

2020

FLOODPLAIN MANAGEMENT IN THE U.S. VIRGIN ISLANDS



Quick Guide

Department of Planning and Natural Resources

Division of Building Permits

<https://dpnr.vi.gov/building-permits/>

Table of Contents

- 1 About This Guide
- 2 Why Do We Regulate the Floodplain?
- 3 What is the National Flood Insurance Program?
- 4 The Virgin Islands NFIP Responsibilities
- 5 Flood Insurance: Property Owner's Financial Protection

FLOODPLAINS AND FLOOD MAPS

- 6 Looking for FEMA Flood Map Information?
- 7 FIRMette: FEMA Flood Maps Online
- 8 Advisory Flood Hazard Data
- 9 Flood Insurance Rate Map (Streams)
- 10 Approximate Flood Zones
- 11 Understanding the Stream Floodplain
- 12 Understanding the FEMA Floodway
- 13 The Regulatory Floodway "No Rise" Certification
- 14 Using the Stream Flood Profile to Determine BFEs
- 15 Floodway Data Table
- 16 Understanding the Coastal Floodplain
- 17 Flood Insurance Rate Map (Coastal)
- 18 FIRM Revisions: LOMAs and LOMR-Fs
- 19 FIRM Revisions: CLOMRs and LOMRs

CONSIDERATIONS FOR SITING DEVELOPMENT

- 20 Are Building Sites Higher than the BFE?
- 21 Floods Don't Always Stop at the BFE

- 22 Planning Your Site: Avoid and Minimize Flood Impacts
- 23 Avoid Flood Hazard Areas in Subdivision Layout
- 24 Fill Can Adversely Affect Floodplain Functions
- 25 Planning Your Site: Minimize Environmental Impacts
- 26 Planning Your Site: Minimize Impacts During Construction

FUNDAMENTALS

- 27 Activities in SFHAs that Require Local Permits and Approvals
- 28 Some Key Floodplain Permit Review Steps
- 29 Fundamentals of Flood Resistant Construction
- 30 Flood Requirements in the Virgin Islands Building Code
- 31 Specific Requirements in the Virgin Islands Building Code
- 32 Freeboard: Build Higher, Reduce Damage, Save on Insurance
- 33 Variances From Elevation Requirements

APPLICATIONS AND ELEVATION CERTIFICATES

- 34 Carefully Complete the Permit Application
- 35 DPNR Retains Flood Records Permanently
- 36 What is the Elevation Certificate and How is it Used?
- 37 Completing the Elevation Certificate
- 38 Paperwork is Important for Owners

REQUIREMENTS FOR BUILDINGS

- 39 How to Elevate Buildings in Flood Zone A/AE
- 40 Enclosures Below the Lowest Floor (Zone A/AE)
- 41 Placement and Compaction of Fill in Zone A/AE

Table of Contents (continued)

- 42** General Requirements in Coastal High Hazard Areas (Zone V)
- 43** How to Elevate Buildings in Flood Zone V
- 44** Coastal Structures Must Resist Wind and Water Forces
- 45** Construction Information for a Stronger Home
- 46** Areas Under Elevated Buildings in Zone V
- 47** The Zone V Design Certificate

UTILITIES AND EQUIPMENT

- 48** Cisterns Under Elevated Buildings in SFHAs (Zone A/AE)
- 49** Utility Service and Equipment Inside Enclosures
- 50** Utility Service, Equipment, and Tanks

OTHER DEVELOPMENT

- 51** Accessory Structures
- 52** Agricultural Structures
- 53** Manufactured Homes and Recreational Vehicles

EXISTING BUILDINGS

- 54** Improvements and Repairs of Buildings in Flood Zones
- 55** FAQs About Substantial Improvement and Substantial Damage
- 56** Estimating Costs of Improvements and Repairs
- 57** Non-Substantial Improvements Other than Additions
- 58** What is Meant by Pre-FIRM and Post-FIRM?
- 59** Substantial Improvement: Renovation Only
- 60** Substantial Improvement: Lateral Addition Only
- 61** Substantial Improvement: Addition Plus Other Work

- 62** Elevating an Existing Building
- 63** When Your Home or Business in the SFHA is Damaged
- 64** Repair of Damaged Buildings
- 65** Paying for Post-Flood Compliance

FLOOD PROTECTION AND MITIGATION

- 66** Some Flood Protection for Older Homes is Easy and Low Cost
- 67** Small Berms or Floodwalls May Protect Older Buildings
- 68** Some Flood Mitigation Projects are More Costly Up Front

SAFETY AND PREPAREDNESS

- 69** Turn Around Don't Drown®
- 70** Be Prepared for Flood Emergencies

RESOURCES

- 71** Useful Resources and Common Acronyms

About This Guide

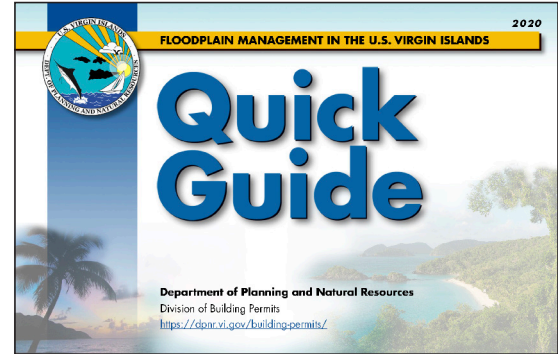
This **Quick Guide** will help property owners, builders, design professionals, real estate and insurance professionals, and others understand why and how the U.S. Virgin Islands manages development in floodplains to protect people and property.

The Department of Planning and Natural Resources (DPNR), Division of Building Permits is responsible for enforcing the Virgin Islands Building Code and the floodplain management regulations in Title 3, Chapter 22, Subchapter 401 (b) (15). The Division reviews permit applications, issues permits, and inspects development. In the event of conflict, those codes and regulations, and not this Guide, must be followed.

The Division of Building Permits has offices in the district of St. Thomas/St. John (340-774-3320) and in the district of St. Croix (340-773-1082).

Prepared by:

RCQUINN
CONSULTING, INC.



Why Do We Regulate the Floodplain?

To protect people and property. Implementing floodplain management regulations reduces vulnerability to future flood risk. If we know low lying land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.

To make sure federal flood insurance is available. The U.S. Virgin Islands participates in the NFIP and administers floodplain management requirements so that residents and businesses can purchase federal flood insurance and are eligible for some types of federal assistance, including flood mitigation grants.

To save tax dollars. Every time we experience flood disasters our budgets are impacted. If we build smart, we'll have fewer problems the next time the water rises. Remember, federal disaster assistance is not available for all floods. Even when the President declares a disaster, we still must pay a portion of repair and clean-up costs, temporary housing assistance, and evacuation expenses.

To avoid liability and lawsuits. If we know an area is mapped as a flood hazard area, and if we know people could be in danger and buildings could be damaged, doesn't it make sense to take reasonable protective steps as our communities develop and redevelop?

Since 1978, federal flood insurance policy holders in the Virgin Islands have received over \$76 million in claim payments. Even though that represents many payments, most of our flood-prone property owners do not have flood insurance.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to protect lives and property and to reduce the financial burden of providing disaster assistance. The NFIP is administered by the Federal Emergency Management Agency (FEMA). Nationwide, over 22,300 communities participate in the NFIP.

The NFIP is based on a mutual agreement between the Federal Government and communities. The Virgin Islands agrees to regulate development in mapped flood hazard areas according to certain criteria and standards. The partnership involves:



- **Flood hazard maps.** FEMA produces flood maps in accordance with FEMA standards. The maps are used by DPNR, architects, engineers, builders, citizens, insurance agents, real estate professionals, and others.
- **Flood insurance.** Property owners and renters are eligible to purchase federal flood insurance for buildings and contents.
- **Regulations.** DPNR enforces minimum floodplain management regulations and building codes so that development, including buildings, is undertaken in ways that reduce exposure to flooding.

To learn more about the NFIP, including your potential flood risk, go to FEMA's FloodSmart web site www.floodsmart.gov.

The Virgin Islands NFIP Responsibilities

To participate in the NFIP, the Territory agrees to:

- **Recognize** flood hazards in community planning ([see page 22](#))
- **Adopt and enforce** flood maps and floodplain management regulations
- **Require** permits for all types of development in the floodplain ([see page 27](#))
- **Assure** that building sites are reasonably safe from flooding
- **Establish** base flood elevations (BFE) where not determined on Flood Insurance Rate Maps (FIRMs)
- **Require** new and substantially improved homes and manufactured homes to be elevated above the BFE
- **Require** non-residential buildings to be elevated above the BFE, or dry floodproofed
- **Determine** if damaged buildings are substantially damaged
- **Conduct** field inspections; cite and remedy violations
- **Require and maintain** surveyed elevation information to document compliance ([see pages 35, 36, and 38](#))
- **Carefully consider** requests for variances
- **Resolve** non-compliance and violations of floodplain management requirements
- **Advise and work** with FEMA when updates to flood maps are needed
- **Maintain** records for review and respond to periodic requests for reports to FEMA

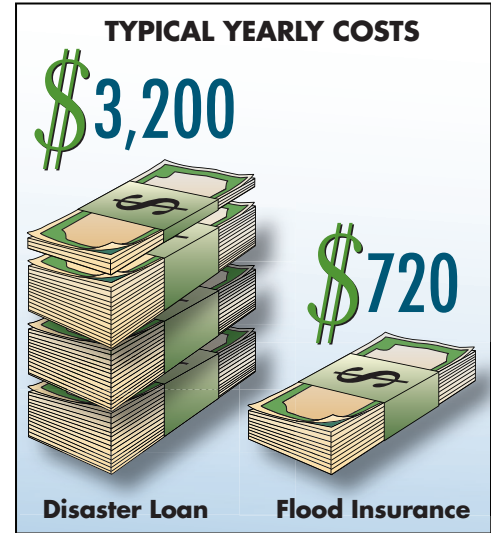
Flood Insurance: Property Owner's Financial Protection

Who needs flood insurance? Federal flood insurance is required for all buildings in mapped flood zones shown on FEMA's maps if they are financed by federally-backed loans or mortgages. All homeowners, business owners, and renters may purchase federal flood insurance on any building and its contents, even if outside of the mapped flood zone. Homes in mapped flood zones are five times more likely to be damaged by flooding than by major fires.

Not in a mapped flood zone? Unfortunately, it's often after a flood that many people discover that their home or business property insurance does NOT cover flood damage. Approximately 25% of all flood damage occurs in low risk zones, commonly described as being "outside the mapped flood zone."

What about disaster grants and loans? Federal disaster grants do not cover most losses and repayment of a disaster loan can cost many times more than the cost of a flood insurance policy.

Want to know more? Learn more at www.floodsmart.gov. To purchase a policy, call your insurance agent. To find an insurance provider in your neighborhood, click on "How to Buy or Renew."



Looking for FEMA Flood Map Information?



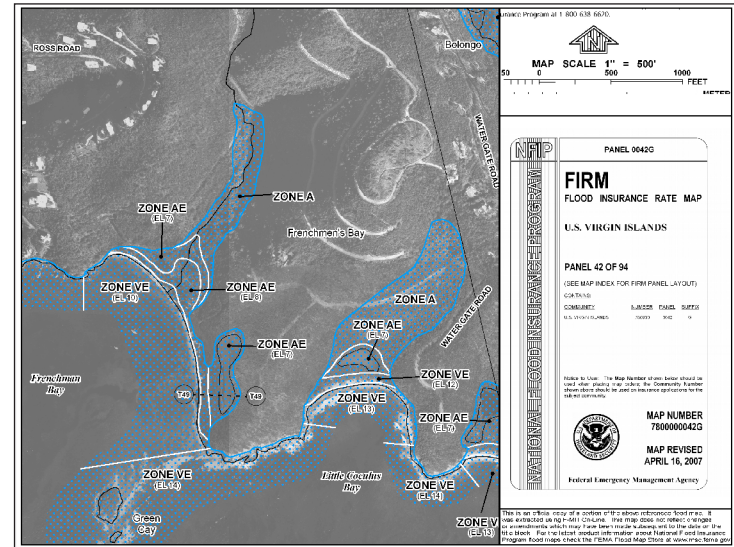
- The Flood Insurance Study (FIS) is a compilation of flood risk information used for planning and development.
- Flood Insurance Rate Maps (FIRMs) show flood zones subject to regulations and where federal flood insurance is required.
- Access FIRMs at the FEMA Flood Map Service Center at <https://msc.fema.gov>, where current and historical flood maps may be viewed and downloaded.
- Access the National Flood Hazard Layer, a geospatial database with current effective data, at <https://www.fema.gov/national-flood-hazard-layer-nfhl>.

Need a fast answer? DPNR's district offices have paper flood maps available for viewing by the public.

FIRMette: FEMA Flood Maps Online

Portions of flood maps can be produced, saved, and printed by making a "FIRMette." FIRMettes are full-scale sections of FIRMs.

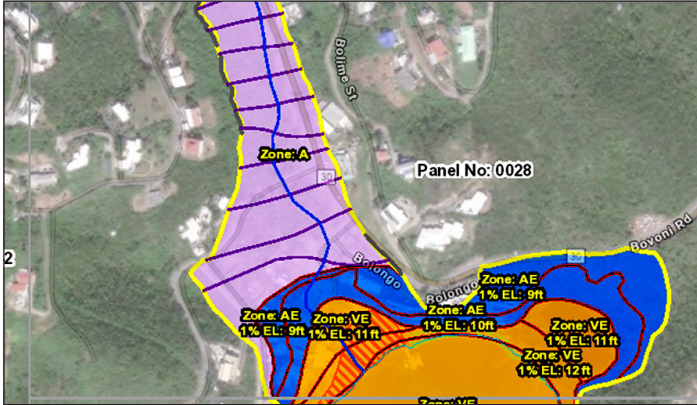
- Search online for a tutorial on FIRMettes and downloading FIRM panels.
- Making a FIRMette is easy after a property is located. Use the <Search by Address> link or <Search All Products> to find the community and map panel of interest.
- Earlier versions of FIRMs are available so current flood hazard information can be compared to historic data.



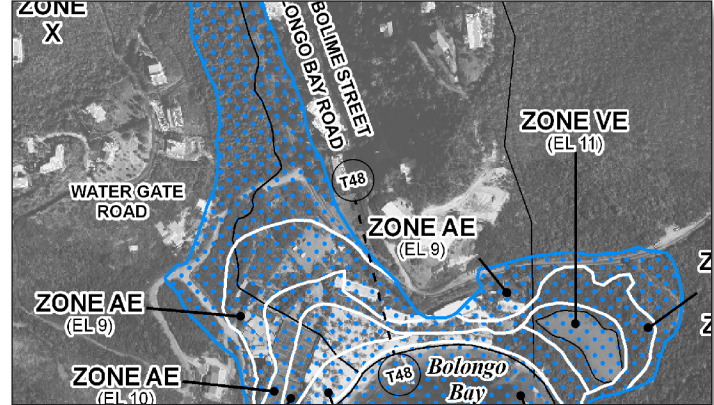
Go to www.msc.fema.gov and check out the "MSC Frequently Asked Questions." For step-by-step instructions on how to read flood maps, view the How to Read a Flood Insurance Rate Map Tutorial.

Advisory Flood Hazard Data

Advisory Flood Hazard Resources Map



Flood Insurance Rate Map



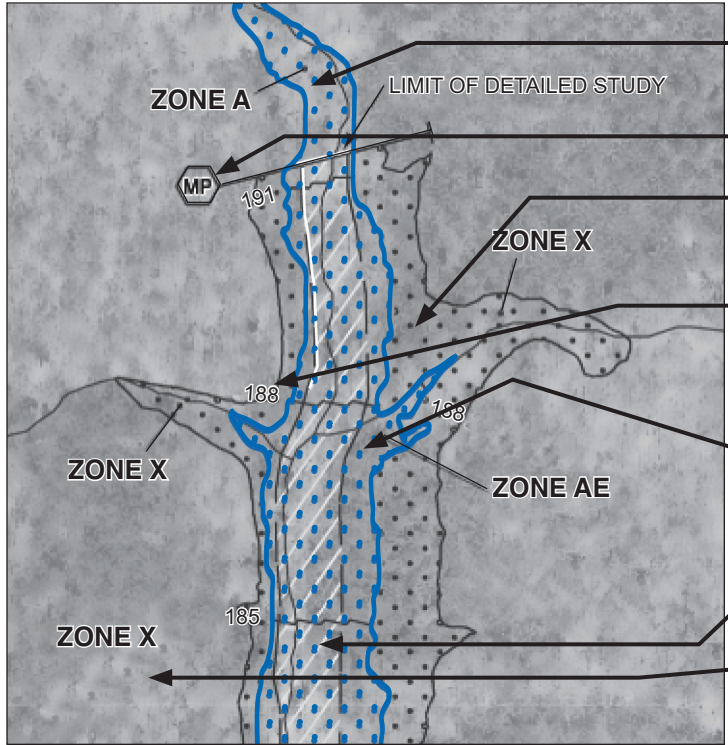
Terms and Definitions

The **Advisory Base Flood Elevation (ABFE)** is the elevation shown on the Advisory Flood Hazard Resources Map created by FEMA in response to Hurricanes Maria and Irma, dated April 26, 2018.

