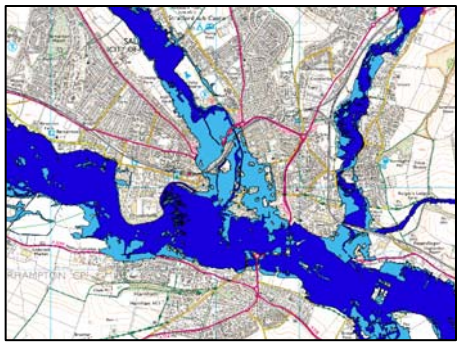
Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury SFRA

Strategic Flood Risk Assessment - Level 1
Executive Summary
February 2008

Halcrow Group Limited

East Dorset District Council
So much to offer

SALISBURY District Council

Christchurch
...where time is pleasant

Bournemouth Borough Council

North Dorset DISTRICT COUNCIL

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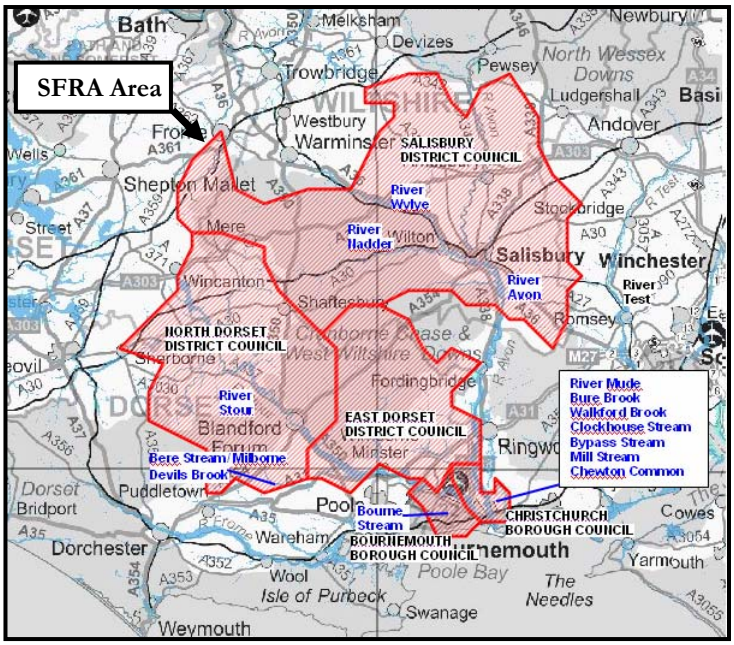
Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
1	0	Executive Summary	1 Feb 08	D Wilson
2	1	Executive Summary	22 Feb 08	D Wilson

Executive Summary



1.1 *Introduction*

1.1.1 *Background*

In July 2007, a consortium of five Councils commissioned Halcrow to produce a Level 1 Strategic Flood Risk Assessment (SFRA):

- Bournemouth BC
- Christchurch BC
- East Dorset DC
- North Dorset DC
- Salisbury DC

The SFRA has been prepared to support the application of the Sequential Test 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), tidal, surface water, groundwater, sewer and flooding from artificial sources (reservoirs), both now and in the future given the likely impacts of climate change.

This document provides a summary of the SFRA and is accompanied by maps of the flood risks.

1.1.2 *Purpose of the SFRA*

- Inform the sustainability appraisal 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;
- 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.

1.1.3 *Structure of the SFRA document*

This document comprises two separate volumes:

- **Volume I** is the main report which provides a summary of the catchments, relevant policies, current flood risks, the potential impacts of climate change, flood risk management practices and policy recommendations.
- **Volume II** contains the SFRA maps that illustrate all the flood risks in the study area.

The SFRA is a living document and should be updated as new data becomes available.

1.1.4 *Key sources of flood risk data*

In order to assess flood risks, each of the five Councils and the Environment Agency have provided data and have been closely involved with this SFRA. In addition, other key stakeholders have been consulted (Wessex Water, Wiltshire County Council, Dorset County Council) and they have provided data on known flood incidents.

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

PPS 25 on development and flood risk, published as part of the Governments 'Making Space for Water' strategy, seeks to provide clearer and more 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.

1.2.1 *The Sequential Test*

A key aim of a Level 1 SFRA is to guide development to the appropriate Flood Zone using the Sequential Test. This is a process whereby preference is given to locating a new development in Flood Zone 1 (Low probability). If there is no reasonably available site in Flood Zone 1, the flood vulnerability 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).

