

Thurrock Borough Council

# Thurrock Water Cycle Study Scoping Study

Scoping Report February 2009



Prepared for:



#### **Revision Schedule**

#### Thurrock Water Cycle Study Scoping Report

February 2009

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# Table of Contents

1	Executive Summary	1
2	Introduction	3
2.1	Background	3
2.2	Aims and Objectives	3
3	Thurrock Water Cycle Study	5
3.1	The Water Cycle	5
3.2	Implications for Development	5
3.3	Stages of a Water Cycle Study	6
3.4	Integration with the Planning System	9
3.5	Data Availability	9
4	Development in Thurrock	10
4.1	Thurrock	10
4.2	National, Regional and Local Drivers and Policies	11
4.3	Housing/Employment Development	20
4.4	Development Areas	20
5	Water Cycle Environment and Infrastructure Baseline	23
5.1	Introduction	23
5.2	Water Resources & Supply	23
5.3	Flood Risk	
5.4	Wastewater Treatment and Collection	33
5.5	Water Quality	33
5.6	Ecology and Biodiversity	35
6	Preliminary Findings, Constraints and Recommendations	38
6.1	Water Resources and Supply	
6.2	Flood Risk & Surface Water Management	40
6.3	Wastewater Treatment and Collection	42
6.4	Water Quality	
6.5	Ecology and Biodiversity	44
7	Progression of WCS	46
7.1	Outline WCS	
7.2	Project Group/Stakeholder	46
Appen	ndix A – Data Catalogue	47

# 1 Executive Summary

The Regional Spatial Strategy (RSS) for the East of England ('The East of England Plan') was published in May 2008 and set targets to guide the scale and location of growth in Thurrock up to 2021. Thurrock lies within the Thames Gateway, which is the Government's top priority for regeneration in the UK, with Thurrock Urban Area (from Purfleet in the west to Tilbury/Chadwell St Mary in the east) identified as a Key Centre for Development and Change. As such, Thurrock is targeted with providing a minimum of 18,500 new homes and an indicative 26,000 new jobs by 2021.

As part of Thurrock Borough Council's overall strategy to meet future growth targets set out in the RSS in a sustainable way, a Water Cycle Study (WCS) has been commissioned. This will make up one of a number of strategic studies and plans which will form part of the evidence base supporting the production of Thurrock Borough Council's Local Development Framework. Specifically, the WCS will form an important basis of the Thurrock Core Strategy making up part the Local Development Framework (LDF), as well as providing input to the development of Supplementary Planning Documents to assist in ensuring the delivery of water cycle management requirements at the local planning application level.

The first stage of the Thurrock WCS Borough, the Scoping Study, has been completed to inform and facilitate the undertaking of an Outline and Detailed WCS for Thurrock which, whilst building upon previous work undertaken in the area, will comprise a wider, more holistic, evidence-based approach to feed into the LDF. The Scoping Stage has undertaken a review and provided an overview of capacity issues with regards to clean and wastewater treatment capacity and infrastructure in Thurrock, water resource availability, water quality and potential ecological impacts of development. The impacts of flood risk within the Borough are being assessed within the update to the Thurrock Strategic Flood Risk Assessment (SFRA) and the findings of this study will be reviewed during the next stage of the WCS.

Discussions with Thurrock Borough Council, the Environment Agency, Anglian Water Services, Essex and Suffolk Water and Natural England were undertaken to identify key issues and constraints in relation to the proposed development within Thurrock and make recommendations for further investigation as part of the next stage of the WCS, the Outline Study.

The key findings from the Scoping WCS include:

- No water is available for further abstraction from surface or groundwater sources in Thurrock and therefore additional water resources will be required to meet future water demand from new developments in Thurrock; this is expected to be met through the proposed increase in storage at Abberton Reservoir and the commensurate increase in abstraction and transfer from the Ely-Ouse transfer scheme;
- There are no treatment capacity issues in terms of treating the generated wastewater from the proposed development within Thurrock though there currently exist hydraulic/infrastructure issues with transmitting the generated wastewater to Tilbury waste water treatment works; AWS have planned to address this in AMP5 (up to 2015) with a new trunk sewer serving development proposed to the west of the town, but development will have to be phased to ensure that the required capacity is available with the proposed housing/employment growth;

- The management of surface water has the potential to act as a constraint to development within Thurrock due to space requirements and the onerous reduction in runoff rates and volumes to limit discharges into and reduce water quality impacts in the Tidal River Thames, River Mardyke and small watercourses, drains and ditches in the Borough;
- No detailed information on the Tidal River Thames water quality and Water Framework Directive (WFD) requirements was available at the time the study was undertaken but it is anticipated that some investment will be required to ensure no deterioration in the Tidal River Thames water quality standards under the WFD; and
- Reduced water quality, due to increased volumes of treated sewage effluent being discharged into the Tidal River Thames, and poorly managed urban runoff from new development areas could impact upon European, National and Locally important ecological sites, particularly the Thames Estuary and Marshes SSSI and RAMSAR site and downstream European sites (RAMSAR, SAC and SPAs) which border the Thames Estuary.

The key recommendations for the Outline WCS include:

- Assessment of the water resource availability up to 2026 within Thurrock;
- Assessment of the flood risk to the proposed development sites and mitigation options; this
  will be undertaken in conjunction with the update to the Thurrock SFRA;
- Assessment of the capacity of the existing wastewater and clean water network, both current and proposed, to identify the key constraints and required phasing of development to ensure that development does not outstrip capacity;
- Assessment of the likely surface water storage requirements and potential Sustainable Drainage Systems for proposed development in the Borough;
- Environmental assessment of the impact of the proposed development within the Borough upon watercourses and ecologically important sites; This includes the impacts on and requirements for increased discharges at Tilbury Wastewater Treatment Works into the Tidal River Thames;
- Phasing of proposed development sites and key constraints for each of the major sites, with reference to the above assessments.

It is recommended that a Project Steering Group comprising Thurrock Borough Council, the Environment Agency, Anglian Water Services, Essex and Suffolk Water and Natural England should be set-up at the early stages of the Outline WCS to guide, advise and agree on the findings of both the Outline Study, and the requirements for the Detailed WCS.

# 2 Introduction

## 2.1 Background

The Regional Spatial Strategy (RSS) for the East of England<sup>1</sup> ('The East of England Plan') was published in May 2008 and set targets to guide the scale and location of growth in Thurrock up to 2021. Thurrock lies within the Thames Gateway, which is the Government's top priority for regeneration in the UK, and high rates of development are planned for the area over the forthcoming two decades. The Thames Gateway was designated as a growth area by the Sustainable Communities Plan<sup>2</sup> in 2003.

The RSS identifies the Thurrock Urban Area (from Purfleet in the west to Tilbury/Chadwell St Mary in the east) as a Key Centre for Development and Change. The East of England Plan also highlights that Thurrock is required to build a minimum of 18,500 new homes and an indicative employment target of 26,000 new jobs by 2021.

Government Planning Policy Statement 3 (PPS3) requires local planning authorities to maintain a 15 year supply of housing from date of adoption of the Development Plan Document (DPD). Currently, Thurrock Council is proposing to adopt the core strategy in 2010 and will need to show a 25 year housing supply up to 2025 which is four years beyond the end date of the current RSS. The Thurrock Core strategy will therefore need to show at the very least the broad indicative location(s) for another 3,800 dwellings to 2025. Therefore, for dwellings, the WCS will need to incorporate the 15 year housing supply.

Currently Thurrock Council is preparing the Submission version of the Core Strategy and the location of the additional 3,800 dwellings will be considered in more detail in the Outline WCS.

Scott Wilson were commissioned by Thurrock Borough Council to undertake a scoping Water Cycle Study (WCS) in order to inform and facilitate the undertaking of a WCS for Thurrock which, whilst building upon previous work undertaken in the area, will comprise a wider, more holistic, evidence-based approach to feed into the Local Development Framework. The study will support the planned growth in the Borough and prepare for the new challenges of climate change and Government policies and European legislation including the Water Framework Directive and European Habitats Directive. The need for this evidence base is discussed further in Section 4.2.3.

## 2.2 Aims and Objectives

The objective of the Thurrock Water Cycle Study is to identify any constraints on housing and employment growth planned for the Borough of Thurrock up to 2021 that may be imposed by the water cycle and how these can be resolved i.e. by ensuring that appropriate water infrastructure is provided to support the proposed development. Furthermore, it will provide a strategic approach to the management and use of water which ensures that the sustainability of the water environment in the region is not compromised.

<sup>&</sup>lt;sup>1</sup> East of England Plan – The Revision to the Regional Spatial Strategy for the East of England, Government Office for the East of England, May 2008.

<sup>&</sup>lt;sup>2</sup> Sustainable Communities: Building for the Future, Office of the Deputy Prime Minister, February 2003 (<u>http://www.communities.gov.uk/publications/communities/sustainablecommunitiesbuilding</u>)

The first stage of this study, the Scoping Report, has undertaken a review and provided an overview of the following specific items:

- Capacity issues with regards to water treatment works, clean water network and water resources in Thurrock;
- Capacity issues with regards to wastewater treatment capacity and wastewater network (pipe routes) in Thurrock;
- Potential impacts of future water abstraction and wastewater discharge near water dependent European Sites; and
- Water quality issues with respect to the discharge of wastewater and surface water, groundwater quality, and management of gravity and pumped discharges to the Thames Tideway.

The impacts of flood risk within the Borough are being assessed within the update to the Thurrock Strategic Flood Risk Assessment (SFRA) and the findings of this study will be reviewed during the next stage of the WCS.

The study has been undertaken following initial discussions with, and using data provided by, the following key stakeholders:

- Thurrock Borough Council (TBC);
- Environment Agency;
- Anglian Water Services (AWS);
- Essex and Suffolk Water (ESW); and
- Natural England (NE).

However, it is concluded that it is important that other stakeholders are involved in these discussions or included in a Steering Group. The additional stakeholders that should be included within this study include the Delivery Vehicle Thurrock Thames Gateway Development Corporation (TTGDC).

# 3 Thurrock Water Cycle Study

## 3.1 The Water Cycle

In its simplest form, the Water Cycle can be defined as 'the process by which water is continually recycling between the earth's surface and the atmosphere'. Without considering human influences, it is simply the process by which rain falls, and either flows over the earth's surface or is stored (as groundwater, ice or lakes) and is then returned to the atmosphere (via evaporation from the sea, the soil, surface water or animal and plant life) ready for the whole process to repeat again.

In the context of this study, the 'water cycle' has a broader definition than the simple water or 'hydrological' cycle. The human influence on the water cycle introduces many new factors into the cycle through the need to abstract water from the natural environment, use it for numerous purposes and then return to the natural system (Figure 3.1). The development and introduction of technology such as pipes, pumps, drains, and chemical treatment processes has meant that human development has been able to manipulate the natural water cycle to suit its needs and to facilitate growth and development. 'Water Cycle' in this context is therefore defined as both the natural water related environment (such as rivers, wetland ecosystems, aquifers etc), and the water infrastructure (hard engineering focused elements such as: water treatment works, supply pipelines and pumping stations) which are used by human activity to manipulate the cycle.



Figure 3.1 The Water Cycle Study (Source: Environment Agency<sup>3</sup>)

## 3.2 Implications for Development

In directly manipulating elements of the water cycle, man affects many changes to the natural water cycle which can often be negative. To facilitate growth and development, there is a

<sup>&</sup>lt;sup>3</sup> Draft Water Cycle Study Manual – Guidance on how to carry out a water cycle study, Environment Agency (<u>http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf</u>)

requirement for clean water supply which is taken from natural sources (often depleting groundwater stores or surface systems); the treatment of waste water which has to be returned to the system (affecting the quality of receiving waters); and the alteration and management of natural surface water flow paths which has implications for flood risk. These impacts can indirectly affect ecology which can be dependent on the natural features of a water cycle for example wading birds and wetland habitat, or brown trout breeding in a Chalk stream which derives much of its flow from groundwater sources.

In many parts of the UK, some elements of the natural water cycle are considered to be at, or close to their limit in terms of how much more they can be manipulated. Further development will lead to an increase in demand for water supply and a commensurate increase in the requirement for waste water treatment; in addition, flood risk may increase if development is not planned for in a strategic manner. The sustainability of the natural elements of the water cycle is therefore at risk.

A Water Cycle Study (WCS) is an ideal solution to address this problem. It will ensure that the sustainability of new development is considered with respect to the water cycle, and that new water infrastructure introduced to facilitate growth is planned for in a strategic manner; in so doing, the WCS can ensure that provision of water infrastructure is sufficient such that it maintains a sustainable level of manipulation of the natural water cycle.

## 3.3 Stages of a Water Cycle Study

Current draft guidance on Water Cycle Studies<sup>4</sup> suggests that they should generally be undertaken in three stages, dependent on the status of the various Local Development Documents (LDDs), as part of the wider Local Development Framework (LDF), being prepared by Local Planning Authorities (LPAs) for submission. To coincide with Thurrock's timescales for responses and submissions the WCS is being undertaken in three distinct stages: scoping, outline and detail (if required).

Figure 3.2 illustrates the three stages of the WCS and how they inform planning decisions and documents. This study undertakes the first stage, the Scoping Study.

<sup>&</sup>lt;sup>4</sup> Draft Water Cycle Study Manual – Guidance on how to carry out a water cycle study, Environment Agency (<u>http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf</u>)



#### Figure 3.2 Stages of the Water Cycle Study Process (Source: Environment Agency<sup>5</sup>)

#### 3.3.1 Scoping Water Cycle Study

The scoping study determines the key 'water-cycle' areas where development is likely to either impact on the water environment, or is likely to require significant investment in water infrastructure (i.e. pipes, or treatment) to service new development.

Its key purpose is to define whether there are significant constraints that would need further assessment to determine whether they affect either the locations of allocation options, or the amount of development that can be provided within an allocation site.

It is a high level assessment that looks at town-wide or area-wide issues. The level of assessment covers whether:

- There is a potential for an area-wide negative supply and demand balance for potable water i.e. demand is likely to be greater than supply for the growth area;
- There are any ecologically sensitive sites that have a hydrological link to development i.e. an SAC wetland site located on a river downstream of discharges from a wastewater treatment works;
- A town has a history of sewer flooding and hence potential restrictions on new connections from development; and
- Local watercourses have water quality concerns which will be made worse if further discharge of wastewater from new development occurs.

