Adur Level 2 Strategic Flood Risk Assessment

December 2025

Prepared for:
Adur & Worthing Councils

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Contract

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This report describes work commissioned by Adur & Worthing Councils by an instruction dated 27 January 2025. The Client's representative for the contract was Catherine Hutchins of Adur & Worthing Councils. Adam Downton and Harriet Freestone 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 January and December 2025, and is based on the conditions encountered and the information available during said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

JBA disclaims any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to JBA's attention after the date of the Report.

Acknowledgements

We would like to acknowledge Adur & Worthing Councils, West Sussex County Council, the Environment Agency and Southern Water for their input into the SFRA.

Contents

List of Figures

List of Tables

Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AIMS	Asset Information Management System
BGS	British Geological Survey
CC	Climate Change
CFMP	Catchment Flood Management Plan
CIA	Cumulative Impact Assessment
Defra	Department of the Environment, Food and Rural Affairs
EA	Environment Agency
FRA	Flood Risk Assessment
GIS	Geographical Information System
ID	Identifier
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
NPPF	National Planning Policy Framework
PPG	Planning Policy Guidance
AWC	Adur & Worthing Councils
SFRA	Strategic Flood Risk Assessment
TUFLOW	Two-dimensional Unsteady FLOW (a hydraulic model)

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 Adur District Council. It follows on from the 2024 Adur and Worthing Level 1 SFRA. The Level 2 SFRA document should be read in conjunction with Adur and Worthing Level 1 SFRA.

The primary purpose of the Level 2 SFRA is to provide an appropriate understanding of the level of actual risk affecting development included in the Local Plan Review. The assessment takes into account 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 Adur & Worthing Councils to apply the sequential and exception test to sites in accordance with the National Planning Policy Framework.

SFRA Objectives

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

The aim of the Level 2 assessment is to build on identified risks from Level 1 for proposed development sites, to provide a greater understanding of tidal, fluvial, surface water, groundwater, and reservoir related flooding risks to the sites. From this the Local Council and Developers can make more informed decisions and pursue development in an effective and efficient manner. The Level 2 assessment also identifies sites for further risk analysis at the site-specific Flood Risk Assessment (FRA) stage.

Level 2 SFRA Outputs

The Level 2 assessment includes detailed assessments of the proposed site options. These include:

- An assessment of all sources of flooding including tidal flooding, surface water flooding, groundwater flooding, and the potential increase in tidal and surface water flood risk due to climate change.
- Reporting on conditions of flood defence infrastructure, where applicable.
- An assessment of existing flood warning and emergency planning procedures, including an assessment of safe access and egress during an extreme event.
- Advice and recommendations on the likely applicability of sustainable drainage systems for managing surface water runoff.
- Advice on whether the sites are likely to pass the second part of the Exception Test with regards to flood risk and on the requirements for a site-specific FRA.

Summary of the Level 2 SFRA

Adur District Council provided 17 sites for further assessment. These sites were screened against flood risk datasets to assess the potential viability and provide flood risk recommendations.

Summary tables were prepared for all 17 sites and multiple sources of flood risk were assessed and can be found in Appendix A. Maps of depth and velocity of flooding as well as hazard mapping have been produced where modelled outputs were available, flood datasets are outlined in Appendix B. The Risk of Flooding from Surface Water (RoFSW) mapping has also been used. The superseded (pre March 2025) RoFSW dataset has been used to consider depth, hazard and velocity as the NAFRA2 dataset is not currently suitable to support a Level 2 SFRA assessment as the NAFRA2 data does not include depth, hazard and velocity data for surface water. A comparison between the two surface water dataset extents has been undertaken.

Each table sets out the National Planning Policy Framework (NPPF) requirements for the site, as well as guidance for site-specific FRAs. A broadscale assessment of suitable SuDS options has been provided to give an indication of potential constraints to surface water drainage and where additional information may be required.

1 Introduction

1.1 Level 2 SFRA Study Area

Adur District covers an area of approximately 42km^2 in West Sussex, south England, with an estimated population of 65,000[1]. The area encompasses urban areas including Southwick, Shoreham and Shoreham-By-Sea, as well as rural villages and agricultural land. To the west of the area is Worthing and east the city of Brighton and Hove. The South Downs National Park is to the north of the District.

Adur District contains only one Environment Agency Main River, the River Adur.

1.2 Purpose of the Strategic Flood Risk Assessment

Paragraph 171 of the National Planning Policy Framework (NPPF)[2] states that strategic policies should be informed by a Strategic Flood Risk Assessment (SFRA) 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 (EA) and other relevant flood risk management authorities, such as Lead Local Flood Authorities (LLFAs).

The Planning Practice Guidance (PPG) Flood Risk and Coastal Change (2025)[3] advocates a staged approach to risk assessment and identifies two levels of SFRA:

- Level 1 SFRA: where flooding is not a major issue and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test. Level 1 is completed first to understand whether a Level 2 assessment is required.
- Level 2 SFRA: where land outside Flood Zones 2 and 3 cannot accommodate all the necessary development creating the need to apply the NPPF's Exception Test. In these circumstances the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of other sources of flooding.

This SFRA report fulfils the requirements for a Level 2 assessment of strategic sites identified for potential allocation within the Adur District and has been prepared in accordance with the NPPF (2024) and PPG (2025).

This report should be read alongside the Adur and Worthing Level 1 SFRA (2024) and builds upon the information presented within the Level 1 SFRA.

1 Office for National Statistics (November 2021) Ward-level population estimates (Experimental Statistics) (Mid 2020)

2https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf

3 https://www.gov.uk/guidance/flood-risk-and-coastal-change

1.3 Local Plan

The Adur Local Plan (2017) makes up the development plan for Adur District. The Local Plan 'sets the strategic development and land-use priorities for Adur (outside the South Downs National Park) up to 2032, and contains the policies against which development management decisions within that area will be made.'

