Mid Mersey Water Cycle Study (Outline Phase)

On Behalf of Warrington Borough Council, St Helens Borough Council and Halton Borough Council

Final Report

April 2011










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Entec
An AMEC company

Report for

Melanie Hughes, Planning Officer
New Town House
Buttermarket Street
Warrington
WA1 2NH

Main Contributors

Chris Tattersall
Richard Breakspear
Sandra Ryan
Clare Heeley

Issued by

.....
Chris Tattersall

Approved by

.....
Rob Lawson

Entec UK Limited

155 Aztec West
Almondsbury
Bristol BS32 4UB
England
Tel: +44 (0) 1454 822000
Fax: +44 (0) 1454 822010

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Executive Summary

Purpose of this Report

This report has been produced for the purpose of providing an overview of the water cycle and its constraints to development across the three local authority areas which form the Mid Mersey Growth Point (Warrington Borough Council, Halton Borough Council, and St. Helens Council). It provides strategic level advice on water infrastructure and environmental capacity to inform the development of the Local Development Frameworks and associated growth strategies.

The strategic **objectives** for the Outline Water Cycle Study are to:

- Identify whether environmental resources can cope with further development, with particular reference to Water Framework Directive targets and UKCP09 climate change projections (i.e. can growth be accommodated without breaching water quality and abstraction limits);
- Identify if, where, and when development might overload existing infrastructure, and if capacity exists for development without the need for additional infrastructure;
- Identify if, where, and when new infrastructure or management interventions are needed to allow development;
- Establish effective liaison with adjoining Growth Point areas to enable any potential cumulative impacts on the water environment to be identified;
- Identify any potential impacts of development on the specially designated conservation sites and watercourses in the Mid Mersey areas and other sites or features of significant nature conservation importance, within and outside the Mid Mersey area, resulting from additional abstraction and wastewater discharge;
- Contribute to the evidence base for the Local Development Framework Core Strategies, the Infrastructure Plans and the Habitats Regulations Appropriate Assessments of the three individual local authorities in the Mid Mersey area.

The study has involved working with the key stakeholders: Warrington Borough Council, Halton Borough Council, St. Helens Council, United Utilities, and the Environment Agency to establish the key constraints within the water cycle and to identify integrated solutions in order to achieve sustainable development. Data for this study has been collated from these stakeholders. Incoming information (referenced within the document) has been reviewed and the information and findings summarised.

A regional (North West) Water Cycle Scoping Study was completed for the six North West Growth Point areas by the Environment Agency in 2009 (Halcrow, 2009). This Outline report builds on the findings of the scoping study and assessments undertaken by Entec, taking into account additional feedback from the key stakeholders. It

examines the capacity of existing water resources, sewerage and drainage systems, and wastewater treatment to accommodate growth. It considers existing levels of water quality and flood risk in the area and how these may change in response to climate change and legislation. The study examines the factors that could constrain the ability to increase the capacity of water services in the future. The location and severity of these constraints are presented together with recommendations that could resolve or mitigate the constraints and an evaluation of the implications for growth.

The report concludes that whilst there are no major constraints to growth in Mid Mersey there are a number of issues that need to be addressed. The main issue is the uncertainty surrounding capacity at the wastewater treatment works after 2015. United Utilities has indicated that there is capacity for planned developments until 2015 but after this point capacity at all treatment works will need to be reassessed by the Company. Evidence in this water cycle study suggests that the most significant constraints due to environmental conditions could be as St. Helens wastewater treatment works.

United Utilities and the local authorities must work together to ensure that the potential demands generated over time from the growth proposals can be accommodated. There may be environmental constraints, such as water quality objectives and the presence of designated sites that could affect the likelihood of obtaining the necessary revised discharge consents. This is most likely to be an issue in St. Helens. Elsewhere there are restrictions in terms of the space available for treatment works to expand, as at Runcorn, so if extra capacity is required alternative options may need to be considered.

On the whole sewerage and surface water drainage do not pose significant risks to growth. However, the study has clearly highlighted local areas and specific proposed development sites where action will be required to improve the network or to connect developments to the network.

This report includes a comprehensive section setting out the results from the Strategic Flood Risk Assessments (SFRAs) that have been carried out for the three local authorities; the implications of the Catchment Flood Management Plans; the existing Surface Water Management Plan (SWMP) for North West Warrington; and the Shoreline Management Plan, on policy and development in Mid Mersey. The key issue is the risk of flooding along the banks of the River Mersey and the risks of locating high quality new developments (i.e. residential development) in areas of high flood risk. In this respect, central Warrington is an area of concern.

This report concludes with a proposed action plan for the three Councils to take forward. It sets out the actions the Councils and their partners need to undertake and when in order to facilitate the growth that they have proposed for this study. A timeline of actions is presented. This is a high level summary, supported by a series of recommendations for policies that the three Councils may wish to include in their Core Strategies to ensure development is not only delivered but that it is delivered sustainably, to protect the environment and water services in the future. At this point it is not considered necessary for the Councils to undertake a detailed water cycle study as no constraints have as yet been identified that could justify a detailed study. Continuing dialogue between the Local Authorities, United Utilities, and the Environment Agency, and agreed phasing actions, is likely to be sufficient to ensure development is not unduly constrained.

Contents

Glossary

AMP	Asset Management Period	Five year period in which water companies implement planned upgrades and improvements to their asset base. Activities are subject to funding review. The current AMP period, AMP5, runs from 2010 to 2015.
AONB	Area of Outstanding Natural Beauty	An area of countryside considered to have significant landscape value in England, Wales or Northern Ireland, that has been specially designated by the Countryside Agency (now Natural England) on behalf of the United Kingdom government
BAP	Biodiversity Action Plan	Each Local Biodiversity Action Plan works on the basis of partnership to identify local priorities and to determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets.
BOD	Biological Oxygen Demand	A widely used measure of polluting potential - a measure of oxygen use, or demand, by bacteria breaking down the biodegradable load in sewage treatment plants or environmental waters.
BREEAM	Building Research Establishment Environmental Assessment Method	A voluntary measurement rating for green buildings that was established in the UK by the Building Research Establishment.
CAMS	Catchment Abstraction Management Strategy	The assessment of how much water can be extracted to meet its many economic uses – agriculture, industry, and drinking water supply – while leaving sufficient water in the environment to meet ecological needs.
CLG	Communities and Local Government	The department for Communities and Local Government sets policy on local government, housing, urban regeneration, planning and fire and rescue.
CFMP	Catchment Flood Management Plan	A strategic planning tool through which the Agency will seek to work with other key decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.
CSH	Code for Sustainable Homes	Signals a new direction for building standards. Wherever practical CLG intend to develop and introduce a system of sustainable building standards based on voluntary compliance.
CSO	Combined Sewer Overflow	A system for allowing a certain flow of combined untreated sewerage and stormwater to be discharged into watercourses during storm events to prevent the sewerage system backing up and flooding.
Defra	Department for Environment, Food and Rural Affairs	Department that brings together the interests of farmers and the countryside; the environment and the rural economy; the food we eat, the air we breathe and the water we drink.
DPD	Development Plan Document	Local Development Documents (LDDs) that set out the key development goals of the area that have been agreed after public consultation and examination by an independent planning inspector.
DWF	Dry Weather Flow	The measure of the flow influx to a wastewater treatment works derived from human activity (both domestic and trade), but excluding any storm-induced flows.
EA	Environment Agency	A government body that aims to prevent or minimise the effects of pollution on the environment and issues permits to monitor and control activities that handle or produce waste. It also provides up-to-date information on waste management matters and deals with other matters such as water issues including flood protection advice.
GIS	Geographical Information System	A system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to the earth.
GQA	General Quality Assessment	The Environment Agency's method for classifying the water quality of rivers and canals is known as the General Quality Assessment scheme (GQA). It is designed to provide an accurate and consistent assessment of the state of water quality and changes in this state over time.

LDD	Local Development Documents	These are documents which make up the Local Development Framework and consist of Development Plan Documents and Supplementary Planning Documents.
LDF	Local Development Framework	The collection of planning documents prepared by a local planning authority (LPA) to outline how they will manage development and land use in their area.
l/p/d	Litres per head per day	A unit for measuring the amount of water consumed and waste flow from households.
LPA	Local Planning Authority	The local authority or Council that is empowered by law to exercise planning functions. Often the local borough or District Council. National parks and the Broads Authority are also considered to be local planning authorities. County Councils are the authority for waste and minerals matters.
Ofwat	The Water Services Regulation Authority	Ofwat regulates how much money a water company is required to spend over each five year planning period, and regulate the amount of money the water companies can charge from their customers.
pcc	Per capita consumption	A phrase referring to the amount of water consumed per person per day.
PPS25	Planning Policy Statement 25	Set out the Government's national policies on development and flood risk. The policies in these statements apply throughout England and focus on procedural policy and the process of preparing local development documents.
PR	Periodic Review (for water companies' investment plans)	One of Ofwat's main tasks is to set price limits for the water and sewerage companies in England and Wales. Ofwat do this in order to protect consumers from the monopoly providers of these services. However it is also their duty to enable efficient companies to finance their functions. They make sure that consumers receive reliable services and value for money and that each company is able to meet its environmental obligations now and in the future. Price limits are reviewed every five years. Prices were set at the price review in 2004 for the 2005 – 2010. The last price review (PR09) covers the five years from April 2010 to March 2015.
Ramsar	The Convention on Wetlands of International Importance, called the Ramsar Convention	Intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Named after the Iranian city of Ramsar, where the treaty was signed in 1971.
RBMP	River Basin Management Plan	River Basin Management Plans have been produced as a requirement of the Water Framework Directive (WFD). They describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures in line with the requirements of the WFD. It sets out what improvements are possible by 2015.
RSS	Regional Spatial Strategy	A broad development strategy for a region for a 15 to 20 year period prepared by the Regional Planning Body. The status of the RSS is currently uncertain as the revocation in 2010 has been challenged. However, many local authorities are opting to retain their allocated housing requirement within their own LDF's.
SAC	Special Area of Conservation	A site designated under the European Community Habitats Directive, to protect internationally important natural habitats and species.
SFRA	Strategic Flood Risk Assessment	A document that informs the planning process of flood risk and provides information on future risk over a wide spatial area. It is also used as a planning tool to examine the sustainability of the proposed development allocations.
SOP	Standard of Protection	The return period up to which the defence provides protection against flooding.
SPA	Special Protection Area	Sites classified under the European Community Directive on Wild Birds to protect internationally important bird species.
SSSI	Site of Special Scientific Interest	A site identified under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) as an area of special interest by reason of any of its flora, fauna, geological or physiographical features (basically, plants, animals, and natural features relating to the Earth's structure).

