

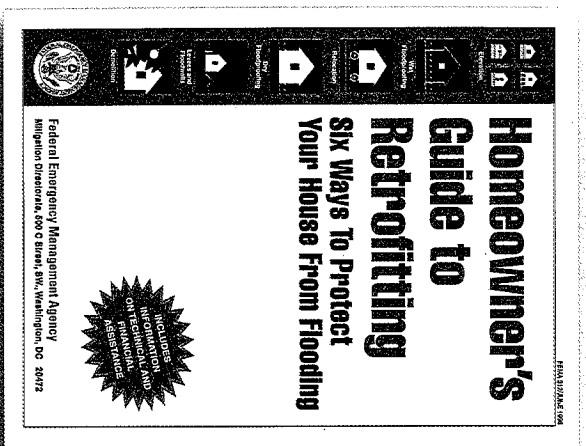
What is Retrofitting?

Retrofitting means making changes to an existing building to protect it from flooding or other hazards such as high winds and earthquakes.

FEMA PUBLICATION 312

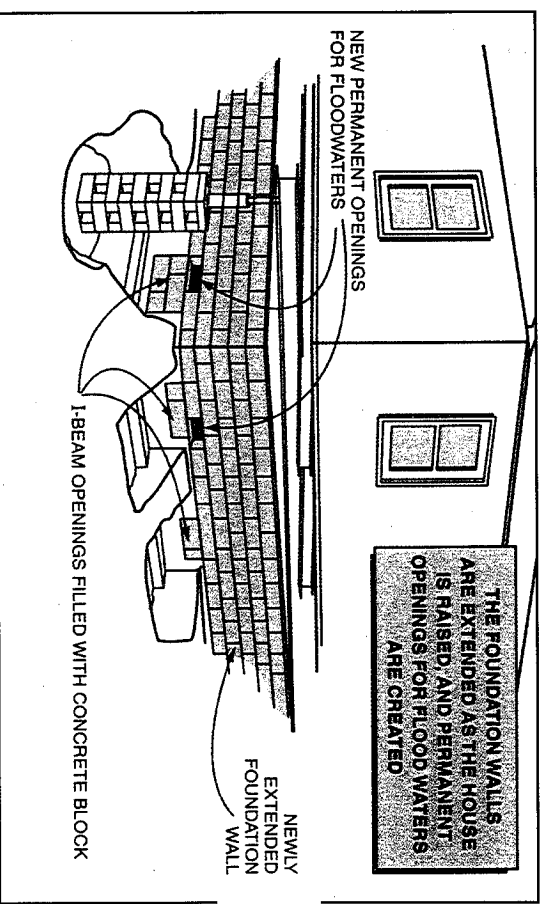
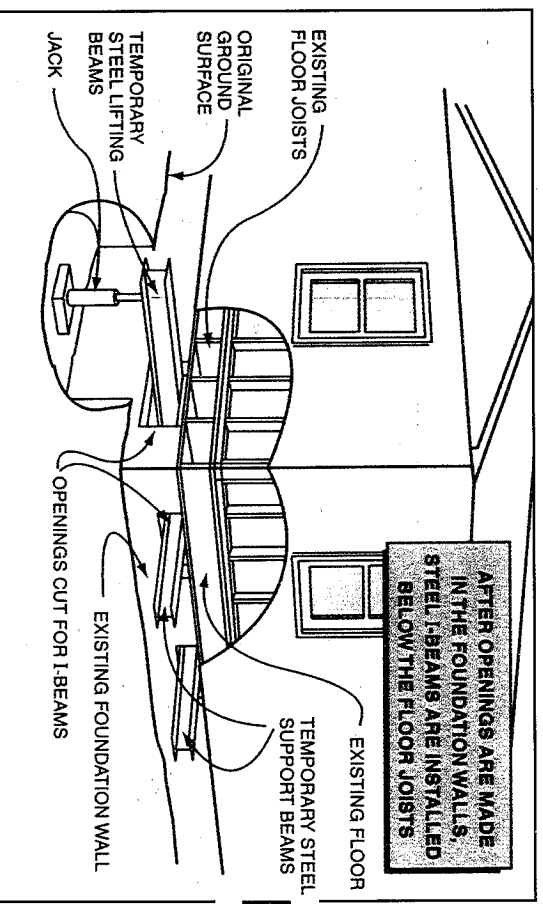
Home Owner's Guide to Retrofitting: Six Ways to Protect Your House From Flooding, provides information that will help you decide whether your house is a candidate for retrofitting.

The Guide helps by describing six retrofitting methods that protect your house from flooding.

