

Guildford Borough Council Water Quality Assessment

Stage 1 – Technical Statement

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Quality information

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1. Introduction

Guildford Borough Council are currently progressing a New Local Plan 2013 – 2033 with submission to the Secretary of State planned prior to expected adoption by December 2017. The New Local Plan will include:

- 'Local Plan: strategy and sites' - sets out the vision, aims and strategy for the borough up to 2033 including: allocating land for housing, employment, community facilities and other types of development.
- 'Local Plan: Development Management Policies' - sets out detailed development control policies to ensure sustainability and effective place-making.

The New Local Plan was consulted on during June and July 2016 with responses now being considered by the Council, in preparation for submission to the Secretary of State. The New Local Plan sets out the strategic policies and identifies strategic sites for housing, employment and supporting infrastructure required in the Borough up to 2033.

In line with the policy requirements of the National Planning Policy Framework (NPPF), Local Plans should consider wastewater and water quality concerns in relation to growth numbers and allocation sites they propose. With this in mind, the need for a Water Quality Assessment (WQA) has been identified to support the council's New Local Plan. The WQA considers the capacity of wastewater treatment to serve proposed new growth and potential effects on water quality as a result of discharge of treated wastewater.

This Technical Statement represents stage 1 in the WQA, and provides an interim position in the Borough with respect to wastewater quality and wastewater treatment.

1.1 Background

Guildford Borough Council was involved in the Blackwater Valley Water Cycle Study (WCS) Scoping Report (published 2011) as part of the evidence base for the current Local Plan (adopted 2003), together with neighbouring councils to gather relevant planning information and define likely discharge points and abstraction sources. However, the WCS scoping report was not progressed to a Phase 1 (Outline) WCS sufficient to support a Local Plan submission. In addition, the new Local Plan development targets across the Borough have changed and assessments within the 2011 WCS scoping study related to wastewater treatment and water quality need to be revisited.

Following consultation on the Proposed Submission Local Plan in June/July 2016, representation from Thames Water and the Environment Agency identified the requirement for a Water Quality Assessment (WQA) as part of the New Local Plan evidence base.

1.2 Objectives

This technical statement covers interim outputs in relation to the WQA which was commissioned to take into account growth forecast in during the Plan period. This Technical Statement:

- Provides the location of Wastewater Treatment Works (WwTWs) across the Borough,
- Presents an estimate of treatment capacity of WwTWs in the Borough, and
- Considers the potential reasons why waterbodies receiving flows from WwTWs may not meet water quality targets under the Water Framework Directive (WFD).

2. Local Plan consultation responses

All Local Authorities have the duty to cooperate under the Localism Act 2011, throughout the planning process which includes consultation on Guildford Borough Councils Local Plan 2013-2033: Strategy and Sites. To this end, Guildford Borough Council commissioned a consultation on the draft local plan from 6th June to 18th July 2016. This section summarises the consultation responses with reference to wastewater only.

2.1 Thames Water

Thames Water Utilities Limited (TWUL) is the statutory sewerage undertaker for the whole of the Borough. The submission response noted the New Local Plan would benefit from developing policies further around:

- The provision of infrastructure for wastewater as required under the National Planning Policy Framework (NPPF),
- Assessing the quality and capacity of infrastructure for wastewater and its treatment, taking into account the need for strategic infrastructure,
- Ensuring developers demonstrate there is adequate wastewater capacity and surface water drainage to serve the existing development, including the avoidance of problems for existing or new users,
- Inclusion of the need for developers to fund studies to identify if proposed developments may overload the existing wastewater or sewerage infrastructure, and
- Ensuring the timely identification of development sites which may exceed sewerage and wastewater infrastructure capacity, and the inclusion of planning conditions attached to developments which may require an upgrade.

TWUL made specific reference to Policy A24, the Slyfield Area Regeneration Project, Guildford. If progressed, this project would require relocation of the TWUL Guildford (Slyfield) WwTW. TWUL confirmed in principle its support for relocation of the WwTW, in the form of a new WwTW, noting the importance of detailed technical and feasibility assessments in conjunction with the Council.

