

SWALE SURFACE WATER MANAGEMENT PLAN



Final Report

KENT COUNTY COUNCIL



In Partnership With:





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Quality Management

DOCUMENT INFORMATION

Title:	Swale Surface Water Management Plan
Version:	0.3
Status:	Final
Project Name:	GCKENT
File Name:	Swale_SWMP_report_v0.3.doc

REVISION HISTORY

Summary of Changes	Completed by	Date of Issue	Version
Draft submitted to Partners	Olly Evans / Bruno Venturini	March 2012	0.0
Draft Report	Olly Evans / Bruno Venturini	July 2012	0.1
Final Draft Report	Olly Evans	October 2012	0.2
Final Report	Olly Evans	November 2012	0.3

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RELATED DOCUMENTS

Doc Ref	Document Title	Author	Date of Issue	Version
PFRA	Preliminary Flood Risk Assessment	Kent County Council	June 2011	Final
SFRA	Strategic Flood Risk Assessment	Halcrow Group Ltd	October 2009	Final
SWMP Guidance	Surface Water Management Plan Technical Guidance	DEFRA	March 2010	Final

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1.0 Introduction

1.1 Study Area

1.1.1 The study area covers the administrative area of Swale Borough Council which is located on the north Kent coast (see **Figure 1.1 - Study Area**). It comprises of two large urban areas, Sittingbourne and Faversham, and the Isle of Sheppey.

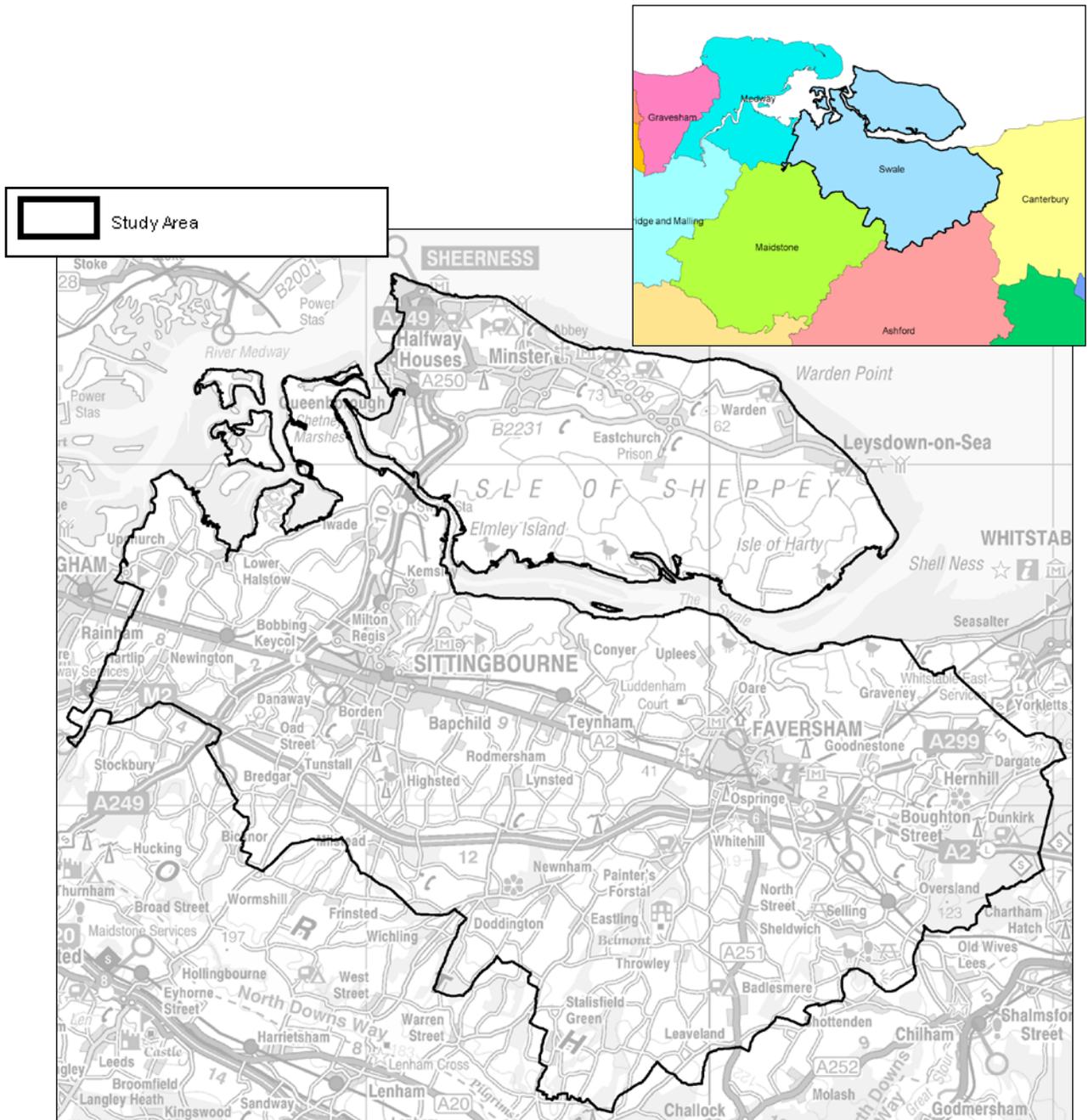


Figure 1.1 – Study Area

1.2 What is a Surface Water Management Plan?

1.2.1 A Surface Water Management Plan (SWMP) is a study that aims at effectively understanding and managing flood risks that arise from local flooding, which is defined by the Flood and Water Management Act (FWMA) 2010 as flooding from surface runoff, groundwater, and ordinary watercourses.

