

Local Development Framework

Development and Flood Risk

Supplementary Planning Document

Adopted 26 September 2008

Development and Flood Risk SPD

Page

Part One: Introduction		
1	Introduction The Need for Supplementary Advice – Context of Flooding and Flood Risk in the Broads Status of the Supplementary Planning Document Sustainability Appraisal/Strategic Environmental Appraisal (SA/SEA) and Appropriate Assessment Consultation Review	1 1 2 3 3 3
Part Two: Policy Context		
2	The Broads Planning Policy Context Vision for the Broads Spatial Strategy – where will the Broads be in 2021?	4 4 4
3	Government Advice and Planning Policies National Policy Regional Policy Broads Policy	6 6 7 7
4	The Interrelationship of Regeneration and Flood Risk Management Policies Development Needs in the Broads Application of Policies	8 8 9
5	Understanding Flood Risk Environment Agency Flood Maps Strategic Flood Risk Assessment (SFRA) Flood Maps The Nature of Flood Risk in the Broads Definition of Functional Floodplain	10 10 11 12 13
Part Three: Implementation		
6	Making and Assessing a Planning Application The Principles of Land Use and Development in Areas of Flood Risk Sequential Test Exception Test Information for Flood Risk Assessments	15 15 17 18 19
7	Reducing Flood Risk to Development Raising Floor Levels Raising Plot Levels Bunds or Flood Walls Consents Floating/Amphibious Structures Resilience Flood Warnings Sustainable Drainage Systems (SUDS)	20 20 20 21 21 22 22 22 23
8	Conclusions	23

Appendices		Page
1	Preparation of Supplementary Planning Documents	24
2	Sustainability Appraisal, Strategic Environment Assessment and Appropriate Assessment	25
3	Flood Risk Vulnerability and Flood Zone Compatibility	29
4	Applicability of SUDS at Broads Authority settlements	31
5	Glossary and Abbreviations	37

About this Supplementary Planning Document

The Development and Flood Risk Supplementary Planning Document (SPD) covers the whole of the Broads Authority's executive area. The purpose of this SPD is to increase awareness of the nature of flood risk in the Broads area, give advice to developers and others about the Authority's approach to the issue of development and flood risk, and stress the need to maintain a high standard of design in new waterside development.

This SPD supplements Policy CS20 of the Broads Authority's Core Strategy (adopted September 2007) and is in conformity with the East of England Plan 2008.

The guidance in this SPD will be applied alongside the Core Strategy policies which define appropriate development for rural sustainability within the Broads, in particular policies CS18 and CS23. The SPD reflects the approach of the Authority's Development Policies Development Plan Document (submission report to be published in 2009).

The SPD is consistent with national policy, in particular Planning Policy Statements PPS1 (Delivering Sustainable Development), PPS12 (Local Spatial Planning) and PPS25 (Development and Flood Risk). It has been prepared in accordance with the Town and Country Planning (Local Development) (England) Regulations 2004 (amended June 2008).

Copies of this document may be viewed and downloaded from the Authority's website at www.broads-authority.gov.uk (follow links from Planning/Planning Policy). Paper copies are available on request from the Authority's head office at 18 Colegate, Norwich NR3 1BQ. For further information, telephone 01603 610734 or email the Authority's Planning and Strategy Directorate at: LDF@broads-authority.gov.uk.

This document is available in large print and on tape. Please telephone the Broads Authority on 01603 610734 or email LDF@broads-authority.gov.uk for details.

Part One: Introduction

1 Introduction

The Need for Supplementary Advice – the Context of Flooding and Flood Risk in the Broads

- 1.1 The Norfolk and Suffolk Broads is Britain's premier wetland. Within the area there are 28 Sites of Special Scientific Interest (SSSI), almost all with European designations. There are also many riverside settlements and businesses, including boatyards, reflecting the area's importance for tourism, recreation and the marine industry. Economic impact studies estimate the value of tourism at some £146m and the marine industry at £64m. Most of the Broads area consists of low lying land within the floodplain and therefore flooding is an integral part of the character of the Broads. The Broads Core Strategy and the Strategic Flood Risk Assessment identify the future risk of flooding as a major issue. Flooding can cause damage to property and infrastructure. Coastal flooding can be particularly damaging. In extreme cases, flooding can lead to loss of life. The threat of flooding can also cause fear and distress to local residents. On the other hand, flooding is also a natural process within a floodplain. In some circumstances it can be beneficial to wildlife.
- 1.2 Flood risk has significant implications for future development in the Broads, both in terms of new buildings and land uses. The purpose of this document is to give advice to developers and others about the Broads Authority's approach to the issue of development and flood risk, while also stressing the need to maintain a high standard of design in new waterside development. It is the intention of the advice not to make any new businesses or people more vulnerable to flooding. It will also help to increase awareness of the nature of flood risk in the Broads area. The guidance supplements and amplifies the policies of the Broads Core Strategy, it does not replace those policies.
- 1.3 The Broads Authority is the Local Planning Authority within the Broads area and this Supplementary Planning Document (SPD) applies only to land within the Authority's executive boundary. Adjoining local planning authorities will have different circumstances to deal with, and will have their own policies. The Authority takes advice from the Environment Agency (EA) on flood related issues concerning development. The EA is responsible for flood defence and has permissive powers to carry out work to construct and improve flood defences. It is currently implementing the Broadland Flood Alleviation Project, which runs until 2021. This SPD has been formulated by the Authority in close consultation with the Environment Agency and other key stakeholders and local communities.¹
- 1.4 This SPD is divided into three sections. Part One sets the context to the preparation of the SPD. Part Two establishes the policy framework, starting with the 'Vision for the Broads', then the national, regional and relevant Broads Authority planning policies. It goes on to explain the issues that arise from the desire to meet development needs and the need to understand the nature of flood risk. Part Three provides guidance to applicants on management of flood risk and the particular circumstances for developments in this wetland environment. It explains how consideration of these factors should be integral to making planning applications and will be central to the determining of applications.

¹ Public consultation on this SPD and a list of bodies consulted is set out in the Consultation Statement that accompanies the adopted SPD.

Status of the Supplementary Planning Document

- 1.5 The Local Development Framework (LDF) sets out the policies and proposals for the development and use of land in the Broads. The Broads LDF is currently planned to include:
- Local Development Scheme (the LDF programme/timetable) - completed
 - Statement of Community Involvement – adopted
 - Annual Monitoring Report – produced on an annual basis
 - Core Strategy Development Plan Document (DPD) – adopted September 2007
 - Development Policies Development Plan Document (DPD)
 - Proposals Map
 - Development and Flood Risk Supplementary Planning Document (SPD)
- 1.6 The two Development Plan Documents (DPD) are part of the statutory Development Plan (together with the Regional Spatial Strategy). The Supplementary Planning Document (SPD) forms part of the planning framework for the area, but is not part of the statutory Development Plan. SPDs have non-statutory status, but are material considerations in decision making. They may expand policy or provide further detail to policies in a DPD. They therefore have to be consistent with national and regional policies as well as the DPD.
- 1.7 The Development Plan currently includes: The East of England Plan (Regional Spatial Strategy), the Broads Core Strategy DPD, saved policies of the Norfolk and Suffolk Structure Plans, and saved policies of the Broads Local Plan 1997. In due course it will include the Development Policies DPD. The Core Strategy DPD was adopted in September 2007. It is now being used by the Authority in the determination of planning applications.
- 1.8 The Development and Flood Risk SPD covers the demand for development in areas currently at risk of flooding and land expected to be at risk over the lifetime of a development, and provides advice and guidance on appropriate development and design and mitigation measures. It applies Planning Policy Statement 25 (PPS25): Development and Flood Risk² to the specific local issues of the Broads.
- 1.9 The Development and Flood Risk SPD is in conformity with the Core Strategy DPD and the Regional Spatial Strategy. It expands on Core Strategy policy CS20 and will supplement the Development Policies DPD. The SPD was progressed more quickly than the DPD because it covered a single issue and, without its additional guidance, there would have been a policy vacuum resulting in the refusal of planning applications that contribute to sustainable development. It contains more detail on the interpretation of policy than could be accommodated in the DPD.
- 1.10 The SPD replaces the Authority's Supplementary Planning Guidance approved in 2003.
- 1.11 This SPD was prepared in accordance with national planning regulations and national planning policy³. The various stages of preparation of a SPD are explained in Appendix 1.

² Planning Policy Statement 25: Development and Flood Risk, Department for Communities and Local Government (2006)

³ Town and Country Planning (Local Development) (England) Regulations 2004 (amended 2008); Planning Policy Statement 12 (PPS12): Local Spatial Planning

Sustainability Appraisal / Strategic Environmental Appraisal (SA/SEA) and Appropriate Assessment

- 1.12 Sustainability appraisal of all new DPDs and SPDs is required under the Planning and Compulsory Purchase Act 2004 to promote sustainable development. A strategic environmental assessment of the proposed new document is also required.
- 1.13 The Sustainability Appraisal Framework was established through the Core Strategy DPD. The Core Strategy was also appraised through an Appropriate Assessment. Both these documents can be viewed on the Authority's website. The policy interpretation in this SPD was appraised at the same time as the appraisal of Preferred Options for the Development Policies DPD. The guidance promoted through this SPD is intended to apply the national objectives of reducing flood risk in development and promoting sustainable development. An overview of the sustainability appraisal process is set out in Appendix 2.

Consultation

- 1.14 The draft SPD was prepared following consultation on issues and options carried out in Summer 2007 (in combination with the Development Policies DPD). During 2007, a local Flood Risk Policy Working Group was established to help build a consensus on drafting policies and guidance for development in areas of flood risk. Representation on the Group included the Authority, Environment Agency, District Councils, Norfolk County Council (Economic Development), the marine industry, landowners, residents and amenity societies.
- 1.15 Formal consultation on the draft SPD was carried out alongside the Preferred Options consultation for the Development Policies DPD between December 2007 and February 2008. Subsequent further discussions on the development of a local flood risk policy were held with the Environment Agency in association with Government Office for the East of England (GoEast).

Review

- 1.16 Research and evidence on flood risk and climate change impacts will be revisited and amended during the lifetime of the adopted Core Strategy. The SPD will be kept under review to make sure it is giving the best advice to applicants.

