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Surveying Individual Properties for Flood Resilience – Technical guidance for Local Authorities and other scheme promoters

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Surveying for Flood Resilience in Individual Properties

Technical guidance for Local Authorities and other scheme promoters

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Introduction

This guidance document has emerged out of the Defra-funded Surveying Individual Properties for Flood Resilience project. Aimed at local authorities and other potential PLP scheme promoters, the guidance aims to give readers an insight into why they should choose an independent Flood Risk Assessor (iFRA) and what they can expect when accessing the service.

Please note, this guidance is a draft. It should be updated and revised as and when the flood risk management context and the framework for property level resilience alters. Some important future developments that will affect this guidance will be:

- Decisions regarding accreditation and certification of iFRAs;
- Alterations to the insurance context and to FloodRe;
- EA Local Framework developments

We have highlighted parts of the guidance that cannot yet be completed or that will need to be revisited before publication. We also suggest that the guidance is forwarded to the Local Government Association and representatives from Lead Local Flood Authorities for comment after each iteration.

Background

The current market for PLP has no clear listing of suitably qualified providers who can undertake an independent flood risk assessment. For the property owner this is both confusing and has hidden pitfalls with potentially serious consequences arising from an incorrect assessment of flood risk or poor advice on inappropriate products.

The extensive difficulties experienced by many property owners in trying to take advantage of the Repair & Renew Grant (RRG) following the 2014 floods highlights the relevance and need for this guidance, as illustrated by a quote from a very motivated and informed resident struggling to get to grips on their own with the RRG.

> ***"I have to say I am at a complete and utter loss as to who is meant to be doing what and how the use of the PLP and RRG funds can be best used to achieve some protection of our house from flooding."***
>
> **Flooded resident – Surrey 2014**

This is mirrored across many communities. Therefore, this Technical Guidance for Scheme Promoters along with an associate Homeowner Guide will provide the much needed independent support to encourage the wider cohort of accredited, competent iFRAs providing reliable and competent advice and guidance that will encourage the wider take-up of PLP, greater resilience in communities at flood risk, and increased confidence in PLP by both property owners and insurers.

The intention is that by establishing a process of accreditation for competent iFRAs, many more property owners will be reassured by the service they receive, encouraging the wider take-up and awareness of PLP benefits as reported below.

> ***"It was the best flood I've ever had! Everything was working."***
>
> ***"We didn't aim to make it perfectly dry...our aim was to keep the water to one or two inches."***
>
> **Resident with PLP deployed – East Peckham 2014**

Using this guide

This document provides guidance to assist local authorities (and other professionals) in understanding the contributions of Independent Flood Risk Advisors to flood risk management, particularly through their ability to provide surveys for property level flood resistance and resilience measures. The term flood resilience technology is used here to include property level protection (PLP) and other technologies which operate at neighbourhood scale: these may be resistance or resilience measures.

The guidance provides important information regarding the *process* that the iFRA undertakes when advising on resistance and resilience measures and details some of the limitations of the iFRA's remit and responsibilities. The guide identifies the context for iFRAs, provides details regarding their role within the broader context for flood risk management. It provides support for assisting property owners and communities to find an appropriate iFRA or for a local authority, the Environment Agency, Water Company or other agency to procure the services of an iFRA for a community wide scheme.

The guidance should be read in full by those officers considering using the services of an iFRA, or advising others (both individuals and communities) to do so. Readers are advised to refer to the accompanying Defra report "Surveying for Flood Resilience in Individual Properties" as well as guidance for property owners. The document refers to sources of further information throughout and a list of references is provided at the end of the document. 'The client' refers to a local authority, EA, community group, individual or other organisation (such as an insurer) who want to commission an iFRA. The 'end-user' refers to property owners and/or local residents who are in receipt of resistance or resilience measures, and/or responsible for their deployment and/or maintenance.

The context

Many property owners benefit from traditional flood defence schemes such as flood walls and embankments. However, it is not always possible to install structural defences to protect communities, either on practical or economic grounds. In the past, property owners have therefore had to resort to sandbags, plywood boards and plastic sheets in efforts to protect their homes. Such measures often prove ineffective, with frequent floods causing extensive damage and stress, costly repairs, difficulties in obtaining affordable insurance and adverse impacts on both mortgage-ability and property value. However, over the last ten years or so additional low cost flood management measures and options have become established, including the use of free-standing temporary barriers and property level protection (PLP).

