



In partnership with:
Dover District Council

Strategic Flood Risk Assessment

March 2019

Dover District Council

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Strategic Flood Risk Assessment 2019

Dover District Council

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Executive Summary

The NPPF and accompanying practice guidance emphasise the responsibility of Local Planning Authorities to ensure that flood risk is understood, managed effectively and sustainably throughout all stages of the planning process. This Strategic Flood Risk Assessment (SFRA) identifies that the Dover district is potentially at risk from a number of sources of flooding, with over 30km of coastline, low-lying marshland and several main rivers crossing the district. It is therefore evident that flooding must be a key consideration for any future development.

Considering the location of the main towns of Deal, Sandwich and Dover in relation to the River Stour, the River Dour and the coastline, it is evident that these towns are highly reliant on flood defences. It is therefore critical that these defences are maintained, and priority should be given to safeguarding the standard of protection provided by defences over the lifetime of any development.

The focus of this SFRA update is therefore to address the changes since the original SFRA was prepared in 2007, to reflect changes in policy and in legislation. The SFRA update aims to bring the planning context and flood risk information up to date and is intended to aid the development of the Dover District Council's emerging Local Plan. The main objectives are as follows:

- To identifying the risk of flooding from each source of flooding at key locations within the district;
- Inform the sustainability appraisal so that flood risk is taken into account when considering strategic land use policies;
- Provide data and information to enable the Council to apply the Sequential Test to land use allocations and to identify whether the application of the Exception Test is likely to be necessary;
- To support the Council's policies for the management of flood risk within the Local Development Documents and to assist with the testing of site proposals;

It should be recognised that at the time of publication, Dover District Council (DDC) is continuing to develop the emerging Local Plan and as such, the information contained within this report will help to support this process. This report is supplemented by a series of maps, which provide the key information required to appraise the risk of flooding, and these maps include the location of the main watercourses and defences, historic records of flooding, and a map designed to determine the potential risk of flooding across the district (to assist in the application of the Sequential Test).

Guidance relating to the points stated above, should be considered when developing any local planning policies relating to flood risk management, however, it should also be acknowledged that the SFRA is a living document and consequently, regular updates will be required to ensure that the most contemporary flood risk information is considered.

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Scope of Appraisal

Drivers for the SFRA

The National Planning Policy Framework (NPPF) requires the Local Planning Authority (LPA) to apply a risk-based approach to the preparation of development plans with respect to potential flooding. This district-wide appraisal of flood risk is to be delivered through the Strategic Flood Risk Assessment (SFRA). Herrington Consulting has been commissioned by Dover District Council (DDC) to update the existing SFRA which was prepared in 2007, which pre-dated the introduction of the NPPF in 2012 (updated in 2018). This latest version of the SFRA report has therefore been prepared in accordance with the requirements of the NPPF, as outlined within paragraphs 9 and 10 of the *Planning Practice Guidance: Flood Risk and Coastal Change*.

This study provides an analysis of the main sources of flood risk to the district, together with a detailed means of appraising development allocation sites and existing planning policies, against the risks posed by flooding over this coming century.

The risk of flooding within the district is diverse; the coastal settlements of Sandwich, Deal and Dover are all shown (to some degree) to be at risk of flooding from the sea, with the River Stour and River Dour presenting a fluvial risk of flooding to the settlements bordering these rivers. The centre of the district is in parts low lying, and the varied topography throughout the district can present a risk of surface water flooding to both rural and urban communities alike. Consequently, the focus of the SFRA is to provide a strategic overview of the risk of flooding from each of the main sources of flooding to enable informed spatial planning decisions to be made.

The completion of the original SFRA in 2007 quantified the risk of flooding for a number of sites, however, since the publication of the first SFRA many of these sites have either been developed, or alternatively are no longer relevant/available. As such, the 2018 SFRA has been prepared to provide a revised assessment of flood risk, collating information relating to the district's physical characteristics and defining the relevant planning policies relating to flood risk and drainage rather than assessing the relative merits of individual sites.

It is acknowledged that the way in which the risk of flooding is managed is constantly changing, with improved predictions relating to climate change and new planning policy reflecting the changes in relation to the Country's requirements for development. As such, it is imperative that the SFRA is adopted as a 'living' document and is reviewed regularly in light of emerging policy directives and an improving understanding of flood risk within the district.

The report has been prepared in consultation with the Environment Agency (EA), Lead Local Flood Authority, Internal Drainage Board (IDB) and Sewerage Undertaker (Southern Water).

Objectives of the SFRA

The key objectives of SFRA are:

- to update the SFRA report to reflect changes in planning policy, guidance and data availability since the previous SFRA was prepared in 2007;
- provide an overarching appraisal of the risk of flooding across the district from all sources;
- inform the sustainability appraisal so that flood risk is taken into account when considering strategic land use policies;
- provide sufficient data and information to enable the Council to apply the Sequential Test to land use allocations and to identify whether the application of the Exception Test is likely to be necessary;
- to support the Council's policies for the management of flood risk within the Local Development Documents and to assist with the testing of site proposals;

Key updates since 2007

Since the original SFRA report in 2007 there has been a number of key developments in national policy. An overview of the policies which are currently applicable is provided in Part 2 of this report (Section 2.1). Since the previous SFRA report was prepared, the most notable change has been the introduction of the NPPF in 2012 (updated in 2018). The 2007 SFRA referenced the now superseded Planning Policy Statement 25 (PPS25) and the accompanying technical guidance, both of which are now obsolete. The latest technical guidance which compliments the NPPF was released in 2014 and is called the National Planning Policy Guidance Suite (NPPG). The information contained within the NPPG can be found at; <https://www.gov.uk/government/collections/planning-practice-guidance>.

Further changes since the original SFRA was published include the release of the Pitt Review in 2008. This review was in response to a series of national flood events and evoked changes in the management of localised flood risk, resulting in the introduction of Lead Local Flood Authorities (LLFAs). The LLFAs were given the responsibility for flooding from surface water, groundwater and ordinary watercourses. This has been accompanied by an increased awareness for the management of surface water run-off from new development, which has been promoted by the Flood and Water Management Act 2010. In March 2016, the (non-Statutory) National Technical Sustainable Drainage Systems (SuDS) Standards were released, although these Standards currently only apply to 'major development'. Therefore, local guidance has been included within this SFRA to encourage best practice for managing surface water runoff within all new development, regardless of size.

Advances in mapping and modelling since 2007 have enabled the enactment of EU Floods Directive (2007) and subsequent Flood Risk Regulations (2009) through the production of risk maps, which were released in December 2013. These maps identify areas which are at risk of flooding from rivers or the sea, surface water and reservoirs and are publicly available. These maps have been used within this report to appraise the risk of flooding across the district.

Finally, datasets managed by the EA are now freely available, including data from flood modelling studies and aerial height data (LiDAR). Updates in flood data in this area include a numerical flood model of the East Kent Coast, which considers the impact of climate change on tidal flood risk. The results from this modelling have also been considered within this report.

How to use this Document

The primary focus of the updated SFRA is provide clear information in relation to flood risk and drainage, which is delivered through a user-friendly report. The structure for the SFRA report is set out below, describing the two discrete parts of the report. In conjunction to providing background information on the district's characteristics relating to flood risk, the report has been specifically designed to present the relevant national and local planning policies relating to flood risk and drainage.

How to Use this Document

| Part 1 – Background and Context | |
|--|---|
| <p><i>The primary purpose of this part of the SFRA is to provide background information about the Dover district and to describe the main characteristics, such as the geology and topography. This section introduces key elements which are fundamental to the flood risk management process and includes information on the sources of flooding, the impacts of climate change, and the defence infrastructure within the district.</i></p> | |
| Section 1.1 | Overview of the District |
| Section 1.2 | Sources of Flooding |
| Section 1.3 | The 'Design Flood' Event |
| Section 1.4 | Historic Flooding |
| Section 1.5 | Climate Change |
| Section 1.6 | Defence Infrastructure |
| Section 1.7 | Actual and Residual Risk |
| Part 2 – Policy Requirements | |
| <p><i>This part of the SFRA highlights the relevant local and national policy and legislation relating to the Flood Risk Management Process. The information contained within this part includes a detailed list of the documents required to support a planning application.</i></p> | |
| Section 2.1 | Applicable Policies and Studies |
| Section 2.2 | Development Classifications |
| Section 2.3 | When is an FRA is required? |
| Section 2.4 | When is a SWMS required? |

Part 1

Background and Context



The primary purpose of Part 1 of the SFRA is to provide background information about the district and to describe the main characteristics, such as the geology and topography. This section introduces key elements which are fundamental to the flood risk management process and includes information on the sources of flooding, the impacts of climate change, and the defence infrastructure within the district.

Part 1: Background and Context

1.1. Overview of District

The district is situated on the East Kent Coast, covers an area of approximately 315 square kilometres and has a population of approximately 113,100 people. A map of the district is provided in Figure 1.1 below, delineating the three main urban centres of Dover, Deal and Sandwich.

