

Water Quality Modeling Summary: Basingstoke (Chineham) Sewage Treatment Works

Summary

- An update to the relevant sections of the water cycle study for Basingstoke sewage treatment works (STW) was undertaken to assess the potential water quality impacts of new development on the river Loddon. Two sets of scenarios were run; 748 houses per year and 850 houses per year over the plan period (2011- 2029). Taking account of the current shortfall over the first three years of the plan this equated to 796 dpa or 918dpa over the period 2014 - 2029.

- It is a requirement under the Water Framework Directive that there is no deterioration in class of any element. Environment Agency guidance for water quality planning ensures this by limiting in stream deterioration to 10% from its baseline when assessing impacts downstream from discharges. The results from the modeling of Basingstoke STW indicated that future development for both housing level scenarios would cause less than a 10% deterioration¹ in river quality for Ammonia and Biological Oxygen Demand (a proxy for Dissolved Oxygen) if the STW continues to operate to the same level as it currently does.

- The assessment indicated that without upgrades to Basingstoke STW, phosphate levels in the Loddon could potentially deteriorate by more than 10% by 2025 if 796 homes are built per year or by 2020 if 918 homes are built per year.

- Based on the model results, to avoid the deterioration in phosphate levels in the river Loddon a tighter consent of 0.5 mg/l would be required at the STW. This is currently deemed to be technically feasible, therefore the river can be protected.

- For all scenarios and water quality elements, the assessment indicated that there would be no deterioration in Water Framework Directive (WFD) classification.

- Whilst the assessment used the best available data, it includes estimates of upstream river flow which cannot be verified at this time due to there being no monitoring upstream of the STW. The modeling indicates a worst case scenario of the level of impact the Basingstoke STW has on the Loddon, especially as not all of the development taking place in the borough over the plan period will affect the Loddon. However, it is recommended that continuous environmental monitoring is undertaken during the construction of the new developments to ensure there is no significant impact on the water environment.

- Draft Policy EM6 of the Submission Local Plan sets out how water monitoring results will be reported through Basingstoke and Deane's Authority Monitoring Report (AMR). Draft Policy SS4 of the Submission Local Plan, used in conjunction with EM6 will ensure that, where there is likely to be deterioration in band classes, further allocated sites will not be released or planning

¹ The 10% figure referred to relates to internal Environment Agency guidance on water quality modelling. The 10% is to allow for error in the modelling. It is not legally enforceable. The only deterioration that is legally enforceable is the deterioration between class boundaries.

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permissions granted until measures have been taken to improve water quality. These policies set a suitable framework for monitoring the river Loddon over the plan period.

- The installation of two new flow gauges upstream of Basingstoke STW is required to verify the results from this water quality assessment and to help assess any impacts seen in the river Loddon. The new flow gauges are important as they will lead to better understanding of the condition of the Loddon and, with the ongoing water quality monitoring downstream of the STW and annual review of WFD classifications, the flow gauge project will ensure that the Loddon can be protected and improved. This is due to better data ensuring we have increased certainty over impacts and actions required to improve the water environment.

Introduction

In 2007 a Water Cycle Study (WCS) was commissioned to assess what the final impact of the total planned growth in Basingstoke would be on the river Loddon. The study concluded that there would be no significant deterioration (i.e. greater than 10%) although ongoing monitoring would be required. Whilst the original water cycle study remains valid, recent changes to the local plan on annual housing provision and the availability of more up to date environmental data meant that a review of the modeling results was required. At the request of Basingstoke and Deane Borough Council (BDBC) and other stakeholders, the Environment Agency has undertaken additional water quality modeling to review and update the results from the 2007 WCS based on 748 homes per annum between 2011 and 2029, and, following the Exploratory Meeting on the Basingstoke and Deane Submission Local Plan, 850 homes per annum between 2011-2029.

Updates to the water quality modeling

The impacts of increases in treated effluent from Basingstoke sewage treatment works on Ammonia, Biological Oxygen Demand (a proxy for Dissolved Oxygen) and phosphate levels were assessed. The modeling results were compared against two objectives; allowing only a 10% deterioration in river quality and ensuring there would be no deterioration in WFD status from the 2009 baseline. The levels of impacts every 5 years were calculated in line with water company business planning (i.e. impact by 2015, 2020, 2025 etc.). This was done to identify which business planning period Basingstoke STW might potentially require significant upgrades.

The data used were:

- Effluent quality from Basingstoke STW based on current performance
- Consented maximum volume of effluent that can be discharged from the STW
- Estimates of river flow upstream of the STW
- The most recent water quality data for upstream of the STW
- Estimates of increases in flow from both predicted residential and commercial development

Results

Modeling results for both 748 and 850 homes per annum indicated that there would be a slight deterioration in Ammonia and Biological Oxygen Demand (BOD) in the river. However, it would be less than 10% and within current WFD class.

A slightly greater than 10% deterioration was seen in phosphate levels by 2020 (when using 850 homes per annum) and by 2025 (when using 748 homes per annum). However, both scenarios indicated that there would not be a deterioration in WFD class. A further assessment was undertaken to see what consent standards would need to be implemented

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at Basingstoke to avoid any deterioration in phosphate levels in the river Loddon. Based on the worst case scenarios for 2029, Basingstoke STW would need to be upgraded to deliver a consent standard of 0.5 mg/l (Basingstoke STW currently has a consent of 1 mg/l). Any revisions to the current consent will be processed by the Environment Agency as the regulator. There is currently the technology in place at Basingstoke STW to meet the required standards and therefore the deterioration can be mitigated against.

Conclusions

The review to the modeling for Ammonia and BOD indicates that the planned growth for Basingstoke can be delivered without causing a significant level of deterioration in water quality in the river Loddon (i.e. less than 10% deterioration). Although there would potentially be a greater than 10% deterioration in phosphate concentrations in the river by 2020 if 918 homes are built per year from 2014 onwards, this can be addressed through a tighter consent regime at Basingstoke STW. The results for both the 748 and 850 scenarios indicate that there would not be a deterioration in WFD status and therefore the impacts would be deemed acceptable by the EA and would not result in any soundness issues being raised in relation to the local plan or its proposed housing figures.

Due to the environmental sensitivity of the river at Basingstoke, and the caveats on the modeling results, it is recommended that annual environmental monitoring is undertaken to ensure that there is no deterioration in WFD class in line with Draft Policy EM6 of the Basingstoke and Deane Submission Local Plan.