High Peak Borough Council Level 1 Strategic Flood Risk Assessment

Final Report

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Prepared for:
High Peak Borough Council

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Contract

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This report describes work commissioned by High Peak Borough Council, by an instruction dated 18 May 2023. The Client's representative for the contract was Ruth Wooddisse of High Peak Borough Council. Rebecca Lee, Dylan Nattrass, and Helen Dawson of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
AStGWF	Areas Susceptible to Groundwater Flooding
CC	Climate Change
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
DCC	Derbyshire County Council
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
FAA	Flood Alert Area
FCERM	Flood and Coastal Erosion Risk Management
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FWA	Flood Warning Area
FWMA	Flood and Water Management Act
FWS	Flood Warning System
GSPZ	Groundwater Source Protection Zone
HPBC	High Peak Borough Council
IDB	Internal Drainage Board
JBA	Jeremy Benn Associates
LFRMS	Local Flood Risk Management Strategy
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LPU	Local Plan Update
mAOD	metres Above Ordnance Datum
NFM	Natural Flood Management
NPPF	National Planning Policy Framework
NRD	National Receptor Database
NVZs	Nitrate Vulnerable Zones

PFRA	Preliminary Flood Risk Assessment
PPG	Planning Practice Guidance
RBD	River Basin District
RBMP	River Basin Management Plan
RMAs	Risk Management Authorities
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment
SoP	Standard of Protection
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
WFD	Water Framework Directive

Definitions

1D model: one-dimensional hydraulic model

2D model: two-dimensional hydraulic model

Annual Exceedance Probability: the probability (expressed as a percentage) of a flood event occurring in any given year.

Brownfield: previously developed parcel of land

Catchment Flood Management Plan: a high-level planning strategy through which the EA works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.

Climate Change: long term variations in global temperature and weather patterns caused by natural and human actions.

Cumecs: the cumec is a measure of flow rate. One cumec is shorthand for cubic metre per second (m^3/s).

Design flood: This is a flood event of a given annual flood probability, which is generally taken as: fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), or surface water flooding likely to occur with a 1% annual probability (a 1 in 100 change each year), plus an appropriate allowance for climate change, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Exception test: Set out in the NPPF, the exception test is a method used to demonstrate that flood risk to people and property will be managed appropriately, where alternative sites at a lower flood risk are not available. The exception test is applied following the sequential test.

Flood defence: Infrastructure used to protect an area against floods such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).

Flood Map for Planning: The EA Flood Map for Planning (Rivers and Sea) is an online mapping portal which shows the Flood Zones in England. The Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences and do not account for the possible impacts of climate change.

Flood Risk Area: An area determined as having a significant risk of flooding in accordance with guidance published by Defra and WAG (Welsh Assembly Government).

Flood Risk Assessment: a site-specific assessment of all forms of flood risk to the site and the impact of development of the site to flood risk in the area.

Flood Risk Regulations: Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.

Flood and Water Management Act: Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.

Fluvial Flooding: Flooding resulting from water levels exceeding the bank level of a river (main river or ordinary watercourse).

Green Infrastructure: a network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity (NPPF, December 2023).

Greenfield: undeveloped parcel of land

Indicative Flood Risk Area: nationally identified flood risk areas based on the definition of 'significant' flood risk described by Defra and WAG.

Lead Local Flood Authority: the unitary authority for the area or if there is no unitary authority, the county council for the area.

Main river: a watercourse shown as such on the statutory main river map held by the Environment Agency. They are usually the larger rivers and streams. The Environment Agency has permissive powers (not duties) to carry out maintenance and improvement works on main rivers).

Major development: defined in the National Planning Policy Framework (NPPF) as a housing development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more, or as a non-residential development with additional floorspace of 1,000m² or more, or a site of 1 hectare or more, or as otherwise provide in the Town and Country Planning (Development Management Procedure) (England) Order 2015 available here.

Ordinary watercourse: any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows but which does not form part of a main river. The local authority or internal drainage board has permissive powers (not duties) on ordinary watercourses.

Pitt Review: Comprehensive independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.

Pluvial flooding: see surface water flooding.

Resilience measures: Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.

Resistance measures: Measures designed to keep flood water out of properties and businesses; could include flood guards for example.

Return period: Is an estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.

Riparian owner: A riparian landowner, in a water context, owns land or property, next to a river, stream or ditch.

Risk Management Authority: the Environment Agency; a lead local flood authority; a district council in an area where there is no unitary authority; an internal drainage board; a water company and a highway authority.

Risk: In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

Sequential test: Set out in the NPPF, the sequential test is a method used to steer new development to areas with the lowest probability of flooding. The sequential test is a risk-based approach, taking into account all sources of flood risk and climate change.

Sewer flooding: Flooding caused by a blockage or overflowing in a sewer or urban drainage system.

Stakeholder: A person or organisation affected by the problem or solution or interested in the problem or solution. They can be individuals or organisations, includes the public and communities.

Standard of Protection: Defences are provided to reduce the risk of flooding from a river and within the flood and defence field standards are usually described in terms of a flood event return period. For example, a flood embankment could be described as providing a 1% AEP (1 in 100 year) standard of protection.

Surface water flooding: Flooding as a result of surface water runoff as a result of high intensity rainfall when water is ponding or flowing over the ground surface before it enters the underground drainage network or watercourse or cannot enter it because the network is full to capacity.

Surface Water Management Plan: The SWMP plan should outline the preferred surface water management strategy and identify the actions, timescales and responsibilities of each partner. It is the principal output from the SWMP study. There are three key partners who must be involved and engaged in the SWMP study process: the Local Authority, the Environment Agency and the relevant Water and Sewerage Companies.

Sustainable Drainage Systems: SuDS are methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques, such as grates, gullies and channels.

Water Framework Directive: Under the WFD, all waterbodies have a target to achieve Good Ecological Status (GES) or Good Ecological Potential (GEP) by a set deadline. River Basin Management Plans (RBMPs) set out the ecological objectives for each water body and give deadlines by when objectives need to be met.

Windfall site: a site which becomes available for development unexpectedly and therefore not included as allocated land in a planning authority's local plan.

Executive Summary

This report provides a comprehensive and robust evidence base on flood risk issues to support the review and update of High Peak Borough Council's (HPBC) planning policies. The review process is known as the Local Plan Update (LPU). High Peak Borough is located in Derbyshire, England, immediately south-east of Manchester. It is largely rural, the main urban areas are the towns of Buxton, Glossop, Chapel-en-Frith, New Mills, and Whaley Bridge. In addition, the Peak District National Park covers two-thirds of High Peak Borough and takes the role of Local Planning Authority (LPA) within this area. The study area for this SFRA covers the entirety of High Peak Borough, including the Peak District National Park.

This report uses the best available information, including input from key stakeholders. The SFRA applies the latest national planning policy and guidance, including the National Planning Policy Framework (NPPF), which was revised in July 2021 and further updated in December 2023, the Planning Practice Guidance (PPG), which was updated in February 2024, and the updates to the Environment Agency (EA) climate change guidance in July 2021 and May 2022.

Introduction

To support the review and update of the Local Plan for HPBC, the key objectives of the assessment are:

- To collate and analyse the latest available information and data for current and future (i.e., climate change) flood risk from all sources, and how these may be mitigated for development.
- To inform decisions in the emerging LPU, including the selection of development sites and planning policies.
- To provide evidence to support the application of the sequential test for the allocation of new development sites, to support HPBC in the preparation of the LPU.
- To provide a comprehensive set of maps presenting flood risk from all sources that can be used as evidence base for use in the update to the Local Plan.
- To provide advice for applicants carrying out site-specific Flood Risk Assessments (FRAs) and outline specific measures or objectives that are required to manage flood risk.
- To provide the basis for applying the sequential test on planning applications, including by identifying sources of flooding other than those in 'Flood Zones', and those at risk of flooding in the future.

Summary of flood risk in High Peak Borough

- **Fluvial:** The primary fluvial flood risk in the Borough is along Glossop Brook, the River Sett, River Goyt, River Etherow, River Wye**,** and Black Brook. These potential sources of fluvial flooding are located to west and south of the Borough.

Modelled fluvial flood extents highlight flood risk from these watercourses in Glossop, Buxton, Chapel-en-le-Frith, Whaley Bridge and New Mills.

- **Surface Water:** The Risk of Flooding from Surface Water map shows a number of prominent overland flow routes that largely follow the topography of the watercourses. There are some areas where there are additional flow paths and areas of ponding, for example where water is impounded at road or rail embankments and in low-lying areas. While the Borough is largely rural, there are also considerable flow routes following the roads through the main urban areas of Glossop, Buxton, and Chapel-en-Frith, alongside isolated areas of ponding, which may affect many properties across these settlements.
- **Climate Change:** Areas at risk of flooding today are likely to become at increased risk in the future and the frequency of flooding will also increase in such areas, due to climate change. Flood extents will increase; in some locations, this may be minimal, but flood depth, velocity and hazard may have more of an impact due to climate change. It is recommended that HPBC work with other Risk Management Authorities (RMAs) to review the long-term sustainability of existing and new development when developing climate change plans and strategies for High Peak Borough.
- **Sewer:** United Utilities and Severn Trent Water provide water services and sewerage services across the Borough, with United Utilities serving the north and west and Severn Trent Water serving the south and east. Both United Utilities and Severn Trent Water have provided details of historic sewer flooding across the Borough.
- **Groundwater:** The Areas Susceptible to Groundwater Flooding map shows that in general, areas with greater than 50% susceptibility to groundwater flooding are limited, although do occur around flow routes such as the River Noe, River Goyt**,** and Black Brook**.** The JBA Groundwater Emergence Map emulates this, with similar flow routes experiencing emergence levels within 0.5m of the surface, with the addition of Glossop Brook. Furthermore, the data shows groundwater emergence levels within 0.5m of the surface in the south of the Borough near Buxton and Chapel-en-Frith, particularly around Dove Holes Quarry.
- **Canals:** Peak Forest Canal runs through the west of the Borough, through the urban centres of Buxworth, Hockerley, Furness Vale, New Mills. The canal has the potential to interact with other watercourses such as the River Goyt and become flow paths during flood events or in a breach scenario.
- **Reservoirs:** There is a potential risk of flooding from reservoirs both within High Peak Borough and those outside. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is relatively low. However, there is a residual risk of a reservoir breach, and this risk should be considered in any site-specific Flood Risk Assessments (FRA) where relevant.

Flood Defences

The EA Asset Information Management System (AIMS**)** dataset provides information on flood defence assets across the Borough. The main defence type across the study area is 'Natural High Ground', located along the main watercourses of the River Goyt, Glossop Brook, Black Brook, River Sett, River Etherow and River Wye. Engineered defences in the Borough include embankments, walls and engineered high ground lining parts of Black Brook, Glossop Brook, River Goyt, River Sett and River Etherow.

Development and flood risk

The sequential and exception test procedures for both Local Plans and FRAs have been documented, along with guidance for planners and developers. Links have been provided for relevant guidance documents and policies published by other Flood RMAs such as the Lead Local Flood Authority (LLFA) and the Environment Agency (EA).

The risk of flooding should be reviewed as early as possible in the development process to ensure that opportunities are taken to reduce the risk of flooding on and off the site. Where necessary, development and redevelopment within High Peak Borough will require an FRA appropriate to the scale of the development and to the scope as agreed with the LLFA and/or EA. FRAs should consider flood risk from all sources including residual risk, along with promotion of Sustainable Drainage Systems (SuDS) to create a conceptual drainage strategy and safe access/egress at the development in the event of a flood. Latest climate change guidance (last updated in May 2022) should also be taken into account, for the lifetime of developments. Planners and developers must check that modelling in line with the most up to date EA climate change guidance has been run.

How to use this report

Planners

The SFRA provides recommendations regarding all sources of flood risk in High Peak Borough, which can be used to inform policy on flood risk within the emerging LPU. This includes how the cumulative impact of development should be considered.

It provides the latest flood risk data and guidance to inform the sequential test and provides guidance on how to apply the exception test. The Council can use this information to apply the sequential test to strategic allocations and identify where the exception test will also be needed.

The SFRA provides guidance for developers, which can be used by development management staff to establish when an FRA is required and to assess whether site-specific FRAs meet the required quality standard.

Developers

For sites that are not strategic allocations, developers will need to use this SFRA to help apply the sequential test. For both strategic allocations and windfall sites, developers will need to apply the exception test in the following cases:

- Highly vulnerable development in Flood Zone 2
- Essential infrastructure in Flood Zone 3a or 3b
- More vulnerable development in Flood Zone 3a
- Proposed development in locations affected by surface water flood risk

A site-specific FRA should be used to inform the exception test at the planning application stage.

This SFRA is a strategic assessment and does not replace the need for site-specific FRAs where a development is either within Flood Zones 2 or 3 or greater than a hectare in Flood Zone 1**,** is less than a hectare and located in an area affected by sources of flooding other than rivers and the sea, or is in an area within Flood Zone 1 which has critical drainage problems as notified by the EA. In addition, a sustainable surface water drainage strategy will be needed for development requiring an FRA, or in any case for major category development**,** to satisfy Derbyshire County Council (DCC), the LLFA. Further assessments may also be required at this stage to manage the risk from sewer flooding to a site, and developers should contact United Utilities or Severn Trent Water for further advice.

Developers can use the information in this SFRA, alongside site-specific research to help scope out what additional work will be needed in a detailed FRA. To do this, they should refer to Section 4, Appendix A (Interactive Mapping Portal available on HPBC website), and Appendix B (Data sources used in the SFRA). At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of the watercourses to verify flood extent (including latest climate change allowances, last updated in May 2022), inform master-planning and demonstrate, if required, that the exception test is satisfied. As part of the EA's updated guidance on climate change, which must be considered for all new developments and planning applications, developers will need to undertake a detailed assessment of the impact of climate change on flood risk to the site as part of the planning application process when preparing FRAs. Additionally, at planning application stage, flood risk from other sources should be assessed if identified at the development site.

Developers need to check that new development does not increase surface water runoff from a site or contribute to cumulative effects at sensitive locations, see Section 7 and Appendix F: Cumulative Impact Assessment (CIA). Section 9 provides information on the surface water drainage requirements of the LLFA. SuDS should be considered at the earliest stages that a site is developed which will help to minimise costs and overcome any site-specific constraints.

Site-specific FRAs will need to identify how flood risk will be mitigated so development is safe from flooding for its lifetime and does not have an adverse effect on third parties or other areas. The FRA will also need to consider emergency arrangements, including how there will be safe access and egress from the site.

Any developments located within an area protected by flood defences and where the Standard of Protection (SoP) is not of the required standard (either now or in the future)

should be identified and the use of developer contributions considered to fund improvements to the defences.

Neighbourhood Plans

Neighbourhood planning groups can use the information in this SFRA to assess the risk of flooding to sites within their community, using Section 4, the sources of flooding in High Peak Borough and the flood mapping on the HPBC Interactive Mapping Portal. The SFRA will also be helpful for developing community level flood risk policies in high flood risk areas. Similarly, all known available recorded historical flood events for High Peak Borough are listed in Section 4.1. This can be used to supplement local knowledge regarding areas worst hit by flooding. Ongoing and proposed flood alleviation schemes planned by HPBC are outlined in Section 6 and Section 8.3 discusses mitigations, resistance and resilience measures which can be applied to alleviate flood risk to an area.

Mapping

Mapping for this SFRA is available on the High Peak Borough Council's Interactive Mapping Portal available here. This mapping highlights on a strategic scale flood risk from fluvial, surface water and reservoirs sources, and where groundwater emergence may occur; as well as where the effects of climate change are most likely. The maps are useful to provide a community level view of flood risk but may not identify if an individual property is at risk of flooding or depict small scale changes in flood risk. The latest information and data available at the time of writing will be included in the mapping. Local knowledge of flood mechanisms will need to be included to complement this mapping. The mapping data should always be supplemented by direct consultation with the relevant wastewater company to ascertain if there is any site-specific risk from a public sewer. This is because sewer flood risk information is not publicly available and would need to be considered on a site-specific basis.

Cumulative Impact Assessment (CIA)

Under the NPPF, strategic policies and their supporting SFRAs, are required to ‘consider cumulative impacts in, or affecting, local areas susceptible to flooding’ (Paragraph 166). A Cumulative Impact Assessment (CIA) has identified which catchments in High Peak Borough are more sensitive to the cumulative impact of development and where more stringent policy regarding flood risk is recommended. Any development in these areas should seek to contribute to work that reduces wider flood risk in those catchments.

1 Introduction

1.1 Purpose of the Strategic Flood Risk Assessment

“Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the EA and other relevant flood RMAs, such as lead local flood authorities and internal drainage boards.”.
(NPPF, Paragraph 166).

In May 2023, High Peak Borough Council (HPBC) commissioned an updated Level 1 SFRA to reflect the latest legislation and guidance, to inform the new local plan (2021-2041). This study provides a comprehensive and robust evidence base to support the local plan. This SFRA replaces the previous Level 1 report (2008).

This 2024 SFRA will be used to inform decisions on the location of future development and the preparation of land use planning policies for the long-term management of flood risk, reflecting the implications of the August 2022 changes to the PPG.

As the data available for SFRAs and the relevant legislation is continually changing, an SFRA should be a live document and updated to reflect changes where applicable and practicable. Under any changes in guidance or legislation, the implications on the SFRA should be considered and a review undertaken where this is deemed reasonably necessary.

1.2 Local Plan

HPBC are working to update the Local Plan for High Peak, which will replace the current Local Plan (2016) covering the period from 2011 to 2031. The review process is known as the Local Plan Update (LPU). The LPU will guide where and how growth will take place in the Borough in the years up to 2041.This covers the area of High Peak which is outside the Peak District National Park.

For the area of High Peak which is inside the Peak District National Park, the Peak District National Park Authority is the local planning authority, and is currently working towards an updated local plan covering the period 2024 - 2040.

1.3 Levels of SFRA

The PPG identifies the following two levels of SFRA:

- A Level 1 assessment is required where flooding is not a major issue in relation to potential site allocations and where development pressures are low. The assessment should be of sufficient detail to enable application of the sequential test.

- A Level 2 assessment is required where land outside Flood Zones 2 and 3 cannot appropriately accommodate all necessary development, creating the need to apply the NPPF's exception test. In these circumstances the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of other sources of flooding.

This is a Level 1 SFRA assessment. If all the development proposed is not located outside areas of Flood Risk, a Level 2 assessment may be required to inform the exception test. The PPG can be accessed on the Government's website here.

1.4 SFRA Outputs

This SFRA aims to provide the following outputs:

- Identification of existing national and local policy and technical updates.
- Identification of any strategic flooding issues or cumulative effects which may have cross boundary implications.
- Appraisal of all potential sources of flooding, including main river, ordinary watercourse, surface water, sewers, groundwater, and reservoirs.
- Review of historic flooding incidents.
- Reporting on the SoP provided by existing flood risk management infrastructure.
- Mapping showing distribution of flood risk across all Flood Zones from all sources of flooding including climate change allowances.
- Assessment of the potential increase in flood risk due to climate change to identify areas at risk of flooding in the future.
- FRA guidance for developers.
- Identification of the requirements for developers to consider emergency planning arrangements.
- Assessment of strategic surface water management issues, how these can be addressed through development management policies and the application of SuDS.
- Recommendations of the criteria that should be used to assess future development proposals and the development of a sequential test and sequential approach to flood risk.
- Assessment of strategic flood risk solutions that can be implemented to reduce risks.

1.5 SFRA Study Area

HPBC is a local authority in the north-west of Derbyshire, England, immediately south-east of Manchester. The study area for this SFRA covers the entirety of High Peak Borough, including the Peak District National Park.

High Peak Borough is largely rural, the main urban areas are the towns of Buxton, Glossop, Chapel-en-Frith, New Mills and Whaley Bridge.

High Peak Borough is bounded by nine other authorities:

- Kirklees District
- Barnsley District
- Sheffield District
- Derbyshire Dales District
- Staffordshire Moorlands District
- Cheshire East
- Stockport District
- Tameside District
- Oldham District

The Peak District National Park covers two-thirds of High Peak Borough, extending across the boundaries between High Peak Borough and the authorities to the north, east, south and southwest of the Borough, which includes Oldham District, Kirklees District, Barnsley District, Sheffield District, Staffordshire Moorlands District and a large part of the boundaries with Derbyshire Dales District and with Cheshire East. Within the Peak District National Park, the Peak District National Park Authority are the Local Planning Authority (LPA).

An overview of the study area showing the neighbouring authorities and extent of the Peak District National Park is shown in Figure 1-1. The water service providers are United Utilities in the north and west of the Borough and Severn Trent Water covering most of the central, east and south of the Borough, shown in Figure 1-2. United Utilities and Severn Trent Water are also the sewerage providers across the Borough.

The main watercourses which run through High Peak Borough are the River Etherow, River Sett, River Goyt, River Wye, Glossop Brook, Black Brook, Otter Brook, and Hurst Brook. Glossop Brook flows from east to west in the north of the Borough to Glossop before it's confluence with the River Etherow which flows from north to south down the western boundary of the Borough. The River Goyt flows from the south to the north in the west of the Borough, through Whaley Bridge and then is joined by its tributary, Black Brook, before flowing through New Mills. These watercourses are shown in Figure 1-3.

1.6 Consultation

SFRAs should be prepared in consultation with other Risk Management Authorities (RMAs). In addition to HPBC Council, the following parties have been consulted during the preparation of this version of the SFRA either through data requests or draft report reviews:

- Derbyshire County Council (DCC) LLFA
- Environment Agency (EA)
- Staffordshire Moorlands District Council (as part of the High Peak Borough and Staffordshire Moorlands Strategic Alliance)
- United Utilities
- Severn Trent Water
- Peak District National Park
- Canal and River Trust

- Neighbouring authorities bordering the area of High Peak outside of the Peak District National Park:
  - Derbyshire Dales District Council
  - Cheshire East Council
  - Stockport Borough Council
  - Tameside Borough Council

