

# FLOOD Safe

Information about future flood damage prevention

A publication of FEMA Mitigation & the Washington Military Department – Emergency Management Division

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## Helpful Websites

Washington Military Department  
Emergency Management Division  
[www.emd.wa.gov](http://www.emd.wa.gov)

National Flood Insurance Program  
[www.fema.gov/fima/nfip.shtml](http://www.fema.gov/fima/nfip.shtml)

DisasterHelp Website  
[www.disasterhelp.gov](http://www.disasterhelp.gov)

## Elevated Buildings Stay Dry

### SKAGIT COUNTY, WA

If their Maple Street home in Hamilton, Washington was not elevated, the Thrams family would not have moved into it last June. And if the home had not been elevated, it would be as flooded and unlivable as the house next door.

Mike and Velda Thrams are glad they bought a house that was elevated by its previous owner following the 1995 flood. On October 20, the Puget Sound area suffered the worst single-day rainfall the state had seen in more than 100 years.

"I'm very happy about our home," said Mrs. Thrams. "We wouldn't have bought this house if it wasn't this high. We may have lost a motorcycle and the back deck was dislodged, but our belongings and our house are fine." The Thrams had closed on the home only a few weeks before the flood invaded the town of Hamilton.

According to Mrs. Thrams, the elevated town museum (formally the city hall) across the street also "looks good." The museum had been part of a FEMA elevation project. Owing to the elevation of the museum and the Thrams' home, both structures stayed dry.

In addition, the land now used for the city park across the street from the museum used to be occupied by several flood-prone homes. Another mitigation project, funded by FEMA and administered by the State of



JEFFREY MARKHAM - FEMA

The Thrams' elevated home remains dry.

Washington, allowed for the purchase and destruction of these homes and the formation of the existing park. This too avoided a great deal of damage from the recent flooding that would have occurred to those homes had they not been removed.

The rental house next door to the Thrams was flooded and unoccupied, said Mrs. Thrams. That was the fate of many other homes in the Thrams' neighborhood – a view from their elevated home that makes its point.

Public Information Office  
FEMA Region 10  
425.487.4610



JEFFREY MARKHAM - FEMA

Mike Thram points out the high-water mark on the side of his home.



JEFFREY MARKHAM - FEMA

The museum and park that were part of a FEMA funded, and state administered mitigation projects.

## FloodSafe

FloodSafe is published by the Mitigation Division at FEMA Region 10. If you have any questions or concerns please contact us at 425.487.4600



FEMA



Washington Military Department  
Emergency Management Division

## On-line Education for Homeowners

FEMA continues to develop new multimedia tutorials to provide in-depth training in different facets of the National Flood Insurance Program (NFIP) and to support FEMA's public education and outreach efforts. Recent improvements to the FEMA web page provide an array of training opportunities for anyone interested in learning more about the NFIP and related topics. If you are in need of a Letter of Map Amendment to show your house is outside of the floodplain, or are required to

get an Elevation Certificate that will cost you money, visit these tutorials to learn more about what you should know and how to get it done. Additional on-line tutorials walk you through reading Flood Insurance Rate Maps (FIRM's), understanding GIS, Elevation Certificates, and much more. For a more detailed explanation of all these services, visit FEMA on-line at:

[www.fema.gov/fima/education.shtm](http://www.fema.gov/fima/education.shtm)



## Pumping Out a Flooded Basement

If your basement is flooded, don't rush to pump it out. Water in the ground outside your house is pushing hard against the outside of your basement walls, and the water inside your basement is pushing right back (Figure A). If you drain your basement faster than the water outside drains out of the ground, the outside pressure will be greater than the inside pressure. This unequal pressure may cause the floor to crack then buckle and the walls to crack and possibly collapse (Figure B).

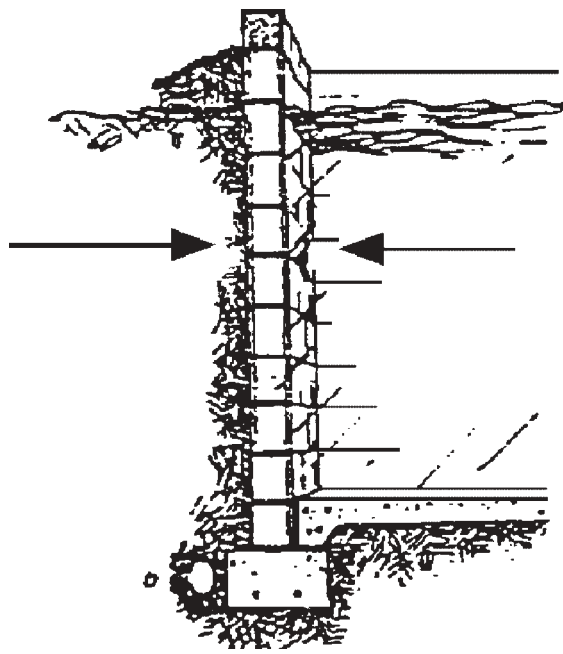


Figure A

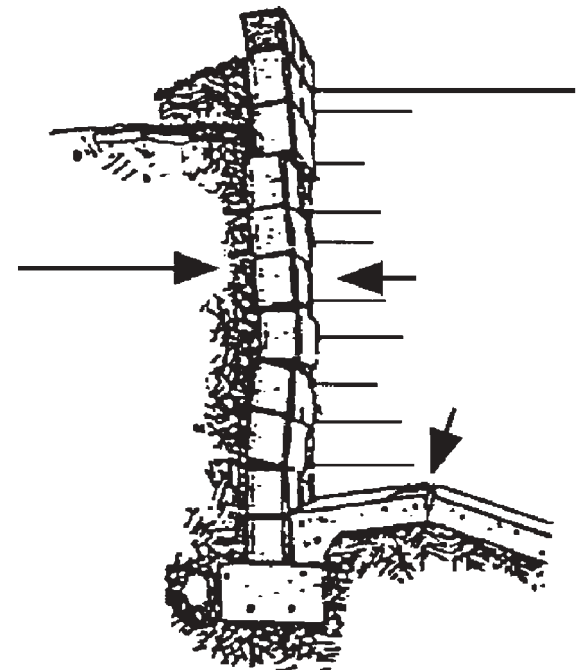


Figure B

### How to Safely Pump Water Out of Your Basement

- Never go into a flooded basement unless you are sure the electricity is off.
- Start pumping the water out of the basement when floodwaters no longer cover the ground around the outside perimeter of the house.
- Gasoline engines create deadly carbon monoxide exhaust fumes, so don't use them indoors.
- Pump the water level down 2 to 3 feet. Mark the level, and wait overnight.
- Check the water level the next day. If the water level went back up over your mark, it is still too early to drain your basement.
- Wait 24 hours, then pump the water down 2 to 3 feet again. Mark the level and check it the next day.
- When the water stops rising, pump down another 2 to 3 feet and wait overnight. Repeat steps 4 and 5 until all water is pumped out of the basement.

### What to Do After Draining Your Basement

- Disinfect the floors and walls to remove bacteria left from the floodwaters.

- Before turning the power back on, check any electrical service that may have been damaged. Replace any wiring, switches, and/or outlets that were submerged or got wet during the flood.
- Remove heating and air conditioning vents or registers as soon as possible and hose out the ductwork. Flooded ducts contain mud and bacteria. Ductwork comprised of flexible hose cannot be hosed out; you must replace it.
- Check your water system for loose pipes and leaks.
- Check your water supply to be certain it is not contaminated.
- Check all drains and other utilities for damage from the floodwaters.

## Cleaning Up & Drying Out Your Home

If your house or its understructure have been under water from the recent flooding, you will need to take important steps to clean out bacteria and mold, and dry the building out thoroughly.

### Steps for drying out the house

- Turn off the main power.
- Open up the house to allow moist air to escape.
- Remove all wet furniture, contents and carpets or rugs. If you decide to keep some of these items they must be cleaned and disinfected.
- Discard all contaminated food products.

**Interior Walls:** Interior plaster walls will need to be drained if they are still holding water. Remove the baseboard trim and drill holes about 2" above the floor to let the water out. The holes can be hidden behind the reinstalled baseboards. Flood soaked sections of wallboard will usually have to be removed and thrown away. Paneled walls can usually be dried out by prying out the bottom corner of the paneling and propping it out away from the wall studs.

