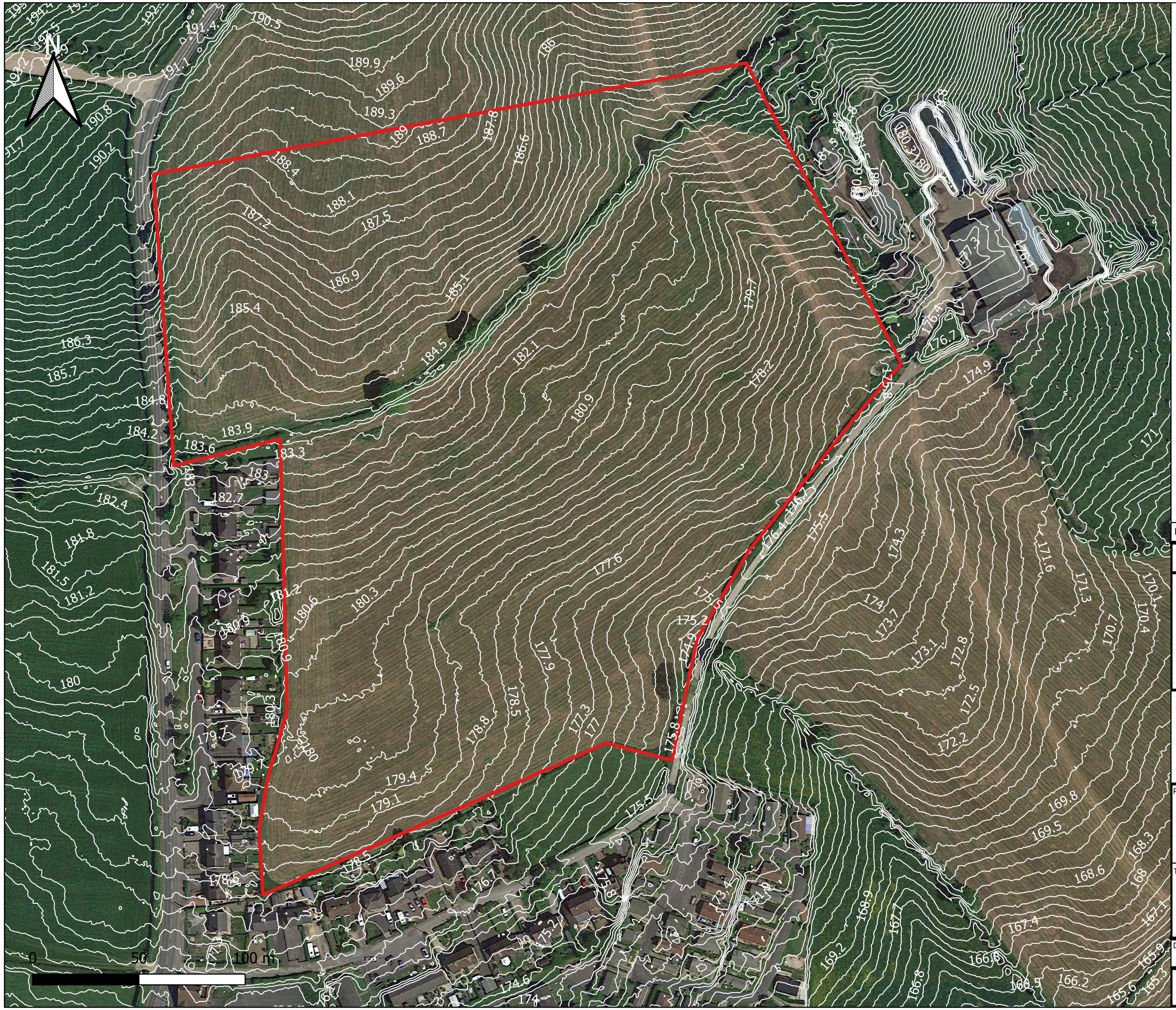


DO NOT SCALE

Legend

Site Outline

Contours

Google Satellite

REV	DATE	BY	DESCRIPTION	CHK
A	03.06.21	MB	PRELIMINARY FOR ISSUE	KW

DRAWING STATUS:

BETTS HYDRO
CONSULTING ENGINEERS
Unit 6, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire CH5 2LY
Tel: 01244 288178 enquiries@betts-associates.co.uk

BLOOR HOMES

PROJECT:

LAND OFF FROGHALL ROAD
CHEADLE

TITLE:

ELEVATION
PLAN

DATE:	SCALE @ SIZE:	DRAWN:	CHECKED:
03.06.21	500@A3	MB	KW

PROJECT No:	DRAWING No:	REV:
HYD618	100	A

APPENDIX G: PROPOSED PLANNING LAYOUT

This page has been left intentionally blank

Key

- Site Boundary
- Existing Trees
- Existing Hedgerows
- Proposed Hedgerows
- Green & Blue Infrastructure
- Residential Development Parcels (Self/ Custom Build)
- Gateways (Primary & Secondary)
- Primary Footpath/ Cycleways
- Landmarks/Focal Points
- Avenue
- Street
- Lane
- Shared Drive
- Squares/Mews (Square)
- Proposed Trees (Indicative Locations)

Broadhay

Broad Haye Farm

Orchard Green

Parcel 1a
1.36 hectares
48 homes
@
35 homes/ha

Parcel 1b
0.35 hectares
12 homes
@
35 homes/ha

Village Green

Parcel 3
0.56 hectres
20 homes
@
35 homes/ha

99 metre minimum stand-off between development edge & farmhouse

Square

Pedestrian link to existing Public Right of Way

Attenuation Pond

Parcel 2a
(Self/Custom Build)
0.26 hectres
10 homes
@
40 homes/ha

Parcel 2c
1.46 hectres
80 homes
@
55 homes/ha

Mews

Parcel 2d
0.80 hectres
28 homes
@
35 homes/ha

Vista to St Giles Church Spire in heart of town

Outfall to Cecily Brook

Crescent Green

Attenuation Pond

Pedestrian link to proposed residential development by Persimmon Homes

Parcel 2b
0.76 hectres
30 homes
@
40 homes/ha

Existing Public Open Space upgraded & extended

Froghall Road A521

Silver Street

Hammersley Hayes Road

Cheadle

n*ORTH

0m 10m 20m 30m 40m 50m 60m

Scale 1:1,250 (@ A3)

Accommodation Schedule

Site Area: 8.70 hectares
Green Infrastructure: 3.22 hectares
Net Developable: 5.48 hectares
Number of Homes: 228 homes
Net Density: 41 homes/ha
Gross Density: 26 homes/ha