Part Two: Policy Context

2 The Broads Planning Policy Context

Vision for the Broads

- 2.1 This Supplementary Planning Document is prepared in the context of national, regional and local planning policies. The overall 'Vision for the Broads' was agreed in the Broads Plan 2004 (the strategic management plan for the Broads), and the Spatial Strategy was adopted through the Core Strategy DPD in 2007.
- 2.2 The vision for the Broads is the starting point for all policies, strategies and initiatives undertaken by the Authority and its partners. It states:

"The Broads ...

An unrivalled naturally functioning wetland ecosystem of international natural and cultural importance, with a landscape that: comprises a mosaic of interconnecting rivers and shallow lakes, fens, marshes, wet woodland, mud-flats and coastal dunes; supports a wealth of plants and animals; and reflects historic patterns of human activity over many hundreds of years.

A place where people live or work in harmony with its natural and cultural qualities and where the local economy is sustained through small and medium-sized enterprises: building and hiring boats; providing services and accommodation, and producing food and other products locally to meet the needs of visitors; harvesting the fens; and farming livestock on the marshes.

A place where people come to enjoy quietly the special qualities of this wetland landscape: exploring the waterways by boat; exploring on land the extensive network of footpaths, cycle routes and bridleways; and pursuing a range of recreational activities that are compatible with its special qualities, environmentally sensitive and socially acceptable, such as sailing, canoeing, fishing, bird-watching and visiting historic sites.

A changing place that, in response to increasing climate and human influences, reflects an increasingly harmonious interaction of people with nature, where local communities enjoy economic prosperity through engagement with the natural environment.

A place where opportunities are sought to enhance and expand the wetland ecosystem, while also seeking to provide wider associated social and cultural benefits, such as flood management and quiet areas for peaceful recreation.

And, importantly, a place treasured for its seclusion and wildness and which provides, in the words of the late Norfolk naturalist Ted Ellis, 'a breathing space for the cure of souls'."

Spatial Strategy – where will the Broads be in 2021?

- 2.3 The vision for the Broads has been translated into a 'spatial vision' that forms the basis for the Core Strategy policies. The spatial vision states that:
- (a) *The Broads will continue to be a key national and international asset for the East of England and has a key role in the protected landscape of the region. There are close relationships with the adjoining Local Planning Authorities over the boundary of the Broads executive area. Therefore the landscape character and setting of the Broads have been protected. In line with this is the approach of an area of general restraint. Development will only have been permitted to meet social and economic needs for the purposes of the Broads Authority set out in legislation.*

- (b) *The Broads will continue to contain areas of true tranquillity and wildness that many come to visit it for. However this will not have been at the expense of those who come to use the Broads for more active recreational pursuits, such as boating, sailing and other water sports. Indeed the important navigation resource will have been protected and, where possible, enhanced.*
- (c) *The Broads will become a naturally functioning floodplain of extensive and connected habitats, accommodating the longer-term impacts of climate change, social and economic influences over the next 100 years.*
- (d) *The cultural heritage will be protected and enhanced keeping alive lifelong skills in the process. Reed and sedge will continue to be harvested and grown commercially, and be re-established as a key employer in the Broads. By working with adjoining planning authorities the problem of a lack of affordable housing for practitioners in local crafts will have been rectified in or adjoining our area.*
- (e) *The Broads, an area for renowned sustainable tourism, will have a network of facilities around the waterways system complementing the range of moorings in urban and rural areas. Indeed the tourist economy will be buoyant and thriving. The key gateway towns and city of Norwich, Great Yarmouth and Lowestoft will have been clearly established as such and their links to the Broads promoted, including emphasis of access by sustainable means. This enables visitors and residents to experience both the Broads and the attractions of established urban areas.*
- (f) *The Broads will be an area thriving with wildlife, and conservation sites will all be in good condition. The water quality will remain good, with any new development contributing to maintaining this. Water quantity will have been managed effectively in times of flood, and where possible protection measures will have added to the biodiversity and ecology of the Broads. Waste will have been managed effectively so there is no detriment to the environment.*

2.4 Spatial policies of the Local Development Framework will deliver the vision for the Broads by:

- *Maintaining the Norfolk and Suffolk Broads and, where appropriate, enhancing it as a unique wildlife, leisure and educational resource within a special landscape with its own sense of place.*
- *A planning policy framework for economically, socially and environmentally sensitive development that will underpin a thriving community. The framework will support innovation and diversification, and promote sustainable infrastructures, which will include the maintenance and enhancement of the navigation, for promoting enjoyment of the Broads.*
- *Only allowing development on the floodplain that has regard to the social and economic wellbeing of the area, the character of the landscape, natural resources, risks from flooding and respect the natural functioning of the floodplain.*

3 Government Advice and Planning Policies

3.1 National planning policy, as published in Planning Policy Statements (PPS), and policies of the Development Plan, published in the Regional Spatial Strategy and the Broads Local Development Framework, will be used in the determination of planning applications.

National Policy

3.2 Government advice on flood risk management is set out in Planning Policy Statement 25 (PPS25): Development and Flood Risk. PPS25 points strongly to the need for caution when considering development in areas at risk from flooding, including the Broads. The aims of the Government's policy are to:

- ensure flood risk is taken into account at all stages in the planning process;
- avoid inappropriate development in areas at risk of flooding;
- direct development away from high risk areas; and
- ensure that new developments take climate change into account and do not increase flood risk elsewhere.

3.3 PPS25 promotes a risk-based approach to ensure that flood risk is taken into account at all stages of the planning process, in order to avoid inappropriate development and direct development away from areas at highest risk. This is based on:

- the *Sequential Test* - to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding; and
- the *Exception Test* - a method of managing flood risk while still allowing necessary development to occur.

3.4 In accordance with PPS25, a Strategic Flood Risk Assessment (SFRA) has been prepared for the Broadland area. The SFRA informs planning policy and provides information to developers of varying levels of flood risk within the area. Flood risk is delineated into three Flood Zones: Zone 1 (low risk), Zone 2 (medium risk), and Zone 3 (high risk). PPS25 defines the appropriate uses for each Flood Zone based on Flood Risk Vulnerability Classification. The types of 'allowed' development in the Flood Zones are shown in matrix form in PPS25 and are described as 'Flood Risk Vulnerability' and 'Flood Zone Compatibility'. Appendix 3 contains extracts from Tables D.1, D.2 and D.3 of PPS25.

3.5 PPS25 recognises the constraints in protected landscapes. If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for development to be located in zones of lower probability of flooding, the Exception Test can be applied. The Exception Test, therefore, is appropriate for use in the Broads, where there are large areas in Flood Zones 2 and 3 and where restrictive national designations such as landscape, heritage and nature conservation designations prevent the availability of unconstrained sites in lower risk areas. This recognises the necessity for continuing development for wider sustainable development reasons, taking into account the need to avoid social or economic blight.

3.6 Additional information to that provided in PPS25 can be found in the "PPS25: Development and Flood Risk Practice Guide", published by the Department for Communities and Local Government⁴.

⁴ <http://www.communities.gov.uk/archived/publications/planningandbuilding/developmentflood>

Regional Policy

- 3.7 The Regional Spatial Strategy for the East of England (the East of England Plan) was published in May 2008. Policy WAT4 covers Flood Risk Management. It recognises that coastal and river flooding is a significant risk in parts of the East of England. The priorities are to defend existing properties from flooding and locate new development where there is little or no risk of flooding. Local Development Documents should include policies which identify and protect floodplains and land liable to tidal or coastal flooding from development, based on the Environment Agency's flood maps and Strategic Flood Risk Assessments. They should only propose departures from the principles in exceptional cases where suitable land at lower risk of flooding is not available, the benefits of development outweigh the risks from flooding, and appropriate mitigation measures are incorporated. They should also require that sustainable drainage systems are incorporated in all appropriate developments (see para 7.18 and Appendix 4).
- 3.8 Policies ENV1 and ENV2 in the Regional Spatial Strategy give priority within the Broads to conserving and enhancing the natural beauty, wildlife and cultural heritage of the area, promoting public enjoyment and protecting the interests of navigation. Policy E6 recognises the Broads as a main tourism destination and gives guidance for Local Development Documents, and Policies GYL1 and NR1 list the gateway to the Broads as an opportunity.
- 3.9 The East of England Regional Assembly has confirmed that this SPD is consistent with the Regional Spatial Strategy.

Broads Policy

- 3.10 This Supplementary Planning Document (SPD) provides greater guidance on the implementation of the Core Strategy DPD. In particular, the SPD supplements Core Strategy Policies CS20, CS18 and CS23, so that sustainable development appropriate to the protected Broads landscape can be achieved. The SPD shows how these policies can work together for the regeneration of the Broads.
- 3.11 The Core Strategy states:
- CS20** Development within the Environment Agency's flood risk zones will only be acceptable when it is:
- (i) compatible with national policy and when the sequential test and the exception test, where applicable, as set out in PPS25 have been satisfied,
 - (ii) demonstrated that it is necessary to support the social and economic needs of the local community,
 - (iii) would not increase flood risk elsewhere; and
 - (iv) would not affect the ability for future flood alleviation projects to be undertaken.
- CS18** Development will be located to protect the countryside from inappropriate uses to achieve sustainable patterns of development, by concentrating development in locations:
- (i) with local facilities;
 - (ii) with high levels of accessibility; and
 - (iii) where previously developed land is utilised.
- CS23** A network of waterside sites will be maintained throughout the system in employment use, providing:
- (i) boating support services;
 - (ii) provision of visitor facilities;

- (iii) access to the water;
- (iv) wider infrastructure to support tourism;
- (v) recreational facilities; and
- (vi) community facilities.

Limited redevelopment of boatyards and other waterside employment sites for tourism or leisure-based operations will be permitted, subject to retention of a network of boating services and to the use for employment purposes of the major part of the sites.

4 The Interrelationship of Regeneration and Flood Risk Management Policies

4.1 Policies for the Broads recognise the necessity for a viable tourism and marine economy in order to support vibrant communities and ensure management of the environment and its enjoyment by people. The challenge is how to achieve this in the knowledge that flooding will get worse over the lifetime of buildings now being constructed. Experts are at an early stage of understanding the potential impacts of climate change and continuing sea level rise. In the meantime, regeneration in the Broads must proceed, albeit with caution. The following section illustrates the dilemma.

