

Flood Risk Overview

Sources of Flood Risk

Fareham occupies a central position in the PUSH sub-region, situated to the north west of Portsmouth. It covers a total area of approximately 74 km². The Borough has 8.5 km of open coastal frontage, 14.5 km of frontage on the tidal River Hamble and 11.5 km of frontage onto Portsmouth Harbour. The Wallington River and River Meon flow through the Borough, with a total main river length of 35 km. At present, approximately 9% of the Borough's land area is designated as within Flood Zones 2 and 3 (see SFRA Map: Flood Mapping Dataset).

The SFRA has shown that the primary source of flood risk to Fareham Borough is from the sea. The key parts of the Borough which are currently at risk of flooding from the sea are the Fareham frontage to Portsmouth Harbour, Portchester, Lower Swanwick and Warsash.

The secondary source of flood risk to the Borough is from rivers. The River Meon in Fareham Borough has a large floodplain in its downstream reach which is designated as a National Nature Reserve downstream of the village of Titchfield. The River Meon is defended from tidal inundation by the harbour frontage at Hill Head. If this defence were to fail, the River Meon would be inundated regularly by tidal flows. As such, 'undefended' Flood Zones show the Meon valley as predominantly at risk of tidal flooding. The Wallington River flows through the village of Wallington before discharging into Portsmouth Harbour. A number of properties in Wallington lie within the predicted flood outline of the Wallington River and its functional floodplain (Flood Zone 3b) and flooding has historically occurred in the village in the past – most notably in 2000. Upstream of Wallington, large areas of greenfield land are covered by the river's floodplain.

There have been some previous incidents of groundwater flooding adjacent to the upper part of the River Meon in Fareham Borough, while Fareham has also been susceptible to flooding from other sources including surface water and flooding caused by infrastructure failure.

Key physical characteristics that may constrain development

Approximately 47% of Fareham Borough is currently covered by existing development. A number of environmentally designated areas represent a significant constraint on development in the Borough, covering approximately 13% of its area. As such there may be only limited sites upon which development can be permitted following consideration of other planning constraints.

The topography of the Borough ranges from sea level to approximately 50 metres above ordnance datum (mAOD) for the majority of the Borough with the exception of the area to the north of Portchester which rises to approximately 110 mAOD on Portsdown Hill, the Borough's steepest slope. The areas of lowest elevation are exclusively along the coastline or within the Wallington or Meon river valleys. Much of the existing development in the Borough, including Fareham town, Locks Heath and the northern part of Portchester is situated on higher ground away from tidal and fluvial floodplains, suggesting that future development outside areas of flood risk should be possible in the Borough.

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Geologically, the Borough is underlain by low and moderately permeable bedrock formations for all areas to the south and west of and including the town of Fareham. To the north east of Fareham, the Borough is underlain by the chalk outcrop of Portsdown Hill. Moderately permeable superficial deposits overlie much of the bedrock in Fareham Borough. Low permeability superficial deposits are present in the Wallington valley and at the foot of Portsdown Hill, reducing the permeability of those areas not covered by artificial surfaces in terms of surface water runoff generation. This can potentially make the installation of Sustainable Drainage Systems (SUDS) difficult in attempting to reduce the flood risk to 'downstream' sites when promoting new development.

Vulnerability to Climate Change

The SFRA has generated predicted tidal outlines for a number of years up to 2115 (see SFRA Map: *Flood Mapping: Climate Change Dataset*). These outlines account for the most up-to-date predicted rises in sea-level over the coming century due to climate change and they therefore allow the identification of locations that will be most vulnerable to this change due to their topography. In Fareham Borough, the areas most vulnerable to rising sea levels are Portchester (both to the north and west of Portchester Castle), the village of Wallington and the frontage between Town Quay and Hoeford Lake. In addition to this effect of rising sea levels, it is anticipated that climate change will result in an increase in fluvial flood flows. This may put additional pressure on settlements which are adjacent to rivers such as Wallington village and Titchfield.

