

# Selecting and reviewing Flood Risk Areas for local sources of flooding

## Guidance to Lead Local Flood Authorities

Flood Risk Regulations 2009

*This guidance is out of date and has been withdrawn.  
Contact the Environment Agency  
if you need information on flood risk planning.*

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## Introduction

- 1.1 This guidance is about the criteria for assessing whether the risk of flooding is significant, as required by regulation 14 of the Flood Risk Regulations 2009<sup>1</sup> (the Regulations). It describes the methodology for identifying and reviewing areas of significant flood risk, known as Flood Risk Areas under the Regulations, and how it was developed. Flood Risk Areas are where it is appropriate to prepare flood hazard and risk maps and flood risk management plans compliant with the Regulations. In determining the criteria, the consequences of flooding to people are considered the most important.

### **Scope of this Guidance**

- 1.2 This guidance is for Lead Local Flood Authorities (LLFAs) as defined in the Regulations. The guidance should be read in conjunction with the Environment Agency guidance that explains in practical terms how to apply the methodology. That guidance is available at <http://publications.environment-agency.gov.uk/pdf/GEHO1210BTGH-e-e.pdf>
- 1.3 This guidance only applies to assessing whether the risk of flooding is significant from any source of flooding except from the sea, main rivers and large raised reservoirs (e.g. local flood risks) and including any effect these have on another source.

### **The Floods Directive and Flood Risk Regulations 2009**

- \*4 The Floods Directive<sup>2</sup> was developed in response to serious pan European floods to enable a common understanding and coordinated management of flood risk. Its main requirements are for Member States to prepare a Preliminary Flood Risk Assessment (PFRA) of flooding from

<sup>1</sup> Statutory Instrument 2009 No. 3042 | Environmental Protection | The Flood Risk Regulations 2009

<sup>2</sup> Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

all sources, and then to use this evidence base to identify areas of significant flood risk (Flood Risk Areas). Flood hazard maps and flood risk maps must then be prepared for these areas to further investigate the risk of flooding. Finally, flood risk management plans must be developed for these areas with the objective of reducing the probability and/or consequences of flooding. The results of the PFRA and any flood hazard and flood risk maps and flood risk management plans prepared under the Regulations must be reported to the European Commission.

- 1.5 In England and Wales the Directive was transposed into law by the Regulations. These require the Environment Agency to assess, map and plan for flood risk from the sea, main rivers and large raised reservoirs<sup>3</sup> and Lead Local Flood Authorities (LLFAs), for all other sources of flooding including where the two intersect.
- 1.6 The timetable for preparing assessments, maps and plans is driven by the Floods Directive and includes a 6-month review, collation and reporting process by the Environment Agency to ensure national consistency and is set out in Table 1 (overleaf). LLFAs must therefore submit their assessments, including identification of Flood Risk Areas, to the Environment Agency by 22 June 2011. Maps must be submitted by 22 June 2013 and plans by 22 June 2015. The Environment Agency will then publish each product by 22 December in the year it is due. Immediately after the plans are completed the second cycle begins, starting with a review of preliminary assessments by 2017.

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<sup>3</sup> The Regulations make the Environment Agency responsible for all reservoirs but the policy intention was for the Environment Agency to be responsible for large raised reservoirs and Lead Local Flood Authorities for smaller reservoirs. The Environment Agency has agreed to adopt the policy intention and the legislation will be amended in due course to reflect this. In the meantime there is no need for LLFAs to assess flood risk from smaller reservoirs as this is judged to be significantly below the threshold for identifying Flood Risk Areas.