e*SCAPE urbanists 10 years 2009 - 2019

Project Title
Froghall Road, Cheadle, Staffordshire

e*SCAPE Job No.
020-020

Client
Bloor Homes

Drawing Number
020-020-P004

Revision
REV E

Drawing Title
Parameters Masterplan

Scale
1:1,250 @ A3

Date
June'21

APPENDIX H: PFRA/SFRA PLANNING EXTRACTS

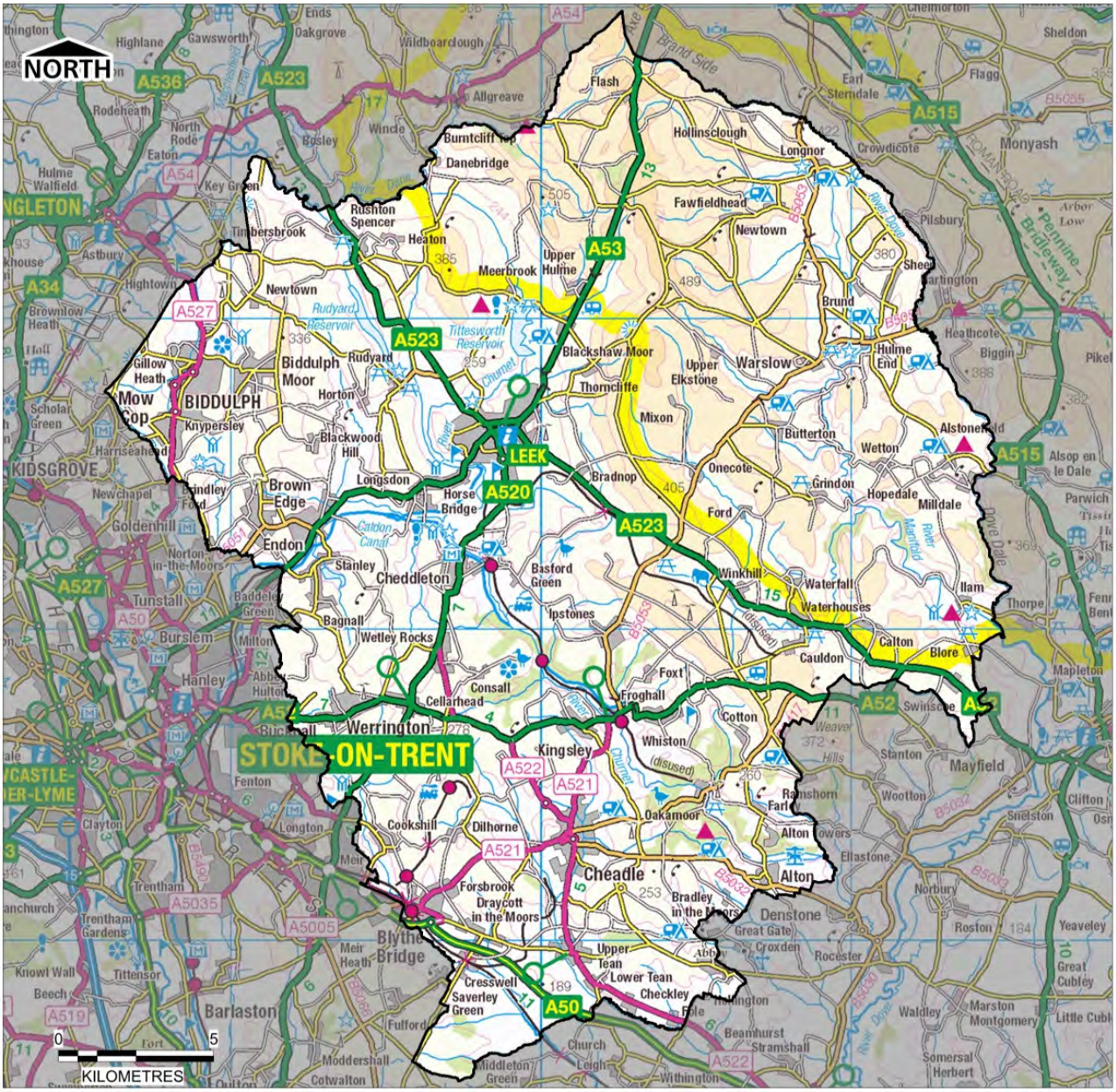
This page has been left intentionally blank

2 Study Area Overview

This Section provides an overview of Staffordshire Moorlands District with respect to flood risk.

2.1 Location

The study area of this Level 1 SFRA is defined by the entire administrative boundary of SMDC as shown in Figure 2-1.



Contains Ordnance Survey 1: 250, 000 scale Raster mapping © Crown copyright, all rights reserved. License number 0100018384. Staffordshire Moorlands District Council 2015.

Figure 2-1: Staffordshire Moorlands Level 1 SFRA Study Area

characterised by the White Peak, an area of limestone overlain by sands and grits with dramatic landforms such as the Roaches and Ramshaw Rocks, surrounded by moorlands.

To the south of the District, the geology comprises a mixture of conglomerates, sandstones and clay rich argillaceous rocks. Limestone underlies much of the eastern boundary of the District associated with the White Peak Character Area, where a number of Limestone quarries are situated.

Superficial deposits of predominantly Till are found in the west of the District towards Stoke-on-Trent and Biddulph in the north west. Stretches of alluvium, alluvial fan deposits and river terrace deposits underlie the main rivers and many of the ordinary watercourses within the District, with some areas of Head deposits and Peat found in the east and north east within the Peak District.

2.4 Watercourses

2.4.1 Main Rivers

Appendix B Figure 3 identifies the locations of key waterbodies within the District including designated main rivers (see Table 2-1) defined as watercourses shown on the statutory main river maps held by the Environment Agency and the Department for Environment, Flood and Rural Affairs (Defra). The Environment Agency has permissive powers to carry out works necessary for flood defence purposes on these rivers. The overall responsibility for maintenance however, lies with the riparian owner.

