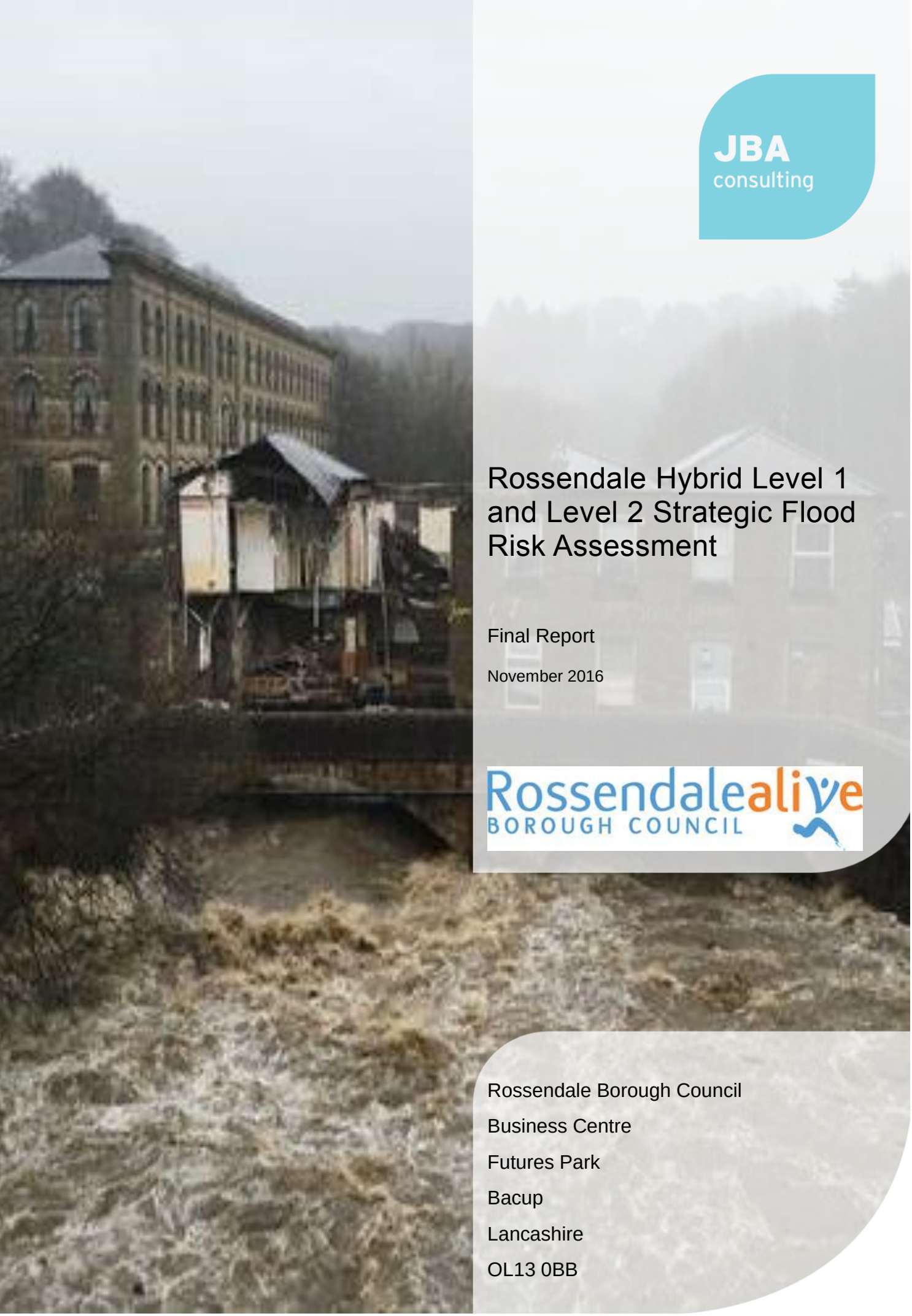

Rossendale Hybrid Level 1 and Level 2 Strategic Flood Risk Assessment

Final Report

November 2016

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Revision History

Revision Ref / Date Issued	Amendments	Issued to
V1.0 / 26 September 2016	-	Adrian Smith (RBC)
V2.0 / 15 November 2016	RBC & EA comments	Adrian Smith (RBC)

Contract

This report describes work commissioned by Adrian Smith, on behalf of Rossendale Borough Council, by a letter dated 31 May 2016. Rossendale Borough Council's representative for the contract was Adrian Smith. Mike Williamson of JBA Consulting carried out this work.

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Purpose

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Acknowledgements

JBA would like to thank all Rossendale Borough Council, Environment Agency and United Utilities staff for their time and commitment to providing data and discussing the issues identified during the course of this study.

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Executive Summary

This hybrid Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) updates the previous Level 1 and Level 2 assessments published in 2009 and 2015 respectively. This update is split into two stages; Stage 1 for the Level 1 update and Stage 2 for the Level 2 update; using the most up-to-date flood risk information together with the most current flood risk and planning policy available from the National Planning Policy Framework[1] (NPPF) and Flood Risk and Coastal Change Planning Practice Guidance[2] (FRCC-PPG) at the time of writing.

Rossendale Borough Council (RBC) requires this update to initiate the sequential risk-based approach to the allocation of land for development and to identify whether application of the Exception Test is likely to be necessary (Stage 1), and if so, the likelihood of passing the Exception Test (Stage 2). This will help to inform and provide the evidence base for the Local Plan.

RBC provided its latest potential sites for allocation data and information. An assessment of flood risk to all sites is provided to assist the Local Planning Authority (LPA) in its decision making process for sites to take forward as part of the Local Plan.

The aims and objectives of this hybrid SFRA are:

- To understand current flood risk from all sources and any historic and future flood risk information to enable investigation and identification of the extent and severity of flood risk throughout the borough. This assessment will enable RBC to steer development away from those areas where flood risk is considered greatest, ensuring that areas allocated for development can be developed in a safe, cost effective and sustainable manner.
- Where this is not possible due to wider sustainability benefits outweighing the level of flood risk at a potential development site, the aim is to show the likelihood of a site passing the Exception Test.
- To form part of the evidence base and inform the Sustainability Appraisal (Incorporating the Strategic Environmental Assessment) for the Local Plan.
- To reflect current national policy documentation including the NPPF and its accompanying FRCC-PPG to enable RBC to meet its obligations as defined by the NPPF.
- To supplement current policy guidelines and to provide a straightforward risk based approach to development management in the area.
- To make recommendations on the suitability of potential development sites based on flood risk for RBC's Local Plan.
- To consider a precautionary approach to climate change using the Environment Agency's (EA) February 2016 climate change allowances.
- To provide guidance for developers and planning officers on planning requirements.
- To pay particular attention to surface water flood risk, using the EA's Risk of Flooding from Surface Water (RoFSW).
- To provide a reference document (this report) to which all parties involved in development planning and flood risk can reliably turn to for initial advice and guidance.
- To develop a report that forms the basis of an informed development management process that also provides guidance on the potential risk of flooding associated with future planning applications and the basis for site-specific Flood Risk Assessments (FRAs) where necessary.
- To provide a suite of interactive GeoPDF flood risk maps illustrating the interaction between flood risk and potential development sites.
- To identify land required for current and future flood management that could be safeguarded as set out in the NPPF.

1 http://planningguidance.planningportal.gov.uk/blog/policy/

2 http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

A number of potential development sites are shown to be at varying risk from fluvial, surface water flooding and residual risk. Table 1-1 summarises the number of sites at risk from each flood zone as per the EA's Flood Map for Planning.

Table 1-1: Potential development sites at risk from fluvial flooding

Potential Development Site	Number of sites within…			
	Flood Zone 1*	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Residential	225	55	44	1
Employment	7	9	9	0
Mixed use	4	2	1	0
Gypsy & traveller	1	0	0	0
TOTAL	**237**	**66**	**54**	**1**
*100% within Flood Zone 1				

Table 1-2 summarises the number of sites at risk from each surface water flood zone of the EA's Risk of Flooding from Surface Water.

Table 1-2: Potential development sites at risk from surface water flooding

RoFSW event outline	Number of sites at risk*	Number of sites at significant risk^
High risk (1 in 30 year)	144	30
Medium risk (1 in 100 year)	177	14
Low risk (1 in 1000 year)	241	36
*In reality, sites within the high risk outline will also be in the medium risk outline and those within the high and medium risk outlines will also be in the low risk outline ^Significant risk = site area >=10% within high and/or medium risk outline, and/or >=20% within low risk outline		

Potential sites in Rossendale have been identified through a “call for sites” exercise (2016) and sites included in RBC's Strategic Housing Land Availability Assessment (SHLAA), 2015. See Section 4.4 for more details.

Strategic recommendations based on fluvial flood risk, in Section 4.5.1 of this report, are made for each site at risk, broadly entailing the following:

- Consider for withdrawal;
- Exception Test required if site passes Sequential Test;
- Consider site layout and design if site passes Sequential Test;
- Site-specific FRA required; and
- Site should be allocated on flood risk grounds due to no perceived risk, subject to consultation with the LPA / LLFA.

Out of the 306 sites provided for assessment by RBC, only 1 is within the functional floodplain (Flood Zone 3b), delineated from this SFRA. This site is however not recommended for withdrawal as only 2.8% of the site area is within Flood Zone 3b. There are 19 sites that have been identified as having to undertake and pass the Exception Test in order to be allocated. These 19 sites have been assessed further in Stage 2 of the SFRA.

For this SFRA, a site is considered to be at significant surface water flood risk if 10% or more of the site area is within the high or medium risk surface water outline or if 20% or more of the site area is within the low risk outline. In total, there are 48 sites considered to be at significant surface water flood risk.

Stage 1 findings

The Level 1 assessment found that, out of the 306 potential sites assessed:

- 50 should be allocated on flood risk grounds,

- 193 could be allocated subject to site-specific FRA,
- 33 require full, detailed consideration of site layout and design at the site planning stage to alter the site footprint or incorporate floodwater storage; or detailed investigation into surface water mitigation through SuDS is required due to significant surface water risk,
- 19 should be subject to perform and pass the Exception Test,
- 11 were recommended for withdrawal.

The 11 recommended for withdrawal were due to significant surface water risk issues.

However, site SFRA123 has extant FRA accepted by the EA. As long as mitigation recommendations in the FRA are adhered to, site should be able to go ahead. Therefore 10 sites were recommended for withdrawal, based on the Level 1 assessment.

The 19 recommended to have to pass the Exception Test formed the basis for the Stage 2 assessment.

Stage 2 findings

The Level 2 assessment found that, out of the 19 potential sites assessed:

- 9 should still be subject to the Exception Test,
- 10 should be withdrawn.

Overall therefore, this hybrid SFRA has recommended that 20 sites are withdrawn from allocation based on fluvial and surface water flood risk (see Table 1-3).

Table 1-3: Potential development sites recommended for withdrawal

Site	Recommendation	Explanation
SFRA08	Withdrawal following Level 1	Significant surface water risk
SFRA10	Withdrawal following Level 1	Significant surface water risk
SFRA16	Withdrawal following Level 1	Significant surface water risk
SFRA56	Withdrawal following Level 1	Significant surface water risk
SFRA121	Withdrawal following Level 1	Significant surface water risk
SFRA133	Withdrawal following Level 1	Significant surface water risk
SFRA153	Withdrawal following Level 1	Significant surface water risk
SFRA215	Withdrawal following Level 1	Significant surface water risk
SFRA243	Withdrawal following Level 1	Significant surface water risk
SFRA306	Withdrawal following Level 1	Significant surface water risk
SFRA07	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA31	Withdrawal following Level 2	High on-site fluvial and surface water flood risk
SFRA92	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA116	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA135	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA139	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA140	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA141	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA161	Withdrawal following Level 2	Withdraw site based on on-site fluvial and surface water flood risk
SFRA292	Withdrawal following Level 2	High on-site fluvial and surface water flood risk and limited access and egress options

SFRA components

Included along with this report as part of this hybrid SFRA are:

- Detailed interactive GeoPDF maps showing all available flood risk information, from Stages 1 and 2, together with the potential development sites - Appendix A;
- Level 1 Development Site Assessment spreadsheet detailing the risk to each site with strategic recommendations on development - Appendix B; and
- A note on the delineation of the functional floodplain following discussion and agreement between RBC and the EA - Appendix C.
- A note on the derivation of the February 2016 climate change allowances from hydraulic river models - Appendix D
- Depth and hazard information for both fluvial and surface water sources calculated for each site, where available - Appendix E

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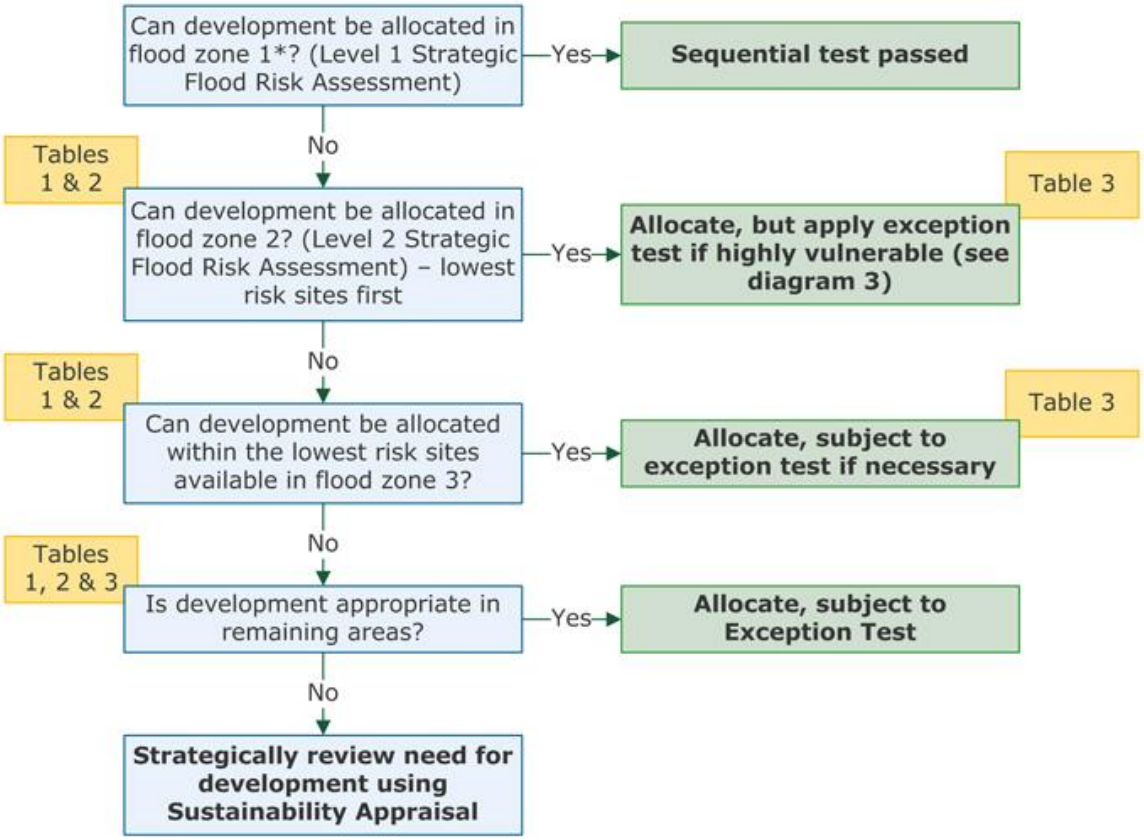
Abbreviations

ABD ..... Areas Benefitting from Defences
ACD ..... Area of Critical Drainage
AEP ..... Annual Exceedance Probability
AIMS ..... Asset Information Management System
AStGWF ..... Areas Susceptible to Groundwater Flooding
CC ..... Climate change
CCA ..... Civil Contingencies Act
CDA ..... Critical Drainage Area
CFMP ..... Catchment Flood Management Plan
CIL ..... Community Infrastructure Levy
CSO ..... Combined Sewer Overflow
DCLG ..... Department for Communities and Local Government
DPD ..... Development Plan Documents
DTM ..... Digital Terrain Model
EA ..... Environment Agency
FAA ..... Flood Alert Area
FCA ..... Flood Consequence Assessment
FCDPAG ..... Flood and Coastal Defence Project Appraisal Guidance
FCERM ..... Flood and Coastal Erosion Risk Management Network
FDGiA ..... Flood Defence Grant in Aid
FEH ..... Flood Estimation Handbook
FRA ..... Flood Risk Assessment
FRCC-PPG ..... Flood Risk and Coastal Change Planning Practice Guidance
FRM ..... Flood Risk Management
FRMP ..... Flood Risk Management Plan
FRMS ..... Flood Risk Management Strategy
FRR ..... Flood Risk Regulations
FSA ..... Flood Storage Area
FWA ..... Flood Warning Area
FWMA ..... Flood and Water Management Act
GI ..... Green Infrastructure
GIS ..... Geographical Information Systems
HFM ..... Historic Flood Map
LA ..... Local Authority
LCC ..... Lancashire County Council
LDF ..... Local Development Framework
LFRMS ..... Local Flood Risk Management Strategy
LLFA ..... Lead Local Flood Authority
LPA ..... Local Planning Authority

LRF ..... Local Resilience Forum
MAFRP ..... Multi-Agency Flood Response Plan
NGO ..... Non-Governmental Organisation
NPPF ..... National Planning Policy Framework
PCPA ..... Planning and Compulsory Purchase Act
PFRA ..... Preliminary Flood Risk Assessment
RBC ..... Rossendale Borough Council
RBD ..... River Basin District
RBMP ..... River Basin Management Plan
RMA ..... Risk Management Authority
RoFRS ..... Risk of Flooding from Rivers and the Sea map
RoFSW ..... Risk of Flooding from Surface Water map
RSS ..... Regional Spatial Strategy
SA ..... Sustainability Appraisal
SEA ..... Strategic Environmental Assessment
SFRA ..... Strategic Flood Risk Assessment
SoP ..... Standard of Protection
SPD ..... Supplementary Planning Documents
SuDS ..... Sustainable Drainage Systems
SWMP ..... Surface Water Management Plan
UDP ..... Unitary Development Plan
uFMfSW ..... updated Flood Map for Surface Water
UKCIP02 ..... UK Climate Projections 2002
UKCP09 ..... UK Climate Projections 2009
UU ..... United Utilities
WFD ..... Water Framework Directive

Introduction

In Summer 2015 Rossendale Borough Council (RBC) undertook a consultation on a Site Allocations Document, Local Plan Part 2. In order to inform this, the 2009 Level 1 Strategic Flood Risk Assessment (SFRA) was updated and a Level 2 SFRA followed. The Level 2 study was necessary because, due to the topography of the Borough, it was not possible to allocate all the required housing and employment sites within Flood Zone 1. It was therefore essential, in line with the National Planning Policy Framework (NPPF) and Flood Risk and Coastal Change Planning Policy Guidance (FRCC-PPG) that a Level 2 SFRA was produced to help apply the Sequential Test and ensure that sites in Flood Zone 2 and Flood Zone 3 were properly assessed. The Level 2 study was therefore undertaken to ensure that the application of the Sequential Test for Local Plan preparation, as shown below, was fully implemented.



* Diagram 2: Application of the Sequential Test for Local Plan preparation, Paragraph 021, FRCC-PPG

A decision was taken by the Council in December 2015 and ratified in February 2016 to abandon preparation of the Site Allocations Document due to a need to find more housing than provided for in the 2011 Core Strategy. It was decided instead to prepare a completely new Local Plan. As part of this a significant proportion of the previous sites were carried forward for further assessment. In addition to this, a "call for sites" was undertaken which identified a number of new sites for consideration. Given that between 300-1000 new houses, in addition to those identified in the previous Plan, needed to be identified it was necessary to update the very recent 2015 Level 2 SFRA. This was essential to ensure that all new sites were thoroughly assessed as part of the sequential approach. It was also important that all sites, including those assessed in 2015 took account of the revised climate change allowances introduced by the Environment Agency (EA) in February 2016.

Commission

RBC is part of a two-tiered local government system with RBC acting as the Local Planning Authority (LPA) and Lancashire County Council (LCC) the Lead Local Flood Authority (LLFA). In its position as a LPA, RBC requires a Strategic Flood Risk Assessment (SFRA) to develop the evidence base for their Local Plan which will include a review of the policies set out in the adopted Core Strategy, including the Sustainability Appraisal (SA). LCC, as LLFA, is responsible for managing flood risk from ordinary watercourses, surface water and groundwater whilst also being a statutory consultee on all planning applications submitted to the LPA.

RBC is in the early stages of producing a new Local Plan following formal abandonment of the Site Allocations and Development Management Plan (Local Plan Part 2) in February 2016 due to matters related to Full Objectively Assessed Housing Need (FOAHN).

The adopted Local Development Scheme commits the Council to undertaking a Regulation 18 consultation on a draft Plan. This will be a consultation on a full Plan including site allocations and development management policies. To inform this, a number of Evidence Base documents are being commissioned, one of which includes this combined Level 1 and Level 2 SFRA. LCC as the LLFA will also need to be involved throughout the process, co-ordinating views and activity with RBC.

RBC commissioned JBA Consulting in May 2016 to undertake an update of the existing Level 1 SFRA completed in 2009, and the existing Level 2 SFRA, completed July 2015, paying particular attention to the Environment Agency's (EA) February 2016 climate change allowances and surface water risk.

The update of both studies is combined into one hybrid Level 1 and Level 2 SFRA composed of two stages of assessment whereby Stage 1 includes the Level 1 assessment and Stage 2 the more detailed Level 2 assessment.

This update has been carried out in accordance with the Government's latest development planning guidance including the National Planning Policy Framework (NPPF) and flood risk guidance called the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG). The latest guidance is available online via:

http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change

SFRA Future Proofing

As discussed, this SFRA has been developed using the most up-to-date data and information available at the time of submission. The SFRA has been future proofed as far as possible though the reader should always confirm with the source organisation (RBC) that the latest information is being used when decisions concerning development and flood risk are being made. The FRCC-PPG, alongside the NPPF, is referred to throughout this SFRA, being the current primary development and flood risk guidance information available at the time of the finalisation of this SFRA.

The EA would usually recommend updating a SFRA every three to four years, unless there is a significant flood affecting the area or significant changes in policy, in which case an immediate review should be undertaken.

This SFRA uses the EA's Flood Map for Planning version issued in February 2016 to assess fluvial risk to potential development sites. The Flood Map for Planning is updated at quarterly intervals by the EA, as and when new modelling data becomes available. The reader should therefore refer to the online version of the Flood Map for Planning to check whether the flood zones may have changed since February 2016:

http://apps.environment-agency.gov.uk/wiyby/37837.aspx

Stage 1 - Level 1 Strategic Flood Risk Assessment

1 Introduction

Stage 1 makes use of the most up-to-date flood risk datasets to assess the extent of risk, at a strategic level, to potential development allocation sites identified by RBC. Stage 1 consists of this report together with an appendix containing SFRA maps showing the potential sites overlaid with the latest, readily available, gathered flood risk information; and a site assessment spreadsheet indicating the level of flood risk to each site following a strategic assessment of risk. This information will allow RBC to identify the strategic development options that may be applicable to each site and to inform on the need for the application of the Sequential Test.

Stage 1 will form an important part of the evidence base of the Local Plan, providing a robust assessment of risk and potential mitigation over the Plan period in line with National Policy. Stage 1 will also help to initiate the sequential risk-based approach to the allocation of land for development and to identify whether application of the Exception Test is likely to be necessary.

1.1 Aims and Objectives

The aims and objectives of Stage 1, as per RBC's Brief, are:

- To understand flood risk from all sources and to investigate and identify the extent and severity of flood risk throughout the borough. This assessment will enable RBC to steer development away from those areas where flood risk is considered greatest, ensuring that areas allocated for development can be developed in a safe, cost effective and sustainable manner.
- To form part of the evidence base to inform the Sustainability Appraisal (Incorporating the Strategic Environmental Assessment) for the council's Local Plan.
- To make recommendations on the suitability of potential development sites based on flood risk for RBC's Local Plan.
- To pay particular attention to surface water flood risk, using the EA's third generation surface water flood map 'Risk of Flooding from Surface Water'.
- To enable RBC to meet its obligations under the NPPF as well as accounting for the EA February 2016 climate change allowances for the North West River Basin District.
- To supplement current policy guidelines and to provide a straightforward risk based approach to development management in the area.
- To develop a functional floodplain for use in development planning and policy, where possible.
- To provide a robust reference document (this report) to which all parties involved in development planning and flood risk can reliably turn to for initial advice and guidance and that is capable of being defended through the Local Plan Examination in Public.
- To develop a report that forms the basis of an informed development management process that also provides guidance on the potential risk of flooding associated with future planning applications and the basis for site-specific Flood Risk Assessments (FRAs) where necessary.
- To identify land required for current and future flood management that could be safeguarded as set out in the NPPF.
- To advise on the applicability of Sustainable Drainage Systems (SuDS) for managing surface water runoff.
- To provide guidance for developers and planning officers dealing with applications as well as for LCC to fulfil its role as LLFA including consultation on planning applications for the approval of SuDS schemes.
- To assist RBC in identifying specific sites where further and more detailed flood risk data and assessment work is required as part of the Level 2 SFRA update (Stage 2), prior to the allocation of specific developments.

This report begins by outlining the connections between the planning framework and flood risk policy thus discussing legislation, planning policy, flood risk management policy and the roles and responsibilities of key stakeholders. All sources of flood risk within the local authority area are then examined before an assessment of flood risk to the potential development sites. Conclusions and recommendations based on both stages of the SFRA are cited at the end of the report.

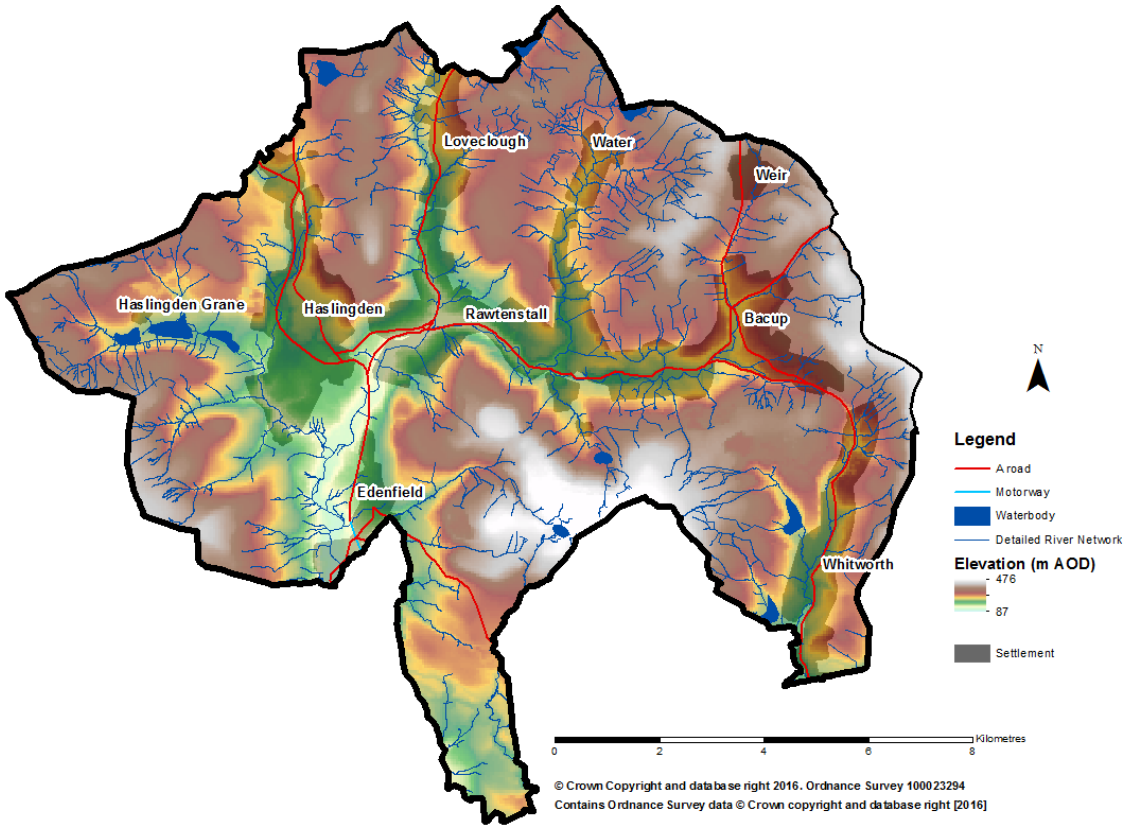
2 Study Area

Over 68,000 people live within Rossendale with the 2011 census[3] indicating a population of 67,922. The borough covers approximately 138 km^2 of land and is characterised by attractive countryside, steep valleys and a number of settlements ranging from the towns of Bacup, Rawtenstall and Haslingden to the small villages such as Loveclough. Many of these settlements have grown around watercourses in a linear fashion, as can be seen on Figure 2-1 below.

The borough is well defined by the steep valleys defined by the Main River of the River Irwell and its tributaries. The catchment of the River Irwell drains the majority of the borough with the source of the Irwell located just to the north of Bacup. The Irwell then meanders through Rawtenstall towards the south east of Haslingden before flowing southwards out of the borough and into Ramsbottom. Other main rivers which are tributaries of the Irwell include Whitewell Brook, Cowpe Brook, Limey Water, the River Ogden and Dearden Brook. The River Spodden, which rises north of Whitworth in the south east of the borough, is also Main River but does not feed directly into the Irwell but rather flows in a southerly direction out of the borough towards Rochdale before meeting the Irwell further downstream.

There are also a number of ordinary watercourses which can be defined as any watercourse that are not designated Main River. Ordinary watercourses can vary in size considerably and can include rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.

Figure 2-1: Rossendale SFRA study area



The dominant bedrock geology of the borough is millstone grit which is made up of mudstone, siltstone and sandstone. The northern and eastern parts of the borough however, as well as most of the surrounding authority areas, are underlain by coal measures. The bedrock is overlain mainly by glacial till along the larger watercourses within the valleys. There are also large deposits of peat in the west and south east of the borough.

3 http://www.ons.gov.uk/ons/guide-method/census/2011/index.html

3 Flood Risk in Rossendale

3.1 Flood Risk Datasets

This section of the SFRA provides a strategic overview of flood risk from all sources within the borough. The information contained is the best available at the time of publication and is intended to provide RBC with an overview of risk. Where further detail is available, then the source of information is provided. Table 3-1 provides a summary of the key datasets used in this SFRA according to the source of flooding.

Table 3-1: Flood source and key datasets

Flood Source	Datasets / Studies
Fluvial	EA Flood Map for Planning (Rivers and Sea) Feb 2016
	EA Risk of Flooding from Rivers and the Sea Map
	Irwell CFMP
	EA Flood Risk Mapping Studies
	Historic evidence – EA Historic Flood Map, RBC flood incident registers
Pluvial (surface water runoff)	EA Risk of Flooding from Surface Water (RoFSW)
	Lancashire Preliminary Flood Risk Assessment
Sewer	UU DG5 data; drainage areas and networks
Groundwater	EA Areas Susceptible to Groundwater Flooding (AStGWF)
Reservoir	EA Reservoir Flood Maps (available online)
All sources	Lancashire and Blackpool Local Flood Risk Management Strategy
	RBC historic flood incident register / diaries
	North West River Basin Management Plan
Flood risk management infrastructure	LCC FRM Asset Register
	EA flood defence data

3.2 Fluvial Flooding

Fluvial flooding is associated with the exceedance of channel capacity during higher flows. The process of flooding from watercourses depends on a number of characteristics associated with the catchment including geographical location and variation in rainfall; steepness of the channel and surrounding floodplain; and infiltration and rate of runoff associated with urban and rural catchments.

Judging from the EA's Flood Map for Planning, the majority of fluvial flood risk comes from the River Irwell in Bacup, Irwell Vale and around Chatterton; the River Irwell, Limy Water and Whitewell Brook in Rawtenstall; and the River Spodden in Whitworth.

The SFRA Maps in Appendix A present the EA's Flood Map for Planning which shows the fluvial coverage of Flood Zones 2 and 3 across the borough.

3.2.1 EA Flood Map for Planning

The EA's Flood Map for Planning is the main dataset used by planners for predicting the location and extent of fluvial and tidal flooding. This is supported by the CFMPs and a number of detailed hydraulic river modelling reports which provide further detail on flooding mechanisms.

The Flood Map for Planning provides flood extents for the 1 in 100 year fluvial (Flood Zone 3), 1 in 200 year tidal (also Flood Zone 3) and the 1 in 1000 year fluvial and tidal flood events (Flood Zone 2). Flood zones were originally prepared by the EA using a methodology based on the national digital terrain model (NextMap), derived river flows from the Flood Estimation Handbook (FEH) and two dimensional flood routing. Since their initial release, the EA has regularly updated their flood zones with detailed hydraulic model outputs as part of their flood risk mapping programme.

The EA Flood Map for Planning is precautionary in that it does not take account of flood defences (which can be breached, overtopped or may not be in existence for the lifetime of the development) and, therefore, represents a worst-case scenario of flooding. The flood zones do not consider sources of flooding other than fluvial and tidal, and do not take account of climate change. For this

SFRA, Flood Zone 3 is referred to as Flood Zone 3a. Areas of functional floodplain are referred to as Flood Zone 3b (see Section 3.2.2).

The EA also provides a 'Risk of Flooding from Rivers and the Sea Map'. This map shows the EA's assessment of the likelihood of flooding from rivers and the sea, at any location, and is based on the presence and effect of all flood defence infrastructure, predicted flood levels and ground levels. This dataset is not used in the assessment of flood risk for planning applications. This dataset is further discussed in Section 3.2.3.

This SFRA uses the EA's Flood Map for Planning version issued in February 2016 to assess fluvial risk to potential development sites, as per the NPPF and the accompanying FRCC-PPG. See Section 4.5.1 for this assessment. The Flood Map for Planning is updated at quarterly intervals by the EA, as and when new modelling data becomes available. The reader should therefore refer to the online version of the Flood Map for Planning to check whether the flood zones may have been updated since February 2016:

http://apps.environment-agency.gov.uk/wiyby/37837.aspx

3.2.2 Functional Floodplain (Flood Zone 3b)

Table 1, Paragraph 065 of the FRCC-PPG defines Flood Zone 3b as:

"…land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency."

Paragraph 015 of the FRCC-PPG states the following:

"The definition of Flood Zone 3b in Table 1 explains that local planning authorities should identify areas of functional floodplain in their Strategic Flood Risk Assessments in discussion with the Environment Agency and the lead local flood authority. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. However, land which would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual probability) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

A functional floodplain is a very important planning tool in making space for flood waters when flooding occurs. Generally, development should be directed away from these areas using the Environment Agency's catchment flood management plans, shoreline management plans and local flood risk management strategies produced by lead local flood authorities.

The area identified as functional floodplain should take into account the effects of defences and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain. If an area is intended to flood, e.g. an upstream flood storage area designed to protect communities further downstream, then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often."

As part of this SFRA, the EA provided all of its most recent, readily available hydraulic river models which were assessed in order to gain 1 in 20 or 1 in 25 year fluvial flood outline defended scenarios, where applicable. Following application of the methodology described in Appendix C, many of these outlines were not used in the final functional floodplain outline, mainly owing to the fact that many of the outlines were within built up areas or did not extend much beyond the banks of the watercourses. Table 3-2 lists the outlines used from the relevant modelling studies.

A draft functional floodplain outline was assessed and agreed upon by the LPA, the LLFA and the Environment Agency, based on their local knowledge. The outline is also displayed on the SFRA Maps. Any site-specific FRAs should further assess areas of functional floodplain through detailed investigation and assessment of the actual risk and extent of any possible functional floodplain.

Table 3-2: Modelled flood outlines defining the functional floodplain

Modelling study	Output
Swinnel Beck, 2009	20 year undefended outline
Crawshawbooth, 2014	20 year undefended outline

3.2.3 EA Risk of Flooding from Rivers and the Sea Map

This map shows the likelihood of flooding from rivers and the sea based on the presence and effect of all flood defences, predicted flood levels and ground levels. The map splits the likelihood of flooding into four risk categories:

- High – greater than to equal to 1 in 30 (3.3%) chance in any given year
- Medium – less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year
- Low – less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low – less than 1 in 1,000 (0.1%) chance in any given year

The Risk of Flooding from Rivers and the Sea Map (RoFRS) is included on the SFRA Maps to act as a supplementary piece of information to assist the LPA in the decision making process for site allocation. This dataset is not suitable for use with any planning application nor should it be used for the sequential testing of site allocations. The EA's Flood Map for Planning should be used for all planning purposes, as per the FRCC-PPG.

3.3 Surface Water Flooding

Surface water flooding, in the context of this SFRA, includes:

- **Surface water runoff (also known as pluvial flooding); and**
- **Sewer flooding**

Judging from the Risk of Flooding from Surface Water (RoFSW) map, formally referred to as the updated Flood Map for Surface Water (uFMfSW), surface water flooding is prevalent across the borough over the flatter ground where surface water can accumulate. The higher ground in the central area of the borough is much less at risk.

There are certain locations where the probability and consequence of pluvial and sewer flooding are more prominent due to the complex hydraulic interactions in the urban environment. Urban watercourse connectivity, sewer capacity, and the location and condition of highway gullies all have a major role to play in surface water flood risk.

