flood. Flood conditions are less severe than in Zone V and MOWAs due to lower wave forces. Because detailed analysis has not been performed, BFEs and flood depths are not provided.

Zone AE: Depicts BFEs on the DFIRM. Further details are provided in the FIS on areas where hydrology and hydraulic modeling was performed to determine flood hazard risk.

Area of Moderate Wave Action (MOWA): Area landward of Zone V, or landward of an open coast without a mapped Zone V. During base flood conditions, the potential wave height in this area is between 1.5 and 3 feet above the 1-percent-annual-chance stillwater flood depth. While this area is not specifically labeled on the DFIRM panel, this is the area between the LiMWA and the VE/AE zone boundary. In many codes and standards it is referred to as the "Coastal A Zone."

Zone AO: Areas subject to shallow flooding or sheet flow during the 1-percent-annual-chance flood. If they appear on a coastal DFIRM they will most likely be found on the landward slopes of shoreline dunes and overtopped structures. Flood depths, rather than BFEs, are shown for Zone AO.

Zone AH: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 foot and 3 feet.

Zone X: Areas with a lower probability of flooding (<1%); these areas are generally not regulated through community floodplain management ordinances and building codes due to their lower predicted risk of flooding.

Sample DFIRM

This map is a portion of the DFIRM for the Town of Oyster Bay and the City of Glen Cove in Nassau County, New York. Several important things to note are highlighted:

The community identification number is 360465 for Glen Cove and 360483 for Oyster Bay.

The panel number is 19. Note that an Index Map is available showing all DFIRM panels for all communities within Nassau County.

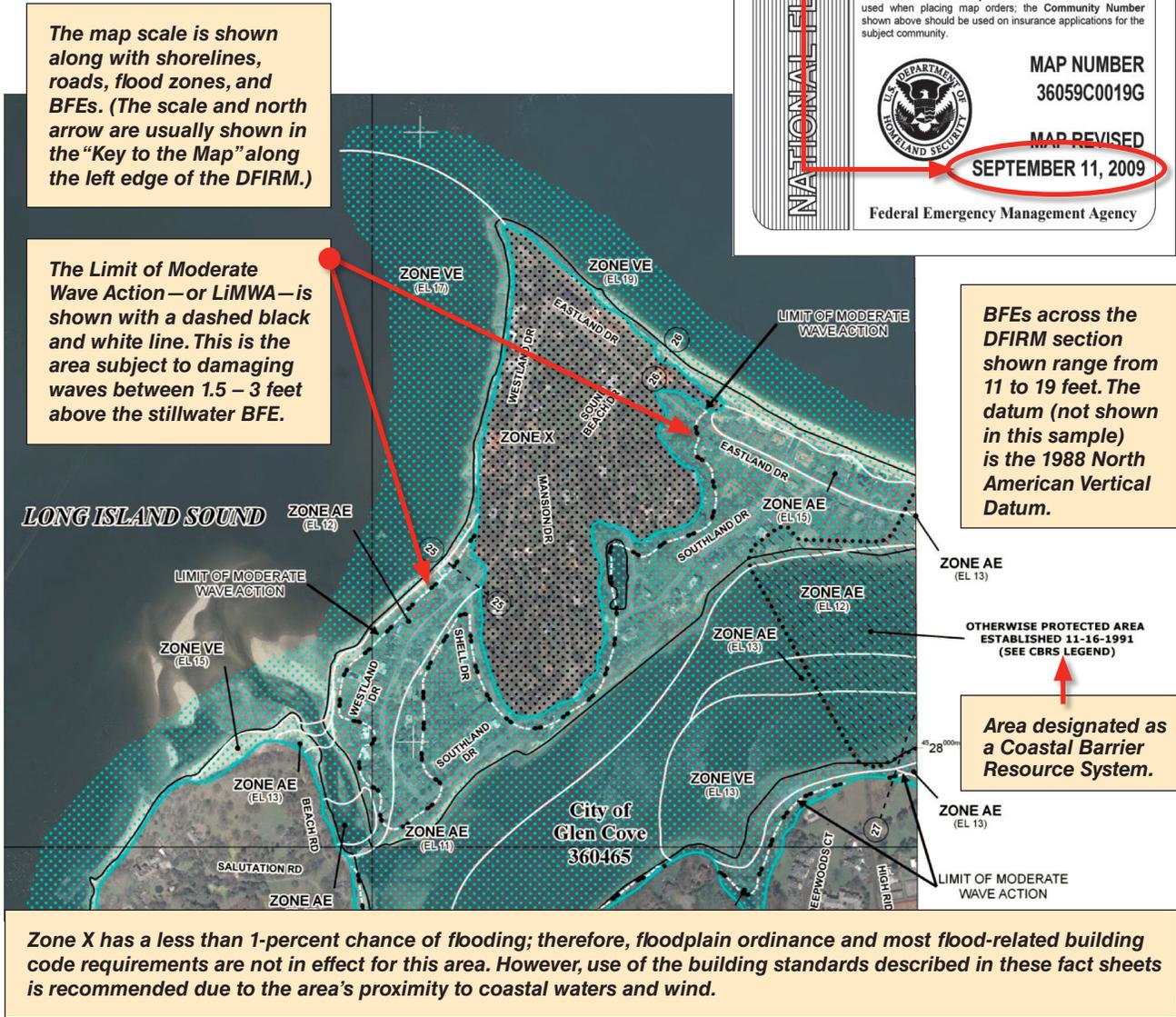
The effective date of the DFIRM is September 11, 2009.

