GBI Overview - Specialist Field Services

GBI—Specialist Field and Site Investigation Services
www.gbinv.com.au

GBI is a specialist geotechnical, environmental, and hydrogeological field investigation and testing service provider. We mainly provide technical field services to engineers, environmental scientists, hydrologists, and hydrogeologists; however, we provide services to other sectors and clients as well.

GBI comprises a team of dedicated, trained, and well-equipped field technicians, overseen and regularly trained by engineers, scientists and experienced health and safety officers. GBI has the ability to mobilise quickly because we own and operate a diverse and modern test fleet, sampling equipment, and plant. Our team not only operate our own equipment, but we also arrange and manage other equipment and technicians from other providers, should that be what your project needs.

GBI's aim is to be your one-stop-shop for all geotechnical, environmental, and water bore related testing and sampling requirements

GBI delivers factual reports, mostly for engineers and scientists, to aid in investigation, design, and planning. Depending on your requirements, we can suggest suitable equipment and field procedures to obtain the results and information your team requires. Contingent on the fieldwork, we can work independently, or along with your field engineers and scientists.

A brief description of what we offer is presented below.

Geotechnical

- Supply field technicians and geotechnical engineers.
- Field tests, including DCP's (to AS1289.6.3.2); PSP's (to AS1289.6.3.3).
- Sampling for various laboratory tests.
- Cone Penetration Testing (CPT's).
- Auger drilling.
- Operate third-party machines, such as excavators.
- Electrical resistivity and thermal resistivity testing.
- Test pitting (hand dug test pits, backhoe, and tracked excavators).
- Rotary core drilling, including Standard Penetration Tests (SPTs).
- DPSH - dynamic probe super heavy test which is equivalent to a continuous SPT-N reading and can be plotted as continuous SPT's or analogous to a CPT qc reading, but from a heavier machine that can penetrate harder ground layers.
- Plate Load Testing, Shear Vane, Pocket Penetrometer, Point Load Test (non- NATA).
- Logging geotechnical services, logging according to Australian Geotechnical Standards AS 1726.

Hydrogeology

- Logging for hydrogeological services, such as initial logging for water bores, also to AS 1726.
- Pump testing of completed bores to provide flow rates and information required for modelling and estimation of flow rates.
- Inspection and servicing of water bores.
  NOTE: GBI does not drill water bores. We rely on third-party contractors to drill large water bores.

Environmental

- Sampling for environmental purposes, including contamination (hydrocarbons, metals, asbestos). Our team is trained to sample appropriately and can decontaminate equipment as required.
- Installation of monitoring wells, using a machine auger or rotary cored boreholes, PVC standpipe, and appropriate gravel backfill, bentonite, and finishings (such as monument/gatic covers).

ASK US FOR OUR CAPABILITY STATEMENTS
0456 354 498

CONE PENETROMETER TESTING
CPT – PAGANI TG73-200

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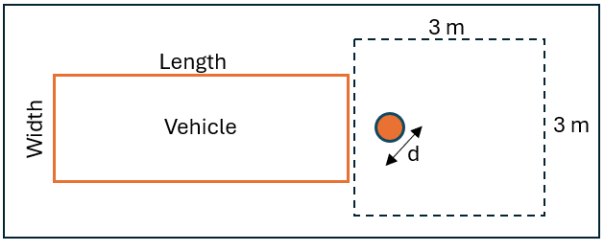
CPT TESTING – PAGANI TRACKED RIG

The Pagani TG73-200 Cone Penetrometer Test (CPT) rig can typically test to depths of about 30m, depending on conditions. On site, this machine moves on rubber tracks and uses two augers to anchor it, allowing for a pushing force of up to 200kN. The machine is transported on the back of a Hyundai transport truck (2wd). Cone penetration testing (CPT) is typically done in accordance with AS1289.6.5.1. The test involves pushing an instrumented cone into the soil with a hydraulically operated pushing frame. The test measures tip resistance and sleeve friction on the cone, which are then plotted with depth. Pore pressure in kPa can also be measured.

FOOTPRINT/ DISTURBANCE AREA

We require a safe working area. The sketch summarises the typical area required around the test location (d). We can work with smaller areas, if required. The final disturbance area will be the size of the test hole (d), which is about 50mm. The side anchoring anchors have a diameter of 300 - 600mm (soil dependent).



