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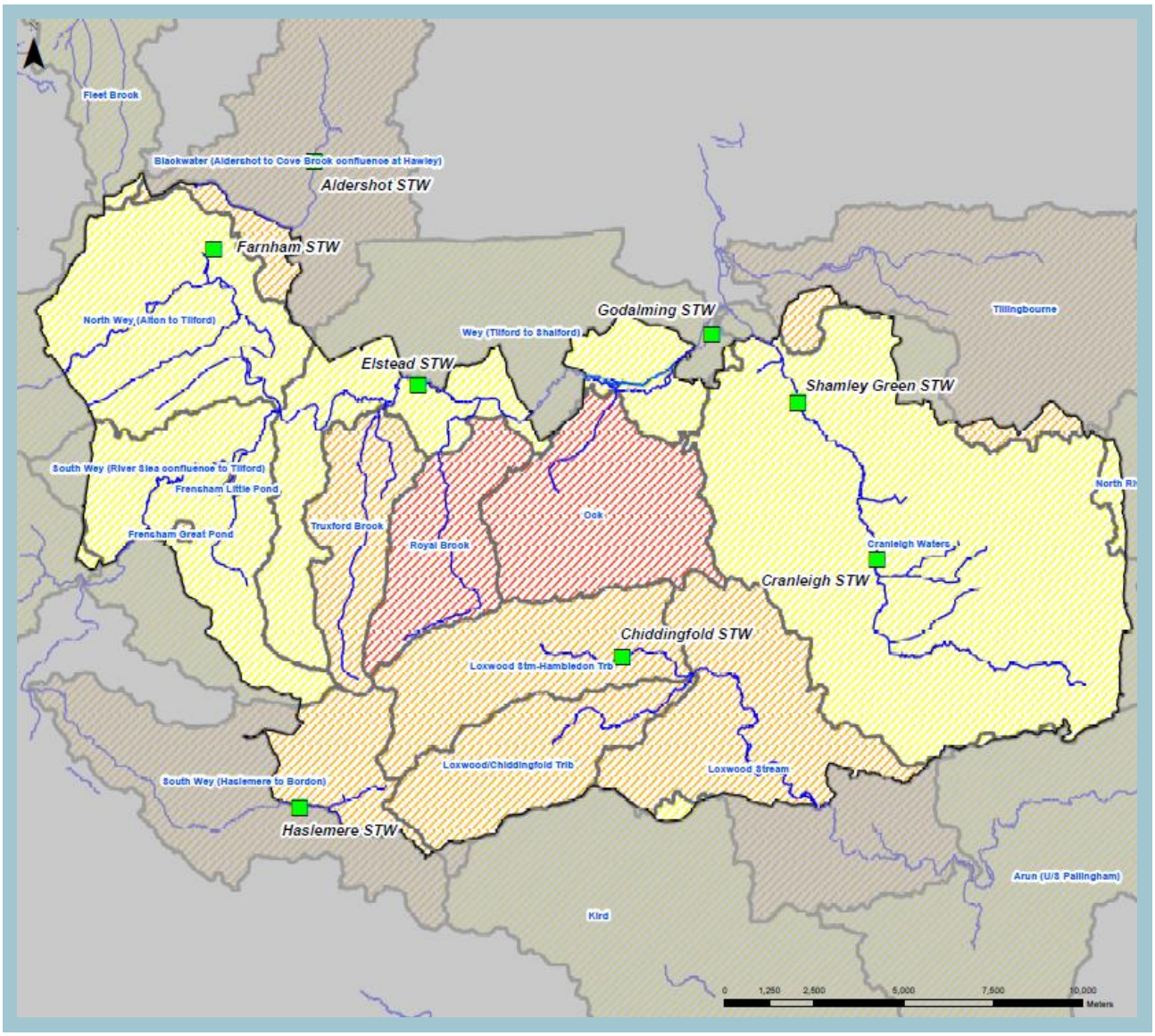
Waverley Borough Council High Level Water Cycle Study

August 2016



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Quality Management

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1	July 2016	Interim Draft Report for Submission to WBC	Tom Godman	Nicole Shamier	Chris Despins
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5	18 August 2016	Update of maps. Final Report	Tom Godman	Nicole Shamier	Chris Despins

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Executive Summary

The Waverley Borough Council new Local Plan Part 1: Strategic Policies and Sites is designed to set out the key policies and overall strategy for managing and directing future development within the Borough of Waverley, outlining Waverley Borough Council's approach to delivering 519 homes per annum up until 2032 whilst accounting for the various constraints that affect the Borough of Waverley.

The service of water, both water supply and wastewater treatment, is one of the primary services that must be considered for each development which has been proposed as a part of the emerging new Local Plan. It is critical that future development within the Borough of Waverley must not be responsible for putting unsustainable pressure on the water environment and existing water infrastructure.

This High Level Water Cycle Study report aims to work in collaboration with the Sustainability Appraisal (2014); the SFRA Level 1 (2015) and the emerging SFRA Level 2 (2016) to assess consider the limitations and constraints of future growth within the Borough of Waverley against environmental constraints and other limiting factors. The three supporting documents are designed to work in collaboration with each other to produce a high level assessment of the impact of future development for the emerging new Local Plan.

This High Level Water Cycle Study investigates available sewage network capacity and environmental capacity to show where there may be particular challenges to infrastructure provision. It considers the Sewage Treatment Works which will be required to provide wastewater treatment services; the additional capacity which would be required, and the potential of the Sewage Treatment Works to expand, if necessary. This study also considers the receiving watercourses; their Water Framework Directive status; Reasons for Failure and the direction of travel resulting from new development.

Additionally, the study summarises consultation responses from Thames Water, Southern Water and the Environment Agency both during this study and during previous consultation phases.

This study does not diminish the need for a site level drainage study. Drainage studies will consider network connections, sustainable urban drainage and discharges. At that stage, there should be direct consultation with the Water Company, in particular as in some circumstances, new infrastructure or infrastructure upgrades will be required to serve new development.

1. Introduction

1.1 Background

The Waverley Borough Council new Local Plan Part 1: Strategic Policies and Sites[1] sets out the overall strategy for managing and directing future development within the Borough of Waverley, outlining Waverley Borough Council's approach to delivering 519 homes per annum up until 2032 whilst accounting for the various constraints that affect the Borough of Waverley. One of the wide range of services that must be considered for each development proposed is the infrastructure associated with the provision of potable and non-potable water to each development, the safe collection and treatment of wastewater before returning it to the local water environment and the risk of flooding. Although each individual development may not by itself represent a significant additional burden to the existing infrastructure associated with the water services, the accumulation of future growth and new development could lead to an exceedance in the design capacity loads of existing water infrastructure and/or damage to the water environment.

Future growth within the Borough of Waverley must not be responsible for putting unsustainable pressure on the water environment and existing water infrastructure. Furthermore, changes in our climate are producing new challenges to the water environment, with wetter winters and drier summers predicted in the future.

1.1.1 The Need for Sustainable Development

Sustainable development is a crucial part of reducing the tensions between future development growth and the environment. If development were to continue within the Borough of Waverley at the scale proposed in the new Local Plan without any consideration given to water infrastructure requirements it could result in capacity stressed infrastructure, and a less sustainable environment. In order to prevent these problems, the capacity of the following is considered in a holistic, integrated way:

- Surface Water Drainage & Local Flood Risk;
- Water Resources & Potable Water Supply;
- Existing wastewater infrastructure;
- Wastewater treatment; and
- Water quality.

Waverley Borough Council has produced a series of publications to consider some of these factors in order to support the new Local Plan. The Waverley Borough Council Sustainability Appraisal (2014[2]) was published in support of the emerging new Local Plan. The report was undertaken in line with the procedures outlined by the Environmental Assessment of Plans and Programmes Regulations (2004[3]) to *'identify, describe and evaluate'* the likely effects implementing the strategic approach outlined in Waverley Borough Council's new Local Plan would have on environmental factors, including water resources, potable water supply and Local Flood Risk at a high level. Additionally, Waverley Borough

[1] Waverley Borough Council, 2016, *The new Local Plan Documents* [www] Available at <http://www.waverley.gov.uk/info/494/local_plan/247/the_new_local_plan_documents> Accessed June 2016

[2] URS & Waverley Borough Council, 2014, *Sustainability Appraisal of the Waverley Local Plan Part 1: Interim SA Report* [www] Available at <http://www.waverley.gov.uk/downloads/file/4512/interim_sustainability_appraisal_report_2014> Accessed June 2016

[3] National Archives, 2016, *The Environmental Assessment of Plans and Programmes Regulations 2004* [www] Available at <http://www.legislation.gov.uk/uksi/2004/1633/contents/made> Accessed June 2016

Council has produced Strategic Flood Risk Assessment (SFRA) Level 1 (2015[4]) report and an emerging SFRA Level 2 (2016) report. These publications assess the relationship between future growth and surface water drainage and local flood risk within the Borough of Waverley. Further details on how these reports are used to support Waverley Borough Council's new Local Plan are given in Section 1.4.

1.1.2 The High Level Water Cycle Study Objectives

The Environment Agency's Water Cycle Study Guidance and Requirements (2015) indicates that in order for Local Authorities to achieve an effective strategy to tackling the problems affiliated with the water environment the following objectives should be reached:

1. Urban development only occurs within environmental constraints;
2. Urban development occurs in the most sustainable location;
3. Water cycle infrastructure is in place before development; and
4. Opportunities for more sustainable infrastructure options have been considered.

The primary objective of this High Level Water Cycle Study report is to, along with the Sustainability Appraisal (2014), the SFRA Level 1 (2015) and the emerging SFRA Level 2 (2016); consider the constraints of future development within the Borough of Waverley against environmental constraints and other limiting factors to achieve the objectives stated above. The three supporting documents are designed to work in collaboration with each other to produce a high detailed assessment of future development for the emerging new Local Plan.

Consultation with the Environment Agency suggested that the effects of planned development on wastewater and environmental capacity required more thought. This High Level Water Cycle Study was commissioned to consider the relationship between the wastewater supplied by planned development, the capacity of the sewage treatment works and the environmental capacity to manage storm overflows and treated effluent within the Borough of Waverley. The High Level Water Cycle Study will achieve the objectives outlined above by using an evidence based approach to answer the following questions:

- Can the future growth and proposed development be accommodated at the Sewage Treatment Works (STW) within the Borough of Waverley without causing a deterioration in water quality?

- Would the future growth and proposed development compromise the ability to achieve "good ecological status" or potential?

- If growth is assessed to impact on water quality is it feasible to upgrade the STWs which accommodate wastewater loads from the Borough of Waverley to prevent any deterioration in water quality from occurring?

The report focuses upon the wastewater effects from the potential development sites identified by WBC in its Land Availability Assessment (2014[5]) and shortlisted for the Local Plan.

[4] Waverley Borough Council, 2016, *Strategic Flood Risk Assessment 2015* [www] Available at <http://www.waverley.gov.uk/info/494/local_plan/1745/strategic_flood_risk_assessment_2015> Accessed June 2016

[5] Waverley Borough Council, 2016, *Strategic Housing Land Availability Assessment* [www] Available at <http://www.waverley.gov.uk/downloads/download/1793/strategic_housing_land_availability_assessment_shlaa_2014> Accessed June 2016

1.2 Study Area

1.2.1 Proposed Development Sites

The High Level Water Cycle Study considers the addition of wastewater from 16 settlements. Table 1-1 shows the number of dwellings proposed by settlement. This excludes existing planning permissions and completions 2013 – 2016.

Table 1-1: Proposed additional new developments within the Borough of Waverley

Settlements within Waverley	Estimated yield (no. of dwellings) broken down by settlements within Waverley
Farnham	1,375
Godalming	472
Haslemere	467
Cranleigh	700
Bramley	7
Chiddingfold	85
Elstead	128
Milford/Witley	338
Alford	80
Churt	0
Dunsfold	78
Ewhurst	53
Frensham	0
Tilford	0
Wonersh/Shamley Green	0
Dunsfold Aerodrome	2,600

In addition to the above figures it is estimated that 185 dwellings will be delivered on new windfall sites in the villages over the plan period up to 2032.

1.2.2 The Catchment Geography

There are several watercourses within the Borough of Waverley. Table 1-2 demonstrates the watercourses that intersect Waverley Borough's administrative boundary. For further geographical information on the size of the catchment, topography, geology and direction of flows for the main watercourse within the catchment please refer to the Level 1 SFRA (2015).

Table 1-2: The list of watercourses within the Borough of Waverley

Rivers		Canals & lakes
River Blackwater	Fleet Brook	The Wey and Arun Canal
North River Wey	Truxford Brook	Frensham Great Pond
River Wey	Ock	Frensham Little Pond
South River Wey	Cranleigh Waters	

Rivers		Canals & lakes
River Slea	Royal Brook	
Loxwood	Tillingbourne	
Kird	North River	
River Arun	Hambledon Tributary	

1.2.3 Existing Urban Areas within the Borough of Waverley

The Borough of Waverley is predominantly considered to be rural; however, it does contain a number of well-defined settlements, the largest of which are Farnham, Godalming, Haslemere and Cranleigh. Additionally there are a significant number of large and small villages throughout the study area.

2. Planning Policy

This section describes the water cycle and outlines the various policy drivers which seek to limit the negative effect of development on the environment.

2.1 The Water Cycle

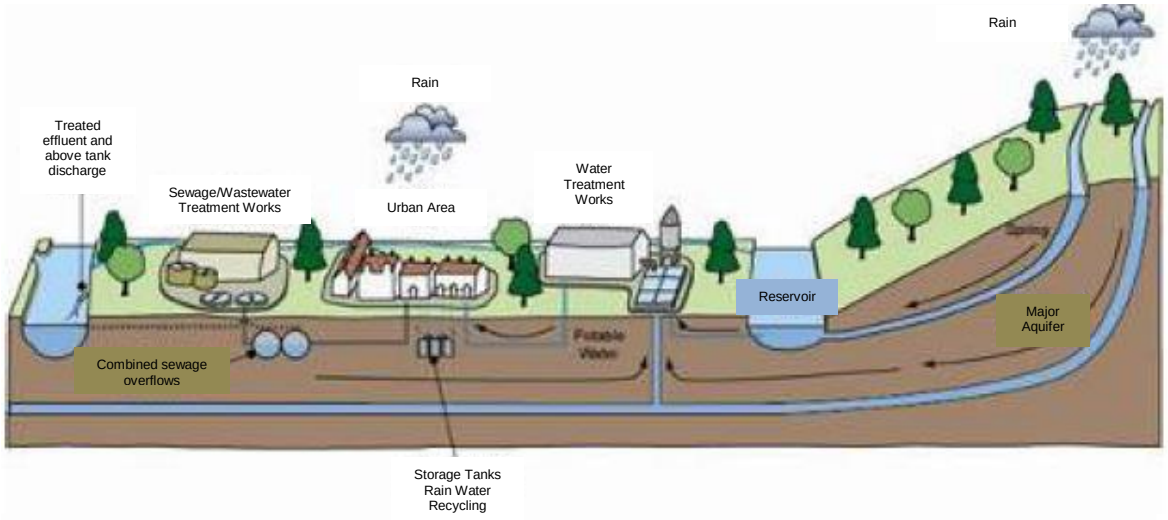
2.1.1 Water Cycle Processes

The water cycle includes the processes and systems which store, collect or transport water in the environment. Water cycle processes occur above and below ground level, and can be either natural or man-made, as shown in Figure 2-1

In undeveloped area, rainfall landing on the ground is either transferred into watercourses, wetlands, floodplains and estuaries, or it is absorbed into the soil through the process of infiltration and is stored in groundwater storage aquifers. Domestically produced wastewater is collected in underground sewage systems. Then it is transported to a Sewage Treatment Works (STW), before being discharged to the sea, rivers or to groundwater.

