

Quick Guide



Wisconsin Department of Natural Resources
Waterways Bureau

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dnr.wi.gov/topic/floodplains

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About This Guide

This **Quick Guide** helps local officials and citizens understand why and how Wisconsin communities must manage development in floodplains to protect people and property. Flood-prone communities adopt codes and ordinances that detail the rules and requirements. In cases of conflict, those codes and ordinances, not the guidance provided in this publication, must be followed.

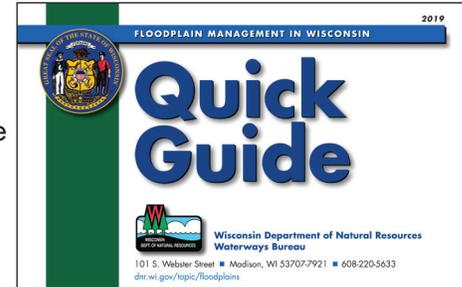
This **Quick Guide** was developed and funded jointly by the Wisconsin Department of Natural Resources (DNR) and the Federal Emergency Management Agency (FEMA).

Questions, comments and requests for additional copies should be directed to the State NFIP Coordinator at dnrfloodplain@wisconsin.gov.

Prepared by:

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For more detail on all aspects of floodplain management, please refer to FEMA 480, *National Flood Insurance Program, Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials*.



National Flood Insurance Program (NFIP)
Floodplain Management Requirements
A Study Guide and Desk Reference for Local Officials
FEMA 480
February 2005
 FEMA

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 National Flood Insurance Program (NFIP) flood insurance is available.

Communities must join the NFIP and administer floodplain management requirements before residents and businesses can purchase NFIP flood insurance and be eligible for some types of Federal assistance, including flood mitigation grants.

To save tax dollars. Every time communities experience flood disasters local 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, communities still must pay a portion of repair and clean-up costs, temporary housing assistance, and evacuation expenses.

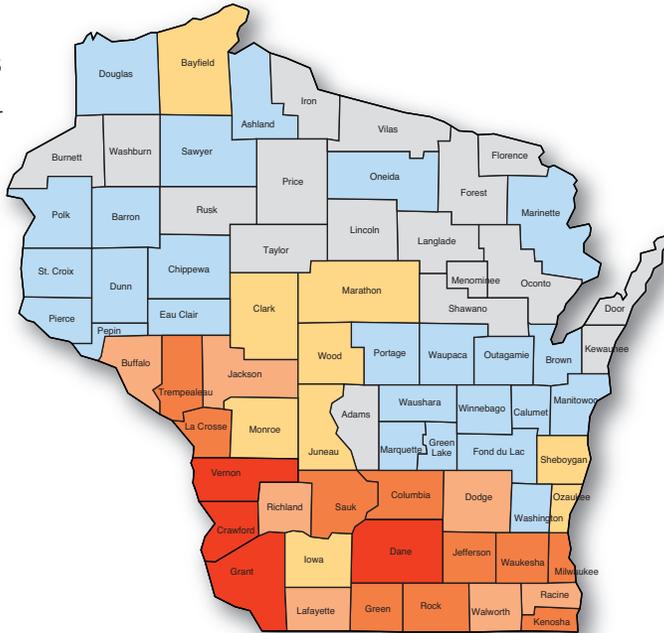
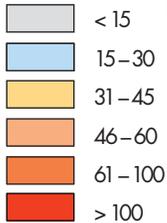
To avoid liability and lawsuits. If we know an area is mapped as a flood hazard area, and if we know people could be in danger and buildings could be damaged, doesn't it make sense to take reasonable protective steps as our communities develop and redevelop?

Since 1978, NFIP flood insurance policy holders in Wisconsin have received over \$103 million in claim payments. Even though that represents many payments, most of the State's flood-prone property owners do not have flood insurance.

Wisconsin Floods and Floodplain Facts

Floods and Flash Floods

(National Weather Service, 1844–2018)



- More than half of Wisconsin’s declared disasters involved flooding. Winter storms and tornadoes account for the rest.
- Most counties, cities and villages in Wisconsin have identified floodprone areas shown on Flood Insurance Rate Maps (FIRMs).
- Thousands of buildings and other structures are located in identified floodprone areas, called Special Flood Hazard Areas (SFHAs).
- Flood maps have not been prepared for many waterways.
- One county and 60 municipalities are floodprone but elect to not participate in the National Flood Insurance Program (as of April 2019).

Many flood events are not declared major disasters. Many floods are local, affecting only small areas such as several homes, a limited number of communities, or a few watersheds.

What is the National Flood Insurance Program (NFIP)?

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. In Wisconsin, more than 563 counties, cities and villages participate.

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



- **Flood hazard maps.** In partnership with water management districts, communities and the State, FEMA produces flood maps in accordance with FEMA standards. The maps are used by communities, insurance agents, real estate professionals, and others.
- **Flood insurance.** Property owners and renters in participating communities are eligible to purchase NFIP flood insurance for buildings and contents.
- **Regulations.** Communities must adopt and enforce minimum floodplain management regulations 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 and the approximate cost of a flood insurance policy, go to FEMA's FloodSmart website www.floodsmart.gov.

Community Responsibilities

To participate in the National Flood Insurance Program, Wisconsin communities agree to:

- **Recognize** flood hazards in community planning ([see page 6](#))
- **Adopt and enforce** flood maps and a flood damage prevention ordinance
- **Require** permits for all types of development in the floodplain ([see page 22](#))
- **Assure** that building sites are reasonably safe from flooding
- **Require** new and substantially improved homes and manufactured homes to be elevated at or above the Flood Protection Elevation (FPE = BFE + 2 ft., [see page 27](#))
- **Require** non-residential buildings to be elevated at or above the FPE; industrial structures may be 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 34, 35, and 38](#))
- **Carefully consider** requests for variances
- **Resolve** non-compliance and violations of floodplain management requirements
- **Advise and work** with FEMA and the DNR when updates to flood maps are needed
- **Maintain** records for review and respond to periodic requests for reports from DNR and FEMA

NFIP Recommended Planning Considerations

Wisconsin communities should consider incorporating planning considerations into comprehensive plans, land development codes, floodplain management regulations, and multi-hazard mitigation plans to reflect the long-term goal of increasing resiliency to future flooding. NFIP regulations (44 CFR Section 60.22(c)) outline 19 factors for consideration, including:



- **Divert** development to areas outside the SFHA to reduce flood damage
- **Full public disclosure** to potential buyers of properties in the SFHA
- **Acknowledge** that SFHA development may increase flood risk of existing development
- **Improve** local drainage to control increased runoff that increases the probability of flooding on other properties
- **Require** additional elevation above the minimum (e.g., above the State minimum FPE, which is BFE + 2 ft.)
- **Require** consistency between State, regional and local comprehensive plans and floodplain management programs
- **Require** evacuation plans for manufactured home parks and subdivisions

Flood Insurance: Property Owner's Financial Protection

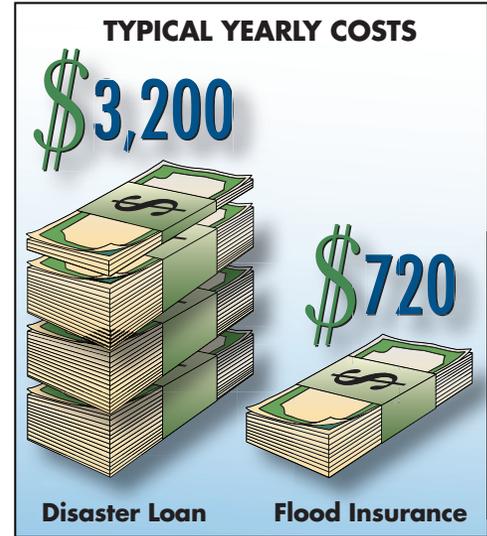
Who needs flood insurance? Flood insurance is required for all buildings in mapped flood zones shown on FEMA's maps if they are financed by Federally-backed loans or mortgages. All homeowners, business owners, and renters in communities that participate in the NFIP may purchase NFIP flood insurance on 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 floodplain."

Protected by a levee or dam? Even areas protected by levees or other flood control structures have some risk of flooding if the structures are overtopped or fail. Even when levees provide "100-year" flood protection, there is still a chance that a higher flood will occur.

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.



The NFIP's Community Rating System (CRS)

The NFIP recognizes communities that achieve better flood resiliency by providing policy holders with reduced flood insurance premiums. Communities must apply to participate in CRS and commit to implement and certify activities that contribute to reduced flood risk. Examples of actions communities can take to reduce the cost of flood insurance premiums include:

- Preserve open space in the floodplain
- Enforce higher standards for safer development through zoning, stormwater, subdivision, and flood damage protection ordinances
- Obtain grants to buy out or elevate houses, or to floodproof manufacturing/industrial structures
- Develop hazard mitigation plans and watershed and storm management plans
- Undertake engineering studies and prepare flood maps
- Maintain drainage systems
- Monitor flood conditions and issue warnings
- Inform people about flood hazards, flood insurance, and how to reduce flood damage

Community officials can request assistance from CRS specialists to help with the application process and prerequisites. Check the online CRS Resource Center ([see page 67](#)).

Property owners in 17 Wisconsin communities that participate in the CRS receive premium discounts ranging from 5% to 25% (as of April 2019).

Looking for FEMA Flood Map Information?



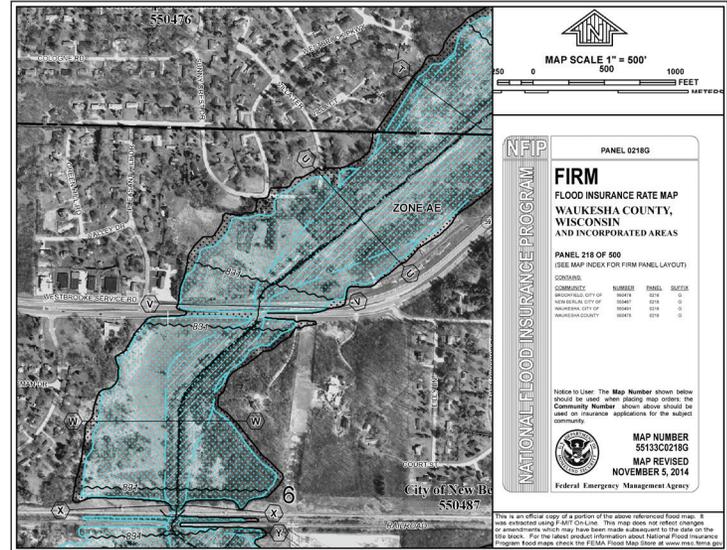
- Flood Insurance Studies (FISs) are compilations of flood risk information used for community planning and development.
- Flood Insurance Rate Maps (FIRMs) show flood zones subject to regulations and where flood insurance is required.
- Access FIRMs at the FEMA Flood Map Service Center at <https://msc.fema.gov>, where current and historical flood maps may be viewed and downloaded.
- Many cities and counties also make digital flood maps available online, sometimes with property parcel data.

Need a fast answer? Community planning, zoning, engineering, or permit offices may also have paper flood maps available for viewing by the public.

FIRMette: FEMA Flood Maps Online

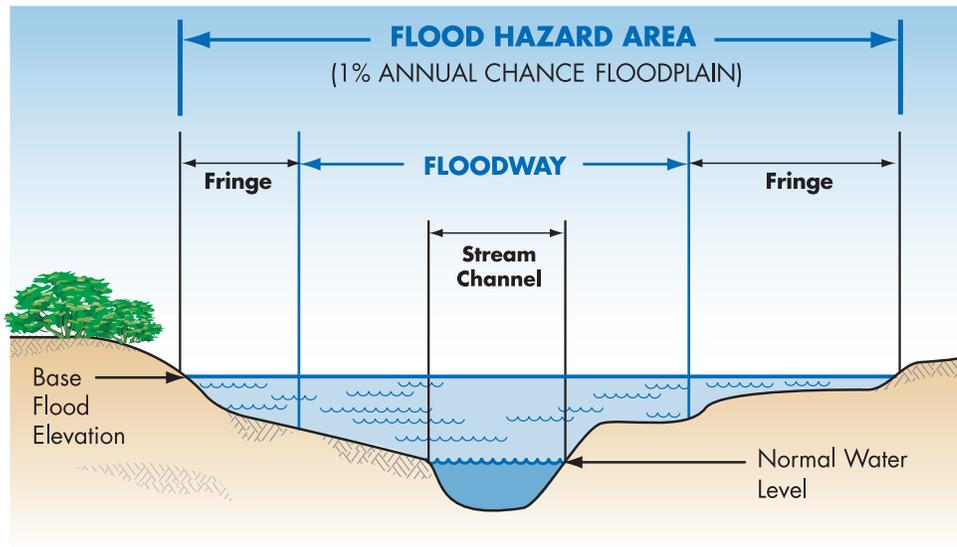
Portions of flood maps can be produced, saved, and printed by making a "FIRMette." FIRMettes are full-scale sections of FIRMs.

- The tutorial "How to Print a FIRMette and Download a FIRM Panel" is available at www.fema.gov/media-library/assets/documents/34930.
- 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 for many communities, so current flood hazard information can be compared to historic data.



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

Understanding the Riverine Floodplain



For riverine 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 15](#)).