Existing defence assets and likely future investment

The coastal frontages of Fareham Borough are either: low-lying and subject to some form of coastal defence; or are composed of higher ground which protects the land behind from coastal flooding.

Of the low-lying areas, only some are protected from a present day 1 in 200 year tidal flood. Areas below the minimum standard of protection required for new development are on the Hamble estuary (particularly around Warsash), the Fareham frontage between Town Quay and Hoeford Lake and the Portchester frontage on Portsmouth Harbour. In these areas, while many defences do not offer protection to a 1 in 20 year tidal flood, it is not thought that flood protection is the primary purpose of the majority of these defences. The coastal defences in Fareham are, however, likely to be susceptible to climate change, as 100 years of predicted sea level rise would mean that almost all man-made defences fail to offer protection from a 1 in 20 year tidal flood. On some frontages where defences can prevent inundation of large areas by tidal flooding, significant investment will be required in improving and maintaining existing flood defences (see SFRA Map: *Infrastructure Dataset*). In order to consider the sustainability of investing in improved defences, the 'danger to people from breaching' index (see SFRA Map: *Infrastructure: Danger to Public/ Property Dataset*) will provide indications as to where the residual risk due to breaching may remain unfavourably high following improvements to defences to protect from extreme tidal floods.

Sequential and Exception Test

National Planning Policy Framework (NPPF) and The Planning Practice Guidance sets out the Government's objectives for achieving sustainable development through the avoidance and management of flood risk. The NPPF aims to ensure that flood risk is taken into account at all stages

Guidance Document: Fareham Borough Council

of the planning process to avoid inappropriate development in areas of flood risk. To achieve this aim the Planning Practice Guidance provides a decision making tool to ensure that sites with a low probability of flooding are developed in preference to areas at higher risk. The Sequential Test is the decision process which Local Authorities must demonstrate when developing their Local Plans. This SFRA has developed a suite of mapping outputs to assist Local Authorities in applying the Sequential Test.

When applying the Sequential Test, the Flood Mapping Dataset of the SFRA will provide all the necessary information required upon which to base decisions regarding the location of future development in relation to flood risk. Within The Flood Mapping Dataset, the key map required for applying the Sequential Test is the Environment Agency's Flood Map for Planning, shown as Flood Zone 2 and Flood Zone 3 in conjunction with the Historic Flood Map.

The Flood Mapping Dataset also contains 4 other Mapsets which provide useful information to support Local Authorities when applying the Sequential Test, these include:

- *Hazard Map* – undefended Flood Hazard
- *Flooding from Other Sources* – including Surface Water, Groundwater, Sources of Overland Flow
- *Flood Warning Areas*
- *Climate Change* - Outlines for years 2025, 2055, 2085 and 2115

In the original SFRA these guidance documents included specific advice on how to apply at the time the PPS25 Sequential and Exception Tests. This advice has since been updated and incorporated into other guidance notes. For the purpose of efficacy and ensuring this text remains contemporary, it will not be reproduced here and signposted to relevant key guidance below:

- [The National Planning Policy Framework](#)
- [Planning Practice Guidance: Flood Risk and Coastal Change](#)
- [Flood risk assessment for planning applications](#)
- [Flood risk assessment: standing advice](#)

It is requested that if in applying any of this guidance that links are found to be broken or require updating that contact is made with the SFRA helpdesk through contact details on the mapping webpage.

Planning Policy

When developing Local Plans, Local Authorities are advised by the NPPF to prepare criteria-based policies in line with their Core Strategy's Sustainability Appraisal, against which the Exception Test can be tested. This will minimise the need to consider this element of the Exception Test for each individual planning application.

By assisting Local Authorities, at the site allocation level, in steering new development to areas with the lowest probability and hazard of flooding, the use of the SFRA outputs (in particular Flood Mapping and Infrastructure Datasets) will mean that site specific flood risk assessments in these areas will be more likely to satisfy criteria c) of the Exception Test.