It is important that when building new developments, or even redeveloping existing areas, to analyse the relationship between the future growth and proposed development in order to minimise environmental impacts and to promote sustainable growth.

Figure 2-1: The Water Cycle Process. Man-made processes interacting with the natural environment (Image from Environment Agency Water Cycle Guidance)



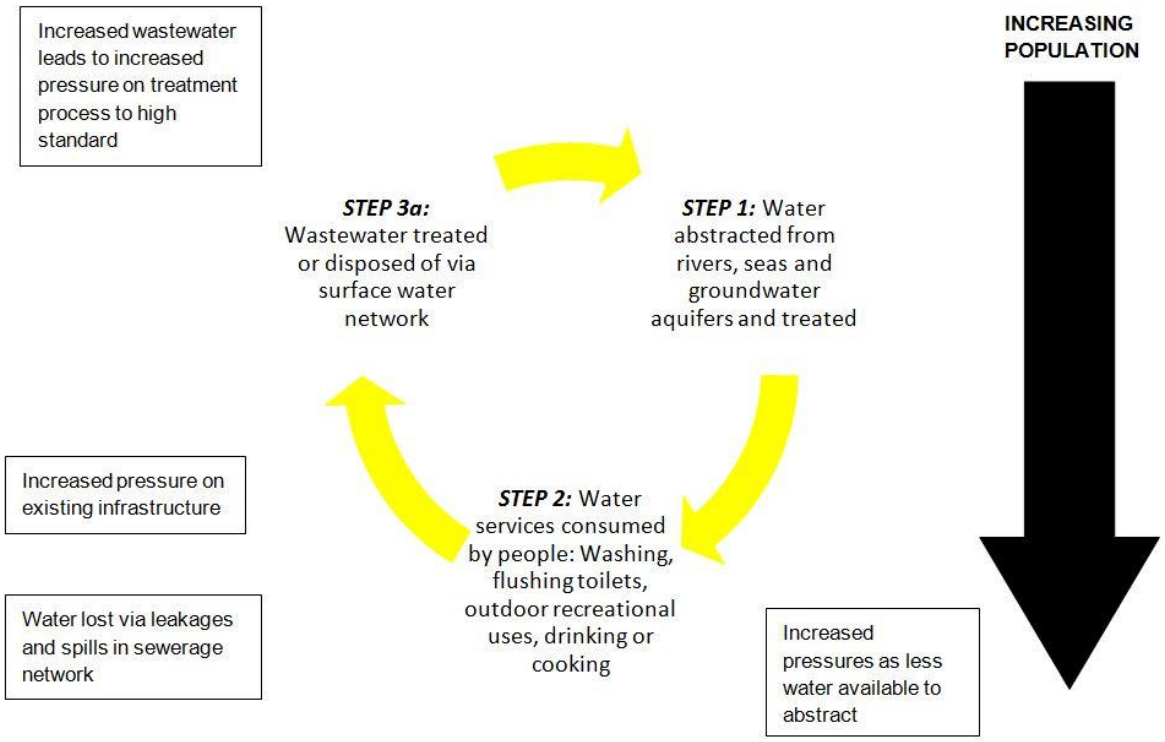
2.1.2 Water Cycle Capacity & Our Impact on the Water Cycle

Water resources are scarce; excess demand causes constraints on the water cycle, which can have a detrimental effect on both the environment and wellbeing.

Figure 2-1 illustrates each stage of the water cycle process. A sustainable approach to maintaining the water cycle requires a sustainable water cycle management approach to strategically planning new development. Although it is the legal responsibility of the water companies to provide connections to both the potable and non-potable water service networks for new developments a

strategic view of whether new homes can be developed into the Borough without causing harm to existing infrastructure and the surrounding environment is the responsibility of Waverley Borough Council.

Figure 2-2: Flow chart showing the impact that population has on the water cycle



2.1.3 The Integrated Water Cycle Catchment Management

Integrated Catchment Management is an approach which seeks to achieve the best ecological and environmental state for the catchment by considering all land uses and catchment processes as components within one integrated catchment system. The approach examines issues as a product of all activity within the catchment.

Environmental objectives set out in legislation, such as within the Water Framework Directive (2000), can be most effectively be achieved by undertaking an integrated water cycle catchment management approach. Understanding how water is moving through a catchment and the processes involved in the transfer of water from one store to another is fundamental to managing and identifying the quality of water and the ecological status of the watercourses within the Borough of Waverley.

2.2 National Planning Policy Framework (2012) and the Planning Practice Guidance (2014, updated in 2015)

The National Planning Policy Framework (NPPF, 2012[6]) was published to provide the statutory guidelines and advice for local authorities and others on planning policy and the operation of the

[6] Department for Communities and Local Government, 2016, *National Planning Policy Framework* [www] Available at <http://planningguidance.communities.gov.uk/wp-content/themes/planning-guidance/assets/NPPF.pdf> Accessed June 2016

planning system. One of the objectives outlined within the NPPF is to protect the environment and to promote sustainable growth. The NPPF provides guidance to local authorities to take account of wastewater, water and flood risk infrastructure delivery in their Local Plans:

(NPPF, 2012) Paragraph 156 –

"Local planning authorities should set out the strategic priorities for the area in the Local Plan. This should include strategic policies to deliver... the provision of infrastructure for transport, telecommunications, waste management, water supply, wastewater, flood risk and coastal changes management, and the provision of minerals and energy"

The Planning Practice Guidance (PPG 2014, updated 2015[7]) is an accompanying set of guidance documents to the NPPF, providing additional guidance to the local authorities and others to ensure the effective implementation on the planning policy set out in the NPPF. The PPG-34 provides guidance on how an integrated catchment water cycle management approach to managing wastewater and water quality can achieve the environmental standards set out in the EU's WFD.

(PPG – 34, 2014) Paragraph 002 –

"Wastewater treatment plants are waste developments and handled by the waste planning authority so it is important in two-tier areas for district and county councils to work closely on these matters. Early discussions between local planning authorities and water and sewerage companies, so that proposed growth and environmental objectives are reflected in company business plans, will help ensure that the necessary infrastructure is funded through the water industry's price review.

(PPG-34) Paragraph 005 –

"Plan-making may need to consider... Considering whether new development is appropriate near to sites used (or proposed) for water and wastewater infrastructure (for example, odour may be a concern). Phasing new development so that water and wastewater infrastructure will be in place when needed"

(PPG-34) Paragraph 007 –

"Plan-making may need to consider: The sufficiency and capacity of wastewater infrastructure".

The PPG Water Supply, Wastewater and Water Quality sets out states that a Water Cycle Study is a voluntary study which assists the Environment Agency, Local Planning Authorities and Water and Sewerage Companies to collaborate resources and work together.

Both the NPPF and the PPG emphasise the importance of environmental sustainability and delivering appropriate water infrastructure to achieve it. This High Level Water Cycle Study, along with the Level 1 and Level 2 SFRAs and the Sustainability Appraisal, will help balance the requirements of the various planning policy documents and ensure that a sustainable approach to land-use planning and water cycle infrastructure is considered within Waverley Borough Council's new Local Plan.

2.3 Waverley Borough Council's new Local Plan supporting documents

2.3.1 Waverley Borough Council Strategic Flood Risk Assessments Level 1 (2015) & Level 2 (2016)

The Waverley Borough Council SFRA Levels 1 and 2 reports assess the relationship between new proposed development as a part of the Waverley Borough Council new Local Plan and local flood risk within the Borough of Waverley. The Level 1 SFRA was a borough-wide study analysing whether all

[7]Department for Communities and Local Government, 2016, *Planning Practice Guidance* [www] Available at: <http://planningguidance.communities.gov.uk/blog/guidance/> Accessed June 2016

the proposed development could be accommodated within land outside of flood risk areas. The SFRA demonstrated that land outside of flood risk areas within Waverley cannot appropriately accommodate all the necessary development; therefore, a SFRA Level 2 was produced to provide all the information necessary for the application of the Exception Test. The SFRA Level 2 uses a risk based approach, set out in the NPPF and PPG, to determine the suitability of development according to flood risk from fluvial and tidal sources. This approach ensures that where possible proposed developments are removed from areas with a high probability of flooding.

The SFRA Levels 1 and 2 are supporting documents to the emerging Waverley Borough Council new Local Plan to demonstrate the likely effects implementing the Waverley Borough Council's new Local Plan would have on flood risk.

2.3.2 Waverley Borough Council Sustainability Appraisal (2014)

The Sustainability Appraisal was undertaken in-line with the procedures outlined by the Environmental Assessment of Plans and Programmes Regulations (2004) to *'identify, describe and evaluate'* the likely effects implementing the strategic approach outlined in Waverley Borough Council's new Local Plan would have on a wide variety of environmental factors.

The Sustainability Appraisal also acts as a supporting document to the emerging Waverley Borough Council new Local Plan, providing an evidence based approach to assess the relationship between future growth and the new proposed development within the Borough of Waverley and environmental factors.

2.4 Water Quality

2.4.1 EU Legislation and Policy – The Water Framework Directive (2000[8])

The Water Framework Directive (WFD, 2000) outlines the environmental standards necessary to improve the ecological, chemical and physical health of inland waters to achieve a 'good status'. The WFD sets out a requirement to achieve 'good ecological status' in rivers, estuaries and coastal waters, together with 'good status' of groundwater by at least 2027. In 2000 the WFD estimated that 95% of water bodies in England and Wales were at risk of failing to meet 'good status'. Within the UK the implementation of the WFD is administered by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA). The framework presents the necessity for holistic environmental management of the water environment. Within the UK a cross-body Technical Advisory Group (UKTAG) has published environmental standards and thresholds for its water bodies. The WFD has encouraged analysis of water bodies to be taken at River basin catchment scale through a series of River Basin Management Plans (RBMPs). These RBMPs are strategies which should both influence proposed development plans and be influenced by them.

The majority of the Borough of Waverley is covered by the Thames River Basin District. A small area to the south of the borough, the area surrounding Haslemere, is covered by the South East River Basin District.

The WFD objectives for surface water bodies are the following:

- Prevent deterioration in status for water bodies (including surface water, groundwater and coastal water bodies);

[8] European Commission, 2016, *The EU Water Framework Directive – integrated river basin management for Europe* [www] Available at <http://ec.europa.eu/environment/water/water-framework/index_en.html> Accessed June 2016

- Aim to achieve 'good ecological status' and 'good chemical status' in water bodies by 2015, 2021 or by 2027 (each RBMP cycle is 6 years and good status should be attained at the earliest opportunity with 2027 being the final RBMP reporting deadline and by when good status must be achieved);

- For water bodies that are designated as artificial or heavily modified (HMWB), aim to achieve 'good ecological potential' by 2015, 2012 or 2027;

- Comply with objectives and standards for protected areas where relevant; and

- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

Any new development, construction or general works that has the potential to impact on any water body (surface water or groundwater) or affect its current status (be it improvement or deterioration) must be assessed. Impacts include effects on:

- **Ecological Status:** measured using fish, invertebrates, plants and diatoms; basic physical chemistry conditions such as dissolved oxygen, biochemical oxygen demand, nitrates, phosphates, pH, ammonia, temperature and Specific Pollutants such as copper, zinc, iron arsenic and others listed in Annex VIII (1-9) of the WFD; physical conditions such as low quantity and dynamics and geomorphology.

- **Chemical Status:** this is defined by modelled risk assessment or field data collected to measure the presence of Priority Substances (WFD Annex X substances) and Priority Hazardous Substances (WFD Annex IX substances which have been or are in the process of being banned) both of which include pesticides, industrial chemicals, heavy metals, fire retardants and other substances with potential significant impacts on humans and wildlife. These also have legislative requirements within the Environmental Quality Standards Directive (EQSD) which supports the WFD.

The water cycle assessment will need to consider quantity and quality aspects of WFD in relation to water sources (surface and groundwater sources as applicable) and in relation to waste water produced by the development (including both surface water and grey/dirty water impacts).

Groundwater water bodies are assessed for WFD based on quality and quantity status. Increased demand on water sources for supplies and impacts of development activities above groundwater water bodies may need to be assessed.

Surface water bodies may be impacted by physical alterations, non-native species, more rapid runoff from increased impermeable areas and reduced infiltration across the catchment (affecting quantity and dynamics of flow) as well as potential contaminants carried within runoff water in urbanised areas (water quality). Waste water generated by developments will also be directed to private or Water Company treatment works and treated effluent will inevitably discharge into a watercourse – potentially altering quantity and dynamics of flows and water quality aspects. STWs have been identified as key 'end-of-pipe' sources of many of them as they gather waste water from many different sources including domestic dwellings as well as sports, schools, doctors, hospitals, laboratories and industrial centres. Increased loading to existing STWs and new STW developments therefore need careful consideration alongside consideration of groundwater and surface water impacts of the developments.

2.5 The National Policy Statement for Wastewater (2012[9])

The National Policy Statement for Wastewater (NPS, 2012) sets out the National policy for the provision of major wastewater infrastructure. It provides a framework for planning decisions on nationally significant wastewater infrastructure. The NPS states the following:

(NPS 2012) Section 1.2.1 –

"The Planning Act (2008) sets out the thresholds for nationally significant infrastructure in the waste water sector. The Act empowers the examination of applications and subsequent decisions on the following waste water NSIPs in England:

- *Construction of waste water treatment plants which are expected to have a capacity exceeding a population equivalent of 500,000 when constructed; or*
- *Alterations to waste water treatment plants where the effect of the alteration is expected to be to increase by more than a population equivalent of 500,000 the capacity of the plant."*

[9] GOV.UK, 2012, *National policy statement for waste water* [www] Available at <https://www.gov.uk/government/publications/national-policy-statement-for-waste-water> Accessed June 2016

3. Data Sources

This section provides the desktop evidence based data to consider the relationship between the wastewater supplied by planned development, the capacity of the sewage treatment works and the environmental capacity to manage storm overflows and treated effluent within the Borough of Waverley. Water is constrained to watershed catchments rather than administrative boundaries; the Borough of Waverley is found to be within the Thames River Basin District, and a small area to the south of the Borough of Waverley is found to be within the South East River Basin District. The majority of waste water within Waverley is managed by Thames Water; with Southern Water also managing waste water within part of the Borough of Waverley.

