



ADVISORY Base Flood Elevations for St. Tammany Parish, Louisiana

Hurricane Katrina and Rita were both strong Category 5 hurricanes for several days in the Caribbean and Gulf of Mexico before pushing waters towards the Louisiana coast. Katrina made landfall on August 29, 2005 near the Mississippi-Louisiana border, with Rita's landfall on September 23, at the Texas-Louisiana border. These hurricanes and caused extensive damage along the Gulf Coast and Lake Pontchartrain Parishes of Louisiana.

To minimize the flood impacts of future events, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) is providing advisory information concerning coastal flood elevations that can be used to guide recovery efforts. This guidance is necessary because Hurricanes Katrina and Rita, along with other recent storms, have created concerns about the accuracy of the current flood risk information for St. Tammany Parish (including incorporated areas) and whether or not it may be understated.

FEMA has completed an early assessment of the 1%-annual-chance (or 100-year) flood elevations for coastal areas and areas along Lake Pontchartrain. The analysis incorporates storm data from the past 35 years, including Hurricanes Katrina and Rita, new and existing long-term tidal gage records, and other existing engineering studies. The results of the storm data analysis indicate that the existing 1%-annual-chance flood elevations in areas impacted by coastal storm surge are not adequate as shown on the current effective Flood Insurance Rate Maps (FIRMs) for St. Tammany Parish.

For coastal areas the results of the storm data analysis indicated that the existing 1%-annual-chance flood elevations are 6 to 9 feet higher than the Stillwater Elevations (SWELs) published in the effective Flood Insurance Study (FIS). Specifically, the effective SWELs of 9.0 to 12.1 feet are increased to a uniform Advisory SWEL of 18 feet (relative to the National Geodetic Vertical Datum [NGVD] of 1929) in areas south and east of US 90 and, to account for storm reduction between the

Gulf of Mexico and Lake Pontchartrain flooding sources, are increased to a uniform Advisory SWEL of 15 feet NGVD29 between Interstate 10 and US 90.

For areas north and west of Interstate 10 and along Lake Pontchartrain, FEMA is encouraging people to adopt freeboard and elevate structures to at least 1 foot above the current BFEs shown on the effective FIRMs.

Using freeboard is a prudent measure for ensuring structures are rebuilt using the best available information to protect lives and property, and is also a sound floodplain management practice which communities are encouraged to adopt and enforce.

"Freeboard" is defined as follows (from 44 CFR 59.1):

Freeboard means a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

The use of Advisory SWELs and freeboard will take into account increased flood risk due to subsidence, the exclusion of wave setup from the effective Stillwater Elevations (SWELs), and the degradation of coastal barriers; additionally, it will provide extra flood protection to structures, reduce nuisance flooding, and may result in lower flood insurance premiums.

A FEMA coastal study of hurricane storm surge flooding is already underway, and FEMA intends to have an updated preliminary FIS and updated FIRMs for coastal areas of St. Tammany Parish as early as 6 months from now. The maps will become effective following a formal appeals process and community adoption. The updated FIS and FIRM may show an increase of the SWELs, Special Flood Hazard Areas (SFHAs), and BFEs over existing flood data (including that used for this Flood Recovery Guidance), and may result in the coastal high hazard area (V Zone) moving further landward.

Until the study is completed, FEMA is encouraging communities within St. Tammany Parish to use the recommendations in the Flood Recovery Guidance described herein. This Flood Recovery Guidance method can be used during recovery and reconstruction of the Louisiana coastal areas to determine site-specific Advisory BFEs.

Flood Recovery Guidance Method – Advisory SWELs

For coastal areas south of Interstate 10, the first step in applying the method is to determine the Advisory SWEL applicable to the building site. The wave height is then calculated by: (1) finding the ground elevation at the site; (2) subtracting the ground elevation from the Advisory SWEL to determine the flood depth; and by (3) dividing the flood depth by two for the wave height. The Advisory BFE is calculated by adding the wave height to the Advisory SWEL.

Please note that the wave effects, which are a key component of coastal flood elevations, are not included in the SWEL and must be calculated separately.

1. Approximate Method for Calculating Advisory BFE using Advisory SWEL:

Advisory BFE = Advisory SWEL + wave height
 Wave height = $\frac{1}{2}$ flood depth = $d/2$

2. Example:

Advisory SWEL = 18 ft
 Wave height = $\frac{1}{2}$ (12) = 6 ft
 2a. Ground elevation (z) = 6 ft
 2b. Flood depth = SWEL - z = 18 ft - 6 ft = 12 ft
 2c. Wave height = $\frac{1}{2}$ (12) = 6 ft
 Advisory BFE = 18 ft + 6 ft = 24 feet NGVD29

Flood Recovery Guidance Method – Freeboard

For areas north and west of Interstate 10 and along Lake Pontchartrain, the Advisory BFE is the effective BFE plus a recommended freeboard of 1 foot. The first step in applying the method is to use the effective FIRM to determine the SFHA and the highest BFE mapped for the footprint of the building site. FEMA requires, for National Flood Insurance Program rating purposes, the use of the most restrictive and highest BFE that encroaches on a building.

The next step is to have a surveyor determine the lowest adjacent ground elevation (also known as the lowest adjacent grade or LAG). The LAG is useful for ensuring the finished floor elevation is elevated above the Advisory BFE. For structures located in Zone VE on the effective FIRMs, the bottom of the lowest horizontal structural member must be at or above the Advisory BFE. For Zone AE slab-on-grade foundations that can't be replaced with Zone VE compliant pile elevated foundations, the finished first floor of the habitable area should be elevated at or above the Advisory BFE.

