



SA State  
Emergency  
Service

This brochure deals only with contingent and permanent measures, which require planning and preparation of a building well before floods threaten. Details regarding emergency measures are available in a number of publications produced by Emergency Management Australia.



Government  
of South Australia



# RETROFITTING For Floods



PROTECTING BUILDINGS FROM FLOODS

Fact Sheet 2

## RELOCATING



Relocating eliminates the flooding potential by moving the structure out of the floodplain. Relocation can only be undertaken with small, non-brick/masonry structures and where suitable alternative sites are available.

It may be expensive since it requires raising the house, loading it onto a semi-trailer, moving it out of the floodplain and placing the house on a new foundation. Because of the complexity of moving a house, the job would have to be done by a professional.

## ELEVATING

Raising or elevating a structure above the 100-year flood elevation reduces the flood damage potential significantly. With proper foundation design, this technique can be used in areas of deep flooding. The elevated house can be placed on several types of foundations, including earthfill, piers, pilings or vertical walls.



## INSURANCE

All insurers have their own policies and specifically define the cover. Flooding can arise from a number of different circumstances. It is important to check the scope of cover with your own insurance company, agent or broker. Generally policies will cover storm-water damage but a large number of companies do not include cover in their standard policy for flooding from rivers, creeks or other known water courses. Some will quote additional premiums to include flood from water courses, others may not. Check out with your existing insurer. It may pay to enquire more widely to obtain the cover you require.

Further information may be obtained by contacting your local council, and remember their formal approval is required before you undertake most of the processes described in this publication.

## INTRODUCTION

This Brochure presents the concepts and procedures for floodplain building protection which will reduce flood risk to life and property. Flood risks are reduced through modifications or adjustments to building design, site location or placement of contents. These techniques are referred to as "floodproofing", measures which can range from elevating or relocating a structure, to the intentional flooding of a basement during times of flood (to equalise water pressure on foundation walls).

## FLOODPROOFING MEASURES

Specific flood proofing measures are classified as permanent, contingent or emergency. Permanent measures are typically incorporated into the design of new structures and do not require any advance flood warning or availability of persons to initiate action. Permanent floodproofing, such as elevation on fill, is always in place and reduces the element of human error. Contingent or partial floodproofing measures, such as pre-fitted window or door closures, require some type of human action to make the floodproofing measures operational at the time a flood warning is issued.

Contingent measures require someone to be at the site during the flood warning and that an adequate flood warning plan for the community exists. Emergency flood proofing measures, such as sandbagging, are made operational during an actual flood event. Emergency measures are temporary and should be carried out according to a pre-arranged plan. The following gives a summary of the classification of specific floodproofing measures.

### CLASSIFICATION OF FLOODPROOFING MEASURES

Classification	Definition	Examples
Emergency	Measures used and initiated at the time of flooding.	<ul style="list-style-type: none"> <li>- Sandbagging</li> <li>- Temporary levees</li> <li>- Emergency sealing</li> </ul>
Contingent	Require human action to initiate at time of flood warning.	<ul style="list-style-type: none"> <li>- Removable flood shields</li> <li>- Watertight doors</li> <li>- Movable flood doors</li> </ul>
Permanent	Do not require any action to initiate. Usually incorporated into the design or location.	<ul style="list-style-type: none"> <li>- Elevating</li> <li>- Relocating</li> <li>- Flood walls with opening barriers</li> <li>- Berms &amp; levees</li> </ul>

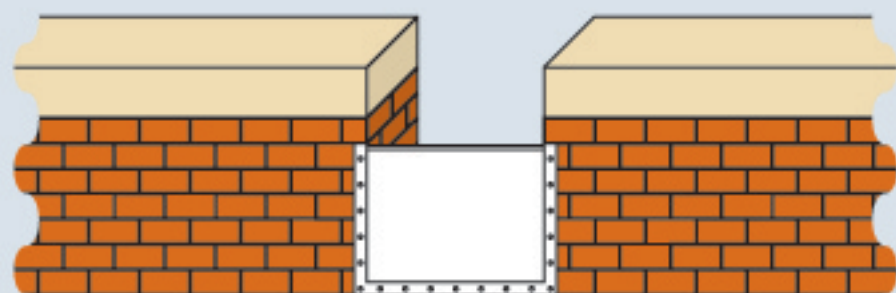


## CONSTRUCTION BARRIERS

Constructing barriers is an effective method to stop flood water reaching the building. There are two techniques employed in construction of barriers. The first technique involves constructing free-standing barriers that are not attached to the structure. The three primary types of free standing barriers to contain floodwater are flood walls, berms and levees.

**Flood walls** are usually constructed out of reinforced concrete and anchored into the ground. Flood walls, because of their greater cost, would normally be considered only on lots that are too small to have room for berms or levees or where flood velocities may erode earthen berms or levees.

Other considerations such as aesthetics and possible obstructions such as trees, etc. would also cause a homeowner to consider flood walls rather than a berm or levee. Berms, levees and flood walls may not be appropriate for homes with basements since they are susceptible to under-seepage.



Brick flood wall with barrier panel fitted.

**Berms** are typically earthen structures, constructed from local compacted fill, to stop floodwater from reaching the building. To be effective over a period of time, berms must be constructed out of suitable materials (i.e. impervious soils) and with correct side slopes.

**Levees**, which are similar in construction to berms, are also earthen structures of compacted local fill. Levees are usually constructed along riverbanks to prevent the floodwater from spilling over and flooding structures. Berms, on the other hand serve the same purpose but usually are constructed closer to the structures themselves.

Both berms and levees are generally appropriate for floodproofing a home where floodwater is less than about 1.8 metres deep. Levees can be constructed in areas where floodwater exceeds 1.8 metres deep, but the cost and the land area required for these levees usually makes them impractical for the average homeowner.



## DRY FLOODPROOFING



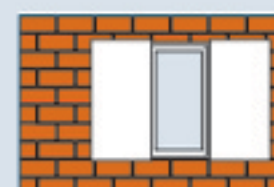
The second technique that can be used to construct a barrier against flood water is known as "dry floodproofing". With this technique, a building is sealed so that the floodwater cannot get inside. All areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or impermeable sheeting.

Openings such as doors, windows and vents are closed with permanent closures or removable shields etc. This floodproofing technique is only appropriate where expected flood depth is less than 1 metre. Walls and floors in buildings may collapse under higher water levels. This, of course, depends upon the type of material used in the construction of the dwelling.

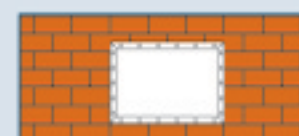
A professional engineer should be consulted when considering dry floodproofing because of the threat of a collapse from water pressure.

## SEALING ENTRY POINTS

The three main areas to consider are: (i) Windows, (ii) Doors, (iii) Air Vents



Shutter in closed position



Air vent sealing

Flood shields or window shutters are usually applied for openings near the ground surface.

A variety of door and window frame seals are available from your local hardware store; discuss your problem with the store person and be guided by their advice. Remember that the best seal will be the one that responds best to the pressure being applied from the water outside; the tighter the seal the less amount of water that will enter the premises.