

# Your industrial mineral solutions



**Mineral  
Technologies**  
A Downer Company

**Downer**  
Relationships creating success





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Whether investing in a new project or optimising an existing plant, there are many challenges to overcome including investment, licensing, infrastructure, recovery of materials, and environmental product. When major investors see that we are working on a project they gain the confidence that it is well underway.”



There are many hurdles to  
minerals and marketing the  
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## The first step – understanding your project vision

The world’s leading producers rely on us to extract their valuable minerals.

Success is achieved through skilled, passionate people working together in pursuit of a shared vision and goals.

That’s why the very first step we take in working with our customers is to **listen and understand what success for the project looks like.**

We then go out of our way to work collaboratively with our customer teams, based on our shared understanding of the project goals and timeframes.

Working from this understanding we deliver a comprehensive range of equipment, plant design and services to achieve our customers’ vision across all stages of the project lifecycle.

### Experience Delivers Results

From our beginnings in the 1950s separating heavy minerals from the local sands on Australia’s East Coast, we have expanded and developed our capability.

Today, we are recognised by customers worldwide as the **‘go to’ partner for process solutions across the project lifecycle.**

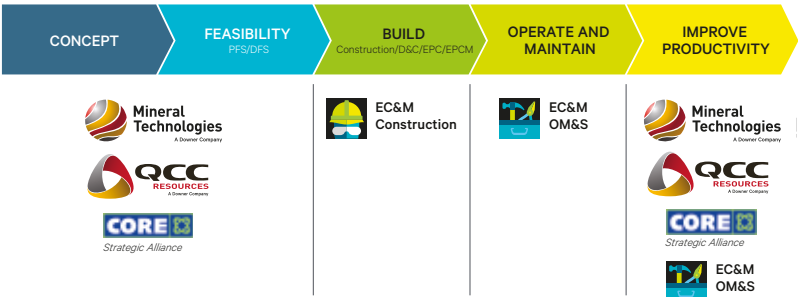
Customers call us when they need fast, cost effective process improvements to **lower costs, convert tailings into revenue or construct a new plant.**

Importantly, we support NI 43-101 requirements as qualified experts for the processing section of technical reports.

### Strategic Alliance

We have also formed a strategic alliance with Core Resources to deliver high-end metallurgical smarts for industrial minerals, and precious and base metals projects.

**Worldwide, our involvement and participation in projects not only provides customers with confidence in a successful outcome, it also provides confidence for key investors and stakeholders.**







## Reliable, expert delivery

**Our proven expertise in delivering tailored process solutions ensures customers can cost effectively produce saleable products that meet their specific needs across a wide range of industrial minerals including phosphate, silica, calcium carbonates, zircon, rutile, ilmenite, tin, tantalum, lithium and feldspar.**

### Concept and Feasibility

Delivering concept, prefeasibility and feasibility studies for customers worldwide, our work typically begins with metallurgical testing at our Australian headquarters in Queensland or under our direction in partner test laboratories in the USA, South Africa, Brazil and India.

We test samples as small as 100 grams for characterisation through to larger samples up to 2,000 kg. Our testing uses state-of-the-art mineral separation equipment for crushing, grinding, classification, gravity and electrostatic separation as well as high and low intensity magnetic separation for wet and dry applications. We also deliver speciality leaching and flotation techniques.

Our laboratory has the capability to create multi-stage pilot scale circuits to treat bulk samples (80-100 tonnes) for process testing and circuit optimisation.

**Where the mineral is different and challenging, we bring innovative capabilities to design new and unique solutions that augment and lift the potential of conventional flowsheets to extract the mineral and meet specific product grade requirements for saleable product.**

### Plant Design

Our plants are designed to safely and efficiently separate minerals to produce specific product grade requirements while delivering high availability, low capital and low operational expenditure. Extending beyond traditional spiral plants our designs include gravity, magnetic and electrostatic equipment with capacities ranging from 5 t/h to 7000 t/h.

Responding to demand from industrial minerals customers for relocatable, modular plants we have become the 'go to' provider, delivering plants that incorporate core process technologies into new low cost configurations.

### Project Delivery

Our project delivery includes fully integrated Engineering, Procurement and Construction Management (EPCM) solutions from concept through to operations and ongoing asset management.

Mineral Technologies provides the EPCM services while Downer's Engineering, Construction and Maintenance division delivers construction services.

As one of Australia's largest providers of engineering services for critical infrastructure projects we deliver civil, structural, mechanical, electrical, instrumentation and technical capabilities.