Within each Flood Zone:

- New development should be directed to sites with lower flood risk (towards the adjacent zone of lower probability of flooding) from all sources as indicated by the SFRA maps.
- 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 summarises the appropriate uses of each zone, as well as Flood Risk Assessment (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 for wider sustainability reasons to avoid social or economic blight. The Exception Test therefore provides a method of managing flood risk while allowing necessary development to occur.

1.2.2 *Level 2 SFRAs*

The 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. These are used in exceptional circumstances where lower flood risk sites are not available and the variation in flood risk across a site requires further analysis.

1.3 *Planning Policy*

Flood related planning policy at national, regional and local levels is detailed in the main report (Volume 1). This highlights that flood risk must be 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.

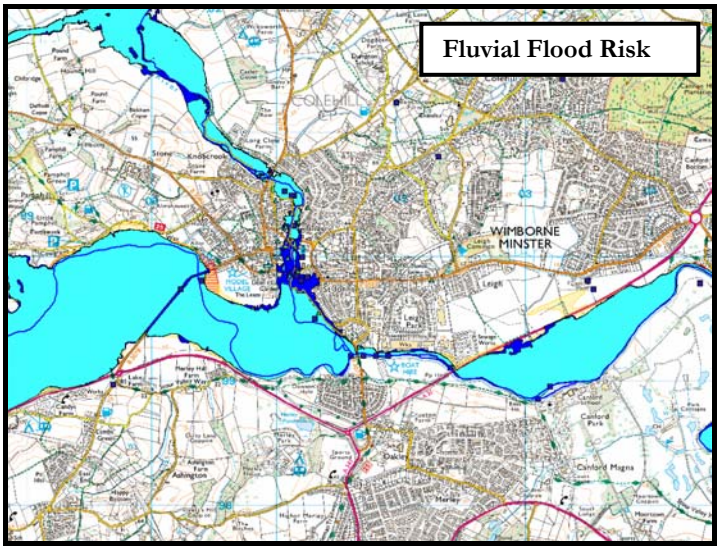
1.4 *Key findings of the SFRA*

1.4.1 *Flood risks - all types*

The SFRA has assessed all sources of flooding using the information supplied by the Councils, Environment Agency and key stakeholders.

In order to present the best available flood information, the SFRA fluvial and tidal flood zones were derived using several sources of existing data. Where detailed hydraulic modelling of rivers and coastal areas has been undertaken and approved by the Environment Agency, the modelled flood extents were used in preference to the existing Environment Agency Flood Map.

The various sources of the data and the relative confidence in these datasets are detailed in the main report (Volume 1). SFRA flood maps are presented (Volume 2) that provide a detailed picture of the extent of all sources of flooding. These maps show that significant areas are at risk of flooding from the Rivers Avon and Stour and their tributaries.



This figure illustrates an example of fluvial flood risk for Wimborne Minster.

The maps of Flood Zones are defined based on the best available information and show:

- **Flood Zone 1** –All areas that are not considered to be at risk of fluvial or tidal flooding. Whilst fluvial flooding and tidal flooding is not a concern in these areas, the risk of flooding from other sources, such as surface water, groundwater, sewers and artificial sources (reservoirs) may still be an issue.
- **Flood Zone 2** – Shows areas at risk of flooding in an extreme fluvial or coastal flood event. This zone shows those areas with a risk of flooding between a 0.1% and 0.5% / 1% Annual Exceedence Probability (AEP), i.e. between a 1 in 100 year, and a 1 in 1000 year probability.
- **Flood Zone 3a** – This represents the area that is part of Flood Zone 3, but outside Flood Zone 3b (Functional Floodplain). This zone identifies the areas at risk from a 1% AEP fluvial flood event or a 0.5% AEP flood event caused by flooding from the sea, i.e. between a 1 in 200 year, and a 1 in 100 year probability.
- **Flood Zone 3b** (Functional Floodplain) – The functional floodplain shows areas of land which are frequently flooded. For all areas it has been necessary to make conservative assumptions about the extent of the functional floodplain in the absence of historical flood outlines and detailed models. As such, the functional floodplain has been assumed to be equivalent to Flood Zone 3a.

The maps show significant areas of Christchurch and parts of East Dorset, North Dorset and Salisbury are currently at risk of tidal and/or fluvial flooding. The risk of fluvial and tidal flooding across most of Bournemouth is low.

