

‘Gatwick Sub-region’ Joint Water Cycle Study

Scoping Study

March 2010



Crawley Borough Council, Horsham District Council, Mid Sussex District Council and Reigate and Banstead Borough Council

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Executive Summary

Background

The Regional Spatial Strategy (RSS) for the South East of England, the South East Plan, sets out the long term spatial planning framework for the south east region from 2006 to 2026. The South East Plan, hereafter referred to as 'the SEP', identifies Gatwick and its surroundings as one of nine sub-regional centres which will be the focus for growth and regeneration over the next 20 years. Policy GAT3 of the SEP requires the delivery of 36,000 new homes in the Gatwick Sub-region by 2026, the majority of which should be in the form of major developments 'at, or adjoining Crawley'.

This required growth will substantially increase the demand for water, necessitating additional water resources, water abstraction and treatment. Further development will also require additional infrastructure for water supply and for wastewater treatment and disposal, as well as for surface water drainage and flood risk alleviation. This stress is recognised under Policy GAT3, which states that housing provision 'at Crawley' must be informed by the findings of a Water Cycle Study.

In order to ensure that any planned development does not have a negative impact on the existing water environment, Crawley Borough Council (CBC), Horsham District Council (HDC), Mid Sussex District Council (MSDC) and Reigate and Banstead District Council (RBBC) wish to jointly commission an Outline Water Cycle Study to inform their emerging Core Strategies.

Water Cycle Study

A Water Cycle Study is the process of assessing environmental capacity and determining the most sustainable water infrastructure service solutions. It identifies possible tensions between growth proposals and environmental constraints and establishes the type of sustainable water infrastructure required to deliver growth. In doing so the Study establishes at what point infrastructure is required and how it is to be delivered and funded, the study then sets out solutions through which these tensions can be addressed.

The production of a Water Cycle Study is normally broken down into three stages, the first of which is the *Initial Scoping Study* – a process of summarising the available information relating to the water environment and identifying any information gaps that may require further study. This is followed by the *Outline Study*, a process of identifying the environmental and major infrastructure constraints that exist and establishing whether there are any significant infrastructure barriers to development that will require further investigation through a final stage the *Detailed Study*.

Benefits of a Water Cycle Study

In a sub-regional context, a Water Cycle Study will inform the evidence base for establishing strategic development allocations at Crawley and within the surrounding areas. This information can then be used to identifying the most appropriate phasing and if necessary mitigation solutions to ensure that development comes forward in a sustainable manner from a water infrastructure perspective. It will also be the role of the Water Cycle Study to consider issues of water quality and biodiversity, including the potential impact of future development upon the health of the sub-region's water bodies. In this context the study can play a key role in meeting the statutory requirements of the EU Water Framework Directive and more locally, the requirements of the Environment Agency's River Basin Management Plan, a plan which requires that local water bodies achieve 'good' quality status by 2015.

Study Progression

The sub-regional authorities (CBC, HDC, MSDC, RBBC) have agreed that the Water Cycle Study should be progressed on a joint-authority, sub-regional (Gatwick Diamond) basis, with Crawley Borough Council acting as lead authority. This position has been endorsed by the Government Office for the South East and the Environment Agency. In order to ensure that the study and its findings are accurate and robust, a Water Cycle Study Steering Group has been established, which in addition to the sub-regional authorities, includes the Environment Agency (Thames and Southern regions) and the water service providers in the South East including Southern Water, Thames Water, South East Water, and East Sutton & Surrey Water. All stakeholders have agreed to engage fully with the WCS production process, particularly through providing information, expertise and ultimately 'sign-off' at each stage in the study's progression.

Scoping Study (Key Findings)

The Scoping Study is primarily an information gathering exercise and has been progressed by the Councils in-house. This stage has drawn upon a range of existing documents to assemble information required to inform the next stage of the WCS process. The information reviewed includes sub-regional and local planning policy, water service provider Water Resource Management Plans and position statements and information from the Environment Agency relating to water quality and availability. This information has allowed the Councils to build up a detailed understanding of the balance between the water environment and development pressure in the sub-region, which can be investigated in detail through the Outline Water Cycle Study Stage. The following paragraphs identify the key findings of the Scoping Study.

Water Supply

The WCS confirms that many areas of the south east are currently under significant levels of water stress, a situation that is reflected in the respective Water Resource Management Plans (WRMP) of the three water supply companies serving the Study Area. The Southern Water WRMP identifies a water supply/demand balance deficit in the Sussex North Water Resource Zone during the AMP5 period (2010-2015) and the South East Water WRMP demonstrates that leakage is a major area of concern in this area. The Sutton and East Surrey WRMP identifies sufficient resources to meet average demands, however recognises there is a deficit to meet peak demands in dry years. Whilst a shortage of water supply would represent a constraint to development over the plan period, all three water suppliers remain confident that this risk can be appropriately managed through a twin-track approach involving the bulk transfer of water supply from other areas of the region and the implementation of water efficiency and leakage reduction measures. Both the water service providers and Environment Agency believe that this approach will ensure that sufficient water capacity is available to serve the quantum of development identified in the South East Plan. As such it is not currently anticipated that water supply should act as a constraint to development in the study area over the plan period to 2026. The Scoping Study does however recommend that in the interests of completeness, this position be reviewed in detail through an Outline Water Cycle Study.

Water Resource Management and Abstractions

This section considers the extent to which water resources are available for abstraction (mainly by water service providers) to meet existing and planned development. It has been set out on a river catchment basis and as such, consideration has been afforded to the availability of water in the River Mole Catchment (Crawley/Reigate and Banstead), Adur and Ouse Catchment (southern part of Horsham and Mid Sussex Districts), and Arun and Western Streams Catchment (Horsham District).

Catchment Abstraction Management Strategies produced by the Environment Agency identify that parts of the three river catchments in the study area have been designated as either 'over-abstracted' or have 'no water available' for abstraction. The Environment Agency has advised that this would in practice mean that they would not permit any increases beyond existing abstraction licences and that the requirements of all future development would need to be met within the headroom of existing licences. This means that future growth cannot rely on the development of new local resources and instead will have to rely on greater efficiency in water use and bulk transfer from neighbouring supply zones. The water service providers remain confident that demand management can be met on this basis, though it is considered that an Outline Study should be able to provide guidance on how issues of demand management can be addressed from a planning perspective.

Wastewater Treatment

Wastewater treatment capacity has emerged as a major issue within the study area, particularly within the context of development at Crawley. Should development in the North East Sector of Crawley come forward in conjunction with the allocated West of Bewbush development and existing permissions/windfall figures for Crawley, the bulk of remaining available sewage capacity at Crawley would be expended, thereby restricting further development at Crawley until 2021 (the earliest date at which it is anticipated that new sewage treatment capacity can be delivered by the statutory provider). Beyond Crawley, it is evident that wastewater treatment works have reached, or are nearing capacity in areas of both the Horsham and Mid Sussex Districts, whilst identified development at Horley will place further strain on sewage treatment capacity. Wastewater treatment capacity subsequently represents a major constraint to sub-regional development over the South East Plan period, particularly in an 'at Crawley' context where the bulk of development is required to be located. Given the current capacity issues, it is recommended that an Outline Water Cycle Study be undertaken to investigate the situation in detail, particularly in terms of assessing capacity available to accommodate further growth at Crawley. The Outline Study should also assess the most sustainable way forward and recommend solutions to assist in the delivery of sub-regional housing requirements.

Water Quality

The European Water Framework Directive seeks to protect and improve inland and transitional water bodies, focussing specifically on issues of water quality and quantity and ultimately seeking to ensure that all waters achieve 'good status' by 2015. In the UK context, the legislation is reflected in the publication of the Environment Agency's River Basin Management Plans (RBMPs), which seek to ensure the protection, improvement and sustainable use of the water environment, considering the extent to which targets to reach 'good status' are achievable and how any necessary improvements are to be achieved.

The Thames River Basin Management Plan identifies high levels of phosphate and ammonia in several rivers within the Mole Catchment which pose a potential threat to fish and invertebrates due to their toxicity. The South East River Basin Management Plan sets out the current status of the A&O Catchment and A&WS. This RBMP identifies obstruction to fish passage in the Ouse, diffuse pollution from agriculture and issues with the quality of effluent from Goddards Green, Barns Green and Coolham WwTW as key reasons behind not achieving Good status in the Ouse catchment. In the Arun and Western Streams Catchment, the most significant environmental constraint is discharge of pollutants contained in the wastewater discharged from the Horsham WwTW, however diffuse agricultural pollution is also an area of concern.

Development planned up to 2026 could compound this situation through increasing volumes of discharged effluent. In light of this situation, the Scoping Report recommends that an Outline Water Cycle Study should be undertaken to investigate the capacity of the water environment to absorb further discharges from receiving water courses, and consider whether further development would result in an unacceptable deterioration of the water environment within and beyond the study area. The Outline Study should also look to meet the objectives and actions outlined of each of the RBMP's, seeking to not only avoid deterioration in watercourses but also to enhance them through growth. Finally, it is recommended that the Outline Study should investigate whether strategic water quality mitigation measures will need to be planned and delivered to enable new development.

Ecology and Biodiversity

The study area and its surroundings contain several sites of ecological importance which have the potential to be impacted by development within the Gatwick Sub-Region. As such it is intended that an Outline Water Cycle Study be prepared to consider the potential impact of development on the water environment and make policy recommendations to identify how development can be brought forward in a manner that protects and enhances ecology and biology within and beyond the study area.

Moving Forward

It is the view of the stakeholders involved in preparing this Scoping Study that an **Outline Study should be undertaken.**

The findings of an Outline Study (and potential progression to a Detailed Study) will then be used as part of a robust evidence base to inform the development of policies in each of the sub-regional authorities Core Strategy documents. The information will then help determine suitability, location and intensity of development.

The findings from the Outline Study will determine the progression of this Water Cycle Study. If it is found that development in certain locations of the study area will require new infrastructure, or would be likely to have a significant effect on the water environment, a Detailed Study will need to be undertaken. It is proposed that this will be the responsibility of the Authority(s) with effected areas to progress, rather than to be carried out sub-regionally.

1.0 Introduction

1.1 Background

The Regional Spatial Strategy (RSS) for the South East of England, the South East Plan, sets out the long term spatial planning framework for the south east region from 2006 to 2026. The South East Plan, hereafter referred to as 'the SEP', identifies Gatwick and its surroundings as one of nine sub-regional centres which will be the focus for growth and regeneration over the next 20 years. The 'Gatwick Sub-Regional Strategy Area' identified in the SEP extends north from Gatwick Airport to the edge of Redhill, east to East Grinstead, south to Burgess Hill and Haywards Heath and west to Horsham as shown in Figure 1.1. In order to support the economic performance of this area, Policy GAT3 of the SEP requires the delivery of 36,000 new homes in the area by 2026, the majority of which should be in the form of major developments at, or adjoining Crawley.

This required growth will substantially increase the demand for water necessitating additional water resources, water abstraction and treatment. Further development will also require additional infrastructure for water supply and for wastewater treatment and disposal which is already constrained in Crawley, as well as for surface water drainage and flood risk alleviation. In order to ensure the development does not have a negative impact on the existing water environment, Policy GAT 3 of the SEP states that '*provision levels at Crawley will need to be informed by the findings of a Water Cycle Study*'. Conducting such a study will also ensure sufficient Water Cycle Infrastructure (WCI) can be planned for and provided alongside new development in a sustainable and cost effective manner.

There are six Local Authorities whose boundaries fall within the Gatwick Sub-Regional Strategy Area, these are Crawley Borough Council, Mole Valley District Council, Reigate & Banstead Borough Council, Tandridge District Council, Mid Sussex District Council and Horsham District Council. In order to satisfy the requirements of Policy GAT3, Crawley (CBC), Horsham (HDC), Mid Sussex (MSDC) and Reigate and Banstead (RBBC), (hereafter referred to as the 'sub-regional authorities'), have agreed to undertake a Joint Water Cycle Study (WCS) and will be progressing the first phase of this process in-house in consultation with the Environment Agency (EA). Tandridge and Mole Valley Councils opted out of inclusion within this study due to the fact that the bulk of their SEP housing allocation has been identified in the northern portion of their respective districts and will subsequently have little influence on the water cycle within the 'at Crawley' study area. More information on this is provided in Section 3.1.

This 'Gatwick Sub-Region Joint WCS Scoping Study forms the first stage in the overall WCS process as identified by the EA in their *Water Cycle Study Guidance (January 2009)*. In doing so, it collates all available information relating to the water environment, identifies key issues which need to be considered and determines the need and scope for a further and more detailed Outline Study. In the interests of completeness, this Initial Scoping Study expands upon the initial requirements of SEP Policy GAT3 and will consider the development requirements and water environment for the Gatwick sub-region at a whole. As such, the study will focus upon the water environment in the Gatwick Diamond Sub-Region area set out in Figure 1.1, hereafter referred to as the 'study area'. If found to be appropriate, the study area considered in future stages of the water cycle process will be narrowed down as required.

Once complete, the Joint WCS will provide sufficient detail to inform each sub-regional authorities Local Development Framework (LDF) and will be reflected in future reviews of the SEP.

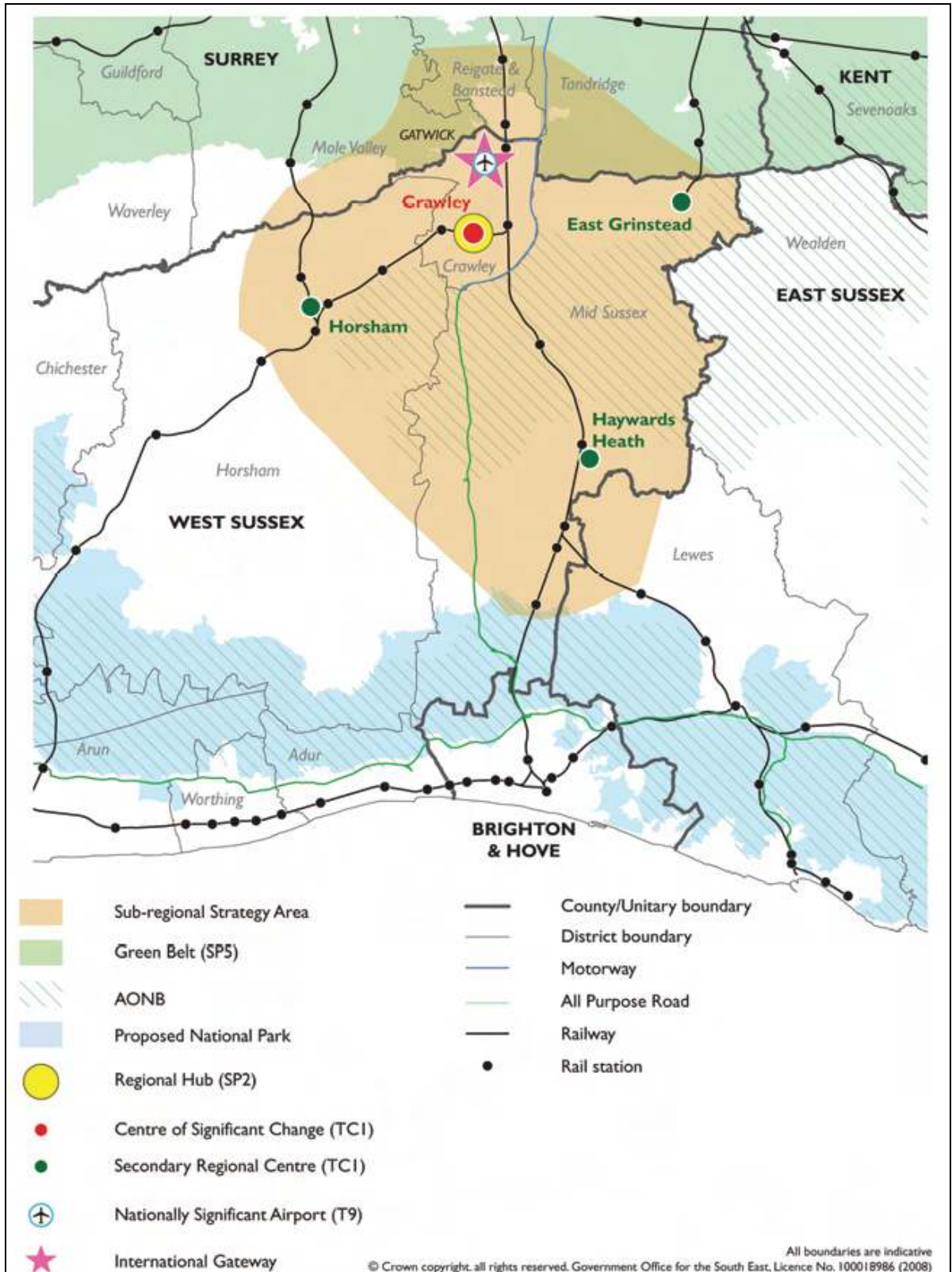


Figure 1.1: Gatwick Sub-regional Strategy Area (Source: *The South East Plan*, May2009)

1.2 Aims and Objectives

The overall aim of this Joint WCS is to identify constraints imposed by the water cycle that may impede the long-term delivery of housing and employment within the study area. The aim of this initial Scoping Study is to identify the key water environment issues impacting the study area and to review the suitability of data currently available. This Scoping Study will determine whether an Outline Study is required and this in turn will identify whether a Detailed Study is required thereafter. If required, Outline and Detailed study stages will go on to consider how these constraints can be resolved, i.e. by ensuring adequate water infrastructure is provided to support all proposed development. More information on the stages of the WCS can be found in Section 2.

