



TAILINGS

F I R S T

A BEST-PRACTISE APPROACH TO
TAILINGS MANAGEMENT

BEST PRACTISE

GBG LEADS THE WAY

Within industry, the consultant and the client always strive to achieve 'best practise'. Operating within tailings facilities, this is executed by adhering to the latest and most-improved processes, learning from past events, being open with community, tailoring the dam to appropriate conditions, and attaining the best-possible dataset to design a strong and economical tailings dam.

GBG is proud to be working within the Australian Government handbook *Leading Practise Sustainable Development Program for the Mining Industry*, released in 2016.

Since then, GBG has been operating closely to the handbook and creating best-practise enduring value from its framework.

GBG leads by example and conforms with 'early and ongoing consultations, information sharing and dialogue with stakeholders that are required during the design, operation, and closure phases'.

By aligning closely with industry best practise, GBG provides a framework to the client that falls in line with applicable audits and ongoing document control.





IS PROUD TO PRESENT



Tailings First is a unique product combining industry-proven geophysical methods, geotechnical physical characterisation, hydrogeological modeling and assessment, and airborne methods for point-based data capture.

Tailings First practises to deliver a life-of-tailings facility, holistic product: 'A best-practise tailings management product assisting companies to achieve industry-leading, safe and effective storage facilities over the lifetime of their tailings dams.'

OUR PAST CLIENTS INCLUDE BHP, RIO TINTO, OIL SEARCH, NEWCREST, ADVISIAN, GHD, CARDNO, AND MANY MORE

THE PRODUCT

PLANNING AND DESIGN

With any plan, best practise is to gain an understanding of the surface. With CASA approved pilots creating flight plans and lodging permits, GBG will complete initial site surveys and provide base high-res images of the natural ground state.

If flying over a current TSF, GBG can provide LiDAR, elevation models and orthomosaics of the 'time of flight' ground conditions. Once a ground model is created, GBG can plan and execute geophysical ground investigations, complete and compile geological studies into the natural rock layering, and collate all datasets into a working 3D model.

GBG owns and operates their own geophysical equipment, so there are never timing issues around equipment availability. Some examples of results can

include structural geology investigations, combined with magnetics and seismic surveys, ground truthed with boreholes and water monitoring wells creating a holistic subsurface picture to 150m.

Some benefits of having multiple input datasets include: providing flow paths of natural rainwater from LiDAR models, interrogating wall cross sections to analyse wall health, and foundation investigations that may provide detail on wall subsidence or beach cracking extending with depth.

GBG can also facilitate best-practise framework with collection of samples at the earliest of stages, for ongoing impact studies into the effect of the tailings on the subsoil or basement of the dam over the life of slurry deposition in a real-world environment.