Development Needs in the Broads

- 4.2 The Broads has the same level of planning protection as a National Park. It is a sensitive area in terms of new development. Much of the natural environment is of high conservation value and there is a need to conserve and enhance important landscapes and the character of the built environment. In this context, in addition to the constraint of flood risk, there are large parts of the Broads where little or no new development is appropriate. However, the Broads is also a place where almost six thousand people live and which is of considerable economic importance, particularly for tourism, the marine industry and agriculture. Some redevelopment will continue to be necessary and beneficial, for example to meet the social and economic needs of those who live or work in the Broads, to provide facilities for visitors, and in relation to conservation management.
- 4.3 Waterborne tourism is considered to be the largest contributor to the Broad's local economy, and there is a wide variety of attractions with growth potential against the background of changing tastes and leisure habits, such as shorter and multi-activity breaks. There is a need to support, widen and strengthen the tourism base by encouraging the provision of tourism/recreation facilities, protecting waterside employment sites and supporting diversification of tourism where sustainable.
- 4.4 Without redevelopment, the Broads Authority will not be able to achieve its strategic objectives. The nature of boatyards, boat hire and boat building has been evolving for many years. It is mainly in these areas that new opportunities for tourism and recreation will be needed, but only if the developments facilitate the economic and social well-being of the local area, and contribute to the regional economy and the UK boating sector nationally.
- 4.5 Marine businesses are multifunctional. The manufacturing base of the industry is large and its export performance is strong. Together with tourism elements, these sectors bring money into the area, jobs for local people and business to other local companies.
- 4.6 The Core Strategy reconfirms there will be no major development, as the strategic aim of the designation of the Broads is one of conservation and development restraint.

Application of Policies

- 4.7 Consistent with the Core Strategy policies, the types of development appropriate to the Broads will be primarily those that are sustainable - which is defined as being compatible with the Spatial Vision for the Broads and necessary to achieve the social, economic and environmental objectives of the Core Strategy. None of the policies can be implemented in isolation.
- 4.8 Policy CS20 is supportive, in principle, of a wide range of uses generally found in the Broads subject to being compatible with its statutory purposes and status as a protected landscape and subject to flood risk mitigation and safety considerations.
- 4.9 Policy CS18 aims to prevent development beyond settlements other than in exceptional circumstances. Development within settlements would be permitted only where it meets criteria covering issues such as flood risk, satisfactory provision of infrastructure and design. Appropriate types and levels of development within the floodplain, as flood risk increases due to climate change and coastal submergence, must also be considered when implementing the policy.
- 4.10 Policy CS23 encourages diversification of boatyards. LDF policies will continue to aim to protect all waterside sites in use or suitable for boating use from prejudicial redevelopment to enable investment in infrastructure to be made. The majority of sites are within areas that are identified as at risk of flooding, and this will be a constraint to alternative uses in many locations. The Authority is also mindful that the marine industry draws services from across Norfolk and Suffolk, supporting its concern that the economic and social impact of diversification within the boatyards, or their closure, would be felt in the wider Broads area and across a range of businesses. This will need to be taken into account in determining appropriate alternative uses. The Core Strategy proposes that possible alternative uses might include visitor accommodation, uses which generate local employment and income, uses which are related to the water and ancillary to boating, or uses which retain part or all of the boating infrastructure (environmental improvements, visitor moorings, electric charging points, fresh water supplies, toilet/shower rooms, etc).
- 4.11 Where a site is assessed to comprise large areas of Flood Zone 3b and has been used solely for water-compatible development (without offices, shops or flood resistant buildings), it is unlikely to be possible to redevelop the site by bringing in land uses defined by PPS25 as “less vulnerable” and “more vulnerable” to flooding. In these cases, the Authority will support co-operation between the site owner and other landowners within the same community to help to achieve the aims of policies CS20, CS18 and CS23 to prevent future blight and stagnation of these sites.
- 4.12 Sites for new residential development are generally restricted by Policy CS24, which encourages development on previously developed land. This means that new residential development on undeveloped footprints in areas of high flood risk will not pass the criteria in PPS25.
- 4.13 The issue addressed in this SPD relates to the implementation of appropriate and sustainable development in the context of increasing flood risk. The following uses are considered through the Core Strategy as appropriate, in principle, on **previously developed**⁵ sites in the Broads:
- shops; ancillary offices including for financial, professional and other services relating to the Broads’ waterside economy; restaurants and cafes; hot food takeaways; places of assembly and leisure and land and buildings used for land

⁵ ‘Previously developed land’ is defined in national planning policy as land “which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure.” See Glossary (Appendix 5) for a full definition.

and water management and interpretation (these are classified as less vulnerable development in PPS25); and

- short-let or other holiday sleeping accommodation, hotels and other tourist accommodation, for drinking establishments and for non-residential educational establishments (these are classified as more vulnerable development in PPS25).

However, current uses of this nature and regeneration sites will most likely be located within land shown on the SFRA as Flood Zones 3a and 3b.

Additionally, the following uses are appropriately found on waterside sites:

- flood control infrastructure; water transmission infrastructure and pumping stations; marinas and wharves; navigation facilities; boat building and repair; water-based recreation; lifeguard stations; amenity open space, nature conservation and biodiversity, outdoor sports and recreation and facilities such as changing rooms; and ancillary sleeping or residential accommodation for staff (these are classified as water-compatible development in PPS25).

Current uses of this nature and regeneration sites will most certainly be located within land shown on the SFRA as Flood Zones 3a and 3b.

- 4.14 In principle, the Core Strategy policies would allow **replacement** residential development (policies CS18 and CS24) throughout the Broads. Again, this development is likely to be already on land identified on the SFRA as Flood Zones 3a and 3b, since the majority of the Broads area is in Zone 3. It is recognised that some traditional properties in the Broads are of lightweight construction, utilise stilts and voids, are raised over their lifetime and may not adversely affect the functionality of the floodplain. Functionality of the floodplain in these locations will be a factor to consider in assessing any redevelopment proposal.
- 4.15 Whilst this SPD identifies the types of development that would be associated with economic sustainability, there are wider sustainability and, in particular, landscape issues which must be taken into consideration. Development must recognise the wetland environment within which it would be situated (Policy CS1). The reduction and minimisation of flood risk must be central to all decisions; therefore, there would be conditions attached to types of development, such as use of water-resilient construction, seasonal occupation of residential (holiday) properties, time limited approvals, flood warning, escape routes, evacuation plans, etc. Detailed decisions can only be made on a site-by-site basis, following the principles of PPS25 as applied to the Broads through the Local Development Framework in the knowledge of a site specific Flood Risk Assessment.

5 Understanding Flood Risk

- 5.1 An understanding of flood risk can be achieved through a study of flood risk mapping, which takes into account patterns of flooding in the past with assumptions about the future, knowledge of the nature of flooding at a site, and an appreciation of the functionality of land. This section provides an overview of these concepts as an introduction for prospective developers and landowners.

Environment Agency Flood Maps

- 5.2 The Environment Agency (EA) flood risk maps depict the current probability or likelihood of flooding without defences in place. They therefore show a 'worst case' scenario. However, the EA maps do not include climate change predictions of rising sea levels, increase in peak river flow, or increased peak rainfall intensity. Also, the EA flood risk maps just show areas identified as Flood Zone 3 and do not distinguish between zones 3a and 3b. In addition, the EA maps are not intended to be used to

consider the impact of flooding to an individual property. Site-specific flood risk assessments (FRA) are required to consider the impacts of all sources of flooding on an individual property, and these should also include climate change considerations.

Strategic Flood Risk Assessment (SFRA) Flood Maps

- 5.3 Millard Consulting were appointed to carry out the Stage 2 Strategic Flood Risk Assessment (SFRA) for the administrative areas covered by a consortium of local planning authorities consisting of Broadland District Council, North Norfolk District Council, the Broads Authority, Norwich City Council and South Norfolk Council.
- 5.4 The SFRA is intended to be used as a planning tool to enable local planning authorities and others to meet the strategic objectives set out in PPS25⁶. PPS25 requires each local planning authority to carry out an SFRA to inform the preparation of its Local Development Documents, and enable it to apply the sequential approach in the site allocation process.
- 5.5 The SFRA is a midway stage between the EA maps and a site-specific FRA and is required to provide a more accurate, up-to-date picture of flood risk which also takes account of future climate change predictions.
- 5.6 The climate change predictions are based on Government's recommended contingency allowances for net sea level rise and precautionary sensitivity ranges for peak rainfall intensities, peak river flows, etc. contained in Annex B of PPS25, and provide a picture of risk 100 years hence.
- 5.7 SFRA maps show Flood Zones 2, 3a and 3b. This includes the risk from a 1 in 200 year tidal flood event and also future climate change predictions such as increase in peak river flow.
- 5.8 The flood probability maps in the SFRA indicate flood risk from the tidally influenced river systems within the Broads. Certain eastern locations remain at risk from direct flooding from the coast following failure of coastal defences, and reference should be made to EA maps for details of the risk of direct coastal flooding.
- 5.9 Direct flood risk from tidal inundation is also illustrated in the SFRA by a tidal breach scenario at Sea Palling. However, this only illustrates the risk at a specific location.
- 5.10 As the EA maps do not include climate change allowances, further work may be necessary to show the impact of climate change predictions on direct tidal flood risk along the coast. The data that allows this to be mapped was not available when the SFRA was commissioned. Furthermore, it may be useful in the case of the Broads Authority area to investigate the consequences of further coastal breaches, possibly in the vicinity of Horsey, where inspection suggests that the extent of direct tidal flooding affecting the Broads would be greatest.
- 5.11 In addition to the Flood Zones, the SFRA also identifies significant "Areas of Uncertainty". This is where the flood probability outline is uncertain due to continuing bank settlement and the effect of the ongoing Broadland Flood Alleviation Project works. In these areas, the EA flood maps will be used and it will not be possible to distinguish between zones 3a and 3b.
- 5.12 The SFRA is a strategic flood risk management tool. It is based on hydrological modelling and therefore cannot take account of site variations resulting from different types of building construction and their impact on the functioning of the floodplain. This can only be achieved through site-specific studies.

