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Executive Summary

Wycombe District is situated to the north west of London in the county of Buckinghamshire. The District covers an area of approximately 32,500 hectares and has a population of approximately 172,000 (2011 Census), mainly centred in and around the town of High Wycombe.

The River Thames makes up the southern boundary of Wycombe District. The River Wye flows in a south-eastern direction from the centre of the District, close to West Wycombe, through High Wycombe, Wooburn Green and Bourne End, prior to its confluence with the River Thames. A relatively small number of properties within the District are at risk of flooding from the River Thames and Wye. These river valleys are well defined, and river flooding is not a significant issue to the large majority of the local community. Flooding of roads and properties occurs across the District from more localised sources including surface water, groundwater, sewers and blocked culverts.

Flooding can result not only in costly damage to property, but can also pose a risk to life and livelihood. The likelihood and consequences of flooding are predicted to increase with climate change. It is essential that future development is planned carefully, steering it away from areas that are most at risk from flooding, and ensuring that it does not exacerbate existing known flooding problems. This Strategic Flood Risk Assessment (SFRA) is an important step in this process, and provides one of the building blocks upon which the Council's planning policy and development management decisions will be made.

This Level 1 SFRA, and the supporting mapping, has been updated from the original published in 2008 and provides key information, including the following, which may affect existing and/or future development within the District:

- A summary and locations of past recorded flooding across the District from all sources including rivers, surface water, groundwater and sewers
- Mapping of areas that have a 'low', 'medium' and 'high' probability of fluvial (river) flooding, based on the EA's flood maps, and an indication of how these could change with climate change
- Mapping of Wycombe Critical Drainage Areas, which are likely to be most at risk of flooding from surface water, groundwater and ordinary watercourses and where sustainable drainage solutions should be a priority
- Development management and spatial planning recommendations, including advice on application of the sequential and exception tests and preparation of site-specific Flood Risk Assessments
- General advice on managing flood risk, including property protection, emergency planning (including maps showing key evacuation routes) and Sustainable Drainage Systems (SuDS).

Consultation has been undertaken with stakeholders (including neighbouring local authorities) to obtain the best available information on flooding and to seek consistency with relevant local and national policies and best practice. A review of relevant policy, including the National Planning Policy Framework, is provided.

Since the original Level 1 SFRA was published in 2008 national flood risk mapping has been updated, including the EA Flood Zone maps. National surface water flood risk mapping has been published by the EA to highlight areas at low, medium and high risk of surface water flooding. The EA has also published maps representing areas at risk of flooding from reservoirs. Flood risk planning policy has also been revised significantly since 2008, with the publication of the National Planning Policy

Framework (NPPF) in 2012 and accompanying National Planning Policy Guidance (NPPG) in 2014. The NPPF covers a range of planning issues, with the central focus being on sustainable development. These changes are discussed fully in the main body of this SFRA.

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Glossary

Term	Definition
Adaptation	Adjustments to natural or human systems in response to actual or expected climatic factors or their effects, including from changes in rainfall and rising temperatures, which moderate harm or exploit beneficial opportunities *(NPPF definition)*.
AEP	Annual Exceedance Probability e.g. 1% AEP is equivalent to 1% (1 in 100) probability of flooding occurring in any one year (or, on average, once in every 100 years)
BCC	Buckinghamshire County Council. Under the Flood & Water Management Act 2010 and the Flood Risk Regulations 2009, BCC is the Local Authority responsible for taking the lead on local flood risk management in its administrative area
Climate Change	Long term variations in global temperature and weather patterns caused by natural and human actions.
Core Strategy	Part of the Local Plan for Wycombe District, which sets the long-term vision and objectives for the area. It contains a set of strategic policies that are required to deliver the vision including the broad approach to development.
CLG	Department of Community and Local Government
Defra	Department of Environment, Food and Rural Affairs
Development	The carrying out of building, engineering, mining or other operations, in, on, over or under land, or the making of any material change in the use of a building or other land.
Development Plan	This includes adopted Local Plans and neighbourhood plans, and is defined in section 38 of the Planning and Compulsory Purchase Act 2004 *(NPPF definition)*.
Delivery and Site Allocations Plan (DSAP)	A spatial planning document within the Council's Local Plan, which set out policies for development and the use of land.
DG5 Register	A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding with an annual probability of 1 in 20 (5%) or more.
EA	Environment Agency
FRMS	Flood Risk Management Strategy
Flood & Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which (partly) is to clarify the legislative framework for managing surface water flood risk in England.
Flood Storage Area	Land which provides a function of flood conveyance and/or storage, either through natural processes, or by design
Flood Zone maps/ Flood Map for Planning (Rivers and Sea)	Nationally consistent delineation of Flood Zones 1 ('low probability'), 2 ('medium probability') and 3 ('high probability') of fluvial (and tidal) flooding, published on a quarterly basis by the Environment Agency. See below definitions of Flood Zones.
Flood Zone 1 Low Probability	NPPF Flood Zone, defined as areas outside of Zone 2 Medium Probability. This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). Flood zones refer to the probability of river and sea flooding, ignoring the presence of defences.
Flood Zone 2 Medium Probability	NPPF Flood Zone which comprises land assessed as having between a 1% (1 in 100) AEP and 0.1% (1 in 1,000) AEP of river flooding in any year. Flood zones refer to the probability of river and sea flooding, ignoring the presence of defences.

Term	Definition
Flood Zone 3a High Probability	NPPF Flood Zone which comprises land assessed as having a 1% AEP (1 in 100) or greater of river flooding (>1%) in any year. Flood zones refer to the probability of river and sea flooding, ignoring the presence of defences.
Flood Zone 3b (Functional Floodplain)	NPPF Flood Zone, defined as areas in which water *has* to flow or be stored in times of flood. This is usually assessed as having a 5% AEP (1 in 20) of river flooding in any year.
Formal Flood Management Asset	A feature or structure built and maintained specifically for the purpose of flood risk management
Green Infrastructure	A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities *(NPPF definition)*.
Habitable Room	A room used as living accommodation within a dwelling but excludes bathrooms, toilets, halls, landings or rooms that are only capable of being used for storage. All other rooms, such as kitchens, living rooms, bedrooms, utility rooms and studies are included in this definition.
Informal Flood Management Asset	A feature or structure that provides a flood defence function, however has not been built and/or maintained for this purpose (e.g. boundary wall)
Local Plan	The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community. In law this is described as the development plan documents adopted under the Planning and Compulsory Purchase Act 2004. Current core strategies or other planning policies, which under the regulations would be considered to be development plan documents, form part of the Local Plan. The term includes old policies which have been saved under the 2004 Act. *(NPPF definition)*
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers. N.B. Main River designation is not an indication of size, although it is often the case that they are larger than Ordinary Watercourses.
National Planning Policy Framework (NPPF)	National planning policy, published by the Government in March 2012. It replaces most of the previous Planning Policy Statements, including that regarding flood risk (PPS25).
National Planning Practice Guidance (NPPG)	Supporting guidance to the NPPF, published by the Government in March 2014 as an online resource, available at: (http://planningguidance.planningportal.gov.uk/). It replaces previously published Government guidance, including that regarding flood risk.
Neighbourhood Plans	A plan prepared by a Parish Council or Neighbourhood Forum for a particular neighbourhood area (made under the Planning and Compulsory Purchase Act 2004).
Ordinary Watercourse	All watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards. There are no IDBs in Wycombe District. Note that Ordinary Watercourse does not imply a “small” river, although it is often the case that Ordinary Watercourses are smaller than Main Rivers.
Permitted Development (PD)	Permitted Development rights allow for some minor development, such as certain sizes of building extension, without planning permission.
Planning Policy Statement (PPS)	A series of statements issued by the Government, setting out policy guidance on different aspects of planning. The majority of PPSs have now been replaced by the National Planning Policy Framework, including PPS25 regarding flood risk.

Term	Definition
PPS25	Planning Policy Statement 25: Development and Flood Risk – previous government planning policy regarding flood risk, which has now been replaced by the National Planning Policy Framework.
Previously Developed (Brownfield) Land	Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: 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 private residential gardens, parks, recreation grounds and allotments; and 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. *(NPPF definition)*
Residual Risk	A measure of the outstanding flood risks and uncertainties that have not been explicitly quantified and/or accounted for as part of the design process
Risk Management Agencies (RMA)	This is a collective term in this report for the relevant departments within Buckinghamshire County Council, Wycombe District Council and Environment Agency who record and investigate flood incidents
Strategic Environmental Assessment (SEA)	A procedure (set out in the Environmental Assessment of Plans and Programmes Regulations 2004) which requires the formal environmental assessment of certain plans and programmes which are likely to have significant effects on the environment. *(NPPF definition)*
Supplementary Planning Document (SPD)	Documents which add further detail to the policies in the Local Plan. They can be used to provide further guidance for development on specific sites, or on particular issues, such as design. Supplementary planning documents are capable of being a material consideration in planning decisions but are not part of the development plan. *(NPPF definition)* SPDs are not subject to independent examination before adoption by a local planning authority.
Sustainability Appraisal (SA)	Appraisal of plans, strategies and proposals to test them against broad sustainability objectives. The SEA forms part of the SA.
Sustainable Development	"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development, 1987).
Sustainable Drainage System (SuDS)	Term covers the whole range of sustainable approaches to surface drainage management. They are designed to control surface water run off close to where it falls and mimic natural drainage as closely as possible. *(Based on NPPF flood risk guidance text)*
uFMfSW	Updated Flood Map for Surface Water
WDC	Wycombe District Council
Wycombe Critical Drainage Areas (WCDA)	Areas which are likely to be most at risk of flooding from local sources (surface water, groundwater and ordinary watercourses) and where sustainable drainage solutions should be a priority. These areas have been termed "Wycombe Critical Drainage Areas" to differentiate them from Critical Drainage Areas that can be designated by the Environment Agency. The Environment Agency has not designated any Critical Drainage Areas in Wycombe District.

1 Introduction

1.1 Overview

Wycombe District is situated to the north west of London in the county of Buckinghamshire. The District covers an area of approximately 32,457 hectares and has a population of approximately 172,000 (2011 Census), mainly centred in and around the town of High Wycombe.

A relatively small proportion of the District is at risk of flooding from rivers. Notwithstanding this, flooding caused by groundwater, surface water runoff, ordinary watercourses and/or culvert blockage may result in localised flooding at any location, resulting in damage to property and severe disruption. Flooding has received widespread media attention in recent years and potential associated issues with the cost of and obtaining property insurance are well-known. Organisational responsibilities for managing flood risk have changed substantially in the last few years. The following provides definitions of the principal local sources of flooding referred to in this SFRA.

Local Flood Risk

Buckinghamshire County Council, Wycombe District Council and their partners have responsibilities for managing local flood risk, i.e. flood risk from sources other than Main Rivers, the sea and reservoirs, principally meaning surface runoff, groundwater and ordinary watercourses.

Surface runoff – rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer. Note that the term 'surface water' is used generically to refer to water on the surface and is often associated with periods of intense rainfall.

Groundwater – water which is below the surface of the ground and in direct contact with the ground or subsoil. It is most likely to occur in areas underlain by permeable rocks, called aquifers. These can be extensive, regional aquifers, such as the Chalk of the Chilterns, or may be more local sand or river gravels in valley bottoms underlain by less permeable rocks.

Ordinary watercourse – all watercourses that are not designated Main River, and which are the responsibility of local authorities

It is essential that future planning decisions do not inadvertently increase the potential risk of localised flooding and, where possible, seek to improve flood management. Specific recommendations have been provided within the SFRA to guide the design of future development accordingly.

The National Planning Policy Framework (NPPF) requires that local planning authorities prepare a Strategic Flood Risk Assessment (SFRA) in consultation with the Environment Agency (EA) and others. The primary purpose of the SFRA is to determine the variation in flood risk across the District, based upon data from a variety of sources. Robust information on flood risk is essential to inform and support the Council's revised flooding policies in its emerging Local Plan.

The previous Wycombe District Council Level 1 SFRA to inform the development of the Delivery and Site Allocations Plan for the district was published in August 2008. A Level 2 SFRA was published in December 2008, which assesses the flood risk at potential development sites in further detail.

Wycombe District Council (WDC) is currently updating its local planning policy. In this respect, the Level 1 SFRA has been updated as part of the evidence base that informs this process.

This report (and the supporting mapping) represents the Level 1 SFRA[1], and should be used by the Council to inform the application of the Sequential Test (see Section 5.3). Following the application of the Sequential Test, it may be necessary to develop a more detailed Level 2 SFRA[2] should it be shown that any further proposed allocations fall within a flood affected area of the District. The more detailed SFRA should consider the risk of flooding in greater detail within a local context to ensure that the site can be developed in a safe and sustainable manner.

1.2 SFRA Approach and Update

The primary objective of the Wycombe District SFRA is to inform the development and review of policies related to flood risk management and also policies for the allocation of land for future development, within the emerging Local Plan. The SFRA has a broader purpose, however, and in providing a robust depiction of flood risk across the District, it can:

- inform the development of Council policy that will underpin decision making within the District, particularly within areas that are affected by (and/or may adversely impact upon) flooding;
- assist the development management process by providing a more informed response to development proposals which may be affected by flooding, influencing the acceptability and design of future development within the District;
- help to identify and implement strategic solutions to flood risk, providing the basis for possible future flood attenuation works by a range of agencies with responsibility for flood risk management;
- support and inform the Council's emergency planning response to flooding.

Government provides no specific methodology for the SFRA process. Therefore, to meet these broader objectives, the SFRA has been developed in a pragmatic manner in close consultation with WDC, Buckinghamshire County Council (BCC) and the EA.

The knowledge of flood risk within the District is provided largely in the form of records of observed flooding and provided from a variety of sources. The Wycombe SFRA has gathered and built upon this existing knowledge, underpinning the delineation of the District into zones of 'high', 'medium' and 'low' probability of fluvial flooding, in accordance with the NPPF, and together with Wycombe Critical Drainage Areas. These zones have then been used to provide a robust and transparent evidence base for the development of flooding related policy, and the allocation of sites for new development as part of the Local Plan.

The original 2008 SFRA contained a series of questions to be addressed as part of the review process to identify the need for an SFRA update (see Section 6).

[1] The requirements of a Level 1 SFRA are further detailed in the 'Flood Risk and Coastal Change' section of the national Planning Practice Guidance available online at http://planningguidance.planningportal.gov.uk/

[2] The requirements of a Level 2 SFRA are further detailed in the 'Flood Risk and Coastal Change' section of the national Planning Practice Guidance available online at http://planningguidance.planningportal.gov.uk/

Responses to these questions, leading to this updated SFRA, are detailed in Table 1.

Table 1: SFRA Update Prompts

Prompt Question	Response Leading to This Update
Has any flooding been observed within the District since the previous review?	YES. Information on recent flooding has been requested from a number of consultees in January – March 2014 as part of the SFRA update.
Have any amendments to PPS25 or the Practice Companion Guide been released since the previous review?	YES. PPS25 and the Practice Companion Guide have been replaced by the NPPF and new accompanying National Planning Practice Guidance (NPPG). Although many of the key items covered by PPS25 have been carried forward into the NPPF, some re-wording has occurred, such that the recommendations of the previous SFRA do not fully represent national planning policy. The latest national policy context is contained in Section 2.
Has the EA issued any amendments to their flood risk mapping and/or standing guidance since the previous policy review?	YES. Since 2008 the EA have published the Flood Map for Surface Water, which was further updated (Risk of Flooding from Surface Water) in October 2013. This provides greater detail than previously available of locations likely to experience surface water flooding. The EA issues updates to their published fluvial flood risk mapping, following detailed hydraulic modelling work; this was last updated in August 2014 following hydraulic modelling at Glory Park in Wooburn.
Has the implementation of the SFRA within the spatial planning and/or development control functions of the Council raised any particular issues or concerns that need to be reviewed as part of the SFRA process?	None have been reported. However, the spatial planning team recognised that the SFRA was likely to be out of date in relation to both policy and flooding data (and so the resulting mapping) and that an updated SFRA was required in order to adequately support the production of the new Local Plan.

1.3 Consultation and Co-operation

Consultation and co-operation has formed a key part of the development of the updated Wycombe SFRA. This is particularly important in light of the 'Duty to Cooperate' brought in by the Localism Act 2011 (Section 110). In addition, paragraph 157 of the NPPF states that Local Plans should *"be based on co-operation with neighbouring authorities, public, voluntary and private sector organisations"*. One of the roles of this SFRA is to support the production of the emerging Local Plan.

