



South Essex Surface Water Management Plan Phase I - Report

April 2011



Prepared for



Revision Schedule

Surface Water Management Plan: Phase I
April 2011

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Abbreviations

ACRONYM	DEFINITION
AAP	Area Action Plan
CDA	Critical Drainage Area
CIRIA	Construction Industry Research and Information Association
CFMP	Catchment Flood Management Plan
CLG	Government Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DEM	Digital Elevation Model
EA	Environment Agency
IUD	Integrated Urban Drainage
LDF	Local Development Framework
LIDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LRF	Local Resilience Forum
PPS25	Planning and Policy Statement 25: Development and Flood Risk
RMA	Risk Management Authority
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan

Glossary

TERM	DEFINITION
Aquifer	A source of groundwater comprising water bearing rock, sand or gravel capable of yielding significant quantities of water.
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.
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.
Climate Change	Long term variations in global temperature and weather patterns caused by natural and human actions.
Civil Contingencies Act	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.
Critical Drainage Area	Areas of significant flood risk, characterised by the amount of surface runoff that drains into the area, the topography and hydraulic conditions of the pathway (e.g. sewer, river system), and the receptors (people, properties and infrastructure) that may be affected.
Culvert	A channel or pipe that carries water below the level of the ground.
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.
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 and Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, one of the key aims of which is to clarify the legislative framework for managing surface water flood risk in England.
Lead Local Flood Authority	As defined by the Flood and Water Management Act, the lead local flood authority" in relation to an area in England means— (a) the unitary authority for the area, or (b) if there is no unitary authority, the county council for the area.
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.
Main River	Main rivers are a statutory type of watercourse in England and Wales, usually larger streams and rivers, but also include some smaller watercourses. A main river is defined as a watercourse marked as such on a main river map, and can include any structure or appliance for controlling or regulating the flow of water in, into or out of a main river. The Environment Agency's powers to carry out flood defence works apply to main rivers only. In England main rivers are designated by Defra. Every other open watercourse in England and Wales is determined by statute as an 'ordinary watercourse'.
Ordinary Watercourse	Ordinary watercourses are a statutory type of watercourse in England and Wales. Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a main river. An Internal Drainage Board where relevant or local authority has permissive powers to carry out flood defence works for ordinary watercourses at their discretion. This is similar to those powers the Environment Agency can use on main rivers.
Partner	A person or organisation with responsibility for the decision or actions that need to be taken.
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 following rainfall events; often

	occurs when the soil is saturated and natural drainage channels or artificial drainage systems have insufficient capacity to cope with additional flow.
Rate Support Grant	Funding mechanism from CLG to Local Authorities which provides funding for all Local Authority responsibilities.
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 or raising electrical appliances 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 Flood and Water Management Act, the ‘risk management authority’ means— (a) the Environment Agency, (b) a lead local flood authority, (c) a district council for an area for which there is no unitary authority, (d) an internal drainage board; (e) a water company, and (f) a highway authority.
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Stakeholder	A person or organisation affected by the problem or solution, or interested in the problem or solution. They can be individuals or organisations, and includes the public and communities.
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.

1 Identify the Need for a SWMP

1.1 Introduction

The principal output from a Surface Water Management Plan (SWMP) is a preferred strategy for the coordinated management of surface water flood risk within a given area¹, in this instance South Essex, which covers the administrative areas of Basildon Borough Council (BC), Castle Point Borough Council and Rochford District Council (DC) (Appendix A, Figure 1). In the context of the SWMP, surface water flooding incorporates flooding from small ordinary watercourses and ditches, sewers, drains, groundwater and runoff from land, occurring as a result of heavy rainfall.

The SWMP Technical Guidance issued by Defra in March 2010 emphasises that SWMPs may not be required in all locations. Studies should be prioritised in areas considered to be at greatest risk of surface water flooding or where partnership working is essential to both understand and subsequently address surface water flooding issues.

The preparation phase of this report provides an overview of the rationale behind the need for a SWMP in South Essex, including the history of flooding issues and problems from surface water and sewer flooding, the complexity of flooding mechanisms due to drainage system interactions, the fragmented nature of asset ownership and management, proposed future redevelopment and urban growth in the study area and the impacts of existing and emerging policy and legislation. The preparation phase includes a Project Governance Framework which will identify partners to be involved, outline roles and responsibilities, and how partners should engage with stakeholders.

1.2 History of Surface Water Flooding

According to national research undertaken by Defra², there are more than 12,800 properties estimated to be at risk of surface water flooding within the South Essex area in England. Table 1-1 provides a summary of the findings relevant to the study area.

Table 1-1: Settlements Susceptible to Surface Water Flooding in South Essex (Defra National Rank Order, 2009)

Settlement Name	Estimated No. of Properties at Risk	Settlement National Rank
Basildon	3,800	84 th
Wickford	3,400	98 th
Canvey Island	1,700	204 th
Rochford	1,400	242 nd
Benfleet	1000	316 th
Billericay	560	511 th
Rayleigh	400	645 th
Hockley	320	741 st
North Benfleet	100	1411 th

¹ Defra (March 2010) Surface Water Management Plan Technical Guidance www.defra.co.uk

² National Rank Order of Settlements Susceptible to Surface Water Flooding, Defra 2009

Settlement Name	Estimated No. of Properties at Risk	Settlement National Rank
Great and Little Wakering	60	1824 th
Hullbridge	50	1897 th
Ramsden Bellhouse	30	2161 st
Little Burstead	10	2896 th
TOTAL	12,830 properties	

Flooding associated with surface water runoff, inadequacies in the local drainage system and from ordinary watercourses is widespread in all three boroughs and therefore requires further investigation which will be undertaken as part of this SWMP. Heavy rainfall in January 2011 caused widespread disruption in the study area (see Plate 1-1) and emphasised the need for a strategic approach to identifying measures to manage and reduce the impact of surface water flooding

Plate 1-1: Surface Water flooding on 18th January 2011



a) North Avenue, Canvey Island



b) Waterside playing fields, Canvey Island

At the time of completing the Phase I report, the Environment Agency has provided a draft map of indicative flood risk areas, as required under the Flood Risk Regulations, to Essex County Council in its role as Lead Local Flood Authority (LLFA) to support the production of a Preliminary Flood Risk Assessment (PFRA). The draft outputs identify an area covering Basildon, Rochford, Castle Point and neighbouring Southend-on-sea as one of 10 indicative areas where greater than 30,000 people are at risk from surface water flooding, providing further evidence of the need for a strategic approach to manage the risk from surface water flooding.

