South Hams District Council SFRA Level 1 Addendum

Final Report

May 2016

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Contract

This report describes work commissioned by South Hams District Council in their email dated 4th August 2015. Rachel Hopgood and Daryl Taylor of JBA Consulting carried out this work.

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Purpose

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List of Tables

Abbreviations and Glossary of Terms

Term	Definition
ABD	Areas Benefitting from Defences
AEP	Annual Exceedance Probability
AStSWF	Areas Susceptible to Surface Water Flooding
Brownfield	Land which has been previously developed.
CDA	Critical Drainage Area – A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure.
CDM	Construction (Design and Management) Regulations 2015
CFMP	Catchment Flood Management Plan - A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.

Term	Definition
CIRIA	Construction Industry Research and Information Association
CSO	Combined Sewer Overflow
DCC	Devon County Council
Defra	Department for Environment, Food and Rural Affairs
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 more frequently than once in 20 years.
DNPA	Dartmoor National Park Authority
DPD	Development Plan Documents
DRN	Detailed River Network – a dataset mapping the river network.
EA	Environment Agency
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management
FCRM GiA	Flood and Coastal Risk Management Grant in Aid
FMfSW	Flood Map for Surface Water
FRA	Flood Risk Assessment – A site specific assessment of all sources of flood risk to a site and the impact of development of the site on flood risk in the area.
FWMA	Flood and Water Management Act
GIS	Geographic Information System – a system (usually software) for visualising, analysing and interpreting geographic data.
Greenfield	Land which has not previously been developed.
HA (2009)	HA (2009) "Road Drainage and the Water Environment" - Part of the Design Manual for Roads and Bridges
HCWS161	House of Commons Written Statement 161 (2014) – written statement from the Secretary of State for Communities and Local Government (Mr Eric Pickles) following the consultation on delivering Sustainable Drainage Systems.
JBA	Jeremy Benn Associates
LASOO	Local Authority SuDS Officer Organisation
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority – Local Authority responsible for taking the lead on local flood risk management.
LPA	Local Planning Authority
Main River	A watercourse for which the Environment Agency has responsibilities and powers.
Major development	Developments of 10 dwellings or more or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010)
NPPF	National Planning Policy Framework
OFWAT	The Water Services Regulation Authority – the body responsible for economic regulation of the privatised water and sewerage industry in England and Wales.

Term	Definition
Ordinary Watercourse	All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.
PFRA	Preliminary Flood Risk Assessment
Pitt Review	Comprehensive independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
PPG	Planning Policy Guidance – superseded by NPPF
PPS25	Planning Policy Statement 25: Development and Flood Risk – superseded by NPPF
RBMP	River Basin Management Plan
SFRA	Strategic Flood Risk Assessment
SHDC	South Hams District Council
SMP	Shoreline Management Plan
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
SWW	South West Water Ltd
WFD	Water Framework Directive

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1 Introduction

1.1 Background

A Level 1 Strategic Flood Risk Assessment (SFRA) for South Hams District was published in 2007. There have been a number of significant changes to planning policy and to available data since the original Level 1 SFRA was published. These include: the revocation of Regional Spatial Strategies; the introduction of the National Planning Policy Framework (NPPF) and accompanying Planning Practice Guidance, introduction of the Flood and Water Management Act (FWMA); the production of a national surface water map, Areas Susceptible to Surface Water Flooding (AStSWF) and Flood Map for Surface Water (FMfSW); and a significant update of the Environment Agency's Flood Maps in 2012.

In addition to the revised policy and guidance documents, many of the data sets used to inform the SFRAs have since been updated. The introduction of new policy guidance and improved flood risk data sets has prompted the revision the Level 1 SFRA documents.

1.2 Strategic Flood Risk Assessment (SFRA) Approach

The primary objective of the revised South Hams Strategic Flood Risk Assessment (SFRA) is to inform the emerging Local Plan. The SFRA has a broader purpose, however, and in providing a robust depiction of flood risk from all sources 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 control process by providing a more informed response to development proposals affected by flooding, influencing the 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;
- Support and inform the Council's emergency planning response to flooding.

To meet these broader objectives, the SFRA has been developed in a pragmatic manner in close consultation with the Council. Government guidance[1] provides information to Local Planning Authorities (LPAs) on the key elements which should be included in a Strategic Flood Risk Assessment (SFRA), although no specific methodology is given for undertaking the assessment. The key requirements are summarised below:

- The SFRA should provide sufficient detail for the application of the Sequential Test.
- The SFRA should include mapping of: main rivers, any other rivers and streams, development sites allocated or under consideration for the local plan, flood zones including the functional floodplain.
- The report should include an assessment of flooding from all sources, including an allowance for climate change and should list: areas at risk from other sources of flooding, existing measures to manage flood risk, areas covered by flood warnings, areas with critical drainage problems noted by the Environment Agency, areas that may need surface water management plans, locations that may have an increased risk if there's additional development.
- The report should contain advice to applicants on producing site specific flood risk assessments including specific requirements for managing flood risk. This should include information on which sustainable drainage techniques are suitable for major and other development types.

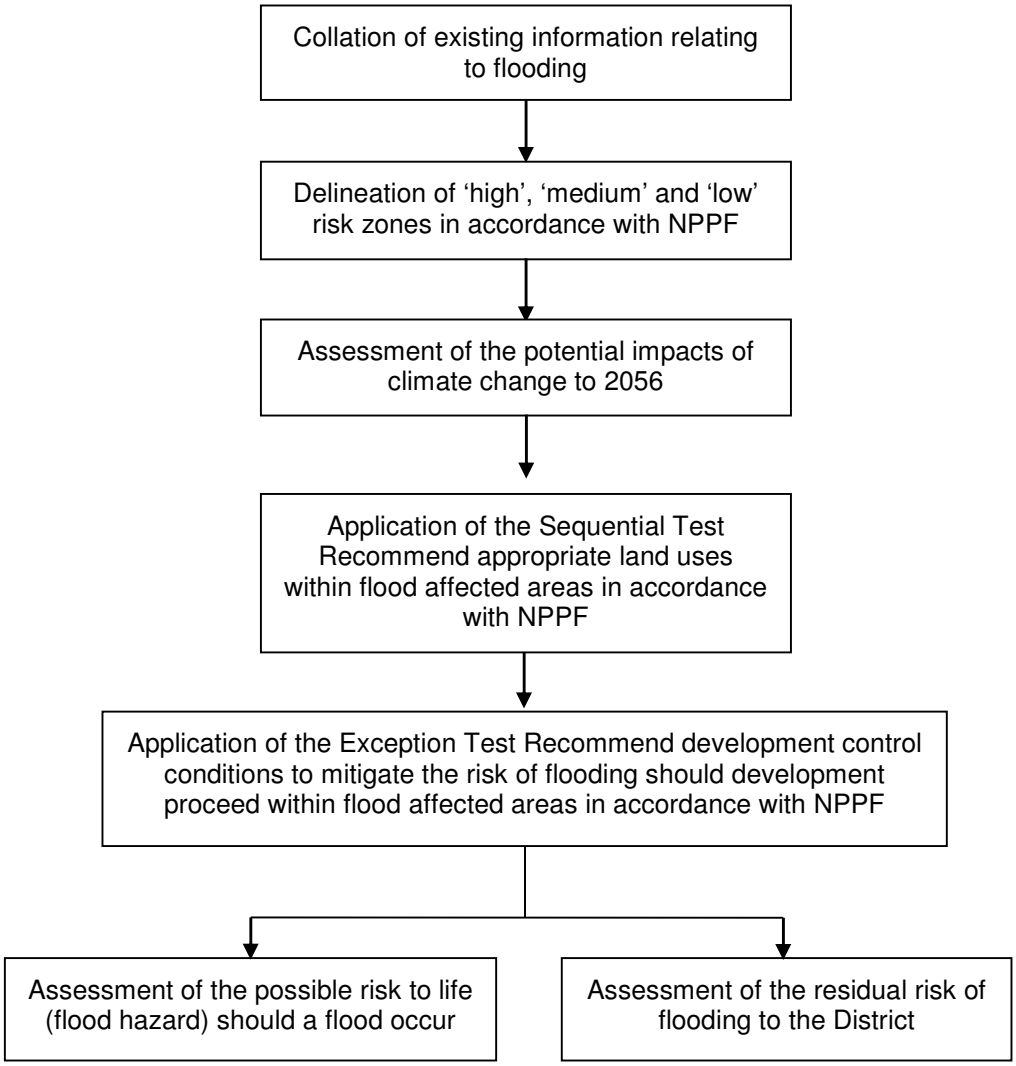
A considerable amount of knowledge exists with respect to flood risk within the District, including information relating both to historical flooding, and the predicted extent of flooding under extreme weather conditions (i.e. as an outcome of detailed flood risk modelling carried out by the Environment Agency). The South Hams SFRA has built upon this existing knowledge,

[1] https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment [Accessed December 2015]

underpinning the delineation of the District into zones of 'high', 'medium' and 'low' probability of flooding, in accordance with NPPF. 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 future housing and employment uses.

A summary of the adopted SFRA process is provided in the figure below, outlining the specific tasks undertaken and the corresponding structure of the SFRA report.

It is important to recognise that some of the rivers that affect the District flow into, or from, adjoining authorities within Devon and Cornwall. Future development within the District, if not carefully managed, can influence the risk of flooding posed to residents within neighbouring areas. Conversely, planning decisions within adjacent districts can also impact adversely upon flooding within the District.



1.3 Planning Context

The National Planning Policy Framework (NPPF) was published in March 2012 and the supporting NPPF Planning Practice Guidance was launched in March 2014. This replaces most of the previous Planning Policy Statements (PPS) and Planning Policy Guidance (PPG), including PPS25: Development and Flood Risk. This Strategic Flood Risk Assessment (SFRA) has been prepared in accordance with the principles set out in the NPPF and supporting guidance.

The NPPF and accompanying Planning Practice Guidance emphasise the responsibility of Local Planning Authorities (LPAs) to ensure that flood risk is understood and managed effectively using a risk-based approach throughout all stages of the planning process. The NPPF requires LPAs to undertake SFRAs to support the preparation of their Local Plan and to use their findings, and those of other studies, to inform strategic land use planning, including the application of the Sequential Test which seeks to steer development towards areas of lowest flood risk prior to consideration of areas of greater risk.

1.4 Study Area

The study area for this SFRA covers South Hams District Council administrative area and includes parts of Dartmoor National Park with respect to land drainage responsibilities. However, the Dartmoor National Park Authority is a discrete planning authority and therefore no settlement-specific mapping or flood risk summaries have been included for this area.

1.5 South Hams District Council Area

South Hams District covers an area of 887 km^2 and has the fifth largest population of districts in Devon, with approximately 84,000 residents. South Hams District has the highest proportion of rural residency of all districts in Devon, with only 21% of residents living in urban towns/cities. The main towns are Ivybridge, Totnes, Kingsbridge and Dartmouth. The District incorporates a band of coastline in the south and hilly moorland of southern Dartmoor National Park in the north, separated by a band of agricultural land. The area includes many small ordinary watercourses originating on the granite plateau of Dartmoor, which generally flow in a southerly direction towards the coastline.

Significant river catchments are:

- River Avon catchment - Originates on Dartmoor. Settlements within the catchment include South Brent, Loddiswell and Aveton Gifford (which is the tidal limit of the watercourse).
- River Dart catchment - The River Dart originates on Dartmoor at the confluence of the East and West Dart at Dartmeet (outside SHDC boundary). The main settlements within the catchment is Totnes, which also marks the tidal limit of the river, and Dartmouth, which is located on the Dart Estuary.
- River Erme catchment - Originates on Dartmoor and reaches its tidal limit at Holbeton. Main settlements within the catchment are Ivybridge and Ermington.
- River Yealm catchment - Originates on Dartmoor and the whole catchment falls within the boundary of SHDC. Main settlements within the catchment are Cornwood, Lee Mill and Yealmpton (which is the tidal limit of the watercourse).

1.6 Dartmoor National Park Area

South Hams District Council, West Devon Borough Council and Teignbridge District Council hold land drainage responsibilities for the areas of Dartmoor National Park which fall within the three Councils' administrative boundaries. Dartmoor National Park Authority is a discrete planning authority and has responsibility for strategic planning and development control within the National Park.

Many of the main rivers and ordinary watercourses which flow though South Hams originate on Dartmoor. The surface water run-off from the moor feeds the watercourses which can respond quickly following rainfall. The results of rainfall on the moor can be experienced downstream immediately in some cases, or several days later in others.

Surface water run-off from the moor is a potential source of risk and can result in property and highway flooding issues.

As the Dartmoor National Park Area operates as a discrete planning authority, separate to South Hams District Council, no settlement-specific mapping or flood risk summaries have been produced for this area as part of this Strategic Flood Risk Assessment.

1.7 Aims and Objectives of the SFRA Update

The aim of this study is to provide an updated Level 1 SFRA for South Hams District Council (SHDC). This document will be used to inform planning and development policies within the county in accordance with the NPPF and supporting guidance.

The aim of the Level 1 SFRA update will be met through the following objectives:

- Provide an assessment of the impact of all potential sources of flooding in accordance with NPPF, including an assessment of any future impacts associated with climate change and sea level rise
- Enable planning policies to be identified specific to local flooding issues
- Provide information required to apply the Sequential Test for identification of land suitable for development in line with the principles of the NPPF
- Provide baseline data to inform the Sustainability Appraisal of the Development Plan Documents (DPDs) with regard to catchment-wide flooding issues which affect the Study Area
- Provide sufficient information to the Local Planning Authority to assess the flood risk for specific development proposal sites, thereby setting out the requirements for site specific Flood Risk Assessments (FRAs)
- Provide recommendations of suitable mitigation measures including the objectives of Sustainable Drainage Systems (SuDS)
- Enable the Local Planning Authority to use the SFRA as a basis for decision making at the planning application stage
- Where necessary, inform technical assessments to demonstrate that development located in flood risk areas are appropriate and in line with the requirements of the exception test
- Present sufficient information to inform the Local Planning Authority of levels of flood risk in relation to emergency planning capability

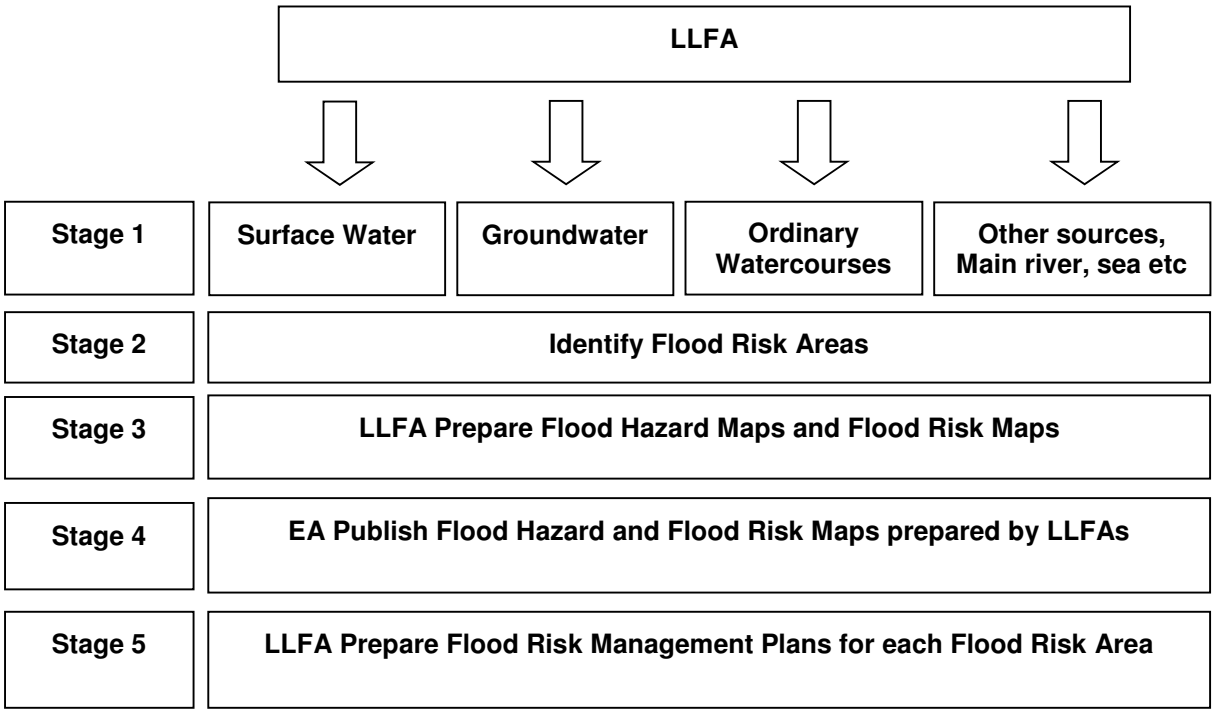
2 Policy Context

Since the Level 1 SFRA was completed in 2007, updates to national planning policy and flood risk have been implemented. This section identifies the main changes and the impacts they have on the SFRA.

2.1 The Flood Risk Regulations (2009)

The Flood Risk Regulations came into force in December 2009 and set out duties for the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) in the preparation of a range of reports and mapping outputs.

The Flood Risk Regulations (2009) transpose the EU Floods Directive (2007/60/EC) into UK Law. One of the main impacts on LLFAs in the England and Wales is that they are required to complete Preliminary Flood Risk Assessment (PFRAs). Where Flood Risk Areas were defined within the PFRA Flood Risk Maps showing the extents and hazards of flooding are required to be produced alongside Flood Risk Management Plans.



The LLFA, Devon County Council, prepared a PFRA report for flooding from sources other than that from the sea, main rivers and reservoirs.

This document determines whether, in the opinion of the LLFA, there is a significant flood risk in its area and identify the part of the area, if any, where this risk exists (for sources other than that from sea, main rivers and reservoirs).

- Where the LLFA identify a relevant flood risk area there is a requirement to prepare flood hazard and flood risk maps for these areas for publication by the Environment Agency before 22nd December 2013.
- In addition, for these areas, a flood risk management plan must be prepared for publication by the Environment Agency by 22nd December 2015.

2.2 River Basin Management Plans (2009)

River Basin Management Plans (RBMPs) were produced by the Environment Agency in order to set out how partners work together to protect the water environment. RBMPs were produced for 11 districts in England and Wales and consider the state of the water environment for each district and any pressures which may be affecting it. They also set out objectives for protection of the water environment and any actions which are required to achieve these.

South West River Basin Management Plan focuses on the protection, improvement, sustainable use of the water environment and the mitigation of the effects of flooding. River basin management is a continuous process of planning and delivery. The Water Framework Directive introduces a formal series of 6 year cycles. The first cycle will end in 2015 when, following further planning and consultation, this plan will be updated and re-issued.

2.3 The Flood and Water Management Act (2010)

Following the floods in 2007, which devastated many parts of the country, one of the recommendations from Sir Michael Pitt's review was that "the role of local authorities should be enhanced so that they take on responsibility for leading the co-ordination of flood risk management in their areas".

The Flood and Water Management Act (FWMA) (2010) brings new roles and responsibilities for local authorities. The Act defines the role of the LLFA, which in this case is Devon County Council. The LLFA is encouraged to bring together relevant bodies and stakeholders to effectively manage local flood risk.

The new responsibilities that the Act assigns to LLFAs include:

- Coordinated management of flooding from surface water, ground water and ordinary watercourses;
- Development and maintenance and implementation of Flood Risk Management Strategies;
- Investigation and recording of local flood events;
- Establishment and maintenance of a Flood Risk Asset Register.

Devon County Council have produced flood investigation reports for a number of flood events within the county under the Act. Those relevant to the South Hams District Council study area are discussed further in section 5.8 of this report.

2.4 National Flood and Coastal Erosion Risk Management Strategy (2011)

The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in England was developed by Environment Agency. The strategy provides a framework for the work of all flood and coastal erosion risk management authorities.

The National FCERM Strategy sets out the long-term objectives for managing flood and coastal erosion risks. It informs the production of local flood risk management strategies by LLFAs. The aim is to encourage effective risk management by enabling people, communities, business and the public sector to work together to:

Establish aims and principles for others to be consistent with:

- Establish aims and principles for others to be consistent.
- Ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively.
- Set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risks.
- Encourage innovative management of risks taking account of the needs of communities and the environment.
- Ensure that emergency responses to flood incidents are effective and that communities are able to respond properly to flood warnings.
- Ensure informed decisions are made on land use planning.

2.5 Shoreline Management Plan (2011)

The Shoreline Management Plan (SMP) was published in 2011 and provides a large scale assessment of the risks associated with costal evolution. It includes a framework aimed at addressing risks in a sustainable manner with respect to people and the developed historic and natural environment. Although the SMP does not concentrate on flooding it does identify locations that are susceptible to coastal evolution due to tidal influences. The SMP also identifies the location of natural and man-made coastal defences, and identifies short, medium and long term

plans relating to the natural coastal evolution. The document provides strategic planners and development managers with details of the preferred methods of management of coastal evolution.

It is also designed to allow strategic allocation of funding in the short, medium and long term from risk management authorities, in accordance with the coastal strategies of "Hold the line", "Managed retreat" and "No active intervention".

2.6 Devon County Council Preliminary Flood Risk Assessment (2011)

In May 2011 Devon County Council (DCC) published the Devon-wide Preliminary Flood Risk Assessment (PFRA) to meet their duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations 2009. The aim of the report was to review the existing flood risk information available from the LLFA and partner organisations. The data consisted of the record of local historic flood events, flood probabilities and harmful consequences of flood events which could impact on the economy, environment and cultural heritage. The data collection exercise enabled the national surface water flood risk models to be verified and to identify areas of flood risk within the area which might not have been captured elsewhere.

The PFRA provides a high level overview of flood risk from local flood sources, including surface water, groundwater, ordinary watercourses and canals.

2.7 National Planning Policy Framework (2012)

The National Planning Policy Framework (NPPF) was published in March 2012 together with accompanying Technical Guidance. The supporting Planning Practice Guidance to the NPPF was launched in March 2014 and replaced the Technical Guidance. The NPPF replaces most of the previous Planning Policy Statements (PPS) and Planning Policy Guidance, including PPS25: Development and Flood Risk.

The NPPF is a framework under which councils and local people can produce local and neighbourhood plans. These plans are tailored to the needs and priorities of their communities.

Paragraph 103 of the NPPF states that:

"When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific FRA following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- *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*
- *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.*"

2.8 Catchment Flood Management Plans (CFMPs) (2012)

A CFMP is a high-level strategic planning document produced by the Environment Agency. This provides an overview of the main sources of flood risk and how these can be managed in a sustainable framework for the next 50 to 100 years. The Agency engages stakeholders within the catchment to produce policies in terms of sustainable flood management solutions and considers local land use changes and climate change.

CFMPs are used to support and inform planning policies, statutory land use plans and implementation of the Water Framework Directive to ensure that development with the catchment is sustainable in terms of flood risk.

