

FLOODPLAIN MANAGEMENT IN MICHIGAN

Quick Guide




Rick Snyder, Governor
Dan Wyant, Director

Michigan Department of Environmental Quality

525 West Allegan Street • Lansing, MI 48933 • 517-373-1170

www.michigan.gov/deq



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This document will not be printed in mass quantities. It will only be posted on the MDEQ web site of: http://michigan.gov/deq/0,4561,7-135-3313_3684_3725_9441_,00.html for access.

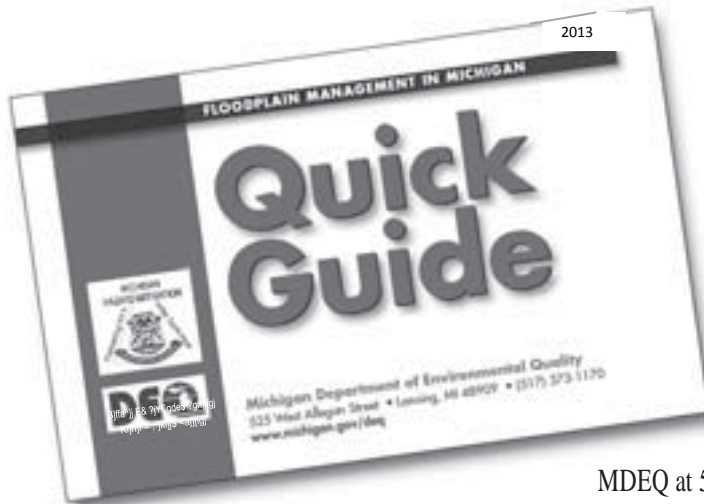
Persons accessing the site may then print
Portions of, or the entire, document from
that posting.

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About This Guide



This **Quick Guide** will help you understand why and how communities in the State of Michigan manage floodplains to protect people and property. Michigan's floodplain management and flood hazard mitigation programs have been active since 1967. Flood-prone communities adopt codes and ordinances that detail the rules and requirements. In case of conflict, that ordinance and not this publication must be followed. If you have questions, be sure to talk with your local planning or permit office.

Questions and comments on the **Quick Guide** can be directed to the MDEQ at 517-373-1170. More information about Michigan's Floodplain Management Program is on the web at www.michigan.gov/deq.

PREPARED BY

RCQUINN
CONSULTING, INC.

To learn more about preparing for floods and cleaning up afterward, see the list of useful resources on page 48.

Flood Insurance: Property Owner's Best Protection

Who needs flood insurance? Every homeowner, business owner, and renter in Michigan communities that participate in the National Flood Insurance Program may purchase a flood insurance policy – regardless of the location of the building.

Unfortunately, it's often after a flood that many people discover that their homeowner or business property insurance policies do not cover flood damages. Approximately 25% of all flood damages occur in low risk zones, commonly described as being "outside the mapped flood zone."



The MDEQ and the Emergency Management and Homeland Security Division of the Michigan State Police urge **YOU** to protect your financial future by getting a flood insurance policy. To purchase a policy, call your insurance agent. To get the name of an agent in your community, call the NFIP's toll free number 1(888)356-6329.

Why Do We Regulate the Floodplain?

- **To protect people and property.** Floodplain management is about building smart. It makes good sense. If we know part of our land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.
- **To make sure that federal flood insurance and disaster assistance are available.** Your community must join the NFIP and enforce floodplain regulations so that you can get flood insurance. If your community doesn't, then you can't get some types of federal financial assistance. Home mortgages will be hard to find, and you won't be able to get some types of state and federal loans and grants.
- **To save tax dollars.** Every flood disaster affects your community's budget. If we build smarter, we'll have fewer problems the next time the river rises. Remember, federal disaster assistance isn't available for all floods. And even when the President declares a disaster, your community still has to pay a portion of the costs of evacuation, temporary housing, repair, and cleanup.
- **To avoid liability and lawsuits.** If we know an area is mapped as a floodplain and likely to flood, if we know people could be in danger, and if we know that buildings could be damaged, it makes sense to take reasonable protective steps when we develop and build.
- **To reduce future flood losses in Michigan.** Floodplain development regulations are simply a "good neighbor" policy designed to protect our citizens from future flood losses. It is illegal to do any floodplain activity that may increase or divert flood waters onto neighboring properties. This helps keep flooding conditions from getting worse as more and more development takes place.

Community Responsibilities

To participate in the National Flood Insurance Program, your community agrees to:

- **Adopt and enforce** a flood damage prevention ordinance.
- **Require** permits for all types of development in the floodplain (see page 18).
- **Assure** that building sites are reasonably safe from flooding.
- **Estimate** flood elevations that were not determined by FEMA.
- **Require** new or improved 1 and 2 family homes and manufactured homes to be elevated above the Base Flood Elevation (BFE), the 100-year (1% chance) flood elevation.
- **Require** other buildings to be elevated or flood proofed.
- **Conduct** field inspections and cite violations.
- **Require** Elevation Certificates to document compliance (see pages 27 and 28).
- **Carefully** consider requests for variances.
- **Resolve** noncompliance and violations.
- **Advise** FEMA when updates to flood maps are needed.



**NATIONAL
FLOOD
INSURANCE
PROGRAM**

Turn Around Don't Drown™

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 18-24 inches of water.
- Be especially cautious at night when it is harder to recognize dangers.
- Just six inches of fast-moving water can knock you off your feet.



Looking for Floodplain Information?

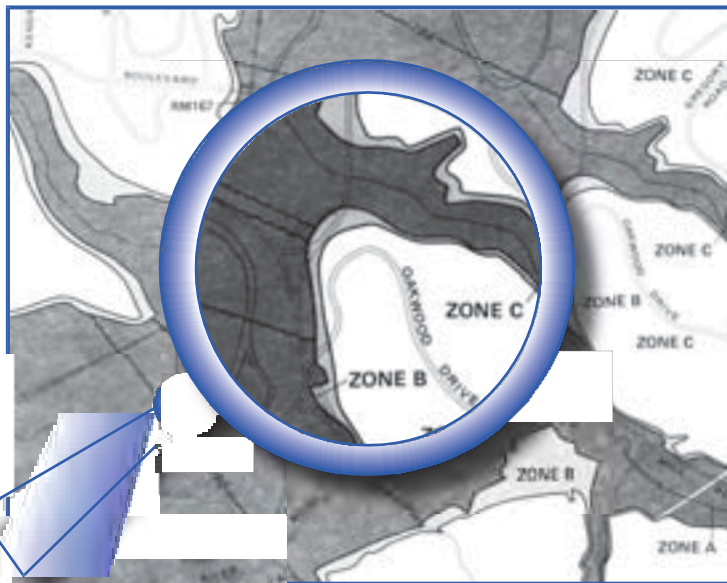
Need a fast answer? Visit your community's planning or permit office where flood maps are available for viewing by the public.



- FEMA publishes Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) for communities in Michigan.
- Most FIRMs show Special Flood Hazard Areas and floodways. Some FIRMs show floodplains delineated using approximation analyses (see page 15).
- Print a scan or order a flood map from the FEMA Map Service Center online at msc.fema.gov.
- Floodplain studies may be prepared by local governments, state and federal agencies, special districts, or by engineering companies working for private property owners and developers. Studies must be approved by the MDEQ (see page 16)
- Not all waterways have designated floodplains – but all waterways will flood, even though a floodplain study may not have been prepared.

Contact the MDEQ District Floodplain Engineers for more information or to help determine if your building or property is in a mapped floodplain (see page 8).

FIRMette: Flood Maps Online



You can order paper maps or digital maps on CD-ROM.

- You can find and print a FIRM by using FEMA's online tools.
- Go to <https://msc.fema.gov/portal/home>.
- Click "Map Search" link (top of page) and select "Flood Maps" from the product pull-down menu.
- Enter the address and click the "Go" button. On the "Addresses Found" page, select your address (far left).
- On the Map Search Result Page, click the green view button (far right).
- Click on "Make a FIRMette." When the map appears, drag the red translucent box (upper left hand corner) to the area you want to print.
- Select paper size; select the scale, north arrow, and title block.
- Your FIRMette will be displayed and you can print or save the file as an Adobe Acrobat (pdf) or graphic image file (gif).

MDEQ District Field Offices

Any construction, fill or alteration of a floodplain of a river, stream, or drain which has a drainage area greater than or equal to 2 square miles requires a state floodplain permit.

Contact District Floodplain Engineers at:

1 Gwin: 906-346-8300

2 Cadillac: 231-775-3960

3 Grand Rapids: 616-356-0500

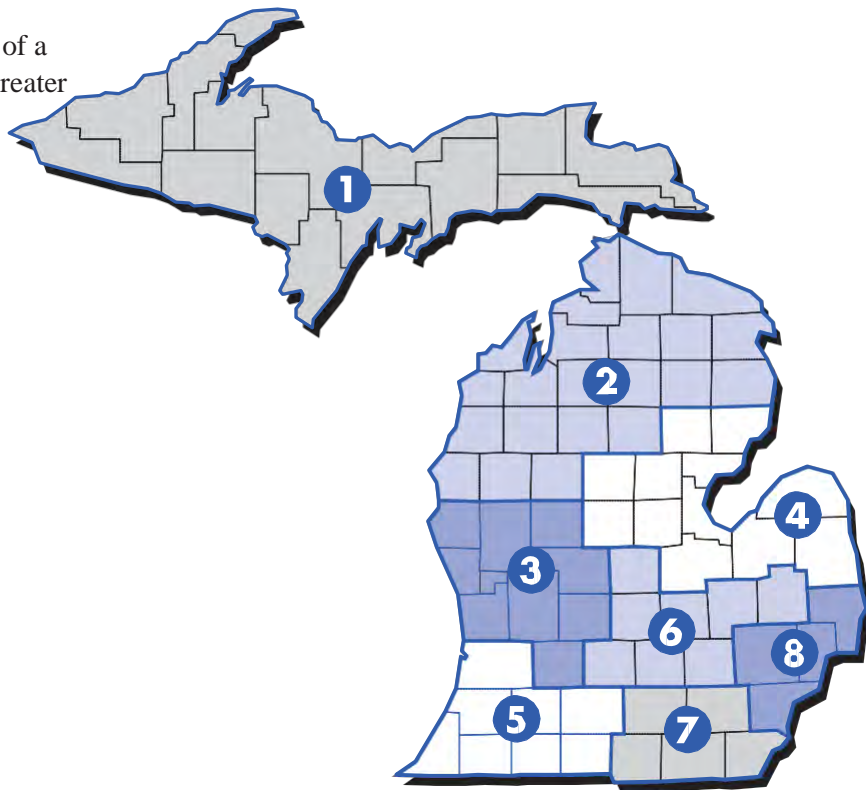
4 Saginaw Bay: 989-894-6200

5 Kalamazoo: 269-567-3500

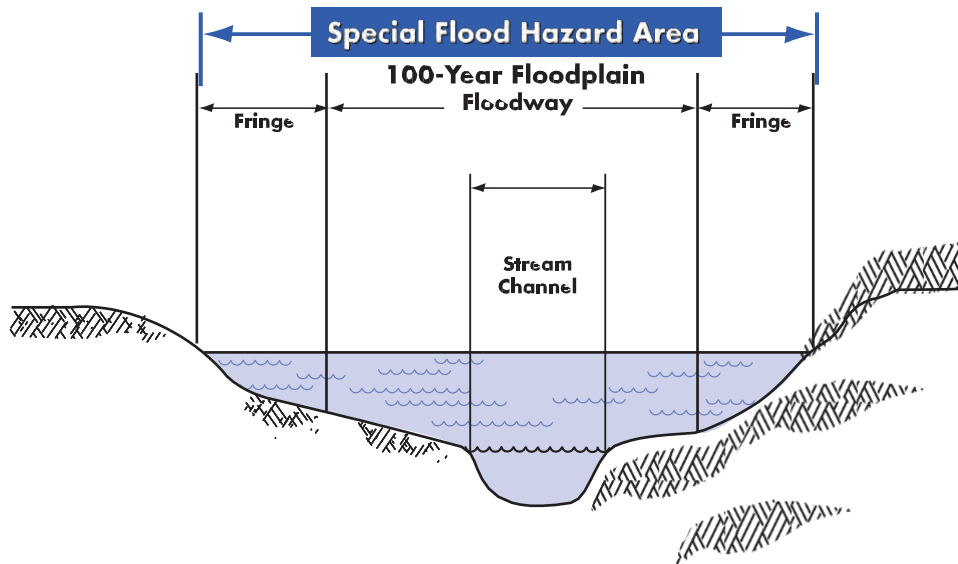
6 Lansing: 517-335-6010

7 Jackson: 517-780-7690

8 Southeast MI (Warren): 586-753-3700



Understanding the Riverine Floodplain



Terms and Definitions

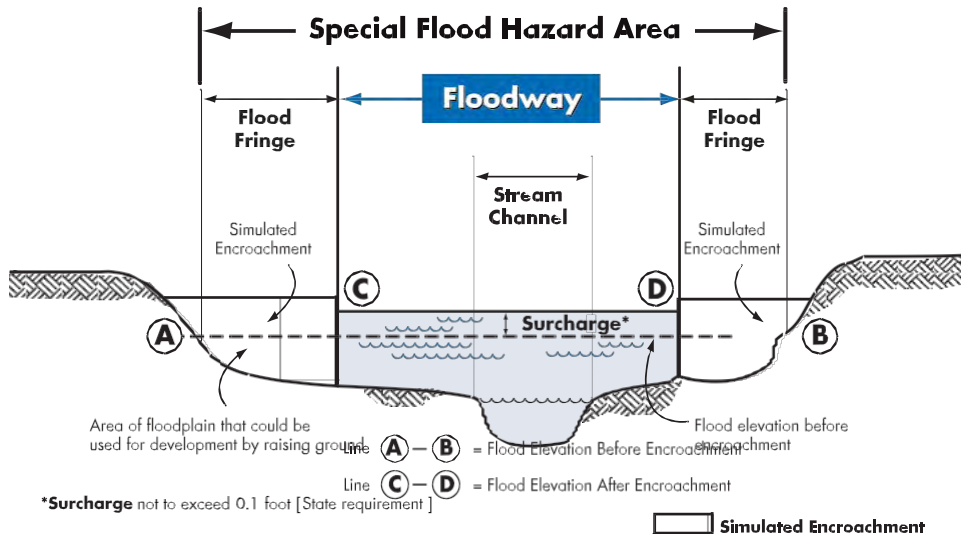
The Special Flood Hazard Area (SFHA) is that portion of the floodplain subject to inundation by the base flood and/or flood-related erosion hazards. SFHAs are shown on FHBMs or FIRMs as Zones A, AE, A1-A30, AH, and AO.

The Base Flood is the flood having a 1% chance of being equaled or exceeded in any given year; also called the "100-year flood."

See page 10 to learn about the floodway, the area of the floodplain where floodwaters usually flow faster and deeper.

For floodplains with Base Flood Elevations, check the Flood Insurance Study to find the Flood Profile which shows water surface elevations for different frequency floods (see page 14).

Understanding the Floodway



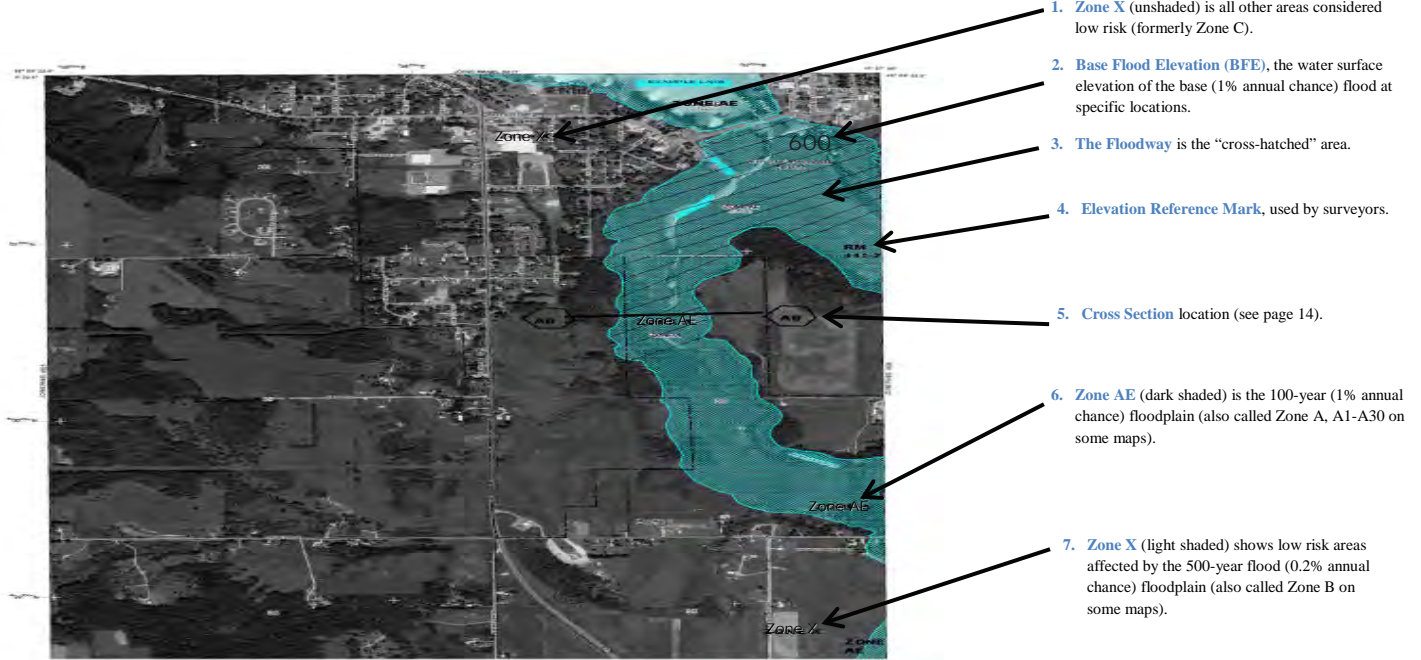
Terms and Definitions

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

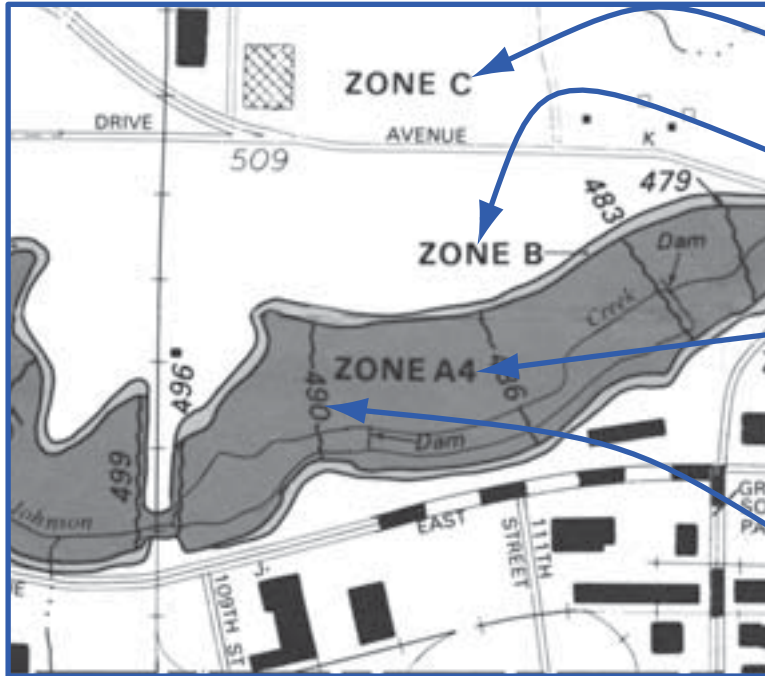
Computer models of the floodplain are used to simulate “encroachment” or fill in the flood fringe to predict where and how much the base flood elevation would increase.

Local permits may not be issued until after a state floodplain permit is obtained from the MDEQ. **NOTE:** residential construction is prohibited in the floodway! For other floodway activities, you may need a qualified engineer to make sure your project won’t increase flooding on other properties.

New Format Flood Insurance Rate Map



Old Format Flood Insurance Rate Map

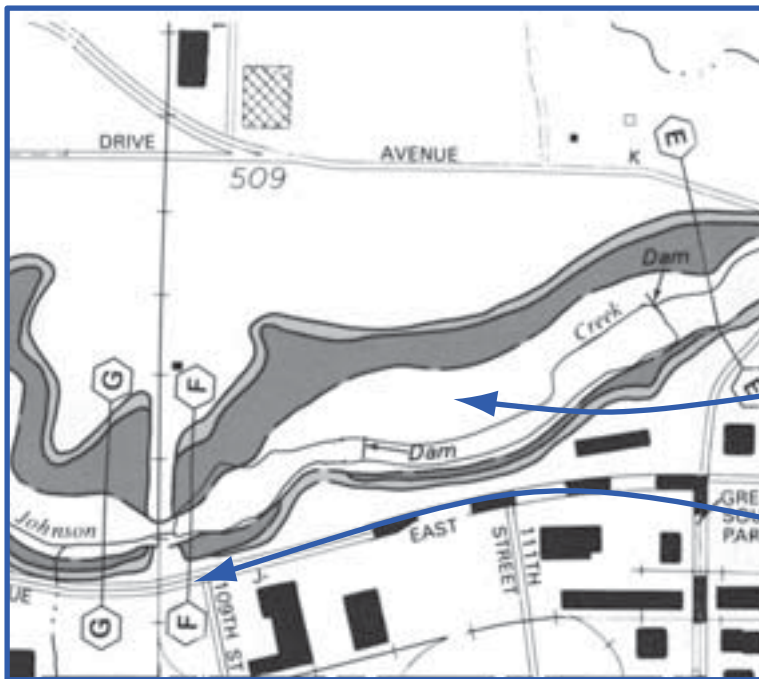


FLOOD HAZARD ZONES

- 1 **Zone C** (unshaded or Zone X) is all other areas, considered to be low-risk.
- 2 **Zone B** (or shaded Zone X) is subject to flooding by the 500-year flood (0.2% annual chance), and is a moderate risk area.
- 3 **Zone A, Zones A1-A30 and Zone AE** are subject to flooding by the base or 100-year flood (1% annual chance), and are considered high-risk areas.
- 4 **Base Flood Elevation (BFE)**, the water surface elevation of the 100-year flood at specific locations.

FEMA prepares Flood Insurance Rate Maps (FIRMs) to show areas that are at high risk of flooding after intense or major storms. Many FIRMs show the flood elevation (how high the water may rise), called the Base Flood Elevation.

Old Format Flood Boundary and Floodway Map



Important Information

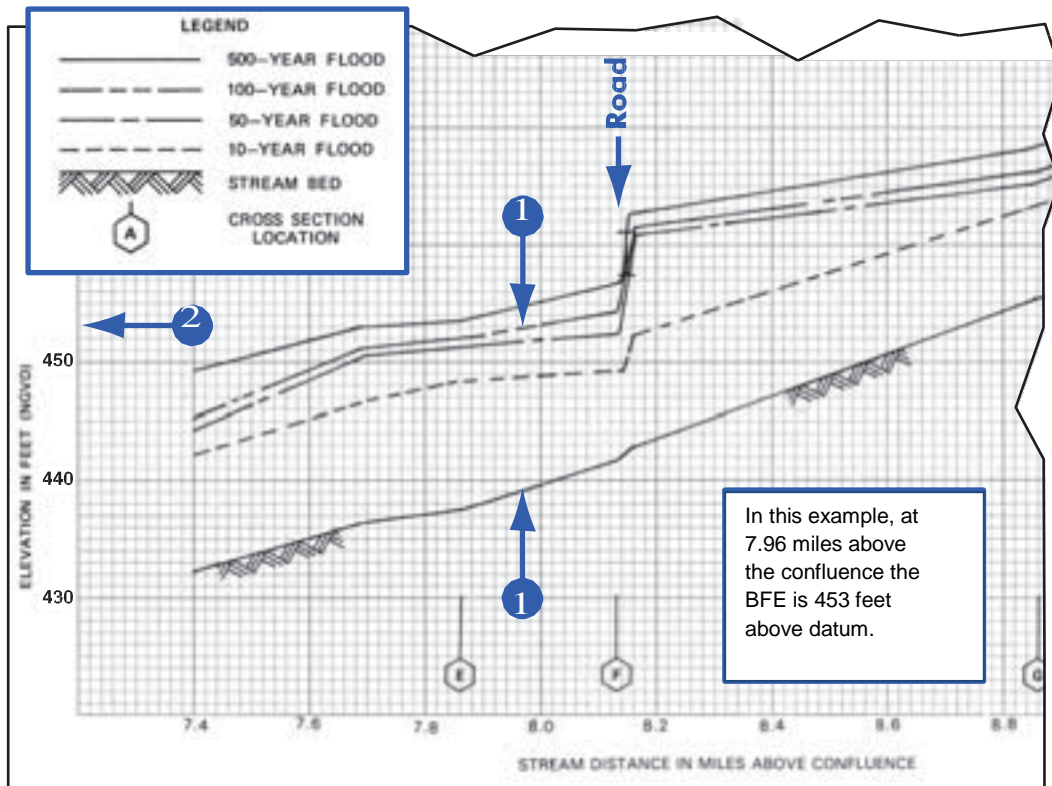
Floodway maps do not show flood zones or BFEs. Check the companion FIRM for that information. Page 12 shows the FIRM that matches the map clip to the left.