**Exterior Walls:** Insulation in exterior walls will hold moisture and bacteria. It is important to remove any flood soaked insulation as soon as possible so the other building materials can dry out properly. Batt insulation

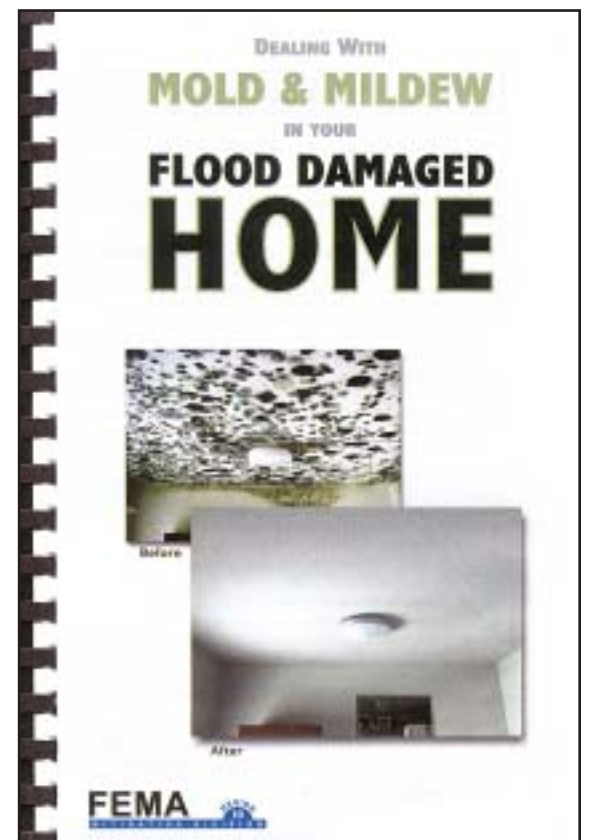


and blown-in insulation cannot be reused in your repairs and must be thrown away. Rigid foam insulation can be removed and disinfected. Once it is completely dry it can be reinstalled in the wall cavity. Once the insulation is removed the wall must be disinfected and thoroughly dried. Dehumidifiers and portable heaters can speed this process up.

**Floor Framing:** If the flood waters got into your floor framing but not into your house you will need to check for wet floor insulation. Wet floor insulation must be removed and the framing disinfected and dried out in the same manner as the walls.

**Disinfecting:** Disinfect all surfaces that were soaked by flood waters with "disinfecting" or "sanitizing" products. An alternative is to use a mixture of ¼ cup liquid chlorine bleach mixed into one gallon of water. Remove mildew using household mildew removers or fungicides.

**Reconstruction:** Reconstruction materials should be water resistant. Instead of regular wallboard or plaster, use water resistant or waterproof wallboard for interior wall surfaces. Install wallboard horizontally. Use rigid foam insulation instead of batt or blown-in insulation. Use galvanized or stainless steel hardware. Use indoor-outdoor carpeting. Use exterior grade plywood for sub-floor reconstruction.



This booklet on mold is available on-line.

## The Problem with Mold

One problem that often occurs after a flood is the development of mold. Mold growths, or colonies, can start to grow on a damp surface within 24 to 48 hours. Molds digest organic material, eventually destroying the material they grow on. In addition to the damage molds can cause in your home they can also cause mild to severe health problems.

If your home has water damage due to flooding, sewage backup, plumbing or roof leaks, damp basement, overflows from sinks or bathtub, or high humidity, mold and mildew will develop within 24-48 hours of water exposure. Even worse, it will continue to grow until steps are taken to eliminate the source of moisture and effectively deal with the mold problem. FEMA now offers a publication called "Dealing with Mold and Mildew in Your Flood Damaged Home." This booklet will help you determine the severity of your mold problem. It will also provide steps you can take to make your house normal again. This booklet is available in a printable Adobe Acrobat (PDF format) document on-line at this address:

[www.fema.gov/pdf/reg-x/mold\\_mildew.pdf](http://www.fema.gov/pdf/reg-x/mold_mildew.pdf)



## Protecting Your Home From Backflow

The sewage/septic system is designed to remove sewage from a house. If flood water enters the system, the sewage can backup and enter your home. To help prevent this, install a backflow valve in the sewer line. The backflow valve is opened by the flow of sewage exiting your home, but closes when the flow reverses preventing sewage from backing up into your home. Keep these points in mind when considering installing a backflow valve:

- For your own safety, changes to the plumbing in your house must be done by a licensed plumber or contractor, who will ensure that the work is done correctly and according to all applicable codes.

- Some valves incorporate the advantages of both flap and gate valves into a single design. Your plumber or contractor can advise you on the advantages and disadvantages of the various types of backflow valves.
- Valves should be installed on all pipes that leave the house or that are connected to equipment that is below the potential flood level. Such valves may be needed on washing machine drain lines, laundry sinks, fuel oil lines, rain downspouts, and sump pumps, as well as sewer/septic connections.
- If you have a sump pump, it may be connected to underground drain lines, which may be difficult to seal off.

## Relocating Your Electrical Box

Elevate the electrical box to a recommended 12" safety margin above 100-year flood elevation (Fig. A) or relocate the electrical box to an upper floor (Fig. B).

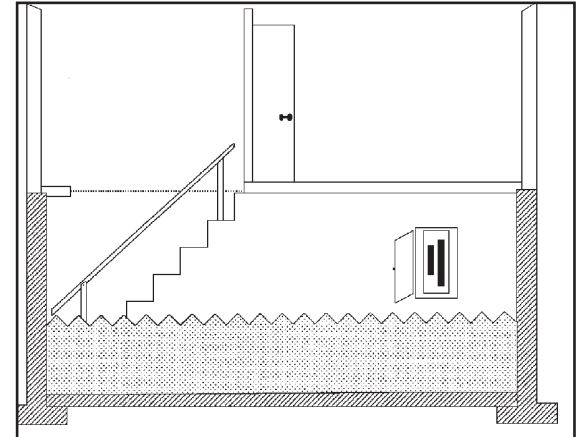


Figure A

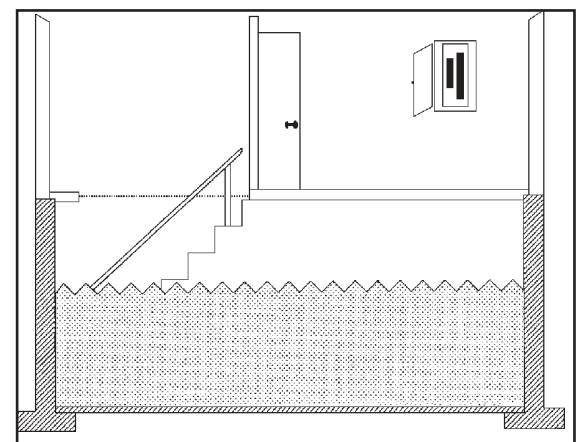
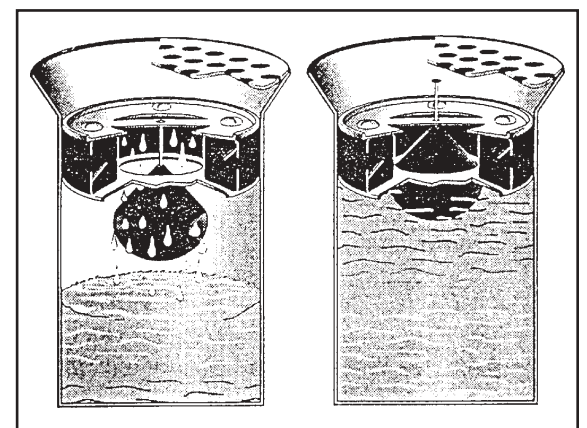


