



6.0 Relocation and Demolition

This chapter describes two mitigation alternatives: relocation and demolition.



Relocation



Demolition

These mitigation options can be more effective than other mitigation methods because they provide the opportunity to relocate or rebuild in an area outside of the floodplain. If rebuilding outside the floodplain is not possible, then moving to less vulnerable locations (i.e., from Zone V to a Zone A) on the same property or on a new property is also an option. If neither rebuilding outside the floodplain or in a less vulnerable location is feasible, elevation may be your best option. Elevation is described in detail in Chapter 5. This chapter addresses relocation outside of the floodplain.

Because relocation and demolition are both complex, you should consult design and/or construction professionals to help with your mitigation project.



NOTE

Always use a licensed, bonded, and insured contractor for relocation projects. Be sure that your contractor has experience with relocation projects and understands the considerations discussed in Section 6.1.1. Checking the contractor's references is very important.

For information about home relocation companies, contact the International Association of Structural Movers at P.O. Box 2104, Neenah, WI 54956-2104 (803) 951-9304, <http://www.iasm.org/>.

6.1 Relocation



Relocation, or moving your home out of the flood hazard area, offers the best protection from flooding. It also can free you from anxiety about future floods and lower your flood insurance premiums. However, relocation usually is the most expensive of the retrofitting methods.

The relocation process involves lifting a home off its foundation, placing it on a heavy-duty flatbed trailer, hauling it to a new site outside the flood hazard area, and lowering it onto a new conventional foundation. The process sounds straightforward, but a number of considerations require careful planning.

6.1.1 Considerations

Condition of Home

For a home to be picked up and moved successfully, it must be structurally sound. All the structural members and their connections must be able to withstand the stresses imposed when the home is lifted and moved. Before the home is lifted, the home moving contractor must inspect it to verify its structural soundness. A home that is in poor condition, especially one that has been damaged by flooding, may need so much structural repair and bracing that relocation is not be practical (see Section 6.2 for demolition).

Home Size, Design, and Shape

In general, the types of homes that are the easiest to elevate (as discussed in Section 5.1.5) are also the easiest to relocate: single-story, wood-frame homes over a crawlspace or basement foundation, especially those with a simple rectangular shape. These homes are relatively light, and their foundation design allows the home moving contractor to install lifting equipment with relative ease. Multistory homes and solid masonry homes are more difficult to relocate because their greater size and weight requires additional lifting equipment and makes them more difficult to stabilize during the move. Slab-on-grade foundations complicate the relocation process because they make the installation of lifting more difficult.

The relocation process is also more complicated for homes with brick or stone veneer, which can crack and peel off when disturbed. Removing the veneer before the home is moved and replacing it once the home is on the new foundation at the new site may be less expensive. For the same reason, chimneys may need to be removed before the move and rebuilt afterwards. If they are to be moved with the home, they must be braced extensively.

Moving Route Between Old and New Sites

Restrictions along the route to the new site can complicate a relocation project, especially for large homes. Narrow roads, restrictive load capacities on roads and bridges, and low clearances under bridges and power lines can make finding an alternative route necessary. When no practical alternatives are available, the home moving contractor may have to cut the home into sections, move them separately, and reassemble the home at the new site. Experienced home movers can make the cuts and reassemble the home in such a way that it will not appear to have ever been apart.

Disruption of Occupants

Among all the retrofitting methods, relocation is the most disruptive for the occupants of the home. Before the home can be lifted, all utility systems must be disconnected, and the home becomes uninhabitable. You cannot move back into the home until it has been installed at the new site and all utility systems



NOTE

Relocation is sometimes used as an alternative to demolition (as described in Section 6.2) when a home has been damaged. Instead of demolishing the home, the owner may be able to sell it for salvage to a contractor, who will then move the home to another site, renovate it, and sell it. Relocation is also used after a community acquires a flood-prone property from the owner. Instead of leaving the home to be demolished, the owner may decide to keep the home and move it to property outside the flood hazard area.



CROSS REFERENCE

See Section 4.1.3 for information about working with local officials regarding flood hazards and permitting requirements in your community.

reconnected. In the interim, you will need temporary lodgings and a place to store your furniture and other belongings.

6.1.2 The Relocation Process

The relocation process consists of more than lifting and moving the home. You must work with your contractor to select a new site for the home, and the contractor must plan the moving route, obtain the necessary permits, prepare the new site, and restore the old site.

Selecting the New Site

Selecting a new site for your relocated home is similar to selecting a site on which to build a new home. You need to consider the following:

Natural Hazards – Remember that the goal of relocating is to move your home to a site that will be safe from flooding and other natural hazards. Before buying new property, check with local officials about the flood, wind, and earthquake hazards at any new site you may be considering (see Section 4.1.3).