2.2 Environment Agency

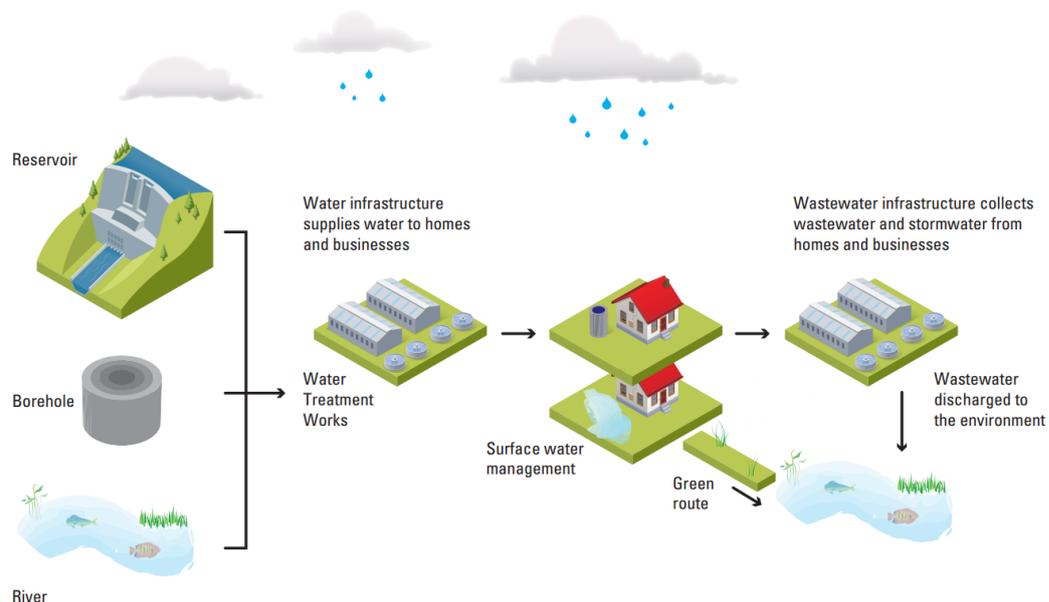
The Environment Agency response noted a number of concerns with the New Local Plan in its present form, specifically with reference to wastewater:

- The New Local Plan was found not to be consistent with the NPPF, paragraph 109, with reference to wastewater capacity issues and the potential impact on water quality and so was classified as unsound,
- Within the draft Infrastructure Delivery Plan (IDP) there was no evidence focused on environmental capacity and water quality, specifically with reference to sewerage infrastructure needs and impact on the WFD,
- The Environment Agency noted that the smaller allocated sites anticipated to be built within the first five years of the plan might be built in advance of sufficient funding and infrastructure being in place, which would be inconsistent with paragraph 177 of the NPPF, and
- To overcome these challenges the Environment Agency recommended the completion of a Water Cycle Study (WCS) or equivalent assessment to assess the impacts on water quality and WFD objectives of proposed growth during the plan period to 2033.

3. Wastewater Treatment

3.1 Wastewater in the Borough

Figure 3-1. The water environment and infrastructure components¹



A broad overview of the water cycle and the role of wastewater infrastructure within the cycle is illustrated in Figure 3-1. Wastewater is generally produced following the use of potable water in homes, businesses, industrial processes and in certain areas can include surface water runoff (where sewerage networks are combined foul and surface water).

