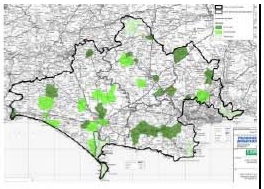

# Dorset County Council's LOCAL FLOOD RISK MANAGEMENT STRATEGY

Local Flood Risk Management Strategy for surface water, groundwater and ordinary watercourses

*'Working together to manage local flood risk in Dorset so communities are resilient and prepared for flooding'*


## Technical Report

Dorset County Council

Dorset County Council
County Hall
Colliton Park
DORCHESTER
T1 1XJ

# LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR DORSET

## TECHNICAL REPORT:

**Dorset County Council's Local Flood Risk Management Strategy for surface water, groundwater and ordinary watercourses**

**Technical Report**

- The widespread flooding experienced across Dorset in recent years demonstrates the devastating effects that flooding has on people and their homes and communities.
- As a Lead Local Flood Authority, Dorset County Council's Flood Risk Management team has a duty to produce and maintain a Local Flood Risk Management Strategy. The Strategy sets out Dorset County Council's vision of: *"working together to manage local flood risk in Dorset so communities are resilient and prepared for flooding".*
- Dorset County Council's Local Flood Risk Management Strategy is available in two formats: Technical Report (this document) and a summary document.
- Public consultation on the Draft Local Flood Risk Management Strategy took place between the 26th June and 4th August 2014.
- Comments and feedback from the consultation have been considered and modifications have been be implemented into the document where appropriate.

Director for Environment and the Economy Mike Harries

August 2014

## NON TECHNICAL SUMMARY

Although flooding is a natural phenomenon, the way in which we interact with and manage our environment can help to minimise the worst effects of flooding, and in some cases may help to positively enhance our resilience to flood incidents. Equally, if we do not properly consider the risks of flooding and take steps to manage them, then the problem will worsen as the effects of climate change take hold. The location and severity of flooding, particularly flooding caused by locally extreme rainfall, is very difficult to predict. It is not possible to prevent all flooding and dealing with uncertainties that are effectively out of our control are challenging. However, flood risk is something that can be understood and its effects are generally predictable. This means that up to a point the impacts can be mitigated and response / recovery can be more effective.

This local flood risk management strategy covers the geographical area of Dorset excluding Bournemouth and Poole (i.e. the administrative area of Dorset County Council. Whilst this strategy acknowledges that flooding is a natural process, Dorset County Council will over time increase its level of understanding of local flood risk management and of the level of risk posed by flooding. This requires the need to consider community safety and environmental impacts associated with flooding. The strategy and future updates will be informed by ongoing programme reviews, economic impact risk assessments, information from real flooding events and the latest technical guidance. Dorset County Council (as a Lead Local Flood Authority) will be coordinating and partnering with stakeholders and risk management partners to manage local flood risk and contribute towards sustainable development. The strategy will encourage Flood Risk Management Authorities in Dorset (Table 1) to manage local flooding in a coordinated way.

Analysis of the surface water flood maps displayed on the Environment Agency website) suggests that in Dorset, 35,545 receptors (including 22,300 properties) are at risk of surface water flooding in a 1 in a 200 year flood; and 15,794 receptors are at risk of surface water flooding in a 1 in a 30 year flood Additionally, many properties within Dorset are at risk from groundwater flooding. Dorset's unique geography gives the county a range of challenges regarding flood risk. The relatively steep clay catchments in the west of the county are at risk from extreme flash flooding, while the chalk catchments have a tendency to respond more slowly to rainfall. The nature of groundwater flooding means that in certain communities, flooding can last for long periods of time. The multiple and prolonged flooding in some communities can extend the recovery process for residents and businesses which can have significant impacts upon the local economy and health of the community. The dispersed nature of flooding across rural areas in Dorset means that large capital schemes may not be feasible, so individual property level protection solutions may be considered. The most cost effective and practicable solution requires communities to work together to develop flood plans to mitigate and reduce the risks of flooding. Dorset has a good network of flood wardens and flood action groups whose work has reduced the impact of flooding to lives and properties on numerous occasions. This work needs to be extended across the county.

Dorset's Local Flood Risk Management Strategy has been developed by Dorset County Council's Flood Risk Management team in collaboration with other Flood Risk Management Authorities. The strategy has considered: (i) historical flood records; (ii) information from mapping and modelling; (iii) previous flood management priorities; and (iv) evidence from flooding. Objectives, measures and actions have been developed to realise the strategy's vision of: *"Working together to manage local flood risk in Dorset so communities are resilient and prepared for flooding".* The strategy sets out roles and responsibilities of Flood Risk Management partners within the county, highlighting the position of Dorset County Council as the Lead Local Flood Authority under the Flood and Water Management Act 2010.

The strategy contains five key objectives:
Objective 1: Understand flood risk across Dorset (Section 2);
Objective 2: Manage the likelihood and impact of flooding (Section 3);
Objective 3: Help Dorset's communities manage their own flood risk (Section 4);
Objective 4: Ensure flood risk is considered in local land development proposals (Section 5);
Objective 5: Improve flood prediction, warning, response and post flood recovery (Section 6).

Future flooding across Dorset is inevitable with the frequency and magnitude of flood incidents expecting to increase due to climate change. The objectives outlined within the strategy are intended to coordinate, minimise and manage these impacts. Key considerations include community safety,

economic and environmental impacts and ways to progress partnership working and contributions to deliver local flood alleviation schemes to reduce the impact of local sources of flooding.

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# 1 Introduction

## *1.1 Background to Flood and Water Management Act*

In June 2008, Sir Michael Pitt published the final report: 'Learning Lessons from the 2007 Floods'. This called for urgent and fundamental changes in the way the UK is adapting to the increased risk of flooding. The report stated that Local Authorities should play a major role in the management of local flood risk, taking the lead in investigating local flooding sources and co-ordinating relevant agencies. The Flood and Water Management Act 2010 (FWMA) was enacted as part of the Government's response to the Pitt Report. The Act intended to create a comprehensive and risk based regime for managing flood risk and coastal erosion and identified clear responsibilities relating to flood management. Under the Act, Dorset County Council became a 'Lead Local Flood Authority' (LLFA) and was given a series of new responsibilities to lead on: local flood risk from surface water, ground water and ordinary watercourses and to ensure coordination between risk management authorities.

### 1.1.1 Flood Risk Management Authorities (RMA's) within Dorset

This strategy covers the administrative area of Dorset County Council and so excludes the unitary authority areas of Bournemouth Borough Council and Borough of Poole, each of whom will be responsible for producing their own flood risk strategies. The Act defines those organisations which constitute the flood risk management authorities and states that these have a duty to co-operate with one another in exercising their flood and coastal erosion risk management functions. The RMA's in Dorset are:

- **Lead Local Flood Authority (LLFA):** Dorset County Council is responsible for investigating flooding from 'ordinary watercourses', surface water and groundwater. Bournemouth Borough Council and Borough of Poole, as unitary authorities, are the LLFA's for their own administrative areas;
- **District Councils**: Christchurch Borough Council, East Dorset District Council, North Dorset District Council, Purbeck District Council, West Dorset District Council and Weymouth and Portland Borough Council are flood RMA's.
- **The Environment Agency:** Within Dorset the local office is part of the Wessex Area, based in Blandford Forum. They are responsible for managing the risk of flooding from the sea and main rivers, and also for regulating the safety of reservoirs. Where there is an interface between the sea and main rivers with local flood risk sources (for example, tide locking) it is the responsibility of the LLFA to consider the impacts, consequences and agree who will lead.
- **Water companies:** The majority of Dorset is serviced by Wessex Water plc, there is a small area to the West of the county which is covered by South West Water plc, and a small area to the East which is covered by Sembcorp Bournemouth Water. The Water Companies are responsible for sewer flooding and systems they manage;
- **Highways Authorities**: The Highways Agency manages the A31, A35 and A303 trunk roads and Dorset County Council manages all other public highways in Dorset. They are responsible for the management of surface water from rainfall on the highway.

Primary roles and responsibilities of Flood Risk Management Authorities are presented in Table 1. Flooding can be caused by a number of factors which often require different Flood Risk Management Authorities to work together to develop solutions to flooding. The different types of flooding are defined in Section 2.1. Additional detail of specific roles and responsibilities of the different Flood Risk Management Authorities can be found in Section 3.1.

**Table 1: Responsibilities for the Flood Risk Management Authorities**

| Flood Source | Environment Agency | Lead Local Flood Authority | District Council | Water Company*** | Highways Authority |
|---|---|---|---|---|---|
| **Main river*** | ✓ | | | | |
| **Ordinary watercourse**** | | ✓ | | | |
| **Surface water** | | ✓ | | | |
| **Surface water on highway** | | | | | ✓ |
| **Sewer flooding** | | | | ✓ | |
| **The sea** | ✓ | | ✓ | | |
| **Groundwater** | | ✓ | | | |
| **Reservoirs** | ✓ | | | | |

* A Main River is a river that has been designated as such by the Environment Agency. These tend to be the larger arterial watercourses that are considered to pose a significant flood risk.

**Ordinary watercourses include all rivers and streams not designated as a Main River and all ditches, drains, cuts, culverts, sluices, sewers (other than public sewers) and passages, through which water flows.

*** Highways authorities include the Highways Agency and Dorset County Council Highways team.

All RMAs have a duty to co-operate and to share information and work in partnership while carrying out their flood risk management functions as detailed in Section 3.2.4.

### 1.1.2 Flood and Water Management Act (FWMA)

The Flood and Water Management Act (UK Parliament, 2010) (FWMA) gives County Councils and Unitary Authorities the role of Lead Local Flood Authority (LLFA). This involves managing local flood risk in partnership other Flood Risk Management Authorities.

Lead Local Flood Authorities are required to:

- develop, maintain and apply a local flood risk strategy;
- investigate flooding incidents, where deemed to be necessary;
- maintain a register of assets relevant to flooding;
- take on the responsibility for: (i) flood defence consenting activities; and (ii) enforcement on ordinary watercourses;
- approve drainage systems for new dwellings, in their capacity as Sustainable Drainage Systems Approving Bodies (SABs) which require the approval, adoption and maintenance of Sustainable Drainage Systems (SUDS); and
- cooperate with other Flood and Coastal Erosion Risk Management (FCERM) authorities through developing partnerships and contributing to effective multi-agency working.

The Environment Agency was given a Strategic Overview role which requires them to consider all sources of flooding. As a Category 1 responder, they are also required to provide an operational role to manage flooding.

The Civil Contingencies Act places a legal obligation upon emergency services and local authorities (defined as "Category 1 responders" under the Act) to assess the risk of, plan, and exercise for emergencies, as well as undertaking Business continuity Management. Category 1 responders are also responsible for warning and informing the public in relation to emergencies. Finally, local authorities are required to provide business continuity advice to local businesses. It also places legal obligations for increased co-operation and information sharing between different emergency services and also to non-emergency services that might have a role in an emergency such as electric companies (non-emergency services are defined as "Category 2 responders" under the Act).

Sir Michael Pitt's Review of the 2007 floods (Pitt, June 2008) (Section 1.1) recommended that the LLFA should bring together all flood Risk Management Authorities (RMA's), which include: District Councils, Highway Authorities, Water Companies and the Environment Agency.

The Environment Agency has developed a National Strategy for the management of coastal erosion and all sources of flood risk for England (Environment Agency, 2011). All LLFA's in England are required to develop, maintain, apply and monitor the application of a strategy for management of local flood risk in their area that is consistent with the National Strategy.

### 1.1.3 National Flood and Coastal Erosion Risk Management Strategy

The overall aim of the National Flood and Coastal Erosion Risk Management Strategy (Environment Agency, 2011) is to have communities, individuals, voluntary groups, private and public sector organisations working together to:

- manage the flood risk to people and their property;
- facilitate decision-making and action at the appropriate level - individual, community, or local authority, river catchment, coastal area or nationally;
- achieve social, economic and environmental benefits, consistent with the principles of sustainable development.

It seeks to achieve this through working with individuals, communities and organisations to reduce the threat of flooding through the following objectives:

- understanding the risks of flooding, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
- avoiding inappropriate development in areas of flood risk and being careful to manage land elsewhere to avoid increasing risks;
- building, maintaining and improving flood management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, society and environment;
- increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient;
- improving the detection, forecasting and issuing of flood warnings, planning for and co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

The FWMA (UK Parliament, 2010) requires the objectives of the local strategy to be consistent with these national objectives.

### 1.1.4 Local Flood Risk Management Strategy Requirements

Section 9 of the Flood and Water Management Act (UK Parliament, 2010) details the requirements for LLFA's in England. It states that LLFA's must develop, maintain, apply and monitor a Strategy for Local Flood Risk Management in its area for the following forms of flood risk:

- surface runoff;
- groundwater; and
- ordinary watercourses.

The Strategy for Local Flood Risk Management in Dorset will specify the following:

- the objectives for managing local flood risk (Section 1.2.3 with detail provided in Sections 2 to 6);
- the assessment of local flood risk for the purpose of the strategy (Section 2);
- the measures proposed to achieve those objectives (contained within the tables at the end of Sections 2 to 6);
- the roles and responsibilities of Flood Risk Management Authorities within Dorset (Section 3.1);
- the flood and coastal erosion risk management responsibilities that may be exercised by those authorities in relation to the area (Sections 3.1.1 to 3.2.4);
- how the measures will be funded (Section 7);
- the costs and benefits of flood risk management options (Section 7.3.1);
- how the strategy contributes to the achievement of wider environmental objectives (Section 8.1);
- how and when the strategy is to be reviewed (Section 9); and
- how and when the measures are expected to be implemented (Appendix 1);

## *1.2 Dorset's Local Flood Risk Management Strategy*

The Dorset Local Flood Risk Management Strategy has been developed in conjunction with LGA's framework to assist with the development of local strategies (Local Government Association, 2011). The Strategy has also incorporated Dorset County Council's current Vision of *"Working together for a strong and successful Dorset"* which will be achieved by focusing on *"Growing our local economy"* and *"Enhancing health, wellbeing and safeguarding" .*

Figure 1 presents an overview of Dorset's Local Flood Risk Management Strategy. The Strategy Aims are defined in Section 1.2.2; the Strategy Objectives are defined in Section 1.2.3. Detail of the measures required to meet the strategy objectives are presented at the end of relevant section (Sections 2 to 6). The actions required to meet the measures are presented in the Action plan in Appendix 1.

### 1.2.1 Dorset's Local Flood Risk Management Strategy Vision

The vision of Dorset's Local Flood Risk Management Strategy is to see everyone '*Working together to manage local flood risk in Dorset so communities are resilient and prepared for flooding'.*

### 1.2.2 Dorset's Local Flood Risk Management Strategy Aims

The aims of the strategy have been developed to meet the Strategy's vision. They focus on three main elements of: community, economy and the environment. The aims of the strategy are as follows:

- *Reduce risk to life and the impact of flooding to communities, whilst safeguarding vulnerable residents;*
- *Reduce the risk of flood damage to properties and businesses so as to develop a flood resilient economy within Dorset;*
- Work together towards integrated and holistic catchment flood management.

### 1.2.3 Dorset's Local Flood Risk Management Strategy Objectives

Local objectives that have been developed to describe how the aims and vision of the strategy will be met are as follows:

Objective 1: Understand flood risk across Dorset (Section 2);
Objective 2: Manage the likelihood and impact of flooding (Section 3);
Objective 3: Help Dorset's communities manage their own flood risk (Section 4);
Objective 4: Ensure flood risk is considered in local land development proposals (Section 5);
Objective 5: Improve flood prediction, warning, response and post flood recovery (Section 6).

Figure 1 presents an overview of the Flood Risk Management Strategy and outlines measures that have been devised to demonstrate progress in implementing the strategy.

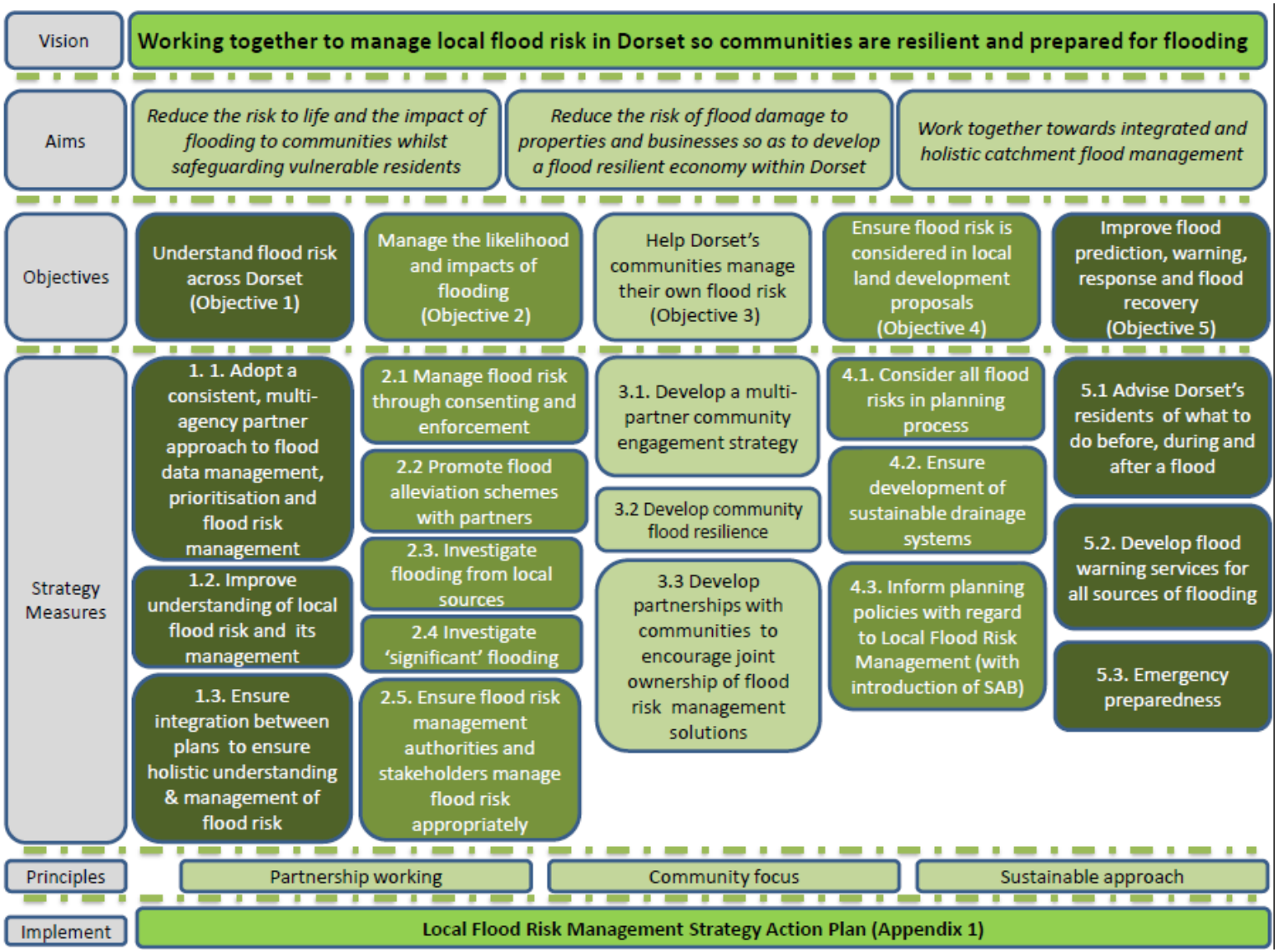



**Figure 1: Overview of Dorset's Local Flood Risk Management Strategy**

## *1.3 Consultation and engagement*

There are a number of groups and organisations who have been invited to provide input into the development of the Dorset Local Flood Risk Management Strategy. These include:

- Dorset Flood Risk Management Officers Group;
- Dorset Flood Risk Management Board;
- Planning and climate change teams;
- Natural England;
- Environment Agency;
- English Heritage;
- Attendees at the Strategy Initial Consultation sessions held in 2013 including:
    - Parish and Town Councils;
    - Flood Wardens;
    - District Councillors;
    - Members of the public.

# 2 Objective 1: Understand flood risk across Dorset

This section presents the current understanding of flood risk in Dorset. Section 2.1 discusses the different types of flooding that may occur within Dorset and presents available intelligence relating to different types of flood risk. It also identifies communities that are known to experience the different types of flooding. The potential impact of flooding to communities is considered in Section 2.1.9. Section 2.2 reviews how existing flood risk plans, strategies and assessments interconnect and how they are relevant to this Local Flood Risk Management Strategy. Section 2.9.3 brings together all intelligence regarding flooding in Dorset and identifies communities with greatest risk of flooding from local sources. Section 2.10 identifies challenges to understanding flood risk in Dorset and outlines measures for improvement.

## *2.1 Type and location of flood risk in Dorset*

This section discusses the different types of flooding that may occur within Dorset. Figure 2 presents a schematic diagram of the different sources of flooding. Local flood risks include flooding from surface water (Section 2.1.1); groundwater (Section 2.1.2); ordinary watercourses (Section 2.1.3). Other flood sources include flooding from the rivers and sea (Section 2.1.4.); highways (Section 2.1.5) sewers (Section 2.1.6); and reservoirs (Section 2.1.7).

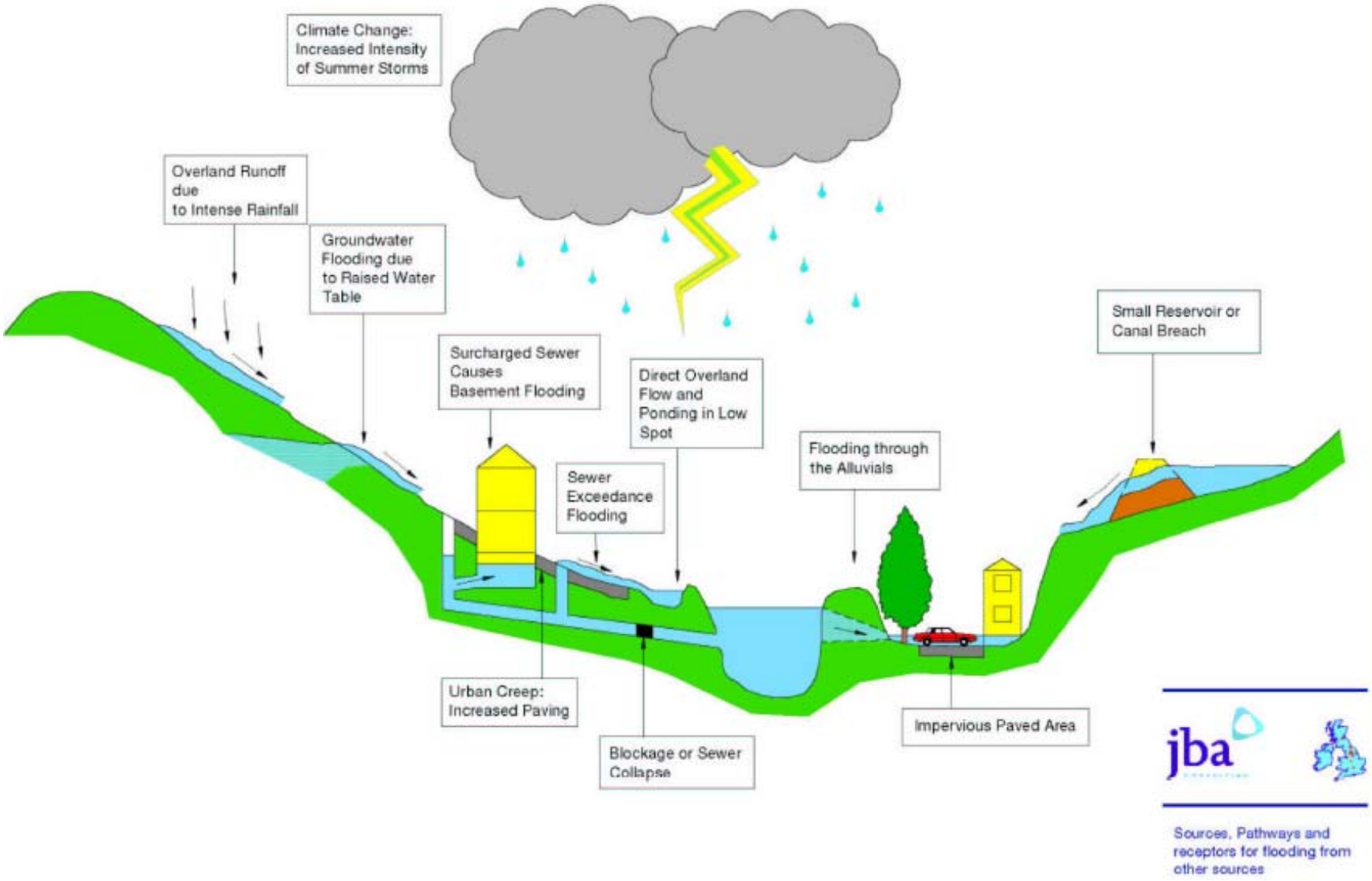



**Figure 2: Sources, pathways and receptors for flooding from other sources (JBA)**

### 2.1.1 Surface Water / overland runoff

Surface water refers to rainfall that has been intercepted by the ground or roofs but has not yet entered a natural watercourse system. Surface water flooding occurs when heavy rainfall exceeds the capacity of the local drainage network and water flows across the ground. This occurs either due to blockages in the drainage system or during very high intensity storms when water builds up before it can reach the surface water drainage system. The Pitt Review (Pitt, June 2008) highlighted the impact of surface water during flood incidents. This led to the Flood and Water Management Act (UK Parliament, 2010) recommended that LLFAs were given greater responsibility for surface water management (Section 3.1.1).

The Environment Agency has produced the Flood Map for Surface Water (FMfSW) which indicates the risk of surface water flooding for a 1 in 30 and 1 in 200 year flood. Analysis has been conducted within this strategy to establish the number of receptors that are at risk from flooding from surface water according to the FMfSW. Receptors include all properties and critical services which could encounter consequences of flooding that could impact on human health. Critical services are defined by Environment Agency guidance, examples of critical services considered within the analysis include: schools, hospitals, nursing/care/retirement homes, police, fire and ambulance stations, prisons, sewerage treatment works, electricity installations.

Analysis of the number of receptors that are at risk from flooding from surface water according to the FMfSW suggests that: 35,545 receptors (including 22,300 properties) within Dorset are at risk of surface water flooding in a 1 in a 200 year flood; and 15,794 receptors are at risk of surface water flooding in a 1 in a 30 year flood. Some of these receptors are also susceptible to flooding from rivers and the sea. Figure 3 shows the main areas at risk of surface water flooding in Dorset in a 1 in a 30 year flood; this reflects expected impacts when drainage design standards for highways and culverts will be exceeded. Figure 4 shows the main areas at risk of surface water flooding in Dorset in a 1 in a 200 year flood. To put the 1 in a 200 year flood in context, the rainfall that occurred between the 1st and 8th in July 2012 at the rain gauge in Eggardon Hill in West Dorset produced a return period of a 1 in a 251 year flood (Environment Agency, 2012). Climate change predictions suggest an increased frequency and intensity of extreme weather (Section 2.2.9).

The communities are ranked according to the number of receptors at risk from flooding in a 1 in 30 year flood. These communities are likely to experience frequent surface water flooding and a potentially deep flooding during larger magnitude flooding. The table highlights that some smaller communities have a larger number of receptors at risk of flooding in a 1 in 30 year flood than larger more densely populated communities. This is an important consideration included in the prioritisation of flood risk management activities as detailed in Section 2.9.3.

Table 2 presents the communities with the greatest number of vulnerable receptors at risk of surface water flooding in a 1 in 30 and 1 in 200 year flood event according to the Flood Map for Surface Water. The communities are ranked according to the number of receptors at risk from flooding in a 1 in 30 year flood. These communities are likely to experience frequent surface water flooding and a potentially deep flooding during larger magnitude flooding. The table highlights that some smaller communities have a larger number of receptors at risk of flooding in a 1 in 30 year flood than larger more densely populated communities. This is an important consideration included in the prioritisation of flood risk management activities as detailed in Section 2.9.3.

**Table 2: Communities in Dorset with the greatest risk of surface water flooding ranked according to the number of receptors at risk in a 1 in 30 year flood and with detail of number of vulnerable receptors at risk in a 1 in 200 year flood.**

| Rank for a 1 in 30 year flood | Community | Number of vulnerable receptors 1 in 30 year flood | Number of vulnerable receptors 1 in 200 year flood |
|---|---|---|---|
| 1 | Weymouth | 768 | 2064 |
| 2 | Dorchester | 521 | 1176 |
| 3 | Ferndown Town | 368 | 862 |
| 4 | Sherborne | 337 | 671 |
| 5 | Verwood | 308 | 682 |
| 6 | Beaminster | 266 | 356 |
| 7 | Sixpenny Handley | 218 | 298 |
| 8 | Shaftesbury | 200 | 428 |
| 9 | Lyme Regis | 189 | 417 |
| 10 | Gillingham | 187 | 418 |
| 11 | Winterborne Stickland | 178 | 227 |
| 12 | Swanage | 172 | 384 |
| 13 | Blandford Forum | 156 | 348 |
| 14 | Piddletrenthide | 151 | 208 |
| 15 | Chickerell | 151 | 307 |
| 16 | Christchurch | 149 | 980 |
| 17 | Portland | 140 | 477 |
| 18 | Winterborne St. Martin | 134 | 175 |
| 19 | Bridport | 131 | 416 |
| 20 | Broadmayne | 129 | 171 |

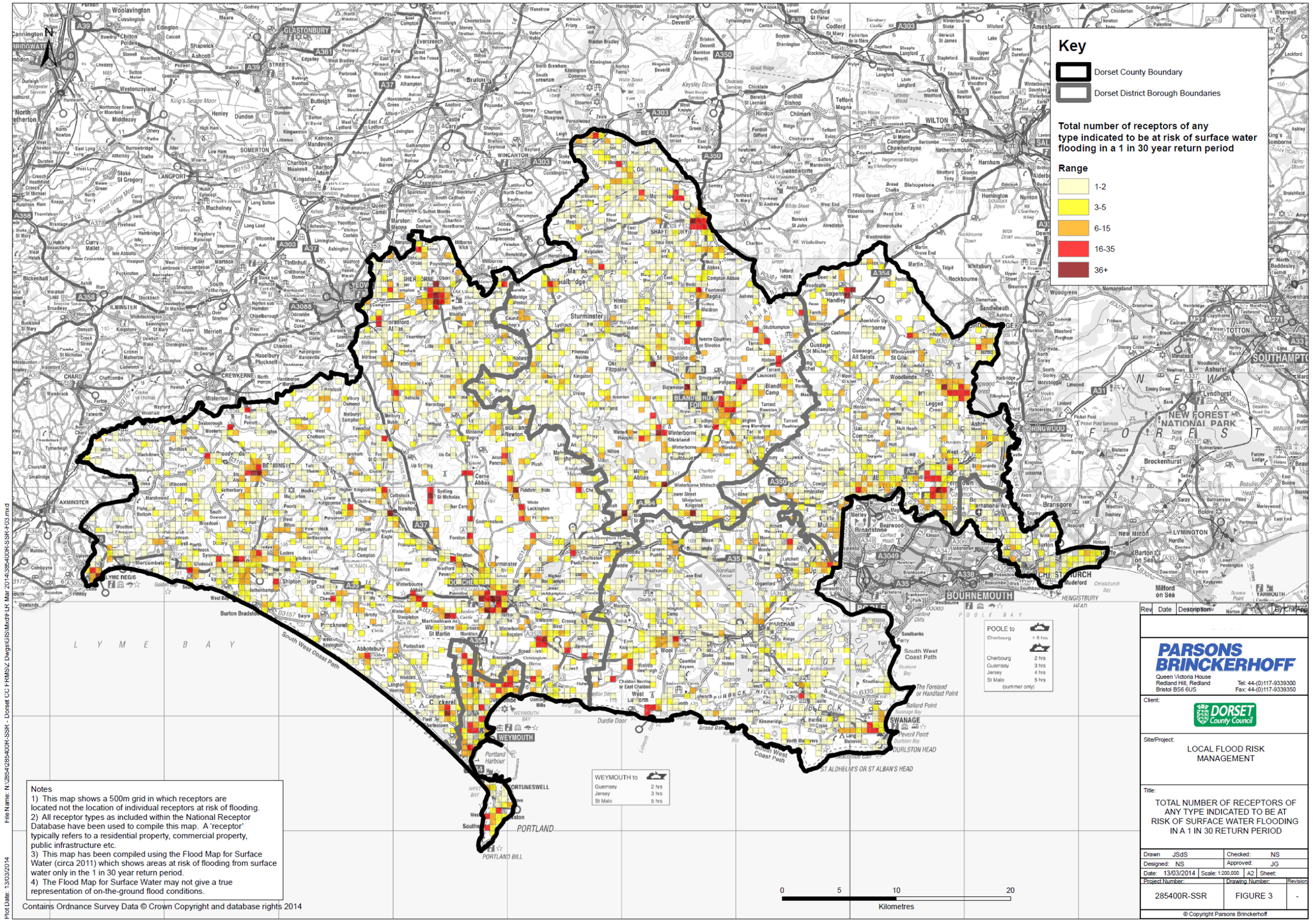
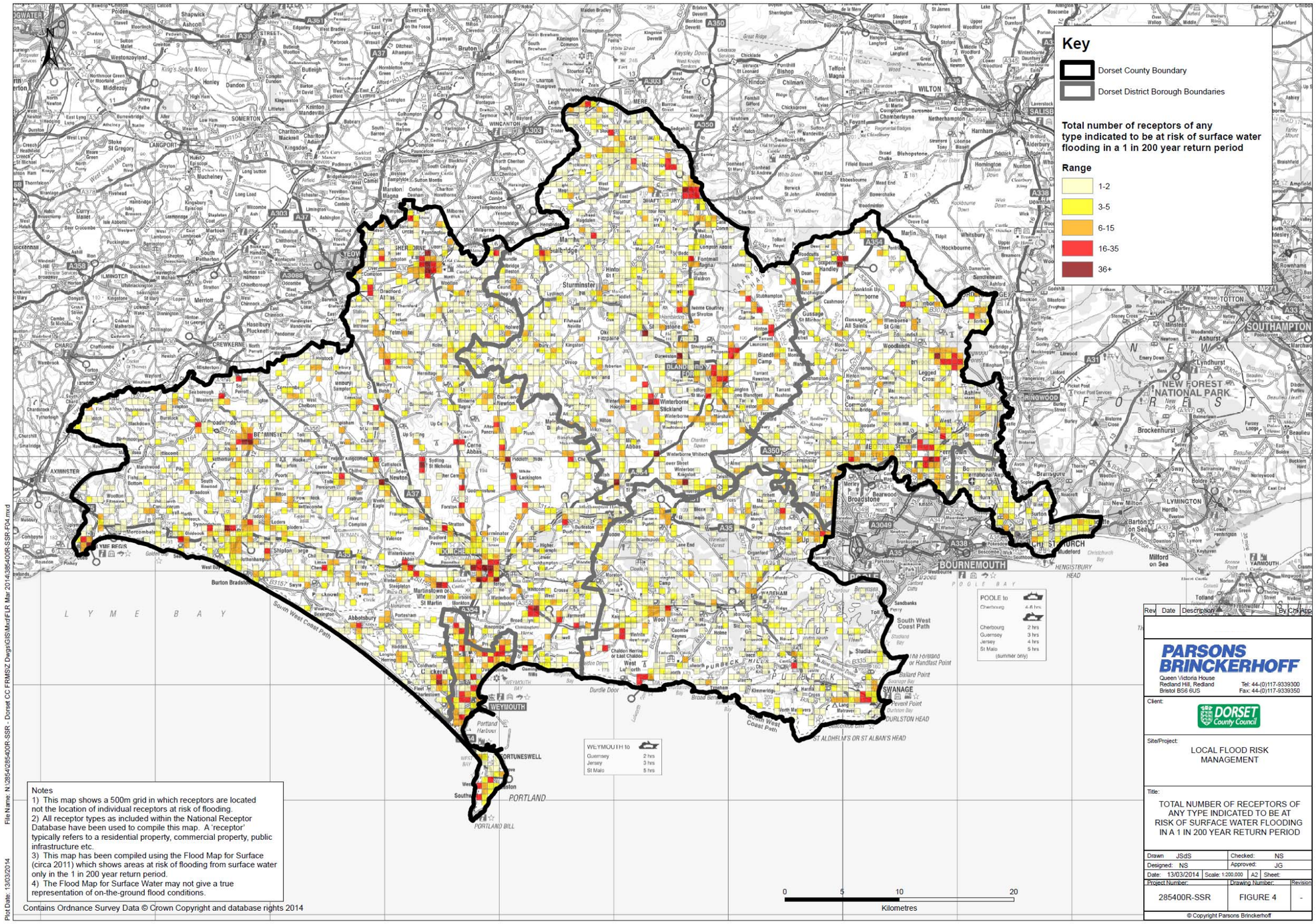



**Figure 3: Total number of receptors at risk of surface water flooding in a 1 in 30 year return period**


Key
Dorset County Boundary
Dorset District Borough Boundaries
Total number of receptors of any type indicated to be at risk of surface water flooding in a 1 in 200 year return period
Range
1-2
3-5
6-15
16-35
36+
WEYMOUTH to
Guernsey 2 hrs
Jersey 3 hrs
St Malo 5 hrs
POOLE to
Cherbourg 4.45 hrs
Guernsey 2 hrs
Jersey 3 hrs
St Malo 5 hrs
(summer only)
Notes
1) This map shows a 500m grid in which receptors are located not the location of individual receptors at risk of flooding.
2) All receptor types as included within the National Receptor Database have been used to compile this map. A 'receptor' typically refers to a residential property, commercial property, public infrastructure etc.
3) This map has been compiled using the Flood Map for Surface (circa 2011) which shows areas at risk of flooding from surface water only in the 1 in 200 year return period.
4) The Flood Map for Surface Water may not give a true representation of on-the-ground flood conditions.
Contains Ordnance Survey Data © Crown Copyright and database rights 2014
0 5 10 20
Kilometres
Rev Date Description By Chk App
PARSONS BRINCKERHOFF
Queen Victoria House
Redland Hill, Redland
Bristol BS6 6US
Tel: 44-(0)117-9339300
Fax: 44-(0)117-9339350
Client:
DORSET County Council
Site/Project:
LOCAL FLOOD RISK MANAGEMENT
Title:
TOTAL NUMBER OF RECEPTORS OF ANY TYPE INDICATED TO BE AT RISK OF SURFACE WATER FLOODING IN A 1 IN 200 YEAR RETURN PERIOD
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Designed: NS
Approved: JG
Date: 13/03/2014
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**Figure 4: Total number of receptors at risk of surface water flooding in a 1 in 200 year return period**

### 2.1.2 Groundwater

Groundwater flooding tends to occur after long periods of sustained high rainfall, however during exceptional rainfall, rapid groundwater recharge can occur as evident in July 2012 in West Dorset (Dorset County Council, 2013). Groundwater flooding occurs where the water levels in rock and soil become high enough for the water to appear near to or above the ground surface. This may happen where there are underlying gravels, or porous or fractured rocks, allowing water to pass through. At present, understanding of this risk is limited, restricted to a broad indication of areas that may be susceptible to groundwater floods. The solid geology of Dorset is dominated by the chalk with gravels in the Stour and Frome, Piddle, Winterbourne and Tarrant valleys.

