Australasian Groundwater & Environmental Consultants

# Western Australia

## We empower informed water decisions that help our clients, communities and environment thrive

### About us

We're Australia's groundwater specialists, providing groundwater and environmental advisory for more than 25 years.

We have an unrivalled depth of experience and technical excellence borne out of more than 2,500 projects across major industries, agriculture, government and communities in Australasia and beyond.

We combine Western Australian insight with global thinking: we stay up-to-date in government legislation, nurture our relationships across government and communities, and leverage the latest in water and environmental issues around the world. With a reputation for solving problems, we pride ourselves on delivering scientifically rigorous advice that consistently stands up to scrutiny.

Through powerful insights and clear advice, we empower informed water decisions to help advance your projects.

### Our expertise

We specialise in end-to-end groundwater services for all Tier companies, from field work and modelling, to analysis and reports, to expert advisory and peer review. We also provide advisory services from a project's scoping and exploration phase, to the post-closure phase.

That means we understand the commercial, environmental, government and community challenges you face, regardless of your project's environment, stakeholders and goals.

For more than two decades, we have been helping clients understand their groundwater environment across a wide range of sectors, including:

- Mining & Quarrying
- Oil & Gas
- Infrastructure
- Agriculture
- Local Councils & Government
- Pumped Hydro
- Defence
- Energy Transition
- Water & Leachate Management
- Legal

Our highly technical advisory team has a depth of knowledge and experience in groundwater and environmental consulting in different countries, regions, cities and towns. We have intimate knowledge of the myriad groundwater challenges and potential impacts you face in the design, planning, development and execution of your project.




*We take care of every stage of your groundwater and environmental investigations, from data collection in the field and modelling, through to stakeholder engagement and ongoing monitoring.*

## End-to-end groundwater services

01 **Drilling & testing supervision**

We custom design industry-leading bores and monitoring equipment and oversee the construction of your infrastructure, including Section 26D licences. Our team evaluates long-term water yield and quality, and ensures compliance with legislation. We help you achieve the objectives of bores and water management plans.

02 **Fieldwork**

We undertake assessments, big or small, and endeavour to tailor the method to the projects needs. We apply a 'plug and play' approach to assessments including verifying water quality and yield, to enable data to be fed seamlessly into models. Our data acquisition, monitoring and sampling techniques align with legislative requirements.

03 **Modelling**

We develop conceptual, analytical and numerical models to determine groundwater impacts and identify behaviour of contamination issues or considerations for sustainable extraction. We address mitigation and management scenarios, as well as explore future impacts through uncertainty analysis and integration of climate data.

04 **Analysis & report**

Our analysis is always conducted and reviewed by a Principal-level scientist. We complete geochemical analysis and integrate with groundwater investigations, where required. Our groundwater assessments are undertaken in alignment with applicable guidelines including Operational Policy 5.12 (H-level reporting), Mining Development and Closure Proposals, and the WA EPA proposal assessment process. Through our high-quality, comprehensive reports, we decipher the science and provide easy-to-understand interpretation.

05 **Approvals & stakeholder engagement**

We leverage our strong regulator relationships to ensure your compliance with relevant legislation. We know what it takes to facilitate effective stakeholder engagement across diverse your stakeholders, from government to communities.

06 **Monitoring & troubleshooting**

We conduct monitoring to address sustainability and the impacts of use, as well as evaluate level, quality and volume data. We assist with your government reporting, including regulatory compliance reporting aligned with operational licenses and operating strategies. We troubleshoot any ad hoc issues, looking at why they have occurred and conducting rehabilitation where necessary.

07 **Expert advisory**

We support clients on joint expert reports, as expert witnesses in court, in technical review panels or in peer-review and gap analysis of groundwater models and reports.

