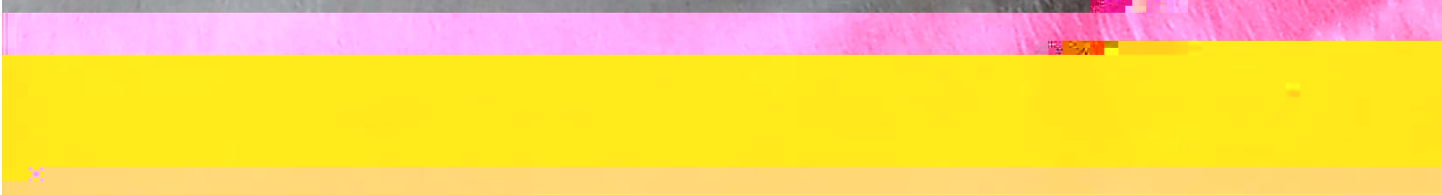
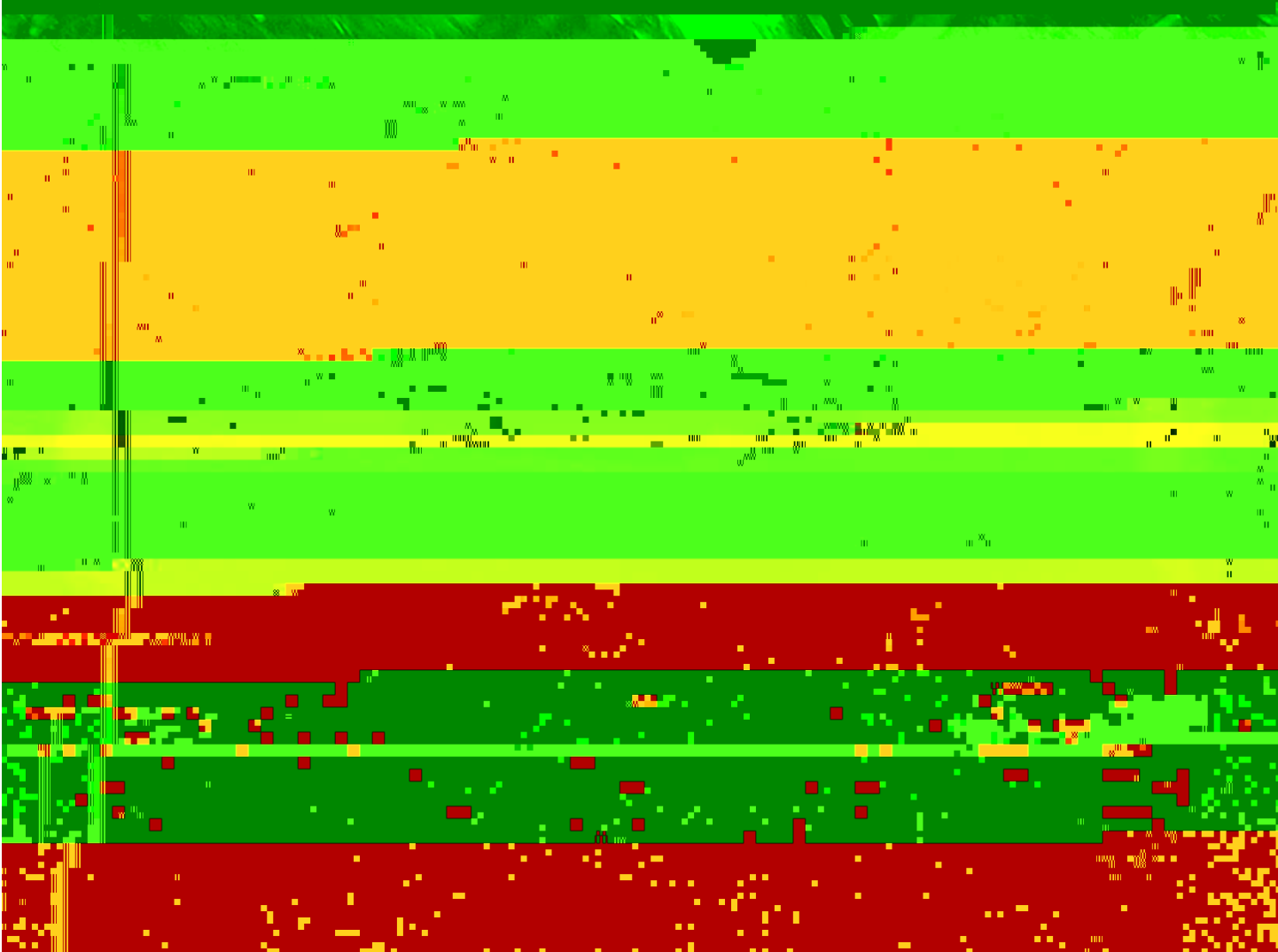


Birmingham City Council



Birmingham City Council

Preliminary Flood Risk Assessment

June 2017

Document History

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Abbreviations

Term	Meaning / Definition
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Executive Summary

This report has been prepared by Birmingham City Council to meet the requirements of the Flood Risk Regulations (2009). Under the regulations Lead Local Flood Authorities are responsible for undertaking a Preliminary Flood Risk Assessment (PFRA) for local sources of flood risk, primarily from surface water, groundwater and ordinary watercourses. The LLFA is not instructed to assess the risk from Main Rivers, the

1. Introduction

1.1 Scope

Flood Risk Management Plans (FRMPs), as required by the Flood Risk Regulations 2009 (FRR)¹, play an important part in how we protect lives and livelihoods from the risk of flooding. The plans give us an opportunity to bring together information about all sources of flooding and the

The PFRA forms part of a six year cycle of planning based on a four stage process as outlined in Table 1.1.