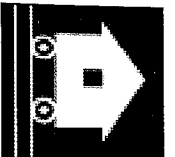


Elevating Your House

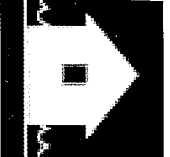
This set of illustrations shows how a house built on a basement or crawl space can be elevated above the base flood elevation on extended foundations walls with added flood vents to equalize any pressure from flood waters and therefore reduce flood damage to your home.



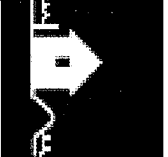
Elevation: Raising your house so that the floor of the lowest living space is above the Base Flood Elevation.



Relocation: Moving your house to a new, safer location.



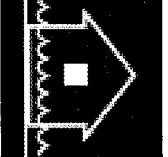
Dry Flood Proofing: Sealing your house to prevent flood waters from entering.



Levee and floodwall: Constructing barriers to prevent flood waters from entering your house.



Demolition: Razing your house and rebuilding on the same property or buying a house elsewhere.

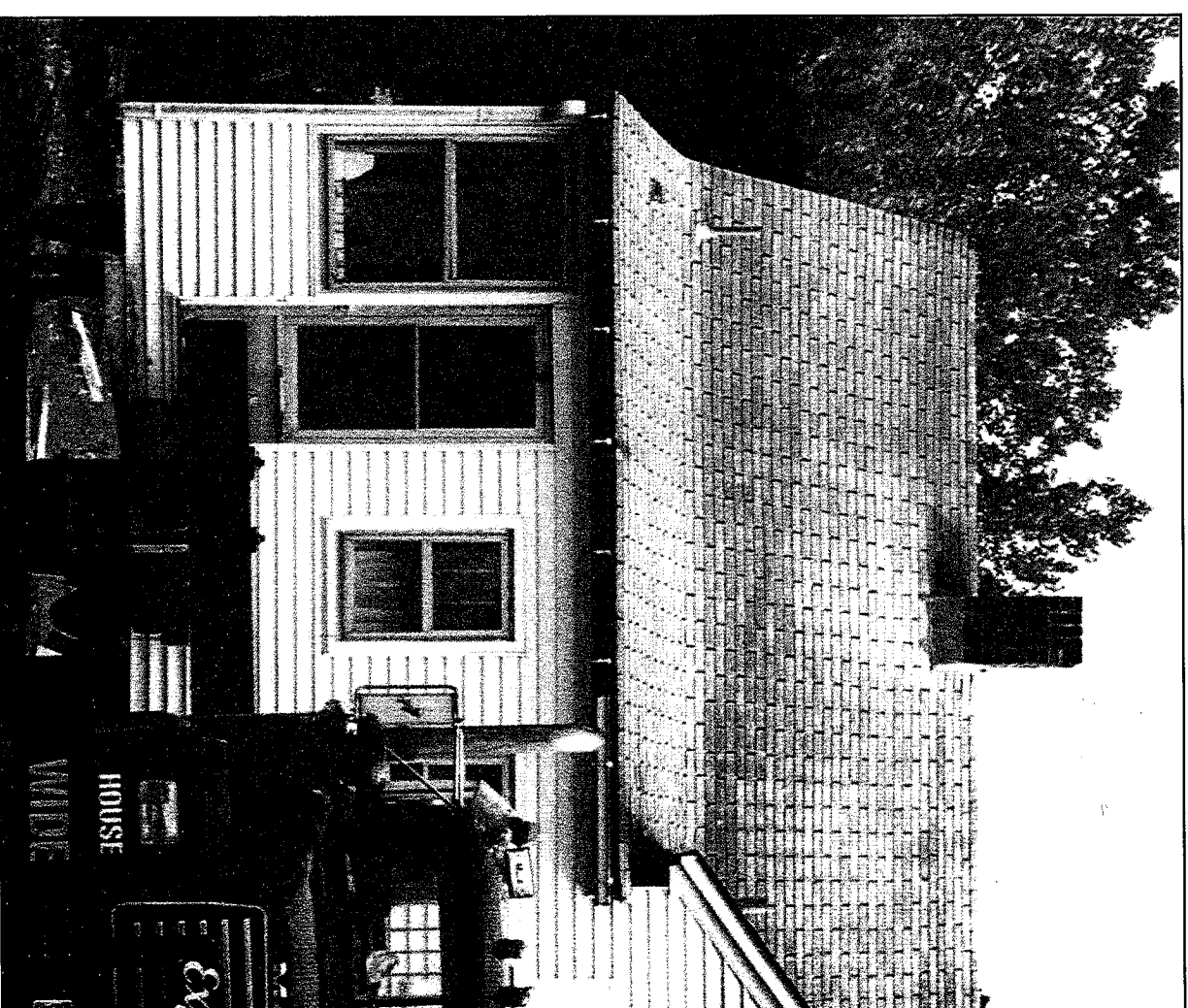


Wet Floodproofing: Using vents or breakaway walls to reduce structural damage by allowing floodwaters to flow through unhabited parts of a building.