Figure B

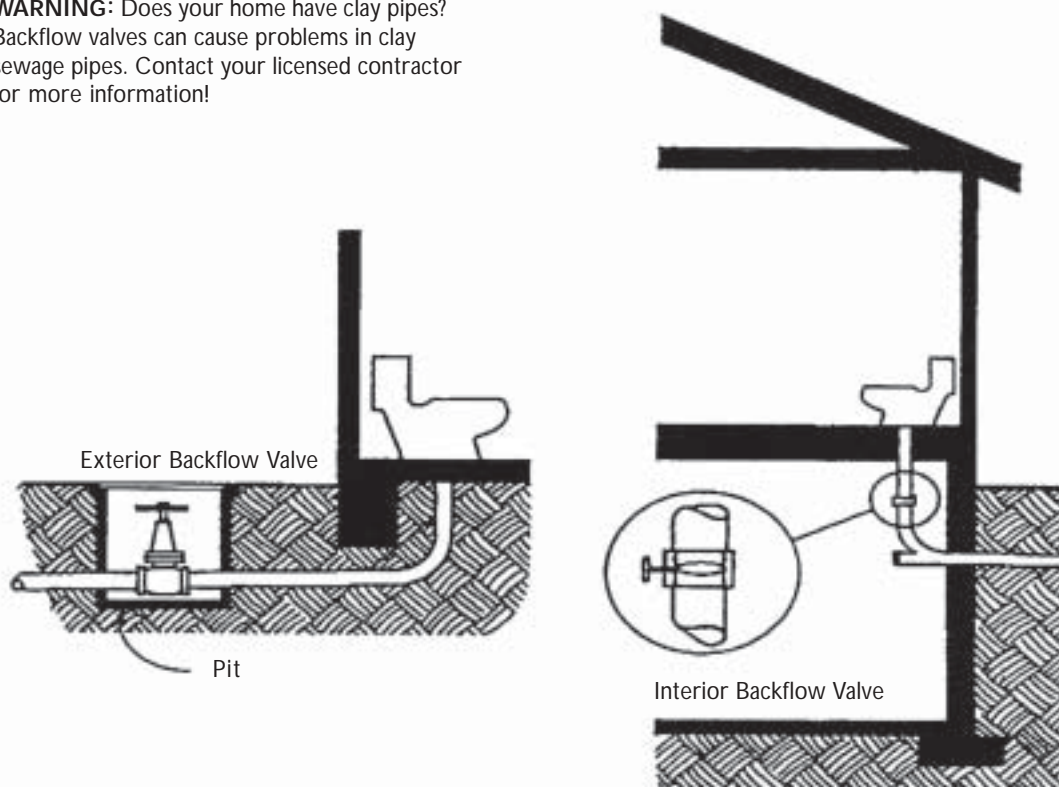
## Install Floating Floor Drain Plug



Install a floating floor drain plug at the lowest point of the lowest finished floor. This will allow the water to drain. When the floor drain pipe backs up, the float rises and plugs the drain, preventing sewer backup.



**WARNING:** Does your home have clay pipes? Backflow valves can cause problems in clay sewage pipes. Contact your licensed contractor for more information!



## Floodwalls

If your home is not in the regulatory floodway, an innovative technique for safeguarding your home against the onslaught of floodwaters is the floodwall. Experts recommend that the floodwall not exceed two feet in height; it could however be incorporated into a standard chain-link or wooden fence. The floodwall pictured

below forms a perimeter around the property of a house in Seattle. Notice the photo of the driveway at right. Under normal conditions, the driveway portion of the floodwall remains open, as shown in the photo. When floodwaters begin to threaten the home, the owner simply installs a floodgate that seals off the open space.





## Do you need Flood Insurance?

### How do I know if I'm in the Floodplain?

The floodplain is identified as "Special Flood Hazard Areas" in your community's Flood Insurance Study and the accompanying Flood Insurance Rate Maps (FIRMs). The flood level shown for these Special Flood Hazard Areas has a 1% chance of being equaled or exceeded in any one year. That translates into a 26% chance of flooding over a typical 30-year mortgage period as compared to a 1% chance of fire damage over the same period. The building permit officials in your community have these documents available for you to see.

### What is Substantial Damage?

Substantial Damage is damage, of any origin, to a structure where the cost of restoring the structure to its before-damage condition would equal or exceed fifty percent (50%) of its pre-damage value.

### When does the NFIP affect me?

The NFIP requires participating communities to regulate, with permits, any new or substantially improved structures during non-disaster periods and to monitor and identify any substantially damaged structures as a result of a disaster within the community's floodplain areas. Participating communities adopt an ordinance that requires any new buildings to be elevated above the projected flood level within the identified floodplain. Nonresidential buildings have the additional option of being dry flood proofed. Existing buildings that are substantially damaged or improved (50% or more) must be elevated or flood proofed to meet the same construction code standards as new construction. When you apply for a local building permit you will be informed if you are in a floodplain and what further steps are required to repair or reconstruct your building. If your building was flooded but not substantially damaged there is a wide range of inexpensive measures described in this booklet that can help you reduce future flood damage.



This collapsed foundation wall, caused by heavy floodwaters, constitutes "substantial damage."

## Counterpoint

### Why go through all this trouble?

First, typical homeowner and business insurance does not cover damage caused by a flood. Second, as a participating community in the National Flood Insurance Program (NFIP), your community is required to enforce its floodplain regulations. Third, structures located in the floodplain, that are not elevated or flood-proofed, are a threat to the health and safety of the occupants. Fourth, structures that do not take into consideration the flood risks will repeatedly need to be bailed out by the government (usually through the NFIP or various disaster assistance programs) when flooding reoccurs.

### What happens if I refuse to comply?

If you do not obtain a permit and do not elevate or flood proof, then your community could take legal action against you. This could include halting development, revoking the permit, imposing a fine, or withholding a certificate of occupancy. If the

structure is in violation of the regulations, flood insurance premiums could be extremely costly, possibly making the structure difficult to sell. Also, your community could be placed in jeopardy for continued participation in the NFIP.

### What if I have more questions?

Your building permit and floodplain management officials are responsible for implementing the requirements of the local floodplain management ordinance, including the substantial damage provisions. Following a disaster declaration, the requirements pertaining to substantial damage will be presented to your community officials in detail at meetings held in various locations throughout the state. FEMA will work with building officials to help them identify structures which may qualify as substantially damaged. In addition, FEMA will provide technical assistance to local building officials concerning the repair or reconstruction of substantially damaged structures.

## What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) is a federal program enabling property owners to purchase flood insurance. It is based on an agreement between your community and the federal government. The agreement states that if your community adopts and enforces floodplain management regulations that at least meet minimum federal requirements, the federal government will make flood insurance and flood disaster assistance available in your community.

## How Do I Purchase Flood Insurance?

Flood Insurance is not available everywhere. It is available only to residents of communities participating in the National Flood Insurance Program (NFIP). For more information and to find out if your community participates in the NFIP, call 1-800-427-4661.

If your community is participating in the National Flood Insurance Program you can purchase insurance for your property. There are no restrictions. All insurance agents can sell flood insurance policies. If your agent is not aware of the procedures for selling flood insurance policies, please call 1-800-720-1093 for a referral to an insurance agent in your area who writes NFIP policies.

## How Do I File A Flood Insurance Claim?

If you experienced flood damage and are covered by flood insurance, these important steps will help you when filing your flood insurance claim.

1. Save as many damaged articles as possible. If you must throw items out, take pictures to document your losses.
2. Contact your insurance agent right away.

Once your insurance agent has your claim:

1. The agent will file a Notice of Loss.
2. An adjuster will be assigned to your case.
3. Once the loss has been adjusted, a Proof of Loss will be submitted, and payment can be made. Partial payment can be made to claimants upon submission of a partial Proof of Loss.
4. If you have any problems with your insurance claim call the Office of the Insurance Commissioner's Consumer Hotline at (800) 562-6900.

### Do I Still Need to Make an Application to FEMA ?

All property owners who had flood damages caused by a federally declared disaster should make an application for disaster assistance. The applications are routed through the different disaster programs and homeowners are notified if they are eligible for assistance beyond their flood insurance claim.

## Insurance Rating Example

The charts below give an example of typical rates one can expect to pay for flood insurance. The cost of insurance is proportional to the flood risk. This is determined by comparing the flood zone, as shown on a FEMA Flood Insurance Rate Map (FIRM) with the structure's elevation above the Base Flood Elevation (BFE). In other words, the higher the structure above the base flood, the lower the rate!

The chart on the left, "Post FIRM Construction," shows average rates for \$100,000 of coverage on a single

family home built after the community's FIRM was adopted. For example, if your home was built in 2000, your premium will reflect your home's flood zone and its elevation above the "BFE" as depicted on the maps in effect in 2000.

Similarly, the chart on the right, "Manufactured (Mobile) Homes," shows the rates for a typical manufactured home (valued at \$60,000) in an existing manufactured home park.

Post FIRM Construction	Manufactured (Mobile) Homes
3 ft. above BFE . . . . . \$196	3 ft. above BFE . . . . . NA
2 ft. above BFE . . . . . \$231	2 ft. above BFE . . . . . \$194
1 ft. above BFE . . . . . \$351	1 ft. above BFE . . . . . \$345
0 ft. at BFE . . . . . \$521	0 ft. at BFE . . . . . \$735
1 ft. below BFE** . . . . . \$1601	1 ft. below BFE** . . . . . \$1036
2 ft. below BFE** . . . . . \$1790	2 ft. below BFE** . . . . . \$1276
3 ft. below BFE** . . . . . \$2140	3 ft. below BFE** . . . . . \$1662

Premiums as of September 2003 \*\*Can be higher depending on how risk exposure is reviewed by FEMA.

## Community Rating System (CRS)

You may be eligible for reduced flood insurance premiums if your community is involved in FEMA's Community Rating System (CRS). The CRS is a voluntary program that rewards community members for the proactive work taken by local officials to reduce flooding and encourage the purchase of flood insurance. For every activity that your community takes to reduce flood damages, restore river habitat, and increase public awareness, points are awarded. There are ten CRS classes. For each class improvement, community members in the floodplain receive an additional 5% reduction in their insurance premium. As your community advances in the CRS, so will the savings. Beginning at a class 10, these communities are at the entry level. Although there are no savings at this level, it is the first commitment towards improved flood hazard reduction and flood awareness. Some communities will eventually achieve Class 1 status, meaning, they have the most credit points and receive the maximum 45% discount.