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

1.2.3 The purpose of a SWMP is to identify what the local flood risk issues are, what options there may be to alleviate the risk and who should take these options forward. This is presented in an Action Plan that the partners agree.

1.2.4 As a result of the surface water mapping from the Environment Agency and the outputs of the Preliminary Flood Risk Assessment (June 2011), KCC recognised that there are significant risks in Kent and that these needed to be better understood. Based on historic flooding records and the potential for future development, Swale Borough Council was identified as a priority area where an outline SWMP would be beneficial to the overall understanding of local flood risk in Kent.

1.2.5 This outline SWMP is being undertaken by Kent County Council (KCC) to investigate the local flood risks in Swale 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.

1.2.6 This study only focuses on local flood risks. It does not include flooding from main rivers or coastal flooding. These forms of flooding are managed by the Environment Agency and information about how they are managed can be found in the North Kent Rivers Catchment Flood Management Plan for main river flooding, or the Medway Estuary and Swale Shoreline Management Plan, for coastal flooding.

1.3 Scope of the Study

1.3.1 Local flood risk is defined as flood risk originating from sources other than main rivers, the sea and large reservoirs and principally meaning flood risk from:

- a) surface runoff (including snow melt, see overview in **Section C.5**),
- b) groundwater (see assessment in **Section C.7**),
- c) ordinary watercourses (see assessment in **Section C.8**),

1.3.2 This main definition of local flood risk requires further clarification, because:

- a) it includes ponds and lakes (see assessment **Section C.8**),

- b) it does consider flooding from sewers if wholly or partly caused by rainwater or other precipitation entering or otherwise affecting the system (see overview **Section C.6**),
- c) it considers the interaction with high groundwater levels, high fluvial levels and high tidal levels (see **Sections C.7** and **C.10** respectively).

1.3.3

A schematic of local flood risk is shown in **Figure 1.2**.