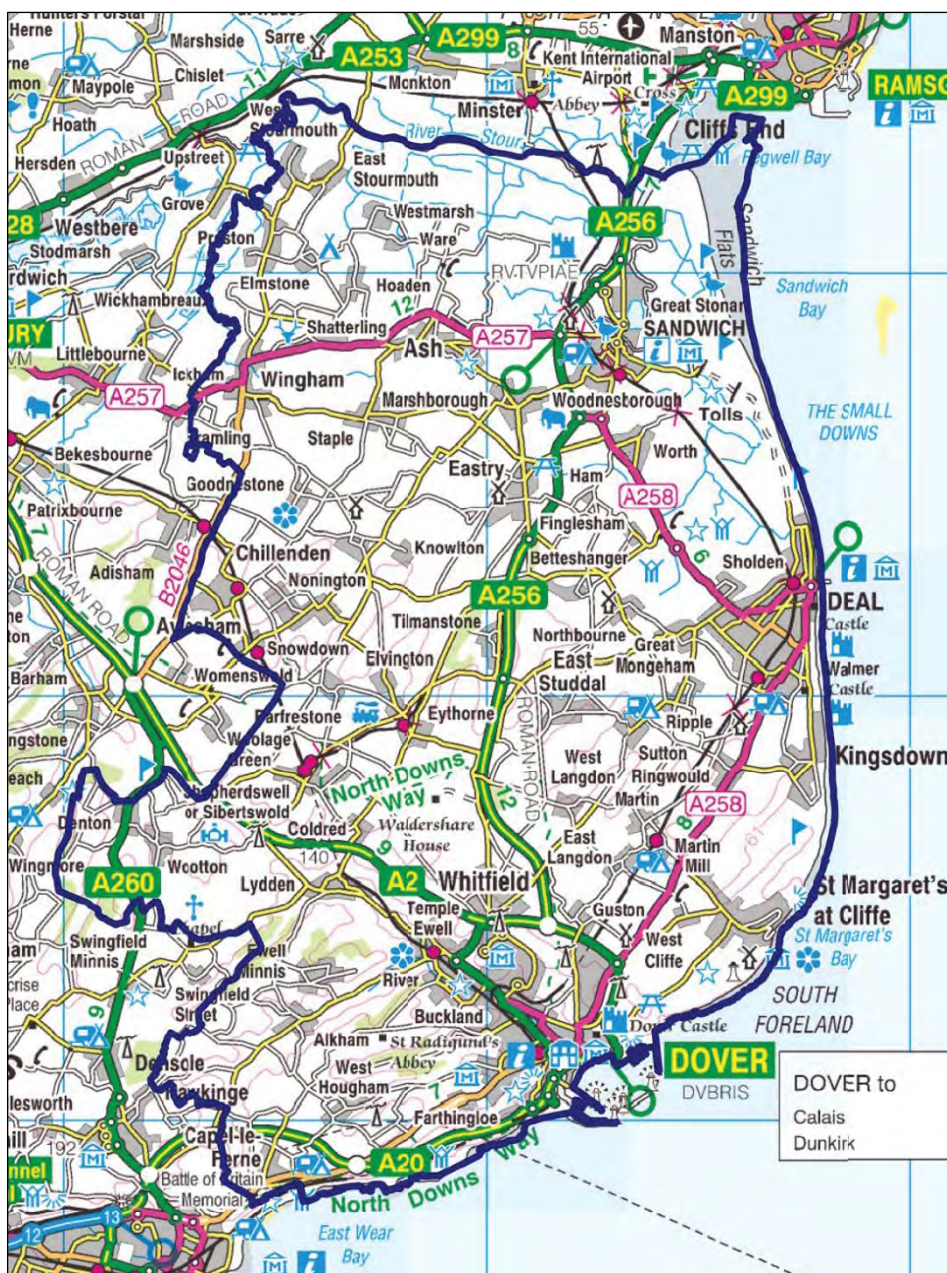


Figure 1.1 – Location map of district Council (Contains Ordnance Survey data © Crown copyright and database right 2018).

There are a number of areas within the district which are of international importance due to the habitats they provide for a variety of species of flora and fauna. To the northeast of the district lie two Special Areas of Conservation (SAC), two Special Protection Areas (SPA) and a Ramsar site, designated under wetlands of international importance. The Lydden and Temple Ewell Downs SAC is located further to the south and includes some of the richest grassland in Kent. Within the south of the district lies the Dover to Kingsdown Cliffs SAC, which is internationally recognised for the White Cliffs.

The coastline hosts regionally and nationally important infrastructure such as the railway link between Dover and Folkestone (which passes through Shakespeare Cliff tunnel), Samphire Hoe nature reserve and the Eurotunnel ventilation facility. In addition, the coastline from Walmer to Deal accommodates three castles; Walmer Castle, Deal Castle and Sandown Castle, as well as the Deal pier. The industrial areas of Great Stonar, to the north of Sandwich, are entirely encompassed by the tidal reaches of the River Stour.

The district has a coastal frontage that extends for approximately 35 km between its western boundary at East Wear Bay, through to its north east boundary to the south of Pegwell Bay. The north and east of the district typically comprises low-lying land, which include the area around the River Stour and the coastal areas nearing Deal. Much of these areas have flood defences in place, such as the Deal Coastal Defence Scheme which includes seawalls with a shingle beach in front. These low-lying areas account for approximately 15% to 20% of the district and are classified by the Environment Agency as Flood Zone 3a.

The **topography** of Dover is split into two distinct areas. To the north of the district is a relatively flat expanse of low lying land, and to the south are the North Downs, a large expanse of chalk upland containing numerous hills and dry valleys. Along the coast, the flat land to the north is bordered by a slightly elevated ridge formed of relic sand dunes, whilst the south coast is bordered with an almost vertical chalk cliff face that includes the famous 'White Cliffs of Dover'. Dover Town itself lies predominantly within a steep sided valley, known as the Dour valley, which is relatively large and northwest to southeast trending.

The bedrock **geology** of the district consists of gently dipping cretaceous chalk, which outcrops across the Downs to the south of the district. The chalk is overlain in the north by cenozoic deposits from the Thanet and Lambeth formations. The entire district forms part of northern limb of the Wield Anticline, a large anticlinal feature covering a sizable part of south east England. Superficial soil deposits can be found across many of the hills and valleys within the chalk downs, and alluvium overlies most of cenozoic deposits to the north, forming a flat plain of clay silt sand and gravel, that was once an expanse of marshland. This marshland has since been drained through human activity and intervention.

1.2. Sources of Flooding

1.2.1. *Flooding from Rivers and Watercourses*

There are a number of rivers and watercourses throughout the district and the location of these are shown on the map in [Appendix A.2](#).

The River Dour passes through the south of the district, where it rises in the Alkham Valley. The Dour follows the valley which runs through Dover Town Centre, before flowing into the sea through a control structure (the gate) located within the Wellington Dock. Further upstream of Dover the river is mainly groundwater fed, however, the river is also fed by surface water flows within the catchment during extreme or prolonged rainfall events. Any impacts from such events are exacerbated downstream where the river enters Dover town centre, primarily due to this highly modified reach of Dour which contains a number of culverts, weirs and smaller channels/leats. In addition, numerous surface water drains discharge into the River Dour, which increase the volume of water within the river system. The impacts of these additional inflows are especially evident during both prolonged rainfall events, or conversely during flashy rainfall events, which have resulted in flooding in the town in the past.

The River Stour cuts through the northern half of the district, flowing from Stourmouth to Pegwell Bay. The reach of the Stour which is located within the district is tidally influenced but is also fed by a network of drainage ditches and watercourses. The Richborough Stream and Gosshall Main Stream join the Stour to the north of Sandwich, whilst the Sandwich Bay and Hacklinge Marsh Sewer drain (via the North and South Streams) from the north of Deal to the River Stour at Sandwich (aided by pumping). The extensive drainage network within the north of the district helps to maintain groundwater levels below the surface, discharging any excess water into the Stour.

The tidal influence on the river means the water level within this section of the Stour is governed by extreme sea levels and tidal surges encroaching upriver. Therefore, as the impacts of [climate change](#) influence sea level rise, the water level within the river will increase, in turn increasing the risk of flooding in the low-lying areas, which could occur more frequently in the future. Due to the extensive drainage system connected to the Stour, any increase in the water level within the river will have an impact on these connecting watercourses. This could particularly affect towns including Sandwich, Deal and the smaller settlements to the north.

The northern half of the district also benefits from an extensive network of land drainage ditches. The water levels in many of these ditches are managed using pumps. Whilst the drainage ditches across the Deal, Sandwich and Ash levels act to drain the surrounding land, there are instances whereby the capacity of these drainage ditches has been exceeded following an extreme rainfall event, or due to failure of a pumping station. Furthermore, the majority of the drainage network discharges into the Lower Stour and therefore, flooding can occur when high water levels in the River Stour prevent the discharge of water from the drainage network.

The River Wingham is located in the west of the district and is a tributary of the River Stour. It flows from Ash through Wingham and discharges into the Stour further to the north. The main risk of flooding from this river is mostly to rural areas located in close proximity to the river.

1.2.2. ***Flooding from the Sea (Tidal)***

There are two main ways that the sea can cause flooding; An extreme increase in the sea level, or through wave overtopping; These two mechanisms are discussed below.

- An extreme increase in water levels, known as a *surge* event, can occur when an already high tide coincides with a low-pressure weather event, resulting in the surface of the sea becoming elevated. Unlike the day-to-day tide, the height of a surge event is difficult to predict. Elevated sea levels due to a surge could result in flooding within coastal developments.
- A *wave overtopping* event usually occurs when large powerful waves collide with the shoreline, or sea defences, forcing seawater landwards. In this event the effects can be exacerbated by strong onshore winds, which contribute to increased runup and spray from the waves, allowing water to pass over the crest of the sea defences.

