

Common Techniques Explained

Dynamic Impedance or Impact Echo

Impact Echo is an acoustic echo sounding system which, in conjunction with UPV is the primary technique used to assess the mechanical properties such as strength and integrity of materials. It can also be applied to deep structures, in the assessment of the form of masonry and concrete elements and to investigate the length and integrity of sheet piles.



GPR and Impulse Radar

GPR is a radio echo system and the primary technique for mapping the arrangement of elements within a structure. Radio waves can cross air gaps which stop acoustic waves. This is a quick method for the internal assessment of a wide range of materials. It is particularly useful for identifying shallow buried targets and internal elements of concrete, asphalt and masonry structures.



Ultrasonics and UPV

Ultrasonic Pulse Velocity (UPV) measurements of a material are used to assess the mechanical properties such as strength and integrity; they can also be used to assess crack depths and direction. Ultrasonics are also applied to measure the thicknesses of materials such as steel and certain polymers.



Seismic methods

Seismic waves are propagated through the ground and the return waves (reflected, refracted or surface waves) are detected by receivers on the surface. The velocities and paths of these waves may then be analysed to provide a cross section model of the subsurface in terms of layers, stiffness and geometry.



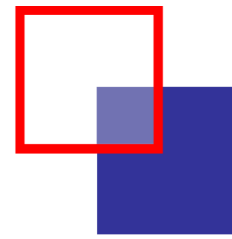
Electromagnetic methods

EM uses the principal of induction to measure changes in the electrical conductivity of the subsurface. A primary field is generated by a transmitter and this induces a secondary field in subsurface conductors which is detected by a receiver coil. These methods can work either frequency or time domain and can give information at varying depths.



Resistivity

Electrical currents are injected into the ground via ground coupled electrodes and the potential difference at the surface is measured. This technique allows for over 500m of continuous line data to be collected in one day and has minimal impact on the environment. It shows up contrasts in subsurface conditions which may indicate bedrock, landfill material or other changes.



GBG *Australia*

Advanced Subsurface Investigations



GBG Australia specialise in applying shallow geophysical investigation techniques for site assessment. We offer our clients innovative methods of revealing subsurface information over large or small areas whilst minimising both costs and disturbances on the site.

GBG Australia is an independent provider of non destructive and shallow geophysical investigation services with applications ranging from the location of a single pre-stressing strand in a concrete slab to mine scale exploration geophysics. With clients ranging from Local to Federal Government, and from developers and engineering companies to private individuals, we can provide tailored solutions to your particular subsurface investigation requirements.

Sydney

18 Fennell Street
NORTH PARRAMATTA
NSW 2151
P: +61 2 9890 2122
F: +61 2 9890 2922

Contact

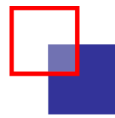
Simon Williams
info@gbgoz.com.au
http://www.gbgoz.com.au

Perth

Level 1, 2 Sabre Crescent
JANDAKOT
WA 6164
P: +61 8 6436 1599
F: +61 8 6436 1500

Contact

Robert Hunn
info@gbgmaps.com.au
http://www.gbgmaps.com.au

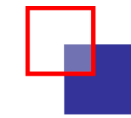
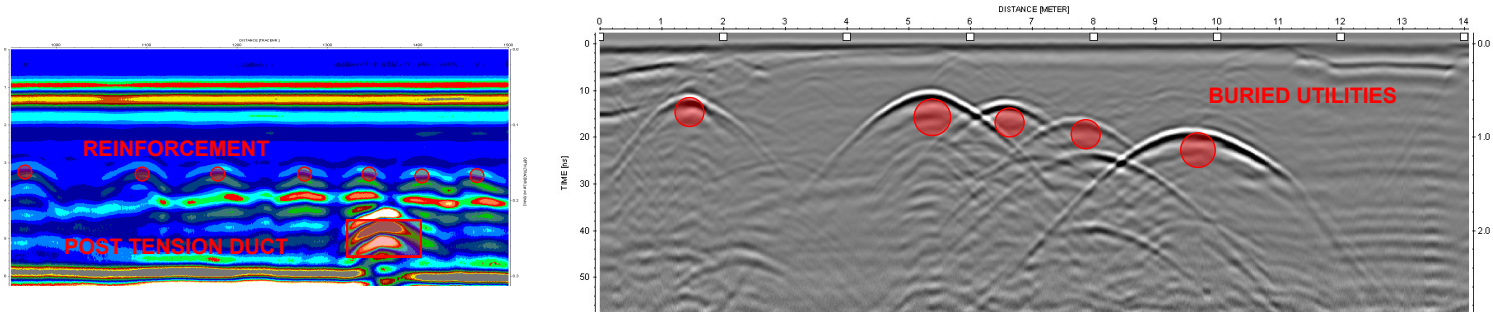


