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Huntingdonshire IWMS Level 2 Strategic Flood Risk Assessment

Main Report

Final Report

Prepared for

Huntingdonshire District Council

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This report describes work commissioned by Huntingdonshire District Council by an instruction via email dated 21 July 2025. The Client's representative for the contract was Frances Schulz of Huntingdonshire District Council. Mike Williamson of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between 21 July 2025 and 6 November 2025 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate.

Acknowledgements

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Abbreviations

AEP	Annual Exceedance Probability
AW	Anglian Water
BGS	British Geological Survey
CC	Climate Change
CCC	Cambridgeshire County Council
EA	Environment Agency
FAA	Flood Alert Area
FMfP	Flood Map for Planning
FRA	Flood Risk Assessment
FWA	Flood Warning Area
GIS	Geographical Information System
HDC	Huntingdonshire District Council
LIDAR	Light Detection And Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
mAOD	metres Above Ordnance Datum
NaFRA2	National Flood Risk Assessment 2
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PPG	Planning Practice Guidance
RBD	River Basin District
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems

Definitions

1D model: One-dimensional hydraulic model, typically representing a watercourse and structures within the channel (for example bridges and culverts).

2D model: Two-dimensional hydraulic model, typically representing the floodplain flows.

Annual Exceedance Probability: The probability (expressed as a percentage) of a flood event occurring in any given year.

Brownfield: A previously developed parcel of land.

Climate change: Long term variations in global temperature and weather patterns caused by natural and human actions.

Design flood: A flood event of a given annual flood probability, which is generally taken as: fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or surface water flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), plus an appropriate allowance for climate change, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Dry island: Land which may not be at risk of flooding itself but is surrounded by flood risk and therefore may become cut off during a flood event.

Flood defence: Infrastructure used to protect an area against floods such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).

Green infrastructure: A network of natural environmental components and green spaces that intersperse and connect the urban centres, suburbs, and urban fringe.

Greenfield: An undeveloped parcel of land.

Lead Local Flood Authority: The unitary authority for the area or if there is no unitary authority, the county council for the area.

Local Planning Authority: The local government body which is responsible by law to exercise planning functions for a particular area.

Main river: A watercourse shown as such on the statutory main river map held by the Environment Agency. They are usually the larger rivers and streams. The Environment Agency has permissive powers (not duties) to carry out maintenance and improvement works on main rivers.

Major development: Defined in the National Planning Policy Framework as a housing development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more, or as a non-residential development with additional floorspace of 1,000m² or more, or a site of 1 hectare or more, or as otherwise provide in the Town and Country Planning (Development Management Procedure) (England) Order 2015 (gov.uk).

Natural Flood Management: Techniques that work with nature to reduce the risk of flooding for communities.

Ordinary watercourse: Any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows but which does not form part of a main river. The local authority or internal drainage board has permissive powers (not duties) on ordinary watercourses.

Permissive powers: Authorities have the power to undertake flood risk management activities, but not a duty to do so. This will depend on priorities in flood risk management.

Return period: An estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.

Riparian owner: A riparian landowner, in a water context, owns land or property, next to a river, stream or ditch.

Risk: In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

Risk Management Authority: The Environment Agency, Lead Local Flood Authorities, District and Borough Councils in an area where there is no unitary authority, Coast Protection Authorities in coastal areas, Water and sewerage companies, Internal Drainage Boards, and Highways authorities.

Standard of Protection (SoP): Defences are provided to reduce the risk of flooding (typically from a river, sea or surface water). A Standard of Protection is usually described in terms of an AEP flood event. For example, a flood embankment could be described as providing a 1% AEP Standard of Protection

Stakeholder: A person or organisation affected by the problem or solution or interested in the problem or solution. They can be individuals or organisations, includes the public and communities.

Sustainable Drainage Systems: Sustainable Drainage Systems are methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques, such as grates, gullies, and channels.

Windfall site: A site which becomes available for development unexpectedly and therefore not included as allocated land in a planning authority's local plan.

Executive Summary

Introduction and context

This Level 2 Strategic Flood Risk Assessment (SFRA) document was prepared with the purpose of providing part of the evidence base for the Local Plan for Huntingdonshire District Council (HDC). It follows on from HDC IWMS Level 1 SFRA produced in 2024 and should be read in conjunction.

The primary purpose of the Level 2 SFRA is to provide an appropriate understanding of the level of flood risk affecting development included in the updated Local Plan. The assessment considers all sources of flooding and considers other factors affecting flood risk such as residual risk. The information provided as part of the Level 2 SFRA enables HDC to apply the Exception Test to sites in accordance with the National Planning Policy Framework (NPPF).

SFRA objectives

The Government's Planning Practice Guidance (PPG) on Flood Risk and Coastal Change advocates a tiered approach to risk assessment involving Level 1 and Level 2 SFRAs.

After completing the Level 1 SFRA and the 'Call for Sites' process, HDC have undertaken the sequential test and have shortlisted sites which cannot be relocated outside of flood risk areas due to additional planning factors. The Level 2 assessment aims to build on identified risks from the Level 1 SFRA in order to provide a greater understanding of fluvial, surface water, groundwater, sewer, and reservoir related flooding risks to these shortlisted sites. From this, HDC and developers can make more informed decisions regarding future development. The Level 2 assessment also identifies sites requiring further risk analysis at the site-specific Flood Risk Assessment (FRA) stage.

Summary of Level 2 SFRA

76 sites were assessed in detail at the Level 2 SFRA stage. A further five sites were assessed as having 'nominal' risk of flooding. These sites underwent a brief assessment of flood risk, summarised in the nominal risk sites report.

Recommendations

Section 8 sets out the recommendations based on the findings of this Level 2 SFRA. This includes recommendations for applying the Exception Test, where required, requirements for developers in developing the Local Plan allocations, and guidance for windfall sites and development of sites not included within the Local Plan

1 Introduction

1.1 Purpose of the Strategic Flood Risk Assessment

Paragraph 171 of the National Planning Policy Framework (NPPF) (2024) (gov.uk) states that *'Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards*.'

