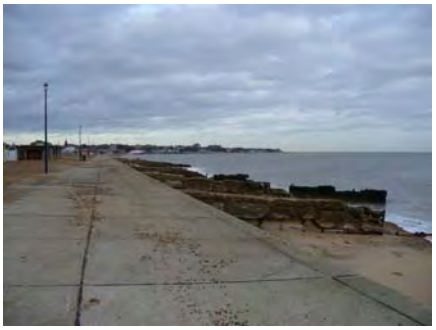
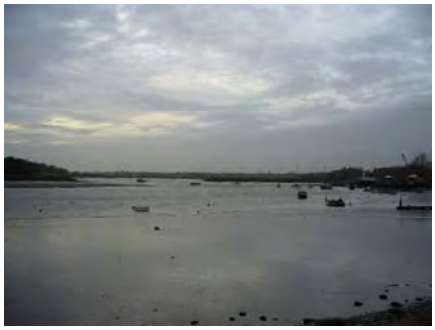
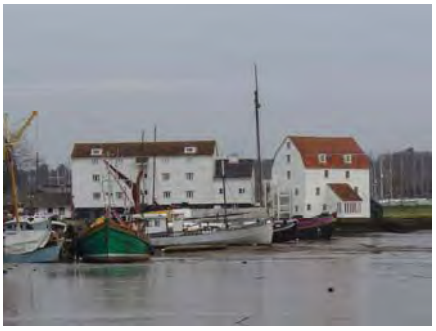
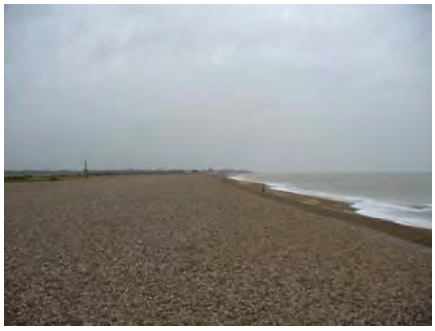
Suffolk Coastal and Waveney District Councils

# Suffolk Coastal and Waveney District Strategic Flood Risk Assessment

## Appendix B – **Suffolk Coastal District Council**

**Report**
January 2009

Prepared for:

Suffolk Coastal

*…where quality of life counts*

# Revision Schedule

**Strategic Flood Risk Assessment – Appendix B Suffolk Coastal**
January 2009

| Rev | Date | Details | Prepared by | Reviewed by | Approved by |
|---|---|---|---|---|---|
| 01 | 1/06/07 | Draft | **Elizabeth Williams**<br>Senior Consultant<br>**Eleanor Cole**<br>Graduate Hydrologist | **Elizabeth Williams**<br>Senior Consultant | **Damon O'Brien**<br>Associate Director |
| 02 | 16/07/2007 | Draft | **Elizabeth Williams**<br>Senior Consultant<br>**Eleanor Cole**<br>Graduate Hydrologist | | |
| 03 | 06/2008 | Final | **Eleanor Cole**<br>Assistant Hydrologist | **Elizabeth Williams**<br>Principal Consultant | |
| 04 | 11/2008 | Final – EA comments | **Eleanor Cole**<br>Assistant Hydrologist | **Elizabeth Williams**<br>Principal Consultant | |
| 05 | 01/2009 | Final – EA final comments | **Eleanor Cole**<br>Assistant Hydrologist | | **Elizabeth Williams**<br>Principal Consultant |



**Scott Wilson**
8 Greencoat Place
London
SW1P 1PL

Tel 0207 7985000
Fax 0207 7985001

www.scottwilson.com

# Addendum

The 1 in 1000 year event modelling for Woodbridge, in the SFRA document, uses 4.38 metres AOD (Above Ordnance Datum), which has been taken from the extreme water levels report.

However, advice from the Environment Agency has stated that the water level which should now be used for this scenario event is 4.61 metres AOD taken from the estuaries studies.

Please note that Flood Risk Assessments and flooding consideration in the Woodbridge area should be aware of these levels and may be asked to use the higher 4.61 metres AOD in any modelling.

For further information please contact the local Environment Agency office.

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# 1 Non-Technical Summary

## 1.1 SFRA Background

1.1.1 Scott Wilson was commissioned by Suffolk Coastal and Waveney Districts to undertake a Strategic Flood Risk Assessment (SFRA) of these districts. An Inception Report, completed by Faber Maunsell in November 2006, preceded this SFRA. The Inception Report located and identified available data and information that would be useful for completion of the SFRA. In addition the report outlined the extents of the study areas, the modelling approach and highlighted various specific flood risk issues within the Suffolk Coastal and Waveney area that should be covered within the main SFRA report.

1.1.2 This project was carried out in collaboration with the Environment Agency's Anglian Region, and a draft of the full report was submitted to the Agency for their comments and observations. Mutually acceptable amendments have been incorporated into the final SFRA report.

## 1.2 SFRA Planning Objectives

1.2.1 The primary objective of the study was to enable the two participating local authorities to undertake Sequential Testing inline with the Government's flood risk and development policy document - Planning Policy Statement (PPS) 25: Development and Flood Risk - to inform the development of their emerging Local Development Framework (LDF) documents.

1.2.2 PPS25 requires local planning authorities to review flood risk across their districts, steering all development towards areas of lowest risk. Development is only permissible in areas at risk of flooding in exceptional circumstances where it can be demonstrated that there are no reasonably available sites in areas of lower risk, and the benefits of that development outweigh the risks from flooding. Such development is required to include mitigation/management measures to minimise risk to life and property should flooding occur. Development proposals will need to pass the Exception Test set out in Annex D to PPS25. Part c) of the Exception Test states that the development will need to be safe, without increasing flood risk elsewhere, and, where possible, reduce flood risk overall.

1.2.3 The Strategic Flood Risk Assessment is the first step in this process, assisting in the development of the LDF's by identifying flood risk areas and outlining the principles for sustainable development policies, informing strategic land allocations and integrating flood risk management into the spatial planning of the area. The SFRA thereby forms an essential reference tool providing the building blocks for future strategic planning.

## 1.3 SFRA Report Layout

1.3.1 The main background and methodology information, including guidance on using the figures and potential measures for residual risk management are discussed in the main SFRA report. For the two participating authorities a suitable appendix has been compiled to include background information on that area with regards to flood risk. Additional information requested

as part of the SFRA Brief in relation to each respective local authority and associated flood risk mapping for that area is also included.

1.3.2 There are two separate appendices. This report, Appendix B reflects the flood risk issues for Suffolk Coastal District Council. The other Appendix reflects the flood risk issues in relation to Waveney District Council.

## 1.4 Suffolk Coastal District Council Considerations

### Background

1.4.1 The district of Suffolk Coastal is situated south of Waveney District and to the northeast of Ipswich and Babergh Districts. The district is bounded to the north by the River Blyth and to the south by the River Orwell. The inland areas of the district are characterised by agricultural countryside (arable). Marshlands are situated at sea level with surrounding land commonly a few meters above sea level. Higher topographic areas are found at the headwaters of the river valleys. Some coastal areas are below current sea level (East Suffolk CFMP: Inception Report, March 2006).

1.4.2 The principal rivers in the district are the rivers Orwell, Deben, Ore, Alde, and Blyth. There are also a number of smaller watercourses that flow directly to the sea or estuaries. The Rivers Blyth, Alde, Deben and Ore terminate in tidal estuaries, thus tidal processes affect large areas of the coastline and inland estuaries. There are a number of coastal surface water bodies including the area of Minsmere Level, north of Sizewell.

1.4.3 Along the coast there are a number of protected areas including SSSI's, NNR's, SAC's, SPA's and Ramsar Sites. In addition, the majority of the Suffolk Coastal coastline, extending inland has been designated an Area of Outstanding national Beauty (AONB).

### Objectives

1.4.4 The Suffolk Coastal District Council SFRA has been undertaken to provide information and guidance to enable the Local Planning Authority (LPA) to apply the Sequential Test within their district and where necessary inform the Exception Test process. It is also intended to provide a robust evidence base for the Local Development Framework process.

### The Sequential Test

1.4.5 The process of the Sequential Test outlined in PPS25 aims to steer vulnerable development to areas of lowest flood risk. The SFRA aims to facilitate this process by identifying the variation in flood risk across the District allowing an area-wide comparison of future development sites with respect to flood risk considerations.

1.4.6 The District of Suffolk Coastal has been delineated into the Flood Zones outlined in PPS25 as Flood Zone 1, low probability, Flood Zone 2, medium probability and Flood Zone 3a, high probability. In addition, Flood Zone 3b, functional floodplain, has also been mapped. Table D.1 of PPS25 provides information on which developments might be considered to be appropriate in each flood zone, subject to the application of the Sequential Test and the Exception Test with a site-specific Flood Risk Assessment demonstrating safety.

1.4.7 In accordance with PPS25 Suffolk Coastal District Council will use this SFRA to inform their Sequential Test process for their spatial strategy and each of their proposed development allocations and individual planning applications. Flood Risk is identified in the first instance by reference to the Flood Maps and then by hazard mapping within the SFRA. Once flood risk has been identified, it is then linked to the vulnerability classification of development which is determined by reference to Table D.2 in Annex D to PPS25.

## The Exception Test

1.4.8 Where it can be demonstrated by the Local Planning Authority that the Sequential Test is passed, it will also be necessary in some circumstances for the Council to demonstrate that all three elements of the Exception Test can be satisfied.

## Flood Sources

1.4.9 The district of Suffolk Coastal contains both fluvial and estuarine systems with associated creek networks and marshlands. The eastern boundary of the district is bordered with the North Sea. These sources pose various degrees of risk, dependent on the area of interest. Flood sources resulting in the most significant consequences include tidal flooding and the overtopping of flood defences. The hydraulic modelling completed as part of this SFRA addresses both actual and residual flood risk (depending on the defence standards), identifying consequences as a result of a potential failure, or overtopping of the defences at a particular location.