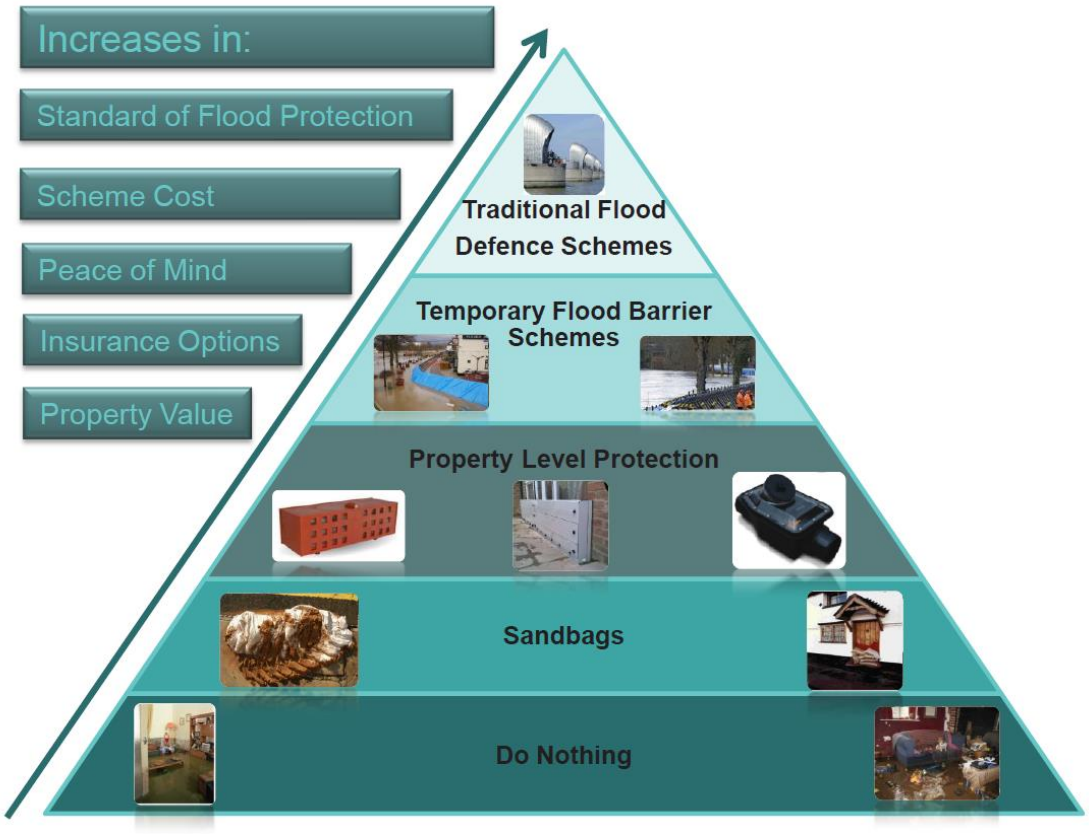


Figure 6-1 Hierarchy of flood protection

PLP is the installation and deployment of a range of flood resistance and flood resilience measures. Resistance measures (dry proofing) such as door barriers, are aimed at preventing or limiting water from entering individual properties; resilience measures (wet proofing) such as waterproof plaster, aim to limit the damage caused once it has entered. In this guidance document, we refer to both resistance and resilience measures, which are applied to and in a property, as PLP.

It is now widely acknowledged that resistance and resilience PLP can, in many cases, offer technically and cost effective measures that can assist property owners and communities in managing flood risk. There are now a number of manufacturers and installers of resistance and resilience PLP materials and products operating throughout the country. Many, though not all, offer products and systems that have been tested to high standards (such as the BSI PAS 1188 2014 Kitemark standard for PLP products and barriers) and that can not only reduce the impact of flooding, but can offer significant 'peace of mind' to property owners. Resistance and resilience PLP can help to manage residual risk, or to provide 'defences behind the defences' by way of a fail-safe mechanism.

Importantly, resilient and resilient materials and products are not effective in all circumstances. There will be instances when alternative flood risk management approaches at different scales (larger, heavy engineered flood defences, for example) would be more effective. Even when such measures are a technically appropriate option, given the range of products and systems that are now available great care must be taken to install the correct system. There have been instances when poorly installed or incorrect products have either not prevented flooding or have failed to increase the resilience of

properties, sometimes exacerbating flood damage. The success or failure of measures are *context specific*; their efficacy will depend upon property type and condition, the source/ type, depth and velocity of flooding, and the demographics, capabilities and attitudes of property owners, tenants and users. Given the complex technical, social and administrative context for flooding and flood risk management, ***there is a need for a cohort of competent assessors that can provide impartial, professional advice that will help property owners to fit and use appropriate and effective resistance and resilience PLP measures***. The purpose of this guide is to assist scheme promoters in the procurement of such an assessor, who we term an independent Flood Risk Advisor (iFRA). Competency requirements and suggested accreditation arrangements are ultimately designed to increase the specialist capacity and to build consumer confidence and the wider take-up of PLP technologies.

What is an Independent Flood Risk Advisor and an Independent Flood Risk Assessment?

Independent Flood Risk Advisor (iFRA) refers to either an individual or an organisation that is able to provide *independent*, *impartial* and *professional* advice to a scheme promoter, property owner or community wishing to install resistance and resilience technologies, materials and systems to mitigate or adapt to the risk of flooding. The advisor will provide an independent flood risk assessment at property or community level. They will identify all sources of flood risk and propose technologies and solutions to mitigate the risks that are suitable for the particular property construction and the residents.

