

Mechanical Engineering

Capability Statement



Acknowledgement of Country

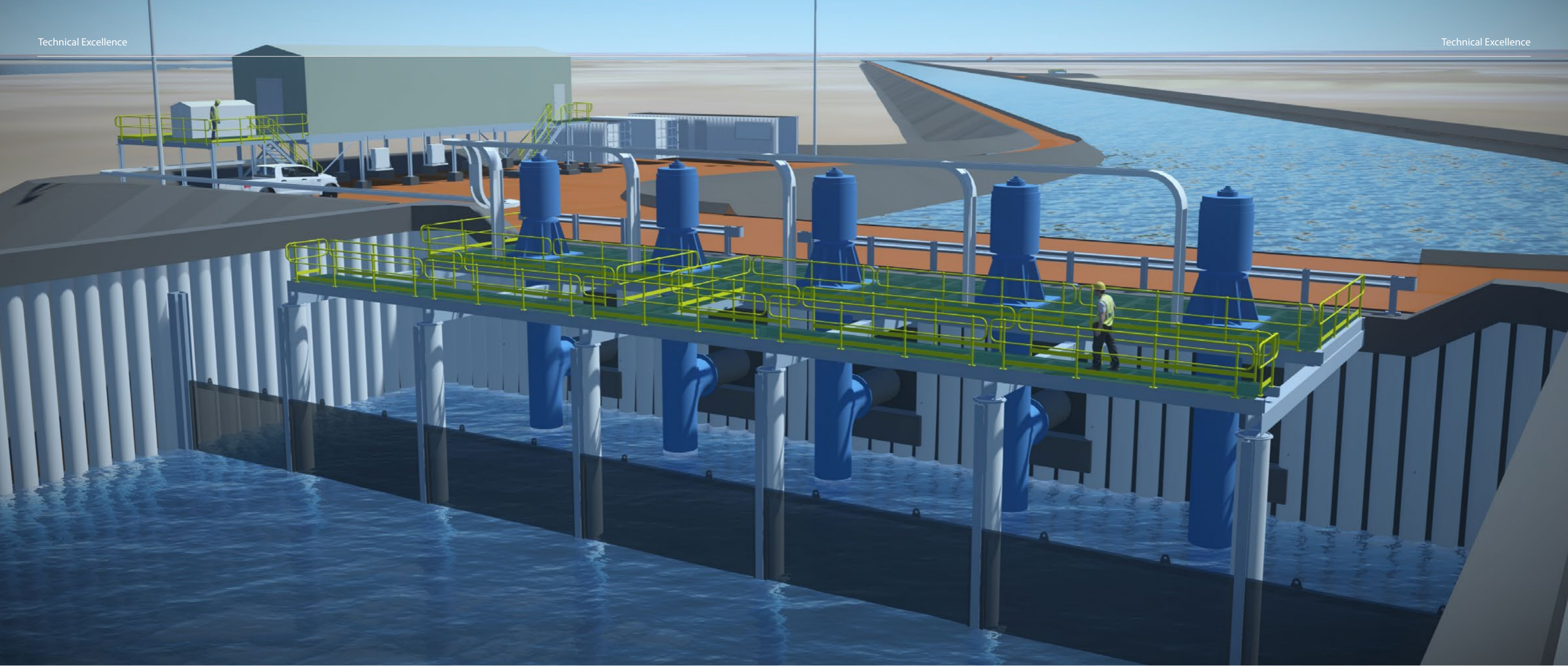
BG&E Resources acknowledges Aboriginal and Torres Strait Islander peoples as the first peoples of Australia and the Traditional Owners and Custodians of lands and waterways on which we work and live.

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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Mechanical Engineering and Design for Asset Optimisation

BG&E Resources (BGER) is a multidisciplinary engineering, EPCM and ESG consultancy, delivering 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 non-destructive 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](#).

Mechanical Engineering

Drawing on our consolidated experience, we provide client-centric mechanical engineering services for small and large projects.

Delivering projects on time, on budget and to our clients' expectations is at the core of our mechanical engineering services. We focus on optimising designs for operability, maintainability, durability, adaptability and resource efficiency.