Guidance Document: Fareham Borough Council

SFRA Mapping Outputs

Table 2 summaries the most relevant mapping outputs and their purpose, for each of the key users of the PUSH SFRA.

Key Users	Relevant SFRA Mapping Dataset	Purpose
Planning Policy	Flood Mapping: NPPF Sequential Test and Relevant Supporting Information	Flood Mapping Dataset provides all the necessary information to help planners apply the Sequential Test and Exception Test when allocating new sites for development. Flood Mapping Dataset also allows planners to identify sites with the lowest probability of flooding and lowest flood hazard / danger and how the extent of flooding is likely to change in the future due to climate change.
	Development Control	Flood Mapping Dataset helps Development Control personnel to: <ul style="list-style-type: none"> o Prepare specifications for site specific FRAs. o Review site specific FRAs for new development sites and check for compliance with the NPPF.
Risk Management	Flood Mapping: NPPF Sequential Test and Relevant Supporting Information	Flood Mapping Dataset helps Flood Risk Managers to identify variations in flood hazards / dangers to existing development. The data also provides mapping to show how the extent of flooding is likely to increase over time due to climate change.
	Infrastructure: Appropriate Defence Standards and Levels of Investment	Infrastructure Dataset helps Flood Risk Managers to: <ul style="list-style-type: none"> o Identify shortfalls in existing defences in providing appropriate standards of defence, now and in the future. o Identify indicative levels of investment required to provide the appropriate standards, now and in the future.
Emergency Planning	Flood Mapping: NPPF Sequential Test and Relevant Supporting Information	Flood Mapping Dataset can provide emergency planners with information on the variation of flood probability and hazard across the sub region. Such information can aid in the development of emergency plans and evacuation routes during flood events.
	Infrastructure: Appropriate Defence Standards and Levels of Investment	Infrastructure Dataset can help Emergency Planners to: <ul style="list-style-type: none"> o Identify indicative standards of defence, now and in the future.

Recommendations for Site Specific Flood Risk Assessments

Whilst the information presented in this SFRA will inform Local Authorities and facilitate their strategic allocation of sites for future development, it should not preclude the need for developers to undertake site specific flood risk assessments (FRAs). A SFRA, by its very nature, is a high level assessment of flood risk at the local authority level. It does not provide sufficiently detailed information to satisfy all of the requirements of a site specific FRA as outlined in the National Planning Policy Framework.

To improve the efficiency of disseminating general guidance, the Environment Agency has produced a suite of standing advice and guidance on producing Flood Risk Assessments.

- Flood Risk Assessment: Guidance for completing flood risk assessment to accompany a planning application
 - [When you need an assessment](#)
 - [When you don't need an assessment](#)
 - [When to follow standing advice](#)
 - [How to do an assessment](#)
 - [Get information to complete an assessment](#)

- Flood Risk Assessment: Guidance for planning authorities on review of flood risk assessments submitted as part of planning applications
 - [Check if you need to consult](#)
 - [Flood zone 1](#)
 - [Flood zone 2](#)
 - [Flood zone 3](#)
 - [What you need to check in an assessment](#)
 - [Extra flood resistance and resilience measures](#)

The following sections provide additional specific guidance for assessing flood risk at the site specific level within Fareham Borough and indicate how the outputs from the SFRA can inform such assessments.

Tidal Flooding

Flooding from tidal sources is one of the primary sources of flood risk within Fareham Borough and the areas at risk are predicted to increase significantly by 2115. *Flood Mapping* Dataset shows the existing areas at risk of tidal flooding and the associated undefended flood hazard. The index of flood hazard represents a gradation of hazard within the Flood Zones based on a combination of the depth of flood water and the velocity of the water (indicative ranges for which have been assumed based on distance from the coastline). It should also be noted that this dataset was derived during the evolution of the 2007 work package and has not been updated as part of the 2016 update. For this reason in areas where there have been flood mapping updates since 2007, there may be discrepancies in the data presented. Where this occurs it is recommended that further advice is sought from the SFRA Helpdesk team or local Environment Agency office.