1.4 West Sussex County Council Local Flood Risk Management Strategy (LFRMS) 2025-2030

The Flood and Water Management Act (2010) makes county and unitary authorities lead local flood authorities with a strategic overview role for local flooding in their area. Therefore, West Sussex County Council as LLFA, has responsibility to deliver a Local Flood Risk Management Strategy, to set out how flood risk will be managed in the county.

The West Sussex County Council LFRMS highlights the main sources of flood risk in West Sussex and how this risk will be managed. The aims of the LFRMS are as follows:

- Understand flood risk by using a catchment-based approach to assess and manage flood risk across West Sussex
- Plan for resilience by ensuring new developments are sustainable and built to handle flooding, using better drainage
- Work together by collaborating with partners to manage flood assets and promote nature-based solutions
- Supports communities by helping resident prepare for and respond to flooding through awareness campaigns, community engagement and local actions.

1.5 River Adur Stage 1 Surface Water Management Plan (SWMP) 2013

The River Adur Stage 1 SWMP was undertaken by West Sussex County Council (Lead Local Flood Authority), to investigate the local flood risk in the River Adur as part of their strategic oversight of local flood risk management in West Sussex.

The SWMP highlights an action plan, identifying a range of recommended actions for the reduction of flood risk across the Adur District. This consists of a generic action plan, indicating options to be applied throughout all drainage areas, and a location specific action plan, highlighting actions for specific locations.

1.6 River Adur Catchment Flood Management Plans (CMP), 2009

The River Adur CFMP identifies flood risk management policies to assist all key decision makers in the catchment. It is identified that the main source of flood risk in the Adur catchment area is from localised river flooding, with some flooding influenced by tidal conditions on the lower reaches of the Adur.

All of the sites considered in the Level 2 site summary tables are located within the Adur Management Catchment.

1.7 SFRA Objectives

Objectives of this Level 2 SFRA are to:

- Assess the flood risk to potential development sites using the latest available flood risk data and climate change uplifts where available;
- Using available data to provide information and a comprehensive set of maps presenting flood risk from all sources for each site option.
- Where the Exception Test is required, provide recommendations for making the site safe throughout its lifetime.
- Consider the most recent policy and legislation in the NPPF, Planning Policy Guidance (PPG) and LLFA Sustainable Drainage Systems (SuDS) guidance.

1.8 Consultation

SFRAs should be prepared in consultation with other risk management authorities. The following parties (external to Adur & Worthing Councils) have been approached for comment during the preparation of this Level 2 SFRA:

- Environment Agency
- West Sussex County Council (as Lead Local Flood Authority)

1.9 How to use 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. The Planning Framework and Planning Policy for Flood Risk Management	Provides an overview of both national and local policy on flood risk management. This includes the application of the Sequential Approach and Sequential/Exception Test process. Provides guidance for the Council and Developers on the application of the Sequential and Exception Test at allocation and planning application stages.	Users should use this section to understand and follow the steps required for the Sequential and Exception Tests.
3. Level 2 Strategic Flood Risk Assessment	Highlights the data used within the Level 2 assessment including Flood Zones, tidal, fluvial and surface water data, groundwater, historic flooding	For information on the data sources used within the Level 2 assessment.

Section	Contents	How to use
	etc.	
4. Level 2 Site Assessments	Details the approach taken to the site screening and scoping exercise and highlights the key points from the 16 Level 2 site sheets.	Developers and planners should use this section to provide an overview of the 16 sites and their requirements for development.
5. Summary	Summarises the results and conclusions of the Level 2 assessment and makes recommendations for planning policy and development.	Developers and planners should use this section to provide an overview of the Level 2 assessment.
Appendices A - Site Assessment Summary Tables B – Flood Datasets C- **Error! Reference source not found.**	Detailed assessment of the risk to specific sites identified by Adur & Worthing Councils and likely actions required to bring the site forward under the Sequential/Exception Tests.	Developers and planners should use this section to provide an overview of the risk to specific sites.

Hyperlinks to external guidance documents/websites are provided throughout the SFRA.

2 The Planning Framework and Planning Policy for Flood Risk Management

The Flood Risk Management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within the Adur & Worthing Councils Level 1 Strategic Flood Risk Assessment (July 2024).

This contains detail on:

- Flood risk policy and strategy
- Roles and responsibilities for Flood Risk Management in Adur
- Relevant legislation
- Relevant Flood Risk Policy and Strategy Documents
- Key legislation for flood and water management
- Key national, regional and local policy documents and strategies

2.1 National Planning Policy Framework Guidance

The National Planning Policy Framework (NPPF) was updated in December 2024, with minor updates in February 2025. The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The Framework is based on core principles of sustainability, and is accompanied by the Planning Practice Guidance (PPG). The NPPF and PPG must be taken into consideration in the preparation of local plans, and are a material consideration in planning decisions. Further details about the NPPF can be found in the Level 1 SFRA[4].

2.1.1 Planning Practice Guidance (PPG) Flood Risk and Coastal Change

An updated version of the PPG (Flood Risk and Coastal Change) was published in August 2022 and most recently updated on 17 September 2025. This advises on 'how to take account of and address the risks associated with flooding and coastal change in the planning process'. The guidance outlines the steps required when preparing strategic policies. Further details regarding the PPG can be found in the Level 1 SFRA.

2.1.2 The Sequential Test

The Sequential Test aims to ensure that areas of little or no flood risk are prioritised for development over areas at a higher risk of flooding. This means areas at a medium or high risk of flooding from any source, now or on the future should be avoided for development where possible.

