Appendix B - Data sources used in the SFRA

1 Historical Flooding

Birmingham City Council provided Section 19 reports in the area which include records of historical flood events within the area. These are presented in Table 5-1 of the Main Report. The Environment Agency's Historic Flood Map and Recorded Flood Outline datasets are also presented in Appendix A: GeoPDF Mapping.

Section 5.1 documents historic flooding records obtained.

2 Fluvial flooding

2.1 Flood Zones 2 and 3a

The Fluvial Model Flood Zones 2 and 3a, as shown in the Appendix A mapping, show the 1000-year (0.1% AEP) and 100-year (1% AEP) fluvial flood extents from the detailed model outputs where these were available. Figure B-1 shows the coverage of these models.

The Environment Agency's Flood Map for Planning Flood Zones 2 and 3 are also shown in the Appendix A mapping which should be used where detailed model outputs are not available.

Over time, the online EA mapping is likely to be updated more often than the SFRA, so SFRA users should check there are no major changes in their area.

2.2 Flood Zone 3b (the Functional Floodplain)

The following models were updated and available for use in this Level 1 SFRA:

- Cole 2011 - 3.3% AEP (30-year)
- Tame 2017 – 3.3% AEP (30-year)
- Hatchford Brook 2017 – 3.3% AEP (30-year)
- There were difficulties re-running the 2017 River Rea model due to the age of the model and the instabilities present. The 2% AEP (50-year) event has been used as a proxy for the 3.3% AEP (30-year) event.

Details of the hydraulic modelling undertaken as part of this SFRA are included in Appendix G: Modelling Technical Note.

For areas not covered by detailed EA models (or where suitable outputs were not available), a precautionary approach should be adopted for Flood Zone 3b with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a. If development is shown to be in Flood Zone 3a, further work should be undertaken as part of a detailed site-specific Flood Risk Assessment to define the extent of Flood Zone 3b.

If the area of interest is in an area that has seen some major changes to the extent of the Flood Zones, having checked the online mapping, developers will also need to remap Flood Zone 3b as part of a detailed site-specific Flood Risk Assessment.

