Process Engineering

AGILITUS

Capability Statement

Shaping
Tomorrow
Together

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Acknowledgement of Country

Agilitus 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 Kaurna 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.

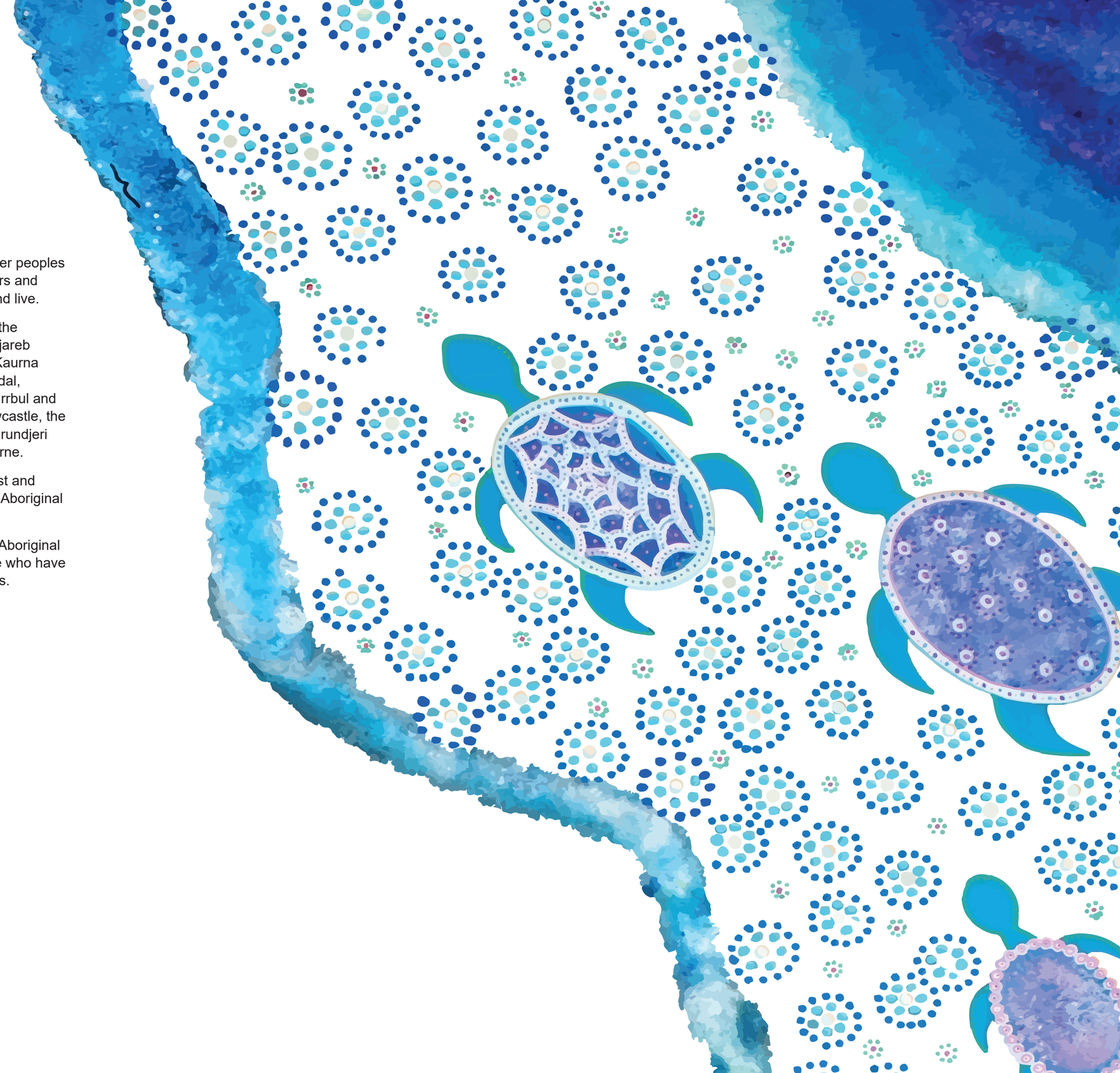

Image: Aboriginal artwork created by Jayda Sebire (Indigenous Artist and former Agilitus People and Culture Assistant).

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

Image: Graphite Concentrator, Mozambique. Courtesy of Syrah Resources.