It should be acknowledged that once an area is flooded during a large rainfall event, it is often difficult to identify the route, cause and ultimately the source of flooding without undertaking further site-specific and detailed investigations.

3.3.1 Pluvial Flooding

Pluvial flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. In these instances, the volume of water from rural land can exceed infiltration rates in a short amount of time, resulting in the flow of water over land. Within urban areas, this intensity is too great for the urban drainage network resulting in excess water flowing along roads, through properties and ponding in natural low spots. Areas at risk can, therefore, lie outside of the fluvial flood zones.

Pluvial flooding within urban areas will typically be associated with events greater than the 1 in 30 year design standard of new sewer systems. Some older sewer and highway drainage networks will have a lower capacity than what is required to mitigate for the 1 in 30 year event. There is also a residual risk associated with these networks due to possible network failures, blockages or collapses.

The Risk of Flooding from Surface Water (RoFSW) is the third generation national surface water flood map, produced by The EA, aimed at helping to identify areas where localised, flash flooding can cause problems even if the Main Rivers are not overflowing. The RoFSW, used in this SFRA to assess risk from surface water, has proved extremely useful in supplementing the EA Flood Map for Planning by identifying areas in Flood Zone 1, which may have critical drainage problems.

3.3.2 Risk of Flooding from Surface Water (RoFSW)

The EA updated the second generation FMfSW in 2013 to produce a third generation national surface water flood map, the RoFSW, is much more refined than the second generation map in that:

- More detailed hydrological modelling has been carried out using several design rainfall events rather than one for the second generation,

- A higher resolution Digital Terrain Model (DTM) has been used – 2 m, compared to 5 m for the second generation,
- Manual edits of DTM to improve flow routes at over 91,000 locations compared to 40,000 for the second generation,
- DTM edited to better represent road network as a possible flow pathway, this was not done for the second generation,
- Manning's roughness coefficient (used to represent the resistance of a surface to flood flows in channels and floodplains) values varied using MasterMap Topography layer compared to blanket values for urban and rural land use applied in the second generation surface water flood map.

The EA website[4] splits each surface water flood return period into four categories of risk:

- High risk - each year, has a chance of flooding of greater than 1 in 30 (3.3%)
- Medium risk - each year, this area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%)
- Low risk - each year, this area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%)
- Very low risk - each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

The National Modelling and Mapping Method Statement, May 2013 details the methodology applied. The RoFSW is displayed on the SFRA Maps.

3.3.3 Sewer Flooding

Combined sewers spread extensively across urban areas serving residential homes, business and highways, conveying waste and surface water to treatment works. Combined Sewer Overflows (CSOs), provide an overflow release from the drainage system into local watercourses or large surface water systems during times of high flows. Some areas may also be served by separate foul and surface water sewers which convey waste water to treatment works and surface water into local watercourses.

Flooding from the sewer network mainly occurs when flow entering the system, such as an urban storm water drainage system, exceeds its available discharge capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. Pinch points and failures within the drainage network may also restrict flows. Water then begins to back up through the sewers and surcharge through manholes, potentially flooding highways and properties. It must be noted that sewer flooding in 'dry weather' resulting from blockage, collapse or pumping station mechanical failure (for example), is the sole concern of the drainage undertaker.

UU is the water company responsible for the management of the majority of the borough's drainage network.

3.3.4 Locally Agreed Surface Water Information

EA guidance on using surface water flood risk information recommends that the LLFA, should:

"…review, discuss, agree and record, with the Environment Agency, Water Companies, Internal Drainage Boards and other interested parties, what surface water flood data best represents their local conditions. This will then be known as locally agreed surface water information".

The PFRA considered locally agreed surface water information that best represents local conditions in each Lancashire district. For Rossendale this was to be the Flood Map for Surface Water (FMfSW) produced by the EA. This is the second of three generations of surface water flood maps produced by the EA with the third having been released in 2013, after the first cycle of Preliminary Flood Risk Assessments were published. RBC and LCC should now consider the latest third generation Risk of Flooding from Surface Water map to be their locally agreed surface water flood information as this is the latest, most robust surface water flood map available.

3.3.5 Critical Drainage Areas or Areas of Critical Drainage

The Town and Country Planning (Development Management Procedure) (England) Order 2010 defines Critical Drainage Areas (CDA) as:

4 http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

"…an area within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency".

EA guidance on carrying out FRA[5] states that a Flood Risk Assessment should be carried out for sites in Flood Zone 1 that are…

"…in an area with critical drainage problems as notified by the Environment Agency."

The EA has not formally designated any CDAs within Rossendale.

3.4 Groundwater Flooding

Groundwater flooding is caused by the emergence of water from beneath the ground, either at point or diffuse locations. The occurrence of groundwater flooding is usually local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas, and can pose further risks to the environment and ground stability.

There are several mechanisms that increase the risk of groundwater flooding including prolonged rainfall, high in-bank river levels, artificial structures, groundwater rebound and mine water rebound. Properties with basements or cellars or properties that are located within areas deemed to be susceptible to groundwater flooding are at particular risk. Development within areas that are susceptible to groundwater flooding will generally not be suited to SuDS; however, this is dependent on detailed site investigation and risk assessment at the FRA stage.

3.4.1 Areas Susceptible to Groundwater Flooding (AStGWF)

The EA's national dataset, Areas Susceptible to Groundwater Flooding (AStGWF), is a low resolution map which uses four susceptibility categories to show the proportion of a network of 1 km grid squares where geological and hydrogeological conditions show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring and is not suitable for planning considerations at a site-specific level. It should only be used as a trigger for further investigation as to the possibility of groundwater flooding.

The AStGWF is shown on the SFRA Maps.

3.5 Canal and Reservoir Flood Risk

3.5.1 Canals

There are no canal systems within the Rossendale authority area.

3.5.2 Reservoirs

A reservoir can usually be described as an artificial lake where water is stored for use. Some reservoirs supply water for household and industrial use, others serve other purposes, for example, as fishing lakes or leisure facilities. The risk of flooding associated with reservoirs is residual and is associated with failure of reservoir outfalls or breaching. This risk is reduced through regular maintenance by the operating authority. Reservoirs in the UK have an extremely good safety record with no incidents resulting in the loss of life since 1925.

The EA is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be regularly inspected and supervised by reservoir panel engineers. Local Authorities are responsible for coordinating emergency plans for reservoir flooding and ensuring communities are well prepared. Local Authorities should work with other members of the Lancashire Resilience Forum (LRF) to develop these plans. See Section H.2 for information on the Lancashire Resilience Forum of which RBC are a member.

3.5.3 Reservoir Flood Maps

The EA has prepared reservoir flood maps for all large reservoirs that they regulated under the Reservoirs Act 1975 (reservoirs that hold over 25,000 cubic meters of water). There are a number of reservoirs located within the borough of Rossendale, several of which are above the 25,000 cubic metre threshold. There are also a number of smaller reservoirs that do not fall under the Reservoirs Act.

5 https://www.gov.uk/guidance/flood-risk-assessment-in-flood-zone-1-and-critical-drainage-areas

The reservoir flood maps show the largest area that might be flooded if a reservoir were to fail and release the water it holds but do not give any information about the depth or speed of the flood waters. RBC Emergency Planners should have access to this information so they can develop effective Emergency Plans. Due to the sensitivity of the information, any detailed information on reservoirs is not provided within this SFRA.

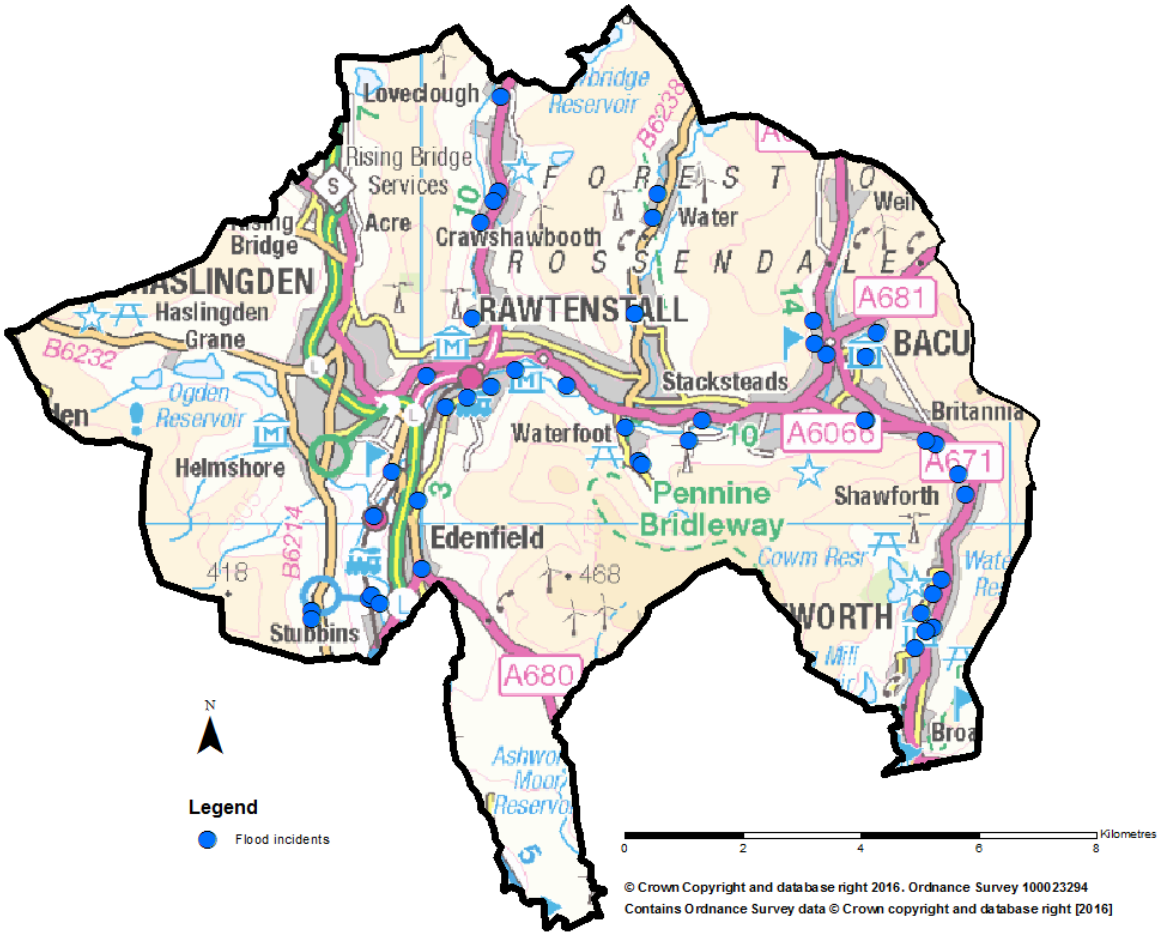
However, reservoir flood maps can be viewed online only and can be found on the EA's website[6]. The FWMA updated the Reservoirs Act and targeted a reduction in the capacity at which reservoirs should be regulated from 25,000 cubic metres to 10,000 cubic metres. This reduction, at the time of writing, is yet to be confirmed meaning the requirements of the Reservoirs Act 1975 should still be adhered to.

3.6 Historical Flooding

LCC as the LLFA hold a flood incident register, which is shared with the LPA, as part of their FWMA duties to keep a record of flood incidents that is continually updated when flood events occur. LCC's register contains a number of fluvial flood incidents dating back to 2004, the locations of which are shown on Figure 3-1. The register includes such relevant information as flood location, the date the flood incident occurred, the source and cause of the flood and details of any actions taken or proposed to deal with the cause and effect of the flood. RBC has limited records regarding any historical flood incidents though there is a record of the properties flooded in December 2015 and a number of flood diaries relating to specific past flood events.

The Lancashire PFRA summarises past surface water flood events across the county. The Sewer Incident Recording System (SIRS), provided by UU for use in the PFRA, showed clusters of flood risk in key locations most notably in Bacup and Rawtenstall, amongst other areas within the county.

Figure 3-1: LCC Flood Incident Register



6 http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=reservoir

3.6.1 Water Company Incidents

The water company that serves within this administrative area is UU. UU has provided its DG5 register to aid with the understanding of historic surface water and sewer flooding. The DG5 Register is used to record flood incidents attributable to water company controlled sewer networks, whether that be from foul and / or surface water sewers. UU also provided a list of historic flood incidents based on hydraulic inadequacies where the sewer capacities were not large enough to cope and flooding from other causes such as culvert blockages / collapse or equipment failure.

All UU data has been provided at a four-digit postcode level rather than the property level due to data sensitivity and could not be displayed on the SFRA Maps. This data is however provided in a table presented in Table 3-3.

Table 3-3: UU DG5 Register and Flood Incidents

4-Digit Postcode	DG5 Register		Properties affected by hydraulic inadequacy (2011-2016)		Properties affected by FOC* (2011-2016)	
	Internal	External	Internal	External	Internal	External
BB4					1	1
BB4 4		4		3	3	57
BB4 5	1				18	37
BB4 6	1		2		8	76
BB4 7	1	1			14	41
BB4 8	3		2		11	65
BB4 9	10	1	4	1	8	69
BB5 2						2
OL12					1	
OL12 8	3	2	12	10	22	74
OL13 0	1	1	1		19	32
OL13 8					4	35
OL13 9	2		1		8	61
BL0 0					5	35

*FOC = Flooding Other Causes (blockage / collapse / equipment failure)

3.6.2 June 2012 Floods

LCC's Section 19 Flood Investigation Report indicates that the following areas were affected by surface water flooding during the summer 2012 flooding:

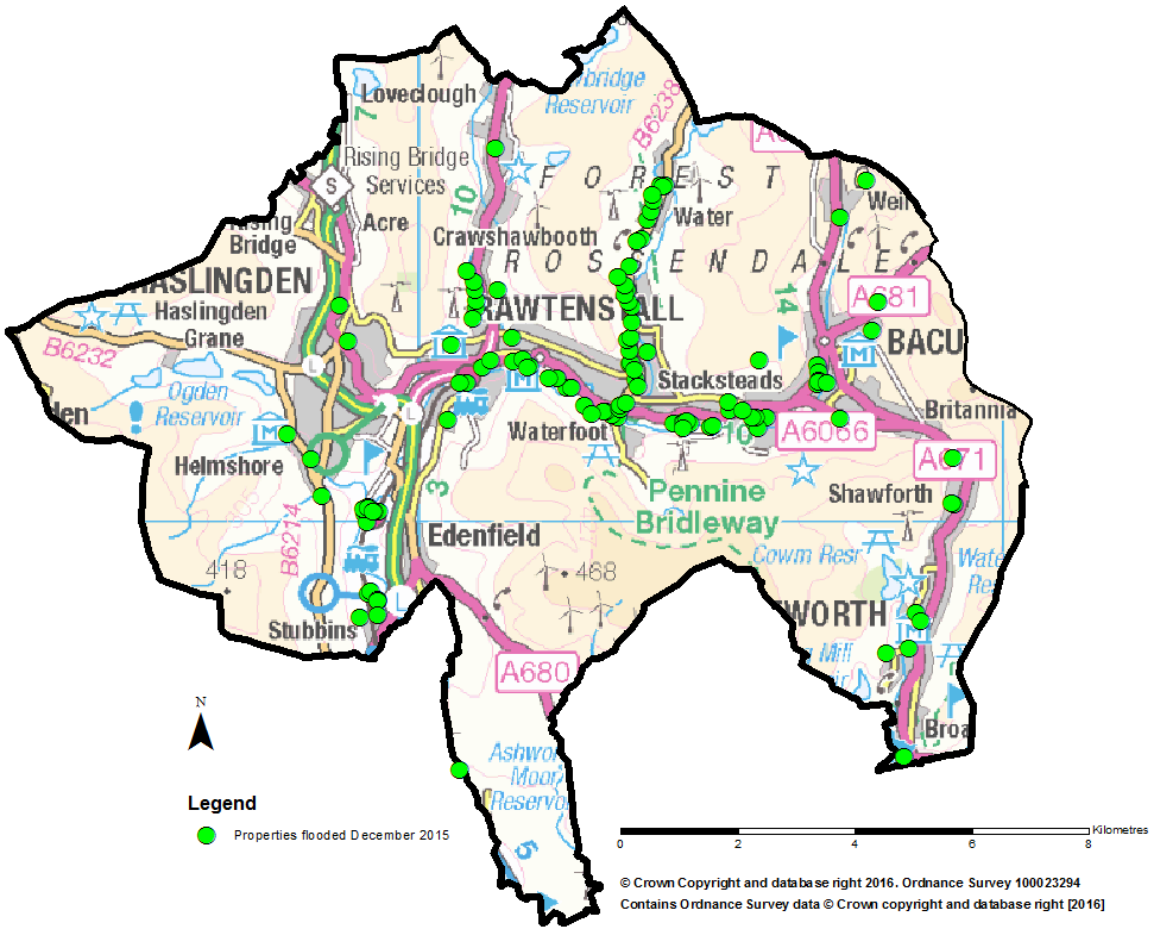
- Flooding at Irwell Vale was thought to be as a result of surface water flowing off the hillside behind the railway embankment and groundwater emerging near the foot of the hill.
- Flooding at Strongstry affected properties on North Street, and resulted from high levels in the River Irwell exacerbated by surface water running off the railway embankment, and a local ordinary watercourse. The River Irwell also contributed to the flooding at Chatterton, where surface water from a car park added to the problem.
- The flooding at Crawshawbooth resulted from overtopping of Folly Clough Brook, due to obstruction of a debris screen.
- The flooding in Whitewell Bottom, Piercy and Edgeside resulted from surface water draining off the hillsides, bringing down gravel, boulders and other debris.
- Market Street and eight nearby properties suffered flooding where the River Spodden flows through a restricted culvert put in place by residents in order to create access to garages on the far bank. Surface water flooding from the highway aggravated the situation.
- A number of streets in Bacup suffered flooding from surface water, blocked drains and obstructed watercourses.
- Six properties suffered flooding at Ewood Bridge following surface water runoff from a golf course.

Numerous other locations across Rossendale have been identified where isolated properties suffered flooding in June. Further details about the specific flooding mechanisms and details of the subsequent risk management authority actions plan may be found within LCC's Section 19 Flood Investigation Report (LCC, 2012).

3.6.3 December 2015 Floods

Over 350 properties and businesses were flooded across Rossendale on 26 December 2015 as a result of Storm Eva, the majority of which were in the main Rossendale Valley in Rawtenstall and also in the Whitewell Brook catchment. It is thought that the majority of properties flooded as a result of surface water flooding. Figure 3-2 highlights the areas of the borough where properties and businesses flooded on the 26 December 2015, however at the time of writing, a Flood Investigation report has yet to be published.

Figure 3-2: Areas flooded in December 2015



3.6.4 EA Historic Flood Map

The Historic Flood Map (HFM) contains outlines of past fluvial, tidal and groundwater flooding. These outlines can be viewed on the accompanying Level 1 SFRA Maps. It does not contain any information regarding flood source, return period or date of flood. The HFM shows that there has been historic flooding from Limy Water in Crawshawbooth; from Whitewell Brook in Piercy; from the River Ogden around Helmshore; and from the River Irwell at Lumb Bridge in Irwell Vale.

3.7 Flood Risk Management

The aim of this section of the SFRA is to identify existing Flood Risk Management (FRM) assets and previous / proposed FRM schemes in the borough. The location, condition and design standard of existing assets will have a significant impact on actual flood risk mechanisms. Whilst future schemes in high flood risk areas carry the possibility of reducing the probability of flood events and reducing the overall level of risk. Both existing assets and future schemes will have a further impact on the type, form and location of new development or regeneration.

3.7.1 EA Assets

The EA's flood defence dataset was downloaded from the Government's Spatial Data Catalogue[7]. The dataset shows that there is a large network of flood defence infrastructure throughout the borough, with 22 purpose built walls offering differing flood risk functions. There are several major flood walls located on the River Irwell at Stubbins, with design standards of 75 years, protecting residential and industrial areas. These defences were built in 2015. There are other concrete / masonry walls on the River Spodden at Tong End, Whitworth, protecting the football ground and residential areas up to a 1 in 25 year flood event. A number of other masonry and concrete walls exist on the River Ogden which appear to offer protection to residential areas in Helmshore. Many of these walls are in poor condition though the design standard is unknown.

The dataset also doesn't state who is responsible for the maintenance of the structures which is likely to range from the EA, the LLFA or private maintenance by way of a private owner.

As well as the ownership and maintenance of a network of formal defence structures, the EA carries out a number of other flood risk management activities that help to reduce the probability of flooding, whilst also addressing the consequences of flooding. These include:

- Maintaining and improving the existing flood defences, structures and watercourses.
- Enforcement and maintenance where riparian owners unknowingly carry out work that may be detrimental to flood risk.
- Identifying and promoting new flood alleviation schemes (FAS) where appropriate.
- Working with local authorities to influence the location, layout and design of new and redeveloped property and ensuring that only appropriate development is allowed on the floodplain.
- Operation of Floodline Warnings Direct and warning services for areas within designated Flood Warning Areas (FWA) or Flood Alert Areas (FAA). EA FWAs are shown on the SFRA Maps in Appendix A.
- Promoting awareness of flooding so that organisations, communities and individuals are aware of the risk and are prepared in case they need to take action in time of flood.
- Promoting resilience and resistance measures for those properties already in the floodplain.

3.7.2 LCC Assets

As LLFA, LCC owns and maintains a number of assets throughout Rossendale including culverts, bridge structures and trash screens. The majority of these assets lie along ordinary watercourses, especially within built up areas, such as Rawtenstall, where they have been culverted or diverted. Other managed assets may include highway drains and gullies on major and minor roads. All these assets can have flood risk management functions as well as an effect on flood risk if they become blocked or fail.

As part of their FWMA duties, LCC has a duty to maintain a register of structures or features, which are considered to have a significant effect on flood risk, including details on ownership and condition as a minimum. RBC as an RMA, has duties to pass on relevant information to the LLFA and will therefore need to be involved in collecting data for the asset register and maintaining assets within the region.

LCC's asset register, available to download from the LCC website, contains information on type of structure and location but no information on ownership, condition or material. The register should also outline how LCC intend to manage these assets or features including their ongoing maintenance programme. Where assets or features are located in a high risk area or have been assessed to have the potential to effect flood risk, RBC should prioritise and focus any maintenance or upgrades. This information should be shared and consulted upon with RBC. LCC's Flood Risk Asset Register is presented on the SFRA Maps in Appendix A.

3.7.3 Water Company Assets

The sewerage infrastructure of Rossendale is likely to be based on Victorian sewers from which there is a risk of localised flooding associated with the existing drainage capacity and sewer system. The drainage system may be under capacity and / or subject to blockages resulting in localised flooding of roads and property. UU is responsible for the management of the urban drainage system. This includes surface water and foul sewerage. There may however be some private

7 http://environment.data.gov.uk/ds/catalogue/index.jsp#/catalogue

surface water sewers in the borough as only those connected to the public sewer network were transferred over to the water companies under the Private Sewer Transfer in 2011. However, surface water sewers discharging to watercourses did not transfer and would therefore not be under the ownership of UU, unless adopted under a Section 104 adoption agreement.

Water company assets include Wastewater Treatment Works, Combined Sewer Overflows, pumping stations, detention tanks, sewer networks and manholes.

3.7.4 Future Flood Risk Management Work Programmes

To gain an insight into how the EA will manage government investment to reduce flood risk in England, including Rossendale, up to 2021, follow the following link:

https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes

The next link provides more detailed information on individual schemes taking place at the time of writing across England:

https://www.gov.uk/government/collections/flood-risk-management-current-schemes-and-strategies

4 Development and Flood Risk

4.1 Introduction

This section of the SFRA provides a strategic assessment of the suitability of the potential development sites to be considered though the Local Plan which have been provided by RBC.

The information and guidance provided in this chapter (supported by the SFRA mapping in Appendix A and the Development Site Assessment Spreadsheet in Appendix B) can be used by RBC to inform its Local Plan, and provide the basis from which to apply the Sequential Approach in the development allocation and development management process.

Climate change outputs have also been produced from existing EA hydraulic river models for this Level 1 study, using the EA's February 2016 allowances. Where EA models were not available, a precautionary approach to assessing future flood risk to sites has been adopted whereby Flood Zones 2 and 3 of the EA's Flood Map for Planning have been used as a proxy to provide an indication of the possible increase in flood risk as a result of climate change. Section 4.5.4 discusses the risk of climate change to potential sites.

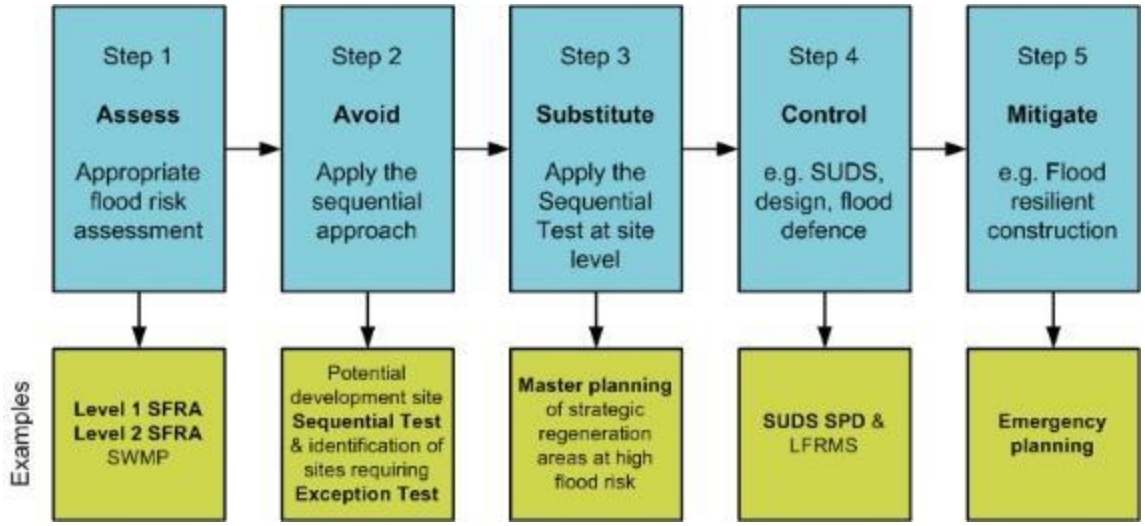
4.2 The Sequential Approach

The FRCC-PPG provides the basis for the Sequential Approach. It is this approach, integrated into all stages of the development planning process, which provides the opportunities to reduce flood risk to people, their property and the environment to acceptable levels.

The approach is based around the flood risk management hierarchy, in which actions to avoid, substitute, control and mitigate flood risk is central. For example, it is important to assess the level of risk to an appropriate scale during the decision making process, (starting with this Level 1 SFRA). Once this evidence has been provided, positive planning decisions can be made and effective flood risk management opportunities identified.

Figure 4-1 illustrates the flood risk management (FRM) hierarchy with an example of how these may translate into the council's management decisions and actions.

Figure 4-1: Flood Risk Management hierarchy



The overall aim of the Sequential Approach should be to steer new development to low risk Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, the flood risk vulnerability of land uses and reasonably available sites in Flood Zone 2 should be considered, applying the Exception Test if required.

Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in higher risk Flood Zone 3, be considered. This should take into account the flood risk vulnerability of land uses and the likelihood of meeting the requirements of the Exception Test if required.

There are two different aims in carrying out the Sequential Approach depending on what stage of the planning system is being carried out i.e. Local Planning Authorities (LPAs) allocating land in Local Plans or determining planning applications for development. This SFRA does not remove the need for a site-specific Flood Risk Assessment at a development management stage.

The following sections provide a guided discussion on why and how the Sequential Approach should be applied, including the specific requirements for undertaking Sequential and Exception Testing.

4.3 Local Plan Sequential & Exception Test

RBC, as the LPA, should seek to avoid inappropriate development in areas at risk of flooding by directing development away from areas at highest risk and ensuring that all development does not increase risk and where possible can help reduce risk from flooding to existing communities and development.

(Guidance on the application of the Sequential and Exception tests through the development management process is provided at Section 4.7 of this report).

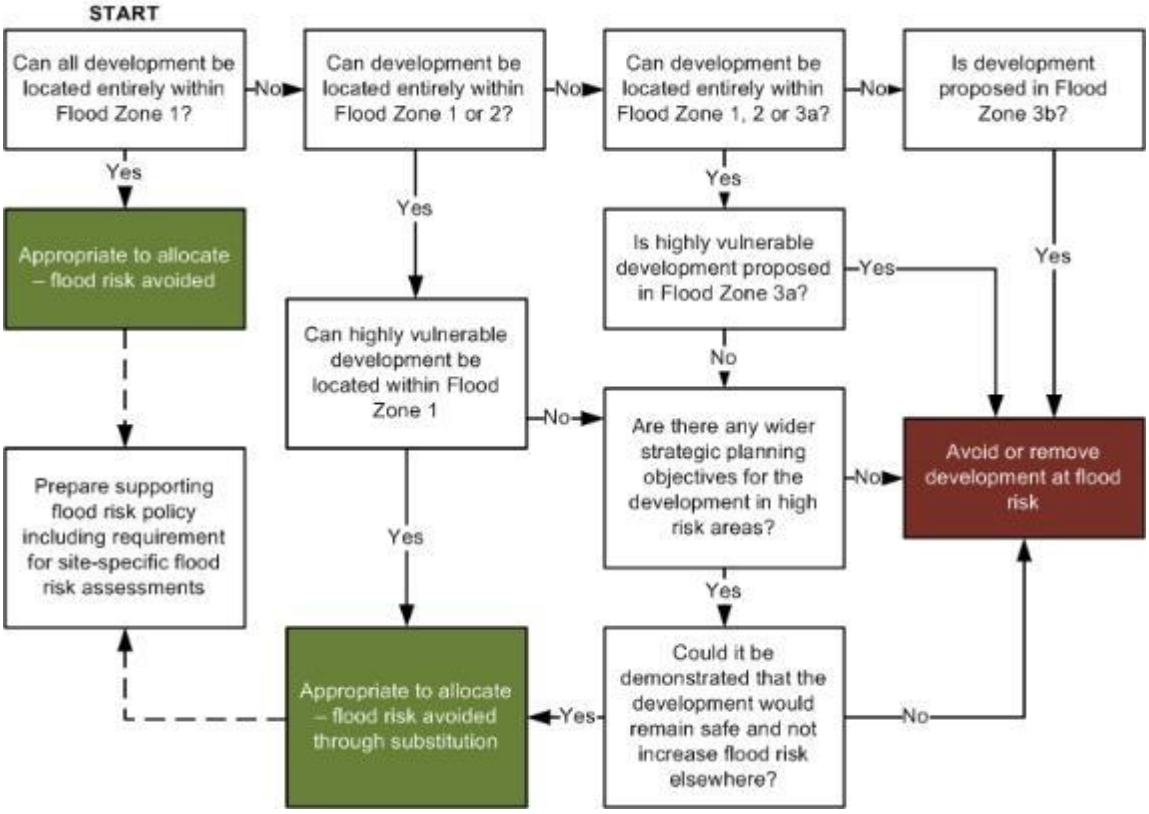
At a strategic level, this should be carried out as part of RBC's Local Plan. This should be done by:

1. Applying the Sequential Test and if the Sequential Test is passed, applying the Exception Test, if required;
2. Safeguarding land from development that is required for current and future flood management;
3. Using opportunities offered by new development to reduce the causes and impacts of flooding and where climate change is expected to increase flood risk so that existing development may not be sustainable in the long term;
4. Seeking opportunities to facilitate the relocation of development including housing to more sustainable locations.

Figure 4-2 illustrates the Sequential and Exception Tests as a process flow diagram using the information contained in this SFRA to assess potential development sites against the EA's Flood Map for Planning flood zones and development vulnerability compatibilities.

This is a stepwise process, but a challenging one, as a number of the criteria used are qualitative and based on experienced judgement. The process must be documented and evidence used to support decisions recorded.

Figure 4-2: Local Plan sequential approach to site allocation



This SFRA provides the main evidence required. This process also enables those sites that have passed the Sequential Test, and may require the Exception Test, to be identified.

For the Exception Test to be passed, the NPPF Paragraph 102 states:

a. *It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk informed by a Strategic Flood Risk Assessment where one has been prepared; and*

b. *A site-specific Flood Risk Assessment (FRA) must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

Both elements of the test will have to be passed for development to be allocated or permitted.

Although actually passing the Exception Test will require the completion of a site-specific FRA, RBC should be able to assess the likelihood of passing the test at the Local Plan level by using the information contained in this SFRA to answering the following questions:

a. Can development within higher risk areas be avoided or substituted?
b. Is flood risk associated with possible development sites considered too high and will this mean that the criteria for Exception Testing are unachievable?
c. Can risk be sustainably managed through appropriate development techniques (resilience and resistance) and incorporate Sustainable Drainage Systems without compromising the viability of the development?
d. Can the site, and any residual risks to the site, be safely managed to ensure that its occupiers remain safe during times of flood if developed?

Where it is unlikely that the Exception Test can be passed due to few wider sustainability benefits, the risk of flooding being too great, or the viability of the site being compromised by the flood risk management work required, then RBC should consider avoiding the site all together.

Once the process has been completed RBC should then be able to allocate appropriate development sites through the Local Plan as well as prepare flood risk policy including the requirement to prepare site-specific FRAs for all allocated sites that remain at risk of flooding.

4.4 Local Plan Sites Assessment

Local Planning Authorities have a requirement under the NPPF to demonstrate a sufficient supply of potential sites suitable for residential development to meet local housing requirements as well as sites for economic development uses. In addition, the NPPF identifies advantages of carrying out land assessments for housing and economic development as part of the same exercise in order that sites may be allocated for the most appropriate use. Planning Practice Guidance (PPG) is regularly reviewed and updated and the preparation of a joint land availability assessment is now aided by the publication of guidance entitled "Housing and economic land availability assessment", last updated 27 March 2015.

Potential sites in Rossendale have been identified from a broad range of sources as suggested in the PPG, and include planning commitments, sites promoted through a "call for sites" exercise (2016), and sites included in RBC's Strategic Housing Land Availability Assessment (SHLAA), 2015. The identified sites have been used for assessment for the purposes of this SFRA update. 306 sites overall have been assessed and subdivided into several proposed uses including:

- Residential (282 sites)
- Employment (17 sites)
- Mixed use (6 sites) including housing and employment
- Gypsy and traveller (1 site)

In order to inform the first part of the Sequential Approach for allocation of development through the Local Plan (illustrated in Figure 4-2), this SFRA has carried out a high level screening exercise overlaying the sites against Flood Zones 1, 2, 3a and 3b.

Surface water risk to sites has also been assessed through the EA's Risk of Flooding from Surface Water dataset to help identify those sites that may have critical drainage problems. The site assessment Excel spreadsheet, included in Appendix B provides a breakdown of each site and the Area (ha) and percentage coverage of each flood zone and each surface water flood zone.

Zones 3b, 3a and 2 are considered in isolation. Any area of a site within the higher risk Flood Zone 3b that is also within Flood Zone 3a is excluded from Flood Zone 3a and any area within Flood Zone 3a is excluded from Flood Zone 2. This allows the sequential assessment of risk at each site by addressing those sites at higher risk first. Table 4-1 provides a count of the number of sites within each Flood Zone.

Table 4-1: Number of potential development sites at risk from Flood Map for Planning flood zones

Potential Development Site	Number of sites within…			
	Flood Zone 1*	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Residential	225	55	44	1
Employment	7	9	9	0
Mixed use	4	2	1	0
Gypsy & traveller	1	0	0	0
TOTAL	**237**	**66**	**54**	**1**
*100% within Flood Zone 1				

RBC should use the site assessment spreadsheet in Appendix B to identify which sites should be avoided during the Sequential Test. The spreadsheet can also be used to assess whether or not economic and housing projections can be met by purely allocating sites in areas at low risk of flooding. If this is not the case, or where wider strategic objectives require regeneration in areas already at risk of flooding, then RBC should consider the compatibility of vulnerability classifications and Flood Zones (refer to FRCC-PPG) and whether or not the Exception Test will be required before

finalising sites. The decision making process on site suitability should be transparent and information from this SFRA should be used to justify decisions to allocate land in areas at high risk of flooding.

4.4.1 Sustainability Appraisal and Flood Risk

The Sustainability Appraisal should help to ensure that flood risk is taken into account at all stages of the planning process with a view to directing development away from areas at flood risk, now and in the future, by following the sequential approach to site allocation, as shown in Figure 4-2. Using this SFRA, and specifically the sites assessment information included in Section 4.5 and the Development Site Assessment spreadsheet (Appendix B), RBC should be able to make decisions on the sustainability of specific sites, with regards to flood risk.

By avoiding sites identified in this SFRA as being at significant risk, or by considering how changes in site layout can avoid those parts of a site at flood risk, such as any site included within Recommendation C (Section 4.5.1.3), the Council would be demonstrating a sustainable approach to development.

In terms of surface water, the same approach should be followed whereby those sites at highest risk should be avoided or site layout should be tailored to ensure sustainable development. This should involve investigation into appropriate SuDS techniques (see Section 4.9).