The district has 33km of coastline, 26km of which benefits from formal sea defences, with the remaining length protected naturally by high chalk cliffs. The sea defences in district offer a good level of protection against flooding from the sea and are designed to protect against increases in water level. Consequently, the urban centres situated in the low-lying areas behind these defences are unlikely to be flooded up to the 'design' storm event, however, these areas could be flooded if the extreme sea level was to exceed the crest of the defences (i.e. for an event which exceeds the criteria that the defence has been designed to protect against).

Development located directly behind the defences could also be affected by flooding from wave overtopping. This type of flooding is likely to occur when waves repeatedly strike the defence during a storm event, and/or if the drainage system cannot cope with the sudden deluge of water. Within Deal, land levels slope away from the coastline towards the centre of Deal and a number of the roads adjacent to the coastline are orientated perpendicular to the shoreline. As a consequence, floodwater passing over the defences (as a result of waves overtopping the defences during a storm event) is directed along these roads towards the low-lying areas, where it can accumulate within the town.

With regard to the River Stour, the entire reach of the River Stour located within the Dover district is tidally influenced, meaning that the water levels within the channel rise and fall with each tidal cycle. However, in the event of a surge event, water levels are likely to be contained within the channel by the sea defences constructed as part of the Sandwich Town Tidal Defence Scheme. It is only in the event that the water level within the channel was to exceed the design criteria of the tidal defences, or if a section of the flood wall was to fail, that the properties would be inundated with floodwater.

Water levels in the River Dour are tidally influenced; During high tide elevated water levels within the Wellington Dock mean that the outfall structure is often submerged, preventing the river from discharging (termed 'tide locking'). During extreme tidal surge event, water has been observed to flow upstream along the River as far as Bridge Street. In the event that the outfall is tide-locked coincident with an extreme pluvial in the Dour valley, water levels could become elevated within the Dour, which could result in flooding of riverside properties, where bank levels are low.

1.2.3. Flooding from Land (Overland Flow and Surface Water Runoff)

Flooding from surface water runoff typically occurs following an extreme rainfall event, where water from higher in the catchment flows overland and accumulates in topographic depressions. This is further exacerbated in areas with steeply sloping topography, low permeability ground conditions (e.g. urban areas), or where the surface water drainage system (e.g. highway gullies) are overwhelmed. Mapping provided by the EA provides an indication of areas at risk of flooding from surface water; <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

The northern half of the district, where the geology is less permeable, is relatively flat. Surface water runoff in this area is intercepted by the extensive network of drainage ditches. Historic records identify that the capacity of these drainage ditches may be exceeded following an extreme rainfall event, particularly if the pumping station fails to operate as required.

The southern half of the district is predominantly located on chalk bedrock, which has capacity to infiltrate surface water runoff, thereby reducing the amount of water flowing overland. Notwithstanding this, surface water flooding is known to occur within the valley of River Dour due to a combination of steep topography and the impermeable surfacing throughout the urban town of Dover and the surrounding villages. The surface water management plan prepared for Dover Town centre appraises the risk of flooding in this area, and highlights areas where localised flooding may occur. A copy of the SWMP can be found at; <http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/surface-water-management-plans/dover-surface-water-management-plan>

Flooding within the Dour Valley is further exacerbated by high water levels within the River Dour, which can occur following an extreme rainfall event, due to high groundwater levels and/or as a result from the outfall becoming tide locked. Localised flooding can occur when the surface water drainage system is prevented from discharging into the river due to high water levels in the channel.

Within the urban centre of Deal, land levels slope inland from the coastline towards the centre of Deal. Localised flooding is known to have occurred (around the Albert Road areas) within the topographically low areas of the town as highway gullies are unable to discharge surface water into the combined sewer (designed to manage both surface water and wastewater), due to capacity issues. Following a heavy rainfall event, the capacity of the drainage system can be exceeded, and any excess water is channelled along the highways towards these lower lying areas.

1.2.4. *Flooding from Groundwater*

Groundwater flooding typically occurs in areas with permeable underlying geology. The emergence of groundwater typically occurs in topographic low points or where a groundwater spring has formed.

The chalk downs form a large principle aquifer and is the source of potable water for a substantial part of district. The migration of water through the chalk primarily occurs through fissures and fractures within the rock. Water held within the chalk is extracted via; human activity, wells and pumping stations, or is naturally drained to surface waters by springs. High concentrations of springs can be found in and around the Dour Valley, as well as in a band running from Deal through Ash and up to Preston.

There is potential for groundwater flooding across the chalk downs, especially at the base of dry valleys where large seasonal fluctuations in groundwater levels can reactivate springs or watercourses. The sometimes seasonal, or more often infrequent activation of springs, can in some cases make it particularly difficult to predict where groundwater emergence is likely to occur. The influence of human activity of abstracting groundwater and as a result of mining may also need to be considered, especially as in recent years the reduction in groundwater extraction for industry has contributed to groundwater rebound. This is where water levels within aquifers return to a level which is higher than the natural levels.

Groundwater flooding is also possible across the low lying flat land to the north of the district, where there is a high potential for elevated groundwater levels and flooding to occur in close proximity to the River Stour. The drainage system in this area consists of an extensive network of ditches designed to remove water, to allow this land to be used. These ditches control groundwater levels and as a result, groundwater emergence in this part of the district is normally directly related to water levels within the drainage network.

1.2.5. *Flooding from Sewers*

Sewer flooding within district is most likely to occur in the three main urban locations of Sandwich, Deal and Dover (and surrounding areas such as Whitfield), due to the reliance on the extensive sewerage infrastructure. Although typically confined to these urban areas, sewer flooding is still possible within more rural locations where the sewer network is not so extensive and therefore, may have less capacity available.

Flooding from sewers can occur when the sewer is overwhelmed by heavy rainfall, becomes blocked, or is of inadequate capacity. Sewer networks are typically designed to accommodate the water generated under a storm with a 1 in 30 year return period and as such, higher return period rainfall events can cause sewers across the district to surcharge. As a result, water may back up flooding properties, or exit the sewer system via gullies and manholes.

When this happens to a combined sewer (which is designed to manage both surface water and wastewater), there is a risk of floodwater being contaminated by foul effluent. The hazards

associated with untreated foul effluent can increase the risk associated with sewer flooding, although generally the effects are relatively localised.

Although sewers may be designated for draining surface water, foul water, or combined waste, it is recognised that misconnections can occur, and this can result in insufficient capacity being available within the wider network, which ultimately increases the risk of above ground flooding. The removal of unauthorised misconnections is therefore a priority for minimising the risk of sewer flooding within the district.

For most of the rural areas in the district sewers are relatively small and designed solely for the removal of foul effluent. Across the Downs the majority of the surface water runoff is drained to the ground via infiltration, or to the low-lying land to the north via the established network of drainage ditches. As a result, the sewers in these rural areas are typically less sensitive to heavy rainfall. Notwithstanding this, overcapacity issues associated with these rural sewers still occur and it is particularly a problem where surface water enters the foul sewer network in large quantities (for example, where sewers cross beneath an overland flow path of surface water).

Sewer flooding in Dover Town and the Dour Valley is relatively common and can largely be attributed to rainwater running off the steep slopes of the surrounding valleys and entering the sewer network. There is also limited sewer capacity within the Whitfield area to the north of Dover Town and consequently, this area has also experienced localised sewer flooding in the past. Within Dover, the sewerage infrastructure consists of a mix of combined sewers and separate surface water and foul sewers. The majority of the surface water sewer network in Dover town centre is hydraulically connected to the River Dour and as a result, high water levels within the River Dour can influence the risk of sewer flooding within the town. Sewer flooding within Dover can occur relatively quickly due to the high volume of water draining off the surrounding hills.

Similar to Dover, the Deal sewerage infrastructure is relatively mixed, typically with only the newer areas of development being connected to dedicated surface water sewers. East of the railway line, the sewer network consists of foul sewers only, with surface water runoff mostly being drained to a series of ditches. To the west of the railway line, the sewerage network has been expanded to also comprise surface water sewers. The sewer system in Deal relies upon pumps and a sea outfall and as such, flooding has been witnessed in the past due to a failure of the infrastructure (e.g. Albert Road, Deal – refer to [Section 1.4](#)).

In Sandwich, the infrastructure consists of combined sewers, which drain both surface water runoff and foul effluent from the town. The lack of dedicated surface water sewers within Sandwich could potentially increase the risk of sewers surcharging and properties being flooded.

A large number of sewers within the district are drained to pumping stations, where pumps push effluent onto other parts of the sewer system, or treatment works. Some of these pumping stations can result in a bottleneck within the sewer system and as a result, can increase the risk of flooding in the surrounding areas. The potential for sewer flooding, is also exacerbated by failures in pumps which should be considered when assessing the risk of sewer flooding within the district. To reduce

the risk of future sewer flooding as a result of pumping station failure, the use of pumped drainage systems for foul effluent, or surface water runoff should only be taken as a last resort where no other alternative option is available.

1.2.6. ***Flooding from Reservoirs and other Artificial Sources***

Non-natural or artificial sources of flooding can include reservoirs, canals and lakes where water is retained above natural ground level, operational and redundant industrial processes including mining, quarrying and sand and gravel extraction, as they may increase floodwater depths and velocities in adjacent areas. The potential effects of flood risk management infrastructure and other structures also need to be considered. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.

There are no potable water reservoirs within the district, nor are there any artificial waterways such as canals. The Stonar Lake to the northeast of Sandwich town is below ground level and has no embankments or control structures and is therefore considered to be at a low risk of failure.