Process Engineering and Design for Asset Optimisation

Agilitus 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 their assets, minimise operational disruption, improve safety and mitigate risks.

Agilitus’s proven approach to project management and clearly understanding the scope and technical objectives of a project allow us to deliver schedule and cost benefits through clever engineering and true collaboration. This is what differentiates us from our industry counterparts.

Our people pride themselves on providing smart, robust 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.

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.

Image: Matheus Pimentel on-site at Mt Holland Mine.

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 Agilitus. 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

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.

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

Respecting, Protecting and Preserving our Cultural Heritage

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

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.

Process Engineering

Delivering bespoke design for projects with a focus on optimising costs and increasing circuit efficiencies.

Agilitus' process engineers have amassed considerable experience in mining, mineral processing, hydro and pyro-metallurgy, with specialist expertise in areas such as metallurgical test work management, flowsheet development, pilot and demonstration plants, process modelling and simulation, commissioning, operations and maintenance.

Our team is also committed to delivering renewables-based hydrogen and ammonia projects. We bring relevant experience in H2 and NH3 production. This includes process design and novel technology development for H2, process safety, hazardous area classification as well as operations and management support for large scale air separation units.

From concept/trade-off studies to detailed engineering and commissioning support, our specialised team offers full engineering and design services, procurement management and construction management services.

Collaborating with our clients, we tailor our approach to meet project requirements of budget, scope and schedule. Our engineers provide high quality process deliverables including PDC, mass & energy balances, PFDs, P&IDs, Process Control Philosophies and commissioning plans, through to metallurgical accounting assistance and debottlenecking/optimization support on site.

Capabilities

- Lithium plants (hard rock and brine)
- Rare Earths
- Nickel
- Vanadium
- Phosphate
- Gold
- Iron Ore
- Copper
- Base metals including tin, zinc and lead
- Mineral sands
- Alumina (Bayer Process) and High Purity Alumina (HPA)
- Petrochemicals & Chemicals
- Silver

Image: Roy Hill WHIMS.

Project Phases

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

Capabilities

- Scoping/Concept/OoM Studies
- Pre-Feasibility Studies
- Bankable Feasibility Studies
- Front End Engineering Design (FEED)
- Detailed Design
- Independent Review & Due Diligence
- Construction Support
- Commissioning
- Debottlenecking, Ramp-Up and Process Optimisation
- Brownfields Modifications
- Utilities & Reagents Designs

Image: Hydrogen Plant. Courtesy of Adobe Stock.

Agilitus Case Studies

Image: Rare Earth Processing Plant.
Courtesy of James Schloffer.

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Christmas Creek Green Iron Project

Client: Fortescue

Agilitus was awarded the interface detailed engineering design for FMG's CCGIP Demonstration Plant.

Agilitus was selected to undertake the engineering for Fortescue's Christmas Creek Green Iron Project (CCGIP) in Western Australia's Pilbara region. The process plant will produce over 1,500 tonnes per annum of high-purity green iron metal, utilizing green hydrogen generated at FMG's existing hydrogen facility at Christmas Creek.

The trial commercial plant CAPEX was approved for USD$50M and commenced in August 2024, with first production anticipated in late 2025.

The plant will leverage FMG's renewable energy infrastructure, including both gaseous and liquid hydrogen production, storage, and refueling facilities. An electric smelting furnace will be used to produce high-purity green iron suitable for global steel production.

Agilitus provided a multidisciplinary team of engineering professionals from our Process, Mechanical, Piping, Electrical & Controls, Civil/ Structural and Project Delivery disciplines to complete the detailed design.

A number of equipment vendors and technology providers provided a challenging number of interfaces to manage, particularly around the NPI and Balance of Plant Areas. Agilitus utilised its advanced process plant understanding combined with industry leading project management methods to successfully deliver the engineering design and project delivery leading into construction.

The complex process flowsheet included a beneficiation plant, direct reduction of iron using hydrogen, smelting, granulation and packaging.

Additional plant included hydrogen reticulation, nitrogen generation, compressed air, multiple water circuits, water treatment and cooling water circuits along with additional reagents.

Image: Spodumene Flotation Circuit. Courtesy of James Schloffer.

Mt Holland Concentrator Operations Ramp-Up

Client: Covalent Lithium

Covalent Lithium engaged Agilitus to assist with debottlenecking and ramp up at its spodumene mining operation at its Mt Holland Concentrator.