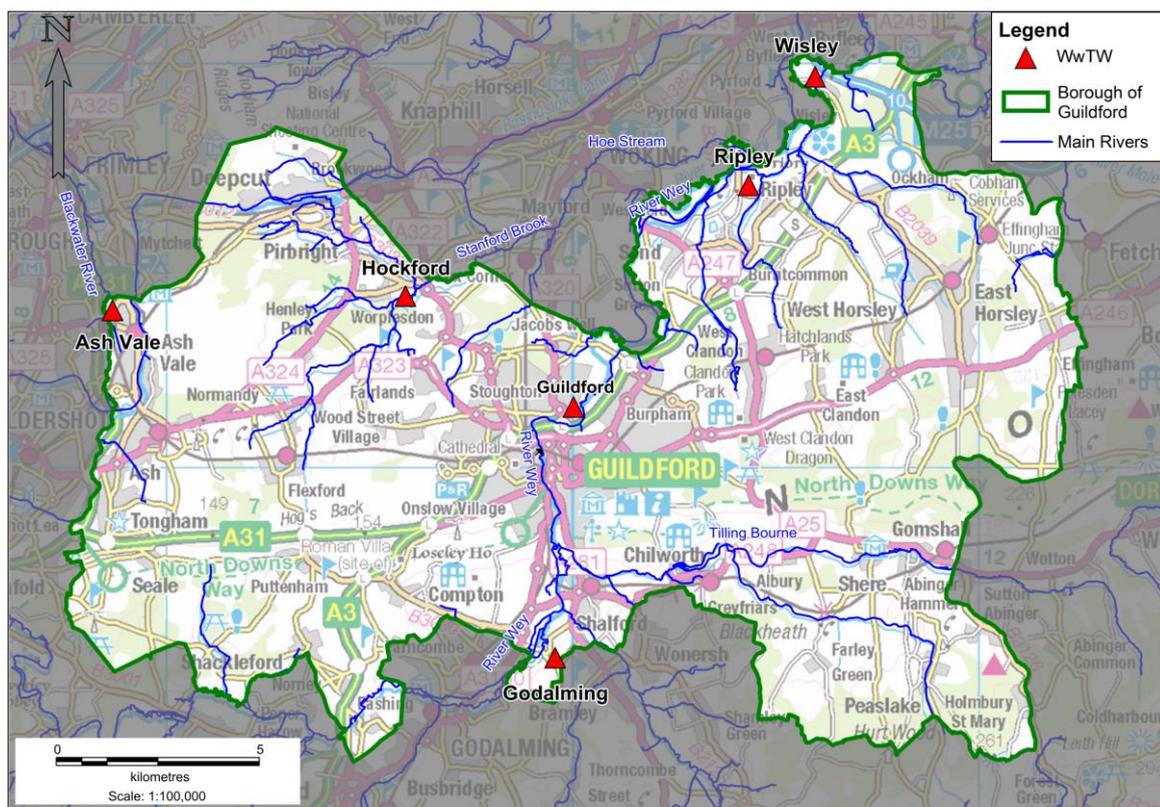
The administrative area of Guildford Borough Council covers Guildford town centre in addition to the settlements of Ripley, West Horsley, East Horsley, East Clandon, Shere, Albury, Chilworth, Compton, Onslow, Tongham, Ash Vale, Pirbright and Seale. Figure 3-2 illustrates Guildford Borough Council’s administrative boundary, settlements.

Wastewater treatment in the Borough is provided via WwTWs operated and maintained by TWUL, ultimately discharging treated wastewater to nearby fluvial watercourses. Wastewater from the Borough is treated at six WwTWs which fall in the Guildford’s administrative boundary and are illustrated in Figure 3-2:

- Ash Vale;
- Godalming;
- Guildford;
- Wisley;
- Hockford; and
- Ripley.

¹ Adapted from the Sustainable Urban Drainage Scottish Working Party’s Water Assessment and Drainage Assessment Guide (2016)

Figure 3-2. Location of WwTWs within Guildford Borough boundary



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3.2 Management of WwTW Discharge Permits

All WwTWs are issued with a permit to discharge by the Environment Agency, which sets out conditions on the maximum volume of treated wastewater that it can discharge and also limits on the quality of the treated discharge. These limits are set in order to protect the water quality and ecology of the receiving waterbody. They also dictate how much wastewater each WwTW can accept, as well as the type of treatment processes and technology required at the WwTWs to achieve the quality permit limits.