The risk of potential groundwater flooding has been identified in a number of Strategic Flood Risk Assessments and Catchment Flood Management Plans for Dorset also identify the potential for groundwater flooding (Section 2.2.6.1).

Communities that reported flooding from groundwater in the 2012/13 floods are given in Table 3 and shown on a map in Figure 5.

**Table 3: Communities that reported groundwater flooding during 2012/ 2013 floods**

| | | |
|---|---|---|
| Bridport | Cerne Abbas | Charminster |
| Cheselbourne | Chettle | Corscombe |
| Farnham | Frome Valley Ward | Frome Vauchurch |
| Hilton | Holwell | Hooke |
| Maiden Newton | Melbury Osmond | Melcombe Horsey |
| Milborne St. Andrew | Milton Abbas | Pentridge |
| Piddlehinton | Piddletrenthide | Sixpenny Handley |
| Stourpaine | Sturminster Marshall | Sydling St Nicholas |
| Tarrant Gunville | Toller Fratrum | Toller Porcorum |
| Wimborne St. Giles | Winteborne Whitechurch | Winterborne Clenston |
| Winterborne Houghton | Winterborne Kingston | Winterborne Monkton |
| Winterborne Stickland | Winterborne St. Martin | Winterborne Whitechurch |
| Winterborne Zelston | Winterbourne Abbas | Winterbourne Steepleton |
| | | |

### 2.1.3 Ordinary watercourses

An ordinary watercourse is any river, stream, ditch, drain, cut, culvert, dike or sluice through which water flows that is not designated as Main River. The main causes of flooding can be attributed to a number of factors including: (i) poor management, (ii) structures; (iii) alignment; (iv) poor gradient; or (v) interaction with main rivers.

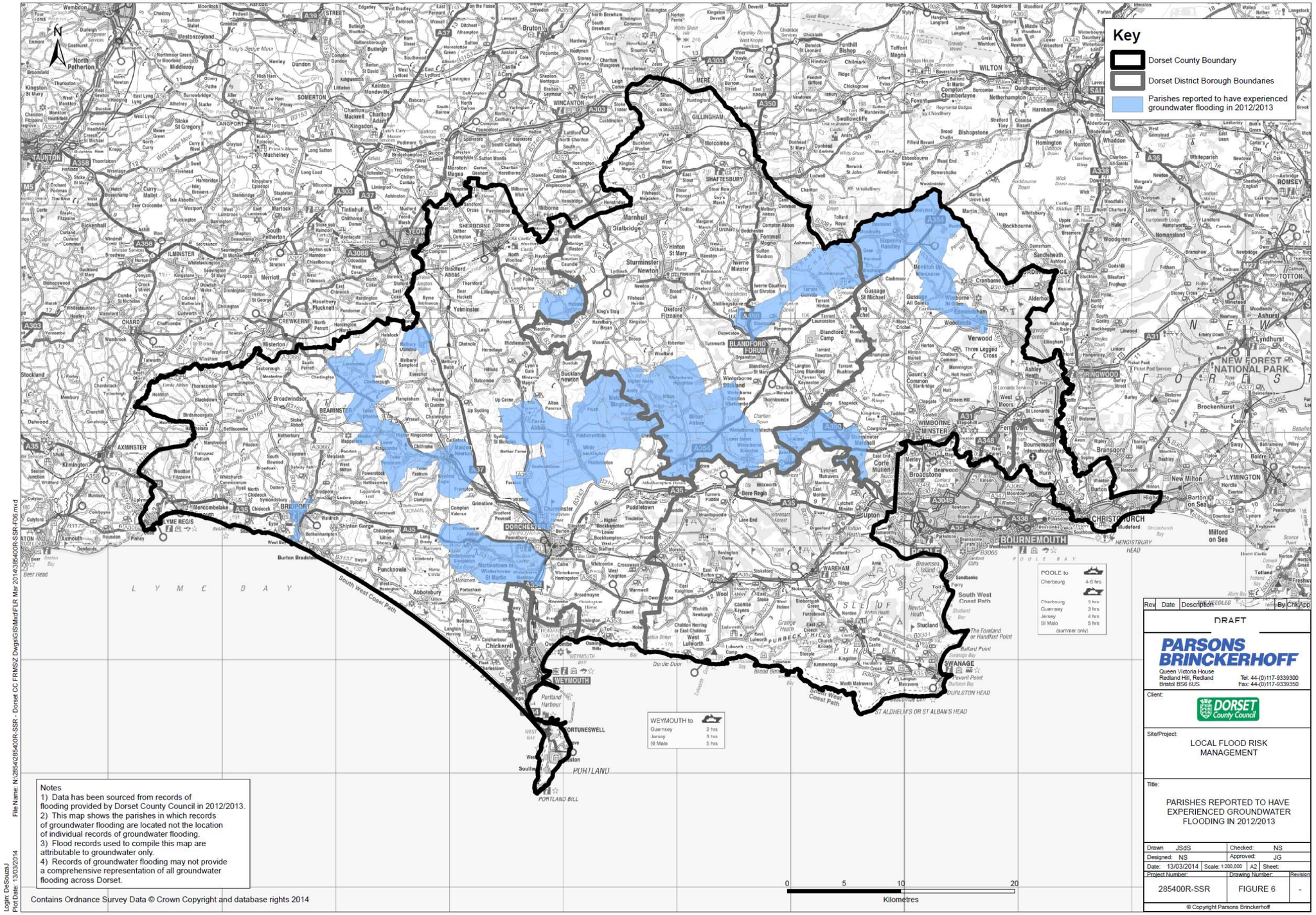



**Figure 5: Parishes reported to have experienced groundwater flooding in 2012/2013**

### 2.1.4 Flooding from main rivers and the sea

River flooding happens when a river or stream cannot cope with the water draining into it from the surrounding land - for example, when heavy rain falls on the ground that is already waterlogged (http://www.environment-agency.gov.uk/homeandleisure/floods/143146.aspx). Coastal flooding happens when there are high tides and stormy conditions. If low atmospheric pressure coincides with a high tide, a 'tidal surge' may happen causing higher than normal sea levels that may go over the top of defences (http://www.environment-agency.gov.uk/homeandleisure/floods/143152.aspx). The largest 'Main Rivers' within Dorset include the Rivers Lim, Brit, Bride, Asker, Wey, Jordan, Frome, Piddle, Stour and Hampshire Avon. The risk of flooding from the sea is greatest at the following communities along the coast including Lyme Regis, West Bay, Chiswell, Weymouth, Swanage and Christchurch. Flooding from Main Rivers and the sea is the responsibility of the Environment Agency (EA) (as detailed in Section 3.1.3). The management of flood risk from these sources of flooding is not covered in this Local Flood Risk Management Strategy.

### 2.1.5 Highways flooding

Highways flooding can occur for a number of reasons. Intense rainfall can lead to highways drains becoming overwhelmed due to capacity, however it can also occur as a result of blocked gullies and culverts. A total of 764 records of highway flooding exist between October 2013 and February 2014. These records identify 497 different roads that experience flooding in 161 parishes in Dorset. Communities / parishes that submitted the greatest number of reports of highways flooding are given in Table 4. Figure 6 presents the information on number of flood reports relating to highway flooding across all communities / parishes.

**Table 4: Communities in Dorset that recorded the greatest number of records for highways flooding between October 2013 and February 2014.**

| | |
|---|---|
| Christchurch | Charminster |
| Weymouth | Sixpenny Handley |
| Ferndown Town | Arne |
| Corfe Mullen | Sturminster Marshall |
| Lytchett Minster and Upton | Verwood |
| Burton | Wareham Town |
| Beaminster | Stalbridge |
| Gillingham | Long Bredy |
| Sherborne | Alderholt |
| Dorchester | Netherbury |

Highways that were reported to have flooded three times between October 2013 and February 2014 are as follows:

- Purwell, Christchurch
- Mudeford, Christchurch
- Hinton Wood Avenue, Christchurch
- Stony Lane, Christchurch
- Bargates, Christchurch
- Ringwood Road, Verwood
- Broadmoor Road, Corfe Mullen
- Sandy Lane, St Leonards/St Ives
- High Street, Spetisbury
- Milton Road, Milborne St.Andrew
- Gillingham Road, Shaftesbury
- Dorchester Road, Lytchett Minster
- Litton Cheney Junction Baglake To Junction, Long Bredy
- West Stafford Bypass From Junction West, West Stafford
- Coombe, Sherborne

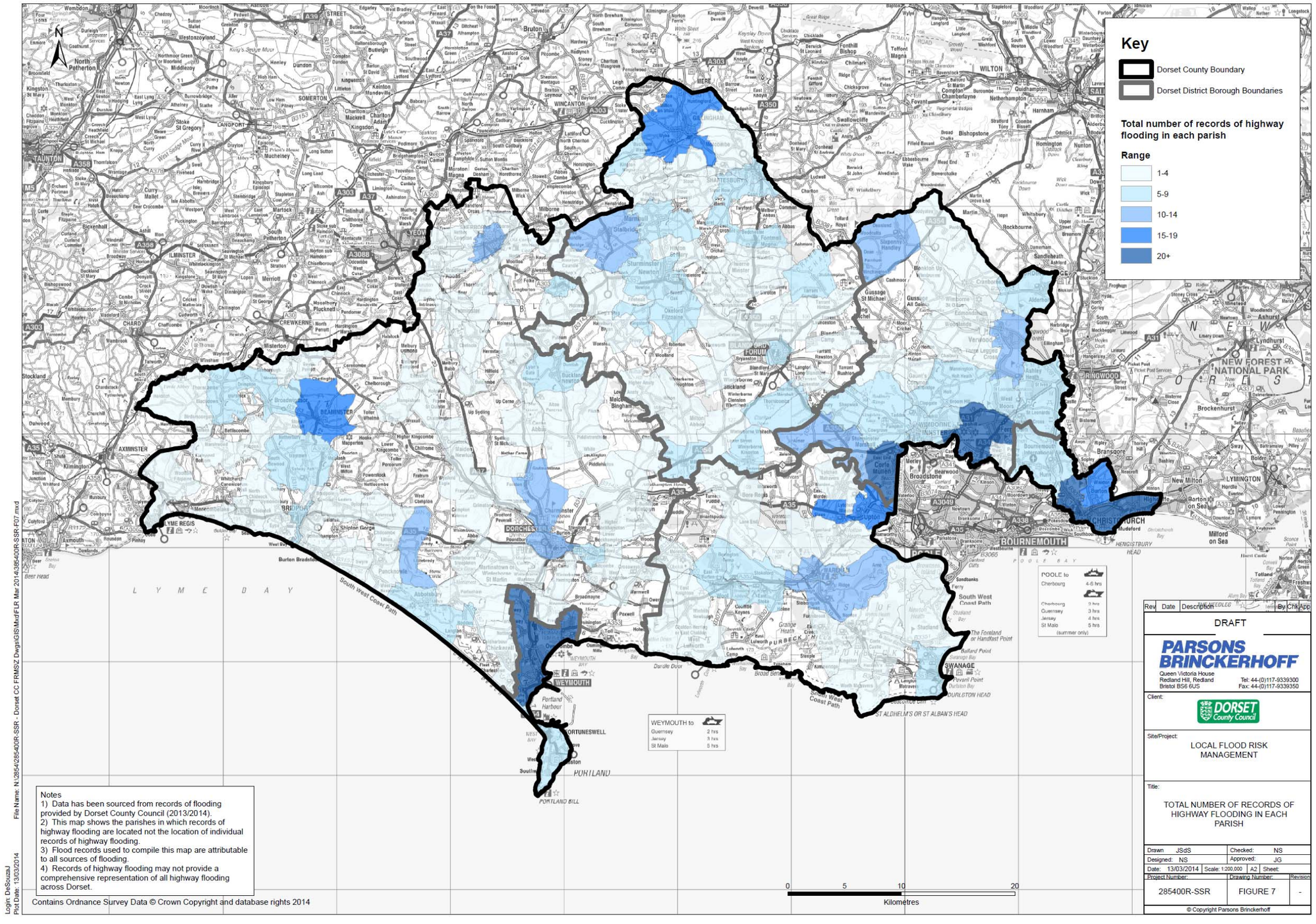



**Figure 6: Number of records of highway flooding in each community**

### 2.1.6 Sewer flooding

Sewer flooding is often caused by excess surface water entering the drainage network. The sewerage system comprises foul sewers, which do not accept surface water runoff, surface water sewers that do and combined sewers, which accept a combination of surface water and foul sewage. Water companies are responsible for sewer flooding, in many cases they will need to work in partnership with Dorset County Council as the Lead Local Flood Authority where surface water ingress affects sewer performance. During flooding or when groundwater levels are high, water companies carry out a programme of over pumping / removal of water from over capacity sewers to ensure the operation of toilets etc.

Although sewer flooding has been reported across Dorset, this source of flooding is not classed as 'local flooding' and is managed by water companies independently or in partnership with relevant Flood Risk Management Authorities detailed within this Local Flood Risk Management Strategy.

### 2.1.7 Reservoirs

The Environment Agency is responsible for regulating large raised reservoirs under the Reservoirs Act 1975. They currently regulate reservoirs over 25,000 m³ in capacity. This will reduce to10,000 m³ through provisions of the Act. Reservoirs below this size are unlikely to present significant flood risks in the context of the Regulations.

### 2.1.8 Combined risks

The individual risks of flooding from different sources can and frequently combine to change the overall level of risk. For example, flooding from rivers and the sea may combine locally with that from ordinary watercourses and surface water. Assessment of these combined risks is complex. Local information on past flooding from surface water and groundwater can be used to improve understanding of flood risks by collecting additional data and carrying out modelling of local systems.

### 2.1.9 Potential impacts of flooding on communities

The impacts of flooding and the associated recovery can cause significant disruption to communities. Examples of negative impacts of flooding include:

(i) loss of life by people entering flood water;
(ii) health and well-being and distress to people living and working in the areas affected;
(iii) major disruption to energy, water, communications and transport infrastructure;
(iv) disruption to public services such as schools and hospitals;
(v) indirect effects through disruption to travel or loss of income;

Figure 7 presents locations where critical services may be at risk of flooding in a 1 in 30 and 1 in 200 year return period surface water flood. Details of critical services considered in this analysis can be found in Section 2.1.1.

The above mentioned impacts can also have significant effects on the local economy outside the area directly flooded. Flooding can also impact on the environment and on cultural heritage.

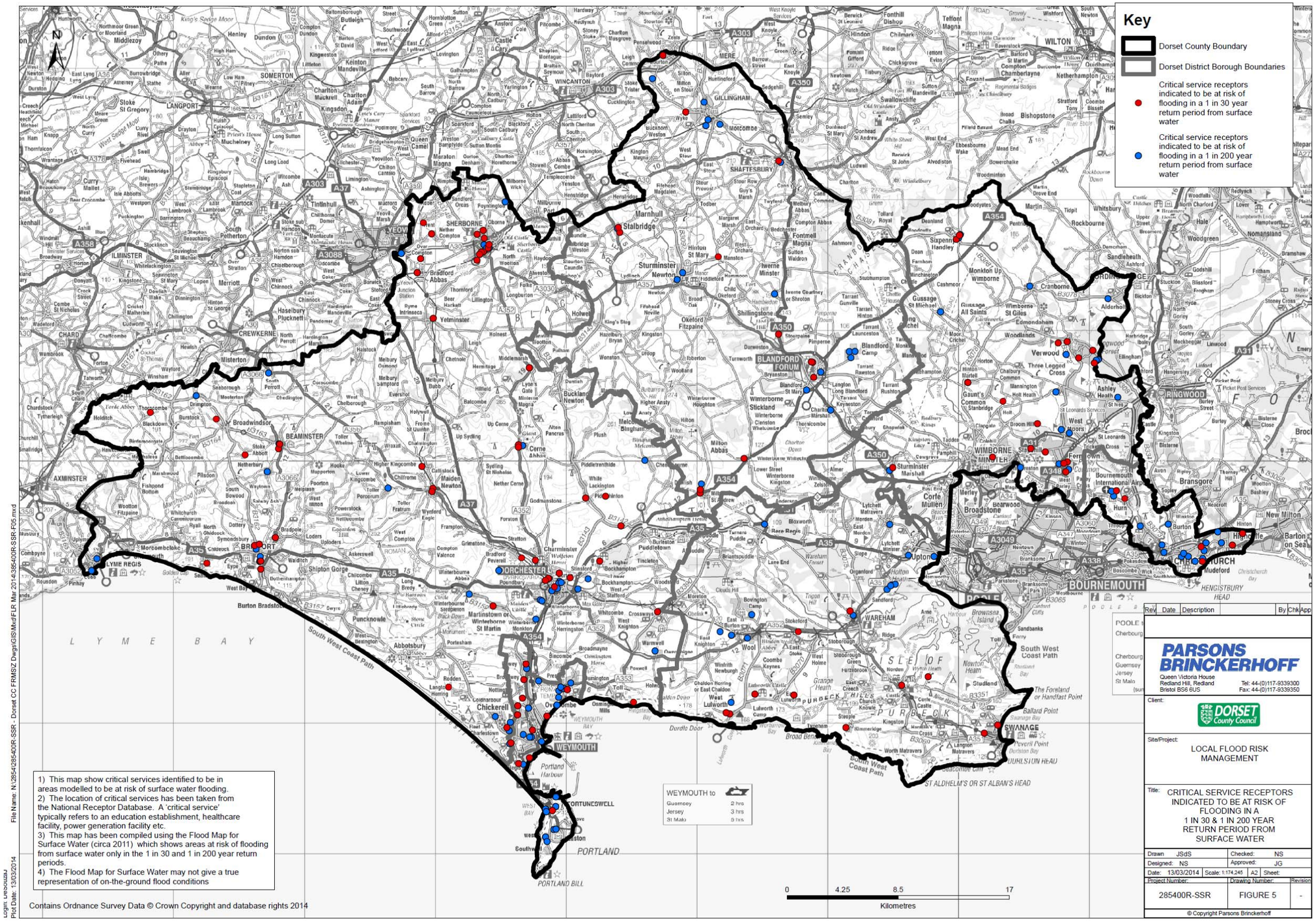



**Figure 7: Critical service receptors indicated to be at risk of flooding in a 1 in 30 and 1 in 200 year return period from surface water**

## 2.2 Legislative, guidance documents, strategies and plans relating to Flood Risk Management

This section presents an overview of the reports, plans, assessments and strategies that have previously been developed which relate to flood risk management of local sources of flooding as shown in Figure 8.

Sections 2.2.1 to 2.2.6.3 outline documents that have been developed to meet Government and European Legislation for flood risk management. Section 2.2.9 considers the potential impact of climate change on flood risk in Dorset.

Section 2.2.10 discusses how existing documents and flood intelligence have been used to help inform the development of this Local Flood Risk Management Strategy.

Sections to 2.3 to 2.8 summarises intelligence relating to flood risk according to Local Authority Areas:

- West Dorset (Section 2.3)
- Weymouth and Portland (Section 2.4)
- North Dorset (Section 2.5)
- East Dorset (Section 2.6); and
- Purbeck (Section 0)
- Christchurch (Section 2.8)

Section 2.9.3 prioritises communities according to flood risk in Dorset. This will be used as a basis for strategic long term planning of flood risk management activities.

### 2.2.1 European Floods Directive

The European Floods Directive (European Parliament and Council of the European Union, 2007) aims to provide a consistent approach to managing flood risk across Europe.

The approach is based on a 6 year cycle of planning which includes the publication of:

- Preliminary Flood Risk Assessments (PFRAs) by 22 December 2011
- Hazard and risk maps by 22 December 2013
- Flood risk management plans by 22 December 2015

Hazard risk maps and flood risk management plans are not required in Dorset as flood risk is not considered significant at a national scale (>30,000 people).

### 2.2.2 Flood Risk Regulations

The Flood Risk Regulations (Department for Environment, Food and Rural Affairs, 2009) detail the work required to implement the requirements of the European Floods Directive (Section 2.2.1).

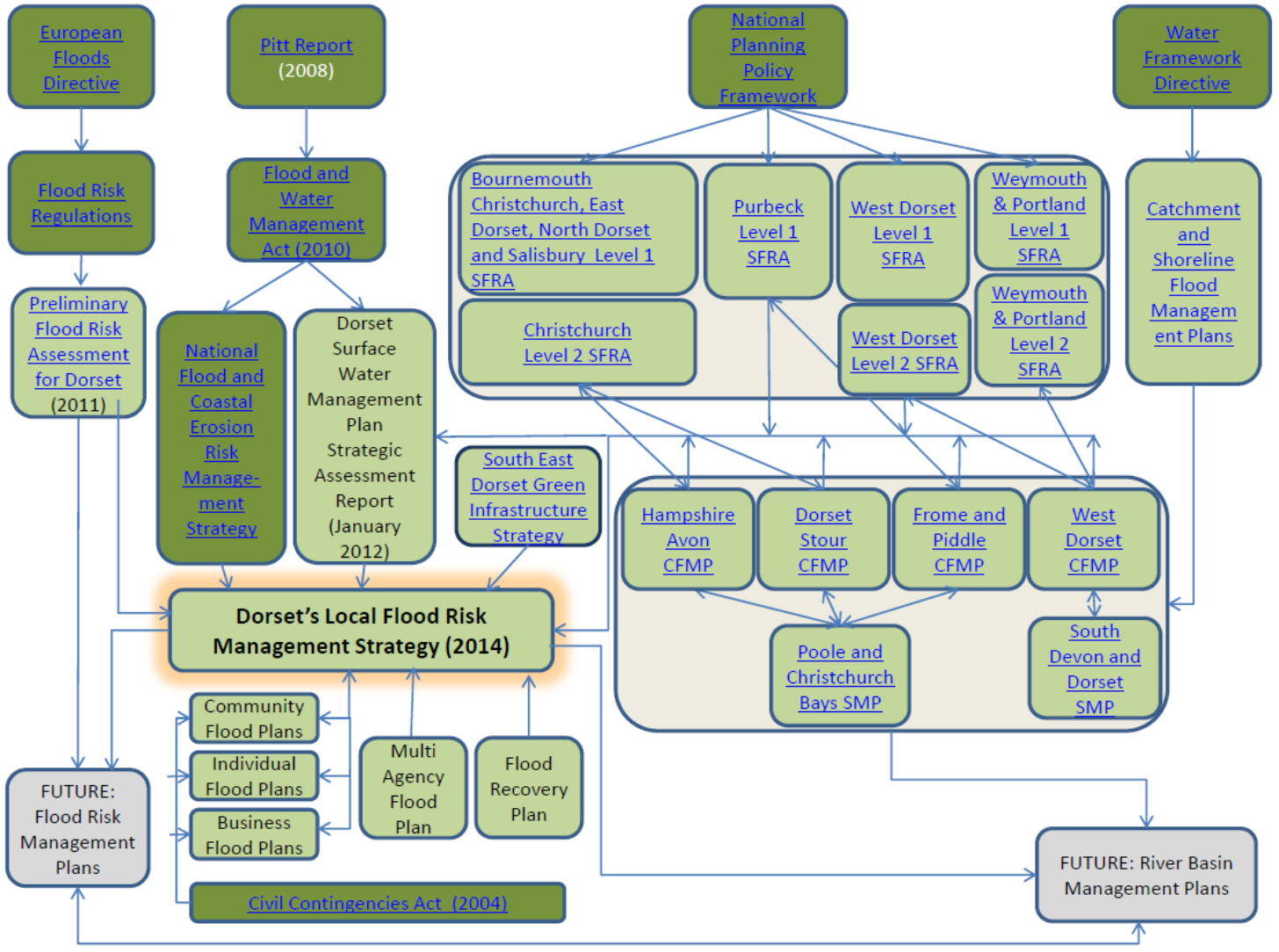

European Floods Directive
Pitt Report (2008)
National Planning Policy Framework
Water Framework Directive
Flood Risk Regulations
Flood and Water Management Act (2010)
Bournemouth Christchurch, East Dorset, North Dorset and Salisbury Level 1 SFRA
Purbeck Level 1 SFRA
West Dorset Level 1 SFRA
Weymouth & Portland Level 1 SFRA
Catchment and Shoreline Flood Management Plans
Christchurch Level 2 SFRA
West Dorset Level 2 SFRA
Weymouth & Portland Level 2 SFRA
Preliminary Flood Risk Assessment for Dorset (2011)
National Flood and Coastal Erosion Risk Manage-ment Strategy
Dorset Surface Water Management Plan Strategic Assessment Report (January 2012)
South East Dorset Green Infrastructure Strategy
Hampshire Avon CFMP
Dorset Stour CFMP
Frome and Piddle CFMP
West Dorset CFMP
Dorset's Local Flood Risk Management Strategy (2014)
Poole and Christchurch Bays SMP
South Devon and Dorset SMP
Community Flood Plans
Individual Flood Plans
Business Flood Plans
Multi Agency Flood Plan
Flood Recovery Plan
FUTURE: Flood Risk Management Plans
FUTURE: River Basin Management Plans
Civil Contingencies Act (2004)

**Figure 8: Overview of the reports, plans, assessments and strategies that relate to flood risk management**

### 2.2.3 Dorset Preliminary Flood Risk Assessment for Dorset (PFRA)

The Flood Risk Regulations (Department for Environment, Food and Rural Affairs, 2009) transpose the European Floods Directive (2007/60/EC) and place a duty on Dorset County Council (DCC) as Lead Local Flood Authority (LLFA) to prepare a Preliminary Flood Risk Assessment (PFRA). The PFRA for Dorset (Dorset County Council, July 2011) highlighted the poor quality of historic flood data and identified a need for a consistent approach to recording flood incidents across the county in the future. The PFRA also considers potential future flood risk based on the 1 in 200 year and 1 in 30 year Flood Map for Surface Water (FMfSW).

The PFRA identified that 57,400 properties are at risk of flooding from surface water to a depth of more than 0.1m in a 1 in 200 year flood and 22,300 properties are at risk of flooding to a depth of more than 0.3m. Two thirds of these properties were identified to be residential.

### 2.2.4 Pitt report

The Pitt review (Pitt, June 2008) recommended that local Surface Water Management Plans (SWMP) should provide the basis for managing flood risk.

#### 2.2.4.1 Flood and Water Management Act (2010)

Details of the Flood and Water Management Act are provided in Section 1.1.2. This provides the main requirement for the development of this Local Flood Risk Management Strategy (LFRMS).

#### 2.2.4.2 National Flood and Coastal Erosion Risk Management Strategy

Details of the National Flood and Coastal Erosion Risk Management Strategy are given in Section 1.1.3. It is essential that the LFRMS aligns with the National Flood Risk Management Objectives to work towards integrated catchment flood management.

#### 2.2.4.3 Dorset's Surface Water Management Plan Strategic Assessment

The Dorset Surface Water Management Plan (Dorset County Council, 2012) (SWMP) outlined the preferred strategy for the management of surface water in Dorset. It contained findings from the preparation and risk assessment stages of the SWMP process, in line with the guidance on preparation of SWMPs published by DEFRA. The actions identified within the SWMP were created in 2012. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014 or may be considered as part of the detailed assessment of local flood risk in the highest priority locations (identified in Tables 28 to 30) where relevant.

Surface water is referred to within the SWMP as flooding from high intensity rainfall where water is ponding or flowing over the ground surface before it enters a drainage network or watercourse. This also incorporates flooding from groundwater and / or ordinary watercourses. The SWMP identified further actions to be considered in the form of an Action Plan. Details of the actions contained within the SWMP are given in subsequent sections in relation to each local authority area.

### 2.2.5 National Planning Policy Framework

The National Planning Policy Framework states that Local Plans should be supported by Strategic Flood Risk Assessment (SFRA). More detail about the planning system and Local Plans is set out in Section 5. An SFRA provides the essential information on flood risk, taking climate change into account that allows the Local Planning Authority to understand the risk across its area so that the Sequential Test can be properly applied. An SFRA provides an overview of flood risk within a specific area and aims to provide guidance to local authority planners, developers and other interested parties regarding flood risk issues, opportunities and constraints. The severity or complexity of flood risk at a location determines if a Level 1 or 2 SFRA is required.

#### 2.2.5.1 Level 1 Strategic Flood Risk Assessment

A Level 1 SFRA includes an assessment of flood risk within the administrative boundary to guide development to appropriate flood zones using the Sequential Test in accordance with National Planning Policy Framework (previously Planning Policy Statement 25). Within Dorset, a Level 1 SFRA has been completed for each district/borough.

#### 2.2.5.2 Level 2 Strategic Flood Risk Assessment

Level 2 SFRAs may be required for locations of greatest flood risk. This includes a detailed review of the flood hazard, taking into account flood risk management measures including flood defences. Site-specific recommendations are made to reduce or mitigate flood risk.

### 2.2.6 Water Framework Directive

#### 2.2.6.1 Catchment Flood Management Plans (CFMPs)

The Environment Agency has developed Catchment Flood Management Plans that provide a summary of flood risk from rivers, groundwater, surface water and tidal flooding. Flooding from the sea is considered within Shoreline Management Plans (Section 2.2.6.3). CFMPs were developed before the creation of the Lead Local Flood Authority Role. Recommendations within the CFMPs for the management of flooding from local flood sources have been considered as part of this LFRMS.

The CFMPs and SMPs relevant to Dorset include:

- Dorset Stour Catchment Flood management Plan;
- Frome and Piddle Catchment Flood Management Plan;
- Hampshire Avon Catchment Flood Management Plan;
- West Dorset Catchment Flood Management Plan;
- East Devon Catchment Flood management Plan (a small section is relevant to Dorset);
- Parrett Catchment Flood Management Plan (a small section is relevant to Dorset);

Each catchment in Dorset has been divided into distinct sub-areas with similar physical characteristics, sources of flooding and levels of risk. Six policy options have been prepared by the EA and every sub-area has been assigned a policy and proposed actions to implement the preferred policy. The EA assigned specific flood risk management policy options to each sub-area (Table 5).

The CFMPS were created before the introduction of the new roles and responsibilities assigned by the Flood and Water Management Act in 2010. The Actions contained within the CFMPs were reviewed by the LLFA as part of the Surface Water Management Plan. Details of the relevant actions to the management of local flooding and comments from the SWMP review are summarised according to Local Authority Area in Sections 2.3 to 2.8.

**Table 5: Policy options within CFMPs**

| | |
|---|---|
| *Policy 1* | Areas of little or no flood risk where the EA will continue to monitor and advise |
| *Policy 2* | Areas of low to moderate flood risk where the EA can generally reduce existing flood risk management actions |
| *Policy 3* | Areas of low to moderate flood risk where the EA are generally managing existing flood risk effectively |
| *Policy 4* | Areas of low, moderate or high flood risk where the EA are already managing the flood risk effectively but where they may need to take further actions to keep pace with climate change |
| *Policy 5* | Areas of moderate to high flood risk where the EA can generally take further action to reduce flood risk |
| *Policy 6* | Areas of low to moderate flood risk where the EA will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits |

#### 2.2.6.2 River Basin Management Plans (RBMPs)

The European Water Framework Directive (WFD) requires the local flood risk management strategy to take account of River Basin Management Plans (RBMPs) along with the programme of measures for implementing these plans.

