Folkestone & Hythe District Council

Water Cycle Study

EB 05.20

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Agreed by	

Folkestone and Hythe Water Cycle Report

This report has been produced by the District Council, and the approach taken has been to build upon and update the 2011 Water Cycle Study. The report has been shared with key stakeholders for comment/feedback, notably the Environment Agency, Affinity Water, South East Water and Southern Water. Information specifically relating to flood risk has been sourced from the 2015 Strategic Flood Risk Assessment prepared by Herrington Consulting to update the 2009 study.

The Water Cycle Report is produced to inform the District's Local Plan documents and is not considered material to any planning application.

CONTENTS

List of Diagrams

List of Tables

List of Appendices

Glossary of Terms

Term	Definition
AMP	AMP is an 'Asset Management Plan' within the water industry. AMP6 refers to the 5 year planning period for 2016-2020
Aquifer	An underground layer of water-bearing permeable rock or unconsolidated materials such as silt gravel or clay from which groundwater can be extracted
Abstraction, (also referred to as water extraction or groundwater abstraction)	The process of taking water either permanently or temporarily from a source
Artificial Water Body	Surface water bodies which have been created in a location where no water body existed before and which have not been created by the direct physical alteration, movement or realignment of an existing water body
Baseflow, (also referred to as groundwater flow, or dry-weather flow)	Water resulting from precipitation that infiltrates into the soil and eventually moves through the soil to the stream channel
Catchment Abstraction Management Strategy (CAMS)	Six year plans that detail water management within a designated area
Code for Sustainable Homes	This is an environmental impact rating system for housing in England & Wales, setting standards for energy efficiency and sustainability. The government withdrew the code in March 2015, aside from the management of legacy cases
Catchment	An area of land where water from rain or melting snow or ice drains downhill into a body of water. The drainage basin includes streams, rivers and land that convey water into those channels
Diffuse pollution	Polluting substances that cannot be traced back to an exact source, occurs when potentially polluting substances leach into surface water and groundwater as a result of rainfall, soil infiltration and surface runoff
Diffuse pollution sources	Agriculture, transport and construction are examples of potential sources for diffuse pollution
Discharge	Water that is emitted by a process back into natural hydrological systems
Dry Weather Flow	When the sewage flow is mainly domestic in character, the average daily flow to the treatment works during seven consecutive days without rain following seven days during which the rainfall did not exceed 0.25mm on any one day. Usually taken as 200 litres per head per day on domestic properties

Flood Zones (Environment Agency)	High level information on the type and likelihood of flood risk in any area of the country; classified as follows: Zone 1 - Low probability of flooding Zone 2 - Medium probability of flooding Zone 3 - High probability of flooding
Flood Hazard Zones (Strategic flood risk assessment)	In developing the Strategic flood risk assessment more detailed flood scenarios were calculated for the District. Low - Caution Moderate - Dangerous for some Significant Dangerous for most people Extreme - Dangerous for all
Flooding	See Table 8, 6.2.7 Flood Sources
Groundwater	Water located beneath the ground surface in soil pore spaces and in the fractures within rock or rock formations.
Headroom	For water supply this is the amount of water allocated in planning as a safety reserve to allow for a range of uncertainties. For wastewater treatment it is the spare capacity within strategic infrastructure.
Heavily modified water body (HMWB)	Bodies of water which, as a result of physical alterations by human activity, are substantially changed in character and cannot, therefore, meet "good ecological status" (GES). In this context physical alterations mean changes to, e.g. the size, slope, discharge, form and shape of river bed of a water body.
Hydrogeology	The branch of geology concerned with water occurring underground or on the surface of the earth
Local reinforcement	Describes the works necessary to an existing network to enable a development to go ahead
National Planning Policy Framework (NPPF)	The National Planning Policy Framework was published on 27 March 2012 (with an update released on 24th July 2018) and sets out the Government's planning policies for England and how these are expected to be applied.
Sequential test	Applied in accordance with Planning Policy Statement 25, used to demonstrate that there are no reasonable sites within an area with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
Sewage infrastructure (pipes works)	The sewerage network comprises local and strategic elements: local - connecting domestic properties through localised pipes to the main sewerage network strategic - major elements of infrastructure, including large pipes and wastewater treatment plants.

Strategic Flood Risk Assessment (SFRA)	Herrington Consulting has been commissioned by Folkestone and Hythe District Council in partnership with the Environment Agency to prepare a Strategic Flood Risk Assessment for the council. The report provides an analysis of the main sources of flood risk to the District, together with a detailed means of appraising development allocations and existing planning policies against the risks posed by coastal flooding over this coming century.
Soakaway	A method of water disposal (usually surface water) that disperses water from drains leading to it, provided surrounding soil conditions are suitable. A soakaway may consist for example, of a hole dug in the ground and then filled with brick, rubble or similar material, and covered over.
Special Protection Area (SPA)	SPAs are areas which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within European Union countries. They are European designated sites, classified under the 'Birds Directive 1979' which provide enhanced protection given by the Site of Special Scientific Interest (SSSI) status all SPAs also hold.
Groundwater Source Protection Zone	The delineation of a protection area around groundwater sources where they are used to supply drinking water. The zones show the risk of contamination from any activities that might cause pollution in the area.
River Basin Management Plans	River Basin Management Plans are plans for protecting and improving the water environment and have been developed in consultation with organisations and individuals. They contain the main issues for the water environment and the actions required to maintain/improve them.
Site of Special Scientific Interest (SSSI)	SSSIs give legal protection to the best sites for wildlife and geology in England. Natural England has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981 (as amended).
Surface runoff	The water flow that occurs when soil is infiltrated to full capacity and excess water from rain, snowmelt, or other sources flows over the land.
Waste Water Treatment Works (WWTW)	Installations in which contaminants are removed from waste water and household sewage.

Waterbody	Any significant accumulation of water including: rivers, lakes and streams, ponds, puddles and wetlands.
Water table	The level at which the groundwater pressure is equal to atmospheric pressure. It may be conveniently visualized as the 'surface' of the groundwater in a given vicinity.
Water Framework Directive (WDF)	The European Water Framework Directive came into force in December 2000 and became part of UK law in December 2003. It gives us an opportunity to plan and deliver a better water environment, focusing on ecology. The Directive will help to protect and enhance the quality of: • surface freshwater (including lakes, streams and rivers) • groundwaters • groundwater dependant ecosystems • estuaries • coastal waters out to one mile from low water
Water Resource Management Plan (WRMP)	Following the Water Act 2003, water resources management plans are now statutory documents, which are submitted to the Secretary of State (DEFRA), and are made available for public consultation. These plans are prepared every five years. Affinity Water's Water Resources Management Plan (WRMP) shows how the company intends to maintain the balance between available water supply and the demand for water over the next twenty five years. Affinity Water is currently out to consultation on draft WRMP (2020-2080) between 19 March 2018 until the 23 May 2018
Waste water treatment and abstraction	Incorporating physical, chemical and biological processes to remove physical, chemical and biological contaminants.

EXECUTIVE SUMMARY

A Water Cycle Study is a voluntary study that helps organisations work together to plan for sustainable growth. It uses water and planning evidence and the expertise of partners to understand environmental and infrastructure capacity. It can identify joined up and cost effective solutions, that are resilient to climate change for the lifetime of the development.

This report examines the issues relating to water within the context of Folkestone and Hythe district and the physical characteristics of its hydrology. One of the primary reasons for producing this report was to investigate the potential impact of new growth proposed under the emerging Places and Policies Local Plan and the Core Strategy Review with corresponding plan periods up to 2031 and 2037 respectively.

The report provides a simple analysis of the hydrology of the district in the context of the south east of England, coverage of existing planning legislation and an overview of the Water Framework Directive, the latter being the primary piece of legislation that exists to protect the quantity and quality of water in the natural environment. Understanding the potential impact of new growth on existing resources and infrastructure is key to the provision of sound policy, and so an analysis of the capacity of drinking water supply and waste water treatment is an important facet of the report.

The topography of the district is also intrinsic in directing development, with Romney Marsh forming more then half of the district's land mass and lying below sea level, ensuring development is suitably located is imperative to sustainable development. The district is also a place with a rich ecology, with its most valued natural environments being heavily dependant on adequate supplies of clean water, an important consideration.

The District Council was the subject of a name change on 1st April 2018, and is now referred to as 'Folkestone and Hythe District Council', formerly 'Shepway District Council'. Within this report there are document references that cite Shepway District Council, subject to when the corresponding study was completed.

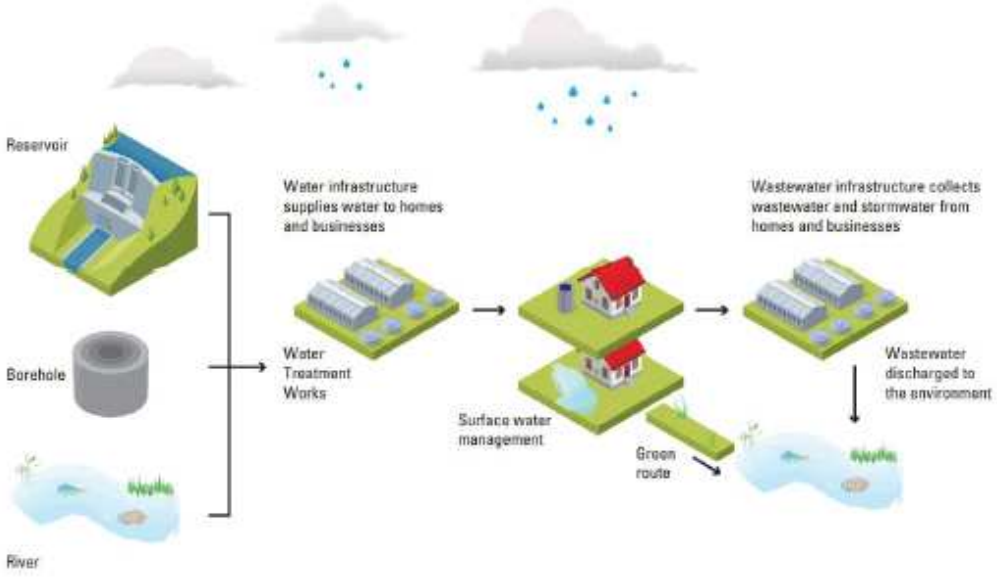
1. INTRODUCTION

1.1 Overview

1.1.1 As a non-statutory instrument, Water Cycle Studies are typically produced by planning authorities during the Local Plan making process to demonstrate that water supply, water quality and delivery of adequate water and wastewater infrastructure can be managed as required by the National Planning Policy Framework (NPPF).

1.1.2 Water cycle studies are an important part of the plan making process, however, the physical water cycle is generally influenced by spatial planning beyond limitations imposed by administrative boundaries; water bodies affected by wastewater discharges often span several Districts and aquifers and river systems supply water to several Districts at a time, often through complex, interconnected water transfer and supply networks. Considering growth at a larger geographic scale (i.e. a county level) affords a more aligned catchment assessment approach to potential impacts posed by growth thereby facilitating an integrated water cycle response to be assessed and determined (see Figure 1.1).

Figure 1.1 The Water Cycle approach



1.1.3 It is useful to look at the different elements that make up the water cycle when considering potential pressures on Shepway's water environment from increased urbanisation:

- Water quality - Is a key indicator about the health of the water environment. Good quality water can support and enhance an abundance of biodiversity and has a higher value for recreation and amenity use.
- Water supply – demand management measures are essential for the long-term resilience of water supplies in the South East which is identified as an area of serious water stress[3].
- Wastewater - Rivers and streams around Folkestone and Hythe have an environmental carrying capacity and wastewater is therefore treated in accordance with environmental permits set by the Environment Agency before it can be safely returned to the water system without having a detrimental impact on water quality objectives.
- Abstraction – There is a limit to the amount of water that can be abstracted from groundwater or surface water sources before harm to the environment.

1.2 The planning policy position

The Places and Policies Local Plan

1.2.1 The Places and Policies Local Plan is one of the documents that will, when adopted, form part of the development plan. The allocations and policies within this plan cover the whole District and will be used to consider the suitability of development proposals. The plan covers the period from 2006 to 2031, in line with the adopted Core Strategy.

1.2.2 The Places and Policies Local Plan sits below the Core Strategy and has two functions:

- To allocate enough land for future development to meet the requirements set out in the Core Strategy for residential, employment, community and other needs; and
- To provide development management policies that will be used to assess planning applications and guide future development.

1.2.3 The plan will, therefore, play an important role in shaping the future of the district and ensuring that the aims set out in the Core Strategy are met, providing local communities, landowners, developers and infrastructure providers with certainty about the future pattern of development in the District. The policies in the plan will ensure that new developments are sustainable, the natural and historic environment is maintained and that people's quality of life is improved and healthy lifestyles are encouraged.

1.2.4 The Places and Policies Local Plan Submission version went out to consultation in February/March 2018 with Examination in Public expected in autumn 2018 with formal adoption in early 2019. When adopted the PPLP will replace the saved policies in the 2006 Shepway District Local Plan.

The Core Strategy Review

1.2.5 The District Council has separately commenced work on a Core Strategy Review (CSR) to identify and define proposed strategic site allocations to meet national policy for housing provision up to 2037. The 'Preferred Options' version of the CSR was subject to public consultation for a 7-week period to 18th May 2018. The requirement to commence a CSR was prompted by the findings of a Strategic Housing Market Assessment (SHMA) carried out jointly with Dover District Council, which concluded that Folkestone and Hythe DC's Objectively Assessed Housing Need (OAHN) requires significantly more homes to be provided across Folkestone and Hythe in coming years than was planned for within the adopted Core Strategy (2013).

1.2.6 In October 2016 AECOM was commissioned by the District Council to develop a Strategic Growth Options Study to identify land suitable for strategic scale development across multiple plan periods. The Strategic Growth Options Study comprises three elements: a High Level Options Report, a Phase Two Report and a High Level Landscape Appraisal that informs both the High Level Options Report and the Phase Two Report.

1.2.7 The Phase Two Report takes as its starting point the conclusions of the High Level Options Report and aims to add sufficient detail and site-specific evidence to them in order

to determine the boundaries of land considered suitable for strategic-scale development and the extent of land considered unsuitable for such development. Accordingly, the Phase Two Report builds on the evidence presented within the High Level Options report to set out the final conclusions of the Strategic Growth Options Study.

1.2.8 The Core Strategy Review will detail strategic policy for the district and the main local principles to achieve sustainable development. The district is predominantly rural (historically with a strong agricultural and coastal focus), environments which mean water is potentially a key issue for the district. However, water for industry and homes is also vital for the economic and social wellbeing of the district.

1.2.9 Water of sufficient quality and quantity and in the right place is a growing issue, which needs to be addressed in planning for development. The impact and causes of climate change also need to be taken into account in the Council's plan-making process. A key purpose of this study is to review and integrate the approach to water supply, waste water treatment, flood risk issues and biodiversity.

1.3 Other relevant studies and documents and purpose of the study

1.3.1 Other relevant evidence in preparation of the Places and Policies Local Plan and Core Strategy Review, and utilised in this document includes:

- **Strategic Flood Risk Assessment** - prepared in association with the NPPF, which requires local planning authorities to apply a risk-based approach to the preparation of their development plans in respect of potential flooding. In simple terms, the NPPF requires local planning authorities to review the variation in flood risk across their District, and to steer vulnerable development (e.g. housing) towards areas of low risk. The District Council commissioned Herrington Consulting to update the 2009 Strategic Flood Risk Assessment, resulting in a Phase II SFRA study being published in July 2015.
- **Sustainability Appraisal** - A Sustainability Appraisal (SA) is required during the preparation of a Local Plan by the Planning and Compulsory Purchase Act 2004 to ensure compliance with the requirements of the Strategic Environmental Assessment Directive. Its purpose is to help the Local Authority assess how effectively the Local Plan contributes to sustainable development.
- **Habitat Regulations Assessment** – The requirement to undertake HRA of development plans was confirmed by the amendments to the Habitats Regulations published for England and Wales in July 2007 and updated in 2010 and again in 2012. Therefore, when preparing the Local Plan, Folkestone and Hythe District Council is required by law to carry out a Habitats Regulations Assessment. The HRA refers to the assessment of the potential effects of a development plan on one or more European Sites, including Special Protection Areas and Special Areas of Conservation. The overall purpose of the HRA is to conclude whether or not a proposal or policy, or whole development plan would adversely affect the integrity of the site in question.

1.3.2 The management of flood risk for new development is generally covered through the Strategic Flood Risk Assessment (SFRA) process, supplemented by Surface Water Management Plans (SWMPs) and Local Flood Risk Management Strategies (LFRMS) produced to support the NPPF requirements as well as flood related legislative drivers.

1.3.3 As the importance of natural water resources/assets has become more recognised, the issue of water provision and treatment in southeast England has become more contentious. Accordingly, this document demonstrates consideration of water in the local environment to help shape the emerging Places and Policies Local Plan and Core Strategy Review the Council working in conjunction with its partners who have primary responsibility for water management.

1.3.4 Specifically this report will:

- Recognise and understand the importance of the hydrological cycle for the District
- Understand the role of planning policy in relation to the efficient use of water
- Examine the function of the Water Framework Directive in the context of Shepway, including surface water, groundwater and coastal waters
- Investigate water supply in relation to new planning policy
- Investigate waste water treatment in relation to new planning policy
- Summarise strategic issues within the council's Strategic Flood Risk Assessment, draft Sustainability Appraisal, emerging Habitats Regulation Assessment and acknowledge work undertaken in association with the Shoreline Management Plan.
- Determine or provide a procedure for determining what water-related infrastructure is required and where in the context of the emerging Places and Policies Local Plan and Core Strategy Review

1.4 Key stakeholders

1.4.1 In order that the report achieves these aims it has been prepared in close association with stakeholders who have a significant interest in water in the district. As such the Council has identified the Environment Agency (EA), Affinity Water, South East Water and Southern Water as essential partners in the development of this assessment.

1.4.2 The Environment Agency has overall responsibility for the protection of the amount and quality of water in natural systems and flood risk, but does so in conjunction with key partners, including the local planning authority.

1.4.3 Affinity Water is responsible for water supply through most of the district, including the more populated areas located within Affinity Water's Dour WRZ. The very north and south west of the LPA area are located within South East Water's WRZ 8. Southern Water (SW) is responsible for wastewater treatment throughout Shepway. In addition the council has also liaised with or utilised information from other organisations such as Herrington Consultancy Ltd which was responsible for the development of (and update to) the Strategic Flood Risk Assessment for Shepway.

1.5 National guidance on water cycle studies

1.5.1 The Environment Agency issued a National Guidance document to ensure that water cycle studies are carried out in a considered way. This guidance outlines the required approach for the Scoping, Outline and Detailed phases of the water cycle studies.

1.5.2 The National Guidance on Water Cycle Studies indicates that the assessment should be carried out in three phases:

- Scoping: the primary aim of the Scoping Assessment is to collate and review existing information (e.g. previous studies and monitoring data) on the water environment within the study area, identify development plans and engage with key stakeholders, including the Environment Agency, water companies and drainage authorities, to identify key issues that require consideration in the following stages of work;
- Outline: the primary aim of the Outline Assessment is to identify potential environmental and water infrastructure constraints to development to provide an evidence base to support the Local Plan and identification of preferred sites for development. The Folkestone and Hythe District Council (undertaken jointly with Dover DC) Strategic Housing and Land Availability Assessment (SHLAA) data is applied during this assessment. It is recommended that the study identify areas of uncertainty that may require further detailed studies if necessary;
- Detailed: the detailed assessment aims to resolve areas of uncertainty identified in the Outline Assessment through further more detailed studies. It identifies what water cycle management measures and infrastructure are needed, where and when they are needed; who is responsible for providing the systems, and by what deadline. This may involve an assessment of the costs and benefits of options. It also provides guidance to the local authorities to facilitate implementation and funding of the strategy.

1.5.3 This report incorporates both a Baseline Assessment (Scoping Phase) and Capacity Assessment (Outline Phase). This study does not include a Detailed Assessment, the details and requirement of which would be based on the outcomes of the Outline Phase.

1.5.4 The Government has issued guidance titled 'Water supply, wastewater and water quality'[1], which asserts:

> *"adequate water and wastewater infrastructure is needed to support sustainable development. A healthy water environment will also deliver multiple benefits, such as helping to enhance the natural environment generally and adapting to climate change."*

1.5.5 The guidance also acknowledges the following:

> *"The EU Water Framework Directive applies to surface waters (including some coastal waters) and groundwater (water in underground rock). It requires member states, among other things, to prevent deterioration of aquatic ecosystems and protect, enhance and restore water bodies to 'good' status. Local planning authorities must, in exercising their functions, have regard to the river basin management plans on the Environment Agency website that implement the Water Framework Directive. These plans contain the main issues for the water environment and the actions needed to tackle them."*

1.5.6 The National policy statement for wastewater forms part of the overall framework of national planning policy.

[1] https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality

1.6 Local Plans and water cycle studies

1.6.1 The need to examine existing water and environmental infrastructure across the Folkestone and Hythe District area is driven by a requirement to align growth with infrastructure provision and so the context in which this study is undertaken is framed by:

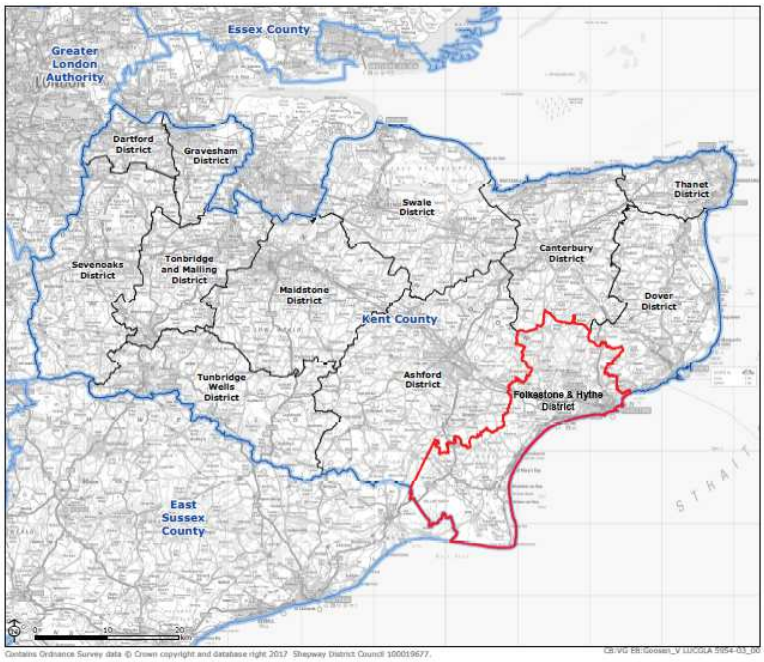
- The scale and distribution of growth to be provided
- Relevant national and local planning policies
- The asset management plans of infrastructure providers

1.6.2 The Strategic Flood Risk Assessment (SFRA) that was undertaken in 2009 was updated in 2015. The updated SFRA provides further supporting evidence for the Council's Places and Policies Local Plan and Core Strategy Review. Both the Water Cycle Study and the SFRA will be used to inform decisions on the locations of future development and the preparation of sustainable policies for the long-term management.

1.7 Scope and Approach

1.7.1 Folkestone and Hythe District is situated on the south east Kent coast, and covers an area of 357 sq km. It shares land-borders with Dover District Council to the east, Canterbury City Council and Ashford Borough Council to the north, and Rother District Council to west. The administrative boundaries are shown in Figure 1.2.

Figure 1.2. Folkestone and Hythe District and its context within Kent



1.7.2 The district's population is predominantly located in the three main urban areas of Folkestone, Hythe and New Romney, with the remainder being spread across a number of rural villages and small towns. Shepway's natural landscape ranges from the green North Kent Downs in the north of the district to the flat marshes of the Romney Marshes that dominate the southern and coastal areas. It has a coastline of around 41km, stretching from Folkestone in the east to Lydd in the west.

