

Folkestone & Hythe Surface Water Management Plan - Stage 1

Final Report

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Purpose

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Abbreviations and Glossary of Terms

Term	Definition
CFMP	Catchment Flood Management Plan- A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
CIRIA	Construction Industry Research and Information Association
DA	Drainage Area
DBC	Dartford Borough Council
DEM	Digital Elevation Model
Drainage Area	Are defined for the purposes of this study using FMfSW (1 in 200 year (deep)), historic flooding records and policy areas as defined by Kent County Council
DTM	Digital Terrain Model
EA	Environment Agency
EU	European Union
Flood defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Flood Risk Area	An area determined as having a significant risk of flooding in accordance with guidance published by Defra and WAG (Welsh Assembly Government).
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.
Floods and Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Fluvial Flooding	Flooding resulting from water levels exceeding the bank level of a main river
FMfSW	Flood Map for Surface Water
GBC	Gravesham Borough Council
IDB	Internal Drainage Board
JBA	Jeremy Benn Associates
KCC	Kent County Council
LLFA	Lead Local Flood Authority - Local Authority responsible for taking the lead on local flood risk management
Local Flooding	Flooding from surface runoff, groundwater and ordinary watercourses
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers
NPPF	National Planning Policy Framework
NRD	National Receptor Dataset – a collection of risk receptors produced by the Environment Agency
Ordinary Watercourse	All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.
Pathway	The mechanism or method flood waters are directed to a location/ receptor.
PFRA	Preliminary Flood Risk Assessment
Receptor	The area at risk from receiving flood water
Risk	In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.
RMA	Risk Management Authorities
SAB	SUDS Approving Body - responsible for approving, adopting and maintaining drainage plans and SuDS schemes that meet the National Standards for sustainable drainage.
SDC	Sevenoaks District Council
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment - The Strategic Housing Land Availability Assessment (SHLAA) is a technical piece of evidence to support the Core Strategy and Sites & Policies Development Plan Documents (DPDs). Its

	purpose is to demonstrate that there is a supply of housing land in the District which is suitable and deliverable.
Source	Source of flooding i.e. heavy rainfall
Stakeholder	A person or organisation affected by the problem or solution, or interested in the problem or solution. They can be individuals or organisations, includes the public and communities.
SUDS	Sustainable Drainage Systems - Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques
Surface water flooding	Flooding as a result of surface water runoff as a result of high intensity rainfall when water is ponding or flowing over the ground surface before it enters the underground drainage network or watercourse, or cannot enter it because the network is full to capacity, thus causing what is known as pluvial flooding.
SW	Southern Water
SWMP	Surface Water Management Plan - The SWMP plan should outline the preferred surface water management strategy and identify the actions, timescales and responsibilities of each partner. It is the principal output from the SWMP study.

1 Introduction

1.1 What is a Surface Water Management Plan

A Surface Water Management Plan (SWMP) is a study to understand the flood risks that arises from local flooding, which is defined by the Flood and Water Management Act 2010 as flooding from surface runoff, groundwater, and ordinary watercourses.

SWMPs are led by a local partnership of flood risk management authorities who have responsibilities for aspects of local flooding, including the County Council, Local Authority, Sewerage Undertaker and other relevant authorities.

The purpose of a SWMP is to identify what the local flood risk issues are, the damage they cause and what options there may be to manage them. These options are presented in an Action Plan which lists the partners who are responsible for taking the options forward. Although the SWMP provides a full flood history for the study area which may include coastal and fluvial flood sources, the Action Plan only proposes measures to manage local flooding. The Action Plan is agreed by partners and reviewed periodically.

This SWMP is being undertaken by Kent County Council (KCC) in partnership with the Environment Agency, to investigate the local flood risks in Folkestone and Hythe as part of their new remit for strategic oversight of local flood risk management in Kent, conferred on them by the Flood and Water Management Act 2010. Folkestone and Hythe have been identified as areas potentially at risk of local flooding in the Preliminary Flood Risk Assessment¹, which KCC undertook in 2011 for the whole county of Kent. This SWMP will determine whether there are any local flood risks and what further work may be needed. To find out more about KCC's new role and other SWMPs they are undertaking please visit their website:

http://www.kent.gov.uk/environment_and_planning/flooding.aspx

1.2 Summary of aims and objectives

The main aims and objectives of the Folkestone and Hythe Stage 1 Surface Water Management Plan (SWMP) are detailed below.

1. The establishment of a local partnership;
2. The collation of a comprehensive flood history for all relevant local flood risk sources;
3. The identification, collation and mapping of all available flood data and its availability for future use including an assessment of the reliability of the data;
4. The identification, where possible from the available data, of flood prone areas;
5. The identification of areas where existing data may be missing or unreliable, as a consequence of inappropriate local assumptions, additional local features or any other reason, and options to improve our understanding;
6. The identification of areas where the risks originate from a combination of sources;
7. Identification of any proposed or allocated development sites and any impacts they may have on local flood risks;
8. The preparation of source pathway receptor models for all the risks and sources that are identified;
9. The suitability of SUDS in the area and the techniques that are appropriate, identifying regional variations where necessary;
10. The identification of any easy win opportunities that are apparent without further work, which may include planning policies or simple flood defence measures; and
11. A plan for further work that may be necessary to manage or better understand the risks identified, including the owner of the actions, the timeframe for undertaking them and indicative costs.

¹ Kent County Council (2011) Preliminary Flood Risk Assessment available at <http://publications.environment-agency.gov.uk/PDF/FLHO1211BVS1-E-E.pdf>
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1.3 Study area

Folkestone and Hythe are located in the south east of England within the Rother Romney Catchment and River Stour Catchment. The M20/A20 motorway between Sellindge and Capel-Ferne defines the northern boundary of the study area while the southern boundary is defined by the coastline between Dymchurch in the west and Folkestone in the East. Figure 1.1 shows the extent of the study area.