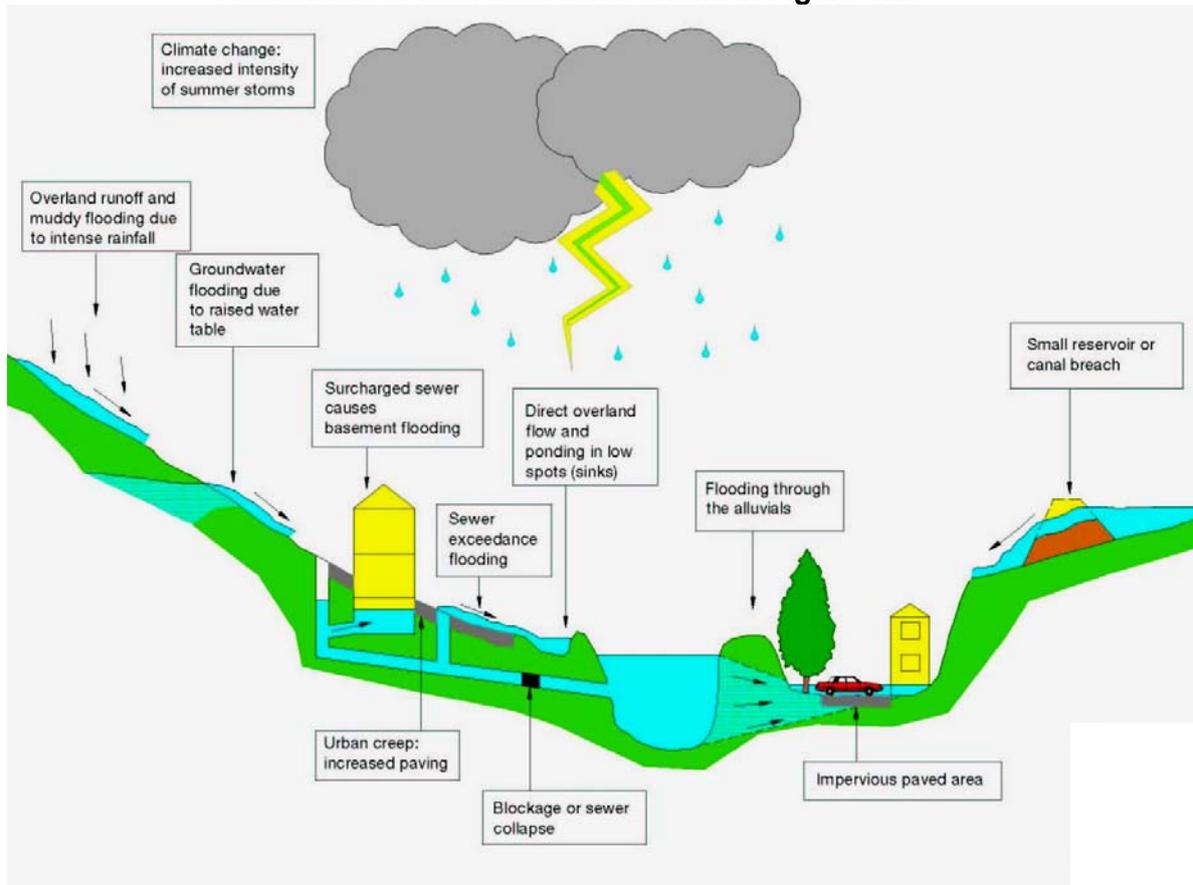


Figure 1.2 – Schematic of Local Flood Risk

1.3.4

Local flood risk does not include flooding from water supply systems (for example burst water mains), foul only sewers or large reservoirs.

1.3.5

This report builds on previous relevant studies undertaken in the study area and has been delivered using a tiered, four phase approach (see **Figure 1.2**); Phase 1 – Preparation; Phase 2 – Risk Assessment; Phase 3 – Options; and Phase 4 – Implementation and Review.

1.4

Delivery of Local Risk Management

1.4.1

The diagram in **Figure 1.3** illustrates how this SWMP fits into the delivery of local flood risk management, and where the responsibilities for this lie.

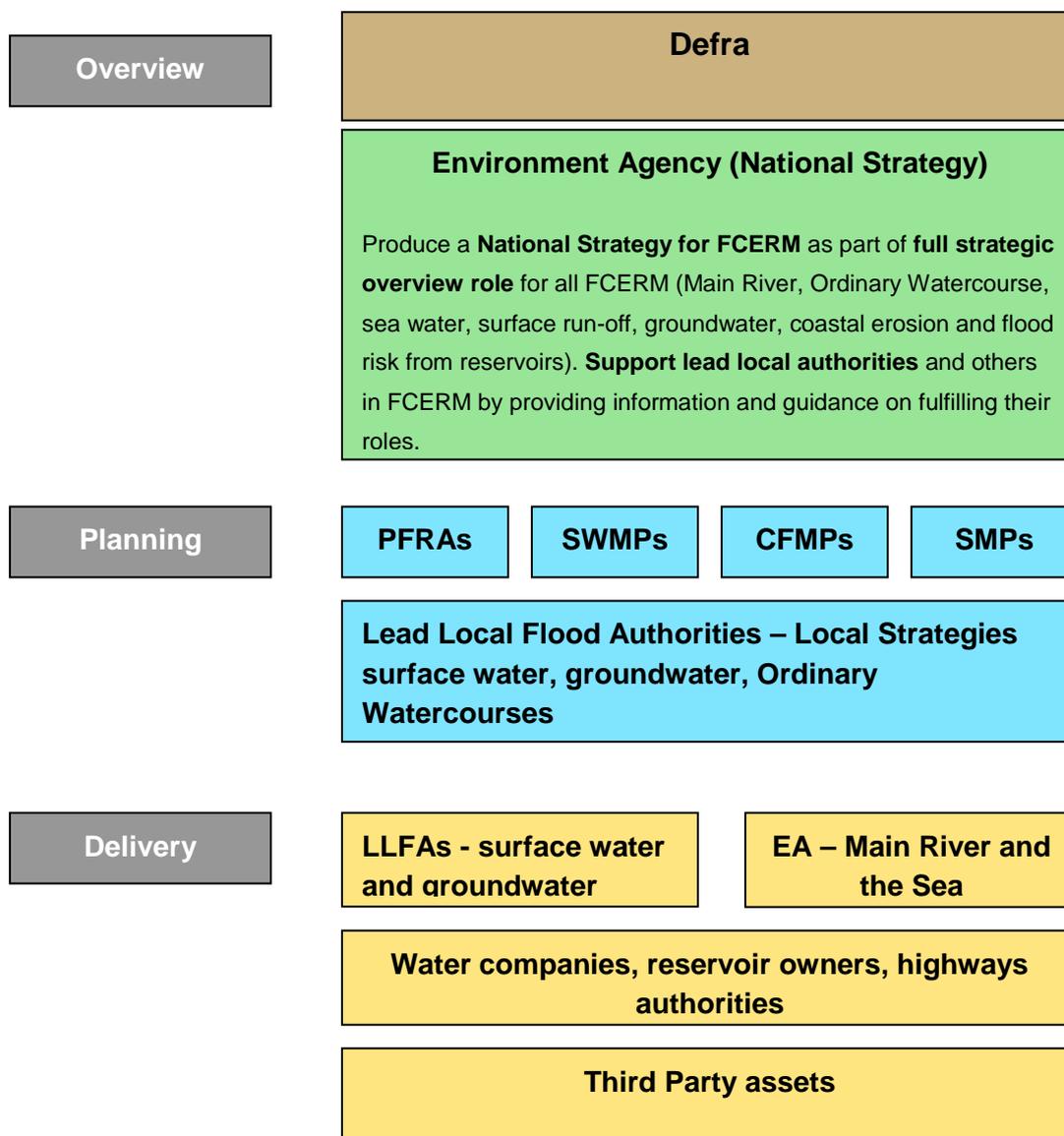


Figure 1.3 – Delivery of local flood and coastal erosion risk management (FCERM)

1.5

SWMP Leadership and Partnership

1.5.1

Figure 1.4 provides a schematic of the SWMP partnership and stakeholder arrangements.