It should be noted that, following the September 2025 update, the Sequential Test is no longer required for surface water where a Flood Risk Assessment demonstrates that the

4 Adur and Worthing Level 1 Strategic Flood Risk Assessment (SFRA) - July 2024

development will remain safe for its lifetime and will not increase flood risk elsewhere, specifically for windfall development.

2.1.3 The Exception Test

It may not always be possible for all new development to be allocated on land that is not at risk from flooding. To further inform whether land should be allocated, or planning permission granted, a greater understanding of the scale and nature of the flood risks is required. In these instances, the Exception Test will be required.

The Exception Test should only be applied following the application of the Sequential Test. It applies in the following instances, where it is not possible for development to be located in areas with a lower risk of flooding:

- Development classified as 'More vulnerable' in Flood Zone 3a
- Development classified as 'Essential infrastructure' in Flood Zone 3a or 3b
- Development classified as 'Highly vulnerable' in Flood Zone 2 (this is NOT permitted in Flood Zone 3a or 3b)

Details of Flood risk vulnerability classifications can be found in Annex 3 of the NPPF[5].

2.1 Use of SFRA data

This SFRA has been developed using the best available information, supplied at the time of preparation. This relates both to the current risk of flooding from rivers, the sea, surface water and groundwater and, where available, the potential effects of future climate change.

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 Risk Management Authorities. This new information (such as updated mapping and modelling) may supersede the information included in this SFRA. Guidance should be sought from West Sussex County Council, the Environment Agency and Adur District Council as appropriate to check that the most up to date information is used for future flood risk assessments.

5 National Planning Policy Framework - Annex 3: Flood risk vulnerability classification - Guidance - GOV.UK

3 Level 2 Strategic Flood Risk Assessment

This section highlights the datasets used in the Level 2 SFRA to assess the local plan sites against flood risk.

3.1 Historic Flooding

The Environment Agency's 'Recorded Flood Outlines' dataset has been used to understand whether historic flooding has been recorded at the sites. This dataset takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding.

West Sussex County Councils' Flood Incident Database has also been reviewed, with floods up to 2021 included. Flood events post 2021 were not available. As specified in the Level 1 SFRA, there is a history of documented flood events within the district, with the properties impacted by surface water, tidal and sewer flooding.

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 have changed since the date of a recorded flooding incident, making it more or less likely for flooding to occur on site.

3.2 SFRA flood zones

As part of the Level 1 SFRA, existing tidal modelling was incorporated into the SFRA Flood Zone 3b dataset. The Arun-Adur model was then re-run with additional climate change allowances. Since the publication of the Level 1 SFRA, the Environment Agency's Flood Map for Planning was updated (on 25 March 2025) as part of the new National Flood Risk Assessment (NaFRA2). This included new and updated flood zones.

Detailed modelling has been used for the Level 2 SFRA and at the time of writing this is considered to be more up to date.. However, over time the online Flood Map for Planning is likely to be updated more often than the SFRA.

Further details on the Flood Zones can be found within the Level 1 SFRA[4], Appendix B and included within each flooding section below.

3.3 Flood defences

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.

Current flood defence data has been taken from the Environment Agency's Asset Information Management System (AIMS) Spatial Defences data set.

3.4 Flooding from rivers and the sea

Tidal flooding is notable throughout the district, particularly along the River Adur, which is tidally influenced throughout the entirety of the Adur District. Adur District is more accurately represented by tidal modelling than fluvial modelling; Flood Zones for the Adur District have been derived from tidal models. Details of the detailed modelling datasets used within the Level 2 SFAR are included in Table 3-1.

A number of smaller watercourses (tributaries of the River Adur) and field drains located within the district also have the potential to pose significant flood risk to development. Tide locking occurs along several of these smaller watercourses.

Table 3-1 Detailed modelling used for tidal flood risk in Adur Level 2 SFRA

Source	Data source
Tidal risk – present and climate change	2025 Arun-Adur modelling - 3.3%, 0.5%, 0.1% AEP. 2025 Arun-Adur modelling – 3.3%, 0.5% AEP, higher central and upper end.

3.4.1 Impacts of climate change on tidal flood risk

Climate change is expected to increase sea levels and the magnitude and frequency of storms. Areas benefitting from flood defences will find the standard of protection changes over time with overtopping of defences more likely unless they are upgraded.

Sea level climate change allowances developed by the Environment Agency are available for river basin districts and epochs. Adur District is within the South East of England river basin district. Details of the sea level allowance for the South East are shown below in Table 3-2.

Table 3-2 South East sea level climate change allowances for each epoch in mm for each year. The total sea level rise for each epoch is in brackets.

Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm	Cumulative rise 2000 to 2125(metres)
Higher Central	5.7 (200)	8.7 (261)	11.6 (348)	13.1 (393)	1.20
Upper End	6.9 (242)	11.3 (339)	15.8 (474)	18.2 (546)	1.60

3.5 Surface water flooding

Mapping of surface water flood risk in Adur District has been taken from the Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping. Surface water flood risk is subdivided into the following four categories:

Table 3-3 Datasets used for surface flood risk in Adur Level 2 SFRA

Source	Data source
Surface water risk – present and climate	Risk of Flooding from surface water. This will use the superseded dataset as the newly released data is not suitable for planning. The NAFRA2 data does not include depth, hazard and velocity data for surface water and the climate change data is not suitable for planning. Return periods to be considered are 3.3%, 1% and 0.1%AEP. A comparison between the surface water extents will be undertaken and described in the individual site summary tables. This will compare the superseded Risk of Flooding from surface water data with the new data sets. Surface water risk zones (JBA analysis from Level 1).

