



Householders guide to property flood resilience

A living document

FLOODRE

Landmark
Information Group

**flood
mary**



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Foreword



Mary Long-Dhonau OBE
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Having been flooded ourselves, we know that flooding can have a devastating impact on homes and families. This was clearly shown by the terrible floods of winter 2019/20 when 4,600 properties were flooded, following extreme rainfall of around four times the average.

In the last few years, due to intense and prolonged storms like this, we have seen robust defences overtopped or damaged. According to Sir James Bevan, the Chief Executive of the Environment Agency, winter rainfall is set to increase by almost 60% by 2050.*

Reducing the impact a flood can have on your own home continues to be a very sensible option, however, as insurance arrangements cannot prevent the appalling disruption and emotional trauma that comes with the flooding and its aftermath.

The prospect can be a baffling one, with many people not knowing how to go about reducing flood risk to their homes other than with the humble and inefficient sandbag.

This guide which is written especially with the householder in mind hopes to reduce the worry about what flood risk reduction products to use, and illustrates the variety of ways a home can install such measures, how difficult the product is to fit and when it is appropriate to use them.

It is often the case when the flood water is too high that it is better to let the floodwater in and adapt your home to help it to recover more quickly from the devastation the floodwater can bring. For inspirational stories of how real people have made their homes resilient to flooding, please see the ‘E-Mag’ I have created, to sit alongside this Guide: shorturl.at/KMVZ5

Sadly, as flooding is set to get worse, it is essential that we not only know our own flood risk, but also prepare in advance and do everything we can to reduce the impact a flood can have on our own homes. When thinking about installing Property Flood Resilience, it is essential that you have a survey undertaken from a suitably qualified surveyor. Make sure they adhere to the recently published CIRIA Code of Practice. (This is an industry wide document, which lays out stringent guidelines to be followed, to make sure that the appropriate products are used, and that they are fitted to high standards).

This guide has been written in partnership with RAB Consultants Ltd (first edition) and MDA/FloodMary.com (updates from 2014 onwards). We hope that it will help to inform you what can be done to mitigate against floods, and so help to reduce the misery that being flooded brings with it.

Mary Long-Dhonau

Carly B Rose

* www.gov.uk/government/speeches/creating-climate-resilient-places-a-new-direction-for-a-nation



1 Learn about your Flood risk

Why should I think about flood risk?

A personal perspective from Mary Long-Dhonau OBE

Having suffered first-hand from the effects of being flooded, I know only too well what an appalling experience it is. Being a victim of floodwater ravaging your home has far-reaching and long-term consequences for everyone concerned. Flooding is not just when the media and the minister come to visit. To watch helplessly as everything you have worked so hard for is thrown into a skip is hard enough, but to lose precious sentimental items – such as children’s first drawings or photos of relatives who are no longer with us – is completely devastating.

Many people have told me of occasions when they have gone to look for something only to remember it having been lost years earlier in a flood; once again, the pain comes rushing back to haunt them. The misery is further compounded by having to move out of your home into alternative accommodation for months, sometimes years on end and to stand powerlessly by and watch as your precious home becomes a building site. When re-building your home doesn’t go to plan, it can often cause more upset than the actual flood itself. It is these intangible consequences of being flooded that are often overlooked when thinking about reducing the impact from being flooded again in the future.

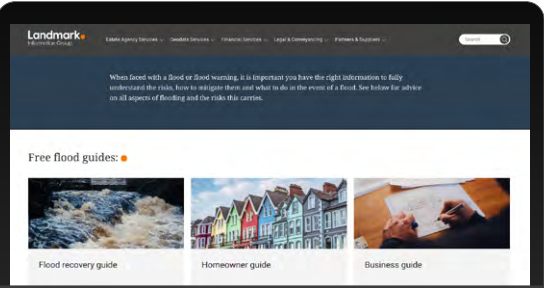
Many of us happily invest in smoke alarms and security locks to protect ourselves against fires or thefts, but if you live in a floodplain, you’re far more likely to be flooded than have your belongings lost in a fire. A flood is the most effective and indiscriminate ‘burglar’ there is, it will take everything you have including items of no value to anyone else. We don’t stop to think about investing in flood prevention as we believe ‘the Government should protect us’ or ‘our insurance will cover it’. The sad truth is that so many of us are at risk of being flooded, there simply isn’t enough Government money to protect everyone - and your insurance policy might not cover the final bill.

Having talked to many people who have been flooded over the last 20 years, since my first flood, each person without exception has told me that the recovery process was far worse than the flood itself. I can endorse that fact – the disruption caused cannot be underestimated! Whilst protecting a home from being flooded is not cheap, I passionately believe that anything we can do to reduce the awful impact is money (and time) well spent!

How can property flood resilience help people access affordable insurance currently?

Thanks to the Government backed insurance scheme Flood Re (more about that on page 4) flood Insurance cover is now widely available. Property Flood Resilience (PFR) covers both flood resistance (using products and materials to try to keep the water out of a property) and resilience/recoverability (making adaptations internally to try to reduce the impact if flood water does get in). PFR can avoid the need to make an insurance claim at all, or reduce the value of any claim that is needed. In the future, taking such action will help secure a reduction in the amount we pay for our insurance. There are also ‘Flood Performance Certificates’ (similar to energy certificates for a home) in development. These will take into account the measures that have been taken to reduce flood risk at home level, to help us obtain insurance when Flood Re is no longer available. They will also help us sell our homes, by assuring the purchaser that the risk has been reduced as far as possible.

For information about how to purchase a flood report go to:
landmark.co.uk/products/know-your-flood-risk/



Flood Re



Andy Bord
CEO at Flood Re

How Flood Re is working to build a more flood resilient nation

Being flooded is a devastating experience, as those who have lived through it know only too well. The emotional strain on families is very high – often having to leave their home for many months whilst theirs is repaired. I am very pleased that there is no longer the additional worry about obtaining affordable home insurance – whether you have been flooded or live at high risk.

As Chief Executive of Flood Re, I know the vital role insurance plays in addressing flood risk and providing peace of mind to millions. Flood Re is a scheme designed specifically for those who have been affected by flooding, or are at risk of flooding. It began in April 2016, and is a joint initiative between the insurance industry and Government. It manages a subsidy collected from insurers so that householders in high flood-risk areas have access to affordable insurance premiums.

Flood Re works in the background to do this, so people in flood-prone areas won't deal directly with us. Instead, we encourage you to shop around to find the right deal. There are many ways of doing this, including using price comparison sites, talking directly to insurers, or using a broker. Almost half a million households have already benefited since our launch, with 94 per cent of the home insurance market now offering the Scheme. 98 per cent of homeowners with prior flood claims can now receive quotes from five or more insurers.

After three relatively dry years, the winter of 2019/20 saw Storms Ciara and Dennis cause widespread flooding across the UK. Between November 2019 and February 2020 thousands of homes were flooded in South Wales, Northern and Central England, and the Scottish Borders. Flood Re processed more claims, and paid out more, than in our first three years of operation combined. The total for that period was £160m, which was ten times higher than the previous year. This is all very positive, so we are already moving in the right direction.

We now need to go further, by creating new ways to deal with the increased flood risk due to climate change, as well as meeting the demand for new house building that doesn't further increase the risk. In April 2022 we launched our **Build Back Better** scheme which offers homeowners the chance to install Property Flood Resilience measures up to the value of £10,000 when repairing their properties after a flood. This means that the next time the area floods, their home will be better prepared to keep as much of the water out as possible. Measures can also be installed so that when water does enter it is easier, quicker and safer for families to clean up and move back in – often in a number of days rather than many months.

While Flood Re will continue to work in the background, to help provide more affordable cover to people across the UK, we will also be promoting our priorities and solutions to help make your home and your community more resilient to future flooding.

Before the introduction of Flood Re, only 9% of householders who had made prior flood claims could get quotes from two or more insurers, with 0% being able to get quotes from five or more.



What do you need to do?
To see if you are eligible for Flood Re, there are three easy steps to follow:

1. Talk to your existing insurer and ask them if your home is eligible for the Flood Re Scheme (details of eligibility are set out on our website)
2. Be prepared to shop around
3. Remember, finding the right advice and products is important

We have created a video which helps explain how the scheme works which can be viewed on our website: www.floodre.co.uk/how-flood-re-works

Are you on social media? If so, we have also created dedicated feeds which we would invite you to follow on Facebook and Twitter.

At Flood Re, we are committed to working with insurers to get this right for households. If you have any specific policy queries do speak to your current insurer who will be able to provide you with more information.

* <https://bit.ly/3svsqVc>
** <https://www.gov.uk/guidance/apply-for-the-green-homes-grant-scheme>
*** <https://www.floodre.co.uk/wp-content/uploads/Flood-Performance-Certificates.pdf>

What is the risk to houses from flooding?

1. Surface water flooding

In prolonged, exceptionally heavy downpours, which are becoming more frequent, the ground may saturate and the drains and sewers which carry away surface water may not be able to cope or may even be blocked with debris or hailstones, leading to surface water flooding. Surface water flooding will flow downhill and collect in low-lying areas which means that houses in low basins or at the foot of slopes may be at particular risk of surface water flooding.

2. Groundwater flooding

Groundwater flooding generally occurs during long and intense rainfall when infiltration into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by porous soils and rocks, or in areas with a naturally high water table. Groundwater flooding is a particular risk to buildings with basements.

3. River flooding

River flooding occurs following heavy rainfall (or melting snow) across the upstream reaches and tributaries of a watercourse where the normal river channel is unable to carry the resulting high flow of water. Adjacent low-lying properties and land are then liable to flood. River flooding can extend over very large areas causing widespread damage and may be long-lasting and difficult to drain away. Fast-flowing floodwaters can be dangerous to people and animals and can structurally damage buildings.

4. Coastal and tidal flooding

Coastal and tidal flooding is caused by high tides coinciding with a lowpressure storm system which raises sea and tidal water levels, overwhelming coastal defences. This may be made worse by strong winds blowing sea water onto the coast. Coastal flooding may affect not only property on the coast itself but also property in tidal river basins some distance from the coast, due to floodwater being forced up the tidal reaches of rivers.