The following policies for the approach to flood risk management are the same across the CFMPs and are as follows:

- **Policy 1** - Areas of little or no flood risk where we will continue to monitor and advise
- **Policy 2** - Areas of low to moderate flood risk where we can generally reduce existing flood risk management action
- **Policy 3** – Areas of low to moderate flood risk where we are generally managing existing flood risk effectively

- **Policy 4** - Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change
- **Policy 5** - Areas of moderate to high flood risk where we can generally take further action to reduce flood risk
- **Policy 6** - Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits

Table 2-1: Summary of Tamar CFMP sub-regions

CFMP	Sub-Region	Policy	LPA
Tamar Catchment (2012)	Upper Tamar	Policy 6	Torridge District Council, Cornwall Council, Dartmoor National park Authority
	Tidal Central	Policy 6	West Devon Borough Council, South Hams District Council
	Plymouth	Policy 5	Plymouth City Council, Cornwall Council, South Hams District Council
	East Tamar	Policy 4	West Devon Borough Council, South Hams District Council
	Central Tamar	Policy 3	Torridge District Council, West Devon Borough Council, Cornwall Council
	West Tamar	Policy 3	Cornwall Council

Table 2-2: Summary of South Devon CFMP sub-regions

CFMP	Sub-Region	Policy	LPA
South Devon (2012)	Dartmoor	Policy 6	Dartmoor National Park Authority, West Devon Borough Council, Teignbridge District Council, South Hams District Council
	Avon	Policy 6	South Hams District Council
	Torbay	Policy 5	Torbay Council, South Hams District Council
	Newton Abbot and Totnes	Policy 5	Teignbridge District Council, South Hams District Council
	Dart, Teign and Kingsbridge Estuaries	Policy 5	Teignbridge District Council, South Hams District Council
	Bovey Tracey and Ashburton	Policy 5	Teignbridge District Council, Dartmoor National Park Authority
	Buckfastleigh	Policy 4	Teignbridge District Council, Dartmoor National Park Authority
	Lower Erme	Policy 3	South Hams District Council
	Rural Mid-Lower Teign, Dart and Avon sub-area	Policy 2	South Hams District Council, Teignbridge District Council, Mid Devon District Council

2.9 Surface Water Management Plans (2012 – 2013)

Devon County Council has developed Surface Water Management Plans (SWMPs) in order to progress the management of "local flooding" within the county (i.e. not from Main Rivers and the sea). The Devon-wide SWMP investigated flood risk in 13 locations identified as potentially at high risk of flooding. Of these, only Ivybridge is located within the South Hams District Council boundary. Devon County Council has also produced specific SWMPs for several of the high risk areas identified although none of the additional SWMPs are for areas within the South Hams District Council area.

2.10 Local Flood Risk Management Strategy (2014)

In May 2014 Devon County Council published the Local Flood Risk Management Strategy for the county of Devon. This strategic document outlines the responsibilities of the Risk Management Authorities in Devon and sets out how they work in partnership to coordinate local flood risk management.

2.11 Consultation on delivering Sustainable Drainage Systems (2014)

Public consultation on the approach to deliver effective Sustainable Drainage Systems (SuDS), ran for 6 weeks from 12 September 2014 to 24 October 2014. The consultation responses were published on 18 December 2014.

The consultation sought views and evidence from a wide range of partners on an alternative approach to the one envisaged in the Flood and Water Management Act 2010, specifically to deliver sustainable drainage systems through changes to the current planning system. Through 7 questions, the consultation set out four key areas for discussion: whether the planning system would deliver sustainable drainage systems; local planning authorities' ability to obtain appropriate expert advice; appropriate thresholds for the proposed policy; and the maintenance of sustainable drainage systems. In this document, a summary of the general themes and concerns raised is provided on the four key areas together with the Government's response.

2.12 House of Commons: Written Statement HCWS161 (2014)

Following the result of the consultation on delivering Sustainable Drainage Systems (SuDS) the Secretary of State for Communities and Local Government (Mr Eric Pickles) a written statement was made on 18 December 2014.

The statement set out the Government's continuing commitment to protect people and property from flood risk. The Department for Environment, Food and Rural Affairs consulted on a proposal to make better use of the planning system to secure Sustainable Drainage Systems. The Government's expectation is that Sustainable Drainage Systems will be provided in new developments wherever this is appropriate.

Local planning policies and decisions on planning applications relating to major development - developments of 10 dwellings or more; or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010) - should ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate.

Under these arrangements, in considering planning applications, local planning authorities should consult the relevant lead local flood authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development. The sustainable drainage system should be designed to ensure that the maintenance and operation requirements are economically proportionate.

This policy will apply to all developments of 10 homes or more and to major commercial development, but the Government could review these arrangements and make adjustments where necessary. The current requirement in national policy that all new developments in areas at risk of flooding should give priority to the use of sustainable drainage systems will continue to apply.

Implementation of changes will be from 6 April 2015. For avoidance of doubt this statement should be read in conjunction with the policies in the National Planning Policy Framework. Consideration

must be given to this policy during the preparation of local and neighbourhood plans, and may be a material consideration in planning decisions.

2.13 Emergency Planning

The Civil Contingencies Act 2004 placed duties on Local Authorities making them Category 1 responders with regard to the preparation of emergency plans, communicating with the general public, promoting business continuity and management, and risk assessment. South Ham District Council provides support to emergency services and Lead Authorities during major emergencies e.g. severe weather, flooding and coastal erosion. The councils also work with local communities to help them produce and implement community emergency plans to develop community resilience to natural occurrences such as flooding.

3 Planning for Flood Risk

3.1 Site Specific Flood Risk Assessment Guidance

This Strategic Flood Risk Assessment provides an assessment of flood risk from all sources throughout the South Hams District Council study area. However, this is a broad-scale assessment and a site-specific Flood Risk Assessment (FRA) would need to be undertaken prior to development of a site in order to ensure that all forms of flood risk are fully assessed. It is normally the responsibility of the developer to provide a FRA with an application. However, a LPA can decide to commission a detailed, site-specific FRA to help them decide upon allocations in the high risk zone. The SFRA cannot provide this level of site-specific information.

This section provides guidance on the preparation of site-specific Flood Risk Assessments (FRAs) and has been based on the following:

- The recommendations detailed in NPPF, and associated Planning Practice Guidance.
- Information contained within this SFRA report.

When preparing a site specific Flood Risk Assessment, further information should be sought from the NPPF and from the Environment Agency's standing advice on Flood Risk Assessment[2].

3.1.1 Requirements of a Flood Risk Assessment

The NPPF states that for sites in areas at risk of flooding and/or where the site area is 1 hectare or more, a site-specific Flood Risk Assessment (FRA) will need to be submitted as part of a planning application. NPPF defines "areas at risk of flooding" as areas at risk from all sources of flooding. For fluvial and tidal flooding this is usually defined as land in Flood Zone 2 or 3 (see section 4.5.1) or areas of Flood Zone 1 defined as a Critical Drainage Area (see section 4.5.4).

The aim of the FRA is to assess the flood risk from all sources and to demonstrate that the development is protected from flooding and is safe during the design flood event, including an allowance for climate change. This includes assessment of mitigation measures required to safely manage flood risk. Development proposals requiring FRAs should:

- Apply the Sequential and, when necessary, Exception, Tests.
- Not increase flood risk, either upstream or downstream, of the site, taking into account the impacts of climate change
- Not increase surface water volumes or peak flow rates, which would result in increased flood risk to the receiving catchments
- Use opportunities provided by new development to, where practicable, reduce flood risk within the site and elsewhere
- Ensure that where development is necessary in areas of flood risk (after application of Sequential and Exception Tests), it is made safe from flooding for the lifetime of the development, taking into account the impact of climate change
- Consider all sources of flood risk, including fluvial, surface water, groundwater and drainage.

FRAs should follow the approach recommended by the NPPF and associated guidance, and guidance provided by the Environment Agency.

3.1.2 Development and Flood Zones

As set out in the NPPF, inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Table 3-1 shows the flood risk vulnerability types which are deemed appropriate for each of the flood zones (see section 4.5.1). More information on the definition and policy aims for each flood zone and on the vulnerability type classifications can be found in the NPPF and its Planning Practice Guidance.

[2] https://www.gov.uk/guidance/flood-risk-assessment-standing-advice

Table 3-1: Flood Risk Vulnerability and Flood Zone 'Compatibility' [Source: Table 3, NPPF Planning Practice Guidance]

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test required	✓	✓	✓
Flood Zone 3a	Exception Test required †	×	Exception Test required	✓	✓
Flood Zone 3b	Exception Test required *	×	×	×	✓*
Key: ✓ - Development is appropriate × - Development should not be permitted					

Notes:

- *This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;*
- *The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;*
- *Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.*

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

** In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:*

- *remain operational and safe for users in times of flood;*
- *result in no net loss of floodplain storage;*
- *not impede water flows and not increase flood risk elsewhere.*

It should be acknowledged that a detailed FRA may show that a site is not appropriate for development of a particular vulnerability, or at all. Where the FRA shows that a site is not appropriate for a particular usage, a lower vulnerability classification may be appropriate at that site.

3.1.3 The Sequential and Exception Tests

The NPPF sets out the aim of the Sequential Test which is to steer new development to areas with the lowest probability of flooding. The Flood Zones (see section 4.5.1) should be the starting point for this approach. Development should first be steered towards land in Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, sites may then be considered in Flood Zone 2, taking into account the vulnerability classification of the proposed development and applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should development in Flood Zone 3 be considered, taking into account the vulnerability classification of the proposed development and applying the Exception Test if required.

The Exception Test will be required as indicated in Table 3-1 above. The Exception Test is applied only where suitable sites at lower risk of flooding are not available and is used to demonstrate that flood risk to people and property at a development will be managed. There are two parts to the Exception Test. Firstly, it must be demonstrated that the proposed development will provide wider sustainability benefits to a community that will outweigh the flood risk. Secondly, it must be shown that the proposed development will be safe for its lifetime, without increasing flood risk elsewhere, and where possible will reduce flood risk. Any site which fails the Exception Test should not be allocated for development.

3.1.4 Reducing Flood Risk through Site Layout

Development which is proposed to be located within areas at flood risk (having passed the Sequential Test and, where appropriate, the Exception Test) should be designed taking flood risk into account at an early stage. The site layout should be planned to reduce flood risk to the development where possible.

The NPPF states that a sequential, risk-based approach should be applied, aiming to locate more vulnerable land uses to higher ground, while more flood-compatible development (e.g. vehicular parking, recreational space) can be located in higher risk areas. However, the risks associated with vehicular parking in floodplains should be addressed considering the nature of parking, flood depths and hazard including evacuation procedures and flood warning.

Waterside areas, or areas along known flow routes, can act as Green Infrastructure, being used for recreation, amenity and environmental purposes, allowing the preservation of flow routes and flood storage, and at the same time providing valuable social and environmental benefits contributing to other sustainability objectives. Landscaping should ensure safe access to higher ground from these areas, and avoid the creation of isolated islands as water levels rise.

3.1.5 Reducing Flood Risk through Mitigation Measures

Mitigation measures to reduce flood risk should always be seen as a last resort. Consideration should first be given to selecting an appropriate site, in accordance with the Sequential and Exception Tests, and then to planning the site layout to ensure that the most vulnerable land uses are assigned to areas at lowest flood risk within the site.

Often the determining factors in deciding whether a particular development is appropriate are the practical feasibility, financial viability and long term maintenance implications of flood risk mitigation rather than technical limitations. Detailed technical assessments are required in the FRA to assess the practical feasibility, together with a commercial review by the developer of the cost of the mitigation works and how provisions will be made for their long term maintenance.

Whilst it might be possible to identify appropriate flood mitigation measures for some sites, it is worth noting that in some instances the findings of individual FRAs may determine that the risk of flooding to a proposed development is too great and mitigation measures are not feasible or appropriate. In these instances, the development is likely to be subject to an objection by the Lead Local Flood Authority and / or Environment Agency. The minimum acceptable standard of protection against flooding for new residential property within flood risk areas is 1% annual probability for fluvial flooding, 0.5% annual probability of tidal flooding and a breach during a 0.5% annual probability tidal event. An allowance for climate change over the lifetime of the development must be made when assessing all these scenarios. The measures chosen will depend on the nature of the flood risk. Further information on measures which may be appropriate is detailed below.

Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) aim to mimic the natural processes of Greenfield surface water drainage, allowing water to flow along natural flow routes and reducing the runoff rates and volumes during storm events, while providing water treatment benefits. SuDS also have the advantage of providing effective Blue and Green infrastructure, ecology and public amenity benefits when designed and maintained properly.

The inclusion of SuDS within developments should be seen as an opportunity to enhance ecological and amenity value, and promote Green Infrastructure, incorporating above ground facilities into the development landscape strategy. SuDS must be considered at the outset, during preparation of the initial site conceptual layout to ensure that enough land is given to design spaces that will be an asset to the development rather than an after-thought.

As discussed in section 2.12, the House of Commons Written Statement (HCWS161) sets out the requirement for SuDS to be incorporated for all major development unless demonstrated to be inappropriate. Major development is defined as developments of 10 dwellings or more or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010).

Further guidance on the provision of SuDS is included in section 3.2 of this SFRA document.

Modification of ground levels and compensatory storage

Modifying ground levels to raise the land above the required flood level is an effective way of reducing flood risk to a particular site in circumstances where the risk is entirely from tidal flooding and the land does not act as conveyance for flood waters. However, care must be taken at locations where raising ground levels could adversely affect existing communities and property.

In most areas of fluvial flood risk, conveyance or flood storage in flood cells would be reduced by raising land above the floodplain, adversely impacting on flood risk downstream or on neighbouring land. There should be no interruption to flood flows or loss of flood storage as a result of any proposed development. Flood storage compensation may be appropriate for sites on the edge of the existing floodplain or within a flood cell.

Compensatory flood storage should be provided, and would normally be on a level for level, volume for volume basis on land that does not currently flood but is adjacent to the floodplain (in order for it to fill and drain). It should be in the vicinity of the site and within the red line of the planning application boundary (unless the site is strategically allocated).

Raising ground levels can also deflect flood flows, so analyses should be performed to demonstrate that there are no adverse effects on third party land. Raising levels can also create areas where surface water might pond during significant rainfall events. Any proposals to raise ground levels should be tested to ensure that it would not cause increased ponding or build-up of surface runoff on third party land.

Raised defences

Construction of localised raised floodwalls or embankments to protect new development is not a preferred option, as a residual risk of flooding will still remain. Compensatory storage must be provided where raised defences remove storage from the floodplain or flood cell. It would be preferable for schemes to involve an integrated flood risk management solution. Temporary or demountable defences are not generally considered acceptable forms of flood protection for a new development but might be appropriate to address circumstances where the consequences of residual risk are severe. In addition to the technical measures, the proposals must include details of how the temporary measures will be erected and decommissioned, responsibility for maintenance and the cost of replacement when they deteriorate.

Developer contributions

In some cases and following the application of the Sequential Test, it may be necessary for the developer to make a contribution to the improvement of flood defence provision that would benefit both proposed new development and the existing local community. Developer contributions can also be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).

Defra's Flood and Coastal Risk Management Grant in Aid (FCRM GiA) can be obtained by operating authorities to contribute towards the cost of a range of activities including flood risk management schemes that help reduce the risk of flooding and coastal erosion. Some schemes are only partly funded by FCRM GiA and therefore any shortfall in funds will need to be found from elsewhere when using Resilience Partnership Funding, for example local levy funding, local businesses or other parties benefitting from the scheme.

For new development in locations without existing defences, or where the development is the only beneficiary, the full costs of appropriate risk management measures for the life of the assets proposed must be funded by the developer. However, the provision of funding by a developer for the cost of the necessary standard of protection from flooding or coastal erosion does not mean the development is appropriate as other policy aims must also be met. Funding from developers should be explored prior to the granting of planning permission and in partnership with the Local Planning Authority and the Environment Agency.

The appropriate route for the consideration of strategic measures to address flood risk issues is the Local Flood Risk Management Strategy (LFRMS) prepared by the Lead Local flood Authority. The LFRMS should describe the priorities with respect to local flood risk management, the measures to be taken, the timing and how they will be funded. It will be preferable to be able to demonstrate that strategic provisions are in accordance with the LFRMS, can be afforded and have an appropriate priority.

The Environment Agency is committed to working in partnership with Developers to reduce flood risk. Where assets are in need of improvement or a scheme can be implemented to reduce flood risk, the EA request that Developers contact them to discuss potential solutions.

Building design – resistance and resilience

Internal areas of new development should be designed to be dry during the 1 in 1,000-year flood event. Additionally, Environment Agency standing advice on Flood Risk Assessment states that ground floor levels should be a minimum of whichever is the higher of:

- 300mm above the ground level of the site
- 600mm above the estimated design river or sea level (usually the 1% annual probability for fluvial flooding or the 0.5% annual probability event for tidal flooding, both with an allowance for climate change over the lifetime of the development)

The raising of floor levels within a development aims to reduce damage occurring to the interior, furnishings and electrics in times of flood. However, it should be noted that raising of floor levels may not be appropriate in some locations and, as with all mitigation measures, should be considered on a site-by-site basis. Additionally, consideration should be given to safe access and egress for occupants of the buildings during a flood event.

There may be instances where flood risk remains to internal areas of a development. For example, where the use is water compatible, where an existing building is being changed or where residual risk remains behind defences. In these cases (and for existing development in the floodplain), additional measures can be put in place to reduce damage in a flood and increase the speed of recovery. These measures should not be relied on as the only mitigation method. Resistance and resilience measures might include:

- Temporary barriers and covers
- Permanent barriers (e.g. built up doorstep or toughened glass barriers)
- Installation of electrical circuitry at high level
- Water-resistant materials for floors, walls and fixtures
- Non-return valves to prevent water ingress from the sewerage system

Resilience measures will be specific to the nature of the development and the flood risk, and as such should be informed and determined by the FRA.

Addressing sewer flooding

The capacity of internal drainage infrastructure is often limited and designed to be at or near capacity under existing conditions. Development that leads to increased peak runoff within the drainage catchments may lead to infrastructure capacity being exceeded, with the potential for increased flood risk. Development locations should be assessed to ensure capacity exists within both the on and off site network.

Where new development is in an area where the public sewerage network does not currently have sufficient spare capacity to accept additional development flows it is recommended that the developer discusses such issues with the relevant sewerage undertaker (South West Water) at the earliest possible stage.

In areas where sewer flooding is an issue, non-return valves can be installed within gravity sewers or drains, within private sewers upstream of the public sewerage system. These need to be carefully installed and must be regularly maintained. Additionally, manhole covers within the site could be sealed to prevent surcharging, if it can be demonstrated that this would not cause detrimental impacts on local flood risk.

Addressing groundwater flooding

Groundwater flooding has a very different flood mechanism to any other and it is often difficult to predict and quantify the risk. For this reason many conventional flood defence and mitigation methods are not suitable. The recommended method to reduce flood risk would be through building design, ensuring floor levels are raised. Site design would also need to preserve any flow routes followed by the groundwater overland to ensure that flood risk is not increased elsewhere. When redeveloping existing buildings it may be acceptable to install pumps in basements as a resilience measure. However for new development this is unlikely to be considered an acceptable solution.

3.1.6 Safe Access and Egress

Consideration must be given to the provision of safe access and egress during flood events, and how this is linked to flood warning and emergency evacuation where necessary. The Emergency Services and local authority should be consulted on the evacuation and rescue capabilities and any advice or requirements included.

The NPPF Planning Practice Guidance outlines how developers can ensure safe access and egress to and from development in order to demonstrate that development satisfies the second part of the Exception Test.

Access considerations should include the voluntary and free movement of people during a 'design flood', with allowance for climate change, as well as for the potential of evacuation before a more extreme flood. The access and egress must be functional for changing circumstances over the lifetime of the development. The NPPF Planning Practice Guidance sets out that:

- Access routes should allow occupants to safely access and exit their dwellings in design flood conditions. In addition, vehicular access for emergency services to safely reach the development in design flood conditions is usually required.
- Where possible, safe access routes should be located above design flood levels and avoid flow paths. Where this is unavoidable, limited depths of flooding may be acceptable providing the proposed access is designed to sufficiently reduce the risk. The acceptable flood depth for safe access will vary as this will be dependent on flood velocities and risk of debris in the flood water.

As part of an FRA, the developer should review the acceptability of the proposed access in consultation with the Environment Agency.

3.1.7 Flood Warning and Evacuation

A consideration for any new development is how to make it safe from flood risk over the development's lifetime (including the likely impacts of climate change). The NPPF Planning Practice Guidance outlines the main options and considerations for making a development safe; this includes flood warning and evacuation plans (these can also be referred to as flood plans or flood response plans etc.) which should be prepared where appropriate. Flood warning and evacuation plans should detail actions to assist residents / building users in preparing and responding to the risk of flooding and remaining safe, as well as defining procedures in the event an evacuation is required.

The practicality of safe evacuation from an area will depend on:

- the type of flood risk present and the extent to which advance warning can be given in a flood event;
- the number of people that would require evacuation from the area at risk;
- the adequacy of both evacuation routes and identified places that people could be evacuated to (taking into account the length of time that the evacuation may need to last);
- Sufficiently detailed and up to date evacuation plans being in place for the locality that address these issues.

It is a requirement under the NPPF that a flood warning and evacuation plan is prepared for sites at risk of flooding used for holiday or short-let caravans and camping and are important at any site that has transient occupants (e.g. hostels and hotels). Flood warning and evacuation plans can be prepared at a personal, site specific, community/group level in consultation with the local planning authority and emergency services.

Flood warnings supplied by the Environment Agency's Floodline Warnings Direct service can be provided to homes and businesses within Flood Zones 2 and 3, although the service is not available everywhere. Developers should encourage those owning or occupying developments, where flood warnings can be provided, to sign up to receive them. This applies even if the development is defended to a high standard.

3.1.8 Making Space for Water

The NPPF sets out a clear policy aim in Flood Zone 3 to create space for flooding by restoring functional floodplain.

All new development close to rivers should consider the opportunity presented to improve and enhance the river environment. Developments should look at opportunities for river restoration and enhancement as part of the development. Options include backwater creation, de-silting, in-channel habitat enhancement and removal of structures. When designed properly, such measures can have benefits such as reducing the costs of maintaining hard engineering structures, reducing flood risk, improving water quality and increasing biodiversity. Social benefits are also gained by increasing green space and access to the river.

Buffer strips

As a minimum, developers should set back development 8 metres from the landward toe of fluvial defences or top of bank where defences do not exist. This provides a buffer strip to 'make space for water', allow additional capacity to accommodate climate change and ensure access to defences is maintained for maintenance purposes. For watercourses classed as 'Main River' a minimum eight metre easement from the top of bank is recommended for maintenance purposes to avoid disturbing riverbanks, benefiting ecology and having to construct engineered riverbank protection. Building adjacent to riverbanks can also cause problems to the structural integrity of the riverbanks and the building, making future maintenance of the river much more difficult.

3.2 Sustainable Drainage Systems (SuDS)

Following issue of the House of Commons Written Statement (HCWS161), it is a requirement for SuDS to be incorporated for all major development unless demonstrated to be inappropriate. Major development is defined as developments of 10 dwellings or more or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010). Planning applications for major development should therefore be accompanied by a site-specific drainage strategy or statement that demonstrates that the proposed drainage scheme is in compliance with relevant guidance (see section 3.2.1).

Local planning bodies should:

- Promote the use of SuDS for the management of runoff
- Ensure that their policies and decisions on applications support and compliment the building regulations on sustainable rainwater drainage, giving priority to infiltration over watercourses, then sewers
- Incorporate favourable policies within development plans
- Adopt policies for incorporating SuDS requirements into Local Plans
- Encourage developers to utilise SuDS wherever practicable, if necessary, through the use of appropriate planning conditions
- Develop joint strategies with sewerage undertakers and the Environment Agency to further encourage the use of SuDS

Further guidance for local authorities on addressing SuDS at the planning stage can be found in the Local Authority SuDS Officer Organisation (LASOO) non-statutory technical standards for sustainable drainage practice guidance[3].

Sustainable Drainage Systems (SuDS) are management practices which enable surface water to be drained in a way which mimics, as closely as possible, the run-off prior to site development.

[3] Local Authority SuDS Officer Organisation (LASOO), 2015. *Non-statutory Technical Standards for Sustainable Drainage Practice Guidance*.

The choice of flow management facilities within a single site is heavily influenced by constraints including (but not limited to):

- Topography
- Geology (soil permeability)
- Available area
- Former site use (including an potential contamination issues)
- Proposed site use
- Groundwater conditions
- Future adoption and maintenance possibilities

The design, construction and ongoing maintenance regime of such a scheme must be carefully defined, and a clear and comprehensive understanding of the existing catchment hydrological processes and existing drainage arrangements is essential.

