

Groundwater Capabilities



HYDROSOLUTIONS
PTY LTD
Hydrogeological & Environmental Consultants

Western Australia's independent groundwater & environmental consultancy, with a proven track record in groundwater, surface water, environment, risk assessment, contaminated land management & auditing. We combine reliable expertise with regulatory knowledge, delivering high-quality output on time & on budget.

GROUNDWATER RESOURCES

Our core expertise is in hydrogeology. We have over 28 years experience in groundwater resource exploration & sustainable exploitation in the mining, industrial & land development sectors. Contact us for all your needs in:

- ◆ Exploration, resource evaluation
- ◆ Mining/industrial/residential feasibility studies
- ◆ Irrigation assessments
- ◆ Dewatering assessments
- ◆ Drilling program management & supervision
- ◆ Test pumping & hydraulic analysis
- ◆ Managed aquifer recharge (MAR)
- ◆ Sustainable yield assessment
- ◆ Well efficiency assessment
- ◆ Recharge estimates
- ◆ Downhole geophysical logging
- ◆ Tailings dams
- ◆ Source protection models (SPZ)
- ◆ Ground/surface water interaction
- ◆ Tidal influences
- ◆ Wetland/ecological studies
- ◆ Average Annual Maximum Groundwater Levels (AAMGLs)
- ◆ Conceptual modelling, water balances
- ◆ Vadose (unsaturated) zone models



MONITORING & WATER QUALITY

Recent major projects have involved monitoring programs and water quality studies for both government/municipal bodies and major industrial clients. Our capabilities include:

- ◆ In-house pumps, pump testing, data logging
- ◆ Monitoring program design & database management
- ◆ Equipment installation implementation
- ◆ Sampling, analysis and quality plans (SAQP)
- ◆ Borefield monitoring reviews, Notice of Intents (NOIs)
- ◆ High-quality compliant licence reporting
- ◆ Potable & process water supplies
- ◆ Source protection plans, management plans
- ◆ Hydrochemical analysis
- ◆ Trace metals, ecotoxicology assessment
- ◆ Irrigation assessments
- ◆ Nutrient loading assessments
- ◆ Leachate analysis
- ◆ AquaChem typing and mixing analysis
- ◆ Phreeqc chemical speciation, saturation, batch reactions, inverse reactions
- ◆ Isotopic analysis, dating
- ◆ Volatiles in groundwater

GROUNDWATER MODELLING

Our group is a multi-disciplinary team, supported by in-house geology & GIS specialists. We are experienced in all forms of modelling, from core analytical models, to the most recent multi-parameter uncertainty analysis:

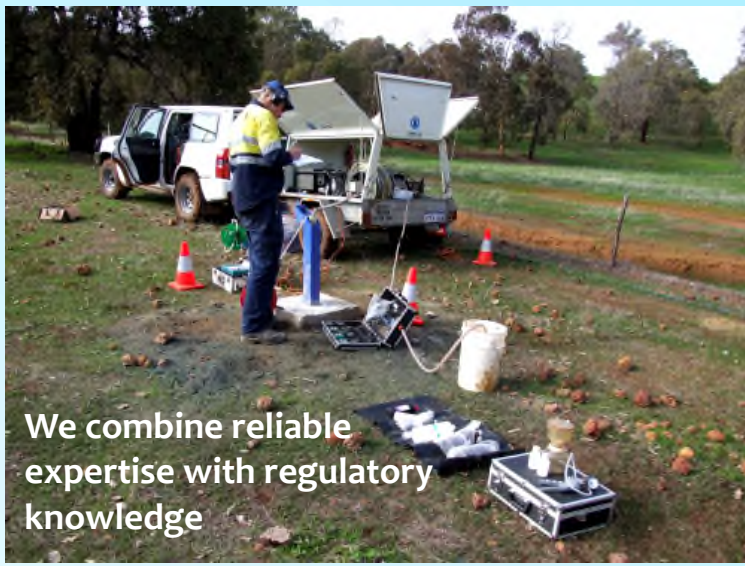
- ◆ Analytical water balances
- ◆ Conceptual Site Models (CSM)
- ◆ 3D spatial analysis of hydrogeological systems
- ◆ Borehole visualisation & correlation
- ◆ Dewatering assessments
- ◆ Hydraulic containment/flow path analysis
- ◆ FlowPath & Mars2D
- ◆ Analytical models with AquiferTest using Theis (confined), Neuman (unconfined), Walton (semi-confined/leaky) methods
- ◆ Numerical modelling with Groundwater Vistas, Visual MODFLOW, ModelMuse
- ◆ Solute transport models for in-situ remediation, with MT3D/RT3D & Bioplume
- ◆ Density & heat coupled models with SEAWAT
- ◆ Automated parameter estimation with PEST, including SVDA
- ◆ Multi-parameter uncertainty analysis, including Monte Carlo methods