The National Planning Practice Guidance (NPPG) (2014) states that the following organisations / roles should be involved in preparing the SFRA:

- Environment Agency;
- Lead Local Flood Authorities (BCC);
- Emergency response (WDC and BCC);
- Drainage authority (role within WDC/BCC under the Land Drainage Act 1991); and
- Internal drainage boards (none operating in Wycombe District).

The NPPG also requires consultation with Thames Water as the sewerage undertakers so that the SFRA *'takes account of any specific capacity problems and of the undertaker's drainage area plans'*. Thames Water has provided information on where they have received reports of flooding.

The draft of this SFRA has been circulated to relevant teams within Wycombe District Council (WDC), to Buckinghamshire County Council (BCC) as the Lead Local Flood Authority and to the EA in April 2014.

2 Policy Framework

2.1 Introduction

This Section provides a brief overview of the strategy and policy context relevant to flood risk in Wycombe District.

The success of the SFRA is heavily dependent upon the ability of the Council to implement the recommendations put forward for future sustainable flood risk management, both with respect to planning policies and development management recommendations (refer to Section 5). The NPPF provides guidance and direction to local planning authorities. Ultimately however, it is the responsibility of the Council to establish 'sound' planning policies that will ensure future sustainability with respect to flood risk.

The policy framework informing the development of this Level 1 SFRA has changed significantly since it was first published in August 2008. At the national level, there have been several updates to Planning Policy Statement 25 (PPS25) (regarding flood risk) and its supporting guidance, all of which has then been replaced with the National Planning Policy Framework (NPPF) in 2012 and accompanying National Planning Practice Guidance (NPPG) in 2014. At the regional level, the South East Plan has now been repealed by the Government. At the local level, County Councils and District Councils have been given new responsibilities through the Flood & Water Management Act 2010 with regard to managing local flood risk and best practice and knowledge with regard to the production of SFRAs continues to evolve.

2.2 National Planning Policy

National planning policy is set out in the NPPF, which was published by the Government in March 2012. It forms a more succinct replacement for numerous topic-specific Planning Policy Statements (PPSs), including PPS25 on flood risk. The NPPF is accompanied by online National Planning Practice Guidance (NPPG)[3], first published in March 2014, which provides further guidance on specific issues, including flood risk, and replaces all previously published national planning guidance.

The NPPF covers a full range of planning issues drawing on the central issue of sustainable development. Central themes include the re-use of previously developed land of low environmental value, promoting economic growth and high quality design, and transitioning to a low carbon future, including taking full account of flood risk.

The NPPF underpins the process by which local planning authorities are to account for flood risk as an integral part of the planning process. The overarching aims set out by the NPPF for the management of flood risk at a planning authority level are encapsulated in Paragraph 100 of the document:

"Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- *applying the Sequential Test;*
- *if necessary, applying the Exceptions Test;*

[3] http://planningguidance.planningportal.gov.uk/

- *safeguarding land from development that is required for current and future flood management;*
- *using opportunities offered by new development to reduce the causes and impacts of flooding; and*
- *where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations."*

The Sequential Test and Exception Test are further explained in Section 5.3.

These aims effectively set the scope for the specific outcomes of the SFRA process. The SFRA in turn then informs planning and development management decisions to ensure that the aims set out above can be achieved.

The NPPF states that *'a sustainability appraisal which meets the requirements of the European Directive on strategic environmental assessment should be an integral part of the plan preparation process, and should consider all the likely significant effects on the environment, economic and social factors'* (paragraph 165). The purpose of Sustainability Appraisal (SA) is to promote sustainable development through better integration of sustainability considerations in the preparation and adoption of plans. The SA developed in conjunction with the new Wycombe District Local Plan will be informed by the information and recommendations contained in this updated SFRA.

It is important to reiterate that the NPPF covers a range of planning issues – not just flood risk. The formulation of Council policy and the allocation of land for future development must also meet the requirements of other elements of the NPPF, including (for example) with regard to environmental protection, housing and economic growth. The provision of sustainable development requires the balancing of a range of social, economic and environmental factors.

The SFRA aims to assist in this process through the provision of a clear and robust evidence base upon which informed decisions can be made.

2.3 Adopted Local Planning Policy

Local planning policy in Wycombe District is currently comprised of three key documents:

- the Core Strategy (2008);
- the Delivery and Site Allocations Plan (2013); and
- the remaining 'saved' policies from the Local Plan (2004).

WDC are currently consulting on policy options as an early stage in the development of a new Local Plan to replace to Core Strategy and remaining 'saved' policies from the 2004 Local Plan. The Delivery and Site Allocations Plan (2013), the development of which was informed by the previous 2008 SFRA, will remain in place. The updated EA Flood Zone mapping has been checked, and remains unchanged for all allocation sites and therefore the previous 2008 SFRA review of sites remains valid. It should be noted that some of the sites (RES35, PBA7, MU20, GBA18 and GBA21) are near to Wycombe Critical Drainage Areas (as redefined in 2014). Sustainable drainage solutions will need to be carefully implemented.

Current local planning policy as relevant to flooding is set out below.

2.3.1 Adopted Wycombe Core Strategy

The Core Strategy, covering the period to 2026, was adopted in July 2008. It is due to be replaced by the emerging Local Plan. The Core Strategy sets out the overall approach to development in the District.

Policy CS 2 (Main Principles for the Location of Development) seeks to focus new development in High Wycombe (including the adjoining settlements of Downley, Hazlemere / Widmer End / Tylers Green, Loudwater and Wooburn Green), with the emphasis on regenerating and transforming key areas of change at High Wycombe, and the pre-use of previously developed land. The policy does, however, state that *'greenfield land at the reserve locations may be allocated as and when necessary to achieve secure supplies of land to meet the development needs of the District'*. Development on a smaller scale is envisaged at Marlow, Princes Risborough and the other smaller settlements. In terms of residential development, **Policy CS 12** seeks the provision of 8050 net additional dwellings (402.5 net additional dwellings per annum) in the District in the period 2006-2026, split 90% to that part of Wycombe in the Western Corridor and Blackwater Valley sub-region and 10% to that part outside it.

In relation to flooding, the key policy is **Policy CS 18 (Waste/Natural Resources and Pollution)**, which requires proposals for new development to *'avoid increasing (and where possible reduce) risks of or from flooding, including fluvial flooding, sewer flooding, surface water flooding, and groundwater flooding'*. The policy also requires development proposals to *'minimise off-site water discharge during operation by employing measures including sustainable urban drainage'*.

Several policies within the Core Strategy seek the provision of infrastructure in association with new development, including green infrastructure **(Policy CS 17 – Environmental Assets)**; however, there is no specific reference to flood management infrastructure.

In relation to area-specific policies, **Policy CS 5 relating to Marlow** seeks to protect the floodplain around the town from development.

2.3.2 Adopted Wycombe Delivery and Site Allocations Plan

The Delivery and Site Allocations Plan (DSAP) was adopted in July 2013. The document sets out proposals for the main town centres in the District and some detailed policies for managing development. It is proposed that the DSAP will remain in force when the new Local Plan is adopted and will not be replaced by that document. The development of the DSAP was informed by the previous 2008 SFRA.

The key policy with regard to flood risk is **Policy DM17 (Planning for Flood Risk Management)**. This states that:

1) *Developments that are in Flood Risk Zones 2 or 3 (as identified on the Policies Map) and have not been allocated in a Local Plan document by the Council will only be permitted where it has been demonstrated that:*

    a) *There are no other sites available in a lower flood risk zone as a result of a sequential assessment including an assessment against allocations in this (or any subsequent) Local Plan document; and where appropriate*

    b) *That the requirements of the exceptions test as set out in national policy have been met.*

In such circumstances the requirements of 2a) to 2g) below will also need to be fulfilled.

2) Applications on allocated sites greater than 1ha or that are in Flood Risk Zones 2 or 3 will need to be supported by:

a) A flood risk assessment which demonstrates that the most appropriate layout of development on site in terms of flood risk has been applied; and

b) Demonstration that a sequential approach has been taken within the site, directing the most vulnerable uses to the areas of lowest flood risk; and

c) Demonstration that resilient and resistant construction methods for managing residual risk and delivering an overall reduction in flood risk have been assessed; and

d) The provision of space for flood water storage through the use of open space or areas above ground (where appropriate).

e) Demonstration that flood risk is not increased elsewhere and where possible reduced,

f) Demonstration that all forms of flooding are taken into account including groundwater and surface water flooding, and

g) Demonstration that Sustainable Urban Drainage Systems (SUDS) are incorporated, where feasible.

Flood Zones 2 and 3 are identified on the Policies Map although developers should consult with the Environment Agency for any updates to it.

Identification of additional areas of risk may trigger a requirement for a Flood Risk Assessment.

'Areas of flood risk', noted to be those in Flood Zones 2 and 3 are shown on the **DSAP inset maps 20a-g and 21a-f**; these maps are not affected by any updates in flood data for the district obtained for the production of this SFRA. The accompanying legend to the maps highlights the importance of checking with the EA for the latest maps as they are regularly updated.

Policy DM15 seeks the protection and enhancement of river and stream corridors. It states that:

'Planning permission will only be granted for development proposals which would not have an adverse impact on the functions … of any watercourse and its associated corridor'.

The policy further states that:

'Opportunities for de-culverting of watercourses should be actively pursued. Planning permission will only be granted for proposals which do not involve the culverting of watercourses and which do not prejudice future opportunities for de-

culverting (including on sites specifically identified in High Wycombe town centre)'.

Paragraph 6.92 of the supporting text to the policy highlights that the de-culverting of the River Wye is 'part of the long-term vision High Wycombe town centre'. It further states that three opportunity areas for improving the River Wye corridor through the town centre have been identified in the plan:

- Improvements to the existing river channel at **Baker Street (Policy HWTC18)**;
- De-culverting and implementation of an exposed river corridor at **Oxford Road roundabout (Policy HWTC16)**; and
- De-culverting and implementation of an extended an improved river corridor at **Swan Frontage (Policy HWTC10)**.

In addition, as noted in **paragraph 6.93**, **Policies HWTC10 regarding Swan Frontage and HWTC16 regarding Oxford Road roundabout** specifically state that any proposals coming forward for those sites must demonstrate that they do not prejudice the future de-culverting of the River Wye.

The River Wye Culvert and the Hughenden Culvert are shown on the **inset maps** that accompany the DSAP.

As shown above, **Policy DM17 (Planning for Flood Risk Management)** seeks 'the provision of space for flood water storage through the use of open space or areas above ground (where appropriate)'. **Policies DM11 (Green Networks and Infrastructure), DM12 (Green Spaces), DM15 (Protection and Enhancement of River and Stream Corridors) and DM16 (Open Spaces in New Development)** also seek to protect and enhance existing, or to create new, green infrastructure and green spaces, which can be beneficial for flood water storage although this is not recognised in the policy wording.

With regard to infrastructure provision more generally and the use of CIL and planning obligations, **Policy DM19 (Infrastructure and Delivery)** states that:

'Where development will create a need to provide additional or improved infrastructure … , developers will be expected to make such provision directly, including through planning obligations and/or through financial contributions to the Wycombe Community Infrastructure Levy'.

The policy further states that key infrastructure to support the future sustainable development of the District are set out in the Wycombe Infrastructure Delivery Plan. Flood defences and green infrastructure, including open spaces, are included in the latest **Wycombe Infrastructure Delivery Plan (May 2012)**. Green infrastructure and open space are also included within the latest list[4] of infrastructure for which **Community Infrastructure Levy (CIL)** funding can be used. Many of the infrastructure schemes listed also have flood risk management benefits, as highlighted in the High Wycombe Surface Water Management Plan, although this is not acknowledged in the CIL document.

Open spaces, which could potentially alleviate flood risk associated with new development, are also specifically listed in the **Planning Obligations Supplementary Planning Document (SPD) (2013)** as a type of infrastructure that could be secured through the use of planning obligations. The document further

[4] November 2012 list.

states that types of infrastructure specifically listed in the SPD do not form an exhaustive list and that 'items will be considered on a case by case basis and in line with any new evidence, guidance or policy that becomes available' (page 14). The SPD states that 'negotiations in relation to the specific planning obligations which are necessary to make a development acceptable will take place on a case by case basis' and that 'a variety of planning obligations may be necessary dependent on the specific development and its impact on the local area' (page 14).

2.3.3 Saved Polices from the Adopted Wycombe Local Plan

The Wycombe District Local Plan was adopted in January 2004, setting out the Council's policies and proposals for development and land use in the District over the plan period up until 2011. In 2007, many of its policies were saved and their applicability extended until replaced by new local planning policy; some were subsequently replaced by policy contained in the adopted Core Strategy (2008) and the adopted Delivery and Site Allocations Plan (2013). A consolidated Local Plan containing the remaining policies in force from the original 2004 document was published by WDC in September 2013. None of the remaining policies in force are of direct relevance to flood risk. The remaining policies will be replaced by policies contained in the emerging new Local Plan.

2.4 Emerging Local Planning Policy – Wycombe District Local Plan

In response to changes at a national level the Council is preparing the new Wycombe District Local Plan. The new Local Plan will replace the adopted Core Strategy (2008) and saved policies of the existing Local Plan (2004), and it will sit alongside the Delivery and Site Allocations Plan, once adopted.

The new Wycombe District Local Plan will:

- set housing targets for the district and address strategic housing issues including housing and mixed use allocations;
- include policies and proposals for the protection and provision of employment land;
- identify the infrastructure required to support new development;
- include site specific proposals for local communities; and
- set detailed policies to manage development.

Further information on the new Wycombe Local Plan can be found on the Council's website at www.wycombe.gov.uk/newlocalplan

2.5 Buckinghamshire County Council Strategy for Management of Local Flood Risk

In order to provide better and more comprehensive management of flood risk, the Flood & Water Management Act 2010 has assigned new responsibilities to local authorities. As a result, Buckinghamshire County Council (BCC) and the district councils within Buckinghamshire (Chiltern, Aylesbury Vale, South Bucks and Wycombe) work in partnership with the EA, water companies and others to manage various aspects of flood risk.

BCC published and adopted its Strategy for the Management of Local Flood Risk in May 2013[5]. The key aim of the Strategy is to reduce the likelihood and detrimental consequences of flooding in a way which does not compromise the interconnected

[5] Available at: www.buckscc.gov.uk/flooding

needs of the economy, society and environment in the future. Further aims of implementing the Strategy are to:

- Clarify the roles of the key Partners which have responsibilities in the four Districts. However, the Strategy recognises that the public and, in particular, property and land owners also have important roles to play;
- Improve cooperative working between Partners, including across administrative boundaries, through appropriate sharing of information and best practice and enabling the best placed organisations to be involved;
- Improve communication of clear information regarding local flood risk and appropriate responses and involve the public and stakeholders in taking action and making decisions;
- Through adopting best practice and closer working within council and Partner disciplines, seek flood management responses which can also improve the natural habitat and the social environment and thereby provide multiple benefits;
- Identify gaps where better understanding of the mechanisms of flooding and appropriate responses is required; and
- Facilitate a strategic funding plan so that funding applications can be submitted for priority areas and potential contributors to location-specific actions can be identified.

The Strategy contains three levels of actions which will form the basis for its implementation:

- Ongoing functions which will continue to be undertaken. These include, for example, inspecting and undertaking maintenance of highway drainage and ordinary watercourses on council owned land;
- New functions to be undertaken which have been introduced by the Strategy. These include, for example, sharing of information and investigating certain flood incidents; and
- Actions to pursue works at specific locations. These are detailed in an Action Plan which accompanies the Strategy and which will be fully reviewed annually to remove completed actions and include new ones.

Care has been taken to ensure that this updated SFRA is consistent with the policies proposed in the Strategy.

3 Data Collection and Methodology

3.1 Overview

This Section details the data used to develop this SFRA, its sources, and the methodology used to analyse the flood risk.

Information regarding flood risk is held within the District in the following forms (but not limited to):

- experience of council engineers and staff;
- records and information on past flooding from all sources (primarily river, surface water, groundwater and sewers);
- EA Fluvial Flood Zone and Risk of Flooding from Surface Water maps showing areas most susceptible to local flooding; and
- BCC's Preliminary Flood Risk Assessment.

This core dataset has informed the SFRA process. The application of this data has facilitated the delineation of zones of 'high', 'medium' and 'low' probability of fluvial flooding, Wycombe Critical Drainage Areas and the formulation of planning and development management recommendations. A summary of the findings based on the analysis is provided in Section 4.