Stage	Requirement	Submission Date
1	Prepare Preliminary Flood Risk Assessment	22 nd June 2017
2	Identify Flood Risk Areas	22 nd June 2017
3	Prepare Flood Hazard Maps and Flood Risk Maps for each Flood Risk Area	22 nd June 2019
4	Prepare Flood Risk Management Plans for Each Flood risk Area	22 nd June 2021

Table 1.1 - Work Required under the Flood Risk Regulations 2009

1.2 The Study Area

2. Lead Local Flood Authority Responsibilities

2.1 Introduction

This section provides an overview of the governance and partnership arrangements in place within Birmingham. It also outlines the plans in place for stakeholder and public communication.

2.2 Governance and Partnership Arrangements

The Pitt Review³, the subsequent Flood and Water Management Act 2010² and the Flood Risk Regulations 2009^{Error! Bookmark not defined.} identify that partnership working is essential in the management of local flood risk. To ensure the effective management of not only the PFRA process, but flood risk management as a whole, Birmingham City Council has developed partnerships with Severn Trent Water, the Environment Agency and other key stakeholders over a number of years.

Birmingham has worked with its partner organisations to develop a three tiered approach to managing flood risk. Figure 2.1 shows the three tiered structure.

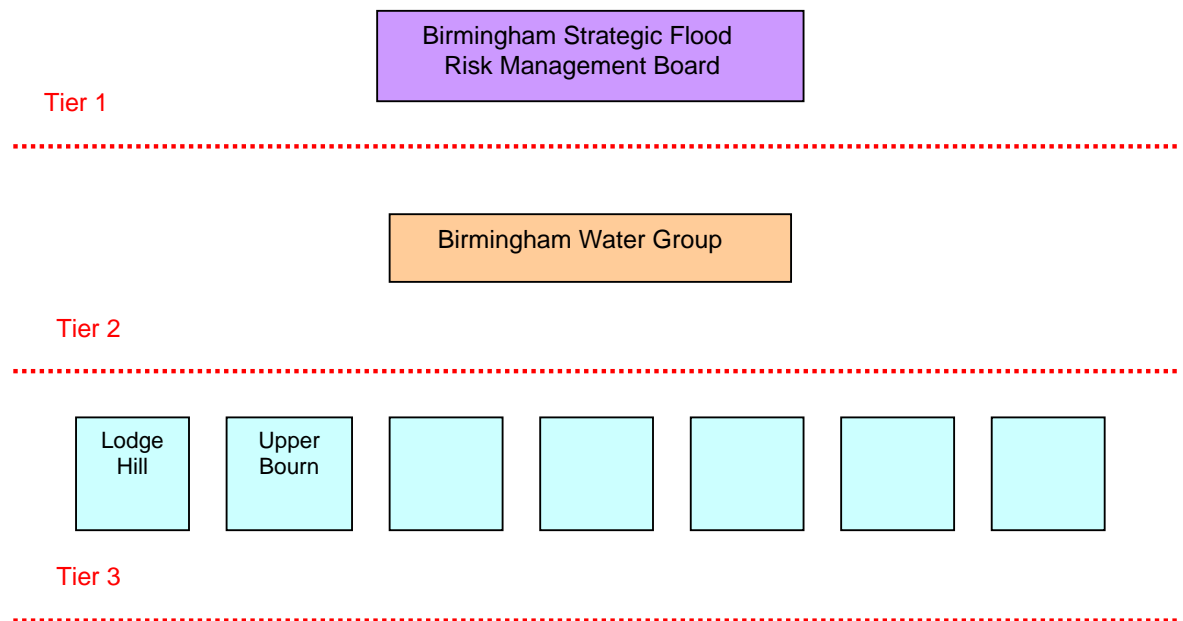


Figure 2.1 – Birmingham Three Tiered Flood Risk Management Structure

³ Pitt, M. (2008) – *Learning Lessons From the 2007 Summer Floods*, Cabinet Office, London

3. Methodology and Data Review

3.1 Introduction

The PFRA should be based on readily available or derivable data. The data collection, availability, limitations and methodology for sharing data are outlined in this section.

3.2 Data Collection & Quality

Birmingham established a data register during the development of the 2011 PFRA which records the type of data, source, format and quality. The data register is also a valuable tool for identifying

the partners. Birmingham keeps a register of data sharing agreements that have been entered into.

3.4 Public Asset Register

Lead Local Flood Authorities are required, under Section 21 of the Flood and Water Management Act 2010, to 'establish and maintain a register of structures or features which, in the opinion of the

Source

Source	Data Type	Description of Data	Data Provided	Quality Score	Reason
	Integrated Modelling	Modelling from SWMP and other strategies	Cole Integrated Model - Feb 2013	2	Based on sewer models from 2012/13 which have since been updated
			Hockley Brook - Feb 2014		
			SWMP Outlines Oct 14		
External Data	External Blue Sky Data with BCC Analysis	Tree Coverage	Tree Canopy Tree Cover %	2	No better analysis available
			Blue Sky Data	2	Tree Canopy Mapping Most Accurate available
			Street Cleaning Route Data Set	2	Data analysed by Buffer
Canal and River Trust	Breach and Overtopping Records	Historic flooding records of breach and overtopping of canals	Overtopping	1	No better data available
			Breaches		
	Canal Features	Digital mapping of canal features within Birmingham administrative boundary	Locks		
			Sluices		
			Weirs		
BW_Waterways					
Severn Trent Water	Sewer Network	Digital mapping of Severn Trent sewer network within Birmingham administrative boundary	culverted watercourse manhole_all	2	Data several years old, request made for updated dataset
			foul_combined manhole_all		
			highway drain manhole_all		
			highway drain pipe_all		
			MapInfoAllSTWStormWater_ManholesAppendTable_all		
			private manhole_all		
			public surface water manhole_all		
			Section 18 manhole_all		
			Section 24 manhole_all		
			Section 104 manhole		
			Western_Boundary_all		

