



CARTLEDGE
MINING AND GEOTECHNICS

Specialising in pit-to-port and exploration to mine closure solutions, CM&G is a geotechnical consultancy delivering practical and innovative solutions to the civil and mining industries.

Our approach is grounded in geology and a detailed understanding of the ground conditions reinforced by a commitment to technical excellence ensuring we deliver value-driven, practical and safe solutions for our clients.

MINING

As mines access deeper and more complex reserves, a detailed understanding of the ground conditions is critical to developing safe and optimal mines. Cartledge Mining and Geotechnics (CM&G) approach is grounded in geology and a detailed understanding of the ground conditions backed-up by a commitment to technical excellence.

We provide geotechnical solutions for the mining life cycle from advisory services through to mining operations and infrastructure solutions for:

- Open Cut Coal;
- Underground Coal;
- Open Cut Metals; and,
- Underground Metals.

CM&G deliver a tailored approach where we examine closely the project and look to optimise the design and construction methodology. We provide practical and safe solutions that are cost effective while providing our clients with the knowledge they need to assist them in realising the best risk mitigation option for their project.

Our team of mining professionals provides flexible options for delivering whole-of-project strategic planning through to mine closure for bulk commodities, precious and base metals, and REE's. Our team have worked for large multi-disciplinary and small boutique consultancies, multi-national mining houses and research and development roles across the globe providing a valuable blend of practical and technical experience.

ADVISORY SERVICES

CMG provides a complete lifecycle advisory services to ensure clients obtain desired project outcomes. CMG's network of technical specialists are highly respected within the industry and have worked on world-class projects around the globe. Our services include:

- Strategic mine planning
- Input to project cost and risk assessment
- Third party review
- Technical due diligence
- Peer review
- Financial evaluation
- Development of ground models and rockmass characterisation

GEOTECHNICAL SITE INVESTIGATION AND GROUND MONITORING

CMG is experienced in the design, implementation and interpretation of surface and subsurface geotechnical investigations and ground monitoring. Our network is experienced in shallow investigations for mine infrastructure through to deep open cut and underground greenfield and brownfield projects. Our services include:

- Scheduling and interpretation of laboratory test data
- Geological, geotechnical and geomorphological mapping
- Design of ground monitoring instrumentation for pre-emptive and hazard management
- Innovation and optimisation studies
- Groundwater



STUDIES

From concept development through to bankable feasibility studies, CMG has the experience to provide appropriate level of detail solutions that satisfy our client's requirements. CMG's network of mining professionals are highly experienced in innovative solutions for multiple mining methods for our client's projects. Our services include:

- Mine infrastructure and linear project studies
- Selective versus bulk mining methods for hard rock environments
- Single seam and multi-seam mining methods for open cut and underground tabular deposits
- Numerical modelling 2D and 3D
- Geological structure interpretation