1.2 Levels of SFRA

The Planning Practice Guidance (PPG) Flood risk and coastal change (gov.uk) advocates a staged approach to risk assessment and identifies two levels of a Strategic Flood Risk Assessment (SFRA):

- A Level 1 assessment, which all Local Planning Authorities (LPA) are required to undertake. Where potential site allocations are at low flood risk and where development pressures are low a Level 1 assessment is likely to be sufficient, without the LPA progressing to a more detailed Level 2 assessment. The Level 1 assessment should be of sufficient detail to enable application of the Sequential Test, to inform the allocation of development to areas of lower flood risk.
- A Level 2 assessment is required where land outside flood risk areas cannot appropriately accommodate all necessary development, creating the need to apply the NPPF's Exception Test, or if an LPA believe they may receive high numbers of applications in flood risk areas on sites not identified in the Local Plan. In these circumstances the assessment should consider the detailed nature of the flood characteristics within a flood zone and assessment of all sources of flooding.

This SFRA report fulfils the requirements for a Level 2 assessment of development sites identified for potential allocation within Huntingdonshire and has been prepared in accordance with the NPPF (2024) and PPG (2022).

This report should be read alongside the 2024 Level 1 SFRA and builds upon information presented within the Level 1 SFRA and the Level 1 SFRA Addendum.

1.3 SFRA objectives

The objectives of this Level 2 SFRA are to:

1. Provide individual flood risk analysis for site options using the latest available flood risk data, thereby assisting the Council in applying the Exception Test, where required, to their proposed site options in preparation of their Local Plan.

2. Using the available data, provide information and comprehensive mapping presenting flood risk from all sources for each site.
3. Provide recommendations for making sites safe throughout their lifetime.
4. Consider the most recent policy and legislation in the NPPF, PPG, Environment Agency (EA) SFRA Guidance, and Lead Local Flood Authority (LLFA) Sustainable Drainage Systems (SuDS) guidance.

1.4 Consultation

This SFRA has been prepared in consultation with the Environment Agency (EA), Cambridgeshire County Council (CCC) as the LLFA, and the Middle Level Commissioners. Peterborough City Council and Anglian Water were also invited to review and comment.

1.5 How to use this report

Table 1-1 below outlines the contents of this report and details how different users can apply this information.

Table 1-1: Outline of the contents of each section of this report.

Section	Contents	How to use
1. Introduction	Outlines the purpose and objectives of the Level 2 SFRA.	For general information and context.
2. Policy and strategy for flood risk management	Includes information on the implications of recent changes to planning and flood risk policies and legislation and signposts to relevant sections of the Level 1 SFRA.	Users should refer to this section and the relevant sections of the Level 1 SFRA for any relevant policy which may underpin strategic or site-specific assessments.
3. Sequential and Exception Tests	Signposts to relevant sections of the Level 1 SFRA for information on the Sequential and Exception Tests.	Users should refer to this section and the relevant sections of the Level 1 SFRA to understand and follow the steps required for applying the Sequential and Exception Tests.
4. Information used in the Level 2 SFRA	Summarises the data used in the Level 2 detailed site assessments and mapping.	Users should refer to this section in conjunction with the site assessments (Appendix B) to understand the data presented.
5. Level 2 Assessment Methodology	Summarises the sites taken forward to a Level 2 assessment and the outputs produced for each of these sites.	Users should refer to this section in conjunction with the Scoping Report (Appendix A) and the site assessment reports (Appendix B) to understand the data presented.

Section	Contents	How to use
6. Flood risk management requirements for developers	Identifies the scope of the assessments that must be submitted in Flood Risk Assessments (FRAs) supporting applications for new development. Refers to relevant sections in the Level 1 SFRA for mitigation guidance.	Developers should use this section alongside the relevant sections of the Level 1 SFRA to understand requirements for FRAs, which conditions/guidance documents should be followed, and information on flood mitigation options.
7. Surface water management and SuDS	Signposts to relevant sections of the Level 1 SFRA for information on the management of surface water including types of SuDS, SuDS policy and guidance, and SuDS constraints.	Developers should use this section alongside the relevant sections of the Level 1 SFRA to understand what national, regional, and local SuDS standards are applicable.
8. Summary of Level 2 assessment and recommendations	Summarises the results and conclusions of the Level 2 assessment, and signposts to the Level 1 SFRA for planning policy recommendations.	Developers and planners should use this section to see a summary of the Level 2 assessment and understand the key messages from the detailed site assessments. Developers should refer to the Level 1 SFRA recommendations when considering requirements for site-specific assessments.
Appendix A: Scoping Report	Summarises data and methodologies used in the Level 2 SFRA	Users should use this report to assess the methodologies used.
Appendix B: Site assessments (detailed and nominal)	Provides a detailed summary of flood risk for sites requiring a more detailed assessment, which considers flood risk, emergency planning, climate change, broadscale assessment of possible SuDS, exception test requirements, and requirements for site-specific FRAs.	Planners should use this appendix to inform the application of the sequential and exception tests, as relevant. Developers should use these assessments to understand flood risk, access and escape route requirements, climate change, SuDS, and FRA requirements for site-specific assessments.
Appendix C: Flood model data sources used in this SFRA	Summarises the GIS and model data used in the Level 2 detailed site assessments and mapping.	Users should refer to this appendix to understand the data used and where this data can be obtained, and the model data created and used.

1.6 SFRA study area

Huntingdonshire is situated in the southeast of England within the county of Cambridgeshire and covers an area of approximately 910km^2. Huntingdonshire is a predominantly rural area interspersed with numerous villages and hamlets, which retain their natural character. The main towns within the district include Huntingdon, Ramsey, St Ives and St Neots. The largest of these is St Neots, which is located to the south of the district. Other distinct settlements include, but are not limited to, Godmanchester and the villages of Brampton, Kimbolton, Somersham, Sawtry and Yaxley as well as the most recent development Alconbury Weald.

The district of Huntingdonshire is bounded by the unitary authorities of the City of Peterborough to the north, North Northamptonshire and Bedford to the west, and Central Bedfordshire to the south, and the districts of Fenland, East Cambridgeshire and South Cambridgeshire to the east. The east and west of the district is split by the A1 which runs north to south.

Huntingdonshire falls within the River Great Ouse catchment, which is linked to the Ouse Washes, which are designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site. The Ouse Valley dominates the landscape in the central and eastern parts of the district. The River Great Ouse enters Huntingdonshire from Bedford to the southeast and flows through the town of St Neots then flowing in a north easterly direction as it passes through the settlements of Huntingdon, Godmanchester, Wyton and St Ives before crossing the district boundary into South Cambridgeshire. Other notable main rivers include the River Nene, the River Kym and their tributaries.