The only storage reservoir within the district is at Updown Farm, for which planning permission was granted in 2007. The reservoir has a capacity of 43,000m³ and is privately owned. The purpose of the reservoir is to collect water during the winter months for use during summer, when the water is used for spray irrigation. If the reservoir was to fail, the risk of flooding would be mainly confined to rural areas with some farmhouses in Updown Farm and West Street shown to be affected.

1.3. **The 'Design Flood' Event**

The magnitude of a flood events is expressed as its probability of occurrence. This can be defined as the average number of years expected before another event of the same magnitude will occur (termed the 'recurrence interval'). This is more commonly referred to as the **return period** and is expressed as the '1 in X year return period' event. It should be recognised that an event with a return period of 1 in 10 years, for example, does not imply that the event is expected to occur every 10 years. It is possible to experience such an event with a greater or lesser 10-year interval of occurrence (e.g. such an event could be experienced more than once a year).

Alternatively, events are defined as the probability that an event with a greater magnitude will occur in any one year, this is referred to as the **annual exceedance probability (AEP)** and is expressed as a percentage (i.e. X% AEP).

The NPPF requires that the risk of flooding is appraised for the 'design flood' event. For most sources of flooding this is defined as the 1 in 100 year return period or 1% AEP event. The exception is tidal flooding, where the design flood is based on the 1 in 200 year return period or 0.5% AEP event. In all circumstances, an allowance for [climate change](#) over the expected lifetime of the proposed development is also required to be considered.

The design event is used to appraise the suitability of a development and should inform the design of any mitigation measures.

1.4. Historic Flooding

A review of the historic flood records for the district has identified that there has been a number of minor flood events since the original SFRA was drafted in 2007. Building on the information outlined in the 2007 report, the main historic flood events have been listed and described below:

- During the 1953 tidal flood event, areas to the north of the district were affected.
- In 1978, the existing defences in Sandwich were overtopped/breached which caused fluvial flooding within the drains surrounding the Stour.
- A similar flood event occurred in 1983 in Sandwich when a tidal surge caused water to exceed the river banks of the Stour.
- In 2013, defences were overtopped in Gazen Salts Recreation, Sandwich Quay and Dover as a result of a tidal surge which caused damage to several flood defences.
- In 2000 and 2001, fluvial flooding was recorded in Dover as a result of the River Dour exceeding its channel capacity.
- There were several surface water flooding incidents in 2007 and 2016 which affected parts of Sandwich, Deal and Dover.
- There were sewer flood incidents in 2014, 2015 and 2016 near the North Deal Recreation Ground.
- Albert Road, Deal has been affected by flooding from sewers on a number of occasions; namely 2006, 2007, 2008, and 2010. An incident report prepared by Kent County Council (KCC) in August 2014 concludes that the failure of a pumping station (owned by Southern Water) caused the sewer to surcharge. KCC has also undertaken a CCTV survey of this area. Three further flood incidents recorded in the last four years have been investigated by Southern Water and operation issues identified in combination with heavy rainfall. Remedial action has been taken.
- In Sandwich, several flood incidents were recorded in in 2014 which were caused by a hydraulic overload of the sewerage infrastructure.
- Flood incidents were recorded in Whitfield in 2014 and 2016 as a result of heavy rainfall which caused the foul sewer network to become overloaded. Southern Water has investigated this issue and proposed an interim solution for the foul drainage in this area, which is expected to be implemented within the next two years.

The historic records have been updated and are presented on the map in [Appendix A.1](#), accompanied by a table which identifies the date of each event and provides any details which have

been provided. [Appendix A.3](#) identifies which stakeholders have contributed historical records as part of this SFRA update.

1.5. **Climate Change**

The global climate is constantly changing, but it is widely recognised that we are now entering a period of accelerating change. Over the last few decades there have been numerous studies into the impact of potential changes in the future and there is now an increasing body of scientific evidence which supports the fact that the global climate is changing as a result of human activity. Past, present and future emissions of greenhouse gases are expected to cause significant global climate change during this century.

The nature of climate change at a regional level will vary: for the UK, projections of future climate change indicate that more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall of the type responsible for the recent UK flooding could be expected.

These effects will tend to increase the size of flood zones associated with rivers, and the amount of flooding experienced from other inland sources. The rise in sea level will change the frequency of occurrence of high water levels relative to today's sea levels. It will also increase the extent of the area at risk should sea defences fail, although this increase will be comparatively small in the district due to the valley topography of the coastal floodplains. Changes in wave heights due to increased water depths, as well as possible changes in the frequency, duration and severity of storm events are also predicted.

To ensure that any recommended mitigation measures are sustainable and effective throughout the lifetime of the development, it is necessary to base the appraisal on the extreme flood level that is commensurate with the planning horizon for the proposed development. The NPPF and supporting *Planning Practice Guidance Suite* state that residential development should be considered for a minimum of 100 years, but that the lifetime of a non-residential development depends on the characteristics of the development. For commercial development, a 60 year design life is typically assumed, although the LPA and Environment Agency should be consulted to determine the most appropriate design life for each development.

1.5.1. **Extreme Sea Level**

Global sea levels will continue to rise, depending on greenhouse gas emissions and the sensitivity of the climate system. The relative sea level rise in England also depends on the local vertical movement of the land, which is generally falling in the south-east and rising in the north and west. The accompanying *Planning Practice Guidance Suite* to the NPPF provides allowances for the regional rates of relative sea level rise and these are shown in Table 1.1.

| Administrative Region | Net Sea Level Rise (mm/yr) Relative to 1990 | | | |
|--|---|--------------|--------------|--------------|
| | 1990 to 2025 | 2026 to 2055 | 2056 to 2085 | 2086 to 2115 |
| East of England, East Midlands, London, SE England (south of Flamborough Head) | 4.0 | 8.5 | 12.0 | 15.0 |
| South West | 3.5 | 8.0 | 11.5 | 14.5 |
| NW England, NE England (north of Flamborough Head) | 2.5 | 7.0 | 10.0 | 13.0 |

Table 1.1 – Recommended contingency allowances for net sea level rise

When these values are applied to the current day predicted extreme sea levels, it can be seen that the increase in sea level is significant and is not linear. The extreme water levels under a 1 in 200 year event have therefore been calculated for time steps between the current day and the year 2115. These values are summarised in Table 1.2 below.

| Year | 1 in 200 year extreme water level (m AODN) | | |
|-------------------------|--|------|----------|
| | Dover | Deal | Sandwich |
| Current day (year 2008) | 4.59 | 4.55 | 4.57 |
| 2025 | 4.66 | 4.62 | 4.64 |
| 2055 | 4.91 | 4.87 | 4.89 |
| 2075 | 5.15 | 5.11 | 5.13 |
| 2085 | 5.27 | 5.23 | 5.25 |
| 2115 | 5.72 | 5.68 | 5.70 |

Table 1.2 – Climate change impacts on extreme flood levels

1.5.2. Offshore Wind Speed and Extreme Wave Height

As a result of increased water depths resulting from changes in the climate, wave heights may change. The following allowances in Table 1.3 for offshore wind speed and wave height applicable around the entire English coast and are relative to a 1990 baseline. These figures include a sensitivity allowance which should be used to show that the range of impact of climate change is understood.

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

Table 1.3 – Recommended climate change allowance and sensitivity ranges for offshore wind speed and extreme wave height (relative to 1990 baseline)

1.5.3. **Peak River Flow**

Since the previous SFRA, the Environment Agency has published new guidance on the peak river flow allowances for climate change. The new figures show the anticipated changes to peak river flow by river basin district. The district is covered by the South East River Basin Districts, as defined by the Environment Agency River Basin maps. A copy of these maps can be found at;

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

For each district a range of climate change allowances are provided for different time epochs over the next century, which correlate with the planning horizons for the varying classifications of development.

For each epoch there are three climate change allowances defined. These represent different levels of statistical confidence in the possible emissions scenarios on which they are calculated. The three levels of allowance are as follows:

- Central: based on the 50th percentile
- Higher Central: based on the 70th percentile
- Upper End: based on the 90th percentile

With reference to this methodology, it is recognised that although the higher percentile allowances are possible, these events are less likely to occur.

As well as encouraging sustainable development to meet the demands of a growing population, the NPPF also promotes a precautionary approach. For more vulnerable development in areas of higher risk of flooding, a higher percentile allowance is recommended in order to manage the risk of flooding over the lifetime of the proposed development. The Environment Agency has therefore provided guidance regarding the application of the climate change allowances and how they should be applied in the planning process, which can be seen in Table 1.4 below.

| Flood Risk Vulnerability Classification | Flood Zone 2 | Flood Zone 3a | Flood Zone 3b |
|---|--------------|---------------|---------------|
| Essential infrastructure | ↗ ↑ | ↗ ↑ | ↑ |
| High vulnerability | ↗ ↑ | X | X |
| More vulnerable | → ↗ | ↗ ↑ | X |
| Less vulnerable | → | → ↗ | X |
| Water compatible development | No allowance | → | → |

Key :

| | | | |
|---|----------------|---|-------------------------------------|
| ↑ | Upper End | → | Central |
| ↗ | Higher Central | X | Development should not be permitted |

Table 1.4 – Recommended Climate Change allowance percentile based on flood risk vulnerability and flood zone compatibility.

