

Project Info



02 / 09 / 20



CC8™ Bulk Rolls



115m²



Transverse layers



Tongwynlais, Wales



Edwards Diving Services Ltd.



CC used to remediate an existing channel to prevent water damage to adjacent properties



Completed CC remediation installation in Tongwynlais, Wales

In September 2020, Concrete Canvas® (CC) GCCM* was specified as a remediation solution for a project in a residential area in Tongwynlais in South Wales.

The client, Cardiff Council, required a solution to reline an existing channel and prevent water damage to properties adjacent to the stream.

The channel in question was a masonry walled structure with a loose gravel invert. Over time the mortar between the rock in the channel walls had eroded. During a period when the water level was high in the channel, the water pressure caused rising damp and localised flooding in the area, which also affected the local properties. Cardiff Council's water specialist, Alun Holvey, sought a solution that would provide continued erosion protection as well as a barrier which could reduce permeability in the channel.

Conventional poured concrete was previously considered for the project, but would have required extensive timber shuttering to place the concrete against the vertical wall. There would also have been a risk of washout overnight when the pumps had to be turned off. As a result, CC was specified as it was easier and faster to install, with reduced logistical requirements.

*Geosynthetic Cementitious Composite Mat



An 8mm thick variant of the material (CC8™) was specified; the low mass nature of the product and its flexibility also meant it could conform to the varying channel profile and would maintain hydraulic capacity. Had the alternative been used, the completed channel would have been significantly narrower, reducing capacity and could have caused further issues during high flow events. The works were carried out by Edwards Diving Services for Cardiff Council.

The watercourse was live and was overpumped during the day when works were being undertaken. On this occasion, the material was submerged at the end of the shifts when the pumps were turned off. The cementitious material within the geosynthetic also has a low washout rate and low alkaline reserve, which means runoff does not need to be treated prior to being discharged and will not have an adverse effect on the local ecology. However, the high water levels and fast flow rates at the time made conditions difficult for the team to work in. In order to create a dry workspace a dam was created upstream of the works using sandbags.

Prior to installation, the contractor regulated the channel; sharp and protruding rock and concrete were cut away using a disc cutter. Vegetation was removed from the channel and any voids were then filled with a marine cement. A poured concrete base was installed with a brush finish to provide a smoother surface on which to install the CC.



Channel prior to works



Water was overpumped to allow works to be carried out



Channel side slopes coated with marine cement for a smooth surface



Anchor trenches were prepared by hand



Anchor trench created for CC termination downstream



Anchor trench and brushed poured concrete finish for invert



Marine cement used to fill voids in uneven blockwork



CC was cut to accommodate new and existing protruding pipework

Bulk rolls of the specified CC8™ material were delivered to site and cut to the required lengths, averaging 2.5m, which were then carried to the channel by hand. In some places, the channel ran between a brick wall and one of the houses, making conditions for installation incredibly complex.

The lengths of CC were laid transversely across the channel. In this case, the team began upstream as the pumps were turned off at the end of each day, and the high flow rates in the channel could have caused uplift.

Subsequent layers were overlapped by 100mm and shingling in the direction of water flow as standard, and the lap joints were fixed using an 8mm continuous bead of a CC-approved adhesive sealant to reduce permeability and prevent water ingress between layers. The ends of the CC lengths were either fixed within a pre-dug anchor trench using ground pegs, or along existing masonry with an aluminium clamping bar and zinc plated M10 through bolts and 25mm stainless-steel washers. Where the CC met the outside walls of the houses, a fillet of marine cement was applied along the edge of the material to prevent water ingress between the back of the CC and the wall.

At the end of each working day, the team secured the exposed edge of CC within the channel using the through bolts and stainless-steel washers. The CC on the sides of the channel were hydrated using a water pump and hose. Sandbags were placed over the edge to prevent undermining and uplift overnight and the pumps were then turned off and the stream allowed to flow through the channel, providing active hydration for CC along the channel floor. This process was repeated down the 35 linear metre channel.

A total of 115m² of CC8™ were installed over a three-week period. The environmental conditions were at times very challenging with water levels rising quickly in the channel. At times, despite two pumps running, the water flow overtopped the sandbag dam and inundating the working areas. Works were stopped on a few occasions due to inclement conditions which made the installation impossible to continue with. Using CC made the installation process simpler.

Prior to this project, Cardiff Council did not have any experience of using CC. Their water specialist was very pleased with the material and its ability to conform to the irregular profile of the channel. As a result of this installation, the adjacent properties will now be protected from the flooding previously caused by the poor performance of the damaged channel.



Termination of CC against outer wall of houses



Termination of CC into anchor trench downstream



Additional through bolts used to secure CC to uneven side slopes



Marine cement used to fill any voids at material edge due to uneven profile