- **High**: An area has a chance of flooding greater than 3.3% AEP (1 in 30-year) each year.
- **Medium**: An area has a chance of flooding between 1% AEP (1 in 100-year) and 3.3% AEP (1 in 30-year) each year.
- **Low**: An area has a chance of flooding between 0.1% AEP (1 in 1,000-year) and 1% AEP (1 in 100-year) each year.
- **Very Low**: An area has a chance of flooding of less than 0.1% AEP (1 in 1,000-year) each year.

The results should be used for high-level assessments. If a particular site is indicated in the Environment Agency mapping to be at risk from surface water flooding, a more detailed assessment would be required to illustrate the flood risk more accurately at a site-specific scale. Such an assessment should use the RoFSW in partnership with other sources of local flooding information to confirm the presence of a surface water risk at that particular location.

3.5.1 Impact of climate change on surface water flooding

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. The potential impacts of surface water plus climate change will likely need to be considered at site-specific assessment stage.

Peak rainfall climate change allowances developed by the Environment Agency are divided into Management Catchments. The details of the Adur and Ouse Management Catchment are shown below in Table 3-4.

Table 3-4 Adur Management Catchment peak rainfall climate change allowances

AEP	Allowance	Total potential change anticipated for '2050s' (up to 2060)	Total potential change anticipated for '2070s' (2061 2125)
3.3%	Central	20%	20%
3.3%	Upper End	35%	40%
1%	Central	20%	25%
1%	Upper End	45%	45%

3.6 Groundwater flooding

In comparison to other sources of flooding, current understanding of the risks posed by groundwater flooding is limited and mapping of flood risk from groundwater sources is in its infancy. Groundwater level monitoring records are available for areas on Major Aquifers. However, for lower lying valley areas, which can be susceptible to groundwater flooding caused by a high-water table in mudstones, clays, and superficial alluvial deposits, very few records are available. Additionally, there is an increased risk of groundwater flooding where long reaches of watercourse are culverted as a result of elevated groundwater levels not being able to naturally pass into watercourses and be conveyed to less susceptible areas.

To assess groundwater flooding emergence within Adur District, the Groundwater Flood Data 5m Resolution (JBA licensed product) has been used. The Groundwater Flood Data shows areas of potential groundwater emergence during a 1% AEP flood event, and highlights areas where there is sufficient evidence to suggest that flooding may occur. This data cannot form part of the Sequential Test as it is not directly comparable to other datasets (e.g. Flood Zones), and therefore cannot categorise an area as high, medium or low risk on its own. The map should be interpreted as an initial indicative tool to assess groundwater flood risk at preliminary stages of planning/site allocation. Where mapping indicates a risk of groundwater flooding a detailed assessment should be undertaken to confirm the risk to the site as part of any planning application, which may require ground investigations.

The Groundwater Flood dataset categorises data into five different classes. A detailed description of the classes is provided in Table 3-5 below. For more information, please refer to Section 5.6 in the Level 1 SFRA.

Table 3-5: JBA Groundwater Flood data classifications

Risk Class	Depth range below ground surface	Description
0 - Low risk	>5m	The zone is deemed as a having negligible risk from groundwater flooding due to the nature or local geological deposits

Risk Class	Depth range below ground surface	Description
1	At least 5m	Flooding from groundwater is unlikely
2	Between 5m and 0.5m	Risk of flooding to subsurface assets but surface manifestation is unlikely
3	Between 0.5m and 0.025m	Risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge locally<0.0
4	<0.025m	

3.6.1 Impact of climate change on groundwater flooding

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. The influence of rising sea levels on groundwater has been explored as part of the SFRA, however, there is still significant uncertainty associated with this, and the information should be used to identify where further investigation is needed. Further details are available in the Appendix H and K of the Level 1 SFRA.

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.

3.7 Reservoirs

There are no reservoirs in the Adur district.

3.8 Sewer Flooding

3.8.1 Data used to inform sewer flooding

Southern Water's Sewer Flood Incident Database was used to identify any sewer flooding within the same past code area as the site. Five-digit post code areas were used. Developers should contact Southern Water for further information on the risk of sewer flooding to the sites.

3.9 Residual risk

The residual flood risk to sites is identified where potential blockages or overtopping / breach of defences could result in the inundation of a site, with the sudden release of water with little warning.

Residual risk from breaches to flood defences, whilst rare, needs to be considered in Flood Risk Assessments. Considerations include the location of a breach, when it would occur and for how long, the depth of the breach (toe level), the loadings on the defence and the potential for multiple breaches. Modelling of five breaches has been undertaken, following Environment Agency guidance (LIT 56413) for estuary breaches. Within the TUFLOW model the breaches have been enacted using variable z-shapes that simulate the formation of the breach during the model run. Breaches a, b and d were through embankments and used a breach width of 50m and breaches c and e are through walls and used a breach width of 20m. Also in line with the Environment Agency guidance, the breaches were set trigger when the water level reached ¾ of the defence height and were closed after 30 hours. The breach models were run for the tidal 3.3%, 0.5% and 0.1% AEP events.