The measures proposed by this local flood risk management strategy will be consistent with Article 4 of the directive, which outlines the environmental objectives as follows:

- All surface water bodies to achieve good ecological and chemical status by 2015;
- This covers inland waters, transitional waters (estuaries) and coastal waters;
- All groundwater bodies to achieve good groundwater quantitative and chemical status by 2015;
- Heavily-modified water bodies and artificial water bodies to achieve good ecological potential and good surface water chemical status by 2015;
- No water bodies to experience deterioration in status from one class to another;
- Protected Areas to achieve the requirements made under their designation in relation to the water environment.

Where possible, flood risk management plans will be aligned with River Basin Management Plans in order to meet the challenges of WFD environmental objectives. This means that flood risk management schemes will be planned and delivered bearing in mind the following requirements:

- To protect and enhance the water environment;
- To ensure that flood risk activities do not deteriorate water bodies;
- To change the way flood assets are managed in order to improve the quality of water bodies.

As a lead local flood authority, Dorset County Council will ensure that a sustainable approach to reducing local flood risk is adopted and seek to lessen the risk of localized flooding using mechanisms that are economically viable with environmental benefits. Dorset County Council's Strategic Environmental Assessment prepared in support of the Local Flood Risk Strategy provides more information on the condition of the county's watercourses with respect to the requirements of the WFD.

#### 2.2.6.3 Shoreline Management Plans (SMPs)

A Shoreline Management Plan (SMP) provides a summary of flood risk from coastal sources and provides policy actions for the management of flooding and coastal erosion risks in the short term (0-20 years), medium term (20-50years) and long term (50-100 years). In Dorset two SMPs cover the entire length of coastline which include: (i) South Devon and Dorset SMP; and (ii) Poole and Christchurch Bays SMP. The policy options outlined in Table 6 are assigned to various policy units along the coast.

**Table 6: SMP policy options**

| SMP Policy | Description |
|---|---|
| **Hold the line** | Maintain or change the level of protection provided by defences in their present location. |
| **Advance the line** | Build new defences on the seaward side of the existing defence line to reclaim land. |
| **Managed realignment** | Allowing the shoreline position to move backwards (or forwards) with management to control or limit movement. |
| **No active intervention** | A decision not to invest in providing or maintaining defences. |

## 2.2.7 Civil Contingencies Act

#### 2.2.7.1 Multi Agency Flood Plan

The 'Bournemouth, Dorset and Poole Multi Agency Flood Plan' outlines actions from Category 1 and Category 2 responders relevant to managing flood incidents in Dorset. Details of the multi-agency response to flooding can be found in Section 6.1.1.

#### 2.2.7.2 Flood Recovery Plan

The Flood Recovery Plan for Bournemouth Dorset and Poole identifies the multi-agency process for managing the flood recovery phase. Details can be found in Section 6.4.1.

#### 2.2.7.3 Community and Individual Flood Plans

Community flood plans are developed by Parish Councils or Flood Action Groups often in conjunction with Risk Management Authorities to identify actions and triggers that can be taken before, during and after flooding. Details of community flood plans can be found in Section 4.2.1.
Individual flood plans are often linked to community flood plans where individual home owners outline actions relevant to their properties. Details of individual flood plans can be found in Section 4.2.3.

## 2.2.8 Additional documents relevant to management of flood risk in Dorset

#### 2.2.8.1 Investing in Green Places: South East Dorset Green Infrastructure Strategy

The Green Infrastructure Strategy (GIS) sets out South East Dorset's aspirations with regards to enhancing and promoting green infrastructure for the benefit of the environment and community. Green infrastructure also has the potential to reduce existing and future flood risk.

One of the GIS outcomes that is of particular relevance to this strategy is *Water Management & Climate Change*. This seeks '*To ensure that the green infrastructure network achieves its potential in providing flood and water management, local climate control, dispersing air pollution and filtering water to enhance quality,and therefore supporting opportunities for climate change adaptation'*.

The Green Infrastructure strategy supports the integration of flood risk management with development of walking and cycling routes adjacent to watercourses to enhance local landscape and community areas (including dual use of open space), provide areas to store flood water, improve water quality and offer biodiversity benefits. The following key themes within the GIS that relate to the

local flood risk management strategy include: (i) water and flood management; and (ii) greening the urban environment. Generic recommendations applicable across the whole of South East Dorset include:

- Greening the Urban Environment: This aims to enhance semi-natural habitats and small scale green infrastructure which has the potential to reduce runoff rates and volumes. The GIS suggests the use of sustainable drainage systems including ponds, reed beds and wetland vegetation to achieve this.
- Enjoying Water Project – This is an EA project that aims to maximise the economic, environmental and social benefits of water-based recreation in the South West. It identifies coast and water-based sport and recreation activities that can excel in the South West.

## 2.2.9 Potential climate change impacts on flood risk in Dorset.

The latest scientific consensus from the Intergovernmental Panel on Climate Change (IPCC) 5th assessment report outlines that the global climate is changing as a result of human activity. The UK Climate Change Projections 09 indicate that there will be an increase in average temperatures throughout the year, an increase in winter rainfall, decrease in summer rainfall and rising sea levels. Projections indicate that there will be an increase in the frequency and intensity of more extreme weather impacts. The UK could experience more heatwaves, snow and ice events, drought and flooding from all sources. Areas within Dorset which are already at risk of flooding will become more vulnerable to long term climate change. Although total annual rainfall experienced in Dorset may not change in the future. The change in rainfall patterns may lead to more frequent short-duration but high intensity rainfall events leading to flash flooding and also more frequent periods of long duration rainfall.

### 2.2.9.1 Predicted changes to Dorset's climate

The key projections for climate change in the South West are as follows:

- The mid range or 'change factor' scenario climate change projections have been used when considering future flood risk for Dorset (within the South West River Basin District). These projections are based on a 1961 – 1990 baseline.
- River flood flows are projected to increase by 20% by 2050, and 30% by the 2080s The increase flows are likely to be seasonal, with an increase in winter flows of up to 20%, but a decrease in flows for the rest of the year, particularly in the summer where flows could be reduced by 50 to 80% in some instances by 2050.
- High impact scenarios (H++) for river flood flows, should be considered where the consequences of rare events could be extreme. Predictions of river flood flows suggest increases of 60% by 2050, and 110% by the 2080s.
- Extreme rainfall intensity is likely to increase by 10% by the 2050's and 20% by the 2080's.
- Sea level for the UK is projected to increase by almost 0.5m by the 2080's (medium emissions scenario and 95th percentile). The upper end (H++) scenario for the UK is from 0.93 up to 1.9m increase for 2100 compared to 1990 levels.
- Storm surge may increase as much as 35cms by the 2050's and 70cms by the 2080's in the UK (upper end estimate). A rigorous assessment should be made of the current coastal extreme water level in Dorset to produce a mid-range scenario (further information available in the guidance above).

Further information can be found from the CEH/EA 'Future Flows' project for future river flows: (http://www.ceh.ac.uk/sci_programmes/water/futureflowsandgroundwaterlevels.html).

#### 2.2.9.2 Potential impacts to flooding due to a changing climate

The direct impacts of predicted changes in the Dorset climate are twofold in nature: (i) those areas within Dorset that already experience flooding or are at risk from flooding will become increasingly susceptible to flooding; (ii) areas that do not currently experience flooding may become at risk of flooding and experience flooding in the future.
These changes may be caused by sea level rise or an increase in surface water flooding. Indirect impacts of predicted changes in the Dorset climate could lead to longer term impacts including: (i) loss of business and trade; (ii) cost of flood recovery operations; and (iii) impacts on human health. If the current patterns of climate change continue, this process will cycle as areas at risk are likely to become areas at greater risk, and areas not currently at risk become areas at risk with the gradual increase in the extremity of weather events and sea level rise. The process of assessing and managing areas at risk of flooding will therefore be an ongoing and continual process.

The following may experience a change in the flooding resulting from predicted impacts of climate change:

- critical infrastructure including highways and utilities;
- communities - especially those identified as vulnerable, coastal communities and those in rapid catchment areas;
- the built environment, in particular properties that are most vulnerable to flooding and local authority assets with an increased need for maintenance and repair;
- the local economy, due to damage and recovery costs from flooding;
- potential exceedence of drainage and Sustainable Urban Drainage schemes (SUDs)
- planning policy, with decreasing availability of land suitable for new development.
- impact to Businesses: Dorset has many SMEs which are vulnerable to the impacts of climate change (flood, drought, heat wave etc).

#### 2.2.9.3 What climate change information will mean for flood risk plans and investments

This section has been derived using the EA/DEFRA guidance 'Adapting to climate change, advice for flood and coastal erosion risk management authorities' (EA / DEFRA, 2011).
Given the long lifetime and high cost of many flood and coastal erosion management measures, it is imperative that plans and investment projects take into account the risks resulting from a changing climate over the coming century.

A "managed adaptive approach" should be taken where possible, which is based on taking action as and when trigger points are observed. This approach provides greater flexibility to manage future uncertainties associated with climate change.

To assess the potential impacts that climate change may have on extreme rainfall, river flood flows, sea level rise and storm surges, the potential change from the baseline (or change factors) taken from the UK Climate Projections 2009 (UK09) should be used. Higher end estimates may need to be used in some instances, for example where critical infrastructure is being protected. This approach means flood risk options can be designed that are able to cope with a range of possible future climate change scenarios, and are not tied to a single assumption.

Within Dorset, work by communities with relevant Flood Risk Management Authorities to develop community flood plans should consider the potential impacts of climate change by considering the information contained within flood maps and take into account how changes in rainfall patterns may affect their community. Mitigation measures could include ways to cut greenhouse gas emissions to help reduce the impact of future climate change and the severity of severe weather events including flooding.

### 2.2.10 Summary of legislative guidance documents in relation to the LFRMS

The documents reviewed as part of this strategy have provided useful information in the understanding of flood risk in Dorset. The high level overview of flood risk given in the PFRA provided useful evidence relating to flooding from local sources including surface water, groundwater and ordinary watercourses.

The CFMPs provided a useful overview of flood risk and management options identified by the Environment Agency for the catchments. The actions within the CFMPs that related to local sources of flooding (the responsibility of Dorset County Councils LLFA were reviewed in the SWMP and prioritised according to the management options outlined in the SWMP. The actions within the SWMP will support meeting the objectives of this LFRMS. As a consequence, the action plans associated with the CFMPs will need to be updated before they become incorporated into the River Basin Management plans.

The South East Dorset Green Infrastructure plan has potential to link in with actions within Catchment Flood Management Plans and could provide benefits to the management of flood risk.

The Level 2 SFRA documents provide information in relation to flood risk at specific sites. This information should be used as a basis to inform planning decisions but also act as a starting point for any future work in areas where a Level 2 SFRA exists.

## 2.3 Existing Flood intelligence for West Dorset

### 2.3.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in West Dorset

The PFRA (Dorset County Council, July 2011) identified:

- the most significant flooding occurred in Bridport in 1979 due to main river flooding.
- the following areas in West Dorset where flood risk should be considered as: Burton Bradstock, Chickerell and 'Little Egypt' in Piddletrenthide.
- the A35 from Devon to Bere Regis to have a history of flooding.
- the communities in West Dorset identified to be at greatest risk of flooding from surface water in the PFRA are shown in Table 7.

**Table 7:** Communities in West Dorset identified within the PRFA ranked according to the risk of flooding from surface water

| Rank | Location | No People | Number Residential Properties | Number of critical Services | No. non residential properties |
|---|---|---|---|---|---|
| **1** | Dorchester | 2321 | 992 | 8 | 268 |
| **3** | Bridport | 1254 | 536 | 7 | 171 |
| **4** | Sherborne | 1243 | 531 | 10 | 314 |
| **6** | Beaminster | 625 | 267 | 5 | 115 |
| **11** | Lyme Regis | 487 | 208 | 0 | 66 |
| **15** | Piddletrenthide | 257 | 110 | 2 | 63 |
| **18** | Maiden Newton | 222 | 95 | 2 | 41 |
| **20** | Cerne Abbas | 215 | 92 | 1 | 49 |
| **21** | Sydling St Nicholas | 192 | 82 | 2 | 54 |
| **25** | Bradford Abbas | 147 | 63 | 0 | 21 |
| **29** | Winterbourne Abbas | 112 | 48 | 1 | 50 |
| **30** | Nether Compton | 96 | 41 | 1 | 22 |
| **32** | Puddletown | 77 | 33 | 2 | 24 |
| **33** | Stratton | 73 | 31 | 0 | 27 |
| **35** | Chetnole | 63 | 27 | 0 | 31 |
| **36** | Alton Pancras | 59 | 25 | 0 | 21 |
| **37** | Thornicombe | 54 | 23 | 0 | 45 |
| **39** | Symondsbury | 35 | 15 | 2 | 19 |
| **40** | Netherbury | 30 | 13 | 1 | 27 |
| **46** | Higher Waterston | 16 | 7 | 0 | 23 |
| **47** | Forston | 14 | 6 | 0 | 26 |
| **51** | Piddlehinton | 2 | 1 | 0 | 24 |
| **52** | Wynford Eagle | 2 | 1 | 0 | 23 |
| **53** | Owermoigne | 2 | 1 | 0 | 22 |
| **55** | Nr Burton Bradstock | 0 | 0 | 0 | 24 |

### 2.3.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in West Dorset

The SWMP recommended further investigations were conducted at the following locations in West Dorset (i) Burton Bradstock; (ii) Piddletrenthide; and (iii) Dorchester. The SWMP outlined further actions to be taken in the form of an Action Plan. Actions that are relevant to West Dorset are given in Table 8. The actions identified within the SWMP were created in 2012. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 8: Actions from Dorset's Surface Water Management Plan that are relevant to West Dorset**

| Location | Description | Lead RMA | Partners | Time scale |
|---|---|---|---|---|
| **Piddle-trenthide** | Development of a strategy for informing residents of the steps being taken, the residual risks they face and the consequences of allowing surface or groundwater to enter the foul system. Surface water flood risk and disposal issues also to be examined | Wessex Water | EA, DCC, WDDC | 2012 /2013 |
| **Burton Bradstock** | Identify sources of funding and secure before continuing with design and implementation of scheme | WDDC | EA, DCC, WRFCC | 2012 /2014 |
| **Bridport** | Intermediate and detailed SWMP to more accurately determine the level of flood risk. Link to Wessex Water Drainage Action Plan to achieve savings. Output to verify EA FMfSW and update 'locally agreed surface water information' | DCC | WW, EA, WDDC | 2014/ 2015 |
| **Sherborne** | Intermediate and detailed SWMP to more accurately determine the level of flood risk. Link to Wessex Water DAP to achieve savings. Output to verify EA FMfSW and update 'locally agreed surface water information'. | DCC | WW, EA, WDDC | 2014/ 2015 |

### 2.3.3 Relevance of the Level 1 Strategic Flood Risk Assessment (SFRA) to management of local sources of flooding in West Dorset

The Level 1 SFRA prepared for West Dorset District Council (WDDC) was published in August 2008. The SFRA provided a list of locations where at least 10 properties were identified to be at risk of flooding as indicated by their location in the indicatively mapped medium or high risk Flood Zones 2 or 3. Table 9 provides an extract from the Level 1 SFRA where flooding was identified from local sources.

**Table 9: Extract from the Level 1 SFRA where flooding was identified from local sources of flooding in West Dorset**

| Community | Flood source |
|---|---|
| **Chideock** | River Winniford; |
| **Martinstown** | South Winterborne; |
| **Osmington Mills** | unnamed watercourse |
| **Sherborne** | minor tributary of the River Yeo |
| **Toller Porcorum** | River Hooke and its tributaries |
| **West Milton** | Mangerton River |
| **Winterborne Monkton** | South Winterborne |
| **Winterborne Abbas** | South Winterborne |
| **Winterbourne Steepleton** | South Winterborne |

## 2.3.4 Relevance of the Level 2 Strategic Flood Risk Assessment (SFRA) to management of local sources of flooding in West Dorset

The Level 2 SFRA prepared for West Dorset District Council (WDDC) was published in August 2010. The Level 2 SFRA focused on flood risk in Bridport due to (i) known issues in the West Bay / Bridport area; (ii) extent of existing buildings within the flood zones and the benefit of flood risk information to inform future planning decisions.

## 2.3.5 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in West Dorset

### 2.3.5.1 West Dorset CFMP

The West Dorset CFMP was divided into seven sub-areas. Flood risk in West Dorset was attributed to fluvial, surface water and tidal flooding. Areas that had a concentration of properties at risk from flooding included: Bridport, Beaminster and Burton Bradstock. Details within the CFMP that relate to sub-areas within West Dorset are given below (refer to Table 5 for definitions of policy options).

**Bridport –** Policy 4: Maintenance of fluvial defences in Bridport was recommended. Improving floodplain connectivity was suggested as a way to improve flood management.
**Beaminster** – Policy 4: Flood defences in Beaminster were assessed to effectively manage flood risk. However, the requirement for further action was highlighted to account for potential impacts of climate change.
**Burton Bradstock** – Policy 3: Fluvial and surface water flooding were identified as potential flood risks in this sub-area. Sedimentation of defences from surface water flows were identified to require a frequent maintenance regime. A suggestion was made to realign the river to its original location to reduce flood risk.
**Charmouth** – Policy 3: A specific flood risk to a holiday and caravan park was identified but risk elsewhere was considered low.
**West Dorset Rural Areas** – Policy 1: Flood risk in this sub-area was considered to occur mainly from small watercourses. No significant action was suggested by the EA to reduce this flood risk.

### 2.3.5.2 Frome and Piddle CFMP

The Frome and Piddle CFMP identified history of flooding in the following communities: Piddletrenthide, Maiden Newton, Sydling St Nicholas and other hamlets. Surface water flooding was reported to have occurred in Frampton, Swanage and Wareham. Groundwater flooding was reported to have occurred in Milborne St Andrew, Cerne Abbas, Dorchester and other isolated locations. A summary of each of the sub-areas within the catchment is provided below.

**Headwaters** – Policy 6: The option to store water and manage runoff was assigned to the headwaters of the Frome to reduce the primary flood risk from surface water.

**The Chalklands** – Policy 6: Flooding was attributed to surface water and groundwater springs, chalk bed river flooding and artesian flows.

**Dorchester** – Policy 4: Groundwater and surface water flooding were identified as the greatest risk in this sub-area. In Dorchester, surface water and river flooding was expected to increase in the long term.

**River Frome Corridor** – Policy 6: Flood risk was identified from the Rivers Frome and Piddle and overland flow containing silt from Bovington Camp. The proposed policy intended to manage run-off by enhancing and creating wetland habitats to attenuate flood water. Other actions were required to protect low-lying communities near the sea as the sea level rises due to climate change.

#### 2.3.5.3 East Devon CFMP

The East Devon CFMP covers a small area in the west of Dorset covered by the Upper Otter and Axe sub-area.

**Upper Otter and Axe sub-area** – Policy 6 The option was assigned to increase floodplain storage to attenuate and retain floodwater and reduce flood flows for urban areas downstream.

#### 2.3.5.4 Parrett CFMP

The Upper Yeo and Cary sub-area of the Parrett CFMP includes a small section of Dorset.
Upper Yeo and Cary sub-area – Policy 3: The CFMP identified scattered flood management issues across the Parrett catchment. This meant that investment beyond existing Environment Agency management practices were not economically justifiable. The proposed actions within the Parrett CFMP did not relate to management of local sources of flooding in West Dorset.

### 2.3.6 Reports of flooding in West Dorset between 2013-2014

Table 10 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in West Dorset between December 2013 and April 2014. The 2013/2014 flooding led to a total of 242 properties in West Dorset to report flooding. 55 properties reported internal flooding, 187 reported external flooding (that did not enter the building). The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information has been used to prioritise flood recovery.

**Table 10: The number of flood reports within communities in West Dorset between 2013-2014**

| Community | Number of flood reports of internal property flooding | Number of flood reports of external property flooding | Total |
|---|---|---|---|
| Piddletrenthide | 7 | 7 | 14 |
| Charminster | 5 | 10 | 15 |
| Sherborne | 4 | 5 | 9 |
| Puddletown | 3 | 11 | 14 |
| Netherbury | 3 | 3 | 6 |
| Dewlish | 3 | 3 | 6 |
| Chetnole | 3 | 2 | 5 |
| Godmanstone | 3 | 2 | 5 |
| Up Cerne | 3 | 0 | 3 |
| Dorchester | 2 | 17 | 19 |
| Bridport | 2 | 16 | 18 |
| Winterbourne Abbas | 2 | 9 | 11 |
| Sydling St. Nicholas | 2 | 6 | 8 |
| Piddlehinton | 2 | 1 | 3 |
| Nether Compton | 1 | 4 | 5 |
| Oborne | 1 | 2 | 3 |
| Longburton | 1 | 2 | 3 |
| Maiden Newton | 1 | 2 | 3 |
| Sandford Orcas | 1 | 1 | 2 |
| Littlebredy | 1 | 0 | 1 |
| Kingston Russell | 1 | 0 | 1 |
| Burton Bradstock | 1 | 0 | 1 |
| Charmouth | 1 | 0 | 1 |

| | | | |
|---|---|---|---|
| Whitchurch Canonicorum | 1 | 0 | 1 |
| Wraxall | 1 | 0 | 1 |
| Bishop's Caundle | 0 | 10 | 10 |
| Cerne Abbas | 0 | 7 | 7 |
| Frome St. Quintin | 0 | 6 | 6 |
| Chickerell | 0 | 5 | 5 |
| Lyme Regis | 0 | 4 | 4 |
| Cattistock | 0 | 4 | 4 |
| Winterborne St. Martin | 0 | 4 | 4 |
| Broadwindsor | 0 | 3 | 3 |
| Winterbourne Steepleton | 0 | 3 | 3 |
| Stratton | 0 | 3 | 3 |
| South Perrott | 0 | 3 | 3 |
| Broadmayne | 0 | 3 | 3 |
| Buckland Newton | 0 | 2 | 2 |
| Askerswell | 0 | 2 | 2 |
| Holwell | 0 | 2 | 2 |
| Toller Porcorum | 0 | 2 | 2 |
| Puncknowle | 0 | 2 | 2 |
| Allington | 0 | 2 | 2 |
| Goathill | 0 | 2 | 2 |
| Bothenhampton | 0 | 2 | 2 |
| Evershot | 0 | 1 | 1 |
| Holnest | 0 | 1 | 1 |
| Frome Vauchurch | 0 | 1 | 1 |
| Thorncombe | 0 | 1 | 1 |
| Winterborne Monkton | 0 | 1 | 1 |
| Beer Hackett | 0 | 1 | 1 |
| Castleton | 0 | 1 | 1 |
| Lillington | 0 | 1 | 1 |
| Minterne Magna | 0 | 1 | 1 |
| Poyntington | 0 | 1 | 1 |
| Nether Cerne | 0 | 1 | 1 |
| Loders | 0 | 1 | 1 |
| Langton Herring | 0 | 1 | 1 |

## 2.4 Existing Flood intelligence for Weymouth and Portland

### 2.4.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in Weymouth and Portland

The PFRA identified the following historic flooding in Weymouth and Portland: Flooding in Martinstown, Upwey and Southill were attributed to local sources of flooding. Weymouth was reported to experience surface water flooding when the tide is high and the surface water system cannot discharge. Table 11 provides an extract of communities in Weymouth and Portland that were identified in the PRFA according to the risk of flooding from surface water.

**Table 11: Communities in Weymouth and Portland identified within the PRFA ranked according to the risk of flooding from surface water**

| Rank | Location | No People | Number Residential Properties | Number of critical Services | Number of non-residential properties |
|---|---|---|---|---|---|
| **2** | Weymouth | 1697 | 725 | 4 | 79 |
| **7** | Portland | 625 | 267 | 3 | 35 |
| **10** | Preston (Weymouth) | 498 | 213 | 3 | 20 |
| **14** | Chickerell (Weymouth) | 302 | 129 | 0 | 7 |
| **54** | Shilvinghampton | 2 | 1 | 0 | 21 |

### 2.4.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in Weymouth and Portland

The SWMP recommended further investigations were conducted at the following locations in Weymouth and Portland: (i) Chickerell; (ii) Southill; (iii) Overbury Close; (iv) Lanehouse Rocks Road; and (v) Puddledock Lane in Sutton Poyntz. The relevant actions from the SWMP to Weymouth and Portland are summarised in Table 12. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 12: Actions from Dorset's Surface Water Management Plan relevant to Weymouth and Portland**

| Location | Description | Lead RMA | Partners | Time scale |
|---|---|---|---|---|
| **Chickerell / Southill** | Extend existing hydraulic model upstream beyond its current boundary at Putton lane to include surface water system in Chickerell. Consider benefit of including 2D domain. Use output of model to assess damages and likely level of payment for outcomes. Decision then required whether to continue to options appraisal and scheme development | W&PBC | WDDC, DCC | 2012/ 2013 |
| **Overbury Close / Lanehouse Rocks Road** | Assessment of options and potential sources of funding for increasing the capacity of the Lanehouse Stream | W&PBC | | 2013/ 2014 |
| **Weymouth: Chickarell / Southill** | Intermediate and detailed SWMP to more accurately determine the level of flood risk. Output to verify EA FMfSW and update 'locally agreed surface water information' | DCC | WW, EA, W&PBC | 2013/ 2014 |
| **Puddledock Lane, Sutton Road** | An investigation is required in to the feasibility of carrying out flood defence works to extend the Main River scheme upstream and also deal with surface water flooding | EA | W&PBC, DCC | 2014/ 2015 |

### 2.4.3 Relevance of Level 1 Strategic Flood Risk Assessment(s) to management of local sources of flooding in Weymouth and Portland

A Level 1 SFRA for Weymouth and Portland was published in 2009. It identified flooding to be an issue across most of the borough with 5% of properties at risk of flooding. It noted that significant flooding was mainly caused by the overtopping of river banks, whilst less severe flooding in Weymouth itself was attributed to surface water runoff and blockage of drainage systems and culverts.

The SFRA considered both historic flood records and modelled flood data. Historic flooding from local sources was reported at the following locations:

- Weymouth from blocked drains and surface water runoff;
- Southill from a culvert on an ordinary watercourse with limited capacity and from surface runoff;
- Wyke Regis from inadequate culverts on ordinary watercourses, surface water runoff and sewer flooding;
- Westham from surface water runoff.

Modelled flood risks were considered in the SFRA and the following locations were identified to be at greatest risk from local sources of flooding:

- Sutton Poyntz from overland surface water flow;
- Preston from overland surface water flow.

The SFRA gave consideration to groundwater flood risk and identified that the risk from groundwater flooding in Weymouth and Portland was generally low with the exception of:

- Ridge Hill;
- Bincombe Down;
- West Hill;
- East Hill.

### 2.4.4 Relevance of Level 2 Strategic Flood Risk Assessment(s) to management of local sources of flooding in Weymouth and Portland

The Level 2 SFRA for Weymouth and Portland Borough Council was commissioned to investigate flood risk at specific sites in the borough that were proposed for development. It does not provide a full picture of flood risk in the borough. However details relevant to local sources of flooding are as follows:

- Chickerell was reported to have experienced surface water/foul sewage flooding;
- Littlemoor Road in Littlemoor was reported to have experienced surface water and foul water flooding;
- Preston Downs was reported to have experienced several surface water incidents;
- The Lanehouse stream was reported to have caused flooding;
- The Wey Valley was reported to have suffered flooding that resulted in road closures and internal flooding;
- Surface water was identified to be an issue in Southill.

### 2.4.5 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in Weymouth and Portland

**Weymouth** – Policy 4: Fluvial and groundwater flooding were reported to occur in this sub-area. The proposed policy would continue to leave some properties undefended from flood risk.

**The Isle of Portland** – Policy 1: There are no significant flooding issues on the Isle of Portland from local sources of flooding and no action was proposed.

### 2.4.6 Reports of flooding in Weymouth and Portland between 2013-2014

Table 13 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in Weymouth and Portland between December 2013 and April 2014.

The 2013/2014 flooding led to a total of 40 properties in West Dorset to report flooding.
13 properties reported internal flooding, 27 reported external flooding (that did not enter buildings).
The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information is currently being used to inform the flood recovery process.

**Table 13: The number of flood reports within communities in Weymouth and Portland between 2013-2014**

| Community | Number of flood reports of internal property flooding | Number of flood reports of external property flooding | Total |
|---|---|---|---|
| Portland | 5 | 11 | 16 |
| Wey Valley Ward | 4 | 0 | 4 |
| Westham East Ward | 2 | 2 | 4 |
| Melcombe Regis Ward | 1 | 2 | 3 |
| Preston Ward | 1 | 1 | 2 |
| Westham North Ward | 0 | 4 | 4 |
| Radipole Ward | 0 | 4 | 4 |
| Weymouth East Ward | 0 | 2 | 2 |
| Wyke Regis Ward | 0 | 1 | 1 |

## 2.5 Existing Flood intelligence for North Dorset

### 2.5.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in North Dorset

The PFRA (Dorset County Council, July 2011) identified:

- the most significant flooding in North Dorset was reported to have occurred due to main river flooding;
- surface water and groundwater was reported to have flooded 12 properties in Winterborne Stickland in 2000, and main river and groundwater were reported to have flooded 5 properties in Milborne St.Andrew in 1996.
- Stubhampton and Pimperne were reported to have been flooded by groundwater.
- the communities in North Dorset listed in Table 14 to be at greatest risk of flooding from surface water.

**Table 14: Communities in North Dorset identified within the PRFA ranked according to the risk of flooding from surface water**

| Rank | Location | No People | Number Residential Properties | Number of critical Services | Number of non-residential properties |
|---|---|---|---|---|---|
| **5** | Blandford | 873 | 373 | 3 | 100 |
| **8** | Shaftesbury | 515 | 220 | 0 | 66 |
| **16** | Winterborne Stickland | 243 | 104 | 1 | 33 |
| **17** | Pimperne | 229 | 98 | 0 | 52 |
| **19** | Winterborne Whitechurch | 220 | 94 | 1 | 68 |
| **24** | Milborne St Andrew | 147 | 63 | 1 | 27 |
| **34** | Tarrant Gunville | 73 | 31 | 0 | 21 |
| **42** | Milton Abbas | 26 | 11 | 0 | 37 |
| **44** | Tarrant Hinton | 21 | 9 | 0 | 21 |
| **45** | Milton on Stour | 16 | 7 | 0 | 35 |
| **48** | Cann | 14 | 6 | 0 | 21 |
| **49** | Hedge End | 12 | 5 | 0 | 24 |
| **50** | Chettle | 9 | 4 | 2 | 11 |
| **56** | Ash (Stourpaine) | 0 | 0 | 2 | 5 |
| | | | | | |

### 2.5.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in North Dorset

The SWMP recommended flood investigations were conducted at the following locations in North Dorset at Milborne St Andrew. The SWMP outlined further actions to be taken in the form of an Action Plan. The relevant actions from the SWMP that are relevant to North Dorset are given in Table 15. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 15: Actions from Dorset's Surface Water Management Plan that are relevant to North Dorset**

| CFMP | Action | Lead | Partners | Time-scale |
|---|---|---|---|---|
| **Milborne St Andrew** | Assessment of damages and likely level of payment for outcomes to determine whether an appropriate scheme can be developed. If the level of payments is considered to be insufficient then alternative funding will need to be investigated before proceeding further | EA | DCC, NDDC | 2014 2015 |

## 2.5.3 Relevance of Level 1 Strategic Flood Risk Assessment(s) to management of local sources of flooding in North Dorset

Very little information was detailed regarding flood risk in North Dorset in the SFRA. Some groundwater flood risk was acknowledged however locations were not indicated.

## 2.5.4 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in North Dorset

### 2.5.4.1 Dorset Stour CFMP

The Dorset Stour catchment is divided into eight sub-areas. The most common policy option assigned the catchment is Policy 3 which recommends that the catchment is predominantly at moderate flood risk and the Environment Agency is generally managing flood risk effectively. A summary of the CFMP for each of the sub-areas within the Dorset Stour catchment is provided below.

**Upper Stour and Blackmore vale** – Policy 6: This largely rural sub-area was proposed to be used to attenuate flows by improving connectivity between channel and floodplain areas. This would potentially reduce downstream flood risk in areas including Tarrant, Winterborne and Allen, Blandford Forum, Hambledon Hills and Gillingham.
**Gillingham** – Policy 3: Flood risk was considered low in this sub-area and not expected to increase greatly due to climate change.
**Hambledon Hills** – Policy 3: Flood risk was assessed as low in this sub-area and not expected to increase greatly due to climate change.
**Blandford Forum** – Policy 3: Large scale improvements to flood management in this area could not be justified due to the relatively low flood risk. Changes in the Upper Stour and Blackmore Vale sub-area were identified as potential options to reduce flood risk in this sub-area in the future.
**Middle Stour, Tarrant, Winterborne and Allen** – Policy 3: The middle Stour catchment is largely rural with some villages and communities at a limited risk of flooding. Flood risk in the future was not expected to increase greatly. Changes in the Upper Stour and Blackmore Vale sub-area could potentially reduce flood risk to this sub-area in the future.

## 2.5.5 Reports of flooding in North Dorset between 2013-2014

Table 16 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in North Dorset between December 2013 and April 2014.

The 2013/2014 flooding led to a total of 122 properties in North Dorset to report flooding.
61 properties reported internal flooding, 61 reported external flooding (that did not enter the building).
The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information is currently being used to inform the recovery process.

**Table 16: The number of flood reports within communities in North Dorset between 2013-2014**

| Community | Number of flood reports of internal property flooding | Number of flood reports of external property flooding | Total flood reports for community |
|---|---|---|---|
| Blandford Forum | 10 | 1 | 11 |
| Milborne St. Andrew | 9 | 5 | 14 |
| Stourpaine | 9 | 5 | 14 |
| Tarrant Gunville | 4 | 7 | 11 |
| Sturminster Newton | 4 | 2 | 6 |
| Tarrant Hinton | 4 | 1 | 5 |
| Farnham | 3 | 1 | 4 |
| Shillingstone | 3 | 0 | 3 |
| Winterborne Houghton | 3 | 0 | 3 |
| Winterborne Whitechurch | 2 | 2 | 4 |
| Winterborne Stickland | 2 | 1 | 3 |
| Hammoon | 2 | 1 | 3 |
| Charlton Marshall | 1 | 5 | 6 |
| Durweston | 1 | 4 | 5 |
| Fifehead Neville | 1 | 3 | 4 |
| Winterborne Clenston | 1 | 0 | 1 |
| Fontmell Magna | 1 | 0 | 1 |
| Pimperne | 1 | 0 | 1 |
| Marnhull | 0 | 4 | 4 |
| Iwerne Courtney or Shroton | 0 | 3 | 3 |
| Stalbridge | 0 | 2 | 2 |
| Kington Magna | 0 | 2 | 2 |
| Shaftesbury | 0 | 2 | 2 |
| Child Okeford | 0 | 2 | 2 |
| Okeford Fitzpaine | 0 | 2 | 2 |
| Tarrant Rawston | 0 | 2 | 2 |
| Lydlinch | 0 | 1 | 1 |
| Hinton St. Mary | 0 | 1 | 1 |
| Spetisbury | 0 | 1 | 1 |
| Langton Long Blandford | 0 | 1 | 1 |

## 2.6 Existing Flood intelligence for East Dorset

### 2.6.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in East Dorset

The PFRA reported historic flooding from local sources in East Dorset as follows:
- intense rainfall flooded the highway and 14 commercial premises in Wimborne;
- surface water from fields and roads flooded 11 properties in Cranborne;
- groundwater and surface water flooded 8 properties in Six Penny Handley.