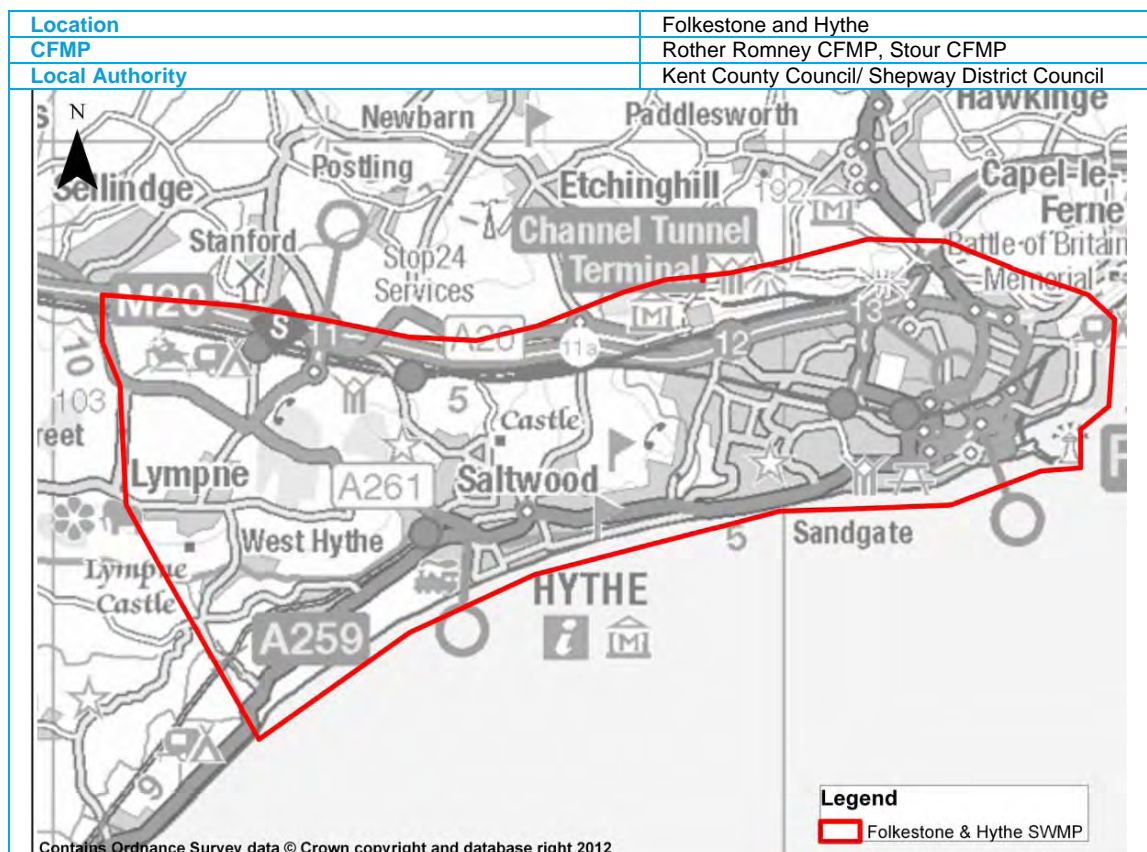


Figure 1.1 Study Area

1.3.1 Catchment Flood Management Plan (CFMP)

Folkestone and Hythe are located within the Romney Catchment and the Stour Catchment. Within any Catchment Flood Management Plan there are six standard flood risk management policies which can be applied to each policy unit:

- Policy 1 – No active intervention (including flood warning and maintenance). Continue to monitor and advice.
- Policy 2 – Reduce existing flood risk management actions (accepting that flood risk will increase over time).
- Policy 3 – Continue with existing or alternative actions to manage flood risk at the current level.
- Policy 4 – Take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change).
- Policy 5 – Take further action to reduce flood risk.
- Policy 6 – Take action to increase the frequency of flooding to deliver benefits locally or elsewhere (which may constitute an overall flood risk reduction, e.g. for habitat inundation).

The SWMP area falls within both the Romney and Rother and the Stour Catchment Flood Management Plans (CFMPs), both of which describe Folkestone and Hythe as a Policy Option 4; an area of low, moderate or high flood risk, where flood risk is already being managed effectively

but where further action may need to be taken in order to account for climate change in the future.

1.3.2 Surface Water

Surface water presents a risk throughout Folkestone and Hythe. When there are instances of heavy rainfall and water fails to infiltrate into the ground or enter the drainage system there is an increased risk of surface water flooding. Ponding generally occurs at low points in the topography. Historically there have been significant events attributed to surface water in Folkestone and Hythe; however the likelihood of flooding is dependent on not only the rate of runoff but also the condition of the surface water drainage system (surface water sewers, KCC Highway drains and gullies), and notably within Folkestone the interaction of the surface water system with the Pent Stream.

There are two sources of information available from the Environment Agency, relating to the identification of potential surface water flood risk in Folkestone and Hythe. These are:

- Areas Susceptible to Surface Water Flooding (ASfSWF) - Since July 2009, these maps have been available to Local Resilience Forums and Local Planning Authorities, and provided a starting point in understanding the broad areas where surface water flooding is likely to cause problems.
- Flood Maps for Surface Water (FMfSW) - these followed on from the ASfSWF maps and provide a more realistic representation than the ASfSWF maps in many circumstances. The Environment Agency considers this to be the national source of information².

For the purposes of this report we will be using the FMfSW datasets.

1.3.3 Watercourses

Main Rivers

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).

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.

Ordinary Watercourses

An Ordinary Watercourse is any watercourse which is not shown as a main river on the Environment Agency's Main River map. Main River's 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.

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.

² Environment Agency (2012) Flooding from Surface Water - available at <http://www.environment-agency.gov.uk/research/planning/109490.aspx>
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1.3.4 Sewers

Southern Water is responsible for the sewer network in this area. Data provided shows that there are various sewer types located within the study area:

- Combined
- Foul
- Treated effluent
- Surface Water

Records show that the sewers within the Folkestone and Hythe area are predominantly combined sewers.

Southern Water has a comprehensive model of the foul/combined public sewer network in Folkestone. There is also a model of the surface water sewer system located to the west of Downs Road which culminates in a 2.1m diameter tunnel discharging to the sea.

1.3.5 Land Use

The urban area covers approximately 50% of the study area with the remainder predominantly rural. The largest urban area is Folkestone to the south east, followed by Hythe in the west of the study area.

1.4 Using this report

Use Table 1-1 to find the information that you need.

Table 1-1 Report layout

Section	Description of contents
1. Introduction	This section defines objectives of the Stage 1 SWMP and describes the background of the study area.
2. Preparation	This section provides a summary of the key partners and consultation, data collected and a brief summary of the historic flooding collected. It introduces the source-pathway-receptor model and outlines how local sources of flood risk have been assessed.
3. Sustainable Drainage	Provides details on the suitability of SUDS within Folkestone and Hythe.
4. SWMP Action Plan	Provides details of the generic and location specific Action Plan and potential funding opportunities.