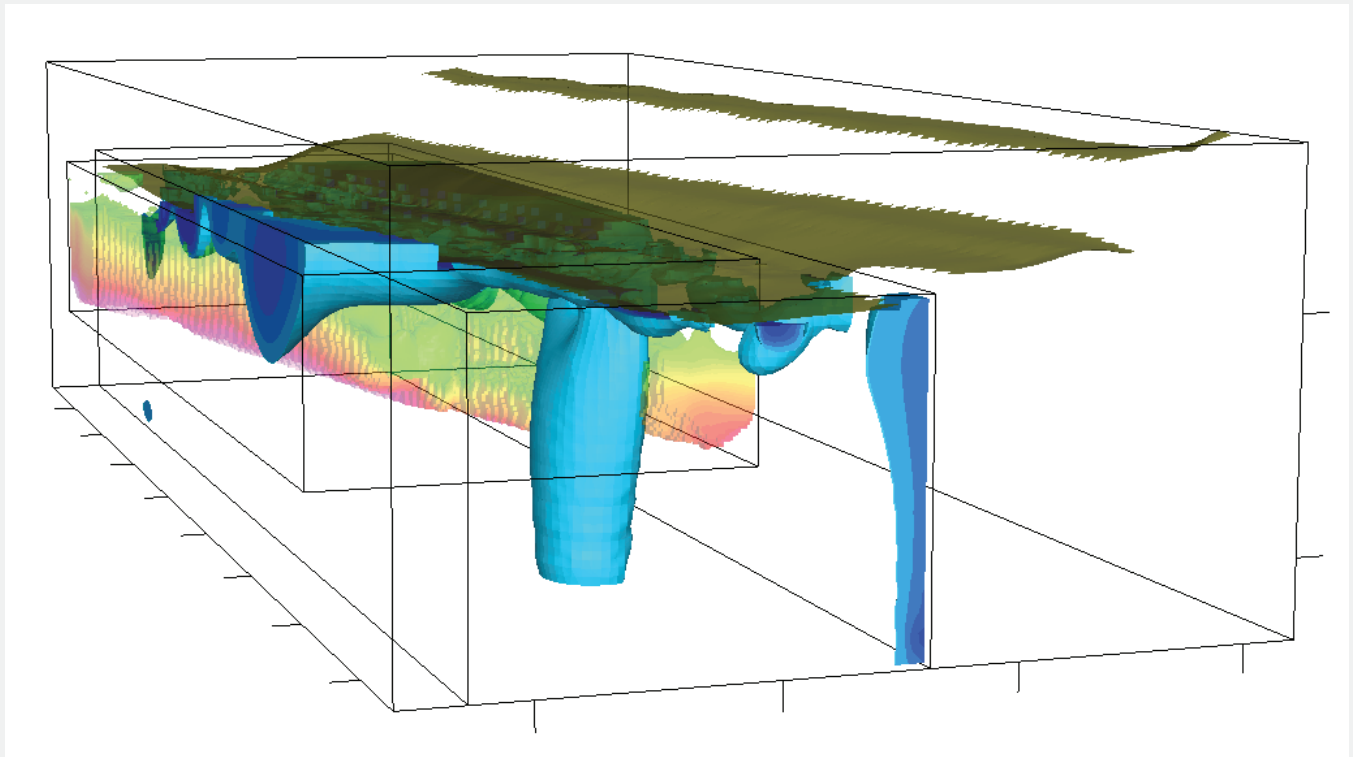


IMAGE: A COMBINATION OF DATASETS ON A TAILINGS DAM WALL CONFIRMING THE HEALTH OF THE UPSTREAM RAISES. GBG COMPLETED A SURFACE DTM COMBINED WITH A GEOPHYSICAL SEISMIC AND RESISTIVITY MODEL, WHICH WERE PHYSICALLY CALIBRATED WITH DRILL HOLES AND HYDROGEOLOGICAL MODELS. ALL DATA WAS INPUT INTO A 3D MODEL AND SUBSEQUENTLY ANALYSED IN LEAPFROG.



CONSTRUCTION AND WALL RAISES

Through all phases of construction, GBG can provide detailed consultation, industry advice, project management, laboratory works, geotechnical investigation, hydrogeological studies and site characterisation.

GBG understands the importance of timing when dealing with tailings projects and can therefore advise on any aspect of the project.

Stages may include: pre-feasibility, feasibility, site characterisation, elevation survey, subsurface geophysical survey, intrusive testing, 3D datasets, real-time monitoring, drone surveying, LiDAR, laboratory testing and ongoing subsoil studies over time.