1.4.10 The most significant flood events in the area tend to be associated with storm surges, coinciding with high spring tides to produce high tidal water levels along the coast and in estuaries.

1.4.11 Major rivers have been assessed as fluvial sources of flood risk using both existing and new revised modelling information. These include the Rivers Blyth, Minsmere, Thorpeness Hundred, Alde/Ore, Butley, Deben, Fromus and Orwell. Tidal flooding was identified in the inception report as having the most serious of consequences in the area, and as such the SFRA modelling studies have focused on this flood source, although some additional fluvial modelling has been undertaken as part of this study.

1.4.12 Many of the defences in the Suffolk Coastal District fall below the 1 in 200 year plus climate change standard. As a result these may overtop during an event of this return period. Where defences have been identified as below standard at present, actual flood risk has been assessed, (i.e. overtopping of the existing defence), and in some key areas such as Woodbridge and Felixstowe, residual flood risk, (through potential failures or breaches in the flood defence), have also been assessed.

1.4.13 The inception report identified settlement location areas, including potential breach locations in reference to existing and future settlement and development areas. These locations have the potential to experience extreme consequences as a result of tidal flooding in the event of a breach in the existing, or future improved defences.

## 1.5 Way Forward

1.5.1 The risk of flooding posed to properties within the District arises from a number of different sources including river flooding, tidal flooding and surface water flooding.

1.5.2 Many of the settlements within Suffolk Coastal are situated within close proximity to estuaries and their associated floodplains (e.g. Woodbridge), or the North Sea (e.g. Aldeburgh, Sizewell). Much of these settlements are within Flood Zones 2 and 3. Therefore a considerable proportion of the settlement areas could be at risk of flooding.

1.5.3 A spatial planning solution to flood risk management should be sought wherever possible. It is necessary for the local authority to consider, through the PPS25 Sequential Test, how to steer vulnerable development away from areas affected by flooding. This should also take into consideration other relevant strategies and studies in the area seeking to reduce flooding to those already at risk within the District. Specific planning recommendations have been provided at the end of this report.

1.5.4 Where other planning considerations must guide the allocation of sites, and the Sequential Test has been satisfied, further studies can be carried out to assist the local authority and developers to meet the Exception Test.

1.5.5 Engagement with the Emergency Planning Team and 'Blue Light Services' is imperative to minimise the risk to life posed by flooding within the District. It is recommended that the Council review their adopted flood risk response plan in light of the findings and recommendations of the SFRA.

## 1.6 A Living Document

1.6.1 The Suffolk Coastal and Waveney SFRA has been completed in accordance with PPS25 and the current guidance outlined in Planning Policy Statement 25: Development and Flood Risk Practice Guide (June 2008).

1.6.2 The SFRA has been developed by building upon existing knowledge with respect to flood risk within the District. Ongoing modelling of fluvial systems may significantly improve current knowledge of flood risk within the District over time, and may alter predicted flood extents within the District through improved defence over time (or improved modelling). This may therefore influence future development control decisions within these areas.

1.6.3 In summary, it is imperative that the SFRA is adopted as a 'living' document and is reviewed regularly in light of emerging policy directives and an improving understanding of flood risk within the District.

# 2 Introduction and Background

## 2.1 Introduction

2.1.1 The district of Suffolk Coastal is an area under pressure from development, outlined in the East of England Plan (Jan 2007), which suggests a housing provision of 508,000 in the region, an increase of 30,000 since the Draft Plan (Dec 2004). It is suggested in the East of England Plan, (Dec 2004), that an annual average of 505 and a total of 10,100 dwellings will be built in Suffolk Coastal between 2001 and 2021. In addition, the East of England Plan (Dec 2004) suggests the provision for 421,500 new jobs in the area[1]. These increased targets will generate pressure for the development of new land areas, possibly on marginal land that is at risk of flooding.

2.1.2 Scott Wilson was commissioned by Suffolk Coastal District Council and Waveney District Council to undertake a Strategic Flood Risk Assessment (SFRA). The SFRA identifies flood risk issues relevant to both existing and proposed developments within the areas of Suffolk Coastal and Waveney Districts. The SFRA process also aids local authorities to meet the requirements of Planning Policy Statement 25 (PPS25): Development and Flood Risk.

2.1.3 This report deals with flood risk areas specific to the Suffolk Coastal District and includes the main mapping deliverables for this area. The scope and objectives for the Suffolk Coastal area are addressed in the following section.

## 2.2 Scope and Objectives

2.2.1 This report has been undertaken for the local authority of Suffolk Coastal District Council.

The purpose of this report is to:

- Provide information and guidance to enable the Local Planning Authority (LPA) to apply the sequential test within their district.
- Present the detailed results of breach and overtopping analyses undertaken for the SFRA to provide the LPA with a more comprehensive planning tool specific to their district.
- Provide a strategic assessment of the flood risk within the potential development areas of: Aldeburgh, Alderton, Bramfield, Earl Soham, Felixstowe, Foxhall, Framlingham, Grundisburgh, Hollesley, Ipswich Eastern Fringe Warren Heath, Knodishall, Martlesham Heath, Melton, Orford, Peasenhall, Rushmere, Saxmundham, Snape, Wickham, Witnesham, Woodbridge, and Yoxford
- Produce a total of five tidal embankment breach analyses located in: Sizewell (2), Woodbridge (2) and Felixstowe (1).
- Create, analyse and present a Flood Records Database containing the District councils 'hard copy' flooding records for the parishes in Suffolk Coastal District. This database has been stored on CD.

[1] Job provision by region as suggested in the East of England Plan (Dec 2004) – Great Yarmouth/Lowestoft sub-region, 4,700 jobs; Haven Gateway (part), 29,400 jobs; Rest of Suffolk (including Bury St Edmunds and The Cambridge sub-region (part)), 17,800 jobs

This report is comprised of one volume, which forms an appendix to the main SFRA report:

**Appendix B – Suffolk Coastal District Council**

## 2.3 Suffolk Coastal District Area

### Background

2.3.1 The district of Suffolk Coastal is situated immediately to the south of Waveney District, northeast of Ipswich and Babergh Districts. The district is bounded to the north by the River Blyth and to the south by the River Orwell. The inland areas of the district are characterised by agricultural countryside (arable), the majority of which is below 60m AOD with low lying land in coastal areas, for example some estuarine areas of the Rivers Blyth and Alde-Ore lie below sea level. Marshlands are situated at sea level with surrounding land commonly a few meters above sea level. Higher topographic areas are found at the headwaters of the river valleys. Some coastal areas are below current sea level, including areas around the Blyth and Alde-Ore Estuaries (East Suffolk CFMP: Inception Report, March 2006).

2.3.2 The principal rivers in the district are the rivers Orwell, Deben, Ore, Alde, and Blyth. There are also a number of smaller watercourses that flow directly to the sea or estuaries, including the River Tang, which flows into the River Ore estuary. The River Blyth, Alde, Deben and Ore terminate in tidal estuaries, thus tidal processes affect large areas of the coastline and inland estuaries in this district. There are a number of coastal surface water bodies including the area of Minsmere Level, north of Sizewell and The Mere, south west of Thorpeness. There are a number of small private and public ponds and lakes in the district and a number of small reservoirs in the south of the district, to the east of Ipswich.

2.3.3 Figure B1 identifies the local water sources within the Suffolk Coastal area.

### Human Geography/Demographics

2.3.4 There are a number of developed areas within the district of Suffolk Coastal. Major urban settlements include Felixstowe, Woodbridge, Aldeburgh, Leiston, Saxmundham, Framlington, and Wickham Market. The area to the east of Ipswich is also located within the district, (Ipswich is not), and is subject to development as Ipswich grows. There are also a number of smaller settlements scattered throughout the District of Suffolk Coastal.

2.3.5 The majority of land use in inland areas is agricultural, mainly arable with a lesser amount of pasture. There are also a number of large forested areas, Rendlesham Forest, Tunstall Forest and Dunwich Forest, as well as smaller enclosures. Along the coast there are a number of protected areas including SSSI's, NNR's, SAC's, SPA's and Ramsar Sites. In addition, the majority of the Suffolk Coastal coastline, extending inland has been designated an Area of Outstanding national Beauty (AONB).

### Geology

2.3.6 The Crags (marine deposits) and Chillesford Clays are the dominant solid geology types found in the district. Areas of London Clay surround the large river channels, including the Rivers Deben, Ore and Orwell. There is an area of Chalk in the southwest corner of the district,

separated from the London Clay deposit surrounding the River Orwell by a deposit of Lambeth Group (shallow marine deposit).

2.3.7 Towards the east of the District the main soil types are deep well drained sandy soils, deep well drained sandy often ferruginous soils and deep stone less non-calcareous and calcareous clayey soils. These soil types allow free drainage. To the west slowly permeable seasonally waterlogged fine loamy over clayey soils and slowly permeable calcareous clayey soils are found. There is an area of slowly permeable seasonally waterlogged clayey and fine loamy over clayey soils in the central area of the district. In contrast to the freely draining soils found towards the coast these inland soils are slow draining, leading to saturation and large volumes of runoff during sustained or successive periods of rainfall, (East Suffolk CFMP: Consultation Scoping Report, July 2006).

2.3.8 The following tables (Table 2-1 & Table 2-2) highlight the main solid deposits, drift geology deposits and solid geology deposits and corresponding appropriate SuDS techniques. In addition, the following maps (Figures B-I & B-II) show the general locations of the main solid and drift geology deposits and possible SuDS techniques. It is anticipated that the following tables, maps and Chapter 8 in the main report are used in conjunction to determine the most appropriate SuDS technique in any particular area.