To find out if your community participates in the CRS, contact your local floodplain administrator or visit FEMA's website at:

[www.fema.gov/nfip/crs.shtm](http://www.fema.gov/nfip/crs.shtm)

## Covering Compliance Costs

If your home or business is damaged by a flood, you may be required to meet certain building requirements in your community to reduce future flood damage before you repair or rebuild. To help you cover the costs of meeting those requirements, the national Flood Insurance Program includes additional coverage known as **Increased Cost of Compliance (ICC)** coverage.

### How Much Coverage is Available

Flood insurance policyholders in high-risk areas, also known as special flood hazard areas, can get up to \$30,000 to help pay the costs to bring their home or business into compliance with floodplain ordinances.

### Four Options Covered

There are four options you can take to comply with your community's floodplain management ordinance and help you reduce future flood damage. You may decide which of these options is best for you:

**Elevation** – This raises your home or business to a point at or above the base flood elevation level adopted by your community.

**Relocation** – This moves your home or business out of the floodplain, and thus out of harm's way.

**Demolition** – This tears down and removes flood-damaged buildings.

**Floodproofing** – Primarily available for nonresidential buildings, this involves making a building watertight.

### Are You Eligible To File an ICC Claim?

You are eligible to file for ICC if the floodplain administrator determines one of the following:

- Your property is "substantially damaged." This term means that your community determines that the cost to repair your flooded structure is 50% or more of its pre-disaster market value.
- Your property sustained "repetitive damage." This term applies to homes or businesses that were damaged by flooding twice in the past 10 years, where the cost of repairing the flood damage, equaled or exceeded 25% of the property market value at the time of each flood. Also, there must have been flood insurance claim payments for each of the two flood losses and the community's floodplain management ordinance must have a repetitive loss provision.

## Myths and Facts about the National Flood Insurance Program (NFIP)

### Who needs to buy flood insurance?

Everyone in a participating community in the National Flood Insurance Program (NFIP). To clear up some misconceptions about National Flood Insurance, the NFIP has compiled the following list of common myths about the program, and the real facts behind them, to give you the full story about this valuable protection.

**Myth:** Homeowner's insurance policies cover flooding.

**Fact:** Unfortunately, many homeowners do not find out until it is too late that their homeowner policies do not cover flood damages. Only National Flood Insurance covers damage to your home and belongings caused by flooding.

**Myth:** Federal flood insurance can only be purchased through the NFIP (FEMA) directly.

**Fact:** NFIP flood insurance is sold through private insurance companies and agents and is backed by the federal government.

**Myth:** Only residents of high-risk flood zones need to insure their property.

**Fact:** Even if you live in an area that is not flood-prone, it's advisable to have flood insurance. Over 25 percent of the NFIP's claims come from outside high-flood-risk areas. If you live in an area not shown as a floodplain, not only can you buy insurance, but the rates you pay will be less than if you lived in a mapped floodplain.

**Myth:** You can't buy flood insurance if you are located in a high-flood-risk area.

**Fact:** You can buy federal flood insurance no matter where you live – as long as your community participates in the NFIP. The NFIP provides affordable flood insurance coverage for any walled and roofed building whether it is in a mapped floodplain area, or in areas where no floodplain map exists.

**Myth:** The NFIP does not offer basement coverage.

**Fact:** Yes, it does. While flood insurance does not cover basement improvements, such as finished walls, floors or ceilings, or personal belongings that may be kept in a basement, such as furniture or other contents, it does cover structural elements, essential equipment and other basic items normally located in a basement. The following items are covered in a basement, as long as they are connected to a power source and used as intended:

- Sump pumps
- Well water tanks and pumps
- Oil tanks and the oil in them
- Gas tanks and the gas in them
- Furnaces, water heaters, air conditioners, and heat pumps
- Electrical junction and circuit breaker boxes, and required utility connections
- Foundation elements
- Stairways, staircases, and elevators
- Unpainted drywall and sheet rock walls and ceilings and fiberglass insulation
- Cleanup
- Clothes washers and dryers and food freezers (*with contents coverage only*)

**Myth:** Federal disaster assistance will pay for any flood damage.

**Fact:** Before a community is eligible for disaster assistance, it must be declared a Federal disaster area. Federal disasters are only declared with a request from the governor following widespread and devastating flooding. The premium for an NFIP policy, averaging \$360 a year nationally, is less expensive than the annual interest paid on a federal disaster loan



## Elevate & Anchor Manufactured Homes

The proper elevating and anchoring of a mobile or manufactured home incorporates a **total foundation system**. The three basic components of the system are foundations (footings and piers), anchors, and lateral bracing. All three are essential in creating a safe and secure manufactured home installation that can resist extreme loading conditions, such as those that occur during natural disasters.

### Foundations

#### Footing

A poured concrete footing, reinforced with rebar, gives maximum stability. In accordance with the Washington

State standards the footing must be 30" deep, or to the depth of the frost line, whichever is deeper. Additionally, the repair that will connect the footing to the pier must be cast into the footing at the time it is poured. This rebar must be located such that it will be in the center of the pier when it is constructed.

#### Piers

The use of 8" x 16" concrete blocks stacked vertically without any reinforcement or concrete grouting, in conjunction with a proper tie-down system is permissible for units elevated up to 3 blocks high if they are stacked as a single row. You can go up to 5 blocks high if they are stacked as a double row. In all cases the blocks must be stacked with the solid outside walls facing out and the open cells facing up. This is commonly referred to as dry-stacked block.

Piers that will be from 5 blocks high (40") to 9 blocks high (72") must have a #5 size reinforcing bar (rebar) in each block cell for a total of four bars. Each cell must then be filled solid with cement mortar with a stated strength of 2000psi. This is commonly referred to as reinforced block. If 20% of the piers are going to be higher than 40" Washington State law requires that the piers be designed by a licensed structural engineer or architect.

Piers over 72" high are required by Washington State law to be designed by a licensed structural engineer or architect.

### Anchoring & Lateral Bracing

Anchoring is the structural function of holding the dwelling unit down to keep it from floating. Lateral bracing is the structural function that resists horizontal forces such as flowing floodwaters, earthquakes and high winds. In many manufactured home foundation designs the anchoring system acts as both the anchoring and lateral bracing system.

It is important that the proper anchoring system is used for your site conditions. Begin by determining the type of soil on your property. Use the appropriate anchor for the type of soil present.



Double Headed Rock Anchor

#### Double Headed Rock Anchors with Drive Rods

Use these for your anchors if you have rock or very dense, cemented clay soil. A small hole must be pre-drilled into the rock and the rod is hammered in with as many blows as it takes so that the top of the rod mushrooms to a size that is too large to fit through the tube top of the anchor.



Double Headed Double Helix Earth Anchor

### NFIP Regulations

In order for manufactured homeowners located in Special Flood Hazard Areas (SFHA) to be eligible for NFIP flood insurance, their home must have the lowest floor elevated to or above the Base Flood Elevation (BFE). It must also be able to resist floatation, collapse, or lateral movement by means of one of the following methods:

1. Use of over the top or frame ties to ground anchors.
2. Follow the manufacturer's recommendations for securing your home.
3. Be in compliance with the community's floodplain management requirements.

The only time when these rules don't apply is when a manufactured home on a permanent foundation has been continuously insured by the NFIP on the same site since September 30, 1982.



Slab Anchor

#### Double-Headed Double Helix Earth Anchor

Use this anchor in coarse gravel and cobble soils or medium dense coarse sands, sandy gravels, or very stiff silts and clays. (Class II & III soils)

#### Slab Anchors

A Double-Headed Slab Anchor is used when an anchor needs to be installed into poured concrete. The hook at the base of the anchor is wrapped around the horizontal rebar in the poured concrete slab. The concrete is poured around the anchor with the top exposed for attachment of the tie-down straps.

#### Tie-down Straps

Tie-down straps are used at the base of the manufactured home and can be tied over the top. The most common failure is "pullout" of the ground anchor. To avoid this, cast the anchor into a concrete "deadman."

