



Achieving improved rehabilitation for Queensland: addressing the state's abandoned mines legacy

Discussion paper

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Executive summary

On behalf of the Queensland Government, the Department of Natural Resources, Mines and Energy (DNRME) has responsibility for the management of abandoned mines throughout Queensland. DNRME assesses and monitors the risks of these sites and prioritises government funding to mitigate and eliminate risks to community safety and health, the environment and property.

DNRME recently reviewed all available information on abandoned mines and identified approximately 120 sites that form the Abandoned Mine Priority sites with a combined area of disturbance of just over 10 300 hectares. The remaining 99 per cent of the 15 000 ‘known’ or ‘identified’ sites represent historical mining disturbances where there are generally very small workings associated with historical mining activities.

The Queensland Treasury Corporation undertook a review of Queensland’s Financial Assurance (FA) Framework in 2016 to reduce the Queensland community’s exposure to the financial and environmental costs of managing land disturbed by resource activities, including both mining and petroleum. The review proposed a redesigned financial assurance framework to better protect the State’s financial and environmental interests, should a resource company not meet statutory rehabilitation and environmental obligations.

The reform ideas presented in this discussion paper are complementary to the Financial Provisioning Scheme (FPS), proposed to be established in the Minerals and Energy Resources (Financial Provisioning) Bill 2018 (the Bill), and aim to provide the Queensland Government with greater capacity to manage both the risks and opportunities of abandoned mines. The expansion of abandoned mines management was one of the reform areas identified, which aims to:

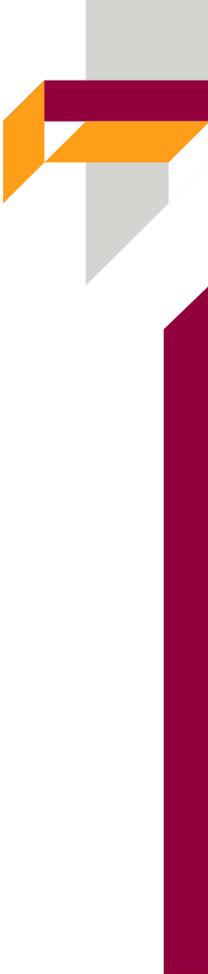
- create greater capacity to mitigate the environmental and safety risks associated with the state’s higher risk abandoned mines and disclaimed operations
- create greater opportunity to commercialise the remaining resources in abandoned mines
- develop new initiatives that will provide incentives for private investment in abandoned mines.

These reforms create further opportunity in which to review the current whole of government approach to managing abandoned mines and to assess whether there are further efficiencies to be gained by:

- clearly articulating the Queensland Government’s objectives for managing abandoned mines
- supporting improvements to legislative and regulatory frameworks to better assist the Queensland Government and the private sector rehabilitate and repurpose sites
- improving the administrative processes by which sites are prioritised to ensure a more efficient allocation of Queensland Government’s resources
- building Queensland Government’s capacity to deliver its programs including skills and systems capabilities.

This discussion paper outlines the government’s proposed approach in each of these areas.

This paper summarises the proposed reform ideas that will allow the risks associated with abandoned mines to be more effectively managed.



It is proposed that DNRME's prioritisation and operating framework be enhanced to update the process by which abandoned mines are risk assessed, prioritised and progressively incorporated into a schedule of works. This process will prioritise the three sub-categories of abandoned mines (legacy mines, pre-commencement terminated mines and historical mining disturbances – see Table 1 on page 5 for details) into three classifications (priority site, surveillance site, low concern site) that accurately reflect the risks and opportunities posed. This paper further explores the standards of works that DNRME, on behalf of the government, will undertake to make abandoned mines safe, secure, durable and where possible, productive. Engagement with stakeholders and the FPS Advisory Committee, (which provides counsel to the FPS Scheme Manager for claims made on the FPS Rehabilitation Fund), will also occur regarding the standard of rehabilitation works.

It is in the public interest to ensure that the value of abandoned mines and the remaining infrastructure and/or residual resources is optimised. It is proposed that works on abandoned mines are structured into three programs including (i) minor works, (ii) major works and (iii) the repurposing of sites to optimise the use of the residual resource or for an alternative, more productive use where possible.

The reform ideas proposed in this paper are intended to stimulate discussion regarding the management of abandoned mines. They do not represent the final views of government. This discussion paper seeks public comment to allow the Queensland Government to systematically develop views on the reform ideas presented. To assist this, a number of questions have been asked throughout the document and summarised in the 'Have your say' section located at the end of the paper. All feedback will be submitted to the government for its consideration. The Queensland Government welcomes any additional ideas or options stakeholders might have on these matters.

Introduction

The Department of Natural Resources, Mines and Energy (DNRME) manages abandoned mines in Queensland. This includes assessing and monitoring the risks of these sites and prioritising government funding to mitigate and eliminate risks to community safety and health, the environment and property.

In 2016, the Queensland Treasury Corporation undertook a review of the financial assurance framework for the resources sector. The review recommended wide-ranging reforms to:

- better protect the state’s financial interests
- reduce the financial burden for industry
- promote good environmental outcomes.

The Queensland Government is developing a reform package in response to the recommendations of the review. The package will be progressively rolled out to deliver positive rehabilitation outcomes and a new financial assurance framework, referred to as the Financial Provisioning Scheme. The financial assurance framework reform discussion paper outlines the package of reforms.¹

The expansion of abandoned mines management was a reform area identified, which aims to:

- create greater capacity to mitigate the environmental and safety risks associated with the state’s higher risk abandoned mines and disclaimed operations
- create greater opportunity to commercialise the remaining resources in abandoned mines
- develop new initiatives that will provide incentives for private investment in abandoned mines.