Capabilities

- Bulk Material Handling Design
 - Overland Conveyors and Transfer Conveyors
 - Crushing, Screening
 - Train Load Outs
 - Stockyard Design
 - In Loading and Out Loading Systems Including Stacking, Reclaiming and Car Dumpers
- Wet Process Plant Design
 - Slurry Pumping and Piping Systems
 - Computational Fluid Dynamics (CFD)
 - Process Water Pumping and Piping Systems
 - Tank Design
- Non-Process Infrastructure
 - Workshops, Offices and Camps
 - Services Design Including Fuel Systems, Lubrication Systems, Compressed Air, Sewer, Potable Water, Fire Systems and Water/Sewerage Treatment
 - Bore Systems and Overland Piping
- 3D Modelling, 3D Scanning, 2D Drawing Production and Shop Detailing
- Finite Element Analysis (FEA)
- Debottlenecking and Optimisation Studies
- Integration of Vendor Equipment
- Asset Inspection and Testing
- Mine Dewatering
- System Analysis and Troubleshooting



Pumping and Piping Engineering

Specialising in mineral and chemical process pumping and piping engineering.

BGER has a longstanding track record in 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 large bore water and slurry transfer projects including marine works, bore fields, raw water, wastewater and process water handling.

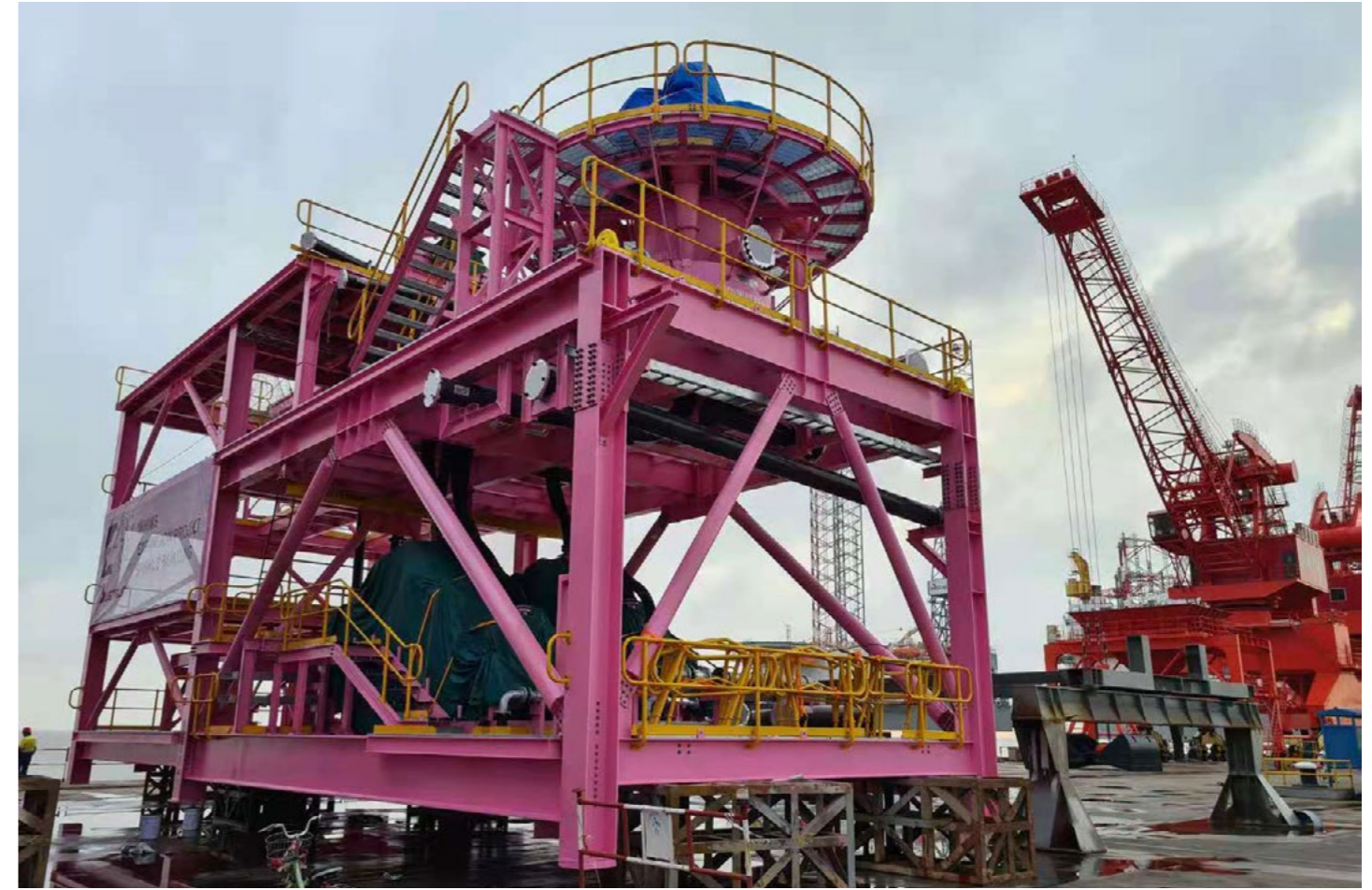
We use the latest technology, software applications and inhouse methodologies to complete complex calculations and analyses as required, depending on the individual project requirements.