Guidance Document: Fareham Borough Council

The frontages where existing defences provide the minimum standards required for new development (i.e. 1 in 200 years for tidal flooding), are identified in the *Infrastructure: Overview* Dataset by a purple line. Indicative Areas Benefiting from Defences (ABDs) are also shown in this dataset. The Indicative ABDs have been defined as areas where the crest levels of the existing defences are consistently equal to or higher than the present day 1 in 200 year extreme sea level.

If small lengths of defences have crest levels which fall below the 1 in 200 year extreme sea level (even for a short length), the area behind the defence has not been classed as an Indicative ABD. The frontage of Portchester is an example of where this study has not been able to define an Indicative ABD due to small lengths of defence where the crest levels fall below the 1 in 200 year extreme sea level. The gaps in the defence level can also be viewed in more detail using *Infrastructure: Defence Level*. It should be noted that other areas may potentially be classified as ABDs if more detailed modelling assessments of the defences, which is beyond the scope of this SFRA, are carried out.

The *Flood Mapping: Hazard Map* Dataset shows the flood hazard (in terms of danger to people) associated with a hypothetical breach in the defences for the whole of the tidal frontage. The Indicative ABDs shown in *Infrastructure: Overview* define which of the hazard maps is most appropriate for consideration. Hazard Map for Flood Zone 2 is only appropriate for considering present day flood hazards within an ABD. To aid interpretation, the areas where this index is not appropriate for present day analysis are hatched out. The benefit of showing hazard information in the hatched out areas is to allow planners and developers to understand the likely residual risks that would remain if they were to invest in defending an area to a 1 in 200 year standard. The Hazard Map for Flood Zone 2 (Undefended Flood Hazard) should be used to assess the variation of flood hazard within the Flood Zones for all areas outside the Indicative ABDs.

The benefit of both the undefended flood hazard maps and the danger from breaching maps is that the gradation of flood hazard within the Flood Zones can facilitate both planners and developers to ensure that development is steered away from the areas of highest hazard. The hazard mapping presented in *Flood Mapping: Hazard Map*, however, should only be applied when appropriate consideration has been taken of alternative sites at a lower probability of flood risk (i.e. within Flood Zone 1) have been considered.

The flood hazard information, for both the undefended and breach scenario, developed as part of this SFRA, has been undertaken at a strategic level and is therefore at an appropriate level of detail to allow Local Authorities to strategically allocate sites for development. The hazard data has been classified into 4 categories to illustrate the gradation of flood hazard within Flood Zones 2 and 3 in line with best practice guidance as set out in Defra/ EA Guidance FD2320. The hazard data has not been calculated using modelling or other detailed numerical methods and is therefore not appropriate for identifying design parameters as part of site specific FRAs. It is therefore recommended that FRAs for sites located within the flood hazard zones should still include a quantitative assessment of flood hazard based on more detailed assessments of defence standards, defence failure scenarios and overland conveyance of flood flow.

The impact of climate change on increasing sea levels has a significant effect on the extents of Flood Zones 2 and 3 by 2115, especially on frontages around parts of Fareham Creek and North

Guidance Document: Fareham Borough Council

Portsmouth Harbour including communities around Portchester. The NPPF expects consideration to be given to both current and future flood zones at the site specific level, taking account of climate change. The climate change flood extents presented should be used when undertaking a site specific FRA to inform the assessment of the long term sustainability of developments currently within Flood Zone 1 and the likely increases in flood risk in Flood Zones 2 and 3.

The defence information provided in the *Infrastructure Dataset* can provide developers undertaking site specific FRAs with an indication of the equivalent tidal return period of the crest level of the existing defences in the present day and an indicative level of investment that may be required to raise defence standards to the minimum required for new development. Such investment could be secured through the development process by Section 106 agreements.