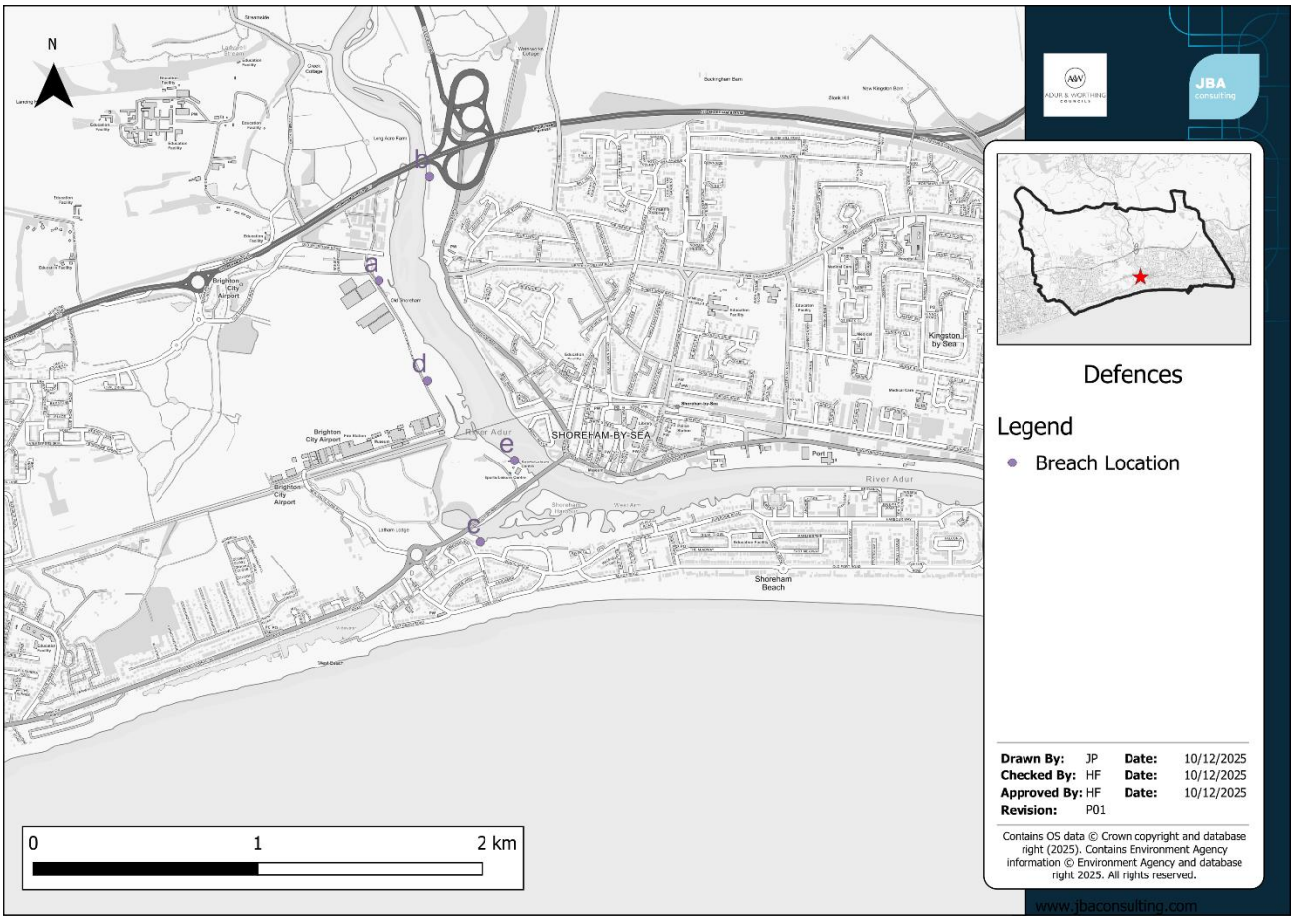


Figure 3-1: shows the locations of the five breach locations tested as part of this study.

3.10 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 during the defended tidal 3.3%, 0.5% and 0.1% AEP plus climate

change flood events. Depth mapping was also undertaken for the surface water 3.3% and 1% AEP plus climate change events.

Hazard to people has been calculated using the below formula, as suggested in Defra's FD2321/TR2 "Flood Risk to People". The different hazard categories are shown in Table 3-6. Developers should also assess the impact of climate change depths, velocities, and hazard on the site, as part of the site-specific Flood Risk Assessment.

Table 3-6: Defra FD2321/TR2 Flood Risks to People classifications

Description of Flood Hazard Rating	Flood Hazard Rating	Classification Explanation
Very Low Hazard	< 0.75	Flood zone with shallow flowing water or deep standing water.
Danger for some	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.

As part of a site-specific FRA, developers may need to undertake more detailed hydrological and hydraulic assessments of the flood risk to verify flood depth, velocity and hazard based on the relevant design event, using the relevant climate change allowance based on the type of development and its associated vulnerability classification.

3.11 Duration and onset of flooding

The duration and onset of flooding affecting a site depends on a number of factors, including as:

- Tide heights can influence inland flood extents. Coastal and estuarine sites are influenced by tidal cycles. Flooding can occur rapidly during high tides and flood levels will often recede with tide levels. However, extreme events can accelerate flooding. especially when combined with storm surges or low atmospheric pressure. The onset is typically predictable based on tide tables. Duration may last for several hours.
- Tide locking occurs when high tides prevent river water from discharging into the sea, causing water levels in rivers and drainage systems to rise. This can significantly delay the recession of floodwaters and prolong flooding duration, particularly in low-lying areas near estuaries.
- The position of the site within a surface water catchment, with those at the top of a catchment likely to flood sooner than those lower down. The duration of flooding tends to be longer for areas in lower 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.
- 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, for example chalk catchments take longer to respond than typical clay catchments.

It is recommended that a site-specific Flood Risk Assessment refines this information, based on more detailed modelling work where necessary.

It is not always possible to extract information on the duration and onset of flooding from detailed modelling, and information is not available where there is no detailed modelling available. Where sites are at risk of flooding, the duration and onset of flooding should be assessed within an emergency response plan.

3.12 SuDS suitability

The hydraulic and geological characteristics of each site have been assessed to determine the constraining factors for surface water management. This assessment is designed to inform the early-stage site planning process and is not intended to replace site-specific detailed drainage assessments.