SuDS	Sustainable Drainage Systems	Sustainable drainage systems or sustainable (urban) drainage systems: a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than compared to some conventional techniques (may also be referred to as SDS).
SWMP	Surface Water Management Plan	A framework through which key local partners with responsibility for surface water and drainage in their area work together to understand the causes of surface water flooding and agree the most cost effective way of managing surface water flood risk.
UKCP	United Kingdom Climate Change Programme	Mainly funded by the Department for Environment, Food and Rural Affairs it helps co-ordinate scientific research into the impacts of climate change, and helps organisations adapt to those unavoidable impacts.
UKWIR	United Kingdom Water Industry Research	This organisation facilitates collaborative research for UK water operators.
UU	United Utilities	Water supply and sewerage company. Provides water supply and sewerage services to the whole of the Mid Mersey study area.
WCS	Water Cycle Study	A study aimed at ensuring that future development is sustainable in terms of flood risk management, water quality and water supply.
WFD	Water Framework Directive	A European Union directive which commits member states to making all water bodies (surface, estuarine and groundwater) of good qualitative and quantitative status by 2015 9or 2027 if it can be demonstrated that meeting the 2015 deadline would be prohibitively expensive).
WRMP	Water Resource Management Plan	A plan prepared by water supply undertakers every 5 years outlining how they aim to balance demand for and supply of water over the next 25 years.
WRZ	Water Resource Zone	Defined by the water supply/demand balance in the region such that all customers within it receive the same level of service in terms of reliability of water supply. Water can be moved across the zone through the supply network.
WwTW	Wastewater Treatment Works	Separates solids from liquids by physical processes and purifies the liquid using biological processes. Discharge from Wastewater Treatment Works may contain a range of pollutants and need to be carefully monitored. Discharges are regulated by a discharge consent, issued by the Environment Agency.

1. Introduction

1.1 Background and Aims

This Outline Water Cycle Study (WCS) is one of a number of strategic studies used by the Local Planning Authorities (Warrington Borough Council, Halton Borough Council and St. Helens Council) as part of the evidence base for their Local Development Frameworks. The study examines the existing water and environmental infrastructure, and the Councils' development proposals in order to:

1. Examine the capacity of the existing system and from this to determine the existing level of constraint;

2. Present options to facilitate sustainable development: e.g. considering alternative development locations and/or numbers; presenting mitigation measures (e.g. enhanced water efficiency, sustainable drainage) and reassessing the impact on the existing system; examining feasibility and impact of infrastructure enhancements on the *potential* capacity to facilitate development; and

3. Highlight any environmental constraints that cannot be resolved due to prohibitive costs, technical impossibilities, and regulatory restrictions.

The study concludes by presenting sustainable growth proposals, i.e. that will not cause deterioration in the water environment, and highlighting the opportunities where development could enhance the environment. The study sets out the necessary infrastructure (investment) and policies that are required to deliver this sustainable growth. The conclusions also set out timescales to phase water infrastructure enhancements in line with the proposed growth plans. This provides an early indication for the water companies to re-examine their Asset Management Plans (AMP), and enables the Councils to plan housing development projects in line with these. In the longer term, ongoing dialogue regarding growth and planning water services will be essential and mutually beneficial.

The key issues that are addressed in the study include:

- Assessment of the capacity of the existing water infrastructure to accommodate growth without adversely affecting the environment by considering:
  - The availability of water resources and the capacity in the supply network;
  - The capacity of existing wastewater treatment works;
  - The environmental capacity of watercourses receiving wastewater discharges;
  - The capacity of the drainage/sewerage network;
  - Known flood risk and potential increased risk due to development.

- Examination of how environmental legislation including the Water Framework Directive, Habitats Directive and other relevant water cycle policy which may constrain growth proposals (within the existing system);

- Identification of the infrastructure improvements that will enable the proposed growth to take place within the constraints of the environment and legislation; and

- Development of an action plan for a phased approach to development that allows growth proposals to be delivered whilst providing sufficient time for the identified infrastructure to be delivered.

The WCS is a risk based approach to ensuring that town and country planning makes best use of environmental capacity and opportunities, and adapts to environmental constraints.

The study brings together the range of water related issues under a single framework and ensures that all stakeholders have their say. Most of the data and information used in the WCS already exist within stakeholder organisations and one of the key benefits of the partnership approach is unlocking and joining-up this understanding and information and making it available.

1.2 National Guidance on Water Cycle Studies

The Environment Agency has issued a National Guidance document[1] to ensure that water cycle studies are carried out in a consistent way. This guidance outlines the required approach for the Scoping, Outline and Detailed phases of water cycle studies.

The National Guidance on water cycle studies indicates that the assessment should be carried out in three phases:

- Scoping: The primary aim of the Scoping Phase is to collate and review existing information (e.g. previous studies and monitoring data) on the water environment within the study area, identify development plans and engage with key stakeholders, including the Environment Agency, water companies and drainage authorities, to identify key issues that require consideration in the following stages of the work;

- Outline: The primary aim of the Outline Phase is to identify potential environmental and water infrastructure constraints to development to provide an evidence base to support the Core Strategy and identification of preferred sites for development. The study should identify areas of uncertainty that may require further detailed studies;

- Detailed: The Detailed Phase aims to resolve areas of uncertainty identified in the Outline Phase through further more detailed studies. It identifies what water cycle management measures and infrastructure are needed, where and when they are needed, who is responsible for providing the systems, and by what deadline. This may involve an assessment of the costs and benefits of options. It

[1] http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf

also provides guidance to the local authorities to facilitate implementation and funding of the action plan.

This report is an Outline study. It is considered to be robust and fully meets Environment Agency National Guidance on water cycle studies.

1.3 Structure of the Report

The report has been structured around the requirements of the Environment Agency's National Guidance and the needs of the Councils:

- Section 2 describes the water cycle and sets out the concepts of integrated water management and the relevant water management legislation;
- Section 3 summarises the planning context with regard to growth and water related infrastructure;
- Section 4 sets out the existing capacity to support growth and the factors constraining options to increase capacity;
- Section 5 presents a proposed development action plan indicating a phased approach that the Councils may wish to consider, and the actions that are likely to be required to support the longer term growth proposals up to 2024/25. It includes guidance on the technical elements and recommended policies that the Councils may wish to include in their Core Strategies and Development Plan Documents (DPDs).

1.4 The Study Area

At the project inception meeting the Councils and the project Steering Group agreed that the study area should be the whole of Mid Mersey Growth Point, comprising the administrative areas of Warrington Borough Council, Halton Borough Council and St. Helens Council. A regional scoping study was undertaken for the Environment Agency, published in May 2009 (Halcrow, 2009), which recommended that six Water Cycle Strategies are undertaken in the North West.

The scoping report suggested that a River Mersey Water Cycle Study be undertaken to include both the Association of Greater Manchester Authorities (AGMA) and Mid Mersey Growth Points. In taking forward the recommendations, joint working with the AGMA Growth Point has not been possible. Work on an Outline Water Cycle Study has therefore been progressed for the Mid Mersey area.

Mid Mersey covers an area of over 400 square kilometres in the North West of England. Located midway between the regional poles of Liverpool and Manchester, the Mid Mersey area is home to almost half a million people. The Mid Mersey Growth Point Programme of Development identifies that although the area is heavily urbanised, fifty six per cent of the land area is Green Belt (Halton Borough Council, 2009). The Mid Mersey area is well served by

the region's road, rail, air and sea transport network. This means that Mid Mersey is well placed to secure continued investment and strong economic growth.

The water environment is influenced by a number of factors including rainfall, the underlying geology, and the types of land use in the area. Long term rainfall data at Westy (Warrington) shows that average rainfall is over 1076 millimetres per year[2]. The main river catchments within Mid Mersey are the River Mersey, the Sankey Brook, and their tributaries. There are also a number of smaller rivers and streams flowing through the study area. The whole of the Mid Mersey study area is located within the Lower Mersey and Alt river catchment area. The principal aquifers are formed of sandstone, and are important as a source of water for public water supply. There are other groundwater bodies that are also locally important for industrial, agricultural and private water supplies.

Agricultural pollutants affect both surface and groundwater sources. Groundwater aquifers in the area are under pressure not only from agricultural and industrial activities but also from pollution arising from old mine workings, and saline intrusion. Specific pollutants such as calcium sulphate from the glass industry are present, along with leachate from landfill sites, and other contaminants from the heavy industrialised areas of the catchment. High levels of phosphate and ammonia have been identified in several watercourses that flow through the study area, such as the Sankey, Ditton and Keckwick Brooks.

[2] http://www.nwl.ac.uk/ih/nrfa/station_summaries/069/037.html

2. The Water Cycle

2.1 Introduction

The water cycle describes the pathways and processes through which the water we use moves through the natural and built environment, as well as through the surface and sub-surface water service infrastructure. Figure 2.1 illustrates the traditional image of the water cycle showing how water enters a river catchment, how it runs through and over the land, before returning to the river system and ultimately returning to the sea.

