Peak Sub Region

Strategic Flood Risk Assessment
Level 1
Executive Summary
September 2008

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1 Executive Summary

1.1 Background

In December 2007 Derbyshire Dales District Council, High Peak Borough Council and the Peak District National Park Authority commissioned Halcrow to produce a Level 1 Strategic Flood Risk Assessment (SFRA) in accordance with Planning Policy Statement 25 (PPS25). These authorities make up the Peak Sub-Region as defined by the Draft East Midlands Regional Plan 2006. The SFRA is split into three reports covering the areas for which each authority is the local planning authority.

Figure 1: Peak Sub Region SFRA Study Area

The SFRA has been prepared to support the application of the Sequential Test (by the Councils) outlined in Planning Policy Statement 25: Development and Flood Risk (PPS25), and to provide information and advice in relation to land allocations and development control.

The SFRA has assessed all forms of flood risk: fluvial (rivers), surface water, groundwater, sewers and impounded water bodies (reservoirs and canals), both now and in the future given the likely impacts of climate change.

The SFRA includes maps of the flood risks. The strategic flood risk information is also presented as GIS layers, and can be interrogated to gain the associated descriptive information.

1.2 Purpose of the SFRA

The purpose of the SFRA is to:

- Inform the sustainability appraisals so that flood risk is taken into account when considering options in the preparation of strategic land use policies
- Propose appropriate policy recommendations for the management of flood risk within the Local Development Documents (LDDs)
- Determine the acceptability of flood risk in relation to emergency planning capability
- Identify the level of detail required for future site-specific Flood Risk Assessments (FRAs) that support planning applications

The SFRA output is relevant not only to planning and development control, but also site specific FRAs and mapping for emergency planning, alleviation of flood risk within existing development and Surface Water Management Plans.

1.3 Structure of the SFRA

An SFRA document and accompanying set of maps has been produced for each Peak Sub Region local authority (Derbyshire Dales District Council, High Peak Borough Council and the Peak District National Park Authority).

For each local authority, the SFRA comprises two separate volumes:

- **Volume 1** contains the technical SFRA report and accompanying executive summary document
- **Volume 2** contains a series of maps

The SFRA is a 'living' document, to be updated as new data becomes available.

1.3.1 Key Sources of Flood Risk Data

The main approach adopted for the SFRA has been to build on previous studies and existing flood risk information. It has therefore been critical to make best use of the significant amount of information which already exists and is held by the various bodies involved in the management of flood risk. Consultation has formed a key part of the data gathering stage of the SFRA. Stakeholders including the Peak Sub Region (which has included information from the public), the Environment Agency, water companies (Severn Trent Water, Yorkshire Water and United Utilities), the Highways Agency and British Waterways were consulted so that flood risk data could be gathered. The benefits of adopting a partnering approach (as advocated by PPS25) are significant

and have helped to ensure that the findings and recommendations of the SFRA cover flooding from all sources and are relevant, detailed and robust.

The data gathering process has resulted in a review of:

- Strategically important documents including the Regional Flood Risk Appraisal and Making Space for Water
- Historical flooding information from Environment Agency historic fluvial flood outlines and various datasets from water companies, the Councils, the Highways Agency and British Waterways, detailing flooding experienced from 'other sources'
- Environment Agency Flood Zone maps and detailed flood risk mapping outputs, including fluvial climate change outputs
- Information on flood risk management infrastructure, including defences and culverts (supported by information from the Councils and the Environment Agency's National Flood and Coastal Defence (NFCDD) database)
- Existing flood risk management reports including Catchment Flood Management Plans (CFMPs)
- Environment Agency flood warning and flood watch information

1.4 Planning Policy Statement 25: Development and Flood Risk (PPS25)

PPS25 on development and flood risk, published as part of the Government's making space for water strategy, seeks to provide clear and robust guidance to ensure that current and future flood risk is taken into account at all levels of the planning system.

PPS25 recognises that, although flooding cannot be wholly prevented, its impacts can be avoided and reduced through good planning and management. Flood risk is required to be taken into account at all stages in the planning process to avoid inappropriate development in areas of flood risk and to direct development away from areas of highest risk. This is referred to by PPS25 as the sequential approach. The Sequential Test refers to the application of the sequential approach by a local authority.

