

# Tailings Management, Mine Closure & Rehabilitation

Capability Statement



COMPETENCY  
CAPACITY  
COMMITMENT

BG  
&E  
RESOURCES

# Acknowledgement of Country

**BG&E Resources acknowledges Aboriginal and Torres Strait Islander peoples as the first peoples of Australia and the Traditional Owners and Custodians of lands and waterways on which we work and live.**

**Our operations are conducted on the traditional lands of the Whadjuk people of the Noongar nation in Perth, the Bindjareb people in Mandurah, the Larrakia people in Darwin, the Kurna people in Adelaide, the Gurambilburra Wulgurukaba, Bindal, Nywaigi, and Gugu Badhun peoples in Townsville, the Turrbul and Jagera peoples in Brisbane, the Awabakal people in Newcastle, the Gadigal people of the Eora nation in Sydney, and the Wurundjeri and Boon Wurrung peoples of the Kulin nation in Melbourne.**

**We honour the wisdom of, and pay respect to, Elders past and present, and we acknowledge the cultural authority of all Aboriginal and Torres Strait Islander peoples across Australia.**

**We also acknowledge the vital contribution made by our Aboriginal and Torres Strait Islander employees and we thank those who have guided our approach and generously shared their insights.**

Image: Aboriginal artwork created by Jayda Sebire (Indigenous Artist and former BG&E Resources People and Culture Assistant).  
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# Optimising Tailings Storage Facilities and Managing Mine Closures and Rehabilitation

BG&E Resources (BGER) is a multidisciplinary engineering, design, project delivery and advisory consultancy, providing technical solutions for clients in the Resources, Energy and Industrial sectors.

With offices on the East and West coasts of Australia, we are majority owned by our employees and committed to helping clients decarbonise in a net zero economy.

Our fit-for-purpose engineering solutions enable mining and raw material proponents, energy and water utilities, and port authorities to optimise the performance of their assets, minimise operational disruption, improve safety and mitigate risks.

BGER's proven approach to deliver schedule and cost benefits through clever engineering and true collaboration is what sets us apart.

Our people pride themselves on providing smart and sustainable solutions to complex engineering problems; and importantly, on being great people to work with.





# Technical Excellence

## Our people are passionate about leveraging their technical ingenuity to solve complex problems.

Technical excellence is the bedrock of our business. It drives our people and propels the outcomes that we provide for clients, communities, asset owners and operators, and financiers.

Our dedicated professionals and subject matter experts focus on understanding our clients' business objectives, their desired project outcomes, as well as the latest industry research for the sectors in which we operate.

### A Premium Client Experience

The success of our project work depends on leveraging the best expertise of our people. That's why we allocate the most qualified professionals to help realise our clients' development vision and bring their projects to life.

Our work is underpinned by strong engineering design principles, industry-leading technology and pragmatic advice to deliver exceptional outcomes, every time.

This approach provides the following benefits:

- Ease of understanding of regulatory frameworks
- Efficient navigation through the development approvals process
- Protection and preservation of our cultural heritage, the environment and waterways
- Healthy, transparent and trusted relationships are established with stakeholder groups
- Respectful liaison with Traditional Owners is undertaken
- Fair and equitable outcomes are achieved for First Nations' communities
- Project knowledge is retained, including lessons learned
- Innovation is embraced and deployed.

### Technical Leadership Team

The quality and excellence of our world and ability to deliver the best technical and cost-effective solutions for our clients is guided by our Technical Leadership Team.

Led by the most senior members of our business, this team facilitates learning and knowledge transfer, professional collaboration and mentorship to drive continuous excellence in our technical capabilities. It also encourages our people to perform to high technical standards and rewards staff for incorporating innovation into projects.

Image: Steve Ash and Kanishka Pathirana at Paraburdoo Train Load Out Facility, Pilbara WA.



# Safety is at the Heart of our Business

**Our diverse and culturally aware teams embrace safe work practices that are environmentally sound.**

Safety is integral to everything we do at BG&E Resources. We care about our people, clients, and the communities in which we operate, and strive for zero harm in everything we do.