TABLE 2-1 SPECIFIC DRIFT DEPOSITS TO SUFFOLK COASTAL DISTRICT

| | Drift Deposit | Permeability | General Characteristics | Locations | SuDS |
|---|---|---|---|---|---|
| | Alluvium/River Terrace Deposits | Variably Permeable | Sand, silt and clay with some gravel and silt and clay | Around the upper reaches of rivers in the district, including the Rivers Deben, Alde and Ore. Minsmere and Blyth | Infiltration and combined infiltration/attenuation systems and attenuation systems e.g. permeable surfaces, sub surface infiltration, basins and ponds, swales and filter strips i.e. a combined system |
| | Kesgrave Formation | Permeable | Sand and gravel | Dominant in the southern half of the district, surrounded by Lowestoft Formation | Infiltration and combined infiltration/attenuation systems and attenuation systems e.g. permeable surfaces, sub surface infiltration, basins and ponds, swales and filter strips i.e. a combined system |
| | Lowestoft Formation | Variably Permeable | Aldeby Sands and Gravels, Haddiscoe Sands and Gravels, Corton Woods Sands and Gravels, Oulton beds – laminated clays and silts, silt, sand and gravel, chalky pebbly sandy clay (till), stony, sandy clay rich in chalk and flint pebbles | Found throughout the district, but particularly dominant in the northern section of the region. | Attenuation systems e.g. basins and ponds, green roofs, tanks, rainwater harvesting etc. Where permeable sands are encountered, infiltration systems can be used. |
| | Peat | Variably Permeable | | Found in small deposits around the lower reaches of the Minsmere River | Attenuation systems e.g. basins and ponds, green roofs, tanks, rainwater harvesting etc |
| | Tidal Flat Deposits | Variably Permeable | Muds, sand and sand and gravel. Marine and coastal zone deposits; depositional environments of shore face and beach, bank, tidal flat, channel and salt marshes. | Found in the lower and estuarine reaches of the Rivers Deben, Alde and Ore, Minsmere and Blyth. | Attenuation systems e.g. basins and ponds, green roofs, tanks, rainwater harvesting etc |

## TABLE 2-2 SPECIFIC SOLID GEOLOGY TO SUFFOLK COASTAL DISTRICT

| | Solid Geology | Permeability | General Characteristics | Locations | SuDS |
|---|---|---|---|---|---|
| | Chalk | Permeable | White and grey chalk, nodular and soft with flint seams in upper part | There is an area of chalk situated towards the western boundary of the district. | Infiltration and combined infiltration/attenuation systems and attenuation systems e.g. permeable surfaces, sub surface infiltration, basins and ponds, swales and filter strips i.e. a combined system |
| | Lambeth Group (shallow marine deposits) | Variably Permeable | Mottled mudstones in upper part sands and silts in lower part and mottled clays | There are small deposits of the Lambeth Group situated in the south west of the District, bounded by chalk and London Clay. | Infiltration and combined infiltration/attenuation systems and attenuation systems e.g. permeable surfaces, sub surface infiltration, basins and ponds, swales and filter strips i.e. a combined system |
| | London Clay | Impermeable | Clay, blue gravy, variably silty with thin sand and pebble beds. Clay, silty with ash layers and cementstone nodules and beds. Mudstones and Siltstones | This is found along the Rivers Orwell, Deben and Alde and Ore in the southern region of the district. | Attenuation systems e.g. basins and ponds, green roofs, tanks, rainwater harvesting etc Attenuation Systems |
| | The Crags, (marine deposits) & Chilesford Clay | Variably Permeable | Includes: Mainly fine grained buff to brown, locally shelly, micaceous sands, with local rounded flint gravels. Chillesford Clay – grey silty mudstones. Red Crag-ferruginous shelly sands | This is the dominant deposit in the district found throughout the region. | Infiltration and combined infiltration/attenuation systems and attenuation systems e.g. permeable surfaces, sub surface infiltration, basins and ponds, swales and filter strips i.e. a combined system |

# 3 Sources of Flooding in Suffolk Coastal

## 3.1 Introduction

3.1.1 The main SFRA report covers both districts of Suffolk Coastal and Waveney and as such includes a variety of potential flood risks and sources as required by a broad-scale strategic approach. This appendix provides a summary of the more specific flooding sources for Suffolk Coastal District. Information regarding the different mechanisms of flooding can be found in the Main SFRA Report.

3.1.2 The district of Suffolk Coastal contains both fluvial and estuarine systems with associated creek networks and marshlands. These sources pose various degrees of risk, dependent on the area of interest. Although some additional fluvial modelling was undertaken as part of the SFRA, the hydraulic modelling and results section focuses on flood sources that would result in the most significant consequences, which includes tidal flooding as a result of a failure in the defences either through a breach or overtopping. The modelling addresses both actual and residual flood risk (depending on the defence standards), identifying the potential consequences as a result of a potential failure in the defences at a particular location.

3.1.3 Many of the defences in the Suffolk Coastal area fall below the 1 in 200 year plus climate change standard, as a result these defences may overtop during an event of this return period. Therefore where the defences have been identified as below standard at present actual flood risk (i.e. overtopping of the existing defence), has been assessed.

3.1.4 The inception report identified settlement location areas including breach locations in reference to future settlement and development areas, and areas most likely to have greatest consequences in the event of a breach.

3.1.5 The mechanical or structural failure of localised defence barriers or mechanisms such as demountable flood boards, pumps designed to drain individual properties etc. have not been considered in this report as it is not appropriate for a district level study. Flood risk associated with smaller localised streams and failure of property specific flood defence systems will require site specific Flood Risk Assessments as and when appropriate.

3.1.6 The most significant flood events in the area, tend to be associated with storm surges, coinciding with high spring tides to produce high tidal water levels along the coast and in estuaries. In addition, the rivers within the district pose some fluvial risk.

3.1.7 The district of Suffolk Coastal is an area increasingly at risk of flooding due to rising sea levels and increasing intensity of rainfall.

## 3.2 Fluvial

### Sources

#### River Alde-Ore

3.2.1 The Alde-Ore catchment is approximately 173km$^2$. The Rivers Alde and Ore are situated within a catchment characterized by arable farming and horticulture. There are a number of significant

settlements in the catchment, the largest of which are Saxmundham and Framingham. There is good coverage of hydrometric rain gauge stations in the catchment in response to the October 1993 event, when the catchment responded quickly to the heavy rainfall but the rivers receded at varying speeds due to the differing sizes and different natures of the catchments, (East Suffolk CFMP: Draft Scoping Report, July 2006 EA).

3.2.2 The River Alde-Ore has an extensive estuary, fed by the Rivers Alde and Butley, which combine elements of the typical coastal estuary with that of a bar-built estuary. In the upper area of this estuary the main channel meanders through a broad area of inter tidal mudflat and saltmarsh. At Orfordness flood defences act to restrict the width and alignment of the main channel, consequently the flow of the river is constrained through a narrow channel until the River Butley joins the main channel. The tidal limit of the Butley River is adjacent to Butley Mills. Further downstream the channel is increasingly restricted by man-made embankments, which effect channel flow (Suffolk Coast and Estuaries Coastal Habitat Management Plan, Final Report, October 2002, Posford Haskoning Ltd.).

**River Deben**

3.2.3 The River Deben Catchemnt is approximately 184km2 and the source can be found west of the town of Debenham in the district of Mid Suffolk. The river winds southeast to the town of Wickham Market and then changes direction and runs southwest to Woodbridge. From Woodbridge the river is estuarine in characteristic with marsh areas and tidal mud flat areas on either side of the channel. Embankments are located to the eastern side of Woodbridge and in downstream locations. There are also a number of floodgates found in the Woodbridge area; these are generally located where access and infrastructure intersect the line of flood defence.

3.2.4 The Fynn and Lark catchment is approximately 80km2 and flows east before its outfall into the Deben Estuary just south of Martlesham. There are a number of small villages situated within the catchment including Great Bealings, Little Bealings and Playford but no major settlements. The River Lark flows between Martlesham and Woodbridge before outfalling to the Deben Estuary. There are a number of minor tributaries in the catchment, including the Hasketon watercourse. During the flooding event of October 1993 the catchment responded in a flashy manner, suggestive of runoff from saturated soils subjected to prolonged rainfall during the days leading up to the event, (East Suffolk Catchment Flood Management Plan – Draft Scoping Report, July 2006 EA).

**River Orwell**

3.2.5 The River Orwell forms the southern limit of the Suffolk Coastal District. The River Gipping and Belstead Brook feed this river. A number of marsh areas are found on the peripheries of this river, two sluices discharge water from the marshes. Dams are strategically positioned to maintain water levels in dykes during dry weather.

3.2.6 The Gipping catchment is approximately 313km$^2$ and outfalls to the Orwell Estuary. The main land use in the catchment is agriculture. There are a number of urban areas within the catchment including the town of Ipswich. The main river is joined by a number of tributaries including the Rattlesden River, Earl Stonham watercourse and Somersham watercourse. There is a sparse coverage of rainfall gauging stations within the catchment, however those present indicated the river responded quickly to the October 1993 event due to the large number of tributaries flowing into the main watercourse and the presence of large urban areas. These

high flows following heavy rainfall have been significantly affected by flood relief schemes since the late 1980's (East Suffolk CFMP: Draft Scoping Report, July 2006 Environment Agency).

3.2.7 The Belstead Brook catchment is approximately 49km2 and also outfalls into the Orwell Estuary. Again, this catchment is largely rural and used for arable cultivation or pasture. There is a significant area of the Ipswich suburb in the lower part of the catchment, namely Chantry, Stoke Park and Maidenhall. Spring Brook is the only significant tributary and joins Belstead Brook just upstream of Washbrook. Hydrometric stations (flow and rainfall) are located in the lower reaches of the catchment. The lower reaches of Belstead Brook responded quickly to the October 1993 rainfall, potentially as a result of surface water runoff generated from surrounding urban areas (East Suffolk CFMP: Draft Scoping Report, July 2006 Environment Agency).

## Historical Flooding

3.2.8 Tidal Flooding associated with storm surges are a major source of flooding in the Suffolk Coastal district as the area is bounded in the east by the North Sea. In addition 'flash flooding' caused by runoff from saturated catchments has been a dominant source of historical flooding in the district.