1.3 Drainage System Interactions

In the context of SWMPs, surface water flooding incorporates flooding from sewers, drains, groundwater, and runoff from land, small watercourses and ditches occurring as a result of

heavy rainfall. These sources may operate independently or through a more complex interaction of several sources.

An initial overview of the flooding issues in South Essex reveals areas that are affected by multiple sources of flood risk and complex interactions between urban watercourses, direct surface water ponding, overland flow paths and the surface water sewer system.

In order for these flooding mechanisms to be adequately assessed, a holistic approach to surface water management is required. The SWMP approach will seek to ensure that all sources and mechanisms of surface water flood risk are assessed and that solutions are considered in a holistic manner, so that measures are not adopted that reduce the risk of flooding from one source to the detriment of another.

1.4 Unknown & Fragmented Responsibilities

In areas of multiple sources of flood risk and complicated interactions between different sources of flooding there are likely to be multiple water or drainage regulators, owners and maintainers. In South Essex there are numerous partners with responsibility for decisions regarding drainage assets and areas at risk of flooding including the Risk Management Authorities³ of Basildon BC, Castle Point BC, Rochford DC, Essex CC, Environment Agency and Anglian Water Services.

It is essential that all relevant partners who are responsible for making decisions and taking actions are involved in plans for flood risk management from the outset. The purpose of the SWMP for South Essex is to strengthen the partnership between these organisations and ensure inclusivity through all phases of this study and future flood risk management.

1.5 Projected Growth & Urbanisation

Basildon Borough Council

Basildon lies within the Thames Gateway area, which is a regional and national priority area for urban growth. The Basildon BC urban area includes the towns of Basildon, Billericay and Wickford. The SWMP for Basildon BC will afford a particular focus on each area allocated for significant development and urbanisation and will identify any potential locations for strategic improvements and upgrades to the existing drainage systems.

Castle Point Borough Council

Castle Point also lies within the Thames Gateway area. The Castle Point BC urban area includes Canvey Island and South Benfleet. Regeneration and development are proposed for Canvey Town Centre and Hadleigh Town Centre. Most of the housing needs can be met from housing provision in existing urban areas, particularly town centres, main route corridors and other undeveloped land.

Rochford District Council

Rochford also lies within the Thames Gateway area. Larger settlements such as Ashingdon, Hullbridge, Hockley, Rayleigh and Rochford are found in the west of the district, with smaller villages in the eastern area.

A number of Area Action Plans are currently being prepared for Hockley, Rochford and Rayleigh which highlight these areas for development and employment provision.

³ As defined in the Flood and Water Management Act 2010)

Overall these plans for urbanisation and redevelopment within the South Essex area present a significant challenge to the existing drainage systems. However, it also affords an important opportunity to address long-standing issues and problems relating to surface water flooding and pressure points on the drainage system through strategic improvements and upgrades to the drainage system.

1.6 Existing & Emerging Legislation

Following the flooding in July 2007, the Government commissioned Sir Michael Pitt to undertake an independent review into the causes and management of flood risk in the areas affected. The recommendations from the review formed a key element of the drivers for the establishment of the subsequent Flood and Water Management Act and therefore some of the key aims of the Act are to reduce the risk and impact of flooding, improve the Local Authority's ability to manage the risk of flooding, improve water quality and reduce pollution.

The Flood Risk Regulations 2009 came into force in December 2009 and are a set of regulations which translate the EU Floods Directive into law for England and Wales. The Regulations bring the Environment Agency, County Councils and Unitary Authorities together with partners such as water companies to manage flood risk from all sources and to reduce the consequences of flooding on human health, economic activity, cultural heritage and the environment.

All these documents; Sir Michael Pitt's review of the Summer 2007 floods, the subsequent Flood and Water Management Act and the Flood Risk Regulations 2009, emphasise the need for local authorities to embrace a leadership role for local flood risk management, ensuring that flood risk from all sources, including flooding from surface water, groundwater and small watercourses, is identified and managed as part of locally agreed work programmes.

In accordance with these recommendations and emerging requirements, the councils within the client group, Basildon BC, Castle Point BC and Rochford DC and Essex CC have begun the process of preparing a Surface Water Management Plan.

1.7 Summary

South Essex has a history of widespread and severe surface water flooding. There are multiple and interlinked sources of flooding across the three Council areas which will require holistic management and solutions. In order to achieve this, engagement of multiple responsible organisations from an early stage in the flood risk management process is required. In addition, any plans to increase the level of development in and around the main centres of Basildon, Billericay, Wickford, Benfleet, Canvey Island, Rayleigh, and Rochford will result in additional strain on an often already overloaded drainage system. It is therefore crucial that issues relating to surface water flooding are addressed when and where new development is proposed to maximise the potential for strategic improvements such as flood storage, SuDS retrofit, and/or upgrades to the drainage system.

On top of these issues, existing and emerging legislation strongly advocates the leadership role of local authorities in local flood risk management and the preparation of SWMPs where there is a clear need.

In the light of these factors, it is evident that further works need to be undertaken to address surface water flooding issues in the boroughs and to develop a strategy for urban surface water management that is evidence based, risk based, future proofed and inclusive of stakeholder views and preferences. This is the purpose of the South Essex Surface Water Management Plan.

2 A Partnership Approach

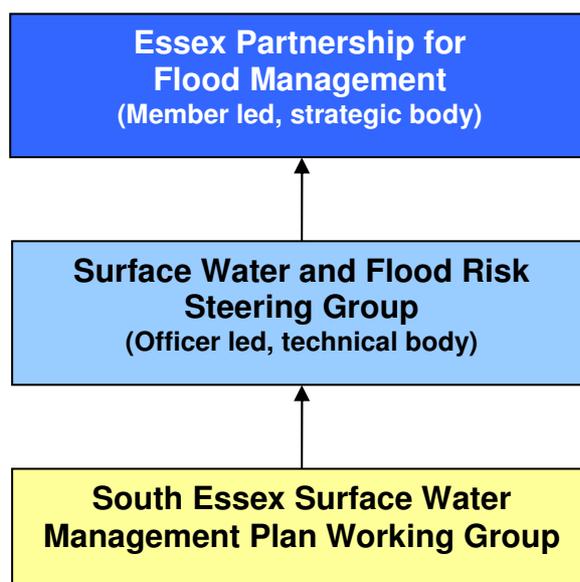
2.1 Essex Flood Risk Partnership

It is the role of Essex CC as LLFA to forge effective partnerships with the Districts and Borough Councils within its area, Anglian Water, Thames Water and the Environment Agency, as well as other key stakeholders and risk management authorities.

