Australasian Groundwater & Environmental Consultants

Mining

Robust investigations to help fulfil your commitments

Groundwater impact assessments are a critical part of every mining project. They help determine groundwater inflows to your project and evaluate the most appropriate dewatering or groundwater control measures to adopt to maintain safe and efficient operations. Comprehensive groundwater investigations also provide the data you need to meet your environmental regulatory requirements and get your project through the complex approvals process.

Typically, you will need to obtain rights from State and Federal regulators to interfere with groundwater, as well as obtain water licences during mining operations. Mines will also need to demonstrate compliance with regular monitoring and reporting to regulators, environmental bodies and the public. Both the science and legislation underpinning groundwater approvals and compliance can prove to be as complex as a modern minefield.

Regardless of the stage of your mining project - from greenfield to operations to mining closure - you need a trusted relationship with your groundwater partner: one in which you know you can rely on the data and be assured everything is accurate, compliant and within budget.

About us

We're Australia's groundwater specialists, providing groundwater and environmental advisory across Australasia for more than 25 years. We have a 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 specialise in end-to-end groundwater services, from field work and modelling to analysis and reports, to expert advisory and peer review.

That means we understand the commercial, environmental, government and community challenges you face, whether you need a mining approval or modification, assistance with operational issues or support through a mine closure. We deliver robust, reliable advice that stands up to scrutiny and helps you navigate the green tape.

Our experience

We're intimately familiar with the challenges that groundwater presents to the mining and quarrying industries through the entire lifecycle of a project: from greenfield exploration, approvals, operations to closure and relinquishment.

As your partner, we work closely with you to ensure you're able to fulfil your extensive environmental regulatory conditions and secure your approvals. Crucially, we can support you on community engagement and stakeholder communication, including various levels of government and surrounding landholders. We decipher the science and ensure our advice is easily understood and clearly shows why it adds value.

Mine approvals and modifications

Our team has extensive experience delivering groundwater impact assessments. We ensure regulatory requirements and industry standards are adhered to, so you can secure the approvals you need.

When planning greenfield projects and mine modifications, we understand the need to adequately characterise the risks imposed on groundwater resources. This typically includes estimating groundwater seepage rates in mines and assessing the potential for operations to impact upon other surrounding users of groundwater, including communities, agriculture and the environment.

Water stewardship and management

We provide assistance in steering and managing your water supply to help reduce costs, uncertainty and risks to your mining operation. We simulate managed aquifer recharge using surplus water and reduce the uncertainty with excessive water discharge.

Your licensing success is often contingent on the replenishment of groundwater resources taken over the life of the mine. We help you with planning, modelling and monitoring your groundwater assets, as well as assist with deficit (water supply and injection) and excess (dewatering) water. For more than two decades, our team has designed the modelling strategy and guidelines for government entities and major mining companies.

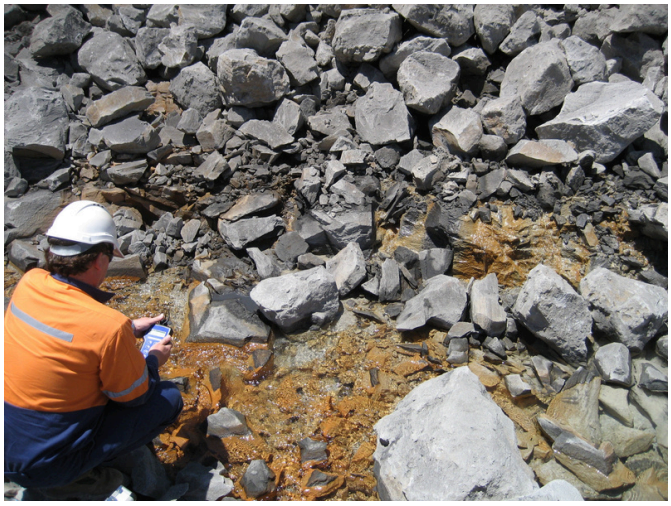
We provide independent, impartial advice that stands up to scrutiny.

Through end-to-end groundwater services and a depth of experience, we help you navigate the legislation and meet your regulatory requirements.

Mine operations and water balance

Our experts can help with groundwater-related operational issues that can present operational and safety challenges, such as inrushes, high seepage rates, high pore pressures or wet blasting.

We also have deep experience in helping operators meet their regulatory conditions, including the development of monitoring plans and programs, fieldwork for data collection (including water levels and water quality sampling), groundwater model updates and routine reporting.



Mine closures

We understand that the closure of mines presents a significant challenge for your business. The water issues cross disciplines and require a multi-disciplinary team that can make reliable predictions for decades or centuries into the future.

With our end-to-end groundwater solutions combined with our established networks and partners in related disciplines, we offer a 'turnkey' service. Our hydrogeologists, hydrogeochemists, and numerical modellers collaborate with ecologists, geochemists, surface water engineers and other key specialists to overcome these challenges and develop adaptable and flexible work programs to work towards mine closure.