1 The **Floodway** is the “white” area along the waterway.

2 **Cross Section** location, where ground surveys determined the shape of the land and how constrictions such as bridges and culverts affect the flow of floodwater.

FEMA prepares Floodway maps as companions to many FIRMs. You should check to see if your project will be in the Floodway because additional engineering may be required (see page 30).

Use the Riverine Flood Profile to Determine BFEs



Flood profiles can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for flood frequencies other than the 100-year flood.

1 On the effective flood map, locate your site by measuring the distance, along the center line of the stream channel, from a road or cross section, for example **E** or **F**.

2 Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the elevation.

Approximate Flood Zones and Unnumbered A Zones

Approximate flood zones are drawn based on approximate methods. FEMA checked other sources such as the U.S. Army Corp of Engineers, the U.S. Geological Survey, the state, local officials, and sources of historic records.

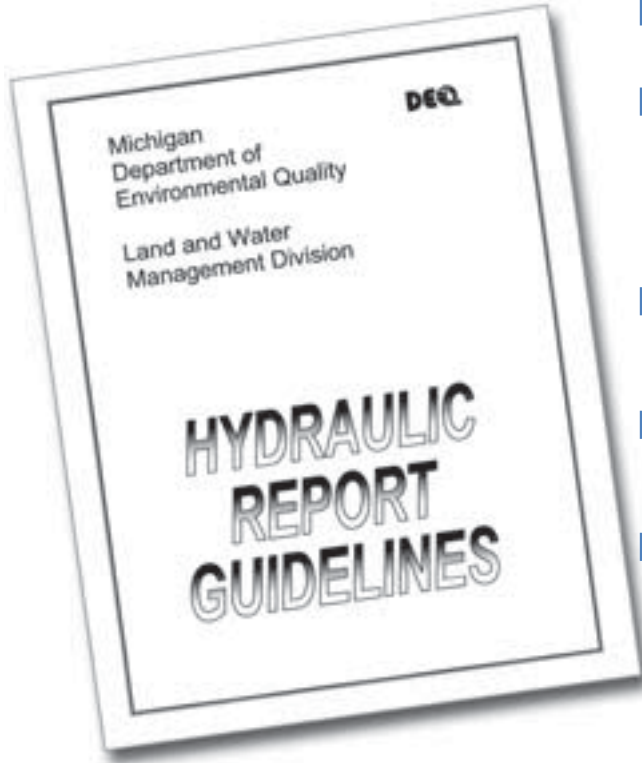


If you need help determining the BFE, contact the MDEQ District Floodplain Engineer (page 8).

Sometimes new flood studies are required in order to determine the floodplain and BFE. The MDEQ reviews and approves flood studies, a requirement that must be met before the studies can be used for regulatory purposes.



State Approval of Floodplain Studies



- The cornerstone of reliable floodplain management is good floodplain mapping.
- The MDEQ may require you to provide new floodplain information if the current map shows only approximate or outdated flood information. If development proposals involve more than 5 acres or 50 lots, then federal regulations require permit applicants to provide a detailed floodplain study.
- New engineering studies typically are required for projects that involve changing the floodplain, for example placing large quantities of fill, altering a waterway, or working in the floodway.
- Engineers can download the Hydraulic Report Guidelines (search by title at www.michigan.gov/deq) or request a copy by contacting the District Floodplain Engineers (page 8).
- The MDEQ must approve new floodplain studies and information used for regulatory purposes.

Flood Map Revisions Issued by FEMA

1. **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, such as ground elevation relative to the BFE, SFHA, and the building. Lenders may waive the flood insurance requirement if the LOMA documents that a building is on ground above mapped floodplain.
2. **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, floodplain 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.
3. **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 shows that a building on fill is above the BFE.
4. **Physical Map Revision (LOMR PMR)** may be issued for major physical floodplain changes that require engineering analyses, such as bridges, culverts, channel changes, flood control measures, and large fills that change the BFE or Floodway. Physical map revisions are also issued when a new study updates or improves the FIRM.

Requests for map revisions must be coordinated through your community and the MDEQ.



Important

Information

Check FEMA'S Flood Hazard Mapping Web Site for more information about map revisions concerning Homeowners and Engineers/Surveyors.



<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

Activities that Require State and Local Permits

- Constructing new buildings
- Additions to existing buildings
- Substantially improving existing buildings
- Placing manufactured (mobile) homes
- Subdivision of Land
- Temporary buildings and accessory structures
- Agricultural buildings
- Parking or storage of recreational vehicles
- Temporary or permanent materials storage, including gas/liquid tanks and sand/gravel
- Roads, bridges, and culverts
- Fill, grading, excavation mining, and dredging
- Altering stream channels



YOU NEED STATE AND LOCAL PERMITS FOR ALL OF THESE ACTIVITIES.

Safe Uses of the Floodplain



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

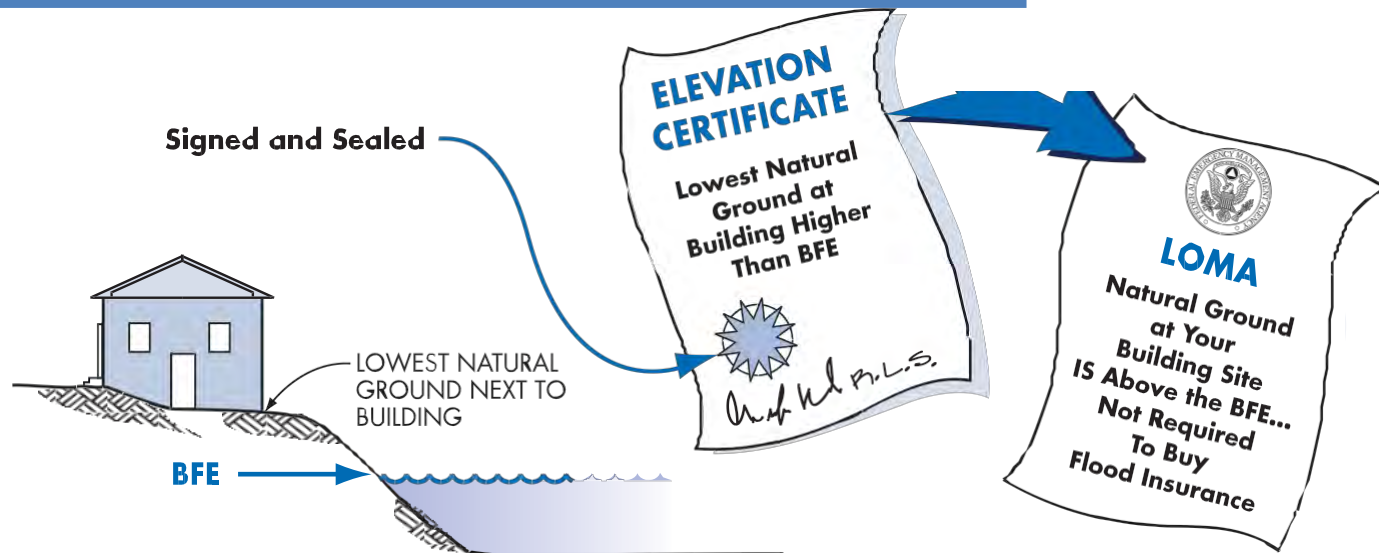


Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

Let the floodplain do its job – if possible, keep it as natural open space. Other low damage uses: recreational areas, playgrounds, reforestation, parking, gardens, pasture, created wetlands.

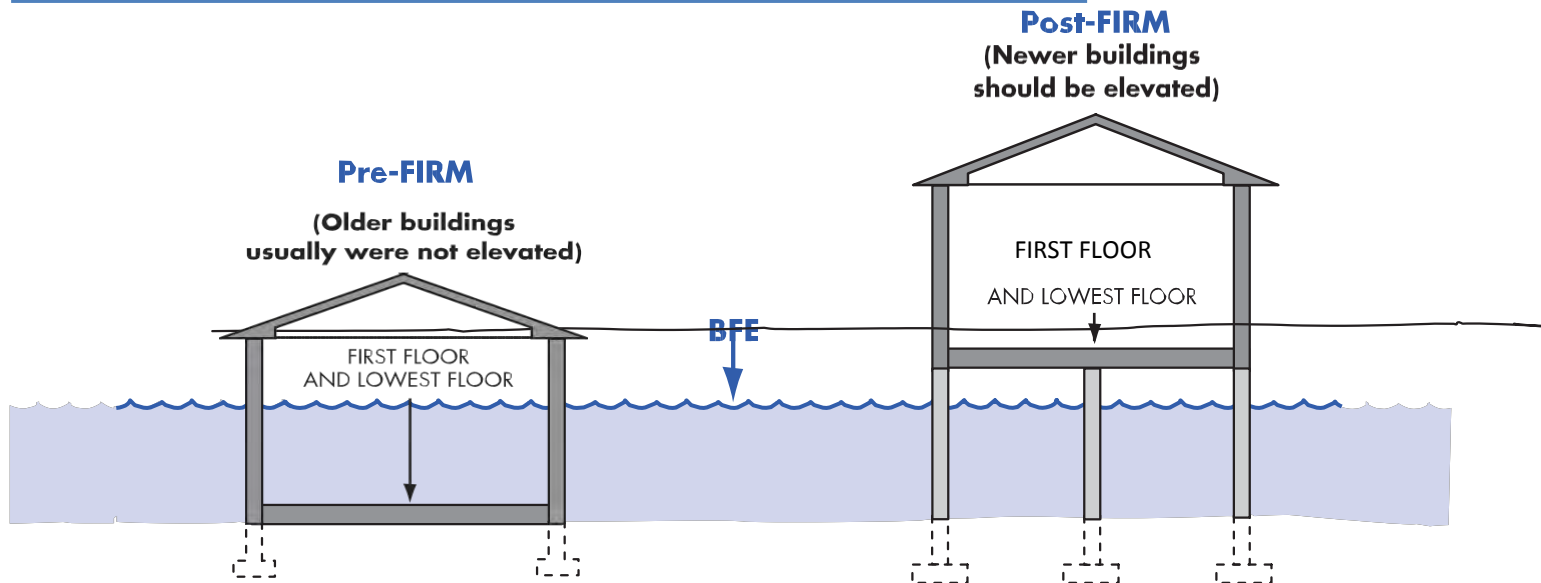
Is your building Site Higher than the BFE?



If your land is shown on the map as “in” the floodplain, but the natural ground of your building site is higher than the Base Flood Elevation (BFE)... get a surveyor, engineer, or architect who is authorized to certify elevations to complete a FEMA Elevation Certificate (EC). Submit the EC with an application to FEMA and a Letter of Map Amendment may be issued. This is the **ONLY** way to remove the requirement to buy flood insurance.

Keep the EC and LOMA with your deed, if will help future buyers.