In order to achieve this, the Essex Partnership for Flood Management was established which is led by elected members focusing on overall strategy and in particular funding and communications. It also led to the development of the Flood and Water Management Steering Group internally, which acts as an officer-led operational group with representatives from Environment Agency, Anglian Water and a number of the District and Borough Councils.

Figure 2-1 details the Flood Group Structure established by Essex CC.

Figure 2-1: Flood Group Structure



2.2 Essential Partners

Throughout the SWMP it is proposed to build on the existing partnerships that have been established through the work undertaken for the Strategic Flood Risk Assessment (2010/2011), the Essex Resilience Forum and the Essex Preliminary Flood Risk Assessment (2011). In line with the Defra SWMP Technical Guidance, the following organisations are essential partners for the SWMP (Table 2-1 details the key partners involved in the SWMP).

- Basildon Borough Council;
- Castle Point Borough Council;
- Essex County Council;
- Rochford District Council;

- Environment Agency; and,
- Anglian Water.

Basildon BC are the lead accountable local authority for the Working Group and are responsible for ensuring that the SWMP is developed in accordance with the project brief.

In order for the SWMP study and future flood risk management more generally within South Essex to be successful, it is essential that relevant partners and stakeholders, who share the responsibility for necessary decisions and actions, work collaboratively to understand existing and future surface water flood risk in the three boroughs.

Table 2-1 provides a summary of the partners and stakeholders that are likely to be required in the completion of the South Essex SWMP. The table also provides a summary of the information that they are responsible for providing, where available, and how the SWMP may impact their operations. Appendix B includes contact information for essential and lead partners in the study.

Table 2-1: Key Stakeholders

Partner / Stakeholder	Role	Responsibility for Sharing Information about	How the SWMP will inform their operations	Name	Role	Email
Essex County Council	Overall leadership role throughout Essex in local Flood Risk Management as LLFA. Responsible for SWMPs adoption and enforcement ⁴	Responsible under the Flood and Water Management Act 2010 as Lead Local Flood Authority to establish and maintain a register of structures and features which are likely to have a significant effect on flood risk. Highways drainage Reported flood incidents Sustainable drainage systems in their control	Prepare and planning for emergencies Controlling drainage for new development through planning controls Allocating land use and adopting surface water management policies	Nick Humfrey	Flood Partnership Manager	nicholas.humfrey@essex.gov.uk
				Lucy Gosling	Flood Investigations Officer	lucy.gosling@essex.gov.uk
Basildon Borough Council	Lead Partners for the preparation and delivery of the South Essex SWMP and responsible for ensuring that and that a partnership approach is adopted and ensuring that objectives are set and met.	Land use planning and urban development Green space Sustainable drainage systems in their control Ordinary watercourses in their control Strategic Flood Risk Assessment Reported flood incidents Costs and practicalities of re-engineering streets and green space as flow routes or storage Operations and maintenance regimes	Controlling drainage for new development through planning controls Use opportunities arising from development and redevelopment to work in partnership with developers to implement SWMP Communicate with residents about surface water flooding Refurbish and improve the urban environment Plan operations and maintenance regimes Invest in local flood risk management, in particular highways drainage and ordinary watercourses	Matthew Winslow	Basildon Borough Council, Senior Planning Officer	matthew.winslow@basildon.gov.uk
Emmanuelle Meunier				Basildon Borough Council, Sustainability Assessment Officer	emmanuelle.meunier@basildon.gov.uk	
Amanda Raffaelli				Castle Point Borough Council, Senior Planning Officer	araffaelli@castlepoint.gov.uk	
Rochford District Council				Rochford District Council, Planning Policy Team Leader	samuel.hollingworth@rochford.gov.uk	
Environment Agency	Essential Partner for SWMP	River flows, levels and flooding River flow models CFMP Reported flood incidents DTM data (e.g. LiDAR) Interactions between rivers or the sea and drainage systems Operation and maintenance regimes Long term investment plans National Property Dataset (subject to licensing restrictions)	Prepare for emergencies Communicate with residents about all sources of flooding Invest in flood risk management (especially for smaller urban 'main' watercourses) Plan operations and maintenance regimes	Jeremy Bloomfield	Team Leader, Flood Risk & Mapping Data Management	jeremy.bloomfield@environment-agency.gov.uk
				Andrew Hunter	Planning Liaison Officer	andrew.hunter@environment-agency.gov.uk
Anglian Water	Essential Partner for SWMP responsible for public sewer systems and the reduction of sewer flooding. Responsible for 'effectually draining' their area (Water Industry Act 1991).	Sewer network capacity and performance Reported flood incidents Sewer and network models Costs and practicalities of sewer rehabilitation Drainage Area Plans and Sewerage Management Plans Long term investment plans Sustainable drainage systems in their control	Prepare for emergencies Communicate with residents about sewer flooding Undertake Drainage Area and Sewerage Management Plans Plan their investment in sewerage systems Respond to climate and population change Work with developers to adopt some drainage infrastructure for new developments	Mark Leggett	Anglian Water, Senior Asset Planner	mLeggett@anglianwater.co.uk
Natural England	Potential Partner	Designated sites that might be affected or improved by solutions	Ensure ongoing protection of designated sites from the effects of surface water management Potential for linkage of surface water management solutions with green infrastructure for biodiversity and ecological gain	Chris Keeling	Species Advisor	chris.keeling@naturalengland.org.uk
Riparian Owner	Potential Partner for the SWMP if responsible for improvement to open channel or culverted watercourses essential to surface water drainage.	Flooding incidents Operation and maintenance of channels in their control				
Developers	Key Stakeholder for SWMP especially where large areas of new development are proposed.	Development proposals as early as possible, thus ensuring any surface water issues are fully integrated into the SWMP				

⁴ At the time of completion of this Phase I report, Essex County Council as LLFA have the responsibility for adopting the SWMPs and enacting the recommendations of it, until such time as agreement has been made for delegation of these powers and responsibilities to the lower tier authorities

2.3 Benefits of Collaborative Working

In order to deliver the SWMPs for the study area, a Working Group has been set up consisting of the lead partners and the essential partners for the project.

A number of benefits will arise from the collaborative working between members of the South Essex Working Group, including:

- Greater understanding of urban drainage by a range of organisations;
- A shared understanding of flood risk across the Councils, Anglian Water, and the Environment Agency;
- Efficiency savings for ‘essential partners’ though achieving outcomes;
- Appraisal of surface water drainage options;
- Greater certainty for developers concerning appropriate drainage;
- Quicker, more certain decisions on development and infrastructure provision; and
- Overall reduction in flood risk to Basildon BC, Rochford DC and Castle Point BC (primarily driven through the latter SWMP phases III and IV).

