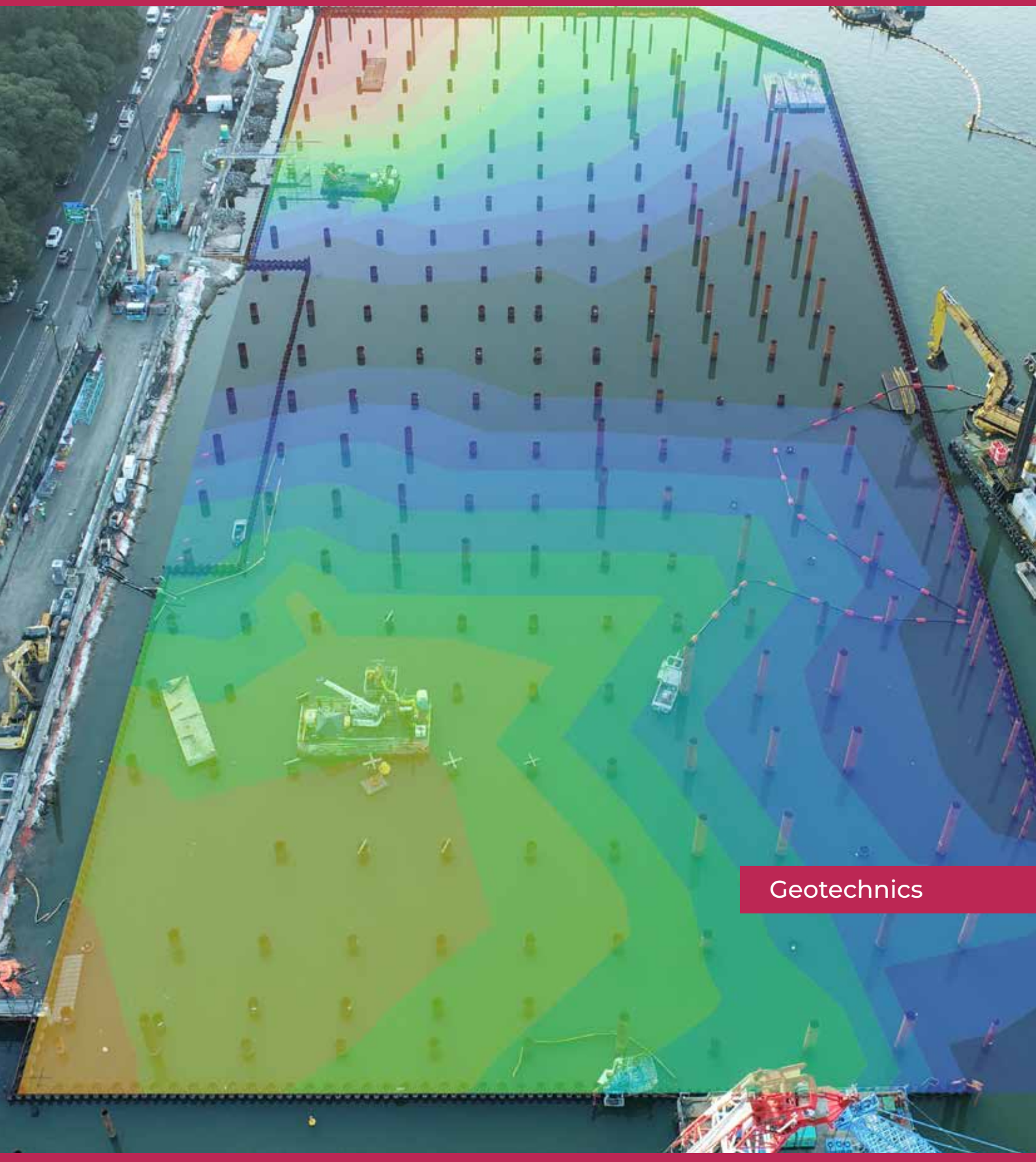
Douglas PARTNERS

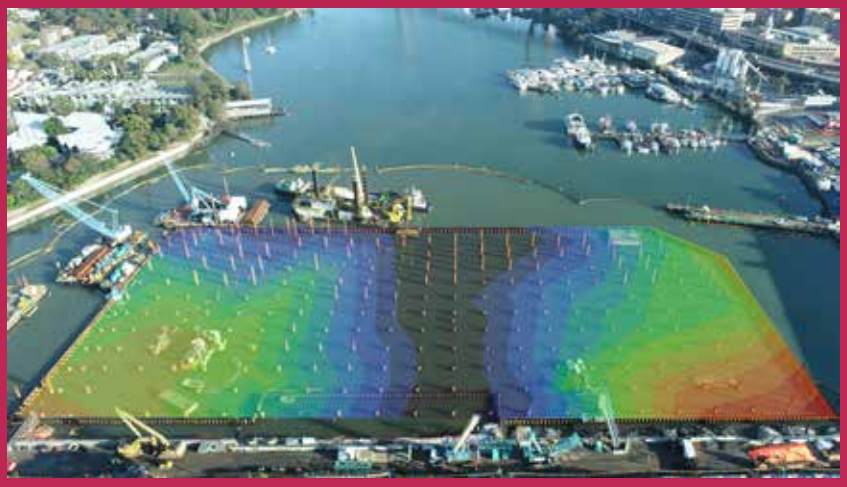
GROUNDED
EXPERTISE



Geotechnics

“Multiplex and Douglas Partners have worked collaboratively on numerous projects over the years. This collaboration has seen Douglas Partners provide innovative geotechnical, contamination and hygienist solutions for our projects and they continue to be a valued consultancy firm for our business”.

David Ghannoum
Regional Managing Director Multiplex Australasia



Grounded Expertise

We are down-to-earth, practical ground experts who have been getting the job done with integrity since 1963. Our specialist disciplines encompass geotechnical engineering, rock mechanics, contaminated land, groundwater, geophysics and materials testing.

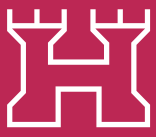
With over 60 years of experience, using local knowledge to collect high-quality ground data, Douglas Partners is uniquely positioned to deliver practical solutions for projects where the built environment interacts with the ground.

Quality is central to our operations. Our ISO9001 accredited Quality Assurance system underscores our commitment to excellence. Our culture embodies our guiding mantra: “Keep it Simple, Get it Right, Do it Well.”

With 600+ dedicated professionals across 19 branches in Australia, including 14 NATA registered laboratories, our expert advice helps manage and mitigate risk and our solutions are tailored to enhance outcomes for our clients, community and environment.

Services Across Sectors

