

New water source for 90,000 in SE London but 1.2km triple pipeline poses environmental challenge

by
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To meet increasing demands for drinking water, Thames Water, as part of its AMP3 obligations, is commissioning a new 17.3 megalitres per day groundwater source and treatment works at Bell Green in the London Borough of Lewisham, sufficient to supply some 90,000 people in SE London. The treatment process is fairly conventional, comprising aeration, pressure filtration and disinfection, but constructing the network infrastructure, comprising a 300, 400 and 500mm diameter ductile iron triple pipeline, posed a number of environmental challenges before the OFWAT delivery milestones could be met.



Bell Green WTW – Riverview Walk reinstatement (courtesy Thames Water)

Water treatment works

The Bell Green ABH supplies a maximum flow of 17.3ML/d of groundwater to the treatment works. This is treated through aeration, coagulation, flocculation and pressure filtration with dual media filters. The pressure filtration is required to remove small and intermittent spikes of turbidity and iron.

Design and construction of the water treatment works has been complicated by the planned introduction of a second abstraction borehole at Catford. This ABH (to be commissioned in 2004) will supply a maximum flow of 10ML/d. Testing suggests that the treatment required for this second source would be disinfection only, but further investigation is being undertaken to confirm this process selection.

The Bell Green and Catford aquifers are known to be linked and there is a risk that organic contaminants will be present in both boreholes. However, testing of ABHs has indicated that the level of organic contaminants is below the relevant regulatory levels and so GAC contactors have not been provided. However, the plant is designed such that these facilities can be retrofitted if the water quality declines. The water treatment works also provided super chlorination and de-chlorination, ammoniation and orthophosphoric acid dosing for the combined flow from the Bell Green and Catford sources. The first phase of the works constructed on a new site at Kangley Bridge Road, Bromley was substantially complete by the end of March 2003.

Pipeline route design

A number of options were investigated at the feasibility stage and desktop studies were commissioned to identify specific issues along the pipeline route, particularly with regard to environmental considerations. This work was carried out using both in house and external specialist teams to determine geological, ecological, archaeological and landscape information and identify the presence of any statutory and non-statutory protected areas.

The chosen route included approximately 1.2km of triple pipeline constructed in a narrow landscaped Linear Park between a former gasworks site and the River Pool known as Riverview Walk, an area designated by London Borough of Lewisham as a Site of Borough Importance for nature conservation. Original plans had proposed to construct the pipeline under the existing cycle path but this was not possible as the route contained too many existing services and land drains. The final route had the advantage that it minimised diversion of the cycle path, part of the National Cycle Network and allowed continued public access to the park throughout construction.

After consultation in the spirit of EIA Regulations, Circular 9/95, the Council issued an EIA Screening Opinion to the effect that in their opinion the pipeline comprised a long distance aqueduct likely to give rise to significant environmental impacts, namely:

- * possible affect of construction works on the integrity of a bentonite containment wall separating potentially hazardous material on the old gasworks site from an embankment on the western side of the river;
- * impact on landscaping on the west bank of the River Pool.

It was Thames Water's view that the proposals would not give rise to significant environmental effects and that these matters could be readily addressed by detailed method statements and reinstatement plans. A successful appeal against the Screening Opinion was made to the Secretary of State.

Works adjacent to Bentonite Wall

Within Riverview Walk the pipelines were constructed in the sloping embankment adjacent to a bentonite containment wall and polythene liner. The wall runs around the old Bell Green gasworks site and acts as a barrier preventing the lateral migration of contaminants from the site. An old gasometer base was located outside of this area but both it and the gasworks site had been remediated by the owners, Lattice Properties, however migration of contaminants towards the river could potentially occur in the event that the wall's integrity was compromised.

Analysis of the potential affect of pipeline construction on the containment wall was carried out by Thames Water's in house geotechnical specialists in close liaison with Lattice Properties and their advisors, who confirmed the proposed works would not adversely affect the stability of the wall at critical cross sections.

Soil samples were taken in Riverview Walk and analysed for potential contamination. Only one sample indicated slight contamination and

Lattice's advisors indicated that levels of contamination were not sufficient to warrant concern. During construction the excavated material was monitored for contamination and categorised for disposal in accordance with statutory requirements.

