

Reviewing the Plan for Purbeck's future

Purbeck Local Plan Partial Review
Strategic Flood Risk Assessment, January 2015



Thriving communities in balance
with the natural environment

Strategic Flood Risk Assessment for the Partial Review (Issues and Options)

This Strategic Flood Risk Assessment (SFRA) has been carried out by Purbeck District Council with additional guidance from the Environment Agency. It covers all of Purbeck except for Swanage, which is being considered separately. This SFRA is published alongside the Purbeck Local Plan Partial Review Issues and Options consultation document.

It is a 'Level 1' SFRA for Purbeck, which is a basic level SFRA. This is because there are no current or future proposals to build in areas at risk of flooding or at risk of increasing flooding elsewhere. The partial review is only at its very early stages, with several options for development. This is an 'issues and options' stage. This SFRA does not, therefore, consider specific sites, but provides an overview of flooding issues.

In Purbeck we have approximately 250 sites submitted through our Strategic Housing Land Availability Assessment (SHLAA). We will update this SFRA to include the SHLAA sites under consideration at the next stage of the partial review consultation, following the results of the Issues and Options consultation.

Contents

- Part 1 Background to SFRA for the Partial Review Issues and Options**
- Part 2 Maps**
- Part 3 General information on flooding in Purbeck**
- Part 4 Information on flooding by area**
- Part 5 Planning for the Partial Review**

Appendix 1 SFRA map

Part 1 Background to SFRA for Partial Review Issues and Options

Local Authorities and responsibility for flood risk

Purbeck is a Flood Risk Management Authority whose district engineer gives advice. Roles are set out in more detail in the following link: <https://www.gov.uk/flood-risk-management-information-for-flood-risk-management-authorities-asset-owners-and-local-authorities>.

The National Planning Policy Framework states that Local Authorities should assess flood risk and avoid flood risk. The main guidance on flood risk (and SFRA) is found in the following document: 'Flood Risk and Coastal Change' at the link below: <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change>

To assess flood risk: Local Authorities should undertake a Strategic Flood Risk Assessment to fully understand the flood risk in the area to inform Local Plan preparation.

To avoid flood risk: Local Authorities should apply a sequential approach to site selection so that development is, as far as reasonably possible, located where the risk of flooding from all sources is lowest, taking account of climate change and the vulnerability of future uses to flood risk. In plan-making this involves applying the 'Sequential Test', and, if needed, the 'Exception Test' to Local Plans.

What is Flood Risk?

Flood risk is a 'combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources' (Para 2 of planning guidance 'Flood Risk and Coastal Change').

What is a Level 1 Strategic Flood Risk Assessment (SFRA)?

A Strategic Flood Risk Assessment assesses 'the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change, and ... the impact that land use changes and development in the area will have on flood risk' (Para 9 of planning guidance 'Flood Risk and Coastal Change'). A Level 1 assessment is a basic assessment where flooding is not a major issue.

How should a Strategic Flood Risk Assessment be used in plan making?

Para 10 of planning guidance 'Flood Risk and Coastal Change' states that the SFRA 'will be used to refine information on river and sea flooding risk shown on the Environment Agency's Flood Map'. It also lists six ways in which the SFRA should be used, as follows:

Local planning authorities should use this SFRA to:	Where in the SFRA?
Determine the variations in risk from all sources of flooding across their areas, and also the risks to and from surrounding areas in the same flood catchment	Purbeck: Description of Flood Risk
Inform the sustainability appraisal of the Local Plan, so that flood risk is fully taken into account when considering allocation options and in the preparation of plan policies, including policies for flood risk management to ensure that flood risk is not increased	Recommendations for the Partial Review Recommendations for Sustainability Appraisal of the Partial Review
Apply the Sequential Test and, where necessary, the Exception Test when determining land use allocations	Recommendations for the Partial Review
Identify the requirements for site-specific flood risk assessments in particular locations, including those at risk from sources other than river and sea flooding	Purbeck: Description of Flood Risk
Determine the acceptability of flood risk in relation to emergency planning capability	Adequacy of escape routes from SHLAA sites.
Consider opportunities to reduce flood risk to existing communities and developments through better management of surface water, provision for conveyance and of storage for flood water	To be considered in later iterations of the SFRA, as the plan-making process progresses.