The topography of the catchment is characterised by higher elevations in the west and south of the district in contrast to the flatter fen landscape to the north and west.

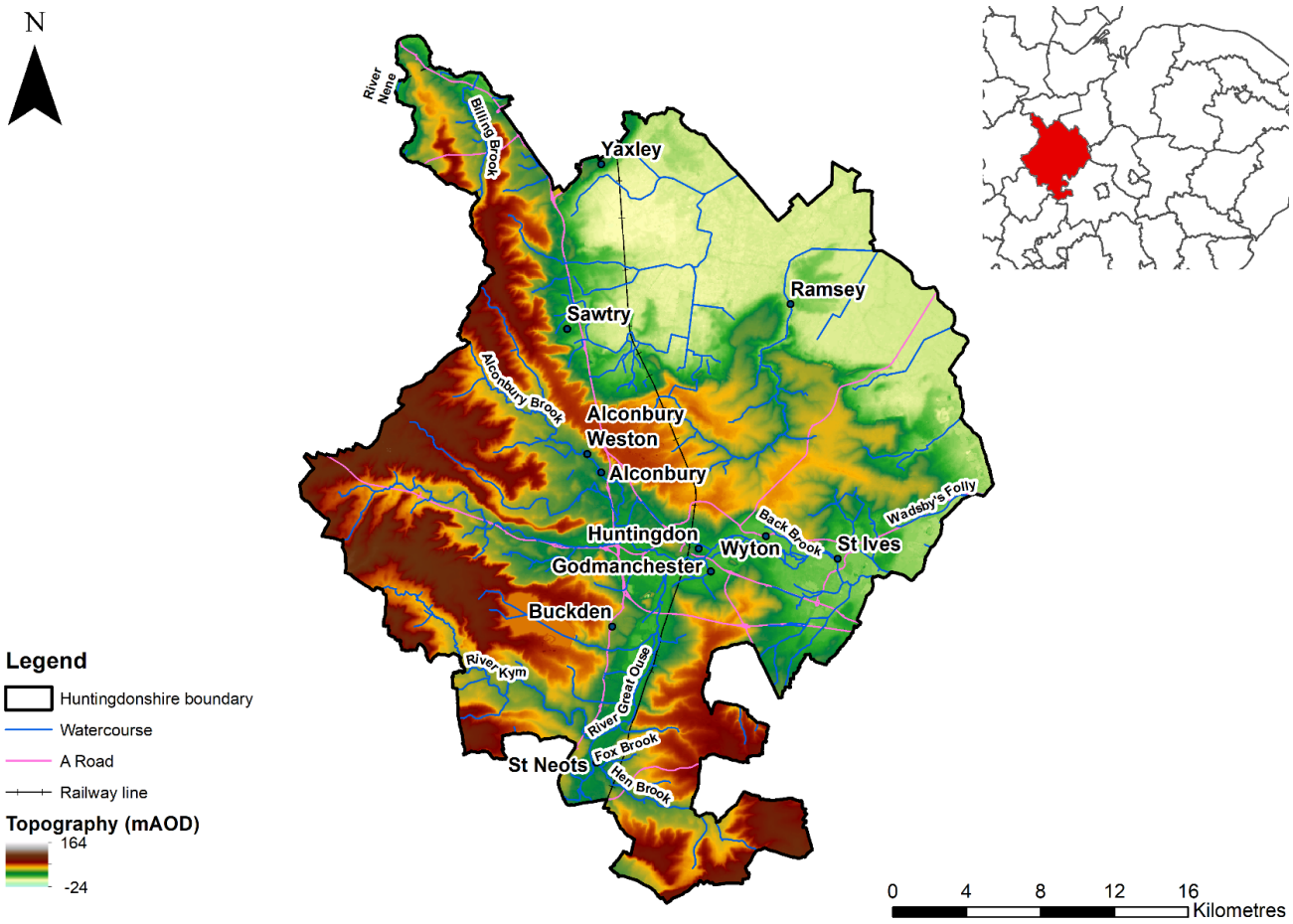

Figure 2-1 Topography and main rivers within Huntingdonshire

2 Policy and strategy for flood risk management

The flood risk management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within Appendix A of the Level 1 SFRA.

This contains details on:

- Key legislation for flood and water management.
- Key national, regional, and local policy documents and strategies.
- Roles and responsibilities for flood risk management in Huntingdonshire.

The following policy and information have changed since publication of the Level 1 SFRA in March 2024:

- The NPPF was revised in December 2024 in response to the proposed reforms to the planning system consultation.
- National Flood Risk Assessment 2 (NaFRA2) was released by the EA at various stages throughout 2025. This involved changes and updates to the Flood Map for Planning and the Risk of Flooding from Surface Water (RoFSW) national datasets.

This Level 2 SFRA accounts for the latest versions of the NPPF and NaFRA2 datasets.

There are several important studies relevant to the SFRA and local plan, namely:

- The Future Fens Flood Risk Management study (December 2020) which considers what the future flood risk management choices for the Great Ouse Fens might look like. This study is the first of three main phases to deliver future flood and drainage infrastructure that will provide flood resilience in and around the Fens. The Baseline Report presents the findings of the first phase in the programme, setting out the understanding of the situation and challenges for managing all sources of flood risk, with the overall aim to develop flood risk options for the area's long term flood risk management strategy.
- Cambridgeshire Flood and Water Supplementary Planning Document (SPD), adopted by HDC April 2017 (soon to be updated, at the time of writing). This SPD forms part of each of the Cambridgeshire LPAs suite of planning documents. This SPD has been developed by Cambridgeshire County Council in conjunction with LPAs within Cambridgeshire (including HDC), and other relevant stakeholders, to support the implementation of flood risk and water related policies in the Local Plans. It provides guidance on the implementation of flood and water related policies in each authority's respective local plan.
- The Fens 2100+ programme is a programme to develop a Fens-wide flood resilience investment strategy that achieves long-term value for money and generates regional and national benefits. It's being developed with, and for, Flood Risk Management Authorities so they can plan for the next 20-25 years of flood risk management. This investment strategy is due to be completed in 2025.

