£10m Capital Projects for Yorkshire Water

significant archaeological finds at two major projects

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Two of Yorkshire's most significant archaeological discoveries in recent times have been unearthed during work on two major capital projects totalling £10m worth of investment. During part of Yorkshire Water's programme to remove the risk of cryptosporidium from local spring sources the first evidence of a medieval 'pottery manufacturing site' was found and while laying a 900mm duplicate pipeline at a different location contractors uncovered a previously unknown Roman settlement.

"Y" piece connection being installed at Elvington WTW *(courtesy Yorkshire Water).*

Ilton/Agra & Witton Moor are spring sources in the North Yorkshire Dales. The Ilton spring supplied a total of 14 properties and Agra spring supplied 392 properties. Witton Moor spring supplemented the Thornton Steward WTW supply to Middleham reservoir where the two waters were blended. All three sources offered chlorination treatment but were unfiltered and following Cryptosporidium risk assessment, were identified under the terms of the Water Supply Regulations 1999 as being at serious risk of failing.

The £3m project involved 'maining out' from Thornton Steward WTW to Ilton, making use of and upgrading existing assets wherever possible. The route taken was via a new reservoir at Witton Moor, then gravitating to Agra, with a pumped supply to Ilton. The whole system was extensively modelled hydraulically from Thornton Steward to ensure the treatment works was capable of meeting the extra demand.

The majority of this work included laying approximately 8km of a new 150mm pipeline and the construction of a new 875m^3 reservoir at Witton Moor. However, additional works included upgrading the existing pump sites at Thornton Steward and Waterloo Farm (from 18l/s to 30l/s to meet the new peak week demand and the reconfiguration of Healey pumping station required to boost flows to Ilton.

16th Century Potter's Workshop

During construction of the new pipeline in the village of Healey, near Masham in the Yorkshire Dales, local archaeologists identified the first evidence of a medieval 'pottery manufacturing site' to be excavated within the Yorkshire Dales. The site, found by *Earth Tech Morrison,* was seen as a major archaeological discovery. Approximately 100,000 pieces of pottery and sections of a kiln structure were recovered.

The pottery was dated to the early 16th century, the period immediately before, during and after the dissolution of the monasteries. The site lies 5km south of Jervaulx Abbey and 15km north-west of Fountains Abbey and it is likely that much of the pottery manufactured at Healey was destined for either of these abbeys.

The site consisted of a potters workshop, buried by a huge waste heap of broken pottery and a heavily fired kiln. The potter's workshop was defined by a low stone wall, which would have supported a timber structure, most probably open at both ends to allow good ventilation. When the workshop went out of use it was burnt down and deliberately destroyed. The remains were subsequently covered by a waste heap from further pottery manufacturing being undertaken up slope of the site.

Yorkshire Derwent Aqueduct (YDA) - Duplicate Pipeline

The original YDA comprises 42", 38" and 36" diameter butt welded, steel pipelines, laid between Elvington WTW and Hoober Reservoir, near Sheffield. With the recent completion of the 14km length between Elvington WTW and Riccall PS, the YDA has been duplicated along its entire length (approximately 60km). This now allows Yorkshire Water to reduce pumping costs and has significantly enhanced security of the supply from the works.

This 14km length passes through the Selby Coalfield, an active mining area. Mining has already affected the existing pipeline to some extent but further mining will have a greater impact on the integrity of the existing pipeline and the new duplicate pipeline over the next five years.

To mitigate the effects of mining subsidence and to allow the new pipeline to cope with predicted current and future ground movement stresses, the new duplicate pipeline was laid using 900mm ductile iron pipes with extended sockets (19mm longer than standard joints).

Back on line

Although the 14km was the only section of the YDA to have been laid using material other than butt welded steel, the connection at Elvington WTW was carried out using a fabricated steel section in the shape of a 'Y' branch. The straight piece was 1,050mm (the existing YDA) and the branch off 900mm (the duplicate YDA). *Galliford Try* completed the connection in 54 hours allowing the treatment works to be brought back on line 18 hours sooner than anticipated. This was particularly important as a resource deficit in Sheffield meant Yorkshire Water were operating at a greater supply risk than would normally have been accepted for a major works shut down.

Unknown Roman Ruins

A previously unknown Roman settlement was discovered at Wheldrake, near York, by *Galliford Try,* whilst laying the new 900mm Yorkshire Aqueduct duplicate pipeline.

This settlement w as completely unknown to archaeological records and dates back to the 3rd century. It was the first lower-class arable and livestock farming settlement found in the area, thought to have been built by the Romans specifically to meet the demands of the city of York.

Four Roman graves were discovered, two of which contained full skeletons. Buried in one grave was an amber bead, something the Romans would have used as decoration, or as a sign of importance within the settlement.

The burial ground was on the outside of the settlement, next to the ruins of a main Roman road, a classic example of Roman tradition. Along with this, the main road and the graves point directly to York Minster, again conforming to Roman theories.

Other finds included a huge quantity of broken pottery and animal bones that would have been used for cooking, engineering equipment and structural remains, including the ruins of buildings, walls and roadside ditches. ■

New Witton Moor Reservoir under construction *(courtesy Yorkshire Water).*

The Roman road (lighter shade) looking towards York Minster *(courtesy Yorkshire Water).*

Examining fragments of broken pottery *(courtesy Yorkshire Water).*

Note: *The author of this article, Paul Robins, is Capital Solutions Manager, Yorkshire Water.*