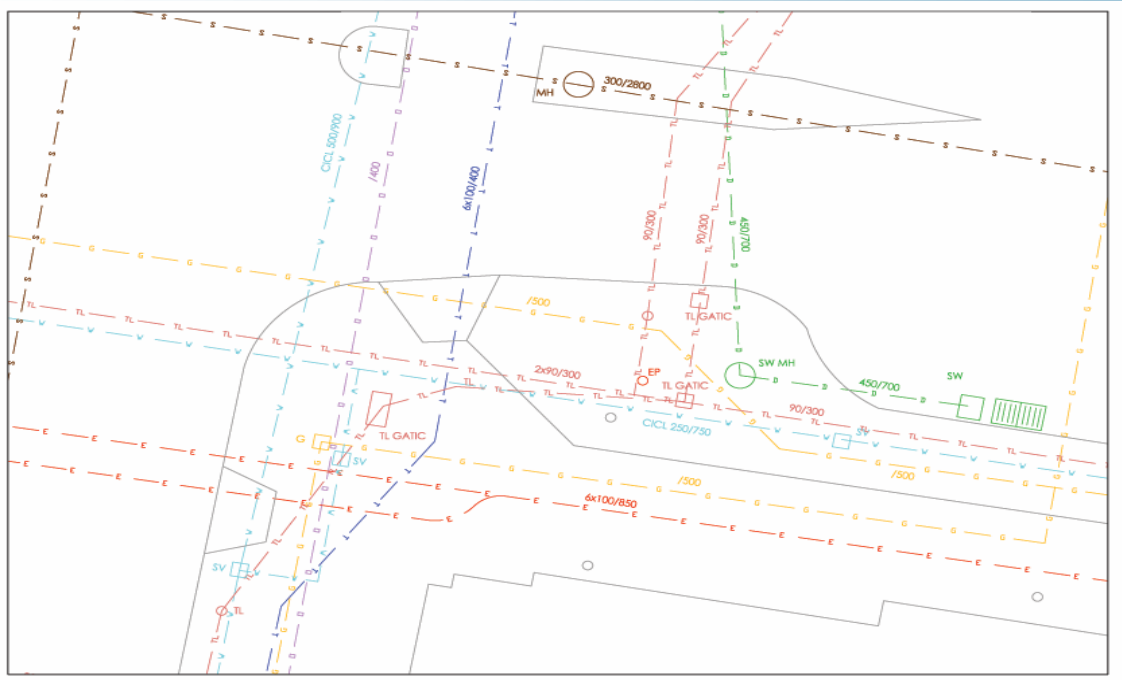


Non Destructive Techniques for **UTILITY / SERVICES LOCATION**



GBG Australia

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

Company Expertise

GBG Australia is a subsidiary of one of the United Kingdoms foremost non-destructive investigation companies – GBG UK Ltd. The UK partner has pioneered the application of shallow geophysical techniques to the precision investigation environmental sites and engineered structures in the UK, Europe and the USA since 1982. GBG Australia staff originally ran the CMP-GBG Joint Venture with CMPS&F and GHD for the last 10years, GBG Australia is now an Independent consultant company and the Australian office of GBG UK.

Our office is based in Sydney N.S.W. from where we undertake investigations across Australia and South East Asia for Federal, State and Local government bodies as well as private companies and asset owners.

Utility/Services Location

With the redevelopment of green or brown field sites, the reconstruction or upgrading of roadways and footpaths or even just digging a new service trench comes the risk of damaging essential underground services. In the construction of new pavements, kerb & guttering and footpaths the risk of damaging underground utilities is particularly high because of the concentration of services in these access areas. Non-destructive subsurface investigations utilising a combination of modern investigation techniques can greatly reduce that risk.

Typical services that can be located by non-destructive test methods include water, irrigation, electrical (power distribution, parking meters, traffic lights, street lighting), fuel & gas, telecommunications, sewerage and storm water. The typical features that are detected include cables, conduits, ducts, pipes, trenches and service tunnels.

GBG Australia undertake investigations utilising a combination of methods. An investigation will include desktop study using existing plans of the services from "dial before you dig" searches and liaison with the asset owners, field investigations including logging of above ground information such as access pits, stop valves, hydrants, warning plaques. Opening of pit covers to assess utility depths, duct usage, layout and direction. All this information is combined on CAD drawings and then correlated with information collected from the subsurface profiling carried out along or across the investigation area using standard induction cable and pipe locators and shallow geophysical techniques, primarily Ground Penetrating Radar (GPR) but in special circumstances Time Domain Metal Detector (EM-61), magnetic gradiometry or ground resistivity. This work is carried out in consultation with Project or Site Engineers.

