

Huxley Green

eliminating UID problem & reducing local flooding

The Newport catchment covers an area of approximately 2,600 hectares serving a population of approximately 105,000. The Malpas sub-catchment lies to the north of the M4 motorway, located on a hilly area, bordered to the east by the River Usk and A4042 and to the west by the Monmouthshire & Brecon Canal. The Newport -Malpas Combined Sewer Overflow (CSO) Strategy is one of a number of Unsatisfactory Intermittent Discharges (UIDs) projects undertaken as part of Dwr Cymru Welsh Water's AMP3 Programme in South East Wales.



Huxley Green CSO under construction

courtesy: Welsh Water Capital Alliance

Within the sub-catchment there are five UIDs, three of which pass forward flow to Huxley Green CSO. This CSO is located in playing fields opposite Bettws Nature Park, and discharges into a ditch that runs through the park. The ditch often holds the discharges until sufficient storm flows flush the ditch, causing potentially hazardous slugs of concentrated effluent going straight to the watercourse and has visible sewage litter along its length.

The nature park is of scientific interest, and host to flora and fauna. Due to the presence of Great Crested Newts less than a kilometre away, a licensed independent inspector investigated the nature park and surrounding area in 2003. No Great Crested Newts were found. Before construction activities began another survey was undertaken, again reporting no Great Crested Newts, but confirming the presence of other newt species, frogs, toads and grass snakes.

The construction works required the temporary removal of habitat that could potentially contain newts, frogs, toads and snake species, but the scale of impact of the destruction of the habitat was considered low. Nevertheless, mitigation measures were required to protect the species within the construction zone, which include erection of "one way" fencing to allow species to leave the

area, but not return, and capture, through a combination of drift fencing, pitfall traps and hand searching and night searching all in accordance with current guidelines. Experienced ecologists supervised the mitigation works and daily checking of traps ensured no species starved or became distressed. The species were then translocated to the receptor area, outside the construction zone. Following completion of the construction activities, the disturbed ground will be replaced and left to regenerate naturally from the adjacent areas.

During preliminary and detailed design, hydraulic and water quality investigations showed the effect of the discharges to the watercourse. Environment Agency Wales (EAW) identified the CSO discharges as aesthetic and water quality environmental deficiencies, seriously affecting the receiving water course.

The existing CSO is necessary to relieve the downstream combined sewerage system, which is hydraulically overloaded. The contributing population to the CSO is less than 4,000 and the arrangement consists of double low side weirs with no screening. It currently spills over 250 times a year and discharges over 43,000m³ of unscreened sewage. Water quality analysis also revealed the discharges failed 99%ile standards for both BOD and



NH4, in respect to RE2 river classification standards (RE2 refers to River Ecosystem classifications with regard to BOD and NH4 concentrations, where RE1 has the highest allowable concentrations and RE4 has the lowest allowable).

The existing overflow pipework passes under the Monmouthshire and Brecon Canal before discharging to a ditch which in turn connects to a tributary of Malpas Brook and finally Malpas Brook some 600metres away.

The EAW determined that the ditch is unsuitable to receive any discharges and the new arrangement had to satisfy RE2 standards by discharging to either the tributary or Malpas Brook or both.

A number of solutions were investigated including a new CSO chamber with screening and overflow to the tributary and the Brook; use of large volume storage tanks and associated pump returns; increasing the downstream sewer capacity to accommodate larger pass forward flow and spilling excess flows at other CSOs downstream, and various combination of the above.

The optimum solution was to construct diversionary pipework to a new CSO chamber with powered screening and build new outfall pipework taking flows to both the tributary and the brook

In solving the unsatisfactory discharges, localised flooding in the immediate vicinity was also reduced by over 70%, with flows passing through the new pipework arrangements and discharging to the tributary and Brook. The final solution actually increased the volume of spills to approximately 56,000m³, but the number of spills reduced to fewer than 180. RE2 99%ile standards for BOD and NH4 were met and all spills screened.

Construction of the final solution included:

- * connections into the existing sewerage system;
- * open cut installation of single and twin concrete and ductile iron pipework, ranging in diameter from 400mm to 900mm;
- * construction of a large reinforced concrete (RC) chamber with powered screen, capable of treating flows up to 1,060 litres per second.
- * directional drilling of twin 600mm dia. pipes under the canal;
- * construction of 2 RC outfalls in the banks of the tributary & Brook;
- * construction of a number of standard and pressure tight manholes;
- * re-grading of land around the CSO structure to improve cover to pipes;
- * abandonment of existing CSO structure & ancillary pipework;
- * construction of permanent access road & installation of a fenced control kiosk and telemetry. ■

Note: The Editor & Publishers wish to thank Welsh Water Capital Alliance for preparing the above article.

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