**Table 1. Flood Risk Regulations 2009 Timetable (for local flood risk sources)**

Stage	Lead	Deadline
<b>First cycle</b>		
<b>PFRA preliminary assessment report completed and Flood Risk Areas determined</b>	LLFA	22 June 2011
PFRA preliminary assessment report and Flood Risk Areas reviewed and finalised	EA	22 December 2011
PFRA preliminary assessment report and Flood Risk Areas published	EA	22 December 2011
<b>Flood risk maps and flood hazard maps</b>	LLFA	22 June 2013
Flood risk maps and flood hazard maps reviewed	EA	22 December 2013
Flood risk maps and flood hazard maps published	EA	22 December 2013
<b>Flood risk management plans</b>	LLFA	22 June 2015
Plans reviewed	EA	22 December 2015
Plans published	EA	22 December 2015
<b>Second cycle</b>		
<b>First review PFRA is updated or revised</b>	LLFA	22 June 2017
PFRA review	EA	22 December 2017

## Identifying Flood Risk Areas

1.7 Regulations 13 and 14 of the Regulations require the Environment Agency and LLFAs respectively to determine whether and where there is a Flood Risk Area. LLFAs are only required to do this in relation to local flood risks and areas where the different sources of flooding interact.

1.8 In order to help LLFAs with their determinations, the Environment Agency has provided a set of 'indicative' Flood Risk Areas based on

national data-sets. Paragraph 2.12 describes how indicative Flood Risk Areas were selected.

- 1.9 LLFAs must review the indicative areas drawing on local flood risk information in their preliminary assessment report to determine their proposed Flood Risk Areas which they must submit to the Environment Agency by 22 June 2011. Annex D describes in detail the method adopted for defining indicative Flood Risk Areas.

### Review and publication

- 1.10 After LLFAs have submitted their proposed Flood Risk Areas to the Environment Agency a review process will begin. This review, led by the Environment Agency, will aim to ensure that the national method for identifying Flood Risk Areas has been applied appropriately and consistently by LLFAs across England and Wales.
- 1.11 Should the review panel dispute a LLFA's Flood Risk Area determination it may recommend that the LLFA identifies a different Flood Risk Area, an additional Flood Risk Area or that no Flood Risk Area exists. If the LLFA disagrees with such a recommendation, the matter will be referred to the Minister<sup>4</sup> who will determine the Flood Risk Area for which the LLFA must prepare maps and plans.
- 1.12 The Environment Agency will publish all preliminary assessment reports and Flood Risk Areas by 22 December 2011 before making them available to the European Commission.

### How the Regulations work with the Flood and Water Management Act

- 1.13 The requirements of the Regulations and the Flood and Water Management Act 2010 (the Act) are complementary. The functions of the Environment Agency and LLFAs to implement the Regulations are defined as Flood Risk Management Functions under the Act.
- 1.14 The PFRA stage of the Regulations will provide a flood risk assessment for the local flood risk strategy in the Act. In Flood Risk Areas (when agreed), Hazard and Risk Maps and Flood Risk Management plans (under the Regulations) will provide detailed

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<sup>4</sup> Reference to the Minister means the Secretary of State in England or the Welsh Minister in Wales.

## Introduction

information which will inform the local flood risk strategy (a requirement of the Act). In all other areas LLFAs will be able to choose the management approach they feel is most appropriate for the area. This could include some form of risk mapping and development of Surface Water Management Plans or simple local maintenance plans which will also form part of and inform the local strategy. LLFAs are encouraged to consider the full range of local flood risk across their area in addition to any areas identified as “significant risk” for the purposes of the Regulations and may choose to categorise these (for example as low/medium/high risk) depending on their local priorities.

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## 2. Flood Risk Areas method

### **Context and Resource Implications**

- 2.1 Flood risk must be managed strategically, efficiently and sustainably. In order to achieve this at the national level a comprehensive assessment of flood risk from all sources is required. The identification of Flood Risk Areas under the Regulations forms part of this assessment. Other work such as local and national strategies will also inform this national assessment of risk.
- 2.2 The future allocation of resources to manage flood risk will take into account all assessments of flood risk including local and national strategies. Funding will primarily be related to the total risk within a LLFA area and not be limited to Flood Risk Areas identified under the Regulations. A LLFA that identifies a number of additional Flood Risk Areas will not necessarily receive additional funding for these. For consistency and affordability it is important that only the most significant Flood Risk Areas are chosen. As stated in 1.14 above, LLFAs should consider alternative means and timescales to manage areas susceptible to local flood risk where it is not appropriate to prepare detailed flood hazard/risk mapping or flood risk management plans as set out in the Regulations. Such approaches can be set out and addressed through the local flood risk management strategies.