<sup>&</sup>lt;sup>5</sup> Draft Water Cycle Study Manual – Guidance on how to carry out a water cycle study, Environment Agency (<u>http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf</u>)

A scoping study therefore defines the study area, defines the key stakeholders required to input to the study and concludes what issues require further investigation and therefore, what the scope of the Outline Water Cycle Study should be.

In general, a Scoping WCS should consider flood risk as part of the assessment; however, as mentioned, TBC are undertaking a parallel SFRA scoping exercise as part of the production of their updated SFRA. Thus SFRA scoping exercise is identifying the work required to address flood risk as required by Planning Policy Statement 25 (PPS25). To avoid duplication, the scoping of flood risk issues has not been referred to in this scoping WCS. The next stages of the WCS and SFRA will also be undertaken concurrently, at which point the cross-over flood risk issue will be agreed prior to commencement of each study.

#### 3.3.2 Outline and Detailed Water Cycle Studies

#### **Outline Study**

The Outline Study considers all of the ways in which new development will impact on the water environment or water infrastructure specific to where growth is most likely to be targeted. It is usually undertaken during consideration of allocation sites such that it can inform the decision process in terms of where development will be targeted for each authority. The key aim of the Outline study is to provide Local Planning Authorities (LPAs) with the evidence base which ensures that water issues have been taken into account when deciding the location and intensity of development within an authority's planning area as part of the development of the Core Strategy. It also aids in setting core policies related to water as part of the Development Control Policies Supplementary Planning Document (SPD). Finally, it gives the water company an evidence base to its business plans which determine how much they can charge customers to invest in upgrades and the provision new infrastructure required to service proposed development.

TBC have reached an advanced stage with the production of the Core Strategy; hence the Outline WCS will follow immediately upon completion of this Scoping Study to ensure that water cycle issues are adequately addressed for the favoured development options.

It could be that the Outline Study identifies that water cycle issues are not significant, and that new development can be implemented without significant new investment. If this is the case, a detailed study may not be required. However, if new infrastructure is required, or an impact on the water environment cannot be ruled out as significant, a detailed water cycle study will need to be undertaken for site specific allocations, or for the authority as a whole.

#### **Detailed Study**

The detailed study can vary significantly in its scope and remit. However, its key purpose is to define what specific infrastructure and mitigation is required to facilitate development, once the decisions have been made on the location of allocations and the likely intensity and type of development within them. Dependent on the findings of the Outline Study, there could be the potential requirement to undertake detailed and complex studies in order to define exactly what infrastructure or mitigation is required.

The Detailed study should be undertaken in conjunction with the development of DPDs such as Area Action Plans and should provide the evidence base to site specific policies in SPDs.

## 3.4 Integration with the Planning System

As part of the Local Development Framework (LDF) process, LPAs are required to produce evidence based studies which support the selection processes used in deciding on final growth targets and areas to be promoted for growth. The WCS is one such example of an evidence-based study which specifically addresses the impact of proposed growth on the 'water cycle'.

As part of Thurrock Borough Council's overall strategy to meet future growth targets set out in the RSS in a sustainable way, the WCS will make up one of a number of strategic studies and plans which will form part of the evidence base supporting the production of Thurrock Borough Council's LDF. Specifically, the WCS will form an important basis of the Thurrock Core Strategy making up part of the LDF evidence base, as well as providing input to the development of SPDs to assist in ensuring the delivery of water cycle management requirements at the local planning application level. There is a strong inter-relationship between the WCS and other components of the LDF evidence base, e.g. the Site allocations DPD and Minerals and Waste DPD. This interaction is discussed further in Section 4.2.3.

It is important that the findings of the WCS feed into, and make use of the findings of other LDF studies the Council is undertaking. The studies that are particularly relevant include the Thurrock Strategic Flood Risk Assessment (SFRA), the Infrastructure Prioritisation and Implementation Study and the Strategic Housing Land Availability Assessment (SHLAA). Additionally, the findings of the WCS can be used by TTGDC in the preparation and revision to its Spatial Plan, master plans and design briefs for Thurrock.

## 3.5 Data Availability

Undertaking of a Water Cycle Study requires a large amount of data collection, much of which is reliant on the willingness of third parties to supply in order to allow the study to be progressed. In some cases, the availability of data with respect to water cycle infrastructure and future planning is not available within the time required to undertake the assessment and various assumptions have to be used to enable the study to continue. This study had collated available information within the project timeline, and produced a catalogue of the data collected, and further data required to complete the Outline WCS. It also identifies the data provider in each case.

A full list of the data requested and that which was made available to the study is included in the data catalogue and Appendix A – Data Catalogue. This also includes the list of data required for the Outline stage of the WCS.

# 4 Development in Thurrock

## 4.1 Thurrock

Thurrock Council is a unitary local authority along the East Thames Corridor in the southeast of England (Figure 4.1). It covers an area of 165 km<sup>2</sup> and is located to the east of London, with the southern boundary of the Borough forming the north bank of the tidal River Thames. Historically the main urban centres and settlement areas in Thurrock have grown up around the riverbank industries including oil, aggregate, cement works, scrap yards, power stations and docks. Significant reduction in industry throughout the riverfront areas has lead to increased numbers of derelict 'brownfield' land sites available for development along the River Thames frontage. Regeneration in Thurrock is a recognised requirement in the Regional Spatial Strategy and is supported by other regeneration drives such as the Thames Gateway Initiative. The area identified by these strategies as the main focus for growth in Thurrock lies between Purfleet in the west and runs through to Tilbury in the east (Figure 4.2).



Figure 4.1 Thurrock Location Map (Source: Thurrock Council<sup>6</sup>)

Thurrock has a diverse range of land uses, with 60% green belt land, a river front that extends 18 miles from Aveley Marshes in the west to the oil refinery at Coryton in the east, and ecological sites of European, National and Local importance. Being both on the river and close to London, Thurrock has excellent local, national and international communication links including the M25 London Orbital Motorway, high speed rail links leading to the Channel Tunnel, local railway line providing direct access to Central London, the Port of Tilbury and is approximately 25km west of the City of London Airport (Figure 4.1).

<sup>&</sup>lt;sup>6</sup> Thurrock Council Website (<u>http://www.thurrock.gov.uk</u>)



Thurrock has a population of approximately 148,900 (2006) with 63,600 houses<sup>7</sup>. The Borough has a number of main settlements including Grays, Stanford/Corringham, South Ockendon and Tilbury, together with a number of villages in the Green Belt (Figure 4.2). Thurrock also has the developing community of Chafford Hundred and the Lakeside Regional Shopping Centre which contributes to the diverse and thriving economy within Thurrock.<sup>8</sup>

The East of England Plan and the South Essex Thames Gateway Partnership promote Thurrock as a world leading logistics centre, encouraging the growth of the existing logistics and distribution and retailing major employment sectors.<sup>9</sup>

## 4.2 National, Regional and Local Drivers and Policies

#### 4.2.1 National Drivers and Policies

The growth within Thurrock is driven by regional planning policy, but any growth and changes to the environment will need to comply with the main EU Directives and UK legislation and guidance on water as provided in Table 4.1.

<sup>&</sup>lt;sup>7</sup> Our Thurrock: Know Your Area..., Thurrock Council, June 2008 (<u>http://www.thurrock.gov.uk/l-know/profile/pdf/our\_thurrock\_200806.pdf</u>)

<sup>&</sup>lt;sup>8</sup> Thurrock Local Development Framework: Annual Monitoring Report 2007, December 2007 (http://www.thurrock.gov.uk/planning/strategic/pdf/monitor\_annual\_2007.pdf)

<sup>&</sup>lt;sup>9</sup> Thurrock Local Development Framework: Annual Monitoring Report 2007, December 2007 (http://www.thurrock.gov.uk/planning/strategic/pdf/monitor\_annual\_2007.pdf)

Directive/Legislation/ Guidance	Description					
Bathing Waters Directive 76/160/EEC	To protect the health of bathers, and maintain the aesthetic quality of inland and coastal bathing waters. Sets standards for variables, and includes requirements for monitoring and control measures to comply with standards.					
Code for Sustainable Homes	The Code for Sustainable Homes has been introduced to drive a step- change in sustainable home building practice, providing a standard for key elements of design and construction which affect the sustainability of a new home. It will become the single national standard for sustainable homes, used by home designers and builders as a guide to development, and by home-buyers to assist in their choice of home. It will form the basis for future developments of the Building Regulations in relation to carbon emissions from, and energy use in homes, therefore offering greater regulatory certainty to developers.					
Environment Act 1995	Sets out the role and responsibility of the Environment Agency.					
Environmental Protection Act, 1990	Integrated Pollution Control (IPC) system for emissions to air, land and water.					
Future Water, February 2008	Sets out the Government's vision for water in England in 2030. The strategy sets out an integrated approach to the sustainable management of all aspects of the water cycle, from rainfall and drainage, through to treatment and discharge, focusing on practical ways to achieve the vision to ensure sustainable use of water. The aim is to ensure sustainable delivery of water supplies, and help improve the water environment for future generations.					
Groundwater Directive 80/68/EEC	To protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.					
Making Space for Water, 2004	Outlines the Government strategy for the next 20 years to implement a more holistic approach to managing flood and coastal erosion risks in England. The policy aims to reduce the threat of flooding to people and property, and to deliver the greatest environmental, social and economic benefit.					
Planning Policy Statements and Planning Policy	Planning policy in the UK is set by Planning Policy Statements (PPSs) They explain statutory guidelines and advise local authorities and others on planning policy and operation of the planning system.					
Guidance	PPSs also explain the relationship between planning policies and other policies which have an important bearing on issues of development and land use. These must be taken into account in preparing development plans.					
	A water cycle study helps to balance the requirements of the various planning policy documents, and ensure that land-use planning and water cycle infrastructure provision is sustainable.					
	The most relevant PPSs to WCS are:					
	PPS1 – Delivering Sustainable Development;					

#### Table 4.1 EU Directives and UK Legislation and Guidance on Water

Directive/Legislation/ Guidance	Description
	PPS3 – Housing; PPS12 – Local Development Frameworks; PPS23 – Planning and Pollution Control; and PPS25 – Development and Elood Bisk
The Pollution Prevention and Control Act (PPCA), 1999	Implements the IPPC Directive. Replaces IPC with a Pollution Prevention and Control (PPC) system, which is similar but applies to a wider range of installations.
Water Act 2003	Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.
Water Framework Directive (WFD) 2000/60/EC	The WFD was passed into UK law in 2003. The overall requirement of the directive is that all river basins must achieve "good ecological status" by 2015 unless there are grounds for derogation. The WFD will, for the first time, combine water quantity and water quality issues together. An integrated approach to the management of all freshwater bodies, groundwaters, estuaries and coastal waters at the river basin level will be adopted. It will effectively supersede all water related legislation which drives the existing licensing and consenting framework in the UK. UKTAG <sup>10</sup> , the advisory body responsible for the implementation of the WFD in the UK, has proposed water quality, ecology, water abstraction and river flow standards to be adopted in order to ensure that water bodies in the UK (including groundwater) meet the required status <sup>11</sup> . These are currently in draft form and will not be formalised until the final River Basin Management Plans are finalised in December 2009 (prior to EC sign off. The WCS is required to consider the longer term issues with respect to the water cycle and water environment and as such, an assessment of the impact of the interim WFD standards has been considered.
Water Resources Act, 1991	Protection of the quantity and quality of water resources and aquatic habitats.

#### 4.2.2 **Regional Drivers and Policies**

#### Regional Spatial Strategy – The East of England Plan

The Regional Spatial Strategy (RSS) for the East of England12, published in May 2008, set targets to guide the scale and location of growth in Thurrock up to 2021. It also includes spatial policies relating to water and flooding which are forming part of the driver for the WCS. Those of particular mention are WAT2, WAT3 and WAT4 (Table 4.2).

<sup>&</sup>lt;sup>10</sup> The UKTAG (UK Technical Advisory Group) is a working group of experts drawn from environment and conservation agencies. It was formed to provide technical advice to the UK's government administrations and its own member agencies. The UKTAG also includes representatives from the Republic of Ireland. <sup>11</sup> UK Environmental Standards and Conditions (Phase I) Final Report, April 2008. UK Technical Advisory Group on the Water

Framework Directive. <sup>12</sup> East of England Plan – The Revision to the Regional Spatial Strategy for the East of England, Government Office for the East of

England, May 2008.

Description							
"The Environment Agency and water companies should work with OFWAT, EERA and the neighbouring regional assemblies, local authorities, delivery agencies and others to ensure timely provision of the appropriate additional infrastructure for water supply and waste water treatment to cater for the levels of development provided through this plan, whilst meeting surface and groundwater quality standards, and avoiding adverse impact on sites of European or international importance for wildlife.							
A co-ordinated approach to plan making should be developed through a programme of water cycle and river cycle studies to address the issues of water supply, water quality, wastewater treatment and flood risk in receiving water courses relating to development proposed in this RSS.							
Complementing this approach, Local Development Documents should plan to site new development so as to maximise the potential of existing water/waste water treatment infrastructure and minimise the need for new/improved infrastructure."							
'Local planning authorities should work with partners to ensure their plans, policies, programmes and proposals take account of the environmental consequences of river pasin management plans, catchment abstraction management strategies, groundwater vulnerability maps, groundwater source protection zone maps, proposals for water abstraction and storage and the need to avoid adverse impacts on sites of European importance for wildlife.							
The Environment Agency and water industry should work with local authorities and other partners to develop an integrated approach to the management of the water environment."							
<ul> <li>"Coastal and river flooding is a significant risk in parts of the East of the England. The priorities are to defend existing properties from flooding and locate new development where there is little or no risk of flooding. Local Development Documents should:</li> <li>use Strategic Flood Risk Assessments to guide development away from floodplains, other areas at medium or high risk or likely to be at future risk from flooding elsewhere;</li> <li>include policies which identify and protect flood plains and land liable to tidal or coastal flooding from development, based on the Environment Agency's flood maps and Strategic Flood Risk Assessments Plans and policies in Shoreline Management Plans and policies in Shoreline Management Plans and Flood Management Strategies, including 'managed re-alignment' where appropriate;</li> <li>only propose departures from the above principles in exceptional cases where suitable land at lower risk of flooding, and appropriate mitigation measures are incorporated; and</li> <li>require that sustainable drainage systems are incorporated in all appropriate developments.</li> </ul>							

### Table 4.2 Water Related Policies in East of England RSS<sup>13</sup>

<sup>&</sup>lt;sup>13</sup> East of England Plan – The Revision to the Regional Spatial Strategy for the East of England, Government Office for the East of England, May 2008.