The assessment is based on catchment characteristics, British Geological Survey (BGS) mapping and borehole data available online. LIDAR data was used as a basis for determining the topography and average slope across each development site. Other datasets were used to determine factors such as potential water quality and flood constraints, including:

- Environment Agency 1m LiDAR
- The British Geological Survey website (bgs.ac.uk) geology and soils mapping
- Historic landfill sites
- Groundwater Source Protection Zones
- Nitrate Vulnerable Zones
- Detailed River Network
- Detailed modelling
- Risk of Flooding from Surface Water mapping
- Flood Map for Planning

This data was then collated to provide an indication of particular groups of SuDS systems which might be suitable at a site. SuDS techniques were categorised into five main groups, as shown in

Table 3-7.

Table 3-7: Summary of SuDS categories

SuDS Type	Technique
Source Controls	Green Roof, Rainwater Harvesting, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway, Pervious Pavements
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand Filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance	Dry Swale, Under-drained Swale, Wet Swale

SuDS in the plan area should be designed in accordance with the following documents:

- Water, People, Places- A guide for master planning sustainable drainage into developments
- National standards for sustainable drainage systems (SuDS)
- Southern Water Surface Water Management Policy
- Surface Water Management Guidance for Developers is to be published by the LLFA later in 2025.

Lancing Meadows, Barns at New Salts Farm and Land East of Adur Close were identified by Adur and Worthing Councils as having a limited options for drainage. To support the Level 2 site summary tables for a drainage strategy was developed.

3.13 Emergency Planning

3.13.1 Data used to Inform Emergency Planning

The Environment Agency operates a Flood Information Service for areas deemed to be at a risk of fluvial or coastal flooding. Flood Warning and Flood Alert Areas are detailed in the Environment Agency's GIS datasets. A Flood Alert means flooding is possible from rivers or the sea. A flood warning indicates flooding is expected from rivers, heavy rainfall or the sea.

Table 3-8 Environment Agency's Flood Information Service

Flood Code	What It Means	What To Do
 **Flood Alert**	Flooding is possible, be prepared	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.

 **Flood Warning**	Flooding is expected, immediate action is required	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.
 **Severe Flood Warning**	Severe flooding and danger to life	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.
Warning no longer in force	Warning has been removed in the last 24 hours	Be careful. Floodwater may still be around for several days and could be contaminated If you've been flooded, ring your insurance company as soon as possible.

Flood alerts and warnings can be used to better prepare for flooding and are used to notify the public of potential risk and any actions that should be taken. Flood warnings can be received by the public via text, email or a phone call. Flood warnings can be signed up for via the Environment Agency's website.

For more information about Flood Warning and Alert areas please refer to Section 10.1 in the Level 1 SFRA report.

3.13.2 Access and egress

The Modelled depth, velocity and hazard data can be used to understand safe access and egress routes for each site. Access considerations include the voluntary and free movement of people during a design flood, as well as the potential for evacuation before a more extreme flood, considering the effects of climate change for the lifetime of the development. Access and escape routes need to be designed to be functional for changing circumstances over the lifetime of the development.

4 Level 2 Site Assessments

4.1 Approach taken to the site screening and scoping exercise

JBA Consulting have recently undertaken the Level 1 Strategic Flood Risk Assessment (SFRA) for Adur & Worthing Councils. Following this work, a number of sites have been identified by Adur District Council as potentially requiring a Level 2 SFRA.

In order to provide guidance on which of these sites should be taken forward to a Level 2 SFRA, JBA Consulting have undertaken a Level 2 scoping exercise.

This section outlines how sites were screened against flood risk datasets to determine which sites were taken forwards for a Level 2 assessment.

4.2 Site Screening

Adur & Worthing Councils provided 36 sites for assessment as part of the Level 1 SFRA. These sites were screened against a suite of available flood risk information and spatial data to provide a summary of risk to each site, including:

- The proportion of the site within Flood Zones or tidal modelling data (including an allowance for climate change) derived from the Level 1 SFRA.
- Whether the site is shown to be at risk from surface water flooding in the Risk of Flooding from Surface Water (RoFSW) dataset including an allowance for climate change.

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

4.3 Sites taken forward to a Level 2 assessment

A spreadsheet was prepared for the 36 sites assessing flood risk from tidal, groundwater and surface water flooding extents and the Environment Agency's flood zone data. Sites were taken forwards if greater than 10% of the site area was within the following flood extents:

- Surface Water Annual Exceedance Probability (AEP) plus upper end climate change allowance
- Tidal 0.5% AEP from detailed modelling plus upper end climate change allowance

The historical flood risk and groundwater flood risk was also considered for each site, along with location within flood warnings/alerts and defences. Access and egress were then also assessed for each site, identifying depths locally above 300mm for both tidal and surface water flooding.

In addition to the 36 an additional four sites were then put forward Level 2 assessment.

Out of the 41 sites, 26 sites were identified as potentially needing a Level 2 assessment.

Following a discussion with Adur & Worthing Councils, ten sites were then removed as they were no longer required and 5 sites were merged to create the larger Lancing Meadows site.

Therefore, out of the 36 sites provided by Adur & Worthing Councils, 16 sites have been identified to be carried forward to a Level 2 assessment. The key points for the 16 sites are listed in Table 4-1 below in, full details are provided in Appendix A.