3.2.1 Flow Condition

The flow element of the discharge permit, measured as Dry Weather Flow (DWF)², determines an approximation of the maximum number of properties that can be connected to a WwTW catchment. When discharge permits are issued, they are generally set with a flow 'headroom', which acknowledges that allowance needs to be made for future development and the additional wastewater generated. This allowance is referred to as 'permitted headroom'.

This headroom therefore determines how many properties can be connected to the WwTW before a new discharge permit would need to be considered.

3.2.2 Quality Conditions

The quality conditions applied to the discharge permit are derived to ensure that the water quality of the receiving waterbody is not adversely affected in terms of concentration of physico-chemical elements such as ammonia, Biological Oxygen Demand (BOD) and phosphate. However, currently not all WwTW discharge permits are set to equate to maintaining the current WFD status of the receiving waterbody due to the discharge permits being issued prior to the implementation of the WFD. Consequently, some discharge permits, if operated to the full flow limit (i.e. all permitted headroom has been used), could lead to a significant deterioration in water quality and possibly WFD status.

² DWF is a measure of the flow of foul water only to a WwTW (excludes additional flow as a result of excessive rainfall or groundwater infiltration entering the sewer network).

An assessment needs to be undertaken to determine what new quality conditions would need to be applied to the discharge under the following circumstances:

- When a new or revised discharge permit is required, or
- When a new or revised discharge permit is not required, but a significant quantity of development is proposed to connect to a WwTW.

If the quality conditions remain unchanged, the increased flow of wastewater received at the WwTW would result in an increase in the pollutant load³ of some substances being discharged to the receiving waterbody. This may have the effect of deteriorating water quality and hence in most cases, an increase in permitted discharge flow results in more stringent (or tighter) conditions on the quality of the discharge.

The requirement to provide a higher standard of treatment may result in an increase in the intensity of treatment processes at a WwTW, which may also require improvements or upgrades to be made to the WwTW to allow the new conditions to be met. In some cases, it may be possible that the quality conditions required to protect water quality and ecology are not achievable with conventional treatment processes and as a result, this WQA assumes that a new solution would be required in this situation to allow growth to proceed.

3.3 Existing WwTW Capacity

Based on measured flow information from TWUL and analysis of the flow permit conditions, all WwTWs currently have permitted headroom. Table 3-1 below presents the current DWF capacity and the approximate capacity of dwellings for each WwTW.

Table 3-1. Summary of existing WwTW capacity.

WwTW	Current DWF consent m3/d	Measured Flow m3/d	Current DWF capacity m3/d	Dwelling capacity (approx.)
Ash Vale	6130	5700	440	1,180
Godalming	8750	6910	1,840	4,940
Guildford	26250	19560	6,690	17,980
Hockford	6280	3870	2,410	6,470
Ripley	8300	6580	1,720	4,610
Wisley	6780	5400	1,380	3,700

Following receipt of dwelling and employment data for the New Local Plan, development sites will be assigned to WwTW catchments to determine the additional flow volumes that each WwTW will receive. A flow headroom assessment will subsequently be undertaken to determine which WwTW's are able to accept future growth and those with flow capacity or potential treatment constraints. Where WwTW's have potential future capacity or treatment issues, water quality modelling will be undertaken to assess impacts on WFD targets in receiving waterbodies and set new discharge permits.

³ Concentration is a measure of the amount of a pollutant in a defined volume of water, and load is the amount of a substance discharged during a defined period of time.

4. Reasons for not achieving WFD targets

Waterbodies which are affected by WwTW discharges in the Borough include the River Blackwater, River Wey and the Hoe Stream. This section presents the current baseline water quality in terms of the Water Framework Directive (WFD) and where relevant, the reasons for not achieving good status. It sets out where WwTW discharges within the Borough are likely to be affecting WFD water quality objectives for these waterbodies.

A level of certainty ('suspected', 'probable' or 'confirmed') from low to high certainty, as detailed in the Thames RBMP, is also assigned to each reason for not achieving good status, based on a weight of evidence approach.