Figure 2.1 Traditional View of the Water Cycle without Artificial Influence

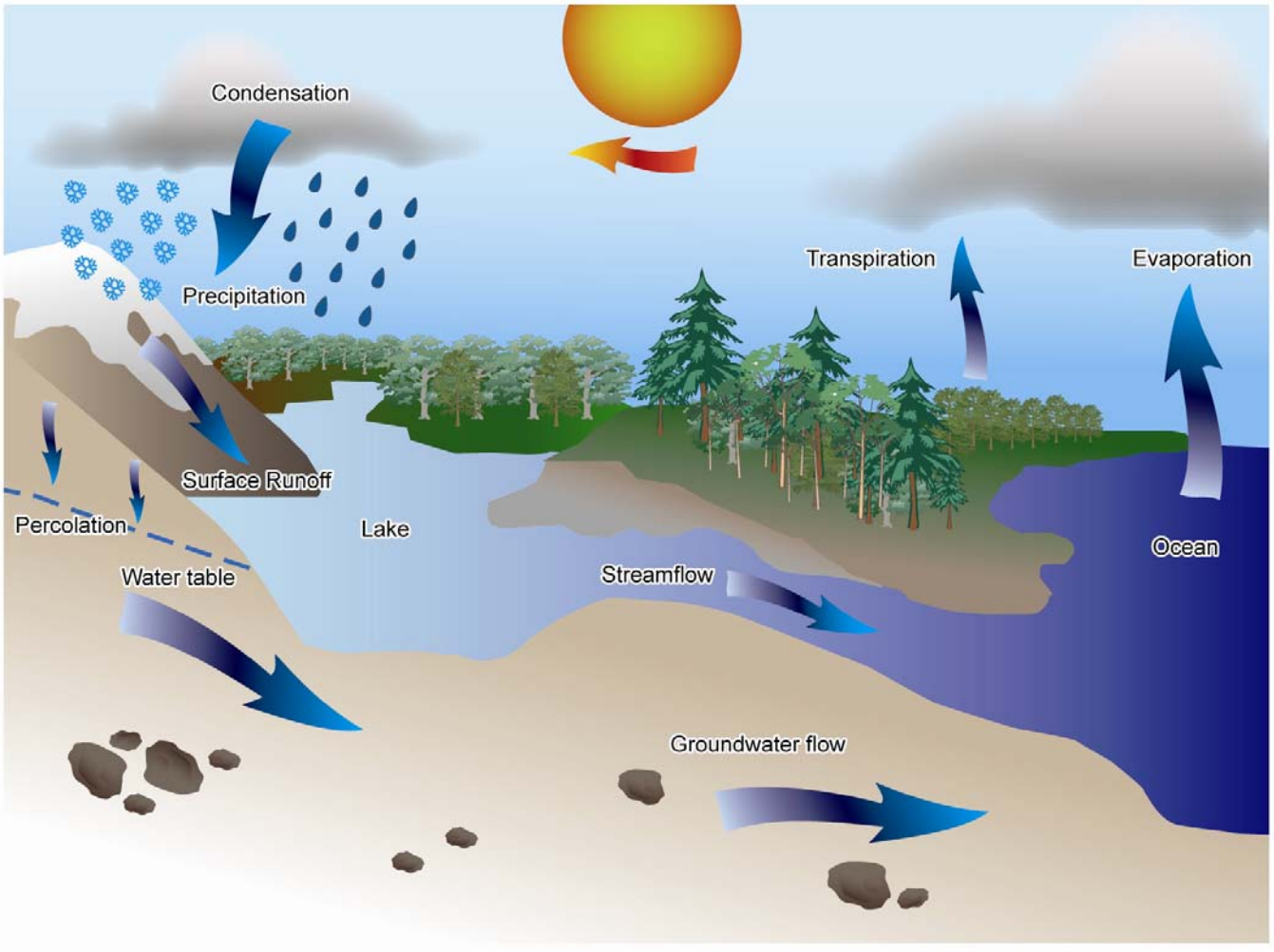
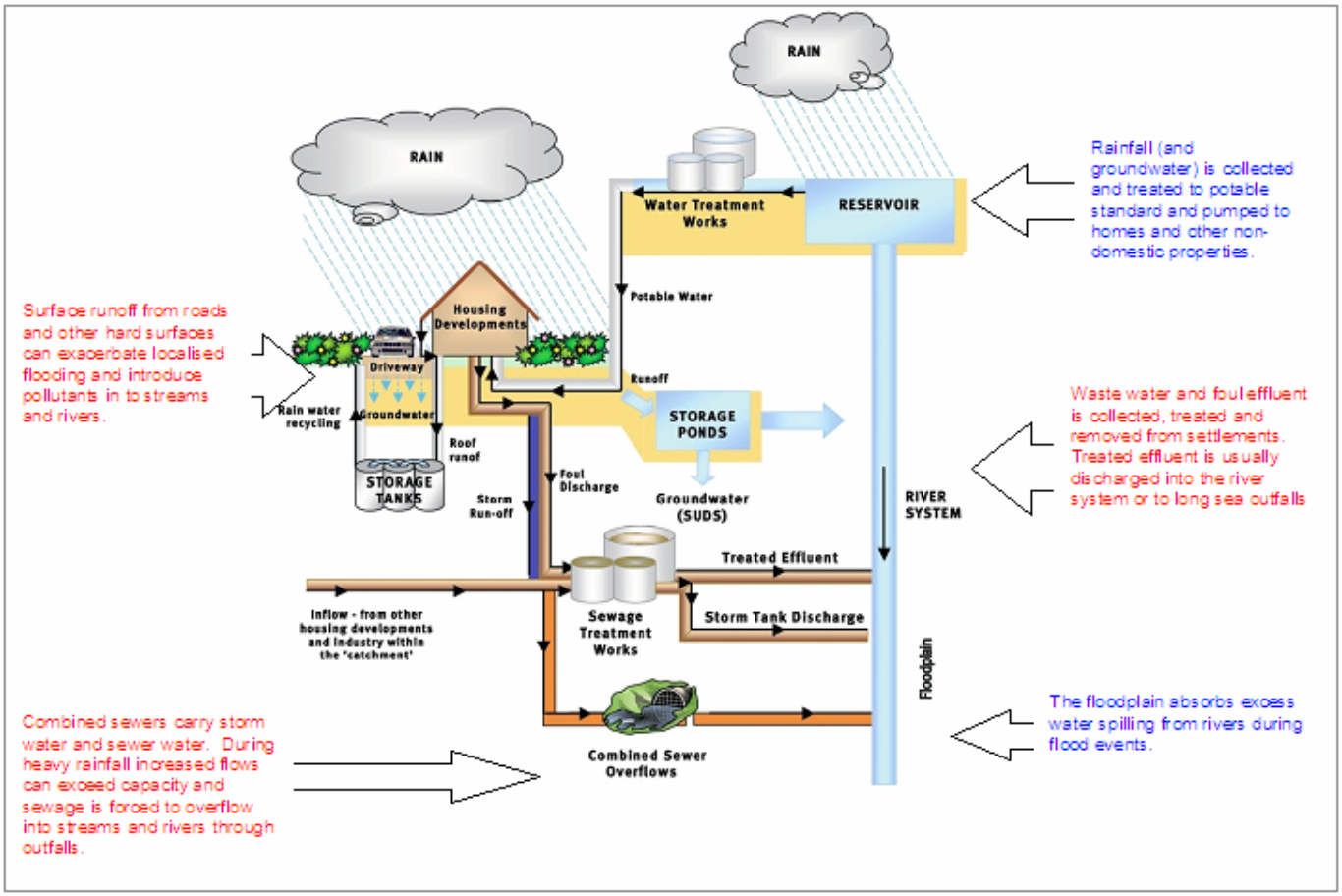


Figure 2.2 illustrates the added complexities within the urban water cycle (in schematic form) as a result of housing development and the infrastructure required to support it. The main differences between the natural and the

urbanised water cycle are the rates of surface run-off (and infiltration) and overland stream flow. In the urbanised cycle water is captured and stored for use, and this water only re-enters the river network once it has been used and then treated at wastewater treatment works. Hence, the timing and quality of water entering the river network can be significantly different in the urban version of the cycle.

Figure 2.2 Schematic of the Urban Water Cycle based on Current Practice



The size and extent of the water infrastructure must be appropriate to the area it serves. This will ensure that sufficient supplies of clean water are made available to homes and industry, and that foul effluent is removed and transferred to wastewater treatment works, whilst preventing polluted run-off and untreated foul drainage from entering the water environment. A secure and well maintained system, operating within its capacity limits protects the quality of the receiving water and any dependant habitats, whilst also reducing the risk of flooding.

2.2 Management of the Water Cycle

It is important to understand the different scales at which the elements of the water cycle (water supply, sewerage and drainage) are managed, and the impacts this has on assessing constraints to growth. Water supply is managed strategically, as there is a high level of connectivity in the water supply network. Water can be moved great distances from the raw water sources (rivers, reservoirs, or groundwater) to the point of delivery. Generally, new developments can be connected to the main system relatively easily.

In contrast, wastewater treatment works have much smaller defined catchment areas and so the location of development relative to the capacity of the nearest treatment works and receiving water can be critical. Although drainage issues are specific to individual developments, integrating drainage across sites offers significant potential for green space/habitat creation, in addition to reducing flood risk and potentially water demand.

2.3 Integrated Catchment Management

The capacity of the receiving water environment, and thus development in the study area, is constrained by environmental quality objectives enforced by UK and European legislation. The Water Framework Directive (WFD) is European legislation that came into force in December 2000, and was transposed into UK law in 2003. It introduces new environmental standards that will help to improve water quality by defining and requiring waterbodies to meet Good Ecological Status. The WFD is applied at a 'River Basin' scale. There are eleven river basins covering England and Wales and Mid Mersey is within the North West River Basin.

The main aims of the WFD are to prevent deterioration and enhance the status of the water environment, including groundwater. This will be achieved within a framework of River Basin Planning by:

- Reducing pollution;
- Promoting sustainable water use; and
- Contributing to mitigating the effects of floods and droughts.

Sustainable Drainage Systems (SuDS) is the name given to drainage techniques that mimic natural processes, rather than using traditional piped systems. Traditionally piped drainage has been installed to transfer rainfall away from developments as quickly as possible; however this increases and speeds up the rate of water entering rivers more quickly in urban areas compared to rural catchments and can result in flooding. Sustainable drainage systems use grassed ditches and ponds, for example, instead of pipes to manage rainfall run-off. These allow some of the rainfall to soak into the ground, and this slows down the movement of rainfall run-off in the catchment. Vegetation in these systems can also reduce the amount of urban pollutants entering watercourses and groundwater sources.

In the UK, all water that is supplied to properties and business is treated to a standard suitable for drinking. Implementing water efficiency measures to reduce water consumption will also reduce the volume of wastewater that is discharged into the sewer network. Water efficiency also helps to reduce the amount of water abstracted

from rivers and groundwater sources, reducing the pressure on natural ecosystems and increasing the volume of water available to dilute both point source and diffuse pollution.

The urban water cycle is complex and highly integrated with many feedback mechanisms. Advanced planning and appropriate management helps to ensure that the water cycle contributes to a safe, clean and healthy environment, rather than being a source of long term problems.

2.4 Legislation and Guidance

Legislation, guidance and supporting evidence for water related issues, such as water quality, flood risk management and urban drainage, have a significant impact on activity within the water cycle. Water infrastructure improvements are often driven by legislation, notwithstanding development pressures. Adaptations to the water cycle must be compliant with legislation and managed within the regulatory framework.

Water management methods and procedures change and improve regularly in response to changes in legislation and technical guidance. Some of these changes are driven by European directives; others are in response to national pressures, from the 2007 summer floods for instance. Legislative changes are either currently being implemented, are soon to be applied or are likely to change in next five to ten years. Given that the timetable for the Water Framework Directive spans the next 18 years in three six-year cycles, it is expected that the water companies will use the first six-year period to carry out the majority of investigations required to determine the measures subsequently needed to achieve Good Status. This will provide an opportunity to assess the improvements delivered through other quality investments.

The primary pieces of legislation which affect the water cycle are summarised in Table 2.1 below.

Table 2.1 Primary Water Related Legislation

Legislation	Description
Water Framework Directive	The Water Framework Directive (WFD) sets out a requirement to achieve good ecological status in rivers, estuaries and coastal waters, together with good status of groundwater by at least 2027. Waterbodies that have been heavily modified are assessed against their ecological Potential, rather than Status. The WFD presents a unique opportunity for holistic environmental management for all users of the water environment. A cross-body Technical Advisory Group (UKTAG) has published environmental standards and thresholds. Whilst there is no certainty that these standards will become statutory in the current form, they form the best current knowledge of how the standards may change. It is considered likely they will be finalised later this year.
Habitats Directive	As people make increasing demands on the environment our wildlife habitats are coming under more and more pressure. The Habitats Directive recognises this and aims to protect the wild plants, animals and habitats that make up our diverse natural environment. The European Directives created a network of protected areas of national and international importance. These are called 'Natura 2000' sites and include Habitats Directive Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SPAs are designated under the Directive on the Conservation of Wild Birds. The Habitats Directive has been transposed into English law as the Conservation (Natural Habitats &c) Regulations 1994, now known as the Habitats Regulations. Existing and future water management has the potential to affect a number of these designations and the Environment Agency Review of Consents process has identified a series of amendments that will be required to existing abstraction licences and discharge consents if adverse effects on the European Sites are to be avoided.
Urban Wastewater Treatment Directive	The Urban Wastewater Treatment Directive (UWWTD) regulates the collection and treatment of wastewater from residential properties and industry. Under this Directive receiving waters can be designated as 'Sensitive' where additional levels of treatment are required at significant contributing discharges. These can either be direct discharges or those upstream of the designated reach / water body that serve a population equivalent in excess of 10,000. One type of sensitive area is the "Sensitive Area [Eutrophic]", where elevated nutrient concentrations, mainly nitrogen or phosphorus, present a risk to the ecological status of the receiving water. In these areas, larger sewage discharges must be treated to reduce nutrient loads.
Nitrates Directive	Adopted by the European Union in 1991, this directive aims to reduce water pollution caused by nitrogen from agricultural sources and to prevent such pollution occurring in the future. The directive requires Defra and the Welsh Assembly Government to identify surface or groundwaters that are, or could be high in nitrate from agricultural sources. Nitrogen is one of the nutrients that can effect plant growth. Surface waters also have to be identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals and the use of the water. Once a water body has been identified, all land draining to that water is designated as a Nitrate Vulnerable Zone. Within these zones, farmers must observe an action programme of measures which include restricting the timing and application of fertilisers and manure, and keeping accurate records.
Freshwater Fish Directive	The EC Directive on Freshwater Fish is designed to protect and improve the quality of rivers and lakes to encourage healthy fish populations. It sets water quality standards and monitoring requirements for areas of water which are chosen, or 'designated' by Defra. These 'designated' areas of water are selected because they are significant bodies of water which are capable of supporting fish populations.
Floods Directive and Flood Risk Regulations 2009	The Floods Directive is designed to help Member States prevent and limit floods and their damaging effects on human health, the environment, infrastructure and property. The Floods Directive came into force on 26 November, 2007. The Directive requires Member States to first carry out a Preliminary Flood Risk Assessment (PFRA) by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish Flood Risk Management Plans (FRMPs) focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU. The Flood Risk Regulations 2009 was published in December 2009 to transpose the directive into UK law