#### 4.2.3 Local Drivers and Policies

#### Local Development Framework

The Local Development Framework (LDF) for Thurrock is a statutory spatial development plan that comprises a portfolio of documents including the Core Strategy and the supporting Site Allocation Development Plan Documents (DPDs). The LDF will set out the spatial strategy, policies and proposals to guide the future development and use of land in Thurrock up to the year 2026. Thurrock Council must ensure it coordinates and prepares LDF documents and policies, including preferred development locations, infrastructure and delivery plans that have had regard to the intent and steer from national policies, the RSS, as well as local aspirations, needs and demands. Figure 4.3 illustrates the key documents that feed into the LDF.



#### Figure 4.3 Local Development Framework Key Documents (Source: Thurrock Council<sup>14</sup>)

The Core Strategy is the overarching DPD that provides the strategic framework for the other DPDs and Supplementary Planning Documents (SPDs). In particular, the Site Specific Allocations and Policies DPD will set out the sites that will deliver the Core Strategy Spatial Strategy, policies and targets<sup>14</sup>. All these Plans must conform to the Core Strategy and help to deliver its strategic objectives and policies. The Council will also produce SPDs that provide further guidance to support policies in the DPDs.

It is essential that these are all informed using the findings and advice from a sound evidence base that examines economic, social and environmental needs and constraints. This must include the comprehensive planning, phasing, delivery and management of water, sewerage, flooding and drainage infrastructure, whilst not adversely affecting environmental capacity. A critical element is therefore to consider in greater detail, the risks associated from all forms of flooding and the existing state, limitations and future requirements of the Thurrock water cycle system in the context of future growth.

<sup>&</sup>lt;sup>14</sup> Thurrock Local Development – Core Strategy & Policies for Control of Development. Development Plan Document Preferred Options Consultation. November 2007. (<u>http://www.thurrock.gov.uk/planning/strategic/pdf/ldf\_preferred\_cs\_200711.pdf</u>)

Thurrock Council's LDF will set out the plan for directing development within the area. The choice of where to locate new development, and new waste water sites, will directly impact upon one another. Due to this, the findings of the WCS will be important in future alterations to the LDF – particularly the Core Strategy, Site Specific Allocations and Minerals and Waste DPDs. The timeline for the LDF process within Thurrock is provided in Figure 4.4.

The LDF process involves an extensive process of consultation. This overall planning process supports a two stage strategy for the water cycle study, so that important considerations are not overlooked in-between the production of a scoping/outline WCS (which informs the draft Local Development Documents (LDDs)), and the detailed study which will ensure that the final LDF has sufficient detail to ensure delivery of the WCS requirements. The WCS will also make recommendations on phasing for development.

#### Minerals and Waste Development Plan Document (DPD)

The Minerals and Waste DPD will address the two specialist topic areas that are of particular interest in Thurrock and provide detailed site and development control issues. Local mineral mining and waste issues require consideration due to the associated impacts with extracting minerals and providing sites for waste. Historically, holes dug to access minerals were later filled with waste but in reality, the situation is more complicated with complex pathways existing between the sites and groundwater/watercourses/ecological sites. Landfill sites for waste are running out, and as such Thurrock must consider the future of providing minerals and dealing with waste within the district.

The Minerals and Waste DPDs will form part of the LDF documents and will be produced in conjunction with other strategic documents as part of the Local Development Scheme. The choice of where to locate new development, and new waste water sites, will directly impact upon one another. Due to this, the WCS needs to provide guidance and advice to inform the Minerals and Waste DPDs to avoid any adverse effects on the water environment within Thurrock. Similarly, findings from any studies undertaken into future development of waste and minerals sites will need to feed into and be assessed within the Outline WCS.

Thurrock Council:	Porvisional Local Development Framework Programme 2009							
Document	08	Document						
Regional Spatial Strategy 14: ADOPTED		egional Spatial Strategy 14						
Local Development Scheme	1 1 1 1 1 2 3 LC	ocal Development Scheme						
Statement of Community Involvement ADOPTED	state in the second seco	tatement of Community nvolvement (ADOPTED)						
Core Strategy and Control of Development DPD	3 3 4 4 5 5 5 5 5 5 5 5 5 5 6 6 7 7 7 8 X 9 X 10 X X X X 11 12 12+	Core Strategy and Control of Development DPD						
Site Specific Allocations and Policies DPD	3 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ite Specific Allocations and olicies DPD						
Minerals and Waste DPD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	linerals and Waste DPD						
Affordable Housing SPD	1       1       1       2       2       3       3       4       4       5       5	ffordable Housing SPD						
Green Grid SPD	1 1 1 2 2 2 3 3 3 4 4 4 5 5* 1 1 1 2 2 2 3 3 3 4 4 4 5 5 G	ireen Grid SPD						
Development Control SPD		evelopment Control SPD						
Urban Character SPD	1 1 1 2 2 2 3 3 3 4 4 4 5 5* 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 1 2 2 2 3 3 3 4 4 4 5 5 V 1 1 1 1 2 2 2 3 4 4 4 5 5 V 1 1 1 1 2 2 2 3 4 4 4 5 5 V 1 1 1 1 1 2 2 2 3 4 4 4 5 5 V 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Irban Character SPD						
Developer Contributions SPD	1 1 1 1 2 2 2 3 3 3 4 4 4 <mark>5 5*</mark> 1 1 1 2 2 2 3 3 3 4 4 4 <mark>5 5</mark>	eveloper Contributions SPD						
Regional Spatial Strategy Stage	LDS Process Stage Development Plan Document Process Stage 1. Evidence Gathering 7. Representations on Proposed Submission Draft DPD 8. Publication of Submission Draft DPD	ocess Stage						
A. Start consultation	1. Review         2*. Prepare Issues and Options in Consultation         9. Pre Examination Meeting         1. Evidence Gathering           2. Submission         2. Dublis Distribution on Disformed Options         10. Methods for provide the submission         2. Dublis Distribution							
B. End Consultation	2. Sublinission 3. Public Participation on Preferred Options 10. Independent Examination 2. Preparation or draft SPD							
C. Start Public Examination	3. Approval 4. Representations on Preferred Options 11. Binding Report 3. Public participation on draft SPD							
D. End Public Examination E. ODPM publish Draft Changes E. Formal Approval	5. Preparation of Proposed Submission Draft DPD 12. Adoption 4. Representations and finalise SPD 6. Publication of Proposed Submission Draft DPD + Update Proposals Map 5. Adoption X Consideration by Planning Inspectorate							
	* Under the new Regulations, Stages 3 & 4 Preferred Options are not required. Issues and Options Stage includes necessary consultation phases and SEA/SA/AA studies to lead on to preparation of Submission DPD Final SPDs to support Adopted Core Strategy	ed pending production of						

#### Figure 4.4 Thurrock Council Local Development Framework Programme

#### Water Company Planning

It is important to consider the planning timelines, both for Thurrock Borough Council in terms of the LDF but also Essex and Suffolk Water (ESW) and Anglian Water Services (AWS) in terms of the funding mechanisms for new water supply and water treatment infrastructure.

There are two elements of Water Company planning that are pertinent to the Thurrock WCS and specifically, with regard to integration with Spatial Planning timelines for Local Planning Authorities and Regional Government.

#### Financial and Asset Planning

Water companies currently plan for Asset Management and the financial procurement required for this through the Asset Management Plan (AMP) process which runs in 5 year cycles. The Office of Water Services (OFWAT) is the economic regulator of the water and sewerage industry in England and Wales, and regulates this overall process.

In order to undertake maintenance of its existing assets and to enable the building of new assets (asset investment), water companies seek funding by charging customers according to the level of investment they need to make. The process of determining how much asset investment required is undertaken in conjunction with:

- the Environment Agency as the regulator determining investment required to improve the environment;
- the Drinking Water Inspectorate (DWI) who determine where investment is required to improve quality of drinking water; and,
- OFWAT who along with the Environment Agency require Water Companies to plan sufficiently to ensure security of supply (of potable water) to customers during dry and normal years.

The outcome is a Business Plan which is produced by each Water Company setting out the required asset investment over the next 5 year period, the justification for it and the price increases required to fund it.

Overall, the determination of how much a Water Company can charge its customers is undertaken by OFWAT. OFWAT will consider the views of the Water Company, the other regulators (Environment Agency, DWI) and consumer groups such as the Consumer Council for Water when determining the price limits it will allow a water Company to set in order to enable future asset investment. This process is known as the Price Review (PR) and is undertaken in 5 year cycles. When OFWAT make a determination on a Water Company's business plan, the price limits are set for the proceeding five year period allowing the water company to raise the funds required to undertake the necessary investment which will also be undertaken in that 5 year planning period (the AMP period).

At the time of undertaking the Thurrock WCS, Water Companies are preparing for Price Review 2009 (PR09), whereby they are currently drafting their Strategic Business Plans which seek funding for asset investment for the 5 year period covering 2010 - 2015 (known as AMP5).

It therefore follows that any new asset (or infrastructure) investment required to meet the requirements of the WCS (and hence future development in Thurrock) needs to feed into the drafting of the Strategic Business Plan for PR09. OFWAT will determine the final price limits from this process in November 2009. This ultimately means that there will be no funding available to undertake significant water cycle infrastructure upgrades until 2010 at the earliest.

It can also be seen that, if significant water cycle infrastructure requirements are not included in this current price review (PR09), the funding cannot be sought for it until the next Price Review towards the end of AMP5 (PR14) which would result in funding not being available until AMP6 running from 2015 -2020. Water companies are able to submit interim determinations within the 5 year AMP cycles to seek funding for unforeseen investment requirements; however it is considered that infrastructure for planned development should be planned for in sufficient time for to be included in the relevant Business Plan and Price Review.

#### Water Resource Planning

Water companies are now required to produce Water Resource Management Plans (WRMP) on a statutory basis covering 25 year planning horizons. WRMPs set out how a water company plans to provide and invest in existing and new water resource schemes (e.g. reservoirs, desalination) to meet increases in demand for potable supply, as a result of new development, population growth and climate change over the next 25 year period. When complete, the new statutory WRMPs will be updated in 5 yearly cycles to coincide with the Price Review and AMP process.

At the time of undertaking the Thurrock Scoping WCS, ESW are in the process of consulting on their draft WRMP09. This Scoping WCS has made use of the draft WRMP09 to inform the water resources assessment for growth in Thurrock. However, until such time as consultation is complete and the WRMP09 is approved and published in 2009, it is not possible to state with any certainty as to what options will be taken forward.

The WCS is therefore essential for several reasons: It allows the discrepancies in the planning timeframes of AWS, ESW and Thurrock Council to be reconciled through strategic planning as well as providing sufficient evidence base for Thurrock Borough Council's statutory LDF process and robust evidence and justification for AWS and ESW Strategic Business Plans for investment required in AMP5 (2010-2015) and beyond.

#### **Additional Information**

In addition to the legislation and guidance set out in Table 4.1 and above, the following studies and reports are relevant to and, where available, have been used within the Thurrock WCS:

- Environment Agency South Essex Catchment Abstraction Management Strategy (June 2004);
- Thurrock Infrastructure Deficit Study 2004 2021 (April 2006);
- Thurrock Habitat Regulations Assessment Final Report (October 2007);
- Thurrock Sustainability Appraisal Core Strategy and Polices for Development Control and Site Specific Allocations and Policies Development Plan Documents (December 2007); and
- Thames Gateway South Essex (TGSE) Strategic Flood Risk Assessment (SFRA) (December 2006) – the required update for this to meet with PPS25 requirements is being scoped alongside this Scoping study and will be reviewed during the Outline WCS;
- Thurrock Infrastructure and Implementation Study due for completion in early 2009; and
- Thurrock Strategic Housing Land Availability Assessment (SHLAA) due for completion in early 2009.

## 4.3 Housing/Employment Development

The East of England RSS sets a total of a minimum of 18,500 new dwellings and an indicative employment target of 26,000 new jobs for Thurrock in the period 2001-2021, as part of the wider growth in the Thames Gateway South Essex (TGSE) area. It is estimated that 4,250 new dwellings have already been built in the period 2001 – 2006.

Thurrock has a population of approximately 148,900 (2006) with 63,600 houses<sup>15</sup>. Since 1991, Thurrock's population growth has exceeded regional and national growth and is projected to continue to do so due to a combination of indigenous growth and net inward migration. By 2021 it is predicted that the population within Thurrock will be 166,900; an increase of 23,600 population (16%) from the 2001 Census. To accommodate this growth, and the declining occupancy rate in the district (from 2.4 per household in 2001 census to a forecasted 2.16 by 2021), Thurrock has been set the target of developing 18,500 new dwellings. The majority of the development will be infill development on existing urban/brownfield sites with a minimal amount on greenfield.

The total estimated number of jobs in Thurrock in 2005 was  $62,000^{16}$  with the employment structure dominated by Retail (21.6%), Public Services (19.6%), Finance and Business (16.7%), Manufacturing (14.2%) and Transport, Storage and Communications (10.6%)<sup>17</sup>. By 2021, it is expected that Thurrock will accommodate a further 26,000 jobs.

## 4.4 Development Areas

The housing and employment (primary and secondary) development areas are provided in Figure 4.5 and Figure 4.6 respectively.

<sup>&</sup>lt;sup>15</sup> Our Thurrock: Know Your Area..., Thurrock Council, June 2008 (<u>http://www.thurrock.gov.uk/l-know/profile/pdf/our\_thurrock\_200806.pdf</u>)

<sup>&</sup>lt;sup>16</sup> Thurrock Profile: A Summary Assessment of the State of Thurrock using Demographic, Social, Economic and Environmental Indicators, Thurrock Council, November 2007, (<u>http://www.thurrock.gov.uk/l-know/profile/pdf/profile\_200711.pdf</u>)

<sup>&</sup>lt;sup>17</sup> Thurrock Local Development Framework: Annual Monitoring Report 2007, December 2007 (http://www.thurrock.gov.uk/planning/strategic/pdf/monitor\_annual\_2007.pdf)

#### Thurrock Borough Council

Thurrock Water Cycle Study – Scoping Study



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Thurrock Water Cycle Study – Scoping Study



## 5 Water Cycle Environment and Infrastructure Baseline

## 5.1 Introduction

This section describes the environmental and infrastructure baseline within Thurrock with regards to the various components of the water cycle. It is important to establish the baseline and hence spare capacity of the water environment and associated water/wastewater infrastructure because a basic assumption of the WCS is that it is preferential to maximise the use of existing facilities without causing negative effects upon the existing water environment. This is to reduce cost, reduce the impact to existing communities and to allow early phasing of some new development, negating the need to rely on longer lead in times associated with securing funding for new infrastructure through the statutory water company planning process.