An overview of the core datasets, including their source and their applicability to the SFRA process, is outlined here. It is important to note that datasets which have been collected and presented at the District scale can inform, but are not a substitute for, site specific investigation of topographic levels, geology, records of past flood etc. It is also noted that information on flood risk is continually changing as new flooding events occur and further modelling is undertaken. Therefore, whilst the datasets used here are the best available at the time of publication, the SFRA should be reviewed periodically (see Section 6 for a checklist), with WDC contacted in the meantime for the latest information.

3.2 Information on Past Flooding

The information on past flooding collated for the 2008 SFRA, the Preliminary Flood Risk Assessment and the Surface Water Management Plan (SWMP) for Chesham and High Wycombe has been updated through consultation with the following bodies to identify those areas within the District that are known to have been exposed to flooding in recent years:

- Wycombe District Council;
- Buckinghamshire County Council;
- Environment Agency; and
- Thames Water.

Thames Water provided information on flooding resulting from surcharge and blockage of surface, combined and foul water sewers. This data, known as DG5 flooding data, is subject to confidentiality issues and specific incidences where individual properties were affected cannot be divulged. However, Thames Water is allowed to confirm how many properties have been subject to DG5 flooding per postcode area (the first four digits of the postcode are provided only). The data is shown in Figure 7 (Incidents of Sewer Flooding). The number of recorded incidents has significantly increased since 2008 SFRA, particularly in the north of Wycombe District, in the centre and in the south, in Marlow, Little Marlow and Bourne End. The

cause of this increase is unconfirmed however it could be related to periods of intense rainfall experienced since 2008, resulting in surcharging of the public sewer network.

3.3 Delineation of the Fluvial Flood Zones

The risk of an event (in this instance a flood event) is a function of both the probability that the flood will occur, and the consequence to the community as a direct result of the flood. This SFRA endeavours to assess the likelihood (or probability) of fluvial (river) flooding, categorising the District into zones of low, medium and high probability. It then provides recommendations to assist the Council to manage the consequence of flooding in a sustainable manner, for example through the restriction of vulnerable development in areas of highest flood risk.

To this end, a key outcome of the SFRA process is the establishment of the Sequential Test in accordance with the NPPF, which will assist the Council to direct new development to areas with the lowest probability of flooding. To inform the planning process, it is necessary to review flood risk across the District, categorising the area in terms of the likelihood (or probability) that flooding will occur. The District has been delineated into the fluvial Flood Zones summarised below, in line with the NPPF. The delineation of Zones 1 (low), 2 (medium) and 3a (high) is based on the EA's Flood Zone Maps, whereas Zone 3b (functional floodplain) has been derived separately as a combination of detailed hydraulic modelling provided by the EA and modelling carried out by Jacobs as part of the 2008 SFRA.

The EA's Flood Map for Wycombe District, available on its website[6], shows the natural floodplain, ignoring the presence of defences, and therefore areas potentially at risk of flooding from rivers. The information used for this SFRA was updated in August 2014. The Flood Map shows the area that is susceptible to a 1 in 100 (1% annual exceedance probability; AEP) chance of flooding from rivers in any one year. It also indicates the area that has a 1 in 1,000 (0.1% AEP) chance of flooding from rivers in any given year, which is known as the Extreme Flood Outline. The Flood Map outlines for the District have been produced from a combination of a national generalised computer model and available historic flood event outlines. The EA's knowledge of the floodplain is continually being improved by a variety of studies, detailed models, data from river flow and level monitoring stations, and actual flooding information. The EA has an ongoing programme of improvement, and updates are made on a quarterly basis.

3.3.1 Delineation of Zone 1 Low Probability

Zone 1 Low Probability comprises land assessed as having a less than 1 in 1,000 (<0.1% AEP) chance of river flooding. For SFRA purposes, this incorporates all land that is outside of the Zone 2 and Zone 3 flood risk areas (as defined below and shaded on Figures 1 - 4). Therefore, as Zone 2 has changed, as described in 3.3.2 below, then Zone 1 has also been modified when compared with the 2008 SFRA.

3.3.2 Delineation of Zone 2 Medium Probability

Zone 2 Medium Probability comprises land assessed as having between a 1 in 100 (1% AEP) and 1 in 1,000 (0.1% AEP) chance of river flooding (1% – 0.1%) in any year. In other words, land situated between Zones 1 and 3a. Zone 2 Medium Probability is based on the most recent EA Flood Zone Map.

Compared with the map used in the 2008 SFRA, the August 2014 data shows a slightly larger Zone 2 flood extent delineated along most of the River Wye through

[6] http://www.environment-agency.gov.uk/

High Wycombe, with a lesser extent at the confluence with the Hughenden Stream. The flood extent has also reduced on the River Wye in Wooburn Green, between Boundary Road, Watery Lane and the River Wye,

The flood extent on the River Thames has also slightly increased adjacent to Marlow, with a small reduction at Greenlands, by the junction with A4155 and Benhams Lane. The flood extent has also slightly extended on the tributaries of the River Thame, in the northwest corner of the district, just west of Monks Risborough.

It should be noted that none of these changes occur within the allocated development sites in the Delivery and Site Allocations Plan (DSAP).

3.3.3 Delineation of Zone 3a High Probability

Zone 3a High Probability comprises land assessed as having a 1 in 100 or greater (>1% AEP) chance of river flooding in any year. Zone 3a High Probability is based on the most recent EA Flood Zone Map. The August 2014 Zone 3a extent has decreased slightly along the River Wye through High Wycombe, especially in the fields to the east of Millbrook School and Nursery, the western side of The Rye (flood storage area) and Boundary Road Industrial Estate.

There are also notable reductions of the River Thames Zone 3a flood extent through Little Marlow and Marlow, especially along the west side of Fieldhouse Lane and the block consisting of Station Road/Mill Road/Lock Road, as well as within the open space to the southwest of Marlow. There is a slight increase in the extent at both Remenham and Mille End (on the A1455), when compared with the 2008 mapping.

It should be noted that none of these changes occur within the allocated development sites.

3.3.4 Delineation of Zone 3b Functional Floodplain

Zone 3b Functional Floodplain is defined in Table 1 of the National Planning Practice Guidance (NPPG) as those areas in which 'water *has* to flow or be stored in times of flood'. The definition of functional floodplain remains somewhat open to subjective interpretation, but the NPPG requires that the boundaries shown in the SFRA should be as agreed with the EA. The NPPG states that '*the identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. However, land which would naturally flood with an annual probability of 1 in 20 [annual chance] (5%) or greater in any year, or is designed to flood (such as a flood alleviation scheme) in an extreme [1 in 1000 annual chance] (0.1% annual probability) flood, should provide a starting point for consideration and discussions to identify the functional floodplain'* (NPPG, SFRA guidance, paragraph 015). The guidance (paragraph 015) further clarifies that:

'The area identified as functional floodplain should take into account the effects of defences and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as function floodplain.'

In addition, the guidance states that areas intended to flood, such as upstream flood storage areas (such as The Rye), should also be identified as functional floodplain. Currently The Rye is the only classified flood storage area in the Wycombe District. The EA has planning permission to construct additional areas in Marlow, a scheme which currently awaits funding.

Detailed modelled flood extents for the 5% (1 in 20) AEP chance design event, representing Flood Zone 3b, have been obtained from the EA for the River Wye (2001) and most of the River Thames (2007) (with the exception of the reach west of Danesfield) along the southern boundary of Wycombe District.

Some watercourses in the District have not been recently modelled in detail, as they are not considered a priority, and therefore do not have a Flood Zone 3b flood extent. This includes Lyde, Bonny and Elm Brooks (tributaries of the River Thame in the north of the District), the Hambleden Stream and an approximately 7.5km stretch of the River Thames in the southwest corner of the District. These areas of Flood Zone 3b were defined using a simple hydraulic assessment based upon Manning's Equation and using cross-sections through a coarse Digital Elevation Model (provided by Wycombe District Council) as part of the 2008 SFRA.

Any new development within Flood Zone 3b is likely to measurably impact upon the existing flooding regime, increasing the severity and frequency of flooding elsewhere.

3.3.5 Dry Islands

'Dry Islands' are locations that, whilst above the flood level, will be surrounded by floodwater during a flood event. Dry Islands can be inferred from the flood maps in Figures 1 – 4. For this reason, development proposals in these areas should be accompanied by a flood evacuation plan suitable for the NPPF category into which the surrounding area falls. For example, a development proposal on a dry island site that is categorised as Zone 1 Low Probability, but wholly surrounded by the 1% (1 in 100) AEP floodplain, should be accompanied by an flood evacuation plan appropriate to Zone 3a High Probability. Additionally the EA would expect to see in their review of a site-specific FRA, 'very-low' flood Hazard along the access route in accordance with FD2320[7].

3.3.6 Climate Change

There is clear scientific evidence that global climate change is happening now and cannot be ignored. Further information is provided in Section 4.4. Changes in the extent of inundation due to climate change may be negligible in well-defined valleys, but could be dramatic in flat areas. Changes in the depth of flooding under the same allowance will increase the probability of a given flood. This means that a site currently located within a lower risk zone (e.g. Zone 2) could in the future be re-classified as lying within a high risk zone (e.g. Zone 3a). This in turn could have implications for the type of development that is appropriate according to its vulnerability to flooding.

In Wycombe District the only available modelling representing an allowance for climate change is on the River Thames between Harleyford Manor in the west (close to Medmenham) and Hedsor in the east (Figure 4). The remaining stretch of the River Thames and watercourses in Wycombe have no available climate change modelling.

In the absence of any further detailed flood modelling to define the impact of climate change on Flood Zones in this SFRA, the following interpretation of the mapping should be made:

- the anticipated extent of Zone 3b (functional floodplain) at the end of this century may be approximated by the current Zone 3a (the 1% AEP flood);
- the anticipated extent of Zone 3a (the 1% AEP flood) at the end of this century may be approximated by the current Zone 2 (the 0.1% AEP flood); and

[7] Flood Risk Assessment Guidance for New Development Phase 2 R&D Technical Report FD2320/TR2, Defra, October 2005

- the anticipated extend of Zone 2 (1% - 0.1% AEP flood) at the end of the century should be determined by analysing local ground levels to establish which areas currently in Zone 1 would be re-classified as Zone 2.

3.4 Delineation of Wycombe Critical Drainage Areas

Based on the updated Flood Maps for Surface Water (uFMfSW) finalised in November 2013 (refer to Figures 8 to 11), a number of residential and commercial properties in Wycombe could be at risk of flooding from local sources (principally surface runoff generated by intense rainfall, groundwater and ordinary watercourses). In areas susceptible to local flooding, the volume of runoff and sufficiency of the drainage, ordinary watercourse and sewer systems are critical to determining the degree of flood risk. For this reason, this SFRA has delineated "Wycombe Critical Drainage Areas" (WCDA) across Wycombe in Figures 18 to 21. The EA has the ability to delineate Critical Drainage Areas (CDA) to cover such areas, but as is the case across much of the country, has not currently done so within the District. Although WCDA and CDA would both cover areas with critical drainage problems, the variation in name has been used to differentiate between those areas delineated by Wycombe's SFRA and those which may be notified by the EA.

In the 2008 SFRA, indicative overland flowpaths and areas of ponding were identified using an automatic tool in ArcGIS, but no further significance was attached to them. Guidance was provided for proposed developments, and that WDC should take responsibility for ensuring flood risk is addressed, in these areas.

Since the 2008 SFRA, the BCC Preliminary Flood Risk Assessment agreed that the EA's Risk of Flooding from Surface Water map best represents those areas which are susceptible to local flooding. In other words, the mapping identifies areas where flooding from surface water, groundwater and ordinary watercourses is likely to be most severe. High Risk is defined as the 3.3% (1 in 30) AEP of surface water flooding occurring; similarly Medium Risk is defined as between 3.3 and 1% (1 in 100) AEP of surface water flooding and Low Risk is the 1% to 0.1% (1 in 1000) AEP.

The outline of the Medium Risk of Flooding from Surface Water is used in this SFRA as a basis to define WCDA in Wycombe District (refer to Figures 18 to 21). Because the WCDA represents flood risk from different sources, no indication of the likely duration of flooding is given. However, it is emphasised that groundwater flooding from the underlying Chalk can last a number of weeks and can cause substantial damage and disruption because of the long duration, such as that experienced on Hughenden Stream, in Radnage and the Lower Hughenden Valley, as well as the Hambleden Stream and Hambleden valley in Winter 2013-14.

3.5 Delineation of Dam Breach

A small number of reservoirs and ponds have been identified within the District including the lake in West Wycombe Park, those at Little Marlow and lakes adjacent to Copgrove Wood (southwest of Stokenchurch). Of these, only the lake in West Wycombe Park falls under the Reservoirs Act, and is therefore managed in accordance with the Flood & Water Management Act 2010 which amended the Reservoirs Act 1975.

Following a recommendation in the Pitt Review, the EA has provided Reservoir Flood Maps for those reservoirs which it regulates under the Reservoirs Act 1975. These show the likely extent of flooding resulting from a dam breach which could be caused by extreme rainfall or floods, as well as structural failure. The data obtained from the EA website for this SFRA shows the extent of flooding resulting from a

breach of the West Wycombe Park's lake (Figure 4.3.4). The extent of flooding from a breach of the Lake is predicted to be similar to Flood Zone 2 along the River Wye and The Dyke down through the centre of High Wycombe until it reaches Wycombe Marsh where the water is retained within the watercourses. However, the onset of flooding could potentially be far more rapid and pose a risk to life. No corresponding information is available for the other lakes in the District.

3.6 Flood Management Structures and Features

In the complex rural and built environments in which we live, many natural and manmade structures and features can affect the routing of flood waters. Some of these may have been specifically constructed (i.e. known as 'formal') for the purposes of managing water flow and reducing flooding (e.g. flood embankments, culverts and sluices) and are maintained by their respective owner. This could be the EA, Local Authority, or an individual. The EA have confirmed they have no formal defences in Wycombe District, and BCC and WDC have no record of any defences either.

Other features may have been built for a different purpose other than defence (i.e. known as 'informal') but which also affect the spread of floods (e.g. buildings, garden walls, railway embankments) but are not maintained for this specific purpose. The structures recognised as formal flood defence features have not been included in modelling used to generate the flood maps in this SFRA.

It should be noted that the EA has no statutory responsibility to maintain Main Rivers (and/or flood management assets) within the UK. This remains the responsibility of the riparian land owner. The EA retains 'permissive powers' however, and using these powers may carry out a programme of monitoring and maintenance.

Assets that are defined by the BCC Asset Register as having a significant impact upon flood risk (e.g. an earth embankment or significantly positioned wall) should be carefully reviewed in a local context as part of the detailed site based Flood Risk Assessment (see Section 5). The Asset Register can be accessed on the BCC website at www.buckscc.gov.uk/environment/flooding/strategic-flood-management/asset-register/

Within protected areas there will always be a residual risk of flooding. This may be due to an extreme event that exceeds the design of the asset, changing climatic conditions that increases the frequency and severity of flooding, a structural failure, or flooding behind the asset e.g. due to elevated groundwater levels. Therefore, mitigation measures such as those suggested in Section 5.6 may still be required. It is incumbent on both the Council and developers to ensure that the level and integrity of flood management assets provided within new developments can be assured for the lifetime of the developments.

3.7 Topography & Geology

Broad information on topographic levels and underlying superficial and solid geology is available for the District, and is presented in Figures 10 and 11. Whilst this information could be used to provide an indication of, for example, likely flow direction or suitability of the ground for different SuDS techniques, the data will be too coarse to be used at the scale of an individual site. Therefore, detailed topographic survey and/or infiltration tests are recommended to identify the local characteristics of a site where development is proposed. The EA recommends that infiltration tests are undertaken in accordance with the Building Research Establishment's Soakaway design Digest 365.

3.8 Chesham and High Wycombe Surface Water Management Plan

Surface Water Management Plans identify sustainable responses to manage local flooding and contain Action Plans that provide an evidence base for future decisions. Based on national mapping, Chesham and High Wycombe were identified as particularly susceptible to local flooding and a SWMP has been prepared using funding from Defra[8] to assess both areas. The SWMP study, which focused on the urban areas of Chesham and High Wycombe, but considered inflows from the surrounding catchments, has provided the following:

- Maps showing predicted flood depth and velocity in different flood event scenarios, including consideration of climate change.
- A first appreciation of the cost of damage which could be caused by local flooding: for those residential properties experiencing flooding at least once in the next 100 years, the cost of the flooding is likely to be about £30k per property.
- Development of a number of options to improve management of local flooding, both through changes to policy and practice, as well as location-specific actions including individual property protection, control of runoff close to source and design of urban environments to make space for water.