1.5.2

As Lead Local Flood Authority, it is the role of Kent County Council to continue developing effective partnerships with Southern Water and the Environment Agency as well as engaging key stakeholders, such as Swale Borough Council, the Highways Agency and Southern Water.



Figure 1.4 - Partnership and Main Stakeholder Schematic Diagram

- 1.5.3 Ideally, with the completion of the SWMP, working arrangements with the partners (and if possible with key stakeholders) should be formalised by the LLFA to ensure clear lines of communication, mutual co-operation and management through the provision of Level of Service Agreements or Memorandums of Understanding.
- 1.5.4 Southern Water owns and maintains all public adopted sewers which drain the study area and reports to OFWAT. The exceptions are highways drainage (Kent County Council's responsibility) and local connections.
- 1.5.5 The Environment Agency is the public body responsible for delivering the environmental priorities of central government and has an overview role of all flood and coastal erosion risk management.
- 1.5.6 The above partnership group is different to the Flood Management Group which is a higher level group that was set up in response to the Pitt Report and the FWMA 2010. It is anticipated that this group will assist in making strategic decisions in relation to the recommendations of this SWMP and its action plan.
- 1.5.7 A project organogram and communication plan for the SWMP can be found in Appendix A.

1.6

SWMP Objective

1.6.1

The objective of this study is to provide a clear strategic risk assessment of surface water flood risk and to prioritise flooding hotspots across the study area, which includes:-

- (a) Establish and consolidate partnerships between key drainage stakeholders to facilitate data sharing and exchange and closer coordination to maximise partnership working opportunities;
- (b) A robust understanding of flood risk from all sources providing Kent County Council with a clear understanding of sources of flood risk, local flood mechanisms, potential receptors;
- (c) Confidence that areas identified as being at risk of flooding have been correctly identified and prioritised for further work; and
- (d) Holistic and multifunctional recommendations for flood risk management to enable better flood risk and drainage infrastructure investments.

2.0 Phase 1 – Preparation

2.1 Introduction to this chapter

2.1.1 This chapter follows the process of the SWMP guidance Preparation Phase.

2.1.2 The need for a SWMP study is explained in **Section 1.2**. The partnership, stakeholders, roles and responsibilities are identified in **Section 1.5**.

2.1.3 The following sections represent the scoping element of this Preparation Phase. **Section 2.2** covers the data collection and review of information and **Section 2.3** identifies the level of assessment of the subsequent phases of the study.

2.2 Data Collection and Review

2.2.1 A list of data was issued and developed with the key partners and stakeholders, which covered information potentially of use for the SWMP. As data was received, it was logged into an Incoming Data Register, with date of receipt, contact name and licence information details. A quality scoring of the data was determined in line with the SWMP Technical Guidance (Defra, March 2010) as follows:

1. No known deficiencies – not possible to improve in the near future.
2. Known deficiencies – best replaced as soon as new data are available.
3. Assumed – based on experience and judgement.
4. Grossly assumed – an educated guess.

2.2.2 Data was collected from each of the following organisations:

- Kent County Council
- Swale Borough Council
- Environment Agency
- Highways Agency
- Medway Internal Drainage Board
- Southern Water

2.2.3 The key datasets used for the main stages of the SWMP are:

- a) OS maps,
- b) the Southern Water public sewer network,
- c) the flood zones and the historic flood map from the Environment Agency,
- d) flood incident records,

- e) the Environment Agency national Flood Map for Surface Water (FMfSW),
- f) a digital terrain model from LiDAR data to identify catchment boundaries and terrain gradients,
- g) Southern Water records of flooding at postcode level, and
- h) the National Receptor Database

2.2.4 **Appendix B – Data Log** provides a full list of all datasets provided.

2.3 **Selecting the Level of Assessment of the Main Phases of the Study**

2.3.1 SWMPs can function at different geographical scales and, therefore, at differing levels of detail.

2.3.2 A 'Strategic Assessment' is at a Council wide scale providing a broad understanding of locations that are vulnerable to surface water flooding with prioritised flooding hotspots and maps to inform spatial and emergency planning (see **Appendix C**).

2.3.3 An 'Intermediate Assessment' is either at Council wide scale or focused on large urban areas highlighting areas which require detailed assessment and identifying possible mitigation measures which can be implemented. In the light of extensive and severe historical flooding and the results from the overarching national pluvial modelling suggesting that there are approximately 75,800 residential and commercial premises in Kent at risk of significant flooding for the 1 in 200 year rainfall event, it was considered appropriate to adopt this level of assessment to quantify the risks within Swale Borough Council (see **Appendix D**).