Utilities – Determine what steps you need to take to install new utility systems and to have utility lines extended to your new site. Consider electrical, gas, water and sewer, telephone, and cable TV services. Your community will probably require that your new utility systems meet current code requirements. Regardless of these requirements, you should consider upgrading one or more of your utility systems to provide more energy-efficient service.

Accessibility – Your new site must be accessible to the home movers and to the construction crews that will prepare the site and build the new foundation for your home. The more difficult it is for contractors to reach and work at your new site, the more expensive your relocation project is likely to be. If extensive grading and clearing are necessary for adequate access, some of the characteristics that made the site attractive to you may be diminished. Your existing site may also present some accessibility issues if your home has a cistern or septic tank system installed on the property. If these need to be detached from your home and installed at the new project site, additional time and cost may be involved.

Another important consideration regarding accessibility is the difficulty of moving the home to the new site. In determining the best route between the old and new sites, the moving contractor must anticipate potential problems. For example, the routing of the home may be impeded by narrow bridges and road cuts, bridges with low weight limits, low-hanging utility lines and traffic signals, low underpasses, tight turns, road signs, and fire hydrants.

The moving contractor should also coordinate any special services that may be required to deal with obstacles, such as raising traffic lights, relocating signs, and constructing temporary bridges. Utility lines can usually be raised temporarily during the move, but utility companies often charge for this service. In some cases, it may be possible to avoid some obstacles by choosing an overland (non-road) travel route.



WARNING

Regardless of the age of your home, you may be required by local regulations to bring it up to current code when you move it to a new site. This requirement could affect not only the home but also its utility systems. You should check with your local officials about such requirements before you decide to relocate.

Permitting

You or your moving contractor must obtain permits to move the home on public roads or other rights-of-way. These permits may be required by local governments, highway departments, and utility companies, not only in the jurisdiction from which your home is being moved, but also any jurisdiction through which the home will pass. If the moving route crosses or affects private land, you may need to obtain the approval of the landowner.

Obtaining the necessary permits and approvals may be a lengthy and complex process, and you may find that the requirements vary from jurisdiction to jurisdiction and agency to agency. So it is extremely important that you, your design professional, and your moving contractor investigate the need for permits and approvals before you make a final decision to relocate.

You or your design professional should check with local officials to make sure that, when your home is moved to the new site, it will conform to all zoning requirements and building codes in effect at the time of the relocation. The design professional should also determine the local design standards and permitting requirements that govern the development of your new site. All permits required for construction at the new site, moving your home, and restoring the old site after the home is moved should be obtained *before* the relocation project begins.

Preparing the New Site

Before the home is moved, the new foundation must be designed and is usually partially constructed. The foundation will be completed after the home is brought to the site. Clearing, excavation, and grading are necessary to allow construction to begin and to ensure that the home can be maneuvered on the site. Also, unless already available, utility service must be brought into the site so that there will be no delay in connecting them to the home and making it habitable. Figure 6-1 shows a new slab-on-grade foundation that is being constructed for a relocation project.



CROSS REFERENCE

Refer to Section 5.2 for a description of how homes on various types of foundations are lifted off their foundations.

Figure 6-1. New foundation is being prepared (photo courtesy of Wolfe House Movers).



Lifting the Home

In general, the steps required to lift a home off its foundation are the same as those described in Section 5.2.1 for elevating a home on extended foundation walls. As described in Section 5.2.2, the steps to lift homes on basement and crawlspace foundations differ from those for homes on slab-on-grade foundations.

Homes on basement and crawlspace foundations are separated from their foundations and lifted on steel I-beams that pass through the foundation walls directly below the floor framing. The lifting is done with hydraulic jacks placed directly under the I-beams. The process for homes on slab-on-grade foundations is similar. However, because these homes are lifted with the concrete floor slab attached, the I-beams are inserted below the slab. Figures 6-2 through 6-5 show the basic steps for lifting a home.



Figure 6-2. Clearing pathways beneath the structure for lifting supports (photo courtesy of Wolfe House Movers).

Figure 6-3. Pathways for lifting beams (photo courtesy of Wolfe House Movers).



Figure 6-4. Beams supported by cribbing are placed at critical lift points (photo courtesy of Wolfe House Movers).





Figure 6-5. Hydraulic jacks lift the structure, and the home is separated from existing foundation (photo courtesy of Wolfe House Movers).