In order to fulfil the overall aim of the study, the Joint WCS will consider the effect of development on each facet of the water environment, including wastewater collection and treatment, water resources and supply, water quality and flood risk management. In doing so it will provide an evidence base that enables all areas to be considered in an integrated manner and in a way that does not compromise the sustainability of the water environment in the long term.

To satisfy the requirements of the initial scoping stage, this Scoping Study undertakes a full review of;

- The potential impact of future water abstraction in the study area;
- Infrastructure capacity in terms of water treatment, water resources and the clean water network in the study area;
- Infrastructure capacity in terms of wastewater treatment and discharge in the study area; and
- Water quality issues in terms of the discharge of wastewater, surface water and groundwater quality.

The impact of flood risk within the study area will be considered separately through emerging Strategic Flood Risk Assessments (SFRA) updates that are being undertaken, where required, by the sub-regional authorities',

The information compiled within this Scoping Study will be used to determine whether the next stage in the Water Cycle Study process, a detailed Outline Study is required and if so, will establish the key objectives for the document. Should an Outline Study be required, the findings of SFRA updates will be reviewed and taken into consideration as appropriate.

1.3 Steering Group

An initial steering group has been set up, in line with the Environment Agency's guidance on the preparation of a Water Cycle Study. This Scoping Study has been prepared by the Local Authorities involved, with guidance from the Environment Agency and the relevant water companies. This steering group is therefore made up of representatives from:

- Crawley Borough Council
- Horsham District Council
- Mid Sussex District Council
- Reigate and Banstead Borough Council
- Environment Agency – Southern Region
- Environment Agency – Thames Region
- Southern Water
- South East Water
- Thames Water
- Sutton and East Surrey Water

1.4 Report Structure

The remainder of this report is structured as follows:

- Section 2: provides a description of the water cycle and its implications for development. It also outlines the complete WCS process and its integration with the planning system;
- Section 3: sets out in more detail the 'at Crawley' study area and identifies the national, regional and local drivers guiding development;
- Section 4: Identifies the existing baseline capacity of the study area in relation to the water environment. It sets out key constraints and recommendations that need to be considered; and
- Section 5: provides a summary of the recommendations needed to progress the WCS onto the Outline Study Stage, if required.



2.0 Gatwick Sub-Regional Water Cycle Study

2.1 The Water Cycle

The water cycle or hydrologic cycle as it is also known, describes the continuous movement of water over, through and below the Earth's surface. During the cycle water can be stored as liquid, vapour or ice. The water cycle is a natural process where water which has condensed in the upper atmosphere to form clouds falls on to the earth. It is then either transported via a river or stream, or is stored as groundwater, ice or lakes. Over time this water finds its way back to the ocean where it is heated by the sun. The water vapour then evaporates into the upper atmosphere where it re-condensed to form clouds and the whole cycle is repeated again.

Following development, this natural process is often adapted to suit human need. Water is repeatedly removed from the natural cycle and used for processes which humans require for their own well being and sanitation. In these cases pipes, pumps and drains are used to mimic the natural cycle enabling water to be transported around a man-made environment. The development of such infrastructure enables water to be piped away from natural stores such as lakes, treated and pumped to urban areas as drinking water. Wastewater from these areas is then collected and transported via an underground sewerage system, where once treated, it can be discharged back into the sea and returned to the natural cycle.

In the context of this study 'the water cycle' not only refers to the transportation of water through the natural environment (rivers, lakes and wetlands), but also to the movement of water through man-made infrastructure including pipelines, drains and water treatment works.

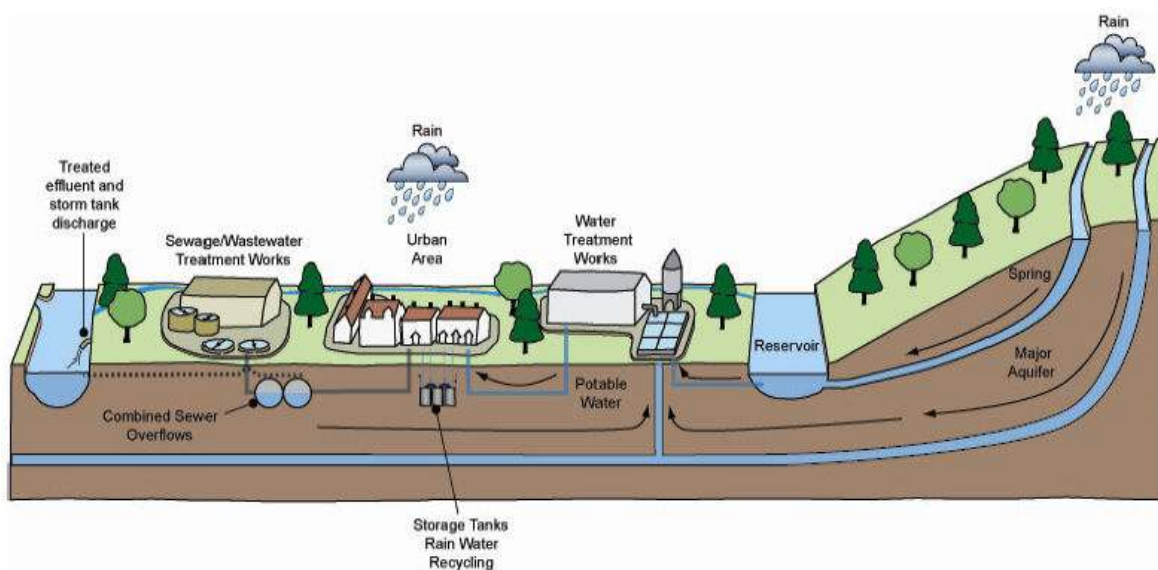


Figure 2.1: The Water Cycle (Source: Water Cycle Study Guidance – Environment Agency)

2.2 Implications for Development

Water is essential for all forms of life. Not only do we require clean water for human consumption and sanitation, but the natural water environment also supports an abundance of wildlife and biodiversity. Unfortunately, continued pressure from development, coupled with changes to the earth's climate, places increased pressure on the water environment, causing changes to the water cycle which are often negative.

Excessive demand for clean water, particularly in the summer months can often lead to depletion in groundwater stores or surface systems. This is a particular problem in the south-east where summers tend to be drier than the rest of the UK. In addition, an increase in the number of new homes being built can result in a greater volume of wastewater that needs to be treated and discharged into the natural cycle. An over abundance of wastewater can have a negative impact on the quality of the receiving waters if volumes are not great enough to disperse the pollutants.

Finally, unless managed, over development can have a negative impact on surface water drainage flows, which can in turn, result in surface water flooding. If coupled with an increase in hard-standing, which reduces infiltration rates, this impact can be significantly greater.

All of these impacts can indirectly effect the ecological environment as many species are wholly dependant on natural features provided by the water cycle such as rivers, wetlands and lakes. Over abstraction in these areas can result in low river flows, siltation and a reduction in water quality as pollutants are concentrated in a lower volume of water. These impacts subsequently threaten the natural environment and the habitats it supports. It is therefore important that when building new homes, the overall impact on the natural environment and water cycle is fully understood.

Sustainable water cycle planning and management can help ensure that new development does not lead to a deterioration of the water cycle environment, if managed properly it can also actively provide improvements. A WCS provides a strategic form of evidence that can be used by the Local Planning Authority (LPA) and local water providers to ensure all new development is considered in the context of the local water cycle. It will also ensure that sufficient water infrastructure is provided to facilitate the planned growth, allowing a sustainable level of manipulation of the natural water cycle to be maintained.

2.3 Stages of a Water Cycle Study

Guidance published by the EA (Water Cycle Study Guidance, 2009), states there are typically three stages to a WCS that can be altered to coincide with the status of the LDF being prepared by the LPAs undertaking the study.

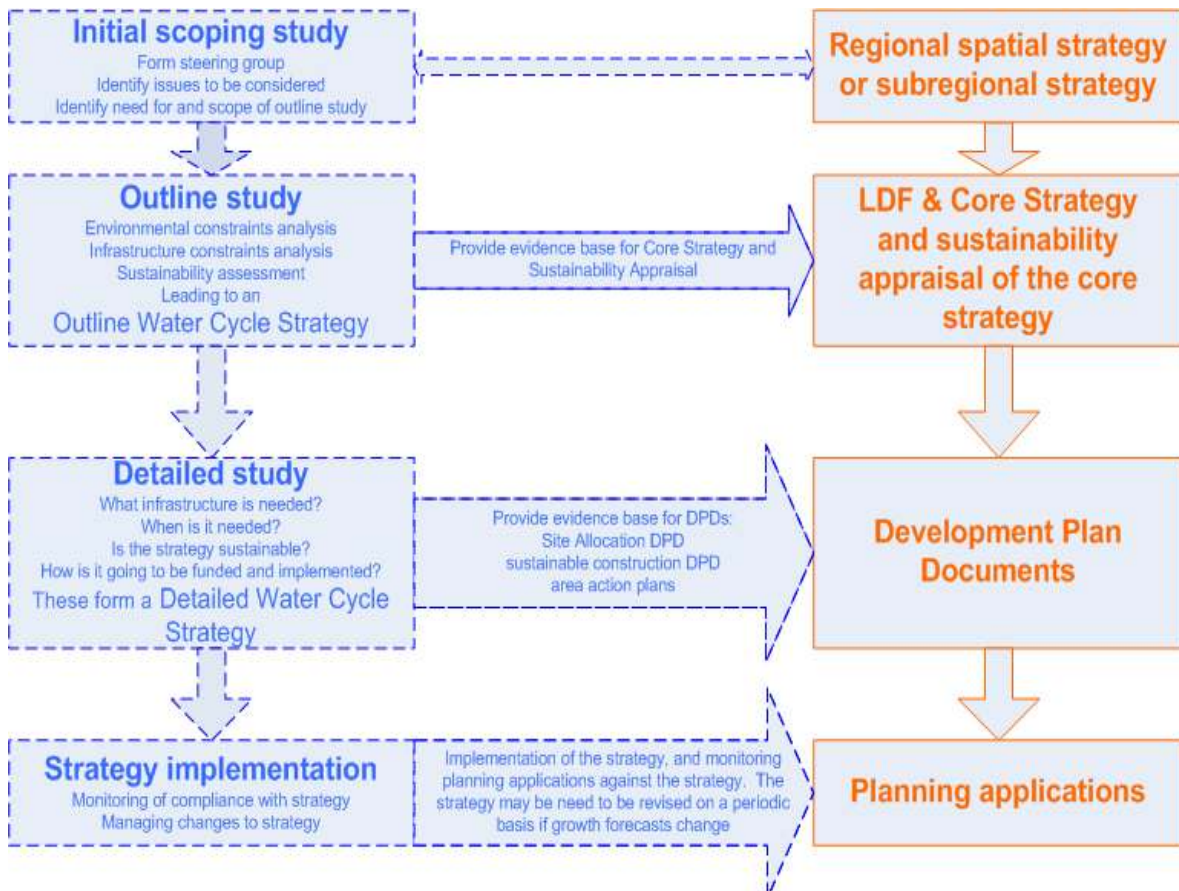


Figure 2.2: Stages of a Water Cycle Study (Source: Water Cycle Study Guidance – Environment Agency)

STAGE 1: Scoping Study

This report represents the first stage of the process, known as the Scoping Stage. In doing so it provides a baseline assessment of where the water environment is likely to be impacted by development and/or where significant investment in water infrastructure would be required to service any proposed new development. In making this assessment the report considers;

1. whether **water demand** is likely to exceed supply (section 4.5);
2. whether sufficient **water resources** are available (section 4.6) and the current extent of **water abstraction** (section 4.7);
3. whether local watercourses have **water quality** concerns that will be exacerbated if further discharge of wastewater from development occurs (section 4.8);
4. whether there are any **ecologically sensitive sites** that have a hydrological link to a development area (section 4.9);
5. the key issues relating to **sewage capacity** within the study area (section 4.10); and
6. the key locations subject to **surface water flooding** which pose potential restrictions on new connections from development (section 4.11).

The key purpose of the report is to ascertain whether any of the factors listed would result in significant constraints to development and whether these constraints would require further assessment to determine whether the planned amount of development could be accommodated within the identified site allocation options. In identifying what issues require further investigation, this Scoping Study outlines the need and scope for a more detailed Outline Study.

STAGE 2: Outline Study

An Outline WCS considers the ways new development will impact the water cycle and water infrastructure specific to where growth is most likely to be proposed. As illustrated in Figure 2.2, an Outline Study should be undertaken in conjunction with the production of the Core Strategy DPD, as it provides an evidence base that the LPAs can use to inform the development of strategic site options. This will ensure the water cycle is taken into consideration when determining location and intensity of development. An Outline Study can also be used by water companies to support business plans that detail the level of future investment needed to provide the infrastructure required to support all planned new development.

Once again, an Outline Study may identify constraints to development that require further investigation before a new development can be approved. In this instance the Outline Study identifies the need and scope for a further Detailed Study to be undertaken. Conversely, the Outline Study may also identify that investment in future infrastructure is not required to accommodate development. In this instance a further Detailed Study would not be necessary.

STAGE 3: Detailed Study

A Detailed WCS should be carried out alongside the latter stages of the Core Strategy production process. Its key purpose is to identify specific infrastructure and mitigation requirements which would be needed in order to facilitate development once strategic site options have been identified. A Detailed Study should therefore be undertaken in conjunction with site specific Development Plan Documents (DPD's) (such as Area Action Plans) and should provide the evidence base for site specific policies and Supplementary Planning Documents (SPD's). The findings of a Detailed WCS may also feed into the LPA's LDF Infrastructure Plans.

2.4 Integration with the Local Development Framework

Under the LDF process all LPAs are required to produce series of technical studies and reports which provide a robust and credible evidence base on which to support the preparation of policies and sites selected for strategic growth.

A WCS forms part of this evidence base, identifying the impact of proposed development on the water cycle and detailing any mitigation which may be required to ensure development does not have adverse effect on the water environment.

If a WCS is undertaken early enough in the LDF process, namely in line with the development of the Core Strategy and strategic site allocations, its findings can influence the location of development and ensure the best use is made of existing environmental and infrastructure capacity. It can also ensure that water cycle requirements are considered at the planning application level. This is the case for both CBC and HDC, who are currently in the initial stages of the Core Strategy review process. If it is deemed that a full WCS (Scoping / Outline / Detailed) is required, this will subsequently be able to influence the development of the latter stages of both Core Strategies and provide further certainty regarding the location of strategic site allocations, in line with the EA recommendations within the WCS guidance.

MSDC and RBBC are somewhat through the preparation of their Core Strategies, with RBBC undertaking its examination into the document in early 2010 and MSDC due to submit their Core Strategy to the Secretary of State in mid to late 2010. Even at these advanced stages, the WCS will form an important part of each authorities' evidence base for the LDF. For MSDC, the results of the study should endorse the selection of sites for strategic development across the district and provide this evidence at examination later in 2010, or provide information on water infrastructure that will need to be put in place in order to adequately serve these new developments. Aside from its use for the Core Strategy process, for both MSDC and RBBC the findings will form a significant part of the evidence base for future site specific DPDs which will be produced within the plan period to identify and allocate sites for housing in order to meet the housing requirements set out in the SEP (up to 2026).

2.5 Data Limitations

The Scoping stage of a WCS involves a large amount of data collection from third parties including the EA and local water companies.

Although there were no issues with the availability of data when preparing this scoping report, it is important to note the following considerations:

- The adoption of the South East Water – Water Resource Management Plan is subject to a public inquiry, due to be held in May/June 2010. Where necessary, the draft Water Resource Management Plan (May 2008) has been referred to.
- Sutton and East Surrey Water – Sutton and East Surrey Water anticipate that the final Water Resource Management Plan will be published in Spring 2010 and where necessary, this Scoping Study has been informed by the Draft Water Resource Management Plan which represents the most recent information available at the time of writing.

Should this Scoping Study identify the requirement to undertake a more detailed Outline Water Cycle Study, it is anticipated that the adopted Water Resource Management Plans will be utilised if available. Should the final plans remain subject to delay, it is anticipated that a continued dialogue with water infrastructure providers through the Water Cycle Study Steering Group will ensure that the information used to inform the study is up to date, robust and relevant.

3.0 Policy and Development Context

3.1 Gatwick Sub-Regional Study Area

As identified in Section 1, the Gatwick sub-region, as identified in the SEP, encompasses the administrative areas of six local authorities, CBC, HDC, MSDC, RBBC and Mole Valley and Tandridge District Councils. Policy GAT3 of the SEP sets out that a total of 36,000 new homes will be required during the year 2006 to 2026, with each local authority is required to deliver a specific quantum of housing development.

The Policy sets out that a proportion of this requirement should be in the form of major development 'at' or adjoining Crawley, with provision levels at Crawley to be informed by the findings of a WCS. This Initial Scoping Study forms the first stage in this process, collating information to identify where constraints may exist in the water environment that could potentially compromise the ability of local authorities in the sub-region to deliver the required housing totals.

For the purposes of the study, it is important to note that for Mole Valley District Council and Tandridge District Council, the bulk of their required SEP housing allocation has been identified in the northern portion of their respective districts and is consequently measured against the housing requirements of the London Fringe sub-region. Given that the SEP does not propose significant development within the portion of their districts falling within the Gatwick sub-region and that the identified development in the north of their districts would not affect the water environment in an 'at Crawley' context, both Mole Valley and Tandridge District Councils have advised that they would not wish to become involved with the progression of this particular piece of work.

This Initial Scoping Study therefore assesses the requirement for a Water Cycle Strategy to inform the evidence bases of the remaining sub-regional authorities of CBC, HDC, MSDC and RBBC.