Important Information

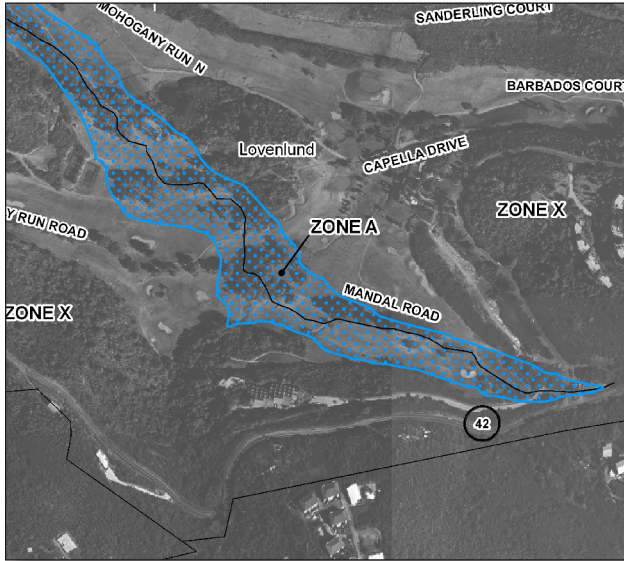
DPNR reviewers check BFEs on FIRMs and ABFEs. The higher of the BFE and ABFE is used for regulatory purposes. Contact DPNR for online access to the Advisory Flood Hazard Resources Maps.

Flood Insurance Rate Map (Streams)



- 1 Zone A** (approximate) is the 1% annual chance (100-year) flood hazard area without BFEs.
- 2 Cross Section** location ([see page 14](#)).
- 3 Shaded Zone X** is the 0.2% annual chance (500-year) floodplain.
- 4 Base Flood Elevation (BFE)** is the water surface elevation of the base flood rounded to the nearest whole foot (consult FIS profiles and tables for more accurate elevations).
- 5 Zone AE** is the 1% annual chance (100-year) floodplain with BFEs.
- 6 The Floodway** is the cross-hatched area ([see page 12](#)).
- 7 Unshaded Zone X** is all other areas considered low risk.

Approximate Flood Zones



FEMA uses existing information – not engineering studies – to draw Approximate Zone A boundaries. Information may be provided by the U.S. Army Corps of Engineers, other agencies, and historic records.

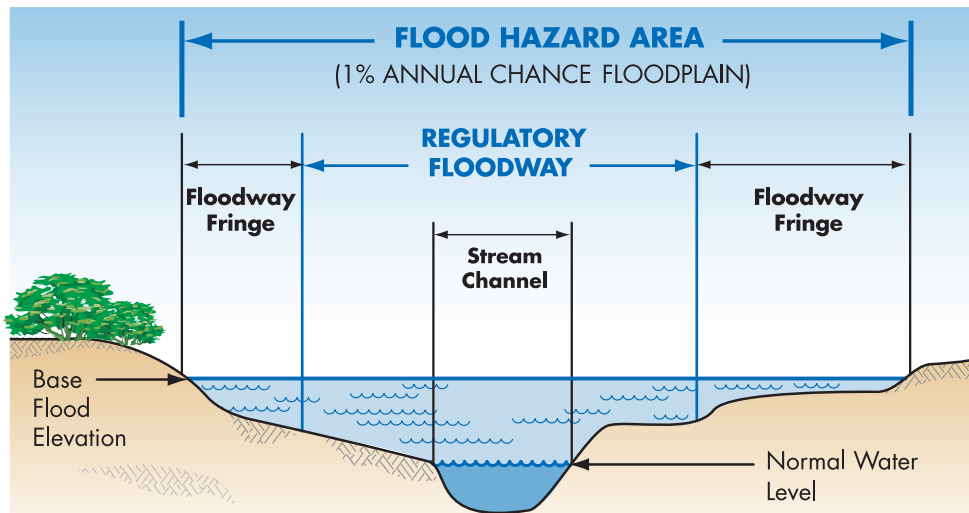
For assistance determining BFEs, contact DPNR. Useful guidance for engineers is found in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas*.

de Terms and Definitions

An **Approximate Zone A** is a special flood hazard area where BFE information is not provided.

If data are not available from another source, and provided there is no evidence indicating flood depths have been or may be greater than two feet deep, DPNR may specify the BFE is two feet above the highest adjacent grade.

Understanding the Stream Floodplain



For stream and gut floodplains with base flood elevations (BFEs) determined by detailed flood studies, the Flood Profile in the Flood Insurance Study shows water surface elevations for different frequency floods ([see page 14](#)).

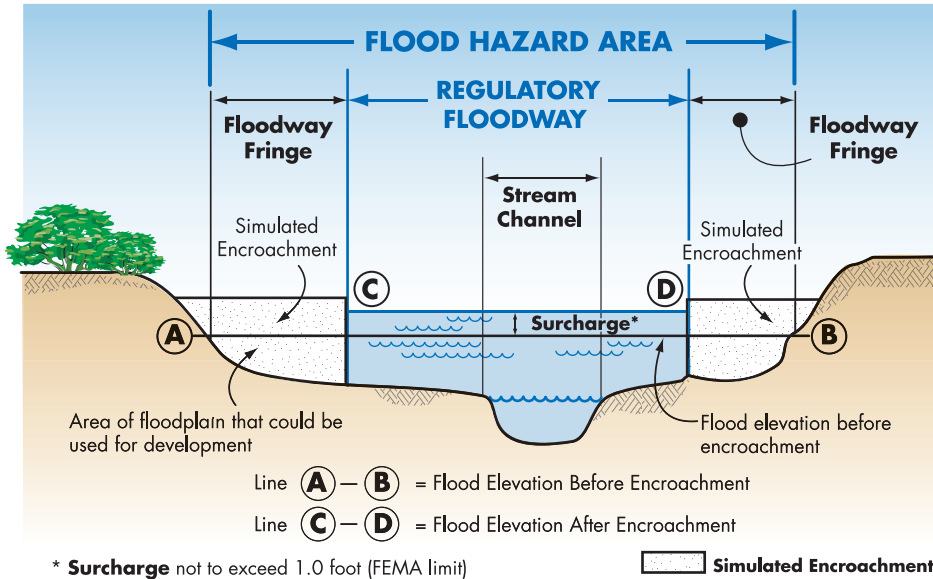
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (1% annual chance) and/or flood-related erosion hazards. SFHAs are shown on FIRMs as Zones A, AE, AH, AO, AR, and A99.

The floodplains along most streams in the Virgin Islands show approximate Zone A ([see page 10](#)), without floodways or BFEs.

[See page 12](#) to learn about the floodway, the area of the regulatory floodplain where flood waters usually are deeper and flow faster.

Understanding the FEMA Floodway



Terms and Definitions

The **Floodway** is the channel of a stream or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without cumulatively increasing flood elevations.

Computer models are used to simulate “encroachment” or development in the floodway fringe in order to predict where and how much the base flood elevation would increase if the floodway fringe is allowed to be developed.

For any proposed floodway development, the applicant must provide evidence that “no rise” in flood elevation will occur or obtain a Conditional Letter of Map Revision (CLOMR) before a local floodplain permit can be issued ([see page 19](#)). Experienced registered professional engineers must make sure proposed projects either won't increase flooding or that any increases do not impact structures on other properties.

The Regulatory Floodway "No Rise" Certification

- Floodways convey the largest volume of water and may have high velocities.
- Development is limited in regulatory floodways.
- Engineers must prepare floodway encroachment analyses to evaluate the hydraulic impact of proposed development.
- Development is not allowed unless certified to cause "no rise" (no increase) in base flood elevations.
- "No rise" certifications must be signed, sealed, and dated by a Professional Engineer licensed in the Virgin Islands and qualified to conduct hydraulic analyses.

**XYZ Engineering, Inc.,
USVI**

Mr. Floodplain Manager
1000 Main Street
USVI

Re: 1200 Jackson Street
USVI

This is to certify that I am a duly qualified Professional Engineer licensed to practice in the U.S. Virgin Islands. It is to further certify that the attached technical data supports the fact that the proposed (Name of Development) will not increase Base Flood Elevations, floodway elevations and the floodway widths on (Name of Stream) as published in the Flood Insurance Study for the U.S. Virgin Islands, dated (Date of Effective FIS).

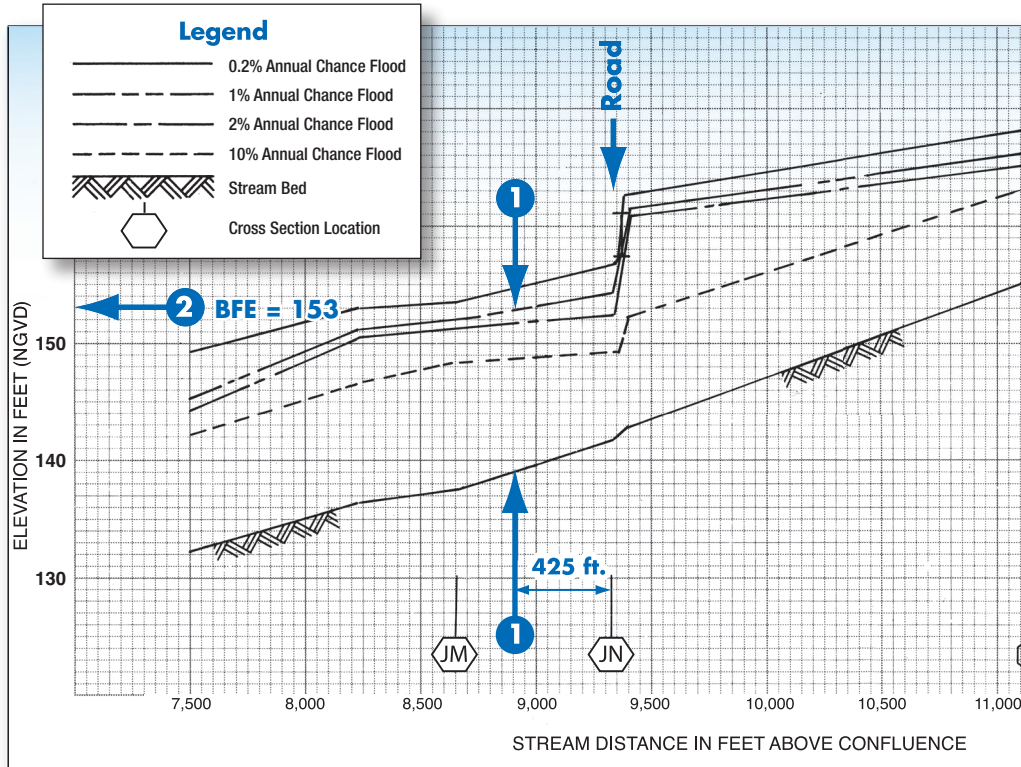
A.J. Smith P.E.



The floodway encroachment analysis must be based on technical data obtained from FEMA.

Reduce flood risk – don't build in the Floodway!

Using the Stream Flood Profile to Determine BFEs



Flood Profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1% annual chance flood (100-year).

- On the effective flood map, locate the site by measuring the distance, along the profile baseline of the stream channel, from a known point such as a road or cross section, for example, JM or JN.
- Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the BFE, to the nearest 1/10 of a foot. (Answer: 153 feet).

Floodway Data Table

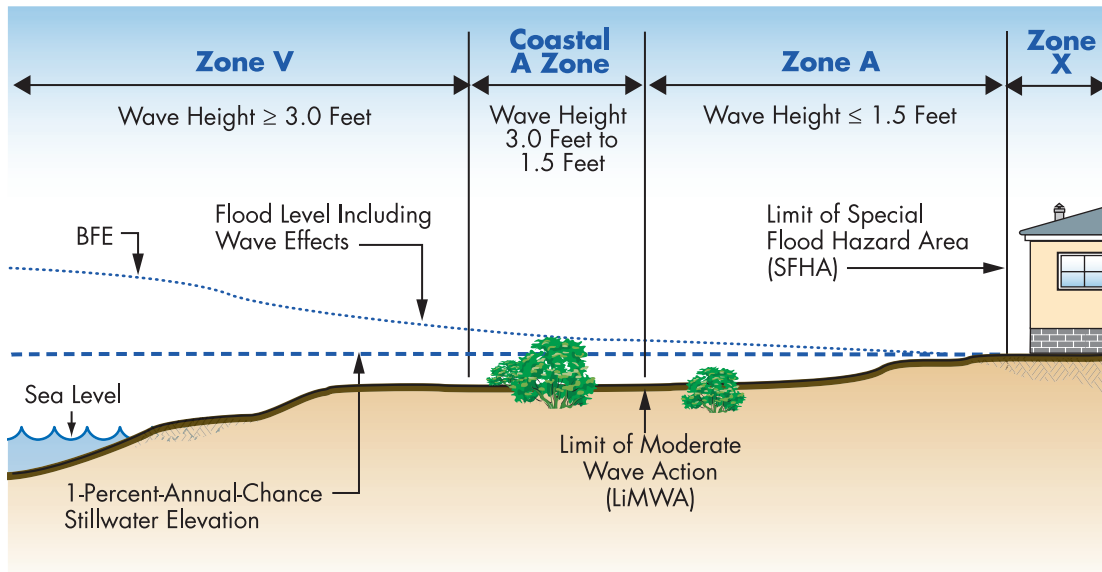
The USVI Flood Insurance Study has Floodway Data Tables for streams and guts that were studied by detailed methods that included delineation of floodways.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET LOCAL DATUM)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Turpentine Run								
A	450	580	2,078	4.2	7.1	7.1	8.0	0.9
B	1,000	270	1,382	6.3	11.8	11.8	12.5	0.7
C	1,475	198	1,927	4.5	15.0	15.0	15.9	0.9
D	1,870	242	1,609	5.4	15.7	15.7	16.5	0.8
E	2,185	155	1,250	6.9	17.1	17.1	18.1	1.0
F	2,243	165	1,009	8.6	19.5	19.5	20.4	0.9
G	3,091	120	808	10.7	24.3	24.3	24.3	0.0
H	3,631	47	473	18.3	28.9	28.9	28.9	0.0
I	3,813	115	1,511	5.7	35.0	35.0	35.0	0.0

¹Feet above confluence with Caribbean Sea.

- ① Velocity estimates based on the mean velocity data may be used to compute hydrodynamic loads.
- ② Compute BFE (rounded values are shown on FIRMs).
- ③ Elevations may not consider backwater effect from downstream river or the ocean.
- ④ Amount of allowed increase – not more than 1.0 foot at any location.

Understanding the Coastal Floodplain



Areas subject to Coastal A Zone conditions (wave heights between 3 feet and 1.5 feet) may not be shown on FIRM.

As of 2020, FEMA has not delineated a Limit of Moderate Wave Action on FIRMs in the Virgin Islands.

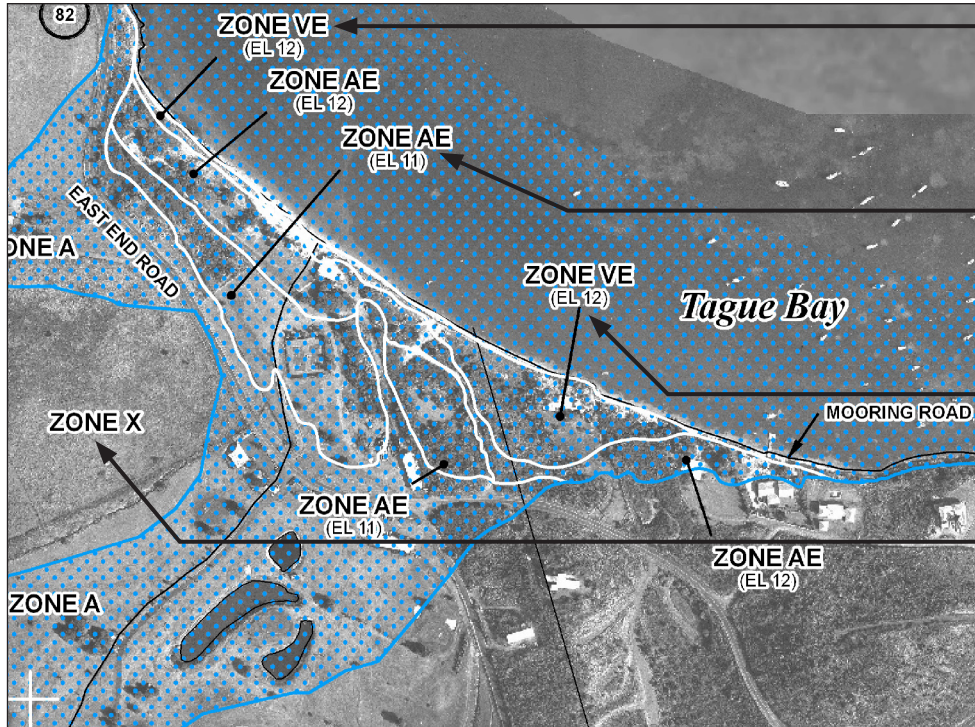


Terms and Definitions

The **Coastal High Hazard Area (Zone V)** is the special flood hazard area that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action. The area is designated on the FIRM as Zone VE.