Initial assessments of the potential impacts from the proposed level of growth in Thurrock and recommendations for further investigation are provided in Section 6.

## 5.2 Water Resources & Supply

#### 5.2.1 Climate

The climate within the Thurrock area is typified by low rainfall with little variation in the average amount throughout the year, averaging about 600mm. The annual evapotranspiration averages 380mm. Most of the evapotranspiration occurs during the summer months and exceeds rainfall totals over this period. However, winter rainfall and recharge provides the water required to offset this seasonal imbalance.

#### 5.2.2 Geology & Groundwater

Chalk underlies the whole of Thurrock and is near to the ground surface around southwest Thurrock. It then dips southward beneath the Thames and northward beneath deep deposits of London Clay. The chalk is the principal underlying aquifer in the area. Rainfall percolates in to the aquifer and recharges it over the autumn and winter months. However, the impermeable London Clay precludes infiltration of rainfall over large areas of the chalk aquifer in the north of the district and beyond, thereby restricting its use for water resource development. Despite this, in the Thurrock area, the aquifer is unconfined and chalk groundwater is utilised for public water supply. Water quality is generally good due to recharge to the aquifer in the area although the unconfined chalk adjacent to the Thames can have elevated salinity levels.

In some areas of Thurrock, groundwater levels are rising in response to the cessation of longterm water abstraction in the 1970s. River terrace gravels and other superficial deposits, present over much of the area, provide limited baseflow to the rivers and are used to supply water for various non-public water supply purposes.

The nature of the soil within a catchment plays an important role in the dynamics of water movement, particularly surface water. Along the coastal zone soils are predominantly alluvial with a significant clay content and are periodically or permanently waterlogged. The soils inland are predominantly clay but also exhibit a loamy characteristic making them more suitable for

cultivation. Generally the soils are fertile with the majority classified as Grade 3 or above under agricultural land classification. Nevertheless, the tendency of these soil types to waterlogging, and their impermeable nature during this state, is an important factor which adds to the 'flashy' nature of the surface water catchment.

The Catchment Abstraction Management Strategy (CAMS) for the area<sup>18</sup> has concluded that, given the overall resource assessment and complexity of the groundwater unit covering Thurrock, new abstractions based on the locally rising groundwater are not appropriate and therefore there are no further groundwater resources available for development in Thurrock.

#### 5.2.3 Rivers

Thurrock has two main river systems that flow through the area: the Mardyke and the Tidal River Thames (Figure 5.1). The River Mardyke, located in the west of the study area, is a fenland stream system that has two main sources at Langdon Hills and Cranham, to the north of the Borough, and discharges to the Tidal River Thames at Purfleet. The river flows through and drains a predominantly agricultural landscape that becomes increasingly industrial and urban in character along its lower reaches. It has a very shallow gradient and low river flows which can exacerbate the fairly poor water quality. There are several small tributaries that feed into the Mardyke, along with numerous field drains of the intensively farmed Thurrock Plain. The Mardyke catchment is 111.6 km<sup>2</sup> and has a main river length of 18.5 km.

The River Mardyke responds rapidly to rainfall during the winter period due to the impermeability of the London Clay underlying the upper part of the catchment, especially when the soil moisture deficit is low. These factors, in combination with the very small volumes of baseflow provided by the shallow sand and gravel aquifers, contribute to the extremely low river flows during the summer months<sup>18</sup>.

The River Thames flows along the Southern boundary of the Borough and is tidal along the entire stretch. Upstream, to the west of the Borough, the river flows through central London and the Thames flood control Barrier, before flowing east past the southern boundary of Thurrock and finally entering the Thames Estuary near Southend-on-Sea.

In addition to the two main river systems, there are several smaller watercourses, ditches and drains within the Borough of Thurrock including Stanford Brook and Fobbing Creek to the east of the Borough. Gabbions Sewer, Stone House Sewer, East Tilbury Dock Sewer and West Thurrock Sewer, have been identified by the Environment Agency as low-flow channels with no additional capacity to accept surface water runoff. Any future development within the locality of these watercourses will therefore require attenuation to greenfield runoff rates prior to discharging into the sewers.<sup>19</sup>

<sup>&</sup>lt;sup>18</sup> South Essex Catchment Abstraction Management Strategy (CAMS), Environment Agency (June 2004)

<sup>&</sup>lt;sup>19</sup> Letter from the Environment Agency to Thurrock borough Council Re: Site Specific Allocations and Policies – Preferred Options Consultation, 1<sup>st</sup> July 2008, Reference: AE/2006/00289/SP-01/PO1-L01

#### Thurrock Borough Council

Thurrock Water Cycle Study – Scoping Study



Scoping Report

February 2009

#### 5.2.4 Abstractions

Although much of the area surrounding Thurrock is agricultural in nature, industrial abstractors take a large volume of water within the area. Water is used for a variety of purposes such as non-evaporative cooling, sanitation, mineral washing and a range of other industrial processes. The majority of these activities are non-consumptive (i.e. almost all of the water is returned to the source after use)<sup>18</sup>.

Figure 5.2 and Figure 5.3 show the surface water and groundwater abstractions within the vicinity of Thurrock respectively. These sources, whilst relatively small, are important in maintaining the overall balance between supply and demand. However, most public water supply is imported from outside the CAMS area, from Abberton and Hanningfield reservoirs and from sources in the Thames Region (Section 5.2.6).

# Figure 5.2 Surface Water Abstractions in the South Essex CAMS Area (Source: Environment Agency<sup>20</sup>)



# Figure 5.3 Groundwater Abstractions in the South Essex CAMS Area (Source: Environment Agency<sup>20</sup>)



<sup>&</sup>lt;sup>20</sup> South Essex CAMS, Environment Agency, June 2004.

#### 5.2.5 Water Resource Management

Water Resources within a catchment are assessed and monitored by the Environment Agency. The river catchment is split up into a number of individual units whose status is assessed within a Catchment Abstractions Management Strategy (CAMS). CAMS are strategies for management of water resources at a local level and set out how water abstraction will be managed. They outline where water is available, and also, if relevant, where current rates of abstraction need to be reduced to allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered.

There are two water resource management units (WRMU) covering the Thurrock area; WRMU 4 - The Mardyke and WRMU 5 - Thameside Chalk (Figure 5.4).



# Figure 5.4 Water Resource Management Units in the South Essex CAMS Area (Source: Environment Agency<sup>21</sup>)

#### 5.2.5.1 Water Resource Management Unit 4 – The Mardyke

Throughout the catchment London Clay heavily confines the chalk aquifer resulting in a lack of hydraulic connection between river and aquifer. Furthermore, there are only a few shallow aquifers, which provide limited groundwater storage to sustain river flows. The discharges from Upminster Sewage Treatment Works make a significant contribution to the total flow of the

<sup>&</sup>lt;sup>21</sup> South Essex Catchment Abstraction Management Strategy (CAMS), Environment Agency (June 2004)

Mardyke, and helps to maintain flow artificially higher than natural.<sup>21</sup> At the local scale the Mardyke is an important landscape feature with limited lengths of the Mardyke used by anglers and canoeists.

Abstraction within the Mardyke has developed significantly and water is utilised for a range of purposes. Agriculture is the dominant sector within the upper reaches of the catchment while industrial abstraction dominates the lower reaches.

The CAMS Annual Update report for 2008 (for the Combined Essex CAMS)<sup>22</sup> has assessed the WRMU as having No Water Available for further abstractions.

#### 5.2.5.2 Water Resource Management Unit 5 – Thameside Chalk

The Thameside Chalk is exposed at or near the ground surface near Thurrock and is folded with potential faulting which means that the aquifer is supported by some local recharge, although the mechanism is uncertain. Flow from other areas of the Upper Chalk is likely to be another significant source of recharge. The groundwater quality is generally good in this area, with recent infiltration to the aquifer, but becomes poor to the north and east of the WRMU where older water containing high concentrations of chloride and sodium can be found within the confined chalk. It is uncertain if groundwater flow occurs from the chalk in the south, however it is thought unlikely. The Essex Groundwater Model and investigations which are currently being undertaken will help improve the understanding of the resource balance in the chalk unit. Large-scale abstractions for both industrial and public water supply purposes take water from the chalk with no direct abstraction from other geological formations. The chalk aquifer does not support flows in any of the rivers in the Thurrock.

This unit has been assessed as No Water Available for further abstractions.

#### 5.2.6 Water Supply

In South Essex evaporation exceeds rainfall during the summer months and a recent series of dry winters continues to strain the water supply network further. The low rainfall levels affect the amount of water which can be sustainably extracted from rivers, reservoirs and aquifers. As a result of this Essex suffers a water deficit in relation to the demand. Therefore, the Essex and Suffolk areas are not self sufficient in relation to water resources and over the last 25 years, Essex has been dependent on the transfer of water from other areas.

There are three principle water treatment works, operated by Essex and Suffolk Water that supply potable water to Thurrock; Langham; Layer; and Hanningfield. Langham and Layer are situated in Colchester, while Hanningfield is located near Chelmsford.

The water in Langham and Layer Water Treatment Works comes from the River Stour. When the water in these works is running low the River Stour is used to transport water from the River Ouse in Cambridge to top up the supply. This is the Ely - Ouse to Essex Transfer Scheme which is licensed and operated by the Environment Agency.

Hanningfield Reservoir is fed from the Rivers Blackwater and Chelmer. The Environment Agency can also transfer water from the River Stour into the River Pant which then joins with the River Blackwater. Water is taken from the Rivers Blackwater and Chelmer at Maldon and it is pumped to Hanningfield where it is treated. Water is also supplied from Abberton reservoir,

<sup>&</sup>lt;sup>22</sup> Combined Essex Catchment Abstraction Management Strategy Annual Update March 2008 – Update on Strategy Actions, March 2008, Environment Agency (<u>http://www.environment-agency.gov.uk</u>)

from which water is subsequently supplied to the Herongate and Heaton Grange service Reservoirs. The Abberton reservoir is filled via abstractions from local watercourses including Layer Brook, Roman River and the River Stour, and these abstractions are supplemented from flow augmentation in the River Ely Ouse via a transfer of raw water from the Ely-Ouse catchment at Denver in Norfolk.

The water from the three works is mixed together at the service reservoir on the outside of Brentwood (Herongate). This mixed water is then pumped to Thurrock (Figure 5.5).

Water supply within Thurrock is supplemented via the Thames Water Utilities raw water bulk supply from Lea Valley reservoirs to Chigwell Water Treatment Works, along with two local water supply boreholes in Thurrock itself at Linford and Stifford. The boreholes supply small areas of Thurrock either side of Grays. The water is mixed with that from the Herongate reservoir. Both Linford and Stifford public water supply boreholes are located in Groundwater Source Protection Zones (Figure 5.6<sup>23</sup>).

Thurrock is part of the fully integrated Essex water resource zone (WRZ), which is controlled by Essex and Suffolk Water (ESW). This WRZ boundary is shown in Figure 5.5. Water can be moved around the zone as required. ESW have developed 8 water supply network (pipeline) models in the Essex WRZ which includes Thurrock and have undertaken modelling for all proposed future development scenarios to aid in their planning process and ensure that water will be available over future years in line with growth in the area. There are no identified pressure or capacity issues in the water supply infrastructure, with local reinforcements provided within Thurrock.

<sup>&</sup>lt;sup>23</sup> Environment Agency Website (<u>www.environment-agency.gov.uk</u>)



## Figure 5.5 Essex Resource Zone and Associated Infrastructure (Source: ESW<sup>3124</sup>)

<sup>&</sup>lt;sup>24</sup> Essex and Suffolk Water Draft Water Resources Management Plan, Essex and Suffolk Water, April 2008 (<u>http://www.eswater.co.uk/ESW\_Draft\_Water\_Resources\_Management\_Plan.pdf</u>)

#### Thurrock Borough Council

Thurrock Water Cycle Study – Scoping Study



## 5.3 Flood Risk

Thurrock's Strategic Flood Risk Assessment (SFRA) was completed in December 2006 under the draft Planning Policy Statement 25 (PPS25). This is currently being updated by Scott Wilson, in accordance to PPS25 (released February 2007) and its guidance document, incorporating new climate change allowances, new water levels (issued by the Environment Agency), and updated breach modelling. These will feed into a Level 1 and Level 2 SFRA for Thurrock, providing information on the flood risk from fluvial, tidal, surface, ground and artificial water sources to aid Thurrock Borough Council in their application of the Sequential Test and inform the Sustainability Appraisal and subsequent planning policies. Until completed, it is not at this stage possible to report on the flood risk baseline within Thurrock; however, flood risk will be considered in the Outline stage of the WCS.

## 5.4 Wastewater Treatment and Collection

The principal waste water treatment works (WWTW) in the Thurrock area is Tilbury WWTW which serves a population equivalent of approximately 269,500 and discharges directly to the Tidal River Thames. Discharging to a Tidal rather than main, inland river system means that different, less rigid, restrictions are placed upon the discharge consent and requirements to meet Environment Agency and future WFD water quality standards, where they exist; in part this is due to the larger dilution effect offered by transitional (tidal) waters and the difficultly associated with assigning water quality objectives to these stretches of water. As such there is unlikely to be an objection to an increase in discharge consents, assuming the works has the capacity to accommodate the increased wastewater and the quality requirements can be met. The works is owned and operated by Anglian Water Services (AWS) and is the largest sludge treatment centre in the country, currently operating at half its flow and process capacity.

The Thurrock Infrastructure Deficit Study<sup>25</sup> investigated the potential deficits in wastewater capacity with the proposed future growth in Thurrock and concluded that there is limited spare capacity in the wastewater network (sewerage system) across the Borough. The existing network has sufficient capacity for approximately 4,000 dwellings, although the disposal network in the west of the Borough is almost at capacity and development in the Purfleet and West Thurrock area will require an upgrading of the network to increase capacity. AWS have confirmed these findings and have planned an upgrade to the existing wastewater network to serve future proposed development to the west of the Borough as part of their next AMP Capital Scheme (AMP5). This will require a 1.8m trunk sewer to service and transport the waste from the west of the town to Tilbury WWTW.