Typical access requirements for field testing

Specifications				
Testing and Machine Details	Type:	Cone Penetrometer Test (CPT)	Depth:	Maximum 30m
	Model:	Pagani CPT TG73-200	Fuel:	Diesel
	Samples:	Normally, no samples. A split spoon sampler (SPT style) can be used.	Results:	CPT, CPTu, SCPT. Measures tip resistance in MPa and sleeve friction in kPa. Pore pressure in kPa where measured. Results in Qc – Cone Resistance
	Height:	2m folded, 5.4m working	Length:	3.4m
	Width:	2.1m	Weight:	2,900kg
	Footprint/ Disturbance:	Requires the length and width of the machine, plus an area of about 3m x 3m to allow for a safe testing area. Final disturbance (after we leave the site), is the size of the test hole about 50mm. The side augers will leave a zone of about 300mm disturbed.		
	Ground conditions required for access:	For truck: Drive on access, firm ground, suitable on most sand sites. For rig: Can traverse grades up to 25%. Concrete and paved areas must be pre-drilled for both the test and the anchor augers. Unpaved sites, like sand sites and vegetated areas are preferred.		
	Suitability:	Testing suitable in most soils, including firm to stiff clay, and dense sand. Not suitable through limestone, gravelly soil and mixed sand/limestone gravel fill. Not suitable in rock and cemented material like laterite. In ideal conditions, we can do about 10 CPT's in one day, to a depth of about 6m – 10m		

Diamond / Rotary Core Drilling

- Hanjin DB8 Rotary Core Drilling Machine -

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DIAMOND / ROTARY CORE DRILLING

Diamond coring (or rotary coring) drilling is used for the recovery of a wide range of material, including cemented soil and rock. The machine is capable of drilling in all strengths of rock. Standard Penetration Tests (SPT's) can be carried out, typically every 1.5m in soil layers. SPT's are done in accordance with AS1289.6.3.1.

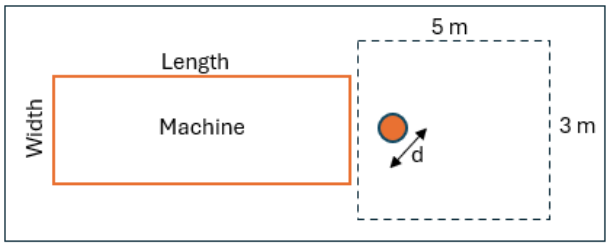
GBI offers drilling services with a trained drilling team, supplying all consumables and core trays, and can allow for water, if this is not available on site. Our head driller will provide you with a drillers log, summarising samples taken, SPT results, core loss, or any anomalies encountered during drilling.

The drillers log is not a formal log. We can offer a formal log, logged by a geotechnical engineer or technician in accordance with AS1726, if required.

Additionally, we can install monitoring wells and measure short-term or long-term water levels, and conduct infiltration tests. We can also sample water and rock/soil samples at your request.

FOOTPRINT/ DISTURBANCE AREA

We require a safe working area. The sketch below summarises the typical area required around the test location (d). We can work with smaller areas, if required. The final disturbance area will be the size of the test hole (d), which is about 100mm.



Typical access requirements for field testing

Specifications				
Testing and Machine Details	Type:	Diamond / Rotary Core Drilling Machine	Depth:	Maximum 50m
	Model:	Hanjin Drilling Machine	Fuel:	Diesel
	Samples:	Core samples, and SPT split spoon sampler. Logs to AS 1726. HQ3 and NQ3 core sizes available. PQ3 on request. U50 Tube Samples also available.	Results:	SPT – N30 SPT to AS 1289.6.3.1
	Height:	2.4m folded, 6.4m working	Length:	6.2m
	Width:	2.3m	Weight:	4,200kg
	Footprint/Disturbance:	Requires the length and width of the machine, plus an area of about 5m x 3m to allow for a safe testing area. Final disturbance (after we leave the site), is the size of the test hole about 100mm.		
	Access requirements:	Drive on access, firm ground, suitable on most sites. Rig can traverse grades up to about 20% and is suitable for most unmade sites.		
	Suitability:	Drilling suitable in most soils and rock, SPT testing suitable in most sandy and clayey soils.		

