

Costs of Freeboard

Under the rules of the National Flood Insurance Program, buildings must be protected to the base flood elevation. Therefore, the cost of freeboard is just the additional cost of building higher than the minimum NFIP standard.

A 2006 study conducted for the American Institutes for Research* looked at these average additional costs for a 2,000 square foot house. The findings are below, updated to 2017 construction costs.

Foundation Type	Cost per additional foot
Concrete block piers	\$890
Crawlspace with concrete block walls	\$1,850
Crawlspace with poured concrete walls	\$2,155
Stem wall with fill	\$2,345
Fill only	\$4,470

Using a house on fill with a stem wall (as illustrated on the other side), here are the average costs for various levels of freeboard:

- 1 foot: \$2,345
- 2 feet: $\$2,345 \times 2 = \$4,690$
- 3 feet: $\$2,345 \times 3 = \$7,035$

* Evaluation of the National Flood Insurance Program's Building Standards, found at www.fema.gov/media-library-data/20130726-1602-20490-5110/nfip_eval_building_standards.pdf

Return on the Investment

The owner of a building built with freeboard protection will realize the savings in two ways. The most important way is when the area floods again and the building is not damaged and the owner does not have to relocate, repair, and rebuild.

An immediate return will be in the form of reduced flood insurance premiums. Every building in the floodplain with a Federally backed mortgage must have a flood insurance policy to at least the amount of the mortgage. The owner will pay the premiums, either directly or through the lender's escrow account.

Here is an example using the 2,000 square foot home with a stem wall foundation and two feet of freeboard. Premiums are as shown in the table on the other side.

Additional cost of construction:	\$4,690
Annual insurance premium with no freeboard:	\$2,147
Annual insurance premium with 2 feet of freeboard:	\$734
Annual premium savings:	\$1,413
Number of years to pay off \$4,690 via premium savings:	3.3 years
Added savings realized during a 30 year mortgage:	\$37,300

The Benefits and Costs of Freeboard



Slab-on-Grade Foundations

For more information: contact the ASFPM Nonstructural/Floodproofing Committee at ASFPM@floods.org

Building in the Floodplain

All communities that participate in the National Flood Insurance Program (NFIP) must ensure that all new residential buildings constructed in the floodplain be elevated to or above the base flood elevation (BFE). The base flood is the flood that has a one percent chance of occurring or being exceeded in any given year.

Many communities have concluded that the base flood elevation is not a sufficient level of protection. They have found:

- Floods higher than the base flood can and do occur.
- Most flood studies do not account for debris or obstructions during the base flood, thereby underestimating the BFE.
- NFIP flood studies do not account for the impacts of future development or sea level rise. Over time, the regulatory standard does not keep up with increases in flood elevations.
- In non-coastal areas, the protection level is measured at the top of the lowest floor, leaving the flooring, subfloor, and floor joists exposed to the base flood.

To help account for these shortcomings of building only to the BFE, over half of the communities in the country require freeboard, i.e., new buildings must be protected to one or more feet *higher* than the base flood elevation.

Benefits of Freeboard

A building built to a freeboard protection level is better protected from:

- Waves that are higher than the BFE,
- Unpredictable flooding conditions, such as debris at a bridge or culvert that creates a dam to stream flow,
- A base flood elevation that was underestimated by the typical study criteria,
- Increases in flood heights due to development and climate change, and
- Damage to the floor joists and other parts of the building lower than the top of the lowest floor.

Through a national consensus process, freeboard has been part of the International Building and Residential Codes and the American Society of Civil Engineers' construction guidance (ASCE 24) since 1998.



One or two feet of additional elevation can prevent thousands of dollars in flood damage.

Insurance Premiums with Freeboard

While the base flood elevation is the minimum standard for communities in the National Flood Insurance Program, **the NFIP encourages adoption of a freeboard requirement** (44 CFR 60.1(d)).

As seen in the table below, flood insurance premiums are significantly lower for buildings with 1, 2, or 3 feet of freeboard.

There is one simple reason for this: More than forty years of insurance claims experience has proven that these buildings suffer much less flood damage. Less potential for damage means lower premiums.

Flood Insurance Premium Comparison		
Zone	Freeboard	Premium
AE	At BFE (no freeboard)	\$2,147
AE	BFE + 1 foot	\$1,106
AE	BFE + 2 feet	\$734
AE	BFE + 3 feet	\$614

Premiums are for a single family house, one floor, slab on grade or stem wall foundation, \$200,000 in building coverage, \$80,000 in contents coverage, \$1,000 deductible, no CRS discount, April 2017 *Flood Insurance Manual*

Lower insurance premiums are an immediate benefit of freeboard to the property owner. Other benefits include less flood damage in the community, less suffering less business interruption, quicker recovery, and higher property values.