The SWMP made a number of location-specific and policy related recommendations to improve management of local flooding in Wycombe. A number of these recommendations have been included in the BCC Local Flood Risk Management Strategy Action Plan which is regularly updated and is available at http://www.buckscc.gov.uk/environment/flooding/strategic-flood-management/flood-management-strategy/www.bucks. The relevant policy related actions have been included in Section 5 of this SFRA and included as Figure 17.

[8] www.buckscc.gov.uk/flooding

4 Flood Risk in Wycombe District

4.1 Overview

This Section details the findings of the review of flood risk in the Wycombe District, based on the data provided by a range of partners as described in Section 3.

A relatively small number of properties within the District are at risk of flooding from the River Thames and Wye. These river valleys are well defined, and river flooding is not a significant issue to the large majority of the local community. Flooding of roads and properties occurs across the District from more localised sources including surface water, groundwater, sewers and blocked culverts.

4.2 Summary of Past Flooding

Flooding of homes, businesses, agricultural land and roads has occurred in Wycombe District from Main Rivers, as well as from local sources. These local sources principally concern surface runoff generated by intense rainfall, groundwater and ordinary watercourses. Many areas affected by flooding are situated outside of the delineated higher probability Flood Zones. This is an important reminder that the risk of flooding must always be carefully considered when planning future development, irrespective of the site's proximity to a local river or watercourse. Development allocations in Local Plans and development management decisions must consider all forms of potential flooding to the site. They must also be made with due consideration to the potential impact that future development may have upon known existing flooding problems if not carefully managed.

Information on past flooding in Wycombe District was available from the 2008 SFRA, the Buckinghamshire PFRA, the Chesham and High Wycombe SWMP and from recent work in Wycombe since the SWMP. A review of the available information confirmed that data presented in the PFRA, published in 2011, represents the most comprehensive and consistent dataset available.

For the purposes of this updated SFRA, this available data has been supplemented by updated data provided by Buckinghamshire County Council (BCC), Wycombe District Council (WDC) Emergency Planning Department and the EA regarding recorded incidents in Winter 2013-14. During Winter 2013/2014 a period of heavy and prolonged rainfall was experienced, resulting in fluvial, surface water and groundwater flooding reported in various locations across the District.

The following is a broad summary of historic flooding from various sources in Wycombe which is presented on the maps in Figures 5 and 6, with data also extracted from the Buckinghamshire PFRA. It should be noted that the number of properties recorded to have flooded by Risk Management Agencies (RMA) is predicted to be considerably lower than what actually occurred.

4.2.1 Princes Risborough / Monks Risborough

- RMA recorded four flooding incidents in Princes Risborough during Winter 2013-14, with one of these resulting in internal flooding, expected to be caused by river flooding; A further six incidents of flooding were recorded in Monks Risborough and Longwick, one of these is known to have caused internal flooding, with Molins Sports Ground and many gardens also flooded in the area. The following roads in the area were reported as flooded: Crowbrook Road, Kingsmead, Longwick Road, Lower Icknield Way and Mill Lane. These events were recorded within Flood Zone 1 and remote from any

watercourses, therefore were most likely a result of surface water and/or groundwater flooding;

- Roads recorded to have flooded close to Princes Risborough, in the villages of Bledlow, Butlers Cross and Saunderton, include Chalkshire, Sandpit Lane, Saunderton Road, Skittle Green and Slough Lane. These incidents were a result of surface water and/or groundwater flooding, with the potential interaction with ordinary watercourses on Sandpit Lane and Skittle Green;
- Further flooding was recorded by RMA during Winter 2013-14 in the north of the District, close to Little Kimble, with one incident in Marsh resulting in internal property flooding; and
- The EA's historical fluvial outlines do not show that this area has previously experienced fluvial flooding.

4.2.2 High Wycombe / Hughenden Valley

- Five incidents of flooding were recorded in the centre of High Wycombe during Winter 2013-14, all in close proximity to the River Wye. Numerous others were recorded in the outskirts of High Wycombe and neighbouring towns and village, including an incident of internal flooding occurring in West Wycombe and also one in Radnage (known to have been caused by groundwater flooding). Thames Water are reported to have operated pumps in Hughenden Valley to help clear flood water, as well as local residents taking protection measures themselves by pumping water, redirecting flow and the use of sandbags to avoid internal property flooding;
- During Winter 2013-14 two Flood Alerts were issued by the EA for the River Wye from West Wycombe to Cores End (including Hughenden Stream) and regarding the risk of groundwater flooding in High Wycombe, including Radnage and Lower Hughenden Valley. The alert regarding the risk of groundwater flooding continued for several weeks. Groundwater emergence was reported towards the end of February and continued for many weeks for Hughenden Valley and from Radnage to West Wycombe;
- The roads recorded by RMA during the Winter 2013-14 to have flooded in the vicinity of High Wycombe include Bottom Road, Bradenham Road, Clayfields, Coates Lane, Coombe Lane, Curzon Avenue, Desborough Park Road, London Road, Manor Gardens, Manor Road, Penn Road, Ralphs Retreat, and Valley Road, as a combination of fluvial, groundwater and surface water flooding;
- Thames Water recorded external flooding incidents during Winter 2013-14 in this area, particularly along Valley Road and Boss Lane. Thames Water over-pumped flows from the local sewers to reduce the impact of flooding in the area;
- Due to the local topography High Wycombe is known to be particularly susceptible to flooding from the River Wye and Hughenden Stream, as well as incidents of surface water flooding in urban areas that respond quickly to rainfall;
- Groundwater and fluvial flooding are known to be strongly linked due to the chalk catchments of the River Wye and Hughenden Stream; and
- Seventeen properties were recorded as being flooded from groundwater during Winter 2000/01 in High Wycombe and twenty-one properties in Hughenden Valley; It is unknown whether this was internal or external flooding.

4.2.3 Marlow / Little Marlow / Bourne End

- A number of flood incidents were recorded by RMA in this area, during Winter 2013-14, with numerous properties experiencing internal flooding as a result of flooding from the River Thames; these included houses on Gossmore Lane, Gossmore Close, Pound Lane, Mill Road, Garnet Court, Pound Crescent, Quarrydale Drive, Riversdale, The Drive, Sailing Club Road, The Avenue South, Spade Oak Meadows, Cores End Road, Lock bridge Road, Firview Close and St Peter's Street;
- The following roads were recorded by RMA emergency planning to have flooded in Marlow during Winter 2013-14: Bream Close, Dedmere Road, Fieldhouse Lane, Fir View Close, Fishermans Retreat, Garnett Court, Gossmore Close, Gossmore Lane, Holland Road, Lock Road, Lower Pound Lane, Marlin Court, Marlow Mill, Meadow Close, Mill Road, Pound Crescent, Pound Lane, Quarrydale Drive, Riverside, Riverpark Drive, Riverwood Avenue, Riverwoods Drive, St Peters Street, Spinners Walk, Tierney Court and Wethered Park. Due to the location of some of these roads it is clear that this flooded was caused by a combination of fluvial, surface water and groundwater flooding;
- In Little Marlow and Bourne End RMA recorded the following roads to have flooded during Winter 2013-14: Andrew's Reach, Camden Place, Corer End Road, Ferry Lane, Hedsor Road, Jeffries Court, Orchard Mill, Ravenshoe Close, Riversdale, Riversdale Court, School Lane, Spade Oak Meadow, Station Road, The Moor, Westhorpe Farm Lane and Wharf Lane. This flooding was caused by a combination of fluvial, surface water and groundwater sources;
- A Flood Warning was issued by the EA for properties closest to the River Thames including Little Marlow, particularly Marlow Bridge Lane, Rivermead Court, Quarrywood Road, Marlow Lock Island, Mill Road and Meadow Close. Another warning was issued for the River Thames between Hurley and Cookham, including Marlow;
- Thirty properties are recorded to have been affected by groundwater and thirty-five by the River Thames in Marlow during Winter 2000/01; and
- A section of land from Marlow to Bourne End adjacent to the River Thames is included within the EA's historical fluvial outlines. This area mainly consists of open space and parkland, with the exception of the area to the area to the west of A404 and the southwest of Bourne End;

4.2.4 Hambleden Valley

- During Winter 2013-14 a number of flooding incidents were recorded across the Hambleden Valley from Fingest to Mill End, with two properties known to have experienced internal flooding in Skirmett and one in Fingest;
- A few roads in the area were also reported as flooded by RMA during Winter 2013-14, including: A4155 (Henley Road), Ferry Lane, Hambleden Village and Skirmett Road;
- A number of EA flood alerts and warnings were issued for the Hambleden Valley, including one in December regarding river levels on the Hambleden Brook in Skirmett and Hambleden, and a number from late February regarding groundwater emergence in the Hambleden Valley, especially Skirmett and Turville;
- Thames Water worked to alleviate flooding in this area during Winter 2013-14 by tankering flows from sewers to reduce the volume of water in the system; and

- Groundwater ingress into the sewer network caused flooding of properties in the village of Hambleden and nearby Mill End in December 2012 and January 2013.

4.2.5 Medmenham

- Numerous incidents of flooding were recorded in Medmenham by RMA during Winter 2013-14, with 23 properties affected internally and externally on Ferry Lane and New Lock Lane, during flood events in December 2013, and January and February 2014. The expected cause of the flooding is a combination of fluvial and surface water flooding;
- The EA issued flood alerts in December 2013 and February 2014, warning of the risk of fluvial flooding from the River Thames for Medmenham and Remenham;
- Nineteen properties were recorded to have flooded by ordinary watercourses in Medmenham during Winter 2000/01; and
- The area of Medmenham to the south of A4165 is included in the EA's historical fluvial outlines.

4.2.6 Wooburn / Wooburn Green

- There was an incident of flooding recorded in Wooburn Green by BCC during Winter 2013-14. There were no recorded incidents of road flooding in this area during this period; and
- Seven properties were recorded to have flooded as a result of groundwater fed by the River Wye in Wooburn during Winter 2000/01; It is unknown whether this was internal or external flooding; and
- Areas of Wooburn and Wooburn Green adjacent to the River Wye are represented as within in the EA's historical fluvial outlines.

4.2.7 Records of Sewer Flooding

Postcode data provided by Thames Water (to April 2014) suggests that a number of areas have experienced sewer flooding to property either internally or externally. The greatest number of occurrences over the past 20 years have been in:

- Postcode region SL7, Marlow and Little Marlow has had 38 incidents of external sewer flooding and 9 internal;
- Postcode region HP14, in the centre of Wycombe District (including Stokenchurch, Cadmore End, West Wycombe, Hughenden Valley, Walter's Ash and Saunderton) experienced 36 incidents of flooding, two of these being internal;
- Postcode region HP13, in the north of High Wycombe (including Downley, Totteridge and Micklefield) had 19 incidents of sewer flooding, 6 of which have caused internal property flooding;
- Postcode region HP27, in the north of Wycombe District (including Princes Risborough and surrounding villages) experienced 20 incidents of external flooding and 3 of internal; and
- Postcode region SL8, Bourne End has had 19 incidents of sewer flooding, 1 which caused internal flooding.

These results are represented in Figure 7.

4.3 Interpretation of Flood Risk Mapping

4.3.1 Overview

The following figures accompany this SFRA:

- **Figures 1 to 12** focus on all sources of flooding and recorded incidents of flooding within Wycombe District, including Flood Zones, Risk of Flooding from Surface Water maps, groundwater emergence mapping and incidents of sewer flooding as recorded by Thames Water;
- **Figure 13** shows the superficial and solid geology underlying the District. This map could assist with determining whether infiltration or attenuation SuDS techniques may be suitable;
- **Figure 14** shows the available LiDAR data for the area;
- **Figures 15 and 16** highlight the location of properties housing vulnerable people or critical services within Wycombe District, such as blue light services, schools, care homes and hospitals. Five inset maps of these are also provided for additional detail (Figures 15a-e and Figure 16a-e);
- **Figure 17** shows the location of areas highlighted within the BCC Flood Risk Management Strategy Action Plan that could be considered for flood risk management works; and
- **Figures 18 to 21** show Wycombe Critical Drainage Areas (WDCAs). Note WCDAs are represented as the Medium Risk outline in Figures 8 – 11 that are located in Flood Zone 1. Medium Risk of surface water flooding is defined by the EA as between a 3.3% and 1% (1 in 30 – 100) AEP event.

4.3.2 Fluvial Flood Risk

The fluvial flood risk as shown by the EA's Flood Zones (Figures 1 to 4) is interpreted here for the main settlements along the Rivers Wye and Thames.

It is important to note that even shallow flood waters can be extremely dangerous. Some people will be at risk when the water depth is only 0.5m if the velocity is 1m/s (about 2 mph). Should the velocity increase to 2m/s (about 4mph), some people will be unable to stand in a depth of water of only 0.3m. Most people will be unable to stand when the velocity is 2m/s and the depth is 0.6m[9].

High Wycombe

The River Wye flows through the centre of High Wycombe from northwest to southeast, from West Wycombe to Wycombe Marsh. Several properties in the town are situated within Flood Zone 3b surrounding The Rye (flood storage area) including properties on Chestnut Avenue, Bowden Lane and Bassetsbury Lane. A number of properties on London Road adjacent to Kings Mead are located within Flood Zone 3a, as well as properties adjacent to Station Road and Boundary Road, just north of M40.

Through High Wycombe Flood Zone 2 forms a narrow corner along the River Wye. Properties located within Flood Zone 2 include those encompassed within Desborough Avenue / Suffield Road and A40 (Oxford Road / Abbey Way), and those located adjacent to Abbey Barn Road roundabout. There are also a number of properties located in Flood Zone 2 in Loudwater and Wooburn Moor, to the southwest of the A40, either side of the M40.

[9] Further information is contained in the Defra Report "Flood Risks to People" Phase 1 (July, 2003) and Phase 2 Project Records (FD2321/PR), March 2006)

It should be noted that the River Wye is culverted through the centre of High Wycombe, beneath Wycombe Road and Oxford Road, including Eden Shopping Centre. There is a risk that this culvert could block resulting in an increase in flood risk to the properties in the town centre. This area is located within Flood Zone 1.

Wooburn Green / Wooburn

Downstream of High Wycombe the River Wye turns southwards and then east, flowing through Wooburn Green and Wooburn. There is a narrow corridor of Flood Zone 3a adjacent to Watery Lane and Old Watery Lane with some residential property included in this area. There is another small area of Flood Zone 3a affecting property in the south of Wooburn Green in the block of Windsor Hill / Town Lane / Western Drive / Manor Gardens.

There is also a small area in Flood Zone 3a and 3b in Cores End, on Cores End Road / Willow Lane, just of upstream from where the River Wye bends sharply southwards to its confluence with the River Thames.

There are also a number of properties in Wooburn on Glory Mill Lane, North Croft, Holtspur Lane and Town Lane that are located in Flood Zone 2.

Mill End / Medmenham

The River Thames flows from west to east along the southern boundary of Wycombe District, from north of Henley to Bourne End.

The corridor of land between the River Thames and the A4155 through the area north of Henley, Mill End and Medmenham is a combination of Flood Zone 3a and 3b. Flood Zone 2 is very similar to Zone 3a in this location.

Marlow

The area to the southwest of Marlow, between the River Thames and Harleyford Lane is all located within Flood Zone 3b, with only the marina, lakes and open fields occupying the area.

The area west of Marlow Bridge, surrounding Pound Lane is located within Flood Zone 3a, with many residential properties situated in this area on the main road and adjacent cul-de-sacs off. Further downstream there is another block of residential housing enclosed within the A404, Lock Road and railway line east of Marlow station, which is located within Flood Zones 3a and 3b, and one to the east of A404, with housing along Riverwoods Drive.

A number of properties are located within Flood Zone 2 between Glade Road and A404, south of Westhorpe Road.

Little Marlow

Little Marlow is also located on the banks of the River Thames, just downstream of Marlow. The open areas around the sewer treatment works, in the south of Little Marlow, are included in Flood Zone 3a, with the Works themselves located within Flood Zone 1 and 2.

The area between Coldmoorholme Lane in the west and The Drive and The Avenue in the east is located in Flood Zone 3a and 3b, with the area closest to the River Thames classified as Flood Zone 2. A number of residential properties are located within this area.