Health, safety and quality are embedded in our work practices, while heritage and sustainability are considered throughout the entire project life cycle.

We recognise the importance of continuously reviewing safety in design issues at all stages of a project, from investigation, design, construction, operation (including maintenance), closure and rehabilitation.

Exceeding regulatory obligations, we leverage a formalised Health, Safety, Environment and Quality Management framework that allows us to analyse and implement practical measures to mitigate risks.



## Leadership

- Understanding of client needs
- Technical Leadership Team governance
- Strong Chartered presence
- Adherence to Technical Standards & Regulatory Instruments
- Committed to Technical Excellence
- Striving for low-carbon impacts



## Systems

- ISO Accredited Quality Management System (QMS)
- Design Assurance
- Engineering Verification Procedures
- Safety in Design
- Net Zero in Design
- Risk Mitigation & Management
- Project Governance (Action Tracking, Monitoring, Performance & Auditing)
- Continuous Improvement (Lessons Learnt)



## Characteristics

- Client Centric
- Risk Adverse
- Reliable
- Accountable
- Innovative
- Simplification
- Community & Culture



Image: Lucy Nguyen at Cape Lambert Port Facility, Karratha WA.





Image: Indigenous peoples' hands. Copyright approved via Shutterstock.

# Respecting, Protecting and Preserving our Cultural Heritage

## Diversity across our workforce and our supply chain is vital.

Our clients trust in our ability to enhance their social license to operate, including through the provision of mutually rewarding cultural heritage consultation and management, healthy Indigenous partnerships, and ethical procurement from Aboriginal-owned and operated businesses.

Working with Traditional Owners, First Nations peoples, Indigenous Prescribed Body Corporates and Aboriginal Corporations, is seeded in early engagement as it enables our team to deliver benefits for today (across the life cycle of proponents' projects) and for future generations.

Early engagement underpins our approach to cultural heritage management as it enables us to understand the needs and desires of all stakeholder groups, as well as any existing Indigenous Land Use Agreements (ILUAs) which have been registered with the National Native Title Tribunal (NNTT).

We partner with highly experienced local archaeologists and ethnographic specialists to provide clients with access to an abundance of heritage site data, and to collectively undertake walk-throughs of proposed project sites.

From the Kimberley in the North to Esperance in the South of WA, across central Australia and along the Eastern seaboard – we engage with Traditional Owners and Custodians, Prescribed Body Corporates (PBCs), Aboriginal development corporations and First Nations communities to preserve their cultural heritage and when helping proponents and/or government agencies to deliver projects.

### Cultural Heritage Management Capabilities

- Stakeholder consultation and engagement to help Traditional Custodians of the land and Native Title Claimants to establish IULAs, registration to the NNTT and compensation frameworks (among others).
- Advice for proponents regarding the application of legislation including the Native Title Act 1993, Heritage Act 1972 (Aboriginal Cultural Heritage Bill 2021) and Repeal Bill 2023.
- Developing scopes for archaeological and ethnographic surveys.
- Indigenous business contracting (including teaming with Aboriginal-owned and Supply Nation-certified businesses to develop First Nations regional workforces).
- Capacity building (including coaching, mentoring and career pathway development, etc. for First Nations peoples).
- Reconciliation Action Plans.

### First Nations' Partnerships

We have a range of actions in place to increase Aboriginal and Torres Strait Islander employment and engagement in our business, to help First Nations communities become self-sustaining (current participation is approximately 1.5 per cent of our workforce and we are striving to increase that to three per cent by December 2025).

We proudly support Aboriginal and Torres Strait Islander owned businesses and have established a majority-owned Aboriginal company, TICS (WA) Pty Ltd (TICS). TICS is a NATA-accredited laboratory to ISO 17025, providing nondestructive testing (NDT) services.

