

# Embankment Drainage

High Speed Rail, Pozidrain, Sevilla - Cádiz, Spain



## Project Description

The Alto Velocidad Española (AVE) is Europe's largest high speed rail network. The ambitious construction project was undertaken to improve connections between all of Spain's major cities, reducing commute time and contributing to socio-economic regeneration. The new Sevilla to Cádiz railway line would be an extension of the Madrid to Sevilla route, connecting Cádiz to Jerez Airport and crossing areas of outstanding natural beauty.

## The Challenge

The new route would traverse an area of Bahía del Sur (Cádiz) where an embankment would be constructed to accommodate the railway line. Ground investigations identified soft, wet soils which would be unsuitable for construction without remediation to improve stability. This would traditionally be addressed through a combination of vertical wick drains and a granular drainage blanket to direct the water horizontally to French drains adjacent to the embankment. However, this method required the use of large quantities of costly imported granular material, which would also prove slow to install. These considerations led the designer to consider the use of a drainage geocomposite to act as a horizontal drainage blanket, a methodology which had proved successful in other infrastructure works on soft ground.

## Project Information

Client	Administrador de Infraestructuras Ferroviarias (ADIF)
Contractor	Acciona Infraestructuras
Consultant	Administrador de Infraestructuras Ferroviarias (ADIF)
Products	Pozidrain 4SK500/NW8
Quantity	45,000m <sup>2</sup>
Benefits	<ul style="list-style-type: none"><li>• Rapid installation over a large area</li><li>• Significant material and labour cost savings vs granular materials</li><li>• Carbon emission reductions</li></ul>



Pozidrain 4SK500/NW8

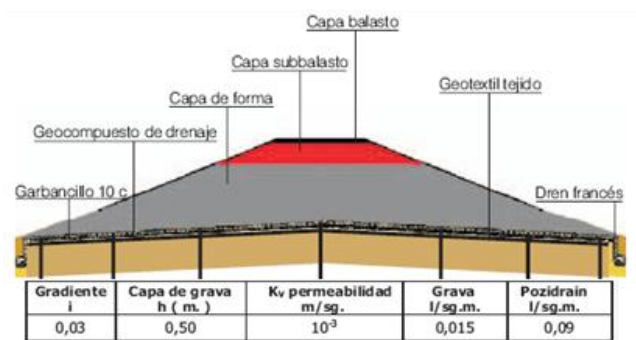
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## The Solution

The contractor Terratest approached **ABG** to assist in the redesign utilising **Pozidrain** drainage geocomposite. **Pozidrain** comprises a high-strength drainage core thermally bonded to a filtration geotextile. Using Darcy's Law allowed ABG to calculate the equivalent in-plane flow of the granular material, and propose a grade of **Pozidrain** suitable to manage the expected water flows. In-plane flow tests to EN ISO 12958 using **soft foam** platens to simulate soil overburden proved the required flow capacity. Design calculations, which accounted for the weight of the embankment and the traffic loads, indicated a long term pressure at the base of the embankment in excess of 55 kPa. **Pozidrain 4SK500/NW8** was chosen to provide a 9.0 factor of safety. **Pozidrain** was installed by the contractor in a fraction of the time required for the original granular design, meeting tight project timescales and providing a significant cost saving.



Cross-sectional drawings show the designed build up and the water flow at the shallow gradient

## The ABG Service

**ABG** worked closely with Terratest to provide full design support, comparisons, costing and supply.



Embankment fill being installed on Pozidrain



Wide width rolls allowed rapid installation to meet challenging project timescales

Contact ABG today to discuss your project specific requirements and discover how ABG past experience and innovative products can help on your project.