The following datasets and publications were reviewed as part of the desktop evidence based review:

- The WFD Classification Status Cycle 1 and 2 datasets;
- Thames River Basin Management Plan;
- South East River Basin Management Plan;
- Thames Water AMP6 business plan 2015-2020;
- Thames Water Strategic Direction Statement 2015-2040;
- Thames Water Water Resources Management Plan;
- Thames Water Progress in Planning For Climate Change Adaptation Reporting Power Report;
- Southern Water AMP6 business plan;
- Southern Water Strategic Direction Statement 2015-2040;
- Southern Water Water Resources Management Plan;
- Thames Water website: Sewage Works Upgrades; and
- Southern Water website: Improvements in your area.

3.1.1 Water Framework Directive (2000)

The WFD (2000) set out a requirement to achieve 'good status' in all rivers, estuaries and coastal waters, together with 'good status' of groundwater by at least 2027. As a minimum the WFD aims to achieve a mandatory target of 'No Deterioration' in the water quality of receiving watercourses below conditions recorded at WFD inception in 2003 The WFD objectives are administered by the Competent Authority, which, in England, is the Environment Agency. The WFD status of all water bodies for both Cycle 1 and Cycle 2 is provided by the Environment Agency[10] and contains the classification status for overall, ecological and chemical status, component, element and sub-element status for all water bodies in England. The WFD overall status is calculated using the Surface Water Class Hierarchy for each applicable surface water body within the EU using the following approach:

1. **OVERALL WATER BODY Classification**

2. **OVERALL Classifications** - Ecological Status; Chemical Status

3. **Component Classifications** - Ecological components (e.g. biological quality elements, physic-chemical quality elements, Specific Pollutants and hydro-geomorphological elements); chemical components (e.g. Priority Substances, Priority Hazardous Substances)

4. **Elements Classifications** - Individual elements to each Ecological and Chemical component

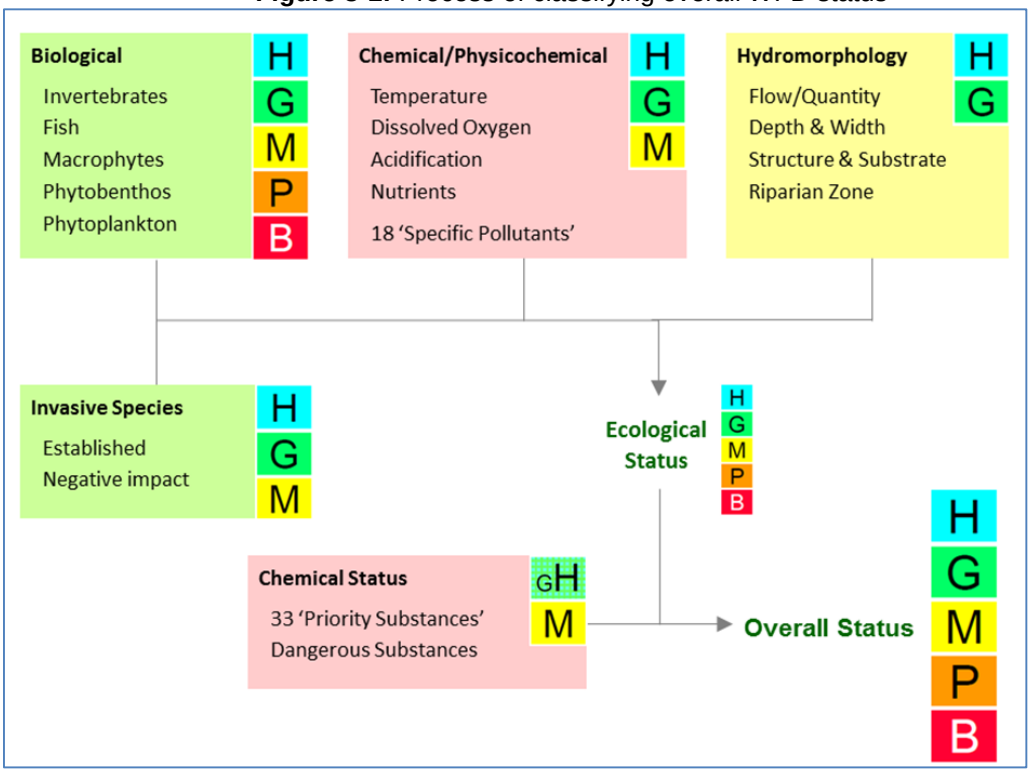
5. **Sub-elements Classifications** - Sub-element classifications for each element classification where they exist

[10] Environment Agency, 2016, *Catchment Data Explorer* [www] Available at <http://environment.data.gov.uk/catchment-planning> Accessed June 2016

The Overall Water Body status is categorised into: Bad, Poor, Moderate, Good and High status. Section 4 outlines the current WFD status of waterbodies that are present within Waverley Borough Council's administrative area, highlighting, where applicable, reasons for not achieving good status.

The process for categorising overall WFD status is 'one out, all out', implying that the lowest recorded status will be utilised for overall status. However, this may not always be the case. WFD overall status aims to be representative of the ecological status of the water body, and as such, biological features, such as those shown in Figure 3-1, can be classified between Bad and High status, meaning they have the most influence over the overall status. Physicochemical/chemical elements, such as phosphate and dissolved oxygen, while important to the overall quality of the river, cannot drive an overall status of anything lower than Moderate. For example, if a water body's phosphate status was recorded as Bad, the minimum status of physicochemical/chemical component would be Moderate. If all other components were recorded as Good, the Moderate status of physicochemical/chemical would result in an overall status of Moderate to be recorded. This captures that the water body is failing for at least one element, whilst not discriminating against water bodies where these 'failing' elements may be integral to maintaining the existing habitat.

Figure 3-1: Process of classifying overall WFD status



3.1.2 Thames River Basin Management Plan (2015[11])

The 2015 Thames River Basin Management Plan (Thames RBMP) was prepared in partnership with 39 different local councils within the Thames River Basin District. It is the Cycle 2 update from the Cycle 1 2009 Thames RBMP. Fourteen of the twenty water bodies within the Borough of Waverley fall within the Thames River Basin District (RBD). The significant water management issues, identified based on the results of public consultation and assessments of the pressures caused by people are shown in the following figure.

[11] GOV.UK, 2016, *Thames river basin district river basin management plan* [www] Available at <https://www.gov.uk/government/publications/thames-river-basin-district-river-basin-management-plan> Accessed June 2016

Table 3-1: The significant issues affecting the water bodies within the Thames River Basin District

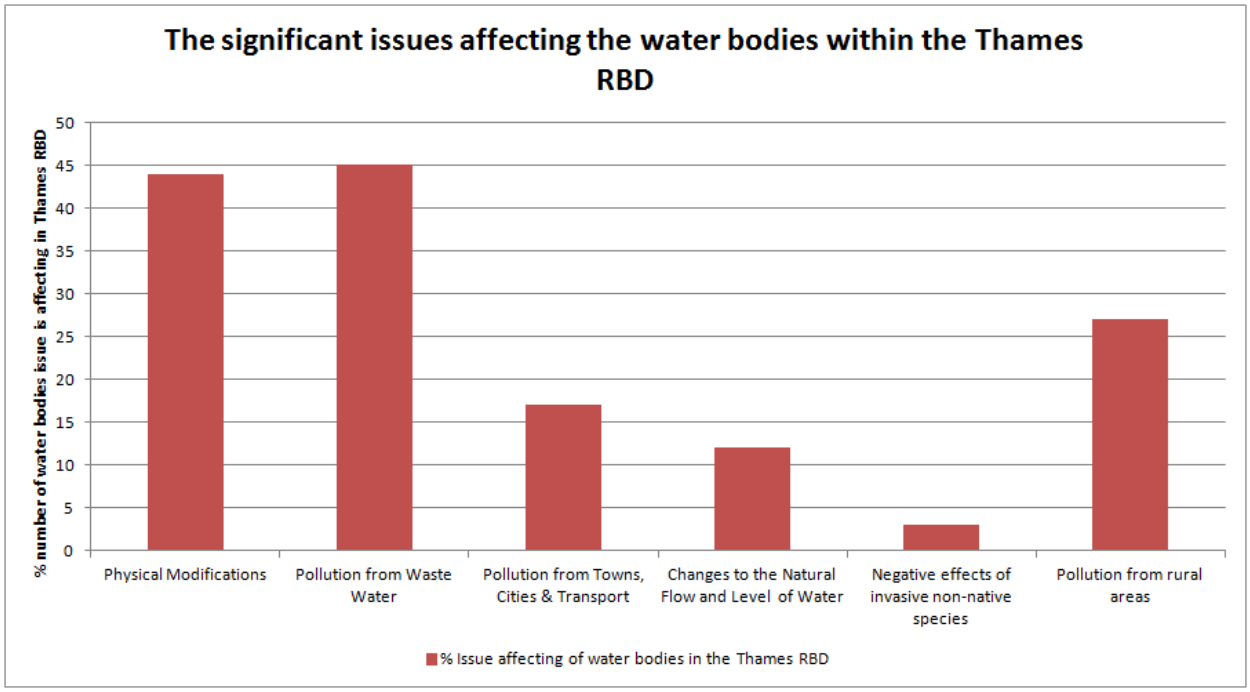


Table 3-1 shows that 45% of water bodies within the Thames RBD are affected by wastewater issues. This is where there is insufficient sewage treatment technology to remove enough phosphorus and harmful chemicals, from leakages from privately owned septic tanks and storm overflows during periods of heavy precipitation. The Thames RBMP states that increasing population growth and changes in rainfall patterns are currently, and will continue to, increase the pressure on the sewerage network.

Increased effluent discharges are likely to negatively impact all of these issues. Pollution from rural areas is likely to be affected where rural areas change land use to urban through development.

Table 3-2 shows the Urban Waste Water Treatment Directive (UWWTD) protected areas type and extent within the Thames RBD and shows that there are nine protected sensitive areas due to eutrophication in rivers and thirteen in lakes and reservoirs.

Table 3-2: Urban Waste Water Treatment Directive protected areas type and extent

Reason for designation	Number of sensitive areas	Length (km)/Area (km2) designated
Eutrophication in rivers	9	483
Eutrophication in canals	N/A	N/A
Eutrophication in lakes / reservoirs	13	15.87
Eutrophication in estuaries or coastal waters	N/A	N/A
High nitrate in surface fresh water	N/A	N/A

The Thames RBMP states that improvements in waste water discharges within the district made by three water companies is scheduled to lead to improvements to protected areas. These include improvement to the quality of raw water at 78 safeguard zones[12] due to actions targeting pesticides, reduced nutrient pollution at 6 Natura 2000 protected areas and bathing and shellfish water quality as a part of the 2021 outcomes. The RBMP states that wastewater, or sewage, affecting water quality within the district is currently managed by regulators, operators and influencers using and applying relevant legislation and policy:

- Government and agencies (Environment Agency) grant and review environmental permits under the Environmental Permitting Regulations (England and Wales) 2010 to the water industry, manufacturing and other business and other sectors to protect the environment from pollutants such as chemicals, nutrients, bacteria, viruses, ammonia and organic material in discharged effluent.

- Government and agencies (Environment Agency) work with the water industry to develop a long-term strategy for sewerage to prevent deterioration of permitted discharges (for example, combined sewer overflows), resulting from pressures such as climate change, growth and ageing infrastructure; and to develop a long term strategy to reduce and minimise risks to the water environment from misconnected sewerage (foul sewage wrongly connected to surface water).

- Government and agencies (Environment Agency) grant environmental permits for small sewage discharges in designated sensitive areas. In other areas, small sewage discharges (including septic tanks) are exempt from the need for a permit if they can meet a number of criteria.

- Government (Environment Agency) to carry out a review of areas sensitive to eutrophication, in relation to the Urban Waste Water Treatment Directive (UWWTD) and make recommendations to DEFRA.

[12] Safeguard Zones: a non-statutory designation that identifies areas where the Environment Agency and other responsible bodies (such as water companies) will seek to gain voluntary uptake of measures that will prevent further deterioration in water quality.

- Government and agencies (Environment Agency and Health and Safety Inspectorate) enforce restrictions and bans on the use of certain chemicals

- Local government considers the impact on water quality in their preparation of spatial plans, decisions on spatial planning, development management, new buildings and infrastructure.

- All sectors to consider the Marine Policy Statement and marine plans in decisions that affect marine and coastal environments. These plans set out the strategic framework for sustainable development of the sea.

There were over 300 improvement schemes implemented at STWs since 2009 within the Thames RBD, which have been effective in improving water quality compliance with WFD environmental objectives in some areas. Additionally the report shows that only one water body within the Thames district was prevented achieving good status due to high phosphate loads within the waste treatment and disposal.

3.1.3 South East River Basin Management Plan (2015[13])

The 2015 South East RBMP (Cycle 2) succeeded the 2009 RBMP (Cycle 1). Six of the twenty-one water bodies listed within the Borough of Waverley are within the South East RBD. The significant water management issues, identified based on the results of public consultation and assessments of the pressures caused by people, are shown below.

Figure 3-2: The significant issues affect the water bodies within the South East River Basin District

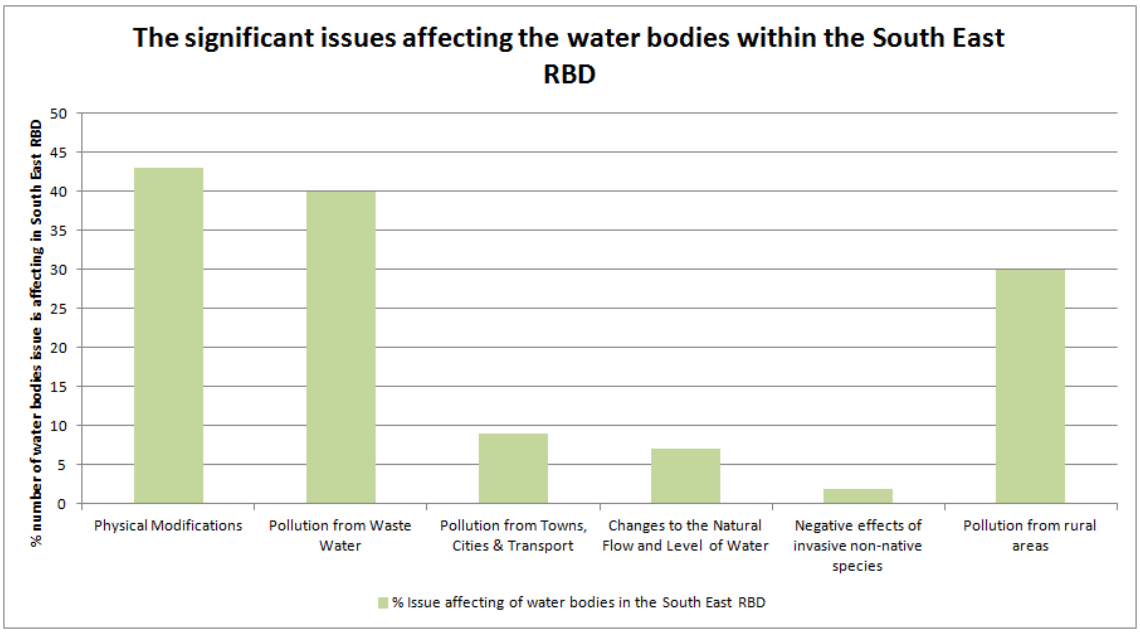


Figure 3-2 shows that 40% of water bodies within the South East RBD considered to be affected by waste water issues. This includes entering water bodies where sewage treatment technology to remove enough of the phosphorus and harmful chemicals doesn't exist, from leakages from privately

[13] GOV.UK, 2016, *South East river basin district river basin management plan* [www] Available at <https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan> Accessed June 2016

owned septic tanks and, in wet weather, storm overflows can discharge untreated sewage having a significant impact on bathing waters.