Our team has a deep understanding of the potential issues with pumping system installations, having been involved with numerous plant commissioning and start-up activities, as well as investigation into pump operations.

Capabilities

- Slurry Pumping and Piping Systems
- Computational Fluid Dynamics (CFD)
- Process Water Pumping and Piping Systems
- Settling Velocity Calculations
- 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
- TSF Pumping System
- Gravity Flows and Launder Designs





Project Phases

Our Mechanical team offers services throughout the project life cycle covering concept, PFS, FS, Detailed Design through to construction and commission support.

Capabilities

- Concept Studies
- Pre-Feasibility Studies
- Bankable Feasibility Studies
- Front End Engineering Design
- Detailed Design
- Independent Review
- Construction Support
- 2D & 3D Design

Projects





Stanley Point 3 Port Expansion

Client: Roy Hill

We have played a key role in the expansion of one of the largest bulk commodities ports in the world, completing three engagements to date.

To support the long-term strategic planning of its existing mine and port infrastructure, Roy Hill commenced the detailed design phase of the proposed Stanley Point 3 Port Expansion Project to increase the current export capacity from 60-64 Mtpa to 102 Mtpa.

BGER was engaged to provide a range of multidisciplinary capabilities including civil, structural, mechanical, and electrical engineering.

Concept Engineering Study

We have completed this study and determined optimal solutions for magnetite handling from within the Ridley Development Envelope at Port Hedland, and into the Stanley Point 3 shiploading circuit.

As part of this study, our team provided a detailed assessment of the options including identifying and developing feasible conveying and transport routes. They also undertook a high-level assessment of the proposed assets and identified mitigation measures to prevent issues relating to handling the higher-density product.

Feasibility Study

Further to the Concept Engineering Study, we were asked to complete the Feasibility Study. Our team incorporated sufficient engineering definition (15%) to support a Class 4 cost estimate for a base case integrated stockyard and split yard solution.

Progressive delivery combined with 3DEGlobal's Indian Design Modelling Centre was effectively utilised to facilitate rapid development of the design documentation in an aggressive 16-week schedule to achieve the Financial Investment Decision milestone.

Energy & Power Feasibility Study

Our third engagement on this project helped to determine the overall power and energy demand for the new infrastructure planned for Berth 3.

The BGER NetZero in Design™ approach was integrated throughout the project life cycle to enable Roy Hill to achieve its targets as efficiently as possible.

Engineering design and approvals are now well advanced for the Stanley Point 3 expansion, which will support the rising demand in exports in the coming years for the global energy transition.



Last Cars Indexer

Client: Fortescue

The indexer utilises hydraulic cylinders to actuate a wheeled trolley running on guide rails with ‘dogs’ that extend upwards to engage on the wagon wheel axles.

Fortescue would like to install an Outgo indexer to train unloader number 1 at Anderson Point Port South of Port Hedland. The indexer will be used to spot the last two wagons in a rake in the car dumper and will also be used as a back-up indexer in the event of a break down occurring on the main indexer. This will eliminate the requirement to have 2 ‘compressor’ cars attached to the end of each train.

Our Mechanical team provided suitable mounting structures for the indexers and associated equipment, and the integration of this equipment into the existing tippler control and plant control systems.

Owner’s Engineer & QS Services

Client: Fortescue

We acted as the Owner’s Engineer during the design and construction phase of Fortescue’s Green Energy Manufacturing Centre (GEM) - Electrolyser Facility Stage 1.

We helped Fortescue develop its GEM Centre in Gladstone, a world-class electrolyser facility with an annual output capacity of 2 GW per annum.

Our team worked closely with Fortescue’s project team to provide multidisciplinary reviews throughout the design phase to ensure adherence to scope.

We also provided ongoing engineering and design support throughout the construction stage including quantity surveying.