5. Reservoir or dam failure

There are many thousands of reservoirs and retained bodies of raised water across the UK, that pose a flood risk from failure of the retaining dam. Reservoirs larger than 25,000 cubic metres must be registered with the Environment Agency (or equivalent bodies in Scotland and Wales) and will be regularly inspected to ensure their safety. Dam failures in the UK are uncommon, so while the consequences of a dam failure are potentially catastrophic and could affect a large area, the chances of it happening are remote. There are many smaller bodies of raised water, such as mill ponds and agricultural treatment lagoons that may pose a flood risk locally.

6. Burst water mains

Considerable amounts of water may be released, which may flood the street and enter adjacent properties. The flooding is usually comparatively shallow and short-lived, but may nevertheless cause extensive damage to the ground floors or basements.

7. Sewer flooding

When sewage escapes from the pipe through a manhole, drain, or by backing up through toilets, baths and sinks this is known as sewer flooding. Sewer flooding can be caused by: a blockage in a sewer pipe; a failure of equipment; too much water entering the sewers from storm run-off (from roads and fields) and rivers and watercourses which overflowed; or the sewer being too small to deal with the amount of sewage entering it. The cause of the problem may be some distance away from where the flooding is happening. A flood can happen to any property from one or more of these sources and at any time. For most property in the UK the risk is small, however some premises are more at risk than others because of their geographic location and particular local situation. Flooding of your home will almost always involve water entering the building from outside. Houses are usually built to prevent ‘normal’ water sources getting in by the use of damp proof membranes, roof over-hangs, guttering, below ground drains and raised finished floor levels in the ground floor. Normal house construction is not designed to keep flood water out when large amounts of water lie against the building for any period of time. There are many routes by which external flood water can enter your house. Some are very obvious such as doorways, windows, air bricks and cracks in walls. Others are not so visible such as washing machine outlets, downstairs toilets, soaking through brick walls, below ground gaps in the walls and floors. The chance of water getting into your house will also depend on things like the depth of flood water and the time it takes to drain away.

How do I find out if my home is at risk from flooding?

The first check that you can do, and which doesn’t cost anything, is to investigate whether your property is at risk of flooding from a number of sources, using the maps provided by the relevant agency for your part of the UK.

These are:

England

<https://www.gov.uk/check-long-term-flood-risk>

Wales – (in English or Welsh)

<https://bit.ly/2Dp1rBc>

Scotland

www.sepa.org.uk/environment/water/flooding/flood-maps

Northern Ireland

<https://bit.ly/2sYG8Sv>

(The colour coding and symbols used may vary)

By choosing the relevant map and entering your post code the map will indicate the areas at risk of flooding, for example: in England, the dark blue shading for the highest risk, lighter shades where there is some risk and no shading where the risk is very low (meaning that each year, this area has a chance of flooding of less than 1 in 1000 or 0.1%). Click the map at the location of your house and a summary of flood risk at that area will be provided. The risk is graded as ‘very low’, ‘low’, ‘medium’ or ‘high’.

An additional map, called ‘Flood and coastal risk management activities’ shows where new schemes are being planned, and the likely year of the work. These maps give a general guide only, and are not accurate down to individual properties. They show areas at risk, and if so, whether there are considered to be adequate flood defences in place. However, they do not take into account local variations in physical features, nor the height of a property’s lowest floor above the surrounding ground.

At the time of writing, the maps do not give any information about the flood risk from raised bodies of water holding less than 25,000 cubic metres (such as agricultural lagoons or mill ponds), nor groundwater flooding.

Local knowledge is an important source of information about the flood risk to your home. Long-standing neighbours may have useful knowledge about flooding that occurred in the area before you moved in. Your local council or water company may hold flood records. For a more accurate assessment of flood risk you can go to a specialist search provider who, for a small fee, will provide you with a more detailed, ‘desktop’ property-specific report. This will determine the risks from the different types of flooding. Currently (2023).

the VAT exclusive cost of such a search is around £37 for a residential property, though higher for commercial properties depending on the total number of hectares covered.

This type of report will not go to the level of detail where you would know what to expect when a flood occurs, you may still have questions such as: From which direction will water come? How much warning will I get? How deep will the water get? For how long will the water stay? How often will I flood? Will water get into my house? Can I protect my home? A specialist flood risk consultant would be able to answer these questions but you should expect fees of several hundred pounds. These are very modest costs when compared with the overall price of your house, mortgage costs and ongoing insurance fees.



Should I consider planning to make my property more flood resilient?

Whether and to what extent flood protection measures are necessary will depend on the degree of flood risk, and the vulnerability of your house and occupants. As a minimum you should investigate the degree of risk to your property using the map links provided on page 7 of this Guide.

Even if your property does not lie in a shaded area (very low risk) it is very important to note there may still be risk of flooding, for example, from groundwater, or raised bodies of water holding less than 25,000 cubic metres (such as agricultural lagoons or mill ponds).

If there is a low risk, usually meaning that the chance of flooding is less than 1 in 100 (1%) in any year (Insurance Band 1 type properties as a broad guide), but the risk is not serious enough to significantly affect the buildings insurance, you should make some plans about how you would deal with a flood if one was to occur, bearing in mind that floods are happening to many properties which have never previously flooded. As a minimum, you need a Flood Plan (discussed as part of the next question). You may also consider introducing some flood resilient or recoverable measures when convenient, for example when you are carrying out refurbishment and replacement work.

If the risk is medium, there is a chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%). (Insurance Band 2 properties and some others at local risk), for example if the property has previously been flooded, you should have a Flood Plan and you may also consider whether some flood protection measures to the property would be appropriate. These measures can be implemented when improvements and alterations are undertaken, perhaps as a consequence of new ownership, or may be undertaken solely to ensure peace of mind and maintain market value. If the risk is high, with a chance of flooding greater than 1 in 30 (3.3%). (Insurance Band 3 properties, and those which have been flooded more than once within the last ten years or so), you will need a Flood Plan and you should actively consider flood protection measures, in order to maintain insurance cover and to minimise the negative impact on market value.

Having decided whether you should apply flood resilience, the next question is, of the many options available, which is the best choice for me?

Academic research has found flood protection measures to be cost-effective:**

“While resilient repairs were found to be more expensive than traditional methods (average 34% higher) they were found to significantly reduce the repair costs assuming a subsequent flood were to take place. Resilient flood mitigation measures... will help in limiting the cost of repairs up to as much as 73 per cent for properties with a 20 per cent annual chance of flooding... the up-front investment would be recovered following a single subsequent flood event.”

* Bowker, P, 2007. Flood Resistance and Resilience Solutions. An R&D Scoping Study. R&D Technical Report.
** Rotimi Joseph, David Proverbs, Jessica Lamond, Peter Wassell, (2011) “An analysis of the costs of resilient reinstatement of flood affected properties: A case study of the 2009 flood event in Cockermouth”, Structural Survey, Vol. 29 Iss: 4, pp.279 - 293

Resilico Connect: ‘Adapting the present for a resilient future’

The Resilico Connect app and website is like having a personal flood resilience advisor on your smartphone.

The user friendly, innovative, risk management tool helps manage flood risk, empowering citizens, communities and businesses to take ownership and responsibility for their flood risk and climate adaptation by being ‘flood prepared’.

Preparedness is simply knowing what to do, and when to do it and includes:

Flood Alerts

Set up bespoke flood alerts – for river, coastal and surface water – through Resilico Connect for any UK domestic property, commercial or infrastructure asset. Whether you want to monitor your own home or business, or a loved one’s address, you can choose which properties you need to keep an eye on and customise the notifications.

Flood Plan

Resilico Connect guides you through a simple process to set-up and maintain a custom flood plan for each property you’re looking after. By having a personal flood plan in place, on your smartphone, it enables you to take action and respond quickly, as soon as you receive a flood alert.

Maintain

If you’ve installed any resilience measures at your property, such as flood doors, gates or air bricks, it is so important to keep them in good working order. Resilico Connect will send you timely maintenance reminders and allow you to simply record all details to evidence good climate risk management, which can be shared.

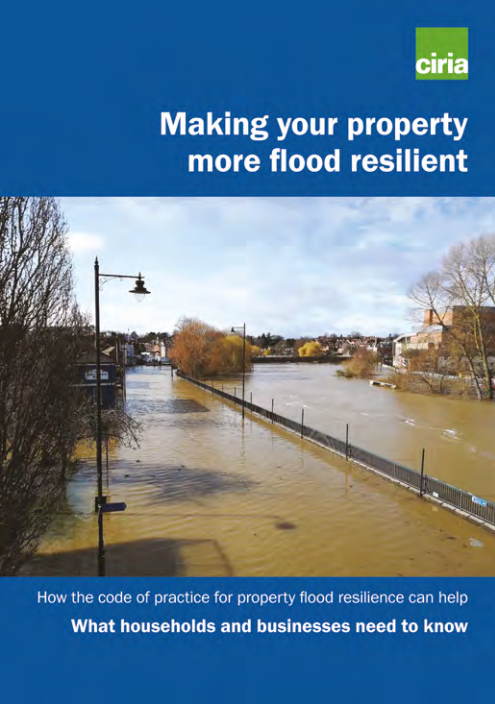
Report

In the event of a flood, Resilico Connect lets you easily record the actions you’ve taken to help protect your properties. This information can then be shared with your insurance company, helping to simplify the upfront claims process.

About Resilico: The team behind Resilico has extensive PFR, climate adaptation and resilience experience, and works collaboratively in partnership with industry stakeholders including the Chartered Institution of Water and Environmental Management (CIWEM), Environment Agency, Flood Re and the DEFRA Property Flood Resilience Roundtable.



How to reduce the impact of flooding: the Code of Practice for property flood resilience



In the past, some companies have targeted flooded communities and persuaded people to have flood barriers installed that were not fit for purpose. This left people out of pocket and still vulnerable to flooding.

To address this, a group of experts who know how properties should be protected from flooding came together to develop an industry recognised Code of Practice for property flood resilience (PFR).