Table 3-3 illustrates the Urban Waste Water Treatment Directive protected areas type and extent within the South East River Basin District. The table shows that there are thirteen protected sensitive areas due to eutrophication in rivers and one in lakes or reservoirs within the Thames River Basin District.

Table 3-3: Urban Waste Water Treatment Directive protected areas type and extent

Reason for designation	Number of sensitive areas	Length (km) / Area (km2) designated
Eutrophication in rivers	13	266
Eutrophication in canals	N/A	N/A
Eutrophication in lakes or reservoirs	1	0.64
Eutrophication in estuaries or coastal waters	7	74.14
High nitrate in surface fresh water	N/A	N/A

The South East RBMP states that improvements in wastewater discharges within the district made by seven water companies is scheduled to lead to improvements to protected areas such as the quality of raw water at 57 Safeguard Zones due to actions targeting pesticides, reduced nutrient pollution at 6 Natura 2000 protected areas and bathing and shellfish water quality as a part of the 2021 outcomes.

3.1.4 Thames Water Strategic Direction Statement 2015-2040 (2013[14])

The Thames Water Strategic Direction Statement describes the course that Thames Water has set itself for the next 25 years. The statement reports on the wastewater treatment strategy overview for the London and Thames Valley areas. It identifies population growth within its catchment area as one of its largest challenges, with an expected increase in population within its wastewater area from 15 million to 18 million by 2040. The statement has outlined the following strategic paths it wishes to follow over the next 25 years:

- It will work closely with Local Authorities and Relevant Managing Authorities to reduce the number of discharges to rivers and streams through combined sewer overflows (CSOs);
- Increase the use of real-time controls and monitoring systems to more closely identify hotspot areas in need of increased sewer capacity; and
- Continue to target full environmental compliance at all the Thames Water sewage works and have zero pollution incidents due to the Thames Water sewerage network.

[14] Thames Water, 2016, *Out 25-year strategy for 2015 to 2040* [www] Available at <http://www.thameswater.co.uk/about-us/5372.htm> Accessed June 2016

3.1.5 Thames Water's Progress in Planning for Climate Change Adaptation Reporting Power Report (2016)

The Thames Water Progress in Planning for Climate Change Adaptation Reporting Power Report describes the progress Thames Water have made in making their business more resilient to the impacts of climate change since the first Adaptation Reporting Power Report in January 2011.

Thames Water is seeking to undertake a twin track approach, managing effectively the unavoidable impacts of a changing climate and reducing their own contribution to producing greenhouse gas emissions. As part of this Thames Water have undertaken the following assessments in order to best understand the climate sensitivity of their wastewater systems:

- A project was commissioned to improve the understanding of current and potential future flood risk to the water and wastewater sites, which has helped to prioritise investment up to 2020;
- An assessment was undertaken to study the potential impacts of climate change upon our sites of biodiversity interest, which has been used to inform long-term planning and prioritisation decision-making; and
- For selected assets, such as targeted STWs, they have begun developing and implementing a monitoring programme to assess threshold exceedance.

Thames Water are working in partnership with their stakeholders to research the wastewater assets which should be prioritised to improve in order to mitigate the risks affiliated with a changing climate. Thames Water are undertaking the following wastewater UKWIR industry best practice projects:

- The use of stochastic UK climate projects 2009 weather generator data in wastewater modelling;
- Risk-based approach to wastewater planning;
- The importance of understanding climate sensitivity thresholds;
- Tiered modelling approach which is fit for purpose, i.e. level of detail modelling adopted is proportionate to the level of risk;
- Monitoring to improve understanding and avoid inappropriate capital expenditure;

Figure 3-3 shows the summary of the Five Year Plan 2015-2020, which demonstrates the changes Thames Water intend to implement in order to best tackle the impacts of climate change.

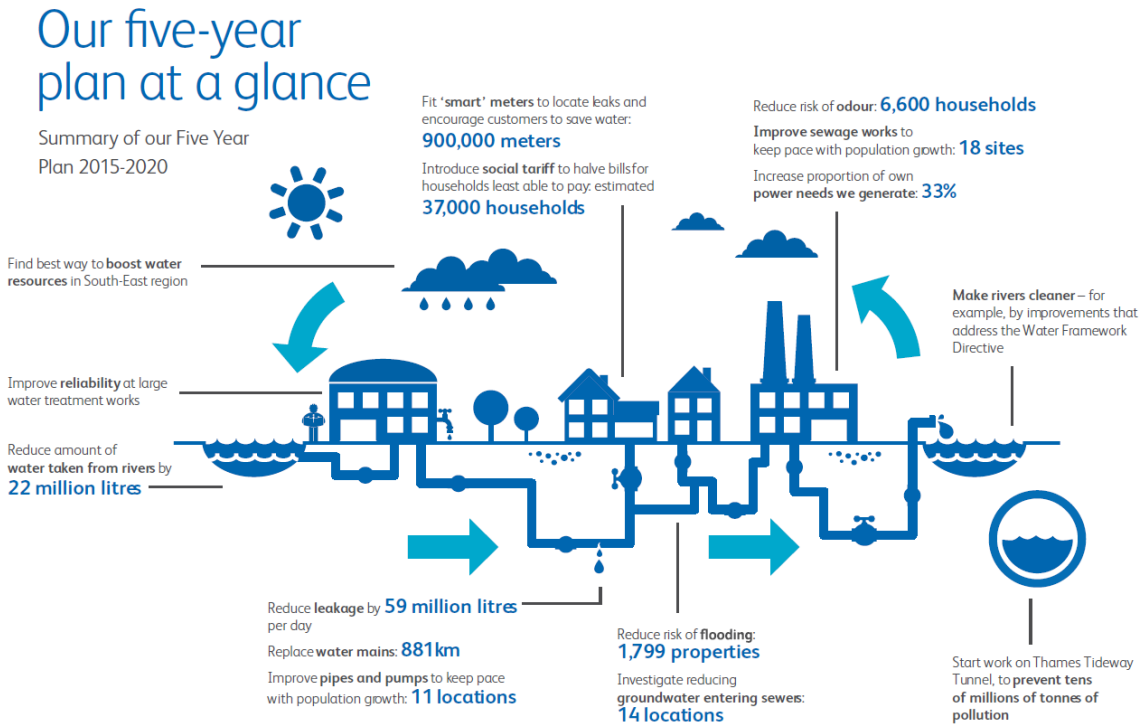


Figure 3-3: Thames Water Summary of Five Year Plan 2015-2020 (taken from *http://www.thameswater.co.uk/tw/common/downloads/ five-year-plan-summary-2015-2020(1).pdf*)

3.1.6 Southern Water Strategic Direction Statement 2015-2040 (2013[15])

The Strategic Direction Statement is a detailed study outlining Southern Water's plans for the next twenty-five years (until 2040). The statement outlines the need for planning capacity in their STW works, with an expected growth in population of more than 16% between 2010 and 2030 in their catchment area. Under Section 2: *Removing wastewater effectively* the statement identifies its current need to increase demand for sewage treatment, and to improve the efficiencies of the treatment works, in order to adapt to an increasing population:

> *"We operate a network of 37,000km of sewers and work with planning authorities to ensure we can accommodate new housing development while maintaining service levels. All new sewers are designed to cope with severe rainfall; we use historic records to plan for this. Floods from sewers are mainly caused by blockages, collapsed pipework, insufficient capacity or problems with our pumping stations.*
>
> *In 2011-12, 303 properties suffered internal flooding. Of these, 288 were caused by blockages and collapses, and 15 by a lack of sewer capacity… Our more modern treatment works include state-of-the-art technology to avoid any impact from smells on the local area." (Southern Water, 2013)*

Under *Section 3: Looking after the environment* the statement says that in 2012, 96.1% of STW works complied fully with Environment Agency set standards. After public consultation the statements found that the following factors were to be a priority for Southern Water over the next 25 years:

[15] Southern Water, 2016, *Strategic Statement 2015-40* [www] Available at <https://www.southernwater.co.uk/strategic-direction-statement> Accessed June 2016

- Continue to renew existing sewers and pumps, targeting areas of greatest risk and reacting to problems as they arise;
- Deliver 100% compliance with the Environment Agency standards at the water and wastewater treatment works;
- Aim to have no pollution incidents in local rivers and watercourses;
- Increasing the level of 'real-time' monitoring of the Southern Water sewerage network in order to spot issues before they occur; and
- Catering for new housing developments, tackling 'hot spots' with local solutions.

3.1.7 Additional Data

The following data was requested from the Environment Agency:

- WFD GIS layer (eco status etc.) (from Geostore)
- Discharge consents for STWs
- STW discharge records (volumetric and quality): WIMS.
- WQ sampling points for the period 04-16: WIMS. For all monitoring points within the catchment
- STWs monitoring points for the period 04-16: WIMS.
- River Flows for all monitoring station in SDOC (daily values). All gauged flows on all rivers within the catchment.
- NIRS incidents (from Geostore)
- WQ standards/objectives: the file "WFD_2014_C2_Physchem_WB_Sites_Stds.xlsx" that should cover all the country
- CAMS document (Wey, - Arun & Western Streams) – .GOV website.
- Water quality model - SIMCAT
- Overview classification of WFD Eco Status for each WB in Waverley 2009-2016. With a breakdown of each element status for each year.
- Waterbodies RRF list (SWIMI & Activity) within Waverley

The following data was requested from Thames Water:

- Population Equivalent and headroom at each STW
- DWF full flow figures and consent figures
- Drainage cluster studies
- Location of Combined Source Overflow occurrences.

4. Sewage Treatment Capacity

4.1 Wastewater Treatment

Sewage treatment in the Waverley Borough Council area are provided by Thames Water and Southern Water. Each have a number of treatment works, some of which are situated outside the council boundaries.

The sewage treatment works (STWs) provide treatment to levels as required by the Environment Agency, with defined discharge consents being closely monitored in accordance with the Urban Waste Water Treatment Directive. Discharges will impact on water quality within the area, particularly when receiving water courses have a low proportion of summer flow.

When considering long term strategic planning of developments, the following are to be considered:

- Available capacity at STWs
- Potential for upgrade of STWs
- The capacity of the infrastructure network connecting properties and risk of Combined Storm Overflows (CSO's).

4.1.1 Existing STW capacity within the Borough of Waverley

STWs operating within the UK are each issued environmental permits, constraining the level of pollutants input into watercourses receiving treated effluent. This is set out within the Urban Waste Water Treatment Directive, aiming to protect the environment from the adverse effects of the discharge of wastewater.

Both Thames Water and Southern Water have outlined in their Strategic Direction Statements the necessity for increasing existing STW capacity should future development mean the existing design capacity loads are unfeasible.

Table 4-1 illustrates the remaining capacity within each of the STWs which treat waste water from within the Borough of Waverley, according to 2012 data. The data has been sourced from the Urban Waste Water Treatment Directive Treatment Plants information available from the EEA data catalogue[16] and should be succeeded by latest water company information. The EEA dataset includes all wastewater treatment plants in England that were reported to the European Commission under the Urban Waste Water Treatment Directive (UWWTD), also known as (91/271/EEC), for the calendar year 2012. This means all treatment plants serving population equivalents greater than 2,000 if discharging to freshwaters or 10,000 if discharging to coastal/transitional waters.

Table 4-1: Capacity remaining for the STWs treating the Borough of Waverley (*Sourced from EEA data catalogue, 2012).*

STW name	Population Equivalent Loads	Design Pop Equivalent Capacity	Remaining Capacity (%)
Aldershot STW	35900	43250	17.0
Chiddingfold STW	2314	2314	0
Cranleigh STW	13300	14349	7.3

[16] European Environment Agency, 2015, *Waterbase – UWWTD: Urban Waste Water Treatment Directive* [www] Available at <http://www.eea.europa.eu/data-and-maps/data/waterbase-uwwtd-urban-waste-water-treatment-directive-3> Accessed June 2016

STW name	Population Equivalent Loads	Design Pop Equivalent Capacity	Remaining Capacity (%)
Elstead STW	4450	4690	5.1
Farnham STW	37400	38680	3.3
Godalming STW	30100	31331	3.9
Haslemere STW	13600	14008	2.9
Shamley Green STW	5050	5337	5.4

4.1.2 Planned upgrades to wastewater infrastructure.

Future objectives from both Thames Water and Southern Water seek to improve their treatment and disposal of waste water into receiving watercourses. A review of the water companies' Strategic Direction Statements shows that they both aim to reduce the number of pollution incidents from wastewater treatment and disposal to zero within the next 25 years, with a minimum aim of 100% compliance by their STW within required standards. Furthermore, both the Thames and South East River Basin Management Plans show that water company waste water treatment disposal improvements have led to improvements to protected areas at 78 and 57 safeguard zones respectively.

A desktop review of Thames Water and Southern Water publications, such as the Thames Water and Southern Water AMP6 business plans and the Water Resources Management Plans, does not detail any site specific improvements to the wastewater infrastructure within the Borough of Waverley. Other online information showing any significant capital improvements required which would directly affect the area of study is not available.

However, consultation with Thames Water shows that the STWs with planned investment are:

- Cranleigh STW -
    1. Dewatering sludge to comply with regulations and reduce risk of nitrate pollution
    2. Improvements to STW to reduce odour for approximately 100 neighbouring properties

- Farnham STW –
    1. Improvements to STW to reduce odour for approximately 100 neighbouring properties

- Haslemere STW –
    1. Dewatering sludge to reduce the risk of nitrate pollution

- Chiddingfold STW –
    1. To meet environmental quality standards

- Grayswood STW –
    1. To meet environmental quality standards

- Loxwood STW –
    1. To meet demand for wastewater treatment

- Chephurst Copse Rudgwick STW

1. To meet demand for wastewater treatment

Consultation with Thames Water as part of this project also flagged up particular investment concerns at the following STWs:

- Farnham
- Cranleigh
- Haslemere
- Godalming
- Guildford

4.1.3 Required wastewater capacity

STW treatment capacity is generally defined through the measure of Population Equivalent (PE) and Maximum Flow. PE quantifies the level of treatment load and is the principle measure for development strategy. Maximum Flow represents the maximum capacity of the network and STW's.