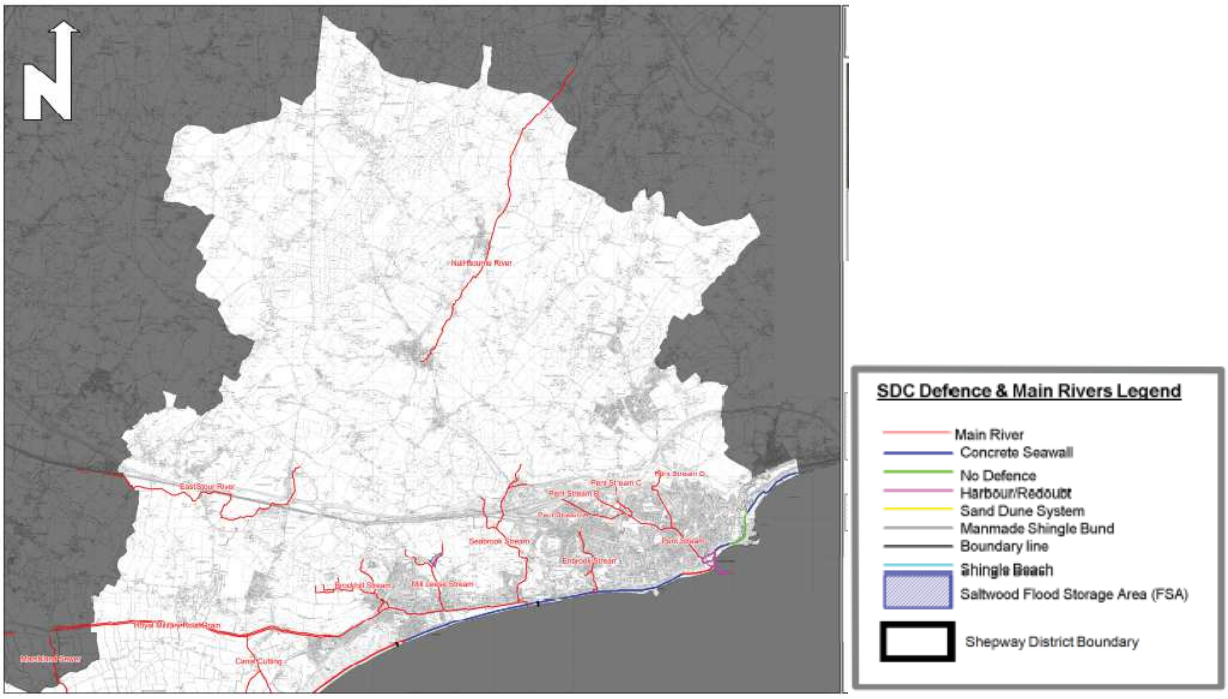
1.7.3 A large proportion of the district is low-lying, with tidal inundation presenting the source of the most significant flood risk. Around 55% of the district's total area lies within

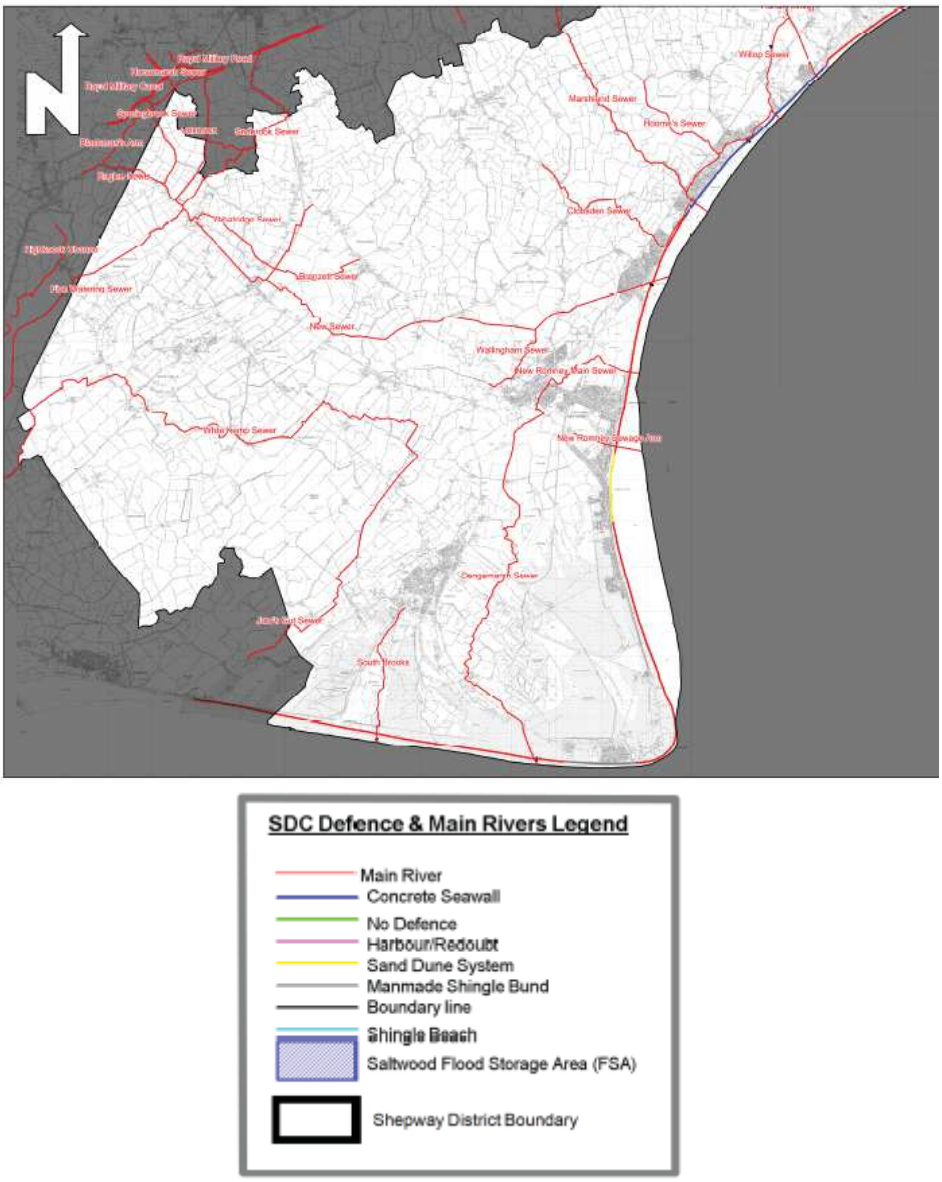
Flood Zone 3a, an area considered to be at high risk from flooding. However, most of the residential areas and the fertile (yet low-lying) arable farm land that covers much of the district are generally well protected from flooding by tidal defences. These are either formal hard engineered structures or are formed by natural shingle barrier beaches that are actively managed to reduce the risk of breaching. However, it should be added that only some of the natural shingle barrier beaches are actively managed. Approximately 4km of the Lydd Ranges south facing coastline is monitored but left to natural coastal processes. 7.5km of the Dungeness east coast, an accreting shoreline, is a relatively long length of coastline that is naturally accreting and provides robust flood defence on the coast with no active management.

1.7.4 There are a number of watercourses within the district which have been categorised as 'main rivers', many of which have caused fluvial flooding problems in the past. The most significant of these rivers are:

- Mill Leese Stream (Saltwood)
- Seabrook Stream (Horn Street)
- Pent Streams (A,B & C – Folkestone)
- Enbrook Stream (Sandgate)
- Brockhill Stream (Hythe)
- East Stour (Postling, towards Ashford)
- The Nailbourne (Lyminge towards Bridge and the Little Stour, Canterbury)

Figure 1.3. The principal rivers and existing defence infrastructure within Folkestone and Hythe District





Source: SFRA 2015

1.7.5 Many of these rivers are located in the towns of Folkestone and Hythe, which lie to the south of the North Downs. These watercourses are short and steep and respond quickly to heavy rainfall. The Pent Stream in Folkestone is designated as a rapid response catchment due to this and the high risk of flooding from it.

1.7.6 The Nailbourne is a very different river to the Pent. It lies in the bottom of the Chalk Valley that runs from Lyminge to the Little Stour in Canterbury district. The Nailbourne is an ephemeral river that only flows when the groundwater is high enough; this does not occur every year.

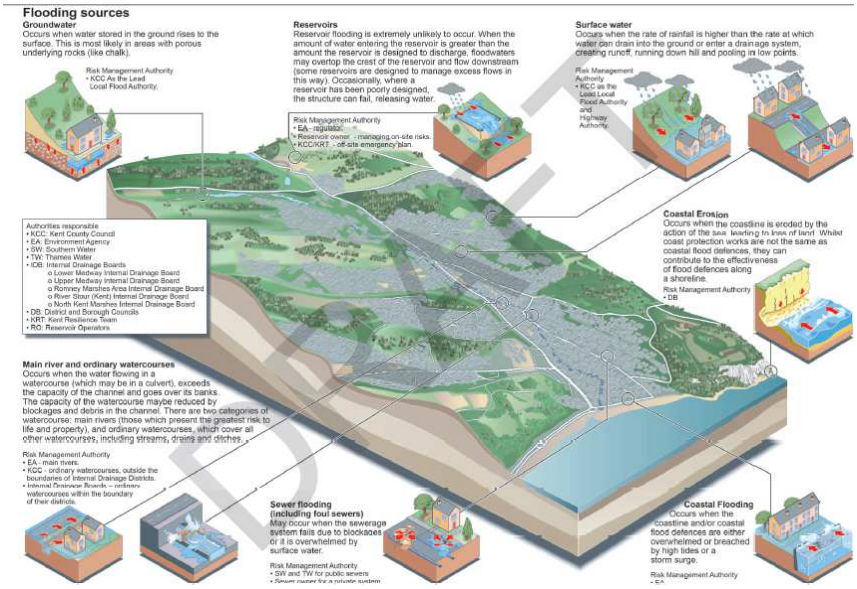
1.7.7 The district has two distinctly different geological regions. To the north the underlying strata comprises solid sedimentary deposits in the form of chalk, greensand and Weald clay, with varying levels of superficial clay and brickearth deposits over the top. To the south, the underlying sandstone is largely covered by marine alluvium and beach deposits. These differing conditions give rise to levels of flood risk from other sources throughout the district.

1.7.8 In the north the permeability of the underlying chalk means that the risk of surface water flooding is relatively low. Incident rainfall tends to drain away quickly through direct infiltration into the ground. The depth to the groundwater means that the chance of emergence is small except in the valley bottoms.

1.7.9 The steeply sided and often urbanised areas between the higher ground to the north and the lower lying to the south or the adjacent coast gives rise to flood risk either directly from over-ground runoff, or from the surcharge of overwhelmed sewers and watercourses.

1.7.10 In many of these densely populated urbanised areas (such as Hythe and Folkestone), surface water is discharged from roof and highway areas into the streams that flow through culverts beneath the ground. These can be susceptible to overflowing during extreme rainfall events, resulting in surface water flows in the streets and occasional property flooding.

Figure 1.4. Flooding sources



Source: Flood Risk to Communities Shepway, Kent County Council (June 2017)

1.7.11 The output of the Outline Water Cycle Study should be a strategy or report which answers the following questions:

- Is there enough water? Has the water company's twin track approach to water resources made sure that there is enough water available to serve the projected growth levels? This issue is largely dealt with within Chapter 5, which looks at how water resources are managed.
- Will there be a water quality impact? Can the existing sewerage and wastewater treatment networks cope with the increased load, and can the environment cope with the resulting increased flow and pollutant loads from the treated effluent? If not, are there alternative discharge locations that will not cause a failure of water quality targets? Is there an increased risk of storm water overflows causing an adverse water quality impact? This is an especially important consideration within Folkestone and Hythe as many of the district's most important ecological sites are aquatic. Sustainable development underpins the planning system and is inherent in many aspects of planning policy, this is also dealt with in Chapter 5. Dedicated legislation to safeguard water resources is expressed through the

Water Framework Directive. Chapter 4 explains the implications of this for ground and surface waters in the context of the Stour and Rother River basins that cover Shepway. The District's coastal waters are also important and are covered within this Section.

- Can development be accommodated without increasing flood risk? The outline WCS needs to work alongside the SFRA, and identify if there is there sufficient land at low risk of flooding for all the proposed development. Will rain water be adequately managed to prevent surface water flooding in the development or elsewhere? Will increased discharge from WwTWs increase flood risk? As 55% of the District is at or below sea level, consideration of flood risk is an important aspect of planning. Chapter 6 examines this, drawing from the council's strategic flood risk assessment and shore line management plans.
- Are there other location specific environmental risks that need to be considered, for example relating to biodiversity or conservation requirements? The requirement to undertake Habitat Regulations Assessment (HRA) of development plans was confirmed by the amendments to the Habitats Regulations published for England and Wales in July 2007 and updated in 2010 and again in 2012. Therefore, when preparing the Local Plan, Folkestone and Hythe District Council is required by law to carry out a Habitats Regulations Assessment. The HRA refers to the assessment of the potential effects of a development plan on one or more European Sites, including Special Protection Areas and Special Areas of Conservation. The district Council appointed LUC in 2016 to undertake a Habitats Regulations Assessment of the Regulation 18 stage of the PPLP to ascertain whether the proposals would be likely to result in significant effects on the qualifying features of European Sites within and adjacent to the District, and where such effects were predicted, whether they would result in adverse effects on site integrity following mitigation. The draft HRA of the Regulation 18 Stage of the PPLP concluded that there would be no adverse effect on the integrity of European Sites.
- What constraints are there on increasing capacity? The outline study needs to summarise the answers to the questions above and identify where there are environmental or infrastructure constraints.
- What opportunities are there for changing proposed development location? The outline study needs to inform core strategy decisions, and compare major infrastructure provision for different options for development. The exercise of defining sites to be allocated for residential use within the Places and Policies Local Plan has applied the output of corresponding studies, most notably the SFRA. The infrastructure providers also provided detailed comments on the infrastructure implications of proposed site allocations, for example the need for network reinforcement of wastewater infrastructure. Comments were then incorporated into site specific policies, as required. Similarly, the Core Strategy Review has applied information gathered from the Growth Options Study completed by AECOM on behalf of the district Council. Accordingly, the approach taken has been to allocate sites in the correct location and of a suitable quantum so as to take account of environmental constraints and infrastructure capacity limitations. The soundness of the emerging development plan documents will be scrutinised by an independent Government Inspector at Examination in Public, and any sites that an inspector might deem unsuitable for allocation can have their allocation removed
- Are there outstanding concerns about infrastructure provision that need to be addressed in a detailed WCS? The outline WCS includes commentary on water supply and wastewater treatment infrastructure, from which the implications for

growth objectives can be clearly defined. The implications for the site-specific level cannot be evidenced as part of the outline study, rather this reflects instances where detailed site assessments will be required. The example of Otterpool Park Garden Town is one where a detailed site-specific study will need to be carried out.

1.7.12 These questions cover the central issues of water availability, water quality and flood risk management.

1.7.13 This study endorses the sustainable use of water as a core principle and a collected examination of all key water related issues in the management of the environment is provided. However, it is also important to understand that the purpose of this report is limited to informing strategic planning decisions as opposed to the provision of site-specific detail.

1.7.14 The EA raises other issues which relate to its own area of competence, such as other environmental risks or more detailed water information or primary research. These are all potentially relevant to the planning system, but will normally be picked up at the stage specific information is available, such as in the preparation, submission and determination of planning applications.

1.8 Sources of reference

1.8.1 A certain amount of information contained and referenced within this study has been drawn from the following source documents:

- Rother Abstraction licensing strategy, Environment Agency (February 2013)
- Stour Abstraction licensing strategy, Environment Agency (February 2013)
- Flood Risk to Communities Shepway, Kent County Council (June 2017)
- River Stour Catchment Flood Management Plan, Environment Agency (December 2009)
- Water for life and livelihoods Part 1: South East river basin district River basin management plan, Environment Agency (Updated: December 2015)
- Kent Water for Sustainable Growth Study, Kent County Council (October 2017)
- Strategic Flood Risk Assessment and associated appendices – Shepway District Council, Herrington Consulting Ltd (July 2015)
- Final Water Resources Management Plan, 2015-2040, Affinity Water (June 2014)
- Need and Availability of Water: Affinity Water Pre-consultation dWRMP19 (no date)
- South Foreland to Beachy Head Shoreline Management Plan (2006)
- Folkestone to Cliff End flood and erosion management strategy – a guide for local communities
- Folkestone to Cliff End flood and erosion management strategy – approved strategy update
- Policy Statement on flooding and coastal erosion risk management, Shepway District Council, February 2016
- Shepway Cabinet Report C/17/73 – Core Strategy Review Reg 18 Consultation, 17th January 2018
- Folkestone & Hythe Surface Water Management Plan - Stage 1 Final Report, November 2012

- the Shepway District Council Local Multi Agency Flood Plan, September 2014

1.8.2 This update to the 2011 Water Cycle Study also retains information presented within the original study where more up-to-date data/information has not been published.

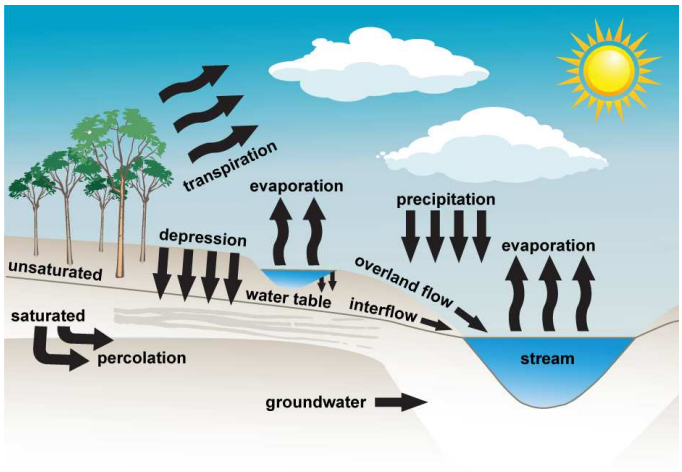
2.0 THE DISTRICT AND ITS WATER ENVIRONMENT

2.1 Introduction

2.1.1 The United Nations state[2]: *"Water is the lifeblood of the planet and the state of the resource affects all natural, social and economic systems. Water is the fundamental link between the climate system, human society and the environment."* As our drinking water is sourced from natural systems it is useful to include an overview of this, which is provided below. The examination of inland watercourses and infrastructure is complemented by an overview of coastline management issues. At the outset of this report, it is important to highlight the natural connections between these features and the environment.

2.2 The Hydrological Cycle

Figure 2.1. The Hydrological Cycle



2.2.1 Uninterrupted by human interventions, water will flow through the ground into rivers and streams and ultimately to the sea. At the same time the processes of evapotranspiration return water vapour to the atmosphere from where it will condense to fall as rain, forming a continuous cycle. This is known as the hydrological cycle.

2.2.2 This process will be affected by many factors such as geology, topography, soils and vegetation cover. It is from this cycle that fresh water is obtained and treated waste water deposited. Obviously there are not just human demands on the water in the natural environment; it is essential for all forms of life and its abstraction has to be managed sustainably.

2.3 Physical factors affecting Hydrology

2.3.1 As previously described, the hydrological cycle is affected by various physical factors, such as topography and soil type. Topography is particularly important as it forms river catchment areas or basins, which collect water and ultimately direct it to the sea.

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[2] Unesco (2009) The United Nations World Water Assessment Programme *The Implications of Climate Change on Water: Highlights on climate change from the UN World Water Development Report 3: Water in a Changing World,* Unesco, Accessed on line, Date Accessed 31.01.11, Web site address: http://unesdoc.unesco.org/images/0018/001863/186317e.pdf

2.3.2 The north part of the district is largely underlain by the Lewes Chalk Formation. The central section is underlain by a succession of formations including the Folkestone, Sandgate, Hythe, the Atherfield Clay, the Gault, and the Weald Clay Formation. The southern section and it is underlain by the Tunbridge Wells Sand Formation and the Hastings Beds. The Lewes Chalk Formation, the Hythe Formation and the Folkestone Formation are classified as principal aquifers. The coastal stretches of the LPA area are drained via small watercourses directly to the English Channel or via drained marsh systems drains to the English Channel as w ell as parts of the River Rother to the west. The central north and northern section of the district drains to the Stour management catchment via the East Stour and Little Stour.

2.3.3 The Local Plan documents prepared by the District Council must consider the approach to development on the basis of the district's own characteristics. In terms of its environment, the district is in many areas defined by its waterbodies and associated landscapes such as marshland. Moreover, human action has often centred on physical water features, from locating villages by springs through to the Cinque Ports and constructing the Royal Military Canal, and the growth of towns as holiday resorts. In terms of the spread of population the district is predominantly coastal.

2.4 Water's prominence in defining the District's context

Main Rivers

2.4.1 As drawn from the Folkestone and Hythe Surface Water Management Plan Stage 1 report, the Pent Stream flows in a south-easterly direction through the town of Folkestone to its outlet into the sea at Folkestone Harbour. The channel has been heavily modified through Folkestone as a result of urbanisation; culverting, channel realignment, channel widening and the construction of weirs resulting in changes to channel gradients have all taken place over a period of time. The Pent catchment is a Rapid Response Catchment (RRC) which means that it responds rapidly following a rainfall event. This is due to the characteristics of the catchment (i.e. topography and geology).

2.4.2 The Seabrook Stream, Saltwood &Mill Lease Stream and Brockhill Stream form part of the Rother and Romney Catchment. They flow in a south-easterly direction discharging into the Royal Military Canal which flows between Seabrook and Cliff End. The East Stour rises in Postling on the northern boundary of the District and flows in a southerly direction through Stanford and then under the M20- motorway. From this point the river then flows in a westerly direction towards Sellindge and on towards Ashford where it joins the river Great Stour. The source of the Nailbourne is in Lyminge and from here the river flows intermittently in a north-easterly direction through Elham and out of the District. It is believed that this bourne is activated when groundwater levels are high, usually following prolonged periods of rainfall. The Nailbourne joins the Little Stour and Great Stour, flowing out to sea at Sandwich on the east Kent coast.

2.4.3 The Environment Agency has been clear to advise that development proposals should avoid increasing discharge to 'main river' or ordinary watercourses which ultimately discharge to 'main river'. This could be particularly important for major development near the East Stour where any increase could impact the standard of protection of the Aldington reservoir. Flood Risk Assessments (FRAs) should clearly demonstrate that a proposal will not increase flood risk for a 1 in 100yr + climate change scenario. The Aldington reservoir is one of the main flood defences for Ashford and proposals should not result in the reservoir impounding more frequently or for a longer duration.

2.4.4 Ashford Borough Council's Infrastructure Delivery Plan (IDP) (2017) provides additional context in respect of flood risk associated with the River Stour. The IDP recognises that South East Water's current and approved WRMP14 identifies the need for new water resources and enhanced demand management programmes across Resource Zone 8, where Ashford lies. This will ensure they meet demand within the planning period to 2040 arising from housing growth, climate change impacts and environmental requirements.

2.4.5 The Upper Stour does not contain any flood defences but includes the flood storage reservoirs at Aldington and Hothfield which provide flood defence benefits to Ashford and to locations downstream on the River Stour. The River Stour CFMP has identified that there may be opportunities to increase storage and attenuation to bring benefits to areas downstream and to Ashford. This could be achieved by increasing the storage afforded by the Hothfield and/or Aldington reservoirs or by creating new areas of storage within the Upper Stour catchment.

Ordinary Watercourses

2.4.6 An Ordinary Watercourse is any watercourse which is not shown as a main river on the Environment Agency's Main River map. Main Rivers are managed by the Environment Agency while Kent County Council and the Internal Drainage Boards have powers and responsibilities for consenting and enforcement on ordinary watercourses.