Douglas Partners consulting services provide our clients with a range of integrated and specialist skills with the aim of delivering practical solutions across a large number of business sectors including:



DEFENCE

WATER

TRANSPORT

RESOURCES

ENERGY

HEALTHCARE

PROPERTY & BUILDINGS

MARINE

LAND DEVELOPMENT

SPORT & RECREATION

WASTE MANAGEMENT

TELE-COMMMUNICATIONS

To achieve our client's objectives, we provide one of the most experienced and innovative geotechnical teams in Australia.

With a proven track record in projects ranging from detailed investigations, provision of support services through the design stages of a project, ending in construction supervision and monitoring, our geotechnical team can provide innovative advice and solutions for your project.

Investigations

Whether it be on land, over water or offshore, Douglas Partners has the in-house resources and experience to complete a wide range of geotechnical investigations for a range of projects across all development sectors. Our highly experienced engineers, geologists, geophysicists and technicians can manage projects and call upon extensive additional internal resources to build integrated investigative teams to successfully complete large and challenging projects.

Typically we undertake investigations for:

- Industrial, commercial and residential buildings;
- Deep basements;
- Roads and railways including pavements, bridges, tunnels, embankments and cuttings;
- Subdivisions and land capability studies;
- Large scale service installations and communications/energy sector studies; and
- Mines and dams, together with associated infrastructure.