2.3.4 A 'Detailed Assessment' is at a local scale of known flooding hotspots determining the causes and consequences of flooding to test mitigation measures. This study identifies where detailed assessments could be undertaken to better understand the flood risks.

3.0 Phase 2 – Risk Assessment

3.1 Strategic Risk Assessment

3.1.1 A strategic assessment was undertaken for the study area. This is summarised in **Appendix C** and includes a review of the following:-

- the ground topography and geology (see **Sections C.1 and C.2** respectively),
- areas of open spaces and urbanisation and proposed development (See **Section C.3**),
- an overview of local flood risk (see **Sections C.4 to C.12**),
- historical flooding incidents (see **Section C.13**).

3.1.2 Due to the low-lying nature of the Isle of Sheppey groundwater flood risk is most prevalent resulting in the limited ability for the drainage system to convey surface water away from significant receptors. This combined with the possibility of tide-locking for coastally located hotspots exacerbates flood risk further.

3.1.3 In locations such as the Isle of Sheppey where the flooding hotspots are sensitive to sea levels (which impacts on groundwater levels), current predictions of sea level rise suggest future flood risk will increase significantly. This associated risk needs to be clearly understood to ensure any proposed options (discussed in **Section 4**) are future proofed.

3.1.4 Other flood risk hotspots are located in either semi-rural or densely urban locations caused by a combination of localised depression within the topography, high groundwater levels and lack of maintained drainage systems.

3.2 Intermediate Risk Assessment

3.2.1 An intermediate assessment has been carried out for the purpose of identifying hotspot locations based on: a) the knowledge gained as part of the strategic risk assessment, b) local knowledge from the SWMP partners (from one to one meetings and workshops) and c) flooding incident records. The main output of the intermediate risk assessment is the Hotspots Storyboard (see further details in the section below).

3.3

Selection and prioritisation of Hotspots

3.3.1

The selection and prioritisation of Hotspots were based on interpreting readily available information and as a result of many face to face meetings with stakeholders, aimed at gaining a better understanding of their local knowledge. This included:-

1. **Historic Flooding Incidents (Map 1, Appendix F)** – records collected by partners on predominately surface water flooding.
2. **Environment Agency Surface Water Mapping (Map 2, Appendix F)** –second generation predicted surface water flood risk modelled by the Environment Agency. This Flood Map for Surface Water (FMfSW) dataset indicates deep or shallow flooding for the 1 in 30 and 1 in 200 year rainfall events. This dataset is more accurate than the first generation Areas Susceptible to Surface Water Flooding (AStSWF) dataset since it has taken into consideration the influence of buildings and the sewer system.
3. **Environment Agency AStGWF map (Areas Susceptible to Ground Water Flooding) (Map 3, Appendix F)** – indicates the likelihood of groundwater emergence at a 1km square grid, this dataset was predominately used for the PFRA study.
4. **Face to face meetings and partnership workshop** – detailed information on the frequency, extent and impact of known flooding within the Swale area.

3.3.2

At the partnership workshop, the above information was presented in a storyboard format (see **Appendix D**) and tabled with the partners for discussion. Through the workshop additional information was collated and all relevant organisations agreed to the proposed hotspots.

3.3.3

The Hotspot Storyboard represents the results of the intermediate risk assessment which is summarised in **Figure 3.1** below with a source-pathway-receptor model in Table 3.1.