### **Key Principles**

- 2.3 Defra and the Welsh Assembly Government engaged key stakeholders during August and September 2010 to seek their views on a set of proposed principles for determining Flood Risk Areas. Common consensus supported the following approach.
- 2.4 In particular there was strong agreement that, for the first cycle of the Regulations, the selection of Flood Risk Areas should focus on areas with the highest levels of flood risk. For the purposes of the PFRA process a probability of flooding in the order of a 1 in 100 chance in any given year should be used together with an assessment of the consequences resulting from this. Higher probability events (more frequent) that also affect many people might also be identified as equivalent areas of flood risk where good local evidence in the Preliminary Assessment Report confirms this.

## Box 2: Probability of flooding and rainfall events

Heavy rainfall events do not always result in flooding. Identification of indicative Flood Risk Areas used a rainfall event with a chance of 1 in 200 in any year. If the chance of a rainfall event in any year is 1 in 200, then in any location the chance of a flood occurring is about 1 in 140 in any year. Therefore in approximate terms the flood outline used in the analysis will be very similar to the outline of a flood with a chance of 1 in 100 in any year. This is comparable to other sources of flood risk information such as the 1 in 100 year flood outline shown on the Environment Agency's flood map for rivers and the sea.

2.5 The key principles for identifying Flood Risk Areas are therefore:

- Select only the highest risk areas for the first round given the time and cost implications and the need to test the benefits and methods being used;
- Use readily available or derivable information (a Directive requirement);
- Focus on forward looking assessments, but maintaining other information for future use;
- Consider risk from a rainfall event which is approximately comparable to a 1 in 100 chance of flooding in any year;
- Focus on assessing indicators of significant consequences particularly considering the impact on people from local flooding;
- Consider multiple sources of flooding and residual risk where possible, and  
Adopt consistent scales of assessment i.e. 1 km<sup>2</sup> grid squares.

2.6 Paragraph 1.14 describes how LLFAs may wish to categorise and manage risk in other areas (outside of Flood Risk Areas).

## National Indicators and Thresholds

2.7 This section describes the indicators and thresholds to be used in determining and reviewing Flood Risk Areas.

2.8 The Floods Directive and the Regulations require an assessment of potential consequence for human health, economic activity and the environment including cultural heritage, so separate groups of indicators and thresholds have been selected for each of these consequences.

- 2.9 The indicators are a list of receptors whose loss, temporary or permanent, as a result of flooding from local sources of flood risk would cause significant adverse effects. Where the impact on an indicator can be derived from national data, the Environment Agency may have used this to inform its selection of indicative Flood Risk Areas. Similarly where such information is only available locally it will be for LLFAs to consider whether to use this information and, as a result, whether it agrees with or wishes to vary the indicative Flood Risk Area.
- 2.10 Table 2, overleaf sets out the indicators and thresholds that have been used to determine the indicative Flood Risk Areas and that should be used by LLFAs when they review these and when determining where there is a significant flood risk in their area.

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## Flood Risk Areas method

**Table 2. Indicators and threshold values to determine Flood Risk Areas**

Area designation	Indicators	Threshold	Assessed Nationally or Locally
<b>Human Health</b>			
Indicative Flood Risk Areas	<b>Number of people</b> (based on number of residential properties x 2.34)	Set at 30,000 (England), 5,000 (Wales) within a cluster where risk is most concentrated.	Nationally
	<b>Critical services</b> (including schools, hospitals, nursing homes, power and water services)	“Nominal threshold” 150 (England) 25 (Wales) although number of people is the deciding threshold for indicative Flood Risk Areas.	Nationally
LLFA proposed new or expanded Flood Risk Areas	<b>Number of people</b> (based on number of residential properties x 2.34)	New Flood Risk Areas could be identified on the basis of being at equivalent risk to the indicative Flood Risk Areas. Annex A describes criteria which may be used to determine this.	Locally
	<b>Critical services –</b> (including schools, hospitals, nursing homes, power and water services)	Locally held information might provide a more accurate assessment of the number of people who depend on specific critical services. Although new Flood Risk Areas are unlikely to be identified on the basis of critical services alone, local information might suggest that a Flood Risk Areas might be expanded. Annex A provides more information on the assessment of critical services.	Locally
<b>Economic activity</b>			
Indicative Flood Risk Areas	<b>Non-residential properties</b> (including shops and businesses).	“Nominal threshold” of 3,000 (England) 500 (Wales) although number of people is the deciding threshold for indicative Flood Risk Areas.	Nationally
LLFA proposed new or expanded Flood Risk Areas	<b>Non-residential properties</b> (including shops and businesses).	Areas could be identified on the basis of being at equivalent risk to the indicative Flood Risk Areas. Generally business properties represent less than 2% of total properties in Flood Risk Areas so it is unlikely that additional non-residential properties alone will lead to new Flood Risk Areas.	Locally
	<b>Agricultural land</b> (e.g. area of land (hectares) based on agricultural grade)	Consequences of flooding to agricultural land from local flood risks are unlikely to identify new Flood Risk Areas but may contribute to Flood Risk Areas selected on other indicators. Annex B indicates factors to consider.	Locally