3.2 Study Area Overview

The study area, as identified in Figure 4.1, is predominantly rural in nature, though contains the significant urban settlements of Crawley, Burgess Hill, East Grinstead, Haywards Heath, Horsham and Horley. Significantly, the study area also includes the international Gatwick Airport and Crawley Town Centre and the Manor Royal Industrial Estate (also in Crawley) both of which serve as significant economic drivers in the sub-region.

The main watercourses running through the study area are the Rivers Adur, Arun, Ouse and Mole. The Mole catchment dominates the north of the study area, with Upper Mole flowing northwards to the west of Crawley. The Gatwick Stream, a tributary of the Mole, skirts east of Crawley, converging with the Upper Mole north of Gatwick Airport, where the river passes west of Horley. The Arun catchment, sourced at St. Leonard's Forest near Horsham, covers the western part of the study area, where the Upper and Eastern Arun flows east to west from Rudgewick to Horsham Town. The southern part of the study area, predominantly encapsulating the administrative area of Mid Sussex District, contains the Adur and Ouse (A&O) catchments. The town of Burgess Hill is situated adjacent to the eastern extent of the Adur catchment, while the northern extent of the Ouse catchment flows in a south easterly direction close to Haywards Heath.

3.3 Planning Policy and Guidance

3.3.1 European and National Legislation and Guidance

The SEP is the central document setting out the growth requirements for the Gatwick sub-region; though it is also important that due consideration is given to the broader guidance of European Union Directives and UK Legislation. In this regard, the relevant European and National guidance relating to the water environment is set out in Table 3.1:

Document	Legislation Status	Summary
Groundwater Directive 80/68/EEC	European	The Groundwater Directive seeks to prevent polluting substances entering groundwater, primarily as a consequence of the disposal of waste substances. The Directive is implemented in the UK by the Groundwater Regulations 1998 and Regulation 15 of the Waste Management Licensing Regulations 1994.
Water Framework Directive 2000/60/EC	European	The Water Framework Directive (WFD) was published in December 2000 and transposed into English and Welsh law in 2003. The WFD seeks to protect and improve our rivers, lakes, groundwater, transitional and coastal waters and focussing specifically on issues of water quality and quantity, requires river basins in the UK to have achieved 'good' ecological status by 2015. The principal output from this legislation is the River Basin Management Plan (RBMP), produced by the EA for each of the UK's 11 River Basin Districts.
Environmental Protection Act 1990	National	Establishes the legal responsibilities of businesses in England, Scotland and Wales with the duty of care for waste, contaminated land and statutory nuisance.
Water Resources Act 1991	National	Defines the EA's responsibilities to protect the water environment in terms of water pollution, water resource management, flood defence, fisheries and navigation. The Act also covers discharges to surface and ground waters, coastal waters and estuaries and controls abstracting and impounding water. The Act places legal requirements on water companies to produce and consult on 25 year plans and supply all existing new and domestic properties with water.
Environment Act 1995	National	Provides for the establishment of the EA and sets out its function and responsibilities.
Pollution Prevention and Control Act 1999	National	Implements revised regulations allowing the UK to meet the requirements of the European Council Directive 96/61/EC on Integrated Pollution Prevention and Control and for other measures to prevent and control pollution.
Planning Policy Statements and Guidance	National	<p>Planning Policy Guidance notes (PPG) and their successors, Planning Policy Statements (PPS) set out the Government's national policies in relation to a range of land use planning issues. The key themes established in these documents are reflected in the planning policy approaches set out at both regional and local level. In relation to the Gatwick sub-regional WCS, the following are of particular relevance.</p> <ul style="list-style-type: none"> - PPS1: Delivering Sustainable Development (and Climate Change Supplement) - PPS3: Housing - PPS9: Biodiversity and Geological Conservation - PPS12: Local Spatial Planning - PPS23: Planning and Pollution Control - PPS25: Development and Flood Risk¹ (and Practice Guide).

¹ An amended version of this document has been published by the Department of Communities and Local Government for a period of public consultation in August 2009.

Water Act 2003	National	Revises the manner in which water abstraction and impoundment is regulated, specifically aiming to improve the protection of the environment and provide greater regulatory flexibility.
Making Space for Water (2004)	National	Published for consultation in April 2004, the Making Space for Water programme sets out the Government's strategy for achieving holistic flood and coastal erosion management in England.
Code for Sustainable Homes	National	The Code for Sustainable Homes was published in December 2006 with the aim of providing a step change in sustainable home building practice. The Government is currently encouraging the Code's use on a voluntary basis, though it will eventually become the single national standard by which the sustainability of new homes is to be assessed and will form the basis of future updates of the Building Regulations. The Code measures the sustainability of a home against design categories, of which water sustainability, surface-water run-off, waste, pollution and biodiversity are of particular relevance to this study.
Pitt Review (2008)	National	Following the Summer floods of 2007, the Government commissioned Sir Michael Pitt to undertake an independent review into the causes of the flooding and lessons that could be learnt. The Review identifies need for an integrated approach to flood management from both the public and private sectors and sets out 92 recommendations relating to the prediction of flooding, its management and flood recovery. All 92 Pitt Review recommendations have been supported in <i>The Government's Response to Sir Michael Pitt's Review</i> and have consequently fed into the Draft Water and Flood Management Bill (see below).
Future Water <i>The Government's Water Strategy for England</i> (2008)	National	Sets out the Government's vision for sustainable water management in England by 2030. The document recognises that the effects of climate change will impact upon the water environment, affecting both water supply and through increased incidents of extreme weather, the likelihood of flooding. The strategy looks at the water cycle as a whole, focussing on a range of areas including water supply, drainage, treatment and discharge and presents practical steps to ensure that good, clean water is available for people, businesses and nature.
Draft Water and Flood Management Bill (April 2009)	National	This consultation document seeks to review the Government's current legislation relating to flood and coastal erosion risk, particularly in response to the impacts of climate change and in light of new legal obligations from the EU. In doing so, the draft Bill sets out the Government's proposed response to the recommendations of the Pitt Review and seeks to give effect to many of the commitments set out in 'Future Water'. The document also proposes that certain aspects of OFWAT's regulatory powers be enhanced.

Table 3.1 – European and National Legislation and Guidance

3.3.2 Regional Policy and Guidance

South East Plan

The SEP, published in May 2009, is the RSS for the south east of England. The document sets out the long-term spatial planning framework for the region over the years 2006-2026 and is the key driver guiding development in the Gatwick sub-region over the plan period.

In a Gatwick context, one of the central objectives of the SEP is to maximise the potential for sustainable sub-regional economic growth whilst maintaining and enhancing the character, distinctiveness, sense of place and important features of the sub-region. Policy GAT1 identifies that this should be achieved by sustaining and enhancing the pivotal role played by Crawley-Gatwick in the sub-region and wider economy, in particular through recognising and sustaining inter-relationships with London, the South Coast and Gatwick Airport.

To achieve this, Policy GAT2 seeks to encourage high-value added economic growth and development that contributes to the improvement in the skills and flexibility of the local workforce. The policy directly refers to the provision of a new university campus at Crawley, the continued functioning of Gatwick Airport and the provision of employment floorspace in association with major development and identified strategic locations. The supporting policy text notes that interim estimates suggest that a net increase of 17,400 jobs will be required during the first part of the planning period from 2006-2016.

SEP Policy GAT3 identifies that a net total of 36,000 new homes should be located in the Gatwick sub-region during the plan period 2006-2026, with the majority of this development in the form of major developments at or adjoining Crawley. The policy places onus on Local Planning Authorities (LPAs) to allocate sufficient land to facilitate the delivery of this figure and encourages collaborative working to ensure this is achieved. Crucially, the policy footnote sets out that *'provision levels at Crawley will need to be informed by the findings of a water cycle study. The results of this study will need to be reflected in local development frameworks and future revisions of the Regional Spatial Strategy'*.

The policy breaks down the sub-regional housing allocation as follows:

District/Borough	Annual Average	Total
Crawley	375	7,500
Horsham (part)	460	9,200
Mid Sussex (part)	840	16,800
Reigate & Banstead (part)	125	2,500
Sub-Regional Total	1,800	36,000

Table 3.2 – Gatwick sub-regional housing allocation

The SEP also sets out a number of more general policies relating to the water environment² that are of relevance to the undertaking of this Initial Scoping Study. In brief, these are;

Policy CC2: Climate Change – Calls upon LPA to implement measures to adapt to and forecast climate change, with particular focus to be placed upon the reduction of carbon dioxide emissions. In a water environment context, the policy seeks to ensure that strategic development is guided to locations offering greater protection from impacts such as flooding and water shortage, whilst also ensuring that development incorporates sustainable drainage measures. The policy also outlines that opportunities should be taken to increase flood storage capacity and promote sustainable flood management.

² These policies have in part been informed by the South East Plan background paper *Technical Note 4: Water and Growth in the South East (March 2006)*

Policy NRM1: Sustainable Water Resources and Groundwater Quality – Seeks to maintain and enhance water supply and ground water through avoiding adverse effects of development on the environment. The Policy places particular emphasis upon the achievement of the Water Framework Directive (WFD) through ensuring the delivery of the actions set out in River Basin Management Plans (RBMPs).

Significantly, the policy identifies that new development should be directed to areas of sufficient water supply and outlines that where sufficient water infrastructure to support proposed development is not available, development should be phased to allow time for the relevant water infrastructure to be put in place.

Policy NRM2: Water Quality – Sets out the requirement to maintain and enhance water quality through avoiding adverse effects of development on the water environment. Particular emphasis is placed upon the need to take account of a comprehensive information base including water cycle studies, groundwater vulnerability maps, groundwater source protection zones and Asset Management Plans (AMP). Local planning authorities are also required to work alongside water and sewerage infrastructure providers and the EA to ensure that sufficient infrastructure is in place to meet demand and that impacts of treated sewage discharges do not breach environmental quality standards or 'no deterioration' objectives.

Policy NRM3: Strategic Water Resources Development – Identifies the need for new water resource schemes and increased demand management over the plan period to cater for current and future development needs. No new strategic water resource options are proposed in the WCS area during the plan period.

Policy NRM4: Sustainable Flood Risk Management – Relays the requirements of PPS25 and outlines the need for local authorities, in conjunction with the EA, to take account of RBMPs, Catchment Flood Management Plans and Surface Water Management Plans in developing local development documents and other strategies.

River Basin Management Plans

In accordance with the requirements of the Water Framework Directive (WFD), the EA has been working to produce River Basin Management Plans (RBMP) for each of the UK's 11 River Basin Districts. These were published in draft for public consultation in February 2009, with the documents adopted in their final form on 22 December 2009.

RBMPs provide the framework through which the overarching requirements of the WFD will be met, seeking to ensure the protection, improvement and sustainable use of the water environment and requiring that the water environment is managed to consistently high standards. In this regard, the WFD sets the target that all waters should achieve 'good status' by 2015, with the role of the RBMP being to establish what improvements are possible by 2015, how these targets will be achieved and how this will affect the local environment.

The Gatwick sub-region is covered by two River Basin Districts and the RBMP for the Thames and South East districts are relevant to this study. The South East RBMP covers the geographical bulk of the study area, encompassing the Arun and Western Streams and Adur and Ouse catchments. The Thames RBMP covers the northern part of the sub-region and of specific relevance to the study area, sets out the priorities for the River Mole Catchment.

3.3.3 Local Policy and Guidance

Local Authority Planning - Local Development Frameworks

The LDF comprises a suite of planning documents intended to set out the spatial vision and policies to guide development within, the administrative area of a local authority. The sub-regional authorities are currently at different stages in the LDF production process and a brief outline of each authority's current position is outlined below.

Crawley

CBC adopted its current Core Strategy in November 2007, covering a plan period up to 2016. Following a High Court challenge, which successfully contested specific elements of the document relating to the delivery of a new neighbourhood at the North East Sector, an amended version of the Core Strategy was published in October 2008. A number of uncertainties during the Examination in Public of the adopted Core Strategy, including the possible requirement for a second runway at Gatwick Airport and the availability of the North East Sector, impacted upon the certainty with which longer-term housing supply could be planned for in Crawley. In light of this and given the need for the next Core Strategy to be in line with the plan period of the SEP, the Council has been tasked with an early review of the Core Strategy. As the first stage in this process, the Council produced 13 Topic Papers for a period of non-statutory public consultation during May/June 2009. As the next stage in this process, consultation on the Preferred Strategy will be undertaken from July to September 2010. Following a further stage of Proposed Submission consultation and subject to being found 'sound' at an Examination in Public, it is anticipated that the Core Strategy Review will be adopted in December 2012.

Horsham

HDC adopted its current Core Strategy in February 2007, covering a plan period up to 2018. Following the recent publication of the SEP in 2009, HDC has embarked upon an early review of this Core Strategy in order to bring it in line with the latest housing requirements specified in the SEP. The new Core Strategy will cover the plan period up to 2026. As the first stage in this process, the Council produced '*Leading Change in Partnership to 2026 and Beyond*' for public consultation in September/October 2009. It is anticipated that the next stage in the process, the Preferred Strategy, will be published for consultation in spring 2010, with Proposed Submission consultation expected early in 2011. It is expected that the final document will be adopted by the Council in summer 2011.

Mid Sussex

MSDC adopted its Local Plan in May 2004. In September 2007, the Government Office for the South East (GOSE) agreed that the majority of policies set out within the Local Plan would be maintained as 'saved policies' until such time that they are replaced by policies within a future DPD. The District Council adopted its first DPD under the LDF system in 2008, the Small Scale Housing Allocations DPD. This allocates small sites (up to 250 dwellings) with larger, strategic sites to follow in the Core Strategy. The Council is continuing to progress work on its Core Strategy and it is anticipated that consultation on the Proposed Submission document will be undertaken during mid to late 2010. Following consultation, it is anticipated that the document will be formally submitted to the Secretary of State late in 2010 with the Examination in Public to follow shortly after. Subject to the document being found 'sound', it is anticipated that the Core Strategy will be adopted by the Council in mid 2011.

Reigate and Banstead

RBBC adopted its Local Plan in April 2005, with an update published in September 2006. In September 2007, GOSE confirmed the Local Plan policies that would be retained as 'saved' policies until such time that they are replaced by policies within a future Development Management and Site Allocations DPD. In this regard, the Council submitted its Core Strategy to the Secretary of State in March 2009, though following an Exploratory Meeting with the Inspector appointed to consider the document's soundness, it was agreed that the Examination should be postponed for a period of five months, with an additional period of public consultation undertaken.

Following the addressing of a number of issues to the Inspector's satisfaction, Examination in Public is now scheduled for January 2010. Should the Core Strategy be found sound at Examination, it is anticipated that the Council will adopt the document in September 2010.

Water Company Planning

An important consideration for this study centres on the manner in which the water infrastructure companies serving the sub-region are planning for development over the SEP period up to 2026. Four companies are responsible for the provision of water infrastructure in the sub-region, namely South East Water, Southern Water, Thames Water and Sutton & East Surrey Water. The sub-regional responsibilities for each company are set out in Table 3.3 below.

District/Borough	Water Supply Provider	Wastewater Treatment Provider
Crawley Borough	Southern Water	Thames Water
Horsham District	Southern Water	Southern Water & Thames Water
Mid Sussex District (south of East Grinstead)	South East Water*	Southern Water
Mid Sussex District (north of East Grinstead)	South East Water	Thames Water
Reigate & Banstead Borough	Sutton & East Surrey Water	Thames Water

* Southern Water is the water provider for a small part of the district adjacent to Pyecombe.

Table 3.3 – Sub-Regional Water Infrastructure Providers

In order to fund the upkeep and improvement of existing infrastructure and finance the building of any new infrastructure that is needed, water companies in England and Wales are required to comply with the Asset Management Plan (AMP) process. The AMP process runs in five year cycles³ and for each AMP period, water companies are required to work alongside the EA, Drinking Water Inspectorate and the Office of Water Services (OFWAT) to determine the level of investment required.

The net outcome of this process is the production of a Business Plan setting out the required level of investment for the forthcoming AMP period and how this is to be achieved. In this regard, the Business Plan will outline how the level of funding required will impact on customer charges, with the acceptability of any increases assessed by OFWAT as the regulatory body (a process known as the Price Review). Provided that OFWAT endorse any customer charges amendments proposed in the draft Business Plan, the agreed customer charges will be set for the forthcoming AMP period, thereby allowing the water company to raise funds for the required infrastructure.

The next AMP period (AMP5) covers the period April 2010 to March 2015, with the next Price Review due to be undertaken towards the end of this period. To secure funding for this period, water companies submitted their Business Plans to OFWAT in April 2009 and received OFWAT's final determination on five-year pricing in November 2009. Water companies have accepted the price limits, with the new price limits will taking effect from April 2010.

In addition to the AMP process, water companies dealing with water supply infrastructure are required to undertake a Water Resource Management Plan (WRMP). These are statutory documents detailing the strategy through which a water company proposes to ensure the sufficient supply of water to meet anticipated customer demands over a 25 year period. The WRMP affords particular focus to the manner in which increases in water supply demand are to be met, particularly those resulting from identified strategic development, or brought about as a result of climate change.

The current WRMPs (published in 2009) cover a plan period from 2010 to 2035, although they are intended to act as living documents and will be updated at least every five years. The WRMPs of Southern Water, South East Water and East Surrey & Sutton Water are of relevance to this Initial Scoping Study and will be discussed in detail in Chapter 5.

³ It is important to note that the AMP periods do not operate in conformity with the timeframes of the South East Plan or Local Development Frameworks.