Agilitus's scope of services for this project included provision of an engineering team comprised of a Project Manager, a Principal Process Engineer and 2 back to back process engineers. The Engineering team assisted Covalent Lithium with the following objectives:

- Achieve PDC throughput and recovery
- Investigate and close out punchlist items and debottlenecking activities.
- Review existing plant design and consultant reports and make recommendations.
- Develop contractor scopes of work and RFQ documents for plant improvement projects.
- Work with client metallurgists to design newmetallurgical laboratory and plant optimization tasks.

The contract duration was extended multiple times and Agilitus provided numerous Technical Memorandums which assisted the client in fault finding and general plant optimisation.

Scopes of work were developed and issued to contractors to tender on numerous plant improvement projects. Agilitus assisted the client in expeditiously closing out construction punchlist items by conducting technical analyses of pumping and reagent design and recommending best courses of action to improve reliability, throughput and maintenance.

Iron Ore Leaching Project - Scoping Study

Client: HILT-CRC

HILT-CRC engaged Agilitus as the engineering partner to review the flowsheet and make recommendations on technology and unit operations, energy efficiency, CAPEX, OPEX and process engineering for a novel flowsheet.

Agilitus was engaged as a key project partner for the ARENA-funded research and development project that is leading the decarbonisation research for Australia's iron ore and steel industries.

Led by HILT-CRC, the project aims to improve the commercial viability of a scalable hydrometallurgical caustic leaching process for low-grade iron ore beneficiation through the generation of reagents and valuable by-products from seawater brines using reverse osmosis (RO).

Utilising our multi-disciplinary engineering expertise, Agilitus is supporting the research and development process by advising on the technical and economic viability of the project and undertaking the engineering design of the process pilot plant.

Embracing a circular economy approach, the project investigates the use of natural resources directly available, given the proximity of the ore in the Pilbara to the ocean, and reuses various byproducts from the process or generates saleable byproduct commodities.

It has the potential to generate additional byproduct revenue to offset some of the hydrometallurgical beneficiation costs and produce higher grade iron ores suitable for direct reduced iron (DRI) processing to generate domestic green steel.

The project demonstrates a coordinated effort to tackle challenges and explore opportunities in the field of low emission iron and steel. It has the potential to contribute significantly to the advancement of technological solutions required for lowcarbon products to bring us closer to net zero.

Ore Sorter Plant - PFS & DFS

Client: Undisclosed

Our work has shaped the plans for a world-leading minerals producer to meet increasing demand for lithium driven by the global energy transition.

Agilitus conducted the Pre-Feasibility Study (PFS) and the Detailed Feasibility Study (DFS) for our client's proposed two-stage crushing, screening, and Ore Sorting Plant (OSP).

Our client had marginal stockpiles with high levels of iron contamination that could not be processed through the existing Chemical Grade Plant (CGP). After extensive testing, it was concluded that an OSP would be required for the pre-processing of marginal stockpiles. By pre-processing these marginal stockpiles through sorting the product can be blended through the crushing circuit into the CGPs.

This expansion would enable our client to meet the increasing demand for lithium driven by the global energy transition such as electric vehicles and energy storage.

Agilitus assembled a multidisciplinary team of professionals from our Project Delivery, Civil/ Structural, Process, Mechanical, Piping, Electrical and Energy practices to complete the concept design and detailed design.

The PFS explored the options for designing the Ore Sorting Plant, which was designed to guarantee performance between performance between 1 and 2 Mtpa. During the study, the plant transitioned from a semi-mobile to a fixed plant.

Our team modelled the crushing sizes based on the proposed optical sorters' throughput and size capabilities. External factors such as the mobility of the plant, and environmental constraints such as noise and dust were all considered due to site's location.

Image: Ore Sorting Installation.
Courtesy of Robben, C., & Wotruba, H. (2019).

Kwinana Beach Refinery - Lime Addition Process Audit & Detailed Design

Client: Covalent Lithium

Agilitus was engaged to undertake a preliminary audit to determine the design impacts from a change in reagent type and then detailed design of any resulting modifications to the plant.

Covalent Lithium has engaged Agilitus to undertake a review of the impacts of a process change to its limestone addition and neutralisation circuits and develop a detailed design for modifications to the plant at the Kwinana LiOH Refinery in Western Australia. The plant is still in late stages of construction and the objective is to incorporate the design changes in time for commissioning activities in late 2024.