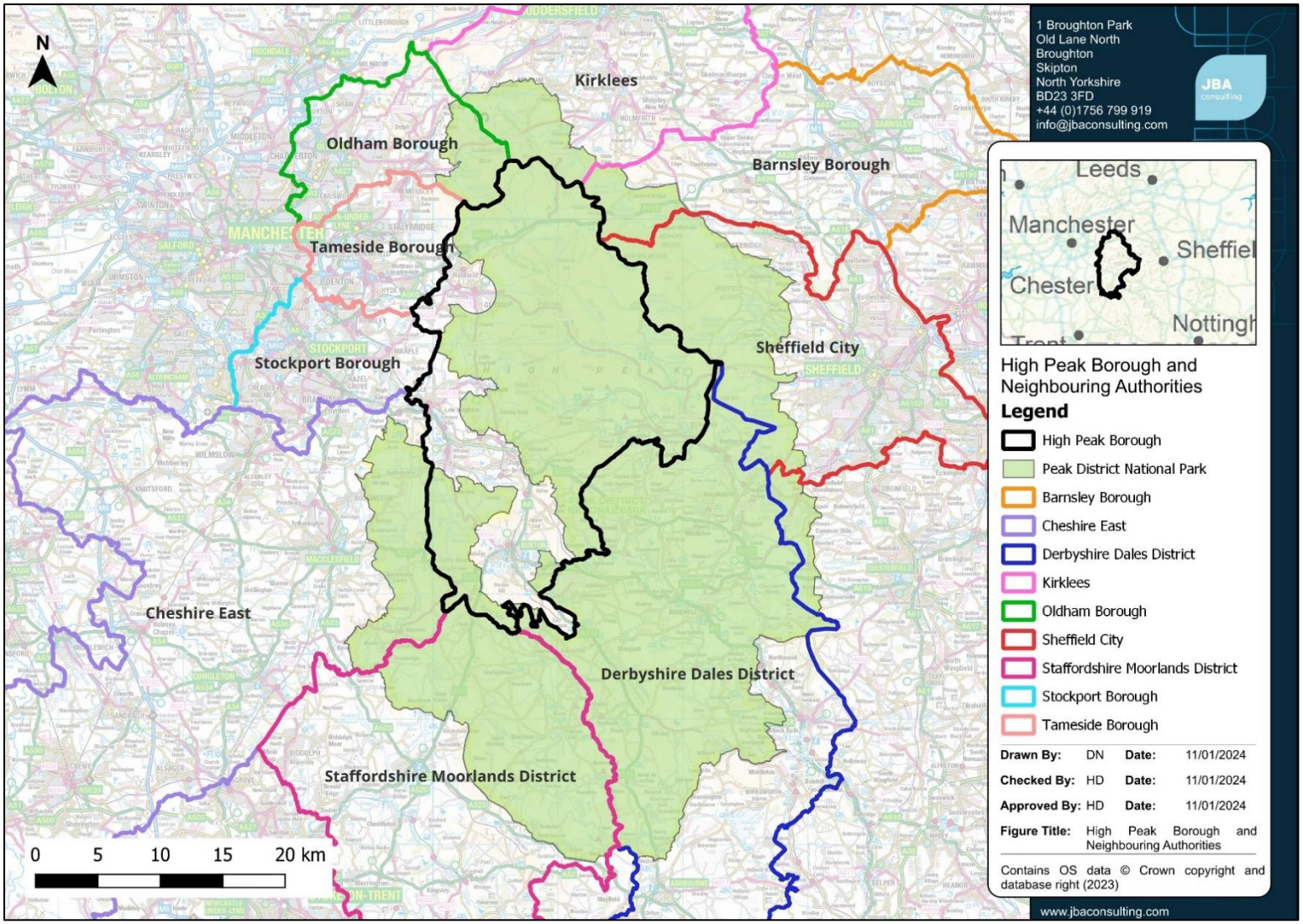


Figure 1-1: High Peak Borough and Neighbouring Authorities

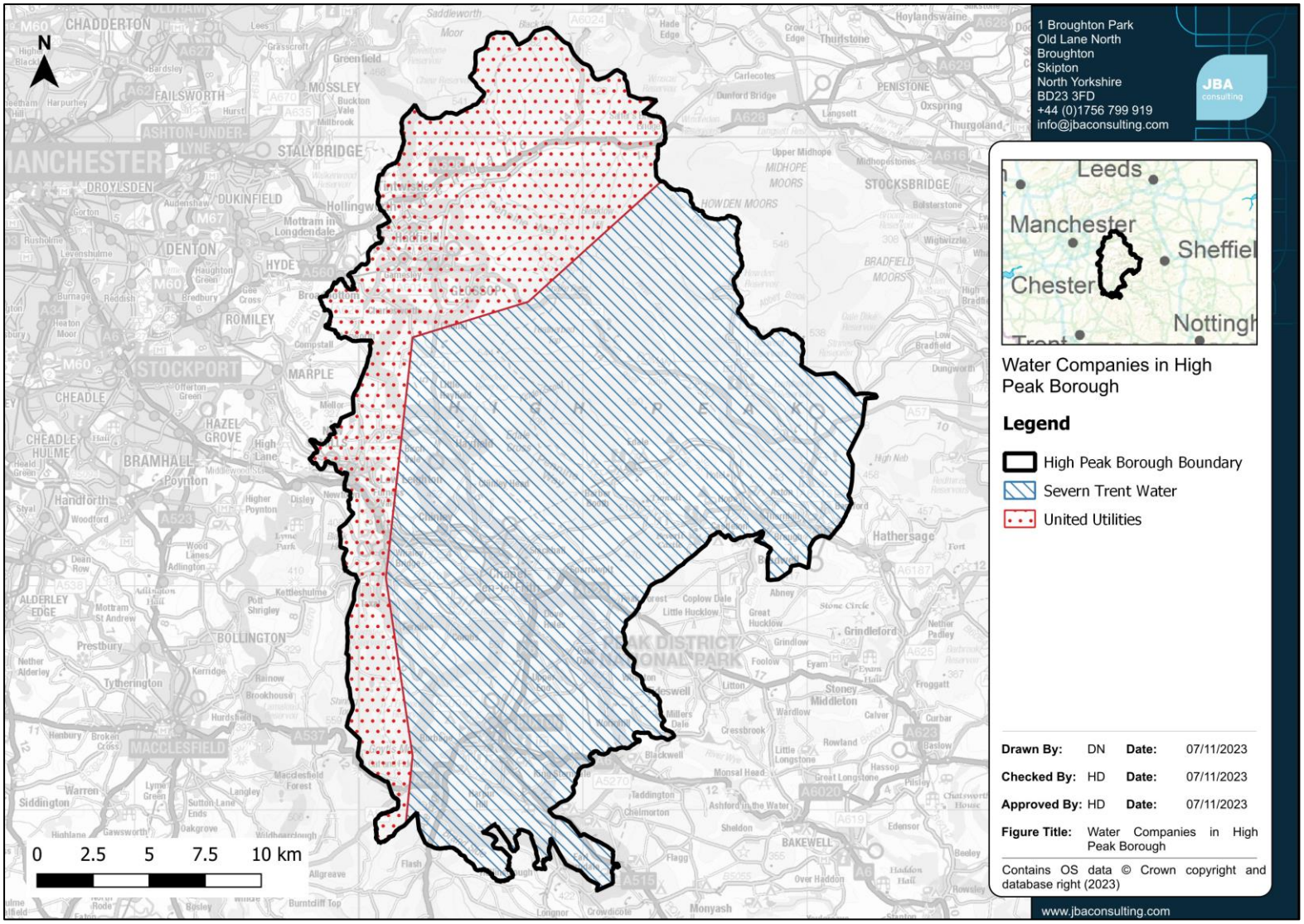


Figure 1-2: Water companies across High Peak Borough

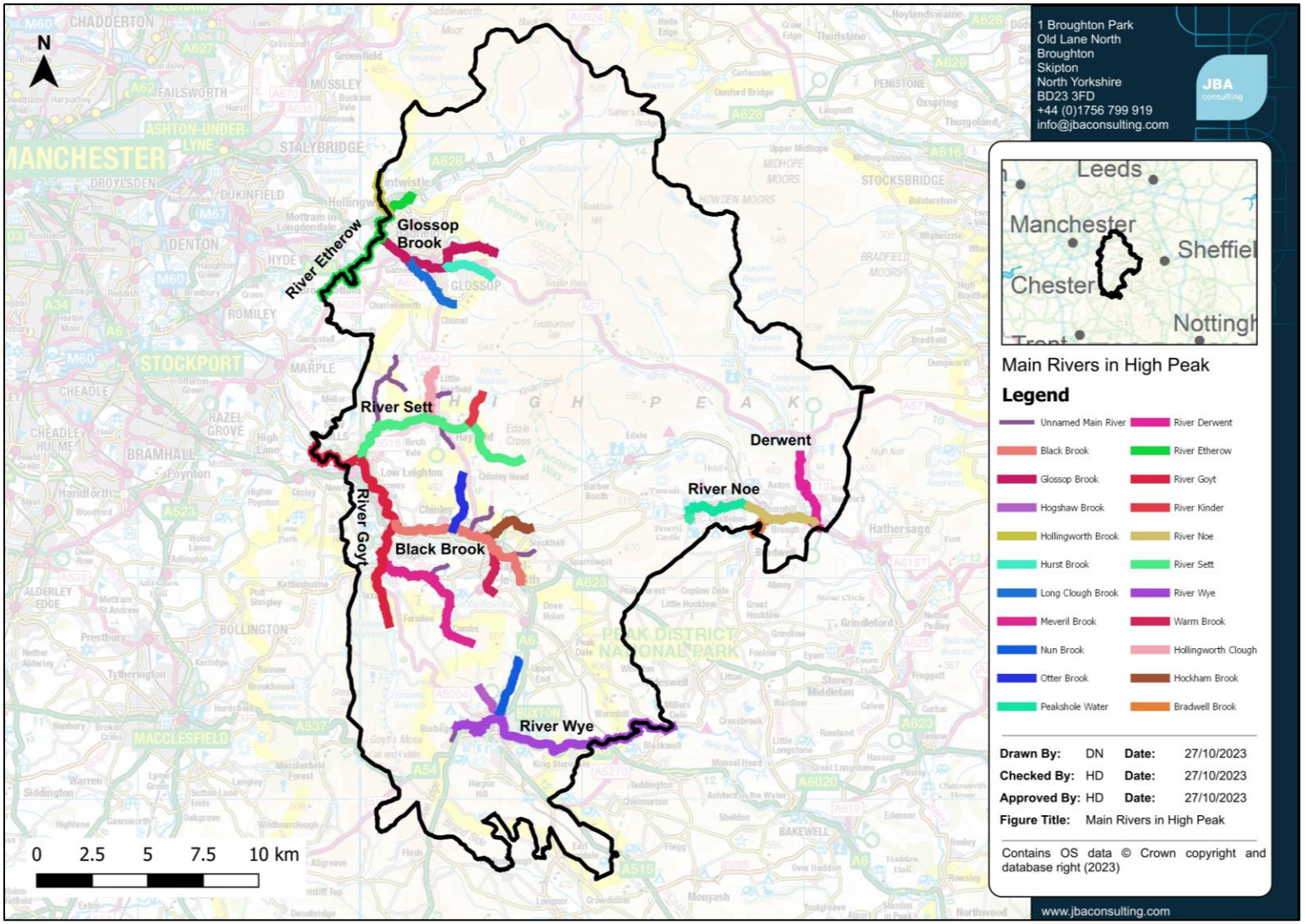


Figure 1-3: Main watercourses in High Peak Borough

1.7 Use of SFRA data

Level 1 SFRAs are high-level strategic documents and do not go into detail on an individual site-specific basis. The primary purpose is to provide an evidence base to inform the preparation of Local Plans and any future flood risk policies.

Developers will still be required to undertake site-specific FRAs where required to support Planning Applications. Developers will be able to use the information in the SFRA to scope out the sources of flood risk that will need to be explored in more detail at site level.

Appendix C presents a SFRA User Guide, further explaining how this SFRA data should be used, including reference to relevant sections of the SFRA, how to consider different sources of flood risk and recommendations and advice for sequential and exception tests.

On the date of publication, this SFRA contains the latest available flood risk information. Over time, new information will become available to inform planning decisions, such as updated hydraulic models (which then update the Flood Map for Planning), updated information on other sources of flood risk or evidence showing future flood risks, new flood event information, new defence schemes and updates to policy, legislation, and guidance. The EA are currently undertaking new nationalised modelling (NaFRA2) which is due to go live in August 2024, although these timescales are subject to change due to the complexities of the project. Developers should check the online Flood Map for Planning in the first instance to identify any major changes to the Flood Zones and the long-term flood risk mapping portal for any changes to flood risk from surface water or inundation from reservoirs.

1.8 Structure of this report

Table 1-1 sets out the contents of each section of the report, and guidance on how to use each section. Appendices of this SFRA are also included.

Table 1-1: Contents of the report

Section	Contents	How to use
Executive summary	This section focuses on how the SFRA can be used by planners, developers, and neighbourhood planners.	Users should refer to this section for a summary of the Level 1 findings and recommendations.

Section	Contents	How to use
1. Introduction	This section provides a background to the study, the Local Plan stage the SFRA informs, the study area, the roles and responsibilities for the organisations involved in flood management and how they were involved in the SFRA. It also provides a short introduction to how flood risk is assessed and the importance of considering all sources.	Users should refer to this section for general information and context.
2. Flood risk policy and strategy	This section sets out the relevant legislation, policy, and strategy for flood risk management at a national, regional, and local level.	Users should refer to this section for any relevant policy which may underpin strategic or site-specific assessments.
3. Planning policy for flood risk management	This section provides an overview of both national and existing Local Plan policy on flood risk management. This includes the Flood Zones, application of the Sequential Approach and sequential/exception test process. It provides guidance for HPBC and Developers on the application of the sequential and exception test for both allocations and windfall sites, at allocation and planning application stages.	Users should use this section to understand and follow the steps required for the sequential and exception tests.
4. Understanding flood risk in the High Peak Borough	This section provides an overview of the characteristics of flooding affecting the study area and key risks including historical flooding incidents, flood risk from all sources and flood warning arrangements.	This section should be used to understand all sources of flood risk in High Peak Borough including where has flooded historically. This section may also help identify any data gaps, in conjunction with Appendix B.

Section	Contents	How to use
5. Impact of climate change	This section outlines the latest climate change guidance published by the EA and how this was applied to the SFRA. It also sets out how developers should apply the guidance to inform site-specific FRAs.	This section should be used to understand the climate change allowances for a range of epochs and conditions, linked to the vulnerability of a development.
6. Flood alleviation schemes and assets	This section provides a summary of current flood defences and asset management and future planned schemes. It also introduces actual and residual flood risk.	This section should be used to understand if there are any defences or flood schemes in a particular area, for further detailed assessment at site specific stage.
7. Cumulative impact of development and strategic solutions	This section introduces the Cumulative Impact Assessment (CIA), which is included as Appendix F.	Planners should use this section to help develop policy recommendations for the cumulative impact of development, in conjunction with Appendix F.
8. Flood risk management for developers	This section contains guidance for developers on FRAs, considering flood risk from all sources.	Developers should use this section to understand requirements for FRAs and what conditions/guidance documents should be followed, as well as mitigation options.
9. Surface water management and Sustainable Drainage Systems	This section provides an overview of SuDS, Guidance for developers on Surface Water Drainage Strategies, considering any specific local standards and guidance for SuDS from the LLFA.	Developers should use this section to understand what national, regional, and local SuDS standards are applicable. Hyperlinks are provided.
10. Summary and recommendations	This section summarises sources of flood risk in the study area and	Developers and planners should use this as a

Section	Contents	How to use
	outlines planning policy recommendations. It also sets out the next steps.	summary of the SFRA. Developers should refer to the Level 1 SFRA recommendations when considering site specific assessments.
Appendices	Appendix A: Interactive Mapping Portal user guide Appendix B: Data sources used in the SFRA Appendix C: SFRA User Guide Appendix D: Flood Alert and Flood Warning Areas Appendix E: Summary of flood risk across High Peak Borough Appendix F: Cumulative Impact Assessment (CIA)	Planners should use these appendices to understand what data has been used in the SFRA, to inform the application of the sequential and exception tests, as relevant, and to use these maps and tabulated summaries of flood risk to understand the nature and location of flood risk.

1.9 Understanding flood risk

The following content provides useful background information on how flooding arises and how flood risk is determined.

1.9.1 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 ways. Major sources of flooding include:

- 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.
- Surface water - direct run-off from adjacent land.
- Sewer flooding - surcharging of piped drainage systems (public sewers, highway drains, etc.).

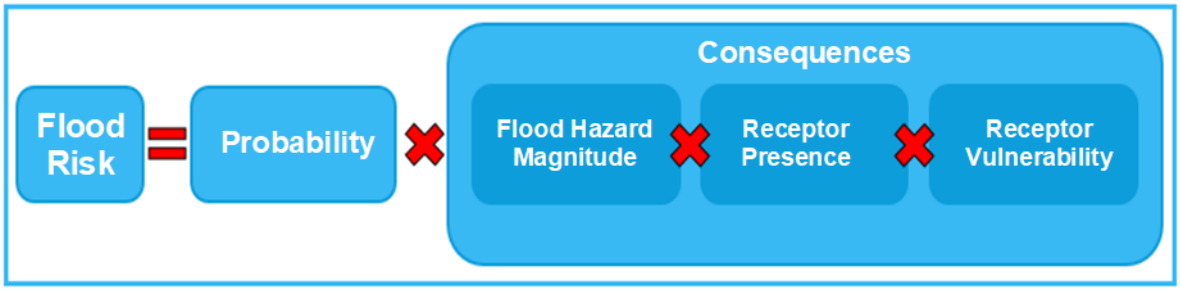
- Groundwater - water table rising after prolonged rainfall to emerge above ground level remote from a watercourse; most likely to occur in low-lying areas underlain by permeable rock (aquifers); groundwater recovery after pumping for mining or industry has ceased.
- Infrastructure failure - reservoirs; industrial processes; burst water mains; blocked sewers or failed pumping stations.
- Other sources of flooding including breaching of flood defences, overwhelmed canals, lakes, and other artificial sources.

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.

1.9.2 Defining flood risk

Section 3 (subsection 1) of the Flood and Water Management Act (FWMA) defines the risk of a potentially harmful event (such as flooding) as 'a risk in respect of an occurrence is assessed and expressed (as for insurance and scientific purposes) as a combination of the probability of the occurrence with its potential consequences.'

Thus, it is possible to summarise flood risk as:



1.9.2.1 Source-Pathway-Receptor model

Flood risk can be assessed using the Source-Pathway-Receptor model where:

- The source is the origin of the floodwater, principally rainfall.
- A pathway is a route or means by which a receptor can be affected by flooding, which includes rivers, drains, sewers, and overland flow.
- A receptor is something that can be adversely affected by flooding, which includes people, their property, and the environment.

This is a standard environmental risk model common to many hazards and should be the starting point of any assessment of flood risk. All these elements must be present for flood risk to arise. Having applied the Source-Pathway-Receptor model it is possible to mitigate the flood risk by addressing the source (often very difficult), blocking, or altering the pathway, or removing the receptor, e.g., steer development away.

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 to apply this guidance in a consistent manner.

1.9.2.2 Probability

The probability of flooding is expressed as a percentage based on the average frequency measured or extrapolated from records over many 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 at least once every hundred years.

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.

1.9.2.3 Consequences

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), the receptors that are present and the vulnerability of these receptors (type of development, nature, e.g., age-structure, of the population, presence, and reliability of mitigation measures etc).

2 Flood risk policy and strategy

This section sets out the flood risk management roles and responsibilities for different organisations and relevant legislation, policy, and strategy.

2.1 Roles and responsibilities for Flood Risk Management in High Peak Borough

There are different organisations in and around High Peak Borough that have responsibilities for flood risk management, known as RMAs. These are listed in Table 2-1, with a summary of their responsibilities. Further information on the roles and responsibilities of the EA is available in Annex A of the National Flood and Coastal Erosion Risk Management Strategy (FCERM) for England, available from the Government website here.

Land and property owners are responsible for the maintenance of watercourses either on or next to their properties, called Riparian Owners. Riparian Owners are also responsible for the protection of their properties from flooding as well as other management activities, for example by maintaining riverbeds/ banks, controlling invasive species, and allowing the flow of water to pass without obstruction. More information can be found on the Government website in the EA publication 'Owning a watercourse' (2018), available from the Government website here.

When it comes to undertaking works to reduce flood risk, the EA, and DCC as the LLFA do have jurisdiction but limited resources must be prioritised and targeted to where they can have the greatest effect. Permissive powers mean that RMAs are permitted to undertake works on watercourses but are not obliged.

It is important to note that within the Borough, there are two LPAs. The Peak District National Park are the LPA for all areas within the Peak District National Park, as shown in Figure 1-1. The Peak District National Park's Core Strategy and Development Management Policies are currently being updated to set out a plan for 2024- 2040. HPBC are the LPA for the area in High Peak Borough that lies outside of the Peak District National Park.

Table 2-1: Roles and responsibilities for RMAs

Risk Management Authority	Strategic Level	Operational Level	Planning role
EA	Strategic overview for all sources of flooding, National Strategy, reporting, and general supervision	Main River (e.g., the River Goyt) and reservoirs (consenting, enforcement, and works)	Statutory consultee for certain development in Flood Zones 2 and 3 and all works within 20 metres of a main river. Advice on when to consult the EA is available

Risk Management Authority	Strategic Level	Operational Level	Planning role
			on the Government website here.
DCC as LLFA	Local Flood Risk Management Strategy (LFRMS)	Surface water, groundwater, and ordinary watercourses (consenting, enforcement, and works)	Statutory consultee for major developments
HPBC as LPA (excluding areas within the Peak District National Park)	Local Plans	Determination of Planning Applications	Determination of Planning Applications
Severn Trent Water and United Utilities	Asset Management Plans, supported by Periodic Reviews (business cases), develop drainage and wastewater management plans	Public sewers	Non-statutory consultee
Highways Authorities - Highways England for motorways and trunk roads and HPBC for non-trunk roads	Highway drainage policy and planning	Highway drainage	Statutory consultee regarding highways design standards and adoptions

2.2 Relevant legislation

The following legislation is relevant to development and flood risk in High Peak Borough. Hyperlinks are provided to external documents:

- Town and Country Planning Act (1990), Water Industry Act (1991), Land Drainage Act (1991), Environment Act (1995), which set out the regulations for development on land in England and Wales.

- Flood and Water Management Act (2010) – as amended and implemented via secondary legislation. These set out the roles and responsibilities for organisations that have a role in Flood Risk Management.
- The Land Drainage Act (1991, as amended) and Environmental Permitting Regulations (2018) also set out where developers will need to apply for additional permission (as well as planning permission) to undertake works to an ordinary watercourse or main river.
- The Water Environment Regulations (2017) – these transpose the European Water Framework Directive (WFD) (2000) into law and require the EA to produce River Basin Management Plans (RBMPs). These aim to improve/maintain the water quality of aquatic ecosystems, riparian ecosystems, and wetlands so that they reach 'good' status.
- The Environment Act 2021 requires developers to provide Biodiversity Net Gain (BNG) and for LPAs to develop Local Nature Recovery Strategies (LNRS). Strategic site allocations in Local Plans which present opportunities for BNG or areas for habitat improvement/creation identified by the LNRS could have parallel opportunities to contribute to reduced flood risk from a range of sources.
- Other environmental legislation such as the Habitats Directive (1992), Environmental Impact Assessment Directive (2014), and Strategic Environmental Assessment Directive (2001) also apply as appropriate to strategic and site-specific developments to guard against environmental damage.
- Flood Risk Regulations (2009) - these transpose the European Floods Directive (2000) into law and require the EA and LLFAs to produce PFRAs and identify nationally significant Flood Risk Areas (FRAs).

2.3 Key national, regional, and local policy documents and strategies

Table 2-2 summarises relevant national, regional, and local flood risk policy and strategy documents and how these apply to development and flood risk. Hyperlinks are provided to external documents. These documents may:

- Provide useful and specific local information to inform FRAs within the local area.
- Set the strategic policy and direction for flood risk management and drainage – they may contain policies and action plans that set out what future flood mitigation and climate change adaptation plans may affect a development site. A developer should seek to contribute in all instances to the strategic vision for flood risk management and drainage in High Peak Borough.
- Provide guidance and/or standards that inform how a developer should assess flood risk and/or design flood mitigation and SuDS.

The following sections provide further details on some of these documents and strategies.

Table 2-2: National, regional, and local flood risk policy and strategy documents.

Policy level	Document, lead author and date	Contextual information	Policy and measures	Development design requirements	Next update due
National	Flood and Coastal Management Strategy (EA) 2020	Yes	Yes	No	2026
National	National Planning Policy Framework updated in December 2023	Yes	Yes	Yes	-
National	Planning Practice Guidance (PPG) updated in February 2024	Yes	No	Yes	-
National	How to prepare a strategic flood risk assessment	Yes	No	No	-
National	Building Regulations Part H (MHCLG) 2010	Yes	No	Yes	-
Regional	Upper Mersey Catchment Flood Management Plan (EA) 2009	Yes	Yes	No	-
Regional	Derwent Derbyshire Catchment Flood Management Plan (EA) 2009	Yes	Yes	No	-
Regional	North West river basin district river basin management plan (EA) 2022	Yes	Yes	No	2027
Regional	Humber river basin district river basin management plan (EA) 2022	Yes	Yes	No	2027
Regional	North West river basin district flood risk management plan (EA) 2023	Yes	Yes	No	2027
Regional	Humber river basin district flood risk management plan (EA) 2023	Yes	Yes	No	2027
Regional	United Utilities water resources management plan 2019	Yes	No	No	-

Policy level	Document, lead author and date	Contextual information	Policy and measures	Development design requirements	Next update due
Regional	Severn Trent Water water resources management plan 2022	Yes	No	No	-
Regional	United Utilities Drainage and Wastewater Management Plan 2023	Yes	No	No	-
Regional	Severn Trent Water Drainage and Wastewater management Plan 2023	Yes	No	No	-
Regional	Climate change guidance for development and flood risk (EA) last updated May 2022	Yes	No	Yes	-
Local	Preliminary Flood Risk Assessment for Derbyshire (DCC) 2011	Yes	No	No	-
Local	Preliminary Flood Risk Assessment for Derbyshire addendum (DCC) 2017	Yes	No	No	-
Local	Derbyshire Local Flood Risk Management Strategy (DCC) 2023	Yes	Yes	No	-
Local	High Peak Flood Risk Assessment and Drainage Strategy Report 2018	Yes	Yes	Yes	-
Local	Water in Buxton Supplementary Planning Document Adopted December 2021	Yes	Yes	Yes	-

2.3.1 The National Flood and Coastal Erosion Risk Management Strategy for England (2020)

The National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England provides the overarching framework for future action by all RMAs to tackle flooding and coastal erosion in England. The EA brought together a wide range of stakeholders to develop the strategy collaboratively. The Strategy looks ahead to 2100 and the actions needed to address the challenge of climate change.

The Strategy has been split into three high level ambitions:

- Climate resilient places
- Today's growth and infrastructure resilient in tomorrow's climate
- A nation ready to respond and adapt to flooding and coastal change.

Measures within the Strategy include:

- Updating the national river, coastal, and surface water flood risk mapping and producing a new set of long-term investment scenarios to improve understanding of future risk and investment needs.
- Trialling new and innovative funding models to contribute to the investment needs for flood and coastal resilience.
- Flood resilience pilot studies.
- Developing an adaptive approach to the impacts of climate change by seeking nature-based solutions towards flooding and erosion issues, integrating Natural Flood Management (NFM) into the new Environmental Land Management scheme, and considering long term adaptive approaches in Local Plans.
- Maximising the opportunities for flood and coastal resilience as part of contributing to environmental net gain for development proposals, investing in flood risk infrastructure that supports sustainable growth, and developing world leading ways of reducing the carbon and environmental impact from the construction and operation of flood and coastal defences.
- Aligning long term strategic planning cycles for flood and coastal work between stakeholders.
- Consistent approaches to asset management and record keeping.
- Updating guidance on managing high risk reservoirs considering climate change.
- Development of digital tools to communicate flood risk, transforming the flood warning service, supporting communities to plan for flood events, increasing flood response and recovery support, and mainstreaming property flood resilience measures and 'building back better' after flooding.

The Strategy was laid before parliament in July 2020 for formal adoption and published alongside a New National Policy Statement for Flood and Coastal Erosion Risk Management, which can be accessed here from the Government website. The statement sets out five key commitments which will accelerate progress to better protect and better prepare the country for the coming years:

1. Upgrading and expanding flood defences and infrastructure across the country,
2. Managing the flow of water to both reduce flood risk and manage drought,
3. Harnessing the power of nature to not only reduce flood risk, but deliver benefits for the environment, nature, and communities,
4. Better preparing communities for when flooding and erosion does occur, and
5. Ensuring every area of England has a comprehensive local plan for dealing with flooding and coastal erosion.

It can be expected that the implementation of the National Strategy will lead to the publication of new guidance and practice that is focused on resilience and adaptation over the coming years. It will be important to adjust the content of the SFRA so that changes in approach are captured in the delivery of the Local Plan.

For further information, the Government has published the full National Flood and Coastal Erosion Risk Management Strategy (FCERM).

2.3.2 Flood Risk Regulations (2009)

The Flood Risk Regulations (2009) translate the European Union (EU) Floods Directive into UK law, which is retained in UK law post-Brexit, and can be accessed on the Government website. The EU requires Member States to complete an assessment of flood risk (known as a PFRA) and then use this information to identify areas where there is a significant risk of flooding. For these Flood Risk Areas, States must then undertake Flood Risk and Hazard Mapping and produce Flood Risk Management Plans (FRMPs).

The Flood Risk Regulations direct the EA to do this work for river, sea, and reservoir flooding. LLFAs must do this work for surface water, ordinary watercourse, and groundwater flooding. This is a six-year cycle of work and the second cycle started in 2017.