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

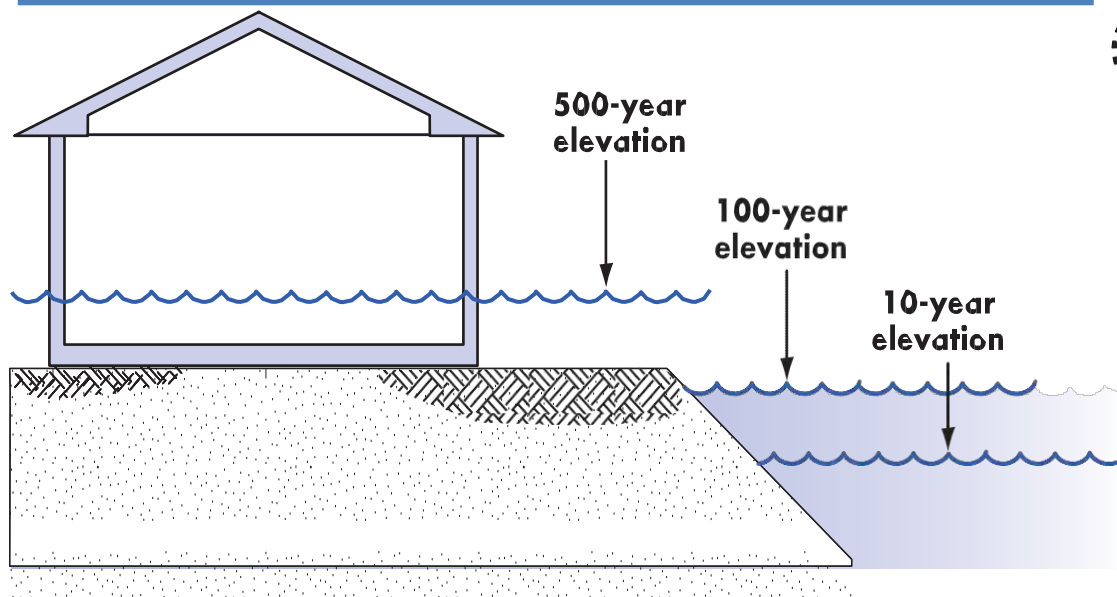


A building is Pre-FIRM if it was built before the date of your community's first FIRM.

If built after that date, a building is Post-FIRM.

Additions, improvements, or repairs may require permits (see pages 41, 42, and 43).

Nature Doesn't Read Maps

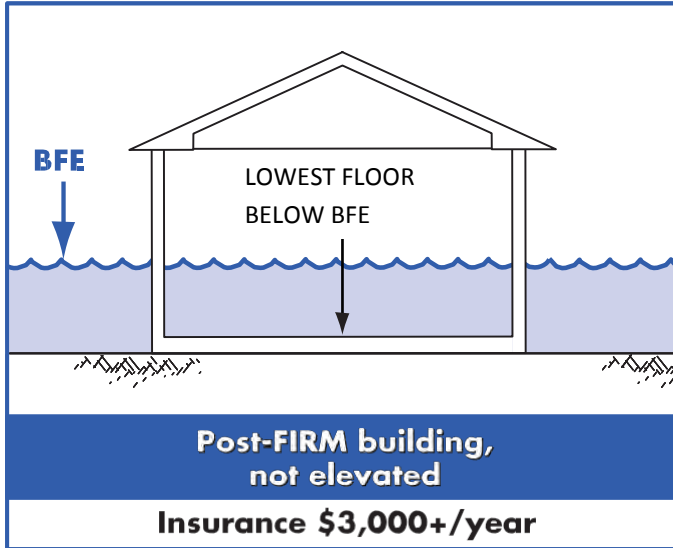


Important Information

Many people don't understand just how risky the floodplain can be. There is a 26% chance that a non-elevated home in the floodplain will be damaged during a 30-year mortgage period. The chance that a major fire will occur during the same period is only 1%!

CAUTION! Nature doesn't read the flood map! Major storms, flash floods, and increased upland development can cause flooding that rises higher than the 100-year elevation (BFE). Consider safety – protect your home or business by building higher. See page 26 to see how this will save you money on insurance.

Think Carefully Before You Seek A Variance



Very specific conditions must be satisfied to justify a variance.

- Good and sufficient cause
- Unique site conditions
- Individual non-economic hardship
- If in the floodway, the project causes no increase in flood levels.

A variance that allows construction below the BFE does not waive your lender's flood insurance requirement. Flood insurance will be very expensive – perhaps more than \$3,000 per year (see page 26)!

Think carefully about seeking a variance to build below the BFE. Not only will your property be more likely to get damaged, but insurance will be very costly. If your community has a pattern of inconsistent variances, FEMA can impose sanctions – costing you even more!

Some Key Application Review Steps

The Permit Reviewer has to Check Many Things. Some of the Key Questions are:

- Is the site in a mapped or unmapped floodplain?
- Is the site in the mapped floodway?
Have other state and federal permits been obtained?
- Is the site “reasonably safe from flooding”?
- Does the site plan show the Base Flood Elevation?
- Does the site plan show existing ground contours?
- Is substantial improvement of an older building proposed?
- Is an addition proposed?
- Will new buildings and utilities be elevated properly?
- Will manufactured homes be properly elevated and anchored.
- Do the plans show an appropriate and safe foundation?




Get the State/Federal Permit First



Important Information

You must get the State/Federal permit before you apply for a local building permit.

JOINT PERMIT APPLICATION (partial)

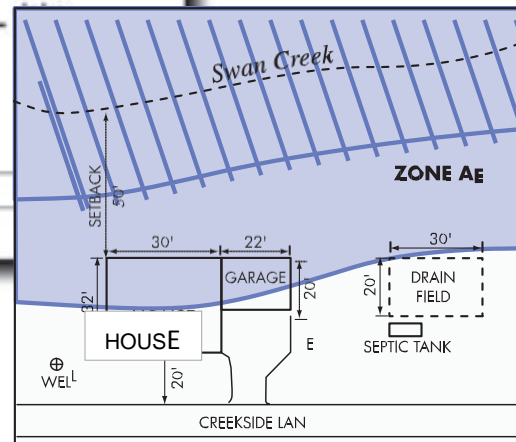
 **US Army Corps of Engineers (USACE)** **MI Department of Environmental Quality DEQ**

PROJECT LOCATION INFORMATION
 Address 375 Creekside Ln. Name of Water Body Swan Creek

Project Types ☐ industrial ☐ commercial ☒ multifamily ☒ single-family
 (check all that apply) ☐ building addition ☒ new building/structure ☐ renovation/restoration

Project is on, within, or involves: ☐ stream ☐ river ☐ ditch/drain ☐ pond ☐
 (check all that apply) ☐ floodway area ☒ 100-year floodplain

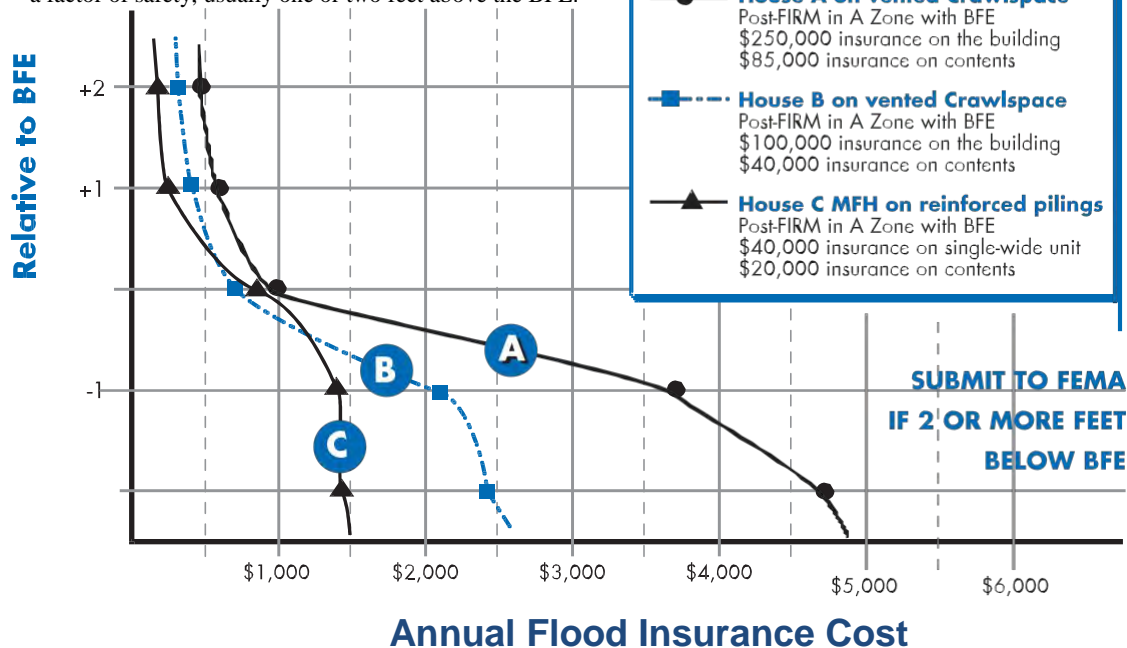
DESCRIBE PROPOSED PROJECT
House with crawlspace, garage, well, on-site septic, 300 cubic yards fill



Download the Joint Permit Application from www.michigan.gov/deq (click on Permits, then scroll down to the chart below, under the LAND heading, click on DEQ/USACE Joint Permit Application). Contact MDEQ's District Floodplain Engineers for assistance (see page 8).

Freeboard: Go the Extra Foot!

Want to save some money and have peace of mind at the same time? Then add Freeboard to build higher than the minimum elevation requirement! Freeboard is a factor of safety, usually one or two feet above the BFE.



Important Information

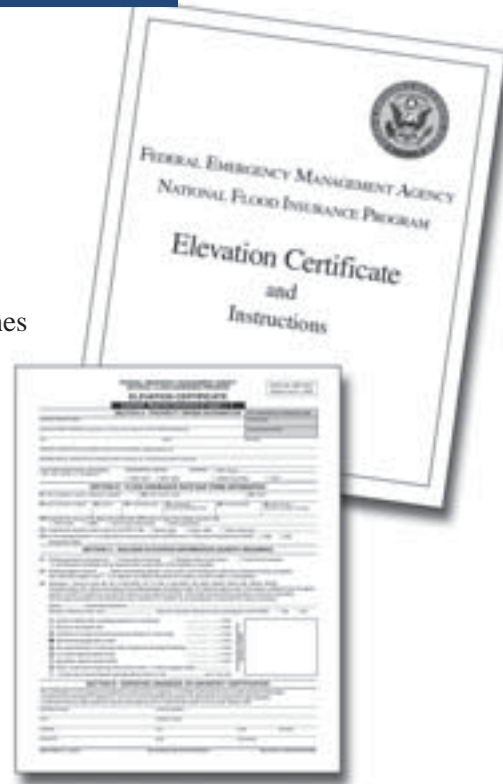
NOTE: Flood insurance rates and various fees change from time to time. Rather than specific costs for insurance, this figure gives a feel for how much difference just a foot or two can make.

Remember!

The community may be able to grant a variance, but the owner will probably still be required to buy flood insurance. Imagine trying to sell a house if the bank requires coverage that costs over \$3,000 a year!

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.”
- When the floodplain has BFEs, the EC must be signed and sealed by a land surveyor engineer, or architect authorized by law to certify elevation information.
- A community official may complete the EC for sites in AO zones and A zones without BFEs.
- It can be used to show that sites are natural ground above the Base Flood Elevation (see page 20).
- It is used to verify that buildings are elevated properly (see page 28).
- Insurance agents use the EC to write flood insurance policies.



By itself, the EC cannot be used to waive the requirement to get flood insurance. See page 17 to learn about Letters of Map Amendment.