## 5.5 Water Quality

#### 5.5.1 River Mardyke

The River Mardyke is a designated cyprinid freshwater fishery. Many species of fish occur in the Mardyke river valley; the most common being Roach, Carp, Eel, Perch and Chub in the upper reaches and Tench, Rudd and Flounder mainly restricted to lower river sections.

<sup>&</sup>lt;sup>25</sup> Thurrock Infrastructure Deficit Study 2004 – 2021, April 2006, Colin Buchanan and Partners Limited for Thurrock Council (<u>http://www.thurrock.gov.uk/planning/strategic/pdf/ldf\_tech\_infrastructure.pdf</u>)

Problems with water and habitat quality are believed to be the main contributory factors to poor fish stocks in the Mardyke.

The water quality target in the lower reaches of the Mardyke is RE3 (River Ecosystem target level 3), which is water of '*fairly good quality*'. In the last three reporting years (2005 - 2007) the chemical water quality has been recorded as poor or bad, whilst the biological value has been recorded as good or fairly good. Nitrates are Moderately Low to Moderate and Phosphates are excessively high.

The lower reaches of the Mardyke have a history of suffering from low dissolved oxygen levels as a result of 'ponding' which occurs when the tidal flap at the outfall is closed on the highest tides and freshwater begins to back up. In some cases saline water can enter the freshwater system and exacerbate the problem.

Tighter standards under the Water Framework Directive (WFD) are likely to require a tightening of consents and reduction in diffuse sources entering the River Mardyke. Additionally, under the WFD the Mardyke will likely be required to achieve a 0.12 mg/l (mean) standard for Phosphate, which will be exceeded with the current excessively high Phosphate levels.

Of all forms of Phosphorus (P), it is desirable to determine the concentrations of Soluble Reactive Phosphorus (SRP) as this form of P is most immediately available to aquatic macrophytes and algae. Phosphorus is usually the limiting nutrient in *inland freshwaters* and gives an indication of the likelihood of eutrophication within a water environment. There are guidelines on concentrations that should occur to protect the overall health of the water body. Some sources of P to water bodies are regulated by legislation, such as emissions from WWTWs (Urban Wastewater Treatment Directive, (91/271/EEC)).

#### 5.5.2 Tidal River Thames

Under the existing Environment Agency River Ecosystem Classification there is no statutory water quality standard for the Tidal River Thames stretch to the south of Thurrock as it is a transitional watercourse and is therefore downstream of the freshwater limit, where traditionally water quality standards have been applied. Similarly, there is limited information available at this stage on the quality of the water in the river and therefore it is difficult to assess the current baseline of the Tidal River Thames.

The Tidal River Thames is assessed by the Environment Agency as being 'At Risk' from point and diffuse sources of pollution and physical and morphological alteration under their initial risk assessments for the WFD. Therefore it is likely that some investment is likely to be required to ensure no deterioration in water quality .The WFD transitional water quality standards are still draft and exist only for Dissolved Oxygen and Dissolved Inorganic Nitrogen.

While Thurrock has no designated bathing beaches, Grays Beach and Coalhouse Fort are used for recreational purposes. The European Community (EC) provides quality guidelines for bathing waters at designated bathing beaches as well as a maximum level for pollutants. The level has occasionally been exceeded.<sup>26</sup>

<sup>&</sup>lt;sup>26</sup> Sustainability Appraisal- Core Strategy and Polices for Development Control and Site Specific Allocations and Policies Development Plan Documents, Volume 2: Main Report, December 2007. Scott Wilson for Thurrock Council. (http://www.thurrock.gov.uk/planning/strategic/pdf/ldf\_preferred\_ear.pdf)

## 5.6 Ecology and Biodiversity

The Borough of Thurrock contains several areas/sites of ecological importance, including the Thames Estuary and Marshes Special Protection Area (SPA) and RAMSAR Site, Holehaven Creek Site of Special Scientific Interest (SSSI), the West Thurrock Lagoon and Marshes SSSI and the Grays Chalk Pit SSSI.<sup>27</sup> The water dependent sites within and surrounding Thurrock are illustrated in Figure 5.7 and described in Table 5.1.

The Thames Estuary & Marshes SPA and RAMSAR site is the only European Site that lies wholly or partly within the Thurrock boundary. However, a further sixteen European sites outside of the district are considered to have links with development within Thurrock via identified pathways. A Habitats Regulations Assessment has been carried to assess the impacts of the proposed LDF development will have on the European Sites<sup>28</sup>.

The lower Mardyke floodplain is designated as a County Wildlife Site. The site is considered to be in a sub-optimal condition and there are plans to restore the floodplain to wet woodland and reedbed, both of which are priority BAP habitats.

 <sup>&</sup>lt;sup>27</sup> South Essex Catchment Abstraction Management Strategy (CAMS), Environment Agency (June 2004)
 <sup>28</sup> Habitat Regulations Assessment Final Report, October 2007, Scott Wilson for Thurrock Council (<u>http://www.thurrock.gov.uk/planning/strategic/pdf/ldf\_preferred\_ear\_hra.pdf</u>)

#### Thurrock Borough Council

Thurrock Water Cycle Study – Scoping Study



Site	Description						
Thames Estuary and Marshes SPA and RAMSAR Site <sup>29</sup>	Thames Estuary & Marshes is both a RAMSAR site and a Special Protection Area (SPA) due to the nationally and internationally important numbers of wintering wildfowl and wading birds. The majority of this site (the Thames Estuary and Marshes SSSI) is situated within Kent but one element, the Mucking Flats and Marshes SSSI is situated within Thurrock.						
Marshes SSSI <sup>30</sup>	Mucking Flats & Marshes SSSI comprises an extensive stretch of Thames mudflats and saltmarsh, together with sea wall grassland. It is an internationally important feeding habitat for birds, particularly during the overwintering period. Mucking Flats & Marshes is by far the most important part of the SPA for feeding avocets and has supported a single flock in March 2003 of 1395 birds. This is the largest single count of avocet ever recorded in the UK and represents 1.9% of the international population.						
Holehaven Creek SSSI <sup>30</sup>	Holehaven Creek is situated on the opposite side of Shell Haven from Mucking Flats and Marshes and effectively serves as southeast boundary of Thurrock. Although it is not part of any European site, the tidal creek system acts as the principal drain for the surrounding grazing marshes, which are important supporting habitat for waterfowl for which the SPA was designated, and forms a confluence at Holehaven with the River Thames. The site is therefore linked geographically and functionally with the wider Thames Estuary and thus the Thames Estuary & Marshes SPA.						
West Thurrock Lagoon and Marshes SSSI <sup>30</sup>	West Thurrock Lagoon and Marshes is one of the most important sites for wintering waders and wildfowl on the Inner Thames Estuary. The combination of extensive intertidal mudflats together with a large and secure high tide roost, attracts waders in nationally important numbers, with significant populations of other bird species. The adjacent Stone Ness saltings constitute the largest area of saltmarsh in the inner Thames estuary, and are characteristically high marshes of low salinity. Stone Ness is one of the few sites where it occurs outside the sea wall, and is unusually large in extent.						
Grays Chalk Pit SSSI <sup>30</sup>	Grays Thurrock Chalk Pit is situated in the SW of Essex. Active mineral extraction ceased in the early 1920s and since that time natural colonisation of the pit bottom has created a range of woodland, scrub and calcareous grassland habitats that are important for the assemblage of invertebrate fauna they support. The site is also part of the Essex Wildlife Trust Nature Reserve. The assemblage of invertebrate fauna mean this site has the best concentration and diversity of calcareous invertebrate fauna in Essex.						
Vange & Fobbing Marshes SSSI <sup>30</sup>	Vange & Fobbing Marshes covers and area of 165 hectares and lies on the alluvial plain of the lower River Thames. The unimproved coastal grassland and associated dykes and creeks support a diversity of maritime grasses, herbs, invertebrates and birds. Many of these species are nationally uncommon or rare, and together form an outstanding assemblage of plants.						
Inner Thames Marshes SSSI <sup>30</sup>	The Inner Thames Marshes form the largest remaining expanse of wetland bordering the upper reaches of the Thames Estuary, and extends from the east to the western extent of the Borough of Thurrock. The site is of particular note for its diverse ornithological interest and especially for the variety of breeding birds with wintering teal populations reaching levels of international importance. The Marshes also support a wide range of wetland plants and insects.						
	The site comprises a major relic of low-lying grazing marsh with a variety of grassland communities dissected by a network of fresh to brackish water drains. The series of lagoon habitats are complemented by more restricted areas of naturally derived saltmarsh and intertidal mud along the Thames foreshore.						

#### Table 5.1 Water Dependent Conservation Sites in Thurrock

 <sup>&</sup>lt;sup>29</sup> Habitat Regulations Assessment Final Report, October 2007, Scott Wilson for Thurrock Council (<u>http://www.thurrock.gov.uk/planning/strategic/pdf/ldf\_preferred\_ear\_hra.pdf</u>)
 <sup>30</sup> Natural England (<u>http://www.english-nature.org.uk</u>)

# 6 Preliminary Findings, Constraints and Recommendations

## 6.1 Water Resources and Supply

Thurrock lies within an area typified by low rainfall and chalk underlies the whole of Thurrock. The chalk is near to the ground surface in the area around the Southwest, and in some areas of Thurrock groundwater levels are rising in response to the cessation of long-term water abstraction in recent decades. The chalk acts as the principal underlying unconfined aquifer in the area, and this chalk groundwater is utilised for public water supply, along with some surface water abstractions principally from the River Mardyke. Through their Catchment Abstraction Management Strategy process (CAMS) for the South Essex catchments, the Environment Agency have concluded that no water is available for further abstraction from surface (River Mardyke catchment) or groundwater (Thames Chalk) sources in the Borough, and as such additional water resources will be required to supply water to new developments within Thurrock.

Water is currently supplied to Thurrock by Essex and Suffolk Water (ESW). Thurrock is part of the wider Essex 'Water Resource Zone' (WRZ). Water is supplied to the Essex WRZ and hence Thurrock Borough through some existing surface water and groundwater abstractions; but these local sources have to be supplemented through strategic transfers into the Zone from Abberton reservoir, from which water is subsequently supplied to the Herongate and Heaton Grange service Reservoirs, and via a Thames Water Utilities raw water bulk supply from Lea Valley reservoirs to Chigwell Water Treatment Works. The Abberton reservoir is filled via abstractions from local watercourses including Layer Brook, Roman River and the River Stour, and these abstractions are supplemented from flow augmentation in the River Ely Ouse via a transfer of raw water from the Ely-Ouse catchment at Denver in Norfolk. This transfer is licensed and operated by the Environment Agency.

During normal years, ESW have sufficient water resources to supply all demand from existing housing and non-domestic use in the Essex WRZ; however, for very dry years (drought conditions) ESW are currently running at a 'supply and demand deficit' in their water resources planning for this zone. This means that during a very dry year there is considered to be insufficient resources to meet peak demand, and as such ESW are at greater risk of not meeting their 'levels of service' to customers. 'Levels of service' refers to a water company's targets in ensuring water supplies in dry years. A water company must be able to demonstrate that it can supply sufficient water in all conditions which ensures that measures such as restrictions on use, and hosepipe bans are only implemented according to a given frequency as agreed with OFWAT (the water industry regulator). Whilst this does not mean that water resources are not available for new development in 'normal years' it does mean that new development cannot be guaranteed to receive the same 'level of service' for water supply until new resources or demand measures are put in place.

In order to address this deficit in the dry year supply and demand balance, and to meet the additional demand expected from development as proposed in the East of England Plan, ESW as part of their Draft WRMP<sup>31</sup> have planned to meet future water demand through the proposed increase in storage at Abberton Reservoir and the commensurate increase in abstraction and

<sup>&</sup>lt;sup>31</sup> Essex and Suffolk Water Draft Water Resources Management Plan, Essex and Suffolk Water, April 2008 (<u>http://www.eswater.co.uk/ESW\_Draft\_Water\_Resources\_Management\_Plan.pdf</u>)

transfer from the Ely-Ouse transfer scheme, which if approved will come online in 2014. The scheme has undergone comprehensive public consultation and at the time of writing this study, has been recommended for approval by Colchester Borough Council's Development Control Committee. The Government Office for the East of England (GO East) will have the final decision on whether the scheme will go ahead, and this decision is expected by the end of 2008.

Development up to 2014 therefore has a constraint in that new development could affect the levels of service provided by ESW; phasing of development up to 2014 will have to be carefully considered and potentially minimised to ensure that 'levels of service' for water provision by ESW are not adversely affected. In addition, development beyond 2014 is reliant on the Abberton scheme being given approval and being complete by this date. If the scheme is not given approval, then the current planned development will be constrained as a result of dry-year water resources planning. If implementation of the scheme is delayed by the need for a Public Inquiry into the scheme, then the phasing of development will be constrained up until the revised date for implementation of the scheme. Figure 6.1 illustrates the forecasted supply and demand balance for Essex up to and post 2031.

Figure 6.1 Essex Resource Zone Forecasted Supply and Demand Balance (Source:  $\text{ESW}^{32}$ )



Note: BL (Red Line) = Baseline Supply-Demand i.e. without planned measures, FP (Blue Line) = Final Planning Supply -Demand i.e. with planned measures

As discussed, ESW have undertaken extensive consultation to minimise the likelihood of objection to the Abberton scheme by statutory and non-statutory stakeholders as well as the local community, and hence their draft WRMP is based on the Abberton scheme receiving approval. It is considered that the risk of the scheme not being given approval is relatively low; nevertheless, the scheme cannot, at this stage, be guaranteed and hence water resources do currently represent a potential limit to growth in Thurrock.

In terms of the water supply infrastructure (i.e. transmission pipes and pumping stations) there are no pressure or capacity issues which would affect future growth and local reinforcements have been provided to the piped network within Thurrock up to 2015. Future plans for

<sup>&</sup>lt;sup>32</sup> Essex Water Resources Planning Guidelines Supply Demand Worksheets, Essex and Suffolk Water, March 2008, (<u>http://www.eswater.co.uk/DryYr\_Essex\_DraftPlanFinal\_April\_2008.pdf</u>)

reinforcements and upgrades are planned for in ESW's next 5 year planning period (AMP5) running from 2010 to 2015; however, at the time of writing this report, ESW are currently consulting with OFWAT on their draft Strategic Business Plan (SBP). The SPB is the document which sets out ESW's requirements for new infrastructure (such as reinforcement of pipe supply networks) and seeks approval from OFWAT to increase water charges during the AMP5 period in order to pay for the investment. As with any water company's investment proposals, there is a risk that OFWAT will not approve the price increases required for specific elements of investment (in this case the required reinforcements) and hence there is a risk that new development could be constrained beyond AMP5 (after 2015). This risk can be mitigated by the Water Cycle Study which should act as an evidence base to the ESW's Business Plan as well as Thurrock Borough Council's LDF which further strengthens ESW's case for further investment in AMP5.