2.4 Project Governance Framework

The Working Group has two main functions;

- A strategic function to contribute to the delivery of the SWMP by establishing a shared understanding of flood risk and agreeing a coordinated approach to reduce the risk; and,
- An operational function to improve the co-ordination of flood incident management and emergency response.

A project governance framework has been prepared⁵. This document sets out proposed roles and responsibilities for ‘essential partner’ organisations feeding into the Working Group including Anglian Water and the Environment Agency, as well as the objectives and terms of reference of the Client Group, and proposed lines of communication.

This document is included in Appendix C and should be consulted for more detailed information regarding the working relationship between key partner organisations throughout the completion of the SWMP and for future flood risk management.

⁵ Scott Wilson (January 2011) Project Governance Framework

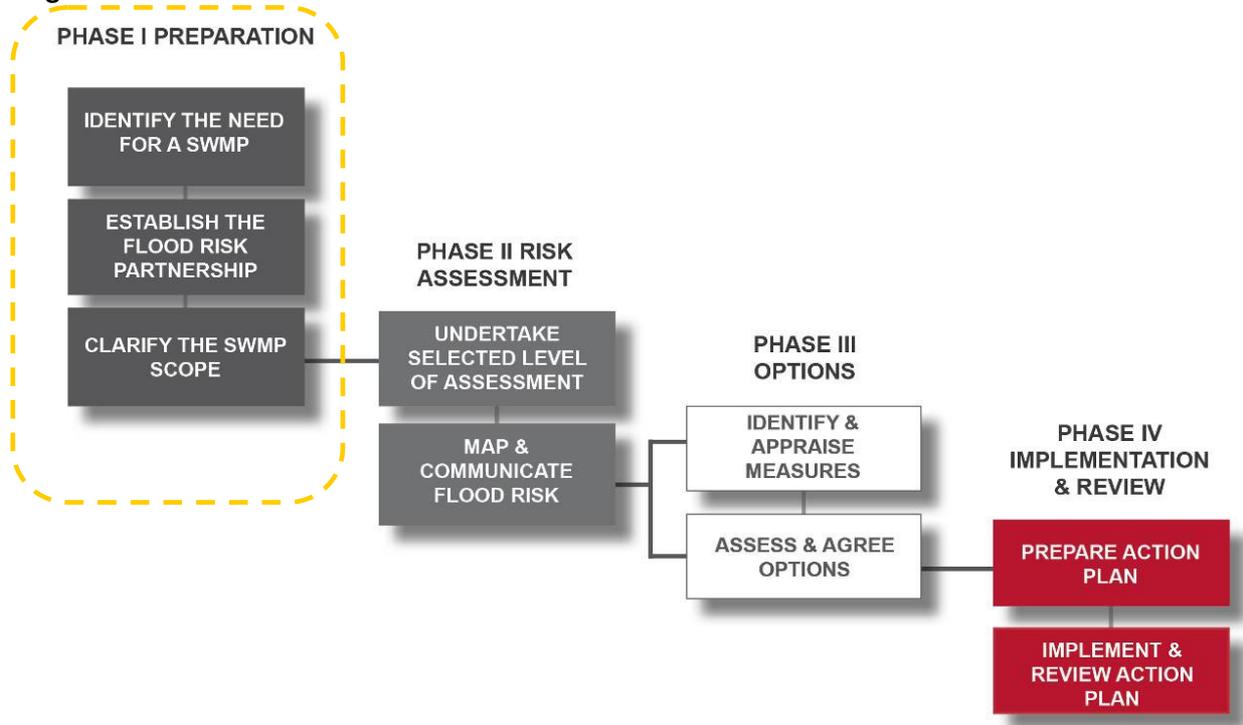
3 Clarify the SWMP Scope

3.1 Structure

The principal output from a Surface Water Management Plan (SWMP) is an action plan which outlines the preferred strategy for the coordinated management of surface water flood risk within a given area.

The Defra SWMP Technical Guidance identifies four key phases of a SWMP as shown in Figure 3-1.

Figure 3-1: Phases of SWMP



The first three phases involve undertaking the 'SWMP study', whilst the fourth phase involves producing and implementing the 'action plan', founded on the evidence base of the Phase I – III SWMP study. This report constitutes the outputs and summary of Phase I (Preparation) of a SWMP for South Essex.

3.2 Aims & Objectives

The overarching objectives of the SWMP as defined by the Client Group are:

- to provide a co-ordinated flood risk management and operational response service to the communities within the South Essex study area;
- integrate and share 'essential partners' knowledge concerning drainage and flood risk issues (main river, ordinary watercourses, groundwater, sewer and pluvial flood risk);
- improve co-ordination between the 'essential partners' (Anglian Water, Basildon BC, Castle Point BC, Rochford DC, Essex CC, and the Environment Agency);
- provide a forum and means of influence planning applications to ensure appropriate SuDS for future development proposals;
- help to ensure new developments have appropriate drainage mechanisms in place; and,
- inform the allocation of new growth and land use policies.

The following specific objectives have therefore been developed for each phase of the South Essex SWMP:

Phase I – Preparation:

- identify the specific needs for a SWMP in the study area and determine the local project drivers;
- build upon the established Client and Technical Advisory Group (from previous SFRA and Water Cycle Study work) to continue to develop a joint understanding of flood risk within the study area and overcome the division of responsibility in urban drainage;
- collate existing information regarding flood risk from all sources and undertake a gap analysis of this data; and,
- determine an appropriate level of assessment for the South Essex SWMP.

Phase II – Risk Assessment

- undertake further data collection or agree a suitable substitute for key missing data identified in the Phase I data gap analysis;
- map flood risk from all sources using data collected, including assessment of groundwater flood risk;
- undertake a suitable modelling approach to enable an intermediate assessment of surface water flood risk in the study area and map the results of the pluvial modelling;
- quantify the risks from surface water flooding through the identification of overland flow paths and areas of surface water ponding leading to an assessment of properties and infrastructure at risk;
- using intermediate modelling, and the risk of flooding from all sources (including groundwater), identify surface water flooding hotspots and Critical Drainage Areas (CDAs) requiring further assessment or potential management options;
- communicate flood risks to relevant bodies within the local South Essex flood risk partnership;
- provide recommendations for detailed risk assessment if appropriate; and,

- Undertake detailed risk assessment where required for flooding hotspots or CDAs.