- Future Fens Integrated Adaptation (FFIA) is a project designed to secure the long term future of the Fens in the face of major climate challenges, from flooding and drought to biodiversity loss. Much of the region lies below 6m above sea level, relying on 17,000 flood management systems to stay dry. Climate change causes rainfall to fluctuate, leading to both floods and droughts, which strain water resources and impact agriculture and biodiversity. With a growing population and increasing climate pressures, securing long-term water supplies is a critical challenge that demands urgent action. The Fens are renowned for being particularly vulnerable to flooding and climate change due to their low altitude, with large areas lying below sea level.
- The Great Ouse Strategic Intervention Study (GO-SIS) is underway and will look to provide a strategic overview of future flood risks, considering other drivers such as growth, and give a spatial dimension to where different flood risk interventions (e.g. storage or conveyance) would be more effective, or less effective. This study could help to inform HDC on targeting areas that would benefit from safeguarding for future flood storage, or where Critical Drainage Areas would help influence storage, conveyance and tighter regulation, or surface water.

3 Sequential and Exception Tests

Information on planning policy for flood risk management is detailed in Chapter 5 and Appendix A of the Level 1 SFRA. Users should consider the information within the Level 1 SFRA to understand national planning policy guidance and how to evidence that a proposed development will pass the Sequential Test, and if necessary, the Exception Test.

The Level 1 SFRA also contains detail on:

- The NPPF and PPG;
- The risk-based approach; and
- The Sequential and Exception Tests.

4 Information used in the Level 2 SFRA

This section outlines the GIS datasets used in assessing the Local Plan proposed development sites in the Level 2 SFRA Appendix B. All data and information used was consulted on and agreed with the EA and LLFA at the scoping stage.

It should be noted that datasets used to inform this SFRA may be updated following the publication of this SFRA and new information on flood risk may be produced by RMAs. This new information (such as updated mapping and modelling) may supersede the information included in this SFRA. Guidance should be sought from the LPA, LLFA, and the EA, as appropriate to check the most up to date source of information is used for future flood risk assessment.

Appendix C provides an overview of the supplied GIS datasets used to inform the appraisal of flood risk for Huntingdonshire, including when the data was provided, the source of the data, and how the data can be obtained by a developer if applicable.

4.1 Historic flooding

Historic flooding was assessed using:

- Historic Flood Map (HFM) - EA
- Recorded Flood Outlines (RFO) - EA
- Sewer flood incident register - Anglian Water

It is important to note that the absence of historic flood records does not mean that an area has never flooded, only that records are not held. For previously undeveloped sites, it is likely that historic flooding incidents may have gone unreported due to a lack of site use or interest. In addition, it is also possible that flooding mechanisms may have changed since the date of a recorded flooding incident, making it more or less likely for flooding to occur on site.

4.2 River networks

Main Rivers are represented by the EA's Statutory Main River layer. Ordinary Watercourses are represented by the OS MasterMap Water Network layer. Caution should be taken when using these layers to identify culverted watercourses which may appear as straight lines but, in reality, are not.

4.3 Present day fluvial and tidal flooding

- EA NaFRA2 Flood Map for Planning:
  - River and Sea Flood Zone 3a
  - River and Sea Flood Zone 2
- Functional floodplain (Flood Zone 3b), based on EA Rivers and Sea 3.3% defended flood risk extent

- EA detailed flood model depths, velocities, and hazards:
  - Lower Ouse 2015 Alconbury Brook ISIS-TUFLOW model
  - Lower Ouse 2015 Downstream Lower Ouse ISIS-TUFLOW model
  - Lower Ouse 2015 Kym ISIS-TUFLOW model
  - Lower Ouse 2015 Non Main Rivers Hilton ISIS-TUFLOW model
  - Lower Ouse 2015 Non Main Rivers St. Ives ISIS-TUFLOW model
  - Lower Ouse 2015 Non Main Rivers St. Neots Small ISIS-TUFLOW model
  - Fenland Bury Brook 2016 ISIS-TUFLOW model

The model log in Appendix C lists the return periods available for use in the SFRA for each model.

4.4 Flood defences

Current flood defence information has been taken from the EA's Asset Information Management System (AIMS) Spatial Defences dataset. These datasets include all flood defences currently owned, managed or inspected by the EA and include information pertaining to their current condition and standard of protection.

4.5 Present day surface water flooding

- EA NaFRA2 RoFSW:
  - Low risk (0.1% AEP event) flood extent
  - Medium risk (1% AEP event) flood extent
  - High risk (3.3% AEP event) flood extent
- EA third generation RoFSW:
  - Low risk (0.1% AEP event) flood depths and hazards
  - Medium risk (1% AEP event) flood depths and hazards
  - High risk (3.3% AEP event) flood depths and hazards

4.6 Climate change

Climate change mapping is shown in the site reports (Appendix B) for fluvial, tidal, and surface water flooding using modelled outputs with the latest climate change uplifts where available.

4.6.1 Climate change allowances for peak flows

Climate change is expected to increase the peak flows of rivers, meaning that flows which were previously thought to be extreme will now be considered far more possible. Areas benefiting from flood defences will find the standard of protection changes over time with overtopping of defences more likely unless they are upgraded.

Peak river flow climate change allowances developed by the EA are divided into a series of Management Catchments. Huntingdonshire is covered by four Management Catchments, namely:

- Upper and Bedford Ouse
- Old Bedford and Middle Level
- Nene
- Cam and Ely Ouse

The relevant allowances for each Management Catchment are detailed in Tables 4-1, 4-2, 4-3, and 4-4.

Table 4-1: Peak river flow allowances for the Upper and Bedford Ouse Management Catchment

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	24	30	58
Higher Central	10	11	30
Central	5	4	19

Table 4-2: Peak river flow allowances for the Old Bedford and Middle Level Management Catchment

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	23	22	39
Higher Central	9	4	15
Central	3	-3	6

Table 4-3: Peak river flow allowances for the Nene Management Catchment

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	18	17	36
Higher Central	4	0	13
Central	-2	-7	4

Table 4-4: Peak river flow allowances for the Cam and Ely Ouse Management Catchment

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	21	22	45
Higher Central	7	5	19
Central	2	-2	9

4.6.1.1 SFRA modelling

The EA's SFRA guidance states that SFRAs should assess the central allowance for less, more, highly vulnerable, and water compatible development. The higher central allowance should be assessed for essential infrastructure. Therefore, for this SFRA, the central and higher central allowances for the 2080s have been modelled for the 3.3%, 1%, and 0.1%, where possible. Refer to Appendix C for details on the modelling.