Legislation	Description
Floods and Water Management Act	The Flood and Water Management Act received Royal Assent in April 2010. It improves how the UK prepares for and responds to flood emergencies and protects water quality and water supplies during drought. The Act provides better, more comprehensive management of flood risk for people, homes and businesses. It also helps tackle bad debt in the water industry, improves the affordability of water bills for certain groups and individuals, and helps ensure continuity of water supplies to the consumer. Implementation of the first parts of the Flood and Water Management Act 2010 began on the 01 October 2010.

3. Development and Growth

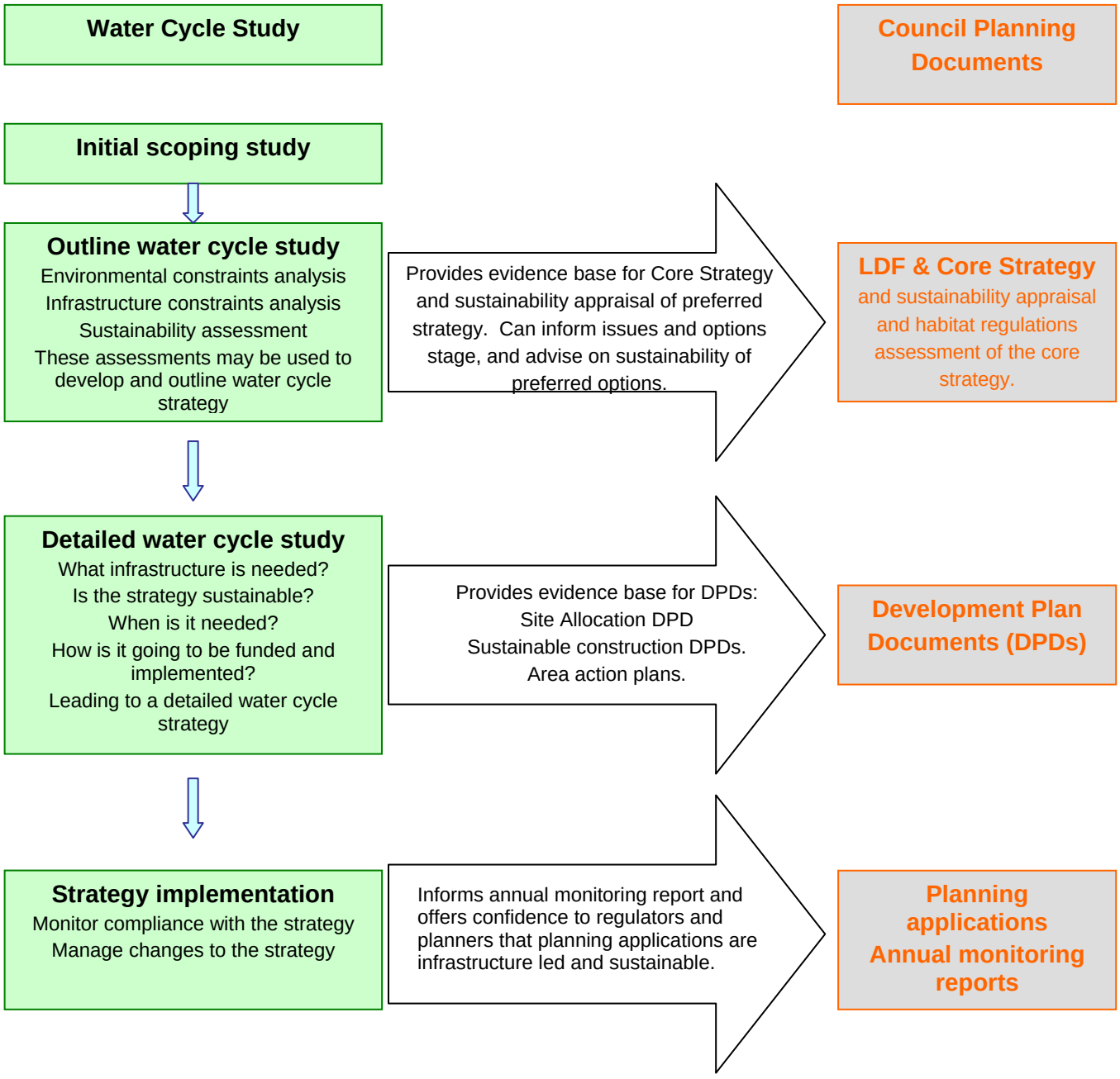
3.1 Introduction

The purpose of this section is to describe the context in which this Outline WCS has been undertaken as a precursor to the assessment that follows. The need to examine existing water and environmental infrastructure within the Mid Mersey area is driven principally by a requirement to align planned growth with infrastructure provision and so the context in which the study is undertaken is framed by:

- Relevant national, regional and local planning policies;
- The scale and distribution of growth to be provided in the study area; and
- The asset management plans of infrastructure providers.

Figure 3.1 summarises how the various stages of the WCS relate to the Local Development Framework process.

Figure 3.1 Planning Context of Water Cycle Studies



3.2 Planning Policy Context

National, regional and local planning policy currently sets out guidance and requirements for delivering sustainable development. This includes the need to ensure that sufficient infrastructure is in place to support new development. The following sections therefore outline the current relevant planning policies for the study area which define the role of the WCS in the plan preparation process and help inform the assessment's recommendations. Section 3.2.2 discusses the recent regional changes as a result of the change in Government in May 2010 and how the local authorities are responding to this.

3.2.1 National Planning Policy

Government guidance is provided through a series of Planning Policy Statements (PPSs). Those relevant to the WCS are summarised in Table 3.1.

Table 3.1 National Planning Policy

PPS1 Delivering Sustainable Development and Supplement to PPS1: Planning and Climate Change
PPS1 and its 2006 supplement set out how the planning system can deliver sustainable development by responding to climate change, including achieving zero carbon development and implementing the Code for Sustainable Homes. PPS1 requires Local Planning Authorities (LPAs) to prepare development plans which are in line with the principles for sustainable development and promote outcomes in which environmental, economic and social objectives are achieved together over time. This should be achieved using a spatial planning approach. Specifically, planning authorities should identify land suitable for meeting housing and other types of development, taking into account the need to provide essential infrastructure and avoid flood risk. PPS1 advises that local authorities should promote amongst other things: - the sustainable use of water resources; and - the use of sustainable drainage systems in the management of run-off. The supplement advises local authorities to take into account the capacity of existing and potential infrastructure including water supply, sewage and sewerage to service future development sites in ways consistent with successfully adapting to likely changes in the local climate.
PPS3 Housing
PPS3 underpins the delivery of the Government's strategic housing policy objectives, where the goal is to ensure that everyone has the opportunity to live in a decent home, which they can afford, in a community where they want to live. The policy expects the planning system to deliver housing in suitable locations which have good access to key services and infrastructure. The policy requires local planning authorities to assess the impact of development upon existing or planned infrastructure and consider the availability and capacity of existing major strategic infrastructure and/or feasibility of delivering the required level of new infrastructure to support the proposed distribution of development.
PPS4 Planning for Sustainable Economic Development
PPS4 provides the Government's policies with regards to the delivery of sustainable economic growth. The policy requires local planning authorities to consider the delivery of infrastructure needed to support planned economic development and, where necessary, provide advice on phasing and programming of development within Local Development Documents.

PPS12 Creating Strong, Safe and Prosperous Communities through Local Spatial Planning
PPS12 was published in June 2008. The document outlines the nature of local spatial planning, setting out the key components of local spatial plans and how they should be prepared. It should be taken into account by LPAs in preparing Local Development Frameworks (LDFs) which include Development Plan Documents (DPDs) and other Local Development Documents (LDDs). With regard to infrastructure, PPS12 states that Core Strategies should be supported by evidence of what physical, social and green infrastructure is needed to enable the amount of development proposed for the area, taking account of its type and distribution. This evidence should cover who will provide the infrastructure and when it will be provided. The Core Strategy should draw on and in parallel influence any strategies and investment plans of the local authority and other organisations. **This water cycle study forms part of the robust and credible evidence base which will underpin policies within the Authorities' Core Strategies and other relevant LDDs.**
PPS23 Planning and Pollution Control
PPS23 highlights the potential impact of inadequately served development on water quality stating that, in preparing LDDs, local planning authorities should consider: • the possible adverse impacts on water quality and the impact of any possible discharge of effluent or leachates which may pose a threat to surface or underground water resources directly or indirectly through surrounding soils; • the need to make suitable provision for the drainage of surface water; and • the provision of sewerage and sewage treatment and the availability of existing sewage infrastructure.
PPS25 Development and Flood Risk
PPS25 aims to ensure that flood risk is taken into account at all stages in the planning process in order to avoid inappropriate development in areas at risk of flooding. It also aims to ensure that new development does not increase the risk of flooding elsewhere. Where, in exceptional circumstances, new development is necessary in such areas then the aim is to ensure development is safe, does not increase flood risk elsewhere and, where possible, reduces flood risk overall. This approach is supported in the Government's Pitt review of the summer 2007 flooding, which reiterates the requirements of PPS25 to make clear that development within Flood Zone 2 and 3 should not be allowed to proceed unless there is clear proof that they are compatible developments for these zones. The review also outlines that LPAs should become responsible for ensuring localised flood risk is not worsened by development by directing development away from areas of flood risk through planning and development control.

3.2.2 Regional Planning Policy

Under the Planning and Compulsory Purchase Act 2004, Regional Spatial Strategies replaced Structure Plans as the strategic planning framework for regions in England. The Regional Spatial Strategy (RSS) for the North West (also known as the North West of England Plan) was approved in September 2008 and provides a regional framework within which Local Planning Authorities in the North West prepare their Local Development Frameworks (LDFs) for the period to 2021. The North West RSS was undergoing a review to provide a Regional Integrated Strategy for the region.