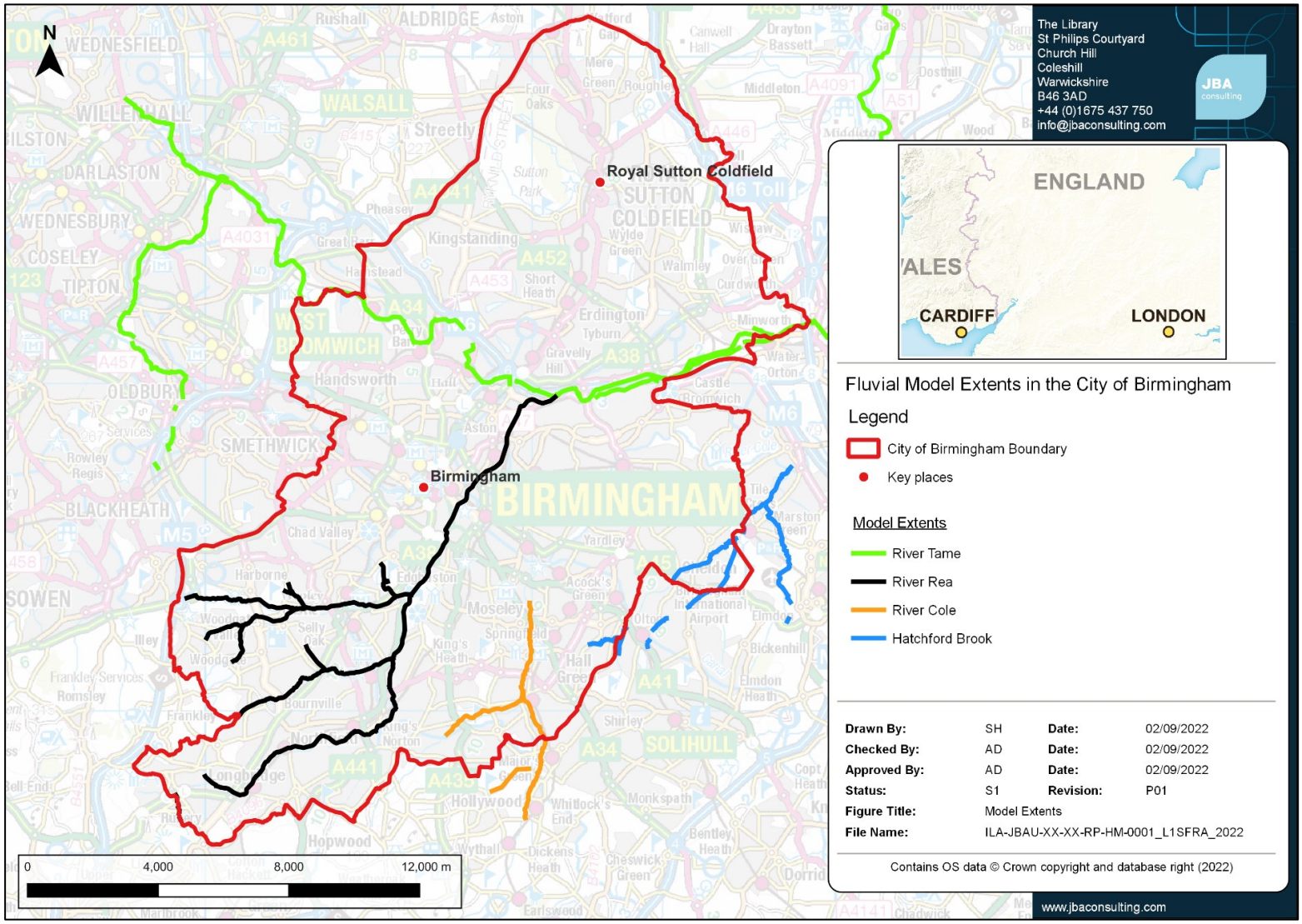

Figure B-1: Existing hydraulic modelling coverage

3 Climate change

Detailed Environment Agency hydraulic models were obtained under licence for the SFRA. Where climate change simulations undertaken for the past projects were within +/- 10% of the updated climate change allowances, these were deemed suitable to use. This was the case for the River Rea and Hatchford Brook models.

Where previous climate change runs were not suitable these models were re-run as part of this SFRA. This was the case for the River Tame and River Cole models for the Higher Central and Upper End allowance scenarios. Both models had suitable model runs for the Central allowance scenario.

Peak Rainfall climate change uplifts were also applied to surface water modelling for this assessment for the following events and scenarios:

- 3.3% AEP CC+25%
- 3.3% AEP CC+35%
- 1% AEP CC+25%
- 1% AEP CC+40%

Please refer to Chapter 4 for information on the approach to climate change in this SFRA.

4 Surface water flooding

Mapping of surface water flood risk in the study area has been taken primarily from the Risk of Flooding from Surface Water (RoFfSW) maps published online by the Environment Agency. These maps are intended to provide a consistent standard of assessment for surface water flood risk across England and Wales in order to help LLFAs, the Environment Agency and any potential developers to focus their management of surface water flood risk.

The RoFfSW is derived primarily from identifying topographical flow paths of existing watercourses or dry valleys that contain some isolated ponding locations in low lying areas. They provide a map which displays different levels of surface water flood risk depending on the annual probability of the land in question being inundated by surface water (Table B-1).

Table B-1: RoFfSW EA risk categories

Category	Definition
High	Flooding occurring as a result of rainfall with a greater than 1 in 30 chance in any given year (annual probability of flooding 3.3%).
Medium	Flooding occurring as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
Low	Flooding occurring as a result of rainfall of between 1 in 1,000 (0.1%) and 1 in 100 (1%) chance in any given year.

Although the RoFfSW offers improvement on previously available datasets, the results should not be used to understand flood risk for individual properties. The results should be used for high level assessments such as SFRAs for local authorities. If a site is indicated in the Environment Agency mapping to be at risk from surface water flooding, a more detailed assessment should be considered to illustrate the flood risk more accurately at a site-specific scale.