Phase III – Options

- provide initial identification of potential options for surface water management in the study areas;
- advise on ‘early actions/quick wins’ or practical solutions that can be implemented;
- advise on the potential for Integrated Drainage Strategies for strategic development sites;
- undertake an assessment of shortlisted options for flooding hotspots or CDAs via a cost benefit analysis; and,
- agree preferred options.

Phase IV – Implementation & Review

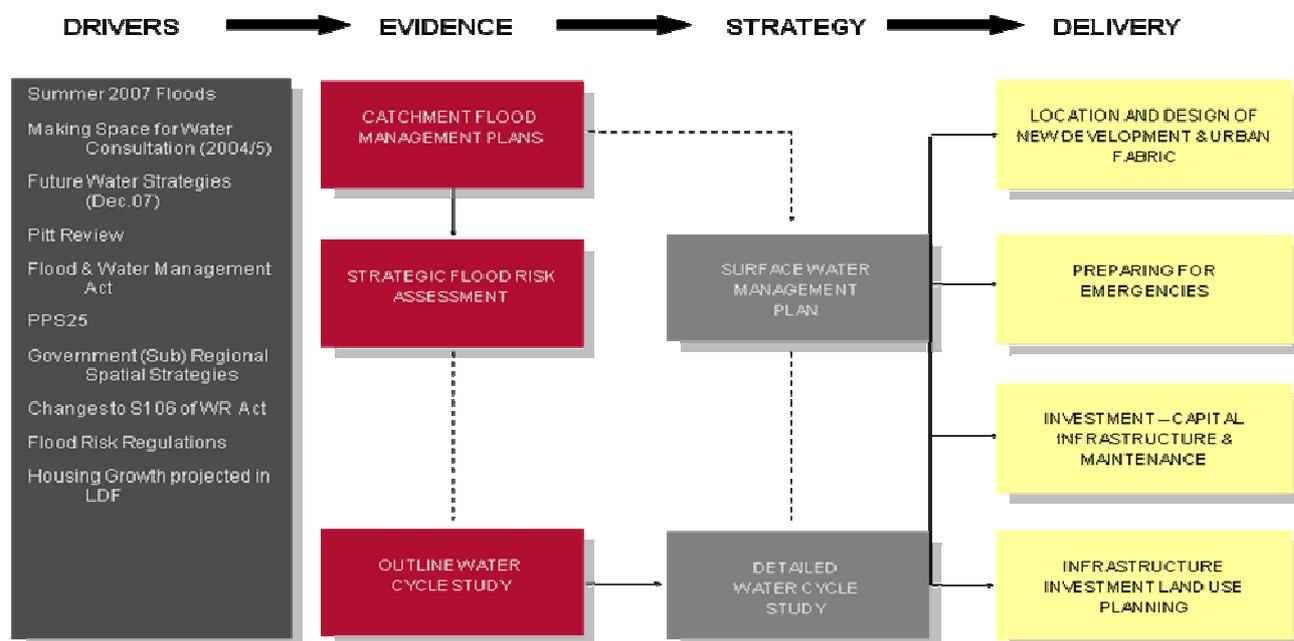
- collate information from SWMP Phase I to III and prepare surface water management action plan for implementing the preferred options;
- outline the preferred options, actions required by each partner and stakeholder, who will pay for actions and timetable for implementation;
- provide advice and information to local authority planners (including forward planners), local resilience forums and emergency planners; and,
- Provide guidance on the implementation and review of the action plan to be completed by Essex County Council as the LLFA and owner of the plan (or the Local Planning Authorities if and when powers are delegated).

3.3 Linkages with Other Plans

It is important that the SWMP is not viewed as an isolated document, but one that connects with other strategic and local plans, for example the Southend-on-Sea SWMP and the Thurrock SWMP.

Figure 3-2 below shows URS/Scott Wilson’s interpretation of the drivers behind the South Essex SWMP, the evidence base and how the SWMP supports the delivery of other key spatial planning and investment processes.

Figure 3-2: 'Where SWMPs Fit In', Scott Wilson (2009)



Environment Agency Plans

River Basin Management Plan

The River Basin Management Plan for the Anglian River Basin District addresses the pressures facing the water environment in the district and the actions required to protect and improve the water environment. This plan has been developed in consultation with a wide range of organisations and individuals and is the first of a series of six-year planning cycles. The first cycle will end in 2015 when, following further planning and consultation, this plan will be updated and reissued.

Catchment Flood Management Plan (CFMP)

The South Essex CFMP and the North Essex CFMP were published in 2008 and set out policies for the sustainable management of flood risk across the whole catchment over the long-term (50 to 100 years) taking climate change into account. The CFMPs emphasise the role of the floodplain as an important asset for the management of flood risk, the crucial opportunities provided by new development and regeneration to manage risk and the need to re-create river corridors so that rivers can flow and flood more naturally.