4. Past Flood Risk

4.1 Introduction

This section summarises relevant information on all past floods. It also considers whether Birmingham has experienced floods which are considered to have 'significant harmful consequences'

4.2 Historic Flood Risk in Birmingham

A dataset has been collated to assess the local historic flood risk in Birmingham; this includes flooding from watercourses, surface water and groundwater. However due to the urbanised nature of the Birmingham catchment there are often significant interactions between sources of flooding and it is not always possible to ascertain the source of the flooding, therefore the type of flooding is not defined. As the PFRA should only consider local sources and exclude Main River this can often be difficult in Birmingham as Main River flooding is often combined with flooding from ordinary watercourses and localised surface water flooding. Therefore all historic incidents of flooding, including that which is considered to be primarily from Main River is included in the data, as there will inevitably have been interaction with surface water flooding.

4.2.1 Historic Records

Historical flooding records provide a source of data that indicates the date, location and depth of flooding. Recent years have seen a number of flooding events affecting Birmingham; September 1998, April 1999, June 1999, July 2000, June 2005, June 2007, July 2007 and September 2008. Since the 2011 PFRA 5 further flooding events have occurred, June 2012, July 2013 and three events in June 2016.

This data is presented in Figure 4.1 and shows all reports of internal property flooding across Birmingham.

Birmingham City Council also publishes its historic flooding online⁶, to protect the sensitivity of this data and to build up an understanding of the areas that are susceptible to flooding, this has been plotted using postcode polygons whereby each polygon represents one or more properties which have flooded. Each polygon contains data on the number of flooding incidents and the date of each incident.

4.3 Consequences of Historic Flood Risk

The Regulations require PFRA to include information on past floods that had significant harmful consequences and which could occur again. This is separate from the identification of Flood Risk Areas which is based on Defra guidance providing a national perspective of significant (potential) flood risk.

The guidance states that only past floods with 'significant harmful consequences' of a level sufficient to justify reporting to Europe must be considered in the preliminary assessment report and recorded in the Annex 1 spreadsheet. However this does not preclude LLFAs making reference to the occurrence of less severe flooding in general terms in the report if this is considered relevant and useful for a more complete picture.