Similarly, we have strategic partnering arrangements with several Aboriginal-owned businesses, including Karlayura Contracting, which provides design and construction support for clients.

We have also established a similar partnering agreement with i24s, an Aboriginal-owned and operated workforce company, providing security, civil works and commercial cleaning services for mine sites in remote locations across Australia, as well as for commercial premises in capital cities (their clients include BHP, Horizon Power and Cundaline Resources, among others).

Most recently, we also established a partnership with Pirrpala, a 100 per cent Aboriginal-owned and operated small scale project delivery provider.

Our partnerships also span the globe, specifically in China, for the procurement of equipment and professional services, including on Country inspections of fabrication, testing, compliance and design reviews.

### Reconciliation

Review our [Innovate Reconciliation Action Plan](#), [Aboriginal and Torres Strait Islander Engagement Strategy](#), [Human Rights Statement](#) and [Anti-Discrimination Policy](#).



# Tailings Storage Facilities (TSFs)

**Offering an integrated approach to managing tailings and mine waste for minerals across the full life cycle of TSFs including meeting all standards - GITSM, TSM and others.**

Our experienced ground engineering specialists collaborate with our clients to create holistic solutions at any stage of the life cycle of TSFs. This is achieved by developing a thorough understanding of the specific risks and hazards of your site.

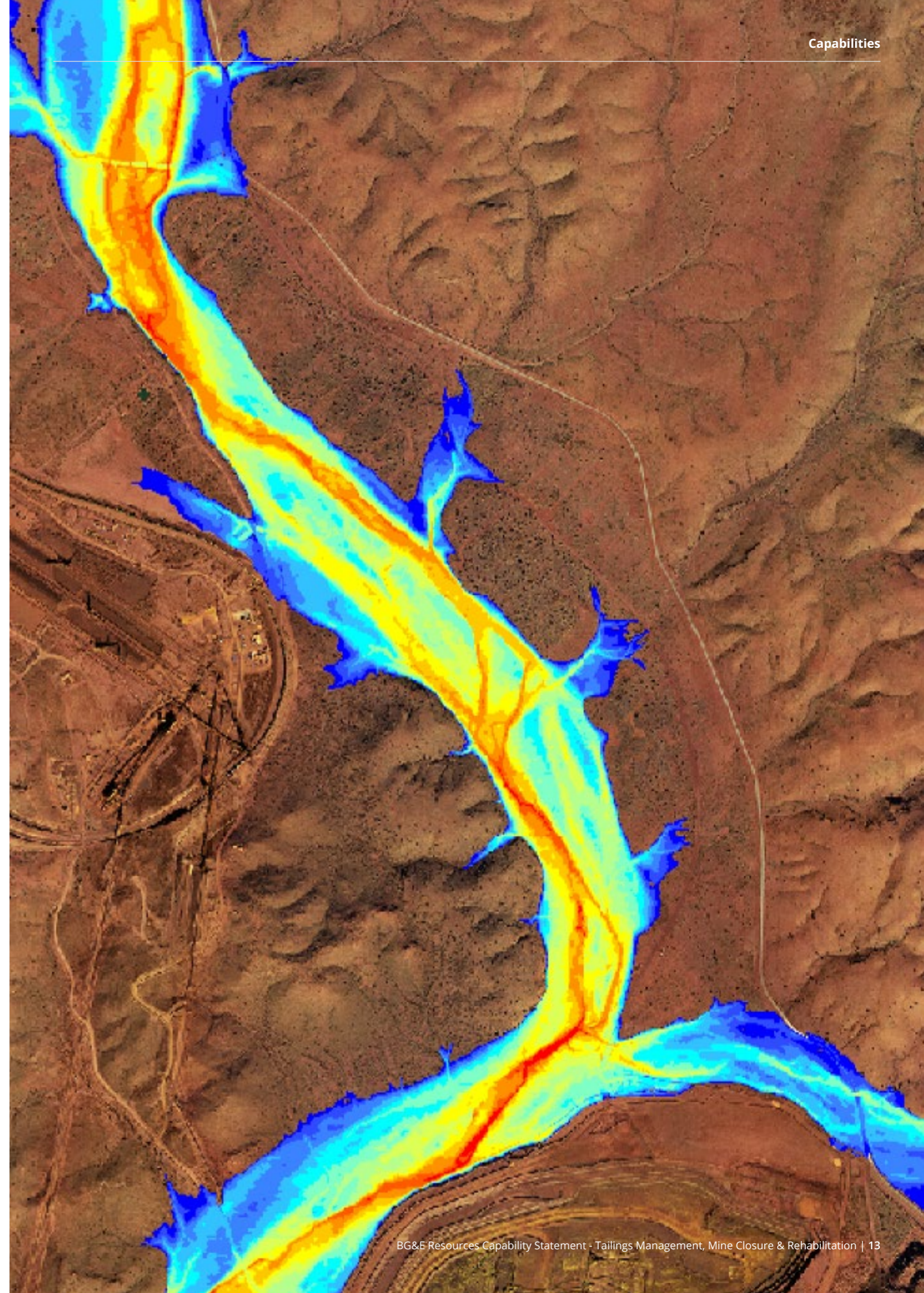
Our expertise with tailings includes hydraulically-placed slurry, thickened paste and filtered dry stack operations. Our designs consider the overall site-specific constraints and opportunities for optimal disposal, such as upstream, downstream, centerline, and integrated waste landforms or in-pit disposal.