The allowances for the district cover the South East river basin district and are shown in Table 1.5 below.

| River Basin District | Allowance Category | 2015 to 2039 | 2040 to 2069 | 2070 to 2115 |
|----------------------|--------------------|--------------|--------------|--------------|
| South East | Upper End | 25% | 50% | 105% |
| | Higher Central | 15% | 30% | 45% |
| | Central | 10% | 20% | 35% |

Table 1.5 – Recommended peak river flow allowances for each epoch for the South East river basin district (1961 to 1990 baseline)

1.5.4. Peak Rainfall Intensity

The recommended allowances for increase in peak rainfall intensity have also been updated since the completion of the previous SFRA. Although the allowance is applicable nationally, there is a range of values provided which correspond with the central and upper end percentiles (the 50th and 90th percentile respectively) over three-time epochs. The recommended allowances are shown in Table 1.6 below.

| Allowance Category (applicable nationwide) | Total potential change anticipated for epoch | | |
|---|--|--------------|--------------|
| | 2015 to 2039 | 2040 to 2069 | 2070 to 2115 |
| Upper End | 10% | 20% | 40% |
| Central | 5% | 10% | 20% |

Table 1.6 – Recommended peak rainfall intensity allowance for small and urban catchments (1961 to 1990 baseline)

All of the above recommended allowances for climate change should be used as a guideline and can be superseded if local evidence supports the use of other data or allowances. Additionally, in the instance where flood mitigation measures are not considered necessary at present but will be required in the future (as a result of changes in climate), a “managed adaptive approach” may be adopted where development is designed to allow the incorporation of appropriate mitigation measures in the future.

1.5.5. Impacts of Climate Change on the District

The Environment Agency Flood Zone maps are based on current day sea levels and climate conditions. However, these maps do not take into consideration the impact of climate *change*. The majority of the district to the south is located on higher ground and therefore, for the coastal areas the impact of climate change will be comparatively small. However, in the northeast of the district, the impact will be more pronounced due to the relatively flat topography of the low-lying land. Furthermore, the River Stour is tidally influenced throughout the entire district and thus, an increase in sea level would also result in a larger area further inland being at risk of flooding. Therefore, it is necessary to ensure that new development is designed so that these residual risks are mitigated.

The reliance of villages and towns (such as, Deal and Sandwich) on tidal flood defence infrastructure will increase over the next century as sea levels increase. The consequences of such structures failing (i.e. a breach), or becoming overtopped, will therefore increase too. When the dynamics of a breach are considered, the increase in sea level over the next 100 year period will result in a significant increase in the volume of water which is able to flow through the breach during the peak of an extreme event. Higher water levels can promote larger wave heights along the coastline, as waves are sustained closer inshore through a combination of increased water levels and increases in offshore wind speed.

In addition to the risk tidal flooding, consideration should also be paid to the impact of climate change associated with fluvial and pluvial flooding. The River Dour which runs through Dover is known to respond quickly to heavy rainfall and historically this has caused many problems. This is primarily due to the river passing through a heavily urbanised area where sections are culverted, form part of the surface water sewerage network, and/or have the potential for the outfalls to become tide locked. Consequently, increases in peak rainfall intensity and peak river flow are likely to significantly increase the risk of flooding from rivers.

By managing surface water in a sustainable manner, through the use of SuDS for example, it is possible to ensure that new development does not exacerbate flood risk on site or elsewhere within the catchment. Taking climate change into account at the planning stage will ensure that its impacts are mitigated, thus the risk of flooding can be managed throughout the lifetime of the development.

Climate change will inevitably result in an increased risk of flooding from all sources. Consequently, the potential impacts of climatic change will require careful consideration before sites for development are allocated.

1.6. Defence Infrastructure

Within the district there has been extensive investment in the defence infrastructure along the rivers and the coast by both the EA and DDC. Defences can be found on much of this coastline and tidal reach of the River Stour. These defences provide protection from coastal erosion as much as they do flooding, and are actively maintained, with a [‘hold the line’ policy](#). These defences provide protection to the low-lying coastal areas inland of the coast. The location and extent of the existing defence infrastructure network within the district is shown in [Appendix A.2](#).

Other sections of the district coastline are not actively defended, (termed ‘no active intervention’), and include areas to the north of Deal and most of the chalk cliffs in the south of the district. However, due to the presence of important infrastructure or settlements, some sections of the cliff coastline are currently defended.

A summary of the coastal defences is outlined below;

- There are no formal defences from Shell Ness to Sandwich Bay Estate, however, relic sand dunes along this frontage provide a level of protection;
- Sandwich Bay Estate to Sandwich Bay Sailing Club there is a revetment of SeaBee armour units;
- An earth and shale embankment provides protection from sea flooding from Sandwich Bay Sailing Club to Sandown Castle. The shingle beach along this frontage protects the bank from erosion and wave overtopping, with additional protection provided by the rock revetment at Sandown Castle;
- As part of the Deal Coastal Flood Defence Scheme (completed in 2013), a recurved concrete sea wall was constructed from Sandown Castle to Deal Castle. Beach renourishment provides an additional level of protection to this frontage.
- At Walmer a wide shingle beach provides an informal defence against erosion and wave overtopping;
- A concrete seawall at Kingsdown, in conjunction with groynes and regular beach renourishment, provide protection from flooding along this frontage;

- A rock revetment, timber upstand wall and four timber groynes at Oldstairs Bay protect the land behind from flooding and erosion;
- At the Ministry of Defences Range north of St Margaret's Bay, a low concrete wall provides some protection from the sea, albeit to a low standard;
- At St Margaret's Bay, timber groynes on a shingle beach protect a concrete seawall from erosion, whilst the concrete wall and car park provide protection to the base of the cliff;
- Within the harbour at Dover, breakwaters reduce the risk of wave overtopping by protecting the frontage from incoming waves. The Dover Harbour Authority also owns a sea wall and secondary wall within the inner-harbour.
- Shakespeare Beach is wide and comprises shingle at the eastern end. At the western end, the defences were recently upgraded (completed in 2016) and comprise a rock revetment.

The tidal reaches of the River Stour are defended, and these defences extend to the smaller tributaries that feed into the Stour along this reach. The Sandwich Tidal Defence Scheme (completed in 2016) comprises flood walls and embankments along the River Stour and a tidal flood storage area to the south east of the town. The location of the storage area is shown in [Appendix A.2](#). Additionally, the Stonar Cut is designed to bypass Sandwich town and further alleviate the risk of flooding by dropping the water level in the river at this location. Considering that these defences were constructed relatively recently, it is envisaged that they will be maintained for the foreseeable future.

There are informal flood walls along the length of the River Dour as it passes through Dover. These defences are not formally maintained by either the EA or DDC, and are thought to have a standard of protection less than the required [design standard](#).

1.7. Actual Risk and Residual Risk

The NPPF requires the *actual* risk of flooding to a development to be appraised. The actual risk considers the likelihood of flooding under extreme conditions (e.g. the design flood event), whilst considering the influence of any defence infrastructure, or drainage systems, which may provide a level of protection to the site.

The presence of such defences, or drainage system, does not imply a low risk of flooding, as locations where the design standard is low can still result in flooding under the design flood event.

Examples of *actual risk* are as follows;

- A combination of a storm surge and extreme waves resulting in waves overtopping the sea wall;

- The in-channel river level exceeding the crest height of the flood embankment which has a low standard of protection (e.g. 1 in 20 years);
- Surface water ponding in a topographic depression following a heavy rainfall event;
- Flooding from the emergence of groundwater due to a rising water table following prolonged rainfall;
- The capacity of the public sewer being exceeded, due to its design standard (typically 1 in 30 years);
- Flooding within the highway due the highway gullies becoming overwhelmed, as these gullies are typically designed to manage the 1 in 2 year return period event.

The NPPF requires development to be appraised against the *actual* risk of flooding under design flood event conditions. However, from the above examples it is evident that many sites within the district are reliant on the protection of flood defences or are dependent on the influence of on-site drainage systems to ensure that the *actual* risk of flooding under the design event is reduced.

If the defences, or drainage system were to fail (i.e. due to a breach or a blockage), or if an event greater than the design flood event was to occur and overtop the defences (i.e. an exceedance event), properties would be inundated by floodwater. This is termed the *residual risk* of flooding.

Residual risk is a particular issue within the low-lying areas of Deal and Sandwich, which are currently protected by the coastal and tidal defences.

When considering impacts of climate change into the future, the potential impact of residual risk is further exacerbated. Sea levels are predicted to increase, and much of the lower-lying areas of Sandwich and Deal will as a result be located below the anticipated extreme sea level in the future. Furthermore, as a result of the predicted increase in peak river flow, in-channel water levels are likely to rise. As a consequence, the district will be more reliant on the defences in the future and thus, it is inevitable that the defences will require upgrading, once their current defence standard is exceeded, to keep in line with increasing water levels and minimise the likelihood of the defences failing and the water level exceeding the crest height of the defences.

Given the rapid rate of inundation and extensive flooding which is likely to result from a residual risk flood event, the use of hydrodynamic numerical flood modelling is required to apprise the depth, extent and velocity of flooding under such scenarios. Such modelling has recently been undertaken by EA as part of the East Kent Coast Modelling Study.

Similar modelling has been undertaken by the EA for reservoirs across the England to provide information on the expected depth and velocity of flooding in the event of a reservoir failure. The 'Flood Risk from Reservoirs' mapping show the impact of a failure of the reservoir at Updown Farm, which is the only formal reservoir within district. The results can be found at;

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

It is also necessary to consider the residual risk of flooding from a drainage system. An event which exceeds the design criteria, or a failure of the drainage system (i.e. due to a blockage) should both be considered when designing a drainage system. The potential overland flow routes and the area where floodwater is likely to pond following an exceedance event should also be appraised. This analysis will need to demonstrate that the proposed drainage system does not increase the risk of above ground flooding to the development, or to the surrounding area, and should be tested by applying the 1 in 100 year event, inducing a 40% increase in peak rainfall intensity.