Other Relevant Documentation

In addition to the above, the following documents are also of relevance to this Initial Scoping Study and have largely been used to inform the sections of this report which follow:

- Environment Agency Arun and Western Streams Catchment Abstraction Management Strategy (CAMS) (April 2003);
- Environment Agency Adur and Ouse Catchment Abstraction Management Strategy (March 2005);
- Environment Agency Mole Catchment Abstraction Management Strategy (June 2007);
- Crawley Borough Strategic Flood Risk Assessment (April, 2007);
- Horsham District (Upper Mole) Strategic Flood Risk Assessment (April, 2007);
- Horsham District Strategic Flood Risk Assessment (June, 2007);
- Reigate and Banstead Strategic Flood Risk Assessment (December 2007);
- Mid Sussex Strategic Flood Risk Assessment (March, 2008);
- 'At Crawley' Study 2009;
- Sub-Regional Employment Land Review (Part 1), 2008;
- Thames Water, Water Resource Management Plan 2010-2035 (2009);
- Southern Water, Water Resource Management Plan 2010-2035 (2009);
- South East Water, Water Resource Management Plan;
- Sutton and East Surrey Water, Water Resource Management Plan (due to be adopted in February 2010);
- Environment Agency, Water for Life and Livelihoods River Basin Management Plan South East River Basin District (2009);
- Environment Agency, Water for Life and Livelihoods River Basin Management Plan Thames River Basin District (2009);
- Ar2A Creating a Better Place: Planning for Water Quality and Growth in the South East, version 11 final – Environment Agency;
- Ar2B Planning for Water Quality and Growth in the South East, Map for water data meeting, Environment Agency;
- Appropriate Assessment of Horsham District Councils Core Strategy, 2007;
- Habitat Regulations Assessment of the Crawley Borough Council Core Strategy Review DPD, Initial Screening Report, May 2009;
- Habitats Regulations Assessment Scoping Report For Mid Sussex District Council Core Strategy Pre-Submission Document January 2008; and
- Revised Appropriate Assessment of the Core Strategy for Reigate & Banstead, August 2009.

3.4 Current / Potential Strategic Allocations

3.4.1 Strategic Housing Sites

In order to meet the SEP requirement to provide 36,000 new homes in the sub-region by 2026, the sub-regional authorities have worked to identify a number of strategic site allocations in their existing development plans, with further strategic opportunities to be explored and/or formally allocated through the currency of the Core Strategy adoption/review process. An overview of the current status of these sites is provided in Table 3.4.

3.4.2 Strategic Employment Land⁴

The CBC Core Strategy identifies a net requirement for a total of 280,000m² additional floorspace in the Borough during the period 2001-2016. This requirement and the net quantum of employment floorspace required beyond 2016 will be assessed as part of the emerging Core Strategy Review.

The HDC Core Strategy policy CP10 requires the provision of 210,000 m² of employment floorspace in the District within the period 2001 – 2018. This requirement and the amount of floorspace required beyond 2018 and on into the next plan period to 2026 will be reviewed as part of the emerging Core Strategy review.

Evidence prepared for the MSDC Core Strategy suggests a requirement of 18ha of employment land will be required in the period up to 2026. The main focus of this provision will be at the three towns of Burgess Hill (8ha), East Grinstead (4ha) and Haywards Heath (1.7ha) with the rest to be spread across the minor settlements within the District. This evidence has been worked up into policy within the current draft Core Strategy (at Proposed-submission stage). Although the Core Strategy is not adopted as yet, policies within it should be in conformity with the evidence base work prepared.

The RBBC Core Strategy is currently going through examination. The latest suggested amendments of the Core Strategy identify Redhill and Horley as areas that will deliver the largest levels of employment land. In Redhill, the Council will allocate 40,000m² of additional floorspace, of which 30,000m² will be delivered through identified sites in the Redhill Area Action Plan. Horley will be allocated 12,200m² of office floorspace with a further 1,000m² to nearby Salfords. Smaller amounts of employment land will be allocated the areas of Banstead and Reigate. Banstead will deliver 2,000m² to increase capacity of existing locations and Reigate will deliver 2,500m² of additional office floorspace, delivered through the intensification and re-use of existing sites.

An overview of the current status of these sites is provided in Table 3.5.

⁴ For further information please see the Employment Land Review Part 1, undertaken by GL Hearn on behalf of Crawley Borough Council, Horsham District Council and Mid Sussex District Council.

Table 3.4 – Current/Potential Sub-Regional Strategic Housing Allocations

Site	Council	Yield	Status	Comments
North East Sector	Crawley	1,900*	Allocated	*Following a planning inquiry held in June 2009, the Secretary of State has issued an interim decision indicating that the appeal will be allowed. A formal decision is to be issued in 2010. Should the appeal be allowed, the Council will consider whether the yield of this site should be increased. It should be noted that the Core Strategy allocates this site for 2,500 dwellings.
Town Centre North	Crawley	800**	Allocated	**The Core Strategy identifies that TCN will provide 800 residential dwellings, though this figure is under review as part of the Core Strategy Review.
Haslett Avenue (Former Leisure Centre)	Crawley	784	Permitted, under construction	
Lucerne Drive	Crawley	107	Permitted, under construction	
Ifield Community College	Crawley	170	Allocated	
Thomas Bennett	Crawley	200	Allocated	
Dorsten Square	Crawley	160	Allocated	
Haslett Avenue/Telford Place	Crawley	312	Allocated	
Three Bridges Corridor	Crawley	n/a	Designated in Core Strategy. Identified in SHLAA	
West of Pegler Way (Southern Counties)	Crawley	218	Not formally allocated. Identified in Town Centre Wide SPD as Opportunity Site. Also identified in SHLAA	Planning permission granted for development of 218 flats with accompanying crèche, gym.
Station Way	Crawley	110	Not formally allocated. Identified in Town Centre Wide SPD as Opportunity Site. Also identified in SHLAA	
Land East of Brighton Road	Crawley	1,400	Identified in SHLAA	
Land East of Tinsley Lane	Crawley	100/150	Identified in SHLAA	
The Broadway/Cross Keys	Crawley	75 (with potential for greater density)	Identified in SHLAA	

Crawley College Site	Crawley	100	Identified in SHLAA	
Crawley Hospital	Crawley	110	Identified in SHLAA	
West Sussex County Council Professional Centre	Crawley	80 (with potential for greater density)	Identified in SHLAA	
West of Ifield	Crawley	2,500	Identified in SHLAA	
West of Crawley	Horsham	2,500	Allocated through Policy CP6 in current Core Strategy	Application expected in Spring 2010
West of Horsham (East of A24)	Horsham	1,000	Allocated through Policy CP7 in Core Strategy 2007	Application for mixed use development including 1,044 units received from Berkeley Homes, decision anticipated summer 2010
West of Horsham (West of A24)	Horsham	1,000	Allocated through Policy CP7 in Core Strategy 2007	Application for 963 residential units received from Countryside Properties, decision anticipated late summer 2010
West of Ifield	Horsham	Potential capacity for 3,000 dwellings	Not allocated*	* Sites identified in 'Leading Change in Partnership' Consultation Document September 2009 as potential strategic development site options. Not all of these sites will be taken forward to the Preferred Strategy stage.
Faygate	Horsham	Potential capacity for 2-3,000 dwellings	Not allocated*	
Holbrook Park	Horsham	Potential capacity for 1,500 dwellings	Not allocated*	
Chennels Brook	Horsham	Potential capacity for 2,000 dwellings	Not allocated*	
Chesworth Farm	Horsham	Potential capacity for 1,500 dwellings	Not allocated*	
West of Southwater	Horsham	Potential capacity for 2,750 dwellings	Not allocated*	
East of Billingshurst (not within study area)	Horsham	Potential capacity for 1,750 dwellings	Not allocated*	
Adversane / North Heath (not within study area)	Horsham	Potential capacity for 4,000 dwellings	Not allocated*	
West of Pulborough (not within study area)	Horsham	Potential capacity for 280 dwellings	Not allocated*	
Land east of Kings Way, Burgess Hill	Mid Sussex	Potential capacity for 700 dwellings	Not allocated**	

Land between Gravelye Lane and Scamps Hill, Lindfield	Mid Sussex	Potential capacity for 528 dwellings	Not allocated**	identified are subject to change as this document progresses.
North / North West of Burgess Hill : 'Northern Arc'	Mid Sussex	Potential capacity for 3,800 dwellings	Not allocated**	
Land West of East Grinstead	Mid Sussex	Potential capacity for 570 dwellings	Not allocated**	
Broad Location to the North West of Haywards Heath	Mid Sussex	Potential capacity for 300 dwellings	Not allocated**	
Crabbet Park	Mid Sussex	Potential capacity for 2,300 dwellings	Not allocated**	
Keymer Brick and Tileworks, Burgess Hill	Mid Sussex	475 dwellings	Allocated, outline permission granted	
Bolnore Village: Phases 4 and 5	Mid Sussex	685 dwellings	Allocated, outline permission granted on appeal	
Horley North East Sector	Reigate and Banstead	710	Under construction	First of three phases underway
Horley North West Sector	Reigate and Banstead	1510	Permitted, under construction	Section 106 to be finalised by April 2010. First completions expected in 2010/15
Horley Town Centre	Reigate and Banstead	255	Allocated	Housing delivered through several mixed use development schemes

Table 3.4 – Current/Potential Sub-Regional Strategic Housing Allocation

Table 3.5 – Current/Potential Sub-Regional Strategic Employment Allocation

Site	Council	Site Area	Status	Comments
North of Manor Royal Opportunity Areas	Crawley	2.5ha & 5ha	Allocated	
Land adjacent to Belmont House (Southgate Avenue)	Crawley	0.3ha (approx)	Identified as Opportunity Area in TCW SPD	Opportunity Area for Employment/Housing
Gatwick Green	Crawley	63ha	Site Being Promoted	
GlaxoSmithKline Site, Manor Royal	Crawley	12ha (excluding open space provision)	Opportunity Site	
Thales East Sites, Manor Royal	Crawley	5ha	Opportunity Site	
BOC Edwards Site	Crawley	4ha	Opportunity Site	
Gatwick City Place	Crawley	3.3ha	Opportunity Site	
Segro West (Manor Royal Gateway)	Crawley	2ha	Opportunity Site	
Premiere House	Crawley	0.9ha	Opportunity Site	
Warnham & Wealden Brickworks	Horsham	24.4 hectares	Allocated in Site Specific Allocations of Land DPD	This site is allocated for employment use through the comprehensive redevelopment of an existing industrial complex which already contains a significant amount of employment floorspace. As such, the net increase in employment provision is likely to be negligible.
Lifestyle Ford, Bishopric	Horsham	1.4 hectares	Allocated in Site Specific Allocations of Land DPD	Allocation is part of a wider allocation for residential, commercial use and open space
West of Horsham	Horsham		Allocated through Policy CP7 in Core Strategy 2007	Allocated as part of wider housing allocation for 2,500 new homes. Outline application received from Countryside Properties for western part of the site from Berkeley Homes for eastern part of site in November 2009. A decision is anticipated for both applications in summer 2010 .
West of Crawley	Horsham		Allocated through Policy CP6 in Core Strategy 2007	Allocated as part of wider housing allocation for 2,000 new homes (Application expected in Spring 2010)
North Horsham (Holbrook Park)	Horsham	58 hectares	Not allocated*	* Sites identified in 'Leading Change in Partnership' Consultation Document September 2009 as potential strategic development site options. Further work

North Horsham (Chennells Brook)	Horsham	121 hectares	Not allocated*	is being undertaken to ascertain whether these sites will be taken forward to the Preferred Strategy stage.
Land to the south of Maltings Park, Burgess Hill	Mid Sussex	1.8ha	Local Plan designated	
Land between Pookebourne stream and York Road West, Burgess Hill	Mid Sussex	0.5ha	Local Plan designated	
Christopher Road, East Grinstead	Mid Sussex	0.3ha	Local Plan designated	
King Street / Christopher Road / London Road, East Grinstead	Mid Sussex	2.3ha	Local Plan designated	
Haywards Heath Station, Haywards Heath	Mid Sussex	2.5ha	Local Plan designated	
Bolney Grange, Bolney	Mid Sussex	3.5ha	Local Plan designated	
Borers Yard, Copthorne	Mid Sussex	0.8ha	Local Plan designated	
Hassocks Goods Yard, Hassocks	Mid Sussex	0.2 – 0.4ha	Local Plan designated	This site is allocated in the Local Plan (2004) for 1.19ha. This has subsequently been superseded by a residential allocation in the Small Scale Housing Allocations DPD (2008), however 0.2-0.4ha remains allocated for employment use.
Rowfant Business Centre, Rowfant	Mid Sussex	2.72ha	Local Plan designated	
Land at High Grove, Imberhome Lane, East Grinstead.	Mid Sussex	2.26ha	Local Plan designated	
Burgess Hill	Mid Sussex	Up to 8ha	Not allocated**	** These broad areas have been identified in the draft Proposed-submission Core Strategy (2009), based on the findings of the Employment Land Review (Part 1). The Employment Land Review Part 2 will help to identify specific site options where these requirements can be met.
East Grinstead	Mid Sussex	4ha (approx)	Not allocated**	
Haywards Heath	Mid Sussex	1.7ha	Not allocated**	

Holmethorpe Industrial Site, Redhill	RBBC	170,000 sq. meters (Approx site area)	Local Plan designated	
Horley Area	RBBC	12,200m ² floorspace	Core Strategy designated	
Redhill Town Centre area	RBBC	40,000m ² (30,000m ² Redhill Area Action Plan) floorspace	Area Action Plan (AAP) designated/potential for inclusion in AAP	
Reigate Town Centre	RBBC	2,500m ² floorspace	Core Strategy designated	
Salfords Industrial Estate/Aggregate Depot	RBBC	230,000 sq. meters (Approx. site area)	Local Plan designated	

4.0 Water Cycle: Environment, Infrastructure, Constraints and Recommendations

4.1 Introduction

This section investigates the current situation within the study area with regards to the water environment. It is important to establish the baseline information that exists with respect to the environment and infrastructure in order to be able to assess the possible impacts on these from new development within the study area. By establishing the baseline, a judgement can be made on existing capacity of the water environment and associated water/wastewater infrastructure, as it will be preferable to maximise use of existing facilities where possible without causing negative effects upon the existing water environment.

Data within this section is largely derived from existing documentation produced and published by the EA, Water Companies and contributing authorities. To assist in the reading of this document, the majority of discussion in this Chapter is discussed on a river catchment basis, with details of the three river catchment areas set out under Section 4.4. The exception to this relates to consideration of the current water infrastructure provider positions (water supply and wastewater), which have been considered on the basis of the water companies provision areas.

4.2 Climate

The climate in the south east region is mild in comparison with the rest of the British Isles. Average daytime temperatures are around 9°C and annual sunshine durations exceed 1550 hours. The area is also characterized by low rainfall, with little change in the average of between 25 and 30 inches (630 and 760 mm) throughout the year. In winter the wettest parts of the region are over the Downs which see approximately 35-40 wet days on average. The region is also susceptible to summer thunderstorms which could result in flooding and extensive dry periods which place demands on water supplies and require conservation measures such as summer hosepipe bans. (Source met office.gov.uk) Evapo-transpiration in the summer months often exceeds rainfall totals for this period causing water resources to diminish. However rainfall during the winter is generally sufficient to recharge reservoirs thereby offsetting the seasonal imbalance.

4.3 Geology & Groundwater Sources

The geology of the study area is varied. The High Weald area (in which the study area lies) consists of sandstones and mudstones overlain by the relatively impermeable Weald Clay and Tunbridge Wells sandstones and clays.

The Chalk and Lower Greensand aquifers, classified as Major Aquifers by the EA, underlie the Weald Clays. These two aquifers represent the areas most important water resource providing numerous springs and streams which support surface water flows.

The River Mole Catchment rises on the Weald Clay and from small springs situated on the north facing slopes of the Hastings Bed in the Ruser Area. The Mole's tributaries, most notably including the Ifield Brook, rise on the Tunbridge Wells Sands/Weald Clays located to the south, feeding the river as it flows north over the Weald Clay. The Gatwick Stream, sourced from the Tunbridge Wells sands, flows over the Weald Clay, before joining the Mole at north west Horley.

The River Ouse Catchment is formed on a Tunbridge Wells Sand base, with small pockets of Wadhurst Clay, the Adur Catchment predominantly on Weald Clay.

