

## PROJECT EVERGREEN NORTHOLT EMBANKMENT, WEST LONDON, UNITED KINGDOM

### Mass Gravity Retaining Walls

#### Problem

The busy London to Oxford Chiltern Rail line passes through a historic bottleneck near Northolt, West London. Here engineers were faced with the challenge of increasing line capacity by widening an existing 3.0m high embankment to allow the installation of an additional track within what was an already narrow rail corridor.

Not only was space severely restricted by the position of an access road at the foot of the supporting embankment but the underlying London clay substrata were also felt to be inherently unstable. This posed a potential risk of stability failure under extreme loading.

#### Solution

As a conventional battered slope was not viable due to space restrictions consulting engineers Atkins proposed the construction of a near vertical 3.0m high retaining wall - comprising stone-filled Woven Mesh Gabions in combination with an array of integral 14.0m long soil nails.

The soil nails would be installed and grouted after the wall was completed by drilling through pre-formed apertures in the Gabion Baskets. This process allowed engineers to back-fill and compact material behind the wall as the construction of the Gabions progressed.

The extended length of the soil nails ensured the long-term stability of the embankment by reinforcing the structure well beyond the critical circular plane of potential slippage.

The drill apertures within the Gabions were lined with standard twin-walled drainage piping set at a predetermined angle. This novel design detail allowed free passage of the soil nails and protected the woven-mesh construction of the Gabions from damage during fixing. The stone infill was hand placed around the apertures to eliminate any voids in the Gabion Baskets. Three sections of composite wall were constructed totalling 300m in length.

**Client:** NETWORK RAIL FOR CHILTERN RAIL

**Designer / Consultant:** Atkins

**Contractor:** BAM Nutall

**Products used (Qty.)**

**Date of construction:** 06/2011 - 09/2011

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Immediately after construction, before soil nailing



Immediately after soil nail installation



After construction