Completing the Elevation Certificate

ELEVATION CERTIFICATE (partial)
Important: Read the instructions on pages 1-7

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

Elevation reference mark used RM166 Does the elevation reference mark used appear on the FIRM? ☒ Yes ☐ No

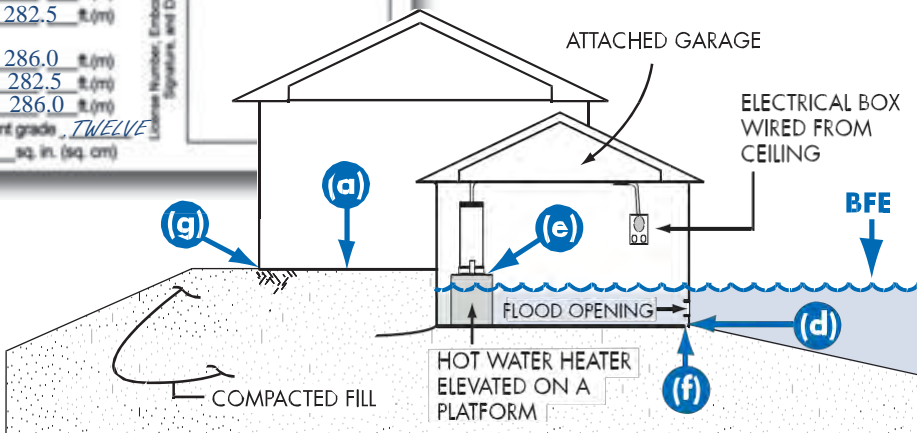
<input type="checkbox"/> a) Top of bottom floor (including basement or enclosure)	<u>286.0</u> ft.(m)
<input type="checkbox"/> b) Top of next higher floor	<u>NA</u> ft.(m)
<input type="checkbox"/> c) Bottom of lowest horizontal structural member (V zones only)	<u>NA</u> ft.(m)
<input type="checkbox"/> d) Attached garage (top of slab)	<u>282.5</u> ft.(m)
<input type="checkbox"/> e) Lowest elevation of machinery and/or equipment servicing the building	<u>286.0</u> ft.(m)
<input type="checkbox"/> f) Lowest adjacent grade (LAG)	<u>282.5</u> ft.(m)
<input type="checkbox"/> g) Highest adjacent grade (HAG)	<u>286.0</u> ft.(m)
<input type="checkbox"/> h) No. of permanent openings (flood vents) within 1 ft. above adjacent grade	<u>TWELVE</u>
<input type="checkbox"/> i) Total area of all permanent openings (flood vents) in C3h	<u>1,280</u> sq. in. (sq. cm)

(License Number, Embossed Seal, Signature, and Date)

Elevation Certificate (partial)

In this example, the BFE is 285.

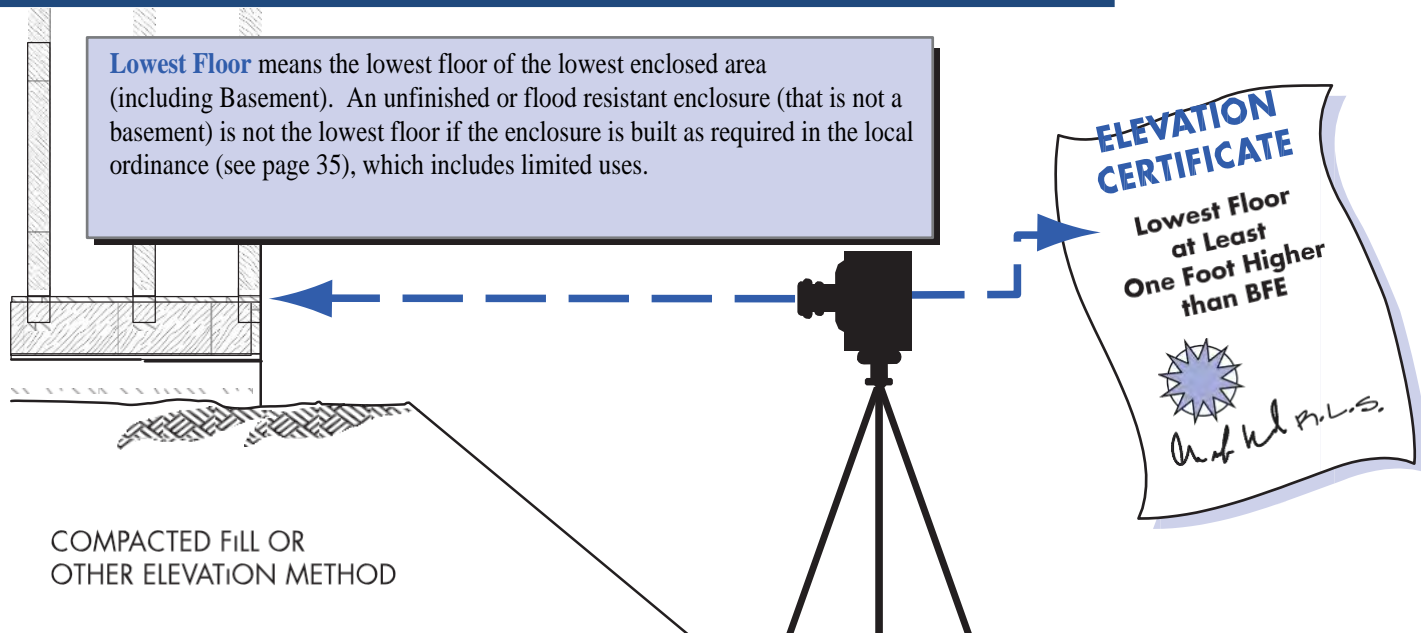
The slab-on-grade house was elevated on fill 1' above the BFE, and the vented garage is 2.5' below the BFE.



Download the Elevation Certificate form from FEMA's web page (see page 27). The Elevation Certificate includes diagrams for eight building types. Several points must be surveyed.

Paperwork is Important – for You and Your Community

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 built as required in the local ordinance (see page 35), which includes limited uses.



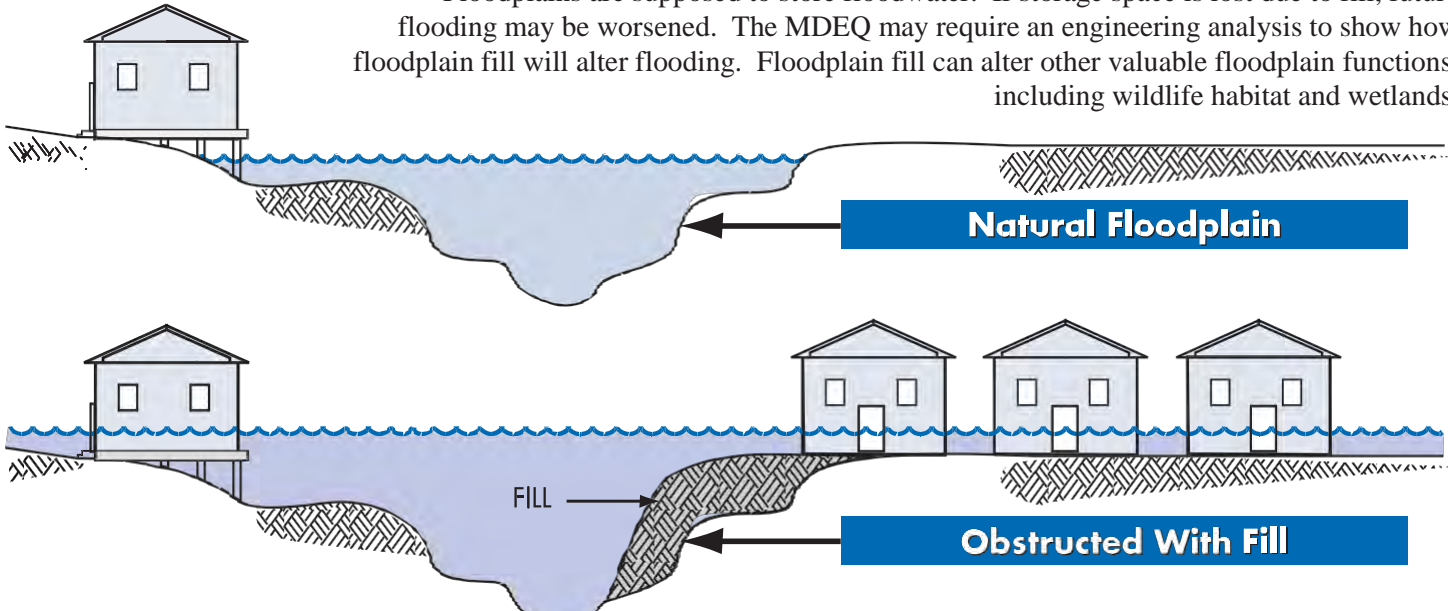
Before you get a Certificate of Occupancy, you will be required to submit an Elevation Certificate form. As soon as your lowest floor is set, get the form filled out and sealed by an authorized professional (page 27).

This form is important!

It proves that you built correctly, and is used to get the lowest cost flood insurance.

Floodplain Fill Can Make Things Worse

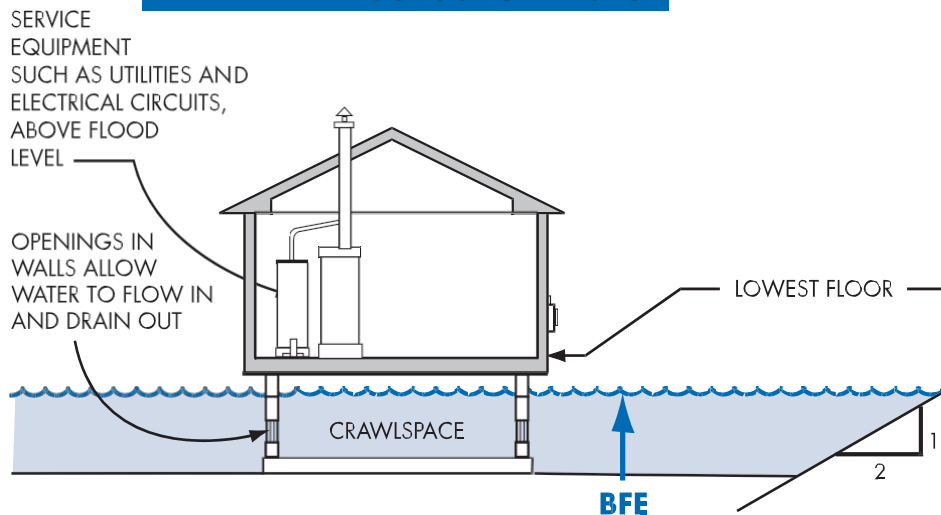
Floodplains are supposed to store floodwater. If storage space is lost due to fill, future flooding may be worsened. The MDEQ may require an engineering analysis to show how floodplain fill will alter flooding. Floodplain fill can alter other valuable floodplain functions, including wildlife habitat and wetlands.



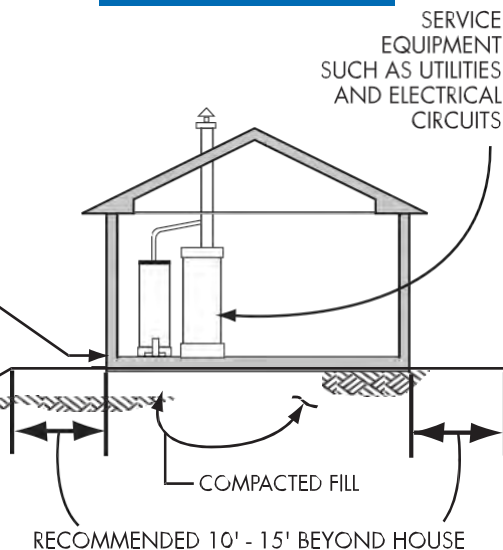
Make sure your floodplain fill project won't harm your neighbors. Floodway fill is allowed only if compensating excavation is provided or if an engineering evaluation demonstrates that "no harmful increase" in flood level will result.

How to Elevate Your Floodplain Building

Elevate on Foundation Walls



Elevate on Fill

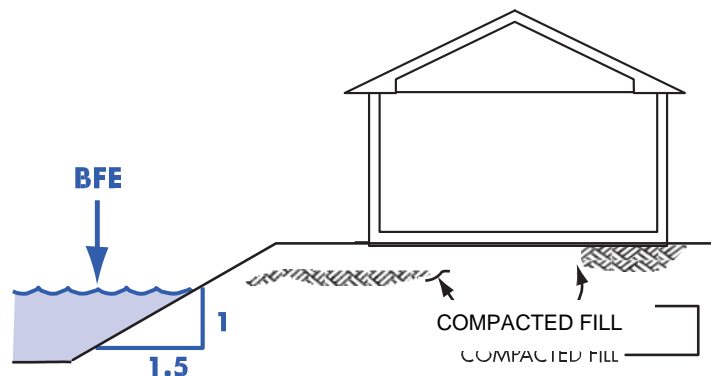


CAUTION! Enclosures (including crawlspaces) have some special requirements, see page 35. Note: When the walking surface of the lowest floor is at the minimum elevation, under-floor utilities and ductwork are not allowed. Fill used to elevate buildings must be properly compacted (see page 32).