Geotechnical Analysis and Design

Douglas Partners can provide geotechnical analysis and design services for a range of building and infrastructure projects that extend our geotechnical involvement beyond the investigation phase.

These services include:

- Foundation design (that is, capacity and settlement of shallow footings, slabs, driven and bored piles, pile testing);
- Retaining structure design (such as gravity walls, anchored, propped or cantilevered walls, reinforced soil walls);
- Slopes and excavations (slope stability assessment, soil nail and anchor design);
- Earthworks and embankments (stability analysis and settlement analysis);
- Pavement and container handstand investigation (flexible and rigid);
- Ground improvement techniques and bridging options; and
- Temporary piling platform / crane pad design and assessment.

"Douglas Partners has greatly assisted Enstruct Group on a range of projects involving deep basements and their interaction with roads and rail infrastructure. They have coupled numerical modelling with sound practical advice to manage ground risk."

Ross Clarke, Managing Director Enstruct Group

Terrain Evaluation & Land Capability

Douglas Partners provides an integrated range of services to clients who require efficient and practical solutions to problems associated with land development projects:

- Preliminary aerial photography mapping;
- Assessment of available geotechnical, groundwater and environmental data;
- Hazard and risk assessments (e.g. land instability, site contamination);
- Assessment of foundation and road pavement conditions;
- Identification and assessment of potential land contamination and groundwater problem areas;
- Mapping, definition and testing of potentially poor/problematic soil conditions;
- Selection and categorisation of site suitability (e.g. housing, roads, parkland, industrial);
- Definition and mapping of areas that require special/further work;
- Environmental assessments;
- Earthworks quality control testing;
- Coordination of laboratory testing;
- Comprehensive reporting of site data;
- Pavement thickness design; and
- Site classification.

Transport & Power Route Location Studies

Douglas Partners provides advice on preliminary route location by undertaking a review of the following:

- Published topography maps;
- Published maps and in-house information relating to subsurface conditions; and
- Aerial photography.

This information is then utilised to plan, locate and undertake ground truthing intrusive investigations.

Specialist In-Situ Testing, Drilling & Sampling

Douglas Partners owns and operates a comprehensive range of drilling equipment and in-situ testing equipment, ensuring a high standard of service, project control and reliability for our clients.

NATA registered laboratories for testing of soil and rock are attached to most of our offices. We can also set up field laboratories to undertake sampling and field testing on remote sites.

For more information, please read our Earthworks capability brochure.

"Douglas Partners has worked on a number of small to large scale and high profile marine projects in Sydney including: Port Botany Expansion, Sydney Metro, Western Harbour Tunnel & BeachesLink, and Sydney Ferry Wharves. These projects have included complex investigations in difficult environments with extensive marine stakeholder engagement."

Scott Easton, Principal Geotechnical Engineer Douglas Partners

Geomechanics For Near Shore & Offshore Structures

The range of services that we provide for offshore geomechanics includes:

- Geotechnical investigations in the open sea from drilling ships and barges;
- Specialised testing equipment, including a wide range of cone penetration testing gear, soil samplers and environmental monitoring systems;
- Geotechnical design and analysis of: offshore foundations, gravity based structures, well configuration, anchors;
- Marine geophysical exploration;
- Onshore and offshore soils laboratory testing;
- Geotechnical assessment and numerical analysis of soil behaviour;
- Site investigations for pipeline route surveys and assessment of seabed stability;
- Dynamic pile capacity testing;
- Sediment contamination assessments for dredging;
- Offshore geotechnical surveys; and
- Evaluation of liquefaction and site response and site response to seismicity.

Quarry Products & Resource Assessments

Douglas Partners provides an integrated range of services to clients requiring innovative and economic solutions in the quarrying industry.

Our quarrying services include:

- Geological and resource assessments;
- Geological mapping services;
- Provision of field drilling and testing services;
- Laboratory testing by NATA accredited laboratories;
- Excavatability assessment
- Quarry planning services
- Geotechnical design and stability analysis
- Environmental assessments;
- Groundwater control, quarry products and resource assessment; and
- Drilling and blasting optimisation studies.