Why is an IFRA required?

The market for PLP products is increasingly vibrant, with many technically robust and financially feasible products available. Although it is currently possible to obtain flood risk assessments and resistance and resilience surveys, there is a need for guidance and a process that identifies easier access to competent and independent flood risk advisors. There are a number of concerns that lead to a lack of confidence in schemes on the part of property owners, insurers and other interested parties:

- Surveys are often not comprehensive, for instance not taking account of all the sources and dynamics of the flood risk, that do not adequately take account of the building fabric or neighbouring properties, or do not take account of the current and future needs and requirements of the property owners;
- Surveys and assessments can be commissioned in good faith might be provided by unqualified surveyors or surveyors that are not independent but working for - or have commercial agreements with - one technology and/or material provider;

- Concerns that installers and manufacturers are not installing the correct products or are overstating the performance capabilities of their products.

There are three options for surveying and it is important to understand the benefits and drawbacks of each.

Option 1. Unqualified survey provision:

- Little or no control over quality or competence.
- High risk of failure due to a lack of flood risk awareness.
- Unlikely to provide suitable solutions for person or property.

Option 2. Flood risk assessment surveys provided by product manufacturer/installer adopting an installation training standard:.

- Innovative manufacturers/skilled product installers raising installation standards but not independent or impartial.
- Product installers may only have a very basic knowledge and understanding of flood risk assessment.
- Likely to offer only a partial assessment and appreciation of all flood risks and may not provide all options and choices suitable for the person and property.

Option 3. Independent, qualified and accredited flood risk assessment service (iFRAS):

- May be more expensive than options 1 and 2 but offers impartial and independent with no links or vested interest to sell products.
- Chartered professionals offering the requisite knowledge, skills and experience in flood risk assessment (CIWEM), property construction and surveying (RICS) and community engagement and emergency planning (EPS).
- Full assessment and appreciation of all flood risks and options suitable for the person and property (including wider catchment options).

These issues and risks face a local authority, the EA or other organisations seeking to procure this service as well as property owners. Without the support and advice from an iFRAS provider the reputation and credibility of the use of adaptive technologies and the approach may be compromised.

The iFRA role, as identified in this project, requires a unique blend of skills and knowledge focussed on a thorough understanding of the flood risks and sources; building construction; the full range of PLP products that are available, and the needs and abilities of the person and family living in that property. A direct comparison can be made between a PLP scheme and a traditional multi-million pound flood defence scheme for a town: both require significant and effective engagement to raise public awareness as well as a focus on a thorough technical assessment of the catchment flood risks and the proposed engineering solution. Whilst a PLP scheme is typically an order of magnitude lower in cost, no compromises can be made in terms of assessing the flood risks, the property or the needs of the person.

An iFRA will help increase consumer confidence and encourage wider take-up of measures. In addition, the independent flood risk assessment will be able to guide clients through what is an increasingly confusing array of products and will be able to promote quality (for instance 'Kitemarked') products that have been tested to nationally and internationally recognised standards

Without the support and advice from an iFRAS provider the reputation and credibility of the PLP approach may be compromised. Experience also emphasises how vital it is for property owners with PLP measures successfully installed to have well-rehearsed emergency plans so they are prepared and know what to do ahead of the next flood.

The remit of an iFRA

To understand whether PLP is an appropriate option, it is necessary to investigate its potential as part of a wider catchment flood risk study reflecting the hierarchy of options, in consultation with the Environment Agency and the local authority. There may be viable alternatives being proposed by the risk management authorities (that would offer higher standards of protection and make PLP unnecessary) or community PLP schemes may already be programmed. Many PLP schemes now and in the future are requiring a more comprehensive review and assessment of all available flood risk data and previous catchment flood management investigations as part of the iFRA role, in order to be confident that PLP and resilience is the preferred and appropriate approach.

Independent flood risk assessors must be able to ***competently identify*** the most appropriate resistance and/or resilient measures ***given the flood, the people at flood risk, and the building's performance under flood conditions***. With effective flood risk assessments and PLP products the approach aims to help build improved flood resilience by empowering the **person** to help protect their **property** from **floods** (See Figure 1).