Compaction of Floodplain Fill

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 floodplain requirements, floodplain fill should:

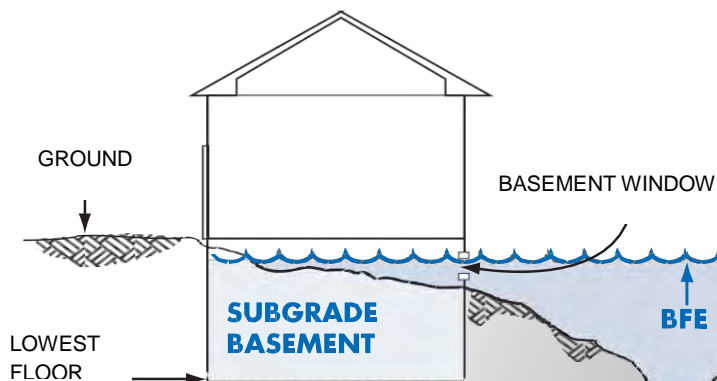
- Be good clean soil, free of large rocks, construction debris, and woody material (stumps, roots)
- Be machine compacted to 95 percent of the maximum density (determined by a design professional)
- Have graded side slopes that are not steeper than 1:1.5 (one foot vertical rise for every 1.5 feet horizontal extent)
- Have slopes protected against erosion (vegetation for “low” velocities – determined by a design professional)



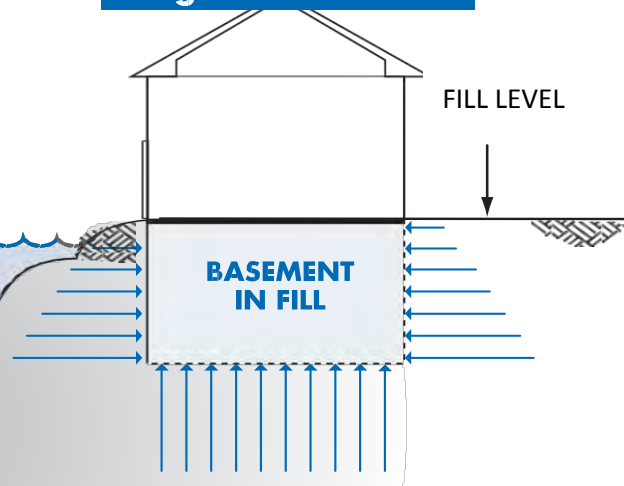
Your community may ask for certification of the elevation, compaction, slope, and slope protection materials. Your engineer or design professional can find more information in FEMA’s technical guidance for Letters of Map Revision based on Fill (FEMA Form MT-1).

Basements Are Unsafe

Not Allowed



Might be Allowed

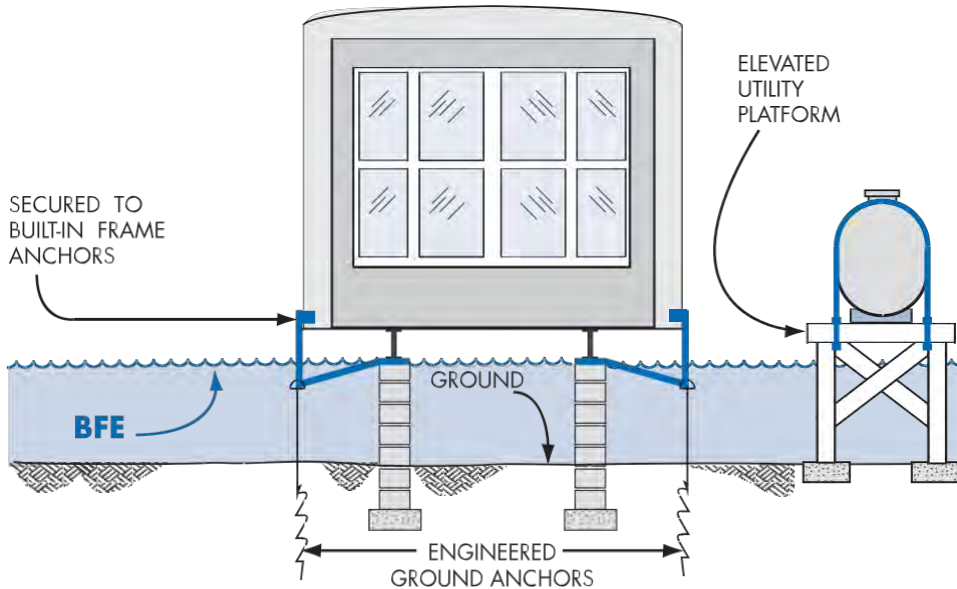


Terms and Definitions

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

New basements below the BFE are not allowed. An inch of water over the sill and the entire basement can fill. Excavating a basement into fill doesn't always make it safe, pressure from saturated ground can damage the walls. Basements can be designed and built under certain circumstances. Check with your local permit office – the community must certify that a filled site is “reasonably safe from flooding.”

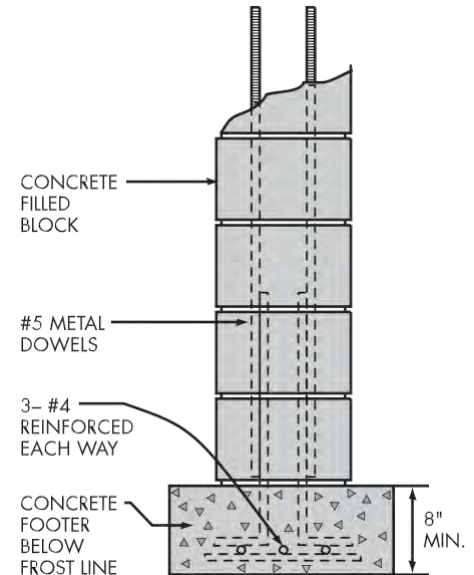
Manufactured Homes Deserve Special Attention



Manufactured homes must be anchored to resist flotation, collapse, or lateral movement by being tied down in accordance with your community's ordinance and the Michigan Residential Code 2009.

Experience shows that manufactured homes are easily damaged. As little as one foot of water can cause substantial damage.

Dry stacked blocks are not acceptable – they will **NOT** withstand a flood.



Enclosures Below the BFE



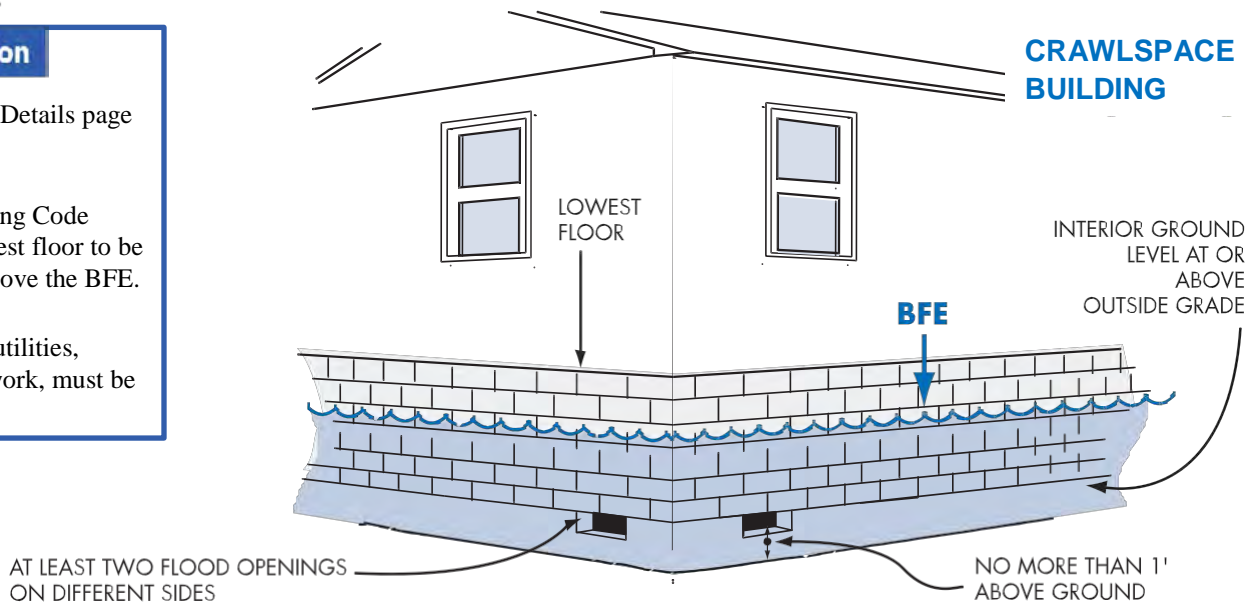
Important

Information

See Crawlspace Details page 36).

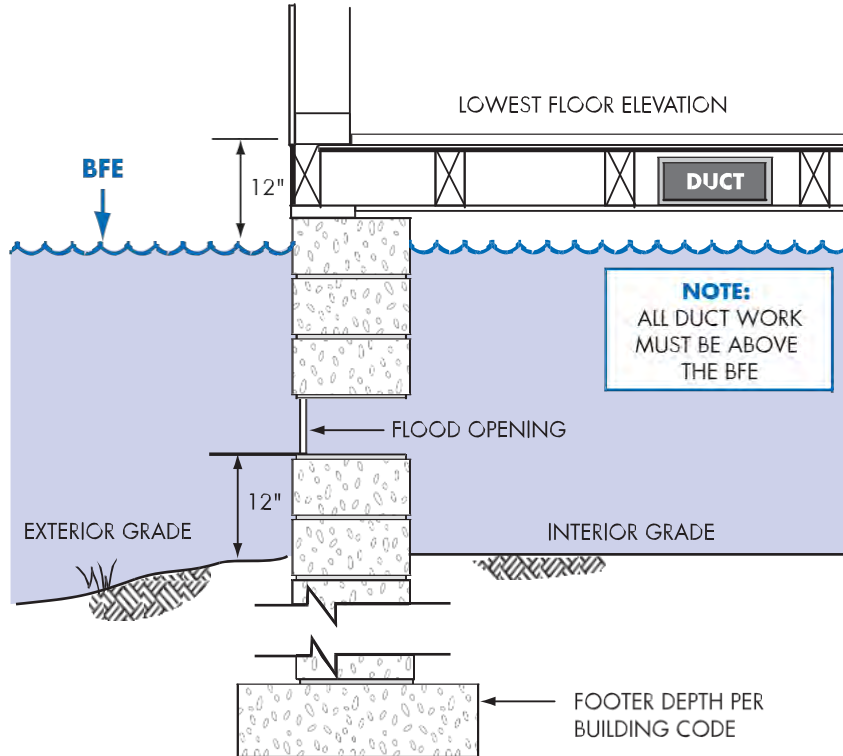
Michigan Building Code requires the lowest floor to be at least 1 foot above the BFE.

All under-floor utilities, including duct work, must be above the BFE.



A crawlspace is one way to elevate just a couple of feet. For best flood protection and drainage, the interior ground surface should be the same as the outside ground level along at least one side. Check with the local permit office for restrictions. In all cases, the following are required: openings/vents, elevated utilities and ductwork, flood resistant materials, and limitations on use.

Crawlspace Details



- The Lowest Floor Elevation must be at least 1 foot above the BFE.
- The bottom of flood openings must be no more than 1 foot above grade.
- Total area of flood openings is 1 square inch for every square foot of enclosed area.
- A 25' x 45' building needs, 1,125 sq. in. net of opening.
- A standard ventilation unit, with screen, provides 42 sq. in. of opening.
- Standard ventilation units must be disabled in the "open" position to allow water to flow in and out.
- Interior and exterior grades should be equal on at least two sides.