The term **Coastal A Zone (CAZ)** refers to a portion of the SFHA landward of a Zone V or landward of an open coast without Zone V. CAZs may be subject to breaking waves between 3 and 1.5 feet high.

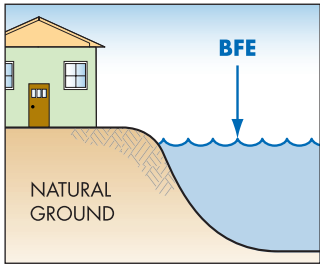
Flood Insurance Rate Map (Coastal)



- 1 Zone VE** is the 1% annual chance (100-year) floodplain where wave heights are expected to be 3 feet or more.
- 2 Zone AE** is subject to flooding by the base or 1% annual chance (100-year) flood with waves less than 3 feet high.
- 3 Base Flood Elevation (BFE)** is the water surface elevation (in feet above the local tidal datum).
- 4 Unshaded Zone X** is the area of minimal flood risk outside the 0.2% annual chance (500-year) floodplain.

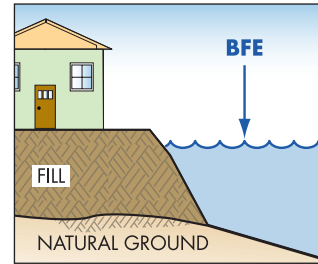
FIRM Revisions: LOMAs and LOMR-Fs

The most accurate information available is used to make flood maps, including topographic base maps and detailed engineering methods or methods of approximation. FEMA issues map revisions if technical data are submitted to support the changes.



Letter of Map Amendment (LOMA) is an official amendment to an effective FIRM that may be issued when a property owner provides additional technical information from a land surveyor, such as ground elevation relative to the BFE.

Lenders may waive the flood insurance requirement if the LOMA removes a building site from the SFHA because natural ground at the site is at or above the BFE.



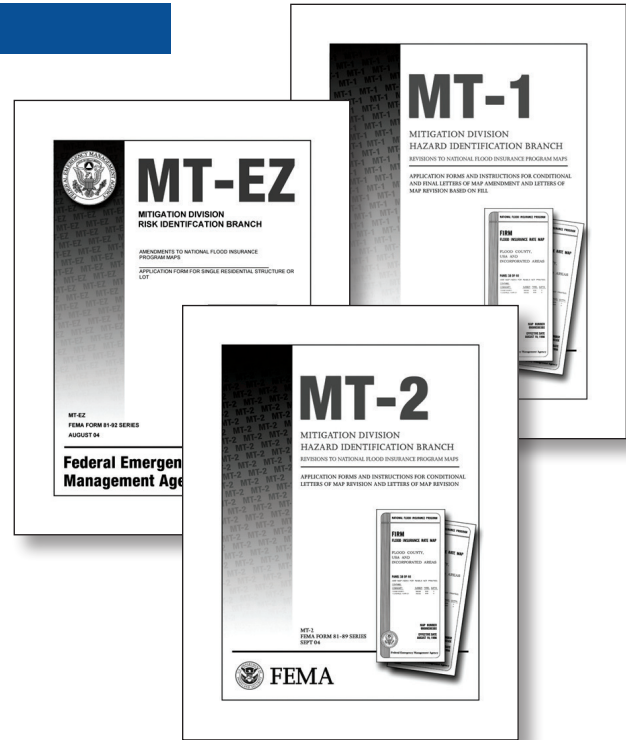
Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been

elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if the LOMR-F removes a building site from the SFHA.

Check <https://www.fema.gov/flood-maps/change-your-flood-zone> for guidance on map revisions. Access to FEMA's web-based application for land surveyors and civil engineers to submit eLOMAs is <https://hazards.fema.gov/femaportal/resources/whatiseloma.htm>.

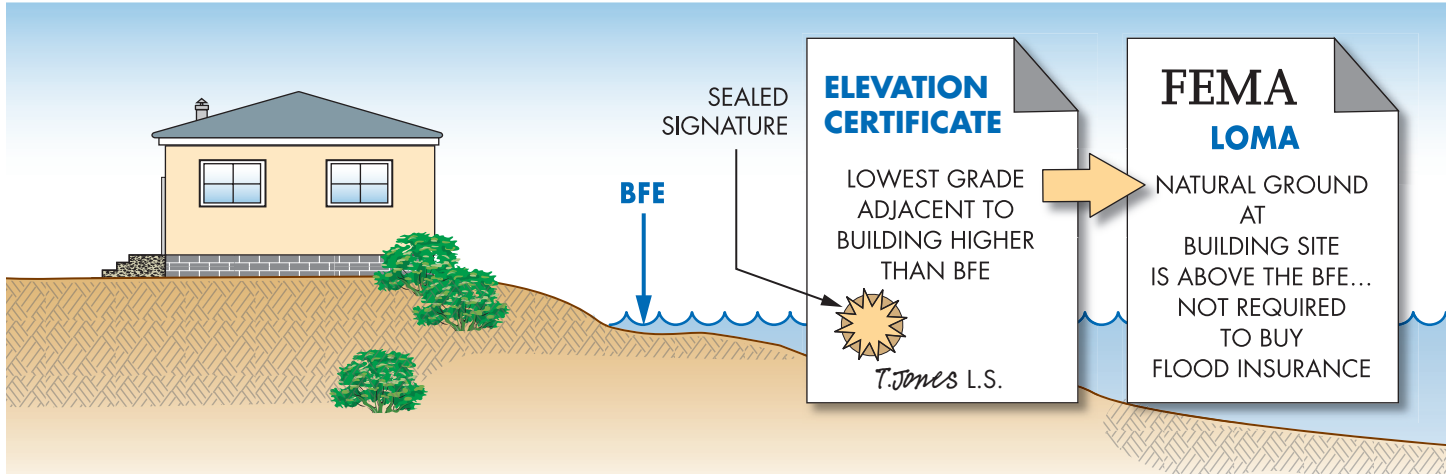
FIRM Revisions: CLOMRs and LOMRs

- **Conditional Letter of Map Revision (CLOMR)** comments on whether a proposed project, if built as shown on the submitted documentation, would meet the standards for a map revision. This evidence is needed before DPNR can issue permits for fill or alteration of a watercourse. Certificates of Occupancy/Compliance may be withheld until receipt of the final LOMR based on “as-built” documentation and certification.
- **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, special flood hazard areas and floodway boundary delineations, BFEs and/or other map features. Lenders may waive the insurance requirement if the approved map revision shows buildings to be outside of the SFHA.



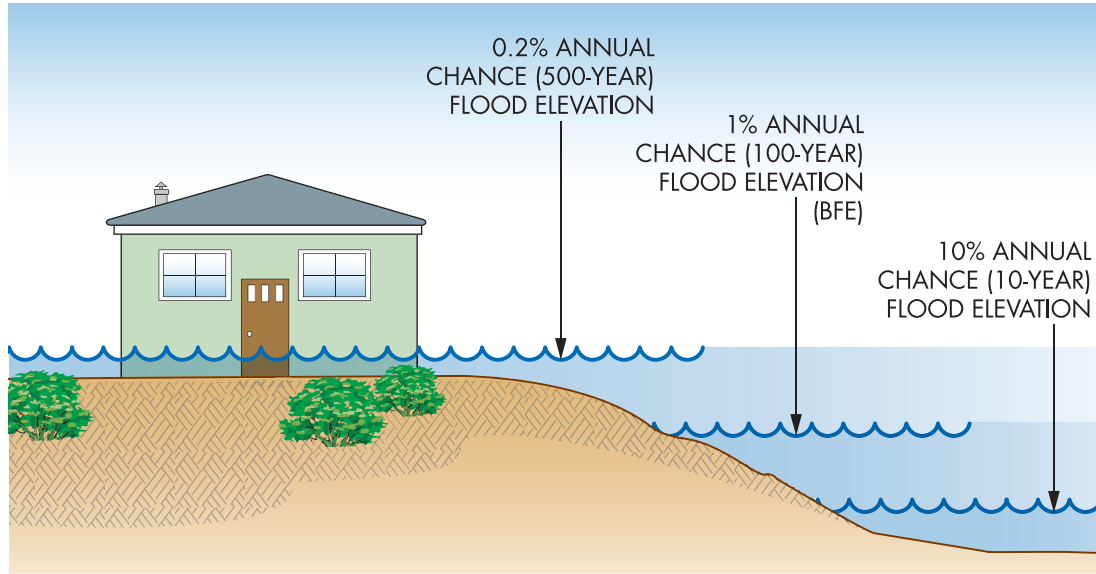
To learn more and download forms, find links by searching key words “MT-EZ,” “MT-1,” and “MT-2.”

Are Building Sites Higher than the BFE?



If land is shown on the map as “in” the SFHA, but the building site is higher than the base flood elevation (BFE)... get a USVI-licensed land surveyor or professional engineer to complete a FEMA Elevation Certificate (EC). Submit a request for a Letter of Map Amendment to FEMA along with the EC to verify that the structure is above the BFE ([see page 18](#)). If FEMA approves the request, lenders are not required to require flood insurance policies, although some may still require them. Owners should keep certificates and LOMAs with deeds— the documentation will help future buyers.

Floods Don't Always Stop at the BFE



Important

Information

Many people don't understand just how risky building in flood zones can be. There is a greater than 26% chance that a non-elevated home in the SFHA will be flooded during a 30-year mortgage period. The chance that a major fire will occur during the same period is less than 5%!

CAUTION! Major storms and flash floods can cause flooding that rises higher than the base flood elevation (BFE). Be safer – protect your home or business by avoiding flood zones or building higher. [See page 32](#) to see how this will save you money on flood insurance.

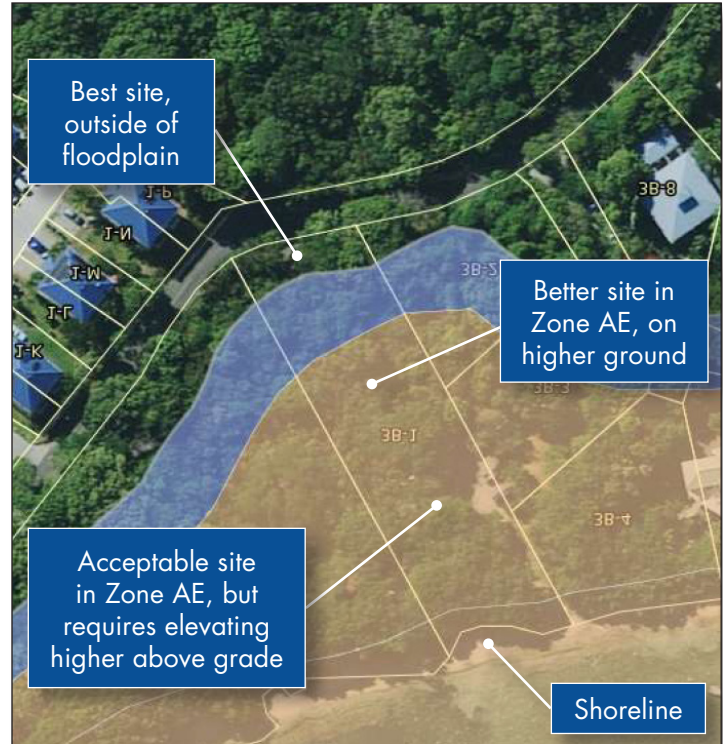
Planning Your Site: Avoid and Minimize Flood Impacts

- Locate buildings outside of mapped flood hazard areas.
- Locate buildings on highest ground available to minimize floodplain impacts and reduce potential future flooding.
- Avoid disrupting drainage patterns by elevating buildings on pilings or columns.



Important Information

Avoid using earthen fill to elevate buildings in SFHAs. Fill can block drainage and direct runoff onto neighboring properties. Using fill to elevate buildings requires removal of more vegetation than when pilings or columns are used.



Avoid Flood Hazard Areas in Subdivision Layout

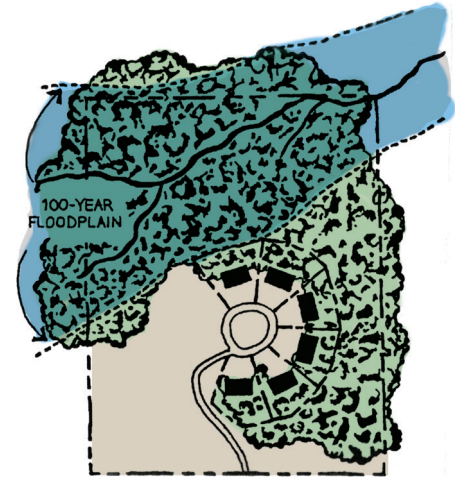


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

All land subdivided into lots, some lots partially in the floodplain, setbacks modified to keep homesites on high ground.

RECOMMENDED



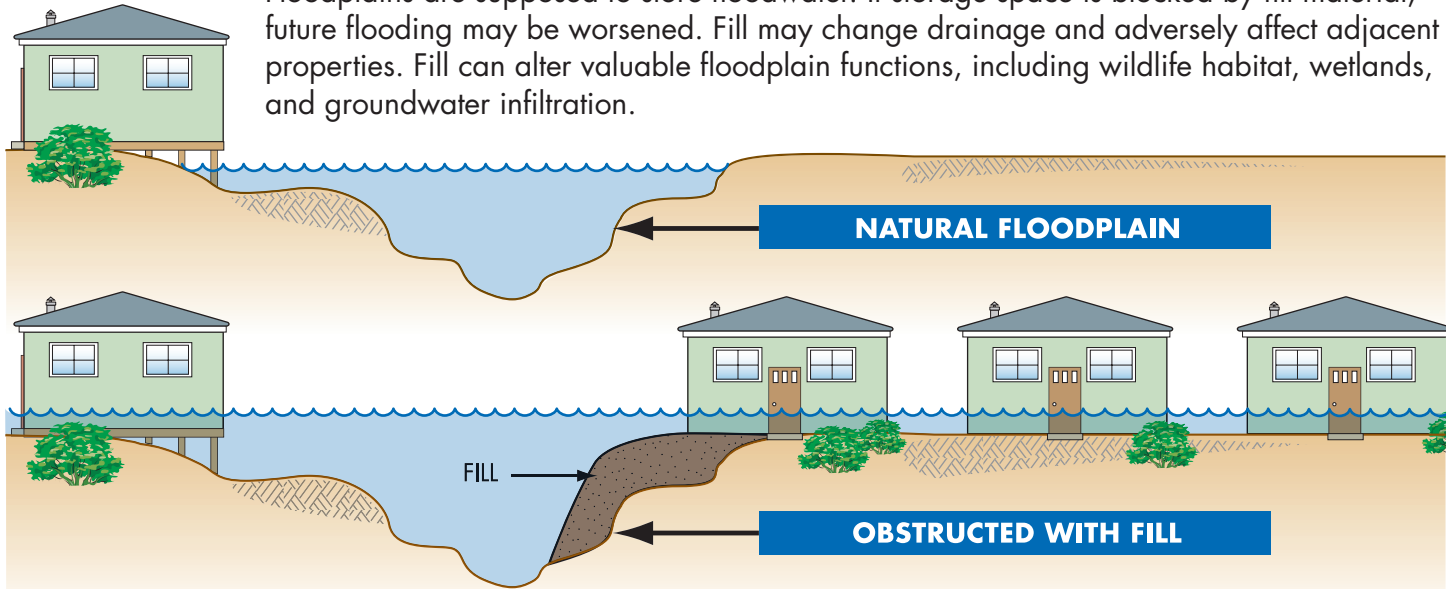
Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

Let the floodplain perform its natural function – if possible, keep it as open space. Other compatible uses: Recreational areas, playgrounds, reforestation, unpaved parking, gardens, pasture, and created wetlands.

Fill Can Adversely Affect Floodplain Functions

Floodplains are supposed to store floodwater. If storage space is blocked by fill material, future flooding may be worsened. Fill may change drainage and adversely affect adjacent properties. Fill can alter valuable floodplain functions, including wildlife habitat, wetlands, and groundwater infiltration.