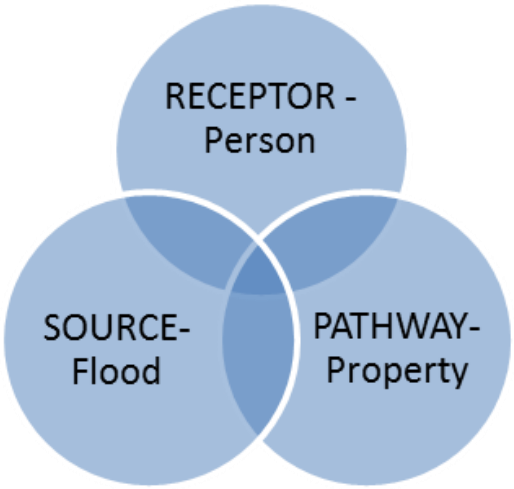


Figure 6-2: The Source-Pathway-Receptor Model as applied to PLP

The iFRA must possess not only technical skills and knowledge about flooding and building construction, but also be able to understand the social impacts of flooding, be able to manage expectations of clients and support flood awareness and preparedness more generally. They must also be able to provide this service both to individual property owners and communities. This calls for a specialist blend of skills if such schemes are to be successful and property owner and insurer expectations met. A comprehensive overview of the skills and knowledge required by an iFRA are presented in the main Defra report "Surveying for Flood Resilience in Individual Properties" – March 2015.

There are a number of principles that lie behind the need for an iFRAS and that frame their role, knowledge and practice:

- The assessor must understand and be able to explain to the client, ***the rationale for using resistance and/or resilience measures*** and to be able to advise when such adaptations are not feasible or may be counterproductive to other flood risk management solutions.
- They should be able to ***advise regarding funding opportunities*** available to assist with procurement, and the potential benefits of using measures (for instance, with obtaining accessible and affordable insurance cover, with property marketability and the 'peace of mind' benefits that such interventions might bring).
- They must be able to ***understand and explain flood risk management*** administrative, financial and political contexts, and to be knowledgeable regarding the stakeholders and scales of flood risk management. This might include an understanding of how a PLP scheme may be affected (both technically and financially) by a broader flood risk defence scheme.
- The assessors must operate ***independently*** from product manufacturers and installers. They should not have a commercial or vested interest in recommending any PLP measure. In certain circumstances, the iFRA must be ready to advise against any adaptation of a property through PLP (e.g. due to excessive flood depths, property construction, Listed Buildings etc).
- The iFRA should address the risk of flood flow from adjoining terraced or semi-detached properties should be addressed. This means not dealing with a property in isolation, and recommending that communities working together not alone.
- The iFRA must undertake ***comprehensive and competent assessments***. The flood risk assessments are not merely building surveys, and the assessors should have skills beyond those of a building surveyor. In particular, assessors should:

    1. Take account of all ***dimensions of the flood*** (including flood sources, flow routes, depth, velocity and duration) and understand **flood warning arrangements** and potential;

    2. Assess ***the impact of the flood upon both the fabric of the property and those that use or inhabit a property***. They should be able to analyse flood risk for an individual and for neighbouring properties. Particular attention should be given to consider how the performance of interventions might be contingent upon neighbouring and adjoining properties;

3. Assess the ***ability and capacity of property owners or tenants*** to store, access, use and maintain PLP measures. The iFRA needs to understand a client's individual circumstances and attitudes toward the use of resistance and resilience. Additionally, the iFRA should be able to assess the impacts of a flood on neighbouring properties, and the effect of PLP measures on neighbouring properties and property users;

4. Be knowledgeable regarding the range of ***materials and products*** that are available, to understand the circumstances within which they will operate, and ***know their performance parameters*** (that is their limitations and contingencies) or any potential implications they may have for the health and well-being of property users and operators. They must understand and be able to advise regarding the ***maintenance and lifespan of products and materials.***

Identifying and Mapping Knowledge and Skills

Drawing on the insights of practitioners, the IFRA must possess – or have access to - particular skills:

- building construction skills (particularly the ability to assess construction conditions, building regulations and standards, and heritage concerns) were identified as essential;
- knowledge of how flooding affects a building, including source, velocity, duration and depth are deemed to be essential;
- knowledge and awareness of flood risk management scored highly
- an ability to liaise with clients (in particular) and the wider community were thought to be critically important;
- it was recognised that whilst a single individual/organisation need not necessarily possess all of the skills, there needs to be knowledge of when specialist help is required and how to access it;
- complex cases requiring full structural surveys, for example, will need to be planned for even though they may be rare;
- there is a need to understand health and safety requirements and how PLP may compromise or contradict these. Water pipes often contain asbestos whilst another hazard is placing PLP on gas vents which can lead to the build-up of carbon monoxide.

Training Opportunities

In terms of training opportunities and how these opportunities might be underpinned, stakeholders highlighted that an iFRA:

- Needs to have a minimum qualification at a high enough standard that invites trust yet low enough not to ensure that it becomes too exclusive (and expensive);

- Should be of chartered status including registered engineers, CIWEM, chartered surveyors, architects, hydrologists and geologists;
- Accreditation process would need to be provided by the United Kingdom Accreditation Service (UKAS), who would audit certifying bodies;
- British Standard could be developeed as a Code of Practice, and from this a number of bodies could act to certify the iFRAS.