The Code, published by CIRIA, sets the benchmark for good PFR. It includes six standards stipulating what should be achieved when delivering PFR. These standards are:

Standard 1: Hazard assessment

- Agreeing the amount of work needed and extent of survey required
- Knowing how your property is affected by flooding
- Collecting all information needed for PFR measures to be installed

Standard 2: Property survey

- Agreeing cost of survey and level of damages that need to be avoided
- Documenting:
 - building condition, construction type and age
 - current level of resilience, your needs and preferences
 - methods of drying, decontamination and repairs after future flooding
 - ground conditions and water entry points

Standard 3: Options development and design

- Discussing:
 - options and costs
 - maintenance and repair needs of different options
- Receiving information on trusted products
- Agreeing your preferred option/s in writing
- Receiving a full description of the chosen option/s
- Ensuring the specification enables the work to be done to your requirements

Standard 4: Construction

- Ensuring:
 - work is carried out as agreed and meets standards and legislation
 - work of any subcontractors is up to standard
 - work was inspected during construction

Standard 5: Commissioning and handover

- Ensuring:
 - measures installed have been independently inspected
 - any post-installation procedures have been carried out
 - you have received all the information you need and have a point of contact for the future
 - you know which measures need to be manually operated and who has responsibility for them
 - you and anyone else responsible have had a demonstration of how to operate measures

Standard 6: Operation and maintenance

- Creating a plan for operation and maintenance and ensuring they can be carried out, including:
 - how to record operation, maintenance and repair of measures
 - if, when and how the plan may need to be changed
 - how to clean, check and repair measures after a flood

The Code of Practice helps anyone planning to make their property more flood resilient to make the best choices and to have confidence in the work carried out.

Supporting guidance explains how the standards can be met by the professionals carrying out the work. It also explains how a six-staged process aligned with the standards complies with the Code of Practice and follows good practice. Further information can be obtained from **CIRIA here**.

CIWEM the Chartered Institution for Water and Environmental Management is delivering training to cover the delivery of PFR aligned with the Code of Practice. Further information can be obtained from **CIWEM here**.

Make a Household Flood Plan!

Being prepared for an emergency will reduce the risk to you and your family and limit the damage to your house and its contents. A Household Flood Plan will need to establish the best emergency actions and who does what when flooding looks set to strike.

The important facts about flood risk and the availability of flood warnings will guide your best action in an emergency. Evacuation is most appropriate where flooding is deep and flood warnings will give you time to move to a place of safety unaided. Identifying a place of safe refuge with possible rescue by the emergency services may be the best approach where rapid flooding occurs and safe evacuation is not possible.

The Household Flood Plan should clearly list actions needed on receipt of a flood warning, such as how to set up any temporary flood protection devices as well as giving a maintenance schedule to ensure correct operation of devices in the future. The plan should take account of the possibility of flood protection devices failing or their design being exceeded.

A planning template is available here:
<https://floodmary.com/wp-content/uploads/2023/01/household-flood-plan.pdf>

Flood warnings

Flood warnings will give you time to prepare for flooding which could save you time, money and heartache. They are also vital in order to know when to carry out your flood plan. A free Flood Warning service is currently available for England, Wales and Scotland. To find out if a service is available in your area, and to sign up contact Floodline on: **0345 988 1188**

This service sends you a direct message when flooding is expected and may affect your property. You can receive warnings by telephone, mobile, email, SMS text message or fax, whichever you prefer. You can also view flood warnings through a variety of websites, phone apps and social media channels.

There are other warning services that are available where an area isn’t covered by a formal flood warning service, for example the Met Office provides a National Severe Weather Warning Service (NSWWS) to warn the public of severe weather, including heavy rainfall. The NSWWS issues alerts when severe weather is expected more than 24 hours ahead and warnings when severe weather is expected in the next 24 hours.

All warnings and alerts appear on the Met Office website: www.metoffice.gov.uk/public/weather/warnings

They are also communicated to the public via electronic and broadcast media. Some local authorities may also issue warnings to residents. Private flood level alarms are also available for purchase (refer to page 22).

It is vital that your Household Flood Plan is kept up to date, such as when circumstances change, and to make sure that everyone knows what to do what flooding occurs.

Your local council is an important resource when creating a Household Flood Plan for things such as finding a place to evacuate and whether you are best to evacuate or stay in your house. They may have an emergency planning officer to offer assistance.

The Environment Agency provides a guide for preparing a Flood Plan and offers a template to follow on the website. You can access this by visiting: <https://bit.ly/2K5wojZ>

As the floods of December 2015 showed, people who currently live behind community flood defences can still be flooded if the water should ever flow over the top. For these properties, as well as those at risk of very deep floods, keeping the water out (even if only temporarily) using resistance measures can ‘buy’ some valuable extra time for raising and moving belongings (although the advice of the emergency services regarding evacuation must always be followed). If recoverable measures (such as waterproof/water resistant materials) are also used, then the post-flood clean up and the amount of time families have to spend out of their home, can be drastically shortened. An imaginary home that combines both these approaches is shown overleaf.

There are three flood warning codes:



FLOOD ALERT

A Flood Alert means that flooding is possible and that you need to be prepared



FLOOD WARNING

A Flood Warning means that flooding is expected and that you should take immediate action. You should take action when a flood warning is issued and not wait for a Severe Flood Warning.



SEVERE FLOOD WARNING

A Severe Flood Warning means that there is severe flooding and danger to life. These are issued when flooding is posing significant risk to life or disruption to communities.



Combined resistance and resilience measures

Keeping water out for as long as possible buys valuable time to raise / move your belongings.

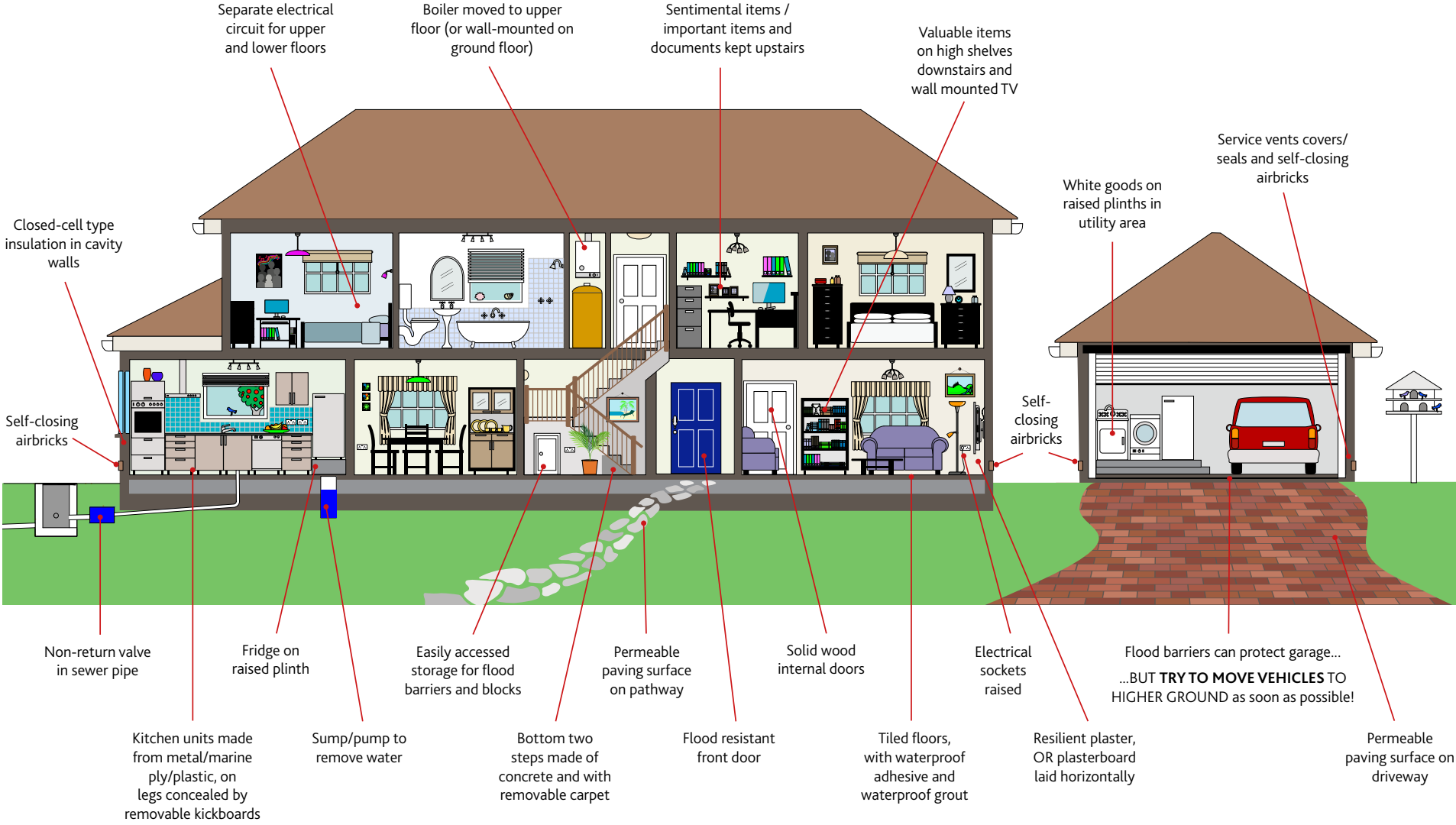


image © andrewbrysonphotography

02 Flood expertise around the UK



Who does what in the UK?

Many organisations are involved in managing various aspects of flooding in the UK – and the picture is still more complex, because different arrangements can apply to England, Scotland, Wales and Northern Ireland. We therefore approached each organisation, asking them to describe their responsibilities in simple terms – and we are extremely grateful to the friendly folk whose pictures appear below for shining a light into some of the darker corners!

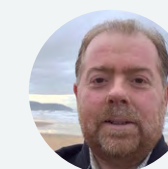
This section aims to provide an easy-to-follow summary, with a brief description of each body's involvement – the symbols indicate the areas of the UK in which that organisation operates. Full details for each organisation can be revealed by rolling over the 'Read More' box. (Details correct as at the time of writing - February 2023).