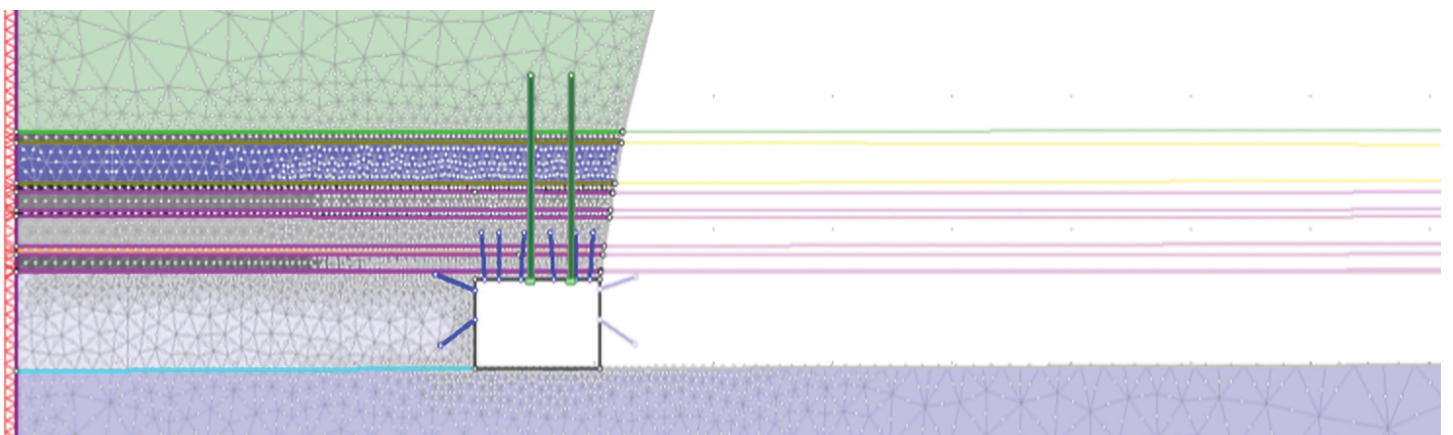
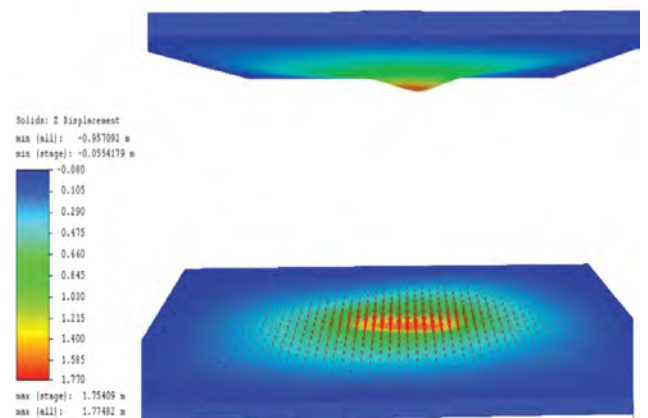
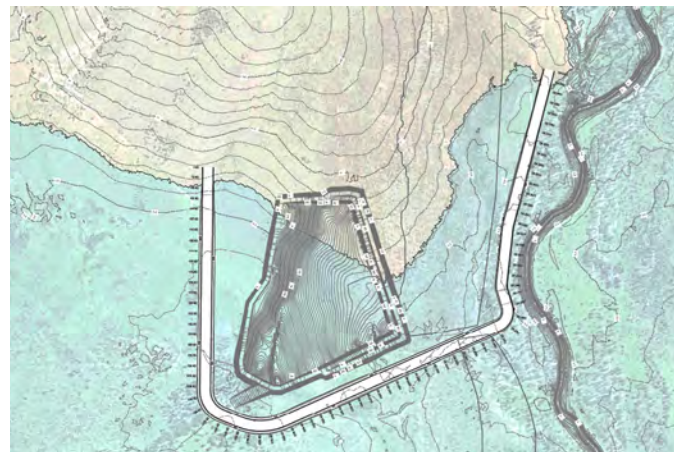
OPERATIONS

With a focus on maintaining close relationships with mining operations, our team ensure that our clients receive prompt, practical and cost effective solutions to support safe and efficient operations. Our services include:

- Emergency response and regular advice services
- Geotechnical hazard identification and awareness
- Development and review of GCMP's, PHMP's and TARP's
- RPEQ peer review of geotechnical designs
- Audit of site geotechnical standards and procedures
- Roof and rib support design optimisation
- Pillar design including stress relief 'yield pillars' and barrier pillars
- Longwall overburden caveability assessment
- Mine subsidence modelling
- Roadway, drift and decline failure mechanisms and design studies

MINE CLOSURE

We work with our clients to reduce remediation costs and develop innovative, stable long term geotechnical solutions that meet regulatory requirements.



CIVIL

As projects become more complex and delivery times shorten, understanding the ground conditions is critical to developing successful projects. Cartledge Mining and Geotechnics (CMG) provide geotechnical solutions for your project life-cycle from advisory services through to construction support services for:

- Road and linear projects;
- Residential developments;
- Commercial developments;
- Industrial developments;
- Dams and levees;
- Quarries; etc.

Our team of geotechnical professionals provide a flexible option to ensure our clients understand and manage geotechnical risk. CMG's network of technical specialists are highly respected within the industry and have worked on world-class projects around the globe.

SERVICES

Construction of large complex structures is key to delivering successful projects, CM&G's team understand the key drivers of mining projects, delivering practical and innovative advice that has saved our clients up to 75 percent of their construction costs. Our services include:

- Geotechnical site investigations and ground monitoring
- Geological, geotechnical and geomorphological mapping
- Development of ground models and rockmass characterisation
- Soil and rock cut slope design
- Foundation design
- Borrow investigations and construction material assessment
- Earthworks specifications
- Retaining wall design and remediation
- Pavement design





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