Before deciding to use fill, property owners should check with DPNR district offices. Engineering analyses may be required to demonstrate that fill will cause "no rise" ([see page 13](#)).

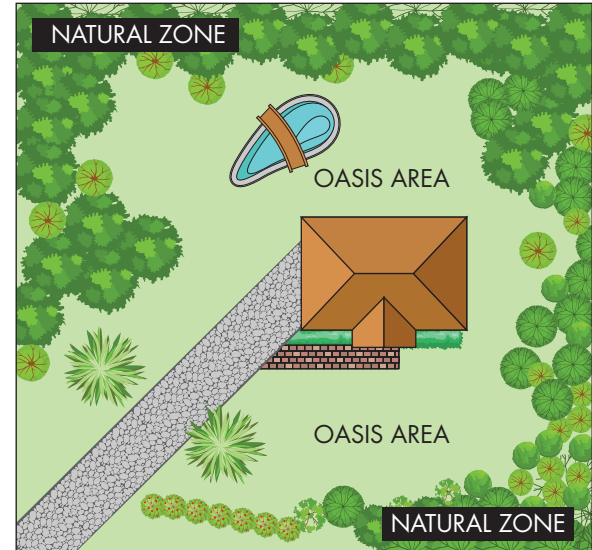
Planning Your Site: Minimize Environmental Impacts

Maintain as much pre-development vegetation as possible:

- Vegetation absorbs water and reduces the amount of stormwater runoff.
- Keep trees – permits from the Department of Agriculture may be needed to remove trees.

Maintain buffers and drainageways:

- Keep buildings and land disturbance away from streams and ghyats, at least 25 feet from the top of bank or 30 feet from the centerline, whichever is greater.
- Natural buffers help runoff soak into the ground and trap some sediment.
- Natural depressions and swales slow runoff and store water.
- Keep drainageways clear to allow high water to flow unimpeded



Planning Your Site: Minimize Impacts During Construction

Make sure your contractor has a Stormwater, Erosion and Sediment Control Plan approved by DPNR. The Plan should show:

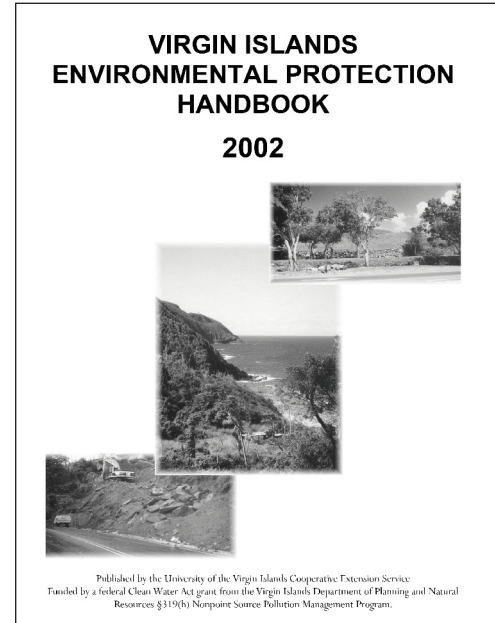
- Disturbance of the smallest area necessary for planned construction
- Sediment control practices, including silt fences and sediment traps
- Shallow grass channels or water quality swales with check dams to manage runoff from roads, parking lots, and other impervious surfaces
- Cut slopes not steeper than 2:1 (2 horizontal to 1 vertical) because steep slopes have significant potential for erosion



Important

Information

The *Virgin Islands Environmental Protection Handbook* is available at DPNR local offices and the Division of Environmental Protection.



Activities in SFHAs that Require Local Permits and Approvals

- Construction of new buildings
- Additions to buildings
- Substantial improvements of buildings
- Renovation of building interiors
- Repair of substantially damaged buildings
- Placement of manufactured (mobile) homes
- Subdivision of land
- Construction of accessory structures and placement of temporary buildings
- Construction of agricultural buildings
- Construction of roads, bridges, and culverts
- Placement of fill, grading, excavation, mining, and dredging
- Alteration of stream channels



Floodplain development or building permits must be obtained before these and **ANY** land-disturbing activities occur in flood zones.

Some Key Floodplain Permit Review Steps

The DPNR permit reviewer must check many things. Some of the key questions are:

- Is the site near a watercourse, ghut, stream, or shoreline?
- Is the site in a FEMA mapped SFHA or floodway)?
- Will applicants need other Territory or federal permits?
- Is the site reasonably safe from flooding?
- Does the site plan show the flood zone, base flood elevation and building location?
- Is substantial improvement or repair of substantial damage proposed?
- Is an addition proposed?
- Will new buildings and utilities be anchored and elevated properly?
- Do the plans show an appropriate and safe foundation?
- Are all required design certifications submitted?
- Will the owner/builder have to submit an as-built Elevation Certificate?

REVIEW CHECKLIST

- FLOODPLAIN
- FLOODWAY
- BFE
- NEW CONSTRUCTION
- IMPROVED EXISTING BUILDING
- ELEVATED
- ELEVATION CERTIFICATE
- ISSUE PERMIT

Roberto Reviewer C.F.M.

Fundamentals of Flood Resistant Construction

The flood resistant construction requirements of the NFIP and the Virgin Islands Building Code share the common objective of increasing resistance to flooding, including:

- **Foundations** capable of resisting flood loads (including dry floodproofed nonresidential buildings)
- **Structurally sound walls and roofs** capable of minimizing penetration by wind, rain, and debris
- **Lowest floors elevated** high enough to prevent floodwaters from entering during the design event
- **Equipment and utilities** elevated or designed to remain intact and be restored easily
- **Enclosures below elevated floors** limited to parking, limited storage, and building access and designed to minimize damage
- **Flood damage-resistant materials** used below elevated lowest floors

In short ... flood resistant buildings!

Flood Requirements in the Virgin Islands Building Code

The Virgin Islands Building Code is based on the International Codes®. The flood provisions of the VI building code are found in the following:

- **International Building Code:** Flood provisions are primarily in Section 1612 Flood Loads, which refers to the standard *Flood Resistant Design and Construction* (ASCE 24).
- **International Residential Code:** Flood requirements are found in several sections. Section R322 requires new dwellings and substantial improvement or repair of substantial damage to be designed and constructed in accordance with ASCE 24.
- **International Existing Building Code:** Flood requirements are in chapters with requirements for repairs, alterations, and additions. When work is determined to be substantial improvement or substantial damage, compliance is required ([see page 54](#)).



DPNR enforces the VI Building Code and the VI flood damage prevention management regulations.

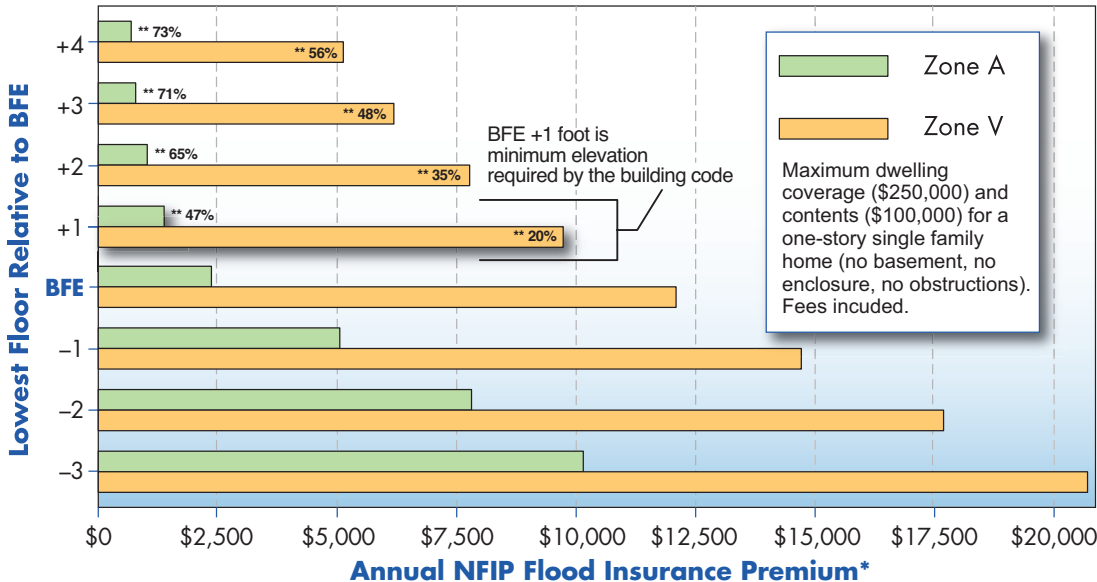
Excerpts of the flood provisions of the International Codes and “Highlights of ASCE 24” are online at <https://www.fema.gov/emergency-managers/risk-management/building-science> (Flood Publications).

Specific Requirements in the Virgin Islands Building Code

- **Lowest Floor.** Minimum BFE plus 1 foot for buildings in all flood zones
- **Critical Facilities.** Elevated or protected to the higher of BFE plus 2 feet or 500-year flood elevation
- **Local Scour and Erosion.** Must be considered for foundations in Zone V
- **Flood Openings.** Required in at least two walls of all enclosures below elevated buildings; performance of engineered flood openings emphasized
- **Mechanical equipment, plumbing, and electrical systems.** Elevated or protected against flood damage
- **Cisterns.** Overflow pipe invert located at or above the BFE and cistern and foundation designs are certified
- **Dry Floodproofing.** Permitted only for nonresidential buildings and must be designed in accordance with ASCE 24
- **Mixed Use.** Defined in ASCE 24 commentary for limitations on dry floodproofing nonresidential portions of mixed use buildings

Freeboard: Build Higher, Reduce Damage, Save on Insurance

Freeboard is additional height – a factor of safety – above the BFE. Buildings that are higher than the BFE experience less damage. The Virgin Islands Building Code requires all buildings to be elevated to at least BFE plus 1 foot. Owners of buildings elevated above the BFE also save on federal flood insurance.



* Unofficial estimates using April 2020 rates; use only for comparison purposes

** Savings over at-BFE premium



Important

Information

NOTE! Flood insurance rates and various fees change from time to time. Rather than specific costs for insurance, these figures give a feel for how much difference just a foot or two can make.

Remember! Builders must submit floor elevations as part of foundation inspections. An error of just 6 or 12 inches could more than double the cost of federal flood insurance.

DPNR may be able to grant a variance, but the owner will probably be required to buy insurance. Imagine trying to sell a house if the bank requires insurance that costs more than \$10,000 to \$20,000 a year!

Variations From Elevation Requirements

Very specific conditions related to the property (not the owner's actions or preferences) must be satisfied to justify a variance:

- Compliance would result in exceptional noneconomic hardship due to the unique conditions not common with adjacent properties
- Variance does not result in threats to public safety or extraordinary public expense
- Variance does not create a nuisance, cause fraud and victimization of the public, or conflict with other laws and regulations
- If in floodway, no increase in flood levels would result
- Applicant has shown good and sufficient cause
- Variance is the minimum necessary to provide relief



Terms and Definitions

Variance means a grant of relief from the floodplain management requirements which permits construction in a manner that would otherwise be prohibited and where specific enforcement would result in exceptional hardship.

Property owners must carefully consider the impacts of variances to build below the BFE. Not only will buildings be more likely to sustain flood damage, but federal flood insurance will be very costly ([see page 32](#)).

Carefully Complete the Permit Application

Owner's Name <i>Jones Associates</i>
Site Address, Tax#, Parcel # <i>Smith Bay Rd, St Thomas, 1-02604-0000-00</i>
A. Description of Work
1. Proposed Development Description:
<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Dredging
<input type="checkbox"/> Alteration or Repair <input type="checkbox"/> Logging
<input checked="" type="checkbox"/> Filling <input type="checkbox"/> Other
<input type="checkbox"/> Grading
B. Type of Construction
<input type="checkbox"/> New Residential <input type="checkbox"/> Improvement
<input checked="" type="checkbox"/> New Non-Residential <input type="checkbox"/> Renovation
<input type="checkbox"/> Addition <input type="checkbox"/> Accessory Structure
<input type="checkbox"/> Temporary
Applicant's Signature <i>David M. Jones</i>

Part Flood Zone Permit Application

Community Map and Elevation Data:

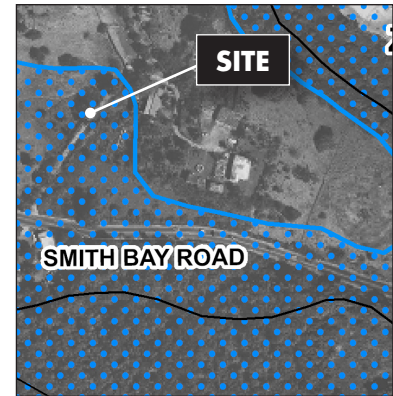
- Community No. 780000
- Panel No. 286
- Zone A
- Base Flood Elevation 3 ft. HAG
- Floodway Yes No
- Required Lowest Floor Elevation (including basement) 3 ft. HAG
- Elevation to which all attendant utilities, including all heating, duct work, and electrical equipment will be installed or floodproofed
3 ft. HAG



Important

Information

You must get all permits **before** you do work in a flood zone.



Good information will lead to better construction and less exposure to future flood damage.

DPNR Retains Flood Records Permanently

DPNR maintains certain documentation for all development in flood zones, including:

- Permits issued and variances granted
- Floodway encroachment (no rise) and watercourse alteration
- Design certifications for buildings in Zone V
- Design certifications for dry floodproofed nonresidential buildings
- Design certifications for engineered flood openings
- Determinations of whether work on existing buildings is substantial improvement or repair of substantial damage
- Surveyed “as-built” building elevations (Elevation Certificates)



Important

Information

Maintaining permanent records allows DPNR to respond to citizen inquiries and to provide documentation to FEMA as part of Community Assistance Visits.

What is the Elevation Certificate and How is it Used?

- The Elevation Certificate (EC) is a FEMA form. Go to www.fema.gov and search for "Elevation Certificate."
- The EC must be completed and sealed by a USVI-land surveyor or professional engineer.
- DPNR may complete the EC for sites in Approximate Zone A and Zone AO (see Section G of the EC).
- It can be used to show lowest grades adjacent to planned or existing building sites are above the base flood elevation and to support map changes ([see page 20](#)).
- It is used to verify building and equipment elevations.
- Insurance agents use the EC to write and rate NFIP flood insurance policies.
- [See page 71](#) for online Elevation Certificate training information

By itself, the EC cannot be used to waive the mortgage lender requirements to obtain flood insurance. [See page 18](#) to learn about FEMA's Letter of Map Amendment process.

U.S. DEPARTMENT OF HOMELAND SECURITY Federal Emergency Management Agency National Flood Insurance Program		OMB No. 1660-0008 Expiration Date: November 30, 2022
ELEVATION CERTIFICATE Important: Follow the instructions on pages 1-3.		
Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner		
SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Company NAIC Number:
City	State	ZIP Code:
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)		
A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number _____		
A8. For a building with a crawlspace or enclosure(s)		
a) Square footage of crawlspace or enclosure(s) _____ sq ft		
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A8.b _____ sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		
A9. For a building with an attached garage:		
a) Square footage of attached garage _____ sq ft		
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A9.b _____ sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		
SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION		
B1. NFIP Community Name & Community Number		B2. County Name
		B3. State
B4. Map/Panel Number	B5. Suffix	B6. I-FIRM Index Date
B7. I-FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth)
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in item B9: <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____		
B11. Indicate elevation datum used for BFE in item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1985 <input type="checkbox"/> Other/Source: _____		
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA		
FEMA Form 086-0-33 (12/19)		Form Page 1 of 6

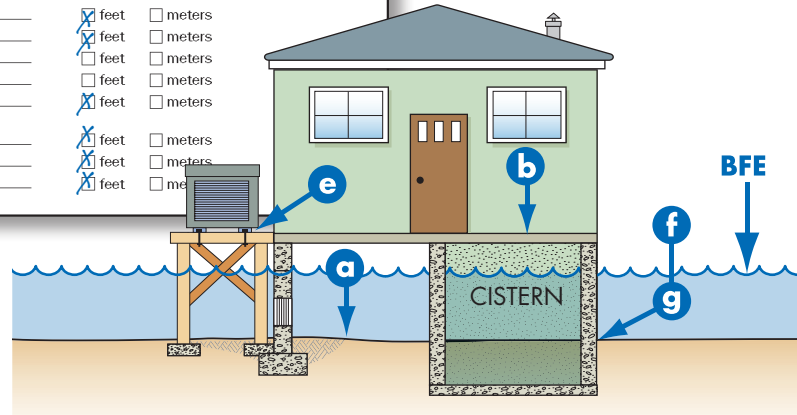
Completing the Elevation Certificate

ELEVATION CERTIFICATE (partial)

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on:	<input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input checked="" type="checkbox"/> Finished Construction *A new Elevation Certificate will be required when construction of the building is complete.
C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.	
Benchmark Utilized: _____	Vertical Datum: _____
Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>Local Tidal</u>	
Datum used for building elevations must be the same as that used for the BFE.	
	Check the measurement used.
a) Top of bottom floor (including basement, crawlspace, or enclosure floor) _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG) _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG) _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

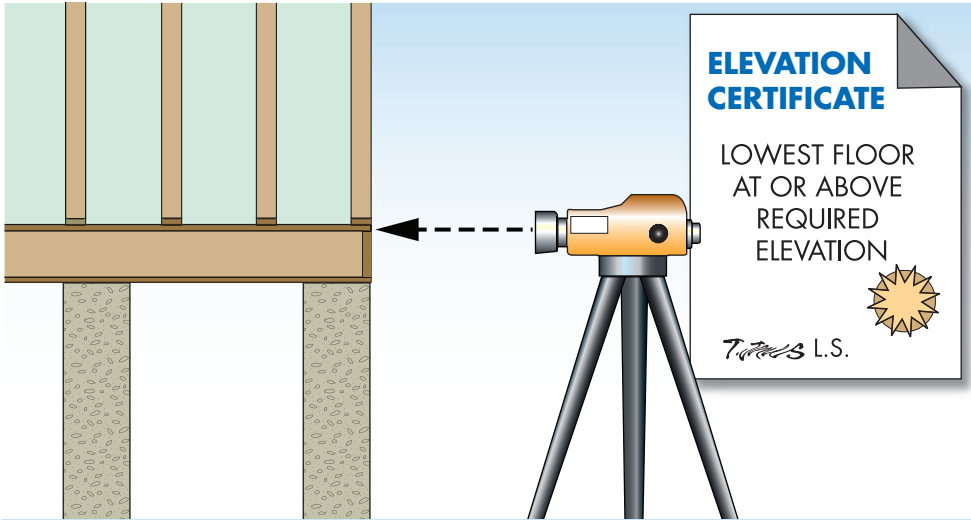
In this example, the BFE is 29.0 feet.