3.2.1 Local and National Policy and Guidance

The following national and local policy and guidance documents are applicable (amongst others) to surface water drainage system design within the South Hams District:

- National Planning Policy Framework (NPPF)
- Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems (Defra, March 2015)
- Devon County Council Draft Sustainable Drainage Design Guidance (2015)
- The Building Regulations 2000 Part H: Drainage and waste disposal
- The SuDS Manual (CIRIA, 2015)
- The EU Water Framework Directive (2000/60/EC)
- The Construction (Design and Management) Regulations 2015

A summary of the key points from this guidance is included below. Additionally, further requirements for sustainable drainage design may arise in Critical Drainage Areas (see section 3.2.9) or where there are other local issues (see section 3.2.10).

3.2.2 Discharge Location

New surface water systems should follow the 'drainage hierarchy' starting with the prevention of disposal off-site through measures such as rainwater harvesting. Where this is not feasible, infiltration on site is the preferred option for surface water discharge, followed by discharge to a watercourse or water body and then connection to a sewer as a last resort. Discharge to any watercourse, water body or sewer will require agreement from the relevant authority.

For infiltration SuDS techniques it is imperative that the water table is low enough and a site specific infiltration test is undertaken. Where sites lie within or close to groundwater protection zones or aquifers, or where there are potential land contamination issues, further restrictions may be applicable, and guidance should be sought from the Environment Agency.

3.2.3 Runoff Quantity

For Greenfield developments, the peak runoff rate from the development for the 1 in 1-year and 1 in 100-year rainfall events should not exceed the peak Greenfield runoff rate for the same event. For developments on brownfield sites, the peak runoff rate for the 1 in 1-year event and 1 in 100-year event should be as close as reasonably practicable to the Greenfield rate for the site in the same rainfall event and should never exceed the pre-development runoff rate.

For development on Greenfield sites, the runoff volume for the 6 hour 1 in 100-year event should not exceed the Greenfield runoff volume for the same event, where reasonably practicable. For development on brownfield sites, the 6 hour 1 in 100-year rainfall event runoff volume should be constrained as close as is reasonably practicable to the Greenfield runoff volume for the same event and should not exceed the pre-development runoff volume. Where it is not reasonably

practicable to constrain the volume, runoff must be discharged at a rate which does not adversely affect flood risk.

It should be noted that design flows and volumes used should include an appropriate allowance for climate change. Where a drainage system discharges to a water body which can accommodate uncontrolled discharges without any impact (e.g. the sea), restrictions on peak flows and volumes need not apply. Where runoff is to be discharged to a sewer, confirmation should be sought from the water company that sufficient capacity is available within the system.

3.2.4 Runoff Quality

The CIRIA SuDS Manual (2015) sets out a range of approaches to water quality risk management and suggests which of these are appropriate for different land use types (e.g. roofs, car parks etc.). Table 3-2 outlines the suggested approaches.

Table 3-2: Minimum water quality management requirements for runoff from development [Source: Table 4.3, CIRIA SuDS Manual 2015]

Land use	Pollution hazard level	Requirements for discharge to surface waters (including coasts and estuaries)	Requirements for discharge to groundwater
Residential roofs	Very low	Removal of gross solids and sediments only.	
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (e.g. cul de sacs, home zones, general access roads), non-residential car parking with infrequent change (e.g. schools, offices)	Low	Simple index approach *Note: Extra measures may be required for discharges to protected resources*	
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach *Note: Extra measures may be required for discharges to protected resources*	Simple index approach *Note: Extra measures may be required for discharges to protected resources* In England and Wales Risk Screening must be undertaken first to determine whether consultation with the environmental regulator is required.
Trunk roads and motorways	High	Follow the guidance and risk assessment process set out in HA (2009)	
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require an environmental licence or permit. Obtain pre-permitting advice from the environmental regulator. Risk assessment is likely to be required.	

Further detail on the water quality risk management approaches can be found in the SuDS Manual (CIRIA, 2015).

3.2.5 Flood Risk

Surface water flood risk within the development should be managed based on the following events:

- The 1 in 30-year event – in this event water should be stored in areas designated to hold and/or convey water and should not flood any other part of the site.
- The 1 in 100-year event – in this event flooding should not occur within any part of a building or utility plant susceptible to water unless in an area designated to hold and/or convey water.
- Events exceeding the 1 in 100-year event – in these events flows should be managed to minimise the risks to people and property by providing appropriate overland flow route taking the flow away from properties and towards low risk areas.

3.2.6 Health and Safety

The surface water drainage system should be designed so that it minimises health and safety risk to the public and to maintenance staff. SuDS are sometimes perceived as unsafe features, with fears of drowning and overturning cars, but with correct design these risks can be minimised. The risk of drowning in SuDS features can be overcome by ensuring that water bodies have fencing or dense planting along their edges to initially discourage people from entering them, and shallow sloped banks to allow people to easily climb back out of them should they fall in.

As for any design which will lead to construction, the Construction (Design and Management) Regulations 2015 apply to the design of surface water management systems. This means that health and safety aspects relating to the construction, operation, maintenance and decommissioning/demolition stages of the system should be considered throughout the design process.

3.2.7 Operation and Maintenance

The surface water drainage system should be designed to reduce the need for maintenance, where possible. For example, to minimise the risk of blockage, flow control structures should be selected to ensure that the aperture size will not make them prone to blockage. Where flow control structures serve permeable paving or other filter media, smaller flow control structures may be appropriate as the blockage risk associated with such structures is significantly lower. Where reasonably practicable, gravity systems should be favoured over pumped systems.

To facilitate maintenance and repair of SuDS features, consideration should be given to the provision of appropriate access routes for maintenance staff, plant and equipment. As described above, the Construction (Design and Management) Regulations 2015 apply to the design of SuDS and the operation and maintenance of SuDS features should be considered in their design.

SuDS proposals should demonstrate that provisions have been made for maintenance of the system throughout its lifetime. Where the system is to be adopted by a third party (e.g. South West Water) there may be additional design standards which will need to be met.

3.2.8 Ecological and Amenity Benefits

The inclusion of SuDS within developments should be seen as an opportunity to enhance ecological and amenity value, and promote green infrastructure, incorporating above ground facilities into the development landscape strategy. SuDS must be considered at the outset, during preparation of the initial site conceptual layout to ensure that enough land is given to design spaces that will be an asset to the development rather than an after-thought.

3.2.9 Requirements for Critical Drainage Areas

Several locations within the District are classified as Critical Drainage Areas (CDAs) as defined in section 4.5.4. These areas have their own additional drainage standards which must be met in addition to national and local standards. The required minimum drainage standards for these areas are detailed in Table 5-1 and section 5.7.

3.2.10 South Hams District Council Local Requirements

South Hams District Council have identified further requirements and constraints for surface water drainage in several areas within the District, based on their local knowledge. These are summarised in Table 3-3. It should be noted that the drainage hierarchy described in section 3.2.2 and other local and national standards and guidance should still be followed.

Table 3-3: Additional local surface water drainage requirements and information

Location	Surface water drainage information
St. Ann's Chapel (land to east)	Soakaway or Greenfield runoff to existing watercourse required.
St. Ann's Chapel (land to south)	No surface water system –infiltration SuDS expected to be appropriate but soakaway testing is needed.

Location	Surface water drainage information
Bigbury	No surface water system –infiltration SuDS expected to be appropriate but soakaway testing is needed.
Brixton (land to north)	No surface water system or watercourses available. Infiltration SuDS required.
Brixton (land to south)	Greenfield rates required.
Chillington (land to north)	Greenfield rates required.
Areas between Chillington and Stokenham	Flood Risk Assessment and SuDS proposal required addressing concerns of increased flow downstream at Frogmore.
Churchstow (Leigh Cross)	Infiltration SuDS expected to be appropriate but soakaway testing is needed.
Dartington	SuDS schemes required with Greenfield runoff rates.
Dartmouth (land to north west)	No surface water system present.
Dartmouth (land to south west)	No surface water system present. Infiltration SuDS expected to be achievable.
Dean	No surface water system –infiltration SuDS expected to be appropriate but soakaway testing is needed.
Dittisham	No separate surface water system present. Greenfield runoff rates required.
Down Thomas	Infiltration SuDS expected to be appropriate but soakaway testing is needed.
Heybrook Bay	SuDS scheme required, controlled discharge to Hey Brook may be appropriate.
East Allington (Mounts Farm area)	Infiltration SuDS expected to be appropriate but soakaway testing is needed.
East Allington	No surface water system present – SuDS required.
Harberton (Dundridge area)	No surface water system present – Greenfield rates required.
Hillhead	No surface water system present – Greenfield rates required.
Holbeton	No separate surface water sewer. SuDS solution required.
Hood	No surface water system available – Greenfield discharge to watercourse may be appropriate.
Ivybridge (Cadleigh area)	SuDS required. Extent and capacity of surface water sewers in Cornwood Road unknown.
Ivybridge (land to west)	SuDS scheme required. Some areas may be able to discharge to watercourse or surface water sewers in Cornwood Road but in some locations this will not be possible.

Location	Surface water drainage information
Ivybridge (south of A38)	No surface water drainage system present to the south of A38. Greenfield rates required. In some areas there are no adopted sewers but a clay land drainage system is in place which should be catered for in design.
Ivybridge (land to east)	Surface water sewer discharges to River Erme at Glanvilles Mill – the capacity will need to be proven and attenuation provided.
Kingsbridge (land to south west)	Extent of surface water sewers not known. On site attenuation required.
Kingsbridge (land to north east)	No existing surface water sewer system – SuDS and Greenfield rates required. Construction phase precautions essential.
Kingston	Controlled discharge required to existing stream with on-site attenuation.
Kingswear	No surface water system – Greenfield runoff rates required.
Lee Mill	Separate surface water system may be available on New Park Road or A38 slip road. On site attenuation may be required.
Malborough	No surface water system exists – SuDS solution and Greenfield runoff rates required.
Marldon	SuDS proposals required.
Modbury	SuDS and Greenfield rates required due to serious flooding problems downstream. Infiltration SuDS may not work in land to south.
Newnham	SuDS required. Discharge to tributary of Tory Brook must be controlled.
Newton Ferrers (Collaton Park area)	No surface water system available.
Noss Mayo	No surface water system available. Greenfield rates are required.
Rattery	SuDS required.
Roborough	Greenfield rates required to prevent increase to watercourse flows.
Salcombe	Greenfield runoff and on-site attenuation required.
Sparkwell (Sparkwell Farm area)	No surface water sewer available – on-site disposal is only likely solution.
Sparkwell (land to south)	Controlled discharge required to stream.
Staverton	Infiltration SuDS may be appropriate.
Stoke Fleming	Separate surface water system is unlikely and existing culverted watercourse likely to be undersized – attenuation with Greenfield runoff required.
Stoke Gabriel	SuDS and on-site attenuation required.

Location	Surface water drainage information
Strete	Likely that no surface water sewer is present – SuDS required.
Totnes (land near mill leat)	Permission for discharge to mill leat would be required from owner.
Totnes (land to north west)	SuDS and Greenfield runoff required.
Totnes (land south of Plymouth Road)	Undersized culverts and attenuation. Improvements to attenuation would be required.
Totnes (land to north and east)	SuDS required.
Totnes (Winsland House Farm area)	SuDS required. Greenfield runoff would be required to watercourse.
Ugborough	Infiltration SuDS may be appropriate. Greenfield runoff rates required.
West Alvington	No surface water sewer available – SuDS required. Infiltration SuDS may be appropriate.

3.2.11 Examples of Potential SuDS Features

A summary of examples of some of the most commonly used SuDS features is given in Table 3-4. For each feature type listed, several of the key benefits and considerations are given. However, this should not be considered an exhaustive list – further detail can be found in The SuDS manual (CIRIA, 2015) and in other guidance documents.

Table 3-4: Examples of SuDS features

Rainwater Harvesting
Description: Systems which collect and store runoff for use on site. Water is generally stored in tanks.
Potential Benefits: • Sustainability benefits from reducing site water demand. • Can help reduce runoff from site. • Can help reduce attenuation storage requirements on site.
Key Considerations: • May require use of a pump to extract stored water for use or for an active system. • If used to provide storage for surface water management, consideration should be given to providing extra storage in addition to that used for water supply. • Treatment requirements should be considered for proposed water use. • Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.
Green Roofs
Description: Vegetated roofs aiming to provide attenuation and treatment of runoff and promote evapotranspiration.
Potential Benefits: • Reduction and treatment of runoff. • Opportunities for ecological, visual and amenity benefits • Enhanced building performance.

Key Considerations:

- Access and maintenance requirements.
- Weight of the system (when saturated), and other loadings such as snow and maintenance loadings, and load-bearing capacity of underlying structure.
- Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.

Infiltration Systems (e.g. infiltration trenches, blankets and basins, soakaways)

Description: Systems that are designed to promote infiltration of surface water into the ground.

Potential Benefits:

- Reduction in runoff rates.
- Groundwater recharge.
- Opportunities for ecological, visual and amenity benefits.

Key Considerations:

- Groundwater and ground conditions (particularly soil infiltration capacity).
- Potential for mobilisation of contaminants.
- Potential for dissolution of underlying ground and other subsidence/stability issues.
- Potential for leakage into underground structures and sewers.
- Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.

Filtration systems (e.g. filter strips and drains)

Description: Features through or across which surface water is drained with the aim of removing pollutants, particularly sediments and particulates.

Potential Benefits:

- Water treatment.
- Opportunities for ecological, visual and amenity benefits.

Key Considerations:

- Flow velocities sufficiently low for treatment to be effective.
- Sediments likely to accumulate over time.
- Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.

Swales

Description: Vegetated channels which are generally used principally to convey and treat runoff, although sometimes storage is also provided.

Potential Benefits:

- Water treatment.
- Storage can be provided.
- Opportunities for ecological, visual and amenity benefits.

Key Considerations:

- Use for storage is likely to reduce water treatment benefits.
- Storage requirements should allow for slope – check dams can be incorporated if required.
- Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.

Bioretention Systems
Description: Planted areas which allow water to pond on the surface before filtering through vegetation and underlying soil.
Potential Benefits: • Water treatment. • Opportunities for ecological, visual and amenity benefits.
Key Considerations: • Unlikely to function well with large or fast flows. • Where planting with large roots is used (e.g. for tree pits) consideration should be given to effect on nearby structures. • Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.
Pervious Paving
Description: Paved areas which allow water to infiltrate through the surface into underlying layers.
Potential Benefits: • Reduction in runoff rates. • Potential for storage in sub-base and/or infiltration to underlying ground. • Water treatment.
Key Considerations: • Potential for live traffic – particular considerations to loading and to maintenance. • Potential for leakage into underground structures and sewers. • Potential for clogging and blockage. • Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.
Detention Basin
Description: Landscape depressions which are usually dry but which can store water during rainfall events.
Potential Benefits: • Storage of runoff. • Potential for water treatment (with features such as vegetation and sediment forebays). • Opportunities for ecological, visual and amenity benefits.
Key Considerations: • Drain time. • Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.
Pond and Wetlands
Description: Landscape depressions which have a permanent water level but which are designed to store additional runoff above the permanently wet level.
Potential Benefits: • Storage of runoff. • Potential for water treatment (with features such as vegetation and sediment forebays). • Opportunities for ecological, visual and amenity benefits.
Key Considerations: • Avoidance of dead zones. • Health and safety considerations for construction, operation, maintenance and inspection and decommissioning.

4 Data Collection and Review

This chapter describes the data collection process associated with the flood risk assessment element of this study, and provides a summary of the available data.

The NPPF and its accompanying Planning Practice Guidance require SFRAs to present sufficient information on all flood sources. The objective of the Level 1 SFRA update is to collect, collate and review available information relating to flooding in the Study Area. The information is then presented in a format to enable the Council to apply the NPPF Sequential Test to their preferred sites for future development. The document can be used to identify potential development sites which require the application of the Exception Test through a Level 2 SFRA.

The assessment of probability should also account for the effects of climate change over the lifetime of any development that would be approved through Council's emerging Local Plans.

4.1 Tasks

In the preparation of the Level 1 SFRA, the following sequence was used:

- Contacted stakeholders requesting data/information
- Collated and reviewed data and populated data register
- Identified data gaps
- Reviewed received data against the SFRA objectives
- Produced flood risk maps based on available data
- Presentation of available relevant information on flood sources and flood risk.

4.2 Stakeholder Consultation

In the preparation of this Level 1 SFRA update, the following stakeholders were contacted to provide data and information:

- South West Water Ltd
- Environment Agency

Data collected internally by South Hams District Council was also used in this SFRA.

4.3 Data Availability

Information and data requested from the stakeholders was integrated in a GIS system to facilitate a review of the datasets. Table 4-1 lists the supplied data which was used for this assessment.

Table 4-1: Supplied data

Data Description	Format	Source
Bedrock geology and superficial deposit mapping	GIS shapefile	EA
Areas Susceptible to Groundwater Flooding (AStGWf) mapping	GIS shapefile	EA
Detailed River Network (DRN) mapping	GIS shapefile	EA
Flood Alert Areas and Flood Warning Areas mapping	GIS shapefile	EA
Flood Map for Planning	GIS shapefile	EA
Historic Flood Map and Recorded Flood Outlines	GIS shapefile	EA
Statutory Main Rivers mapping	GIS shapefile	EA
Updated Flood Map for Surface Water (uFMfSW)	GIS shapefile	EA

DG5 sewer flooding data	Spreadsheet	SWW
Known flooding problems data	pdf	SHDC
Critical Drainage Area (CDA) data	Pdf and GIS shapefile	EA (through SHDC)
Ordnance Survey 1:10,000 mapping	tif	SHDC
Settlement locations	AutoCAD dwg and pdf	SHDC

An explanation of the data and how it has been used to assess different sources of flood risk is included in section 4.5.

4.4 Recommendations for Further Data Collection

The following data was not available for the purposes of this SFRA:

- Functional floodplain extent – The Environment Agency's Flood Map for Planning data has provided information on flood zone extents but this does not differentiate between Flood Zones 3a and 3b. The functional floodplain extent is usually determined by modelling, which is outside of the scope of this study, with allowance for local circumstances.
- Climate change impact data – Allowances for future climate change have been summarised in this report but no modelling has been undertaken to determine the impact of climate change.

4.5 Data Summary

4.5.1 Fluvial Flooding and Tidal Flooding

The Detailed River Network and Statutory Main Rivers dataset has been supplied by the Environment Agency to show the locations of all main rivers and other watercourses within the Study Areas. These have been used to identify watercourses which may pose a flood risk to settlements.

The Environment Agency's Flood Map for Planning data has also been supplied. This splits areas into Flood Zones as described in Table 4-2.

Table 4-2: Environment Agency Flood Zone definitions

Flood Zone	Definition
Flood Zone 1	Low probability – Defined as a zone where there is less than 0.1% Annual Exceedance Probability (AEP) (1 in 1,000-year) of fluvial or tidal flooding
Flood Zone 2	Medium probability - Defined as having between 0.1% (1 in 1,000-year) and 1% (1 in 100-year) Annual Exceedance Probability (AEP) of fluvial flooding or between a 0.1% (1 in 1,000-year) and 0.5% (1 in 200-year) Annual Exceedance Probability (AEP) of tidal flooding
Flood Zone 3	High probability - Defined as having 1% or greater Annual Exceedance Probability (AEP) (1 in 100-year) of fluvial flooding or a 0.5% or greater Annual Exceedance Probability (AEP) (1 in 200-year) of tidal flooding

The Flood Zone data above has been used to assess areas at risk of fluvial flooding for settlements within the district. Under NPPF Flood Zone 3 is further split into Flood Zone 3a and Flood Zone 3b (functional floodplain) as described in Table 4-3.

Table 4-3: Flood Zone 3a and 3b definitions

Flood Zone 3a	High probability - Defined as having 1% or greater Annual Exceedance Probability (AEP) (1 in 100-year) of fluvial flooding or a 0.5% or greater Annual Exceedance Probability (AEP) (1 in 200-year) of tidal flooding, but outside of the functional floodplain as defined below.
Flood Zone 3b	Functional Floodplain – Defined as land where water has to flow or be stored in times of flood. Usually delineated as 5% AEP (1 in 20-year) floodplain or an area designated to flood in an extreme (0.1% AEP) flood, but it should also take into account local considerations. The extent should be agreed between the LPA and the Environment Agency.

No additional data has been available for the purposes of this study to determine the split between Flood Zones 3a and 3b.

4.5.2 Groundwater Flooding

In comparison to other sources of flooding, current understanding of the risks posed by groundwater flooding is limited and mapping of flood risk from groundwater sources is in its infancy. The SFRA considers groundwater flooding, but a quantified assessment of risk from groundwater flooding is difficult to achieve on a strategic scale. The main issues with the assessment of groundwater flood risk are: a lack of groundwater level records, variability in geological conditions, and that the few predictive tools (such as modelling) can be used to make assessments of groundwater flow and risk of groundwater flooding following rainfall events are unpredictable.

The Environment Agency's Areas Susceptible to Groundwater Flooding (AStGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The Environment Agency has provided information with the data and guidance for using it, which is summarised below.

The AStGWF was prepared as part of the PFRA process. The aim of the AStGWF is to allow LLFAs across England and Wales to gain a broader sense of the wider areas which might be susceptible to groundwater flooding.

The susceptible areas are represented by one of four area categories showing the proportion of each 1km square that is susceptible to groundwater. It does not show the likelihood of groundwater flooding occurring.

The dataset covers a large area, but only isolated locations within the overall susceptible area are actually likely to suffer groundwater flooding. The AStGWF dataset has not been formally assessed as appropriate for any other use than for the PFRA. Data should not be interpreted as identifying areas where groundwater is actually likely to flow or pond, but may be useful in identifying where further studies could be undertaken. The AStGWF should not be used as the sole evidence for any specific flood risk management, land use planning or other decision at any scale.

4.5.3 Surface Water Flooding

Surface water mapping used for this SFRA has been taken from the Environment Agency's updated Flood Map for Surface Water (uFMfSW) which was published online by the Environment Agency in December 2013. This is based on national scale surface water modelling which separates flood risk into the following categories:

- **High risk** – Areas with a chance of flooding greater than 3.3% each year (1 in 30-year).
- **Medium risk** – Areas with a chance of flooding between 1% (1 in 100-year) and 3.3% (1 in 30-year) each year.
- **Low risk** – Areas with a chance of flooding between 0.1% (1 in 1,000-year) and 1% (1 in 100-year) each year.
- **Very low risk** – Areas with a chance of flooding less than 0.1% (1 in 1,000-year) each year.

The Environment Agency updated Flood Map for Surface Water (uFMfSW) indicates areas which are at risk of surface water flooding. The uFMfSW maps are not definitive or intended to identify whether a property will flood, but provide information to support local flood risk management where

there is no better information available. This data should be used in conjunction with other information on sources of local flood risk when considering site-specific risk. It should be noted that the uFMfSW maps do not consider building thresholds and do not contain sufficient detail to represent features such as kerbs and small bunds which may act to redirect flow.

4.5.4 Critical Drainage Areas

Critical Drainage Areas (CDAs) are discrete geographic areas where multiple and interlinked sources of flood risk cause flooding in one or more local flood risk zones during severe weather thereby affecting people, property or local infrastructure. Information on CDAs is compiled by the Environment Agency and notified to Local Planning Authorities.

The Environment Agency have identified several Critical Drainage Areas (CDAs) within the South Hams District boundary. These are areas which have been identified as being at significant flood risk from "local sources" and which may require additional drainage standards to be applied in order to prevent an increase in flood risk. A summary of the CDAs within the District is included in section 5.7.

4.5.5 Sewer Flooding

Areas at risk from sewer flooding have been determined through review of records on the DG5 register, held by South West Water Ltd. In order to fulfil statutory commitments set by OFWAT, water companies must maintain verifiable records of reported sewer flooding, which is achieved through their DG5 registers. Water companies are required to record flooding arising from public foul, combined or surface water sewers and identify where properties have suffered internal or external flooding. The data provided by Water Companies is reliant on complaints made by customers and so in some instances is limited, and does not provide a comprehensive record of sewer flooding events.