Table 4-2: Wastewater capacity (provided by Thames Water, August 2016)

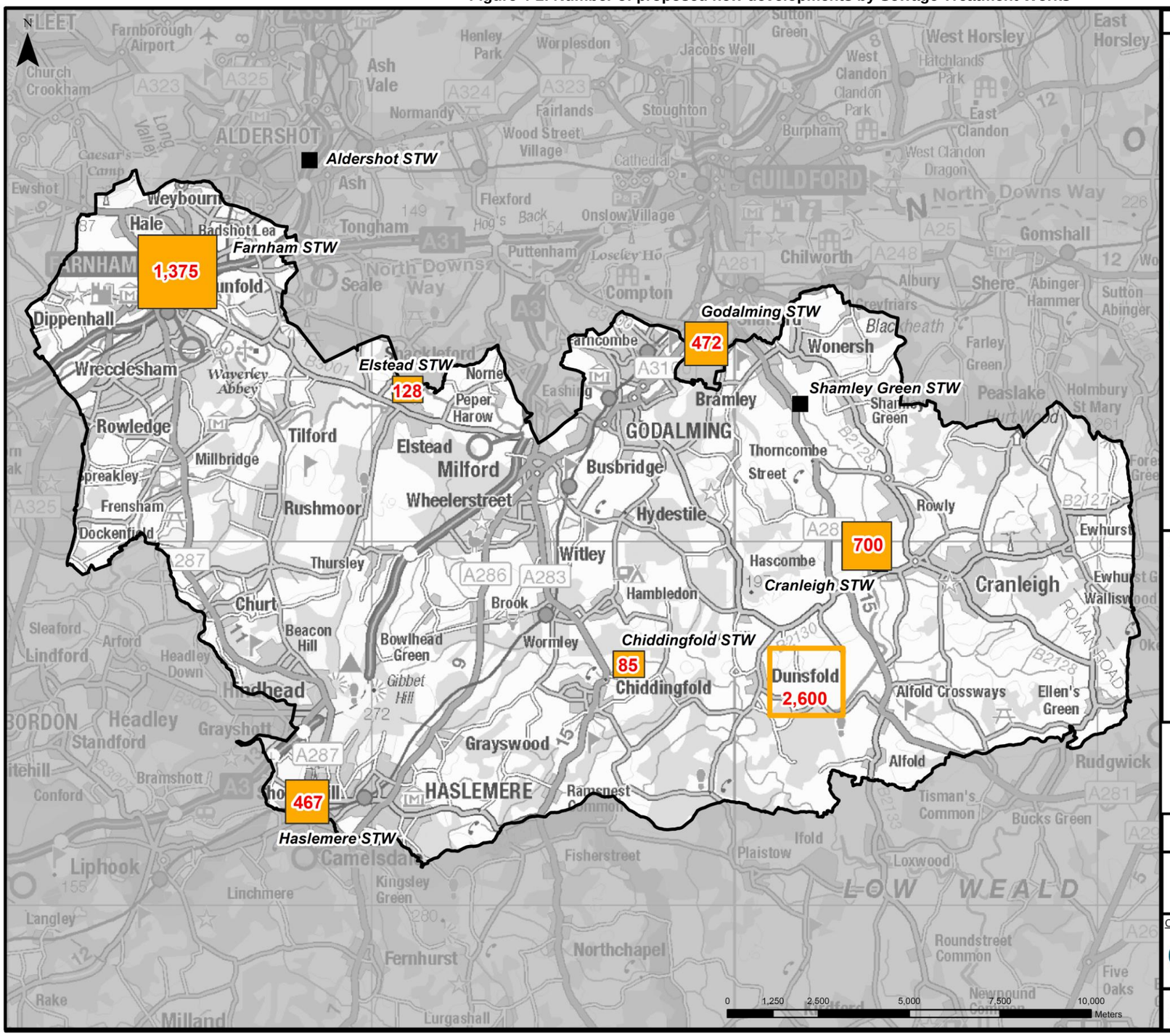
Sewage Treatment Works	PE (2016)	DWF (m3/d)	Max Flow to Full Treatment (L/s) & storm tank capacity (m3)	Permitted Consents (SS, BOD, Amm, P)	Does the site have tertiary treatment?	Phosphorous stripping plant on site?
Cranleigh	14,163	4,540	158 l/s, 482m3	28/8/3/2	Yes	Yes
Elstead	4,608	1,591	no storm separation, peak flow = 5,158m3/d; no storm tank	45/20/10	No	No
Farnham	46,733	13,300	255 l/s, 1,803 m3	20/10/3/2	No	No
Godalming	34,078	8,749	204 l/s, 1,319 m3	25/10/4/2	Yes	Yes
Guildford	94,353	26,254	778 l/s, 6870 m3	45/20/6/2	No	No
Haslemere	14,190	4,296	125 l/s forecast to reduce to 105 l/s in 2016, 1118 m3	25/15/3/2	No	No
Shamley Green	5,230	2,850	54 l/s, 864 m3	45/30/5/n/a	No	n/a

Figure 4-1 shows the STW's which are considered to be effected by the proposed developments in the Waverley Borough Council area, and the number of dwellings per STW which require wastewater treatment. The Dunsfold Park development has not been allocated to a STW. The size of the development and the location from an existing STW means that it is likely that the development will require a new wastewater treatment facility to service it.

The topography of the Borough of Waverley generally runs from north to south; therefore, the figure shows that based upon the location of the developments Cranleigh STW, Haslemere STW, Godalming STW, Aldershot STW and Farnham STW would treat the majority of the developments proposed.

Table 4-3 outlines existing and required population equivalent loads and capacity loads expected as a result of new development in Waverley Borough.

Figure 4-1: Number of proposed new developments by Sewage Treatment Works



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Estimated number of new dwellings requiring wastewater treatment per sewage treatment works (size scaled to number of dwellings requiring treatment)
- Sewage Treatment Work not expected to provide services to new dwellings
- Dunsfold Aerodome Site

Notes

Waverley High Level WCS

Waverley BOROUGH COUNCIL

Scale at A3	Date	Drawn by	Approved by
1:100,000	August 2016	TG	NS

The Borough of Waverley
Estimated number of new dwellings requiring Sewage Treatment

Consultant

CAPITA

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65 Gresham Street
London
EC2V 7NQ

DRAWING NUMBER
CS082381/Figure 4-1

Table 4-3: Population Equivalent requirement to support new development

STW	Assumed current PE	2016 PE data	2012 PE data	Possible Connected new Properties	Additional requirements, PE *(Assuming 2.43 people per dwelling)*	Additional 5% site operational headroom (PE) *(5% of existing PE + additional PE)*	Total STW PE requirement for development	Site notes
Chiddingfold	2314		2314	85	207	127	2648	Site has potential space to build additional capacity
Aldershot	35900		43250	Unlikely to be serving new properties				Constrained site possible room to north of site for expansion
Cranleigh	14163	14163	14349	700	1701	794	16658	Ongoing upgrades. And future required – inlet works pinch point long thin site water quality odor and flooding. Dilution factor issue.
Elstead	4608	4608	4690	128	312	246	5166	Existing site appears to have area for expansion if required
Farnham	46733	46733	38680	1375 some possibly shared with Aldershot depending on siting and network	3342	2504	52579	Would need an upgrade. Storm tanks, aeration centrifuges. Potential tertiary treatment.

STW	Assumed current PE	2016 PE data	2012 PE data	Possible Connected new Properties	Additional requirements, PE *(Assuming 2.43 people per dwelling)*	Additional 5% site operational headroom (PE) *(5% of existing PE + additional PE)*	Total STW PE requirement for development	Site notes
Godalming	34078	34078	31331	472 possibly shared with Guildford depending on siting and network	1147	1762	36987	Limited capacity and upgrades proposed in the near future
Guildford	94353	94353		May not be serving new properties, unless some of the 472 expected to be served by Godalming was shared with Guildford, depending on siting and network				Treatment Works under review for rebuild due to asset life.
Haslemere	14190	14190	14008	467	1135	767	16092	Limited site capacity, Land to east and potential for smaller footprint technologies
Shamley Green	5230	5230	5337	Unlikely to be serving new properties				Available land for expansion on site and adoption of new technologies allows growth capacity

The table shows that the existing works have a varying degree of additional capacity for expansion, and whilst generally some small scale developments may be absorbed by the existing capacity the increasing in loads are likely to require capacity increases. Utilising an average household size of 2.43 (Surrey Transport Plan, Surrey County Council, February 2016) the transposed increase in PE has been calculated. A nominal 5% headroom has been included to enable the plant to withstand shock loads and peaks that are present in operation. The final PE figure shown in the table does not, however, take into account the additional loads that would be required from further social infrastructure which supports development such as schools, healthcare establishment, nor from increased commercial and industrial development attracted as a result of an increased population.

As can be seen from the table and without allowing for additional social, commercial or industrial loads, all of the STW's will require some form of expansion to cater for the additional development. Given the improvements in technology reducing overall asset size whilst improving performance and the perceived site areas available we do not believe that the STW's are unable to be modified to accommodate the potential additional loads.

Investment may also afford the opportunity to potentially improve water quality through improved treatment processes and modern control systems. As we move to a greater understanding of receiving water's water quality through a number of UK and EU initiatives we would assume that regulation and enforcement will drive the improvement of water quality discharge from STW's which will require further asset investment in the mid to long term.

4.1.4 Network infrastructure capacity

To assess the effects of developments on networks capacity requires a detailed understanding of the relevant networks the location and type of development, the drainage approach used as well as other factors beyond the scope of this report. We would advise that the implications of any development on the network infrastructure, and flood risk is assessed in detail on a case by case basis.

Similarly the effects of developments on any Combined Storm Overflows and their impact on water quality can only be assessed through the detailed case by case study of a development.

Taking a high level look at the location of development in relation to STW, the Dunsfold Park development stands out as the most challenging in terms of network connection. This is because the development is located in a rural area around 2.5 miles from Cranleigh STW and around 4 miles from Chiddingfold STW.

4.1.5 Challenges and recommendations

The most significant challenge is managing wastewater from the Dunsfold Park development. As a development some distance away from existing STW and the resulting likelihood that the network infrastructure would be significantly under capacity for the proposed development, consideration is needed whether to build and operate network infrastructure to allow for the transportation of sewage to an existing treatment works or to build a local treatment works to service the new development. The wastewater infrastructure needs for this development should be agreed between Waverley Borough Council, Environment Agency, wastewater treatment provider and developer(s) at an early stage to ensure that the necessary infrastructure is in place before development is completed.

In order to fully assess demands and loadings on STW's such that proactive STW upgrades may be implemented we would recommend that a review of the capacity needed for commercial, industrial, institutional and social infrastructure development required to support the increased population is also undertaken. SIMCAT modelling can be used to model wastewater inputs and outputs.

Further integrated working between Waverley Borough Council, the Environment Agency, wastewater regulated business and community groups are also recommended to develop this report as a live document with increasing detail as further knowledge of development sites is gained.

5. Environmental Capacity

5.1 Baseline WFD Status

5.1.1 Cycle 2 WFD Status

Table 5-2 shows the status of all water bodies within Waverley for Cycle 2, correct as of 2015. All water bodies are currently failing as none have achieved overall good or high status. There are 3 incidents of Bad status being recorded: for Ock, Royal Brook and Frensham Little Pond. The number of occurrences of failure for individual elements are shown below in Table 5-1. It indicates that phosphate, macrophytes and phytobenthos and fish are the three most often failing elements. Phosphate is recorded as Moderate, Poor, or Bad in 80% of Waverley's WFD water bodies. Macrophytes and phytobenthos were recorded as failing in 80% of water bodies, whilst fish failed to achieve good in 55% of water bodies.

Table 5-1: Occurrences of Failing Elements

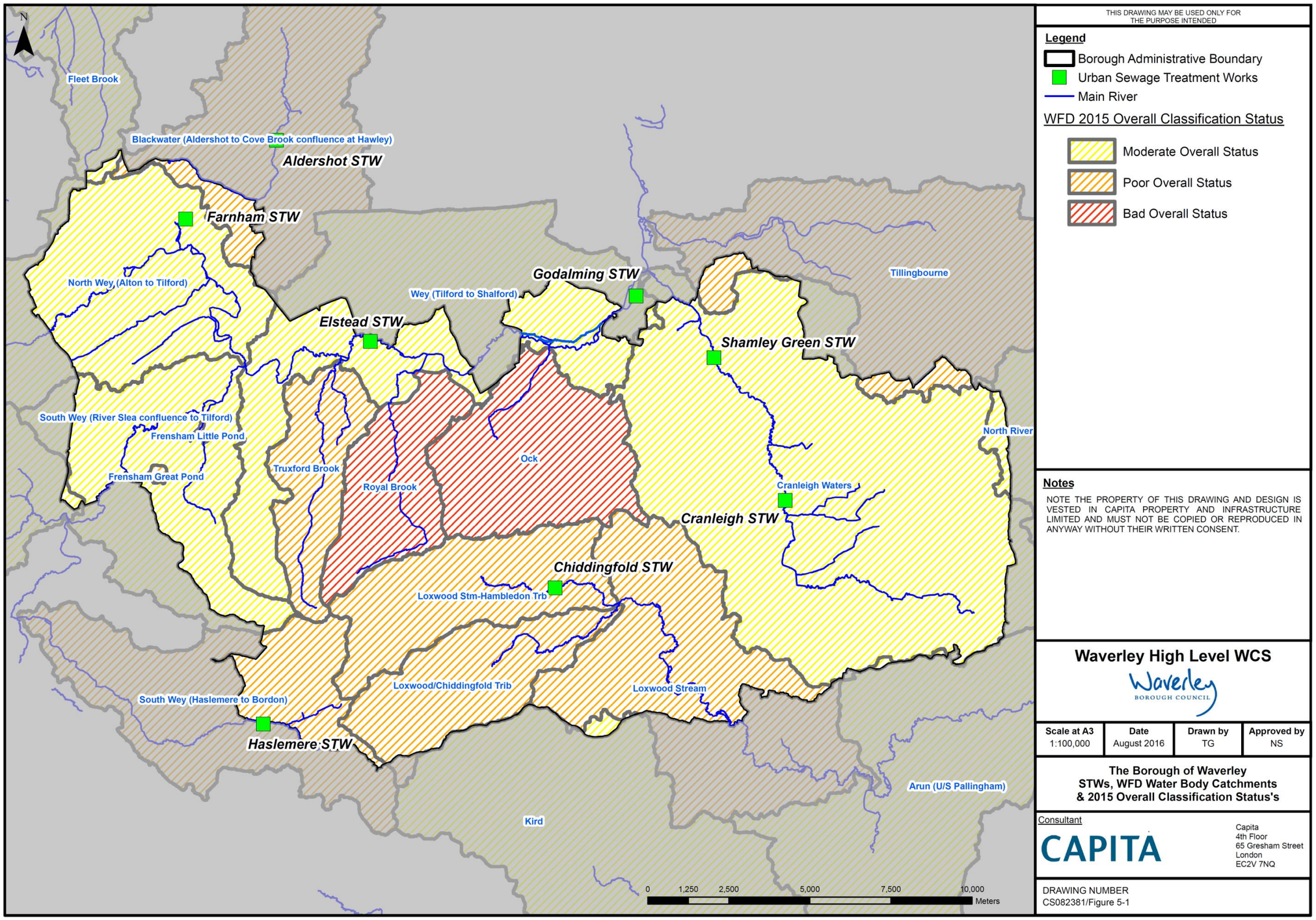
Failing Element	Number of Occurrences
Fish	11
Invertebrates	5
Macrophytes and Phytobenthos	16
Phytoplankton	2
Dissolved Oxygen	3
Biochemical Oxygen Demand	1
Phosphate (including Total Phosphorus)	16
Ammonia	1
Hydrological Regime	2