1.4.1 The Sequential Test

A key aim of a Level 1 SFRA is to provide the necessary information to allow each local authority to guide development towards the area of lowest flood risk using the Sequential Test. This is a process whereby preference is given to locating a new development in Flood Zone 1.

If there is no reasonably available site in Flood Zone 1, the flood vulnerability (see table D3 of PPS25, overleaf) of the proposed development can be taken into account in locating development in Flood Zone 2 (Medium Probability) and then Flood Zone 3 (High Probability).

Table 1: Flood Risk Vulnerability and Flood Zone 'Compatibility' (Table D3 of PPS25)

Flood Risk Vulnerability classification (see Table D2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see Table D.1)	Zone 1	✔	✔	✔	✔	✔
	Zone 2	✔	✔	Exception Test required	✔	✔
	Zone 3a	Exception Test required	✔	✗	Exception Test required	✔
	Zone 3b 'Functional Floodplain'	Exception Test required	✔	✗	✗	✗

Key:

✔ Development is appropriate

✗ Development should not be permitted

Within each Flood Zone:

- New development should be directed away from 'other sources' of flood risk and towards the area of lowest probability of flooding, as indicated by the SFRA maps.
- The flood vulnerability of the development should be matched to the flood risk of the site, e.g. higher vulnerability uses should be located on parts of the site at lowest probability of flooding.

The Sequential Test demonstrates whether there are any reasonably available sites, in areas with a lower probability of flooding, that would be appropriate to the type of development or land use proposed. PPS25 and indeed the SFRA summarises the appropriate uses of each zone, as well as FRA requirements and policy aims for each.

Where it is not possible, or consistent with wider sustainability objectives, for development to be located in Flood Zones of lower probability of flooding, the Exception Test can be applied (in accordance with Table D3 of PPS25). The Exception Test is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is necessary for wider sustainable development reasons (the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods). It may also be appropriate to use it where restrictive national designations such as landscape, heritage and nature conservation designations, e.g. Areas of Outstanding Natural Beauty (AONBs), Sites of Special Scientific Interest (SSSIs) and World Heritage Sites (WHS), prevent the availability of unconstrained sites in lower risk areas.

The Exception Test must only been attempted once the Sequential Test has been carried out.

1.4.2 Level 2 SFRAs

A Level 2 SFRA involves a more detailed review of flood hazard (flood probability, flood depth, flood velocity, rate of onset of flooding) taking into account the presence of flood risk management measures such as flood defences. Level 2 SFRAs are required when the need to apply the Exception Test is identified, and/or when Flood Zone information needs to be refined in order to support application of the Sequential Test.

1.5 Planning Policy

Flood related planning policy at national and regional levels is detailed in the main reports (Volume 1). This highlights that flood risk is taken into account at every hierarchical level within the planning process. A series of policy recommendations are made, and information contained in the SFRA provides evidence to facilitate the preparation of robust policies for flood risk management (see Section 1.9 of this document for further details).

1.6 Key Findings of the SFRA

The SFRA has assessed all sources of flooding using the information supplied by the consultees mentioned in Section 1.3.1. This section provides a summary of the flood risk issues within the Peak Sub Region.

The various sources of the data used in this assessment and the relative confidence in these datasets are detailed in the main reports (Volume 1). SFRA flood maps are presented in Volume 2.

1.6.1 Fluvial Flood Risk

The Flood Zones used in the SFRA have been derived from a mixture of the Environment Agency Flood Map and detailed modelled information. This encompasses the best available flood risk information at this time. The Flood Zone maps presented in the SFRA show the undefended situation, i.e. the risk posed if all defences did not exist. Undefended maps should be used to carry out the Sequential Test.

The Flood Zone maps show:

- **Flood Zone 1:** This zone comprises land assessed as having less than a 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). While the risk of fluvial flooding is not a concern, flooding from other sources including surface water, groundwater, sewers and impounded water bodies (reservoirs and canals) may still present themselves.

- **Flood Zone 2:** This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year. Flooding from other sources can also occur.

- **Flood Zone 3a:** This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Flooding from other sources can also occur.