# Our services

Our broad range of hydrogeological and environmental services includes:

## Groundwater modelling

- Conceptual hydrogeological modelling
- Analytical groundwater modelling
- Numerical groundwater modelling

## Groundwater field services

- Routine groundwater monitoring for levels and chemistry/quality
- Water supply bore construction design and drilling supervision
- Monitoring bore construction design and drilling supervision
- Vibrating wire piezometer (VWP) design and installation
- Pumping test planning and supervision
- In-situ hydraulic analysis with packer testing
- Baseline assessments
- Bore assessments
- Bore condition assessments
- Landholder bore census
- Spring surveys and remote sensing analysis

## Groundwater approvals and licensing

- Preparing groundwater impact assessments to support 5C licence applications and Part IV and Part V assessments
- Reviewing monitoring data and preparing periodic compliance reports
- Preparing underground water impact report (UWIR)
- Consulting with regulators to support our clients during government engagement
- Assessing the yield of groundwater bores to support applications for water licences

## Hydrogeochemistry

- Water quality / chemistry monitoring and analysis
- Chemical speciation modelling and contaminant fate transport pathways
- Assessment of leachate generation and mixing interactions
- Groundwater chemistry assessment for environmental assessments including EIS

## Water Resources: supply & management

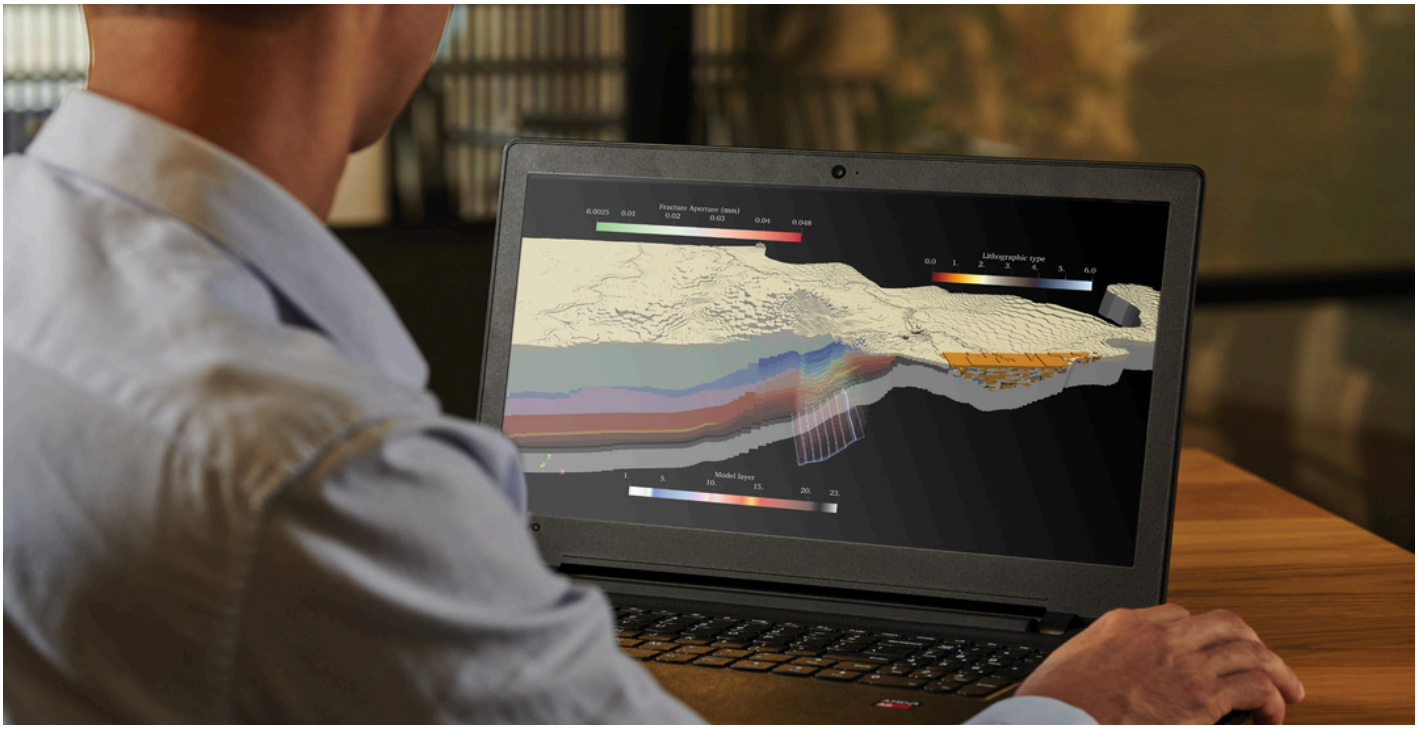
- Obtaining regulatory approval
- Hydrogeological mapping and geophysical surveys, including downhole logging
- Bore design, tender documentation, and contract supervision
- Designing and managing the installation of deep bores in the great artesian basin
- Test pumping and borefield analysis
- Numerical modelling for borefield design, operations, and impact assessment including H-level reporting
- Bore rehabilitation
- Catchment scale analysis for government sectors
- Irrigation demand, soil moisture and detailed recharge modelling
- Water balance modelling