JEFFREY MARKHAM - FEMA

JEFFREY MARKHAM - FEMA





## Minimizing Flood Damage to Manufactured Homes

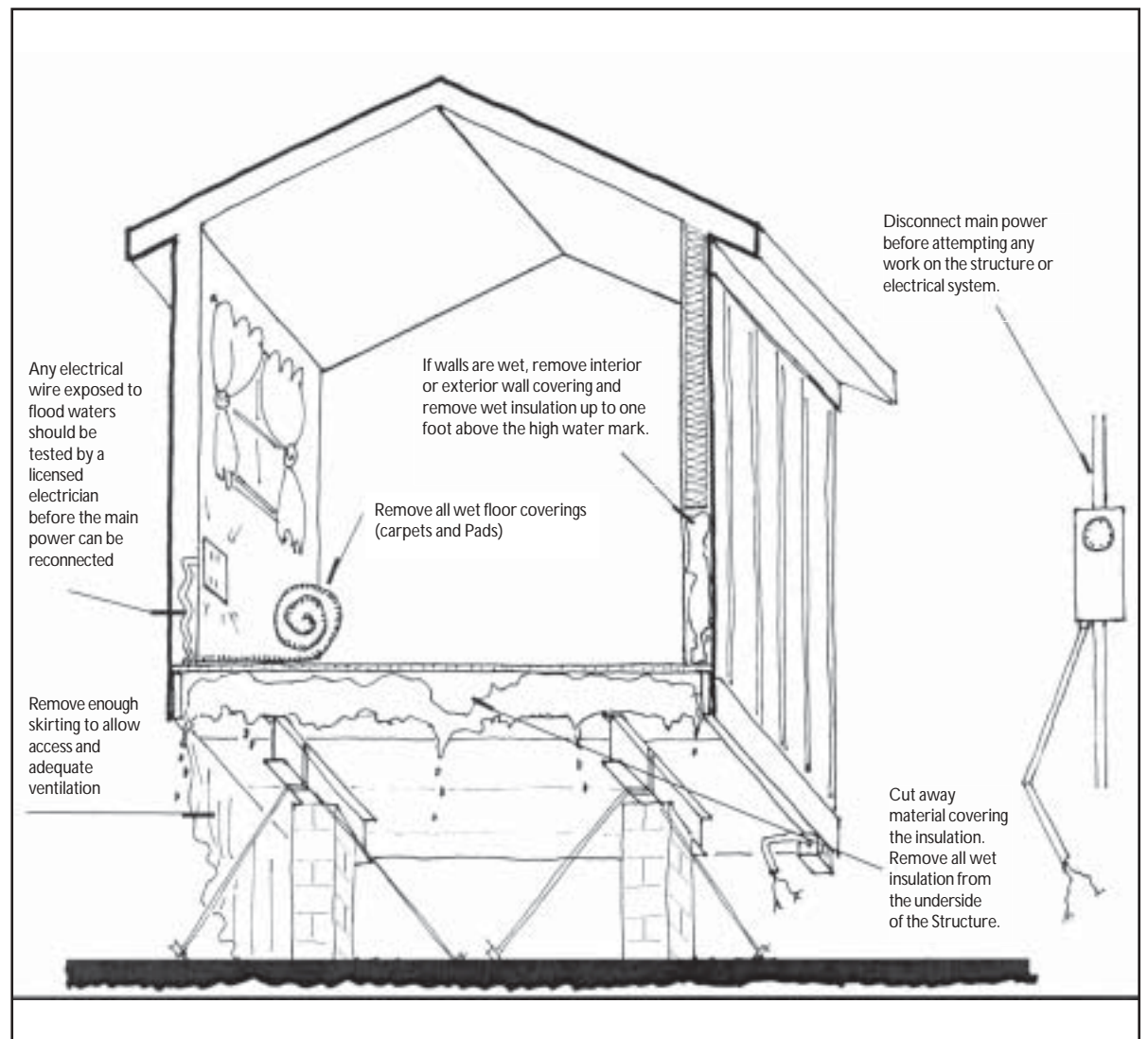
If your manufactured home had flood waters inside the structure for a short period of time, it may be possible to minimize the amount of structural damage by quickly removing the wet materials and drying out the structure. If the insulation under your manufactured home got wet from flood waters, it's important that the structure is thoroughly dried. Wet insulation can wick moisture into the flooring, causing warping and structural problems.

The following is a list of suggested actions to take immediately after flooding has occurred. Note that repairs to manufactured homes in Washington must comply with building codes and certifications as established by the Washington State Department of Labor and Industries (L&I).

- Have gas line systems re-tested for leakage.
- Remove skirting around home to allow drying.
- Have a registered installer check soils around footings for washout or scouring, check shims and piers for stability, check anchors (if installed) for stability from soil withdrawal.
- Check drain/waste lines for proper slope and leaks.
- Remove bottom board (belly paper) to allow drying of insulation, decking, structural lumber. If necessary, replace damaged insulation and belly paper with similar material.
- Loosen siding or sheathing to allow for drying of construction materials and insulation in order to avoid decay and bacterial growth.
- Check for water in ductwork and remove.
- Have an electrical contractor check all affected electrical system items for damage.
- Check and clean water lines.
- Check furnace.
- Check water heater.

In some cases, if water did not touch the bottom of the manufactured home proper, only footings, piers, and anchors may require inspection for damages. If manufactured home owners have questions concerning items they should have checked, they may contact Washington State L&I at the website listed below; then click on "Factory Assembled Structures."

[www.lni.wa.gov/scs](http://www.lni.wa.gov/scs)



## Repairing Your Manufactured Home

### Do I Need to Elevate as Part of the Repair Work?

Just like a stick frame house, a manufactured home may need to be elevated so that the lowest floor of the unit is at or above the 100-year flood level. This applies if the home has been "substantially damaged" and is located in a designated floodplain. "Substantial damage" means that it will cost more than 50% of the pre-disaster market value of the structure to make the necessary repairs to the unit. The Washington State Department of Labor and Industries (L&I) has the responsibility to help you determine if your manufactured home meets the "substantial damage" criteria.

### Do I Need A Permit to Make Repairs?

If your foundation was damaged, or water got into the underside of the housing unit (or higher), you must get an inspection for repairs made to your property.

Call your local building department if you are resetting the foundation or re-anchoring your dwelling unit to the ground.

If you are making repairs to the prefabricated dwelling unit you must call Washington State L&I for permits and necessary inspections.





## Is It Possible to Relocate My House?

Yes! Whether you relocate just your family and belongings or you choose to move your entire house structure, relocation out of the floodplain is the retrofitting technique that can offer the greatest security from future flooding. Moving the whole building away from danger can also assure that another family will not be in a disastrous situation in the future. Relocation relieves the homeowner from future anxiety about flooding, eliminates flood insurance payments, and assures continuity in people's lives during future flood events.

The first stages of relocation are similar to those used for elevation. Once the house is elevated, instead of putting it back down on a raised foundation, it is placed on a heavy duty truck bed, transported to a new site out of the floodplain, and set down on a new conventional foundation.

### Considerations

If your present lot has a good building location on higher ground, you can plan to put the structure at that location. You may need to purchase a new lot if your existing site is completely in the floodplain. Be certain the site is accessible and the pathway is clear to move the existing structure. Also, make sure utilities are available and proper permits have been obtained. A house must also be in sound structural condition in order to be moved. A house in poor condition will need so much bracing that moving it may become financially impractical. Consult a building professional if you are uncertain about the condition of your structure. Single-story frame houses over a crawlspace or basement are the easiest to relocate, while homes that are slab-on-grade or multi-story are more difficult. It is feasible to move even the heaviest houses, such as those of brick or block, or very large ones, though this will generally be more expensive.

Moving a house is a complex operation that must be done by a professional. There are professional contractors who specialize in house moving. They understand the issues involved and know how to coordinate the project. Obtain bids from several house movers and contractors.

### Basic Steps in Elevating a Building:

1. Have appropriate professionals disconnect all utilities.
2. Hire a professional house mover to disconnect your house from the existing foundation, jack it up to the new height and provide a temporary foundation.
3. Have the utilities temporarily reconnected so the house is livable while foundation work is done.
4. Build a temporary access stair to meet the new height.
5. Build a new, permanent foundation.
6. Have the house mover lower the house onto the new foundation and connect the anchor bolts.
7. Have the utilities permanently reconnected.
8. Build a new, permanent access stair and landing.



Moving your home is one way to avoid flooding.

## Home Elevation: Where Do I Start?

Most types of homes can be elevated above floodwaters, including wood frame, brick, slab-on-grade, crawlspace or homes with basements. Elevation is an extremely reliable flood proofing method and requires little human intervention to prepare for a flood event. The floor elevation height should be set at a recommended safety margin above the 100-year flood level. Some buildings may be elevated over 9 feet above their existing floor levels. In such an extreme case the new lower level would probably be used as a garage. In all cases, a new entry stair and front porch is built to meet the new height. Elevating a home requires use of professional plumbers, electricians, house movers, contractors, and structural engineers to

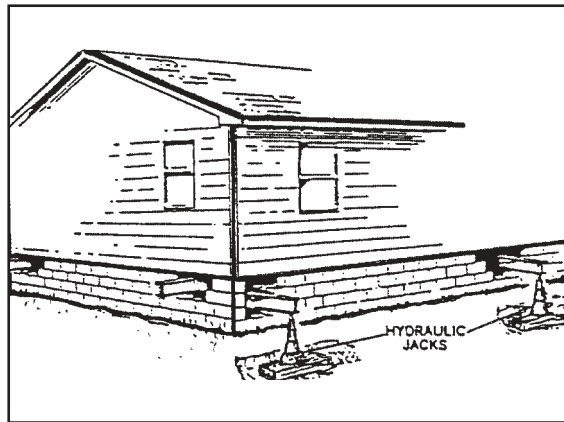


Figure 1: I-beams are placed under lifting points perpendicular to floor joists with a second set beneath for uniform lifting.