South West Water Ltd has provided data on the number of properties reported to have suffered flooding between 1st January 2000 and 1st August 2015 for each settlement. Flood incidents have been split into the following two causal categories:

- Sewer flooding caused by overloaded sewers
- Sewer flooding caused by other temporary problems

The properties where flooding due to overloaded sewers have been reported (considered "at risk") have then been split into the following categories which indicate the frequency of flooding:

- Internal flooding once in every twenty years
- Internal flooding twice or more in every ten years

The data provided does not give individual property locations and therefore further investigation would be required for a site-specific assessment of this risk.

4.5.6 Other Potential Sources of Flood Risk

Flooding from artificial sources including man-made water bodies such as reservoirs, canals, lakes and leats has not been assessed as part of this SFRA as no data on flooding from these sources has been provided.

4.5.7 Flood Warning Areas

The Environment Agency has provided details of those areas which benefit from the Environment Agency flood warning system. Flood warnings are split into the following categories:

- **Flood Alerts** - these are used to warn people of the possibility of flooding and encourage them to be alert, stay vigilant and make early preparations. Flood Alerts are issued before Flood Warnings to give advance notice of the possibility of flooding but before there is sufficient confidence that flooding is expected.
- **Flood Warnings** – these are used to warn people of expected flooding and encourage them to take action to protect themselves and their property.
- **Severe Flood Warnings** – these are used to warn people of expected severe flooding where there is significant threat to life.

- **Warnings no longer in force** – these inform people when river or sea conditions begin to return to normal and no further flooding is expected in the area. However, care should still be taken as flood water may remain for several days.

It is also possible that community-managed flood warning systems have been implemented in some locations which are not part of the Environment Agency's national system. However, no information on community-based systems has been available for this SFRA. Information from both Environment Agency and community-based systems should be used by emergency planners and development planners in conjunction with the Flood Zone maps and defence information to assist in developing plans in flood risk areas.

4.5.8 Historical Flooding

Historic Flood Map and Recorded Flood Outlines data have been supplied by the Environment Agency. The Historic Flood Map indicates areas that have previously flooded including flood extent but does not give information on the date or the source of flooding. The Recorded Flood Outlines dataset supplements the Historic Flood Map data and provides more detail including information on the date of flooding, the source and cause of flooding (if known) and the source of the flood outline data (for example whether it has been reported by the public or surveyed in detail by the Environment Agency).

It should be noted that flood outlines digitised from anecdotal evidence are likely to be more uncertain than data obtained from survey, although all sources of data will have some inherent uncertainty associated with the method of data collection. It should also be recognised that historical flood outline data may not represent conditions at the peak of a flood event.

4.5.9 Known Flooding Problems

"Known Flooding Problems" mapping has been supplied by South Hams District Council. This information indicates areas within the district that have previously experienced flooding or where there are known issues with assets which may result in an increased risk of flooding. This local knowledge is a valuable source of settlement-specific data which has been used to supplement the flood risk data from national datasets which has been supplied by the Environment Agency. Relevant information has been included in the settlement-specific flood risk summaries in Section 6 when assessing the flood risk from all sources.

4.5.10 Climate Change

Government guidance for local authorities relating to the production of SFRAs states that an allowance for climate change should be included in the assessment. A quantitative assessment of the impact of climate change has not been undertaken for the purposes of this SFRA. However, a qualitative assessment of the potential effects of climate change on the study area is included in Section 5.9.

The Environment Agency's new guidance on climate change allowances for flood risk assessments was published in February 2016[4]. A summary of these allowances is provided in this chapter.

Peak river flows are expected to increase as a result of climate change. Table 4-4 gives the recommended peak river flow allowances for the south west river basin district. These should be applied relative to the 1961 to 1990 baseline. The guidance provides information on which allowance categories should be considered based on the vulnerability of proposed development.

Table 4-4: Recommended allowances for peak river flow – south west river basin district

Allowance category	Total potential change anticipated for 2015 to 2039	Total potential change anticipated for 2040 to 2069	Total potential change anticipated for 2070 to 2115
Upper end	+25%	+40%	+85%
Higher central	+20%	+30%	+40%
Central	+10%	+20%	+30%

[4] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Peak rainfall intensity is expected to increase as a result of climate change. Table 4-5 gives the recommended peak rainfall intensity allowances for small and urban catchments which should be applied across all of England. These should be applied relative to the 1961 to 1990 baseline. The guidance states that both the central and upper end allowances should be applied to understand the range of impact.

Table 4-5: Recommended national allowances for peak rainfall intensity in small and urban catchments

Allowance category	Total potential change anticipated for 2015 to 2039	Total potential change anticipated for 2040 to 2069	Total potential change anticipated for 2070 to 2115
Upper end	+10%	+20%	+40%
Central	+5%	+10%	+20%

Sea levels are expected to rise as a result of climate change. Table 4-6 gives the recommended sea level rise allowance for south west England which should be applied relative to a 1990 baseline.

Table 4-6: Recommended allowances for net sea level rises – south west England

Net sea level rise relative to 1990 (mm/year)			
1990 to 2025	2026 to 2055	2056 to 2085	2086 to 2115
3.5	8.0	11.5	14.5

In addition to local sea level rise allowances, the guidance also gives national allowances for offshore wind speed and extreme wave height which should also be applied to a 1990 baseline. These are included in Table 4-7.

Table 4-7: Recommended national allowances for offshore wind speed and extreme wave height

	1990 to 2050	2051 to 2115
Offshore wind speed allowance	+5%	+10%
Offshore wind speed sensitivity test	+10%	+10%
Extreme wave height allowance	+5%	+10%
Extreme wave height sensitivity test	+10%	+10%

4.5.11 Flood Defences

Flood defences are generally engineered structures designed to limit the impact of flooding. Flood defences may take several forms including bunds/embankments, canalised channels, culverts and flood storage areas.

The Environment Agency have supplied data on defence locations and Areas Benefitting from Defences, taken from their Flood Map for Planning. However, no data has been available providing detail on the type of defence. The Areas Benefitting from Defences data identifies areas of land which benefit from the presence of flood defences in the 1% AEP (1 in 100-year) event. No further detail has been provided on the expected standard of protection for each of the defence assets shown. Additionally, smaller local schemes may not be included in this data.

Flood defences do not completely remove the possibility of flooding. The risk of flooding to these areas, due to overtopping or a breach, should also be considered when allocating land for development.

5 South Hams Strategic Flood Risk Summary

The South Hams study area is defined by the administrative boundary of South Hams District Council, which includes part of Dartmoor National Park within this boundary and covers an area of approximately 900 km^2. Dartmoor National Park forms a discrete Local Planning Authority therefore a detailed assessment of this area is not included within this SFRA.

This chapter gives an overview of flood risk in the study area, including potential sources of flood risk. Settlement-specific flood risk summaries are contained in chapter 6.

5.1 Fluvial Flood Risk

There are a number of watercourses within the South Hams District boundary which present a flood risk to settlements and infrastructure in the area. There are several main rivers (which are described in more detail below) as well as a large network of smaller watercourses and drains. The majority of catchments in the District have their upper reaches on Dartmoor and flow in a southerly or south easterly direction towards the English Channel.

Several of the area's main population centres are at significant fluvial flood risk, particularly Dartmouth, Kingsbridge, Ivybridge and Totnes. A large number of the smaller settlements within the district are also located close to watercourses which may pose a risk. In coastal areas, the fluvial flood risk is often tidally influenced, with high tides combined with high fluvial flows having led to flooding previously.

5.1.1 River Yealm

The River Yealm originates at Yealm Head on Dartmoor and flows south towards Yealmpton, its tidal limit. From Yealmpton it flows south west and into the English Channel near Newton Ferrers. The majority of the floodplain is located in rural areas, although parts of Yealmpton are shown to be at fluvial flood risk.

5.1.2 River Avon

The River Avon originates at Avon Head on Dartmoor. The Avon Dam Reservoir, near Shipley Bridge, is located in the upper reaches just inside the South Hams District boundary. The Avon flows in a southerly direction to near Loddiswell before flowing south west towards the English Channel at Bigbury Bay. The catchment is mainly rural, with several villages located close to the river shown to be at flood risk.

5.1.3 River Dart

The River Dart begins as two separate tributaries (the East Dart and West Dart), which join at Dartmeet. The Dart flows southwards, to the east of Buckfast and then Buckfastleigh, continuing on through Totnes (tidal limit) and eventually discharging to the sea at Dartmouth. The River Mardle, a tributary of the River Dart, flows into Buckfastleigh from the west. The River Ashburn is another tributary of the River Dart and flows into Ashburton from the north. Venford Reservoir impounds a minor tributary of the River Dart to the south of Dartmeet. Water from Venford is used by South West Water Ltd as a potable water supply source.

The main population centres of Totnes and Dartmouth are shown to be at flood risk from the river as well as several smaller settlements.

5.1.4 River Erme

The River Erme originates at Erme Head on south Dartmoor and flows southwards through Ivybridge. The river flows in a southerly direction and into the English Channel at Bigbury Bay. The main settlement of Ivybridge is located on the river and several parts of the town are shown to be at fluvial flood risk here. Several other smaller settlements are shown to be at flood risk.

5.1.5 Kingsbridge Watercourses

The Kingsbridge North Watercourse and Kingsbridge North West Watercourse both originate in rural areas to the north of Kingsbridge an are shown to pose a fluvial flood risk where they flow through the town and into the Kingsbridge Estuary.

5.2 Tidal Flood Risk

Despite a long coastline, there are relatively few locations susceptible to tidal flooding within the District, as the majority of the coastline is steeply cliffed. However, more vulnerable coastal floodplains exist in a few low lying areas and several tidal estuaries also pose a tidal flood risk. The major towns at risk from tidal flooding are Dartmouth, Salcombe and Kingsbridge, with smaller villages such as Aveton Gifford, Noss Mayo, Newton Ferrers and Beesands also at risk. High tide levels also influence fluvial flood risk where watercourses are unable to discharge or where high levels cause a backwater effect upstream.

5.3 Surface Water Flood Risk

Surface water flood mapping for the District show a number of properties and roads that are at risk of flooding from this source. A large proportion of the surface water flow routes follow the natural topography and, as a result, areas at risk often coincide with those at fluvial flood risk. However, there are also a number of locations where manmade features, such as roads, channel surface water resulting in additional areas at risk. There have also been a number of reports in the District of properties being flooded by runoff from adjacent fields following heavy rainfall.

There have been several historical surface water flooding events within the study area, particularly in Ivybridge, Dartmouth and Modbury. These are generally caused by a combination of factors such as direct runoff following heavy rainfall and inadequate or blocked drainage systems. A number of settlements in the study area have been identified as having inadequate drainage systems which were installed historically and are no longer sufficient to manage the increased runoff from new development.

5.4 Sewer Flooding

DG5 data supplied by South West Water Ltd indicates that there have been 17 properties in the District which have flooded due to overloaded sewers between 1st January 2000 and 1st August 2015. Of these, 9 fit into the *once in every twenty years* category and 8 into the *twice or more in every ten years* category. The majority of these have occurred in the larger settlements of Dartmouth, Kingsbridge and Salcombe.

A further 120 properties in the District have been reported as flooded from sewers due to other temporary problems between 1st January 2000 and 1st August 2015. The majority of these were in Dartmouth, Ivybridge, Kingsbridge, Totnes and Salcombe.

5.5 Highway Flooding

Highway flooding in the District has been assessed based on the South Hams District Council "known flooding problems" data. This source of flooding is closely linked to flooding from other sources, particularly surface water and sewer flooding.

For the purposes of this SFRA highway flooding incidents have only been discussed where the highway was known to have directed flood water towards properties or where runoff from the highway itself caused flooding. Flood incidents where the highway was flooded from other sources have not been discussed in the highway flooding section. Several locations have been identified within the District where highway flooding has previously occurred.

5.6 Groundwater Flood Risk

Given the lack of data on groundwater flood risk, it has not been possible to carry out a quantified assessment of the likelihood of groundwater flooding in the District. However, the AStGWF data supplied has been used to assess the potential susceptibility of the area to groundwater flooding, albeit on a broad scale and without the ability to identify individual locations which may be at risk. As described in section 4.5.2, the AStGWF is a dataset indicating the proportion of each 1km square that is susceptible to groundwater. It does not show the likelihood of groundwater flooding occurring.

The AStGWF dataset indicates that the majority of the South Hams District Council area fits into the <25% category which indicates that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. This is based on the underlying ground conditions. A few areas are shown to fit into the higher percentage categories, most notably the area around Ivybridge and parts of Totnes.

No incidents of flooding which have been attributed to groundwater have been identified within the District. However, there have been reports of high springs near to both Totnes and Slapton which have previously raised the concerns of residents. Additionally, an area of land to the south of Noss Mayo has previously been subject to waterlogging from an unknown source. It should also be noted that, whilst no incidents of groundwater flooding have been found, it is possible that incidents have not been reported or that flooding from unknown sources or attributed to another source may have been a result of groundwater. Groundwater levels are likely to be high following prolonged rainfall and may therefore coincide with high river levels or surface water issues.

5.7 Critical Drainage Areas

A summary of the Critical Drainage Areas (CDAs) within the South Hams District boundary is provided below in Table 5-1.

Table 5-1: Critical Drainage Areas (CDAs) in South Hams

CDA Location	Summary of Drainage and Flooding Issues	Minimum Drainage Standards Required
Ivybridge	• Flood risk to the town centre from the River Erme • Surface water systems not designed to a high standard • Pluvial flooding from minor watercourses, ditches and surface water culverts • Sewer flooding which may be exacerbated by heavy rainfall	• SuDS hierarchy to be followed, using infiltration as far as reasonably practicable • Off-site surface water discharges should mimic Greenfield performance up to a maximum 1 in 10-year discharge rate • All on-site surface water should be managed safely up to the 1 in 100-year plus climate change event • All new development (including brownfield development) needs to meet these standards
Kingsbridge	• Runoff causes flooding from Main River, ordinary watercourses and surface water in combination with high tide levels • Historically drainage system has been altered and does not perform well in storm events • Some sewer flooding during heavy rainfall	• SuDS hierarchy to be followed, using infiltration as far as reasonably practicable • Off-site surface water discharges should mimic Greenfield performance up to a maximum 1 in 10-year discharge rate • All on-site surface water should be managed safely up to the 1 in 100-year plus climate change event • All new development (including brownfield development) needs to meet these standards
Modbury	• History of flooding • Existing culvert and channels at the limit of their capacity	• SuDS hierarchy to be followed, using infiltration as far as reasonably practicable • Off-site surface water discharges should mimic Greenfield performance up to a maximum 1 in 10-year discharge rate • All on-site surface water should be managed safely up to the 1 in 100-year plus climate change event • All new development (including brownfield development) needs to meet these standards

CDA Location	Summary of Drainage and Flooding Issues	Minimum Drainage Standards Required
Totnes (Bridgetown)	• History of flooding at caravan park and road	• SuDS hierarchy to be followed, using infiltration as far as reasonably practicable • Off-site surface water discharges should mimic Greenfield performance up to a maximum 1 in 10-year discharge rate • All on-site surface water should be managed safely up to the 1 in 100-year plus climate change event • All new development (including brownfield development) needs to meet these standards
Totnes (Warlands)	• Modified watercourses will not manage flows safely in extreme events	• Infill development should not proceed without reducing runoff over and above present day Greenfield levels • SuDS hierarchy to be followed, using infiltration as far as reasonably practicable • Off-site surface water discharges should mimic Greenfield performance up to a maximum 1 in 10-year discharge rate • All on-site surface water should be managed safely up to the 1 in 100-year plus climate change event • All new development (including brownfield development) needs to meet these standards

5.8 Historical Flooding

There have been a number of significant flood events in the South Hams area which are summarised below:

- **December 1970** - widespread fluvial flooding across south Devon mainly from ordinary watercourses.
- **November and December 1974** – combined tidal and fluvial flooding in Totnes with nearly 100 properties flooded.
- **October 1979** – major flooding in Totnes with large areas affected.
- **December 1979** – flooding along the River Avon although mostly in rural areas.
- **December 1989** – tidal flooding of 48 residential and 43 commercial properties in Salcombe.
- **May 2002** – fluvial flooding following heavy rain in the Erme catchment including a school and businesses in Ivybridge.
- **June 2004** – flooding of at least 30 properties in the Ford Valley area of Dartmouth due to the capacity of the surface water system being exceeded. Further fluvial flooding from the tributary of the River Dart near Lake Street, Dartmouth. Additionally, Mill Street and Bridge Street in Kingsbridge were flooded.

- **October 2004** – widespread flooding of coastal and estuarine areas from a combination of high tides and strong winds. Flooding in Dartmouth, Kingsbridge, Salcombe and Beesands as well as flooding of the A379 at Slapton Sands near Torcross.
- **February 2009** – flooding of commercial properties in Kingsbridge in the vicinity of Bridge Street, caused by a combination of intense rainfall and tide locking of outfalls.

Since the Flood and Water Management Act (2010) was enacted Lead Local Flood Authorities (LLFAs) must carry out investigations into flooding in their area and publish the findings. Devon County Council have published the results of several such investigations. Those which include information on flooding in South Hams have been summarised below.

5.8.1 Devon Summer Floods, July 2012

Flooding occurred in locations throughout Devon on 7th and 8th July 2012 following intense rainfall. A total of 237 properties were recorded as flooded throughout Devon – those in South Hams District are summarised in Table 5-2.

Table 5-2: Summary of South Hams flooding detailed in July 2012 Flood Investigation

Location	Number of properties flooded
Avonwick	7
Harbertonford	12
Modbury	27
Aveton Gifford	5
Bittaford	5
Cheston, South Brent	1
Cornwood	1
Lucas Wood	4
Dean Prior	1
Ermington	3
Thornham and Lower Keaton	6
Ivybridge	4
Sequers Bridge	3
Kingsbridge	3
Loddiswell	4
Ludbrook	1
Ugborough	4
Yealmpton	13
Yealmbridge	7

Further information on the flood events at individual locations can be found in Devon County Council's Flood Investigation report[5].

5.8.2 South Hams and Teignbridge Flood Investigation, October 2012

Flooding occurred on 5th and 6th October 2012 following heavy rain across the Teignbridge and South Hams District areas. A total of 22 properties were flooded – those in South Hams District are summarised in Table 5-3.

[5] Devon County Council, 2012. *Flood Investigation Report Devon Summer Floods* 7th – 8th *July 2012.*

Table 5-3: Summary of South Hams flooding detailed in October 2012 Flood Investigation

Location	Number of properties flooded
Dartington	4
Littlehempston	2
Totnes	3
Week	2

Further information on this flood event can be found in Devon County Council's Flood Investigation report[6].

5.8.3 Devon Floods, November 2012

Between 20th and 25th November 2012 flooding occurred across Devon following heavy rainfall. A total of 466 properties were reported as flooded – those in South Hams District are summarised in Table 5-4.

Table 5-4: Summary of South Hams flooding detailed in November 2012 Flood Investigation

Location	Number of properties flooded
Ashprington	1
Aveton Gifford	0 (external flooding only but very close to flooding school, village hall and store)
Avonwick	4
Bittaford	1
Frogmore	5
Goveton and Ledstone	3
Harberton	1
Harbertonford	1
Kernborough	1
Lee Mill	1
Longcombe	1
Modbury	6
Noss Mayo	4
South Barton	3
South Milton	2
Thornham and Lower Keaton	4
Totnes	3
Ugborough	4
Wrangaton	2
Yealmbridge	3
Yealmpton	4

Further information on this flood event can be found in Devon County Council's Flood Investigation report[7].

[6] Devon County Council, 2013. *Flood Investigation Report South Hams and Teignbridge Floods* 5th – 6th *October 2012.*

[7] Devon County Council, 2013. *Flood Investigation Report Devon Floods* 21st – 25th *November 2012.*

5.8.4 Devon Floods, December 2012

In December 2012, widespread areas of Devon were affected by a long duration fluvial flood event which began on 22nd December 2012 and resulted in the flooding of 327 properties across Devon. A summary of the number of properties flooded in South Hams is given in Table 5-5.

Table 5-5: Summary of South Hams flooding detailed in December 2012 Flood Investigation

Location	Number of properties flooded
Aveton Gifford	4
Bowcombe	4
Chillington	13
Harbertonford	1
Ivybridge	1
Kingsbridge	28
Modbury	7
Noss Mayo and Newton Ferrers	14
Rattery	2
Stoke Fleming	1
Torr	5
Yealmpton and Yealmbridge	15

Further information on this flood event can be found in Devon County Council's Flood Investigation report[8].

5.8.5 Devon Winter Floods, December 2013 – February 2014

A series of flood events occurred in Devon throughout the winter of 2013/2014 from a combination of fluvial, surface water and tidal sources resulting in the flooding of 256 properties and 3 people losing their lives. A summary of the number of properties flooded in South Hams is given in Table 5-6.

Table 5-6: Summary of South Hams flooding detailed in December 2013 – February 2014 Flood Investigation

Location	Number of properties flooded
Aveton Gifford	13
Beesands	1
Challaborough	2
Chillington	1
Dartmouth	3
Ermington	3
Harbertonford	2
Ivybridge	1
Kingsbridge	13
Newton Ferrers	1
Rattery	2
Ringmore	2
Salcombe	5

[8] Devon County Council, 2013. *Flood Investigation Report Devon Floods* 19th – 24th *December 2012*.

Stoke Gabriel	1
Torcross	11
Totnes	1
Ugborough	1
Yealmpton	1

Further information on this flood event can be found in Devon County Council's Flood Investigation report[9].

5.9 Potential Impacts of Climate Change

As discussed in section 4.5.10, no data has been available with which to carry out a detailed assessment of the impacts of climate change within the District. However, a qualitative assessment of the potential effects of climate change of flooding from different sources is included below.

5.9.1 Fluvial Flooding

Environment Agency guidance indicates that an allowance of up to +85% should be applied to peak fluvial flows to represent the potential effects of climate change. This is likely to increase flood levels and extents depending on local topography and channel conditions. It is recommended that modelling is undertaken to obtain more detailed information on the likely impacts of climate change. In addition to flood levels and extents, consideration should also be given to the effects of climate change on flood depths, velocities and hazards and how this may affect people and properties.

It should also be noted that climate change is expected to increase the frequency of flood events occurring.

5.9.2 Surface Water Flooding

Environment Agency guidance recommends that an increase of up to +40% is applied to peak rainfall intensity to take into account the possible effects of climate change. Increased rainfall intensity will increase the likelihood and frequency of flooding from this source. Increased runoff may overwhelm historically constructed drainage systems which have not been designed to cope with such intense rainfall. As with fluvial flooding, climate change may have an effect on flood depths, velocities and hazard to people.

5.9.3 Tidal Flooding

Predicted sea level rise will increase the risk of tidal flooding to coastal areas within the District. Additionally, the Environment Agency guidance recommends an allowance of up to +10% for extreme wave height to account for the potential effects of climate change. This is will increase the likelihood and frequency of wave overtopping events if defence heights remain the same. It should also be noted that tide levels have a strong influence on the fluvial flood risk in the area and that increased sea levels are likely to prolong the time for which watercourses are unable to discharge at high tide and may have a backwater effect upstream.

5.9.4 Groundwater Flooding

The effect of climate change on groundwater flooding problems, and those watercourses where groundwater has a large influence on winter flood flows is more uncertain. Milder wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible, but warmer drier summers may counteract this effect by drawing down groundwater levels more during the summer months.

5.9.5 Sewer Flooding

Increased surface water runoff (as described in section 5.9.2) is likely to increase the frequency at which surface water and combined systems are overwhelmed, particularly those which have been

[9] Devon County Council, 2014. *Flood Investigation Report Devon Winter Floods 23rd December 2013 – 14th February 2014.*

constructed historically and do not have sufficient capacity. Additionally, increases in the surface water component of flows may mean that Combined Sewer Overflows (CSOs) spill more frequently, with both flood risk and water quality implications.