2 Preparation

2.1 Establishment of Local Partnership

Local flooding cannot be managed by a single authority or organisation. Instead, all the key partners and decision-makers must work together to plan and act to manage local flooding across Folkestone and Hythe. Many authorities and organisations have responsibilities for local flood risk management. Although Kent County Council has commissioned this project, the key partners have been consulted at appropriate stages in the study. Working in partnership encourages co-operation and enables all parties to make informed decisions and agree the most cost effective way of managing local flood risk across Folkestone and Hythe. The partnership process is also designed to encourage the development of innovative solutions and practices; and improve understanding of local flooding.

2.1.1 Key Partners

Partners are defined as authorities or organisations with responsibilities for decisions or actions that need to be taken to manage local flooding. The key partners involved in this project are:

- Kent County Council
- Kent County Council - Highways
- Shepway District Council
- Environment Agency
- Southern Water

The Stage 1 SWMP was undertaken to determine whether there are any local flood risks within Folkestone and Hythe that may require further work and / or investigation. In fulfilling this objective, the decision was made only to consult with the key partners noted above. Future studies that may be undertaken at a more local level will seek to widen this consultation to include parish and / or town councils as well as other community groups or local people. During the course of the study the key partners were involved in the following engagement events:

- Inception meeting
- Data gathering exercise
- Action plan workshop

2.2 Data Collation and Review

Data has been collected from the key partners and the quality of the data has been assessed and uncertainty or perceived weakness has been described and discussed with the key partners. A table summarising the data collected is located in Appendix **Error! Reference source not found..** A vast array of information was made available to inform the SWMP, including:

- The Environment Agency historical flood maps, FMfSW and LIDAR were used to delineate the individual drainage areas and define the receptors within Folkestone and Hythe.
- Records of historic flooding from Shepway District Council (SDC), Southern Water and Kent County Council Highways were used to identify areas where actions are required within Folkestone and Hythe. It should be noted that many of the historic records, specifically from KCC Highways only went back as far as 2008.
- Groundwater vulnerability zones and groundwater source protection zones were informative when determining the applicability of SUDS within Folkestone and Hythe.
- The National Receptor Database (NRD) was used to quantify risk and prioritise potential measures and actions. The NRD was not used to determine the number of properties potentially affected by flooding but rather to indicate the critical infrastructure that may be affected.

- Other data utilised included the Shepway District Council SFRA³ and Environment Agency Flood Zone⁴.

2.3 Historical flooding

It should be noted 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.

Each RMA provided data on incidents of historical flooding.. The records begin in 1988 to the present; there are a number of records which do not have a date specified. For further details on each recorded event, see Appendix **Error! Reference source not found.** A short summary is noted below.

Fluvial

Fluvial flooding during 1996 was recorded at numerous locations across Folkestone and Hythe, the areas chiefly affected included Downs Road, Morehall, Enbrook Valley, Spring Lane, Foord Road, Pavilion Road, Tontine Street, Cherry Garden Avenue and West Hythe. It was reported that this event was a 1 in 500 year event.

Coastal

Coastal flooding occurred along Sandgate Esplanade, Hythe on the 24th October 1999 and August 1992 due to wave overtopping prior to the coastal defence scheme of 2004.

Surface Water

The 1996 event was a significant combined fluvial and surface water flood event, and since this event there have been works undertaken to help alleviate similar events occurring again. However, with the steep nature of the urban area, and the interaction with the Pent Stream, flooding from surface water remains inevitable and the following areas continue to be hot spot areas.

Cherry Garden Lane in Folkestone, where the highway floods regularly as a result of heavy rainfall.

In Saltwood blocked gullies/ drains lead to flooding of Sandling Road. Blocked gully obstructed the pavement and centre of the road over the carriageway. Six inches of water was measured on the road and three inches of water on the pavement.

Frogholt and Newington in the north of the study area have been affected by surface water flooding. Both these areas are surrounded by higher land. Runoff would naturally accumulate in these areas. In addition the sewers are unable to cope with heavy rainfall and incidents of hydraulic overload have been recorded in Newington.

On Downs Road, road heights and the camber of the road pushes surface water from one side of the road to the other into properties. Surface water collects in the bowl like topography at the junction with Down's Road with Dolphin's Road.

Sewer

Heavy rainfall and hydraulic overload of the sewer system has caused issues historically. The majority of the incidents recorded were as a result of heavy rainfall. In some instances, specifically those where the sewers discharge to the sea, tidal waters entered the foul system and resulted in surcharging. Less frequent occurrences, due to faults within the sewer system were also reported, i.e. faulty non return valve.

³ Shepway District Council (2009) Shepway District Strategic Flood Risk Assessment available at: http://www.shepway.gov.uk/UserFiles/File/pdf/flood-consultation/shepway-district-council_sfra_rev2_final_june_2009.pdf

⁴ Environment Agency Flood Maps available at www.environment-agency.gov.uk/homeandleisure/37837.aspx
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2.4 Source Pathway Receptor

The Source-Pathway-Receptor concept can be used to highlight the processes that influence the flood risk in a given area. A simple schematic is illustrated in Figure 2.1.