Table 4-1 Site summary table key points

Site Name	Key points
B&Q and Halfords	
Barns at New Salts Farm	The site has generally been identified to be at high risk of flooding due to its location within Flood Zone 3. According to the 2025 Arun-Adur modelling, 75% of the site is at risk of tidal flooding in the design event (0.5% AEP plus 55% climate change allowance). The key access routes to the site is via New Salts Farm Road. During the design event access to the site is unavailable, with a hazard rating of 'Danger to most'. Detailed consideration into site access and egress will be required.
Car Park Beach Green	
Chandlery	70% of the site is shown to flood during the tidal design event (0.5% AEP plus 55% climate change allowance). The site is not shown to be at risk of surface water flooding during the design event. The key access routes to the site is via Shoreham Port, linking to Riverside to the east of the site. During the tidal design event, flooding is predicted along these access routes. Detailed consideration into site access and egress will be required.
Egypt Wharf/Lennards Wharf	

Site Name	Key points
Fisherman's Wharf	The site is identified to be at high risk of flooding. According to the 2025 Arun-Adur modelling, the site is situated 3% in Flood Zone 3b, 16% in Flood Zone 3a and 9% in Flood Zone 2. 92% of the site is shown to flood during the tidal design event (0.5% AEP plus 55% climate change allowance). The site is a low risk of surface water flooding. 6% of the site is shown to flood during the surface water design event (1% AEP plus 45% climate change allowance). The key access route to the site is via Brighton Road. During both the tidal and surface water design events, flooding is predicted along this access routes. Detailed consideration into site access and egress will be required.
Kwik Fit/Ham Business Centre	
Lancing Meadows	The site is located within Flood Zone 3. According to the 2025 Arun-Adur modelling, 89% of the site is at risk of tidal flooding in the design event (0.5% AEP plus 55% climate change allowance). A small area of land, less than 1% is at risk of surface water flooding during the 3.3%AEP scenario. Land with this probability is considered high risk and development in these areas should not take place. 17% of the site is at risk of surface water flooding in the design event (1% AEP plus 45% climate change allowance). The site has generally been identified to be at low risk of flooding at this time, with an increasing risk in the future due to the severity of flooding during the tidal climate change events. This is only likely to become an issue if the standard of protection for the defences are not maintained in line with the effects of climate change.
Lancing Police Station	The site has been identified to be at low risk of flooding due to its location within Flood Zone 1.
Land East of Adur Close	The site is located within Flood Zone 3. According to the 2025 Arun-Adur modelling, 96% of the site is at risk of tidal flooding in the design event (0.5% AEP plus 55% climate change allowance). The site is at low risk of surface water flooding
Land East of Manor Close	

Site Name	Key points
Malthouse Industrial Estate	According to the 2025 Arun-Adur modelling, the site is situated 3% in Flood Zone 3b, 1% in Flood Zone 3a and 2% in Flood Zone 2. 99% of the site is shown to flood during the tidal design event (0.5% AEP plus 55% climate change allowance). The site is a low risk of surface water flooding. 3% of the site is shown to flood during the surface water design event (1% AEP plus 45% climate change allowance). The key access routes to the site is via Brighton Road. During both the tidal and surface water design events, flooding is predicted along these access routes. Detailed consideration into site access and egress will be required.
New Monks Farm	
Pond Road	The site has been identified to be at low risk of flooding due to its location within Flood Zone 1. Approximately 16% of the site is at surface water flood risk during the design flood event (1%AEP plus 45% climate change allowance).
Shoreham Airport	

Site Name	Key points
Shoreham Gateway	The site is identified to be at high risk of flooding. According to the 2025 Arun-Adur modelling, the site is situated 44% in Flood Zone 3a and 48% in Flood Zone 2. 99% of the site is at risk of tidal flooding in the design event (0.5% AEP plus 55% climate change allowance). The site is at high risk of surface water flooding, at risk of surface water flooding during the 3.3%AEP scenario. Land with this probability is considered high risk and development in these areas should not take place. 50% of the site is at risk of surface water flooding in the design event (1% AEP plus 45% climate change allowance). The key access routes to the site are via Steyning Road (A283). During both the tidal and surface water design events, flooding is predicted along access route, with depths exceeding 1.2m in the tidal design event. Access and egress is likely to be unavailable, detailed consideration into site access and egress will be required.

4.4 Sites not taken forward to a Level 2 assessment

Sites that were identified as not requiring a Level 2 assessment may still have some restraints. It is therefore critical that the flood risk at each development site including access and egress is considered to prepare the necessary documentation (for example a Flood Response Plan) and gain the appropriate advice.

Sites can still be allocated but should be assessed as part of an individual site-specific assessment and should have a Flood Response Plan produced to further consider access and egress on a site-specific basis. Residents should sign up to Flood Warnings and Alerts where these are available. Please refer to Paragraph: 047 of the Flood and Coastal Change section of the PPG for further details on access and egress.

4.5 Cumulative Impact Assessment (CIA)

When allocating land for development, consideration should be given to the potential cumulative impact of the loss of floodplain storage volume and potential effects of increased volumes of runoff from proposed development. Whilst the loss of storage or potential increase in flow volume for individual developments may only have minimal impact on flood risk, the cumulative effect of multiple developments may be more severe.

As part of the Level 1 Assessment a cumulative impact assessment was carried out and identified which catchments within the Adur and Worthing administrative area are more sensitive to the cumulative impact of development and where more stringent policy regarding flood risk is recommended. Any development in these areas should seek to contribute to work that reduces wider flood risk in those catchments. For more details on the CIA and catchment rankings please refer to Section 12 of the Level 1 SFRA report.

5 Summary

5.1 Overview

This Level 2 SFRA delivers site specific guidance and recommendations for sites in the Adur District. As part of the Level 2 SFRA, 16 detailed site summary tables have been produced. The Level 2 SFRA should be read in conjunction with the Level 1 SFRA.

5.2 Recommendations

5.2.1 Level 1 SFRA

Recommendations from this report should be considered in addition to recommendations from the Level 1 SFRA, which still stands for the site allocations and any windfall development that comes forwards. The recommendations in the Level 1 SFRA are set out in Section 14 of the report.