Table 5-2: RBMP2 WFD Status

WFD Water Body Name	WFD Water Body ID	River Basin District	Management Catchment	Overall Water Body Class	Overall Water Body Objective	Failing Elements	Reasons for Not Achieving Good Status	Overall Water Body Alternative Objective Reason
Blackwater (Aldershot to Cove Brook confluence at Hawley)	GB106039017180	Thames	Loddon and Tributary	**Poor**	*Good by 2027*	Fish Invertebrates Macrophytes & Phytobenthos Phosphate Dissolved Oxygen Ammonia	Continuous sewage discharge from waste water, urbanisation (development and transport), contaminated land, industrial discharge and mixed drainage.	No known technical solution is available, Cause of adverse impact unknown, Unfavourable balance of costs and benefits, Disproportionate burdens
Fleet Brook	GB106039017120	Thames	Loddon and Tributary	**Moderate**	*Good by 2027*	Fish Invertebrates Dissolved oxygen Phosphate	Continuous sewage discharge from waste water, physical modification for land drainage, natural low flows, and dairy/beef field.	No known technical solution is available, Cause of adverse impact unknown, Disproportionate burdens
Truxford Brook	GB106039017770	Thames	Wey and Tributary	**Poor**	*Good by 2027*	Fish Invertebrates	Physical modification for land drainage, and pollution from mixed agricultural areas.	Cause of adverse impact unknown
South Wey (River Slea confluence to Tilford)	GB106039017780	Thames	Wey and Tributary	**Moderate**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water.	No known technical solution is available
Ock	GB106039017790	Thames	Wey and Tributary	**Bad**	*Good by 2027*	Fish Invertebrates Hydrological regime	Physical modification for land drainage, physical modification creating barriers to fish migration, and surface water abstraction.	Cause of adverse impact unknown
South Wey (Haslemere to Bordon)	GB106039017700	Thames	Wey and Tributary	**Poor**	*Good by 2027*	Fish Phosphate	Continuous sewage discharge from waste water, physical modification creating barriers to fish migration, and pollution from mixed agricultural areas.	Cause of adverse impact unknown, Disproportionate burdens
Cranleigh Waters	GB106039017810	Thames	Wey and Tributary	**Moderate**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water.	No known technical solution is available
Wey (Tilford to Shalford)	GB106039017820	Thames	Wey and Tributary	**Moderate**	*Good by 2027*	Fish Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water, impoundments due to navigation and pollution from mixed agricultural areas.	No known technical solution is available, Disproportionate burdens
Slea (Kingsley to Sleaford)	GB106039017750	Thames	Wey and Tributary	**Moderate**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water, and pollution from mixed agricultural areas.	Disproportionate burdens
Royal Brook	GB106039017760	Thames	Wey and Tributary	**Bad**	*Good by 2027*	Fish Macrophytes & Phytobenthos	Physical modification causing barriers to fish migration, and physical modification for land drainage.	Cause of adverse impact unknown
North Wey (Alton to Tilford)	GB106039017830	Thames	Wey and Tributary	**Moderate**	*Good by 2027*	Fish Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water, and physical modification causing barriers to fish migration.	No known technical solution is available, Cause of adverse impact unknown
Tillingbourne	GB106039017840	Thames	Wey and	**Poor**	*Good by 2027*	Fish	Continuous sewage	Disproportionate

WFD Water Body Name	WFD Water Body ID	River Basin District	Management Catchment	Overall Water Body Class	Overall Water Body Objective	Failing Elements	Reasons for Not Achieving Good Status	Overall Water Body Alternative Objective Reason
			Tributary			Macrophytes & Phytobenthos Hydrological regime Phosphate	discharge from waste water, industrial discharge, invasive non-native species, physical modification causing barriers to fish migration, and pollution from mixed agricultural areas.	burdens
Arun (Upstream of Pallingham)	GB107041017950	South East	Arun and Western Streams	**Moderate**	*Good by 2027*	Fish Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water, and pollution from mixed agricultural areas.	No known technical solution is available, Disproportionate burdens
Loxwood/Chiddingfold Tributary	GB107041017960	South East	Arun and Western Streams	**Poor**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water.	Disproportionate burdens
Loxwood Stream	GB107041017970	South East	Arun and Western Streams	**Poor**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water.	Disproportionate burdens
Loxwood Stream-Hambledon Tributary	GB107041017980	South East	Arun and Western Streams	**Poor**	*Good by 2027*	Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water.	Disproportionate burdens
North River	GB107041017990	South East	Arun and Western Streams	**Moderate**	*Good by 2027*	Fish Macrophytes & Phytobenthos Phosphate	Continuous sewage discharge from waste water, pollution from mixed agricultural areas, and dairy/beef field.	Disproportionate burdens
Kird	GB107041012300	South East	Arun and Western Streams	**Moderate**	*Good by 2027*	Invertebrates Macrophytes& Phytobenthos Biochemical Oxygen Demand Dissolved Oxygen Phosphate	Continuous sewage discharge from waste water, impoundments, natural low flows, and pollution from mixed agricultural areas.	Disproportionate burdens
Frensham Great Pond	GB30644031	Thames	Wey and Tributary	**Poor**	*Good by 2027*	Macrophytes & Phytobenthos Phytoplankton Total Phosphorus	Continuous sewage discharge from waste water, diffuse sewage discharge from towns, cities and transport, and drainage from road runoff.	Disproportionate burdens
Frensham Little Pond	GB30643943	Thames	Wey and Tributary	**Bad**	*Good by 2027*	Macrophytes & Phytobenthos Phytoplankton	Unknown	Cause of adverse impact unknown

Figure 5-1: Location of WFD water bodies and their classification status



5.1.2 Reasons for failure

Table 5-3 lists all of the reasons water bodies did not achieve good status in Cycle 2 and highlights the number of instances they were stated. Continuous sewage discharge from waste water is the most frequently stated reason for an element failure, being attributed for 80% of the water bodies. This directly links with the most often failing elements, phosphate and macrophytes and phytobenthos, which are heavily influenced by STW discharge.

Table 5-3: Cited reasons for not achieving good status

Reason for failure	Number of occurrences
Continuous sewage discharge from waste water	16
Urbanisation – transport and development	1
Contaminated land	1
Industrial discharge	2
Mixed drainage	1
Physical modification for land drainage	7
Natural low flows	2
Dairy/beef field	2
Pollution from mixed agricultural areas	8
Physical modification causing barriers to fish migration	5
Surface water abstraction	1
Impoundment – navigation	1
Impoundment – agriculture and land management	1
Invasive non-native species	1
Diffuse sewage discharge from towns, cities and transport	1
Drainage from road run-off	1

Physical modification for land drainage, pollution from mixed agricultural areas and physical modification causing barriers to fish migration are all cited as reasons for not achieving good status in between 25% and 40% of the water bodies.

The current status of water bodies in the Waverley Borough and reasons for their failure suggest that STWs may already be negatively impacting riverine ecology. High phosphate levels (primarily from detergents, human waste and arable applications) can cause an imbalance within the aquatic plant and animal communities. In particular, high nutrient loading and stimulate the growth of certain plankton and aquatic plant species, whilst negatively affecting species less tolerant of impure water quality conditions. The effect of this is a reduced floral diversity as species that thrive in high-nutrient (eutrophic) conditions will outcompete those that thrive in low-nutrient conditions, thus changing the ecological community balance from what would be expected in an un-impacted water body. Changes to phytoplankton and plant communities, along with general water quality and physical habitat conditions, then has a knock-on impact on invertebrate and fish community diversity as the latter are dependent upon habitat and water conditions and available food sources.

Table 5-4: High level assessment of proposed growth plans and WFD impacts

STW receiving body	WFD status	Water quality issues	Impact of growth plans
Chiddingfold STW Loxwood Stream – Hambledon Tributary (Proposed additional dwellings: 85)	Poor Disproportionate burdens exist preventing achieving Good by 2015. Objective to reach Good by 2027.	• Macrophytes & phytobenthos classified as Poor, although the cause is uncertain. Further investigation is required. • Phosphate is classified as Moderate for the water body. The cause is confirmed to be continuous sewage discharge from the treatment of wastewater. In this case, the point source would be Chiddingfold STW. • Although the overall WFD status for this water body appears to have deteriorated between Cycles 1 and 2, it is due to the additional inclusion of Fish, which drives the Poor status. Phosphate classification improved from Poor to Moderate status between Cycles 1 and 2.	Moderate impact Chiddingfold STW has reached its population equivalent design capacity, so will be unable to treat any additional waste water. The current STW will be unable to cope with waste water from the proposed development at Dunsfold, so alternative options will need to be explored for this site (see below).
Dunsfold No existing formal STW for this site. (Proposed additional dwellings: 2,600) Adjacent STWs are Chiddingfold (to the west) or Cranleigh (to the east) – both of which already have issues for allocated proposed developments. If a new STW was built, receiving	Wey & Arun Canal: Moderate Canal system unlikely to be suitable for significant sewage effluent discharge (not considered further at this stage). Loxwood Stream: Poor Disproportionate burdens exist preventing achieving Good	• Macrophytes & phytobenthos classified as Poor. • Phosphate is classified as Moderate for the water body. The cause is confirmed to be continuous sewage discharge from the treatment of waste water. In this case, the major point source would also be Chiddingfold STW which discharges into the upstream waterbody	High Impact A new STW may need to be built for this development site as adjacent STWs will need expansion for other allocated developments. This will result in a new, significant discharge, most likely to be released into the Loxwood Stream which is already impacted by effluent released from Chiddingfold into the upstream water body.

STW receiving body	WFD status	Water quality issues	Impact of growth plans
watercourse(s) could include: • Wey & Arun Canal – Loxwood Section (nearest water body) • Loxwood Stream	by 2015. Objective to reach Good by 2027		
Haslemere STW South Wey (Haslemere to Bordon) (Proposed additional dwellings: 467)	Poor Disproportionate burdens exist preventing achieving Good by 2015. Causes of some adverse impacts are unknown. Objective to reach Good by 2027.	• Fish is classified as Poor, with suspected causes being physical modification causing barriers to fish migration and diffuse sources of sediment from agricultural and rural land management. Further investigation is required to confirm. • Phosphates are classified as Poor with the suspected cause of continuous sewage discharge from the treatment of waste water. Further investigation is required to confirm this, and whether Haslemere STW would be the point source of pollution. • The waterbody has not deteriorated between Cycles 1 and 2, but shows no sign of improvement.	Moderate impact. Haslemere STW is suspected to be the factor causing Poor status of phosphate, so increasing the population equivalent load could potentially cause further deterioration of this classification. Haslemere STW is nearing its design capacity, so careful consideration must be taken to ensure proposed developments do not breach existing discharge permits.
Farnham STW North Wey (Alton to Tilford) (Proposed additional dwellings: 1,375)	Poor No known technical solution is known, and causes of some adverse impacts	• Fish is classified as Moderate, with suspected causes being physical modification causing barriers to fish migration, and physical modification due to urbanisation. • Phosphate is classified as Poor due to continuous sewage discharge from the treatment of waste water. • Macrophytes & phytobenthos are classified as	High impact. Farnham STW is nearing its capacity, and it is suspected that STW effluent is currently having an adverse impact on the water body's quality, specifically phosphate and

STW receiving body	WFD status	Water quality issues	Impact of growth plans
	are unknown. Good by 2027	Moderate due to the poor phosphate levels in the water body. • Deterioration of the water body occurred between Cycles 1 and 2, specifically for fish.	macrophytes and phytobenthos. Increasing the population equivalent load and thereby discharge from the STW could risk breaching existing discharge permits.
Cranleigh STW Cranleigh Waters (Proposed additional dwellings: 700)	Moderate No known technical solutions. Moderate by 2015	• Phosphate is classified as Moderate status, with the probable cause of STW effluent. • Macrophytes and phytobenthos are classified as Moderate, and this status is caused by poor phosphate levels, so is driven by STW effluent. • Phosphate status deteriorated between Cycles 1 and 2.	High impact. The probable cause of existing failing WFD elements has been attributed to STW effluent, and evidence of deterioration between Cycles 1 and 2 is recorded. Increasing the population equivalent load as a result of the proposed developments would have an adverse impact of the ecological integrity and water quality of the water body.
Shamley Green STW Cranleigh Waters (Proposed additional dwellings: 0)	Moderate No known technical solutions Moderate by 2015	• Phosphate is classified as Moderate status, with the probable cause of STW effluent. • Macrophytes and phytobenthos are classified as Moderate, and this status is caused by poor phosphate levels, so is driven by STW effluent. • Phosphate status deteriorated between Cycles 1 and 2.	Low impact No proposed developments within Shamley Green STW catchment. Impacts could be experienced due to conveyance of STW effluent from Cranleigh, but would need to consider whether current available dilution of effluent could mitigate against this.
Elstead STW	Moderate	• Fish is classified as Moderate with the confirmed cause of impoundment for	Moderate impact

STW receiving body	WFD status	Water quality issues	Impact of growth plans
Wey (Tilford to Shalford) (Proposed additional dwellings: 128)	No known technical solutions, and disproportionate burdens. Good by 2027	navigation, and for agriculture and rural land management purposes. • Phosphates are classified as Moderate, with the probable cause of continuous sewage discharge from the treatment of waste water. • Macrophytes and phytobenthos are classified as Moderate, which has a probable cause of phosphate, caused by continuous sewage discharge.	The proposed development within the area that Elstead STW serves is relatively small, and is not likely to cause a breach of the existing discharge permit. The water body, however, is vulnerable to STW effluent, so increasing discharge could risk deterioration in WFD status.
Godalming STW Wey (Tilford to Shalford) (Proposed additional dwellings: 472)	Moderate No known technical solutions, and disproportionate burdens. Good by 2027	• Fish is classified as Moderate with the confirmed cause of impoundment for navigation, and for agriculture and rural land management purposes. • Phosphates are classified as Moderate, with the probable cause of continuous sewage discharge from the treatment of waste water. • Macrophytes and phytobenthos are classified as Moderate, which has a probable cause of phosphate, caused by continuous sewage discharge.	Moderate impact The proposed developments within the area that Godalming STW serves are relatively small, and is not likely to cause a breach of the existing discharge permit. The water body, however, is vulnerable to STW effluent, so increasing discharge could risk deterioration in WFD status.

Of the 6 STWs situated within Waverley, it is estimated that the proposed developments will have high impacts at three sites, moderate impacts at four, and low impacts at one site. This is largely due to the pre-existing pressures that STW effluents are exerting on the WFD status of the receiving and downstream water bodies and the uncertainty that the water bodies would be able to cope with increased sewage effluent volumes.