The location of services from plans alone can be very unreliable. Plans may be incomplete, out of date or inaccurate. Various investigation techniques are often required as no single method provides complete information. The cost of excavation can be high and time consuming as is the cost and inconvenience of damaging a service. However, there is no substitute for pot holing or trenching, and caution to verify a service location.

Why use cable and pipe locators: - This is the most common method used to locate metal pipes, electrical and telecommunication cables. It can not locate optical fibre or plastic pipes unless they were installed with a tracer wire. The system works by picking up stray power or radio emissions from the utilities or by inducing a signal into the cable or pipe at a known frequency and tracing the signal along the length of the service. A depth to the centre of a service can be measured down to 3m. Where access to the inside of the pipe is available the location of the pipe can be traced along the surface up to a depth of 15m by pushing a sonde transmitter through the pipe using flexible rods.

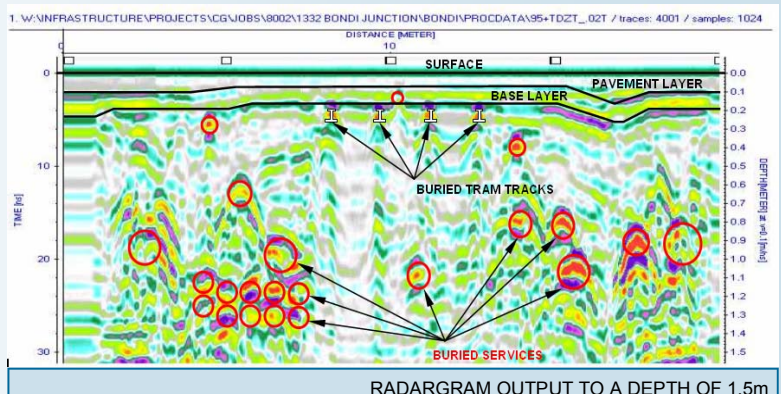
Why use Ground Penetrating Radar (GPR): - GPR provides a non-destructive profile of anomalies below the surface (virtual trenching). The technique works by transmitting radio frequency pulses of energy into the ground. This energy propagates through the material as a function of its electrical properties (ie; conductivity and capacitance). The pulse wave is partially reflected from interfaces between materials of dissimilar electrical properties. A radar gram profile is built up of continuous scans along a traverse. The recorded reflections can be analysed in terms of shape, travel time and signal amplitude. The system can be used to locate both metallic and non metallic utilities as both will provide reflections that are recorded. Depths and approximate target size (diameters can be calculated from the cross section profiles. Subsurface targets have to be larger to be resolved at depth It can typically locate a 1000mm diameter pipe to 5.0m, or a 50mm diameter pipe to a depth of 0.6m depending on the antenna frequency, the pipe material and the ground condition.

Presentation:

The investigation results are typically presented as 1:100 scale plan drawings. However, plans can be customized to meet individual client needs. The information provided includes location, type, diameter and depths of services and can be provided to an ISG coordinate system if required. Digital copies in AutoCAD, DXF or PDF formats can also be provided.

Limitations of Techniques

All non destructive investigations have limitations, many can be overcome by utilising multiple investigation techniques rather than relying on one and this is the reason we generally undertake investigations using various methods depending on the clients requirements and budget. The limitations of various methods and our investigation options available are always discussed with the client in the proposal. Field investigations are undertaken with this in mind and techniques may be varied in accordance with the site conditions and consultation with the client.



Previous Projects:

Australian Technology Park Development: City West Development.
Green park Development, Mid Block: South Sydney City Council.
Redfern St Upgrade, Redfern: South Sydney City Council.
Oxford St, Street-scaping works: Tract Landscaping
O'Dea st / Johnson St utilities location for proposed storm water drainage route. GHD / South Sydney City Council.
Services Tunnel Location, Taylor Square. Reed Construction.
Services Location, Darling Harbour new Electrical supply route for Energy Australia.
Services Location, Bondi Beach & Tamarama for stormwater upgrades, skate park construction and cable installation: Waverley Council.
Fuel pipe location in demolition site, Burrong Power Station, Botany: URS.
Services Location St Vincents Hospital, Darlinghurst: St Vincents Private Hospital
EMT Joint Venture, Location of Sewer Tunnel Construction Change, Matraville.
Services Location Oxford Street Mall, Bondi Junction: GHD / Waverly Council.
Various tower antenna sites for One Tel Communications.
Various tower antenna sites for Hutchinson/Orange Communications.
Various tower antenna sites for Optus Communications.
Various proposed development sites for Aldi Stores.
Services Location, Erskine House Hotel grounds , Lorne, Vic.