- **Flood Zone 3b** (Functional Floodplain): This zone comprises land where water has to flow or be stored in times of flood (land which would flood with an annual probability of 1 in 20 (5%) or

greater in any year, or is designed to flood in an extreme (0.1%) flood, including water conveyance routes). Wherever possible, the SFRA uses modelled information to represent Flood Zone 3b (either by using the 5% (1 in 20 year) annual probability event or a suitable proxy, such as the 4% (1 in 25 year) annual probability event). Where approved modelling of the 5% flood extent has not been undertaken, a conservative approach has been applied in defining the functional floodplain as being to equivalent to land assessed as having a 1% (1 in 100 year) or greater annual probability of river flooding.

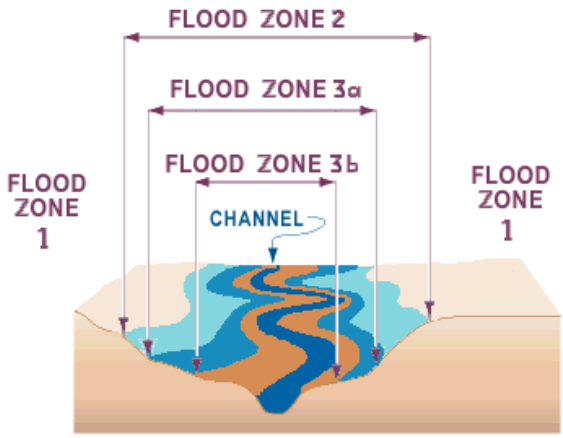

Figure 2: Flood Zones

It should be noted that not all minor watercourses have had Flood Zone maps produced for them (only watercourses with a catchment area greater than 3km² have been modelled by the Environment Agency and, therefore, smaller watercourses as identified on OS maps within Flood Zone 1 may not have Flood Zone information). Any development site located around or adjacent to an unmapped watercourse within Flood Zone 1 should have an 8m development easement from the top of bank applied and a site specific FRA undertaken.

The following summarises the nature of fluvial and tidal flood risk within each Peak Sub Region local authority:

Derbyshire Dales: Fluvial Flood Risk

- Derbyshire Dales District Council falls entirely within the River Trent catchment. The watercourses in the District form the upland tributaries of the River Trent. The two main catchments within the District are the River Derwent and River Dove, each with numerous tributaries and drains.

- Local knowledge suggests that the District is covered by springs which are not identified on OS maps (Darley Hillside, for example).

- Historic flood outlines received from the Environment Agency indicate that significant fluvial flooding has occurred in January 1947 (River Derwent and Bentley Brook), January 1960 (River Derwent), January 1965 (River Derwent) and Autumn 2000 (Rivers Derwent and Wye).

- The onset of flooding in the District varies between the different watercourses according to the catchment characteristics, in particular between the upper and lower reaches. For some

watercourses the onset of flooding is rapid in the upper reaches (e.g. River Derwent) with river corridors characterised by steep, incised channels which, when in flood, produce deep, sometimes fast flowing flood waters. In comparison, in the lower reaches of some catchments (e.g. River Dove), floodplains are wider and flatter with floodwaters spreading out for larger distances, slowing the rivers runoff response to rainfall. This is reflected in the Flood Zone maps.

- The underlying geology plays a significant role in the onset of flooding within the District. In general, rivers in the District have narrow Flood Zones, constrained by the local steep gradients. Siltation problems within these watercourses can be a problem, leading to a decrease in channel capacity.

<u>High Peak: Fluvial Flood Risk</u>

- The plan area of High Peak Borough Council drains into two major river catchments. The northern and central parts of the plan area drain into the Goyt and Etherow catchments, which ultimately drain into the River Mersey. The southern part of the plan area drains into the River Wye catchment, which ultimately drains into the River Trent.

- Fluvial flood risk is influenced by topography and the underlying geology. The headwaters of the Main Rivers in and around the plan area are steeply sloping, the runoff response of which is exacerbated by the Millstone grit geology and highly waterlogged peat soils. The flashy catchment responses exhibited by the high upstream catchments convey flashy flows downstream, which can be made worse downstream by the impervious Millstone grit. The only exception is the headwaters of the River Wye to the south of the plan area, which lies on Carboniferous limestone, resulting in a relatively slow response to rainfall.

- Historic flood outlines received from the Environment Agency indicate that significant fluvial flooding occurred along the River Wye and an unnamed tributary in both January 1965 and November 2000.

- River corridors are generally characterised by steep, incised channels which, when in flood, produce deep, sometimes fast flowing flood waters. Higher return periods do not tend to produce a greater extent of flooding, rather, the flood depth increases.

