

## Project Info

**JAN 21** 21 / 01 / 16

**CC** CC13™ Bulk Rolls

**#** 1,500m<sup>2</sup>

**Transverse layers**

**A59, North Yorkshire, UK**

**HACS Group**

**i** CC13™ was used to line a re-profiled aggregate drainage channel as part of land slip protection works along an important section of the A59 in North Yorkshire.



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*The completed channel installation along the A59 in North Yorkshire*

In January 2016, Concrete Canvas® GCCM\* (CC) was used to line temporary aggregate drainage channels to provide land slip mitigation on a section of the A59 in North Yorkshire, UK.

The A59 is a major road in the North of England which is around 109 miles (175 km) long and runs from Wallasey, Merseyside to York, North Yorkshire. It is a key route connecting Merseyside at the M53 motorway to Yorkshire, passing through three counties and connecting to various major motorways. The road is a combination of historical routes combined with contemporary roads and a mixture of dual and single carriageway.

Sections of the road are particularly prone to flooding and drainage issues, the A59 between Skipton and Harrogate has a history of landslips above the road to the west of Blubberhouses at Kex Gill. A landslip in January 2016 led to the road being shut for eight weeks and when closed, a diversion of more than six miles (10km) through towns unsuitable for heavy traffic was used. The A59 is often trafficked by heavy laden aggregate vehicles and the extra diversion incurred considerable expense to the local quarries, overloading local roads and causing considerable disruption to the local townspeople.

A survey revealed no further movement following the landslip, but a large amount of water is trapped at the top of the area. Whilst options were considered for re-aligning the road, North Yorkshire County Council planned six weeks of work to drain the water as a temporary solution whilst strengthening the banks at the side of the road and improving drainage.

\*Geosynthetic Cementitious Composite Mat







*Evidence of landslide on section of the A59 road in North Yorkshire*



*Adjacent CC lined open channel minor works originally installed in 2014*



*Transporting pre-cut lengths of CC13 to site area*



*Transverse layers of CC13 deployed in conjunction with aggregate and grid*



*Second aggregate layer applied on top of geogrid*





*Inspecting second layer aggregate layer and geogrid*



*Applying top surface aggregate layer*



*Applying top surface layers and compacting access road*





*Completed aggregate drainage channel overtopped with temporary access road*

Part of the temporary drainage improvements involved creating a 400m long aggregate drain underneath a compacted temporary access road in the northern bank of the roadside.

In order to prevent scour of the channel, provide an armoured impermeable lining and prevent wash out of the aggregate, the channel was lined with CC to increase the operational life of the structure. CC had successfully been used to line minor open channel works in the same area two years prior. The channel detail was produced by Capita in conjunction with North Yorkshire County Council Highways, with further input from Highways England. The works were carried out by HACS Group.

The excavated channel was approximately 400m in length and 3.6m at its widest point. Due to the weight and granule size of the aggregate, CC13™ was specified for the lining, with the aggregate poured in stages in conjunction with a layer of Tensar TriAx TX160 geogrid.

The CC was installed concurrently with the preparation of the channel using pre-cut lengths of CC13. These lengths were laid transversely and fixed using ground pegs. A 150mm layer of larger aggregate and rock then formed the base, before applying a geogrid and 300mm of smaller stone above. A layer of non-woven geotextile was applied to the rock surface before compacted earth and fine dust formed a trafficable road surface above.

A total of 1,500m<sup>2</sup> of CC13™ was installed at approximately 35 linear metres per day in inclement weather and on a site with limited access. The installation took just under two weeks in total to complete, and was installed by a team of three.

The temporary drainage improvements successfully stabilised the addressed section of the A59 over a consultation period of two years at which point more extensive works and the possible re-alignment of the A59 are being considered.