The new Financial Provisioning Scheme (FPS) will differentiate between mines that become abandoned mines before and after the commencement of the scheme. This discussion paper outlines the government’s proposed approach to enhance the management of mines abandoned **before** the commencement of the FPS (pre-commencement abandoned mines²)—categorised as legacy mines, pre-commencement terminated mines and historical mining disturbances.

Sites that become abandoned mines **after** commencement of the scheme will be categorised as post-commencement terminated mines. These mines will have different arrangements for realising financial assurance and are outside the scope of this paper. For further information, please refer to the 2017 ‘Financial Assurance Framework Reform’ discussion paper and the Bill.

Have your say

The Queensland Government is seeking industry and community feedback on the reforms proposed in this paper. There are questions posed throughout the document including the ‘Have your say’ section at the end of this document. The government welcomes any additional ideas or comments on these matters.

Please note: Financial assurance and rehabilitation–related policy issues and reforms have been or are being addressed through other processes and fall outside the scope of this paper.

1 *Financial assurance framework reform: discussion paper*, available at <https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/>.

2 See clause 64 of the Mineral and Energy Resources (Financial Provisioning) Bill 2018.

Background

Abandoned mines in Queensland

Abandoned mines³ in Queensland cover an estimated 10,300 hectares of disturbances. The *Mineral Resources Act 1989* defines an abandoned mine as a site:

- (a) where mining or mining exploration activities have been carried out
- (b) for which no current mining lease or mining claim is granted
- (c) for which no environmental authority is in force for activities mentioned in paragraph (a) that were carried out under a mining lease or mining claim that is no longer in force.

The Mineral Resources Act does not seek to categorise abandoned mines according to their risk profile, so estimated reports of 15 000 abandoned mines can be misleading given the vast majority are very small and do not share characteristics common to a contemporary mine. A very high percentage of these sites were mined in the ‘gold rush’ of the late 1800s to early 1900s using relatively unsophisticated methods, such as hand tools, with small disturbances to the land. These historical sites were mined before the introduction of strict environmental regulations. DNRME proposes to categorise these sites as ‘historical mining disturbances’ as their risk profile is generally considered to be low.

In 2000, the *Environmental Protection and Other Legislation Amendment Act 2000* amended the *Environmental Protection Act 1994* to transfer environmental regulation of the mining industry from the former Department of Mines and Energy (now DNRME) to the former Queensland Environmental Protection Agency (now the Department of Environment and Science). These amendments resulted in stronger environmental management and rehabilitation requirements for mining activities under an environmental authority. The environmental authority provides an approval to undertake environmentally relevant activities (either industrial, resource or intensive agricultural activities) that have the potential to release contaminants into the environment.

Revised classification of sites

Abandoned mines that were relinquished prior to the amendment of the Environmental Protection Act in 2000 generally had either:

- special lease conditions relating to rehabilitation
- rehabilitation conditions determined at the Minister’s discretion, or
- no specific rehabilitation requirements.

As such, DNRME proposes to categorise these sites as ‘legacy mines’ due to limited or no obligations having been placed on the operator to decommission or rehabilitate the site.

The circumstances surrounding the creation of legacy mines are fundamentally different to those classed as ‘pre-commencement terminated mines’, at which mining activities were terminated and the operator failed to fulfil their strict environmental and rehabilitation obligations.

Categorising abandoned mines as legacy mines, pre-commencement terminated mines and historical mining disturbances will more accurately describe the scale and type of risks associated with these abandoned sites. The defining characteristics of the three subcategories are outlined in Table 1 below.

³ A site on a current mining lease that is deemed to be in care and maintenance is not an abandoned mine, as the mining lease and environmental authority remain active. Noting there is no legal definition of ‘care and maintenance’ either under the *Environmental Protection Act 1994* or *Mineral Resources Act 1989*.

Table 1: Characteristics of legacy mines, pre-commencement terminated mines and historical mining disturbances

	Legacy mines	Pre-commencement terminated mines	Historical mining disturbances
Description	<p>Ceased production prior to the Environmental Protection Act amendments in 2000 and have features in common with a contemporary mine created by mechanised mining methods</p>	<p>Ceased production after the Environmental Protection Act amendments in 2001 without fulfilling rehabilitation obligations</p>	<p>Ceased production prior to the Environmental Protection Act amendments in 2000 and do not have features in common with a contemporary mine</p> <p>Characterised by small-scale, non-mechanised mining methods</p>
Approximate size	Medium to very large	Small to very large	Very small to small
Approximate number	120	4 major sites	15,000
Typical commodities	Precious and base metals, bauxite, tin and coal	All commodities	Precious and base metals, tin, gemstones and coal
Features	<p>Consistent with surface, underground or alluvial mining methods (e.g. open-cut mines, large underground developments, waste rock dumps, heap leach pads, crushing and processing plants, concentrators, smelters and tailings storage facilities)</p>	<p>Consistent with all mining and resource extraction methods (e.g. open-cut mines, underground developments, waste rock dumps, heap leach pads, crushing and processing plants, concentrators, smelters and tailings storage facilities)</p>	<p>Consistent with surface and underground mining methods (e.g. small waste rock dumps, small shafts with minor underground workings, shallow pits and open or collapsed trenches)</p>
Examples	<ul style="list-style-type: none"> • Mount Morgan • Mary Kathleen • Mount Oxide 	<ul style="list-style-type: none"> • Linc Energy Hopeland site • Collingwood Tin Mine • Mount Chalmers Gold Mine • Rishton Gold Mine 	<ul style="list-style-type: none"> • Gympie goldfields • Charters Towers goldfields • Stanthorpe and Herberton tin mining areas

Legacy mines

Queensland has approximately 120 legacy mines. These sites have characteristics consistent with a contemporary mine as they are typically defined today, such as an open-cut mine or a large underground development created by modern, larger scale mechanised mining methods. Mount Morgan is the largest and most complex legacy mine.