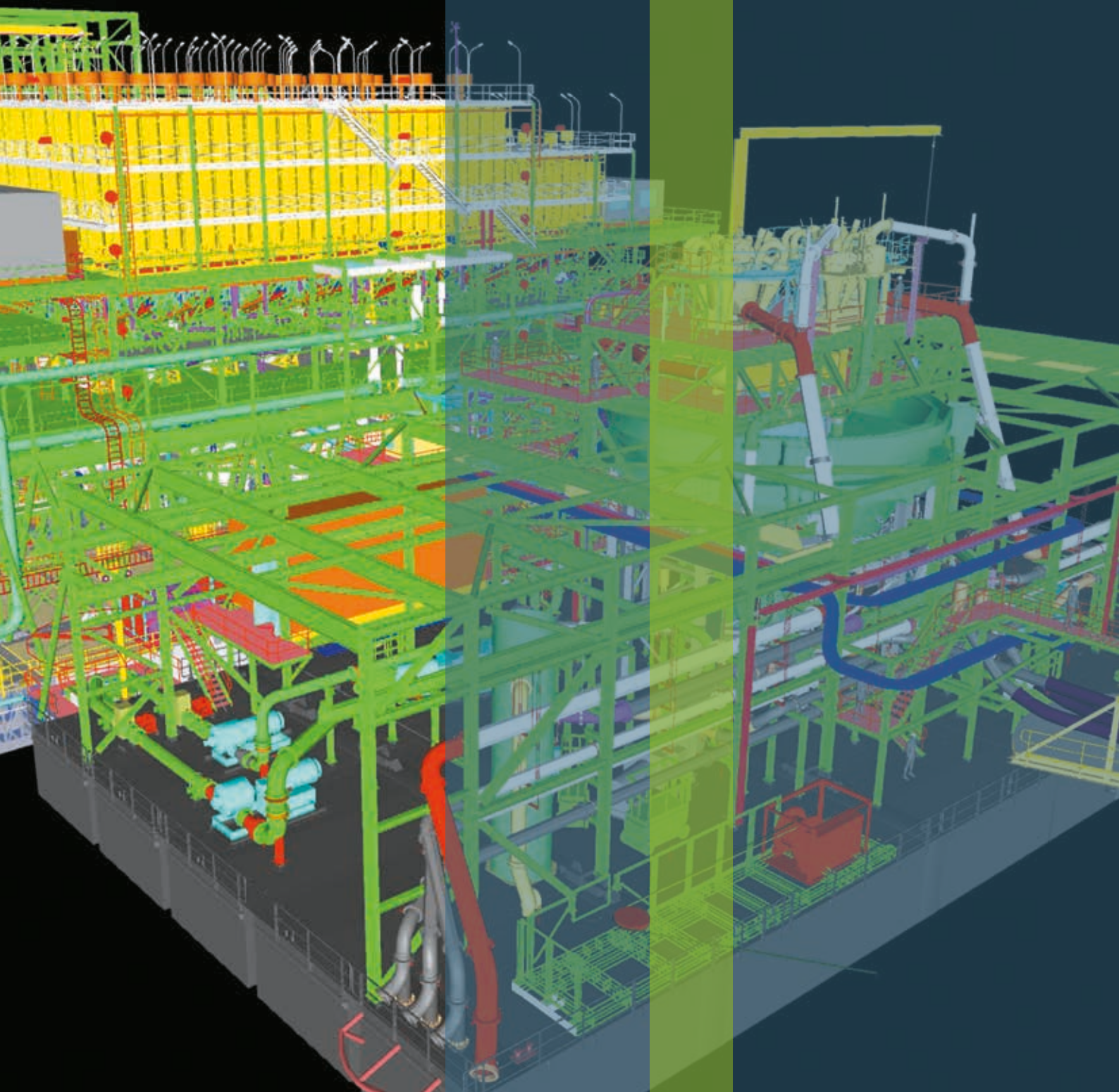
### Operate and Maintain

We deliver services for maintenance shutdown and sustaining capital projects. Our teams are experienced in the maintenance of industrial assets with specialists located across Australia.

### Improve Productivity

**Given our 75+ years' experience working with industrial minerals we regularly transfer learnings and know-how across different mineral types to breakdown knowledge silos and bring new ideas to achieve improved product grades.**

By way of example, we recently brought new thinking about WHIMS technology from the mineral sands sector into chromite tailings to achieve significantly improved product grade.



## Industry leading technology



**Customers value our ongoing commitment to researching and developing new, innovative equipment designs that extract maximum value from fine minerals.**

### Equipment Development and Selection

When purchasing new equipment, we understand that customers need to ensure the equipment maximises grades and recovery while delivering low operational costs and fits within tight capex budgets.

For this reason our equipment is designed and manufactured using the latest technologies and is fully tested in processing operations to ensure optimal performance. This means that when we release new process equipment you can be assured that it will be fit-for-purpose and cost effective.



An excellent example is the use of our new MG12 spirals for the Southern Ionics Mission South Wet Concentrator Plant (WCP) in the USA.

Designed for feed material generally containing up to 25% heavy mineral (up to 40% in some applications), the MG12 spirals offer a highly effective solution and deliver maximum recovery from single and multi-stage circuits.

**Our multi-stage circuit design facilitated a smaller, easier to float plant. It also enabled a smooth construction process with spiral bank modules easily dropped into place and integrated with the plant structure.**

In addition to spirals, we deliver magnetic and electrostatic equipment for mineral sands separation. Customers using our wet high intensity magnetic separation (WHIMS) equipment value the reliability and separation efficiency.