The change in Government in May 2010 led to the revocation[3] of the Regional Spatial Strategies by the Secretary of State for Communities and Local Government in a letter to Chief Planning Officers dated 6th July 2010. This meant regional policies no longer formed part of the development plan for the purposes of the Planning and Compulsory Purchase Act 2004. However a legal challenge (Cala Homes South Ltd v SSCLG) to the revocation has been successful and the RSSs again form part of the development plan. Following this ruling, the Communities

[3] Although it was not formally revoked through legislation.

and Local Government Chief Planner requested that the intention to abolish RSSs set out in the Secretary of State's letter dated 27th May 2010 should be a material consideration when determining planning applications. This was subsequently challenged by Cala Homes South and the recent court ruling has confirmed that this intention should be a material consideration for the purpose of planning decision making.

In the longer term the legal basis for Regional Strategies will be abolished through the 'Decentralisation and Localism Bill', which was introduced in December 2010, although it is expected that RSSs will form part of the development plan until April 2012. One of the aims of this new bill is to encourage Local Planning Authorities to take responsibility for determining the right level of housing provision in their local area without the influence of regional housing figures. The Mid Mersey authorities are currently continuing to plan on the basis of the RSS figures with aspirations to exceed these through their Growth Point programme. RSS Policy L4 requires the authorities to plan for the following numbers of houses as an annual average between 2003 and 2021:

- St. Helens – 570 new homes per year;
- Halton – 500 new homes per year; and
- Warrington – 380 new homes per year.

RSS Policy W3 sets out the employment land supply requirements for the Mid Mersey area focussing on the need to allocate regionally significant, sub-regional and local economic development sites of for B1, B2 and B8 uses (business, general industry, storage and distribution). It requires authorities to ensure that at least 30 percent of sites of the potential sites are available at any one time. For the Merseyside and Halton area, the policy identifies a need for 1,728 hectares of employment land between 2005 and 2021. Taking into account the existing supply at 2005, the policy identifies a need to allocate a further 494 hectares between 2005 and 2021. The employment land requirements for Warrington were provided as part of a sub regional evidence base combined with Cheshire and this identified that there is an oversupply of employment land in the sub-region but not specifically in Warrington Borough. The Core Strategy is revisiting this assessment and consulting on options to determine the appropriate level of employment development in the borough and whether future employment allocations may be required.

Policy EM5 Integrated Water Management requires local planning authorities and developers to protect water resources and manage flood risk. The stipulations in that policy are covered by the aims and objectives of the WCS.

3.2.3 Local Planning Policy

At the local level, the saved planning policies in each of the Unitary Development Plans set out the current policies on water management and new development. The relevant policies are summarised in Table 3.2.

Table 3.2 Saved Local Policies

Policy	Summary
Halton Unitary Development Plan 2005	
PR5 Water quality	Policy will not permit development if it is likely to have an unacceptable effect on the water quality of water bodies and groundwater.
PR7 Development near to established pollution sources	Policy will not permit development near to existing sources of pollution if there is the likelihood of the pollution sources having an unacceptable effect on the proposed development.
PR15 Groundwater	Policy will not permit development if it could lead to an adverse impact on groundwater resources in terms of their quantity, quality and ecological features they support.
PR16 Development And Flood Risk	Policy seeks to protect areas at risk of flooding and avoid increases in flooding as a result of development.
Warrington Unitary Development Plan 2006	
REP1 The Prudent Use Of Resources	Policy ensures development avoids adverse impacts upon water quality and seeks to discourage development in flood risk areas or where it is likely to increase flooding.
REP4 Protection Of The Flood Plain	Policy seeks to protect areas at risk of flooding and avoid increases in flooding as a result of development. In areas at risk development proposals will not be permitted unless appropriate flood protection and mitigation measures are to take place as part of the development, and subject to any overriding nature conservation interest.
REP5 Surface Water Run-Off And Sustainable Drainage Systems	Policy requires new development which would generate surface water run-off that may have adverse impacts to include appropriate attenuation measures. The policy expects developers to cover the costs of assessing surface water drainage impacts and of any necessary mitigation works, including long term management. The policy encourages sustainable drainage systems (SuDS) wherever appropriate in the design of surface water attenuation and this is seen as something that could reduce overflows into sewers with insufficient capacity.
REP6 Surface Water Quality	This policy protects adverse effects upon the water quality of water bodies such as rivers, lakes and canals from surface or waste water discharge and the disturbance of contaminated land.
REP7 Ground Water Quality	This policy protects adverse effects upon the water quality of groundwater resources with regards to their quantity, quality and ecological features.
St. Helens Unitary Development Plan 1998	
ENV 29 Pollution Control	This policy protects surface water and groundwater from unacceptable levels of pollution as a result of emissions or discharge.
ENV 30 Drainage	Policy seeks to protect areas at risk of flooding and avoid increases in flooding as a result of development. Mitigation measures are required if development is to be located in areas at risk and development will not be permitted if it requires drainage or other works which would have a detrimental effect on the conservation of the water environment The supporting text recognises the requirements placed upon the Water Industry and pledges to work together to facilitate development.
REC7 Water resources	Policy aims to protect the Borough's water areas (rivers, streams, ponds, canals, dams and reservoirs) and seek to promote their recreational use, whilst ensuring no conflict with the ecological value of the area

In accordance with the Planning and Compulsory Purchase Act 2004 (as amended) and Planning Policy Statement 12, the Mid Mersey Councils are preparing Local Development Frameworks to replace their Unitary Development Plans. The three Councils have already made progress with their Core Strategies and are due to publish and then submit to the Secretary of State at the times shown in Table 3.3.

Table 3.3 Anticipated Publication and Submission of Core Strategies - Timescales

Local Authority	Publication Version	Submission to Secretary of State
Halton	November 2010	March 2011
St. Helens	Revised Publication Core Strategy Jan 2011	May 2011
Warrington	June 2011	August 2011

Table 3.4 summarises the policies in the Core Strategies which could be used to provide policy direction for water management.

Table 3.4 Core Strategy Water Related Policies

Policy	Summary
Halton Core Strategy Preferred Options Development Plan Document September 2009	
Preferred Policy Option CS22: Protection from Risk and Pollution	This policy expects all development to demonstrate that it does not result in unacceptable flood risk or drainage problems and have regard to the Halton Strategic Flood Risk Assessment, Surface Water Management Plans, River Basin Management Plans, Catchment Flood Management Plans and Water Company Asset Management Plans. The policy requires development to minimise the impact of development on surface water run-off through the use of Sustainable Drainage Systems (SuDS) In addition, the policy expects proposals to not result in unacceptable levels of pollution upon the environment including water and good design should be used to mitigate this.
Preferred Policy Option CS24:Sustainable, Low Carbon and Adaptable Development	The policy requires all development to demonstrate that it is sustainable and will mitigate and manage the risks of climate change through contributing to reductions in carbon emissions and ensuring development is adaptable to a changing climate. With regards to adaptation the policy expects development proposals to incorporate water efficiency and conservation measures including rainwater harvesting and greywater recycling systems and Sustainable Drainage Systems (SuDS) and other measures to manage surface run-off including the use of permeable surfaces.
Preferred Policy Option CS26: Green Infrastructure	This policy seeks to manage and promote green infrastructure within the Borough which could provide water management opportunities.

Policy	Summary
Preferred Policy Option CS33: Infrastructure Provision	The policy is proposing that the Council, its partners and developers will work together to ensure that new development is accompanied by the necessary infrastructure including water requirements. This will be achieved by ensuring that: • Development is located in the most sustainable locations well served by existing infrastructure; • Development minimises any negative impact on the existing infrastructure required to support it; • Development contributes towards additional provision of infrastructure, either on or off site, to serve the needs arising from development; and • Development contributes towards improvements to existing infrastructure and the provision of new infrastructure, alongside Council initiatives and other agencies and service provider's development programmes.
St Helens Re-publication Core Strategy January 2011	
Policy CIN 1 Meeting St. Helens' Infrastructure Needs	This policy seeks to ensure infrastructure required to meet St. Helens' needs is provided. This is to be achieved by: • Directing development to locations that are already well served by infrastructure; • The Council working jointly with infrastructure providers to continually identify and meet needs; • Requiring developers to provide the necessary infrastructure that their development will require through providing on or off site provision; or making payments through a tariff based system, or the Community Infrastructure Levy, or other developer contribution regime; • Ensuring that the LDF process and infrastructure providers service planning is aligned; • Supporting various development programmes for service providers in the Borough.
Policy CQL 1 Green Infrastructure	The policy sets out that the Council will protect, manage, enhance and where appropriate expand the green infrastructure network. This could provide water management opportunities.
Policy CP 1 Ensuring Quality Development in St. Helens	This policy requires development proposals to meet particular standards as a minimum: • Minimise and mitigate against the effects of water pollution, (including contamination of surface water and groundwater resources); • To be located in an area where its use is compatible with the identified flood zone in the SFRA, avoids adding to the causes and sources of flood risk and ensure no adverse impact on other sites. Where this cannot be achieved, but there is an overriding need for the development and a suitable alternative site cannot be identified, protection from the risk of flooding, through the use of flood defences, SUDS and other appropriate measures will be required; • Include satisfactory arrangements for the disposal of foul sewage, liquid waste, trade effluent and contaminated surface water; • Achieve at least the level of Code for Sustainable Homes required by Building regulations for residential development; • Achieve a BREEAM rating of at least very good for non residential development; • Make efficient use of existing infrastructure and services and where practicable, avoids the need for new service investment; • Make efficient use of water; • Not prejudice the delivery/improvement of utility networks.
Warrington Core Strategy Objectives and Options Development Plan Document July 2010	
Sustainability and Climate Change objectives	These objectives would potentially provide policies that require that all new development tackles the threat of climate change and is capable of adapting to its effects. In addition, the objectives identify the need for the Borough to mitigate and adapt to all flood risks, particularly at key locations in the urban sections of the Mersey floodplain through the location and design of development and the sustainable use, storage and disposal of water. Furthermore the need to ensure that potential environmental adverse impacts arising from new development are avoided is identified and this would be achieved by adopting appropriate policies to safeguard and ensure prudent use of resources including water.

Policy	Summary
Green Infrastructure objectives	Aim to identify, conserve, diversify and where appropriate extend the existing multi-functional network of green infrastructure in the urban and rural areas of the borough and this could be achieved through climate change adaptation measures - for example flood alleviation.

3.3 Scale and Distribution of Growth

The Mid Mersey authorities were awarded Growth Point status in July 2008. The Growth Point programme aimed to accelerate the delivery of housing in the Mid Mersey area, enabling the Councils to tackle challenges of growth and regeneration by linking areas of deprivation and opportunity.

The objectives of the Mid Mersey Growth Point include:

- Increased delivery of sustainable and affordable housing in the sub-region by 2016/17;
- Improved economic performance in the Mid Mersey area, including the sustainable regeneration of older areas of Widnes, St. Helens and Warrington;
- Unlocking difficult sites in sustainable locations, for example, where infrastructure provision may not be able to be delivered by developers.

In terms of housing growth, the three local authorities collectively form the Mid Mersey Housing Market Area for which the Growth Point programme aims to increase housing development from a RSS baseline of 13,050 to at least 15,660 between 2008/09 and 2016/17. Given the current economic circumstances, delivering the Growth Point programme will be challenging.

The three local authorities have prepared Strategic Housing Land Availability Assessments (SHLAA) to identify all the potential sites that could deliver the spatial strategy and required housing growth. For the purposes of this WCS, the authorities have identified potential development sites that are most likely to come forward and the phasing of these up until 2024/25. These detailed trajectories are presented in Appendix A and are summarised in Table 3.5.