Utility Service Outside Buildings

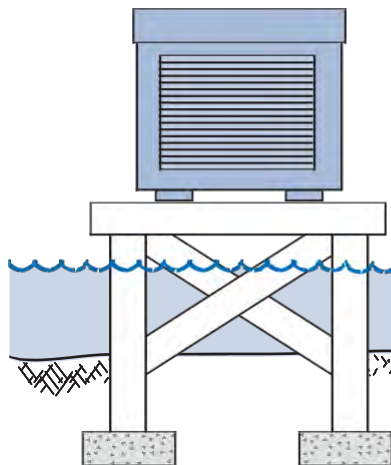


Important

Information

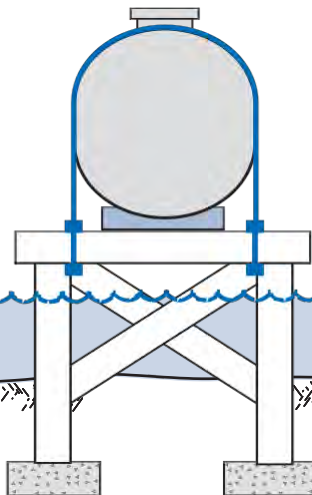
Fuel and propane tanks may cause explosion and pollution risks during flood conditions! Even shallow water can create large buoyancy forces on tanks, so extra care must be taken to ensure that all tanks are anchored.

**Heat Pump or A/C
on Platform**

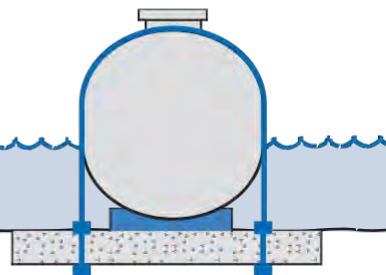


BFE

**Fuel or Propane Tank
Anchored on Platform**

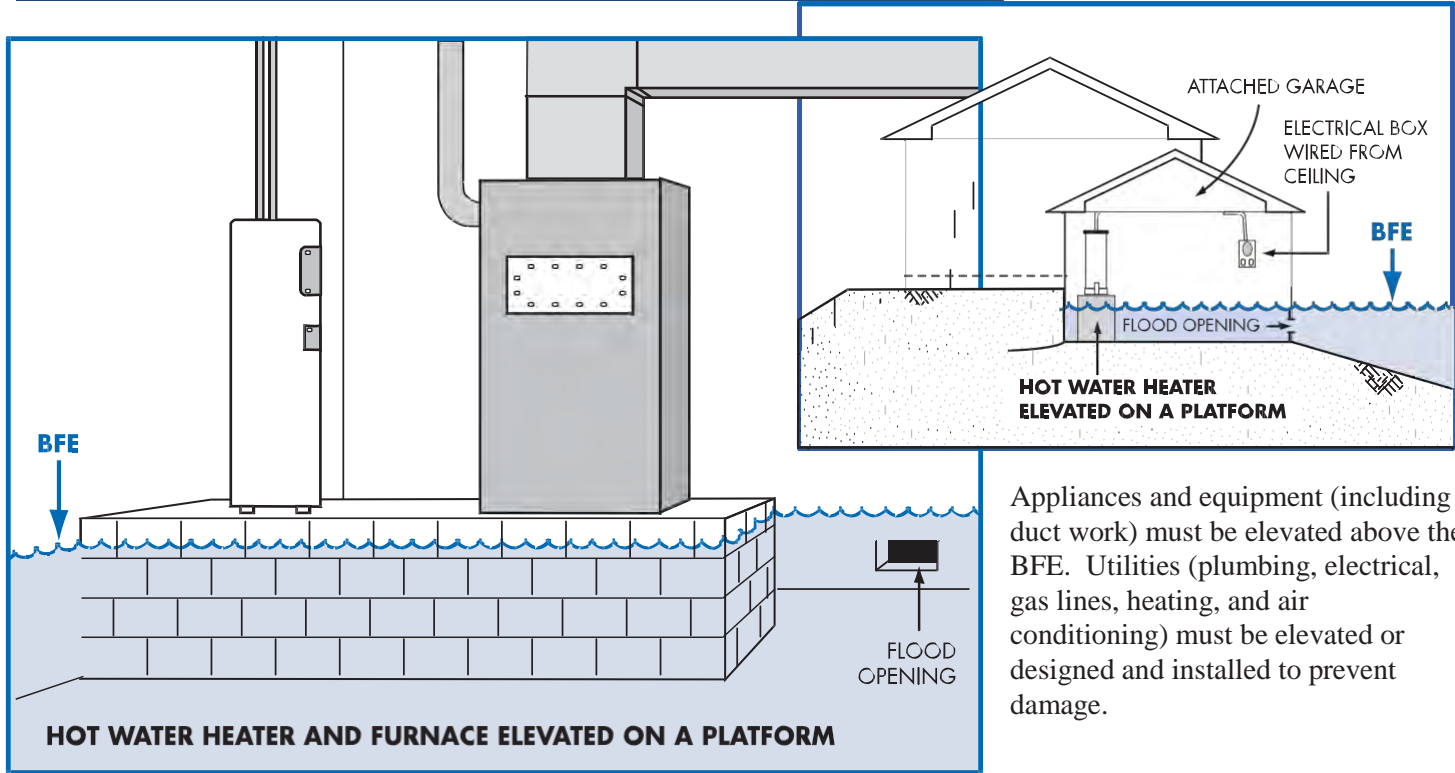


**Fuel or Propane Tank
Anchored to Prevent Flotation**



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

Utility Service Inside Enclosures

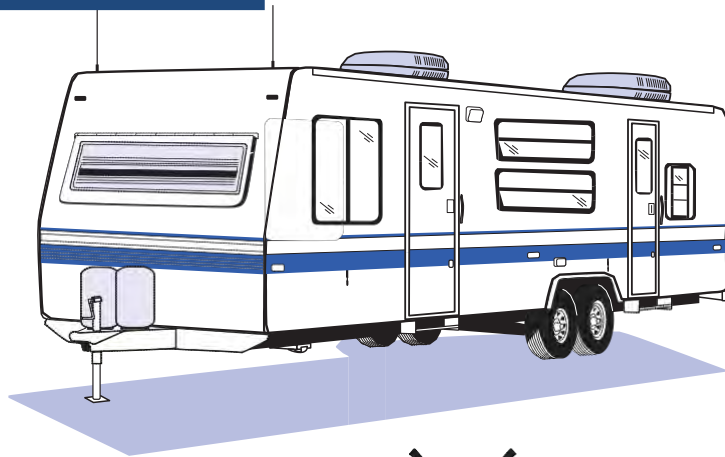


Appliances and equipment (including duct work) must be elevated above the BFE. Utilities (plumbing, electrical, gas lines, heating, and air conditioning) must be elevated or designed and installed to prevent damage.

RECREATIONAL VEHICLES

In a flood hazard area, an RV must:

- Be licensed and titled as an RV or park model (not as a permanent residence)
- Be built on a single chassis
- Have inflated wheels and be self-propelled or towable by light truck
- Have no attached deck, porch, or shed
- Be used for temporary recreational, camping, travel, or seasonal use (no more than 180 days)
- Have quick-disconnect sewage, water, and electrical connectors



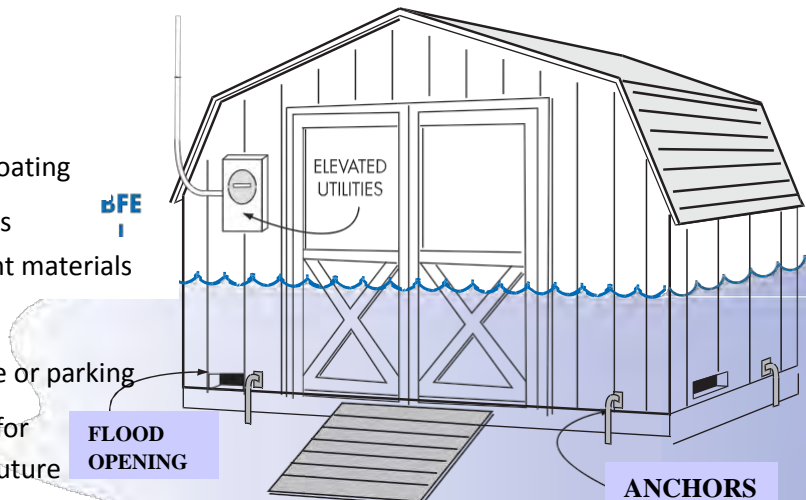
Camping near the water?

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

RVs that do not meet these conditions must be installed and elevated like Manufactured Homes, including permanent foundations and tie-downs (see page 34).

Accessory (Appurtenant) Structures

- Not habitable
- Not habitable
- Anchored to resist floating
- Flood openings/vents
- Built of flood resistant materials
- Elevated utilities
- Used only for storage or parking
- Cannot be modified for different use in the future



Even small buildings are “development” and state and local permits or variances with noted conditions are required. They must be elevated or anchored and built to withstand flood damage. **Caution!** Remember, everything inside is likely to get wet when flooding occurs.



Terms and Definitions

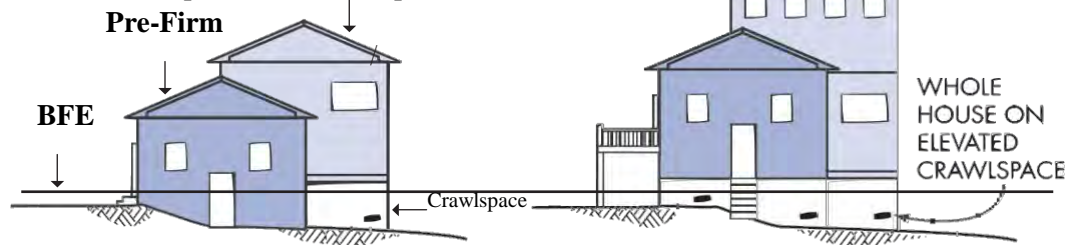
Accessory (Appurtenant) Structure

means a structure that is located on the same parcel of land as a principle structure and whose use is incidental to the use of the principle structure. Accessory structures should be no more than a minimal investment, may not be used for human habitation, and must be designed to minimize flood damage.

Examples: detached garages, carports, storage sheds, pole barns, and hay sheds.

Planning to Make Alterations, Repairs or Additional Improvements to Your Floodplain Building?

Addition not required to be elevated; but, should be to minimize potential flood impacts



Improvement Costs are <50% of Existing Structure's Market Value

Improvement Costs are >50% of Existing Structure's Market Value

Terms and Definitions

Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (excluding land value) before the improvement is started. This term includes structures which have incurred **substantial damage**, regardless of the actual repair work performed (see page 43).



Important Information

Floodplain buildings can be improved or altered, but special rules may apply!

Check with your State and local permit office. Additions that increase the building footprint may have to be built above the BFE.

The cost to correct previously cited violations of state or local health, sanitary, or safety codes to provide safe living condition can be excluded from the cost calculation.

Alteration of a registered historic structure is allowed, as long as it will continue to meet the criteria for listing as a historic structure.

Planning to Make Alterations, Repairs or Additional Improvements to Your Floodplain Building? Continued



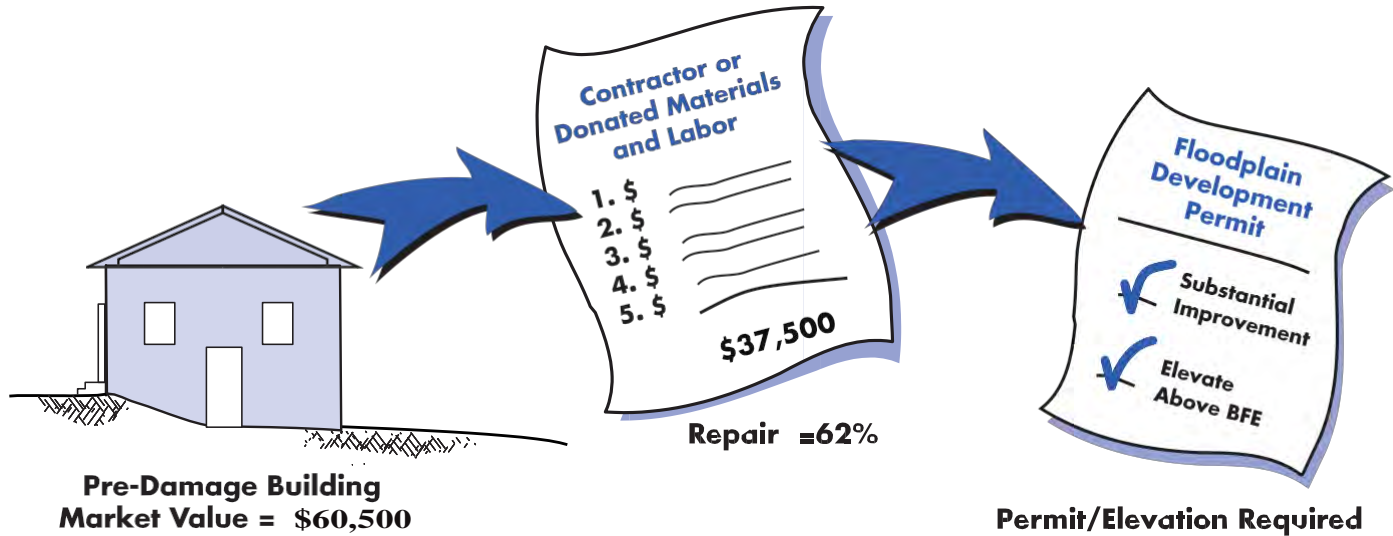
Terms and Definitions

Addition – an extension or increase in floor area or height of a building or structure.