	<b>Roads and rail</b>  (length in km)	Consequences from local sources of flood risk to roads and rail are unlikely to lead to new Flood Risk Areas being identified, but may contribute to Flood Risk Areas which are identified on the basis of other indicators. Annex B indicates factors to consider.	Locally
<b>Environment</b>			
LLFA Proposed new or expanded Flood Risk Areas.	<b>Area of internationally or nationally designated site,</b> (e.g. Special Areas of Conservation; Special Protection Areas; Ramsar sites or Sites of Special Scientific Interest	Consequences of flooding could be positive or negative; some habitats depend on seasonal flooding, although prolonged or unusually extensive flooding might damage habitats. Flooding by polluted/contaminated water might increase damage. Further information on factors to consider is set out in Annex C.	Locally
	<b>Number of nationally / internationally important heritage features.</b> - World heritage sites - Scheduled monuments (SMs) - Listed buildings - Registered parks and gardens	LLFAs should consider the potential consequences of flooding specific to each site. Further information on factors to consider is set out in Annex C.	Locally

## How to apply the method

2.11 Guidance provided by the Environment Agency explains the practical application of the method by LLFAs to determine Flood Risk Areas. This section provides an overview to that process and explains how the Environment Agency has identified indicative Flood Risk Areas for LLFAs to review.

2.12 The indicative areas were identified by drawing on national flood risk information to identify 1 kilometre grid squares where “local flood risk is an issue”. Where many grid squares are close together (clustered) and the risk is most concentrated, these clusters are identified as indicative

Flood Risk Areas. The indicative Flood Risk Areas are meaningful areas in which the magnitude of the flood risk in a national context justifies further investigation through maps and management in plans as required by the Regulations and the results reported to the European Commission. A more detailed description of the method used to derive the indicative Flood Risk Areas is included in Annex D.

- 2.13 The Environment Agency will issue indicative Flood Risk Areas directly to LLFAs. LLFAs should draw on the local flood risk information in their preliminary assessment report to review these areas and determine whether they agree with or wish to amend them. In doing so they should work through the table of indicators and thresholds (table 2) and the annexes to determine whether locally held data suggests that the Flood Risk Area is appropriate or should be modified.
- 2.14 Flood Risk Areas will only be identified where there is relevant information to support this in the Preliminary Assessment Report. If relevant information is not available a Flood Risk Area should not be identified. More information is likely to be available for future cycles.

### **Possible reasons for amending Flood Risk Areas**

- 2.15 The selection of indicative Flood Risk Areas is based on the Environment Agency's surface water maps (Flood Map for Surface Water and Areas Susceptible to Surface Water Flooding). LLFAs are more likely to use other locally derived information than the surface water maps as evidence for any proposed variation to Flood Risk Areas.
- 2.16 LLFAs may wish to modify the indicative Flood Risk Area as a result of the following issues:-

- Geography – the juxtaposition of administrative boundaries to Flood Risk Areas might suggest a minor boundary change or merging or splitting a Flood Risk Area;
- Past/historic flooding – a Flood Risk Area might be expanded or, exceptionally, a new area identified due to local information on more frequent flooding (see equivalent flood risk areas below). Indicative Flood Risk Areas show where receptors are impacted by flooding, however the final Flood Risk Areas should be meaningful areas to map and plan and represent the whole area within which flood risk will be managed at the flood risk management plan stage;



- Future flooding – a Flood Risk Area might be expanded or a new one proposed where a particular local vulnerability is identified, e.g. a designated site or additional flood sources or those combined with other sources indicate a new significant risk area. Local studies might also provide better information than the Flood Map for Surface Water in which case a Flood Risk Area might be contracted or deleted.