The EA PFRA (2018) for river, sea and reservoir flooding identifies nationally significant Flood Risk Areas for these sources. This PFRA identified 40 FRAs within the Humber River Basin District (RBD) and eight in the North West RBD, none of which affect the High Peak Borough. The full PFRA can be found on the Government website.

The DCC PFRA, published in 2011, is a high-level screening exercise which provides an assessment of flood risk based on data from parish, town, borough, and district councils, Derby City Council, the Environment Agency, Severn Trent Water, Yorkshire Water and United Utilities. This identified 14 historical events (in 2000, 2001, 2002, 2004, 2004, 2006, 2008, and 2009) but no Flood Risk Areas (FRAs) were identified within the DCC LLFA area.

The addendum to the DCC PFRA, published in 2017, identified numerous significant flood events in July/November 2012, May/July 2014, June/November 2016. This led DCC to conduct several Section 19 Flood Investigations to establish the cause of the flooding and what can be done to reduce future risk, as well as sparking a number of flood alleviation/resilience schemes either already in progress or programmed for future years. One FRA: Chesterfield was identified by DCC LLFA area during the second cycle, but this does not impact High Peak in any way. The original 2011 DCC PFRA can be downloaded

from the DCC website here, and the 2017 addendum to the PFRA is available on the Government website here.

The six-year cycle of assessment, mapping, and planning required under the Flood Risk Regulations also requires the development of FRMPs. The EA led the development of the FRMPs. The first FRMPs were published in 2016 and the second cycle plans which describe actions to manage flood risk across England between 2021 and 2027 were published in December 2022.

High Peak Borough lies across the North West FRMP area and the Humber FRMP area. The second cycle FRMP is a plan to manage significant flood risk in the FRAs identified within the North West and Humber RBDs within the EA PFRA. Neither the North West FRMP or the Humber FRMP identified any FRAs within High Peak Borough for main rivers and the sea.

More information on district and national scale measures is available on the EA's online interactive mapping.

It is also recognised that there are areas at flood risk outside of these FRAs. The plan has therefore been expanded to show what is happening across the RBD and in locally important areas referred to as 'Strategic Areas' which were put forward by the EA providing they were not already designated FRAs. The North West RBD FRMP is available here, and the Humber RBD FRMP is available here.

At the time of this review (November 2023), it is understood that the UK Government intends to revoke the Flood Risk Regulations 2009 as part of a review into retained EU legislation. It is proposed to revoke this by 31 December 2023, as the Flood Risk Regulations duplicate existing domestic legislation, namely the Flood and Water Management Act.

2.3.3 Flood and Water Management Act (2010)

The FWMA was passed in April 2010 following the recommendations made within the Pitt Review following the flooding in 2007. It aims to improve both flood risk management and the way water resources are managed.

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 LLFAs, 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.

2.3.3.1 Schedule 3 enactment

The enactment of Schedule 3 of the Flood and Water Management Act (2010) has been approved by the government and is expected in 2024. Through this legislation, sustainable drainage will become mandatory on new developments. As the LLFA, DCC will become a SuDS Approval Body.

This will change the way SuDS are constructed, adopted, and maintained. The Non-Statutory Technical Standards for Sustainable Drainage in England were reviewed in 2021. Recommendations for updating these standards have been published and will form the basis for statutory standards if Schedule 3 in enacted.

2.3.4 The Water Framework Directive and Water Environment Regulations and River Basin Management Plans

The purpose of the 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 RBMPs.

The WFD requires the production of RBMPs for each RBD. RBMPs support the government's framework for the 25-year environment plan and allow local communities to find more cost-effective ways to further improve our water environments. Water quality and flood risk can go hand in hand in that flood risk management activities can help to deliver habitat restoration techniques.

The EA manages the RBMPs and must review and update them every six years. The first cycle of RBMPs were published in 2009 and were most recently updated in 2022.

High Peak Borough lies within both the North West RBD and the Humber RBD. The updated North West RBD RBMP for 2022 can be found here, and the Humber RBD RBMP can be found here.

2.3.5 Updated Strategic Flood Risk Assessment guidance.

There was an update to the 'How to prepare a Strategic Flood Risk Assessment guidance' in March 2022, which requires further adjustment to the approaches to both Level 1 and Level 2 assessments. This Level 1 assessment is undertaken in accordance with the latest guidance. The latest guidance can be accessed on the Government website.

2.3.6 Catchment Flood Management Plans

Catchment Flood Management Plans (CFMPs) are high-level strategic plans providing an overview of flood risk across each river catchment. The EA use CFMPs to work with other key-decision makers to identify and agree long-term policies for sustainable flood risk management.

High Peak Borough lies within both the Upper Mersey CFMP region and Derwent Derbyshire CFMP region, which set out policies relating to flooding from rivers, surface water, and groundwater within their respective catchment areas.

2.3.7 Derbyshire County Council Local Flood Risk Management Strategy (LFRMS) 2023

DCC is responsible for developing, maintaining, applying, and monitoring a LFRMS. The most recent Strategy was published in June 2023 and is used as a means by which the LLFA co-ordinates Flood Risk Management on a day-to-day basis.

The LFRMS aims to set out how flood risk will be reduced and managed in the Borough, with three main ambitions:

1. Climate resilient places: working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change.
2. Today's growth and infrastructure resilient in tomorrow's climate: making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as infrastructure resilient to flooding and coastal change.
3. A nation ready to respond and adapt to flooding and coastal change: ensuring local people understand their risk to flooding and coastal change and know their responsibilities and how to take action.

2.3.8 Local policy and guidance for SuDS

The 2023 NPPF states that: 'Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate' (Paragraph 175) and 'development should only be allowed in areas at risk of flooding where… it can be demonstrated that… c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate' (Paragraph 173). When considering major planning applications, local planning authorities (LPAs) should consult the relevant LLFA on the management of surface water to satisfy that:

- The proposed minimum standards of operation are appropriate.
- Using planning conditions or planning obligations there are clear arrangements for on-going maintenance over the development's lifetime.

At the time of writing this SFRA, the following documents and policies are relevant to SuDS and surface water in High Peak. Hyperlinks are provided to external documents:

- SuDS Manual (C753), published in 2007 and updated in 2015.
- Defra Non-statutory technical standards for sustainable drainage systems, 2015
- Defra National Standards for sustainable drainage systems Designing, constructing (including LASOO best practice guidance), operating and maintaining drainage for surface runoff, 2011
- Building Regulations Part H (MHCLG), 2010

The 2023 NPPF states that flood risk should be managed "using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding" (Paragraph 167). Alongside flood risk management, SuDS can provide amenity, biodiversity, recreation, community, and water resources benefits. Where possible, priority should be given to SuDS that can deliver multiple benefits. DCC do not

adopt any specific SuDS schemes at the time of writing; but state that all SuDS construction should be undertaken in line with the CIRIA SuDS Manual C753 and C768.

2.3.9 Water Cycle Studies

Water Cycle Studies assist local authorities to select and develop growth proposals that minimise impacts on the environment, water quality, water resources, infrastructure, and flood risk and help to identify ways of mitigating such impacts. No water cycle studies have been undertaken within this study area.

2.3.10 Surface Water Management Plans

Surface Water Management Plans (SWMPs) outline the preferred surface water management strategy in a given location. SWMPs are undertaken, when required, by LLFAs in consultation with key local partners who are responsible for surface water management and drainage in their area. SWMPs establish a long-term action plan to manage surface water in a particular area and are intended to influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning, and future developments. No SWMPs have been undertaken within this study area.

2.3.11 Water Resources Management Plans (WRMPs)

Under the duties set out in sections 37A to 37D of the Water Industry Act 1991, all water companies across England and Wales must prepare and maintain a WRMP. This must be prepared at least every five years and reviewed annually.

WRMPs should set out how a water company intends to achieve a secure supply of water for their customers and a protected and enhanced environment.

United Utilities published their Final WRMP in 2019, available on their website here. It defines their strategy to undertake sustainable plans for water supplies in the North West between 2020 and 2025. United Utilities are in the process of preparing a new WRMP (WRMP24) which plans for an adequate supply to meet demand from 2025 to 2085.

Severn Trent Water published a Draft WRMP 2024 in November 2023 available on their website here. It demonstrates long-term plans to accommodate the impacts of population growth, drought, and climate change and looks ahead to 2085. The final publication of this WRMP is due to be released in Autumn 2023.

2.3.12 Drainage and Wastewater Management Plans (DWMPs)

Water and sewage companies must produce a Drainage and Wastewater Management Plan (DWMP), covering a minimum of 25 years, which looks at current and future capacity, pressures, and risks to their networks such as climate change and population growth. They detail how a company plans to work with RMAs and drainage asset owners to manage future pressures. The water and sewage companies for High Peak Borough are United Utilities and Severn Trent Water.

United Utilities published their first DWMP in May 2023, which is available here. It highlights effects of future pressures on wastewater systems over the short, medium, and long term, and what can be done to address these issues. It covers the period 2023-2050.

Severn Trent Water published their draft DWMP in June 2022, which is available here. It includes evidence to support and inform their PR24 business plan, and covers the period from 2025-2030, to ensure short term investment needs align with longer-term needs of our catchments out to 2050 and beyond.

3 Planning policy for flood risk management

This section summarises national planning policy for development and flood risk.

3.1 National Planning Policy Framework and Guidance

The revised NPPF was published in July 2021, and was most recently updated in 2023. The NPPF sets out Government's planning policies for England and is available on the Government website. It must be considered in the preparation of local plans and is a material consideration in planning decisions. The NPPF advises on how flood risk should be considered to guide the location of future development and FRA requirements. The NPPF states that:

"Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards" (Paragraph 166). The PPG on flood risk and coastal change was published in March 2014 and sets out how the policy should be implemented. Diagram 1 in the PPG sets out how flood risk should be considered in the preparation of Local Plans. It was updated in August 2022. The most up-to-date guidance is available on the Government website.

3.2 The risk-based approach

The NPPF takes a risk-based approach to development in flood risk areas. Since July 2021 the approach has adjusted the requirement for the sequential test (as defined in Paragraph 167 of the NPPF) so that all sources of flood risk are included in the consideration. The requirement for the revised sequential test has been addressed by adopting the following approach:

- The test will cease to be based on the use of the Flood Zones describing river and sea flood risk, and instead be based on whether development can be located in the lowest risk areas (high-medium-low) of flood risk both now and in the future. The test now applies to all sources of flood risk – whereas previously the test was only performed for present day flood risk for the "Flood Zones" i.e., river and sea flood risk.
- Understanding flood risk to sites based on their vulnerability and incompatibility as opposed to whether development is appropriate.
- In addition to the flood risk mapping describing river and sea flood risk, there is mapping available to describe surface water flood risk. Although, this is not conceptually similar to the flood risk mapping for rivers and sea due to the differing nature of flooding.
- As there is no available competent risk mapping for other sources of risk it is not considered appropriate to use such mapping in a strict process that involves

comparison of differing levels of flood risk. Reservoir, groundwater and sewer flood risk are addressed through the SFRA using a variety of datasets to analyse and describe the risk to areas across High Peak Borough.

- A more formal assessment of these sources is undertaken in a Level 2 SFRA and involves a more detailed assessment of the implications of reservoir, sewer, and groundwater flood risk to establish that more appropriate locations at lower risk are not available. Consultation with the sewerage undertaker is necessary to take in to account any hydraulic incidents and the latest available modelling information on sewer flood risk.
- Consideration is given to all sources of flood risk using the available data to complete the sequential test so decisions on the selection of preferred sites for allocation address the potential implications of groundwater, reservoir, and sewer flooding. Also, where necessary it identifies sites where consideration should be given to satisfying the requirements of the exception test.

3.2.1 Flood Zones - Fluvial Risk

The definition of the Flood Zones is provided below. The Flood Zones do not consider defences, except when considering the functional floodplain. This is important for planning long term developments as long-term policy and funding for maintaining flood defences over the lifetime of a development may change over time.

The Flood Zones are:

- Flood Zone 1: Low risk: less than a 0.1% chance of river and sea flooding in any given year.
- Flood Zone 2: Medium risk: between a 1% and 0.1% chance of river flooding in any given year.
- Flood Zone 3a: High risk: between a 3.3% and 1% chance of river flooding in any given year.
- Flood Zone 3b: Functional Floodplain: land where water has to flow or be stored in times of flood (greater than 3.3% AEP). SFRAs identify this Flood Zone in discussion with the LPA and the EA. The identification of functional floodplain takes account of local circumstances. Only water compatible and essential infrastructure are permitted in this zone and should be designed to remain operational in times of flood, resulting in no loss of floodplain or blocking of water flow routes. Information on flood risk vulnerability classification is available online in Annex 3 of the NPPF, here. It may be required to consider climate change on the functional floodplain; this would need hydraulic modelling to confirm extents and therefore it is recommended that this is considered in a FRA and a suitable approach is agreed with the EA.
    - FZ3b is based on the best available modelled data:
        - 3.3% Annual Exceedance Probability (AEP) where available
        - 1% AEP where the 3.3% is not available.

- Where model data is not available, FZ3a (1% AEP) is used as a conservative proxy.

Flood Zones 2 and 3a consider undefended fluvial or tidal risk whilst Flood Zone 3b considers defended fluvial or tidal risk. The Flood Zones do not risk mapping for surface water, sewer, groundwater flooding or the impacts of reservoir failure or climate change. Hence, there could still be a risk of flooding from other sources and that the level of flood risk will change over the lifetime of a development.

Important note on Flood Zone information in this SFRA

We have used the best available data to inform this SFRA, and therefore for some watercourses, additional modelling is shown on the Interactive Mapping Portal in addition to the existing Flood Zones 2 and 3a from the Flood Map for Planning. These areas are as follows:

- Glossop Brook and Tribs (mostly in the FMfP, some differences)
- Hurst Brook (mostly in the FMfP, some differences)
- Long Clough (mostly in the FMfP, some differences)
- Hogshaw Nun

The EA Flood Zones do not cover all catchments or ordinary watercourses with areas <3km². As a result, whilst the EA Flood Zones may show an area is in Flood Zone 1, there may be a flood risk from a smaller watercourse(s) not shown in the Flood Zones.

Functional floodplain (Flood Zone 3b) is identified as land which allows water to flow in times of flood with an AEP of 3.3% (1 in 30 years). As this extent is not shown on the Flood Map for Planning, this can only be identified where detailed hydraulic modelling exists. 3.3% AEP extents were available for the following models:

- Hogshaw Nun
- Hurst Brook
- River Sett

For areas covered by detailed models, but with no 3.3% AEP output available, the 1% AEP outputs were used as a proxy. This was the case for the following models:

- Black Brook
- Glossop Brook and Tribs
- Hollingworth Clough
- Long Clough
- Otter Brook
- Peakshole Water
- River Goyt
- Upper Derwent
- Warm Brook

For areas outside of the detailed model coverage, Flood Zone 3a (1% AEP) has been used as a conservative indication. Further work should be undertaken as part of a detailed site-specific FRA to define the extent of Flood Zone 3b where no detailed modelling exists.

3.2.2 Flood Zones - surface water risk

To address the requirement that flood risk from all sources is included in the sequential test in addition to the fluvial Flood Zones, a further set of surface water zones have also been defined.

The surface water zones define locations at either lower or higher risk of surface water flooding based on the extent of the 1% AEP plus 40% climate change allowance surface water event. This is the upper end allowance for the 2070s epoch which the EA climate change guidance recommends is assessed within SFRAs.

- Zone A – lower risk of surface water flooding (lies outside the 1% AEP plus 40% climate change surface water extent)
- Zone B – higher risk of surface water flooding (lies within the 1% AEP plus 40% climate change surface water extent)

Surface water mapping does not strictly describe the same conceptual risk zone as is defined for river and sea flooding (even though it is notionally associated with the same probability) as the mapping is based on different assumptions. However, it does create a product that can accommodate sequential testing, as it can facilitate strategic decisions that direct development to land in a “lower risk surface water flood zone”.

Surface water flood risk can also be of much shallower depth and is not normally experienced for such extensive durations as river flooding. However, the safety implications of placing proposed development at locations where there is surface water flood risk together with the potential effects on third parties is a material consideration and thus if it is proposed to place development in a Zone of high surface water flood risk then consideration should be given to the demonstrating that part “b” of the Exception Test (outlined in section 3.2.5) can be satisfied (with the presumption that part “a” was satisfied if the land was allocated in the Local Plan).

3.2.3 Flood Zones - other sources of flooding

Other sources of flooding also need to be considered as part of the sequential test. This includes reservoir and groundwater flooding.

While all sources of flood risk should inform the sequential test, the national data available for use in this SFRA for other sources of flooding are not sufficient 'risk-based' datasets to inform the sequential test in the same way as the available data for fluvial and surface water risk, and therefore a more detailed assessment will be required in a Level 2 assessment.

One source of flooding is from reservoirs. A reservoir's primary function is to provide water storage; however, they can be a source of flooding. The latest available mapping now shows “wet day” and “dry day” reservoir inundation extents. The “wet day” being a reservoir breach at the same time as a 0.1% AEP river flood (as this is a likely time when a reservoir might fail) and the "dry day" shows the failure just from the water retained by the dam. However, neither set of mapping describes a risk-based scenario, as they do not indicate

the relative risk to land based on the probability of dam failure but are intended to show a “worst credible case”.

By comparing the extent of Fluvial Flood Zone 2 with the Reservoir Flood Map Wet Day Extent two zones can be defined:

1. Where reservoir flooding is predicted to make fluvial flooding worse.
2. Where reservoir flooding is not predicted to make fluvial flooding worse.

The mapping could be used to direct proposed new development away from locations that could potentially be affected by reservoir flood risk. However, it is different to the risk pertaining to river and sea flooding and further assessment would be required to understand the magnitude of the potential hazard. This mapping will also identify locations where proposed development could result in a change to the risk designation of a reservoir. If proposed sites are located in a zone at reservoir risk, it will be necessary to include a more detailed assessment in a Level 2 SFRA. Where a risk of flooding from a reservoir is identified, the LPA and developers must liaise with the reservoir owner and operator to understand the implications for reservoir safety and the owners and operators, such as the cost of measures to improve design of the dam, operations, and maintenance to reduce flood risk.

With regards to sewer and groundwater flood risk, for the purposes of this SFRA it is not possible to prepare zone maps as the appropriate analyses and data are not available nationally. Sewer flooding is presented as postcode point locations, and groundwater mapping data shows susceptibility of risk and likelihood of emergence. The latter could be viewed in conjunction with the surface water mapping to ascertain where emerging overland flows may travel above ground. The existing datasets on sewer flooding and groundwater are therefore used to inform the sequential approach to development at a site in accordance with Paragraph 167 of the NPPF (which could in some instances result in alternative sites being considered).

3.2.4 The sequential test

Firstly, land at the lowest risk of flooding from all sources should be considered for development. A test is applied called the ‘sequential test’ to do this.

The LPA are required to undertake the sequential test in the preparation of their local plan, and the process is set out within this section. Developers are also required to follow a sequential approach to development, for both local plan allocations and windfall sites.

Figure 3-1 summarises the sequential test.

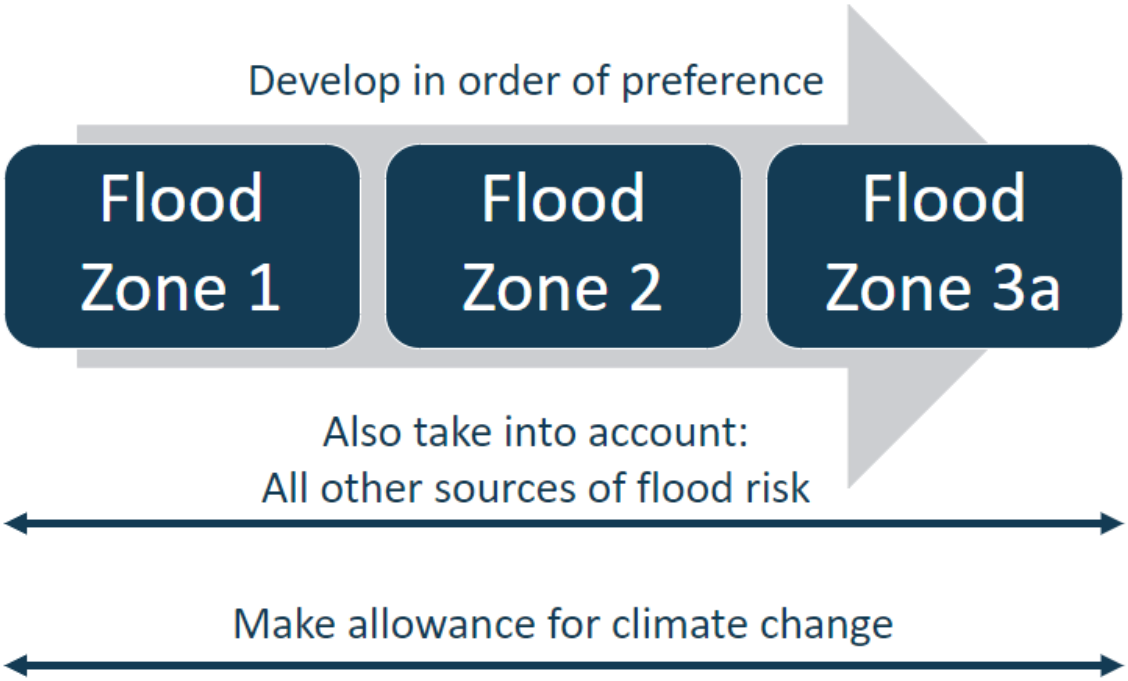


Figure 3-1: A summary of the sequential test

The sequential approach steers development away from areas of flood risk and where the sequential and exception test have been applied (where required) and have not been met, development should not be permitted. It is advised that this approach should be considered early in the design process.

The sequential test should be applied to all relevant planning applications, as set out below. Developers must supply evidence to the LPA, with a planning application, that the development has passed the test.

A sequential test should be carried out if the development is:

- Within Flood Zones 2, 3a, or 3b
- Within Flood Zone 1 where:
  - This SFRA shows it to be at risk of flooding from rivers in the future; or
  - It is at risk of flooding from other sources including surface water (identified as Zone B in this SFRA), groundwater, reservoirs, and sewer (see section 3.2.3 which refers to the limitations with data currently available to assess flood risk from these sources)

Exceptions to this requirement are for changes of use (except for changes of use to a caravan, camping or chalet site, or to a mobile home or park site, where the sequential and exception tests should be applied as appropriate), householder development, and non-residential extensions with a footprint less than 250 square metres.

The LPA should define a suitable search area for the consideration of alternative sites in the sequential test. The sequential test can be undertaken as part of a Local Plan Sustainability Appraisal. Alternatively, it can be demonstrated through a free-standing

document, or as part of Strategic Housing Land or Employment Land Availability Assessments.

Whether any further work is needed to decide if the land is suitable for development will depend on both the vulnerability of the development and the Flood Zone it is proposed for. Annex 3 of the NPPF sets out the flood risk vulnerability classifications for different development types. Table 2 of the PPG defines the flood risk vulnerability and flood zone 'incompatibility' of different development types to flooding which can be found on the Government website here.

Figure 3-2 illustrates the sequential and exception tests as a process flow diagram (Diagram 2 of the PPG) 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 complex one, as several of the criteria used are qualitative and based on experienced judgement. The process must be documented, and evidence used to support decisions recorded. In addition, the risk of flooding from other sources and the impact of climate change must be considered when considering which sites are suitable to allocate. The SFRA User Guide in Appendix C shows where the sequential and exception test may be required for the datasets assessed in the SFRA, and how to interpret different sources of flood risk, including recommending what proposed development sites should be assessed at Level 2.

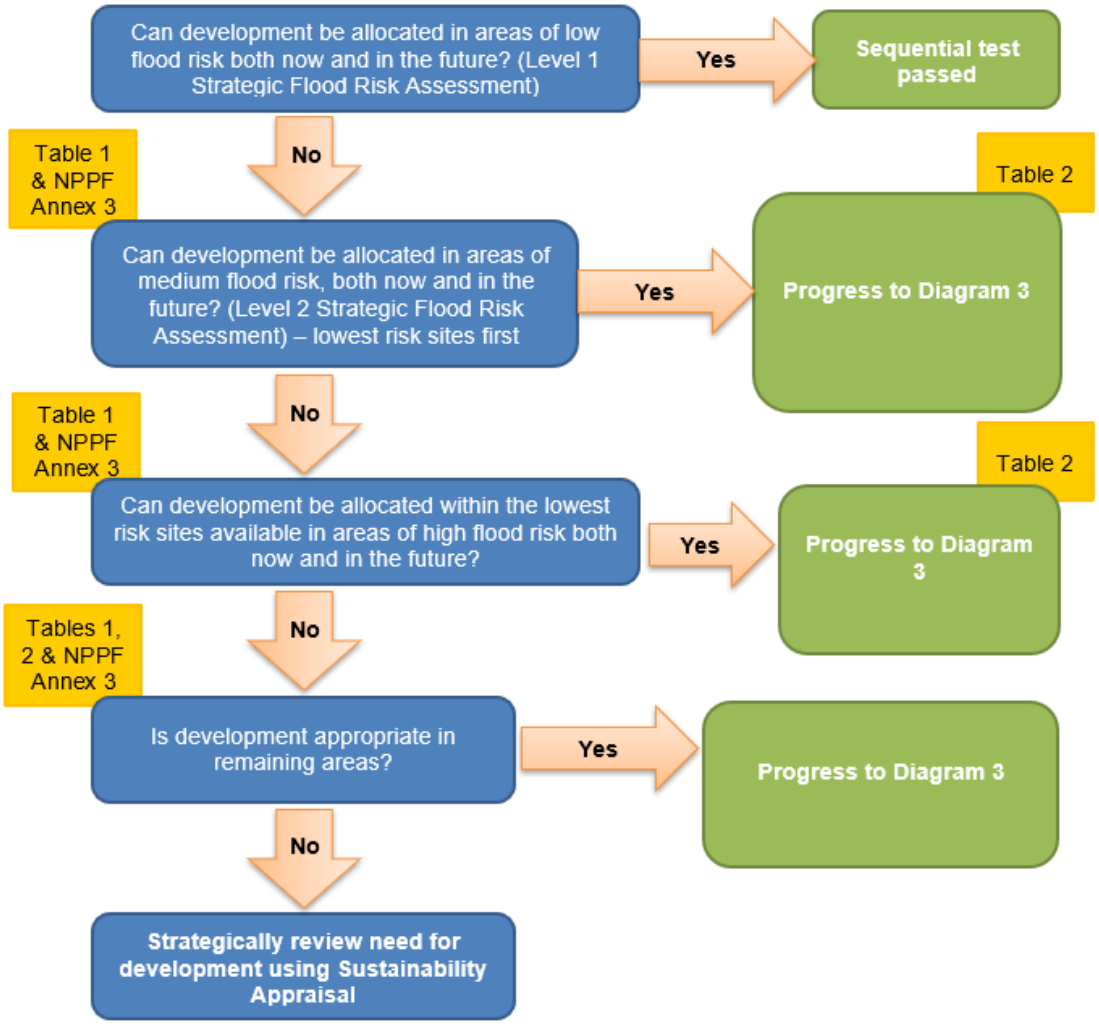


Figure 3-2: Local Plan sequential approach to site allocation.