Alteration – any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

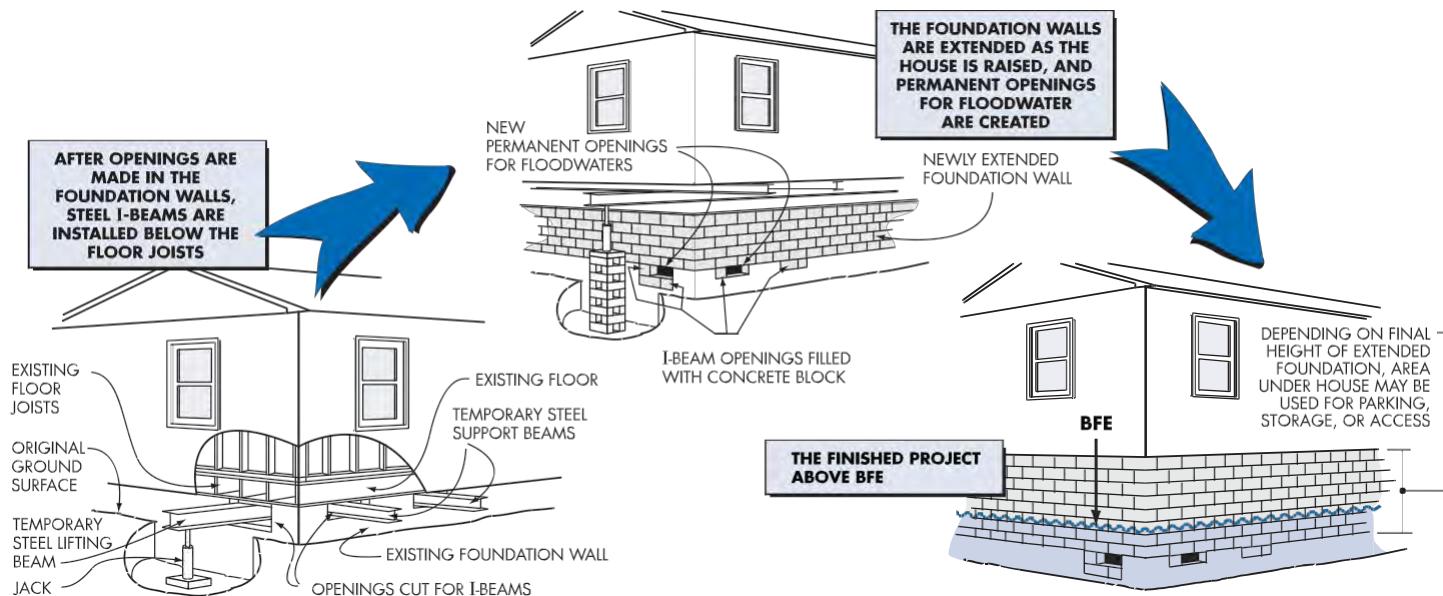
Repair – the reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

What About After Damages?



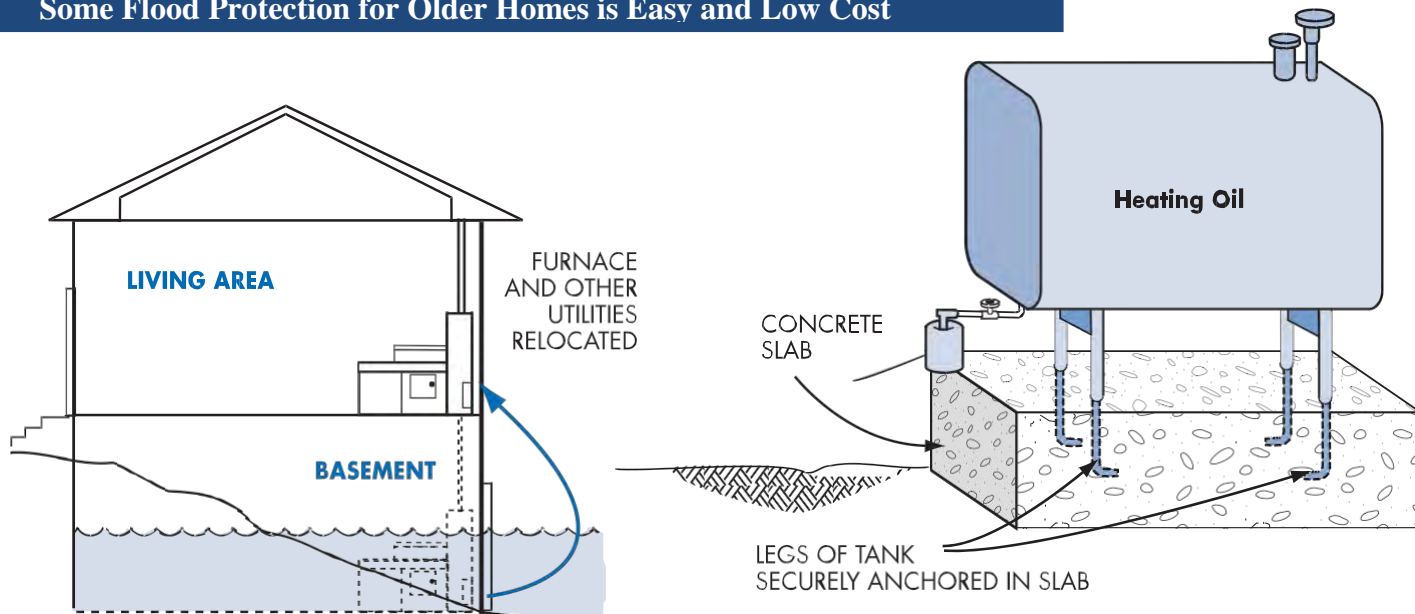
A permit is required to repair damage from any cause – fire, flood, wind, or even a truck running into a building. Check with your community permit office to be sure. You will be asked to provide a detailed cost estimate for repairs. If the cost to repair is 50% or more of the market value, the entire building must be elevated. See page 45 for more information about elevating an existing building on a crawlspace.

Elevating an Existing Building



This is one way to elevate an existing building to comply with floodplain regulations. If your insured building is damaged by flood, you may be eligible for an Increased Cost of Construction payment. The state and FEMA can help with more information and options.

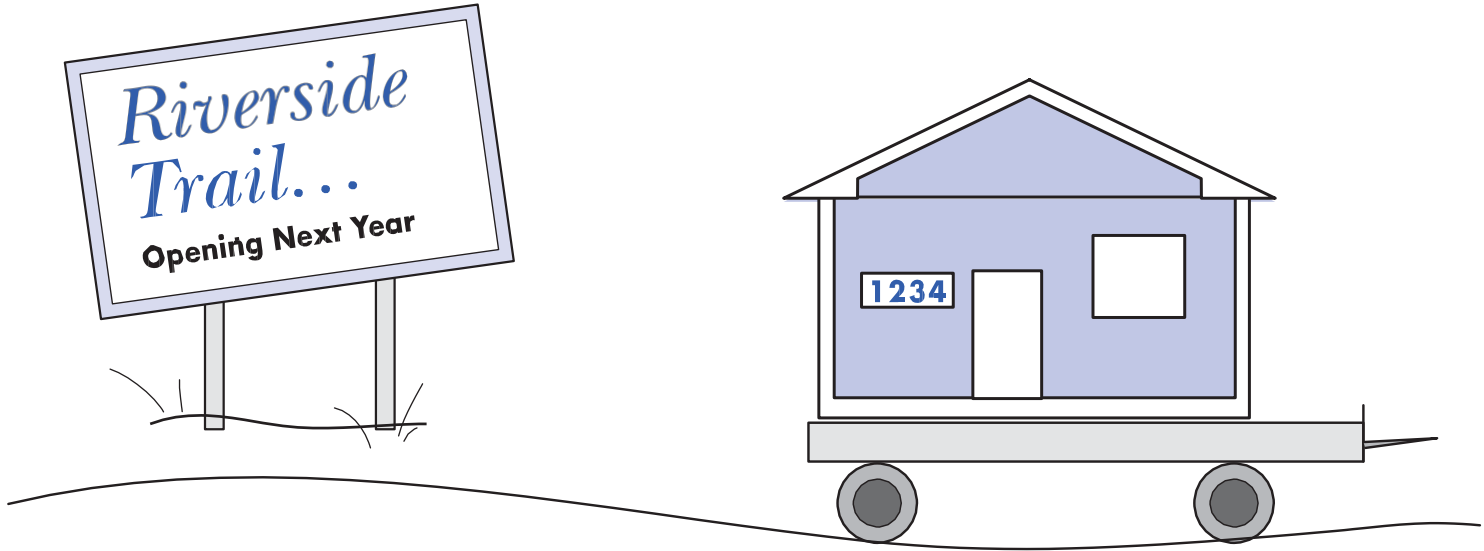
Some Flood Protection for Older Homes is Easy and Low Cost



Move your hot water heater and furnace out of the basement, or build small platforms for them. If the flood depth is less than 2 feet, build floodwalls or anchor the tanks. **Do not** store valuables in a flood-prone basement. Use water-resistant materials when you repair.

Some Flood Mitigation Projects are More Costly

But Give You More Protection



After floods, some communities buy out and demolish homes that were severely damaged. The acquired land is dedicated to open space and can be used for recreation or to help restore wildlife habitat and wetlands. Some homes have been raised on higher foundations (elevated) and others have been relocated to safer high ground.

Useful Resources and Common Acronyms

Useful Resources

- For information on disaster safety, being prepared, and repairing homes, visit the American Red Cross webpage at www.redcross.org/services/disaster.
- FEMA has developed materials to help families and businesses learn more about preparing for floods and recovering from disasters at www.fema.gov/library.
- Find out more about floodplain management in Michigan and applying for State permits from the Michigan Department of Environmental Quality at www.michigan.gov/deq (click on Water).

Common Acronyms

- BFE = Base Flood Elevation
- EC = Elevation Certificate
- FEMA = Federal Emergency Management Agency
- FIRM = Flood Insurance Rate Map
- MDEQ = Michigan Department of Environmental Quality
- MFH = Manufactured House/Home
- NFIP = National Flood Insurance Program
- SFHA = Special Flood Hazard Area

Want to Learn More?

- For advice on permits, call your community's building permit office or planning department.
- Contact the MDEQ's District Floodplain Engineers to learn more about state permits and approvals, see page 8 and online at www.michigan.gov/deq and click on "Locations".
- To order Flood maps, call FEMA's Map Service Center – 1 (877) 336-2627. or order online at <https://msc.fema.gov/portal/home>
- To learn more about flood maps and to check the Status of Map Change Requests, click on "Flood Hazard Mapping" at <https://www.fema.gov/status-map-change-requests>
- FEMA's online publications can be found in the FEMA Virtual Library. Many are posted in the Portable Document Format (PDF). Go to www.fema.gov/library/ for more information. You can order printed copies of FEMA publications from the FEMA Distribution Center, at 1(800) 480-2520.
- To learn about flood insurance, call your insurance agent. Most insurance companies can write a NFIP policy for you. If you need more help, call the National Flood Insurance Program's toll free number to get the name of an agent in your area who does write flood insurance. The number is 1(888)-356-6329.
- To get the best rates for flood insurance, call a local surveyor to complete an Elevation Certificate.
- To learn more about Elevation Certificates, go to <https://www.fema.gov/elevation-certificate>