No dates were specified for the above mentioned flood incidents.

The communities in East Dorset listed in Table 17 were identified to be at greatest risk of flooding from surface water.

**Table 17: Communities in East Dorset identified within the PRFA ranked according to the risk of flooding from surface water**

| Rank | Location | No People | Number Residential Properties | Number of critical Services | Number of non residential properties |
|---|---|---|---|---|---|
| **12** | Verwood | 452 | 193 | 1 | 28 |
| **13** | Ferndown | 384 | 164 | 0 | 96 |
| **22** | Sixpenny Handley | 176 | 75 | 0 | 22 |
| **23** | Cranborne | 161 | 69 | 2 | 23 |
| **28** | Wimborne Minster | 129 | 55 | 3 | 58 |

### 2.6.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in East Dorset

The SWMP recommended flood investigations were conducted at the following locations in East Dorset on the basis of: (i) historic data Cranborne; and on the basis of modelled data: Wimborne Minster, Verwood, Ferndown, St Leonards, Corfe Mullen and Sturminster Marshall.

The SWMP outlines further actions to be taken in the form of an Action Plan. The relevant actions from the SWMP that are relevant to East Dorset are given in Table 18. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 18: Actions from Dorset's Surface Water Management Plan that are relevant to East Dorset**

| Location | Description | Lead Authority | Partners | Time scale | SWMP Comment |
|---|---|---|---|---|---|
| **Cranborne** | Detailed survey and inspection of culvert followed by hydrological assessment and hydraulic capacity assessment | DCC | EDDC | 2013/2014 | |
| **Wimborne Minster** | Intermediate and detailed SWMP to more accurately determine the level of flood risk. Output to verify EA FMfSW and update 'locally agreed surface water information'. | DCC | WW, EA, EDDC | 2015/2016 | |

### 2.6.3 Relevance of Level 1 Strategic Flood Risk Assessment(s) to management of local sources of flooding in East Dorset

Historic and modelled flood data in the SFRA indicated the following areas to be at greatest risk of flooding from local (or unknown) sources:

- Edmondsham and Cranborne from the River Crane where it is classified as ordinary watercourse;
- Alderholt, Wimborne St Giles and Sixpenny Handley from unknown sources.
- Sewer flooding was known to be a problem in Wimborne Minster, West Parley and Corfe Mullen, although it is believed that Wessex Water had since taken action to reduce this issue.

### 2.6.4 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in East Dorset

The Dorset Stour catchment was divided into eight sub-areas. The most common policy option assigned in the catchment was Policy 3 which recommended that the catchment is predominantly at moderate flood risk and the EA was generally managing flood risk effectively.

**St Leonards, Verwood, Moors and Dorset Heaths** – Policy 6: The risk in this sub-area was considered low. The rural area provided a potential opportunity to change how the land is used for flood storage. Large schemes were considered unfeasible owing to the benefits only being realised by a limited number of properties.

**Wimborne Minster, Corfe Mullen and Sturminster Marshall** – Policy 3: The flood risk was considered to be low in this sub-area and not expected to increase greatly in the future. Flood risk management of localised fluvial, surface water and urban drainage problems was considered appropriate for the level of risk.

### 2.6.5 Reports of flooding in East Dorset between 2013-2014

Table 19 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in East Dorset between December 2013 and April 2014.

The 2013/2014 flooding led to a total of 102 properties in East Dorset to report flooding.
51 properties reported internal flooding, 51 report external flooding (that did not enter the house).
The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information is currently being used to inform the flood recovery process.

**Table 19: The number of flood reports within communities in East Dorset between 2013-2014**

| Community | Number of flood reports of internal property flooding | Number of flood reports of external property flooding | Total |
|---|---|---|---|
| Ferndown Town | 26 | 7 | 33 |
| Sixpenny Handley | 7 | 1 | 8 |
| West Moors | 4 | 5 | 9 |
| Alderholt | 3 | 0 | 3 |
| Verwood | 2 | 4 | 6 |
| Corfe Mullen | 1 | 8 | 9 |
| St. Leonards and St. Ives | 1 | 7 | 8 |
| Sturminster Marshall | 1 | 6 | 7 |
| Colehill | 1 | 3 | 4 |
| Shapwick | 1 | 2 | 3 |
| Cranborne | 1 | 1 | 2 |
| Witchampton | 1 | 0 | 1 |
| Wimborne Minster | 1 | 0 | 1 |
| West Parley | 1 | 0 | 1 |
| Woodlands | 0 | 4 | 4 |
| Holt | 0 | 2 | 2 |
| Pamphill | 0 | 1 | 1 |

## 2.7 Existing Flood intelligence for Purbeck

### 2.7.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in Purbeck

The PFRA identified historic flooding in Purbeck as follows:

- the most significant flooding that occurred in Purbeck district was main river and tidal flooding;
- surface water flooding in Swanage in 2002 affected 12 residential and 5 commercial properties;
- Highway and field runoff was reported to have caused flooding in West Lulworth;
- Corfe Castle and Upton were reported to have flooded from main river and surface water. This was partly attributed to a lack of a surface water drainage system;
- the communities in Purbeck listed in Table 20 were identified to be at greatest risk of flooding from surface water.

**Table 20: Communities in Purbeck identified within the PRFA ranked according to the risk of flooding from surface water**

| Rank | Location | No People | Number Residential Properties | Number of critical Services | Number of non residential properties |
|---|---|---|---|---|---|
| **9** | Swanage | 503 | 215 | 1 | 65 |
| **26** | Lulworth | 143 | 61 | 4 | 42 |
| **27** | Winfrith Newburgh | 131 | 56 | 1 | 29 |
| **31** | Bere Regis | 89 | 38 | 1 | 22 |
| **41** | Wareham | 30 | 13 | 0 | 25 |
| **43** | Chaldon Herring | 26 | 11 | 0 | 27 |

### 2.7.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in Purbeck

The SWMP recommended further investigations were conducted on the basis of historic data in Upton. The SWMP outlines further actions to be taken in the form of an Action Plan. The relevant actions from the SWMP that are relevant to Purbeck are given in Table 21. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 21: Actions from Dorset's Surface Water Management Plan that are relevant to Purbeck**

| Location | Description | Lead RMA | Partners | Time scale |
|---|---|---|---|---|
| **Swanage** | Combined under / over ground model of surface water system to determine flood risk from exterem events. To include assessing the impact of sea level risk on the ability of the surface water system to discharge | DCC | WW, EA, PDC | 2015/ 2016 |
| **Upton / Lytchett Minster** | A study into the impact of sea level rise on teh surface water drainage in Upton and the Upton by-pass drainage. Will require linkages with the Poole and Wareham Strategy and DAP (2014) | DCC | WW, EA, PDC | 2015/ 2016 |

### 2.7.3 Relevance of Level 1 Strategic Flood Risk Assessment(s) to management of local sources of flooding in Purbeck

Purbeck SFRA highlighted the majority of flood risk was attributed to main river flooding.
However, Langton Matravers and Acton were identified to flood due to overtopping of the ordinary watercourse that runs through the villages and into Swanage. Groundwater flooding was known to occur in Winfrith Newburgh. Surface Water flooding was identified at the following locations:

- West Lulworth;
- East Lulworth, including highway flooding;
- Winfrith Newburgh;
- Upton;
- East Stoke;
- East Chaldon, where runoff from agricultural land flooded roads and properties with water and slurry.

### 2.7.4 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in Purbeck

**River Frome Corridor** – Policy 6: The primary risk of flooding in this sub-area was from the Rivers Frome and Piddle and from overland flow containing silt from Bovington Camp. The proposed policy intended to manage run-off by enhancing and creating wetland habitats to attenuate flood water. Other possible actions were considered to protect low-lying communities from potential sea level rise due to climate change.
**Wareham Forest** – Policy 6 : The main sources of flooding identified in the Wareham Forest was from the River Piddle and overland flow. The proposed policy intended to manage run-off by restoring wetlands and changing land-use to reduce run-off.
***Coastline*** – *Policy 2:* The Coastline sub-area of the Frome and Piddle catchment was identified to be at risk from increased surface water flooding. The Environment Agency proposed to reduce flood management actions in this area but retain a flood warning system.
**Swanage** – Policy 4: The main flood risk at Swanage was identified from Main River flooding from the Swan Brook. This river is influenced by the tide, overland flow and urban drainage incapacity. Ongoing implementation of policies and practices in place were recommended however additional measures may be required in line with potential climate change.
**Wareham** – Policy 4: The primary flood risk at Wareham was identified as main river flooding from the Frome and Piddle rivers combined with tidal influence. Ongoing implementation of policies and practices in place were recommended however additional measures may be required in line with potential climate change.

### 2.7.5 Reports of flooding in Purbeck between 2013-2014

Table 22 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in Purbeck between December 2013 and April 2014.

The 2013/2014 flooding led to a total of 32 properties in Purbeck reported flooding.
9 properties reported internal flooding, 23 reported external flooding (that did not enter the house).
The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information is currently being used to inform the recovery process.

**Table 22: The number of flood reports within communities in Purbeck between 2013-2014**

| Community | Number of flood reports of internal property flooding | Number of flood reports of external property flooding | Total |
|---|---|---|---|
| Winfrith Newburgh | 3 | 3 | 6 |
| Lytchett Minster and Upton | 2 | 7 | 9 |
| Corfe Castle | 2 | 2 | 4 |
| Swanage | 1 | 2 | 3 |
| Bere Regis | 1 | 0 | 1 |
| Lytchett Matravers | 0 | 4 | 4 |
| Wool | 0 | 2 | 2 |
| Affpuddle and Turnerspuddle | 0 | 2 | 2 |
| Wareham Town | 0 | 1 | 1 |

## 2.8 Existing Flood intelligence for Christchurch

### 2.8.1 Relevance of the Preliminary Flood Risk Assessment for Dorset to management of local sources of flooding in Christchurch

The PFRA summarised historic flooding in Christchurch as follows:

- the most significant flooding in Christchurch has been caused from main river and tidal sources;
- flooding from a local source occurred in 2000 in Burton when a minor watercourse flooded 9 properties.
- Christchurch Borough was identified as being susceptible to flooding when the surface water system cannot discharge at high tide/river levels.

The communities in Christchurch listed in Table 23 were identified to be at greatest risk of flooding from surface water.

**Table 23: Communities in Christchurch identified within the PRFA ranked according to the risk of flooding from surface water**

| Rank | Location | No People | Number Residential Properties | Number of critical Services | Number of non residential properties |
|---|---|---|---|---|---|
| **38** | Christchurch | 49 | 21 | 0 | 24 |

### 2.8.2 Relevance of Dorset's Surface Water Management Plan Strategic Assessment to management of local sources of flooding in Christchurch

The SWMP identified Christchurch as being an area at greatest increased risk of flooding as a result of climate change, principally due to sea level rise. The SWMP recommended that a study was completed to assess the combined probability of a fluvial and tidal event flood risk on local drainage functionality in Christchurch.

The SWMP outlines further actions to be taken in the form of an Action Plan. The relevant actions from the SWMP that are relevant to Christchurch are given in Table 24. The timescale and priority of these actions will be reviewed in conjunction with assessment of flooding issues reported between 2012 and 2014.

**Table 24: Actions from Dorset's Surface Water Management Plan that are relevant to Christchurch**

| Location | Description | Lead Authority | Partners | Time scale | SWMP Comment |
|---|---|---|---|---|---|
| **Christchurch** | Investigate flood risk in Christchurch and develop a strategy to reduce risk. The study to look at the combined risk from the Avon, Stour, the harbour tributaries and the sea and urban drainage | EA | WW, DCC, CBC | 2016/2017 | |

## 2.8.3 Relevance of Level 1 Strategic Flood Risk Assessment(s) to management of local sources of flooding in Christchurch

The Level 1 Strategic Flood Risk Assessment (SFRA) identified the following information in relation to flood risk in Christchurch:

- The majority of flood risk in Christchurch was caused by Main River and coastal/tidal sources.
- Sewer flooding was known to be a problem in Highcliffe and Friar's Cliff, although it was believed that Wessex Water has since taken action to reduce this issue.
- Groundwater flooding was not considered in the SFRA to pose significant risk in Christchurch, however flooding in 2013 / 2014 has highlighted groundwater flooding to be an issue in certain parts of Christchurch.

## 2.8.4 Relevance of Level 2 Strategic Flood Risk Assessment(s) to management of local sources of flooding in Christchurch

The Level 2 SFRA for Christchurch provided further detail on the 7 locations identified as being high flood risk in the Level 1 SFRA. The only area that was flooded by ordinary watercourse was the area surrounding Bournemouth Airport. This was identified as being at risk from flooding as a result of potential blockage or collapse of the culverts on the Burton Brook in the area.

## 2.8.5 Relevance of Catchment Flood Management Plans (CFMPs) to management of local sources of flooding in Christchurch

### 2.8.5.1 Dorset Stour CFMP

Bournemouth and Christchurch sub-area– Policy 4
The Bournemouth and Christchurch sub area of the Dorset Stour CFMP highlighted the potential opportunity to reduce flooding in Bournemouth and Christchurch by increasing storage on the floodplain upstream.

### 2.8.5.2 Hampshire Avon CFMP

Areas of Dorset that are included within the Hampshire Avon CFMP include: (i) the Lower Avon; (ii) New Forest Streams; and (iii) Christchurch. The proposed policies are given below.

**Lower Avon** – Policy 4: The Hampshire Avon CFMP recommended to be continued. It also suggested expanding present actions to enable continued management of flood risk. Some structural works were considered in urban areas.

**New Forest Streams** – Policy 2: Actions to manage flood risk can generally be reduced. Restoration of rivers may increase peak flows and shorten the time of peak for flood flows which may provide negative impacts downstream.

**Christchurch** – Policy 5: Further actions were identified to reduce flood risk. The CFMP recommended investigating existing defences to maintain appropriate protection of vulnerable sites and critical infrastructure located in Christchurch that would be at risk if the defences experienced overtopping.

## 2.8.6 Reports of flooding in Christchurch between 2013-2014

Table 25 provides details of the number of flood reports submitted to Flood Risk Management Authorities and Emergency Responders in Christchurch between December 2013 and April 2014.

The 2013/2014 flooding led to a total of 119 properties in Christchurch to report flooding.
61 properties reported internal flooding, 58 reported external flooding (that did not enter the building). The data is still being collated and verified. As a consequence, this data has not been included in the prioritisation methodology outlined in Section 2.9.3. The prioritisation will be updated once the data set is complete. The information is currently being used to inform the flood recovery process.

**Table 25: The number of flood reports within communities in Christchurch between 2013-2014**

| Communities in Christchurch that reported flooding in 2013 / 2014 | Internally Flooded | Other | Total |
|---|---|---|---|
| Mudeford and Friars Cliff | 26 | 23 | 49 |
| Burton | 13 | 9 | 22 |
| Town Centre | 11 | 13 | 24 |
| St. Catherine's and Hurn | 6 | 0 | 6 |
| Purewell and Stanpit | 5 | 12 | 17 |
| North Highcliffe and Walkford | 0 | 1 | 1 |

## 2.9 Flood Frequency

### 2.9.1 Frequency of flooding within a community

Analysis of the Flood Map for Surface Water provided a useful indicator of flood risk from surface water (Section 2.1.1). However, historic flood records also provide useful evidence of flood risk.

Dorset has an extensive database of historic flood records, however the records are not always complete and sometimes do not contain specific information regarding flood date or source.

This section presents the results of analysis of the historical flood reports contained within the Environment Agency's Flood Reconnaissance Information System (FRIS) which records all known flooding incidents and data from the 2012 / 2013 flooding (which excludes 2013/2014 data). The analysis identifies communities that have reported to have flooded most frequently. The benefit of this analysis enables the identification of lower densely populated areas that flood frequently to be identified. It must be recognised that this analysis will only provide a general indicator due to the following assumptions that were made as part of the analysis:

- If the month and year of flooding was not recorded, the data was not included within the analysis.
- Flood records made within the same month were assumed to be part of the same flood incident.

The results of the analysis are presented in Table 26 and Figure 9 which provide an indication of the parishes where flooding is reported to have occurred most frequently. It is important to recognise that communities identified in Table 26 may have had flood defences developed as a result of historic flooding which may have either reduced or mitigated the risk of flooding.

Figure 10 presents the total number of flood reports submitted in each parish.

**Table 26: Communities and Parishes recorded to have experienced flooding on multiple occasions**

| Parish | Number of reported flood incidents |
|---|---|
| **Weymouth** | 30 |
| **Christchurch** | 27 |
| **Bridport** | 18 |
| **Hammoon** | 18 |
| **Sturminster Newton** | 16 |
| **Burton Bradstock** | 15 |
| **Maiden Newton** | 14 |
| **Portland** | 13 |
| **Netherbury** | 12 |
| **Cerne Abbas** | 11 |
| **East Stoke** | 11 |
| **Swanage** | 11 |
| **Gillingham** | 10 |
| **Spetisbury** | 10 |
| **Arne** | 9 |
| **Frome Vauchurch** | 9 |
| **Shapwick** | 9 |
| **Winfrith Newburgh** | 9 |
| **Hinton St. Mary** | 8 |
| **Wareham Town** | 8 |

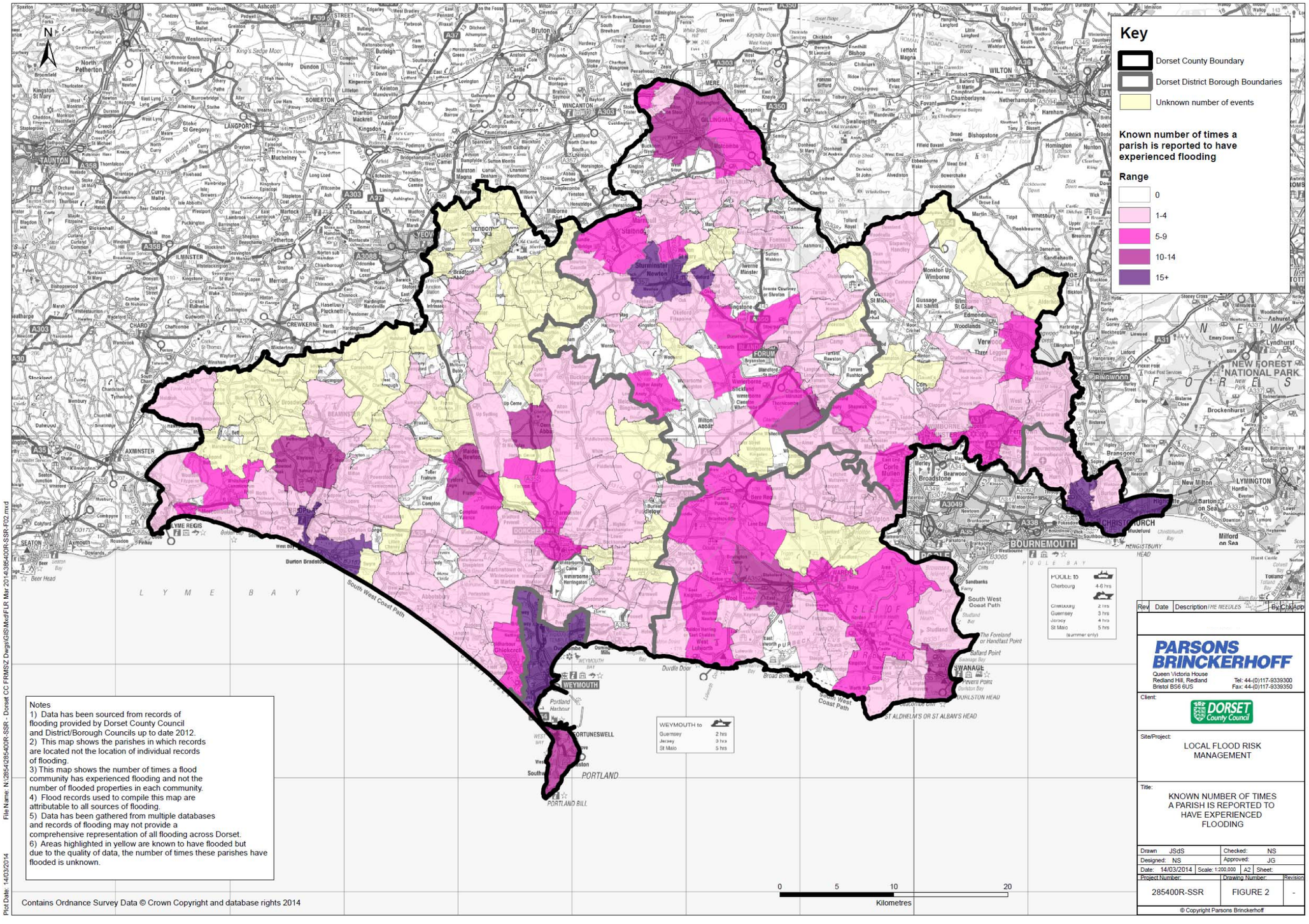



**Figure 9: Number of times a parish has reported flooding**

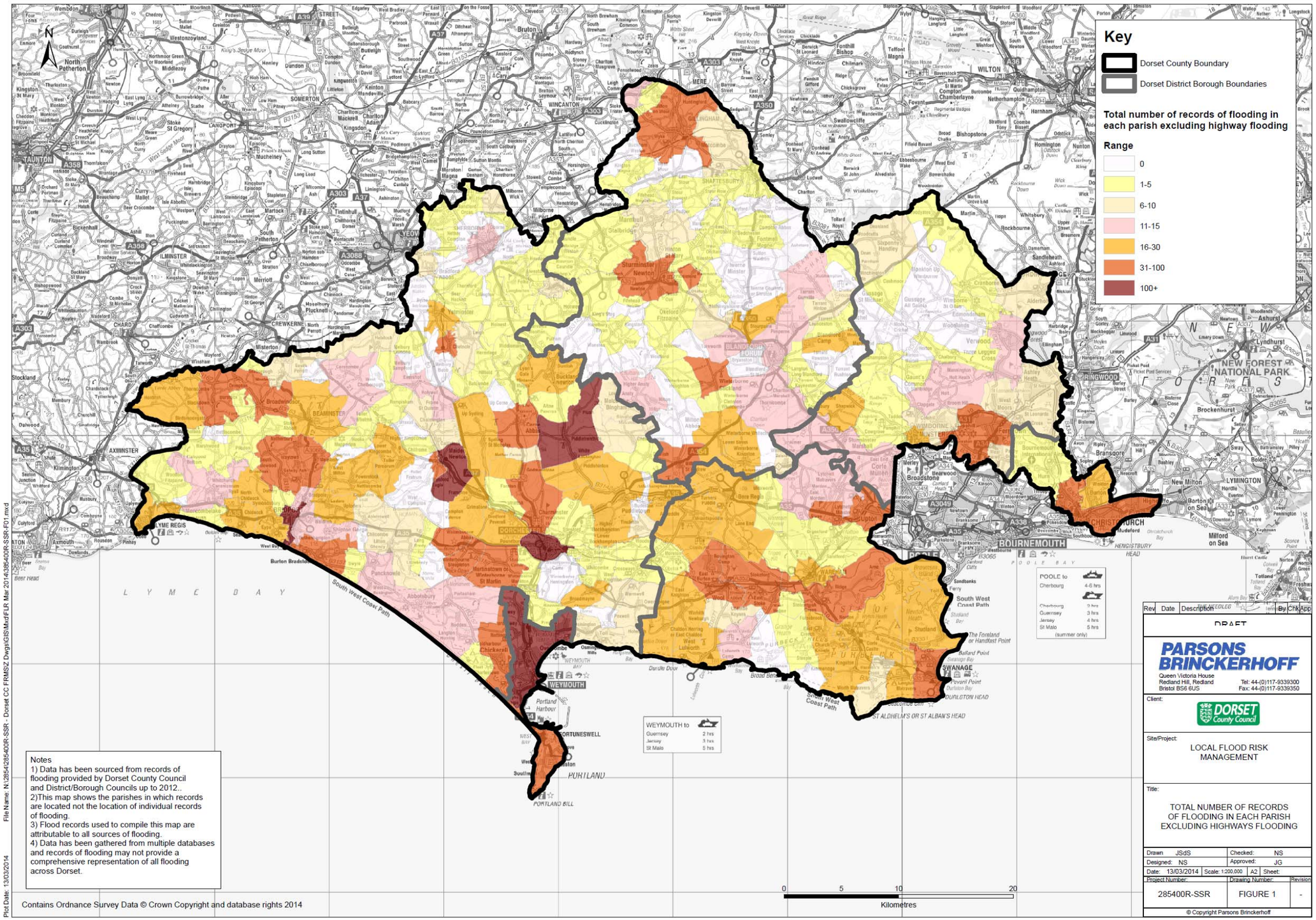



**Figure 10: Total number of flood reports submitted in each parish**

### 2.9.2 Frequency of flooding at an individual property scale

Detailed data collection during and following the July 2012 incidents enabled identification of individual properties that experienced flooding on multiple occasions. This analysis was particularly important to enable properties that are located in sparsely populated areas and/or properties that are located in isolated pockets of flooding but flood frequently to be considered for support by relevant flood risk management authorities. Table 27 summarises the number of properties that have reported flooding on multiple occasions.

**Table 27: Number of receptors reported to flood internally on multiple occasions during the 2012-2013 flooding**

| Number of times a property reported internal flooding | Number of properties recorded |
|---|---|
| **5** | 1 |
| **4** | 1 |
| **3** | 5 |
| **2** | 38 |

The distribution of reported flood incidents during the July 2012 flooding identified in the majority of cases only a few properties flooded within each community. This meant that in the majority of cases large scale scheme development was not economically viable. As a result, Dorset County Council's Flood Risk Management team initiated a property level protection (PLP) scheme which enabled individual properties that had flooded on multiple occasions from local sources of flooding to be considered for installation of PLP.

If a number of properties had reported flooding in a community the whole community was able to benefit from the scheme and support was given to ensure community flood plans were also developed. The effectiveness of PLP schemes is dependent on the community working together to ensure flood protection products are installed in an accurate and timely way and vulnerable residents are supported by their neighbours within the community. Some properties in Dorset will be able to benefit from this scheme.

During the 2013 / 2014 flooding the government announced a 'Repair and Renewal Grant' and Council tax relief for owners of properties that had flooded. The Flood Risk Management team have been working very closely with the Local Authority finance teams who are administering the grant to ensure that any applications made are considered as part of any future PLP schemes.

### 2.9.3 Prioritisation of flood risk management in Dorset

The methodology adopted in this analysis of flood risk has generated three 'shortlists' of parishes deemed to be at greatest risk of flooding based on the data analysed within this section.
The prioritisation assessment is based on the following data:

1. Parishes identified to be at greatest risk based on total flood records;
2. Parishes identified to be at greatest risk of frequent flooding based on analysis of reoccurring flood events;
3. Parishes identified to be at greatest predicted risk of surface water flooding during the modelled 1 in 30 year event FMfSW data.

The parishes at risk in the modelled 1 in 200 year event FMfSW data are at risk in very extreme events only. Instead, the 1 in 30 year event FMfSW data has been used to highlight those parishes at risk during events with higher frequency in line with the Principle 3 of the prioritisation principles.

The three shortlists have been compared with one another to assess which parishes are at deemed to be at greatest risk both in terms of total flood records and repeat flood risk. By using all three lists to indicate the areas of Dorset at greatest risk of flooding, it is believed that a more reliable set of conclusions can be reached. Table 28 presents those parishes that are highlighted to be at risk on three of the shortlists, essentially identifying communities that have a large number of total flood records, have reported flooding on multiple occasions and are predicted to be at risk by modelling. Table 29 presents those parishes that are highlighted to be at risk on two of the shortlists. Table 30 presents those parishes that are highlighted to be at risk on only one of the shortlists.

The Flood Risk Management team will use the lists identified in Table 28 to Table 30 to complete an assessment of local flood risk at these locations. This assessment will determine relevant actions to reduce flood risk from surface water, groundwater and ordinary watercourses. Actions may have already taken place to help reduce flood risk following the 2012-2014 floods. These actions will be considered in the overall assessment. The flood risk for communities identified in Table 28 to Table 30 may be attributed to a number of different sources of flooding. Collaborative investigations between appropriate Risk Management Authorities will be completed where relevant.

**Table 28: Communities identified to be at highest risk in three or more shortlists (shown in Figure 11 as the 1st group of communities where Flood Risk Management Activities should be prioritised).**

| |
|---|
| Christchurch |
| Gillingham |
| Portland |
| Swanage |
| Weymouth |

**Table 29: Communities identified to be at highest risk in two shortlists (shown in Figure 11 as the 2st group of communities where Flood Risk Management Activities should be prioritised).**

| |
|---|
| Bridport |
| Burton Bradstock |
| Cerne Abbas |
| Chickerell |
| Dorchester |
| Ferndown |
| Frome Vauchurch |
| Maiden Newton |
| Netherbury |
| Piddletrenthide |
| Sturminster Newton |
| Winterborne St Martin |
| Winterborne Stickland |

**Table 30: Communities identified to be at highest risk in one shortlist (shown in Figure 11 as the 3rd group of communities where Flood Risk Management Activities should be prioritised).**

| |
|---|
| Arne |
| Beaminster |
| Blandford Forum |
| Charminster |
| East Stoke |
| Hammoon |
| Hinton St Mary |
| Lyme Regis |
| Shaftesbury |
| Shapwick |
| Sherborne |
| Sixpenny Handley |
| Speitsbury |
| Verwood |
| Wareham |
| Wimborne Minster |
| Winfrith Newburgh |
| Winterborne Steepleton |
| Wool |

## *2.10 Working together to gain a better understanding of flood risk across Dorset (Objective 1)*

### 2.10.1 Challenges and measures to improved understanding of flood risk

Table 31 presents measures that have been identified to guide actions that are required to meet the objective of achieving an improved understanding of flood risk in Dorset. Actions required to achieve the measures are detailed in Appendix 1.

**Table 31: Challenges to understanding flood risk (objective 1), measures to achieve a better understanding of flood risk in Dorset and links to other objectives in the strategy**

| Challenges | Measures |
|---|---|
| Existing flood records are held by different partner organisations in different formats and level of detail. | 1. 1. Adopt a consistent, multi-agency partner approach to flood data management, prioritisation and flood risk management |
| It is difficult to ensure transparent and fair allocation of resources following flooding and for long term planning. | |
| Assets, structures, and actions taken by individuals often have an important role in preventing flooding are not always identified. Introduction of Sustainable Drainage Systems will increase the importance of these systems in understanding flood management. | 1.2. Improve understanding of local flood risk and its management |
| Public do not always fully appreciate flood risk and the importance of reporting flooding. | |
| Many strategies / plans exist that relate to and impact on understanding flood risk and associated management. | 1.3. Ensure integration between plans to ensure holistic understanding & management of flood risk |
| Land development occurs in flood risk areas | |

### 2.10.2 How the understanding of flood risk will be used in future flood risk management in Dorset

Understanding flood risk in Dorset (Objective 1) is fundamental to the success of being able to manage flood risk. The prioritisation of flood risk management activities will only be appropriately prioritised if flooding is accurately reported. The development of a comprehensive understanding of flood risk will enable other objectives in the strategy to be met as follows:

**Objective 2 (Manage the likelihood and impacts of flooding):** Once flood reports are submitted the appropriate flood risk management authority (detailed in Section 4.1) will be assigned to take the lead on flood investigation (Section 3.3) and consider appropriate actions to manage the likelihood of flooding.

**Objective 3 (Help Dorset's communities manage their own flood risk):** As part of managing the flood risk, flood risk management authorities also able to work with communities to help establish community flood plans and identify actions they can take to help manage flood risk within their community and to individual properties (Section 4.2.1).

**Objective 4 (Ensure flood risk is considered in local land development proposals):** The recording of flood information also provides essential evidence to be used to help ensure that flood risk is considered in local land development proposals (Section 5)

**Objective 5 (Improve flood prediction, warning, response and recovery):** The information gained from flood reports will be able to be used to improve flood prediction, warning and assist with post flood recovery (Section 6).

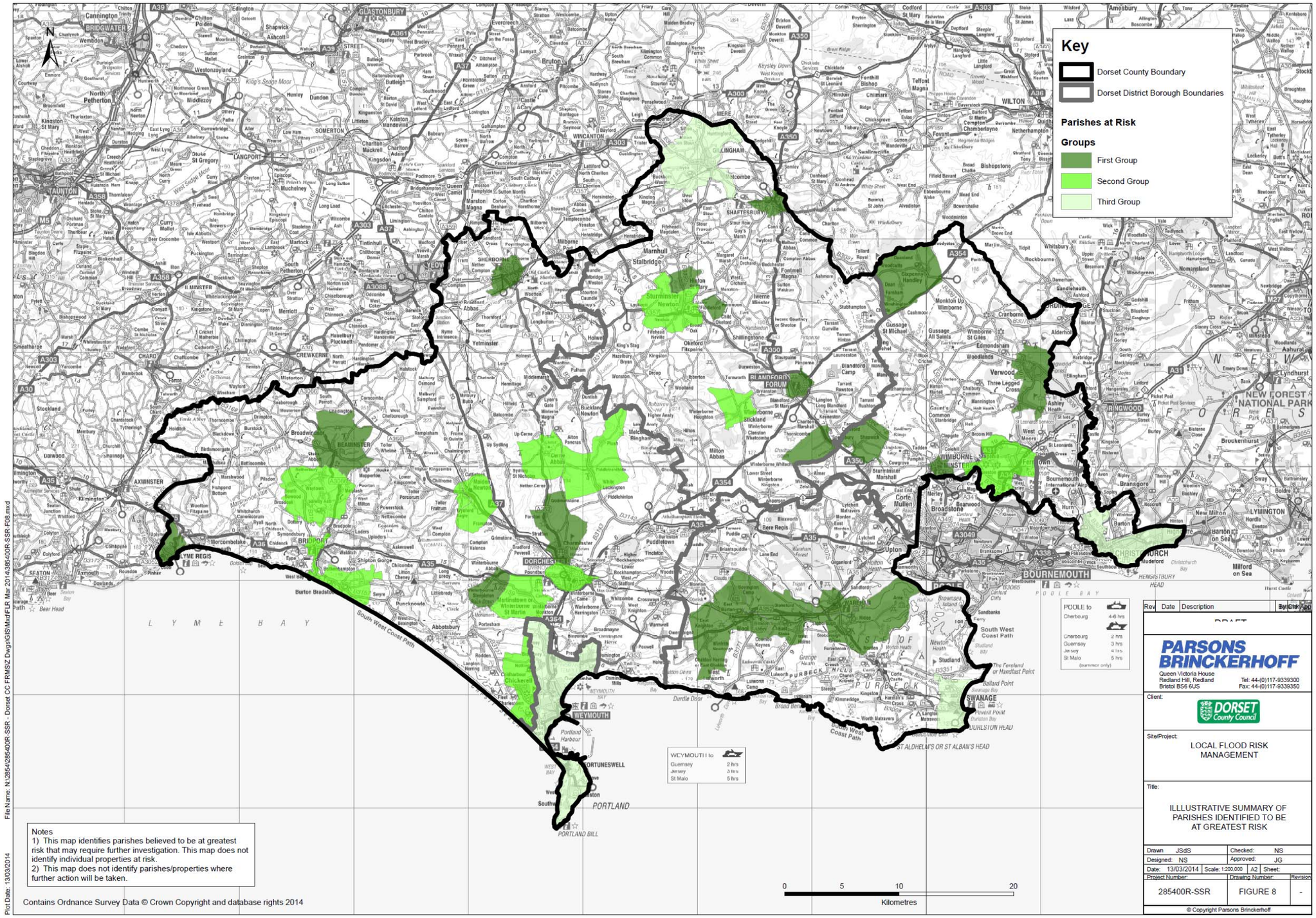



**Figure 11: Communities where Flood Risk Management activities should be prioritised**

# 3 OBJECTIVE 2: MANAGE THE LIKELIHOOD AND IMPACTS OF FLOODING

This section details how an understanding of flood risk can be used by appropriate flood risk management authorities to work with stakeholders to manage and reduce the likelihood and impacts of flooding.