Wave Overtopping

The Wave Energy mapset included within *Flood Mapping: Flooding from Other Sources*, shows how exposure to wave energy varies along the frontage of the study area. Such information can be used to assess, at a high level, the risk of flooding caused by extreme wave overtopping. Fareham's harbour frontages experience low wave energies but its open coast frontage experiences moderate wave energies. Based on information from other similarly exposed frontages in the PUSH sub-region, it is recommended that all applications for development within the vicinity of the open coast frontage of Fareham Borough include an assessment of extreme wave overtopping, regardless of which Flood Zone the site is in. This will ensure that this risk is always considered for new development in the relevant locations. The assessment of extreme wave overtopping should be appropriate to the scale of risk and may, in some cases, be ruled out as a significant risk quite easily, but should nevertheless be addressed.

Fluvial Flooding

Parts of Fareham Borough are at risk of fluvial flooding from the Wallington River and River Meon. The *Flood Mapping Dataset* shows the fluvial Flood Zones, which show the Wallington Village and Titchfield to be the key areas at risk of fluvial flooding in the Borough.

In Fareham Borough there is more fluvial flood risk data available than in other parts of the PUSH sub-region. The two principal rivers in the Borough, the Meon and Wallington are two of the most significant in the sub-region, with a number of flood risk areas and historic records of flooding. Hydraulic modelling of the River Wallington has been finalised as part of the Environment Agency's ongoing Strategic Flood Risk Mapping programme. Therefore, it has been possible in this SFRA to designate Flood Zone 3b (defined by NPPF as the 'functional floodplain') for the River Wallington by using a modelled 1 in 25 year flood outline. This is in accordance with the Planning Practice Guidance. The River Meon does not have a modelled flood outline to define Flood Zone 3b, but the Environment Agency have provided a detailed historic flood outline which they have recommended is used to define Flood Zone 3b for this SFRA. Where this information is not available (in Fareham Borough this represents only a small part of the River Hamble) fluvial Flood Zone 3 has been assumed to be functional floodplain, in line with the Planning Practice Guidance precautionary approach and should be tested by site specific FRAs, where required.

Guidance Document: Fareham Borough Council

Unlike the tidal Flood Zones, flood levels associated with the fluvial Flood Zones have not been identified as part of this SFRA. The variations in previous modelling approaches for the rivers within the PUSH sub-region, coupled with the spatial variation on flood levels along the river valleys, meant that it was not possible to provide a consistent approach to identifying fluvial flood levels without remodelling a number of rivers. Such detailed assessments were outside the scope of this SFRA.

Developers undertaking a FRA for a site within the fluvial Flood Zones should obtain the most up to date flood risk data from the Environment Agency. If no further information is available then a site specific FRA may need to include a numerical assessment to refine the understanding of fluvial flood risk, and agree the form of this assessment with the Environment Agency.

Undefended flood hazard information, has also been developed for the fluvial Flood Zones 2 and 3. This information can provide developers with an indication of the varying degree of flood hazard within the Flood Zones which can facilitate the design and layout of development sites to avoid areas of high hazard. As with the tidal flood hazard data, this dataset was derived during the evolution of the 2007 work package and has not been updated as part of the 2016 update. For this reason, in areas where there have been flood mapping updates since 2007, there may be discrepancies in the data presented. Where this occurs it is recommended that further advice is sought from the SFRA Helpdesk team or local Environment Agency office.

It is recommended that FRAs for sites located within the flood hazard zones to undertake a more detailed quantitative assessment of flood hazard based on an improved understanding of defences and flow routes.

Surface Water/Overland Flow Flooding

The dataset *Flood Mapping: Flooding from Other Sources* show both maps for potential surface water flooding and the variation in the potential source of overland flow across the PUSH sub-region. The areas shown in red and orange relate to areas of very high and high potential for generating overland flow. Notably, the urban areas are indicated as red or orange due to the high runoff potential from urban land uses.