The role of local authorities and Environment Agency

The use of PLP and resilient technologies offers a cost-effective and relatively simple means to support flood risk communities who have been unable to secure funding for permanent flood alleviation options in the past. A number of studies on PLP pilot schemes make it apparent that for PLP to perform to its optimum level, there needs to be careful thought and planning. The wider take-up of PLP depends on evidence from successful delivery elsewhere so establishing competent and independent flood risk assessors and services is critical for consumer confidence and the future of the approach.

The role for local authorities and the EA as key Risk Management Authorities is two-fold: Firstly, as key stakeholders in flood risk management they may procure the services of an iFRA or may wish to train their own staff to conduct such assessments; secondly, as organisations that can provide residents and property owners with further information regarding how they may find a suitable iFRA to conduct an assessment for a proposed scheme.

The guidance and Main Defra Report should be read in full by local authority and EA officers considering using the services of an iFRA, or advising others (both individuals and communities) to do so.

Procuring the services of an iFRA

First steps

This guidance commences from the assumption that resilience and resistance PLP are cost-beneficial, that funding for schemes may have been approved, or that a property owner and/or community have decided that a flood risk assessment is required. However many EA schemes now and in the future are requiring a more comprehensive review and assessment of all available flood risk data and previous catchment flood management investigations in order to be confident that resilience and resistance PLP is the preferred and appropriate approach.

There will be various entry points and drivers for the local authority, EA or property owners to implement PLP (see Figure 2 below).

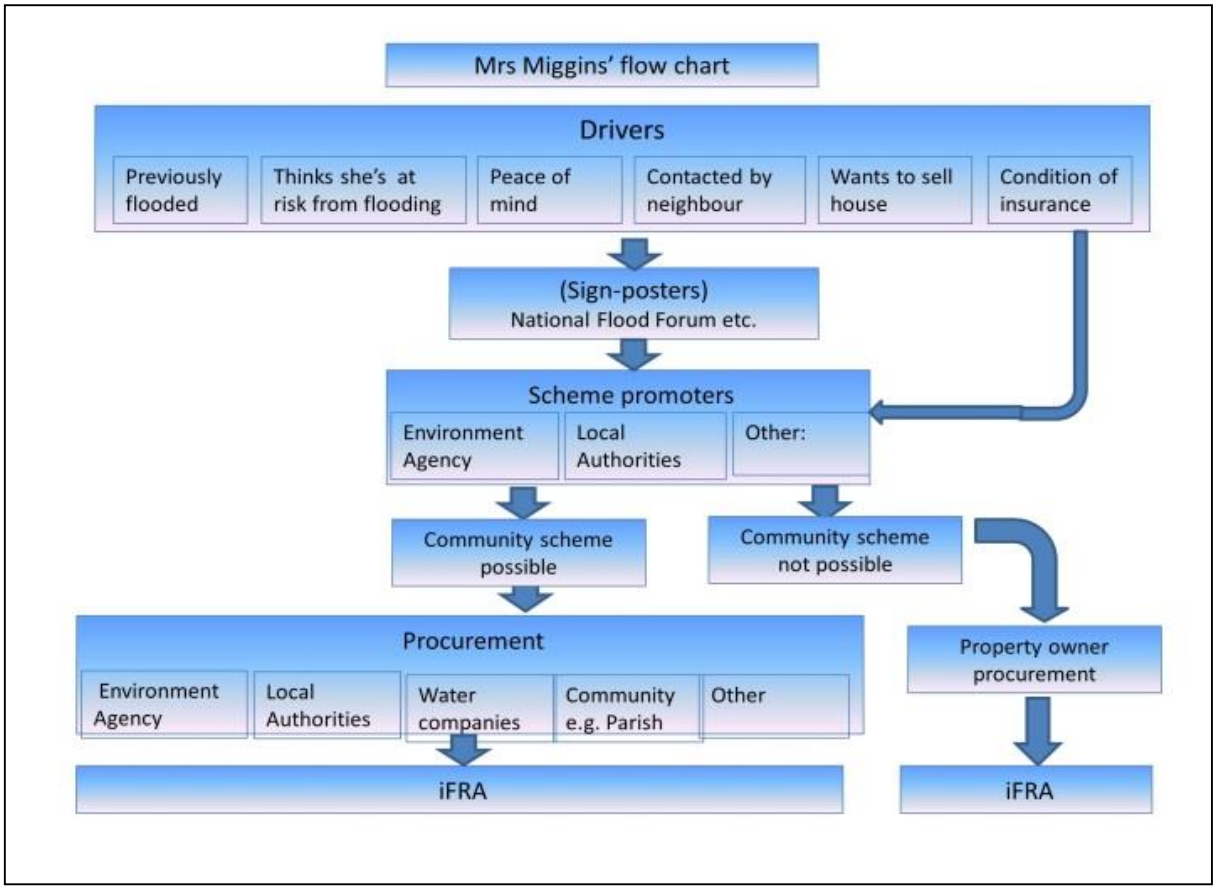


Figure 6-3: Flow chart showing drivers and procurement routes for an iFRA.

