



# Soil stabilisation speeds bypass for Cumbrian village with SSSI



*A66, Temple Sowerby, the finished bypass in use*

## Introduction

The A66 trunk road runs through the village of Temple Sowerby in Cumbria, where they had been waiting 24 years for a bypass. Work began in 2006, and the main contractor, Skanska, brought in Britpave members, Beach Soil Stabilisation as the specialist stabilisation contractor.

Stabilisation was chosen because the 'host' soils had low strengths, and the technique would reduce to a minimum the movement of soils from part of the site on the west of the Eden River to the east end of the site. It also reduced the necessity to take soils off site.

The 5 km route takes the bypass through a Site of Special Scientific Interest (SSSI) and a European Special Area of Conservation (SAC) specifically related to the flood plain of the River Eden, and extreme care was required to minimise the chance of lime and cement contaminating the river.

## Design

The stabilisation was planned in two stages. Firstly the existing 'host' soils required conditioning/improving with lime in order to make them suitable for the embankments for the main line, connectors and slip roads. Then the capping layer was to be strengthened by the addition of cement to the soil already improved by the lime.

The soils on site consisted mainly of sandy gravelly clay, with some Penrith Sand. They had an MCV below 7.5; pre-contract testing established that a minimum of 7.5 was required.

## Construction

The excavated soils were placed as required to make the embankments in layers of 300 mm and treated in-situ by the addition of quicklime. This was spread to the specified percentage using a Terragator Spreader, and was mixed into the soil using a Wirtgen WR2500. Wind speed and direction was continuously monitored to avoid lime blowing onto adjacent land.



Mixing the water into the cement-treated capping layer



The Wirtgen mixing lime into a treated layer

The target MCV of 8 – 12 was achieved by using 2% lime. Tests before, during and after treatment of each layer confirmed that the required value had been achieved. In addition, Nuclear Density Tests were carried out after compaction of each layer to ensure 95% MDD was reached.

The surface layer was treated by adding 3% cement to the already improved material, to a depth of 300 mm, with some minor adjustments in depth to meet the design specification. Water was added during mixing at an average rate of 1% to achieve a CBR > 15%. Areas with Penrith sand only were treated using cement only at the same rate of 3%. Here water was added during mixing at an average rate of 1 – 2%. Testing of the capping layer was to Appendix 1.5 of the Specification for Highway Works.

## Benefits

The project benefited from:

- Avoiding the need to move soils around the site and dispose of unsuitable material.
- A reduction in project duration and costs.

The local community and environment benefited from:

- The use of the existing soils reduced the volume of construction traffic.
- The care taken to reduce the impact of construction on this sensitive site.
- Procedures taken to minimise the chance of lime and dust contaminating the River Eden.

## Project details

<b>Client:</b>	Highways Agency
<b>Project duration:</b>	2 years, stabilisation April to October 2006
<b>Main contractor:</b>	Skanska
<b>Soil stabilisation contractor:</b>	Beach Soil Stabilisation Ltd.
<b>Area stabilised:</b>	Embankment fill 48,890 m <sup>3</sup> , capping layer 21,330 m <sup>2</sup>
<b>Soil type:</b>	Sandy, gravelly clay and Penrith Sand
<b>Blend:</b>	Lime 2%, cement 1%. For Penrith Sand 3% cement
<b>Specialist plant:</b>	Wirtgen WR2500, Terragator Spreader

## The benefits of stabilisation

### LOWER COSTS

- Significant savings compared with conventional treatments
- Less expenditure on imported materials
- Reduced disposal costs

### ECO-FRIENDLY

- Recycling existing soils conserves natural resources
- Fewer lorry movements save fuel and reduce emissions and impact on the local community
- Re-use of on-site soils reduces disposal to landfill

### REDUCED CONTRACT TIME

- Significantly quicker than other site preparation operations
- Stabilisation brings your project back on schedule

For more information visit

[www.soilstabilisation.org.uk](http://www.soilstabilisation.org.uk)



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