

## VOID SPANNING IN HOUSING DEVELOPMENT BURDIEHOUSE, EDINBURGH, UNITED KINGDOM

### Construction over Voids

#### Problem

This site was known to be underlain by historical mine workings in a limestone layer of the Upper Oil Shale Group of the Carboniferous Age, and in this area, it is known to be a particularly thick stratigraphic unit.

An assessment of the potential for mine-related collapses or subsidence found the seam was last worked in 1898. Subsequent intrusive investigation works found up to 10m thick open voids in one area. The recommendation was for the area to be sterilised and a high-strength geosynthetic to be used to safeguard against future collapses at the surface.

The developer planned to make use of the sterile area to create a children's play area, shaped earth mounds and a SuDS pond to attenuate surface water runoff.

#### Solution

The Developer's Engineer approached Maccaferri to provide design and supply of a high-strength geogrid solution.

The proposed site topography was complex as it included a number of mounds, slopes and a SuDS pond along with a meandering footpath network to connect with neighbouring districts. To fully understand and analyse the requirements Maccaferri built a 3D model of the site. This digital modelling approach enabled the identification of two discrete areas on the site, and optimise the design by using different strengths of geogrid appropriate to the local conditions in each area.

The structure of the product and technology used in the manufacture of ParaLink® means that during the design process, a lower material partial safety factor can be used compared to other geogrids. This, coupled with the analysis from the model completed a design which utilised 200kN and 400kN strength geogrids and consequently a significant cost reduction compared to a proposal by other alternative geogrids which required 600kN strength across the site. The design was in accordance with BS8006-1:2010+A1:2016.

As the construction phase started ParaLink® was delivered to the works programme directly from the Maccaferri factory in West Yorkshire. Maccaferri We worked closely with the contractor and shared the digital model to incorporate the ParaLink® extents in the project earthworks software.

**Client:** Barratt Homes (East) Scotland

**Designer / Consultant:** David R Murray & Associates

**Contractor:** Advance Construction Ltd

**Products used (Qty.)**

**Date of construction:** 03/2021 - 07/2021

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[Google Earth](#)



Low partial safety factors enable greater design efficiency



ParaLink® Installation ongoing



SuDS ponds built over treated mineworkings



Landscape areas built over treated mineworkings