3.2.5 The Exception Test

It will not always be possible for all new development to be located on land that is not at risk from flooding. To further inform whether land should be allocated, or Planning Permission granted, a greater understanding of the scale and nature of the flood risks is required. In these instances, the exception test will be required.

The exception test should only be applied following the application of the sequential test. It applies in the following instances:

- 'More vulnerable' development in Flood Zone 3a
- 'Essential infrastructure' in Flood Zone 3a or 3b
- 'Highly vulnerable' development in Flood Zone 2
- Any development where a higher risk of surface water has been identified (surface water Zone B) and the site does not clearly show that development can be achieved away from the flood risk.

'Highly vulnerable' development should not be permitted within Flood Zone 3a or Flood Zone 3b. 'More vulnerable' and 'Less vulnerable' development should not be permitted within Flood Zone 3b.

The updated PPG now requires all sources of flood risk to be assessed within the sequential test and therefore it follows that, where sufficient datasets are available, the exception test should also take into account all sources of flood risk.

Figure 3-3 summarises the exception test. For sites proposed for allocation within the Local Plan, the LPA should use the information in this SFRA to inform the exception test. At the planning application stage, the developer must design the site such that it is appropriately flood resistant and resilient in line with the recommendations in national and local planning policy and supporting guidance and those set out in this SFRA. This should demonstrate that the site will still pass the flood risk element of the exception test based on the detailed site level analysis.

For developments that have not been allocated in the Local Plan, developers must undertake the sequential and exception tests and present this information to the LPA for approval. The Level 1 SFRA can be used to scope the flooding issues that a site-specific FRA should investigate in more detail to inform the exception test for windfall sites.

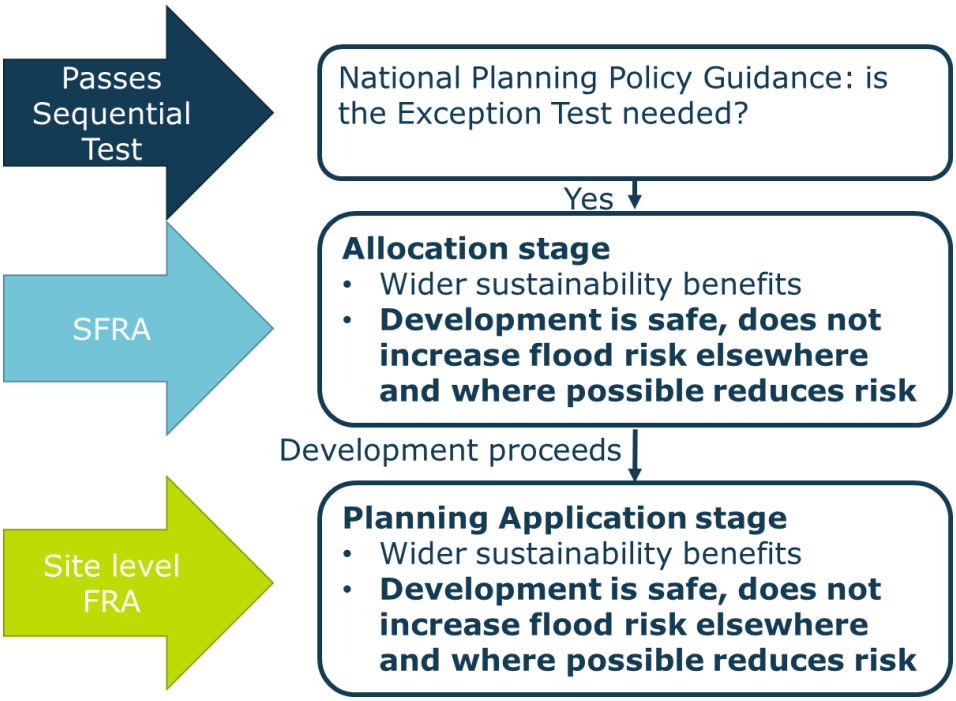


Figure 3-3: The exception test

There are two parts to demonstrating a development passes the exception test:

1. Demonstrating that the development would provide wider sustainability benefits to the community that outweigh the flood risk.

LPAs will need to set out the criteria used to assess the exception test and provide clear advice to developers on the information required. If this information is not provided, the LPA should consider whether the use of planning conditions and / or planning obligations could

allow it to pass the exception test. If this is not possible, this part of the exception test has failed, and planning permission should be refused.

At the stage of allocating development sites, LPAs should consider wider sustainability objectives, such as those set out in Local Plan Sustainability Appraisals. These generally consider matters such as biodiversity, green infrastructure, historic environment, climate change adaptation, flood risk, green energy, pollution, health, transport etc.

The LPA should consider the sustainability issues the development will address and how far doing so will outweigh the flood risk concerns for the site, e.g., by facilitating wider regeneration of an area, providing community facilities, infrastructure that benefits the wider area etc.

2. Demonstrating 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.

In circumstances where the potential effects of proposed development are material a Level 2 SFRA is likely to be needed to inform the exception test for strategic allocations to provide evidence that the principle of development can be supported. At the planning application stage, a site-specific FRA will be needed. Both will need to consider the actual and residual risk and how this will be managed over the lifetime of the development.

3.2.6 Making a site safe from flood risk over its lifetime

LPAs will need to consider the actual and residual risk of flooding and how this will be managed over the lifetime of the development:

- Actual risk is the risk to the site considering existing flood mitigation measures.
- The PPG refers to the 'design flood' against which the suitability of a proposed development should be assessed and mitigation measures, if any, are designed.
- The 'design flood' is defined as the 1% AEP fluvial event or 1% AEP surface water event, plus an appropriate allowance for climate change. Allowances for climate change can be found on the EA website here.
- Safe access and egress should be available during the design flood event. Firstly, the design of the development should seek to avoid areas of a site at flood risk. If that is not possible then access routes should be located above the design flood event levels. Where that is not possible, access through shallow and slow flowing water that poses a low flood hazard may be acceptable.
- Residual risk is the risk that remains after the effects of flood defences have been taken into account and/ or from a more severe flood event than the design event. The residual risk can be:
    - The effects of an extreme 0.1% annual probability flood event. This could lead to the overtopping of flood defences, which may lead to erosion and/or failure, and/ or
    - Structural failure of any flood defences, such as breaches in embankments or walls.

- Flood resistance and resilience measures should be considered to manage any residual flood risk by keeping water out of properties and seeking to reduce the damage caused, should water enter a property. Emergency plans should also account for residual risk, e.g., through the provision of flood warnings and a flood evacuation plans where appropriate.

In line with the NPPF, the impacts of climate change over the lifetime of the development should be taken into account when considering actual and residual flood risk.

3.3 Applying the sequential test and exception test to individual planning applications

3.3.1 Applying the sequential test

HPBC, with advice from the EA, are responsible for considering the extent to which sequential test considerations have been satisfied. Developers are required to apply the sequential test to all development sites, unless the site is:

- A strategic allocation and the test have already been carried out by the LPA as part of preparing the local plan, or
- A change of use (except to a more vulnerable use), or
- A minor development (householder development, small non-residential extensions with a footprint of less than 250m^2), or
- A development in fluvial flood zone 1 unless there are other flooding issues in the area of the development (i.e. surface water, ground water, sewer flooding).

The SFRA contains information on all sources of flooding and takes into account the impact of climate change. This should be considered when a developer undertakes the sequential test, including the consideration of reasonably available sites at lower flood risk.

Local circumstances must be used to define geographical scope of the sequential test (within which it is appropriate to identify reasonably available alternatives). To determine the appropriate search area criteria include the catchment area for the type of development being proposed. For some sites this may be clear, e.g. school catchments, in other cases it may be identified by other Local Plan policies. For some sites, e.g. regional distribution sites, it may be suitable to widen the search area beyond LPA administrative boundaries.

The sources of information on reasonably available sites may include:

- Site allocations in Local Plans
- Sites with Planning Permission but not yet built out
- Strategic Housing and Economic Land Availability Assessments (SHELAAs)/ five-year land supply/ annual monitoring reports
- Locally listed sites for sale

It may be that a number of smaller sites or part of a larger site at lower flood risk form a suitable alternative to a development site at high flood risk. Ownership or landowner agreement in itself is not acceptable as a reason not to consider alternatives.

3.3.2 Applying the exception test

If, following application of the sequential test, it is not possible for the development to be located in areas with a lower probability of flooding the exception test must then be applied (as set out in Table 2 of the PPG). Developers are required to apply the exception test to all applicable sites (including strategic allocations). The applicant will need to provide information that the application can pass both parts of the exception test:

1. Demonstrating that the development would provide wider sustainability benefits to the community that outweigh the flood risk.

- Applicants should refer to wider sustainability objectives in Local Plan Sustainability Appraisals. These often consider matters such as biodiversity, green infrastructure, historic environment, climate change adaptation, flood risk, green energy, pollution, health, transport etc.
- Applicants should assess the suitability issues the development will address and how doing it will outweigh the flood risk concerns for the site, e.g. by facilitating wider regeneration of an area, providing community facilities, infrastructure that benefits the wider area etc.

2. Demonstrating 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.

- The site-specific FRA should demonstrate that the site will be safe, and the residents/occupiers will not be exposed to hazardous flooding from any source. The FRA should consider actual and residual risk and how this will be managed over the lifetime of the development, including:
    - the design of any flood defence infrastructure,
    - access and egress,
    - operation and maintenance,
    - design of the development to manage and reduce flood risk wherever possible,
    - resident awareness,
    - flood warning and evacuation procedures, including whether the developer would increase the pressure on emergency services to rescue people during a flood event, and
    - any funding arrangements required for implementing measures.
- Further guidance on FRAs for new developments can be downloaded from the government website here.

4 Understanding flood risk in High Peak Borough

This section explores the key sources of flooding in High Peak Borough and the factors that affect flooding including topography, soils, and geology. The main sources of flooding affecting High Peak Borough are from watercourses, surface water, and sewers, as detailed in information provided by HPBC, the EA, United Utilities, and Severn Trent Water. In addition, the Peak District National Park have provided information on local flood risk in their State of the Park Report available here.

This is a strategic summary of the risk in High Peak Borough. Developers should use this section to scope out the flood risk issues they need to consider in greater detail in a site-specific FRA to support a Planning Application.

Appendix B contains a list of the sources of data used in the SFRA and the approach to using hydraulic model data to inform the mapping.

4.1 Historical flooding

4.1.1 Historical flood records

As LLFA, DCC provided flood incident reports which detail the major flood events that have occurred in the Borough. A summary of these is provided in Table 4-1. Table 4-2 details the flood events shown within the EA Recorded Flood Outlines dataset. The watercourses and areas affected by these events are detailed further in Appendix E.

Table 4-1: Historic flooding incidents provided by HPBC.

Flood date	Flood source	Flood cause	Receptors
November 2016	Other	Local drainage/ surface water	Internal flooding of five or more residential properties or two or more non-residential (industrial/commercial) properties in Tintwistle.
July 2019	Main river and pluvial	Channel capacity exceedance	Internal flooding to 17 residential properties and 11 commercial/business properties in Whaley Bridge over two separate events between 27th July and 31st July.
July 2019	Main river and other	Channel capacity exceedance local drainage/surface water	Flooding of 32 properties in the Lightwood Road area of Buxton and damage sustained to a culvert.

Table 4-2: Historic flooding incidents shown in the EA Recorded Flood Outlines dataset. These are also shown in Figure 4-1.

Flood date	Flood source	Flood cause	Areas affected
January 1947	Main river Other	Channel capacity exceedance	Fluvial flooding of the River Derwent and River Noe. Areas in villages of Bamford and Shatton affected.
December 1965	Main river other	Channel capacity exceedance	Fluvial flooding of the river Derwent, affecting villages of Bamford and Shatton.
July/August 1973	Main river	Unknown	Areas in Glossop on both banks of Glossop Brook inundated, with some flooding of the River Etherow in Glossop also.
February 1984	Main river	Channel capacity exceedance	Flooding of the River Wye at multiple locations in Buxton and downstream.
January 1995	Unknown	Channel blockage/obstruction	Localised flooding in Chapel Milton village.
October 1998	Main River	Channel capacity exceedance	Inundation of Wooley and Brookfield areas of Hadfield on both banks of the River Etherow. Flooding of River Goyt causing inundation of Whaley Bridge WTW.
October 1999	Unknown	Other	Localised flooding in Chapel Milton village.
October 2000	Main River	Channel blockage/obstruction	Localised flooding of Black Brook near Chapel Milton due to an obstruction/blockage.
November 2000	Main river	Channel capacity exceedance	Flooding downstream of Buxton of the River Wye, inundating rural land.
July 2002	Main River	Channel capacity exceedance	Inundation throughout Glossop town, flooding of both banks of Glossop Brook.
November 2016	Surface Water	Local drainage/surface water	Multiple locations of surface water flooding in Glossop Town and Tintwistle. Localised surface water flooding next to Randall Carr Brook, Horwich End and surface water flooding in Low Leighton.

Flood date	Flood source	Flood cause	Areas affected
		Channel blockage/obstruction	Flooding off the east bank of the River Sett in New Mills.
July 2019	Main River	Channel capacity exceedance	Flooding of both banks of the River Goyt in Whaley Bridge.

In addition, the EA's Historic Flood Map (HFM) shows areas of land that have been previously subject to fluvial flooding in the area. This includes flooding from rivers, the sea and groundwater springs but excludes surface water. The HFM outlines for High Peak Borough are shown in Figure 4-1 alongside the Recorded Flood Outlines (RFO) which also show records of historic flooding from surface water and are included in the Interactive Mapping Portal. Please note some of the historic extents may refer to older historic flood events, prior to flood defence improvements.

A list of historic sewer flooding incidences across the Borough was provided by United Utilities and Severn Trent Water and is available in Table 4-3 and Table 4-4.

4.1.2 Section 19 Flood Investigations

Under the Flood and Water Management Act (2010), the Lead Local Flood Authority (LLFA) has a duty to investigate flood incidences, where considered necessary or appropriate and produce a report. Section 19 Flood Investigation reports by DCC detailing the flood events, recommendations and conclusions, can be requested on their website here, for the following locations:

- Bonsall
- Borrowash
- Breadsall
- Buxton
- Clowne
- Findern
- Matlock
- New Houghton
- Ockbrook
- Scropton
- Stanley
- Tintwistle
- Wash Green
- Whaley Bridge

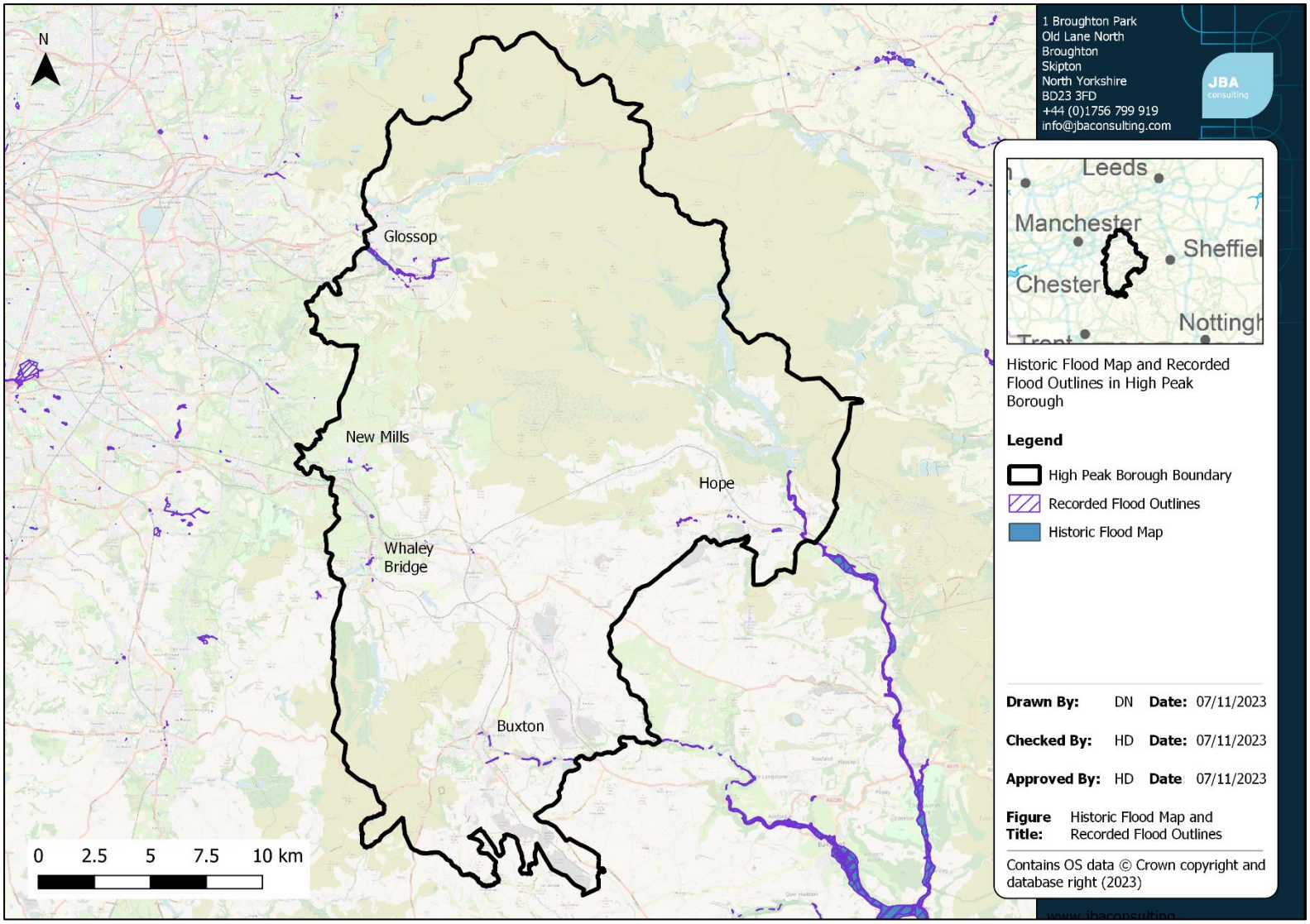


Figure 4-1: Historic Flood Map and Recorded Flood Outlines across High Peak Borough

4.2 Topography, geology, soils, and hydrology

The topography, geology and soil are all important in influencing the way the catchment responds to a rainfall event. The degree to which a material allows water to percolate through it, the permeability, affects the extent of overland flow and therefore the amount of run-off reaching the watercourse. Steep slopes or clay rich (low permeability) soils will promote rapid surface runoff, whereas more permeable rock such as limestone and sandstone may result in a more subdued response.

4.2.1 Topography

Figure 4-2 shows how the topography of High Peak Borough comprises high elevation peaks in the centre and north of the Borough with a maximum elevation of approximately 636 mAOD at Kinder Scout, with watercourses draining from these high elevation areas in all directions. Watercourses such as the River Sett and Glossop Brook flow from this high elevation area to the west, while Rivers Alport, Ashop, Noe, and Derwent flow to the east. The lowest elevation areas are found on the boundaries of the Borough where settlements such as Glossop, Hadfield, and New Mills are located.

4.2.2 Geology

Information on the bedrock and superficial geology in the Borough can be viewed online in the British Geology Society Geology Viewer.

In the north of High Peak Borough bedrock geology is primarily comprised of sedimentary sandstone, mudstone and siltstone formations with Pennine lower coal formations found in the western side of the Borough. South-east of Chapel-en-le-Frith, bedrock geology in the Borough is comprised primarily limestone with igneous intrusions and members present.

The EA also provides mapping of different types of aquifers, the underground layers of water-bearing permeable rock from which groundwater can be extracted. Aquifers are designated as either principal or secondary aquifers. Principal aquifers are designated by the EA as strategically important rock units that have high permeability and water storage capacity. In High Peak Borough there is an area of principal aquifer in the south-east, containing smaller areas of secondary aquifer but the majority of the Borough has secondary aquifer designation when considering the bedrock geology. The aquifer designations across the Borough for bedrock geology are shown in Figure 4-3.

In the northern region of the Borough, superficial peat deposits are widely present, particularly at higher elevations. Superficial deposits are less widespread in the south-west of the Borough with only small areas of head deposits and where alluvium deposits are present in channels.

4.2.3 Soils

Soils in the northern region of High Peak Borough at high elevations are comprised of naturally wet blanket bog peat, with more acidic loamy soils with peaty surfaces present in

the valleys. These more acidic, loamy soils tend to be slowly permeable and freely draining. Towards the south-east of the Borough, soils are primarily comprised of base-rich, freely draining soils, with some shallow lime-rich soils which are also freely draining.

Mapping showing soils information across the Borough can be viewed online through the BGS website here.

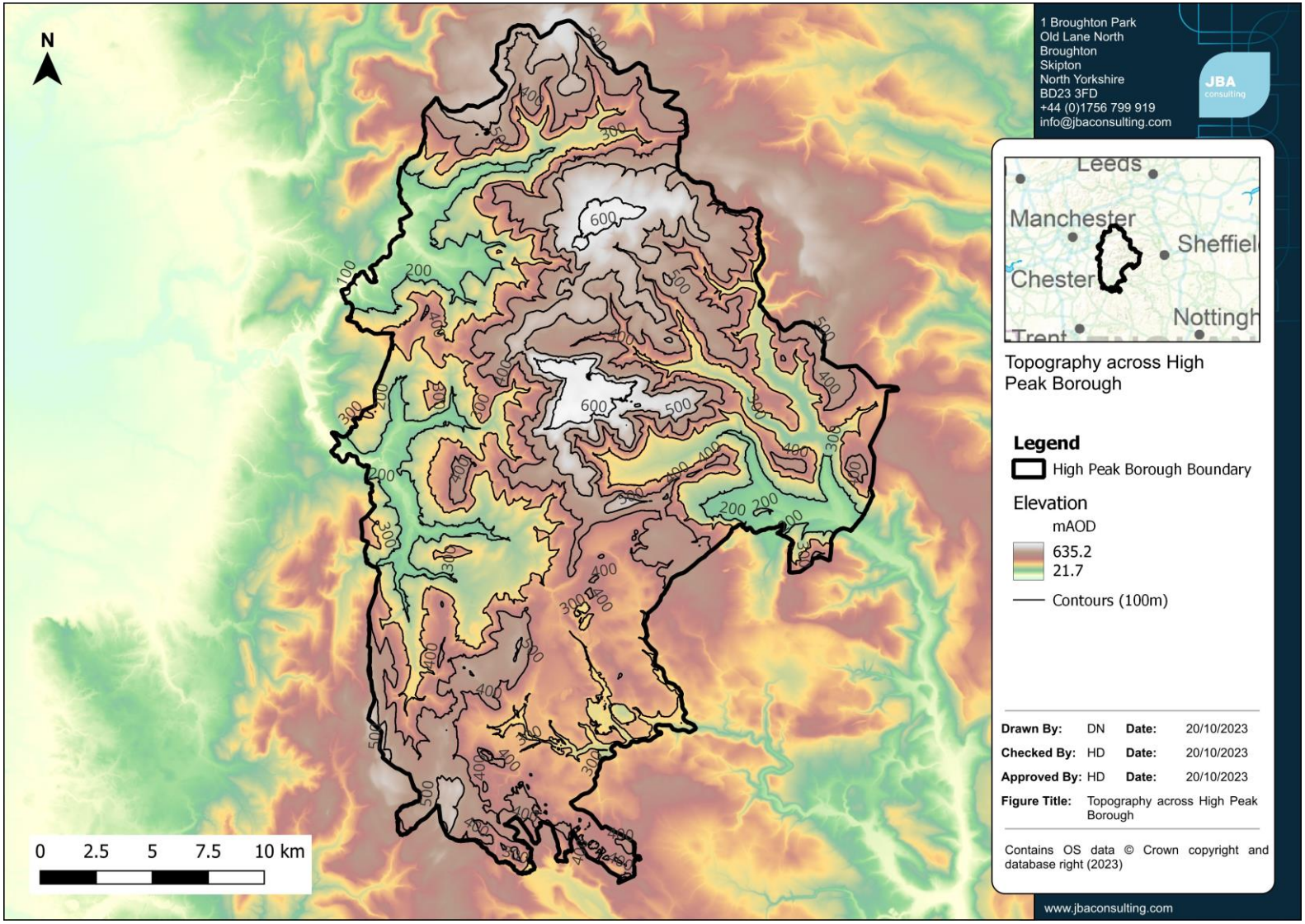


Figure 4-2: OS Terrain 50 dataset showing topography across High Peak Borough

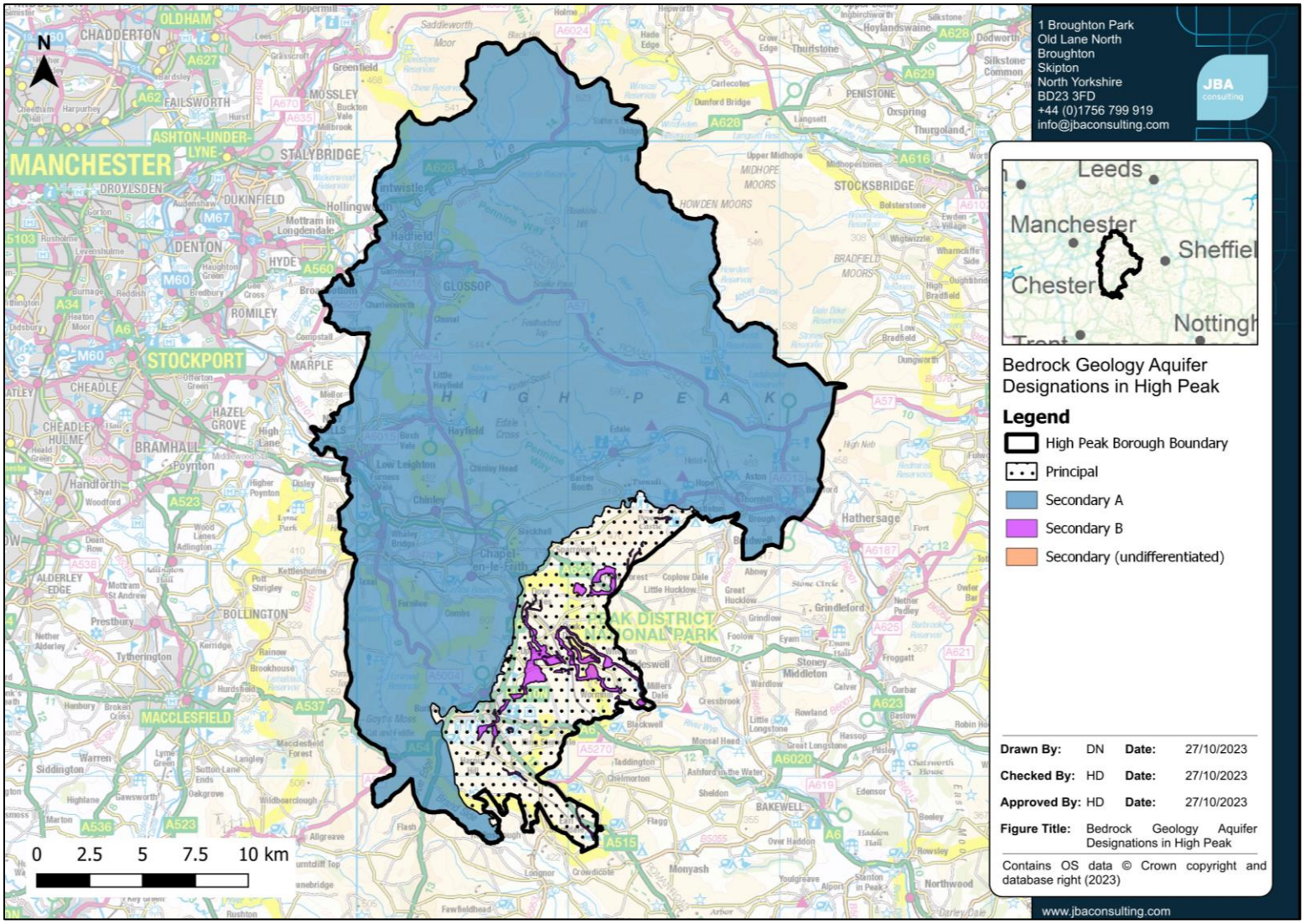


Figure 4-3: Aquifer designations based on bedrock geology across High Peak Borough

