



## Using the Limit of Moderate Wave Action (LiMWA) to Build Safer and Stronger Coastal Communities

The National Flood Insurance Program (NFIP) depicts coastal flood hazards in two different zones on Flood Insurance Rate Maps (FIRMs):

- Zone VE, also known as the Coastal High Hazard Area (CHHA), where flood hazards include wave heights equal to or greater than 3 feet; and
- Zone AE, where flood hazards include wave heights less than 3 feet.

Due to the high risk of structural damage, buildings within Zone VE must adhere to more stringent building requirements. Communities should also be adopting the most up-to-date building codes to ensure buildings are protected from the potential hazards of high-risk floods.

Over the past decade, post-storm surveys of damage and laboratory tests have confirmed that wave heights as small as 1.5 feet can cause significant damage to coastal structures that are not built to withstand these hazards. This fact sheet describes how to use the information that is available to improve construction standards in coastal communities that have not adopted the most recent International Building Codes (I-Codes).

On a FIRM, FEMA identifies where waves can reach heights of 1.5 feet or greater using a line called the Limit of Moderate Wave Action (LiMWA). Through the LiMWA shown on the FIRMs, homeowners and communities can better understand which portions of Zone AE are at risk of high wave energy. These portions, which make up the area between the LiMWA and Zone VE, are referred to collectively as the Coastal A Zone.

While FEMA does not impose floodplain management requirements based on the LiMWA, the LiMWA communicates that a greater risk of flood damage is present in the Coastal A Zone.

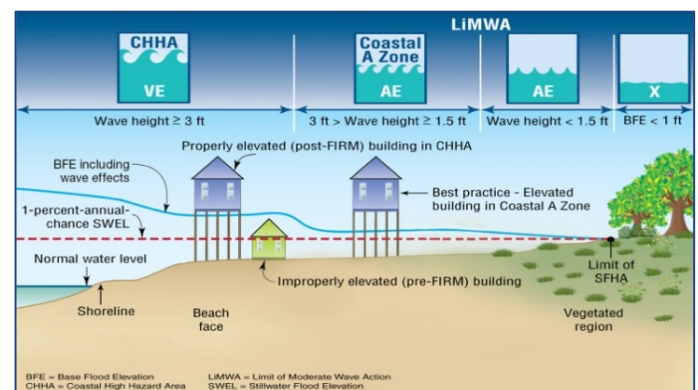
FEMA encourages the practice of building to Zone VE standards within the Coastal A Zone, and many local building codes **require** that buildings in the Coastal A Zone be built to Zone VE standards to be better protected from the dangers posed by waves.

### Zone VE Building Standards for Coastal Communities

Communities that adopt Zone VE standards in the Coastal A Zone can receive Community Rating System (CRS) credits, which could lower flood insurance premiums for residents and business owners.

1. Buildings must be elevated on pile, post, pier, or column foundations.
2. Buildings must be adequately anchored to the foundation.
3. Structural fill is prohibited.
4. The bottom of the lowest horizontal structural member must be at or above the Base Flood Elevation (BFE).
5. The area below the BFE must be built of flood-resistant materials and free of obstructions. If enclosed, the enclosure must be made of lightweight wood lattice, insect screening, or breakaway walls.
6. The building design and method of construction must be certified by a design professional.

*For specific requirements, refer to Title 44 of the Code of Federal Regulations, Section 60.3.*



*“FEMA’s mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.”*

## Effects on Floodplain Management

- For their safety, communities are encouraged to adopt the most recent I-Codes, but at minimum, to adopt construction standards in the Coastal A Zone similar to those for Zone VE. (Refer to the sidebar on page 1 for a summary.)
- Many communities adopt a requirement for a structure to be built a few feet above the BFE, which is the potential height of a 1-percent-annual-chance flood. This added elevation, called freeboard, has at least two benefits: it adds a factor of safety to protect against flooding damage, and it reduces flood insurance premium costs.
- CRS credits are available for participating communities that adopt Zone VE building standards in the Coastal A Zone. For more information on CRS, visit: [www.fema.gov/national-flood-insurance-program-community-rating-system](http://www.fema.gov/national-flood-insurance-program-community-rating-system).

Requiring design and construction within the Coastal A Zone to meet Zone VE standards is a minimum requirement under widely adopted, consensus model building codes (International Building Code and International Residential Code) as well as FEMA assistance programs.