Long-term investment plans of both LAs and the EA are increasingly proposing PLP schemes funded by FDGiA and/or Local Levy. Individual property owners may also adopt such measures driven perhaps by future FloodRe insurance requirements, as well as during post-flood repair and renovation works.

The key to successful buy-in and take-up of measures being proposed as part of a LA or EA PLP scheme is clear and effective engagement and community liaison. The role of the iFRA is increasingly to support the client in this process. Often this will commence with a public meeting at which current proposals and previous investigations must be clearly described. Once there is understanding and acceptance that a permanent flood defence scheme cannot be developed, residents are more likely to accept and sign-up to proposals to adopt PLP. This demands a clear statement around the lower standards of protection to be realised from PLP when compared to a far more costly flood alleviation scheme (such as storage or embankments); but that PLP nevertheless now offers affordable and effective options for property owners that can achieve far greater benefits than sandbags, or indeed nothing at all.

Scheme delivery

There are four distinct stages that are comprise a PLP installation or scheme, from initial conception to final post-installation care (Figure 3). It is important to recognise the length of time involved and the support required from an iFRAS throughout each stage.

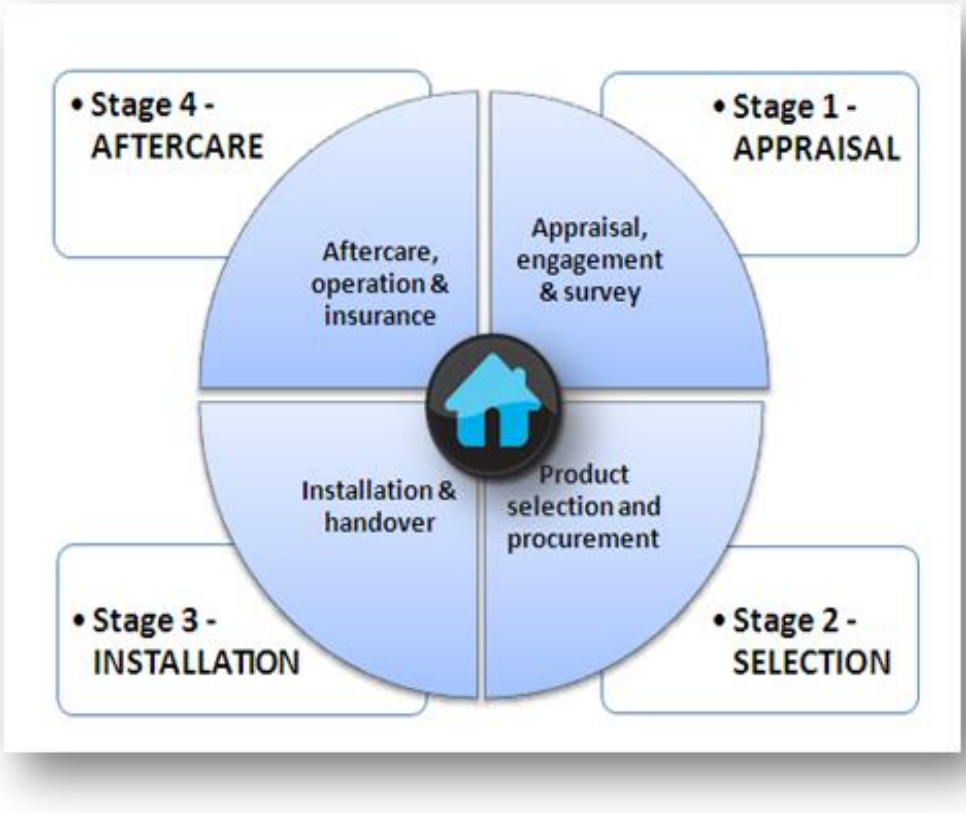


Figure 6-4: The four key stages for iFRA input to PLP

Most schemes require an iFRA input at each stage to support the client throughout the process and, as noted, above increasingly at an earlier feasibility review stage as well. However, it is Stages 1 and 4 that are typically where the iFRA takes a lead role. Stages 2 and 3 are where the client appoints the product supplier/installer and are where the iFRA steps back from this process. This emphasises why Defra and LA/EA Best Practice guidance identifies the distinction between *two surveys*: the initial and **independent flood risk assessor survey** and the subsequent **works inspection survey** by the appointed product supplier/installer.

Finding a certified iFRA

Once a local authority or the EA has identified the option for and/or has funding approved for a PLP scheme a decision has to be made whether to deliver this internally or by procuring consultant support. Current PLP surveyor procurement practice involves the

use of either the EA's "Flood Resistance Measures" framework for EA-led PLP schemes (either through Area teams of as part of a capital project via National Capital Programme Management Services (NCPMS); or local authorities using their own procurement arrangements. The first EA framework established in 2010 could not be used by other organisations but a replacement is currently being developed and the intention is for this to be accessible during 2015 for use by all Risk Management Authorities. This will greatly assist local authority procurement and serve to encourage a wider and more rapid take-up of PLP than otherwise seen to date.