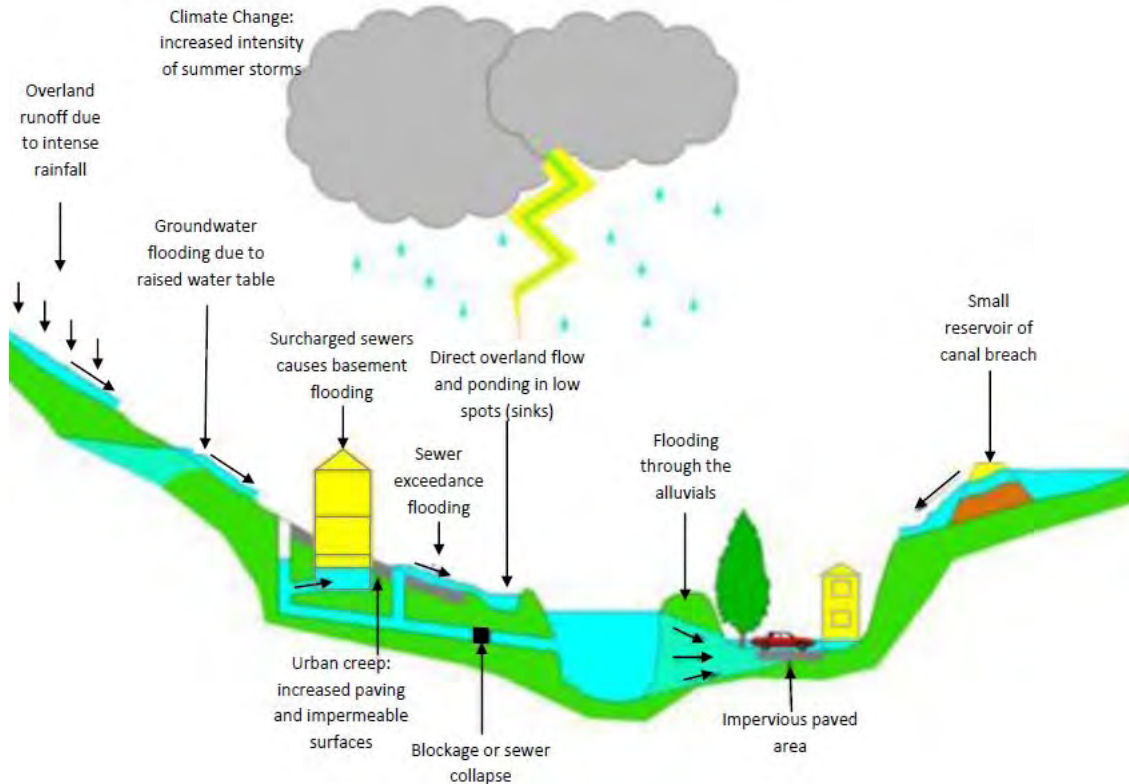
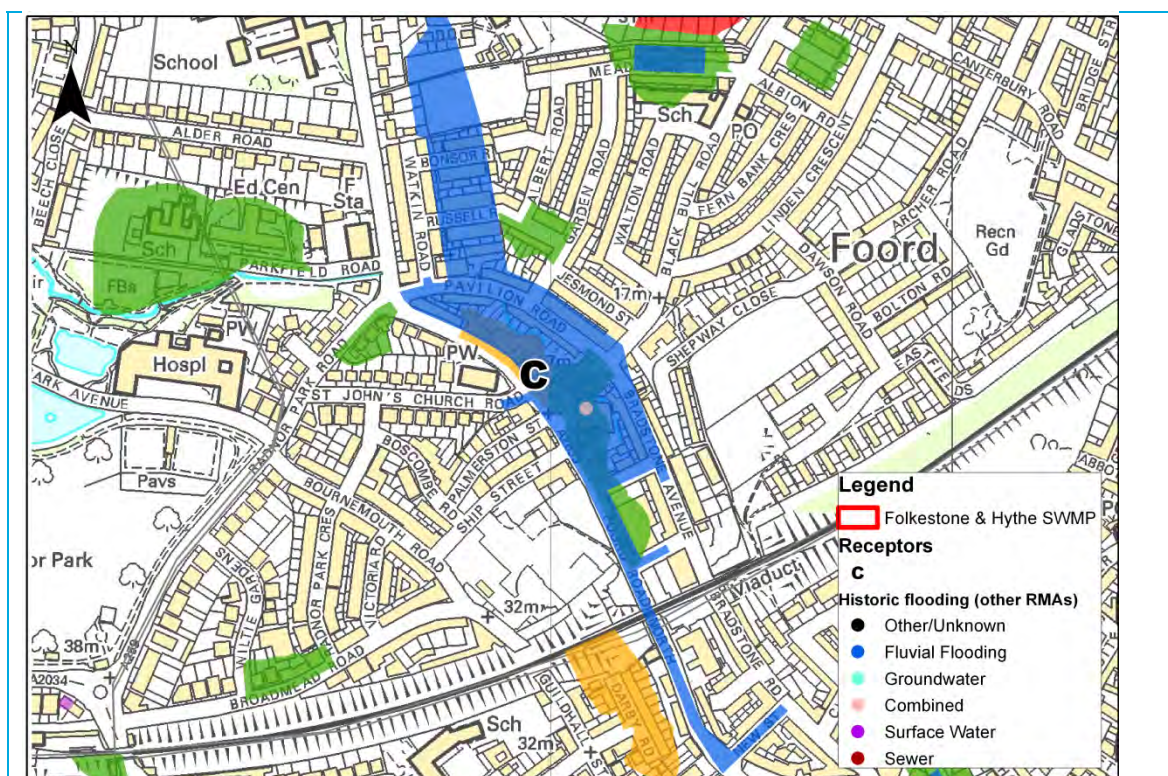


Figure 2.1 Source-Pathway-Receptor (simplified)

The sources of flood water in the study catchment are heavy rainfall and rivers when the banks are overtopped.

The pathway of flood water is the sewer network, drains, gullies and river networks within Folkestone and Hythe. Further detail on pathways is provided in the summary sheets in Appendix **Error! Reference source not found.** (see section 2.5 for discussion on summary sheets).

Receptors within the Folkestone and Hythe study area were highlighted where supplied historic records indicate groupings of flood incidents in particular locations. In addition the FMfSW - 1 in 200 year (deep) was used to indicate where potential receptors may be located. It should be noted that the location of the receptors are not intended to specifically pinpoint exact locations (i.e. house, business or street) but rather to highlight an area, such as a settlement, for example Figure 2.2.



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Figure 2.2 Example of a Folkestone and Hythe SWMP Receptor

2.5 Communicating and mapping the risk

In order to consider the study area in more detail and enable partners and other interested parties to be able to focus in on certain areas of interest (aside from the whole SWMP area), the Folkestone and Hythe study area has been split into nine drainage areas, see Table 2-1. The drainage areas have been split using the topography of the landscape, historic events (from Risk Management Authorities (RMA)) and mapped outlines (Flood Zones and Flood Maps for Surface Water (1 in 200yr, deep)).