The house on crawlspace foundation (with flood openings) is elevated 2.5 feet above the BFE.



The building code requires submission of elevation documentation two times, when the lowest floor is set and prior to further vertical construction and again prior to the final inspection. A USVI-licensed land surveyor or professional engineer must fill out and seal the EC form (except in zones without BFEs). The EC includes diagrams for different building types. Several points must be surveyed.

Paperwork is Important for Owners



Important

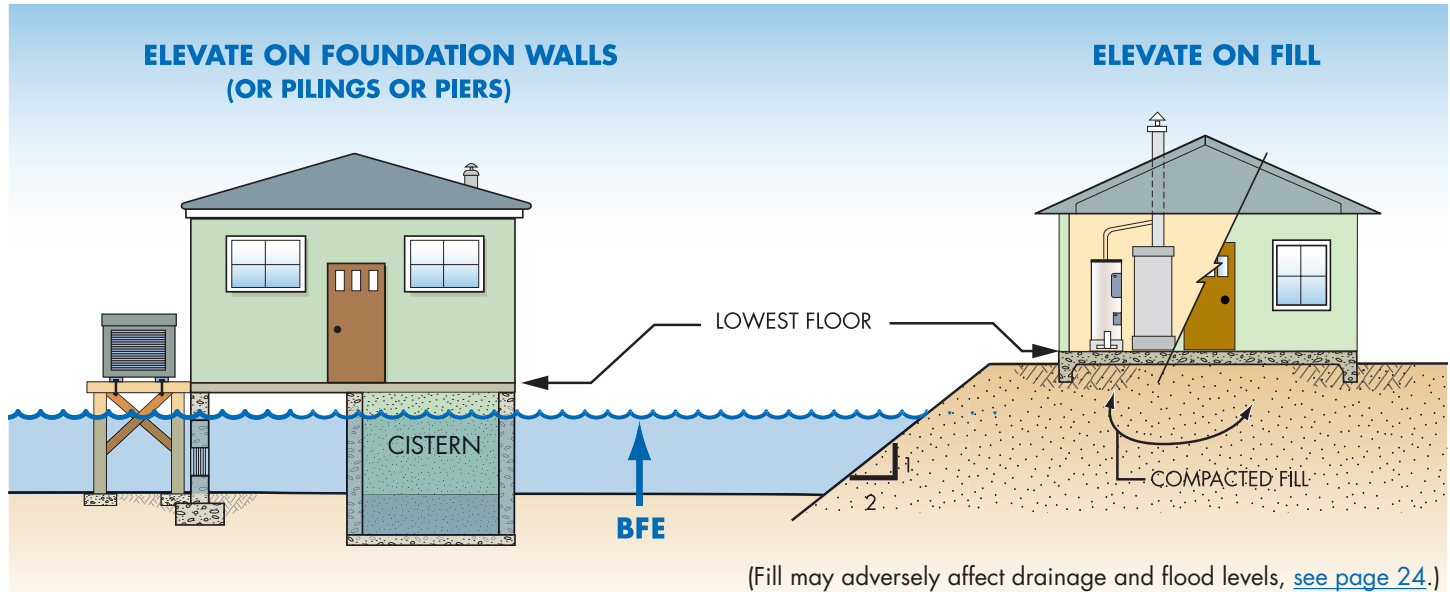
Information

Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure (that is not a basement) is not the lowest floor if the enclosure is limited to parking, limited storage, and building access ([see page 40](#)) and it is built as required in the Virgin Islands Building Code.

Permittees must submit Elevation Certificates after the lowest floor (or lowest horizontal structural member) is placed and prior to further vertical construction. When construction is finished, another Elevation Certificate ("as-built") must be submitted prior to the final inspection.

Owners should keep Elevation Certificates in a safe place. They can be used to demonstrate buildings were compliant at the time of construction. Also, Elevation Certificates may be required to obtain federal flood insurance policies.

How to Elevate Buildings in Flood Zone A/AE

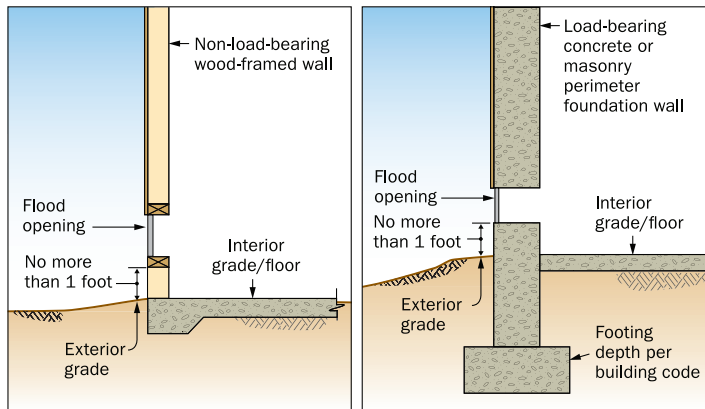


CAUTION! Enclosures (including crawlspaces) have some special requirements ([see page 40](#)).
[See page 48](#) for details about cisterns under elevated buildings.
Fill used to elevate buildings must be placed properly ([see pages 24](#) and [41](#)).

Enclosures Below the Lowest Floor (Zone A/AE)

Enclosures below the lowest floor may be formed by load-bearing concrete or masonry perimeter foundation walls or by wood-framed walls under buildings supported on columns.

- The VI Building Code requires the Lowest Floor at or above BFE plus 1 foot. DPNR recommends another foot or more for greater protection.
- All materials below the lowest floor must be flood resistant.
- Interior grade must be equal to or higher than exterior grade on at least one side.
- Flood openings must provide 1 square inch of net open area for every square foot of area enclosed by the perimeter walls – or certified engineered openings may be used.
- The bottom of flood openings must be no more than 12 inches above the higher of the interior or exterior grades.
- Standard air ventilation units must be permanently disabled in the “open” position to allow water to flow in and out (typical unit provides 42 to 65 square inches of opening).
- A 30' x 40' enclosure needs 1,200 square inches of net opening (non-engineered).

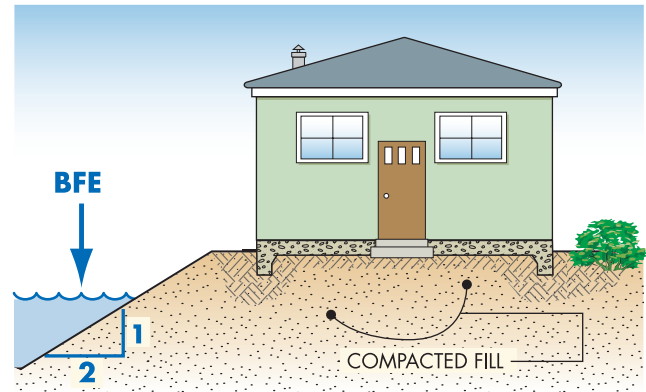


To learn more about flood openings, see NFIP Technical Bulletin #1
Requirements for Flood Openings in Foundation Walls and Walls of Enclosures.

Placement and Compaction of Fill in Zone A/AE

Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet requirements, fill should:

- Not be placed in areas with poor drainage or where the fill may divert water onto adjacent properties. Instead, use perimeter walls, piers or pilings to minimize drainage problems.
- Be good clean soil, free of large rocks, construction debris, and woody material (stumps, roots)
- Be machine-compacted to 95 percent of the maximum density (determined by a design professional)
- Have graded side slopes that are not steeper than 2:1 (one foot vertical rise for every 2 feet horizontal extent); 3:1 flatter slopes are recommended
- Have slopes protected against erosion (vegetation for “low” velocities, durable materials for “high” velocities – determined by a design professional)
- Avoid the floodway ([see page 13](#))




Engineers can find more information in FEMA’s instructions for Letters of Map Revision based on Fill (FEMA Form MT-1) and NFIP Technical Bulletin #10.

General Requirements in Coastal High Hazard Areas (Zone V)

The fundamental requirements for flood resistant construction ([see page 29](#)) apply in Zone V and:

- Building foundations must be “open” (columns and pilings) to allow waves and water to pass under without imposing significant wave forces ([see page 43](#)). Shear walls may be used for multi-story buildings where columns do not provide adequate lateral resistance to wind loads.
- The lowest horizontal structural member of the lowest floor must be elevated to or above the BFE + 1 foot ([see page 43](#)).
- Foundation designs must be prepared and certified by registered design professionals ([see pages 44](#) and [47](#)).

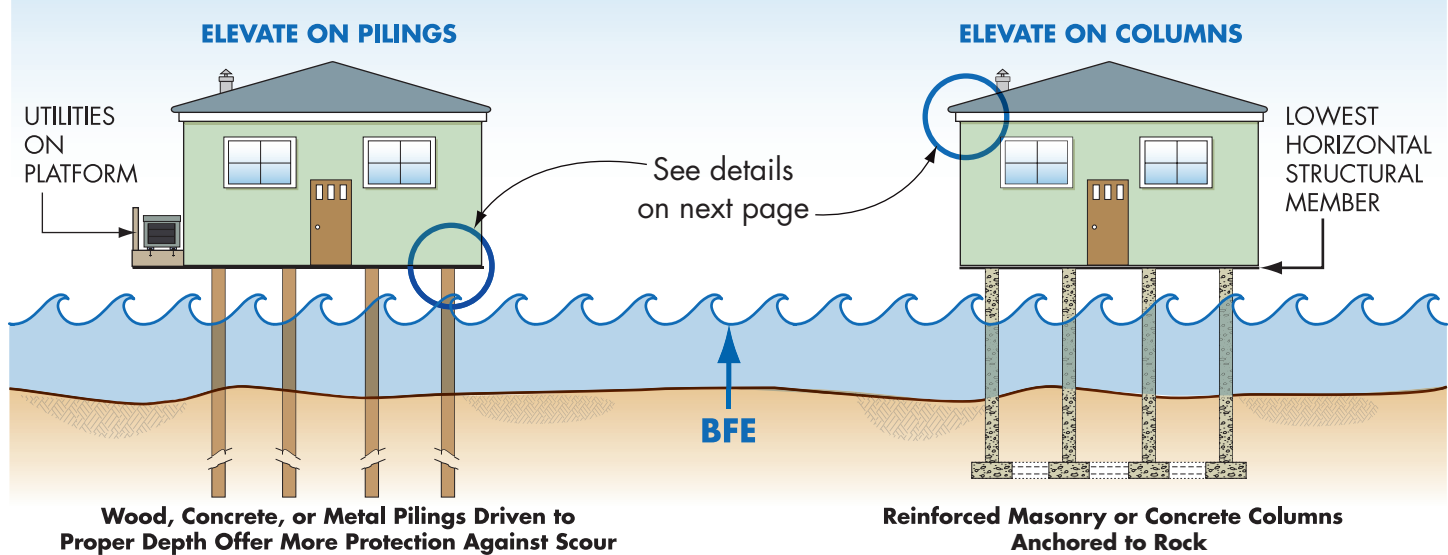


Terms and Definitions

Coastal High Hazard Areas (Zone V) are shown on FIRMs to identify areas subject to high velocity wave action during base flood conditions. In Zone V, waves may be 3 feet high or higher.

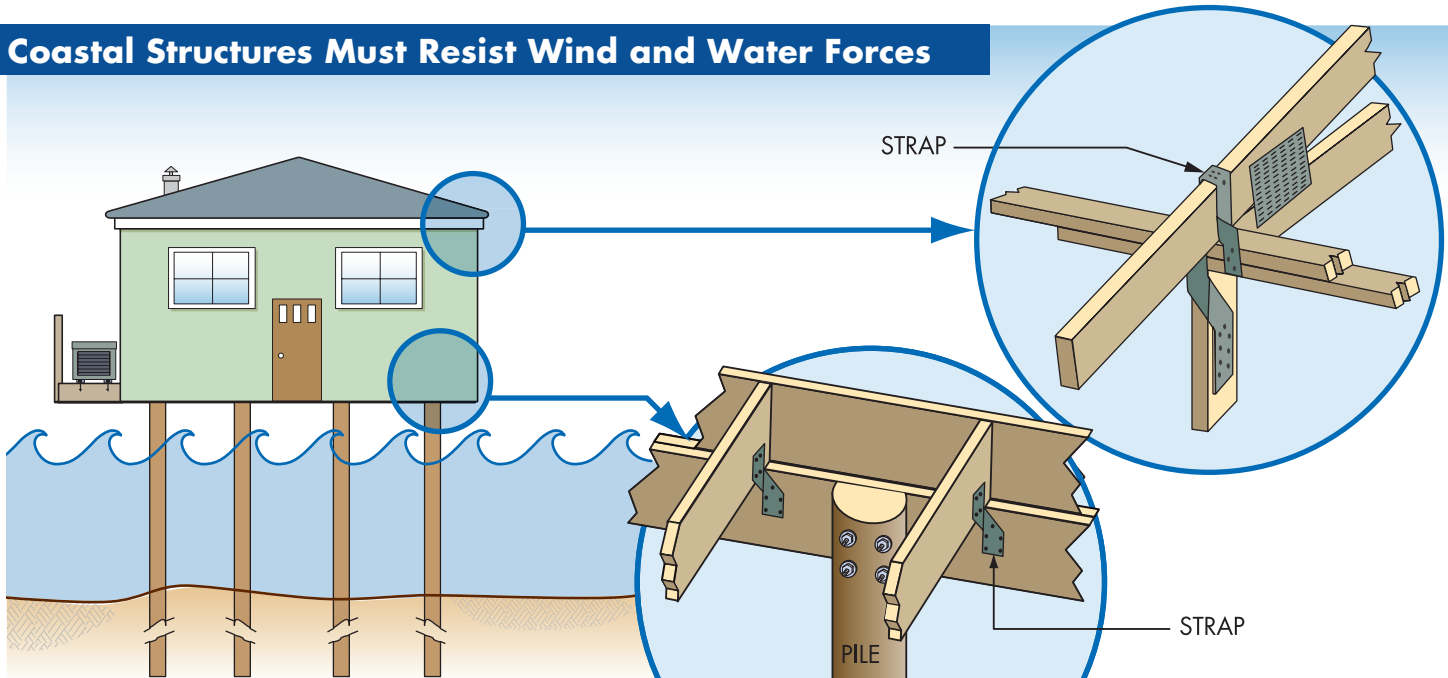
Some Zone AE areas inland of Zone V may be subject to damaging waves and erosion. DPNR recommends buildings in these areas be designed and constructed according to the Zone V requirements.

How to Elevate Buildings in Flood Zone V



In Zone V, the design specifics will be determined by an architect or engineer based on the site, including how the building will be elevated and how deep the foundation elements will be in the ground. A *Zone V Design Certificate* or statement will be required ([see page 47](#)). For more information, see FEMA P-499, *Homebuilder's Guide to Coastal Construction*.