BGER provides multidisciplinary services integrating geotechnical, environmental, civil, hydrogeological, process, pumping and piping, electrical and structural engineering as well as ESG advisory for the successful delivery and management of your TSFs.

We take this one step further, providing education to operate your TSFs and advice for compliance with key standards - the Global Industry Standard on Tailings Management (GITSM) and the Towards Sustainable Mining (TSM) framework adopted by Mining Council of Australia members.

We partner with specialist organisations such as Tailcon, Hydrogeochem Group, and Landloch to integrate the very best advice, approaches and frameworks into our solutions.

Image: Flood Modelling.





# Pumping & Piping Engineering

## Specialising in mineral and chemical process pumping and piping engineering.

BGER offers a wide range of expertise in both brownfield and greenfield projects including detailed engineering design, assessment of existing pump and piping assets, construction support and process design.

Our experience spans the full suite of water and slurry transfer projects including marine works, bore fields, raw water, wastewater and process water handling.

### Capabilities

- Slurry Pumping and Piping Systems
- Water Pumping and Piping Systems
- Computational Fluid Dynamics (CFD) using ANSYS
- Settling Velocity Calculation
- Network Analysis using Fluid Flow Software
- Site Troubleshooting
- Slurry Storage Tank Design
- Oxygen Injection Recirculation Circuits
- Thickening and Filtration Circuits
- Multistage Pumping Systems - Series and Parallel
- Chemical Storage and Dosing Systems
- Fire Water Systems
- Process Plant and Infrastructure
- Air, Water and Wastewater Services
- Gravity Flows and Launder Designs
- Tails Pumping System

Image: Pumping Station, WA.



# Mine Closure & Rehabilitation

**Providing an integrated approach to managing mine closure and rehabilitation across the full life cycle of mining operations to leave a positive legacy.**

Alongside managing TSFs, we help our clients with closure plans which extend past the operational stage of when mining ceases and decommissioning is complete. This includes defining post-mining management such as rehabilitation and relinquishment to support the communities where you operate including First Nations.

BGER provides multidisciplinary services integrating all engineering and ESG capabilities for the entire mine closure process – from early planning to progressive rehabilitation during operation and culminates with final decommissioning, rehabilitation and relinquishment.

Considering the mining industry's ambitions to achieve net zero emissions by 2050, our experienced professionals work closely with our clients, collaborating to plan and action land and water stewardship as well as rehabilitation.