Table 2-1 Drainage Areas

Drainage Area	Location
DA01	Lympne
DA02	Pedlinge, Saltwood, Horn Street, Newington and Peene Village
DA03	Palmarsh and Pennypot
DA04	Hythe and Horn Street,
DA05	Channel Tunnel Terminal
DA06	Cheriton, Sandgate and Shorncliffe
DA07	Folkestone, Castle Hill and Morehall
DA08	Folkestone, Sugar Loaf Hill and Dover Hill
DA09	Folkestone, Lower Leas and Mill Point

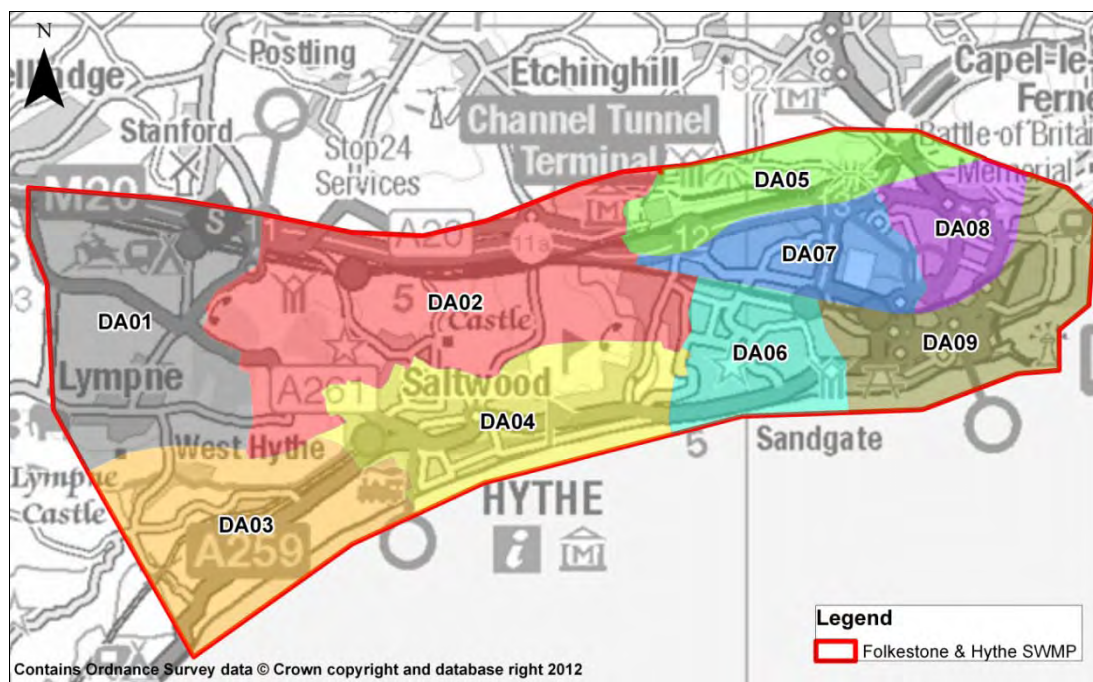


Figure 2.3 Folkestone and Hythe Drainage Areas

Each drainage area has been described in detail in a corresponding Summary Sheet in Appendix **Error! Reference source not found.**. Each summary sheet provides an overview of:

- the drainage area;
- its size;
- drainage assets i.e. main river, ordinary watercourse and sewer network; and
- highlights the source-pathway-receptor model within each area;

In addition, each drainage area has a corresponding flood history table, which provides details of all recorded historic data, as provided by the key partners. The flood history tables are located in Appendix **Error! Reference source not found.**, they include details on the:

- year of the incident;
- general location;
- perceived source as per the data provided;
- whether property was recorded as being affected; and
- any additional comments provided within the historic datasets.

Maps to accompany the summary sheets are also provided for each drainage area illustrating:

- Historic Flooding - this map details the location of the historic flood data as provided by the key partners.
- Surface Water and Critical Infrastructure - this map illustrates the FMfSW and the NRD.
- Watercourses and Drainage Systems - this map illustrates the rivers and sewer network within Folkestone and Hythe.

3 Sustainable Drainage Systems

3.1 Feasibility in Folkestone and Hythe

The choice of SUDS technique is site-specific depending on the nature of the proposed development and local conditions. The suitability of areas for different types of SUDS techniques is often determined by existing land use and in the case of SUDS which involve infiltration, soil type, underlying geology and ground water conditions need also to be considered.

The underlying geology in Folkestone and Hythe is widely varied in its permeability; from silts and clays (low permeability) to sand and gravels (high permeability).

Within Folkestone and Hythe the leaching potential of the soils, range from low leaching potential (L) to high leaching potential (H). The majority of soils are classified as having high leaching potential and are described as not having the qualities to enable diffusion of source pollutants.

When considering infiltration options, the risk of groundwater contamination must also be considered. The Environment Agency provides a web based resource in order to check which areas could be at risk. They define groundwater Source Protection Zones (SPZs) in their "What's in my backyard" section⁵ as Zone I - Inner protection Zone, Zone II - Outer Protection Zone and Zone III - Total Catchment. All three zones are found within the Folkestone and Hythe study area, see Figure 3.1. The Environment Agency define Source Protection Zones for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. Figure 3.1 show three main zones (inner, outer and total catchment).⁶