What is a Sequential Test?

'The Sequential Test ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding The aim is to steer new development to Flood Zone 1 (areas with a low probability of river or sea flooding). Where there are no reasonably available sites in Flood Zone 1, local planning authorities should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 (areas with a medium probability of river or sea flooding), applying the Exception Test if required'

(Para 19 of planning guidance 'Flood risk and Coastal Change').

Within each flood zone, surface water and other sources of flooding also need to be taken into account in applying the sequential approach to the location of development.

Part 2 **Maps**

Data provided by Environment Agency

The map accompanying this SFRA includes fluvial and tidal flooding and surface water flooding, all provided by the Environment Agency. We have not mapped very localized flooding but instead describe incidents and areas in Part 3 of this report.

The maps provided by the Environment Agency show areas of high risk (Flood Zone 3) or a low-to-medium risk (Flood Zone 2) of both fluvial and tidal flooding. We have simplified this so that we show Zones 2 and 3 as merged (see comments on climate change below).

The Environment Agency also produces surface water flooding maps. The map shows all their surface water flooding records, including the most severe events (1 in 1,000 year events).

However, the EA flood zones do not take flood defences into consideration, as these can be breached. Nor do they take into account other sources of flooding, such as surface water drainage: www.environment-agency.gov.uk/floodrisk.

Because the EA flood map is updated quarterly, it is worth checking it to be absolutely sure that our own maps have the most up-to-date information. This information can be viewed at: <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=e>

Risk of Flooding from Reservoirs

According to the Environment Agency website (see above), reservoir flooding is extremely unlikely to happen. It states: 'The shading on the map shows the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large'. The link above brings up the option to search for risk of flooding from reservoirs.

A map can be viewed at:

<http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap#x=357683&y=355134&scale=2>

Climate Change

Climate change is expected to have a major influence on future flood risk. For the purpose of a Level 1 SFRA, the following assumptions have been made:

2050: Functional flood plain/Flood Corridor	currently Flood Zone 3
2050: Flood Zone 3	currently Flood Zone 2

In other words, an area that is currently in Flood Zone 2 is likely to be in Flood Zone 3 by the end of the development's design life. An area that is currently in Flood Zone 3 is likely to be in the functional flood plain/flood corridor by the end of the development's design life.

Tidal inundation

Areas within 6m of the coast may be at risk of tidal inundation. We have not mapped this, but it is a factor to be taken into account.

Local Flood Risk Management Strategy

Dorset County Council has prepared a Local Flood Risk Management Strategy which sets out the County Council's vision for Flood Risk Management of "working together to manage local flood risk so communities are resilient and prepared for flooding". This strategy (see link below) is a source of information on local flooding incidents, which complements the EA flood map.

<https://www.dorsetforyou.com/localfloodrisk>

Part 3 General information on flooding in Purbeck

Fluvial Flooding

The Frome and Piddle catchment has a long history of fluvial, tidal, surface water and groundwater flooding. Flooding as a result of lower order events can be frequently seen in certain areas of the catchment. Widespread flooding has occurred during more significant flood events, some of them in recent years such as in the winter of 2000 and 2001.

Surface Water Flooding

Surface water flooding is experienced when soils are saturated and therefore their natural capacity to absorb rainfall is prevented leading to overland flow, or when rain falls upon paved surfaces with low absorption causing water to run-off. This impact may be exacerbated if falling upon hard/paved surfaces.

Surface water flooding can occur frequently after periods of short intense rainfall. It is often a short lived event after heavy downpours or thunderstorms, and quantities of flood water are not normally on the scale of those associated with flooding from large rivers. However, in more extreme cases, flooding to properties, commercial premises and infrastructure can result. The flooding of main roads is often seen, which can cause major inconveniences to the transport network.

Significant localized flooding in Purbeck is frequently caused by the inadequate capacity of watercourses to cater for severe events and a lack of flood routes through urbanized areas. The latter problem is due to the fact that surface water drainage systems are designed to a standard that renders them unable to cope with higher return events. Highways drains, for example, are built to less than a 1 in 5 year standard and surface water sewers to perhaps a standard of around 1 in 20 to 30 years.