- Local channel restrictions and under capacity structures can cause flooding, i.e. some culverts are not big enough to adequately convey flood flows which can cause/exacerbate flooding due to the back-up of river flows.

<u>Peak District National Park: Fluvial Flood Risk</u>

- The Peak Sub-region watershed drains into the East Midlands, West Midlands, North West and Yorkshire and Humberside Regions. The main catchments include the Tame, Goyt and Etherow in the northern extent of the region; and the Derwent and Dove towards the south.

- The Environment Agency's historic fluvial flood outlines indicate that flooding has occurred in January 1947, January 1962, January 1963, January 1965, August 1998 and November 2000.

- River corridors are characterised by steep, incised channels which, when in flood, produce deep, sometimes fast flowing flood waters.

- The underlying geology of the Peak District National Park plays a significant role in the response of the river catchments within the area. Runoff is high in some upland catchments (e.g. River Derwent) due to the combination of steep slopes, high rainfall, impermeable underlying geology and highly waterlogged peat soils. This results in catchments with a flashy response to rainfall. In comparison, the River Wye catchment drains the lighter, more permeable Carboniferous limestone geology of the White Peak area to the west, and although experiences high rainfall rates, runoff is lower and the watercourse responds to rainfall much more slowly.

- Fluvial flood risk is evident at a number of locations including: River Noe at Hope and Brough; Bradwell Brook at Bradwell specifically around Church Street; localised flooding along the Dale Brook at Eyam and Stoney Middleton (where culvert capacity is known to be an issue); River Wye at Tideswell, Ashford in the Water (exacerbated by siltation problems) and, Bakewell; and, localised flood risk is evident along tributaries of the River Wye. At Calver Sough a system of ancient soughs (underground channels for draining water out of a mine) exist with past localised flooding a subject of concern.

- Flood Zones do not exist for a number of smaller watercourses; however, many of these watercourses do pose local flood risk issues.

1.6.2 Sewer Flood Risk

Sewer flooding occurs when the drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network, causing waste water to back up behind it, or if the sheer volume of water draining into the system is too great to be handled. Water companies covering cover the study area were contacted to gain information on areas which have been affected by sewer flooding in the past. However, due to the Data Protection Act, it is not possible to specify the exact locations of past incidents. Instead, data has been received at four-digit postcode level. These postcode polygons outline a series of large geographical areas. Within each postcode area is an indication of how many incidents have occurred. Sewer flood risk has then been classified according to the number of properties flooded from overloaded sewers within each postcode area. The categorisation is as follows:

- Low sewer flood risk: 1 to 5 properties
- Medium sewer flood risk: 6 to 15 properties
- High sewer flood risk: >15 properties

The following conclusions have been drawn:

Derbyshire Dales: Sewer Flood Risk

- A number of postcode areas within the District have been identified as having properties which have been affected by flooding from artificial drainage systems and surface water runoff. In general the level of flood risk from artificial drainage systems is medium to low.
- Part of the area is served by a system of ancient soughs (underground channels for draining water out of a mine) and past localised flooding of the area has meant that they have been the subject of concern.

High Peak: Sewer Flood Risk

- Seven postcode areas within the High Peak plan area are identified as having properties which have been affected by flooding from sewers and surface water runoff. In general the level of flood risk from artificial drainage systems within both the plan area and the remainder of the Borough is medium to low.

Peak District National Park: Sewer Flood Risk

- The level of flood risk from artificial drainage systems within the Peak District National Park is low, with only four of the postcode areas identified as having a medium to high risk. These are located towards the south eastern and western extents of the study area.

1.6.3 Surface Water Flood Risk

Surface water flooding occurs when excess water runs off across the surface of the land and is usually the product of short duration but intense storms. This type of flooding usually occurs because the ground is unable to absorb the high volume of water that falls on it in a short period of time, or because the amount of water arriving on a particular area is greater than the capacity of the drainage facilities that take it away. Where discharge is directly to a watercourse, locally high water levels can cause back-up and prevent drainage taking place. In each instance the water remains on the surface and flows along the easiest flow path towards a low spot in the landscape. Surface water flooding is often short lived and localised and there is often limited notice as to the possibility of this type of flooding. In addition to general surface water flood risk analysis, the Highways Agency, County Council and local authorities provided databases of surface water flooding locations and the following has been found:

Derbyshire Dales District Council: Surface Water Flood Risk

- Surface water flooding is known to have been a problem at a number of locations including the village of Eyam, Stoney Middleton, the land and highway adjacent to the Red House in Darley Dale, Matlock, Gorsey Bank at Wirksworth, Cromford, Yorkcliffe estate, Clifton.
- Runoff from open land appears to also be a problem within the District.