4.1 River Blackwater (Aldershot to Cove Brook confluence at Hawley)

The River Blackwater from Aldershot to Cove Brook confluence at Hawley receives treated effluent from the Ash Vale WwTW and currently has an overall waterbody status of 'Poor', with the alternative objective to maintain 'Poor' status by 2021.

Its current overall status is limited to 'Poor' status due to the less than Good statuses of the classification elements as listed in Table 4-1.

Table 4-1. Classification elements of less than Good status for River Blackwater

Classification Element	Current Status (2015)	Objective
Dissolved oxygen	Bad	Bad by 2021
Phosphate	Poor	Moderate by 2027
Fish	Poor	Poor by 2021
Ammonia	Moderate	Good by 2027
Invertebrates	Moderate	Moderate by 2021
Macrophytes and Phytobenthos Combined	Moderate	Moderate by 2021

The Reasons for Not Achieving Good (RNAG) as outlined in the Thames RBMP, relevant to the River Blackwater have been provided in Table 4-2 below.

There is a probable certainty that the current 'Bad' dissolved oxygen status is as a result of sewerage discharge, and high phosphate concentrations in the waterbody are attributed to a probable combination of sewerage discharge, industrial discharge and urban drainage. The current 'Poor' fish status, targeted to remain at 'Poor' by 2021 is linked to numerous pressures including contaminated land, drainage, barriers to fish migration, urban runoff and the suspected presence of North American signal crayfish.

Table 4-2. Reasons for not achieving good status on the Blackwater (GB106039017180)

Category	Activity	Activity Certainty	Classification Element
Water Industry	Sewage discharge (continuous)	Probable	Dissolved oxygen
			Phosphate
			Invertebrates
		Suspected	Ammonia
			Macrophytes and Phytobenthos Combined
Industry	Industrial discharge (EPR)	Probable	Phosphate
		Suspected	Macrophytes and Phytobenthos Combined
			Urban and transport
Suspected	Fish		
	Confirmed	Invertebrates	
	Contaminated land	Confirmed	Fish

Category	Activity	Activity Certainty	Classification Element
			Invertebrates
	Urbanisation - urban development	Confirmed	Fish
	Urbanisation - transport	Confirmed	Invertebrates
No sector responsible	North American signal crayfish	Suspected	Fish
			Invertebrates
Other	Barriers to fish migration	Confirmed	Fish

4.2 River Wey (Tilford to Shalford)

The River Wey from Tilford to Shalford receives treated effluent from the Godalming WWTW and currently has an overall waterbody status of 'Moderate', with the alternative objective to maintain 'Moderate' status by 2021.

Its current overall status is limited to 'Moderate' status due to the less than Good statuses of the classification elements as listed in Table 4-3.

Table 4-3. Classification elements of less than Good status for River Wey

Classification Element	Current Status (2015)	Objective
Phosphate	Moderate	Moderate by 2021
Fish	Moderate	Good by 2027
Macrophytes and Phytobenthos Combined	Moderate	Moderate by 2021

The Reasons for Not Achieving Good (RNAG) as outlined in the Thames RBMP, relevant to the River Wey have been provided in Table 4-6 below.

There is a probable certainty that the high phosphate concentrations in the waterbody are attributed to sewerage discharges. The high nutrient concentration is a probable result of this activity and is also having a probable impact on the biological quality of the waterbody, specifically on the macrophytes and phytobenthos communities. The current 'Moderate' fish status, targeted to be 'Good' by 2027 is linked to numerous pressures including impoundments from navigation and rural land management, barriers to fish migration and the suspected presence of North American signal crayfish.

Table 4-4. Reasons for not achieving good status on the Wey (GB106039017820)

Category	Activity	Activity Certainty	Classification Element
Water Industry	Sewage discharge (continuous)	Probable	Phosphate
			Macrophytes & Phytobenthos Combined
Agriculture and rural land management	Impoundment - no water storage	Confirmed	
Other	Barriers to fish migration	Confirmed	Fish
Navigation	Impoundments	Confirmed	
No sector responsible	North American signal crayfish	Suspected	

4.3 Hoe Stream (Pirbright to River Wey confluence at Woking)

The Hoe Stream from Pirbright to the River Wey confluence at Woking receives treated effluent from the Hockford WWTW and currently has an overall waterbody status of 'Moderate', with the alternative objective to maintain 'Moderate' status by 2021.