⁶ Planning Policy Statement 25 (PPS25): Development and Flood Risk; Department for Communities and Local Government (2006)

The Nature of Flood Risk in the Broads

- 5.13 Approximately 95% of the Broads Authority area is at some risk of flooding. This includes more than 2000 properties and almost 30,000 hectares. The Broads Authority boundary is tightly drawn around the edge of the floodplain. The Strategic Flood Risk Assessment (SFRA) has identified that the majority of the area is presently within Flood Zone 3a and over time, with rising sea levels, will be in Flood Zone 3b as defined in PPS25. Flood Zone 3a is defined as 'High Probability' of flooding and Zone 3b as 'The Functional Floodplain'. PPS25 requires that all development proposals in the Broads Authority area should be tested against the flood probability maps in the SFRA.
- 5.14 The flood risk in the Broads is mainly from both fluvial and tidal sources and the whole character and development in the Broads over many hundreds of years has been closely associated with the water environment and flood risk. Much of the Broads area is defended by flood defence embankments, which are maintained by the Environment Agency to reduce flooding. The flood defences, where they exist, only reduce the risk of flooding and will never eliminate it; this has been the historic case within the Broads.
- 5.15 Working, living and visiting the Broads have been, and will continue to be, activities that have co-existed with the risk of flooding. However, any new development (which includes change of use, etc) must be in line with government policy and minimise flood risk. In the Broads area, this means identifying the risks from flooding and ensuring that they are at as low a level as possible compatible with the wetland and water-based environment.
- 5.16 The Broads is not subject to open sea conditions (relating to tidal range and wave action). Therefore, although parts of the Broads are tidally influenced, for flood risk assessment purposes the river flooding probabilities are used to define the Flood Zones.
- 5.17 The SFRA shows that coastal flooding and flooding associated with defence failure are likely to produce the most significant consequences and greatest hazard because of the speed of onset of the flood, the high water velocities and the deep water. Settlements towards the east of the Broads which are at risk of flooding from failure of the coastal defences are indicated on the Environment Agency maps.
- 5.18 The flood probability mapping carried out within the SFRA does not represent the degree of hazard likely to be experienced in the Broads Authority area, especially in the more upstream catchment areas and those areas not at risk of breaching of coastal defences, because it does not quantify depth or water velocity.
- 5.19 Hazard is very site specific and could vary greatly over a relatively small area due to the presence of drains, dykes, quay-headings, flood banks, etc., all of which could be masked by turbid floodwaters. The effect of climate change on hazard was also not assessed in the SFRA.
- 5.20 The flood probability mapping indicates in some areas that the functional floodplain extends to the boundary of the Broads Authority area. Intuition, or engineering judgement, indicates that this is likely to be the case in reality, at least if the functional floodplain is defined as the 1 in 20 year event.
- 5.21 It is suggested in the SFRA that if hazard mapping were to be carried out in order to quantify depth and water velocity at the various flood events considered by PPS25 (hazard, or "danger to people", is a function of depth and velocity) it would quite likely indicate that both flood depth and velocity are not great. As a result of this, hazard is generally likely to be low. However, site specific factors significantly contribute to risk and a site-specific Flood Risk Assessment will need to quantify this.
- 5.22 The SFRA suggests flooding from the tidally influenced Broads' river systems is likely to be less hazardous because of the slower onset. This may be an oversimplification

due to the interaction of site specific factors and the condition of winds and tides. The above notwithstanding, hazard and risk does tend to be predictable on the Broads and this has implications for how these are managed.

- 5.23 Fluvial flooding associated with upstream areas of individual catchments within the Broads is not normally “flashy” and the hazard from these floods, excepting unusual meteorological conditions, is least onerous. Consideration of the flood risk at a particular location should also take account of the climate change enhanced flood outlines in the SFRA in accordance with PPS25.
- 5.24 The typical Broads river has a permeable catchment, is groundwater dominated, and is a slow responding watercourse with a slow increase and decrease of flow in response to rainfall. Although tidal surges can develop rapidly within 6-12 hours as a result of the movements of weather systems in the North Sea, the Environment Agency Flood Warning System covers the whole of the Broads area which could provide some measure of early warning, however, uptake of the service is voluntary and is not enforceable within the context of planning.
- 5.25 It is also the case that existing flood defences in the Broads area offer a very low standard of defence (typically up to a 1 in 7 year standard) so that overtopping events, or events in which defences are outflanked or breached, are likely to produce a slow speed of approach of the flood, slow water velocities, shallow depth and low hazard. The majority of people living and working within the Broads are historically familiar with the water environment and are unlikely to be surprised or alarmed by the prospect of floods or rising water levels. Measures will need to be in place to ensure effective communication with visitors - an issue which is already addressed on many sites locally.
- 5.26 Any development encroaching within any of the plotted Flood Zones may increase flood risk to adjacent areas, and the effect on flood risk of a number of small encroachments is cumulative. If the requirements of PPS25 are met in full, then additional development would not increase flood risk elsewhere.

Definition of Functional Floodplain

- 5.27 The majority of the Broads lies within land classified on the SFRA as Flood Zones 3a and 3b. Flood Zone 3 as a whole covers areas which currently flood and also areas which do not currently flood but will over a 100 year period.
- 5.28 The functional floodplain is determined considering the effects of defences and other flood risk management infrastructure (as stated in the Practice Guide to PPS25). The development and functionality of land shown in the SFRA as Flood Zone 3b must be taken into account when considering flood risk management policies in the context of the Broads.
- 5.29 Land identified in the SFRA as being in the functional floodplain (Flood Risk Zone 3b) does not, however, necessarily function as floodplain and three separate types of site can be identified:
- i) Greenfield sites – ie., land where there has previously been no development and which do function as floodplain;
 - ii) Brownfield sites which have been previously developed – ie., sites where there has been previous development, but which may now be vacant in whole or in part and may function as floodplain in whole or in part; and
 - iii) Brownfield sites which are currently developed – ie., sites which accommodate buildings which are currently in use and which do not function as floodplain.
- 5.30 Areas of Flood Zone 3b that do not function up to a 1 in 20 year flood event should be considered as Flood Zone 3a. The Authority will apply the PPS25 guidance applicable to Flood Zone 3a to these areas. The site-specific FRA must identify the probability of flooding and the consequences in respect of velocity, speed of onset and depth of

flooding. This can then be used in conjunction with the “Flood Risk to People Calculator⁷” and factors such as flood warning, escape routes, etc, to identify the level of risk.

- 5.31 Developed areas which have no or low levels of flood defence are currently subject to flooding, sometimes fairly frequently. Small-scale development comprising houses, bungalows, boatyards and other properties have been built upon or, using voids, over the functional floodplain over the past hundred years or so, while still allowing the sites to function as floodplain. The amount of land occupied by the foundations or piles of such properties is, in most cases, very small compared with the surface area of the lawns and gardens surrounding them. These latter areas do, of course, continue to receive and temporarily store water in times of flood.
- 5.32 The Authority recognises that these sites are inappropriate for permanent residential development. Nevertheless, either through established use or through decisions made by planning inspectors, some properties *are* people’s homes. Additionally, sites within Flood Zone 3b *may* be suitable for holiday accommodation as originally intended, or for Broads related business uses subject to the site appraisal criteria discussed in Section 6.
- 5.33 The Authority, businesses and property owners are faced with three options:
- To make extensive repairs to outdated structures, without the need for planning consent, and with no requirement to decrease flood risk and build in resilience. This course of action would be based on an uninformed decision in the absence of a Flood Risk Assessment (FRA).
 - To rebuild, allowing the functioning of the floodplain, managing risks and building in resilience based on the understanding of a FRA. For example, the replacement building should be mounted on piles so that the land beneath it can receive and temporarily store flood water, thereby fulfilling its role as part of a functional floodplain.
 - To abandon the site or find a developer willing to invest in water-compatible development.
- 5.34 Owners of houses, or prospective purchasers of properties requiring renovation, must think carefully about the risks. Vulnerability of land use classification will not change through re-development proposals; however, the frequency and characteristics of flooding - for example, the duration and hazard - will change with the influence of climate change, particularly in riverside locations. It is important that the nature of flood risk, now and in the future, is understood in the consideration of any replacement dwelling application. The PPS25 Practice Guide provides useful guidance in the factors that should influence the decision-making process with regard to the acceptability of proposals.

⁷ EA/Defra research has developed a ‘Flood Risk to People Calculator’ (Ref: FD2321/Tr2).

Part Three: Implementation

6 Making and Assessing a Planning Application

- 6.1 Proposals for developments in areas at risk of flooding are subject to appropriate detailed requirements and, where appropriate, a Flood Risk Assessment (FRA). The basic requirements of the FRA are set out in Appendix C of the PPS25 Practice Guide. Early discussion with both the Broads Authority and Environment Agency prior to preparing a FRA is recommended to discuss the scope of the FRA and data requirements.
- 6.2 Developers should assess carefully the full range of issues associated with flood risk when considering and formulating development proposals. Pre-application discussion of these issues with officers of the Broads Authority and the Environment Agency is strongly encouraged. Failure to consider these issues is likely to lead to delay or to refusal of planning permission. Developers must demonstrate that development both minimises flood risk and will still be of a scale and design appropriate to its Broads setting. There is a particular need for a good quality of design when dealing with waterside sites.
- 6.3 PPS25 sets out a Sequential Test to development and flood risk undertaken by the planning authority to direct development away from flood risk areas. It also sets out an Exception Test for development located in zones of higher flood risk to provide a method to manage flood risk, while still allowing necessary development to occur, subject to appropriate risk reduction and mitigation measures.

The Principles of Land Use and Development in Areas of Flood Risk

- 6.4 The principles of land use and development in areas of flood risk are set out in PPS25 and developed in the guidance given in the Practice Guide. Due to the limited availability of sites in Flood Zone 1, the objective, as applied to the Broads, is to reduce flood risk to new development through the application of the sequential approach and to maximise opportunities to build in resilience both at the site and buildings level through design. The improvement of safety and management of risk, including response to risk, must be addressed at the design stage.
- 6.5 A distinction may be drawn between proposed development in flood risk zones 1, 2 and 3a and proposed development in flood risk zone 3b. In the case of the former, PPS25 is very clear on circumstances in which the Sequential and Exception tests must be applied and this is appropriate. In terms of proposed development in Flood Zone 3b, however, PPS 25 cautions against development other than that which is water compatible and there is concern that locally this will lead to blight and will undermine the economic and social viability of Broads communities. Furthermore, as identified in paragraph 5.29, a range of situations and historic land uses can be found within Flood Zone 3b. In determining a particular planning application it is necessary to consider the functionality of the floodplain as it applies to a particular site.
- 6.6 The approach in any particular case will depend on the nature of the land and the specific functionality of the floodplain, taking into account the presence of built structures and site infrastructure. The following principles will apply.
1. Greenfield sites
- In the case of a 'green field' site which has not been the subject of any previous development, the site will function as an unconstrained, open floodplain. It will provide areas for water storage in times of flood and may have other value associated with this, for example as wet woodland. No development will be permitted other than in accordance with PPS25 and the Development Plan.