FI LRP2 Substation AC Replacement

Client: BHP

We helped to modify the existing ductwork reticulation to cater for new switchboards that were installed in the substation at Finucane Island in Port Hedland.

The Air Conditioning (AC) units serving the LRP2 Substation were nearing the end of their useful economic life and needed replacing.

An initial design was completed to replace these units and associated infrastructure including ductwork and fittings, a structural platform on which to install the proposed new roof top type packaged AC units, associated electrics, and controls provisioning.

Our Mechanical team delivered an update to the existing 3DM design model with new ducting design and existing mechanical drawings to ensure the new system would pressurise the substation as per requirements.



Ultrafines Detailed Design WHIMS 1.5

Client: Roy Hill

Ultrafine recovery is extremely important for incremental tonnage costs, grade quality and extending the mine lifespan.

BGER provided detailed design to optimise ultrafine product recovery at the Roy Hill Processing Plant.

While remaining under budget and on scheduled, we identified opportunities to reduce concrete volumes by 30-50%, improve operability by lowering the complexity of pipe supports and simplifying transformer compound construction with a tilt-up solution.

Our Mechanical team delivered pump designs, hoppers and tanks, piping support and piping and instrumentation diagram (P&ID).





ROM 4 Crushing Station 5

Client: Roy Hill

The crushing station is an evolution of the commissioned ROM 3 crushing station designed by BGER in 2020.

Our team was further engaged to complete the detailed design of the ROM 4 crushing station 5 facility. With an upgraded annual capacity of 34.1mtpa, we designed the facility to cater for larger haul trucks.

Structurally, the ROM 4 facility design is based on similar integrated supporting structures to those completed for ROM 3. However, it was evolved to utilise modularised large 'building blocks' similar to those used in the ship building industry.

The modules were designed to achieve compressed fabrication and construction programmes with a substantial reduction achieved in on-site man hours.

Our mechanical team incorporated these items into the design:

- Smaller material top size to improve crusher performance and reduce impact on equipment
- Hydraulic pump apron feeder
- Vibrating grizzly screen
- Jaw gyratory crusher



Paraburdoo Tertiary Hydrocyclones Plant

Client: Rio Tinto

To improve Fines Further Processing Plant (FFPP) recovery, Rio Tinto sought our assistance for future recovery of high-grade SOP of the operational life in the Paraburdoo Tailings Storage Facility (TSF).

BGER has executed the study for the proposed tertiary cyclone process plant upgrade at Paraburdoo.

There is a significant opportunity to recover alternate size range particles from future plant feed. Recovering this material will decrease plant per/ton operation costs, increase production and reduce Life of Mine (LOM) TSF costs.

Installing this process infrastructure will also enable increased potential for future recovery of high-grade SOP that has been deposited over the course of the operational life in the Paraburdoo TSF.

The tertiary cyclone project aims to improve plant recovery, through improvement of fines production, reducing per ton operation costs and decreasing LOM capital costs.

Overland Conveyor Belt Change Facilities

Client: Rio Tinto

We developed a low-risk belt replacement solution on Rio Tinto's longest overland conveyors to minimise lost production and lower impacts on existing road networks.

We supported Rio Tinto through multiple project phases that included option identification, optioneering, equipment selection and detailed design through to implementation and close out support for the Overland Conveyor (OC) replacements at Western Turner Syncline (WTS). We provided multidisciplinary services spanning civil, structural, mechanical and electrical engineering.

Our scope of work encompassed the suitability and modification of belt changeout sites and the design of belt reeling platforms, splicing stations, clamp stations and belt flaking layouts for the four overland conveyors and the stacking conveyor, including auxiliary belt pulling drives specific for the changeouts.

During the WTS1 greenfield project construction phase, cost optimisation led to the OCs being constructed without belt replacement or belt splicing facilities. Since installation in 2014, these belts had not been replaced and were approaching their end of usable life.

In particular, the CV2104 conveyor belt which is 12 km long (25 km tape length) and the longest in the company's fleet is a critical component for both plant and production operations. Rio Tinto required a solution to allow these belts to be replaced according to their planned maintenance schedule which involved years of pre-planning.

Image: Western Turner Syncline, Tom Price WA.

Through our involvement over the past 4-5 years, BG&E Resources (BGER) identified an innovative approach to develop layouts that maximised the efficiency of the belt replacement and minimised impacts on existing road networks.

Tony Daniel, Program Manager – Sustaining Capital says, “This allowed the rest of the plant to continue operating during belt changeout, minimising the risk of lost production and work required during shutdowns.”