Once the Council has decided on a final list of sites following application of the Sequential Test and, where required, the Exception Test following a site-specific FRA, a phased approach to development should be carried out to avoid any cumulative impacts that multiple developments may have on flood risk. For example, for any site where it is required to develop in Flood Zone 3, detailed modelling would be required to ascertain where water displaced by development may flow and to calculate subsequent increases in downstream flood volumes. The modelling should investigate scenarios based on compensatory storage techniques to ensure that downstream or nearby sites are not adversely affected by development on other sites.

Using a phased approach to development, based on modelling results of floodwater storage options, should ensure that any sites at risk of causing flooding to other sites are developed first in order to ensure flood storage measures are in place before other sites are developed, thus ensuring a sustainable approach to site development. Also, it may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

4.4.2 Safeguarded Land for Flood Storage

Where possible, the Council may look to allocate land designed for flood storage functions. Such land can be explored through the site allocation process whereby an assessment is made, using this SFRA, of the flood risk at potential sites and what benefit could be gained by leaving the site undeveloped. In some instances, the storage of flood water can help to alleviate flooding elsewhere, such as downstream developments. Where there is a large area of a site at risk that is considered large enough to hinder development, it may be appropriate to safeguard this land for the storage of flood water.

Applicable sites may include any current Greenfield sites:

- That are considered to be large enough (>1 hectare) to store flood water to achieve effective mitigation,
- With large areas of their footprint at significant risk from surface water flood events (based on the RoFSW),
- That are within the functional floodplain (Flood Zone 3b),
- With large areas of their footprint at risk from Flood Zone 3a, and
- That are large enough and within a suitable distance to receive flood water from a nearby development site using appropriate SuDS techniques which may involve pumping, piping or swales / drains.

Brownfield sites could also be considered though this would entail site clearance of existing buildings and conversion to greenspace.

4.5 Potential Development Sites Review

This section of the report assesses flood risk to potential sites. Section 4.5.1 provides high level broad-brush recommendations for those sites within the flood zones of the Flood Map for Planning. The recommendations do not take account of climate change. See Section 4.5.4 for assessment of climate change. Section 4.5.2 reviews the surface water risk to the potential sites by way of the updated Flood Map for Surface Water.

It is important to note that each individual site will require further investigation, as local circumstances may dictate the outcome of the recommendation. Such local circumstances may include the following:

- If sites have planning permission but construction has not started, the SFRA may only be able to influence the design of the development e.g. finished floor levels. New, more extensive flood extents (from new models) cannot be used to reject development where planning permission has already been granted.
- Some sites, where appropriate, may be able to develop around the flood risk. Planners are best placed to make this judgement i.e. will the site still be deliverable if part of it needs to be retained to make space for flood water.
- Surrounding infrastructure may influence the scope for development layout redesign/removal of site footprints from risk, and also locations of safe access and egress points during a flood.
- Current land use. A number of sites included in the assessment are likely to be brownfield, thus the existing development could be taken into account as further development should not lead to increased flood risk.
- Existing planning permissions may exist on some sites where the EA and/or LPA may have already passed comment and/or agreed to appropriate remedial works concerning flood risk. Previous flood risk investigations/FRAs may already have been carried out at some sites that demonstrate flood risk may be effectively managed.

4.5.1 Flood Map for Planning Site Assessment

The following strategic recommendations provide only a guide, based on the flood risk information made available in Stage 1 of the hybrid SFRA. It is RBC's responsibility to carry out sequential testing of each site using the information provided in this SFRA and more specifically using their local, site specific knowledge and advice from the EA. These sections should be read alongside the Development Site Assessment spreadsheet in Appendix B.

4.5.1.1 Recommendation A – Consider withdrawal of site

This recommendation DOES NOT take account of local circumstances, such as local culvert blockage, groundwater interactions or highways drainage, only that part of a site area falls within a flood zone.

Recommendation A applies to any site within the functional floodplain where the following criteria are true:

- 10% or greater of the site area is within Flood Zone 3b. The FRCC-PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test. Land allocated for housing falls in to the more vulnerable category and employment sites are in the less vulnerable category, though waste management sites for hazardous materials fall with the more vulnerable category. Gypsy and traveller sites are within the highly vulnerable category. Mixed use sites should be placed into the higher of the relevant classes of flood risk sensitivity. Development should not be permitted for sites within the highly, more and less vulnerable categories that fall within Flood Zone 3b. If the developer is able to avoid 3b however, then part of the site could still be delivered
- The scale of surface water risk on the site is considered large enough that possible mitigation of the risk on site is deemed unlikely to be achievable

The 10% threshold is not included within any policy, it is merely considered that it would likely prove difficult for developers to deliver a site where 10% or more of the site area is considered as undevelopable, based on the NPPF. However, this is up to the LPA to consider on a site by site basis as the 10% threshold is designed to provide an indicative extent for the basis of strategic screening of a large number of sites and subject to detailed assessment. Where the risk covers less than 10%, it is more likely that appropriate site use may be made with allowance for higher risk areas. This 10% threshold does not account for local circumstances or the EA recommended 8 metre easement buffer for Main Rivers, therefore it may be possible to deliver a site included within Recommendation A upon more detailed investigation.

Recommendation A does not apply to any sites at fluvial risk. Only one site is within the functional floodplain (Land east of Holcombe Road, Ref: SFRA253) with only 2.8% of the site area affected therefore it should be possible to avoid the risk area. 11 sites are recommended for withdrawal based on the scale of surface water risk, however:

Site SFRA123 has extant FRA accepted by the EA. As long as mitigation recommendations in the FRA are adhered to, site should be able to go ahead. Therefore 10 sites were recommended for withdrawal, based on the Level 1 assessment.

See Section 4.5.2 for surface water risk to sites.

4.5.1.2 Recommendation B – Exception Test

Recommendation B applies to sites where it is likely the Exception Test would be required. This does not include any recommendation on the likelihood of a site passing the Exception Test. These sites are examined in more detail in Stage 2 (Level 2 SFRA), where a further recommendation is made on allocation options and likelihood of passing the Exception Test (see summary tables in Section 6.2. The developer / LPA should always attempt to avoid the risk area where possible.

This recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a Flood Zone.

Recommendation B applies to sites where the following criterion is true:

- 10% or greater of any residential site, mixed use site entailing residential, or essential infrastructure site that is within Flood Zone 3a. Water-compatible and less vulnerable uses of land do not require the Exception Test if in Flood Zone 3a

All development proposals in Flood Zone 3a must be accompanied by a site-specific FRA

The rationale behind the 10% threshold was discussed in 4.5.1.1 so based on this, it may still be possible to avoid Flood Zone 3a altogether for some of the sites included with Recommendation B. It may also be possible to deliver part of some of the larger sites, dependent upon further investigation, where a significant area is not within the Flood Zone 3b.

Table 4-2 lists those sites where Recommendation B should apply based on the 10% threshold of site area within Flood Zone 3a. The Development Site Assessment spreadsheet in Appendix B lists those sites where Recommendation B should apply, encompassing 19 sites. See Section 6 for the more detailed Level 2 assessment of these sites.

Table 4-2: Sites where application of the Exception Test would be required

Site ID	Site Name	Proposed use	Site Area (ha)	% Area within FZ3a
SFRA07	Mill End Mill	Residential	1.29	21.07
SFRA308	Shadlock Skip	Residential	1.14	23.86
SFRA31	Land Adj to Futures Park	Residential	0.39	11.54
SFRA92	Land Off Hill End Lane, 8222-3397	Residential	0.58	50.89
SFRA97	Land Off Rock Bridge Fold	Residential	0.41	33.72
SFRA116	Myrtle Grove House, 392 Bacup Road	Residential	0.28	11.13
SFRA134	Adj Toll Bar Business Park	Residential	2.36	15.34
SFRA135	South of Toll Bar Business Park	Residential	1.10	64.55
SFRA137	Lee Brook Close, Rake Foot	Residential	0.97	10.61
SFRA139	Gaghills Building Lane	Residential	1.07	21.53
SFRA140	Globe Mill and Adj Land	Residential	1.58	58.58
SFRA141	Dale Mill Burnley Road East	Residential	1.26	76.42
SFRA142	Old Football Ground Manchester Road	Residential	1.73	23.29
SFRA155	Townsend Fold, North of Hill	Residential	2.63	10.04
SFRA161	Rear of Anglo Felt Factory	Residential	0.64	37.09
SFRA178	Irwell Vale Mill	Residential	2.19	26.68
SFRA195	Eagley Bank, Shawforth	Residential	0.43	17.30
SFRA292	Townsend Fold, Rawtenstall	Residential	3.69	10.88
SFRA299	Cowm water treatment works, Whitworth	Residential	2.53	47.12

4.5.1.3 Recommendation C – Consider site layout and design

Recommendation C recommends a review of site layout and / or design at the development planning stage in order for development to proceed. A Level 2 SFRA or site-specific FRA would be required to inform on site layout and design.

This recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a flood zone.

Recommendation C may apply to sites where the following criteria is true:

- <10% of the area of any site type is within Flood Zone 3b.
- <10% of any residential site is within Flood Zone 3a.
- <10% of any mixed use site entailing residential use is within Flood Zone 3a.
- <10% of any essential infrastructure site is within Flood Zone 3a.
- 10% or greater of the area of any site type is within the high risk (1 in 30 year) or medium risk (1 in 100 year) surface water flood outline.
- 20% or greater of the area of any site type is within the low risk (1 in 1000 year) surface water flood outline.

Again, the 10% threshold is not included within any policy, it is merely considered that it may be possible for developers to avoid a flood zone when less than 10% of the site area is at risk, as discussed in Section 4.5.1.1.

The Development Site Assessment spreadsheet in Appendix B categorises those sites with <10% of their area within Flood Zone 3b where site layout should be examined with a view to removing the site footprint from Flood Zone 3b (one site - Land east of Holcombe Road, Ref: SFRA253). Depending on local circumstances, if it is not possible to adjust the site boundary to remove the site footprint from Flood Zone 3b to a lower risk zone then development should not be permitted.

Also listed within the spreadsheet are the residential and mixed use sites with <10% of their area within Flood Zone 3a and where site layout and / or design should be examined with a view to removing the site footprint from Flood Zone 3a or incorporating on-site storage of water into site design. Depending on local circumstances, if it is not possible to adjust the site boundary to remove the site footprint from Flood Zone 3a to a lower risk zone or to incorporate on-site storage of water within the site design, then the Exception Test should be undertaken and passed as part of a site-specific FRA.

Overall there are 33 potential sites to which Recommendation C applies, 20 of which are based on fluvial risk and vulnerability (see Table 4-3) and 13 of which are based on surface water risk. There are 12 sites 100% within Flood Zone 1 that are at significant risk from surface water and a further four sites are at significant surface water risk that are also at fluvial risk (see Table 4-5).

Any site layout and design should take account of the 8 metre easement buffer along watercourses from the top of the bank or the landward toe of a defence on main rivers where development is not permitted. This easement buffer is recommended by the EA to allow ease of access to watercourses for maintenance works. Site designs, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of suitable SuDS.

Table 4-3: Sites to consider layout and design to avoid risk areas

Site ID	Site Name	Proposed use	Site Area (ha)
SFRA19	Land to rear of Cemetery Terrace	Residential	0.26
SFRA39	Site 5B Kearns Mill, Cowpe	Residential	0.37
SFRA84	Laund Bank Barn 2	Residential	3.64
SFRA90	Land off Wales Road 8322-251	Residential	0.63
SFRA101	Land Off Bocholt Way	Residential	1.63
SFRA118	Waterfoot Bus Terminus	Residential	0.38
SFRA151	Redundant Car Park Cowpe Road	Residential	0.14
SFRA162	Land off Rockcliffe Road	Residential	3.04

Site ID	Site Name	Proposed use	Site Area (ha)
SFRA166	Waterhouse, Cowpe	Residential	1.04
SFRA169	Land west of Park Road, Helmshore	Residential	0.96
SFRA179	Land south of Chatterton Old Lane, Stubbins	Residential	5.08
SFRA180	Edenwood Mill	Residential	2.32
SFRA181	Acre Meadow	Residential	2.57
SFRA191	Land to the north of Whitworth High School	Residential	7.51
SFRA196	Land north of Knott Hill (west of Winterbutt Lee)	Residential	2.61
SFRA231	Land north of Adelaide Street	Residential	4.75
SFRA253	Land east of holcombe Road	Residential	5.52
SFRA287	Glen Mill, 640 Newchurch Road, Stacksteads	Residential	0.18
SFRA291	Toll Bar Business Park	Residential	0.80
SFRA297	Reedsholme Works, Rawtenstall	Residential	3.25

4.5.1.4 Recommendation D – Development could be allocated subject to FRA

Recommendation D recommends that development could be allocated, assuming a site-specific FRA shows the site can be safely developed and it is demonstrated that the site is sequentially preferable. A site within Flood Zone 2 could still be rejected if the conclusions of the FRA decide development is unsafe or inappropriate.

This recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a Flood Zone.

Recommendation D applies to sites where the following criteria is true:

- Any site within Flood Zone 2 that does not have any part of its footprint within Flood Zone 3a, with the exception of highly vulnerable developments (such as gypsy and traveller sites) which would be subject to, and have to pass, the Exception Test.
- Employment sites within Flood Zone 3a assuming the site use falls within the less vulnerable or water-compatible category of the flood risk vulnerability classification of the FRCC-PPG. No part of the site can be within Flood Zone 3b.
- Any site 100% within Flood Zone 1 where surface water flood risk is apparent on site and therefore recommended for investigation through a site-specific FRA. Surface water risk to sites is assessed in Section 4.5.2.
- Any site 100% within Flood Zone 1 that is greater than or equal to 1 hectare in area.

Recommendation D applies to 193 potential sites.

All development proposals within Flood Zone 2 or Flood Zone 3a must be accompanied by a site-specific FRA. Any sites 100% within Flood Zone 1 that are equal to or greater than 1 hectare in area must also be accompanied by a site-specific FRA to determine vulnerability to flooding from other sources as well as fluvial. The FRA should determine the potential of increased flood risk elsewhere as a result of the addition of hard surfaces on-site and the effect of new development on surface water runoff.

The FRCC-PPG states:

"Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally." (Paragraph 50).

4.5.1.5 Recommendation E - Should be allocated on flood risk grounds subject to consultation with the LPA / LLFA

Recommendation E recommends that development should be allocated on flood risk grounds, based on the evidence provided within this SFRA. Further investigation may be required by the developer and a FRA may be required assessing further or new information that may not have been included within this SFRA.

> Recommendation E applies to any site with its area 100% within Flood Zone 1 and with no or little perceived risk from surface water, based on the updated Flood Map for Surface Water.

Recommendation E applies to 50 sites which equates to approximately 16% of the sites assessed.

4.5.2 Surface Water Risk to Potential Sites

This section assesses surface water risk to each site according to the RoFSW. The Development Site Assessment spreadsheet in Appendix B isolates each of the surface water outlines so that any area of a site within the high risk 1 in 30 year outline is excluded from the medium risk 1 in 100 year outline and any area within the 1 in 100 year outline is excluded from the low risk 1 in 1000 year outline. This allows a sequential assessment of surface water risk at each site.

For this SFRA, a site is considered to be at significant surface water flood risk if 10% or more of the site area is within the high risk or medium risk outlines or if 20% or more of the site area is within the low risk outline. As explained with the fluvial flood zones, the percentage thresholds are not included within any policy, it is merely considered that where a site has 10% or greater of its area within the high and medium risk outlines, or 20% or greater within the low risk outline, then the risk from surface water is considered to be significant. However, it is up to the LPA to consider on a site by site basis as the thresholds are designed to provide an indicative extent for the basis of strategic screening of a large number of sites and subject to detailed assessment. For these sites, a drainage strategy, SWMP or site-specific FRA should be carried out to investigate possible mitigation measures for flood storage or infiltration techniques through appropriate SuDS.

Table 4-4 shows the number of overall sites at risk for each event and the number of sites considered to be at significant risk from surface water flooding. A number of these sites are also at fluvial flood risk. In total, there are 48 sites considered to be at significant surface water flood risk. These sites are listed in Table 4-5.

NOTE: This assessment of surface water risk to sites DOES NOT take account of local circumstances, such as local culvert blockage, groundwater interactions or highways drainage, only that part of a site area falls within a surface water flood outline of the updated Flood Map for Surface Water.

Table 4-4: Number of sites at risk from surface water flooding

RoFSW event outline	Number of sites at risk*	Number of sites at significant risk^
High risk (1 in 30 year)	144	30
Medium risk (1 in 100 year)	177	14
Low risk (1 in 1000 year)	241	36
*In reality, sites within the high risk outline will also be in the medium risk outline and those within the high and medium risk outlines will also be in the low risk outline ^Significant risk = site area >=10% within high and/or medium risk outline, and/or >=20% within low risk outline		

Table 4-4 shows that of the 144 sites at high risk, 21% have 10% or more of their site area at risk and are therefore considered to be at significant risk. 8% of sites have 10% or more of their area at medium risk and for the low risk event, 15% of sites have 20% or more of their area at risk and are therefore considered to be at significant risk. Table 4-5 lists the sites considered to be at significant risk from surface water and where it may be difficult to accommodate surface water storage on-site. A number of these sites are also at fluvial risk and are therefore included within the strategic recommendations based on fluvial risk (Section 4.5.1), unless surface water risk is considered to be of greater significance. 15 of the sites considered to be at significant surface water

risk have 100% of their area footprint within Flood Zone 1. These 15 sites are given a strategic recommendation based on surface water risk alone.

As discussed in Section 4.5.1.1, no sites are recommended for withdrawal based on fluvial risk alone. However, 11 sites are recommended for withdrawal based on the large percentage area at risk of surface water flooding though 1 site (SFRA123) has an extant FRA accepted by the EA and is therefore not considered. Overall site area footprint is also taken into account, i.e. is the site large enough to accommodate floodwater storage on-site? The proposed use is also taken account of, i.e. residential development is considered to be more vulnerable than development for employment use.

Overall, of the sites at significant surface water risk:

- 10 are within Recommendation A,
- 15 are within Recommendation B,
- 16 are within Recommendation C,
- 6 are within Recommendation D,
- 1 is considered not applicable (N/A) due to extant FRA (site SFRA123).

Table 4-5 lists these sites and their recommendation.

Table 4-5: Sites at significant surface water risk

Site ID	Area (ha)	% Area within High Risk Outline	% Area within Medium Risk Outline	% Area within Low Risk Outline	Fluvial Risk?	Strategic Recommendation
SFRA04	0.51	3.87	2.29	27.15	No	Recommendation C
SFRA07	1.29	19.79	7.54	21.55	Yes	Recommendation B
SFRA08	0.14	1.49	0.41	98.10	Yes	Recommendation A
SFRA10	0.91	81.31	9.45	6.28	Yes	Recommendation A
SFRA308	1.14	11.63	2.56	12.47	Yes	Recommendation B
SFRA16	0.48	21.45	12.25	33.84	Yes	Recommendation A
SFRA21	0.20	0.00	0.28	55.31	Yes	Recommendation D
SFRA31	0.39	17.66	10.07	24.42	Yes	Recommendation B
SFRA32	0.53	0.21	0.63	23.26	Yes	Recommendation D
SFRA38	4.47	10.42	2.97	8.30	No	Recommendation C
SFRA39	0.37	13.10	2.10	13.94	Yes	Recommendation C
SFRA42	0.32	0.00	2.35	27.84	No	Recommendation C
SFRA56	3.89	11.57	21.19	22.85	Yes	Recommendation A
SFRA61	0.21	5.48	10.07	59.56	No	Recommendation C
SFRA69	0.36	3.11	8.10	23.59	No	Recommendation C
SFRA76	1.00	4.70	6.35	47.93	Yes	Recommendation D
SFRA86	0.25	5.18	1.87	31.54	Yes	Recommendation D
SFRA92	0.58	7.32	7.51	20.72	Yes	Recommendation B
SFRA97	0.41	25.82	6.69	20.11	Yes	Recommendation B
SFRA109	0.29	0.00	0.00	23.28	No	Recommendation C
SFRA113	0.74	17.66	4.48	8.85	Yes	Recommendation C
SFRA121	0.76	20.16	10.95	25.20	No	Recommendation A
SFRA123	0.20	36.58	4.27	41.42	Yes	N/A
SFRA131	5.30	8.37	10.42	37.96	Yes	Recommendation D
SFRA132	0.06	0.00	0.00	80.65	No	Recommendation C
SFRA133	1.21	10.37	8.32	71.06	Yes	Recommendation A
SFRA135	1.10	4.37	39.48	56.15	Yes	Recommendation B
SFRA137	0.97	14.20	11.33	23.98	Yes	Recommendation B

Site ID	Area (ha)	% Area within High Risk Outline	% Area within Medium Risk Outline	% Area within Low Risk Outline	Fluvial Risk?	Strategic Recommendation
SFRA139	1.07	65.10	9.75	9.94	Yes	Recommendation B
SFRA140	1.58	48.63	8.84	18.78	Yes	Recommendation B
SFRA141	1.26	15.12	2.72	8.27	Yes	Recommendation B
SFRA142	1.73	1.41	2.60	46.82	Yes	Recommendation B
SFRA152	8.38	18.21	7.61	21.19	Yes	Recommendation D
SFRA153	0.24	43.03	23.18	20.85	Yes	Recommendation A
SFRA161	0.64	22.02	9.27	48.31	Yes	Recommendation B
SFRA178	2.19	34.13	4.06	39.12	Yes	Recommendation B
SFRA195	0.43	13.30	4.65	11.58	Yes	Recommendation B
SFRA215	0.82	63.85	9.95	16.20	No	Recommendation A
SFRA243	2.86	22.66	7.18	21.52	No	Recommendation A
SFRA246	3.58	33.47	1.31	6.80	No	Recommendation C
SFRA259	0.55	10.50	6.46	1.61	No	Recommendation C
SFRA262	0.04	0.00	2.58	42.82	No	Recommendation C
SFRA271	0.31	6.43	20.45	28.35	No	Recommendation C
SFRA278	0.78	1.05	2.02	25.30	No	Recommendation C
SFRA291	0.80	17.50	12.09	24.04	Yes	Recommendation C
SFRA292	3.69	14.54	10.70	15.47	Yes	Recommendation B
SFRA297	3.25	7.53	9.09	29.72	Yes	Recommendation C
SFRA306	1.60	21.03	12.13	38.10	Yes	Recommendation A

For sites at surface water flood risk the following should be considered:

- Possible withdrawal, redesign or relocation of the site, certainly for those sites at high and medium risk and those with a large percentage area at risk. This applies to the sites at significant surface water risk listed in Table 4-5;
- A detailed site-specific Flood Risk Assessment incorporating surface water flood risk management for any site at surface water flood risk. Any FRA may want to consider detailed surface water modelling, particularly for the larger sites which may influence sites elsewhere. The FRA should include on-site impacts and in accordance with good practice consideration of suitable allowances for climate change. This should also include offsite impacts and potential overland flow routes onto and from the site. Owing to the steep catchments of Rossendale, the surface water flooding and response times are likely to be rapid therefore, particular consideration needs to be given to culvert blockage and existing drainage issues, which are likely to contribute to flood risk. Early consultation with the LPA, LLFA, UU and the EA are essential in order to identify areas at specific risk from flooding and to confirm site-specific issues that need to be considered as part of any site-specific FRA;
- The size of development and the possibility of increased surface water flood risk caused by development on current greenfield land, and cumulative impacts of this within specific areas. Developers should be looking to achieve betterment on current greenfield rates if possible;
- Any increase in development footprint on brownfield land may lead to increased runoff. The LPA may look to reduce runoff rates beyond the current rates and as close to greenfield as possible
- Management and re-use of surface water on-site, assuming the site is large enough to facilitate this and achieve effective mitigation;
- Larger sites could leave surface water flood prone areas as open greenspace, incorporating social and environmental benefits;

- Effective surface water management should ensure risks on and off site are controlled using appropriate SuDS and achieving betterment of current runoff rates;
- SuDS should be used where possible in accordance with the latest SuDS guidance (see Section 4.9) including for appropriate climate change allowances. Appropriate SuDS may offer opportunities to control runoff to greenfield rates or better. Offsite impacts could be significant and should always be considered. Also any river locking and the interaction with receiving watercourses would need to be assessed, especially whether the site is in close proximity to fluvial flood zones. This will also need to take ground conditions into account to an appropriate level of investigation. Restrictions on surface water runoff from new development must be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical.
- Whether the delineation of critical drainage areas may be appropriate for areas particularly prone to surface water flooding allowing the LPA to place certain restrictions on development i.e. all proposals for development greater than 0.5 hectares must be accompanied by a FRA. Detailed analysis and consultation with the LLFA, UU and the EA would be required. It may then be beneficial to carry out a SWMP or drainage strategy for targeted locations with any such areas of critical drainage. Investigation into the capacity of existing sewer systems would be required in order to identify critical parts of the system. Drainage model outputs could be obtained to confirm the critical parts of the drainage network and subsequent recommendations could then be made for future development i.e. strategic SuDS sites, parts of the drainage system where any new connections should be avoided, and parts of the system that may have any additional capacity and recommended runoff rates.

4.5.3 Strategic recommendation summary

Table 4-6 summaries the strategic recommendations made for the sites at fluvial and surface water flood risk. Table 4-7 lists the number of sites to which each recommendation applies.

Table 4-6: Summary of strategic recommendations

Recommendation	Outcome	Reasons
A	Consider Withdrawal of Site	• 10% or greater of the site footprint is within Flood Zone 3b • The scale of surface water risk on the site is considered large enough that possible mitigation of the risk on site is deemed unlikely to be achievable
B	Exception Test	• 10% or greater of the footprint of any residential site or essential infrastructure site is within Flood Zone 3a • Greater than 10% of the footprint of any mixed use site that may entail residential use is within Flood Zone 3a
C	Consider site layout and design	• Less than 10% of the footprint of the area of any site type is within Flood Zone 3b • Less than 10% of the footprint of any residential site is within Flood Zone 3a • Less than 10% of the footprint of any mixed use site that may entail residential use is within Flood Zone 3a • Less than 10% of the footprint of any essential infrastructure site is within Flood Zone 3a
D	Development could be allocated subject to FRA	• Any site within Flood Zone 2 that does not have any part of its footprint within Flood Zone 3a • Employment sites within Flood Zone 3a assuming the site use falls within the less vulnerable or water-compatible category of the flood risk vulnerability classification of the FRCC-PPG. No part of the site can be within Flood Zone 3b • Any site 100% within Flood Zone 1 where surface water flood risk is apparent on site and therefore recommended for investigation through a site-specific FRA. • Any site 100% within Flood Zone 1 that is greater than or equal to 1 hectare in area
E	Should be allocated on flood risk grounds subject to consultation with the LLFA	• Any site 100% within Flood Zone 1 that is less than or equal to 1 hectare in area and has no surface water flood risk issues.

Table 4-7: Number of sites per strategic recommendations

Recommendation	Number of sites
A	10*
B	19
C	33
D	193
E	50

* Site SFRA123 removed due to extant FRA approved by EA

4.5.4 Assessment of Climate Change Risks to Sites

The FRCC-PPG states that the EA's February 2016 climate change allowances should be used to assess future flood risk in both SFRAs and FRAs. For this hybrid SFRA, fluvial climate change outputs have been produced from existing EA hydraulic river models by increasing the 1 in 100 year event peak river flows by 70%. This is the upper end allowance category for 100 years' time for the North West River Basin District (see Section 4.8.2 for more information on the allowances). The FRCC-PPG states that highly vulnerable sites (i.e. residential) should be assessed using the upper end allowance category for the lifetime of the development, which for residential is stated as a minimum of 100 years (Paragraph 026, FRCC-PPG).

The SFRA is dependent on existing available information and the modelling has been updated, as discussed above, where practical. However, in some instances the EA model for the extreme event is not available or has not been calibrated for this range of extreme events. Model data needs therefore to be used usefully and in this instance the following approach to flood risk has been assumed:

Where EA models were not available, a precautionary approach to assessing future flood risk to sites has been adopted using Flood Zones 2 and 3a as a proxy to provide an indication of risk to sites in the future. For this SFRA therefore, the assumption should be that the current day Flood Zone 2 will become Flood Zone 3a in 100 years' time and the current functional floodplain could become Flood Zone 3a. Predicting future expansion of the functional floodplain is however more difficult as the functional floodplain extent is based on a number of different criteria, as discussed in Section 3.2.2. This approach to climate change is precautionary though is considered to be the most pragmatic methodology available. This approach is also consistent with other SFRAs and professional modelling experience. As such, for any sites within Flood Zone 2, the possibility of these sites being within Flood Zone 3a within 100 years' time is considered. These sites will need to be reviewed further, beyond this SFRA, as part of a site-specific FRA perhaps. Further consultation with the EA will be required to confirm the status of available modelling at the time.

4.5.4.1 Modelled Climate Change Outputs

The EA provided 14 hydraulic river models for use in this hybrid SFRA, three of which could be used to gain climate change outputs. Several of the models were missing certain files and spatial information and therefore could not be rerun to produce the climate change outputs. A technical note is provided within Appendix D which explains the methodology used to extract climate change information from the hydraulic models. The note also states the reasons why a number of models were not suitable for use in producing the required climate change scenarios.

For those models where the climate change allowances could be modelled it was only possible to produce outlines from two of the models, on the River Irwell at Irwell Vale and on the downstream section of Whitewell Brook in Rawtenstall. For the River Spodden model, only depth information at certain locations (model nodes) along the modelled watercourse could be extracted for the climate change scenario. Using the premise described in Section 4.5.4 that this climate change scenario (1 in 100 year +70% on peak flows) should produce a similar extent to that of the current Flood Zone 2, the depth information at the model nodes could be estimated across the Flood Zone 2 outline by comparing with underlying terrain elevation data (Digital Terrain Model (DTM)) to estimate the depths for any site within Flood Zone 2 adjacent to the relevant modelled watercourse.

Table 4-8 lists the sites that may be at risk from climate change in 100 years' time, based on the methodologies described. The table includes the source of the climate change information with which there is a hierarchy of confidence. The greatest confidence exists in the modelled climate change outlines and where climate change depths have been calculated at model nodes. There are 66 potential sites within Flood Zone 2 therefore there are 66 sites considered to be potentially

at risk from climate change. 14 of these 66 sites have been assessed using modelled climate change data (see Table 4-8).

Table 4-8: Potential sites at risk from climate change

Site ID	Name / Location	Proposed Use	Max. Depth (m)	Source of Climate Change
SFRA142	Old Football Ground Manchester Road	Residential	3.5	Irwell Vale modelled outline and depths
SFRA178	Irwell Vale Mill	Residential	0.7	Irwell Vale modelled outline and depths
SFRA306	Side By Pass - Ewood Bridge	Employment	3.1	River Spodden model node, FZ2, DTM
SFRA161	Rear of Anglo Felt Factory	Residential	2.5	River Spodden model node, FZ2, DTM
SFRA10	Land to rear of Oak Street	Residential	3.2	River Spodden model node, FZ2, DTM
SFRA195	Eagley Bank, Shawforth	Residential	1.3	River Spodden model node, FZ2, DTM
SFRA196	Land north of Knott Hill (west of Winterbutt Lee)	Residential	0.8	River Spodden model node, FZ2, DTM
SFRA308	Shadlock Skip	Residential	1.1	FZ2, DTM
SFRA07	Mill End Mill	Residential	2.1	Whitewell Brook modelled outline and depths
SFRA139	Gaghills Building Lane	Residential	3.2	Whitewell Brook modelled outline and depths
SFRA90	Land off Wales Road 8322-251	Residential	0.5	Whitewell Brook modelled outline and depths
SFRA08	Albion Mill, Burnley Road East	Residential	2.2	Whitewell Brook modelled outline and depths
SFRA140	Globe Mill and Adj Land	Residential	2.0	Whitewell Brook modelled outline and depths
SFRA97	Land Off Rock Bridge Fold	Residential	1.8	Whitewell Brook model node, FZ2, DTM

Each site identified to be at risk from climate change will require a more detailed evaluation as part of a site-specific FRA, investigating detail outside the scope of this hybrid SFRA. The FRA should demonstrate how flood risk will be managed now and over the lifetime of the development so that the development will be safe from flooding in the future. Taking account of climate change within a FRA should aim to minimise vulnerability and provide resilience of development to flooding in the future. The FRCC-PPG also states the need for a managed adaptive approach whereby development is located away from a river so it is easier to improve flood defence in the future.

4.6 Summary of Assessment Options

4.6.1 Rejection of site

A site which fails to pass the Sequential Test and / or the Exception Test would be rejected. Rejection would also apply to any residential (including gypsy and traveller) or employment site, or mixed use schemes entailing residential development, as this falls into the more vulnerable, less vulnerable or highly vulnerable categories within Flood Zone 3b for which development should not be permitted. The Flood Risk and Coastal Change PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test and clearly demonstrate that it

does not increase or exacerbate flood risk. If the developer is able to avoid 3b, part of the site could still be delivered.

In terms of surface water flood risk, if risk is considered significant or where the size of the site does not allow for on-site storage or application of appropriate SuDS then such sites could be rejected.

4.6.2 Exception Test required

For those sites that, according to the FRCC-PPG vulnerability tables, would require the Exception Test. Only water-compatible and less vulnerable uses of land would not require the Exception Test in Flood Zone 3a. More vulnerable uses, including residential, and essential infrastructure are only permitted if the Exception Test is passed and all development proposals in Flood Zone 3a must be accompanied by a Flood Risk Assessment. To avoid having to apply the Exception Test, the developer / LPA should attempt to avoid the risk area altogether.

4.6.3 Consideration of site layout and design

Site layout and site design is important at the site planning stage where flood risk exists. SuDS and flood risk management should be considered at the outset of all development planning. The site area would have to be large enough to enable any alteration of the developable area of the site to remove development from the functional floodplain, or to leave space for on-site storage of flood water within Flood Zone 3a. Careful layout and design at the site planning stage may apply to such sites where it is considered viable based on the level of risk. Site layout and design should also account for climate change where necessary. Surface water risk and opportunities for SuDS should also be assessed during the planning stage.

Depending on local circumstances, if it is not possible to adjust the site boundary to remove the site footprint from Flood Zone 3b to a lower risk zone then development should not be permitted. If it is not possible to adjust the developable area of a site to remove the proposed development from Flood Zone 3a to a lower risk zone or to incorporate the on-site storage of water within site design, then the Exception Test would have to be passed as part of a site-specific Flood Risk Assessment.

Any site layout and design options should take account of the 8 metre easement buffer along watercourses from the top of the bank or the landward toe of a defence on main rivers where development is not permitted. This easement buffer is recommended by the EA to allow ease of access to watercourses for maintenance works. Any site redesign, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of appropriate SuDS techniques.

4.6.4 Flood Risk Assessment

See Section 4.8.1 for information regarding site-specific FRA.

4.6.5 Sites passing the Sequential and Exception Tests

Development sites can be allocated or granted planning permission where the Sequential Test and the Exception Test (if required) are passed. In addition, a site is likely to be allocated without the need to assess flood risk where the proposed use is for unaltered open space. Assuming the site is not to include any development or earth works, and is to be left as existing open space then the proposal is likely to be acceptable from a flood risk point of view. For such sites, opportunities for flood storage should be explored however as part of an FRA.

All development proposals within flood zones 2 or 3 must be accompanied by a Flood Risk Assessment. Any sites 100% within Flood Zone 1 that are 1 hectare or more in area must be accompanied by a Flood Risk Assessment to determine vulnerability to flooding from other sources as well as fluvial. The FRA should determine the potential of increased flood risk elsewhere as a result of the addition of hard surfaces on-site and the effect of new development on surface water runoff.

The Flood Risk and Coastal Change PPG states:

"Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally." (Paragraph 50).

4.7 Development Management Sequential & Exception Test

This section of the SFRA has been developed to provide a useful tool to inform the development management process about the potential risk of flooding associated with future planning applications and the basis for requiring site-specific FRAs where necessary.

According to the NPPF Paragraph 103:

"When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and*
- *Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems."*

Paragraph 011 of the NPPF re-affirms planning law that applications for planning permission…

"…must be determined in accordance with the development plan unless material considerations indicate otherwise".

Development proposals that are in line with Local Plan policies should be approved. Those that conflict should be refused unless material considerations indicate otherwise.

