

HEADINGLEY WTW – Leeds, Yorkshire, UK

Client: Yorkshire Water Services

Value: £31million



Scope of Works:

The new treatment works at Headingley supplies most of Leeds. It has a capacity of 120MI/day compared with the 80MI/day capacity of the slow sand filtration plant which it replaced. Previously the area was supplied exclusively from the Washburn Valley reservoirs, but the new works at Headingley was also required to be capable of treating water from the River Ouse. Water quality problems to be overcome therefore included high levels of colour, iron, manganese and algae.

A largely buried concrete substance houses the main process units, with a light steel superstructure. The water is treated by a three stage process (flocculation/flotation and two stage rapid gravity filtration) which was developed by Yorkshire Water and Earth Tech and has been successfully implemented at many plants treating Pennine reservoir waters. Chlorine is electrolytically generated on site. There are two stages of low lift pumps, and a contact tank. Although manned, the plant is fully automated with telemetry links.

Project Management:

The contract strategy was based on a conventional approach. Civil design and project management were by Earth Tech, with architectural design by Farrell & Clark. There were two principal construction contracts - (Civil £14 million) and (Plant £12 million) - plus a substantial landscaping contract. In order to meet, the EU compliance date for water quality standards a “fast track” approach was adopted with overlapping civil and plant contracts on site, which reduced the contract period by 30 weeks compared with initial estimates based on sequential construction. A separate landscaping contract was let for an extensive planting scheme to screen the works from view. The scheme cost of the main works was £31 million. Earth Tech have subsequently designed and built a pesticide removal plant on the Headingley site under a separate turnkey contract.

Construction Management:

The site was divided by one of the main roads into Leeds, with the contact tank being on one side and the rest of the works on the other. Tunnels were driven under this road for the mains connecting the two halves of the works. The site was also constrained by a large existing service reservoir which had to be kept operational; this led to restrictions on access to the construction site. The works was commissioned and trials conducted ‘off-line’ leading up to a single handover date after which the old works was abandoned.

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Excavation for the main building was unusually deep (up to 15 metres below original ground level) in order to reduce the final roof level, which in conjunction with landscaping works screens it from nearby residential areas. A contiguous piled wall was constructed at one side of the site in advance of excavation. Part of the works was on the site of former 19th century filter beds. Despite this and the presence of unstable glacial deposits known from prior site investigations, no problems were encountered with ground conditions. Differential settlement and heave characteristics at foundation level were catered for by constructing the main plant building, which was 90m x 70m in plan, in an articulated manner with patented shear connectors to allow the structure to move without vertical displacement occurring.

Despite the potential difficulties presented by the interface between civil and plant contractors working together, the works was commissioned in time to meet the compliance date. It more than meets the specified standards of treatment, which in themselves were considerably tighter than EU requirements in respect of colour and turbidity.

The works won the Institute of Civil Engineers 1996 award for excellence in concept, design and execution of civil engineering works.