5.10 Main Settlements - South Hams District Council Planning Area

Settlement specific flood risk summaries and mapping have been undertaken for the 10 main settlements within the District. These are the settlements of:

- Chillington
- Dartmouth
- Ivybridge
- Kingsbridge
- Modbury
- Salcombe (including South and North Sands)
- Stokenham
- Totnes
- Woolwell
- Yealmpton

5.11 Minor Settlements – South Hams District Council Planning Area

Settlement specific flood risk summaries and mapping have also been produced for a number of minor settlements in the District. These locations are:

- Ashprington
- Avonwick
- Beeson and Beesands
- Blackawton
- Brixton
- Churchstow
- Cornwood
- Cornworthy
- Dartington
- Diptford
- Dittisham
- Frogmore
- Goveton and Ledstone
- Harberton
- Harbertonford
- Holbeton
- Kingswear
- Lee Mill
- Lee Moor (quarry site)
- Loddiswell
- Malborough
- Marldon
- Newton Ferrers
- Rattery
- Slapton
- South Milton
- South Pool

- Sparkwell
- St. Ann's Chapel
- Stoke Fleming
- Stoke Gabriel
- Strete
- Thurlestone
- Ugborough
- Wembury
- West Alvington

5.12 Sherford New Town Development

The new community planned at Sherford is a key proposal of the Development Plan for the South Hams. When completed, the development will have provided 5,500 new homes and 83,000 square metres of employment space on the outskirts of Plymouth in the form of a sustainable mixed use settlement. Proposals also include community and open space facilities; three primary schools and one secondary school; health care centre; community recreation space; two community wind turbines; park and ride interchange at Deep Lane, together with details of the Main Street link between Deep Lane junction and Stanborough Cross.

South Hams District Council and Plymouth City Council formally granted outline planning permission for the development proposals in November 2013.

http://www.southhams.gov.uk/article/4052/Sherford-New-Community

5.13 Minor Settlements – Dartmoor National Park Authority Planning Area

South Hams District Council is the Land Drainage Authority for part of the area which falls within the Dartmoor National Park Authority planning area. However, Dartmoor National Park is its own discrete Local Planning Authority and therefore an assessment of flood risk in this area has not been included as part of this SFRA.

6 Settlement Specific Flood Risks

6.1 Chillington

Chillington is the largest settlement within Stokenham Parish. The village stretches in a linear fashion from Stokenham, along the A379 to the western edge of the parish. An unnamed watercourse flows parallel to the south of the A379.

6.1.1 Main River

No Main Rivers are located in the vicinity of Chillington and the flood risk from these sources is therefore considered to be negligible in this area.

6.1.2 Ordinary Watercourses

An unnamed watercourse flows in a westerly direction immediately to the south of Chillington. This is joined by several small unnamed tributaries in the vicinity of Chillington. Two of these originate to the north of Chillington, close to Coleridge Farm, before flowing south towards Chillington; the western of the two flows past the western edge of the village whilst the eastern tributary flows in culvert beneath the A379 and Orchard Way/Fairfield Way before emerging to the south of the village. A further small tributary joins the larger unnamed watercourse to the south of Chillington close to Tanpits Cross.

Fields to the south west of Chillington are shown to be located in Flood Zones 2 and 3 of the unnamed watercourse with the flood zone extents generally following a narrow corridor parallel to the channel. Historical flood maps show that the eastern part of Chillington has previously been flooded, from the eastern tributary and from the unnamed watercourse to the south of the village, in September 1970 when the channel capacity was exceeded. Local flood risk data from South Hams District Council indicates that the residents of Frogmore, downstream, have reported increased flows on the unnamed southern watercourse following development in Chillington.

6.1.3 Surface Water Flooding

The majority of the area shown to be at high risk of surface water flooding (1 in 30-year extent) coincides with the channel and fluvial floodplain of watercourses. However, there are also several low spots on the A379, Port Lane and Coleridge Lane which are shown to be at high risk. A significant overland flow route is shown in the Orchard Way area, with several properties shown to be at risk. It is expected that some flow would be conveyed in the culverted watercourse beneath this area, which is not represented in the surface water modelling, but there is still likely to be a risk of surface water flooding here when the culvert's capacity is exceeded. Several other areas, mostly on highways are shown to be at medium (1 in 100-year extent) and low risk (1 in 1,000-year extent) of surface water flooding.

Runoff from fields to the north of Chillington has been known to cause flooding to properties on the A379 and the capacity of drains and culverts may not be sufficient to convey flows.

6.1.4 Tidal Flooding

Chillington is not at significant risk of tidal flooding.

6.1.5 Sewer Flooding

No records of sewer flooding in Chillington are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.1.6 Highway Flooding

Coleridge Lane is known to channel runoff from fields towards the A379 and properties have previously been flooded from this source. The capacity of drains has been exceeded in previous flood events.

6.1.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Chillington all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater

flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.1.8 Flood Warnings and Flood Alerts

No Flood Warning Areas exist in the Chillington area. Flood Alert Area 113WABTW15, South Devon Rivers, covers part of the watercourse to the south west of the village.

6.1.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Chillington area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.2 Dartmouth

Dartmouth lies on the western bank of the estuary of the River Dart. The town had historic importance as a deep-water port for sailing boats. It is now a tourist destination, within the South Devon Area of Outstanding Natural Beauty.

6.2.1 Main River

Dartmouth is located on the right bank of the River Dart estuary. An unnamed tributary of the River Dart, which flows in culvert along the path of Duke Street before joining the Dart close to the war memorial, is classified as a main river in this area.

A large area of central Dartmouth (approximately bounded by Lower Street, Fairfax Place, South Ford Road, North Ford Road, Broadstone, Clarence Street and North Embankment) is shown to be located in Flood Zones 2 and 3 of the River Dart and its tributary. Given that the tributary discharges to the estuary, it is likely that there is a tidal influence on fluvial flood risk. Coronation Park and areas along the entire bank of the River Dart in Dartmouth are also shown to be in Flood Zones 2 and 3 but this is expected to be predominantly tidal.

Historical flood outlines show that parts of Duke Street, Lake Street and Roseville Street have previously been flooded in June 2004. South Hams District Council records indicate that previous flooding of this area may have been as a result of the capacity of the culvert being exceeded.

6.2.2 Ordinary Watercourses

Two small tributaries of the watercourse beneath Duke Street, which both originate to the south of the town, enter Dartmouth in culverts beneath Victoria Road. A further small watercourse originates to the south of the naval college and joins the Dart in culvert close to the corner of North Embankment and Mayor's Avenue. No flood risk data is available for these small watercourses.

6.2.3 Surface Water Flooding

A large area of the town centre is shown to be at significant risk of surface water flooding particularly the area around Roseville Street, Lake Street and Victoria Road. A number of properties in this area are shown to be at high (1 in 30-year extent) and medium (1 in 100-year extent) risk of surface water flooding. A significant overland flow route reaches this area from the west following Victoria Road and Ford Valley. A further large overland flow route follows the A379 across the north of the town and towards Coronation Park. Most of the A379 in this area is shown to be at high risk with some adjacent properties and roads at medium risk.

Further areas shown to be at risk of surface water flooding are roads in the Lower Street area and the area of the town to the north west of the A379. Additionally an overland flow route posing a high risk to Warfleet Road and nearby properties is shown to the south of Dartmouth. Steep hillsides to the south of Dartmouth are also known to generate high surface water runoff.

6.2.4 Tidal Flooding

Areas of Dartmouth along the Dart Estuary are shown to be located within Flood Zones 2 and 3. Several properties close to Dart Marina are shown to be at flood risk from tidal sources as well as properties along Southtown/Warfleet Road. Near to Darmouth town centre, Coronation Park is shown to be in Flood Zone 2 and 3 from tidal sources and a large area of the town centre (described above in Section 6.2.1) is at risk from a combination of tidal and fluvial flooding. Tidal flooding has previously been recorded on Lower Street in October 2004 due to overtopping of tidal defences.

6.2.5 Sewer Flooding

The DG5 register indicates that there have been four records of flooding from overloaded sewers in Dartmouth between 1st January 2000 and 1st August 2015. All four records fit into the "once in every twenty years" frequency category. There are also 33 records of sewer flooding from other causes.

6.2.6 Highway Flooding

No records of highway flooding have been found for Dartmouth.

6.2.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Dartmouth all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data.

6.2.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWT2T1C, South Devon Coast at Dartmouth, covers low-lying areas of Dartmouth Close to the harbour. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis covers a similar area to the Flood Warning Area within Dartmouth. There is an additional Flood Alert Area associated with the watercourse along Victoria Road – 113WABTW15, South Devon Rivers.

6.2.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Dartmouth area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.3 Ivybridge

Ivybridge is the largest settlement in the South Hams district and lies along the A38, approximately 15 km east of Plymouth. Its topography is undulating due to the valley of the River Erme which flows through the centre of the town. Historically, Ivybridge had important status as the only crossing point over the River Erme between Exeter and Plymouth.

6.3.1 Main River

The River Erme flows in a southerly direction through the centre of Ivybridge. Several roads and properties adjacent to the river are within Flood Zones 2 and 3 with the floodplain generally following a narrow corridor close to the watercourse. The floodplain extent is wider to the south of the A38, south of Ivybridge, with some minor roads, playing fields and farms shown to be in Flood Zone 2 and 3. The area around the tennis club and sewage treatment works is also shown to be at fluvial flood risk. Historical flooding from the River Erme was recorded in September 1968 to the north of Ivybridge upstream of the weir in Longtimber Wood.

6.3.2 Ordinary Watercourses

An unnamed tributary of the River Erme flows in a southerly direction through the western part of Ivybridge, partially in culvert and partially in open channel. This tributary then flows in culvert beneath the A38 before flowing in an easterly direction to join the River Erme close to the sewage treatment works. A further branch of the tributary is shown to follow the approximate route of Kennel Lane but no flood risk mapping is available for this branch, although flooding of houses and gardens is known to have occurred in the Plover Rise area due to damaged or undersized land drains.

Areas of Pinehurst Way, Cornwood Road and Woodland Road adjacent to the main western branch of the watercourse are shown to be in Flood Zone 2 and 3 of the tributary, as well as areas to the south of the A38. Flooding from this watercourse is reported to have occurred previously due to flows from a relatively large catchment exceeding culvert capacities. Flooding has also previously occurred in the Woodland Farm area due to blockage.

A large area around the A38 junction, including parts of the road itself and parts of the sewage treatment works, is located within Flood Zones 2 and 3, with an additional area including the Park Street allotments and the remainder of the sewage treatment works shown to be in Flood Zone 2. Flows from a small watercourse behind properties on St. John's Road may further contribute to flood risk here.

There are several other small watercourses located in the eastern part of Ivybridge but no flood risk information is available for these watercourses. There have been reports of localised flooding in the area close to Stowford Primary School but the source of this flooding is not known.

6.3.3 Surface Water Flooding

There are numerous roads and properties throughout Ivybridge shown to be at risk of surface water flooding. Several of the high risk areas follow the routes of watercourses but a number of additional overland flow routes are also present throughout the town, often following roads. The A38 in the area around the junction is shown to be at high risk of surface water flooding although the modelling underlying this mapping does not allow for the presence of road drains which may act to reduce the risk. Steep hillsides around Ivybridge are known to generate high surface water runoff.

6.3.4 Tidal Flooding

Ivybridge is not at significant risk of tidal flooding.

6.3.5 Sewer Flooding

The DG5 register indicates that there has been one record of flooding from overloaded sewers in Ivybridge between 1st January 2000 and 1st August 2015. This fits into the "twice or more in every ten years" frequency category. There are also 16 records of sewer flooding from other causes.

6.3.6 Highway Flooding

No records of highway flooding have been found for Ivybridge.

6.3.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the majority of 1km grid squares covering Ivybridge fit into the 25%-50% category which means that between 25% and 50% of the area of each grid square is expected to be susceptible to groundwater flooding. Areas to the east of Ivybridge are shown to be in the <25% category whilst the southern part of Ivybridge falls in a >75% category grid square. It is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.3.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWF2A0A, River Erme from Ivybridge to Ermington, covers riverside locations along the River Erme in Ivybridge. Flood Alert Area 113WABTW15, South Devon Rivers, covers riverside locations along the Erme as well as areas close to Yeolands Farm and around the A38 junction.

6.3.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Ivybridge area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.4 Kingsbridge

Kingsbridge is the second largest settlement in the South Hams, situated on the northern tip of the Kingsbridge Estuary. It has been the main market town in the area for centuries and is now a popular tourist destination.

6.4.1 Main River

Kingsbridge is located on an arm of the Kingsbridge Estuary and two watercourses – the Kingsbridge North Watercourse and Kingsbridge North West Watercourse - are classified as Main River within the town. The Kingsbridge North watercourse enters Kingsbridge close to the hospital before flowing south between West Cookworthy Road and Fore Street. The Kingsbridge North Watercourse enters to the north of Kingsbridge following a route approximately parallel to Wallingford Road. It then continues south past Church Street/Ebrington Street. The watercourses meet, in culvert, in the area close to the bus station and council offices before draining into the estuary. Both watercourses are partially culverted through Kingsbridge.

A number of properties and roads close to the watercourses are shown to be in Flood Zone 2 and 3 and historical flood outlines indicate previous flooding has occurred on Mill Street and Bridge Street from fluvial sources in June 2004. Further areas along the banks of the Kingsbridge Estuary are shown to be located in Flood Zones 2 and 3, although it is likely that flood risk is tidally influenced in these areas.

6.4.2 Ordinary Watercourses

The Kingsbridge North West and Kingsbridge North watercourses are designated as ordinary watercourses upstream of the railway culvert and Wallingford Road culvert respectively. Three further watercourses are located in Kingsbridge: a western tributary of Kingsbridge North West watercourse which enters Kingsbridge close to Norden House; a watercourse flowing to the south of the Westville area and draining to the estuary at Tacketwood; and a watercourse flowing southwards along Kingsbridge's eastern boundary and draining to the estuary at Derby Road recreation ground.

Several areas of Kingsbridge are shown to be at flood risk from ordinary watercourses. Properties on Lime Grove, Union Road and West Cookworthy Road are shown to be in Flood Zones 2 and 3 of the western tributary of Kingsbridge North West Watercourse, despite a storage area and hydrobrake being located just upstream near Norden House. Properties on Kingsway Road and in the Tacketwood area are shown to be in Flood Zones 2 and 3 of the Westville watercourse. Parts of the Derby Road Industrial Estate are located within Flood Zones 2 and 3 of the eastern watercourse and flooding has previously been recorded at the industrial estate and nearby recreation ground due to blocked grills and backing up of the watercourse during spring high tides.

6.4.3 Surface Water Flooding

A number of properties and roads in Kingsbridge are shown to be at high risk (1 in 30-year extent) of surface water flooding. Areas of high risk generally follow the routes of watercourses, including several large areas of ponding in the floodplain, but several other high risk flow routes are present, notably at Northville Park, Church Street/Waterloo Road, Ebrington Street and Rack Park Road. Runoff from fields near Northville Park has previously blocked gullies and exacerbated the problem. An area of the town centre close to the council offices is shown to be at risk of surface water flooding.

6.4.4 Tidal Flooding

Several properties along the banks of the Kingsbridge Estuary are shown to be located in Flood Zones 2 and 3 due to tidal flood risk. Tide levels are also known to have contributed to flood risk in the Derby Road recreation ground and industrial estate where backing up of the watercourse has been caused by spring high tides.

6.4.5 Sewer Flooding

The DG5 register indicates that there have been four records of flooding from overloaded sewers in Kingsbridge between 1st January 2000 and 1st August 2015. Two of these fit into the "once in every twenty years" frequency category and two into the "twice or more in every ten years" category. There are also 20 records of sewer flooding from other causes.

6.4.6 Highway Flooding

Field runoff in the vicinity of Northvale Park has previously caused gully blockages.

6.4.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Kingsbridge all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.4.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers low-lying areas of Kingsbridge close to the estuary including parts of the town centre. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis covers a similar area to the Flood Warning Area within Kingsbridge. There is an additional Flood Alert Area associated with several watercourses in the town – 113WABTW15, South Devon Rivers.

6.4.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Kingsbridge area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.5 Modbury

Modbury is a small market town in the parish of Harford. The surrounding topography is very hilly and town sits in a steep-sided valley.

6.5.1 Main River

No Main Rivers are located in the vicinity of Modbury and the flood risk from these sources is therefore considered to be negligible in this area.

6.5.2 Ordinary Watercourses

The Ayleston Brook flows in a westerly direction to the south of Modbury. Two unnamed tributaries of the Ayleston Brook flow through Modbury. The larger of the two enters Modbury to the east, close to Ayleston Park, before flowing in a south westerly direction through the centre of Modbury and meeting the Ayleston Brook close to Swanbridge Mill Farm. The smaller tributary originates close to Cromwell Park and flows in a southerly direction through open space between Barracks Road and Brownston Street. It then flows in culvert beneath Church Street before joining the larger tributary to the south of Modbury. Both tributaries are partially culverted through Modbury.

In Modbury, a number of properties are shown to be in Flood Zones 2 and 3 of the larger tributary of the Ayleston Brook, particularly the reach between Ayleston Park and Church Lane. The majority of this reach is culverted but it has been reported that blockage has previously caused flooding of the town centre. Further properties are shown to be located in Flood Zone 2 and 3 at the confluence of the tributary with the Ayleston Brook and historical flooding has been noted at two properties here due to restricted flow beneath the highway. No flood risk mapping is available for the smaller tributary but flood records indicate that there has been flooding to Exeter Inn and Back Street from this watercourse and flooding to a low spot on Dark Lane from an unknown source.

6.5.3 Surface Water Flooding

Surface water flow routes within Modbury generally follow the channels of watercourses where they do not pose a significant risk to properties. However, some areas of high risk (1 in 30-year extent) affecting properties and roads are shown in the town centre at Back Street, Church Street and New Road. It is possible that some flow would be directed into the culverted watercourses beneath the town centre but there is likely to still be a risk during storm events. Areas of medium (1 in 100-year extent) to low risk (1 in 1,000-year extent) of surface water flooding to properties and roads are shown on Brownston Street and Champernowne/Cromwell Park. It has been noted that field runoff has often caused flooding issues to Brownston Street and beyond.

6.5.4 Tidal Flooding

Modbury is not at significant risk of tidal flooding.

6.5.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Modbury between 1st January 2000 and 1st August 2015. There are, however, 2 records of sewer flooding from other causes.

6.5.6 Highway Flooding

No records of highway flooding have been found for Modbury.

6.5.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Modbury generally fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.5.8 Flood Warnings and Flood Alerts

No Flood Warning Areas exist in the Modbury area. Flood Alert Area 113WABTW15, South Devon Rivers, covers part of the Aylestone Brook and its tributaries.

6.5.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Modbury area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.6 Salcombe (including South and North Sands)

Salcombe is a popular tourist destination on the steep western banks of the upper Kingsbridge Estuary. The town has a long waterfront and had historic importance as a sailing port.

6.6.1 Main River

No Main Rivers are located in the vicinity of Salcombe and the flood risk from these sources is therefore considered to be negligible in this area.

6.6.2 Ordinary Watercourses

The Batson Creek, an arm of the Kingsbridge Estuary, flows along the north east edge of the town and discharges into the Kingsbridge Estuary close to Snape's point. A further unnamed watercourse, originating near Collaton, flows along the south western edge of Collaton before discharging to the estuary at North Sands Bay. Only tidal flood risk mapping is available for these watercourses as this is expected to be the most significant source of flood risk although fluvial flooding has previously been reported at the car park for North Sands Bay when flow has been restricted by high tides. Another watercourse, originating south of Malborough, joins the estuary at South Sands. Fluvial Flood Zone 2 of this watercourse extends upstream, beyond the areas at risk from tidal flooding, and a property near Southern Mill Farm is shown to be at risk.

6.6.3 Surface Water Flooding

Several surface water flow routes are shown in Salcombe in surface water flood risk mapping and a number of roads and properties are shown to be at risk. The Beadon Road/Park Rise area is shown to be at high (1 in 30-year extent) to medium (1 in 100-year extent) flood risk but this is mostly contained within the highway. Coronation Road and Broadventure Road are also shown to be at high to medium risk with some properties in these areas shown at medium to low risk. There is an area of high risk to properties shown on Island Street. An overland flow route from Camperdown Road to Courtenay Street poses a medium to high risk to properties and roads in the Courtenay Street/Union Street area. Some areas close to the watercourses in North Sands and South Sands are also shown to be at risk of surface water flooding.

6.6.4 Tidal Flooding

Areas along the Batson Creek are shown to be in Flood Zones 2 and 3 for tidal flood risk with properties in Lower Batson, Island Street, Buckley Street, Union Street and Fore Street shown to be at risk. Properties, the road and a car park close to North Sands Bay and the road and properties at South Sands are also shown to be located in tidal Flood Zone 2 and 3.

6.6.5 Sewer Flooding

The DG5 register indicates that there have been six records of flooding from overloaded sewers in Salcombe between 1st January 2000 and 1st August 2015. Two of these fit into the "once in every twenty years" frequency category and four into the "twice or more in every ten years" category. There are also 18 records of sewer flooding from other causes.

6.6.6 Highway Flooding

No records of highway flooding have been found for Salcombe.

6.6.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Salcombe all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.6.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers areas close to Batson Creek and North Sands Bay as well as a small area close to Salcombe Harbour. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis covers a similar area to the Flood Warning Area within Salcombe. There is an additional Flood Alert Area associated with the watercourse draining into South Sands – 113WABTW15, South Devon Rivers.

6.6.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Salcombe area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.7 Stokenham

The village of Stokenham lies on the A379 approximately 1km to the west of Slapton Ley. It gives its name to the parish in which it is located. The village contains a primary school, church and a pub but is mostly residential.

6.7.1 Main River

No Main Rivers are located in the vicinity of Stokenham and the flood risk from these sources is therefore considered to be negligible in this area.

6.7.2 Ordinary Watercourses

Two unnamed watercourses flow from the western and southern edges of Stokenham and join a watercourse to the south west of the village; this then flows in a westerly direction to the south of Chillington. The western of the two watercourses originates close to Holbrook Farm and flows south before following a westerly route behind properties on the A379 and beneath the road to join the Chillington watercourse. Overtopping of the banks of this watercourse has previously been reported in the area near to the playground but no flood risk mapping is available. The eastern watercourse appears to originate in two branches – one to the west of the school and one to the south of Stokenham – before leaving Stokenham to the south west. No flood risk mapping is available for this watercourse. Fluvial flooding occurred just downstream of Stokenham in September 1970.

6.7.3 Surface Water Flooding

The school and properties on the A379 are shown to be at medium (1 in 100-year extent) to low risk (1 in 1,000-year extent) from a surface water flow route at the western end of the village. A further overland flow route to the east of the town puts a stretch of the A379 and several properties at high (1 in 30-year extent) to medium risk (1 in 100-year extent). Several properties and roads in the village are shown to be at low risk of surface water flooding from a flow route originating from the north.

6.7.4 Tidal Flooding

Stokenham is not at significant risk of tidal flooding.

6.7.5 Sewer Flooding

No records of sewer flooding in Stokenham are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.7.6 Highway Flooding

No records of highway flooding have been found for Stokenham.

6.7.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Stokenham all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.7.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Stokenham area.

6.7.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Stokenham area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.8 Totnes

Totnes is a market town and is a popular tourist destination and centre for the arts. The town is located on the River Dart with the town centre located to the west of the river. It is located on the Exeter to Plymouth railway line and can be reached by road on the A381, A384 and A385.