3.2.9 This area suffered as a result of the 1953 floods that hit this area on the 31st January to the 1st February. This flooding was the result of a large storm surge that moved down through the North Sea. This was coupled with hurricane force winds. The storm hit Felixstowe at about midnight and resulted in loss of life and damage to property. Nearly 100,000 Ha of land in Eastern England was inundated and 307 people lost their lives as a result of the storm.

3.2.10 A severe flood event occurred in 1993, causing a total of 166 properties to be flooded, with the majority of damage occurring in Wrentham, where the river is constricted between two roads (East Suffolk CFMP: Inception Report, March 2006). This event was caused by a series of rainstorms, both localised and of high intensity and caused considerable fluvial and surface water flooding in all the Suffolk river catchments.

3.2.11 Several areas of particular importance with regard to flooding in the Suffolk Coastal area are Framlingham and Saxmundham. In Framlington dense property development on both sides of the river has increased the number of potential properties at risk from flooding. In Saxmundham dense development to the western side of the river has increased the number of potential properties at risk from a flooding event in the area.

## Pathways

3.2.12 The main pathway of fluvial flooding is from high flows along rivers such as the River Deben and River Alde resulting in out of bank flows. Flood defences or control structures could potentially fail resulting in flooding of properties. Areas at risk from a potential failure of defences, are classed as being at residual risk of flooding. Details on the differences between these two flooding pathways are outlined in the main SFRA report.

3.2.13 The frequency and/or magnitude of fluvial flooding can be exacerbated under a range of scenarios, such as blocked culverts and bridges within the Rivers or any of the other smaller watercourses within the district.

### Receptors

3.2.14 The flood mapping in this report is based upon the most up to date information available from the Environment Agency and modelling carried out as part of this investigation. The flood maps, (see Figures), should be consulted to identify Flood Zones 2, 3a and 3b within the district of Suffolk Coastal, both for the present day (PPS25 Flood Zones 2007 maps), and in the future (PPS25 Flood Zones 2107 maps), where this information is available.

3.2.15 Tidal floodplains are dominant in the lower reaches of the rivers. Further west, as the rivers extend inland, tidal floodplains reduce and fluvial floodplains dominate. There are some key settlements situated within Environment Agency fluvial floodplains, for example, Wickham Market on the River Deben and Yoxford on Minsmere River.

### Functional Floodplain

3.2.16 PPS25 stipulates that functional floodplain is defined as any land that:

- would flood with an annual probability of 1 in 20 (5 per cent) or greater in any year, or at another probability to be agreed between the LPA and the Environment Agency (EA), or:
- is designed to flood in an extreme (0.1 per cent) flood, or at another probability to be agreed between the LPA and the EA.

3.2.17 The functional floodplain is classified as Flood Zone 3b. PPS25 restricts the types of development permitted in this flood zone, and would not permit highly vulnerable, more vulnerable or less vulnerable developments in accordance with the classifications in PPS25 Table D.2.

3.2.18 Flood Zone 3b (Functional Floodplain) has been modelled as part of this study, using revised 1 in 20 year outlines from the Thorpeness Hundred modelling as part of this study provided by JBA, the River Minsmere by JBA and the River Deben by Royal Haskoning. Outlines have been provided for these watercourses; these are mapped as Flood Zone 3b in the Figures depicting the current and climate change PPS25 Flood Zones for 2007 and 2107 respectively.

3.2.19 To make an allowance for climate change for Flood Zone 3b, the 1 in 20 year event plus a 20% increase in flows was mapped. The model for the Thorpeness Hundred was re-run by JBA to determine these outlines, which are mapped in the figures depicting the PPS25 Flood Zones inclusive of climate change. In accordance with PPS25 and Environment Agency guidelines, 100 years of climate change have been mapped appropriate for residential considerations.

3.2.20 In many locations within the District of Suffolk Coastal tidal defences are effective up to the 1 in 20 year event and as such there is no tidal functional floodplain in these tidal locations.

## 3.3 Tidal

### Sources

3.3.1 The eastern boundary of Waveney and Suffolk Coastal districts are formed by the land/sea interface from Corton Cliffs in the north to the mouth of Harwich Harbour in the south. This area is very low lying, especially in coastal locations where land has been reclaimed for agriculture and conservation purposes, and can be below current sea level. This coastal stretch is sparsely

developed and supports a number of nationally and internationally important conservation sites and habitats. This land will become more prone to flooding from the higher tide levels that will result from future sea level rise.

3.3.2 Tidal flooding constitutes the main form of flooding along this boundary, which forms an exposed but defended coastline. Flood Defence takes the form of a natural frontage of embankments and cliffs as well as sections of 'man-made' defenses at Felixstowe, Kessingland and around the mouths of the Deben and Alde-Ore estuaries, particularly at Slaughden, just south of Aldeburgh (East Suffolk CFMP: v1.0, March 2006).

3.3.3 Tidal information for the North Sea from Felixstowe Pier is available from the Admiralty Tide Tables (2006 edition). The reported mean high water spring tide at Felixstowe Pier is +1.85m OD and the reported mean low water spring tide is –1.55m OD. These figures indicate a tidal range of 3.4m under normal conditions but do not account for waves or storm surge, which increase the water levels significantly.

3.3.4 The areas with the greatest potential risk from a 200-year (0.5% AEP) tidal event, as outlined in the East Suffolk CFMP (Draft Scoping Report, July 2006), are Felixstowe, Aldeburgh, and Woodbridge. The main flooding process considered in the CFMP was tidal in respect of tide-locking conditions. This occurs when rivers and streams cannot discharge their water load into estuaries or the sea, causing the river and stream water to 'back up' and create higher water levels upstream. Tide-locking has the greatest impact when tidal events coincide with high river flows. There are a number of coastal draining rivers in the study area, including the Minsmere River and the Thorpeness Hundred. High tide levels also affect rivers discharging into the many estuaries in the area.

## Standard and Condition of Tidal Defences

3.3.5 Figure B-III shows the NFCDD database and the locations of flood defences in the Suffolk Coastal area. Flood defences in Suffolk Coastal protect against both tidal sources and fluvial sources.

3.3.6 Coastal flood defences in the area include man-made and natural sea defences and coastal protection in the form of hard and soft defences, with some natural defences such as cliffs and beaches. Some of these defences are classified as minor and some are major. The Environment Agency, private owners and the Local Authority are responsible for the coastal defences in Suffolk Coastal District. These defences have defence standards ranging from 4 to 250 years, (NFCDD database).

3.3.7 The overall condition of these defences is good, although the defences were not originally built to a high specification. Indeed, the defence crest height falls below the 1 in 200 year level in many places within the district and subsequently considerably beneath the new PPS25 climate change levels for this stretch of coastline. This suggests that in order to protect any future development in these areas, funding contributions will be required to improve the existing standard of the flood defence in line with increasing water levels.

3.3.8 Any improvements in the flood defences or policies regarding the improvement and maintenance of flood defences in light of this investigation should be integrated with defence management plans suggested in the Catchment Flood Management Plan and Shoreline Management Plans in the area. Changes in any fluvial and/or tidal flood defences within this

area may have significant impacts on the flooding system, thus an integrated approach should be taken.

3.3.9 As a result of low defence standards, overtopping of defences was considered in the SFRA. The existing crest heights were modelled for the 1 in 200 year with the influence of climate change scenario in order to demonstrate the 'Actual Risk' these areas face as a result of poor defence standard. These can be seen in the Results section (Chapter 6) of this report. Defence failure scenarios as a result of a breach in the defences have also been looked at within the scope of this report.

### Pathways

3.3.10 The North Sea and river mouths of the Blyth, Minsmere, Thorpeness Hundred, Alde/Ore, Deben and Orwell provide the main pathway for tidal flow in the District. In a flood event, the low-lying nature of the District and the presence of drainage channels within the floodplain areas of these watercourses provide pathways for floodwater into the greater floodplain area.

### Receptors

3.3.11 Based on the methodology presented in the SFRA, areas of interest within the district of Suffolk Coastal have been separated into flood cell embayments, defined by topographic features, flooding characteristics and potential flood pathways. Figures A2 to A5 show the flood cells in the District of Suffolk Coastal.

## 3.4 Overland Flow

3.4.1 Many of the existing settlements and potential growth areas in the district are situated within rural areas, surrounded by agricultural land. The general topography is relatively flat, which aids the ability of the fields to allow rainfall to soak into the ground and reduce the quantity of runoff from rural land onto urban land.

3.4.2 Overland Flow incidents could still occur within the area due to the presence of London Clays and Chillesford Clays that underlie much of the district. Very limited information exists regarding this source but overland flow flooding should not be entirely discounted and should be assessed on a site-by-site basis in a Flood Risk Assessment.

3.4.3 For more information on this source of flooding, see Annex 1: Flood Records Database.

3.4.4 Flooding from overland flow (or any other source for that matter) does not discriminate on a particular receptor. However, flooding from overland flow is more likely to occur where large hill slopes are situated close to a particular site. Overland flow pathways should be explored as part of a site specific FRA.

# 4 Level 1 Assessment

## 4.1 Level 1 SFRA – Study Area, Flood Source Review and Data Review

4.1.1 The objective of the Level 1 SFRA is intended to collate and review available information on flood risk for the study area. The Inception Report, which is in effect a Level 1 report without mapping any growth areas with respect to flood risk considerations, was completed prior to the release of PPS25 Practise Guide. Therefore to ensure this document is consistent with future policy, the Inception Report should be used in conjunction with the Level 1 Assessment tables presented at the back of this report.