1.4.2 Flood risks – fluvial climate change

There is increasing scientific evidence that our climate is changing as a result of human activity. The potential impact of climate change has been considered for the fluvial reaches and coastal areas, as detailed below:

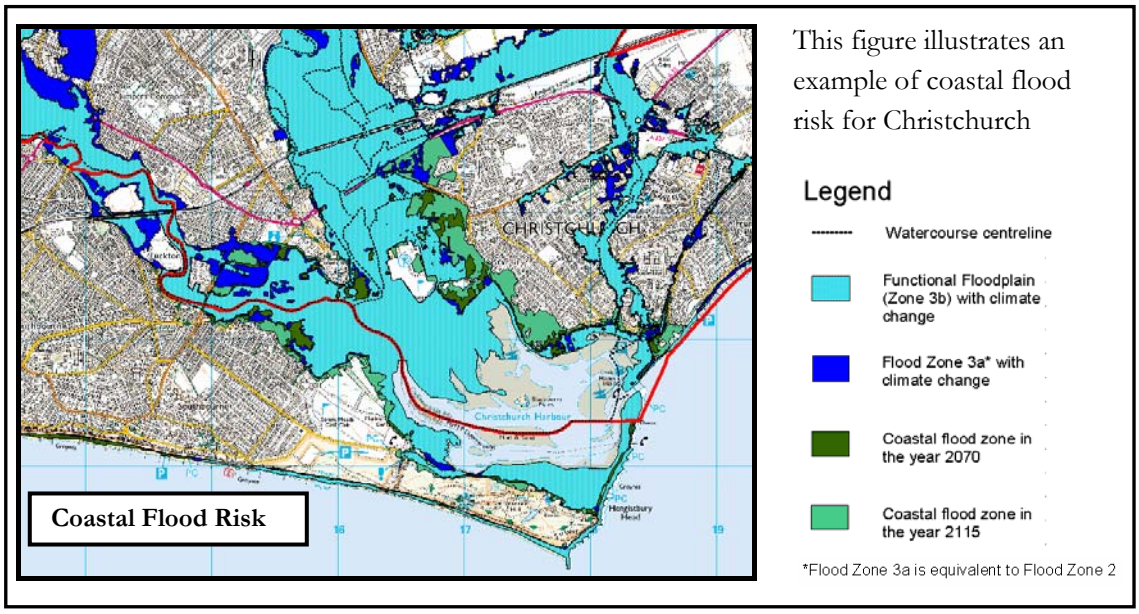
- **Flood Zone 2** with climate change - is assumed to equal the current Flood Zone 2 since there is very little certainty about the effect of climate change on extreme flood events.
- **Flood Zone 3a** with climate change - the current Flood Zone 2 outline has been used as a proxy until such time when more detailed information is available.
- **Flood Zone 3b** (Functional Floodplain) –the current Flood Zone 3a outline has been used as a proxy for the functional floodplain until such time when more detailed modelling is available.

1.4.3 Flood risks – tidal climate change

For coastal areas, the likely effects of climate change on the 1 in 200 year tide levels (0.5% AEP) has also been established for the years 2070 (to correspond with the design life of a commercial development) and 2115 (to correspond with the design life of a residential development), using the net sea level rises specified in PPS25. The effect of sea level rise on these planning horizons is illustrated on the SFRA maps.

However, it should be recognised that the tidal Flood Zones do not make an allowance for the current wave action nor the potential effects of increased wind speeds and wave heights as a

result of climate change. Given the significance that wave impact can have in coastal locations this element can not be ignored within the SFRA and the planning process, and will need to be considered in a Level 2 SFRA should development be proposed in coastal areas.



1.4.4 Flood risks - surface water, groundwater & sewer flooding

In addition to the extent of fluvial and tidal flooding there are areas in each Borough and District affected by surface water, groundwater and sewer flooding. It is expected that these types of flood risks will generally increase due to the expected wetter winters (causing more frequent and prolonged groundwater flooding) and the incidence of short-duration high intensity rainfall events associated with summer convective storms (causing more frequent surface water and sewer flooding).

1.4.5 Flood risks - artificial sources

The reservoirs situated within the SFRA area are detailed below by Local Planning Authority:

- Salisbury DC: 21
- East Dorset: DC 15
- North Dorset DC: 12
- Christchurch BC: 1 (service reservoir)
- Bournemouth BC: none

The majority of these reservoirs are impounded by earth embankments. The risk of failure of reservoirs need not constrain the location of development, but it is likely that should any major development be proposed in the area downstream of these reservoirs then an extended scope SFRA (Level 2) will be required to determine the risk posed by overtopping or breach of the embankment and to inform appropriate mitigation measures.

1.4.6 Sites for future development

Within Christchurch, East Dorset and Salisbury, 'Areas of Search for Development' have been identified by the Draft Regional Spatial Strategy[1]. A preliminary review of these areas has been undertaken.

Table 1 provides a summary of these areas of search according to the PPS25 Flood Zones taking into account climate change and other sources of flooding. It should be noted that the Sequential Test has not yet been undertaken, and these areas of search are themselves subject to review - for this reason the classifications detailed in **Table 1** are likely to change.

