Appendix A: GeoPDF User Guide

Please tick the boxes next to the dataset titles in the map legend to display data. If data does not display, it means it is not present in that particular area.

Legend	Description	Reference
Authority Information • Birmingham City Boundary • Watercourses • Severn Trent Water	• Birmingham City Boundary - the boundary of the City of Birmingham, the study area for this SFRA. • Watercourses – the Environment Agency (EA) Detailed River Network representing the river network based on Ordnance Survey (OS) MasterMap for surface features and EA culvert surveys for underground features (where available). • Severn Trent Water – the study area is covered by Severn Trent Water as the water and sewerage provider.	**Section 1.5** SFRA study area **Figure 1-1** **Figure 1-2** **Section 5.6** Sewer flooding
Historic • Recorded Flood Outlines (EA) • Historic Flood Map (EA)	• EA Recorded Flood Outlines show all records of historic flooding from rivers, the sea, groundwater and surface water. This may not include all LA/ LLFA flood incidents or records. • The EA Historic Flood Map shows areas of land that have been previously subject to fluvial flooding in the area. This includes flooding from rivers, the sea and groundwater springs but excludes surface water. If an area is not covered by the Historic Flood Map/Recorded Flood Outlines, it does not mean that it has never flooded, only that currently there are no records of flooding in this area from the EA records. Other historic information is supplemented in the Level 1 Main Report (section 5.1).	**Section 5.1** Historical Flooding **Figure 5-1** **Table 5-4** **Appendix E**
Risk of Flooding from Surface Water (EA) • RoFfSW 3.3% AEP • RoFfSW 1% AEP • RoFfSW 0.1% AEP	The EA's Risk of Flooding from Surface Water (RoFfSW) flood maps give an indication of the broad areas likely to be at risk of surface water flooding. This includes flooding that takes place from the surface runoff generated by rainwater. • 3.3% - each year the area has greater than a 1 in 30 chance of flooding • 1% - each year the area has between a 1 in 100 and a 1 in 30 chance of flooding • 0.1% - each year the area has greater than a 1 in 1000 chance of flooding The dataset maps the likely extent, depth, velocity and hazard of the flooding.	**Section 5.5** Surface water flood risk **Appendix E**
Boosting Action Druids Heath ICM Modelling • 3.3% AEP	The Druids Heath surface water model was developed by Birmingham City Council and partners and was finalised in 2022. The aim of the project was to more accurately map pluvial (surface water) flood risk in Druids Heath, where historically properties have been	**Section 5.5** Surface water flood risk

Legend	Description	Reference
• 1% AEP • 0.1% AEP • 3.3% AEP + 25% CC • 3.3% AEP +35% CC • 1% AEP +25% CC • 1% AEP +40% CC	flooded. The model outputs include flood depth, flood hazard rating and flood velocity. The 3.3% AEP, 1% AEP and 0.1% AEP events have been modelled. The 3.3% AEP and 1% AEP events have also been updated to reflect the most recent Central and Upper End climate change uplifts for the Tame Anker and Mease management catchment.	
Surface Water Zones • Surface Water Zone A • Surface Water Zone B	The Surface Water Zone maps describe two zones that indicate locations at either low or high risk of flooding from surface water based on the modelled extent of the 1 in 100 year plus 40% climate change allowance surface water flood event. The decision has been made to use the 1 in 100 year plus 40% climate change and 1 in 1000 year surface water flood extent as the low risk zone (Zone B). The extent of flooding during the lower return period surface water flood events (1 in 30 year, 1 in 100 year and 1 in 100 year plus 25% climate change allowance) has been used to represent Zone A, indicating locations at high risk of flooding from surface water. This decision has been made due to the likelihood of these events occurring.	**Section 3.2.2**
Risk of Flooding from Rivers and Sea (EA) • Very low • Low • Medium • High	The Risk of Flooding from Rivers and Sea maps have been generated from the EA's National Flood Risk Assessment (NaFRA) and National Receptor Dataset (NRD). • Very low risk: each year there is a chance of flooding of less than 1 in 1000 (0.1%) • Low risk: each year there is a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) • Medium risk: each year there is a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%) • High risk: each year there is a chance of flooding of greater than 1 in 30 (3.3%)	**Section 5.4** Fluvial flood risk **Appendix E**
Flood Zones • Flood Zone 3b • Flood Zone 3a • Flood Zone 2	The EA's Flood Map for Planning (FMfP) is an online mapping portal which shows the Flood Zones in England. They are formed from older national 2D generalised (broadscale) modelling and updated periodically every year with detailed modelling outputs. In most places they should therefore reflect latest modelling where available. In areas that are not covered by fluvial modelling the 100-year and 1,000-year modelled flood extents were used to represent Flood Zones 3a and 2 respectively. The Flood Zones are for use in development planning and flood risk assessments. • Flood Zone 3b – Functional Floodplain: This zone comprises land where water has to flow or be stored in times of flood. Flood Zone 3b is identified as land which would flood	**Section 3.2.1** Flood Zones – river risk