The map scale is shown along with shorelines, roads, flood zones, and BFEs. (The scale and north arrow are usually shown in the "Key to the Map" along the left edge of the DFIRM.)

The Limit of Moderate Wave Action—or LiMWA—is shown with a dashed black and white line. This is the area subject to damaging waves between 1.5 – 3 feet above the stillwater BFE.

BFEs across the DFIRM section shown range from 11 to 19 feet. The datum (not shown in this sample) is the 1988 North American Vertical Datum.

Area designated as a Coastal Barrier Resource System.



Zone X has a less than 1-percent chance of flooding; therefore, floodplain ordinance and most flood-related building code requirements are not in effect for this area. However, use of the building standards described in these fact sheets is recommended due to the area's proximity to coastal waters and wind.

Is There Anything Else I Should Know About Coastal Flood Hazard Areas and Flood Elevations?

- Many DFIRMs are digital conversions of FIRMs produced during the past few years without improved analysis of flood hazards. While some corrections were made, the maps may not accurately represent coastal flood hazards. Sections 7.8 and 7.9 of FEMA's *Coastal Construction Manual* (FEMA-55, 2005) describe how coastal flood hazards are mapped and how to determine whether coastal FIRMs reflect present-day flood hazards.
- DFIRMs do not incorporate the effects of long-term shoreline erosion. This information should be obtained from other sources.
- Recent post-storm investigations and studies have shown flood forces and damage in Areas of Moderate Water Action (MOWAs) or Coastal A Zones can be very similar to those in Zone V. Some communities have adopted DFIRMs that show MOWAs as a white line on the DFIRM that depicts the LiMWA. Although DFIRMs (and minimum NFIP building standards) do not differentiate between Zone A in coastal areas and Zone A in riverine areas, *builders should consider using Zone V foundation and elevation standards for new construction in the MOWA. These flood zones are depicted as white boundaries on DFIRMs where communities are encouraging use of Zone V standards in MOWAs.*
- Many communities and states require that the lowest floor elevations are above the BFE, offering an additional level of protection known as **Freeboard**. The term used to describe the higher elevation level is **Design Flood Elevation (DFE)**.
- Many property owners have voluntarily constructed their buildings with the lowest floor several feet above the BFE because of the potential for flood waters to exceed the BFE and enter the building. Flood insurance is not available in areas designated as being in the Coastal Barrier Resource System (CBRS). Only structures constructed prior to the designation of the area as being in the CBRS are allowed to purchase federal flood insurance.

Where Can I Get FIRMs, DFIRMs, Flood Studies, and Other Information?

Community floodplain administrator. The community's DFIRMs and its local floodplain management regulations, should be on file and available for viewing at the office of the community floodplain administrator.

FEMA's Map Information eXchange, or FMIX. This service center serves as a one-stop shop for a variety of information, products, services, and tools that support the National Flood Insurance Program. To contact a FEMA Map Specialist, please call 1-877-FEMAMAP (1-877-336-2627) or email FEMAMapSpecialist@riskmapcde.com. DFIRMs and FISs can be accessed at www.msc.fema.gov. Index sheets and specific FIRM panels can be viewed online at the FEMA Map Service Center website by entering either a parcel address or the specific DFIRM panel number, if known. A user-selected portion of flood maps (called a FIRMette) such as the previous sample can be created, saved, and printed. An effective tutorial on interpretation and use of the old FIRM product is available at www.FloodSmart.gov. While not specific to the newer DFIRM platform, the tutorial defines basic flood hazard map terminology and will be helpful to those less experienced with using flood hazard maps.

Information regarding FIRMs, DFIRMs, FISs, and related products can also be obtained from FEMA through FMIX at:

1-877-FEMAMAP (1-877-336-2627)

Or

FEMAMapSpecialist@riskmap.cde.com

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