4.3 Fluvial flood risk

The major watercourses flowing through the High Peak Borough are:

- Glossop Brook and its tributary Long Clough Brook
- River Goyt and its tributary Black Brook
- River Sett
- River Noe
- River Derwent
- River Wye
- River Etherow

Tributaries of these watercourses include smaller ordinary watercourses and numerous unnamed drains. There are also several ponds and lakes within the study area. A map of the key watercourses is included in Figure 1-3 and in the Interactive Mapping Portal.

The primary fluvial flood risk in High Peak Borough is from rivers running through developed areas such as the River Goyt, Glossop Brook, Black Brook and the River Derwent. Much of this flood risk is found near the Borough boundary, in areas of lower elevation.

The Flood Zone maps for the High Peak Borough are provided in the Interactive Mapping Portal, split into Flood Zones 2, 3a, and 3b. Section 3.2.1 describes how the fluvial Flood Zones have been derived for this SFRA. The flood risk associated with the major locations in the Borough of High Peak are detailed in Appendix E.

4.4 Surface water flooding

Surface water runoff is most likely to be caused by intense downpours e.g. thunderstorms. At times the amount of water falling can completely overwhelm the drainage network, which is not designed to cope with extreme storms. The flooding can also be complicated by blockages to drainage networks, sewers being at capacity and/ or high-water levels in watercourses that cause local drainage networks to back up.

The EA Risk of Flooding from Surface Water mapping (RoFSW) highlights several communities in High Peak Borough at risk from surface water flooding. Surface water flow paths generally follow the topography of existing watercourses, although there are some areas at risk from isolated ponding. Additionally, surface water flow routes are also established on roads in the more urban areas within the Borough, highlighting risk to transport networks while posing a risk to buildings which water can be routed to. The RoFSW mapping for the High Peak Borough can be found in the Interactive Mapping Portal.

4.5 Sewer flooding

Sewer flooding occurs when intense rainfall/river flooding overloads sewer capacity (surface water, foul or combined), and/or when sewers cannot discharge to watercourses due to high water levels.

Sewer flooding can also be caused by blockages, collapses, equipment failure or groundwater leaking into sewer pipes.

Since 1980, the Sewers for Adoption guidelines mean that new surface water sewers have been designed to have minimum capacity for a 3.3% AEP rainfall event, although until recently this did not apply to smaller private systems. This means that sewers can be overwhelmed in larger rainfall and flood events.

New developments should not cause additional pressures on existing sewers due to the requirements to maintain greenfield runoff rates. However, increases in rainfall as a result of climate change can lead to existing sewers reaching capacity, although this can be reduced through the use of well-designed SuDS to reduce surface water runoff.

United Utilities and Severn Trent Water are the water companies responsible for the management of the drainage networks across the High Peak Borough. United Utilities and Severn Trent Water provided a record of flooding incidents relating to public foul, combined or surface water sewers from January 2000 until May 2022. Table 4-3 and Table 4-4 below display this data using truncated postcodes to avoid identifying specific streets or properties.

Table 4-3: Sewer flooding incidents recorded by United Utilities (January 1990 - May 2023)

Postcode	Number of recorded incidents 2023	Number of recorded incidents 2022	Number of recorded incidents 2021	Number of recorded incidents 2020	Number of recorded incidents from 1990-2020	Total flooding incidents
SK13 7	0	0	0	0	8	**8**
SK13 8	0	2	0	0	11	**13**
SK13 2	0	3	0	0	0	**3**
SK13 6	0	3	0	2	3	**8**
SK22 1	0	0	0	0	2	**2**
SK22 4	0	0	0	0	2	**2**
SK23 0	0	1	6	8	9	**24**
SK23 6	0	0	1	6	13	**20**
SK23 7	0	0	2	0	29	**31**
SK23 9	0	0	0	2	11	**13**

Table 4-4: Sewer flooding incidents recorded by Severn Trent Water (January 1990 - May 2023)

Postcode	Number of recorded incidents 2023	Number of recorded incidents 2022	Number of recorded incidents 2021	Number of recorded incidents 2020	Number of recorded incidents from 1990-2020	Total flooding incidents
SK17 9	0	0	10	0	54	**64**
SK17 7	1	2	0	1	2	**6**
SK17 0	0	0	0	0	3	**3**
SK17 6	0	0	0	1	3	**4**
SK17 8	0	1	0	2	6	**9**
S32 3	0	0	0	0	5	**5**
S33 0	0	6	6	6	6	**24**
S33 6	0	0	3	0	19	**22**
S33 8	0	0	1	0	0	**1**

4.5.1 Further information provided by United Utilities

Where a risk of flooding from the public sewer is identified, applicants/ site promoters must engage with the wastewater undertaker to consider the masterplanning for the site, the detailed design and the drainage details, including details of foul drainage arrangements. The risk of sewer flooding could affect the developable area of the site. Site promoters/ applicants must engage with the wastewater undertaker prior to any masterplanning to assess the flood risk and ensure development is not located in an area at risk of flooding from the public sewer.

Applicants should consider site topography and any exceedance flow paths. Resultant layouts and levels should take account of such existing circumstances. Applicants must demonstrate that the proposed development would be safe and not lead to increased flood risk. Applicants should not assume that changes in levels or changes to the public sewer, including diversion, will be acceptable as such proposals could increase/ displace flood risk.

It may be necessary to apply the sequential approach and incorporate mitigating measures subject to the detail of the development proposal. Careful consideration will need to be given to the approach to drainage including the management of surface water; the point of connection; whether the proposal will be gravity or pumped; the proposed finished floor and ground levels; the management of exceedance paths from existing and proposed drainage systems and any appropriate mitigating measures to manage any risk of sewer surcharge.

4.6 Groundwater flooding

In general, less is known about groundwater flooding than other sources and availability of data is limited. Groundwater flooding can be caused by:

- High water tables, influenced by the type of bedrock and superficial geology.
- Seasonal flows in dry valleys, which are particularly common in areas of chalk geology.
- Rebounding groundwater levels, where these have been historically lowered for industrial or mining purposes.
- Where there are long culverts that prevent water easily getting into watercourses.

Groundwater flooding is different to other types of flooding. It can last for days, weeks, or even months and is much harder to predict and warn for. Monitoring does occur in certain areas, for example where there are major aquifers or when mining stops.

Two datasets were used to assess potential areas that are likely to be at higher risk of groundwater flooding:

- The EA's Areas Susceptible to Groundwater Flooding (AStGWF) dataset, showing the degree to which areas are susceptible to groundwater flooding based on geological and hydrogeological conditions. It does not show the likelihood of groundwater flooding occurring, i.e., it is a hazard, not risk, based dataset.
- The JBA Groundwater Emergence map, showing the risk of groundwater flooding to both surface and subsurface assets, based on predicted groundwater levels. This divides groundwater emergence into five categories:
    - Groundwater levels are either at or very near (within 0.025m of) the ground surface. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
    - Groundwater levels are between 0.025m and 0.5m below the ground surface. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
    - Groundwater levels are between 0.5m and 5m below the ground surface. There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
    - Groundwater levels are at least 5m below the ground surface. Flooding from groundwater is not likely.
    - No risk. This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

In this SFRA, a three-stage approach has been adopted to assess the risk of groundwater flooding:

- Firstly, the AStGWF dataset was used to identify grid squares that are most susceptible to groundwater flooding. Based on this dataset, any areas with greater than 50% susceptibility to groundwater flooding were taken forward for further analysis. This resulted in 30 out of 491 grid squares across High Peak Borough being taken forward, which were generally located in the west of the Borough, near the Rivers Goyt, River Sett, and River Etherow. Squares in the east were located around Hope and Booth.
- Of the areas identified in the above, the JBA groundwater emergence map was used to locate areas where this groundwater is most likely to emerge. For this assessment, areas where groundwater levels are predicted to be within 0.5m of the surface level were identified.
- Upon identifying likely areas of groundwater emergence, the 0.1% AEP surface water extent from the EA's RoFSW map was used to identify where any groundwater emerging in these locations is most likely to flow.

The results of this assessment are summarised in Appendix E. It should be noted that this assessment only identifies areas likely to be at risk of groundwater emergence and where this water might flow. It does not predict the likelihood of groundwater emerging or attempt to quantify the volumes of groundwater that might be expected to emerge in a given area.

The JBA Groundwater Emergence map and the EA AStGWF dataset for High Peak Borough are shown on the council's Interactive Mapping Portal (see Appendix A for more information). In high-risk areas, a site-specific risk assessment for groundwater flooding may be required to fully inform the likelihood of flooding.

4.7 Flooding from canals

Canals are regulated waterbodies and are unlikely to flood unless there is a sudden failure of an embankment or a sudden ingress of water from a river in areas where they interact closely. Embankment failure can be caused by:

- Culvert collapse
- Overtopping
- Animal burrowing
- Subsidence/ sudden failure e.g., collapse of former mine workings
- Utility or development works close or encroaching onto the footings of a canal embankment.

Flooding from a breach of a canal embankment is largely dictated by canal and ground levels, canal embankment construction, breach characteristics and the volume of water within the canal that can discharge into the lower lying areas behind the embankment. The volume of water released during a breach is dependent on the pound length (i.e. the distance between locks) and how quickly the operating authorities can react to prevent further water loss, for example by the fitting of stop boards to restrict the length of the canal

that can empty through the breach, or repair of the breach. The Canal and River Trust monitor embankments at the highest risk of failure.

There is one canal in the High Peak Borough: The Peak Forest Canal. This has a canal feeder connecting from Combs Reservoir. The canal runs through the west of the Borough, through the urban centres of Buxworth, Hockerley, Furness Vale and New Mills as displayed in Figure 4-4. The canal often runs parallel to the River Goyt in these areas. The Canal and River Trust were consulted to identify any instances of breaches and overtopping of the canal. The data provided showed five recorded overtopping incidents which occurred on the canal feeder from Combs Reservoir, and one recorded breach at Horwich End.

The canals have the potential to interact with other watercourses in the study area, including the River Goyt and other smaller watercourses. These have the potential to become flow paths if these canals were overtopped or breached. Any development proposed adjacent to a canal should include a detailed assessment of how a canal breach would impact the site, as part of a site-specific Flood Risk Assessment. Guidance on development near canals is available from the Canal and River Trust.

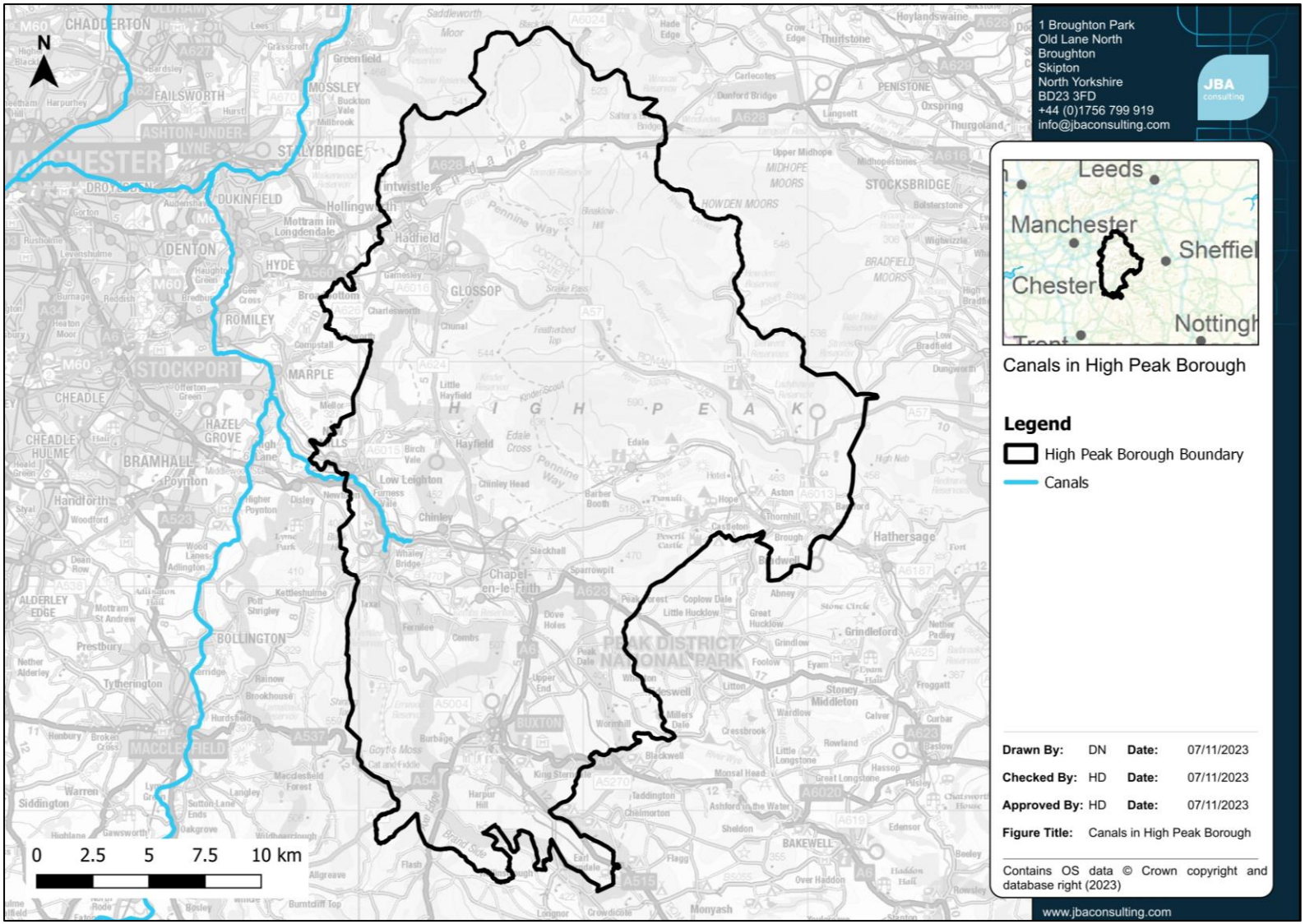


Figure 4-4: Location of canals in High Peak Borough

4.8 Flooding from reservoirs

Reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoirs Act 1975, available on the Government website here, and are on a register held by the EA. The level and standard of inspection and maintenance required by a Supervising Panel of Engineers under the Act means that the risk of flooding from reservoirs is very low. Flooding from reservoirs occurs following partial or complete failure of the control structure designed to retain water in the artificial storage area. Reservoir flooding is very different from other forms of flooding; it may happen with little, or no warning and evacuation will need to happen immediately. The likelihood of such flooding is difficult to estimate but is extremely low compared to flooding from other sources. It may not be possible to seek refuge upstairs from floodwater as buildings could be unsafe or unstable due to the force of water from the reservoir breach or failure.

The EA hold mapping showing what might happen if reservoirs fail. Developers and planners should check the Long-Term Risk of Flooding website before using the reservoir data shown in this SFRA to make sure they are using the most up to date mapping. The EA provide two flooding scenarios for the reservoir flood maps: a ‘dry-day’ and a ‘wet-day’. The ‘dry day’ scenario shows the predicted flooding which would occur if the dam or reservoir fails when rivers are at normal levels. The ‘wet day’ scenario shows the predicted worsening of the flooding which would be expected if a river is already experiencing an extreme natural flood. It should be noted that these datasets give no indication of the likelihood or probability of reservoir flooding.

The current mapping shows that there are nineteen reservoirs located within High Peak Borough, detailed in Table 4-5, with their locations shown in Figure 4-5. There is one more reservoir located outside High Peak Borough but whose flood extents lie within High Peak Borough boundary. Section 8.4.3 provides further considerations for developing in the vicinity of reservoirs. The reservoir flood mapping for both the ‘dry day’ and ‘wet day’ scenarios in High Peak Borough can be viewed on the Interactive Mapping Portal. The EA maps represent a credible worst-case scenario. In these circumstances it is the time to inundation, the depth of inundation, the duration of flooding and the velocity of flood flows that will be most influential.

4.8.1 Toddbrook Reservoir incident

In August 2019, the spillway at Toddbrook Reservoir failed as a result of heavy rainfall between 27 July and 1 August. A full-scale emergency was declared and 1500 people were evacuated from Whaley bridge, the town immediately downstream, as a precaution. In response, urgent measures were taken to stabilise the dam and the water level was drawn down. An Independent Review Report determined that the most likely cause of the spillway failure was design of the spillway being inadequate for conveying the probable maximum flood, which was exacerbated by intermittent maintenance. Recommendations from this report included a minimum of one year between inspections by Inspecting and Supervising Engineers and new EA commissioned guidance on spillway failure mechanisms and how to undertake spillway inspections.

Table 4-5: Reservoirs within High Peak Borough. The locations of these reservoirs are shown in Figure 4-5.

Reservoir	Easting and Northing	Reservoir owner	Risk Category	Category	Year built	Surface Area (m^2)	Local Authority
Errwood	401471, 375293	United Utilities PLC	High	Unknown	1967	310400	High Peak
Fernilee	401396, 376939	United Utilities PLC	High	Unknown	1938	314600	High Peak
Combs	403689, 379623	Canal & River Trust	High	Unknown	1797	290040	High Peak
Toddbrook	400559, 380959	Canal & River Trust	High	Unknown	1838	145687	High Peak
Kinder	405758, 388199	United Utilities PLC	High	Unknown	1911	180000	High Peak
Ladybower	418898, 387747	Severn Trent Water	High	Unknown	1943	2104000	High Peak
Derwent	417115, 390967	Severn Trent Water	High	Unknown	1902	708200	High Peak
Woodhead	409328, 399723	United Utilities PLC	High	Unknown	1877	546326	High Peak
Torside	406433, 398384	United Utilities PLC	High	Impounding	1864	647497	High Peak

Reservoir	Easting and Northing	Reservoir owner	Risk Category	Category	Year built	Surface Area (m^2)	Local Authority
Rhodeswood	404658, 398261	United Utilities PLC	High	Impounding	1855	204000	High Peak
Valehouse	403663, 397762	United Utilities	High	Compensation reservoir	1869	254952	High Peak
Bottoms	402663, 396959	United Utilities	High	Compensation reservoir	1877	202343	High Peak
Swineshaw	404253, 395808	United Utilities PLC	High	Impounding	1837	47880	High Peak
Arnfield	401303, 397348	United Utilities	High	Impounding	1854	157827	High Peak
Birch Vale Lodge	402591, 387042	Mr John Anthony Volpicelli	High	Unknown	Unknown	20234	High Peak
Hope Works Lagoon 1 & 2	417087, 382353	Breedon Cement	High	Unknown	Unknown	33400	High Peak
Hope Works Lagoon 3	417350, 382404	Breedon Cement	High	Unknown	Unknown	14900	High Peak
Hope Works Lagoon 4	417565, 382342	Breedon Cement	High	Unknown	Unknown	20500	High Peak
Howden	416980, 392608	Severn Trent Water	High	Unknown	1912	616000	Sheffield (Western Half in High Peak)

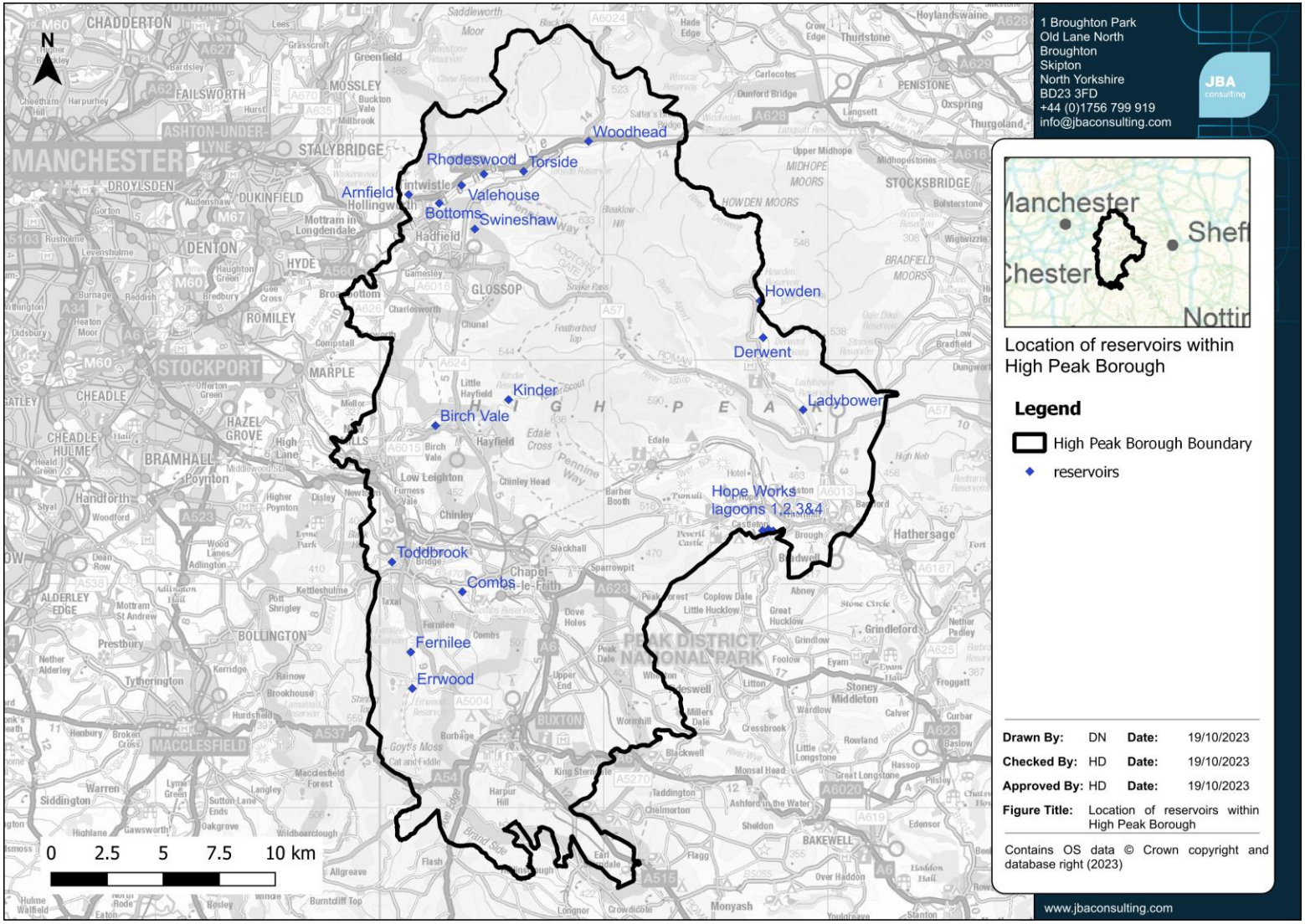


Figure 4-5: Location of reservoirs within High Peak Borough

As above, the risk of reservoir flooding is extremely low. However, there remains a residual risk to development from reservoirs which developers should consider during the planning stage.