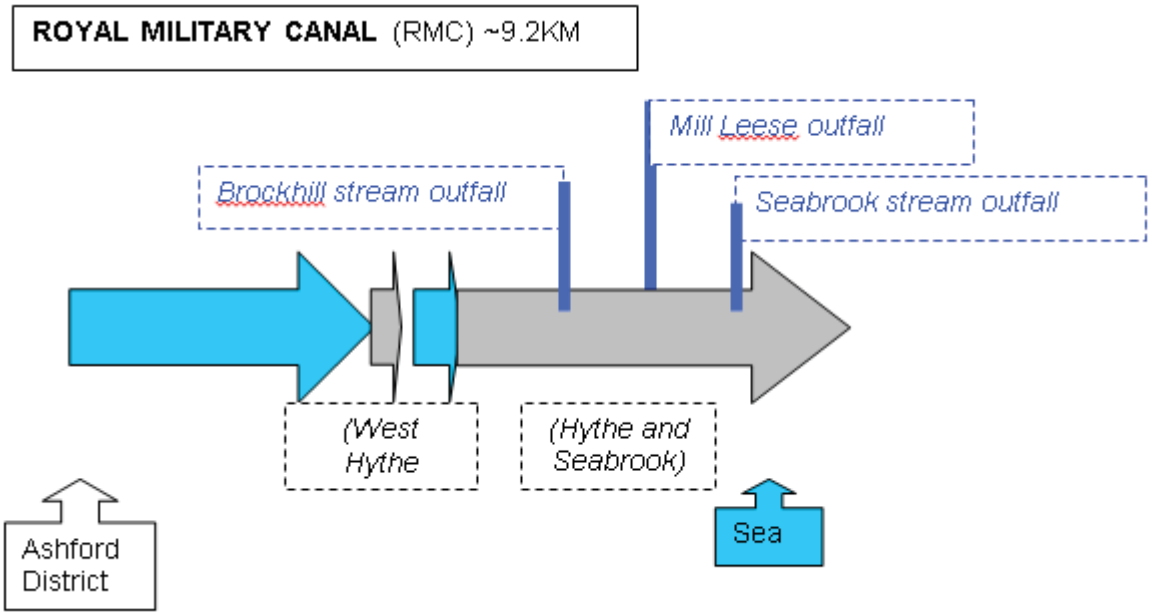
2.4.7 The flooding mechanism for ordinary watercourses is similar but often less significant in its effects than flooding from Main Rivers. Flooding from ordinary watercourses also tends to be more localised. There is a high concentration of ordinary watercourses in the north west of the SWMP study area, where drainage flows in a north to north westerly direction towards the River Stour. Other ordinary watercourses are located to the north of Folkestone and Hythe at Saltwood. These watercourses feed into the Saltwood & Mill Lease Main River.

Relationship between Shepway's water features, the coast and main watercourses

2.4.8 To evaluate the current relationship between Shepway's water features, the coast and main watercourses have been examined on a linear basis. This linear, map-focused analysis has also been applied to main inland watercourses. The example provided in Figure 2.2 of the Royal Military Canal (RMC) within Folkestone and Hythe shows, to approximate scale, the flow of the Canal (from Ashford's administrative area) through open countryside and settlements to the sea.

2.4.9 This illustration reveals that although the RMC initially flows through open countryside (blue coloured) for the majority of its course it is within or adjacent to an urban environment. For context, the defined settlement boundaries of West Hythe and Hythe town as depicted in grey. Referencing from left to right, it is also shown that after within the urban environment of Hythe and Seabrook three identified streams flow into the RMC. The fuller analysis (see Appendix 1) clearly reveals the contrast between the 'sewers' of the Marsh and the rivers/streams elsewhere in Shepway. *Jury's Gut/White Kemp* and *New Sewers* each flow for 24 and 16km (15 and 10 miles) through Shepway, are avoid all the towns, although the New Sewer cuts through the southern fringes of St Mary's Bay.

Figure 2.2. A linear summary of the Royal Military Canal



2.4.10 By contrast, the *Nailbourne* is the third longest watercourse within the Folkestone and Hythe administrative area after the RMC and Marsh Sewers, but is only about 8km (5 miles) in length. The length of the Nailbourne within the district's administrative area marginally exceeds that of the *East Stour*. Both these watercourses are in the north of the district and are largely rural, although they flow in different directions (north and east respectively). The only other streams of any significant length are the *Pent (West)* and *Seabrook Streams* (both around 4.5km).

2.4.11 The streams in the North Downs region of Folkestone and Hythe rise in the hills behind Folkestone and follow the topography down to the coast or out into neighbouring Districts. The Nailbourne is located in the North Downs area of the district, and is intermittent in nature, as shown in the below photographs.


Nailbourne Stream at Elham


Nailbourne Stream at Lyminge

2.4.12 The Pent Stream is notable in being almost completely urban in setting and rarely seen in its natural state, being widely culverted from the northwest edges of Folkestone through to Tontine Street, after which it flows in Folkestone Harbour. The only significantly evidence open section is from the northern part of Cheriton Road Sports Ground through to Lower Radnor Park.

2.4.13 To the east of the Folkestone urban centre is the Folkestone Warren which is a SSSI and popular recreational resource. The remainder of the District's coastline (south and west of Hythe) is around in 25km long (approx.15 miles) flanking the parishes of Dymchurch, St Mary in the Marsh, New Romney Town and Lydd (including Dungeness).

This is made of dozens of separate sections, although coastal environments arguably take a more cohesive form on the far southern stretches. The following table aggregates the results of the linear analysis of maps and policies for the area:

Table 2.1 Evaluation of local designations for Folkestone and Hythe coastline (west of Hythe)

Coastline land designation	Further information	Approx. length (km)
Local landscape area (only designation)	Open land characteristic of Romney Marsh south of St Mary's Bay	0.2
Designated open space	Play areas and amenity greenspace at The Greens, Littlestone.	0.8
Designated settlements (villages)	Including some conservation designations (Dymchurch and Littlestone Conservation Areas)	2.8
Undesignated land	Includes a shoreline frontage of approximately 1km by Dungeness Power Station.	5
Natural environment conservation designations	Includes: • heritage/undeveloped coast, • nature conservation, biodiversity and scientific designations (supported by several international 'Natura 2000' habitats) • special landscape area.	Residual (over 15km)

2.4.14 Table 2.1 presents information on the measured length of coastline land designations in ascending significance (length). Although limited to the point immediately landward of the coast, and not considering specifically coastal structures such as sea defences, this evaluation suggests that the coastal environment outside of the main urban area is often of notable conservation value, and elsewhere may have limited specific planning policy other than provisions for being generally non-built up. As well as the specific features of the Dungeness area, the human value of coastal areas in the District for residential and recreational purposes is apparent in certain locations. Issues facing this environment are considered further in section 6.6.

2.4.15 Identification of urban or open countryside character is a key element of the examination of watercourses. The principal urban watercourses and the RMC referenced in Table 2.2. By total length the RMC comprises the longest urban stretch of Folkestone and Hythe watercourses, although the Pent is characterised as being more urbanised as a proportion of its length. Folkestone and Hythe covers only a relatively small part of the whole length of the RMC; a rural western stretch and its riparian environment in the defined Hythe area is characterised by a generous amount of open space on one or both sides.

Table 2.2. Most urban watercourses by evaluation of planning policies

Coastline land designation	Relevant settlement(s)	Approximate length	
		Total 'urban' setting (km)	Proportion 'urban' of whole length (%)
Royal Military Canal (RMC)	Hythe and Seabrook, West Hythe village	6.3	~60
Pent Stream (west)	Folkestone	4.4	~99
Nailbourne	Lyminge, Elham	1	~15

2.4.16 The two other identified watercourses, *Brockhill* and *Mill Leese streams* flow into the RMC fed by short sections that pass south through countryside and the main urban area. These streams form important elements of the built environment, but they are potentially more prominent during periods of heavy rainfall. This is pertinent as the topography, descending from the escarpment through the towns, translates into significant stream discharge and great 'flash flood' risk. There may be appropriate opportunities for 'de-culverting' that could reduce flood risk and produce both environmental and social benefits.

2.4.17 It is clear that the surface water network within the district is complex. The myriad of drainage channels that are found on Romney Marsh correlate with its flat topography and the proximity of the water table to the surface of the land. Significant water courses that are mentioned within the text are numbered individually.

2.5.18 In summary, a section-by-section examination of the linear setting and applicable planning policies for water in Folkestone and Hythe confirms the following:

- The dominance of the coast as a prominent water feature defining much of the district.
- Shepway's coast is flanked by a variety of land-uses. Across the district's coastline, whether urban or rural, leisure is commonly a prominent land use.
- Along the district's coast, nature conservation is clearly a vital issue for a range of scientific and human interest reasons.
- The built environment along the coast has identified positive planning attributes in certain areas (that may directly stem from a coastal location). This can take the form of existing high quality townscapes, or in contrast, the potential of (previously developed) land to provide popular new development.
- A small amount of Shepway's coastline is not formally designated in relation to any specific purpose or objective. It is protected from development outside of urban areas but there is not at present an integrated 'a coastline policy'.
- The Royal Military Canal is highly significant, not least in the context of its route through the Hythe area.
- The Pent Stream is not of significant length, especially in terms of being evident at ground level, but flows through the heart of Folkestone. It is perhaps the most

significant example of the streams that run southwards off the North Downs through the main urban area bringing issues such as flood risk.

- The longest and least urbanised watercourses in Folkestone and Hythe are generally in the Romney Marsh area. Elsewhere, the Nailbourne and East Stour are also prominent from this perspective. With agriculture as the dominant land use, changes in farming practices may be pertinent in influencing these watercourses, particularly regarding water quality.

2.4.19 These features confirm the merit in considering the local water cycle further, and highlight key areas of consideration in the report to maximise benefit to spatial planning.

Chapter 3 SPATIAL PLANNING CONTEXT

3.1 Introduction

3.1.1 This chapter draws together planning policy relating to water and water related issues. It looks at current policy (national and local) and then the nature of future provisions in the context of other forms of public intervention.

3.1.2 The National Planning Policy Framework (2012) and accompanying Planning Practice Guidance replaces the PPS25: Development and Flood Risk. A principal objective of the NPPF is to stimulate growth and promote sustainable development and make the planning system less complex and more accessible. Subsequently, a number of Planning Policy Guidance documents have been published to support the NPPF.

3.1.3 The NPPF requires Local Plans to be supported by a Strategic Flood Risk Assessment (SFRA). The Shepway District Strategic Flood Risk Assessment (2015) replaces a previous version published in 2009. The updated SFRA covers the whole of the District and assesses the extent and nature of flood risk and the implications for land use planning. The assessment has been used to locate potential development and infrastructure to areas with the lowest probability of flooding using the risk-based sequential test in accordance with latest guidance.

3.2 Current National Planning Policy

3.2.1 The National Planning Policy Framework (NPPF) expects LPAs to *'take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change'*.

3.2.2 Paragraph 109 states *'the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of water pollution'.*

3.2.3 National policy identifies Local Plans as a key to delivering sustainable development and sees a need for Councils to *'work with other authorities and providers to assess the quality and capacity of infrastructure for transport, water supply, wastewater and its treatment… flood risk and coastal change management'* and for Councils to *'adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations'.*

3.3 Current Local Planning Policy

3.3.1 The development plan for the district currently comprises the Core Strategy (2013) and the saved policies of the Local Plan Review (2006). Policies relating to water within the current adopted Core Strategy for the Folkestone and Hythe District includes policy are tabulated in Table 3.1.

Table 3.1. Relevant policies drawn from the adopted Core Strategy 2013

Local Plan Policy	Policy document source	Policy Content
Policy DSD	Core Strategy (2013)	Takes a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.
CSD5 - Water and Coastal Environmental Management in Shepway	Core Strategy (2013)	Protection of ground and surface water resources - Development should contribute to sustainable water resource management which maintains or improves the quality and quantity of surface and ground water bodies, and where applicable, the quality of the coastal environment and bathing waters.

3.4 Emerging Planning Policy

3.4.1 The District Council is currently preparing the Places and Policies Local Plan (PPLP) document, which has advanced through two stages of consultation and revision. The plan is now at the 'submission' stage, having progressed through 'Issues and Options' stage (Reg 18) and 'Preferred Options' (Reg 19) stages. The plan is to be submitted to the Planning Inspectorate in spring 2018, with formal examination via Examination in Public expected to follow in summer 2018. Once adopted, the PPLP will form part of the development plan. As part of the PPLP, the District Council has proposed to allocate sites for housing in line with the need identified in the Core Strategy.

3.4.2 The Places and Policies Local Plan contains a number of policies that are relevant to the context of the Water Cycle Study, in particular a detailed site-specific assessment that would be prepared in conjunction with a major site, as summarised below:

- Policy CC2 'Sustainable Design and Construction': this policy requires development proposals (all new dwellings or for new non-domestic buildings) to contribute to sustainable development through appropriate sustainable construction measures, including water efficiency and securing a proportion of new buildings' energy needs from renewable and low carbon sources by setting specific targets.
- Policy CC3 'SuDS': this policy is in response to the district being one of the driest in England, and water scarcity is a challenge that is only likely to increase in future given the likely impacts of climate change. This policy introduces mechanisms to ensure the effective collection and reuse of water should be

designed into any surface water drainage system. Any development should also ensure the drainage design is resilient to these future changes.

- Criteria to be considered for development proposals relating to sewage and wastewater disposal for four dwellings or less, or equivalent was previously covered under policy U1 of the 2006 Local Plan. This policy is to be deleted by the Places and Policies Local Plan, as it is no longer required but criteria included (where required) within site specific allocation policies
- The requirement for five dwellings or more or equivalent to be connected to mains drainage was dealt with under Policy U2 of the 2006 Local Plan. However, this policy is to be deleted by the Places and Policies Local Plan, but criteria included (where required) within site specific allocation policies.
- Policy NE8 'Integrated Coastal Zone Management': this policy specifies that development in coastal areas should pay regard to the aims and objectives of the Shoreline Management Plan and the emerging Marine Plan. The District Council will work with partners to promote 'Integrated Coastal Zone Management', including the preparation of a comprehensive management plan for the coast. The policy establishes that proposals and initiatives will be supported that promote certain general objectives.

3.4.3 As drawn from the Shepway District Council Cabinet Report C/17/73 titled *'Core Strategy Review Reg 18 Consultation'* dated 17th January 2018, the Core Strategy Review is being undertaken at a time of great change in national planning policy. The Department for Communities and Local Government (DCLG) has consulted on proposed changes to the way that housing need is calculated across the country. If implemented as proposed, the approach would replace local assessments of need undertaken through SHMAs (unless local assessments indicate higher levels of growth) with a standard national formula, updated annually with new data from the Office for National Statistics (ONS).

3.4.4 When accounting for housing supply to come forward from extant permissions and sites under construction, windfall allowance and the delivery of existing allocated sites that do not currently have planning consent, the remainder of the housing requirement is projected to be met by new and revised policies within the Core Strategy Review, comprising the further expansion of Sellindge and the new garden settlement in the North Downs Area:

- For the further expansion of Sellindge, the figure of 350 homes allows for a proposed second phase of development, beyond the 250 homes already allocated in the 2013 Core Strategy. This is set out in the revised Core Strategy Review Policy CSD9; and
- For the allocated garden settlement in the North Downs Area, an allowance of 5,500 dwellings has been made for development. It should be noted that this only includes development within the plan period; as Core Strategy Review Policy SS6 sets out, there is potential for future growth to provide a total of 8,000 to 10,000 homes (subject to detailed masterplanning) within the site allocation boundary up to and beyond the plan period. These homes would be accounted for in a future review of the plan.

3.4.5 Importantly, the role and purpose of this outline study in the context of the allocated garden settlement is that it sets the parameters for a detailed site-specific Water Cycle Study to be prepared as part of the suite of documents that will form a future planning application for the garden settlement.

3.5 Protection of ground and surface water resources

3.5.1 Planning Practice Guidance states that new development should only be considered appropriate in areas at risk of flooding if priority has been given to the use of sustainable drainage systems. The vast majority of the southern part of the district (the Marsh) is situated in Flood Zones 2 and 3, and proposals here should always show how surface water drainage has been taken into account and integrated into the site.

3.5.2 Any proposed developments within Flood Zone 3 or at risk of wave over-topping near the coastline, will require a Site Specific Flood Risk Assessment, in accordance with national policy and guidance, and Core Strategy Policy SS3: *'Place-Shaping and Sustainable Settlements Strategy'.* In addition policies NE8: *'Integrated Coastal Zone Management'* and NE9: *'Development Around the Coast'* would also need to be considered.

SECTION B – EVALUATION

Section B is more practical in its content rather than theoretical. It discusses the role of the Water Framework Directive as a tool to protect and improve the quantity and quality of natural water bodies. The study then evaluates the status of these in Folkestone and Hythe before investigating the implications of this in terms of water resources, wastewater treatment and new development.

CHAPTER 4 - WATER QUALITY

4.1 Introduction

4.1.1 Water quality is often taken for granted but it is important for both human health and the natural environment. Many rivers within Kent are currently failing to meet standards set by the Water Framework Directive. Not only is poor water quality detrimental to the natural environment it is more expensive to treat to make it suitable for human consumption. River systems are vulnerable as contaminants can cause pollution to long lengths of river as they progress downstream. And groundwater is vulnerable as pollutants can affect large volumes over a long period of time and can be especially difficult to remedy.

4.2 The Water Framework Directive

4.2.1 The Water Framework Directive (more formally the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies, including surface waters, groundwater and marine waters out to one nautical mile from the shore.

4.2.2 More simply, the Water Framework Directive (WFD) is the legal framework for managing the water environment in Europe. The WFD (article 1) aims to:

- prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
- promote the sustainable consumption of water;
- reduce pollution of waters from priority substances;
- prevent the deterioration in status and to progressively reduce pollution of groundwater;
- contribute to mitigating the effects of floods and droughts;

4.2.3 There are a number of WFD objectives applicable to the district in respect of water quality, the general protection of the aquatic ecology, specific protection of unique and valuable habitats and the protection of drinking water resources.

4.2.4 A key target of the WFD is to aim for a ‘good’ status for all water bodies by 2015, where this is not possible the aim is to achieve ‘good’ status by 2021 or 2027. The aim is also to achieve ‘good’ ecological potential and ‘good’ surface water chemical status for heavily modified water bodies and artificial water bodies.

4.2.5 It is important to note that the WFD uses the ‘lowest common denominator’ rule when determining a status. Therefore, water quality may show improvement in all indicators, but if even one of those elements is classed as ‘poor’ for example, the whole waterbody returns an overall ‘poor’ classification. The current status of water bodies for both surface water and groundwater bodies within the Folkestone and Hythe District are set out in Appendix 2.

4.2.6 For surface waters there are two separate classifications for water bodies; ecological and chemical. For a surface water body to be in overall 'good' status both ecological and chemical status must be at least 'good'. Ecological status is recorded on a scale high, good, moderate, poor and bad; chemical status is recorded as ‘good’ or ‘fail’.

4.2.7 For groundwater, there are also two separate classifications; quantitative and chemical. For a groundwater water body to be in overall 'good' status, both quantitative and chemical status must be 'good'. Groundwater status is recorded as good or poor. The Directive requires member states to aim to achieve at least good status in each water body within their river basin Districts.

4.2.8 The Water Framework Directive requires special protection for areas identified under other EU Directives and waters used for the abstraction of drinking water. The River Basin Management Plan describes the objectives for each protected area and assesses compliance with them. It also describes the actions needed to achieve and maintain compliance. The River Basin Management Plan is one of a number of documents required to be prepared under the Directive over six year planning cycles. The first River Basin Management Plan was published in 2009; with an update published in 2015 and a further publication scheduled for 2021. These are a means of achieving the protection, improvement and sustainable use of the water environment.

4.2.9 Plans must include the objectives for each water body, reasons for not achieving objectives where relevant and the programme of actions required to meet the objectives. The Environment Agency has the responsibility to produce River Basin Management Plans in this country. The plan for the south east includes a suite of documents; of note is Annex C: Actions to deliver objectives and Annexe J: Aligning other key processes to river basin management. This is of particular relevance to the council as it promotes the coordination of different strands of policy from different bodies to underpin sustainable growth objectives.[3]

4.2.10 The South East River Basin Management Plan December 2009 (updated December 2015) has been produced to identify measures that will achieve WFD requirements for all water bodies. It identifies the pressures facing the water environment which prevent a 'good' status being achieved. These issues include:

- Point source pollution from sewage treatment works
- The physical modification of water bodies
- Diffuse pollution from agricultural activities
- Diffuse pollution from urban sources
- Water abstraction
- Flood protection/coastal erosion
- Physical modification – urbanisation
- Physical modification – wider environment
- Physical modification – land drainage

4.2.12 There are a range of threats to the quantity and quality of water in the environment:

- point source pollution from sewage treatment works
- the physical modification of water bodies
- diffuse pollution from agricultural activities
- diffuse pollution from urban sources

[3] Environment Agency (Date Unknown) South East Basin Management Plan, Environment Agency, Accessed on line, Date Accessed: December 2010, Web site address: http://www.environment-agency.gov.uk/research/planning/124978.aspx

- water abstraction
- transport pressures
- Recreation
- Saline intrusion

4.2.13 The Environment Agency reports that the chalk and greensand aquifers in Kent are suffering from diffuse pollution from nitrate. Although pollution from agricultural activity is significant, the EA is working with stakeholders to secure remediation of land contamination including potential impacts from both public and private sewage systems and pesticides used in both urban and rural areas. The Environment Agency has developed 11 safeguard zones to focus efforts where groundwater is abstracted for public water supply in a bid to improve water quality.

4.2.14 With the exception of pollution arising from agricultural activities, any new development associated with Shepway's growth proposals could pose a direct or indirect threat to water quantity or quality for any of the above reasons. However, of particular interest in terms of this document are point source pollution from sewage treatment works, water abstraction and issues relating to saline intrusion, relevant because of the sensitivity of the European designated wildlife sites in Dungeness.

4.2.15 As such, and in association with the objectives of the Water Framework Directive this report will concentrate on:

- The volume of water that can be extracted from natural water bodies
- The quality of treated water that can be deposited back into natural water bodies
- The importance of water and the sustainable management of this resource in relation to the District's ecology

4.2.16 In addition this report will acknowledge issues relating to maritime flooding because of the geographical location and typology of the District.

4.2.17 This study identifies some of the key 'pathways' connecting development and the water cycle through analysing the impact of potential development on the service providers, who ultimately rely on the hydrological cycle.

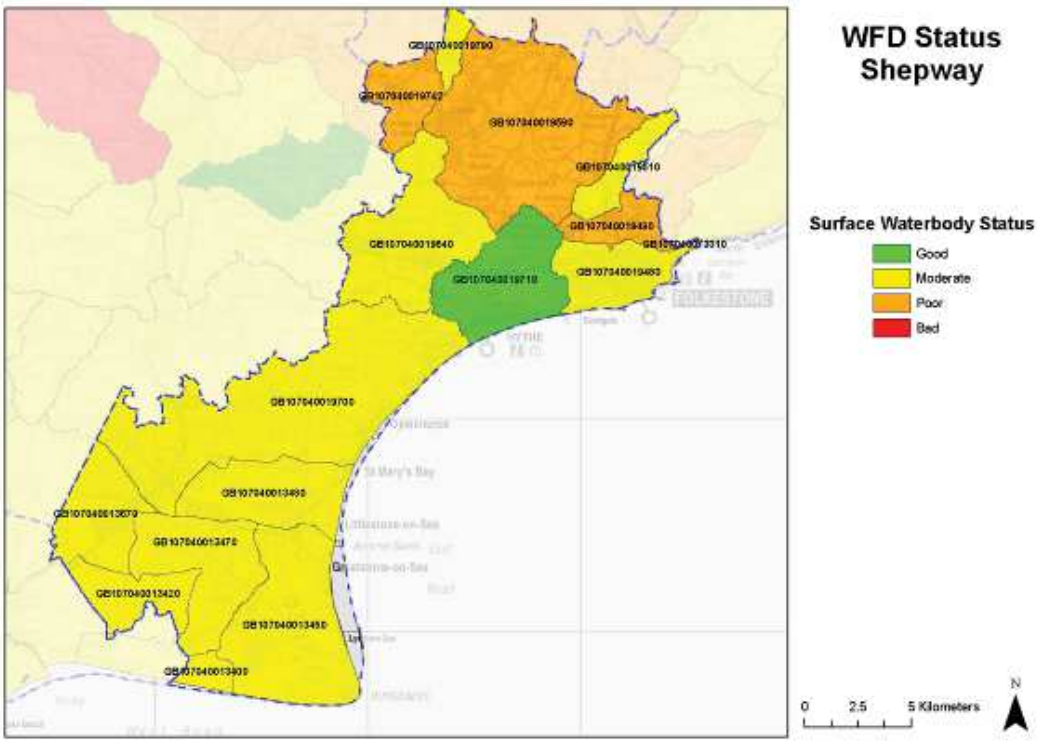
4.2.18 In this chapter the current status of surface and groundwater bodies and bathing water will be discussed. The impact of development on water supply and waste water treatment is discussed in Chapter 5 and flooding issues are discussed in Chapter 6.

4.3 Current Issues Surface Waters

4.3.1 Whilst surface waters are important in contributing to all natural and urban landscapes, they are particularly intrinsic to the character of Romney Marsh, which is divided up by a network of water courses, the most notable of which is the Royal Military Canal.

4.3.2 Most of the surface water bodies across the district are accredited with a 'moderate' status; whilst there are some areas to the north of the district that are classified as 'poor', there are no bad areas (the lowest category). The objective is to achieve a good status, of which there are two examples - the Seabrook Stream and the eastern end of the Royal Military Canal. This is illustrated below in Figure 4.1.