Mount Morgan Mine

Mining operations at Mount Morgan began in 1882 and ceased in November 1990. The state government took over management of the site in 1993. Key site management activities include:

- minimising the volume of rainfall that collects in the mine pit and infiltrates stockpiles
- lime treatment of acidic mine pit water and release of treated water to reduce risk of uncontrolled discharges
- operation of evaporators to reduce pit water levels
- interception of seepage from stockpiles
- focusing on safety and maintaining key infrastructure, supported by contingency and disaster management plans
- managing safety risks relating to heritage-listed infrastructure and stockpiles.

Pre-commencement terminated mines

DNRME is currently managing four sites categorised as pre-commencement terminated mines in Queensland, including the Linc Energy Hopeland site, Collingwood Tin Mine, Mount Chalmers Gold Mine and Rishton Gold Mine. While these sites were subject to active mining leases at some point since 2000, for various reasons activities ceased and liquidators were appointed. As part of liquidation, the mining leases were disclaimed⁴ and responsibility for managing the former mine sites and associated liabilities left by the operators has reverted to the government.⁵

In addition to these four sites, there are numerous other small mining leases that have either been cancelled or expired. Financial assurance is held for the majority of these sites.

⁴ Under the federal *Corporations Act 2001*, liquidators may disclaim or terminate a company's rights, interests or liabilities in, or with respect to, onerous property, including land and any resources tenures held by the company.

⁵ The difficulties of managing of sites that have been disclaimed by liquidators will be presented in more detail in a discussion paper on resource authority risks and proposed solutions to improve rehabilitation, which was released in May 2018—the discussion paper will propose reforms to better manage the risks created by the disclaiming of resource tenures.



Collingwood Tin Mine

Mining at Collingwood Tin involved extracting tin ore from underground workings through a crushing and gravity separation process. Following various small-scale mining operations, full-scale mining and mineral processing occurred between 2005 and 2008 when tin prices quadrupled. The mine was placed into care and maintenance in 2008 and the site proposed for sale. The former mine site operator was placed into liquidation in June 2015 and the mining leases over the site were disclaimed, effectively removing all responsibility for rehabilitation of the site by the former operator. The site is now managed by DNRME.

Historical mining disturbances

Historical mining disturbances include features such as shallow workings, small excavations and stockpiles, open and collapsed trenches, remnant waste rock dumps, shafts and remnant mining infrastructure. These features are often in very isolated and inaccessible rural locations and, to the untrained eye, are not easily identifiable as remnants of mining activity. These features are commonly clustered in historic mining fields and are generally legacies from the gold and tin mining era of the late 1800s to early 1900s. Mining activity in this era predated any environmental regulation requiring the close out of a mining site. Many of these sites are listed on the Queensland Heritage Register.



Example of an historical gold mining operation at Charters Towers, circa 1890
(source: State Library of Queensland)

The majority of these disturbances have a very small or sometimes indistinguishable surface impact. While individual features such as open shafts may present local hazards, many of these areas have merged back into the landscape or naturally stabilised over time. These sites are inspected, catalogued and assessed based on risk as part of a ground-truthing program. Significant risks are addressed by follow-up earth works. The following images provide examples of the types of historical mining disturbances commonly encountered in the landscape.



Small open shaft



Shallow surface workings



Remnant mining infrastructure

Legislative provisions

The Mineral Resources Act includes provisions for undertaking activities on abandoned mines. The Act provides the Chief Executive of DNRME with powers to authorise a person or persons to carry out the following activities on land where an abandoned mine is located:

- investigate the condition of the land
- cap a mine shaft
- remove, or make safe, structures or equipment at or near the abandoned mine
- clean up pollution remaining at or near the abandoned mines
- repair erosion, or prevent further erosion, of land or vegetation at or near the abandoned mine
- another activity at or near the abandoned mine to make it safe.

Amendments to the *Petroleum and Gas (Production and Safety Act) 2004* to introduce a new framework for safely managing abandoned operating plants were re-introduced into the Legislative Assembly on 15 February 2018. The abandoned operating plant framework includes provisions similar to those in the *Mineral Resources Act 1989*.

Abandoned Mine Lands Program

DNRME receives funding from consolidated revenue to undertake the following activities⁶:

- historic shaft repair programs involving a combination of planned close out and reactive response to subsidence
- Collingwood Park Monitoring and State Guarantee Response
- management of risks of pre-commencement terminated mines
- legacy mine management, maintenance and monitoring—currently includes the following high priority sites
 - » Mount Morgan Mine, including water treatment facilities
 - » Mount Oxide
 - » Horn Island Gold Mine
 - » Croydon Gold Group
 - » Irvinebank Target Gully tailings storage facility
 - » Herberton tailings storage facility.

Earthworks, capping of waste rock dumps and tailings storage facilities, water treatment and water management activities (such as managing contaminated seepage from mineral waste) are examples of the works required on priority abandoned mines. These works benefit the community in a variety of ways, such as eliminating (or restricting access to) physical hazards and improving air and water quality for adjacent landholders and communities by the removal and/or reduction of contaminants.

⁶ In the 2016–17 Budget, the Queensland Government provided the Abandoned Mine Lands Program with \$42 million over 5 years to 2020–21, with \$8 million ongoing from 2021–22 to manage the public safety risks associated with abandoned mines across Queensland.