- Section 3.1 details roles and responsibilities of Flood Risk Management Authorities;
- Section 3.2 details roles and responsibilities of key stakeholders;
- Section 3.3 details the importance of reporting flood incidents to enable the appropriate Flood Risk Management Authority to be identified and consider appropriate action to reduce flood risk in the future;
- Section 3.3.5 details how the reported flood data will be used for prioritising flood recovery, flood investigations and to influence long term future strategic planning of flood alleviation measures.

## *3.1 Roles and Responsibilities of Flood Risk Management Authorities and stakeholders*

This section details the responsibilities designated to each Risk Management Authority by the Flood and Water Management Act (UK Parliament, 2010). In many cases, flooding may be caused by a number of different sources which are managed by different Flood Risk Management Authorities. This highlights the importance of partnership working between authorities and stakeholders for holistic flood risk management (Section 3.2.4).

The following Flood Risk Management Authorities and stakeholders are integral to flood risk management in Dorset.

- Dorset County Council as a Lead Local Flood Authority
- District and Borough Councils
- Environment Agency
- Water Authorities – Wessex Water / South West Water
- Highway Authorities - Dorset County Council, Highways Agency
- Riparian owners
- Private drainage assets owners
- Property owners and residents
- Bournemouth Dorset and Poole Local Resilience Forum

Figure 12 presents is a schematic diagram that details the responsible flood risk management authority for the sources of flooding that were outlined in Section 2.1. Specific detail of the responsibilities assigned to each authority is given in Section 3.1. Stakeholder responsibilities are detailed in Section 3.2. In many instances, flooding may occur from more than one source which makes partnership working between Flood Risk Management Authorities and stakeholders essential. Details of how the flood risk management authorities relate to each other are given in Section 3.2.4 and how Dorset County Council as the Lead Local Flood Authority facilitates partnership working.


**Figure 12: Diagram showing flooding sources and responsible Flood Risk Management Authority / Authorities**

### 3.1.1 Dorset County Council – Lead Local Flood Authority

The management of local sources of flooding in Dorset is conducted by 3 Lead Local Flood Authorities (LLFA). These include Dorset County Council, Bournemouth Borough Council and the Borough of Poole. However, this strategy relates only to the administrative area of Dorset County Council.

Dorset County Council has the following powers, duties and responsibilities as a Lead Local Flood Authority (LLFA):

- Duty to develop, maintain, apply and monitor a strategy consistent with national and local strategies for local flood risk management in Dorset;
- Duty to provide strategic leadership to local Risk Management Authorities through partnership working;
- Power to request information from any person in connection the authority's flood risk management functions;
- Duty to ensure that investigations for significant flood incidents are carried out by the relevant Risk Management Authorities and are published. When an investigation is not carried out the LLFA will ascertain why and, where it deems necessary, will carry out and publish it's own investigation;
- LLFA duty to establish and maintain a register of structures and features which it deems to have a significant affect on local flood risk in Dorset;
  - Registered Assets are those deemed by the Lead Local Flood Authority to have the greatest effect on local flood risk within its area. The effect an asset has on local flood risk will be determined by assessing the likelihood of the asset failing and the likely consequence of the flooding in the event of failure.
  - Dorset County Council has begun the task of establishing a register and record of flood risk assets within the county as required by the Flood and Water Management Act 2010 looking at areas most vulnerable to flooding first. This process will take a number of years. Other than in exceptional circumstances, a structure that is maintained by a competent risk management authority will not be added to the Register. Often landowners do not realise or acknowledge that they have responsibility for assets, such as culverts, ditches and small watercourses. It is hoped that Dorset's Asset Register will help address this problem so that interested parties are aware of assets in their area and can contact the asset's owner when maintenance is required, thus reducing the likelihood of flooding.
- Power to designate structures and features that affect flooding.
  - Designation is a form of legal protection reserved for key structures or features that are privately owned and maintained and that contribute to the management of flood and coastal erosion risks. Designation aims to ensure that owners do not in advertently alter structures and features and potentially increase flood or erosion risk to themselves, their neighbours and the wider community. A designation is a legally binding notice served by the designating authority to the owner of the structure or features and the notice is also a local land charge.
  - The following Flood Risk Management Authorities have the powers to designate assets: (i) Dorset County Council; (ii) Environment Agency; and (iii) District and Borough councils. They may 'designate' features or structures where the following four conditions are satisfied: (i) the designating authority thinks that the existence or location of the structure or feature affects flood risk; (ii) the designating authority manages the risk affected; (iii) the structure or feature is not already designated by another authority; (iv) the owner of the structure or feature is not a designating authority. If an asset becomes 'designated' its owner cannot alter, remove it or replace it, without prior consent from the designating risk management authority.

- Provision of Land Drainage Consent for permanent and temporary works affecting flows in ordinary watercourses and culverts;
- Statutory duty to regulate ordinary watercourses and, where necessary, carry-out works through enforcement;
- Duty to aim to contribute to the achievement of sustainable development in the exercise of flood risk management functions;
- Duty to establish a Sustainable Drainage System (SuDS) Approving Body (SAB) with responsibility to approve all surface water drainage plans. This includes the approval, adoption and future maintenance of relevant SuDS features. This duty will come into affect when Section 3 of the FWMA is implemented by Government.

Dorset County Council as LLFA does not intend to delegate any of these responsibilities to other risk management authorities.

### 3.1.2 District and Borough Councils

District Authorities and Borough Councils in Dorset include: Christchurch Borough Council; East Dorset District Council; North Dorset District Council; Purbeck Borough Council; West Dorset District Council and Weymouth and Portland Borough Council.

District Authorities and Borough Councils have the following roles and responsibilities:

- Designated Risk Management Authority;
- To have regard to national and local strategies when carrying out their flood risk management functions;
- To be subject to scrutiny from Lead Local Flood Authority's democratic processes for flood risk management activities;
- Emergency response to a flood incident, and dealing with resulting homelessness;
- A local planning authority duty to encourage appropriate development, promoting sustainable drainage and be satisfied that an application will not cause increase flood risk elsewhere;
- To contribute towards the achievement of sustainable development.

### 3.1.3 Environment Agency

The Environment Agency has the following roles and responsibilities:

- Designated Risk Management Authority;
- Strategic overview for all forms of flooding;
- To be subject to scrutiny from Lead Local Flood Authorities democratic processes for flood risk management activities;
- Develop the National Strategy for Flood and Coastal Erosion Risk Management, reporting to Ministers on flood risk management including implementation of the strategies, and carrying out flood risk management functions in a manner consistent with the national and local strategies;
- Flood risk management for 'main rivers' and the sea;
- Granting consents for works in or near main rivers and nearby floodplains;
- Flood risk of the Environment Agency's own reservoirs, and regulates and enforces the Reservoirs Act (1975) for other reservoirs with a capacity over 10,000m$^3$ above ground level;
- Powers to request information in connection with the Environment Agency's flood risk management functions;
- Power to designate structures and features that affect flooding;
- Consultee to the Sustainable Drainage Systems Approving Body on surface water drainage proposals;
- Statutory consultee to local planning authorities on flood risk matters regarding main rivers and the sea;

- Emergency responder to flood incidents, defined as a designated Category 1 responder in the Civil Contingencies Act.
- Statutory consultee on planning applications for development other that minor or householder in flood zones 2 and 3;
- Duty to aim to contribute towards the achievement of sustainable development in the exercise of flood risk management functions.

Continuing roles and responsibilities for the EA contained within the Act include:
- Duty to contribute to sustainable development.
- Ability to issue levies to Lead Local Flood Authorities.

### 3.1.4 Water companies

Water Authorities have the following roles and responsibilities:
- Designated Risk Management Authority;
- To have regard to national and local strategies when carrying out their flood risk management functions;
- To be subject to scrutiny from Lead Local Flood Authority's democratic processes for flood risk management activities;
- Adoption of private sewers;
- Responsible for dealing with flooding from public sewers;
- Adoption of new built sewers.

Continuing roles and responsibilities include:
- Working with developers and landowners to reduce amount of rainfall entering sewers.
- Effective drainage of their network.

### 3.1.5 Highways Authorities

Dorset County Council and Highways Agency highways authorities have the following roles and responsibilities:
- Designated Risk Management Authority;
- Duty to have regard to national strategies and to have regard to local strategies when carrying out their flood risk management functions;
- To maintain highways under the Highways Act 1980;
- Powers to protect the highway from flooding;
- To carry out maintenance and improvement work on an ongoing basis as necessary to maintain existing standards of flood protection for highways and adjacent properties, making appropriate allowances for climate change.

Continuing roles and responsibilities include:
Providing and managing highway drainage and relevant roadside ditches under the Highways Act 1980.

## *3.2 Key Stakeholders responsible for flood risk management*

### 3.2.1 Riparian owners and Landowners

- Riparian land owners own land adjoining, above or with a watercourse running through it.
- If the land is rented, an agreement is required with the owner who will manage these rights and responsibilities.
- Householders or businesses whose property is adjacent or above a river or stream or ditch are likely to be riparian owners with maintenance responsibilities. These responsibilities are still applicable when a watercourse only flows during wet periods.

- If a property backs onto a river or stream then the owner is likely to be a riparian owner and own the land up to the centre of the watercourse.
- Riparian responsibilities are not always and do not have to be included in deeds or title plans.
- Riparian owners have a responsibility to maintain the bed and banks of the watercourse and ensure there is no obstruction, diversion or pollution of the watercourse.

Continuing roles and responsibilities for riparian owners include:
Common Law duty to maintain ditches to prevent them, causing flood risk to others. More details on riparian rights and responsibilities can be found in the Environment Agency's 'Living on the edge' guide or online at their website.

### 3.2.2 Property owners and residents

It is the responsibility of householders and businesses to look after their property, including protecting it from flooding. While in some circumstances other organisations or property owners may be liable due to neglect, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently, it is important that property owners, whose homes are at risk of flooding, take steps to ensure that their home is protected.

### 3.2.3 Private drainage asset owners

Private drainage assets may have a significant impact on local flood risk. It is the responsibility of the owner to regularly inspect and maintain their assets. Dorset County Council has powers to obligate owners to carry out maintenance on assets on ordinary watercourses. The failure to ensure any drainage asset is fit for purpose is a civil liability for the owner.

### 3.2.4 Partnership working

Dorset County Council is designated a Lead Local Flood Authority (LLFA) by the Flood and Water Management Act 2010 (FWMA). The FWMA also designates other bodies as Risk Management Authorities. In order to facilitate partnership working across organisations Dorset County Council chairs the Flood and Risk Management Officer Group and Flood Risk Management Board. These groups include representatives from the Risk Management Authorities. Figure 13 presents a diagram of how the Flood Risk Management Authorities interact.

Flooding may often be caused by a number of different sources managed by different Flood Risk Management Authorities (RMA). Where flooding has occurred from multiple sources, a RMA will be assigned to take the lead on investigating the flooding and may be supported by other RMA(s). The Flood Risk Management Officers are aware of the roles and responsibilities of partner authorities and proactively make every effort to ensure appropriate partners are included in flood investigations where necessary. The ability to share information on flooding between RMA's is essential to ensure integrated and holistic solutions are proposed and developed to reduce or mitigate the risk from all sources of flooding.
The LLFA regularly convenes meetings with RMAs to discuss responsibilities, actions and propose integrated solutions to reduce the impact of flooding. Community engagement is conducted in collaboration with appropriate flood risk management authorities where appropriate.

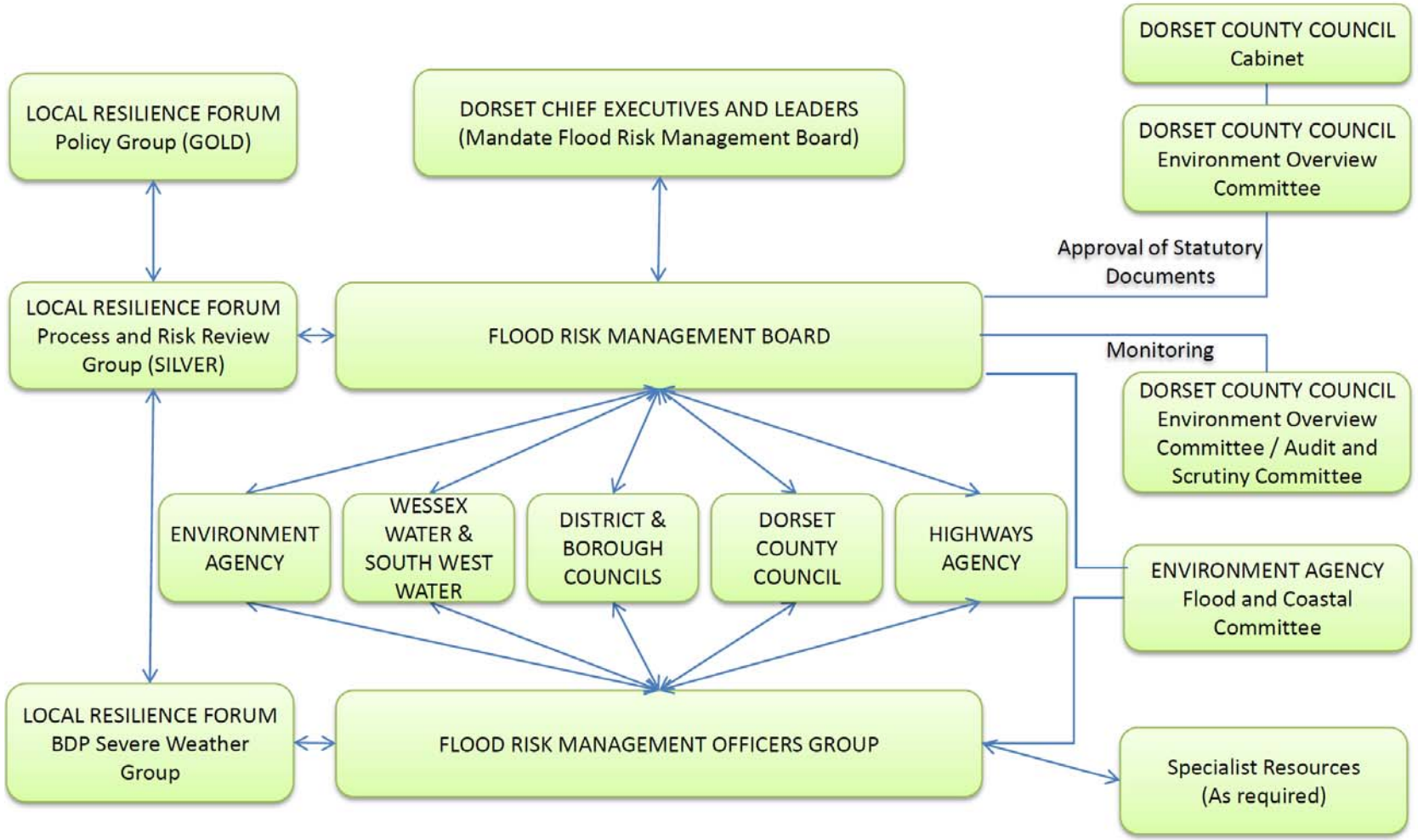



**Figure 13: Relationship of Flood Risk Management roles within Dorset**

## *3.3 Flood reporting*

The flood report form on Dorset County Council's website has been developed with the Environment Agency and Local Authorities to enable the public to complete one flood report that covers all partners needs. When a flood report is submitted, the main source or sources of flooding will be identified and the information quickly shared amongst Flood Risk Management Authorities using the online flood reporting and information sharing tool 'SWIM' (South West Incident Management). Details of the flood reports are only available to Flood Risk Management Authorities.

The development of the flood reporting process outlined in this section will overcome many of the challenges identified in Section 2 'Understanding Flood Risk' which were identified when interpreting historic flood records that contain limited and varied information.

The process developed by Dorset County Council in partnership with Dorset's Flood Risk Management Authorities is unique and is being considered for use by other flood risk management authorities across the South West.

### 3.3.1 Why report flooding?

#### 3.3.1.1 During flood incidents:

Information on flood incidents is vital for emergency responders to use to prioritise their incident response during widespread flooding.

#### 3.3.1.2 During flood recovery

The information on the number of properties flooded within a community will be used to ensure that flood recovery support is targeted to the communities that experienced the greatest flooding.

#### 3.3.1.3 Once flood recovery is complete

The information on flooded properties will be compared with historic flood records to prioritise flood risk management activities and will be used as evidence to support application for funding to develop appropriate schemes to reduce flood risk and improve the flood warning service.

### 3.3.2 How to report flooding

#### 3.3.2.1 To report risk to life during a flood incident

If the flood water is dangerous or there is a risk to life and an immediate emergency response is required, the 999 emergency telephone number should be used to report flooding.

#### 3.3.2.2 Report property flooding to assist with the prioritisation of incident response, flood recovery and future flood planning

To reports of flooding from surface water, groundwater or local watercourses to Dorset County Council complete the online flood report form at: https://apps.geowessex.com/swim (Figure 14) or call Dorset Direct on 01305 221000. The flood report requires information on the following:

- Properties / locations affected;
- Flood event and impact;
- Problem identification;
- Help received;

**Please note** – submitting a flood report will not activate an immediate response from any flood risk management authority. It is important to inform the relevant emergency 'hot lines' for informing emergency responders where flooding issues are occurring. The information will be invaluable for informing the flood recovery process.

Flood reports will be collated from the following sources:

- members of the public reporting a flood using the online flood report form https://apps.geowessex.com/swim, (also accessed via the Dorset County Council website at: https://www.dorsetforyou.com/flooding/reporting)
- members of the public reporting a flood in person, over the phone or by e-mail. If the flood is reported to Dorset Direct (the County Council's customer support line) they will either advise the caller how to report the flood report online or complete the Flood Report Form over the phone.
- flood risk management officers encountering flooding;
- members of the County or Parish Council reporting a flood they have encountered or had reported to them;
- flood reports collated by flood wardens or flood action groups;
- flood - related activities by emergency services or flood risk management authorities.

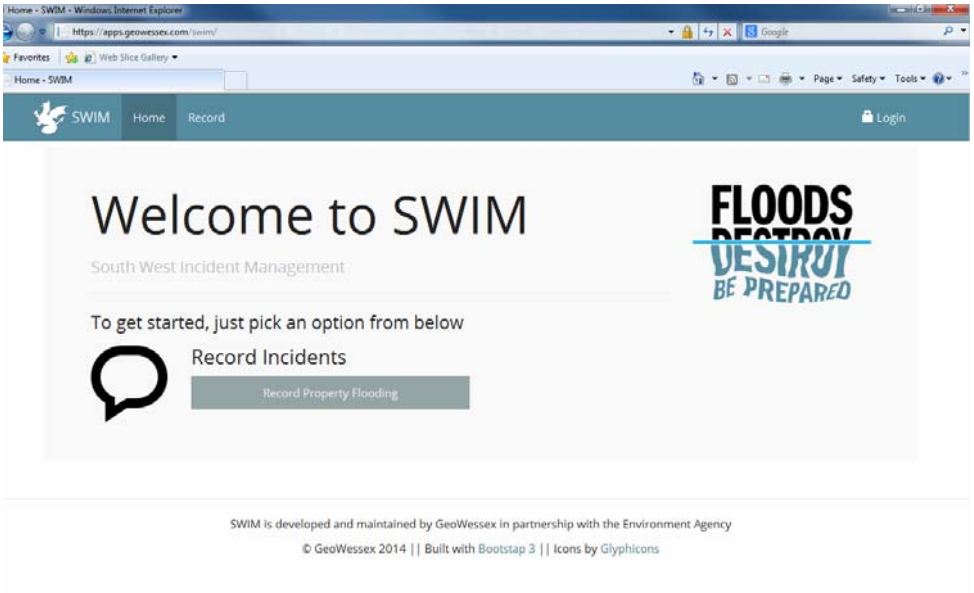



**Figure 14: Online flood reporting using SWIM (South West Incident Management)**

#### 3.3.2.3 To request assistance from Flood Risk Management Authorities during flooding

Flood Risk Management Authorities have limited resources to provide support during flooding.

- To report flooding from surface water, groundwater or local watercourses to Dorset County Council complete the online flood report form at: https://apps.geowessex.com/swim (Figure 14) or call Dorset Direct on 01305 221000.
- Some Local Authorities may provide sandbags if required. Details and information on sandbags can be found on the following web page: https://www.dorsetforyou.com/412807
- To request assistance regarding flooding from main river or the sea call the Environment Agency's Floodline number: 0345 988 1188.
- To report flooding of roads:
    - For trunk roads and motorways contact the Highways Agency on 0300 1235000 or via their website http://www.highways.gov.uk/about-us/contact-us/

- For flooding of all other public roads contact the Dorset highways authority via their website: https://www.dorsetforyou.com/travel-dorset/roads-and-driving/report-a-road-problem or on 01305 221020 or (0845 0678 999 out of hours).

- Advice on Sewer flooding can be found at http://www.wessexwater.co.uk/water-and-sewerage/threecol.aspx?id=726.

### 3.3.3 How flood information is used

#### 3.3.3.1 During flood incidents:

- Flood Risk Management Authorities and emergency responders and members of the Bournemouth, Dorset and Poole Local Resilience Forums will view live flood data on a map to support decision making regarding incident response during flooding (from the flood reports submitted to https://apps.geowessex.com/swim); an example of flood reports collected during the 2013/14 flooding is shown in Figure 15;
- All Flood Risk Management Authorities will be able to view and share live information on flooding instantly;
- The flood reports will provide information to supply responses to the Department of Communities and Local Government and the Cabinet Office Briefing Room (COBR) during large scale flood incidents and flood recovery;

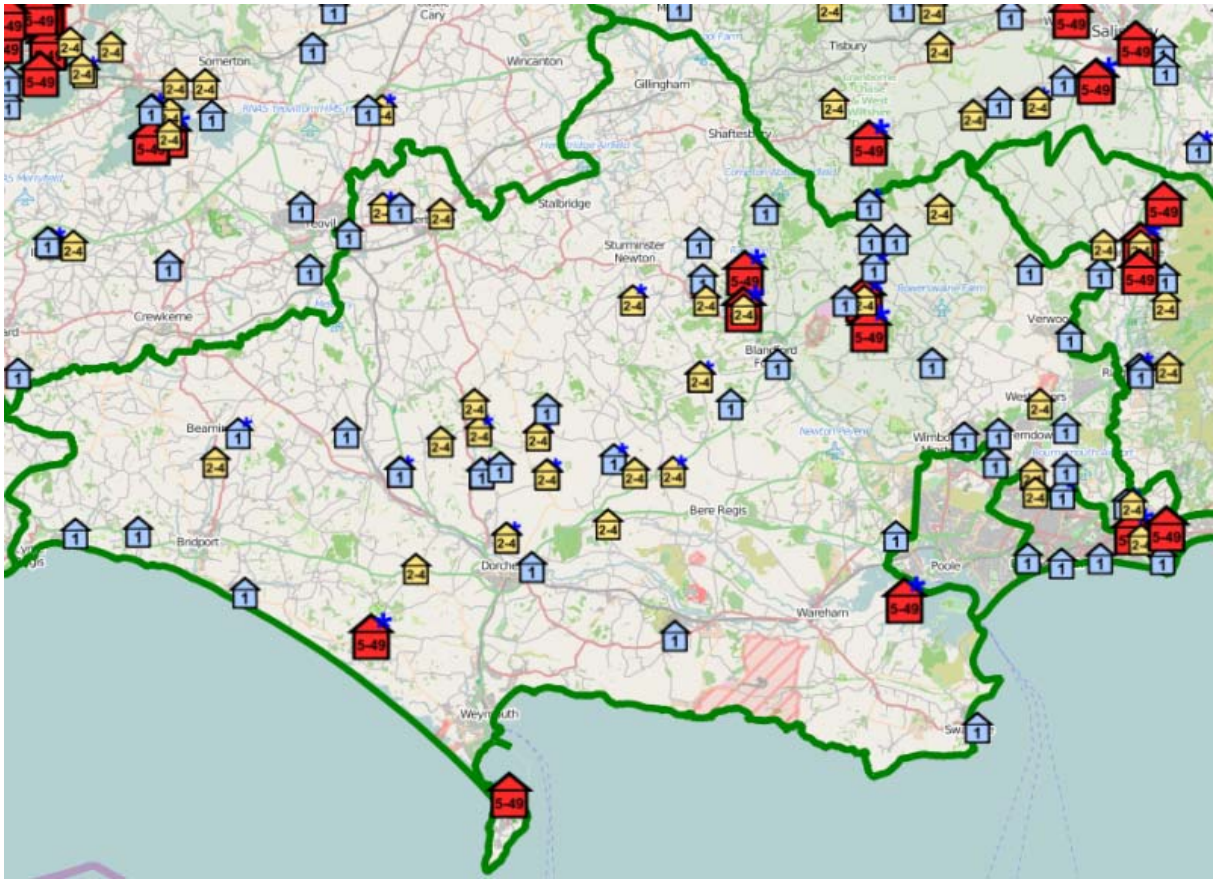



**Figure 15: Example of how flood reports are seen by emergency responders to assist with informing incident response**

#### 3.3.3.2 During flood recovery

The information gathered from the flood report form will be used by the Flood Risk Management Authorities to:

- Assist with appropriate prioritisation of resources and support as part of the incident response and recovery process;
- Assist with the identification of the appropriate flood risk management authority to take the lead on recovery;
- Obtain combined reports using data from all flood risk management authorities to gather evidence regarding the extent of flooding in Dorset;
- Develop a programme of community engagement and flood recovery support according to the prioritisation process detailed in Section 3.3.5;
- Identify if 'significant' flooding has occurred (as defined in Section 3.3.5) and determine if a full flood investigation is required.

#### 3.3.3.3 Once flood recovery is complete:

The information gathered from the flood report form will be used by the Flood Risk Management Authorities to:

- Provide evidence to improve understanding of flood risk, identify appropriate risk management options and secure funding to support future flood risk management and alleviation schemes;
- Develop and improve future flood warnings to inform modifications to actions within flood plans and procedures.

### 3.3.4 Assessment of flood report data

Information collected using SWIM flood reports will be used to create automatic summaries of data customised to individual Flood Risk Management Authority's requirements.

The SWIM flood data currently automatically generates the following summary reports for flood risk management and emergency responders to quantify the number of properties that have reported flooding:

- in Dorset;
- within a Local Authority area;
- within a parish / community.

Section 3.3.5 details the prioritisation methodology that will be applied to the flood reports to enable flood risk management activities to be prioritised according to the flood impact.

This information will be used:
**During flood incidents**: to assist direction of emergency responders;
**During flood recovery**: to prioritise flood incident response and identify the appropriate Flood Risk Management Authority to lead on flood investigations and flood recovery support;
**Once flood recovery is complete:** to revise long term strategic planning of future flood risk management activities.

### 3.3.5 Prioritisation of flood reports for investigation

The process outlined in this section has been developed to detail how the flood records will be analysed to prioritise reported flood incidents according to the methodology outlined in Section 3.3.5. An assessment will also be made to categorise the flooding as either: (i) 'Significant' flooding (Section 3.3.5.2); or (ii) a General Flood Enquiry (Section 3.3.5.4). Flood Risk Management activities will be prioritised where 'significant' flooding has occurred. The process applied to flood reports is summarised in Figure 16.

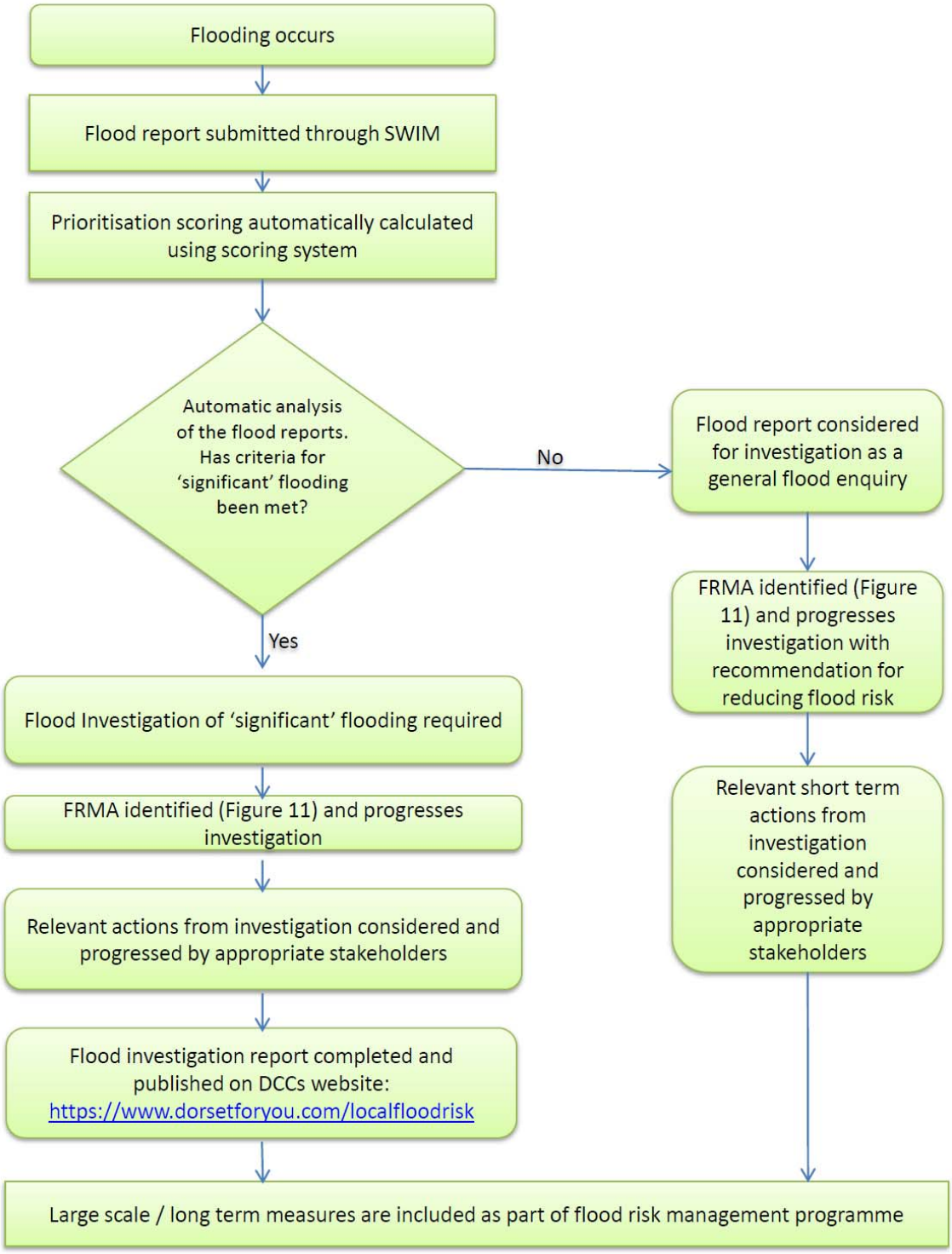



**Figure 16: Overview of how flood data is used**

#### 3.3.5.1 Prioritising methodology

Flood investigations for 'Significant' flooding and General Flood Enquiries will be prioritised on the criteria detailed below using data obtained through information submitted in flood reports. The success of the prioritisation methodology is dependent on all relevant information being accurately submitted within flood reports. The flood score and associated risk to life will be assessed based on the physical extents: the depth, velocity, length of time, and frequency of the flooding and the significance of the location effected as given in Equation 1 and Table 32.

**Equation 1: Equation used to calculate flood score**

$$\text{Flood Score} = Con*(D * V * Freq)$$

**Where** : **Con** is consequence factor based on risk to life
**D** is the depth factor (based on FD2320)*
**V** is the velocity factor (based on FD2320)*
**Freq** is the frequency factor based on the number of flood incidents in the last year.

*(FD2320 refers to criteria defined in the Defra / EA R&D project FD2320 "Flood Risk Assessment Guidance for New Development" (Defra / Environment Agency Flood and Coastal Defence R&D Programme, 2005)).

**Table 32: Values associated to factors used to calculate the flood score**

| | Description | value |
|---|---|---|
| Consequence factor | Critical Services e.g. Hospitals, Health Centres, Schools, Nurseries, Care Homes, Refuge Facilities and Emergency Service Facilities. | 1000 |
| | Residential Property Internal | 150 |
| | Commercial Property Internal | 200 |
| | Residential Property External effecting access or flooding garage/outbuildings | 75 |
| | Commercial Property External | 100 |
| | Residential garden, recreation space, (not adjacent to building or effecting access) | 25 |
| | Highway Flooding Causing hazard on highway and irresolvable under Highways legislation | 100 for road not on salting route.<br>500 for road on salting route. |
| Depth factor | flooding less than 100mm | 0.75 |
| | flooding between 100-500mm | 1.00 |
| | flooding over 500mm | 1.5 |
| Velocity factor | standing water | 0.75 |
| | slow flowing water | 1.00 |
| | fast flowing water | 1.5 |
| Frequency factor | for single flood incident | 1.0 |
| | for multiple incidents within 12 months | 1.5 |

The objective method for recording and ranking flood incidents outlined in this section will be automatically calculated for all flood reports. This will ensure that residents are equally able to access and receive a consistent level of support.