Table 2-1: Main Rivers within the Staffordshire Moorlands District

NAME	APPROX. CATCHMENT AREA WITHIN DISTRICT (km^2)	CATCHMENT DESCRIPTION
River Churnet	231	The River Churnet rises in the Peak District National Park, flowing south through the District around the major settlement of Leek. The topography of the catchment is of moderate relief with mixed geology. Land use is largely low grade agriculture or pasture. Major tributaries include Endon Brook and Combes Brook. South of Cheddleton, the river is canalised for approximately 1.6km as the Caldon Canal, before returning to natural river channel, flowing south out of the District and joining the River Dove.
River Dane	58	The River Dane borders the north of the District for approximately 15 km flowing west, with its source in the Peak District. A predominantly rural catchment with a steep topography and mixed geology.
River Tean	48	The River Tean rises to the east of Stoke on Trent and flows south east out of the District, before joining the River Dove north of Uttoxeter in East Staffordshire. The catchment is largely rural, except for the town of Cheadle. The Cecilly Brook is a major tributary.
River Blithe	42	Catchment drains the most southerly region of the District, rising to the south of Stoke-on-Trent and flowing south east out of the District and ultimately draining into the River Dove, south of Uttoxeter. Land use is largely mixed arable farming and grassland. Fors Brook is a major tributary.
Biddulph Brook	27	Biddulph Brook and its associated catchment drains a small area to the far west of the District, around the town of Biddulph, ultimately draining to the River Dane east of Congleton.

The locality of the District in the upper catchments of watercourses and the associated steep topography results in a 'flashy' hydrology, whereby watercourses (the majority of which rise in the Peak District) have steep sided valleys and narrow floodplains.

4.3.3 Flood Map for Planning (Rivers and Sea)

The 'Flood Map for Planning (Rivers and the Sea)' dataset is available on the Environment Agency website[35] and provides information on the areas that would flood if there were no flood defences or buildings in the "natural" floodplain. It is the main reference for planning purposes as it contains the most up-to-date publically available dataset for Flood Zones 1, 2 and 3a which are referred to in the NPPF and presented in Table 4-1.

The map was first developed in 2004 using national generalised modelling and is routinely updated and revised using the results from the Environment Agency's programme of catchment studies, entailing topographic surveys and hydrological and/or hydraulic modelling as well as previous flood events.

It should be noted that a separate map is available on the Environment Agency website which is referred to as 'Risk of Flooding from Rivers and Sea. This map takes into account the presence of flood defences and so provides a more realistic overview of flood risk compared to the Flood Map for Planning, which assumes no flood defences. While flood defences reduce the level of risk they don't completely remove it as they can be overtopped or fail either due to extreme weather conditions, or poor maintenance. As a result the maps may show areas behind defences which still have some risk of flooding.

This mapping has been made available by the Environment Agency as the primary method of communicating flood risk to members of the public, however for planning purposes the 'Flood Map for Planning (Rivers and the Sea)' and associated Flood Zones remains the primary source of information for planning considerations.

4.3.4 Hydraulic Modelling Studies

Table 4-2 provides a summary of the hydraulic modelling studies that have been undertaken for the main rivers in the Staffordshire Moorlands District and used to inform the 'Flood Map for Planning (Rivers and Sea)'.

Table 4-2: Hydraulic models for main rivers in Staffordshire Moorlands

WATERCOURSE	MODELLING STUDY	DATE
Cecilly Brook[36]	1D hydraulic model for Cecilly Brook beginning at Froghall Road before the watercourse is culverted, and continues south to its confluence with the River Tean.	2006
Fors Brook[37]	Coverage: 1D/2D hydraulic model for Fors Brook from immediately upstream of Willow Way at the farthest extent of the Fors Brook urban area, to its confluence with the River Blithe downstream of the railway line.	2009
River Blithe[38]	Coverage: 1D hydraulic model for the River Blithe from its upstream extent located north of Blythe Bridge, approximately 120m upstream of the Old Mill Channel, to the downstream extent located south of the A50 bridge near Bridestone Farm.	2006
River Churnet[39]	Coverage: River Churnet A 1D model was constructed for the River Churnet channel, extending from Tittesworth Reservoir down to the confluence with the River Dove, and a 2D model included the River Churnet floodplain from Tittesworth Reservoir to Basford Bridge. Includes Endon Brook and Leek Brook.	2014

It should be noted that the scope of the modelling studies covers flooding associated with main rivers, and therefore ordinary watercourses that form tributaries to the main rivers are not included in the models. Modelling of ordinary watercourses available on the 'Flood Map for Planning (Rivers and Sea)' (for catchments >3 km^2) is likely to be the result of the earlier national generalised modelling carried out by the Environment Agency and may need to be refined when determining the probability of flooding for an individual site whilst preparing a site-specific FRA. A challenge to the Environment Agency Flood Map would need to be made if such further detailed modelling demonstrated differing results.