Bourne End

Downstream of Little Marlow is Bourne End, where the River Wye joins the River Thames. The southern area of Bourne End is included in Flood Zone 3a, either side

of A4094, south of Hedsor Road. Numerous residential properties are located within this zone along Riversdale.

There are a number of properties located in Flood Zone 2 on Cores End Road and in areas to the west of A4155 (Marlow Road / The Parade) and Station Road, and adjacent to the junction of Hedsor Road and Ferry Lane.

4.3.3 Local Flood Risk

Based on national mapping provided by the EA, a high number of residential and commercial properties in the District could be at risk of flooding from local sources (principally surface runoff generated by intense rainfall, groundwater and ordinary watercourses), with the main concentration in High Wycombe and Marlow; this was confirmed during the Winter 2013-14 flood events when numerous flooding incidents were recorded in these areas by BCC and WDC. The EA Risk of Flooding from Surface Water outputs have been used to identify "Wycombe Critical Drainage Areas" which may be most susceptible to local flooding. These areas are identified in Figures 18 to 21 and have been determined as areas located within Flood Zone 1 and at "Medium Risk" on the uFMfSW maps; this is defined by the EA as the probability of surface water flooding between a 3.3% and 1% (1 in 30 – 100) AEP event. A broad summary of the larger Wycombe Critical Drainage Areas (WCDAs) lying outside fluvial Flood Zone 2 is provided here.

High Wycombe

There a numerous WCDAs which join the River Wye at High Wycombe. Four notable areas originate in the north-west of the town, joining the River Wye at West Wycombe from Stokenchurch and Radnage in the west, and Lacey Green in the north.

Another significant Area originates in the Speen / Great Hampden / Lacey Green area, moving south through the Hughenden Valley where it joins the Hughenden Stream. It should be noted that part of this WCDA enters Wycombe District from the east (Chiltern District).

There are a number of smaller WCDAs which are more localised, originating within High Wycombe and draining towards the River Wye in the centre, from both the north and south of the town.

Marlow

There are two significant WCDAs that drain through Marlow towards the River Thames – one originating in the outskirts of High Wycombe, to the north, and the other in Lane End and Frieth areas, passing in a south-easterly direction before entering the west of Marlow.

There are also smaller, more localised WCDAs within the town centre itself.

Princes Risborough

There are three localised WCDAs in Prince Risborough that drain towards tributaries of the River Thame in the west of the town.

Hambledon Stream

Three WCDAs are defined to drain into the Hambledon Stream just north of Skirmett; one of these areas is relatively large, draining from Stokenchurch in the north, through the woods to the east of Ibstone. The other two drain from Southend in the south-west and Frieth in the east.

Areas along the River Thames

There are a number of other WCDAs in the south of Wycombe District that drain towards the River Thames through Medmenham, Marlow Common, Flackwell Heath, Bourne End and Wooburn.

4.3.4 Groundwater Flood Risk

Figure 12 shows areas within Wycombe District that are at increased risk of groundwater flooding. The geology of the District (Figure 13) is dominated by chalk. It should be noted that the groundwater emergence outputs represented in Figure 12 were developed for national assessment and therefore provide coarse information; it should not be assumed that areas outside the 'groundwater emergence zone' are not at risk of groundwater flooding.

The areas highlighted as being at increased risk of groundwater flooding are "dry valleys", where overland flowpaths are underlain by the permeable chalk ground. Due to the largely permeable nature of the District, these areas can be assumed as those highlighted in Figures 18 to 21, with reference to the local geology in Figure 13.

Princes Risborough and Monks Risborough, and their surrounding areas as being at classified as being at increased risk of groundwater flooding; however there are no confirmed flood incidents attributed to this source in the area.

A few valleys, at increased risk of groundwater flooding, are located to the north and west of West Wycombe, one connecting to the area in the north of the District. The area from Radnage and West Wycombe is known to have experienced groundwater flooding during winter 2013-14 which continued for several weeks.

Hughenden Valley, to the north of High Wycombe, is known to be at risk of groundwater flooding, as indicated on Figure 12. The area experienced groundwater flooding in winter 2013-14 for several weeks, with reports of similar incidents in previous years. Due to the chalk catchment and topography of the area, groundwater and fluvial flooding are closely linked.

Marlow and Little Marlow are also classified as being at increased risk of groundwater flooding. Incidents of groundwater flooding are known to have occurred during winter 2013-14 and in previous years, resulting in flooding to roads and properties.

Hambleden Valley is also known to be at risk of groundwater flooding, as shown in Figure 12. During winter 2013-14 the EA issued a number of flood alerts and warning over several weeks for this area regarding the groundwater flooding risk, with a number of incidents recorded. In previous years incidents of groundwater flooding have been recorded in this area, particularly Medmenham, Hambleden village, and Mill End with some properties experiencing flooded.

The corridor surrounding both the River Thames and the River Wye are also highlighted as at increased risk of groundwater flooding. Flooding of this kind would be closely linked with fluvial flood events on these rivers.

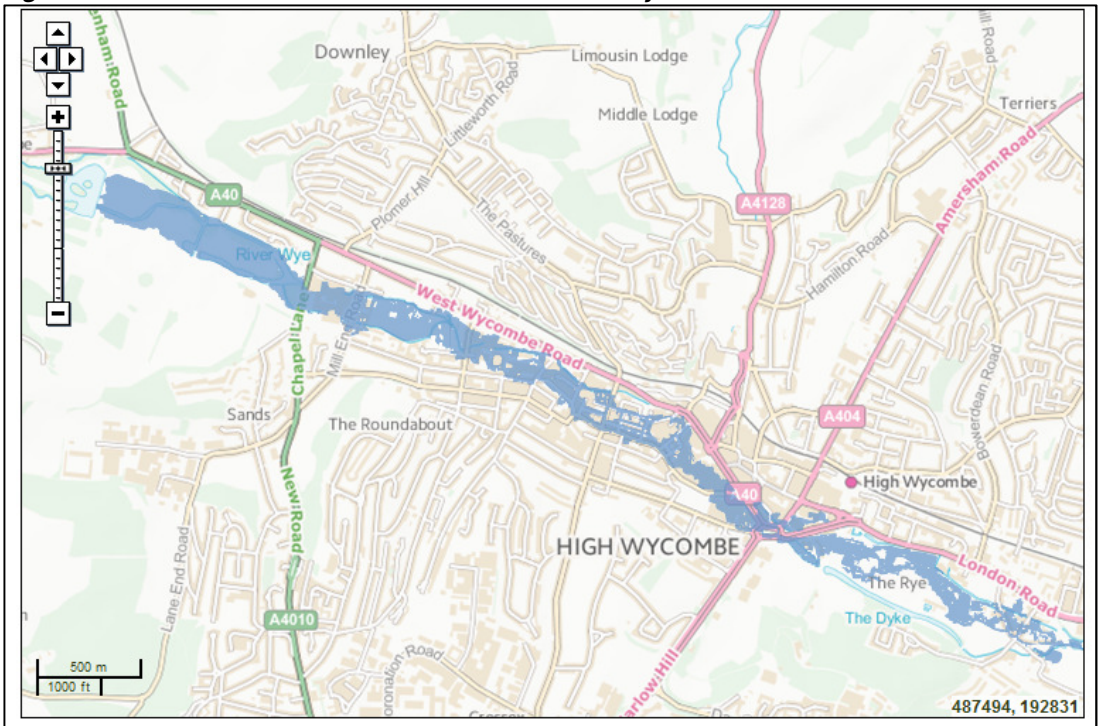
It should be noted that some areas highlighted in Figure 12 as being at increased risk of groundwater flooding are dry valleys, others may be ephemeral watercourses which are only activated during high groundwater levels and others may be recognised watercourses which have significant groundwater flow. Characteristics of

groundwater flooding which make it particularly challenging are the huge volumes of water involved, the long duration of flooding which can last for weeks or months, the likely contamination of the water should it inundate the sewer network, the difficulties in predicting when and where flooding will occur and the subsurface emergence of water which makes management particularly difficult.

4.3.5 Flood Risk from Reservoirs

Because of the requirement for regular inspections by a Supervising Panel Engineer, the likelihood of structural failure of reservoirs is considered to be minimal. The risk of failure remains however, and the EA has mapped the potential extent of flooding resulting from the lake in West Wycombe Park (see Figure 4.3.5). Since the lake is on-line to the River Wye, the flood extent follows and largely lies within Flood Zone 3a defined for the River Wye. No similar extent is mapped for a failure of the lakes at Little Marlow or those adjacent to Copgrove Wood.

Figure 4.3.5 – Reservoir Breach Flood Extent for West Wycombe Park's Lake



4.4 Potential Impact of Climate Change

There is clear scientific evidence that global climate change is happening now. It cannot be ignored. Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation; however the broad trends are in accordance with projections from climate models, suggesting partly anthropogenic causes.

Greenhouse gas levels in the atmosphere are likely to cause higher winter rainfall in future. Past Greenhouse gas emissions mean some climate change is inevitable in the next 20–30 years. Lower emissions could reduce the amount of climate change

further into the future, but changes are still projected at least as far ahead as the 2080s.

There is enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand[10] rain storms may become more intense, even if we cannot be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25 mm in a day). It is plausible that the amount of rain in extreme storms (with a 20% (1 in 5) annual chance or less) could increase locally by 40%. If emissions follow a medium future scenario, UKCP09 projected changes for Wycombe District by the 2050s relative to the recent past are:

- winter precipitation increases of around 15% (very likely to be between 2 and 32%); and
- precipitation on the wettest day in winter up by around 15% (very unlikely to be more than 31%).

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability. Wetter winters and more of this rain falling in wet spells may increase river flooding in both rural and urbanised catchments. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected. Rising river levels may increase local flood risk away from major rivers because of interactions with drains, sewers and smaller watercourses. There is a risk of flooding from groundwater-bearing chalk aquifers across the District. Recharge may increase in wetter winters, or decrease in drier summers.

Changes in the extent of inundation due to climate change on fluvial flooding are likely to be negligible in well-defined valleys, but could be dramatic in very flat areas. Changes in the depth of flooding under the same allowance will increase the probability of a given flood. This means that a site currently located within a lower risk zone (e.g. Zone 2) could in the future be re-classified as lying within a high risk zone (e.g. Zone 3a). This in turn could have implications for the type of development that is appropriate according to its vulnerability to flooding. In the absence of detailed flood modelling to define the impact of climate change on Flood Zones in this SFRA, the anticipated extent of Zone 3a (the 1% AEP flood) at the end of the century may be approximated by the current Zone 2 (the 0.1% AEP flood). In terms of existing property flood risk in Zone 3a, this could lead to an increase in the number of properties at risk of flooding. In the same way, the WCDAs could increase in extent and/or depth of flooding with climate change.

It is essential that developers consider the possible change in flood risk over the lifetime of the development as a result of climate change. For planning purposes, the EA assume that the 'lifetime of development' equates to 100 years for residential development, and 60 years for commercial development.

In planning terms, it is essential that Wycombe District Council consider their response to the potential impacts of climate change within the District. In the absence of detailed modelling, and instead by comparing Zone 3a and Zone 2,

[10] Jacobs (2011) Buckinghamshire County Council Preliminary Flood Risk Assessment. May 2011. Available at http://www.buckscc.gov.uk/Flooding

climate change may not markedly increase the extent of fluvial flooding. However, those properties (and areas) that are currently at risk of flooding may be susceptible to more frequent, more severe flooding in future years (i.e. situated within Zone 3a and may be located in Flood Zone 3b in the future). Note that in Zone 3b it is anticipated that flood depth could increase with climate change. Furthermore, there could be an increase in localised surface water issues. It is essential therefore that the development management process (influencing the design of future development within the District) carefully mitigates against the potential impact that climate change may have upon the risk of flooding.

For this reason, all of the development management recommendations set out in Section 5 below require all floor levels, access routes, drainage systems and flood mitigation measures to be designed with an allowance for climate change within Zones 3b, 3a and 2, as well as within Wycombe Critical Drainage Areas in Zone 1. This provides a robust and sustainable approach to the potential impacts that climate change may have upon the District over the next 100 years, ensuring that future development is considered in light of the possible increases in flood risk over time.

4.5 Cross-Border Flows

It is evident from the Risk of Flooding from Surface Water outputs represented on Figure 17 that there are overland flow paths that occur across the District boundaries.

This is particularly noticeable in the Stokenchurch and North End area, where the WDCAs originate outside of Wycombe District in the west and then contribute to the overland flow paths within the District.

There are also a number of locations along the eastern boundary of Wycombe District where overland flow paths that originate in Wycombe District drain into Chiltern District, such as at Hazlemere, Great Kingshill and Hampden Bottom.

It is important to emphasise that the NPPF – and indeed the Wycombe District SFRA – puts strict development design constraints into place. It will be a requirement in every instance that development is designed specifically NOT to increase flood risk elsewhere, for example by not increasing runoff from the site. This ensures (on a site level) that future development will not exacerbate the risk of flooding to sites upstream and/or downstream, and in a more holistic sense, makes a contribution towards addressing cross boundary related issues.

4.6 Residual Risk of Flooding

It is essential that the risk of flooding is minimised over the lifetime of the development in all instances. However, it is important to recognise that flood risk can never be eliminated, and there will always be a residual risk of flooding. This residual risk is associated with a number of potential risk factors including (but not limited to):

- a flood event that exceeds the probability of that for which the flood risk management measures have been designed; and
- general uncertainties inherent in the prediction of flooding.

The SFRA process has carried out a review of flood risk within the District in accordance with the NPPF Sequential Test, identifying a number of areas that fall within Zone 3a High Probability. The modelling of flood flows and flood levels is not an exact science. There are limitations in the methodologies used for prediction, and the models developed are reliant upon observed flow data for calibration. For this

reason, there are inherent uncertainties in the prediction of flood levels used in the assessment and management of flood risk.

It is incumbent on applicants to carry out a detailed Flood Risk Assessment as part of the design process. A review of uncertainty should be undertaken as an integral outcome of this more detailed investigation.

5 Sustainable Flood Risk Management

5.1 Overview

This Section highlights the role of various parties in relation to flood risk and offers recommendations for each to ensure that flood risk is managed in a sustainable manner into the future.

The risk of flooding can never be completely eliminated, but the likelihood and consequences of flooding can be minimised through good management. One of the key aims of the EA's National Flood and Coastal Erosion Risk Management Strategy and BCC's Local Flood Risk Management Strategy is to improve flood risk management in a sustainable way. In other words, the risk of flooding must be reduced now, but in a way which does not compromise the interconnected needs of the economy, society and environment in the future. Indeed, one of the defined roles of local authorities in the Flood & Water Management Act 2010 is for them to aim to make a contribution towards the achievement of sustainable development.

The primary purpose of the SFRA is to inform decision making as part of planning policy and development management processes, taking due consideration of the scale and nature of flood risk affecting the District. Responsibility for flood risk management resides with all tiers of government, and indeed individual landowners and applicants, as outlined below.