Figure 4.1. Water Framework Directive Status in Folkestone and Hythe District



Not to Scale

4.3 Future Management of Surface Waters

4.3.1 In summary the environmental objectives for surface waters in accordance with the Water Framework Directive are:

- Prevent deterioration in status for water bodies
- Aim to achieve good ecological and good surface water chemical status in water bodies by 2015
- For water bodies that are designated as artificial or heavily modified, aim to achieve good ecological potential by 2015 (Achieving a good status for heavily modified water bodies may be problematic, as there may be overriding reasons for the physical state of the water body that cannot be overcome, such as flood risk management needs or maintenance for good drainage. In such situations, as long as the ecology and water quality are good, the physical conditions may be left unaltered, resulting with the water body achieving a status of good ecological potential)
- Comply with objectives and standards for protected areas (those covered by the Freshwater Fish Directive, the Habitats Directive or within SSSI's etc.) where relevant.
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

4.4 Current Issues Groundwater

4.4.1 The purity and volume of groundwater is important for a number of reasons:

- the ecology of the District

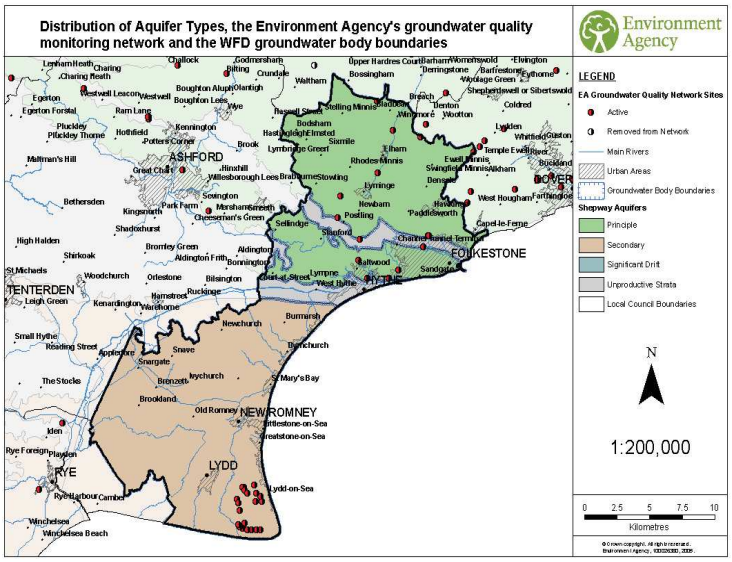
- ensuring that drinking water conforms to Drinking Water Industry standards
- the protection of rivers and surface water features dependent on groundwater.

4.4.2 Groundwater is vital to life and livelihoods. In Folkestone and Hythe it provides approximately 70% of drinking water and supports many of the rivers and wetland habitats. Groundwater quality must be protected and improved. Abstraction of groundwater has to be balanced with the needs of the environment.

4.4.3 The aquifer sources in the north of the District are considered 'principle aquifers' under the Water Framework Directive (Chalk and Greensand). However, the groundwater sources in the south of the District (the Denge Gravel Aquifer in Dungeness) are also important although classified as 'secondary' they provide a significant source of water for the area. The distribution of aquifers throughout Folkestone and Hythe is shown in Figure 4.2.

4.4.4 There are concerns about the condition of aquifers that underlie Shepway, both in terms of water quality and quantity and so it is important that new development does not place additional undue pressure on natural water reserves. Further information on the health on groundwater in and adjacent to the district can be found within the supporting information for the Water Framework Directive on the Environment Agency website, available via http://www.environment-agency.gov.uk/research/planning/124978.aspx

Figure 4.2. Distribution of Aquifer Types



[4] Not to Scale

4.5 Future Management of Groundwater

4.5.1 In summary, the environmental objectives for groundwater are:

- Prevent deterioration in the status of groundwater bodies
- Aim to achieve good quantitative and good groundwater chemical status by 2015 in all those bodies currently at poor status

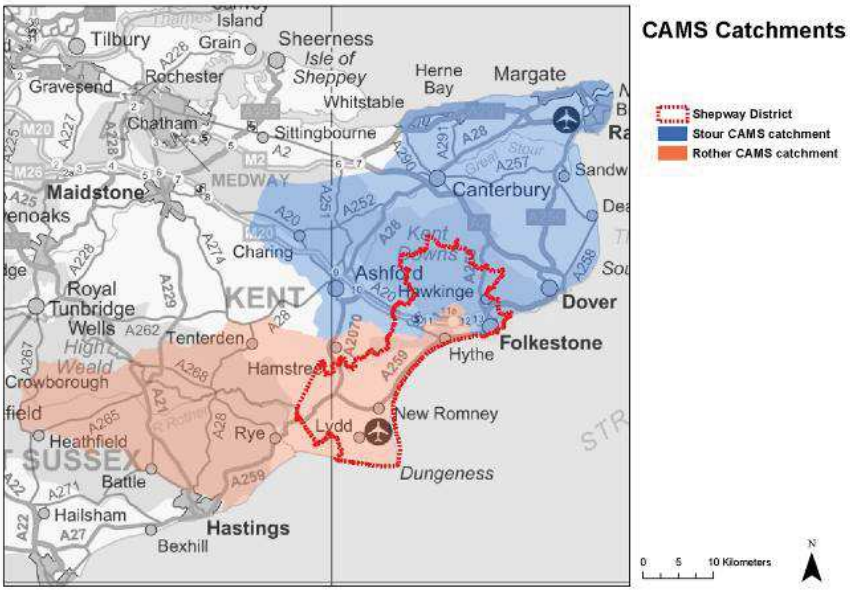
[4] Environment Agency (2009) Fact Sheet, State of Groundwater Report, Shepway District Council, Environment Agency

- Implement actions to reverse any significant and sustained upward trends in pollutant concentrations in groundwater
- Comply with the objectives and standards for protected areas where relevant
- Prevent or limit the input of pollutants into groundwater.

4.5.2 Groundwater is a vital aspect of the hydrologic cycle and thus an important consideration for sustainable development. Unless nowhere were to develop, future arrangements to manage Shepway's groundwater will be vital, particularly for quantitative factors (limit over-abstraction). This report considers the potential effect new development may have on the hydrological cycle through the associated additional demand in water and the treatment of additional waste water. However, development may also present water related opportunities; e.g. through the mitigation of surface run-off, temporary storage of storm water or improvements to habitat. With this in mind the careful control of new development is vital to minimise the impact of new development and maximise any benefits.

4.5.3 The principal objective of WFD policy in relation to groundwater is to achieve good overall status in as many groundwater bodies as possible by 2027, although this is likely to be difficult because of the time it can take for pollutants to move from surface to groundwater and because of the risk of saline intrusion caused by rising sea levels. To achieve this it is necessary to prevent or limit sources of pollution of groundwater.

Figure 4.3. CAMS Catchments that cover Folkestone and Hythe District



5

4.5.4 The Environment Agency is responsible for abstraction management. It is their role to manage flows to prevent flow variability. The EA operates a permitting system for the amount of water taken from the environment which is regulated through a licencing regime. The Catchment Abstraction Management Strategy (CAMS) determines how much water is available for abstraction at a catchment level, taking account of the amount already licensed and how much the environment needs. CAMS areas are defined by river basins. The district is covered by two river basins; those for the Stour and the Rother, and

[5] Environment Agency (2010) CAMS Catchments (unpublished)

therefore is covered by two CAMS, as shown in Figure 4.3. Catchment Abstraction Management Strategy is now called Abstraction Licensing Strategy (ALS).

4.5.5 Accordingly, the role of the CAMS is to define a flow regime that a sustainable ecology would require and then examine how the amount of water abstracted under licence would impact on this.

4.5.6 The EA now publish more concise Abstraction Licensing Strategies which set out how the EA is going to manage abstraction licensing in a particular area.

4.5.7 The Stour Abstraction Licensing Strategy (2013) states that 65% of water abstracted from the Stour catchment each year is drawn from groundwater sources. 51% of water abstracted from the environment is for the public water supply with 25% of surface water being used for agriculture.

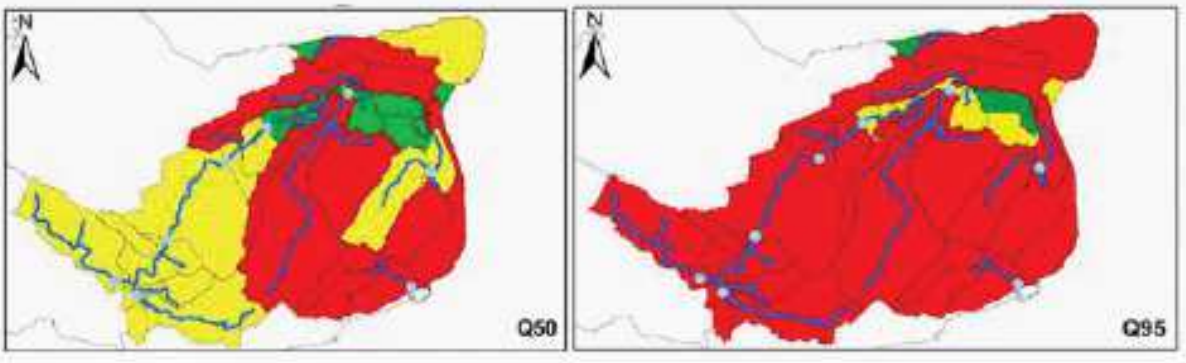
4.5.8 The Rother Abstraction Licensing Strategy (2013) asserts that the main pressures from the public water supply network within the catchment are found in the east around Folkestone and Hythe and the shingle aquifer of Dungeness.

4.5.9 Defra recently consulted on proposed changes to the water abstraction licensing exemptions in England (January to April 2016), and new authorisations are being introduced currently to better manage water at a catchment level.

4.5.10 River flow statistics are expressed as the percentage of time that river flows are exceeded. Availability is calculated at four different flows ranging from Q95 (very low flow), Q70, Q50 (average flow) and Q30 (highest flow). The implications of flow levels on water availability are indicated by the following colour coding:

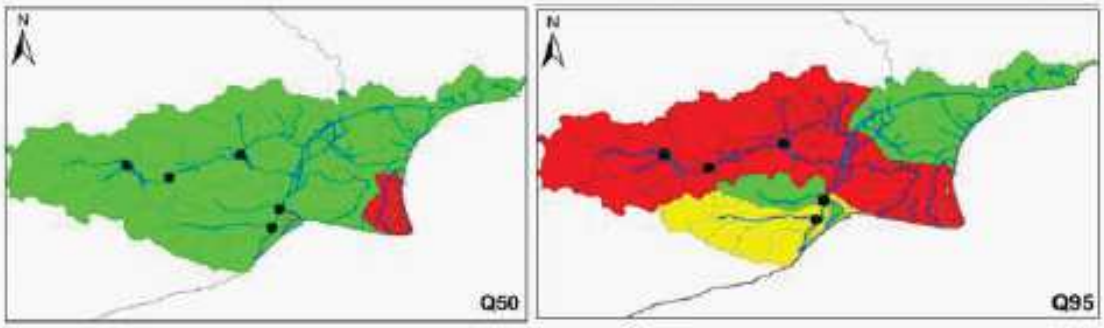
- Red – 'no water available for licensing'
- Yellow – 'restricted water availability'
- Green – 'water available'

Figure 4.4. Stour - Abstraction Licensing Strategy availability status



4.5.11 It can be seen that there is little or no further water resources available from the both surface and groundwater serving Folkestone and Hythe(Chalk and Lower Greensand aquifers) even at average flows. This is linked to issues associated with low flows in the River Stour. It can be seen that the problem is less acute in the Rother catchment, where in certain circumstances there is water available even during very low flow conditions.

Figure 4.5. Rother - Abstraction Licensing Strategy availability status

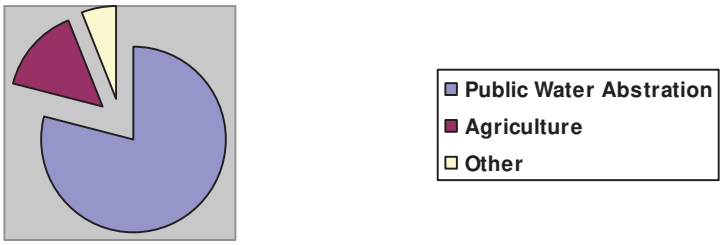


4.5.12 There are 378 licensed abstractions in the Stour CAMS area. Of these 286 licences are for spray irrigation, although this is a high proportion of all licences, this accounts for only 10% of the annual licensed quantity. Public water supply is the main abstractor, as it is licensed to take 84% of the total annual licensed quantity for the Stour CAMS area.

Figure 4.6. Breakdown of Abstraction quantities in the Stour CAMS

4.5.13 The majority of licensed abstraction within the Rother catchment is also for public water supply (78%). This is followed by industrial (15%) and agricultural (6%) purposes. Approximately 60% of water abstracted in the catchment is drawn from groundwater sources with the remaining 40% from surface water.

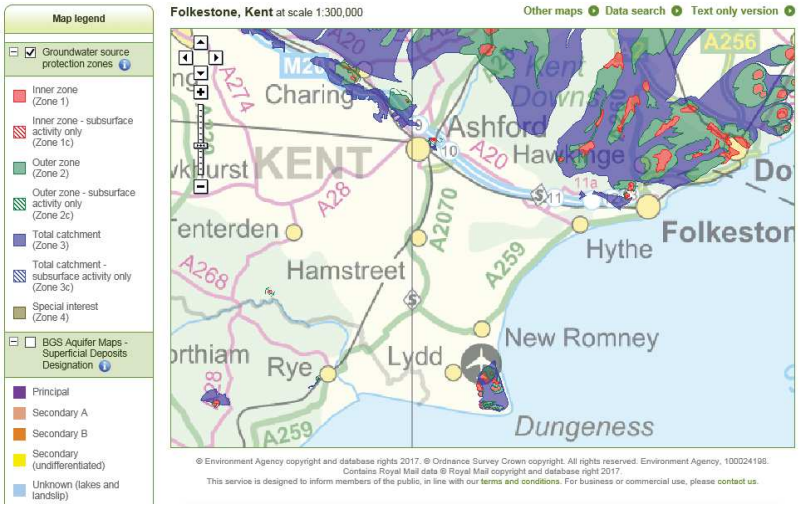
Figure 4.7. Breakdown of Abstraction quantities in the Rother CAMS



4.5.14 The EA has the responsibility for measuring the volume of surface and groundwater within a river catchment. This is done by measuring the quantity of naturally available water in a given water body and then comparing it against the quantity taken from it for public water supply, agriculture and industry.

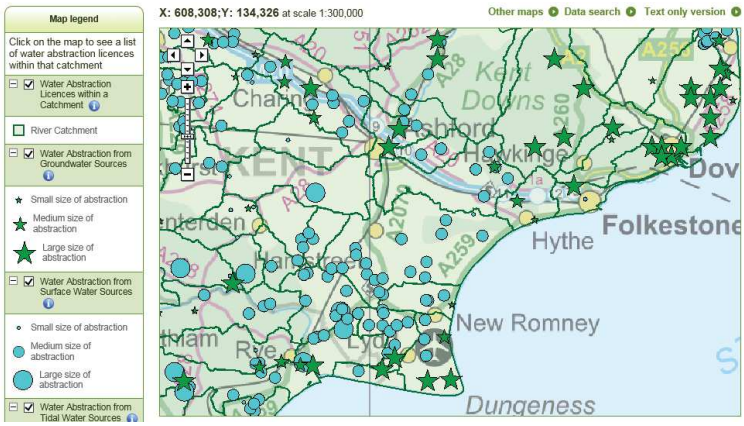
4.5.15 Research by the EA shows that many of the surface and groundwater sources providing water for Folkestone and Hythe are ‘over licensed’ or ‘over abstracted’. Over abstraction means that the existing abstraction rates are causing water flows to drop below those required to sustain the ecology of the area. Importantly, the south of the Romney Marsh area is over-abstracted. Over licensed means that at existing rates of abstraction the volume of water in a system is only just sufficient to sustain the ecology of the area. In such a situation, if the rate of abstraction were to increase to the maximum limit permissible under the licence, flows would fall below that level.

Figure 4.8. Distribution of Source Protection Zones



4.5.16 Figure 4.8 shows three main zones (inner, outer and total catchment) these zones are used alongside Groundwater Protection Policy to establish pollution prevention measures. It can be seen that the area of the Borough to the north of Folkestone urban area fall within source protection zones, as does the area around Dungeness. This shows where the majority of groundwater is abstracted defined by higher yields attained from the Kent Chalk located there. These areas have the greatest pressure from groundwater abstraction and have to be carefully monitored and managed by the Environment Agency.

Figure 4.9. Map showing locations of water abstraction licences in the Folkestone and Hythe District area



4.5.17 The District's Groundwater Source Protection Zones is now a well-established policy, delivered through the local planning authority working closely with the Environment Agency and providing an effective and focused protection mechanism.

4.5.18 The operation of these Zones will be assisted by changing arrangements for non-mains sewage (relevant to a large part of rural Shepway, but only a limited population):

- Historically, waste was dealt with in these areas through septic tanks but this is problematic as waste is only partially 'broken down' before being emitted. Due to the threat of contamination septic tanks are not allowed in an inner Source Protection Zone, and in certain other conditions. The alternative of a cesspool (cesspit) does not face this particular restriction as it should only store sewage.

However, the requirements for installation and regular emptying by suction tanker means a cesspool is rarely practical even on small developments.

- The sustainable option (especially for larger developments) is a non-polluting individual treatment plant, with appropriate discharge.
- Under the government's regulatory reform, procedures for any such discharge are going to be covered under the new Environmental Permitting Programme Second Phase. Under this regime, exemptions are possible for new systems (equivalent to serving up to 27 people for larger treatment plants, or 11 people for small plant or septic tank)[6].

4.5.19 Agricultural chemicals and urban run-off are also major contributing factors to poor groundwater result. The Water Framework Directive provides the mechanism by which to address these problems, at present by 2027. This highlights the need to focus on pathways of impact between development (such as urban run-off) and the water cycle to identify achievable actions. To this end, Sustainable Urban Drainage Systems (SuDS) are considered in Chapter 5.

4.5.20 The degree of imperative for these recommendations depends on the environment and local water feature attributes, and if prioritisation of further water quality protection is required, it may be prudent to focus spatially, for example on the North Downs area.

4.5.21 In terms of the District's growth as a whole, reserves of water need to be sufficiently aligned with the management of increasing demand sources, whilst continuing to ensure the quality of groundwater is also protected.

4.6 Current Issues Rother Catchment

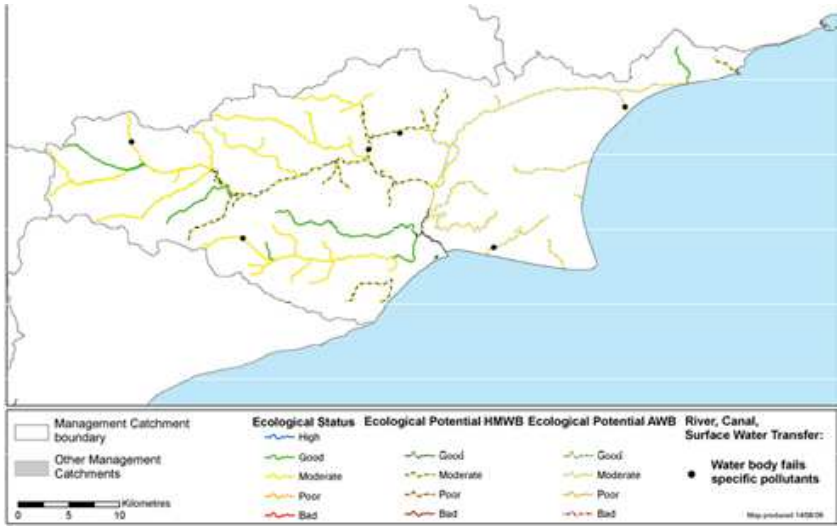
4.6.1 Surface and groundwater are abstracted from the Rother catchment from the Denge gravels, Walland Marsh and Romney Marsh. The chalk and sand geology of this area means there is a strong connection between groundwater and surface water. The Rother catchment area encompasses some important habitats including the Dungeness to Pett level SPA and Dungeness SAC, both of which it supports.[7].

A selection of typical images of Romney Marsh

[6] As calculated by the wastewater systems company LTE: http://www.wte-ltd.co.uk/epp2.html.

[7] Scott Wilson (2008) Draft Appropriate Assessment Screening Document with factual update by SDC June 2009, Scott Wilson & SDC, Accessed on line, Date Accessed 04.02.11, Web site address: http://consult.shepway.gov.uk/portal/core_strategy/core_strategy_po?tab=files

Figure 4.10. Current ecological status/potential of river water bodies in the Rother catchment



4.6.2 Point source pollution from sewage works is a major challenge in the catchment. This is currently limiting the number of rivers at good status. A high proportion of rivers and lakes in the catchment are heavily modified or artificial. The activities in these waters can hinder the movement of fish and increase the challenge for providing good ecology.

4.7 Future Management of the Rother Catchment

4.7.1 This catchment's groundwater bodies suffer from high nitrate concentrations arising from urban sources; such as leaking sewer pipes and disturbance to soil during development and agriculture. There are also concerns regarding the amount of water that can be abstracted from the Rother Catchment without harming the ecology of the area.

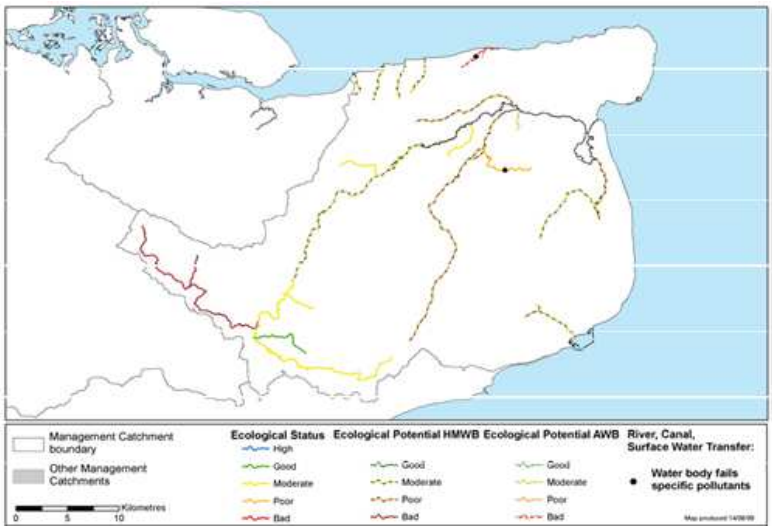
4.7.2 The council is aware of the delicate ecology of the area, in particular those ecological sites recognised at a European level. It is aware of their susceptibility to increased salinity as a result of climate change (coastal management issues are discussed in Chapter 6, Section 3) and will work with partners to protect the environmental quality of the District.

4.8 Current Issues Stour Catchment

4.8.1 Many significant water bodies in this catchment are outside the District boundary as it encompasses a wide area including the Thanet Coast and Sandwich Bay SAC, SPA and Ramsar site, Stodmarsh SAC and Ramsar8. However, it is important to consider that the hydrological cycle does not respect political boundaries and as such it is important to recognise that activities within the District can adversely affect our neighbours. In terms of groundwater the Stour Catchment is important as it contains the principal aquifers that supply the District with water.

[8]Environment Agency (2003) The Stour Catchment Abstraction Management Strategy, Environment Agency, Accessed on line, Date Accessed 07.02.11, Web site address: http://www.environment-agency.gov.uk/cy/ymchwil/cynllunio/33448.aspx

Figure 4.11. Current ecological status/potential of river water bodies in the Stour catchment



4.9 Future Management of the Stour Catchment

4.9.1 Like the Rother, the quality of water systems within the Stour catchment could also be improved. These watercourses are sometimes shaped by the built environment in the District's towns and villages. Folkestone and Hythe lies at the edge of the Stour catchment, which means that any polluting activity will affect the quality of water downstream outside of the District.

4.9.2 Over abstraction at the edge of a river catchment may also have significant implications for the volume of water within surface water bodies further downstream. As such the management of abstraction and protection of water in the Folkestone and Hythe area of the Stour catchment is particularly important to safeguard ground and surface waters beyond the boundaries of the District.