Caroline Douglass
Executive Director of Flood & Coastal Risk Management



The **Environment Agency** is the national flood risk agency for England and we play a central role in managing flood risk. We advise on, and bring together, the planning and management of risks from all sources of flooding and coastal erosion (rivers, the sea, groundwater, reservoirs and surface water).



Stewart Prodger
Principal Officer, Responders & Communities



The **Scottish Environment Protection Agency (SEPA)** is Scotland's national flood forecasting, flood warning and strategic flood risk management authority. SEPA forecast flooding by working closely with the Met Office to predict the likelihood and timing of river, coastal and surface water flooding. SEPA delivers the free Floodline service for Scotland providing live flooding information and advice on how to prepare for or cope with the impacts of flooding 24 hours a day, 7 days a week. We work closely with other organisations responsible for managing flood risk including local authorities, Scottish Water, the National Park Authorities and Forestry Commission Scotland.



Defra
Department for the Environment, Food and Rural Affairs



Defra (the Department for the Environment, Food and Rural Affairs) has policy responsibility for flood risk management in England. This includes: working with the Environment Agency to prioritise and fund flood defence spend, for new build and maintenance; considering complementary approaches to flood management, such as catchment management; and leading on flood response for complex or wide area floods.



Phil Rothwell
Chair, Northumbria



Regional Flood and Coastal Committees (RFCCs) play a key role in local funding and giving consent to programmes of work that protect local communities from flooding and coastal erosion in England. The 12 RFCCs, with the Environment Agency and other Risk Management Authorities, seek to reduce flood risk and the risk of coastal erosion by working in partnership with other organisations, especially in local government and with local communities.

Scottish Government
Flood Risk Management



Policy responsibility for flood risk management in Scotland rests with the Scottish Government.



The **Scottish Flood Forum** is a charitable organisation working to improve understanding and raise awareness of the risks and consequences of flooding to individuals and communities throughout Scotland; and to facilitate effective support to them after a flood event.



A **Lead Local Flood Authority (LLFA)** is a county council or unitary authority that is responsible for local flood risk management in its area. The LLFA will work in partnership with other organisations across its area to manage local flood risk in a way that balances the needs of communities, the economy and the environment.

Welsh Government
Flood Risk Management



Policy responsibility for flood risk management in Wales rests with the Welsh Government.

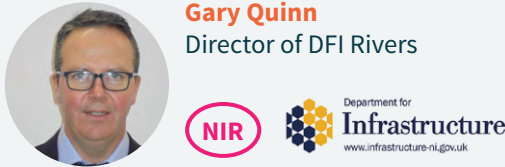
Highways Authorities
Highways Agency & unitary
/ county councils across the UK



Highways authorities (the Highways Agency and unitary/ county councils across the UK) have the lead responsibility for providing and managing highway drainage and roadside ditches under the Highways Act 1980. The owners of land adjoining a highway also have a common-law duty to maintain ditches to prevent them causing a nuisance to road users.



Natural Resources Wales provides advice and guidance on how to prepare for flooding, including templates, signposting and resources to print:
www.naturalresources.wales/flooding (English)
www.cyfoethnaturiol.cymru/llifogydd (Welsh)



DfI Rivers is part of the Department for Infrastructures 'Water and Development Delivery' within Northern Ireland. Its vision is to manage flood risk both now and into the future, to maintain and create sustainable living places and support economic development in Northern Ireland. We aim to reduce risk to life and damage to property from flooding from rivers and sea, by undertaking watercourse and coastal flood management in a sustainable manner. This is achieved by maintenance of Flood defence and drainage infrastructure flood alleviation schemes, flood risk advice to land use planners, implementation of the EU Flood directive, Community engagement – helping those communities most at risk of flooding to be better prepared.



The **Flood Forecasting Centre (FFC)** is a partnership between the Environment Agency (EA) and Met Office (MO) based at the MO headquarters in Exeter and is a 24/7 operational centre. The staff work closely with MO, EA and Natural Resources Wales operational staff to understand current weather, ground, river and coastal conditions in order to produce forecasts and understand the potential for flooding.



The **Consumer Council for Water (CCWater)** is the independent voice for all water consumers in England and Wales. We provide free advice to consumers and keep them informed on the issues that affect their water and sewerage services. We also take up the complaints of household and non-domestic customers when they are unable to resolve them directly with their water company. If you have suffered flooding from public sewers and you are unhappy with the response from your Water Company, we will be able to provide advice, help and support to make sure the problem is resolved.



The **National Flood Forum** exists to help, support and represent individuals and communities at risk of flooding. We understand the impact a flood can have on lives and livelihoods and we focus on putting people first. We do this by: supporting and listening to communities so they feel empowered to reduce their flood risk; helping people to recover after they have been flooded; and representing people at risk of flooding to ensure the authorities and government develop a community perspective.



The **Property Care Association (PCA)** is the trade association representing professionals in the property care industry in the UK, including flood recovery and flood resilience. The PCA's mission is to work to promote high standards of technical competency, expertise and service across the sectors it represents. The PCA has developed a range of Codes of Practice and Best Practice Guidance including one for the Flood Protection of Buildings.



The **Association of Drainage Authorities (ADA)** is the membership organisation for those involved in drainage, water level and flood risk management. Its members include Internal Drainage Boards (IDBs), the Environment Agency, Regional Flood Defence Committees, Local Authorities, Natural Resources Wales, the Northern Ireland Rivers Agency, consultants, contractors and suppliers.



Water and sewerage companies' main role in flood risk management is to provide and maintain a system of public sewers. These are designed to protect properties from the risk of flooding in normal wet weather conditions, however, in extreme weather conditions there is a risk that sewers can become overwhelmed and result in flooding. Sewer flooding can also occur because of blockages and defects with the sewerage network.



03 Reducing the impact of flooding on your home

The flood protection product information tables

The following pages of this handbook provide a list of flood resilience products grouped into categories to help you understand the way they work and to assist with choosing the best product. Advice on flood plans is given within the product categories, such as the importance of warning systems to deploy products in good time or training needed to correctly erect flood defences.

A list of products currently available for each category is provided with notes on advantages/disadvantages and the current suppliers of such items. The indicative costs (for application to a single dwelling) are banded as follows:

< £100	Low
£100 - £750	Low-medium
£750 - £1500	Medium
£1500 - £5000	Medium-high
> £5000	High
> £10000	Very high

Flood resilience products that have been performance tested and comply with the relevant British standards are indicated by 'BS 851188'.

BS 851188: The British Standard for flood resistance products

BS 851188, the British Standard for flood resistance products was published in October 2019. It supersedes the previous publicly available specification (PAS 1188) for flood protection products.

This British Standard is an important milestone in the development of UK flood standards and a significant step for the UK based flood industry. There have been several key changes to the standard:

- The term 'resistance' has been used to better reflect the scope of the standard and to align this with other flood standards and the recently published CIRIA Code of Practice and guidance for property flood resilience
- PAS 1188 Parts 1 and 3 have been combined into BS 851188 Part 1 (Building products incorporating building aperture products, building skirts and wall sealant systems)
- PAS 1188 Parts 2 and 4 have been combined into BS 851188 Part 2 (Perimeter barrier systems incorporating temporary and demountable products)
- The maximum height of the designated maximum water depth (DMWD) has been removed to allow products that are capable of meeting greater design depths to be tested where testing facilities exist.

Maximum leakage rates remain unchanged in both cases. There are now, however, some additional test requirements to ensure that the primary function of products is considered and to simulate exposure to real life conditions. These are:

- Cycling testing and operating forces for flood doors and windows
- Dynamic impact testing for doors, windows, building aperture barriers and temporary and demountable barriers
- Overflowing testing for temporary and demountable barriers to ensure the safety of these products in these conditions.

With the publication of BS 851188 there will be a period of transition during which existing Kitemark certificate holders may undertake testing of their products to the new specification. At the end of the transition period any certificate holders with products that have been not tested will have their certification withdrawn.

Some products will continue to have the older 2009 or 2014 PAS 1188 Kitemarks - this is because there are major financial costs for companies having items tested to new standards, so in some cases they have chosen not to pursue this for the time being. As all the standards include a permitted leakage rate per hour, always check with the product provider what rate applies to the device(s) under consideration. It may be advisable to purchase absorbent bags and/or small portable pumps to deal with any flood water that does come through.

For more information visit the British Standards Institute website www.bsigroup.com/en-GB/validate-bsi-issued-certificates/product-directory-results/?sector=Flood+Protection choose 'Kitemark advanced search' (near top of page, on the right) and then select Flood Protection from the Sector menu.

Permanent resistance (also known as passive resistance)

Permanent resistance products are designed to stop water entering your home either through existing openings (doors, windows, airbricks, vents and pipes) or to stop it penetrating the walls. Flood protection is permanently in place, with no action needed to deploy the device, which is why it is often described as a ‘fit and forget’ approach. This doesn’t mean you can actually forget about regular inspection and maintenance, of course! Door seals can become worn/ damaged over time, or automatic air-bricks become blocked by leaf-litter. (For more information, refer to the Code of Practice, PFR standard 6). These measures are designed to lessen the damage that floodwater can do and also to give homeowners extra time to move ground floor contents. The measures may only be effective for a limited time and limited water depth.

These products will only keep water out if they are correctly used as part of a package of measures identified from a property-level flood protection survey carried out by a qualified and experienced surveyor. No particular action is required by you to make the product work and so they will protect even while you are away from your home and if flooding arrives quickly with no warning. The products are designed to keep water out for long periods, however seepage is possible (depending upon both workmanship and flood conditions) and the BSI Kitemark standard allows for some seepage.

There is a risk to the structure of your home if deep water is held back by the external walls due to the pressure of water. For this reason the products are only suitable for limited flood depths. A structural assessment of the building is recommended where flood depths in excess of 300mm (about a foot) are intended to be resisted. It is generally recognised that flood depths of greater than 1m (over 3 ft) can result in damage to the structural integrity of a building.

Flood plan considerations

These products do not require activating to make them work and so protection to your home does not depend upon receiving and acting on a flood warning. No training is needed to operate the products and no long term storage of items is required. Routine inspection and maintenance of the products is however essential.