Table 1 Flood Zone classification of the Areas of Search for development

Local Planning Authority	Total No. of areas	No. of areas intersecting with Climate Change Flood Zone 3b	No. of areas intersecting with Climate Change Flood Zone 3a	No. of areas affected by other sources of flooding
Christchurch BC	1	1	1	0
East Dorset DC	4	3	3	4
Salisbury DC	7	4	4	3

From the above, it is apparent that some of the 'Areas of Search for Development' intersect with Flood Zone 3b (Functional floodplain) and 3a (High Probability) when the potential effects of climate change are taken into account.

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 developments life. By applying the Sequential Test the more vulnerable uses of land can be allocated to the lowest risk sites.

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

Within each of the five council areas many of the sites allocated for future development will be sited within existing urban areas. The flood risks to the largest of the existing urban areas are summarised in **Table 2** (next page).

1.4.7 Potential for Flood Defence Failure

Due to the history of flooding within the study area, there are numerous defences that provide localised protection against flooding, together with seven flood storage areas and a number of flood warning procedures. As with any flood defence there is a residual risk that a defence may fail, as a result of either overtopping and/or a breach.

Should such an event occur it may result in rapid inundation of the local community behind the flood defence, and may pose a risk to life. In the event that the Sequential Test needs to be

[1] The areas of search identified at the Core Strategy Issues and Option Stage are subject to revision

applied to specific site allocations behind a flood defence, the scope of the SFRA should be extended to a Level 2 assessment to refine information on the flood hazard in the location.

1.5 Development Implications

The SFRA has established that there are significant areas within Christchurch in particular, but also East Dorset, North Dorset and Salisbury are at risk of flooding. Flood risks within Bournemouth are localised except at the boundaries with East Dorset and Christchurch.

In order to minimise the flood risks posed to all potential future development the Sequential Test will need to be applied for all future land use allocations. It is recommended that surface water and sewer flooding should not necessarily be a limit on future development, but that all potential development locations are checked to ensure that capacity exists within the drainage networks to reduce the risk of flooding from these sources. The SFRA does however underline the importance of sustainable drainage systems in new development.

Across the whole of the study area, developers should seek to minimise surface water runoff from sites. 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 Sustainable Drainage Systems (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. The SFRA recommends that all developments in all flood zones should use SUDS.

Table 2 Flood Zone classification for existing urban areas

Local Planning Authority	Urban area	Does the urban area intersect with Climate Change Flood Zone 3b?	Does the urban area intersect with Climate Change Flood Zone 3a?	Is the urban area affected by other sources of flooding*?
Bournemouth BC	Bournemouth	√	√	√
Christchurch BC	Christchurch	√	√	√
East Dorset DC	Wimborne	√	√	√
	Ferndown			√
	St Leonards		√	√
	Verwood		√	√
	Alderholt			√
	Corfe Mullen			√
	Shapwick	√	√	√
	Sturminster Marshall	√	√	√
North Dorset DC	Blandford Forum	√	√	√
	Pimperne	√	√	√
	Shaftesbury			√
	Gillingham	√	√	√
	Child Okeford			√
	Shillingstone		√	√
	Okeford Fitzpaine			√
	Milborne St. Andrew	√	√	√
	Sturminster Newton			√
	Marnhull			√
	Bourton	√	√	√
	Stalbridge			√
Salisbury DC	Salisbury	√	√	√
	Tisbury	√	√	√
	Wilton	√	√	√
	Mere	√	√	√
	Downton	√	√	√
	Amesbury	√	√	√
	Bulford	√	√	√
	Durrington	√	√	√
	Shrewton	√	√	√

* Other sources of flooding are groundwater, sewer and surface water flooding

1.6 ***Concluding Remarks***

The risk of flooding within the study area arises from river, surface water, groundwater, sewer and coastal flooding. The SFRA flood maps with an allowance for climate change show that many urban areas within the study area are at risk of flooding from a 1% fluvial or 0.5% tidal annual probability flood extent (Flood Zone 3). Several (1/1 in Christchurch, 3/4 in East Dorset and 4/7 in Salisbury) of the areas of search for development lie within Climate Change Flood Zone 3, although in many cases the area affected is small. The Sequential Test should be applied to direct

any development away from these higher flood risk areas, but where this is not possible a Level 2 SFRA will be required to inform flood risk and the exception test must be passed.

The SFRA output is relevant not only to planning and development control, but also site specific flood risk assessments and mapping for emergency planning, alleviation of flood risk within existing urban development and surface water management plans.