Cranleigh STW, for instance, does have approximately 7.3% spare capacity, as per Table 4-1, but the extent of the proposed developments combined with the current failing and deteriorating WFD status caused by phosphate is indication that the STW and the water body, in their existing state, do not have the environmental capacity to cope with the proposed developments.

Farnham STW, due to the low remaining capacity and failing and deteriorating WFD status of the downstream water body, is unlikely to have sufficient environmental capacity to effectively treat waste water from the proposed developments. The water body's failure is suspected to be caused by continuous sewage discharge, so increasing the population equivalent load through the implementation of the proposed developments is likely to have an adverse impact of water quality and ecology, and therefore WFD status.

Chiddingfold STW is likely to be causing elevated phosphate levels in the Loxwood Stream but careful site management may provide sufficient treatment improvement for 85 dwellings to not have an impact. However, when the potential 2,600 dwellings at Dunsfold are factored in, combined existing and new effluent impacts on the next water body downstream, even with a separate new treatment works for Dunsfold, may have a high impact as the water body is already under pressure.

For all water bodies, future detailed assessment should consider the impacts on both the immediate receiving water body and the next water body downstream for cumulative effects. Future detailed assessment could include use of SIMCAT to model these catchment effects.

5.1.3 STW Permits

The STWs within Waverley and that serve the administrative area have existing permits, details of which were supplied by the Environment Agency, can be found in Table 5-5. The composition of included determinands can suggest the source or cause of water quality issues, for example, the inclusion of heavy metals in the Aldershot STW permit suggests that the site receives water from industry, which may have a detrimental impact on the water course. As demonstrated in Table 5-3, the receiving water body (Blackwater (Aldershot to Cove Brook confluence at Hawley)) currently has industrial discharge cited as a reason for not achieving good status, suggesting the permit has either been breached, or that the restrictions in place are not adequate to protect the water quality of the receiving body.

Table 5-5: Sewage Treatment Plant existing permits

STW	Start date of permit	Determinands permit applies to	Limit type	Limit
Aldershot	April 2009	Ammoniacal Nitrogen as N	95 percentile	2 mg/l
		BOD 5 day ATU	95 percentile	9 mg/l
		Cadmium	Maximum	1 µg/l
		Chromium	Maximum	8 µg/l
		Copper	Maximum	77 µg/l
		Iron	Maximum	4000 µg/l
		Nickel	Maximum	68 µg/l

STW	Start date of permit	Determinands permit applies to	Limit type	Limit
Chiddingfold	Not provided	Ammoniacal Nitrogen as N BOD 5 day ATU Iron Suspended solids Total phosphorus	95 percentile 95 percentile Maximum 95 percentile Mean	8 mg/l 20 mg/l 4000 µg/l 30 mg/l 1 µg/l
Cranleigh	April 2010	Aluminium Ammoniacal Nitrogen as N BOD 5 day ATU Flow (dry weather) Iron Suspended solids	Maximum 95 percentile 95 percentile Maximum Maximum 95 percentile	4000 µg/l 3 mg/l 3 mg/l 4540 m^3/day 4000 µg/l 25 mg/l
Elstead	April 2010	Ammoniacal Nitrogen as N BOD 5 day ATU Flow (dry weather) Suspended solids	95 percentile 95 percentile Maximum 95 percentile	10 mg/l 20 mg/l 1591 m^3/day 45 mg/l
Farnham	April 2010	Aluminium Ammoniacal Nitrogen as N BOD 5 day ATU Flow (dry weather) Iron Suspended solids	Maximum 95 percentile 95 percentile Maximum Maximum 95 percentile	4000 µg/l 3 mg/l 10 mg/l 13,300 m^3/day 4000 µg/l 20 mg/l
Godalming	April 2010	Aluminium Ammoniacal Nitrogen as N BOD 5 day ATU Flow (dry weather) Iron Oil and grease (present/not, 1/0) Suspended solids	Maximum 95 percentile 95 percentile Maximum Maximum - 95 percentile	10,000 µg/l 4 mg/l 10 mg/l 8749 m^3/day 4000 µg/l 1 25 mg/l
Haslemere	April 2011	Aluminium Ammoniacal Nitrogen as N BOD 5 day ATU Iron Suspended solids	Maximum 95 percentile 95 percentile Maximum 95 percentile	4000 µg/l 3 mg/l 15 mg/l 4000 µg/l 25 mg/l
Shamley Green	April 2010	Ammoniacal Nitrogen as N BOD 5 day ATU Flow (dry weather) Suspended solids	95 percentile 95 percentile Maximum 95 percentile	5 mg/l 30 mg/l 2850 m^3/day 45 mg/l

5.1.4 Challenges and Recommendations

Further information with respect to the drainage strategy that will be implemented for the Dunsfold Park development is needed in order to assess the impact that this will have on WFD status. Of the two STWs located in close proximity to the site, Chiddingfold STW has reached capacity and will not be equipped to serve the extent of the development, and Cranleigh STW is currently the probable cause of the failing

and deteriorating status of phosphate and macrophytes and phytobenthos, meaning increasing the effluent would have a further impact on WFD status.

The current WFD status of water bodies within Waverley's administrative boundaries suggest that the ecology and water quality could be adversely impacted by the proposed developments causing increased effluent from STWs. This approach could, however, be considered qualitative, and an element of uncertainty is involved due to the prevalence of unconfirmed causes of WFD failures.

To gain a more quantitative conclusion of the current impact of STWs on water quality, and the potential impact of proposed developments, it is recommended that SIMCAT water quality modelling be applied.

6. Consultation

6.1 Prior Consultations

This section reviews the information received by WBC from consultations carried out between the WBC and the water companies related to the Local Plan developments.

6.1.1 Consultation 1: Consultation with Southern Water 19th December 2014

This consultation with Southern Water was to clarify potential scenarios for housing delivery. Waverley Borough Council requested local infrastructure planning advice for the following four housing delivery scenarios proposed:

1. Around 4,450 on greenfield sites at the four largest settlements, some growth at villages (600) but no development at Dunsfold Aerodrome

2. Around 2,650 on greenfield sites at the four largest settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome

3. Around 1,900 on greenfield sites at the four largest settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome

4. Around 1,200 on greenfield sites at the four largest settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome

The proforma response from Southern Water can be viewed in Appendix C. During the consultation response Southern Water stated the following:

"Southern Water provides wastewater services in parts of Waverley, including Chiddingfold STW, Grayswood STW and some of the smaller villages to the south of the Borough of Waverley...

We have not identified any fundamental reason why new development should not go ahead. However, it is likely that investment would be required to deliver additional wastewater treatment capacity, Southern Water can plan and deliver this strategic infrastructure through the five yearly price review process. It is also likely that investment will be required in the sewerage system which conveys wastewater to the treatment works. We need the precise location and scale of development to assess the ability of our infrastructure to accommodate the proposed development. We take this opportunity to point out that limited capacity is not a constraint to development. We would seek a criterion in any site allocation policy to support the delivery of the necessary local infrastructure to meet the anticipated demand."

This consultation response demonstrates that Southern Water had no fundamental challenge to new development within the areas proposed in the housing delivery scenarios by Waverley Borough Council.

6.1.2 *Consultation 2: Utilities IDP 2015 update 8th February 2016*

A consultation between Waverley Borough Council and Thames and Southern water companies was held on the 8th February 2016. The updates to the IPD 2015 schedule showed the following improvements are currently being made to the STWs within the Borough of Waverley:

- Improvements to Cranleigh STW -
    1. Dewatering sludge to comply with regulations and reduce risk of nitrate pollution (**Lead Agency for scheme – Thames Water; delivery phase - Unknown)**;
    2. Improvements to STW to reduce odour for approximately 100 neighbouring properties (**Lead Agency for scheme – Thames Water; delivery phase - Unknown)**.

- Improvements to Farnham STW –
    1. Improvements to STW to reduce odour for approximately 100 neighbouring properties (**Lead Agency for scheme – Thames Water; delivery phase - Unknown)**.

- Improvements to Haslemere STW –
    1. Dewatering sludge to reduce the risk of nitrate pollution (**Lead Agency for scheme – Thames Water; delivery phase - Unknown).**

- Investment into Chiddingfold STW –
    1. To meet environmental quality standards (**Lead Agency for scheme – Southern Water; delivery phase – 2011-2016).**

- Investment into Grayswood STW –
    1. To meet environmental quality standards (**Lead Agency for scheme – Southern Water; delivery phase – 2011-2016).**

- Investment into Loxwood STW –
    1. To meet demand for wastewater treatment (**Lead Agency for scheme – Southern Water; delivery phase – dependant on level of development).**

- Investment into Chephurst Copse Rudgwick STW
    1. To meet demand for wastewater treatment (**Lead Agency for scheme – Southern Water; delivery phase – dependant on level of development).**

6.1.3 *Consultation 3: Consultation with Southern Water 16th May 2016*

A consultation between Waverley Borough Council and Southern Water, taken place 16th May 2016, found that approximately 250 dwellings under the Waverley Borough Council's new emerging Local Plan would fall under Southern Water's operational area. It is likely that additional wastewater treatment capacity may be required to serve the proposed development, which would require new or amended environment permits from the Environment Agency; however, no environmental constraints that might prevent Southern Water from providing the necessary capacity were identified.

Additionally Southern Water stated that any requisite additional strategic infrastructure can be planned and funded in parallel with development through the water industry's investment planning process (Ofwat's five yearly price review process). Finally the consultation response states that overall there is no fundamental reason why the housing options could not proceed from the view of Southern Water. Please refer to Appendix C for the full consultation response.

6.1.4 Consultation 4: Consultation with Thames Water 16th March 2016

A consultation between Waverley Borough Council and Thames Water was held on the 16th March 2016. Thames Water was asked to clarify potential scenarios for housing delivery. Waverley Borough Council requested local infrastructure planning advice for the following four housing delivery scenarios proposed:

1. Around 4,450 on greenfield sites at the four largest settlements, some growth at villages (600) but no development at Dunsfold Aerodrome

2. Around 2,650 on greenfield sites at the four largest settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome

3. Around 1,900 on greenfield sites at the four largest settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome

4. Around 1,200 on greenfield sites at the four largest settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome

The proforma response from Thames Water is attached in Appendix A. The response from Thames Water states that it is anticipated that within scenarios 1 and 2 there will be proposed developments where the receiving STWs are unlikely to be able to support the demand anticipated and that infrastructure upgrades are; therefore, likely to be required to ensure sufficient treatment capacity is available to serve these developments.

Thames Water also state they have significant concerns in regards to wastewater treatment and network for the Dunsfold Aerodrome site:

"We have significant treatment and network capacity concerns for the Dunsfold Aerodrome site. The application is proposing to deal with the development's foul water flows by using onsite sewage treatment. While this proposal does not directly affect Thames Water at the moment, should it prove not feasible then the alternative is likely to be a connection to the public sewer for which we would have serious concerns and an appropriately worded condition would be sought on any permissions."

Thames Water advised that to address these uncertainties Waverley Borough Council should require the developer to produce a detailed drainage strategy, covering the following points:

- **What is required within the drainage strategy –** Upsizing of pipes, provision of storage tanks; location plan & drawings of the solution
- **When is it required** – All phasing associated with the delivery of the site;
- **Which route will the developer take** – What agreements are in place, will the developer deliver it, will Thames Water deliver it or will it be a joint effort?

6.2 High Level Water Cycle Study Correspondence

During this project, the Environment Agency, Thames Water and Southern Water were consulted. The former two organisations partook in telecoms on Friday 22nd July 2016. The latter provided us with email correspondence on 12th July 2016.

Thames Water stated that there were a number of STWs which required improvements. These included:

- Farnham STW - a centrifugal aeration system.
- Cranleigh STW - inlet works improvements.
- Haslemere STW– limited capacity
- Godalming STW – limited capacity
- Guildford STW – relocation of works

Thames Water reiterated their concerns over providing wastewater services for the Dunsfold Park development and recommended all developments to include a detailed design strategy and integrated water strategy. Thames Water also mentioned that some areas have drainage cluster studies; although none of relevance were provided after the call.

Following on from the consultation Thames Water provided the following data:

- Daily mean monitored flows from five of the STWs within the Borough of Waverley;
- Site maps for the STWs within the Borough of Waverley; and
- 2016 recorded data for the STWs within the Borough of Waverley.

The Environment Agency stressed the need to understand what elements are failing in receiving watercourses (with respect to the WFD), whether they are driven by outfalls from STWs, and how effluent from increased development will affect discharges. The Environment Agency representative also said he was keen to see quantitative data analysis and recommended that the use of SIMCAT or other catchment modelling software be used to understand impacts. The Environment Agency has since provided us with SIMCAT and the majority of data which feeds into it, so this would be a prudent next step in analysis.

Southern Water stated that:

'Southern Water provides wastewater services in part of Waverley, including Alford and Chiddingfold. As mentioned, in response to Waverley's consultation on housing scenarios early this year, we identified that approximately 250 of the new dwellings would fall within our operational area. Southern Water has a statutory obligation to serve new development. The company is committed to providing the right infrastructure in the right place at the right time.

Southern Water operates its wastewater treatment works in accordance with environmental permits issued and enforced by the Environment Agency. These permits set the maximum volume of treated wastewater that the company is permitted to recycle to the environment (in terms of Dry Weather Flow). They also define the standards of treatment that must be met in order to protect water quality objectives and safeguard the natural environment. If additional wastewater treatment capacity is needed to serve new development or meet stricter environmental standards, this would require a new or amended environmental permit from the Environment Agency. The Environment Agency would normally permit increased flows provided the treatment standards are tightened so that the total load to the environment is not

increased. This is in line with the "no deterioration" principle. We have not identified any environmental constraints that might prevent Southern Water from providing any necessary capacity.

Any investment to provide additional capacity could be planned and funded through the water industry's five yearly price review process, undertaken by Ofwat, the water industry's economic regulator. It is possible that future permit conditions become so tight that they cannot be achieved by conventional technology. This is likely to trigger the need for significant and expensive investment. The WTWs most likely to be affected in this way could be identified by looking at the sensitivity of the water bodies receiving treated wastewater and/or environmental designations such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs).

Fundamentally wastewater treatment capacity is not a constraint to future new development even if investment requirements are significant. Southern Water has a statutory obligation to find solutions and provide infrastructure to serve new development. The planning period for Waverley's emerging new Local Plan runs until 2032 and there will be repeated opportunities through the water industry's five yearly price review process to investigate and implement solutions. Possible options where conventional technology could not achieve the required standards include:

1. *Reducing infiltration into the sewerage system*
2. *Reducing consumption of water by existing and future residents*
3. *Transfer flow to an alternative discharge location (where the environmental capacity of the receiving water is sufficient to accommodate the discharge)*
4. *Treat wastewater to a higher standard using non-conventional technology.*

The implementation of one or a combination of these options would mitigate the impact of increased volumes of wastewater arising from new development and population growth, so that it would not have an unacceptable adverse effect on water quality objectives and the integrity of protected sites such as SPAs, SACs and SSSIs.'