- Developers should seek to contact the reservoir owner to obtain information which may include:
  - Reservoir characteristics: type, dam height at outlet, area/volume, overflow location.
  - Operation: discharge rates/maximum discharge.
  - Discharge during emergency drawdown.
  - Inspection/maintenance regime.
- Developers should apply the sequential approach to locating development within the site.
- Consult with relevant authorities regarding emergency plans in case of reservoir breach.
- The reservoir owners are contacted to confirm the Reservoir Risk Designation (if determined) and the inspection and maintenance regime of the reservoir.
- Consider the impact of a breach and overtopping, particularly for sites proposed to be located immediately downstream of a reservoir. This should consider whether there is sufficient time to respond.
- It should also be understood that the “risk category” of a reservoir is set by the potential damage and loss of life in circumstances where there is a breach or an extreme flood event. Accordingly, it is possible that allocation of new development downstream of an existing reservoir could potentially change the risk category and result in a legal requirement (under the Reservoirs Act 1975) to improve the structural and hydraulic capacity of the dam. As the cost of implementing such works can be substantial consideration should be given to considering the implications and whether it would be more appropriate to place development in alternative locations not associated with such risk.
- The EA online Reservoir Flood Maps contain information on the extents following a reservoir breach (note: flood extents are not included for smaller reservoirs or for reservoirs commissioned after the reservoir modelling programme began in October 2016). For proposed sites located within the extents, consideration should be given to the extents shown in these online maps.
- In addition to the risk of inundation, those considering development in areas affected by breach events should also assess the potential hydraulic forces imposed by the rapid flood event and check that that the proposed infrastructure fabric can withstand the loads imposed on the structures by a breach event.

4.9 Flood alerts and flood warnings

The EA is the lead organisation for providing warnings of river flooding. Flood Warnings are supplied via the Flood Warning System (FWS) service, to homes and business within Flood Zones 2 and 3.

There are currently 7 Flood Alert Areas (FAA) and 9 Flood Warning Areas (FWAs) covering High Peak Borough. Flood Alerts are issued when there is water out of bank for the first time anywhere in the catchment, signalling that 'flooding is possible', and therefore Flood Alert Areas usually cover the majority of main river reaches. Flood Warnings are issued to designated Flood Warning Areas (i.e., properties within the extreme flood extent which are at risk of flooding), when the river level hits a certain threshold; this is correlated between the FWA and the gauge, with a lead time to warn that 'flooding is expected'.

The FAAs and FWAs are listed in Appendix D and included in the Interactive Mapping Portal.

4.10 Summary of flood risk in High Peak Borough

A table summarising all sources of flood risk to key settlements in High Peak Borough can be found in Appendix E. For this summary, the Borough has been delineated into 4 Character Areas, taking consideration of Parish boundaries, socioeconomic, and future planning characteristics. The Character Areas are detailed below and shown in Figure 4-6:

- Character Area 1 covers the Hope Valley region in the east of the Borough, containing the villages Bamford, Thornhill and Castleton and is largely rural in nature and lies entirely within the Peak District National Park.
- Character Area 2 is located towards the north and north-west of the Borough and contains the towns of Glossop and Hadfield. Around two thirds of the character area is rural.
- Character Area 3 is in the west of the Borough and contains the towns of New Mills, Whaley Bridge, and Chapel-en-le-Frith. Over three quarters of the character area is rural.
- Character Area 4 is in the south of the Borough and contains the town of Buxton, the majority of the character area is also rural.

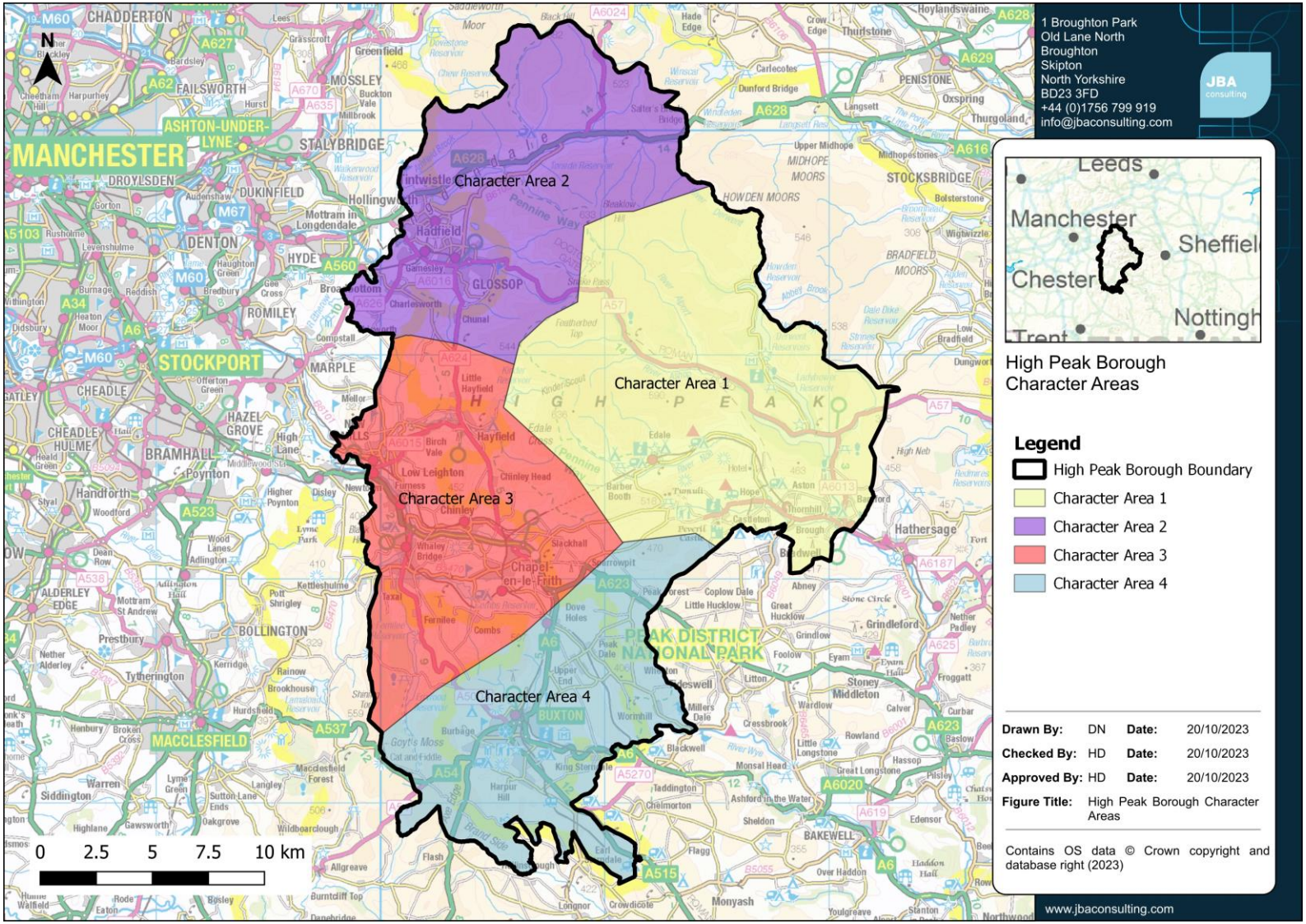


Figure 4-6: Character areas used to summarise the flood risk across High Peak Borough

5 Impact of Climate Change

Climate change projections show an increased chance of warmer, wetter winters and hotter, drier summers with a higher likelihood of more frequent and intense rainfall. This is likely to make severe flooding happen more often.

The NPPF sets out that flood risk should be managed over the lifetime of a development, taking climate change into account. This section sets out how the impact of climate change should be considered.

5.1 Revised climate change guidance

The Climate Change Act 2008 creates a legal requirement for the UK to put in place measures to adapt to climate change and to reduce carbon emissions by at least 80% below 1990 levels by 2050. This was updated in June 2019 under the Climate Change Act 2008 (2050 Target Amendment) Order to a 100% reduction (or net zero) by 2050. The full Act is available on the Government website here and the amendment order is available on the Government website here.

In 2018, the government published new UK Climate Projections (UKCP18). The EA used these projections to update their climate change guidance for new developments with regards to updated fluvial and rainfall allowances. The EA published updated peak river flow climate change allowances in July 2021 for use in both strategic and site-specific FRAs. The guidance adopts a risk-based approach considering the vulnerability of the development and considers risk allowances on a management catchment level, rather than a river basin level. The guidance was further updated in May 2022 to provide updated climate change allowances for rainfall.

Before undertaking a detailed FRA, developers should check the government website for the latest guidance.

5.1.1 Applying the Climate Change Guidance

To apply the appropriate climate change guidance to a site, the following information is required:

- The vulnerability of the development – see Annex 3 in the NPPF.
- The likely lifetime of the development – in general 75 years is used for commercial development and 100 for residential, but this needs to be confirmed in an FRA. For development that will have an anticipated lifetime significantly beyond 100 years a higher allowance is required.
- The Management Catchment (assigned by the EA) that the site is located in (as shown in Figure 5-1).
    - Most of High Peak Borough lies across two Management Catchments: Upper Mersey and Derwent Derbyshire.
    - The west of the Borough lies in the Upper Mersey Catchment

- The east of the Borough lies within the Derwent Derbyshire Catchment
- Small sections to the south of the Borough lie within the Weaver Gowy and Dove Management Catchments.

Developers should consider the following when deciding which allowances to use to address flood risk for a development or local plan allocation:

- Likely depth, speed, and extent of flooding for each allowance of climate change over time considering the allowances for the relevant epoch (2020s, 2050s and 2080s).
- The 'built in' resilience measures used, for example, raised floor levels.
- The capacity or space in the development to include additional resilience measures in the future, using a 'managed adaptive' approach.

Developers should refer to the EA guidance when considering which climate change allowances to use, available on the government website here.

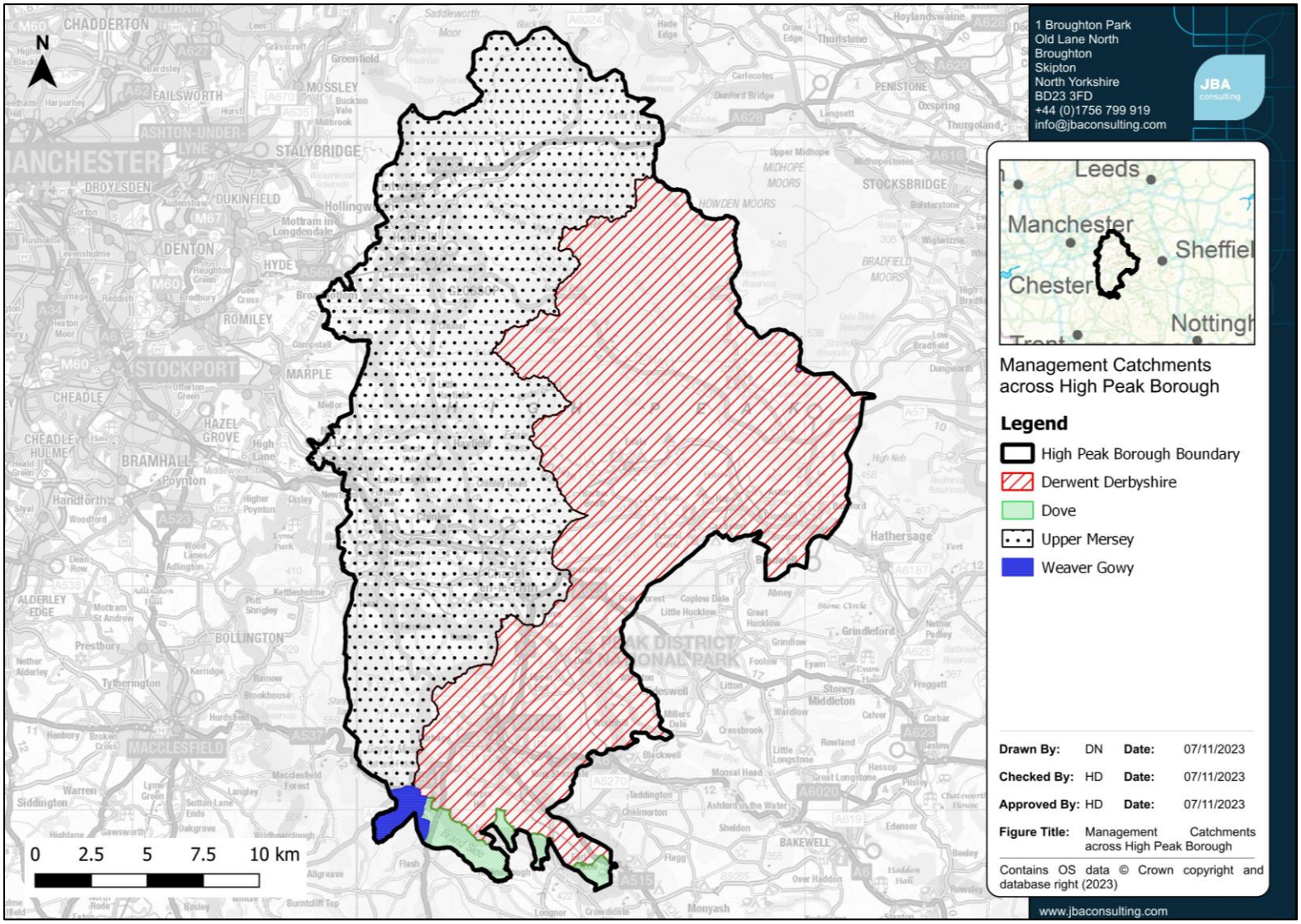


Figure 5-1: Management Catchments (assigned by the EA) across High Peak Borough

5.2 Relevant allowances for High Peak Borough

Table 5-1 shows the updated peak river flow allowances that apply in High Peak Borough for fluvial flood risk for the Upper Mersey and Derwent Derbyshire Management Catchments. These allowances supersede the previous allowances by River Basin District.

The range of allowances are based on percentiles which describe the proportion of possible scenarios that fall below an allowance level:

- The central allowance is based on the 50th percentile (exceeded by 50% of the projections in the range).
- The higher central allowance is based on the 70th percentile (exceeded by 30% of the projections in the range).
- The upper end allowance is based on the 95th percentile (exceeded by 5% of the projections in the range).

Table 5-1: Peak river flow allowances for the Management Catchments which cover High Peak Borough

Management Catchment	Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2115)
Upper Mersey	Upper end	27	51	85
Upper Mersey	Higher central	17	31	53
Upper Mersey	Central	13	22	41
Derwent Derbyshire	Upper end	29	38	63
Derwent Derbyshire	Higher central	18	23	39
Derwent Derbyshire	Central	13	17	29

Table 5-2 shows the updated rainfall intensity allowances that apply in High Peak for surface water flood risk for the different Management Catchments. These allowances supersede the previous country-wide allowances. Peak rainfall intensity allowances should be used for site-scale applications and for surface water flood mapping in small catchments (less than 5km^2) and urbanised drainage catchments.

Table 5-2: Peak rainfall intensity allowances for small and urban catchments for the Management Catchments which cover High Peak Borough

Management Catchment	Allowance category	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 3.3% AEP	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 1% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 1% AEP
Upper Mersey	Upper end	35	40	40	45
Upper Mersey	Central	20	25	30	30
Derwent Derbyshire	Upper end	35	40	35	40
Derwent Derbyshire	Central	20	20	25	30

5.3 Representing climate change in the Level 1 SFRA

Representation of climate change within the SFRA was agreed with the EA. The fluvial hydraulic models received from the EA were reviewed to determine their age, type of model, and the outputs available. A pragmatic approach was then taken to determine a methodology which aims to make best use of the available model data whilst balancing the timescales and budgets. More detailed modelling of different climate change scenarios may need to be considered further if and when a Level 2 assessment is required or during a site-specific flood risk assessment.

The sections below detail the approaches taken to consider climate change for fluvial and surface water flooding.

5.3.1 Fluvial Climate Change

The following model and allowances were used to represent the 2080s Central climate change estimate:

- Hogshaw Nun - 1% AEP plus 29% climate change

The following model and allowances were used to represent the 2080s Higher Central climate change estimate:

- Hogshaw Nun - 1% AEP plus 39% climate change

For all other watercourses, a proxy approach was implemented as follows:

- 1% AEP (Flood Zone 3a) plus climate change scenario
  - where hydraulic modelling was available, the 0.1% AEP outline was used as an indicative climate change extent. Where not available, Flood Zone 2 was used.
- 3.3% AEP (Flood Zone 3b) plus climate change scenario
  - where hydraulic modelling was available, the 1% AEP outline was used as an indicative climate change extent. Where not available, Flood Zone 3a was used.
- 0.1% AEP (Flood Zone 2) plus climate change scenario
  - there is currently no available flood extent which could be used as a proxy. It is therefore recommended that developers undertake detailed modelling as part of their detailed site assessment as part of the planning application process when preparing FRAs.

Extents are presented in the Interactive Mapping Portal, and Appendix B details all models used in this assessment.

5.3.2 Surface Water Climate Change

Modelled Climate Change uplifts for the 3.3% and 1% AEP events for the 2070s are included as part of this SFRA and are presented in the Interactive Mapping Portal. As the study area is covered by two management catchments, as shown in Figure 5-1, the following uplifts have been used:

For the western half of the Borough (Upper Mersey Management Catchment):

- 3.3% AEP with 30% and 40% uplifts
- 1% AEP with 30% and 45% uplifts

For the eastern half of the Borough (Derwent Derbyshire Management Catchment):

- 3.3% AEP with 25% and 35% uplifts
- 1% AEP with 30% and 40% uplifts

In addition, the 0.1% AEP surface water extent can be used as an indication of surface water risk from smaller watercourses which are too small to be covered by the EA's Flood Zones.

5.3.3 Climate Change within Flood Risk Assessments

Developers will need to undertake a more detailed assessment of climate change as part of the planning application process when preparing FRAs, using the percentage increases which relate to the proposed lifetime and the vulnerability classification of the development. In areas where no modelling is present, this may require development of a 'detailed' hydraulic model, using channel topographic survey. Developers should consult the EA to provide further advice on how best to apply the new climate change guidance.

When undertaking a site-specific FRA, developers should:

- Confirm which national guidance on climate change and new development applies by visiting the Government website here.
- Apply this guidance when deciding the allowances to be made for climate change, having considered the potential sources of flood risk to the site (using this SFRA), the vulnerability of the development to flooding and the proposed lifetime of the development. If the site is just outside the indicative climate change extents in this SFRA, the impact of climate change should still be considered because the site may be affected should the more extreme climate change scenarios materialise.
- Refer to Section 8 which provides further details on climate change for developers, as part of the FRA guidance, and the SFRA User Guide in Appendix C.

5.4 Impacts of climate change in High Peak Borough

This section explores which areas of High Peak Borough are most sensitive to increases in flood risk due to climate change. It should be noted that areas that are already at high risk will also become at increasing risk in future and the frequency of flooding will increase in such areas.

It is recommended that the Council works with other RMAs to review the long-term sustainability of existing and new development in these areas when developing climate change plans and strategies for the Borough.

5.4.1 Impact of climate change on fluvial flood risk

Modelled and proxy climate change extents for the 1% and 3.3% AEP events were compared with their respective present day extents to determine which areas are most sensitive to climate change.

Areas in High Peak Borough most sensitive to fluvial impacts of climate change are:

- Along the River Sett from Hayfield to New Mills.
- Along Glossop Brook from Old Glossop to Hadfield.

It is worth noting that appropriate climate change allowances were only available for the Hogshaw Nun fluvial model. As such, the use of proxy extents for climate change is a potential limitation to these findings.

5.4.2 Impacts of climate change on surface water flood risk

The 1% AEP surface water event with a 40% climate change uplift can be compared to the present day 1% AEP extent for an indication of areas most sensitive to climate change.

Areas in High Peak Borough most sensitive to changes in surface water flood risk are typically in areas of low-lying topography on the floodplains of the main watercourses. In particular, the following areas are sensitive to increased surface water flooding due to climate change:

- Along the path of Black Brook from Bridgeholm Green to Buxworth.
- Along the path of Glossop Brook from Dinting Viaduct to High Peak Borough Boundary.

- Along the path of Long Clough from Charlestown to confluence with Glossop Brook.
- Along the path of the river Wye through Buxton town centre.
- Along the path of the River Goyt from Furness Vale to confluence with the River Sett in New Mills.

5.4.3 Impacts of climate change on groundwater flood risk

There is no technical modelling data available to assess climate change impacts on groundwater. It would depend on the flooding mechanism, historic evidence of known flooding and geological characteristics, for example prolonged rainfall in a chalk catchment. Flood risk could increase when groundwater is already high or emerged, causing additional overland flow paths or areas of still ponding.

A high likelihood of groundwater flooding may mean infiltration SuDS are not appropriate and groundwater monitoring may be recommended.

5.4.4 Adapting to climate change

The PPG Climate Change guidance contains information and guidance for how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. Examples of adapting to climate change include:

- Considering future climate risks when allocating development sites so that the risks are understood over the development's lifetime.
- Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development.
- Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality.
- Promoting adaptation approaches in design policies for developments and the public realm, for example by building in flexibility to allow future adaptation if needed, such as setting new development back from watercourses.
- Identifying no or low-cost responses to climate risks that also deliver other benefits, such as green infrastructure that improves adaptation, biodiversity, and amenity, for example by leaving areas shown to be at risk of flooding as public open space.
- Considering the Standard of Protection (SoP) of defences and sites for future development, in relation to sensitivity to climate change. HPBC and developers will need to work with RMAs and use the SFRA datasets to understand whether development is affordable or deliverable. Locating development in such areas of risk may not be a sustainable long-term option, such as at the defence locations mentioned in Section 1; and
- It is recommended that the differences in flood extents from climate change are compared by HPBC when allocating sites, to understand how much additional risk there could be, where this risk is in the site, whether the increase is marginal

or activates new flow paths, whether it affects access/ egress and how much land could still be developable overall. Recommendations for development are made for the levels of risk in the SFRA User Guide in Appendix C.

6 Flood alleviation schemes and assets

This section provides a summary of existing flood alleviation schemes and assets in the High Peak Borough. Planners should note the areas that are protected by defences where further work to understand the actual and residual flood risk through a Level 2 SFRA may be beneficial. Developers should consider the benefit they provide over the lifetime of a development in a site-specific FRA.

6.1 Asset management

RMAs hold databases of flood risk management and drainage assets according to their jurisdiction as follows:

- The EA holds a national database that is updated by local teams.
- The LLFA holds a database of significant local flood risk assets, required under Section 21 of the FWMA (2010).
- Highways Authorities hold databases of highways drainage assets, such as gullies and connecting pipes.
- Water Companies hold records of public surface water, foul and combined sewers, the records may also include information on culverted watercourses.
- The databases include assets RMAs directly maintain and third-party assets. The drainage network is extensive and will have been modified over time. It is unlikely that any RMA contains full information on the location, condition, and ownership of all the assets in their area. They take a prioritised approach to collecting asset information, which will continue to refine the understanding of flood risk over time.

Developers should collect the available asset information and undertake further survey as necessary to present an understanding of current flood risk and the existing drainage network in a site-specific FRA.

6.2 Standards of Protection

Flood defences are designed to give a specific Standard of Protection (SoP), reducing the risk of flooding to people and property in flood prone areas. For example, a flood defence with a 1% AEP SoP means that the flood risk in the defended area is reduced to at least a 1% chance of flooding in any given year.

Over time the actual SoP provided by the defence may decrease, for example due to deterioration in condition or increases in flood risk due to climate change. The understanding of SoP may also change over time as RMAs undertake more detailed surveys and flood modelling studies.

It should be noted that the EA's on-going hydraulic modelling programme may revise flood risk datasets and, therefore, the SoP offered by flood defences in the area may differ from those discussed in this report.

Developers should consider the SoP provided by defences and residual risk as part of a detailed FRA.

6.3 Maintenance

Different authorities have responsibilities relating to maintenance of flood risk assets.

- The EA and local authorities have permissive powers to maintain and improve main rivers and ordinary watercourses, respectively. The ultimate responsibility for maintaining watercourses rests with the landowner.
- Highway's authorities have a duty to maintain public roads, making sure they are safe, passable, and the impacts of severe weather have been considered. They are also responsible for maintaining sections of watercourses where they are crossed by highways.
- Water companies have a duty to effectually drain their area. What this means in practise is that assets are maintained to common standards and improvements are prioritised for the parts of the network that do not meet this standard e.g., where there is frequent highway or sewer flooding.
- DCC as the LLFA has permissive powers and limited resources are prioritised and targeted to where they can have the greatest effect.

There is potential for the risk of flooding to increase in areas where flood alleviation measures are not maintained regularly. Breaches in raised flood defences are most likely to occur where the condition of a flood defence has degraded over time. Drainage networks in urban areas can also frequently become blocked with debris and this can lead to blockages at culverts or bridges.

It is important that the authorities work in partnership to maintain flood risk assets and manage flood risk across High Peak Borough.

Developers should not assume that any defence, asset, or watercourse is being or will continue to be maintained throughout the lifetime of a development. They should contact the relevant RMA about current and likely future maintenance arrangements and make future users of the development aware of their obligations to maintain watercourses.

Formal structural defences are given a rating based on a grading system for their condition. A summary of the grading system used by the EA for condition is provided in Table 6 1.

Table 6-1: Grading system used by the EA to assess flood defence condition.

Grade	Rating	Description
1	Very good	Cosmetic defects that will have no effect on performance.
2	Good	Minor defects that will not reduce the overall performance of the asset.
3	Fair	Defects that could reduce the performance of the asset.
4	Poor	Defects that would significantly reduce the performance of the asset. Further investigation required.