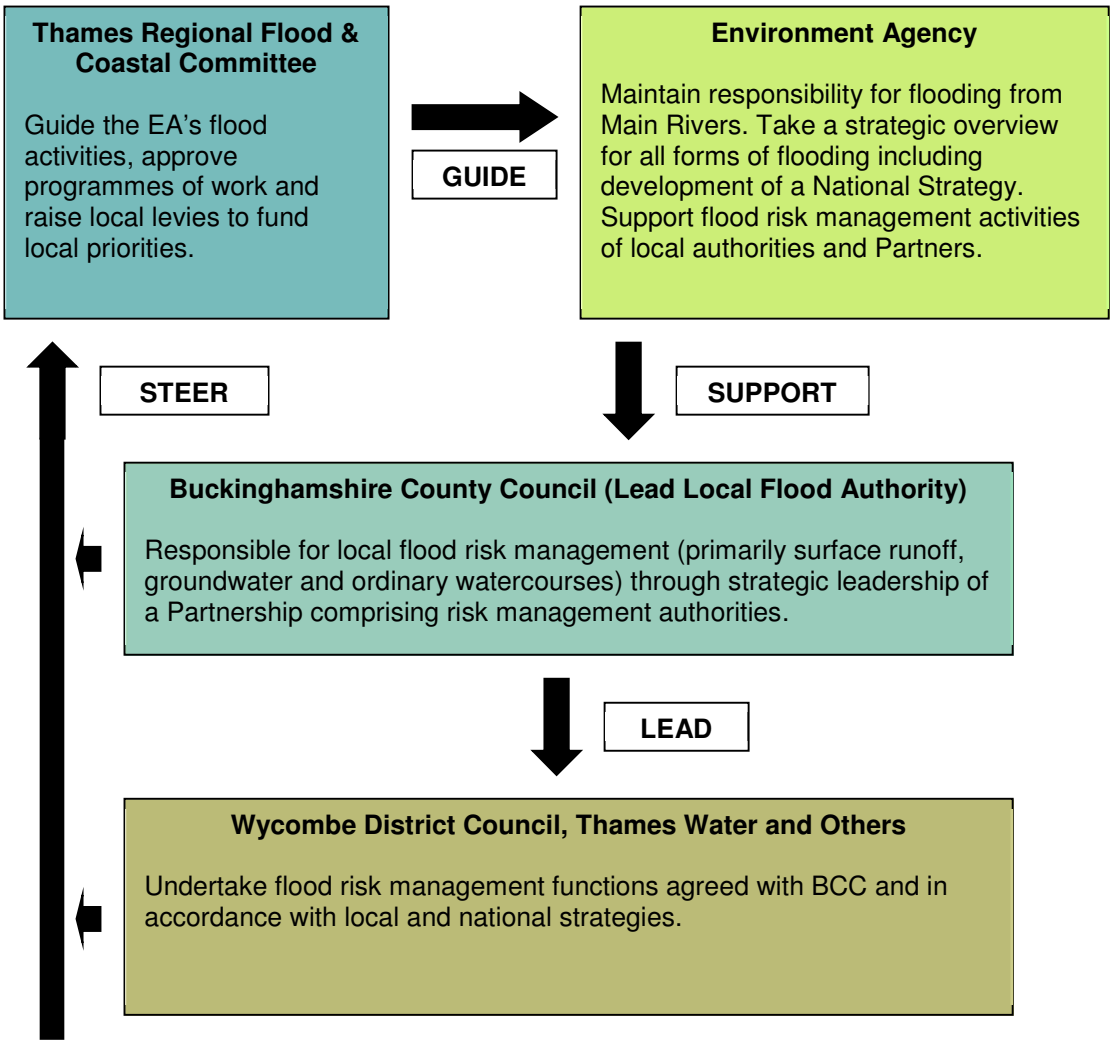
5.2 Responsibility for Flood Risk Management

There is no statutory requirement for the Government to protect property against the risk of flooding. Nevertheless, the Government recognises the importance of safeguarding the wider community and, in doing so, the economic and social well-being of the nation. Following the Pitt Review into the flooding of summer 2007 and subsequent Flood Risk Regulations 2009 and Flood & Water Management Act 2010, new responsibilities for managing flood risk have been assigned to local authorities, the EA and others as outlined in the schematic overleaf. This Partnership working approach to better managing flood risk from all sources is being coordinated in Buckinghamshire by the Buckinghamshire Strategic Flood Management Committee (BSFMC). The key responsibilities of the main Partners relevant to this SFRA are:

- **Environment Agency:** Provides a strategic overview of all sources of flooding. Under its permissive powers, it is responsible for flood risk management activities on Main Rivers, regulating reservoir safety, and working in partnership with the Met Office to provide flood forecasts and warnings. It assists the spatial planning and development management process through the provision of information and advice regarding flood risk and related issues;
- **Buckinghamshire County Council:** As Lead Local Flood Authority, BCC is responsible for coordination of local flood risk management across its administrative area. This includes development, maintenance, application and monitoring of a strategy for local flood risk management, a duty to maintain a register of structures or features which have a significant effect on flood risk and a duty to aim to contribute towards the achievement of sustainable development;
- **Wycombe District Council:** The Local Planning Authority is responsible for carrying out a Strategic Flood Risk Assessment which should consider the risk of flooding throughout the district and inform the allocation of land for

future development, development management policies and sustainability appraisals. WDC is responsible for determining local planning applications and must consult with the EA when making planning decisions (BCC is responsible for assessing County planning applications relating to Waste and Minerals, Highways and Educational facilities). Wycombe District Council has a duty to act consistently with the BCC Local Flood Risk Management Strategy and the EA National Strategy. The position of WDC within the structure of flood risk management agencies is summarised in Figure 5.2;

Figure 5.2 – Structure of Flood Risk Management Agencies within Wycombe



- **Landowners** have the primary responsibility for protecting their land against the risk of flooding. They are also responsible for managing the drainage of their land such that they do not adversely impact upon adjoining properties.

The EA has updated its "Living on the Edge" guide in 2013 that provides specific advice regarding the rights and responsibilities of property owners, the EA and other bodies. The guide is targeted at owners of land situated alongside rivers or other watercourses, and is a useful reference point outlining who is responsible for flood defence, and what this means in practical terms. It also discusses how stakeholders

can work collaboratively to protect and enhance the natural environment of our rivers and streams. This guide can be found on the internet[11].

This SFRA has been updated to be consistent with the BCC Strategy and implementation of the SFRA should ensure it remains consistent with the Strategy. Some of the key policies developed by the Strategy which link to this SFRA are:

- **Adapting to Climate Change:** BCC is committed to the sustainable management of local flood risk which includes necessary adaptation to the wide-ranging impacts of a changing climate;
- **Integrated Flood Risk Management**: BCC will work with relevant teams within the councils, with other Risk Management Authorities and with delivery Partners in BCC's area and across administrative boundaries towards truly integrated management of flood risk;
- **Improving Communication and Involvement:** BCC will work with all Partners towards providing clear and up to date information on the risk of flooding and what can and is being done to manage the risk. Partners, stakeholders and the public will be involved as far as is practicable in actions to improve flood risk management to seek locally acceptable solutions which provide other benefits in addition to a reduction in flood risk;
- **Sustainable Management of Local Flood Risk**: BCC will seek to reduce the risk of flooding now, but in a way which does not compromise the interconnected needs of the economy, society and environment in the future;
- **Improve Recording of Flood Events**: BCC will centrally collate records of flooding which have been reported by the public, its Partners or through its own investigations as evidence to support future improvements in local flood risk management. Information will be managed according to our existing data protection policy;
- **Promoting Sustainable Drainage Systems (SuDS):** The use of Sustainable Drainage Systems (SuDS) will be promoted by the Buckinghamshire Strategic Flood Management Committee as a method to reduce the rate and volume of surface water runoff. Where practical, the design of SuDS will be encouraged to provide some natural removal of pollutants and sediments, promote aquifer recharge, enhance biodiversity and add aesthetic value to local communities;
- **Reducing Urban Creep:** Property owners will be encouraged to use permeable surfacing, or to direct surface water runoff to a lawn or border to drain naturally when considering a new or replacement driveway. In some cases these options may not require planning permission; and
- **Promoting Sustainable Land Management:** BCC will act to strengthen the partnership approach to sustainable land management which seeks reduced rates and volumes of runoff and erosion and sediment transport alongside meeting the objectives of the Rural Strategy and Biodiversity Action Plan.

5.3 Spatial Planning – Wycombe District Council

5.3.1 New High-Level Local Flood Risk Management Policy

The policies contained in the Wycombe Core Strategy, including Policy CS 18 that includes flooding and SuDS, will be replaced by new policies contained in the

11 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297423/LIT_7114_c70612.pdf

emerging Local Plan. The Core Strategy policy pre-dates this SFRA and new national policy contained in the NPPF.

RECOMMENDATION: Although a detailed flood risk management policy is contained in the DSAP (Policy DM17), which is being retained, Wycombe District Council should prepare a strategic (high-level) policy for local flood risk management for inclusion in the new Local Plan which is consistent with the BCC Strategy for Local Flood Risk Management, in addition to the NPPF. The policy should reflect the findings and recommendations of the SFRA, including requiring applicants to consider the SFRA and its mapping as a starting point for the assessment of flood risk in relation to development proposals. Consideration should also be given to whether the policy should give further coverage to WCDA (see also recommendation 5.3.5 below), flood resilience and SUDS (see also recommendation 5.6 below), which may not be adequately covered by DSAP Policy DM17 or may be worth highlighting in a high-level policy. As also noted in 5.3.5 below, WCDAs should also be shown on the Proposals Map to highlight these areas, linked to a policy in relation to WCDA. Recognition of the potential flood risk management benefits of green infrastructure could also be included in the policy (see also recommendation 5.3.7).

5.3.2 Site Allocations

The ideal solution to effective and sustainable flood risk management is a planning led one, i.e. steer urban development towards the areas of lowest flood risk (Flood Zone 1). The NPPF stipulates the application of a sequential approach to site allocation – seeking development sites within areas of lowest flood risk in the first instance (Flood Zone 1). Only if it can be demonstrated that there are no suitable sites within these areas should alternative sites (i.e. within areas that may potentially be at greater risk of flooding) be contemplated (seeking sites in Flood Zone 2 and then, failing that sites in Flood Zone 3), taking account of the vulnerability of the proposed land use.

Some of the sites currently allocated in the Delivery and Site Allocations DPD are either partially or fully outside of Flood Zone 1; however, none are affected by the updated fluvial flood data utilised in producing this latest SFRA. Little information was available on the predicted surface water flood in Flood Zone 1 at the time of the previous SFRA, so the site allocation assessment at that time was primarily focused on fluvial flood zones. None of the sites currently allocated are in the WCDA, although some are in close proximity so particular attention should be given to suitable drainage measures.

Additional sites will be allocated in the new Local Plan, the choice of which will be informed by this Level 1 SFRA (and a more detailed Level 2 SFRA if required). The Flood Zones within Wycombe District are set out in the maps that support this SFRA.

The Sequential Test, which is set out in the NPPF with further detail provided in the accompanying National Planning Practice Guide (NPPG), must be applied when seeking to allocate sites. Tables 2 and 3 in the NPPG stipulate 'appropriate' land uses for each Flood Zone.

Table 3 identifies types of development that should not be permitted in particular Flood Zones via the application of the Sequential Test; it also identifies types of development which may be permitted in zones of higher flood risk where, following the application of the Sequential Test, it is not possible to locate the development within zones with a lower probability of flooding. Table 3 also specifies instances where, having undertaken the Sequential Test, the Exception Test is required.

Paragraph 102 of the NPPF states that *'For the Exception Test to be passed:*

- *it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh the flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and*
- *a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.'*

The latter point includes a requirement for account to be taken to the future risk from climate change over the lifetime of the development.

The Planning Practice Guidance (SFRA guidance, paragraph 012) states that *'where a Level 1 Assessment shows that land outside flood risk areas cannot appropriately accommodate all the necessary development, it may be necessary to increase the scope of the Assessment to a Level 2 to provide the information necessary for application of the Exception Test where appropriate'.*

RECOMMENDATION: Any future site allocations must be determined via the application of the Sequential Test, and the Exception Test if required. The evaluation of potential sites should be guided by the mapping and the findings presented within this SFRA, including with regard to Wycombe Critical Drainage Areas and, if necessary, supplemented by a more detailed Level 2 SFRA which covers all potential sources of flooding. Full account should be taken of all sources of flooding including from rivers, groundwater, sewerage and surface water, together with the potential effects of climate change on flood risk and impacts on and from existing flood management infrastructure (see Sections 3 and 4).

5.3.3 Relocation of Unsuitable Existing Development

Paragraph 100 of the NPPF recommends that, where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, local authorities should seek to facilitate the relocation of development, including housing, to more sustainable locations.

RECOMMENDATION: Wycombe District Council, working in partnership with the EA, Buckinghamshire County Council, and others, should seek to identify both existing development which is potentially at risk from future impacts of climate change and, if necessary, potential sites for relocating that development, taking into account the Sequential Test. More suitable alternative uses for such sites should be sought, taking into account Table 3 in the NPPG. The information contained in the SFRA can be used to assist this process.

5.3.4 Safeguarding

Paragraph 100 of the NPPF states that local authorities should safeguard land from development that is required for current and future flood management. Such land may take the form of multi-functional water-compatible green infrastructure, which can also be used to provide natural flood storage. Areas that flood as a result of fluvial and non-fluvial flooding should be considered, where appropriate. Groundwater flooding can occur infrequently in a number of usually dry valleys in the District, which are generally open land at present. These areas are included in this SFRA mapping of WCDAs.

RECOMMENDATION: In partnership with the EA, Buckinghamshire County Council and others, Wycombe District Council should seek to identify land required for current and future flood management and, if justified, safeguard it through planning policy. This can include areas within or adjoining allocated development sites which

are particularly suitable for flood management purposes. The information contained in the SFRA can be used to assist this process.

5.3.5 Wycombe Critical Drainage Areas

Flooding can occur from non-fluvial, in addition to fluvial, sources. Groundwater flooding can occur infrequently in a number of usually dry valleys in the District. Knowledge of the locations susceptible to groundwater and other sources of flooding can be lost if flooding does not happen for a number of years, but it is important that these areas are identified so that they are retained as natural flood storage where possible and can be taken into account in flood risk assessments. WCDAs are highlighted in the SFRA mapping.

The NPPF requires a site-specific flood risk assessment for all development proposals 'in an area within Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA)'. The EA has not specified any Critical Drainage Areas in Wycombe District. However, areas which are likely to be most at risk of flooding from local sources have been identified as part of this SFRA. They have been termed 'Wycombe Critical Drainage Areas' (WCDAs) to differentiate them from those areas which could potentially be notified by the EA. However, the wording of the NPPF is such that it is not clear that an FRA would be required in a WCDA because they were not 'notified to the local planning authority by the EA'.

WDC DSAP Policy DM17, which is to be retained, states that 'Identification of additional areas of risk may trigger a requirement for a Flood Risk Assessment'; this gives some allowance that may enable the inclusion of an FRA requirement for WCDA, but the policy is not clear with regard to this issue.

RECOMMENDATION: Wycombe District Council should seek to adopt a local policy requiring a site-specific flood risk assessment for all development in WDCAs to address this anomaly. WCDAs are identified in this SFRA. FRAs are particularly important in such areas as they have known localised flooding problems which can cause significant damage. WCDAs should also be shown on the Proposals Map to highlight these areas, linked to a policy in relation to WCDA.

5.3.6 Adoption of Best Practice

Buckinghamshire County Council, in their role as Lead Local Flood Authority for managing flooding from local sources and SuDS, are in the process of producing best practice guidance with regard to sustainable drainage solutions across the county. It is important that applicants are made aware of current best practice guidance with regard to SuDS to ensure that such information can be taken into account in development proposals. The BCC flood management website also contains links to various other best practice guidance published by the EA, and others.

RECOMMENDATION: Wycombe District Council should continue to be involved in the development of BCC's proposed SuDS guidance and, when developed, adopt it as a Supplementary Planning Document to assist with the production and evaluation of flood risk assessments accompanying planning applications. This would avoid the need for WDC to produce its own guidance, which would repeat work already being undertaken by BCC and consume resources. An SPD should be linked to a new Local Plan policy regarding flooding and SuDS.

5.3.7 Opportunities to Reduce Flooding

Paragraph 100 of the NPPF recommends that local plans should seek to reduce the causes and impacts of flooding by *'using opportunities offered by new development'*.

The NPPF requires local authorities to work with other local authorities and providers to assess infrastructure needs in their area, including with regard to flood risk (Paragraph 162); Wycombe District Council has already been working to assess infrastructure needs within the District in their development of the Wycombe Infrastructure Delivery Plan (May 2012). Many of the items highlighted in the plan also have flood risk management benefits, although this additional benefit is not explicitly acknowledged, as highlighted in the High Wycombe Surface Water Management Plan.

After identifying infrastructure needs, the NPPF states that strategic policies should then be included within the Local Plan to deliver the infrastructure required (Paragraph 156); Policy CS 17 of the Core Strategy, which is to be replaced by the new Local Plan, seeks to secure the provision of needed infrastructure through new development, as does Policy DM19 of the DSAP that is to be retained.

Policy DM19 includes provision to seek financial contributions from new development through planning obligations and/or the Community Infrastructure Levy (CIL). As noted in Section 3 of this SFRA, many of the items included within the latest list of infrastructure for which CIL funding can be used, published by WDC in November 2012, have flood risk management benefits although this is not acknowledged in the document.

However, with regard to such financial contributions, account should be taken of the potential impact on the financial viability of development proposals, particularly in light of the current challenging economic climate.