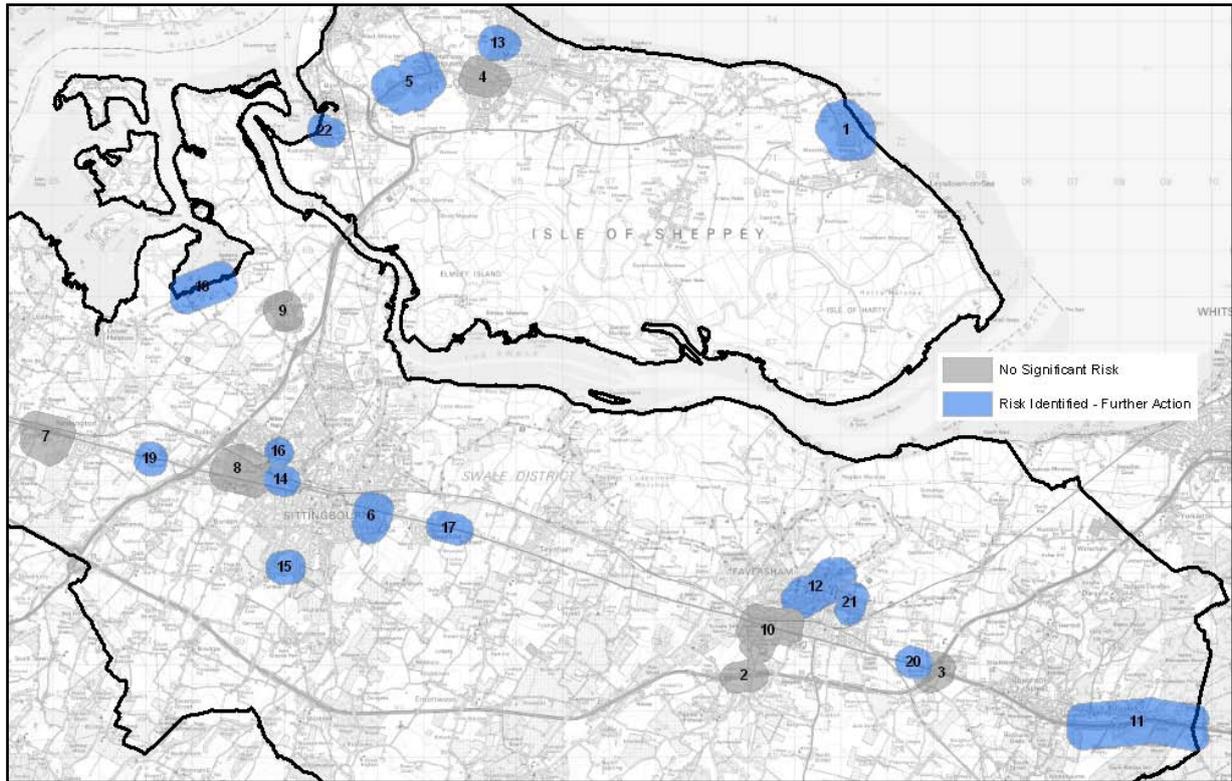


Figure 3.1 – Hotspots in Swale

Table 3.1 – Source-pathway-receptor model

Hotspot	Source	Pathway	Receptor	Details
01	Sewerage system & Groundwater	Highway & overland flow	Residential properties, highway and pumping station	Low point with historic flooding from sewerage system with risk of groundwater and tidal flooding in the future.
05	Sewerage system & Groundwater	Highway & overland flow	Residential properties, ambulance station, pumping station & highway	Low-lying land susceptible to surface water flooding due to high groundwater levels and ineffective drainage network (piped and open ditches) to convey flows.
06	Surface runoff & drainage system	Highway & overland flow	Residential properties & highway	Depression in highway unable to drain effectively due to heavily silted soakaways and high groundwater levels.
11	Surface runoff & highway drainage	Highway & overland flow	Highway	Known highway flooding problem, highway is managed by KCC Highways department.
12	Tide locked sewerage system	Highway & overland flow	Residential properties & highway	There is a tide-locking flood risk which is to be managed by a Southern Water scheme.
13	Sewerage system,, surface runoff & groundwater	Highway & overland flow	Residential properties & highway	High groundwater levels infiltrating into sewerage network reducing capacity with known surface water flow paths with poorly drained surrounding fields.
14	Surface runoff & highway drainage	Highway & overland flow	Residential properties, highway & railway tunnel	'Bottle-neck' of drainage network passing under railway line at a local depression resulting in highway flooding.
15	Surface runoff, groundwater & highway drainage	Highway & overland flow	Residential properties & highway	Ineffective highway drainage to soakaways due to high groundwater levels.
16	Highway drainage	Highway	Highway	Highway floods 3-4 times a year, however it does not affect any properties.
17	Highway drainage	Highway	Highway	Issue has arisen many times, floods approximately half of the highway.
18	Tidal & highway	Highway	Highway	Complete flooding of the highway, 1-2 times a year. However no properties are affected

Hotspot	Source	Pathway	Receptor	Details
19	Surface runoff & highway drainage	Highway & overland flow	Residential properties & highway	Depression in highway unable to drain effectively to flooded local pond.
20	Surface runoff & highway drainage	Highway & field runoff	Highway	Ineffective highway drainage with surface water runoff from the surrounding fields.
21	Surface runoff	Highway & overland flow	Residential properties	Low spot flooding due to ineffective highway drainage.
22	Surface runoff	Highway & overland flow	Residential properties & commercial premise	Large impermeable area unable to convey flows via a ditch due to poorly maintained culvert.

4.0 Phase 3 & 4 – Options & Action Plan

4.1 Introduction

4.1.1 The purpose of Phase 3 is to identify a range of measures for alleviating flood risk that has been identified. This assessment was undertaken in collaboration with the partners in a workshop environment and based on the Source, Pathway, Receptor Model.

4.1.2 Phase 4 in **Section 4.2** and **4.3** is the delivery of the resulting Action Plans providing local and generic measures to manage surface water flood risk.

4.1.3 The objectives of the action plans are to:

- identify the partners or stakeholders responsible for implementation of the actions;
- provide an indication of the priority of the actions and timescales for delivery.

4.1.4 The delivery of certain actions will require cooperation of people and organisations outside of the SWMP partnership, for instance land owners. Where third parties need to be involved it is the responsibility of the lead partner for each action to engage with them.

4.1.5 The priority given for each action in the actions plans indicates the priority for undertaking the next step to resolve the issues identified. It does not always represent the timescale for resolving the issue, as it may not be possible at this time to determine what specifically has to be done and how long it may take.