6.8.1 Main River

The River Dart flows through the centre of Totnes and is classified as Main River throughout the town. An additional large mill leat channel branches from the main Dart channel near Swallowfields and flows through Totnes before rejoining the main channel at the Fore Street Bridge. This channel is also classified as Main River. A main river tributary of the Dart, the Malt Mill Lake watercourse, enters Totnes to the east near Brook House and follows the route of the railway line towards the town centre before flowing east and joining the Dart near Coronation Road.

Large areas of Totnes are shown to be in fluvial Flood Zones 2 and 3 with numerous roads (including the A381) and properties affected. The areas at flood risk are relatively widespread and the extent of Flood Zone 2 is only slightly larger than that of Flood Zone 3. The River Dart is tidal upstream to the weir close to Swallowfields and therefore it is expected that fluvial flood risk in Totnes will be influenced by tide levels.

Several small areas of Totnes, close to the Dart are shown in historical flood mapping: the crossroads between Fore Street, The Plains and Station Road, which flooded in February 1974; and two separate properties on Steamer Quay Road which flooded in December 1981 and October 2004. Local flood risk information for the Malt Mill Lake watercourse indicates that there are areas where flooding is caused by culvert capacity being exceeded.

6.8.2 Ordinary Watercourses

Two large ordinary watercourses join the Dart to the north of Totnes: the Bidwell Brook, which joins from the west just upstream of the Dart's tidal limit; and the River Hems, which meets the Dart at the water treatment works to the south of Marlands Farm. Another smaller tributary also flows into the Dart near this water treatment works but mostly flows within farmland to the north east of Totnes.

Two other smaller tributaries join the Dart to the south of Totnes. One originates near Fishowter's Lane and flows north east into Totnes where it becomes a culverted system. The second southern tributary flows through the Christina Park recreation ground and woodland and under Parkers Way and Steamer Quay Road before flowing into the Dart.

Several areas along the ordinary watercourses lie within Flood Zone 2 and 3, although in some cases flood risk mapping is not available for the upper reaches. Flooding on these watercourses is expected to be partially influenced by levels on the Dart. The River Hems valley is known to flood when levels on the Dart are high and the A381 has been affected by flooding here in the past.

6.8.3 Surface Water Flooding

Numerous properties and roads in Totnes are shown to be at risk of surface water flooding including sections of the A381 and A385. Widespread areas on both sides of the River Dart are shown to be at high risk (1 in 30-year extent). Overflows from the surface water system are also known to exacerbate fluvial flooding issues.

6.8.4 Tidal Flooding

The tidal reaches of the River Dart extend as far as the weir close to Swallowfields in the north of Totnes. River levels on the Dart and its tributaries are therefore expected to be heavily influenced by high tide levels. Large parts of the extensive Flood Zones 2 and 3 within Totnes may be at least partially tidally influenced.

6.8.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Totnes between 1st January 2000 and 1st August 2015. There are, however, 11 records of sewer flooding from other causes. Storm water overflows are known to cause issues on the Malt Mill Lake watercourse near Quarry Close.

6.8.6 Highway Flooding

Highway flooding has been reported at a low spot near Whiteley Bridge following high rainfall. Flooding from highway runoff is also noted to have occurred near Malt Mill Bridge. Additional highway flooding has also been reported on the A381 near the Water Treatment Works.

6.8.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the majority of 1km grid squares in the area around Totnes fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, the centre and northern part of Totnes lie within grid squares in the 25%-50% category. It is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

High springs to the east of Totnes are known to cause flooding.

6.8.8 Flood Warnings and Flood Alerts

There are three Flood Warning Areas which cover areas of Totnes. Flood Warning Areas 113FWF2C0B, River Dart at Totnes, and 113FWT2T1G, South Devon Coast at Totnes, both cover a large area of low-lying land close to the river downstream of the railway line. Upstream of the railway line Flood Warning Area 113FWF2C0C, River Dart from Buckfastleigh to Totnes including Staverton, covers low-lying areas close to the river. There are two Flood Alert Areas in Totnes: 113WABTW14, River Dart Area, and 113WACT1A, South Devon Coast from Plymouth to Lyme Regis.

6.8.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Totnes area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.9 Woolwell

Woolwell is located on the north east edge of Plymouth and close to Dartmoor National Park. Development of the area began in the early 1980s and it is located just to the east of the A386 Tavistock Road.

6.9.1 Main River

No Main Rivers are located in the vicinity of Woolwell and the flood risk from these sources is therefore considered to be negligible in this area.

6.9.2 Ordinary Watercourses

An unnamed watercourse flows through woodland to the south of Woolwell but the extents of Flood Zone 2 and 3 for this watercourse are narrow and remain within the woodland some distance from Woolwell. A further small watercourse originates on the eastern side of Woolwell but flows away into woodland to the south east. The fluvial flood risk from these sources to Woolwell is therefore not expected to be significant.

6.9.3 Surface Water Flooding

There are several areas of Woolwell which are shown to be at risk of surface water flooding. High risk (1 in 30-year extent) areas are generally limited to roads although a few properties are at high risk. Roads at high risk include: Towerfield Drive, Woolwell Road, Warren Park, Cann Wood View, Rowan Way, Maple Way, Merlin Close and Park Road. There are properties throughout Woolwell that are shown to be at low (1 in 1,000-year) to medium (1 in 100-year) risk of surface water flooding.

6.9.4 Tidal Flooding

Woolwell is not at significant risk of tidal flooding.

6.9.5 Sewer Flooding

No records of sewer flooding in Woolwell are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.9.6 Highway Flooding

No records of highway flooding have been found for Woolwell.

6.9.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Woolwell all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.9.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the Woolwell area. Flood Alert Area 114WAFT1W12A00, River Plym and Tory Brook, covers part of the unnamed watercourse to the south of Woolwell.

6.9.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Woolwell area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.10 Yealmpton

Yealmpton is a village located on the A379 approximately 3km to the south east of Plymouth city boundary. The village is named after the River Yealm which flows through it in a south westerly direction.

6.10.1 Main River

The River Yealm flows through Yealmpton in a westerly direction. The extent of Flood Zone 3 of this watercourse is generally limited to gardens of properties on Torr Bridge Park and Riverside Walk and fields upstream of the town, although a small area of property flooding is shown within Flood Zone 3 close to Torr Hill Bridge. Flood Zone 2 is slightly wider in extent through Yealmpton, with some properties on Torr Bridge Park included. The sewage works located adjacent to the Yealm is shown to lie partially in Flood Zone 2 and partially within Flood Zone 3.

A number of fluvial flood events have occurred previously in Yealmpton, mostly flooding areas of open space although some property and road flooding occurred near to Torr Hill Bridge in several events. Flood events have been recorded in January 2003, December 2007, January 2008, July 2012, November 2012 and December 2012. The Yealm channel is known to be fairly narrow and, despite recent improvements, flooding is still know to occur due to blockage of culverts.

6.10.2 Ordinary Watercourses

Two unnamed tributaries join the Yealm at Yealmpton. One tributary originates to the north of Yealmpton and flows in a south easterly direction before entering a culvert near Bowden Hill. This then flows beneath Yealmpton and discharges to the Yealm near Stray Park. There is no flood risk mapping available for this watercourse.

A southern tributary originates from several small drains in the area around Seccombe Wood to the south of Yealmpton. This flows past the rear of properties on Church Park Road and Ford Road before entering a culvert at Ford Road and discharging to the Yealm near Boldventure. Flood Zone 3 for this watercourse shows overland flows along Ford Road towards the bridge but no properties are included. Flood Zone 2 is slightly larger in extent with some properties on Rockdale Road and Ford Road shown as flooded.

6.10.3 Surface Water Flooding

Areas at risk of surface water flooding in Yealmpton are generally located close to the watercourses although additional overland flow routes are shown in the surface water mapping in the areas near Stray Park, Elm Tree Park, New Road, Torr Bridge Park and Ford Road. Areas of high risk (1 in 30-year extent) are mostly limited to the highways but some properties are shown to be at risk in these areas. Additionally, an area of ponding between Riverside Walk and Chapel Road poses a medium (1 in 100-year extent) to high (1 in 30-year extent) risk of flooding of properties.

6.10.4 Tidal Flooding

Yealmpton is not at significant risk of tidal flooding.

6.10.5 Sewer Flooding

No records of sewer flooding in Yealmpton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.10.6 Highway Flooding

No records of highway flooding have been found for Yealmpton.

6.10.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Yealmpton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.10.8 Flood Warnings and Flood Alerts

Flood Warning Area 114FWF1I4AA00, River Yealm at Yealmbridge and Yealmpton, covers riverside locations along the River Yealm in Yealmpton. Flood Alert Area 114WAFT1W13A00, River Yealm, covers a similar area to the Flood Warning.

6.10.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Yealmpton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.11 Ashprington

Ashprington is a small village located approximately 1km south west of the River Dart. It is situated approximately 3km south of Totnes.

6.11.1 Main River

No Main Rivers are located in the vicinity of Ashprington and the flood risk from these sources is therefore considered to be negligible in this area. However, roads to the south west of Ashprington are shown to be located within Flood Zone 2 and 3 of the Harbourne River.

6.11.2 Ordinary Watercourses

A small tributary of the Harbourne River originates to the south of Ashprington and flows south to join the Main River. This is not expected to pose a significant flood risk to Ashprington.

6.11.3 Surface Water Flooding

Parts of the road through the centre of Ashprington is shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding. This appears to be from an overland flow route originating in Ashprington and flowing south following the road. Additionally, several properties in the Frogmore Farm area at the southern end of the village are shown to be at risk. Surface water is also known to have previously caused issues close to the nearby industrial park.

6.11.4 Tidal Flooding

Ashprington is not at significant risk of tidal flooding.

6.11.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Ashprington between 1st January 2000 and 1st August 2015. There are, however, 6 records of sewer flooding from other causes.

6.11.6 Highway Flooding

No records of highway flooding have been found for Ashprington.

6.11.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Ashprington all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.11.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are located in the immediate vicinity of Ashprington.

6.11.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Ashprington area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.12 Avonwick

Avonwick is a small village located on the River Avon, mostly to the south west of the river. It is situated approximately 2km south east of the A38.

6.12.1 Main River

No Main Rivers are located in the vicinity of Avonwick and the flood risk from these sources is therefore considered to be negligible in this area.

6.12.2 Ordinary Watercourses

The River Avon flows in a south easterly direction along the north east edge of Avonwick and its tributary, the Horse Brook, joins the Avon just upstream of the village at Horsebrook. The Charford Brook, another tributary, joins the Avon from the east and downstream of Avonwick, near Beneknowle, and a further small unnamed watercourses joins nearby from the west. Flood Zones 2 and 3 of these watercourses are similar in extent in the area around Avonwick.

Flood risk from the Charford Brook and the western watercourse is generally limited to fields and is fairly narrow in extent. Several properties and the road in the Horsebrook area are shown to be within Flood Zones 2 and 3 of the Horse Brook and River Avon. Properties close to the River Avon, in the Avon Villa area and further downstream at Beneknowle Farm, are also shown to be located in Flood Zones 2 and 3. Historical flood outlines from the December 1979 flood event do not show any properties to have been flooded but more recently fluvial flooding, exacerbated by highway runoff, has caused flooding issues in the area near Avon Villa with the sewage pumping station often affected by flooding.

A small tributary of the western watercourse flows through Avonwick to the west of Jubilee cottages and a network of small watercourses cross fields to the east of Avonwick and flow into the Avon. Flood risk mapping is not available for these smaller watercourses.

6.12.3 Surface Water Flooding

Areas shown to be at surface water flood risk in Avonwick generally coincide with the watercourses. The risk to the majority of properties in the village is negligible but areas of higher risk are shown due to ponding in the area around Avon Villa. A large area of the road near Beneknowle is shown to be at high risk (1 in 30-year extent) of surface water flooding.

6.12.4 Tidal Flooding

Avonwick is not at significant risk of tidal flooding.

6.12.5 Sewer Flooding

No records of sewer flooding in Avonwick are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.12.6 Highway Flooding

Highway runoff has been known to contribute to flooding of a low spot near Avon Villa and the nearby sewage pumping station is often affected.

6.12.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Avonwick generally fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. An area to the south of Avonwick fits into the 25%-50% category. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.12.8 Flood Warnings and Flood Alerts

There are two Flood Warning Areas in the vicinity of Avonwick: 113FWF2B0B, River Avon at South Brent, Avonwick and Aveton Gifford, and 113FWF2B0A, River Avon from Didworthy to Aveton Gifford. These Flood Warning Areas cover parts of Avonwick which are close to the River Avon. Flood Alert Area 113WABTW15, South Devon Rivers, covers a similar area to the Flood Warning Areas in the Avonwick area but three additional tributaries are also covered.

6.12.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Avonwick area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.13 Beeson and Beesands

Beesands is a small seaside resort located just to the south of Slapton Ley. The nearby village of Beeson is located around 750m to the north-west of Beesands.

6.13.1 Main River

No Main Rivers are located in the vicinity of Beeson and Beesands and the flood risk from these sources is therefore considered to be negligible in this area.

6.13.2 Ordinary Watercourses

A small unnamed watercourse flows in a north easterly direction through Beeson and joins the watercourse that flows into Widdicombe Ley to the north of the village. No flood risk mapping is available for this watercourse.

6.13.3 Surface Water Flooding

Surface water flood mapping indicates that there are several areas at medium (1 in 100-year extent) to high (1 in 30-year extent) surface water flood risk in Beeson in areas adjacent to the watercourse. Flood risk to several properties and roads is shown in the mapping.

The western road entering Beesands is shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding and is likely to convey flow towards the village. Additionally, parts of the seafront road are shown to be at risk. Runoff from fields to the west of Beesands have previously caused flooding issues to the Cricketers Inn.

6.13.4 Tidal Flooding

Several properties located on the seafront road in Beesands, as well as parts of the road itself, are shown by mapping to be located in tidal Flood Zone 2 and 3. Historical flood outlines indicate that the seafront road in Beesands was flooded in October 2004 due to defences being overtopped. Beeson is located further inland and is therefore not at significant risk of tidal flooding.

6.13.5 Sewer Flooding

No records of sewer flooding in Beeson and Beesands are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.13.6 Highway Flooding

Highway runoff has previously caused flooding to the seafront car park in Beesands.

6.13.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Beeson and Beesands generally fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. An area immediately to the north of Beeson and Beesands is located in a 25%-50% category grid square. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.13.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A2, South Devon Coast from Start Point to Dawlish Warren, covers areas of Beesands close to the seafront including the seafront road and several properties. Flood Alert Areas 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, and 113WACT1H, South Devon Coast at Beesands, Torcross, Slapton, Torbay and Dawlish, cover a similar area to the Flood Warning.

6.13.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Beeson and Beesands area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.14 Blackawton

Blackawton is a small village located approximately 7km to the west of Dartmouth. The village is located approximately 2km to the south west of the A3122.

6.14.1 Main River

No Main Rivers are located in the vicinity of Blackawton and the flood risk from these sources is therefore considered to be negligible in this area.

6.14.2 Ordinary Watercourses

A small unnamed watercourse originates in land to the south of Blackawton and flows southwards away from the village. A culvert, currently maintained by South Hams District Council, drains stormwater overflows from fields to the north of Blackawton beneath Castle Lane and to the southern watercourse. No fluvial flood risk mapping is available in Blackawton.

6.14.3 Surface Water Flooding

A few small areas at low risk (1 in 1,000-year extent) of surface water flooding are shown in the surface water flood mapping at Vicarage Road, The Grove and Castle Lane. Runoff from fields to the north of Castle Lane had previously posed a flood risk to properties in this area but a culvert has been installed beneath the road to drain some of the flow to the watercourse. The majority of Blackawton is not at significant risk of surface water flooding.

6.14.4 Tidal Flooding

Blackawton is not at significant risk of tidal flooding.

6.14.5 Sewer Flooding

No records of sewer flooding in Blackawton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.14.6 Highway Flooding

No records of highway flooding have been found for Blackawton.

6.14.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Blackawton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.14.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Blackawton area.

6.14.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Blackawton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.15 Brixton

Brixton is a village located on the A379, approximately 1km to the south east of the Plymouth city boundary. It is located to the north of the mudflats of the River Yealm.

6.15.1 Main River

No Main Rivers are located in the vicinity of Brixton and the flood risk from these sources is therefore considered to be negligible in this area.

6.15.2 Ordinary Watercourses

Four small watercourses are located in the vicinity of Brixton (to the north east, south east, west and north west) all flowing away from the village. The north eastern watercourse originates near Wollaton before flowing eastwards near Tapp's Lane. The south eastern watercourse originates south of Brixton and flows past the rear of properties in The Crescent and east through Winston Hill Wood. The western watercourse originates near Combe and flows into Cofflete Creek to the west. The north western watercourse flows in an easterly direction to the north of properties at Chittleburn Cross and also joins the Cofflete Creek. No flood risk mapping is available for these watercourses.

6.15.3 Surface Water Flooding

Several areas of Brixton are shown to be at risk of surface water flooding with areas of high risk (1 in 30-year extent) shown at Combe, on the A379 and in areas close to the school. Numerous small patches at low risk (1 in 1,000-year extent) are spread throughout the village with several properties shown to be at risk.

6.15.4 Tidal Flooding

Brixton is not at significant risk of tidal flooding.

6.15.5 Sewer Flooding

No records of sewer flooding in Brixton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.15.6 Highway Flooding

No records of highway flooding have been found for Brixton.

6.15.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Brixton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.15.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Brixton area.

6.15.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Brixton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.16 Churchstow

The village of Churchstow is located on the A379, approximately 2km to the north west of Kingsbridge. At the eastern end of the village is the South Hams Business Park which is home to a variety of small businesses.

6.16.1 Main River

No Main Rivers are located in the vicinity of Churchstow and the flood risk from these sources is therefore considered to be negligible in this area.

6.16.2 Ordinary Watercourses

Two watercourses are located in the vicinity of Churchstow – to the south and to the north east. There is no flood risk mapping available for these watercourses. The southern watercourse originates in two branches near Home Farm and to the south east of South Hams Business Park. These branches meet to the east of Higher Holditch and the watercourse then flows in a south easterly direction towards Kingsbridge. The north eastern watercourse originates in several branches in fields to the north west of Leigh Cross and flows northward where it eventually joins the River Avon.

6.16.3 Surface Water Flooding

Surface water flood risk to Churchstow is generally very low although areas close to Home Farm and Pulleyblanks Farm are shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk. Some ponding is also shown in the surface water mapping near units in the industrial estate.

6.16.4 Tidal Flooding

Churchstow is not at significant risk of tidal flooding.

6.16.5 Sewer Flooding

No records of sewer flooding in Churchstow are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.16.6 Highway Flooding

No records of highway flooding have been found for Churchstow.

6.16.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Churchstow all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.16.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Churchstow area.

6.16.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Churchstow area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.17 Cornwood

Cornwood is a village located approximately 4km to the north west of Ivybridge. The village is bounded on its eastern and north western sides by woodland.

6.17.1 Main River

No Main Rivers are located in the vicinity of Cornwood and the flood risk from these sources is therefore considered to be negligible in this area.

6.17.2 Ordinary Watercourses

The River Yealm, which is not designated as a main river near Cornwood, flows southwards past the eastern edge of the village. Upstream of Cornwood, the area around Blachford Fish Pond is shown to be located within Flood Zones 2 and 3. Further downstream, at the junction of Bond Street and Bridge Mill Lane, several properties are shown to be in Flood Zones 2 and 3 as well as the road towards Ivybridge. Occasional flooding has been reported at this junction at the point where the River Yealm passes beneath the highway. Historical flood outlines from the July 2012 flood event show some flooding to fields near Cornwood and overtopping of the road to Ivybridge but no properties affected.

A tributary of the River Piall flows in a south westerly direction to the north east of Cornwood but no flood risk mapping is available in this area.

6.17.3 Surface Water Flooding

A number of roads in Cornwood are shown to be at risk of surface water flooding including Fore Street, Bond Street and Abbot's Park. Several properties on these roads are also shown to be at surface water flood risk. A flow route runs along Bond Street and south east across the fields at Puttapool to join the River Yealm.

6.17.4 Tidal Flooding

Cornwood is not at significant risk of tidal flooding.

6.17.5 Sewer Flooding

No records of sewer flooding in Cornwood are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.17.6 Highway Flooding

No records of highway flooding have been found for Cornwood.

6.17.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Cornwood all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.17.8 Flood Warnings and Flood Alerts

Flood Warning Area 114FWF1I4BA00, River Yealm from Mill Bridge to Lee Mill, covers areas close to the Yealm to the south east of Cornwood. Flood Alert 114WAFT1W13A00, River Yealm, covers a similar area.

6.17.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Cornwood area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.18 Cornworthy

Cornworthy is a small village located approximately 5km south east of Totnes and approximately 5km north west of Dartmouth. The village is situated around 600m to the south of the Harbourne River where it flows through Bow Creek, an inlet of the tidal River Dart.

6.18.1 Main River

No Main Rivers are located in the vicinity of Cornworthy and the flood risk from these sources is therefore considered to be negligible in this area.

6.18.2 Ordinary Watercourses

Two small unnamed tributaries of the Harbourne River originate just to the north of Cornworthy and flow northwards away from the village. No flood risk mapping is available for these watercourses.

6.18.3 Surface Water Flooding

Surface water flood mapping indicates that areas of the main street through Cornworthy are at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding. There are also several properties to the east of Priory View which are shown to be at medium (1 in 100-year extent) to low (1 in 1,000-year extent) risk.

6.18.4 Tidal Flooding

Cornworthy is not at significant risk of tidal flooding.

6.18.5 Sewer Flooding

No records of sewer flooding in Cornworthy are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.18.6 Highway Flooding

No records of highway flooding have been found for Cornworthy.

6.18.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Cornworthy all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.18.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Cornworthy area.

6.18.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Cornworthy area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.19 Dartington

Dartington is a village located approximately 1km to the north west of Totnes. Most of the village is located to the south of the A385 in an area known as Cott.

6.19.1 Main River

No Main Rivers are located in the vicinity of Dartington and the flood risk from these sources is therefore considered to be negligible in this area.

6.19.2 Ordinary Watercourses

The Bidwell Brook flows close to Dartington, entering from the north west before flowing in a south westerly direction adjacent to the A385. Three small tributaries of the Bidwell Brook flow through the Cott area of Dartington, although no flood risk mapping is available for the eastern of these tributaries. Two additional small tributaries join from the north, neither of which have flood risk mapping available. Bidwell Brook and its tributaries are known to have flooded previously.

Several properties along the Bidwell Brook and its tributaries are shown to be located in Flood Zones 2 and 3 and the Flood Zones show the A385 to be at flood risk in several locations. The junction of the A385 and A384 is located within Flood Zones 2 and 3. The extents of Flood Zones 2 and 3 are generally similar in Dartington with the exception of the area around Dartington Primary School where Flood Zone 2 extends across part of the main school building whilst Flood Zone 3 remains parallel with the channel.

6.19.3 Surface Water Flooding

Several areas of Dartington are shown to be at risk of surface water flooding. Areas of surface water flood risk in Dartington generally follow the paths of watercourses. However, additional overland flow routes are shown in the area around the community centre, the area near Mill Road, Cott Road and between Vineyard Hill and the A385. Several areas are shown to be at high risk (1 in 30-year extent): roads around Week, Vineyard Hill and the junction of the A384 and A385.

6.19.4 Tidal Flooding

Dartington is not at significant risk of tidal flooding.

6.19.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Dartington between 1st January 2000 and 1st August 2015. There are, however, 2 records of sewer flooding from other causes.

6.19.6 Highway Flooding

No records of highway flooding have been found for Dartington.

6.19.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Dartington all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.19.8 Flood Warnings and Flood Alerts

There are no Flood Warning areas within the vicinity of Dartington. Flood Alert Area 113WABTW14, River Dart Area, covers areas close to the watercourses.

6.19.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Dartington area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.20 Diptford

Diptford is a small village located approximately 8km to the east of Ivybridge and 8km to the south west of Totnes. The village is located on a hill overlooking the River Avon.