Within Fareham Borough there are a number of areas which have a high to very high potential for generating overland flow. FRAs for sites that are found to be within or in the vicinity of these areas, especially if the local topography places the site at a lower elevation than the surrounding land and hence downstream of the source, should consider the impacts and management of flooding due to overland flow.

In particular the area to the north of Fareham proposed for the major new community of Welborne, is situated on permeable geology, indicating that development could have a high impact on surface water runoff regimes if not controlled. Site specific FRAs should therefore carefully consider the impact of development on the local surface water runoff regime and should design SUDS options appropriately, in order to manage surface water runoff.

Groundwater Flooding

Within the PUSH region the key areas at risk of groundwater flooding are north of Fareham Borough in East Hampshire, Winchester, Eastleigh and Test Valley where highly permeable geology meets lower permeability geology as shown in *Flood Mapping: Flooding from Other Sources: Groundwater*, which has been verified by inspection of the historical incident records. The River Meon due to its highly permeable upstream geology is very sensitive to groundwater conditions and there has been previous groundwater flooding observed around Titchfield. The Wallington is also subject to a significant permeable catchment area upstream of Fareham. Site specific FRAs within Fareham Borough should seek to ascertain whether a site has been previously affected by groundwater flooding if it lies adjacent to the River Meon or Wallington River.

Flooding from Infrastructure

Historically, a number of parts of Fareham Borough have recorded incidents of flooding caused by problems relating to drainage infrastructure as shown in Dataset *Flood Mapping: Flooding from Other Sources*. When undertaking a site specific FRA for a large development site, consultation with Southern Water should always be undertaken to investigate whether the proposed development will have an adverse impact on the local drainage system.

Sustainable Urban Drainage Systems (SUDS)

Conventional surface water drainage systems have traditionally used underground pipe networks to efficiently convey water away from sites. In the past this has led to problems of downstream flooding, reductions in groundwater recharge and waste pollution incidents associated with surface water overwhelming combined sewers. Both 'Making Space for Water' and the 'Water Framework Directive' have highlighted the need for an improved understanding and better management of how our urban environments are drained. The SUDS management train approach, as shown in Figure 2, is the principle that a range of SUDS which feed into each other can often offer benefits to the delivery of a successful surface water system/strategy.

The NPPF states that Local Authorities should prepare and implement planning strategies that help to deliver sustainable development, by using opportunities offered by new development to reduce the causes and impacts of surface water flooding. By implementing policies to encourage developers to incorporate SUDS wherever possible, Local Authorities can help to mitigate the impacts that development has on surface water runoff rates and volumes.

Emergency Planning

As well as informing the development control process, the outputs of the SFRA can also be used by the Local Authority to inform their Emergency Planning Policies. The Flood Mapping Datasets are particularly useful when considering the feasibility and sustainability of key access routes within their administrative boundaries. The benefit of producing such outputs on a sub-regional scale mean that the Local Authority can also consider access to the Borough beyond their administrative boundary where key access routes (e.g. M27) cross a number of Local Authorities.



Additional Guidance

- [Flood risk assessment for planning applications](#); Environment Agency
- [Flood risk assessment: standing advice](#); Environment Agency
- [National Planning Policy Framework](#); DCLG
- [National Planning Policy Framework Quick Guide](#); Environment Agency
- [Planning Practice Guidance – Online web-based resource](#); DCLG
- [Flood and coastal risk guidance: climate change allowances](#); Environment Agency
- [Development and Flood Risk: Guidance for the Construction Industry](#) CIRIA (2004)
- [Flood Risk Assessment Guidance for New Development: FD2320/TR2](#) Environment Agency / DEFRA
- [Susdrain online resource: The community for sustainable drainage](#) CIRIA
- [Fareham BC emergency planning flooding – online resource](#)
- [Fareham BC Local Plan SFRA evidence – online resource](#)