Ecological assessment & Reinstatement proposals

Thames Water's Conservation and Heritage team completed a detailed assessment of the area to consider the effects of pipeline construction on the ecology and nature conservation in Linear Park. Although not a statutory nature conservation site, the park is a Site of Borough Importance for nature conservation and supports a variety of plant species that, although common, are a local wildlife and recreational asset. No protected species were identified during site visits but the park does offer bird nesting opportunities and vegetation clearance had to be completed outside of the bird nesting season.

The Riverview Walk area affected by the pipeline comprised mown grass areas together with a mix of ornamental and naturalistic tree and shrub planting. A comprehensive method statement and restoration plan was agreed with the Borough to minimise impact on the area and return it to its original condition as far as possible.

The working strip for the pipeline was, in places, reduced to 5m but still required removal of areas of mixed shrub beds, boundary planting and individual trees, a number of which were relocated elsewhere within the Linear Park. The original surface was in places steeply sloping and a 3m wide strip was levelled and a temporary trackway placed to provide a safe working platform. A temporary safety barrier was constructed adjacent to the river embankment that doubled as a barrier to prevent spoil falling into the river.

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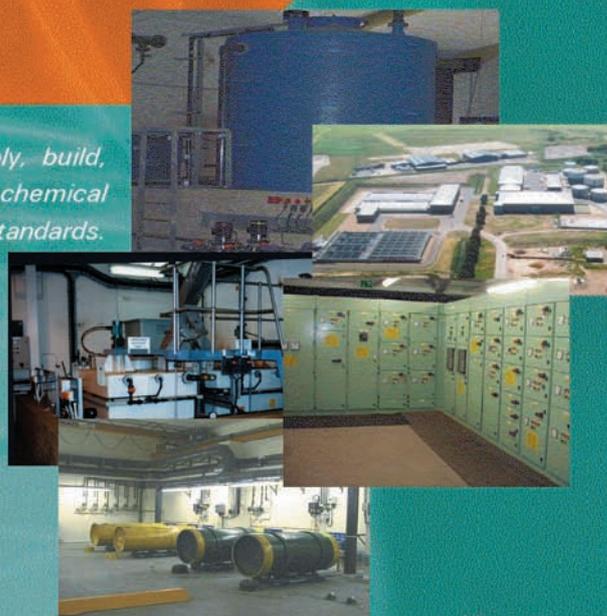
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Bell Green WTW – Riverview Walk reinstatement (courtesy Thames Water)

Comprehensive restoration

In certain locations it was not possible to replace trees where they conflicted with the pipeline route and enhancements, including additional tree and shrub planting, clearance of weeds and removal of invasive species, replacing non-native planting with appropriate native species within the route of the pipeline and additional planting to poorer shrub beds were included in the design to compensate for these losses. Overall, The comprehensive restoration proposals when completed will enhance the landscape and planting within Linear Park and improve the wildlife and amenity value.

Archaeology

The Museum of London Archaeological Service (MOLAS) in full consultation with English Heritage carried out desktop archaeological assessments on behalf of Thames Water. These studies identified two known areas of archaeological interest.

The first of these lies alongside the Pool River and consists of an area where traces of Romano-British activity were discovered in the 1960s. At approximately the same point a Roman Road crossed the Pool River, however, the exact crossing point has never been determined. Urbanisation of the area was believed to have caused significant disturbance to the ground along the river corridor and the majority of archaeological deposits were not expected to have survived.

Thames Water engaged the services of MOLAS to conduct advance trial trenching work where considered necessary and to monitor and record all other work that had potential to produce archaeological remains, but no trace of these features was found.

Relationships

London Borough of Lewisham inspectors were given a watching brief, including attendance at progress meetings and this cooperative arrangement has helped to avoid problems. Close attention on site to the agreed method statements and restoration plans has ensured that the project had minimal impacts on the public and the environment, despite the council's earlier concerns.

Work commenced in Linear Park in October 2002 and was completed by March 2003. Reinstatement works are expected to be completed by July 2003. The whole project is forecast to be completed on time and within budget. ■

Alliancing teams on the Bell Green Project were: Trident South Alliance (Costain Construction Ltd., Black & Veatch) & Network South Alliance (Morrison Construction Ltd.

Note: *The author of this article Adrian Jack, is Project Manager, Thames Water.*