7. Conclusions

7.1 Conclusions

A desktop based evidence approach to analyse the relationship between the wastewater supplied by planned development, the capacity of the sewage treatment works and the environmental capacity to manage storm overflows and treated effluent within the Borough of Waverley was undertaken in this High Level Water Cycle Study.

The WFD Classification Status Cycle 2 dataset and the accompanying updated River Basin District Management Plans for the Thames River Basin District and the South East River Basin District were assessed. It was observed that all of the twenty water bodies within the Borough of Waverley have failed to achieve an overall Good status, with three achieving Bad status, eight achieving Poor status, and nine achieving Moderate status.

The future plans for the water companies, the Strategic Direction Statements, the AMP6 business plans and the Water Resources Management Plans, were reviewed. The reports focussed on improving environmental issues, such as reducing pollution incidents from STW treatment disposal, and improving the local STWs to accommodate increased flows from both future development and climate change. However, site specific STW infrastructure upgrades were not mentioned in the reports. More detailed site specific information was gathered during consultation with Thames Water and Southern Water.

Consultations with Southern Water indicated that some increases in STW capacity will be necessary to accommodate the additional wastewater from the proposed future development. Both water companies suggested that new infrastructure investments could use technology which reduce environmental impact, however, these investments are likely to be costly. There could be the opportunity for developments to contribute to these costs through planning obligations. In particular, the Dunsfold Park development is likely to require specific investment into a new STW which would service the 2,600 new dwellings located there.

The current failing WFD status of all water bodies within Waverley Borough Council's administrative boundaries has been linked as a suspected cause, probable cause, and confirmed cause, to STWs within the area. This suggests that the STWs are currently having an adverse impact, to varying degrees, on the ecological status of the water bodies. Any decisions to increase capacity should therefore be completed with appropriate consideration being given to the impact that increased STW effluent would have on the receiving water bodies.

7.2 Further Recommendations

- Identify wastewater treatment options for Dunsfold development site and identify receiving water bodies for further assessment.
- SIMCAT modelling can be carried out for each STW and water body once all information is available to estimate impacts on WFD status.
- Careful consideration will be needed for receiving water bodies as well as the impacts on the next water body downstream for cumulative effects – particularly where consecutive STW effluents will be added to the same river system.

- Should deterioration of any water body WFD status prove inevitable and unavoidable – each development will need to undertake an Article 4.7 detailed assessment, through which any potential opportunities to reduce the impacts must be identified and implemented.
- Further consideration will be needed for the impacts of providing new/increased clean water supplies to the new development areas. Water supplies may be sourced from areas within or outside the study catchment and be of surface or groundwater nature. This will need to be assessed for impacts on WFD status at the source locations.
- The development areas themselves will also need to be assessed for impacts of increased impermeable areas (and reduced infiltration), surface water runoff impacts and impacts of surface water outfall construction on recipient watercourses (physical modifications). The inclusion of SuDS and consideration for the drainage of the sites will be of key importance for WFD in terms of quantity and dynamics of flow, water quality, impacts on ecology and physical modifications.
- Development design should take into account Waverley Borough Council aspirations for Water Efficiency as outlined in the Local Plan to limit water usage to 110 litres per person per household per day as the area is already under significant water supply stretch.
- Ensure consideration of the whole water cycle impacts and improvement opportunities forms the fundamental design aspirations for the development sites.
- Local awareness of the poor condition of the watercourses is high and considerate design and consultation will be very important. Programme of public awareness to campaign for water efficiency and careful use of chemicals (e.g. detergents, domestic pesticides, surface water awareness etc.) should form part of the Council's forward strategy.
- Joint liaison involving Thames Water, Environment Agency and Waverley Borough Council and Highways England (where applicable) will be vital from the outset of development design, through to public consultation and delivery.

Appendix A - Glossary of Terms

Term	Definition
Asset Management Period (AMP)	A five year period in which water companies implement planned upgrades and improvements to their asset base. Activities are subject to funding review. The AMP6 period runs from 2015-2020.
Communities and Local Government	Communities and Local Government sets policy on local government, house, urban regeneration, planning and fire and rescue
Department for Environment, Flood and Rural Affairs (DEFRA)	A governmental department that brings together the interests of the countryside, farmers, the environment and the rural economy.
Development Plan Document	Details the spatial representation of housing and employment land allocations in response to the regional spatial strategy
Dry Weather Flow (DWF)	The measure of the flow influx to a WWTW derived from human activity (both domestic and trade), but excluding any storm-induced flows.
Dry Year Annual Average (DYAA)	The cumulative demand for water in a dry year (as defined by the water company) divided by the number of days in the year. This enables demand assessment taking into account fluctuations throughout the year.
Dry Year Critical period (DYCP)	The average daily demand for water during a defined critical period.
Environment Agency (EA)	An administrative government body that aims to protect the environment and prevent or minimise the effects of natural and man-made impacts.
Estuary	A tidal basin, where a river meets the sea, characterised by wide inlets
Flood Risk	The level of flood risk is the product of the frequency or likelihood of the flood incidents and their consequences (such as loss, damage, harm, distress and disruption)
Flood Risk Assessment	Considerations of the flood risks inherent in a project, leading to the development actions to control, mitigate or accept them.
Flood storage	A temporary area that stores excess runoff or river flow often ponds or reservoirs.
Fluvial	Relating to the actions, processes and behaviour of a water course (river or stream)
GIS	Geographic Information System – A mapping system that uses computers to store, manipulate, analyse and display data
Greenfield	Previously undeveloped land.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
High Level Water Cycle Study	See Water Cycle Study. The Waverley High Level Water Cycle Study is looking specifically at wastewater capacity and water quality.
Internal Drainage Board (IDB)	An operating authority which is established in areas of special drainage need in England and Wales with permissive powers to undertake work to secure clean water drainage and water level management within drainage districts.
Infrastructure	Physical structures that form the foundation for development.
New Local Plan	Waverley's statutory development plan, comprising Part 1 (Strategic Policies and Sites) and Part 2 (Development Management and Site Allocations).

Term	Definition
Local Planning Authority	The local authority or council empowered by law to exercise statutory planning functions for its administrative area.
Main River	Watercourse defined on a 'Main River Map' designated by DEFRA. The EA has permissive powers to carry out flood defence works, maintenance and operational activities for Main Rivers only
The Water Services Regulation Authority (OFWAT)	As the Water Services Regulation Authority, OFWAT regulates the budgets a water company is required to spend over each AMP period, and to regulate the price of water services.
River Basin Management Plan (RBMP)	The RBMPs describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures in line with the requirements of the Water Framework Directive.
Strategic Flood Risk Assessment (SFRA)	A supporting document to Waverley's new Local Plan, which informs the planning process of flood risk, and provides information on future risk over a wide spatial area.
Southern Water (Services)	A water supply and wastewater company, which provides sewerage and wastewater treatment services across Hampshire, the Isle of Wight, West Sussex, East Sussex, Kent and areas of Surrey.
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Sewage Treatment Works (STW)	Infrastructure managed and maintained by water companies which treats wastewater. Treated effluent is then disposed of to receiving watercourses and sludge disposal.
Strategic Direction Statement	Documentation provided by water companies which outlines their strategic direction over the subsequent 25 years for all water services. The last Strategic Direction Statement for water companies is 2015-2040.
Sustainability	To preserve /maintain a state or process for future generations.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations meeting their own needs
Thames Water Utilities Ltd	The UK's largest water and wastewater services company providing wastewater supplies to over 15 million customers.
Urban Wastewater Treatment Directive	UWTD's objective is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors. It concerns the collection, treatment and discharge of: Domestic waste water; Mixture of waste water and Waste water from certain industrial sectors.
Water Cycle Study	A study aimed at ensuring that future development is sustainable. It is a supporting documentation to the new Local Plan.
Water Framework Directive (WFD)	An EU directive which commits member states to achieve a good status for all water bodies by 2027.
Water Resources Management Plan (WRMP)	Documentation prepared by water companies every 5 years to outline how they aim to meet predicted demands for water services over the subsequent 25 year period. This is primarily focussed on water supply.
Wastewater Treatment Works (WWTW)	See STW.

Appendix B – Consultation Proformas

CAPITA

Waverley BOROUGH COUNCIL

Capita Property and Infrastructure Ltd
4th Floor
65 Gresham Street
London
EC2V7NQ

Southern Water Ltd

LOCAL PLAN CONSULTATION: POTENTIAL SCENARIOS FOR HOUSING DELIVERY

Scenario 1: *Around 4,450 on greenfield sites at the four largest settlements, some growth at villages (600) but no development at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	Southern Water provides wastewater services to part of Waverley. Southern Water has a statutory duty to serve new development, and is committed to ensuring the right wastewater infrastructure in the right place at the right time in collaboration with developers and the local planning authority. The adopted Local Plan would inform our investment planning.
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	Additional wastewater treatment capacity and sewerage infrastructure maybe required to serve new development. An assessment could be undertaken for specific sites when the scale of development is identified and then we could advise on any infrastructure requirements and site specific policy provision.
What are the resource or funding implications for any required new or improved infrastructure? Does your current capital programme make provision for such investment?	Strategic infrastructure, such as extensions to wastewater treatment works, can be planned and funded through the five yearly price review process and coordinated with new development. Local infrastructure, such as local sewers, should be funded by the development if specifically required to service individual sites. Southern Water would take future income from customers into account so that the developer would only need to fund a proportion of the total cost.
What, if any, level of external funding, including developer contributions, might be required?	This would depend upon the precise location and scale of development.
What are the likely timescales for the provision of any new or improved infrastructure?	New and improved infrastructure could be provided in parallel with development, facilitated by planning policies and planning conditions that coordinate the timing of development with the provision of infrastructure.

Scenario 2: *Around 2,650 on greenfield sites at the four largest settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	Southern Water provides wastewater services to part of Waverley. Southern Water has a statutory duty to serve new development, and is committed to ensuring the right wastewater infrastructure in the right place at the right time in collaboration with developers and the local planning authority. The adopted Local Plan would inform our investment planning.
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	Additional wastewater treatment capacity and sewerage infrastructure maybe required to serve new development. An assessment could be undertaken for specific sites when the scale of development is identified and then we could advise on any infrastructure requirements and site specific policy provision.
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What are the likely timescales for the provision of any new or improved infrastructure?	New and improved infrastructure could be provided in parallel with development, facilitated by planning policies and planning conditions that coordinate the timing of development with the provision of infrastructure.

Scenario 3: *Around 1,900 on greenfield sites at the four largest settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	Southern Water provides wastewater services to part of Waverley. Southern Water has a statutory duty to serve new development, and is committed to ensuring the right wastewater infrastructure in the right place at the right time in collaboration with developers and the local planning authority. The adopted Local Plan would inform our investment planning.
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	Additional wastewater treatment capacity and sewerage infrastructure maybe required to serve new development. An assessment could be undertaken for specific sites when the scale of development is identified and then we could advise on any infrastructure requirements and site specific policy provision.
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What, if any, level of external funding, including developer contributions, might be required?	This would depend upon the precise location and scale of development.
What are the likely timescales for the provision of any new or improved infrastructure?	New and improved infrastructure could be provided in parallel with development, facilitated by planning policies and planning conditions that coordinate the timing of development with the provision of infrastructure.

Scenario 4: *Around 1,200 on greenfield sites at the four largest settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	Southern Water provides wastewater services to part of Waverley. Southern Water has a statutory duty to serve new development, and is committed to ensuring the right wastewater infrastructure in the right place at the right time in collaboration with developers and the local planning authority. The adopted Local Plan would inform our investment planning.
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	Additional wastewater treatment capacity and sewerage infrastructure maybe required to serve new development. An assessment could be undertaken for specific sites when the scale of development is identified and then we could advise on any infrastructure requirements and site specific policy provision.
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What, if any, level of external funding, including developer contributions, might be required?	This would depend upon the precise location and scale of development.
What are the likely timescales for the provision of any new or improved infrastructure?	New and improved infrastructure could be provided in parallel with development, facilitated by planning policies and planning conditions that coordinate the timing of development with the provision of infrastructure.

Thames Water Utilities Ltd

LOCAL PLAN CONSULTATION: POTENTIAL SCENARIOS FOR HOUSING DELIVERY

Scenario 1: *Around 4,450 on greenfield sites at the four largest settlements, some growth at villages (600) but no development at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	No
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	Yes
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	We have concerns regarding Waste Water Services in relation to this site. Specifically sewage treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. There may be local incapacities but due to the complexities of the sewerage network and the uncertainties around the exact locations of development, their scale and phasing it is difficult for Thames Water to accurately identify the infrastructure needs.
What are the resource or funding implications for any required new or improved infrastructure? Does your current capital programme make provision for such investment?	Where Treatment and Network infrastructure constraints are identified, they can be delivered in a number of ways. The two most frequently used are through our 5 year Business Plan where we advise OFWAT on the funding required to accommodate growth at all our Waste Water Treatment Works and on the network. Growth needs are prioritised against each other and the ones with the greatest need are delivered first or via the requisition route where we and the developer contribute to the solution which is then delivered within a quicker time frame. Network growth needs are only included in our Business Plans when we are confident that they will come to fruition.
What, if any, level of external funding, including developer contributions, might be required?	Where Infrastructure capacity problems are known or suspected, the developer will be required to finance an impact study.

What are the likely timescales for the provision of any new or improved infrastructure?	Due to the complexities of sewerage networks, until we have a clearer picture of developments exact location scale and phasing we are unable to give a clear indication as to what infrastructure upgrades will be required. Typically local network upgrades take 18 months – 3 years to investigate design and build. More strategic solutions 3 – 5 years and where new Sewage treatment works are required this could take 7 – 10 years This applies to all scenarios.

Scenario 2: *Around 2,650 on greenfield sites at the four largest settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	No
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	Yes
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	We have concerns regarding Waste Water Services in relation to this site. Specifically sewage treatment capacity in this area is unlikely to be able to support the demand anticipated from this development There may be local incapacities but due to the complexities of the sewerage network and the uncertainties around the exact locations of development, their scale and phasing it is difficult for Thames Water to accurately identify the infrastructure needs.
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Scenario 3: *Around 1,900 on greenfield sites at the four largest settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	No
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	Yes
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	We have concerns regarding Waste Water Services in relation to this site. Specifically sewage treatment capacity in this area is unlikely to be able to support the demand anticipated from this development There may be local incapacities but due to the complexities of the sewerage network and the uncertainties around the exact locations of development, their scale and phasing it is difficult for Thames Water to accurately identify the infrastructure needs
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Scenario 4: *Around 1,200 on greenfield sites at the four largest settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome*	
Can your existing infrastructure accommodate the suggested level of housing growth and distribution around the Borough? YES/NO	No
If NO, is it possible to upgrade the existing infrastructure to meet the assessed need/demand? YES/NO	Yes
If YES, what improvements would be required? Would these require additional land or could they be carried out within current landholdings?	We have concerns regarding Waste Water Services in relation to this site. Specifically sewage treatment capacity in this area is unlikely to be able to support the demand anticipated from this development There may be local incapacities but due to the complexities of the sewerage network and the uncertainties around the exact locations of development, their scale and phasing it is difficult for Thames Water to accurately identify the infrastructure needs
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