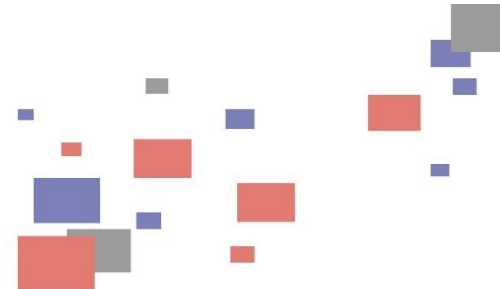


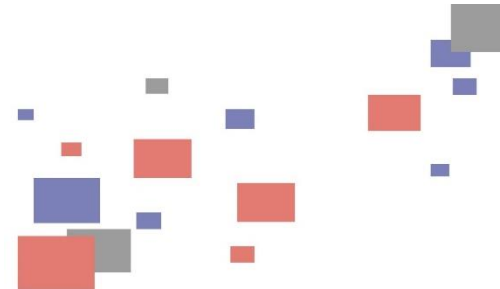
GBG GROUP is a specialist consulting group with offices in Australia, Europe and USA providing a wide range of investigation services to supply subsurface information for mining, geotechnical, environmental and engineering purposes utilising “state of the art” geophysical and non-destructive test methods.





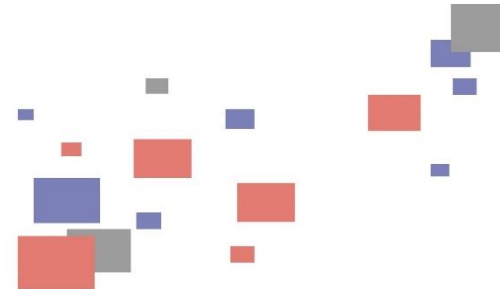
GBGGROUP

- 2 offices in UK, 2 in USA and 2 in Australia.
- Undertake work in 2 business streams:
 - Geophysical investigations in the near surface
 - Non-Destructive assessment of structures



Our main areas of business are:

- Environmental, archaeological, civil, geotechnical and mining investigations
- Non-destructive investigations of structures
- Rental of geophysical and non-destructive testing equipment
- Provision of consulting services for data collection, analysis and interpretation



Geophysical Techniques

Ground Penetrating Radar (GPR)