2. Brownfield sites which have been previously developed

Sites categorised as “brownfield sites which have been previously developed” will typically cover sites larger than a single plot and may have been in use for a variety of uses, often employment based. Typically these will be characterised by areas of built development, including buildings and hardstandings, with undeveloped areas too which might include vegetated margins or open areas which may or may not have had a function to support the previous land use. Parts of the site will function as functional floodplain and parts will not. The functionality of any part will depend on the way in which the water would behave in times of flood – if flood waters can pass under or through a building or sit on land this will be defined as functional floodplain, but where the building or structure acts as a barrier to flood water then its functionality is compromised and it will not be classified as Flood Zone 3b and can be described as Flood Zone 3a.

When considering development proposals for brownfield sites which have been previously developed, the objective is to locate development in a sequentially appropriate manner on the site and to reduce risk through design. An initial site appraisal should identify the different flood risk zones on the site (where applicable) and differentiate between areas of Flood Zone 3a and Flood Zone 3b, as described above.

Site appraisal in the floodplain

A comprehensive and accurate site appraisal will be essential in order to identify constraints and potential areas for development on a site within the floodplain. The appraisal should identify:

1. Flood risk zones 1 – 3 within the site with reference to the SFRA/EA maps;
2. The boundaries between areas of Flood Zone 3a and the Flood Zone 3b (reference to SFRA);
3. The boundaries within mapped areas of Flood Zone 3b where water has to flow or be stored and land areas where buildings and other infrastructure restrict this functionality. The following will need to be considered in identifying these boundaries:
 - Extent of buildings on site and their footprints
 - Extent of hardstandings on site and their coverage
 - Permeability of the buildings and hardstandings on site, including the contribution of voids
 - Extent of open areas and drainage infrastructure on site and their capacity
 - Flow pathways and patterns within and off-site

Provision of this information will allow an accurate calculation to be made of the extent and location of Flood Zone 3a and Flood Zone 3b within the site. The objective of the appraisal, as part of the process of assessment under PPS25, is to identify the location and extent of the site that would be appropriate for development, so that the LPA can ensure that it does not increase flood risk to the site or to the development. Analysis of the above may identify means to reduce risk as well as allowing development and these opportunities should be incorporated as part of the design process. There may also be mechanisms to improve flood storage capacity, and hence reduce risk, through layout and design and the appraisal will demonstrate where this is required.

Development should be located in a sequentially appropriate manner across any flood risk zones, in accordance with PPS25. Where there is existing development within Flood Zone 3a, opportunities to improve flood risk should follow the following hierarchy:

- a. relocate development to Flood Zone 1
- b. relocate development to a lower flood risk zone
- c. ensure there is no net increase in the development area within Flood Zone 3a.

Land uses or development which is of a higher level of vulnerability, as defined in PPS25, than existing or previous uses on the site will not be permitted.

The objective when looking at development proposals on this category of land is to seek opportunities to restore the functionality of the floodplain. This must, however, be balanced against the need to maintain the land uses and development which support the economic and social viability of the Broads communities. So the overriding principle in respect of development is that it should not increase risk above the existing level and this is the test that must be met.

3. Brownfield sites which are currently developed

Sites categorised as “brownfield sites which are currently developed” will typically cover individual sites where replacement development is proposed. Typically these will be smaller plots and are owner occupied with limited (if any) opportunity for relocating development to an area of lesser flood risk, either on-site or elsewhere. [reference to PPS25 Practice Guide 4.36].

When considering proposals for replacement development, an initial appraisal should identify whether the development is located in Flood Zone 3a or Flood Zone 3b.

If the site is in Flood Zone 3b, new water compatible development will be permitted or a like-for-like replacement of an existing use.

If the site is in Flood Zone 3a, new development for water compatible uses or less vulnerable uses (as defined in PPS25) will be permitted or a like-for-like replacement of an existing use.

The objective when looking at development proposals on this category of land is to ensure that development does not increase flood risk to the site or the building or elsewhere above the existing level and this is the test that must be met.

Sequential Test

- 6.7 The Broads Authority's Local Development Framework has not identified land for development, but has identified the types of development that are considered appropriate for the Broads' wetland environment. The Core Strategy is supported by a Sustainability Appraisal based on a set of sustainability objectives (set out in Appendix 2). The Sequential Test will be carried out by the Broads Authority on each application located in Flood Zones 2 and 3, drawing on information provided by the developer. Sites must be reasonably available to be considered as part of the Sequential Test. The Environment Agency advises that the Sequential Test should be undertaken in isolation and judged on flood risk issues only. The results of the test should then be compared to other non-flood risk matters. A site may therefore pass the Sequential Test but still be considered inappropriate for other reasons, such as being contrary to the Core Strategy.
- 6.8 The Authority will aim to minimise flood risk by directing development away from areas of high risk. However, this does not override other Core Strategy policies which may indicate the unsuitability, for other reasons, of land in Flood Zones 1 or 2. Just

because a development is capable of passing the Sequential Test does not make the principle of its location in the Broads appropriate.

- 6.9 The policies of the Core Strategy favour development which contributes to the economic function of the area such as agriculture, tourism (including hotels and holiday accommodation) and the marine industry, or for environmental purposes. It is development for these uses which, subject to the overall suitability of their proposed location, may not pass the Sequential Test and would trigger the application of the Exception Test.
- 6.10 The policies of the Core Strategy are not looking for the provision of sites for new residential development. The adjacent local planning authorities have made adequate site allocations to meet their housing targets. Therefore, in applying the Sequential Test, while permanent residential development on previously undeveloped land in Flood Zones 1 or 2 may pass the Sequential Test, the development of the sites is unlikely to be appropriate in terms of other policies of the Core Strategy. A proposal for permanent residential development on previously undeveloped land in Flood Zone 3 is most unlikely to pass the Sequential Test.
- 6.11 PPS25 lists types of (highly vulnerable) development which would require an Exception Test should their proposed location be in Flood Zone 2. None of these uses is likely to be appropriate in principle within the Broads so they would not pass beyond the Sequential Test.

Exception Test

- 6.12 It is expected that, as most developed land in the Broads lies within Flood Zone 3, the Exception Test will need to be applied for most applications for new development which are compatible, in principle, with their location in the Broads (applications for change of use do not require sequential or exception tests to be applied). The requirements of the Exception Test are set out in PPS25. The Broads Authority has considered these tests and has clarified how they will be interpreted locally in the context of the landscape character and spatial vision. Again, the developer must provide the evidence to enable the Exception Test to be applied by the Authority.
- 6.13 The following three conditions must be met in order for the Authority to be sure that a proposal is appropriate, in flood risk terms, to be developed in Flood Zone 3a and on developed sites notionally shown in the SFRA as Zone 3b but now reclassified as Zone 3a:
- a. it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk. In the Broads, the development should make a significant contribution to the Core Strategy's Sustainability Appraisal objectives (Appendix 2) and the achievement of the strategic objectives of the Local Development Framework;
 - b. the development should be on developable previously-developed⁸ land or is the reuse of an existing building and there are no reasonable alternative sites on developable previously-developed land at a lower risk; and
 - c. a site-specific FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere or adversely affecting the functionality of the floodplain and, where possible, will reduce flood risk overall.

In addition to these three conditions, the following will also be applied as part of the Exception Test:

- d. The development must not compromise future flood alleviation or flood defence schemes;

⁸ See Glossary (Appendix 5) for definition of 'previously developed land'

- e. The design and access statement must demonstrate how resilience to flooding has been incorporated through a design which does not detract from the character of the locality;
 - f. The site-specific Flood Risk Assessment must demonstrate how the development will be compatible with the nature of flooding in the Broads, taking into account climate change and sea level rise over the planned life of the development;
- and, in the case of the replacement of a residential property
- g. A residential development must be on a like-for-like basis, with no increase in the number of bedrooms, on the same sized footprint⁹, potentially being relocated in a less vulnerable part of the site.
- 6.14 The Authority may permit the relocation of existing development out of Flood Zone 3b to an undeveloped site with a lower probability of flooding where the vacated site is reinstated as naturally functioning floodplain, and where the benefits to flood risk outweigh the benefits of leaving the new site undeveloped.
- 6.15 National policy will expect any proposed development in Flood Zones 3a and 3b to demonstrate an improvement in flood risk management (taking into account climate change over the development lifetime). For example, a building may be redesigned to be more flood resistant or have habitable areas raised. The frequency of flooding to the surrounding land may become greater and more hazardous with time, therefore offsetting any improvement to the design of the building and challenging the overall sustainability of the location for the given land use. These issues will need to be addressed in the site-specific Flood Risk Assessment. Some landowners may decide that risk management is too onerous and seek to relocate.

Information for Flood Risk Assessments

- 6.16 Information required for preparing Flood Risk Assessments (FRA) can be found in PPS25 and in more detail in the PPS25 Practice Guide. Information on flood risk zones can be found in the Strategic Flood Risk Assessment for the Broads (on the Greater Norwich Development Partnership website and the Flood Maps (on the Environment Agency website), noting these are only indicative and more detailed information should be sought from the Environment Agency (tel: 08708 506 506). Considerable additional information for developers and landowners can be found in the Environment Agency's Standing Advice Development and Flood Risk on the EA website: www.environment-agency.gov.uk. Developers should refer to these sources of information so they are fully informed of the requirements at the time of their application.
- 6.17 The management of residual risk is another area that has to be addressed. There is no definition of what is deemed to be 'safe', but there is information from various sources that can provide a guide to what is acceptable in respect of flood depths and velocities. Reference should be made to the Defra/EA Research Report FD2320, 'Flood Risk Assessment Guidance for New Development'¹⁰. Advice on the flood resistance and resilience of buildings can be found in 'Preparing for Flood' (ODPM 2003) and in the more recent CLG document, "Improving the Flood Performance of New Buildings: Flood Resilient Construction".

⁹ The "footprint" is the aggregate ground floor area of the existing buildings, **excluding** temporary buildings, open spaces with direct external access between wings of a building, and areas of hardstanding.