RECOMMENDATION: Wycombe District Council should:

- Continue to work with other authorities and bodies, as appropriate, to identify specific flood risk infrastructure required within the District. The information contained in the SFRA can be used to assist this process, although more detailed studies may be required;
- Review the Wycombe Infrastructure Delivery Plan (May 2012) and the November 2012 CIL list in light of the High Wycombe Surface Water Management Plan, which highlights flood risk management benefits of some of the items listed, and explicitly highlight the flood risk management benefits of schemes in the next revision of these documents;
- In identifying potential development sites in the emerging Local Plan, seek reasonable opportunities for flood risk reduction measures, where required, and develop site specific guidance for such sites in the form of policy wording and/or Supplementary Planning Documents where appropriate. This could potentially include statements seeking Section 106 agreements to secure that planning benefit. The information contained in the SFRA can be used to assist this process, although more detailed studies may be required. Wycombe District Council should also ensure that suitable enabling policy is contained within DPDs linking to such SPDs;
- If appropriate, specifically identify sites for future flood risk management infrastructure on the Proposals Map with supporting policy wording in the Local Plan; and
- Consider Community Infrastructure Levy charges, and appropriate policy guidance relating to this, as a potential additional tool for securing contributions towards the delivery of flood risk reduction measures where a need has been identified.

This section is also relevant to any neighbourhood plans developed in the District.

5.4 Planning Applications – Wycombe District Council and Applicants

Planning applications can be submitted both for sites allocated within development plans and other sites, known as windfall sites. Flood risk at windfall sites may not have been previously considered in detail by the local planning authority.

The NPPF[12] stipulates that a site-specific flood risk assessment is required for:

- development proposals on sites of 1 hectare or greater in Flood Zone 1;
- all proposals for new development (including minor development and change of use) in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA);
- all proposals for new development (including minor development and change of use) in Flood Zones 2, 3a and 3b; and
- where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding (groundwater or surface water flooding).

The table overleaf is an extract from the summary table in Section 5.7 and summarises WDC's requirements for site-specific flood risk assessments (FRAs). It is noted that the EA has not notified Wycombe District Council of any areas within Flood Zone 1 with critical drainage problems at present. However, areas which are likely to be most at risk of flooding from local sources, and where sustainable drainage solutions should be a priority, have been identified in this SFRA and have been delineated as WCDA. This is different from the CDA delineation used by the EA. Importantly, flooding from local sources has occurred outside the mapped WCDAs. Therefore, a FRA is also required for sites greater than 1ha in area within Zone 1, but outside a WCDA. The FRAs in Zone 1 should be proportionate to the level of risk and focus on records of past flooding and sustainable drainage solutions.

The EA provides detailed Standing Advice, available online[13], to assist with both those developing and evaluating of flood risk assessments. This includes information on what FRAs should cover and what accompanying plans should be submitted. In addition to a Flood Risk Standing Advice Tool for Local Planning Authorities, advice specific to the fluvial flood zone in which the proposed development lies and the broad size of the development is provided. For example, there is specific standing advice for proposed developments in fluvial Flood Zone 1 which are more than 1ha in size or in an area with critical drainage problems. It is also noted that a homeowner's guide to flood resilience has been published at http://www.knowyourfloodrisk.co.uk.

[12] Footnote 20, page 24
[13] www.gov.uk/planning-applications-assessing-flood-risk

Table 2: Requirements of Flood Risk Assessments

Zone 3b Functional Floodplain		Zone 3a High Probability	Zone 2 Medium Probability	Wycombe Critical Drainage Areas	Zone 1 Low Probability
Existing Development	New Development				
Detailed FRA required				FRA required (proportionate to level of risk), should focus on records of past flooding and SuDS	FRA required (proportionate to level of risk) for all sites greater than 1ha in area, but should focus on records of past flooding and SuDS. Recommend that sites of 1ha or less carry out an assessment of localised flood risks

The site-specific FRA must follow the Sequential Test, and if required the Exception Test, as noted above and detailed in the NPPF and the accompanying NPPG. The NPPF[14] stipulates that the FRA must demonstrate that:

- the development is appropriate in its proposed location, considering the proposed use and all potential sources of flooding;
- within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- the development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems; and
- the development will not increase flood risk elsewhere.

Paragraph 104 of the NPPF notes the following exceptions to this:

- The Sequential Test need not be applied where the proposed site is allocated in the development plan; and
- The Sequential and Exception Tests should not be applied for applications for minor development and changes of use, *'except for any proposal involving a change of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the Sequential and Exception Tests should be applied as appropriate'*.

The NPPF requirements are supplemented by planning policies in relation to flooding set out in local planning documents produced by WDC, including with regard to FRAs and sustainable drainage. Relevant policies at the time of writing are set out in Section 2 of this SFRA.

The EA offer a free and charged for planning advice service. They will provide a free preliminary opinion on what environmental constraints, including flood risk, may affect development proposals. They then offer a charged planning advice service for any further discussions about the development proposals. This would include for example, a detailed review of a site specific Flood Risk Assessment. More information on this service can be found online at:

https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

The local EA Sustainable Places Team can be contacted for more information by emailing *planning-wallingford@environment-agency.gov.uk*.

[14] Paragraph 103

A Site-Specific Flood Risk Assessment Checklist is provided by the Government as part of the Planning Practice Guidance and should be used as the starting point for all site-specific FRAs. It is available online at:

http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/site-specific-flood-risk-assessment-checklist/

RECOMMENDATION: Applicants should use the Government's FRA checklist as a starting point for any flood risk assessment to be submitted with their planning application, utilising the information contained within this SFRA in both their FRA and design proposals. In this respect, as noted above, WDC should consider a policy in the Local Plan which would require developers to utilise the checklist and review the SFRA as a starting point to producing an FRA. Equally, planning officers should use the information contained in the checklist, the NPPG and this SFRA to inform their evaluation of planning applications and any accompanying flood risk assessments. It should be noted that, in line with the NPPF, ALL sources of flooding must be considered, including from surface water and groundwater. When granting planning permission, the use of planning conditions and Section 106 agreements should be considered where necessary to prevent any increase in flood risk and to assist in securing flood risk reduction measures.

The SFRA mapping will be of particular use in identifying key information for the FRA, including Flood Zones, Wycombe Critical Drainage Areas and flood management assets, but must be read in conjunction with the SFRA text. Sections 3 and 4 provide further information on flood risk in specific locations and highlight key issues to consider, including the potential effects of climate change on flood risk and location of flood management infrastructure. Further issues to take in to consideration in developing or evaluating an FRA are noted below.

However, it is important to note that the SFRA provides the most up-to-date information at the time of writing, but the data could change with time. The SFRA mapping is also taken at a district-wide level and more localised mapping and flood history information will be needed to determine flood risk at particular sites. The EA and BCC will be important sources for the latest data.

Compliance with current planning policy in relation to flooding contained in the NPPF and in planning policy documents produced by WDC should be demonstrated by applicants in their planning applications and considered by planning officers in their determination of applications, including with regard to FRAs, sustainable drainage and flood resilience.

Key contacts:

- National Planning Policy Framework and Planning Practice Guidance – http://planningguidance.planningportal.gov.uk/
- Environment Agency – www.gov.uk/government/organisations/environment-agency
- Buckinghamshire County Council – www.buckscc.gov.uk/flooding
- Know Your Flood Risk - http://www.knowyourfloodrisk.co.uk

5.5 Restriction of Permitted Development Rights – Wycombe District Council

Permitted Development (PD) rights allow for some minor development, such as certain sizes of building extension, without planning permission. The Planning Practice Guidance (Flood risk guidance, paragraph 047) states that minor

developments, some of which are covered by PD rights such as small extensions, are *'unlikely to raise significant flood risk issues unless they would:*

- *have an adverse effect on a watercourse, floodplain or its flood defences;*
- *impede access to flood defences and management facilities; or*
- *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows'.*

Minor developments subject to PD rights, such as some extensions, therefore have the ability to raise flood risk in such situations. Two tools enable the restriction of PD rights: planning conditions and Article 4 Directions.

Article 4 of the Town and Country Planning General Permitted Development Order provides a possible vehicle for the removal of PD rights in exceptional circumstances, which the NPPF (Paragraph 200) notes to be *'limited to situations where this is necessary to protect local amenity or the wellbeing of the area'*. This could include situations where minor permitted development, such as extensions, has the potential to add to localised flood risk as highlighted above, such as from the cumulative impact of extensions within an area.

The NPPF states that *'planning conditions should only be imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects'* (paragraph 206). In addition, paragraph 200 of the NPPF states that *'planning conditions should not be used to restrict national permitted development rights unless there is clear justification to do so'*. Again, this could include situations where minor permitted development, such as extensions, has the potential to add to localised flood risk, as the NPPF itself highlights. Permitted development rights would be removed by a planning condition, typically meaning that extensions or outbuildings which would have been permitted development will now require planning permission.

RECOMMENDATION: Wycombe District Council should consider the potential for using planning conditions, and in exceptional circumstances Article 4 Directions relating to specific areas within the District, to minimise the flood risk associated with minor developments subject to permitted development rights.

5.6 General Recommendations – Minimising Flood Risk and Impacts of Flooding

When evaluating the flood risk of an existing or proposed development it is important to consider issues of flood resilience and flood resistance – minimising the likelihood of flooding, minimising impacts if the site does flood, and allowing a quick recovery after flooding. Such measures should also be included in the development of design proposals in planning applications, as relevant to the likely level of flood risk at a site. As noted above, the NPPF requires that planning applications demonstrate that the *'development is appropriately flood resilient and resistant'*, that *'any residual risk can be safely managed'* and *'it gives priority to the use of sustainable drainage systems'*. Potential considerations include:

- A change in land use to reduce the vulnerability of the proposed development;
- Placing uses with greater vulnerability to flooding in higher areas within the site to limit the risk or extent of flood damage;
- Minimising / reducing impermeable surfaces (building footprints and areas of hardstanding);

- Raising internal floor levels above the predicted flood level to reduce the likelihood of the property flooding, taking into account any increase in flood level likely in future as a result of climate change;
- Arranging buildings and solid walls on site to remove obstructions to the overland flow paths of flood waters;
- Identifying potential sources of pollution in the event of flood and seeking to contain them;
- Ensuring there is a safe means of access and escape in the event of a flood;
- Developing a flood evacuation plan in the event of the threat of flood; and
- Subject to matters relating to Building Control, Raising electrical wiring and sockets to avoid damage to electrical systems in the event of flood, use of tiled or stone flooring etc.

It should be noted that WDC DSAP Policy DM17, which is to be retained, also requires that FRAs include *'demonstration that resilient and resistant construction methods for managing residual risk and delivering an overall reduction in flood risk have been assessed'*.

WDC DSAP Policy DM17 also requires FRAs to include *'demonstration that Sustainable Urban Drainage Systems (SuDS) are incorporated where feasible'*. Similar wording is included within Policy CS18 of the Core Strategy, which is to be replaced.

Sustainable Drainage Systems (SuDS) is a term used to describe the various approaches that can be used to manage surface water drainage in a way that mimics the natural environment. The management of rainfall (surface water) is considered an essential element of reducing future flood risk to both the site and its surroundings. WDC, the EA and BCC all strongly advocate the use of SuDS. A wide variety of SuDS techniques are available, potentially providing both water quality and water quantity improvement benefits on a site by site basis throughout Wycombe. Wherever possible within brownfield areas, the developer should seek to reduce the rate of runoff from the site to the equivalent greenfield runoff rates (i.e. the rate of runoff generated from the site assuming it were an open grassed area). This is usually within the range of 5 to 9 litres per second per hectare (l/s/ha), depending on site slope and soil porosity. Collectively, the effective application of SuDS as part of all future development has the potential to reduce the risk of flooding within Wycombe District.

Indeed reducing the rate of discharge from urban sites to greenfield runoff rates is one of the most effective ways of reducing and managing flood risk within the District. Although any reduction in the amount of water that originates from any given site is likely to be small, if applied to sites across the district in a consistent way, the cumulative effect could be significant. There are numerous different ways that SuDS can be incorporated into a development and the most commonly found components of a SuDS system are described in Table 3. The appropriate application of a SuDS scheme to a specific development is heavily dependent upon the topography and geology of the site.

Table 3: SuDS System Components

SuDS Measure	Description
Pervious surfaces	Surfaces that allow inflow of rainwater into the underlying construction or soil.
Green roofs	Vegetated roofs that reduce the volume and rate of runoff and remove pollution.
Filter drain	Linear drains consisting of trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water; they may also permit infiltration.
Filter strips	Vegetated areas of gently sloping ground designed to drain water evenly off impermeable areas and to filter out silt and other particulates.
Swales	Shallow vegetated channels that conduct and retain water, and may also permit infiltration; the vegetation filters particulate matter.
Basins, Ponds and Wetlands	Areas that may be utilised for surface runoff storage.
Infiltration Devices	Sub-surface structures to promote the infiltration of surface water to ground. They can be trenches, basins or soakaways.
Bioretention areas	Vegetated areas designed to collect and treat water before discharge via a piped system or infiltration to the ground.

It should be noted that SuDS can have other benefits, depending upon the system installed, in addition to helping to minimise flood risk; these include helping to improve water quality by reducing pollutants, helping to recharge groundwater supplies, reducing the demand for potable water, improving wildlife habitats and helping to provide green corridors and improving local amenity. The cumulative benefits of numerous SuDS schemes over a number of sites in the District could therefore be significant (Table 4).

Table 4: SuDS System Components

Most Sustainable	SuDS technique	Flood Reduction	Water Quality Improvement	Landscape & Wildlife Benefit
↓	Living roofs	✓	✓	✓
↓	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
↓	Filter strips and swales	✓	✓	✓
↓	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
↓	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paving	✓	✓	
Least Sustainable	Tanked systems - over-sized pipes/tanks - storms cells	✓		

There are numerous sources of best practice advice with regard to flood resilience and flood resistance measures, including SuDS. Examples are the EA standing advice for development of Flood Risk Assessments and the Know Your Flood Risk guide to flood resilience. These should be consulted in the production of all FRAs.

5.6.1 SuDS Approval Body

Schedule 3 of the Flood and Water Management Act (FWMA) 2010, which is yet to be fully implemented, deals with SuDS. In particular, the Act calls for the establishment of a SuDS Approving Body (SAB) to be set up within Lead Local Flood Authorities (LLFA).

The role of the SAB will be to approve drainage systems prior to construction, according to National SuDS Standards and adopt and maintain SuDS that serve more than one property. Further information can be found on the BCC website: http://www.buckscc.gov.uk/environment/flooding/planning-and-development/sustainable-drainage-systems-%28suds%29/

The use of SuDS will be promoted by the Buckinghamshire Strategic Flood Management Committee as a method to reduce the rate and volume of surface water runoff. Where practical, the design of SuDS will be encouraged to provide some natural removal of pollutants and sediments, promote aquifer recharge, enhance biodiversity and add aesthetic value to local communities.

Buckinghamshire County Council, in their role as Lead Local Flood Authority for managing flooding from local sources and SuDS, are in the process of producing best practice guidance with regard to sustainable drainage solutions across the county.

Key contacts:

- Environment Agency – www.gov.uk/government/organisations/environment-agency;
- Buckinghamshire County Council – www.buckscc.gov.uk/flooding;
- CIRIA[15] – www.susdrain.org;
- Know Your Flood Risk – www.knowyourfloodrisk.co.uk.

At the time of this SFRA's publication, a consultation on SABs was released by Defra. The results of the consultation may invalidate what has been outlined in this report regarding SABs. For up-to-date information on SABs and SuDS, consult the WDC and BCC websites.

RECOMMENDATION: Wycombe District Council should continue to encourage developers to consider flood resilience and resistance in their developments, as appropriate to the flood risk, to permit a quick recovery post-flooding and to encourage the use of SuDS in developments, including ensuring that such policies adequately apply to WCDA. A policy should be in place requiring development proposals on 'Dry Islands' (see Section 3.3.5 of this SFRA) to be accompanied by a flood evacuation plan suitable for the flood risk category into which the surrounding area falls. Developers are required to minimise the runoff from their development site and should be encouraged to achieve greenfield runoff rates where practical. Inclusion of appropriate policy wording covering flood resilience and resistance, flood evacuation plans and SuDS in a new high-level flooding policy should be considered. In all cases, the potential effects of climate change throughout the lifetime of the development should be taken into account as the level of flood risk may change.

[15] Construction Industry Research and Information Association

5.7 Summary – Development Management Recommendations

The following table summarises the recommendations made in this SFRA regarding spatial planning and development management. It is important to note that the table is designed as a summary of issues covered elsewhere in the SFRA, NPPF and other guidance documents. It should not be relied upon in isolation when writing or evaluating a FRA.