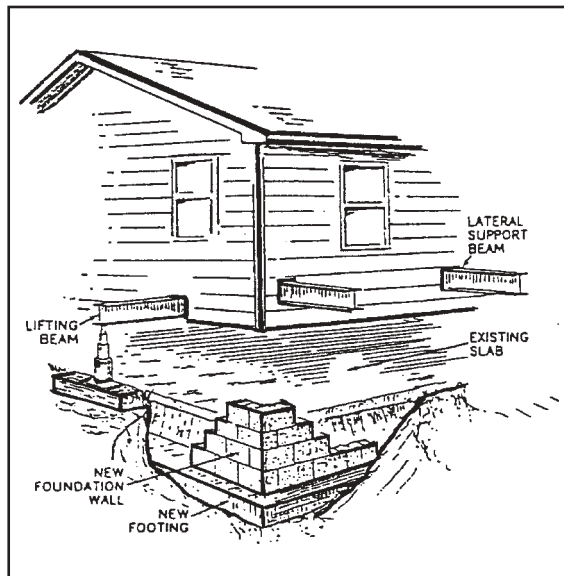


Figure 2: Lifting beams are placed under bearing walls and posts. The house is uniformly lifted using hydraulic jacks.

help you design your new foundation and obtain a permit from your building department. Because the new foundation will be in the floodwaters, it is extremely important that it be structurally designed to withstand lateral (sideways) forces such as fast-flowing currents and the impact of waterborne debris.

### How high should I elevate my home?

It depends on your reason for raising it. If the local agency responsible for zoning and issuing building permits for your property is participating in the NFIP, the lowest acceptable elevation for your house will be that equal to the elevation of the 100-year flood (a flood that has a probability of occurrence in any year equal to one percent). You will need to obtain the services of a professional surveyor to locate and certify the elevation of the 100-year flood at your house.

Some local zoning agencies have elevation requirements that exceed those for the 100-year flood. For instance, they may require an elevation equal to the 100-year flood plus one foot (or some other value) or an elevation equal to that observed for an historical flood. If your local agency requires this, the procedure for determining the acceptable elevation for your house is the same as given above. If your local agency requires your house to be elevated to a height equal to that of a historical flood, they will have to provide that elevation



Coastal home elevated to avoid future flooding.

to you. You will then need to obtain the services of a professional surveyor to locate and certify that elevation at your house.

Finally, you may desire to elevate your house to some level above that required by your local zoning agency. You should be aware that any flood elevation given for your house may be exceeded by a particular flood for several reasons. First, the magnitude (amount of water flowing) of the 100-year flood may increase as more years of data are collected and statistical analyses of flood events are revised. Second, the analysis of the 100-year flood elevations shown for the river responsible for flooding of your property is based on channel conditions at the time of the analysis. If the channel conditions have changed since the analysis, the elevation of the 100-year flood given for your house may also have changed by several inches. Third, the analysis of the 100-year flood for the river is based on an inexact science, and the elevations given for your house may not be precise. Fourth, flood levels at your house may rise above the levels required by your local zoning agency due to log, debris, or ice jams downstream from your house.

Because of all the reasons cited above, you may want to elevate your house using a "factor of safety" equal to one or more feet above the elevation required by your local zoning agency. It is worth noting that in many instances, the difference between the 100-year flood and the 500-year flood (a flood having a probability of occurrence in any year of 0.2 percent) is less than one foot. Furthermore the savings on flood insurance can exceed 60 percent through elevation. Adding this "factor of safety" may protect your house against floods with extreme probabilities of occurrence, provided log, debris, or ice jams don't occur.



## How Do I Hire a Contractor?

### Sleuthing

If you have been satisfied with work done before by a local licensed contractor, you may want to use that firm. If you haven't used a contractor before, or if you were unhappy with a previous experience, you may have to do some investigating to increase your chances of getting a reliable professional.

- Contact the Washington Department of Labor and Industries. You can ask them if a particular contractor is registered to do business in Washington State. They can also inform you of local and state law regarding contracting and construction. For more information visit their contractors website at: [www.lni.wa.gov/scs/contractors](http://www.lni.wa.gov/scs/contractors)
- Ask the contractor for proof of insurance. Insurance is usually required by the state and should include a completion bond, disability and worker's compensation insurance. Otherwise, you may be liable for accidents occurring on your property.
- Check on the firm's reputation. Ask the local Better Business Bureau, home builders association, or building trades council. They may be able to tell you if the firm has had unanswered complaints filed against it. Also, ask for references. Reputable contractors should be willing to provide names of previous customers. Contact some of them and ask how well they were satisfied with the job done.

### Get it in writing

No matter how well you know the contractor or how much you trust him/her, get everything related to the job in writing.



- Get a written estimate. You will need to give the contractor a written scope of work. This should include everything you expect the contractor to do. Be sure to be very thorough with your work request and have plans and materials specified. The contractor will need to know exactly what materials he will be expected to purchase on your behalf and specifically how much of the labor you expect him to complete. Some contractors may charge a fee for an estimate.
- Get more than one contractor to give you an estimate for the job. Even with the same work description you will find that every contractor will give you a different price. When comparing estimates look at them closely and be sure each contractor is pricing out the same work and materials for you.
- Obtain a contract. The contract should be complete and clearly state all the work, costs, and payment schedule. Never sign a blank contract or one with blank spaces. It may be worthwhile to have your attorney look it over if a lot of money is involved.
- Ask for guarantees. Any guarantees from the contractor should be written into the contract. It should include what is guaranteed, who is responsible for the guarantee (dealer, contractor, manufacturer), and the length of time the guarantee is valid.
- Get a final contract. A signed contract is binding on both you and the contractor. Don't sign completion papers or make the final payment until the work is completed to your satisfaction and approved by your local building inspector.

## Building Permits

Local codes generally require a building permit before you make repairs or flood proofing upgrades to your structure. Usually you need to get a permit for electrical work, plumbing, and repairs for structural damage (such as foundations and exterior walls).

Because your property may be located in a designated floodplain you will also want to check with the permit department before constructing any floodwalls or berms in your landscaping. Your permits department will have maps called Flood Insurance Rate Maps (FIRMs) that will show the floodplain in your community. This flood area is known as the Special Flood Hazard Area (SFHA).

The National Flood Insurance Program (NFIP), and most local and state building codes require that a building in the floodplain that is substantially damaged or substantially improved be treated as new construction. The lowest floor must be elevated to or above the base flood (100-year flood protection) elevation.

Substantial damage means that the cost to restore your house to its "before damaged" condition would equal or exceed fifty percent (50%) of the market value of your house before the damage occurred. Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds fifty percent (50%) of the market value of the structure before the start of construction of the improvement.

Combining a repair with an improvement where the total cost equals or exceeds fifty percent (50%) of the market value of your house before the damage occurred will also trigger the requirement to elevate.

## Successful Flood Fight



Sandbag wall in Mount Vernon, Washington

Historically, Washington communities have successfully rallied together to save their town and protect their homes and businesses from washing away. This recent flood was a perfect example of this community spirit. Sand bagging is an important tool in our "flood fight" strategies, but it is only one of many tools for reducing the threat of floods. Every community at risk from floods also needs to include other more permanent mitigation measures for protecting their homes.

We have all heard of sand bag structures failing or being overtopped by floodwaters. As well as being a dangerous operation, there are also unintended consequences of building floodwalls with sandbags. Diverting water from one point along a river affects other areas upstream and downstream. Unfortunately, these changes in the flow of water created by flood fighting walls often cause tragic consequences in other communities. Like a pinball machine, deflected water moves elsewhere until it enters a new area causing damage to homes and businesses that were previously safe.

For example, a permanent solution for protecting your community could be open space that can safely store the excess floodwaters or relocating structures that are habitually flooded. Whether you live in a floodplain or live on city streets that flood, incorporating safer building standards, relocating, elevating, and purchasing flood insurance can avoid damages. These permanent steps will reduce your risk and protect your property. No matter what protective measure your community uses to fight floods, protect yourself by purchasing and maintaining flood insurance.