4.1.2 The Level 1 SFRA addresses Objective 1 (2.2) and forms part of the evidence base (Objective 5) for the study area.

4.1.3 One of the objectives of a Level 1 SFRA is to identify areas that may require strategic relocation due to current and future flood risks. A number of policy aims, outlined in PPS25 (Table D.1, under Zone 3a), should be addressed in order to achieve this, including

- the reduction of the overall level of flood risk in an area through the layout and form of the development and the appropriate application of sustainable drainage techniques
- the relocation of existing developments to land in zones with a lower probability of flooding
- the generation of space for flooding to occur. This can be achieved by restoring functional floodplain and flood flow pathways and by the identification of open space for flood storage.

These policy aims should be addressed using the Level 1 SFRA.

4.1.4 In addition, a Level 1 SFRA is designed to be sufficiently detailed in order to allow the application of the Sequential Test on the basis of Table D.1 of PPS25 and to also identify whether application of the Exception Test is expected to be necessary. Information from this stage can also be used to assess how any environmental objectives relating to flooding, as defined in the sustainability appraisal, may be affected by any additional proposed developments.

4.1.5 This stage in the SFRA is primarily a desk-based study, which should use existing information for a number of sources, outlined below.

- Environment Agency Flood Map. These maps show the extent of the natural floodplain in the absence of any flood defences or other man made structures or channel improvements in place. Dark blue regions indicate areas affected by flooding from rivers (1% or 1 in 100 or greater chance of happening each year) or the sea (0.5% or 1 in 200 or greater chance of happening each year) if there were no flood defences present. Light blue regions show the additional extent of an extreme flood from rivers and/or the sea with a 0.1% (1 in 1000) chance of occurring yearly.
- Regional Flood Risk Appraisal (RFRA), where available (including all the sources of data referred to in the guidance provided on their preparation)

- National Flood and Coastal Defence Database (NFCDD) and National Flood Risk Assessment (NaFRA)
- Any available expert advice from the Environment Agency. This may be in the form of reports containing the results of detailed modelling and flood mapping studies, including critical drainage areas and on historic flood events.
- Consultation with other flood risk professionals including: IDB's, water companies, highways authorities, local authorities (in their role as statutory drainage (operating authority)), navigation authorities, reservoir operators, and informed local sources
- Maps of geology and soil. These allow the potential for the implementation of source control and infiltration techniques, groundwater and overland flood risk to be investigated and assessed

4.1.6 This information as a whole should be sufficient to allow application of the Sequential Test and subsequently inform the Sustainability Appraisal and any succeeding plan policies.

4.1.7 In the event of the Level 1 SFRA demonstrating the potential need of the application of the Exception Test, either due to current levels of flood risk or due to an increase in flood risk resulting from climate change, further data collection and/or analysis will need to be carried out, this should be investigated and incorporated into the Level 2 SFRA.

4.1.8 Figures depicting the PPS25 Flood Zones are split into two series of maps, those showing the current Flood Zones in accordance with PPS25 (2007) and those showing the future scenario, with the influence of climate change (2107) in accordance with PPS25 and current Environment Agency guidance.

4.1.9 In accordance with PPS25 and Environment Agency guidance, consideration should be given to flood risk over the lifetime of the development; 100 years of climate change have been mapped for residential development. Therefore the PPS25 Flood Zones 2107 series show the Flood Zones with 100 years of climate change, where this information is available.

4.1.10 The PPS25 Flood Zones for the District of Suffolk Coastal have been identified in Figures B88 and 89 for PPS25 Flood Zone 1, low probability, Flood Zone 2, medium probability and Flood Zone 3a, high probability. In addition, Flood Zone 3b, functional floodplain and the flood outlines with an inclusion of climate change, have also been mapped. Table D.1 of PPS25 provides information on which developments might be considered to be appropriate in each flood zone, subject to the application of the Sequential Test and either the Exception Test or a site-specific Flood Risk Assessment demonstrating safety.

4.1.11 In accordance with PPS25 Suffolk Coastal District Council should apply a Sequential Test process for their spatial strategy, each of their proposed strategic development site allocations, other site allocations and individual planning applications. The Sequential Test process should use the SFRA to identify the flood risks and development vulnerability in order to assess the suitability of each development location, and where possible will steer more vulnerable developments to areas of lower flood risk.

## 4.2 Level 1 Mapping Methodology

4.2.1 The strategic mapping of flooding within the Suffolk Coastal and Waveney Districts was undertaken specifically for the purposes of this study. The main method of tidal inundation considered was through overtopping and breaching of the flood defences. For the purposes of this study, twenty three settlement areas were mapped, within these areas five breach and two overtopping scenarios were modelled to establish actual and residual risk.

### Fluvial 2007 and 2107 outlines

4.2.2 Flood Zones 2 and 3a have been mapped using outlines from the Thorpeness Hundred and River Minsmere modelling as part of this study provided by JBA for both 2007 and 2107. Flood Zones 2 and 3a have been mapped using outlines from the River Deben and River Fromus modelling as part of this study provided by Royal Haskoning for both 2007 and 2107.

4.2.3 Depth maps have been produced for the Rivers Deben and Alde/Ore for 2007 and the 1 in 200 and 1 in 1000 year scenarios. This modelling was carried out as part of the Suffolk Estuary Strategies and does not include climate change scenarios. The River Blyth, Butley River, and River Orwell were not remodelled as part of the SFRA, therefore the existing Environment Agency Flood Zones have been used. Climate change information was not available for these Rivers.

TABLE 4-1 SOURCE OF FLUVIAL OUTLINES

| Watercourse | Flood Zone Data Source | | | | | |
|---|---|---|---|---|---|---|
| | 2 (2007) | 2 (2107) | 3a (2007) | 3a (2107) | 3b (2007) | 3b (2107) |
| River Deben | Royal Haskoning revised modelling | Royal Haskoning revised modelling | Royal Haskoning revised modelling | Royal Haskoning revised modelling | Royal Haskoning revised modelling | Royal Haskoning revised modelling |
| River Minsmere | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling |
| River Orwell | EA flood outlines | Not Available | EA flood outlines | Not Available | Not Available | Not Available |
| Alde-Ore | Suffolk Estuary Strategies | Not Available | Suffolk Estuary Strategies | Not Available | Not Available | Not Available |
| Thorpeness Hundred | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling | JBA revised modelling |
| North Sea | EA flood outlines | Scott Wilson tidal modelling outlines | EA flood outlines | Scott Wilson tidal modelling outlines | Scott Wilson tidal modelling outlines | Scott Wilson tidal modelling outlines |

4.2.4 All Level 1 mapping is presented at the back of this report and details can be found in Table 4-1.

TABLE 4-2 SUMMARY RESULTS TABLE FOR SETTLEMENT AND SURROUNDING AREA (PRESENT SCENARIO 2007)

| Settlement | Flood Zone 1 | Flood Zone 2 | Flood Zone 3a | Flood Zone 3b | Defences (From NFCDD) |
|---|---|---|---|---|---|
| Alderton | ✓ | ✓ | ✓ | X | Some present |
| Aldeburgh | ✓ | ✓ | ✓ | X | Some present |
| Bramfield | ✓ | ✓ | ✓ | X | Limited |
| Earl Soham | ✓ | ✓ | ✓ | X | Limited |
| Felixstowe | ✓ | ✓ | ✓ | X | Present |
| Foxhall | ✓ | X | X | X | No |
| Framlingham | ✓ | ✓ | ✓ | X | Limited |
| Grundisburgh | ✓ | ✓ | ✓ | X | Limited |
| Hollesley | ✓ | ✓ | ✓ | X | Limited |
| Ipswich Eastern Fringe Warren Heath | ✓ | X | X | X | Some present |
| Knodishall | ✓ | ✓ | ✓ | X | Limited |
| Leiston/Sizewell | ✓ | ✓ | ✓ | X | Some present |
| Martlesham Heath | ✓ | X | X | X | No |
| Melton | ✓ | ✓ | ✓ | X | Present |
| Orford | ✓ | ✓ | ✓ | X | Present |
| Peasenhall | ✓ | ✓ | ✓ | X | Limited |
| Rushmere | ✓ | ✓ | ✓ | X | No |
| Saxmundham | ✓ | ✓ | ✓ | X | Some Present |
| Snape | ✓ | ✓ | ✓ | X | Present |
| Wickham Market | ✓ | ✓ | ✓ | X | Some Present |
| Witnesham | ✓ | ✓ | ✓ | X | Limited |

| | | | | | |
|---|---|---|---|---|---|
| Woodbridge | ✓ | ✓ | ✓ | X | Present |
| Yoxford | ✓ | ✓ | ✓ | X | Limited |

## Functional floodplain mapping (Flood Zone 3b)

4.2.5 The present day (2007) functional floodplain, Flood Zone 3b, was mapped using revised 1 in 20 year outlines from the Thorpeness Hundred and River Minsmere modelling as part of this study provided by JBA, and River Deben and River Fromus provided by Royal Haskoning.

4.2.6 To make an allowance for climate change for Flood Zone 3b, the 1 in 20 year event plus a 20% increase in flows was mapped as part of these studies.

4.2.7 Functional floodplain outlines are not available for the Rivers Blyth, Alde/Ore, Butley River, and Orwell, as the previous Environment Agency and Suffolk Estuary Strategies flood outlines did not include the functional floodplain. Where functional floodplain information is not available, the PPS25 Development and Flood Risk Practice Guide, advises that all of Flood Zone 3 should be considered as Zone 3b (functional floodplain) unless, or until, an appropriate FRA shows to the satisfaction of the EA that it can be considered as falling within Zone 3a (high probability).

4.2.8 Where the functional floodplain is mapped, this considers the presence of defences. The mapped functional floodplain Zone 3b, relates only to flooding from rivers and coastal sources and does not include areas at risk of flooding solely from other sources such as sewer and surface water sources.

# 5 Level 2 Assessment

## 5.1 Level 2 SFRA – Further Detailed Assessment

5.1.1 The majority of the settlement areas are located within close proximity to a river or coastal area and are thus associated with Flood Zones 2 and 3. Through the Sequential Test approach, all development should, where possible, be sited in the areas of Flood Zone 1.