Moving the Home

After the home is lifted, the moving contractor performs the grading and excavation necessary to create a temporary roadway that will allow the home to be moved to the street. The area beneath the home must be leveled and compacted so that trailer wheel sets can be placed under the home (Figure 6-6). The wheel sets and lifting beams form the trailer on which the home will be moved.



Figure 6-6. Trailer wheel sets are placed beneath the lifting beams (photo courtesy of Wolfe House Movers).

After the wheels are attached, a tractor or bulldozer tows the home to the street. As the home is being moved, workers continually block the wheels to prevent sudden movement. At the street, the home is stabilized, the trailer is attached to a truck, and the move to the new site begins (Figure 6-7).

Figure 6-7. The move to the new site begins (photo courtesy of Wolfe House Movers).



At the new site, the moving contractor positions the home over the partially completed foundation and supports the home on cribbing so the trailer wheels can be removed. As in the home elevation process described in Chapter 5, the home is lifted on hydraulic jacks to the desired height and the foundation is completed below it. The home is then lowered onto the foundation, all utilities are connected, and any necessary backfilling and landscaping is completed (Figure 6-8).

Figure 6-8. House is lowered and connected to the foundation after the foundation is fully constructed (photo courtesy of Wolfe House Movers).



Restoring the Old Site

After the home is moved, the old site must be restored according to the local regulations. Restoring the site usually involves demolishing and removing the old foundation and any pavement, such as a driveway or patio; backfilling an old basement; removing all abandoned utility systems; grading to restore areas disturbed by demolition; and stabilizing the site with new vegetation. Permits are normally required for demolition, grading, and vegetative stabilization.

If your old site included a septic tank or fuel storage tank, you may have to meet the requirements of environmental regulations aimed at preventing contamination of groundwater. Depending on the age and condition of the tank, you may be required to drain and remove it. If it is an underground tank, you may have to drain it and anchor it to prevent flotation. You may also be required to test the soil around an underground fuel tank to determine whether leakage has occurred. As the homeowner, you will usually be responsible for cleaning contaminated soil if there has been any leakage from the tank. In this situation, you will need the services of a qualified geotechnical or environmental engineer.

Local utility companies or regulatory officials can inform you about requirements concerning capping, abandoning, or removing various utility system components.



NOTE

Always use a licensed, bonded, and insured contractor for demolition projects and for reconstruction projects. Be sure that your contractor has experience with demolition (and construction for mitigation reconstruction) and understands the considerations discussed in Section 6.2.1.



NOTE

Many homeowners have sold or deeded vacated flood-prone properties to local municipalities for use as parkland or open space.

6.2 Demolition



Demolition is tearing down a damaged home and either rebuilding a compliant home on the same property, rebuilding a compliant home on new property, or moving into another structure. This retrofitting method may be the most practical of all those described in this guide when a home has sustained extensive damage, especially severe structural damage.

If a flood-prone home has been severely damaged, because of flooding or any other cause, demolition can be practical and effective. Demolition may also be practical for an undamaged home that, because of deterioration over time or for other reasons, is not worth retrofitting with any of the other methods described in this guide. If you choose demolition, you will tear down your damaged home and either rebuild a compliant home on the same property or elsewhere outside the floodplain. If you decide not to rebuild, your State or local government may buy or **acquire** your property. Depending on your choice of a site for your new home, this method can lower or even eliminate your flood insurance premiums. If you decide to rebuild, your



DEFINITION

Acquisition is the process by which your State or local government purchases your flood-prone property, demolishes the building, and maintains the land as an open space.

mitigation reconstruction project may be eligible for FEMA grant money (see Section 2.6.1).

The demolition process involves disconnecting and capping utility lines at the damaged home, tearing the home down, removing debris and otherwise restoring the old site, and building or buying a new home. The most important considerations relate to how badly your home has been damaged and your options of building or buying a new home.



DEFINITION

Mitigation reconstruction is the construction of an improved, elevated building on the same site where an existing building and/or foundation has been demolished.

6.2.1 Considerations

Amount of Damage

Demolition is more practical for severely damaged homes than for those with little or no damage. If a flood, fire, earthquake, hurricane, or other disaster has caused extensive damage to the interior and exterior of your home or left it structurally unsound, you will probably find that demolishing the home and rebuilding it is easier than making all of the necessary repairs. Also, remember that a severely damaged home in the regulatory floodplain will almost surely be considered Substantially Damaged under your community’s floodplain management ordinance, regulation, or provisions of the building code. Salvaging such a home would require repairing the damage and elevating the home (including backfilling a basement); wet floodproofing areas used only for parking, building access, or storage; or relocating the home as described in Section 6.1.

