

Greywell WTW – remodelling works

efficient water production for the 21st Century

by

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Greywell WTW, situated near Hook in north Hampshire, is located just outside the historic village of Greywell, near to the Basingstoke canal and is bordered by the River Whitewater and Greywell Fen SSSI. The works currently produces 6Ml/d of water abstracted from the chalk aquifer beneath the site. The original works was constructed in the early 1990's and significantly extended in 1935 as a major site for Mid Wessex Water Company. In the years following various parts of the site have been modified, plant decommissioned and left in place and a variety of new plant installed. Changes in the water industry and increased levels of automation have reduced the need for staff to be permanently based at sites and improvements in technology have led to greatly reduced sizes of plant. Also, the need for such large structures decreased and it has become increasingly difficult to maintain them. With the main Pump House approaching the end of its economic life modernisation became necessary.



Greywell WTW - New pumphouse

courtesy: Dynamco Ltd

Design principles

It became apparent that whilst the building was beyond economic refurbishment the station was essential to the continued supply of water in the area. As such, it was important that any works be carried out in such a manner as to keep the station operational as much as possible. There was also a need to ensure that works were carried out in such a way as to be in keeping with the local conservation area and to minimise the risk of affecting the adjacent SSSI.

The approach recommended by *Dynamco*, was to demolish the redundant structures, as well as the existing pump house superstructure in phases, whilst retaining operation of the station through the existing contact tank and pump house basement. A new pump house would then be constructed over the basement. This approach was approved by South East Water.

Construction

The works was split up into a number of contract packages which commenced in mid 2002 with completion in early 2004. Main contracts awarded were the building and demolition contract to *Mackley Construction*; *Carlton Controls*, electrical; *Onsite*, mechanical contract.

Continuity of service

Initial phase of the work was to make modifications to the on-site pipework. This was carried out during the winter of 2002. Control and monitoring equipment was relocated temporarily to enable demolition work to commence in early 2003. By the beginning of March half of the pump house superstructure over the pump basement had been demolished to enable building works to start,

Following construction of the new pump house the new Motor Control Centre was commissioned by *Carlton Controls*, chlorination and monitoring equipment was relocated and new telemetry outstation installed during a one week shutdown in July. This was the only shut down required for the works.

Following commissioning of the new station, the remainder of the old pump house was demolished and civil and landscaping works were completed by August 2003.

Technical improvements

One of the problems identified during appraisal of the site was the high lift pumping arrangement. Problems identified included high levels of noise and cavitation and pumps that could not pump the full licenced abstraction flow into the high level system.



Greywell: Remodelling works in progress

courtesy: Dynamco Ltd

At the start of the project, three high lift pumps supplied water in two zones, high and low level. The duty low level pump and the standby pump were both relatively new, but displayed signs of cavitation. The duty high level pump was older and could not meet the 6ML/d required capacity.

In order to improve pumping into the high level system, *Dynamco*, together with South East Water staff, carried out a pumping trial along the main. The trials identified a potential maximum flow along the main of 5.6ML/d whilst keeping the pressure in the main within acceptable limits. However, the flow and pressure required was beyond the capability of the existing pump.

Whilst cavitation is often associated with low NPSH available, calculations showed that this was not the problem at Greywell. Investigations by *Onsite* identified the most likely cause of cavitation to be the fact that the suction pipework terminated in a bend fixed directly onto the pumps.

The chosen solution was to replace the high level pump and to rotate the remaining two pumps to reduce the number of suction and delivery bends and thus optimise their performance. This work is underway and will leave South East Water, with a new, lower maintenance and more efficient pumping station. ■

Note: *Andrew Lawson is a graduate engineer with Dynamco Ltd and was responsible for project managing the works at Greywell.*

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