Due to the ending of central Government funding, the Mid Mersey Housing Growth Point will cease to exist in its current form in March 2011. The three authorities involved will continue to work alongside each other, and jointly as appropriate, in the future, to provide a growth point legacy.

Table 3.5 Summary of Mid Mersey Housing Growth Trajectories

Local Authority	Proposed Dwellings		
	Between 2010/11 and 2014/15	Between 2015/16 and 2019/20	Between 2020/21-2024/2025
Halton	3365	5192	2264
St. Helens	4008	3317	682
Warrington	2073	1577	2199
Total proposed dwellings across Mid Mersey by 2024/25 =24,677 Source: SHLAA data provided by the Local Authorities (August 2010)			

The three authorities have undertaken Employment Land Reviews to identify potential employment growth scenarios and sites which could potentially deliver the employment land requirements in the Mid Mersey area.

For St Helens, the Council is aiming for an employment growth scenario which would deliver approximately 220 additional jobs per annum to 2025 which would be an overall 6 per cent increase from a baseline of 70,500 jobs in 2006. This has been assumed to be distributed as follows:

Table 3.6 St. Helens Proposed Employment Projection

St Helens Employment Projection	2006	2011	2016	2021	2025	Overall Change
Total employment	70,500	71,900	73,300	74,100	74,800	
Change		1,400	1,400	800	700	4200
Per cent change		2	2	1	1	6

The Core Strategy for St. Helens aims to provide 46 hectares of land for mainly B8 employment uses by 2027 based on demand and existing permitted supply of employment land.

Halton Council's Employment Land Review 2008 identifies that, taking into account current supply at 2008 and a number of assumptions around uptake, known losses and the need for supply post 2026, Halton needs approximately 147 hectares between 2009 and 2026 (BE Group, 2010). Halton Council's preferred approach to meet this requirement, set out in its Core Strategy, is through existing allocated employment sites; sites benefiting

from planning permission for employment use; new allocations; and other opportunities such as regeneration and mixed use development.

Warrington Council's Employment Land Review outlines the potential for job losses in the short term but with potential recovery to baseline conditions post 2019. Warrington is yet to decide its preferred option for economic growth in their Core Strategy. However its employment land supply consisting of committed development (approximately 165ha) and sites with planning permission (approximately 89ha) as well as the Omega outline permission (approximately 97ha) shows that there is a small surplus of employment land up to 2026 based on the current Unitary Development Plan policy of delivering on average 13ha per annum.

The three authorities have identified a maximum 780 hectares of potential land that could be developed for employment purposes across Mid Mersey, however information regarding the phasing of sites and the type of employment uses to be delivered over the plan period is currently unavailable and therefore detailed employment trajectories have not been considered in this WCS.

3.4 Planning for Water Infrastructure

Water companies plan for investment in water infrastructure to supply new development through the Asset Management Plan (AMP) process which runs in five-year cycles. This process is regulated by the Water Services Regulation Authority (commonly known by its former abbreviated name, Ofwat), which reviews the plans and determines charges for water services. This process is carried out in conjunction with the Environment Agency which assesses environmental requirements for investment, and the Drinking Water Inspectorate (DWI) which assesses the investment required to improve drinking water quality. The outcome is a Business Plan which is produced by each water company and outlines the requirements for investment over the following five year period. This is submitted to Ofwat who examine the plans and determine how much each water company can charge its customers in order to fund the investment plans.

In 2009, the water companies submitted their Business Plans for the period 2010 to 2015. The review of prices is known as the Periodic Review 2009 (PR09) and the subsequent five year period is known as AMP5. Water companies are able to submit interim determinations within the five-year planning cycle to seek additional funding for unforeseen requirements but most plans should be covered by the normal submission process. The WCS examines a longer planning period and can therefore inform longer term water company asset planning.

Water companies are also required to produce Water Resources Management Plans (WRMPs) based on 25-year forecasts of supply and demand. The WRMPs assess the long-term balance between the available supply of water and the demand for water, and on this basis they identify if a deficit in supply will occur. If supply deficits are identified then the timing and size of the deficit determines the preferred Company strategy to ensure that the deficit is resolved. Water companies examine a large range of options and select their preferred strategy, which following a 'twin-track' approach should contain an appropriate range of demand management options, and resource development schemes if necessary. These forecasts take into account the potential impacts of climate change and other uncertainties.

4. Identification of Potential Constraints

This section examines the Councils' development proposals in the context of the existing environment. It considers the potential demand for water services from new dwellings and employment sites. It presents the existing capacity of the water infrastructure services to accommodate growth. United Utilities has provided information on their water supply, sewerage and wastewater treatment works that identifies where there is limited capacity to accept additional growth. Where possible, United Utilities has identified the likely extent of improvements required to accommodate the growth proposals provided by the Councils; and the environmental, financial, and timescale factors constraining their ability to implement these improvements.

The Environment Agency has published information on water quality and the obligations to improve water quality under the European Water Framework Directive. Information from the Environment Agency and the Councils has been used to define flood risk in the Mid Mersey.

The constraints are examined within three categories:

- Water resources and public water supply constraints;
- Flood risk, surface water drainage, and sewerage network constraints; and
- Waste water treatment and water quality constraints.

The capacity to facilitate growth and the factors constraining options to increase capacity are provided in detail across the sub-regional study area. Where possible and where appropriate constraining factors affecting specific areas and proposed development sites are highlighted. This makes it easier to understand the environmental risks and opportunities across the Mid Mersey Housing Market Area as a whole. Supporting information is available in the appendices.

The constraints analysis underpins the proposed Action Plan for Development in Section 5.

The constraints for development are presented below in a traffic light context, for each topic area. The key for the traffic light system is as follows:

	Development ok, no constraints identified
	Development may be ok, minor constraints identified, minor mitigation required to meet planned trajectory
	Constraints identified, development may be ok with major mitigation to meet growth targets against Core Strategy timescale
	Development should not proceed due to major constraint

4.1 Designated Sites

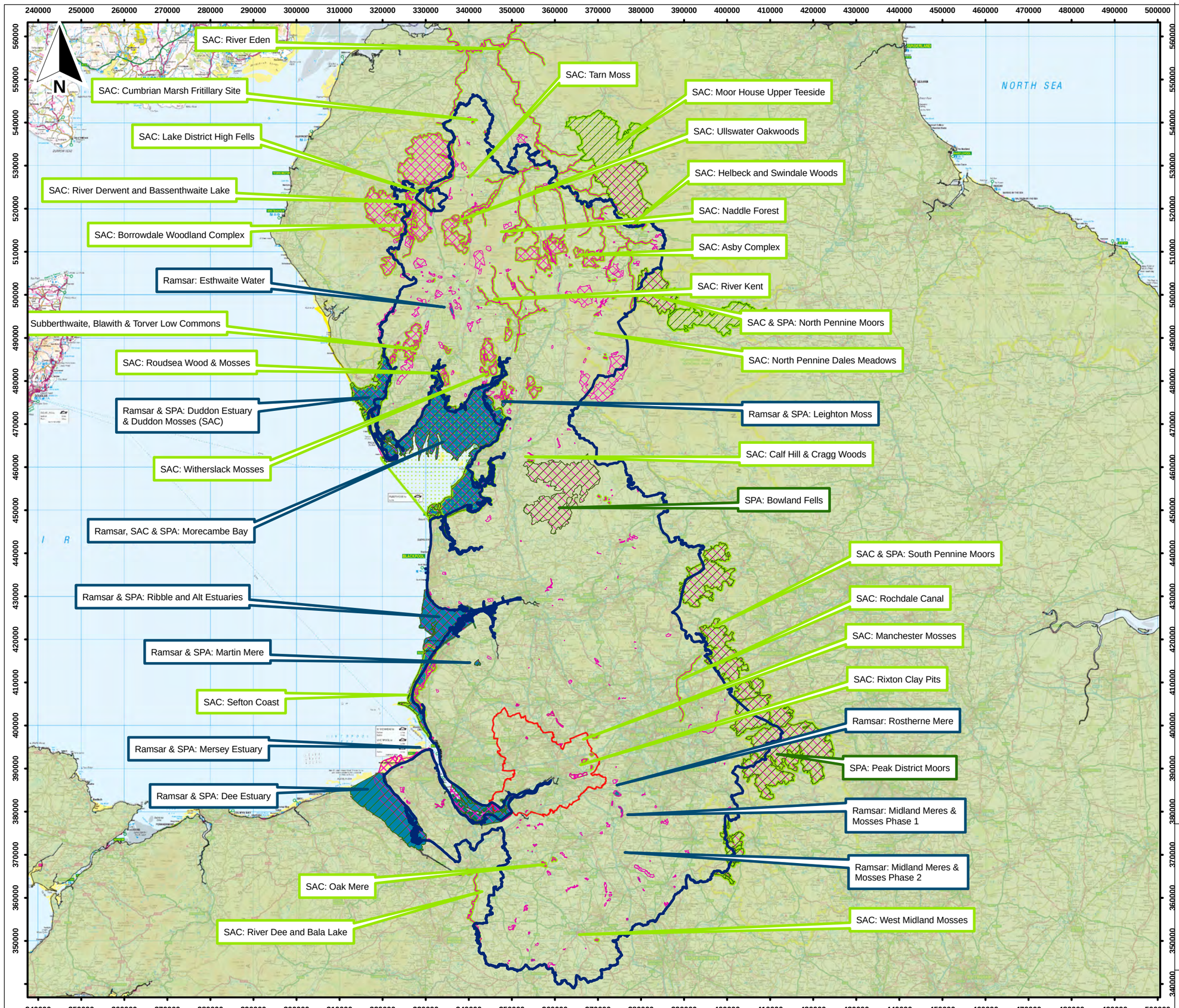
The North West region is rich in natural resources and has a large number of locally, nationally, and globally important habitats. These are shown in Figure 4.1. These areas and the wildlife within them are protected at various levels, depending on the key features driving the designation. This section highlights the sites that are present within and close to the Mid Mersey area, and summarises the sites that are present across the region. This is important to the WCS as the presence of designated sites can affect water services activities, particularly abstractions for public water supply, and discharges from wastewater treatment works. Table 4.1 summarises the main types of designation and the level of protection that each one is awarded.

As explained in the next section, water is sourced from specific areas and can be moved large distances from the point of abstraction to the point of demand. This means that demand in one area could potentially increase the pressure on the water habitat some distance away (see Section 4.2.1). Designated sites across the region are presented in this context. Discharges however, are much more closely linked to the local environment (see Section 4.3.1) and thus designated sites in the study area are presented in more detail in relation to wastewater constraints (see Figure 4.7). Table 4.6 lists the key sites and water related characteristics that could potentially constrain sources of water supply and wastewater discharges.