## Effects on Property Owners

- Residents and business owners living or working in the Coastal A Zone should be aware that potential wave action and floating debris could cause significant damage to their property. Property owners are encouraged to exceed the minimum requirements and build “safer and higher” to reduce the risk to life and property.
- Although the risk of damage is higher in the Coastal A Zone than in other Zone AE areas, NFIP rates for properties in the Coastal A Zone do not differ from those in other Zone AE areas.
- A federal requirement to purchase flood insurance applies in Zones V, VE, A, and AE. Property owners are encouraged to carry coverage equivalent to the replacement cost of their building and to include additional coverage for the contents of their property.

## Options for Communities to Account for Coastal A Zones in Construction

The following paragraphs provide options and sample ordinance language that communities can consider to implement higher standards in the Coastal A Zone. Ideally, communities should adopt the most recent I-Codes, which recognize the Coastal A Zone and provide construction requirements for those areas. Building codes represent the most comprehensive approach to addressing construction within the Coastal A Zone. The options below provide varying levels of increased protection, and communities can choose what is most suitable for their needs. Communities should consult their legal departments to ensure the ordinance language complies with other community standards and regulations.

### Adopt Zone VE standards for all properties\* (most protective option)

With this option, all development in the Coastal A Zone would be subject to the same building requirements enforced by the community in Zone VE. These requirements would include the building standards highlighted on the first page of this fact sheet and apply to all new construction, substantially damaged buildings, and buildings undergoing substantial improvements.

**Substantial Damage** refers to the damage sustained by a building where the cost of restoring the building to its pre-damaged condition would equal or exceed 50 percent of the building’s market value before the damage occurred.

**Substantial Improvement** refers to enhancements or repairs that will cost 50 percent or more of the building’s pre-improvement market value (unless otherwise specified by the community).

\*When using Zone VE standards in the Coastal A Zone, breakaway walls should include the appropriate number of flood openings to equalize hydrostatic loads in the enclosure. If the flood openings are not required by code, the lack of flood openings for the enclosure will result in increased flood insurance premiums.

## **Adopt Zone VE standards for residential structures, but continue to apply Zone AE requirements for non-residential structures\***

With this option, all new residential construction, including substantial improvements and substantial damage repairs, would be subject to the same building requirements enforced by the community in Zone VE. Sample language includes:

- All new residential construction, substantial improvements, and repairs to substantially damaged buildings must comply with the building standards for Zone VE; and
- All new non-residential construction, substantial improvements, and repairs to substantially damaged buildings must comply with the community floodplain ordinance for development in Zone AE.

Additionally, communities could consider applying Zone VE standards to “light-framed construction” in the Coastal A Zone. (Wave damage is expected to be greater in buildings constructed using wood framing or light-gauge metal framing.)

## **Adopt Zone VE standards for new construction only\***

For this option, Zone VE standards would apply only to new construction. Sample language for this option includes:

- All new construction must comply with the building standards for Zone VE; and
- All residential and non-residential buildings undergoing substantial improvement/repair must comply with the community’s floodplain ordinance for Zone AE development.

## **Adopt Zone VE standards for critical facilities only\***

Sample language for this option includes:

- All new construction and substantial improvement or repair of critical facilities or those undergoing substantial improvements in the Coastal A Zone must comply with the building standards for Zone VE.

## **Adopt increased elevation requirements above the BFE—freeboard (least protective option)\***

While this option should reduce damage to a building’s floor system and walls, the foundation system will need to be designed to resist the hazards posed by waves and address scour and erosion.

- Open foundations are recommended, with the option of a designed stem wall foundation (a continuous wall foundation with structural fill placed behind the wall system and the building constructed on a continuous slab, which caps the structural fill). The slab elevation should meet the freeboard requirements. Continuous wall foundations with a crawlspace should be avoided unless they are designed to resist breaking wave loads.
- All foundations should be sufficiently deep to resist scour and erosion. Scour around continuous foundation walls can be significantly deeper than around pile foundations (open and deep foundations).
- Pier foundations should also be designed to resist breaking wave loads and impact loads. Footings should account for scour and erosion.

Communities that only adopt increased freeboard requirements should expect buildings constructed in Coastal A Zones to experience more damage during a flood than buildings designed to Zone VE requirements.

### **For More Information**

- To obtain model ordinances, check with your State NFIP Coordinator.
- For more information on NFIP floodplain management requirements, visit: <https://www.fema.gov/media-library/assets/documents/902>

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\*When using Zone VE standards in the Coastal A Zone, breakaway walls should include the appropriate number of flood openings to equalize hydrostatic loads in the enclosure. Even if the flood openings are not required by code, the lack of flood openings for the enclosure will result in increased flood insurance premiums.