DYNAMIC PROBE SUPER HEAVY (DPSH) TEST
Grizzly DPSH – Continuous SPT

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DPSH TESTING – GRIZZLY

The Dynamic Probe Super Heavy (DPSH) is a relatively small machine, with rubber tracks, making it accessible in most locations.

The DPSH test involves driving a solid cone (20 cm2) into the ground using a 63.5kg hammer falling 760mm. Testing is done in accordance with EN ISO 22476-2 – Geotechnical engineering – Field testing Part 2: Dynamic probing – DPSH-B. This is essentially a continuous SPT.

Results may be presented as either:

- Depth per blow (mm/blow);
- N10 (No. of blows required for every 100mm penetration);
- N30 (No. of blows required for every 300 mm penetration – this is approximately equivalent to SPT-N); or
- q_d (dynamic tip resistance, analogous to CPT qc).

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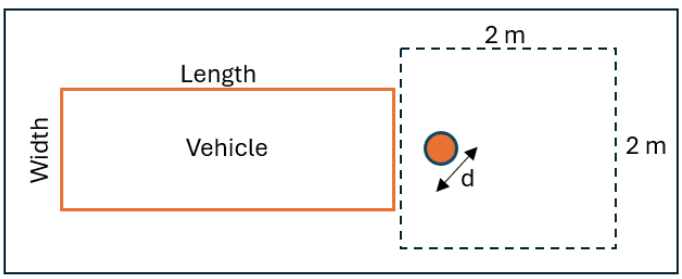
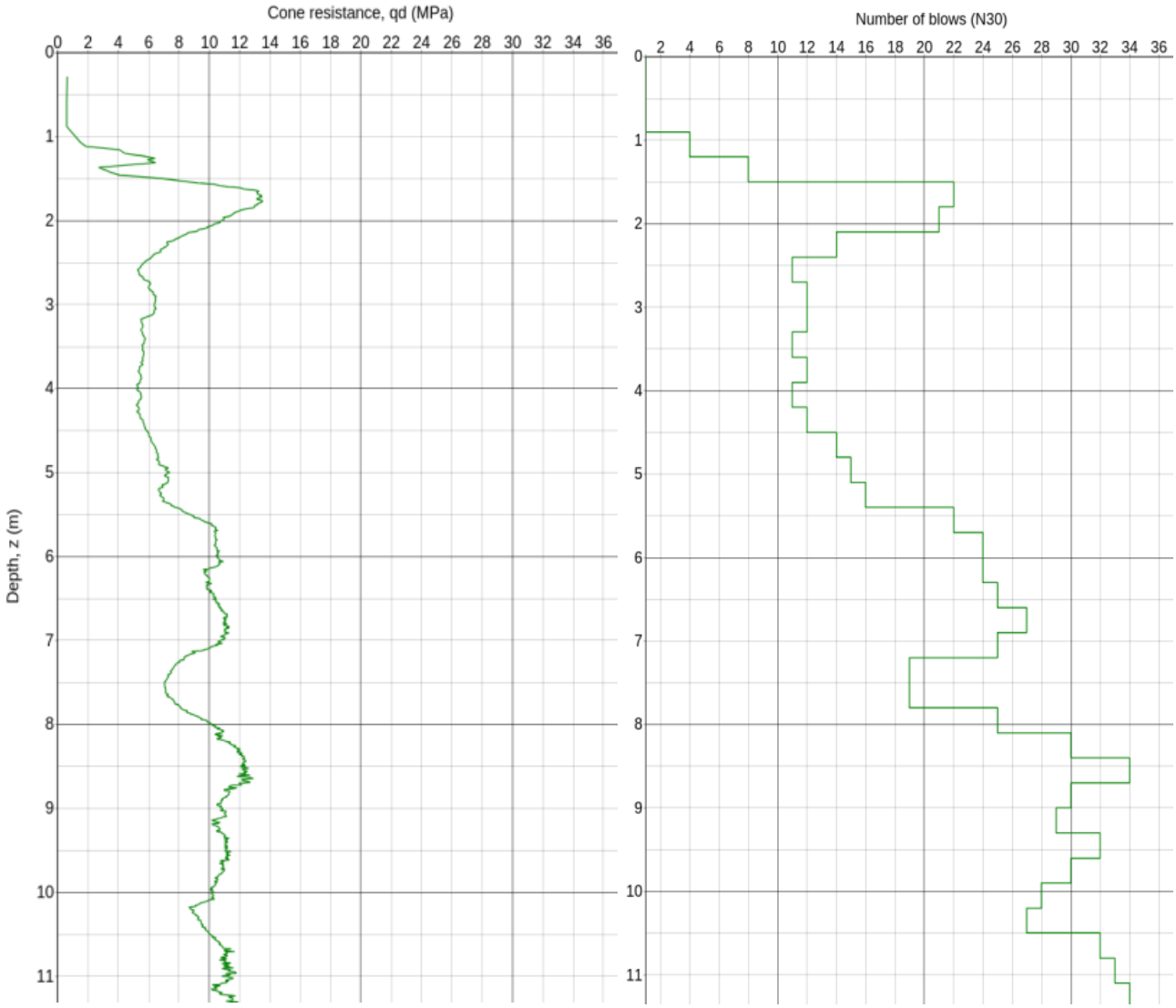