### Equivalent Flood Risk Areas

- 2.17 Some LLFAs may have areas that are susceptible to more frequent, less extensive flooding which can nonetheless over a period of time experience significant flood damages. Whilst such areas may not be identified by the methodology for identifying indicative Flood Risk Areas, LLFAs may identify where such conditions exist within their preliminary assessment reports. Annex A1 describes criteria which can be used to identify equivalent flood risks as a result of more frequent flooding.
- 2.18 The cost of preparing hazard maps and flood risk management plans to Directive specifications for such areas might be disproportionate to the potential benefits to accrue. So LLFAs should consider alternative means for addressing more frequent flooding at a local level in local strategies as already described in paragraph 1.14.

### Flood risk from canals

- 2.19 Based on available or readily derivable information, the risk of flooding from canals is considered to be low. Such flooding may occur from embankment failure which can be unrelated to a rainfall event. British Waterways is conducting research into the probability of failure but based on its historical record, the risk of flooding is considerably below the threshold for identifying Flood Risk Areas. So the presence of a canal should not in itself lead an LLFA to extend or identify a new Flood Risk Area.

### Cross border areas

- 2.20 The Floods Directive requires coordinated flood risk management plans for rivers that cross international boundaries. Although not strictly an international boundary, similar provisions have been applied in the Flood Risk (Cross Border Areas) Regulations 2010 to the catchments within the Solway Tweed and Northumbrian river basin district that lie on the border between England and Scotland. A cross-border advisory group will be set up to ensure that assessments, maps and plans are co-ordinated in this area.

## 3. Maps, Plans and Future Reviews

- 3.1 Following the completion of preliminary assessment reports and identification of Flood Risk Areas, LLFA will be required to prepare maps and plans of all Flood Risk Areas. Flood hazard maps and flood risk maps are required by 22 June 2013 and flood risk management plans by 22 June 2015. In both cases the maps and plans should be submitted to the Environment Agency who will lead a review before publishing the final maps and plans by 22 December, that same year and then making them available to the European Commission within three months.

### **Box 2: Exemptions**

The Flood Risk Regulations 2009 allow LLFAs to exercise one of two exceptions regarding the preparation of preliminary flood risk assessments.

Under Regulation 33 if a LLFA has already completed an assessment of flood risk across its area before 22<sup>nd</sup> Dec 2010 and used that assessment to determine there is a significant flood risk, it need not complete a PFRA. Alternatively, under Regulation 34 a LLFA need not complete a PFRA where a decision is taken to complete flood risk maps, flood hazard maps and flood risk management plans for the whole of its area.

If you are considering applying either of these exceptions you should advise the EA by 22<sup>nd</sup> December 2010 and share any assessments with them. UK Government is required to notify any intention to use these exemptions and the data used to the European Commission under Article 15 of the Directive by 22 December 2011.

- 3.2 Guidance and supporting resources for preparing the maps and plans will be provided by the Environment Agency nearer the time.
- 3.3 In the next cycle of PFRA, the Directive requires more information to be available regarding flooding that occurs from now on, so data collection processes may need to be strengthened.



#### 4. ANNEXES (A-D) Other factors for LLFAs to consider for nominating new or expanded Flood Risk Areas

##### **Annex A - Further information on Factors for considering risks to human health**

More frequent flooding - criteria for equivalent risk to indicative flood risk areas

- A1 Indicative Flood Risk Areas are based on assessing the consequences of flooding as shown on the Flood Map for Surface Water rainfall event with a 1 in 200 chance of occurring in any year. However, users must note that this is the chance of rainfall and not of the resulting flood extent. For the purposes of this exercise, we can consider the chance of the flood extent used to be "in the order of" 1 in 100 in any year.
- A2 New Flood Risk Areas could be identified on the basis of equivalent risk where flooding of a smaller number of people in a community at a greater frequency would be comparable. In addition to people at risk, evidence of equivalent risk to non residential and critical services would also need to be provided.
- A3 The following tables, 3a and 3b, can be used to estimate the number of people affected by successively more frequent events in comparison to those affected by a 1 in 200 year rainfall event shown on the Flood Map for Surface Water and required to demonstrate equivalent significant risk.