In summary, the following issues within Thurrock in relation to future development and water resources and supply have been identified and should be reviewed and further investigated as part of the Outline Stage of the WCS, in conjunction with Essex and Suffolk Water:

- No water is available for further abstraction from surface or groundwater sources and therefore additional water resources will be required to supply water to new developments within Thurrock;
- Water resources from surface and groundwater sources within Thurrock are supplemented by strategic transfers into the Borough from Abberton reservoir and via a Thames Water Utilities raw water bulk transfer from Lea Valley reservoirs;
- In very dry years (drought conditions) ESW are currently running at a 'supply and demand deficit' in their water resources planning for the Borough, meaning that during a very dry year there is considered to be insufficient resources to meet peak demand;
- Future water demand is expected to be met through the proposed increase in storage at Abberton Reservoir and the commensurate increase in abstraction and transfer from the Ely-Ouse transfer scheme, which if approved will come online in 2014; although the risk of the scheme being rejected is relatively low, at this stage the scheme cannot be guaranteed and hence water resources currently represent a potential limit to growth in Thurrock;
- Phasing of development up to 2014 will have to be carefully considered and potentially minimised to ensure that 'levels of service' for water provision by ESW are not adversely affected; and
- There are no pressure or capacity issues in the water supply infrastructure that would affect future growth, with local reinforcements provided to the piped network within Thurrock up to 2015. The Outline WCS will need to advise on the phasing of further upgrades required in AMP6 to service the new development planned beyond 2015.

## 6.2 Flood Risk & Surface Water Management

#### 6.2.1 Flood Risk

Thurrock's Strategic Flood Risk Assessment (SFRA) is currently being updated in accordance to PPS25 and its guidance document, incorporating new climate change allowances, new water levels, and updated breach modelling. These will feed into a Level 1 and Level 2 SFRA for Thurrock, providing information on the flood risk from fluvial, tidal, surface, ground and artificial water sources to aid Thurrock Borough Council in their application of the Sequential

Test and inform the Sustainability Appraisal and subsequent planning policies. Once available, this information should be incorporated into the next stage of the WCS, and assessed in relation to the proposed development site allocations to ensure that:

- The risk of flooding to the potential development areas is quantified and the development is steered away from high risk areas (Flood Zones 2 and 3);
- Any flood mitigation measures are planned in a strategic manner; and
- There is no deterioration to existing communities' standard of protection.

The aim of identifying the potential sources of flood risk to the potential development areas is to assess the risks of all forms of flooding to and from a development in order to identify any potential development constraints with respect to flood risk.

#### Surface Water Management

Surface Water Management is a key consideration when assessing development within large areas. PPS25 requires that new development does not increase the risk of flooding elsewhere by managing surface water runoff generated as a result developing land. Altering large areas of land by urbanising it fundamentally alters the way in which rainfall drains to watercourses and has the potential to increase the rate and amount of water that enters watercourses causing an increase in flood risk. In many cases, the management of surface water is achieved via a requirement to restrict runoff from developed sites to that which occurs from the pre-development site usage and this is achieved by incorporating a range of Sustainable Drainage Systems (SUDS) which aim to maximise the amount of rainwater which is returned to the ground (infiltratation) and then to hold back (attenuate) excess surface water. Incorporating SUDS often requires a large amount of space and for large developments often requires the consideration of large scale strategic features such as balancing ponds which can attenuate and store large volumes of water generated during very heavy rain storms to prevent flood risk downstream.

The management of surface water has the potential to act as a constraint to development within Thurrock, not just because of space requirements, but because the reduction in runoff rates and volumes is likely to be onerous. This is because discharge of surface water to the Tidal River Thames can be restricted during 'tide-locked' conditions, where the water level in the Thames at high tides prevents surface water drains from discharging. Pumping is often required; but with expected increases in tidal water levels as a result of climate change, there is likely to be an increase in the length of time during which surface water discharges are tidelocked, or require pumping. Additionally, several of the smaller watercourses, ditches and drains in the Borough are identified as low-flow channels with no additional capacity to accept surface water runoff and will require attenuation of surface water generated by new development. These issues will be further investigated as part of the outline and detailed stages of the WCS to ensure that the appropriate strategic level constraints and mitigation measures are identified and that guidance is given to the development of a Surface Water Management Plan (SWMP) for the Borough as recommended by the Government's recent Pitt Report. The WCS and SWMP will also help to ensure that developers address the required surface water management issues during preparations of site specific Flood Risk Assessments.

## 6.3 Wastewater Treatment and Collection

The principal waste water treatment works (WWTW) in the Thurrock area is Tilbury WWTW which discharges directly to the River Thames. The works is owned and operated by Anglian Water Services (AWS) and is currently operating at half its flow and process capacity.

It is assumed, and has been planned by AWS as part of their AMP5 investment round, that the wastewater generated from all future development will drain or be pumped to Tilbury WWTW. AWS have confirmed that Tilbury WWTW has adequate volumetric and process capacity to accommodate the proposed development; hence provision of wastewater treatment should not present a constraint to development.

The majority of the proposed development is in the west of the town, and as such an upgrade to the existing wastewater network will be required. This will require a new trunk sewer to service and transport the waste from the west of the town to Tilbury WWTW. AWS have planned for upgrades to the network to increase capacity in their next AMP Capital Scheme (AMP5) estimated to cost in the region of £4-5 million. As advised under the 'Water Resources' section (Section 6.1), there is a risk that the price increases required to deliver this investment will not be approved by OFWAT and hence funding will not be available in the AMP5 period (2010 to 2015); however, the risk is considered to be low and the Water Cycle Study will act as an evidence base to give added confidence that the investment will be approved and the infrastructure can be provided.

AWS have indicated that they have included investment plans in their AMP5 Business Plan for the growth scenarios described as Thurrock Borough Council's 'Scenario 3'. Significant growth beyond this figure is likely to be limited in terms of phasing during the AMP5 period (2010-2015) and further investment is likely to be required in AMP6 (2015-2020) in order to upgrade the sewer network to the level required to provide for additional growth. This will need to be confirmed during the next stages of the WCS, which will outline options for new infrastructure for growth in the favoured development allocations.

In summary, the following issues within Thurrock in relation to future development and wastewater treatment and collection have been identified and should be reviewed and further investigated as part of the Outline and Detailed Stage of the WCS, in conjunction with Anglian Water Services:

- There are no treatment capacity issues in terms of treating the generated wastewater from the proposed development within Thurrock;
- There currently exist hydraulic/infrastructure issues with transmitting the generated wastewater to Tilbury WWTW; AWS have planned to address this in AMP5 (up to 2015) with a new trunk sewer serving development proposed to the west of the town, but development will have to be phased to ensure that the required capacity is available with the proposed housing/employment growth – this phasing advice will be a key requirement of the next stages of the WCS; and,
- If development was to be located elsewhere in the Borough, further development of the wastewater infrastructure may be required to serve the larger population and development beyond 2015 (into the AMP6 period) will require consideration of further investment in the sewer network; this will have to be reviewed as part of the Outline WCS.

The Outline WCS should corroborate the findings of this study and assess in more detail the wastewater baseline and capacity of the existing wastewater treatment and network infrastructure to confirm:

- The baseline with respect to treatment of wastewater and how much 'spare' capacity is available in existing wastewater treatment facilities;
- The baseline with respect to wastewater or sewer network and whether there is scope to use the existing network system33 before upgrades are required; and
- The phasing requirements for development to ensure that any planned growth is commensurate with planned upgrades to the existing network/facilities.

## 6.4 Water Quality

There are two principal river systems within Thurrock; the River Mardyke (located to the west of the Borough) and the River Thames (located to the south).

As described, The River Mardyke has a history of poor water quality in the lower reaches of the river. Whilst no additional wastewater is proposed to be discharged to this watercourse, poor water quality may be exacerbated as a result of surface water runoff from new development areas to the west of Thurrock; therefore Sustainable Drainage Systems (SUDS) should be utilised where possible to ensure there is no worsening of the River Mardyke water quality. These measures will be driven by tighter standards under the Water Framework Directive (WFD) which are likely to require a tightening of consents and reduction in diffuse sources entering the River Mardyke. As with management of surface water for flood risk, the latter stages of the WCS and SWMP would be able to demonstrate the type of SUDS required to ensure that this issue does not pose a major constraint. The study will also provide the evidence for SUDS policies and funding mechanisms to ensure that they are implemented by developers through planning (section 105) conditions.

Under AMP5, the Biodiversity Action Plan (BAP) and WFD drivers, AWS have proposed to investigate an intermittent discharge which occasionally discharges raw sewage into the River Mardyke. If approved, this scheme will improve water quality in the catchment and will contribute towards maintaining and improving local compliance with Freshwater Fish standards.

Whilst Thurrock has no designated bathing beaches, Grays Beach and Coalhouse Fort are used for recreational purposes and Bathing Water Quality guidelines at these sites have occasionally been exceeded. This has the potential to pose a constraint as a result of additional discharges, but the large degree of available treatment capacity (volumetric and process) should ensure that the additional wastewater can be treated to the required standard to ensure no impact on bathing waters.

At this stage there is no detailed information available on the quality or WFD requirements of the Tidal Thames (transitional water quality standards are still draft and exist only for Dissolved Oxygen and Dissolved Inorganic Nitrogen). It is expected that as long as discharges from Tilbury WWTW and Combined Sewer Overflows (CSOs) are within agreed consents between AWS and the Environment Agency, there will be minimal impact on the Tidal Thames and downstream ecological sites and shellfish waters. However, the Tidal Thames is assessed by the Environment Agency as being 'At Risk' from point and diffuse sources of pollution and

<sup>&</sup>lt;sup>33</sup> the network of pipes and pumping stations which are used to transmit wastewater from buildings to treatment facilities

physical and morphological alteration and hence some investment is likely to be required to ensure no deterioration. The Outline WCS will therefore need to define the water quality standards that the increased discharge will need to meet in order to protect water quality.

In summary, the following issues within Thurrock in relation to future development and water quality have been identified and should be reviewed and furthering investigated as part of the Outline and Detailed Stage of the WCS, in conjunction with the Environment Agency, particularly with respect to the consenting requirements under both the existing and future (WFD) water quality standards:

- Poor water quality within the River Mardyke may be exacerbated as a result of surface water runoff from new development areas to the west of Thurrock; the utilisation of SUDS will reduce this impact;
- Bathing Water Quality guidelines at Grays Beach and Coalhouse Fort have occasionally been exceeded; the available treatment capacity at Tilbury WWTW should ensure that additional wastewater can be treated to the required standard to ensure no impact on bathing waters;
- Detailed information on the Tidal River Thames water quality and WFD requirements is not available at this stage, though it is expected that there will be minimal impact (water quality and ecological) on the Tidal River Thames as a result of development as long as discharges from Tilbury WWTW and CSOs are within agreed consents which need to be defined in the Outline study; and
- Some investment will be required to ensure no deterioration in the Tidal Thames water quality standards under the WFD and this will be defined in the Outline WCS.

The Outline WCS should corroborate the findings of this study, in particular whether all of the discharge from growth will be transferred to Tilbury WWTW and whether other options for wastewater disposal are required for different potential allocations. It should also assess in more detail the environmental capacity of the receiving watercourses to ensure that discharge of additional treated wastewater from new development or surface water does not have a detrimental impact on:

- The water quality of receiving waters;
- The hydrological/hydraulic regime of receiving waters and associated habitats; and
- Flood risk downstream of the discharge.

## 6.5 Ecology and Biodiversity

The Borough of Thurrock contains several areas/sites of ecological importance, including the Thames Estuary and Marshes Special Protection Area (SPA) and RAMSAR Site, Holehaven Creek Site of Special Scientific Interest (SSSI), the West Thurrock Lagoon and Marshes SSSI and the Grays Chalk Pit SSSI all of which have the potential to be affected by development within the Thurrock region. There will be no increases in existing abstractions from surface or groundwater sources and as such it is possible to screen out impacts to the sites within Thurrock as a result of water resources. However, a further sixteen European sites outside of the Borough, including the Wash, Abberton Reservoir and RAMSAR and Special Area of Conservation (SAC) sites bordering the Thames Estuary are considered to have links with development within Thurrock via identified pathways and have the potential to be impacted by increased water demand up to and post 2014 when (potentially) the Abberton Scheme comes

online. This is not a Thurrock-specific issue but should be considered alongside increased water demand within South Essex. Phasing of development to ensure that development cannot occur until sufficient water supply is available from the proposed scheme will ensure that there are no adverse impacts on local European sites.

The Habitats Regulations Assessment for Thurrock and the preliminary stages of the WCS have identified the following constraints:

- The impacts of air quality/atmospheric nitrogen deposition, water resources and coastal squeeze on the Thames Estuary and Marshes SSSI and RAMSAR site have been screened out.
- Reduced water quality, due to increased volumes of treated sewage effluent being discharged into the Tidal River Thames as a result of development in Thurrock, could impact upon the Thames Estuary and Marshes SSSI and RAMSAR site and downstream European sites (RAMSAR, SAC and SPAs) which border the Thames Estuary; and
- Poorly managed urban runoff from new development areas could impact upon ecological sites within Thurrock, hence strategic level SUDS will need to be planned for and policy drivers provided in the Water Cycle Study to ensure these do not present a constraint.

These findings will need to be reviewed and further investigated as part of the Outline and Detailed Stage of the WCS, in conjunction with Natural England.

# 7 Progression of WCS

## 7.1 Outline WCS

The next stage of the Water Cycle Study is to progress to the Outline Stage of the WCS. The Outline Study will build on the findings of this Scoping Study and consider all of the ways in which new development will impact on the water environment or water infrastructure specific to where growth is most likely to be targeted. It will be undertaken during consideration of allocation sites such that it can inform the decision process in terms of where development will be targeted. The key aim of the Outline study is to provide Thurrock Borough Council, as the LPA, with the evidence base which ensures that water issues have been taken into account when deciding the location and intensity of development within an authority's planning area as part of the development of the Core Strategy. It is also gives the water company an evidence base to its business plans which determine how much they can charge customers to invest in upgrades and the provision new infrastructure required to service proposed development.