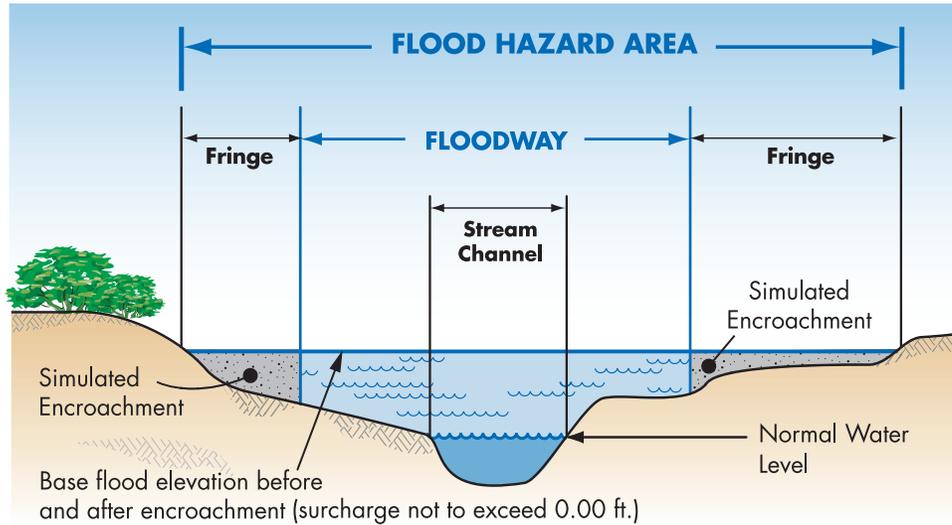
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (1% annual chance). Riverine SFHAs are shown on FIRMs as Zones A, AE, AH, AO, AR, and A99. Older FIRMs may have Zones A1-A30.

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

[See page 17](#) to learn about coastal floodplains in the Great Lakes counties.

Understanding the Floodway



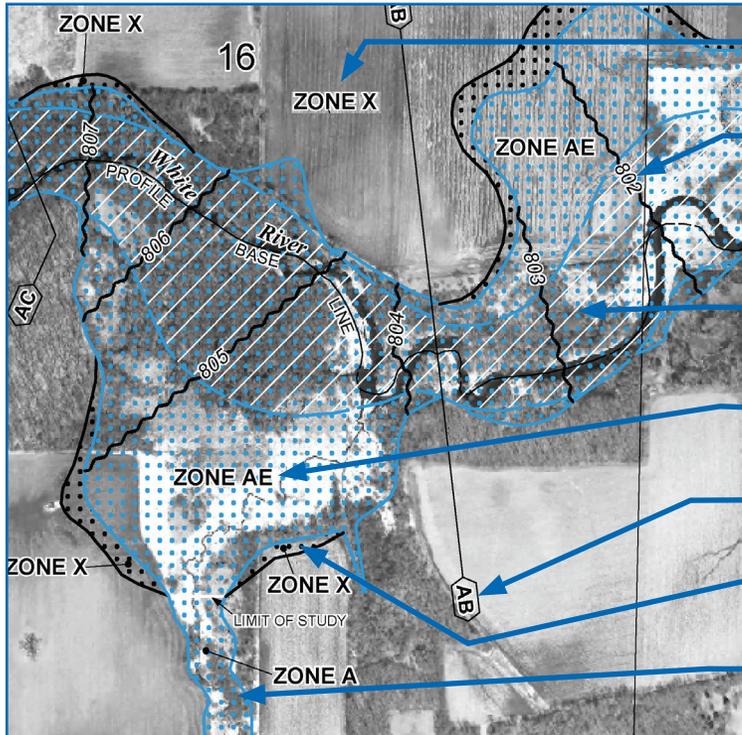
Terms and Definitions

The **Floodway** is the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge.

Computer models are used to simulate ineffective flow limits, which are used to delineate the floodway extent.

For any proposed floodway development, before a local floodplain permit can be issued, the applicant must provide evidence from an experienced professional engineer that “no-rise” will occur ([see page 32](#)). If ANY increase (more than 0.00 ft.) will occur, a Conditional Letter of Map Revision (CLOMR) must be obtained from FEMA ([see page 19](#)). Proposed projects that have cumulative water surface increases may be permitted if the increases do not cause “increased flood damage potential” (including no impacts on existing buildings).

Flood Insurance Rate Map (Riverine)



- 1** **Unshaded Zone X** is all other areas considered low risk.
- 2** **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).
- 3** The **Floodway** is the cross-hatched area ([see page 12](#)).
- 4** **Zone AE** is the 1% annual chance (100-year) floodplain with BFEs.
- 5** **Cross Section** location ([see page 15](#)).
- 6** **Shaded Zone X** is the 0.2% annual chance (500-year) floodplain.
- 7** **Zone A** (approximate) is the 1% annual chance floodplain.

Approximate Flood Zones



Everyone lives in an area with some flood risk – it's just a question of whether it is a low, moderate, or high-risk flood hazard area.

Approximate Zone A designations are based on minimum criteria established FEMA, using very little field work and limited data. Newer FIRMs have better elevation data based on high resolution topography (LiDAR) which results in more accurate boundaries.

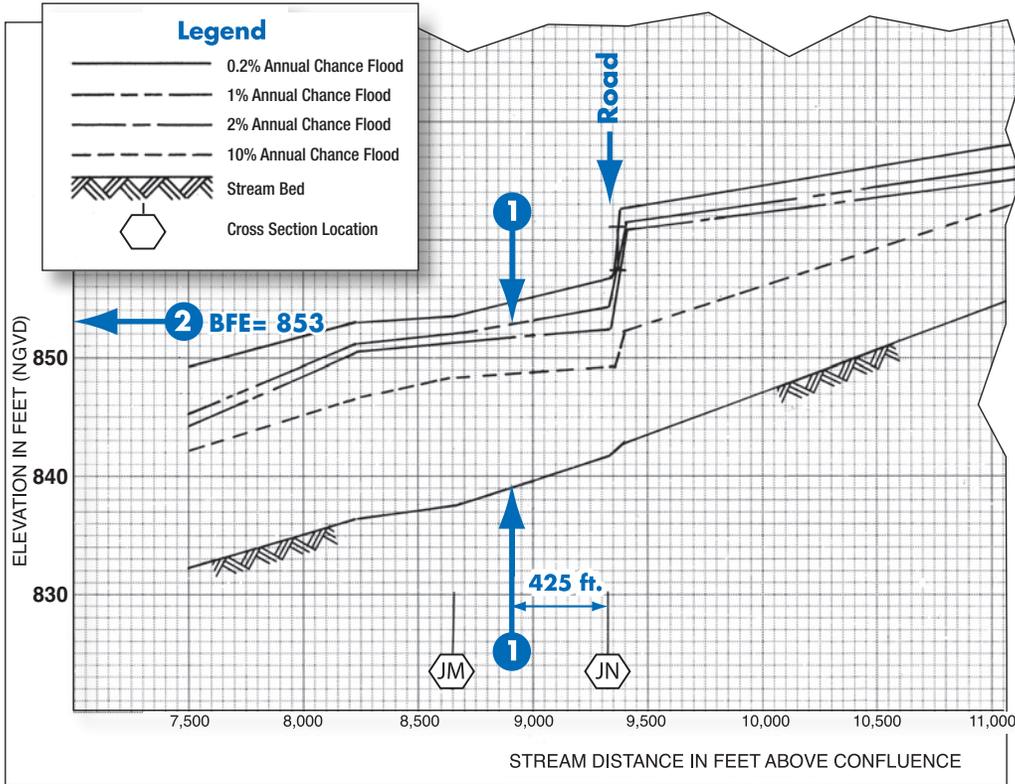
Before permits are issued, Regional Flood Elevations (RFEs) must be determined when development is proposed in an Approximate Zone A. Additional engineering information may be needed to establish the RFE and/or the location of floodway and flood fringe boundaries.

Check with community permitting offices for the best available data. Local officials may request assistance by contacting DNR floodplain staff at dnrfloodplain@wisconsin.gov.

de **Terms and Definitions**

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

Using the Riverine Flood Profile to Determine Riverine 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: 853.0 feet).

Floodway Data Table

Flood Insurance Studies have Floodway Data Tables for every waterway that was studied by detailed methods for which floodways were delineated.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
KOSHKONONG CREEK								
A	17,351	1,473	5,304	0.6	784.9	784.9 ²	784.9	0.0
B	20,101	1,617	5,338	0.6	785.1	785.1	785.1	0.0
C	22,905	1,588	4,308	0.8	785.4	785.4	785.4	0.0
D	24,320	1,371	4,487	1.0	785.8	785.8	785.8	0.0
E	27,184	1,898	5,838	0.8	786.5	786.5	786.5	0.0
F	29,681	1,852	8,027	0.9	787.7	787.7	787.7	0.0

¹Feet above confluence with Rock River

²Elevations without considering backwater effect from Rock River

- 1 Velocity estimates based on the mean velocity for the cross sections.
- 2 Computed BFEs.
- 3 Elevations may not consider backwater effect from downstream river.
- 4 Amount of increase between without and with floodway is not more than 0.00 ft at any location.

Flood Insurance Rate Map (Great Lakes)

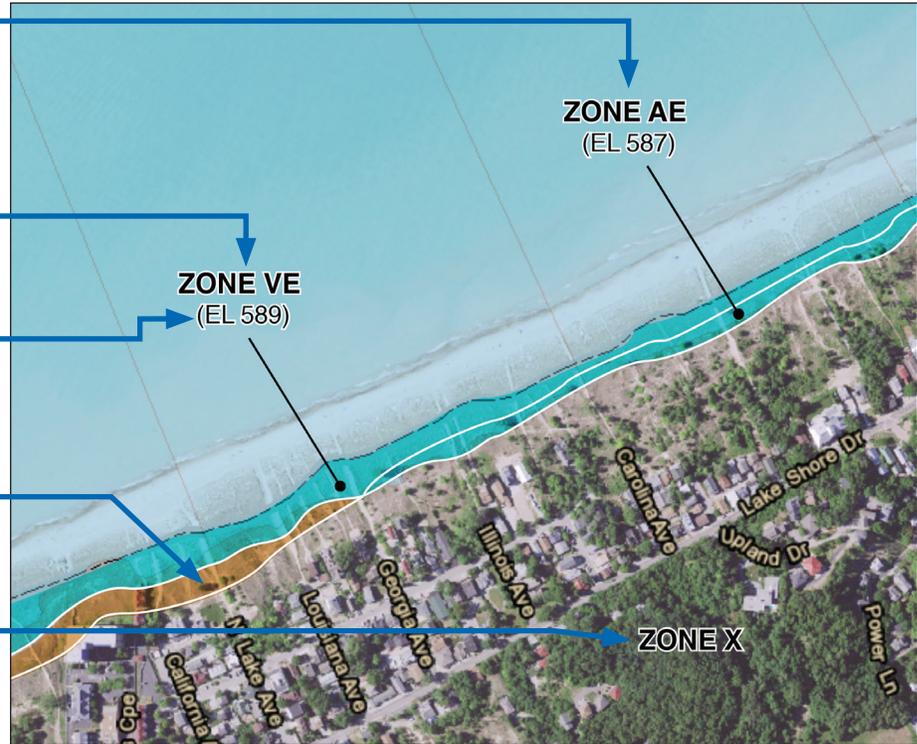
1 Zone AE is subject to flooding by the base or 1% annual chance (100-year) flood, and waves less than 3 feet high.

2 Zone VE is where wave heights are expected to be 3 feet or more.

3 Base Flood Elevation (BFE) is the water surface elevation (in feet above the vertical datum shown on the map).

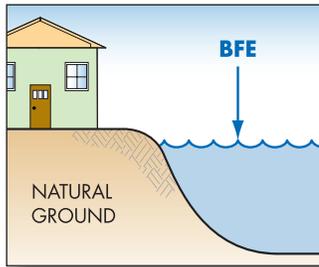
4 Shaded Zone X is the 0.2% annual chance (500-year) floodplain.

5 Unshaded Zone X is the area of minimal flood risk outside the 0.2% annual chance (500-year) floodplain.



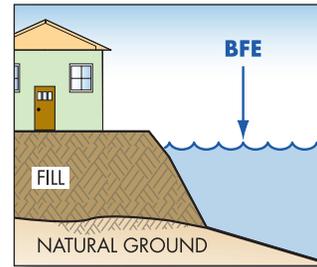
FIRM Revisions: LOMAs and LOMR-Fs

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 professional 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.



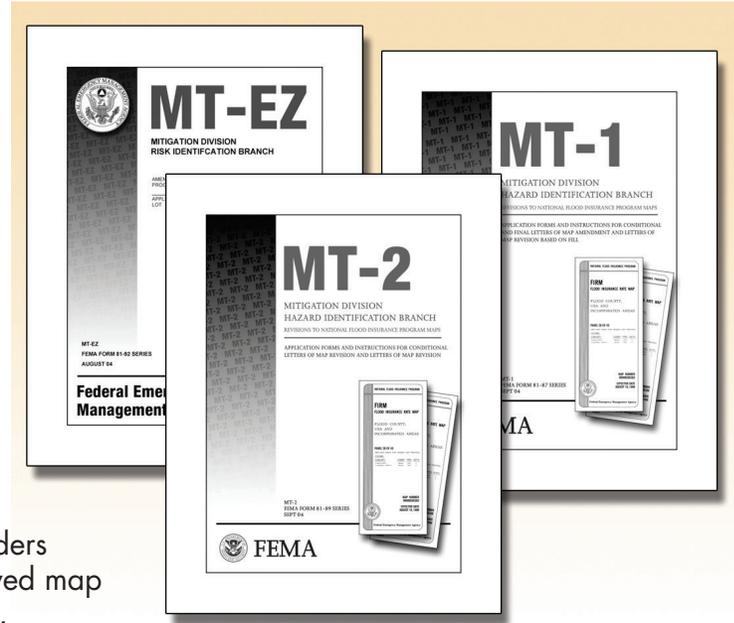
Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been

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 www.fema.gov/letter-map-amendment-letter-map-revision-based-fill-process for guidance on map revisions. Access to FEMA's web-based application for professional land surveyors to submit eLOMAs is hazards.fema.gov/femportal/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. Communities should require this evidence prior to issuing permits for fill or alteration of a watercourse. Certificates of Occupancy/Compliance should 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.