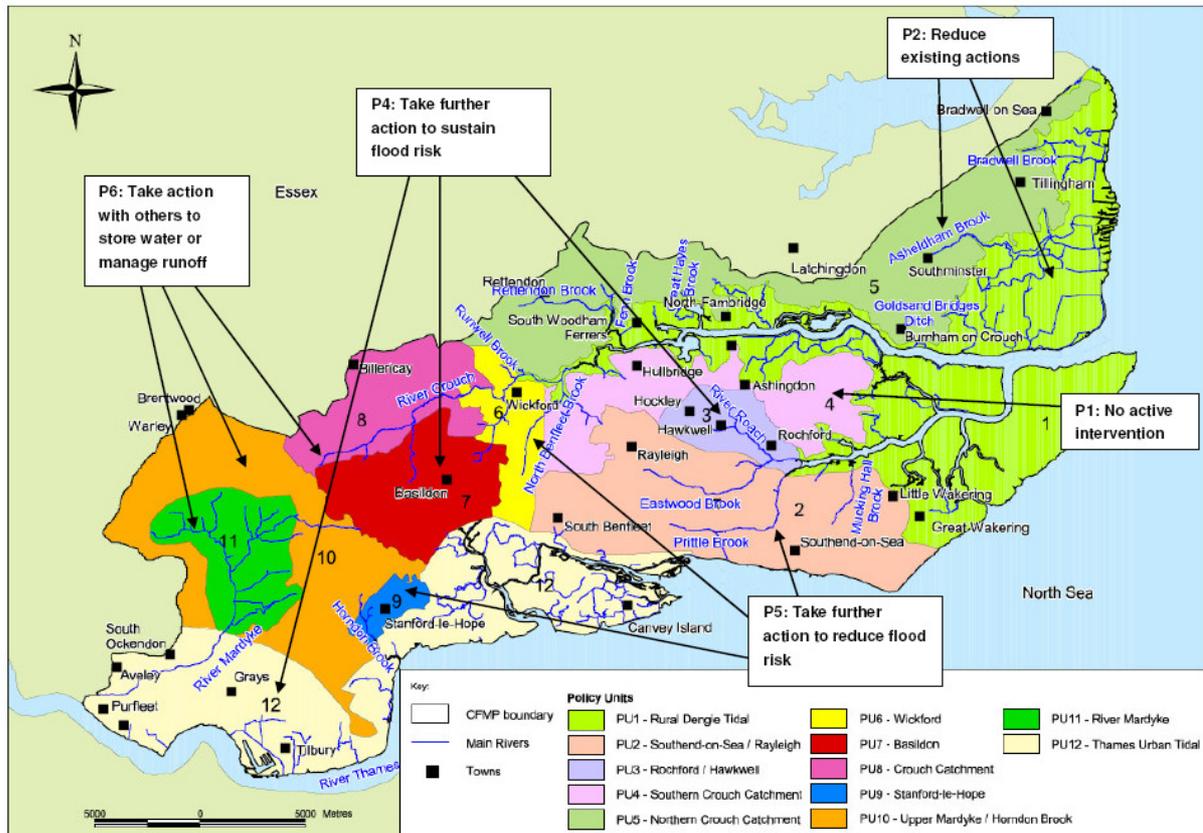
The CFMPs will be periodically reviewed, approximately five years from when it was published, to ensure that it continues to reflect any changes in the catchment.

The South Essex CFMP

The South Essex CFMP policies cover the areas within Basildon BC, Rochford DC and Castle Point BC are shown in

Figure 3-3.

Figure 3-3: South Essex CFMP Policy Areas (extracted from South Essex CFMP, 2008)



Preferred Policies

CFMP Policy Unit 1 – Dengie Rural, Tidal

- This unit covers the area for the Rural Dengie Tidal area, some of which falls within Rochford DC. The selected policy for this area is Policy 2, which involves reducing existing flood risk management actions. Surface water flooding is highlighted as causing damage to properties within the study area in Great and Little Wakering and Ashingdon.

CFMP Policy Unit 2 – Southend-on-Sea & Rayleigh

- This unit covers the area for Southend-on-Sea and Rayleigh, part of which falls within Castle Point BC. The selected policy for this area is Policy 5, which proposes further action to sustain the current level of flood risk into the future. Surface water flooding is highlighted as causing problems in localised areas within the study area, in Rayleigh specifically.

CFMP Policy Unit 3 – Rochford/Hawkwell

- This unit covers the area for Rochford and Hawkwell, which falls within Rochford DC. The selected policy for this area is Policy 4, which proposes further action to reduce flood risk now and in the future. Surface water flooding is highlighted as causing problems in localised areas in Rochford and Hawkwell.

CFMP Policy Unit 4 – Southern Crouch Catchment

- This unit covers the low risk rural areas to the south of the River Crouch estuary, which falls within Rochford DC. The selected policy for this area is Policy 1, which proposes no active

intervention. Surface water flooding is highlighted as causing problems in localised areas in Ashingdon.

CFMP Policy Unit 6 – Wickford

- This unit covers the extended urban area of Wickford and the surrounding area and falls within Basildon BC. The area is predominantly urban with some open parkland to the south-west. The selected policy for this area is Policy 5, which involves taking further action to reduce flood risk now and in the future. Surface water flooding is highlighted as causing problems along Castledon Road to the west of Wickford.

CFMP Policy Unit 7 – Basildon

- This unit covers the urban area of Basildon, located in the upper River Crouch catchment, upstream of Wickford, and falls within Basildon BC. The selected policy for this area is Policy 4, which involves taking further action to sustain the current level of flood risk into the future. Surface water flooding is highlighted as causing problems in localised areas in Basildon.

CFMP Policy Unit 8 – Crouch Catchment

- This unit covers the upper (and relatively rural) River Crouch sub-catchment; it excludes the urban areas of Basildon and Wickford, and falls within Basildon BC. The selected policy for this area is Policy 6, which involves taking action with others to store water or manage runoff in locations that provide overall flood risk reduction or environmental benefits locally or elsewhere in the catchment.

CFMP Policy Unit 12 – Thames Urban, Tidal

- This unit covers the area of Canvey Island and is predominantly tidal and low lying (generally below 5mAOD), and falls within Castle Point BC. The selected policy for this area is Policy 4, which involves taking further action to sustain the current level of flood risk into the future.

The North Essex CFMP

The North Essex CFMP policies cover north Billericay, within Basildon BC.

CFMP Policy Unit 2 – Blackwater and Chelmer

- This unit covers the area for north of Billericay, which falls within Basildon BC. The selected policy for this area is Policy 2, which involves reducing existing flood risk management activities.

Thames Estuary 2100

The Thames Estuary 2100 Project (consultation April 2009) was led by the Environment Agency with the aim of developing a long-term tidal flood risk management plan for London and the Thames Estuary. This is in response to the changing climate and ageing flood defence system. The report includes a detailed assessment and appraisal of options available to manage flood risk, their economic benefits and environmental impacts in the short term (next 25 years), medium term (the following 40 years) and long term (to the end of the century).

Hadleigh Marches and Canvey Island in Castle Point and Bowers Marshes and the northern most part of the Fobbing Marshes in Basildon BC is covered by the Thames Estuary 2100 Project.

Action Plan for Zone 6 – Hadleigh Marshes, Policy Unit 2

The area of Hadleigh Marshes on the mainland in Castle Point BC has its own policy unit – Policy P2 has been adopted to “reduce existing flood risk management actions, accepting that flood risk will increase over time”. It is also proposed that the defences protecting the undeveloped Hadleigh Marshes are not improved resulting in the flood risk in this location increasing over time. As this area is undeveloped the implications of this measure are limited.

In addition to proposals regarding flood defences, there are also proposals set out in Thames Estuary 2100 to create new tidal habitats to replace those lost as a result of coastal squeeze. A proposed location for this is at West Canvey Marshes, where freshwater habitats are currently being created. In order to achieve this, the defences would need to be realigned further inland, seeing the currently defended marshlands inundated at high tide.