Charters Towers Shaft Repair Program

Charters Towers was established as a result of gold mining beginning in the 1870s. The town has a rich history associated with Queensland mining booms. There are more than 1000 historic mine shafts; however, the actual number is uncertain because of incomplete records, particularly for mining conducted during World War I, World War II and the Depression.

DNRME has a dedicated shaft repair program that responds to subsidences and undertakes repairs to make the site safe. The program also progressively investigates known historic shaft sites based on potential risk. Once the historic shaft location is confirmed, generally by excavation, a stable base is prepared at bedrock level and an engineered concrete cap is set in place as a cover before the site is restored to a safe and stable state. Work is also done on freehold land within the city area (e.g. on house blocks) once an agreement has been made with the landholder regarding work scope and remediation standards.



Initial shaft collapse and excavation to bedrock

Preparing and pouring concrete cap

Backfilling and site restoration

Challenges of managing and repurposing abandoned mines

Government management of sites

The Mineral Resources Act defines what an abandoned mine is and the rehabilitation activities that can be undertaken on an abandoned mine by an authorised person. While the legal definition of rehabilitation activities is broad under the Act, there is currently no provision that easily enables further development activities to be undertaken on these sites by government.

In the absence of a mining lease, which is the case for all abandoned mines, undertaking development activities on an abandoned mine may require significant new approvals and agreements. Considerations and negotiations that previously applied with respect to planning and development approvals, landholder agreements and native title no longer apply when the mining tenure is extinguished.

As a consequence, risk management activities that would provide a beneficial outcome for the site could require new approvals and authorisations. For example, activities necessary to manage and/or undertake rehabilitation may be inconsistent with an existing planning scheme and require a regional interests development approval.

Creating a legislative pathway to facilitate activities on legacy mines, pre-commencement terminated mines and historical mining disturbances will enable DNRME to address risks quickly and more effectively in circumstances where the proposed activities are minor in nature.

Private sector repurposing of sites

Repurposing an abandoned mine (typically legacy and pre-commencement terminated mines) refers to using the site for an alternative productive use, such as⁷:

- a new mining activity or re-mining (e.g. reprocessing tailings, accessing unmined ore bodies)
- activities that support mining activities (e.g. processing facilities)
- commercial (non-mining) activity (e.g. renewable energy site)
- a combination of mining and non-mining activities.

Legislative constraints

Current legislation does not easily allow a proponent to mine residual in-ground resources (i.e. resources that were not extracted as part of the original mining operation) at a time when it may be commercially attractive to do so.

In some cases, residual in-ground resources may remain in legacy and pre-commencement terminated mines. Residual resources may be present in previously untouched portions of ore bodies and previously unknown mineralisations. They may also be present in mineralised stockpiles such as ore dumps, waste dumps (including mineral processing waste) and mine affected water or minerals processing liquors.

Under the current statutory framework, a mining lease is required for the recovery of minerals from tailings and/or waste rock in which residual resources are commonly found. The application process for a mining lease involves stringent approval requirements and associated timeframes, and requires the proponent to hold a prerequisite tenure.

Such an extensive approvals process may not be justified in a situation where proponents are only taking surface materials that are easily accessible and require minimal land disturbance, compared to extracting resources located deep below the surface. Also, this type of activity would be occurring on land that has previously been approved for mining activities. Despite this, proponents are still required to obtain the full suite of mining tenure approvals.

Alternatively, some legacy and pre-commencement terminated mines are suitable for alternative non-mining uses. This could include, for example, pumped hydro energy storage or solar projects (see the case study about Genex Power's Kidston Renewable Energy Hub, p. 19). The current tenure framework and associated approvals do not easily allow proponents to obtain the required approvals to repurpose sites for such uses. Proponents are required either to obtain a mining lease or seek separate regulatory approvals, depending on whether the activity is classed as a mining activity. As per section 6A of the Mineral Resources Act, to mine means to carry out an operation with a view to, or for the purpose of:

- (a) winning mineral from a place where it occurs
- (b) extracting mineral from its natural state
- (c) disposing of mineral in connection with, or waste substances resulting from, the winning or extraction.

Depending on the type of activities undertaken, a mining tenure may not be the most appropriate way to obtain the necessary approvals. If a mining tenure is not obtained, the proponent would need to undergo a complex regulatory process to obtain the numerous separate approvals required.

In all instances of repurposing, there are likely to be benefits to streamlining the current legislation without undermining the intent of the relevant Acts (e.g. Mineral Resources Act and Petroleum and Gas Act) to help facilitate the uptake of repurposing options that mitigate the State's contingent liability.

7 Historical mining disturbances may also be repurposed; however given their nature, it is expected that there would be less opportunity to do so.

Technical opportunities

It is likely that technological advances will continue to improve the economic and commercial viability of re-mining opportunities at legacy and pre-commencement terminated mines. Examples of developing technologies include the following:

- Optical and mechanical sorters of waste rock can raise the grade of recovered material during the crushing process, making processing more economical.
- New grinding techniques can reduce the size of tailings particles and improve the extraction of metals.
- Resin extraction technologies facilitate new mineral recovery processes.

Advances in mining and minerals processing technologies can materially improve the commerciality of sites and improve the prospects of a partnership solution to the repurposing and rehabilitation of legacy and pre-commencement terminated mines.

Sharing risk and reward

Industry often perceives the repurposing of abandoned mines as having a relatively high risk profile with low associated financial returns. Repurposing projects can be complex with respect to the potential liability, approval pathways, technology employed and project execution. This can deter larger companies from such ventures and leave the market open to small and medium-sized enterprises.