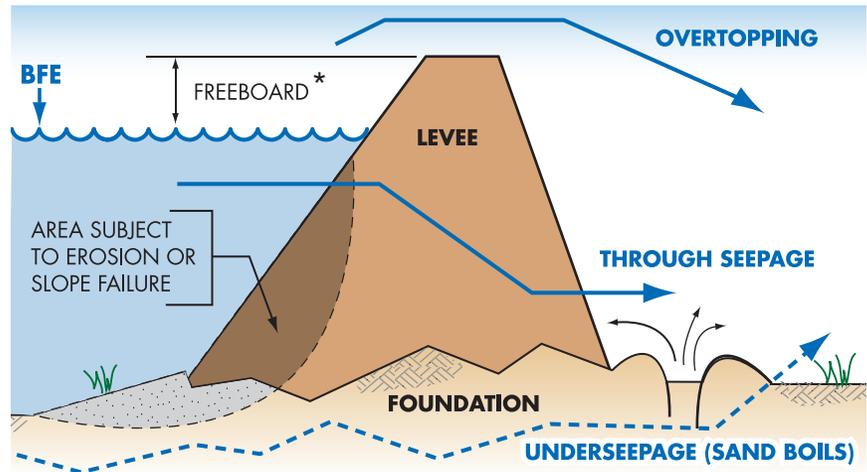
To learn more and download forms, find links by searching key words “MT-EZ,” “MT-1,” and “MT-2.”

Levee Certification for FIRMs

Many levees are designed to protect land against flooding from the Base Flood. In order for FEMA to show those areas as outside of the Special Flood Hazard Area, communities and levee owners must certify that levees meet certain design criteria. Certification will present significant challenges during the map revision process.

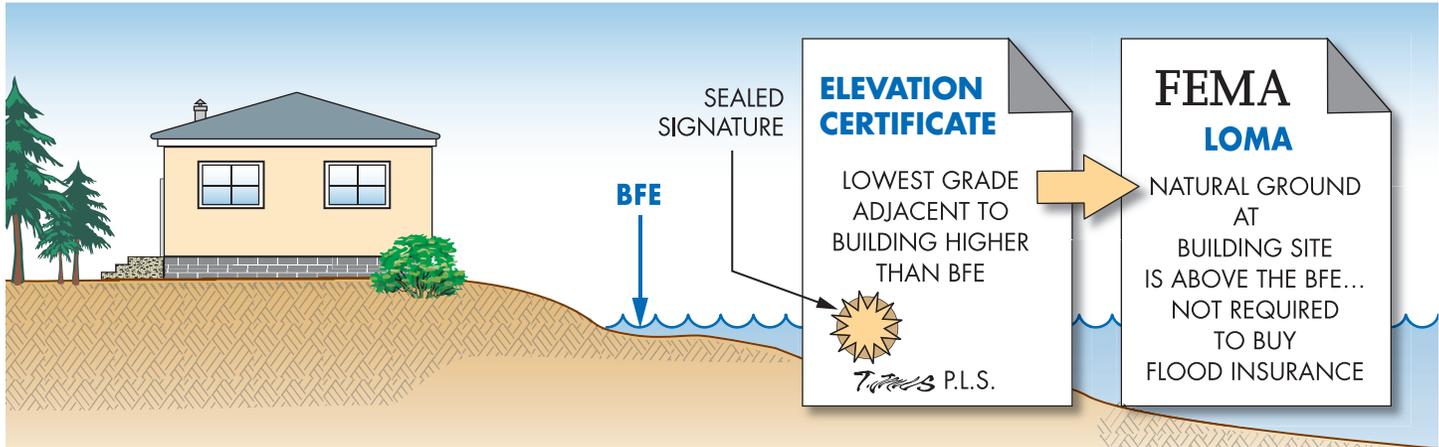
Communities that have levees should determine as soon as possible whether certification will be required. Pursuant to FEMA's Procedural Memoranda 34 and 43, and as outlined in Federal regulations at 44 CFR Section 65.10, the documentation requirements address:

- Freeboard
- Closures
- Embankment protection for erosion
- Embankment and foundation stability
- Settlement
- Interior drainage and seepage
- Operation and maintenance plans
- Other site-specific criteria and state requirements



* Freeboard is the distance between the BFE and the top of the levee; for FEMA accreditation freeboard is usually 3 feet

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), owners should get a professional land surveyor to complete a FEMA Elevation Certificate (EC). Submit a request for a Letter of Map Amendment (LOMA) 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 have property owners get flood insurance policies, although some may still require policies. FEMA and DNR encourage owners with LOMAs to get flood insurance at reduced rates. Owners should keep certificates and LOMAs with deeds— the documentation will help future buyers.

Activities in SFHAs that Require Local Permits and Approvals

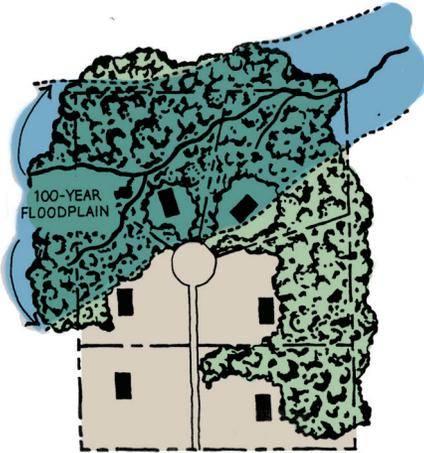
Regulated activities include but are not limited to:

- Construction of new buildings
- Additions to buildings
- Improvements to buildings
- Renovation of building interiors
- Repair of damaged buildings
- Placement of manufactured (mobile) homes
- Subdivision of land
- Construction or placement of temporary buildings and accessory structures
- Construction of agricultural buildings and cranberry reservoirs
- Construction of roads, bridges, and culverts
- Placement of fill, grading, excavation, mining, and dredging



Floodplain development or building permits must be obtained before these activities and **ANY** land-disturbing activities occur in flood zones.
Contact community permitting offices for specific requirements.

Avoid SFHAs When Possible

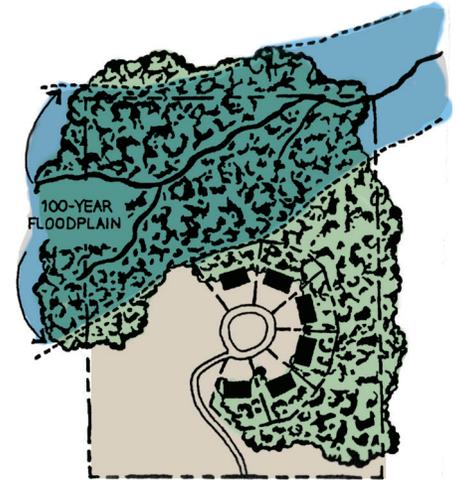
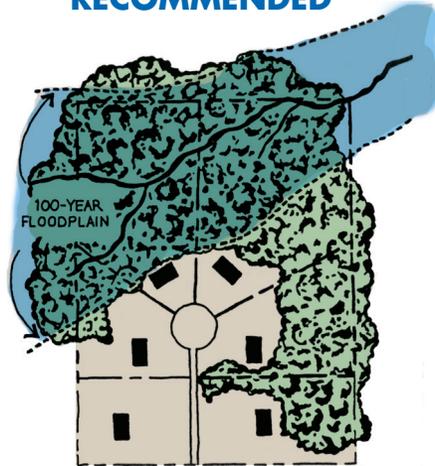


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

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

RECOMMENDED



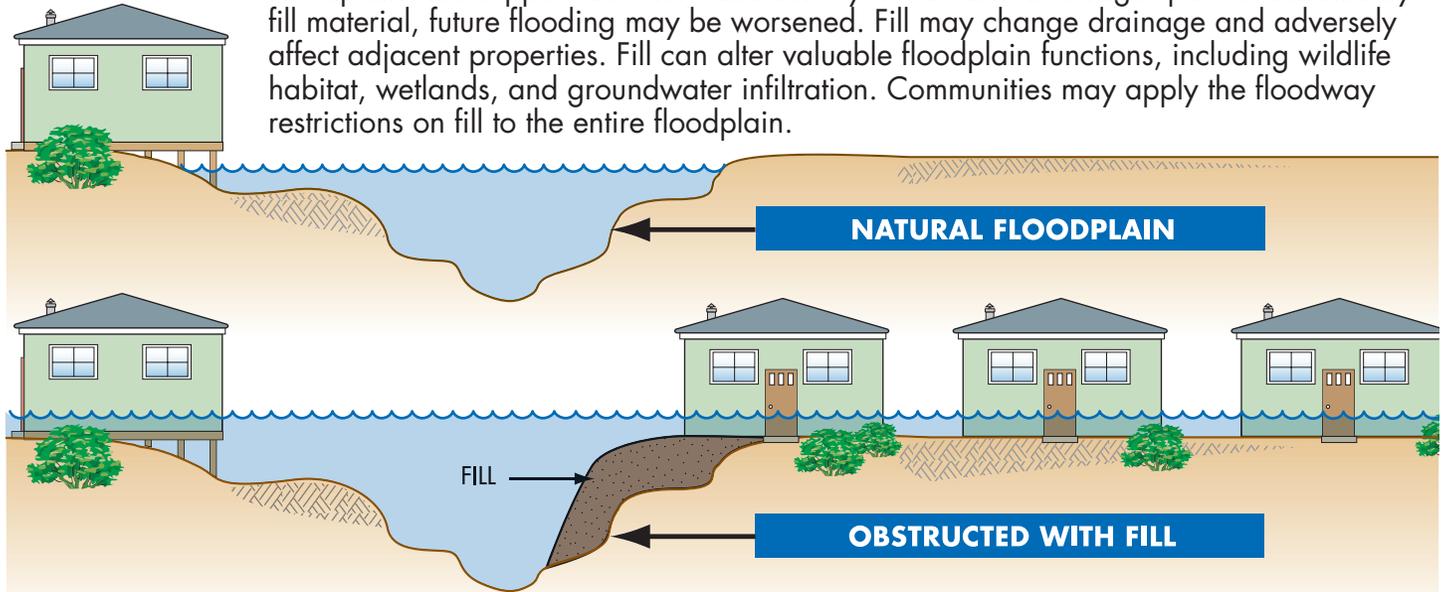
Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

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 and convey 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. Communities may apply the floodway restrictions on fill to the entire floodplain.



State statute Chapter 30 permits may be required for placement of fill below the Ordinary High Water Mark (OHWM) determined by DNR.

Flooded Agriculture District Cranberry Farms

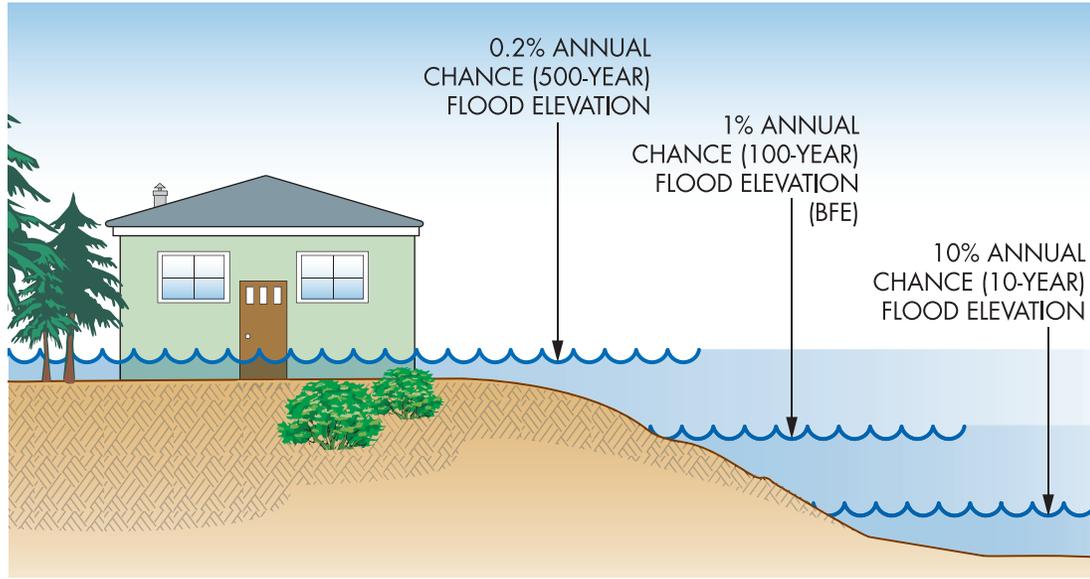
DNR, in partnership with FEMA and the Wisconsin State Cranberry Growers Association, developed a floodplain district for Flooded Agricultural-Cranberry Farms. When existing cranberry farm operations are located in floodplains:

- Landowners establish boundaries of existing activities and communities certify the boundaries to allow normal farming practices and maintenance activities.
- Landowners establish the height of existing perimeter dikes (surveyed or using 2-ft contour maps). Maintenance activities are permitted within the certified boundaries and below the top of existing perimeter dikes.
- Permits are required for improvements, such as raising existing perimeter dikes.
- Permits are required for new activities, including building new cranberry beds and new dikes.

Compliance with all requirements of local floodplain ordinances is required for:

- Construction, maintenance, repair, and improvement of buildings in Flooded Agricultural-Cranberry Farm districts
- New cranberry farm operations or expansion of existing farms outside of certified existing boundaries

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 28](#) to see how this will save you money on flood insurance.