Seismic methods, land and marine

Electro Magnetics / Conductivity

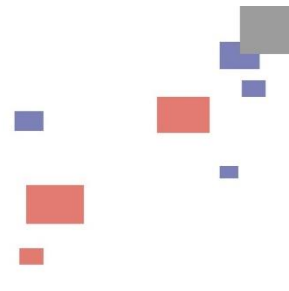
Magnetics

Induced Polarisation and Resistivity

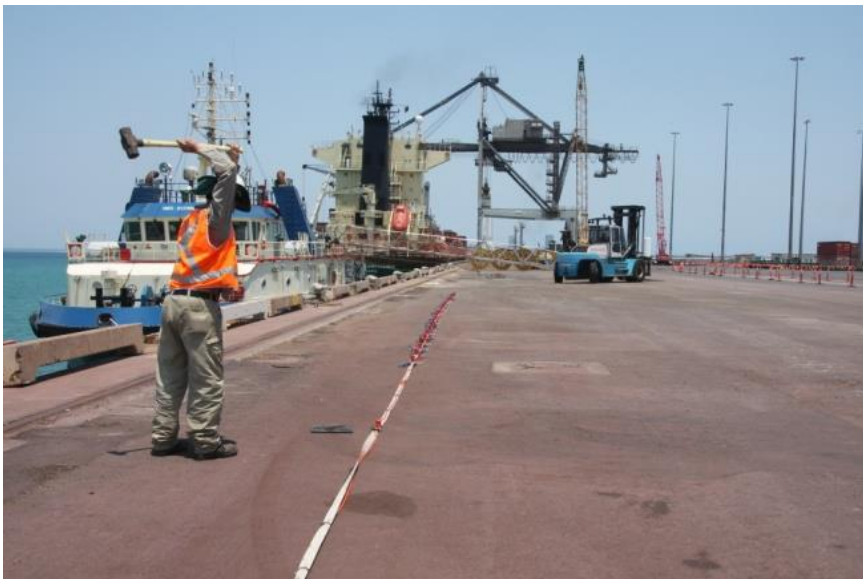
Gravity

Downhole geophysical methods

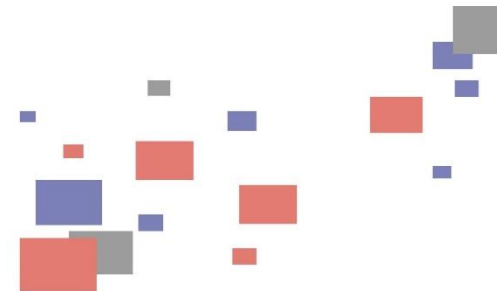
Aerial Surveys



Industry Sectors

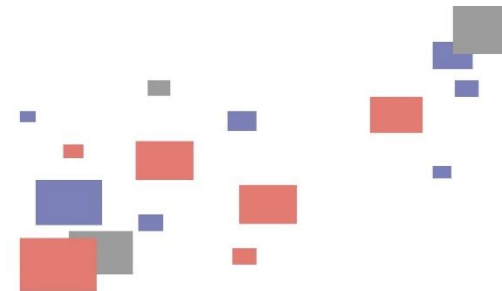


Land Development
Mining Development
Marine and Coastal Development
Resources (Mining)
Environment
Utilities Infrastructure
Architectural / Structural

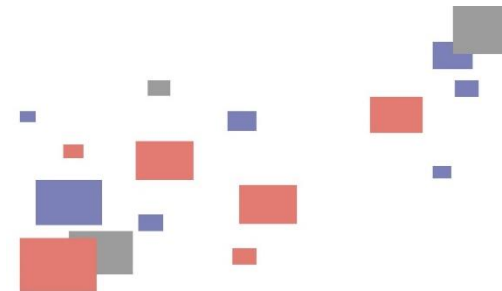


Applications of Ground Penetrating Radar in Cemeteries

- Delineation of unmarked graves
- Bedrock depth mapping



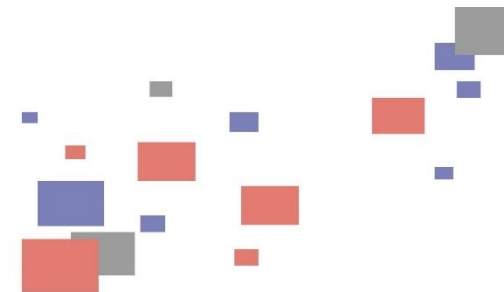
Case Study: Unmarked Graves Menzies Cemetery



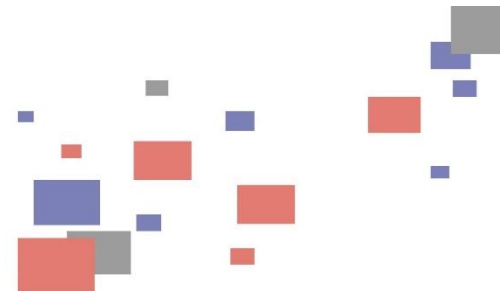
GPR Data Collection and Interpretation



- GPR Profiles were collected at 0.5m spacing
- Unmarked burials are shown as pink polygons with depth to top of burial (mBGL)