4.10 Current Issues Coastal Waters

4.10.1 In accordance with the Water Framework Directive the coastline is divided in coastal water bodies, which extend about a mile off shore. There are two bodies that cover the Folkestone and Hythe coastline, Kent South and Sussex East, both of these coastal water bodies are classified as heavily modified with moderate ecological potential. This is due to the construction of flood defences. Where appropriate mitigation measures may enable these coastal water bodies to be reclassified to those with 'good ecological potential'.

4.10.2 This is important to Folkestone and Hythe and the local summer economy as the District's beaches attract large numbers of visitors. The quality of the District's bathing waters is monitored by the EA and the results from bathing water quality tests are published in the council's Annual Monitoring Report. Table 4.1 shows the results of the 2017 tests.

Table 4.1. Bathing Water Test Results (2017)

Test site	EA classification
Folkestone	Excellent
Sandgate	Excellent
Hythe	Excellent
Dymchurch	Good
St Mary's Bay	Good
Littlestone	Good

4.10.5 Fluctuations in figures are not abnormal and can be affected by weather, for example, as additional rainwater usually causes higher levels of Coliforms and Streptococci. These samples can also be affected by tidal flows.[9]

4.11 Future Management Coastal and Bathing Waters

4.11.1 Marine waters are a useful resource for the District and the council and its partners will seek to maintain the generally excellent bathing water quality. This study recognises the impact that urban runoff may have on the quality of coastal waters and will seek to ensure that this is minimised through the planning process and, where possible the council will support measures to improve the status of the two heavily modified coastal water bodies.

4.12 Chapter Summary

4.12.1 Examining the concept of a water cycle in the local setting is intrinsic to delivering Water Framework Directive aims. In the protection of water within natural systems the WFD looks to provide a regulatory framework in which water can only be abstracted from the environment without having a major adverse impact on ecological systems. In Shepway, hydrology is regulated within the Rother and Stour River Basins. The status of surface waters and groundwater within the river basins has been shown to be varied and the council recognises the need to protect and where possible enhance the quality and to protect our limited water reserves.

4.12.2 Shepway's coastal waters are also important to District. These are ultimately the 'sink' for urban runoff transferring them to the sea. Whilst the volume of marine water available to dilute pollutants is significant, the council acknowledges the importance of protecting its coastal waters.

4.12.3 This chapter has provided an overview of the current condition of water within the local environment. This necessitates the need to understand the impact that new development may have on the District, so that adverse impacts can be minimised. This is studied in the next chapter.

4.12.4 The commitment to protecting groundwater quality must continue and be reinforced by better designed development. In the future the attention of all agencies will have to focus on delivering active improvements to quality. Shepway's dependence on

[9]Shepway District Council (2010) Annual Monitoring Report, Shepway District Council, Accessed on line, Date accessed 03.02.11, Web site address http://www.shepway.gov.uk/UserFiles/File/pdf/local-plan/annual-monitoring-report/Shepway%20AMR%202010.pdf

groundwater for a range of activities means concerns about quantitative water issues are legitimate, and must be reconciled in development strategy.

4.12.5 The integrated approach of this report and the WFD highlights that pressures on the water cycle are more acute in some locations than others. This is irrespective of the specifics of planned new development, but does highlight the growing importance of a holistic examination of natural resources, such as the hydrological balance at Dungeness in the context of precious habitats, or the prospect of saline intrusion in many coastal areas in the context of sea-level rises.

CHAPTER 5 WATER RESOURCES & WASTEWATER TREATMENT

5.1 Introduction

5.1.1 In the context of integrated research of the hydrology of the district, water supply is perhaps the single most pressing concern in the eyes of many people. Wastewater treatment is critical to human life and the natural environment, but can be planned for over time (notwithstanding budgetary constraints and other practical issues). This process is made easier with the certainty of adopted policy and the knowledge of where housing growth will be directed, and hence it is still critical this report influences the planning policy approach.

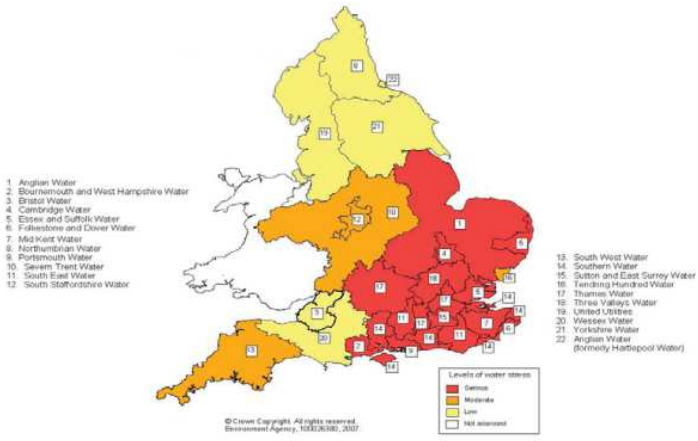
5.1.2 Water supply contrasts somewhat, arguably being less an issue of engineering and delivering an infrastructure solution, and more directly sensitive to aggregate levels of development (especially residential) as there is ultimately a finite amount of drinking water available to supply new development.

5.2 Water resource issues

5.2.1 The South East has experienced low rainfall in recent years, including dry winters. Expected climate change trends for the south east are for drier summers, wetter winters, and more extreme events. Shepway, with its important wetland habitats, is particularly susceptible to such changes. The council recognises this and will endeavour to work with its partners to make strenuous efforts to reduce the risk of water stress, especially in European wetland sites.

5.2.2 The careful management of water in a region of the country with low rainfall and a growing population is difficult. This is further exacerbated with predicated climate change and more extreme weather events intensifying summer drought or flooding in the winter period.

Figure 5.1. Relative Water Scarcity



5.2.3 Water companies in the south east have to operate within the constraints of limited water supplies, whilst having to ensure adequate provision for growing populations. In order to reconcile such conflicting requirements all water companies have a statutory duty as a water undertaker to prepare, consult, publish and maintain a water resources management plan (WRMP) under new sections of the Water Industry Act 1991, brought in by the Water Act of 2003.

5.2.4 Figure 5.1 shows areas of relative water stress in England. It makes it clear that water stress is most significant in the east and south east of the country (NB Affinity Water, No 6, is denoted here under its former name of Folkestone and Dover Water).

5.2.5 The 2013 Environment Agency classification confirms that both water supply areas that overlay Folkestone and Hythe District are ranked as being under serious water stress, both currently and under future scenarios.

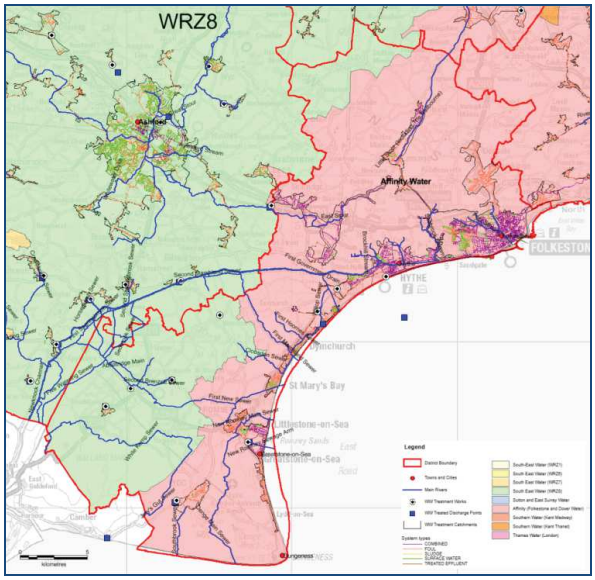
Figure 5.2. 2013 classification of water stress

	2013 Classification					
Water Company Area	Current Stress	Future Scenario 1	Future Scenario 2	Future Scenario 3	Future Scenario 4	Final Stress
Affinity Water (formerly Veolia Water South East)	S	S	S	S	S	Serious
South East Water	S	S	S	S	S	Serious

5.3 Future Management of Water Supply

5.3.1 Water is supplied by Affinity Water (pink area) and South East Water (green area). There is a small import of water from Southern Water, which may include some surface water. Otherwise all supplies are drawn from groundwater sources.

Figure 5.3. Water Company Areas of Supply



5.3.2 Affinity Water manages its water supplies as a single Water Resource Zone (WRZ). It means that water can potentially be supplied to many of the major settlements in both the Dover and Folkestone and Hythe Districts from many different sources. This offers greater flexibility and security in water supply, facilitating the protection of individual sources in the event that they are threatened and it also means that the extra demands arising from growth could potentially be met by abstracting more water from natural sources outside of the District. Without planned measures to manage demand and new resources, Shepway, along with other LPAs sharing the WRZ, would see a deficit of available supply ranging between 20.6 Ml/d and 28.8 Ml/d.

5.3.3 Both Affinity Water and South East Water are proposing a range of measures to close the deficit within the WRZs serving the majority of the LPA area up to end of the

Local Plan period (2031) and beyond to 2040. This study has considered whether the growth forecast by water companies in the current live WRMPs (from 2015) adequately covers the more recent growth forecasts used in the study; this is because water company planning numbers were based on 2013/14 growth forecasts whereas this study has used more recent forecasts from 2016.

5.3.4 South East Water's WRZ8 covering the south western and very northern portion of the Folkestone and Hythe LPA area has mostly sufficient planned water to meet demand; however, the rest of the LPA area covered by Affinity Water has options planned to meet demand for only approximately 27% of the total growth within the WRZ. As a result, this study has estimated that Affinity Water's current WRMP has a potential shortfall in supply of 2.81 Ml/d within the Folkestone and Hythe LPA area.

5.3.5 This study has, therefore, identified a range of measures that could be bought forward early (or included in addition) within the WRMP update due in 2019 which would allow this shortfall to be met. To further enhance strategic scale water resource measures, the potential for a water neutral position across Folkestone and Hythe has also been considered within this study, to demonstrate the potential efficacy of policy to minimise demand from new property as w ell as joint initiatives to further reduce demand in existing housing stock. Affinity Water has advised that it does not recognize any shortfalls in supply within its area. A range of measures were put forward in their WRMP14 to meet the forecast supply demand balance. These measures will be re-appraised as part of WRMP19, and any shortfalls in surplus will be accounted for in their modelling and any deficits in the supply demand balance will be closed as part of their updated work.

5.3.6 Existing water demand (residential only) within the LPA area has been estimated as 16.14 Ml/d and the additional demand from projected residential growth is estimated to be 3.85 Ml/d. To achieve neutrality, demand after all houses are built and occupied would need to be less than 16.14 Ml/d and the Kent Water for Sustainable Growth study has concluded that it would require unrealistic measures to achieve this including: all new development to minimise water demand through the use of extensive and expensive recycling technologies; all water companies to meet maximum water meter penetration in existing housing stock; and, a large funding pot to allow retrofit of a significant proportions of existing housing stock with water efficient fixtures and fittings. Therefore, two more realistic water demand management scenarios have been tested.

- Mandatory requirements scenario plus retrofit - All new homes would be built to deliver a water use of 125 litres per person per day 27 (Building Regulation Part G Mandatory); and, 5% of existing homes in Folkestone and Hythe would be retrofitted with low flush cisterns, as w ell as aerated taps and shower heads;
- Optional requirements scenario plus retrofit - All new homes would be built to deliver a water use of 110 litres per person per day 28 (Building Regulation Part G Mandatory); and, 5% of existing homes in Folkestone and Hythe would be retrofitted with low flush cisterns, as well as aerated taps and shower heads.

5.3.7 Affinity Water has advised that it does not recognize any shortfalls in supply within its area. A range of measures were put forward in their WRMP14 to meet the forecast supply demand balance. These measures will be re-appraised as part of WRMP19, and any shortfalls in surplus will be accounted for in their modelling and any deficits in the supply demand balance will be closed as part of their updated work.

5.3.8 The water neutrality analysis demonstrated that the optional requirement scenario would make some contribution to reducing the post development demand (in 2031) shortfall within Affinity Water's current planned supply and demand balance to 2031 with the optional scenario reducing the deficit by 23%; however, it highlights the importance of alternative strategic water resource options and demand management measures to be developed by Affinity Water to offset the current shortfall in planned supply.

5.3.9 As advised by Affinity Water, the modelling maintains supply and demand and solves deficits where they might occur within their WRMP. The purpose of WRMP is to therefore meet the supply and demand balance into the future, whilst recognizing the change in growth in the region.

5.3.10 The mandatory scenario would potentially deliver a post development demand reduction of 0.25Ml/d (6% reduction in additional demand) whilst the optional requirement would deliver a potential reduction of 0.66 Ml/d (17% reduction in additional demand).

5.3.11 Notwithstanding what has been labelled as 'realistic water demand management scenarios' endorsed by Affinity Water and South East Water, the District Council is seeking to adopt more stringent targets within its Core Strategy Review in order to benchmark a higher water efficiency standard to exceed the current building regulations. The draft policy wording of *SS8 'New Garden Settlement - Sustainability and Healthy New Town Principles'* drawn from the emerging Core Strategy Review is repeated below and will effectively guide development at Otterpool Park Garden Town:

> *a. All new build housing shall be built to water efficiency standards that exceed the current building regulations so as to achieve a maximum use of 90 litres per person per day (including external water use). The development shall be informed by a Water Cycle Strategy which includes detail of:*
>
> *i. Water efficiency, and demand management measures to be implemented so as to minimise water use across the allocation and for individual units and maximise the recycling and reuse of water resources with the aim of achieving water neutrality across the settlement, utilising integrated water management solutions;*
> *ii. ii. Water quality, how it will be protected and improved, and how the development complies with the Water Framework Directive;*
> *iii. iii. Surface water management measures to avoid increasing flood risk through the use of Sustainable Drainage Systems (SuDS); and*
> *iv. iv. Water services infrastructure requirements and their delivery, having regard to Policy CSD5 and the Environment Agency's guidance on Water Cycle Studies;*

5.3.12 In order for the development to be policy compliant the future promotion of the Otterpool Park Garden Town would have to include the preparation and submission of a site-specific Water Cycle Strategy that meets with the requirements of policy SS8. It is also pertinent to highlight that higher levels of water efficiency than the 90 litres per person per day standard specified by policy SS8 are being achieved elsewhere across the country on new build sites driven by the incorporation of water-saving technologies, coupled with the improved performance of new infrastructure in the context of leakage values (very low) when compared to that of ageing infrastructure.

5.3.13 Other studies, for example north Essex Garden Towns, have tested a higher level of water efficiency of 90, 80 and 60 litres per person per day to understand the implications on potable water demand. The onus is, therefore, on the promoters of Otterpool Park Garden Town to identify methods that will achieve the highest level of water efficiency possible. In reality the attainment of the highest possible level of water efficiency will require appraisal of water management at a site-wide level.

5.4 Emerging planning policy – implications for growth on water supply and wastewater treatment

5.4.1 Folkestone and Hythe District Council consulted both Affinity Water and South East Water on development scenarios for infrastructure testing for potable water supply across the district as part of the preparation for the Places and Policies Local Plan and Core Strategy Review. The same exercise was also undertaken with Southern Water in respect of wastewater infrastructure.

5.4.2 In response to communication had with South East Water it was confirmed that South East Water do not foresee any issues with providing supply those development sites within their WRZ area, as the majority of development sites are outside of their WRZ.

5.4.3 Affinity Water responded to advise that given the uncertainty around where the future properties are going to be, despite the fact proposed site allocation locations were shown, they could only provide a high level view on the potential trunk main and water resources implications of developments at each town/village location. Affinity Water qualified that until such time that the precise locations of new development is known it is not possible to calculate a cost for supplying water to each site. The response did provide an insight into those towns and villages that are likely to cost more to develop than others.

5.4.4 Southern Water responded to advise that it is likely that additional wastewater infrastructure would be required to serve new growth in some locations. Accordingly, Southern Water highlighted the importance of ensuring that development is co-ordinated with the provision of necessary infrastructure, but Southern Water have not identified any fundamental reasons why development should not go ahead. In terms of providing additional context, Southern Water also signalled that strategic infrastructure, such as extensions to wastewater treatment works (WTWs), can be planned and delivered through the water industry's five yearly business planning process.

5.4.5 Southern Water has clarified that adoption of the Folkestone and Hythe Policies and Places Local Plan will provide the planning certainty to support proposals to Ofwat, the economic regulator. For some of the proposed allocations, it may be the case that a new or revised environmental permit at a WTW would be required from the Environment Agency. The Environment Agency would normally permit increased flows provided the treatment standards are tightened so that the total load to the environment is not increased. This is in line with the 'no deterioration' principle. Southern Water has not identified any environmental constraints that might prevent them from providing any necessary capacity to serve sites expected to be delivered under the Places and Policies Local Plan. We would look to the Local Plan to contain policy provision to support the delivery of new or improved utility provision. Although the District Council is not the planning authority in relation to wastewater development proposals, support for essential infrastructure is required at all levels of the planning system.

5.4.6 Southern Water also advised that it is likely that new and improved local sewerage infrastructure (which conveys wastewater to the WTW) would be required to serve individual sites. Moreover, Southern Water advised that additional capacity could be provided by making a connection at the nearest point of adequate capacity. However, this should also recognise that the nearest part of the sewerage network with capacity may be distant from a specific site or collection of sites. Hence capacity could be an impediment to growth, although it shouldn't be in practice, as reflected in discussions held with Southern Water.

5.4.7 Southern Water advised that this development principle in reference to new connections should be recognised in any site allocation policies as advised within their response to the Folkestone and Hythe Places and Policies Preferred Options consultation in November 2016, and it can be confirmed that additional site-specific criteria was added to the Submission version of the Places and Policies Local Plan. Southern Water's feedback also advised whether any of the existing infrastructure is under proposed sites and whether any housing allocations would need to provide adequate separation from our wastewater treatments works or pumping stations to safeguard the amenity of future occupiers. This position is reflected within the Submission version of the Places and Policies Local Plan.

5.4.8 Under the Duty to Co-operate representatives of Folkestone and Hythe District Council's Planning Policy team has met with Affinity Water to discuss growth proposals associated with the emerging Core Strategy Review. Affinity Water has advised that Experian data is used to investigate peak demand associated from planning growth/development, and in association with discussions concerning the water supply requirements to serve Otterpool Park

5.4.9 As a 'next step' Affinity Water are to investigate how water supply demands for Otterpool Park could be satisfied based on modelling for up to 10,000 homes with a demand rate of 600 litres per home per day. This usage value assumption makes an allowance for leakage on the network and takes a long-term view to include a 'real world' perspective to recognise that future occupiers of dwellings built at Otterpool Park could remove water saving technologies which would have knock-on implications on usage levels. It is understood that for WRMP19 Affinity Water are modelling an estimated per capita consumption of 126l/p/d across their operational area by 2045. They have used this figure to size the necessary infrastructure needed to transfer water from source to the point of use. They use a per property figure of 400l/prop/day that reflects average occupancy plus an allowance for current unaccounted for water and future leakage. They will note the requirement for Otterpool to have a separate water cycle study that will confirm the measures being put in place to restrict water use at the development to rates lower than 126l/p/d

5.4.10 Affinity Water undertakes full options appraisals to meet future demand and supply shortfalls. One such option might be to buy in supply from neighbouring water companies, such as South East Water if they have spare capacity at any existing or proposed reservoir. While AW have some headroom at present in terms of water resources, additional resources are likely to be required and it will be necessary to look at further abstraction or water treatment or a combination of both. AW look at all possible schemes when considering the most optimal way to meet our supply demand balance. Desalination will have been considered but where options do not appear in the preferred plan it could be for a number of reasons (such as feasibility, cost or environmental constraints).

5.4.11 Based on currently known forecasts Affinity Water have confirmed they have supply capacity for approximately 1,500 additional units over-and-above the quantum of growth modelled for in the latest forecasting. It is important to acknowledge that growth associated with Folkestone and Hythe District Council's Core Strategy Review has not been accounted for within the latest forecasting, meaning it is assumed there is capacity to accommodate early phase(s) of development at Otterpool Park Garden Town.

5.4.12 There is also an opportunity for the promoters of Otterpool Park Garden Town to take an alternative approach to water supply and wastewater treatment through the endorsement of a site integrated water system to endorse the principles of water re-use and water recharge within the demise of the site boundary through application of a systems approach.

5.4.13 Translating this prospect into delivery 'on the ground', it is conceivable that a New Appointment and Variation (NAV) could come forward to serve Otterpool Park Garden Town whereby a limited company would be appointed to provide water and/or sewerage services. A variation is where an existing appointed company (an "appointee") seeks approval from Ofwat to vary its appointment so it can extend the areas it provides services to. A new appointee has the same duties and responsibilities as the previous statutory water company. A NAV, therefore, involves one company replacing another as the appointee for a specific geographic area.

5.4.14 Ultimately, the means of serving Otterpool Park Garden Town with water supply and wastewater infrastructure and its implications from a Water Cycle Study perspective, whether through conventional means or through an alternative approach, would have to be documented as part of a detailed site-specific appraisal for Otterpool Park Garden Town.

5.5 Wastewater issues and the importance of Water Quality

5.5.1 The issue of waste water treatment is intrinsic to the protection of water quality. This part of the chapter looks at some of the most significant aspects of waste water treatment:

- The importance of water quality
- Sustainable Drainage Systems (SuDS) and flooding issues from sewerage infrastructure
- Waste water treatment plants within Folkestone and Hythe and their operation

5.5.2 Increased amounts of housing or business development can lead to reduced water quality of rivers and estuarine environments. Sewage and industrial effluent discharges can contribute to increased nutrients in the natural environment leading to unfavourable conditions. In addition, the EA has identified diffuse pollution, partly from urban run-off as a significant factor in creating unfavourable conditions.

5.5.3 Water quality is an important determinant in the quality of ecosystems and the species they support. Aquatic ones are obviously particularly reliant on it. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.
- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly

result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompany eutrophication deoxygenate water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.

- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

5.5.4 Wastewater and sewage from homes and businesses in the district enter the sewage network managed by Southern Water. Wastewater is treated and cleaned at a treatment works before being discharged to natural water bodies. Precautions need to be taken that new development does not lead to increased levels of pollution and does not suffer from inappropriate odour nuisance when it located close to wastewater treatment works.

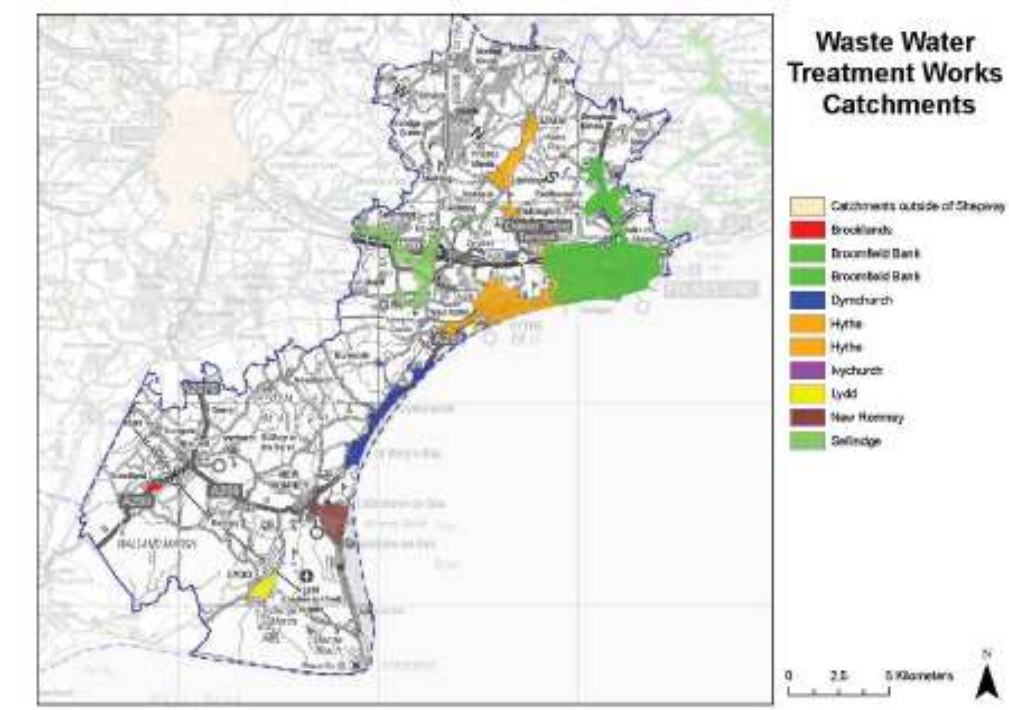
5.5.5 Local features of the wastewater management network often become readily apparent at times of stress to the system, such as heavy rainfall. Particularly in urban areas, impervious surfaces increase the amount of rainwater that drains into surface water sewers or sewers containing both surface and wastewater known as “combined sewers”. Flooding can result when the sewer is overwhelmed by heavy rainfall, becomes blocked or is of inadequate capacity, and will continue until the water drains away. When this happens to combined sewers, there is a high risk of land and property flooding with water contaminated with raw sewage as well as pollution of rivers due to discharge from combined sewer overflows. As this type of flooding is more often found in areas of higher residential density (a predominance of hard surfaces) this can impact on a significant number of households.