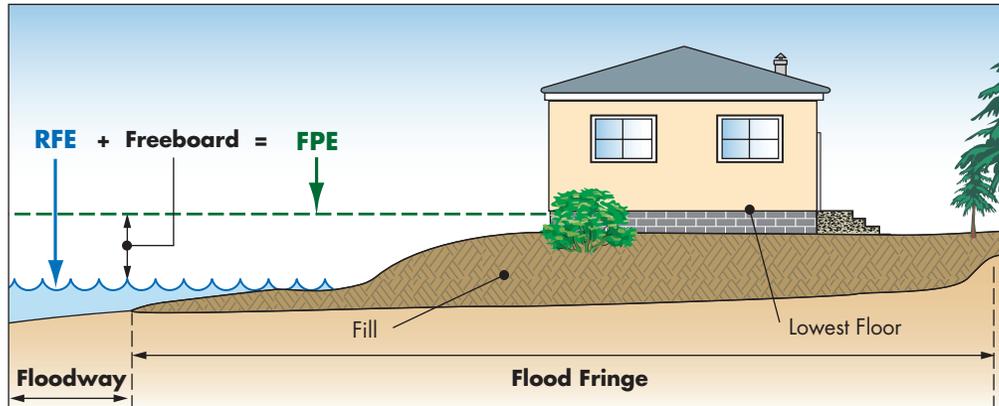
Flood Protection Elevation (FPE)

In Wisconsin, floodplain management requirements for buildings are measured relative to the Flood Protection Elevation. The FPE is determined as follows:

Regional Flood Elevation (RFE)

- + **2 feet minimum freeboard** (some communities adopt more freeboard)

- = **Flood Protection Elevation (FPE)**



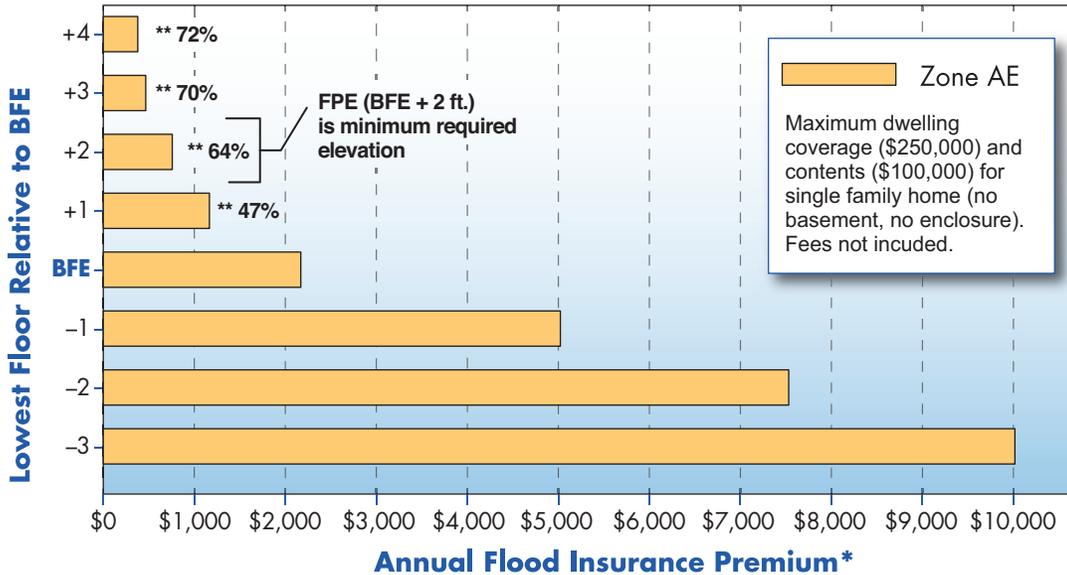
Terms and Definitions

Regional Flood – A flood determined to be representative of large floods known to have occurred in Wisconsin. The regional flood has a one percent chance of being equaled or exceeded in any given year, and if depicted on the FIRM, the Regional Flood Elevation is equivalent to the BFE.

Flood Protection Elevation (FPE) – An elevation of two feet of freeboard above the water surface profile elevation designated for the regional flood.

Freeboard: Build Higher, Reduce Damage, Save on Insurance

Freeboard is additional height – a factor of safety. Buildings that are higher than the BFE experience less damage. Owners of buildings elevated above the BFE also save on NFIP flood insurance.



* Unofficial estimates using 2019 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 NFIP flood insurance. Imagine trying to sell a house if the bank requires insurance that costs nearly \$10,000 a year!

Variations From Elevation Requirements

Very specific criteria related to the property (not the owner's actions or preferences) must be satisfied to justify a variance. In addition to the variance criteria in Wisconsin Statutes, NFIP requirements include:

- Compliance would result in exceptional noneconomic hardship due to the unique conditions not common with adjacent properties
- Variance is consistent with purposes of floodplain management regulations and not contrary to the public interest
- No increase in the BFE would result
- Applicant has shown good and sufficient cause
- Variance is the minimum necessary to provide relief
- Variance is for lot size less than ½ acre and contiguous to lots with existing structures below the BFE, unless technical justification is presented

Property owners and communities must carefully consider the impacts of variances to allow buildings below the FPE. Not only will buildings be more likely to sustain flood damage, but NFIP flood insurance will be very costly ([see page 28](#)). Communities with a pattern of granting variances may be subject to NFIP sanctions, costing all insurance policyholders even more.



Important

Information

Although the “hardship” standard was replaced with “unnecessary burdensome” in State zoning enabling Statutes, hardship remains a Federal standard for variances. NFIP regulations for variances are in 44 CFR § 60.6 and guidance is in FEMA P-993, *Variations and the National Flood Insurance Program*.

Fundamentals of Flood Resistant Construction

Two objectives of the NFIP are to reduce flood damage and guide development to less hazard prone areas. When buildings are built in special flood hazard areas, increased resistance to flooding is achieved by the following fundamentals:

- **Foundations** capable of resisting flood loads
- **Lowest floors elevated** high enough to prevent floodwater 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

Critical facilities such as hospitals, fire stations, police stations, and buildings where hazardous materials or critical records are stored should be located outside of the floodplain. But when they must be located in the floodplain, they should be protected to a higher level than other buildings to allow continued functioning even after extreme flooding. Facility owners should develop emergency plans for actions to take before the onset of flooding, during floods, and after floodwater recedes.

In short ... flood resistant buildings!

Some Key Floodplain Development Permit Review Steps

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

- Is the site in the mapped flood zone or floodway?
- Is the natural ground elevation below the BFE?
- Are applicants advised that other State and Federal permits must be obtained before work starts?
- 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 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.

The Floodway “No-Rise” Certification

- Floodways convey the a large volume of water and may have high velocities.
- State law restricts development in floodways.
- Engineers must prepare floodway encroachment analyses to evaluate the hydraulic impact of proposed development, including but not limited to grading/filling, new/replacement culverts and bridges, and bank stabilization.
- Development is allowed if certified to cause “no-rise” (0.00 ft. increase) in BFEs or if legal arrangements are made.
- Fencing in floodways should be “open” to allow floodwater to flow through; solid and chain link fencing are floodway encroachments.
- “No-rise” certifications must be signed by a Professional Engineer licensed in Wisconsin and qualified to conduct hydraulic analyses.
- Request a “No-Rise” Certification form from dnrfloodplain@wisconsin.gov.

**XYZ Engineering, Inc.,
Anytown, Wisconsin**

Mr. Floodplain Manager
1000 Main Street
Anytown, WI

Re: ABC Developer, Inc.s
210 River Road
Anytown, WI

This is to certify that I am a duly qualified professional engineer licensed to practice in the State of Wisconsin. It is further to certify that the attached technical data supports the fact that the described project will not impact the floodway width or 1% elevation (will not raise or lower by more than 0.00 ft.) of said flooding source in the Flood Insurance Study for the above community dated [date of FIS] and will not impact the 1% elevation at unpublished cross-sections in the vicinity of the proposed development.

 P.E.



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

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

Carefully Complete the Permit Application

Part of Floodplain Development Permit Application (only key parts shown)

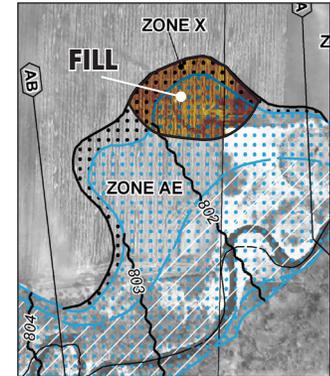
Application No.: 2018-12 Date Filed: 3/23/2018
Applicant: David and Sally Jones
Type of Development: New construction Residence Commercial
 Multifamily Warehouse/Industrial Addition Repair
 Accessory Structure/Garage Fill/Grading Culvert/Bridge
 Other (describe): _____
Property located in Zone AE on FIRM dated: 12/9/2014
Location is: Floodway/Fringe not determined. Fringe. Floodway.
Base Flood Elevation (BFE) at site: 802.0 Datum: NAVD, 1929
Flood Protection Elevation (FPE) at site: 804.0 NAVD, 1988
Approved by: Robert Reivier Title: Building Official Date: 5/18/2018



Important

Information

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



Good information will lead to better construction and less exposure to future flood damage.
Contact the local floodplain administrator or building, planning, zoning, or engineering department for application forms and guidance.

Communities Must Retain Flood Records Permanently

Communities that participate in the NFIP agree to maintain certain documentation for all development in flood zones, including but not limited to:

- Permits issued and variances granted
- Letters of Map Change revising FIRMS ([see pages 18](#) and [19](#))
- Floodway encroachment and watercourse alteration
- Design certifications for dry floodproofed buildings
- Design certifications for engineered flood openings
- Determinations of whether alterations, improvements or additions to existing buildings are substantial improvements
- Determinations of whether damaged buildings are substantially damaged
- Certificates of Compliance with surveyed “as-built” building elevations (Elevation Certificates)



Important

Information

Maintaining permanent records allows communities to respond to citizen inquiries and to provide documentation to FEMA and DNR as part of Community Assistance Visits (CAV).

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 California professional land surveyor or civil engineer.
- Community officials 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 ([see page 21](#)).
- It is used to verify building and equipment elevations.
- Insurance agents use the EC to write and rate NFIP flood insurance policies.
- [See page 68](#) for online Elevation Certificate training information

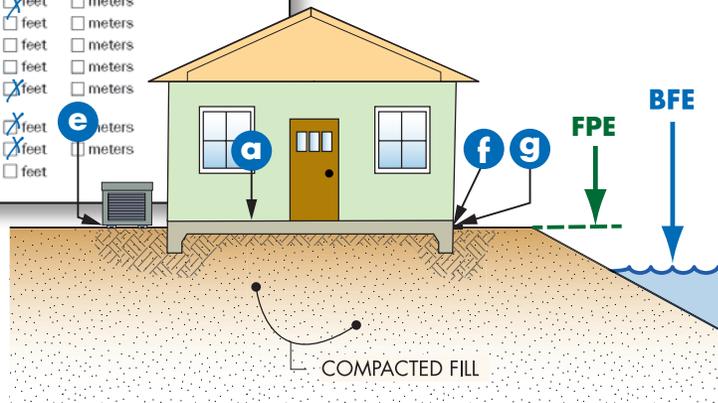
By itself, the EC cannot be used to waive the mortgage lender requirements to obtain flood insurance. [See page 18](#) to learn about FEMA’s Letter of Map Amendment process.

U.S. DEPARTMENT OF HOMELAND SECURITY Federal Emergency Management Agency National Flood Insurance Program		OMB No. 1660-0008 Expiration Date: November 30, 2018
ELEVATION CERTIFICATE Important: Follow the instructions on pages 1-8.		
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		
A1. Building Owner's Name	FOR INSURANCE COMPANY USE 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 crawspace or enclosure(s):		
a) Square footage of crawspace or enclosure(s) _____ sq ft		
b) Number of permanent flood openings in the crawspace 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. FIRM Index Date
B7. 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 1988 <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 (7/15)		Form Page 1 of 6

Completing the Elevation Certificate

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 checked="" type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other /Source: _____	
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, crawspace, or enclosure floor)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>765.0</i>
b) Top of the next higher floor	<input type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>N/A</i>
c) Bottom of the lowest horizontal structural member (V Zones only)	<input type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>N/A</i>
d) Attached garage (top of slab)	<input type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>N/A</i>
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 _____ <i>764.5</i>
f) Lowest adjacent (finished) grade next to building (LAG)	<input type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>764.0</i>
g) Highest adjacent (finished) grade next to building (HAG)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>764.0</i>
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<input type="checkbox"/> feet <input type="checkbox"/> meters _____ <i>N/A</i>

ELEVATION CERTIFICATE (partial)



In this example, the BFE is 762.0 and the FPE is 764.0.

A professional land surveyor must fill out and seal the EC form. The EC includes diagrams for different building types. Several points must be surveyed. Although an EC is required only for finished construction ("as-built"), it's a good practice to complete the EC when the lowest floor is set and prior to further vertical construction.

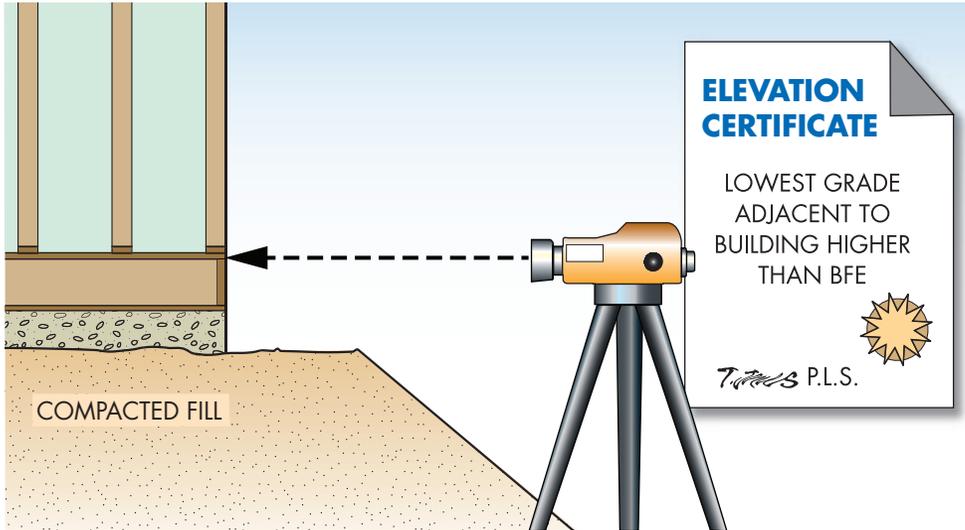
Certificate of Compliance

Certificates of Compliance are evidence that permitted development, including buildings that are built, replaced, altered, added to, modified, or repaired, conforms to floodplain management requirements. These certificates must be issued before the development can be used or occupied.