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.

Contact your local building officials before making any changes to your house.



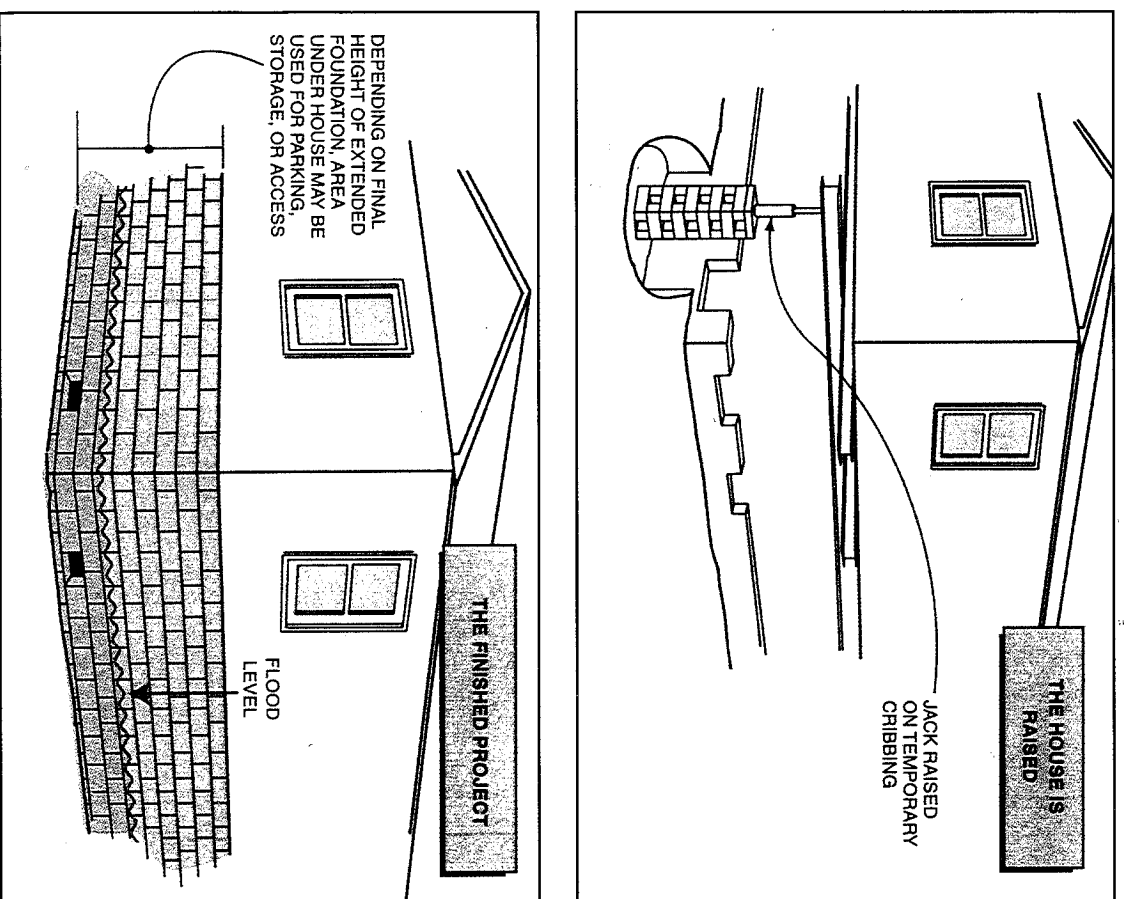
In some cases relocation is the best answer to a hazard problem.

