

Cheshire West and Chester Level 1 SFRA - Appendix D

Final Functional Floodplain Delineation Methodology

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Prepared for:
Cheshire West and Chester Council



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1 Introduction

The Flood Risk and Coastal Change Planning Practice Guidance¹ (FRCC-PPG) states that local planning authorities (LPA) should identify and assess, in their Strategic Flood Risk Assessments (SFRA), areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (EA). The Cheshire West and Chester functional floodplain (Flood Zone 3b) extent has therefore been delineated as part of this Level 1 SFRA using the most up-to-date data available from the EA. The previous functional floodplain extent, delineated for the 2016 SFRA for Cheshire West and Chester, has been superseded by more up-to-date modelled outputs, as updated by the EA as part of the Flood Map for Planning in March 2025. This methodology note explains the delineation process.

Note that the functional floodplain (Flood Zone 3b) is not included in the Flood Map for Planning. Although the updated Flood Map for Planning does include for the 3.3% AEP defended event, the functional floodplain should also account for other available data indicating land where water has to flow, or which stores water, in times of flooding. This SFRA therefore sub-divides Flood Zone 3 into Flood Zone 3a and Flood Zone 3b (functional floodplain). This distinction is for the use of LPAs and developers in development planning. Flood Zone 3a can be considered to be Flood Zone 3 of the Flood Map for Planning that is not functional floodplain.

The LPA, Lead Local Flood Authority (LLFA) and the EA must all agree on the extent of the functional floodplain outline and the methodology used. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The local knowledge of the LPA, LLFA and EA is therefore crucial in defining the functional floodplain as robustly and realistically as possible.

¹ [Flood Risk and Coastal Change Planning Practice Guidance | UK Government | 2025](#)

2 Functional floodplain definition

The EA's SFRA guidance² states that the Level 1 SFRA should include the functional floodplain extent on maps with a detailed explanation of how the functional floodplain was defined. This methodology note provides this definition.

The EA's SFRA guidance (2025) states that functional floodplain should show land that:

"Would flood from rivers or the sea with an annual probability of 1 in 30 (3.3%), with flood risk management features and structures operating effectively

Would normally form the river channel

Is designed to flood (such as flood attenuation schemes), even if it would only flood in more extreme events (such as 0.1% annual probability)"

How to Prepare an SFRA, Environment Agency, 2025

Regarding the impact of defences on the functional floodplain:

"In any modelling used to identify the functional floodplain, include existing defences and other flood risk management features and structures.

You may not need to designate the functional floodplain in locations where evidence shows flooding would be prevented by existing flood defences, flood risk management features or structures, or buildings"

How to Prepare an SFRA, Environment Agency, 2025

Regarding the impact of existing buildings on the functional floodplain:

"The footprints of existing buildings may be removed from functional floodplain extents. However, it may be simpler to include existing buildings and use local policies to control the redevelopment or changes of use that may be acceptable.

Use local policies or guidance to explain the approach you will take when buildings are demolished in functional floodplain. It may be reasonable to assume that sites revert to functional floodplain when buildings have been demolished for more than a year."

How to Prepare an SFRA, Environment Agency, 2025

If there is not enough detailed modelled information available to identify the functional floodplain, this should be made clear on the Level 1 SFRA maps to ensure risk isn't underestimated. In these areas, site-specific flood risk assessments should determine whether a site is affected by functional floodplain through additional modelling. If sites are proposed for development in such areas in the local plan, a Level 2 SFRA will be required to robustly map the functional floodplain extent².

² [How to Prepare a Strategic Flood Risk Assessment | Environment Agency | 2025](#)

3 Available datasets

3.1 EA Flood Map for Planning - 3.3% AEP defended event (rivers and sea)

Areas within the modelled defended 3.3% AEP extent should be considered as functional floodplain, which is defined as land having a 3.3% or greater annual probability of flooding. The EA Flood Map for Planning now includes for the 3.3% AEP defended event (rivers and sea) for both present day and accounting for climate change. The defended scenario considers the presence of flood defences and assumes that they operate in the way they were designed to function. This scenario does not include any asset failure or removal scenarios.