Grade	Rating	Description
5	Very poor	Severe defects resulting in complete performance failure.

Source: Condition Assessment Manual – EA 2006

6.4 Major flood risk management assets in High Peak Borough

The EA retired the Flood Map for Planning 'Areas Benefiting from Defences' (ABD) dataset in December 2022. This dataset will no longer be available on online mapping. Instead, a developer can enter their address on the EA website here to get information about their specific site and request flood risk assessment data for planning (also known as product 4).

The EA now provide a dataset called the 'Reduction in risk of flooding from rivers and sea' which provides areas that are offered some level of reduced flood risk from defences, but with no defined SoP.

In High Peak Borough, a small number of areas are shown to have reduced flood risk due to defences including along the River Goyt in the west of the area, its tributary Black Brook and in several small areas on the banks of other major watercourses in the Borough. The most common form of flood defence across the character areas is natural high ground, with engineered high ground and wall defences less common. Most high ground lies along the left and right banks of the following watercourses:

- River Goyt
- River Sett
- Glossop Brook
- Black Brook
- River Wye
- River Noe
- River Derwent

The EA 'AIMS' (Asset Information Management System) flood defence dataset gives further information on all flood defence assets within High Peak Borough. Table 6-2 details the locations which benefit from flood defences at a lower (or unknown) SoP.

Table 6-2: Locations shown in the EA 'AIMS' data set.

Watercourse	Location	Type	Design SoP (AEP)	Condition Rating (1-5)
River Goyt	East bank in Furness vale and west bank upstream of New Mills	Embankment	Unknown	Unknown

Watercourse	Location	Type	Design SoP (AEP)	Condition Rating (1-5)
River Sett	South bank at Birch Vale reservoir and west bank north of Salem Bridge, New Mills	Embankment	Unknown	Unknown
River Etherow	East bank by Woolley Bridge Road	Embankment	75	3-4
Black Brook	East bank at Britannia Mills	Embankment	Unknown	Unknown
Black Brook	Hunter's Green Close	Embankment	50	2
Black Brook	Both banks, east of Bowden Lane	Embankment	75	3
Glossop Brook	Downstream of Dinting Vale Viaduct	Embankment	Unknown	Unknown
Shelf Brook	East bank off Shirebrook Drive	Embankment	Unknown	Unknown
Otter Brook	Chinley	Wall	Unknown	Unknown
Glossop Brook	Both banks, Glossop High Street	Wall	Unknown	Unknown
River Etherow	East Bank off Woolley Bridge Road along High Peak Borough boundary	Wall	Unknown	3
River Goyt	West bank, off Buxton Road, Horwich End. South bank, dwnstream of New Mills Central	Wall	Unknown	Unknown
Black Brook	North bank, off Blackbrook Drive, Whitehough	Wall	Unknown	5

Watercourse	Location	Type	Design SoP (AEP)	Condition Rating (1-5)
Black Brook	Both banks, off Bowden lane, Chapel-en-le-Frith	Wall	Unknown	2-3
River Sett	North bank, south of Chapel Road, Hayfield East bank, north of Salem bridge, New Mills	Wall	Unknown	Unknown
River Wye	South banks, opposite Spring Gardens car park, Buxton	Wall	Unknown	Unknown

6.5 Existing and future flood alleviation schemes

Below are the current and potential future schemes led by the EA and other local groups in the area.

6.5.1 Fluvial flood alleviation schemes

The EA confirm two fluvial Flood Alleviation Schemes (FAS) within the study area; The Black Brook FAS, and the Glossop Brook & River Etherow FAS including Etherow Gates.

6.6 Actual and residual flood risk

A Level 2 SFRA (for strategic allocations) or developer site-specific FRA will need to consider the actual and residual flood risk due to the presence of flood and drainage assets in greater detail (although it should be noted that Zone 3b is based on the actual flood risk).

6.6.1 Actual flood risk

This is the risk to the site considering existing flood mitigation measures and any planned to be provided through new development. Note that it is not likely to be acceptable to allocate developments in existing undefended areas on the basis that they will be protected by developer works, unless it can be demonstrated there is a wider community benefit.

The assessment of the actual risk should consider that:

- The level of protection afforded by existing defences might be less than the appropriate standards and hence may need to be improved if further growth is contemplated.
- The flood risk management policy for the defences will provide information on the level of future commitment to maintain existing standards of protection. If there is

a conflict between the proposed level of commitment and the future needs to support growth, then it will be a priority for this to be reviewed.

- The standard of safety must be maintained for the intended lifetime of the development. Over time the effects of climate change will erode the present-day SoP afforded by defences and so commitment is needed to invest in the maintenance and upgrade of defences if the present-day levels of protection are to be maintained and where necessary, land secured and safe-guarded that is required for affordable future flood risk management measures.
- By understanding the depth, velocity, speed of onset and rate of rise of floodwater it is possible to assess the level of hazard posed by flood events from the respective sources.

6.6.2 Residual risk

Residual risk is the risk that remains after the effects of flood risk infrastructure have been considered. It is important that these risks are quantified to confirm that the consequences can be safely managed. The residual risk can be:

- The effects of a larger flood than defences were designed to alleviate (the 'design flood'). This can cause overtopping of flood banks, failure of flood gates to cope with the level of flow or failure of pumping systems to cope with the incoming amount of water.
- Failure of the defences or flood risk management measures, such as breaches in embankments or walls, failure of flood gates to open or close or failure of pumping stations.
- It is the responsibility of the developer to fully assess flood risk, propose measures to mitigate it and demonstrate that any residual risks can be safely managed.

This SFRA does not assess the probability of failure other than noting that such events are very rare. However, in accordance with NPPF, all sources of flooding need to be considered. If a breach or overtopping event were to occur, then the consequences to people and property could be high. Developers should be aware that any site that is at or below defence level, may be subject to flooding if an event occurs that exceeds the design capacity of the defences, or the defences fail, and this should be considered in a detailed FRA.

The assessment of residual risk should consider:

- The flood hazard, depth and velocity that would result from overtopping or breach of defences. Flood gate or pumping station failure and/ or culvert blockage (as appropriate). The EA can provide advice at site-specific development level for advice on breach/ overtopping parameters for flood models.
- The design of the development to take account of the highest risk parts of the site e.g., allowing for flood storage on parts of the site and considering the design of the development to keep people safe e.g., sleeping accommodation above the flood level.

- A system of warning and a safe means of access and egress from the site in the event of a flood for users of the site and emergency services.
- Climate change and/ or policy-dependent residual risks (such as those that may be created, if necessary, future defence improvements are required, or those associated with any managed adaptive strategies).

6.6.3 Overtopping

The risk from overtopping of defences is based on the relative heights of property or defence, the distance from the defence level and the height of water above the crest level of the defence. The Defra and EA Flood Risks to People guidance document, available from the Government website here, provides standard flood hazard ratings based on the distance from the defence and the level of overtopping.

Any sites located next to defences or perched ponds/ reservoirs, may need overtopping modelling or assessments at the site-specific FRA stage, and climate change needs to be taken in to account.

6.6.4 Defence breach

A breach of a defence occurs when there is a failure in the structure and a subsequent ingress of flood water.

Where defences are present, risk of breach events should be considered as part of the site-specific FRA. Flood flows from breach events can be associated with significant depths and flow velocities in the immediate vicinity of the breach location and so FRAs must include assessment of the hazards that might be present so that the safety of people and structural stability of properties and infrastructure can be appropriately considered. Whilst the area in the immediate vicinity of a breach can be subject to high flows, the whole flood risk area associated with a breach must also be considered as there may be areas remote from the breach that might, due to topography, involve increased depth hazards.

Considerations include the location of a breach, when it would occur and for how long, the depth of the breach (toe level), the loadings on the defence and the potential for multiple breaches. There are currently no national standards for breach assessments and there are various ways of assessing breaches using hydraulic modelling. Work is currently being undertaken by the EA to collate and standardise these methodologies. It is recommended that the EA are consulted if a development site is located near to a flood defence, to understand the level of assessment required and to agree the approach for the breach assessment.

7 Cumulative impact of development and strategic solutions

7.1 Cumulative Impact Assessment

Under the NPPF, strategic policies and their supporting SFRAs are required to 'consider cumulative impacts in, or affecting, local areas susceptible to flooding' (Paragraph 166), rather than just to, or from, individual development sites.

When allocating land for development, consideration should be given to the potential cumulative impact of the loss of floodplain storage volume, as well as the impact of increased flows on flood risk downstream. Whilst the loss of storage for individual developments may only have a minimal impact on flood risk, the cumulative effect of multiple developments may be more severe. Similarly, the effect of the loss of surface water flow paths, surface water ponding and infiltration can also give rise to cumulative effects and potentially exacerbate surface water flood risk.

All developments are required to comply with the NPPF and demonstrate they will not increase flood risk elsewhere. Therefore, providing developments comply with the latest guidance and legislation relating to flood risk and sustainable drainage, and appropriate consideration is given to surface water flow paths and storage proposals should normally not increase flood risk downstream.

Local planning policies can also be used to identify areas where the potential for development to increase flood risk is highest and identify opportunities for such new development to positively contribute to decreases in flood risk downstream.

The CIA (in Appendix F) assessed catchments in the study area that have the potential to influence existing fluvial and surface water flood risk issues in neighbouring Local Authorities, as well as catchments in the study area that may be influenced by development in catchments in neighbouring Local Authorities. Historic flood incidents, the current and predicted increase in surface water and fluvial flood risk to properties, and cross boundary issues in each catchment were assessed to identify the catchments at greatest risk. The following high-risk catchments within, or partially within, High Peak Borough were identified:

- Randall Carr Brook
- Glossop (Shelf) Brook (Source to Long Clough Brook)
- Sett
- Long Clough Brook
- River Goyt (Sett to Etherow)
- Glossop Brook (Long Clough Brook to Etherow)
- Wye from Source to Monk's Dale

It should be noted that this assessment provides a relative assessment of risk between catchments within the study area and that the overall risk within High Peak Borough is generally low. The catchments designated high risk are within the western side of the Borough, which is more urbanised and as expected shows a higher proportion of properties

at fluvial and surface water flood risk, more incidents of historic flooding, and more proposed development. The National Park is shown to be generally low risk due to its rural nature. There are also no planned site allocations within the National Park.

7.2 Natural Flood Management (NFM)

NFM is used to protect, restore, and re-naturalise the function of catchments and rivers to reduce flood risk. A wide range of techniques can be used that aim to reduce flooding by working with natural features and processes in order to store or slow down flood waters before they can damage flood risk receptors (e.g., people, property, infrastructure, etc.). Techniques and measures, which could be applied in the High Peak Borough include:

- Creation of offline storage areas
- Re-meandering streams (creation of new meandering courses or reconnecting cut-off meanders to slow the flow of the river)
- Targeted woodland planting
- Reconnection and restoration of functional floodplains
- Restoration of rivers and removal of redundant structures, i.e. weirs and sluices no longer used or needed
- Installation or retainment of large woody material in river channels
- Improvements in management of soil and land use
- Creation of rural and urban SuDS

To maximise the benefits of NFM, it is important that land which is likely to be needed for NFM is protected by safeguarding land for future flood risk management infrastructure. This is particularly important for infrastructure that reduces the risk of flooding to large amounts of existing development, or where options for managing risk in other ways are limited to achieve multiple benefits for flood risk and the environment.

In 2017, the EA published an online evidence base to support the implementation of NFM and maps showing locations with the potential for NFM measures. These maps are intended to be used alongside the evidence directory to help practitioners think about the types of measure that may work in a catchment and the best places in which to locate them. The EA evidence directory can be found on the Government website here.

7.2.1 Existing NFM Schemes

The EA have a selection of peatland restoration NFM schemes across the High Peak Borough, predominantly in the north-east of the study area. Much of this is done in partnership with Moors For The Future.

In addition, the Derbyshire Wildlife Trust have recently launched their 'Derwent Living Forest' project; a nature restorative programme across the Derbyshire Derwent catchment to improve habitat quality and provide NFM benefits. The project involves planting 30,000 hectares of trees and wetland by 2050 and making space for water by implementing NFM techniques across 300 hectares of existing habitats to slow the flow of water through the catchment. Additional information can be found on their website.

Furthermore, the Mersey Rivers Trust are implementing a range of NFM techniques within the Upper Mersey Catchment to help slow the flow and improve water quality. More information can be found on their website.

8 Flood risk management requirements for developers

This section provides guidance on site-specific FRAs. These are carried out by (or on behalf of) developers to assess flood risk to and from a site. They are submitted with Planning Applications and should demonstrate how flood risk will be managed over the development's lifetime, considering climate change and vulnerability of users.

The report provides a strategic assessment of flood risk within High Peak Borough. Prior to any construction or development, site-specific assessments will need to be undertaken so all forms of flood risk and the actual and residual risk and SoP and safety at a site are considered in more detail. Developers should, where required, undertake more detailed hydrological and hydraulic assessments of watercourses to verify flood extents (including latest climate change allowances), to inform the sequential approach within the site and prove, if required, whether the exception test can be satisfied.

A detailed FRA may show that a site, windfall or other, is not appropriate for development of a particular vulnerability or even at all. The sequential and exception tests in the NPPF apply to all developments and an FRA should not be seen as an alternative to proving these tests have been met.

8.1 Principles for new development

8.1.1 Apply the sequential and exception tests.

Developers should refer to Section 3.3 for more information on how to consider the sequential and exception tests. For allocated sites, HPBC should use the information in this SFRA to apply the Sequential test. For windfall sites a developer must undertake the Sequential test, which includes considering reasonable alternative sites at lower flood risk. Only if it passes the sequential test should the exception test then be applied if required.

Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test will need to be applied as proposals at the application stage will need to demonstrate flood risk is not increased elsewhere and is safe.

Developers should also apply the sequential approach to locating development within the site. The following questions should be considered:

- can risk be avoided through substituting less vulnerable uses or by amending the site layout?
- can it be demonstrated that less vulnerable uses for the site have been considered and reasonably discounted? and
- can the site layout be varied to reduce the number of people, the flood risk vulnerability or the building units located in higher risk parts of the site?

8.1.2 Consult with statutory consultees at an early stage to understand their requirements.

Developers should consult with the EA, DCC as LLFA, United Utilities, and Severn Trent Water at an early stage to discuss flood risk including requirements for site-specific FRAs, detailed hydraulic modelling and drainage assessment and design.

8.1.3 Consider the risk from all sources of flooding and that they are using the most up to date flood risk data and guidance.

The SFRA can be used by developers to scope out what further detailed work is likely to be needed to inform a site-specific FRA. At a site level, developers will need to check before commencing on a more detailed FRA that they are using the latest available datasets. Developers should apply the most up-to-date climate change guidance (last updated in May 2022) and consider climate change adaptation measures.

8.1.4 Confirm that the development does not increase flood risk elsewhere.

Section 9 sets out these requirements for taking a sustainable approach to surface water management. Developers should also confirm that mitigation measures do not increase flood risk elsewhere and that floodplain compensation is provided where necessary.

8.1.5 Make the development safe for future users.

Consideration should first be given to minimising risk by planning sequentially across a site. Once risk has been minimised as far as possible, only then should mitigation measures be considered. Developers should consider both the actual and residual risk of flooding to the site, as discussed in Section 3.3.

Further flood mitigation measures may be needed for any developments in an area protected by flood defences, where the condition of those defences is ‘fair’ or ‘poor’, and where the SoP is not of the required standard.

8.1.6 Enhance the natural river corridor and floodplain environment through new development.

Developments should demonstrate opportunities to create, enhance, and link green assets. This can provide multiple benefits across several disciplines including flood risk and biodiversity/ecology and may provide opportunities to use the land for an amenity and recreational purposes. Development that may adversely affect green infrastructure assets should not be permitted. Where possible, developers should identify and work with partners to explore all avenues for improving the wider river corridor environment. Developers should open up existing culverts and should not construct new culverts on site except for short lengths to allow essential infrastructure crossings.

8.1.7 Consider and contribute to wider flood mitigation strategy and measures in the area and apply the relevant local planning policy.

Wherever possible, developments should seek to help reduce flood risk in the wider area, e.g., by contributing to a wider community scheme or strategy for strategic measures, such as defences or NFM or by contributing in-kind by mitigating wider flood risk on a development site. Developers must demonstrate in an FRA how they are contributing towards this vision.

8.2 Requirements for site-specific Flood Risk Assessments

8.2.1 When is an FRA required?

Site-specific FRAs are required in the following circumstances:

- Proposals of one hectare or greater in Flood Zone 1.
- Proposals for new development (including minor development such as non-residential extensions, alterations which do not increase the size of the building or householder developments and change of use) in Flood Zones 2 and 3.
- Proposals for new development (including minor development and change of use) in an area within Flood Zone 1 which has critical drainage problems (as notified to the LPA by the EA) (see Section 9.4.5 for more information on critical drainage problems).
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.
- At locations where it is proposed to locate development in a high-risk surface water flood zone.

An FRA may also be required for some specific situations:

- If the site may be at risk from the breach of a local defence (even if the site is in Flood Zone 1)
- Where evidence of historical or recent flood events have been passed to the LPA
- Land identified in an SFRA as being at increased risk in the future.

8.2.2 Objectives of a site-specific FRA

Site-specific FRAs should be proportionate to the degree of flood risk and the scale, nature, and location of the development.

Site-specific FRAs should establish:

- Whether a proposed development is likely to be affected by current or future flooding from any source.
- Whether a proposed development will increase flood risk elsewhere.
- Whether the measures proposed to deal with the effects and risks are appropriate.
- The evidence, if necessary, for the LPA to apply the sequential test; and
- Whether, if applicable, the development will be safe and pass the exception test.

FRAs should follow the approach recommended by the NPPF (and associated guidance) and guidance provided by the EA and HPBC. Guidance and advice for developers on the preparation of site-specific FRAs is available from the following websites with hyperlinks provided:

- Standing Advice on Flood Risk (EA)
- Flood Risk Assessment for Planning Applications (EA); and
- Site-specific Flood Risk Assessment: Checklist (NPPF PPG, Defra)

Guidance for LPAs for reviewing FRAs submitted as part of planning applications has been published by Defra in 2015 and is available on the Government website here.

Guidance should be sought from the EA and HPBC at the earliest possible stage, and opportunities should be taken to incorporate environmental enhancements and reduce flooding from all sources both to and from the site through development proposals. Developers should seek to go beyond managing the flood risk and support reduction of wider flood risk, whilst enhancing and conserving the natural environment. Further advice can be found at: Flood risk and coastal change - GOV.UK (www.gov.uk).

8.2.3 Site layout and design

Flood risk should be considered at an early stage in deciding the layout and design of a site to provide an opportunity to reduce flood risk within the development. Early engagement with, HPBC, DCC, the EA and relevant water company is advised.

The NPPF states that a sequential, risk-based approach should be applied to try to locate more vulnerable land uses away from Flood Zones to higher ground and lower flood risk areas, while more flood-compatible development (e.g., vehicular parking, recreational space) can be located in higher risk areas. Higher risk areas can also be retained and enhanced as natural green space. Whether parking in floodplains is appropriate will be based on the likely flood depths and hazard, evacuation procedures and availability of flood warning.

Waterside areas, or areas along known flow routes, can act as green infrastructure, being used for recreation, amenity, and environmental purposes, allowing the preservation of flow routes and flood storage, and at the same time providing valuable social and environmental benefits contributing to other sustainability objectives. Landscaping should provide safe access to higher ground from these areas and avoid the creation of isolated islands as water levels rise.

When designing sites, developers should consider the Hierarchy of Drainage, as stated in the PPG, aiming to discharge surface water runoff as high up the drainage hierarchy as reasonably practicable:

1. into the ground (infiltration)
2. to a surface water body
3. to a surface water sewer, highway drain, or another drainage system
4. to a combined sewer

8.2.4 Modification of ground levels.

Any proposal for modification of ground levels will need to be assessed as part of a detailed FRA.

Modifying ground levels to raise the land above the required flood level is an effective way of reducing flood risk to a particular site in circumstances where the land does not act as conveyance for flood waters. However, care must be taken as raising land above the floodplain could reduce conveyance or flood storage in the floodplain and could adversely impact flood risk downstream or on neighbouring land. Raising ground levels can also deflect flood flows, so analyses should be performed to demonstrate that there are no adverse effects on third party land or property.

Compensatory flood storage should be provided, and would normally be on a level for level, volume for volume basis on land that does not currently flood but is adjacent to the floodplain (for it to fill and drain). It should be in the vicinity of the site and within the red line of the planning application boundary (unless the site is strategically allocated). Guidance on how to address floodplain compensation is provided in Appendix A3 of the CIRIA Publication C624, available to download from the CIRIA website here.

Where proposed development results in a change in building footprint, the developer should confirm that it does not impact upon the ability of the floodplain to store or convey water and seek opportunities to provide floodplain betterment.

Raising levels can also create areas where surface water might pond during significant rainfall events. Any proposals to raise ground levels should be tested to check that it would not cause increased ponding or build-up of surface runoff on third party land.

8.2.5 Raised floor levels.

If raised floor levels are proposed, these should be agreed with HPBC and the EA. The minimum Finished Floor Level (FFL) may change dependent upon the vulnerability and flood risk to the development.

The EA advises that minimum finished floor levels should be set 300mm above the 1% AEP fluvial plus climate change peak flood level, where the appropriate new climate change allowances have been used (see Section 5.2 for the climate change allowances). An additional allowance may be required because of risks relating to blockages to the channel, culvert or bridge and should be considered as part of an FRA. Lowering existing FFLs below the existing levels within the 1% AEP plus climate change floodplain would not be acceptable and should be discouraged. New development offers opportunities to improve the resilience of buildings.

Allocating the ground floor of a building for less vulnerable, non-residential, use is an effective way of raising living space above flood levels. Single storey buildings such as ground floor flats or bungalows are especially vulnerable to rapid rise of water (such as that experienced during a breach). This risk can be reduced by use of multiple storey construction and raised areas that provide an escape route.

Similarly, the use of basements should be avoided. Habitable uses of basements within Flood Zone 3 and areas at risk of surface water flooding in the surface water flood zone B should not be permitted, whilst basement dwellings in Flood Zone 2 will be required to pass the exception test. Access should be situated 300mm above the design flood level and waterproof construction techniques used.

Where the ground level of a site is below the ground level at the point where the drainage connects to the public sewer, care must be taken to ensure that the proposed development is not at an increased risk of sewer surcharge. It is good practice for the finished floor levels and manhole cover levels (including those that serve private drainage runs) to be higher than the manhole cover level at the point of connection to the receiving sewer. Alternatively, mitigation measures may need to be incorporated into the proposals to protect against sewer surcharge.

8.2.6 Development and raised defences.

Construction of localised raised floodwalls or embankments to protect new development is not a preferred option, as a residual risk of flooding will remain. Compensatory storage must be provided where raised defences remove storage from the floodplain.

Where development is located behind, or in an area benefitting from defences, the residual risk of flooding must be considered.

8.2.7 Developer contributions.

In some cases, and following the application of the sequential test, it may be appropriate for the developer to contribute to the improvement of flood defence provision that would benefit both proposed new development and the existing local community. Developer contributions can also be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e., SuDS). This relates to the Community Infrastructure Levy, a charge that can be levied by local authorities on new development in their area to help them deliver the infrastructure needed to support development in their area, and planning obligations including Section 106. The government website provides further information on the Community Infrastructure Levy and planning obligations. Additional guidance can also be accessed through the HPBC Developer Contributions Supplementary Planning Document.

8.2.8 Buffer strips

The provision of a buffer strip to ‘make space for water’, allows additional capacity to accommodate climate change and means access to the watercourse, structures and defences is maintained for future maintenance purposes. It also enables the avoidance of disturbing riverbanks, adversely impacting ecology, and having to construct engineered riverbank protection. Any watercourse crossings should ensure that flood risk is not impacted. A buffer strip of 8m is required from any main river (16m if tidal influence). Where flood defences are present, these distances should be taken from the toe of the defence.

Building adjacent to riverbanks can cause problems to the structural integrity of the riverbanks and the building itself, making future maintenance of the river much more difficult. Any development in these areas will likely require Flood Risk Activity Permits from the EA alongside any permission. There should be no built development within these distances from main rivers / flood defences (where present). Further advice and guidance on Flood Risk Activity Permits is available on the government website here.

8.2.9 Making space for water

The PPG sets out a clear aim in Flood Zone 3 to create space for flooding by restoring functional floodplain. Generally, development should be directed away from these areas.

All new development close to rivers should consider the opportunity to improve and enhance the river environment. Developments should look at opportunities for river restoration and enhancement as part of the development. Options include backwater creation, de-silting, in-channel habitat enhancement and removal of structures. When designed properly, such measures can have benefits such as reducing the costs of maintaining hard engineering structures, reducing flood risk, improving water quality, and increasing biodiversity. Social benefits are also gained by increasing green space and access to the river.

8.3 Resistance and resilience measures

The consideration of resistance and resilience measures should not be used to justify development in inappropriate locations. However, having applied planning policy, there will be instances where developments, such as those that are water compatible and essential infrastructure are permitted in high flood risk areas.

In these instances, the above measures should be considered before resistance and resilience measures are relied on. The effectiveness of these forms of measures are often dependant on the availability of a reliable forecasting and warning system and the use of back up pumping to evacuate water from a property as quickly as possible. The proposals must include details of how the temporary measures will be erected and decommissioned, responsibility for maintenance and the cost of replacement when they deteriorate. Available resistance and resilience measures include:

- Permanent barriers which can include built up doorsteps, rendered brick walls and toughened glass barriers.
- Temporary barriers which consist of moveable flood defences which can be fitted into doorways and/or windows. The permanent fixings required to install these temporary defences should be discrete and keep architectural impact to a minimum. On a smaller scale, temporary snap on covers for airbricks and air vents can also be fitted to prevent the entrance of flood water.
- Community resistance measures which include demountable defences that can be deployed by local communities to reduce the risk of water ingress to several properties. The methods require the deployment of inflatable (usually with water)

or temporary quick assembly barriers in conjunction with pumps to collect water that seeps through the systems during a flood.