5.2.2 Level 2 SFRA

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.

In principle, it is possible for the majority of sites to pass the flood risk element of the Exception Test by:

- Siting development within the site away from the highest areas of risk.
- Considering safe access/ egress 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 egress is affected a Flood Response Plan may be required.
- Finished floor levels should be above the estimated flood level (Tidal 0.5% AEP event with an allowance for climate change, Surface Water 1% AEP event with an allowance for climate change), including an allowance for freeboard.
- Considering space for green infrastructure in the areas of highest flood risk.

Some sites are at greater risk and will require careful consideration and mitigation to pass the flood risk element of the Exception Test.

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 re-applied by the Developer at the planning application stage.

Developers should, where required, undertake more detailed hydrological and hydraulic assessments of the watercourses, including latest climate change allowances, to verify flood extent in order to inform the sequential approach within the site and demonstrate, as required, that the Exception Test is satisfied.

5.3 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. Additional guidance should be sought from West Sussex County Council, the Environment Agency and Southern Water where relevant to ensure the most up to date information is considered within any new assessments. Such information may be in the form of:

- Policy/ legislation updates
- Flood event information following a flood event
- New hydraulic modelling results
- Environment Agency flood map updates
- New flood defence or alleviation schemes
- New guidance e.g. National standards for sustainable drainage systems

The Environment Agency 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 Flood Risk Assessment.

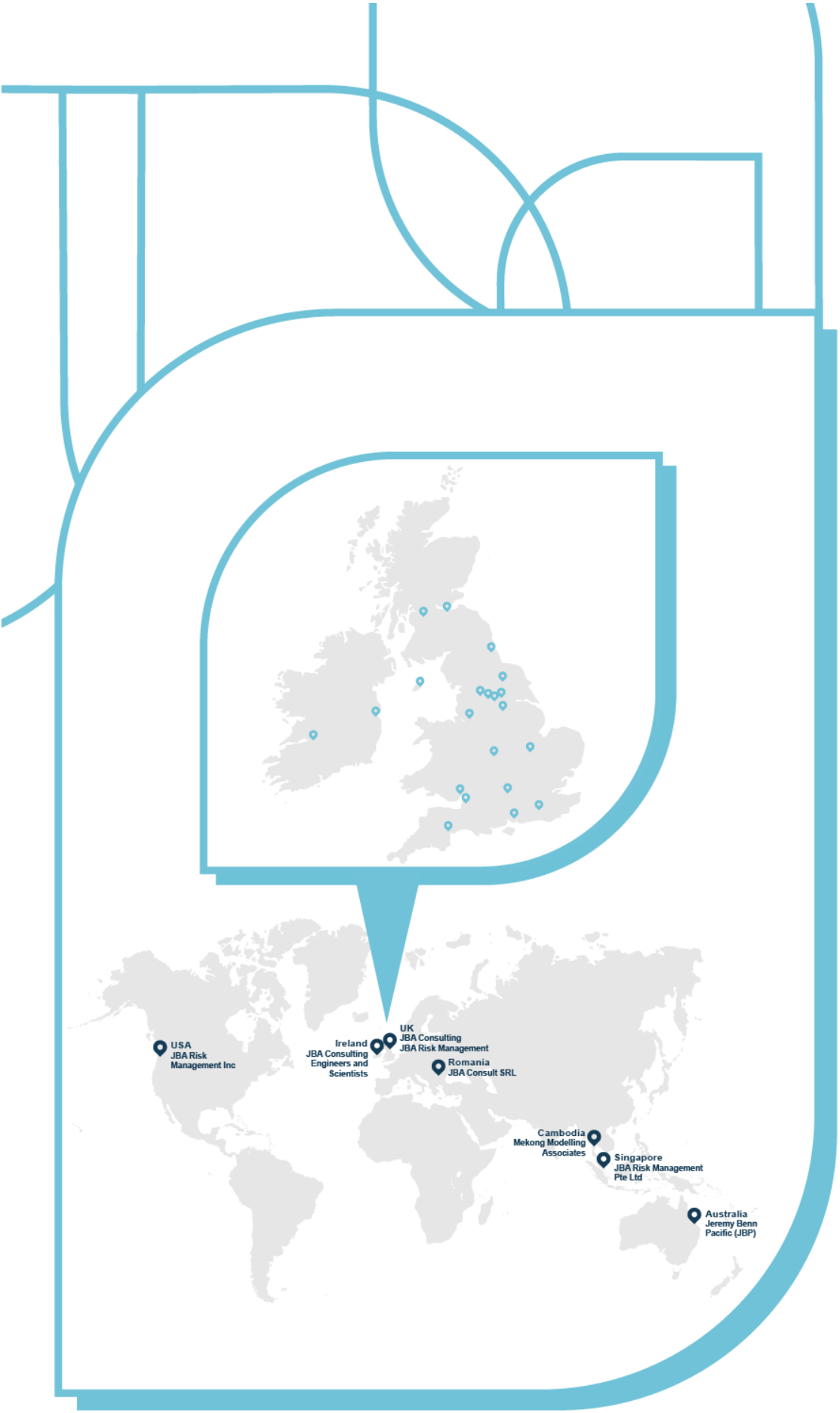
5.4 Neighbourhood Plans

Flood risk should be fully addressed in development plan preparation and in bringing forward policies for the allocation of land. Therefore, SFRA findings should be used in the production of Neighbourhood Plans.

Neighbourhood planners can use the information in the Level 1 and Level 2 SFRAs on the sources of flood risk across Adur District and the flood risk mapping, to assess the risk of flooding to sites within their community. The SFRA will also be helpful for developing community level flood risk policies in high flood risk areas.

A Site Assessment Summary Tables

B Flood Datasets



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