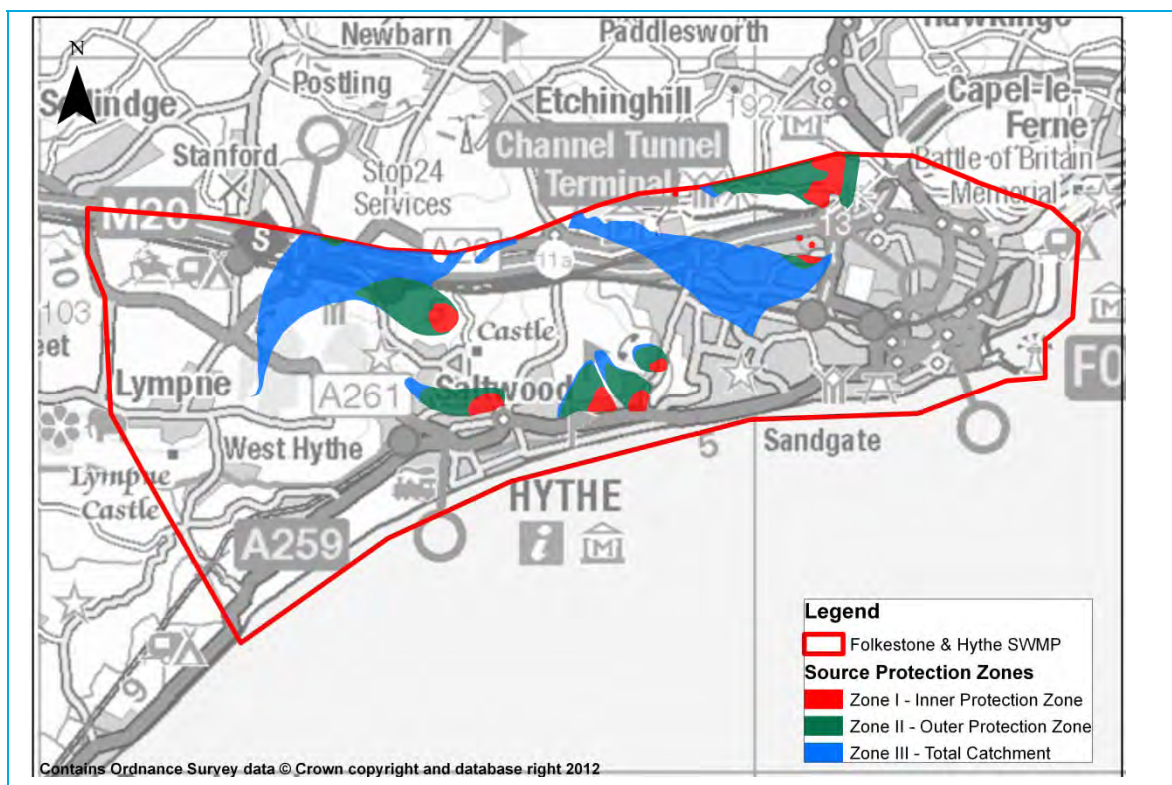


Figure 3.1 Groundwater Source Protection Zone

There are other factors to consider in the use of infiltration techniques, these are described in the Shepway District SFRA (May 2009):

- Soakaways must be constructed such that they do not exceed 3m in depth below the existing ground level.

⁵http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

⁶ <http://www.environment-agency.gov.uk/homeandleisure/37833.aspx>

- In order for water to be discharged to the ground, it must be demonstrated that an unsaturated zone will be available between the discharge point and the groundwater table at all times of the year.
- Assuming that the above can be satisfied, runoff from roofs will need to be discharged to the soakaway via sealed downpipes. This arrangement must be capable of preventing accidental/unauthorised contaminated liquids into the soakaway.
- All discharge must be into a clean, uncontaminated area of natural ground.⁷

It is likely that SUDS using infiltration methods may not be suitable within the study area unless urban diffuse pollutants can be removed from the surface water runoff prior to infiltration. However, other methods such as those discussed above should be considered. The most appropriate option will depend on the type of development, the catchment area, the depth to the water table and the availability of space for SUDS.

Further background information with regards the use and types of SUDs is provided within Appendix D.

⁷ Shepway District Council SFRA (2009) Strategic Flood Risk Assessment
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4 SWMP Action Plan

4.1 Introduction

The SWMP has identified a range of recommended actions for the reduction of flood risk across the Folkestone and Hythe study area. The Action Plan considers all the information collated as part of this SWMP study and:

- outlines the actions required and where and how they should be undertaken;
- sets out which partner or stakeholder is responsible for implementing the actions and who will support them;
- provides indicative costs; and
- identifies priorities.

4.2 Generic Action Plan

Table 4-1 describes the generic actions to be applied throughout all drainage areas (DA01- DA06), it should be noted that the first and fourth action highlighting areas that may need may need monitoring in the future.

Table 4-1 Generic Action Plan

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?)**	Indicative Relative Cost
1	All drainage areas, and of particular importance: DA02: Pedlinge	Develop and implement a targeted maintenance schedule: KCC, SDC, EA and SW should develop and implement a targeted maintenance schedule so that the highway gullies, drains and other drainage assets (including SuDS), the Pent Stream and sewers operate effectively to their design capacity. Of note, maintenance schedules of gullies should be reviewed as a high priority as currently KCC are undertaking maintenance programmes.	1. Use the stage 1 SWMP to identify and record where existing drainage infrastructure is, where it drains to and who owns and/or is responsible for maintaining it. Records of assets should be available to all partners.	KCC	EA, SDC & SW	Quick win	High
	DA04: Mill Road and Station Road		2. Partners to develop a coordinated maintenance schedule using information in the SWMP (i.e. areas at high risk of flooding, natural flow routes, etc).	KCC	EA, SDC & SW	Short Term	Medium

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?) **	Indicative Relative Cost
	DA07: Folkestone, Castle Hill and Morehall		3. Continue to invest in hydraulic improvements, including de-silting, root removal and minor collapse repair, to reduce the risk of property flooding.	KCC	EA, SDC & SW	Medium Term	Medium
			4. Communicate coordinated maintenance activities to the public to manage expectations.	KCC	EA, SDC & SW	Short Term	Low
2	All drainage areas	Raise awareness within the LLFA regarding the current policy for surface water management, specifically SuDS within the evidence base documents – such as the Shepway District Council SFRA.	1. Ensure new developments incorporate SuDS in accordance with : the NPPF, SDC SFRA (Section 13) requirements of the relevant SuDS Approving Body (SAP)	SDC,	EA, KCC	Long Term	Low
			2. Ensure new developments do not increase the risk of surcharge of sewer network within their catchment.	EA, SDC & SW	KCC	Long Term	Low
			3. Stakeholder engagement to inform the public about the benefits of rainwater reuse and recycling and SuDS retrofitting (Three Acres)	KCC, EA, SDC,	SW	Long term	Low
3	All drainage areas, and of particular importance: DA02: Horn Street, Brockhill College DA06: Risborough Lane DA07: Shaftsbury Avenue	Develop and implement a monitoring strategy for areas highlighted within the FMfSW deep and/or areas at risk from fluvial national mapping (possible combined risk), and where appropriate raise awareness of possible risk.	1. Use the Stage 1 SWMP to identify a list of areas highlighted within the FMfSW at risk from deep flooding.	EA, KCC	SDC	Long Term	Low
			2. Develop a monitoring schedule of these areas to check and verify the mapping during extreme events	EA, KCC	SDC	Long Term	Low
			3. Use records of flood incidents to check against the FMfSW annually, to ascertain whether any further areas highlighted as being at risk in the national mapping needed further work / investigation.	EA, KCC	SDC	Long Term	Low
4	All drainage	Improve the understanding within LLFA and	Develop and implement a strategy for	EA,	SW	Long	Medium