¹⁰ www.hydras.co.uk

7 Reducing Flood Risk to Development

7.1 Developers must demonstrate that development both reduces flood risk and will still be of a scale and design appropriate to its Broads setting. There is a particular need for a good quality of design when dealing with waterside sites. The Authority will not permit development where the accommodation of measures to reduce flood risk leads to other, unacceptable, consequences. These may include an intrusive scale of building or land raising which is inappropriate in the landscape or built environment. Developers should also note that, in accordance with advice in PPS25, any necessary flood defence works required because of the development form part of that development and should be funded by the developer. It should be noted that all aspects of the development need to comply with policies of the Local Development Framework and that conformity with Core Strategy policy CS20 does not override applicability of other plans.

7.2 The Authority will continue to give considerable weight to the advice of the Environment Agency with regard to the appropriateness of development and necessary flood alleviation measures.

Raising Floor Levels

7.3 Raising floor levels has been a well established approach in the Broads, setting the building floor level above an appropriate flood level. This approach provides a partial solution by giving protection to people and accommodation, provided that the flood level does not exceed the floor level provided. A traditional approach is to allow the site to flood beneath a raised building. This method does not protect the building curtilage or access roads. In addition, flooding may prevent the effective operation of local drainage and sewage systems, with potential adverse environmental and amenity consequences. It is also difficult to apply new floor levels to building conversions.

7.4 The appropriate minimum floor levels to manage flood risk will be determined through the site-specific Flood Risk Assessment. The use of raised floor levels has significant implications for development. Firstly, it can lead to a raising of the ridge level and overall height of the building. Secondly, it affects the relationship between the floor level and the surrounding site and therefore the means of access into the building, including access for people with disabilities. These aspects need careful consideration by the architect at an early stage to ensure that the resulting development will be acceptable in terms of its design in relation to its surroundings and that it complies with legal and policy requirements with regard to access for disabled people.

7.5 The relationship between existing ground level, floor height and ridge height has a major effect on the overall character and appearance of development in the context of its surroundings. This information is essential to the determination of a planning application. Developers are strongly advised to ascertain this information at an early stage. They should show it clearly in planning application drawings, together with the effect on relationships with surrounding buildings or other features. Failure to do so will lead to delays in the determination of planning applications or to refusal.

Raising Plot Levels

7.6 Developers may seek to reduce the risk of flooding by raising the level of the land, either in isolation or in combination with a minimum floor level. This approach is unlikely to be a viable option in the Broads. The Authority and the Environment Agency have a preference against raising land levels, because:

- (i) It can serve to divert flood water onto neighbouring plots, particularly in areas primarily affected by fluvial flooding.
- (ii) Land in the Broads area is often wet and of poor load bearing capacity. Surcharging of land with soil or other material may lead to the site sinking over a period of time.
- (iii) It affects the relationship of the site to surrounding plots, and to access roads. On waterside sites, the relationship to the river or broad is changed, often leading to the need for higher piling and quay heading, affecting the visual quality of the water's edge.
- (iv) It can be damaging to ecology, geomorphology, trees and other vegetation on the site.
- (v) It can change the character of the landscape. Land raising can increase the height and prominence of new buildings.
- (vi) It can affect the ability to provide alternative flood storage capacity in the drainage compartment.

7.7 Some raising of site levels may be acceptable, for example where ground levels have dropped over a period of years and can be raised without damaging effects. However, ground raising will not be acceptable where it results in harmful effects. Developers should be aware that land raising is an engineering operation requiring planning permission, and should give adequate information on proposed ground raising when making planning applications. Compensatory floodplain storage may be required as a mitigation measure, but this can be difficult to achieve on small plots and the impact off-site would always need to be assessed.

Bunds or Flood Walls

7.8 In some exceptional cases it may be appropriate to consider the use of earth bunds or flood walls to reduce the risk of flooding of development or to protect existing development. This approach is less likely to be applicable to small-scale developments. While acceptable in some locations, bunds or flood walls are likely to be damaging to the character of the landscape or built environment in others. As with land raising, bunds can divert flood water onto neighbouring land, particularly in areas primarily affected by fluvial flooding. The provision of alternative flood storage capacity in the drainage compartment will be a requirement in the use of this technique. Careful consideration will be needed to ensure that the engineering requirements for bunds or flood walls are met and that, as far as possible, they are designed to be sympathetic to the local character. In addition, it will be important to ensure that a bund or flood wall does not prejudice the operational requirements of the site, for example at a boatyard or other employment site.

Consents

7.9 Developers should be aware that land raising or the construction of bunds or flood walls is an operation requiring planning permission. The above issues should be carefully considered when proposals are being formulated. An Environmental Permit may be required under the Environmental Permitting (England and Wales) Legislation 2007. Further information can be obtained from the Environment Agency. It should also be noted that the planting of trees or shrubs on floodbanks will not be permitted because such planting will affect the integrity of the banks.

7.10 In addition, under the terms of the Water Resources Act 1991 and the Land Drainage Byelaws, a Flood Defence consent (formerly known as Land Drainage consent) may be required for any proposed works or structures in, under, over or within 9 metres of the top of the bank of a main river or flood defence. Such consent must be granted in writing, prior to commencement of works.

- 7.11 A Flood Defence consent may also be required for any culverts or works affecting the flow of a watercourse. It should be noted that the Broads Authority seeks to avoid the use of culverts, and consent for such works will not normally be granted, except as a means of access.

Floating/Amphibious Structures

- 7.12 A future option to explore is a fixed but floating solution to development for commercial uses or *replacement* residential properties. Development might be located on land or in a mooring cut within a *currently* developed plot giving connectivity with the landscape, retaining the feeling of intimacy on the waterway and the sense of space between development experienced throughout the Broads system. Solutions would have to address design issues, including height and the visual impact of floats, as well as consideration of safe access and egress at times of flood and infrastructure requirements.

Resilience

- 7.13 A further approach is to take measures to protect individual properties, for example through the use of raised thresholds, floodboards, waterproofing or the protection of airbricks. In addition, consideration should be given at the design stage to the potential effects of flooding on the electrical, foul drainage and other key aspects of the development. Developers may also put forward innovative approaches towards reducing the risks or effects of flooding. The Broads Authority will give careful consideration to such proposals which:

- Build in resilience and allow sites to flood, for example in commercial non-residential buildings and voids (e.g. replacement chalets or extensions to buildings).
- Utilise floating walkways as a safe means of escape.
- Use soft river edge protection measures which absorb water, reduce erosion from wake and encourage plant growth.
- Provide compensatory flood storage capacity or washlands.

- 7.14 Further information can be found in the Communities and Local Government document 'Improving the Flood Performance of New Buildings: Flood Resilient Construction', which is available to view and download on the CLG website.¹¹

Flood Warnings

- 7.15 It is emphasised that the application of measures referred to in this document is not a guarantee against flooding. While the risk of flooding can be reduced, a residual risk will always remain. Attention is drawn to the Environment Agency's Flood Warning System (Floodline). Details of this free service, which provides flood warnings directly by telephone, mobile, fax or pager, can be obtained from the Agency's Floodline (telephone 0845 988 1188). It is also a source of advice on what to do before, during and after a flood.
- 7.16 It will be good practice to display notices within properties (translated where foreign visitors may be present), outlining procedures to be followed, escape routes and evacuation plans. This will often be a requirement of planning permission, and the exact details will be ascertained as part of the Flood Risk Assessment.
- 7.17 The client/developer responsibilities for health and safety and facilities management may also require a site-specific flood response plan. These are important considerations on commercial sites and are potential requirements for compliance with the Construction (Design and Management) Regulations 2007¹².

¹¹ www.communities.gov.uk/publications/planningandbuilding/improvingflood

¹² www.hse.gov.uk/construction/cdm.htm

Sustainable Drainage Systems (SUDS)

- 7.18 Sustainable drainage systems (SUDS) are the best way of avoiding and managing surface water flooding if new development cannot be located away from the flood risk area.
- 7.19 SUDS aim to mimic natural drainage. SUDS can achieve multiple objectives such as removing pollutants from urban run-off at source, controlling surface water run-off from developments, ensuring that flood risk does not increase further downstream and combining water management with green space which can increase amenity and biodiversity value.
- 7.20 SUDS aim to reduce the amount and rate of water flow by a combination of:
- infiltration into the ground;
 - holding water in storage areas; and
 - slowing down the movement of water.
- Multiple objectives of flood risk, water quality and amenity relevant to the consideration of all Broads development can be achieved. To realise the greatest improvement in water quality and flood risk management, these components should be used in combination. More information can be seen at www.ciria.org/suds. Further references are given in the PPS25 Practice Guide. Not all techniques are suitable in the Broads and the Strategic Flood Risk Assessment looked into the measures which would work at a technical level.
- 7.21 Appendix 4 outlines how the Authority would expect to see sustainable drainage accommodated in a development in specific locations.

8 Conclusions

- 8.1 Most of the Broads area consists of low lying land within the floodplain, and the Broads Plan and Strategic Flood Risk Assessment identify the risk of flooding as a major issue for the future. Flooding can disrupt and endanger life and cause damage to property and infrastructure. Flood risk has significant implications for development in the Broads, both in terms of new buildings and land uses.
- 8.2 Waterborne tourism is considered to be the largest contributor to the Broad's local economy and also contributes to the tourism offer of Norwich, Yarmouth and Lowestoft. There is a wide variety of attractions with growth potential against the background of changing tastes and leisure habits such as shorter and multi-activity breaks. There is a need to support, widen and strengthen the tourism base by encouraging the provision of tourism/recreation facilities, protecting waterside employment sites, and supporting diversification of tourism where sustainable.
- 8.3 Without some redevelopment the Broads Authority will not be able to achieve its Core Strategy policies. The boatyards, boat hire and boat building have been in decline for many years and it is mainly in these areas that new opportunities for tourism and recreation, particularly leisure boating, will be needed - but only if the developments facilitate the economic and social well being of the area.
- 8.4 This Development and Flood Risk SPD sets out the Broads Authority policy in respect of development in the Broads Executive Area and in particular the floodplain areas. The guidance should ensure that all developments are sustainable, consider and minimise the flood risk and are consistent with the Broads Authority Core Strategy.