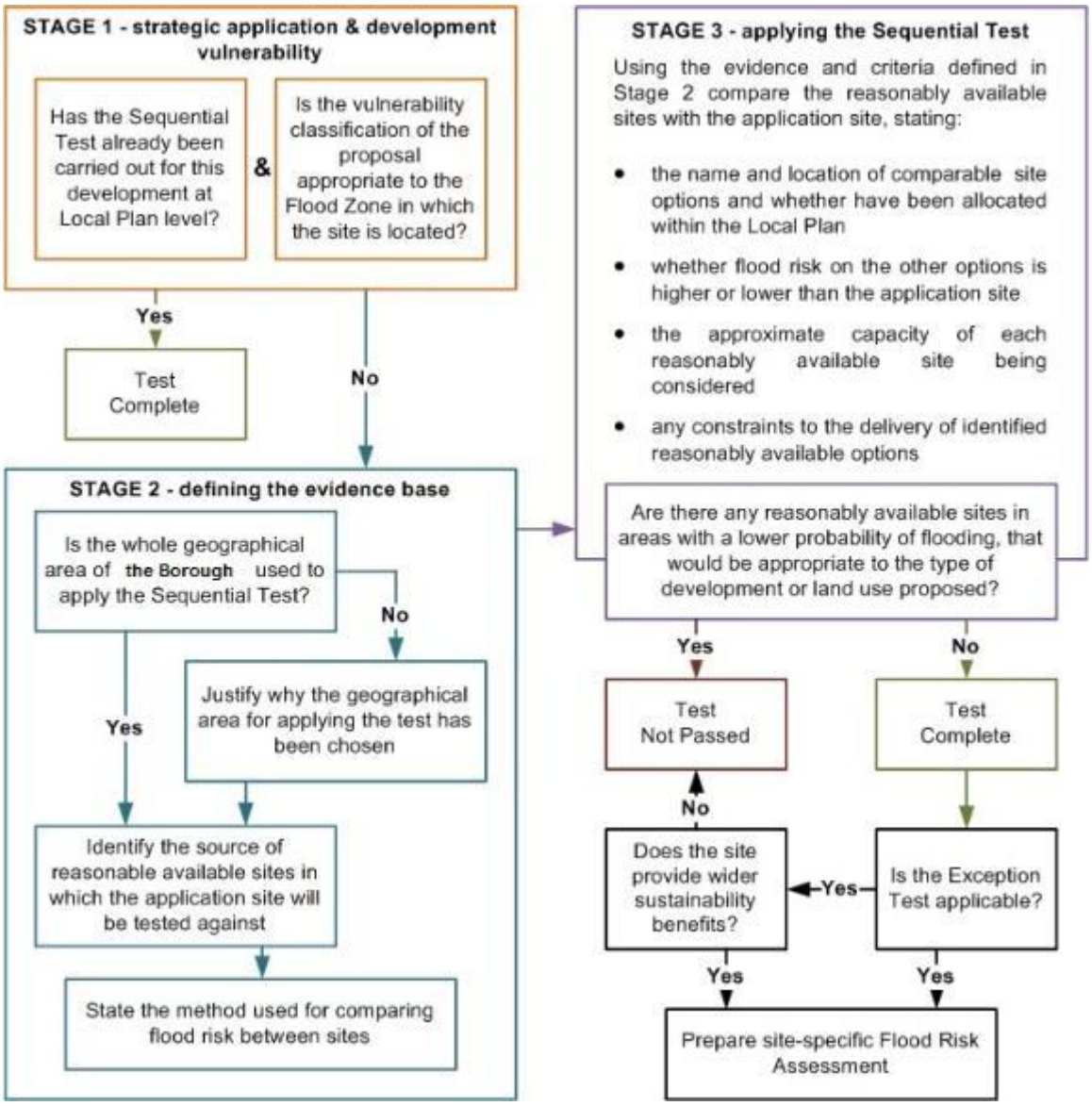
4.7.1 Demonstrating the Sequential Test for Planning Applications

The EA provides advice via:

https://www.gov.uk/guidance/flood-risk-assessment-the-sequential-test-for-applicants

This advice recommends the approach illustrated by Figure 4-3 is used by LPAs to apply the Sequential Test to planning applications located in Flood Zones 2 or 3.

Figure 4-3: Development management Sequential Test process



The approach provides an open demonstration of the Sequential Test being applied in line with the NPPF and the FRCC-PPG. Close working between LPA Development Management and Planning Policy departments will be required to implement the Sequential Test effectively. The EA also works with local authorities to agree locally specific approaches to the application of the Sequential Test and any local information or consultations with the LLFA should be taken into account.

In accordance with the EA's advice, the following process should be followed:

- *First, check the Local Plan for sites that have already been allocated for development and could be suitable for the development you're proposing (though Development Management may only look at the individual site and seek guidance from the EA / LLFA),*
- *Also look at sites that haven't been allocated in the Local Plan, but that have been granted planning permission for a development that's the same or similar to the development you're proposing,*
- *Finally, check whether there are any 'windfall sites' in your search area. Windfall sites are sites that are not allocated in the Local Plan and don't have planning permission, but could be available for development. You can look for windfall sites yourself and also reference the Council's Housing Land Monitor Report and the Housing and Employment Land Availability Assessment.*

The Sequential Test does not apply to change of use applications unless it is for change of land use to a caravan, camping or chalet site, or to a mobile home site or park home site. The Sequential Test can also be considered adequately demonstrated if both of the following criteria are met:

- The Sequential Test has already been carried out for the site (for the same development type) at the strategic level (Local Plan); and
- The development vulnerability is appropriate to the Flood Zone (see Table 3 of the FRCC-PPG).

If both these criteria are met, reference should be provided for the site allocation of the Local Plan document and the vulnerability of the development should be clearly stated.

When applying the Sequential Test, the following should also be considered:

- **The geographic area in which the Test is to be applied. For RBC, this would be the whole borough;**
- **The source of reasonable available sites in which the application site will be tested against; and**
- **The evidence and method used to compare flood risk between sites.**

Sites should be compared in relation to flood risk; Local Plan status; capacity; and constraints to delivery including availability, policy restrictions, physical problems or limitations, potential impacts of the development on the local area, and future environmental conditions that would be experienced by the inhabitants of the development.

The test should conclude if there are any reasonably available sites, in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

The LPA should now have sufficient information to be able to assess whether or not the proposed site has passed the Sequential Test. If the Test has been passed, then the applicant should apply the Exception Test in the circumstances set out by tables 1 and 3 of the FRCC-PPG.

In all circumstances, where the site is within areas at risk of flooding and where a site-specific FRA has not already been carried out, a site-specific FRA should be completed in line with the NPPF and the FRCC-PPG.

In addition to the formal Sequential Test, the NPPF sets out the requirement for developers to apply the sequential approach to locating development within the site. As part of their application and masterplanning discussions with applicants, LPAs should seek whether or not:

- Flood risk can be avoided by substituting less vulnerable uses or by amending the site layout;
- Less vulnerable uses for the site have been considered; or
- Density can be varied to reduce the number or the vulnerability of units located in higher risk parts of the site.

4.8 Guidance for Developers

Stage 1 of this hybrid SFRA provides the evidence base for developers to assess flood risk at a strategic level and to determine the requirements of an appropriate site-specific FRA.

The aim of this section is to provide guidance for developers on using this SFRA.

When initially considering the development options for a site, developers should use this SFRA, the NPPF and the Planning Practice Guidance to:

- ***Identify whether the site is***
    - *A windfall development, allocated development, within a regeneration area, single property or subject to a change of use to identify if the Sequential and Exception Tests are required.*
- ***Check whether the Sequential Test and / or the Exception Test have already been applied***
    - *Request information from the LPA on whether the Sequential Test, or the likelihood of the site passing the Exception Test, have been assessed;*
    - *If not, provide evidence to the LPA that the site passes the Sequential Test and will pass the Exception Test.*
- ***Consult with the LPA Development Control, the LLFA and the EA and the wider group of flood risk consultees, where appropriate, to scope an appropriate FRA if required***
    - *Guidance on FRAs provided in Section 4.8.1 of this SFRA;*
    - *Also refer to the EA Standing Advice, CIRIA Report C624, the NPPF and the Planning Practice Guidance;*
    - *Consult LLFA.*
- ***Submit FRA to Development Control and the EA for approval, where necessary***

Table 4-9 identifies, for developers, when the Sequential and Exception Tests are required for certain types of development and who is responsible for providing the evidence and those who should apply the tests if required.

Table 4-9: Development types and application of Sequential and Exception Tests for developers

Development	Sequential Test Required	Who Applies the Sequential Test?	Exception Test Required?	Who Applies the Exception Test?
Allocated Sites	No (assuming the development type is the same as that submitted via the allocations process)	LPA should have already carried out the test during the allocation of development sites	Dependent on land use vulnerability	LPA to advise on the likelihood of test being passed. The developer must also provide evidence that the test can be passed by providing planning justification and producing a detailed FRA
Windfall Sites	Yes	Developer provides evidence, to the LPA that the test can be passed. An area of search should be agreed within the borough	Dependent on land use vulnerability	Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA
Regeneration Sites Identified Within Local Plan	No	-	Dependent on land use vulnerability	LPA to advise on the likelihood of test being passed. The developer must also provide evidence that the test can be passed by providing planning justification and producing a detailed FRA
Redevelopment of Existing Single Properties	No	-	Dependent on land use vulnerability	Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA
Changes of Use	No (except for any proposal involving changes of use to land involving a caravan, camping or chalet site	Developer provides evidence, to the LPA that the test can be passed	Dependent on land use vulnerability	Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA

4.8.1 Site-Specific Flood Risk Assessment

According to the FRCC-PPG (Para 030), a site-specific FRA is:

"*…carried out by (or on behalf of) a developer to assess the flood risk to and from a development site. Where necessary (see footnote 20 in the National Planning Policy Framework), the assessment should accompany a planning application submitted to the local planning authority. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (see Table 2 – Flood Risk Vulnerability of PPG).*"

The objectives of a site-specific FRA are to establish:

Whether a proposed development is likely to be affected by current or future flooding (including effects of climate change) from any source. This should include referencing this SFRA to establish sources of flooding. Further analysis should be performed to improve understanding of flood risk including agreement with the Council on areas of functional floodplain that have not been specified within this SFRA

- Whether the development will increase flood risk elsewhere;
- Whether the measures proposed to deal with these effects and risks are appropriate;
- The evidence for the local planning authority to apply (if necessary) the Sequential Test, and;
- Whether the development will be safe and pass the Exception Test, if applicable.

The FRCC-PPG doesn't contain any further detail on the minimum requirements for site-specific FRAs. It is therefore important that the EA's FRA guidance[8] is referred to and also the site-specific Flood Risk Assessment Checklist in paragraph 068 of the FRCC-PPG should be consulted. CIRIA's report 'C624 Development and Flood Risk' also provides useful guidance.

When is a Site-Specific FRA Required?

According to NPPF footnote 20, a site-specific FRA should be prepared when the application site is:

- Situated in Flood Zone 2 and 3; for all proposals for new development (including minor development and change of use)
- 1 hectare or greater in size and located in Flood Zone 1
- Located in Flood Zone 1 where there are critical drainage problems
- At risk of flooding from other sources of flooding, such as those identified in this SFRA
- Subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding

The LPA may also like to consider further options for stipulating FRA requirements, such as:

- Situated in an area currently benefitting from defences
- Situated within 20 metres of the bank top of a Main River
- Situated over a culverted watercourse or where development will require controlling the flow of any river or stream or the development could potentially change structures known to influence flood flow

These further options should be considered during the preparation and development of the Local Plan

8 https://www.gov.uk/flood-risk-assessment-local-planning-authorities

4.8.2 Taking Climate Change into Account

Climate change will increase flood risk over the lifetime of a development. In making an assessment of the impacts of climate change on flooding from the land and rivers as part of a FRA, the sensitivity ranges shown below may provide an appropriate precautionary response to the uncertainty about climate change impacts on rainfall intensities and river flow.

Considering the impacts of climate change within a FRA will have implications for both the type of development that is appropriate according to its vulnerability to flooding and design standards for any SuDS or mitigation schemes proposed. For example, through very flat floodplains, using the higher central +35 per cent from 2070 to 2115 allowance for peak river flows (Table 4-10), could see an area currently within lower risk zones (Flood Zone 2), in future be re-classified as lying within a higher risk zone (Flood Zone 3a). Therefore, residential development may not be appropriate without suitable flood mitigation measures or flood resilient or resistant houses. In well-defined floodplains the same climate change allowance could have significant impacts on flood depths influencing building type and design (e.g. finished floor levels). This is the most likely case with Rossendale which has a number of steep sided valleys.

The EA revised the climate change allowances, in February 2016, for use in FRAs and SFRAs and will use these revised allowances when providing advice:

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

The revised climate change allowances are predictions of anticipated change for:

- Peak river flow by River Basin District;
- Peak rainfall intensity;
- Sea level rise; and
- Offshore wind speed and extreme wave height.

Deciding on which of the peak river flow allowances to use is based on the flood zone the development is within and the associated vulnerability classification (see Table 2 of the FRCC-PPG). Table 4-10 shows the peak river flow allowances for the North West River Basin District.

Table 4-10: Recommended Peak River Flow Allowances for the North West River Basin District

Allowance Category	Total Potential Change Anticipated for…		
	2020s (2015-2039)	2050s (2040-2069)	2080s (2070-2115)
Upper end	+20%	+35%	+70%
Higher central	+20%	+30%	+35%
Central	+15%	+25%	+30%

The peak rainfall intensity allowance applies to the whole of England. SFRAs and FRAs should assess both the central and upper end allowances to gauge the range of impacts. Table 4-11 shows these allowances.

Table 4-11: Peak Rainfall Intensity Allowance in Small and Urban Catchments for England

Allowance Category	Total Potential Change Anticipated for…		
	2015-2039	2040-2069	2070-2115
Upper end	+10%	+20%	+40%
Central	+5%	+10%	+20%

The EA will also require consideration, if appropriate, of the 'high++ allowances' for peak river flows and mean sea level rise where a development is considered to be very sensitive to flood risk and with lifetimes beyond the end of the century. This could include infrastructure projects or developments that significantly change existing settlement patterns. The high++ allowances can be found in the EA's *Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities*[9], which uses science from UKCP09. This guidance is based on Government's policy for climate change adaptation, and is specifically intended for projects or strategies seeking Government Flood Defence Grant in Aid (FDGiA) funding. However, RMAs in

9 Environment Agency Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities

England may also find it useful in developing plans and making Flood and Coastal Erosion Risk Management (FCERM) investment decisions even if there is no intention of applying for central government funding. This is important for any future large scale infrastructure used to support the delivery of strategic sites such as flood defence schemes.

Although, it is anticipated that increases in river flows will lie somewhere within the range of the central to upper end estimates of the February 2016 allowances, more extreme change cannot be discounted. The high++ allowances can be used to represent more severe climate change impacts and help to identify the options that would be required. The UKCP09 high++ allowances for peak river flows are presented in Table 4-12.

Table 4-12: UKCP09 High++ Allowances for Peak River Flow for the North West River Basin District

RBD	2020s	2050s	2080s
North West	+40%	+60%	+105%

4.9 Sustainable Drainage Systems (SuDS)

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and consequently a potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure. Managing surface water discharges from new development is therefore crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding.

The FWMA, 2010, originally transferred the adoption and maintenance of SuDS to Sustainable Drainage Systems Approval Bodies (SABs) that were supposed to be established by local authorities, or LLFA's, under Schedule 3 of the Act. However, the designation of a SAB has since been removed following lengthy consultation, with the announcement from the Department for Communities and Local Government (DCLG) in December 2014 that local planners will be responsible for delivering SuDS[10]. Changes to planning legislation give provisions for major applications of ten or more residential units or equivalent commercial development to require sustainable drainage within the development proposals in accordance with the non-statutory technical standards for sustainable drainage systems[11], published in March 2015. This builds on the existing planning system, the NPPF, which developers and local authorities are already using. Policy changes to the planning system can also be introduced relatively quickly ensuring that flood risk benefits from sustainable drainage systems can be brought forward as part of planning application proposals.

The NPPF continues to reinforce how planning applications that fail to deliver SuDS above conventional drainage techniques could be rejected and sustainable drainage should form part of integrated design secured by detailed planning conditions so that the SuDS to be constructed must be maintained to a minimum level of effectiveness.

Maintenance options must clearly identify who will be responsible for SuDS maintenance and funding for maintenance should be fair for householders and premises occupiers; and, set out a minimum standard to which the sustainable drainage systems must be maintained.

The runoff destination should always be the first consideration when considering design criteria for SuDS including the following possible destinations in order of preference:

1. To ground;
2. To surface water body;
3. To surface water sewer;
4. To combined sewer.

Effects on water quality should also be investigated when considering runoff destination in terms of the potential hazards arising from development and the sensitivity of the runoff destination.

10 http://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2014-12-18/HCWS161/

11 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

Developers should also establish that proposed outfalls are hydraulically capable of accepting the runoff from SuDS through consultation with the LLFA, EA and UU.

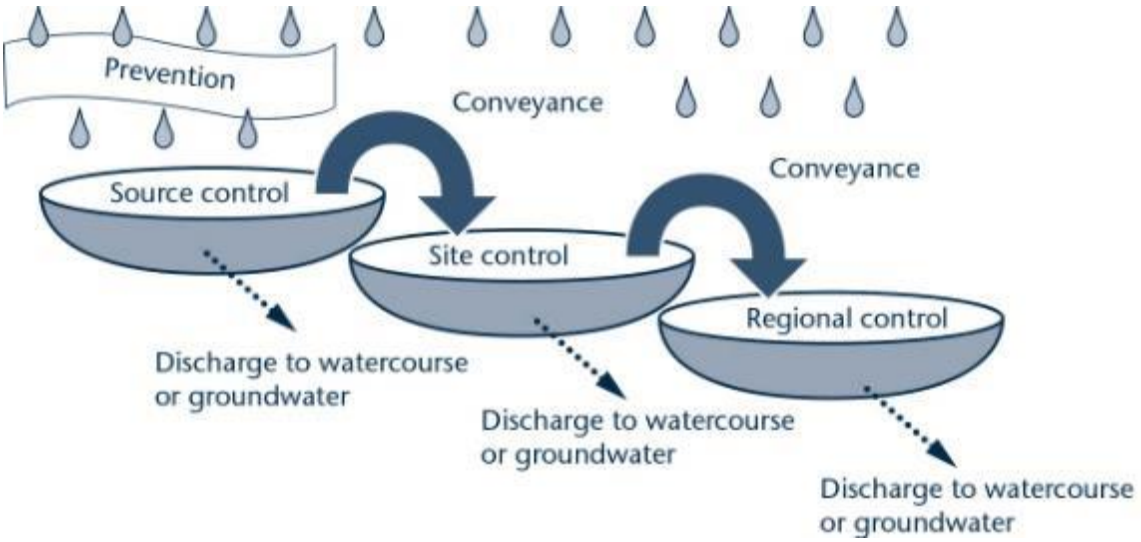
The non-statutory technical standards for sustainable drainage systems (March 2015) set out appropriate design criteria based on the following:

1. Flood risk outside the development;
2. Peak flow control;
3. Volume control;
4. Flood risk within the development;
5. Structural integrity;
6. Designing for maintenance considerations;
7. Construction.

In addition, the LPA may set local requirements for planning permission that include more rigorous obligations than these non-statutory technical standards. More stringent requirements should be considered where current Greenfield sites lie upstream of high risk areas. This could include improvements on Greenfield runoff rates. CIRIA has also produced a number of guidance documents relating to SuDS that should be consulted by the LPA and developers.

Many different SuDS techniques can be implemented. As a result, there is no one standard correct drainage solution for a site. In most cases, a combination of techniques, using the Management Train principle (see Figure 4-4), will be required, where source control is the primary aim.

Figure 4-4: SuDS Management Train Principle[12]



The effectiveness of a flow management scheme within a single site is heavily limited by land use and site characteristics including (but not limited to) topography; geology and soil (permeability); and available area. Potential ground contamination associated with urban and former industrial sites should be investigated with concern being placed on the depth of the local water table and potential contamination risks that will affect water quality. The design, construction and ongoing maintenance regime of any SuDS scheme must be carefully defined as part of a site-specific FRA. A clear and comprehensive understanding of the catchment hydrological processes (i.e. nature and capacity of the existing drainage system) is essential for successful SuDS implementation.

12 CIRIA (2008) Sustainable Drainage Systems: promoting good practice – a CIRIA initiative

Stage 2 - Level 2 Strategic Flood Risk Assessment

5 Introduction

The NPPF (paragraph 100) requires Local Plans to take account of flood risk by directing development away from areas at highest risk. However, where development is necessary it should be made safe without increasing flood risk elsewhere. Local Plans should be supported by a SFRA which will provide the basis from which to apply the Sequential Test and Exception Test in the development allocation process. This approach has been informed by the Level 1 SFRA (Stage 1).

5.1 The Requirement for a Level 2 SFRA

The emerging Local Plan and supporting evidence base, including the Sustainability Appraisal, may identify that there are wider sustainability benefits of delivering housing and economic growth within high risk areas that may outweigh flood risk issues, provided that development is both safe and does not increase flood risk elsewhere.

The FRCC-PPG states that where local planning authorities have been unable to allocate all proposed development and infrastructure in accordance with the Sequential Test, taking account of the flood vulnerability category of the intended use, it will be necessary to increase the scope of the Level 1 SFRA to provide the information necessary for application of the Exception Test. RBC therefore requires this Level 2 SFRA to support the high risk sites identified in Stage 1.

A Level 2 SFRA should include enough detail to facilitate the application of the Exception Test for the high risk sites. Stage 2 of this assessment will therefore consider the detailed nature of fluvial flood characteristics within Flood Zone 3 including flood probability, flood depth, flood hazard and accounting for climate change, using the most up-to-date EA hydraulic river models. Detailed surface water risk analysis will also be carried out at each site at significant risk of surface water flooding, as identified through Stage 1 of the assessment. This will be carried out using flood probability, depth and hazard information from the EA's RoFSW.

This Level 2 assessment does not pre-empt the outcome or need of the Sequential Test to be applied first and foremost. The SFRA process is not just about providing evidence for the plan-making stage as it is also a key document for Development Management purposes. There is merit in looking at identified settlement areas as any future windfall development opportunities will have an up-to-date evidence base on which to prepare site-specific FRAs in the future.

5.2 Scope and Objectives

This Level 2 SFRA, along with the Level 1 assessment carried out in Stage 1, will be used to aid the decision making process and to help inform decisions on the location of future development and the preparation of sustainable policies for the long-term management of flood risk.

Following on from Stage 1 where a number of sites were found to be at risk from fluvial and surface water flooding (Section 4.5), Stage 2 will assess in further detail the potential residential and mixed use sites within Flood Zone 3 and all sites at significant surface water flood risk. Residential sites in Flood Zone 3 accounts for some 44 potential sites and 1 mixed use site (see Table 4-1). 20 of the residential sites would be required to pass the Exception Test (Table 4-2), based on successful completion of the Sequential Test.

The Exception Test would be required for these 19 sites as housing comes under the 'more vulnerable' category of Table 2 of the FRCC-PPG. Given that sites allocated for employment uses are considered to be 'less vulnerable', and therefore not requiring the Exception Test, then such employment sites have not been included for the Stage 2 assessment. The employment sites are considered suitable for development, subject to satisfactory passing of the Sequential Test and subsequent site-specific Flood Risk Assessments, ratified by the EA. All sites also require EA approval and planning approval from the LPA.

Exception Test

For the Exception Test to be passed, the NPPF Paragraph 102 states:

a. *It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk informed by a Strategic Flood Risk Assessment where one has been prepared; and*

b. *A site-specific Flood Risk Assessment (FRA) must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

Both elements of the test will have to be passed for development to be allocated or permitted.

Although actually passing the Exception Test will require the completion of a site-specific FRA, RBC should be able to assess the likelihood of passing the test at the Local Plan level by using the information contained in Stage 2 of this hybrid SFRA to answering the following questions:

- Can the development be avoided or substituted?
- Is the flood risk as such that the criteria for passing the Exception Test are unachievable?
- Can risk be sustainably managed through appropriate development techniques and incorporate Sustainable Drainage Systems without compromising the viability of the development? (see Section 7)
- Can the site, and any residual risks to the site, be safely managed to ensure that its occupiers remain safe during times of flood if developed?

Stage 1 found there to be 48 potential sites at significant risk from surface water flooding (see Table 4-5). Significant risk entails any site with 10% or greater of its area within the high or medium risk outlines or 20% or greater of its area within the low risk outline (see Section 4.5.2).

Based on these findings of the Stage 1 assessment, the following aims and objectives apply to Stage 2:

- Take forward the work of the Level 1 SFRA (Stage 1) to develop a more detailed understanding of the nature of flood risk from fluvial and surface water sources in high risk development sites identified in Stage 1.
- Further, more detailed assessment of flood risk to the high risk sites for which the Exception Test would be required.
- Analysis of modelled fluvial and surface water depths and hazards, where available.
- To provide site-specific options for mitigation and advice for a FRA.

5.3 Limitations

There are a number of limitations to the methodology applied to gaining the climate change outputs. Firstly, a number of the hydraulic river models supplied by the EA could not be used to produce climate change outlines. Several of the models were missing required information, a number were 1D models with no 2D domain from which to produce outlines and others could not accommodate the required increase of +70% on the peak flows. See Appendix D for more details.

For potential sites where climate change outlines were not available, a conservative estimate had to made as to the extent of the climate change outline. This was carried out using Flood Zone 2, with the precautionary approach being that Flood Zone 3 could become Flood Zone 2 in 100 years' time, a 2 m Digital Terrain Model and, in some cases where available, modelled depths at river nodes for the 100 year event +70%.

The site-specific FRAs required for the sites requiring the Exception Test must further investigate the potential effects of climate change on the sites, particularly modelled depths which will dictate development freeboards and finished floor levels.

6 Level 2 Sites Assessment

As discussed in Section 5.2, based on the Level 1 assessment in Stage 1, there are 19 sites that will be required to pass the Exception Test (Recommendation B - Section 4.5.1.2). It is these sites where further detailed investigation is required for this Level 2 assessment. The following summary tables (Section 6.2) summarise the risk identified at each site and provide subsequent advice in relation to flood risk mitigation and FRA requirements. This advice is based on current information used within this hybrid SFRA and information that could be extracted from the hydraulic river models provided by the EA.

6.1 Detailed Assessment Methodology

Further to the Level 1 assessment, a more detailed site-specific review has been undertaken for the relevant high risk sites. This includes surface water depth and hazard data; fluvial model depth and hazard data for climate change scenario; review of potential for flood storage and current land use; review of fluvial and surface water interaction; review of site access and egress; review of surrounding land use and infrastructure; and site-specific FRA requirements.

Appendix D includes a technical note briefly explaining the modelling carried out to produce the climate change outputs.

6.1.1 Depth and Hazard Information

Depth and hazard data was available for the Risk of Surface Water Flooding map and therefore could be reviewed for all sites at risk from surface water. Depth and hazard information for the climate change scenario was modelled using the existing fluvial models. However, due to certain inadequacies with several models, this information was limited (see Appendix D). Where this information was available, it has been used in the summary tables. Appendix E contains two spreadsheets including the calculations for mean and maximum depths and hazards at each site.

The hazard information is based on the Defra document 'Flood Risks to People', 2006[13]. The classification used is shown in the extract from the Defra document in Figure 6-1.

Figure 6-1: Hazard to People as a Function of Velocity and Depth

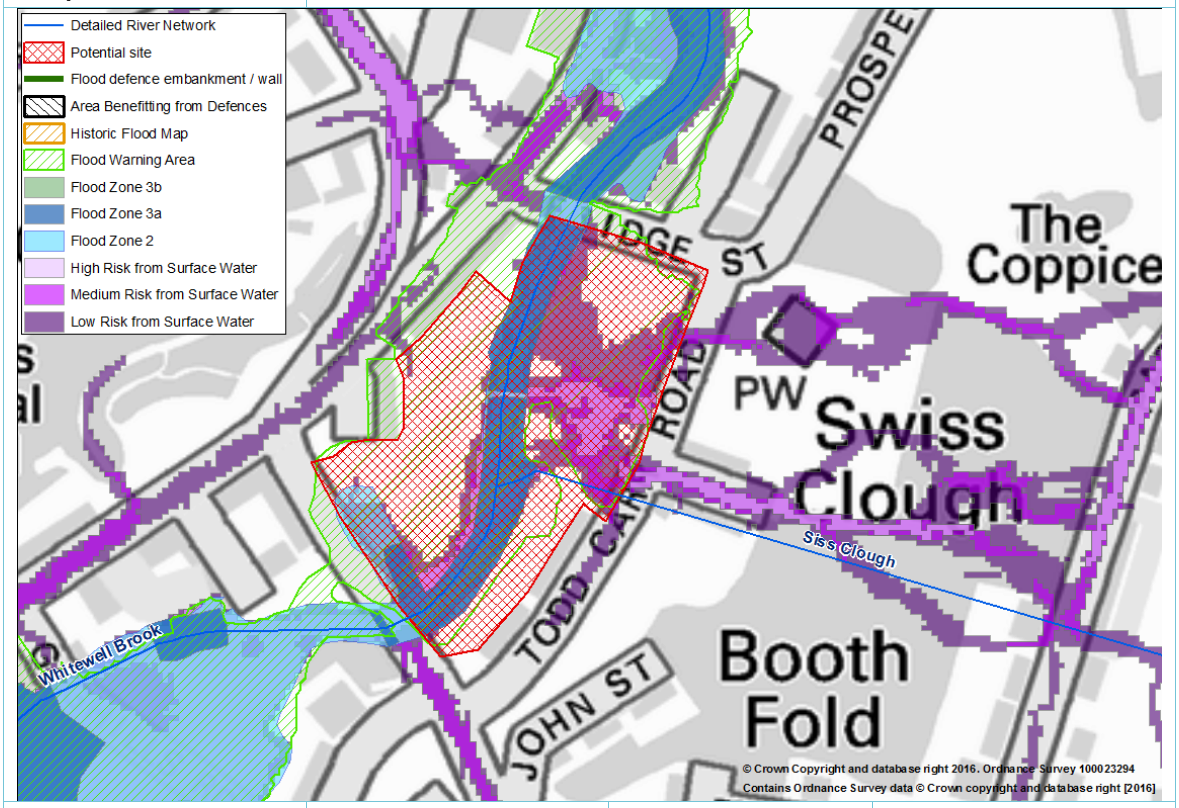
Table 3.2: Hazard to People as a Function of Velocity and Depth

d x (v + 0.5)	Degree of Flood Hazard	Description
<0.75	Low	Caution *"Flood zone with shallow flowing water or deep standing water"*
0.75 - 1.25	Moderate	Dangerous for some (i.e. children) *"Danger: Flood zone with deep or fast flowing water"*
1.25 - 2.5	Significant	Dangerous for most people *"Danger: flood zone with deep fast flowing water"*
>2.5	Extreme	Dangerous for all *"Extreme danger: flood zone with deep fast flowing water"*

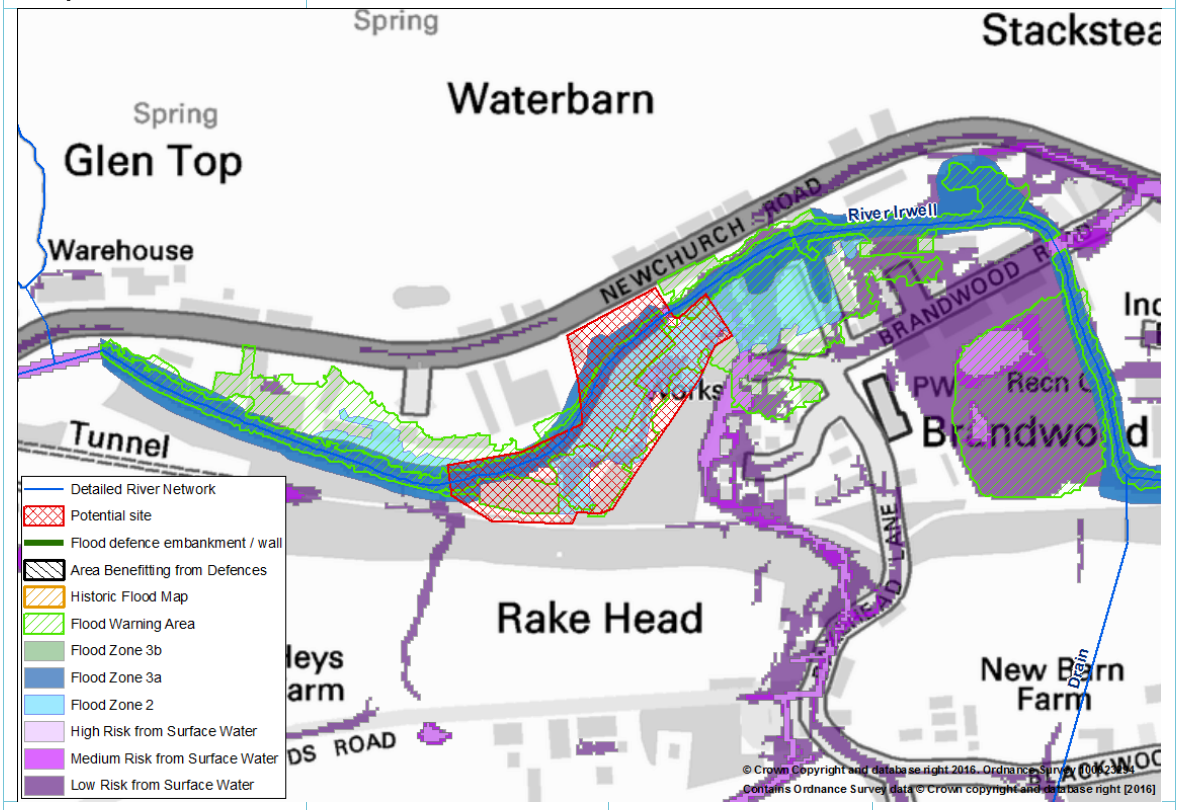
13 Flood Risks to People, Phase 2, FD2321/TR1, The Flood Risks to People Methodology, March 2006, Defra / Environment Agency

6.2 Site Summaries

The following site summary tables assess, in further detail, the risk and possible mitigation options at all potential development sites included within Recommendation B (Exception Test) of Stage 1. The final row in the summary tables will provide an updated recommendation for the site, based on the more detailed investigation performed through stage 2 of this hybrid SFRA.

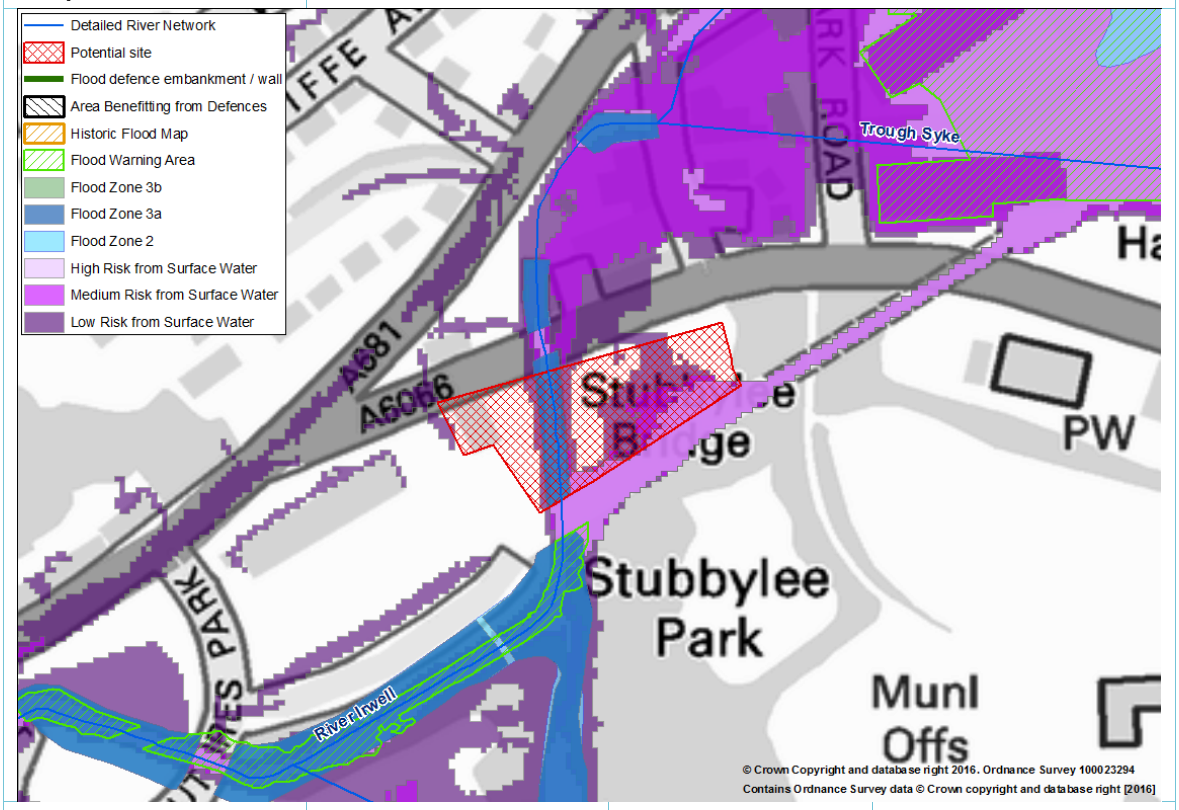
Site	SFRA07 Mill End Mill, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	1.3		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	4	21	0
Flood Zone 3 max depth (m)	2.8		
Flood Zone 3 max hazard	Unavailable		
Climate change	Whitewell Brook modelled 100 year +70% on peak river flows shows minimal increase beyond the current Flood Zone 2 on the right bank. Max depths increase by over 1 m to 3.9 m from the 100 year modelled depths		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	8	2	17
Surface water max depths (m)	2.4	2.7	4.2
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	This site is currently partially clear of any infrastructure. The surface water flood risk area in the north east of the site should be kept free for storage.		
Flood risk	The Main River Whitewell Brook flows directly through the middle of the site with the confluence of Swiss Clough ordinary watercourse also present.		