- Permittees notify communities when construction is complete.
- Permittees must submit certifications signed by a registered professional engineer, architect or land surveyor, as appropriate, that the fill, lowest floor, or dry floodproofing elevations comply with issued permits. As-built Elevation Certificates are part of this documentation.
- Prior to occupancy or use, communities must issue Certificates of Compliance documenting compliance with the floodplain management requirements. DNR's model certificate is online at <https://dnr.wi.gov/topic/floodplains/>.
- Communities must keep Certificates of Compliance on file.

Many communities use a form to be submitted by applicants and accompanied with statements or certifications signed and sealed by professional land surveyors (elevation) or licensed professional engineer or architect (design). Some communities require Elevation Certificates when foundations are complete and prior to further vertical construction.

Paperwork is Important for Owners



Important

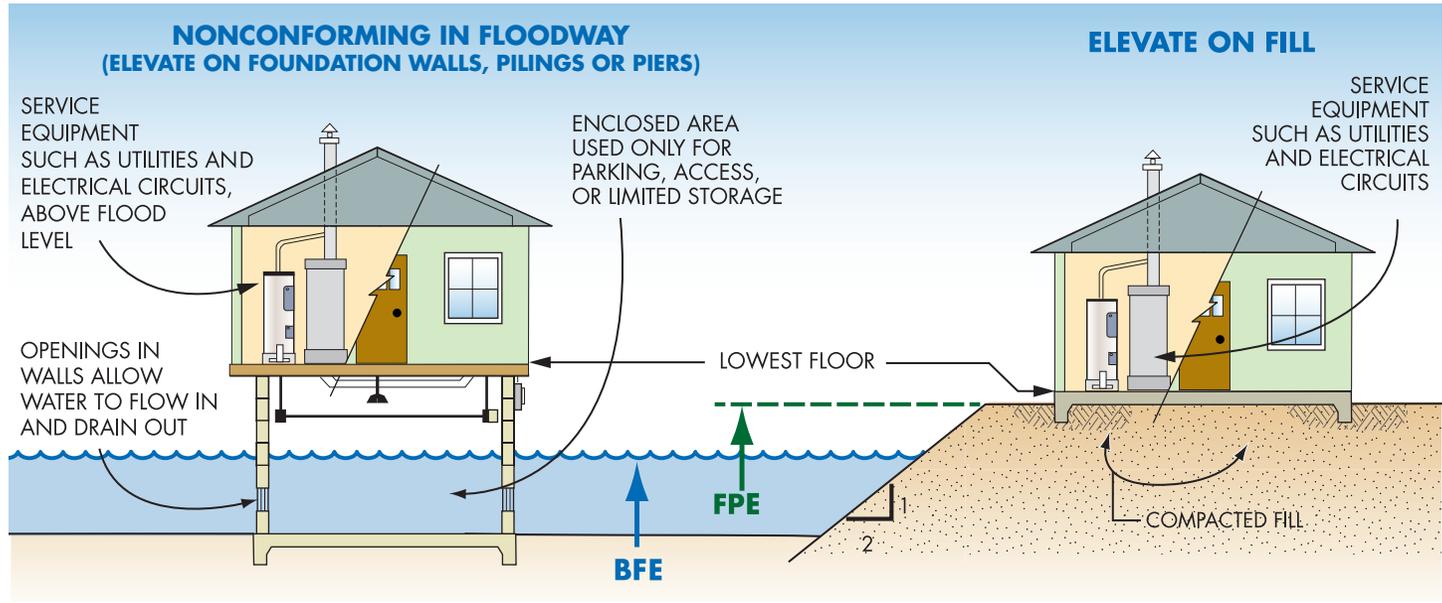
Information

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 and it is built as required by local floodplain management ordinances.

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

“As-built” Elevation Certificates should be submitted before the final inspection. Surveyors collect information helpful to verify compliance, including flood openings and elevation of equipment.

How to Elevate Buildings in Flood Zone A/AE



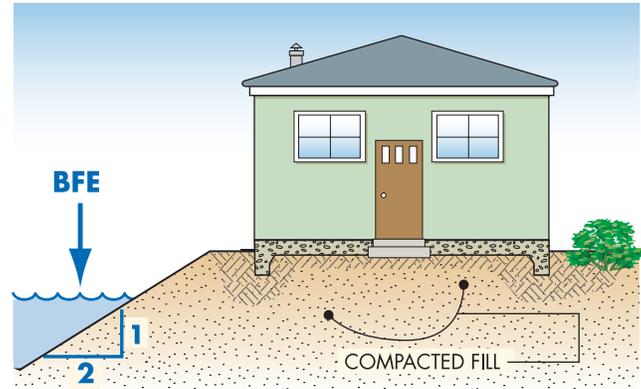
CAUTION! Enclosures (including crawlspaces) have some specific requirements.

Note: When the walking surface of the lowest floor is at the FPE, under-floor utilities are not allowed. Fill used to elevate buildings must be placed properly ([see page 40](#)).

Placement and Compaction of Fill in Zone A/AE

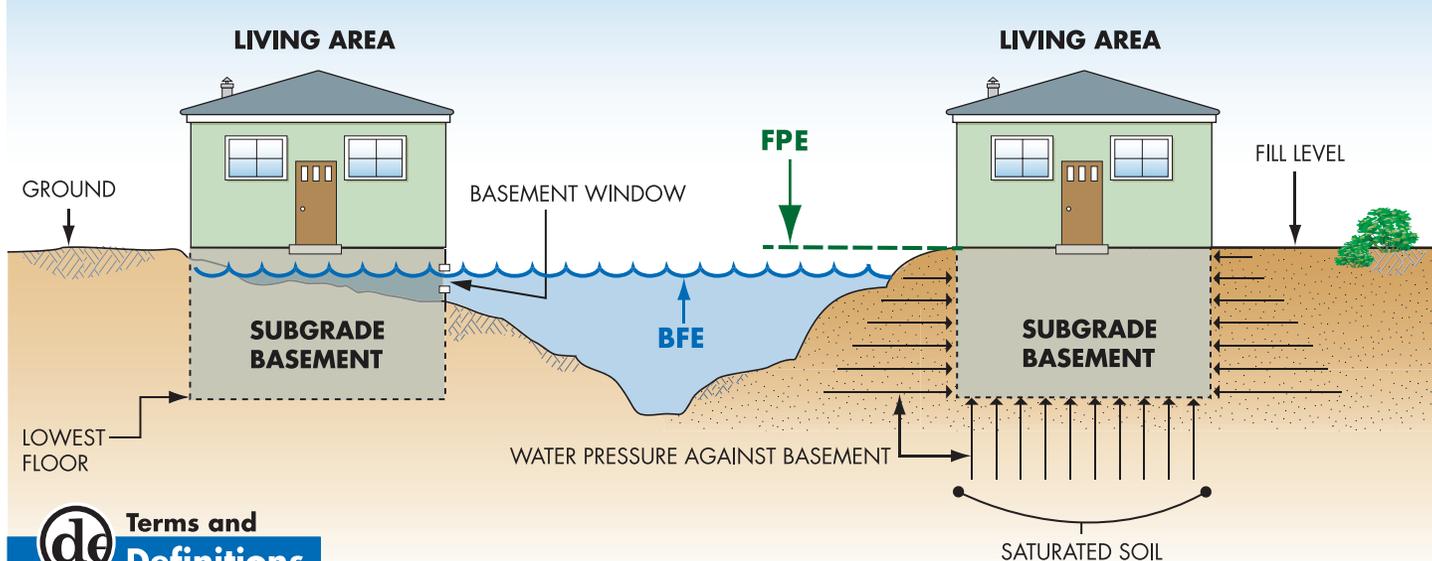
Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet requirements, fill should:

- Not be placed in areas with poor drainage or where the fill may divert water onto adjacent properties.
- 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 32](#))



State requirements specify that fill used to elevate buildings must extend at least 15 feet from the building. 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.

Basements in Flood Zones Are Unsafe

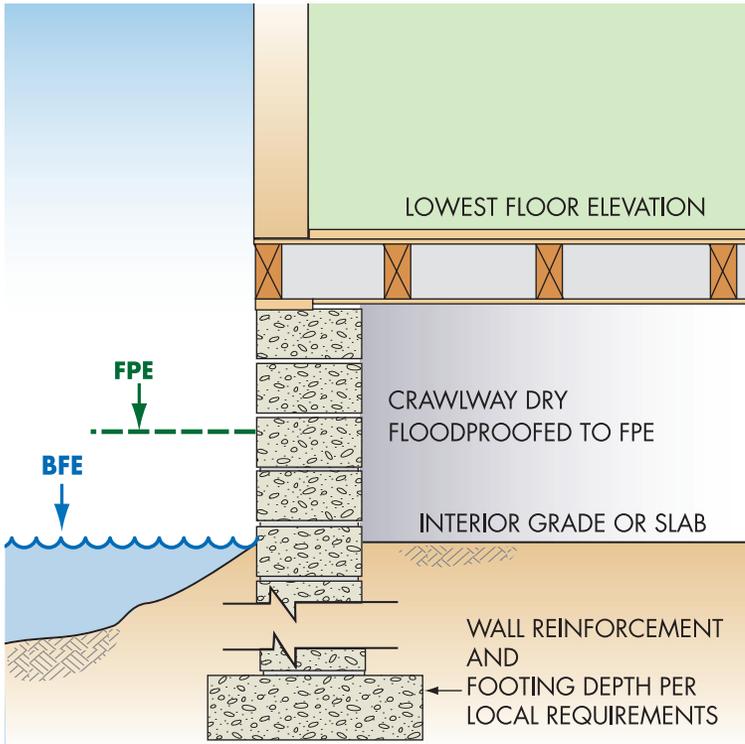


Terms and Definitions

A **basement** is any portion of a building that has its floor sub-grade (below ground level) on all sides.

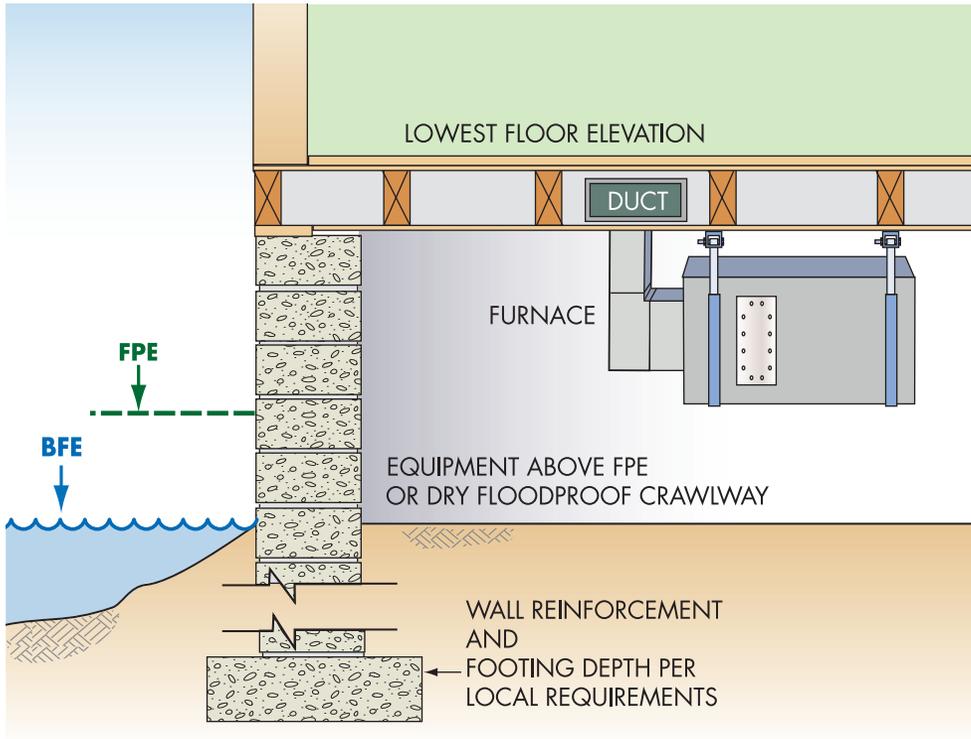
New buildings are not allowed to have basement floors below the BFE and NFIP flood insurance coverage is very limited in existing basements for a very good reason. It only takes an inch of water over a door threshold or window sill and the entire basement fills up! Excavating a basement into fill doesn't always make it safe because saturated groundwater can damage the walls.

Crawlspace Details (Zone A/AE)



- The Lowest Floor must be at or above the Flood Protection Elevation (BFE + 2 ft).
- The crawlspace (crawlspace) interior grade or floor must be at or above the BFE.
- If the crawlspace interior grade or floor is below the FPE, the walls must be dry floodproofed.
- Designs for dry floodproofed crawlways must be certified by a registered professional engineer or architect.
- Utility service and equipment may be located in the crawlspace ([see page 43](#)).

