

## CONTRACT FOR SHARJAH-FUJAIRAH PORTION OF ETIHAD RAIL FUJAIRAH, SHARJAH TO FUJAIRAH , U.A.E.

### Reinforced Soil Walls and Slope Reinforcement

#### Problem

Etihad Rail is the national railway network of the United Arab Emirates (UAE). From the border of Saudi Arabia to the border of Oman, this railway network will span 1200 km across the UAE. The UAE railway will connect all major import and export points, as well as trade, industry, manufacturing, production, logistics, and population centers. There have been two stages in the construction of Etihad Railway. Ruwais, Habshan, and Shah are connected by Stage One, which began operating in January 2016. This second stage has now been completed and extends from UAE-KSA border at Ghweifat to Abu Dhabi, KIZAD, Khalifa Port and Jebel Ali Port, Dubai, Sharjah, Ras al-Khaimah and then to Fujairah on the east coast of the UAE. Etihad Rail's connection to Fujairah passes partially through the Hajjar mountains, characterized by deep valleys, wadis, and high mountains. The railway works in this region required extensive mitigation solutions for problems such as scouring, erosion, soil retention and rock falling.

#### Solution

Maccaferri was subcontracted for design, supply, and construction assistance for various solutions related to scour protection, erosion control, soil retention, and rockfall mitigation. Paramesh system was adopted for the high retaining walls along bridge abutments (3 locations) and tunnel portals (14 locations). Paramesh is a composite MSE wall system that combines high-strength Paralink geogrids along with Terramesh facing units. This solution is much more cost-effective and easy to apply particularly for such high structures, utilizing blasted rocks for filling with gabion facing and structural backfill. At certain locations, high slopes were reinforced with Paragrid geogrid, then covered with shotcrete. In order to mitigate rockfall, simple drapery (passive mesh system) and secured drapery (active mesh system) with high-strength Steelgrid HR mesh were extensively used. The Etihad Rail Project has significantly benefited from Maccaferri's comprehensive range of solutions.

**Client:** Etihad Rail

**Designer / Consultant:** Jacobs & Systra

**Contractor:** CRCC - NPC Joint Venture

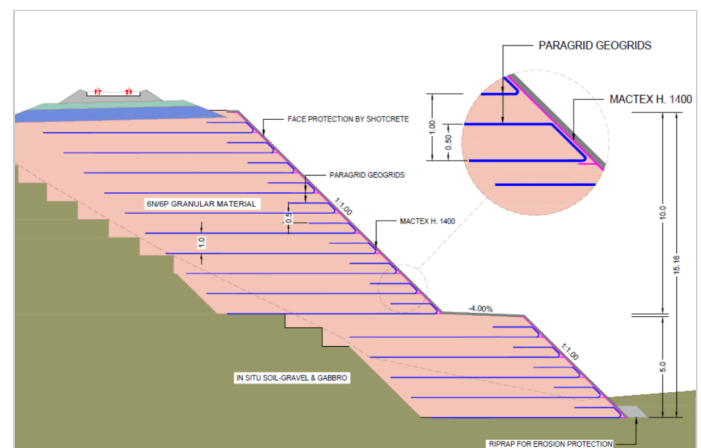
**Products used (Qty.)**

- Terramesh	6,600 m <sup>2</sup>
- MonoAxial GeoGrids	80,000 m <sup>2</sup>
- Macarmour & Steelgrid	200,000 m <sup>2</sup>

**Date of construction:** 08/2020 - 10/2022

[Google Maps](#)

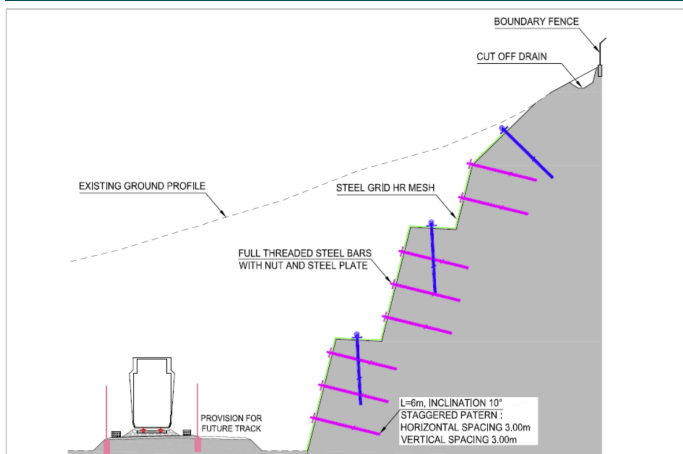
[Google Earth](#)



Drawing: Section of shotcrete covered slope reinforced with Paragrid geogrid



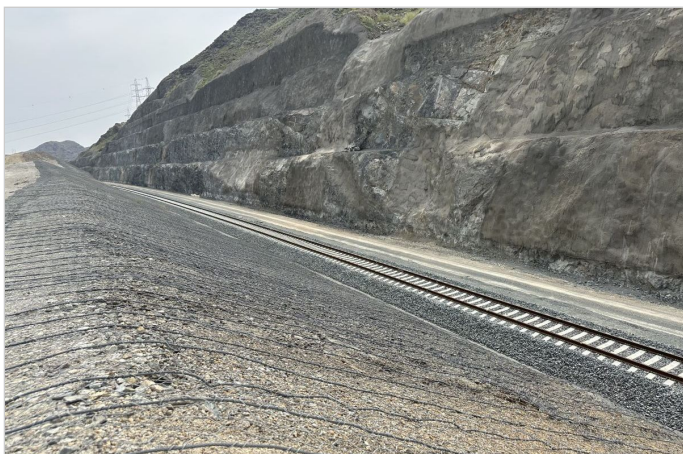
Completed: Shotcrete covered slope reinforced with Paragrid geogrid



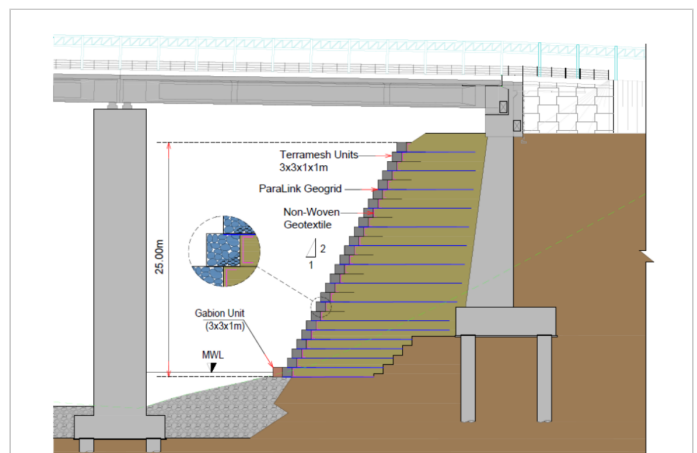
Drawing: Section of secured drapery with Steelgrid HR mesh



Completed: Secured drapery with Steelgrid HR mesh



Completed: Simple drapery with Steelgrid HR mesh.



Drawing: Section of Terramesh MSE wall at bridge location



Completed: Terramesh MSE wall at bridge and tunnel portal locations.