5.5.6 Many parts of Folkestone and Hythe are served by combined sewers and consequently there is an inherent risk that these could become surcharged during an extreme rainfall event. Many of the surface water and highway sewers also discharge directly into the watercourses that flow through these urban areas, which further exacerbates the problem. Detailed information on flood risk from this source is not available on a District-wide scale and therefore this type of flooding will need to be investigated on a site-specific scale[10].

5.6.7 New development has a direct impact on wastewater treatment infrastructure by using spare capacity in existing strategic sewers and waste water treatment works. The treatment of waste water is complex; especially relevant are the measures that are required to reduce chemical levels within treated waste water to those that are acceptable to discharge under the Water Framework Directive. Through consultation with Southern Water and the EA the council will need to ensure that its proposals for growth do not adversely affect water quality. The quality and quantity of water that is finally discharged to the environment is limited by licences issued by the EA so that the standards of the WFD can be met.

[10]Herrington Consulting Limited (2009) Strategic Risk Assessment, Shepway District Council, (2nd Draft), Shepway District Council, Accessed on line, Date accessed 03.02.11, Web site address http://consult.shepway.gov.uk/portal/core_strategy/core_strategy_po?tab=files

Figure 5.4. Waste Water Treatment Works Catchments



Not to Scale

5.5.8 There are a number of waste water treatment plants that serve Folkestone and Hythe District. Figure 5.4 references the treatment works and shows their catchment areas in the context of the district. It can be seen that the catchment areas follow the district's coastline, as well as covering all the towns and all of the larger villages in the north of the district.

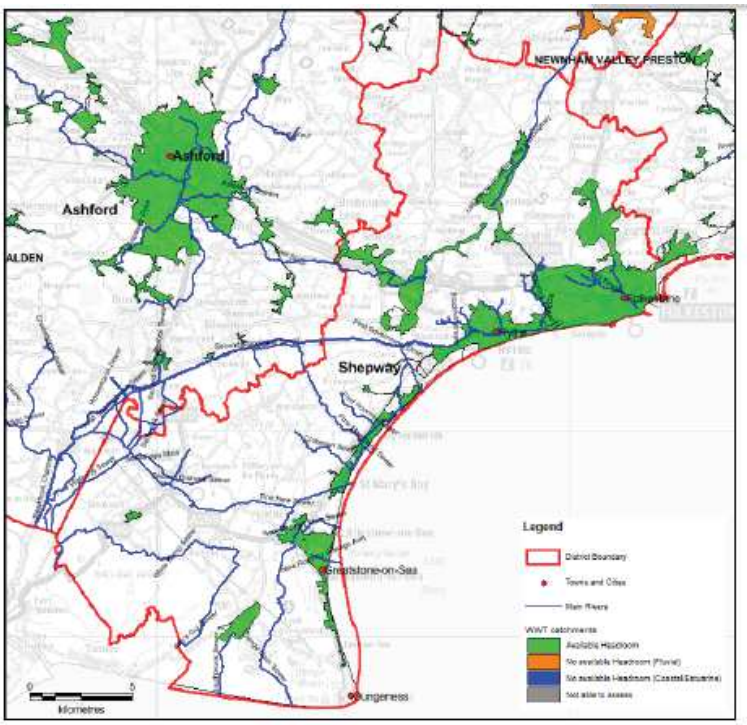
5.5.9 Figure 5.4 also serves to highlight, with the exception of the principal urban areas, much of the district falls outside the catchment areas for main wastewater treatment plants. These areas are generally served by cesspits and septic tanks at present. The amount and density of new development in the areas not served by wastewater treatment works tends to be low. For new development in these areas wastewater treatment is managed through a set of regulatory regimes between the local authority and the EA. In many cases in these locations, new homes are provided with an individual facility, but where developments reach 12 dwellings or more, joint facilities may be instigated. In the work that the council has undertaken in compiling this report, no reliance has been made upon non-mains sewage treatment, as it is considered that this would be inappropriate.

5.5.10 As confirmed within the Shepway district summary of the Kent Water for Sustainable Growth Study, a total of 7,495 dwellings have been assessed across the LPA area up to 2031. This total excludes the growth planned as part of the emerging Core Strategy Review. Of the total growth, 73% is to be phased later in the plan period between 2021 and 2031. Growth in the district is fairly evenly distributed across the LPA area.

5.5.11 Excluding growth within the planned Otterpool Park Garden Town, which is associated with the emerging Core Strategy Review, the growth planned across the district in accordance with the Places and Policies Local Plan has been compared to the available headroom at WwTWs serving the LPA area. Figure 5.5 demonstrates the results of this

assessment and shows all WwTWs have permitted capacity (green) to accept growth. No water quality assessment was, therefore, required for WwTWs in the district.

Figure 5.5. Headroom capacity at WwTWs serving Folkestone and Hythe (ability to accept growth)



5.5.12 The Kent Water for Sustainable Growth Study asserts that when allowing for the inclusion of growth at Otterpool Park Garden Town and the associated demand on wastewater infrastructure a new treatment solution would be required owing to limitations on the environmental capacity of the fluvial inland watercourses receiving flow from WwTWs nearest to the planned development. These watercourses are small, with low flows due to their location near to the headwaters of the wider catchments.

5.5.13 Consultation with Southern Water by KCC to inform the *'Kent Water for Sustainable Growth* Study' has indicated that a range of options could be considered for the Otterpool Park Garden Town, to include the transfer of flows to Hythe WwTW. Initial assessment within the Kent Water for Sustainable Growth Study has identified limited permitted capacity at Hythe, however its discharge to a coastal water body providing potentially more environmental capacity than discharge to a fluvial system. Further more detailed assessment of this option (including modelling) will to be required as plans for the OGC develop.

5.5.14 The Environment Agency, in commenting on the content of a draft version of the Water Cycle Study, has provided some additional clarification concerning the implications of planned growth on water supply and wastewater treatment, as bulleted below:

- Water Quality could be affected if a new installation were to discharge into the small East Stour Stream. An appropriate permit would have to be applied for but there is no guarantee it will be granted.
- Capacity within the combined system sewers in a heavy rainfall event can cause sewage effluent to overflow into the local watercourses

- It would be the responsibility of Southern Water to agree to the development connecting into their main sewer system and being treated at West Hythe WWTW and/or Sellindge. They would have to ensure that the two WWTW's had sufficient capacity within their works and were capable of treating the effluent to an acceptable tight standard which would probably be imposed on their works.
- Large volumes of effluent discharging into the local watercourse could cause a flooding event and would require an assessment by Flood Risk Management.
- Any variation to Southern Water's West Hythe WWTW and Sellindge WWTW would be assessed and determined by the Environment Agency's National Permitting not locally, and there is no guarantee it would be granted.
- Modelling would be required for water quality and flood risk purposes. The Environment Agency would not be carrying this out, it would be the responsibility of the developer to finance the modelling and then submit their finding to us for consultation.

Chapter 6 FLOOD RISK & COASTLINE

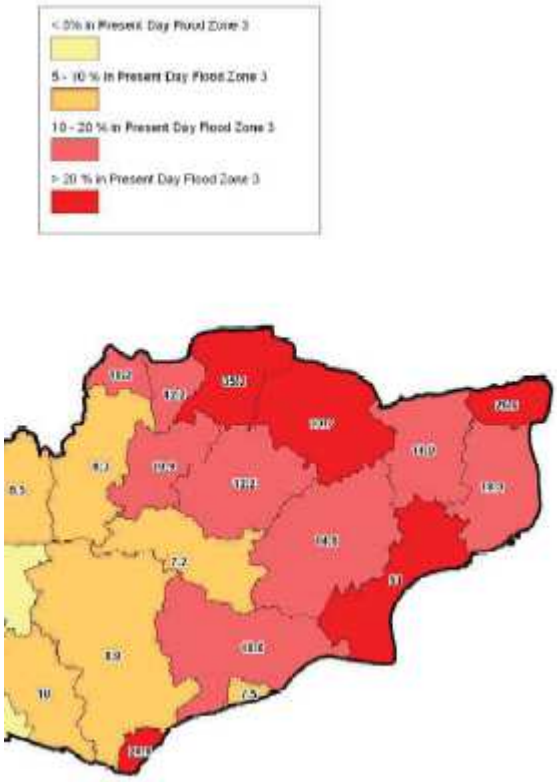
6.1 Introduction

6.1.1 This chapter examines:

- Main flood risks
- Coastline management
- Priority coastal environments

6.1.2 The south and east of England's landmass is very gradually sinking, and this has implications for ongoing coastal management, even if sea levels were predicted to remain unchanged. However, rising sea levels are anticipated as a result of climate change. The overall result is a projected sustained increase in tidal flood risk for low-lying areas.

Figure 6.1. Flood Risk map of Kent authorities



Flooding is an issue for much of Kent. It is particularly acute in Folkestone and Hythedue to the extensive low-lying land, which forms Romney Marsh that makes up the south of the District.

The map shows the south-eastern extent of England (excluding London), and the relative scale of flood risk problems District-by-District. Darker red colours are Districts where significant proportion of the local land area is covered by flood zone 3 as defined by the EA. Source: regional flood risk appraisal.

Not to scale

http://www.southeast-ra.gov.uk/documents/sustainability/rfra_nov08.pdf

6.1.3 The Department for Environment, Food and Rural Affairs (DEFRA) has overall responsibility for flood and coastal erosion risk management in England. However, delivery is the responsibility of a number of flood and coastal defence 'operating authorities' which Folkestone and Hythe District Council is one.

6.1.4 The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. As detailed in the National

Flood and Coastal Erosion Risk Management Strategy for England, this is a strategy designed to ensure that the roles of all involved in managing risk are clearly defined.

6.1.5 Folkestone and Hythe District Council works with key partners in planning local flood risk management works on minor watercourses. As well as working with Lead Local Flood Authorities and others to ensure that risks are effectively managed. But in summary our most significant risks are;

- Coastal Flooding
- Pent Stream – Rapid response catchment
- Fluvial Flooding from the Nailbourne
- Surface Water Flooding – Folkestone

6.1.6 Folkestone and Hythe district has a long coastline of approximately 23 miles, which is intrinsic to the character of much of the District. The coast is not uniform and varies topographically, geologically and ecologically along its length. Chalk cliffs and coastal scrub in the east give way to shingle and sand. The cuspate foreland that forms Dungeness is of particular significance with ecological sites that are of European significance. Many of the District's major settlements have coastal locations, including Folkestone, Hythe, Dymchurch, New Romney and Lydd. These were originally isolated settlements but linear development, especially in the post war period, has meant that much of the previously intervening natural coastline has been lost.

6.1.7 On The Romney Marsh the need to protect people and their homes from climate change and the threat of rising sea levels has necessitated the need for substantial new coastal defences. Today the only sections of the District's coast that are essentially undeveloped are Folkestone Warren, Hythe Ranges and Dungeness.

6.1.8 Climate change means an increased likelihood of intense rainfall periods and sea level rises, both of which increase flood risk. In relation to new development in Folkestone and Hythe district, the severity of risk of flooding from rivers and inland water courses is less significant than possible inundation from the sea. Accordingly, studies have placed an emphasis on the latter.

6.2 Current Issues Main Flood Risks

6.2.1 The National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government in March 2012 requires Local Planning Authorities to apply a risk-based approach to the preparation of their development plans in respect of potential flooding. In simple terms, the NPPF requires local planning authorities 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 risk, the NPPF requires the Council to demonstrate that there are sustainable mitigation solutions available that will ensure that the risk to property and life is minimised (throughout the lifetime of the development) should flooding occur.

6.2.2 The Sequential Test provides clear guidance as to how this should be achieved. In simple terms, the Sequential Test requires that the District is delineated into areas of 'low', 'medium' and 'high' risk, i.e. zones 1, 2 and 3. It then provides a list of suitable types of land use that should be permitted within each zone, depending upon the perceived vulnerability of the community that will be present day within that development.

6.2.3 The SFRA is the first step in this process and provides the building blocks upon which the Council's forward planning and development control decisions are made. One of the most pressing issues for Folkestone and Hythe District Council is the fact that such a large percentage of the district lies within Flood Zone 3.

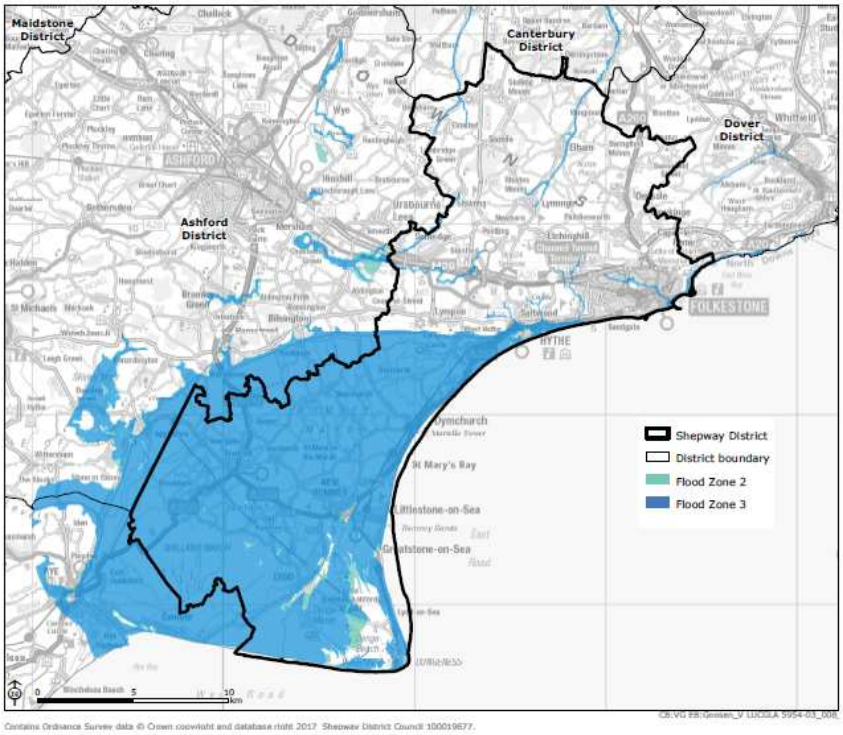
6.2.4 However, the vast coastal floodplains within the district that lie within Flood Zone 3 benefit from the protection provided by a diverse range of flood defence infrastructure. Before the completion of the original SFRA in 2009, the degree of risk across these areas was generally unquantified and, therefore, it was not possible for the Council to implement the primary objectives of the NPPF.

6.2.5 The key objectives of the revised SFRA are, therefore, to meet the following key requirements:

- To collate all known sources of flooding, including river, surface water (local drainage), sewers and groundwater, overland flows and infrastructure failure, that may affect existing and/or future development within the District
- To examine the impact of an extreme flooding event that exceeds the standard of protection provided by existing coastal flood defences
- To quantify the depth, velocity and other key parameters of flood events that result from overtopping or failure of the existing defences
- To map the outputs of this analysis in such a way as to provide clear and precise information at a scale that is appropriate to inform the planning process at both a strategic and site-based level

6.2.7 Flood Zones 2 and 3 cover the majority of the district, concentrated in the low-lying land of the south, but also relating to streams and rivers. This includes some densely-populated areas, as shown in Figure 6.2.

Figure 6.2. Flood Zone Map of Folkestone and Hythe District



6.2.3 These zones look at inherent risk. The extent of flood risk is based on a scenario in which no flood defences or other man-made obstructions to flood flows exist. The zones are very useful but often forming a starting point for management initiatives or the production of more tailored work on the specific nature of flood hazards in a local area.

6.2.4 Catchment Flood Management Plans (CFMP) are high-level strategic tools based around natural catchments. Through these documents the EA seeks to work with other decision-makers within a river catchment to identify and agree policies for sustainable flood risk management. In Shepway:

- The Stour CFMP includes the catchments of both the East Stour and the Pent Stream.
- The Rother CFMP covers the Romney, Walland and Denge Marsh areas, as well as the catchments of the watercourses in the Hythe and Seabrook areas.

6.2.5 The findings of the SFRA is not replicated here verbatim, but it is used to portray the contrasting human impacts of water on developed areas in the form of flooding, especially with reference to tidal flooding[11]

Table 6.1. Sources of flood events across Folkestone and Hythe district

Flooding source	Explanation	Key strategic development/ spatial implications	Past incidence in towns/villages
Coastal (tidal)	See below	Critical to pattern of development and influential over character of areas within the District.	High in Lydd, Littlestone, St Mary's Bay, Hythe, Sandgate.
Fluvial	From rivers and natural watercourses.	Awareness needed of localised risks to development.	In and around Folkestone/ Hythe, and Elham and Lyminge.
Ground-water	As water levels below the ground rise, typically in winter.	Awareness needed of geology and groundwater management (relationships with water supply, industry and land stability)	Low in general but does feature Lyminge for example.
Non-natural water-courses	From structures such as canals and purpose built flood storage areas (FSA)	Features that contribute to water flow management are important infrastructure which warrants monitoring. See later in this chapter.	The Royal Military Canal flooded in West Hythe in the winter of 2000/2001. The canal and front ditch filled up and flooded the

[11]Herrington Consulting Limited (2009) Strategic Risk Assessment, Shepway District Council, (2nd Draft), Shepway District Council, Accessed on line, Date accessed 03.02.11, Web site address http://consult.shepway.gov.uk/portal/core_strategy/core_strategy_po?tab=files

			gardens and some ground floor conservatories and at least one kitchen/garage. The potential for flooding remains at West Hythe, and the Mill Leese FSA (Saltwood) also qualifies.
Sewerage network	Limited capacity in the network of combined sewers dealing with both and wastewater flow and surface water.	Awareness of localised implications and context of achieving infrastructure (sewage network) improvements.	High in central urban Folkestone.
Surface-water	Direct flooding of overland areas in normally dry valley bottoms or where there are restrictions to runoff. Includes overland flows as culverts etc overwhelmed.	Issues for detailed development design in relation to the location of the development. The SFRA identifies the threat from surface water flooding across the District	Significant areas of Romney Marsh including around New Romney/ Littlestone and pockets in Folkestone, Hythe and Newingreen.

6.2.6 The SFRA shows flooding occurs in locations across the district and takes many forms, but the most extensive area at risk is Romney Marsh, where some coastal settlements hold potential to be subject to significant risk to lives and property through tidal flooding. Accordingly, the district is potentially vulnerable from several sources as summarised in Table 6.1. These may occur separately or in combination. A little more context on several sources is presented herein, as drawn from the Shepway Local Multi Agency Flood Plan (2014).

Tidal Flood Risk

6.2.7 Through overtopping of existing defences as a result of a severe storm surge in the North Sea, either in combination with high freshwater flows from upstream, or a surge alone, through a breach resulting either from a malicious act, accident or structural failure in existing defences (embankments and barriers), failure of a barrier to operate, either during a normal tidal sequence or a storm surge There are defended and undefended tidal floodplains of the Thames Estuary, Medway Estuary and East Kent Coast. These defences are maintained and owned by the Environment Agency or local council depending on the stretch of coastline.

Fluvial Flood Risk

6.2.8 The landscape of Kent is defined by its river systems. Fluvial flood risk within the Folkestone and Hythe District is influenced by the following watercourses:

- Brockhill Stream – The Brockhill Stream has a catchment of around 6 square kilometres and rises south of the M20 at Pedlinge. It flows through a relatively steep wooded valley and the Brockhill Country Park and is culverted in sections as it flows through Hythe and into the Royal Military Canal.
- Mill Lease and Saltwood Streams – The Mill Lease and Saltwood Streams join at Saltwood and eventually discharge into the Royal Military Canal. The streams rise north of Saltwood and are culverted beneath a disused railway embankment and by restricting their flows at this location using a hydrobrake, flows downstream are controlled to provide a 1 in 100 year standard of flood protection. The excess flow is stored in the natural valley upstream and dammed by the railway embankment. This is the Mill Lease Flood Storage Area (FSA) and is formally classified as a reservoir.
- Seabrook Stream – The source of the Seabrook Stream is located at the foot of hills at Arpinge, east of Etchinghill. Groundwater from the disused railway cutting flows through a pipeline and overland to a pond south of Etchinghill where it joins the Seabrook Stream. The stream flows through Frogholt and via culverts under the M20 and the railway and onto St. Martin's Plain. The watercourse then flows to the Mill Pond where it is culverted for a short length to Horn Street. From here it crosses under the Seabrook Road where it discharges into a silt trap before entering the Royal Military Canal.

Surface Water/Overland Flow Flood Risk

6.2.9 The urban centres of Folkestone and Hythe were identified as areas potentially at risk of local flooding within Kent County Council's Preliminary Flood Risk Assessment (2011). KCC subsequently commissioned the Folkestone and Hythe Stage 1 Surface Water Management Plan which was completed in November 2012. The study has determined what risks are present and has identified whether any further work or investigations are needed. Local flooding is defined by the Flood and Water Management Act (2010) as flooding from surface water runoff, groundwater and ordinary watercourses.

6.2.10 A large number of smaller watercourses persist within the county which can contribute to localised flooding. Significantly, these include the Brockhill, Mill Lease, Saltwood and Seabrook Streams all rising at the foot of the scarp of the Kent Downs and flowing into the Royal Military Canal. The Enbrook Stream and (now heavily modified) Pent Stream A, B, C and D have the same origin but flow into the English Channel and Folkestone Harbour respectively.

6.2.11 The Enbrook Stream catchment is relatively small with a total area of just over 1.5 square kilometres. The upper section of this steep sided catchment is now predominantly urban, with surface water from this developed area being discharged into the open channel section of the stream at the junction between Chichester Road and Enbrook Road. The stream is also fed by a tributary that flows alongside Military Road. The stream flows in a natural channel through the SAGA estate and into a culvert beneath Sandgate High Street. At this point the flow is split between two culverts, both of which discharge via a 600mm and 1200mm diameter outfall into the English Channel. The invert of these outfalls is set above mean high water and therefore under normal high tide conditions the

stream will not be tide-locked. However, there is potential for these outfalls to become tide-locked under extreme sea level conditions, as well as becoming partially blocked by shingle from the beach.

6.2.12 The River East Stour is one of the sources of the River Stour. The East Stour, 10.3 miles (16.5km) long rises on the Greensand ridge at Postling north of Hythe as a number of small streams. It then flows under the M20 motorway to continue in a westward direction to its confluence with the River Upper Great Stour at Ashford.

6.2.13 The Nailbourne rises as the East Brook at Etchinghill and becomes the Nailbourne at Lyminge and from here the river flows in a north-easterly direction through Elham and out of the District. The Nailbourne eventually joins the Little Stour and the Great Stour, flowing out to sea at Sandwich in Dover District.

6.2.14 Folkestone and Hythe have suffered from a number of flood events in recent years, the largest being the result of the action of a storm event on the Pent Stream catchment in August 1995 (estimated as 0.2% annual probability) which resulted in approximately 400 properties being flooded in Folkestone and Hythe. Flooding occurs from a combination of small local streams coming out of bank, overland flow and blockage of culverts and other structures. Due to the urban nature and steepness of the catchment, peak flows and velocities can be high.

Surface Water/Overland Flow / Groundwater Flood Risk

6.2.15 Surface Water/Overland Flow Flood Risk in the district - parts of the district, especially in the Folkestone and Hythe areas, have very steep topography and are heavily urbanised. In addition, in many places surface water is discharged into the streams that flow through these towns. These streams flow predominantly in culverts through these densely populated urban areas and historically these have become surcharged during extreme rainfall events. This has resulted in surface water flows in streets which has caused flooding in properties. There are also more rural areas within the district where surface water run-off from fields and gardens has caused flooding problems in the past.

6.2.16 Groundwater Flood Risk in Folkestone and Hythe District Area - inspection of the British Geological Society datasets shows that the district is located within a low risk area for groundwater flooding. However, this high level mapping does not take into account the more localised causes of groundwater flooding that can be associated with low-lying land that is drained by man-made watercourses. The recent drift deposits within the lower-lying parts of the district are typically marine alluviums and beach sands and gravels which all have the potential to convey groundwater.