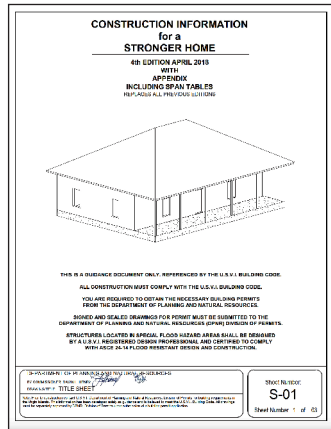
Coastal Structures Must Resist Wind and Water Forces



Structural building components must be connected together to transfer forces in a continuous load path from the roof to the foundation and the ground. The details above are some examples of how this is done. Buildings in SFHAs must be designed by registered design professionals in accordance with the VI Building Code. The design guidance in *Construction Information for a Stronger Home* may apply to many homes ([see page 45](#)).

Construction Information for a Stronger Home

The Virgin Islands Building Code references *Construction Information for a Stronger Home*, guidance developed specifically to address wind loads and seismic design in the Territory. As of mid-2020, the 4th Edition published in April 2018 is in effect. The *Stronger Home* guidance is based on the 2018 International Codes, which are the basis for the VI Building Code. Users should always verify the current, effective edition is used for design.



The *Stronger Home* guidance has foundation, framing, masonry wall, floor framing, and roofing details and specifications for materials and connectors to help design professionals satisfy building code requirements.



Important

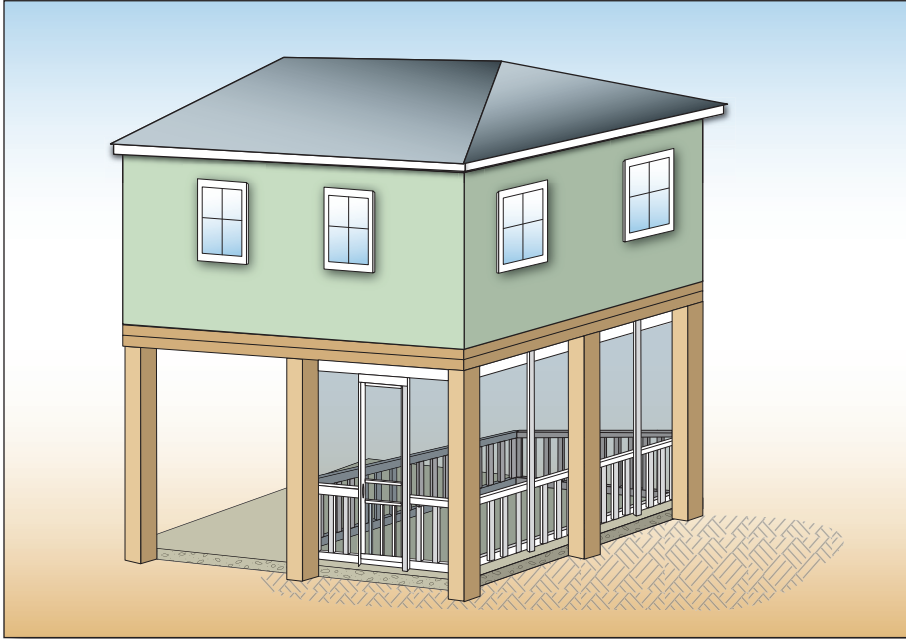
Information

The *Stronger Home* guidance can be used only when homes will be within the parameters specified, including mean roof height, roof type, building length and width, and other limitations. The guidance does not address all building design requirements

Download from
<https://dpr.vi.gov>
(Building Permits)

The *Stronger Home* guidance specifically states that structures located in SFHAs “shall be designed by a U.S.V.I. registered design professional and certified to comply with ASCE 24-14 *Flood Resistant Design and Construction*.”

Areas Under Elevated Buildings in Zone V

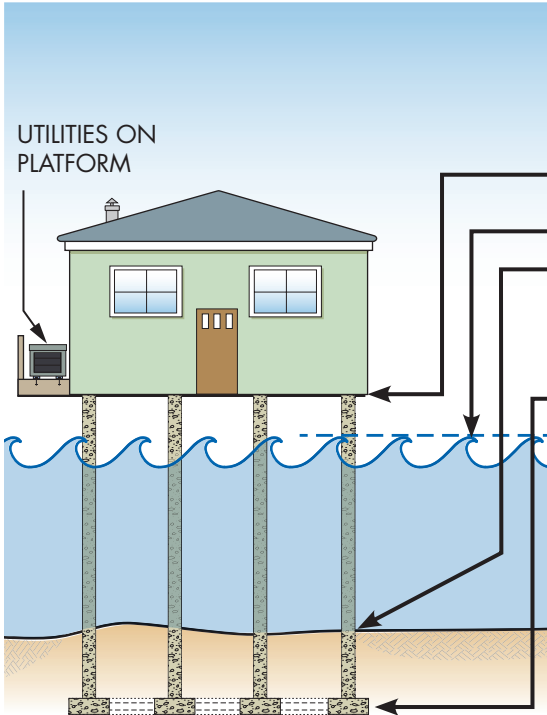


Under elevated buildings in Zone V:

- Areas may be enclosed only by insect screening, lattice work, or decorative screening that will break away under floodwater and wave conditions without causing damage to the piling or column foundation of the building.
- Utility wires and pipes must be attached to the piling or column foundation, preferably on the inland side to minimize damage by floating debris.

It is a violation to build solid walls to enclose areas under below elevated buildings in Zone V.

The Zone V Design Certificate



ZONE V DESIGN CERTIFICATE (Partial) SECTION II: Elevation Information Used for Design

1	Datum.....	<input type="checkbox"/> NGVD	<input type="checkbox"/> NAVD	<input checked="" type="checkbox"/> Other
2	Elevation of the Bottom of Lowest Horizontal Structural Member	14	feet above datum	
3	Base Flood Elevation (BFE).....	12	feet above datum	
4	Elevation of Lowest Adjacent Grade	6	feet above datum	
5	Approximate Depth of Anticipated Scour/Erosion used for Foundation Design.....	1.5	feet	
6	Embedment Depth of Pilings or Foundation Below Lowest Adjacent Grade.....	8'	feet	

A USVI-licensed engineer or architect must review and/or prepare the building design and complete a *Zone V Design Certificate* for any new construction, substantial improvement, and the repair of a substantially damaged structure. An "as-built" Elevation Certificate is required when construction is completed.

Cisterns Under Elevated Buildings in SFHAs (Zone A/AE)

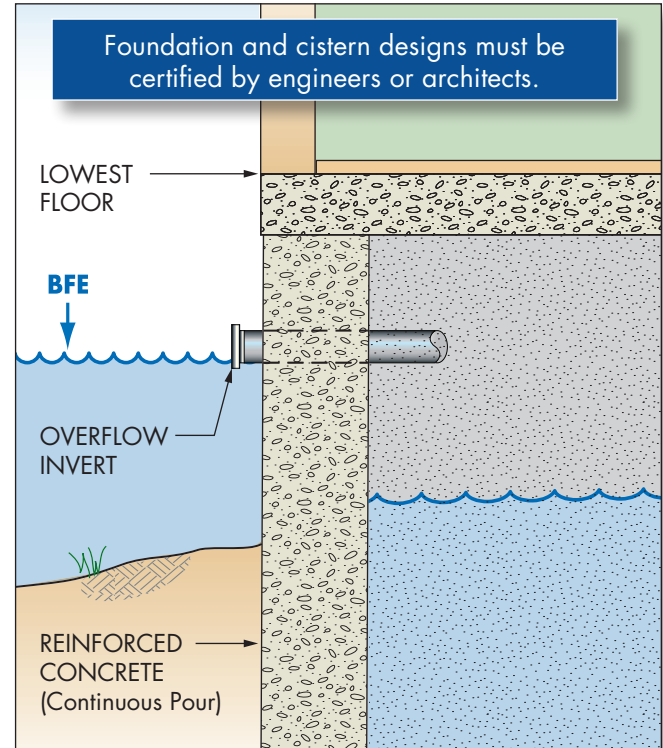
Buildings must have cisterns if they are not connected to a public potable water supply or if water from a safe, palatable well water is not available. Many cisterns are installed under homes. Above ground cisterns are not permitted in special flood hazard areas identified as Zone VE because the cisterns would be obstructions to the flow of water and waves under elevated buildings.

In special flood hazard areas identified as Zone A/AE:

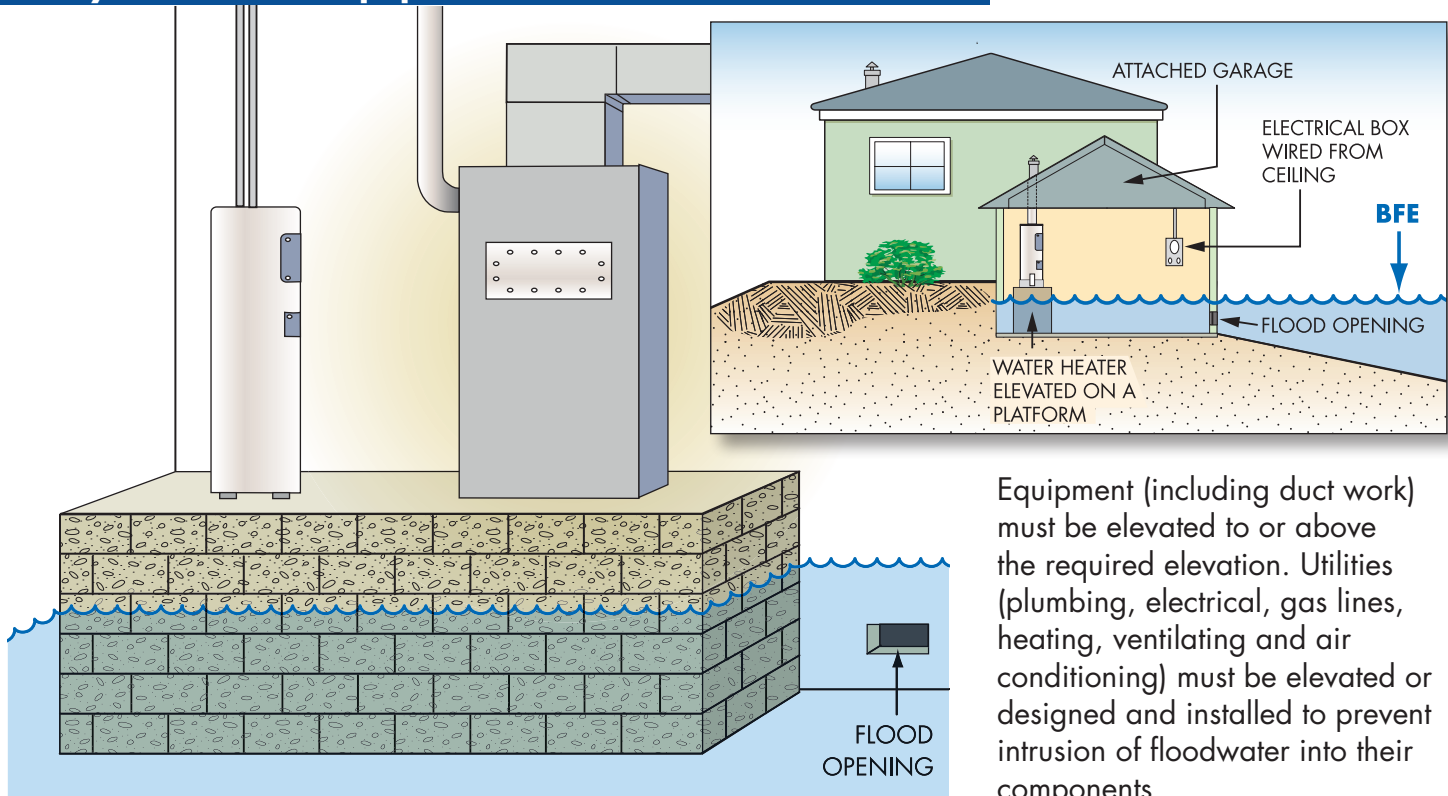
- The invert of a cistern overflow pipe must be at or above the BFE.
- The top of the lowest floor must be at least 12 inches (preferably 18 inches) above the overflow invert.

Terms and Definitions

A **cistern** is a facility used to store water that is part of the water supply system of a building.

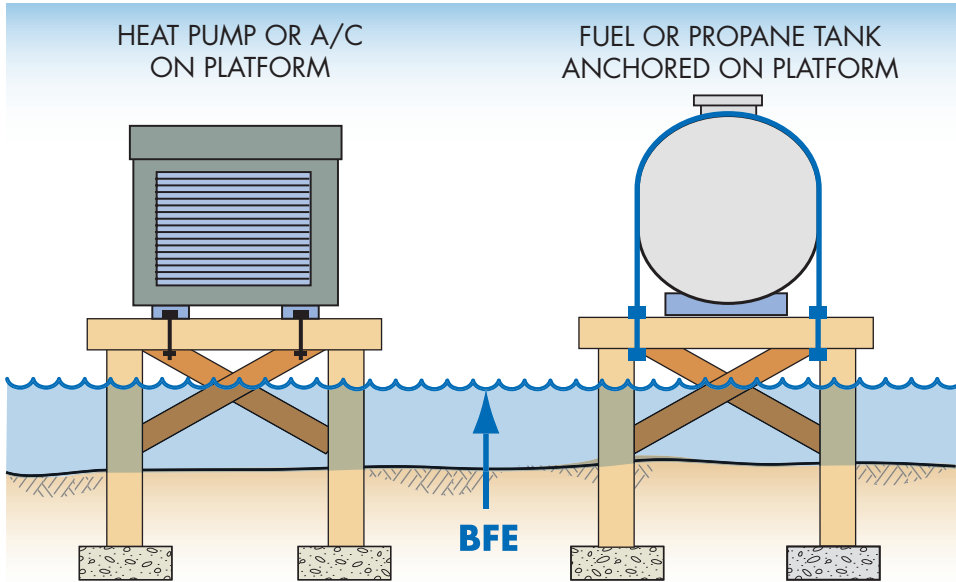


Utility Service and Equipment Inside Enclosures



Equipment (including duct work) must be elevated to or above the required elevation. Utilities (plumbing, electrical, gas lines, heating, ventilating and air conditioning) must be elevated or designed and installed to prevent intrusion of floodwater into their components.

Utility Service, Equipment, and Tanks



Important

Information

Fuel and propane tanks may explode or release contents during flooding. Even shallow water can create large buoyant forces on tanks. In all flood zones tanks may be underground or elevated on platforms or columns. In Zone A/AE only, tanks may be at-grade and anchored to resist flood loads.

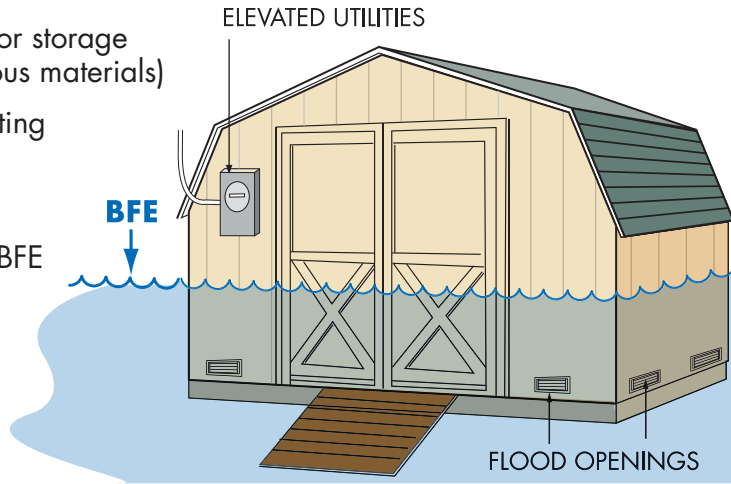
The building code has requirements for tanks in ASCE 24.

Whether inside an attached garage or outside the building, all utilities and equipment must be elevated above required elevation or protected against flood damage. Utilities include plumbing, electrical components, gas lines, tanks, and heating and air conditioning equipment.

Accessory Structures

If not elevated, accessory structures in flood zones must:

- Not be habitable
- Be used only for parking or storage (not pollutants or hazardous materials)
- Be anchored to resist floating
- Have flood openings
- Be built of flood damage-resistant materials below BFE
- Have elevated utilities below BFE
- Not be modified for different use in the future



Terms and Definitions

Accessory Structure

is a structure that is accessory to and incidental to that of a primary structure located on the same lot that is either:

1. Solely for the parking of no more than two vehicles.
2. A storage shed that is less than 200 square feet in size.

Even small buildings are “development” and permits or variances with noted conditions are required. They must be elevated or anchored and built to withstand flood damage.

Caution! Remember, everything inside will get wet when flooding occurs.