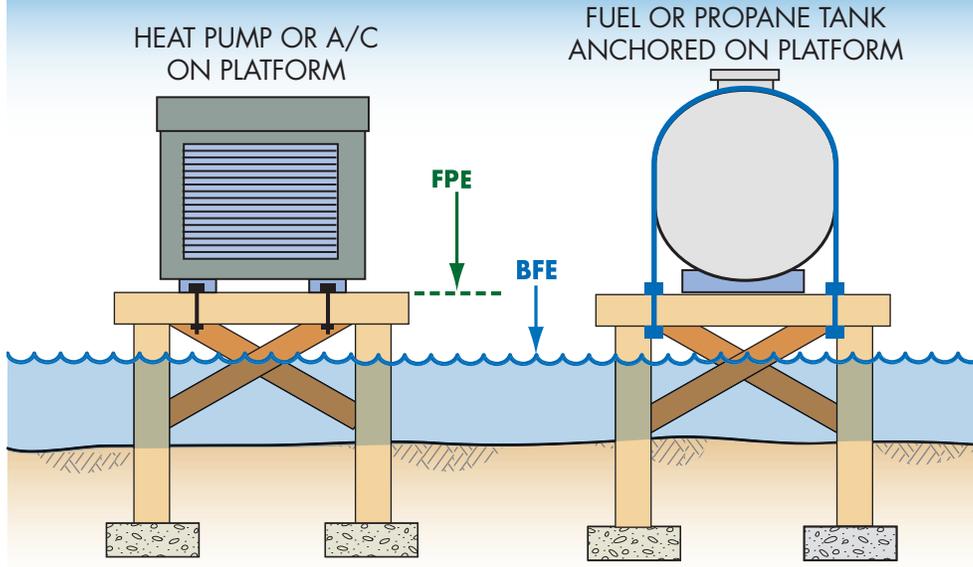
Utility Service and Equipment



Utilities and mechanical equipment must be either:

- Elevated to or above the FPE ([see page 44](#))
- Designed to prevent water from entering or accumulating within the equipment
- Installed in a dry floodproofed crawlway

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. Tanks may be underground, elevated on platforms or columns, or at-grade and anchored to resist flood loads.

Fuel and propane tanks can pose serious threats to people, property and the environment during flood conditions. Search online for FEMA videos on “Fuel Tank Flood Hazards” and “How to Anchor Home Fuel Tanks”. “How-To Guides” on anchoring fuel tanks and other flood damage reduction techniques are available at: <http://www.fema.gov/library/viewRecord.do?id=3262>.

Accessory Structures

In floodplains, accessory structures must:

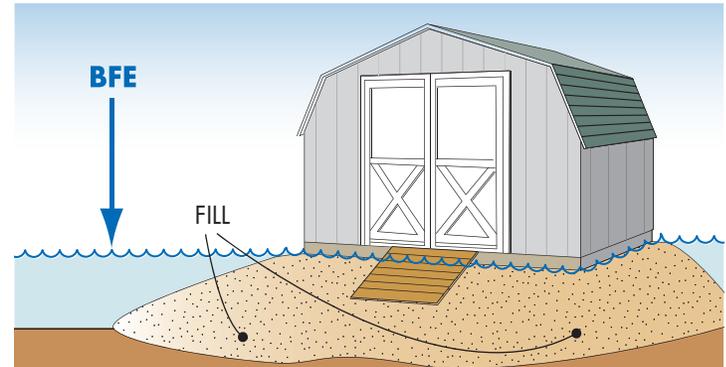
- Not be habitable
- Be elevated on fill, which is not required to extend 15 ft. from the building
- Have the structure floor be at or above the BFE
- Have utilities that are at or above the FPE (BFE + 2 ft.)
- Materials that are buoyant, flammable, explosive, or injurious to property, water quality or human, animal, plant, fish or aquatic life must be stored at or above the FPE
- Meet the floodway limitations, if applicable
- Not be modified for different use in the future

Even small accessory buildings are “development” and permits with the noted conditions are required. Examples of accessory structures include garages, storage sheds, bathouses, gazebos, picnic shelters, and pole barns.



Terms and Definitions

Accessory Structure are facilities, structures, and buildings that are accessory or incidental to the principal use of a property. Accessory structures may be called appurtenant structures.



Mobile Recreational Vehicles

In flood zones, mobile RVs must:

- Be licensed and titled as an RV (not as a permanent residence)
- Be built on a single chassis
- Must measure 400 sq.ft. or less (measured at largest horizontal projection)
- Be road-ready, with inflated tires and be self-propelled or towable by a light-duty truck
- Have no attached deck, porch, shed, or utilities
- Be used for temporary recreational, camping, travel or seasonal use (no more than 180 consecutive days)
- Have quick-disconnect sewage, water and electrical connectors



Important Information

Camping near the water?

Ask the campground or RV park operator about flood warnings and plans for safe evacuations.

Mobile RVs that do not meet these conditions must be installed and elevated like residential structures, including permanent foundations and tie-downs.

General Requirements in Coastal High Hazard Areas (Zone V)

Revisions to Flood Insurance Rate Maps for the Lake Michigan and Lake Superior shorelines may show coastal high hazard areas (Zone V).

The fundamental requirements for flood resistant construction ([see page 30](#)) apply in Zone V and:

- Buildings must be elevated on “open” foundations (piers, pilings, columns) to allow waves and water to pass under without imposing significant wave forces ([see page 48](#)).
- The lowest horizontal structural member of the lowest floor must be elevated at or above the FPE (BFE + 2 ft.), [see page 48](#).
- Foundation designs must be prepared and certified by registered design professionals ([see page 49](#)).
- Walls of enclosures below elevated buildings must be designed to break away ([see page 50](#)).

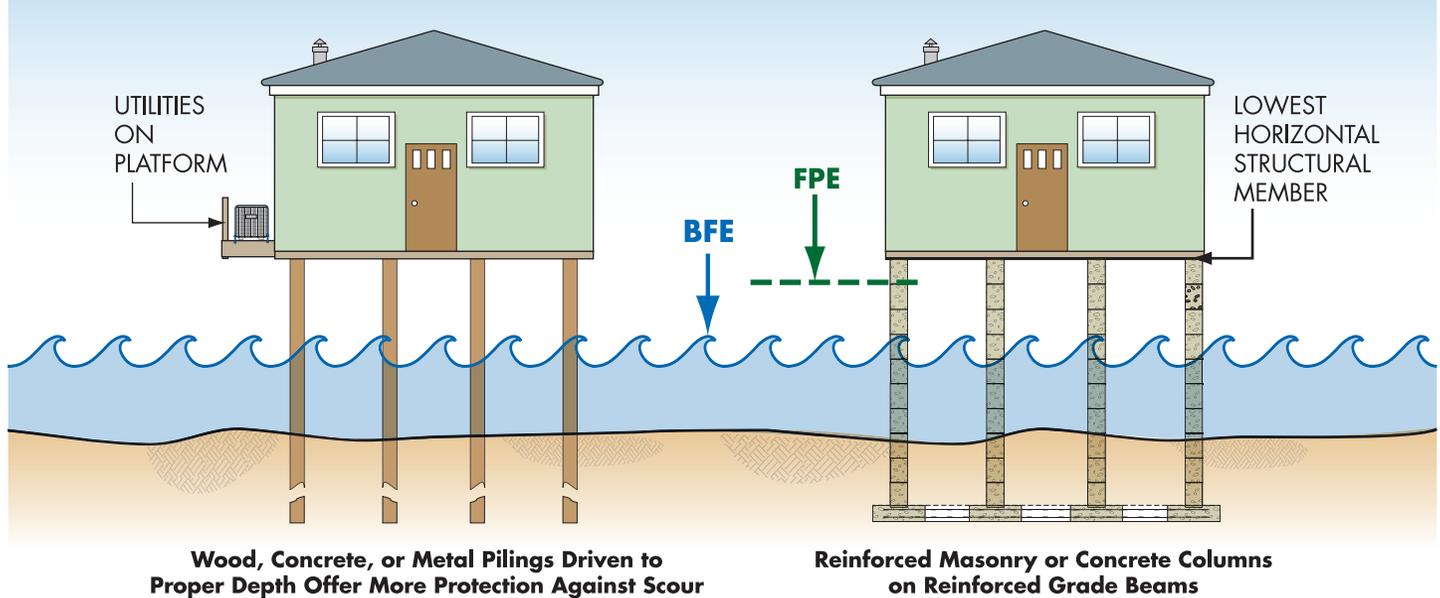
Some Zone AE areas inland of Zone V may be subject to damaging waves and erosion. DNR recommends buildings in these areas be designed and constructed according to the Zone V requirements.



Terms and Definitions

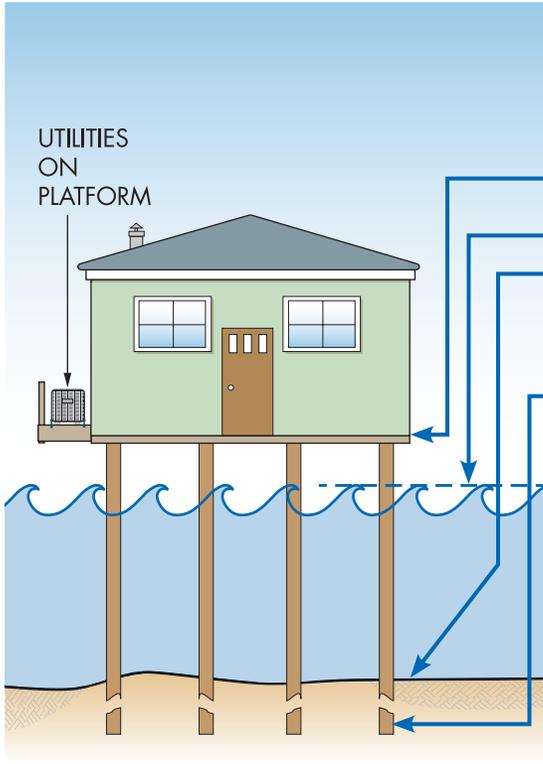
Coastal High Hazard Areas (Zone V) are shown on FIRMs to identify areas subject to high velocity wave action during base flood conditions. In Zone V, waves may be 3 ft high or higher.

How to Elevate Buildings in Flood Zone V



In Zone V, the design specifics will be determined and certified 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 ([see page 49](#)). For more information, see FEMA P-762, *Local Officials Guide to Coastal Construction* and FEMA P-55, *Coastal Construction Manual*.

The Zone V Design Certificate



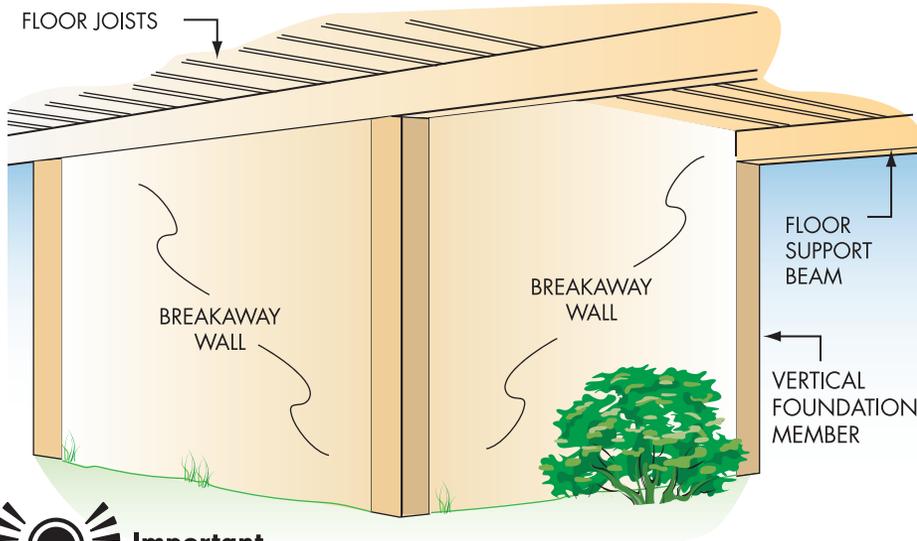
ZONE V DESIGN CERTIFICATE (Partial)

SECTION II: Elevation Information Used for Design

1	Datum.....	<input type="checkbox"/> NGVD	<input checked="" type="checkbox"/> NAVD	<input type="checkbox"/> Other
2	Elevation of the Bottom of Lowest Horizontal Structural Member	<u>597.0</u> feet above datum		
3	Base Flood Elevation (BFE).....	<u>595.0</u> feet above datum		
4	Elevation of Lowest Adjacent Grade	<u>590.0</u> feet above datum		
5	Approximate Depth of Anticipated Scour/Erosion used for Foundation Design.....	<u>1</u> feet		
6	Embedment Depth of Pilings or Foundation Below Lowest Adjacent Grade.....	<u>8'</u> feet		

A Wisconsin 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, or the repair of a substantially damaged structure. This form is on the DNR Floodplain Management webpage ([see page 67](#)).

Enclosures Below Buildings in Zone V



Important

Information

It is a violation if enclosures below elevated buildings are modified or used for purposes other than parking, storage, and access. Not only will damage be increased during floods, but flood insurance policies will be more expensive.

Enclosures under elevated buildings should be avoided. If small areas are enclosed:

- Walls must be designed to collapse or “break away” under flood conditions
- Enclosures must be unfinished and made of flood resistant materials
- Utility wires and pipes must not go through or be attached to breakaway walls
- Enclosures must be used only for parking, limited storage, and building access (no bathrooms, recreation, or utility rooms)
- Minimal electric service for safety (light switch) is permitted

Enclosures larger than 299 sq. ft. may have higher insurance premiums.