⁶ <https://localview.birmingham.gov.uk/Highways/Sites/Drainage/#>

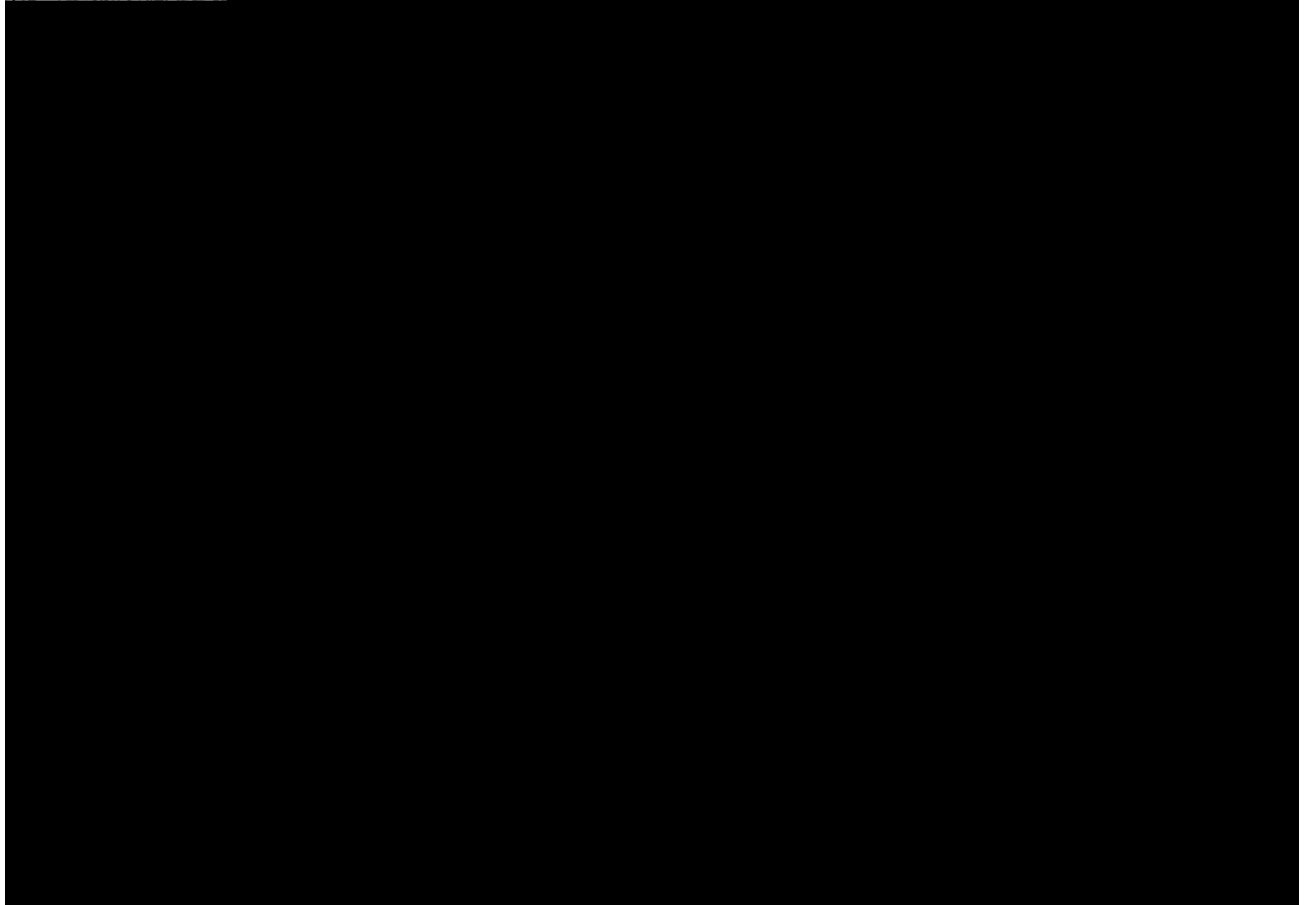
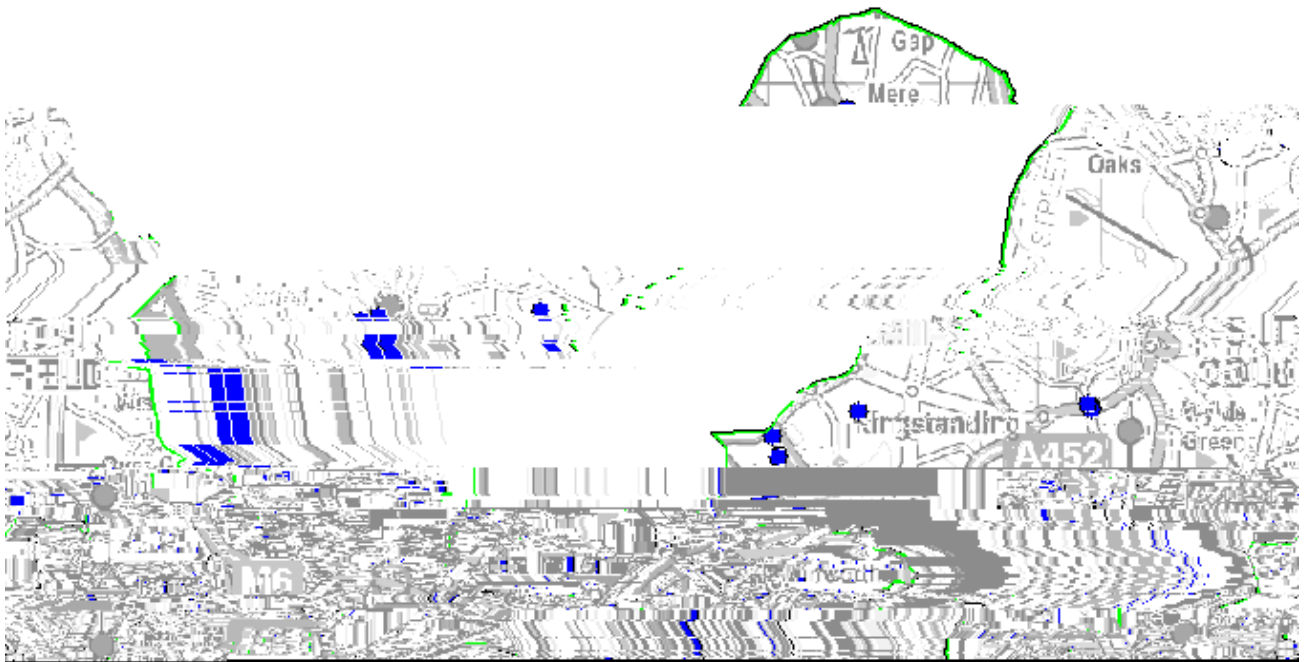


Figure 4.1 –Historic Flooding Locations

5. Future Flood Risk

5.1 Introduction

This section summarises all relevant information on future flood risk in Birmingham including climate change.

5.2 Surface Water Flood Risk

5.2.1 National Information on Surface Water Flood Risk

The Environment Agency has produced the Risk of Flooding from Surface Water (RoFSW) dataset which shows predicted surface water flooding.

The dataset is based on a bare earth model edited to account for buildings, roads, flow paths through structures and surface cover.

The mapping shows areas where surface water would be expected to flow or pond.

Three rainfall events, with probabilities of 3.3% (1 in 30), 1% (1 in 100) and 0.1% (1 in 1000) chance of occurring in any year are modelled and mapped.

For each rainfall probability, flood extents are derived; model results are also produced for depth, velocity, hazard rating and flow direction for maximum velocity.

5.2.2 Local information on Surface Water Flood Risk

As part of the SWMP for Birmingham, maps have been developed that indicate the areas shown to be at risk of surface water flooding from a number of sources. This data does not cover the entire City, just those areas that were considered to be at the most significant risk of surface water flooding.

The flood extents are based on detailed hydraulic models that take account of rivers, minor open watercourses and piped networks of culverted watercourses and public sewers. When rainfall is applied to the model, it flows through the systems and floods where they become overloaded. The flow of flood water across the surface is also modelled in key areas, so that flood depths, speed and direction can be plotted.