To support the shift in processing needs within the lime addition circuit at the Kwinana Beach Refinery, Agilitus is conducting a two staged approach to this scope of work. The first stage will be an audit of the existing circuit design including process, piping, valves, equipment and electrical requirements to assess its suitability for the new processing parameters by presenting a range of options for the client to consider.

Stage Two will comprise of a selection and detailed design of the selected option for the system to function effectively. This evaluation accounts for modifications in the process criteria for the calcium carbonate and sodium hydroxide circuits, along with any downstream impacts in the neutralisation and filtration unit operations.

Image: Reagent Storage.
Courtesy of James Schloffer

Gold Mine Operation

Client: Undisclosed

An Australia gold producer engaged us to conduct a Safety Study and Process Engineering Review of an existing elution circuit at its mining operation.

The extensive study included the delivery of a HAZOP workshop to address engineering improvements, resulting from the site's recent production upgrade.

Agilitus works package included reviewing and updating the Process and Instrument Diagrams as well as the operational documents.

Our team assessed the elution columns, acid wash columns, and other ancillary equipment in the gold recovery area. Detailed design for few major upgrades have also been completed.

After the update of the elution circuit, we reviewed hazards and risks associated with acid wash and elution columns which included:

- Assisting with action plan post regulatory inspections from Western Australia Department of Mines, Industry Regulation and Safety (DMIRS)
- Designing the valves that enable dam operations to isolate Elution columns
- Identifying hazards and operability issues based on the design post upgrade
- Conducting a HAZOP workshop
- Improving the procedures and permits for safe operation and maintenance of Elution Circuit.

Our Process Engineering Team

Sebastien Nalletamby
Senior Project Manager

With a wealth of experience in the bulk materials industry, bringing extensive field expertise in mining and manufacturing. Seb has collaborated closely with major resources companies, including Fortescue, Rio Tinto, CBH and BHP (including BMA) amongst others, providing high-level technical advisory in their Asset Management & Engineering Services Business Units.

He is highly proficient in 3D modelling, data analysis, and conveyor simulation software, applying these skills to optimise material flow, reduce wear, and improve overall system reliability. Reviewed the complete outload conveyor circuit at BMA's Peak Downs' CHPP to support site objectives of increasing overall plant throughput. Conducted conveyor calculations to assess asset condition and performance, identify issues, and develop cost-effective, phased upgrade solutions.

Chris Larder
Principal Project Engineer

Chris has over 30 years of experience in project and study management for mineral processing plants spanning across the fields of base metals, gold, iron ore (magnetite and hematite) and battery metals metallurgy. He is experienced in general and plant management to general manager/senior site executive level. He has delivered cost effective process development, major testwork program development, management and reporting, design and operation of pilot plants, as well as budget preparation and cost management.

Nataly Fernandez
Principal Mechanical Engineer

Nataly is a highly skilled Process and Mechanical Engineer with more than 20 years of experience in process plant operations, engineering and design of piping systems, as well as design and selection of process and mechanical equipment. She is proficient in Front End Engineering Design (FEED) and providing team leadership in demanding industrial environments. Nataly has a proven track record of success in chemical plants, alumina, silicon carbide, and iron ore industries across Australia, Venezuela, Brazil, and Norway.

Matheus Pimentel
Senior Process Engineer

Matheus holds 7 years of experience withmineral characterisation, ore processing and design of pre-feasibility, feasibility, andexecutive projects for miningenterprises. Matheus has process engineering experience across a range of commodities including downstream lithium, rare earths, aluminium, base metals and iron ore.

Matheus' project experience in-cludes crushingplant design, dewatering plants, copper flotation circuits and detailed design for slurrypipelines to name a few. His operational experience includesboth pilot plant test work and full scale commissioning and troubleshooting for flotation circuits in copper and lithium concentrators. Matheus also has strong detailed design capabilities relating to pump and valve sizing and selection.

Jack Birch
Graduate Process Engineer

Jack has joined Agilitus as a Graduate Process Engineer. He graduated from The University of Western Australia majoring in Engineering Science and Finance. He undertook units involving chemical processing, process design, electrical circuit planning and design, safety costing, thermodynamics, and data interpretation through Excel, Python and Aspen HYSYS. He takes a particular interest in the renewable energy sector.

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agilitus.com

info@agilitus.com

+ 61 8 6375 9100