The requirement in the Building Regulations for surface water drainage is that it should be adequate and the adequacy of any system should be dependent on its location. The standards suggested in the Building Regulations approved document may not be sufficient to consider the broader flooding problems. The implications of the system failing or overflowing and the effect on neighbouring property and property at the lower level in the catchment should be taken into consideration and should be set out in the site specific FRA.

In existing urban areas the number of vehicle hardstands and paved areas for recreational use has been increasing. Most of these have been constructed without providing any drainage facility, and as a result the rate and amount of surface water run-off has increased.

Additional development can cause an increase in run off from hard surfaces in areas which previously provided areas of drainage or flood flow routes. Incremental development in Purbeck has sometimes resulted in the loss of such areas (see detailed descriptions of each location).

When existing roads are re-surfaced the top layer is not necessarily removed, thus the level of the road is continually raised, causing nearby dwellings to be lower than the road and more vulnerable to flooding from run-off from the road in heavy rain. This is more common in rural areas.

Coastal Flooding

Coastal flooding is becoming a major issue along the Dorset coastline, in particular from predicted increases in sea level rise from climate change. Deeper water near the coast could result in larger waves with greater energy, causing an increased rate of erosion or causing flooding due to overtopping of defences.

Tidal Flooding

The Environment Agency maps of tidal flooding only relate to still water levels. As a consequence, wave overtopping also needs to be taken into account. The District Engineer will be involved in any allocations/applications that are at risk of tidal flooding.

Groundwater Flooding

The Environment Agency's Catchment Flood Management Plan for the Frome and Piddle provides additional information on flooding in the catchment, including maps of areas vulnerable to groundwater flooding.

Catchment Flood Management Plan

The Environment Agency has produced a Catchment Flood Management Plan for the Frome and Piddle. This document contains additional maps, for example, on groundwater flooding (see Chapter 16) which assist in building up a picture of the overall catchment and in setting the context for Purbeck.

For Purbeck the relevant CFMP policies are:

Policy 1: General Coastline

Areas of little or no flood risk where the EA will continue to monitor and advise. This policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible.

Policy 4: Wareham and Swanage

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. This policy will tend to be applied where the risks are currently deemed to be appropriately managed, but where the risk of flooding is expected to significantly rise in the future. In this case we would need to do more in the future to contain what would otherwise be increasing risk. Taking further action to reduce risk will require further appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

Policy 6: The River Frome Corridor, Wareham Forest and the Chalklands

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. This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. This policy has been applied to an area (where the potential to apply the policy exists), but would only be implemented in specific locations within the area after more detailed appraisal and consultation.

Part 4 Information on flooding by area

Bere Regis

The Bere Stream is the continuation of the stream running through Milborne St Andrew, (which is not in Purbeck) where there are a number of flooding problems. Most flooding in the vicinity of Bere Regis has been around the Shitterton area between the culvert under the by-pass and Shitterton Bridge. Shitterton Bridge itself is too small to cater for extreme events and as such the flow has to cross the road, leading to the flooding of some properties around the bridge. Dorset County Council is considering replacing the invert to this bridge, and suggestions have been made about increasing the capacity.

The open land downstream of Shitterton Bridge is not suitable for development as there is a defined flood corridor through it. The more recent development of the 1990s has been set at a definitive height above the stream bed level.

Further downstream at Snatford Bridge, Dorset County Council has replaced the invert to this bridge to avoid scour. This bridge is under capacity for carrying extreme flows and flooding of the nearby highway might result.

Corfe Castle

Properties adjacent to the Byle Brook have been affected on a number of occasions by the stream overtopping its banks. However, the principal problem in this area is associated with the flooding event in 1990 when properties upstream and downstream of the bridge at the millpond were flooded. This was due to two factors: 1: The sluice gates to the millpond were in a dilapidated condition and were not capable of being opened fully. These became blocked and the millpond overflowed. 2: Upstream, although there was a raised bank behind the properties, was not continuous with the railway embankment, and water flowed around the back of the raised bank. Subsequently permission was sought to link the bank with the railway embankment. This has reduced the flood risk to these properties.

The tributary which runs to the north of the Castle principally affects the road. A study was carried out by Ian Howick Associates following the 1990 flooding, and the conclusion was that the two bridges under and adjacent to the A351 near the Castle were too small to cope with the 1990 event.