By leveraging cutting-edge technology, approaches and frameworks, we apply circular economy principles to closure and rehabilitation – to help our clients maintain their social licence to operate, reduce risks and deliver on their ESG goals.

## Capabilities

- Landform Design
- Closure Support
- Cost Estimation & Provisioning
- Risk Assessments & Gap Analysis
- Water Quality Assessment & Management
- Stakeholder Engagement Strategies including Cultural Heritage Management
- Groundwater and Hydrogeology
- Mine Waste Characterisation
- Soil Assessments
- Geospatial Modelling, GIS, UAVs
- Integration of Closure & Rehabilitation Plans into LoM Plans
- Rehabilitation Advice and Supervision

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# Projects

Our team's experience spans decades of successfully delivering cost-effective, low residual risk TSFs, as well as managing mine closures and rehabilitation across Australia and Africa.





Image: Mulga Downs, WA.

# Mulga Downs TSF

Client: HanRoy

**HanRoy sought our advice for site selection with a number of critical siting constraints including Traditional Owner sites of significance, environmental wetland receptors and mine planning scenarios.**

Dam break studies were undertaken to ensure residue was not likely to reach and impact environmentally significant wetlands.

**Outcomes**

This project involved the assessment and selection of a preferred site and disposal option after consideration of operational, environmental and heritage constraints.

Our team designed the main embankments with consideration for the use of mining equipment only with limited or no access to heavy civil construction equipment using dirty waste rock material for the main embankment.



Image: Mardie Salt Project Pilbara, WA.

# Mine Closure & Rehabilitation

Client: Undisclosed

**One of the world's largest mining companies has sought our advice for a scheduled mine closure plan.**

**Outcomes**

Our solution involves the closure of a residue pond closure and progressive rehabilitation of the land.

While the end of mining is not expected until later this decade, our client is rehabilitating the mine site and ensuring activities are planned, implemented and regulated to create a sustainable future for the Traditional Owners and broader region



# Mt Marion TSF

Image: Mount Marion, Goldfields WA.

Client: Mineral Resources

We developed a TSF Operating Manual for an existing in-pit disposal site in consideration of new environmental operating requirements and the practical needs of the Operations team on site.

Change management was required to address some of the new compliance requirements and historical disposal activities.

Change of project Engineer of Record part way through the process caused some disruption and delays to project delivery.

**Outcomes**

A live tailings operations manual was developed following facilitated meetings between the Operations, Environmental and Corporate management teams.

The site is now operating under the new manual with no identified issues.

# Ravensworth, Bayswater and Liddell TSFs

Image: Liddell Power Station, courtesy of AGL Energy.

Client: Undisclosed

AGL faced characterisation of cenospheric fly ash and bottom ash for seismic and static liquefaction risk using field and laboratory testing techniques.

**Outcomes**

We designed the final TSFs with extremely low post liquefaction and residual strength ash tailings. This project involved cutting-edge critical state characterisation of the differing ash streams sampled from each site to assess long term stable slopes and final acceptable closure profiles.





# Current and recently completed projects

## Tailcon projects

To provide end-to-end services for our clients' TSFs, BGER has partnered with Tailcon, an organisation with specialist expertise in the operation and management of TSFs including education and knowledge transfer.

### Lucapa Diamonds

Mothae Diamond Mine (Lesotho) – TSF and Raw Water facility detailed design, construction supervision, technical monitoring and review, and annual auditing.

Lulo Diamond Project (Angola) – TSF Detailed design, construction supervision, technical monitoring and review, and annual auditing.

Merlin Diamond Mine – Feasibility study design for LOM TSF and return water facility.

### South32

Cannington Mine – EOR.

Worsley Alumina – BRDA deposition review, operations training, OMSM, TMP and EPRP.

Pantoro South – Norseman Gold Operation – TSF development plan, concept and detailed design, construction supervision.

### Westgold Resources

Fortnum Gold Operation – TSF detailed design, construction supervision, technical monitoring, and annual auditing, "In Pit" detailed design, construction supervision, technical monitoring, annual auditing, LOM TSF planning.