Non-destructive Investigations

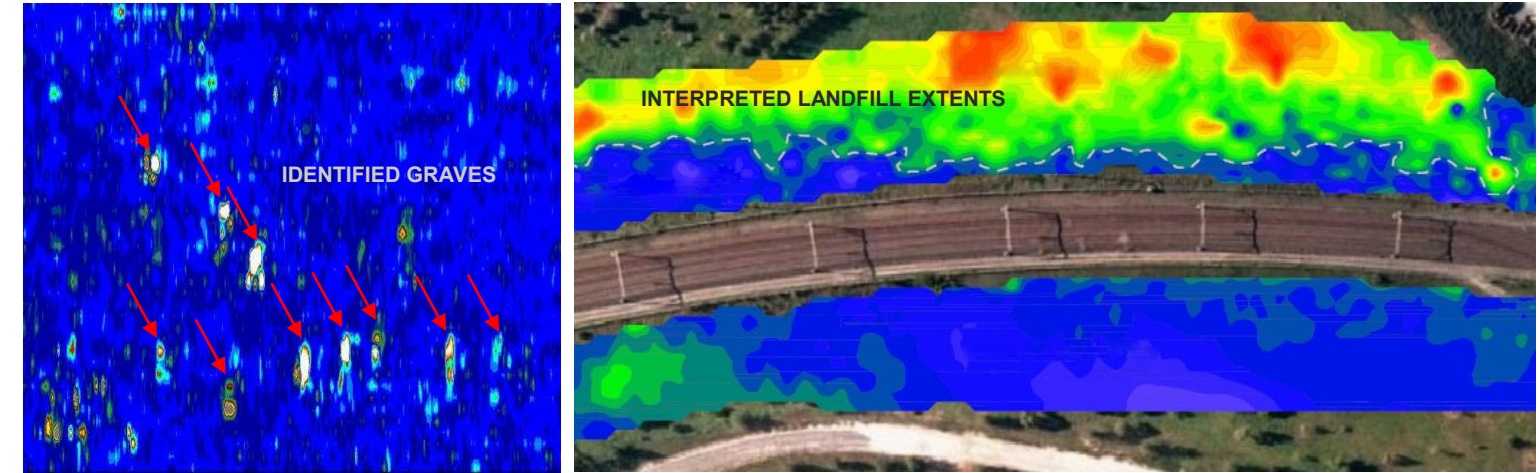
GBG Australia offer a range of non-destructive techniques for the analysis and assessment of buildings and infrastructure. We provide the advantage of:

- ◆ **Rapid** data collection and analysis
- ◆ **Safe** investigation methods with little or no disturbance
- ◆ **Cost effective** results which can minimise the need for further testing

Below we have outlined just some of the services we offer, contact us to find out more.



Geophysical and Environmental Investigations



Geophysical methods can offer valuable information regarding subsurface conditions and composition. These techniques can *safely* and *rapidly* provide results to aid in your future planning and decision making.

Some of common applications of our techniques are highlighted below. Contact us to find out how we can cater to your requirements.



Rail Infrastructure

- Condition assessment
- Ballast profiling for thickness and condition
- Pile depth and condition testing



Utilities & Services

- Location and depth of: Pipes, conduits, voids, tanks, cables and many other possible targets
- Assessment of pipe lining thickness and condition



Pavements

- Pavement construction and condition information including layer thicknesses and defects
- Voids in construction and subgrade materials



Structural

- Assess condition of and/or locate concrete, reinforcement, services, post tension ducts, bridges and tunnel lining
- Wall thickness, crack depths, defects, voiding, moisture content and corrosion potential



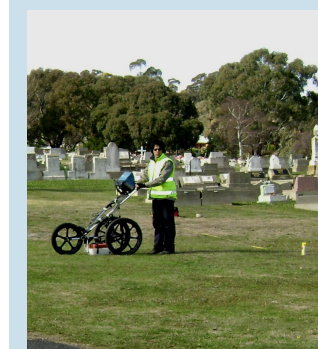
Geotechnical

- Bedrock depth and strength delineation, void detection, tunnel lining
- Seismic refraction, MASW, GPR, Resistivity



Exploration

- Stratigraphy mapping, overburden volume, ore body location.
- Seismic methods, EM, Magnetics, Resistivity, Gravity



Archaeological

- Archaeological sites, unmarked graves
- GPR, Resistivity and EM



Environmental

- Bedrock depth, ground water, rock floaters, fill material, contamination, tree roots, underground storage tanks, salinity
- Resistivity, EM, GPR, MASW, Seismic refraction and reflection

Non-destructive Investigative Techniques

- | | | |
|--------------------------------|---------------------------------|----------------------------------|
| Ground Penetrating Radar (GPR) | Radio Detection | Half Cell Potential, Carbonation |
| High Frequency Impulse Radar | Dynamic Impedance, Impact Echo | Schmidt Hammer |
| Metal Detector and Covermeter | Ultrasonic Pulse Velocity (UPV) | Thermography |

Geophysical Investigation Techniques

- | | | |
|---------------------------|--------------------------------|--------------|
| Marine Seismics | Ground Penetrating Radar (GPR) | Magnetometry |
| MASW | Electromagnetic Methods (EM) | Resistivity |
| Refraction and Reflection | | Gravity |