Construction Monitoring, Inspections, Testing & Advice

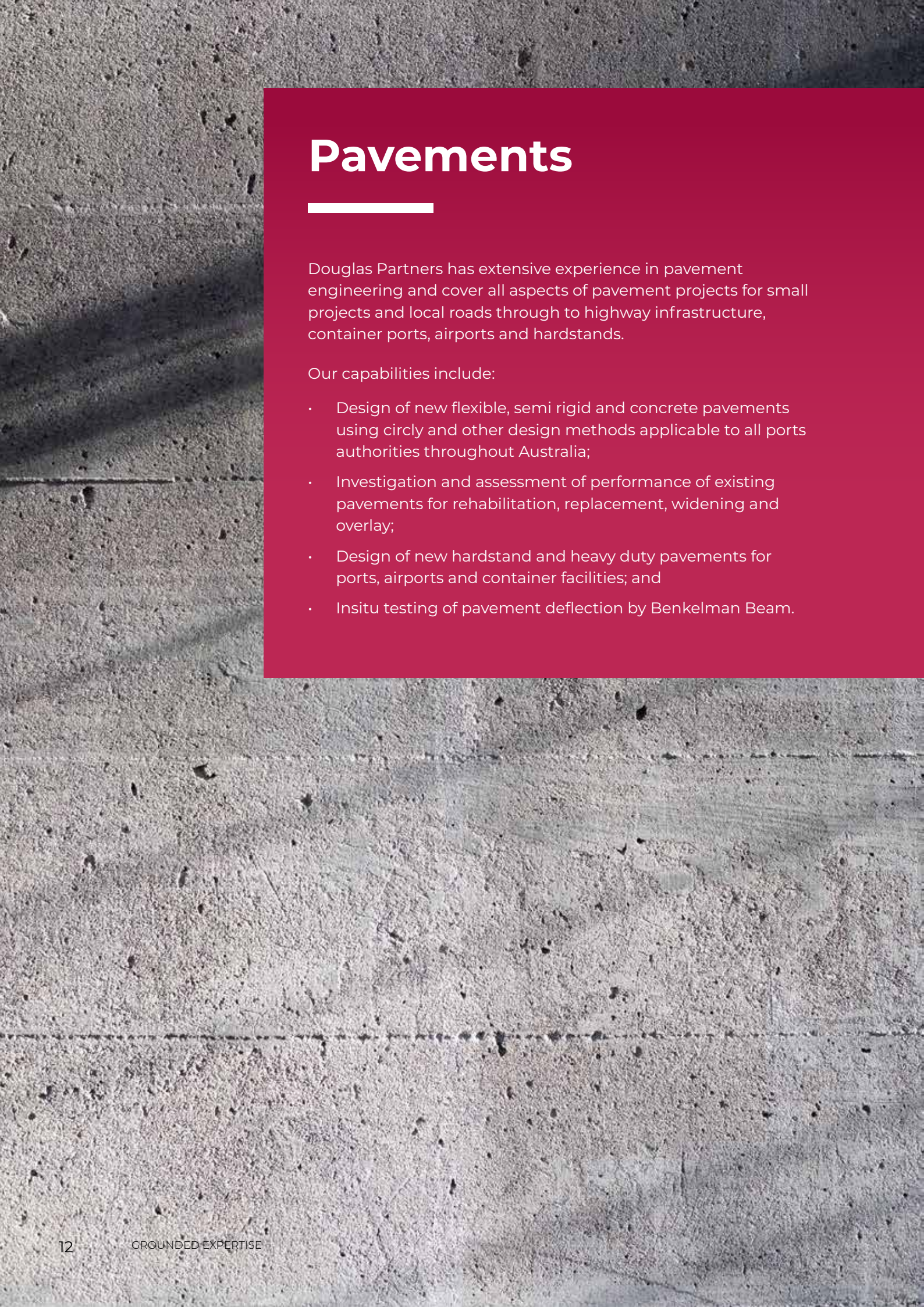
Douglas Partners can provide services during construction in order to verify that ground conditions are consistent with those assumed in design and to assess conditions for temporary works:

- Bored pile / pier inspections;
- Settlement and lateral displacement monitoring;
- Vibration assessment and monitoring;
- Slope creep movement assessment (inclinometers);
- Field testing of foundation soils and rock;
- Assessment of excavation and batter stability;
- Construction advice and analysis for temporary works;
- Groundwater monitoring and dewatering assessment;
- Rock slope mapping and assessment of face support requirements; and
- Earthworks inspection and quality control testing.