Appendix 1: Preparation of Supplementary Planning Documents

Planning Policy and the Local Development Framework

- A 1.1 The Government introduced changes to the planning system for England in the Planning and Compulsory Purchase Act 2004. These changes included the replacement of Structure Plans and Local Plans with a number of new documents which now, together with the Regional Spatial Strategy, form the Development Plan. These documents are Local Development Documents (LDDs) and form a portfolio, or framework, called the Local Development Framework (LDF).
- A1.2 The Broads Authority is the Local Planning Authority for the area within the Broads' executive boundary. Under the Planning and Compulsory Purchase Act 2004, the Authority is responsible for preparing a Local Development Framework which sets out the policies and proposals for the development and use of land in the Broads.
- A 1.3 Some LDF documents, known as Development Plan Documents (DPDs) are subject to statutory requirements and formal testing through independent examination by a Government Inspector. The policies in DPDs will be the first consideration when assessing planning applications. There is also scope for preparing less formal, non-statutory documents offering guidance and interpretation of the DPDs; these are called Supplementary Planning Documents (SPDs).
- A1.4 Details of the programme for the preparation of the LDDs are set out in a Local Development Scheme (LDS). The Authority's LDS can be viewed on its website at www.broads-authority.gov.uk (follow the links from planning/planning policy).
- A1.5 Details of the LDF system which the Authority must follow are set out in Planning Policy Statement 12 (PPS12): Local Spatial Planning. Information is also available on the Communities and Local Government website at www.communities.gov.uk.

Preparation of Supplementary Planning Documents

- A1.6 Supplementary Planning Documents (SPDs) are supporting documents to Development Plan Documents and provide more detailed guidance and advice. They have non-statutory status but are material considerations in decision making.
- A1.7 There are three main stages in the preparation of Supplementary Planning Documents – pre-production, production, and adoption. The preparation process is similar to that for a Development Plan Document (such as the Core Strategy), but it is simplified and there is no independent examination.
- (i) Pre-production: Survey and evidence gathering on key issues.
 - (ii) Production: Following the evidence gathering, the Authority prepares a draft Supplementary Planning Document. The draft SPD is published for consultation with key partners, local communities and other stakeholders. The consultation responses are considered and necessary amendments made to the SPD.
 - (iii) Adoption: The amended SPD is adopted. It then becomes a material consideration in making decisions on planning applications.

Sustainability Appraisal/Strategic Environmental Appraisal (SA/SEA) of the SPD is required where the SA/SEA already carried out for the Development Plan Document that the SPD is supporting does not fully cover the issues raised in the SPD.

Appendix 2: Sustainability Appraisal, Strategic Environment Assessment and Appropriate Assessment

A2.1 The Development and Flood Risk SPD supplements Core Strategy Policy CS20 on development in flood risk areas.

A2.2 The Environmental Report for the Core Strategy, which sets out how environmental considerations and public consultation helped shape the document, and how its environmental impact will be monitored in the future, reports that:

“The restriction of development within the floodplain will make the provision of affordable housing increasing difficult and increases the cost of development as land becomes more valuable as the supply is restricted. To address this it is recommended the provision of affordable housing be secured outside areas of flood risk.

Undefended areas represent a serious constraint on development.”

A2.3 Appropriate Assessment is a requirement of the European Habitats Directive. Its purpose is to assess the impacts of the plans and projects on internationally designated nature conservation sites. The Appropriate Assessment for the Core Strategy concludes that:

“The Broads is a member of the National Park family and as a result has conservation management embedded in its plans and strategies, including the Local Development Framework. In recognition of the implications under the EU Habitats Directive and Appropriate Assessment requirements the Broads Authority has added policy CS2 specifically to deal with European and National protected sites and arising planning and development issues and meet these requirements.

It is clear to see that the overarching policies have very limited impacts on SPAs, SACs and Ramsar sites, because of their strategic nature and that there are no detailed site specifics. Where there maybe implications sufficient to effect site integrity this is drawn out and mitigation measures provided for.

Development is restricted in the Broads. As a member of the National Park family there is no growth requirement in the RSS and major development can only happen under exception circumstances. Another restricting factor is the large proportion at risk of flooding, policy CS20 sets out criteria for determining if development can occur in these areas. Policy CS2 would apply to all proposals and ensure the objectives of designated sites are considered and adverse effects avoided or mitigated.

Possible impacts from the Broads Core Strategy policies on Broads SAC:
CS20 – Development in Flood Risk Areas - would need to satisfy criteria, but protected sites may also be in flood risk areas and development vital to their protection. This would need to be considered on a site-by-site basis and impossible to set out every eventuality here. The purposes of the BA include conservation and the protection of sites is a key consideration, policy CS2 may also be relevant.

Assessment of risk on site integrity: This would need to be judged on a site-by-site basis. If further site specifics are added in later LDDs then AA would be carried out at that time.”

A2.3 The Core Strategy’s Sustainability Objectives are set out in the table below.

REF	SEA Topic	Sustainability Objective
Environmental		
SA1	Landscape, Biodiversity, Flora, Fauna, Soil, Cultural Heritage	To protect and enhance the natural and cultural environment of the Broads, whilst improving its ability to adapt to environmental change
SA2	Air, Climate, Water, Landscape, Biodiversity	To achieve sustainable resource use through the efficient use of land, water, energy and materials
SA3	Water	To improve water quality
SA4	Climate	To reduce vulnerability to climate change and flooding
Social		
SA5	Population, Human Health	To provide safe access for all to facilities, services and sites of natural and cultural interest
SA6	Population	To facilitate opportunities for affordable housing adjacent to, and in exceptional circumstances within, the Broads for those who live and work in the Broads
SA7	Human Health	To encourage safe and healthy recreational activities for all Broads users and residents
SA8	Population	To engage communities within and adjacent to the Broads in the work of the Broads Authority
Economic		
SA9	Material Assets	To maintain and enhance the infrastructure of the Broads in support of business activity
SA10	Material Assets	To support a flourishing and healthy Broads economy
SA11	Air, Climate	To encourage the use of public transport, cycling and walking
SA12	Material Assets	To sustain skills to maintain local crafts and improve the quality of local products

The sustainability appraisal of Core Strategy Policy CS20 against each of the Sustainability Objectives reported the following:

Sustainability Objectives												
	SA 1	SA 2	SA 3	SA 4	SA 5	SA 6	SA 7	SA 8	SA 9	SA 10	SA 11	SA 12
CS20	√	0	0	√√	0	XX	√	0	√√	√	0	0
√√=major positive impact √ = positive impact 0= no significant impact												

Draft Supplementary Planning Document Assessment worksheet

A2.4 The draft Development and Flood Risk SPD was assessed separately to the Development Policies DPD preferred options, and the results of the assessment are outlined below. The purpose of the SPD is to give advice to developers and others about the Broads Authority’s approach to the issue of development and flood risk, while also stressing the need to maintain a high standard of design in new waterside development. It provides further information on the implementation of the Core Strategy Flood Risk Policy CS20 and Development Policies Preferred Option PO9. In general, the effects of the SPD are similar to that of Preferred Option 9, and this is reflected in the table below.

Development and Flood Risk Policy Supplementary Planning Document		
SA Objective	Description of Effects	Assess-ment
SA1: To protect and enhance the natural and cultural environment of the Broads, whilst improving its ability to adapt to environmental change	No significant effect.	0
SA2: To achieve sustainable resource use through the efficient use of land, water, energy and materials	The SPD encourages development in flood risk areas where development would make use of previously developed land, contributing towards increasing the proportion of new development built on previously developed land.	+
SA3: To improve water quality	Allowing for development within Flood Zone 3b is likely to encourage waterside construction, which can produce vast amounts of sediment, which may negatively impact on water quality.	0/-
SA4: To reduce vulnerability to climate change and flooding	The SPD should work to ensure that climate change vulnerability to flood risk is minimised as much as feasible whilst allowing for economic development. However, it does allow for flood risk to be acceptable in certain circumstances, increasing flood risk vulnerability in those circumstances.	--/+
SA5: To provide safe access for all to facilities, services and sites of natural and cultural interest	Allowance for business facilities and services development in high probability flood risk areas could compromise the desired objective to provide “safe access” to such sites.	0/-
SA6: To facilitate opportunities for affordable housing adjacent to, and in exceptional circumstances within, the Broads for those who live and work in the Broads	No significant effect.	0

Development and Flood Risk Policy Supplementary Planning Document		
SA Objective	Description of Effects	Assessment
SA7: To encourage safe and healthy recreational activities for all Broads users and residents	Allowance for recreational development in high probability flood risk areas could compromise the desire to provide “safe and healthy” recreational activities for Broads users and residents.	0/-
SA8: To engage communities within and adjacent to the Broads in the work of the Broads Authority	No significant effect.	0
SA9: To maintain and enhance the infrastructure of the Broads in support of business activity	No significant effect.	0
SA10: To support a flourishing and healthy Broads economy	The SPD would allow for development in flood risk areas providing that it contributes to Broads related employment, commerce, tourism, recreation or environmental purposes to ensure a viable business economy, thus making more land available for economic development purposes. However, allowing for economic development in areas of high probability flood risk could also have negative economic impacts on businesses as a result of increased vulnerability to flood risk.	-/+
SA11: To encourage the use of public transport, cycling and walking	No significant effect.	0
SA12: To sustain skills to maintain local crafts and improve the quality of local products	No significant effect.	0
Key to Assessment symbols		
Impact	Symbol	
Major Positive	√√	
Positive	√	
Both positive and negative	√/x	
Negative	x	
Major negative	xx	
No significant impact	0	
Impact unclear or depends on implementation	?	

Appendix 3: Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zones are identified by their annual probability to flooding as follows (taken from Table D.1 in Planning Policy Statement (PPS25): Development and Flood Risk:

Zone 1: Low Probability

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Zone 2: Medium Probability

This zone comprises land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

Zone 3a: High Probability

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Zone 3b: The Functional Floodplain

This zone comprises land where water has to flow or be stored in times of flood. The SFRA identifies this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, including water conveyance routes).