High Peak Borough Council: Surface Water Flood Risk

- Surface water flooding within the Borough is a significant problem due to the underlying geology and topography which contribute to rainfall response. A number of properties have

been flooded by surface water from open land or highways. This can be made worse by local insufficient drainage capacity.

- A further issue is surface water flows carrying large amounts of debris, which, when deposited in watercourses, can reduce channel capacity and cause local flood risk issues.

Peak District National Park Authority: Surface Water Flood Risk

- Surface water flooding is known to be a significant problem within the Peak District National Park due to the steep topography and underlying impermeable geology. This can be made worse by local insufficient drainage capacity. Where discharge is directly to a watercourse, locally high water levels can cause back-up and prevent drainage taking place.

- The Moors for the Future Project is currently working to reduce runoff to large areas around the Park, including improving storage, which is already contributing to reduced flood risk within the Park and its surrounding areas.

1.6.4 Impounded Water Body Flood Risk

Occasionally, canals can overtop due to high inflows from natural catchments and if overtopping occurs from adjacent water courses. This additional water can be routed/conveyed by the canal which may cause issues elsewhere, not only within the catchment of interest but also in neighbouring catchments where the canal might cross a catchment boundary. Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act 1975, though due to high standards of inspection and maintenance required by legislation, normally flood risk from registered reservoirs is moderately low. British Waterways was consulted to gain information on past reservoir breach and overtopping incidents of canals, while the Environment Agency was consulted to gain a comprehensive overview of reservoirs currently held under the Reservoirs Act, and any breach and overtopping information of these reservoirs. However, it should be noted that there is a residual risk of flood risk from all reservoirs and canals, from either breach or overtopping, therefore any development in immediately adjacent/downstream of these areas should be carefully considered and the risks fully assessed. A Level 2 SFRA would be required to determine the risk posed by overtopping or breach of the embankment and to inform appropriate policy and mitigation measures. The Level 1 assessment found that:

Derbyshire Dales District Council: Impounded Water Body Flood Risk

- There is just one canal in the District, and this falls in the plan area to the east of Cromford. There are no recorded incidents of breaches or overtopping, or any other local flood risk associated with this canal.

- There are no records of breaching or overtopping of reservoirs within the District.

High Peak Borough Council: Impounded Water Body Flood Risk

- One canal is located in the Borough to the east of Furness Vale and Newtown, called the Peak Forest Canal. There are no recorded incidents of breaches or overtopping, or any other local flood risk instances associated with this canal.
- Four reservoirs are located within the Borough. There is one record of breaching/overtopping within the High Peak Borough Council area at Toddbrook in 1964.

Peak District National Park Authority: Impounded Water Body Flood Risk

- There are no canals in the Peak District National Park.
- A number of reservoirs are located within the Peak District National Park. Consultation with the Environment Agency has indicated that there are two records of breaching/overtopping at Dale Dyke dam (breached in 1864) and Woodhead reservoir dam (breached during construction in 1849).

1.6.5 Groundwater Flood Risk

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive regional aquifers (e.g. chalk or sandstone) or localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding occurs as a result of water rising from the underlying rocks or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, so during very wet periods, all the additional groundwater flowing towards these areas can cause the water table to rise to the surface causing groundwater flooding. Groundwater can take weeks or months to dissipate, because groundwater flow is very slow and water levels take much longer to fall.

However, at this time the areas at risk from groundwater flooding are largely unknown. Although data collected for the SFRA has provided an indication of areas potentially susceptible, the assessment undertaken as part of this SFRA is not exhaustive and the risk and impact of groundwater to all development must be considered. Across the Peak Sub-Region, the following was found:

- There are no known problems with flooding from groundwater within the study area. However, peat deposits are found which are typically waterlogged and may breach the surface.