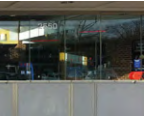
Creating a flood plan is important for protecting people and your property in an emergency. As well as stating who does what when flooding is expected, the flood plan should say what to do in a ‘worst case scenario’ such as water seepage through flood protection

devices, flooding that is higher than the flood protection products are designed to resist and people being trapped in the home with rising water.

Private flood level alarms

As the devices themselves are permanently installed, details of these products are included in the first section. If your home is in an area not served by official flood warnings, you may be able to install a private flood level alarm system. These normally include a water sensor and an alarm unit. The sensor will detect flood water and send a signal to the alarm unit that will make a sound an alert to warn you of the approaching flood risk. The sensor will need to be carefully installed at a location where rising flood water will be detected well before your home is about to flood to alert you to the risk (such as during the night) and to give you time to take action. It is recommended that you obtain expert help choose the right system and correctly install it. Permission from landowners and local authorities may be needed prior to installing the sensor.

Permanent /passive resistance products are designed to stop water entering your home either through existing openings (doors, windows, airbricks, vents and pipes) or to stop it penetrating the walls.

Product type	Indicative cost	Available products/suppliers	Comments	Images
Auto-barriers	High to very high	- Self Closing Flood Barrier (Flood Control International) - Self Activating Barrier (M3 Global Flood Technologies) - Vertical Rising Barriers (Flood Control International) - Lakeside self-closing flood barrier (SCFB) (Lakeside Flood Solutions Ltd) - Automatic Hydraulic Flood Barrier (Lakeside Flood Solutions Ltd)	Powered by floodwater itself, no electrics. Unobtrusive. Structure of building is not the limiting factor. High initial cost, including below-ground work; May need additional seepage measure.	 Self Closing Flood Barrier (raised position)  Self Closing Flood Barrier (concealed below ground)
Water-resisting external doors	Medium-high	- Flood Defender Composite doors BS 851188 (M3 Global Flood Technologies) - Flood Defender uPVC doors BS 851188 (M3 Global Flood Technologies) - Flood Defender Timber door BS 851188 (M3 Global Flood Technologies) - Low Threshold door BS 851188 (M3 Global Flood Technologies) ‘Whitehouse Flood Doors BS 851188’ (Whitehouse Construction Co Ltd) - Flood Resistant Doors – Hardwood, composite or uPVC (Flood Divert Ltd) ‘Floodtite’ flood doors (UK Flood Defence Alliance) ‘StormMeister’ flood doors (StormMeister Flood Protection) - Window hatches/Steel overdoors (IBS Engineered Products) ‘Flood Plan door’ (Stormguard) - Lakeside uPVC flood doors; Composite flood doors; Steel Flood Doors (Lakeside Flood Solutions Ltd) - PVC and Composite Flood Doors (Flood Smart Systems) - Steel Flood, Fire and Security Door (M3 Global Flood Technologies); Stainless Steel Fire & Flood Door (Lakeside Flood Solutions Ltd) - Steel Flood Secure Door (Flood Control International) - Window hatch (Flood Control International)	Some models include ‘Escape hatch’ option, built in to the top half of the door, to aid rescue/delivery of emergency supplies etc whilst keeping water out of the property. Unobtrusive - look the same as normal doors. Some types may need measures to deal with seepage. May be difficult to evacuate if people are trapped inside with rising water. A door may keep water out at depths that are dangerous to the structure of the building.	 Flood door (Flood Smart Systems)
Water-resisting windows	Medium-high	- Flood Defender Window BS 851188 (M3 Global Flood Technologies) - Lakeside Flood Windows (Lakeside Flood Solutions Ltd)	These windows still open when required; designed to withstand collision from floating debris.	 Flood Defender window (M3 Flood Tec)

Product type	Indicative cost	Available products/suppliers	Comments	Images
Render / external tanking	Medium to High	• ‘Polyprufe’ ext tanking (MacIennan) • ‘Vandex’ cementitious range (Safeguard Europe)	Should seal all cracks even when walls are in relatively poor condition. Below-ground work involved. May just reduce penetration rate. May need facing bricks as well. May need planning approval – visually alters building. May lead to damp within the walls.	 Ref: Severn Trent
Wall sealant	Medium (including labour)	• Waterproof Wall Sealant (Lakeside Flood Solutions Ltd)	Note – ‘Water repellent coatings’ (also called ‘damp-proofing masonry creams’) are not intended for under-water use (in accordance with ISO 15148:2002(E) - Hygrothermal performance).	 Wall sealant being sprayed
Tanking (internal), including cavity drain membrane systems	Very high	• Internal cavity wall tanking with membrane/drain channel/ pump system plus joint sealant (Delta Membrane Systems Ltd) • ‘Oldroyd’ range (Safeguard Europe) • ‘Triton cavity drain membranes’ (Triton Chemicals) • ‘Wykamol cavity drain membranes’/sump/pump systems • Tanking Polymer (M3 Global Flood Technologies)	Designed to be completely waterproof. Offers groundwater protection. Needs sump and pump. Vulnerable to damage due to later alterations. Primarily designed to protect against groundwater.	

Product type	Indicative cost	Available products/suppliers	Comments	Images
Water resisting airbricks / permanent airbrick covers	Low (single product) Medium (including fitting costs for multiple units)	• Anti-flood Airbrick BS 851188 (M3 Global Flood Technologies) • ‘SMART automatic airbrick’ (Floodgate Ltd; Flood Smart Systems; Flood Protection Solutions; FloodStop Ltd; UK Flood Defence Alliance) • Automatic anti-flood airbrick (Lakeside Flood Solutions Ltd) • Self-sealing airbrick (StormMeister)	Inexpensive and unobtrusive. Needs careful installation and maintenance. May need measures to deal with seepage. Need to choose correct height from range available to avoid overtopping.	 SMART airbricks
Permanent outdoor pumps	Medium	• ‘Pompa’ Automatic Submersible Flood Pump Unit (The Flood Pump Company) • Submersible Pump LFS 333 (Lakeside Flood Solutions Ltd)	Units fit into existing drainage to remove water from lawns, gardens etc. Care needed in directing flow away from housing. Sub-pump designed to pump dirty water (inc sewage) passes up to 35mm solids/debris.	
Anti-backflow valves for sewer pipes (backwater valves) Non-return valves (NRVs) for appliance waste-pipes	Low to medium	• ‘Kessel’ NRV BSi (Floodstop Ltd) ACO ‘QUATRIX’ BSi (ACO Building Drainage) • Other: ‘Forge’ antiflood sewer valve (Floodstop Ltd); ‘WAR’ Non Return Valve (Floodgate Ltd); other NRVs (Lakeside Flood Solutions Ltd); Drainage NRV (UK Flood Defence Alliance) • Appliance NRVs (washing machine outlets etc.); Flood Divert Ltd; Lakeside Flood Solutions Ltd; UK Flood Defence Alliance; Builders’ merchants) • NRVs, push-fit valves and Backwater valves (M3 Global Flood Technologies)	Relevant standard is BS EN 13564 – ‘Anti-flooding devices for buildings’. Unobtrusive and inexpensive. May need to assess the impact on neighbours.	 Waste pipe NRV

Product type	Indicative cost	Available products/suppliers	Comments	Images
Built-in sump and pump systems	Low (pump only) Medium-high (system)	Floodstop Ltd; Lakeside Flood Solutions Ltd; M3 Global Flood Technologies	Rapid deployment. Relatively low cost. Helps where a resistance product leaks. Can remove flood water in an emergency. Must be positioned and sized correctly. May require ancillary power supply. Will need servicing and maintenance.	
Permanent barrier walls with demountable gates/ concealed gates /permanent swing gates	Medium-high to Very high (depending on length required /groundworks involved)	- Glazed barriers (Flood Control International; IBS Engineered Products Ltd; Lakeside Flood Solutions Ltd; M3 Global Flood Technologies) - Swing, slide or drop-down pivot flood gates (IBS Engineered Products Ltd) - Flood gates (Floodstop Ltd) - Hardwood flood gates PAS 1188-4:2014 (Flood Divert Ltd); also walls and fences (Flood Divert Ltd; FloodStop Ltd; M3 Global Flood Technologies)) - Steel lift-hinge flood gates (Floodstop Ltd) - Flood Defender Wall (M3 Global Flood Technologies) - Aluminium/steel swing/lift hinge floodgates (Flood Control International) - Sliding floodgates (Flood Control International) - Pivot/drop down flood gates (Flood Control International) - Stainless Steel Flood Gates (Lakeside Flood Solutions Ltd)	Structure of building is not a limiting factor. See also Community section for wider area systems.	 Flood Gate BS 851188 (Flood Divert Ltd)
Raised porch / threshold	Medium-high to High	Property level survey needed to establish appropriate threshold height.	Unobtrusive, but disabled access may need to be considered. Low flood depths only; waterproof door may also be needed.	
Brick-facing using engineering bricks	Medium	Engineering bricks must conform to British Standard BS 3921: Class A (blue) water absorption <4.5%; Class B (red) water absorption <7%.	Note 'Clay Engineering bricks' are made to a lower standard. More effective than sealing existing wall. Needs good workmanship; below-ground work involved. May just reduce penetration rate. May need planning approval – visually alters building.	

Temporary resistance (some action required when flood warning received)

Temporary resistance measures are aimed at keeping floodwater out of a building by putting in place devices that block doors, windows, airbricks, vents and pipes. In order to be protected, these products will need to be installed before flood water arrives. They are designed to lessen the damage that floodwater can do and also to give homeowners extra time to move ground floor contents. The measures may only be effective for a limited time and limited water depth.

These products will only keep water out if they are correctly used as part of a package of measures identified from a property-level flood protection survey carried out by a qualified and experienced surveyor. The products will need to be put into place in good time before flood water arrives and then removed once the flood risk has passed. The products are designed to keep water out for long periods, however seepage is possible (depending upon both workmanship and flood conditions) and the BSi Kitemark standard allows for some seepage. There is a risk to the structure of your home if deep water is held back by the external walls due to the pressure of water. For this reason the products are only suitable for limited flood depths. A structural assessment of the building is recommended where flood depths in excess of 300mm (about a foot) are intended to be resisted. It is generally recognised that flood depths of greater than 1m (over three feet) can result in damage to the structural integrity of a building.