Engineering Geology & Slope Stability Assessments

We have a team of highly experienced engineering geology consultants who provide services and support in the following specialist areas:

- Engineering geology (site evaluation; terrain evaluation and classification; materials sources, suitability and resource estimates; quarry site selection; route evaluation and selection);
- Mining engineering (design of pit slopes and slope stabilisation; shafts, tunnels and underground rock mechanics; subsidence estimation; tailings dams and management systems; infrastructure; mine floor stability);
- Geological mapping of cliff lines and excavation faces for rock fall, wedge failure, residential, commercial and recreational developments in hazardous coastal areas, and deep basements; and
- Assessment and monitoring of deep landslides and design of engineered slopes to rectify long term site stability.



Pavements

Douglas Partners has extensive experience in pavement engineering and cover all aspects of pavement projects for small projects and local roads through to highway infrastructure, container ports, airports and hardstands.

Our capabilities include:

- Design of new flexible, semi rigid and concrete pavements using circly and other design methods applicable to all ports authorities throughout Australia;
- Investigation and assessment of performance of existing pavements for rehabilitation, replacement, widening and overlay;
- Design of new hardstand and heavy duty pavements for ports, airports and container facilities; and
- Insitu testing of pavement deflection by Benkelman Beam.

Mining Geotechnics

Our surface mining and underground investigation and geotechnical/earthworks design services include:

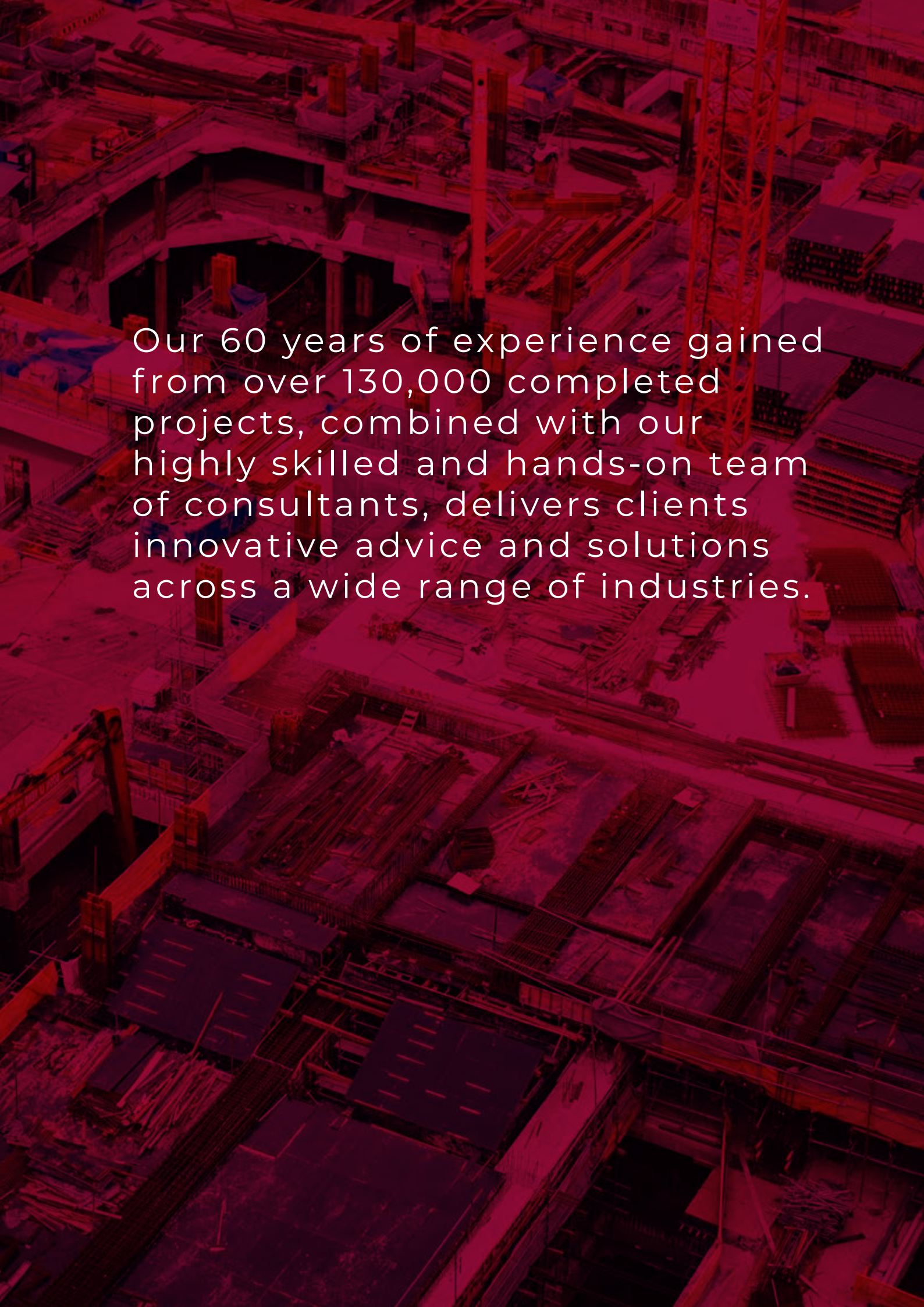
- Surface and underground mapping;
- Underground support analysis and design;
- 2D and 3D modelling of stopes and long walls;
- Design of stopes, shafts, declines, drifts and tunnels;
- Subsidence studies;
- Open pit and box cut stability and design;
- Assessment of long wall parameters (including face width, caving characteristics, chock loads and face stability);
- Aerial photograph interpretation;
- Shaft and drift investigation and design;
- Geological outcrop mapping;
- Surface geophysical surveys;
- Hardstand, airstrip and haul road pavement thickness design;
- Clean water, industrial and tailings disposal dams;
- Footing capabilities and settlements for processing plant, conveyors and stocker reclaimer systems; and
- Subgrade preparation, support and improvement for balloon loop rail lines, drop structures and bridges.

Geophysics Services

Douglas Partners also provides geophysical services to clients seeking to determine in situ physical properties of soil and rock masses and to identify physical property contrasts.

Geophysics may be used during investigation, construction and remedial phases of projects. Projects can vary from general site assessment, where bulk information of the site subsurface permits cost effective selection of targets for further investigation, to measurement of a particular site characteristic including:

- Surface seismic refraction and shallow refraction profiling;
- Downhole and crosshole P&S wave logging;
- Marine seismic reflection profiling;
- Bathymetric and sidescan sonar mapping;
- Electrical resistivity profiling and vertical electrical sounding;
- Electromagnetic (EM) profiling and magnetometer profiling; and
- Gravity surveys and ground penetrating radar imaging.



Our 60 years of experience gained from over 130,000 completed projects, combined with our highly skilled and hands-on team of consultants, delivers clients innovative advice and solutions across a wide range of industries.

Consistently delivering High Quality with Integrity

At Douglas Partners, our purpose it is to provide our clients with **“Grounded solutions for the built environment”.**

Our People demonstrate our company values in every aspect of their work. They uphold ethical standards in their interaction with all stakeholders, consistently seeking creative solutions to challenges in their daily work.

Our Values:

- People

Safety comes first in all we do.

We foster an inclusive and collaborative culture, enabling all to thrive.

We build trusted relationships and are defined by how well we take care of them.

We strengthen connections and make a positive difference where we work and live.

- Integrity

We do what’s right for the environment, client and community.

