CONCRETE CANVAS®

CHANNEL LINING

Project Info

- 02 / 09 / 11
- CC8™ Bulk Rolls
- 800m²
- Transverse layers
- Angus, Scotland, UK
- QTS Rail
- 100 linear metre Network Rail drainage channel, lined with CC8™ and observed over a 5 year period. The channel, with no maintenance and after years of sustained challenging weather, was clear of root growing vegetation.

QTS

CC lined drainage channel, unmaintained for 5 years showing little vegetation growth

In September 2011, Concrete Canvas® GCCM* (CC) was used to line a channel in Angus, Scotland, UK. A combination of surface water and silt run-off from adjacent fields had caused a landslip onto a section of the East Coast Rail line in Angus. In addition to line closures and significant passenger delays, the landslips threatened the biodiversity of the award-winning 'Blue Flag' beach front, a quarter of mile to the South of the site.

A key preventative measure in this water management scheme involved excavating and lining a 100 linear metre drainage channel near track side to take surface run-off from a large adjacent potato field. The volume and velocity of water meant that maintaining the profile and depth of the channel was critical in order to prevent further landslip and to protect the integrity of the track nearby.

Various options were considered by the design and build contractor, QTS, including pre-cast and poured concrete, but both would have required the construction of haulage routes to site and the use of heavy plant. QTS liaised with Network Rail and specified CC as a lining solution to the newly excavated channel.

The remote location of the site would have meant periodic and costly de-vegetation of the ditch if it had remained unlined to prevent blockages and subsequent overspill. CC offers long term effective weed suppression and has been successfully tested to DD CEN/TS 14416:2005 for root penetration resistance.

*Geosynthetic Cementitious Composite Mat

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View of installation in 2011

View of installation in 2015

Widest section of ditch, showing overspill route and silt trap entry

Start of CC lined section, showing vegetation growth on unlined sections

CC lined junction

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Overspill CC lined ditch section

CC lined channel terminating at silt trap outlet

The channel varied in width from 3-6m in sections and by deploying CC in transverse layers across the ditch, QTS were able to cut the material to the exact lengths required greatly reducing wastage. The channel terminated into a large silt trap with an adjoined overflow bypass section. Unlike with rigid plastic liners or concrete precast sections, CC was able to accommodate the undulating profiles, intersections and steep batters of the various sections of the channel.

As a measure to reduce the flow velocity within the channel, a series of baffles were introduced, simply by placing sleeper sections within the invert, which were subsequently draped in Concrete Canvas. The CC was able to drape neatly around the sleepers, to provide erosion and weathering protection to the baffling.

CC has a very low alkali reserve and washout rate, meaning that run-off from installation can be safely discharged into the local water course without treatment and without adversely affecting the local ecology. This as particularly important on this project, given the proximity of the site to the Lunan Bay award winning beach front.

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Completed southern section of lined channel, 5 years after installation (2016)

Over 800m^2 of CC8^{TM} was installed in a little over 4 days at a remote location, using minimal plant and in adverse weather conditions. QTS were able to deliver the work for 50% of the projected costs and 50% of the programmed time. By using CC, QTS were able to utilise low ground pressure machinery avoided building haul roads thus saving 14,000 road miles in total. This equated to 2.5 tonnes of carbon saved overall.

A site inspection in February 2016 showed that after nearly five years without maintenance of any sort, the lined channels were performing exactly as originally designed and the CC had provided a long term and hard wearing erosion protection to the ditch invert which showed no signs of degradation. Small sections of the channel immediately behind the silt trap baffles had a small degree of vegetation growth, which although not required, were easily cleared using basic hand excavation in a matter of minutes. The installation is now being used as a model example for CC maintenance.

Subjected to the harsh winters of the East coast of Scotland over a number of years, CC has continued to provide durable, hard wearing and long lasting erosion protection solution, protecting the profile of the ditch and maintaining its volume capacity to protect the integrity of the nearby track. To date, the material has provided over 5 years of maintenance free channel lining for an important Network Rail asset that has enabled the continued operation of the line and prevented any further land slips and potential line closures.

"As a preferred installer of CC, we've used the material on a number of installations across Scotland on various rail schemes. The speed at which we can install it and the fact that it can be laid in the rain means we can get in and out of sites quickly and provide Network Rail with a cost effective concrete solution in conditions and geographies that would be difficult if not impossible to do with conventional concrete options. I think it's a great solution and will continue to use and recommend CC on other similar sites."

Mel Kay
Project Manager, QTS Group

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