4.2 Local Action Plan

4.2.1 The range of potential measures for managing the identified flood risks at the hotspots is presented in Table 4.1. These actions include structural (for example replacing a sewer) and non structural (for example new planning policies) measures.

4.2.2 The chosen measures are the most appropriate options drawn from the range of available options given in **Appendix E** agreed by the partnership.

Table 4.1 – Local Action Plans

Area of benefit	Location of action	Action	Next Steps	Action Owner	Supporter(s)	Priority ¹	Indicative Cost (£) ²
Hotspot 1 - Warden, Isle of Sheppey	Jetty Road	Maintenance of the tidal outfall required to prevent failure of the flapped gate	Undertake survey and define optimum maintenance regime	KCC	EA	Medium Term	Up to 50k
Hotspot 5 - Halfway Houses, Isle of Sheppey	Rosemary Avenue	Maintenance of local drainage network to improve capacity of the system.	Undertake survey and define optimum maintenance regime	KCC	SBC & SW	Short Term	Up to 50k
Hotspot 6 - Snipeshill	Rectory Road	Improved maintenance of drainage network	Undertake survey, review original design, understand current performance and identify optimum maintenance regime	KCC		Short Term	50-150k
Hotspot 11 - A2, Dunkirk	A2	Improve drainage of carriageway	Investigate options to improve drainage	HA		Medium Term	Up to 50k
Hotspot 12 - Faversham	Abbey Road	Monitor Southern Water scheme to manage tide locking	Monitor flooding	SW		Ongoing	Up to 50k
Hotspot 13 - Minster, Isle of Sheppey	Scrapsgate Road	Management of overland flow paths and storage of runoff in open areas.	Undertake survey and define optimum maintenance regime	KCC	SBC & SW	Short Term	50-150k
Hotspot 14 - Chalkwell	Chalkwell	Improve drainage of carriageway	Investigate options to improve drainage	KCC	KCC Highways & SW?	Medium Term	Up to 50k
Hotspot 15 – South West Sittingbourne	Chegworth Gardens	Construction of attenuation tanks/pond and with prioritised gully and soakaway maintenance.	Undertake initial assessment and identify any available funding	KCC	KCC Highways? & SW	Medium Term	50-150k
Hotspot 16 - Milton Regis	Windmill Road	Prioritised highway gully clearance.	Define optimum maintenance regime	KCC	KCC	Quick win	Up to 50k
Hotspot 17 - Bapchild	The Street	Prioritised highway gully clearance.	Define optimum maintenance regime	KCC	KCC	Quick win	Up to 50k
Hotspot 18 - Lower Halstow	Raspberry Hill Lane	Improve drainage of road through tidal outfall	Investigate tide locking of drainage	EA	KCC	Medium term	Up to 50k
Hotspot 19 - Keycol	Keycol Hill	Improve conveyance away from local low spot.	Undertake initial assessment and identify any available funding	KCC		Medium Term	Up to 50k
Hotspot 20 - A2 nr Junc 7	A2	Improve existing highway drainage to prevent runoff from surrounding land entering the highway.	Undertake initial assessment and identify any available funding	HA		Medium Term	Up to 50k
Hotspot 21 - Faversham	Abbey Fields	Improve conveyance away from local low spot.	Undertake initial assessment and identify any available funding	KCC	IDB	Medium Term	Up to 50k
Hotspot 22 - Queenborough	Rushenden Road	Maintenance of existing drainage ditch	Define optimum maintenance regime	KCC	IDB	Medium Term	Up to 50k

¹ **Priority:** Quick win = *within 12 months*. Short Term = *up to 2 years*. Medium Term = *up to 5 years*. Ongoing = regular monitoring.

² **Indicative Cost:** Up to 50k, 50-150k, 150-250k or 250+k

³ **Funding** for initial assessment through EA project mandate or by KCC or the planning authority

4.3 Generic Action Plan

4.3.1 The purpose of Phase 4 of the SWMP is to prepare a generic action plan which identifies actions and responsibilities for the ongoing management of surface water flood risk.

4.3.2 The plan has been prepared with Kent County Council and has been updated following internal and external consultation with the partners.

4.3.3 **Table 4.2** provides a full summary of the action plan.

4.4 Ongoing Monitoring

4.4.1 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.

4.4.2 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:

- 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.

