

## Freeboard Deficient Procedure Modeling and Mapping Non-Accredited Levees

### LEVEE ANALYSIS AND MAPPING PROCEDURES OVERVIEW

The Federal Emergency Management Agency’s (FEMA) responsibilities include educating and helping a community understand their flood risk. One of the ways FEMA does this is by creating maps to help communities understand the its flood risk and define this as high, moderate, or low risk of flooding. When FEMA conducts a flood mapping project and a non-accredited levee system is involved, there are specific considerations to take into account.

FEMA created a set of procedures for non-accredited levees to more accurately analyze and depict the flood hazard in an area impacted by a levee system. These procedures, known as the “levee analysis and mapping procedures,” offer five different ways to analyze a levee reach (or, section of levee). By applying one of these procedures, the community can more accurately understand their risk and take steps to reduce that risk. The Code of Federal Regulations (CFR) Section 65.10, is the procedure guidance followed and will be referenced throughout this document.

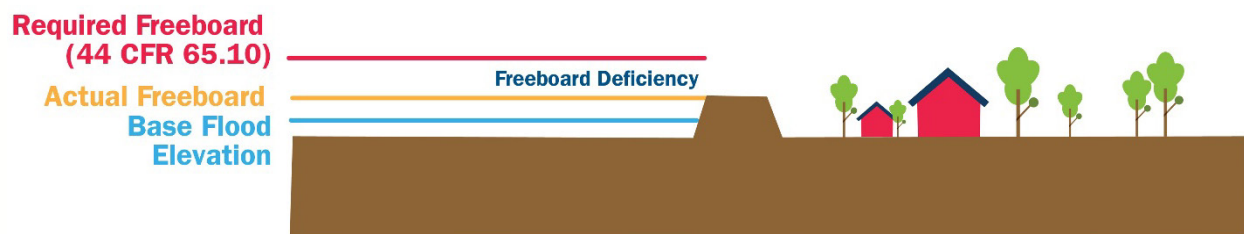
**Levee freeboard** is the vertical distance from the BFE (also known as the 1-percent-annual-chance flood elevation) up to the top of the levee.

**1-percent-annual-chance flood** is often referred to as a “100-year flood,” which means there is a 1 in 100, or 1-percent chance of a flood at that level occurring in any given year. This is the flood level FEMA depicts on its flood hazard maps.

*In the simplest terms, the Freeboard Deficient procedure is applied when a levee reach meets the regulatory requirements of 65.10 except freeboard, meaning that the levee is not tall enough.*

### PROCEDURE OVERVIEW

One such procedure, called **Freeboard Deficient**, applies to levee reaches that are above the Base Flood Elevation (BFE), the level that water is expected to reach during a 1-percent-annual-chance flood, but below the freeboard requirements. Essentially, this means the reach meets all the requirements set by 65.10, except the freeboard is not high enough (see call out box). The benefit of this procedure is that it allows for the height of the levee to be considered during the flood mapping process, even if it is not quite high enough, to ultimately create a more accurate picture of a community’s risk. It can be applied to one or more reaches in a levee system or to an entire system.



*The yellow line shows the height of the levee. While it is above the BFE, it does not meet the red line, which is the required freeboard the levee would need to meet 65.10.*

### WHY FREEBOARD IS NECESSARY

Flood risk is dynamic and constantly changing. While levee systems are designed to manage a certain amount of floodwater, they can be overtopped or fail during flood events that exceed the level for which the levee was designed. Freeboard helps reduce the likelihood of overtopping (flood water runs over the levee) during the design event, and it controls overtopping locations, helping to reduce the risk of catastrophic flooding.

### RESULTING ZONE DESIGNATION

The resulting designation from the **Freeboard Deficient** procedure is Zone D, which represents possible, but undetermined, flood hazards. Zone D is depicted on a Flood Insurance Rate Map (FIRM) but does not carry the mandatory federal flood insurance requirement, although some lenders may require insurance. These zone designations determined in each reach may be impacted by flooding from adjacent or other reaches, and localized interior drainage flooding.

Property owners should understand that Zone D indicates an undetermined hazard, which could still be significant. Flood insurance is strongly recommended. Communities and residents should take proactive steps to mitigate risk. There are several options to help keep insurance costs low:

- **Newly Mapped Procedure:** This cost-saving rating option helps reduce the financial impact of a map change for properties newly mapped as high-hazard. (This option applies if the structure is in Zone D, but is being newly mapped into a Zone A or V. It does not apply if the building is in the Zone X and is being mapped into a Zone D.)
- **Grandfathering:** This rating option may provide a lower cost by locking in the current flood zone or BFE for future rating when the policy renews in the future. The easiest way to take advantage of grandfathering is to buy a policy before the new flood maps take effect.
- **Community Rating System (CRS) credits:** This program recognizes communities for their additional efforts beyond the minimum standards to reduce flood damage to insurable property. Under the CRS, communities that choose to participate may reduce the flood insurance premium rates for property owners in the community by taking these additional actions.

To purchase flood insurance, individuals need to contact their insurance agent. Property owners with questions about flood insurance can call the National Flood Insurance Program, toll free, at 1-888-FLOOD29 (356-6329) or visit [floodsmart.gov](http://floodsmart.gov). See the [Levees and Flood Insurance Fact Sheet](#) for more information.

### OTHER CONSIDERATIONS

Because the levee reaches being analyzed must meet all requirements for an accredited levee system other than freeboard, the **Freeboard Deficient** procedure requires more data than some other procedures. The financial commitment from the community and/or levee owner will depend on multiple factors, including the size of the levee and the availability of existing data.

### Freeboard Deficient Procedure Documentation

Levee documentation for this reach submitted to FEMA must demonstrate:

- Elevation information for the top of the levee (crest), showing that the levee crest is above the BFE.
- Operations and Maintenance Plan information.
- Structural design requirements.
- Inspection Reports.

FEMA will use the documentation received to assist in applying this procedure.

An “interior drainage” analysis must be conducted for all levee systems. Interior drainage represents all water runoff, seepage (water going under the levee), and water collection on the landward side of the levee system. The analysis must identify and demonstrate the potential runoff paths from the impacted drainage area. Any areas of residual risk and interior drainage flooding that fall within these areas are mapped as a SFHA, regardless of whether the levee system is accredited or not. This is a critical analysis because it shows that risk can still exist, even if the levee meets certain 65.10 requirements.

And remember, there is always more a community can do to reduce their risk, especially when it comes to floodplain management, building codes and zoning. See the [Levee Risk and Mitigation Fact Sheet](#) for more information.

***For more information on other procedures for analyzing and mapping hazards associated with non-accredited levees, visit:  
<https://www.fema.gov/media-library/assets/documents/33587>***

***The Code of Federal Regulations can be accessed at: <https://www.govinfo.gov/help/cfr>***