6.2.17 On higher ground the extensive fissures within the chalk of the Kent Downs provide storage for groundwater, which is abstracted by Veolia Water Services UK to supply the local area with potable water. To the south of the M20 the geology is predominantly formed from the Folkestone and Sandgate Beds, which are overlain by Gault Clay. Groundwater is normally found at varying levels and in particular at the interface between the Folkestone and Sandgate Beds, which is a contributory cause of the landslips that have occurred in this area in the past. Canals, such as the Royal Military Canal, are the responsibility of British Waterways.

6.2.18 The Folkestone and Hythe SWMP asserts that it is difficult to ascertain one source or "cause" of flooding, especially in Folkestone, where events can be caused by a

combination of pluvial, fluvial (Pent Stream) and / or overloaded drainage and sewerage systems. This is why partnership involvement between all Risk Management Authorities (RMAs) is key to managing flood risk within Folkestone and Hythe.

6.2.19 The Folkestone and Hythe Stage 1 SWMP report includes an Action Plan which is updated annually and identifies individual actions to address different flood incidents and those responsible for implementing each action. The Action Plan was agreed between key partners.

6.2.20 Both the Shepway District Flood Risk Assessment (2014) and Shepway District Stage 1 Surface Water Management Plan (2013) should be used to support the consideration of planning applications, where appropriate.

6.3 Future Impacts and Management Main Flood Risks

6.3.1 Given the scale of potential tidal flood risks in the district, the SFRA undertook detailed modelling to give a more detailed picture of hazards, and areas of relatively limited risk. This information is complementary to (rather than seeking to replace) the defined flood zones. However, it arguably provides slightly more fine-grained and practical information, with recognition of local factors.

6.3.2 The SFRA (2015) modelling included:

- breach of defences analysis – Herrington Consulting, the council's engineers and officers from the EA identified 7 locations from which to assess the impact of a potential breach, which is a reduction on the 12 locations identified in the 2009 SFRA study. These locations were chosen on the basis of defence type, condition, exposure and the likely consequences of a breach.
- wave overtopping - during extreme storm conditions the combination of high water levels and large waves can result in significant volumes of water overtopping the seawalls. Peak wave overtopping volumes were calculated using joint probability wave and water level data for the identified overtopping locations at Hythe, Hythe Ranges, Dymchurch, St Mary's Bay and Littlestone.
- Combined events - a pragmatic and precautious approach has been adopted based on two dominant storm sectors. Shepway's shoreline has two predominant orientations; south facing and east facing, and therefore when one shoreline is subject to an incident storm, the other will benefit from the relative shelter provided by the other
- combined failures - discussions between the consultants, council's engineers and the EA developed a matrix of events, which presented a worst case scenario.

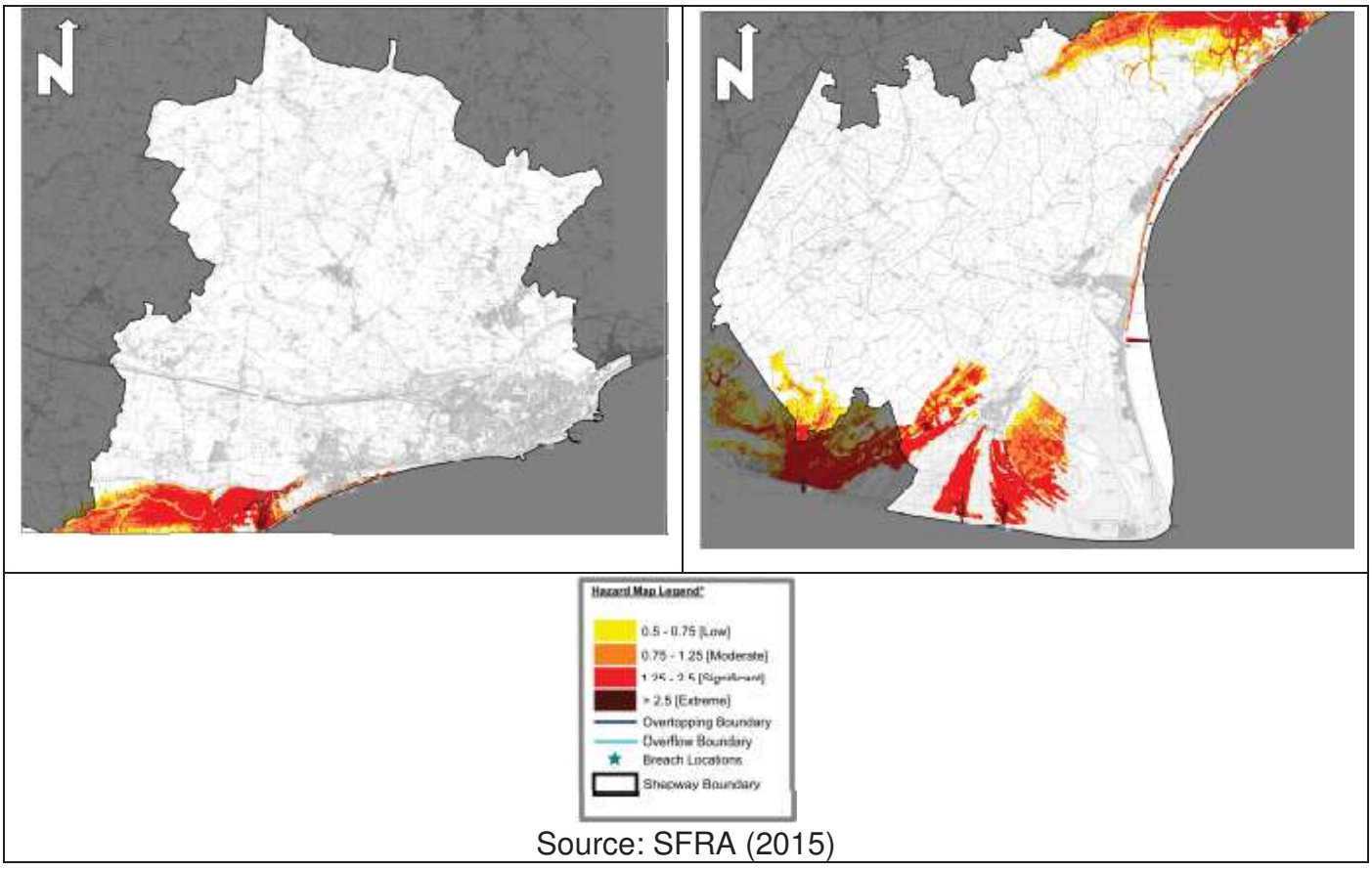
6.3.3 Modelling of events was achieved using a complex computer software package that evaluated the impact of flooding in relation to the criteria that had been developed. The hazard presented by flooding was calculated using an equation that considered the depth and velocity of flooding and the danger caused by debris. The categories presented in Table 6.2 were developed.

Table 6.2. Strategic Flood Risk Assessment Hazard Mapping in the district

Hazard rating	Colour on mapping	Description
Low (< 0.75)	Yellow	Caution – shallow flowing water or deep standing water
Moderate (0.75 to 1.25)	Orange	Dangerous for some, i.e. children – deep or fast flowing water
Significant (1.25 to 2.5)	Red	Dangerous for most people – deep fast flowing water
Extreme (> 2.5)	Dark (red)	Dangerous for all – extreme danger with deep and fast flowing water

6.3.4 These categories were applied to the District using the existing climatic conditions; a second data set was prepared for flood risk with the impact of climate change. Both of these scenarios are represented geographically on two sets of maps that are contained with the evidence base that the council is collating for the Core Strategy. They can be viewed at: http://consult.shepway.gov.uk/portal/core_strategy/core_strategy_po?tab=files

Figure 6.3. Folkestone and Hythe district flood hazard map



Source: SFRA (2015)

6.3.6 As reported in the SFRA (2015), one of the primary objectives of the SFRA is to refine the quality of flood risk information available to decision makers so that planning decisions can be better informed. Without detailed analysis of flood risk, the only available information is the Environment Agency's Flood Zone mapping. However, this is far too coarse and does not recognise the presence of existing flood defences. Consequently, as part of the SFRA, detailed hydraulic modelling has been undertaken to analyse the risk of

flooding and quantify the impacts of flood events that may occur as a result of a breach or overtopping of the sea defences.

6.3.7 The SFRA acknowledges that through discussion with Shepway's Engineering team, seven locations for potential breaches in the flood defences have been identified. These locations were chosen on the basis of defence type, condition, exposure and the likely consequences of a breach and have been reduced from the original 12 breaches identified during the original SFRA. This reduction represents the improvements made to the defence infrastructure during this period.

6.3.8 As part of the SFRA assessment at each breach location the specific characteristics of the defence structure and immediate hinterland have been examined. This information was then used to determine the size and nature of the breach used in the model.

6.3.9 As a result of tidal flood hazards, plus the potential for flooding from a range of other sources, the SFRA set out eight important policy recommendations. These cover flooding (for example avoiding new residential allocations or infill development in the Extreme hazard areas) and associated issues such as waves overtopping seawalls. The recommendations are split equally between guiding the location of development and controlling the design/construction of development, but two recommendations in particular are noteworthy to this study:

- *"To help reduce the rate and volume of surface water runoff and to improve the quality of the water passed on to watercourses, new development should incorporate the principles of SuDS in its drainage design wherever practically achievable.*
- *To ensure that any new development does not have an adverse impact on drinking water resources. This can be achieved through the reference to the Source Protection Zone maps published by the EA and by encouraging the use of rainwater harvesting and grey water recycling systems."*

6.3.10 This endorses recommendations of this report in previous chapters.

6.3.11 The two recommendations both highlight the importance of sustainable construction measures in the design of new developments through the water cycle. More efficient management of water resources at the point of collection can achieve reduced demand, but also bring beneficial flood management results, for example, by smoothing out 'surges to the system' from the increase in high intensity rainfall events anticipated with climate change.

6.3.12 The Environment Agency, in commenting on the draft versions of the Water Cycle Study, has helpfully provided guidance on Natural Flood Management (NFM), which is when natural processes are used to reduce the risk of flooding and coastal erosion. Examples include: slowing the flow in upland areas by restoring / recreating natural barriers, restoring bends in rivers, changing the way land is managed so soil can absorb more water, re-connecting rivers to their floodplains, and creating saltmarshes on the coast to absorb wave energy.

6.3.13 Working with natural processes (WWNP) to reduce flood risk is not a new concept. Natural flood management works best when a 'Catchment-Based-Approach' (CBA) is taken, where a plan is developed to manage the flow of water along the whole length of a river catchment from its source to sea. This way, natural processes can be used upstream

and on the coast to compliment engineered flood defences – such as walls – in urban centres.

6.3.14 Natural flood management not only reduces flood risk it can also achieve multiple benefits for people and wildlife, helping restore habitats, improving water quality, recharging aquifers and helping make catchments more resilient to the impacts of climate change.

6.4 Current Issues Coastline Management

6.4.1 Coastal management is dealt with through a variety of bodies and documents, and this report integrates their findings in relation to the district's coast and seeks to inform spatial planning decisions that arise as a result.

6.4.2 The starting point for examining the coast is the Shoreline Management Plan (SMP), and its associated documents. Whilst the SMP is not a statutory planning document, it does set policy for the management of the shoreline over the next 100 years. Consequently, the SMP is an important document when appraising shoreline management options and the risk of coastal flooding on a regional and local scale. The South Foreland to Beachy Head SMP, along with its recommended management policies, was adopted by the District Council in 2006.

6.4.3 The shoreline management policies stem from government options for coastal change of:

- *Hold the line*
- *Advance the line*
- *Managed realignment*
- *No active* intervention

6.4.4 The SMP achieved recommendations by breaking up the 105km stretch of coast into twenty-seven individual stretches called 'management units'. Shepway's long coastline includes around one third of the management units, reflecting its urban and rural diversity and range of coastal processes.

6.4.5 The National Planning Policy Framework (NPPF) is the official document that regulates the assessment of flood risks and their appropriate mitigations to the planning process. PPS25 Policy in relation to Flood Risk and Development has been superseded by the NPPF. However, it is evident that the NPPF and the supplementary Technical Guidance Note retains the key areas of PPS25 and reinforces Flood Risk as a material planning consideration on all development proposals.

6.4.6 Although the principal policy areas are unaltered, there are some differences to be aware of:

- Under PPS25 one aspect of the Exception Test was to prove the site to be previously developed brownfield. NPPF removes this requirement and opens up the possibility of satisfying the Exception Test on greenfield land.
- Previously in PPS25, the use of SuDS was embedded in the policy in great detail. The NPPF gives priority to use of SuDS in line with the general theme of a presumption in favour of sustainable development.

6.4.7 However, the new legislation is far less prescriptive as the design and implementation of SuDS on new developments will become the responsibility of local SuDS Approval Bodies (SABs).

6.5 Future Impacts and Management Coastline Management

6.5.1 SMPs can fulfil a similar role to that of a SFRA, in that they provide the means of identifying the risks for a local area and proposals on how to manage them. In contrast to SFRA which influences development location and design inter-alia, the SMP primarily guides the planning of public investment and coastal infrastructure in terms of flood defence. This report refers directly to the SMP to these ends, but considers the document in light of subsequent activity and shoreline management policies.

6.5.2 Planning coastal defence in a genuinely sustainable manner requires a long term view to be taken. This suggests that allowing adjustments to take place to a more natural shoreline should be considered. Existing development and commitments to future development mean that opportunities to pursue this objective may be limited, and the Shoreline Management Plan identifies several management units where, in the longer term, realignment of the coast might be considered.

6.5.3 The outcomes of the current SMP for each shoreline local 'management unit' are outlined in Table 6.3. Further context is provided in Figure 6.4 and the supporting text.

Table 6.3. Shoreline Management Plan Units

Management unit	Location	SMP Policy: 2006-2025 & 2026-2055
Folkestone Warren	Easternmost Shepway coastline	'Hold the line'
Copt Point		'No active intervention'
Folkestone and Sandgate		'Hold the line'
Sandgate to Hythe		
Hythe Ranges		
Dymchurch Redoubt to Romney Sands		
Romney Sands to Dungeness Power Station		
Dungeness Power Station		
Lydd Ranges	Westernmost Shepway coastline	'Managed realignment'

6.5.5 The time horizon for this study is for the plan period of the Core Strategy Review to 2037 and, therefore, is relatively long-term. In comparison, the SMP has a forward time trajectory for the next century, although in order to remain relevant only the SMP policies for 2006-2025 and 2026-2055 are presented here, noting that the recommendations are the same for both periods for 2006-2025 and 2026 – 2055.

6.5.6 As drawn from the Folkestone to Cliff End flood and erosion management strategy:

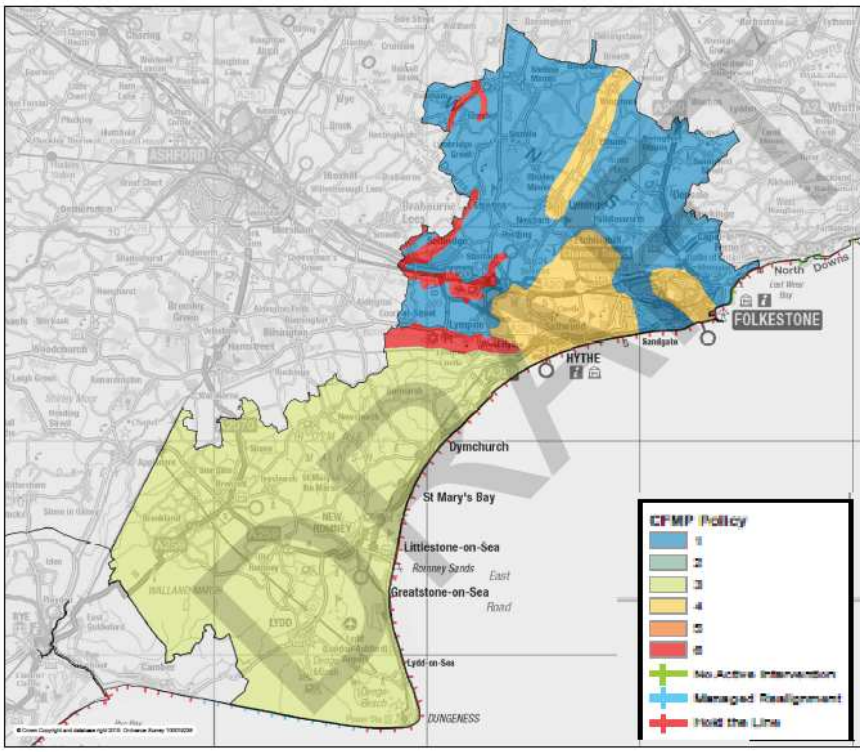
> *"For many frontages our final option is to hold the line by improving or sustaining the current standard of defence against flood and erosion. In other parts of the strategy area where existing defences provide a good standard of protection, less work is needed.*

The options were finalised after widespread consultation and review by local authorities, and the Environment Agency. Now that they are approved, the schemes will need to qualify for national funding.

They will be ranked against other nationally submitted proposals for flood and erosion risk management and funding will be allocated on a priority basis. We want communities to help in the design of flood risk management schemes to maximise the local benefits and we will seek feedback again when we are in a position to develop the options further."

6.5.7 Folkestone and Hythe lies within the Rother and Romney Catchment Flood Management Plan area. The policy map is presented in Figure 6.4.

Figure 6.4. Catchment Flood Management Plan & Shoreline Management Plan policies



Source: Flood Risk to Communities Shepway, Kent County Council (June 2017)

6.5.8 An explanation of what each of the 6 policies mean is provided below:

- Policy 1: Areas of little or no flood risk. The situation will continue to be monitored.
- Policy 2: Areas of low to moderate flood risk where the existing flood risk management actions can be generally reduced.
- Policy 3: Areas of low to moderate flood risk where the existing flood risk is generally being managed effectively.
- Policy 4: Areas of low, moderate or high flood risk where the existing flood risk is already being effectively managed, but where further actions may be needed to keep pace with climate change.
- Policy 5: Areas of moderate to high flood risk where further action can be taken to reduce flood risk.

- Policy 6: Areas of low to moderate flood risk where further action will be taken to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.
- 'Hold the line': Maintain or improve the existing standard of protection
- 'No active intervention': There is no planned investment in defending against flooding or erosion, whether or not an artificial defence has existed previously.
- 'Managed Realignment': Allowing the shoreline to move naturally, but managing the process to direct it in certain areas. This is usually done in low-lying areas, but may occasionally apply to cliffs.

6.5.8. The SMPs considerations can perhaps be seen as aiming predominantly to ensure a 'stable' coastline in terms of its current delineation.

6.5.9 Before the SMP is reviewed again, a South Foreland to Beachy Head Action Plan[12] has been prepared. The Action Plan has aims including:

- facilitating implementation of the SMP policies;
- identifying and/or promoting studies to further/improve understanding where this is required to resolve policy and/or implementation;
- promoting use of the SMP recommendations in spatial planning;
- initiating a future SMP review.

6.5.10 The Action Plan is important in confirming the way forward for coastal management. It highlights specific actions for spatial planning, including noting responsible parties, and the significant ones of which are noted below:

Table 6.4. SMP Action Plan

Action	Responsibility	How addressed in this Report
Adoption of preferred policy 'risk zones' as development planning consideration. High priority.	Local Authority and EA Planning Officers	The SFRA provides the means by which to assess areas at particular risk of flooding for the present day and with the affects of climate change. This document develops Environment Agency data and work on this subject would be undertaken in association with the Environment Agency.
Promote the development of planning policies to address potential housing stock losses through implementation of 'realignment' and 'no active intervention' policies	Local Authority and EA Planning Officers	This is not applicable to Shepway's planning policies that allocate growth. No housing stock losses are expected and the capital expenditure to be brought forward by the EA is for scheme improvements that will protect current (and future) housing stock

[12] http://www.se-coastalgroup.org.uk/main.cfm?objectid=117

Assess the strategic requirement for habitat creation as a result of implementing the short, medium and long term policies on European sites.	Local Authorities, Natural England, and EA.	Natural England is currently reviewing the boundaries of the SPA on Dungeness and investigating the establishment of a Ramsar site at Dungeness/Romney Marsh. If validated these changes will have a significant impact on the responsibilities for the council and the management of the area. At the time of writing this document the council has engaged Jacobs as a consultant to assess Natural England's proposal for the extended SPA and Ramsar and review the implications for the council. This consultation was completed and in 2016 Defra confirmed the SPA and Ramsar sites.
Investigate possible locations for habitat creation. This should be done in conjunction with Local Plan development allocations, catchment management plans and flood management strategies.	Natural England, EA and Local Authorities.	

6.5.11 The SMP Action Plan document sits beneath the SMP and makes recommendations for implementing flood and coastal erosion risk management schemes. The recommended strategic options include a number of large capital schemes within the District that are planned for construction within the next 10 years.

6.5.12 Information on those planned (and recently completed) capital schemes have been sourced from the *'Folkestone to Cliff End flood and erosion management strategy – a guide for local communities'* report prepared by the Environment Agency in 2008. The planned improvements to be carried out/recently carried out by the EA are summarised below:

- **Lydd Ranges (2008 entry):** proposals to IMPROVE the defences by reinforcing the Green Wall and placing shingle on the beach. This will increase the standard of defence to the hinterland. A series of timber groynes will be constructed at the western end to stabilise the beach and prevent it eroding back to the Green Wall. It is intended that features of the Dungeness SAC affected by the proposed works will be recreated or restored locally. The precise alignment and the timing of construction will be confirmed following detailed assessment. It is envisaged that works will be complete by 2020.
  2018 update: the Environment Agency has confirmed that funding for the capital has been secured from Grant in Aid monies
- **Greatstone to Romney Sands (2008 entry):** proposals to IMPROVE the defences by erecting fencing to protect the dunes and adding shingle to the beach at Romney Sands. This will increase the standard of defence against flooding.
  2018 update: Folkestone and Hythe DC own and are responsible for a 2km long sand dune system at Greatstone. This backs a popular tourist beach so the dunes are eroded by people accessing the beach. They carry out works valued at approximately £5,000 every year to provide and maintain fencing to minimise disturbance to marram grass and other dune vegetation, plant new

marram grass to help the dunes to grow, remove unwanted intrusive vegetation and maintain paths to encourage people away from the vegetated part of the dunes.

- **St Mary's Bay (2008 entry):** proposals to IMPROVE the defences at the end of their design life to mitigate against predicted sea level rise. We would do this by carrying out works to the seawall if necessary and adding further shingle to the beach.
  2018 update: a new seawall was completed in 2011.
- **High Knocke to Dymchurch (2008 entry):** the defences here are considered in two sections. Section A from the south of Dymchurch to the Martello Tower is defended by a sloping concrete revetment and a low seawall. The defences at Section B from the Martello tower to the Dymchurch Redoubt have been IMPROVED and consist of a rock revetment and new seawall. Following completion of the works at Section B the EA is to IMPROVE Section A by strengthening and raising the seawall and replacing groynes.
  2018 update: the High Knocke to Dymchurch Redoubt coastal defences on the southern Kent coast between Folkestone and Dungeness was completed in June 2011. Works were split into two frontages: Frontage A - High Knocke to Dymchurch and Frontage B - Grand Redoubt to Dymchurch. Frontage B was completed spring 2008. Works on Frontage A started February 2009 and were completed ahead of schedule in spring 2011. Together, these two schemes protect approximately 4.5km of sea frontage. Total cost of both frontages approximately £60 million
- **Hythe Ranges (2008 entry):** proposals to IMPROVE the defences. This will reduce the risk of flooding to the MoD range and properties in the low lying hinterland, including the Romney and Walland Marshes.
- **2018 update:** the Environment Agency has confirmed that funding for the capital has been secured from Grant in Aid monies
- **Hythe to Folkestone Harbour (2008 entry):** the defences along this section have recently been improved by Folkestone and Hythe District Council as part of the Hythe to Folkestone Harbour Coast Protection Scheme. The seawalls were improved and a number of rock structures were constructed. Shingle was added to the beach and annual recycling distributes the material to where it is needed. The defences here have a design life of 50 years.
  2018 update: Following the completion of the 2008 to 2014 works, it will be necessary to continue with beach management between Hythe and Folkestone in order to comply with the requirements of the Strategy and the policy of Hold the Line (Sustain) for this frontage.