The low-risk solution optimised belt changeout to simplify earthworks, eliminating the need to source fill materials as well as reducing risk to ethnographic sites. By developing a relocatable solution, the scope of the project was optimised, thereby removing the need for the fabrication of duplicate items and overland power supply by utilising portable, temporary power controls.

“This complex multidisciplinary brownfield project is a testament to BGER's commitment to delivering high quality sustaining capital works,” adds Tony.



Our Mechanical Engineering Team



Tony Comerford Technical Director

25 years of experience in technical engineering delivery, project, construction and commissioning management with a diverse background covering metals processing and refining, chemical plant, port facilities and industrial projects. Tony is experienced in alternative project contract delivery models from client and contractor delivery sides including alliances for sustaining capital and maintenance projects.

Joe Allen Director of Operations

15 years of experience in design, construction and operation of process plants with diverse experience across mining, power generation and infrastructure projects. Joe has proven experience in leading teams through all scales and phases, having overseen projects across Lithium, Power Generation and Water. His skills include concept studies and layout development, and capital cost estimates for complete project lifecycle.

Jamie Cigulev Discipline Lead - Mechanical

10 years of experience in conveyor, piping and non-process infrastructure in the iron ore, gold, rare earths, lithium and industrial chemical sectors. He has a broad range of skills in delivering a variety of brownfield design projects and managing multidisciplined teams. Jamie's focus is on delivering projects which exceed the expectations of clients whilst meeting budget and schedule requirements.

Andrea O'Brien Project Manager

10 years of experience in engineering and project management in Ireland and Western Australia. Andrea has an excellent understanding of industry standards and outstanding project management skills. Her systematic approach and attention to detail allows her to exceed the expectations of clients including Rio Tinto and FMG.

Mark Todd Principal Mechanical Engineer

22 years of experience in mechanical engineering spanning both operational and engineering design-based roles. Mark is an industry leader in the delivery of materials handling solutions. Mark strives to simplify mechanical systems ensuring the solution implemented is cost effective, easy to maintain and operate to provide the client with the best possible facility.

Todd Molloy Lead Mechanical Engineer

17 years of experience in engineering, procurement and construction management (EPCM). Proven experience as a Structural/Mechanical/Piping (SMP) Field Engineer during the construction of a multi-billion dollar project. Todd has been involved in a variety of projects and roles from large scale iron plants through to infrastructure projects, pipelines and mine dewatering roles.

Our Mechanical Engineering Team



Tony Daniel
Program Manager - Sustaining Capital

10 years of experience in design and project engineering both in the engineering office and field environments. Tony's roles have included a broad range of activities in Greenfield and Brownfield contexts. He has undertaken field-based assignments that entail the management of multiple, concurrent sustaining capital and production improvement projects within operating facilities.



Matt Moreland
Engineering Manager

10 years of experience working in the mining, minerals processing and oil and gas industries. Matt has extensive experience in mechanical design, operations, maintenance, repair and upgrade of complex utility and processing equipment. He has undertaken projects for BHP, Rio Tinto and FMG; designing and constructing reagents packages, conveying systems, processing equipment and compressed air and gas separation packages.



Gary Bingham
Design Manager - Mandurah

18 years of design, detailing and site experience, Gary has been exposed to a wide range of materials handling and wet plant operations, in both brownfield and greenfield projects. Gary is a strong advocate for smart and effective design which promotes operability and safety while working within strict budgets. His passion for technology in design enables him to meet and exceed client expectations through 3D modelling and visualisation.



Kieran Maher
Design Manager

16 years of experience in structural design and detail drafting experience across the commercial, industrial and mining industries. His experience includes on-site experience working with brownfields projects, producing detailed design drawings, as well as developing scopes and providing technical support to clients.



Michael Ullrich
Study Lead

25 years of experience in the mining industry including management and engineering roles. Michael has completed various mining operations including underground and open pit mining, processing and mining supporting infrastructure. Projects undertaken cover a wide range of commodities, including; most recently, iron ore and nickel, as well as gold, platinum, uranium, manganese, copper and coal.



Daniel Fullwood
Lead Mechanical Designer

15 years of experience in engineering design and project management of both brownfields and greenfields projects. He has effectively project managed operational support projects, from acquiring the task to completion and delivery. He has strong practical skills in structural, piping, mechanical and industrial project planning and design drafting.

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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.

bge-resources.com



COMPETENCY
CAPACITY
COMMITMENT

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