#### 3.3.5.2 Definition of 'Significant' flooding

Dorset County Council as a LLFA has a duty to investigate 'significant' incidents of flooding within its administrative boundary (UK Parliament, 2010).

National guidance issued by DEFRA sets thresholds for defining areas where the flood risk is 'significant'. No guidance has been issued for defining locally significant harmful consequences and it is up to each LLFA to set its own definition. The following definition has been proposed by DCC and agreed by the South West Flood Risk Managers Group (via the communities of practice web-site) as a consistent definition for use in South West Preliminary Flood Risk Assessments (PFRAs) (details of Dorset's PFRA can be found in Section 2.2.3)

Within Dorset, a flood is deemed 'significant' within a community if it:

- caused internal flooding to five or more residential properties, or
- flooded two or more business premises, or
- flooded one or more items of critical infrastructure, or
- caused a transport link to be totally impassable for a significant period.

The definition of 'significant period' in relation to the length of time a transport link is impassible has been adopted from the following categories as set out in the UKRLG Code of Practice for Highway Maintenance as follows:

- Category 1 highways (motorways) and major rail links – impassable for 2 hours or more;
- Category 2 and 3a highways and other railway links – impassable for 4 hours or more;
- Category 3b and 4a highways – impassable for 10 hours or more;
- Category 4b highways – impassable for 24 hours or more.

#### 3.3.5.3 Investigation of 'Significant' flooding

Prior to the implementation of the Flood and Water Management Act 2010, local authorities were not required to investigate significant flood incidents or collate records of flooding within their boundaries. This is one of the reasons why existing records of historic flood events range in the quality and quantity of data held. As a Lead Local Flood Authority (LLFA) Dorset County Council has a duty within Section 19 of the Flood and Water Management Act (UK Parliament, 2010) to ensure that significant flood incidents are investigated by the relevant RMA within the county administrative boundary.

The flood investigation process is outlined in Figure 16. The purpose of flood investigations are to: (i) provide an understanding of the possible causes of flooding; (ii) examine which flood risk management authorities or stakeholders are responsible for the flooding; (iii) clearly outline and assign any necessary actions to appropriate flood risk management authorities or stakeholders.

The scale of the flood investigation report will vary according to the requirements of an incident. For example, a single flood investigation report may be prepared for multiple properties affected by the same source. Alternatively, a single flood investigation report may also be prepared for all properties affected by the same event, i.e. the July 2012 flood incident.

Investigations will involve consultation with the relevant flood risk management authorities, landowners and private organisations involved, all of whom are expected to cooperate and provide comments. The duty to investigate, however, does not guarantee that problems will be resolved and requires close partnership working. Decisions about appropriate actions must be made in agreement with all parties involved.

The information from the flood investigation report will assist Dorset County Council and the relevant risk management authority in prioritising those communities, properties and other receptors that have been affected by flooding to guide flood recovery, investment and subsequent action to reduce flood risk in the future. Dorset County Council, as LLFA, is required to publish the results of any flood investigations. Findings from flood investigations and actions that the community can proactively take should be incorporated in to community flood plans (Section 4.2) as part of Objective 3 of Dorset's Local Flood Risk Management Strategy (Section 4).

#### 3.3.5.4 Definition of a 'general flood enquiry'

'General flood enquiries' are defined as any flood reports that do not meet the criteria to be considered as 'significant' flooding. These smaller incidents vary vastly in their severity and impact.
Responses to 'general flood enquiries' can be time consuming to resolve and often require intensive communication between various stakeholders to develop agreed actions to reduce the impact of flooding in the future.

#### 3.3.5.5 Investigation of a 'general flood enquiry'

Future flood reports made to the Flood Risk Management teams will firstly require completion of a flood report form through the methods outlined in Section 3.3.2.

Incidents reported by telephone to members of the Flood Risk Management Team will require a flood report form to be completed. The incident report will be given a reference number and be mapped on Dorset Explorer for other Flood Risk Management Authorities to view.

An investigation of non-significant flood incident will typically include:

- Identification of sources and pathways of flooding,
- Identification of the responsible Risk Management Authorities,
- Identification of solutions,
- What the responsible RMAs have done or intend to do in response to the flood incident,
- Write to the party reporting the flood incident to inform them off the outcome of the investigation,
- If works are planned agree a target date with the RMA and notify the resident.

### 3.3.6 Possible flood risk management options

Within every community in Dorset, there are a number of actions that can be considered to reduce flood risk within Dorset. It is important that appropriate actions required within each community are considered according to many factors (e.g. flood source, risk to life, frequency of flooding, impact of changing rainfall patterns e.t.c.) which emphasises the importance of reporting flooding. Figure 17 presents some of the options that may be considered through flood investigation

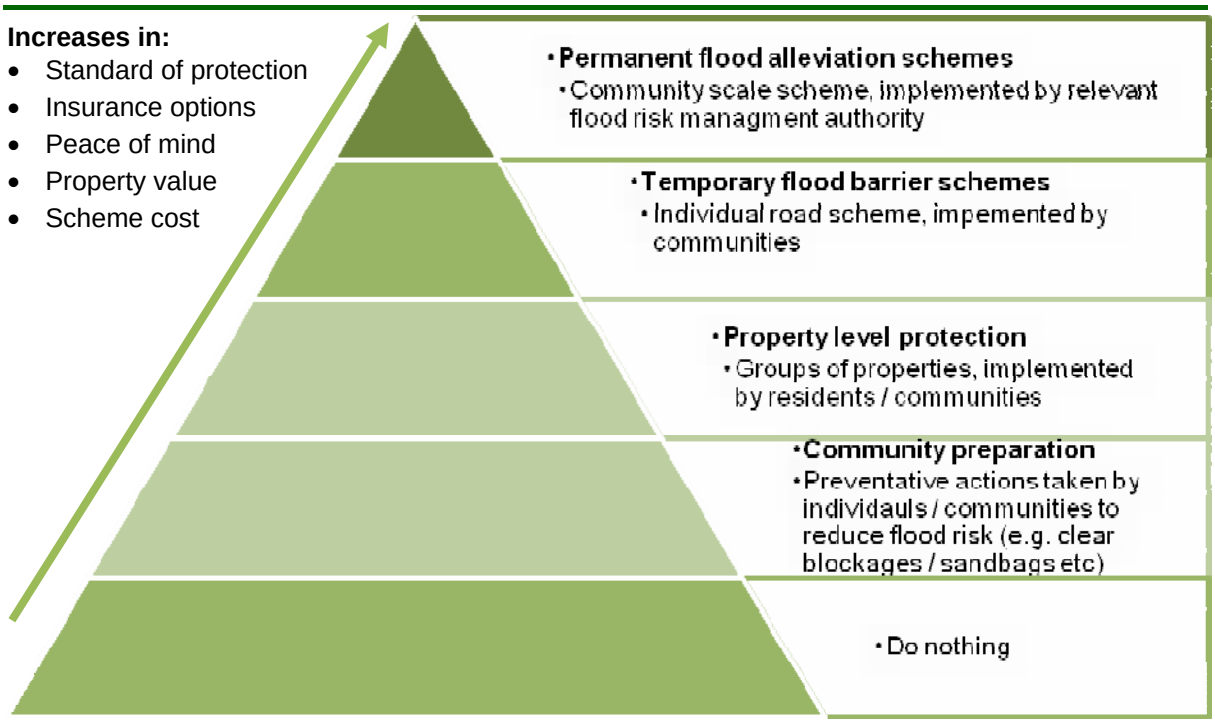



**Figure 17: Possible measures to manage flood risk**

## *3.4 Working together to manage the likelihood and impacts of flooding across Dorset*

### 3.4.1 Challenges and measures to manage the likelihood and impacts of flooding

Table 33 presents measures that have been identified to guide actions that are required to meet the objective managing the likelihood and impacts of flooding in Dorset. Actions required to achieve the measures are detailed in Appendix 1.

**Table 33: Measures to overcome challenges to manage the likelihood and impact of flooding**

| Challenges | Measures |
|---|---|
| Works in ordinary water courses can have adverse impacts on flood risk. | 2.1 Manage flood risk through consenting and enforcement |
| Action may be required to remedy works in the watercourse that have not obtained consent. | |
| Large capital schemes in rural areas of Dorset are unlikely to achieve required cost benefit. Therefore alternative flood risk management solutions need to be considered. | 2.2 Promote flood alleviation schemes with partners |
| Works to ordinary watercourses may cause negative environmental impacts and mitigation measures may be required. | |
| Potential improvements to flood risk management are not always considered within work of other partners and stakeholders. | |
| Communities / individuals require support to understand: (i) small-scale flooding from local sources; and (ii) what appropriate flood risk management options may reduce or mitigate the flooding. | *2.3. Investigate flooding from local sources* |
| Significant flooding can cause great disruption to local communities. Communities require support to understand: (i) large-scale flooding from local sources; and (ii) what appropriate flood risk management options may reduce or mitigate the flooding. | 2.4 Investigate 'significant' flooding |
| Property flooding can be caused by flooding from sources managed by different flood risk management authorities. | 2.5. Ensure flood risk management authorities and stakeholders manage flood risk appropriately |
| Runoff from agriculture can impact on flood risk | |
| Assets, structures and actions taken by individuals often have an important role in preventing flooding are not always identified. | |

### 3.4.2 How managing known flooding issues will reduce the likelihood and impacts of future flooding (Objective 2)

Work to manage the likelihood and impacts of flooding in Dorset (Objective 2) is fundamental before, during and after flooding. Prioritisation of flood risk management activities is dependent on a comprehensive understanding of flood risk gained through accurate flood evidence collated through flood reports. Management of the likelihood and impacts of flooding need to be done in connection with other objectives in the strategy as follows:

**Objective 1 (Understand flood risk across Dorset):** The flood reports submitted to assist with managing flood incidents and recovery will be used to update Flood Risk Management authorities' understanding of flood risk. This information will then be used to inform future flood risk management activities.

**Objective 3 (Help Dorset's communities manage their own flood risk):** Community input is required to help manage the likelihood and impacts of flooding. An essential part of the flood wardens role is informing emergency Category 1 responders of the flood situation in their community. Analysis of flood reports can be used to assist flood risk management authorities to work in conjunction with flood action groups and flood wardens to help identify ways that Dorset's communities can manage their own flood risk through actions identified in community flood plans (Section 4.2.1).

**Objective 4 (Ensure flood risk is considered in local land development proposals):** The recording of flood information also provides essential evidence to be used to help ensure that flood risk is considered in local land development proposals (Section 5)

**Objective 5 (Improve flood prediction, warning, response and flood recovery):** The information gained from flood reports will be able to be used to improve flood prediction, warning and assist with post flood recovery where management options are not able to prevent flooding (Section 6).

# 4 OBJECTIVE 3: Help Dorset's communities manage their own flood risk

This section details how Dorset's communities can work together with flood risk management authorities to manage their own flood risk to help them become resilient and prepared for flooding. Section 4.1 highlights the importance of stakeholder and community engagement in enabling communities to manage their own flood risk through flood warden and flood action groups. Section 4.2 discusses flood plans that businesses, individuals and communities can develop to ensure they know exactly what actions to take when flooding occurs. Section 4.3 summarises the challenges and measures required to meet the objective of helping Dorset's communities manage their own flood risk.

## *4.1 Stakeholder and community engagement*

The key to enabling and empowering communities to manage their own flood risk is by working with them to understand the risks and support them in the development of plans to reduce those risks. This can be facilitated by advising: (i) communities and property owners of actions they can take to reduce the impact of flooding; and (ii) landowners of their roles and responsibilities so that they appreciate the value, nature and role of the watercourse and are aware of the maintenance required to keep the channel in good order.

Community engagement is conducted by the appropriate Flood Risk Management Authorities according to the relevant flood risk within the community. Flood Risk Management officers from the County Council regularly attend town and parish meetings to discuss issues related to local flood risk and work with Local Authorities to support them at community and flood forum meetings. The Flood Risk Management team works in partnership with the EA to work together to jointly target consultation and communication exercises regarding flood risk management. This collaborative working aims to achieve an integrated and holistic approach to flood management within communities.

### 4.1.1 Community flood wardens

Extensive groundwater flooding in 2000 and 2003 led to the Environment Agency office developing a flood warden network through Dorset's Parish Councils to: (i) act as a single community contact point; (ii) provide valuable information about the timing and extent of flooding; (iii) act as an emergency coordinator, liaising with flood risk management authorities in locations where community flood plans have been developed; and (iv) lead community response teams (where appropriate) in locations where community flood plans have been developed.

Dorset has approximately 120 flood wardens and flood action groups in the parishes which are identified by the areas shown in purple in Figure 18. Further work is required to support communities without flood wardens / flood action groups / flood plans to help them manage their own risk.

Community flood plans were activated on numerous occasions during flooding between 2012 and 2014. The flood wardens investigated reports of blockages or flooding in their local communities and update the Environment Agency. This ensured that limited resources were directed to the most appropriate locations. Communities with flood plans were more prepared to respond to the flooding independently than those communities without flood plans. Following the flooding, the flood wardens provided useful information and photographs about the incident. They helped coordinate the flood clinics by providing advice about suitable locations within the community to host them and helped to advertise the events. In the post incident period they provided a conduit to disseminate information to their community about planned works, improvements, etc.

The flood intelligence gathered by the flood wardens who had directly experienced the flooding provided valuable evidence to identify the cause and impact of flooding. This helped flood risk management authorities to consider possible measures that could help reduce future flood risk. The improved understanding of the flooding was also used to update and develop community flood plans.

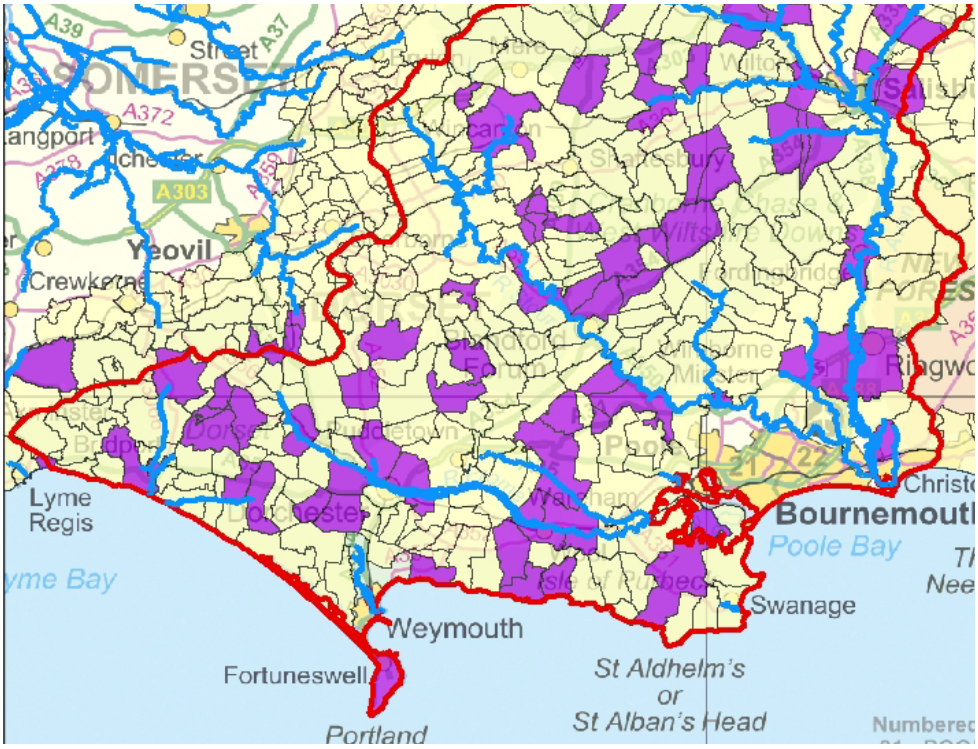



**Figure 18: Map of Dorset showing communities that have flood warden(s)**

### 4.1.2 Flood Warden Seminar

Dorset County Council and the Environment Agency jointly host an Annual Flood Warden Seminar, which brings flood wardens and Parish Councillors from across Dorset together to: (i) provide information on changes in Flood Risk Management; (ii) provide training; (iii) share experiences / good practice; and (iv) provide support to develop flood plans if required. It also provides attendees the opportunity to raise general queries on flooding, flood prevention and land drainage responsibilities and to raise more specific points related to localised flooding problems.

### 4.1.3 Flood 'drop-in' sessions / Flood fairs

Dorset County Council have worked in partnership with flood risk management authorities to host flood drop-in sessions to gather evidence on flooding and provide advice and support to communities who have experienced flooding. As part of the flood recovery process, flood fairs may also be organised where companies are invited to demonstrate a wide range of flood protection products that communities / individuals may want to consider.

### 4.1.4 Community Flood Archive

In 2006, the Environment Agency office commissioned a Community Flood Archive project. The aim of this project was to collect all information about historical flooding across Dorset and Wiltshire. It also emphasised the importance of reporting past flood incidents caused by localised problems such as blocked drains. This project not only served to identify areas of

local flood risk but also proved a valuable exercise when engaging with the public on their flood risk concerns.

The extensive collection of flood records held within the database have provided an invaluable data source to understand flood risk, although as the data has not been captured consistently over time, it is not possible to complete any comprehensive analysis on the data.

The value of this data supports the essential requirement to investigate reported flooding using the Dorset County Councils online flood report form: https://apps.geowessex.com/swim (Section 3.3.2).

## *4.2 Flood Plans*

Dorset County Council works closely with the Environment Agency and communities at risk of flooding to develop flood plans. The flood plans may be referred to during incidents by category 1 responders to help inform them of the greatest risk of flooding to the community. Templates for individual and business flood plans are also available. Support may also be available either through the community flood warden / flood action groups or relevant flood risk management authorities to explain the flood risk and consider appropriate actions in response to warnings.

### 4.2.1 Community flood plans

Community flood plans are generally developed by the flood warden or the flood action group and provide details of actions that the community can take before, during and after a flood. The following lists suggest information that may be considered within a flood plan:

#### 4.2.1.1 Information to consider / actions to take before flooding:

- Identify areas that are most likely to flood in a community (through local knowledge / historic flood reports / reference to flood mapping products) to consider and conduct actions that could be taken to reduce flooding.
- Register and understand the flood warning service to identify appropriate warnings for the community.
- Identify vulnerable residents / properties / infrastructure and outline actions that could be required when flooding occurs.
- Develop a community support network to assist with the installation of property level protection products on receipt of warnings.
- Identify location of potential rest centres.

#### 4.2.1.2 Information to consider / actions to take during a flood:

- Identify pre-defined actions for the Flood wardens / flood action groups to complete when flooding occurs;
- Document contact details of Local volunteers / flood wardens / flood group / voluntary support groups;
- Document important telephone numbers;
- Identify available resources within the community (i.e. sandbag stores etc)
- Outline arrangements between authorities;
- Outline actions that may be required to support vulnerable residents, properties, critical infrastructure and locations;
- Outline rest centre activation arrangements.

#### 4.2.1.3 Information to consider / actions to take during flood recovery

- Identify potential reputable contractors who may be able to assist with repairing flood damage
- Refer to relevant pages of the Blue Pages, a directory produced by the National Flood Forum containing information and advice on what products are available to help protect homes or businesses against flooding: http://www.bluepages.org.uk/BluePages/tabid/1664/Default.aspx;
- Gather evidence that may be required for insurance purposes.

### 4.2.2 Business flood plans

Flooding can cause direct and indirect impacts to businesses. If business premises are at risk of flooding, a business flood plan could provide a useful guide for employees to understand flood risks and appropriate actions to consider, potentially reducing the risk of flood damage to properties and businesses. This will help Dorset work towards developing a flood resilient economy. Measures to reduce the indirect impacts of flooding on businesses could also be considered as part of the plan.

The environment Agency has a business flood plan template at the following location: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/292937/LIT_5284_ab06c2.pdf

### 4.2.3 Individual flood plans

Residents of properties that are vulnerable to flooding should consider developing a personal flood plan that contains steps to limit damage to their property.

It is essential that properties that have property level protection measures which require installing on receipt of a flood warning have a comprehensive flood plan which is includes support from neighbours / community.

A typical plan will include:

- Triggers for the installation of Property Level Protection products (if relevant);
- Identification of places upstairs or out of the home to store or move most valuable possessions to;
- Identification of a higher location to move motor vehicles to;
- Identification of a safe place to keep insurance policy documents and contact details for electricity, gas and water suppliers;
- A pre-prepared bag of emergency supplies in case property evacuation is required.

More advice on preparing for flooding and specific advice on developing a flood plan from the Environment Agency can be found in their document 'What to do before, during and after a flood' http://www.biba.org.uk/PDFfiles/Contents/3130flho1110btfk-e-e.pdf

## 4.3 Working together to help communities manage their own risk of flooding across Dorset

### 4.3.1 Challenges and measures to help communities manage their own risk of flooding across Dorset

Table 34 presents measures that have been identified to guide actions that are required to meet the objective managing the likelihood and impacts of flooding in Dorset. Actions required to achieve the measures are detailed in Appendix 1.

## 4.4 Helping communities to manage their own risk

People who live and work in flood risk areas have a critical role in managing the risks they and their communities face. This role will, however, need to be supported by the risk management authorities. This section identifies some of the key areas that the strategy will take forward.

**Table 34: Measures to overcome challenges to help communities manage their own risk of flooding**

| Challenges | Measures |
|---|---|
| It is difficult to have a clear understanding of partner engagement by all Flood Risk Management Authorities and stakeholders. | 3.1. Develop a multi-partner community engagement strategy |
| Not all communities at risk from flooding have a flood plan that considers all sources of flooding. | 3.2 Develop community flood resilience |
| Difficult to share information between flood risk authorities from flood wardens / individuals during incident and recovery. | |
| Property Level Protection schemes require community level support to ensure success. | |
| Climate change may lead to an increased frequency, intensity and longevity of flooding which may require communities to respond differently. | |
| Communities and individuals are not always aware of funding / grants available to support flood risk management. | |
| The impact of flooding on local businesses can impact greatly on communities. Businesses do not always understand flood risk or actions they could consider to reduce potential impacts of flooding. | |
| Communities and individuals are not always fully aware or clear of their roles and responsibilities within flood risk management. | 3.3 Develop partnerships with communities to encourage joint ownership of flood risk management solutions |
| Individuals can be unaware of flood risk management options applicable to their property. | |

## 4.5 How Helping communities to manage their own risk can reduce impacts of future flooding (Objective 3)

Work together to help communities to manage their own risk can reduce impacts of future flooding and can contribute greatly to meeting other objectives in the strategy as follows:

**Objective 1 (Understanding flood risk across Dorset):** The information collected by communities and provided to flood risk management authorities can provide very useful evidence to help understand the flood risk and impacts so that appropriate flood risk management activities can be identified.

**Objective 2 (Manage the likelihood and impacts of flooding):** Actions contained within community flood plans can enable the communities to take actions to manage the likelihood and impacts of flooding and take action during flooding if support from flood risk management authorities or category 1 responders are unavailable.

**Objective 4 (Ensure flood risk is considered in local land development proposals):** Where communities have a good understanding of flood risks and impacts, this information can be used to bring the community together to address issues including watercourse maintenance. The knowledge and evidence the communities will have developed through managing their own flood risk could be a useful contribution to neighbourhood planning.

**Objective 5 (Improve flood prediction, warning, response and flood recovery):** The community flood plan which outlines how Dorset's communities can manage their own flood risk needs to be closely related to flood incident response and recovery plans to ensure interconnectivity between community flood plans, flood warnings and Category 1 responder's incident response plans.

# 5 OBJECTIVE 4: ENSURE FLOOD RISK IS CONSIDERED IN LOCAL LAND DEVELOPMENT PROPOSALS

This section discusses how flood risk needs to be considered in local land development proposals. It firstly provides a summary of how Dorset's population is likely to change (Section 5.1). It then discusses National Planning Policies (Section 5.1.1) and how this relates to Dorset (Section 5.2). Section 5.3 considers the measures that are required to ensure flood risk is considered in local land development proposals.

## *5.1 Population change, development and land management*

The provision of housing, business and associated needs of an increasing population may increase the impact of flooding. The population of Dorset is predicted to increase by over 50,000 by 2033 (Dorset County Council, June 2010), increasing the need to provide homes and infrastructure. It is important that development does not increase the risk or impact of flooding, National Planning Practice Guidance sets out the Government's advice on ensuring that such development takes place in areas of little or no risk in preference to areas at higher risk (it should be noted that some forms of mineral development are defined as being 'water compatible'). Central government funding will not be available to provide flood protection to properties constructed after January 2012 (Section 7.3.3). Therefore, it is essential that local plans and decisions on planning applications take flood risk fully into account, to ensure that new development does not increase flood risk (and, where possible, positively enhances flood management opportunities). It is also essential communities understand flood risk (Section 2), know how to manage and reduce the likelihood of flooding (Section 3) and know what actions to take on receipt of flood warnings Section 4).

Land management and development can have significant effects on the movement of water within a catchment. Development or changes in land use in areas not at risk of flooding can reduce or prevent rainwater infiltration into the ground, speed up surface water runoff resulting in increased flood risk downstream. This can also apply to rural and agricultural land use where changes in vegetation may cause similar impacts. This highlights the need for integration of planning policies with Flood Risk Management Strategies and Assessments and plans detailed in Section 2.2. The cost of flood damage is also likely to increase with inflation and in line with general increases in wealth over time as the value of goods and fittings in households and businesses increases. As a result, if the likelihood of flooding decreases over time, the economic consequences of flooding may still increase as the value of property and contents continue to rise.

### 5.1.1 National Context

The purpose of the planning system is to contribute to the achievement of sustainable development. The National Planning Policy Framework references the United Nations General Assembly definition of sustainable development: *"delivering development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (World Commission on Environment and Development, 1987). The National Planning Policy Framework also refers to the UK sustainable development strategy 'Securing the Future' which sets out five guiding principles of sustainable development: (i) living within the planet's environmental limits; (ii) ensuring a strong, healthy and just society; (iii) achieving a sustainable economy; (iv) promoting good governance; and (v) using sound science responsibly. It is within this context that all development should be delivered. The National Planning Policy Framework can be accessed at the following location: http://www.communities.gov.uk/publications/planningandbuilding/nppf.

A key part of this approach is to ensure that new development is planned to manage the risk of flooding. This should be taken into account in: (i) local plans by directing new development to areas with the lowest probability of flooding, and (ii) development management, by determining planning applications to ensure decisions comply with planning policy. Development also needs to be monitored to ensure that it is built according to the agreed permissions and, if necessary, enforcement action may be required to deal with unauthorised development.

The National Planning Policy Framework states that "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". Technical guidance on flood risk published alongside this framework sets out how this policy should be implemented and carries forward guidance previously contained in Planning Policy Statement 25 titled 'Development and Flood Risk.' This technical guidance can be accessed at the following location:
http://www.communities.gov.uk/documents/planningandbuilding/pdf/2115548.pdf
Changes introduced by the Localism Act have resulted in the abolition of Regional Spatial Strategies and (county level) Structure Plan policies which had been 'saved' under previous legislation. Consequently, responsibility for statutory plan-making resides with District councils in Dorset (but note that this is subject to a duty to co-operate on strategic matters across district boundaries, which may have relevance to flood risk management). Local communities can develop Neighbourhood Plans, which may set out planning policies for their local areas, but these must conform with the wider local plan for the area. Once adopted, Neighbourhood Plans form part of the statutory development plan. . Details of the Localism Act are available at the following location:
http://www.legislation.gov.uk/ukpga/2011/20/contents/enacted While the full impact of these changes remains to be seen, it is clear that local planning authorities now have increased responsibilities for strategic matters of cross-boundary significance, and this highlights the need for close working between the Dorset's authorities on planning and flood risk management.

## *5.2 Planning and local flood risk in Dorset*

Dorset County Council, is to become a Sustainable Drainage System Approving Body (SAB) and will have the role of approving, adopting and maintaining Sustainable Drainage Systems connecting more than one property. The County Council will be responsible for providing approval before connection can be made to the public surface water sewerage system. Sustainable Drainage Systems consent must be given before construction on a site can begin. In its Sustainable Drainage Systems Approval Body role, the County Council will become a statutory consultee on planning applications with implications for surface water drainage.

In addition to these duties, Dorset County Council has a regulatory role in respect of issuing and enforcing formal Land Drainage Act consents for activities on ordinary watercourses for consenting third party activities on "designated structures"; therefore a parallel process to issuing planning permissions is also required here. These new duties will result in significant changes to Dorset County Council's involvement in the planning system. It is important that the appropriate linkages are made to maximise opportunities for sustainable development and adaptation to climate change; ensuring that the planning process continues to operate efficiently in sustaining local communities, promoting economic growth and protecting and enhancing the environment.

Local planning authorities have the overall responsibility for ensuring that new developments and redevelopments do not increase flood risk elsewhere and are located in the areas of

lowest risk practicable. If development is to be undertaken in areas of flood risk, the local planning authorities should ensure it is informed by an appropriate flood risk assessment and that development is appropriately flood resistant and resilient. The local planning authority also has the responsibility to give priority to the use of sustainable drainage systems.

### 5.2.1 Plan-making in Dorset

District Councils and the unitary authorities of Bournemouth and Poole, as local planning authorities, are responsible for preparing local plans for their areas. Local plans should set out strategic priorities for their areas, including a spatial indication of development needs over the plan period, and are responsible for allocating land for specific uses, where appropriate. They should also include policies to deliver climate change mitigation and adaption, and will need to be supported by adequate, up-to-date and relevant evidence, including evidence on flood risk which is held within the Strategic Flood Risk Assessments, and expanded on further in this section.

Minerals and waste local plans are the responsibility of 'upper tier' authorities which in Dorset's case includes Bournemouth Borough Council, Dorset County Council and Borough of Poole. Minerals and waste local plans identify the future need for mineral extraction and waste management facilities and set out appropriate spatial policies including, where necessary specific allocations. Unlike most other forms of development, minerals need to be worked where they are found. National planning policy guidance makes it clear that sand and gravel extraction is generally deemed to be water-compatible as it does not, in itself, increase the risk of flooding or displace flood water storage capacity. By agreement with Bournemouth and Poole, Dorset County Council prepares minerals and waste local plans for the entire county area (i.e. including the two unitary authorities).

Details of the Local Plans relevant to Dorset can be found at the following location: https://www.dorsetforyou.com/planning.

### 5.2.2 Neighbourhood planning

The Localism Act 2011 introduced the right for communities to prepare a neighbourhood plan for their local area. A neighbourhood plan may set out planning policies for the local area but should be in line with the strategic policies of the adopted development plan.

Neighbourhood plans will become part of the local development plan and will form the basis for determining planning applications in that area. A neighbourhood development order is another device which enables the community to grant planning permission for the development it wishes to see. The local parish or town council will lead the work. In areas without a parish council, new neighbourhood forums will take the lead. In areas which are predominately commercial, the neighbourhood forum can be led by a business neighbourhood forum.

The local planning authority must provide support and make the necessary decisions at key stages, for example, it will organise the neighbourhood referendum at the end of the process. The referendum ensures that the local community has the final say on whether a neighbourhood plan, neighbourhood development order or a community right to build order comes into force in their area. Neighbourhood plans must be in general conformity with the strategic policies of corresponding local plans, but outside these strategic elements neighbourhood plan policies will take precedence over existing local plan policies.

### 5.2.3 Flood risk plans

Dorset County Council has produced a Preliminary Flood Risk Assessment that identifies any high level flood risk in Dorset (Section 2.2.3) and undertaken a strategic Surface Water Management Plan (Section 2.2.4.3). Although the documents cannot be used to assess flood risk for individual developments, they can be used to inform strategic planning decisions. It is anticipated that sites that are identified after strategic assessment as being at risk of flooding will require a site specific flood risk assessment.

The flood risk assessment will help to assess risks and any mitigation required and to inform the detailed design of surface water systems for any development planned on a site.

Dorset County Council's Flood Risk Management team will work closely with Local Authority planners to consider the implementation of the Sustainable Drainage System Approving Body role.

### 5.2.4 Managing Development

In the context of land use planning development management is the process of considering, and taking decisions on, planning applications for specific development proposals, including housing, business, schools or other uses. Local Authorities are responsible for determining most planning applications including housing, health, retail, offices and leisure. The county council is responsible for determining planning applications related to minerals and waste and its own developments, such as local authority schools, and highways schemes.

Flood risk in Dorset is assessed through the planning process in a number of ways. The planning process applies a principle called a sequential test that seeks to identify, allocate or develop certain types or locations of land before others. This is now contained within the National Planning Policy Framework. For example, a site considered to be at low flood risk in flood zone 1 should be considered before a site in a flood zone 2 or 3 wherever practicable.

The Environment Agency is a statutory consultee for planning applications. Therefore, Local Planning Authorities (LPAs) have to consult the Environment Agency on certain development proposals at risk from flooding before they make a decision. There is standard advice of the Environment Agency's website which explains what proposals they want to be consulted on. This helps steer the applicant to the appropriate level of detail required for a Flood Risk Assessment http://www.environment-agency.gov.uk/research/planning/93498.aspx
.
At present, the Environment Agency is required to be consulted by the Local Planning Authorities (LPAs) on all developments over 1 hectare in size in Flood Zone 1 with regards to surface water runoff implications; and on planning applications for development other than minor in Flood Zones 2 and 3. The Environment Agency provides technical advice to LPAs and developers on how best to avoid, manage and reduce adverse impacts of flooding. Developments in Flood Zone 1are likely to be dealt with by the LLFA following the introduction of the SAB.

The flood zones are the starting point for the sequential approach. The Environment Agency classifies land into zones. Flood zone 3 or high levels of local flood risk; flood zone 2 or medium levels of local flood risk; and flood zone 1 or low levels of local flood risk. Zones 2 and 3 are shown on the Environment Agency flood map with flood zone 1 being all the land falling outside zones 2 and 3. These flood zones refer to the probability of sea and river flooding only and does not take into account any existing flood defences or flooding from other sources (considered within this strategy).

The residual flood risk (i.e. the flood risk considering the presence of existing defences) is also considered in determining the viability of land for planning in areas of Dorset along main rivers and the coast that are protected by flood defences.

Properties that are not at risk from flooding from the rivers or the sea but may experience flooding from surface water or groundwater flooding may be located within Flood Zone 1. The public are able find out if there is a risk of surface water flooding in an area by looking at the map on the Environment Agency website at the following location: http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=377068&y=94320&scale=5 Development needs to also consider the aspirations of water companies, e.g., Wessex Water would like to maximise opportunities for surface water to be separated from the combined sewer through new and redevelopment.

A flood risk assessment report is required for all non-minor operational development. If the development is over 1 hectare in size a flood risk assessment will be required for all zones. The flood risk assessment should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account without increasing risk to others.