Action Plan for Zone 7 – Canvey Island, Policy Unit 4

Canvey Island has its own policy unit – Policy P4 which recommends that “further action is taken to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use and climate change)”. It is proposed that existing defences are maintained around Canvey Island to ensure the safety of the community up to 2100 and beyond. However, the Plan also advocates the introduction of community strategies for safe havens, appropriate development and other floodplain management measures as recommended in Government’s guidance PPS25.

Action Plan for Zone 7 – Bowers Marshes, Policy Unit 4

The Bowers Marshes is an open area of freshwater grazing marshes. The area at risk of flooding includes the railway line, the main A130 road, the Wat Tyler Country Park, an electricity generation plant and a sewage works. The flood risk management policy for this area is Policy 4; to take further action to sustain the current level of flood risk into the future, responding to potential increases in risk from urban development, land use change and climate change.

Action Plan for Zone 7 – Fobbing Marshes, Policy Unit 3

The Fobbing Marshes extend northwards just inside the Basildon BC administrative boundary. This area comprises freshwater marshes, some of which are designated SSSIs. The flood risk management policy for this area is Policy 3, to continue with existing or alternative actions to manage flood risk at the current level, accepting that flood risk will increase over time from this baseline. This approach is to be supplemented with local secondary defences to protect key sites where necessary.

TGSE Strategic Flood Risk Assessment

In collaboration with the Environment Agency, the boroughs of Thurrock Council, Basildon BC, Castle Point BC, Southend-on-Sea BC, Rochford DC and Essex CC, established the Thames Gateway South Essex (TGSE) Partnership and co-ordinated a joint SFRA (2006). A review of the TGSE SFRA, for Basildon BC, Rochford DC and Castle Point BC is currently being undertaken by URS/Scott Wilson.

Basildon Borough Council Plans

Core Strategy

The Core Strategy document is currently being prepared, and will set out the spatial vision, strategic objectives and policies for growth in the borough, including locations for proposed new housing, retail and business development up to 2032. As plans progress within each of the

broad areas allocated for growth and regeneration the findings of the SWMP should be considered and implemented as appropriate.

Castle Point Borough Council Plans

Core Strategy

The Core Strategy was sent for examination by the Secretary of State in June 2010. However, owing to changes in Government policy and the revocation of the Regional Spatial Strategy, the Council is currently undertaking a further consultation of a revised document. Separate Planning Documents have been produced for Canvey Town Centre and Hadleigh Town Centre. As plans progress within each of these broad areas allocated for growth and regeneration the findings of the SWMP should be considered and implemented as appropriate.

Rochford District Council Plans

Core Strategy

The Core Strategy presents the spatial vision, strategic objectives and policies for growth in the borough over the next 15 years, including locations for proposed new housing, retail and business development. This document has been sent to the Secretary of State for independent examination. Following recent changes in Government Policy, in particular the revocation of the Regional Spatial Strategy, the Council have confirmed that the submitted documents are still considered to remain sound and await the Inspector's judgement. As plans progress within each of the areas allocated for growth and regeneration the findings of the SWMP should be considered and implemented as appropriate.

Anglian Water Plans

During the preparation of this Phase I report, Drainage Area Plans have been received from Anglian Water. Documents that would also be useful to the flood risk partnership include the following:

- Sewerage Management Plan
- Asset Management Plan

3.4 Stakeholder Engagement

For the purpose of the SWMP a stakeholder is defined as anyone affected by, or interested in, the surface water problem or proposed solution. Stakeholders are often individual homeowners but they can include organisations and communities. Different stakeholders should be engaged to provide a rounded view of the issues.

It is important that Basildon BC, Rochford DC, Castle Point BC and Essex CC liaise with stakeholders in an on-going process as they have often experienced flooding first hand and can provide invaluable information. Also, to ensure the smooth running and effective implementation of potential mitigation measures (especially those which may lead to local disruption e.g. road works), stakeholder engagement is required from the start.

The SWMP process supports liaison with local stakeholders throughout the process, however it also highlights the importance of managing their expectations.

It is suggested that as the SWMP continues to move forward to Phases III and IV (options and implementation stages), that local stakeholders (especially those identified in vulnerable areas) are contacted for their views on flood risk mitigation options and to exchange ideas about what they would like to see as potential outcomes.

The following engagement priorities are suggested to be taken forward by the Working Group:

- Engage with stakeholders to raise the profile of flood risk – potentially through a leaflet drop or website links;
- Provide a single point of contact at the Essex CC for surface water drainage problems to be reported to;
- Provide a newsletter/leaflet to promote schemes that have been completed in order to reduce existing flood risk;

In keeping with the Technical guidance, URS/Scott Wilson developed a communication and stakeholder engagement plan with the SWMP Working Group during Phase I. This is a key document that sets out:

- the engagement and communications objectives of the SWMP;
- the key stakeholders and audiences;
- a stakeholder engagement plan;
- a proposed public consultation approach, including responsibilities for the client group partners and the wider working group;
- a communications schedule outlining when and how stakeholders and the wider public will be informed and asked to contribute to the SWMP; and,
- initial key messages for the study, including suggested Frequently Asked Questions (FAQs) on the SWMP process.

The communications plan will be reviewed during the SWMP process and hence will remain as a live document.

3.5 Data Review

One of the key components of a shared understanding of flood risk is the transfer of flood risk data between, and across, organisations. This section sets out the results of the comprehensive data collection and review undertaken during Phase 1.

Data has been collated, recorded and analysed by URS/Scott Wilson. Data collected has been recorded in a project data register which documents the source of the data and its completeness. In line with the SWMP technical guidance (Defra 2009), the quality of the data has been scored using the following classifications:



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.

Table 3-1: Data Register

Category	Data / Information	Source	Provided	Details	Format	Quality Score	Comments / Limitations
Asset Data and Information	Highway drainage records	Highway Authority	✓		Excel	1	
	'Ordinary watercourses'	Basildon BC	✓		GIS	1	
		Rochford DC	✓		GIS	1	
		Castle Point BC	✓		GIS	1	
	Maintenance regimes and records	Basildon BC	✓		PDF	1	
		Rochford DC					
		Castle Point BC					
	Foul / combined surface water models	Anglian Water					
	Drainage asset data	Anglian Water	✓	Locations of pipes, sewer outfalls, CSOs	GIS	1	
Information on local watercourses	Environment Agency	✓		GIS	1		
	Basildon BC	✓		GIS	1		
	Rochford DC						
	Castle Point BC	✓		GIS	1		
Location of critical infrastructure	Essex Resilience Forum & Partner Authorities	✓	Location of national receptors and other critical infrastructure	GIS and Excel	1		
Borehole records	Environment Agency						
Background Information	OS Mapping data	Basildon BC	✓	50,000, 10,000 and OS Mastermap	GIS	1	
		Rochford DC	✓	50,000	GIS	1	Licence needs amending
		Castle Point BC	✓	50,000, 10,000	GIS	1	Licence needs amending