Part 2

Policy Requirements



Part 2 of the SFRA highlights the relevant local and national policy and legislation relating to the Flood Risk Management Process. This information contained herein includes a detailed list of the documents required to support a planning application.

Part 2: Policy Requirements

2.1. Applicable Policies and Studies

Flood and Water Management Act (FWMA) (2010)

In response to the Pitt Review which followed the summer 2007 floods, and the requirements of the EU Flood Directive, the Flood and Water Management Act was implemented in England and Wales in April 2010. The act outlines the responsibilities for managing flood risk and drought, with an increased focus on the risk of flooding from local sources. An important outcome of the act is that County or Unitary Authorities are now classified as 'Lead Local Flood Authorities' and have the responsibility for managing flood risk at a local scale. Additionally, it aims to encourage the use of SuDS, and promotes resolution of sewer misconnections.

National Planning Policy Framework (NPPF) (2018)

The National Planning Policy Framework (NPPF) was published on the 27th March 2012 and subsequently updated in July 2018. This Framework is a key part of the Government's reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF sets out the Government's planning policies for England and is used in the preparation of local plans, as well as in decision making with respect to planning. The framework is executed by means of the accompanying Planning Policy Guidance Suite (March 2014) which supersedes *PPS25: Development and Flood Risk Practice Guide* (2009).

Paragraphs 7 to 211 contain policy that represents the Government's view of sustainable development. In order to achieve sustainable development within different districts, local circumstances need to be taken into account. Each Local Planning Authority is required to complete a SFRA to assess the risk of flooding from all sources, following criteria set out in the NPPF. The overarching use of SFRAs is to implement the Sequential Test, and where necessary the Exception Test, when determining land use allocation.

Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS)

As part of the Government's continuing commitment to protect people and property from flood risk, the Department for Environment, Food and Rural Affairs (Defra) consulted on a proposal to make better use of the planning system to secure sustainable drainage systems (2014).

The standards came into effect from the 6th April 2015 and relate to Schedule 3, Paragraph 5 of the Flood and Water Management Act 2010 and provide additional detail and requirements not initially covered by the NPPF through specifying criteria to ensure sustainable drainage is included within applications classified as [major](#) development.

Kent County Council Local Flood Risk Management Strategy

Kent County Council (KCC) is the Lead Local Flood Authority (LLFA) and has the duty to manage local flooding. KCC has developed the Local Flood Risk Management Strategy to provide a countywide framework to manage risks of local flooding following the Flood and Water Management Act (2010). The strategy covers the risk of flooding from surface water, groundwater and ordinary watercourses and sets out how the risk from these sources can be reduced for people and businesses in Kent. In addition, it provides information and guidance on roles and responsibilities and how authorities will co-operate to manage flood risk. The 2017 to 2023 strategy builds upon knowledge and understanding resulting from delivering the previous strategy (2013-2016).

KCC Drainage and Planning Policy Statement (2017)

The Drainage and Planning Policy Statement outlines how KCC will review drainage submissions for all applications classified as [major](#) development in accordance with the objectives of the Local Flood Risk Management Strategy. The statement outlines the policy requirements for SuDS and other considerations which could impact the drainage design for a scheme.

River Stour Catchment Flood Management Plan

The Stour CFMP, relevant to the district, was completed and published by the Environment Agency in March 2007. A CFMP is a high-level strategic planning tool through which the Environment Agency seeks to work with other decision-makers within a river catchment to identify and agree policies for sustainable flood risk management. The primary objectives of the CFMP are to:

- Develop complementary policies for long-term (50-100 years) management of flood risk within the catchment that take into account the likely impacts of changes in climate, land use and land management.
- To undertake a strategic assessment of current and future flood risk from all sources within the catchment and quantify the risk in economic, social and environmental terms.
- Identify opportunities and constraints within the catchment for reducing flood risk through strategic changes and identify how these benefits could be delivered.
- Identify opportunities to maintain, restore or enhance the total stock of natural and historic assets from flooding.
- Identify the relative priorities for the catchment and assign responsibility to the Environment Agency and other operating authorities, local authorities, water companies and other key stakeholders for further investigations or actions to be taken to manage and reduce flood risk within the catchment.

Isle of Grain to South Foreland and South Foreland to Beachy Head Shoreline Management Plans (SMP)

Whilst the SMPs are not statutory planning documents, they do set policy for the management of the shoreline over the next 100 years. Consequently, each SMP is an important document when appraising the risk of coastal flooding on a regional and local scale.

The SMP Reviews were completed and approved by the Environment Agency's Regional Director in 2010 and 2006 for the Isle of Grain to South Foreland and South Foreland to Beachy Head SMPs, respectively. Each SMP has been examined as part of the SFRA process and the relevant policies are listed in Table 2.1.

| Location | Policy Unit Reference | SMP Policy | | |
|---|-----------------------|------------------------|------------------------|---|
| | | 2006 to 2025 | 2025 to 2055 | 2055 to 2105 |
| South of River Stour to Sandwich Bay Estate | 4b 21 | No active intervention | No active intervention | No active intervention |
| Sandwich Bay Estate to Sandown Castle | 4b 22 | Hold the line | Hold the line | Hold the line |
| Sandown Castle to Oldstairs Bay | 4b 23 | Hold the line | Hold the line | Hold the line |
| Oldstairs Bay to St Margret's Bay | 4b 24 | No active intervention | No active intervention | No active intervention |
| St Margaret's Bay | 4b 25 | Hold the line | Hold the line | Hold the line |
| South Foreland | 4b 26 | No active intervention | No active intervention | No active intervention |
| South Foreland to Dover | 4c 01 | No active intervention | No active intervention | No active intervention |
| Dover | 4c 02 | Hold the line | Hold the line | Hold the line |
| Shakespeare Cliff | 4c 03 | No active intervention | No active intervention | No active intervention |
| Samphire Hoe | 4c 04 | Hold the line | Hold the line | Hold the line |
| Abbots Cliff | 4c 05 | No active intervention | No active intervention | No active intervention |
| Folkestone Warren | 4c 06 | Hold the line | Hold the line | Hold the line or no active intervention |

Table 2.1 - Summary of SMP policies for frontages within the district.

Five SMP policy units in district are assigned a 'hold the line' management policy due to the important infrastructure and habitats along these coastlines. Most of the defences in these policy units are maintained by the EA, while a single section in Deal is operated by DDC. It will be necessary for both the EA and DDC to allocate funding to manage and maintain the defences in the district to discharge these policies.

Other sections of the district coastline have a management policy of 'no active intervention'. In these areas, coastal change, specifically erosion, must be considered even if the risk of flooding from the sea is low. The NPPF states that action must be taken to manage the development activities in areas subject to coastal change. More information can be found in the document 'Review of Coastal Change Management Areas in Dover District' (which can be found on the DDC website). The SMPs note that these units contain property, such as residential housing and transport infrastructure, which will be required to be relocated at some time during the next 100 years.

Dover District Local Plan

The current Local Plan was adopted in February 2010 and is currently in the process of being updated. The plan will cover the period up until 2037 and will set out policies for the district in line with the Council's objectives for development. The SFRA forms part of the evidence base for the updated Plan, which will be used to update Local Planning Policies in relation to flood risk and surface water management, as well as informing the sustainability appraisal required as part of the Housing and Economic Land Availability Assessment (HELAA).

As part of the current Local Plan, reference is made within the Core Strategy and Development Management Policies to flood risk. Policy DM17 sets out the requirements for development within a groundwater source protection zone, and Policy DM 18 makes reference to development affecting the setting of the River Dour. These policies will be reviewed as part of the Local Plan process.

Dover Surface Water Management Plan (2011)

In August 2011, KCC prepared a Surface Water Management Plan (SWMP) for the urban centre of Dover. Mapping undertaken by the EA identified that Dover town could be susceptible to surface water flooding. The purpose of this report was to review the risk of flooding to the town through modelling and identify suitable measures to manage the risk from surface water flooding.

Flood Risk Appraisal of the River Dour (2010)

In support of development options for Dover Mid-Town, a study of the risk of flooding from fluvial, tidal and surface water was commissioned. The study included a detailed hydraulic model of the River Dour through Dover Mid-Town and evaluated options for managing the risk of flooding.

Deal Transport and Flood Alleviation Model

Within north Deal, and in particular the Sholden area, significant opportunities for development have been identified. However, development in the future will be constrained by transport and flood risk issues. The Deal Transport and Alleviation study provided an initial (Stage 1) appraisal of the scope for future development and the issues related to transport and flood risk. The report outlines recommendations for improvements which could be made to facilitate future development in this area. Following on from this report, a Stage 2 report was undertaken which focuses on the scope of development, and potential flood risk and traffic alleviation options within the Albert Road area of Deal. This work has been revisited as part of a wider study of the North Deal area as part of the Local Plan review process.

