Merthyr Dyfan Storage Tank

an innovative semi-precast concrete solution

by
Michelle Barker BSc, MSc

Dwr Cymru Welsh Water are undertaking a £640 million investment programme over the AMP4 period, to improve both the condition and performance of their wastewater assets. The aim is to provide water quality/aesthetic improvements (to both local and bathing waters) and flood protection for local properties. To achieve these improvements, modifications are required to the existing sewerage network. The CSO at Merthyr Dyfan was one of the thirteen CSOs identified by the Environment Agency as an Unsatisfactory Intermittent Discharge (UID).

Merthyr Dyfan CSO: Placement of pre-cast batters, forming benching of one of side channels.- laser measured for accuracy *copyright Arup*

The Welsh Water Asset Management Alliance (AMA) is the team set up to deliver DCWW's AMP4 programme between 2005 - 2010. The AMA is a group of strategic partners working with the water company to secure the successful delivery of its investment and operational plans.

Arup and MWH, as part of the Virtual Design House (UK Water Projects 2002) and AMEC, as part of the South East Team (SET) commissioned by DCWW, are undertaking the design and implementation of upgrade works addressing 13 unsatisfactory combined CSOs within the existing sewerage system at Cold Brook in Barry, Vale of Glamorgan.

The CSO at Merthyr Dyfan was one of those 13 CSOs identified by the Environment Agency as an Unsatisfactory Intermittent Discharge(UID).

The existing Merthy Dyfan CSO discharged unscreened storm water into the Cold Brook to the west of Merthy Dyfan Road, and operated approximately 70 times per year. The Environment Agency required the new CSO to be screened and additional storage provided to reduce the spilling frequency to 5 times per year. The proposal was to decommission the existing CSO chamber and replace it with a new structure which would provide the necessary screening facility and storm water storage.

Merthyr Dyfan CSO

Owing to the layout of the existing sewerage system and the local topography, the scheme was moved to a new location, reducing the extent and magnitude of improvements required to the existing system by eliminating the need for pumping and for major upsizing works across the area. The final scheme involved the construction by open-cut of 245m of new sewer, plus a 290m^3 underground storage tank,

The storm storage tank has a Dry Weather Flow (DWF) channel and two side drainage channels. The DWF channel is lower than the side channels, for the tank to drain. A tank such as this would traditionally be constructed as an in situ reinforced concrete tank. In this case, a pre-cast concrete Carlow tank was used; this consisted of pre-cast modules for the base, benching units, external walls, intermediate walls and top slabs.

The units were brought to site and assembled in little over 2 weeks, which reduced the overall time for construction from 30 weeks to 20 weeks, when compared with conventional in-situ construction. The cost of the Carlow solution was 15% less than conventional in situ construction

The benefits of the semi-preformed tank were:

* less time spent on site;
* fewer site operations;
* specifically trained force;
* fewer unforeseen events;
* benefit of repeat experience;
* improved H & S - i.e. reduced contact with vibrating tools.

The storm tank will fill only in times of heavy rainfall and will receive very dilute sewage. As such, no odour is anticipated. As an added safeguard, an automated tank cleaning system was installed to flush out the tank after every storm and thus prevent the build up of any solid residues that could lead to odour problems.

This system requires a dedicated clean water storage cistern and pump, which are housed in a below ground chamber. The control panel is located in a kiosk at the edge of the site.

A vent stack was installed to provide relief for displaced air as the tank fills during storm conditions. The vent stack is located amongst existing trees to minimise visual impact.

This scheme is already completed and performing satisfactorily, according to expectations. ■

Note: *The author of this article, Michelle Barker, is a Senior Engineer with Ove Arup & Partners.*