1.6.6 Climate Change Impacts

In its October 2006 publication of the predicted effects of climate change on the UK, Defra described how short duration rainfall could increase by 30% and flows by 20%, and suggests that by 2085 winters will become generally wetter whilst summers, although drier, will be characterised by more intense rainfall events. Changes in sea level could result in tide locking of watercourses draining to the sea and resultant coastal and tidal flooding. Overall, these effects will tend to increase both the size of Flood Zones and the depth of floodwater associated with rivers, and the

amount of flooding experienced from 'other sources'. Sites that are currently within Flood Zones 2 and 3 will be subject to more frequent and potentially deeper flooding. Generally, it is anticipated that in flatter areas, the extent of inundation will become bigger, while in narrow floodplains, the depth of the floodwaters will increase. In particularly steep areas the velocity might also increase. This will have a significant impact on the flood hazard. Possible climate change impacts on flood risk in the Peak Sub Region are as follows:

- Climate change effects mean upland areas are likely to be subject to deeper, faster flowing water, while in lowland areas the extent of flooding is likely to become greater. In the upland areas which characterize the Peak Sub-Region, an increase in flood extent is not expected, however, flood water may become deeper and faster flowing. This means that the flood hazard is likely to increase over time, creating increased risk to humans, more damage to property and higher economic damages. A Level 2 SFRA, which assesses flood hazard, will therefore be required for site allocations which need to satisfy the Exception Test. Certainly, sites that are currently within Flood Zones 2 and 3 will be subject to more frequent and potentially deeper flooding.

- It is expected that flood risk from surface water, sewers and groundwater will generally increase due to the expected wetter winters (causing more frequent groundwater flooding) and incidence of short-duration high-intensity rainfall events associated with summer convective storms (causing more frequent surface water and sewer flooding).

1.7 Future Development

Regional planning policies provide the overarching framework for the preparation of the Local Development Frameworks (LDFs). The Draft East Midlands Plan is the Regional Spatial Strategy for the East Midlands (EMRSS) and provides a broad development strategy for the East Midlands Region up to 2026. The purpose of the EMRSS is to provide a long term land-use and transport planning framework for the East Midlands Region. It guides the preparation of local authority development plans and local transport plans and determines (amongst other things) the scale and distribution of housing and economic development for each Local Authority within the region, investment priorities for transport and sets out policies for enhancing the environment.

The Spatial Strategy sets out a Regional approach to selecting land for development. Sub-area priorities are discussed. The Regional Plan describes the Peak Sub-area as largely rural in character, and a major visitor destination. This local authority grouping has been used as the starting point for determining key policies in the Regional Plan, including levels of new housing provision. The Peak District National Park covers a significant proportion of the Peak Sub-area, and such designation confers the highest status of protection for landscapes and scenic beauty. The purpose of National Parks is to conserve and enhance their natural beauty, wildlife and cultural heritage and to promote opportunities for public understanding and enjoyment of their special qualities. All relevant authorities which fall in the National Park area are required to have regard to these purposes when acting in a way that could affect the National Park (Environment Act 1995, Section 62). Major developments should not take place in the National Park, save exceptional circumstances and where it is demonstrated to be in the public interest and that is not possible to meet that need in another way. Planning policies will continue to be applied to protect the National Park, whilst addressing the social and economic needs of the Park's communities and supporting the regeneration of the surrounding urban areas.

Parts of Oldham, Kirklees, Barnsley, Sheffield, North-East Derbyshire, Macclesfield, Staffordshire Moorlands High Peak Borough Council and Derbyshire Dales District Council fall within the National Park boundary. Within these areas the Peak District National Park is the local planning authority. Given the effects of the restraint policy in the National Park, towns in adjacent planning areas may be subject to development pressure, particularly Buxton, Glossop, New Mills, Whaley Bridge and Chapel-en-le-Frith in High Peak, and Matlock and Ashbourne in Derbyshire Dales. The Regional Plan states, however, that the restrictions on housing in the National Park do not imply that compensatory general market housing should be met elsewhere in the Sub-area, as it would be inconsistent with the objectives of urban regeneration of the surrounding conurbations.

Care must be taken to ensure that all new development respects and enhances the high quality environment of the area, notably the built heritage, particularly in Matlock, Ashbourne and Wirksworth, as well as the setting of the National Park, the Derwent Valley Mills World Heritage Site, and the areas of landscape and nature conservation value.