5.1.2 The objective of the Level 2 SFRA is to reduce the level of uncertainty regarding flood sources for any development sites that cannot be located in Flood Zone 1, through application of the Sequential Test. This SFRA, in addition to the further modelling and hazard mapping, is intended as a combined Level 1 and Level 2 SFRA.

5.1.3 The further modelling and hazard mapping of tidal flood defence breach scenarios is intended to provide a greater level of detail for the areas of Aldeburgh, Felixstowe, Sizewell and Woodbridge. In addition the fluvial area of the Thorpeness Hundred and River Deben has been mapped to show depth and hazard along the catchment. This provides additional information on the variation of risk within Flood Zones to facilitate application of the Exception Test to sites in these areas that cannot be located in lower flood risk zones.

5.1.4 The assessment has been made at a strategic level and is only intended to inform how the potential strategic development areas may be at risk from these sources. This should therefore form a 'stepping-stone' for a site specific FRA, considering the recommendations discussed throughout the SFRA.

5.1.5 The Level 2 results are presented at the end of this appendix. At the time of writing this document no site-specific allocations had been finalised, therefore pending the finalisation of these, the settlement areas were used to identify the flood risks to potential growth and development areas. If on completion of the preferred options there are any allocations that fall outside these settlement areas, then the Sequential Test and potential Exception Test for these sites will need to be explored at that time.

## 5.2 Fluvial

5.2.1 The majority of the settlement areas are located within close proximity to the Environment Agency floodplain extents. The extent of the floodplain within each site allocation varies significantly.

5.2.2 Site specific FRAs should aim to refine the Environment Agency floodmaps based upon detailed site topography and adjacent modelled flood levels, in addition to considering the implications of residual risk associated with the failure of defences discussed further in the Level 2 tables.

### Fluvial Hazard Mapping

5.2.3 The fluvial hazard maps are based on 1 dimensional hydraulic models and as such do not have an associated velocity output. Therefore the hazard has been classified as a function of depth, assuming zero velocity. The Hazard categories have been mapped using the 'FD2320/TR2 –

Flood Risks Assessment Guidance for New Development' depths and associated hazard with an assumed zero velocity as shown in Table 13.1 of that document.

5.2.4 This method of assuming zero velocity does not take into account the velocity factor and as a result, the hazard classification may increase with the incorporation of velocity.

| **Key (depth of flooding in metres assuming a 0 m/s velocity*):** | |
|---|---|
| **0.30-0.50** | **Danger for Some** |
| **0.50-1.50** | **Danger for Most** |
| **1.50 +** | **Danger for All** |

**Taken from Table 13.1 Defra/ EA Flood and Coastal Defence R&D Programme FD2320.*

5.2.5 Hazard maps have been provided for the Thorpeness Hundred, the Minsmere River and the River Deben where additional modelling was completed as part of this study.

## 5.3 Overland Flow

5.3.1 As identified in section 2.3 of this report, the dominant geology in the area is characterised by the Crags and Chillesford Clays. The dominant soil type in the area is classed as deep well drained sandy soils, deep well drained sandy often ferruginous soils and deep stone less non-calcareous and calcareous clayey soils. It is therefore considered that flooding incidents associated with this particular source are localised in extent to specific areas of more impermeable geology. An assessment should be made from this source for individual site allocations based upon a site visit and the risks explored within a site-specific FRA.

## 5.4 Tidal Flood Defence Breach Analysis

5.4.1 There were 6 breaches and 1 overtopping scenario specified over seven flood cells affecting Suffolk Coastal District. Suffolk Coastal District Council initially specified the analysis of five tidal embankment breach analyses at the inception stage. However following the release of PPS25 climate change levels and further consultation with the EA, more complex modelling scenarios were proposed. These addressed the actual crest height of the defences (below the 1 in 200 year plus climate change water levels), overtopping and defence failure at specific locations.

5.4.2 Different scenarios in the figures presented at the back of this report are explained below (where X represents an arbitrary number that corresponds to the location of the modelled scenario, where C represents Sizewell, D Aldeburgh, E Woodbridge, and F Felixstowe):

- X0 – existing conditions, where present defence heights are used for overtopping scenarios
- X1-4 –signifies the location of a simulated breach in the flood defences or the simulation of the overtopping of the flood defences. Future improvements in flood defences are taken into account in these numbered scenarios.

5.4.3 The following scenarios have been modelled as part of this analysis:

- Breach in defences near Minsmere sluice (C1)
- Breach of natural defences north of Aldeburgh (D1)
- Breach of defences south of Aldeburgh (D2)
- Breach of defences in north Woodbridge (E1)
- Breach of defences in south Woodbridge (E2)
- Breach and overtopping of defences in east Felixstowe (F1)[2]

5.4.4 The breach locations were determined through consultation with the local authority and Environment Agency. Potential poor defence standard or likelihood of failure was taken into consideration in addition to locations where a failure in defence could have the greatest consequences. In areas where the existing standard of defence was below the 1 in 200 year water level, the flood cells have modelled overtopping inundation i.e. the actual flood risk that would result at present day defence heights - Actual Risk.

5.4.5 Breaches were simulated using the following tidal event scenarios.

- 1 in 20 years (2007);
- 1 in 20 years plus 100 years of climate change (2107);
- 1 in 200 years (2007);
- 1 in 200 years plus 100 years of climate change (2107);
- 1 in 1000 years (2007);
- 1 in 1000 years plus 100 years of climate change (2107);

5.4.6 In accordance with PPS25 and Environment Agency guidelines 100 years of climate change was taken into account for the lifetime of residential development. Commercial development would only need to consider 60 years of climate change, so in that respect the maps present a conservative estimate for future commercial developments in these areas.

5.4.7 Considerable parts of the study area are either urbanised or associated with man-made features (e.g. roads, embankments, walls, bridges) that may strongly affect the free flood flow on the floodplain.

5.4.8 Embankments, flood defences, significant water courses and other linear features that may have been misrepresented due to the resolution of the hydraulic model used, have been incorporated into the hydraulic model by adding break lines (i.e. the mesh orientation is forced to follow the alignment of the features and the localised elevations are amended within the

2 The breach in the east coast defences at Felixstowe is located near the intersection of St Edmunds Road and Sea Road (Felixstowe F1 case). The breach is 50 metres wide and assumes that the flood defences (modelled as being 5.05 metres AOD) have been reduced to the local land level of 4.00 metres AOD over the width of the breach (50 metres). All ground immediately inland of the breach is assumed to be at this level (that is, there are no obstructions). Details of the other breaches are listed in Table 5-1.

ground model). A detailed modelling methodology is presented in Section 5 of the Main SFRA Report.

5.4.9 Smaller linear features and individual buildings have not been included in this model. More specific detailed models could be produced as part of a site specific flood risk assessment to refine the results in specific areas of interest.

5.4.10 It is important to note that a breach may occur at any point of the flood defences. For the purposes of this study the breach locations were focused on potential growth areas, and in areas thought most likely to breach. These locations and modelling methodology were agreed with the Environment Agency at the start of the project.

### Tidal Hazard mapping

5.4.11 The tidal hazard maps, indicate the variation of risk within the PPS25 defined Flood Zones 2 and 3, identifying areas of High, Medium and Low hazard as a result of overtopping and breach scenarios. The hazard maps were produced using the consequence and risk methodology outlined in Chapter 5 of the Main Report.

5.4.12 The 2D breach modelling produces variables for both depth and velocity during the tidal inundation as a result of a breach. The hazard zone methodology on a strategic scale is similar to the Flood Hazard guidance provided in DEFRA/EA R& D publication FD2320/TR2 Table 13.1 but excludes a debris factor. The debris factor cannot be considered on a strategic scale as the source and volume of debris would vary hugely on a spatial basis resulting in ambiguous results.

5.4.13 The hazard zone maps have been produced by calculating the depth and velocity of inundation as a result of overtopping and breach scenarios. It is important to remember that the hazard maps associated with a breach scenario represent the hazard arising from a breach scenario in a specific location and will almost certainly vary spatially should the breach location differ.

## 5.5 Results

5.5.1 The Level 2 breach/overtopping result tables present the findings from the hydraulic modelling at the breach/overtopping locations in Aldeburgh, Felixstowe, Sizewell and Woodbridge (for modelling summary details see Table 5-1 and Table 5-2). Hazard zones of high, medium and low hazard have been identified for each scenario. Figures B32 to B69 include the details of the breach and the results of the different modelled scenarios. The methodology used to distinguish between high, medium and low hazard is included in the main SFRA report, (Chapter 5) and discussed below.

5.5.2 Each table discusses the hazard zones resulting from a single breach. Breaches in other locations along the defences may result in different hazard zoning. This should be taken into account when determining whether a particular property is within the hazard zone. In addition to this, the hazard zone results for this study were produced at a regional scale, not appropriate for the assessment of whether individual properties on the edge of the zones are within a flood hazard zone or not. A precautionary approach is recommended when using the study results at the fringes of hazard zones.