A particular problem with one of the inputs into the river comes from the Halves Cottages area. This route, partly in pipe and culvert and partly open watercourse, is routed along West Street. The system is not capable of coping with extreme events and there is no satisfactory overland route for water to reach the lower ground. As a result some properties in West Street are at significant risk of flooding.

East Lulworth

East Lulworth has localized highways flooding and some overtopping of the watercourse and roadside ditches, which has caused flooding to some properties. This watercourse discharges into Luckford Lake at East Holme.

East Morden

There are flooding problems associated with the stream alongside the road in East Morden which has insufficient capacity to cope with extreme events. Development near the Cock and Bottle was specifically raised to mitigate flood risk.

Langton Matravers and Acton

There have been localised flooding events in Langton Matravers and Acton from the watercourse which discharges into Swanage.

Lytchett Matravers

The soils in Lytchett Matravers are clayey and may be unsuitable for standard soakways. Any discharge to a watercourse in Lytchett Matravers may need to be attenuated due to downstream flooding problems, for example at the Bakers Arms roundabout. In some developments in the 1980s and 1990s, surface water attenuation tanks were used. This has reduced the risk of flooding to downstream properties.

Studland

Flooding of the highways in Studland occurs in heavy rain due to surface water run-off.

Upton and Lytchett Minster

Upton suffers from a lack of adequate watercourses and surface water sewers. Some parts are low-lying, and the natural overland route for surface water to discharge to the harbour has been cut off in some places, due to filling in of the harbour and raising the level of the land. As a result, localized flooding occurs, in particular in Upton, around Sandy Lane, Watery Lane, and Dorchester Rd, as well as in Old Watery Lane in Lytchett Minster. Some areas are also at risk of tidal flooding.

Wareham and Stoborough

The Rivers Frome and Piddle both discharge into Poole Harbour at Wareham. The extent of tidal influence on the River Piddle is cited as being from the railway line downstream, and on the River Frome from Holme Bridge downstream. The river flooding which occurs in Wareham, and Stoborough is exacerbated by the tidal influence.

The principal flood risk in Wareham and Stoborough is flooding from the Rivers Frome and Piddle, combined with tidal flooding. There are risks to properties near to these rivers.

The low land between the Frome and Piddle is predominantly agricultural and is artificially defended by raised banks against tidal flooding. The Wareham Tidal Banks Strategy (currently in its early stages) is considering the removal of these banks to allow natural flooding of the floodplain, which may reduce flooding in Wareham itself.

If the River Frome overtops its banks further upstream towards the Wareham Bypass, the water flows across the water meadows between Wareham and Stoborough and the only out-let is through the tide flap at Red Cliff. This tide flap does not have sufficient capacity to take extreme flows and as a result the water meadows can still be flooded even though the tide has receded.

West Lulworth

Much of the road through West Lulworth down to the Cove acts as a flood channel during severe rainfall events. As a consequence properties at or very near to road level may be at risk of flooding. The flood route runs through a system bypassing Hambury Farm and flows through the Weld Estate car park and down to the Cove. Development adjacent to the car park has been protected by flood gates and a specific flood route was retained when the heritage centre was constructed.

Winfrith Newburgh, East Stoke and East Chaldon (River Win)

The villages of Winfrith, East Stoke and East Chaldon are in the catchment of the River Win which has a history of flooding. The underlying geology of the Win is permeable. However, when the land is saturated, flash flooding can occur. The most significant event was on 5 June 1983. This affected all the villages. One of the problems was the gauging station at Winfrith Newburgh, the purpose of which was to measure low flows. However, as no bypass route had been provided, the structure caused a significant obstruction to flood flows. As the gauging station was in place prior to the adjacent development being built, it only became a problem after the area was developed in the 1980s. Winfrith Newburgh has also suffered from groundwater flooding.

The area around the Red Lion Pub floods and affects the pub. This situation was exacerbated when the A352 was improved by adjusting and raising the road levels.

The river passes through a culvert under the A352. Immediately down stream it passes under a bridge giving access to a development at Gatmore Rd constructed in the 1990s and which was the subject of a planning appeal. The National Rivers Authority (now the Environment Agency) allowed a bridge to be built, provided that it would be free-spanning. However, for practical reasons, the bridge could not be free spanning. To facilitate its construction, the roadside bank was removed. This resulted in the flooding and evacuation of two cottages on the opposite side of the road and flooding of the farm house further down Gatmore Rd. The bridge has caused a problem and has been the subject of a great deal of correspondence over the years. This problem is still not resolved but the downstream channel has been enlarged, which has improved the situation.