Elevating an Electrical System

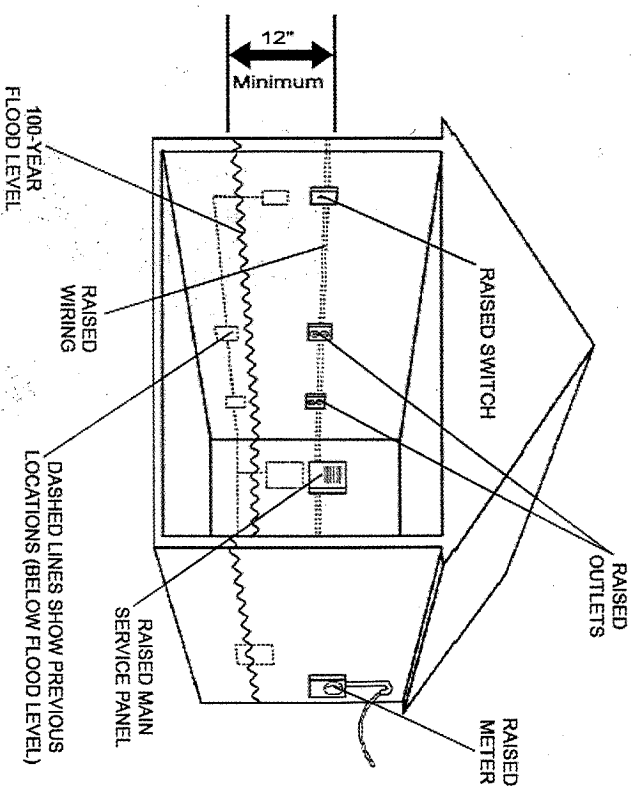
The surest way to protect your valuable electrical system is to keep it from getting wet. When rebuilding after a flood, or repairing by wet floodproofing, move all wiring at least one foot above the 100-year flood level. All outlets, switches, light sockets and junction boxes, as well as the main breaker or fuse box and electric motors, should be out of danger of getting wet.

Run wires overhead. If a wire has to run into the areas that could get wet, use a wire rated for underground use. No wire should end in the flood zone and all junctions should be in approved junction boxes. If a wire has to terminate below the 100-year flood level, it should be specially marked in the panel box and turned off at the time of a flood warning.

Change all outlets to ground fault interrupters (GFI). Be sure all electrical wiring is done by a licensed electrician and approved by the local building department.



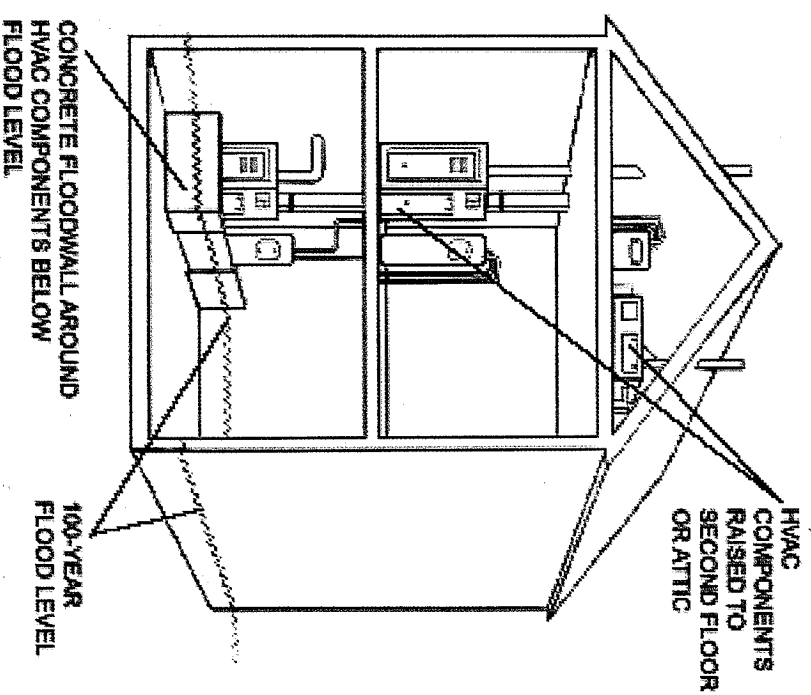
NOTE: Certain repairs are not permitted for substantially damaged buildings. Check with your local building official or floodplain administrator before beginning repairs.



Raise or Floodproof HVAC Equipment

Heating, ventilating, and cooling (HVAC) equipment, such as a furnace or hot water heater, can be damaged extensively if it is inundated by flood waters. The amount of damage will depend partly on the depth of flooding and the amount of time the equipment remains under water. Often, the damage is so great that the only solution is replacement.

In floodprone houses, a good way to protect HVAC equipment is to move it from the basement or lower level of the house to an upper floor or even to the attic. A less desirable method is to leave the equipment where it is and build a concrete or masonry block floodwall around it. Both of these methods require the skills of a professional contractor. Relocation can involve plumbing and electrical changes, and floodwalls must be adequately designed and constructed so that they are strong enough and high enough to provide the necessary level of protection.



Other Related Publications *	
FEMA 55	Coastal Construction Manual
FEMA 257	Mitigation of Flood and Erosion Damage
FEMA 102	Floodproofing Non-Residential Structures
FEMA 259	Engineering Principles
FEMA 347	Elevating your Flood-Prone Home
FEMA 114	Design Manual for Retrofitting

