

**EDEN BROWS**  
**NORTH OF ARMATHWAITE, CUMBRIA, UNITED KINGDOM****Soil Nailing****Problem**

Around 500,000 tonnes of earth gave way after the devastating flooding in Cumbria throughout the winter that forced the closure of the iconic Settle-Carlisle line in February 2016 at Eden Brows near Armathwaite in Cumbria.

The railway line is located 200m away from the river and 70m above. Reactivation of the historic landslide, following Storm Desmond, caused movement at circa 15m depth between the River Eden at the base of the river bank, resulting in large movements of the rail embankment and Upside tracks.

The slip had threatened the future of Britain's best-loved railway – until Network Rail confirmed its repair programme. The Settle-Carlisle line opened in 1876, and goes through some of the most beautiful scenery in Britain. It attracts tourists from around the world. It is also a key freight route and vital to the local communities it serves.

**Solution**

The landslide caused the ground below the railway to slip 2.5 metres below its normal level during the weeks that followed and led to a £23 million repair project, which engineers described as one of their most complex ever projects. To stop the railway from collapsing again, even if the land does, two rows of steel tubes filled with concrete are being embedded into the sloping bedrock of the Eden gorge, north of Armathwaite.

In March 2017 the line was reopened to Northern trains after a vast concrete track base was secured into the steeply-sloping bedrock of the Eden Gorge with the aid of 226 steel piles between 20 and 30 metres long. This bespoke engineering solution ensures that if the ground gives way at this location in future, the railway will not.

Maccaferri MacMat® R was used as a soil nailing erosion protection system stabilising the slope surface.

**Client:** Network Rail**Designer / Consultant:** Aecom**Contractor:** Story Contracting**Products used (Qty.)****Date of construction:** 02/2016 - 02/2016[Google Maps](#)[Google Earth](#)

Story Contracting has removed 16,000 tonnes of soil from site



During construction in 2016



View of the site after the repair works



Works almost completed with 480m of new track installed



Vegetation is growing over the MacMat® R



The much loved section of the Settle-Carlisle railway re-opened in March 2017