It is considered likely the new EA framework will continue the "two lots" approach with the iFRA role in one lot and product supply and installation in the second, separate lot. As such it would be possible to factor in any new agreed accreditation arrangements that Defra and the EA chose to adopt, this is in line with the research findings and proposals are presented in the main Defra "Surveying for Flood Resilience in Individual Properties" report (March 2015). Moreover, a possible accreditation scheme for an independent flood risk assessor role will assist in the two delivery routes for an iFRA: in-house training needs can be identified and completed by local authorities and the EA as necessary in order to achieve accreditation; or contracted-in support could be procured from individuals or consultancy companies who have also attained this standard and procured as part of the overall scheme. In so doing, local authorities, the EA and others would have easier access to iFRAs and the added reassurance over competency and independence that have been lacking or hard to identify, until now.

Costs and liability issues

Affordability will remain an important consideration but iFRA style surveys are available currently for under £500 per property (and the R&RG reflects this cost as well). However an individual survey will cost significantly more than if a part of a coordinated community or neighbourhood scheme that realises efficiencies of scale. The costs that stakeholder have reported varied widely, depending on the type of house, the complexity of the issues and the type of provider. It was also indicated that they vary across the country too. This is even more of an issue with installation of products as responding for a single property is both inefficient and generally not viable.

Cost and quality criteria for determining the procurement of an iFRA will need an appropriate balance that reflects the serious consequences of poor workmanship: quality should not be sacrificed and should contribute more in an assessment than low costs. A range of cost/quality ratios and criteria exist as part of current procurement arrangements, with some emphasising quality (75%) while others prioritising cost (60%).

Liability

Evidence from current local authority and EA practice highlights the need for suppliers to hold high levels of insurance to cover this type of work: a pre-requisite for Public Liability Insurance of £2m and Employer's Liability Insurance of £10m is typical. Cost and quality

criteria for determining the procurement of an iFRA will need an appropriate balance that reflects the serious consequences of poor workmanship. Quality should not be sacrificed and should contribute more in an assessment than low costs.

Sources of Guidance

The PLP market has developed significantly in response to the Defra and Environment Agency (EA) grant schemes between 2009 and 2012. Reviews[1] and feedback from people involved in the schemes highlighted the importance of independent flood risk property surveys by competent professionals; yet there was confusion amongst stakeholders and residents over the survey process, particularly the differences between the 'Appraisal Survey' and the 'Suppliers Survey'.

Simultaneously, the EU-funded Smart Resilience Technologies, Systems and Tools (SMARTeST) project,[2] undertaken by the University of Manchester, Manchester Metropolitan University and the Building Research Establishment also delineated different types of survey, and highlighted the need for an independent flood risk assessment, based on feedback from a wide range of stakeholders. The SMARTeST project led to the property owner and local authority **Six Steps to Flood Resilience** guidance.[3] This sets out the various planning, design and delivery stages involved in establishing PLP as part of an overall community flood resilience strategy (See Figures 4 and 5).

Figure 6-5: The Six Steps to Property Level Flood Resilience

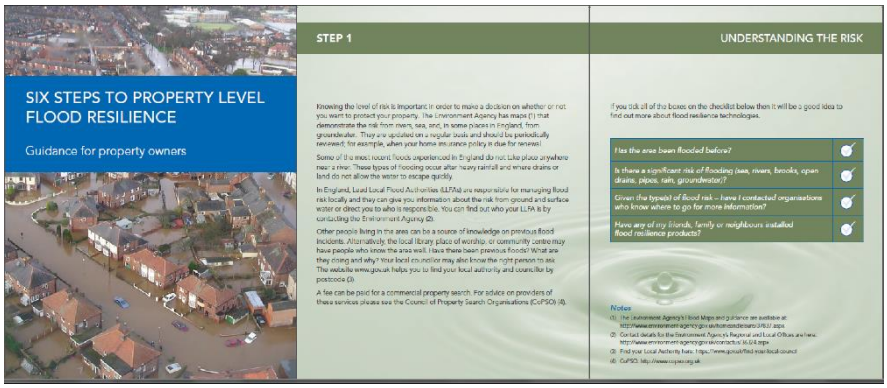


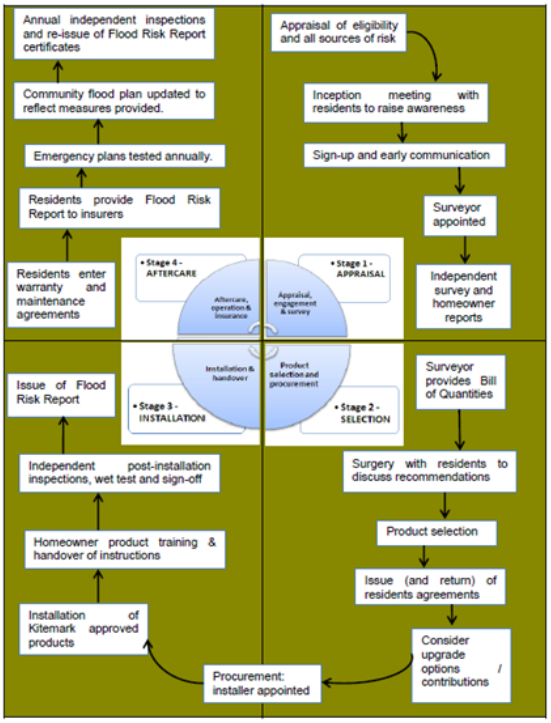
Figure 6-6: Sample pages from Six Steps to Property Level Flood Resilience