The Regional Plan sets out an annual average housing provision rate between 2001 and 2026 for the Peak Sub-Area as[1]:

- Derbyshire Dales: 1501
- High Peak: 270
- Peak District National Park: 0

In allocating sites for development, the local authorities will be required to undertake the Sequential Test if promoting any areas that lie within Flood Zones 2, 3a or 3b at any point throughout the life of the development. By applying the Sequential Test the more vulnerable uses of land can be allocated to the lowest risk sites. The SFRA provides the necessary information to allow the local authorities to do this.

Only where there are no reasonably available sites in Flood Zones 1 should the suitability of sites in Flood Zones 2 and 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required. To facilitate the application of the Exception Test, a Level 2 SFRA will be required.

1.8 Flood Risk Management Measures and Potential for Failure

The SFRA has identified existing flood risk management measures such as defences, culverts, flood storage areas and flood alleviation schemes, as well as the existing Flood Warning and Flood Watch service operated by the Environment Agency.

Permanent defences, culverts and storage areas within the Peak Sub Region have been identified using the Environment Agency's NFCDD and through consultation with the local authorities. As with any flood defence there is a residual risk that it may fail, for example, as a result of either overtopping and/or a breach of a raised defence, or as a result of a blockage or collapse of a

[1] The annual average housing rates for the Peak Sub Region may alter following the proposed changes to the RSS arising from the Panel Report

culvert. Should such an event occur it may result in rapid inundation of the local community behind or in the vicinity of the flood defence, and may pose a risk to life. This is termed a residual risk area. In the event that allocations are proposed in the vicinity of flood risk management measures, the scope of the SFRA should be extended to a Level 2 assessment.

A number of purpose-built and natural flood storage areas are located within the Peak Sub Region. These include:

- A number of areas of extended floodplain acting as natural storage within the Derbyshire Dales plan area, along the River Derwent, Henmore Brook (as it approaches and flows through Ashbourne) and the River Dove (as it approaches and flows through Mayfield).
- Areas of extended floodplain acting as natural storage within the High Peak Borough Council plan area, including the River Goyt through Furness Vale.

It is imperative that any storage areas used as a means of attenuation of flood waters should be maintained to ensure their efficient operation during a flood event.

As a general note, further culverting and building over of culverts should be avoided. All new developments with culverts running through their site should seek to de-culvert rivers for flood risk management and conservation benefit.

1.9 Planning Policy Recommendations

Council policy is considered essential to ensure that the recommended development control conditions can be imposed consistently at the planning application stage. A key aim of an SFRA, therefore, is to define flood risk management objectives and identify key policy considerations. It should be noted that it is ultimately the responsibility of the Council to formally formulate these policies and implement them. The SFRA puts forward a number of flood risk objectives which should be taken into account during the policy making process and, where appropriate, used to strengthen or enhance the development control policies also provided in the SFRA. Locationally specific policy considerations are also put forward for each local authority in the Peak Sub-Region. The flood risk management objectives cover the following points:

Peak Sub Region

Flood Risk Objective 1: To Seek Flood Risk Reduction through Spatial Planning and Site Design:

- Use the Sequential Test to locate new development in least risky areas, giving highest priority to Flood Zone 1
- Use the Sequential Approach within development sites to inform site layout by locating the most vulnerable elements of a development in the lowest risk areas. For example, the use of low-lying ground in waterside areas for recreation, amenity and environmental purposes can provide an effective means of flood risk management as well as providing connected green spaces with consequent social and environmental benefits
- Build resilience into a site's design (e.g. flood resistant of resilient design, raised floor levels)
- Identify long-term opportunities to remove development from the floodplain through land swapping
- Ensure development is 'safe'. For residential developments to be classed as 'safe', dry pedestrian egress out of the floodplain and emergency vehicular access should be possible. The Environment Agency states that dry pedestrian access/egress should be possible for the 1 in 100 year +20% for climate change return period event, and residual risk, i.e. the risks remaining after taking the sequential approach and taking mitigating actions, during the 1 in 1000 year event, should also be 'safe'.
- Avoid development immediately downstream of/adjacent to reservoirs which will be at high hazard in the event of failure.