4.4 Rivers

There are three main river catchments (along with their tributaries) within the study area, The Adur & Ouse Catchment; the Arun & Western Streams Catchment and the Upper Mole Catchment. These catchments are illustrated in Figure 4:

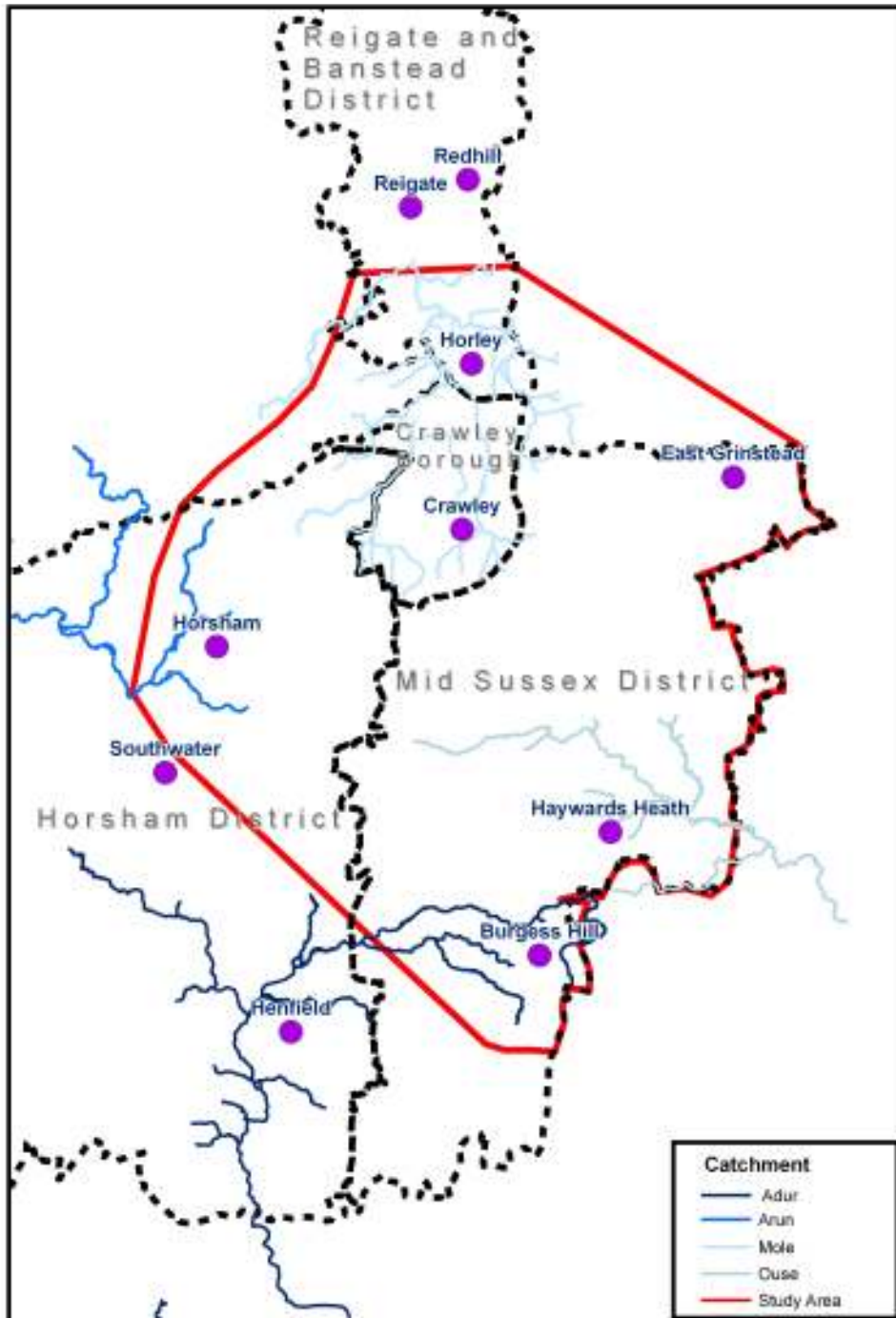


Figure 4.1: Map of Study Area Including River Catchments (Source: EA Main River Centrelines)

Adur and Ouse Catchment

The upper and western branch of the River Adur flows south within the south-eastern portion of Horsham District. A further tributary meets the Adur north of Henfield, with its source on the eastern boundaries of Burgess Hill within Mid Sussex District. The Adur is highly 'flashy', responding quickly to rainfall events and having low summer flows. This is predominantly due to the impermeable Weald Clay, which underlies most of the catchment. The catchment also contains the Brighton Chalk, a major aquifer unit. The Adur is fed by perennial springs emanating from the northern scarp slope of the Brighton Chalk. This can provide a limited quantity of baseflow to some tributaries of the river.

The River Ouse flows eastwards from its source in Lower Beeding skirting the northern boundary of Haywards Heath. It then gradually flows southwards, outside of the boundary of the study area, joining the River Uck just south of Uckfield, before flowing through Lewes and the South Downs towards the English Channel at Newhaven. The Ouse is also characterised by its underlying Weald Clay, making it 'flashy' and prone to winter flooding. This is exemplified by the floods in Uckfield and Lewes, although there have been no similar flood events of this scale and nature within the study area. Flows are also naturally low in summer months and abstraction can be unreliable.

River Arun Catchment

The Upper and Eastern Arun is the reach of the River Arun which flows east to west through the study area towards Rudgwick. Here it meets the main channel of the Arun and flows south through the rest of Horsham District. The source of the River Arun is located at St Leonard's Forest, near Horsham town and is approximately 120m AOD⁵. Like much of the River Arun, this reach has a 'flashy' nature and responds quickly to heavy rainfall events due to the underlying impermeable Weald Clay and steep topography. The Upper Arun collects water from the High and Low Weald, which mainly comprises of low permeability Weald Clay and transfers it downstream to the confluence with the River Rother at Pulborough. (*Source: Horsham District SFRA*)

River Mole Catchment

The River Mole Catchment covers an area of 512km², with the Upper Mole area being of particular relevance to the study area, encompassing the towns of Crawley and Horley. The Mole flows north from its source in the North Sussex hills near Rusper, where it is fed by a number of tributaries, most notably the Ifield Brook. The Gatwick Stream flows north from its source at the Tunbridge Wells sands and is joined by Tilgate Brook at Crawley before skirting east of the Borough to converge with the Mole south of Horley. The other main watercourses in the area are the Burstow Stream, which flows north from its source at Crawley down to join the Mole at Meathgreen in the north-west of Horley and the Redhill Brook which skirts Reigate and joins the Salfords Stream. The Redhill Brook is considered a CAMS river as it has the potential for abstractions. The predominantly urban nature of Crawley, Horley and Gatwick Airport accentuates run-off in the Upper Mole Catchment area, resulting in a 'flashy' catchment that responds quickly to rainfall events.

⁵ Above Ordinance Datum

4.5 Water Supply

The study area is supplied by three water companies, as follows:

District/Borough	Water Supply Provider
Crawley Borough	Southern Water
Horsham District	Southern Water
Mid Sussex District (south of East Grinstead)	South East Water & Southern Water (Pyecombe area only)
Mid Sussex District (north of East Grinstead)	South East Water
Reigate & Banstead Borough	Sutton & East Surrey Water

Information on Water Supply can be found in each water providers WRMP. There are three WRMPs relevant to the study area:

Southern Water - Water Resource Management Plan

Southern Water is responsible for water supply in Crawley Borough, Horsham District and the Pyecombe area of Mid Sussex. It also provides wastewater treatment for much of the Horsham District and the area of Mid Sussex south of East Grinstead. In order to best direct the provision of water in the region, Southern Water apply a 'twin-track' approach to management. This is centred on the parallel objectives of reducing water demand through demand management (for example, metering, reducing leakage and encouraging water efficiency) and also through ensuring sufficient supply via the development of new sources, inter-zonal transfers, or inter-company bulk supplies as required. This approach is developed in Southern Water's WRMP October 2009, which sets out how the company propose to ensure that a sufficient supply of water is provided over the next 25 years.

The bulk of the Southern Water region's supply is sourced from groundwater (68%), the majority of which comes from the chalk aquifer that is commonplace across the region. River abstractions account for 28% of supply, most notably in the context of the study area, from the Western Rother. The remaining 4% of supply is sourced from surface water impounding reservoirs providing water supply for parts of Horsham and Crawley. As of October 2009, the main reservoir in the area, Weir Wood, was 99% full⁶

For the purposes of water resource planning, the Southern Water region has been allocated into three sub-regional areas, which are further sub-divided into ten Water Resource Zones (WRZ). The study area considered in this Scoping Study is situated in Southern Water's Central Sub-Region. This falls within the Sussex North WRZ and includes the towns of Crawley, Horsham and parts of rural Mid Sussex. The WRMP observes that the variety and distribution of water sources across the Central Sub-Region, combined with limited water storage capacity in the Sussex North WRZ, can make the area very susceptible to severe short-term drought events. Significant droughts occurred in the south east in 1989-92, 1995 and 2004-06, placing serious stress on water resources in the area and compromising the ability of ability of the company to meet its 'levels of service' (a target level of water supply to customers during dry years). Despite the well-stocked nature of the areas reservoirs, the Sussex North WRZ is identified within the WRMP as being subject to a supply demand balance deficit during AMP 5 (2010-2015), starting at 11 MI/d and reducing to 6MI/d at the end of the period. This means that there is a theoretical risk that, in the event of drought conditions occurring, water supplies would be placed under even greater risk, potentially necessitating the introduction of water restrictions.

In order to manage the supply/demand balance deficit for the Central Sub-Region, the WRMP sets out the Water Resources Strategy for the AMP5 period and beyond. In arriving at the strategy, Southern Water has afforded regard to a number of considerations, including the housing requirements of the SEP, climate change and environmental legislation. For the Sussex

⁶ At Crawley Study, October 2009

North WRZ, the Water Resources Strategy identifies the following requirements for the AMP5 period;

- A policy of universal metering throughout the area by 2015;
- The optimisation of inter-zonal transfers from the Sussex Worthing WRZ to Sussex North WRZ;
- The renewal of the existing bulk supply contract from Portsmouth Water to Sussex North WRZ;
- Asset improvement schemes for groundwater sources (0.30 MI/d peak, 0.10 MI/d average);
- The development of a new surface water source enabled by abstraction from the tidal stretch of the River Arun (South of Pulborough), with an associated small raw water storage reservoir and pumping and pipework infrastructure to link with the existing water supply works at Hardham. A separate scheme would involve the upgrading of the existing water main between Hardham and Stopham. Planning consent and the abstraction licence have been granted and it is anticipated that the source will be commissioned by 2012.

In order to ensure that an element of flexibility is incorporated into the Water Resources Strategy for the Central Sub-Regional area, sensitivity analysis has been undertaken to consider a 'worst-case' scenario that could worsen the supply demand balance. Under the 'worst-case' scenario, the timing of the Arun abstraction would remain the same, though a small amount of additional leakage reduction would be required in the Sussex North and Sussex Worthing WRZ to meet the increased demand. Beyond the AMP5 period, no further interventions are proposed for the Sussex North WRZ and Southern Water is satisfied that the supply demand balance can be met through the optimisation of inter-zonal bulk transfers and through the benefits of supply and demand side interventions made during AMP5⁷. To this end, it is considered that the proposed works programme provides sufficient headroom for growth and uncertainty to ensure that service capacity is available to meet housing figures proposed in the SEP⁸. Therefore, it is not envisaged that water supply will be a constraint to strategic development at Crawley, despite the pressure on water resources at the regional level.

South East Water - Water Resource Management Plan

South East Water is responsible for the water supply within the Mid Sussex area of the study, apart from the most southerly section which includes Pyecombe, which is supplied by Southern Water (as described above). Like Southern, South East Water also apply a twin-track approach to management, with their objectives focussed on developing new sources of water at the same time as initiatives to reduce the demand for water. The increased development pressures on the water supply infrastructure have led to two key elements of work; reducing leakages and implementing water metering, to reduce inefficiencies and maximise consumption from the existing resource. It has been demonstrated that leakage is a major area of concern, however South East Water have reduced the amount of leakage by 30% over the last ten years and are currently operating slightly below their Sustainable Economic Level of Leakage (SELL). Further leakage reductions are considered as part of their Water Resource Management Plan (draft January 2010).

The Mid Sussex area covered by this Scoping Study is entirely within South East Water's Resource Zone 2. South East Water's strategy (up to 2020) for Resource Zone 2 makes use of existing inter-resource zone transfers in early years with small improvement works to existing groundwater sources. Post 2020, South East Water's options appraisal modelling identifies a local winter storage reservoir as the preferred solution, identifying a site at Clay Hill, Ringmer (outside the study area). Other possible sites within the Ouse catchment could also meet the same need and could match or better the criteria used in the model – detailed studies will be required.

⁷ Southern Water Resource Management Plan, October 2009.

⁸ Crawley Core Strategy Review Southern Water Position Statement, July 2009

Both options – winter storage and regional transfers, would maintain the supply-demand balance in Resource Zone 2 and Resource Zone 3 through to the end of the 25 year planning period. Further work will be required during AMP5 to assess these options, as well as alternatives. (Source: South East Water draft WRMP, 2010). As of October 2009, the main reservoir in the area, Ardingly, was 95% full.

Sutton & East Surrey Water - Water Resource Management Plan (February 2009)

Sutton and East Surrey (SESW) supplies water to households and businesses within three London Boroughs, five Boroughs within Surrey and the Boroughs of Sevenoaks in Kent and Crawley in Sussex. There are two Water Resource Zones (WRZs) within the supply area, the Sutton WRZ and East Surrey WRZ. Approximately 85% of the Company's water is supplied from groundwater sources within three separate aquifer units:

- North Downs Chalk;
- Mole Valley Chalk; and
- Lower Greensand.

SESW also operates one surface water source at Reservoir A, supplied by a pumped river abstraction.

SESW supplies water to approximately 275,000 properties, of which approximately 23% are currently measured. The majority of water supplied by the SESW is for domestic household consumption which increases significantly during dry summer periods, resulting in peaking factors of up to 1.5 for unconstrained demand.

The Company has sufficient resource to meet average demands but a deficit in resources to meet peak demands (in a dry year). The Company's WRMP identifies a twin track approach to meeting growth in demand. The twin track approach relies upon demand management to control growth in demand from both new and existing properties. Sutton and East Surrey's demand management programme includes leakage control, pressure management, replacement of mains, metering and promoting customer awareness of the need to use water wisely. In addition, the Company proposes to increase the capacity of its Bough Beech treatment works and to make network improvements, which together with the proposed demand management measures, will enable it to overcome its existing peak resource deficit and to meet peak and average demands till 2035.

4.5.1 Potential Constraints to Development and Recommendations

It is evident that many areas of the south east are currently under significant levels of water stress, a situation that is reflected in the respective WRMPs of the three water supply companies serving the Study Area, which each identify a water supply/demand balance deficit during the AMP5 period. Whilst a shortage of water supply would represent a constraint to development over the plan period, the water suppliers remain confident that this risk can be appropriately managed through the twin-track approach to ensure that sufficient water capacity is available to serve the quantum of development identified in the South East Plan. As such, it is not currently anticipated that water supply should act as a constraint to development in the study area over the plan period to 2026, though it is recommended that this position should be reviewed in detail through the Outline Water Cycle Study, particularly within a context of development phasing across the sub-region.

4.6 Water Resource Management and Abstractions

To manage water resources effectively at a local level, the EA uses Catchment Abstraction Management Strategies (CAMS), 6-year plans that consider the availability of both surface water and groundwater in an attempt to gain a better understanding of how much water is available and where it is located.

There are three CAMS relevant to the study area;

- The Arun and Western Streams CAMS
- The Adur and Ouse CAMS
- The River Mole CAMS

The CAMS are used to demonstrate the availability of water resources for consumptive purposes within a river catchment. To express this, a classification system is used which provides information on the 'resource availability status' of an individual reach of river. This status indicates;

- The relative balance between committed and available resources;
- The river reaches where water is available for further abstraction (and therefore where licences are likely to be available); and
- The river reaches where abstraction needs to be reduced.

There are four categories of resource availability status, as shown in Table 1:

Indicative Resource Availability Status	Definition (relating to the availability of water for abstraction licences – generally at low flow)
Water Available (Blue)	Water likely to be available at all flows including low flows. Restrictions may apply
No Water Available (Yellow)	No water available for further licensing at low flows although water may be available at higher flows with appropriate restrictions
Over Licensed (Orange)	Current actual abstraction is resulting in no water available at low flows. If existing licences were used to their full allocation they would have the potential to cause unacceptable environmental damage at low flows. Water may be available at high flows with appropriate restrictions
Over Abstracted (Red)	Existing abstraction causing unacceptable damage to the environment at low flows. Water may still be available at high flows with appropriate restrictions.

Table 4.1: CAMS Resource Availability status categories

Water can be abstracted from the earth in two ways; through groundwater abstraction which involves the removal of water from underground aquifers (e.g. the Chalk and Lower Greensand in the A&WS area) and through surface water abstractions from reservoirs and river systems. In order to measure, manage and regulate water effectively, catchments are broken down into smaller areas with similarities in characteristics. In areas where groundwater resources are significant 'Groundwater Management Units' (GWMUs) are defined and where surface water is more dominant 'Assessment Points' (APs) are located at specific locations on the river network. Both GWMUs and APs are used to assess water resource availability. Water Resource Management Units (WRMUs) are used to manage water at a river catchment or sub-catchment level. They include all major abstractions and are derived from the individual river reaches and their associated APs and GWMUs, however some WRMUs can have no associated AP's if they are groundwater dominated.

The following section provides an overview of the current levels of abstraction taking place within the study area and sets out the current water availability status of WRMUs within it (as defined in the relevant CAMS documents).

Adur and Ouse

Total licensed abstraction in the Adur and Ouse (A&O) Catchments amounts to 231ml/d, around 20% of the areas average effective rainfall. Approximately 98% of the licensed groundwater abstraction is for public water supply, the remaining 2% used for industrial and agricultural purposes. With regards to surface water abstraction 94% is for public water supply, 4.4% for aquaculture, 1.5% for agricultural purposes and 0.1% for industry.

Figure 4.2 shows the licensed surface water abstraction in the A&O CAMS area.