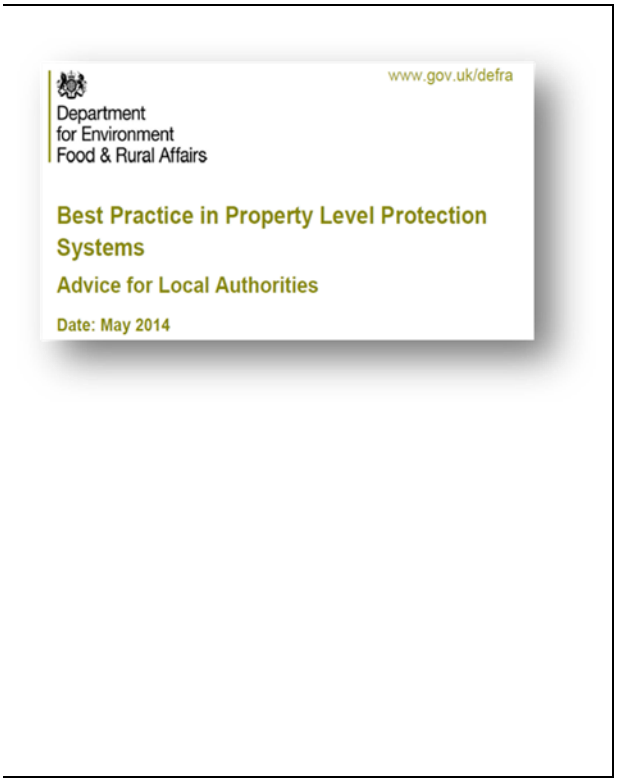
[1] http://nationalfloodforum.org.uk/wp-content/uploads/Evaluation-of-the-Defra-PL-Flood-protection-Scheme-25918.pdf

[2] www.floodresilience.eu

[3] www.smartfloodprotection.com

Extensive flooding witnessed during 2012 provided the first real tests of both the PLP measures and property owner emergency plans. An evaluation was undertaken, on behalf of Defra to assess performance and learning points, informing the production of a **Best Practice guide published by Defra in May 2014**.[4] The best practice drew on a range of stakeholders involved in the planning, delivery and operation of PLP schemes in order to gather evidence of how PLP performed during the 2012 floods. The responses indicated that where PLP measures were deployed and actually required during a flood, measures performed as intended and successfully mitigated against the effects of flooding in 84% of properties. This also highlighted additional learning points and issues relating to the products, their installation, operation, maintenance and storage; and in some instances the expectations, awareness and understanding of the residents involved. Problems were examined in more detail and recommendations made to share best practice through simple step-by-step guidance (See Figures 4 and 5).





Figures 6-7: 'Best Practice in Property Level Protection Systems (May 2014).

Much of the best practice has been brought together on the National Flood Forum's website. The **Property Protection Advisor** tool has also been developed for Defra, and is hosted on the National Flood Forum website.[5] The advisor provides residents with a report indicating the estimated cost of PLP measures for their property, either on an individual

[4] http://nationalfloodforum.org.uk/wp-content/uploads/20140519-PLP-Advice-for-Local-Authorities.pdf

[5] http://nationalfloodforum.org.uk/?page_id=1275

basis, or as part of a community scheme. It also serves to raise awareness of PLP and provide information on the variety of products available.

Further sources of information

The Environment Agency's e-learning module on property level protection gives advice on roles and responsibilities, suppliers and products, and case studies of some schemes.

The European Union-funded SMARTeST project technical site looks at different methods of dealing with flood risk, provides details of some of the latest technologies and how they have been tested, along with models to support effective decision making on flood risk and resilience measures. The National Flood Forum's Blue Pages Guide to FRe Products and Manufacturers. The Flood Protection Association also has links to products and manufacturers.

For resilient construction methods in new build developments, refer to Communities and Local Government (CLG) (2007) Improving the Flood Performance of New Buildings, the Building Research Establishment (2012) Flood Resilient Construction, or the work from the Long-Term Initiatives for Flood Events (Life) project (2009). Please also note that, in accordance with UK Government guidance, the tools and technologies referred to in this document should not be used to permit developments in flood risk areas (CLG 2012).