Flood Risk Objective 2: To Reduce Surface Water Runoff from New Developments and Agricultural Land:

- SUDS required on all new development. As outlined in section 10.3 which outlines appropriate SUDS techniques for the District, infiltration systems should be the preferred means of surface water disposal, provided ground conditions are appropriate. Above ground attenuation, such as balancing ponds, should be considered in preference to below ground attenuation, due to the water quality and biodiversity benefits they offer. The adoption and maintenance of SUDS should also be considered at the earliest opportunity in their planning (refer to Section 10.4).
- All sites require the following:

  - Greenfield discharge rates with a minimum reduction of 20%, as required by the Environment Agency

  - 1 in 100 year on-site attenuation taking into account climate change

- Space should be specifically set aside for SUDS and used to inform the overall site layout
- Promote environmental stewardship schemes to reduce water and soil runoff from agricultural land

Flood Risk Objective 3: To Enhance and Restore the River Corridor:

- An assessment of the condition of existing assets (e.g. bridges, culverts, river walls) should be made. Refurbishment or/and renewal should be made to ensure the lifetime is commensurate with lifetime of the development. Developer contributions should be sought for this purpose.
- Those proposing development should look for opportunities to undertake river restoration and enhancement as part of a development to make space for water. Enhancement opportunities should be sought when renewing assets (e.g. de-culverting, the use of bioengineered river walls, raising bridge soffits to take into account climate change)
- Avoid further culverting and building over of culverts. All new developments with culverts running through their site should seek to de-culvert rivers for flood risk management and conservation benefit
- Set development back from rivers, seeking an 8 metre wide undeveloped buffer strip

Flood Risk Objective 4: To Protect and Promote Areas for Future Flood Alleviation Schemes:

- Protect Greenfield functional floodplain (our greatest flood risk management asset) from future development and reinstate areas of functional floodplain which have been developed (e.g. reduce building footprints or relocate to lower flood risk zones)
- Develop appropriate flood risk management policies for the Brownfield functional floodplain, focusing on risk reduction
- Identify sites where developer contributions could be used to fund future flood risk management schemes or can reduce risk for surrounding areas
- Seek opportunities to make space for water to accommodate climate change

Flood Risk Objective 5: To Improve Flood Awareness and Emergency Planning:

- Seek to improve the emergency planning process using the outputs from the SFRA
- Encourage all those within Flood Zone 3a and 3b (residential and commercial occupiers) to sign-up to Flood Warnings Direct service operated by the Environment Agency
- Ensure robust emergency (evacuation) plans are implemented for new developments greater than 1 Ha in size

The policy recommendations provided in the SFRA have taken strong direction from the findings of the SFRA on local flood risk issues, PPS25, Making Space for Water, the Water Framework Directive and CFMPs. CFMPs have been critical in informing the SFRA of the Environment Agency's policies for long-term flood risk management of each river catchment in the study area over the next 50 to 100 years. The SFRA advises each local authority of how the relevant CFMP policies will affect their areas and therefore planning decisions.

1.10 Concluding Remarks

The SFRA has established that there are areas within the Peak Sub Region at risk of flooding. In order to minimise the flood risks posed to all potential development the Sequential Test will need to be applied for all land use allocations. The SFRA provides the necessary information to do this.

A Level 2 SFRA will be required where the need to apply the Exception Test is identified (as outlined in Table D3 of PPS25). This cannot be determined until the Sequential Test has been carried out on all proposed development sites. It is recommended that the Level 2 SFRA approach is agreed with the Environment Agency.

The SFRA underlines the importance of sustainable drainage systems (SUDS). The management of rainfall (surface water) is considered an essential element of reducing future flood risk to both the site and its surroundings. Indeed, reducing the rate of discharge from sites is one of the most effective ways of reducing and managing flood risk within the area. Across the whole of the study area, developers should seek to maximise the reduction of runoff from a site. This is because large increases in impermeable areas contribute to significant increases in surface runoff volumes and peak flows. There are numerous different ways that SUDS can be incorporated into a development to manage surface water drainage to avoid increases in peak flows and volumes, but the appropriate application of a SUDS scheme to a specific development is heavily dependent upon the topography and geology of a site and the surrounding areas.

A number of general issues and resultant recommendations have come forward through the SFRA process. Recommendations have been made within the SFRA which are specific to Council Policy, Environment Agency policy relevant to the Council and Emergency Planning procedures. These recommendations should be taken into account by each Local Authority.