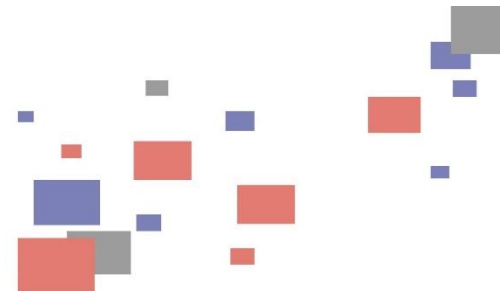


Case Study: Unmarked Graves Karrakatta Cemetery

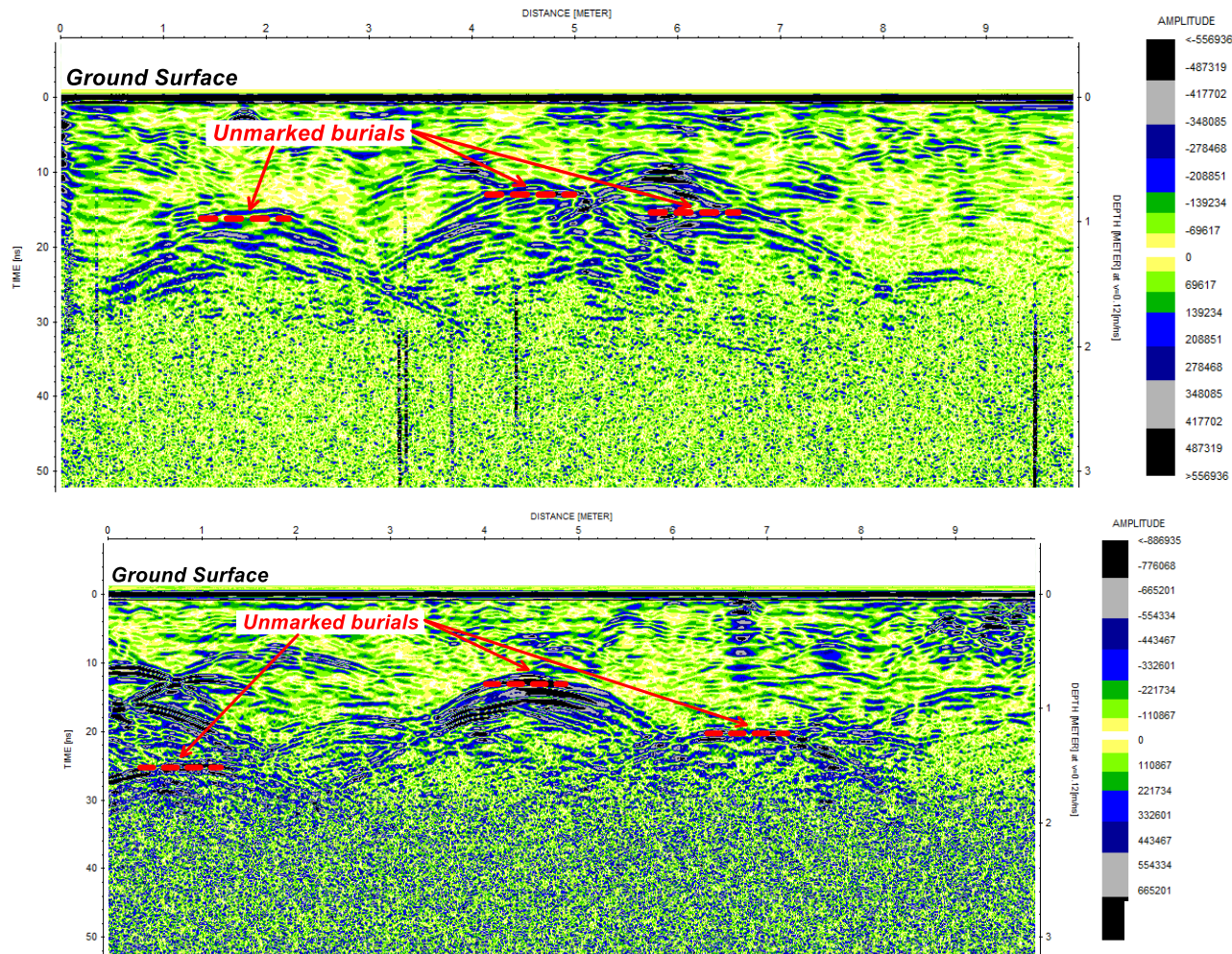


Data collection

- GPR data collected as parallel profiles at 0.5m spacing, perpendicular to reported orientation of graves
- Dual-frequency 300 MHz and 800 MHz antenna used