4.6.1.2 EA Flood Map for Planning

For certain locations across Huntingdonshire, modelled information either wasn't available, or it was different to what was shown in the Flood Map for Planning for equivalent modelled flood event return periods. In instances where this is the case, the Flood Map for Planning climate change data was reviewed, based on the EA's New National Model from NaFRA2. These datasets included:

- River and Sea Plus Climate Change:
  - Flood Zones Plus Climate Change extent
  - Flood Zones Plus Climate Change Unavailable extent

Depth and hazard information is not available for the Flood Map for Planning at the time of writing.

4.6.2 Climate change allowances for peak rainfall

Climate change is predicted to result in wetter winters and increased summer storm intensity in the future. This increased rainfall intensity will affect land and urban drainage systems, resulting in surface water flooding, due to the increased volume of water entering the systems. Peak rainfall climate change allowances developed by the EA are divided into the same Management Catchments as peak river flows.

At the time of writing, the climate change data for the NaFRA2 RoFSW is not appropriate for use in SFRAs or planning, as stated by the EA. Therefore, the 0.1% AEP surface water extent should be used as an indication of the impact of climate change on surface water flood risk from smaller watercourses, which are too small to be covered by the EA's Flood Zones.

4.6.3 Climate change allowances for sea level rise

Increasing global temperatures are leading to ocean warming. This is resulting in sea level rise from two different mechanisms: as the oceans warm seawater expands and the melting of ice over land is resulting in further water adding to the oceans.

Huntingdonshire is located within the Anglian River Basin District (RBD). Table 4-5 shows the sea level rise allowances that apply.

Table 4-5: Sea level allowances for the Anglian RBD for each epoch in mm for each year (based on a 1981 to 2000 baseline). The total sea level rise for each epoch is in brackets.

Allowance category	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
Upper end	7 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.60
Higher central	5.8 (203)	8.7 (261)	11.6 (348)	13 (390)	1.20

The 2015 Downstream Lower Ouse model contains a tidal downstream boundary at Kings Lynn based on a 1 year tidal event sea level, including a storm surge component. This downstream boundary is located approximately 50km downstream of the model domain and is used for all design events up to the 1000 year (0.1% AEP) event. The impact of sea level rise on the downstream boundary was not accounted for in the 2015 modelling study. It was not within the scope of the SFRA to update the model to show the impact of sea level rise on the Downstream Lower Ouse.

For certain locations across Huntingdonshire, modelled information either wasn't available, or it was different to what was shown in the Flood Map for Planning for equivalent modelled flood event return periods. In instances where this is the case, the Flood Map for Planning climate change data was reviewed, based on the EA's New National Model from NaFRA2. These datasets included:

- River and Sea Plus Climate Change:
  - Flood Zones Plus Climate Change extent
  - Flood Zones Plus Climate Change Unavailable extent

The tidal sea level allowance used in the Flood Map for Planning Climate Change extent mapping is the Upper End allowance, accounting for cumulative sea level rise to 2125.

4.7 Groundwater flooding

The JBA Groundwater Emergence map has been used to assess potential areas that are likely to be at higher risk of groundwater flooding. The JBA Groundwater Emergence map, shows the likelihood of groundwater emergence posing a risk to both surface and subsurface assets, based on predicted groundwater levels during a 1% AEP event. Surface water mapping and topographic data is used to gain an understanding of the overland flow routes which may be impacted by this emergence.

4.7.1 Groundwater flooding and climate change

The impact of climate change is more uncertain for groundwater flooding associated with rivers and land catchments and those watercourses where groundwater has a large influence on winter flood flows. Changes in frequency and intensity of groundwater flooding due to climate change would depend on the flooding mechanism and geological characteristics.

Milder wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible, but warmer drier summers may counteract this effect by drawing down groundwater levels to a greater extent during the summer months.

4.8 Reservoir flooding

The risk of inundation as a result of a breach or failure of a number of reservoirs within the area has been identified from the EA's Reservoir Flood Extents dataset (gov.uk). Although it is predicted that there is a risk to life if these reservoirs were to fail, the risk of such an event occurring is very low.

This dataset consists of flood extents for two scenarios including 'Wet Day' and 'Dry Day', for all large, raised reservoirs. Flood extents are not included for smaller reservoirs or for reservoirs commissioned after the reservoir modelling programme began in October 2016. Furthermore, only those reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975.

4.9 Sewer flooding

Anglian Water (AW) is the water company responsible for the management of the sewerage networks across Huntingdonshire. AW provided a GIS file of historic sewer flooding incidents which is assessed against the potential allocations.

Due to licencing and confidentiality restrictions, this data has not been represented on the mapping in the site reports. However, there are no records of historic sewer flooding incidents within any of the potential site allocations.

4.10 Residual risk

Several potential site allocations assessed contain or are near culverted sections of watercourses which flow beneath roads, railway lines, and footpaths, and present a residual flood risk should they become blocked or collapse. Potential culvert blockages that may affect a site are identified using OS Mapping, the OS MasterMap Water Network layer, and Google aerial photography and Google Streetview to determine where watercourses flow into culverts or through structures (i.e. bridges) in the vicinity of the sites. Any potential locations have been mapped in the detailed site assessment reports.

4.11 Depth, velocity, and hazard to people

The Level 2 assessment seeks to map the probable depth and velocity of flooding as well as the hazard to people to use within the detailed site assessments. This information is available from the EA's fluvial and tidal flood models (see Section 4.3 for model list).

The model log in Appendix C lists the return periods available for use in the SFRA for each model. This includes present day and the climate change events that were modelled through this Level 2 SFRA.

At the time of writing, suitable flood depth, velocity and hazard mapping was not available for the EA's NaFRA2 RoFSW dataset. As a proxy, the third generation RoFSW dataset depth, velocity and hazard mapping has been used within the detailed site assessments.

Hazard to people for fluvial and tidal flooding has been calculated using the below formula as suggested in Defra's Supplementary note on flood hazard ratings and thresholds for development planning and control purpose (gov.uk). The different hazard categories are shown in Table 4-6. Developers should also test the impact of climate change depths, velocities, and hazard on the site, as part of the site-specific FRA.

Table 4-6: Defra's 'Flood Risks to People' classifications for fluvial and tidal flooding

Description of Flood Hazard Rating	Flood Hazard Rating	Classification Explanation
Very Low Hazard/ Caution	<0.75	'Flood zone with shallow flowing water or deep standing water'
Danger For Some (i.e. children)	0.75 - 1.25	'Danger: flood zone with deep or fast flowing water'
Danger For Most	1.25 - 2.00	'Danger: flood zone with deep fast flowing water'
Danger For All	>2.00	'Extreme danger: flood zone with deep fast flowing water'

Hazard to people for surface water flooding is based on Section 7.5 - Hazard rating of the What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019 report by the EA, as shown in Table 4-7.

