

# RETROFIT Improvements

## Install Sump Pump

Making  
Homes  
Safer in  
Disasters

### Retrofit Opportunity

- A sump pump and sump pit can be installed at anytime
- May be included in basement renovations or landscaping

### Purpose

- To prevent basement flooding from groundwater seepage

### Benefits

- Prevents water damage to the foundation
- Keeps contents of home dry and free of mold

### Hazards

Wind



Rain



Flood



Seismic



Fire



Snow



### Summary

Gutters and downspouts are a foundation's first line of defense against water pooling at the foundation. Properly cleaned and directed away from the building, the guttering moves storm water collected on the roof away from the house. Similarly, the finished grade sloping down and away from the foundation and plantings held at least 12"- 24" from it encourage rainwater to move out and away from the foundation.

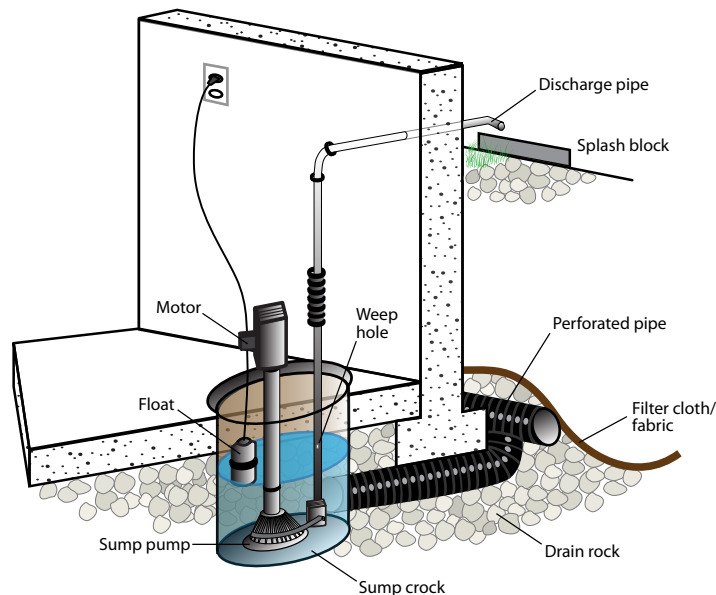
Further assurance that water will not damage a foundation or the structure's contents is provided by installing drain tile at the base of the footing and under the sub-grade slab. Drain tile is 4" perforated pipe laid in a trench that is protected with filter cloth, and back-filled with crushed stone. The pipes collect ground water and channel it to a central collection point, called a sump crock, which is equipped with a submersible pump controlled by a float.

The sump pump and its outfall pipe move the water either to a storm drain, drywell, or grade where it is channeled to flow away from the foundation. Pump capacity is specifically dependent on the hourly inflow rate of water and the distance it is pumped. Because groundwater increases during rain, snow, and floods—events that may also cause electrical power outages—it is best to install a sump pump with an emergency power source, such as a battery.

Cost will vary with the scope of the retrofit. Sump crocks and pumps cost under \$100, but battery back-up systems are double that. Hand labor, which can be "Do-It-Yourself", is the largest share of installing new drain tile and sump crock.

### Illustration

#### Retrofit



## Potential Damage



Photo: [www.fema.gov](http://www.fema.gov)

## Key Steps

- Inspect the perimeter of the home to ensure there are no low areas that allow water to collect around the foundation.
- Cut a hole in the basement slab at a low point near an exterior wall or similar exit point for sump pump piping.
- Install a sump crock with two 4" holes precut into the sides. If there is substantial sub-slab hydrostatic pressure, the stone beneath the slab will act like a French drain to move water toward the sump crock.
- If the sump crock does not appear to collect any water, but there is evidence of moisture intrusion around slab edges or through cracks in the slab, then interior slab drains should be installed. (Concrete slab is cut around perimeter and perforated pipe and stone are installed with pipe outfalling into sides of sump crock).
- If moisture persists after installation of interior drains, then the exterior foundation should be excavated. The foundation wall should be inspected and water sealed as required, and footing drains should be installed and tied to the interior drains/sump crock.
- Consider installing a water-powered back up sump pump – a second pump that kicks in if the electric pump fails during a power outage.
- Your contractor may have additional ideas on how to improve the safety of your home.
- For more details about this retrofit improvement, please refer to the list of Resources in the section below.

## Resources

FEMA, *Homeowner's Guide to Retrofitting Second Edition*

<http://www.fema.gov/library/viewRecord.do?id=1420>

Insurance Institute for Business & Home Safety, *Reduce Basement Flood Risk*

<http://www.disastersafety.org/project?execution=e3s1&projectId=3840>