[35] Environment Agency Flood Map for Planning (Rivers and Sea) http://apps.environment-agency.gov.uk/wiyby/37837.aspx
[36] Capita Symonds (2006) MD677 Cecilly Brook SFRM
[37] Capita Symonds (2009) MD807 Fors Brook
[38] Capita Symonds (2006) MD678 River Blithe SFRM
[39] Royal HaskoningDHV (June 2014) River Churnet Hazard Mapping Report

Overtopping and breach incidents have been provided by the CRT and are illustrated in Appendix B, Figure 4. Additional information as provided by the CRT also states that at the junction with the River Churnet, operational issues occur if the river parallel to the downstream end of this lock flight is in flood. It is reported by the CRT that water can back up and flood out of the lower lock, and possibly the next lock upstream. The CRT state that there are no actions to mitigate this, but just ensure the lock gates are closed once the water recedes, to prevent the canal pounds from draining upstream of the flooded lock(s).

From Consall Forge down to the terminus, the CRT report an issue with the freeboard in the upper pound and high flows in the river section which affect the operation when the river is in flood. It is reported that there may be clearance issues under the bridges at Consall Forge at higher water levels. Typically the navigation in the river will be shut at water levels exceeding 300 mm to weir crest level on safety grounds.

4.7.2 Environment Agency Risk of Flooding from Reservoirs Map

The failure of a reservoir has the potential to cause catastrophic damage due to the sudden release of large volumes of water. The latter can happen suddenly resulting in rapidly flowing, deep water that can cause significant threat to life and major property damage.

The PPG encourages LPAs to identify any impounded reservoirs and evaluate how they might modify the existing flood risk in the event of a flood in the catchment it is located within, and / or whether emergency draw-down of the reservoir will add to the extent of flooding.

The 'Risk of Flooding from Reservoirs' map on the Environment Agency's website[44] illustrates the maximum potential extent of inundation from breach failure of any reservoirs subject to the Reservoirs Act 1975 modelled as part of the Reservoir Inundation Mapping (RIM) modelling project (2011). The map illustrates the 'worst case' scenario and it is very unlikely that flooding of this scale would actually occur. Reservoirs included within this modelling project included those characterised by >= 25,000 m^3 of water impounded above the adjacent ground level. The mapping shows that the following reservoirs pose a potential risk of flooding in the Staffordshire Moorlands District:

- Hales Hall Pool;
- Ladderedge Storage Reservoir;
- Knypersley Reservoir;
- Rudyard Lake / Reservoir;
- Serpentine;
- Stanley Pool; and
- Tittesworth Reservoir.

To the north of Leek, an area containing Abbey Green, Bridge End and the A523 is shown to be at risk from Tittesworth only. Continuing downstream along the River Churnet west and south of Leek, the valley including Ladderedge Country Park, the A53, Barnfields and Leekbrook are at risk of flooding from failure of both the Rudyard Reservoir and the Tittesworth Reservoir.

From Stanley Pool, the area at risk of flooding associated with the reservoir is predominantly contained within the Endon Brook floodplain, affecting only a small portion of eastern Endon. The area at risk is narrow containing little to no development alongside the Endon Brook, continuing east to the confluence with the River Churnet.

From the confluence to approximately the Consall train station, the River Churnet valley is at risk of flooding from the Stanley Pool, Tittesworth and Rudyard Reservoirs. Flood risk from Tittesworth and Rudyard Reservoirs continues from Consall to just east of Alton where the River Churnet departs from the District, and includes the settlements of Froghall and Oakamoor, and roads including the A52 and B5417 in the respective settlements.

[44] Environment Agency (2015) What's in Your Backyard? 'Risk of Flooding from Reservoirs' map. Available at: http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?&topic=reservoir#x=357683&y=355134&scale=2

Appendix A.
Data Register

The following register details the datasets that were used throughout the preparation of the Level 1 SFRA update.