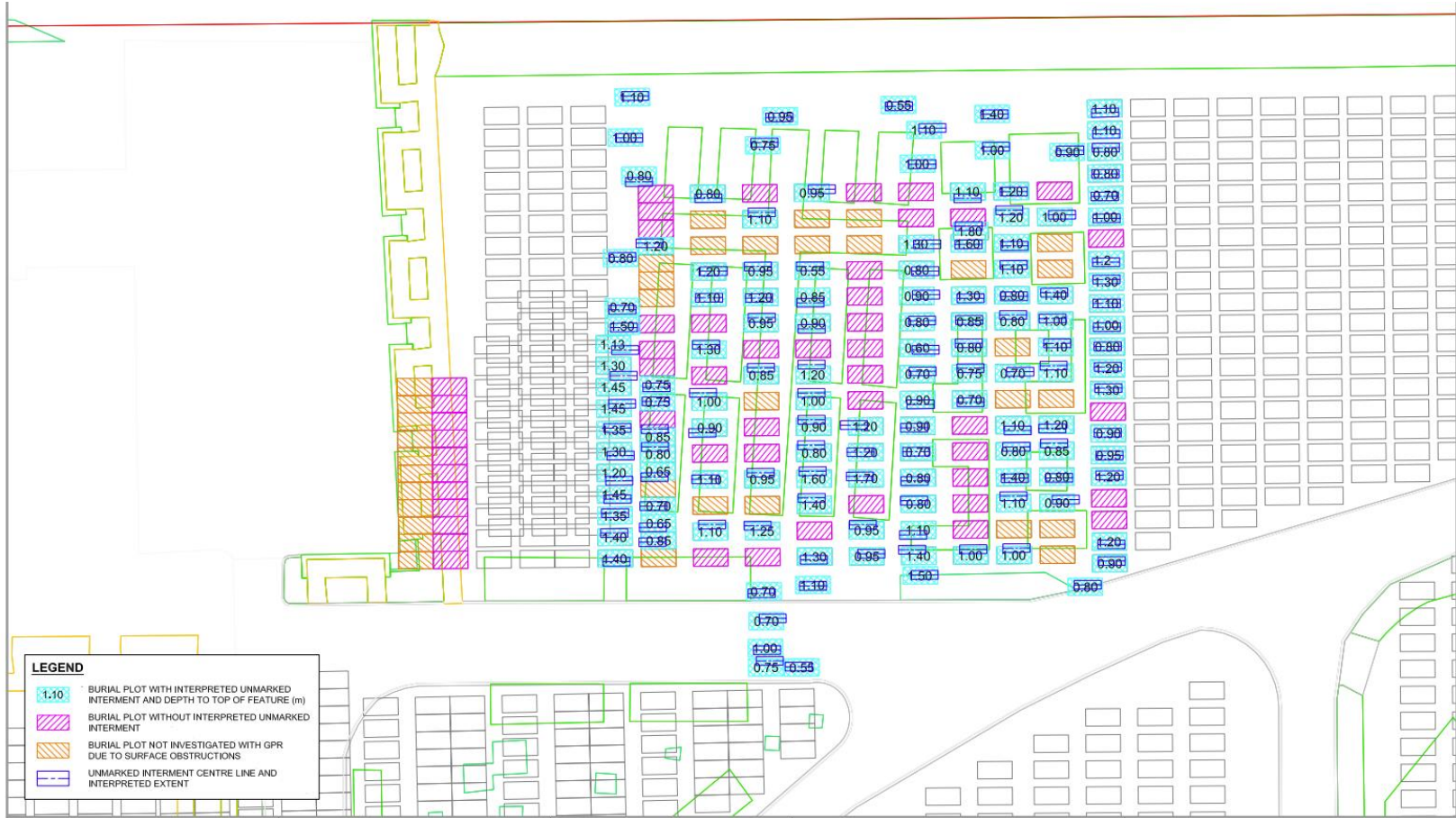


2D GPR profile analysis

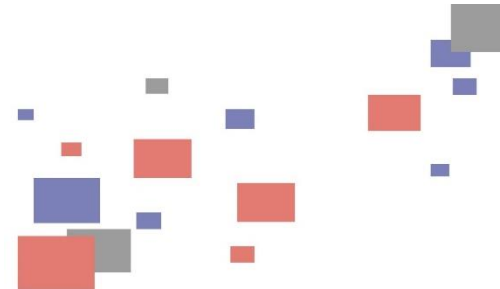


- Processed radar-grams showing interpreted unmarked burials

Survey Results

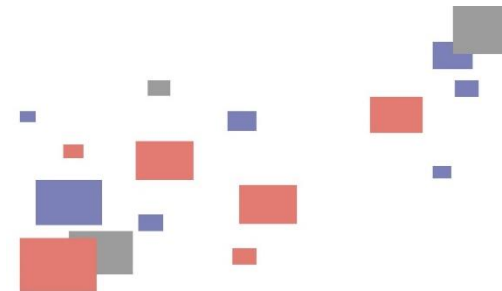


Case Study: Unmarked graves Tom Price Cemetery

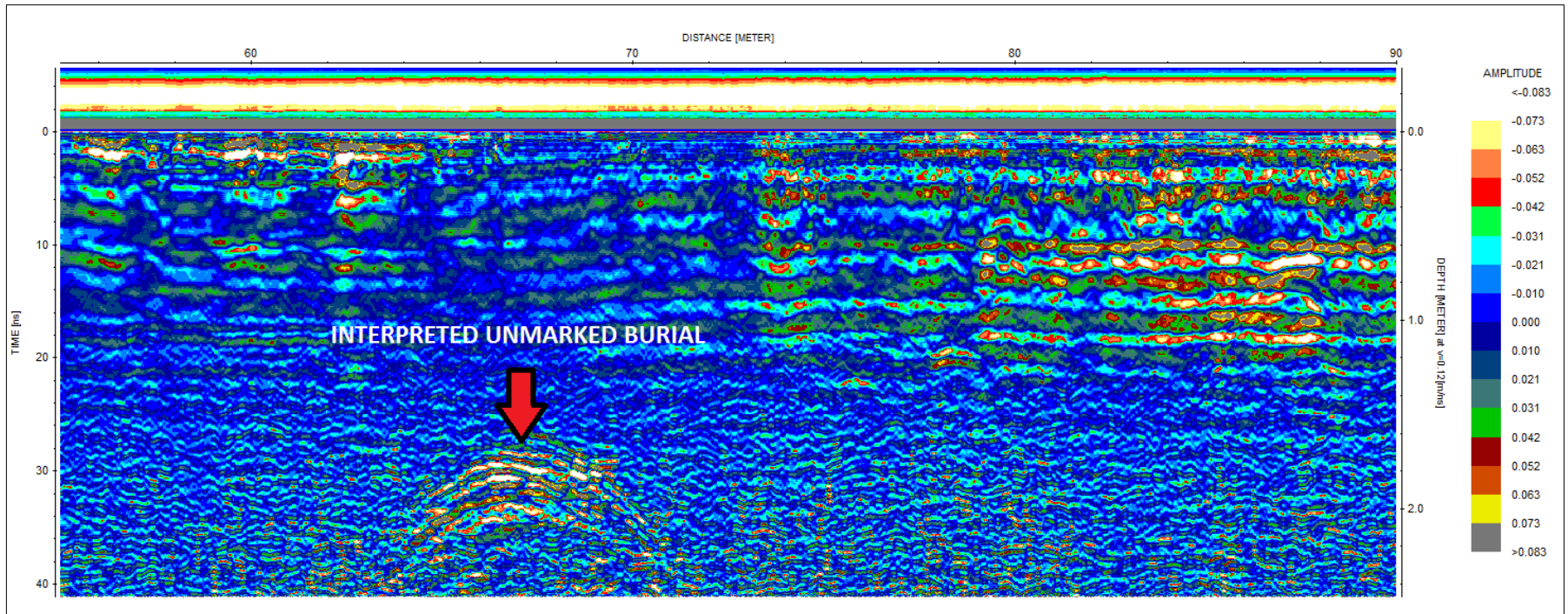


Data collection

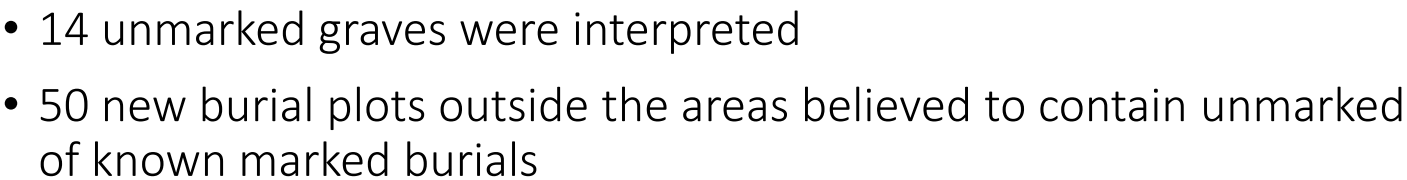
- The data was acquired using a GSSI GPR with a dual-frequency 300 MHz and 800 MHz ground coupled antenna
- GPR profile lines were collected by pushing the system over the ground surface
- The GPR system was set to record to a depth of approximately 2.5 – 4.5 m.
- The GPR profiles were collected at a line spacing of 0.5 m intervals
- GPR data was collected as a series of parallel profiles perpendicular to the graves
- Some sections along the profile lines were not scanned due to the presence of obstacles such as grave markers and monuments



2D GPR profile analysis

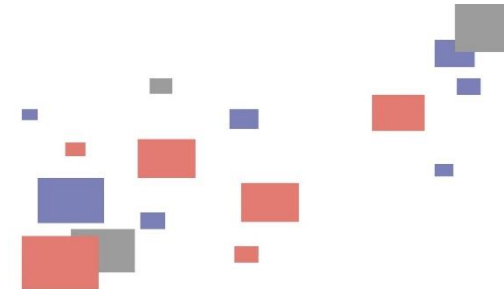


- Processed radar-grams showing interpreted unmarked burials



Case Study: Bedrock Depth Mapping, Fremantle Cemetery

- A Geophysical investigation was carried out to map the depth to bedrock.
- The results were used for planning of future development, including allocation of new burial plots