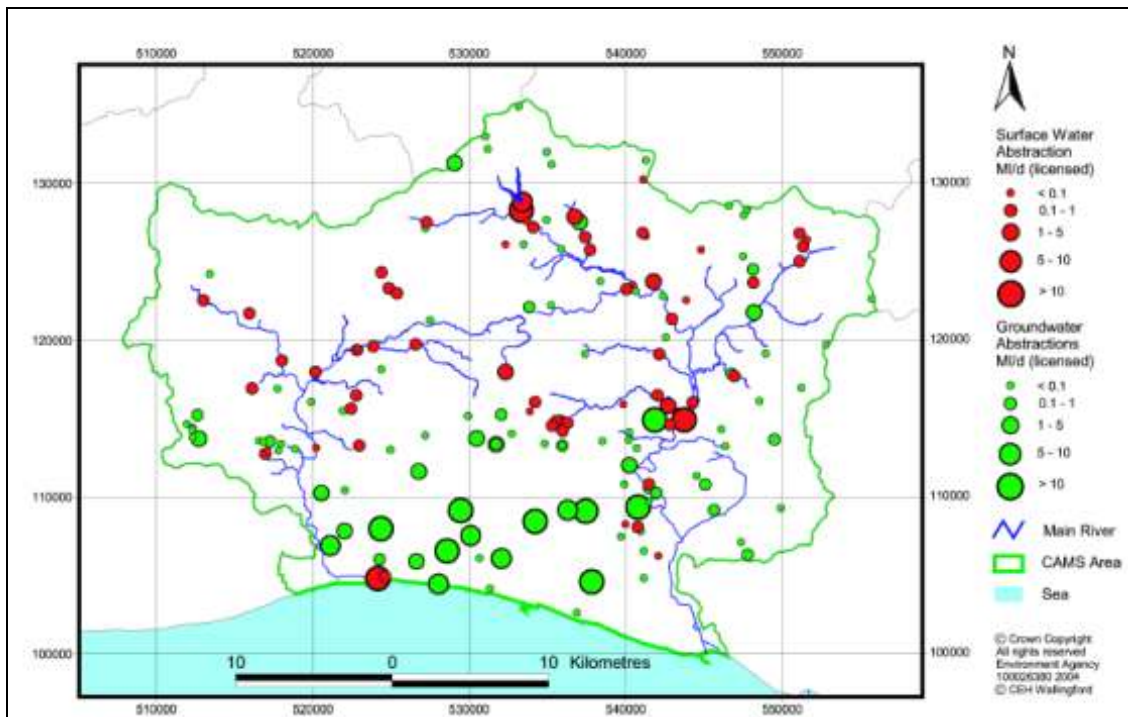


Figure 4.2: Licensed abstraction in the Adur and Ouse CAMS Area (Source: Environment Agency Adur and Ouse Catchment Abstraction Management Strategy, 2005)

The main concern is the impact of abstraction from streams fed from springs arising from the Brighton Chalk aquifer. Research undertaken prior to publication of the CAMS document suggested that abstraction may have been the cause of depressed ecological quality at a number of Chalk stream sites within the Adur catchment. Further work should be undertaken to prove the link between the two and to ensure that abstraction from these sites are sustainable. This has the direct effect of time-limiting new and varied licenses to 2018.

The A&O CAMS was produced in 2005 prior to the publication of the SEP (2009), so the effect of new development on the catchment is speculative. However, the scale of growth forthcoming from the SEP was assumed to be higher than those proposed in its predecessor, RPG9 – Regional Planning Guidance for the South East which is correct.

With the increasing requirement to provide new homes, the SEP identifies Burgess Hill and Haywards Heath as having potential for focussing large-scale strategic development towards them. Both of these settlements are within the A&O CAMS area, which was taken into account when preparing the SEP, hence the requirement for a WCS to be undertaken due to concerns about water availability within the Gatwick sub-region. Water companies within the A&O CAMS area are investigating future reservoir development, sharing resources between water companies and effluent reuse (specifically the reuse of effluent currently discharged to coastal water). It is also stressed that water efficiency campaigns and improvements to new-build building regulations will be important to make best use of existing supply. (Source: A&O CAMS, 2005)

Three WRMUs identified within the Adur and Ouse (A&O)CAMS are relevant to the study area. The River Adur WRMU (WRMU2) covers the southern half of Horsham and the southern half of Mid Sussex (the majority of the District south of Haywards Heath). The River Ouse WRMU (WRMU1) covers the rest of Mid Sussex, apart from a very small section which is covered by the Cockhaise Brook WRMU (WRMU3) to the north of Haywards Heath.

WRMU1 (River Ouse) – Water Available

WRMU1 is assessed at two APs, one of which (Sakeham) is within the study area. The WRMU is rural in character with little resource demand aside from public supply. The river is naturally 'flashy' and due to the impermeable geology, surface water flows dominate. Large discharge from the Goddards Green Wastewater Treatment Works (WwTW) mean significantly enhanced summer flows on the eastern branch, which is in excess of abstraction levels from this reach. The western branch has very little abstraction, with natural river flows ensuring there is an excess of water required by the environment.

WRMU2 (River Adur) – No Water Available

WRMU2 is assessed at seven APs, of which only one (Ardingly AP) is within the study area. It is predominantly a rural catchment, although does contain the main town of Haywards Heath and other small villages within the study area and beyond.

The river's hydrological regime is dominated by a large public water supply abstraction operated by South East Water, immediately upstream of the AP at Barcombe Mills just outside of the study area. The abstraction is supported by augmentation releases from Ardingly Reservoir, which in turn affects the river reaches to Gold Bridge and Barcombe Ultrasonic APs.

Most of the APs report Water Available, however the lowermost AP at Barcombe Mills was assessed as having No Water Available. This is critical, as it means the assessment of all upstream APs have been downgraded to No Water Available to recognise the need to maintain flows to this river reach. Furthermore, although there is water available at two further APs, this is due to the augmentation releases from Ardingly Reservoir and further abstractions would not be permitted.

WRMU3 (Cockhaise Brook) – Over Licensed

There are no APs within the study area- this WRMU is small in comparison to the others for this catchment and only covers a small area of Mid Sussex within the boundary of the study area. There are two current abstractions for public water supply although both were not fully utilised at the time of publication of the CAMS (2005). However, if abstraction were to increase to full licensed limits, there is potential for river flows to be reduced below the minimum required for the environment. This WRMU has therefore been classified as Over Licensed.

Arun and Western Streams

Total licensed abstraction in the Arun and Western Streams (A&WS) CAMS area amounts to approximately 440 Ml/d. This is about 30% of average effective rainfall. Approximately 56% of licensed abstraction is for public water supply, 31% for industry and about 13% for agriculture.

Just under half of the water abstracted in the A&WS CAMS area (45%) is lost from the catchment and discharged directly into the sea via long-sea outfalls. The remaining 55%, (approximately 145 Ml/d) is treated and discharged to the rivers and streams.

The licensed surface water abstraction in the A&WS CAMS area is shown in Figure 4.3.

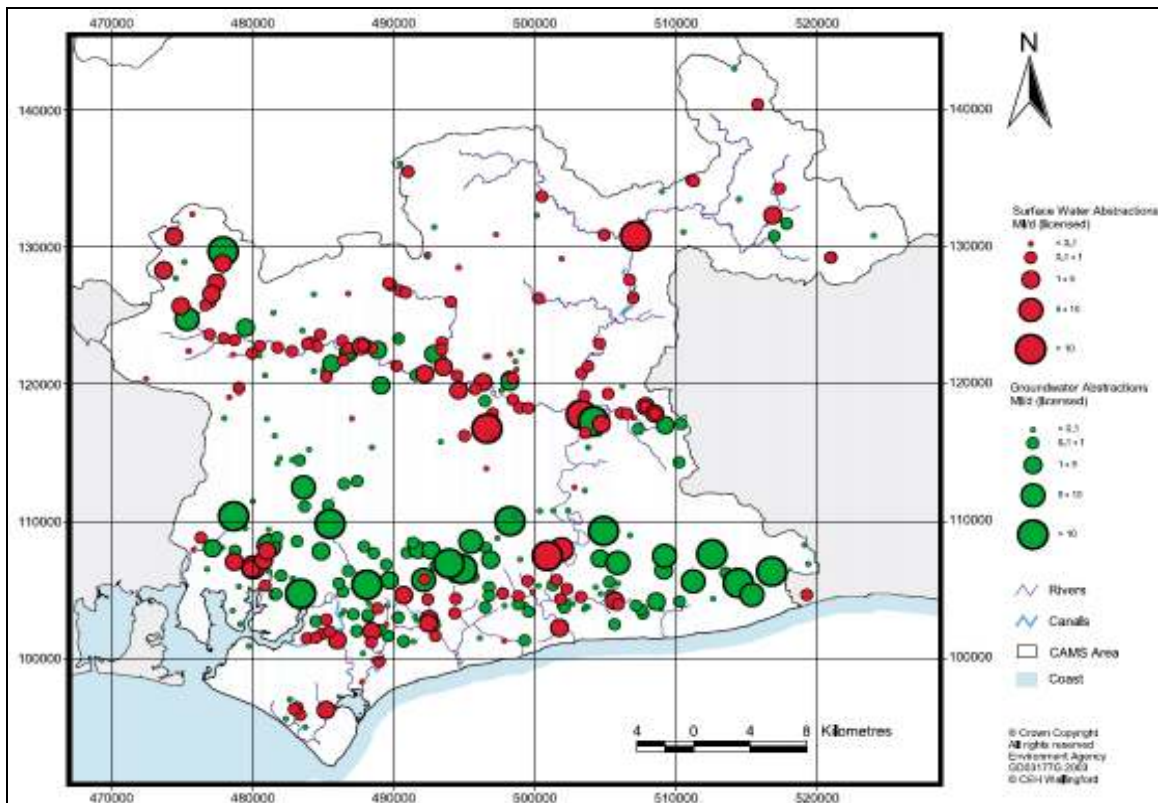


Figure 4.3: Licensed abstraction in the A&WS CAMS Area (Source: Environment Agency Arun and Western Streams Catchment Abstraction Management Strategy, 2003)

Two major aquifers, the Chalk and Lower Greensand underlie much of the A&WS (A&WS) CAMS area. These aquifers represent the areas most important water resource providing numerous springs and streams which support surface water flows and feed internationally important sites such as the Arun Valley Special Protection Area (SPA) and Ramsar Site.

Although the area suffered from significant flooding in 1993/94 and 2000/01, pressure from new development and rising demand from householders is increasing the need for water. The EA believed resources are already finely balanced within the A&WS CAMS area to meet the demands of existing abstractions and the need to protect river flows to meet environmental requirements. The EA is therefore against any further abstraction from the Chalk and Lower Greensand aquifers and from rivers during the summer months. (Source: A&WS CAMS, 2003)

The Arun and Western Streams (A&WS) CAMS covers a wide area in which only one WRMU, the Upper Arun WRMU (WRMU1) is relevant to the study area.

WRMU1 (Upper Arun) – Water Available

This area is essentially a rural area with little demand on water resources. Surface water flows dominate and there are no significant aquifers. The Arun also has enhanced summer flows due to the large discharge from Horsham WwTW. The study area includes one AP known as the Alfolddean AP and the Pallingham AP is located further downstream. Although there are no GWMUs within the Arun catchment, there are three GWMUs south of the study area within The Worthing Chalk, The Lower Arun Greensand and the Hardham Lower Greensand.

The Pallingham, Alfolddean and Drungewick (located on the neighbouring Loxwood stream) APs were all assessed and all three were shown to have water available, therefore WRMU1 is defined as having Water Available at present.

Mole Catchment

At the time of the EA's last Catchment Abstraction Management Strategy (July 2007), a total of 44 abstraction licences had been granted in the River Mole catchment (Figure 5). These consents are licensed to abstract over 96MI/d, with the bulk of licensed abstractions (68%) sourced from groundwater sources, in particular the Chalk aquifer. The majority of licensed abstractions in the Mole Catchment are for public water supply (82%), though the rural nature of the catchment has meant that many abstractions are also related to agriculture, particularly crop irrigation (which may often be limited to the summer growing season) and also industrial uses such as gravel washing and cooling (Environment Agency, 2007). Within the context of the Upper Mole Catchment, licences are operational for the abstraction of surface water from the Gatwick Stream and groundwater abstractions adjacent to the River Mole and Gatwick Stream.

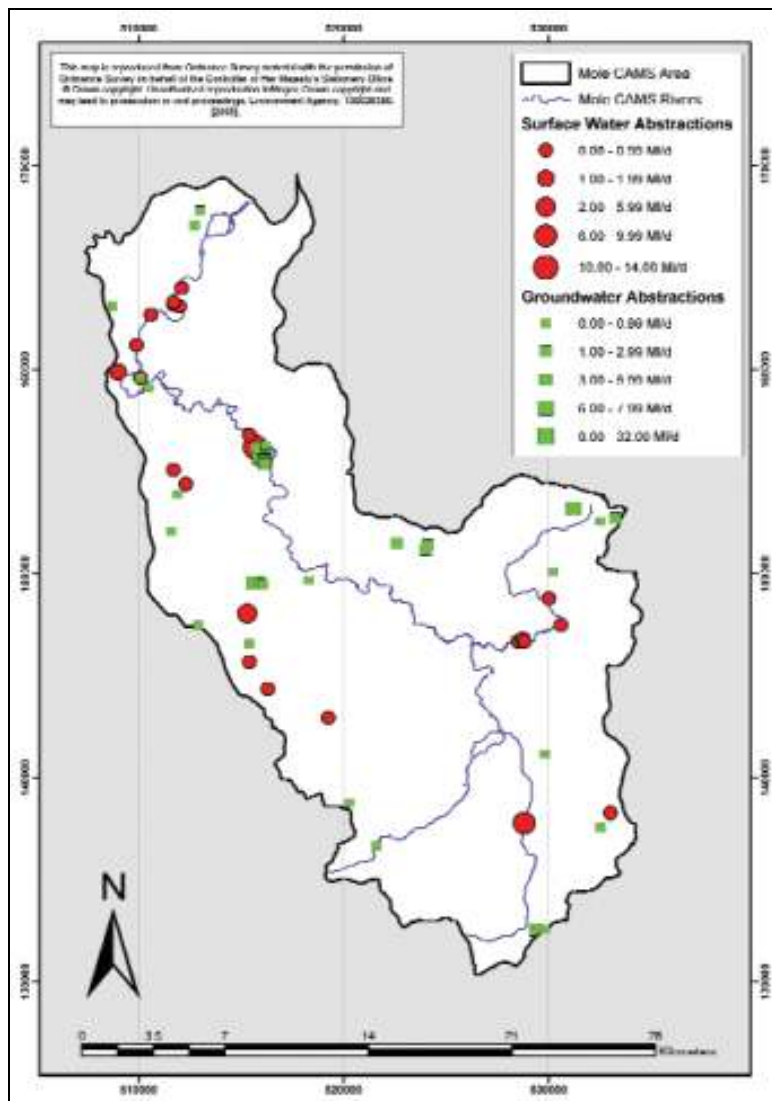


Figure 4.4: Licensed abstraction in the Mole CAMS Area (Source: Environment Agency Mole Catchment Abstraction Management Strategy, 2007)

The Mole CAMS identifies five WRMUs of which two are relevant to the study area- the Middle Mole and Upper Mole WRMU (WRMU2) and the Redhill Brook and Salfords Stream WRMU (WRMU3).

WRMU2 (Middle Mole and Upper Mole) – No Water Available

The Upper Mole Catchment, relevant to the northern part of the study area, is identified by the Mole CAMS as falling within WRMU2, Middle Mole and Upper Mole. The Middle and Upper Mole WRMU drains the urbanised areas of Crawley, Dorking and Horley and contains seven Sewage Treatment Works (WwTW). These can serve to enhance flows, particularly during summer months when approximately 74% of flow is effluent.

The Middle Mole and Upper Mole WRMU contains two APs which are of relevance to the study area. These are AP5, situated on the Gatwick Stream and AP6, which is located at the Upper Mole to the west. The Mole CAMS has assessed both APs within the study area as being of a Medium Sensitivity to abstraction. There are no GWMUs situated within the Upper Mole catchment, though four GWMUs are located beyond the study area to the north, namely, the Confined Lower Greensand, Confined Chalk, Unconfined Chalk and Lower Greensand. The Mole CAMS provisionally identifies the water resource availability status and groundwater status of the Middle and Upper Mole WRMU as being 'water available'. However, the CAMS also considers the cumulative impact of abstraction in this WRMU on the status of flows within the Thames Corridor. Consequently, following integration with the Thames Corridor CAMS both the water resource availability status and groundwater status of the Middle and Upper Mole WRMU has been over-ridden to 'No Water Available' status.

WRMU3 (Redhill Brook and Salfords Stream) – No Water Available

This WRMU covers the area of the Mole Catchment north of Horley and east/south east of Redhill and falls partly within the northernmost extent of the study area. The WRMU3 consists of the Redhill Brook, which rises near Warwick Wold and Salfords Stream, which is assessed at AP4. The Mole CAMS has assessed AP4 as being of a Low Sensitivity to abstraction and the two abstractions present in the WRMU are taken from surface water sources. WRMU3 is also home to a total of 3 Sewage Treatment Works and a partial area of the Mole Gap to Reigate Escarpment SSSI/SAC. There is some geographical overlap between the northern extent of WRMU3 and WRMU4 to the north, though as the latter is a standalone groundwater unit, there is no connection between the two. Though the local resource availability status of surface water in the Redhill Brook and Salfords Stream has been identified as 'water available', this status has been over-ridden to 'No Water Available' status following integration with the Thames Corridor CAMS.

4.6.1 Potential Constraints to Development and Recommendations

In terms of water resources, the three CAMS assessments relevant to the study area have indicated that parts of catchment are already 'Over-abstracted', whilst all tributary catchments supplying the River Thames (upstream of Teddington) of 'water available' status have been over-ridden to 'no water available' status in order to reflect the limited nature of water resources in the wider Thames Region. The Environment Agency has advised that this would in practice mean that they would not permit any increase beyond existing abstraction licences and that the requirements of all future development would therefore need to be met within the headroom of existing licences. This means that future growth cannot rely on new local resources being developed and new development will instead have to rely on greater efficiency in water use. The water provision companies remain confident that demand management can be met on this basis and it is not currently anticipated that water resource availability should represent a constraint to development. Notwithstanding this, given the current water stress within the region it is considered that this position should be reviewed through the undertaking of an Outline Water Cycle Study, particularly in terms of reviewing;

- Potential water resources within neighbouring areas and their spare capacity;
- Demand management measures which could be taken to improve water efficiency and usage rates; and
- Impact of climate change on water resources, both local and in the surrounding area.