Category	Data / Information	Source	Provided	Details	Format	Quality Score	Comments / Limitations
	Ground data	Any of the partners may hold this	✓	2m resolution Light Detection and Ranging (LiDAR) data	GIS	2	2m resolution LiDAR will be adequate for intermediate assessment; however, 1m resolution data is required should detailed modelling of flooding hotspots or CDAs be required.
	Flood Map for Surface Water	Essex County Council	✓	Coverage for all of South Essex	GIS	1	
	Supporting Documents	All partners	✓		PDF	1	
	Geological data	BGS	✓		GIS	1	
	Aerial photography	Basildon BC Rochford DC Castle Point BC	✓			1	Not available under licence
	Ward Boundaries	Basildon BC Rochford DC Castle Point BC	✓ ✓ ✓		GIS GIS GIS	1 1 1	
	Parks and Open Spaces	Basildon BC Rochford DC Castle Point BC	✓ ✓ ✓		GIS GIS GIS	1 1 1	
Historical Information	Historic flood incident data	Basildon BC Rochford DC Castle Point BC	✓ ✓ ✓		Excel/PDF Excel/PDF Excel/PDF	1 1 1	

Category	Data / Information	Source	Provided	Details	Format	Quality Score	Comments / Limitations	
	Rainfall data	Environment Agency	✓	Rainfall data	Excel	1		
	DG5 Register	Anglian Water	✓		Excel	1		
Document & Plans	Development proposals	Partner Authorities						
	Drainage Area Plans	Anglian Water	✓		PDF	1		
	Emergency Plans	Partner authorities & Essex Resilience Forum	✓		PDF	1		
Future development information	Strategic Flood Risk Assessment	Local Planning Authorities	✓	Level One and Two Reports	PDF	2	Update of SFRAs currently being undertaken	
	Catchment Flood Management Plan	Environment Agency	✓	North and South Essex CFMPs	PDF	1		
	TE2100	Environment Agency	✓		PDF	1		
	Existing flood management plan		Basildon BC	✓		PDF	1	
			Rochford DC	✓		PDF	1	
Castle Point BC			✓	PDF		1		
Future proposals	Environment Agency							
Water Quality Information	Water quality information	Environment Agency	✓		Excel	1		
	Continuous and intermittent discharges	Anglian Water	✓		Excel	1		

Data Gap Analysis

The data availability analysis has identified two data gaps that need to be filled during the early stages of Phase II of the SWMP. These include:

- 1m resolution LiDAR data for CDAs or flooding hotspots. This will be required if detailed modelling is proposed for these locations in Phase II; and
- Maintenance regimes and records for Castle Point BC and Rochford DC.

3.6 Level of Assessment adopted for SWMP

SWMPs can function at different geographical scales and therefore necessarily at differing scales of detail. Table 3-2 defines the potential levels of assessment within a SWMP as taken from the Technical Guidance.

Table 3-2: SWMP Study: Levels of Assessment (Defra 2010)

Level of Assessment	Appropriate Scale	Outputs
1. Strategic Assessment	County wide	Broad understanding of locations that are more vulnerable to surface water flooding. Prioritised list for further assessment. Outline maps to inform spatial and emergency planning.
2. Intermediate Assessment	Borough wide	Identify flood hotspots which might require further analysis through detailed assessment. Identify immediate mitigation measures which can be implemented. Inform spatial and emergency planning.
3. Detailed Assessment	Known flooding hotspots	Detailed assessment of cause and consequences of flooding. Use to understand the mechanisms and test mitigation measures, through modelling of surface and sub-surface drainage systems.

The recently produced national Flood Map for Surface Water (Figure 2a-f, Appendix A) has been made available for the study and covers Essex County. The information provided by the mapping is sufficient to represent the strategic level assessment and to inform outline inputs into spatial and emergency planning. This information is being used by the partner authorities to inform their ongoing Local development Framework and emergency plans. The maps will be used in Phase II to identify the key urban areas of the study area that will be modelled in the intermediate level assessment.

Phase II - Intermediate Assessment

As shown in Table 3-2, the intermediate assessment is applicable across a large town, city or borough. In the light of historical flooding and the results from the over-arching national pluvial modelling suggesting that there are 12,830 properties at risk across the three boroughs, it is appropriate to adopt this level of assessment to further quantify the risks.

The purpose of the intermediate assessment to be undertaken in Phase II will be to further identify those parts of the study area that are likely to be at greater risk of surface water flooding and require more detailed assessment.

The outputs from this intermediate assessment should be used to update spatial and emergency planning and to identify potential mitigation measures including quick win measures

which can be implemented to reduce surface water flooding. These may include improved maintenance and clearance of blockages.

Detailed Assessment

As stated above, it is the purpose of the immediate assessment to identify those parts of the three boroughs that may require more detailed assessments to gain an improved understanding of the causes and consequences of surface water flooding, together with testing the benefits and costs of any suitable mitigation measures. This is typically undertaken using modelling of the surface and subsurface drainage system where required.

4 Conclusions

4.1 Phase I - summary

Overall, and inline with the Defra Technical guidance, the Phase I South Essex SWMP has achieved the following:

- data has been collected to enable Phase II intermediate modelling to begin;
- gaps in available data have been highlighted, and steps will be taken for this to be obtained at the beginning of Phase II;
- the 'essential partner's have been identified and the 'SWMP Working Group has been set up to guide progress through each of the four phases; and,
- the wider stakeholders have been identified and the level at which they will be contacted; a full communications and engagement plan has been produced along with a Governance Structure to support the delivery of the SWMP.

4.2 The next Step: Phase II

Phase II will involve:

- intermediate direct rainfall pluvial modelling for the urban areas within Basildon BC, Castle Point BC and Rochford DC, with the Environment Agency Flood Map for Surface Water used for the eastern part of Rochford DC;
- hydrological site investigations with a member of the drainage team from each Council;
- identification of Critical Drainage Areas (CDAs);
- review of data relating to the existing sewer system from Anglian Water;
- a borough-wide groundwater assessment;
- provide recommendations for detailed risk assessment of identified CDAs, if appropriate;
- further implementation of actions for consultation as recommended by the communication and engagement plan; and,
- identify specification and cost of bespoke asset register.