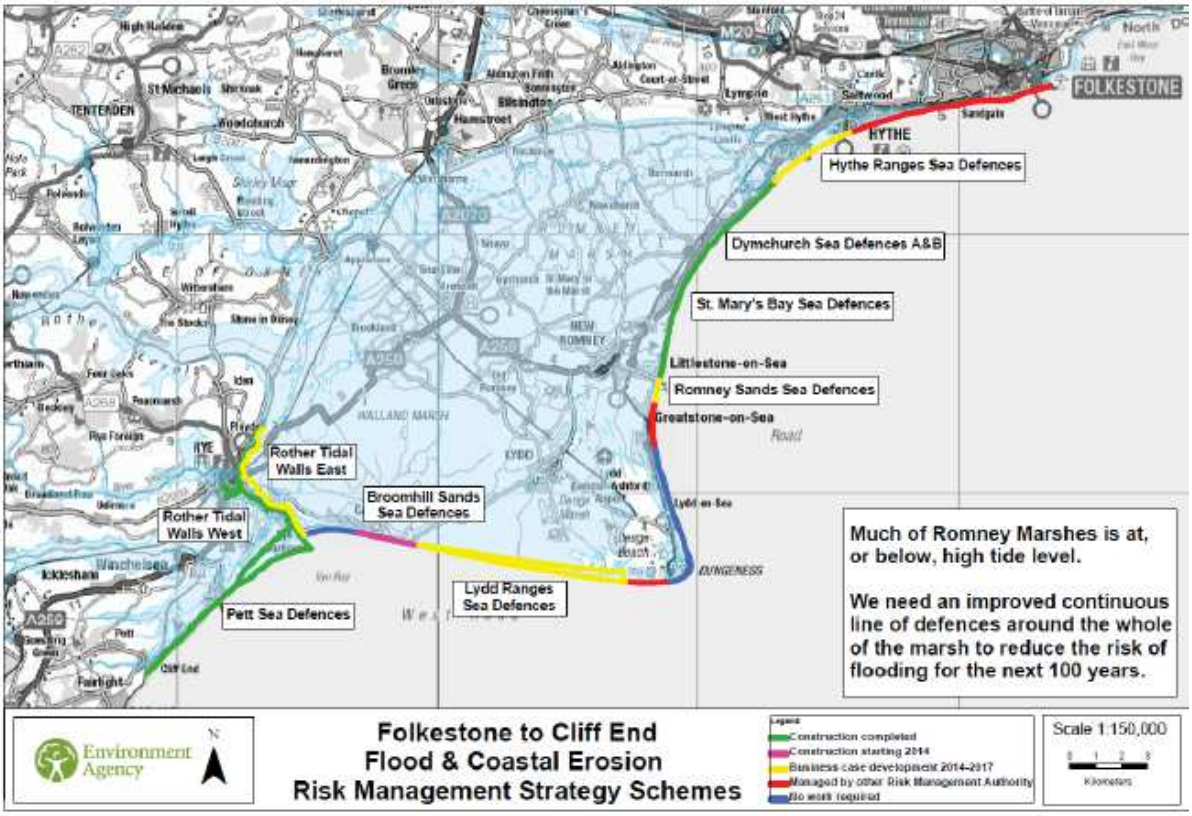
6.5.13 The Folkestone to Cliff End Strategy Newsletter dated February 2015 provides a very useful update on those capital schemes referenced within the 'Folkestone to Cliff End flood and erosion management strategy. Progress is shown figuratively on Figure 6.5 supplemented by accompanying text.

6.5.14 The Environment Agency has already completed several projects around the marsh at a value of £100 million (coloured green on Figure 6.5). These include new defences on the western bank of the tidal River Rother (2006), and a new seawall at Dymchurch (2011). But to ensure the entire marsh is protected from tidal flooding, five further schemes need to be constructed.

6.5.15 As reported in the 2014 update, at the time of writing the Environment Agency was in the process of building the £30million Broomhill Sands Coastal Defences (the pink line

on Figure 6.5) between Camber and Jury's Gap. This scheme was completed in winter 2015. For the four remaining projects (coloured yellow) the Environment Agency were developing business cases to determine the most effective way to construct the new defences. The four projects are located at Lydd Ranges, Hythe Ranges, Romney Sands (Greatstone) and the eastern bank of the tidal River Rother, and their construction is likely to cost around £100million.

Figure 6.5. Folkestone to Cliff End Flood and Coastal Erosion Risk Management Strategy Schemes (2014 update)



6.5.16 To elaborate further on the EA Business Case process, in order to gain funding to construct the schemes the EA must demonstrate the reduction in flood risk that they will provide, how the defences could be constructed and how the EA will make best use of public money. This is set out in the business cases.

6.5.17 The EA also investigate the environmental impact of the new schemes, and how we could mitigate it. We will look at the construction materials and where these can be sourced from, and how the EA can improve the amenity, environment and aesthetics of the existing coastal defences.

6.5.18 Due to the complexity and scale of the projects, the EA identified that the preparation of the Business Cases would take approximately 3 years. Once these are complete, the EA will then move to the design and construction phase, and seek planning permission for the Lydd Ranges and Rother Tidal Walls East schemes. In 2014 the EA's indicative funding programme shows construction planned for between 2018 and 2022 for all the remaining projects. However, future funding is allocated each year and projects are prioritised nationally based on the reduction in flood risk they provide, and how much external funding they have sourced.

6.6 Current Issues Priority Coastal Environments

6.6.1 Whilst previous chapters have focused on the impact of day-to-day human life on the hydrological cycle, the water we use and waste we create, which predominantly non-urbanised areas, are clearly important to the approach of this report and examination of natural systems. To this end, this section takes forward the linear analysis of the rural coast (Shepway's central and southern coastline) by taking forward the identified issue in section 2.5 of coastal nature conservation and the distinct character of semi-natural marine environments.

6.6.2 This closer investigation shows that development is not a continuous strip along the coast, the communities either forming discrete settlements or developments broken up, or not lying on the immediate coastline.

6.6.3 Post-war housing characterises much of the coastal route, and some developments have occurred outside of recognisable settlements. However, evaluation reveals this environment is less prevalent along the coastline itself, with the 'more hidden' coastline at Lydd Ranges and Dungeness being more significant (or a strip of housing just set back, as at Lydd-on-Sea). At the southern end, before Dungeness point, the built form is reduced to a strip a single dwelling in depth, fronting onto the coastal road and wide tidal beach, as the following aerial photo reveals:

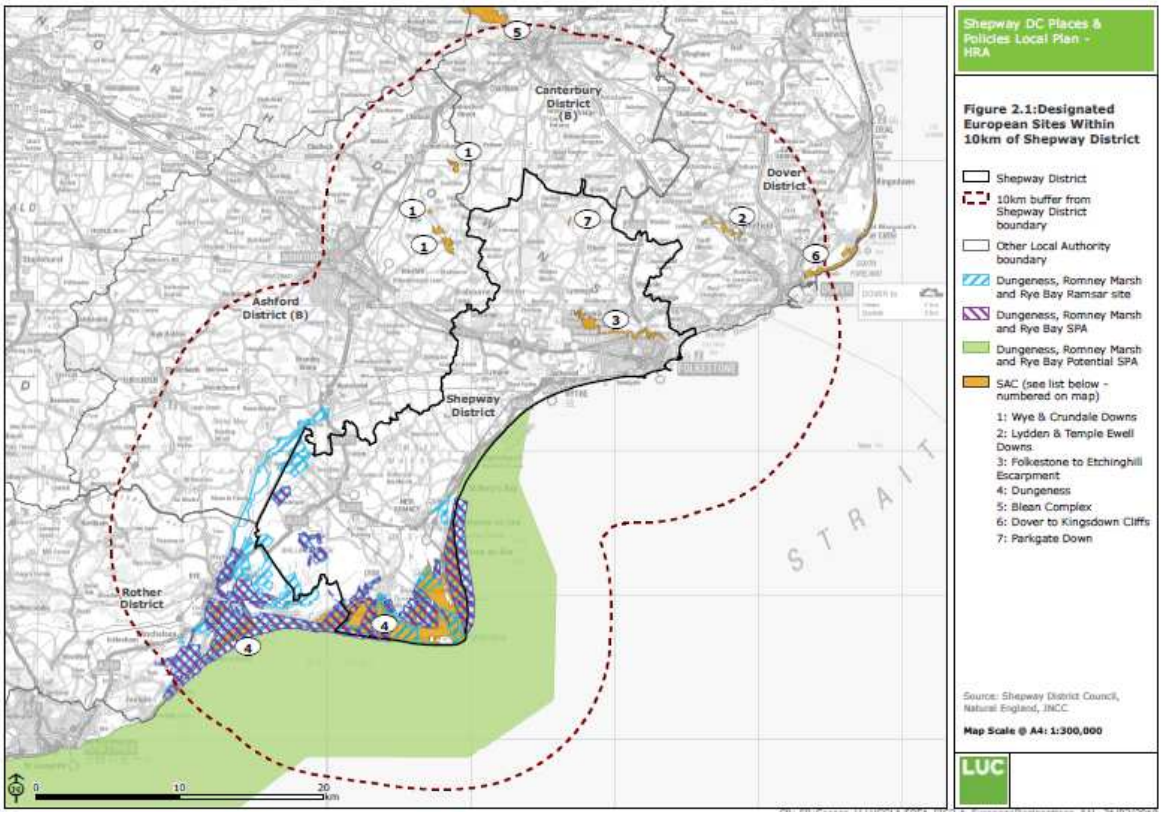
Figure 6.6. Typical coastal development Dungeness

6.6.5 The clear majority is of scientific or landscape interest and covered by a wide range of designations, which sometimes have similar objectives. This includes an extensive nature designation at Hythe Ranges (nearly 2km) but is predominantly in relation to the multiple features at Dungeness. The geography of the District is increasingly complex and interesting at this southern point of the District, perhaps reflecting that, in Romney Marsh in general, many environmental features distinctive across the area derive from its water-related and coastal origins.

6.7 Dungeness, Romney Marsh and Rye Bay SPA and Ramsar Appropriate Assessment

6.7.1 The Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site are located in the southern part of Shepway. Much of the site extends into the adjacent Rother District boundary. The qualifying features of the SPA relate to a variety of wetland bird species while the Ramsar site is designated for its bird assemblage, populations of mute swan, shoveler and aquatic warbler, in addition to wetland habitats, bryophytes including thread moss, vascular plants including greater water parsnip, water vole, great crested newt, medicinal leech and a ground beetle, also the marsh mallow moth and a lagoon snail.

Figure 6.7. Ecologically Sensitive Areas



Source: Shepway District Core Strategy Review Habitats Regulations Assessment

6.7.2 The SPA and Ramsar site are considered together within the Habitat Regulations Assessment (HRA) report undertaken by Land Use Consultants (LUC), as many of their qualifying features are similar (birds) and/or rely on the same habitats and are susceptible to the same pressures. Where different conclusions are reached in relation to the SPA and the Ramsar site this is made clear in the relevant sections of the Appropriate Assessment within the HRA.

6.7.3 In respect of water quantity and quality the HRA asserts:

> *"An increase in demand for water abstraction and treatment resulting from the growth could result in changes in hydrology at European sites, specifically a decrease in water quality or changes to water levels. Depending on the qualifying features and particular vulnerabilities of the European sites, there could be a likely significant effect on site integrity."*

6.7.4 The HRA continues:

> *"The following sites have been screened out from impacts associated with changes in water quantity and quality because they do not have hydrological connectivity with the proposed allocations and are designated for features (e.g. dry grasslands) which are of low sensitivity to increased water abstraction and treatment associated with the PPLP:*
>
> - *Blean Complex SAC*
> - *Dover to Kingsdown Cliffs SAC*
> - *Folkestone to Etchinghill Escarpment SAC*
> - *Lydden and Temple Ewell Downs SAC*
> - *Parkgate Down SAC*
> - *Wye and Crundale Downs SAC"*

6.7.5 Lastly, the HRA recognises that the Dungeness SAC, SPA and Ramsar sites are more susceptible to changes in water quantity and quality when compared to other European designated sites:

> *"The Dungeness SAC, SPA and Ramsar sites are designated for features which are susceptible to changes in water quantity and quality and have hydrological connectivity with allocations specified within the Plan. As a result, the potential for likely significant effects associated with hydrological changes will be considered for the Dungeness sites only."*

6.7.6 In respect of recreational pressure in the context of planned growth, the HRA confirms that:

> *"Recreational pressure has been identified as a key threat to Dungeness SPA/Ramsar and significant effects associated with increases in local housing and subsequent potential increases in visitation to the site could not be ruled out at the Screening Stage."*

6.7.7 Having appraised the implications of growth proposed to be allocated within the PPLP in terms of the impact of recreational pressures on the SPA and Ramsar sites the HRA concludes as follows:

> *"Providing the Council adopts the flexible, strategic and pro-active approach described above, successfully implements the recommendations of the SAS, and ensures that the mitigation policies in the plan are successfully implemented, the Folkestone and Hythe PPLP will not result in adverse effects on the integrity of the Dungeness, Romney March and Rye Bay SPA/Ramsar as a result of recreational pressure, either alone or in-combination with other plans and projects."*

6.8 Summary of Chapter Findings

6.8.1 To both manage flood risk (from tidal and other sources) and to better manage increasingly pressurised water demand/supply balance in Shepway, all the recommendations of the SFRA on development location and design are fully supported in emerging Local Plan documents.

6.8.2 The evaluation of the SMP and all associated documents and prospects for its implementation in Folkestone and Hythe reveals that coastal defence improvement measures will be central in managing flood risk to existing communities. Accordingly, future planning policy documents must plan for the sustainable delivery of public investment in coastal management, both in terms of infrastructure planning and ensuring factors such as coastal squeeze, are addressed.

6.8.3 The planning of coastal environments should include consideration of provisions to secure the status of further special marine or water sensitive habitats.

SECTION C – CONCLUSIONS

Section C defines the key aspects of the report that will be carried forward into policy. It also promotes a list of recommendations that will contribute to the sustainable use of water in the District in accordance with the local plan documents.

Chapter 7 CONCLUSIONS

7.1 Overview

7.1.1 This scoping and outline Water Cycle study has integrated a range of perspectives, issues and studies from topics across the water cycle. It provides a snapshot but also looks forward in relation to planning policy options.

7.1.2 This study has highlighted and drawn out the complex range of issues that relate to water and development within Shepway; nevertheless there are many ways that the report shows water management could be integrated further. This report's findings can be summarised around the following broad questions:

- Is there enough water to supply the development proposed without having an adverse affect on the environment?
- Can an increase in the volume of waste water be treated without having an adverse impact on the environment?
- Has sufficient consideration been given to flood risk?

7.1.3 Recommendations for the planning system, and especially the Council's emerging Local Plan documents must recognise the need to safeguard the District's water reserves, as considered by this report are summarised below:

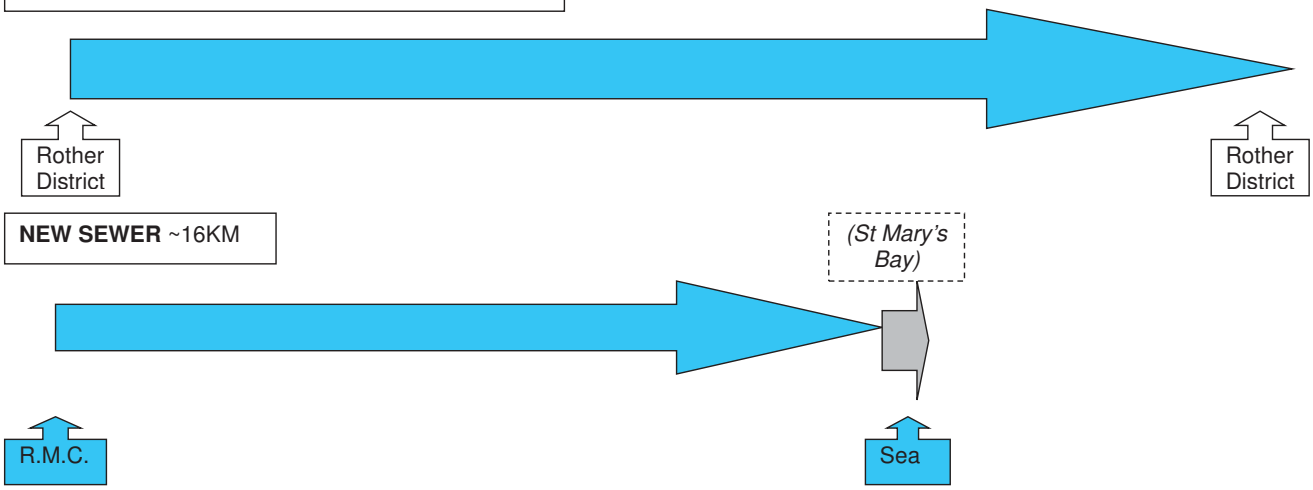
1. Reflecting an appropriate role for strategic planning in delivering WFD objectives
2. Maintaining and enhancing the integrity of groundwater, and ensure proper local wastewater connections are in place
3. Supporting the maintenance of water resources through multi-pronged demand management measures, such as appropriate increases in efficiency through setting development standards
4. Supporting, as practicable, water companies in promoting widespread water efficiency measures in Folkestone and Hythe for all users and sectors (including potential savings from existing stock, e.g. retro-fitting measures)
5. Ensuring planning provisions continue to help manage the demand on, and capacity of, strategic wastewater infrastructure
6. Continuing the current regime of shoreline management by implementing existing management proposals, supported by use of the SFRA in spatial planning to tackle the primary risk for coastal communities that of inundation by tidal flooding
7. Planning in advance to align the delivery of key strategic infrastructure and site allocations

APPENDIX 1: An indicative linear analysis of the main watercourses, illustrated to approximate scale (1cm=1km)

This process is a simplification that illustrates the relative importance of contrasting spatial development priorities along the longer watercourses in Shepway. This creates section lengths depending on whether inside or outside the Local Plan (2006) Proposal Map's definition of settlement boundaries (open countryside or not. This should be considered as an indicative overview not 'scientific'. An annotated example is included on the next page.

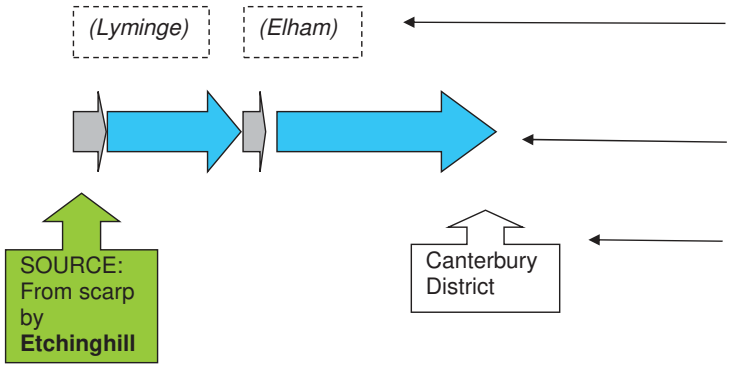
Although agreeing the primary route of watercourses is notoriously difficult (and has on occasions reached the heights of the Houses of Parliament in the past) this has been informed by Ordnance Survey mapping down to 1:25,000 scale. This evaluation does not cover secondary branches of watercourses, and certainly does not include all significant water features on Romney Marsh – being focused on two most recognisable waterways there. This arose from tracing the primary course of streams as defined by the *main watercourse* Folkestone and HytheGIS layer).

JURY'S GUT / WHITE KEMP SEWER ~23.8KM



NEW SEWER ~16KM

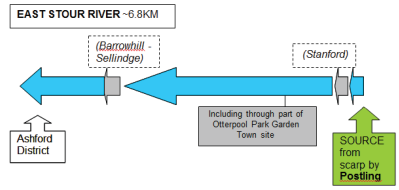
NAILBOURNE ~7.6KM

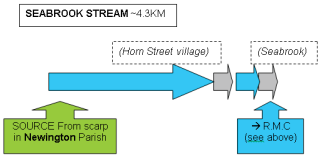


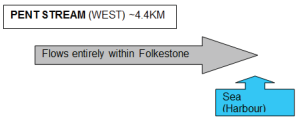
Annotated explanation of diagrams.
Features shown on this example include:

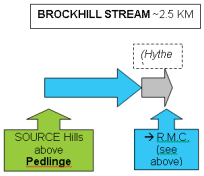
- *Settlements past through (grey sections)*
- *Urban sections (within/on Local Plan settlement boundary): shown blue. To approximate scale.*
- *Origin and outflow points. Natural source in Folkestone and Hythe shown green, outfall to sea in Folkestone and Hythe shown blue, and flow to/from land elsewhere (crosses Folkestone and Hythe boundary) shown clear.*

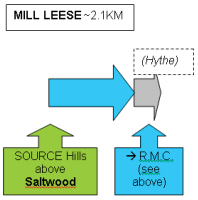
This linear depiction of the Nailbourne therefore shows it is one of the longer watercourses in Shepway, that it has two main urban and two main rural sections (flowing through Lyminge and Elham but mostly through open countryside), and that it originates near Etchinghill and flows on into Canterbury's+ area.


EAST STOUR RIVER ~6.8KM
(Barrowhill - Sellindge)
(Stanford)
Including through part of Otterpool Park Garden Town site
Ashford District
SOURCE from scarp by Postling


SEABROOK STREAM ~4.3KM
(Horn Street village)
(Seabrook)
SOURCE From scarp in Newington Parish
→ R.M.C (see above)


PENT STREAM (WEST) ~4.4KM
Flows entirely within Folkestone
Sea (Harbour)


BROCKHILL STREAM ~2.5 KM
(Hythe
SOURCE Hills above Pedlinge
→ R.M.C. (see above)


MILL LEESE ~2.1KM
(Hythe)
SOURCE Hills above Saltwood
→ R.M.C. (see above)

Appendix 2. Current status of water bodies for both surface water and groundwater bodies within the Folkestone and Hythe District

Water body classification for East Kent Chalk – Stour

Water body classification

Select year: 2009 Cycle 1 Select year: 2016 Cycle 2

	2009 Cycle 1	2016 Cycle 2	Objectives
Overall Water Body	Poor	Poor	Poor by 2015
Quantitative	Poor	Poor	Poor by 2015
Chemical (GW)	Poor	Poor	Good by 2027

Linked protected areas

Bathing Water Directive	Conservation of Wild Birds Directive	Drinking Water Protected Area	Freshwater Fish Directive	GWDTE	Habitats and Species Directive	Nitrates Directive	Safeguard Zone	Shellfish Water Directive	Urban Waste Water Treatment Directive
No	No	Yes	No	No	No	Yes	No	No	No

List of protected areas

PA Name	ID	Directive	Type	More information
East Kent Chalk - Stour	UKGB40701G501500	Drinking Water Protected Area		
158	NVZ12GW011580	Nitrates Directive		
64	NVZ12GW010640	Nitrates Directive		
67	NVZ12GW010670	Nitrates Directive		

Download water body to protected area links data: CSV format

Water body classification for Kent Greensand Eastern

Water body classification

Select year: 2009 Cycle 1 Select year: 2016 Cycle 2

	2009 Cycle 1	2016 Cycle 2	Objectives
Overall Water Body	Poor	Poor	Good by 2027
Quantitative	Poor	Poor	Good by 2027
Chemical (GW)	Poor	Poor	Good by 2027

Linked protected areas

Bathing Water Directive	Conservation of Wild Birds Directive	Drinking Water Protected Area	Freshwater Fish Directive	GWDTE	Habitats and Species Directive	Nitrates Directive	Safeguard Zone	Shellfish Water Directive	Urban Waste Water Treatment Directive
No	No	Yes	No	No	No	Yes	No	No	No

List of protected areas

PA Name	ID	Directive	Type	More information
Kent Greensand Eastern	UKGB40701G501400	Drinking Water Protected Area		
64	NVZ12GW010640	Nitrates Directive		

Water body classification for Kent Romney Marsh

Water body classification

Select year: 2009 Cycle 1 Select year: 2016 Cycle 2

	2009 Cycle 1	2016 Cycle 2	Objectives
Overall Water Body	Poor	Poor	Good by 2027
Quantitative	Poor	Poor	Good by 2027
Chemical (GW)	Poor	Poor	Good by 2027

Linked protected areas

Bathing Water Directive	Conservation of Wild Birds Directive	Drinking Water Protected Area	Freshwater Fish Directive	GWDTE	Habitats and Species Directive	Nitrates Directive	Safeguard Zone	Shellfish Water Directive	Urban Waste Water Treatment Directive
No	No	Yes	No	No	No	No	No	No	No

List of protected areas

PA Name	ID	Directive	Type	More information
Kent Romney Marsh	UKGB40702G503900	Drinking Water Protected Area		