4.7 Wastewater Treatment and Collection

Southern Water and Thames Water are responsible for the wastewater network in the Gatwick sub-region study area. The Sub-regional responsibilities are set out in Table 4.1;

District/Borough	Wastewater Treatment Provider
Crawley Borough	Thames Water
Horsham District	Southern Water & Thames Water
Mid Sussex District (south of East Grinstead)	Southern Water
Mid Sussex District (north of East Grinstead)	Thames Water
Reigate & Banstead Borough	Thames Water

Table 4.1: Wastewater providers within the study area

Crawley

Thames Water is responsible for wastewater treatment in Crawley and its surrounding villages, with the bulk of treatment undertaken at Crawley WwTW. The current Thames Water AMP outlines that capacity exists to serve development up to 2012, after which further works will be required to allow sufficient capacity to meet demand in the medium to long term. The site of the existing Crawley WwTW does not offer the potential for expansion, though Thames Water's Business Plan for the AMP5 period (2010-2015) includes provision for additional capacity to be made available at Crawley WwTW during this period. These upgrades will take approximately three years to complete and additional capacity will at best be available in 2013.

Having regard to sites with planning permission, existing strategic allocations and the development of a new neighbourhood west of Bewbush, it is expected that c. 5,100 homes will be delivered in the plan period to 2021 on sites in and around Crawley. In light of this, there is limited sewage infrastructure capacity (current or planned) to support further strategic development. Thames Water have identified (under a scenario that assumes no further windfall development in the built-up area), that existing sewage treatment capacity is only available to support the delivery of one strategic neighbourhood (designed on the neighbourhood principle) beyond the quantum of development identified above. In light of the Secretary of State's interim decision to allow an appeal at Crawley's North East Sector (for a neighbourhood of approximately 1,900 dwellings and associated facilities, services and infrastructure), strategic development at this site would bring the expected level of development up to 7,000 dwellings, largely taking up the remaining sewage treatment capacity.

It would normally take between 5 and 10 years to plan, design and obtain the necessary consents to deliver a new WwTW. This could mean that future strategic development, potentially including Crabbet Park, could not be delivered prior to 2021. Were Crabbet Park become formally allocated in the Mid Sussex Core Strategy, there may be potential to bring forward a private WwTW as part of the development, which could be adopted by a statutory sewage undertaker at a later date. The EA has however indicated to Mid Sussex District Council that it would not support this approach.

Notwithstanding any strategic development located at Crabbet Park, the current capacity issues at Crawley WwTW mean that Thames Water will need to start work on a new WwTW early in the AMP5 period. As it stands, the current capacity issues relating to sewage treatment infrastructure and long lead-in times required to bring forward a new WwTW means that further strategic development at Crawley, beyond the existing and planned capacity of 7,000 homes (assuming development at the North East Sector is progressed) will be precluded, unless a private solution can be progressed. In light of these constraints, it is recommended that an Outline Water Cycle is undertaken to identify solutions.

Horsham

As set out in Table 4.1, wastewater treatment in the Horsham portion of the study area is provided by two companies, Thames Water and Southern Water. Thames Water service the north eastern corner of the District, east of Faygate Lane and north of Park Road, while Southern Water service the remainder of the District south west of Faygate.

Thames Water:

As identified earlier, the Secretary of State's interim decision to allow an appeal at Crawley's North East Sector (for a neighbourhood of approximately 1,900 dwellings and associated facilities, services and infrastructure), means that the expected level of development in and around Crawley is anticipated to rise to approximately 7,000 dwellings. Should this new development go ahead in conjunction with the allocated West of Bewbush development in the Horsham District, it is likely to largely take up any remaining existing sewage treatment capacity, meaning future strategic development could not be delivered 'at Crawley' prior to 2021.

Southern Water

In the remainder of the Horsham portion of the study area, SW is the sole provider of wastewater services. In previous correspondence with HDC, SW have confirmed that local sewer capacity cannot accommodate further development. As such SW would look to any developer wishing to promote a site to requisition a connection to the nearest point of capacity, as specified by Southern Water.

Development sites in this area could potentially drain to Faygate WwTW or Horsham WwTW.

Faygate WwTW

Faygate WwTW currently serves around 100 properties and has headroom within the existing discharge consent for up to 90 additional dwellings if the treatment capacity of the works is extended. Development at the level proposed would increase the volume of effluent discharged fifteen fold and consent for an increase of this magnitude is unlikely to be granted by the EA. HDC are advised to check with the EA whether they are likely to object to a significant increase in the volume of effluent discharged from Faygate WwTW.

In theory, further development in this area could drain to Horsham WwTW if a developer were to fund the cost of a new sewer to connect the development directly to Horsham WwTW. However there are potential environmental constraints relating to the Horsham WwTW discharge that are likely to constrain this option.

Horsham WwTW

Environmental constraints could limit growth beyond the consented headroom at the Horsham WwTW due to the constraints on receiving waters. Phosphorous is already at Best Available Technology (BAT) and previous studies have found the works has no spare capacity to accommodate growth beyond the current LDF allocation. While the EA is in the process of reviewing the existing discharge consents, change is unlikely and capacity should be considered under the existing consent. It is not known at this stage whether an alternative discharge point is would be required. Tripartite discussions between EA, HDC and SWS are recommended before any development options that might drain to the Horsham WwTW are progressed through the Core Strategy. Such discussions are supported by the EA.

Mid Sussex

Wastewater treatment in Mid Sussex is provided by two companies: Southern Water are responsible for the wastewater treatment for the vast majority of the District, including the three main towns of Burgess Hill, East Grinstead and Haywards Heath. A small section to the north-west of the District (bordering Crawley Borough's administrative area) is the responsibility of Thames water. This includes the villages of Copthorne, Crawley Down and Turners Hill as well as

the area known as Crabbet Park, which has been subject to investigation through the Core Strategy as a potential location for strategic development in the period up to 2026.

Information obtained from Thames Water in a continued dialogue regarding Crabbet Park, combined with the findings of the 'At Crawley' study, indicate that the current sewerage infrastructure in this location is not sufficient to be able to cope with the planned growth in the 'At Crawley' area. It is considered that there is insufficient sewerage capacity planned to deliver more than one further new neighbourhood in this area and as the North East Sector (within Crawley BC) is now likely to gain planning permission following appeal (the inspector has been 'minded to approve' this scheme) there is more certainty that this location will come forward before Crabbet Park. It is therefore sensible to suggest that Crabbet Park should only be considered as a longer-term option for strategic development, from 2021 onwards, in order for necessary sewerage infrastructure to be planned for and in place. Although a private WwTW within/adjacent to the site have been discussed by the site proponent, the EA have indicated to the District Council that they would not support this.

Southern Water is responsible for the wastewater treatment throughout the rest of the District. In terms of the proposed development throughout Mid Sussex, there are a number of WwTW that could be impacted by increased housing numbers. The predominant WwTW is at Goddards Green, to the west of Burgess Hill. There are further WwTW at Scaynes Hill, serving the majority of Haywards Heath and adjacent villages and at Felbridge, Eden Vale and Luxfords Lane, serving the majority of East Grinstead and surrounds.

Southern Water has indicated their concerns with the current wastewater infrastructure in discussions with MSDC, in relation to the impact that new development (to be allocated through the Core Strategy) will have on the capacity of current WwTW.

Of the WwTW that are likely to be impacted by strategic sites proposed through the Core Strategy, only Scaynes Hill WwTW is thought to have sufficient capacity. The levels of strategic development planned for the Burgess Hill area are of highest concern. Goddards Green WwTW, is currently operating with limited headroom and does not have the capacity to accommodate the scale of development planned. Southern Water have indicated that improvements are planned to improve effluent quality at this works which will also overcome capacity constraints. This work is scheduled to come online by 2015. There remains further scope for the provision of further headroom through tighter constraints. Further work will be required in order to assess whether this is the case and MSDC, the EA and Southern Water will need to discuss this matter further.

Reigate and Banstead

Thames Water has subsequently not identified any specific areas of concern with regard to water provision nor have they identified specific wastewater infrastructure projects required in the Borough except for Horley.

Thames Water Utilities Ltd has indicated that foul drainage capacity for Horley may need to be consolidated and increased to accommodate the new communities in the North East and North West Sectors, if it proves unviable to relocate the works. This is still under investigation.

4.7.1 Potential Constraints to Development and Recommendations

The Scoping Stage has identified wastewater treatment capacity as a major issue within the study area, particularly 'at Crawley' where the bulk of development is required to be located. Should Crawley's North East Sector Development come forward in conjunction with the strategic development West of Bewbush (allocated in HDC's current Core Strategy) and existing permissions/windfall figures for Crawley, it is likely that any remaining wastewater treatment capacity within the Crawley area will be exhausted, thereby restricting further development at Crawley until 2021. Beyond Crawley, it is evident that wastewater treatment works have reached, or are nearing capacity in areas of both the Horsham and Mid Sussex Districts, with identified development at Horley placing further strain on sewage treatment capacity.

Given the current capacity issues, it is recommended that an Outline Water Cycle Study be undertaken to investigate these issues in detail, particularly in terms of assessing the strategic capacity to accommodate further growth at Crawley and in the wider sub-region, in order to assess the most sustainable way forward and recommend solutions to assist in the delivery of sub-regional housing requirements.

4.8 Water Quality

As set out in Section 3, the European Water Framework Directive seeks to protect and improve inland and transitional water bodies, focussing specifically on issues of water quality and quantity and ultimately seeking to ensure that all waters achieve 'good status' by 2015. In the UK context, the legislation is reflected in the publication of the Environment Agency's River Basin Management Plans (RBMPs), which seek to ensure the protection, improvement and sustainable use of the water environment, considering the extent to which identified targets to reach 'good status' are achievable and how any necessary improvements are to be achieved.

New development can impact groundwater and surface water quality in three main ways;

Over-abstraction of water can reduce water flow, which in turn limits the amount of water available downstream to dilute pollutants, particularly in the summer months. Lower river flow can also impact the hydromorphology and chemistry of watercourses for aquatic and riparian habitats.

Run-off: Further development is likely to increase the magnitude of runoff from impervious surfaces, made increasingly worse due to the impacts of climate change. Such runoff is generally managed by attenuation features such as SuDS to prevent flood risk, however all runoff from such surfaces will contain pollutants from sources such as roads and gardens transporting them into the surface and groundwater water supply;

Wastewater: New development increases the volume of wastewater effluent which needs to be discharged into rivers and streams and the volume of water discharged from storm drains. All such discharges contain pollutants which have the potential to damage the water environment.

This section considers the key themes identified by RBMPs for the three river catchment areas relevant to the study area.

Thames River Basin Management Plan (Mole Catchment Area)

The EA's Thames District River Basin Management Plan (RBMP) sets out the current status of the Mole Catchment, identifying where pressures are being placed on the water environment and establishing how and if targets to achieve 'Good' ecological status by 2015 can be achieved. The Mole catchment contains 20 river water bodies, of which 8 are designated as Heavily Modified and 3 lake water bodies, of which 1 is classified as artificial and 2 as Heavily Modified. The RBMP identifies high levels of phosphate and ammonia in several rivers within the Mole Catchment, which pose a potential threat to fish and invertebrates due to their toxicity. This is often sourced from effluent from WwTW and the RBMP identifies that the substantial quantum of development planned in the catchment up to 2026 will lead to increased volumes of treated effluent and demand for water and will therefore likely impact upon the quality of the water environment.

In this regard, Thames Water has advised that although treated sewage release consents in the Crawley area currently afford flexibility for development, the levels of development planned over the South East Plan period will contribute towards the utilisation of remaining capacity. As such, the drafting of an Outline Water Cycle Study will play an important role in informing water companies of the discharge consents that are considered acceptable to the Environment Agency from a water quality perspective and whether current levels of consent are anticipated to change as a result of planned South East Plan development figures.

A brief summary of the water quality status for relevant Mole Catchment water bodies falling with the study area is provided below.

Ifield Brook (tributary of River Mole)/River Mole (Crawley to Gatwick Airport) is currently identified as being at a 'Moderate' overall ecological potential.

An overall objective to achieve 'Good' ecological potential by 2027 is set, with the RBMP observing that to achieve this status by 2015 would be technically infeasible and disproportionately expensive. High levels of Ammonia and moderate levels of Phosphate are identified, along with poor (uncertain) levels of Dissolved Oxygen.

Stanford Brook, Tilgate Brook, Gatwick Stream and Crawters Brook at Crawley are currently identified as being at a 'Moderate' overall ecological potential. An overall objective to achieve 'Good' ecological potential by 2027 is set, with the RBMP observing that to achieve this status by 2015 would for Stanford Brook be technically infeasible and would be disproportionately expensive for Stanford Brook, Tilgate Brook, Gatwick Stream and Crawters Brook. Ammonia and Phosphate levels are considered 'Good' and Dissolved Oxygen levels are High.

Baldhorns Brook (southern section of Upper Mole) and Salfords Stream (Salfords to River Mole confluence) is currently identified as being at a 'Poor' overall ecological potential. An overall objective to achieve 'Good' ecological potential by 2027 is set, with the RBMP observing that to achieve this status by 2015 would be technically infeasible for Baldhorns Brook and disproportionately expensive and technically infeasible for Salfords Stream.

Burstow Stream is currently identified as 'bad' for its ecological potential, with the objective to achieve 'good' by 2027. To achieve this by 2015 would be technically infeasible.

South East River Basin Management Plan (Adur and Ouse & Arun and Western Streams Catchments)

The EA's South East River Basin Management Plan (RBMP) sets out the current status of the A&O Catchment and A&WS, identifying where pressures are being placed on the water environment and establishing how and if targets to achieve 'Good' ecological status by 2015 can be achieved.

Adur and Ouse Catchment Area

The A&O catchment area consists of 50 water bodies and 1 lake (Ardingly Reservoir – within the study area). Ten of these rivers are modified, as is Ardingly Reservoir. Of these rivers, 12% are at Good Ecological Status or Potential of which one (Bolney Sewer) is within the study area. The majority of rivers falling within the A&O Catchment that are within the study area are of poor or moderate ecological status. Obstruction to fish passage in the Ouse, issues with the quality of effluent from Goddards Green, Barns Green and Coolham WwTW and diffuse pollution from agriculture are the key reasons behind not achieving Good status at present.

16% of river water bodies are expected to improve by at least one element by 2015, with the ecological status of 5 water bodies expected to improve by 2015. Currently 24% of waters assessed for biology are at good biological status, which will increase to 29% by 2015. In order to improve the status of rivers in this catchment, Southern Water is due to improve sewage works at seven locations to reduce levels of nutrients including phosphate and organic pollutants. The EA will address barriers to fish passage and work with LA's and the Highways Authority to produce targeted pollution prevention initiatives. Further investigation as to the anticipated impact of these works on water quality and the extent to which these works will, where required, allow for any increased levels of release consent should be considered in an Outline Water Cycle Study.

Arun and Western Streams Catchment Area

There are 105 river quality sampling points in the A&WS catchment area and routine water monitoring shows surface water quality is variable. The ecological sensitivity of the reach of river running through the study area is classified as having a 'good' ecological status by the EA, however this quality is generally from Rudgewick down to its tidal limit at Pallingham Weir. A major reason for this is discharge of pollutants contained in the wastewater discharged from the Horsham WwTW causing concern over the biological quality of the river and Boldings Brook. In stretches where water quality is not impacted by WwTW discharges, diffuse agricultural pollution is also an issue, the sensitivity is dependant on the proximity of impoundments with downstream stretches more sensitive to changes in flow than those upstream. (Source: South East River Basin Management Plan)

Water quality is perhaps the most significant environmental constraint against development in the Horsham District. The 2006 EA report, 'Water Quality and Growth in the South East'⁹ examined the likely effect that increasing flows of effluent (resulting from an increase in house numbers) would have on river quality downstream of the associated WwTW. The report found that the River Arun was under significant pressure from discharges from the Horsham WwTW and recommended that development be limited to 3,800 new houses beyond that already connected.

This issue is likely to be worsened as a result of the implementation of the Habitats Directive and the EA limiting the concentration of phosphate permitted to be discharged from WwTWs. There is also concern that there is only limited technology available to meet the standards required.

Meeting future water quality objectives is dependant on sufficient flows being available in rivers and streams and as such an increase in abstraction to enable future development may have a negative impact on water quality downstream.

Groundwater monitoring has also highlighted increasing trends in nitrate in the Lower Greensand aquifer. Protection of groundwater is important within this catchment due to the number of public water supply abstractions taken from aquifers in this area. Localised pollution of the aquifer has also been caused by oil and agricultural pollutants and the impact of this in terms of supplying new development with clean water would need to be investigated in future stages of the WCS.

The EA has a groundwater protection policy designed to protect areas of Chalk feeding water supply abstractions. If public water supply sources are affected by pollution, alternative sources must be found; therefore poor groundwater quality can affect water resources. (Source: A&WS CAMS)

4.8.1 Potential Constraints to Development and Recommendations

As demonstrated above, further development can impact upon the quality of ground and surface waters as a result of over abstraction, leading to a decreased ability to dilute pollutants; an increase in the volume of wastewater discharged into the water environment; and due to increased run off from impermeable surface which often contain pollutants from vehicular transport.

This Scoping Study has identified the specific water quality issues relevant to the study area which should be examined further as part of the Outline WCS. This should ascertain whether;

- Further development would result in an unacceptable deterioration in the quality of the water environment within the study area as a result of over abstraction;
- Changes will be required to sewage release consents as a result of development pressure over the South East Plan period and should ascertain whether the existing water environment in all catchments within the study area has capacity to absorb further discharges from associated WwTW and
- Strategic water quality mitigation measures would need to be planned and delivered to enable new development.

