

Porthcawl, South Wales

£5.8m investment cleans up the sea at popular resort

by Peter D Williams BEng, CEng, MIstructE

Every summer the picturesque seaside resort of Porthcawl is transformed into a hustling, bustling town as thirteen thousand tourists and ten thousand day trippers swell a town of eighteen thousand residents. A short distance west of Porthcawl the sand west of Rest Bay flies the prestigious European ‘Blue Flag Beach Award’. However, closer to the centre of town the seawater has suffered from an inconsistent quality. On occasions samples have failed to meet bathing water standards. Now, Dwr Cymru Welsh Water has invested £5.8 million in improving problematic intermittent discharges from the existing Consented Storm Overflows (CSOs).



Porthcawl - works under construction (courtesy Hyder Consulting UK Ltd).

This significant investment is designed to satisfy two new regulatory emission standards, namely the Bathing Water and Shellfish Directives. The primary objectives would be addressed by limiting CSO spill frequency to three spills per bathing season. The second objective would be to limit the total CSO discharges to ten spills per annum. Sand banks just off the foreshore are a habitat for bivalves and though cockles and mussels are not presently commercially harvested, the Porthcawl scheme also has a shellfish quality driver.

Morrison Construction was the Civil Contractor charged with addressing the CSO and sewerage programme on behalf of Dwr Cymru Welsh Water. with Cost Consultants *Chandler KBS*. The scheme was significant within Welsh Water’s Capital Alliance as it was the first project to be shared by two contracting partners as an integrated team. *Morrison Construction* calling on the expertise of *Meica Process Ltd* to carry out the design, procurement and commissioning of the most complex M & E works.

Ten CSOs

In total, ten existing CSOs were identified varying in sophistication from a simple pipe discharge from the sidewall of a manhole

to elaborate arrangements including powered screens and storm pumps. A full *Info Works* sewerage model was built by the Design Consultants *Hyder Consulting*, and computer generated simulated flows from known rainfall events were verified against recorded flows at various points on the sewerage system. The model quickly identified that Porthcawl’s two main pumping stations, at Irongate PS and Beach Road PS, discharged the majority of the storm spill. These stations soon became the focus for design efforts and solutions for the catchment.

Major challenges facing the team were two fold; firstly to win over the support of the local community and secondly to complete the works outside the tourist season. A public relations strategy was formulated comprising of a public display, press releases and discussions with local businesses and local councillors. The aim was to take the project to the public and to stress the environmental benefits balanced against the short term disruption. The second challenge was the time scale. Work could not start until October and had to be completed before the end of April. The challenge set was to build a storm tank of 2700 cubic metres at Irongate PS and at Beach Road PS extensive remodelling of the existing pumping station and construction of a 1300 cubic meters of storage.

The design work was carried out at *Morrison's* project offices. Baglan, where many of the Alliance Partners have a permanent presence. Regular progress meetings kept all abreast of developments and the designs evolved to address the constraints and opportunities. The design finally selected for both sites utilised pumped fill of the storm tanks and conventional civil construction techniques.

Irongate PS was built ten years ago on an exposed outcrop of rock and construction was set back three months as rock breakers nibbled fragments from the massively jointed, iron hard, limestone rock. The tier one supply chain contractors *David Lewis Civil Engineering* were brought in on a back to back partnership agreement for the construction phase. *David Lewis's* approach was to adopt methods of excavation best suited to the conditions at Irongate. The first three metres of rock were easily excavated using a tracked excavator of 75 tonne capacity. The spoil was, in part, used to crease a noise bund but much was used as block stone by the Environment Agency. Below three metres pneumatic hammers on 30 tonne tracked excavators progressed the excavation down to five metres where, with five metres of excavation still to go, the rock simply got too hard. The answer was to adopt Pyrotechnic blast canisters which proved highly effective. Typically, disrupting a two metre high face and a one metre fetch, pyrotechnic blasting was a great success. Noise and vibration was regularly monitored and maintained within acceptable parameters. Once formation was achieved the tank structure, including a low lift pump well, screening chamber and return sumps were formed, using conventional RC techniques.

Storm tank construction

Beach Road serves one of the largest caravan parks in Europe. Civil construction here was quite different from Irongate. A 4m deep excavation through sand and above water table permitted very rapid construction of the storm tanks. Three metre diameter spiral wound MDPE pipes were selected for the offline storm tanks and these were readily installed. At the same time the existing pumping station was extensively modified to suit the new screening and pumping regime. While the main projects were in progress, small scale works of varying complexity were undertaken to resolve the other CSOs and repair outfall structures.

The M & E features worthy of note are: mixed flow canister pumps lift 1127 l/s from Irongate low-lift well; at Irongate, motor managers reduced the size of Irongate Motor Control Panel permitting re-use of the existing below ground MCC and finally at Beach Road PS, chopper pumps to recalculate flow to avoid plugs of screenings and to prevent the accumulation of fats in the wet well.

The project is notable for finishing on time; beating the tightly controlled target cost; winning the support of the local community and for the high level of close co-operation within a multi company, multi discipline team. Since being set to work and with the single exception of a single telemetry signal (which reported a pump run as a pump failure) the scheme has worked impeccably.■

Note: *The author of this article, Peter D Williams is with Hyder Consulting UK Ltd*



Portcawl - works under construction (courtesy Hyder Consulting UK Ltd).