**Table 3. Estimated equivalent number of people at risk from more frequent flooding than a flood in the order of 1 in 100 annual probability.**

**Note:** Due to the differing population sizes, dispersion and topography of it has been necessary to set different significant risk to people thresholds. Therefore, table 3a below relates to England only and table 3b overleaf, to Wales only.

##### **3a - ENGLAND**

Number of flood events	Approximate chance of flooding in any year	% affected compared to flood with chance of 1 in 100 in any year	Equivalent significant risk to 30,000 people
2 or more in the last 20 years	In the order of: 1 in 10 – 1 in 20	25%?	7500
2 or more in the last 50 years	In the order of: 1 in 20 – 1 in 50	80%	24,000
2 or more in the last 100 years	In the order of: 1 in 100	100%	30,000

**Table 3b - WALES**

Number of flood events	Approximate chance of flooding in any year	% affected compared to flood with chance of 1 in 100 in any year	Equivalent significant risk to 5,000 people
2 or more in the last 20 years	In the order of: 1 in 10 – 1 in 20	25%?	1,250
2 or more in the last 50 years	In the order of: 1 in 20 – 1 in 50	80%	4,000
2 or more in the last 100 years	In the order of: 1 in 100	100%	5,000

- A4 The tables above are based on information provided in the “Multicoloured Manual” (The Benefits of Flood and Coastal Risk Management: A Manual of Assessment Techniques (Flood Hazard Research Centre, 2006) S4.5.2).
- A5 The minimum frequency of rainfall event that should be considered in making an equivalent comparison is a flood with a chance of 1 in 10 in any year.
- A6 In areas where risk is less concentrated the causes of flooding may be less complex and solutions more easily identified. Approaches to managing flood risk should be proportionate and cost effective. Requirements of the Regulations such as hazard and risk mapping and flood risk management plans may not be proportionate or appropriate approaches for management of the risk. If these approaches are not a proportionate approach, the risk is unlikely to be significant for the purposes of the Regulations.
- A7 LFAAs will be considering all areas where flood risk is an issue within their local strategy as described in section 1.14 and will be able to identify and prioritise management approaches to suite local needs.

#### **More Vulnerable areas**

- A8 Some types of property may be more vulnerable to flood risk than others.
- Permanent Caravan sites – in general where each plot on such a site has an individual postal address allocated these will have been assessed as part of the national assessment.
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- Temporary caravan sites – temporary caravans located in for instance steep flood plains could expose people to more hazardous conditions than permanent dwellings. Caravans are likely to float in flood water. Table 3 provides a starting point for assessing whether temporary caravan sites could be at equivalent risk to indicative Flood Risk Areas. Generally consequences from local sources of flood risk to temporary caravan sites are unlikely to lead to new Flood Risk Areas being identified. Temporary caravans are better not placed in areas where there is flood risk. Requirements of the Regulations such as hazard and risk mapping and flood risk management plans may not be proportionate or appropriate approaches for management of such risks. Flood risk can be addressed in local strategies as described in Section 11.14.
- Temporary event areas – flood risks in areas where large numbers of people can gather for temporary events such as agricultural shows or music festivals should be managed before the events take place through appropriate risk assessments and contingency plans and risk avoidance measures. New Flood Risk Areas are unlikely to be identified on the basis of temporary event areas only.