Requirements	NPPF Flood Zone					
	Zone 3b Functional Floodplain		Zone 3a High Probability	Zone 2 Medium Probability	Wycombe Critical Drainage Areas	Zone 1 Low Probability
	Existing Development[16]	New Development				
DEVELOPMENT MANAGEMENT RECOMMENDATIONS						
Important Considerations	Opportunities should be sought: to reduce overall level of flood risk in the area through layout and form of development and appropriate application of SuDS; and to relocate existing inappropriate development to land with lower probability of flooding. Sequential Test required (unless para.104 of NPPF applies) All existing 'solid buildings' that would otherwise be in Zone 3b, unless designed to allow the passage of water, together with any other land prevented from flooding in a 5% (1 in 20) AEP event by the presence of solid buildings and existing infrastructure, are considered to be within Zone 3a for planning purposes. Existing buildings and other land designed to flood will continue to be in Zone 3b.	Includes all new development on previously undeveloped land, or on surfaces that are currently permeable, or on surfaces that are currently impermeable but not designed to flood.	Opportunities should be sought: to reduce overall level of flood risk in the area through layout and form of development and appropriate application of SuDS; to relocate existing inappropriate development to land with lower probability of flooding; and to create space for flooding to occur. All existing 'solid buildings' are considered to be within Zone 3a for planning purposes, together with any other land prevented from flooding in a 5% (1 in 20) AEP event by the presence of solid buildings and existing infrastructure, unless designed to allow the passage of water (even if in Zone 3b on flood map). Sequential Test required (unless para.104 of NPPF applies)	Opportunities should be sought to reduce overall level of flood risk in the area through layout and form of development and appropriate application of SuDS. Sequential Test required (unless para.104 of NPPF applies)	Important to check whether site is a 'dry island' (see Section 3.3.5). WCDAs have been identified which are likely to be most at risk of flooding from local sources. Local flooding must be considered as in integral part of the design process for all development. Opportunities should be sought to reduce overall level of flood risk in the local area through layout and form of development and appropriate application of SuDS. (See guidance provided by EA on Critical Drainage Areas - equally applicable here - and guidance on SuDS to be provided by BCC)	Important to check whether the site is a 'dry island' (see Section 3.3.5). It is important to recognise that sites within Zone 1 may be susceptible to flooding from other sources. Development may contribute to an increase in flood risk elsewhere if not carefully mitigated. Opportunities should be sought to reduce overall level of flood risk in the area and beyond through layout and form of development and appropriate application of SuDS.
Appropriate Land Use (refer to Tables 2 and 3 of the NPPG)	Proactively seek a reduction in risk by reducing the vulnerability of the existing land use.	Water Compatible uses Essential Infrastructure, if passes Exception Test.	Water Compatible or Less Vulnerable uses. More Vulnerable uses or Essential Infrastructure, if passes Exception Text.	Water Compatible, More Vulnerable or Less Vulnerable uses. Highly Vulnerable uses, if passes Exception Test.	No restrictions upon land use.	No restrictions upon land use.
SPECIFIC DEVELOPMENT MANAGEMENT RECOMMENDATIONS						
Flood Risk Assessment (FRA) **(all sources of flooding)**	Detailed FRA required (provided it is appropriate development for Flood Zone 3b)		Detailed FRA required	Detailed FRA required	FRA required (proportionate to level of risk), should focus on records of past flooding and SuDS	FRA required (proportionate to level of risk) for all sites greater than 1ha in area, but should focus on records of past flooding and SuDS. Recommend that sites of 1ha or less carry out an assessment of localised flood risks
Extensions, Outbuildings, Permitted Development & Property Subdivision **(see EA guidance on PD on internet)**	There should be a presumption against all building extensions (including out-buildings) to avoid raising flood levels elsewhere. Property sub-division may increase the population at risk, and should not be permitted. Restriction of PD rights should be considered.		Building extensions (inc. out-buildings) should be discouraged to avoid raising flood levels elsewhere. Property sub-division may increase intensity of development, and population at risk, and should be discouraged. Restriction of PD rights should be considered.		Building extensions and outbuildings may obstruct overland flow paths and should be designed carefully to avoid raising the potential risk of flooding to adjoining properties. Restriction of PD rights should be considered.	No restrictions.
Flood Resilience & Resistance, including Floor Levels	FRAs must include details of flood resilience and resistance measures included in designs. Generally, floor levels must be a minimum of 300mm above the 1% (1 in 100) AEP river flood level, including climate change, but varies according to flood zone and nature of development – see EA & BCC guidance				FRAs must include details of any flood resilience and resistance measures included in designs (see EA & BCC guidance). No minimum floor level	
Site Access & Escape, including Flood Evacuation	For residential property, dry access is to be provided in the 1% (1 in 100) AEP event. For commercial property, access must be 'safe' in accordance with Defra "Flood Risk to People" (FD2320 & FD2321). A Flood Evacuation Plan must be in place, suitable to the type of development, where there is no safe dry access to/from the site (i.e. access through Zone 1) – officers should consult the WDC Emergency Planning team as appropriate.				FRA should consider the vulnerability of the proposed development, and a safe route of escape should be provided if necessary[17].	No minimum level
Basements	Seeking to reduce vulnerability of use	Not permitted	Basement dwellings not permitted (see NPPF). For other development, no sleeping accommodation permitted at basement level. All basements must have an access point that is above the 1% (1 in 100) AEP river flood level, including climate change	Exception test required for basement dwellings (see NPPF). Generally, basements to have unimpeded access internally to upper levels – see EA guidance.	No sleeping accommodation permitted at basement level. All basements must have an access point that is above the anticipated localised flood level.	No restrictions.
SuDS & Permeable Paving	Priority must be given to use of SuDS. Implement SuDS to seek runoff from the site (post development) that does not exceed greenfield runoff rates, where feasible. Any SuDS design must take account of groundwater and geological conditions. NB Hardstanding which exceeds 5sqm in front garden of residential properties must be permeable (result of amendment to General Permitted Development Order (GPDO) in 2008)					
Buffer Zones and EA Consent	Minimum 8m buffer zone must be provided to 'top of bank' within sites immediately adjoining a Main River corridor (both open waterways and culverted waterway corridors). Any structures within 8m of 'top of bank' require EA consent. Reference should be made to EA's "Living on the Edge" guide (www.environment-agency.gov.uk) that discusses development situated in, over, under or adjacent to rivers and/or streams and the responsibilities of the riparian landowner.					
Other	Ensure that the proposed development does not result in increase in flood levels elsewhere – e.g. by ensuring that existing impermeable area is not increased, that overland flow routes are not truncated by buildings and/or infrastructure, or hydraulically linked to compensatory flood storage is provided within the site (or upstream) – measures should be appropriate to potential impact.					
	As an integral part of the government's "Making Space for Water" agenda, the EA is actively seeking the denaturalisation of culverted watercourses as part of any future development, and this is acknowledged by WDC. Realistic opportunities to reinstate the natural open waterway within existing culverted reaches of the river(s) should be promoted.					
	Ensure ALL sources of flooding are covered by the FRA and that surface water is adequately managed in line with EA and BCC guidance, especially in known WCDA.					
	In addition to a Flood Risk Assessment, applications within all fluvial flood zones (including within WCDAs) for developments of greater than 1ha must be accompanied by proposals for the management of surface water, as per EA standing advice**Error! Hyperlink reference not valid.**. Similar surface water management proposals should also be prepared for developments of less than 1ha within any flood zone even if an FRA is not required.					

[16] Existing development specifically designed to allow the passage of flood water, such as buildings on stilts or car parks designed to flood

[17] Local knowledge may suggest that the rapid onset of flooding (from surface water), its long duration (e.g. groundwater flooding) or its large depth could pose a risk to life which should be taken into consideration

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5.8 Local Community Action to Reduce Flood Damage

It is important to ensure a broad awareness with respect to flood risk, to enable communities to help themselves should a flood event occur. Advice is available on several websites, in particular those of the EA and BCC.

Key contacts:

- Environment Agency – www.gov.uk/government/organisations/environment-agency
- Buckinghamshire County Council – www.buckscc.gov.uk/flooding
- Thames Valley Local Resilience Forum – www.thamesvalleylrf.org.uk

The EA advises everyone to check whether their property is at risk of flooding; this includes both residential and business premises. For those whose properties are at risk of flooding, the EA advises:

- sign up to their flood warnings;
- make a flood plan;
- prepare the property for flooding; and
- prepare a flood kit.

Information on all of the above can be found on the EA's website.

It is also important for property owners to ensure that they have sufficient insurance to cover their property if damaged by flood.

5.9 Emergency Planning – Wycombe District Council

The Council is designated as a Category 1 Responder under the Civil Contingencies Act 2004. As such, the Council has defined responsibilities to assess risk, and respond appropriately in case of an emergency, including (for example) a major flooding event. The Council's primary responsibilities are[18]:

- *from time to time assess the risk of an emergency occurring;*
- *from time to time assess the risk of an emergency making it necessary or expedient for the person or body to perform any of his or its functions;*
- *maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs the person or body is able to continue to perform his or its functions;*
- *maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur the person or body is able to perform his or its functions so far as necessary or desirable for the purpose of:*
    - *preventing the emergency,*
    - *reducing, controlling or mitigating its effects, or*
    - *taking other action in connection with it.*

The EA monitors river levels within the main watercourses affecting Wycombe, including the River Wye (just downstream of The Rye in High Wycombe and also just downstream of Kingsmead in Loudwater) and the Hughenden Stream (just upstream of its confluence with the River Wye)[19]. Based upon a sophisticated in-house forecasting computer model, the EA makes an assessment of the maximum

[18] Civil Contingencies Act 2004

[19] Refer to the EA website (www.gov.uk/government/organisations/environment-agency) for further details regarding flood warning services within Wycombe District

water level that is likely to be reached during an anticipated flood event, which can extend from a few hours to several days. Where these predicted water levels are expected to result in the inundation of populated areas[20], the EA will issue a series of flood warnings within defined flood warning areas, encouraging residents to take action to avoid damage to property in the first instance.

In addition to the EA fluvial flood warning service, the Flood Forecasting Centre is a partnership between the EA and the Met Office. The centre forecasts for all natural forms of flooding - river, surface water and groundwater. A daily Flood Guidance Statement provides information for Category 1 and 2 responders to help with emergency planning and resourcing decisions. It presents an overview of the flood risk across five days and identifies possible severe weather, which could cause flooding and significant disruption to normal life. These forecasts, combined with understanding of the areas at highest risk of local flooding through the WCDA maps, can inform emergency planning for all sources of flooding.

As water levels rise and begin to pose a risk to life and/or livelihood, it is the responsibility of the emergency services to coordinate the evacuation of residents. This evacuation will be supported by the Council. It is essential that a robust plan is in place that clearly sets out (as a minimum):

- roles and responsibilities;
- paths of communication;
- evacuation routes;
- community centres to house evacuated residents;
- contingency plans in case of loss of power and/or communication.

Dry access (i.e. above flood level) should be sought wherever possible to ensure that all residents can be safely evacuated in times of flood. A Flood Evacuation Plan must be in place, suitable to the type of development, where there is no safe dry access to/from the site (i.e. access through Zone 1). To inform the assessment of public 'safety', Figures 23 to 29 provide an indication of the depth of flooding anticipated along key local roads during the 1% (1 in 100) AEP design event and suggestions as to evacuation routes, although these may vary depending upon the circumstances of individual events.

Coordination with the emergency services and the EA is imperative to ensure the safety of residents in time of flood. Relatively few areas within Wycombe District are at risk of river flooding (as indicated by the shaded NPPF flood risk zones in the adjoining maps). Flooding of this nature will typically occur following relatively long duration rainfall events, and consequently forewarning will generally be provided to encourage preparation in an effort to minimise property damage and risk to life. It is worth highlighting however that the benefits of flood warning are often compromised to a large degree by the lack of 'take up' within the local community. This emphasises the extreme importance of raising local awareness with respect to the potential risks of flooding.

Areas suffering from localised flooding issues may be at greater risk due to the difficulty of forecasting intense rainfall which may lead to surface water flooding and the response of aquifers to above average long-term rainfall which may lead to groundwater flooding. Localised flooding caused by intense rainfall can occur rapidly and pose a risk to life, particularly in confined spaces e.g. basement properties. Furthermore, the blockage of gullies and culverts as a result of litter and/or leaves is commonplace, and this will inevitably lead to localised problems that can only

[20] Restricted to those urban areas situated within EA flood warning zones

realistically be addressed by reactive maintenance. It is noted, however, that the EA has recently introduced a Groundwater Flood Warning Service as an extension to its existing Floodline Warnings Direct service. This new service is available to areas which have previously been affected and already receive local information about groundwater flooding. The service will issue Flood Alerts when there is the possibility of flooding from groundwater, Flood Warnings in some areas when flooding of property is expected and support the dissemination of information through the website, flood wardens, flood action groups etc.

It is recommended that Wycombe District Council advises the Thames Valley Local Resilience Forum of the risks raised in light of the updated Wycombe SFRA, ensuring that the planning for future emergency response can be reviewed accordingly. This will inform the Thames Valley Local Resilience Forum Community Risk Register[21].

[21] www.thamesvalleylrf.org.uk/useful-links/publications/risk-register.ashx

6 Updating the SFRA

The SFRA provides a strategic overview of the spatial variation of flood risk throughout the District at a particular point in time, building upon the best available information at that time.

The SFRA has been developed building heavily upon existing knowledge with respect to flood risk within the district; with data continually changing as new flooding events occur and further modelling is undertaken, this knowledge is continually evolving. In addition, Government policy on flood risk continues to change, with significant changes to national and local policy evident between the publication of the original SFRA in 2008 and the production of this update in 2013. Given that this is the case, a periodic review of the Wycombe District SFRA is imperative and it must be treated as a living document.

The following key questions should again be addressed as part of the SFRA review process:

Question 1

Has any flooding been observed within the District since the previous review? If so, the following information should be captured as an addendum to the SFRA:

- Location of flooding (grid reference or street name);
- Date(s) of flooding;
- Source of flooding (e.g. surface water, main river, sewers etc);
- Pathway of floodwaters (e.g. street name, direction etc);
- Receptors (e.g. properties flooded internally, road, gardens etc); and
- Frequency of flooding (e.g. once a year, during heavy rainfall etc).

Question 2

Have any amendments to the NPPF or the accompanying Planning Practice Guidance been released since the previous review? If so, the following key questions should be tested:

- Does the revision to the policy guidance alter the definition of the NPPF Flood Zones presented within the SFRA?
- Does the revision to the policy guidance alter the decision making process required to satisfy the Sequential Test?
- Does the revision to the policy guidance alter the application of the Exception Test?
- Does the revision to the policy guidance alter the categorisation of land use vulnerability, presented within Table 2 of the national Planning Practice Guidance?

If the answer to any of these core questions is ‘yes’ then a review of the SFRA recommendations in light of the identified policy change should be carried out.

Question 3

Has the EA or BCC issued any amendments to their flood risk mapping and/or guidance since the previous policy review? If so:

- Has any further detailed flood risk mapping been completed within the District, resulting in a change to the 5% (1 in 20) AEP, 1% (1 in 100) AEP or

0.1% (1 in 1000) AEP flood outline? If yes, then the Zone 3b and Zone 3a flood outlines should be updated accordingly;

- Has any further detailed or revised mapping been produced for the District resulting in a change to the Wycombe Critical Drainage Areas? If so, then relevant maps should be altered accordingly;
- Has the assessment of the impacts that climate change may have upon rainfall and/or river flows over time altered? If yes, then a review of the impacts that climate change may have upon the District is required; and
- Do the development management recommendations provided in the SFRA in any way contradict emerging EA advice with respect to (for example) the provision of emergency access, the setting of floor levels and the integration of sustainable drainage techniques? If yes, then a discussion with the EA is required to ensure an agreed suite of development control requirements are in place.

It is highlighted that the EA reviews the Flood Zone Map on a quarterly basis. If this has been revised within the District, the updated Flood Zones will be automatically forwarded to the Council for their reference. *It is recommended that only those areas that have been amended by the EA since the previous SFRA review are reflected in Zone 3 and Zone 2 of the SFRA flood maps.* This ensures that the more rigorous analyses carried out as part of the SFRA process are not inadvertently lost by a simple global replacement of the SFRA flood maps with the Flood Zone Maps.

Question 4

Has the implementation of the SFRA within the spatial planning and/or development management functions of the Council raised any particular issues or concerns that need to be reviewed as part of the SFRA process?

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Figures

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