Agricultural Structures

The Board of Land Use Appeals may grant variances to allow certain agricultural structures to be “wet floodproofed” rather than elevated or dry floodproofed. FEMA specifies:

- Variances must be granted for individual agricultural structures
- Applicants must justify variances, including low damage potential and the anticipated hardship if variances are not granted
- Except for size limits, the accessory structure requirements also apply to agricultural structures ([see page 51](#))

FEMA issued a policy on agricultural structures and accessory structures in early 2020. The policy, a floodplain management bulletin, and fact sheets are available on FEMA's web site. Contact the DPNR Floodplain Manager with questions.



Important

Information

Agricultural Structure is defined by FEMA policy as a structure that is used exclusively in connection with the production, harvesting, storage, raising, or drying of agricultural commodities and livestock. Aquaculture is farming conducted in or over water. Structures used for human habitation are not agricultural structures, even when located on agricultural land.

Manufactured Homes and Recreational Vehicles

There are very few manufactured homes and recreational vehicles in the Virgin Islands. Manufactured homes have to be designed, constructed, and installed to resist high wind hazards present throughout the Territory. There are few if any locations that allow recreational vehicles, even for recreational, camping, and seasonal use.

For floodplain management purposes, if proposed to be located in special flood hazard areas:

- Manufactured homes would have to comply with the building code requirements for dwellings, including permanent foundations and lowest floors elevated to above the BFE plus 1 foot.
- Recreational vehicles would have to be licensed as vehicles, be self-propelled or towable by light-duty trucks, and have quick-disconnect sewage, water, and electrical connectors. Recreational vehicles must not be used as dwellings.



After Hurricanes Irma and Maria in 2017, inspection teams reported many manufactured homes experienced near-total damage cause by high winds.

Improvements and Repairs of Buildings in Flood Zones

Permits to improve and repair buildings are required. DPNR must:

- Review costs estimated in construction contracts or other cost estimates (including estimate market value of owner labor and donated labor and materials).
- Estimate the market value using property assessment records or use an independent assessment of market value performed by a licensed appraiser.
- Compare the cost of improvements and repairs to the market value of the building.
- Require buildings to be brought into full compliance if the improvement costs equal or exceed 50% of the market value, called Substantial Improvement.
- Require damaged buildings to be brought into full compliance if the costs to repair to pre-damage condition equal or exceed 50% of the market value, called Substantial Damage
- Encourage owners to consider other ways to reduce future damage if the comparison is less than 50% ([see page 66](#)).



Important

Information

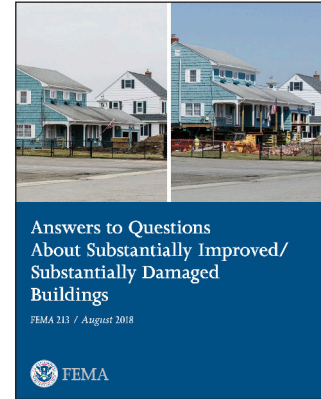
Improvements include:

- Renovation/rehabilitation of the interior of the existing building ([see page 59](#))
- Lateral addition, without renovation or structural alteration of the existing building ([see page 60](#))
- Lateral addition, with renovation or structural alteration of the existing building ([see page 61](#))
- Vertical addition (add new story)

FAQs About Substantial Improvement and Substantial Damage

FEMA's *Answers to Questions about Substantially Improved/Substantially Damaged Buildings* (FEMA 213) is a good resources for citizens, elected officials, members of appointed boards, contractors, and real estate and insurance professionals. Each question refers the reader to sections in the *SI/SD Desk Reference* (FEMA P-758) for more details.

- Who makes the substantial improvement and substantial damage determinations?
- What is required when a building is substantially improved or substantially damaged?
- How is market value determined and how are costs of improvements and repairs determined?
- How are NFIP flood insurance rates affected?



Terms and Definitions

Substantial Improvement means any reconstruction, rehabilitation, alteration addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement.

Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Estimating Costs of Improvements and Repairs

The costs of improvements (or the costs to repair damaged buildings to pre-damage condition) must be estimated before determining whether proposed work constitutes Substantial Improvement or repair of Substantial Damage.

- **Include** costs of all structural elements, all interior and exterior finishes, built-in appliances, all utility and service equipment
- **Include** site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements)
- **Include** costs of demolition, construction management, contractor overhead and profit
- **Exclude** costs of plans and specifications, land survey, permit and inspection fees, and debris removal
- **Exclude** costs of outside improvements (landscaping, irrigation, sidewalks, driveways, fences, yard lights, pools, detached accessory structures, etc.)



Important Information

Written estimates prepared by contractors provide the best cost information.

Owners performing work must include estimates of the value of their own labor.

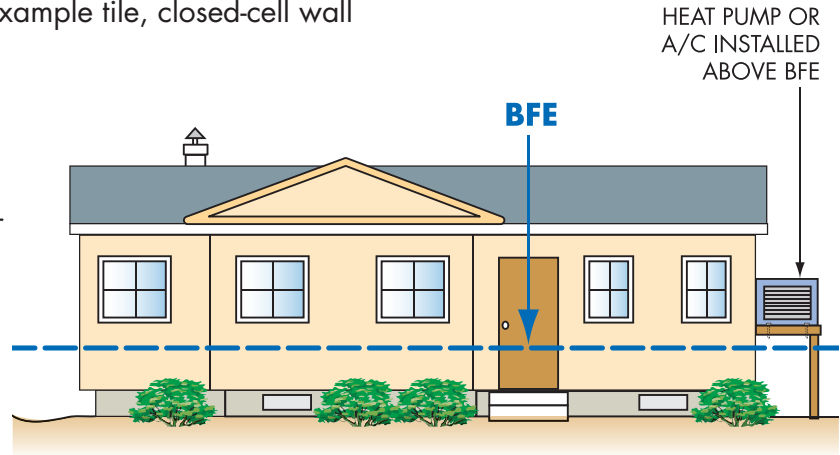
Equivalent costs must be estimated when materials are donated or volunteers help with construction.

For more details on cost items that must be included and those that are excluded, see Answers to Questions on [page 55](#).

Non-Substantial Improvements Other than Additions

Proposed improvements are “non-substantial” if the costs are less than 50% of the market value of the building. In these cases, buildings are not required to be brought into compliance. However, there are many things owners can do to reduce exposure to future flooding. Owners should consider the following:

- Use flood damage-resistant materials, for example tile, closed-cell wall insulation, and polyvinyl wall coverings
- Raise air conditioning equipment, heat pumps, furnaces, water heaters, and other appliances on platforms
- Move electric outlets higher above the floor
- Add flood openings to crawlspace foundations
- Move ductwork out of crawlspaces
- Fill in below-grade crawlspace

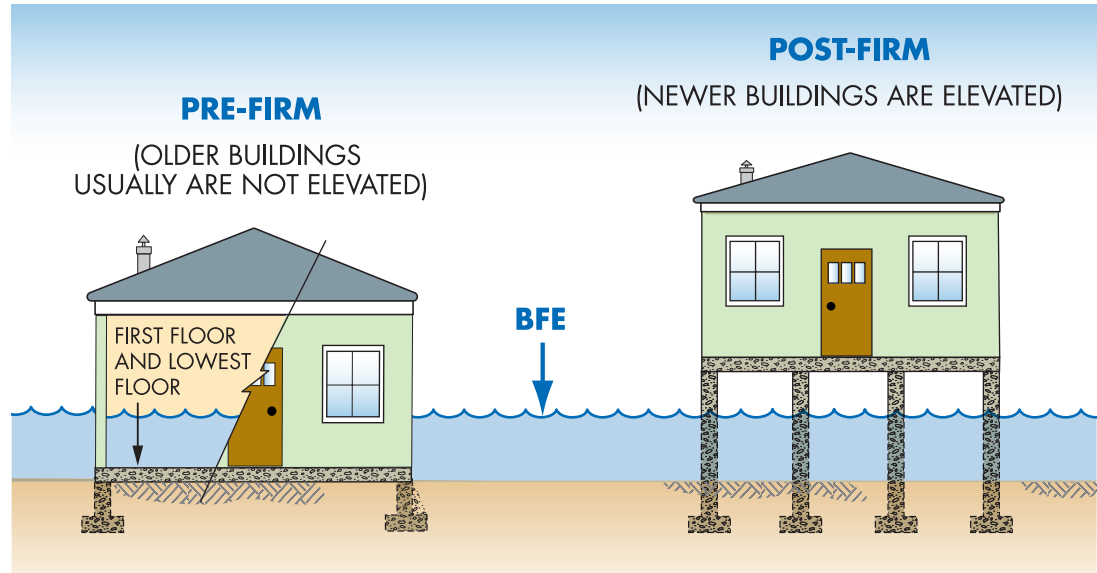


Note! ALL proposed work must be included in permit applications. If more work is proposed or undertaken after a permit is issued, DPNR must determine whether the additional work changes the substantial improvement determination.

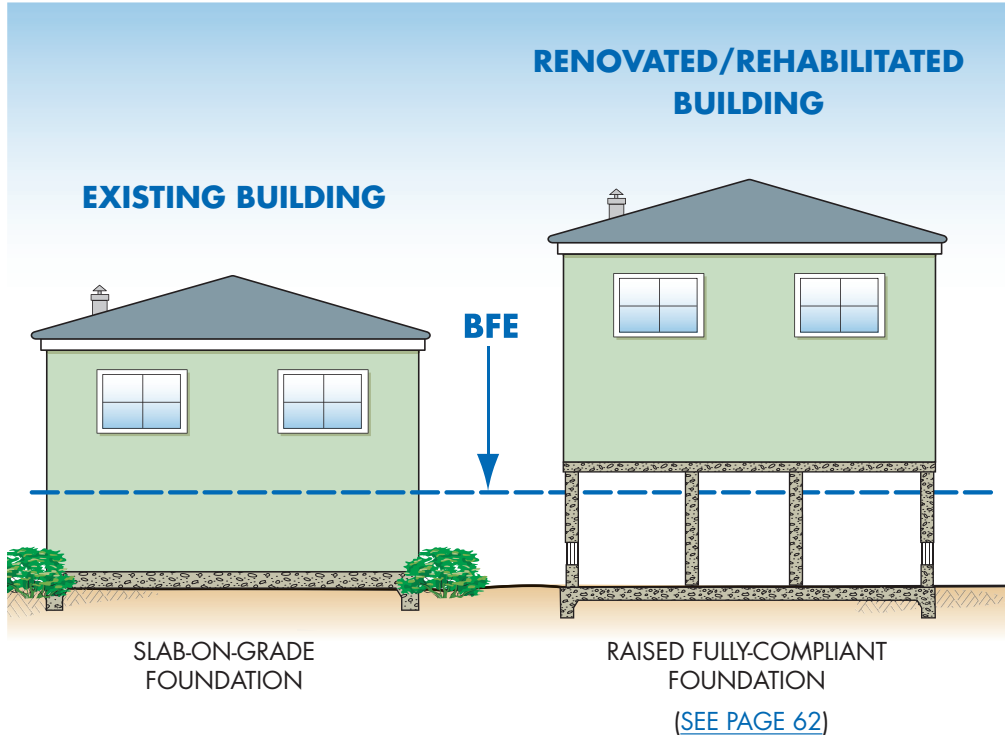
What is Meant by Pre-FIRM and Post-FIRM?

Pre-FIRM and **Post-FIRM** are insurance terms tied to the USVI's initial Flood Insurance Rate Map. The terms are used to determine federal flood insurance rates. Although common, the terms should not be used to distinguish between new construction built before the Territory joined the NFIP and those built after.

The Virgin Islands Building Code specifies when permits are required for work on existing buildings. Buildings must be brought into compliance when work is determined to be substantial improvement or repair of substantial damage.



Substantial Improvement: Renovation Only



Important

Information

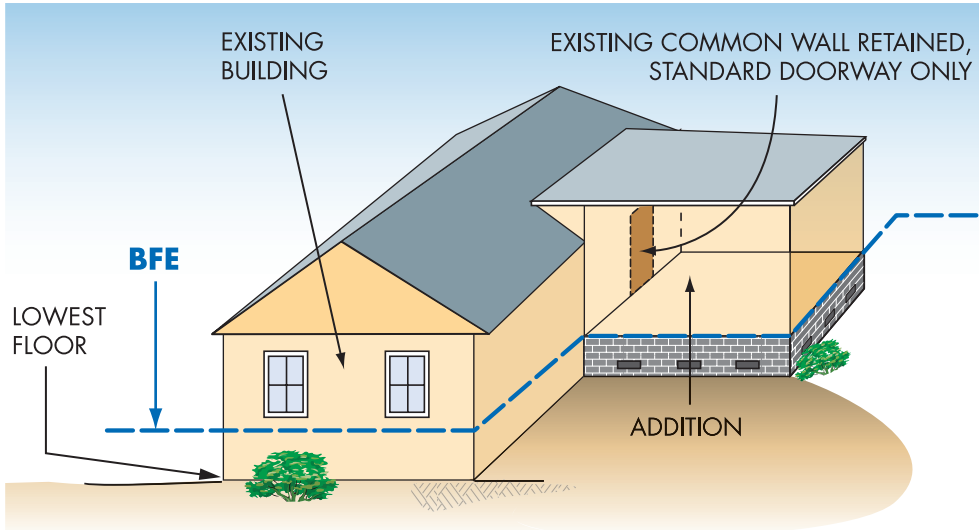
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Consult DPNR district offices before beginning work. Provide complete information about all proposed work.

If DPNR cited violations of Territory health, sanitary, or safety codes, minimum costs to correct violations to provide safe living conditions can be excluded from the cost of renovations.

Alteration of registered historic structures are allowed, by variance, as long as the structures continue to meet the criteria for listing as historic structures.

Substantial Improvement: Lateral Addition Only



Important

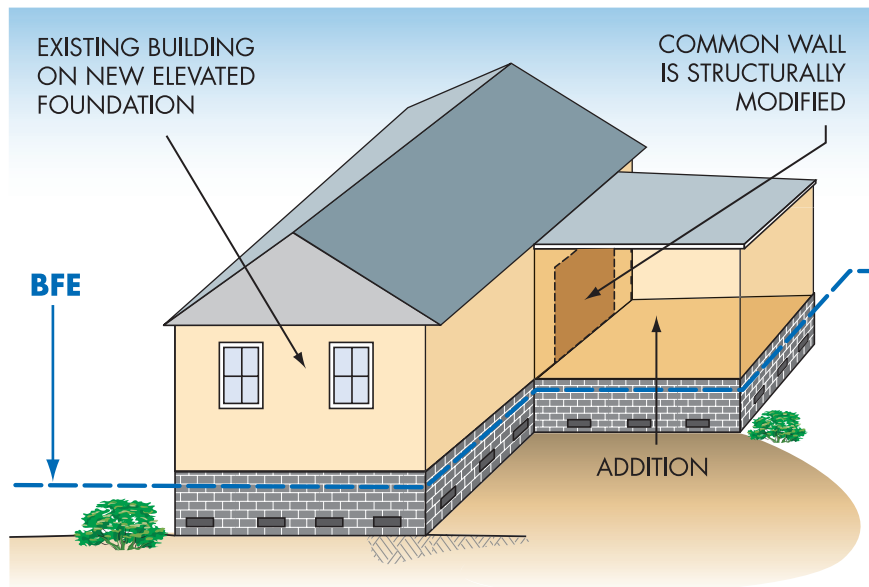
Information

See [page 61](#) for projects to add lateral additions that also modify the interior of the existing building or make structural modifications to the existing common wall.

Permits are required to build additions to buildings in flood zones. Only the addition must be elevated and comply with the building code and floodplain management requirements, provided:

- There are no other modifications to the existing building, and
- There are no structural modifications to the existing common wall other than adding a standard 36" doorway

Substantial Improvement: Addition Plus Other Work



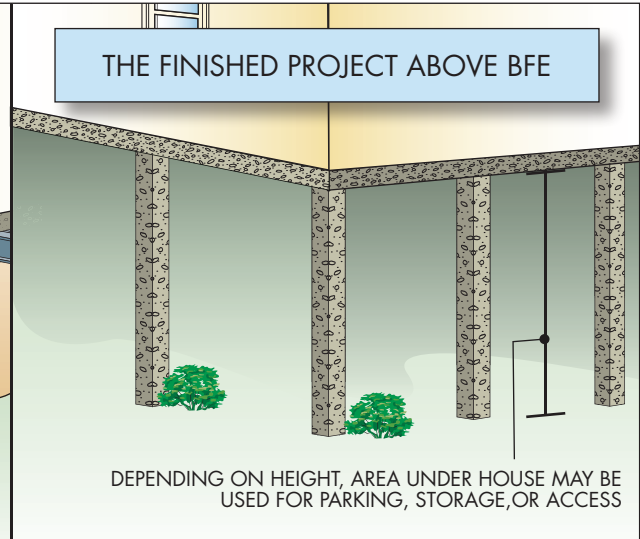
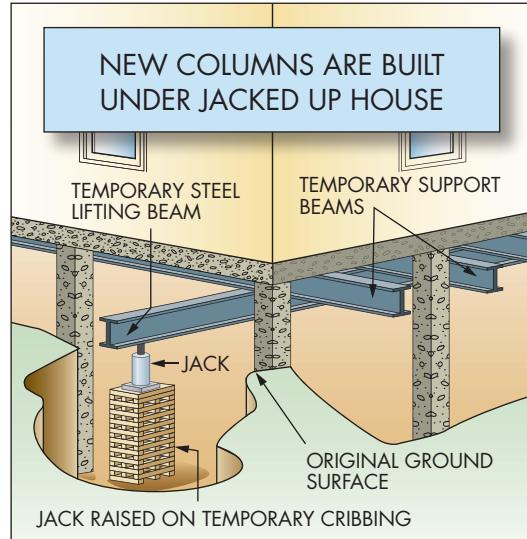
DPNR must prepare evaluations to determine if all proposed work will trigger the substantial improvement requirement. Substantial improvement is triggered if:

- The work involves adding a new top floor, modifying the interior of the existing building, or structural modifications to the existing common wall (for lateral addition); and
- The cost of all proposed work plus the cost of improvements equals or exceeds 50% of the market value of the existing building.