Legend	Description	Reference
	with an annual probability of 1 in 30 years (3.3% AEP) where detailed hydraulic modelling exists. • Flood Zone 3a – High probability: greater or equal to a 1 in 100 years (1% AEP) chance of river flooding in any given year or greater than a 1 in 200 years (0.5% AEP) chance of sea flooding in any given year. • Flood Zone 2 – Medium probability: between a 1 in 100 years (1% AEP) and 1 in 1000 years (0.1% AEP) chance of river flooding in any given year or 1 in 200 years (0.5% AEP) and 1 in 1000 years (0.1% AEP) chance of sea flooding in any given year. This also includes the EA's Historic Flood Map.	
Modelled fluvial flood extent, depth, velocity and hazard • 3.3% AEP • 1% AEP • 0.1% AEP	These layers are from existing hydraulic models for the River Tame, River Cole, River Rea and Hatchford Brook. Layers showing the extent, depth, velocity and hazard rating of flooding for each watercourse have been merged together to create one layer for each return period. The 3.3% AEP (1 in 30 year) event, 1% AEP (1 in 100 year) event and 0.1% AEP (1 in 1000 year) event. The River Rea model could not be re-run due to the age of the model and the instabilities present. For this reason, the 2% AEP (1 in 50 year) event has been used as a proxy for the 3.3% AEP (1 in 30 year) event for the River Rea.	
Climate Change Extent (Modelled) Fluvial • Climate Change Central (1% AEP +22%) • Climate Change Higher Central (1% AEP +30%) • Climate Change Upper End (1% AEP +51%) Surface water • Climate Change Central (3.3% AEP +	For the fluvial models, these extents are from existing hydraulic models, where the 1% AEP (100-year flow) is upscaled by the EA's Central, Higher Central and Upper End climate change allowances for the 2080s epoch for the Tame, Anker and Mease management catchment. Climate change modelled flood extents can be compared to the 100-year flood extent (Flood Zone 3a), and where no detailed modelling exists, compared against Flood Zone 2, for an indication of areas most sensitive to climate change. Modelled climate change uplifts for the 3.3% and 1% AEP surface water flood events were included as part of this SFRA and are presented in in Appendix A: Surface Water GeoPDFs	**Section 4** Impact of Climate Change **Appendix B**

Legend	Description	Reference
25%, 1% AEP +25%) • Climate Change Upper End (3.3% AEP + 35%, 1% AEP + 40%)		
<u>EA Flood Alert and Warning Areas</u> • Flood Warning • Flood Alert	• Flood Warnings are issued to designated Flood Warning Areas when a river level hits a certain threshold, heavy rainfall or high tides and strong winds are forecast. "Flooding is expected, immediate action is required". • Flood Alerts are issued when there is water out of bank for the first time *anywhere in the catchment* and when forecasts indicate flooding may be possible. "Flooding is possible, be prepared". • Both of these datasets are a polygon GIS shapefile where the above are issued; they are not flood extents.	**Section 5.10** Flood Alert and Flood Warnings **Appendix D** Flood Alert and Flood Warnings
<u>Groundwater Emergence Mapping (JBA)</u> • No risk • At least 5m below surface • Between 0.5-5m below surface • Between 0.025-0.5m below surface • Less than 0.025m below surface	JBA's Groundwater Emergence map shows the level of groundwater below the surface, at a resolution of 5m. Flood risk could increase when groundwater is already high or emerged, causing additional overland flow paths or areas of still ponding. The Groundwater risk categories are listed within the main Report.	**Section 5.7** Groundwater flooding **Appendix E**
<u>Defences</u> • Embankment • Engineered High Ground • Natural High Ground • Flood Gate • Spillway • Wall	EA Asset Information Management System (AIMS) spatial Flood Defence dataset, shows flood defences currently owned, managed or inspected by the EA. A defence is any asset that provides flood defence or coastal protection functions. The main defences within the City of Birmingham are natural high ground, but there are also some embankments, walls and areas of engineered high ground.	**Table 6-2** Locations shown in the 'EA AIMS' dataset **Section 6.5** Existing and future flood alleviation schemes

Legend	Description	Reference
Reservoir Flood Extents (EA) • Dry Day • Wet Day	The EA reservoir flood extents show the predicted flooding which would occur if a dam or reservoir fails. The EA provide two scenarios: • Dry Day – the predicted flooding which would occur if the dam or reservoir fails when rivers are at normal levels. • Wet Day – the predicted worsening of the flooding which would be expected if a river is already experiencing an extreme natural flood.	**Section 5.9** Flooding from reservoirs