The 3.3% AEP event extent is recommended to be used as a starting point for the functional floodplain delineation. However, this process should also consider other datasets that indicate where water has to flow, or where water is stored, in times of flooding. The additional datasets included within the functional floodplain extent are outlined in Section 3.2.

3.2 Additional datasets

In addition to the EA Flood Map for Planning 3.3% AEP defended event, the datasets outlined below were also used to assist with the delineation of the functional floodplain:

- EA Statutory Main River Map
 - To define areas of the channel that are designated as main river by the EA.
 - This dataset includes both open channel and culverted watercourses.
 - The dataset has been buffered by 8m either side of the channel line to broadly represent the width of the river across the area. It is recognised that this is an approximation. Policy relating to functional floodplain applies to the actual location of the river and not the buffered channel within the functional floodplain mapping in locations where they may differ.
- EA Flood Map for Planning - Flood Storage Areas
 - To define areas of land which store water during a flood event.
 - Flood Storage Areas should be consulted on for appropriateness with the EA.
 - The Flood Storage Area dataset has been reviewed and it was found that there were three EA defined Flood Storage Area's within the Cheshire West and Chester authority area. These have been included within the functional floodplain outline.

4 Functional floodplain delineation methodology

4.1 GIS methodology

The below steps summarise the methodology used to delineate the functional floodplain:

- The EA Flood Map for Planning 3.3% AEP defended event outline covering Cheshire West and Chester was used as a starting point.
- All main river channels, including culverted sections of river, were added to the functional floodplain outline. This is required by the EA SFRA guidance to define areas that would normally form the river channel and where water has to flow in times of flooding. At a local scale, this may lead to some inaccuracies, especially in hydrologically complex areas where there are man-made interactions or interactions with other bodies of water such as reservoirs or canals.
- Recognising this, functional floodplain policy relates to the river and not the mapping where they are different. For main rivers, the functional floodplain should include for an 8m buffer either side of the channel to allow for access to the channel for maintenance.
- Each polygon within the functional floodplain outline has been attributed with the source dataset so it is possible to ascertain which dataset each polygon within the outline is based on.
- Checks on the geometry of the functional floodplain outline were carried out to ensure geometric correctness in GIS.

4.2 Methodology hierarchy

The hierarchy of methods used to define the functional floodplain is outlined below:

1. Use of the Flood Map for Planning 3.3% AEP defended event outlines (downloaded March 2025)
2. Use of the Flood Map for Planning Flood Storage Area dataset, where applicable
3. Use of the buffered EA Statutory Main River Map (8 metres either side of the channel)

Table 4-1 provides a description of each source attribute within the functional floodplain dataset.

Table 4-1: Functional floodplain source attribute definitions

Source attribute	Description
Flood Map for Planning 3.3% AEP defended outline (EA) - modelled fluvial and tidal	Areas of the Flood Map for Planning 3.3% AEP defended outline contributed to by fluvial and tidal model outputs
Flood Map for Planning 3.3% AEP defended outline (EA) - modelled direct rainfall	Areas of the Flood Map for Planning 3.3% AEP defended outline contributed to by direct rainfall model outputs
Flood Map for Planning 3.3% AEP defended outline (EA) - modelled fluvial/tidal and direct rainfall	Areas of the Flood Map for Planning 3.3% AEP defended outline contributed to by a combination of both fluvial/tidal and direct rainfall model outputs
Flood Map for Planning Flood Storage Areas (EA)	Environment Agency Flood Storage Areas, showing areas of land acting as a storage basin to attenuate flooding.
Main River (EA)	8m buffered polygon of the Statutory Main River map indicating areas of river channel.

4.3 Environment Agency models

More recently available models may not have been captured as part of the Flood Map for Planning 3.3% AEP defended event outline. Therefore, all available EA models covering the study area were provided, and the outlines reviewed against the Flood Map for Planning.

Table 4-2 lists these models.

All EA models covering the study area were completed in 2019 or earlier. Therefore, modelled flood outlines have either been superseded by more up to date national modelling or have been included within the 3.3% AEP defended event outline.

It is recommended that this SFRA is kept as a 'live' document and is updated where there are any significant changes to the flood zones across the authority area due to the availability of updated modelling.