The SWMP modelling assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

1 in 30 (3.3%)

1 in 100 (1%)

1 in 200 (0.5%)

The peak depths are mapped to produce the flood outline maps. Depths of flooding less than 0.1m have been excluded for clarity. In addition, these would be unlikely to affect properties and would be seen as normal overland flow or puddles in the heavy rainfall that has been modelled.

5.2.3 Locally Agreed Surface Water Information

The Environment Agency guidance on surface water flood risk information recommends that Lead

The reasoning is that the SWMP process has taken account the effect of the drainage system in

- f* River Cole
- f* Chinn Brook
- f* Hockley Brook
- f* Griffins Brook
- f* Chad Brook
- f* Perry Brook
- f* Plants Brook

5.4.2 Local Information on Ordinary Watercourse Flood Risk

There is no specific local ordinary watercourse flood risk information for Birmingham; however the outputs from SWMP can be used where available supplemented by the RoFSW, RoFRS and FMfP where appropriate.

Generally, due to the highly urbanised nature of Birmingham and the close interactions between watercourses, sewers and rainfall, Birmingham City Council prefers to undertake integrated modelling that considers how all sources of flooding interact as it is believed that gives a better indication of actual risk. Birmingham City Council will continue to develop these models where appropriate as part of its investigation and understanding of flood risk.

5.5 Potential Consequences of Future Flooding.

The potential consequence of future flooding from surface water is included in Annex 2 of the Preliminary Assessment Report Spreadsheet.

5.6 Climate Change and Long Term Developments

5.6.1 The Evidence

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in

Winter precipitation increases of around 12% (very likely to be between 2 and 26%)

Precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 24%)

Relative sea level at Grimsby very likely to be up between 10 and 41cm from 1990 levels (not including extra potential rises from polar ice sheet loss)

Peak river flows in a typical catchment likely to increase between 8 and 14%

Implications for Flood Risk

Climate changes can affect local flood risk in

change. NPPF and supporting planning practice guidance on Flood Risk and Coastal Change explain when and how flood risk assessments should be used. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account. Local planning authorities refer to this when preparing local plans and considering planning applications.

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).

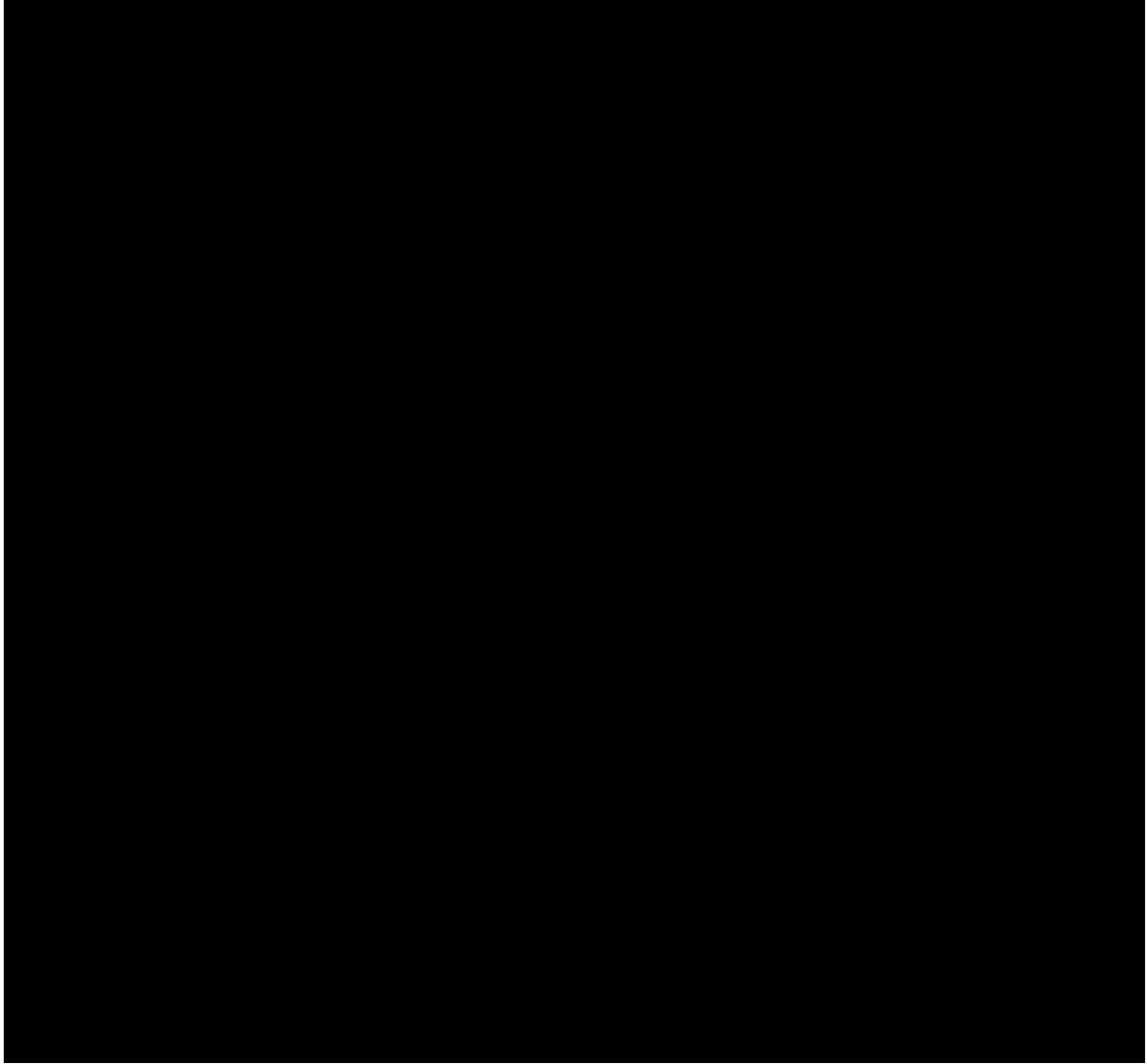
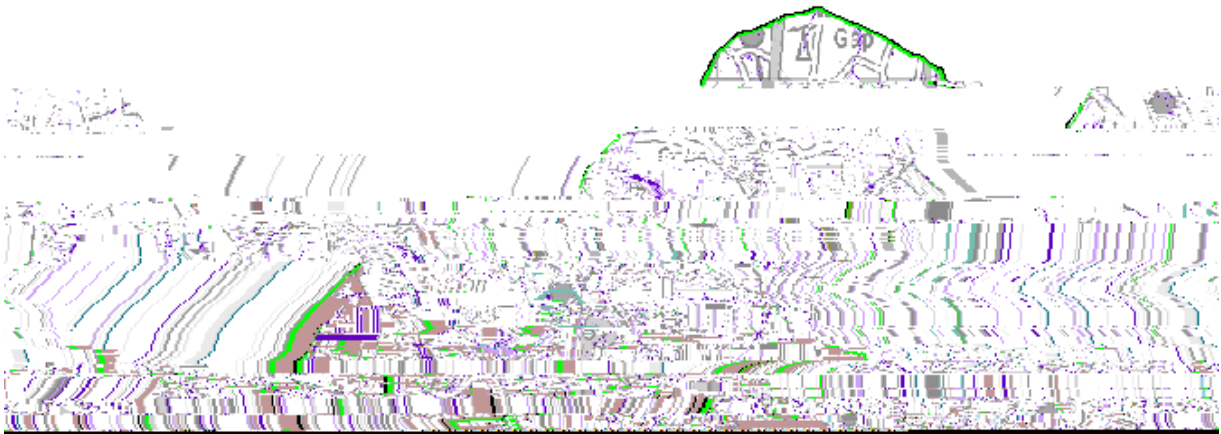