Improvements and Repairs of Buildings in Floodplains

Permits to improve and repair buildings are required. Local officials must:

- Review costs estimated in construction contracts ([see page 54](#)).
- Use Equalized Assessed Value (building only) in the property assessment records. Permittees who do not agree with EAVs may appeal to their local assessors.
- Compare the costs to the Equalized Assessed Value.
- Require buildings to be brought into full compliance if the costs equal or exceed 50% of the Equalized Assessed Value, called Substantial Improvement (or repair of Substantial Damage).
- Keep track of improvement and repair percentages over the life of each building.
- Encourage owners to consider other ways to reduce future damage if the comparison is less than 50% ([see page 62](#)).



Important

Information

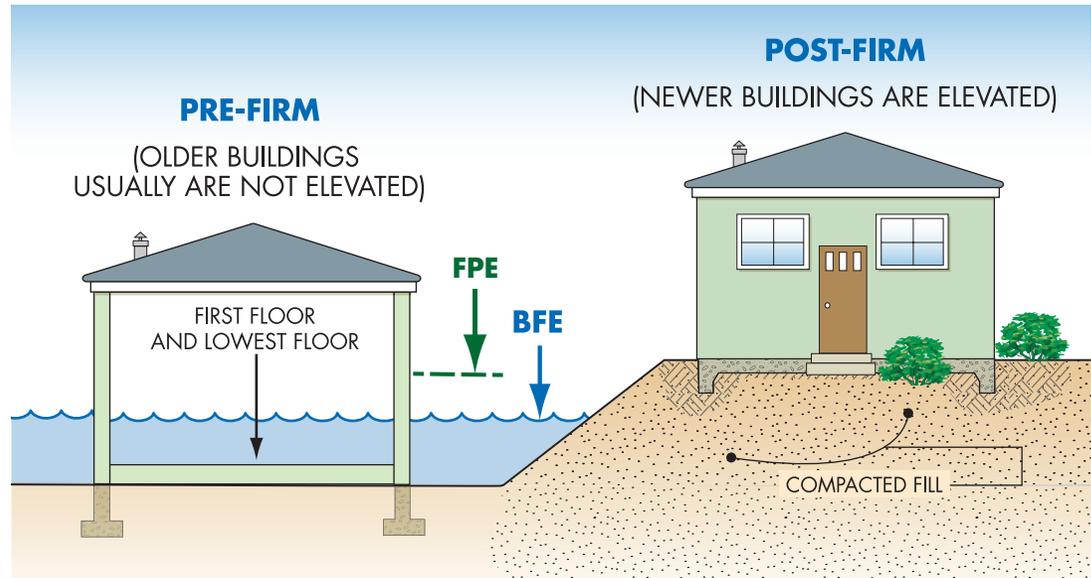
The Department of Revenue determines the Equalized Assessed Value of taxable real property. The EAV for a building is determined by excluding the value of land, landscaping, accessory buildings, etc. EAVs are used because property is assessed in different taxation districts at different percentages of market value.

By Wisconsin statute, nonconforming buildings that are damaged or destroyed by a nonflood disaster may be repaired or reconstructed to the same size and use, provided they meet certain requirements, including elevation to at least the BFE (fill, pilings, columns, posts, and perimeter walls are permitted).

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

Pre-FIRM and **Post-FIRM** are NFIP insurance terms tied to a community's initial FIRM. The terms are used to determine flood insurance rates. Although common, the terms should not be used to distinguish between buildings constructed before a community joined the NFIP and those built after, especially in communities where the FIRMs have been revised.

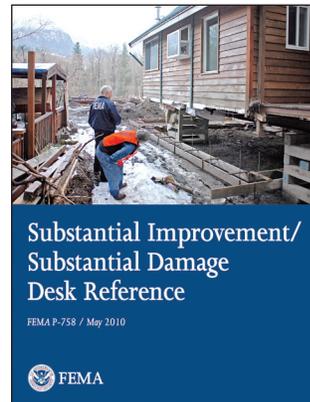
Buildings must be brought into compliance when work is determined to be substantial improvement or repair of substantial damage ([see pages 53 through 58](#)).



Substantial Improvement/Substantial Damage Desk Reference

FEMA's SI/SD Desk Reference (FEMA P-758) provides guidance and suggested procedures for:

- Estimating costs of improvements and costs of repairs ([see page 54](#))
- Estimating market values
- Community and property owner responsibilities
- Administrative requirements
- Key aspects of bringing buildings into compliance
- Suggestions for preparing for disasters



<https://www.fema.gov/media-library/assets/documents/18562>



Terms and Definitions

Substantial Improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the present equalized assessed value of the structure before the "start of construction" of the improvement. The term includes structures that have incurred "substantial damage" from any cause, regardless of the actual repair work performed. The term does not include improvements of structures to correct existing violations of state or local health, sanitary, or safety code requirements. Wisconsin communities track improvements over a period of time, triggering compliance for repetitive flood damage, when the cumulative improvement value equals or exceeds 50%, or when a structure has been previously altered.

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
- **Include** costs associated with elevating a structure when the proposed elevation is lower than the FPE
- **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.)

For more details on cost items that must be included and those that are excluded, see the SI/SD Desk Reference ([page 53](#)).



Important

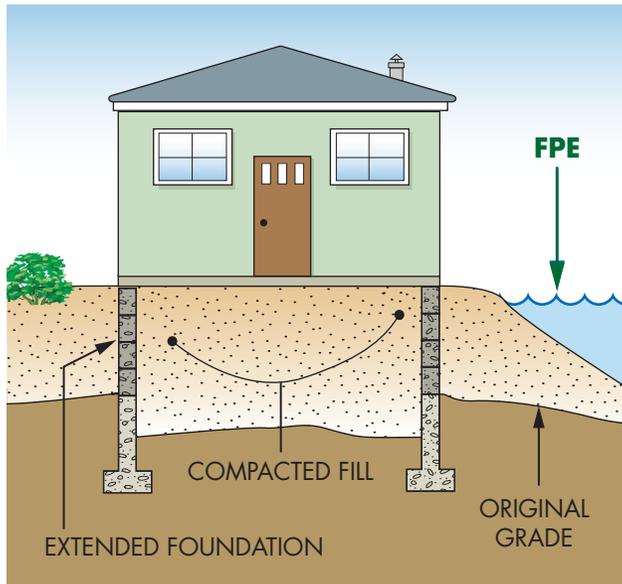
Information

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.

Elevating an Existing Building

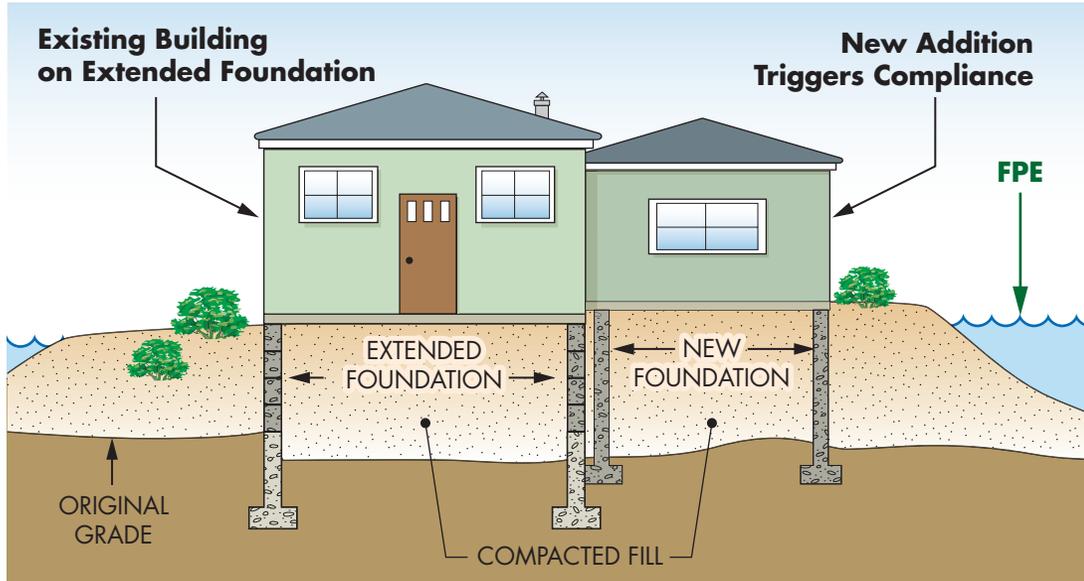


This illustrates one way existing buildings on crawlspaces can be elevated. The primary steps in the process include:

- Determine if the existing building is sound enough to lift
- Determine if the existing foundation can be extended; if not, then a new foundation is required
- Detach the building and lift it on cribbing
- Build the extended or new foundation
- Lower and attach the building to the taller foundation
- Fill in below-grade spaces and place compacted fill under and around the building

Because use of fill is limited in floodways, this method of elevating existing buildings cannot be used. Instead, when an existing building is proposed to be substantially improved, the owner must either reduce the amount of work or relocated the building out of the floodway.

Substantial Improvement: Additions



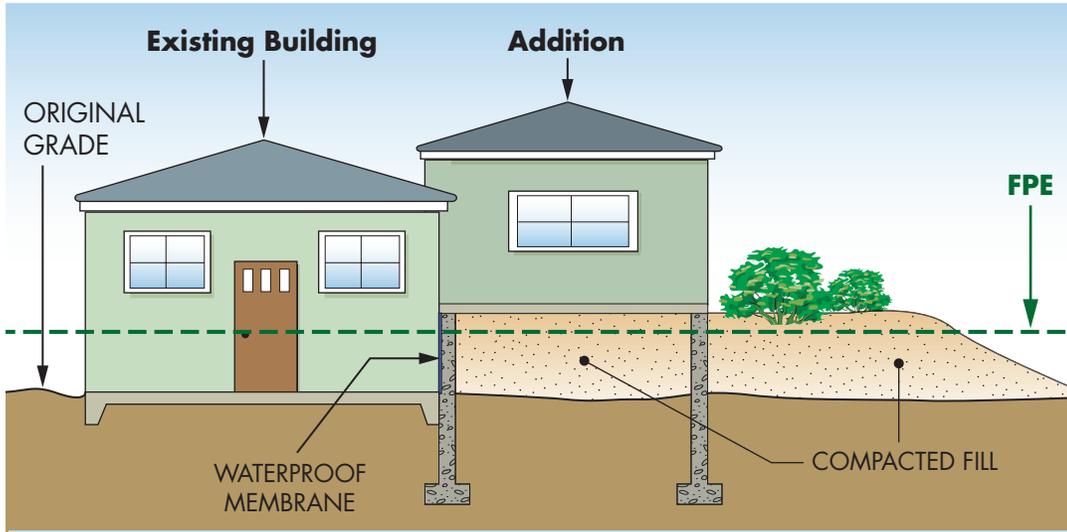
Important

Information

When communities determine an addition is substantial improvement, or an addition plus other improvements are substantial improvements, the addition and the existing building must be elevated in compliance with the floodplain requirements.

Community permit offices can help determine the requirements that 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.

Non-Substantial Improvement: Lateral Addition Only



Important

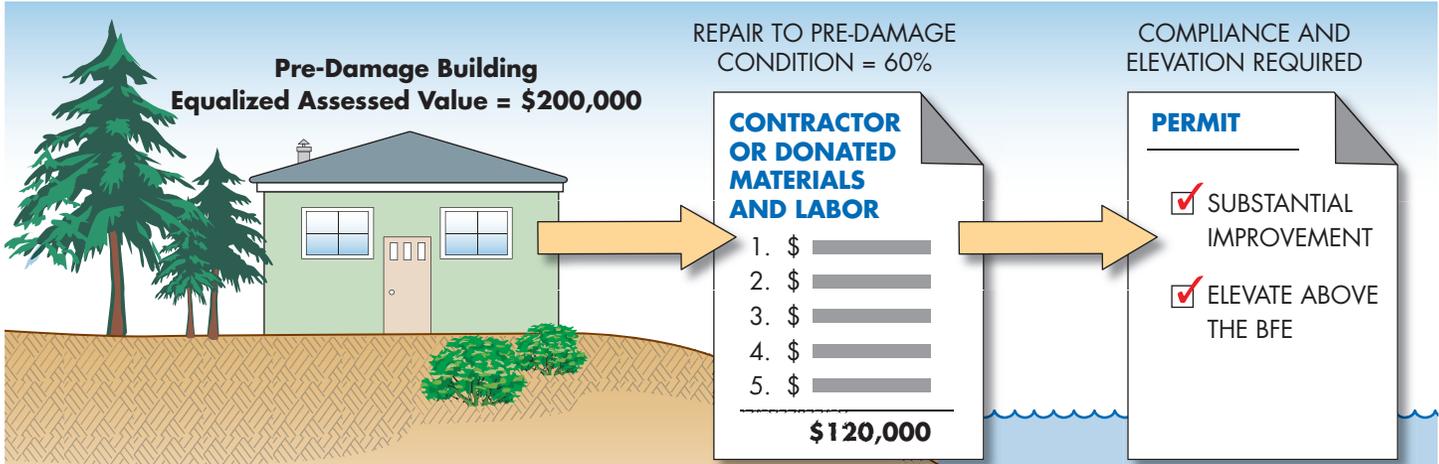
Information

In floodways, non-substantial improvement additions must be elevated on piers or columns (fill is not permitted).

Permits are required to build additions to buildings in SFHAs.

- If an addition is not a substantial improvement, then only the addition must be elevated.
- If an addition is a substantial improvement, the addition and the existing building must be elevated ([see page 56](#)).

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 ([see page 54](#)). If the costs are 50% or more of the pre-damage equalized assessed value of the building, then it is “substantially damaged” and must be brought into compliance, which may involve raising the building and other measures. Consult with local permit offices before repairs are started.

[See page 55](#) for an example of elevating an existing building.