Table 4-7: Defra's 'Flood Risks to People' classifications for fluvial and tidal flooding

Description of Flood Hazard Rating	Flood Hazard Rating
Low	0.5 - 0.75
Moderate	0.75 - 1.25
Significant	1.25 - 2.00
Extreme	=>2.00

4.12 Emergency Planning

Flood Warning Areas (FWAs) and Flood Alert Areas (FAAs) are detailed in the EA's GIS datasets and can be used to inform emergency planning. FAAs inform the EA when there is flooding first in the catchment, irrespective of properties, hence this coverage tends to apply to whole watercourses or stretch of coastline. FWAs are derived from the extreme flood outline (0.1% AEP event), focussed on communities, properties, and/or infrastructure. Modelled depth, velocity and hazard data can be used to understand safe access and escape routes for each site.

5 Level 2 Assessment Methodology

This section outlines how sites were screened against flood risk datasets to determine which sites required a Level 2 detailed site assessment.

5.1 Site screening

HDC provided 437 potential development sites for screening through the 2025 Level 1 SFRA Addendum. These sites were screened using an 'overlap analysis' tool in GIS. This analysed various flood risk datasets against the sites layer and calculated the percentage cover for each flood risk dataset against each site. This was used to provide a summary of risk to each site, including:

- The proportion of the site in each flood zone as taken from the EA's NaFRA2 FMfP.
- The proportion of the site within the functional floodplain (Flood Zone 3b).
- The proportion of the site affected by climate change within the 1% AEP + climate change zone.
- Whether the site is shown to be at risk from surface water flooding in the RoFSW mapping for the 3.3%, 1%, and 0.1% AEP events, and the 1% AEP event plus climate change extent (using the 0.1% AEP event extent as a proxy).
- Whether the site is within, or partially within, the reservoir flood extents.
- Whether the site is at risk from groundwater emergence using the JBA Groundwater Emergence Map.

The results of the screening provide a quick and efficient way of identifying sites that are likely to require a Level 2 assessment, assisting HDC with Sequential Test decision-making so that flood risk is taken into account when considering allocation options.

The screening also provides an opportunity to identify sites which are 100% in Flood Zone 1, but upon visual inspection in GIS, have an ordinary watercourse flowing through or adjacent to them. Although there are no flood zone maps available for these watercourses, it does not mean such watercourses do not pose a risk, it just means no modelling has yet been undertaken to identify the risk.

Flood zones are not provided for specific sites or land where the catchment of the watercourse falls below 3km² in area. For this reason, the Flood Zones are not of a resolution to be used as application evidence to provide the details of possible flooding for individual properties or sites and for any sites with watercourses on, or adjacent to the site. The RoFSW has been used to assess flood risk in these cases because it is comparable to fluvial flooding from smaller watercourses and is therefore a reasonable representation of the floodplain of such watercourses to use for a strategic assessment.

5.2 Sites taken forward to a Level 2 assessment

The 2025 Level 1 SFRA Addendum identified 79 sites that were shown to be at some level of fluvial, tidal, and/or surface water flood risk yet considered important to HDC's Local Plan ambitions. As part of this scoping study, a further sites screening exercise was carried out to identify which of the sites require more detailed assessment through the Level 2 SFRA. 76 sites were identified through this process. The risk to five of the remaining sites was assessed as nominal, based on current information. Therefore, for these sites a rapid review and brief report on the risk and any mitigation required in order to allocate them in the Huntingdonshire Local Plan has been carried out.

The site assessments can be found in Appendix B.

6 Flood risk management requirements for developers

The flood risk management requirements for developers are detailed within the 2024 HDC IWMS Level 1 SFRA (Section 5). Users should refer to this section for guidance on site-specific FRAs and other principles for managing flood risk in new development.

This contains details on:

- early consultation with statutory and non-statutory consultees;
- requirements for site-specific FRAs, including signposting to specific guidance; and
- emergency planning.

The sections below contain further information on emergency planning and the requirements for developer contributions.

6.1 Emergency planning

Safe access and escape routes from the site should be provided. The developer should seek to incorporate an emergency plan and a safe refuge point if the development site has been identified to be at risk of flooding. The local authority and emergency services should be consulted when designing an emergency plan.

This Level 2 assessment has identified 20 proposed sites located within existing EA FWAs and/or FAAs. For proposed development within existing EA FWAs, developers should consult the EA to ensure that adequate flood warning procedures and evacuation processes are in place and that RMAs are not put under any additional burden.

Section 5.9 of the Level 1 SFRA report discusses NPPF requirements and what an emergency plan will need to consider and other relevant information on emergency planning. Further information is provided on the Cambridgeshire County Council emergency planning page.

The duration and onset of flooding affecting a site depends on several factors:

- Location of the site within the catchment: flooding is likely to be rapid and flashy in the upper catchment (e.g. small tributaries) and slower responding and longer in duration in the lower catchment.
- Upstream storage: floodplains, reservoirs, and other storage areas upstream of a site may provide some online flood storage that reduces the flood risk downstream and delays the onset of flooding.
- Timing of peak flow: at the confluence of the larger watercourses and smaller tributaries, there may be different timings of peak flows, for example smaller tributaries would peak much earlier than the larger watercourses within the catchments.

- The principal source of flooding: where this is surface water, depending on the intensity and location of the rainfall, flooding could be experienced within 30 minutes of the heavy rainfall event e.g., a thunderstorm. Typically, the duration of flooding for areas at risk of surface water flooding, or from flash flooding from small watercourses, is short (hours rather than days).
- The preceding weather conditions prior to the flooding: wet weather lasting several weeks will lead to saturated ground. Rivers respond much quicker to rainfall in these conditions.
- Whether a site is defended, noting that if the defences were to fail, a site could be affected by very fast flowing and hazardous water within 15 minutes of a breach developing (depending on the size of the breach and the location of the site in relation to the breach), causing danger to life.
- Catchment geology: the permeability of a catchment affects its response time, for example chalk catchments take longer to respond than clay catchments.