Figure 5.1 –Surface Water Flood Risk

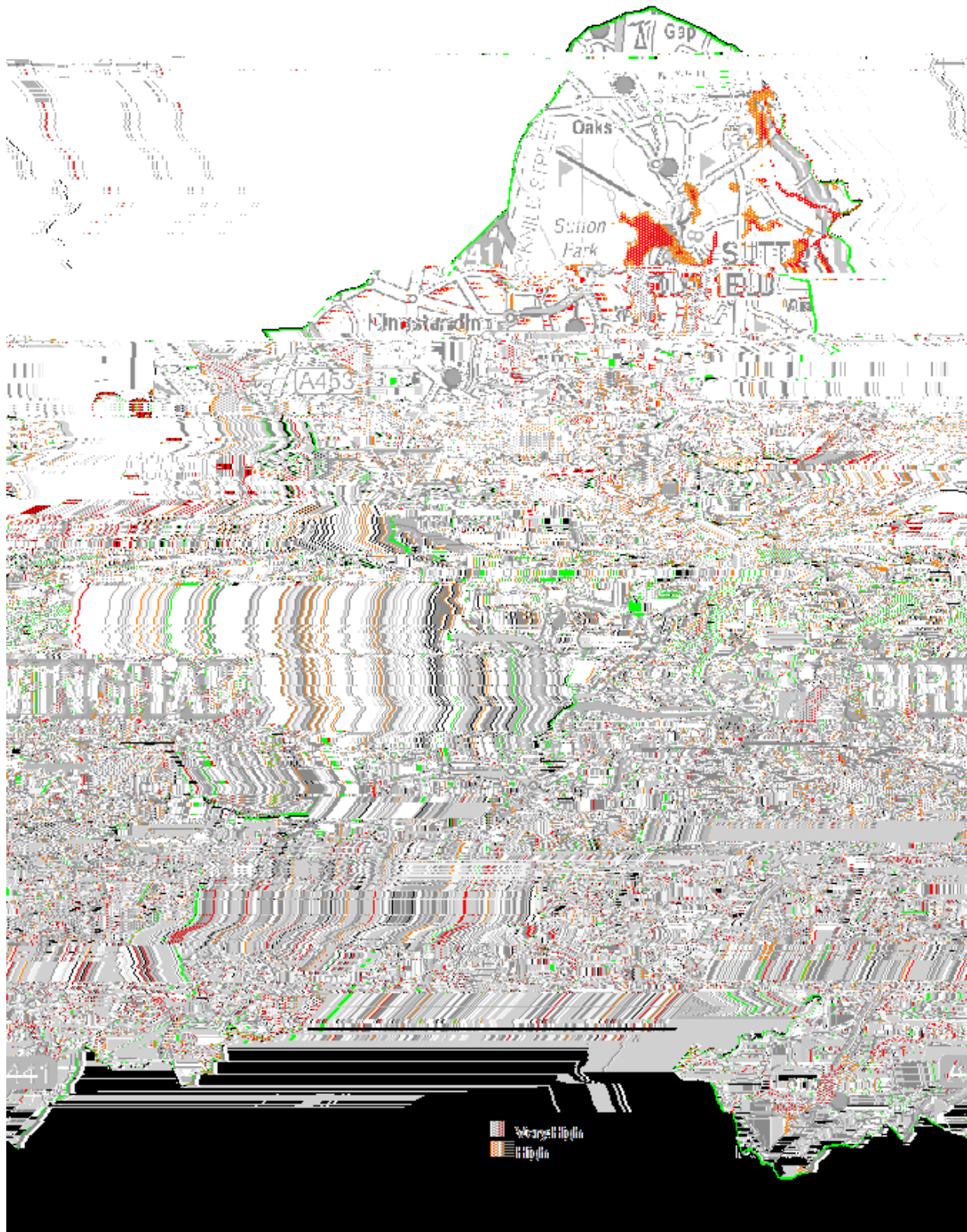


Figure 5.2 –Groundwater Flood Risk

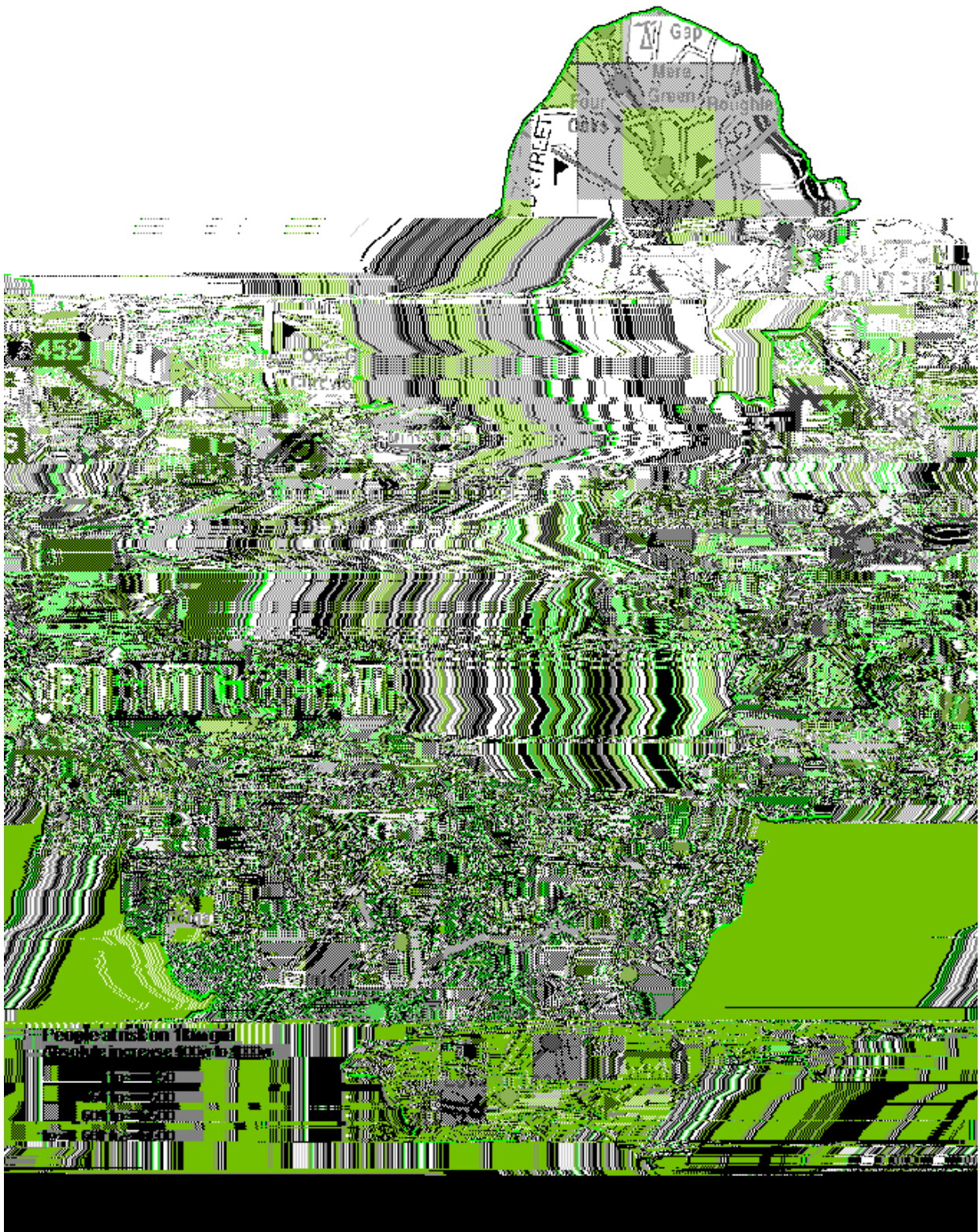


Figure 5.3 - 'Heat Map'

6. Flood Risk Areas

6.1 Introduction

This section summarises the process used to identify Indicative Flood Risk Areas (FRA) and reviews the Indicative Flood Risk area for Birmingham.

6.2 Identification of Flood Risk Areas

The FRR require LLFAs to determine whether any part their area faces significant risk of local

6.2.2 Lead Local Flood Authority Review of Flood Risk Areas

LLFAs are required to review the indicative FRAs that have been provided in light of local knowledge.

The indicative FRAs only represent risk from surface water flooding and should therefore be reviewed against current local understanding of surface water flood risk.

