



Water dams in mining

Identifying needs

Water management is integral to successful mining operations, particularly in arid environments where water scarcity presents significant challenges to the ongoing success of an operation. In addition to tailings storage facilities, mining operations usually require separate dams on site to fulfil functions such as water supply for mineral processing, sediment control, storage of recycled water, storage of water prior to treatment and discharge, evaporation of surplus water and to assist with the management of water quality and quantity on site.

When properly managed, mine water can be turned from a potential liability into an asset, including treatment of mine water for reuse and even hydropower schemes which seek to capitalise on the topographical features brought about by the mine and the available water.

Service offering

Our team offers the following services associated with mining related dam design, construction and operation:

- Geotechnical site investigations including evaluation of foundations and identification and testing of construction materials
- Optimising the proposed dam capacity, location and design to suit the requirements of each specific site
- Selection, specification and assessment of lining, leak detection and monitoring systems
- Concept and detailed design
- Hydrological analysis including water balance and design of assisted evaporation systems
- Diversion and spillway design

- Water quality assessment (surface and groundwater)
- Structural analysis and design of appurtenant structures
- Access layout design
- Construction support and fulfilment of regulatory requirements
- Mechanical control equipment for outlets and spillways
- Environmental studies and permitting assistance
- Preparation of operation and maintenance manuals and dam safety emergency plans
- Dam safety inspections, monitoring and surveillance including regulated dam surveillance surveys

Benefits

Our extensive range of capabilities in dam design and related fields allows us to draw on a wealth of experience to satisfy site specific project objectives. For nearly a century, we've built an employee-owned company powered by knowledge, diversity of thought and experience. Today, more than 10,000 empowered people on five continents are focused on tackling our clients' challenges with clarity and imaginative thinking to deliver transformational outcomes.

Experience

We have specialist dams and geotechnical engineers with a broad range of experience in delivering solutions to the challenging requirements of dams for the mining industry. Examples of some of GHD's completed projects are summarised below.



Mine Water Management Dams (Investigation, design and construction services) - Northern Territory

GHD has undertaken investigation, design and construction phase services for multiple lined water storage dams to assist the mine in dealing with potentially contaminated water. Designs carefully considered the site constraints and adopted practical and affordable methods for seepage control, which included considering a range of different lining systems including clay, HDPE, Bituminous Geomembrane and geocomposite options. Innovative methods for liner construction have been developed as part of ongoing construction.



Historical Mine Water Supply Dams (Assessment and Surveillance) - Tasmania

GHD provided engineering services for two historical concrete arch dams supplying water to a mine. These two concrete arch dams were constructed over 100 years ago and still serve as the primary source of water to support operations at the mine. Our team undertook a Safety Review for the dams and developed options to extend their operating life. Furthermore, GHD has undertaken regular dam safety surveillance, designed modernised monitoring instrumentation for the dams and prepared regulatory documentation.



Evaporation Pond (Design and Construction Services for Raising) South Australia

Provided engineering services for raising an evaporation pond at a mine site, from option framing through to detailed design and onsite technical support. The key benefit to the client was the creation of an additional 1,000 ML of evaporation pond capacity required to meet operational requirements. The 5 m raise has a composite liner system including, locally sourced fill, with a synthetic liner and leak detection system. The works also included structural, mechanical, pipework, electrical, instrumentation, inlets and outlets.



Coal Seam Gas water management dams Queensland

We were engaged to conduct designs for a series of 18 CSG HDPE lined water management dams (up to 500 ML) across southeast Queensland, from greenfields status through to construction, including management of multi-disciplinary design teams. The commission included assessment of dam performance requirements, cost optimisation, flood routing, water management and dam design.



Coal Power Station cooling water pond - Victoria

A Comprehensive Safety Review was undertaken for a 30 GL pond with two embankment dams, each 1600 m long, including geotechnical investigation (geophysics, CPT probing, borehole drilling and lab testing), liquefaction assessment, stability analysis and finite element deformation analysis. The risk of failure of the dam and its appurtenant structures was assessed, and preliminary designs produced for risk mitigation options.



Mine Water Dams (Inspection, assessment and remediation design) - Western Australia

GHD provides annual inspection, comprehensive inspection, dam management documentation and Safety Review advice for a number of clients in Western Australia. The largest of these dams has a storage capacity in of 32 GL; the highest of these dams is 25 m high. Many of these sites have multiple storage facilities. In addition to the inspection services, GHD provides on advice on remedial works upgrade options for these dams and on proposals for new storage facilities.



Reject emplacement area seepage and runoff collection dams NSW

GHD was engaged to provide site-specific design for a series of three lined water management dams in the Western Coalfields near Lithgow, NSW. The challenges included managing restricted construction space for the performance objectives and satisfying strict environmental requirements next to the adjacent World Heritage listed National Park. Innovative integrated solutions were successfully developed for the dam designs.

To touch base with the key person in your region, visit www.ghd.com/dams