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?) **	Indicative Relative Cost
	areas	partners of the natural and manmade drainage systems.	effective land and drainage management.	KCC & SGC		Term	
5	All drainage areas	Raise awareness within Shepway District of the problems caused by inappropriate disposal of Fats Oil and Grease (FOG) to drains and gullies.	Reduce the inappropriate dumping of Fats Oils and Grease by developing and implementing a campaign to educate the public of the impacts on drainage. In addition, consideration, along with stakeholder engagement as to the whether a collection for of Fats Oil and Grease (FOG) within the relevant authority areas, could reduce the inappropriate disposal of FOGs	KCC, SDC, & SW	EA,	Long term	Medium
6	DA06 - DA09	Risk in DA06, DA08 and DA09 is shown by national mapping (Pent Stream modelling study and FMfSW). The risk from the national mapping shows potentially very high risk (but as of yet, has not been supported by historic risk in all instances). In combination with this, there are known hot spot areas across Folkestone that require further investigation in order to test and develop appropriate mitigation measures. Therefore, further modelling to investigate the risk will be required across Folkestone.	Include a Stage 2 SWMP for Folkestone within future schedule of works	KCC	SW, SDC & EA	Quick Win	Medium

****Priority: Quick win = within 12 months. Short Term = up to 2 years. Medium Term = up to 5 years. Ongoing = regular monitoring.**

4.3 Location Specific Action Plan

Table 4-2 describes the action plan for specific locations. Each action has been defined into its particular drainage area and receptor. Through discussion with the key partners specific actions for this stage of the Surface Water Management Plan were defined. It should be noted that a specific action has not been defined for every receptor.

Table 4-2 Location Specific Action

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
DA02	Newington	Newington	<i>Historic data suggests this area was affected by surface water flooding (1995) but looking at the drainage assets within Newington, it is possible that flooding does result in this location from fluvial sources (both main and ordinary watercourses). There are sections of culverted watercourse, which may be exceeding their capacity. Once the source of risk has been verified the following actions may be appropriate:</i>	Improve understanding of flood risk from fluvial and surface water					
			1. Commission modelling study to better understand risk within Newington		Include study within future schedule of works	EA and KCC	SDC	Long term	Up to 50k
			2. Maintain culvert inlets of both Main River (Seabrook Stream) and Ordinary Watercourse		Include culvert in maintenance schedule, ensuring frequency is adequate	EA and KCC	SDC	Long term	Up to 50k
			3. Feasibility options could include flood storage, culvert resizing and/or diversion or flood bunds. There may also be opportunities for deculverting the Ordinary Watercourse entering Newington from the		Complete project mandate form and include within	EA and KCC	SDC	Long term	150 – 250k

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
			north west and exploring the potential for open storage and river restoration. However, the scale of problem within Newington is unlikely to result in positive cost benefit for costly works.		MTP				
DA02	Frogholt	Ashford Road, Frogholt	Highway and gardens flooded due to restricted grill. Ensure maintenance of highway grills	Improved drainage	Identify problem highway grills and include within maintenance schedule	KCC	SDC	Quick win	Up to 50k
DA02	Sandling Road Saltwood	Sandling Road Saltwood	Records suggest that backed up drains led to flooding of <i>Sandling Road</i> . <i>Water collects in troughs, drains back up and there is no way for the surface water to infiltrate or get away</i> Consider use of green infrastructure or localised measures (kerbing, minor bunding, signage etc) to improve management of surface water during intense rainfall.	Improved drainage	Include study within future schedule of works	KCC	SDC	Long term	Up to 50k
DA04	Cannongate Road/Sene Park/Cliff Close, Hythe	Cannongate Road/Sene Park/Cliff Close, Brockhill Hythe	1. A CCTV study to investigate the condition of drains and gullies, 2. Ensure gullies, drains, sewers are cleared and cleansed within the same day. Signposting to inform locals of plans for gully and sewer jetting, would help to demonstrate that the RMAs were working together to help and improve the current problems.	Identify issues Removes potential blockages	Include study within future schedule of works Liaise with all KCC and SW and include within maintenance schedule	KCC, SW KCC SW	SDC SDC	Short Term Short Term	Up to 50k Up to 50k

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
			3. Consider use of property resilience and resistance measures	Protect residents	Apply for EA grant to fund such measures	KCC, SDC	EA	Medium Term	Up to 100K
		Land west of properties along Blackhouse Hill	Divert surface water runoff by using land raising or ditches to divert runoff to Saltwood and Mill Lease Stream	Improve drainage	Include study within future schedule of works and complete project mandate form and include within MTP	KCC	EA/SDC	Long term	Up to 100k
DA04	Spring Lane, Horn Street	Spring Lane, Horn Street	<i>Historic risk suggests this area was affected by surface water flooding (date unknown) and fluvial flooding (1996) but looking at the drainage assets and the FMfSW it is possible that flooding in this location is from surface water only, although there could be potential issues of the ordinary watercourse not being able to discharge freely to the Main River (Seabrook Stream). Once the source of risk has been verified the following actions may be appropriate:</i>	Improve understanding of flood risk from fluvial and surface water					
			1. Commission modelling study to better understand risk within Horn Street		Include study within future schedule of works	KCC	EA and SDC	Long term	Up to 50k
			2. Feasibility options could include green infrastructure along Spring Lane		Complete project mandate form and include within MTP	KCC	EA and SDC	Long term	50-150k
DA06	Enbrook	Enbrook	<i>From historic records and discussions</i>	Improve					

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
	Valley, Cheriton	Valley, Enbrook Court, Enbrook Road	<i>with the RMA⁸, it is suggested that there are problems in this area from sewer and fluvial sources. There are no records of watercourse drains in this area, historic records of fluvial may be mislabelled and should be pluvial.</i>	understanding of flood risk from sewer network and surface water					
			1. Commission modelling study to better understand risk within Enbrook Valley and Enbrook Court		Include study within future schedule of works	KCC	EA and SDC	Long term	Up to 50k
			2. Feasibility options could include green infrastructure or localised measures (kerbing, minor bunding, signage etc) to improve management of surface water during intense rainfall.		Complete project mandate form and include within MTP	KCC	EA and SDC	Long term	50-150k
DA07	Morehall	Morehall	<i>Sewers and drainage systems unable to cope with heavy rainfall causing properties to flood.</i>						
			Investigate surface water, fluvial and sewer interactions.	Identify issues	This study will be covered within the detailed SWMP.	KCC	EA and SDC	Quick Win	Up to 50k
DA08	Downs Road		The issues on Downs Road are exacerbated by the following: - Road heights and steep drives; the camber of the road pushes surface water from one side of the road to the other into properties. - Excess surface water surcharges the sewers. - Surface water collects in Dolphin's Road						

⁸ Shepway District Council and Southern Water described there is an issue of a combination of surface and sewer flooding at this location. Residents may have completed works to alleviate the problem, details of the timescale of this scheme and its function were not received. At the time of writing this report there were no recorded incidents of flooding since 2009.