## Beware of Disreputable Activities

Areas recovering from floods are often prime targets for less-than-honest business activities. Here are some points to help safeguard against such practices.

- Beware of "special deals" offered after a disaster by contractors you don't know.
- Beware of unknown contractors wanting to use your house as a "model home."
- Do not sign any contract under pressure by a salesperson. Federal law requires a three day cooling-off period for unsolicited door-to-door sales of more than \$25. If you choose to cancel such a contract within three business days of signing it, send your cancellation by registered mail.
- Beware if you are asked to pay cash on the spot instead of a check made out to the contracting company. A reasonable down payment is up to 30% of the total project cost.
- Your contractor should call you or a qualified observer to inspect hidden work (e.g., sewers or basement wall) before it is covered over. Most building departments must inspect electrical and plumbing lines before the walls are covered with wallboard or paneling.
- To register a complaint about a contractor, call the Washington State Attorney General's Consumer Protection Hotline at (800) 551-4636.



## Lookout for Landslides

Besides flooding, rainy weather can induce another disastrous problem: landslides. By looking for common indicators you can determine if your property is prone to sliding. Find where the water is coming from. Get out in the rain and check areas like hill slopes, gullies, driveway and street drainage, roof gutters and downspouts. Next, see where the flow originates and where it goes. Concentrated flow can cause great damage.

**Wet, Weak, & Steep** – Slope failure problems are caused by any combination of water saturation and flow, weak, heavy earth materials, and steep slopes. Remember, water is the most common trigger of slope failure!

**Drainage** – Channels, streams, gullying, ponding, and erosion on hills all indicate potential slope problems. Road and driveway drains, gutters, down spouts and other drainage can concentrate and accelerate flow. Ground saturation and concentrated velocity flow are a major cause of slope problems and landslide triggering.

**Debris** – Deposition of soils and vegetation at the base of slopes indicate possible erosion, flow, and creep from ground cover above.

**Vegetation** – Vegetation can indicate slope conditions. Bare slopes may show erosion and sliding. Trees that bend downhill show creep of upper soils. Trees tilting uphill may show deep rotational landsliding. Patches of younger vegetation may show former slope failure. Horsetail ferns or other moisture craving plants often indicate saturated ground and springs.

**Deformed Structures** – Foundation cracks; doors and windows out of line or sticking; tilted floors; sagging decks; cracks in masonry; cracks in driveways and roads; gaps between floors and walls; failing retaining walls; tilted power poles. These are all signs of slope instability.

**Loose Fill** – Loose fill at the top of a slope due to yard waste, “cut & fill,” land grading, or other process can aggravate slope instability.



## Stabilizing Your Property

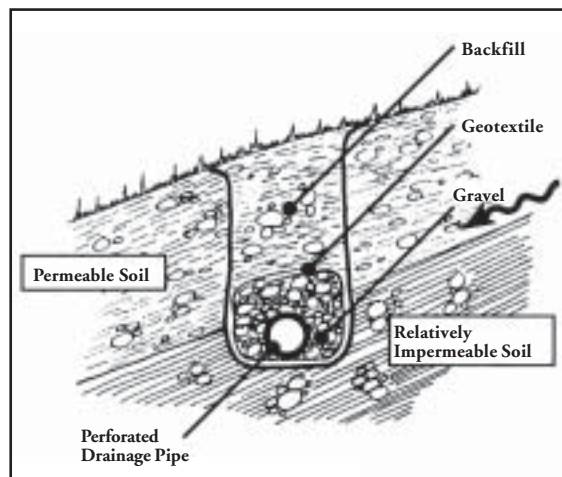
### Bank Stabilization

Banks that are steep and susceptible to landslides, or are already sloughing off and encroaching upon a structure, are in need of a bank stabilization effort. Many different levels of protection are possible and it is best to consult with a geotechnical or structural engineer if you are in a hazardous area.

### Interceptor Drain

Interceptor drains are installed horizontally along a slide-prone hillside. They effectively “intercept” the water flowing down the hillside and divert it away from the weakest part of the hill. Interceptor drains are created using the following steps:

1. Excavate trench into impermeable soil layer.
2. Lay geotextile into trench. (Geotextile is a synthetic fabric designed to retain soil while allowing water to flow through it.)
3. Place gravel into trench and extend gravel height to the maximum anticipated water level.
4. Overlap geotextile on top of gravel.
5. Backfill with excavated soil.



Interceptor Drain

### Vegetation

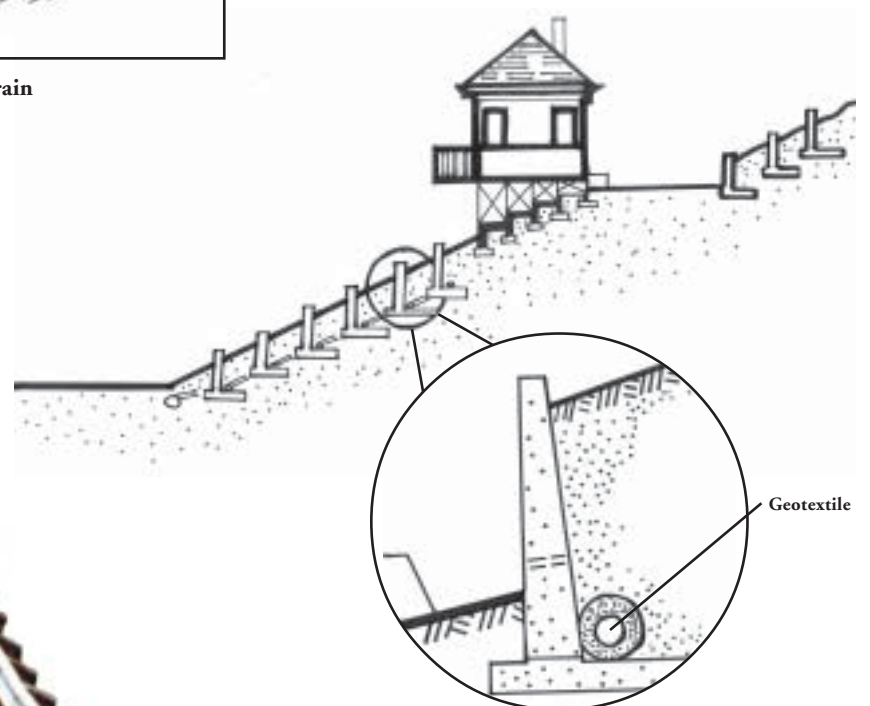
On geotechnical or slope areas where there is no threat to life or structures, a vegetation planting plan may be the most reasonable approach. The different types of root systems that plants have can strengthen the cohesion of soils and bind the soil structure together into a larger unit. This can add resistance to potential landslide areas. Shallow roots can stabilize the top layer of soil, while deep tap or lateral root networks can strengthen the lower base layers. Many plants are particularly useful for bank stabilization. Your local nursery will be able to recommend plants that grow well in your climate and particular soils conditions.

### Concrete Retaining Walls

Concrete retaining walls can be constructed to withstand a large variety of structural loading conditions. They are particularly useful in steep situations where protection is needed close to the top or base of a slope. The strength of the retaining wall is highly dependent upon the strength of the materials it is made of and the manner in which they are put together. Because of the design detail required for each situation, a structural or geotechnical engineer should be consulted when a concrete retaining wall is going to be used.

### Rock Walls

Rock walls are essentially gravity walls made of stacked large rock. They primarily provide erosion protection and limited earth support. Slope, rock depth and wall height are critical to the stability of rock walls. Therefore, they should generally be limited to 15 feet or less in height and should be installed by professional rockery landscape installers. Any rock walls higher than 15 feet should be designed by engineers.



Concrete Retaining Wall



## What is Urban Flooding?

Recent flooding in the Northwest was not limited to the major rivers and floodplains. In fact, urban flooding also posed a significant hazard and caused damage. In cities, paved streets, and other impervious surfaces prevent natural absorption into the ground. Storm water runs from hard surfaces such as rooftops, paved streets, highways, and parking lots directly into sewer systems that quickly become inundated causing them to backup. As development increases, more of the natural absorption process of the ground is diminished. The result is more water being channeled into sewer lines than can be processed causing an urban flood.

Innovation in urban flood mitigation is most evident in the form of Low Impact Development (LID). LID attempts to restore the natural drainage function by encouraging localized treatment of water on site at both residential and nonresidential structures. Instead of channeling rain/storm runoff directly into municipal drains, Low Impact Development uses natural absorption by way of vegetated swales, smaller retention ponds, and efficient use of non-impervious ground on a site by site basis. It has been described as “rain water harvesting” because it uses the water on site (either through rain barrel storage, rain gardens, or natural ground filtration to intended locations away from the foundation). By reducing the amount of water to be handled by the sewer system, and reducing the amount of non-treated runoff that enters natural waterways, LID promotes local flood mitigation.