There may then be other local factors which influence the consideration of risk such as:

- flood risk from other local sources eg groundwater, local watercourses

- the combined impact of flooding from multiple sources

- areas susceptible to more frequent, less extensive flooding, that could over time result in significant damages

- consequences of flooding for agricultural land

- consequences of flooding for roads, rail or other infrastructure

- consequences of flooding for internationally or nationally designated environmental sites or internationally or nationally important cultural heritage features, and

- location of sites subject to Integrated Pollution Prevention and Control or Control of Major Accident Hazard regulation.

LLFAs can suggest amendments to the indicative FRAs, or propose additional FRAs, on the basis of some of these factors.

6.3 Review of Indicative Flood Risk Areas

The geographical extent of the Flood Risk m i(i)-1.5ciynFcFctu6otgnt Haz14(or)-5.5()JT92 -1.8903 TD -.002 Tc .15

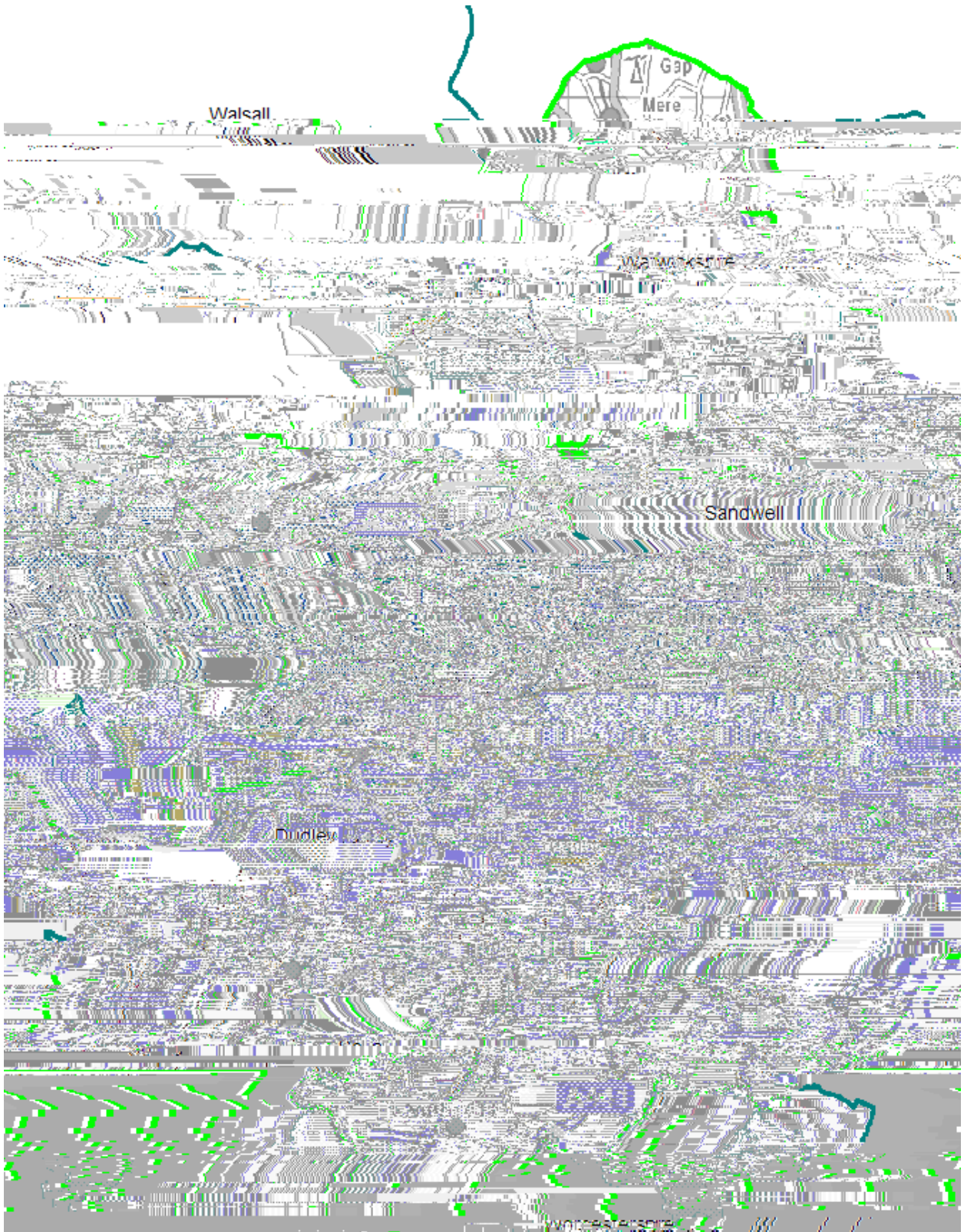


Figure 6.1 –Flood Risk Area

7. Next Steps

7.1 Introduction

This section outlines the measures proposed by Birmingham City Council to support the review of the PFRA every 6 years, including the collection of the information.

7.2 PFRA Process

This report has been prepared by Birmingham City Council in accordance with the guidance to meet the submission deadline of 22nd June 2011.

Birmingham will continue to work with the Environment Agency and neighbouring LLFAs towards the next stages in the cycle, culminating in the production of the Flood Risk Management Plan by June 2021.

7.3 Future Arrangements

Birmingham City Council recognises that as part of their Role as Lead Local Flood Authority they are required to investigate future flood events and ensure that flood risk data and information is collected, assessed and stored in an appropriate manner and passed to the appropriate responsible organisation for further investigation.

Birmingham City Council will continue to work with its professional partners to ensure this process is effective and that data is available for the review of the PFRA in 2023.

Annex 3- Records of Flood Risk Areas and their Rationale

(Preliminary Assessment Report
Spreadsheet – Electronic Copy Available)