If significant new infrastructure is required, or an impact on the water environment cannot be ruled out as significant, a detailed water cycle study will need to be undertaken for site specific allocations, or for the authority as a whole.

## 7.2 Project Group/Stakeholder

#### 7.2.1 Project Group

Once the Outline or Detailed WCS has determined the requirement for new infrastructure it will be necessary for the following key Stakeholders to agree to the WCS findings:

- Thurrock Borough Council as the planning authority and delivery vehicle for growth in the Thurrock District;
- The Environment Agency as the statutory planning and flood risk consultee as well as regulator for water quality;
- Anglian Water Services as provider of wastewater infrastructure; and
- Essex and Suffolk Water as provider of and water supply infrastructure.

Having due regard to the planning timeframes there will need to be stakeholder agreement on what infrastructure will be required (as recommended by the WCS) as well as when it will be required and how it will be funded. The best way to achieve this is to ensure that the key stakeholders are involved at an early stage of the WCS.

As such a Project Steering Group comprising Thurrock Borough Council, the Environment Agency, Anglian Water Services, Essex and Suffolk Water and Natural England should be setup at the early stages of the Outline WCS to advise and agree on the findings of both the Outline Study, and the requirements for the Detailed WCS.

The data required to undertake the Outline stages of the WCS is listed in Appendix A.

# Appendix A – Data Catalogue



#### THURROCK WATER CYCLE STUDY SCOPING STAGE DATA CATALOGUE

Date Source Number	Data Type	Data Description	Data Provider	Website	Author	Source/Data File Name	Format	Date Received	Data Completeness
1	Report	Essex and Suffolk Water Draft Water Resources Management Plan (April 2008)	ESW	~	Essex and Suffolk Water	http://www.eswater.co.uk/ESW_Draft_Water_Resources_Management_Plan.pdf	pdf	03/11/2008	Draft
2	Report	The South Essex Catchment Abstraction Management Strategy (June 2004)	EA	~	Environment Agency	http://www.environment- agency.gov.uk/commondata/acrobat/pg_0109_s_essex_845212.pdf	pdf	03/11/2008	Full
3	Report	Thurrock Infrastructure Deficit Study 2004 - 2021 (April 2006)	TBC	~	Colin Buchanan and Partners Limited	http://www.thurrock.gov.uk/planning/strategic/pdf/ldf_tech_infrastructure.pdf_	pdf	05/11/2008	Full
4	Report	Thurrock Sustainability Appraisal - Core Strategy and Policies for Development Control and Site Specific Allocations and Policies Development Plan Documents - Volume 2: Main Report (December 2007)	TBC	~	Scott Wilson	http://www.thurrock.gov.uk/planning/strategic/pdf/ldf_preferred_ear.pdf	pdf	05/11/2008	Full
5	Report	East of England Plan - The Revision to the Regional Spatial Strategy for the East of England (May 2008)	Government Office for the East of England	~	Government Office for the East of England (GOEE)	http://www.go- east.gov.uk/goee/docs/193657/193668/Regional_Spacial_Strategy/EE_Plan1.pdf	pdf	05/11/2008	Full
6	Report	Habitat Regulations Assessment - Final Report (October 2007)	TBC	~	Scott Wilson	http://www.thurrock.gov.uk/planning/strategic/pdf/ldf_preferred_ear_hra.pdf	pdf	06/11/2008	Full
7	Report	Anglian Catchment South Essex Freshwater Fish Pollution Production Programme: Updated Report August 2008	EA		Environment Agency	Rachel Rees (E-Mail)	Word	11/11/2008	Full
8	Report/Information Note	GQA and RE Background Information	EA		Environment Agency	Rachel Rees (E-Mail)	Word	11/11/2008	Full
9	Excel Spreadsheet	South Essex Rivers GQA and RE Compliance 2003 - 2007	EA		Environment Agency	Rachel Rees (E-Mail)	Excel	11/11/2008	Full
10	Picture	South Essex Catchment and Sewage Treatment Works	EA		Environment Agency	Rachel Rees (E-Mail)	jpeg	11/11/2008	Full
11	Picture	South Essex GQA Stretches	EA		Environment Agency	Rachel Rees (E-Mail)	jpeg	11/11/2008	Full
12	Summary Report	Climate Change and River Flows in the 2050s - Science Summary SC070079/SS1 (Document Ref: SCHO1008BOSS-E-P)	EA		Environment Agency	Rachel Rees (E-Mail)		11/11/2008	Summary
13	Report	Essex and Suffolk 'Water Resources for the Future - the Abberton Scheme' (October 2006)	ESW	~	Essex and Suffolk Water	http://www.eswater.co.uk/Abberton_brochure.pdf_	pdf	12/11/2008	Full
14	Report	The Combined Essex Catchment Abstraction Management Strategy (February 2007)	EA	~	Environment Agency	http://www.environment-agency.gov.uk		12/11/2008	Full
15	Fact Sheet	Combined Essex CAMS Annual Update March 2008: Update on Strategy Actions	EA	~	Environment Agency	http://www.environment-agency.gov.uk	pdf	12/11/2008	Full
16	Report	Sustainable Communities in the East of England (5th February 2003)	Communities and Local Government (Formally Office of the Deputy Prime Minister)	~	Office of the Deputy Prime Minister	http://www.communities.gov.uk/documents/communities/pdf/143600.pdf	pdf	21/11/2008	Full
17	Draft Manual	The DRAFT Water Cycle Study Manual - Guidance on How to Carry Out a Water Cycle Study (2008)	EA	~	Environment Agency	http://www.halcrow.com/wcs_guidance/pdf/WCSguidance_v2.pdf_	pdf	21/11/2008	Full
18	Fact Sheet	Our Thurrock: Know Your Area (June 2008)	TBC	~	Thurrock Borough Council	http://www.thurrock.gov.uk/l-know/profile/pdf/our_thurrock_200806.pdf	pdf	21/11/2008	Full
19	Report	Thurrock local Development Framework: Annual Monitoring Report 2007 (December 2007)	TBC	~	Thurrock Borough Council	http://www.thurrock.gov.uk/planning/strategic/pdf/monitor_annual_2007.pdf_	pdf	21/11/2008	Full
20	Report	Thurrock Local Development Framework: Core Strategy & Policies for Control of Development - Development Plan Document Preferred Options Consultation (November 2007)	TBC	~	Thurrock Borough Council	http://www.thurrock.gov.uk/planning/strategic/pdf/ldf_preferred_cs_200711.pdf_		21/11/2008	Full
21	Report	Thurrock Profile: A Summary Assessment of the State of Thurrock Using Demographic, Social, Economic and Environmental Indicators (November 2007)	TBC		Thurrock Borough Council	http://www.thurrock.gov.uk/l-know/profile/pdf/profile_200711.pdf_	pdf	21/11/2008	Full
22	Citation	West Thurrock Lagoon & Marshes SSSI Notification (File Ref: 14 W5F)	NE	~	Natural England (formally English Nature)	http://www.english-nature.org.uk	pdf	21/11/2008	Full
23	Citation	Grays Thurrock Chalk Pit SSSI Notification (File ref: 14 WBP)	NE	~	Natural England (formally English Nature)	http://www.english-nature.org.uk	pdf	21/11/2008	Full
24	GIS	Amenity Greenspace	TBC			Amenity_Greenspace.shp	Shapefile	29/10/2008	Full
25	GIS	Ancient Woodland (English Nature)	TBC			Ancient_Woodland_(EN).shx	Shapefile	29/10/2008	Full
26	GIS	Areas Deficient in 20 Ha Sites	TBC			Areas_Deficient_in_20_ha_Sites.shp	Shapefile	29/10/2008	Full



#### THURROCK WATER CYCLE STUDY SCOPING STAGE DATA CATALOGUE

Date Source Number	Data Type	Data Description	Data Provider	Website	Author	Source/Data File Name	Format	Date Received	Data Completeness
27	GIS	Areas Deficient in 100 Ha Sites	TBC			Areas_Deficient_in_100_ha_Sites.shp	Shapefile	29/10/2008	Full
28	GIS	Areas That Benefit From Flood Defences	TBC			Areas_that_Benefit_from_Flood_Defences_(EA).shp	Shapefile	29/10/2008	Full
		(Environment Agency)							
29	GIS	Biodiversity Sites of Local Interest	TBC			Biodiversity Sites of Local Interest.shp	Shapefile	29/10/2008	Full
30	GIS	Broad Locations Areas	TBC			BLZ16 4 07 pol.shp	Shapefile	29/10/2008	Full
31	GIS	Character Areas	TBC			Character Areas.shp	Shapefile	29/10/2008	Full
32	GIS	Conservation Areas Boundaries 2007	TBC			Conservation Areas Boundaries 2007.shp	Shapefile	29/10/2008	Full
33	GIS	Environment Agency Groundwater Vulnerability	TBC			EA Ground Water Vulnerability.shp	Shapefile	29/10/2008	Full
34	GIS	Environment Agency Hydrometric Catchments	TBC			EA Hydrometric Catchments.shp	Shapefile	29/10/2008	Full
35	GIS	Environmentally Sensitive Areas	TBC			Environmentally Sensitive Areas.shp	Shapefile	29/10/2008	Full
36	GIS	Environment Agency Flood Defences	TBC			Flood Defences (EA).shp	Shapefile	29/10/2008	Full
37	GIS	Existing Strategic Bridging Points	TBC			GI - Existing Strategic Bridging Points.shp	Shapefile	29/10/2008	Full
38	GIS	Natural Systems Opportunity	TBC			GI - Natural Systems Opportunity.shp	Shapefile	29/10/2008	Full
39	GIS	Potential for managed Realignment	TBC			GI - Potential for Managed Realignment.shp	Shapefile	29/10/2008	Full
40	GIS	Potential for Open Space	TBC			GI - Potential for Open Space.shp	Shapefile	29/10/2008	Full
41	GIS	Potential for Sustainable Drainage Systems	TBC			GI - Potential for SuDS.shp	Shapefile	29/10/2008	Full
42	GIS	Potential Heritage Assets	TBC			GI - Potential Heritage Assets.shp	Shapefile	29/10/2008	Full
43	GIS	Potential Local Greenways	TBC			GL - Potential Local Greenways.shp	Shapefile	29/10/2008	Full
44	GIS	Priority for Flood Management	TBC			GI - Priority for Flood Management.shp	Shapefile	29/10/2008	Full
45	GIS	Proposed Strategic Bridging Points	TBC			GL - Proposed Strategic Bridging Points.shp	Shapefile	29/10/2008	Full
46	GIS	Proposed Strategic Green Links - Bural	TBC			GI - Proposed Strategic Green Links - Bural.shp	Shapefile	29/10/2008	Full
47	GIS	Proposed Strategic Green Links - Urban	TBC			GI - Proposed Strategic Green Links - Urban.shp	Shapefile	29/10/2008	Full
48	GIS	Strategic Heritage Asset	TBC			GL - Strategic Heritage Asset sho	Shapefile	29/10/2008	Full
49	GIS	Strategic Open Space	TBC			GI - Strategic Open Space.shp	Shapefile	29/10/2008	Full
50	GIS	Strategic Sites NSNGS	TBC			GL - Strategic sites NSNGS (Points) shn	Shapefile	29/10/2008	Full
51	GIS	Strategic Sites to Safeguard for Biodiversity	TBC			GL - Strategic Sites to Safeguard for Biodiversity sho	Shapefile	29/10/2008	Full
52	GIS	Strategic Views	TBC			GL - Strategic Views shn	Shapefile	29/10/2008	Full
53	GIS	Sustrans Boute	TBC			GL - Sustrans Boute sho	Shapefile	29/10/2008	Full
54	GIS	Gynsy Sites	TBC			Gynsy Sites shn	Shapefile	29/10/2008	Full
55	GIS	Environment Agency Historic Flood Man	TBC			Historic Flood Man (FA) shn	Shapefile	29/10/2008	Full
56	GIS	LDE Preferred Options - Community Eacilities	TBC			I DE Preferred Ontions - Community Eacilities sho	Shapefile	29/10/2008	Full
57	GIS	LDF Preferred Options - Existing Secondary	TBC			LDF_Preferred_OptionsCommunity_racindes.snp	Shapefile	29/10/2008	Full
51	alo	Employment	100			Ebr_incloned_optionsExisting_occonduly_Employment.shp	onapenie	20/10/2000	i un
58	GIS	LDE Preferred Ontions - Health Eacilities	TBC			LDE Preferred Ontions - Health Facilities sho	Shapefile	20/10/2008	Full
50	GIS	LDF Preferred Options - Housing	TBC			LDF_Preferred_Options - Heusing shp	Shapefile	29/10/2008	Full
60	GIS	LDF Preferred Options - Leisure Eacilities	TBC			LDF_Preferred_OptionsLeisure_Eacilities.chp	Shapefile	29/10/2008	Full
61	GIS	LDF Preferred Options - Leisure racinties	TBC			LDF_Preferred_Options - Major_Developed_Sites.shp	Shapefile	29/10/2008	Full
62	GIS	LDF Preferred Options - New Primary Employment	TBC			LDF_Preferred_OptionsNew_Primary_Employment.shp	Shapefile	29/10/2008	Full
62	GIS	LDE Proferred Options - New Secondary Employment	TRC			LDF_Preferred_OptionsNew_Cocondery_Employment.shp	Shapefile	20/10/2000	Full
05	010	EDI Treferred Options - New Secondary Employment	1DO			EDI_freiened_optionsivew_secondary_Employment.snp	Shapenie	23/10/2000	i un
64	CIE	LDE Proferred Options Oil & Chemical	TPC			I DE Proforrad Ontiona Oil & Chamical aba	Shapofila	20/10/2009	Eull
65	GIS	LDF Preferred Options - Oil & Chemical	TBC			LDF_Preferred_OptionsOit_&_Oiternical.snp	Shapefile	29/10/2008	Full
66	GIS	LDF Preferred Options - Poin Related Development	TBC			LDF_Preferred_OptionsPot_large_Parades.shp	Shapefile	29/10/2000	Full
67	CIE	LDF Proferred Options - Retail Large Faildues	TPC			LDF_Proferred_OptionsRetail_Large_Falades.shp	Shapefile	20/10/2000	Full
68	GIS	LDF Preferred Options - Retail Small Parades	TBC			LDF_Preferred_OptionsRetail_Sinall_Parades.shp	Shapefile	29/10/2000	Full
60	GIS	LDF Preferred Options - Retail Town Certifies	TBC			LDF_Preferred_OptionsSchools.shp	Shapefile	29/10/2000	Full
70		LDF Preferred Options - Schools				LDF_Freierred_OptionsSchools.shp	Shapefile	29/10/2008	Full
70		LDF Preferred Options - Havening Showpeople				LDF_Preferred_OptionsHavening_Showpeople.shp	Chapefile	29/10/2008	Full
71	GIS	LDF Preierred Options - Strategic Transport Schemes	IBC			LDF_Preierred_OptionsStrategic_Transport_Schemes	Snapellie	29/10/2008	Full
70	CIE	- South Essex Rapid Transit	TRO				Chanofile	00/10/0000	E.J.I
12	GIS	LDF Preierred Options - Strategic Transport Schemes	IBC			LDF_Preierred_OptionsStrategic_fransport_SchemesPort.snp	Snapellie	29/10/2008	Full
72	CIR	- FUIL	TPC			I DE Broforrad Ontiona - Stratogia Transport Salamaa - Bood Bailisha	Shapofile	20/10/2002	Eull
73	GIS	LDF Preferred Options - Strategic Transport Schemes	IBC			LDF_Preferred_OptionsStrategic_Transport_SchemesRoad_Rail.shp	Snaperile	29/10/2008	Full
	010	- Road & Rall	TDO				01 (7)	00/10/0000	
/4	GIS	LUF Preferred Options - Strategic Transport Schemes	IBC			LDF_Preferred_OptionsStrategic_Transport_SchemesSustrans.shp	Shapetile	29/10/2008	Full
75	010	- Sustrains	TDO			Listed Duiblings also	Ob an a fil	00/40/0000	E all
/5	615	Listea Builaings	TBC			Listea_Buildings.snp	Shapetile	29/10/2008	Full
/6	615	Local Nature Reserves	IBC			Local_Ivature_Heserves.shp	Shapetile	29/10/2008	Full
//	615	Local wildline Sites	IBC			Local_wildlife_Sites.shp	Shapetile	29/10/2008	Full
78	GIS	National Lanuse Database 2006	IBC TRC			National_Landuse_Database_2006.shp	Shapetile	29/10/2008	Full
79	GIS	Natural Areas	IBC			Natural_Areas.snp	Shapetile	29/10/2008	Full