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
			due to the topography (bowl)						
		Downs Road (mid)	<p>Complete study to investigate source of flooding on Downs Road and undertake options testing, options to consider⁹ include:</p> <ul style="list-style-type: none"> • Increase kerb heights to keep the surface water on the roads • Store floodwater in the allotment gardens • Permeable roads • Consider installation of further gullies along Downs Road (although note that Highways have already done some works) • Potential for diversion to the Pent Stream 	Identify issues	This study will be covered within the detailed SWMP (will be necessary to complete a combined probability model to analyse potential options)	KCC	EA and SDC	Quick Win	Up to 50k
		Downs Road / Dolphins Road	<p>Remove allotment drainage from main sewer network (SW explained that a 150mm pipe constriction had been removed and replaced with a 600mm pipe and it was also highlighted that the allotments have been modified so that they drain directly into the sewer. Ownership of allotment needs confirming with Folkestone Town Council).</p>	Reduce surface water entering sewerage system	Complete Stakeholder engagement with allotment committee	KCC	SDC	Quick win	Up to 50k
DA08	Warren Road and Burrow Road	Warren Road and Burrow Road	<i>This area was affected by surface water flooding and fluvial flooding in 1996 but from observing the drainage assets and the FMfSW it is possible that flooding in this location is from surface water only.</i>	Improve understanding of flood risk from fluvial and surface					

⁹ Underground storage was mentioned within the workshop but this was discounted due to cost and issues associated with maintenance over lifetime.

Drainage Area	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter(s)	Priority	Indicative Cost (£)
			<i>Once the source of risk has been verified the following actions may be appropriate:</i>	water					
			Commission modelling study to better understand risk within Warren Road and Burrow Road.		Include study within future schedule of works	KCC	EA and SDC	Long term	Up to 50k
DA09	Harbour Approach Road		<i>Pent Stream discharges to the sea south east of Harbour Approach Road. There are a number of issues present at this location at the Harbour that may benefit from the following actions:</i>						
		Harbour Approach Road	Investigate opportunities to improve property resilience for properties historically affected by surcharged sewers.	Improve property protection	Stakeholder engagement to encourage the uptake of flood resilience measures	KCC, SDC	SW	Medium term	Up to 100k
DA09	Marine Parade	Marine Parade	Consider use of green infrastructure or localised measures (kerbing, minor bunding, signage etc) to improve management of surface water during intense rainfall.		Include study within future schedule of works	KCC	SDC	Short term	Up to 50k
DA09	Clifton Crescent	Clifton Crescent	Consider use of green infrastructure or localised measures (kerbing, minor bunding, signage etc) to improve management of surface water during intense rainfall.		Include study within future schedule of works	KCC, SDC	EA	Short term	Up to 50k

4.4 Review Timeframe and Responsibilities

The project partners have reviewed and commented upon the actions in Table 4-1 and Table 4-2 during the Action Plan workshop.

Quick win actions identified in the 'Action Plan' are likely to be those addressed first. However, this report can only consider relative priorities within Folkestone and Hythe. Some partner organisations such as Southern Water and Kent County Council have flood risk management responsibilities beyond the geographic scope of this study, and therefore the priority and timescale of delivering actions within Folkestone and Hythe will have to be assessed against actions in other areas. Kent County Council is currently embarking upon a number of more strategic-scale SWMPs in a number of other settlements across the county.

Folkestone was ranked 3rd in the summary of settlement flood risks from 1 in 200 year greater than 0.3 m surface water event (ranked by dwellings at risk) detailed within the PFRA. Hythe was placed 18th within the same table¹⁰.

Actions leading to capital works will initially require a detailed local study that provides robust estimates of costs and justification (i.e. tangible benefits) of the scheme. If a study demonstrates that a scheme is beneficial, funding will need to be obtained before it can be delivered. Applications for funding, implementation of solutions on the ground, and the availability of funding all have the potential to change the recommendations of this report.

It is recommended that an annual review of the Short and Medium Term actions is undertaken. This will allow for forward financial planning in line with external partners and internal budget allocations. Long Term actions should be reviewed on a three-year cycle.

4.5 Sources of funding

Funding for local flood risk management may come from a wide range of sources. In Folkestone and Hythe these may include:

- Defra (Flood Defence Grant in Aid)
- Kent County Council (highways)
- Southern Water
- Network Rail
- Industrial estate owners and businesses
- New developments (directly through the developer or through CIL)
- Local communities
- Shepway District Council
- Romney Marshes Area Internal Drainage Board
- River Stour Internal Drainage Board

It is likely that schemes in Shepway will not have sufficiently strong cost-benefit ratios to attract 100% funding from Defra Flood Defence Grant in Aid (FDGiA), and would therefore require a portfolio of funding to be developed from various sources, including funding sources available for delivering other objectives such as improvements to highways, public open spaces and biodiversity.

4.6 Ongoing Monitoring

The partnership arrangements established as part of the SWMP process should continue beyond the completion of the SWMP in order to discuss the implementation of the proposed actions, review opportunities for operational efficiency and to review any legislative changes.

The SWMP Action Plan should be reviewed and updated once every six years as a minimum, but there may be circumstances which might trigger a review and/or an update of the action plan in the interim, for example:

¹⁰ Kent County Council (2011) Preliminary Flood Risk Assessment available at <http://cdn.environment-agency.gov.uk/fllho1211bvsi-e-e.pdf> - Table 5
Folkestone_&_Hythe_SWMP_Stage 1_Report.doc

- Occurrence of a surface water flood event;
- Additional data or modelling becoming available, which may alter the understanding of risk within the study area;
- Outcome of investment decisions by partners is different to the preferred option, which may require a revision to the action plan, and;
- Additional (major) development or other changes in the catchment which may affect the surface water flood risk.

The action plan should act as a live document that is updated and amended on a regular basis, and as a minimum this should be as agreed in the Local Flood Risk Management Strategy for Kent, although individual partners may wish to review their actions more regularly.