6.20.1 Main River

No Main Rivers are located in the vicinity of Diptford and the flood risk from these sources is therefore considered to be negligible in this area.

6.20.2 Ordinary Watercourses

The River Avon flows in a southerly direction to the west of Diptford and several small tributaries flow west through the village to join the Avon. Flood Zones 2 and 3 of the River Avon generally show flooding of fields although some properties are shown within the Flood Zones near Oakenham Bridge. Both western access roads to the village are shown to be located in Flood Zones 2 and 3 and occasional flooding of the highway has been reported following bank collapse or blockage from fallen trees. Historical flood outlines from the December 1979 flood event show that the extents were fairly narrow near Diptford with no properties shown to be affected, although several roads lie within the outline. No flood risk mapping is available for the smaller tributaries flowing through Diptford.

6.20.3 Surface Water Flooding

Diptford Court, Oakenham Bridge and Mill Lane are all shown to be at high (1 in 30-year extent) risk of surface water flooding with some properties affected. Additionally, the main road between Holsome Lane and Mill Lane is shown to be at risk. Surface water flow routes are generally shown to follow the paths of watercourses or roads.

6.20.4 Tidal Flooding

Diptford is not at significant risk of tidal flooding.

6.20.5 Sewer Flooding

No records of sewer flooding in Diptford are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.20.6 Highway Flooding

No records of highway flooding have been found for Diptford.

6.20.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Diptford all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.20.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWF2B0A, River Avon from Didworthy to Aveton Gifford, covers the floodplain area of the River Avon to the west of Diptford. Flood Alert Area 113WABTW15, South Devon Rivers, covers a similar area.

6.20.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Diptford area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.21 Dittisham

Dittisham is a village located close to the tidal reaches of the River Dart and approximately 3km to the north west of Dartmouth. The Dittisham to Greenway Quay ferry runs across the River Dart from the eastern end of the village. The village is split into the Higher Dittisham and Lower Dittisham areas.

6.21.1 Main River

The River Dart is classified as Main River upstream of Greenway Quay but flood risk from this source is predominantly tidal within Dittisham.

6.21.2 Ordinary Watercourses

A small unnamed tributary of the River Dart flows through Lower Dittisham in a north easterly direction before joining the Dart between Ham Lane and The Lane. Culvert blockages on this watercourse have caused flooding to a car park and to gardens in the past. No flood risk mapping is available for this watercourse. Dittisham Mill Creek flows past the north west edge of Dittisham but flood risk from this source is predominantly tidal.

6.21.3 Surface Water Flooding

Most high risk (1 in 30-year extent) areas in Dittisham are located in areas of open space although small parts of the highway at Dittisham Court and Riverside road are shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk. Several properties are shown to be at low (1 in 1,000-year extent) risk of surface water flooding in the Lower Street area.

6.21.4 Tidal Flooding

The River Dart is tidal in the area adjacent to Dittisham and tidal Flood Zones 2 and 3 show open space between Ham Lane and The Lane to be at risk of tidal flooding. Gardens on The Lane and one property close to the river are shown to be located in Flood Zone 3. A further property on The Lane lies on the edge of Flood Zone 3 and within Flood Zone 2. There is also a very small area of Flood Zone 2 and 3 shown at the edge of gardens of properties on Lower Street from the Dittisham Mill Creek.

6.21.5 Sewer Flooding

No records of sewer flooding in Dittisham are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.21.6 Highway Flooding

No records of highway flooding have been found for Dittisham.

6.21.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Dittisham all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.21.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers low lying coastal areas east of Dittisham near the end of Ham Lane. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers a similar area.

6.21.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Dittisham area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.22 Frogmore

Frogmore is a small village located on the A379 approximately 1km to the west of its larger neighbour Chillington. Frogmore is located at the tidal limit of the Frogmore Creek and was once a port.

6.22.1 Main River

No Main Rivers are located in the vicinity of Frogmore and the flood risk from these sources is therefore considered to be negligible in this area.

6.22.2 Ordinary Watercourses

Two watercourses flow into the Frogmore Creek at Frogmore. One watercourse originates to the south east of Chillington and flows in a westerly direction into Frogmore near Orchard Close. The second watercourse flows in a southerly direction through Keynedon Barton and enters Frogmore upstream of the A379. The watercourses meet in the centre of Frogmore and flow under the Orchard View bridge into Frogmore Creek and are tidally influenced at their downstream end.

Mapping shows a number of properties in the centre of Frogmore to lie in Flood Zone 2 and 3, although this is partly from tidal flooding. Areas of Orchard Close and Orchard View are shown to be at risk as well as a section of the A379 near the centre of the village. Historical flood outlines from September 1970 show that some properties on Orchard Close and Orchard View were flooded as well as several roads, including the A379. The village hall and nearby car park are also known to have flooded previously. Flooding in Frogmore tends to occur when fluvial flows are restricted at high tide.

6.22.3 Surface Water Flooding

Steep hillsides around Frogmore are known to cause rapid runoff into the town. Surface water flooding and mud flows have also been reported from rainfall on ploughed fields to the north of the village. A large part of the centre of Frogmore in the area around Orchard View is shown to be at high (1 in 30-year extent) risk of surface water flooding with properties and roads affected. Parts of the A379 are shown to be at medium (1 in 100-year) risk of surface water flooding.

6.22.4 Tidal Flooding

Frogmore is located at the upper end of the Frogmore Creek, an arm of the Kingsbridge Estuary. Several properties and gardens along the creek and in the centre of the village are included in Flood Zones 2 and 3 for tidal flood risk. There is also a tidal influence on fluvial flood risk in the village and previous fluvial flood events have been caused by high tide levels restricting fluvial flows.

6.22.5 Sewer Flooding

The DG5 register indicates that there has been one record of flooding from overloaded sewers in Ivybridge between 1st January 2000 and 1st August 2015. This fits into the “once in every twenty years” frequency category. There is also 1 record of sewer flooding from other causes.

6.22.6 Highway Flooding

No records of highway flooding have been found for Frogmore.

6.22.7 Ground Water Flooding

The Environment Agency’s Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Frogmore all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.22.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers a large part of the centre of Frogmore, including roads and properties, in areas close to the tidal creek. There are two Flood Alert Areas covering parts of Frogmore, one tidal and one fluvial. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers the centre of Frogmore in areas close to Frogmore Creek. Flood Warning Area 113WABTW15, South Devon Rivers, covers a similar

area to the tidal flood alert within Frogmore but extends further upstream following the channels and narrow floodplains of both watercourses.

6.22.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Frogmore area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.23 Goveton and Ledstone

Goveton and Ledstone are located around 2km to the north east of Kingsbridge. Goveton is located to the east of Ledstone.

6.23.1 Main River

No Main Rivers are located in the vicinity of Goveton and Ledstone and the flood risk from these sources is therefore considered to be negligible in this area.

6.23.2 Ordinary Watercourses

Two small unnamed watercourses, which both eventually drain into the Kingsbridge Estuary, flow through the villages, one through Goveton and one through Ledstone. No flood risk mapping is available for the western watercourse through Ledstone. Flood mapping for the eastern watercourse through Goveton show that several properties are located within Flood zone 2 and 3. Fluvial flooding has previously occurred in Goveton when fields were recently ploughed. Flows are restricted by a narrow channel and by the culvert beneath the highway.

6.23.3 Surface Water Flooding

The areas around the watercourses in Goveton and Ledstone are shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding. In Ledstone several properties close to the watercourses are shown to be at the edge of high risk areas and part of the road is shown to be at low risk (1 in 1,000-year extent). In Goveton several properties and part of the road are shown to be at risk of surface water flooding.

6.23.4 Tidal Flooding

Goveton and Ledstone are not at significant risk of tidal flooding.

6.23.5 Sewer Flooding

No records of sewer flooding in Goveton and Ledstone are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.23.6 Highway Flooding

Highway runoff from roads to the east of Goveton is known to flow towards the centre of the village.

6.23.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Goveton and Ledstone all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.23.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas close to either village and there are no Flood Alert Areas in the vicinity of Ledstone. Flood Alert Area 113WABTW15, South Devon Rivers, covers a narrow corridor close to the watercourse through the centre of Goveton.

6.23.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Goveton and Ledstone area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.24 Harberton

Harberton is a village located approximately 3km to the south west of Totnes. The village is located just to the west of the A381.

6.24.1 Main River

No Main Rivers are located in the vicinity of Harberton and the flood risk from these sources is therefore considered to be negligible in this area.

6.24.2 Ordinary Watercourses

An unnamed tributary of the Harbourne River flows in a south westerly direction through Harberton. A further small watercourse flows in a south easterly direction through Harberton and joins the Harbourne tributary at the southern end of Harberton. Several properties are shown to be located in Flood Zone 2 and 3 within Harberton and roads at the southern end of Harberton are shown to be at flood risk. A recent flood alleviation scheme has reduced flood risk in the area surrounding The Old Forge but flooding is still known to occur upstream due to water backing up behind a highway bridge.

6.24.3 Surface Water Flooding

Areas at risk of surface water flooding in Harberton generally follow the routes of the watercourses through the village. Several roads and properties in the southern part of Harberton are shown to be at risk.

6.24.4 Tidal Flooding

Harberton is not at significant risk of tidal flooding.

6.24.5 Sewer Flooding

No records of sewer flooding in Harberton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.24.6 Highway Flooding

Flooding has been known to occur to the road south of the church due to an undersized or silted highway bridge.

6.24.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Harberton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.24.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Harberton. Flood Alert Area 113WABTW15, South Devon Rivers, covers areas close to the watercourses through the centre of Harberton including roads and properties.

6.24.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Harberton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.25 Harbertonford

Harbertonford is a village located on the A381 and approximately 4km to the south west of Totnes. The village lies in the valley of the Harbourne River, from which it takes its name. Most of the village lies to the north of the river.

6.25.1 Main River

The Harbourne River flows in an easterly direction through Harberton with two tributaries joining from the north and south near the centre of the village. The Harbourne River and its northern and southern tributaries are designated as Main River in Harberton. A number of properties are shown to be located within Flood Zone 2 and 3 as well as parts of Morleigh Road, Woodland Road, Old Road, Bow Road and the A381. A flood alleviation scheme has been put in place for the village and further works are currently under consideration by the Environment Agency.

6.25.2 Ordinary Watercourses

A non-main river tributary of the Harbourne River flows through Stonehills, to the south east of Harbertonford. Several buildings are shown to be located on the edge of Flood Zones 2 and 3 of this watercourse.

6.25.3 Surface Water Flooding

Areas at risk of surface water flooding in Harbertonford generally follow the routes of the watercourses. Parts of Bow Road are shown to be at high (1 in 30-year extent) risk of flooding and a large part of the centre of Harbertonford is shown to be at high risk, including roads and properties. The A381 in the centre of the village is shown to be at risk. Surface water flood risk is also shown in the area around Hernaford cottages. There have also been reports of field runoff down Green Lane.

6.25.4 Tidal Flooding

Harbertonford is not at significant risk of tidal flooding.

6.25.5 Sewer Flooding

No records of sewer flooding in Harbertonford are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.25.6 Highway Flooding

Green Lane has been known to convey field runoff towards the village.

6.25.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Harbertonford all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.25.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWF2C1B, River Harbourne at Harbertonford, covers areas close to the river in the centre of Harbertonford including roads and properties. Flood Alert Area 113WABTW15, South Devon Rivers, covers a similar area to the flood warning but also includes areas close to watercourses joining the River Harbourne from the north and south.

6.25.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Harbertonford area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.26 Holbeton

Holbeton is a village located approximately 4km to the south east of Yealmpton. The village is surrounded by farmland and woodland.

6.26.1 Main River

No Main Rivers are located in the vicinity of Holbeton and the flood risk from these sources is therefore considered to be negligible in this area.

6.26.2 Ordinary Watercourses

Two small tributaries of the River Erme are located close to Holbeton. One tributary flows in an easterly direction to the north of Holbeton through the Ford Farm area. There is no flood risk information available for this watercourse. Another tributary flows in a north easterly direction to the south east of Holbeton before turning south east and discharging into the River Erme around 1km downstream of Holbeton. A track to the disused quarry site and woodland to the south east of Holbeton is shown to be located on the edge of Flood Zones 2 and 3 but no properties are shown to be at significant risk.

6.26.3 Surface Water Flooding

Two overland surface water flow routes are shown in the surface water flood risk mapping entering the village from the west and flowing eastwards. Areas near Masons Yard, Fore Street and Church Hill are shown to be at risk of surface water flooding with some properties shown to be at high risk (1 in 30-year extent).

6.26.4 Tidal Flooding

Watercourses in the vicinity of Holbeton discharge to the tidal River Erme but there is no significant flood risk from tidal sources within Holbeton.

6.26.5 Sewer Flooding

No records of sewer flooding in Holbeton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.26.6 Highway Flooding

No records of highway flooding have been found for Holbeton.

6.26.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Holbeton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.26.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Holbeton area.

6.26.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Holbeton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.27 Kingswear

Kingswear is a village located on the east bank of the River Dart opposite Dartmouth. A terminal of the Dartmouth Steam Railway, which runs between Paignton and Dartmouth, is located in the village. Kingswear is linked to Dartmouth by three ferry services which depart from close to Darthaven Marina.

6.27.1 Main River

Kingswear lies on the Dart Estuary but the River Dart is not classified as Main River in this area due to its tidal nature. No other Main Rivers are located in the vicinity of Kingswear and the flood risk from these sources is therefore considered to be negligible in this area.

6.27.2 Ordinary Watercourses

A small unnamed watercourse discharges into the Waterhead Creek at the northern end of Kingswear but no fluvial flood risk mapping is available for this watercourse. The flood risk in this area is expected to be mostly from tidal sources.

6.27.3 Surface Water Flooding

The area around the station is shown by mapping to be at medium (1 in 100-year extent) to low (1 in 1,000-year extent) risk of surface water flooding. Waterhead Close, to the north of Kingswear is shown to be at high risk (1 in 30-year extent) of surface water flooding with several properties affected.

6.27.4 Tidal Flooding

Kingswear is located on the tidal River Dart and Waterhead Creek. Several properties near to Kittery Quay, a building and car park north east of the station and a section of the railway line are shown to be located in tidal Flood Zone 3. A further section of the railway line and Kingswear Station are located within tidal Flood Zone 2. To the north east of Kingswear, near Waterhead Close, part of Brixham Road is shown to be located within Flood Zones 2 and 3.

6.27.5 Sewer Flooding

The DG5 register indicates that there has been one record of flooding from overloaded sewers in Kingswear between 1st January 2000 and 1st August 2015. This fits into the “twice or more in every ten years” frequency category. There are also 3 records of sewer flooding from other causes.

6.27.6 Highway Flooding

No records of highway flooding have been found for Kingswear.

6.27.7 Ground Water Flooding

The Environment Agency’s Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Kingswear all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.27.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers low lying areas close to the tidal Dart including several properties. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers a similar area to the flood warning as well as a wider area close to the station.

6.27.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Kingswear area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.28 Lee Mill

Lee Mill is a village located just off the A38 approximately 4km to the east of Plymouth city boundary and approximately 2km west of Ivybridge. Lee Mill Industrial Estate is located to the east of the village.

6.28.1 Main River

The River Yealm flows in a south westerly direction through the eastern end of Lee Mill village between the village and the industrial estate. A number of properties in the village are located within Flood Zones 2 and 3 as well as New Park road and slip roads for the A38 junction. Historical flood outlines from the July 2012 event show several properties to the north of New Park Road to have previously been flooded. The River Yealm itself is not shown to pose a significant fluvial flood risk to the industrial estate.

6.28.2 Ordinary Watercourses

A tributary of the River Yealm originates in the north east corner of Lee Mill Industrial Estate and flows in culvert beneath the industrial estate. It emerges to the south of the A38 and flows past the sewage works and into the River Yealm south of Lee Mill village. No flood zone mapping is available through the industrial estate but parts of the sewage works are shown to be located within Flood Zones 2 and 3.

6.28.3 Surface Water Flooding

In Lee Mill village, the area around Arris Way is shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding and many of the remaining roads are shown to be at low risk (1 in 1,000-year extent). Properties close to the River Yealm and its floodplain are shown to be at risk of surface water flooding as are parts of the A38 near the junction. In the industrial estate roads and areas around the buildings are shown to be at risk of surface water flooding.

6.28.4 Tidal Flooding

Lee Mill is not at significant risk of tidal flooding.

6.28.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Lee Mill between 1st January 2000 and 1st August 2015. There is, however, 1 record of sewer flooding from other causes.

6.28.6 Highway Flooding

No records of highway flooding have been found for Lee Mill.

6.28.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that most of the 1km grid squares in the area around Lee Mill fit into the 25-50% category which means that between 25% and 50% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.28.8 Flood Warnings and Flood Alerts

Flood Warning Area 114FWF1I4BA00, River Yealm from Mill Bridge to Lee Mill, covers the floodplain of the River Yealm between Lee Mill and Lee Mill Industrial Estate including several properties and roads joining the A38. The Flood Warning Area finishes just upstream of the A38. Flood Alert Area 114WAFT1W13A00, River Yealm, covers a similar area to the flood warning but continues into the floodplain downstream of the A38.

6.28.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Lee Mill area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.29 Lee Moor (quarry site)

Lee Moor quarry site is located approximately 5km to the north east of Plymouth city boundary. It is home to an extensive China clay works. The villages of Wotter and Lee Moor are located nearby, to the north west and north east respectively.

6.29.1 Main River

No Main Rivers are located in the vicinity of Lee Moor quarry and the flood risk from these sources is therefore considered to be negligible in this area.

6.29.2 Ordinary Watercourses

Two watercourses, fed by a number of small drains throughout the quarry site, are located in the vicinity of the quarry site. The Wotter Brook originates in Woodland near Wotter and flows past the site's north west and south west boundaries and into the Tory Brook to the south of the site. Several attenuation ponds exist in this area and streams are used for electricity generation. No flood risk mapping is available for the Wotter Brook.

The Tory Brook flows past the quarry's south eastern boundary and a large area of floodplain is located to the south east of the site. Several buildings and tracks close to the brook are shown to be located within Flood Zone 2 and 3, as is the main access to the site from the south (the B3417).

6.29.3 Surface Water Flooding

The quarry site is crossed by numerous small drains and several attenuation ponds are located in the areas. A large part of the eastern end of the quarry site is shown to be at risk of surface water flooding with an overland flow route originating to the north and flowing towards Tory Brook. In the western part of the site some small flow routes are shown in the areas surrounding the buildings.

6.29.4 Tidal Flooding

Lee Moor quarry site is not at significant risk of tidal flooding.

6.29.5 Sewer Flooding

No records of sewer flooding at the Lee Moor quarry site are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.29.6 Highway Flooding

No records of highway flooding have been found for Lee Moor quarry site.

6.29.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Lee Moor quarry site all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.29.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Lee Moor quarry site. Flood Alert Area 114WAFT1W12A00, River Plym and Tory Brook, covers an area to the south of the site including several buildings.

6.29.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Lee Moor area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.30 Loddiswell

Loddiswell is a village located approximately 4km to the north west of Kingsbridge. It is located to the west of the River Avon.

6.30.1 Main River

The River Avon flows in a south westerly direction to the south east of Loddiswell. No properties within the main area of the village are shown to be at significant risk of flooding from the Avon but southern access routes to the village are shown to be located in Flood Zone 2 and 3. Additionally, several properties close to Avon Mill are shown to be located within Flood Zone 2 and 3. Historical flood outlines from the December 1979 flood on the River Avon shows flooding of roads and properties close to Avon Mill.

6.30.2 Ordinary Watercourses

A tributary of the River Avon originates within Loddiswell and flows away from the village in a southerly direction behind Little Gate and Great Gate Farm. No flood risk mapping is available for this watercourse.

6.30.3 Surface Water Flooding

Parts of the centre of Loddiswell are shown to be at risk of surface water flooding. Several properties and roads are shown to be at risk with some areas of high (1 in 30-year extent) risk located close to properties. Overland flow routes generally head towards the watercourse which flows from the south east of Loddiswell.

6.30.4 Tidal Flooding

Loddiswell is not at significant risk of tidal flooding.

6.30.5 Sewer Flooding

No records of sewer flooding in Loddiswell are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.30.6 Highway Flooding

No records of highway flooding have been found for Loddiswell.

6.30.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Loddiswell generally fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.30.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWF2B0A, River Avon from Didworthy to Aveton Gifford, covers low lying areas close to the River Avon to the south east of Loddiswell. Flood Alert Area 113WABTW15, South Devon Rivers, covers a similar area.

6.30.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Loddiswell area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.31 Malborough

Malborough is a village located on the A381 approximately 2km to the north west of Salcombe. There is a cycle path linking the village to Salcombe. The village is a popular tourist destination.

6.31.1 Main River

No Main Rivers are located in the vicinity of Malborough and the flood risk from these sources is therefore considered to be negligible in this area.

6.31.2 Ordinary Watercourses

A small watercourse originates near Newhouse Farm but is not expected to present a significant fluvial flood risk.

6.31.3 Surface Water Flooding

Surface water flood risk mapping shows a flow route which runs from Well Hill and behind Shute Park. Several properties in this area are shown at medium (1 in 100-year extent) to low (1 in 1,000-year extent) risk of flooding from this source. Some additional small areas are shown to be at risk at Higher Town, Lower Town and Luckham's Lane.

6.31.4 Tidal Flooding

Malborough is not at significant risk of tidal flooding.

6.31.5 Sewer Flooding

No records of sewer flooding in Malborough are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.31.6 Highway Flooding

No records of highway flooding have been found for Malborough.

6.31.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Malborough all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.31.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Malborough area.

6.31.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Malborough area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.32 Marldon

Marldon is a large village located on the edge of South Hams District just outside Paignton. The village is located immediately to the west of the A380. The village expanded significantly during the 1960s.

6.32.1 Main River

No Main Rivers are located in the vicinity of Marldon and the flood risk from these sources is therefore considered to be negligible in this area.

6.32.2 Ordinary Watercourses

A small watercourse which eventually drains to the Aller Brook originates near Nether Meadow and flows northwards behind properties on Parkfield Close and Meadow Park. It then flows past the area east of Love Lane and away from Marldon. Several properties and gardens along Parkfield Close and Meadow Park are located within Flood Zone 2 and 3 and parts of Parkfield Close, Meadow Park and Love Lane roads are also shown to be at risk. Two additional small watercourses originate in the Westerland area to the south of Marldon but no flood risk information is available for this area.

6.32.3 Surface Water Flooding

The northern part of Marldon is shown to be at highest risk of flooding from surface water. High risk (1 in 30-year extent) areas are mostly contained within the watercourse channel in this area but properties on Parkfield Road, Village Road and Nether Meadow are shown to be at medium (1 in 100-year extent) to low (1 in 1,000-year extent) risk. The highway at Millmans Road and Marldon Cross Hill are also shown to be at risk.

Four areas on the edges of the southern part of Marldon are shown to be at risk of surface water flooding: Furzegood, Westerland area, Five Lanes Road/Vicarage Road and the A380/B3060 roundabout. Parts of the A380 are also shown to be at risk.

6.32.4 Tidal Flooding

Marldon is not at significant risk of tidal flooding.

6.32.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Marldon between 1st January 2000 and 1st August 2015. There are, however, 4 records of sewer flooding from other causes.

6.32.6 Highway Flooding

Highway flooding has previously occurred on Smallwell Lane due to blocked gullies.

6.32.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Marldon all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.32.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Marldon. Flood Alert Area 113WABTW14, River Dart Area, covers a narrow area close to the watercourse which flows out of Marldon to the north.

6.32.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Marldon area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.33 Newton Ferrers

Newton Ferrers is a village located on the River Yealm estuary, approximately 5km south west of Yealmpton. It is located across the Newton Creek from the village of Noss Mayo, which lies to the south.

6.33.1 Main River

No Main Rivers are located in the vicinity of Newton Ferrers and the flood risk from these sources is therefore considered to be negligible in this area.