*(*available to the public on the Environment Agency website)*

	DATASET	SOURCE	FORMAT	DESCRIPTION
Fluvial	Flood Map for Planning (Rivers and Sea) Flood Zones 2 and 3	Environment Agency Geostore*	GIS Layer	A quick and easy reference that can be used as an indication of the probability of flooding from Main Rivers. The original Flood Map was broad scale national mapping typically using JFLOW modelling software that is generally thought to have inaccuracies. This is regularly updated with the result of new modelling studies. For those rivers where there is no updated modelling, the Flood Zones from JFLOW modelling may not provide an accurate representation of probability of flooding. Typically watercourses with a catchment area less than 3km^2 are omitted from Environment Agency mapping unless there is a history of flooding affecting a population. Consequently there will be some locations adjacent to watercourses that on first inspection, suggest there is no flood risk.
	Detailed River Network (DRN)	Environment Agency Geostore*	GIS Layer	Identification of the river network including Main Rivers and Ordinary Watercourses for which the Environment Agency and SCC have discretionary and regulatory powers.
	Historic Flood Map	Environment Agency Geostore	GIS Layer	A single GIS layer showing the extent of fluvial historic flood events created using best available information at time of publication. However, some of the data is based on circumstantial and subjective evidence. There is not always available metadata, e.g. date of flood event.
	Modelled flood outlines for the Cecilly Brook, River Blithe, Fors Brook and River Churnet.	Environment Agency	GIS Layer	Detailed and calibrated hydraulic model outlines. The Environment Agency applies the outcomes from such detailed modelling studies to update the Flood Map for Planning (Rivers and Sea) on a quarterly basis. Some watercourses have not been modelled (e.g. smaller tributaries). The flood risk from these is based on broad scale JFLOW modelling and therefore the flood risk from these cannot be as accurately assessed.
	Asset Information Management System (AIMS) for the District	Environment Agency	GIS Layer	Shows where there are existing defences, structures, heights, type and design standard. Only one such asset exists within the Staffordshire Moorlands District.
	Fluvial Flood Records	SSC	MS Excel Database	Historic records of fluvial flooding in the District held by SSC.

	DATASET	SOURCE	FORMAT	DESCRIPTION
Surface Water	'Updated Flood Map for Surface Water' dataset	Environment Agency Geostore*	GIS Layer	Provides an indication of the broad areas likely to be at risk of surface water flooding, i.e. areas where surface water would be expected to flow or pond. This dataset does not show the susceptibility of individual properties to surface water flooding.
	Surface Water Flood Records	SCC	MS Excel Database / GIS Layer	Historic records of surface water flooding in the District held by SCCs Flood and Water Management and Highways teams.
Groundwater	Groundwater Flood Records	SCC	MS Excel Database	Unconfirmed records of groundwater flooding in the held by the SCC.
	GIS layers of the geology across the District	SCC	GIS Layer	Illustrates bedrock and superficial geology across the District.
	GIS layer of Source Protection Zones	Environment Agency Geostore*	GIS Layer	Shows the areas where the groundwater is protected by the Environment Agency. The designation may not consider fractures in the strata at a greater radius where pollutants could reach the source protection zone.
	Aquifer Designation Maps for Bedrock and Superficial	Environment Agency website*	Website	Shows aquifer designations for bedrock aquifers. The designations identify the potential of the geological strata to provide water that can be abstracted and have been defined through the assessment of the underlying geology.
	GIS layer 'Areas Susceptible to Groundwater Flooding'	Environment Agency Geostore*	GIS Layer	Strategic-scale mapping indicating areas where groundwater emergence may occur.
Sewer	DG5 Register of sewer flooding incidents	Severn Trent Water Limited	MS Excel Database	Indicates individual properties that may be prone to flooding as have experienced flooding in the last 20 years due to hydraulic incapacity. However, given that ST target these areas for maintenance and improvements, areas that experienced flooding in the past may no longer be at greatest risk of flooding.
Artificial	GIS layer of canals and other artificial channels	Environment Agency Geostore	GIS Layer	GIS layer showing the centre line of the Caldon Canal and canal feeders within the District.
Other	LiDAR data (DTM, ASCII)	Staffordshire Moorlands District Council	GIS ASCII	Provides a useful basis for understanding local topography and the surface water flood risk in the area. Spatial resolution of 2m, resampled to 5m.
Emergency Planning	Flood Warning Areas	Environment Agency Geostore*	GIS Layer	Indicates which areas are covered by the flood warning system.

	DATASET	SOURCE	FORMAT	DESCRIPTION
Planning	OS Mapping of SMDC administrative area (1:10K, 1:25K, 1:50K and 1:250K)	Staffordshire Moorlands District Council	GIS format	Provides background mapping to other GIS layers.
	GIS layer of SMDC administrative boundary	Ordnance Survey website	GIS format	Defines the administrative area of the District for mapping purposes.

Figure 2-1 Map of worst affected settlements