South East Inshore Marine Plan and Marine Policy Statement

The MMO will deliver UK marine policy objectives for English waters through statutory Marine Plans and other measures. DDC is located within the South East Inshore Marine Plan area, and a marine plan for this area will be prepared at a future date. Until a Marine Plan has been prepared, the Marine Policy Statement should be referenced for guidance on any planning activity that includes a section of coastline or tidal river. A copy of the Marine Policy Statement can be found at;

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf

2.2. Development Classifications

There are a number of development classifications which are referenced throughout this SFRA. Applications submitted to DDC will be classified as either householder, minor or major development depending on the scale of development. However, such development may also fall under a second definition relevant to the management of flood risk and surface water. The definitions of these development types are provided below for reference;

| DDC classifications for new applications: | | |
|--|---|-----------------------|
| Householder | Minor | Major |
| Other Classifications relevant to Flood Risk and Surface Water management: | | |
| Small development | Minor development (in relation to flood risk) | |

Table 2.2 – Classifications of development relevant to the SFRA.

2.2.1. Householder Development

Householder development is applicable for planning applications for internal changes and extensions to existing dwellings.

2.2.2. Minor Development

Minor development is applicable for planning applications which are not classified as householder development, but are not large enough to be considered as major development (i.e. less than 10 dwellings).

2.2.3. Major Development

Major development is defined within the Town and Country Planning (Development Management Procedure) (England) Order 2010 as development involving one or more of the following;

- a) *the winning and working of minerals or the use of land for mineral-working deposits;*
- b) *waste development;*
- c) *the provision of dwelling houses where:*
 - (i) *the number of dwelling houses to be provided is 10 or more; or*
 - (ii) *the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);*
- d) *the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or*
- e) *development carried out on a site having an area of 1 hectare or more.*

2.2.4. Permitted Development

The Town and Country Planning (General Permitted Development) Order 1995 was amended in May 2013 to allow householders to undertake a wide scope of enlargements, improvements, and other alterations to their properties. This allowed for greater flexibility under permitted development for the change of use of commercial premises, without the need for a full planning permission. In April 2016, the Order was revised to incorporate the change of use of other use classifications to residential use; including (but not limited to) laundrettes and light industrial use buildings. Further amendments to the categories of use change which are permitted have been made on an annual basis. An up-to-date summary of the class use changes which are allowed under *permitted development rights* can be found at:

https://www.planningportal.co.uk/info/200130/common_projects/9/change_of_use/2

2.2.5. 'Minor Development' in Relation to Flood Risk

The NPPG outlines a definition of minor development in relation to flood risk. This definition is used by the EA to define development which is subject to different guidance on the management of flood risk and is used within the NPPF to identify developments which are not subject to the Sequential and Exception Test. The NPPG definition of minor development in relation to flood risk is not to be confused with DDC's definition of [minor development](#) (see above). Minor development in relation to **flood risk** is defined as;

- *minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.*
- *alterations: development that does not increase the size of buildings e.g. alterations to external appearance.*
- *householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling*

itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats.

2.3. When is an FRA required?

The NPPF requires a site-specific FRA to be submitted for **all development located within Flood Zones 2 and 3**. In addition, development situated within **Flood Zone 1** will also require an FRA if the application meets one or more of the following criteria;

- The development site (red line boundary) is **greater than 1 hectare**.
- The development site is located within an area known to have **critical drainage problems**.
- The development site is located within an area identified by the SFRA as being at increased flood risk in the future.
- The development site introduces more vulnerable uses in an area shown to be at risk of flooding from other sources.

For some minor development and change of use, the NPPF states that the above criteria for preparing a site-specific flood risk assessment still apply. However, such applications are not subject to the Sequential Test or Exception Test.

To determine which Flood Zone the development site is located, the EA's 'Flood Maps for Planning' should be referenced:

<https://flood-map-for-planning.service.gov.uk/>

A site-specific FRA is also required to be submitted in support of applications for **a change of use** where the proposals are subject to [permitted development rights](#). Such applications are subject to a notification procedure with the LPA, referred to as a [prior approval application](#) (PAA). The applicant is required to submit details of the proposals, site details and any other information deemed necessary for the LPA to assess the potential impact with regard to: transport and highway; contamination; flood risk; and noise impact. The FRA should demonstrate how the risk of flooding will be managed to ensure that the development remains safe through its [lifetime](#).

For development sites which fall outside the criteria above, the **LPA can request a site-specific FRA** accompanies the application; reasons could include development being proposed in an area known to have an historic risk of flooding.

The FRA should be prepared in accordance with the requirements set out in the document 'Site-specific Guidance for Managing Flood Risk' on the DDC website. The site-specific FRA will also need to demonstrate that the proposals will not have an adverse impact on flood risk to areas

outside of the site boundaries (refer to [Section 2.4](#)). For major developments, a [Surface Water Management Strategy \(SWMS\)](#) may also be required to be submitted.

2.4. When is a SWMS required?

In addition to addressing the risk of flooding to a development, it is necessary to ensure that the development does not increase the risk of flooding offsite as a result of an increase in runoff from the development. A surface water management strategy (SWMS) is therefore required to be submitted to address this. The SWMS can be prepared as an independent report, or integrated into an FRA where applicable.

The requirements for managing surface water runoff from the development are dependant on the scale of the development, as outlined below;

For all [minor](#) and [householder](#) planning applications, there are no specific requirements to provide additional supporting documentation in relation to SuDS. In accordance with Paragraph 163 of the NPPF, all development applications which are required to be accompanied by a Flood Risk Assessment (refer to [Section 2.3](#)) will be required to incorporate sustainable drainage systems, unless there is clear evidence that this would be inappropriate. Notwithstanding this, all development will be subject to The Building Regulations requirements for drainage and waste disposal.

In addition, all development positioned within 8m of an [existing watercourse](#), and/or located within a Coastal Change Management Area (CCMA) will also be required to use Sustainable Drainage Systems (SuDS). The use of infiltration SuDS is restricted within the CCMA's and as such, other methods of discharge should be prioritised (refer to DDC's Site-specific Guidance for Managing Flood Risk for details). Maps delineating the CCMA's within the district can be found on the DDC website.

For all [major](#) applications, the LLFA (KCC) are statutory consultees with respect to surface water management. The LLFA require a detailed **Surface Water Management Strategy** report to be submitted alongside the planning application, which should evidence how SuDS can be incorporated within the proposed development. The SWMS must demonstrate compliance with the Non-Statutory Technical Standards for SuDS as well as all local planning policies related to drainage. Guidance on the completion of a detailed SWMS is set out within [KCC's Drainage and Planning Policy Statement](#).

Conclusions and Recommendations

The National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government in March 2012 (updated 2018), requires Local Planning Authorities (LPA) to apply a risk-based approach to the preparation of their development plans in respect of potential flooding. In simple terms, the NPPF requires LPAs to review the variation in flood risk across their district, and to steer vulnerable development (e.g. housing) towards areas of lowest risk.

Where development is to be permitted in areas that may be subject to some degree of flood risk, the NPPF requires the LPA to demonstrate that there are sustainable options for mitigation available, which will ensure that the risk to property and life is minimised should flooding occur.

In accordance with the NPPF's requirements, this SFRA report provides an evidence base and builds upon the original SFRA which was prepared in 2007. This latest iteration addresses changes to planning policy and introduces new mapping, which is designed to assist with the appraisal of flood risk and to assist with better spatial planning. The document comprises three main parts, which together are designed to guide both the LPA and developer through the process of effective flood risk management.

The purpose of Part One of this document is to provide context in regard to flood risk within the district and to highlight any areas which are at potential risk. This appraisal has identified that the coastal towns of Deal and Dover are protected from sea flooding under an extreme storm event with a 1 in 200 year return period (0.5% AEP) and the construction of the defence infrastructure has significantly reduced the *actual* risk of flooding at these coastal locations. The risk of coastal flooding to these two towns is therefore limited to a *residual* risk event only, which would require a catastrophic failure of the new defence infrastructure (e.g. a failure in the seawall).

Similarly, the tidal reach of the River Stour which passes through Sandwich has also been identified as a source of potential flooding, and until the completion of the Sandwich Town Tidal Defence in 2016, presented a combined risk of tidal and fluvial flooding to the population of Sandwich town. However, through the use of flood protection walls and the construction a flood storage area, it has been demonstrated that the town is now protected from both fluvial and tidal flooding well into the foreseeable future (circa 50 years, under the 0.5% AEP event). All of these defence schemes take it to consideration future changes in the climate, which are required to be considered when introducing new development to an area at risk of flooding.

In addition to coastal flooding, it has been recognised that the potential risk of flooding from other sources of flooding exists throughout the district, including the risk of the sewer network becoming surcharged, and surface water flooding as a result of heavy rainfall, limited capacity of drainage infrastructure and low lying marsh land. With the introduction of the uFMfSW (EA's *Flood Risk from Surface Water* maps) it has been possible to clearly map the areas of the district which are susceptible to surface water flooding and through the implementation of robust drainage guidance

for developers, it is possible to encourage the use of SuDS to minimise the impact of future development in the district.

This SFRA identifies the floodplain areas associated with the River Stour, River Dour and River Wingham and alongside the surface water flood maps, presents an overall Risk Map that delineates the potential risk of flooding across the entire district. These maps provide the necessary information to facilitate the NPPF risk-based approach to planning – the Sequential Test.

Part 2 of the report provides the reader with some additional context with respect to the current flood risk policy requirements. This section of the report includes both national and local policies relating to flood risk and provides clear information on *why* the flood risk information is required to be submitted. This section also defines what information is required to be submitted relating to flood risk and surface water management in support of planning applications.

In summary, the SFRA provides a clear picture of the potential risks associated with flooding within the Dover district and outlines the requirements with regard to ensuring that these risks are managed in a sustainable way into the future.