## Contaminant investigation

- Reaction modelling
- Solute transport modelling
- Design and implementation of field sampling for contaminated sites
- Groundwater contaminant identification and mapping
- Statutory environmental investigations
- Contaminant source investigations
- Waste and leachate characterisation
- Site remediation or closure predictions
- Design, testing and implementation of remediation programs

## Expert advisory

- Joint expert reports
- Appearing in court as expert witnesses
- Technical review panels
- Peer-review and gap analysis of conceptual and numerical groundwater models and reports



# Our projects

Over more than two decades, we have delivered specialist groundwater services for a multitude of projects that are too many to list. Here's an example of some key Western Australian projects we've assisted with over the years:

*We have a significant track record and reputation with regulators across the country over more than two decades. Our strong team of modellers and supporting staff are very familiar with the challenges in green tape and regulatory requirements.*

## Hercules Gold Prospect,

*Karramindie WA*

To assist with the project's feasibility and initial environmental approvals, AGE conducted a comprehensive desktop review of site conditions to inform and execute a targeted field data collection program. This included bore specification and drilling supervision, slug and pumping tests, and groundwater sampling. A conceptual and numerical groundwater model was developed to inform potential mine inflows and impacts, along with an Monte Carlo uncertainty analysis to support findings and recommendations feeding into the mining proposal. To support this project, and H1 and H3 report was prepared.

## Kanowna Belle Gold Mine,

*Kanowna WA*

Since 2016, AGE has delivered extensive groundwater services at Kanowna Belle, including bore design, drilling supervision, aquifer testing, and groundwater sampling. We developed and updated the site-wide conceptual and numerical groundwater models, conducted water balance modelling, and completed annual compliance reviews and TSF seepage assessments to support environmental licensing, including multiple H1, H2, and H3 reports. Our long-term involvement has helped maintain regulatory compliance and optimise water management across the site.

## Six Mile Prospect,

*Kalgoorlie WA*

To inform with the project's scoping and feasibility phase, AGE conducted a comprehensive desktop review of site conditions to inform and plan a targeted field data collection program. Following the desktop review, AGE compiled an H1 report to support the initial water licence application, which included water management options. Subsequent to the H1 report, AGE provided advisory on how to advance the project considering the project's future water demand.

## Gourdis-Vause Prospect,

*Jundee Operations, WA*

AGE completed a hydrogeological assessment, including an H2 report, for the expansion of three pits at Gourdis-Vause. We developed a conceptual model and offered both analytical and numerical modelling options to estimate dewatering volumes and assess environmental impacts. Our work supported groundwater licensing and informed water management and mitigation strategies.

## Wodgina Mine,

*Pilbara Region WA*

AGE supervised drilling and pumping tests, updated the site's conceptual hydrogeological model, and developed a numerical groundwater model calibrated using Ensemble Space Inversion (ENSI). The model simulated multiple abstraction scenarios to support groundwater planning and regulatory compliance. Our predictive modelling helped guide sustainable groundwater abstraction and informed long-term water resource planning.

## Marillana Iron Ore Project

*Newman, Western Australia*

AGE developed a detailed numerical groundwater model for the Marillana Project, including conceptual model refinement, MODFLOW-USG design, and scenario planning. Our team applied advanced uncertainty analysis to predict mine inflows and optimise dewatering strategies, supporting mine planning and environmental approvals. The model provided a robust decision-making tool for managing groundwater impacts throughout the mine's lifecycle.

## Onslow Iron Project,

*Onslow/Cane WA*

Spanning over 130 km from Onslow to Ken's Bore, AGE supported groundwater investigations along the haul road corridor. Our services included drilling supervision across multiple rigs, aquifer testing, infiltration trials, and groundwater sampling. Conceptual and analytical models were developed to assess abstraction impacts and inform groundwater management strategies, ensuring the project's water-related risks were well understood and mitigated.