Typical access requirements for field testing

Example of the DPSH test results are presented below. One in Cone Resistance (q_d – MPa), and the other N30 (or similar to SPT-N values. These two graphs are from the same test.



Specifications				
Testing and Machine Details	Type:	Dynamic Probe Super Heavy (DPSH)	Depth:	Maximum 20m
	Model:	Grizzly DPSH	Fuel:	Petrol
	Samples:	Typically, no samples, but we can sample with a SPT split spoon sampler.	Results:	N30, N10, qd, or cone resistance (MPa)
	Height:	1.3m folded, 3.5m working	Length:	1.9m
	Width:	0.9m	Weight:	1,000kg
	Footprint/Disturbance:	Requires the length and width of the machine, plus an area of about 2m x 2m to allow for a safe testing area. Final disturbance (after we leave the site), is the size of the test hole about 50mm.		
	Ground conditions required for access:	Drive on access, firm ground, for ute and trailer. Rig is tracked and suitable on most sand and unmade sites. Concrete and paved areas must be pre-drilled.		
	Suitability:	Testing suitable in most soils, including firm to stiff clay, very dense sand. Can also test through very weakly cemented limestone, gravelly soil and mixed sand/limestone gravel fill (circumstances where CPT is unsuitable). Not suitable in rock and cemented material like laterite. In ideal conditions we can do up to 15 tests in one day, to a depth of about 8m.		

MACHINE AUGER DRILLING
Light Truck Based—MELVELLE

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AUGER DRILLING - MELVELLE

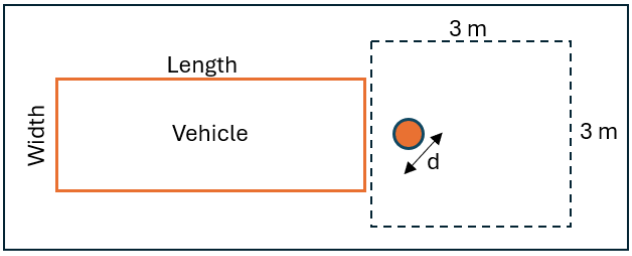
GBI's Melvelle auger drilling machine is capable of accessing most sites, including sand sites. This 4x4 truck-based drilling machine offers a 100mm diameter solid auger or 100mm (ID) hollow auger and can drill to 12m or shallower refusal.

The Melvelle machine auger is suitable and useful in areas where:

- Drive-on access is available.
- Limited ground disturbance is required (opposed to test pitting).
- Several test locations are targeted. In ideal conditions, we can complete about 10 - 15 boreholes to a depth of 3 m in one day.
- Can drill through asphalt (carparks and roads), but not concrete (we can pre-drill / core through concrete).
- In sandy and silty material.

FOOTPRINT/ DISTURBANCE AREA

We require a safe working area. The sketch below summarises the typical area required around the drill location (d). We can work with smaller areas, if required. The final disturbance area will be the size of the drill hole (d), which typically is 100mm, but can be up to 300mm.



Typical access requirements for field testing

We typically do not store the spoil/core recovered from an auger process. We log these in the field and discard them. We can recover and store the recovered spoil on request (and will be done if a logging service has not been requested).