An Outline Study should also look to meet the objectives and actions outlined of each of the RBMP's, looking to not only avoid deterioration in watercourses but also to enhance them through growth.

⁹ Ar2A Creating a Better Place: Planning for Water Quality and Growth in the South East, version 11 final – Environment Agency

4.9 Ecology and Biodiversity

The study area and its immediate surroundings are home to a diverse range of wildlife and habitats, including internationally, nationally and locally important sites and allocations, some of which are afforded special protection. Not all of these sites are dependant upon the water environment, though those linked into the river catchment system can potentially be affected by a number of water-related impacts that are associated with development pressure. Such Impacts include;

*Over-abstraction*¹⁰: Abstraction of groundwater for domestic, agricultural or industrial uses may reduce watercourse flow rates to such levels that the physical form of the river channel and the habitats it supports is threatened. It may also lead to the 'drying-out' of ponds and marshlands during warmer periods which can affect fish spawning and the establishment of submerged plants. Siltation can then smother wildlife further and infill features with coarse gravels;

Flood Risk: Development which does not give adequate consideration to surface water drainage, may result in flash floods down stream during periods of intense rainfall, again this may impact the physical structure of the river banks; and

Water Quality: The maintenance of good water and sediment quality is essential to maintaining a healthy river system. Increasing domestic and industrial effluent discharge resulting from additional development may lead to elevated concentrations of phosphorus that could result in a proliferation of algae or the disappearance of characteristic plants and animals. If coupled with falling water levels, the problem can be compounded as pollutants must be diluted in a lower volume of water.

The following section provides an overview of the key ecology and biodiversity sites in the study area, along with an overview of the ecological status for each of the river catchment areas falling within the study area.

Arun and Western Streams Catchment Area

The portion of the study area located in the A&WS catchment contains a diverse range of national and internationally important habitats and species including five SSSI's. Of these five sites, two support hydrological features that are linked to the water environment within the wider study area;

- **St Leonards Forest SSSI** is a 85.36 ha area of broadleaved semi-natural woodland located to the east of Horsham town. It is located within the natural floodplain of the River Arun and as such is home to a number of interconnected streams which provide a diversity of habitats for plants and animals (including invertebrates, fish, mammals and birds). Some of these habitats are directly connected with the physical form of the channel and its banks (ox bow lakes), while others are created by the vegetation which the river supports (marshland). In order to conserve these important geomorphical features and the habitats they support, it is important that the River Arun's natural structure and form is maintained. (Natural England – www.natureonthemap.org.uk); and
- **St Leonards Park Ponds SSSI** is a 3.92ha area of standing open water and canals. The northern area is heavily used for fishing and is likely to support a high concentration of carp, while the southern area is covered with dense Rhododendron. Due to their small size and shallow depth the area is susceptible to overgrown plants and siltation which further reduce water depth causing a build up of nutrients. Ponds are also particularly vulnerable to pollution events and it is therefore important to maintain good water quality in the surrounding areas at all times.

¹⁰ The Environment Agency has advised that impacts on ecological quality will be address through a separate programme titled "Restoring Sustainable Abstractions". However, given that water companies supply water on a regional basis any reduction in abstractions are unlikely to be a concern to the LPAs Core Strategies.

In addition to the SSSIs listed above, there are also two water dominant SSSI's downstream of the study area which may be impacted by future development within the Gatwick diamond sub-region. These include the Upper Arun SSSI comprising the stretch of the River Arun adjacent to Adversane, Horsham and the Arun Banks SSSI, a fen, marsh and swamp lowland area located north of Arundel.

In addition to these statutory designated sites, the study area also contains non-statutory wildlife sites known as Sites of Nature Conservation Importance (SNCI). These sites are designated by LPA for their considerable wildlife value. A number of these sites are recognised specifically for their aquatic features, of particular note are Leechpool and Owlneech Wood, Warnham Mill Pond, Horsham and Old Deer Park, A further three water dominant SNCI's which are outside the study area but may still be influenced by future development include; Middle Barn Farm Meadow, Pulborough and the Wye and Arun Canal, River Arun Adjacent meadows.

The internationally protected **Arun Valley SPA and Ramsar Site** is located approximately 7.5km to the south west of the study area near the village of Pulborough. This area comprises an area of wet meadows on the floodplain of the River Arun and as such may be affected by development upstream which could impact local hydrology. Reduced water availability within this area would have a significant impact on the SPA and the species and habitats it supports.

The River Arun supports native brown trout populations as well as grayling and coarse fish. Although the dominant coarse fish population upstream is less sensitive to water low water flows, downstream the fish community of grayling and brown trout is more sensitive. Water quality downstream of the Horsham WwTW is also a concern for the Arun fisheries, in particular the impact of artificial oestrogens upon the fish community.

The tributaries of the Arun are also important salmonid spawning grounds and support BAP species such as bullhead and lamprey.

The River Arun also contains two protected species which are designated under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). These include native white clawed crayfish and otters. Both species must be protected from the impacts of any proposed future development.

Mole Catchment

The Mole Catchment is home to a diverse range of wildlife and habitats, many of which are water dependant. In the context of the study area, the most important habitat areas are Sites of Special Scientific Interest (SSSI), four of which are situated within or adjacent to the Upper Mole Catchment Area. These are Buchan Hill Ponds, House Copse¹¹, Worth Forest and Glovers Wood.

Of these, Buchan Hill Ponds SSSI (19.49 hectares) is of greatest significance to the water environment, containing three ponds that provide the best West Sussex example of Wealden hammer ponds on acid Tonbridge Wells sands. These are fringed by marginal fen communities which grade into base-poor springline elder, a nationally uncommon woodland type. The site is home to a variety of wildlife, including 17 species of dragonfly, a nationally significant population that includes the uncommon Hairy Dragonfly and Brilliant Emerald. The adjoining wet woodland habitat is also significant, identified as a priority habitat in the UK Biodiversity Action Plan and supporting a rich ground flora. The SSSI has recently been classified as being of 'unfavourable, recovering' status (Natural England, December 2009).

Downstream of the study area is the Mole Gap and Reigate Escarpment Special Area of Conservation (SAC), which contains much of the Mole Gap to Reigate Escarpment SSSI and has been designated under European Directive. The site contains 7 features that have been designated as being of European interest and whilst the majority of these are not water-dependant, the presence of great crested newt, which require pool and pond environments for breeding and adjacent terrestrial habitats¹²

¹¹ Located in Horsham District

¹² Environment Agency Mole CAMS (June 2007)

The Thames River Basin Management Plan identifies high levels of Phosphate and Ammonia in several rivers within the Mole Catchment, nutrients that can result in excessive plant growth that negatively affects wildlife. The clay characteristics of the Upper Mole Catchment can result in low levels of dissolved oxygen in canalised and shaded reaches during times of low flow, which can again impact negatively upon wildlife. A number of rivers within the Mole Catchment have been identified as Heavily Modified Water Bodies (HMWB), either through culverting or in-stream structure installation, an approach which can negatively impact on habitat diversity and fish migration patterns. For the study area, HMWB's include the lower Gatwick Stream, Ifield Brook and the northern section of the Upper Mole. Within the part of the Upper Mole Catchment falling within the study area, the majority of water bodies are considered to be of a 'Moderate' Ecological Status, with the exception of the section of Baldhorns Brook, where Ecological Status is 'Poor'.

Adur and Ouse Catchment Area

There are four SSSIs within or adjacent to the Adur and Ouse catchment within the study area boundary. One SSSI, Ditchling Common, lies to the eastern boundary of Burgess Hill. Although this is located outside of the boundary for this Scoping Study and outside of West Sussex, it has been highlighted through MSDCs draft Core Strategy (and accompanying Sustainability Appraisal) that development to the east of Burgess Hill may have a significant effect on this designation. However, none of these SSSIs are classified as being designated due to features directly significant to the water cycle environment.

Whilst not within Mid Sussex District and therefore outside of the study area for this Scoping Study, the Ashdown Forest SAC/SPA (Special Protection Area) lies adjacent to the north-east of the District. As this site is designated under European Directive and is within 15km of potential development sites within Mid Sussex, a report investigating the likely effects of development on this site has been prepared under the Habitats Regulations.

The Ashdown Forest SAC/SPA has a number of features that qualify this designation, including Northern Atlantic wet heaths and the presence of the Great Crested Newt which requires pool and pond environments. It is not thought, however, that development in Mid Sussex District will impact on this designation. Although development in Mid Sussex will add demand for water (and could impact on its quality as well as quantity), the northern portion of the District obtains its water from Weir Wood reservoir, the watercourse of which does not run through the Ashdown Forest. Urbanisation may alter water flows and hydrology however rates of flows from new development will be controlled to the rate of greenfield runoff.

The South East River Basin Management Plan has identified a number of water bodies within the A&O Catchment that are currently at 'Poor' ecological status. These include the River Adur East (including the Goddards Green segment) and the Ouse from Slaugham to Ardingly Reservoir. These water bodies are expected to achieve 'Good' ecological status by 2027, but not before the 2015 target set by the Water Framework Directive due to technical infeasibility, disproportionate expense in doing so, or both. A number of water bodies are currently achieving 'Moderate ecological' status and are similarly expected to achieve 'Good' by 2027.

'Shell Brook Upstream from Ardingly Reservoir' and 'Ardingly Reservoir to Lindfield' are designated as heavily modified water bodies due to their use for drinking water and water regulation. These two water bodies are currently considered to be of 'Moderate' ecological status, with a target of being at 'Good' ecological potential by 2027.

4.9.1 Potential Constraints to Development and Recommendations

The study area and its surroundings contain several sites of ecological importance which have the potential to be impacted by development within the Gatwick Sub-Region. The following measures should therefore be undertaken to minimise the risk to the identified designated sites;

- Further development within the Gatwick sub-region will result in increased discharges of wastewater. This has the potential to increase the nutrient load of watercourses and the potential of pollutants downstream. Previous studies have found that there is no spare capacity at the Horsham WwTW to accommodate new development beyond the current LDF allocation and that phosphorus is already at Best Available Technology (BAT) for this

works. As such, capacity at the works should be considered using the existing discharge consent, meaning an alternative discharge point may be required.

- A study is currently being undertaken by the EA to help understand the impact of artificial oestrogens on the fish community downstream of the Horsham WwTW. The findings of this study and the impact of future development on water quality should be taken into consideration as part of an Outline WCS.
- To ensure surface water run-off does not present an increased risk of flooding within the study area which again may impact the designated sites down stream Strategic level Sustainable Drainage Systems (SuDS) will also need to be planned for and policy drivers provided.
- Because the study area is within 7.5km of an internationally protected site, a Habitats Regulation Assessment (HRA) will need to be undertaken as part of the planning process, as required under the Habitats Directive. This would be used to determine the full impact of development on the designated European Sites. It is not possible to complete a full Appropriate Assessment (AA) as part of this Scoping WCS as development design and area has not yet been agreed, however this will be a requirement of any subsequent stages of the WCS. This study has been used to identify whether there are any ecological constraints to the proposed development within the Gatwick Diamond sub-region and can be used in Stage 1 of the HRA process: *Likely Significant Effect*.
- The EA must also contribute to maintaining a favourable conservation status of all habitats afforded international protection and as such will screen all licence applications for the potential impacts on SPA and Ramsar sites.

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

4.10 Flood Risk and Flood Risk Management

Each authority involved with the preparation of this report has an approved Level 1 Strategic Flood Risk Assessment (SFRA) in accordance with PPS25: Development and Flood Risk. These SFRAs form part of the evidence base for each authorities LDF and have been used to contribute to the Sustainability Appraisal process. None of the authorities were required to undertake a Level 2 SFRA, as none of the proposed development areas were found to be at risk from flooding. Notwithstanding this, the SFRA is a 'living document' and both CBC and HDC are currently undertaking a revision of their existing SFRAs to consider the potential of future development sites. While it was not found necessary to repeat the contents of these documents within this report, it is advised that this study be read in conjunction with the existing SFRAs and SFRA Revisions once published.

5.0 Moving Forward

Section 4.0 of this Scoping Study outlines the current baseline with respect to the water environment and water infrastructure. The level of development that each of the Local Authorities involved in this study are required to deliver will impact upon the water environment and section 4.0 highlights areas of concern. In particular, the availability and quality of water supply and issues surrounding present and planned sewerage and wastewater treatment capacity in order to cope with an increased supply of housing, raise issues that will need to be investigated further.

It is therefore the view of the stakeholders involved in preparing this Scoping Study that an **Outline Study should be undertaken**.

5.1 Content of the Outline Study

The Outline Study will build upon the findings of the Scoping Stage by considering, in more detail, the effects of planned new development on the water cycle environment and water infrastructure in relation to where growth is to be targeted.

A number of potential constraints to development have been highlighted throughout Section 4 of this Report, the Outline Study should therefore investigate these potential constraints in more detail, specifically addressing the following points:

General

Provide recommendations as to where further investigation will be required to inform the progress strategic of site allocations; and

Assess the impact of climate change on the water cycle in the study area, including consideration of the impact any increase in flooding could have upon water quality and the availability of water resources.

Wastewater

Investigate, as a matter of priority, the current situation regarding wastewater treatment across the study area, with particular regards to capacity issues at Crawley, Reigate & Banstead, Horsham and Mid Sussex;

Include a detailed consideration of the implications for meeting the quantum of development required by the South East Plan, particularly (given the emphasis of SEP Policy GAT3) in terms of accommodating further growth 'at Crawley';

Assess the most sustainable way forward and recommend solutions, considering development phasing as appropriate, to assist in the identification of strategic allocations in the sub-regional authorities Core Strategies and overall delivery of sub-regional housing and employment requirements. In meeting this objective, regard should be afforded to the sub-regional authorities housing trajectories and the findings of the At Crawley study, 2008;

Consider whether changes will be required to sewage release consents as a result of development pressure over the South East Plan period and ascertain whether the existing water environment in all catchments within the study area has capacity to absorb further discharges from associated WwTW; and

Provide a broad steer on the most appropriate policy direction that should be taken forward through the sub-regional authorities respective Core Strategy documents. This should take the form of an indicative policy approach.

Water Resources & Supply

Confirm whether adequate water supply can be maintained through the twin track approach of promoting water efficiency and the bulk transfer of resources from other areas. In assessing the above, regard should be afforded to the availability of water resources within neighbouring areas and their spare capacity;

Investigate the availability of water resources throughout the sub-region, particularly in relation to the potential strategic sites and within a context of development phasing;

Having regard to the sub-regional authorities' latest housing trajectories, the Outline WCS should highlight areas where 'pinch points' may potentially exist;

Review demand management measures which could be taken to improve water efficiency and reduce water demand (such as metering, grey water recycling, water butts) and provide advice as to an appropriate policy approach through which these measures could be taken forward in the sub-regional authorities respective Core Strategies;

Provide an overview of any opportunities or constraints relating to water supply; and

Give due regard to the Thames and South East River Basin Management Plan (RBMP) Action Plans, providing policy direction where appropriate.

Water Quality

Ascertain whether strategic water quality mitigation measures would need to be planned and delivered to enable new development and provide recommendations for any standard or cross-boundary development management policies that might usefully appear in each authority's Local Development Framework;

Ascertain whether the existing water environment in all catchments within the study area have capacity to absorb further discharges from associated WwTW. In light of the findings of the Scoping Study, particular consideration should be afforded to the River Arun downstream of the Horsham WwTW, and the upper and middle River Mole;

Review and investigate the findings of planned work to be undertaken by the Environment Agency and Water Companies on future development impacts on water quality; and

Consider measures that could be taken to reduce instantaneous run-off to maximise usable ground and surface water recharge (such as sustainable urban drainage systems and brown roofs), and surface water attenuation.

Ecology and Biodiversity

Consider the impact of planned development on ecology and biodiversity and where appropriate make policy recommendations as to how development can come forward in a manner that protects and enhances the natural environment within and beyond the study area; and

Recommend any standard or cross-boundary generic Development Management policies that might usefully appear in each authority's Local Development Framework in relation to ecology and biodiversity.

5.2 Next Steps

Whilst each of the sub-regional authorities contributing to this study are at different stages in the preparation of their Local Development Frameworks and in particular their Core Strategies, the findings from an Outline Study will be used as part of a robust evidence base to inform Policy and help determine suitability, location and intensity of development.

The findings from an Outline Study will also determine the progression of this Water Cycle Study. If it is found that development in certain locations of the study area will require new infrastructure, or would be likely to have a significant effect on the water environment, a Detailed Study will need to be undertaken. It is proposed that this will be the responsibility of the Authority(s) with effected areas to progress, rather than to be carried out sub-regionally.

Glossary of Abbreviations

A&O	Adur and Ouse
A&WS	Arun and Western Streams
AA	Appropriate Assessment
AMP	Asset Management Plan
AP	Assessment Point
CAMS	Catchment Abstraction Management Strategy
CBC	Crawley Borough Council
DEFRA	Department for Environment, Food and Rural Affairs
DPD	Development Plan Document
EA	Environment Agency
GOSE	Government Office of the South East
GWMU	Ground Water Management Unit
HRA	Habitats Regulation Assessment
HDC	Horsham District Council
LDF	Local Development Framework
LPA	Local Planning Authority
MSDC	Mid Sussex District Council
PPS	Planning Policy Statement
RBBC	Reigate and Banstead Borough Council
RSS	Regional Spatial Strategy
SEP	South East Plan
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Area
SPD	Supplementary Planning Document
SSSI	Site of Special Scientific Interest
WwTW	Wastewater Treatment Works
SWMP	Surface Water Management Plan
SuDS	Sustainable Drainage Systems
WCS	Water Cycle Study
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRMU	Water Resource Management Units
WRS	Water Resource Strategy
WRZ	Water Resource Zone
WwTW	Wastewater Treatment Works