### 5.2.5 Strategic Flood Risk Assessments

Strategic Flood Risk Assessments are used to refine information on the probability of flooding, taking into account local and other sources of flooding, and the impacts of climate change (Section 2.2.5). Strategic flood risk assessments should identify the current and future extent and nature of flooding from fluvial, tidal and other natural/artificial sources. They can help improve understanding of what may flood, how, where, how often, and to what extent. In turn it informs decisions on flood risk management, land allocation and emergency planning, which can all contribute to flood risk reduction and help deliver sustainable development.

The overall aspiration for development in Dorset is that it should steer new development to areas of low flood risk.

### 5.2.6 Planning enforcement

The local planning authority has certain enforcement powers in relation to planning. These are used where it is expedient to do so, principally to ensure that development has planning permission or is built in accordance with approved plans and that any conditions on an application are met by the developer according to agreed timescales. Local planning authorities are responsible for enforcement of planning matters within their areas of decision making (e.g. housing, business and other types of development). Dorset County Council is responsible for the enforcement of county matters (minerals and waste and county council developments).

### 5.2.7 Sustainable Drainage Systems (SuDS)Approval and adoption

The Flood and Water Management Act (2010) was introduced to address the concerns and recommendations raised in the Pitt Report relating to surface water flooding following the 2007 floods. A SuDS Approving Body (SAB) will be set up with the responsibility of approving all surface water drainage systems in line with a set of National Standards set out by government as well as any specific local standards.

Approval for Sustainable Drainage Systems will effectively be a parallel process to that of planning permission. Under the legislation, the SAB has a duty to review and approve or

refuse applications for works. Once SuDS approval has been obtained, construction may begin. Once built, it is at the discretion of the SAB whether to voluntarily adopt the SuDS.

The responsibility for approving Sustainable Drainage systems will rest with Dorset County Council. In anticipation of this new responsibility Dorset County Council is working with key stakeholders to develop Dorset's Sustainable Drainage Systems Design and Adoption Handbook that will define how Sustainable Drainage Systems should be designed and constructed within Dorset. This will take into account any restrictions on surface water discharges to watercourses. This guide is intended for use by developers, LPAs, and designers, who are seeking guidance on the county's requirements for the design of sustainable surface water drainage. It provides information on the preferred design, application requirements, and approval process to enable the Sustainable Drainage Systems scheme to offer multiple benefits to the environment, developer, and community.

### 5.2.8 Ordinary watercourse land drainage consents

Under the Flood and Water Management Act 2010 Dorset County Council has a duty to be responsible for consenting of ordinary water courses. The duty transferred from the Environment Agency to County Council in April 2012. The County Council is responsible for ensuring that works (e.g. mill, dam, weir, or culvert) that may affect the flow of water through an ordinary water course gains the proper consents prior to work taking place. This enables the county council to ensure that any future work on a mill dam, weir of culvert does not cause a flood risk. Therefore, if riparian owners wish to culvert an ordinary watercourse or insert any obstruction, consent is required. An application for consent can be made through a form that is available on the Dorset County Council website at the following location: https://www.dorsetforyou.com/media.jsp?mediaid=171779&filetype=pdf There is a charge and conditions for doing this.

## *5.3 Working together to ensure flood risk is considered in local land development proposals across Dorset*

Table 35 presents measures that have been identified to guide actions that are required to meet the objective of ensuring flood risk is considered in local land development proposals. Actions required to achieve the measures are detailed in Appendix 1.

**Table 35: Measures required to achieve Objective 4 of Dorset's Local Flood Risk Management Strategy to Ensure flood risk is considered in local land development proposals**

| Challenges | Measures |
|---|---|
| New developments may be at risk from local sources of flooding. | 4.1. Consider all flood risks in planning process |
| New development may increase flood risk elsewhere within a catchment. | |
| Increased surface water flood risk from developments | 4.2. Ensure development of sustainable drainage systems |
| Planning policies need to take into account long term Flood Risk Management Strategies and plans | 4.3. Inform planning policies with regard to Local Flood Risk Management (with introduction of SAB) |

### 5.3.1 How ensuring flood risk is considered in local land development proposals will reduce impacts of future flooding

Work to ensure flood risk is considered in local land development proposals (Objective 4) is dependent on other objectives in the strategy as follows:

**Objective 1 (Understanding flood risk across Dorset):** Recording information on flooding will greatly assist in developing an improved understanding of flood risk across Dorset. This information will be used to inform future modifications to flood risk maps which are considered as part of the planning process.

The introduction of the Sustainable Drainage Systems Approving Body (SAB) role will ensure surface water will be comprehensively considered in future land developments. Knowledge of existing surface water flooding issues could provide valuable evidence to support the SAB.

Dorset County Council's Flood Risk Management team are currently working with planning departments to consider how the intelligence relating to groundwater flooding reported between 2012 and 2014 could be used to inform future planning processes.

**Objective 2 (Manage the likelihood and impacts of flooding):** Evidence documented through flood reports will help provide information for use in the planning process.

**Objective 3 (Help Dorset's communities manage their own flood risk):** Communities will be able to influence the management of their flood risk by influencing land development proposals through their neighbourhood planning process.

**Objective 5 (Improve flood prediction, warning, response and flood recovery):** Where land is developed exceptionally in a flood risk area, close links should be developed with DCC and the EA to consider the appropriateness of existing flood warning services.

# 6 OBJECTIVE 5: IMPROVING FLOOD PREDICTION, WARNING, RESPONSE AND FLOOD RECOVERY

This section outlines the requirements set out in the Civil Contingencies Act and the organisation of the Bournemouth, Dorset and Poole (BDP) Local Resilience Forum (LRF) Severe Weather Group. Section 6.2 discusses flood prediction and warning, Section 6.3 discusses flood response; and Section 6.4 discusses flood recovery.

## *6.1 Civil Contingency*

The Civil Contingencies Act 2004 lists local authorities, the emergency services and other organisations (including Environment Agency) as Category 1 responders to all emergencies including flooding. The Act sets out clear roles and responsibilities for the Category 1 and 2 responders for managing emergency planning and response at a local level. Information on the Civil Contingency Act 2004 can be found at the following location: https://www.gov.uk/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others.

A Civil Contingencies Unit (CCU) is due to be implemented in July 2014. The purpose of the CCU is to provide a shared service, providing specialist Civil Contingencies support to the Dorset Local Resilience Forum and Local Health Resilience Partnership to enable collective and individual alignment with the statutory duties outlined in the Civil Contingencies Act 2004. The proposed unit will be funded by the organisations that have statutory duties for civil contingencies throughout Bournemouth, Dorset and Poole.

### 6.1.1 Bournemouth, Dorset and Poole (BDP) Local Resilience Forum (LRF) Severe Weather Group

The Bournemouth, Dorset and Poole (BDP) Local Resilience Forum (LRF) was established in response to the statutory requirements of the Civil Contingencies Act 2004. It brings together all local Category 1 and 2 responders to implement a planned and coordinated approach to all the potential emergencies. There are a number of sub-groups in the BDP LRF that cover the specific emergency subjects. The work for developing flood plans relating to emergency and response is covered by the Severe Weather sub-group.
Members of the BDP LRF include all Category 1 and 2 Responder organisations and those other organisations defined in the Civil Contingencies Act. They will carry out their actions, roles and responsibilities as defined in the Major Incident Manual http://www.leslp.gov.uk/docs/major_incident_procedure_manual_8th_ed.pdf and as detailed in their own Operational Response Plans.

The organisations that form the BDP LRF are given in Table 36.

Organisations that are not represented within the Major Incident Manual but contribute to the flood response are as follows:
**MET OFFICE:** Provides the National Severe Weather Warning Service (NSWWS) for Severe Weather and Extreme Weather events.
**FLOOD FORECASTING CENTRE:** Joint EA / Met office centre which provides flood forecasting information and issue the Flood Guidance Statement which advises partners of the potential flooding from all sources.
**DEFRA:** Department of Environment, Food and Rural Affairs – collate local information to advise and ensure an appropriate level of Central Government response. They also facilitate any Ministerial and other VIP visits to the affected areas and ensure lessons learnt are captured from the incident.

During a large scale incident, response will be managed using the following hierarchical structure:
**Operational :** This is the level at which the management of "hands-on" work is undertaken at the incident site(s) - involving multiple agencies though 'FASTCON' multi-agency teleconferences.
**Tactical Co-ordinating Group (TCG):** This is a multi-agency group of tactical commanders that meets to determine, co-ordinate and deliver the tactical response to an emergency. It is at the Tactical level that the response to an emergency is managed.
**Strategic Co-ordinating Group (SCG):** This is a multi-agency body responsible for co-ordinating the joint response to an emergency at the local strategic level. It is at the Strategic level that the policy, strategy and the overall framework are established and managed.

### 6.1.2 Community Risk Register

The Bournemouth Dorset and Poole LRF have evaluated the likelihood and impacts of flood risks in Dorset and have considered the following types of flooding to have the following risk:

- Local coastal / tidal flooding (in one Region) HL18 - Very High (red)
- Localised flooding caused by groundwater emergence/ spring activity - HL108 Very High (red)
- Local fluvial flooding HL19 - Very High (red)
- Storms and Gales H17- High (amber)

The community risk register provides a general overview of the risk and considers potential impacts and required emergency response to flooding.

**Table 36: Organisations that form part of the Bournemouth Dorset and Poole Local Resilience Forum Severe Weather group**

| Category 1 Responders | |
|---|---|
| **Emergency Services** | Dorset Police |
| | British Transport Police |
| | Dorset Fire and Rescue Service |
| | South Western Ambulance Service NHS Trust |
| **Local Authorities** | Bournemouth Borough Council |
| | Dorset County Council |
| | Borough of Poole |
| | East Dorset District Council |
| | West Dorset District Council |
| | Purbeck District Council |
| | North Dorset District Council |
| | Weymouth & Portland Borough Council |
| | Christchurch Borough Council |
| **Health Organisations** | NHS England (Wessex Area Team) (Cat 1) |
| | Public Health England (PHE) (Cat 1) |
| | Dorset County Council Public Health (Cat 1) |
| | NHS Dorset Clinical Commissioning Group (Cat 2, supports NHS England in discharging its Cat 1 duties) |
| | Dorset County Hospital NHS Foundation Trust (DCH) (Cat 1) |
| | Royal Bournemouth & Christchurch Hospitals NHS Foundation Trust (RBCH) (Cat 1) |
| | Dorset Healthcare University Foundation Trust (DHUFT) (Cat 1) |
| | Poole Hospital NHS Foundation Trust (Cat 1) |
| **Miscellaneous** | Maritime Coastguard Agency |
| | Environment Agency |

| Category 2 Responders | |
|---|---|
| **Utilities Transmission, Distribution, Interconnection** | Wessex Water |
| | Bournemouth and West Hants Water |
| | South West Water |
| | Scottish and Southern Electricity |
| | National Grid |
| | Communications Network |
| | Vodafone |
| | Airwave Solutions Ltd |
| | Train Operating Companies |
| | Network Rail |
| | SW Trains |
| **Airports** | Bournemouth International Airport |
| **Harbour Authorities** | Portland Port |
| **Others** | Highways Agency |
| | Health and Safety Executive |
| | SW Strategic Health Authority |
| | Met Office |
| **Other Responder Organisations** | |
| | Divisional Resilience Team |
| | Military |
| | Voluntary Agencies, e.g. Red Cross |
| | Animal Health Agency |

## *6.2 Flood prediction and warning*

Flood prediction is a vital element to be able to understand flood risk and enable flood risk management authorities, stakeholders and communities to take appropriate action to reduce the impact and manage flood risk. The Environment Agency has a well-established flood warning service that aims to issue flood alerts and warnings predominantly for main river, coastal and groundwater flooding.

### 6.2.1 Forecasting and warning for surface water flooding

The projected changes to rainfall patterns as detailed in Section 2.2.9 suggest that in the future there may be more frequent high intensity rainfall events leading to surface water flooding. The increased periods of long duration rainfall would also lead to the saturated ground causing an increase in surface water flooding due to the increased overland flow and runoff. Surface water flooding is difficult to predict due to uncertainties in forecasts and the many factors that may cause it to occur including: (i) heavy rainfall; (ii) overflowing drains; (iii) burst water pipes; (iv) overflowing sewers; (v) blockages of gullies / ordinary water courses and (vi) inability of surface water to drain due to high water table.

Improvements have been made in rainfall forecasting methods since 2007. The National Flood Forecasting Centre provides a forecast of risk of all sources of flooding (including surface water and groundwater) through the daily Flood Guidance Statement. This is available for Category 1 and Category 2 responders (Section 6.1) and enables flood risk management authorities to take appropriate action to prepare for flooding. The Environment Agency presents information from the Flood Guidance Statement in the 'Three Day Flood Risk Forecast' which is available to the public at the following location: http://apps.environment-agency.gov.uk/flood/3days/125305.aspx At present, members of the public can also register to receive Met Office Weather Warnings via email. These provide advance notice of when severe weather / surface water flooding may be an issue:

http://www.metoffice.gov.uk/about-us/guide-to-emails.This service provides a useful trigger for communities at risk from surface water flooding to activate their community flood plans and complete appropriate actions to reduce the risk of flooding e.g. checking / clearing ordinary water courses of blockages in advance of the rainfall.

The Environment Agency's Rapid Response Catchment project developed and piloted new triggers for the identification of intense rainfall over catchments prone to extreme flash flooding. These triggers were then built into the Environment Agency's flood warning service in conjunction with the local communities. This project highlighted the difficulties in obtaining accurate rainfall forecasts. The project worked closely with communities to ensure they understood the balance between the timing and accuracy of the warnings. The results from the project are currently being evaluated. If successful, this methodology could be considered for development of future surface water warnings in partnership between Dorset County Council and the Environment Agency.

### 6.2.2 Flood Warning service for flooding from rivers or the sea or groundwater

The Environment Agency provides a flood warning service throughout the country in areas at risk of flooding from rivers, the sea or groundwater. They monitor rainfall, river levels, sea conditions and groundwater levels and forecast the possibility of flooding. If flooding is forecast, flood warnings are issued via a number of different channels including Floodline Warning Direct, Environment Agency website, Facebook's Flood Alerts' app, and local media etc.

Within Dorset, a Groundwater Flood Alert service has been set up, which covers West Dorset, Cranborne Chase and Salisbury Plain. The flood reconnaissance and intelligence from flood wardens regarding groundwater flooding between 2012-2014 has been used by DCC and the EA to develop Groundwater Flood Warnings are currently being developed for the following locations: (i) South Winterbourne Valley, North Winterborne, Frome and Piddle Valley and the Vale of Allen. The new groundwater flood warning service will be available from Autumn 2014. The Environment Agency uses three different warning codes – Flood Alert, Flood Warning and Severe Flood Warning. Each warning code requires a different response from residents and the emergency responders. Detail of flood risk within each flood warning area is contained in the Local Flood Warning Plan, which flood risk management authorities and Emergency Responders can use to inform the required incident response. Information about the meaning of flood warning codes and appropriate actions are presented in Table 37.

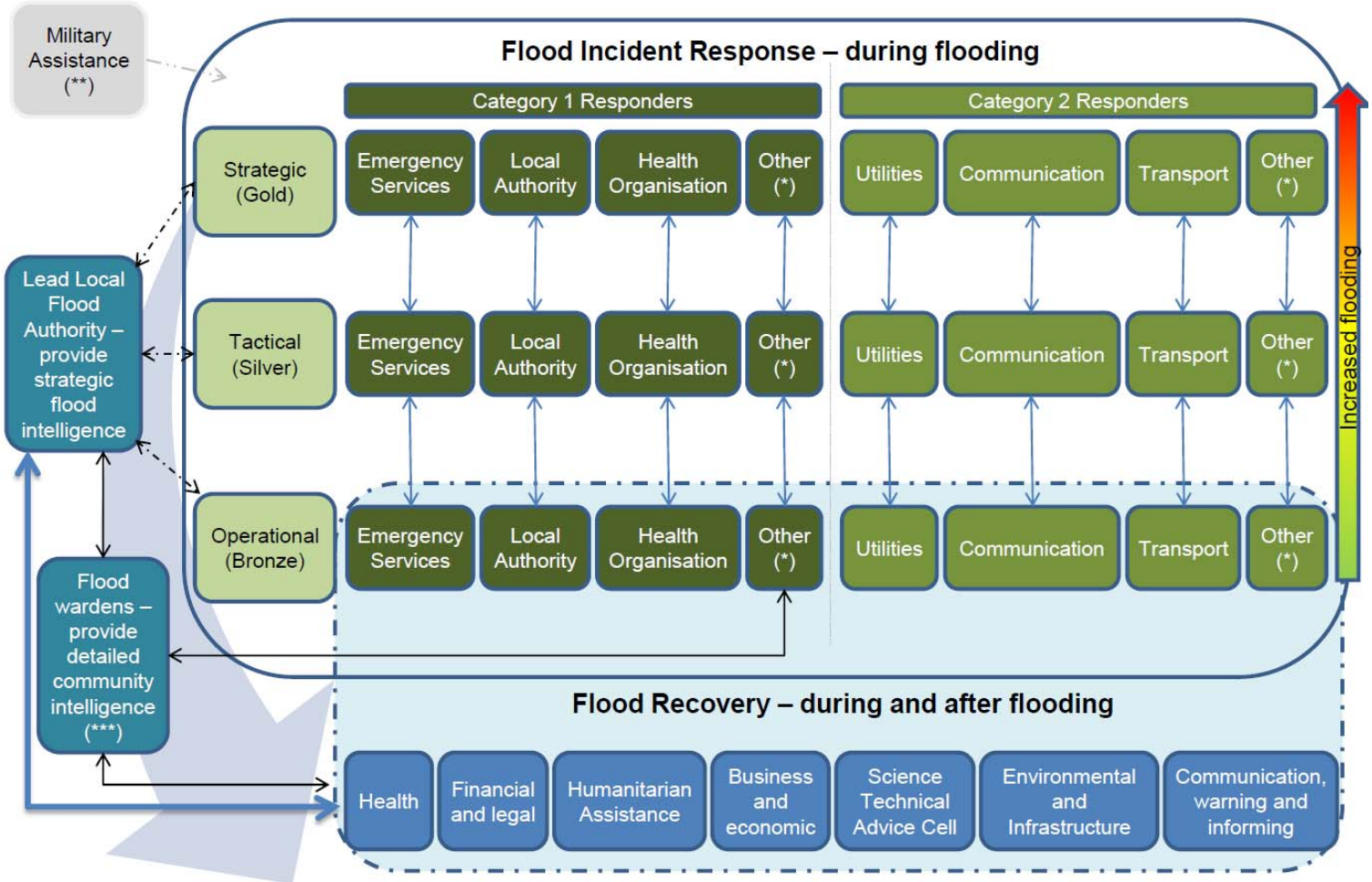
**Table 37: Information about the Flood Warning Service provided by the Environment Agency**

| | | |
|---|---|---|
| **Awareness raising** | | |
| | *Key message*: | Be aware. Keep an eye on the weather situation. |
| | Timing: | Daily forecasts of flooding on our website |
| | Residents actions: | Communications with the media and check the forecast on the Environment Agency website. |
| | Communication method: | internet and media |
| **Flood Alert** | | |
|  | *Key message*: | Flooding is possible. Be prepared |
| | Timing: | 2 hours to 2 days in advance of flooding |
| | Residents actions: | Be prepared for flooding and prepare a flood kit. |
| | Communication method: | Flood warning direct, Floodline and the internet |
| **Flood Warning** | | |
|  | *Key message*: | Flooding is expected, and immediate action required. |
| | Timing: | Half an hour to 1 day in advance of flooding |
| | Residents actions: | Act now to protect your property; Block doors with flood boards or sandbags and cover airbricks and other ventilation holes; Move family, pets and valuables to a safe place and keep a flood kit ready. |
| | Communication method: | Flood warning direct, Floodline, the internet and Media |
| **Severe Flood Warning** | | |
|  | *Key message*: | Severe flooding and / or danger to life. |
| | Timing: | When flooding poses a significant threat to life and different actions are required. |
| | Residents actions: | Be ready should you need to evacuate from your home. Co-operate with the emergency services and call 999 if you are in immediate danger. |
| | Communication method: | Flood warning direct, Floodline, the internet and Media |
| **Warning Removed** | | |
| No icon | *Key message*: | No further flooding is currently expected for your area. |
| | Timing: | Issued when flood warnings are not in force |
| | Residents actions: | Flood water may still be around and could be contaminated. If you've been flooded, ring your buildings and contents insurance company as soon as possible. |
| | Communication method: | Flood warning direct, Floodline, and the internet |

## *6.3 Response to flood incidents*

Response to flooding can be varied subject to the level and severity of the flooding. The Dorset Multi-Agency Flood Plan sets out the process and procedures for responding to flood emergencies by the Bournemouth Dorset and Poole LRF.

A summary of the Command and Control structure including the role of the flood wardens that is used during flood incident response and flood recovery is given in Figure 19.




* 'Other 'relates to Category 1 organisations e.g. the Environment Agency / Maritime & Coastguard Agency and Category 2 organisations including Military / voluntary agencies / Animal Health Agency .

** Military Assistance needs to be requested formally through Gold via the Military Assistance to Civil Authorities

*** Flood Wardens can provide information to inform the incident response through community situation reports on SWIM (October 2014) or by contacting the Environment Agency Duty Officer (24 hours) or Dorset County Councils Flood Risk Management team (working hours).

**Figure 19: Command and control structure including the role of the flood warden for flood incident response and recovery**

### 6.3.1 Bournemouth Dorset and Poole LRF multi-agency response to flooding

There are two activation routes for the response to flooding. If large scale flooding is forecast, a FASTCON teleconference between all multi-agency partners will be convened to discuss high risk sites and appropriate responses. The Environment Agency will arrange and chair this meeting if main river, coastal or groundwater flooding is forecast and will facilitate the teleconference if requested by the LLFA if only surface water flooding is forecast.

If significant flooding is occurring and a multi-agency response required Dorset Constabulary will lead on coordinating the multi-agency response to the flood emergency and other agencies act collaboratively to support the response. The Bournemouth, Dorset and Poole Multi - Agency Flood Plan (MAFP) details the required actions / links to the relevant plans for all the responders during a flood. The MAFP also links to relevant procedures plans and actions for organising evacuation and sheltering.

### 6.3.2 Dorset County Council Flood Risk Management team

During flooding, Dorset County Council's Flood Risk Management team will: (i) attend Local Resilience Forum teleconferences on a needs basis; (ii) provide technical advice regarding flooding; (iii) collate flood intelligence to gain an overview of the flood; and (iii) support the DCC Emergency Planning team who initiate multi-agency flood recovery work during the incident as detailed in Section 6.4.2.

### 6.3.3 Local Authorities

During flood incidents Local Authorities may take the following activities:

- activate their Operational Response Plans;
- provide sandbags to individuals or properties that are impacted by flooding. The sand bag policies of the Local Authorities are detailed at the following location: https://www.dorsetforyou.com/412807. The sandbag policies of Local Authorities across Dorset are currently being reviewed;
- manage a small number of local authority flood defence assets.

## *6.4 Flood Recovery*

The Local Resilience Forum coordinates the initial recovery process following flooding. At an appropriate time, the suitable agency is identified to lead on flood recovery, this could be the County Council.

### 6.4.1 Flood Recovery by the Local Resilience Forum

Actions of the Local Resilience Forum Recovery Group are guided by the Bournemouth Dorset and Poole Strategic Recovery Plan (https://www.dorsetforyou.com/media.jsp?mediaid=165456&filetype=pdf). This provides a strategic overarching framework that for designated personnel and agencies tasked with implementing the recovery process within the Recovery Co-ordinating Group and Sub Groups to provide support to communities that have experienced a major incident (i.e. flooding).

The lead agency will identify and engage the other relevant agencies and establish a recovery coordinating group. The membership of the recovery coordinating group will vary depending on the nature and extent of the flood, but will usually include the following representatives:

- Dorset County Council / Borough and Districts / Unitaries
- Chairs of activated Sub Groups
- Environment Agency (EA)
- Food and Environment Research Agency (FERA)
- Primary Care Trust (PCT)
- Health Protection Agency (HPA)
- Scientific and Technical Advisory Cell (STAC)
- Social and psychological Care
- Department for Environment, Food and Rural Affairs (DEFRA)
- Health and Safety Executive (HSE)
- Utility Companies
- Transport providers
- Maritime and Coastguard Agency (MCA)
- Dorset Police
- Dorset Fire and Rescue Service
- Ministry of Defence (MOD)
- Natural England (NE)
- Site Operator/Contractor
- Voluntary Community Organisation Representatives
- Government Decontamination Service

More detail on how the recovery process will be managed is documented in the Dorset County Council major emergency community recovery plan.

Subgroups may be set up to lead on the following stages of recovery:

- Health
- Humanitarian Assistance
- Business and Economic
- Environmental and Infrastructure
- Financial and Legal
- Science,Techncial Advice Cell
- Communications, Media, Warning and Informing

### 6.4.2 Flood Recovery by the Flood Risk Management team

Flood recovery work and involvement by the Flood Risk Management team begins as soon as reports of local flooding are received.

Actions taken may include:

- collating flood reports from all flood risk management authorities;
- providing advice about flooding;
- advising Dorset County Council's Emergency planners and members of the Local Resilience Forum of details of flood risk from local sources of flooding;
- conducting site visits to investigate and understand flooding mechanisms;
- liaising with appropriate flood risk management authorities to ensure that they are aware of the flood incident;
- working with the communications team to ensure that communities are aware of flood risk management support;
- attending parish council meetings;
- arranging and hosting flood drop-in sessions in partnership with appropriate flood risk management authorities to provide support and advice to communities that have reported flooding;
- liaising and agreeing which communities and specific issues RMA's will lead on.
- coordinating and providing data following the flood incident.

During the 2013/14 flooding the Flood Risk Management team worked with the Dorset Highways team to temporarily re-directed a number of the highways operational teams from non-urgent projects to support clearing drains and repairing pot holes to help reduce the impact of flooding on the Counties infrastructure.

## *6.5 Working together to improve flood prediction, warning, response and recovery across Dorset*

Table 38 presents measures that have been identified to guide actions that are required to meet the objective of improve flood prediction, warning, response and recovery. Actions required to achieve the measures are detailed in Appendix 1.

**Table 38: Measures required to achieve Objective 5 of Dorset's Local Flood Risk Management Strategy to improve prediction, warning, response and recovery to flooding**

| Challenges | Measures |
|---|---|
| To enable communities to manage their own flood risk, support is required to develop individual and community flood plans before flooding occurs, so that communities can manage their own risk independently or in conjunction with flood risk management authorities where required. | 5.1 Advise Dorset's residents of what to do before, during and after a flood |
| Existing flood warnings have been developed for main river, coastal and groundwater flooding. Few flood warnings directly relate to surface water risk. | 5.2. Develop flood warning services for all sources of flooding |
| Flood risk management activities of flood risk management activities may not be effective when conducted independently. | 5.3. Emergency preparedness |

### 6.5.1 How improved flood prediction, warning response and recovery will reduce impacts of future flooding

Work to improve flood prediction, warning, response and recovery is dependent on other objectives in the strategy as follows:

**Objective 1 (Understand flood risk across Dorset):** Continuous improvement in understanding of flood risk through learning from flood incidents and improved modelling techniques will provide the evidence and data required to facilitate improvements to the forecasts and warnings for future flooding.

**Objective 2 (Manage the likelihood and impacts of flooding):** The improvements to warnings derived from the greater understanding of flood risk can also be used to help identify appropriate actions by flood risk management authorities to consider actions and measures to mitigate and reduce future flooding.

**Objective 3 (Help Dorset's communities manage their own flood risk):** Improvements to the warning service and can be used to trigger activation of community and individual flood plans to enable Dorset's communities manage their own flood risk.

**Objective 4 (Ensure flood risk is considered in local land development proposals):** Flood warnings, incident response and recovery plans can be used to provide support to communities to actively manage flood risk where development occurs / has previously occurred in areas at risk from flooding.

# 7 Funding and Delivery

## *7.1 Local Context*

It is important that the local strategy sets out how the proposed actions and measures identified in this strategy will be funded and resourced in Dorset. Dorset County Council, along with other key stakeholders in the county has a limited budget to deliver flood risk measures. So it is important to identify how and from where resources will be available to fund flood risk management activities.

This section outlines the current available funding for flood risk management, the opportunities for funding through mechanisms such as Government grants and where in the future new funding streams will be generated where feasible.
There are various funding streams available for risk management authorities in Dorset, as detailed in Figure 21.

## *7.2 Funding for new and existing flood alleviation schemes*

In line with the Pitt Review, recommendations that the Government should develop a scheme that allows and encourages local communities to invest in flood risk management measures, DEFRA has changed the way in which key stakeholders can access funding for flood risk management activities. Under the new scheme funding can be gained based on the benefits delivered (payment for outcomes).

Benefits are calculated by assessing indicators such as the number of households protected, the damages being prevented, the impact on vulnerable communities, environmental benefits and benefits to businesses and agriculture amongst others.

The funding scheme aims to encourage those that will benefit from the flood alleviation scheme, (including communities, businesses and developers) to contribute financially. It is anticipated that this process will enable Defra to spread its finite resources more widely to fund more projects. This aspiration is explained further in Figure 20 that compares the old all or nothing funding regime to the new approach.

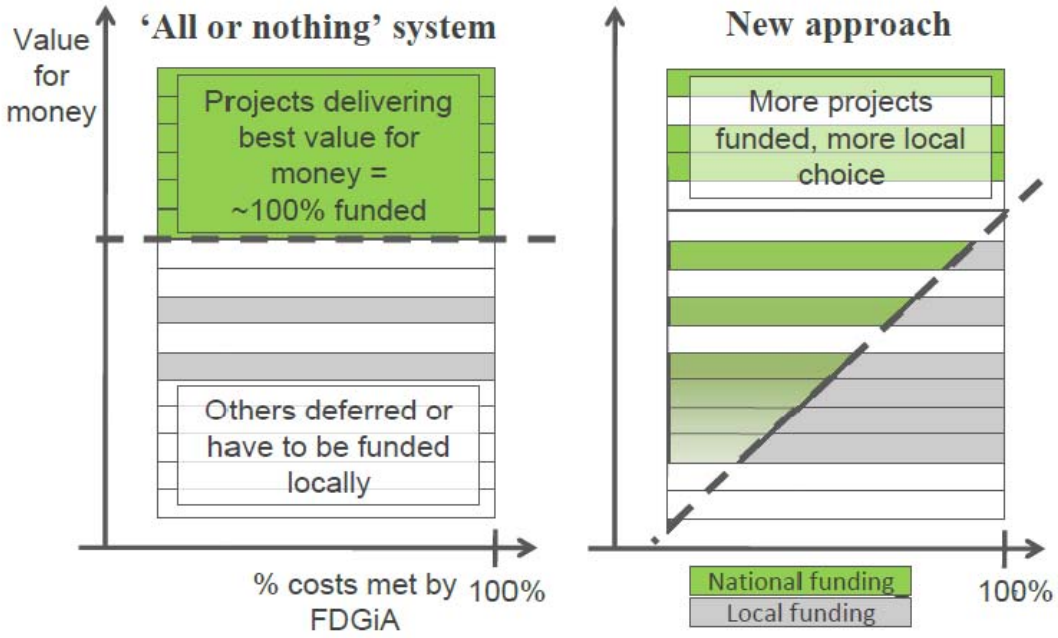



**Figure 20: Defra's funding model**

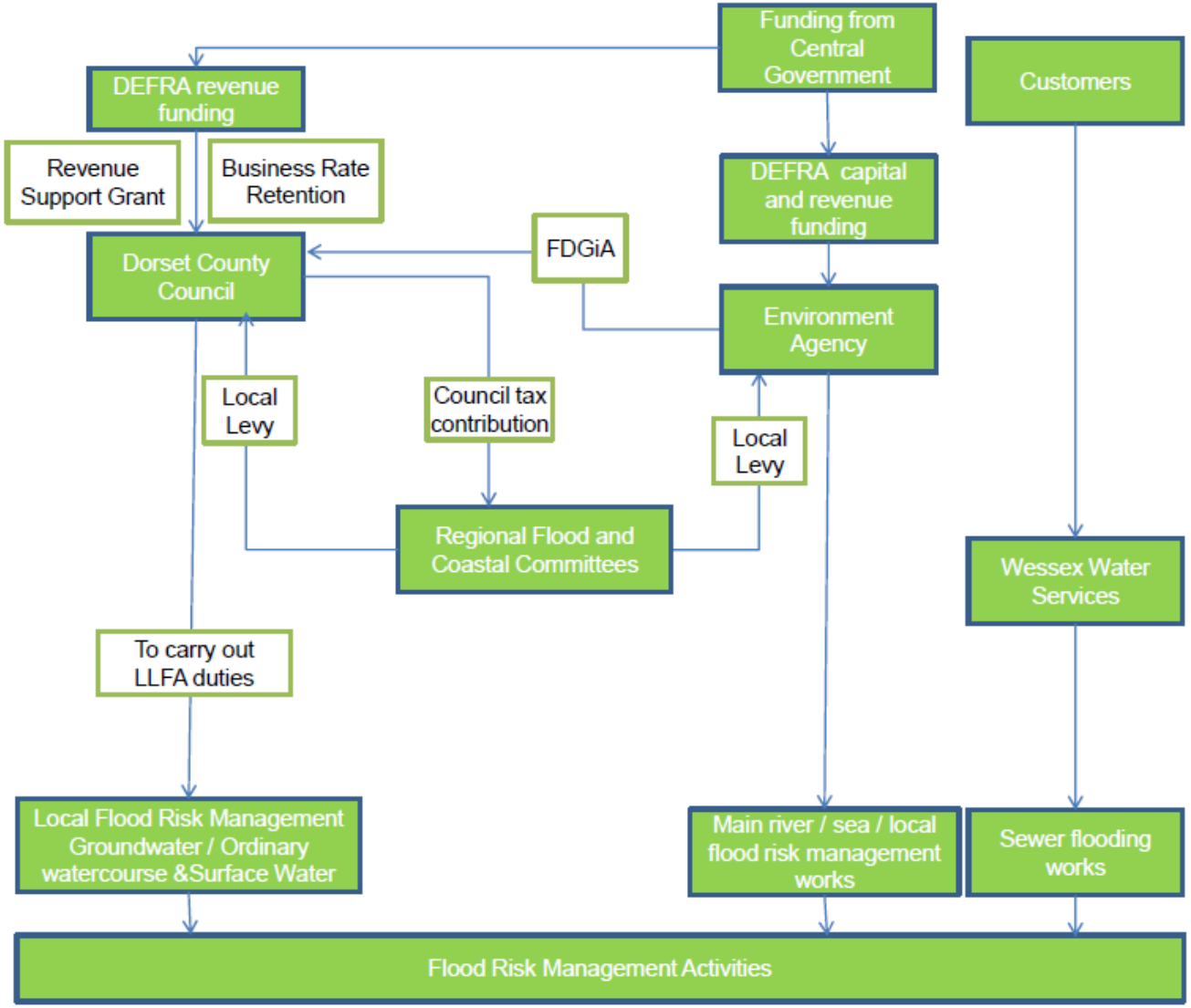



**Figure 21: Various funding streams and expenditure for flood risk management activities**

Defra has devised a set of principles using the funding model presented in Figure 20 to support the new national funding system, and these:

- encourage an increase in total investment in flood risk management by operating authorities, beyond levels provided by central Government alone;
- enable more local choice within the system and encourage innovative and cost-effective options to be promoted;
- rather than some projects being fully funded and others not at all, now some funding will be available to all potential projects;
- funds from central government should prioritise protecting those most at risk and least able to help themselves;
- include all flood and coastal erosion projects, regardless of which risk management authority is leading it, should be treated equally, based on the benefits delivered and damages avoided;
- include the general taxpayer should not pay to protect new development in areas at risk of flooding, now or in the future;
- include all investment within a nationally consistent framework to take account of policies and findings within Catchment Flood Management Plans;
- Maintain the widespread take-up of flood insurance by helping to keep insurance affordable through risks being managed properly.