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We combine reliable expertise with regulatory knowledge



Get high quality output and performance on-time and on-budget

ENVIRONMENTAL ASSESSMENT

We have extensive experience in contaminated land investigation, management & redevelopment. We provide professional risk assessment and remediation of land & groundwater including all associated technical consultancy, such as:

- ◆ Preliminary Site Investigations (PSI)
- ◆ Sampling, Analysis & Quality Plans (SAQP)
- ◆ Detailed Site Investigations (DSI)
- ◆ Site Management Plans (SMP)
- ◆ Remediation, validation & on-going management plans (RVoM)
- ◆ Risk assessment (qualitative, quantitative, probabilistic, human health, ecological)
- ◆ Monitoring programs (soil, groundwater, soil gas, sediment)
- ◆ Landfill investigation & management (Landfill gas (LFG), leachate, groundwater)
- ◆ Soil vapour assessments
- ◆ Fate & transport modelling
- ◆ Enhanced In-situ bioremediation (EISB)
- ◆ Permeable reactive barriers (PRB)
- ◆ Pump-&-treat
- ◆ Monitored natural attenuation (MNA)
- ◆ Asbestos investigation & remediation
- ◆ Acid Sulfate Soils (ASS)
- ◆ Residential redevelopment
- ◆ Industrial redevelopment
- ◆ Contaminated soil treatment & rehabilitation
- ◆ Waste management



SURFACE WATER

We complement our groundwater capability with surface water expertise, covering the full water cycle. We have undertaken surface water studies for mining, urban development & agricultural projects, including BHP Billiton, City of Stirling & Perth Airport. Our capabilities include:

- ◆ Climate change/stochastic models
- ◆ Nutrient & Irrigation Management Plans (NIMP)
- ◆ Urban Water Management Plans (UWMP)
- ◆ Sustainable Urban Drainage systems (SUDs)
- ◆ Drainage & catchment studies
- ◆ Minesite water management & pit-water long-term quality
- ◆ Rainfall runoff, evaporation & infiltration recharge
- ◆ Stormwater modelling & management
- ◆ Salinity studies, salination management
- ◆ Baseflow separation, groundwater interaction
- ◆ Managed Aquifer Recharge (MAR)
- ◆ Waste water design



GROUNDWATER PROJECTS

- ◆ **Chlor-Alkali Plant:** monitoring review, hydraulic investigation and solute transport model for recovery operations, Kemerton
- ◆ **Rio Tinto:** monitoring, risk assessment & remedial action plan
- ◆ **GASFAMS:** DoW-acclaimed regional conceptual model for the Cymod Carnarvon water supply system
- ◆ **Agrochemical manufacturer:** environmental management plan for a heavy metal groundwater plume, Kwinana
- ◆ **Aggregate producer:** groundwater model for quarry dewatering and subsidence impacts
- ◆ **Process supplies for minefields:** Peak Hill Resources, Goldfields; Bulla Bulling mine, Goldfields; Gwalia Consolidated mines, Pilbara
- ◆ **BHP Billiton Iron Ore:** hydrogeological review of Port Hedland Operations; review of bore licensing requirements
- ◆ **British Nuclear Fuels:** deep bore construction and hydraulic testing
- ◆ **National Water regulator:** determination of source protection zones
- ◆ **Aboriginal & Torres Strait Islander Commission:** development of potable water supplies at Kimberley aboriginal communities
- ◆ **Department of Defence:** analytical model for the VLF array at Harold Holt Base, Northwest Cape
- ◆ **FQM Australian Nickel:** groundwater monitoring review & forward plan
- ◆ **Water Corporation:** nutrient loading assessment for waste water discharge, Derby



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