Canterbury Growth Scheme

innovative solution to provide additional capacity to the sewerage system

by
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The historic city of Canterbury consists of approximately 20,000 households. Continuous growth within the city has exhausted spare capacity of the sewerage network. Extra capacity was required to reduce the risk of flooding and pollution. On behalf of Southern Water, 4Delivery (4D) developed an innovative solution to provide additional capacity while saving more than 2,800 tons of carbon, reducing disruption, achieving "no deterioration" to the quality of the River Stour and making substantial savings. The 4D methodology was not only accepted by the Environment Agency (EA) but was put forward to Water UK as the *"process for permitting new CSOs to resolve sewer flooding"* with the intention of becoming official EA policy.

Kinsgmead Shaft – November 2009 *Courtesy of 4Delivery*

Location

Canterbury is located in south east Kent. The catchment comprises Canterbury and the outlying areas of Sturry, Blean, Tyler Hill and Harbledown. It is located either side of the River Stour. All wastewater flows drain directly to Canterbury Wastewater Treatment Works (WTW). The drainage area covers 1,673 hectares and has a population of 49,000.

Approximately 4,500 new properties and 13 hectares of commercial developments are planned in the Canterbury sewerage catchment from 2006 to 2015. Developments are planned at more than 100 sites in the catchment, with a predicted increase in population of 9,400 – that's 20 percent. Analysis showed the existing sewerage system might not meet Southern Water's level of service standard against flooding due to hydraulic overload. The increase in population could affect the service given to Southern Water's customers and the environment. Improvements to the network were required.

Original Client Brief Scheme

The client brief was to build 4.4km of trunk sewer to Canterbury WTW and provide an increased inlet works capacity of 2,000l/s. No additional improvement work or increased capacity was proposed for the WTW. Assessment of this option showed it would impact on the operation of the WTW and storm overflow spills. This would result in deterioration to the quality of the River Stour.

Alternative Scheme
As an alternative, the following scheme was delivered, offering hydraulic capacity for future growth:

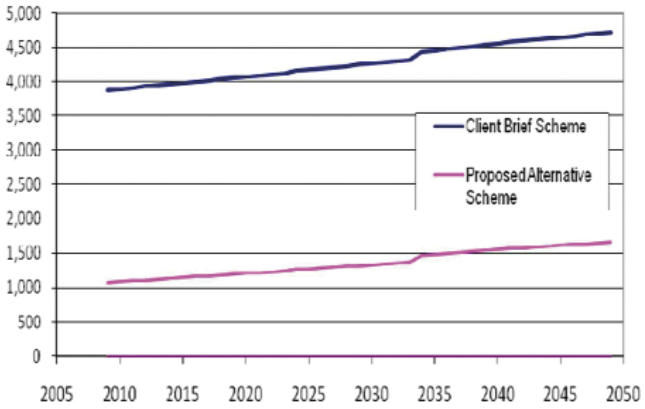
- A new offline pumping station, passing flows to storm tanks at Canterbury WTW;
- Additional 2,500m^3 of storm tank storage to supplement the existing tanks, providing a total of 8,100m^3 of storm tank storage at Canterbury WTW;
- 900m^3 offline storage and screened CSO located in-catchment. The new CSO is Formula A compliant and hydraulic analysis demonstrated that the spill frequency is limited to once every two years. Discharges have been determined to comply with both percentile and fundamental intermittent standards for UPM studies.

The alternative scheme cost was significantly less than the original brief scheme. This was supported by a carbon assessment to demonstrate best value of both cost and environmental impact.

Carbon Assessment
A carbon emissions assessment was undertaken to compare the two schemes. The assessment included consideration of the embodied carbon plus carbon emissions associated with the proposals. The figure below shows the difference in carbon emissions between the client brief scheme and the alternative scheme.

Using the carbon auditing methodology, the total embodied carbon for the alternative scheme was determined to be 1,076 tCO_2 compared to the original scheme emissions of 3,885 tCO_2.

It was clear the alternative scheme offered a substantial advantage. Over a 40-year period the alternative scheme is estimated to generate approximately 3,000 fewer tonnes of carbon dioxide (tCO_2).



Comparison of cumulative emissions (tCO_2e) *Courtesy of 4Delivery*

Conclusion
4Delivery Ltd, a consortium comprising United Utilities, Costain and MWH, which is carrying out a programme of environmental improvement and water quality schemes for Southern Water between 2010 and 2015 across Kent, Sussex, Hampshire and the Isle of Wight, developed an innovative solution to provide additional hydraulic capacity for Canterbury. This saved more than 2,800 tons of carbon, as well as reducing disruption to the public, causing "no deterioration" to the quality of the River Stour and making financial savings.

Note: ***The Editor & Publishers thank Robert McTaggart Strategic Technical Manager with 4Delivery for providing the above article for publication.***■

Construction of in-catchment storage *Courtesy of 4Delivery*