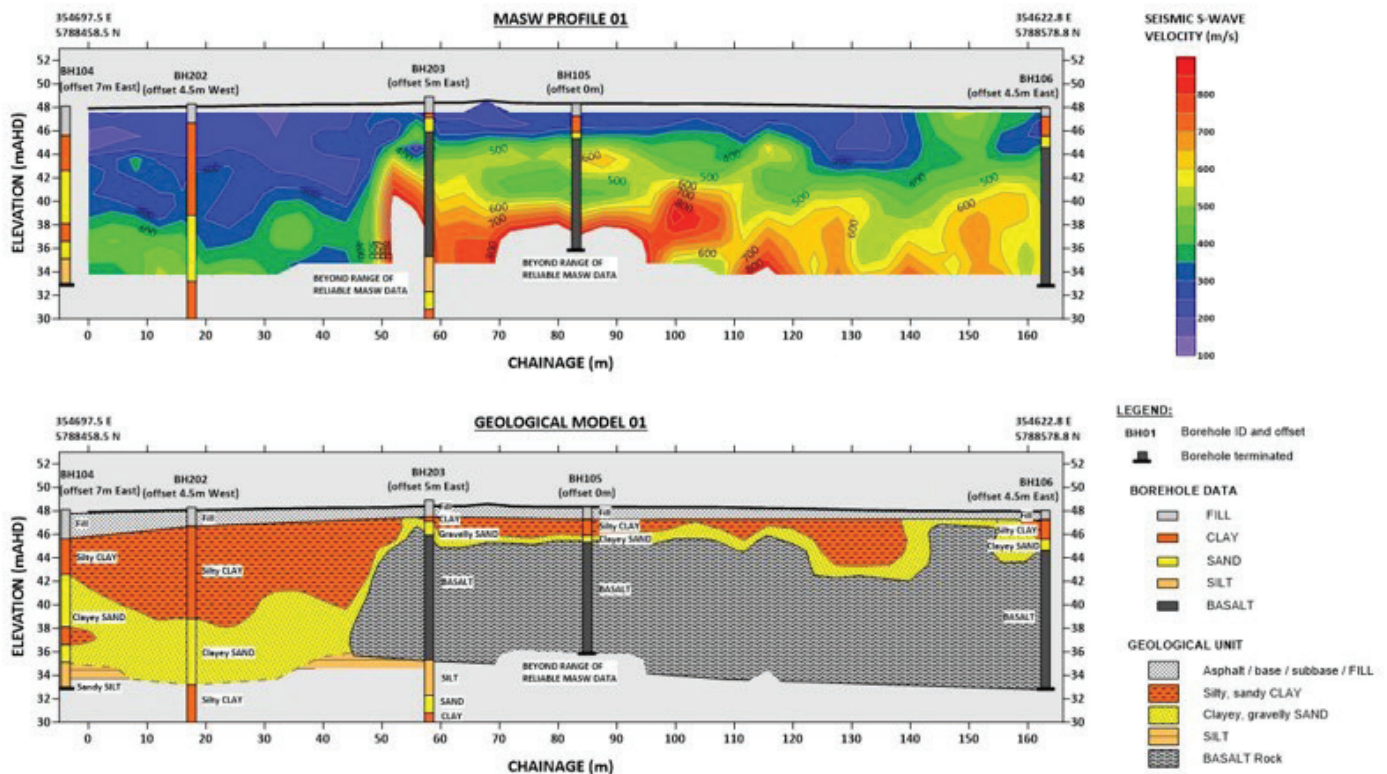


IMAGE: A COMBINED GEOPHYSICAL AND BOREHOLE PROFILE OUTLINING THE CORRELATION OF SEISMIC DATA COLLECTION AND ITS ACCURACY TO BOREHOLE PHYSICAL DATA. WHEN COLLECTED ALONG TAILINGS WALLS OR AT FOUNDATION LOCATIONS, GEOPHYSICS CAN PROVIDE IMPORTANT ENGINEERING INFORMATION FOR DETAILED DECISIONS.

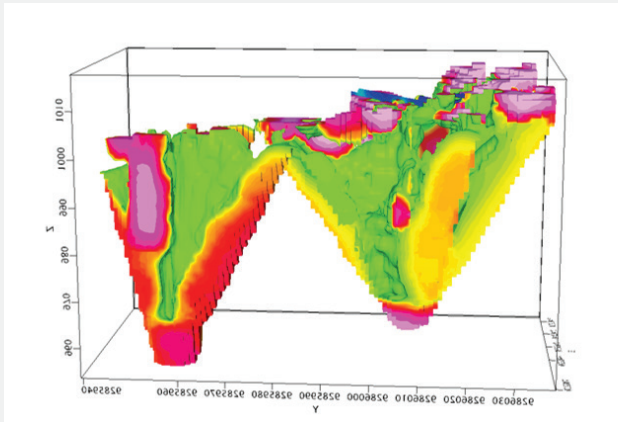


IMAGE: A 3D DATASET OUTLINING LOW VELOCITY AREAS AT DEPTH CORRELATING TO VOIDED AREAS UNDER A PROPOSED TSF SITE.



IMAGE: A SINKHOLE FORMING WITHIN A TAILINGS BEACH AFTER SLURRY DEPOSITION. INVESTIGATIONS OUTLINED ITS EXTENT FOR REMEDIATION PLANNING.

ONGOING MAINTENANCE

Ongoing assessments and closure audits are a known process in tailings management. It is therefore paramount to keep and understand datasets for new, older and legacy tailings facilities.

GBG can collate and create a 3D space where the life of the TSF is recorded. These can even include seepage issues, acid forming mineral (AFM) studies and groundwater impact studies.

GROUNDWATER

Groundwater impact studies are a known and necessary part of tailings management. GBG works closely with Ecological Australia on groundwater model creation, subsurface system confirmation and ongoing evolution. GBG can advise and complete any single or ongoing groundwater impact study.

CLOSURE AND REHABILITATION

Closure and rehabilitation are sometimes overlooked in the initial plans when for a tailings dam. But, if not properly accounted for, their absence can have catastrophic affects. Some include:

- Remobilisation of critical minerals by wind and water into nearby waterways or public zones,
- Acid and Metalliferous Drainage (AMD), typically combined with mobile saline fluids,
- Wall failure due to incorrect wall-raise techniques or failure to investigate wall construction prior to closure.

In the event where a tailings dam is not planned for its closure, it has the potential to be a catastrophic risk to humans and the environment. GBG has the advice and processes to help put plans in place for any TSF closure.

GET IN TOUCH

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