Table 4.1 Summary of Protected Sites Designations and Level of Protection

Designation	Level of Protection
Ramsar (Global importance)	Ramsar sites are wetlands of international importance designated under the Ramsar Convention (Convention on Biological Diversity). Many Ramsar sites are also Special Protection Areas (SPAs) classified under the Birds Directive
Special Area of Conservation (European importance)	Special Areas of Conservation (SACs) are strictly protected sites designated under the EC Habitats Directive. These sites make a significant contribution to conserving the habitat types and species identified in the Directive considered to be most in need of conservation at a European level (excluding birds). These sites form part of the European Natura 2000 network.
Special Protection Area (European importance)	Special Protection Areas (SPAs) are strictly protected sites classified in accordance with the EC Birds Directive. They are classified for rare and vulnerable birds, and for regularly occurring migratory species. These sites form part of the European Natura 2000 network.
Sites of Special Scientific Interest (SSSI). (National importance)	SSSI sites provide statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. SSSIs have been notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales).
SACs and SPAs are European Designated Sites and are part of the Natura 2000 sites. It is Government policy to include sites listed under the Convention on Wetlands of International Importance (Ramsar) as part of the Habitats Regulations Assessment.	

Figure 4.1 shows all the designated sites within the Integrated Water Resource Zone (WRZ). There are a large number of Sites of Special Scientific Interest (SSSI) across the region and those within the study area have been highlighted and named. A close up of the designated sites within the study area is shown in Figure 4.7. This provides a clearer picture of the proximity of designated sites to wastewater treatment works.



Key:

- Mid Mersey study area
- UU Integrated zone
- Watercourses

Designated Sites

- SSSI
- SPA
- SAC
- Ramsar

UU = United Utilities
SSSI = Site of Special Scientific Interest
SPA = Special Protection Area
SAC = Special Area of Conservation

0 4.5 9 18 27 36
Kilometers

Scale: 1:1,100,000

H:\Projects\28467 Mid Mersey WCS\Drawings\GIS\mxd

Mid Mersey Outline Water Cycle Study

Figure 4.1
Designated sites

November 2010
28467-W11 RYANS

Entec

Entec
An AMEC company

Table 4.2 Designated Sites Potentially Affecting Availability of Water and Wastewater Discharges

Site	Designation				Potential Constraint (water/wastewater)	Key Features Underpinning the Designation
	SSSI	SPA	SAC	Ramsar		
HALTON						
The Mersey Estuary	✓	✓		✓	Abstractions in Lower Mersey are subject to flows into the Estuary. Tidal influence in Mersey reduces potential impact on discharges (Widnes WwTW, Warrington North WwTW, Runcorn WwTW and Warrington South WwTW).	Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins). Salt marshes. Salt pastures. Salt steppes. Important for wintering birds.
Flood Brook Clough	✓				None	A deep wooded valley. Many of the plants present are characteristic of ancient woodland on base-rich soils, and are comparatively rare in Cheshire. Unlikely to be affected by fluvial processes.
Red Brow Cutting	✓				None	A lane cutting showing detailed geology. Important sediment sequence. Unlikely to be affected by fluvial processes.
WARRINGTON						
Manchester Mosses	✓		✓		Could limit abstractions in WRMU14*. Downstream of Glazebury WwTW in the Glaze Brook catchment. Could limit discharges.	One of few surviving degraded raised bogs. 89 per cent is marsh, water fringed vegetation, or fens. Wetter pockets have allowed peat-forming grass species to survive.
Woolston Eyes	✓				Downstream of discharges from Glazebury WwTW and Irlam WwTW.	Large area between the River Mersey and the Manchester Ship Canal. There is no continuity between surface water and groundwater in this area.
Rixton Clay Pits	✓		✓		None	Designated due to populations of Great Crested Newts. Habitat is ponds created indirectly and purposefully by human activity. Unlikely to be affected by fluvial processes.
Holcroft Moss	✓				Could limit abstractions in WRMU14*	An isolated remnant of the once extensive area of mossland in the Mersey Valley.
Risley Moss	✓				Located at headwaters of tributaries of the River Mersey. Could limit abstractions in WRMU10*. No WwTW discharges.	A peatland bog moss. Unlikely to be affected by fluvial processes.
ST. HELENS						
Stanley Bank Meadow	✓				Could limit abstractions in WRMU10* Downstream of Billinge South WwTW (small works).	An extensive area of damp unimproved neutral grassland. The diverse habitats support a wide range of insect and bird life. Unlikely to be affected by fluvial processes

OUTSIDE THE STUDY AREA (WITHIN THE WATER SUPPLY ZONE)					
SITE	**SSSI**	**SPA**	**SAC**	**Ramsar**	**Site Characteristics/vulnerabilities**
North Wirral Foreshore	✓				Wirral Penninsula. Some distance away from the study area but could be affected by discharges into the Mersey Estuary. Currently in favourable condition.
Dibbinsdale	✓				Wirral Penninsula. The largest block of semi-natural woodland of its type in Merseyside.
Sefton Coast	✓		✓	✓	Wirral Penninsula. Predominantly shifting and fixed dunes. There are populations of Great Crested Newt. Terrestrial habitat is largely unaffected by fluvial processes.
New Ferry	✓				Wirral Penninsula. Large areas of intertidal sand, mudflats and other habitats, which support two nationally important species of wintering waterfowl.
Mersey Narrows	✓				Large areas of intertidal sand and mudflats, which support internationally important populations of turnstone, redshank, and nationally important populations of cormorant.
Midland Meres & Mosses - Phase 1				✓	Towards Rostherne and Knutsford. Geographically discrete series of lowland open water and peatland sites. The wide range of habitats supports nationally important flora & fauna.
Rostherne Mere				✓	Towards Rostherne. A deep natural lowland lake, supports large numbers of wintering wildfowl. The reserve area includes reedbeds, woodlands and grazing land.
Frodsham Railway & Road Cuttings	✓				Just outside of the study area to the south of the River Weaver. The cuttings expose Triassic sandstones. Unlikely to be affected by fluvial process in the study area.
Ribble & Alt Estuaries		✓		✓	North and north west of the study area. Important for wintering birds. 82 per cent Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins) 17 per cent Salt marshes. Salt pastures. Salt steppes. 1 per cent Marshes and bogs. The Alt catchment also supports a dense population of water voles and is one of the best catchments for them in the Northwest Region. From an abstraction perspective, it is important that the drainage ditches within the Alt are not over abstracted in the summer months as water voles need to have flowing water, even if only low flows.
Highfield Moss	✓				East of Newton-le-Willows. The peatland vegetation is the best remaining example of the raised mires which once covered large areas of lowland Greater Manchester and Merseyside.
Astley & Bedford Mosses	✓				North east of Glazebury. Major habitats present are modified mire communities, heathland, woodland and acidic grassland.
Source of designation information: JNCC and Natural England *(see Section 4.2.3 and Appendix C).					

4.2 Water Resources and Water Supply

Information on public water supply in this area has been taken from United Utilities' Water's Final 2009 Water Resource Management Plan (WRMP). Water supply infrastructure information was provided by United Utilities including general comments on the capacity of the strategic supply network. The Environment Agency is

responsible for managing water resources in the form of granting (or refusing) abstraction licences to abstract water for various purposes, and has provided information on the amount of water available in the environment.

4.2.1 Water Resources Context

United Utilities is the water supply undertaker for the entire Mid Mersey area with a statutory duty for public water supply. United Utilities supplies water to four discrete WRZs covering North West England:

- Integrated WRZ: serves a population of 6.5 million people in south Cumbria, Lancashire, Greater Manchester, Merseyside and most of Cheshire. The Mid Mersey study area is completely within this zone (see Figure 4.4);
- Carlisle WRZ: serves 106,000 people;
- North WRZ: serves 14,000 people; and
- West Cumbria WRZ: serves 152,000 people.

The Integrated Zone is highly inter-connected, and serves 95 per cent of the region's population. The population in the other three zones is relatively small in comparison, and the zones are not connected to the regional network.

Sources of water in the Integrated Zone supply approximately 1,800 million litres per day (Ml/d) of water, of which about 500 Ml/d comes from water sources in Wales, about 600 Ml/d from sources in Cumbria and the rest from sources in other parts of North West England. Supply is from a mix of groundwater and surface water sources, approximately 15 per cent of yield being from groundwater. There are major aqueducts which transfer water from the Lake District to South Cumbria, Lancashire and Greater Manchester, and from mid-Wales and the River Dee to Cheshire and Merseyside. There are connections from the aqueducts to all demand centres in these areas, so that local sources (impounding reservoirs and boreholes) can be operated in a fully integrated manner with the major regional sources.

There are critical boreholes within the study area that are used for public water supply and major industry. These are in groundwater catchments that the Environment Agency has assessed as Over Abstracted (WRMU 14), and Over Licensed (WRMU 6 and 10). These locations are mapped in Appendix C (Figure C.1). The groundwater in this area is at risk from saline intrusion due to a legacy of over abstraction. Seawater or saline water in estuaries is drawn into groundwater cavities when there is a pressure gradient caused by abstraction. The Environment Agency has identified that some water resource management units assessed Over Licensed are currently under abstracted, leading to increases in groundwater levels compared to lows observed in the 1960s-1980s. The Environment Agency is managing abstraction levels in these catchments carefully to protect the public water supply boreholes. There are no surface water abstractions for public water supply in the Lower Mersey and Alt catchment, primarily

due to water quality issues[4]. The water resource availability assessments could change in near future with the second round of Catchment Abstraction Management Strategies (CAMS) that is ongoing.

It is important to note that whilst there are local sources (and local risks to those sources) public water supply is managed strategically. This means that Mid Mersey customers may be supplied with water from across the zone (e.g. from Cumbria, from the River Dee abstraction, and from other boreholes across the North West).

Following the 1995-96 drought, a new strategic pipeline was constructed to link the Merseyside and Manchester supply systems, and United Utilities is currently constructing another pipeline, the 'West-to-East Link', between Merseyside and North Manchester. This is due to be in operation by 2011 and will further increase the integration and flexibility of the supply within the Integrated Zone. It will enable the transfer of water during summer months from Cheshire and Merseyside to Manchester to replace the planned reductions in water source yield from the Lake District and Pennine supplies. This scheme is going ahead as part of United Utilities investment plan to secure water supplies across the whole of its supply area. The following section summarises how United Utilities has forecast supply and demand (including proposed growth across the whole of its region) and presents the options that the Company has been funded to take forward.

4.2.2 Water Resource Situation

United Utilities has forecast both supply and demand over 25 years to 2034/35. In the Integrated zone there is sufficient water available to supply forecast demand under annual average conditions until 2021/21. After this a deficit is forecast from 2022/23, with a shortfall of 0.9 Ml/d below the expected demand. Figure 4.2 illustrates this and shows that the size of deficit is forecast to increase rapidly over the planning period (to 2034/35) reaching a deficit of 74.61 Ml/d. This is based on a number of assumptions:

- Growth of over 609,000 new dwellings and just under 835,000 people across the whole zone (including a total of 26,100 across Halton, St. Helens, and Warrington between 2003 and 2021);
- Measured per capita consumption (pcc) increasing from 130 litres per person per day (l/p/d) to 132 l/p/d;
- Unmeasured pcc increasing from 154 l/p/d to 164 l/p/d;
- pcc in new homes increasing from 126 l/p/d to 129 l/p/d;
- Household metering rates increasing from 21 per cent to 61 per cent;
- Total demand for water from non households declining from 430 Ml/d to 289 Ml/d; and

[4] Lower Mersey and Alt CAMS document.

- Supply (deployable output) declining from 2148 Ml/d to 2108 Ml/d by 2034/35 (32Ml/d of which is to help protect and restore vulnerable habitats under the Habitats Directive and Restoring Sustainable Abstraction programme).

