

BOSTON'S BOATYARD
ORESTON, PLYMOUTH, DEVON, SOUTH WEST, UNITED KINGDOM

Construction over Voids

Problem

Cavanna Homes identified this area as new housing accommodating 53 new residential units. The location occupies a former limestone quarry that had been in-filled following WWII. The site has a history of commercial usage including mineral extraction, timber treatment and sawmill. A rail link once served the site but this closed in the early 1950's following which access to the site has been via the local roads. In more recent years, the site has operated as a boatyard.

Due to the presence of karstic limestone, it was proposed to re-use site won quarry fill to construct a load transfer platform (LTP) reinforced with geogrid to mitigate against the potential formation of voids.

Solution

The Principle Designer CGL was appointed to provide detailed geotechnical design and engineering supervision during construction.

The following design assumption has been applied:

- house foundations were reinforced and formed on a minimum thickness of 1.0m of engineered Class 1A fill (friction angle of minimum 35°);
- the Made Ground at the ground surface were proof-rolled and a regulating layer of 100mm thick of crushed type 1 granular material was placed to form a base for the geogrid (Paralink);
- two layers of reinforcement were required to ensure multi-directional tensile loads could be accounted for. The reinforcement layers were separated by 300mm of engineered Class 1A fill;
- a maximum surcharge of 80kPa was applied to the top of the platform;
- differential surface deformations (d_s/D_s) of 0.5% were acceptable, representing maximum ground surface settlements of approx. 20mm;
- a design void diameter, D , of 1.5m has been used based on a probabilistic approach and experience in similar conditions. The void was assumed to propagate through the Made Ground to the underside of the Paralink® LTP.

CGL designed the LTP with Paralink® 400 in accordance with BS8006. The reinforcement was designed and selected based on serviceability criteria to limit surface settlements should an undisclosed void propagate to the base of the Paralink® load transfer platform.

Client: Canna Homes

Designer / Consultant: Maccaferri Ltd

Contractor: CGL (Card Geotechnics Ltd)

Products used (Qty.)

Date of construction: 01/2014 - 05/2014

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View of the construction site for Cavanna Homes development



Paralink® during installation: No overlapping required



Class 1A fill over ParaLink® 400



ParaLink® 400 ready to be laid and installed



Housing construction phase starting over the ParaLink® load transfer platform