6.33.2 Ordinary Watercourses

Newton Creek, a tributary of the tidal River Yealm, flows in a westerly direction to the south of Newton Ferrers. Fluvial Flood Zone 2 and 3 for this watercourse are generally contained to the mud flats of the creek although several properties and the road at Bridgend are located within the flood zones. Tidal flooding is expected to be a more significant source of flood risk from the creek. A small watercourse which discharges into the Newton Creek at Riverside Road West flows through Newton Ferrers but no flood risk mapping is available for this watercourse.

South of Newton Ferrers, in Noss Mayo, a small watercourse discharges to the Noss Creek which then joins the Newton Creek. Several properties on Pillory Hill, Foundry Lane and Passage Road are located within fluvial Flood Zone 2 and 3 of this watercourse alongside several highways. A further small watercourse joins the Newton Creek to the south, near Bridgend, and Stoke Road and several properties are shown to be located within Flood Zone 2 and 3.

6.33.3 Surface Water Flooding

Several roads in the eastern part of Newton Ferrers are shown to be at risk of surface water flooding: Court Road, Yealm Road, Bridgend Hill and Riverside Road West. The areas of significant flood risk are mainly limited to the highways although some properties on Court Road and Riverside Road West are shown to be at risk. Highway and property flooding due to field runoff has been reported in Court Road.

Areas of the centre of Noss Mayo are shown to be at high (1 in 30-year extent) risk of surface water flooding with properties adjacent to the watercourse shown to be at risk. Land on the northern edge of Brooking's Down Wood is known to be prone to waterlogging.

6.33.4 Tidal Flooding

The Newton Creek, Noss Creek and tidal River Yealm pose a tidal flood risk to areas of Newton Ferrers and Noss Mayo and are also likely to have some influence on fluvial flood risk. Small areas of the quays on the River Yealm are shown to be located within Flood Zone 2 and 3. On the Newton Creek, several properties on Riverside Road West, Bridgend Hill and Stoke Road are located within the tidal Flood Zones 2 and 3 as are properties on both sides of the Noss Creek.

6.33.5 Sewer Flooding

No records of sewer flooding in Newton Ferrers are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.33.6 Highway Flooding

Highway flooding has been reported in Court Road due to field runoff to undersized drains.

6.33.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Newton Ferrers all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

Land in Noss Mayo to the north of Brooking's Down Wood known to be subject to waterlogging although the source of water is not known.

6.33.8 Flood Warnings and Flood Alerts

Flood Warning Area 114FW1T1FA00, South Cornwall Coast from Rame Head to Wembury Bay including tidal estuaries, covers areas close to the Newton Creek and Noss Creek. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers similar areas to the flood warning. A further Flood Alert Area, 114WAFT1W13A00, River Yealm, covers the both creeks and low lying areas adjacent to several watercourses which drain into the creeks.

6.33.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Newton Ferrers area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.34 Rattery

Rattery is a small village located approximately 1km to the east of the A38 and 1km to the north of the A381. It is situated around 5km west of Totnes.

6.34.1 Main River

No Main Rivers are located in the vicinity of Rattery and the flood risk from these sources is therefore considered to be negligible in this area.

6.34.2 Ordinary Watercourses

A tributary of the Bidwell Brook flows in a south easterly direction through Rattery. No flood risk mapping is available for the section through Rattery but fields and a farm building downstream are shown to be located in Flood Zone 2 and 3.

6.34.3 Surface Water Flooding

Surface water flood risk mapping shows that areas at risk generally coincide with the narrow channels of the watercourses in the village. However, several properties and the highway are at risk from overland flows from the north. A number of properties near Penswell Cross have previously been affected by high runoff flowing into small culverts and from surface water flows from a high level leat.

6.34.4 Tidal Flooding

Rattery is not at significant risk of tidal flooding.

6.34.5 Sewer Flooding

No records of sewer flooding in Rattery are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.34.6 Highway Flooding

Several properties on the road through the centre of Rattery have been affected by flooding due to high runoff into small culverts.

6.34.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Rattery all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.34.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Rattery. Flood Alert Area 113WABTW14, River Dart Area, covers areas to the east of Rattery close to watercourses.

6.34.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Rattery area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.35 Slapton

Slapton is a village located approximately 8km to the east of Kingsbridge and approximately 8km to the south west of Dartmouth. Slapton Ley Nature Reserve lies around 500m to the south east of the village. Slapton Sands, a gravel bar beach, runs across the front of Slapton Ley and carries the A379 between Torcross and Strete.

6.35.1 Main River

No Main Rivers are located in the vicinity of Slapton and the flood risk from these sources is therefore considered to be negligible in this area.

6.35.2 Ordinary Watercourses

A small unnamed watercourse flows through Slapton in a south easterly direction and discharges into Slapton Ley. Several properties and the highways are shown to be located in Flood Zone 2 and 3 on Carr Lane, Brook Street and Sands Road. Concerns have previously been raised by residents of Carr Lane and Brook Street relating to flooding from the watercourse.

6.35.3 Surface Water Flooding

Several properties in Slapton are shown to be at risk of surface water flooding. These are mostly located in areas close to the watercourse through the village. Properties and the highway at Carr Lane, Brook Street and Sand Road are shown to be at risk. An additional overland flow route is shown to originate from land to the north east of Slapton and flow along Brook Street, with some properties shown at low (1 in 1,000-year extent) risk.

6.35.4 Tidal Flooding

Areas close to Slapton Ley, including the A379 across Slapton Sands, are shown to be located in tidal Flood Zone 2 and 3 but these are located approximately 1km from the village itself. Properties within Slapton village are no at significant risk of tidal flooding.

6.35.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Slapton between 1st January 2000 and 1st August 2015. There is, however, 1 record of sewer flooding from other causes.

6.35.6 Highway Flooding

No records of highway flooding have been found for Slapton.

6.35.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Slapton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

Previously, water emerging from springs has raised the concerns of the residents of Brook Street.

6.35.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas within Slapton itself but Flood Warning Area 113FWC2T1A2, South Devon Coast from Start Point to Dawlish Warren, covers the A379 across Slapton Sands. Two additional tidal Flood Alert Areas cover the A379: 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, and 113WACT1H, South Devon Coast at Beesands, Torcross, Slapton, Torbay and Dawlish. In Slapton, Flood Alert Area 113WABTW15, South Devon Rivers, covers a narrow area adjacent to the watercourse.

6.35.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Slapton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.36 South Milton

South Milton is a small village located approximately 2km to the east of Thurlestone. It is situated approximately 1km west of the A381.

6.36.1 Main River

No Main Rivers are located in the vicinity of South Milton and the flood risk from these sources is therefore considered to be negligible in this area.

6.36.2 Ordinary Watercourses

Three small unnamed watercourses converge to a single channel in the vicinity of South Milton before flowing in a south westerly direction towards Thurlestone Sands. Flood mapping of the main channel through the village indicates that several properties are located on the edge of Flood Zone 2 and 3. It has been noted that the capacities of culverts beneath the highway in this area are not known.

6.36.3 Surface Water Flooding

Several areas of South Milton are shown by mapping to be at high risk (1 in 30-year extent) of flooding from surface water. The high risk areas mostly coincide with the watercourses and their floodplains although several properties are shown to be at risk as well as the main road through the village.

6.36.4 Tidal Flooding

South Milton is not at significant risk of tidal flooding.

6.36.5 Sewer Flooding

No records of sewer flooding in South Milton are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.36.6 Highway Flooding

No records of highway flooding have been found for South Milton.

6.36.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around South Milton all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.36.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of South Milton. Flood Alert Area 113WABTW15, South Devon Rivers, covers a narrow area close to the watercourse through the village.

6.36.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the South Milton area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.37 South Pool

South Pool is a small village located at the head of Southpool Creek, an inlet of the Kingsbridge Estuary. The village is located approximately 4km north east of Salcombe and 5km south east of Kingsbridge.

6.37.1 Main River

No Main Rivers are located in the vicinity of South Pool and the flood risk from these sources is therefore considered to be negligible in this area.

6.37.2 Ordinary Watercourses

An unnamed watercourse flows in a south westerly direction through South Pool and into the Southpool Creek. Flood mapping for this watercourse shows several properties and roads in the centre of South Pool to be located in Flood Zone 2 and 3. A highway culvert has been known to cause water to back up particularly during high tides and the fluvial flood risk in South Pool is expected to be tidally influenced. Historical flood outlines show that a large part of the centre of the village was flooded in September 1970 when the channel capacity was exceeded. A further small watercourse converges from the south but no flood risk mapping is available for this watercourse.

6.37.3 Surface Water Flooding

Mapping shows that areas at risk of surface water flooding within South Pool generally follow the routes of watercourses with the exception of an area of low (1 in 1,000-year extent) to medium (1 in 100-year extent) risk shown on the northern road into the village. Within the village several properties and parts of the road are shown to be at risk of surface water flooding.

6.37.4 Tidal Flooding

South Pool is located at the head of the tidal Southpool Creek and flood mapping shows that a large part of the centre of the village is located in Flood Zone 2 and 3. Several properties and roads are shown to be at risk of tidal flooding. Flooding issues have previously been noted during high tide.

6.37.5 Sewer Flooding

No records of sewer flooding in South Pool are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.37.6 Highway Flooding

No records of highway flooding have been found for South Pool.

6.37.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around South Pool all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.37.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers a large part of the centre of the village including several roads and properties. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers a similar area to the flood warning. An additional Flood Alert Area, 113WABTW15, South Devon Rivers, covers a narrow area close to the watercourse through South Pool.

6.37.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the South Pool area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.38 Sparkwell

Sparkwell is a small village located approximately 2km north east of the Plymouth city boundary. A large area of woodland lies to the south of the village.

6.38.1 Main River

No Main Rivers are located in the vicinity of Sparkwell and the flood risk from these sources is therefore considered to be negligible in this area.

6.38.2 Ordinary Watercourses

Flood Zone 2 and 3 of the Ridgecot Lake watercourse are shown to cover areas of fields near Welbeck Manor. Several small drains feeding into the Ridgecot Lake watercourse are located towards the north eastern end of the village but no flood risk mapping is available for these watercourses. A further small watercourse originates close to the crossroads in Sparkwell and flows southwards away from the village but no flood risk mapping is available.

6.38.3 Surface Water Flooding

Areas at significant surface water flood risk in Sparkwell are mostly located on highways or in open space. The crossroads near the church and the roads at Blacklands Cross are shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of surface water flooding. Several properties are shown to be at low (1 in 1,000-year extent) risk of surface water flooding.

6.38.4 Tidal Flooding

Sparkwell is not at significant risk of tidal flooding.

6.38.5 Sewer Flooding

No records of sewer flooding in Sparkwell are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.38.6 Highway Flooding

No records of highway flooding have been found for Sparkwell.

6.38.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Sparkwell all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.38.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Sparkwell. Flood Alert Area 114WAFT1W13A00, River Yealm, covers areas close to two watercourses which lie just outside Sparkwell.

6.38.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Sparkwell area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.39 St. Ann's Chapel

St. Ann's Chapel is a small village located approximately 4km south of Modbury. The village contains the remains of St Ann's Chapel which is believed to date from the 15th Century.

6.39.1 Main River

No Main Rivers are located in the vicinity of St. Ann's Chapel and the flood risk from these sources is therefore considered to be negligible in this area.

6.39.2 Ordinary Watercourses

A small watercourse originates near Holwell Farm and flows in a north easterly direction away from St. Ann's Chapel. No flood risk mapping is available for this watercourse.

6.39.3 Surface Water Flooding

Flood risk from surface water to St. Ann's Chapel is generally very low although several small areas of medium to high risk are shown on the highway to the north west and south east of the village. Parts of Holywell Farm are shown to be at low risk (1 in 1,000-year extent) of surface water flooding.

6.39.4 Tidal Flooding

St. Ann's Chapel is not at significant risk of tidal flooding.

6.39.5 Sewer Flooding

No records of sewer flooding in St. Ann's Chapel are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.39.6 Highway Flooding

No records of highway flooding have been found for St. Ann's Chapel.

6.39.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around St. Ann's Chapel all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.39.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the St. Ann's Chapel area.

6.39.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the St. Ann's Chapel area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.40 Stoke Fleming

Stoke Fleming is a village located on the A379 approximately 2km south of Dartmouth. The Overseas Estate area, at the southern end of the village, lies on the clifftop between Blackpool Sands and Leonard's Cove.

6.40.1 Main River

No Main Rivers are located in the vicinity of Stoke Fleming and the flood risk from these sources is therefore considered to be negligible in this area.

6.40.2 Ordinary Watercourses

A small watercourse originates north of Bailey's Meadow and flows through Stoke Fleming in a south easterly direction in culvert. It emerges downstream of Shady Lane and flows out into Leonard's Cove. No flood risk mapping is available for this watercourse.

6.40.3 Surface Water Flooding

The areas at highest risk of surface water flooding in Stoke Fleming are Dartmouth Road (A379), Church Road, Shady Lane, Rectory Lane and Bailey's Meadow. Several properties are shown to be at risk particularly in the area around Church Road.

6.40.4 Tidal Flooding

Stoke Fleming is situated on clifftops and is not considered to be at significant risk of tidal flooding.

6.40.5 Sewer Flooding

The DG5 register indicates that there are no records of flooding from overloaded sewers in Stoke Fleming between 1st January 2000 and 1st August 2015. There are, however, 2 records of sewer flooding from other causes.

6.40.6 Highway Flooding

No records of highway flooding have been found for Stoke Fleming.

6.40.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Stoke Fleming all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.40.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Stoke Fleming area.

6.40.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Stoke Fleming area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.41 Stoke Gabriel

Stoke Gabriel is a village located close to the River Dart and approximately 3km to the south west of Paignton. The village is a popular tourist destination and is known for its fishing. A large mill pool is located to the south east of Stoke Gabriel and is separated from the River Dart estuary by a dam and sluice gate.

6.41.1 Main River

Stoke Fleming is located adjacent to a mill pool of a tributary of the River Dart. This tributary is classified as Main River in this area. Fluvial Flood Zones in this area are limited to the extents of the mill pool and tidal flooding is expected to pose a more significant flood risk.

6.41.2 Ordinary Watercourses

Two small channels feed into the mill pool close to Coombe Shute but flood risk here is expected to be mostly from tidal sources.

6.41.3 Surface Water Flooding

Surface water flood risk mapping shows two main flow routes for surface water which pose a flood risk to roads and properties in the village. In the western part of the village, properties along Paignton Road and Coombe Shute are shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk of flooding from surface water.

Towards the eastern end of the village, properties on Mapledene Close and Yonder Meadow are shown to be at medium to high risk of surface water flooding as are the highways at Paignton Road and Broad Path. Properties on Lower Broad Path are at medium to high risk of surface water flooding.

6.41.4 Tidal Flooding

Areas located around the mill pool to the south east of the village are shown to be located in tidal Flood Zone 2 and 3. Properties and roads on Mill Hill, Coombe Shute and Lower Broad Path are located within the Flood Zones.

6.41.5 Sewer Flooding

No records of sewer flooding in Stoke Gabriel are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.41.6 Highway Flooding

No records of highway flooding have been found for Stoke Gabriel.

6.41.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Stoke Gabriel all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.41.8 Flood Warnings and Flood Alerts

Flood Warning Area 113FWC2T1A1, South Devon Estuaries, covers a small area along Mill Hill including the road and several properties. Flood Alert Area 113WACT1A, South Devon Coast from Plymouth to Lyme Regis, covers a similar area to the flood warning as well as areas to the south east of Coombe Shute and Byter Mill Lane. Flood Alert Area 113WABTW14, River Dart Area, covers areas close to the watercourse including the mill pool.

6.41.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Stoke Gabriel area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.42 Strete

Strete is a village on the A379, approximately 5km south west of Dartmouth. It is located on cliffs close to the eastern part of Slapton Sands.

6.42.1 Main River

No Main Rivers are located in the vicinity of Strete and the flood risk from these sources is therefore considered to be negligible in this area.

6.42.2 Ordinary Watercourses

Two small watercourses originate to the south east of Strete but flow away from the village.

6.42.3 Surface Water Flooding

Areas of the A379 near Strete are shown to be at risk of surface water flooding. There is also a small area of medium (1 in 100-year extent) to high (1 in 30-year extent) risk shown to properties south of Start Bay Park. Throughout the village there are small areas shown to be at low risk (1 in 1,000-year extent) of surface water flooding, including areas where there are roads and properties.

6.42.4 Tidal Flooding

Strete is situated on clifftops and is not considered to be at significant risk of tidal flooding.

6.42.5 Sewer Flooding

No records of sewer flooding in Strete are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.42.6 Highway Flooding

No records of highway flooding have been found for Strete.

6.42.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Strete all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.42.8 Flood Warnings and Flood Alerts

No Flood Warning Areas or Flood Alert Areas are present in the Strete area.

6.42.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Strete area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.43 Thurlestone

Thurlestone is a village located approximately 5km west of Kingsbridge. Yarmouth Sand and Leas Foot Sand beaches are located just south west of the village.

6.43.1 Main River

No Main Rivers are located in the vicinity of Thurlestone and the flood risk from these sources is therefore considered to be negligible in this area.

6.43.2 Ordinary Watercourses

An unnamed watercourse flows along the south eastern boundary of Thurlestone in a south westerly direction and discharges to the sea at Leas Foot Sand. A tributary of this watercourse originates in the golf course and flows south to the east of the Meadcombe Road area. Flood Zones 2 and 3 cover mostly fields and gardens, although the road and pumping station near Leas Foot Sand are shown to be located in the Flood Zones.

6.43.3 Surface Water Flooding

Several areas of the main road through Thurlestone are shown to be at risk of surface water flooding, particularly the areas near the post office and near the crossroads close to Seaview Road which are both shown to be at high risk (1 in 30-year extent). Several properties are shown to be at risk of surface water flooding in the area surrounding the watercourse which flows through the village as well as some properties throughout the village which may be affected by small localised areas of surface water flooding.

6.43.4 Tidal Flooding

Thurlestone is situated on clifftops and is not considered to be at significant risk of tidal flooding.

6.43.5 Sewer Flooding

No records of sewer flooding in Thurlestone are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.43.6 Highway Flooding

No records of highway flooding have been found for Thurlestone.

6.43.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Thurlestone all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.43.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Thurlestone. Flood Alert Area 113WABTW15, South Devon Rivers, covers low lying areas close to the watercourse.

6.43.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Thurlestone area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.44 Ugborough

Ugborough is a village located just of the A3121 approximately 3km east of Ivybridge. The A38 lies approximately 1km to the north west of the village. The village is arranged mostly around the central village square.

6.44.1 Main River

No Main Rivers are located in the vicinity of Ugborough and the flood risk from these sources is therefore considered to be negligible in this area.

6.44.2 Ordinary Watercourses

An unnamed tributary of the Lud Brook originates in several branches to the north east of Ugborough and flows through the village before continuing in a south westerly direction to the south of the village. Several properties between Lutterburn Street and the A3121 are located within Flood Zone 2 and 3 as well as properties at Parsonage Lane. The three roads linking Ugborough to the A3121 are also shown to be located partially in Flood Zone 2 and 3. Undersized or blocked culverts are known to have contributed to flooding in the area.

6.44.3 Surface Water Flooding

An area of ponding at The Square is shown in mapping as an area at high risk (1 in 30-year extent) of surface water flooding. A further area of high risk is shown further east at Lutterburn Street, affecting further properties towards the watercourse to the south of Ugborough. Runoff from fields, which is high in sediment, has flooded the low point in Lutterburn Street previously.

6.44.4 Tidal Flooding

Ugborough is not at significant risk of tidal flooding.

6.44.5 Sewer Flooding

No records of sewer flooding in Ugborough are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.44.6 Highway Flooding

Flooding in Lutterburn Street has previously occurred due to high sediment runoff from fields.

6.44.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Ugborough all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.44.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Ugborough. Flood Alert Area 113WABTW15, South Devon Rivers, covers areas close to the watercourses including several properties and roads.

6.44.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Ugborough area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.45 Wembury

Wembury is a village located approximately 3km to the south of the Plymouth city boundary. The village is known for its surfing and its rock pools. Wembury has a small beach with views of the Mewstone – a small rocky island situated around 500m from the coast.

6.45.1 Main River

No Main Rivers are located in the vicinity of Wembury and the flood risk from these sources is therefore considered to be negligible in this area.

6.45.2 Ordinary Watercourses

A small watercourse flows southwards through the Churchwood Valley to the west of Wembury. Flood Zones are generally well-contained to a narrow channel in wooded areas although small areas of Ford Road, Church Road and several buildings on the edge of the Churchwood Valley Holiday Cabins site are shown to be located within Flood Zone 2 and 3.

Two small tributaries of the Churchwood Valley watercourse flow close to Wembury – one along the northern boundary and another adjacent to the southern part of Church Road. No flood risk mapping is available for these watercourses.

6.45.3 Surface Water Flooding

In the north of Wembury, the West Wembury and Knighton areas are shown to be at risk of surface water flooding, including several properties. Further south, significant overland flow routes are shown along Mewstone Avenue and Church Road, with long stretches shown to be at medium (1 in 100-year extent) to high (1 in 30-year extent) risk. Properties along both roads are also shown to be at risk as well as properties on Hawthorn Drive and Hawthorn Park Road.

6.45.4 Tidal Flooding

Tidal Flood Zones close to Wembury are shown to be limited to a small area close to the beach. Buildings close to the beach are located on the edge of the Flood Zones.

6.45.5 Sewer Flooding

No records of sewer flooding in Wembury are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.45.6 Highway Flooding

No records of highway flooding have been found for Wembury.

6.45.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around Wembury all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.45.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of Wembury. Flood Alert Area 114WAFT1W13A00, River Yealm, covers a narrow area in Churchwood Valley close to the river.

6.45.9 Flood Mapping

Mapping indicating the tidal, fluvial, surface water flood risk and the susceptibility to groundwater flooding for the Wembury area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

6.46 West Alvington

West Alvington is a small village located just outside the western edge of Kingsbridge. The village is located on the A381 and is just to the south of an area of woodland known as West Alvington Wood.

6.46.1 Main River

No Main Rivers are located in the vicinity of West Alvington and the flood risk from these sources is therefore considered to be negligible in this area.

6.46.2 Ordinary Watercourses

A tributary of the Kingsbridge Estuary flows eastwards to the south of West Alvington. This watercourse is culverted under Longbrook Farm. No flood risk mapping is available for the upper reaches of this watercourse near West Alvington.

6.46.3 Surface Water Flooding

Three small localised areas at high risk (1 in 30-year extent) of surface water flooding are shown on or near the A381 through West Alvington. Additionally, properties at Longbrook Farm are shown to be at high risk.

6.46.4 Tidal Flooding

West Alvington is not at significant risk of tidal flooding.

6.46.5 Sewer Flooding

No records of sewer flooding in West Alvington are reported on the DG5 register between 1st January 2000 and 1st August 2015.

6.46.6 Highway Flooding

No records of highway flooding have been found for West Alvington.

6.46.7 Ground Water Flooding

The Environment Agency's Areas Susceptible to Groundwater Flooding mapping indicates that the 1km grid squares in the area around West Alvington all fit into the <25% category which means that less than 25% of the area of each grid square is expected to be susceptible to groundwater flooding. However, it is not possible to assess the probability of groundwater flooding from this data or the specific locations which may be at risk.

6.46.8 Flood Warnings and Flood Alerts

There are no Flood Warning Areas in the vicinity of West Alvington. Flood Alert Area 113WABTW15, South Devon Rivers, covers areas close to watercourses to the east of West Alvington.

6.46.9 Flood Mapping

Mapping indicating the fluvial, surface water flood risk and the susceptibility to groundwater flooding for the West Alvington area can be found in Appendix A. This has been produced from data supplied by the Environment Agency.

Appendix A – SHDC Planning Authority Settlement Flood Maps

Offices at

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

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