For electrostatic separation, the recently released HTR400 incorporates unique composite (no glass) electrodes that deliver high throughput and low operating costs.

### Benefits of Mineral Technologies Equipment

- high mineral recoveries over a wide particle size range;
- highly selective operation improving product grade;
- compact and low weight construction reduces installation costs;

- low equipment maintenance requirements for greater plant availability;
- spiral equipment is operator friendly, no need for skilled labour;
- no reagents are used in the circuits; this delivers environmentally friendly processes reducing operating costs and lowering potential for environmental incidents;
- robust and proven designs incorporating innovation when applicable; and
- energy efficient magnetic elements for reduced OPEX.

### Completed Projects

- Mission South and Offerman Projects, Southern Ionics Incorporated, USA;
- Grande Côte, Mineral Deposits Limited, Africa;
- Chavara, Indian Rare Earths Limited, India;
- Trimex Sands Pvt Ltd, India;
- Millennium, Brazil;
- Snapper and Ginkgo Projects, Cristal Mining, Australia;
- Douglas and Hamilton, Iluka Resources Limited, Australia; and
- Cape Flattery Silica Mines, Australia.









## Relationships creating success



**Our experience in delivering equipment and services to mineral and silica sands customers ensures that we understand what's important to their success.**

We work hard to create and sustain valued relationships that enable our teams to fully understand, predict and deliver solutions that turn possibilities into reality for our customers.

### Grande Côte, TiZir

The Grande Côte mineral sands operation (GCO) in Africa, is the largest single dredge mineral sands operation in the world.

The opening of the GCO in 2014 marked the 13th year of our long association with the project which began with metallurgical testing of 100 tonne bulk samples in 2001.

Over the years our involvement expanded into further testing resulting in the development of process flowsheets to deliver optimum separation of Zircon and Ilmenite.

**Given our proven expertise in fine minerals separation and metallurgical knowledge of the ore body, we were engaged to design the WCP and specific process equipment including a 7,000 t/h Surge Bin and Tails Densification Modules. The WCP design incorporated our state-of-the-art high capacity spiral technology.**

Today, the Grande Côte project is a leading example of excellence in mineral sands separation, and through smart design and innovative technology is expected to continue through the anticipated 20-year life of the mine.

Testament to our relationship with GCO is the ongoing work that Mineral Technologies is doing to assist GCO to optimise the plant in a volatile market with evolving feed conditions.

### Terengganu Silica

Terengganu Silica's (TSC) beneficiation plant located in Setiu, in the state of Terengganu, Malaysia is Asia's largest silica resource.

The beneficiation plant consists of state-of-the-art equipment supplied by Mineral Technologies and plant design delivering breakthrough innovation in clean sand extraction. The fully automated beneficiation plant achieves consistent grades of high purity silica sand.

**Delivering a world class solution at a regional best price is a challenge that Mineral Technologies enthusiastically takes on and for TSC this was achieved through conversation and cooperation; seeking the 1+1>2 outcome.**







## Health and safety



**Zero Harm is embedded in our culture and is fundamental to our future success. We are committed to achieving our goal of Zero Harm.**

Zero Harm means sustaining a work environment that supports the health and safety of our people and minimises the impact our business has on the environment.

We work to eliminate all injuries by identifying and controlling hazards, protecting our people from exposure to health and safety risks, and supporting their general health and wellbeing.

**We recognise that working on critical infrastructure is like no other project. This is why our passionate safety culture, refined project management processes and collaborative approach help us deliver services while maintaining the primary focus of Zero Harm.**

We are continuously improving our management systems, and remain focused on managing risks with the potential to cause serious harm. We learn from our experiences, and develop our frontline employees with the commitment and capability to manage Zero Harm.

- **Leadership:** We listen, set clear expectations, develop and involve our people, and act with integrity;
- **Culture:** We have an aligned set of values throughout our organisation;

- **Systems:** Our approach is simple, robust and consistent across our businesses;
- **Hazards:** Our hazards are identified, assessed, controlled and monitored; and
- **Actions:** We learn from our experiences, and do what we say we will do, translating Zero Harm theory into good work practices.

We have placed a strong governance charter on Zero Harm to ensure the strategy and performance is developed, monitored and refined.

Our Executive Management Team ensures that we have the mandate, systems and processes in place to assist our people to deliver a Zero Harm environment.



## Our Promise

To work closely with  
using world leading







h customers to help them succeed,  
insights and solutions.

### **Diversity and inclusion**

**We are committed to ensuring that we have a diverse and inclusive workforce which fulfils our employees', customers' and shareholders' expectations, while also building a sustainable future for our business.**

#### **2017 – 2020 Action Plan**

To advance our diversity and inclusion efforts, the Engineering, Construction and Maintenance (EC&M) division has an established Diversity Taskforce which is responsible for implementation of the division's Diversity and Inclusion Plan 2017-2020.

The objectives for our Plan are focused on the following three key areas:

- Youth;
- Aboriginal and Torres Strait Islander (ATSI) workforce development; and
- Gender Equity.





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