It is recommended that policy options are expanded to reflect the requirements for Flood Risk Management and the integration of sustainable drainage systems (SuDS). These policy recommendations could be incorporated into the emerging Local Plan and should focus on reducing the risk of flooding to the district from *all* sources.

The SFRA should be reviewed regularly, taking into consideration any changes to planning policy. In response to future climate change, it is recommended that the Sequential Test is refined to include the residual risk of flooding in defended areas, once this information becomes readily available. Finally, with respect to sewer flooding, it is recognised that ongoing discussions between Southern Water and DDC will form part of the Local Plan process and these discussions should be focussed on resolving the known sewer capacity issues within the district.

Appendices

Appendix A.1 – Historic Flooding

Appendix A.2 – Defences and Watercourses

Appendix A.3 – Data Sources

Appendix A.1 – Historic Flooding

Records of Historic Flooding

Dover District Council
Strategic Flood Risk Assessment



Records of Historic Flooding:

- Fluvial
 - Tidal
 - Surface Water
 - Sewer
 - Internal Property Flood
- EA Historic Flood Extents
- Dover District Boundary

These historic flood records are a combination of data from remote sensing, ground surveys and staff observations provided by DDC and the Environment Agency. Validated third party data and anecdotal evidence are also included. The datasets used may have been designed to be viewed at a range of map scales, and therefore this map is not intended to be viewed at a site-specific scale. These records are the best available at the time of collation, but should not be considered comprehensive. An area without a flood outline does not necessarily imply that there is no risk of flooding. Queries with regard to the recorded flood extents should be directed to the Environment Agency.

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Records of Historic Flooding

Dover District Council
Strategic Flood Risk Assessment



Records of Historic Flooding:

- Fluvial
 - Tidal
 - Surface Water
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 - Internal Property Flood
- EA Historic Flood Extents
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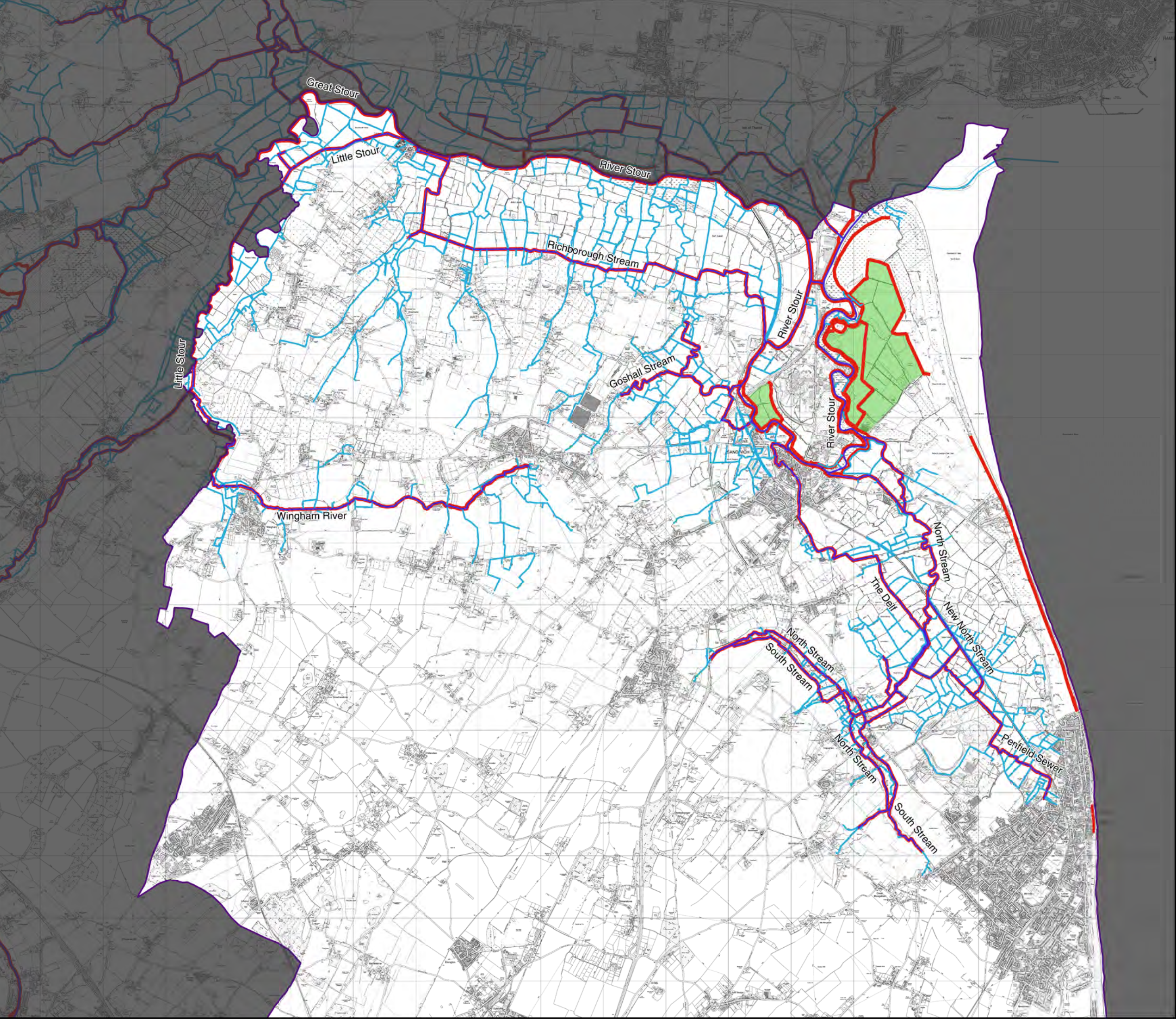
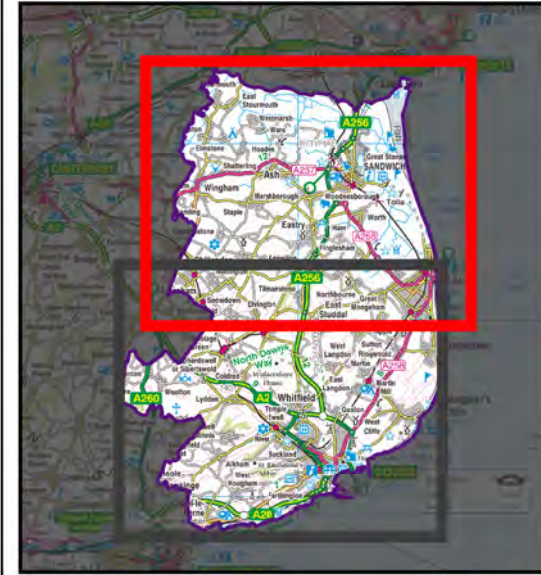
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Appendix A.2 – Defences and Watercourses

Watercourses and Defence Infrastructure
 Dover District Council
 Strategic Flood Risk Assessment



-  Dover District Boundary
- Watercourses:**
-  Main rivers
-  All watercourses
- Defence Infrastructure:**
-  Flood defences
-  Flood storage areas

A number of datasets have been used in the derivation of the mapped extents. The datasets used may have been intended to be viewed at a range of map scales, and therefore this map is not designed to be viewed at a site-specific scale. However, due to the methods used in deriving these extents, a more accurate assessment of the distance from a watercourse/defences may be required by the Environment Agency.

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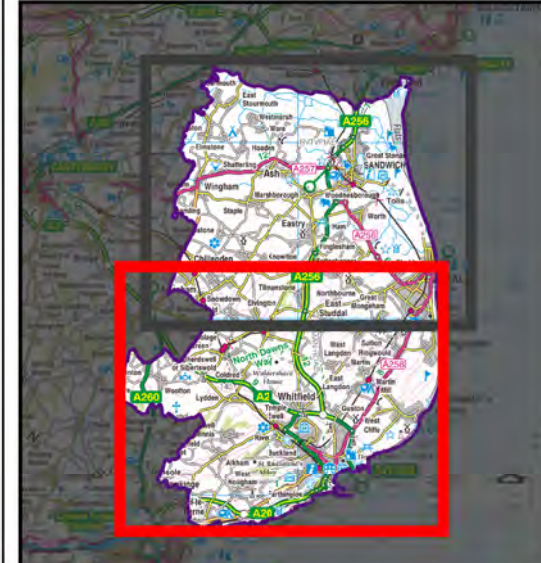
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Watercourses and Defence Infrastructure
 Dover District Council
 Strategic Flood Risk Assessment



-  Dover District Boundary
- Watercourses:**
-  Main rivers
-  All watercourses
- Defence Infrastructure:**
-  Flood defences
-  Flood storage areas

A number of datasets have been used in the derivation of the mapped extents. The datasets used may have been intended to be viewed at a range of map scales, and therefore this map is not designed to be viewed at a site-specific scale. However, due to the methods used in deriving these extents, a more accurate assessment of the distance from a watercourse/defences may be required by the Environment Agency.

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Appendix A.3 – Data Sources

| Data Layer | Source |
|-------------------------------|------------------------|
| OS VectorMap | Ordnance Survey |
| OS 1:250 000 mapping | Ordnance Survey |
| Historic flood extents | Environment Agency |
| Recorded flood incidents | Kent County Council |
| Historic records | Southern Water |
| Flood Zones 2 | Environment Agency |
| Flood Zone 3 | Environment Agency |
| Flood Risk from Reservoirs | Environment Agency |
| Flood Risk from Surface Water | Environment Agency |
| Detailed River Network | Environment Agency |
| Spatial Flood Defences | Environment Agency |
| District boundary | Dover District Council |