United Utilities has developed a strategy to remove the deficit and create a surplus over the whole planning period (Figure 4.3). The measures required to deliver this and improve the consumption forecasts from the baseline are:

- Increase resources by accessing 22.7 Ml/d from the Widnes groundwater from 2025/26; 2.5 Ml/d from the Oldham groundwater from 2030/31; and 22.5 Ml/d from the Southport groundwater from 2032/33;

- Very little customer side savings are expected until 2025/26, at which point a combination of water efficiency measures are expected to make savings fluctuating between 0.2 Ml/d and 0.8 Ml/d by 2034/35); and

- A combination of reducing pressure and leak detection measures are expected to save 0.9 Ml/d to 7 Ml/d between 2022/23 and 2034/53.

Company investment is not driven by the long-term supply-demand balance in the 'critical period' scenario (i.e. during periods of peak demand).

Figure 4.2 Integrated Zone Baseline Forecast of Annual Average Supply and Demand

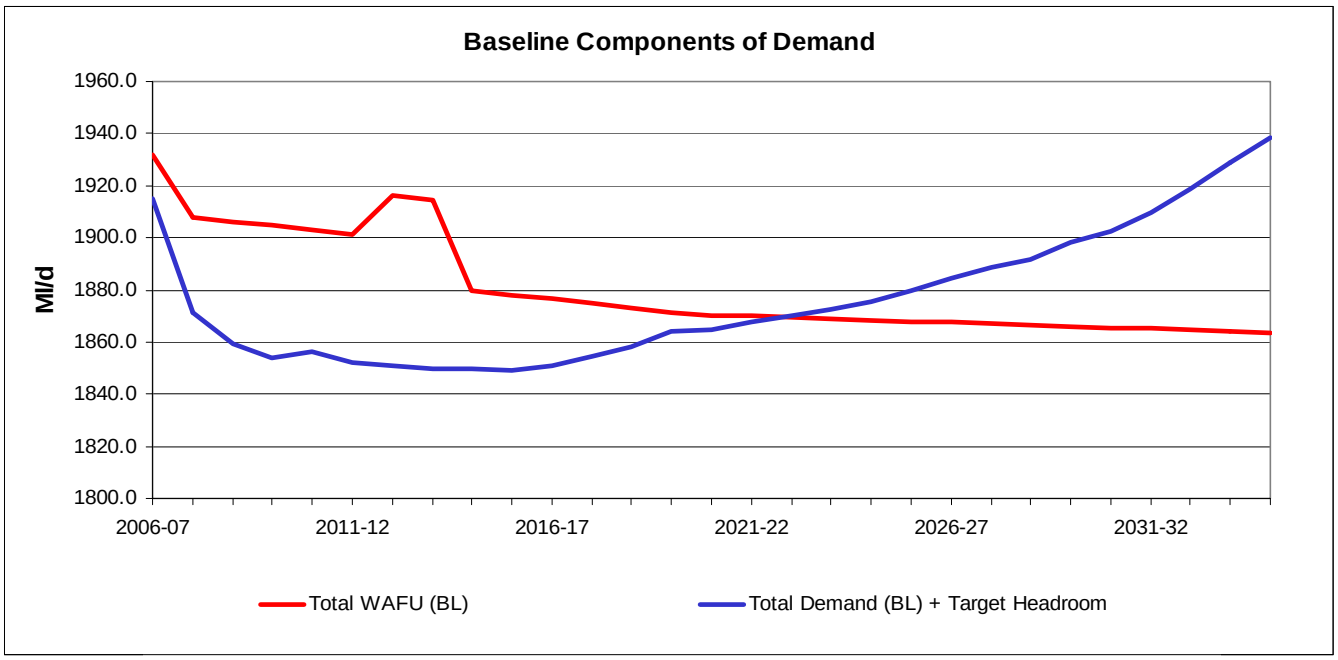
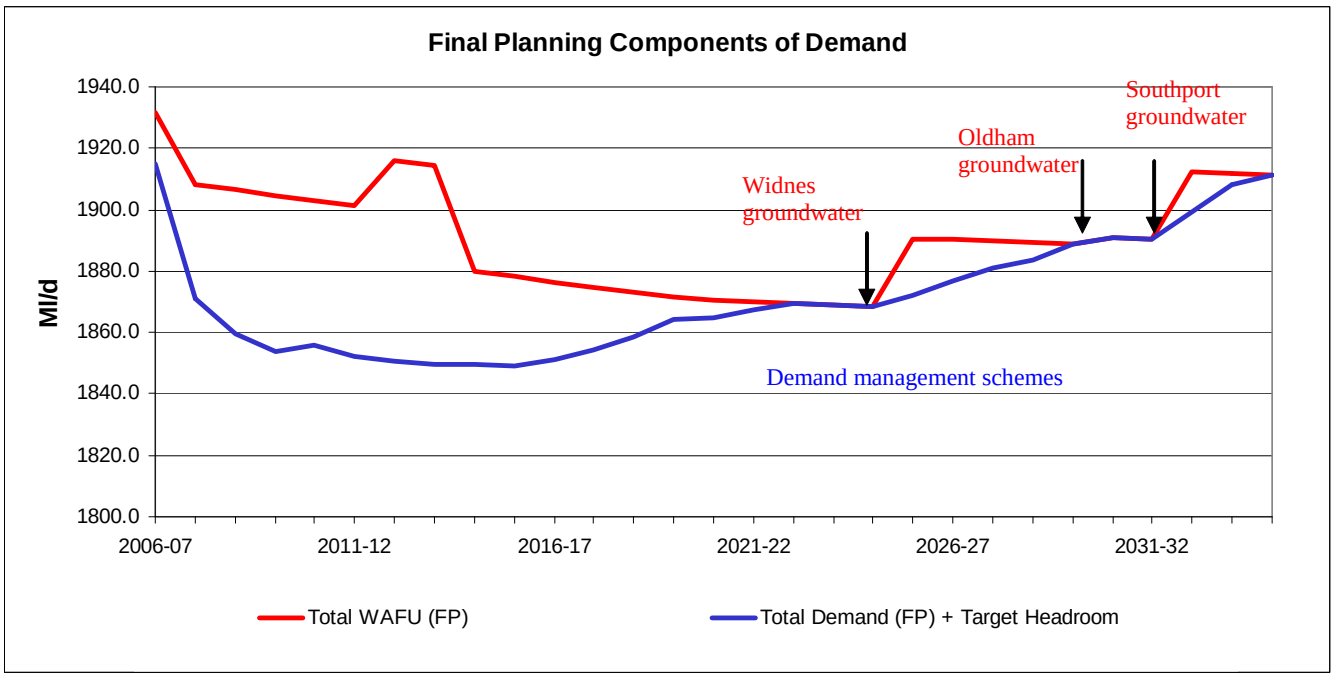


Figure 4.3 Integrated Zone Company Strategy Forecast of Annual Average Supply and Demand



4.2.3 Environmental Constraints Affecting Options to Secure Public Water Supplies

Catchment Abstraction Management Strategies

Options to improve security of supply through resource development are limited in this area. This is best demonstrated by considering the Environment Agency's Catchment Abstraction Management Strategies (CAMS). The results are summarised in Table 4.3 and illustrated in Figure 4.4.

Table 4.3 Summary of CAMS Resource Assessments in the Integrated Zone supplying Mid Mersey

CAMS	Resource Availability Assessment
Catchments providing a large amount of public water supply	
Catchments in West Cumbria (United Utilities Lake District Sources)	Wider variety between individual units (water available to **over abstracted**). Abstractions are being reduced in this area in response to the Habitats Directive, in order to prevent low flows and protect habitats.
Lune	Most catchments in the Lune have water available but WRMU1 is over licensed.
Wyre	The Wyre is under significant pressure from abstractions for public water supply. Two WRMUs are overabstracted and this is due to public water supply abstractions. Most of the rest of the catchment is over licensed. The Environment Agency and UU are working together to resolve this situation.
Catchments providing a small amount of public water supply to the study area	
Weaver and Dane	Water available. A very small proportion of the study area lies within this catchment.
Lower Mersey (combines the former Alt, Sankey & Glaze, and Lower Mersey and Manchester Ship canal CAMS) – borehole abstractions	Ten of nineteen Water Resource Management Units have critical borehole supplies for public water supply. Two of these are already over abstracted, five are over licensed, and three have either no water available or are moving towards no water available. This catchment has a long history of groundwater being over abstracted. There are now groundwater management practices in place to reduce abstraction and reverse the trend of saline intrusion.
Other catchments across the North West	
Ribble, Douglas, Crossens Croal and Irwell	Range between water available to over abstracted
Roch, Irk, and Medlock Tame, Goyt and Etherow	Range between water available to over licensed
Mersey and Bollin	A very small proportion of the study area lies within this catchment.
Other catchments available to United Utilities	
Dee (North Wales)	The River Dee has no water available.

Note – this is the Resource Availability Status at low flows – water may be available for abstraction at higher flows subject to abstraction constraints.

Almost all the study area lies within the Lower Mersey and Alt catchment. The Lower Alt covers the area from Maghull to the coastline between Crosby and Ainsdale, within which the main urban development is Formby,

situated on slightly higher ground. The remainder of the catchment is low-lying and prone to flooding. A number of flood defences have therefore been built over the years to help protect the area.

The Sankey Brook and Glaze Brook catchments, along with the smaller catchments of Padgate, Spittle and Whittle Brooks are part of the greater Lower Mersey and Alt. They drain the north west of Warrington; this includes the areas of St. Helens, Leigh and Newton-le-Willows.

The Lower Mersey is fed by 284 km of inland river systems flowing through mainly flat landscape with heavily urban and agricultural land use. The Lower Mersey section of the CAMS area includes the City of Liverpool, Birkenhead, Runcorn, Warrington and Widnes as well as part of South Manchester.

Designated Sites

A key consideration is the potential for new development to increase demand for public water supply and hence water abstraction. Figure 4.4 shows that the Mid Mersey study area is located within the Lower Mersey and Alt Catchment. Table 4.3 confirms that this catchment provides a small amount of water to the zone, and Figure 4.7 shows that there are a small number of designated sites within the Lower Mersey and Alt.

As discussed in Section 4.2.1 water resources and supplies are sourced from across the North West and from North Wales, although there may be some local abstractions. The Environment Agency and water companies across England and Wales are working together under a programme of work called Restoring Sustainable Abstraction (RSA) to investigate and identify major abstractions that are putting habitats and the environment at risk. This programme is part of a wide range of measures being completed to meet the objectives of the European Habitats Directive. In its Water Resource Management Plan United Utilities has confirmed that from 2014/15 it will reduce its abstractions in the Integrated zone by as much as 32.9 Ml/d as part of this programme. This reduction has been factored in to its forecast of supply and thus its strategy going forward, which forecasts sufficient resources to meet demand (see Section 4.2.2).

Section 4.2.2 explains how the Environment Agency manages water resources through abstraction licensing and the Catchment Abstraction Management Strategies. The key point to note is that the Environment Agency is working with United Utilities to manage existing abstraction licences to make them more sustainable, and is extremely unlikely to issue new abstraction licences in areas which are already over licensed or over abstracted. However, abstraction rates could increase within existing licensed volumes and further study is required to determine whether this would impact on designated sites. The management strategy is to manage demands to a sustainable level and to provide water supplies from more sustainable sources.