Yorkshire Water – West Area CSO Programme

overcoming intermittent discharges in difficult urban area

by

Brendan Carty, EurIng, BEng (Hons), MSc, CEng, MICE, MCIWEM

During the AMP3 period Yorkshire Water had a regulatory obligation to address a significant number of unsatisfactory intermittent discharges (UID), commencing in Year 3 with a regulatory target of 118 uCSO's. In the Company's Western Area, Capital Solutions Partners (CaSP) were expected to deliver 34 outputs from a series of 17 project contracts, having a total contract value of £9.3m. In this area, the catchment is predominantly urban by nature. Construction issues to be overcome were characterised by utility diversions, on-line construction and traffic management. The legacy of the Victorian sewerage network has resulted in small CSO (combined sewage overflow) structures operating in surcharge conditions and, on occasion, with back flow.

Early screen delivery *(courtesy Yorkshire Water Ltd).*

The (CaSP) Alliance formed to deliver capital works in Yorkshire Western Area consisted of MJ Gleeson and MWH who formed an Allliance with Peter Duffy Limited and Johnston Construction Limited known as the 'West CaSP'.

The initial package of work was released as 17 uCSO's in an area of Leeds known as Gipton Drainage Area Zone (DAZ). Typically, the existing CSO chambers were undersized with some operating like a bifurcation, or with simple leaping weirs rather than fully functioning separation chambers. The existing chambers were neither appropriate for solids separation nor adequate to accommodate any form of screen installation.

Extensive computer modelling and design to provide solutions meeting Yorkshire Water's design guidance identified that a series of major construction solutions were required. The initial design proposals involved expensive pipeline upgrade and provided only one instance where two adjacent chambers could be rationalised into a single larger overflow. The proposed solutions for the first 17 CSO structures were priced and did not appear to offer best value for remedial action to address the basic problem of aesthetic pollution.

In addition the scope of works indicated by these initial proposals would not have delivered beneficial completion within the six months timeframe which remained of the Yr 3 period.

Delivery strategy

Following the existing CaSP approach to project delivery all 17 Gipton designs were required to have verified designs modelled which were fully optioneered, appraised and priced as a viable outline solution before going forward for Solution Authorisation. Only after such authorisation would the project be allowed to proceed with planning application and serving land entry notices, where appropriate.

The release of a package of 17 uCSO's, although not typical of the project sizes, caused a 'bottle neck' approach to design requiring high level of resource for a short period of time to ensure that solutions were defined for all 17 uCSO's concurrently. Furthermore, the construction programme indicated that ultimately 34 separate sites would need to be managed with zero float to ensure that the target number of uCSO's were completed on time. The initial forecast was identified that the existing strategy of

individual project delivery would not enable the team to deliver the regulatory target. A more flexible programme strategy would be needed.

Affordability
The benefits of the early works were to increase awareness throughout the CaSP team and the Client's organisation of the cost and time issues. A Value Management of the Gipton DAZ identified that in order to succeed there had to be a number of changes to the delivery strategy by both the CaSP and the Client. A more pragmatic and practicable design approach was required at all levels. The challenge for the West CaSP was to find innovative methods to drive the outputs and also to actively challenge the scope of works being delivered.

Within a week a number of organisational changes were effected to bring about a more focused approach to the team. The number of solution managers (client brief managers) was reduced from seven to four with a nominated Manager identified as a single point of contact for programme control. To complement the actions of the client the CaSP identified a team dedicated to the delivery of the 34 target CSOs.

Models
Catchment models using *Hydroworks* were used extensively, to optioneer solutions and ensure that the screen arrangements did not cause detriment to the existing sewerage system. The use of existing assets was maximised; greater emphasis being given to chamber extensions and modifications where retrofit solutions were not possible, rather than opt for easier new build solutions.

A powered screen was proposed in order that the existing stilling chamber could be retained. The civil works were effectively linked to the creation of a new side weir and reinforced concrete spill chamber. The existing weir was left in situ during construction to manage the flows, thus alleviating the need for overpumping.

Throughout the design process Yorkshire Water were continuously challenged to adopt solutions which had the primary objective of dealing with the aesthetic problem only. An example of this challenge approach was the reintroduction of a proposal for a static screen installation within an existing chamber. The proposal was initially rejected due to the lack of access to the continuation pipe. In conjunction with Yorkshire Water and the screen manufacturers, the West CaSP developed an innovative lifting screen section solution.

Programme management
To assist the CaSP in resource planning the whole of the Client's UID programme data base was made available. To assure the client that the regulatory target would be met a programme of 45 uCSO's were driven to allow an element of flexibility within the programme.

Programme visibility allowed the CaSP team to accelerate early design activity before a project brief was issued.This was done under a Preliminary Investigation brief which allowed site surveys and initial design activities to be started. To accelerate the programme further the CaSp commenced optioneering using unverified models. The preferred solution was checked against the verified model prior to final design acceptance.

With Client approval a number of critical activities were progressed in parallel with Solution Authorisation. Land entry notices were served as soon as optioneering was complete and a CSO location confirmed. Similarly, where a powered screen was required a power supply was immediately ordered and planning application submitted for the erection of a roadside kiosk.

During the latter stages of the programme delivery the proactive design process got to such an advanced stage that for one project brief, for two new CSO's the time between brief acceptance and Solution Authorisation was only two weeks.

Conclusion
The West CaSP delivered the required 34 aesthetic CSO solutions, enabling Yorkshire Water to meet the regulatory obligation. During the delivery of the works programme a change of approach from project to mini-programme management was required. The effective planning of resource, early information exchange and continuous design challenge resulted in programme flexibility, shared innovations and savings for the whole UID programme.

The lessons learnt have been have been captured and form the building blocks for delivery of the Year 4 UID programme, where the West CaSP is tasked with the delivery of 93 water quality and aesthetic uCSO's.

During Year 3, the West CaSP maintained target flexibility by driving 45 new CSO solutions. The 11 excess solutions have provided an early start on the Year 4 target. ■

Note: *The author of this article, Brendan Carty, is Project Manager MWH UK Ltd.*