There may therefore be opportunities to establish collaborative partnerships between government and industry to address the perceived imbalance between the risk of re-mining a site and addressing the associated liability issues, and the likely reward. This may act to encourage stronger companies and increased risk capital into this opportunity space.

Such collaboration remains a key driver for reforms to improve the likelihood of the private sector further investing in abandoned mines to make them productive again, where possible.

Proposed reform ideas

The Queensland Government is aiming to provide greater clarity on the following issues to guide the management of abandoned mines:

- management objectives
- legislative and regulatory framework
- prioritisation and operating framework
- management standards
- program guidelines
- enhanced data management
- funding and governance.

The following sections outline the government's proposed reform ideas.

1. Management objectives

The government's objectives for the management of legacy mines, pre-commencement terminated mines and historical mining disturbances is to ensure the sites are rendered safe, durable, secure and, where possible, productive. The objectives of these four terms are defined as follows:

1. 'Safe' refers to preventing exposure of the surrounding community to hazards that may be present on site through hazard removal, mitigation, or installing barriers.
2. 'Secure' is achieved when impact control measures installed at a site are sufficient to ensure that the level of impact to the surrounding environment is considered acceptable by the government. In this context, offsite impacts could include impacts on downstream water quality, erosion into downstream environments and environmental impacts such as dust generation. Such offsite impacts will be minimal when the site is deemed secure.
3. 'Durable' is achieved by ensuring that a site does not require ongoing maintenance and monitoring beyond what the government considers to be reasonably expected. This includes geotechnical and geochemical stability.
4. 'Productive' refers to the opportunity to repurpose the land for a future alternative appropriate use, such as an economic use or a use with community or conservation values.

These objectives apply to the ongoing management of abandoned mines and differ from the definition of terms that apply to the rehabilitation of land by the holder of an environmental authority under the Environmental Protection Act. Specifically, proposed amendments to the Environmental Protection Act define land as being in a stable condition if:

- (a) the land is safe and structurally stable
- (b) there is no environmental harm being caused by anything on or in the land
- (c) the land can sustain a post-mining land use.

Under the current statutory framework, mine operators and holders of mining tenements are

primarily responsible for ensuring that a mine is safe and secure during operations and at the time of decommissioning. If the mine operator or the holder of the mining tenement fails in their legal responsibilities to do so, the government may make any abandoned mine safe and secure where the operator or holder has failed to do so.

The Financial Provisioning Scheme will create greater capacity to manage the risks posed by abandoned mines. The Queensland Government will continue to exercise its discretion when managing abandoned mines, having regard for the nature of the risks and possible consequences if appropriate management actions are not taken. Projects will continue to be undertaken on a risk-prioritised basis. Abandoned mines that demonstrate lower risks and consequential impacts may be designated a lower priority for works to be undertaken in line with the constraints of the administrative (including financial) resources available (see the 'Prioritisation and operating framework' section for more detail).

2. Legislative and regulatory framework

Legislative amendments⁸ will be sought to enable DNRME to effectively meet the management objectives outlined above and help attract private capital to invest in repurposing sites.

Government management of sites

As by definition there is no longer any resource tenure at abandoned mines, the special exemptions that apply for resource tenure for a range of development considerations no longer apply. Management actions currently undertaken at abandoned mines often require new approvals under various Acts. Legislative changes could be made to the *Minerals Resources Act 1989* to strengthen the capacity to efficiently and effectively manage abandoned mines. This will ensure risks can be addressed in a timely manner and prevent any undue community safety and health, environmental or property impacts.

In addition, it is proposed to broaden the legislative definition of rehabilitation activities that government officers are authorised to undertake under the Mineral Resources Act. The following provision would be reviewed to ensure they adequately enable rehabilitation activities:

- investigation powers
- temporary works
- powers of entry
- temporary occupation of land.

In addition, powers would be expanded to enable the government to contract a party to reprocess or otherwise realise the value of minerals on an abandoned mine site, to prevent resource sterilisation and contribute to the cost of rehabilitation and management of the site.

The framework in the government's Mined Land Rehabilitation Policy formalises the government's commitment to ensuring land disturbed by mining activities is rehabilitated to a safe and stable landform that does not cause environmental harm and is able to sustain an approved post-mining land use. Areas that are not rehabilitated to sustain a post-mining land use may require additional ongoing management. In these cases, any residual risk payment made by the holder of the environmental authority to the Department of Environment and Science as administering authority will include provision for this ongoing management.

⁸ Any amendments would undertake in alignment with normal processes and include stakeholder consultation.



The Mined Land Rehabilitation Policy includes a requirement for all site-specific environmental authorities in Queensland to develop a progressive rehabilitation and closure plan (which will replace the current plan of operations). This will include new mines as part of their site-specific environmental authority application process. Existing mines will be transitioned into the framework. Disturbed land associated with mining activities that is unavailable for rehabilitation includes:

- a site being actively mined
- a site being used to operate mining infrastructure
- a site overlaying a probable or proven resource reserve identified for extraction in an approved progressive rehabilitation and closure plan within 10 years
- a site of built infrastructure that will be retained as a beneficial asset in an approved progressive rehabilitation and closure plan.

Private sector repurposing of sites

The Queensland government proposes to streamline the processes for granting mining tenures without weakening the assessment procedure of incoming proponents and their intentions for sites. Given that mining interests have been previously granted on sites that are now categorised as either legacy or pre-commencement terminated mines, invoking a proposed declaration of ‘abandoned mine’ tenure status (as a new form of tenure) could help expedite appropriate onsite activity.

Any activity allowable under this type of declaration will ultimately aim to complement final rehabilitation outcomes by reducing total rehabilitation costs and, where possible, enabling a more productive use of the abandoned mine and generating a variety of co-benefits such as long-term site improvements (and potential asset values).