Site	SFRA07 Mill End Mill, Rawtenstall
	Surface water risk is significant on site and on the roads and streets immediately outside of the site. Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further
FRA & Mitigation Options	The fluvial risk area along Whitewell Brook should be kept clear of development and used as amenity greenspace. Flood depths are such that the flood hazard is likely to be extreme The EA's recommended 8 metre easement buffer should apply to Whitewell Brook though this is within the fluvial risk area The surface water flood risk area in the north east of the site should be investigated for suitable SuDS as part of the FRA. Depths and hazards are such that this area should be kept clear of all development The FRA should also focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated Access and egress points appear limited to the north east corner at Bridge Street and Prospect Street The site may be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA308 Shadlock Skip, Rawtenstall		
Catchment	River Irwell		
Area (ha)	1.1		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	43	24	0
Flood Zone 3 max depth (m)	1.0		
Flood Zone 3 max hazard	Significant		
Climate change	Based on Flood Zone 2 - a further 19% of this site could be at risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	12	3	13
Surface water max depths (m)	1.6	2.0	4.2
Surface water max hazards (m)	1.0	1.2	2.3
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Unlikely		
Flood risk	The Main River the River Irwell runs through the northern area of the site meaning a quarter of the site is with Flood Zone 3a. Surface water risk is significant on site and on land and roads adjacent to the site Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further and increase flood depths The majority of the site is within a Flood Warning Area		

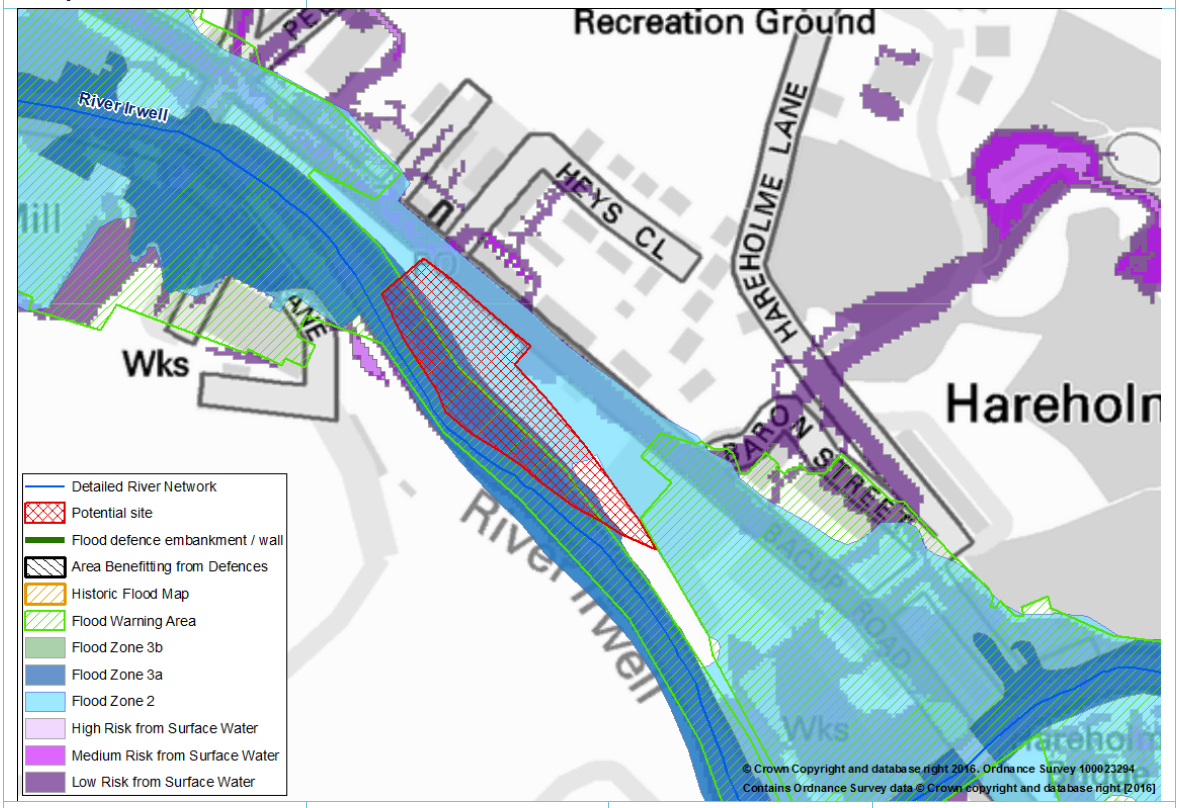
Site	SFRA308 Shadlock Skip, Rawtenstall
FRA & Mitigation Options	The Flood Zone 3a area should be kept clear of development and converted to greenspace. This rules out a quarter of the site from development. The EA's recommended 8 metre easement buffer should also apply 12% of the site is at high risk from surface water flooding. Depths and hazards are such that this area should be kept clear of all development thus reducing the developable area further The FRA should also focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated Access and egress is limited so new access roads would be required to the south of the site
Level 2 Recommendation	Continue with Exception Test if partial development can be agreed so that the site boundary is pulled back to the south of the Irwell and out of Flood Zone 3a

Site	SFRA31 Land Adjacent to Futures Park, Bacup		
Catchment	River Irwell		
Area (ha)	0.4		
Proposed use	Residential		



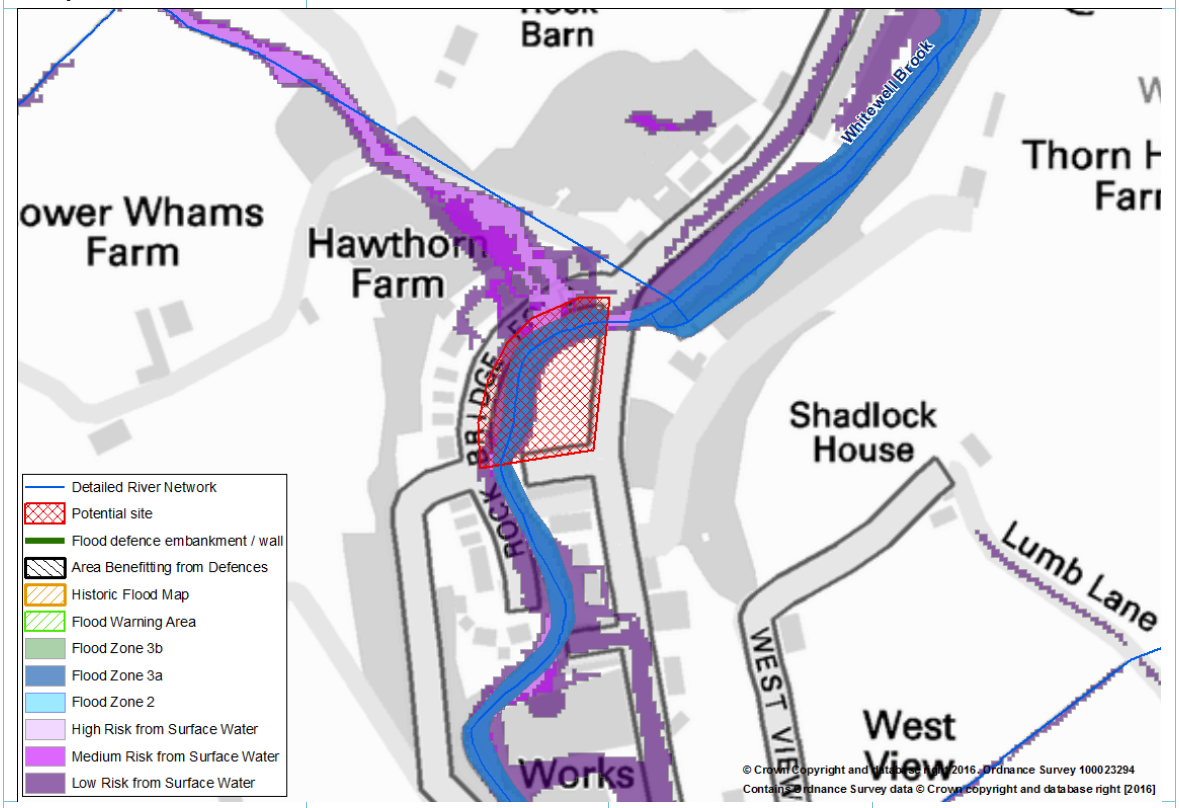
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	0	12	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Based on Flood Zone 2 - remains in bank		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	18	10	24
Surface water max depths (m)	1.0	1.7	3.8
Surface water max hazards (m)	Significant	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	No		
Flood storage potential	The area at risk from surface water is currently clear of any permanent infrastructure. This area should remain free of development		
Flood risk	The River Irwell which is a Main River flows through the centre of the site though Flood Zone 2 is contained in bank Surface water risk is significant on the eastern part of the site and on the track along the southern boundary		
FRA & Mitigation Options	42% of the site is at risk from surface water flooding. Depths and hazards are such that this area should be kept clear of all development thus reducing the developable area The FRA should focus on SuDS for the open area at surface water risk. The trach to the south should also be investigated for drainage options The EA's recommended 8 metre easement buffer should apply to the River		

Site	SFRA31 Land Adjacent to Futures Park, Bacup
	Irwell Access and egress may be gained from the western corner of the site onto the A6066 The site is likely to be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk

Site	SFRA92 Land Off Hill End Lane, 8222-3397, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	0.6		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	40	51	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - approx. 40% of the site may be at risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	7	8	21
Surface water max depths (m)	1.7	2.3	3.7
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes - south western half of the site		
Flood storage potential	This site is currently greenspace with trees there could accommodate flood water		
Flood risk	The River Irwell Main River Brook runs along the south western boundary of the site The south western half of the site is within Flood Zone 3a with the remaining majority within Flood Zone 2. Bacup Road, the likely access point, is entirely within Flood Zone 2 Surface water risk is also significant in the south western part of the site Bacup Road is within the low risk outline. Surface water risk and fluvial risk occur in similar areas of the site and on Bacup Road therefore a combination of both flood sources occurring at the		

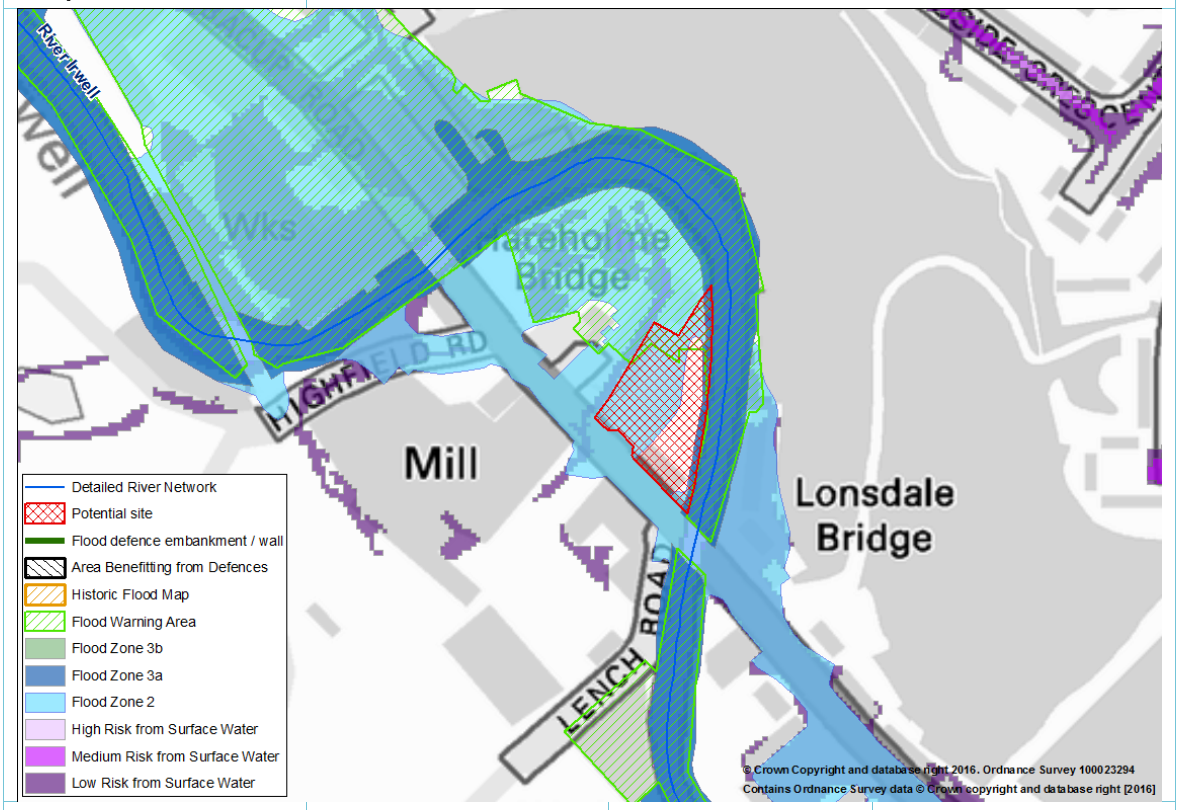
Site	SFRA92 Land Off Hill End Lane, 8222-3397, Rawtenstall
	same time would likely exacerbate flooding further
FRA & Mitigation Options	The south western half of the site should be kept clear of development and left as open space The EA's recommended 8 metre easement buffer should apply to the River Irwell though this is within the fluvial risk area Development may be possible within the north eastern half of the site though the FRA should further investigate climate change to ensure the site will remain safe in the future The FRA should also focus on the risks associated with the interactions between surface water and fluvial flooding Access and egress points are severely limited with only Bacup Road available The site may be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA97 Land off Rock Bridge Fold, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	0.4		
Proposed use	Residential		



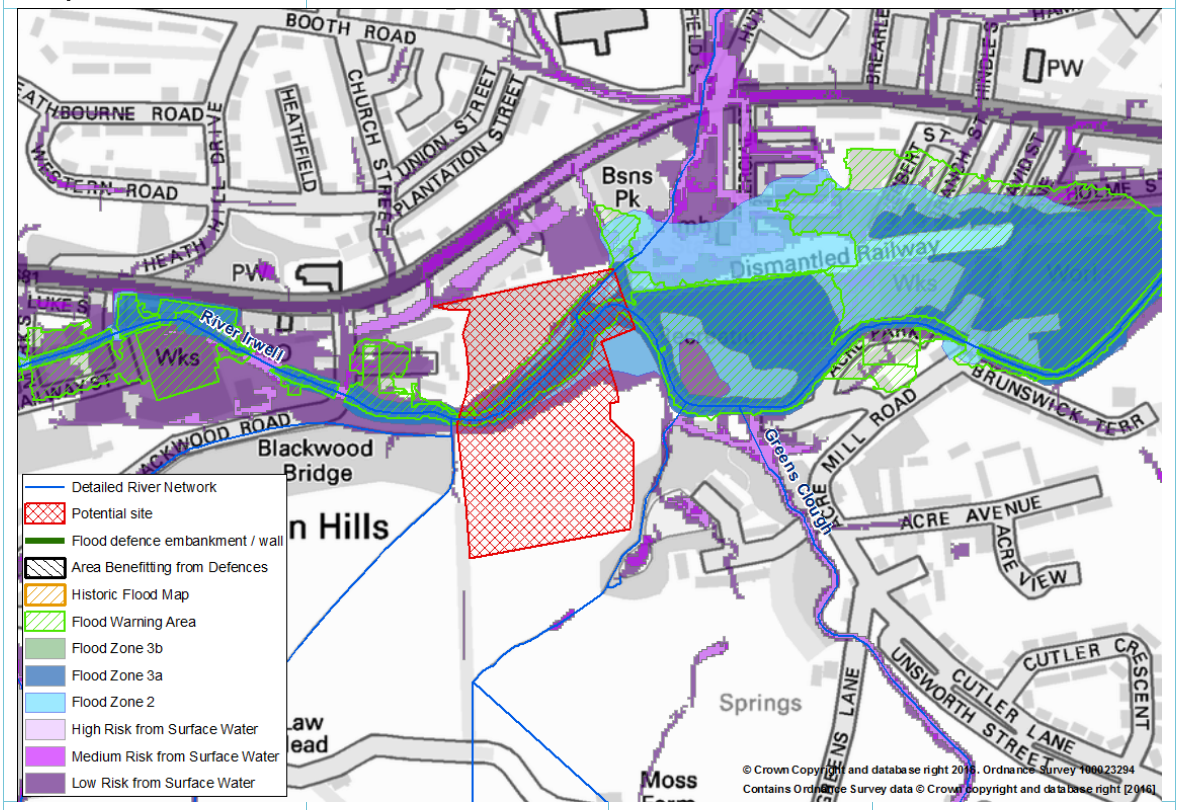
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	0	34	0
Flood Zone 3 max depth (m)	1.5		
Flood Zone 3 max hazard	Unavailable		
Climate change	Whitewell Brook modelled 100 year +70% on peak river flows (based on model nodes). Max depths increase 0.3 m from the 100 year modelled depths		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	26	7	20
Surface water max depths (m)	1.5	1.9	3.5
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	No		
Flood storage potential	This site is currently greenfield therefore could be used for storage		
Flood risk	The Main River Whitewell Brook flows directly through the middle of the site with the confluence of Rock Clough ordinary watercourse just upstream of the site Flood Zones 2 and 3 are contained in bank Surface water risk exists around the banks of the watercourse and also along the western boundary along Rock Bridge Fold road Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely		

Site	SFRA97 Land off Rock Bridge Fold, Rawtenstall
	exacerbate flooding further
FRA & Mitigation Options	The fluvial risk area along Whitewell Brook should be kept clear of development and kept as greenspace The EA's recommended 8 metre easement buffer should apply to Whitewell Brook The FRA should also focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated Safe access and egress could be gained from Burnley Road East Only the eastern part of the site should be developed (east of the watercourse) outside of the 8 m easements buffer and Flood Zone 3a The site may however be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Continue with Exception Test if partial development can be agreed south east of the watercourse

Site	SFRA116 Myrtle Grove House, 392 Bacup Road, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	0.3		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	55	11	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - a further 55% of the site could be within Flood Zone 3 in the future		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	0	0	5
Surface water max depths (m)	0	0	0.3
Surface water max hazards (m)	N\A	N\A	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	No		
Flood risk	The River Irwell Main River flows along the eastern boundary of the site Flood Zone 3 is contained in bank though Flood Zone 2 comes out of bank upstream of the site and inundates the western half the site. Bacup Road is entirely within Flood Zone 2 Surface water risk is minimal		
FRA & Mitigation Options	The EA's recommended 8 metre easement buffer should apply to the River Irwell Provision for climate change should be made in the FRA ensuring the site will		

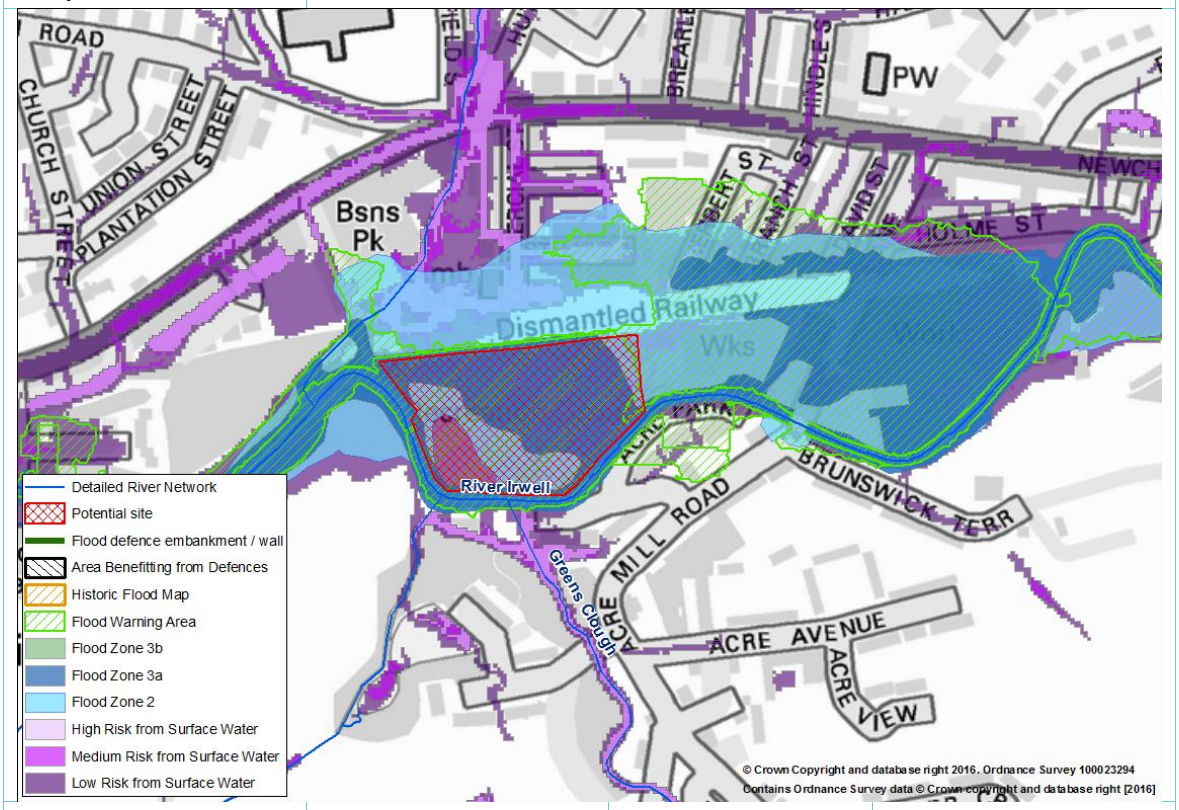
Site	SFRA116 Myrtle Grove House, 392 Bacup Road, Rawtenstall
	remain safe in the future Access and egress can only be gained from Bacup Road on the southern boundary. The FRA should focus on ensuring there are safe escape routes from the site during a flood
Level 2 Recommendation	Withdraw site based on on-site fluvial flood risk and limited access and egress options

Site	SFRA134 Adjacent Toll Bar Business Park, Rawtenstall		
Catchment	River Irwell		
Area (ha)	2.4		
Proposed use	Residential		

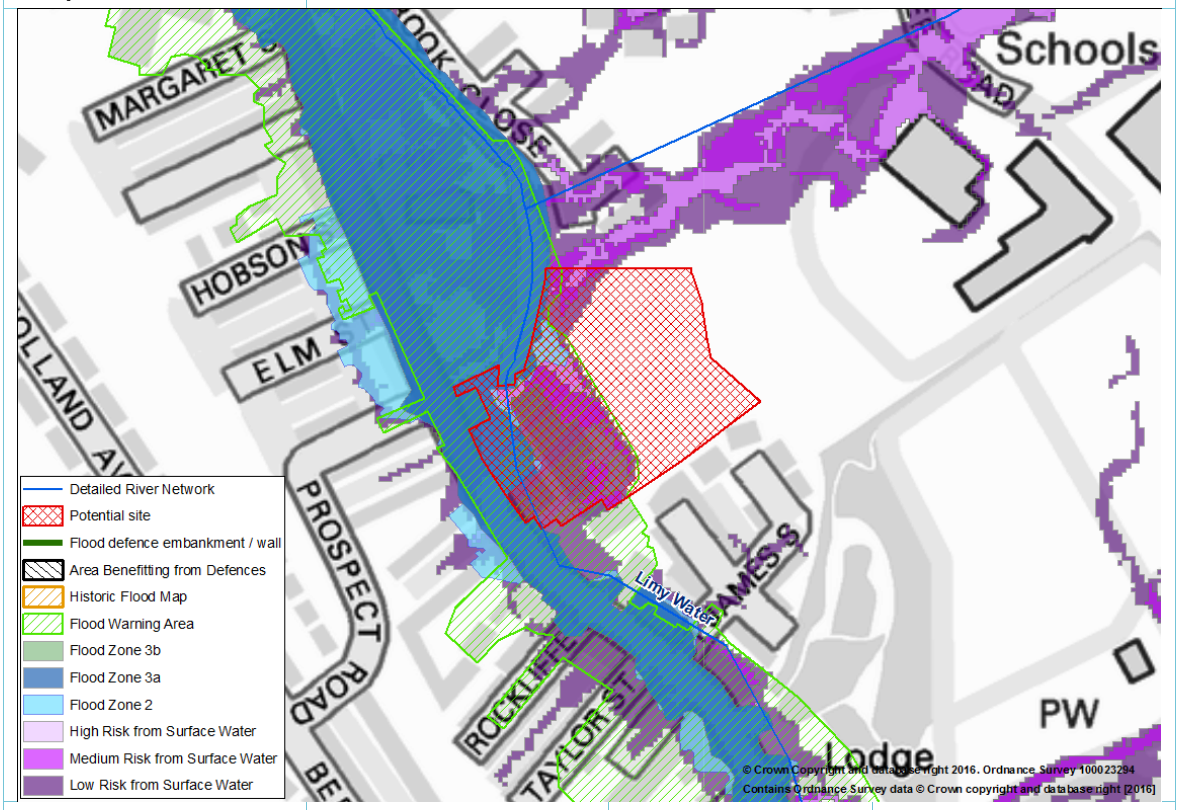


Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	5	15	0
Flood Zone 3 max depth (m)	2.3		
Flood Zone 3 max hazard	Significant		
Climate change	Flood Zone 2 - a further 5% of the site could be within Flood Zone 3 in the future		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	8	2	17
Surface water max depths (m)	1.4	1.7	3.5
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Currently greenfield therefore risk area could be used for storage		
Flood risk	The River Irwell Main River flows directly through the site with the confluence with Sow Clough ordinary watercourse also present in the north east corner Flood Zone 3 does not extend further than 20 m from the riverbanks and Flood Zone no more than 33 m The surface water outlines follow the watercourse with the high and medium risk events not extending far beyond the riverbanks Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

Site	SFRA134 Adjacent Toll Bar Business Park, Rawtenstall
FRA & Mitigation Options	The fluvial risk area should be kept clear of development and kept as open greenspace / used for amenity benefits Consideration should be given to splitting this site into two north and south of the watercourse The FRA should focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future The EA's recommended 8 metre easement buffer should apply to the River Irwell though this is within the risk area Access and egress points should be investigated as many of the surrounding roads are at surface water risk. The FRA should focus on ensuring there are safe escape routes from the site during a flood
Level 2 Recommendation	Continue with Exception Test assuming the site can be split and redefined. Southern area developable though external roads required to gain access

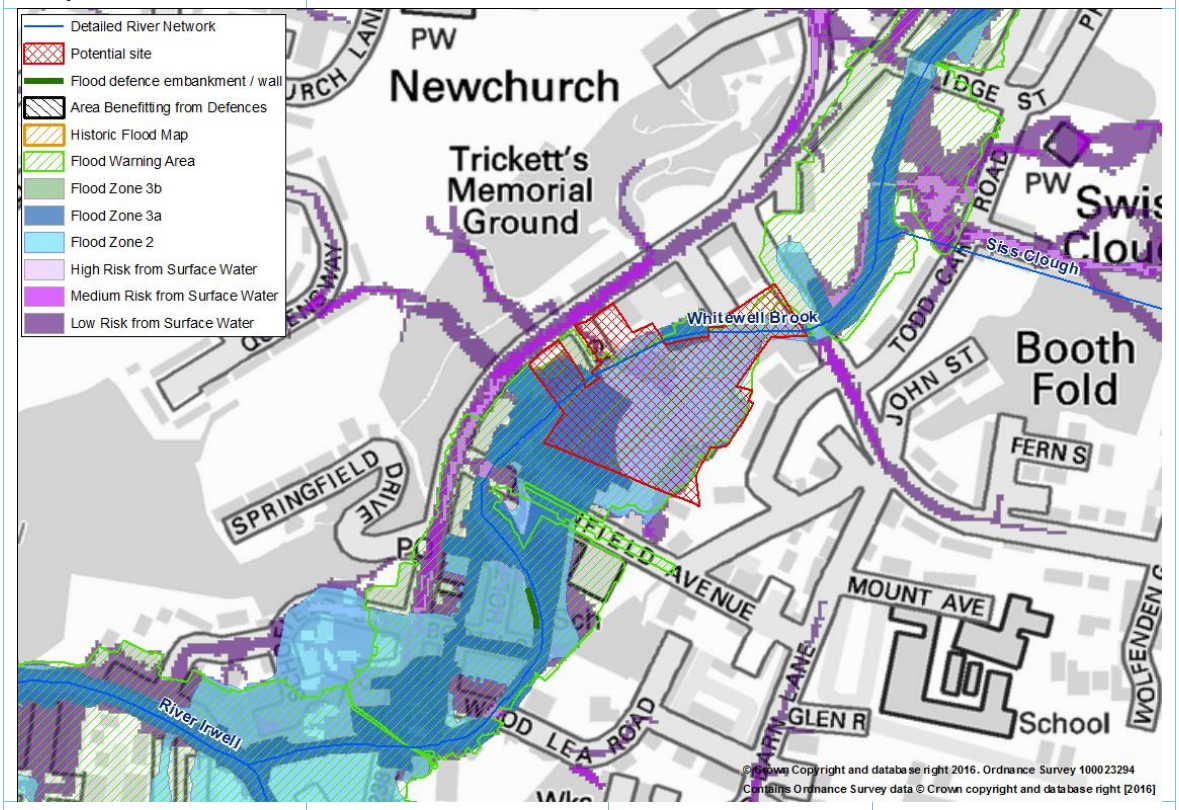
Site	SFRA135 South of Toll Bar Business Park, Rawtenstall		
Catchment	River Irwell		
Area (ha)	1.1		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	26	65	0
Flood Zone 3 max depth (m)	1.0		
Flood Zone 3 max hazard	Significant		
Climate change	Flood Zone 2 - a further 26% of the site could be within Flood Zone 3 in the future which would 91% of the site		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	4	39	56
Surface water max depths (m)	1.5	1.6	2.5
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Currently playing field therefore could be used for storage during a flood		
Flood risk	The River Irwell Main River flows along the eastern and southern boundaries and there are several confluences around the periphery of the site The whole site is at some level of flood risk. Flood Zone 3a covers a large portion of the site with Flood Zone 2 covering a further 26% Surface water is prevalent across the whole site for the medium and low risk events Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

Site	SFRA135 South of Toll Bar Business Park, Rawtenstall
FRA & Mitigation Options	This site should be kept as open space whether that be as the existing playing field or amenity area Safe access and egress points do not exist with Flood Zone 3a surrounding the majority of the site
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA137 Lee Brook Close, Rake Foot, Rawtenstall		
Catchment	Limy Water		
Area (ha)	1.0		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	3	11	0
Flood Zone 3 max depth (m)	1.6		
Flood Zone 3 max hazard	Significant		
Climate change	Flood Zone 2 - a further 3% of the site could be within Flood Zone 3 in the future		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	14	11	24
Surface water max depths (m)	2.1	2.3	2.9
Surface water max hazards (m)	Significant	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes - western half of site		
Flood storage potential	Part of the surface water risk area is wooded and could be used for storage		
Flood risk	Limy Water Main River flows directly underneath the site via a culvert and also along the eastern boundary before entering the culvert. Lee Clough ordinary watercourse enters Limy Water just upstream of the site via a culvert The culverted section of Limy Water appears to be routed underneath existing buildings used for employment purposes Flood Zones 2 and 3 tend to cover the areas currently used for car parking with current buildings outside of the flood zones The high and medium risk surface water outlines skirt around the existing buildings though the low risk event covers just under half of the site, including		

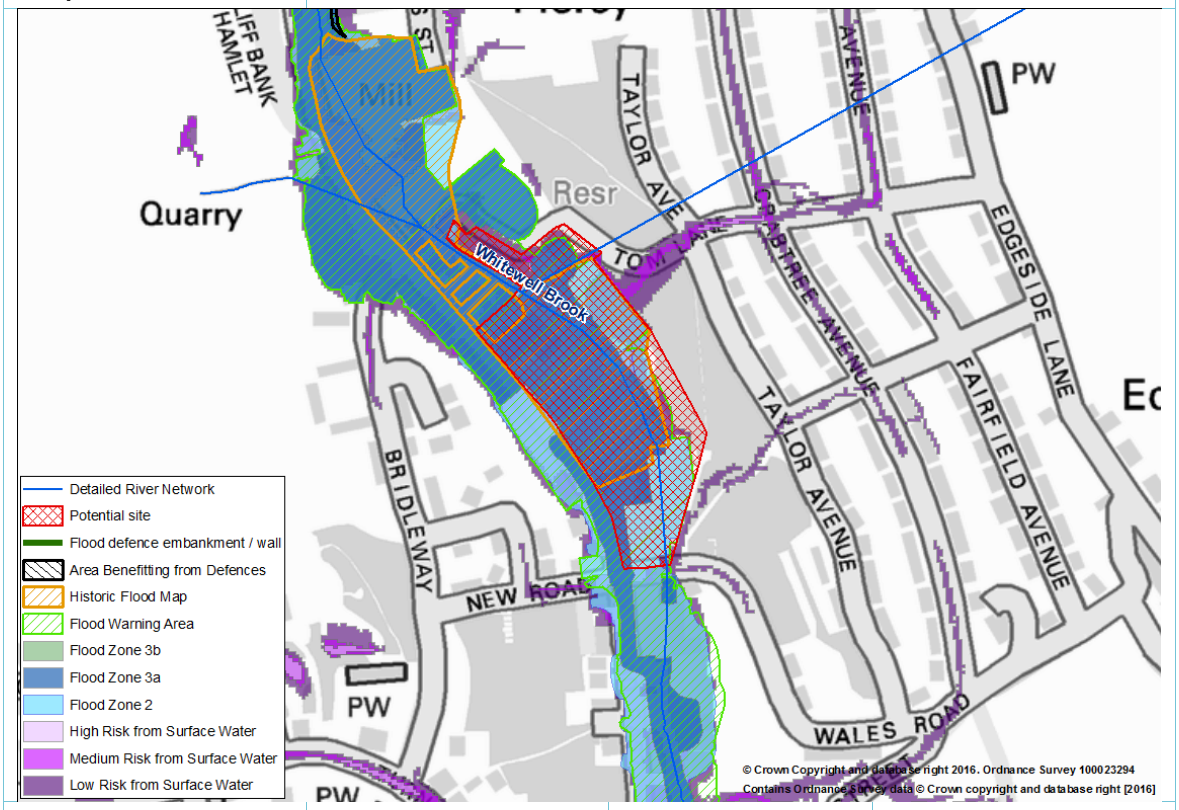
Site	SFRA137 Lee Brook Close, Rake Foot, Rawtenstall
	the currently developed area Surface water risk and fluvial risk occur in similar areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further
FRA & Mitigation Options	It is likely the current employment buildings are to be demolished to make way for residential units The fluvial risk area should be kept clear of development and kept for car parking The LPA may object to any redevelopment over the existing culvert. the developer must seek advice from the LPA and LLFA regarding the existing culvert Ideally, development should be focused towards the current green area in the east of the site The FRA should investigate the current drainage network and UU should be consulted Provision for climate change should be made in the FRA ensuring the site will remain safe in the future The EA's recommended 8 metre easement buffer should apply to the River Irwell though this is within the risk area Access and egress can only be gained from the east of the site though there is currently no road infrastructure in place. The FRA should focus on ensuring there are safe escape routes from the site during a flood
Level 2 Recommendation	Continue with Exception Test, assuming western site boundary can be redefined to remove from risk area. External access roads required

Site	SFRA139 Gaghills Building Lane, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	1.1		
Proposed use	Residential		

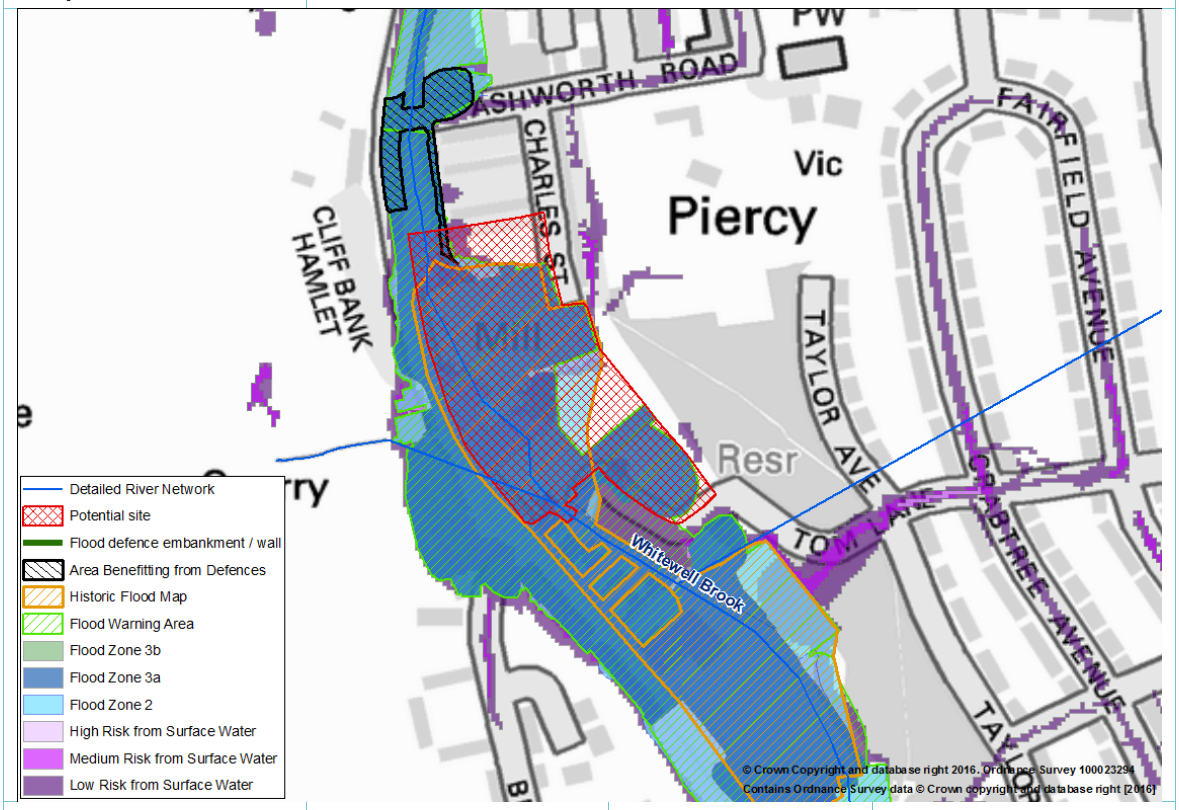


Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	63	22	0
Flood Zone 3 max depth (m)	2.6		
Flood Zone 3 max hazard	Unavailable		
Climate change	Whitewell Brook modelled 100 year +70% on peak river flows. CC outline very similar to current Flood Zone 2. Max depths increase by 1.7 m from the 100 year modelled depths to 4.3 m		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	65	10	10
Surface water max depths (m)	3.0	3.1	3.6
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	There are open areas of greenspace and portable cabins that could be used for flood storage		
Flood risk	Whitewell Brook Main River flows directly through the northern areas of the site with some culverting Existing employment building within Flood Zone 3a which is mainly confined to the quarter of the site Flood Zone 2 covers the majority of the site 65% of the site is at high risk from surface water. The high risk outline covers the majority of the central areas of the site Surface water risk and fluvial risk occur in the same areas of the site		

