

Maximising regional opportunities for in-pit tailings disposal for Queensland coal mines

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INTRODUCTION

One of the key challenges for the mining industry globally is the rehabilitation of mine waste, and Queensland is no exception.

Out of pit waste structures including waste rock dumps and tailings storage facilities, create novel landforms which require ongoing maintenance and pose risks to the environment and sometimes to communities. Where multiple mines co-exist, such as parts of Queensland's Bowen Basin, individual mines can often be constrained by adjoining operations. This presents opportunities for broader rehabilitation strategies to be considered, more than the current single mine focus, that may provide better environmental outcomes for a region.

Given recent global disasters involving tailings storage facilities, and our team's endeavours to drive Queensland to achieve leading practice in mined land rehabilitation, we are exploring the potential to maximise in-pit tailings disposal opportunities for coal mines through shared waste management strategies.

A shared waste management strategy is where two (or more) mines, owned by different companies and operated under different environmental permits, transport tailings from one mine to the other in close proximity, for disposal in a disused pit. This would reduce the number of waste structures to be built, operated, rehabilitated, and managed in perpetuity.

Our objectives are to identify and remove barriers to tailings transfers between sites to:

- minimise environmental risk
- minimise long-term liability of managing mining waste and associated structures, and
- support improved outcomes for the local community.

To determine the scale of coal waste disposal practices in Queensland, internal data and publicly available imagery was analysed by the Department of Environment and Science (2022). Approximately 6,500 ha of land in Queensland is utilised for coal mine tailings storage facilities or co-disposal areas, with $\approx 3,700$ ha of this being out of pit.

BARRIERS TO SHARED COAL MINE WASTE MANAGEMENT

As there are currently no examples of shared coal mine waste disposal strategies in Queensland, it is necessary to investigate and synthesise if there are barriers to such a strategy.

We grouped potential barriers into three main categories – regulatory, operational and financial. Each of these groups was investigated to understand the nature of their extent and significance.

Regulatory barriers

We investigated the legislative and policy settings that intersect with inter-mine waste transfers. Firstly, we investigated the pathway for shared mine waste disposal opportunities under current Queensland legislation. Following this investigation, further research was undertaken into which

pieces of legislation, policies, standards and systems need to be considered and requirements addressed an if inter-mine waste disposal strategy were to be pursued.

Although disposal of waste substances resulting from the winning or extraction of a mineral is included in the definition of a 'mine' in Queensland (Section 6A of the *Mineral Resources Act 1989*), there are overlaps with the *Waste Reduction and Recycling Act 2011* (WRR Act), *Environmental Protection Act 1994* (EP Act) and Environmental Protection Regulation 2019 which impact shared mine waste approaches.

The WRR Act sets out the waste management hierarchy for the State, with disposal being the least preferred option. However, where disposal is the only option, the WRR Act doesn't account for the merits of different disposal options. The WRR Act also defines what a waste disposal facility is, waste levy requirements, exemptions, and end of waste codes.

The EP Act sets the environmental regulatory framework for the State, including how environmental authority (EA) permits and progressive rehabilitation and closure plans (PRC plans) are granted and managed. Although no coal mining EAs currently allow shared waste management strategies, the EP Act does not explicitly prevent the approach, and therefore such strategies could be considered.

Environmental Protection Regulation 2019 defines regulated and non-regulated waste and sets out the environmentally relevant activities (ERA's).

Operational barriers

Operational considerations include progressing any required amendments to both mines' EAs, estimated rehabilitation cost payments and possibly PRC plans, if either mine has one approved. Physical operational barriers are harder to define, as they are specific to the sites involved in the shared waste management strategy. However, considerations include: volumes of waste to be accepted, type of waste to be accepted, geotechnical stability, location of infrastructure between sites and any characterisation required to ensure the receiving mine is willing to accept the tailings and inform how it would need to be managed to ensure the protection of environmental values. Considerations also include how the waste would be moved: whether it would need to leave a mining tenure, how it would be physically transported, any impacts to the Site Senior Executive role and requirements, and any internal operational and safety documents that would need updating to give effect to the strategy.

Financial barriers

An investigation of the financial barriers provided the majority are matters for the companies.

One financial barrier in the public domain however is the impact to the mines estimated rehabilitation cost calculations. The source mine for the waste would not have to build and/or operate, manage and rehabilitate an out of pit tailings storage facility, which would have significant impacts to the estimated rehabilitation cost calculations. The receiving mine would also have greater backfill material from the waste and likely have to source less material to backfill the void being used, which may reduce costs and produce a landform that is closer to pre-mining contours than may otherwise be achieved.

Another barrier is in relation to liability. The implications of where the liability for the waste rests has costs, however the liability in itself could also be a barrier for the company who would have to accept that responsibility.

CONCLUSION

Despite the many considerations and current barriers to their adoption, the development of shared waste management strategies between mining operations presents opportunities for significant benefits to the environment and stakeholders through reduced waste structures to be rehabilitated and left in perpetuity to be managed in the region. To help realise the benefits of shared coal mine waste strategies, the Office of the Mine Rehabilitation Commissioner is undertaking further work, with the aim to present a conceptual model of an inter-mine tailings transfer scheme.

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