Flood plan considerations

These products require activating to make them work and so protection to your home depends upon receiving and acting on a flood warning.

Some training may be needed to correctly operate the products and long term storage of items may be required, in a location that is easily accessed. Routine inspection and maintenance of the products is however essential as is correct storage. For more information on this, see the Code of Practice, PFR standard 6.

Creating a flood plan is important for protecting people and your property in an emergency. As well as stating who does what when flooding is expected, the flood plan should say what to do in a 'worst case scenario' such as water seepage through flood protection devices, flooding that exceeds the design of the flood protection products, people being trapped in the home with rising water.

Always remember, where the home is attached to others (semi-detached or terraced properties) water may also enter via party walls, unless the neighbouring householder(s) takes similar steps.

Ancillary products

The following products can be used alongside either resistance or recoverable measures – for example, absorbent bags can be placed inside a door protected by Kitemarked barriers to take up any water that may leak through seals (as permitted under the Kitemark standard).

Product type	Indicative cost	Available products/suppliers	Comments	Images
Sealing around external doors / windows	Low	• ‘Soudal Fixall’ (Available from builders’ merchants/ ironmongers) • Permanently elastic after curing • Remains flexible; contains fungicide. • Floodlock’s ‘Flood Traps’ (aka ‘Door Protection Strips’) (Allups Ltd)	Unobtrusive and inexpensive, but needs careful application. Not appropriate in conjunction with normal doors/ windows, which are not designed to resist high water pressure. May also need measures to deal with seepage.	
Sealing cracks / weepholes / service inlets and service entry and exit points; duct sealing products	Low	• ‘Soudal Fixall’ (Available from builders’ merchants/ ironmongers) • One Way Weep Vent (M3 Global Flood Technologies)	Unobtrusive and inexpensive. Needs careful application, using water resistant formula (not standard product). May just reduce penetration rate. Damp problems could result if weepholes are permanently covered.	 An uncovered ‘weep hole’ in brickwork
Re-pointing	Low-medium	• For example, Stormdry Repointing • Additive No.2 (Safeguard Europe)	May just reduce penetration rate. Unobtrusive. Brickwork needs to be in good condition to be effective. May lead to damp within the walls.	
Bolt-down manhole covers	Bespoke	• Bespoke	May require liaison with local authority/ sewerage agency.	

Product type	Indicative cost	Available products/suppliers	Comments	Images
Flood alarm systems (domestic)	Low-medium / Bespoke	• Floodstop Ltd; UK Flood Defence Alliance • ‘FloodAlert’ (Andel Ltd)	24/7 monitoring. Needs careful installation. Needs regular testing/maintenance. May need to obtain permission from landowners/ local authorities. See also Community section for mass warning types.	
Modern versions of sandbags	Low to Low-medium (for multi-packs)	• ‘Hydrosacks/Hydrosnakes’ (EVAQ8; Flood Divert Ltd; UK Flood Defence Alliance; Dameasy Flood Barriers) • ‘Floodsax’ (Floodsax online; JTA Flood; builders’ merchants e.g. Travis Perkins) • ‘FloodBag’ (Maris Pumps Ltd) • Floodwater bags (self-inflating) (Murlac) • FloodBags (gel-filled, re-usable) – Flood • Osmo Flood Barrier (water activated bags) (Seton)	Absorbent bags, lightweight, quick to deploy. Can hold tens of litres of water. Sufficient bags must be stored ready for use. Some types of used bags need to be disposed of after use.	 Floodsax (Environmental Defence Systems Ltd)

Product type	Indicative cost	Available products/suppliers	Comments	Images
Toilet seals / bungs	Low	• ‘Panseal’ (Flood Divert Ltd; Lakeside Flood Solutions Ltd; UK Flood Defence Alliance) • Drain/toilet bungs; shower seals; overflow bungs (M3 Global Flood Technologies)	No permanent installation required. Need sufficient warning. Requires storage space.	 M3 Floodtec toilet bung
Pipe bungs/ seals	Low			
Free standing pumps	Low-medium	• ‘Puddlesucker’ and models such as the LSC 1.4S Tsurumi (Flood Protection Solutions; Floodstop Ltd; Lakeside Flood Solutions Ltd; M3 Global Technologies; Maris Pumps Ltd; and Builders’ merchants) • Flood pump kits (Maris Pumps Ltd)	Must be sized, positioned and deployed correctly. May need servicing and maintenance.	 Puddle-sucker type pump (Flood Protection Solutions)
Water-tight covers for furniture / appliances	Low	• ‘Krisis Flood Bags’ (range of watertight bags to protect contents) 3 sizes (KrisisBags) Note – these products have watertight zip fastenings, unlike ordinary storage bags	Requires occupant to store bags and deploy. Larger items may be difficult to move.	

Product type	Indicative cost	Available products/suppliers	Comments	Images
Steel telescopic/ adjustable trestles	Low	• Builders’ merchants • Can support heavy items above flood level. Also known as builders’/carpenters’ trestles, and ‘sawhorses’	Requires occupant to store trestles and deploy. Larger items may be difficult to move.	
Plastic trestles	Low			
Emergency Flood Kits / ‘Grab Bags’ (ready-made)	Low	• Flood Protection Solutions (community and domestic options)	Requires occupant to store bags and review/replace contents periodically.	
As above – home-made	Low	• Contents purchased from normal retail outlets		
Sack trucks	Low	• Builders’ merchants/DIY outlets	For moving moderately heavy items to higher locations. Requires occupant to store and deploy safely.	
Submersible pumps	Medium	• Submersible pumps, for external use (The Flood Pump Company Ltd)		

Recoverability

Recoverability measures are aimed at allowing a building to flood, but constructing the interior from materials that are not damaged by water.

Following flooding, a clean-up will be needed but not major drying and refurbishment. Correctly applied recoverability should ensure that no permanent damage is caused, the structure of the building is protected and drying and cleaning are quickened.

These measures are designed to reduce the amount of damage caused when water enters a building. Ideally a package of products should be used to lessen the harm that water does to a building, based on a property-level flood protection survey carried out by a qualified and experienced surveyor. Most recoverability measures will, however, reduce the aftermath of flooding **even while you are away from your home**, or if flooding arrives quickly with no warning.

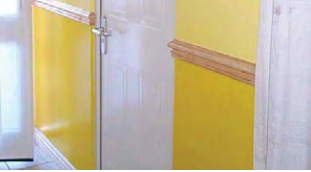
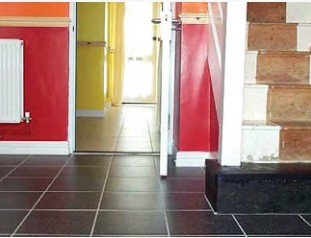
In situations where flood water is expected to arrive very quickly and with high depth and velocity the building structure may still be at risk. In these cases a structural survey is recommended, but recoverability up to one metre (over 3 feet) of water is potentially achievable.

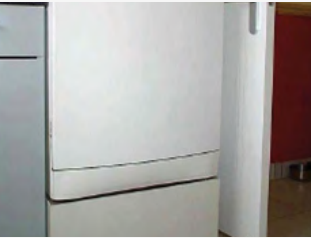
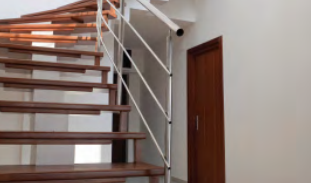


Flood plan considerations

As a few of the methods in this section require you to take action (for example, removing internal doors, or moving valuables to an upper floor) **so the best possible results for your home and its contents depends upon receiving and acting on a flood warning.** Pumping systems can be automatic and so no specific action may be required, but, where the pump is not automatic no flood protection will be provided when you are away from your home. Some training may be needed to operate products such as pumps, and no long term storage of items is required (except for free-standing pumps). Routine inspection and maintenance of the recoverable measures is however essential.

Creating a flood plan is important for protecting people and your property in an emergency. As well as stating who does what when flooding is expected, the flood plan should say what to do in a ‘worst case scenario’ such as when flooding is worse than expected and the risk of people being trapped in the home with rising water.

Product type	Indicative cost	Available products/suppliers	Comments	Images
Water compatible internal walls	Medium	- Dragonboard – Silicon-mineral/Magnesium Oxide board (Dragonboard) - Technitherm Cavity Wall Stabilisation and Insulation System – closed cell type (Isothane Ltd)	Also provides fireproof/thermal insulation. Closed cell cavity insulation. Permanently in place.	
	Low-medium	'Wall Reform Dryboard System' (sacrificial lining) (WallTransform Ltd)	There are still cleaning and drying costs following a flood. Probably only cost effective as part of flood damage repair work.	
Water compatible flooring	Medium to High	- Dragonboard – Silicon-mineral/Magnesium Oxide board (Dragonboard) - Tiled flooring, rather than fitted carpets/laminate - Concrete floor to replace timber	Also fireproof/thermal insulation. Permanently in place There are still cleaning and drying costs following a flood. Probably only cost effective as part of flood damage repair work.	
Water compatible kitchen and bathroom fittings	Medium-high to High	'Miinus' kitchens (Puustelli Group via UK suppliers) 'Sealwise' (Waterproof Construction Board) (Sealwise)	Permanently in place. There are still cleaning and drying costs following a flood. Probably only cost effective as part of flood damage repair work.	 Image courtesy: puustellimiinus.com
Sump and pump systems	Medium-high	- Suitable pumps include: BPS80A; OMA2 Domestic; VA600 Easy flow; various models (Lakeside Flood Solutions Ltd) 'FloodPump' (automatic with alarm built in) (Andel Ltd)	Permanently in place. There are still cleaning and drying costs following a flood. Probably only cost effective as part of flood damage repair work.	