Southern Kalgoorlie Operation – In pit TSF cyclone design.

### Hall Creek Mining

Lambo Gold mine – TSF concept design, option assessment, detailed design, and construction supervision.

### Evolution Mining

Group tailings facilities – Group head tailings management.

### CMOC

Parkes Mines – TSF technical review, LOM TSF disposal options, cyclone option assessment and project management.

### AIC Mines Limited

Eloise Copper Mine – TSF technical review and LOM disposal options.

### Future Gold Resources

Bogoso-Prestea Gold Mine (Ghana) – TSF technical review.

### Citic Pacific Mining

Sino Iron – TSF construction supervision, deposition modelling, LOM waste options, TSF option study review and mine infrastructure design.

### Silver Lake Resources Limited

Deflector Gold Operation – Project and construction supervision.

### Monument Mining Limited

Selinsing Gold Mine (Malaysia) – TSF detailed design, deposition planning and technical review and monitoring.

### Anglo American

Unki Platinum Mine (Zimbabwe) – Return water dam construction supervision.

### Pensana Metals

Longonjo Rare Earth Project (Angola) – TSF design review and accelerated mechanical consolidation study.

### Jubilee Metals

Roan and Sable Projects (Zambia) – TSF annual audit.





# Our Experts



**Jason Fong**  
Director - Geotechnical

30 years of extensive experience as a geotechnical engineer in the geotechnical aspects of long linear infrastructure including planning (geotechnical constraints), site investigation, construction materials assessment and geotechnical design of slopes, retaining structures, ground improvement and foundations.



**Derrick McKenzie**  
Director - Tailcon

Derrick is a Chartered Engineering Technologist (CEngT) and has been involved in Tailings dam design, construction, monitoring, operations, and closure with 28 years of experience fulfilling different Management, Technical and Executive portfolios within the Mining Services and Construction industry. Specific areas of experience include TSF construction, operations; concept and detailed design, hydraulic re-mining, bulk materials handling and corporate governance.

Derrick is currently involved in a range of tailings projects for gold, diamonds, bauxite, copper and rare earth.



**Gary Wills**  
Director - Tailcon

Gary is a Professional Engineering Technologist (PR Tech Eng) and has been involved in Tailings dam construction, design, operations, monitoring and closure with 25 years of experience fulfilling different Management portfolios within the Tailings and waste industry. Specific areas of experience include TSF construction, operations, auditing, planning, project management and construction management.

Gary is currently involved in a range of tailings projects including gold, diamonds, bauxite, rare earth, phosphate, manganese and iron ore.



**Hugo Acosta-Martinez**  
Technical Director - Geotechnical

Hugo has 29 years of consulting experience including geotechnical site investigation, mining infrastructure, analysis and design of foundations for buildings, retaining structures for deep excavations in soft soils, heavy haul railway infrastructure, marine structures, industrial facilities, bridges, pipelines, slope stability and landslide risk assessment.

Hugo has worked on tailings projects for iron and coal ash and has a strong knowledge of material characterization of tailings materials for liquefaction and stability assessment. He is also familiar with the ground conditions of the project area and other regional areas of NSW from involvement in various solar farm and renewable energy projects.



**Pak Chong Law**  
Principal Geotechnical / Tailings Engineer

Pak has 30 years of international consulting experience in construction and geotechnical engineering. His experience includes projects in Australia and abroad. He was involved in the project planning, project management, as well as design and construction of a wide range of projects including tailings storage facilities, mining infrastructures, power plants, reclamation projects, petrochemical plants, ports and airports, shipyards, foundation and basement excavation of high-rise buildings, railways, highways, pipelines and slope stabilisation.



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BG&E Resources is a multidisciplinary engineering, design, project delivery and advisory consultancy, providing technical solutions for clients in the Resources, Energy and Industrial sectors. We are majority owned by our employees, who are united by our purpose – together, we embrace innovation to solve complex problems, for today and future generations.

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