Under this system some schemes will continue to receive complete funding, if the benefits significantly outweigh the costs. For others, partial funding would be available and partnership contributions would be sought. Funding can be applied for on an annual basis, via the Government's Flood Defence Grant in Aid. Applications are assessed by the Environment Agency at a Project Approval Board and applicants receive an indicative allocation of funding pending approval by the Wessex Flood and Coastal Committee. Applications are open to the Environment Agency, Dorset County Council and District Councils.

## *7.3 Funding for key flood risk management activities*

It should be noted that while each organisation receives varying levels of funding for flood risk management activities, they do not act in isolation. Dorset County Council takes a partnership approach to funding work to reduce flood risk and always looks to reduce costs and resources through working in partnership. Funding from the Wessex Flood and Coastal Committee's local levy is also available for flood alleviation schemes, to tackle tidal, costal, fluvial and surface water flood risk.

The Government has committed funds to lead local flood authorities via the revenue support grant and business rate returns, to support them in carrying out responsibilities under the Flood and Water Management Act 2010. Defra is providing up to £36 million a year.

### 7.3.1 Cost / benefits of flood risk measures

The Environment Agency estimates that every £1 currently invested in new and improved flood risk management assets reduces the long-term cost of flooding and coastal erosion damages by around £8 (Environment Agency, 2009). It is expected that a similar cost / benefit could be applied for cost evaluation of surface water and groundwater flood alleviation schemes. These schemes will be considered where appropriate on a needs basis through measures contained within Objective 2 (Manage the likelihood and impacts of flooding) and Objective 4 (Ensure flood risk is considered in local land development proposals) within this strategy.

The rural location of many properties that have experienced flooding in Dorset means that development of large community scale flood alleviation schemes to protect properties from local sources of flooding often are not financially viable. This means that PLP is the only

viable option to support rural properties from flooding. Defra evaluated the cost / benefit of the Defra property level protection scheme and calculated an average cost benefit ratio from the case study projects was 4.8 to 1 (JBA Consulting, 2012). This means that for every pound spent, estimated flood damages of £4.80 are avoided, representing good value for money. The PLP schemes achieve reductions in flood risk and generate other intangible benefits which are not included in the cost benefit analysis. These include reducing stress and anxiety for those living in fear of flooding, bringing communities together to decide how to manage their flood risk (one of the aims of Partnership Funding) and raising the general level of flood awareness and preparedness in communities. The PLP installations relate to Objective 2 (Manage the likelihood and impacts of flooding) and Objective 3 (Help Dorset's communities manage their own flood risk) within this strategy.

The Environment Agency estimates that every £1 currently invested in new and improved in flood incident management and flood resilience measures also reduce the long-term cost of flooding and coastal erosion damages by an en estimated £8 (Environment Agency, 2013). It is expected that a similar cost / benefit could be applied for the cost of incident management and community resilience to also reduce the long-term cost of flooding from local sources of flooding which would be met by Objective 1 (Understand flood risk across Dorset), Objective 3 (Help Dorset's communities manage their own flood risk) and Objective 5 (Improve flood prediction, warning, response and flood recovery) of this strategy.

### 7.3.2 Local Authorities in Dorset

Local Authorities in Dorset hold a limited budget to enable them to undertake essential capital works under a scheduled maintenance routine and are able to secure funding to undertake essential works on watercourses when issues are identified.

### 7.3.3 Town and Parish Councils

Under a new Government order town and parish councils have been given the General Power of Competence (under the Localism Act), and can now spend money on flood alleviation schemes. This means that parish councils can contribute to partnership funding contributions for flood alleviation schemes in the future. Parish Councils have raised concerns about the potential to raise additional funds through the General Power of Competence. Where funding is not possible, alternative funding sources can be explored by communities in partnership with relevant Flood Risk Management Authorities.

### 7.3.4 Wessex Water Services

Funding is not specifically allocated on a county basis. It is allocated on a risk and cost benefit basis throughout the Wessex region. A certain amount is allocated on a Wessex Water Services area basis to tackle reported sewer flooding of properties in their area.

### 7.3.5 Environment Agency

The Environment Agency's Wessex Flood and Coastal Committees raise local levies under existing arrangements to fund local flood risk management priorities. The members of Wessex Flood and Coastal Committees manage the spending of the Government Flood Defence Grant in Aid and local levies which are raised from Lead Local Flood Authorities. These are the key streams of funding for flood alleviation schemes from fluvial, coastal and local flooding. They also contribute towards individual property level protection schemes and the maintenance programme. Dorset falls within the Wessex Regional Flood and Coastal Committee who allocate how and where funds are spent.

### 7.3.6 Developer contributions

Local planning authorities have powers to introduce a Community Infrastructure Levy (CIL) which sets a specific tariff that will be levied upon qualifying development. This needs to be

the subject of viability testing and has to be accompanied by a charging schedule which identifies types of infrastructure that CIL will be used for. This is aimed at gap-funding for infrastructure needed by new development where the pooling of contributions from relevant developments is required (usually more strategic local infrastructure requirements). It might include flood risk management measures which are needed to serve a wider local geographical area (such as coastal towns).

Under Section 106 of the Town and Country Planning Act 1990 local planning authorities can enter into an agreement with a developer or land owner as part of the planning application process to secure financial contributions towards the provision of services or infrastructure which are directly related to the needs of the development. This would include funding to reduce flood risk which is caused by, or increased by a new development. However, once CIL is introduced, or by April 2015, whichever is the sooner, local planning authorities will not be able to pool Section 106 contributions from more than 5 individual developments where such contributions were secured after April 2010. It will be important, therefore, to address flood risk management needs through CIL where the pooling of contributions is required.

The Environment Agency is looking to develop and implement more efficient approaches to the procurement of capital schemes and making contractual frameworks accessible to other risk management authorities.
Building links with other plans such as River Basin Management Plans (RBMPs) (Section 2.2.6) and infrastructure investment plans can help this approach and secure wider sources of funding.

### 7.3.7 Other sources of funding

Other sources of funding and/or assistance that could be considered include:

- National lottery grants
- European Union funding streams
- Private beneficiaries (e.g. utility companies, landowners etc.)
- Business rate supplements
- Local fundraising
- Involvement from the voluntary sector

## *7.4 Staff resources*

Recruitment, retention and skill enhancement of staff within the local flood risk management team is essential to ensure that the plans laid out in the Local Strategy can be implemented.

# 8 Assessments required to implement Dorset's Local Flood Risk Management Strategy

The following assessments are required to ensure the implementation of the local flood risk management strategy will not cause negative impacts to either: (i) Dorset's environment or (ii) cause any discrimination to Dorset's residents.

## *8.1 Strategic Environmental Assessment (SEA)*

The impact of the Local Flood Risk Management Strategy on the environment has been considered within the Environmental Report which can be found at the following location: https://www.dorsetforyou.com/localfloodrisk

## *8.2 Equality Impact assessment (EqIA)*

An equality impact assessment has been undertaken on the strategy and it concluded there are no adverse impacts on any equality grounds. The results of the EqIA will be published at the following location: https://www.dorsetforyou.com/390153

# 9 Next steps

A programme for refreshing this strategy is provided by the Flood Risk Regulations. The Preliminary Flood Risk Assessment review will need to be carried out once every six years and this strategy will sub-sequentially be reviewed as a result.

However, this strategy should be considered a living document at all times. The strategy Action Plan will require regularly updating. As severe weather events occur they will provide a better understanding of flood risk and this could lead to a change in priorities.

# 10 Glossary and Abbreviations

| | |
|---|---|
| **Awarded Watercourse** | **This term is used to describe the range of ordinary watercourses managed some of the lower tier authorities.** |
| **Breach** | Flooding caused by the constructional failure of a flood defence or other structure that is acting as a flood defence. |
| **Catchment Flood Management Plans (CFMPs)** | Catchment Flood Management Plans have been produced by the Environment Agency and are high level planning tools that set out objectives for flood risk management for each river catchment and estuary. They also identify flood risk management policies that are economically practical, have a potential life of 50 to 100 years, and will aid partnership working to put them in place. CFMPs consider inland risk from rivers, surface water, groundwater and tidal flooding but do not consider sewer flooding. |
| **Civil Contingencies Act (2004)** | This is legislation that aims to deliver a single framework for civil protection in the UK and sets out the actions that need to be taken in the event of a flood. The CCA is separated into two substantive parts: local arrangements for civil protection (Part 1) and emergency powers (Part 2). |
| **Climate Change** | A long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may also be a change in the average weather conditions or a change in the distribution of weather events. Climate change may be limited to a specific region, or may occur across the whole planet. |
| **Conservation of Habitats and Species Regulations (2010)** | An Act which transposed the Habitats Directive into UK law. The regulations aim to help maintain and enhance biodiversity throughout the EU, by conserving natural habitats, flora and fauna. The main way it does this is by establishing a coherent network of protected areas and strict protection measures for particularly rare and threatened species. |
| **Critical Infrastructure** | A term used to describe the assets that are essential for the functioning of a society and economy. Most commonly associated with the term are facilities for: electricity generation, transmission and distribution; gas production, transport and distribution; oil and oil products production, transport and distribution; telecommunication; water supply (drinking water, waste water/sewage, stemming of surface water (e.g. dikes and sluices)); agriculture, food production and distribution; heating (e.g. natural gas, fuel oil, district heating); public health (hospitals, ambulances); transportation systems (fuel supply, railway network, airports, harbours, inland shipping); financial services (banking, clearing); and security services (police, military). |
| **Culvert** | A closed conduit used for the conveyance of water under a roadway, railroad, canal, or other impediment. |
| **Flood Defence** | A structure that alters the natural flow of water or flood water for the purposes of flood defence, thereby reducing the risk of flooding. A defence may be 'formal' (a structure built and maintained specifically for flood defence purposes) or 'informal' (a structure that provides a flood defence function but has not been built and/or maintained for this purpose). |
| **Environment Agency** | An Executive non-departmental public body responsible to the Secretary of State for Environment, Food and Rural Affairs. The Environment Agency's principal aims are to protect and improve the environment, and to promote sustainable development. |
| **Flood Map** | A multi-layered map which provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences. |
| **Flood Map for Surface Water** | The most recently produced data set developed by the Environment Agency. The Flood Map for Surface Water better represents the mechanisms that cause surface water flooding. |

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| **Flood And Water Management Act (FWMA) 2010** | The FWMA 2010 combines the recommendations of the Pitt report and previous policies, to improve the management of water resources and create a more comprehensive and risk based regime for managing the risk of flooding from all sources. The Act reinforces the need for an integrated approach to managing flood risk and places a number of roles and responsibilities on local authorities, such as the County Council as Lead Local Flood Authority. |
| **Flood Hazard Map** | A map that defines flood risk areas and shows: the likely extent (including water level or depth) of possible floods; the likely direction and speed of flow of possible floods; and whether the probability of each possible flood occurring is low, medium or high (in the opinion of the person preparing the map). |
| **Flood Resilience** | Actions taken to reduce the impacts of internal flooding of a property |
| **Flood Resistance** | Actions taken to prevent to ingress of flood water to a property. Flood Resistance measures may include flood barriers or flood gates. |
| **Flood Risk** | Flood risk is a combination of two components: the chance (or probability) of a particular flood event occurring and the impact (or consequence) that the event would cause if it occurred. |
| **Flood Risk Map** | A map showing: the number of people living in the area who are likely to be affected in the event of flooding; the type of economic activity likely to be affected in the event of flooding; any industrial activities in the area that may increase the risk of pollution in the event of flooding; any relevant protected areas that may be affected in the event of flooding; any areas of water subject to specified measures or protection for the purpose of maintaining the water quality that may be affected in the event of flooding; and any other effect on human health, economic activity or the environment (including cultural heritage). |
| **Flood Risk Management** | A process to reduce the probability of occurrence through the management of land, river systems and flood defences and reduce the impact through influencing development on flood risk areas, flood warning and emergency response. |
| **Flood Risk Regulations 2009** | The Flood Risk Regulations 2009 came in to force on the 10 December 2009. They transpose the EU Floods Directive into UK law. The key provisions of the regulations for local authorities are:<br>• to give responsibility to lead local flood authorities (unitary and county councils) to do the same for all other forms of flooding (excluding sewer flooding which is not caused by precipitation);to require preliminary flood risk assessments (Preliminary Flood Risk Assessments) by the Environment Agency and lead local flood authorities to be prepared by 22 December 2011. These should, on the basis of Environment Agency and lead local flood authority Preliminary Flood Risk Assessments, identify areas of significant flood risk;<br>• the requirement of flood hazard and risk maps to be prepared by 22 December 2013 for identified areas of significant flood risk; and<br>• the requirement of flood risk management plans to be prepared by 22 December 2015 for the same areas. |
| **Flood Zones** | Nationally consistent delineation of 'high' and 'medium' flood risk, published on a quarterly basis by the Environment Agency |
| **Flood Zone 1** | Defined as an area only at risk of flooding from flood events with an Annual Exceedance Probability (Low Probability) (AEP) of less than 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is less than 0.1%. |
| **Flood Zone 2** | (Medium Probability) Defined as an area at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of between 1% (1 in 100) and 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is between 1% and 0.1%. |
| **Flood Zone 3a** | (High probability) Defined as an area at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of greater than 1% (1 in 100r). The probability of flooding occurring in this area in any one year is greater than 1%. |
| **Flood Zone 3b** | (Flood plain) Defined as land where water has to flow or be stored in times of flood. Usually defined as areas at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of greater than 5% (1 in 20) design |

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| | event. The probability of flooding occurring in this area in any one year is greater than 5%. |
| **Fluvial** | The processes associated with rivers and streams and the deposits and landforms created by them. |
| **Groundwater** | Water located beneath the ground surface, either in soil pore spaces or fractures in rock |
| **Gully** | An artificial channel serving as a gutter or drain. |
| **Land Drainage Act 1991** | The Land Drainage Act was enacted in December 1991. It consolidates existing water legislation and outlined the duties and powers to manage land drainage for a number of bodies including internal drainage boards and local authorities. Some sections of the Land Drainage Act 1991 have been amended subsequently.<br>It outlines the duties and powers to manage land drainage for a number of bodies including the Environment Agency, internal drainage boards, local authorities, navigation authorities and riparian owners. |
| **Main River** | All watercourses shown on the statutory main river maps held by the Environment Agency and the Department for Environment, Food and Rural Affairs. The Environment Agency has permissive power to carry out maintenance and improvement works on these rivers. |
| **Making Space for Water (MSfW) published on 29 July 2004** | A cross-Government programme taking forward the developing strategy for flood and coastal erosion risk management in England. It is no longer current but the work has informed the Government policy direction and the Flood and Water Management Act 2010 with regards to managing all risks and providing innovative ways of doing this. The strategy proposed that the Government will, over the 20-year lifetime of the strategy, implement a more holistic approach to managing flood and coastal erosion risks in England. |
| **Medium Term Plan** | The Medium Term Plan shows flood and coastal management schemes which the Environment Agency Board has allocated Defra grant in aid fund which have been approved by the Wessex Flood and Coastal Committee. |
| **National Flood and Coastal Erosion Risk Management Strategy** | The Environment Agency's National Strategy was published in May 2011 and provides an overview of how flood risk and the risk of coastal erosion will be managed across England. The aims and objectives of the National Strategy have been translated onto a local scale through this Local Strategy for the County Council. |
| **National Planning Policy Framework (NPPF)** | This sets out the Government's planning polices for England in a single concise document. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. |
| **Ordinary Watercourse** | Any section of watercourse not designated as a main river. |
| **Pitt Review** | Sir Michael Pitt carried out an independent review of the 2007 floods and made a number of recommendations for future flood risk management. In particular, he recommended that local authorities should play a more significant role in tackling local problems of flooding and coordinating all relevant agencies. Many of the recommendations of The Pitt Review have been enacted through the Flood and Water Management Act. |
| **Pluvial** | Direct runoff as a result of rainfall and the processes associated with it. |
| **Precipitation** | Describes the processes involved in rain, sleet, hail, snow and other forms of water falling from the sky. |
| **Preliminary Flood Risk Assessment (PFRA)** | The Preliminary Flood Risk Assessment is a process involving an assessment of past floods and the possible consequences of future floods, leading to the identification of Areas of significant risk. All LLFAs must prepare a PFRA report in relation to flooding in the LLFA's area. The LLFA is not required to include information about flooding from the sea, main rivers and reservoirs unless the authority thinks that it may affect flooding from another source. The floods to be included are those which had significant harmful consequences for human health, economic activity or the environment. |
| **Wessex Flood and** | The WFCCs were set up under the Floods and Water Management Act 2010. The committees have a chair appointed by the (WFCCs) Minister, |

| | |
|---|---|
| **Coastal Committee** | members from Lead Local Flood Authorities (allowing for local democratic input) and independent members recruited by the Environment Agency who have specialist skills or backgrounds. The WFCC play an important local role in guiding flood and coastal risk management activities within catchments and along the coast, advising on and approving programmes of work for their areas as well as raising local levies to fund local priority projects and works in partnership with others. |
| **Reservoir** | Artificial lake used to store water. Reservoirs may be created in river valleys by the construction of a dam or may be built by excavation in the ground or by conventional construction techniques such a brickwork or cast concrete. Reservoirs greater than 10,000m3 are governed by the Reservoirs Act 1975. |
| **Residual Risk** | The risk which remains after all risk avoidance, reduction and mitigation measures have been implemented. |
| **Return Period** | The probability of a flood of a given magnitude occurring within any one year. |
| **Riparian Owner** | All landowner s whose property is adjoining to a body of water have the right to make reasonable use of it and the responsibility to suitably maintain it. |
| **River Basin Management Plan (RBMPs)** | River Basin Management Plans have been produced by the Environment Agency for the eleven river basin districts in England and Wales. They help to set out the actions required to achieve the objectives of the Water Framework Directive. RBMPs describe the main issues for each river basin district and state the environmental objectives for the basin, explain the objectives selected to achieve good ecological status and summarise the actions needed to deliver those objectives. |
| **Sequential Test** | Informed by a SFRA, a planning authority applies the Sequential Test to demonstrate that there are no reasonably available sites in areas with less risk of flooding that would be appropriate to the type of development or land use proposed |
| **Sewer** | A sewer is a pipe which carries and removes either rainwater (surface) or foul water (or a combination of both) from more than one property. A sewer can also be categorised as being a private of public sewer and can carry surface or foul water. A Private Sewer is solely the responsibility of the occupiers/owners of the properties that it serves. A Public Sewer is a sewer that has been adopted and maintained by a Sewerage Undertaker |
| **Sewer Flooding** | The consequence of sewer systems exceeding their capacity during a rainfall event |
| **Strategic Environmental Assessment Directive 2001** | (EC Directive 2001/42/EC Is legislation which aims to increase the consideration of environmental issues during decision making related to strategic documents such as plans, programmes or strategies. The Strategic Environmental Assessment (SEA) identifies the significant environmental effects that are likely to result due to the implementation of a plan, programme or strategy. |
| **Strategic Flood Risk Assessment (SFRA)** | A SFRA is used as a tool by a planning authority to assess flood risk for spatial planning, producing development briefs, setting constraints, informing sustainability appraisals and identifying locations of emergency planning measures and requirements for flood risk assessments. The purpose of a SFRA is to assess and map all forms of flood risk from groundwater, surface water, impounded water bodies, sewer and river sources, taking into account future climate-change predictions. This provides planning authorities an evidence base for making decisions on future development primarily in flood risk areas. |
| **SUDS** | Sustainable Drainage Systems (SuDS) are drainage systems which are designed to reduce the impact of urbanisation on the hydrology of a river system. |
| **Surface Water Runoff** | Rainwater (including snow and other precipitation) which: is on the surface of the ground (whether or not it is moving); and has not entered a watercourse, draining system or public sewer. Areas that suffer a depth of greater than 0.1m are considered to be at risk of surface water flooding. Flooding that is greater than 0.3m deep is classed as being at risk of deep surface water flooding |
| **Surface Water Management** | Surface Water Management Plans are produced by local authorities. The following benefits are achieved through undertaking a SWMP study: Increased |

| | |
|---|---|
| **Plans** | understanding of the causes, probability and consequences of surface water flooding; Increased understanding of where surface water flooding will occur which can be used to inform spatial and emergency planning functions; A co-ordinated action plan, agreed by all partners and supported by an understanding of the costs and benefits, which partners will use to work together to identify measures to mitigate surface water flooding; Identifying opportunities where SuDS can play a more significant role in managing surface water flood risk; Increased awareness of the duties and responsibilities for managing flood risk of different partners and stakeholders; Improved public engagement and understanding of surface water flooding; Significant contribution made towards meeting the requirements of the Flood Risk Regulations (2009) and Flood and Water Management Act (2010). |
| **Water Framework Directive (WFD)** | WFD is the most substantial piece of EC water legislation to date and is designed to improve and integrate the way water bodies are managed throughout Europe. It came into force on 22 December 2000 and was transposed into UK law in 2003. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015. |

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**Appendix 1: Action plan to implement Dorset's Local Flood Risk Management Strategy**

| | Measures | Action title | Action no. | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 1: Understand flood risk across Dorset | 1.1. Adopt a consistent, multi-agency partner approach to flood data management, prioritisation and flood risk management | Understanding sources of flood risk | 1.1.1 | Ensure that Flood Risk Management Authorities and stakeholders have a good understanding of the different sources of flooding – main river, ordinary water course, sewer, surface water, reservoir and groundwater etc. | LLFA | Quarterly Flood Risk Officers meetings & engagement with flooded communities. | On going |
| | | Flood incident reporting, data collection, sharing and incident investigation | 1.1.2 | Develop and implement a single multi-agency partner approach to collection and sharing of flood data during and after flooding and agree protocols across FRMAs. Embed processes and procedures for flood investigation including: Online reporting facility, online status reports, investigation criteria and timescales. | LLFA & FRMA's | SWIM online flood reporting launched in April 2014. | On going |
| | | Data Management | 1.1.3 | Develop and implement an automated prioritisation methodology to be used to assist flood response recovery and long term flood risk management. | LLFA & FRMA's | Prioritisation methodology developed and implemented, evaluation of methodology required | On going |
| | | Partnership work with Flood Risk Management Authorities | 1.1.4 | Share progress, best practice, understanding of flood risks and consider joint working opportunities. | LLFA | LLFA hosts the Quarterly FRM Officers group meeting and FRM Board meeting. | On going |
| | 1.2. Improve understanding of local flood risk and its management | Surface Water Management Plans | 1.2.1 | Develop Surface Water Management Plans for communities with greatest flood risk from local sources on an economical and needs basis. | LLFA | | Not started |
| | | Incident reporting | 1.2.2 | Promote the importance of reporting flood incidents by using the online flood report form on the Dorset for you website. | LLFA / LA / EA | Online reporting using SWIM is established: https://apps.geowessex.com/swim | On going |
| | | Flood Risk Asset Register | 1.2.3 | Create an Asset Register of structures and features that could impact on flood risk. | LLFA | Asset register set up: Completed. | Complete |
| | | Flood maps for surface water | 1.2.4 | Review the reliability of the new Surface Water Flood Map using intelligence from flood reports to ascertain if additional modelling is required to consider surface water response on saturated catchments. | LLFA | New surface water flood maps have been produced by EA. LLFA have been given responsibility for maintenance and updating. | On going |
| | | Landslide slope stability | 1.2.5 | Develop work with the Natural Hazards Parnership and Local Authorities to identify areas where slope stability issues could present a risk | LLFA | Include appropriate actions relating to concerns about slope stability within community flood plans. | Not started |

| | Measures | Action title | Action ref | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 1: Understand flood risk across Dorset | 1.3. Ensure integration between plans to ensure holistic understanding & management of flood risk | CFMP actions | 1.3.1 | Ensure actions relating to local flood risk are considered and adopted by the LLFA where relevant as contained within the following CFMPs: Hampshire Avon, Dorset Stour, Frome and Piddle, West Dorset. | EA & LLFA | Plan developed in June 2012; actions from the CFMPs reviewed within Dorset's Surface Water Management Plan | On going |
| | | River Basin Management Plans | 1.3.2 | Work with the EA to develop River Basin Management Plans for Dorset to ensure appropriate actions regarding management of local flood risk. | EA / LLFA | Plans due for release in June 2014. | Planned |
| | | Strategic Flood Risk Assessments | 1.3.3 | Complete strategic assessments of flood risk on a local planning authority scale | WDDC | West Dorset Level SFRA was published in 2008 | Complete |
| | | | 1.3.4 | | W&P BBC | Weymouth and Portland Level 1 SFRA was published in 2009. | Complete |
| | | | 1.3.5 | | CBBC | Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Level 1 SFRA was published in 2008 | Complete |
| | | | 1.3.6 | | EDDC | | Complete |
| | | | 1.3.7 | | NDDC | | Complete |
| | | | 1.3.8 | | CBC | Christchurch Level 2 SFRA was published in 2009 | Complete |
| | | | 1.3.9 | | W&P BBC | Weymouth and Portland Level 2 SFRA was published in 2009. | Complete |
| | | Strategic Surface Water Management Plan | 1.3.10 | Undertake a strategic Surface Water Management Plan to identify sites of significant flood risk in Dorset. | LLFA | Dorset Surface Water Management Plan Strategic Assessment published 2012 | Complete |
| | | Preliminary Flood Risk Assessment | 1.3.11 | Produce Preliminary Flood Risk Assessment to highlight strategic sites at significant risk of flooding to comply with Flood Risk Regulations (2009). | LLFA | PRFA was published in July 2011 | Complete |

| | Measures | Action title | Action ref | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 2: Manage the likelihood and impact of flooding | 2.1 Manage flood risk through consenting and enforcement | Consent | 2.1.1 | Undertake consenting activities for Ordinary watercourses. | LLFA | | On going |
| | | Regulation | 2.1.2 | Carry out regulatory role on Ordinary watercourses. | LLFA | | On going |
| | 2.2 Promote flood alleviation schemes with partners | Funding flood alleviation schemes | 2.2.1 | Bid for financial support from DEFRA and EA for community / local innovative flood risk management solutions. | LLFA | PLP PAR approved in December 2013. | On going |
| | | Property Level Protection | 2.2.2 | Investigate requirement options for installation of property level protection measures. | LLFA | PLP Surveys phase 1 & 2: complete. Phase 3 surveys: May 2014.Construction 2014/15 | On going |
| | | Surface water & local land drainage flood alleviation schemes | 2.2.3 | On a prioritised basis, conduct drainage improvements following recommendations from investigations / surface water management plans if funding is available. | LLFA / LA | | On going |
| | | Mitigate environmental impacts of flood risk management | 2.2.4 | Consider potential environmental impacts of all local flood risk management activities and mitigate flood risks where appropriate. | LLFA | | On going |
| | | Flood Risk Asset Register | 2.2.5 | Use the Asset register to ensure that flood risk management assets are properly managed and where appropriate improved to provide/sustain the appropriate level of protection. | LLFA | Population of asset register: on-going | On going |
| | 2.3. Investigate flooding from local sources | Assess flooding from local sources | 2.3.1 | Adopt a risk based approach to investigate highest priority flooding from local sources (link to Action 3). | LLFA | | On going |
| | 2.4 Investigate 'significant' flooding | Flood incident Investigation | 2.4.1 | Investigate and ensure reports on 'significant flooding incidents' are published to identify relevant flood risk management authorities and outline potential solutions to improve or resolve the situation. | LLFA & FRMA's | | On going |
| | 2.5. Ensure flood risk management authorities & stakeholders manage flood risk appropriately | Highways flooding | 2.5.1 | Regularly inspect and maintain highways assets, respond to incidents, deliver works to protect the highway and adjacent properties from flooding for design events. | Highway Authorities | | On going |
| | | Runoff from fields | 2.5.2 | Work with Natural England & Environment Agency to engage with landowners to engage with landowners to advise on and encourage catchment sensitive farming methods to reduce runoff. | LLFA | | Not started |

| | Measures | Action title | Action ref | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 3: Help Dorset's communities manage their own flood risk | 3.1. Develop a multi-partner community engagement strategy | Community engagement strategy | 3.1.1 | Work with the Environment Agency to develop a prioritised multi-agency approach to community engagement regarding flood risk management. Share record of engagement activities within SWIM. | LLFA | | Not started |
| | 3.2 Develop community flood resilience | Develop Flood Warden / Flood Action Group Network and Community flood plans | 3.2.1 | Investigate and consider options for DCC / Civil Contingencies Unit to work together with the EA's flood warden network. | LLFA / EA | | Not started |
| | | | 3.2.2 | Work with communities and individuals to develop and exercise flood plans that outline:<br>- flood risk within the community<br>- flood risk to individual properties<br>- a plan of actions that may reduce or mitigate the risk<br>- actions and information required to support flood recovery<br>- how communities can prepare for climate change and reduce greenhouse gas emissions. | EA / LLFA | | On going |
| | | Flood reports | 3.2.3 | Promote the importance to communities of reporting flood incidents by using the online flood report form on the Dorset for you website. | LLFA / LA's / EA | Online reporting using SWIM is established: https://apps.geowessex.com/swim | On going |
| | | Individual flood plans | 3.2.4 | Ensure all properties that receive Property Level Protection develop an individual flood plan. | LLFA / EA | | On going |
| | | Riparian owner Responsibilities | 3.2.5 | Distribute the Environment Agency's publication 'Living on the Edge' to provide information to those living near watercourses that have a responsibility for on going maintenance. | LLFA / EA | | On going |
| | | Flood Advice | 3.2.6 | Ensure the Dorset for You website flood pages contain relevant flood information and links to other sources that communities and individuals may require. | LLFA | | On going |
| | 3.3 Develop partnerships with communities to encourage joint ownership of flood risk management solutions | Partnership funding | 3.3.1 | Promote partnership funding of flood alleviation measures within communities (according to DEFRA's partnership funding model) | LLFA & LA's | | On going |
| | | Funding opportunities | 3.3.2 | Support individuals and communities with advice on solutions & applications for funding. | LLFA & LA's | | On going |

| | Measures | Action title | Action ref | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 4: Ensure flood risk is considered in local land development proposals | 4.1. Consider all flood risks in planning process | Surface Water Management Plans | 4.1.1 | Use information from Surface Water Management Plans to inform planning decisions. | LLFA | | On going |
| | | Flood map for Surface Water | 4.1.2 | Use flood map for surface water to inform planning decisions. | LLFA & EA | | Planned |
| | | Groundwater flood risk | 4.1.3 | Consider groundwater flood risk mapping in planning decisions. | LLFA & EA | | Not started |
| | | Development location | 4.1.4 | Influence local plan policy to consider local flood risk when allocating development (following introduction of the SAB) | LLFA / LA's | | On going |
| | | Development location | 4.1.5 | Use flood risk assessments and policies to steer growth to suitable areas (following introduction of the SAB). | LLFA / LA's | | On going |
| | | Development location | 4.1.6 | Ensure that the development does not increase the risk of flooding elsewhere when determining planning applications (following introduction of the SAB). | LLFA / LA's | | On going |
| | 4.2. Ensure development of sustainable drainage systems | Sustainable Drainage | 4.2.1 | Set up Sustainable Approval Body's within the Flood Risk Management team. | LLFA | | Planned |
| | | Sustainable Drainage | 4.2.2 | Sustainable Approval Body to approve, adopt and maintain new Sustainable Drainage Systems. | LLFA | | Not started |
| | 4.3. Inform planning policies with regard to Local Flood Risk Management (with introduction of SAB | Understanding flood risk | 4.3.1 | Ensure Local Planning Authorities are aware of the objectives of the Local Flood Risk Management Strategy that relate to planning policies. | LLFA /LA | | Planned |
| | | Understanding flood risk | 4.3.2 | Update local development frameworks to take account of the relevant information from the Local Flood Risk Management Strategy | LLFA / LA | | Planned |

| | Measures | Action title | Action ref | Detail of Action | Lead | Action progress | Action status |
|---|---|---|---|---|---|---|---|
| Objective 5: improving flood prediction, warning, response & flood recovery | 5.1 Advise Dorset's residents of what to do before, during and after a flood | | 5.1.1 | Refer to measure 3.2 - work with communities to develop community flood plans | EA / LLFA | | On going |
| | | | 5.1.2 | Update and improve the Dorset for you flooding web pages (https://www.dorsetforyou.com/flooding) with links to useful information relating to flood prediction, warning and recovery | LLFA | | On going |
| | 5.2. Develop flood warning services for all sources of flooding | Severe Weather Warnings | 5.2.1 | Ensure communities that are at high risk from surface water flooding register to receive Met Office Severe Weather Warnings to provide advance notice of heavy rainfall | EA / LLFA | Action to be tied in with development of community flood plan | On going |
| | | Groundwater flood warnings | 5.2.2 | Extend the flood warning service to include groundwater flood warnings developed from intelligence gathered from the 2012 - 2014 flooding | EA | | Planned |
| | | Surface water flood warnings | 5.2.3 | Investigate options to develop surface water flood warnings in conjunction with the EA for communities at highest risk. | LLFA / EA | | Not started |
| | | Warnings for local sources of flooding | 5.2.4 | Investigate innovative warning solutions for local sources of flooding for communities at highest risk where traditional warning services are not appropriate. | LLFA / EA | | Not started |
| | | Extended Floodline Direct | 5.2.5 | Adopt the Environment Agency's Extended Floodline Direct service to provide Floodline operatives with answers to Dorset specific flooding questions. | LLFA / EA | EA to provide update on the ability for LLFAs to access the Extended Floodline | Planned |
| | 5.3. Emergency preparedness | Multi-agency Flood Plan | 5.3.1 | Review the Multi-Agency Flood plan following significant flooding | BDPLRF | | On going |
| | | Multi-agency Flood Plan | 5.3.2 | Communicate findings from detailed surface water management plans to the BDP LRF**.** | LLFA | | Not started |
| | | Recovering from a flood | 5.3.3 | Update recovery contingency plans in case the local area is impacted by flooding (including business and economic recovery). | BDP LRF / EP team | | On going |
| | | Recovering from a flood | 5.3.4 | Outline how recovery process should work in conjunction with all FRMA's to facilitate data sharing and streamlined collaborative flood recovery involving all appropriate Flood Risk Management Authorities and clear transition between response and recovery. | LLFA | | On going |