6.2 Developer contributions

In some cases, and following the application of the sequential test, it may be appropriate for the developer to contribute to the improvement of flood defence provision that would benefit both proposed new development and the existing local community. Developer contributions should include the following:

- Developers should check the online Flood Map for Planning (gov.uk) in the first instance to identify any major changes to the flood zones and the long-term flood risk mapping portal (gov.uk) for any changes to flood risk from surface water or inundation from reservoirs.
- Developer contributions can be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).
- Developers should also confirm that a development will not impact upon the ability of a floodplain to store or convey and seek opportunities to provide floodplain betterment, should the footprint of a development change.
- Where necessary, compensatory flood storage should be provided up to the 1% AEP plus climate change flood level and adjacent to the floodplain so that the flood storage can hydraulically fill and drain.
- Developers must be aware that that information within the Level 1 and Level 2 SFRAs will be a useful starting point for development considerations, however they must request the most recent data and update hydraulic modelling where required. At the time of writing, the EA were due to publish new national risk information for flooding and coastal erosion, this will include future scenarios accounting for climate change. Once this information is available, it should be used as the main source of flood risk information, unless site-specific modelling / information is available.

The council should only use planning obligations to secure contributions where it is satisfied that the contribution will fund works / measures which are:

- Necessary to make the development acceptable in planning terms;
- Directly related to the development; and
  Fairly and reasonably related in scale and kind to the development (Paragraph 57, NPPF).

7 Surface water management and SuDS

The Surface Water Management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within the 2024 HDC IWMS Level 1 SFRA (Section 5.7). Users should refer to this section when considering the different sources of flood risk to the site and how this can be mitigated in a sustainable way.

This contains detail on:

- Role of the LLFA and LPA in surface water management;
- Types of SuDS;
- Sources of SuDS guidance; and,
- Other surface water considerations including overland flow paths.

7.1 Updated SuDS guidance

Since publication of the Level 1 SFRA, the Defra National standards for sustainable drainage systems (SuDS) (gov.uk) were published in June 2025.

Previously SuDS guidance was developed to sit alongside the PPG and provide non-statutory standards as to the expected design and performance for SuDS. The new national standards remain as a non-statutory specification but form a material consideration for LPAs when assessing planning applications. These standards aim to reflect and reinforce good practice and use of SuDS, reflecting the four pillars of SuDS design.

The national standards contain two sets of standards. The first type (Standard 1) is known as the hierarchy standard and gives criteria for the prioritisation of final runoff destinations. The other standards (Standards 2-7) detail the minimum requirements of design criteria that surface water drainage systems should satisfy alongside how they are to be appropriately built, maintained, and operated.

8 Recommendations

8.1 Considering the Exception Test for the proposed development sites

When required, to pass the exception test it must be shown that the development will provide wider sustainability benefits that outweigh the risk, and that the development will be safe throughout its lifetime without increasing risk elsewhere. The former is a planning-related consideration and the Level 2 SFRA helps to answer the latter part of the Test.

Some of the sites assessed in this Level 2 SFRA are at greater risk and will require careful consideration and significant mitigation to pass the flood risk element of the exception test. The other sites are likely to pass the flood risk element of the exception test by:

- Undertaking a sequential approach to site planning so development is steered away from areas within the site at the highest risk.
- Considering safe access/escape routes in the event of a flood (from all parts of the site, if say the site is severed by a flood flow path). If access and escape are affected, a Flood Response Plan may be required.
- Designing buildings with finished floor levels above the estimated flood level (fluvial 1% AEP event or tidal 0.5% AEP event with an allowance for climate change), including an allowance for freeboard.
- Using areas in Flood Zone 2 for the least vulnerable parts of the development in accordance with Table 2 in the PPG. No development should be permitted in Flood Zone 3b (aside from Essential Infrastructure).
- Testing flood mitigation measures if these are to be implemented, to ensure that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another).
- Considering space for green infrastructure in the areas of highest flood risk.

Although not explicitly required within the PPG, consideration should be given to the surface water risk where this is high, with regards to the exception est.

If a site is split in future into smaller land parcels for development, and some of those parcels are in areas of flood risk, the exception test may need to be reapplied by the developer at the planning application stage.

8.2 Recommendations from the Level 1 SFRA

Recommendations from this report should be considered in addition to recommendations from the Level 1 SFRA, which still stand for the site allocations and any windfall development that comes forward. The site recommendations for the Level 1 SFRA are set out in the 2025 Level 1 SFRA Addendum.

8.3 Requirements for developers

The sections below set out requirements for developers to consider both for developing sites assessed within this Level 2 SFRA and for developing windfall sites.

8.3.1 Watercourses

Any sites located where there is a main river (including culverted reaches of a main river) may require permits from the EA or an easement of 8m either side of the watercourse from the top of the bank. This may introduce constraints regarding what development will be possible and consideration will also need to be given for access and maintenance at locations where there are culverts. Developers will be required to apply for appropriate permits so the activity being carried out over easements does not increase flood risk. Further information relating to this can be viewed on the government website Flood risk activities: environmental permits (gov.uk).

Where no recent detailed hydraulic modelling is present, it is recommended that developers construct new, or update existing, detailed hydraulic models at these sites as part of a site-specific FRA using channel, structure, and topographic survey to confirm flood risk. Site-specific flood modelling will likely need to be developed in locations where it is necessary to understand the effects of proposed development schemes on the existing flood flow paths and flood volume storage, in the present day and in the future.

At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of unmodelled watercourses and surface water interactions so that the potential effects of proposals can be evaluated at site level and ensure that there is no increase in risk off-site as a result of development. The modelling should evidence flood extents, depths, velocities and hazard (including latest climate change allowances), inform development zoning within the site and prove, if required, whether the exception test can be passed.

If an ordinary watercourse is within or immediately adjacent to the site area, consultation with CCC as the LLFA should be undertaken. If alterations or discharges are proposed to the watercourse, a land drainage consent will be required.

Developers should be aware of the need to identify the route of, and flood risk associated with, any culverts within a site. CCTV condition survey will be required to establish the current condition of the culvert and hydraulic assessments will be necessary to establish culvert capacity of both culverts on site and those immediately offsite that could pose a risk to the site. The risk of flooding should be established using site survey, including the residual risk of culvert blockage.

8.3.2 Flood risk management infrastructure and residual risk

For sites where existing flood defences provide a reduction in the flood risk to the site, it is important to understand the standard of protection these structures and measures provide. It is also necessary to understand how this level of protection changes over time, considering the implications of climate change.