Rebuilding or Buying Another Home

After demolishing your home, you may buy or build a home elsewhere or, in some cases, rebuild on your existing property at an elevation above the BFE. Regardless of your decision, your goal is to greatly reduce or eliminate the potential for damage from floods, earthquakes, high winds, and other hazards. If you buy or build a home elsewhere, you’ll want to find a site that is outside the regulatory floodplain, ideally one that is well above the BFE. You should also check with your local officials about other hazards before you make your final decision.

If you demolish your existing house and plan to relocate elsewhere, you will need to think about what to do with the existing property (land). Property that is entirely within the regulatory floodplain may be difficult to sell because of restrictions on its use. Your community may be interested in acquiring your property and then converting it to a public use, open space area. If you receive a FEMA grant to buy out your property then the land will most likely be deeded to the community and its use will be restricted to open space. As explained in Section 2.6, some Federal programs provide grants to States and communities that they can use to buy flood-prone homes and properties. State and local programs may also provide financial assistance. Check with your local officials about these programs.

When buying or building a home elsewhere is too expensive, you may be able to rebuild on your existing property, either on the site of your old home or, preferably, on a portion of your property that is outside the regulatory floodplain. If you rebuild on the site of your old home, your community’s floodplain management ordinance, regulation, or provisions of the building code will require that the lowest floor be at or above the BFE. How you meet this requirement depends on the flood zone and code requirements of your community. An important disadvantage of this approach is that you may not have access to your home during floods.

If your existing property includes a large enough area outside the regulatory floodplain, a better choice is to rebuild there. Building outside the floodplain gives you greater freedom to build the type of home you want. Also,

because both the home and property are outside the floodplain, restricted access during flooding is less likely to be a problem. Remember that floods do not follow the lines on FIRMs, so although building outside of the floodplain may not involve insurance implications, building high is safer and smarter. Property owners outside of high-risk flood areas file over 20 percent of NFIP claims and receive one-third of disaster assistance for flooding.

Disruption of Occupants

Like relocation, demolition can be disruptive for the occupants of the home. Unless you decide to buy an existing home elsewhere, you must find a place to live and to store your furniture and belongings while your new home is being built.

Permitting

You or your design professional or contractor must check with local officials regarding permitting requirements for the necessary work. All permits for demolition should be obtained before the demolition process begins, including disconnecting and capping utilities, disposing of debris, new construction, and restoration of the old site.

6.2.2 The Demolition Process

Tearing Down the Old Home

Your utility companies must first turn off all services to the home. Your demolition contractor will then disconnect the utility lines. If you do not plan to rebuild on the same site, the contractor will cap the lines permanently or remove them according to the requirements of the utility companies. Before demolition begins, environmental hazards, such as asbestos, must be abated in accordance with Federal, State, and local requirements. Typically, the demolition contractor will bulldoze the home and then dispose of the resulting debris as required by Federal, State, and local regulations.

Restoring the Old Site

If you are not rebuilding on the old site, it must be restored according to the requirements of local regulations. Site restoration usually involves demolishing and removing not only the home, but also any pavement, such as a driveway or patio; grading to restore areas disturbed by the demolition; and stabilizing the site with grass.

If your old site included a septic tank or fuel storage tank, you may have to meet the requirements of environmental regulations aimed at preventing contamination of groundwater. You may be required to drain and remove aboveground and underground storage tanks, or you may have to anchor them to resist flotation. You may also be required to test the soil around an underground tank to determine whether leakage has occurred. As the homeowner, you will usually be responsible for cleaning contaminated soil if there has been any leakage from the tank. In this situation, you will need the services of a qualified geotechnical or environmental engineering firm.

Local utility companies or regulatory officials can inform you about requirements concerning capping, abandoning, or removing various utility system components.

Rebuilding – Mitigation Reconstruction

Your construction contractor will prepare the site and build your new home according to the local building code, floodplain management, and zoning requirements. The lowest floor of your new home must be at or above the BFE, so your new home cannot include a basement. Figure 6-9 shows a mitigation reconstruction project that was recently completed in Louisiana following Hurricane Katrina.

Depending on where you decide to rebuild, local utility companies may have to extend new lines onto the site of your new home. This is usually done before construction is completed and your contractor will hook up the utility lines as part of construction. You may need the services of a design professional if specialized utility systems are required because of the location of your site, the type of home you decide to build, or the nature of the hazards at the site.



WARNING

If you rebuild on the site of your old home, your community's floodplain management ordinance, regulation, or provisions of the building code will not allow you to have a basement below the BFE.

Figure 6-9. Typical mitigation reconstruction project.

