

Combigrid®

Base course reinforcement

- **Project Name**
Haul Road for Blenheim Lake Restoration, UK
- **Client**
Blenheim Estate, Oxfordshire, UK
- **Designer/Installer**
Land & Water Services Ltd, Albury, UK
- **Product**
Combigrid® 40/40 Q1 GRK 4 C





Originally constructed to traverse a wide marshy valley on the approach to Blenheim Palace, Vanbrugh's 'Grand Bridge' now spans Capability Brown's 47-hectare water feature, and the stretch of water to the northerly side of the bridge is known as Queen Pool.

Queen Pool is fed by the river Glyme after it passes through the adjacent village of Woodstock, and from Queen Pool the river flows southwest under Grand Bridge and on into the larger Great Lake; discharging into the river Evenlode near Bladon before finally joining the river Thames a further 6km south.

The man-made lake is susceptible to silting and was dredged for the first time in 1840. It was dredged a second time in 1895, but there is no record of it being dredged again since then. Research, exploration and planning have been ongoing for several years, but work due to have commenced in spring 2020 was postponed for 2 years because of the Covid pandemic.

Challenge

Blenheim is a UNESCO World Heritage site, and Queen Pool is home to some 40 bird species, plus badgers, otters and voles. When first constructed, the lake was around 2m deep, but silt deposited over the past 125 years has now reduced the depth across a wide area of the lake to just 30cm.

The 'wet' dredge was carried out using 3 excavators on pontoons, and once excavated from the lake, 300,000 tonnes of silt had to be hauled 1.3km to be spread over an area of undeveloped grassland, outside the SSSI, and away from any woodland and watercourses.

Without restorative dredging, it is estimated that the lake would revert to marshland within a few years from now so, as well as preserving this iconic view, the dredging project was essential to protect the wildlife dependent on this habitat.

Solution

Naue's Combigrid® 40/40 Q1 GRK 4 C was specified for reinforcement and stabilisation of the haul road and the site compound. Specialist contractor Land & Water Ltd, who prepared the engineering design for the haul road, excavated grassland and laid a base layer of the lightweight Combigrid® geotextile prior to installing a 40cm layer of recycled 6F2 aggregate. Around half of the road is a 4.5m wide single track, with a couple of 8m wide passing points, and approximately 0.7km is 8m wide to allow 2-way traffic on busier sections.

Naue's Combigrid® reinforces the basal layer, improves its bearing capacity and stabilises the fill material but, in addition, provides a filtration layer which allows rainwater to drain away whilst preventing migration of fines from the subgrade into the coarse aggregate layer.

"Using Naue's Combigrid® has reduced the volume of aggregate required by around 20%", says L&W project manager Charlie Oakes; reducing costs of materials and transport, and reducing the depth of excavation required. Using Combigrid® also reduces surface deformation; so less rutting from the continuous movement of heavy loads is required on this project.

Combigrid® is a high-strength geogrid of pre-stressed polypropylene or polyester bars combined with a mechanically-bonded filter geotextile. Combigrid® has numerous applications in environmental protection and is used in many fields of infrastructure and hydraulic engineering.

The geotextile is manufactured to exacting quality standards, in various grades, on 100m rolls, at 4.75m wide. On-site, it is simply rolled out, with minimal overlaps, and trimmed with standard cutting tools.

Charlie Oakes commented: "We have been pleased with the whole process of dealing with Naue; from the initial phone call to installation, the interaction has been professional and efficient."

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