#### THURROCK WATER CYCLE STUDY SCOPING STAGE DATA CATALOGUE

Date Source Number	Data Type	Data Description	Data Provider	Website	Author	Source/Data File Name	Format	Date Received	Data Completeness
80	GIS	Parks and Gardens	TBC			Parks_and_Gardens.shp	Shapefile	29/10/2008	Full
81	GIS	Potential Local Wildlife Sites	TBC			Potential_Local_Wildlife_Sites.shp	Shapefile	29/10/2008	Full
82	GIS	RAMSAR Sites	TBC		RAMSAR_Sites.shp		Shapefile	29/10/2008	Full
83	GIS	Register of Parks and Gardens of Special Historic	TBC			Register_of_Parks_and_Gardens_of_Special_Historic_Interest.shp	Shapefile	29/10/2008	Full
		Interest							
84	GIS	Registered Common Land	TBC			Registered_Common_Land.shp	Shapefile	29/10/2008	Full
85	GIS	Sites of Special Scientific Interest	TBC			Sites_of_Special_Scientific_Interest.shp	Shapefile	29/10/2008	Full
86	GIS	Special Protection Areas	TBC			Special_Protection_Areas.shp	Shapefile	29/10/2008	Full
87	GIS	Urban Areas ECC Defined	TBC			Urban_Areas_ECC_Defined.shp	Shapefile	29/10/2008	Full
88	GIS	Village Greens	TBC			Village_Greens.shp	Shapefile	29/10/2008	Full
89	GIS	Water Based Green Space Open Spaces	TBC			Water Based Green Space Open Spaces.shp	Shapefile	29/10/2008	Full
90	GIS	Thurrock Council Extent	TBC			council_extent_thurrock.tab	MapInfo	04/05/2006	Full
91	GIS	Mineral Sites	TBC			MINERAL.tab	MapInfo	25/01/2006	Full
92	GIS	Landfill Sites	TBC			TC_LFILL.tab	MapInfo	27/01/2006	Full
93	GIS	River Mardyke River Network	TBC			river_mardyke.tab	MapInfo	04/05/2006	Full
94	GIS	TGSE Main River Network	TBC			tgse_main_river.shp	Shapefile	16/06/2008	Full
95	GIS	Urban Areas for Thurrock	TBC			Uraban_areas_THU0508.tab	MapInfo	06/02/2006	Full
96	GIS	Urban Areas (1:250,000)	TBC			Urban_areas_250k.tab	MapInfo	19/01/2006	Full
97	GIS	Major Footpaths (1:250,000)	TBC			Footpath_250k.tab	MapInfo	19/01/2006	Full
98	GIS	Railway (1:250,000)	TBC			Railway_250k.tab	MapInfo	19/01/2006	Full
99	GIS	Railway (1:625,000)	TBC			railway_625k.shp, railway_625k.tab	Shapefile/Mapl	10/01/2006	Full
							nfo		
100	GIS	A Roads (1:625,000)	TBC			roads_a_625k.shp	Shapefile	11/01/2000	Full
101	GIS	B Roads (1:625,000)	TBC			roads_b_625k.shp	Shapefile	11/01/2000	Full
102	GIS	Minor Roads (1:625,000)	TBC			roads_minor_625k.shp	Shapefile	11/01/2000	Full
103	GIS	Primary Roads (1:625,000)	TBC			roads primary 625k.shp	Shapefile	11/01/2008	Full
104	GIS	Ordnance Survey Mapping - Tile TQ57 (1:25,000)	TBC		Ordnance Survey	TQ57.tab, TQ57.TIF	MapInfo, TIF	20/06/2005	Full
105	GIS	Ordnance Survey Mapping - Tile TQ58 (1:25,000)	TBC		Ordnance Survey	TQ58.tab, TQ58.TIF	MapInfo, TIF	20/06/2005	Full
106	GIS	Ordnance Survey Mapping - Tile TQ67 (1:25,000)	TBC		Ordnance Survey	TQ67.tab, TQ67.TIF	MapInfo, TIF	20/06/2005	Full
107	GIS	Ordnance Survey Mapping - Tile TQ68 (1:25,000)	TBC		Ordnance Survey	TQ68.tab, TQ68.TIF	MapInfo, TIF	20/06/2005	Full
108	GIS	Ordnance Survey Mapping - Tile TQ69 (1:25,000)	TBC		Ordnance Survey	TQ69.tab, TQ69.TIF	MapInfo, TIF	20/06/2005	Full
109	GIS	Ordnance Survey Mapping - Tile TQ78 (1:25,000)	TBC		Ordnance Survey	TQ78.tab, TQ78.TIF	MapInfo, TIF	20/06/2005	Full
110	GIS	Ordnance Survey Mapping - Tile TQ79 (1:25,000)	TBC		Ordnance Survey	TQ79.tab, TQ79.TIF	MapInfo, TIF	20/06/2005	Full
111	GIS	Ordnance Survey Mapping - Tile TQ46 (1:50,000)	TBC		Ordnance Survey	TQ46.tab, TQ46.TIF	MapInfo, TIF	13/06/2005	Full
112	GIS	Ordnance Survey Mapping - Tile TQ48 (1:50,000)	TBC		Ordnance Survey	TQ48.tab, TQ48.TIF	MapInfo, TIF	13/06/2005	Full
113	GIS	Ordnance Survey Mapping - Tile TQ66 (1:50,000)	TBC		Ordnance Survey	TQ66.tab, TQ66.TIF	MapInfo, TIF	13/06/2005	Full
114	GIS	Ordnance Survey Mapping - Tile TQ68 (1:50,000)	TBC		Ordnance Survey	TQ68.tab, TQ68.TIF	MapInfo, TIF	13/06/2005	Full
115	GIS	Ordnance Survey Mapping - Tile TQ88 (1:50,000)	TBC		Ordnance Survey	TQ88.tab, TQ88.TIF	MapInfo, TIF	13/06/2005	Full
116	GIS	Ordnance Survey Mapping - Tile TR08 (1:50,000)	TBC		Ordnance Survey	TR08.tab, TR08.TIF	MapInfo, TIF	13/06/2005	Full
117	Report	Essex and Suffolk Water - Water Resources Planning	ESW	~	Essex and Suffolk Water	http://www.eswater.co.uk/DryYr Essex DraftPlanFinal April 2008.pdf	pdf	02/12/2008	Full
		Tables for Essex (2008)					·		
118	Citation	Holehaven Creek SSSI Notification	NE	√	Natural England (formally	http://www.english-nature.org.uk	pdf	08/12/2008	Full
					English Nature)		·		
119	Citation	Inner Thames Marshes SSSI Notification	NE	~	Natural England (formally	http://www.english-nature.org.uk	pdf	08/12/2008	Full
					English Nature)		p. e.		
120	Citation	Mucking Flats & Marshes SSSI Notification	NE	~	Natural England (formally	http://www.english-nature.org.uk	pdf	08/12/2008	Full
.=0		g			English Nature)		- 0.	11.12.000	
121	Citation	Vange & Fobbing Marshes SSSI Notification (File Ref:	NE	√	Natural England (formally	http://www.english-nature.org.uk	pdf	08/12/2008	Full
.=.		14 WPF)			English Nature)		P		
122	GIS	Combined Sewer Overflows	AWS	~	Anglian Water Services	Overflows.tab	MapInfo	08/12/2008	Full
123	GIS	Outfall Location	AWS	~	Anglian Water Services	Outfalls.tab	MapInfo	08/12/2008	Full
124	GIS	STW and Pumping Station Locations	AWS	~	Anglian Water Services	Site P.tab	MapInfo	08/12/2008	Full



THURROCK WATER CYCLE STUDY OUTLINE STAGE DATA CATALOGUE

Date Source Number	Data Description	Data Provider	Priority	Format	Date Received	Data Availability	Data Completeness	Cost of Acquiring Data	Comments
1	Any updates/changes to the Draft Water Resource Plans (2009).	ESW	1						
2	Data from sewerage and treated water capacity assessment studies in support of the development of Business Plans for Price Review 09.	ESW	1						
3	Information of growth forecasts already catered for in ST AMP5 planning (to compare to RSS).	ESW	1						
4	Confirmation of the WRZ and Water supply zones supplying Thurrock & Existing Water Volumes being supplied to the Thurrock district and/or WRZ.	ESW	2						
5	Water balance required for Thurrock WCS study area	ESW	1						
6	WTW current and projected outputs (capacities) and locations.	ESW	2						
7	Clean water supply network layout for Borough, including pipe sizes and any problem areas with regards to pressures.	ESW	1						
8	Location of service and supply reservoirs and information on size.	ESW	1						
9	Confirmation on coverage and reliability status of any clean water supply network models for each development location (to consider for use in detailed study).	ESW	2						
10	Existing water consumption control measures (to support those included in the WRMP demand management proposals).	ESW	2						
11	Asset reports outlining what is required to upgrade/refurbish existing assets in Thurrock.	ESW	2						
12	Flow and quality consent details (& treatment type if available) of Tilbury WwTW	AWS	1						
13	WwTW volumetric capacities, process capacities (if available) PE figures, trade flow figures, infiltration assumptions.	AWS	2						
14	Existing Sludge treatment and disposal information.	AWS	3						
15	Sewerage Network layout, pipe diameter, capacities and CSOs, (Combined Sewer Overflows) and pumping stations locations for development areas - including proposed pipe network to serve new development (if available).	AWS	1						
16	Confirmation on coverage and reliability of wastewater network models (to consider for use in detailed study).	AWS	2						
17	Any known problem locations for the existing sewer network including flooding incident locations and details - DG5 register data if possible.	AWS	1						
18	Any information on surface water flooding - known problem areas, records or accounts of historic flood events, photographs etc.	EA	1						



THURROCK WATER CYCLE STUDY OUTLINE STAGE DATA CATALOGUE

Date Source Number	Data Description	Data Provider	Priority	Format	Date Received	Data Availability	Data Completeness	Cost of Acquiring Data	Comments
19	Any information on ground water flooding issues -	EA	1						
	locations, records or accounts of past events,								
20	Anticipated growth figures for each development area	TBC	1	Excel spreadsheet format					
20	including initial phasing proposals (if developed).	100							
21	Confirmation of the site allocations being considered	TBC	1	Excel spreadsheet format and					
	tor area and hence to be assessed in the WCS and the corresponding GIS Lavers			for GIS Map Into or Arc GIS					
22	Confirmation of locations for committed developments	TBC	1	Map Info or Arc GIS format					
	(GIS)			•					
23	Raw Water Abstraction Volumes (last 3 complete	EA	1						
24	years), Licences limits and locations	E۸	1	If no upstroom flow gaugging					
27	2008) for River Mardyke and Tidal River Thames (if	LA		stations are available can an					
	available)			estimate of the flow upstream					
				of the WWTW please be					
				provided for use in Water					
				Quality capacity assessments					
25	River Quality observations (2000 - 2008) for River	EA	1						
	Mardyke and Tidal River Thames, upstream and								
	downstream of wwwi w discharges including location								
26	Confirmation of water quality standards (current and	EA	1						
	future WFD) and requirements for discharges into the								
07	Tidal River Thames.	<b>F A</b>							
27	settlements proposed for development	EA	1						
28	Information from SIMCAT Models (local and/or	EA	3	If available - a list of models,					
	National SIMCAT Models (for the region) and			coverage, date updated, and					
	supporting reports for rivers in the Thurrock Council			supporting report detailing					
29	Source Protection Zone Maps	FA	2	Indings					
30	Actual sewage effluent discharge measurements	EA/AWS	2						
	(2000 - 2008)								
31	Review of Consent - Stage 3 (and Stage 4 where	EA	1						
32	available) HoU reports for affected sites	FΔ	1						
52	neview of Consent - Stage 4 reports for IUCal SAC S	LA							
33	PR09 Business Plan (if available)	ESW/AWS	1						