East Chaldon has experienced run-off from saturated fields used in agriculture and resulted in mud and slurry being discharged into the road and properties.

Wool, East Burton and Bovington

A culvert near the BT Exchange in Wool has led to some localized flooding, while the watercourse at Spring St and Duck St occasionally overtops its banks and causes some flooding to property. In Bovington, a watercourse running behind properties in Cologne Road has caused some flooding in the area.

A bridge over the River Win at East Burton crossroads is of adequate capacity, but the downstream channel is restricted. One particular restriction is the sheep wash. A scheme was proposed to bypass this but the owner's agreement could not be obtained. Although some work was subsequently carried out, it was not to an adequate standard. The flood risk has been reduced, but the watercourse still represents a significant flood risk. The area was severely flooded in 1983, affecting several properties.

Part 5 Planning for the Partial Review

This SFRA steers the Partial Review towards only considering allocations in Flood Zone 1. Allocations in Flood Zones 2 and 3 should not be considered.

Strategic Housing Land Availability Assessment (SHLAA) sites

At the time of writing this SFRA, approximately 250 sites across Purbeck have been submitted to the Council for potential development. The Council has published a first stage Strategic Housing Land Availability Assessment (SHLAA) alongside the Partial Review Issues and Options consultation. The first stage SHLAA includes an initial site sift, and identifies sites which should be 'included' or 'excluded' from further consideration on the basis of high level constraints. The Council will be undertaking more detailed assessment of promoted land as the Partial Review progresses, and will publish a more detailed SHLAA assessment in due course.

SHLAA sites within flood zones

In the first instance, sites are only 'excluded' from consideration in the SHLAA on grounds of flood risk if all or the majority of the site is within a flood zone. However, this does not mean that sites which haven't been excluded will be developed. It simply means that the Council may consider allocation of all or parts of the non-excluded sites through the Local Plan process. Any proposed allocations would be subject to public consultation.

SHLAA sites that could exacerbate flooding elsewhere

The first stage SHLAA (published in January 2015) does not include consideration as to whether development of a site would exacerbate flooding elsewhere. However, this will be considered as part of the more detailed site assessment, in consultation with the District Engineer.

Adequacy of escape routes from SHLAA sites

The first stage SHLAA (published in January 2015) does not include consideration of adequacy of escape routes. This will be considered as part of the more detailed site assessment, and sites may be excluded from further consideration if it is demonstrated that there is no adequate escape route from a site in case of flooding, for example if the road(s) around the site are prone to flooding and there is no other access.

Recommendations for the Partial Review

The Partial Review Issues and Options consultation offers several options for development. Potential development sites will be subject to more detailed assessment before the next stage of consultation, and this will include assessment by the District Engineer. As stated above, sites that are assessed as being at risk of flooding should not be allocated for development. Nor should any proposed development exacerbate flooding elsewhere. Climate change must also be taken into account, as set out in Part 1 of this report. The District Engineer will be involved at all stages of the consultation process, in particular to provide detailed knowledge on specific and very localized issues related to flood risk and escape routes.