Product type	Indicative cost	Available products/suppliers	Comments	Images
Raised electrics / meters	Medium-high	Local electricians	Permanently in place. There is a practical limit to how high electrics/kitchen appliances can be raised. There are still cleaning and drying costs following a flood. Probably only cost effective as part of flood damage repair work.	 Raised electrics/meters
Plinths for kitchen white goods; wall-mounted boiler	Medium	Local builders/electricians/gas-qualified engineers		 Plinths for white goods (Bowker 2007)
Water compatible steps / stairs (concrete / hardwood / steel)	Bespoke	Specialist firms		 Water compatible steps/stairs
Relocate valuables	No cost	Keep/move valuables/memorabilia on high shelves or in upstairs rooms. Raise valuables on tables/plinths	Requires occupant to maintain and deploy. Needs sufficient warning.	
Removable internal doors	Low	Use quick-release hinges, or avoid painting over door hinges, to permit easy removal; doors may then be placed on top of tables etc. to create storage above water level (in low level flooding)		

Community solutions

Where a particularly large property or a number of homes are involved, there are a number of potential solutions available, in both the temporary and permanent categories. For temporary products, the same general considerations highlighted in the previous sections will still apply (such as expected water depth, duration of flood and the human resources needed to deploy the device/s).

For permanent structures designed to protect larger areas, however, obtaining expert guidance is essential. For example, a detailed understanding of the local geological conditions will be of vital importance in designing and building extensive permanent walls, or undertaking the groundworks required for the demountable barrier options, as illustrated in the example.

Telemetry / mass notification and warning systems

If your area is not served by official flood warnings, specialist companies can install flood level alarm systems with the capability of notifying multiple households, by means such as sirens, or text messages. The sensor will need to be carefully installed at a location where rising flood water will be detected well before flooding commences to alert residents to the risk (such as during the night) and to give them time to take action. Although the initial outlay for such systems may be relatively high, community groups such as Parish Councils or local community resilience groups of the Flood Forums, may be able to lead on fundraising initiatives whilst the appropriate Regional Flood and Coastal Committees should also be approached to check project eligibility for ‘local levy’ funding. Permission from landowners and local authorities may be needed prior to installing the sensor.

Frankwell flood alleviation scheme Shrewsbury

In non-flood conditions, the visible parts of the finished scheme (on the right of the picture) consist of permanent walls, of varying heights, with sockets and mountings for insertion of the removable posts and barriers.

What is not visible here are the underground walls, consisting of steel sheet piling up to 16 meters (over fifty feet) deep, without which water would still be able to flow under the defences. The visible walls themselves are substantial structures, designed to remain safe despite very high water pressure on the river-facing side.



Landscaped flood walls

Flood defences can be incorporated into private gardens via imaginative design. Where the gardens form part of an active floodplain, the defence should ideally be set back from the river’s edge so that loss of floodplain is minimised. The residents retain some garden which is defended, and some which is not. Flood gates can be provided if steps over the defence are not acceptable.

Detailed guidance for professionals engaged in the design and construction of large schemes, is published by the Environment Agency, with Chapter 9 (Flood walls and flood embankments) being of particular relevance:

➔ shorturl.at/giBL2



Product type	Indicative cost	Available products/suppliers	Comments	Images
Free standing barriers	Very high	• ‘K-system barrier’ (IBS Engineered Products) • ‘Floodstop’ modular barrier (Flood Divert Ltd; Fluvial Innovations) • HippoDam (Potamii Ltd) • ‘Watergate Self-inflating’ (Flood Protection Solutions) • NOAQ Tubewall AND NOAQ Boxwall (Flood Control International) • ‘FloodFence’ water and flood diversion system (modular) (Fluvial Innovations Ltd) • ‘INERO’ flood barriers (Flood Control International) • LFS multi-cellular concertina flood barrier; LFS BoxBarrier; Tempo-Dam (Lakeside Flood Solutions Ltd) • BoxBarrier (Andel Ltd)	Typically designed more for communities rather than individuals, but some smaller barriers designed to be installed by 1 person. Property/ies protected to design height of product. Structure of buildings is not a limiting factor. Can be installed in water. Needs sufficient warning. May need significant manpower to deploy. Most products need separate storage. May need measures to deal with seepage.	 NoFloods Basic (Dyrhoff Ltd)  K-System (IBS Engineered Products)  WaterGate range (Flood Protection Solutions)
Demountable barriers (groundworks required)	Very high	• IBS demountable flood protection wall (IBS Engineered Products Ltd) • ‘Lakeside’ Demountable Aluminium Flood Barrier (Lakeside Flood Solutions Ltd) • Slot-in flood barriers (Flood Control International) • Nautilus demountable barriers (Flood Protection Solutions; FloodStop Ltd; Flood Technologies Ltd) • Coniston and Danube demountables (UK Flood Defence Alliance)	Unobtrusive in non-flood conditions. Property/ies protected to design height of product. Structure of buildings is not a limiting factor. Needs sufficient warning. Needs significant manpower to deploy. Most products need separate storage. Needs careful design and construction (needs continuity of barrier/roundworks). May need measures to deal with seepage. Security may be needed to prevent barrier theft.	 IBS demountable

Product type	Indicative cost	Available products/suppliers	Comments	Images
Perimeter walls / permanent barrier systems with gates (fixed or demountable)	High to Very high (depending on length required/any groundworks involved)	• Glazed barriers (IBS Engineered Products; Flood Control International) • Hinged gates; demountable barriers (IBS Engineered Systems) • ‘DriFence’ (Flood Divert Ltd) • Steel lift-hinge flood gates (Floodstop Ltd) • Swing gate (Flood Control International) • Lift hinge/pivot hinge/rolling gates; Flipup/hydraulic gates (Flood Control International)	Glazed types minimise visual impact. Property/ies protected to design height of product. Structure of buildings is not a limiting factor. Needs careful design and construction; needs continuity of barrier. May need measures to deal with seepage.	
Telemetry / mass notification and warning systems	Medium to High	• Aquaread Ltd; Campbell Scientific; Casella; Floodstop Ltd; UK Flood Defence Alliance	Ideal where there is no formal flood warning service. Round the clock monitoring. Needs careful installation. Needs regular testing/ maintenance. May need to obtain permission from landowners/local authorities.	 Level sensor



04 Sustainable drainage solutions

Another piece of the jigsaw: ‘SuDS’

(Sustainable Drainage Systems)

As well as making houses more resilient to flooding from rivers and streams, we are now seeing increasing interest in methods that can slow down the rate at which our drainage systems fill and overflow in heavy rainfall.

No matter how often the roadside gullies are cleaned out by our local authorities, the intense rainstorms we have seen in recent years can quickly overwhelm the surface water sewers and flooding can result. These ‘flash floods’ typically occur and then disappear again in a short space of time, but they can still cause devastation if they get into our homes!

As well as changes in our weather patterns, many of us are unknowingly adding to the problem – for example, by paving over parts of our gardens to make parking spaces, adding conservatories or other extensions to our homes. Each change may be small in itself, but they all cut down the total area of vegetation capable of absorbing rain. Roofs, decking, paving, concrete and tarmac all speed up the rate water enters the roadside gullies, compared with the lawns or flowerbeds that they may have replaced.

This is a complicated topic, but there are a number of things that can be done at the domestic level to help reverse this trend and some of these are shown in the diagram to the right.

There are prices to suit most homeowners’ pockets – for example, creating a ‘rain planter’ is a job within the capability of many DIY enthusiasts, while a 200 litre water butt typically costs less than £25 and is simple to install. (As keen gardeners will already know, if your water supply is metered then saving rainwater can also save money).

Then when the next torrential downpour arrives, at least some of the water that would otherwise go straight down the drains will now be held back, even if only for a short while until the tank (or trough) reaches overflow level. Every little certainly helps where flooding risk is concerned!



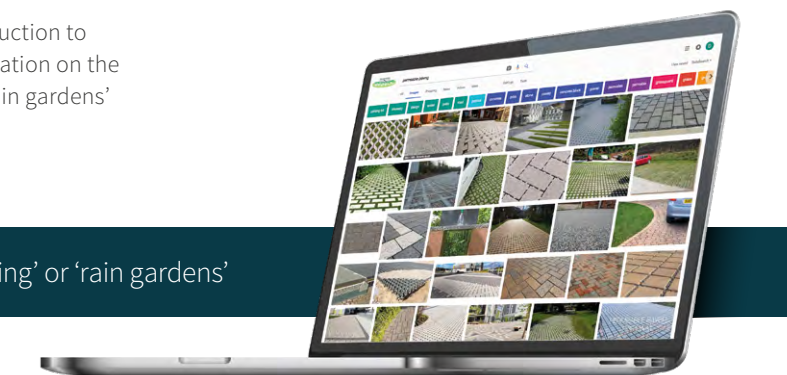
The above is only intended as a brief introduction to the issue, but you can find lots more information on the internet. Just type ‘permeable paving’ or ‘rain gardens’ into your usual search engine.



SUDS approved pavement/car park reinforcement for flood-prone areas – made from recycled plastic (British Recycled Plastic/Low Carbon Products Ltd).



