Yorkshire Water, Heckmondwike CSO scheme

cooperation & innovation solve double problem

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Residents in Heckmondwike, West Yorkshire, suffered a significant source of distress through a flooding problem which had occurred for some time and caused a sewage discharge. The DAZ which was classified as a water quality zone, also had a CSO problem which meant that not only was aesthetically unsatisfactory matter (sewage litter) being discharged, but macrobiotic life in a watercourse was detrimentally affected.

Heckmondwike: Construction on site courtesy MWH

Wastewater CaSP, Yorkshire Water's strategic partnership of *MJ Gleeson and MWH* in conjunction with *Peter Duffy Limited* and *Mowlem Johnston Limited.* together known as Wastewater West CaSP (Capital Solutions Partner) were briefed to resolve the area flooding and river discharge problems in Heckmondwike.

Modelling

The existing situation was modelled to verify the cause of flooding and this demonstrated that 221m^3 was predicted for 1 in 10 year storm. There was some delay on the scheme as the Unsatisfactory Intermittent Discharges model was required to be available and verified. This model was used and accuracy improved in the specific area of the flooding. With this fuller understanding of the problem the possible solutions were optioneered,

The optimum solution to the problem was identified, which was to provide a high level relief 500m^3 storage, and return flows to the system.

Heckmondwike water quality CSO scheme

Yorkshire Water also issued a brief to resolve the CSOs within the Heckmondwike DAZ. This DAZ was classified as a water quality zone which meant that not only was aesthetically unsatisfactory matter (sewage litter) being discharged to the watercourse, but also the macrobiotic life in the watercourse was detrimentally affected. The CSO had a 1 in 5 year Pass Forward Flow of 103 l/s, 1 in 5 year spill flow – 256 l/s and a spill frequency 73.

Specialised modelling shows best way forward

To resolve the water quality CSO problem, modelling is required on a catchment wide basis. The storage volume was optimised to determine the required volume in order to achieve the necessary improvements in the watercourse and the optimum location for storage in terms of modelling and construction costs.

This is done using River Impact & Optimisation Tool (RIOT), a specialised modelling development by *MWH* wastewater networks. The optimum site for storage was adjacent to an existing waste water treatment site.

Combining the schemes

Solution to the area flooding problem was identified earlier than the solution to the CSO problem. This was mainly due to the fact that the contract had been around for some time and whilst resolution of an area flooding problem required some fairly complex modelling to find the root cause and identify solutions, this tends to be in a localised area. The two storage solutions would have been within a few hundred metres of one another. At this time both project teams agreed that it would be prudent to revisit the schemes to optimise both solutions.

Further modelling of the solutions was required to determine whether they could be hydraulically combined, and whether additional storage would be required to achieve the solution to the water quality requirements in the watercourse.

No additional storage would be required by the water quality scheme if the two storage solutions were combined. This was due to the differing critical storm return periods for each scheme.

Heckmondwike: Section of structural wall tank courtesy: MWH

Final solution

The final solution to both schemes was identified as:

* a new high level relief to remove surcharge during storm;
* sewer to storage for the water quality CSO;
* 1000m³ Horizontal HDPE structural wall storage tank:
* pumped tank recirculation cleaning system;
* pumped return for stored volumes to upstream of the tank to pass for treatment once the storm had subsided;
* a screen for all flows up to 1 in 30 year return period for discharging only screened flows to the watercourse.
* all flows into the tanks are screened.

Both schemes were constructed together, and required 500m³ storage volume less than that required by the two schemes individually.

Cooperation and innovation

Yorkshire Water and Wastewater CaSP have delivered solutions to these two schemes simultaneously and enabled the required storage to be minimised. This meant that scheme costs were also minimised at no compromise to the technical solution and, therefore, enabled Yorkshire Water to meet their regulatory obligation. The additional money saved from the work programmes are then released back to the programme and available for other identified schemes.

This is an excellent example of co-operative working and the use of innovative thinking to produce a good solution. ■

Note: *The author of this article, Valerie Flint, is Project Manager, MWH.*