Recommendations for Sustainability Appraisal of the Partial Review

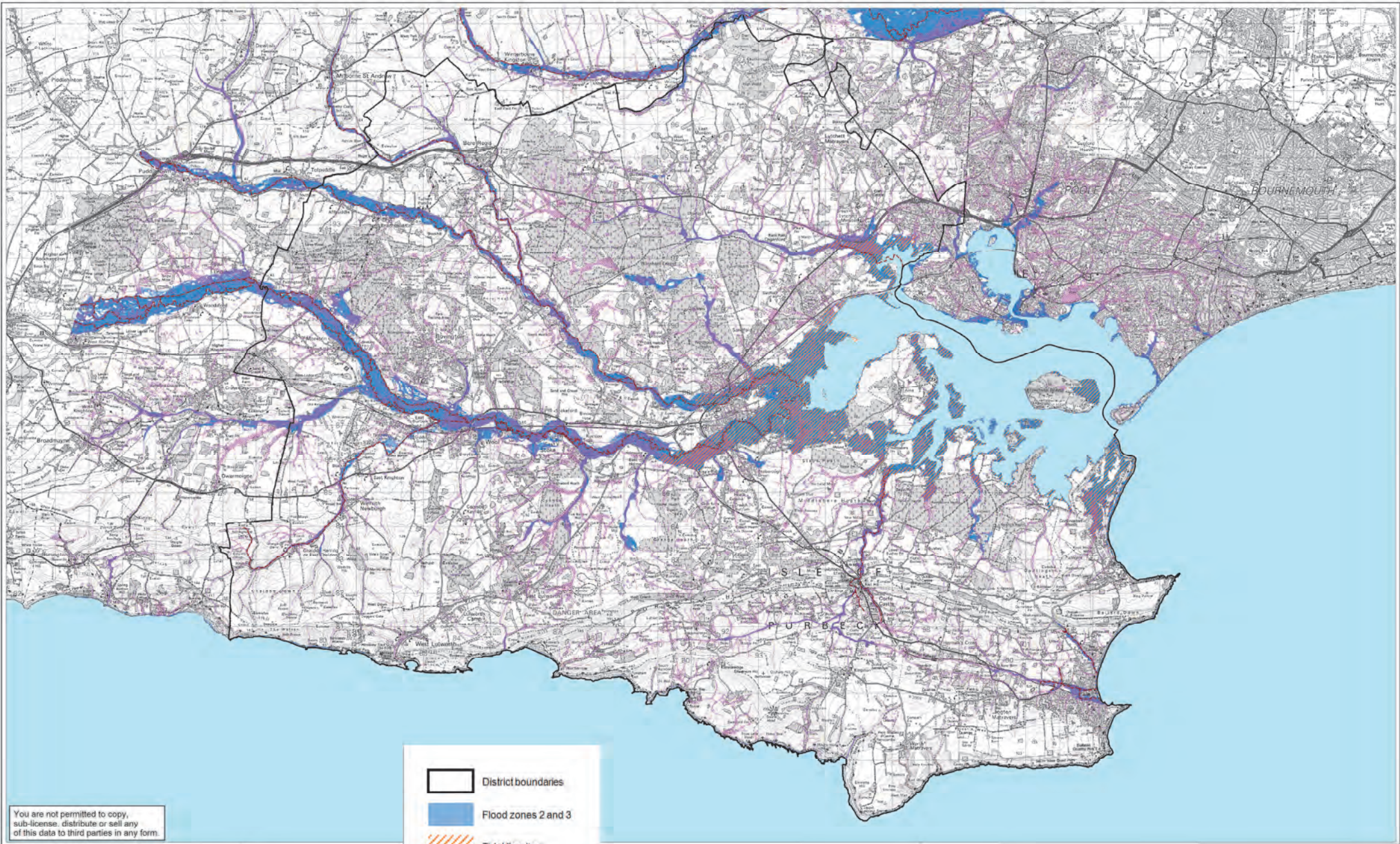
A sustainability appraisal has been published alongside the Partial Review Issues and Options consultation document. At this stage, the sustainability appraisal sets out a high level assessment of the options. The sustainability appraisal refers to all types of flooding (e.g. fluvial flooding, surface water flooding). At the next stage of plan preparation, the sustainability appraisal should take into account whether development of a site would exacerbate flooding elsewhere and the adequacy of escape routes. The District Engineer should be consulted to provide detailed knowledge on specific issues related to flood risk and escape routes for sites being assessed. The sustainability appraisal must also take climate change into account when assessing sites.

Use of development contributions

The Environment Agency wondered if the SFRA could set out how to remedy some of the issues listed through new development, such as contributions towards flood protection infrastructure. There are no such proposals as development contributions are very limited, and are currently largely earmarked for transport projects and heathland mitigation.

Appendix 1 Strategic Flood Risk Assessment Map overleaf

Please note that this map is also available to view online at: <https://www.dorsetforyou.com/evidence/purbeck>









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Not to scale



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-  District boundaries
-  Flood zones 2 and 3
-  Tidal flooding
-  Surface water flooding
-  Sea
-  Main river centrelines

Strategic Flood Risk Assessment

For identification purposes only



Thriving communities in balance
with the natural environment