Search for ‘permeable paving’ or ‘rain gardens’



Solutions to reduce surface water flooding in your garden



For the smaller garden

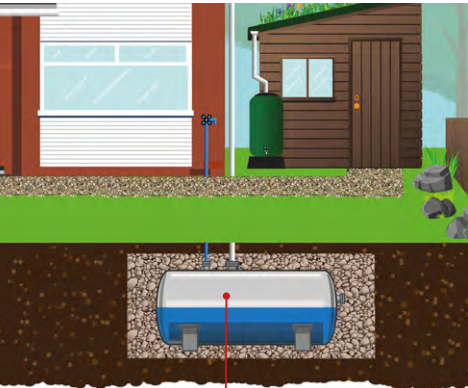


- Rain planter for runoff from garage roof
- Permeable surfaces on car parking areas
- Pathways of gravel over weed-suppressant fabric
- Grass rather than paved areas
- Water butts for collecting rain from roofs
- Green roof (lightweight) on garden shed

For the larger garden



Below ground runoff storage and attenuation crates



Below ground rain harvesting tank





05 Directory of manufacturers

Directory of flood protection product manufacturers and suppliers featured in this handbook

Allups Ltd

Prospect House, Prospect Street
Huddersfield, West Yorkshire HD1 2NU
e Online contact form
w www.allupsltd.co.uk

Andel Ltd

Unit 1 Dodworth Business Park South
Upper Cliffe Road, Dodworth, Barnsley S75 3SP
t 01484 845 000
e help@andel.co.uk
w www.andel.co.uk/flood-defence

Aquaread Ltd

Bridge House, Northdown Industrial Estate
Broadstairs, Kent CT10 3JP
t 01843 600 030
e info@aquaread.com
w www.aquaread.com

British Recycled Plastic

Low Carbon Products Ltd
Unit 8F, Top Land Country Business Park
Cragg Road, Mytholmroyd
Hebden Bridge HX7 5RW
t 01422 419 555
e info@britishrecycledplastic.co.uk
w www.britishrecycledplastic.co.uk/product/hebden-x-grid

Campbell Scientific

Campbell Park, 80 Hathern Road
Shepshed, Loughborough LE12 9GX
t 01509 828 888
e sales@campbellsci.co.uk
w www.campbellsci.co.uk

Casella

Regent House, Wolseley Road
Kempston, Bedford MK42 7JY
t 01234 844 100
e info@casellasolutions.com
w www.casellasolutions.com

Dameasy Flood Barriers

Unit 19A, Ardee Business Park,
Hale Street, Ardee
County Louth, Ireland
t: 020 80686601
e: info@defbarriers.com
w: www.dameasyfloodbarriers.com

Delta Membrane Systems

Delta House, Merlin Way
North Weald, Epping, Essex CM16 6HR
t 01992 523 523
e info@deltamembranes.com
w www.deltamembranes.com

Dragonboard

116 Duke Street, Liverpool, L1 5JW
t: 0151 528 6660
e: info@dragonboard.co.uk
w: www.dragonboard.co.uk

Dyrhoff Ltd

NoFloods (Dyrhoff Ltd)
Unit 9, The Glenmore Centre
Shearway Business Park, Folkestone CT19 4RJ
t 01303 275900
e enquiries@nofloods.co.uk
w www.nofloods.co.uk

Evaq8

PO Box 92, Huddersfield HD7 4WQ
t 01484 641 009
e info@edslimited.co.uk
w www.floodsax.co.uk/buy/uk-suppliers

Environmental Defence Systems Ltd

Unit 5 Vision Industrial Park
Kendal Avenue, London W3 0AF
t 020 8992 1935
e info@evaq8.com
w evaq8.co.uk/deluxe-flood-kit-supplied-in-waterproof-bag.html

Flood Control International Ltd

Kilworthy Park, Tavistock PL19 0FZ
t 01822 619 730
e Online contact form
w www.floodcontrolinternational.com

Flood Divert Ltd

Unit G7b, Elvington Industrial Estate
York Road, Elvington, York YO41 4AR
t 01904 360 204
e Online contact form
w www.flooddivert.co.uk

Flood Fortress (part of the Durey Group)

Unit A3, Knowle Village Business Park
Mayles Lane, Fareham PO17 5DY
t 01329 448 135
e trevor@floodfortress.co.uk
w www.floodfortress.co.uk

Floodgate Limited

49/51 Lammas Street
Carmarthen SA31 3AL, Wales
t 01267 234 205
e sales@floodgate.ltd.uk
w www.floodgate.ltd.uk

Floodmate

28 Blackbird Close, Poole BH177YA
t 0800 0932 690
e info@floodmate.co.uk
w www.floodmate.co.uk

Flood Protection Solutions Ltd

Unit 36, Criftn Enterprise Centre
Oxton Road, Epperstone NG14 6AT
t 0115 9870358
e enquiries@floodprotectionsolutions.co.uk
w www.floodprotectionsolutions.co.uk

Flood Smart Systems Limited

Unit D13, Meltham Mills Ind Estate
Huddersfield HD9 4DS
t 01484 850812
e sales@floodsmartsystems.co.uk
w www.floodsmartsystems.co.uk

FloodStop Ltd

1st Floor, 119 High Street
Selsey, West Sussex PO20 0QB
t 01243 201 100
e info@floodstop-uk.co.uk
w www.floodstop-uk.co.uk

Flood Technologies Ltd

Unit 5, Fullwood Close, Aldermans Green Ind Est
Coventry CV2 2SS
t 012476 610 666
e action@floodtec.co.uk
w www.floodtec.co.uk

Fluvial Innovations Ltd

Unit 68, Basepoint Business Centre
Aviation Park West, Christchurch BH23 6NX
t 01202 031657
e info@fluvial-innovations.co.uk
w www.fluvial-innovations.co.uk

IBS Engineered Products Ltd

Unit 7 Brunel Park, Off Blyth Road
Harworth, Doncaster DN11 8NE
t 01302 630015
e info@ibsenengineeredproducts.com
w www.ibsenengineeredproducts.com

Isodaq Technology (part of Hydro International)

Old Grammar School, Church Street
Bromyard HR7 4DP
t 01885 483 789
e enquiries@hydro-int.com
w www.isodaq.co.uk

Isothane Ltd

Newhouse Road, Huncoat Business Park
Accrington BB5 6NT
t 01254 872 555
e Online contact form
w www.isothane.com

Krisis Flood Bags

Currently online only - will ship to UK
w www.krisisbags.com/krisis-flood-bags-us

Lakeside Flood Solutions Ltd

Invest House, Bruce Road, Fforestfach
Swansea SA5 4HS
t 01792 561117
e sales@lakesidefloodsolutions.co.uk
w www.lakesidefloodsolutions.co.uk

M3 Global Flood Technologies Ltd

9a Wassage Way, Hampton Lovett Industrial
Estate, Droitwich, Worcestershire WR9 0NX
t 01905 676467
e sales@m3floodtec.com
w www.m3floodtec.com

Maris Pumps Ltd

Hill Farm, Hassocky Lane
Temple Normanton, Chesterfield S42 5DH
t 01246 201111
e Online contact form
w https://bit.ly/2lhA2lL

MacLennan (LSE building preservation Ltd)

Field Farm, Porton Road, Salisbury
Wiltshire SP4 0NF
t 0330 3200 240
e Online contact form
w www.maclennanwaterproofing.co.uk/
basement-waterproofing/leaks-and-floods

Potamii Ltd

The Regus Building, Windmill Hill Business Park
Whitehill Way, Swindon SN5 6QR
t 01793 251 700
e sales@potamii.com
w www.potamii.com

Safeguard Europe Ltd

Redkiln Close, Horsham RH13 5QL
t 01403 602146
e Online contact form
w www.safeguardeurope.com

Sealwise 2014 Ltd

Unit 5 Mendip Business Park
Mendip Rd, Axbridge BS26 2UG
t 01934 750 084
e info@sealwise.co.uk
w www.sealwise.co.uk

Seton (Brady Corp Ltd)

Online only
t 0800 316 9700
e sales@seton.co.uk
w www.seton.co.uk

Steelplan Kitchens

Wealdstone Road, Kimpton Industrial Estate
Sutton SM3 9RW
t 0844 809 9186
e sales@steelplan.com
w www.steelplankitchens.co.uk

Stormguard Floodplan

Regency Mill, Macclesfield SK11 8HR
t 01260 289 089
e info@floodplan.co.uk
w www.stormguardfloodplan.com

StormMeister Flood Protection

Unit 1, West View, Preston PR1 5EP
t 01772 704429
e contact@stormmeister.com
w www.stormmeister.com

The Flood Pump Company Ltd

25 Roseberry Rd, Billingham TS23 2SD
t 07765 864596
e neil@thefloodpumpcompany.com
w www.tfpcltd.com

Triton Systems

Units 3 - 5 Crayford Commercial Centre
Greyhound Way, Crayford DA1 4HF
t 01322 318 830
e info@tritonsystems.co.uk
w www.triton-chemicals.com

UK Flood Defence Alliance

The Wenta Enterprise Centre, Cranborne Road
Potters Bar, Hertfordshire EN6 3DQ
t 0208 442 0872
e Online contact form
w www.ukflooddefencealliance.com

WallTransform Ltd

Unit 4, Rosedale Court, Ellerbeck Way Industrial
Estate, Stokesley, Middlesbrough TS9 5GB
t 01642 272848
e info@walltransform.co.uk
w www.walltransform.co.uk/dryboard.html

Whitehouse Construction Co. Ltd

Blenheim Road, Ashbourne DE6 1JU
t 01335 344 000
e contactus@whc.ltd
w https://whitehouseconstruction.co.uk/
services/property-flood-resilience/

Wykamol Group

Unit 3, Boran Court Network
65 Business Park, Burnleyn BB11 5TH
t 08454 006 666
e info@wykamol.com
w www.wykamol.com/waterproofing

Useful contacts

The Chartered Institution of Water and Environmental
Management (CIWEM) maintain a professionals directory
where a list of flood risk consultants can be found:
www.ciwem.org

FloodMary.com / MDA not only provide advice on flood
resilience via their website, but can also offer many years
extensive experience of working with communities and
individuals at risk, as well as flood-related research
initiatives:
floodmary.com

The Royal Institution of Chartered Surveyors (RICS) has
produced a useful guide to flooding for the property
owner just follow the link to useful guides on the UK
website. RICS also maintain a list of chartered surveyors:
www.rics.org/uk

RAB Consultants Ltd can provide advice and assistance
on flood risk and property-level protection surveys:
www.rabconsultants.co.uk

The British Damage Management Association
(BDMA) is the certifying body for damage management
professionals, setting standards and providing training
and accreditation for practitioners and others across
the wider insurance industry who are involved in the
recovery and restoration of damaged properties.
www.bdma.org.uk

British insurance Brokers Association (BIBA) has
an online Directory of specialist flood insurers:
www.biba.org.uk/find-insurance/?find-insurance
type=41&ref=dir&pageNumber=1

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Sponsors

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Whitehouse Construction Co Ltd - www.whitehouseconstruction.co.uk

M3 Global Flood Technologies Ltd - www.m3floodtec.com