One of the main challenges is assessing the nature of lakes that form in mine voids and how these water bodies interact with the groundwater regime. We develop testing programs and models to characterise the behaviour of these lakes and provide a long-term monitoring service to validate the modelling predictions.

Along with helping you engage with key stakeholders during the process, we also support you through complicated and evolving legislation, such as the Progressive Rehabilitation and Closure (PRC) Plan.



Our services

Groundwater modelling

- Conceptual hydrogeological modelling.
- Analytical groundwater flow modelling.
- Numerical groundwater modelling.

Groundwater modelling

- 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 for environmental impact statements (EIS).
- Reviewing monitoring data and preparing annual 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 management

- Mine water and salt balance modelling.
- Water supply and demand management.
- Water infrastructure optimisation and maintenance planning.
- Water management cost/risk benefit analysis.
- Assistance with water licensing applications and compliance planning.

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 experience

Over more than 20 years, our extensive experience has seen us help clients across underground, opencut, metalliferous, coal, quarries and sand operations. We have a significant track record in groundwater assessments and successful approvals, with a reputation for robust and high-quality investigations and reports.

While we have experience conducting studies in major mining regions within Australia, we have also successfully carried out operations globally, particularly in New Zealand, Papua New Guinea, Indonesia and South-East Asian countries.

Our projects

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

Cadia Valley Operations

Orange, New South Wales

Aquifer Interference Policy (AIP) requires a water licence for aquifer interference activity regardless of whether water is taken directly for consumptive use or incidentally, with dewatering considered an incidental take. Numerical modelling estimated whole groundwater take to determine compliance with the water sharing plan licensing limitations in line with the policy. Prediction of potential demand was estimated based on mining and climatic scenarios.

South Flank

Pilbara, Western Australia

Groundwater assessment to predict the uncertainty of dewatering requirements to numerous ore bodies and drawdown impacts. This very robust uncertainty analysis helped to ensure pipe network was optimal.

Mt Arthur Coal

Muswellbrook, New South Wales

Drilling programmes to assist with mine design and expansion, including vibrating wire piezometers (VWP) and monitoring bores to monitor for mining related impacts. Time domain reflectometry (TDR) was used to monitor highwall and endwall stability. Telemetric equipment was installed enabling remote data monitoring.

Hunter Valley Operation

Muswellbrook, New South Wales

Groundwater impact assessment (GIA) to assess consequences of expansion in a large and interconnected mining area. Conceptual groundwater model provided a detailed picture of the system and a numerical groundwater model replicated key system features. Included evaluation of various options for mine planning and contribution to a federal government EIS.

Anglo American CapCoal Operations

Middlemount, Queensland

Hydrogeological assessments for technical feasibility studies and environmental approvals, and field services such as permeability testing of coal seams, piezometric assessment for pit wall depressuristion studies, compliance groundwater reporting, and installation of groundwater monitoring networks.

Orebody 31 (OB31)

Newman, Western Australia

Uncertainty calibration and assessment for a new iron ore development. This work formed one of the Groundwater Modelling Decision Support Initiative (GMDSI) worked examples.

Mangoola Coal Mine

Muswellbrook, New South Wales

GIA for state and federal approvals of continued operations, including site conceptualisation and numerical modelling, field investigations, successive modelling reviews, annual groundwater reporting, review of monitoring network plan, groundwater monitoring trigger review, and water quality and levels exceedance compliance reporting.

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Martins Creek Quarry

Paterson, New South Wales

GIA, including hydrogeological conceptualisation, analytical assessment of inflow and water take from groundwater sources, prediction of drawdown and impact on neighbouring groundwater users and groundwater dependent assets, monitoring and mitigation management and assessment, and preparation of annual groundwater interception reports to meet licence conditions.

Our team

Andrew Durick

Director | Senior Principal Groundwater Modeller

Andrew has over 25 years' experience in groundwater modelling with intimate working knowledge of MODFLOW (industry standard modelling code) and significant experience in both the public and private sectors. He specialises in conceptualisation and modelling of complex groundwater systems, implementation of complex mine plans and third party review of models.

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).

Pieter Labuschagne

Central South QLD 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.

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

If you're looking for an expert partner to manage your groundwater issues and support your mining project, get in touch with us.



James Barratt

WA Region Manager | Principal Hydrogeologist

James has been involved with numerous groundwater resource and mine feasibility studies throughout Southern, Central and West Africa. He has conducted and managed field data collection services ranging from groundwater and geophysical surveys, drilling supervision and data collection, and packer and aquifer testing. James has also developed conceptual, analytical and numerical groundwater models to assess groundwater inflows into mining areas and simulated dewatering scenarios to optimise and inform mine dewatering planning and decision-making. 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.

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 focussing 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.

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.

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