The formal declaration of an abandoned mine tenure status would activate a range of relevant powers and special considerations. It is likely that this would only be applied to legacy and pre-commencement terminated mines that have been identified by DNRME as priority sites. Powers and special considerations would address the complications in the current legislation when repurposing an abandoned mine, without undermining the intention of the legislation. Examples of complications include:

- access to land where repurposing does not involve a mining activity
 - » in this situation, access to land is currently arranged through licensing, permitting and leasing arrangements
- the application process to grant tenure can involve stringent approval requirements and associated timeframes
 - » a streamlined process could be introduced to grant the tenure via the reduction of application requirements and/or removal of objection rights—this reflects that the mining activity is occurring on land that remains impacted by mining activities
- liability for contamination and rehabilitation
 - » repurposing activities will occur on land that has been impacted by the mining activities of a previous owner—this creates complications and uncertainties regarding who is liable/responsible for the mining disturbance.

Proponents will still be required to obtain a number of regulatory approvals separately. That is, the abandoned mine tenure declaration will not provide exemptions to certain legislative requirements and proponents will be required to pursue these separately. These requirements include, but are not limited to:

- native title, cultural heritage and Aboriginal cultural heritage
- environmental obligations
- agreements with third parties (e.g. adjacent landowners) to ensure protection of third party rights
- management of safety obligations.

An abandoned mine tenure declaration will help facilitate the repurposing of legacy and pre-commencement terminated mines for re-mining activities and/or an alternative economic uses. The declaration would address some of industry’s concerns regarding the complexity and timing of resource approvals required under current legislation without undermining the intention of other relevant Acts.

Please note: The barriers to repurposing a site uniquely reflect the intended alternative use, and the barriers of a land use change can be very different to, and possibly fewer than, the regulatory or investment hurdles of recovering residual minerals.

QUESTIONS FOR PUBLIC FEEDBACK

Q: The introduction of an abandoned mine tenure declaration will require amendments to existing legislation. Any activity undertaken under this tenure will ultimately be aimed at mitigating safety and health risks, impacts to the surrounding community, and promoting an alternative productive use of the site. Do you think the introduction of a new tenure is needed to encourage activity on previously mined areas? Do you have other options or solutions?

Q: Do you have an interest in repurposing an abandoned mine (i.e. a legacy or pre-commencement terminated mine) for an alternative use? If so, briefly describe your interest and the opportunity you see. Also you may wish to provide examples for clarification.

3. Prioritisation and operating framework

Following commencement of the Financial Provisioning Scheme, abandoned mines that existed prior to its establishment will be treated as ‘pre-commencement abandoned mines’.

Building on current knowledge and existing administrative processes, DNRME proposes to conduct a risk assessment of the state’s pre-commencement abandoned mines. The risk assessment will ensure that DNRME’s efforts are directed towards those sites that present the most significant level of risk. The risk assessment will take into account a site’s community safety and health, environmental and property risks. A site’s potential for repurposing will also be assessed and will consider factors such as the estimated residual resource, proximity of the site to existing infrastructure (e.g. power and water) and the features that remain on site (e.g. large flat surfaces, dams etc.). Appendix 1 outlines draft criteria to assess the risk level and repurposing potential of abandoned mines for community and health risk, environmental risk and property risk.

Based on this (or a similar) risk assessment, DNRME proposes to prioritise each abandoned mine under one of the following categories:



This classification will inform the type and timing of works to be expected on site. Resources will be directed towards priority sites in the first instance, given the relatively high risks presented by these sites. See Appendix 2 for a high-level framework outlining the process for responding to and managing priority sites.

4. Management standards

Site management activities, aim to ensure that abandoned mines are rendered safe, durable, secure and productive, and includes activities such as investigating the condition of the land, capping mine shafts, removing or making safe structures or equipment, cleaning up pollution and repairing or preventing erosion of land or vegetation.

For legacy mines and historical mining disturbances, works will continue to be undertaken on a priority basis. For pre-commencement terminated mines, management will be prioritised according to a number of factors, including:

- immediate risks to community safety and health, the environment and property
- the current state of rehabilitation
- future possible uses of the site
- advice from the Financial Provisioning Scheme Advisory Committee on the magnitude of potential benefits.

5. Program guidelines

It is proposed that DNRME establish and administer three new programs to help manage the risks and opportunities associated with abandoned mines:

1. **Minor works**—Ongoing projects that reduce risks posed by mining disturbances, including shaft repair projects and subsidence management projects. These sites will typically be historical mining disturbances identified as surveillance sites.
2. **Major works**—Aimed at addressing high-risk, complex sites for which there is limited potential for repurposing for an alternative use. These sites will typically be the priority legacy and pre-commencement terminated mines.
3. **Repurposing**—Projects aimed at understanding the opportunities for the private sector to repurpose legacy and pre-commencement terminated mines. This can include mining or processing the residual in-ground resources or potential alternative site uses (e.g. renewable energy hubs or other industrial activities).

Proposed repurposing program

The repurposing program seeks to motivate the private sector to reduce the total rehabilitation cost on legacy and pre-commencement terminated mines and utilise the site for a productive use. The program will target sites where there is potential to reduce the total rehabilitation cost while enabling a productive use of the site. It is anticipated that the government's role will focus on increasing the information available to stakeholders regarding the site (e.g. the economics of the estimated residual resource and the potential rehabilitation cost).