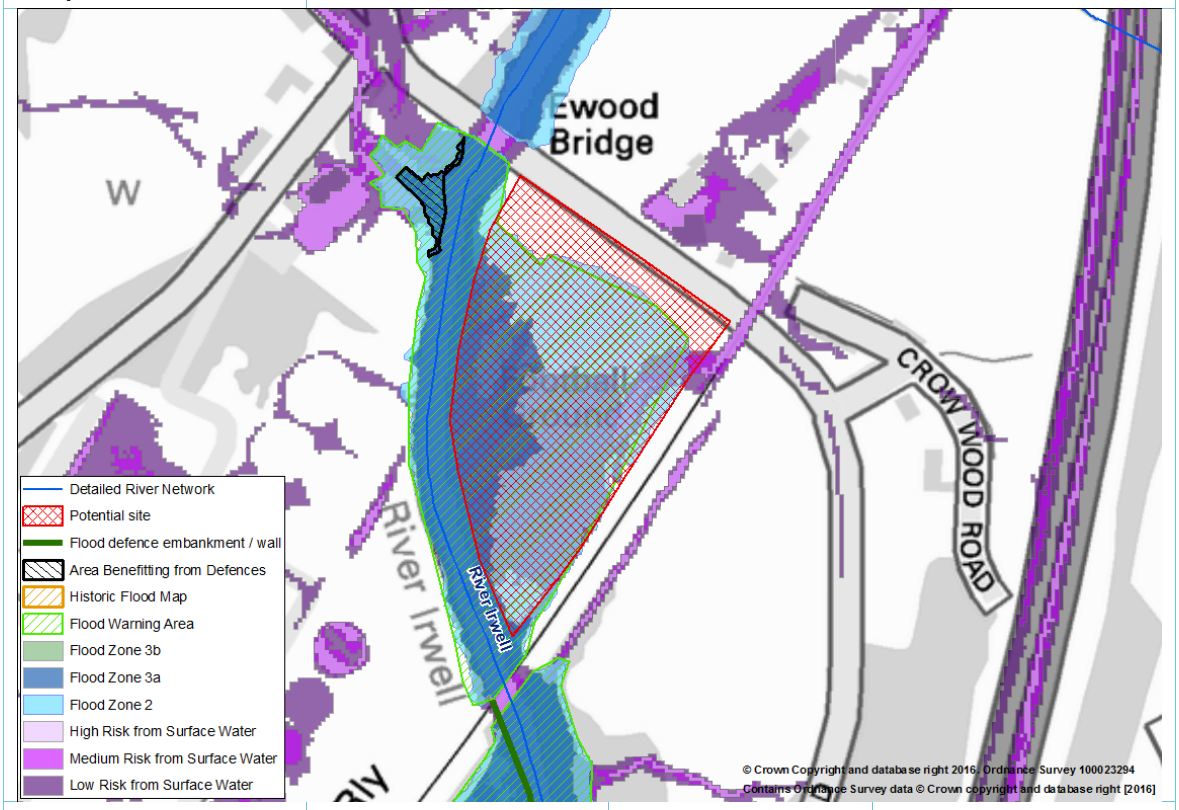
Site	SFRA139 Gaghills Building Lane, Rawtenstall
	therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further
FRA & Mitigation Options	Based on the high risk of surface water flooding across this site, it is unlikely that this site can be allocated for development It is likely the current employment building that is within Flood Zone 3a would be demolished to make way for residential units. However, development within the area of Flood Zone 3a should be avoided The LPA may object to any redevelopment over the existing culvert. The developer must seek advice from the LPA and LLFA regarding the existing culvert Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated The EA's recommended 8 metre easement buffer should apply to Whitewell Brook though this is within the risk area Access and egress around the site is limited by Whitewell Brook to the north and surface water flood risk of surrounding roads
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA140 Globe Mill and Adjacent Land, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	1.6		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	26	59	0
Flood Zone 3 max depth (m)	1.6		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - 85% of the site could be at risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	49	9	19
Surface water max depths (m)	3.3	3.7	5.1
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	Yes - majority of the site		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	No		
Flood risk	Whitewell Brook Main River flows directly through the centre of the site with some culverting. There is also a confluence with a culverted ordinary watercourse in the north of the site Existing industrial site within Flood Zone 3a Flood Zone 2 covers the majority of the site Half of the site is at high risk from surface water. The high risk outline covers the majority of the central areas of the site Surface water risk and fluvial risk occur in the same areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

Site	SFRA140 Globe Mill and Adjacent Land, Rawtenstall
FRA & Mitigation Options	Based on the coverage of Flood Zone 3a and the high risk of surface water flooding across this site, it is unlikely that this site can be allocated for residential redevelopment It is likely the current industrial buildings would be demolished to make way for residential units. Development within the area of Flood Zone 3a should be avoided The LPA may object to any redevelopment over the existing culvert. The developer must seek advice from the LPA and LLFA regarding the existing culvert Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated The EA's recommended 8 metre easement buffer should apply to Whitewell Brook though this is within the risk area Access and egress around the site is limited by flood risk to the surrounding road network
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

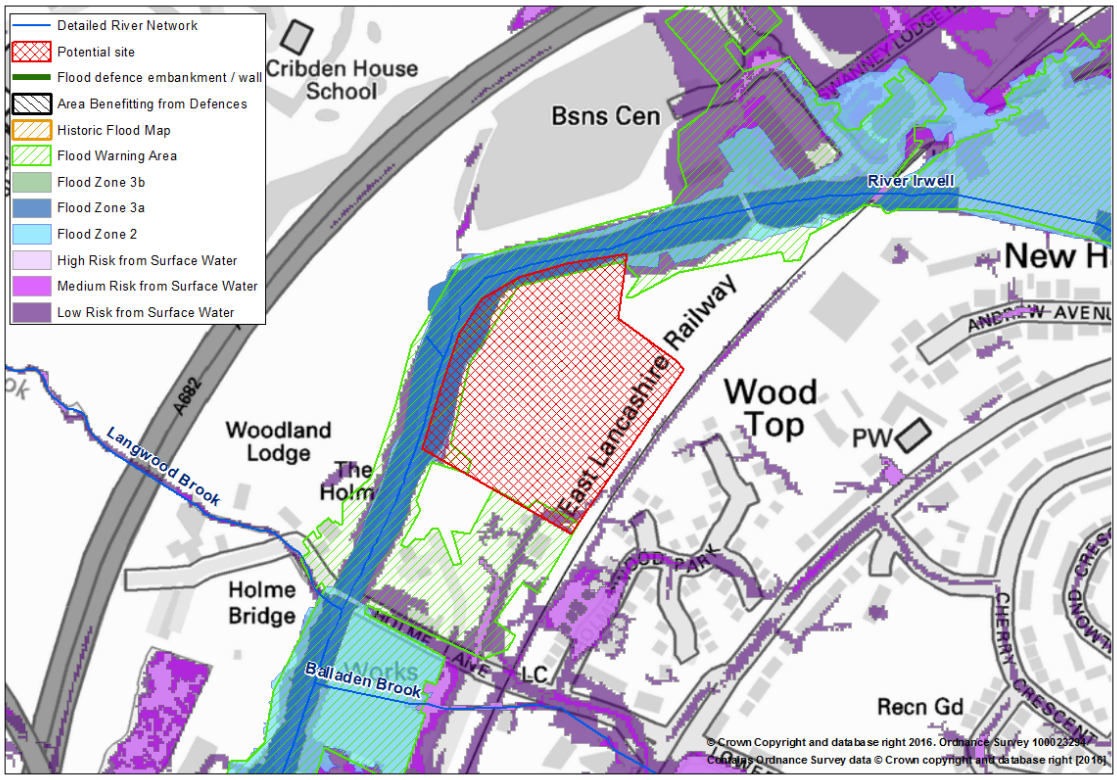
Site	SFRA141 Dale Mill Burnley Road East, Rawtenstall		
Catchment	Whitewell Brook		
Area (ha)	1.3		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	8	76	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - 84% of the site could be at risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	15	3	8
Surface water max depths (m)	3.5	3.9	5.3
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	Yes - majority of the site		
Defended	ABD in the north of the site - would not make much difference to on-site risk		
Flood Warning Area	Yes		
Flood storage potential	No		
Flood risk	Whitewell Brook Main River flows directly through the site with half of the watercourse culverted. There is also a confluence with a culverted ordinary watercourse in the south of the site Existing industrial site the majority of which is within Flood Zones 3a and 2 Parts of the site are at high risk from surface water. Surrounding roads are also at risk from surface water Surface water risk and fluvial risk occur in the same areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

Site	SFRA141 Dale Mill Burnley Road East, Rawtenstall
FRA & Mitigation Options	Based on the coverage of Flood Zone 3a, it is unlikely that this site can be allocated for residential redevelopment It is likely the current industrial buildings would be demolished to make way for residential units. Development within the area of Flood Zone 3a should be avoided The LPA may object to any redevelopment over the existing culvert. The developer must seek advice from the LPA and LLFA regarding the existing culvert Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated The EA's recommended 8 metre easement buffer should apply to Whitewell Brook though this is within the risk area Access and egress most likely confined to Charles Street in the north of the site
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA142 Old Football Ground Manchester Road, Haslingden		
Catchment	River Irwell		
Area (ha)	1.7		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	61	23	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - 84% of the site could be within Flood Zone 3 in the future		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	1	3	47
Surface water max depths (m)	0.2	0.5	0.6
Surface water max hazards (m)	Low	Significant	Significant
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Currently greenfield therefore risk area could be used for storage		
Flood risk	The River Irwell Main River flows adjacent to the western site boundary Flood Zone 3a extends from the watercourse in the centre of the site by approx. 50 m. Flood Zone 2 extends from the River Irwell over the majority of the site apart from the northern boundary The surface water is not such an issue with the majority of risk coming from the low risk event However, the 1000 year surface water event and Flood Zone 2 cover similar areas of the site therefore a combination of both flood sources occurring at the same time during an extreme event would likely exacerbate flooding		

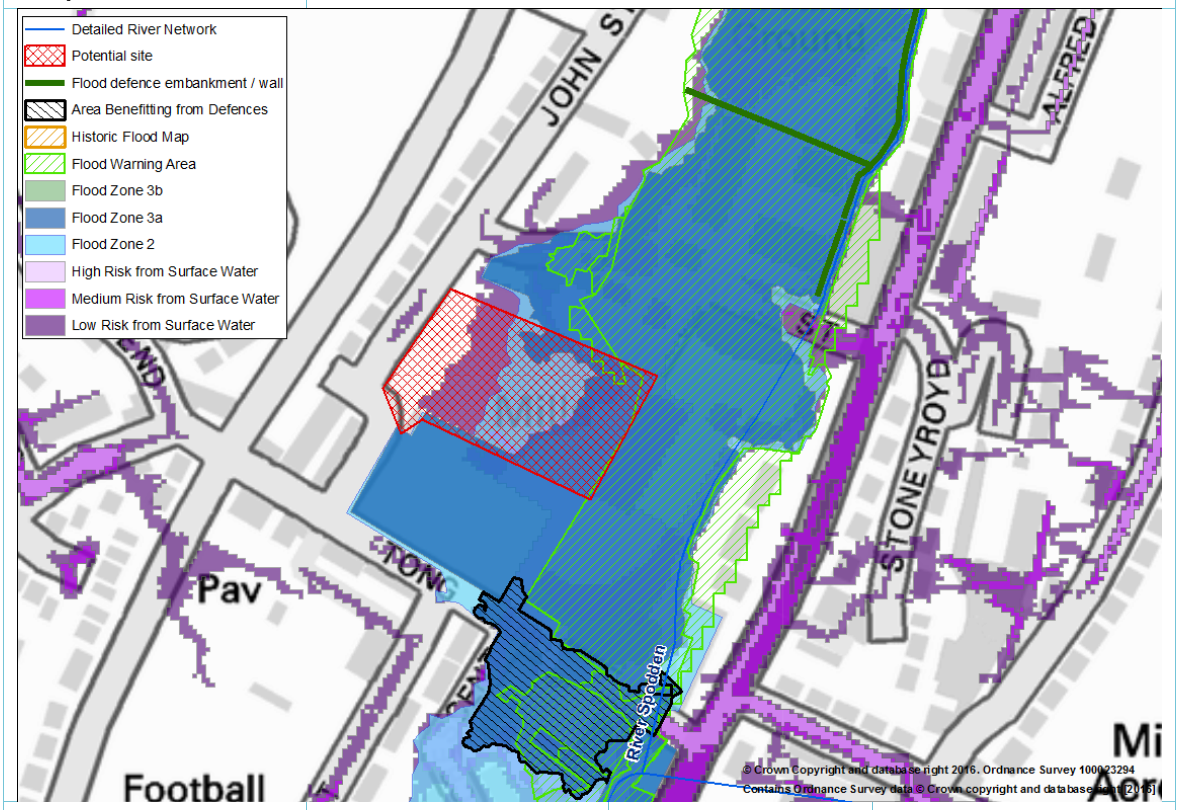
Site	SFRA142 Old Football Ground Manchester Road, Haslingden
	further
FRA & Mitigation Options	Flood Zone 3a area should be kept clear of development and kept as open greenspace / used for amenity benefits along the watercourse. This should be possible given the large size of the site The FRA should focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, given that a large part of the site could be at risk in the future Access and egress could be gained from Blackburn Road on the northern boundary. The FRA should focus on ensuring there are safe escape routes from the site during a flood
Level 2 Recommendation	Continue with Exception Test as may be deliverable outside of Flood Zone 3a and high / medium surface water risk outlines though FRA would require detailed investigation

Site	SFRA155 Townsend Fold, North of Hill, Rawtenstall		
Catchment	River Irwell		
Area (ha)	2.6		
Proposed use	Residential		

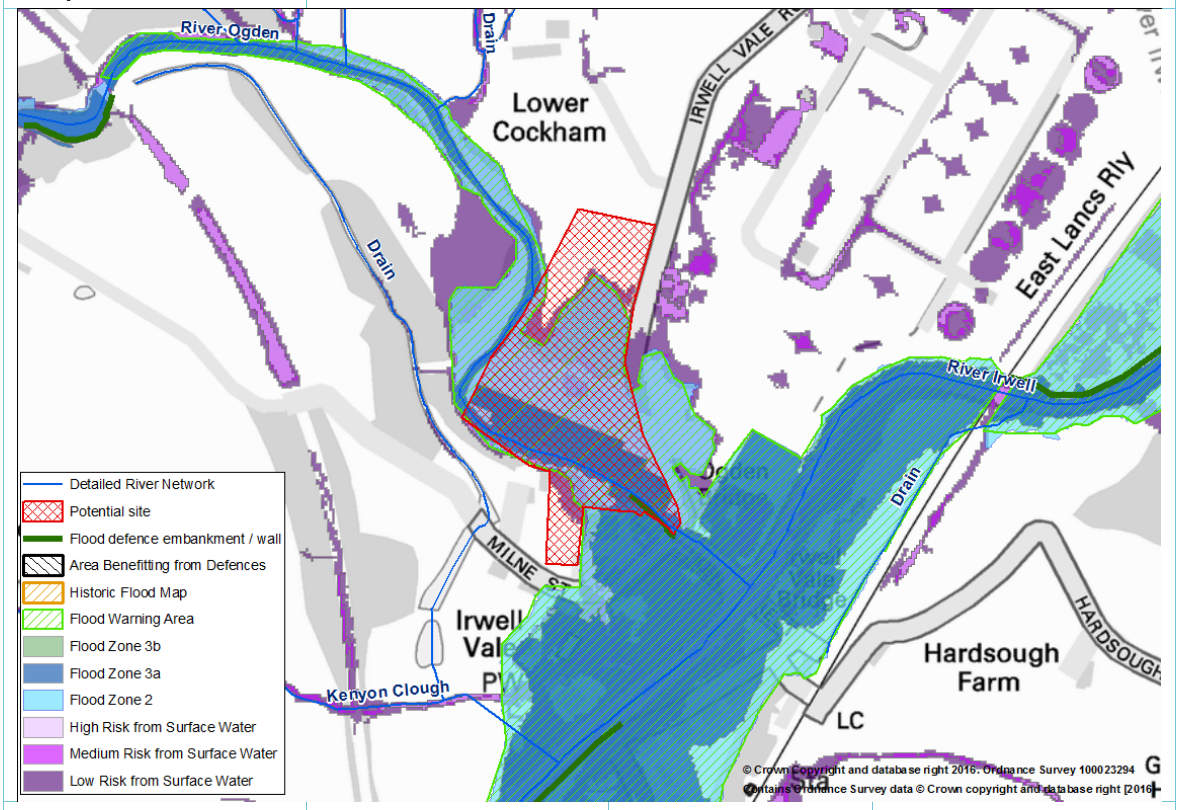


Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	1	10	0
Flood Zone 3 max depth (m)	1.9		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - low risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	1	1	10
Surface water max depths (m)	1.1	1.5	2.5
Surface water max hazards (m)	Significant	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	No		
Flood risk	The River Irwell Main River flows along the western and northern boundaries of the site Flood Zones 2 and 3 do not extend more than 22 m across the site from the Irwell Surface water risk is minimal		
FRA & Mitigation Options	The fluvial risk area along the River Irwell should be kept clear of development The EA's recommended 8 metre easement buffer should apply Safe access and egress should be possible from the south and east however		

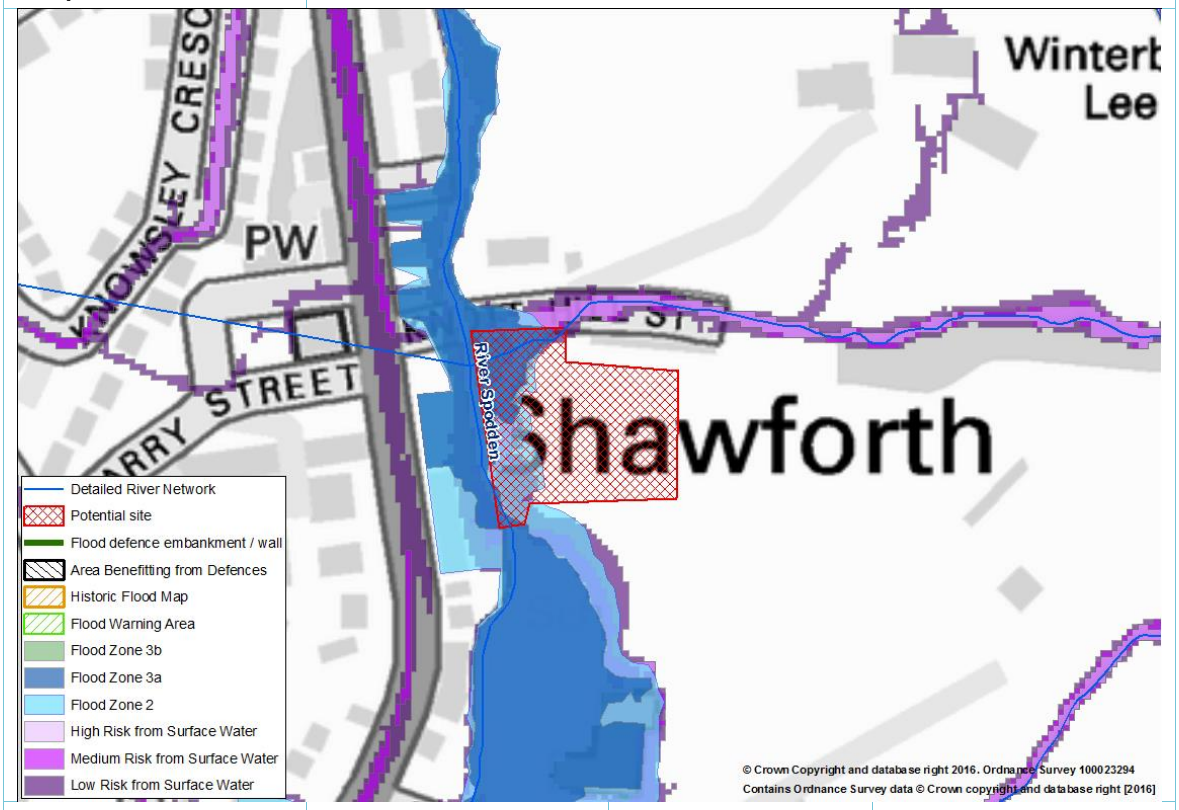
Site	SFRA155 Townsend Fold, North of Hill, Rawtenstall
	there is presently no road or street network
Level 2 Recommendation	Continue with Exception Test as may be deliverable though access would need to avoid the railway line

Site	SFRA161 Rear of Anglo Felt Factory, Whitworth		
Catchment	River Spodden		
Area (ha)	0.6		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	25	37	0
Flood Zone 3 max depth (m)	0.8		
Flood Zone 3 max hazard	Unavailable		
Climate change	River Spodden modelled 100 year +70% on peak river flows (based on model nodes). Max depths increase by approx. 1.7 m from the 100 year modelled depths		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	22	9	48
Surface water max depths (m)	0.8	1.0	1.7
Surface water max hazards (m)	**Significant**	**Significant**	**Extreme**
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Currently playing field therefore risk area could be used for storage during a flood		
Flood risk	The River Spodden Main River flows approx. 45 m adjacent to the eastern site boundary Flood Zone 3a extends from the watercourse to cover the eastern boundary and the majority of the southern and northern boundaries Flood Zone 2 is similar in extend to Flood Zone 3a but extends further into the centre of the site 79% of the site is at some level of risk from surface water, extending across the site from the east and north. Only the approx. eastern third of the site is		

Site	SFRA161 Rear of Anglo Felt Factory, Whitworth
	at high to medium risk Surface water risk and fluvial risk occur in the same areas of the site therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further John Street to the west of the site is virtually flood free
FRA & Mitigation Options	Flood Zone 3a area should be kept clear of development and kept as open greenspace / used for amenity benefits. The high to medium surface water risk area is also contained within the Flood Zone 3a area The FRA should focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, given the large increase in flood depths Access and egress could be gained from John Street Road on the northern boundary. The FRA should focus on ensuring there are safe escape routes from the site during a flood The site may however be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk

Site	SFRA178 Irwell Vale Mill, Irwell Vale		
Catchment	River Ogden		
Area (ha)	2.2		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	44	27	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Irwell Vale modelled 100 year +70% on peak river flows outline similar to current Flood Zone 2. Max depth 0.7 m		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	34	4	39
Surface water max depths (m)	3.9	4.0	4.8
Surface water max hazards (m)	Extreme	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Current greenfield area north of the Mill could be used for storage		
Flood risk	The River Ogden Main River flows the southern part of the site The confluence with the Irwell is located 70 m downstream. Some of the fluvial risk to the site also comes from the Irwell Flood Zone 3a covers the existing Mill building Flood Zone 2 extends further north into the greenfield area Surface water is mainly within the fluvial extents though the risk is significant therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

Site	SFRA178 Irwell Vale Mill, Irwell Vale
FRA & Mitigation Options	It is likely the current Mill building that is within Flood Zone 3a would be demolished to make way for residential units. However, development within the area of Flood Zone 3a should be avoided meaning 27% of the site is undevelopable Flood Zone 3a area should be kept clear of development and kept as open greenspace / used for amenity benefits along the watercourse. This should be possible given the large size of the site The FRA should focus on the risks associated with the interactions between surface water and fluvial flooding Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, given that a large part of the site could be at risk in the future Access and egress should be directed to the northern end of the site onto Irwell Vale Road. The FRA should focus on ensuring there are safe escape routes from the site during a flood
Level 2 Recommendation	Continue with Exception Test as northern third of the site may be deliverable. Southern third at medium risk of surface water flooding should be avoided

Site	SFRA195 Eagley Bank, Shawforth		
Catchment	River Spodden		
Area (ha)	0.4		
Proposed use	Residential		
			
Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	15	17	0
Flood Zone 3 max depth (m)	0.1		
Flood Zone 3 max hazard	Unavailable		
Climate change	River Spodden modelled 100 year +70% on peak river flows (model nodes). Max depth 1.3 m		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	13	5	12
Surface water max depths (m)	0.9	1.2	1.5
Surface water max hazards (m)	**Significant**	**Extreme**	**Extreme**
Historic flooding	No		
Defended	No		
Flood Warning Area	No		
Flood storage potential	Majority greenspace therefore could be used for storage		
Flood risk	The River Spodden Main River flows along the western boundary of the site and two ordinary watercourses flow into the Spodden at the north western boundary of the site The approximate western third of the site is within Flood Zone 2 and the north western corner (17%) is within Flood Zone 3a Surface water risk mimics the fluvial risk extents therefore a combination of both flood sources occurring at the same time would likely exacerbate flooding further		

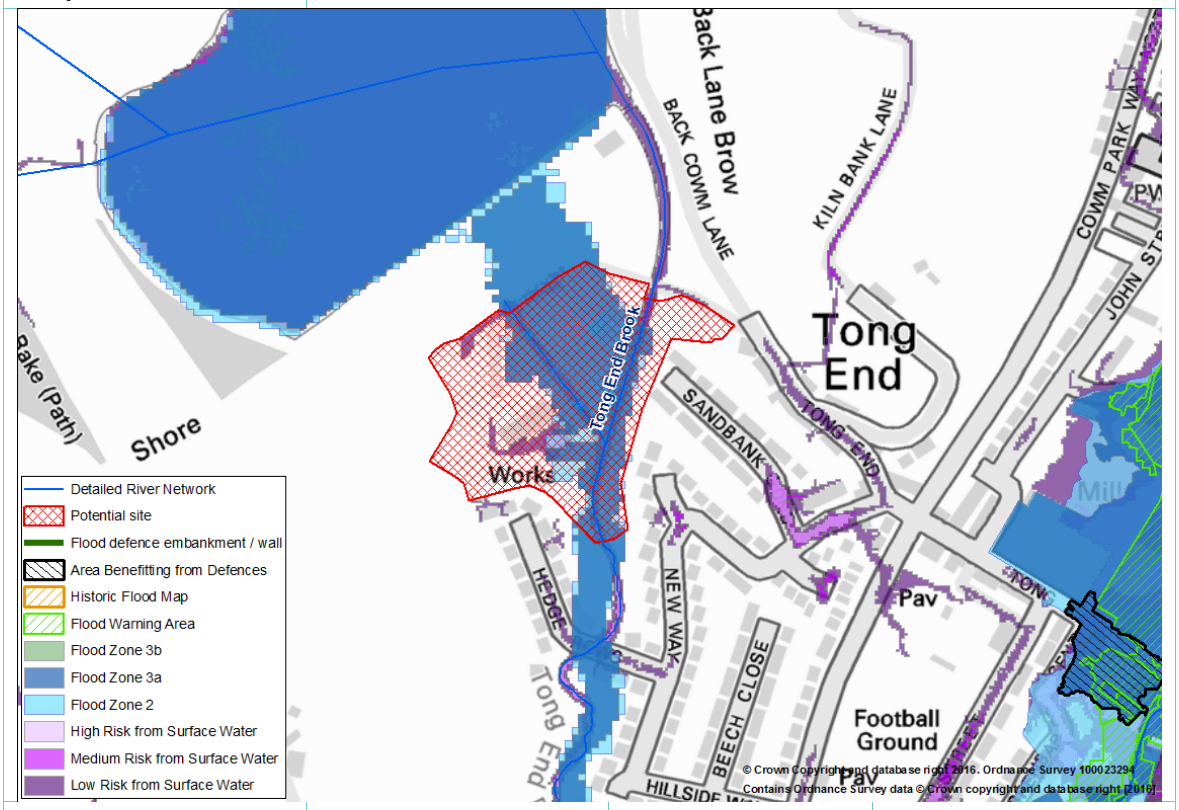
Site	SFRA195 Eagley Bank, Shawforth
FRA & Mitigation Options	The fluvial risk area along the River Spodden should be kept clear of development The FRA should focus on the risks associated with the interactions between surface water and fluvial flooding The EA's recommended 8 metre easement buffer should apply Safe access and egress could be found on the eastern boundary however there are currently no roads / streets in this area The site may however be too small to avoid the risk areas and still accommodate required housing numbers
Level 2 Recommendation	Continue with Exception Test as eastern part of site deliverable however external access roads required

Site	SFRA292 Townsend Fold, Rawtenstall		
Catchment	River Irwell		
Area (ha)	3.7		
Proposed use	Residential		

Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	31	11	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - a further 31% of the site could be at risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	15	11	15
Surface water max depths (m)	1.1	1.4	2.2
Surface water max hazards (m)	Significant	Extreme	Extreme
Historic flooding	No		
Defended	No		
Flood Warning Area	Yes		
Flood storage potential	Greenfield area on the right bank, reservoir in the far west of the site. The current use of this reservoir should be checked		
Flood risk	The River Irwell Main River flows directly through the centre of the site. There are also two confluences - with Langwood Brook on the northern boundary and culverted Balladen Brook in the centre of the site. These are both ordinary watercourses Existing industrial site within Flood Zone 2 Flood Zone 3a mainly within bank on the left bank though extends up to 24 m from the right bank Surface water risk occurs around the existing works and along the Irwell Surface water risk and fluvial risk occur in the same areas of the site along the Irwell therefore a combination of both flood sources occurring at the same		

Site	SFRA292 Townsend Fold, Rawtenstall
	time would likely exacerbate flooding further
FRA & Mitigation Options	The area of Flood Zone 3a should be kept free from development and used as amenity open space It is likely the current industrial unit would be demolished to make way for residential units. The LPA may object to any redevelopment over the existing culvert. The developer must seek advice from the LPA and LLFA regarding the existing culvert Provision for climate change should be made in the FRA ensuring the site will remain safe in the future, assuming current risk can be mitigated The EA's recommended 8 metre easement buffer should apply to the River Irwell The current reservoir should be assessed for flood risk and details on its usage, issues with safety should be obtained Access and egress around the site is limited by flood risk to the surrounding road network. This should be investigated in the FRA to ensure safe escape during a flood
Level 2 Recommendation	Withdraw site based on on-site fluvial and surface water flood risk and limited access and egress options

Site	SFRA299 Cowm Water Treatment Works, Whitworth		
Catchment	Tongue End Brook		
Area (ha)	2.5		
Proposed use	Residential		



Flood Zones (%)	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	4	47	0
Flood Zone 3 max depth (m)	Unavailable		
Flood Zone 3 max hazard	Unavailable		
Climate change	Flood Zone 2 - minimal risk from climate change		
Surface water (%)	**High Risk**	**Medium Risk**	**Low Risk**
	3	3	8
Surface water max depths (m)	0.5	0.6	0.9
Surface water max hazards (m)	**Significant**	**Significant**	**Extreme**
Historic flooding	No		
Defended	No		
Flood Warning Area	No		
Flood storage potential	Majority greenfield therefore could be used for storage		
Flood risk	Tongue End Brook Main River flows directly through the centre of the site and is joined by a small artificial channel Flood Zones 2 and 3a similar in extents through the centre of the site covering just over half of the site area Surface water risk occurs mainly the existing works building Cowm Reservoir upstream of site - risk of dam failure / overtopping		
FRA & Mitigation Options	The area of Flood Zone 3a should be kept free from development and left open as amenity open space. This would still leave approx. 1.7 ha available for development		

Site	SFRA299 Cowm Water Treatment Works, Whitworth
	The area of surface water risk should be left open, using appropriate SuDS techniques to store the surface water on-site The EA's recommended 8 metre easement buffer should apply to Tongue End Brook though this is within Flood Zone 3a The use of the artificial channel should be assessed in the FRA to ascertain its purpose and whether it is still required Access and egress around the site should not be an issue
Level 2 Recommendation	Continue with Exception Test as western area of site may be deliverable though scenarios of reservoir dam failure must be modelled. External access roads required

6.3 Level 2 Site Recommendations

Based on the more detailed site specific assessments of the 19 sites recommended to require the Exception Test in Stage 1 (Section 4.5.1.2), further recommendations have been made. Table 6-1 shows that 10 out of the 19 sites are now recommended for withdrawal based on the Level 2 analysis. The remaining nine are still recommended to have to pass the Exception Test.

Table 6-1: Level 2 site recommendations

Site	Recommendation	Explanation
SFRA07	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA308	Exception Test	Partial development may be possible though likely significant reduction in units
SFRA31	Withdrawal	High on-site fluvial and surface water flood risk
SFRA92	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA97	Exception Test	Partial development possible south east of the watercourse
SFRA116	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA134	Exception Test	Assuming the site can be split and redefined. Southern area developable though external roads required to gain access
SFRA135	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA137	Exception Test	Assuming western site boundary can be redefined to remove from risk area. External access roads required
SFRA139	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA140	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA141	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA142	Exception Test	May be deliverable outside of Flood Zone 3a and high / medium surface water risk outlines though FRA would require detailed investigation
SFRA155	Exception Test	Deliverable though access would need to avoid the railway line
SFRA161	Withdrawal	Withdraw site based on on-site fluvial and surface water flood risk
SFRA178	Exception Test	Northern third of the site may be deliverable. Southern third at medium risk of surface water flooding should be avoided
SFRA195	Exception Test	Eastern part of site deliverable however external access roads required
SFRA292	Withdrawal	High on-site fluvial and surface water flood risk and limited access and egress options
SFRA299	Exception Test	Western area of site may be deliverable though scenarios of reservoir dam failure must be modelled. External access roads required

7 FRA and Mitigation Options

Developers must be able to demonstrate that development will be safe in order to satisfy the second part of the Exception Test, thus proving that risk can be mitigated effectively. This section of the report provides guidance further to the 'FRA & Mitigation Options' section in the summary tables. The following guidance may not be suitable for sites at particularly high risk. Developers should also consult the Environment Agency guidance on carrying out Flood Risk Assessments in order to complete planning applications:

https://www.gov.uk/guidance/flood-risk-assessment-in-flood-zones-2-and-3

7.1 Resilience and resistance techniques

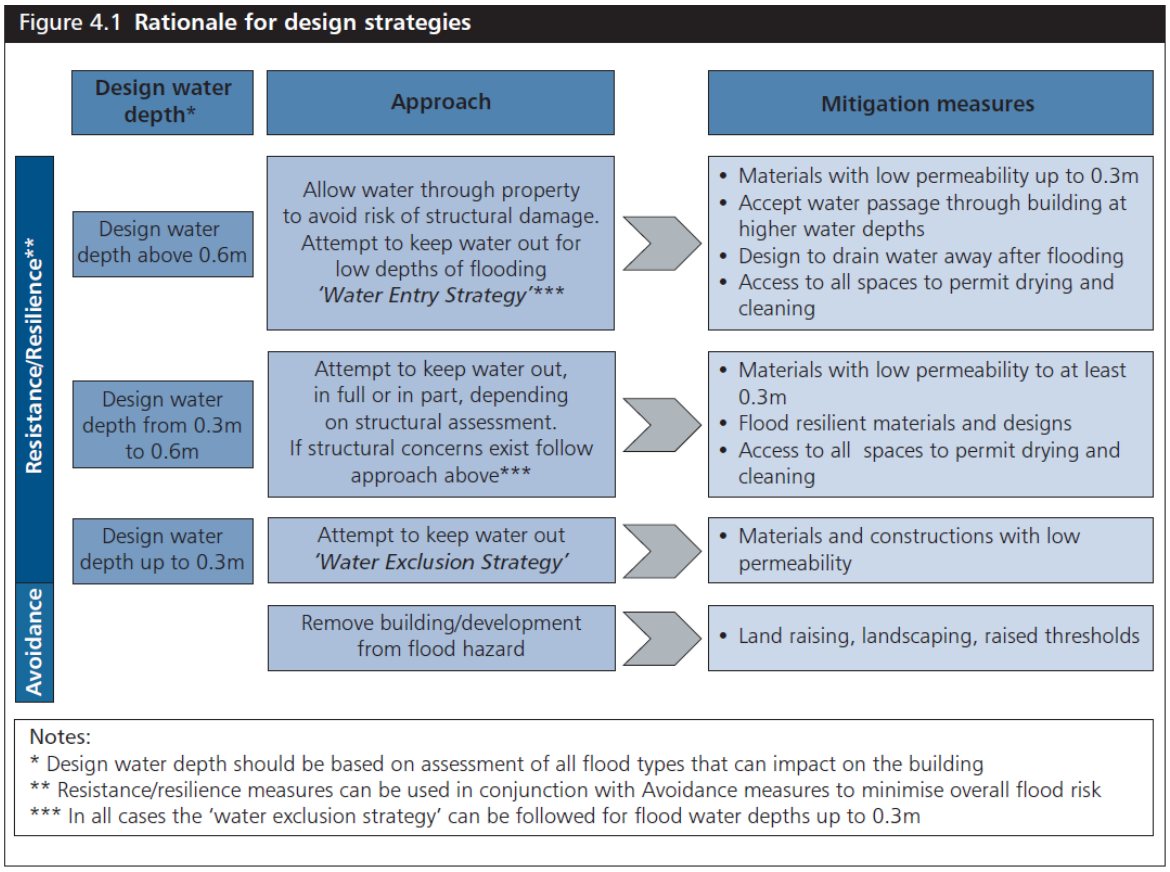
The FRCC-PPG defines flood resilience and flood resistance as flood mitigation approaches for development. Flood resilient buildings are designed to reduce the impact of floodwaters entering a building to avoid permanent damage whilst also maintaining structural integrity. Flood resistance is a more robust approach whereby the entry of water into a building is prevented or minimised. This approach is only applicable where typical floodwater depths do not exceed 0.6 m and must also be combined with resilience measures. Figure 7-1 is an extract from the Defra document 'Improving the Flood Performance of New Buildings'[14] and describes the mitigation measures appropriate to resilience, resistance and avoidance strategies for new buildings.