There are many benefits of LID. It mitigates urban flooding, preserves natural landscape features by minimizing environmental disturbance; reduces the effect of hard surfaces, and facilitates localized retention and infiltration opportunities. It is also recognized by the state of Washington (RCW 35.67.020 (3)) as means of

reducing building costs while protecting natural habitat along streams and local waterways. In conjunction with National Flood Insurance Program’s, Community Rating System (CRS) as well as FEMA Region 10’s, Higher Regulatory Standards, local homeowners and elected officials can further reduce the cost of flood insurance community wide while improving the environment. For more information about LID practices, visit:

<http://www.psat.wa.gov/Programs/LID.htm>



Permeable concrete

JOHN SKALOS - FEMA

## Preventing Flooding Around Your Home

There are a wide range of steps you can take around your property to reduce the impact of stormwater and even reduce the chances of floodwaters entering your home.

### Storm Drains

Take time to clean out the storm drains along your street. Keep sticks, lawn clippings, leaves and other debris away from creeks. Take advantage of yard waste collection services offered in your community.

### Depression Gardening

When possible, use the lowest point on your property for planting a garden. Let gravity help you to keep your garden green.

### Rain Barrels

Rain barrels collect rain from your roof. It is free water that you can use in the summer months around your yard. It also helps keep the ground around your home from getting oversaturated.



RYAN IKE - FEMA

## Efforts at Meadowbrook Pond Reduce Flooding

Despite being inundated with more water than it was built to accommodate, Meadowbrook Pond, functioned as designed during the October 2003 flooding in the City of Seattle. Located at NE 107th and 35th NE, near the confluence of the north and south branches of Thornton Creek, Meadowbrook Pond is a Seattle Public Utility urban flood control project completed in 1998. It resembles a natural functioning wetland that reduces neighborhood flooding near the mouth of Seattle’s largest watershed (19 square miles). By capturing increased creek flow partially resulting from increased impervious or “hard surface” runoff, it mitigates urban flooding while providing a scenic, natural environment for neighborhood residents. Similar to a naturally functioning floodplain, this city run facility improves

local fish and wildlife habitat and provides storage space for natural flooding. It also serves as an educational tool for local students and community members interested in watershed ecology.

Projects like Meadowbrook Pond reduce flooding. They highlight the success of new innovations in local flood mitigation. Located within major cities, these micro-man-made floodplains incorporate natural riverine processes, education, and flood control into the overall function of the site. For more information about Meadowbrook visit:

<http://www.seattle.gov/util/planning/meadowbrook/index.htm>

If you are a resident of Seattle and suffered flood damage, flood insurance and disaster assistance are available. To receive Seattle Emergency Management’s brochure “A Practical Guide to Disaster Recovery Assistance” please call (206) 233-5076 or view it online at:

[www.seattle.gov/emergency\\_mgt/pdf/DisasterRecoverybrochureSeattle.pdf](http://www.seattle.gov/emergency_mgt/pdf/DisasterRecoverybrochureSeattle.pdf)



Meadowbrook Pond was created by Seattle Public Utilities to reduce flooding and educate the public.

RYAN IKE - FEMA



## Just-in-Time Planning in Skagit

With near-perfect timing, Skagit County adopted a Natural Hazard Mitigation Plan just a month prior to the record flooding that took place there in October. This plan provides risk information, strategies, and mitigation measures that will aid in the recovery and reduce the risk of future damages.

Skagit County's Natural Hazard Mitigation Plan was the culmination of a process that began with the county's Emergency management Plan. The Emergency Management Plan coordinates the efforts of county agencies in preparing for and responding to natural and man-made hazards. The Natural Hazard Mitigation Plan identifies the risks and makes recommendations that would reduce future disaster damages.

The Skagit Natural Hazard Mitigation Steering Committee began developing the plan in May 2002. The committee received funding from a grant provided by Washington Emergency Management Division and FEMA. In a little over a year, the committee brought together participating stakeholders and citizens to develop an extensive plan addressing fifty-four jurisdictions in Skagit County.

The spirit of the plan is captured in this excerpt: "It is hoped that the spirit of inter-jurisdictional cooperation that has begun with this planning effort will continue in the years to come, thereby providing further benefits to all jurisdictions and agencies within the county, as well as the citizens these jurisdictions and agencies serve."

## Plan Development & Approval Checklist

This checklist identifies the required and optional content of a local hazard mitigation plan, as outlined in 44 CFR Part 201.6. Utilize the checklist to develop a hazard mitigation plan and/or to verify the required content is included in the plan prior to submitting it for review and approval.

## Hazard Mitigation Plans

Hazard mitigation planning benefits communities by reducing the potential for future disaster-related damages. Reducing damages improves life safety, economic security, and quality of life.

Communities must have a FEMA-approved hazard mitigation plan in place before applying for FEMA mitigation project grants. There are two mitigation grant programs available through FEMA:

**The Pre-Disaster Mitigation Grant Program**, authorized by the Disaster Mitigation Act of 2000. Under this program, communities compete nationwide for grants to fund pre-identified mitigation projects.

**The Hazard Mitigation Grant Program (HMGP)** uses funding from federally declared disaster dollars for mitigation projects identified by the state. In order to be eligible for HMGP funding after November 1, 2004, states and local entities will be required to have an approved mitigation plan.

To receive FEMA approval, a plan must contain a planning process, risk assessment, mitigation strategy, and plan maintenance. It must be adopted by the local governing body and be submitted through the state hazard mitigation office for FEMA review and approval.

For more information on hazard mitigation planning in Washington State, contact Marty Best, State Hazard Mitigation Programs Manager, at [M.Best@emd.gov](mailto:M.Best@emd.gov).

## Planning Resources

The Federal Emergency Management Agency has developed a series of "how-to" guides on developing state and local hazard mitigation plans:

- Getting Started
- Understanding Your Community's Risk
- Developing the Mitigation Plan
- Integrating Human-Caused Hazards Into Mitigation Planning

Copies of the guides may be downloaded from FEMA's website at [www.fema.gov/fima/planhowto.shtml](http://www.fema.gov/fima/planhowto.shtml), or to obtain paper copies or electronic copies on CD, call (800) 480-2520.



**Developing the Mitigation Plan:** One of several "how-to" guides on mitigation planning available from FEMA.



201.6 (C)	<b>Planning Process</b>	<ul style="list-style-type: none"> <li>Description of Process <input type="checkbox"/></li> <li>Contributors <input type="checkbox"/></li> <li>Public Involvement <input type="checkbox"/></li> </ul>
201.6 (C)(2)	<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Description of hazards <input type="checkbox"/></li> <li>+ Location <input type="checkbox"/></li> <li>Extent <input type="checkbox"/></li> <li>Previous occurrences <input type="checkbox"/></li> <li>Hazard event probability <input type="checkbox"/></li> <li>Vulnerability to assets <input type="checkbox"/></li> <li>Impacts to assets <input type="checkbox"/></li> <li>Estimate potential losses (optional) <input type="checkbox"/></li> <li>Analyze development trends (optional) <input type="checkbox"/></li> </ul>
201.6 (C)(3)	<b>Mitigation Strategy</b>	<ul style="list-style-type: none"> <li>Identify mitigation goals <input type="checkbox"/></li> <li>Identify objectives (optional) <input type="checkbox"/></li> <li>Propose mitigation actions &amp; projects <input type="checkbox"/></li> <li>+ Actions for existing buildings, infrastructure &amp; critical facilities <input type="checkbox"/></li> <li>Actions for future buildings, infrastructure &amp; critical facilities <input type="checkbox"/></li> <li>Prioritization process <input type="checkbox"/></li> <li>Cost/benefit analysis utilization <input type="checkbox"/></li> <li>Implementation options <input type="checkbox"/></li> <li>Administration process <input type="checkbox"/></li> </ul>
201.6 (C)(4)	<b>Plan Maintenance</b>	<ul style="list-style-type: none"> <li>Description of monitoring, evaluating, and updating process <input type="checkbox"/></li> <li>Schedule for plan maintenance <input type="checkbox"/></li> <li>Continued public involvement <input type="checkbox"/></li> <li>Incorporation process with other plans <input type="checkbox"/></li> </ul>
201.6 (C)(5)	<b>Adoption</b>	<ul style="list-style-type: none"> <li>Plan adoption <input type="checkbox"/></li> <li>Adoption documentation <input type="checkbox"/></li> </ul>
201.6 (d)	<b>Plan Review</b>	<ul style="list-style-type: none"> <li>Submit plan to SHMO for review <input type="checkbox"/></li> <li>Pre-adoption FEMA review (optional) <input type="checkbox"/></li> <li>Resubmit plan every 5 years <input type="checkbox"/></li> </ul>