4.4.3 It is proposed that the SWMP Action Plan is reviewed internally every 6 months by the KCC Flood Risk group.

Table 4.2 – Generic Action Plan

Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)	Priority (When?) ¹	Indicative Relative Cost
Drainage from new development must not increase flood risk either on-site or elsewhere and seek "greenfield" runoff rates from "brownfield" development	Incorporate requirements for SUDS into local planning documents and guidance	SBC	-	Medium Term	Low
Further assessment of significant receptors including critical infrastructure	Data gathering exercise of key receptors including emergency services and critical infrastructure	KCC	SBC, SW & EA	Medium Term	Medium
Review the third generation (Improved Maps for Surface Water) EA-Flood Maps when issued	Review the new EA-Flood Map from the Surface Water improvements process and the new dataset to see if any other areas of flood risk should be considered.	KCC	-	Short Term	Low
Managing runoff from rural areas onto roads, developments and properties	Targeted management of known flooding areas through education on land management and prioritised maintenance of highway drainage infrastructure.	KCC	SBC	Medium Term	Low
Adopt a risk based maintenance regime approach	Mapping of priority maintenance areas, based on the current understanding of surface water flooding, to modify the existing maintenance regime to reduce the flooding risk. Identify priority maintenance areas based on the current understanding of surface water flooding.	KCC	SBC, SW & EA	Medium Term	Low
Assessment of the impact of climate change on surface water flood risk	Undertake a study on future groundwater flood risk for the Isle of Sheppey to assess and mitigate the impacts on the drainage capacity and resulting surface water flood risk.	KCC	SBC, SW & EA	Long Term	Low
Monitoring the implementation of the SWMP	Quarterly meetings with the SWMP Partners	KCC	SBC, SW & EA	Ongoing	Low
Review and update the SWMP Action Plan	Review and update the SWMP Action Plan	KCC	SBC, SW & EA	Ongoing	High

¹ **Priority:** Quick win = *within 12 months*. Short Term = *up to 2 years*. Medium Term = *up to 5 years*. Ongoing = regular monitoring.

Glossary

Term	Definition
AOD	Above ordnance datum
Aquifer	A source of groundwater comprising water bearing rock, sand or gravel capable of yielding significant quantities of water.
AMP	Asset Management Plan
Asset Management Plan	A plan for managing water and sewerage company (WaSC) infrastructure and other assets in order to deliver an agreed standard of service.
AStSWF	Areas Susceptible to Surface Water Flooding
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.
CDA	Critical Drainage Area
Critical Drainage Area	A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, Main River and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure.
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
Civil Contingencies Act 2004	This Act delivers a single framework for civil protection in the UK. As part of the Act, Local Resilience Forums must put into place emergency plans for a range of circumstances including flooding.
CLG	Government Department for Communities and Local Government
Climate Change	Long term variations in global temperature and weather patterns caused by natural and human actions.
Culvert	A channel or pipe that carries water below the level of the ground.
Defra	Department for Environment, Food and Rural Affairs
DEM	Digital Elevation Model
DG5 Register	A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.
DTM	Digital Terrain Model
EA	Environment Agency
Indicative Flood Risk Areas	Areas determined by the Environment Agency as indicatively having a significant flood risk, based on guidance published by Defra and WAG (Wales Assembly Government) and the use of certain national datasets. These indicative areas are intended to provide a starting point for the determination of Flood Risk Areas by Lead Local Flood Authorities (LLFA, see below).
FDGiA	Flood Defence Grant in Aid
FMfSW	Flood Map for Surface Water
Flood defence	Infrastructure used to protect an area against floods, such 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.

Term	Definition
Flood Risk Regulations 2009	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.
Flood and Water Management Act 2010	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
FRR	Flood Risk Regulations
IUD	Integrated Urban Drainage
LDF	Local Development Framework
LFRZ	Local Flood Risk Zone
Local Flood Risk Zone	Discrete area of flooding that does not exceed the national criteria for an indicative Flood Risk Area (iFRA see above) but affects houses, businesses and/or local infrastructure. It can also include an area where a particular local flood risk issue is identified for further investigation. The boundary is defined as the actual spatial extent of predicted flooding in a single location.
LLFA	Lead Local Flood Authority
Lead Local Flood Authority	Local Authority responsible for taking the lead on local flood risk management
LiDAR	Light Detection and Ranging (topographic data obtained using laser technologies, usually obtained from airplanes and helicopters)
Local Resilience Forum	A multi-agency forum, bringing together all the organisations that have a duty to cooperate under the Civil Contingencies Act, and those involved in responding to emergencies. They prepare emergency plans in a co-ordinated manner.
LPA	Local Planning Authority
LRF	Local Resilience Forum
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, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards (IDBs)
Partner	A person or organisation with responsibility for the decision or actions that need to be taken.
PFRA	Preliminary Flood Risk Assessment
Pitt Review	Comprehensive independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Pluvial Flooding	Flooding from water flowing over the surface of the ground; often occurs when the soil is saturated and natural drainage channels or artificial drainage systems have insufficient capacity to cope with additional flow.
PPS25	Planning Policy Statement 25: Development and Flood Risk, superseded by the National Planning Policy Framework in March 2012.
PA	Policy Area

Term	Definition
Policy Area	One or more Critical Drainage Areas linked together to provide a planning policy tool for the end users. Primarily defined on a hydrological basis, but can also accommodate geological concerns where these significantly influence the implementation of SuDS
Resilience Measures	Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.
Resistance Measures	Measures designed to keep flood water out of properties and businesses; could include flood guards for example.
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.
Risk Management Authority	As defined by the Floods and Water Management Act
RMA	Risk Management Authority
SBC	Swale Borough Council
Sewer flooding	Flooding caused by a blockage or lack of capacity leading to sewer water overflowing from a sewer or urban drainage system.
SFRA	Strategic Flood Risk Assessment
SOP	Standard of Protection
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
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	Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer.
SWMP	Surface Water Management Plan