1. Approximate Method for Calculating Advisory BFE using recommended freeboard:

Advisory BFE = FIRM BFE + Freeboard
 FIRM BFE = highest value from effective FIRM
 Freeboard = 1 foot

2. Example:

Advisory BFE = 12 + 1 = 13 feet NGVD29
 St. Tammany Parish FIRM BFE = Zone VE (EL 12 feet)
 Freeboard = 1 foot
 Compare Advisory BFE (egs., 13 feet) to building LAG. Assume building LAG (z) = 8 feet; therefore, building must be elevated 5 feet above ground surface.

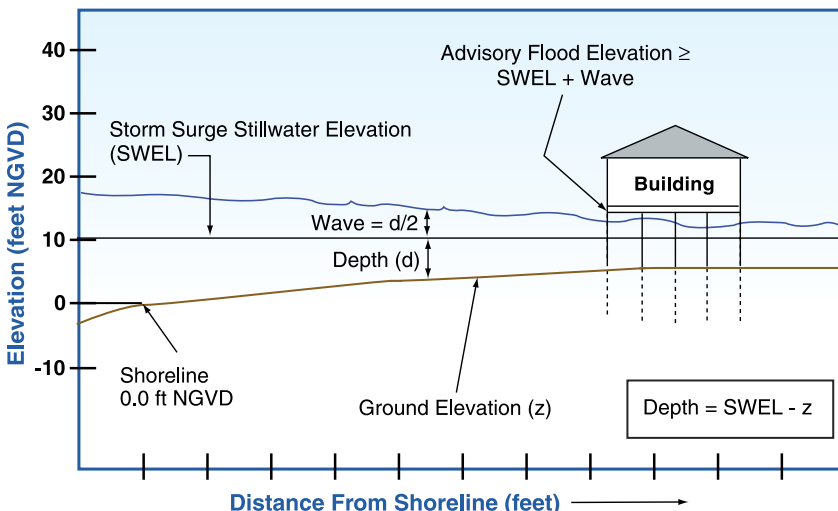


Figure 1: How to determine the Advisory BFE based on the site's ground elevation, applicable advisory SWEL, and calculated wave height.

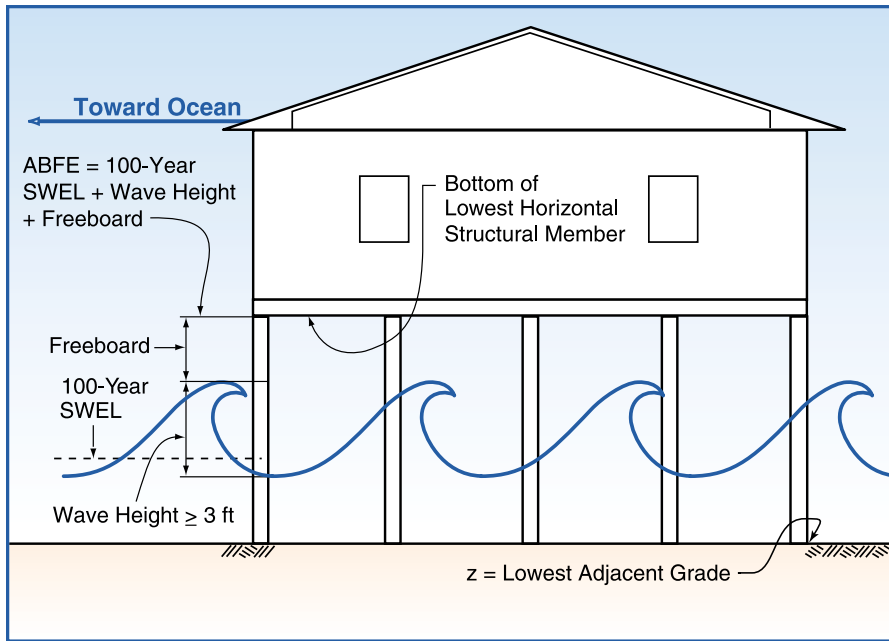


Figure 2: How to determine the Advisory BFE based on the site's ground elevation, effective BFE, and recommended freeboard.

* Effective Firm BFE = 100 Year SWEL + Wave Height

Although the information provided here is advisory, communities should consider its use for rebuilding in a safer manner. In addition to determining site-specific Advisory BFEs, community officials should consider additional protective measures to reduce future flood risks. These measures could include using additional freeboard and using FEMA's *Coastal Construction Manual (CCM)* (FEMA Publication 55). The CCM recommends the use of V Zone building standards in all areas subject to waves and velocity floodwaters caused by hurricane storm surges. For additional information on recommended practices, see the *Coastal Construction Fact Sheet Series* available at <http://www.fema.gov/fima/mat/fema499.shtm>.

Ultimately it will be local officials, working with property owners, who will make final decisions regarding construction type and elevations that will apply during the recovery and rebuilding process. The Advisory BFEs will be a valuable tool until new detailed studies can be developed and incorporated into the FIS and FIRMs. Within the next 2 to 3 months, FEMA will also publish a set of maps that will show detailed event information for Hurricanes Katrina and Rita, including flood inundation boundaries and high water elevations. Areas in St. Tammany Parish with recommended Advisory SWELs will also receive flood recovery maps with Advisory BFEs.