Paying for Post-Flood Compliance

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

- Buildings are located in a mapped flood zone
- Buildings are covered by NFIP flood insurance, which includes Increased Cost of Compliance coverage
- Buildings have lowest floors below the BFE
- Buildings are substantially damaged by flooding
- Substantial damage may be one-time 50% or by repetitive flood damage in communities that enforce repetitive loss provisions
- Owners act quickly with their claims adjusters and community officials 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 buildings into compliance” with flood zone requirements.

USE THE ICC CLAIM TO:



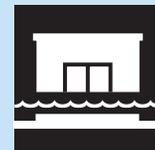
ELEVATE-IN-PLACE



RELOCATE TO HIGH GROUND

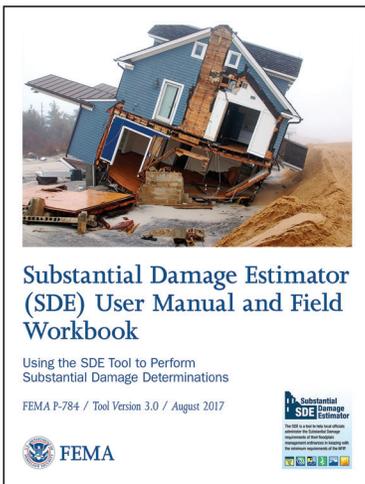


DEMOLISH



FLOODPROOF
(NON-RESIDENTIAL ONLY)

Estimating Substantial Damage



FEMA's SDE tool was developed to help State and local officials in collecting uniform information needed to make substantial damage determinations for residential and non-residential structures in accordance with local floodplain management requirements. The SDE tool:

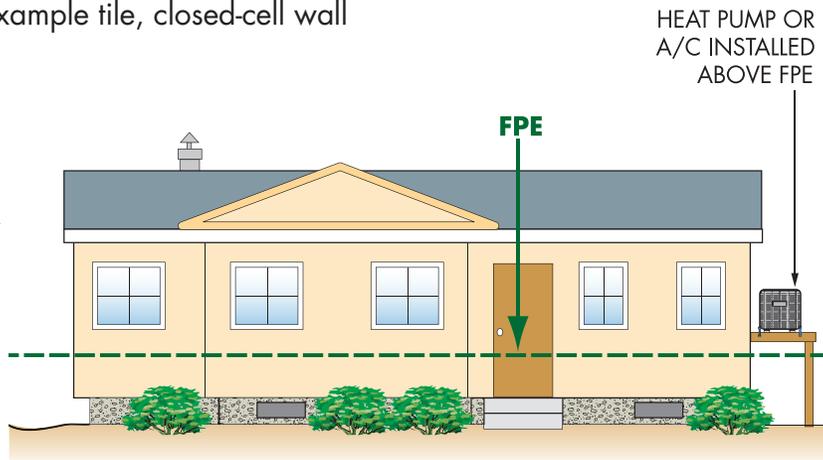
- Can be used to assess flood, wind, wildfire, seismic, and other forms of damage
- Helps provide timely substantial damage determinations so that reconstruction can begin following events that damage buildings
- Is used in conjunction with industry-accepted construction cost-estimating guides

Download the SDE software installation package, User Manual and Workbook, forms, worksheets and other materials at <https://www.fema.gov/media-library/assets/documents/18692>.

Non-Substantial Improvements Other than Additions

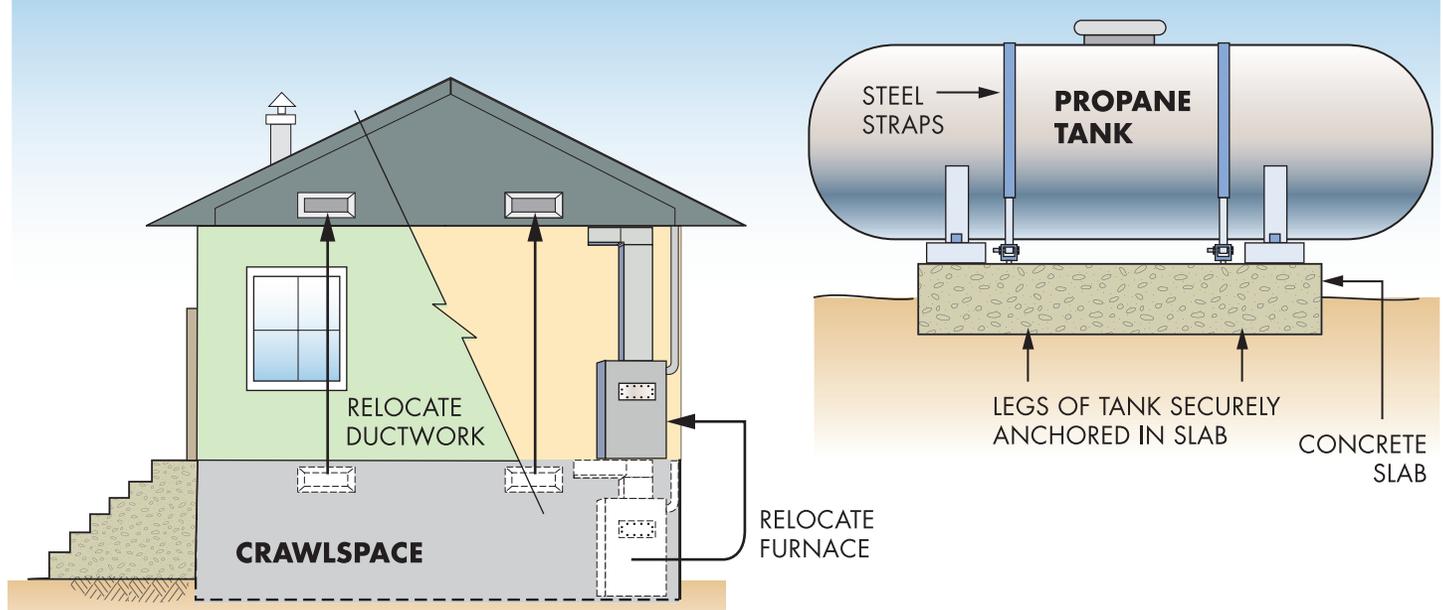
Proposed improvements are “non-substantial” if the costs are less than 50% of the equalized assessed value of the building. In these cases, buildings are not required to be brought into compliance. However, there are many things owners can do to reduce exposure to future flooding. Owners should consider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



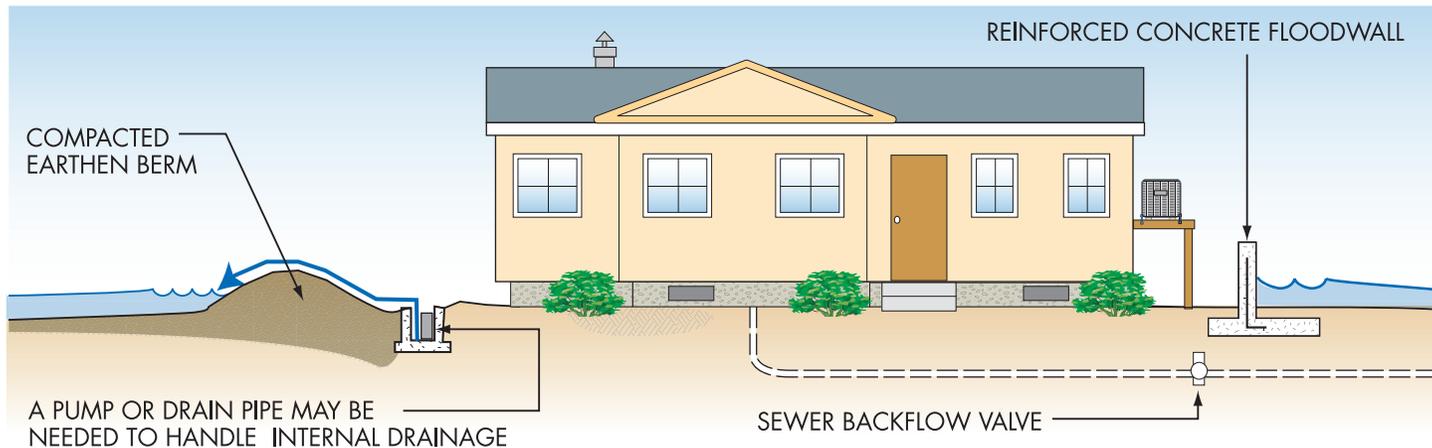
Note! ALL proposed work must be included in permit applications. If more work is proposed or undertaken after a permit is issued, community officials must determine whether the additional work changes the substantial improvement determination.

Some Flood Protection for Older Homes is Easy and Low Cost



Move fuse boxes, water heaters, furnaces, and ductwork out of crawlspaces and basements.
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 or basement.
Use flood-resistant materials when repairs are made.

Small Berms or Floodwalls May Protect Older Buildings

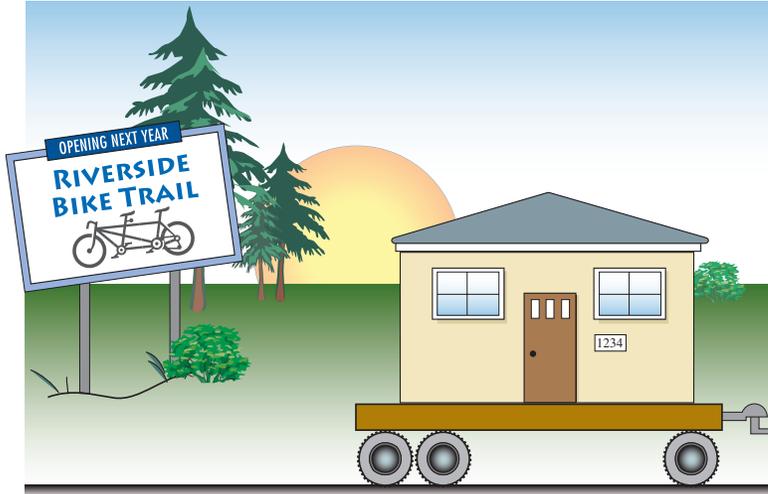


In areas where floodwater isn't expected to be deep, sometimes individual buildings can be protected by earthen berms or concrete floodwalls. Permits are required for these protection measures and extra care must be taken if sites are in floodways ([see page 32](#)). Small berms or floodwalls cannot be used to achieve compliance for new construction, substantially improved buildings, or substantially damaged buildings.

Important! These protective measures will not reduce your NFIP flood insurance premium or remove the property from the floodplain.

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 remove damaged homes. 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.

Wisconsin Emergency Management administers FEMA mitigation grant programs:

<https://dma.wi.gov/DMA/about/wem>

DNR administers the Municipal Flood Control Grant Program:

<https://dnr.wi.gov/aid/munfloodcontrol.html>

Be Prepared for Flood Emergencies

Everyone should be prepared for floods 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 workers will be on the scene after disasters, but they cannot reach everyone right away. Communities, families, and businesses should prepare before disasters occur by:

- Learning about natural hazards (Wisconsin communities participate in developing Hazard Mitigation Plans)
- Learning about community level flood preparation and the Community Resources [Toolbox](#) developed by the St. Paul District U.S. Army Corps of Engineers, including *Emergency Action Plan Guidance and Flood Fight Handbook*
- Making family and workplace emergency plans and knowing where to go if evacuations are required
- Putting together disaster kits with supplies to last a few days

Learn more about ReadyWisconsin at <https://readywisconsin.wi.gov/> and about preparing for emergencies at the American Red Cross (www.redcross.org). Also check with local emergency management agencies.

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>.



Useful Resources and Common Acronyms

- Wisconsin information about floodplain management, mapping and interactive floodplain maps, definitions and standards, local regulations, NFIP flood insurance, publications, fact sheets, grant opportunities, and community officials and homeowners and related links: <https://dnr.wi.gov/topic/Floodplains/>
- NFIP regulations, Title 44 CFR: www.fema.gov/national-flood-insurance-program/laws-and-regulations
- NFIP Technical Bulletins: www.fema.gov/media-library/resources-documents/collections/4
- CRS Resources: www.fema.gov/national-flood-insurance-program-community-rating-system

Common Acronyms

- BFE = Base Flood Elevation
- EC = Elevation Certificate
- FIRM = Flood Insurance Rate Map
- FPE = Flood Protection Elevation
- ICC = Increased Cost of Compliance
- NFIP = National Flood Insurance Program
- RFE = Regional Flood Elevation
- SFHA = Special Flood Hazard Area (100-year floodplain)

Want to Learn More?

- For information and advice on permits, contact local building or planning departments.
- To learn more about flood maps, go to www.fema.gov/national-flood-insurance-program-flood-hazard-mapping.
- FEMA's on-line publications can be found in the FEMA Library (www.fema.gov/library/) or by using an Internet search engine to search on the publication number or title.
- To learn about NFIP flood insurance, call an insurance agent. Most insurance companies write NFIP policies.
- To learn the importance of taking steps to financially protect homes and businesses from flood damage go to www.floodsmart.gov.
- Find out about Elevation Certificates and training for professional land surveyors by searching for Elevation Certificate at www.fema.gov.
- To join the Wisconsin Association for Floodplain, Stormwater, and Coastal Management and see workshop, course, and conference opportunities, go to <https://wafscm.org>.
- See upcoming trainings, subscribe to the Floodplain & Shoreland Management Notes newsletter, and view past newsletters at <https://dnr.wi.gov/topic/floodplains/>

**FLOODPLAIN & SHORELAND
MANAGEMENT Notes**

This **Quick Guide** may be downloaded from



Wisconsin Department of Natural Resources
dnr.wi.gov/topic/floodplains



Wisconsin Association for Floodplain, Stormwater and Coastal
Management
<https://wafscm.org> (see <Training and Education>)