Table 4-2: Available Environment Agency models within the study area

Model	Watercourse(s)	Model year
Balderton	Balderton Brook	2014
Dee CFMP	River Dee, River Alwen, River Ceiriog, River Alyn, River Clywedog	2008
Finchett's Gutter	Finchett's Gutter, Sealand Main Drain, Bache Brook	2015
Gonger	Gonger Brook	2009
Gowy	River Gowy and tributaries	2017
Ince and Frodsham	Ince Marshes, Hornsmill Brook, Frodsham Marshes, River Weaver, MSC	2011
Lower Dee	River Dee	2007
Lower Dee Fluvial	River Dee	2010
Lower Weaver	River Weaver	2019
Mersey Estuary	River Mersey	2016
Middlewich	River Weaver, River Wheelock, River Dane, River Croco, Alum Brook, Howty Brook, Loach Brook, Sanderson Brook, Dane-in- Shaw Brook	2009
Mill Windle	Mill Brook, Windle Brook	2010
Manchester Ship Canal	Manchester Ship Canal	2016
Northwich	River Weaver	2003
Northwich	River Weaver, River Dane	2017
Rivacre Brook	Rivacre Brook	2017
River Weaver	River Weaver	2010
Shotwick Brook	Shotwick Brook	2007
Tattenhall	Mill Brook	2014
Tidal Dee	River Dee	2007
Tidal Dee	River Dee	2015

Model	Watercourse(s)	Model year
Wade, Crow, Red Lion Brook	Wade Brook (also known as Crow Brook and Red Lion Brook)	2010

4.4 Culverted rivers

The EA Statutory Main River Map includes a high-level and approximate representation of culverted sections of watercourses. These sections are subject to a higher degree of uncertainty as it is more challenging to identify and verify below ground alignments. Within culverted sections, functional floodplain policy relates to the actual confirmed alignment of culverted sections, as identified through site investigation, rather than the alignment shown in the functional floodplain where it differs. The EA or LLFA may be able to advise on the culverted sections in the functional floodplain.

It is recommended that investigations of on-site culverted watercourses to establish their full route, condition and capacity are carried out through a site-specific flood risk assessment and incorporated into the surface water sustainable drainage strategy, as required.

4.5 Waterbodies

The river channel datasets contain open river channels and culverted sections of channel only and do not include other types of waterbody such as reservoirs, canals, lakes or ponds. Waterbodies are only included in the delineated functional floodplain where they are present within the Flood Map for Planning 3.3% AEP defended model outlines. There is no reliable dataset to identify waterbodies that can be used to delineate the functional floodplain.

4.6 Buildings and infrastructure

Buildings and infrastructure within the functional floodplain have been retained within the outline, i.e. they have not been removed on the assumption that floodwater ingress may occur. EA SFRA guidance states that you do not need to designate functional floodplain in locations where evidence shows flooding would be prevented by existing buildings, however it may be simpler to include existing buildings and use local policies to control the redevelopment or changes of use that may be acceptable.

4.7 Dry islands

Areas of higher land shown as 'dry islands' within the functional floodplain should also be considered undevelopable, where safe access and escape routes are unachievable. The only exception to this is for water compatible or essential infrastructure uses. It has been assumed that any 'dry islands' within the functional floodplain outlines should be considered as functional floodplain where these areas are located within Flood Zone 3 of the EA's Flood Map for Planning. Therefore, manual edits have been made to fill in these 'dry islands' within the functional floodplain outline.

5 Future functional floodplain

In addition to the present day functional floodplain outline, a future functional floodplain outline, as advised in EA guidance, has been delineated. The same approach to producing the present day outline has been taken for the future functional floodplain, however the Flood Map for Planning 3.3% AEP defended plus climate change outline has been used as the starting point. The climate change allowances used to produce this dataset are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

The future functional floodplain indicates areas likely to be within the functional floodplain in the future, however should take into account local circumstances. The future functional floodplain extent should not be included in the functional floodplain designation².

6 Conclusions

The functional floodplain outline has been assessed and agreed upon by the LPA, LLFA and the EA. The extent of the functional floodplain outline produced from this Level 1 SFRA should always be assessed in greater detail where any more detailed study such as a Level 2 SFRA or site-specific FRA are undertaken.

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