Its current overall status is limited to 'Moderate' status due to the less than Good statuses of the classification elements as listed in Table 4-5.

Table 4-5. Classification elements of less than Good status for Hoe Stream

Classification Element	Current Status (2015)	Objective
BOD	Poor	-
Phosphate	Moderate	Moderate by 2021
Macrophytes and Phytobenthos Combined	Moderate	Moderate by 2021

The Reasons for Not Achieving Good (RNAG) as outlined in the Thames RBMP, relevant to the Hoe Stream have been provided in Table 4-6 below.

There is a probable certainty that the high phosphate concentrations in the waterbody are attributed to sewerage discharges. The high nutrient concentration is a suspected result of this activity and is also having a suspected impact on the biological quality of the waterbody, specifically on the macrophytes and phytobenthos communities.

Table 4-6. Reasons for not achieving good status on the Hoe Stream (GB106039017900)

Category	Activity	Activity Certainty	Classification Element
Water Industry	Sewage discharge (continuous)	Suspected	Macrophytes and Phytobenthos Combined
		Probable	Phosphate

4.4 River Wey (Shalford to River Thames confluence at Weybridge)

The River Wey from Shalford to the River Thames confluence at Weybridge receives treated effluent from the Guildford WwTW, Risley WwTW and Wisley WwTW, and currently has an overall waterbody status of 'Moderate', with the alternative objective to maintain 'Moderate' status by 2021.

Its current overall status is limited to 'Moderate' status due to the less than Good statuses of the classification elements as listed in Table 4-7.

Table 4-7. Classification elements of less than Good status for River Wey

Classification Element	Current Status (2015)	Objective
Phosphate	Moderate	Moderate by 2021
Macrophytes and Phytobenthos Combined	Moderate	Moderate by 2021
Fish	Moderate	Good by 2027

The Reasons for Not Achieving Good (RNAG) as outlined in the Thames RBMP, relevant to the River Wey have been provided in Table 4-8 below.

There is a suspected certainty that the high phosphate concentrations in the waterbody are attributed to sewerage discharges. The high nutrient concentration as a result of this activity is having a confirmed impact on the biological quality of the waterbody, specifically on the macrophytes and phytobenthos communities. The current 'Moderate' fish status, targeted to be 'Good' by 2027 is linked to numerous pressures including impoundments from navigation and rural land management, barriers to fish migration and urbanisation.

Table 4-8. Reasons for not achieving good status on the River Wey (GB106039017630)

Category	Activity	Activity Certainty	Classification Element
Water Industry	Sewage discharge (continuous)	Confirmed	Macrophytes and Phytobenthos Combined
		Suspected	Phosphate

Agriculture and rural land management	Impoundment - no water storage	Suspected	Fish
Other	Barriers to fish migration	Suspected	
Navigation	Inland navigation	Suspected	
Urban and transport	Urbanisation - urban development	Suspected	

5. Next Steps

This Technical Statement represents Stage 1 of the WQA, providing a summary of the current baseline in respect to the water environment and wastewater infrastructure capacity.

Stage 2 of the WQA will include a detailed assessment of wastewater treatment capacity and water quality implications using WwTW catchments and details of proposed development site locations to ensure all development across the Borough which drains to a WwTW is included. The results of the assessment will identify the WwTWs which are at capacity, have treatment constraints or have remaining capacity. The wider, supporting environment will also be considered, including climate change and local ecology.

Stage 2 will also include a high level assessment of each of the proposed major development sites, assessing each site by identifying local receptors such as watercourses, outlining current and future flood risks and assessing the current wastewater network.

Policy recommendations will be made as part of the WQA in regards to wastewater, surface water management, ecology and stakeholder liaison.

Stage 3 of the WQA will allow stakeholders to review and comment on Stage 2 of the WQA. Comments will be incorporated in the final WQA report.