TABLE 5-1 SUMMARY OF BREACH DETAILS

| Flood cell | Event | Nature of Event | Defence Type | Breach Width | Breach Location | Breach Level (mAOD) | Local Defence Level (mAOD) | OS Grid Reference | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | X | Y |
| Sizewell | Sizewell C1 | Breach of defences near Minsmere sluice | Earth bank | 200 | Open coast | 2.5 | 6.6 | 647,794 | 266,169 |
| Aldeburgh | Aldeburgh D1 | Breach of natural defences north of Aldeburgh | Earth bank | 200 | Open coast | 2.5 | Approx. 4.9 – 5.0 | 646,998 | 258,689 |
| | Aldeburgh D2 | Breach of defences south of Aldeburgh | Hard | 240 | Open coast | 2.25 | Approx. 4.8 | 646,395 | 255,467 |
| Woodbridge | Woodbridge E1 | Breach of defences at north Woodbridge | Earth bank | 50 | Tidal river | 2.2 | 4.4 | 627,902 | 249,375 |
| | Woodbridge E2 | Breach of defences at south Woodbridge | Earth bank | 50 | Tidal river | 1.1 | 4.4 | 627,310 | 248,444 |
| Felixstowe | Felixstowe F1 | Breach of defences | Hard | 50 | Open Coast | 4.0 | 5.05 | 629,605 | 233,535 |

TABLE 5-2 SUMMARY OF WATER LEVELS

| Floodcell | 1 in 20-year | 1 in 20-year + climate change | 1 in 200-year level | 1 in 200-year + climate change | 1 in 1000 year level | 1 in 1000yr + climate change |
|---|---|---|---|---|---|---|
| | M AOD | | | | | |
| Sizewell | 2.72 | 3.74 | 3.24 | 4.26 | 3.61 | 4.63 |
| Aldeburgh | 2.72 | 3.74 | 3.24 | 4.26 | 3.60 | 4.62 |
| Woodbridge | 3.50 | 4.52 | 4.02 | 4.75 | 4.38 | 5.11 |
| Felixstowe | 3.33 | 4.35 | 3.89 | 4.91 | 4.26 | 5.28 |

5.5.3 Figures displaying the PPS25 Flood Zones should be used to identify the extents of the Flood Zones (i.e. Figures B7 to B33, B39-B40, B51-B52, B63-64). Figures displaying the results from the updated modelling completed as part of this SFRA present the variation of hazard and depth and should be used to determine further information such as finished floor levels, safe access and egress and other more detailed information (i.e. Figures B34-B38, B41-50, B53-62, B65-B87).

# 6 Policy Review

6.1.1 National and local policies have been reviewed against the local flood risk issues and objectives identified by the Environment Agency in the CFMP. From these policies the following catchment wide and specific area strategies have been developed under the headings Flood Risk, SuDS, Flood Mitigation and the Water Environment. Integration of these suggested policy considerations into LDF/LDD should ensure that the objectives and aspirations of the EA and national policy are met whilst strengthening the position of the Local Planning Authority with regard to Flood Risk.

## 6.2 Flood Risk

### Catchment Wide Strategies

1. National Policy requires that the Sequential Test is undertaken for all allocations in order to reduce the flood risk to the allocation and ensure that the vulnerability classification of the proposed development is appropriate to the flood zone classification;
2. National Policy also requires that Flood Risk Assessments (FRA) should be undertaken for all developments within Flood Zones 2 and 3 to assess the risk of flooding to the development and identify options to mitigate the flood risk to the development, site users and surrounding area. The FRA should make sure that where floodplain storage is removed, the development should provide compensatory storage on a level for level basis to ensure that there is no loss in flood water storage area;
3. Flood Risk Assessments are required for all developments in Flood Zone 1 that are greater than 1.0ha. However, if a critical drainage problem has been identified on a development in Flood Zone 1 then all developments that may have an impact on the local drainage should have to produce a Flood Risk Assessment or a drainage strategy.
4. Flood Risk to development should be assessed for all forms of flooding;
5. Flood defences should be maintained to the climate change levels to ensure continued protection to existing developments.

### Area Specific Strategies

1. Areas such as Moot Hall in Aldeburgh suffered from flooding in 1993 and Felixstowe experiences flooding to roads as a result of heavy rainfall. As such, these areas and any other areas where surface water flooding is an issue should be investigated in detail as part of FRAs for developments located in surface water problem area. In addition, comprehensive surface water runoff calculations should be undertaken.
2. Tidal flooding and associated tidal defences should be investigated in detail as part of FRA's for developments located in Aldeburgh and Felixstowe.

## 6.3 Sustainable Drainage Systems

6.3.1 Sustainable Drainage Policies should address the following issues:

### Catchment Wide Strategies

1. Sustainable Drainage Systems must be included in new developments as a way to manage surface water.
2. PPS25 requires the use of SuDS as an opportunity of managing flood risk, improving water quality and increasing amenity and biodiversity.
3. Flood risk assessments should be undertaken for developments in Flood Zone 1 greater than 1ha in size to ensure that flood risk is not increased to other properties due to increased site runoff;
4. Runoff rates from new developments should not increase following redevelopment, including an allowance for climate change;
5. Runoff rates should be restricted to greenfield runoff rates in areas known to have a history of sewer flooding;
6. Sustainable Drainage Systems should be located in accordance with current restrictions.

### Area Specific Strategies

1. The implementation of strategic flood storage areas operated by a single authority in areas of Framlingham and Leiston to reduce flood risk to towns and villages. Framlingham town suffered flooding in 1993 due to runoff from roads and land and overland flow from ditches and rivers. Following the 1993 heavy rainfall, flooding in Leiston resulted from runoff from fields and impervious services. These areas could therefore benefit from strategic flood storage areas.
2. Restriction of greenfield runoff rates should be employed in developments in Leiston, Framlingham and other towns to ease surface water flooding and drainage capacity exceedence;
3. Developments in the locality of Woodbridge should assess whether capacity is available within the system to attenuate their excess site runoff and provide a contribution to the maintenance of the scheme.

## 6.4 Flood Mitigation

### Catchment Wide Strategies

1. Where an allocation boarders an area benefiting from flood defence, opportunities should be sought for the maintenance of these flood defences to be partly funded by the development for its lifetime;
2. Opportunities should be sought to deculvert rivers, where possible, to return them to a natural system, reducing back up of flows and under capacity where this does not exacerbate the flooding elsewhere;

3. River channel restoration should be undertaken where possible to return the river to its natural state and restore floodplain to reduce the impact of flooding downstream;
4. Where new developments are proposed situated behind defences the impact of the residual flood risk to the development and other surrounding properties should be considered. In the situation where there is a breach or overtopping of the defences, the positioning of the new development behind the defences may increase the residual flood risk to surrounding properties as the property will displace water if there is a finite quantity of flood water. The property may also act to disrupt conveyance routes and/or the displacement of flood water. Particular problems may arise where a development has been situated within a drainage route back to the river/sea where the flood water originated.

   To reduce the potential detrimental impact of development within a defended area it is advised that when planning development within the defended floodplain, consideration is given to the potential cumulative impact of storage loss arising from the development and the impact this may have on flood risk elsewhere. The assessment should take into account the proposed development, the residual flood risk and the potential impact on residual flood risk to the surrounding area. If the impact is found to be unacceptable, the development may have to be redesigned or repositioned. (Guidance from PPS25 – Practice Guide paras 3.62 and 3.63)

### Area Specific Strategies

1. In Leiston, a number of roads are regularly flooded and any culverted waterways should be deculverted to increase capacity and reduce flooding.
2. Where an allocation uses road crossing culverts for access these should be improved by the developer to increase capacity, including an allowance for climate change;
3. River corridors should be reintroduced, and development restricted around Framlingham, where the town is situated on both sides of the river leading to high susceptibility to flooding, and Saxmundham where the majority of development is to the west of the river, to restore floodplain and reduce flooding impacts on infrastructure.

## 6.5 Water Environment

### Catchment Wide Strategy

1. Development should not have a detrimental impact on the water environment through changes to water chemistry or resource.
2. All new developments should look to incorporate water efficiency measures, for example, water reuse and minimisation technology;
3. Any development should not be located within 9 metres of the river bank and 16m of the tidal defences to ensure access for maintenance but also to ensure a riparian corridor for improvement of the riverine environment.

6.5.1 It is intended that the strategies above be integrated with Environment Agency strategies to strengthen the position of the Local Planning Authority.

6.5.2 Through integration of all the above suggestions (under Flood Risk, SuDS, Flood Mitigation and the Water Environment), the emerging LDF will comply with PPS25 and the aspirations and policies represented in the following:

- Suffolk Coastal Local Plan (incorporating first and second alterations), Suffolk Coastal District Council AP92

6.5.3 It is intended that the strategies above be integrated with Environment Agency plans to strengthen the position of the Local Planning Authority.

# 7 Summary

7.1.1 This Strategic Flood Risk Assessment appendix for Suffolk Coastal District Council has been completed in accordance with PPS25 and the current guidance outlined in the PPS25: Development and Flood Risk Practice Guide (June 2008).

7.1.2 Existing knowledge with respect to flood risk in the District of Suffolk Coastal has been utilised in order to produce this SFRA. Over time, knowledge and extents of flood risk within the District may change, for example with improved defences or flood alleviation measures. This may alter predicted flood extents and associated flood risk classifications within the District, therefore influencing future development control decisions within these areas.

7.1.3 It is imperative that this SFRA is adopted as a 'living' document and is reviewed regularly in light of emerging policy directives and improved understanding of flood risk within the District.

# 8 Annex 1: Flood Records Database

## 8.1 Suffolk Flood Records Database

8.1.1 An 'Access' database containing the District council's 'hard copy' flooding records for the parishes in Suffolk Coastal District has been created and analysed. A summary of this analysis is included in this section.

### Compilation of the Flood Records Database

8.1.2 A database has been compiled of the Suffolk District Council 'hard copy' records. The records were compiled from correspondence and other records of flooding in the area. The folders incorporated in the Flood Records Database include those in Table 8-1.