Potential sites are likely to be those in close proximity to power, water, road and rail infrastructure, and have known positive qualities (e.g. sites with an altitudinal difference suitable for pumped hydro energy storage) or an economic resources endowment. Residual resources may be present in previously untouched portions of ore bodies and previously unknown mineralisations. They may also be present in mineralised stockpiles such as ore dumps, waste dumps (including mineral processing waste) and leach liquors. Increases in commodity prices and new technologies may make reprocessing these minerals more economical.

This program will also include a modest grants scheme to help generate new scientific research aimed at mitigating the environmental risks of legacy and pre-commencement terminated mines, and accelerating the conversion of existing scientific research into new production processes. There are a variety of ways to administer funds under the repurposing program, including public consultation to assess interest in repurposing a proposed site, a competitive tender process or a reverse auction.

Working with DSDMIP, there may also be an opportunity for repurposing to be part of a targeted market-led proposal program. Under this program, government would provide industry with specific challenges/opportunities of legacy and pre-commencement terminated mines identified as priority sites where a non-traditional approach and government assistance may yield a better outcome for the community. It is likely that this process would involve expressions of interest (EOI) from industry, followed by comprehensive proposals from proponents. It is expected that the repurposing program will be a small component of DNRME's activities initially, with further funding allocations dependent on an evaluation of the program after a number of years.

QUESTIONS FOR PUBLIC FEEDBACK

Q: What facilitation mechanisms (new or existing) approach do you think would best support the repurposing program (e.g. competitive tender, market-led proposal)?

Q: What other options could the government consider in repurposing mines?

Q: Are you aware of any initiatives or examples either within Australia or overseas that the government could consider in designing this program.



A 50 MW solar farm will be developed during Stage 1 of the project (source: Genex Power Ltd)

Repurposing mine site infrastructure—Kidston Renewable Energy Hub

The Australian-based power generation company, Genex Power Ltd, is developing a large-scale hydro pumped storage project and solar farm at the former Kidston Gold Mine. This project is an example of how mine site infrastructure and existing disturbance footprints can be repurposed for an alternative, non-mining use. Stage 1 of this project is complete.

The Kidston site has two large adjacent mining pits that will act as the upper and lower reservoirs for the proposed hydro-electricity project. Since the closure of the Kidston Gold Mine in 2001, water levels in both pits have increased and now hold a combined water volume sufficient to support 2000 MWh of continuous power generation. The Kidston scheme is a closed loop system, involving the transfer of water from the upper reservoir to the lower reservoir. This will ensure minimal environmental impact during operation.

The Kidston site has existing onsite infrastructure and materials, mitigating the need for the significant capital expenditure normally associated with building a large-scale pumped storage hydro-electric generation scheme. Genex Power owns the pipeline linking Copperfield Dam to the site and can draw up to 4650 ML of water annually from the dam. The Copperfield Dam and the existing water rights held by Genex Power will ensure adequate water for supplementing the Kidston scheme in the event of a prolonged drought event.

The project is being developed in two stages. Stage 1 is the installation of a 50 MW solar farm on the former tailings storage facility, which is connected to an existing 132 kV transmission line. This has been constructed and is generating into the National Electricity Market. Stage 2 comprises a 250 MW pumped storage hydro plant utilising the two mining pits, integrated with an additional 270 MW solar farm. These will be connected to a new 275 kV transmission line (approx. 180 km long) and will deliver power to Queensland's electricity network during peak demand periods.

Together, the two solar farms are expected to generate over 900 GWh of renewable electricity per year. This could power approximately 175 000 homes and will offset 785 000 tonnes of carbon dioxide per year, equivalent to removing 220 000 cars from Australian roads.

6. Enhanced data management

A comprehensive database is essential for identification, assessment and prioritisation of abandoned mines. During the Queensland Floods Commission of Inquiry in 2011, it was recommended that the government establish a dedicated database for historic mines—a database has been developed, with the ability to incorporate new information and record relevant risks.

It is proposed to enhance this database to assist in the characterisation and risk assessment of the state's legacy mines, pre-commencement terminated mines and historical mining disturbances. The database will include, but will not be limited to, data about a site's key features and their condition, and information on the proximity to infrastructure, proximity to key environmental features and estimated in-ground and/or residual resources (if possible). Other key details which may be able to be included are surface and groundwater flows and quality.

7. Funding and governance

The Financial Provisioning Scheme Manager will be responsible for authorising payments from the Financial Provisioning Scheme Rehabilitation Fund for the costs and expenses required by DNRME to manage an abandoned mine. The funds will be limited to certain purposes as prescribed in the legislation. The funds will be managed on a whole-of-government basis in accordance with the governance arrangements developed under the Financial Provisioning Scheme. This will include consultation with the Financial Provisioning Scheme Advisory Committee when considering funding for pre-commencement abandoned mines. This is in addition to the existing budget allocation for the management of abandoned mines.

The approval process to allocate funds from the Financial Provision Scheme Rehabilitation Fund to pre-commencement abandoned mines will differ to those sites that are abandoned after the scheme commences. This is because sites abandoned after the scheme commences will provide either adequate fund contributions to the rehabilitation fund or sufficient surety depending on the risk profile as assessed annually by the scheme manager. Claims for funds to manage precommencement sites will be considered by the advisory committee prior to any formal request being submitted to the scheme manager. This approach allows departments to seek funding for different types of rehabilitation activities consistent with and/or in accordance with their respective legislation.

Delivery of the reforms

The government plans to implement the proposed reforms progressively. Site assessments, engineering designs, option identification and development of detailed implementation strategies will need to be undertaken to ensure the most effective strategies are developed. Accordingly, expenditure is expected to gradually increase and peak after the Financial Provisioning Scheme has been operating for a number of years.