Case Study: Bedrock Depth Mapping, Fremantle Cemetery

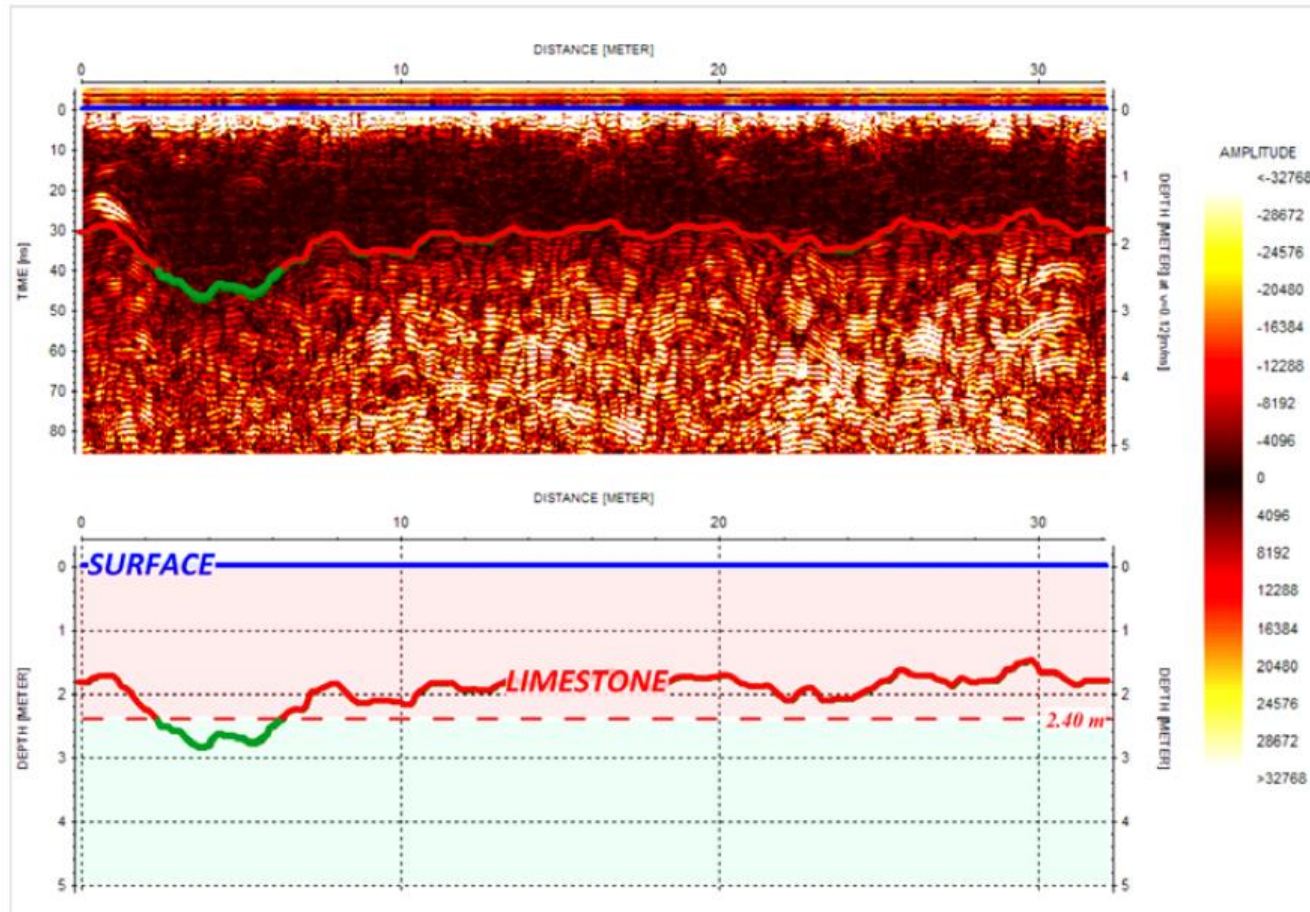


Figure 4: Processed radar-gram showing digitised sand/ limestone rock interface.



GBG GROUP

Interpreted Rock Levels



LEGEND

- Site Boundary (2017 Investigation)
- - - Site Boundary (2019 Investigation)



Areas of interpreted limestone
depth < 1.0 mBGL



Areas of interpreted limestone
depth 1 - 2.4 mBGL



Areas of interpreted limestone
depth > 2.4 mBGL