#### **Critical Services (including critical infrastructure).**

- A9 Critical services include schools, hospitals, nursing homes, power and water services. New Flood Risk Areas are unlikely to be identified on the basis of critical services alone. Larger clusters of “areas where flood risk is an issue” broadly contain numbers of critical services in proportion to the number of people at flood risk in the area.
- A10 If critical services are more isolated a count of the number of people using or dependant on a school or hospital for instance may provide some assessment of equivalent risk. In general LLFAs are encouraged to address risk management needs for such critical services outside of Flood Risk Areas through their local strategy.
- A11 Critical infrastructure can include large power stations, water treatment works, as well as hospitals, schools or community centres designated as rest centres for use during civil emergencies. The owners and operators of critical infrastructure are responsible for identifying, assessing and managing the risks to their infrastructure and operations. Managing risks should consider a range of actions including arrangements for business continuity management to ensure essential services can be provided during times of crisis – whether natural hazards, accidents or security threats.
- A12 At the current time LLFAs may not have information on particular risks to some critical infrastructure and/or the consequences of loss or disruption of infrastructure. The Cabinet Office is developing proposals to enable information on critical infrastructure to be shared with emergency responders for the purposes of emergency planning. LLFAs are not required to assess flood risk for such critical infrastructure, or identify

locations of infrastructure as areas of significant flood risk, for the purposes of the Regulations. Local Resilience Fora may also be able to provide additional guidance.

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## Annex B – Economic Factors

### Agricultural areas - Factors to consider:

- B1 Scale of flooding from local flood risk.
- B2 Quality of agricultural land.
- B3 Vulnerability of land to local flood risk.
- B4 Existing flood risk management arrangements in place.
- B5 Agricultural land is already managed by land owners and managers taking into account local sources of flood risk. Historically land owners and managers have developed drainage systems for groundwater and minor watercourses to manage flood risk from these.
- B6 Agricultural land owners/managers are often in a position to manage local flood risk entirely within the boundaries of their land and do not require others to do this for them. Where drainage needs to be managed in a wider area, sophisticated or operative drainage systems have been developed and are managed by Internal Drainage Boards.
- B7 For these reasons flood risk from these local sources is unlikely to be significant. Specific requirements of the Regulations such as hazard and risk mapping and flood risk management plans are unlikely to be proportionate or appropriate approaches to management of local flood risks in agricultural areas for agricultural purposes.
- B8 Where agricultural land is directly contributing to flood risk in areas under other types of land use or could potentially provide flood risk management services to other areas it may be appropriate to extend Flood Risk Areas to include such areas.

### Roads and rail links - Factors to consider:

- B9 Scale of flooding
- B10 Importance of route i.e. local, regional (main roads) or national (motorways)
- B11 Consequences of flooding to roads and rail from local sources of flood risk are unlikely to be significant or lead to new Flood Risk Areas being identified, but may contribute to Flood Risk Areas which are identified on the basis of other indicators.

B12 Road and rail links should already be provided with drainage systems to deal with safety and structural concerns from most sources of local flood risk and the managers of the route should be consulted about the arrangements and effectiveness of their systems.

B13 Where a short stretch of the route is affected by local flood risk specific requirements of the Regulations such as hazard and risk mapping and flood risk management plans may not be proportionate or appropriate approaches for management of the risk. If these approaches are not a proportionate approach, the risk is unlikely to be significant from a national perspective for the purposes of the Regulations. Local strategies could include co-ordination with route managers to ensure that they have suitable arrangements in place for managing local flood risk and that risk is not significant.

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## Annex C– Environmental Factors

### Environmental designated sites - Factors to consider:

- C1 Are the sites vulnerable to flooding from local flood risk? Consideration needs to be given to two factors:
- C2 whether habitats and species are tolerant to flooding; and
- C3 whether habitats and species are tolerant to the effects of diffuse pollution (surface runoff water originating from urban areas is likely to have some degree of contamination).
- C4 Already identified Flood Risk Areas might contain designated sites. Where this is the case, the environmental consequences should be identified.
- C5 Consider the scale and consequences of local flood risk to a site in comparison to the criteria for significant risk established for human health and the economy.
- C6 Consideration should take into account the proportionality of the requirements of the Regulations for flood hazard and risk mapping and flood risk management plans and the suitability of these for managing the level of local flood risk. If these approaches are not a proportionate approach, the risk may not be significant from a national perspective for the purposes of the Regulations.