	Essential Infrastructure	Water-compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	✓ Exception test required	✓	✓
Flood Zone 3a	✓ Exception test required	✓	x	Exception test required	✓
Flood Zone 3b Functional floodplain	✓ Exception test required	✓	x	x	x

Definitions of types of development

Essential Infrastructure	<ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	<ul style="list-style-type: none"> • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding; • Emergency dispersal points; • Basement dwellings; • Caravans, mobile homes and park homes intended for permanent residential use; and • Installations requiring hazardous substances consent.
More Vulnerable	<ul style="list-style-type: none"> • Hospitals; • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels; • Buildings used for: dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels; • Non–residential uses for health services, nurseries and educational establishments; • Landfill and sites used for waste management facilities for hazardous waste; and • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	<ul style="list-style-type: none"> • Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non–residential institutions not included in ‘more vulnerable’; and assembly and leisure. • Land and buildings used for agriculture and forestry; • Waste treatment (except landfill and hazardous waste facilities); • Minerals working and processing (except for sand and gravel working); • Water treatment plants; • Sewage treatment plants (if adequate pollution control measures are in place).
Water-compatible Development	<ul style="list-style-type: none"> • Flood control infrastructure; • Water transmission infrastructure and pumping stations; • Sewage transmission infrastructure and pumping stations; • Sand and gravel workings; • Docks, marinas and wharves; • Navigation facilities; • MOD defence installations; • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; • Water-based recreation (excluding sleeping accommodation); • Lifeguard and coastguard stations; • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms; and • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Appendix 4: Applicability of SUDS at Broads Authority settlements

Extract from SFRA Table 6.4

Specific conditions of sites should be investigated by site developers prior to design of schemes.

Settlement	Soil types	Infiltration capacity	Appropriate SUDS components	Typical attenuation storage area*	Anglian water capacity and schedule for Improvement
Brundall	Peat deposits.	Poor	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	470m ² /ha with discharge into River Yare.	No data
Cantley	Silt and clay and peat deposits.	Poor	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	475m ² /ha with discharge into the River Yare.	No data
Reedham	Predominantly sands and gravel deposits with limited proportion of peat and Crag.	Average for the Crag deposits	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	475m ² /ha with discharge into the local drainage ditches.	No data
		Good for the sands and gravel deposits.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
		Poor for the peat deposits.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Thorpe St Andrew	Alluvium.	Average	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the River Yare	No data
Filby	Sands and gravels and sandy clay within settlement.	Good for sand and gravel areas.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth	510m ² /ha with discharge into Filby Broad.	No data

Settlement	Soil types	Infiltration capacity	Appropriate SUDs components	Typical attenuation storage area*	Anglian water capacity and schedule for improvement
			to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
		Average for sandy clay.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Great Yarmouth (Port of Yarmouth Marina)	Silt and clay.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	480m ² /ha with discharge into River Bure.	No data
Ormesby	Silt deposits. Some sands and gravel deposits.	Poor for the silt deposits.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into Rollesby Broad or local IDB drainage ditches.	No data
		Good for the sand and gravel deposits.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Rollesby	Sand and gravel deposits. Some small deposits of silt.	Good for the sands and gravel areas.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the ISB drainage ditches.	No data
		Poor for the silts.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Stokesby	Sand and gravel and sandy clay within settlement.	Good for sands and gravels.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green	470m ² /ha with discharge into the River Bure or local drainage	No data

Settlement	Soil types	Infiltration capacity	Appropriate SUDs components	Typical attenuation storage area*	Anglian water capacity and schedule for improvement
			Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	ditches.	
		Average for sandy clay.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
St Olaves	Silt and clay.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	470m2/ha with discharge into the River Waveney.	No data
Thurne	Crag deposits.	Average.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	470m2/ha with discharge into the IDB drainage ditches or Thurne Staithe.	No data
	Silt deposits across the southern area within the settlement.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
West Somerton	Combination of silt and peat deposits within settlement.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m2/ha with discharge into IDB drainage ditches or Staithe.	No data
Dilham	Crag within settlement.	Average.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	460m2/ha with discharge into IDB drainage ditches or Tyler's Cut.	No data
Horning	Peat deposits.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	470m2/ha with discharge into the River Bure.	No data

Settlement	Soil types	Infiltration capacity	Appropriate SUDs components	Typical attenuation storage area*	Anglian water capacity and schedule for improvement
Ludham	Crag across settlement area.	Average.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	470m ² /ha with discharge into IDB drainage ditches.	No data
Neatishead	Crag across settlement area.	Average.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into IDB drainage ditches.	No data
Potter Heigham	Peat.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into IDB drainage ditches or River Thurne.	No data
Stalham Staithe	Mainly undivided silt and clay in the very north of the area with the remainder peat.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the Staithe.	No data
Smallburgh	Peat across settlement.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into IDB drainage ditches.	No data
Wroxham	Peat.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the River Bure.	No data
Norwich	Alluvium.	Average.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the River Yare.	No data

Settlement	Soil types	Infiltration capacity	Appropriate SUDs components	Typical attenuation storage area*	Anglian water capacity and schedule for improvement
Loddon	Peat.	Poor.	Filter Strips, Swales, Pervious Surface, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	430m ² /ha with discharge into the River Chet for LODD1 and discharge into local drainage ditches for LODD2.	No data
Whitlingham Country Park	Alluvium in west and chalk in east.	Average for alluvium.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table and proportion of soil types), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	510m ² /ha with discharge into the River Yare.	No data
		Good for chalk.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Beccles	Silt and clay and peat.	Poor.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	480m ² /ha with discharge into the River Waveney for BEC1. Discharge into AW drainage ditches for BEC2.	Limited capacity with improvements post 2010.
Bungay and Ditchingham Dam	Sand and gravel deposits together with peat deposits within settlement.	Good for sands and gravels.	Filter Strips, Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces, Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.	480m ² /ha with discharge into the River Waveney or IDB drainage ditches.	Limited capacity.
		Poor for peat.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/Wetlands and Detention Basins.		
Oulton Broad Sand	Good for sands and	Filter Strips,	470m ² /ha with discharge into Oulton Broad.	Limited capacity.	

Settlement	Soil types	Infiltration capacity	Appropriate SUDs components	Typical attenuation storage area*	Anglian water capacity and schedule for Improvement
and gravel deposits together with peat deposits within settlement	gravels.	Swales, Infiltration Basins (depending on depth to water table), Pervious Surfaces. Infiltration devices (depending on depth to water table), Green Roofs, Water Butts, Ponds/ Wetlands and Detention Basins.			
	Poor for peat.	Filter Strips, Swales, Pervious Surfaces, Green Roofs, Water Butts, Ponds/ Wetlands and Detention Basins.			

Based on Figure A3.2 of HR Wallingford document entitled "Use of SuDS in High Density Developments". Assumes 70% impermeable area and a 1 in 100 year return period (plus 10% climate change) storm event. Area is based on a 1m deep attenuation feature.

Appendix 5: Glossary and Abbreviations

AA	Appropriate Assessment	A requirement of the EU Habitats Directive to assess impacts of a land use plan against the conservation objectives of a European site.
AMR	Annual Monitoring Report	An annual report assessing the performance of the Local Planning Authority against the targets and milestones set in the previous year's Local Development Scheme.
DCLG	Department for Communities and Local Government	Government Department responsible for policy on planning and regional and local government. It is also responsible for the Government Offices for the Regions (e.g. GO-East).
DP	Development Plan	The Development Plan is made up of the documents that set out planning policy. These policies are used as the basis for forward planning and decision-making. The Development Plan comprises the Regional Spatial Strategy and Development Plan Documents.
DPD	Development Plan Document	Document that contains Local Planning Authority policy and that has been subjected to an independent public examination process. A DPD has statutory Development Plan status.
GO East	Government Office for the East of England	Regional Office for Government Departments including DCLG and DEFRA. Co-ordinates Regional Strategy and Local Development Frameworks.
LDD	Local Development Documents	The documents that set out the spatial planning strategy for the area. LDDs comprise Development Plan Documents that have statutory status, and Supplementary Planning Documents that have non-statutory status, but which are material considerations in decision making.
LDF	Local Development Framework	A portfolio of documents comprising the Local Development Scheme, Local Development Documents, Statement of Community Involvement and Annual Monitoring Report. Taken together, they set out the Local Authority's planning policies for an area, detail when and how planning documents will be produced, explain how the community and stakeholders will be involved in the process, and monitor the progress of the Authority against the targets it has set itself.
LDS	Local Development Scheme	Sets out the documents that will be prepared for the Local Development Framework and the timetable for their production.
ODPM	Office of the Deputy Prime Minister (now DCLG – see above)	Government Department responsible for policy on planning and regional and local government. It is also responsible for the Government Offices for the Regions (e.g. GO-East).
PPG	Planning Policy Guidance Notes	Topic-based documents setting out Government planning policy. Local policy must be in accordance with the advice in PPGs. PPGs are being replaced by PPSs.
PPS	Planning Policy Statements	Topic-based documents setting out Government planning policy. Local policy must be in accordance with the advice in PPSs. PPSs are replacing PPGs.
	Previously developed land (often referred to	Previously-developed land is that which is or was occupied by a permanent structure, including the

	as brownfield land)	<p>curtilage of the developed land and any associated fixed surface infrastructure.</p> <p>The definition includes defence buildings, but excludes:</p> <ul style="list-style-type: none"> – Land that is or has been occupied by agricultural or forestry buildings. – Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures. – Land in built-up areas such as parks, recreation grounds and allotments, which, although it may feature paths, pavilions and other buildings, has not been previously developed. – Land that was previously-developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings). <p>There is no presumption that land that is previously-developed is necessarily suitable for housing development nor that the whole of the curtilage should be developed.</p> <p style="text-align: right;"><i>Extract from PPS3: Housing</i></p>
RSS	Regional Spatial Strategy	Document that sets out the policies for development of the region. Policy in Local Development Frameworks must be in accordance with Regional Spatial Strategy policy. Prepared by the Regional Planning Body.
SA	Sustainability Appraisal	An assessment of the social, environmental, economic and resource effects of strategies and policies. The results of the assessment are set out in a Sustainability Appraisal Report. All strategies, proposals and policies in the Local Development Framework are subject to Sustainability Appraisal.
SCI	Statement of Community Involvement	Document setting out the mechanisms for involving the community and stakeholders in the preparation of Local Development Documents. The SCI is subject to independent public examination to ensure mechanisms are sufficient to achieve the aim of ensuring public involvement and participation.
SEA	Strategic Environmental Assessment	An assessment of the environmental impacts of strategies and policies. The results of the assessment are set out in a Sustainability Appraisal Report. All strategies, proposals and policies in the Local Development Framework are subject to Strategic Environmental Assessment.
SPD	Supplementary Planning Document	Document containing guidance or information to supplement and support policies or strategies in Development Plan Documents. An SPD is not subject to independent public examination and does not have statutory Development Plan status, but is a material consideration in decision-making.
The Act	Planning and Compulsory Purchase Act 2004	The Act that sets out and gives statutory force to the Local Development Framework legislation.