DPNR district offices can help determine which requirements apply when buildings must be brought into compliance. A preliminary review of proposed improvements is recommended before projects are designed and before permit applications are submitted.

Elevating an Existing Building

IF EXISTING SLAB IS SOUND, TEMPORARY LIFTING BEAMS ARE INSERTED UNDER THE SLAB AND HYDRAULIC JACKS LIFT THE SLAB AND HOUSE TOGETHER



This is one way to elevate an existing building to comply with building code and floodplain regulations (also see FEMA P-312, *Homeowner's Guide to Retrofitting*). If an NFIP-insured building is damaged by flood and DPNR determines it is substantially damaged, the owner may be eligible for an **Increased Cost of Compliance** payment ([see page 65](#)).

When Your Home or Business in the SFHA is Damaged

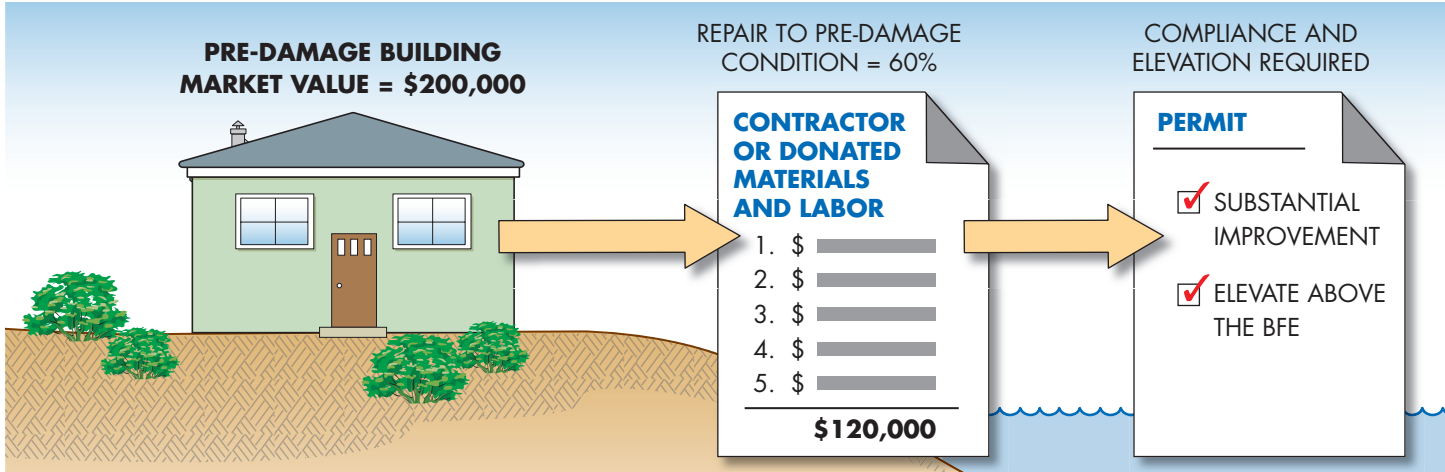
You must get a building permit from DPNR to make most repairs. Repairs must comply with requirements in the Virgin Island Building Code that apply to existing buildings. When your home or business in the SFHA is damaged by any cause, DPNR will evaluate whether the building has been substantially damaged ([see page 54](#)).

- If your building is damaged, you should contact DPNR right away to learn about permit requirements. It is OK to make minimum emergency repairs to stabilize the building.
- You will need to estimate the cost to repair the building to its condition before the damage occurred.
- Especially after hurricanes that damage many buildings, DPNR or FEMA may visit your property to estimate the cost of repairs.
- DPNR may send you a letter based on that estimate, advising you about your next steps.



[See page 55](#) for a link to FEMA's *Answers to Questions about Substantially Improved/ Substantially Damaged Buildings*.

Repair of Damaged Buildings



Permits are required to repair damaged buildings, regardless of the cause – fire, flood, wind, or even vehicle impact. Detailed estimates of the cost to repair a building to pre-damage condition are required. If the costs are 50% or more of the pre-damage market value of the building, then it is “substantially damaged” and must be brought into compliance, which may involve raising the foundation and other measures. Consult with DPNR district offices before repairs are started.

[See page 62](#) for an example of elevating an existing building above a crawlspace.

Paying for Post-Flood Compliance

Owners may be eligible for up to \$30,000 (as of 2020) to help pay to bring buildings into compliance with the building code – if all of the following apply:

- Buildings are located in a special flood hazard area
- Buildings are covered by federal flood insurance, which includes Increased Cost of Compliance (ICC) coverage
- Buildings have lowest floors below the required elevation
- DNPR determined buildings were substantially damaged
- Insurance claims adjusters confirm substantial damage caused by flooding
- Owners act quickly with their claims adjusters and DNPR to process all required paperwork

Learn more at www.fema.gov/increased-cost-compliance-coverage.

Owners whose buildings are substantially damaged are required to “bring the building into compliance” with flood zone requirements. Substantial damage is a special case of substantial improvement.

USE THE ICC CLAIM TO:



ELEVATE-IN-PLACE



RELOCATE TO
HIGH GROUND

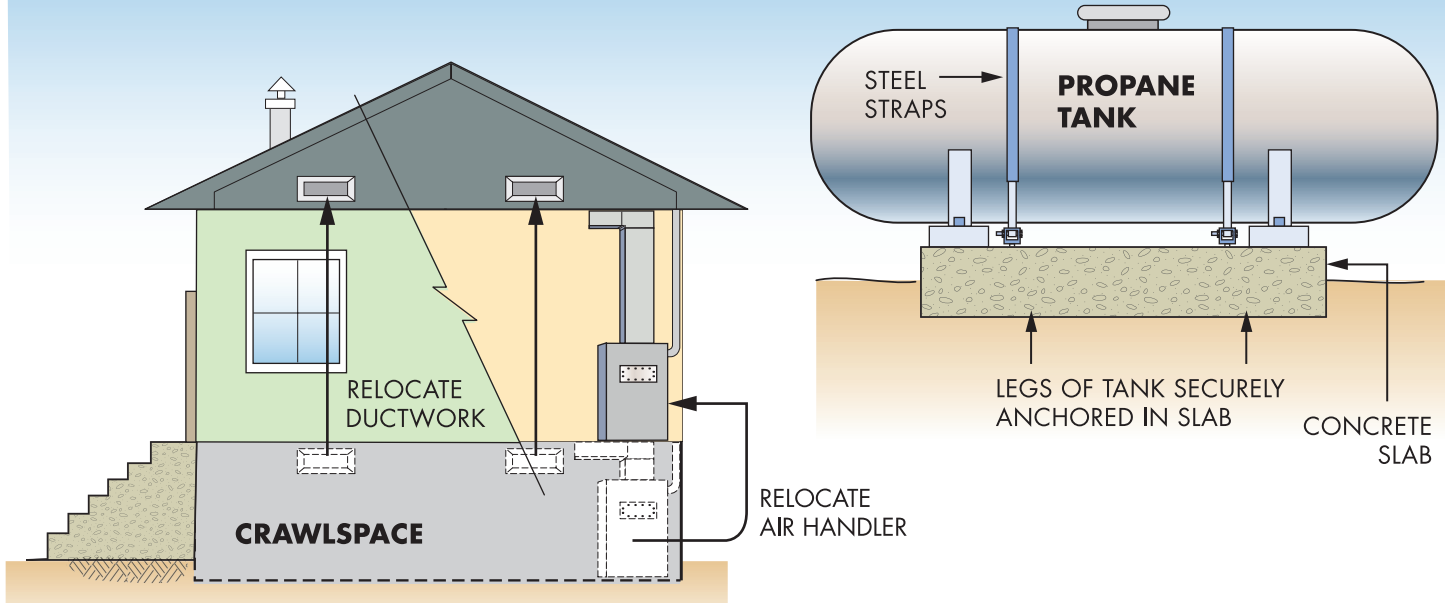


DEMOLISH



FLOODPROOF
(NON-
RESIDENTIAL
ONLY)

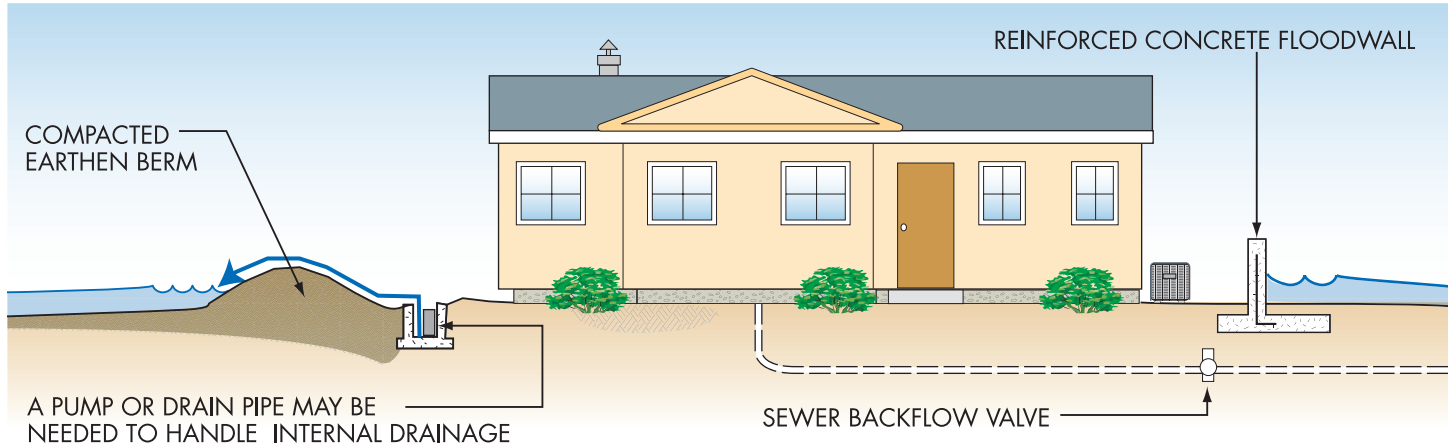
Some Flood Protection for Older Homes is Easy and Low Cost



Move fuse boxes, water heaters, furnaces, and ductwork out of crawlspaces. Anchor heating oil and propane gas tanks to prevent flotation and lateral movement.

Do not store valuables or hazardous materials in a flood-prone crawlspace. Use water-resistant materials when repairs are made.

Small Berms or Floodwalls May Protect Older Buildings



In areas where floodwater isn't expected to be deep, sometimes individual buildings can be protected by earthen berms or concrete floodwalls. Permits are required for these protection measures and extra care must be taken if sites are in floodways ([see page 12](#)). Small berms or floodwalls cannot be used to achieve compliance for new construction, substantially improved buildings, or substantially damaged buildings.

Important! These protective measures will not reduce your flood insurance premium!

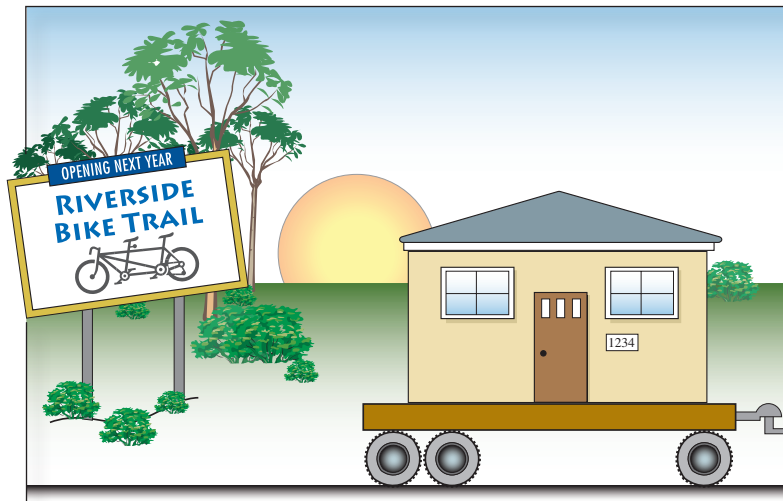
Some Flood Mitigation Projects are More Costly Up Front

But Give More Protection and a Positive Return on Investment

Following floods, some communities purchase and removed homes that have been severely or repetitively damaged by flooding. The acquired land is dedicated to public open space or stormwater storage and can be used for recreation or to help restore wildlife habitat and wetlands.

Some homes have been elevated on new, higher foundations, and others have been moved to safer high ground outside of high risk flood hazard areas.

Studies indicate these types of projects have a 7:1 return on investment.



The Virgin Islands Territorial Emergency Management Agency administers federally-funded mitigation grants. Most grants are used to reduce vulnerability of public buildings and facilities:

www.usviodr.com/programs/fema-hmgrp/

Turn Around Don't Drown®

Learn about flood risks and follow these safety rules:

- When flooding is expected, stay away from creeks, streams, and rivers.
- NEVER drive through flooded roads – they may be washed out.
- Passenger cars may float in only 12-24 inches of water.
- Be especially cautious at night when it is harder to recognize dangers.
- Just 6 inches of fast-moving water can knock you off your feet.
- <https://www.weather.gov/safety/flood-turn-around-dont-drown>.



Be Prepared for Flood Emergencies

Everyone should be prepared for floods, hurricanes, and other emergencies. Preparation begins at home, at work places, at schools, and in communities.

Sometimes floods and other disasters can strike quickly and without warning and evacuation may be required. Basic services (water, gas, electricity and telephones) may be interrupted, perhaps for several days. Local officials and emergency relief works will be on the scene after disasters, but they cannot reach everyone right away. Families and business owners should prepare before disasters occur by:

- Learning about natural hazards
- Making family and workplace emergency plans
- Knowing where to go if evacuations are required
- Putting together disaster kits with supplies to last a few days



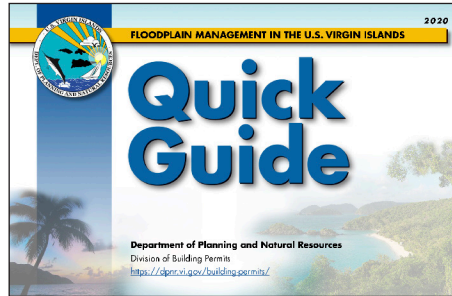
Learn more at www.ready.gov

Useful Resources and Common Acronyms

- Division of Building Permits: <https://dpnr.vi.gov/building-permits/>
- Access DPNR Floodplain Information and Advisory Maps: <https://dpnr.vi.gov/building-permits/flood-plain-information-and-advisory-maps/>
- Find NFIP Technical Bulletins and other FEMA publications online by using an internet search engine to search on the publication number or title.
- Find out about Elevation Certificates and training for land surveyors by searching for Elevation Certificate at www.fema.gov.
- To learn the importance of taking steps to financially protect homes and businesses from flood damage, call an insurance agent and go to www.floodsmart.gov.
- For more about preparation, American Red Cross at www.redcross.org/get-help/how-to-prepare-for-emergencies/make-a-plan.

Common Acronyms

- **ABFE** = Advisory Base Flood Elevation
- **BFE** = Base Flood Elevation
- **DPNR** = Department of Planning and Natural Resources
- **EC** = Elevation Certificate
- **FIRM** = Flood Insurance Rate Map
- **NFIP** = National Flood Insurance Program
- **SFHA** = Special Flood Hazard Area (100-year floodplain)



This **Quick Guide** may be downloaded from the
U.S. Virgin Islands Department of Planning and Natural Resources
web site at:

<https://dpmr.vi.gov/building-permits/flood-plain-information-and-advisory-maps/>