Specifications				
Testing and Machine Details	Type:	Machine Auger fitted with a 100mm solid auger. 100mm ID hollow auger available. Up to 300mm solid auger possible.	Depth:	Typical: 3 m to 6 m; Max: 12 m
	Model:	Isuzu NLS 4x4 truck with Melvelle 'super rig'	Fuel:	Vehicle: Diesel; Rig: Diesel
	Samples:	Disturbed, small sample. Typically, up to 5kg. 20kg samples possible to 1m depth.	Results:	Soil Logs
	Height:	2.5m folded, 4.6m working	Length:	5.7m
	Width:	2.1m	Weight:	3,500kg
	Footprint/Disturbance:	Required the length and width of the vehicle, plus an area of about 3m x 3m to allow for a safe drilling area. Final disturbance (after we leave the site), is the size of the drill hole, typically about 100mm.		
	Ground conditions required for access:	Drive on access, firm ground, suitable on most sand sites (not very loose sand), concrete and paved areas must be pre-drilled		
	Suitability:	Drilling suitable in most soils, including firm to stiff clay, medium dense to dense sand. Not suitable in rock, very stiff clay and cemented material like laterite.		

MACHINE AUGER DRILLING
Ford Ranger Based—SCOUT

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AUGER DRILLING - SCOUT

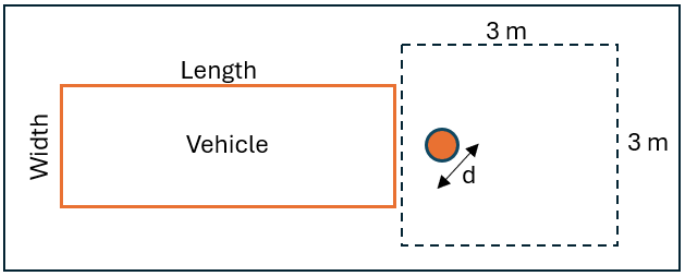
GBI's Scout auger drilling machine is a true all-rounder, capable of accessing most sites, including sand sites. This 4x4 ute-based drilling machine offers a 100mm diameter solid auger and can drill to 12m or shallower refusal.

The Scout machine auger is suitable and useful in areas where:

- Drive-on access is available.
- Limited ground disturbance is required (opposed to test pitting).
- Several test locations are targeted. In ideal conditions, we can complete about 10 to 20 boreholes to a depth of 3 m in one day.
- Can drill through asphalt (carparks and roads), but not concrete (we can pre-drill / core through concrete).
- In sandy and silty material.

FOOTPRINT/ DISTURBANCE AREA

We require a safe working area. The sketch below summarises the typical area required around the drill location (d). We can work with smaller areas, if required. The final disturbance area will be the size of the drill hole (d), which typically is 100mm, but can be up to 300mm.



Typical access requirements for field testing

We typically do not store the spoil/core recovered from an auger process. We log these in the field and discard them. We can recover and store the recovered spoil on request (and will be done if a logging service has not been requested).

Specifications				
Testing and Machine Details	Type:	Machine Auger fitted with a 100mm solid auger. Up to 300mm diameter auger possible.	Depth:	Typical: 3m to 6m; Max: 12m
	Model:	Ford Ranger 4x4. Drill rig is an EVH Scout 1750	Fuel:	Vehicle: Diesel; Rig: Petrol
	Samples:	Disturbed, small sample. Typically, up to 5 kg. 20 kg samples possible to 1 m depth	Results:	Soil Logs
	Height:	2.6m folded, 4.5m working.	Length:	5.8m
	Width:	2m	Weight:	3,500kg
	Footprint/Disturbance:	Required the length and width of the vehicle, plus an area of about 3m x 3m to allow for a safe drilling area. Final disturbance (after we leave the site), is the size of the drill hole about 100mm.		
	Ground conditions required for access:	Drive on access, firm ground, suitable on most sand sites (not very loose sand), concrete and paved areas must be pre-drilled.		
	Suitability:	Drilling suitable in most soils, including firm to stiff clay, medium dense to dense sand. Not suitable in rock, very stiff clay and cemented material like laterite. In ideal conditions, about 10 – 20 boreholes can be drilled to about 3m, in one day.		