The Defra report states that flood depth will dictate whether it is feasible to exclude or delay floodwater from entering a building. Additional freeboard should be used in setting the floor level of a building. The EA requires that floor levels are set 300 mm above the predicted 1 in 100 AEP event flood level plus climate change where there is risk from fluvial flooding. This approach should be applied to development on all housing sites at risk from Flood Zone 3 and the 1 in 100+ 70% AEP climate change event. This should therefore be assessed within a site-specific FRA for sites where this data was unavailable for this SFRA. This SFRA is dependent on existing available information and the modelling has been updated where practical. However, in some instances the EA model for the extreme event is not available or has not been calibrated for this range of extreme events.

For this SFRA therefore, the assumption is that the current day Flood Zone 2 will become Flood Zone 3a in 100 years' time and the current functional floodplain could become Flood Zone 3a. Predicting future expansion of the functional floodplain is however more difficult as the functional floodplain extent is based on a number of different criteria, as discussed in Section 3.2.2. This approach to climate change is precautionary though is considered to be the most pragmatic methodology available. This approach is also consistent with other SFRAs and professional modelling experience. As such, for any sites within Flood Zone 2, the possibility of these sites being within Flood Zone 3a within 100 years' time is considered. These sites will need to be reviewed further, beyond this SFRA, as part of a site-specific FRA. Further consultation with the EA will be required to confirm the status of available modelling at the time.

14 Improving the Flood Performance of New Buildings, Flood Resilient Construction, Department for Communities and Local Government, Defra. May 2007

Figure 7-1: Development Mitigation Measures Based on Flood Depth



The FRA may be required to consider detailed surface water modelling, particularly for the larger sites listed in Table 4-5, which may influence sites elsewhere. The FRA should include on-site impacts and in accordance with good practice consideration of suitable allowances for climate change. This should also include offsite impacts and potential overland flow routes onto and from the site. Owing to the steep catchments of Rossendale, the surface water flooding and response times are likely to be rapid therefore, particular consideration needs to be given to culvert blockage and existing drainage issues, which are likely to contribute to flood risk. Early consultation with the LPA, LLFA, UU and the EA are essential in order to identify areas at specific risk from flooding and to confirm site-specific issues that need to be considered as part of any site-specific FRA.

New development on greenfield land or an increase in development footprint on brownfield land could cause increased runoff. For brownfield, the LPA should look to reduce runoff rates beyond current rates and as close to greenfield as possible. Developers should be looking to achieve betterment on current greenfield rates if possible;

SuDS should be used where possible in accordance with the latest SuDS guidance (see Section 4.9) including for appropriate climate change allowances. Appropriate SuDS may offer opportunities to control runoff to greenfield rates or better. Offsite impacts could be significant and should always be considered. Also any river locking and the interaction with receiving watercourses would need to be assessed, especially whether the site is in close proximity to fluvial flood zones. This will also need to take ground conditions into account to an appropriate level of investigation. Restrictions on surface water runoff from new development must be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical.

7.2 Access and egress

The FRCC-PPG stipulates that buildings should provide residents and / or users routes to safely access and exit a building during a design flood and to evacuate before an extreme flood i.e. 1 in 1000 AEP event. Climate change (+70% allowance on peak flows for housing developments) should also be taken into account with safe access and egress designed for the lifetime of the development.

For any sites that are required to develop in areas at flood risk, access and egress routes should be assessed as part of a detailed site-specific FRA. Design event flood depths should be examined and access and egress routes should be located at points on the site where flood depths and hazard to people are lowest. A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area using public rights of way without the intervention of emergency services or others.

7.3 Raised development

This mitigation scenario may allow safe development in the locality, however the effects of land raising on flood levels upstream and downstream should be examined as part of a site-specific FRA. It is a standard EA response to object to any loss of floodplain, even if flood levels are not raised elsewhere.

This means that an increase in flood conveyance or some form of compensatory flood storage may be required on-site or off-site to compensate for the loss of floodplain as a result of raising the land out of the floodplain. Agreement between RBC and the EA would therefore be required were land to be raised.

7.4 On-site flood storage

If development is required within Flood Zone 3a and the development is raised, then the loss of floodplain may need to be compensated for (unless the EA confirms otherwise). Detailed consultation between RBC and the EA would be required to confirm the scope of investigation required and to confirm any site-specific requirements that may need to be addressed.

Two variations of compensatory floodplain storage can be considered. Firstly, storage could be designed on-site, either as underground flood storage (e.g. storage tank, underground car park) or a ground level undeveloped amenity area or greenspace. Alternatively, an undeveloped area upstream could be utilised for flood storage. Upstream storage is discussed in the following section.

There are some practical issues associated with on-site storage, as like for like compensation would need to be available. This means that for any development within the floodplain, a similar area and volume would need to be allocated for storage that is free from any development. This may reduce possible housing numbers and not create any overall benefit in this regard. Also, the site area would need to be large enough for any compensatory on-site storage. A wider development strategy may be required to examine the possibilities of upstream mitigation.

A further issue is related to subsurface storage on-site. If the habitable floor level is built above the 1 in 100 AEP plus climate change (+70% on peak river flows for residential) event level, then the space beneath could be retained for flood storage during such an event. This free space could be used as a car park, with emergency access and egress procedures for the car park triggered by a suitable flood warning system. However, the type of development that is most likely to be able to handle this type of residential development are multi-storey buildings. In the case of residential uses this would likely entail three storey town houses or flats. For residential developments, allowing the ground floor to flood may be a constrained option and other land uses or mitigation options should be considered. Flood depths and hazards would need to be taken account of.

The situation is not as problematic with less vulnerable land uses such as businesses, retail and other employment land uses in that the Exception Test would not apply. However, any development within Flood Zone 3a would still need to be compensated for which could have significant implications on development layout and the extent of land available for development. A detailed FRA would need to be carried out to determine the extent of works and should be used to help inform the development layout and planning stages. Ground floor flooding can be achieved more easily with less vulnerable land use e.g. offices on stilts (and car parking under this area) or low grade ground floor use with stock moved to higher levels and flood resilience measures on the ground floor. It is also much easier to evacuate this type of development following suitable flood warning, emergency planning and evacuation routes.

7.5 Upstream compensatory storage

If on-site storage is unfeasible, then upstream flood storage could be considered depending on the suitable availability of upstream land. Upstream storage requires an area of undeveloped land that is not at risk from Flood Zone 3a, but close to it, to be retained as flood storage. This is normally an area within Flood Zone 2. This area can be artificially excavated so that it floods during the 1 in 100 AEP flood event. This area would need to be large enough to store the volume of flood water that would be displaced. Any flood storage area would need to be controlled so that flooding would only occur during low probability events via a flow controlled inlet. The flood water should flow out naturally via a specific designed outlet. An assessment can be carried out based on a Green Infrastructure study or open space assessment.

7.6 Flood routing

In order to demonstrate that 'flood risk is not increased elsewhere', development in the floodplain will need to prove that flood routing is not adversely affected by the development, for example giving rise to backwater affects or diverting floodwaters onto other properties.

Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.

Careful consideration should be given to the use of fences and landscaping walls so as to prevent causing obstruction to flow routes and increasing the risk of flooding to the site or neighbouring areas.

7.7 Floodplain widening

This option would involve the design of a widened floodplain corridor either side of the watercourse. As with upstream storage, Green Infrastructure could be used to help define areas where this may be possible. This would increase flood conveyance and create additional storage to reduce the downstream and upstream increase in flood levels as a result of any development raising.

7.8 Development phasing

Development should not all take place at the same time. Development and regeneration of each site should take on a phased approach. The flood risk information provided in this SFRA should be taken account of when deciding the order in which each site is developed. Modelling should investigate scenarios based on compensatory storage techniques to ensure that downstream or nearby sites are not adversely affected by development on other sites.

Using a phased approach to development, based on modelling results of floodwater storage options, should ensure that any sites at risk of causing flooding to other sites are developed first in order to ensure flood storage measures are in place before other sites are developed. Also, it may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

7.9 Basement dwellings

Basement dwellings are classified as Highly Vulnerable and as such they are not permitted within Flood Zone 3a and Flood Zone 3b. They must pass the Sequential and Exception Tests should they be proposed for Flood Zone 2. Basement dwellings should therefore be discouraged within areas at risk of fluvial or surface water flooding. Where they are constructed, access must be situated 300 mm above the design flood level, and waterproof construction techniques should be employed to avoid seepage during flood events.

An assessment of groundwater conditions will also be required to inform the structural integrity of the basement construction. Similar problems can also occur where excessive surface water ponding occurs close to the sides of buildings, leading to significant infiltration. Surface water flow paths should be assessed to ensure that this does not occur.

8 Conclusions and Recommendations

8.1 Conclusions

This hybrid SFRA provides a single repository planning tool relating to flood risk and development in the borough of Rossendale. Key flood risk stakeholders namely the LPA, EA, LCC LLFA and UU were consulted to collate all available and relevant flood risk information on all sources into one comprehensive assessment. Together with this report, this SFRA also provides a suite of interactive GeoPDF flood risk maps (Appendix A) and a development site assessment spreadsheet (Appendix B) illustrating the level of risk to potential sites, with subsequent recommendations.

The flood risk information, assessment, guidance and recommendations of this hybrid SFRA will provide RBC with the evidence base required to apply the Sequential and Exception Tests, as required under the NPPF, and demonstrate that a risk based, sequential approach has been applied in the preparation of their development plans and documents. This will allow for a sustainable and robust Local Plan.

Whilst the aim of the sequential approach is the avoidance of high flood risk areas, in locations such as Rawtenstall, Bacup and Haslingden, where the council is looking for continued growth and regeneration, this will not always be possible. This SFRA therefore provides the necessary links between spatial developments, wider flood risk management policies, local strategies / plans and on the ground works by bringing flood risk information into one location.

Stage 2 (Level 2 SFRA) takes forward the findings of Stage 1 (Level 1 SFRA) and focuses on the high risk sites that have been judged to require passing the Exception Test (Section 4.5.1.2) in order for development to be allocated. The Level 2 assessment allows the LPA to make a better informed decision as to the likelihood of such sites passing the Exception Test.

Stage 1

The Level 1 assessment found that, out of the 306 potential sites assessed:

- 50 should be allocated on flood risk grounds,
- 193 could be allocated subject to site-specific FRA,
- 33 require full, detailed consideration of site layout and design at the site planning stage to alter the site footprint or incorporate floodwater storage; or detailed investigation into surface water mitigation through SuDS is required due to significant surface water risk,
- 19 should be subject to perform and pass the Exception Test,
- 11 were recommended for withdrawal.

The 11 recommended for withdrawal were due to significant surface water risk issues.

However, site SFRA123 has extant FRA accepted by the EA. As long as mitigation recommendations in the FRA are adhered to, site should be able to go ahead. Therefore 10 sites were recommended for withdrawal, based on the Level 1 assessment.

The 19 recommended to have to pass the Exception Test formed the basis for the Stage 2 assessment.

Stage 2

The Level 2 assessment found that, out of the 19 potential sites assessed:

- 9 should still be subject to the Exception Test,
- 10 should be withdrawn.

Overall therefore, 20 sites are recommended for withdrawal from allocation.

8.2 Recommended Local Plan Policy and Flood Risk Recommendations

The following planning policy recommendations relating to flood risk are designed to enable the Council to translate the information provided in this SFRA into meaningful Local Plan policy for flood risk and water management:

Policy Recommendation 1: No development within Flood Zone 3b…

…as per the NPPF and FRCC-PPG, unless in exceptional circumstances such as for essential infrastructure or where development is water compatible.

Development must not impede the flow of water within Flood Zone 3b nor should it reduce the volume available for storage of flood water.

Refer to tables 1 to 3 of the FRCC-PPG

Policy Recommendation 2: Consider surface water flood risk…

…alongside fluvial risk, including possible withdrawal, redesign or relocation for sites at significant surface water risk.

Flood Risk Assessments should always consider surface water flood risk management and options for on-site flood storage.

Policy Recommendation 3: Sequential approach to site allocation and site layout…

…must be followed by the LPA to ensure sustainable development when either allocating land in Local Plans or determining planning applications for development.

The overall aim of the Sequential Approach should be to steer new development to low risk Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, the flood risk vulnerability of land uses and reasonably available sites in Flood Zone 2 should be considered, applying the Exception Test if required.

Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in higher risk Flood Zone 3, be considered. This should take into account the flood risk vulnerability of land uses and the likelihood of meeting the requirements of the Exception Test, if required.

This SFRA, the NPPF and FRCC-PPG should be consulted throughout this process.

Policy Recommendation 4: Requirement for a site-specific Flood Risk Assessment…

…from a developer when a site is:

- Within Flood Zone 3a or Flood Zone 2
- Within Flood Zone 1 and 1 hectare or greater in size
- At risk from surface water flooding
- Situated in an area currently benefitting from defences
- Situated within 20 metres of the bank top of a Main River
- Situated over a culverted watercourse or where development will be required to control or influence the flow of any watercourse

Before deciding on the scope of the FRA, this SFRA should be consulted along with the LPA, LLFA and EA. The FRA should be submitted to and approved by the LPA including suitable consultation with the LLFA and the EA.

Policy Recommendation 5: Use of appropriately sourced of SuDS…

…required for all major developments of 10 or more residential units or equivalent commercial development. This is in accordance with the interim national standards published in March 2015.

SuDS scoping and design, as part of a site-specific FRA, must be included within the early stages of the site design in order to incorporate appropriate SuDS within the development.

The LPA, LLFA and water company must be consulted during the site design stage and the FRA must be submitted to and approved by the LPA, considering all consultation with key stakeholders.

The EA should be consulted with regards to surface water if surface water is being discharged from the site to a Main River.

Policy Recommendation 6: Phasing of development…

…should be carried out by the LPA to avoid any cumulative impacts of flood risk.

Using a phased approach to development, should ensure that any sites at risk of causing flooding to other sites are developed first in order to ensure flood storage measures are in place before other sites are developed, thus contributing to a sustainable approach to site development.

It may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

Policy Recommendation 7: Planning permission for at risk sites…

…can only be granted by the LPA where a site-specific Flood Risk Assessment shows that:

- The NPPF and FRCC-PPG have been referenced together with appropriate consultation with the LLFA, the EA and UU
- The effects of climate change have been taken into account using the February 2016 allowances developed by the EA, referencing this SFRA
- There is no loss in floodplain storage resulting from the development
- The development will not increase flood risk elsewhere
- There is no adverse effect on the operational functions of any existing flood defence infrastructure
- Proposed resistance / resilience measures designed to deal with current and future risks are appropriate
- Appropriate SuDS techniques have been considered and are to be incorporated into the design of the site, where applicable
- Whether the development will be safe and has passed the Exception Test, if applicable.

8.3 Recommendations for Further Work

The SFRA process has developed into more than just a planning tool. Sitting alongside the Lancashire and Blackpool LFRMS and the Lancashire PFRA, it can be used to provide a much broader and inclusive vehicle for integrated, strategic and local flood risk management and delivery. There are a number of plans and assessments listed in Table 8-1 that would be of benefit to RBC in developing their flood risk evidence base to support the delivery of their Local Plan or to help fill critical gaps in flood risk information.

Table 8-1: Recommended Further Work

Type	Study	Explanation	Timeframe
Understanding of local flood risk	EA Flood Risk Mapping updates	EA modelling updates of older models. Updates of Flood Map for Planning upon completion	Medium term
	SWMP / drainage strategy	For those high surface water risk sites / areas as notified by this Level 1 SFRA	Short term
	EA Flood Risk Mapping updates for climate change	Modelling should be updated to include the February 2016 climate change allowances	Short term
CDA designation	SWMP / drainage strategy	Exploration of the possibility of designating official CDAs as notified to the LPA by the EA or identification of areas of critical drainage for use in RBC's Local Plan	Short term
Flood storage	Community Infrastructure Levy (CIL)	For new developments, GI assets can be secured from a landowner's 'land value uplift' and as part of development agreements. The LPA could include capital for the purchase, design, planning and maintenance of GI within its CIL programme.	Short term
Data Collection	Flood Incident Data	LCC, in collaboration with RBC, has a duty to investigate and record details of locally significant flood events within the county. General data collected for each incident, should include date, location, weather, flood source (if apparent without an investigation), impacts (properties flooded or number of people affected) and response by any RMA.	Short Term / Ongoing
	FRM Asset Register	LCC should continue to update and maintain their flood risk management register of structures and features, which are considered to have an effect on flood risk. This should be shared with RBC	Short Term
Risk assessment	Asset Register Risk Assessment	LCC, in collaboration with RBC, should carry out a strategic assessment of structures and features on the FRM Asset Register to inform capital programme and prioritise maintenance programme.	Short Term
Capacity	SuDS review / guidance	LCC with RBC should identify internal capacity required to deal with SuDS applications, set local specification and set policy for adoption and maintenance of SuDS.	Short Term
Partnership	UU	LCC / RBC should continue to work with UU on sewer and surface water projects.	Ongoing
	EA	LCC / RBC should continue to work with the EA on fluvial flood risk management projects. RBC should also identify potential opportunities for joint schemes to tackle flooding from all sources.	Ongoing
	Community	Continued involvement with the community through LCC's and RBC's existing flood risk partnerships.	Ongoing

Appendices

A SFRA Maps

SFRA Interactive GeoPDFs

Open the Index Map in Adobe Acrobat. The index maps contain a set of index squares covering different areas of the borough. Clicking on an index square will open up a more detailed map of that area by way of a hyperlink. Within Adobe Acrobat, use the zoom tools and the hand tool to zoom in/out and pan around the maps. In the legend on the right-hand side of the detailed maps, layers can be switched on and off when required. The potential development site reference labels can also be switched on and off if, for example the smaller sites are obscured by the labels.

B Development Site Assessment Spreadsheet

Excel spreadsheet containing an assessment of flood risk to potential sites based on the EA's Flood Map for Planning Flood Zones 2 and 3a and the functional floodplain delineated from this SFRA, and also surface water flood risk based on the Risk of Flooding from Surface Water (RoFSW).

C Functional Floodplain Delineation

Technical note explaining the methodology behind the delineation of the functional floodplain (Flood Zone 3b) for this SFRA.

D Climate Change Outputs

Technical note explaining the methodology used to assess the effects of climate change, using the EA's February 2016 allowances, on potential development sites.

E Depth and Hazard Information

Four Excel spreadsheets, two containing depth information for surface water and fluvial for each site; and two containing hazard information for surface water fluvial for each site:

- 2016s4505 Surface Water Depths.xlsx
- 2016s4505 Surface Water Hazards.xlsx
- 2016s4505 Fluvial Depths.xlsx
- 2016s4505 Fluvial Hazards.xlsx

F Understanding Flood Risk

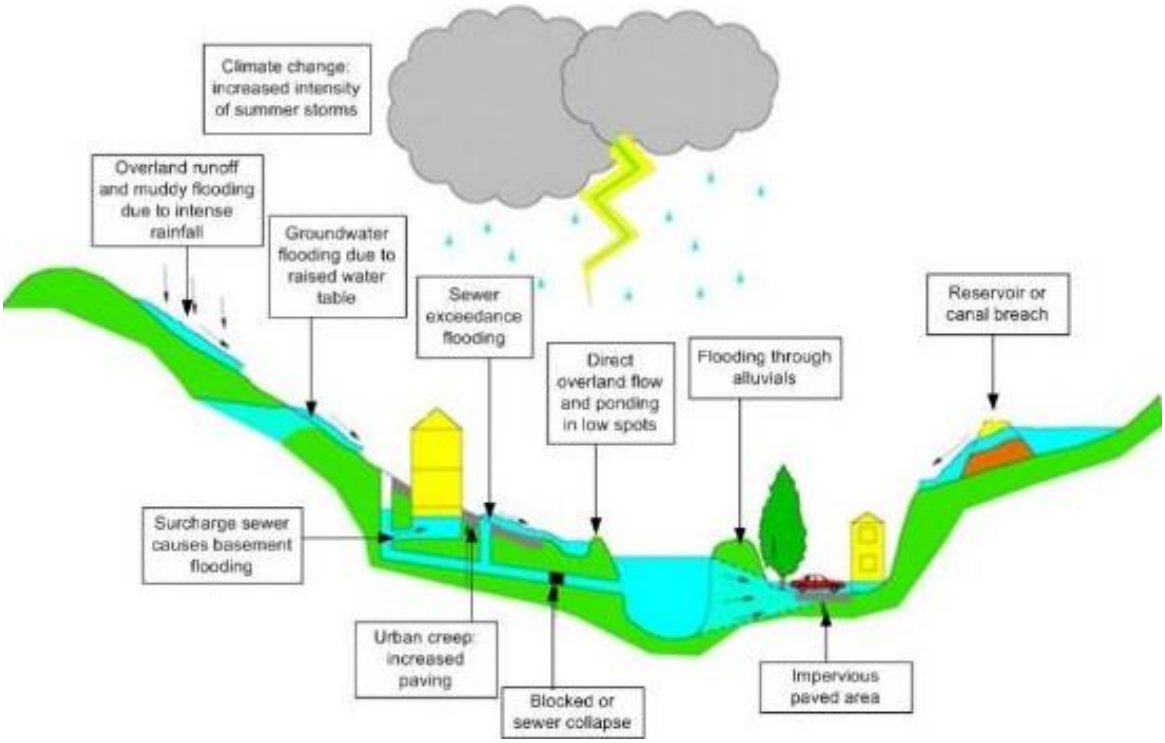
F.1 Sources of Flooding

Flooding is a natural process and can happen at any time in a wide variety of locations. It constitutes a temporary covering of land not normally covered by water and presents a risk when people and human or environmental assets are present in the area that floods. Assets at risk from flooding can include housing, transport and public service infrastructure, commercial and industrial enterprises, agricultural land and environmental and cultural heritage. Flooding can occur from many different and combined sources and in many different ways. Major sources of flooding include (also see Figure F-1):

- **Fluvial** (rivers) - inundation of floodplains from rivers and watercourses; inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels; overtopping or breaching of defences; blockages of culverts; blockages of flood channels/corridors.
- **Tidal** - sea; estuary; overtopping of defences; breaching of defences; other flows (e.g. fluvial surface water) that could pond due to tide locking; wave action.
- **Surface water** - surface water flooding covers two main sources including direct run-off from adjacent land (pluvial) and surcharging of piped drainage systems (public sewers, highway drains, etc.)
- **Groundwater** - water table rising after prolonged rainfall to emerge above ground level remote from a watercourse; most likely to occur in low-lying areas underlain by permeable rock (aquifers); groundwater recovery after pumping for mining or industry has ceased.
- **Infrastructure failure** - reservoirs; canals; industrial processes; burst water mains; blocked sewers or failed pumping stations.

Different types and forms of flooding present a range of different risks and the flood hazards of speed of inundation, depth and duration of flooding can vary greatly. With climate change, the frequency, pattern and severity of flooding are expected to change and become more damaging.

Figure F-1: Flooding from all sources

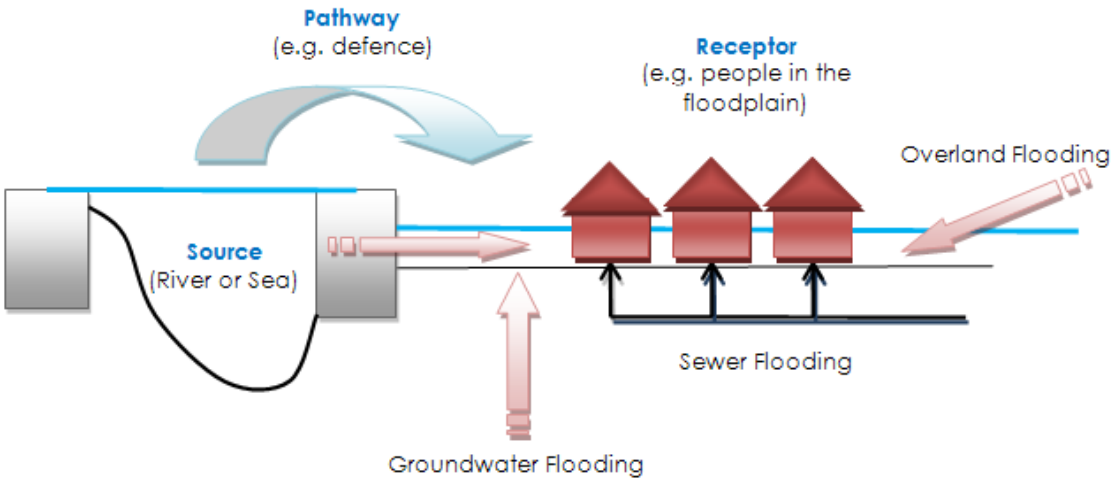


F.2 Likelihood and Consequence

Flood risk is a combination of the likelihood of flooding and the potential consequences arising. It is assessed using the source – pathway – receptor model as shown in Figure F-2 below. This is a standard environmental risk model common to many hazards and should be the starting point of

any assessment of flood risk. However, it should be remembered that flooding could occur from many different sources and pathways, and not simply those shown in the illustration below.

Figure F-2: Source-Pathway-Receptor Model



The principal sources are rainfall or higher than normal sea levels, the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets and the receptors can include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures have little or no effect on sources of flooding but they can block or impede pathways or remove receptors.

The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk. It is therefore important to define the components of flood risk in order to apply this guidance in a consistent manner.

F.2.1 Likelihood

The likelihood of flooding is expressed as the percentage probability based on the average frequency measured or extrapolated from records over a large number of years. A 1% probability indicates the flood level that is expected to be reached on average once in a hundred years, i.e. it has a 1% chance of occurring in any one year, not that it will occur once every hundred years. Table F-2 provides an example of the flood probabilities used to describe Flood Zones as defined in the FRCC-PPG and as used by the EA in its Flood Map for Planning (Rivers and Sea)[15].

15 http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap

Table F-2: FRCC-PPG Flood Zones[16]

Flood Zone	Annual Probability of Flooding
Zone 1 - Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the EA. (Not separately distinguished from Zone 3a on the Flood Map)

Considered over the lifetime of development, such an apparently low frequency or rare flood has a significant probability of occurring. For example:

- A 1% flood has a 26% (1 in 4) chance of occurring at least once in a 30-year period - the period of a typical residential mortgage
- And a 49% (1 in 2) chance of occurring in a 70-year period - a typical human lifetime

F.2.2 Consequence

The consequences of flooding include fatalities, property damage, disruption to lives and businesses, with severe implications for people (e.g. financial loss, emotional distress, health problems). Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures etc). Flood risk is then expressed in terms of the following relationship:

Flood risk = Probability of flooding x Consequences of flooding

F.3 Risk

Flood risk is not static; it cannot be described simply as a fixed water level that will occur if a river overtops its banks or from a high spring tide that coincides with a storm surge. It is therefore important to consider the continuum of risk carefully. Risk varies depending on the severity of the event, the source of the water, the pathways of flooding (such as the condition of flood defences) and the vulnerability of receptors as mentioned above.

F.3.3 Actual Risk

This is the risk 'as is' taking into account any flood defences that are in place for extreme flood events (typically these provide a minimum Standard of Protection (SoP)). Hence, if a settlement lies behind a fluvial flood defence that provides a 1 in 100-year SoP then the actual risk of flooding from the river in a 1 in 100-year event is generally low.

Actual risk describes the primary, or prime, risk from a known and understood source managed to a known SoP. However, it is important to recognise that risk comes from many different sources and that the SoP provided will vary within a river catchment. Hence, the actual risk of flooding from the river may be low to a settlement behind the defence but moderate from surface water, which may pond behind the defence in low spots and is unable to discharge into the river during high water levels.

F.3.4 Residual Risk

Defended sites, located behind EA flood defences remain at residual risk as there is a risk of overtopping or defence breach during significant flood events. Whilst the potential risk of failure

16 Table 1, Paragraph 065 of the Flood Risk and Coastal Change Planning Practice Guidance

may be reduced, consideration of inundation and the impact on development needs to be taken into account.

Paragraph 041 of the FRCC-PPG defines residual risk as:

"…those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

The failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system".

Even when flood defences are in place, there is always a likelihood that these could be overtopped in an extreme event or that they could fail or breach. Where there is a consequence to that occurrence, this risk is known as residual risk. Defence failure can lead to rapid inundation of fast flowing and deep floodwaters, with significant consequences to people, property and the local environment behind the defence. Whilst the actual risk of flooding to a settlement that lies behind a fluvial flood defence that provides a 1 in 100-year SoP may be low, there will always be a residual risk from flooding if these defences overtopped or failed that must be taken into account. Because of this, it is never appropriate to use the term "flood free".

Developers must be able to demonstrate that development will be safe to satisfy the second part of the Exception Test. To that end, Paragraph 042 of the FRCC-PPG states:

"Where residual risk is relatively uniform, such as within a large area protected by embanked flood defences, the Strategic Flood Risk Assessment should indicate the nature and severity of the risk remaining, and provide guidance for residual risk issues to be covered in site-specific flood risk assessments. Where necessary, local planning authorities should use information on identified residual risk to state in Local Plan policies their preferred mitigation strategy in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications".

G The Planning Framework and Flood Risk Policy

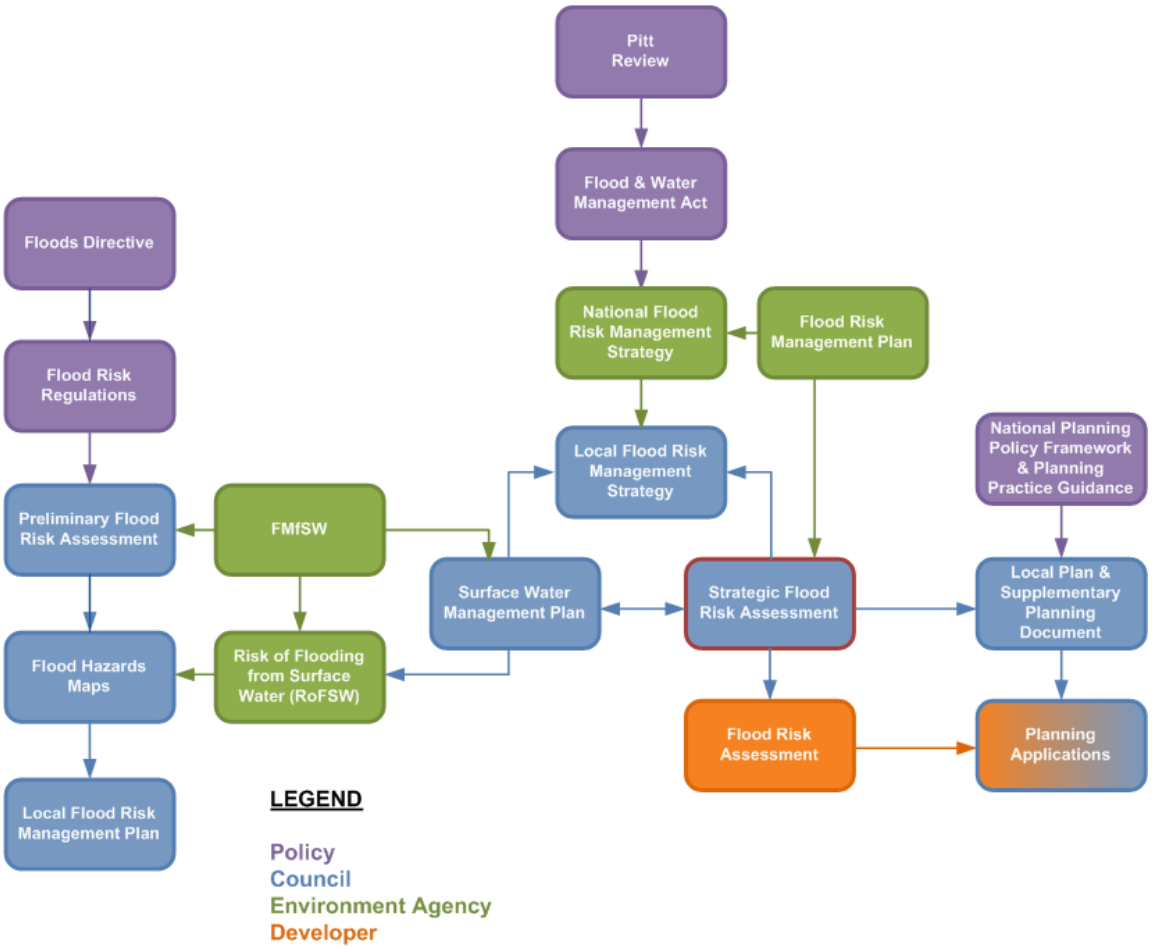
G.1 Introduction

The main purpose of this section of the SFRA is to provide an overview of the key planning and flood risk policy documents that have shaped the current planning framework. This section also provides an overview and contextualisation of RBC's responsibilities and duties in respect to managing local flood risk including but not exclusive to the delivery of the requirements of the Flood Risk Regulations (FRR) 2009 and the Flood and Water Management Act (FWMA) 2010.

Figure G-3 illustrates the links between legislation, national policy, statutory documents and flood risk assessments. The figure shows that whilst the key pieces of legislation and policy are separate, they are closely related and their implementation should aim to provide a comprehensive and planned approach to asset record keeping and improving flood risk management within communities.

It is intended that the non-statutory SWMPs and SFRAs can provide much of the base data required to support the delivery of statutory flood risk management tasks as well supporting Local Authorities in developing capacity, effective working arrangements and informing Local Flood Risk Management Strategies (LFRMS) and Local Plans, which in turn help deliver flood risk management infrastructure and new development at a local level. This SFRA should be used to support RBC's Local Plan and to help inform planning decisions.

Figure G-3: Key documents and strategic planning links with flood risk



G.2 Legislation

G.2.1 EU Floods Directive & the Flood Risk Regulations

The European Floods Directive (2007) sets out the EU's approach to managing flood risk and aims to improve the management of the risk that floods pose to human health, the environment, cultural

heritage and economic activity. The Directive was translated into English law by the Flood Risk Regulations (FRR) 2009 which require Lead Local Flood Authorities (LLFAs) and the EA to produce Flood Risk Management Plans (FRMPs).

The Directive puts in place a six year cycle of producing Preliminary Flood Risk Assessments (PFRAs) with the aim of identifying significant Flood Risk Areas, prepare flood hazard and risk maps and prepare Flood Risk Management Plans (FRMPs). The first six year cycle was completed in December 2015 and the second six year cycle is currently underway.

Figure G-4: EU Floods Directive

PFRAs should cover the entire area for local flood risk (focusing on ordinary watercourses, surface water and groundwater flooding). Where significant Flood Risk Areas are identified using a national approach (and locally reviewed), the LLFA is then required to undertake flood risk hazard mapping and to produce Flood Risk Management Plans as illustrated in Figure G-4.

The FRMP would need to consider objectives for flood risk management (reducing the likelihood and consequences of flooding) and measures to achieve those objectives.

The EA has implemented one of the exceptions for creating PFRAs, etc. for main rivers and coastal flooding, as they already have mapping (i.e. EA Flood Map for Planning (Rivers and Sea), Risk of Flooding from Rivers and Sea Map) and plans (i.e. RBMPs, CFMPs, SMPs) in place to deal with this. The EA has therefore focused their efforts on assisting LLFAs through this process.

