Scunthorpe, Ashby South Grange UID

two key CSO overflows that had UID's within catchment

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Two key combined Sewer Overflows (CSO's) were identified by the Environment Agency as having Unsatisfactory Intermittent Discharges (UID's) within the Scunthorpe Drainage Catchment. These were Grange Lane North, which had a water quality driver and Ashby South Grange with an aesthetic appearance driver. Initially thought to involve two separate solutions to be developed in isolation, during the feasibility stage, a strategic catchment solution was developed resulting in efficiencies in the design and construction and future operation of the CSO's. A brief outline follows on the next page.

Screen installation at Ashby South Grange *photo courtesy Severn Trent Water Ltd*

A brief outline is as follows:

* increased pass forward flow at Grange Lane North to negate requirement for Water Quality storage at an in-appropriate location;
* reinforce downstream system to permit an increase in pass forward flows;
* provide compensation storage to ensure no detriment in spill performance of downstream system;
* construct new CSO chamber and provide screening at Ashby South Grange; and increase pass forward flow above Formula A at Ashby South Grange
* increase FFT to Yaddlethorpe Sewage Treatment Works (STW) to accommodate increased pass forward flows and provide capacity to drain storage volumes in the sewerage network within an acceptable timescale.

Feasibility and Design Work for the Strategic Catchment Solution was undertaken by Severn Trent Water's in-house design resource based in their Derby (Raynesway) offices.

THE EXISTING SYSTEM

Grange Lane North CSO

This CSO is located in a heavy industrialised area with overflow within the main carriageway. Previous works at this site involved constructing a flow control chamber, reconfiguring the flow control arrangement and installing hydrobrakes. This improved the aesthetic performance of the CSO. However, this site was later identified as having an impact on the water quality and a further works were required.

Ashby South Grange CSO

This CSO is located in a public open space and the site was previously a Sewage Treatment Works before being abandoned in the late 1970s. The CSO had operational difficulties and the screen was prone to blinding, therefore resulting in unsatisfactory performance. As a result, the CSO was the cause of aesthetic problems at the nearby watercourse (Bottesford Beck) and a works identified to rectify the problem.

DEVELOPMENT OF A SOLUTION

The development of the strategic solution evolved from influences across the catchment and the desire to provide a holistic approach for the delivery of the UID's.

Initial Drivers

The initial drivers for the catchment would have created independent solutions for Grange Lane North and Ashby South Grange accordingly. These were:

* provision of over 3000m^3 of storage at Grange Lane North;
* provision of new CSO chamber at Ashby South Grange incorporating a mechanical screen.

Evaluation of an isolated approach to solve the UID's identified the following impact on the network performance:

* large storage volume required in the catchment with a low pump return rate due to capacity issues at the downstream STW;
* location of a large storage volume in a dense industrial area; constraint on operational and construction aspects;
* known flooding in the Grange Lane North Area & influence on performance of storage/spill system.

The problems associated with the provision of large storage at Grange Lane North led to the development of a holistic solution.

Development of the Strategic Solution

To achieve water quality compliance at Grange Lane North it was necessary to increase pass forward flow from 580l/s to 1000l/s.To accommodate the additional flows it was necessary to reinforce the downstream system. This was achieved by constructing a new 900mm diameter sewer for a length of 715m. This length of sewer was laid parallel to the existing trunk sewer to act solely as a storage facility. To ensure that there was no degradation of the downstream system performance as a result of the additional flows, storage was required at Ashby South Grange CSO. In conjunction with this, the impact on Yaddlethorpe STW was also considered.

It was identified that Yaddlethorpe STW had very limited capacity to accommodate the emptying of the catchment storage. A number of options were considered during the design stage. Any proposed solution had to ensure a pass forward flow from the Ashby South Grange CSO of Formula A could be achieved, that an economic level of storage was provided and that this could be constructed within the site. It was also essential to consider any impact on Yaddlethorpe STW. Following appraisal of these options, the final solution resulted in the following:

* provision of 1300m^3 of storage at Ashby South Grange;
* construction of a new CSO chamber incorporating a mechanical screen;
* increase flow to full treatment at Yaddlethorpe Sewage Treatment Works; This required an additional final settlement tank to be constructed and would coincide with other planned works at this site.

This volume of storage required could be accommodated online due to the existing arrangement of the system at the Ashby South Grange site. As a result, this provided operational and construction efficiencies.

Construction & Programme

The project was delivered in three phases:

* Phase 1 - Trunk Sewer Reinforcement Works;
* Phase 2 - All works at Ashby South Grange CSO;
* Phase 3 - Modifications to Grange Lane North CSO to the increase pass forward flow.

Each phase was procured using a Target Price Contract in accordance with Severn Trent Water's AMP4 Contract Strategy. The contractor, *North Midland Construction* became involved in the project during the feasibility and design stage. This approach led to all members of the team being involved in the solution development and that buildability issues were considered as part of the design process. It also resulted in early identification of any potential risks to delivery and pro-active management of them to eliminate, mitigate or reduce their impact.

The team were able to ensure that economies were derived through having a phased construction programme. This has proved successful in delivering these projects. Both phases 1 and 2 have been completed and Phase 3 is currently under construction with completion programmed for the end of March 2008.

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