### Heritage sites - Factors to consider:

- C7 Are the heritage assets vulnerable to flooding? Is flooding likely to cause significant damage to the heritage asset?
- C8 Are the heritage assets vulnerable to accelerated erosion during or as a result of a flood event?
- C9 Is flooding likely to have an impact upon a particularly significant element of a heritage asset?
- C10 Is flooding likely to damage a historic planting scheme that forms an integral part of a Registered Park and Garden, or an area included in the Register of Landscapes of Historic Interest in Wales?
- C11 Listed and scheduled monument bridges are particularly vulnerable to damage during flood events. Are assets of this type affected?
- C12 Consequences to heritage assets are unlikely to identify new Flood Risk Areas, however they might contribute to Flood Risk Areas which are defined on the basis of other indicators.

### **Pollution** - Factors to consider:

- C13 Are there any Integrated Pollution Prevention and Control (IPPC) sites or COMAH sites affected by local sources of flooding (which could result in contaminated water)?
- C14 Environmental consequences might lead to LLFAs identifying new Flood Risk Areas. LLFAs must be satisfied and present convincing evidence that the consequences of flooding are likely to be significant from a national perspective.

This guidance is out of date and has been withdrawn.  
Contact the Environment Agency  
if you need information on flood risk planning.



## Annex D – Developing the methodology for identifying Flood Risk Areas

### Indicative Flood Risk Areas

- D1 To assist LLFAs in determining Flood Risk Areas the Environment Agency has produced indicative Flood Risk Areas based on an assessment of national information. 1km grid squares of 'places where flood risk is an issue' were identified wherever at least 200 people or 20 businesses or more than 1 critical service might be flooded to a depth of 0.3 metres by a rainfall event with a chance of 1 in 200 of occurring in any given year (equivalent to 'in the order of' 1 in 100 chance of flooding - see Box 1, section 2.2). This assessment was based on the new Flood Map for Surface Water and produced a map of England and Wales with blue shaded 1km squares.
- D2 In some areas these blue squares were densely packed together which represented a concentration of high consequences from flooding and a viable means to identify areas where flood risk could be significant. Several approaches were tried and tested to cluster and define a boundary for these areas of concentrated risk in a consistent way.
- D3 Initially a 10 km<sup>2</sup> grid was floated around the map to establish the percentage of blue squares it covered. Maps of clustered 10 km<sup>2</sup> grids were then produced for 20%, 25% and 30% blue square coverage. This approach picked up areas of concentrated risk although it also picked up more distributed blue squares around the boundaries, the clusters were large and not very well defined in some areas. A 5km and 3km grid was also tested to improve the resolution.
- D4 In some areas including Wales, "strings" of blue squares were noticeable but not being picked up by the 5km and 10km grids.
- D5 Finally a 3km grid was used centered on a blue square and with at least 3 or more blue squares touching it. This approach reflected the idea of clustering and coped well with different shaped areas.
- D6 In England the 3km grid with 55% coverage (5 of the 9 squares being blue) gave the best resolution and in Wales 45% (4 of the 9 squares being blue) coverage gave better resolution. 67% coverage (6 out of 9 squares) was also reviewed to see if clusters broke up or remained stable.

- D7 Using this approach for England 219 separate clusters were identified ranging from larger areas where many 3km grids overlaid to the smallest which were one or two 3km grids.
- D8 The number of people, critical services and non residential properties were then counted within the cluster boundary and ranked according to the risks.
- D9 A minimum population settlement size was then established so as to include only those potential Flood Risk Areas with significant numbers of people affected. In England a minimum value of 30,000 people was considered to be the most appropriate cut-off point. In Wales, taking account of the predominantly smaller settlements but the need to address flood risk in the south Wales valleys and other specific locations, a lower threshold of 5,000 people was selected.
- D10 The Environment Agency used the Flood Map for Surface Water as the primary source for developing indicative Flood Risk Areas. The Areas Susceptible to Surface Water Map was also used to verify the results and to include additional Flood Risk Areas in England where there are significant differences between the two maps.
- D11 The indicative Flood Risk Areas were also reviewed and amended to ensure they were logical. This involved splitting several Flood Risk Areas which had joined up across estuaries and dividing at administrative boundaries where this made no difference to the viability of the cluster.

This guidance is out of date and has been withdrawn.  
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if you need information on flood risk planning.