TABLE 8-1 FOLDERS INCLUDED IN THE FLOOD RECORDS DATABASE

| Folder | Reference number |
|---|---|
| Watercourses and Drainage Systems, Reasonability of Suffolk | |
| Blythburgh Flooding | 20.21 |
| Critical Ordinary watercourses | 20.22 |
| Friston Flood Alleviation Scheme Phases I & II (Contract Documents & Planning Drawings) | |
| Drainage Miscellaneous | |
| 'Yellow Ring-binder Folder' | |

8.1.3 The folder entitled 'Watercourses and Drainage Systems, Reasonability of Suffolk' comprised of the responses from the parishes/towns within Suffolk Coastal area to two letters circulated by Suffolk Coastal District Council following particularly bad flooding events; one following the flooding events commencing 11th October 1993 and one following a particularly bad flooding year, dated 1st November 2000. These letters appealed for details concerning actual flooding of residential and commercial buildings, specifically:

- Addresses and/or locations of buildings affected,
- Maximum extent and depth of water, which occurred,
- Duration of flooding and time of day of maximum flooding,

Source of floodwater included:

- General run-off from neighbouring land
- Runoff from road

- Overflowing ditch/stream/river
- Overflowing sewer

These details were incorporated into the Flood Records Database in the tables:

- 1993 Flooding Events,
- 2000 Flooding Events and
- Other Flooding Events

In addition, important facts from the other five folders have been assimilated into the tables:

- Yellow Folder
- Friston Flood Alleviation Scheme
- Drainage Miscellaneous
- Critical Ordinary Watercourses

These folders hold a wide range of information including documents, plans, maps, emails, and letters etc., many of which were not incorporated into the Database due to formatting or non-specific information. Some of the information has not been included because flooding events were not recorded in a useful manner with reference to a location of the flood, a source of the flood and a date and time of the incident.

## Analysis of the Flood Records Database

8.1.4 A number of exercises were performed on this data in order to determine relationships and recurring incidents in the different parish/town areas. These include the running of Queries and the formation of Forms and Reports, which can be found in the Flood Records Database.

8.1.5 The Report Tables, an example of which is shown below, outline the main relationships and results explored within the data. It was thought that the specific response of the parishes/towns to the issued letters in 1993 and 2000 was important as this will highlight if flooding incidents leading to property damage, occurring on these two separate occasions, separated by seven years, are indeed the result of the same problem or a different flood source.

8.1.6 One final area of interest is that of areas affected by flooding but did not result in actual damage to property. The floodwater may have inundated garden areas or affected roads, information of which is important to build up a clear picture of historical flooding in the different parishes/towns. These relationships are discussed further below.

## Response Report

8.1.7 There are 22 parishes/towns with the same response reported for the two separate flooding events in 1993 and 2000. These include Monewden where there is a highway problem[3] on both occasions, Walberswick, where there is a negative response[4] to the flood event on the two

[3] A highways flooding response indicative of road and roadside flooding
[4] A negative flooding response indicative of no flooding (with incidents recorded) is indicative of the occurrence of flooding in the parish/town but resulting in no property damage, gardens and roads, may have flooded.

occasions and Bruiseyard where there is a positive response[5] to flooding on the two flooding events. There were also a number of parishes/towns (17), which did not respond to either appeal for data, these include Burgh and Walpole.

TABLE 8-2 NUMBER OF PARISHES/TOWNS CATEGORISED UNDER EACH RESPONSE FOR THE 1993 AND 2000 FLOODING EVENTS

| | Response | | | | |
|---|---|---|---|---|---|
| Year | Positive Flooding Report | Negative Flooding Report (but incidents recorded) | Negative Flooding Report | Highways Problem | No Response |
| 1993 | 30 | 8 | 30 | 17 | 30 |
| 2000 | 22 | 3 | 28 | 14 | 48 |

8.1.8 Table 8-2 shows that in 2000 there were less responses from the parishes/towns to the flooding letter. Accordingly, there are fewer responses in each category. For details of the classification of parishes/towns for the two flooding events see Flood Records Database.

## Details of Affected Properties

TABLE 8-3 THE APPROXIMATE NUMBER OF PROPERTIES AFFECTED BY FLOODING DURING THE 1993 AND 2000 FLOOD EVENTS

| Year | Approximate Number of Properties Affected by Flooding |
|---|---|
| 1993 | 107 |
| 2000 | 45 |

8.1.9 It can be seen, from Table 8-3 that there were more properties inundated by flood water in 1993 than in 2000. The 1993 event caused more damage to property than the 2000 event.

## Source of Floodwater

8.1.10 In a number of areas the source of the floodwater has been comparable. These include:

- The River Alde overflowing in Bruiseyard
- The River Deben overflowing in Easton
- Runoff from neighbouring fields in Theberton

Sources of flood water include blocked and overflowing drains/ditches/streams, increases in river levels, general runoff from agricultural land and runoff from roads.

[5] A positive flooding response indicative of a property, which is assumed to have flooded and resulted in flood damage.

### Flooded Areas with no Property Damage

8.1.11 It is interesting to identify where flooding has caused problems to areas without damage to property. Recurring incidents of garden inundation and road flooding are important to identify, as they are indicative of drainage problems. Areas include:

- Aldeburgh, where there was considerable flooding to roads
- Brandeston, where the River Deben was raised to high levels on both occasions and threatened to flood properties
- Heveningham, where there was concern about the amount of water on Church Road due to poor maintenance of the drains.

### Summary of Flood Records Database Analysis

8.1.12 Following analysis of the database it can be concluded that the flooding event beginning the week of 11th October 1993 resulted in more damage to property in the area of Suffolk Coastal than the flooding events in 2000. As a result of this damage, work may have been carried out to improve flood defences and mitigation measures, resulting in less damage to property as a result of the floods in 2000.

8.1.13 For more information regarding details about the flooding events in the parishes/towns see the Flood Records Database.

### Recommendations

8.1.14 It is recommended that the Flood Records database be updated for any flooding event in the Suffolk Coastal area. Letters appealing for data should be sent to all parishes in the district following a flood event, in the same vain as in 1993 and 2000. These letters should ask for the same specific information about the flood as the letters in 1993 and 2000 in order to keep the database consistent. In addition, flooding to land and roads in the area should be noted. It would be helpful following future food events to ask for specific depth and extent information on any flood incidents.

## 8.2 Examples of Tables From Access Database

Response Report - 1993 and 2000 Flooding Events

| Parish/Town | 1993 Flooding Event-RESPONSE | 2000 Flooding Event-RESPONSE |
|---|---|---|
| Aldeburgh | Highways Problem | Positive Flooding Report |
| Alderton | Negative Flooding Report (but incidents recorded) | No Response |
| Aldringham-Cum-Thorpe | Positive Flooding Report | Negative Flooding Report |
| Badingham | No Response | No Response |
| Bawdsey | Highways Problem | Negative Flooding Report |
| Benhall | Negative Flooding Report | No Response |
| Blaxhall | Negative Flooding Report | No Response |
| Blythburgh | Negative Flooding Report (but incidents recorded) | Positive Flooding Report |

## Details of Affected Properties - 1993 and 2000 Flooding Events

| Parish/Town | 1993 Flooding Event-House Name Of Affected Buliding/s | Road Name Of Affected Buliding/s | 2000 Flooding Event-House Name Of Affected Buliding/s | Road Name Of Affected Buliding/s |
|---|---|---|---|---|
| Framlingham | Brook Cottage & Paper Shop | Brook Lane & Station Rd. respectively | | |
| Friston | The Rectory & Old Chequer P.H.. 87 & Far End Cottage & Rest Harrow. Carnester Cottage. Village Hall | Main Road. Low Road. Donkey Lane | | |
| GreatBealings | | | Little Oaks (Lower Street), Orchard House Regency House, Fambridge | lower Street |
| Letheringham | | | | |
| Leiston-Cum-Sizewell | Carrs Cottages, 13&14 Archway Cottages, 165&167Carr Ave.,103&105 new bungalows17,21,23&25 Haylings Rd. White Horse Hotel, Engineers Arms | Valley Rd., Carr Avenue, Abbey Rd., Haylings Rd Main St. | 15 Haylings Rd., Carr Cottages, 39 Cross St., Barclays Bank and Baker Bros., The Library, The Film Theatre | Valley Rd., Cross Street, Valley Rd and Main Street, High Street |
| Levington | | | | |
| LinsteadMagma&LinsteadParva | Town House, Brook House | Linstead Parva B1123 | Town House | B1123 Linstead Parva |

## Source of Flood Water - 1993 and 2000 Flooding Events

| Parish/Town | 1993 Flooding Event-Source Of Water | 2000 Flooding Event-Source Of Water |
|---|---|---|
| Charsfield | General runoff from land and road and overflowing stream/ditch | |
| Chediston | general runoff from surrounding land at School Cottage, 'wash' from passing traffic at Own House and Brook House | Runoff from road |
| Dallinghoo | | Field run off and road surface water at Vine Cottage, road flooding due to inadequate culverts at Appletree and Debach, lack of |
| Darsham | Runoff from neighboring land at Fairfields runoff from roads at Darsham Street overflowing ditch at Darsham House Eyke | |
| GreatBealings | | River lark and surrounding fields. At Orchard House there was also flooding from Uphill Lane Runoff from Rose Hill and the Street |
| Grundisburgh | | |

## Flooded Areas with no Damage-1993 and 2000 Flooding Events

| Parish/Town | 1993 Flooding Event-Areas Flooded But No Damage Caused | 2000 Flooding Event- Areas Flooded But No Damage |
|---|---|---|

| | | Caused |
|---|---|---|
| Aldeburgh | Considerable flooding to roads and surrounding land, Kings' Field flooded with raw sewage | Many roads and recreational areas in the Town |
| Blythburgh | River level rose significantly to flood some gardens, but only minor problems for householders | Mill Cottage, Riverview, Dunwich Road, Highfields. Flooding in area experienced on occasions from early Sep to mid Nov 2000 |
| Boulge | | |
| Boyton | Severe runoff from neighboring fields but dug drain on part of the road most affected | Concerned with water levels in the R.Tang, a trib.of the R. Butley tidal estuary which joins via a tide operated sluice. EA must keep this clear of debris |
| Bramfield | | Highway problem on Bridge Street & A144 north of Manor Farm |
| Otley | Pipes, drains & culverts at the front of the property insufficient to cope with the discharge that arises from the road | Road flooding common over recent wet months,caused by blocked ditches.On the B1079 at the Swilland crossroads junction with the C366 & C306,on Ipswich Rd/Thompsons Lane,Gibraltar Rd. adjacent to Pear Tree farm, Charity Lane between Corner |