Lancashire Area Preliminary Flood Risk Assessment (2011)

LCC worked in partnership with the two other LLFAs within the Lancashire area, Blackpool Council and Blackburn with Darwin Borough Council, to produce the first cycle PFRA for Lancashire, which included the borough of Rossendale.

The 2011 PFRA found that there were no nationally significant harmful consequences that could be deduced from information on past flood events. The analysis of surface water, using the EA's Flood Map for Surface Water (FMfSW) also revealed that there were no significant flood clusters within Rossendale, therefore the scale of risk was not considered to be sufficient enough to consider the borough as a Flood Risk Area at a European level. LCC therefore was not required to produce a Flood Risk Management Plan for its area due to the absence of any designated Flood Risk Areas.

The PFRA process is cyclical and will need to be carried out again by 2017. The next round of PFRAs should be based on the more detailed third generation Risk of Flooding from Surface Water RoFSW) from the EA.

G.2.2 Flood & Water Management Act

The Flood and Water Management Act (FWMA) was passed in April 2010. It aims to improve both flood risk management and the way we manage our water resources.

The FWMA has created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. This included the creation of a lead role for Local Authorities, as Lead Local Flood Authorities, designed to manage local flood risk (from surface water, ground water and ordinary watercourses) and to provide a strategic overview role of all flood risk for the EA.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by Local Authorities and other key partners. The integration and synergy of strategies and plans at national, regional and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth. Table G-3 provides an overview of the key LLFA responsibilities under the FWMA, that LCC should be looking to achieve.

Table G-3: Key LLFA Duties under the FWMA

FWMA Responsibility	Description of duties and powers	LCC LLFA Status
Local Strategy for Flood Risk Management	A LLFA has a duty to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategies will build on information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments. The local strategy will not be secondary to the national strategy; rather it will have distinct objectives to manage local flood risks important to local communities.	Adopted 2013
Duty to contribute to sustainable development	The LLFA has a duty to contribute towards the achievement of sustainable development.	Ongoing
Duty to comply with national strategy	The LLFA has a duty to comply with national flood and coastal risk management strategy principles and objectives in respects of its flood risk management functions.	Ongoing
Investigating Flood Incidents	The LLFA, on becoming aware of a flood in its area, has (to the extent it considers necessary and appropriate) to investigate and record details of "locally significant" flood events within their area. This duty includes identifying the relevant risk management authorities and their functions and how they intend to exercise those functions in response to a flood. The responding risk management authority must publish the results of its investigation and notify any other relevant risk management authorities.	Ongoing
Asset Register	A LLFA has a duty to maintain a register of structures or features, which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and the Secretary of State will be able to make regulations about the content of the register and records.	Ongoing
Duty to co-operate and Powers to Request Information	The LLFA must co-operate with other relevant authorities in the exercise of their flood and coastal erosion management functions.	Ongoing
Ordinary Watercourse Consents	A LLFA has a duty to deal with enquiries and determine watercourse consents where the altering, removing or replacing of certain flood risk management structures or features that affect flow on ordinary watercourses is required. It also has provisions or powers relating to the enforcement of unconsented works.	Ongoing
Works Powers	The Act provides a LLFA with powers to undertake works to manage flood risk from surface runoff, groundwater and on ordinary watercourses, consistent with the local flood risk management strategy for the area.	Ongoing
Designation Powers	The Act provides a LLFA with powers to designate structures and features that affect flooding or coastal erosion. The powers are intended to overcome the risk of a person damaging or removing a structure or feature that is on private land and which is relied on for flood or coastal erosion risk management. Once a feature is designated, the owner must seek consent to alter, remove, or replace it.	
Emergency Planning	A LLFA is required to play a lead role in emergency planning and recovery after a flood event.	Ongoing
Community Involvement	A LLFA should engage local communities in local flood risk management issues. This could include the training of community volunteers, the development of local flood action groups and the preparation of community flood plans, and general awareness raising around roles and responsibilities plans.	Ongoing

FWMA Responsibility	Description of duties and powers	LCC LLFA Status
Planning Requirements for SuDS	Sustainable Drainage Systems (SuDS) are to become a planning requirement for major planning applications of 10 or more residential units or equivalent commercial development schemes with sustainable drainage. The LLFA is now a statutory planning consultee and it will be between the LPA and the LLFA to determine the acceptability of these proposed sustainable drainage schemes subject to exemptions and thresholds. Approval must be given before the developer can commence construction. Planning authorities should use planning conditions or obligations to make sure that arrangements are in place for ongoing maintenance of any SuDS over the lifetime of the development.	Implemented April 2015
Reservoirs	Designate high risk reservoirs, with preparation of a flood plan by the owner, including all relevant data.	
Latest changes to FWMA legislation[17]		

G.2.3 Water Framework Directive & Water Environment Regulations

The purpose of the Water Framework Directive (WFD), which was transposed into English Law by the Water Environment Regulations (2003), is to deliver improvements across Europe in the management of water quality and water resources through a series of plans called River Basin Management Plans (RBMP). The RBC area is covered by the North West River Basin Management Plan, managed by the EA and published in 2015. Water quality and flood risk can go hand in hand in that flood risk management activities can help to deliver habitat restoration techniques. The North West RBMP, 2015, includes such examples whereby land management techniques have been designed to reduce flood risk whilst also reducing sediment loss and improving water quality.

The EA is responsible for monitoring and reporting on the objectives of the Water Framework Directive (WFD) on behalf of Government. They work with Government, Ofwat, local government, non-governmental organisations (NGOs) and a wide range of other stakeholders including local businesses, water companies, industry and farmers to manage water[18].

The second management cycle of the WFD[19] has already begun and the second river basin management plans were completed in 2015, building upon the first set of RBMPs completed in 2009.

The main responsibility for RBC and LCC is to work with the EA to develop links between river basin management planning and the development of local authority plans, policies and assessments. In particular, the programme of actions (measures) within the RBMP highlights the need for:

- Water Cycle Studies to promote water efficiency in new development through regional strategies and local development frameworks,
- Surface Water Management Plan implementation,
- Considering the WFD objectives (achieving good status or potential as appropriate) in the spatial planning process, including LDDs and Sustainable Community Strategies, and
- Promoting the wide scale use of Sustainable Drainage Systems (SuDS) in new development.

G.3 Planning Policy

G.3.4 National Planning Policy Framework

The NPPF was published in March 2012, and is based on core principles of sustainability. It forms the national policy framework in England and is accompanied by a number of Planning Practice Guidance notes.

17 http://www.legislation.gov.uk/ukpga/2010/29

18 https://www.gov.uk/government/policies/improving-water-quality/supporting-pages/planning-for-better-water

19 http://ec.europa.eu/environment/water/water-framework/info/timetable_en.htm

The NPPF is the national planning policy framework for Local Planning Authorities to help them prepare Local Plans and take development management decisions. Section 10 Paragraph 100 of the NPPF states that Local Plans:

"...should be supported by a Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities and Internal Drainage Boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by applying the Sequential Test, if necessary applying the Exception Test, safeguarding land from development that is required for current and future flood management, using opportunities offered by new development to reduce the causes and impacts of flooding and where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long term, seeking opportunities to facilitate the relocation of development including housing to more sustainable locations".

The Sequential Test must be performed when considering the placement of future development and for planning application proposals. The Sequential Test is used to direct all new development (through the site allocation process) to locations at the lowest probability of flooding. It states that development should not be permitted or allocated if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.

The FRCC-PPG sits alongside the NPPF and sets out detailed guidance on how this policy should be implemented.

G.3.5 Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG)

On 6 March 2014 the Department for Communities and Local Government (DCLG) launched their planning practice guidance, including guidance for flood risk and coastal change, which replaces the previous Technical Guidance. This new guidance is available as a web-based resource[20], which is accessible to all and is regularly updated. Whilst the NPPF concentrates on high level national policy, the FRCC-PPG is more detailed. The practice guidance advises on how planning can take account of the risks associated with flooding and coastal change in plan making and the development management process. This is in respect of local plans, SFRAs, the sequential and exception tests, permitted development, site-specific flood risk, Neighbourhood Planning, Flood Resilience and Resistance and making development safe from flooding, and vulnerability.

G.3.6 Planning and Compulsory Purchase Act, 2004

The Planning and Compulsory Purchase Act (PCPA) sets out provisions in regards to regional functions, local development and development control whilst radically changing the raft of documents required for a Local Plan to be produced and adopted. Previous documents include regional planning guidance, county structure plans, district local plans, unitary development plans, and old-style 'structure' plans. These were replaced with Regional Spatial Strategies (RSS) and Local Development Frameworks contained within a series of Development Plan Documents (DPD).

G.3.7 Planning Act, 2008

This act predominantly applies to streamlining the approval of major national infrastructure development. However, this act also allowed for the streamlining of planning appeals for minor developments by allowing appeals to be heard and considered by a panel of local councillors rather than by a planning inspector. The Community Infrastructure Levy (CIL) was also formed from the Planning Act, 2008, whereby a local authority could place a levy on a new development to help finance local infrastructure projects designed to benefit the local area, such as a new school, health centre or park improvements.

G.3.8 Localism Act

The Localism Act was given Royal Assent in November 2011 with the purpose of shifting power from Central Government back to local councils, communities and individuals. The Government abolished Regional Spatial Strategies, providing the opportunity for councils to re-examine the local

20 http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

evidence base and establish their own local development requirements for employment, housing and other land uses through the plan making process.

Additionally, this act places a duty to cooperate on local authorities, including statutory bodies and other groups, in relation to the planning of sustainable development. This duty to cooperate requires local authorities to:

"...engage constructively, actively and on an ongoing basis in any process by means of which development plan documents are prepared so far as relating to a strategic matter." (Provision 110).

This act, together with the Neighbourhood Planning (General) Regulations 2012, also provides new rights to allow Parish or Town Councils to deliver additional development through neighbourhood planning (Neighbourhood Plans). This means local people can help decide where new homes and businesses should go and what they should look like. Local planning authorities will be required to provide technical advice and support as neighbourhoods draw up their proposals. Neighbourhood Plans have a number of conditions and requirements, set out in legislation and the NPPF and Planning Practice Guidance.

G.3.9 Local Plan

A Local Plan[21] is a statutory document prepared in consultation with the local community. It is designed to promote and deliver sustainable development. Local Plans have to set out a clear vision, be kept up to date and to set out a framework for future development of the local area, addressing needs and opportunities in relation to housing, the economy, community facilities and infrastructure as well as safeguarding the environment and adapting to climate change and securing good design.

Local plans set the context for guiding decisions and development proposals and along with the NPPF, set out a strategic framework for the long-term use of land and buildings, thus providing a framework for local decision making and the reconciliation of competing development and conservation interests. The aim of a Local Plan is to ensure that land use changes proceed coherently, efficiently, and with maximum community benefit. Local plans should indicate clearly how local residents, landowners, and other interested parties might be affected by land use change. They are subject to regular periods of intensive public consultation, public involvement, negotiation and approval.

The NPPF requires that the evidence base for the Local Plan must clearly set out what is intended over the lifetime of the plan, where and when this will occur and how it will be delivered. The NPPF states that local plans should be supported by a SFRA and should take account of advice provided by the EA and other flood risk management bodies. The SFRA should be used to ensure that when allocating land or determining planning applications, development is located in areas at lowest risk of flooding. Policies to manage, mitigate and design appropriately for flood risk should be written into the Local Plan, informed by both the SFRA and Sustainability Appraisal.

Core Strategy

The Council's Core Strategy Development Planning Document was adopted in November 2011 and was informed by the 2009 Level 1 SFRA. The new Local Plan will include a review of the policies set out in the adopted Core Strategy for which this updated Level 1 SFRA will help to inform, along with the more detailed Level 2 assessment. The updated Core Strategy will be used to determine all future planning applications once adopted.

Sustainability Appraisal

The Sustainability Appraisal (SA) is a key component of the Local Plan evidence base, ensuring that sustainability issues are addressed during the preparation of local plans. The SA is a technical document which has to meet the requirements of the Strategic Environmental Assessment Directive 2001/42/EC which assesses and reports on a plan's potential impact on the environment, economy, and society. The SA carries out an assessment of the draft policies at various stages throughout the preparation of the Local Plan, and does this by testing the potential impacts, and consideration of alternatives are tested against the plan's objectives and policies. This ensures that the potential impacts from the plan on the aim of achieving sustainable development are considered, in terms of the impacts, and that adequate mitigation and monitoring mechanisms are implemented.

21 Town and Country Planning, England. The Town and Country Planning (Local Planning) (England) Regulations 2012

The RBC Sustainability Appraisal was completed in November 2010, informed by the 2009 SFRA and accompanies the 2011 Core Strategy DPD. This Level 1 and Level 2 Hybrid SFRA update will help inform an updated version of the Sustainability Assessment to accompany the updated Core Strategy within the new Local Plan.

Rossendale Local Plan

RBC is in the early stages of producing a new Local Plan following formal abandonment of the Site Allocations and Development Management Plan (Local Plan Part 2) in February 2016 due to matters related to Full Objectively Assessed Housing Need (FOAHN).

The Council will ensure that the new Local Plan will focus on:

- How much land is required for growth and where;
- The infrastructure requirements to deliver this; and
- What to protect – the environmental capacity of Rossendale to accommodate growth in the most sustainable manner.

The new Local Plan will include a review of the policies set out in the adopted Core Strategy, identify sufficient land to meet development needs and draft development management policies to guide development. It provides an opportunity for a full reassessment of sites to reflect recent and emerging changes in policy and to provide an up-to-date assessment of need.

Local Plan policy, in relation to flood risk and water management, should focus on reducing flood risk, promoting water efficiency measures, and protecting and enhancing water quality through mechanisms entailing the following:

- All development must follow the sequential approach to determining the suitability of land for development, directing new development to areas at the lowest risk of flooding and where necessary apply the Exception Test, as outlined in national planning policy.
- Developers will be required to demonstrate, where necessary, through an appropriate Flood Risk Assessment (FRA) at the planning application stage, that development proposals will not increase flood risk on site or elsewhere, and where possible should seek to reduce the risk of flooding.
- New development will be required to include or contribute to flood mitigation, compensation and/or protection measures, and, where necessary, to manage flood risk associated with or caused by the development.
- Development proposals should comply with the Water Framework Directive by contributing to the North West River Basin Management Plan objectives, unless it can be demonstrated that this would not be technically feasible.
- The drainage of new development should be designed to reduce surface water runoff rates to include the implementation of suitable Sustainable Drainage Systems (SuDS) unless it can be demonstrated that it is not technically feasible.
- Proposals within areas of infrastructure capacity and/or water supply constraint should demonstrate that there is adequate wastewater infrastructure and water supply capacity to serve the development or that adequate provision can be made available.

The Local Plan should be the starting point when considering planning applications.

G.4 Flood Risk Management Policy

G.4.10 Flood Risk Management Plans

Flood risk management plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs with each FRMP covering a specific river basin district. FRMPs set out how risk management authorities, including the EA and LLFAs, will work with communities to manage flood risk over the period 2015 - 2021. Each EU member country must produce FRMPs as set out in the EU Floods Directive 2007.

The North West FRMP[22] is within the North West River Basin District which covers approximately 13,160 square kilometres from Cumbria in the north to Cheshire in the south with Lancashire

22 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507120/LIT_10208_NORTH_WEST_FRMP_SUMMARY_DOCUMENT.pdf

Merseyside and Greater Manchester in between. As explained previously, LCC was not required to produce a FRMP for its own area following the PFRA process whereby significant flood risk areas were not identified.

Developed by the EA, the River Irwell Catchment Flood Management Plan[23] (CFMP) covers the Rossendale District. The CFMP contains useful information about how the Irwell catchment works, previous flooding and the sensitivity of the river system to increased rainfall. The EA may draw on the evidence and previous proposals set out in the CFMP to help develop the FRMP.

G.4.11 National and Local Flood Risk Management Strategies

As presented in Figure G-3, the FWMA establishes how flood risk will be managed within the framework of National Strategies for England and Local Strategies for each LLFA area.

The National Strategy for England has been developed by the EA with the support and guidance of Defra. It sets out principles for how flood risk should be managed and provides strategic information about different types of flood risk and which organisations are responsible for their effective management. The Act requires risk management authorities (local authorities, internal drainage boards, sewerage companies and highways authorities) to work together and act consistently with the National Strategy in carrying out their flood and coastal erosion risk management functions effectively, efficiently and in collaboration with communities, business and infrastructure operators to deliver more effective flood risk management.

LLFAs have responsibility for developing a Local Flood Risk Management Strategy (LFRMS) for their area covering local sources of flooding (see Table G-3). The local strategy produced must be consistent with the National Strategy. The strategy should set out the framework for local flood risk management functions and activities and should raise awareness of local organisations with responsibilities for flood risk management in the area. The strategy should also facilitate partnership arrangements to ensure co-ordination between local organisations and an assessment of flood risk and plans and actions for managing risk, as set out under section 9 of the FWMA. LCC released a Consultation Draft LFRMS in October 2013.

Draft Lancashire and Blackpool Local Flood Risk Management Strategy

The Draft Lancashire and Blackpool LFRMS, 2013, covers the whole Rossendale authority area and is intended to show how both LLFAs will manage flood risk from local sources including ordinary watercourses, surface water and groundwater. The intention is to review the Strategy every six years. The Strategy states that the LLFAs will work with the LPAs within Lancashire to ensure that new development is safe from the effects of flooding and at the same time does not increase the risk of flooding.

The Strategy states a number of strategic flood risk management planning objectives to carry out across the county:

- Develop a flood incident reporting database (required under FWMA): Develop and maintain a GIS-based database of reported flood incidents where surface water, groundwater or Ordinary Watercourses may be involved, which can be linked to the asset register. The database must hold personal information in a secure way and arrangements for use and any sharing of the information must be clearly defined. Define arrangements for populating this database with information from all RMAs and from any flood investigations undertaken. Communicate with the public how data they report will be securely stored, used and the benefits to them of this process.
- Record drainage engineer experience: Record information on past flooding in map and/or written formats based on extensive experience of LLFA and district drainage engineers and other experts so this information is preserved.
- Maintain awareness of latest risk mapping tools: Maintain awareness of latest mapping available from the EA and actively participate in projects to improve this national mapping. Use best available mapping and knowledge of works undertaken to annually review prioritisation of flood risk areas.
- Create a Local Flood Risk Management Plan: Create Management Plan which states how local flood risk will be managed over the short medium and long term, and how schemes and studies will be prioritised across Lancashire.

23 https://www.gov.uk/government/publications/irwell-catchment-flood-management-plan

- Undertake a Pilot Ordinary Watercourse Study: Conduct an investigation into the level of flood risk from Ordinary Watercourses in a high risk area.
- Undertake detailed SWMPs: Commission Surface Water Management Plans or similar drainage studies in priority areas to improve local understanding and derive site-specific actions.
- Map zones of flood source interaction: Produce an updatable map, based on the latest flood mapping for the various sources, which can be used to highlight zones of likely interaction and focus for joint working.
- Share information about planned FRM works and schemes: Effective communication of flood risk management activities so that partners can identify opportunities for joint delivery and partnership working. For example, this could include stronger links with the EA to ensure mapping is consistent.
- Agree criteria for undertaking flood investigations: Set criteria for when, how and by whom Section 19 flood investigations will be undertaken. Agree this procedure with other RMAs, possibly through signed Memoranda of Understanding.

G.4.12 Surface Water Management Plans

In June 2007, widespread extreme flooding was experienced in the UK. The Government review of the 2007 flooding, chaired by Sir Michael Pitt recommended that…

"…Local Surface Water Management Plans (SWMPs) … coordinated by local authorities, should provide the basis for managing all local flood risk."

The Government's guidance document[24] 2011 for SWMPs defines a SWMP as:

- *A framework through which key local partners with responsibility for surface water and drainage in their area, work together to understand the causes of surface water flooding and agree the most cost-effective way of managing surface water flood risk.*
- *A tool to facilitate sustainable surface water management decisions that are evidence based, risk based, future proofed and inclusive of stakeholder views and preferences.*
- *A plan for the management of urban water quality through the removal of surface water from combined systems and the promotion of SuDS.*

As a demonstration of its commitment to SWMPs as a structured way forward in managing local flood risk, Defra announced an initiative to provide funding for the highest flood risk authorities to produce SWMPs.

G.4.13 Flood Risk Partnerships and Partnership Plans

RBC have been involved in the development of a number of partnerships designed to provide collaboration between public agencies, businesses and the community. Partnerships and plans that affect the borough, according to the PFRA, are listed in Table G-4.

Table G-4: Flood Risk Management Groups in Lancashire

Group	Members	Frequency of meeting
Strategic Flood Risk Management Group	**Lead Local Flood Authorities:** Lancashire County Council Blackpool Borough Council Blackburn with Darwen Borough Council Environment Agency United Utilities Single Representative for all 12 LCC Districts	Variable (minimum Quarterly)

24 Surface Water Management Plan Technical Guidance - https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance

Group	Members	Frequency of meeting
Lancashire Flood Risk Management Group	**Lead Local Flood Authorities:** Lancashire County Council Blackpool Borough Council Blackburn with Darwen Borough Council Environment Agency United Utilities Representatives from each of the 12 District Councils	Variable (minimum Quarterly)
Making Space for Water Group (Meet at District / Unitary Authority level)	**Lead Local Flood Authority & District Council representatives covering:** Land Drainage Highway Drainage Planning Authority Civil Contingencies Environment Agency United Utilities Canal & River Trust	Quarterly

G.4.14 Open Space Assessment

Open space, or Green Infrastructure, should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities and should be provided as an integral part of all new development, alongside other infrastructure such as utilities and transport networks.

Open space can provide many social, economic and environmental benefits close to where people live and work including:

- Places for outdoor relaxation and play;
- Space and habitat for wildlife with access to nature for people;
- Environmental education;
- Local food production - in allotments, gardens and through agriculture;
- Improved health and well-being – lowering stress levels and providing opportunities for exercise;
- Climate change adaptation - for example flood alleviation and cooling urban heat islands.

The NPPF explains that open space can perform many functions, including flood risk mitigation, and that Local Plans should account for increased flood risk, resulting from climate change, through the planning of Green Infrastructure (GI). GI can have an important role to play in reducing the likelihood of flooding by providing space for flood storage, reducing runoff and increasing infiltration, whilst also providing other benefits as stated above.

Alongside GI should be the implementation of Sustainable Drainage Systems (SuDS), specifically within potential development sites, where possible. The suitability of GI and SuDS can be informed by this SFRA through utilisation of open space for water in the areas of greatest flood risk.

The Town and Country Planning Association together with The Wildlife Trusts produced a guidance document for Green Infrastructure[25]. The guidance states that local plans should identify funding sources for GI and provision should be made for GI to be adequately funded as part of a development's core infrastructure. For new developments, GI assets can be secured from a landowner's 'land value uplift' and as part of development agreements. The LPA could include capital for the purchase, design, planning and maintenance of GI within its Community Infrastructure Levy (CIL) programme.

There should be an integrated approach to flood risk and open space throughout the borough which would be key in delivering sustainable development. Examples include:

- Restoration of the natural character of floodplains;
- Keeping and preserving of areas of existing natural floodplain;

25 Planning for a Healthy Environment - Good Practice Guidance for Green Infrastructure and Biodiversity, Published by the Town and Country Planning Association and The Wildlife Trusts, July 2012

- Introduction of new areas and enhancing existing areas of greenspace whilst incorporating sustainable drainage within new development;
- Reduction of downstream flood risk.

G.5 Roles and Responsibilities

The responsibilities for the Risk Management Authorities (RMA) under the Flood and Water Management Act and the Flood Risk Regulations are summarised below.

G.5.15 EA as a RMA

- Has a strategic overview role for all forms of flooding;
- Has the power to request information from any partner in connection with its risk management functions;
- Must exercise its flood or coastal erosion risk management functions in a manner consistent with the National Strategy and Local Strategies;
- Must be consulted on Local Strategies, if affected by the strategy, by the LLFA;
- Must help advise on sustainable development.

G.5.16 RBC LPA as a RMA

- Has a duty to act in a manner that is consistent with the National Strategy and have regard to Local Strategies;
- Must be consulted on Local Strategies, if affected by the strategy, by the LLFA;
- Has a duty to be subject to scrutiny from the LLFA;
- Has a duty to cooperate and share information with other RMAs.

G.5.17 LCC LLFA as a RMA

- Must develop, maintain, apply and monitor a strategy for local flood risk management. This must be consulted on with all RMAs, the public and all other partners with an interest in local flood risk, and must comply with the National Strategy;
- Is required to coordinate and share information on local flood risk management between relevant authorities and partners;
- Is empowered to request information from others when it is needed in relation to its flood risk management functions;
- Must investigate flooding incidents in its area where it considers it necessary or appropriate;
- Has a duty to establish and maintain a record of structures within its area that have a significant impact on local flood risk;
- Is empowered to designate structures and features that affect flooding;
- Has powers to undertake works to manage flood risk from surface runoff, groundwater and ordinary watercourses;
- Must exercise its flood and coastal erosion risk management functions in a manner consistent with the National Strategy and the Local Strategy;
- Is permitted to agree the transfer of responsibilities for risk management functions (except the production of a Local Strategy) to other RMAs;
- Must aim to contribute to sustainable development;
- Should consider flooding issues that require collaboration with neighbouring LLFAs and other RMAs.

G.5.18 UU as a RMA

- Has a duty to act in a manner that is consistent with the National Strategy and have regard to Local Strategies;
- Must be consulted on Local Strategies, if affected by the strategy, by the LLFA;
- Has a duty to be subject to scrutiny from the LLFA;
- Has a duty to cooperate and share information with other RMAs;

- Is responsible for managing the risks of flooding from water and foul or combined sewer systems providing drainage from buildings and yards.

G.5.19 Highways (LCC) as a RMA

- Has a duty to act consistently with the National Strategy and Local Strategies;
- Has responsibility for ensuring effective drainage of local roads in so far as ensuring drains and gullies are maintained;
- Must be consulted on Local Strategies, if affected by the Strategy, by the LLFA;
- Has a duty to be subject to scrutiny from the LLFA.

G.5.20 The Local Community

The local community:

- Must be consulted on Local Strategies by the LLFA;
- Has a key role in ensuring local strategies are capable of being successfully delivered within the community. They should actively participate in this process and be engaged by the LLFA.

G.5.21 Riparian Owners

A riparian owner is someone who owns land or property alongside a river or other watercourses including a culvert. A watercourse is any natural or artificial channel through which water flows, such as a river including where rivers flow through a culvert, brook, beck, or mill stream.

Riparian owners have statutory responsibilities, including:

- Maintaining river beds and banks;
- Allowing the flow of water to pass without obstruction;
- Controlling invasive alien species

Further guidance for riverside property owners can be found in the EA's helpful booklet 'Living on the Edge'[26], which is continually updated.

G.5.22 Developers

- Have a vital role in ensuring effective local flood risk management by avoiding development in areas at risk of flooding. Local Strategies should form a key element of local planning guidance.

26 https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

H Emergency Planning

The provisions for emergency planning for local authorities as Category 1 responders are set out by the Civil Contingencies Act, 2004 and the National Flood Emergency Framework for England, December 2014[27]. This framework is a resource for all involved in emergency planning and response to flooding from the sea, rivers, surface water, groundwater and reservoirs. The Framework sets out the government's strategic approach to:

- Ensuring all delivery bodies understand their respective roles and responsibilities when planning for and responding to flood related emergencies
- Give all players in an emergency flooding situation a common point of reference which includes key information, guidance and key policies
- Establish clear thresholds for emergency response arrangements
- Place proper emphasis on the multi-agency approach to managing flooding events
- Provide clarity on the means of improving resilience and minimising the impact of flooding events
- Provide a basis for individual responders to develop and review their own plans and
- Being a long-term asset that will provide the basis for continuous improvement in flood emergency management

Along with the EA flood warning systems, there are a range of flood plans at a sub-regional and local level, outlining the major risk of flooding and the strategic and tactical response framework for key responders.

This SFRA contains useful data to allow emergency planning processes to be tailored to the needs of the area and be specific to the flood risks faced. The SFRA Maps in Appendix A and accompanying GIS layers provided should be made available for consultation by emergency planners during an event and throughout the planning process.

H.1 Civil Contingencies Act

Under the Civil Contingencies Act (CCA, 2004)[28], RBC is classified as a Category 1 responder and has duties to assess the risk of emergencies occurring, and uses this to inform contingency planning; to put in place emergency plans; to put in place business continuity management arrangements; to put in place arrangements to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency; to share information with other local responders to enhance coordination; to cooperate with other local responders to enhance coordination and efficiency and provide advice and assistance to businesses and voluntary organisations about business continuity management.

During an emergency such as a flood event, the local authority must also co-operate with other Category 1 responders (such as the emergency services and the EA) to provide the core response.

H.2 Lancashire Resilience Forum

RBC is a partner of the Lancashire Resilience Forum (LRF)[29]. The LRF allows responders access to a forum to consult, collaborate and disclose information with each other to facilitate planning and response to emergencies, and produce the Community Risk Register. The LRF is chaired by the Assistant Chief Constable of Lancashire Constabulary. The LRF meets twice a year and senior representatives of all Category 1 and Category 2 Responders are invited to attend. The main work of the LRF is carried out by various thematic sub-groups, who report to the LRF General Purposes Group.

The role of the LRF is to ensure an appropriate level of preparedness to enable an effective multi-agency response to emergency incidents that may have a significant impact on the communities of Lancashire Borough Council. The LRF Category 1 responders[30] consist of representatives from the

27 https://www.gov.uk/government/publications/the-national-flood-emergency-framework-for-england

28 https://www.gov.uk/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others#the-civil-contingencies-act

29 http://www.lancsresilience.org.uk/

30 http://www.lancsresilience.org.uk/Pages/LRF/Membership.html

Emergency Services, all 14 of Lancashire's local authorities, the EA, NHS Trusts, the Health Protection Agency, the Maritime and Coastguard Agency, etc.

The LRF provides advice on how to prepare for a flood, what to do during a flood and what to do after a flood:

http://www.lancsresilience.org.uk/Pages/Advice/Flooding.html

Lancashire Community Risk Register

As a strategic decision-making organisation, the LRF prepared a Community Risk Register (CRR)[31], last updated in December 2013, which considers the likelihood and consequences of the most significant risks and hazards the area faces, including fluvial and urban flooding. This SFRA can help to inform this.

The CRR has been produced on behalf of all Category 1 Responders in Lancashire who are members of the Lancashire Resilience Forum by the Risk Assessment Working Group. It is based on the profile of Lancashire detailed in "The Context"[32] document following the process outlined in Emergency Preparedness.

The CRR is considered as the first step in the emergency planning process and is designed to reassure the local community that measures and plans are in place to respond to the potential hazards listed within the CRR.

Multi Agency Flood Plan

Local Resilience Forums are required to have generic multi-agency and site-specific plans in place to respond to all emergencies including the development of a specific flood plan due to the complex and diverse nature of flooding and the consequences that arise. Developing a Multi-Agency Flood Plan (MAFP) allows all responders to collaborate on an agreed coordinated response to a severe flood incident. The Detailed Guidance on Developing a Multi-Agency Flood Plan[33] (June 2011) document, written by Defra, provides guidance for Local Resilience Forums on how to develop a MAFP.

The Lancashire MAFP[34], last updated June 2011, has been developed by the LRF and the Flooding and Severe Weather Sub Group. It details information regarding triggers for the activation of the plan and the notification arrangements that are in place, along with the multi-agency roles and responsibilities in response to flooding in Lancashire.

LRF Generic Reservoir Plan[35]

A similar multi-agency plan has been prepared for dealing with flooding incidents arising from large raised reservoirs that can hold at least 25,000 cubic metres of water above natural ground.

H.3 Local Flood Plans

This SFRA provides a number of flood risk data sources that should be used when producing or updating flood plans. RBC will be unable to write specific flood plans for new developments at flood risk. Developers should write their own. Guidance can be found on the EA web site[36]. Generally, owners with individual properties at risk should write their own individual flood plans, however larger developments or regeneration areas, such as retail parks, hotels and leisure complexes, should consider writing one collective plan for the assets within an area.

This SFRA can help to:

- Update these flood plans if appropriate;
- Inform emergency planners in understanding the possibility, likelihood and spatial distribution of all sources of flooding (emergency planners may however have access to more detailed information, such as for Reservoir Inundation Maps, which have not been made available for this SFRA);

31 http://www.lancsresilience.org.uk/Pages/General/RiskRegister.html
32 http://www.lancsresilience.org.uk/Documents/RiskRegister/Context.pdf
33 Detailed Guidance on Developing a Multi-Agency Flood Plan, June 2011, Defra
34 http://www.lancsresilience.org.uk/Documents/Plans/MAFP1.pdf
35 http://www.lancsresilience.org.uk/Pages/Plans/Plans.html
36 https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan

- Identify safe evacuation routes and access routes for emergency services;
- Identify key strategic locations to be protected in flooding emergencies, and the locations of refuge areas which are capable of remaining operational during flood events;
- Provide information on risks in relation to key infrastructure, and any risk management activities, plans or business continuity arrangements;
- Raise awareness and engage local communities;
- Support emergency responders in planning for and delivering a proportionate, scalable and flexible response to the level of risk;
- Provide flood risk evidence for further studies.

H.4 Flood Warning and Evacuation Plans

Developments that include areas that are designed to flood (e.g. ground floor car parking and amenity areas) or have a residual risk associated with them, will need to provide appropriate flood warning and instructions so users and residents are safe in a flood. This will include both physical warning signs and written flood warning and evacuation plans. Those using the new development should be made aware of any evacuation plans.

Whilst there is no statutory requirement on the EA or the emergency services to approve evacuation plans, RBC is accountable under its Civil Contingencies duties, via planning condition or agreement, to ensure that plans are suitable. This should be done in consultation with Development Management Officers. Given the cross cutting nature of flooding, it is recommended that further discussions are held internally to RBC between emergency planners and policy planners / development management officers, the LLFA, drainage engineers and also to external stakeholders such as the emergency services, the EA and UU.

It may be useful for both the LLFA and spatial planners to consider whether, as a condition of planning approval, flood evacuation plans should be provided by the developer which aim to safely evacuate people out of flood risk areas, using as few emergency service resources as possible. The application of such a condition is likely to require policy support in the Local Plan, and discussions within the Lancashire Resilience Forum are essential to establish the feasibility / effectiveness of such an approach, prior to it being progressed. It may also be useful to consider how key parts of agreed flood evacuation plans could be incorporated within local development documents, including in terms of protecting evacuation routes and assembly areas from inappropriate development.

Once the development goes ahead, it will be the requirement of the plan owner (developer) to make sure the plan is put in place, and to liaise with RBC regarding maintenance and updating of the plan.

What should the Plan Include?

Flood warning and evacuation plans should include the information stated in Table H-5. Advice and guidance on plans is accessible from the EA website and there are templates available for businesses and local communities

Table H-5: Flood warning and evacuation plans

Consideration	Purpose
Availability of existing flood warning system	The EA offers a flood warning service that currently covers designated Flood Warning Areas in England and Wales. In these areas they are able to provide a full Flood Warning Service.
Rate of onset of flooding	The rate of onset is how quickly the water arrives and the speed at which it rises which, in turn, will govern the opportunity for people to effectively prepare for and respond to a flood. This is an important factor within Emergency Planning in assessing the response time available to the emergency services.
How flood warning is given and occupants awareness of the likely frequency and duration of flood events	Everyone eligible to receive flood warnings should be signed up to the EA flood warning service. Where applicable, the display of flood warning signs should be considered. In particular sites that will be visited by members of the public on a daily basis; sports complexes, car parks, retail stores. It is envisaged that the responsibility should fall upon the developers and should be a condition of the planning permission. Information should be

Consideration	Purpose
	provided to new occupants of houses concerning the level of risk and subsequent procedures if a flood occurs.
The availability of staff / occupants / users to respond to a flood warning and the time taken to respond to a flood warning	The plan should identify roles and responsibilities of all responders. The use of community flood wardens should also be considered.
Designing and locating safe access routes, preparing evacuation routes and the identification of safe locations for evacuees	Dry routes will be critical for people to evacuate as well as emergency services entering the site. The extent, depth and flood hazard rating should be considered when identifying these routes.
Vulnerability of occupants	Vulnerability classifications associated with development as outlined in the FRCC-PPG. This is closely linked to its occupiers.
How easily damaged items will be relocated and the expected time taken to re-establish normal use following an event	The impact of flooding can be long lasting well after the event has taken place affecting both the property which has been flooded and the lives that have been disrupted. The resilience of the community to get back to normal will be important including time taken to repair / replace damages.

H.5 Flood Awareness

Emergency planners may also use the outputs from this SFRA to raise awareness within local communities. This should include raising awareness of flood risks, roles and responsibilities and measures that people can take to make their homes more resilient to flooding from all sources whilst also encouraging all those at fluvial flood risk to sign up to the EA's Floodline Warnings Direct service. It is also recommended that Category 1 responders are provided with appropriate flood response training to help prepare them for the possibility of a major flood with an increased number of people living within flood risk areas, to ensure that adequate pre-planning, response and recovery arrangements are in place.

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Isle of Man
Limerick
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Newport
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Skipton
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