# Our technical team

We have expert teams in multiple locations across Australia and offer the largest consulting modelling team in the country. With around one third of our team at principal-level, we have highly skilled, industry leading experts who specialise in particular fields across our services.

## James Barratt

*WA Region Manager | Principal Hydrogeologist*

James Barratt has 10 years' experience as a hydrogeologist and project manager and has worked on groundwater modelling, field data collection and analysis, and hydrogeochemical investigations in South Africa, Africa, and Australia. Since joining AGE, James has successfully led, managed, and delivered groundwater projects including bore installation programs, groundwater conceptualisation models, groundwater modelling and technical reporting. James's technical experience includes conducting desktop studies, field work activities, surface- and groundwater conceptualisation, hydro- and geochemical analysis and interpretation, groundwater modelling with FEFLOW and MODFLOW, and technical reporting. He is well-versed at managing groundwater studies for large-scale planned and operational mines and the compilation of technical reports to comply with international standards.

## Keith Phillipson

*Senior Principal Hydrogeologist*

Keith specialises in the use of groundwater models to assess and manage the impacts of a broad range of developments on groundwater and surface water resources, with more than 25 years' experience working in jurisdictions including Queensland, New South Wales, Victoria and Europe. In particular, Keith has undertaken, overseen and peer reviewed a wide variety of modelling studies focused on assessing the cumulative impacts of large-scale water supply, coal mining and coal seam gas developments.

## Pieter Labuschagne

*CQ/SEQ Region Manager Principal Hydrogeologist*

Pieter has 20 years of experience in Southern Africa, Africa and South America, including more than 15 years in a South African based consultancy as director and principal scientist. Having started his career in the development of groundwater monitoring systems for coal fired power stations, Pieter's expertise includes project management and delivery of hydrogeological conceptual models, groundwater impact and liability assessments, development of groundwater management plans, consultant reviews and numerical applications.

## Dr Tariq Lattoe

*Principal Hydrogeologist*

Tariq has 14 years of combined industry and academic experience as a hydrogeologist specializing in groundwater modelling. His project experience is diverse comprising GDE impact assessments; resource characterization; dewatering/injection optimisation; capture zone delineation; managed aquifer recharge operation; and seawater intrusion threat analysis across mining and agriculture sectors. Notable project work includes developing groundwater models for some of Australia's nationally recognized Major Projects including Gudai-Darri Iron Ore Mine and the Ammaroo Phosphate Project. Tariq is well versed in the applied use of use of statistical, analytical, analytical element and numerical methods in hydrogeology. This includes simulation of solute, heat and reactive transport under saturated, variably saturated and variable density conditions.

## Rodrigo Rojas

*Head of Technical Services | Senior Principal Hydrogeologist*

Rodrigo brings over 20 years of professional experience in groundwater resources assessment and management, hydrogeological conceptualisation and characterisation, surface and groundwater modelling, flood risk assessment, and community engagement for participatory modelling. He has held leadership positions in consultancy and research organisations, leading multidisciplinary teams to successful project delivery domestically and internationally across diverse market sectors, including mining, agriculture, water utilities, infrastructure and government.

## Dr Angela Bush

*Principal Hydrogeologist*

Angela specialises in integrated groundwater assessments, contaminant investigations and geochemical analyses, with more than 15 years' experience in consulting, research and education. One of her strengths is underpinning groundwater quality and contamination assessments with an understanding of groundwater evolution mechanisms. With detailed knowledge of groundwater systems in various settings, specifically focusing on fractured rock groundwater flow systems of North Queensland, she has supported clients across metalliferous and coal mines, industrial operations, unconventional gas projects, state and federal governments, and agriculture bodies.

## Bryce McKay

*NSW Region Manager | Principal Hydrogeologist*

Bryce's broad range of expertise includes undertaking and managing field programs, groundwater studies and impact assessments to support environmental approvals for a number of coal and hard rock mines, as well as sand and hard rock quarries in the Hunter Valley, Newcastle and Port Stephens areas. He specialises in writing and reviewing groundwater monitoring and modelling plans, water management plans, trigger assessments, designing and managing field work programs, geological modelling and conceptualisation, inflow estimation, and data interpretation and analysis (including pumping, packer and slug tests).

# Local insight, global thinking

*If you're looking for an expert partner to solve your groundwater or environmental challenge, get in touch with us.*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