If flood defences are required to protect a development site, evidence will be required to show that the new development does not adversely impact and increase flood risk to other areas, for example, that there is no net loss in floodplain storage in circumstances where this is a material consideration. It will need to be established that these defences can be appropriately managed and maintained during the lifetime of the development. In some cases, it will be a requirement to demonstrate that there is an appropriate level of commitment to the maintenance of the standard of protection afforded by existing defences, where reliance is placed on the standard they provide.

Any development proposed adjacent to a drain should include a detailed assessment of how a breach would impact the site, as part of a site-specific FRA. The relevant internal drainage board (IDB) should be contacted to provide guidance on development near drains.

8.3.3 Access and escape routes

Access and escape routes should be considered at the site, but also in the vicinity of the site, for example, a site may have low surface water risk, but in the immediate locality, access/escape routes to and from the site could be restricted for vehicles and/or people. For sites assessed within this Level 2 SFRA, an initial overview of potential access and escape options is provided within the detailed site assessments and potential constraints identified.

8.3.4 Surface water flood risk and SuDS

Surface water risk should be considered in terms of the proportion of the site at risk in the 3.3%, 1% and 0.1% AEP events (with an appropriate allowance for climate change), whether the risk is due to isolated minor ponding or deeper pooling of water, or whether the risk is due to wider overland flow routes.

A strategic assessment of SuDS options has been undertaken using regional datasets for sites assessed within this Level 2 SFRA. A detailed site-specific assessment of suitable SuDS techniques should be undertaken at site-specific level to understand which SuDS options are most appropriate. This may need to include infiltration testing to determine the suitability of infiltration methods.

Surface water risk and mitigation should be considered as part of a detailed site-specific FRA and surface water drainage strategy.

8.4 Use of SFRA data and future updates

It is important to recognise that the SFRA has been developed using the best available information at the time of preparation. This relates both to the current risk of flooding from all sources and the potential impacts of future climate change.

The SFRA should be a ‘living document’, and as a result should be updated when new information on flood risk, flood warning, or new planning guidance or legislation becomes available. New information may be provided by HDC, CCC as LLFA, the EA, the Middle

Level Commissioners, and Anglian Water (water supply and wastewater). Such information may be in the form of:

- New hydraulic modelling results.
- Flood event information following a future flood event.
- Policy or legislation updates.
- Updates to the EA flood mapping.
- New flood defence schemes or flood alleviation schemes.

The EA regularly reviews their flood risk mapping, and it is important that they are approached to determine whether updated information is available prior to commencing a detailed FRA. The EA plan to update flood risk datasets every three months and coastal erosion risk datasets every 12 months. In 2025/26, flood risk updates will be less frequent as new processes are established. A new model of the Lower Ouse is being developed at the time of writing. This will replace the Lower Ouse 2015 modelling used throughout the SFRA.

It is recommended that the SFRA is reviewed in line with the EA's Flood Zone map updates to ensure latest data is still represented in the SFRA, allowing a cycle of review and a review of any updated data by checking with the above bodies for any new information.

A Scoping report

Level 2 SFRA scoping report detailing datasets and methodologies used in the Level 2 SFRA.

B Level 2 site assessments

Individual Level 2 site assessments for potential site allocations. The nominal risk sites are assessed in one report.

C Data catalogue and modelling log

Excel spreadsheets detailing the GIS datasets and model data used in the Level 2 SFRA.

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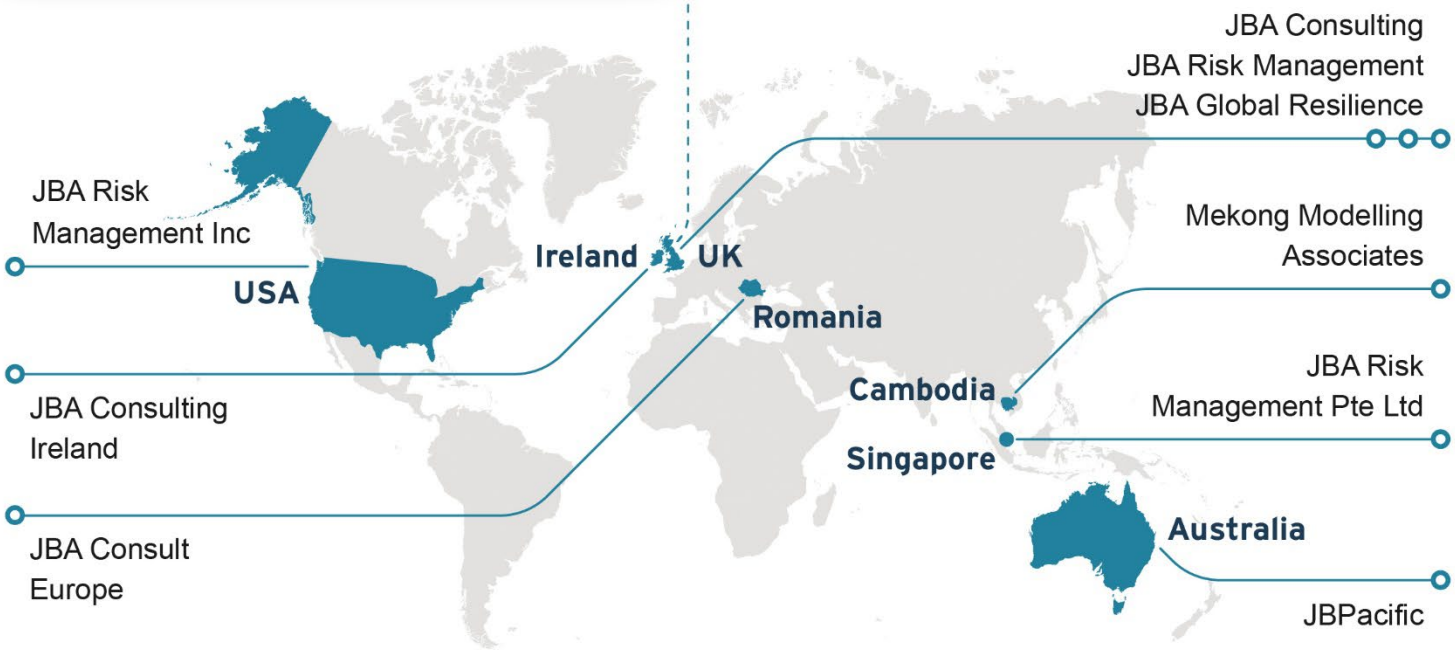

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