- Flood resilience measures which aim to limit any permanent damage, prevent the structural integrity of the building being compromised and make the clean up after the flood is easier. Interior design measures to reduce damage caused by flooding can include electrical circuitry installed at a higher level and water-resistant materials for floors, walls, and fixtures.

Guidance on flood resilient and flood resistant construction techniques is available on the government website, here.

There are also opportunities for 'change of use' developments to be used to improve the flood resistance and resilience of existing development, which may not have been informed by a site-specific flood risk assessment when it was first constructed.

8.4 Reducing flood risk from other sources

8.4.1 Groundwater

Groundwater flooding has a very different flood mechanism to any other and so many conventional flood mitigation methods are not suitable. The only way to fully reduce flood risk would be through building design (development form), ensuring floor levels are raised above the water levels caused by a 1% AEP plus climate change. Site design would also need to preserve any flow routes followed by the groundwater overland so that flood risk is not increased downstream.

Infiltration SuDS can increase groundwater levels and subsequently may increase flood risk on or off a site. Developers should provide evidence that this will not be a significant risk. Other underground works, such as basements, may also need to be assessed as part of a site-specific FRA in certain prone areas susceptible to groundwater issues.

8.4.2 Surface water and sewer flooding

Developers should discuss public sewerage capacity with the water utility company at the earliest possible stage. It is important that a Surface Water Drainage Strategy (often undertaken as part of an FRA) shows that this will not increase flood risk elsewhere, and that the drainage requirements regarding runoff rates and SuDS for new development are met.

If residual surface water flood risk remains, the likely flow routes and depths across the site should be modelled. The site should be designed so that these flow routes are preserved and building design should provide resilience against this residual risk.

When redeveloping existing buildings, the installation of some permanent or temporary floodproofing and resilience measures could protect against both surface water and sewer flooding. Non-return valves prevent water entering the property from drains and sewers. Non-return valves can be installed within gravity sewers or drains within a property's private

sewer upstream of the public sewerage system. These need to be carefully installed and must be regularly maintained.

Consideration must also be given to attenuation and flow ensuring that flows during the 1% AEP plus climate change storm event are retained within the site if any flap valves shut. This should be demonstrated with suitable modelling techniques.

8.4.3 Reservoirs

As discussed in Section 4.7, the risk of reservoir flooding is extremely low. However, there remains a residual risk to development from reservoirs which developers should consider during the planning stage:

- Developers should contact the reservoir owner for information on:
  - the Reservoir Risk Designation
  - reservoir characteristics: type, dam height at outlet, area/volume, overflow location
  - operation: discharge rates / maximum discharge
  - discharge during emergency drawdown; and
  - inspection / maintenance regime.
- The EA online Reservoir Flood Maps contain information on the predicted extents following a reservoir breach both when rivers are at normal levels and in conjunction with rivers in flood conditions (note: only for those reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975). Consideration should be given to the extents shown in these online maps.
- The GOV.UK website on Reservoirs: owner and operator requirements provides information on how to register reservoirs, appoint a panel engineer, produce a flood plan, and report an incident.
- In addition, developers should consult the Derbyshire County Council's Emergency Planning Team about emergency plans.

Developers should use the above information to:

- Apply the sequential approach to locating development within the site.
- Consider the impact of a breach and overtopping, particularly for sites proposed to be located immediately downstream of a reservoir. This should consider whether there is sufficient time to respond, and whether in fact it is appropriate to place development immediately on the downstream side of a reservoir.
- Assess the potential hydraulic forces imposed by sudden reservoir failure event and check that that the proposed infrastructure fabric could withstand the structural loads.
- Develop site-specific Emergency Plans and/ or Off-site Plans if necessary and make the future users of the development aware of these plans. This may need to consider emergency drawdown and the movement of people beforehand.

The potential implications of proposed development on the risk designation of the reservoir should also be considered, as it is a requirement that in particular circumstances where there could be a danger to life, that a commitment is made to the hydraulic capacity and safety of the reservoir embankment and spillway. The implications of such an obligation should be identified and understood before new development is permitted, to ensure it can be achieved.

8.5 Emergency planning

Emergency planning covers three phases: before, during and after a flood. Measures involve developing and maintaining arrangements to reduce, control or mitigate the impact and consequences of flooding and to improve the ability of people and property to absorb, respond to and recover from flooding. National Planning Policy takes this into account by seeking to avoid inappropriate development in areas of flood risk and considering the vulnerability of new developments to flooding.

Certain sites will need emergency plans:

- Sites with vulnerable users, such as hospitals and care homes
- Camping and caravan sites
- Sites with transient occupants e.g., hostels and hotels
- Developments at a high residual risk of flooding from any source e.g., immediately downstream of a reservoir or behind raised flood defences
- Situations where occupants cannot be evacuated (e.g., prisons) or where it is safer to remain “in-situ” and / or move to a higher floor or safe refuge area (e.g., at risk of a breach).

Emergency Plans will need to consider:

- The characteristics of the flooding e.g., onset, depth, velocity, hazard, flood borne debris
- The vulnerability of site occupants.
- Structural safety
- The impact of the flooding on essential services e.g., electricity, drinking water
- Flood warning systems and how users will be encouraged to sign up for them.
- Safe access and egress for users and emergency services
- How to manage the consequences of events that are un-foreseen or for which no warnings can be provided e.g., managing the residual risk of a breach.
- A safe place of refuge where safe access and egress and advance warning may not be possible, having discussed and agreed this first with emergency planners. Proposed new development that places an additional burden on the existing response capacity of HPBC will not normally be appropriate.

It is advised that emergency plans should be provided to support developments ensuring that residual risk is covered. However, it will not be appropriate to rely solely on emergency plans to mitigate residual risk. Further information should be included to understand the approach where residual risk from flood risk management infrastructure affects large areas.

This information should be covered in site-specific Flood Risk Assessments (FRAs) and the accepted approach in locating development in these areas to ensure that new development is not put at risk.

The Derbyshire Local Resilience Forum provide Emergency Planning information about risks to the community, warn of hazardous conditions, such as flooding, snow, and drought, and provide information on preparing for emergency situations. Information is available from their website here.

Further information is available from the following documents / websites with hyperlinks provided:

- The National Planning Policy Guidance
- 2004 Civil Contingencies Act
- Defra (2014) National Flood Emergency Framework for England
- FloodRe
- The EA and Defra's Standing Advice for FRAs
- HPBC's 'Drainage and flooding' website page
- EA's 'How to plan ahead for flooding'
- Sign up for Flood Warnings with the EA
- The National Flood Forum
- GOV.UK 'Prepare for flooding' page
- ADEPT Flood Risk Plans for new development

9 Surface water management and SuDS

This section provides guidance and advice on managing surface water runoff and flooding.

9.1 Roles of the Lead Local Flood Authority and Local Planning Authority in surface water management

DCC as the LLFA is a statutory planning consultee. They provide technical advice on surface water drainage strategies and designs put forward for major development proposals, to confirm that onsite drainage systems are designed in accordance with the current legislation and guidance.

When considering planning applications, the drainage team will provide advice to the Planning Department on the management of surface water. The LPA should satisfy themselves that the development's proposed minimum standards of operation are appropriate and, using planning conditions or planning obligations, that there are clear arrangements for on-going maintenance over the lifetime of the development.

It is essential that developers consider sustainable drainage at an early stage of the development process – ideally at the pre-application or master-planning stage. To further inform development proposals at the master-planning stage, pre-application submissions are accepted by HPBC. This will assist with the delivery of well designed, appropriate, and effective SuDS.

Currently the use of SuDS is driven through planning policy. However, Schedule 3 of the FWMA 2010 is expected to be implemented in 2024 following a government review making SuDS mandatory for new developments in England. Schedule 3 will provide a framework for the approval and adoption of drainage systems, a SuDS Approving Body (SAB) within unitary and county councils, and national standards on the design, construction, operation, and maintenance of SuDS for the lifetime of the development.

9.2 Sustainable Drainage Systems (SuDS)

SuDS are designed to maximise the opportunities and benefits that can be secured from surface water management practices.

SuDS provide a means of dealing with the quantity and quality of surface water and can also provide amenity and biodiversity benefits. Given the flexible nature of SuDS they can be used in most situations within new developments as well as being retrofitted into existing developments. SuDS can also be designed to fit into most spaces. For example, permeable paving could be used in parking spaces or rainwater gardens as part of traffic calming measures.

It is a requirement for all new major development proposals that SuDS for management of runoff are put in place, unless there is clear evidence that this would be inappropriate (NPPF Paragraph 175). Where possible, SuDS that offer multiple benefits should be given priority. It is important that SuDS are maintained for the lifetime for the development so that

features can function as designed. Consideration should be given to enhancing SuDS to achieve biodiversity net gain.

9.3 Sources of SuDS guidance

9.3.1 C753 CIRIA SuDS Manual (2015)

The C753 CIRIA SuDS Manual (2015) provides guidance on planning, design, construction, and maintenance of SuDS. The manual is divided into five sections ranging from a high-level overview of SuDS, progressing to more detailed guidance with progression through the document. The manual can be downloaded from the CIRIA website here.

9.3.2 Non-Statutory Technical Guidance, Defra (March 2015)

Non-Statutory Technical guidance provides non-statutory standards on the design and performance of SuDS. It outlines peak flow control, volume control, structural integrity, flood risk management and maintenance and construction considerations. This guidance can be accessed on the Government website here.

9.3.3 Non-statutory Technical Guidance for Sustainable Drainage Practice Guidance, LASOO (2016)

The Local Authority SuDS Officer Organisation (LASOO) produced their practice guidance in 2016 to give further detail to the Non-Statutory technical guidance. This guidance is available on the SUS Drain website here.

9.3.4 High Peak Borough Council SuDS Guidance

At the time of writing, DCC and HPBC do not adopt any specific SuDS guidance or schemes; but state that all SuDS construction should be undertaken in line with the CIRIA SuDS Manual C753 and C768.

The 2023 NPPF states that flood risk should be managed “using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding".

9.4 Other surface water considerations

9.4.1 Groundwater Vulnerability Zones

The EA published new groundwater vulnerability maps in 2015. These maps provide a separate assessment of the vulnerability of groundwater in overlying superficial rocks and those that comprise of the underlying bedrock. The map shows the vulnerability of groundwater at a location based on the hydrological, hydro-ecological, and soil properties within a one-kilometre grid square.

The groundwater vulnerability maps should be considered when designing SuDS. Depending on the height of the water table at the location of the proposed development

site, restrictions may be placed on the types of SuDS appropriate to certain areas. Groundwater vulnerability maps can be found on Defra's interactive mapping.

9.4.2 Groundwater Source Protection Zones (GSPZ)

The EA also defines Groundwater Source Protection Zones (GSPZs) near groundwater abstraction points. These protect areas of groundwater used for drinking water. The GSPZ requires attenuated storage of runoff to prevent infiltration and contamination. GSPZs can be viewed on Defra's interactive mapping. Three main zones are defined as follows:

- Inner protection zone (Zone 1) - areas from where pollution can travel to the groundwater source within 50 days or is at least a 50m radius.
- Outer protection zone (Zone 2) - areas from where pollution can travel to the groundwater source within 400 days or lies within the nearest 25% of the total catchment area (whichever is largest).
- Total catchment (Zone 3) - the total area needed to support removal/discharge of water from the groundwater source.

Online mapping shows there are currently seven GSPZs which lie partially or wholly within High Peak Borough. Where a site is located in a GSPZ used for public water supply, applicants should engage with United Utilities or Severn Trent Water to understand any concerns and any necessary mitigating measures to manage the risk of development to public water supply.

9.4.3 Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. Nitrate levels in waterbodies are affected by surface water runoff from surrounding agricultural land entering receiving waterbodies. The level of nitrate contamination will potentially influence the choice of SuDS and should be assessed as part of the design process.

NVZs can be viewed on the EA's website here. There are no pre appeal NVZ 2021 to 2024 areas affecting High Peak Borough:

Currently, information on the 2021 to 2024 NVZs post-appeal is unavailable. Landowners can appeal an NVZ designation once notified if their land (or part of it):

- Does not drain into water that has been identified as polluted.
- Drains into water that should not be identified as polluted.

9.4.4 Nutrient Neutrality

In March 2022, Natural England and the Department for Levelling Up Housing and Communities issued advice surrounding development that could cause adverse impacts on nutrient pollution. Such development includes, but is not limited to:

- Any development comprising overnight accommodation (such as new homes, tourist attractions etc)

- Any form of permitted development under planning legislation which would give rise to new overnight accommodation
- Any development not involving overnight accommodation but which may have non-sewerage water quality implications

In addition, the Habitats Regulation (2017) states that planning authorities are required to make sure development does not have adverse impacts on protected habitats before granting permission. Further information on nutrient neutrality can be accessed through the HPBC website here.

9.4.4.1 Phosphate Levels in the River Wye

In the River Wye, both effluent discharges from wastewater treatment works and runoff from agricultural land are anthropogenic sources of phosphorous. Elevated phosphorous levels can have a detrimental effect on river ecology and The Wye Valley SSSI forms part of the Peak District Dales Special Area of Conservation, meaning the area is under the highest level of protection under habitat Regulations. As a result of this, water produced by new developments is recognised to have direct impacts on phosphate levels in the River Wye, highlighting the importance of new development in the Buxton area meeting water efficiency requirements outlined in the Water in Buxton Supplementary Planning Document Adopted December 2021.

9.4.5 Critical Drainage Areas

Areas with Critical Drainage Problems (ACDPs) is land formally notified to the LPA by the EA as having critical drainage problems. Within ACDPs, proposed development may present increased risks of flooding both on and off site if the surface water runoff is not effectively managed. A dataset containing ACDPs is available to download from the EA website here. There are currently no ACDPs identified within the High Peak Borough.

10 Summary and recommendations

Parts of High Peak Borough are at risk of flooding from the following sources: fluvial, surface water, groundwater, sewers, reservoir inundation, and overtopping/ breaches. This study has shown that the most significant sources of flood risk in High Peak Borough are fluvial and surface water.

Fluvial: The primary fluvial flood risk in the Borough is along Glossop Brook, the River Sett, River Goyt, River Etherow, River Wye, and Black Brook. These potential sources of fluvial flooding are located to the west and south of the Borough.

Surface water: The Risk of Flooding from Surface Water map shows a number of prominent overland flow routes that largely follow the topography of the watercourses. There are some areas where there are additional flow paths and areas of ponding, for example where water is impounded at road or rail embankments and in low-lying areas. While the Borough is largely rural, there are considerable flow routes following the roads through the main urban areas of Glossop, Buxton, and Chapel-en-Frith, alongside isolated areas of ponding, which may affect many properties across these settlements.

Climate change: Areas at risk of flooding today are likely to become at increased risk in the future and the frequency of flooding will also increase in such areas, due to climate change. Flood extents will increase; in some locations, this may be minimal, but flood depth, velocity and hazard may have more of an impact due to climate change. It is recommended that HPBC work with other RMAs to review the long-term sustainability of existing and new development when developing climate change plans and strategies for High Peak Borough.

Sewer: United Utilities and Severn Trent Water provide water services and sewerage services across the Borough, with United Utilities serving the north and west and Severn Trent Water serving the south and east. Both United Utilities and Severn Trent Water have provided details of historic sewer flooding across the Borough. Postcodes identified with a higher number of previous sewer flooding events are in Chapel-en-le-Frith, Whaley Bridge, Buxton and Calver.

Groundwater: The Areas Susceptible to Groundwater Flooding map shows that in general, areas with greater than 50% susceptibility to groundwater flooding are limited, although do occur around flow routes such as the River Noe, River Goyt, and Black Brook. The JBA Groundwater Emergence Map reflects this, with similar flow routes experiencing emergence levels within 0.5m of the surface, with the addition of Glossop Brook. Furthermore, the data shows groundwater emergence levels within 0.5m of the surface in the south of the Borough near Buxton and Chapel-en-Frith, particularly around Dove Holes Quarry.

Canals: The Peak Forest Canal runs through the west of the Borough, through the urban centres of Buxworth, Hockerley, Furness Vale, New Mills. The canal has the potential to interact with other watercourses such as the River Goyt and become a flow path during flood events or in a breach scenario. The Canal and River Trust were consulted as part of

the SFRA and provided details of five recorded overtopping incidents which occurred on the canal feeder from Combs Reservoir, and one recorded breach at Horwich End.

Reservoirs: The current mapping shows that there are nineteen reservoirs located within High Peak Borough, and one more located outside the borough, where the 'wet day' or 'dry day' scenarios encroach into the borough. There is a potential risk of flooding from reservoirs both within High Peak Borough and those outside. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is relatively low. However, there is a residual risk of a reservoir breach, and this risk should be considered in any site-specific FRAs (where relevant) in accordance with the updated PPG.

Defences: The EA AIMS dataset provides information on flood defence assets across the Borough. The main defence type across the study area is 'Natural High Ground', located along the main watercourses of the River Goyt, Glossop Brook, Black Brook, River Sett, River Etherow and River Wye. Engineered defences in the Borough include embankments, walls and engineered high ground lining parts of Black Brook, Glossop Brook, River Goyt, River Sett and River Etherow.

10.1 Recommendations

The following recommendations are made for High Peak Borough.

10.1.1 Reduction of flood risk through site allocations and appropriate site design

- To locate new development in areas of lowest risk, in line with the sequential test, by steering sites to Flood Zone 1 from the Flood Map for Planning and avoiding where possible areas with a higher risk of surface water flooding. If a sequential test is undertaken and a site at flood risk is identified as the only appropriate site for the development, the exception test should be undertaken. If development can’t be avoided in the higher risk surface water Zone (Zone B), then part “b” of the exception test should be satisfied.
- After application of the exception test, a sequential approach to site design should be used to reduce risk. Any re-development within areas of flood risk which provide other wider sustainability benefits will provide flood risk betterment and be made resilient to flooding.
- Identification of long-term opportunities to remove development from the floodplain and to make space for water.
- Ordinary watercourses not currently afforded flood maps should be modelled to an appropriate level of detail to enable a sequential approach to the layout of the development.
- Confirm development is ‘safe’, dry pedestrian egress from the floodplain and emergency vehicular access should be possible for all residential development. If at risk, then an assessment should be undertaken to detail the flood duration, depth, velocity, and flood hazard rating in the 1% AEP plus climate change flood event, in line with FD2320.

- Raise residential and commercial finished floor levels 300mm above the 1% AEP plus climate change flood level. Protect and promote areas for future flood alleviation schemes.
- Identify opportunities for brownfield sites in functional floodplain to reduce risk and provide flood risk betterment.
- Identify opportunities to help fund future flood risk management through developer contributions to reduce risk for surrounding areas.
- Seek opportunities to make space for water to accommodate climate change.

10.1.2 Promote SuDS to mimic natural drainage routes to improve water quality

- Planners should be aware of the conditions set by the LLFAs for surface water management. The enactment of Schedule 3 of the FWMA means that there will be mandatory standards for delivery and adoption of SuDS in new developments.
- SuDS design should demonstrate how constraints have been considered and how the design provides multiple benefits e.g. landscape enhancement, biodiversity, recreation, amenity, leisure and the enhancement of historical features.
- Planning applications for phased developments should be accompanied by a drainage strategy, which takes a strategic approach to drainage provision across the entire site and incorporates adequate provision for SuDS within each phase.
- Use of the SuDS management train to prevent and control pollutants to prevent the 'first flush' polluting the receiving waterbody.
- SuDS are to be designed so that they are easy to maintain, and it should be set out who will maintain the system, how the maintenance will be funded and should be supported by an appropriately detailed maintenance and operation manual.

10.1.3 Reduce surface water runoff from new developments and agricultural land

- Space should be provided for the inclusion of SuDS on all allocated sites, outline proposals and full planning applications.
- Promote biodiversity, habitat improvements and Countryside Stewardship schemes help prevent soil loss and to reduce runoff from agricultural land.
- Identify opportunities to maintain and enhance permeable surfaces and greenspaces to help reduce surface water runoff whilst promoting other benefits, including biodiversity and wellbeing.

10.1.4 Enhance and restore river corridors and habitats

- Assess condition of existing assets and upgrade, if required, to confirm that the infrastructure can accommodate pressures/flows for the lifetime of the development.
- Natural drainage features should be maintained.
- Identify opportunities for river restoration/enhancement to make space for water.

- A presumption against culverting of open watercourses except where essential to allow highways and/or other infrastructure to cross, in line with CIRIA's Culvert design and operation guide (C689) and to restrict development over culverts.
- There should be no built development within 8m from the top of a watercourse or main river for the preservation of the watercourse corridor, wildlife habitat, flood flow conveyance and future watercourse maintenance or improvement.

10.1.5 Mitigate against risk, improved emergency planning and flood awareness

- Work with emergency planning colleagues and stakeholders to identify areas at highest risk and locate most vulnerable receptors.
- Exceedance flows, both within and outside of the site, should be appropriately designed to minimise risks to both people and property.
- For a partial or completely pumped drainage system, an assessment should be undertaken to assess the risk of flooding due to any failure of the pumps to be assessed. The design flood level should be determined if the pumps were to fail; if the attenuation storage was full, and if a design storm occurred.
- An emergency overflow should be provided for piped and storage features above the predicted water level arising from a 1% AEP rainfall event, inclusive of climate change and urban creep.
- Consideration and incorporation of flood resilience measures up to the 0.1% AEP event.
- Produce and implement robust emergency (evacuation) plans for major developments.
- Increase awareness and promote sign-up to the EA Flood Warnings within the High Peak Borough.

10.2 Requirements for Level 2 SFRA

Following the application of the sequential test, if sites cannot be appropriately accommodated in low-risk areas, HPBC will apply the NPPF's exception test. In these circumstances, a Level 2 SFRA may be required, to assess in more detail the nature and implications of the flood characteristics.

As part of this Level 1 SFRA, an initial site screening exercise has been undertaken for HPBC to help inform the application of the sequential test and subsequent potential requirement for a Level 2 SFRA.

Appendices

A Interactive Mapping Portal User Guide

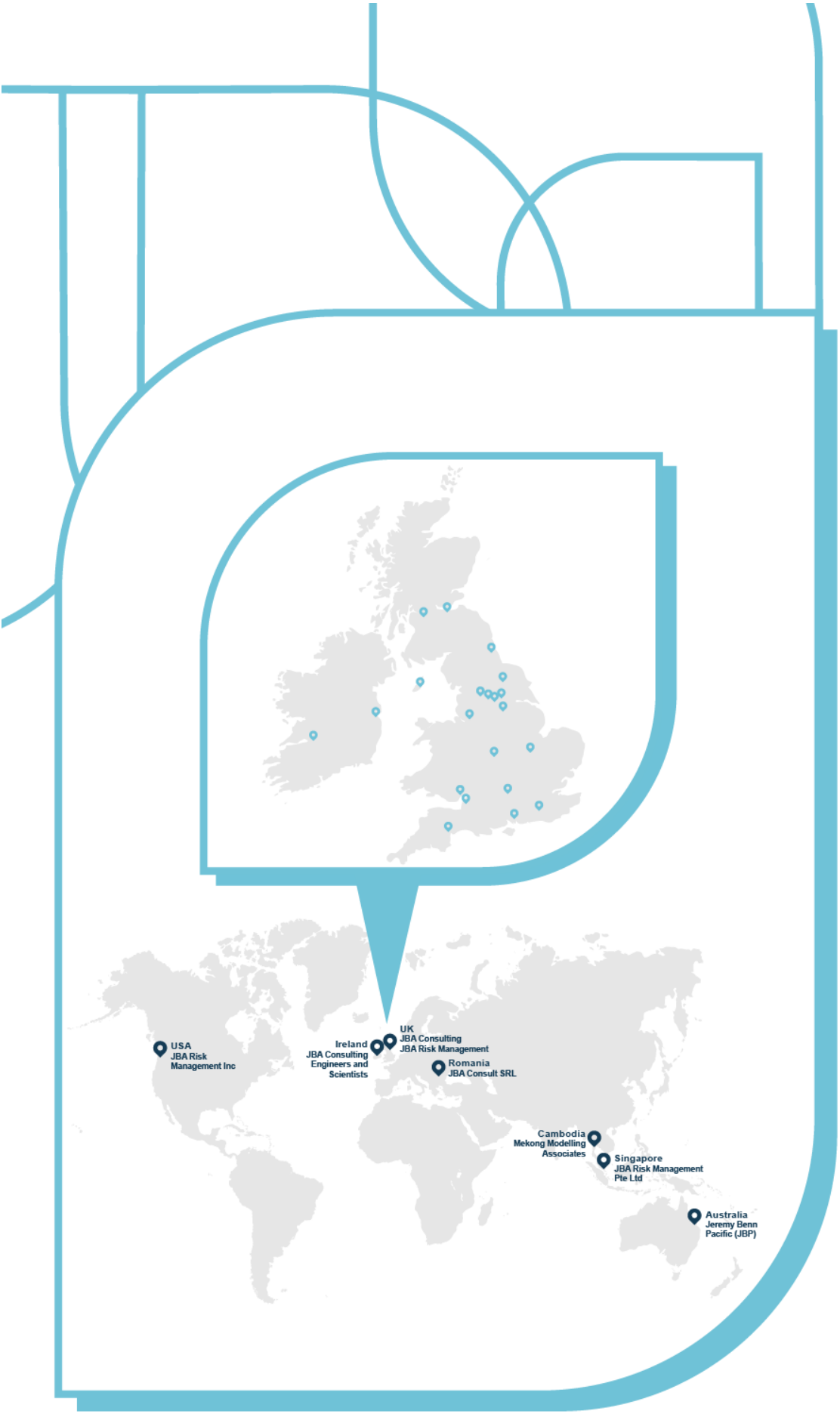
B Data Sources used in this SFRA

C SFRA User Guide

D Flood Alerts and Flood Warnings

E Summary of Flood Risk across High Peak Borough

F Cumulative Impact Assessment (CIA)



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