4.1 Surface Water Flood Zones

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.

It is important to note that this is not strictly the same conceptual risk zone as defined for river and sea flooding (even though it is associated with the same probability) as the mapping is based on different assumptions.

5 Groundwater

Mapping of groundwater flood risk has been based on the JBA Groundwater Flood Risk map.

The JBA Groundwater Emergence mapping shows groundwater flood risk on a 5m square grid. For each grid cell, a depth range is given for modelled groundwater levels in the 100-year return period (1% AEP) flood event. It takes into account factors including topography, groundwater recharge volumes and spatial variations in aquifer storage and transmission properties.

Section 5.7 of the Main Report explains groundwater flooding.

6 Sewers

Severn Trent's DG5 register of historic sewer flooding incidents has recently been replaced by the 'At Risk Register' which gives properties a risk based on incident likelihood and impact on customer. Settlements with properties at risk on Severn Trent's 'At Risk Register' are set out in Table 5 3 of the Main Report. For confidentiality reasons this data has been supplied on a postcode basis. Data was supplied from 1993 to March 2023.

Section 5.6 of the Main Report explains sewer flooding.

7 Reservoirs

The risk of inundation because of reservoir breach or failure of reservoirs within the City of Birmingham has been mapped using the outlines produced as part of the National Reservoir Flood Mapping (RFM) study, and are shown online on the **Long-Term Risk of Flooding website** at the time of publication.

The Environment Agency provide two flooding scenarios for the reservoir flood maps: a 'dry-day' and a 'wet-day'. The 'dry-day' scenario shows the predicted flooding which would occur if the dam or reservoir fails when rivers are at normal levels. The 'wet-day' scenario shows the predicted worsening of the flooding which would be expected if a river is already experiencing an extreme natural flood.

Section 5.9 of the Main Report presents the reservoirs affecting the City of Birmingham.

8 Flood Defences

The Environment Agency supplied the location of all flood defences within the City of Birmingham in their AIMS database, including information relating to the type of flood defence and their standard of protection. Chapter 6 of the Main Report provides information on flood defences and schemes.

9 Overview of supplied data

Overview of supplied data for the Birmingham SFRA from stakeholders is as follows:

Source of flood risk	Data used to inform the assessment	Data supplied by
Historic (all sources)	Historic Flood Map Recorded Flood Outlines Hydraulic Modelling Reports	Environment Agency
	Section 19 Reports	Birmingham City Council
	Historic flooding incident records	Birmingham City Council, Severn Trent Water
Fluvial (including climate change where available)	River Rea (2017) 1D-2D ISIS-TUFLOW model Hatchford Brook (2017) 1D-2D Flood Modeller – TUFLOW model River Tame – Perry Barr and Witton (2017) 1D-2D ISIS-TUFLOW model River Cole (2011) 1D-2D ISIS-TUFLOW model River Cole (2009) 1D ISIS model	Environment Agency
	Flood Map for Planning Flood Zones	Environment Agency

Surface Water	Risk of Flooding from Surface Water dataset Boosting Action Druids Heath ICM surface water model	Environment Agency Birmingham City Council
Sewers	Internal and external historic drainage records	Severn Trent Water
Groundwater	Bedrock geology/superficial deposits datasets (online dataset)	British Geological Survey
	Groundwater Flood Risk Map	JBA
Reservoir	National Inundation Reservoir Mapping (Long term flood risk map)	Environment Agency
Flood Defences	Location and description of flood defences	Environment Agency
Cross-boundary impacts	Neighbouring authority sites and Local Plan information, to help assess cross-boundary impacts and the cumulative impact assessment	Bromsgrove District Council Dudley Metropolitan Borough Council Lichfield District Council North Warwickshire Borough Council Sandwell Metropolitan Borough Council Solihull Metropolitan Borough Council Walsall Council
Other datasets	Partner Data Catalogue: - Detailed River Network - Flood Alert Areas - Flood Warning Areas - Flood Maps for Planning - Historic Flood Map - Risk of Flooding from Rivers and Sea	Environment Agency (via Birmingham City Council)