Customers choose us because they trust our name, and people. We earn that trust by always acting honestly and with the highest level of integrity.

- Improvement

We’re proud of our industry-leading processes and are always looking for ways to improve.

We make improvement a daily habit as continuous improvements lead to sustainable innovation.

- Excellence

We pride ourselves on our high level of technical expertise.

We recognise quality is important in every step of the process.

We work collaboratively, combining our collective knowledge and experience to provide grounded solutions.

Geotechnical Specialists

Our success is due to the expertise, skills and knowledge of our staff, many of whom have postgraduate qualifications and international experience. Douglas Partners team of over 600 highly skilled consulting staff, technicians and support staff, gives clients access to the best engineering talent available.

Our offices have a number of key personnel who possess geotechnical skills and experience enabling projects to be undertaken effectively and at minimal cost to the client.

Principals are actively involved in projects ensuring client access to the best available expertise and experience in the industry.

Meet some of our key consultants from our Sydney Geotechnical Group.

SCOTT EASTON

Principal / Geotechnical Engineer

Scott is a graduate of UNSW (BE Civil and MRE). Scott has been involved with the geotechnical investigation and design for a number of large high profile rail, highway, tunnel and marine infrastructure projects in Sydney and across NSW. Scott has also worked extensively with developers, consultants and contractors on a wide range of small to large scale residential, commercial, and industrial projects.
He is responsible for managing the Sydney Geotechnical team.

RAY BLINMAN

Principal / Geotechnical Engineer

Ray is a graduate of both UTS (BE Hons) and UNSW (MEngSci, Geotechnical). Ray's vast experience covers a broad range of geotechnical and environmental investigation and design services for government and private sector developers, consulting and contracting clients across small and large scale residential, commercial, industrial and infrastructure projects. Ray has considerable experience in pavements, earthworks and land capability/ stability.

PETER OITMAA

Director / Principal / Geotechnical Engineer

Peter graduated from UTS with a Bachelor of Engineering (Hons) and Master of Engineering Management. He is a Chartered Professional Engineer (CPEng), a Registered Professional Engineer in Queensland (RPEQ) and is on the National Engineering Register (NER). Peter has a wide range of experience in both undertaking and reviewing geotechnical and contaminated site projects.

BRUCE McPHERSON

Principal / Geotechnical Engineer

With over 25 years experience in consulting and contracting, Bruce has worked on many groundworks and foundation projects. With particular interests in basement construction, foundations, reactive and dispersive soils, Bruce also assists in lecturing at the University of Sydney. He has carried out extensive pile testing and has written several published technical papers.

BRENDAN O'KANE

Principal / Geotechnical Engineer

Brendan graduated from UNSW with a Bachelor of Engineering (Hons) and Master of Engineering Science (Geotechnical). He is a Chartered Professional Engineer (CPEng) and is on the National Engineering Register (NER). Brendan has a wide range of experience in managing large scale geotechnical investigations and leading geotechnical design for multi-disciplinary teams.

Local capability, world-class talent

For information on how Douglas Partners can assist on your project, please contact one of our branches below or email info@douglaspartners.com.au.

BRISBANE	(07) 3237 8900	**MELBOURNE**	(03) 9673 3500
CAIRNS	(07) 4055 1550	**NEWCASTLE**	(02) 4960 9600
CANBERRA	(02) 6260 2788	**NTH WEST SYDNEY**	(02) 4666 0450
CENTRAL COAST	(02) 4351 1422	**PERTH**	(08) 9204 3511
COFFS HARBOUR	(02) 6650 3200	**PORT MACQUARIE**	(02) 6581 5992
DARWIN	(08) 8948 6800	**SUNSHINE COAST**	(07) 5351 0400
GEELONG	(03) 5221 0711	**SYDNEY**	(02) 9809 0666
GOULBURN	(02) 4822 8395	**TOWNSVILLE**	(07) 4779 9866
GOLD COAST	(07) 5568 8900	**WOLLONGONG**	(02) 4271 1836
MACARTHUR	(02) 4647 0075		

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