Benefits of the reforms

The proposed reforms to DNRME's management of abandoned mines will result in at least four material benefits:

1. mitigation of safety and health risks with the potential to cause major injury at the priority sites
2. improved environmental and community outcomes
 - » improved water quality and reduced tailings erosion into downstream environments, allowing revegetation to occur
 - » reduced environmental impacts (e.g. reduced potential for downstream water impacts and groundwater contamination, and minimisation of offsite contamination)
 - » improved conservation of heritage values
 - » prevention of future subsidence events and potential damage to private property
 - » expedited hand-back of sites to Indigenous landowners if Indigenous Land Use Agreements are present
 - » enhanced environmental amenity (such as expanding adjacent natural territories to the benefit of enhanced biodiversity)
3. mitigation of risks and impacts that might affect businesses or employment in other sectors that require a healthy natural resources environment (e.g. tourism or agriculture)
4. economic stimulus and employment through returning disturbed land to an alternative productive use.

The anticipated benefits from rehabilitation can be qualified and, in some situations, quantified. It is likely that quantification will be based on the four main benefits of rehabilitation listed above and will depend on the exact nature of the onsite activity.

Table 2 illustrates the relative types of works that could reasonably be expected to be completed on abandoned mines and the associated benefit of these works. Depending on the scale of the activities, there can be significant employment benefits for the local community (employment benefits will vary from site to site depending on the type and extent of rehabilitation required).

Table 2. Benefits of rehabilitation works undertaken on abandoned mines

	Risks to be addressed	Works expected to be completed	Benefits of works
Legacy mines	<p>Safety and health, environment and property</p> <p>Impacts on surrounding and downstream land users</p>	<p>Work towards practical closure:</p> <p>decommission/make safe historic mining infrastructure</p> <p>install clean water diversions</p> <p>treat contaminated water</p> <p>remove/contain site and stream contamination</p> <p>decommission dams and process ponds no longer required</p> <p>cap mineralised stockpiles and tailings dams</p> <p>minimise dam maintenance requirements</p> <p>change site landforms to promote long-term stability</p> <p>support reprocessing opportunities</p>	<p>Site made safe, secure, durable and productive</p> <p>Future land use opportunities considered</p> <p>Opportunities to access residual mineral resources in the future are maintained</p> <p>Improved downstream water quality</p> <p>Minimised ongoing site management cost</p> <p>Minimal impediment to land use post-mining</p> <p>Employment opportunities during closure works</p>
Pre-commencement terminated mines	<p>Safety and health, environment and property</p>	<p>Site closure with funding from the Financial Provisioning Scheme Rehabilitation Fund</p>	<p>Site closure with close out of site risks and impacts</p> <p>Employment opportunities during closure works</p>
Historical mining disturbances	<p>Safety and downstream impacts</p>	<p>Program of prioritised site assessment and close out of identified risks</p>	<p>Removal of site safety risks (e.g. open shafts)</p> <p>Improved downstream water quality</p> <p>Improved land use</p>

QUESTIONS FOR PUBLIC FEEDBACK

Q: Do you support the proposed reforms to the management of legacy mines, pre-commencement terminated mines and historical mining disturbances? Briefly explain why.

Q: How do you think the proposed reforms could be improved?

Have your say

The Queensland Government is seeking industry and community feedback on the policy and program approaches proposed in this discussion paper.

More specifically, we want your feedback on the following questions:

1. Do you support the proposed reforms to the management of legacy mines, pre-commencement terminated mines and historical mining disturbances? Briefly explain why.
2. How do you think the proposed reforms could be improved?
3. Do you have an interest in repurposing an abandoned mine (i.e. a legacy or pre-commencement terminated mine) for an alternative use? If so, briefly characterise the opportunity you see. Also you may wish to provide examples for clarification.
4. What facilitation mechanisms (new or existing) approach do you think would best support the repurposing program (e.g. competitive tender, market-led proposal)?
5. What other options could the government consider in repurposing mines?
6. Are you aware of any initiatives or examples either within Australia or overseas that the government could consider in designing this program?
7. The introduction of an abandoned mine tenure declaration will require amendments to existing legislation. Any activity undertaken under this tenure will ultimately be aimed at mitigating safety and health risks, impacts to the surrounding community, and promoting an alternative productive use of the site. Do you think the introduction of a new tenure is needed to encourage activity on previously mined areas? Do you have other options or solutions?
8. Is the draft criteria and indicators provided in Appendix 1 suitable is there any additional criteria or indicators that should be added?

In addition, to help identify trends from different groups, please indicate which of the following categories best describes you:

- resource company—existing resource operation
- resource company—prospective resource operation
- landholder
- Traditional Owner or group representing the interests of Traditional Owners
- peak bodies (please specify)
- federal, state or local government (please specify)
- community group (please specify)
- environmental group (please specify)
- financial institution (please specify)
- member of the public
- other (please specify).

How to make a submission

Visit the Queensland Treasury website at www.treasury.qld.gov.au.

You can also provide a written submission by email or post:

Email: financial.assurance@treasury.qld.gov.au

Post: Financial Assurance Review
Queensland Treasury
PO Box 15216
City East Qld 4002

For more information, visit www.treasury.qld.gov.au or call 13 QGOV (13 74 68).

Submissions close **5 pm, 16 July 2018**.

Should these reform ideas proceed, the Queensland Government plans to roll them out as soon as possible.

Appendix 1: Draft prioritisation criteria

Draft criteria to assess the relative level of risk and repurposing potential of legacy mines, pre-commencement terminated mines and historical mining disturbances are indicated in Table 3. The criteria will help determine a relevant site ranking from very low to very high for community safety and health risk, environmental risk, property risk and repurposing potential. The overall ranking will be used to prioritise sites.

Table 3: Draft prioritisation criteria and indicators

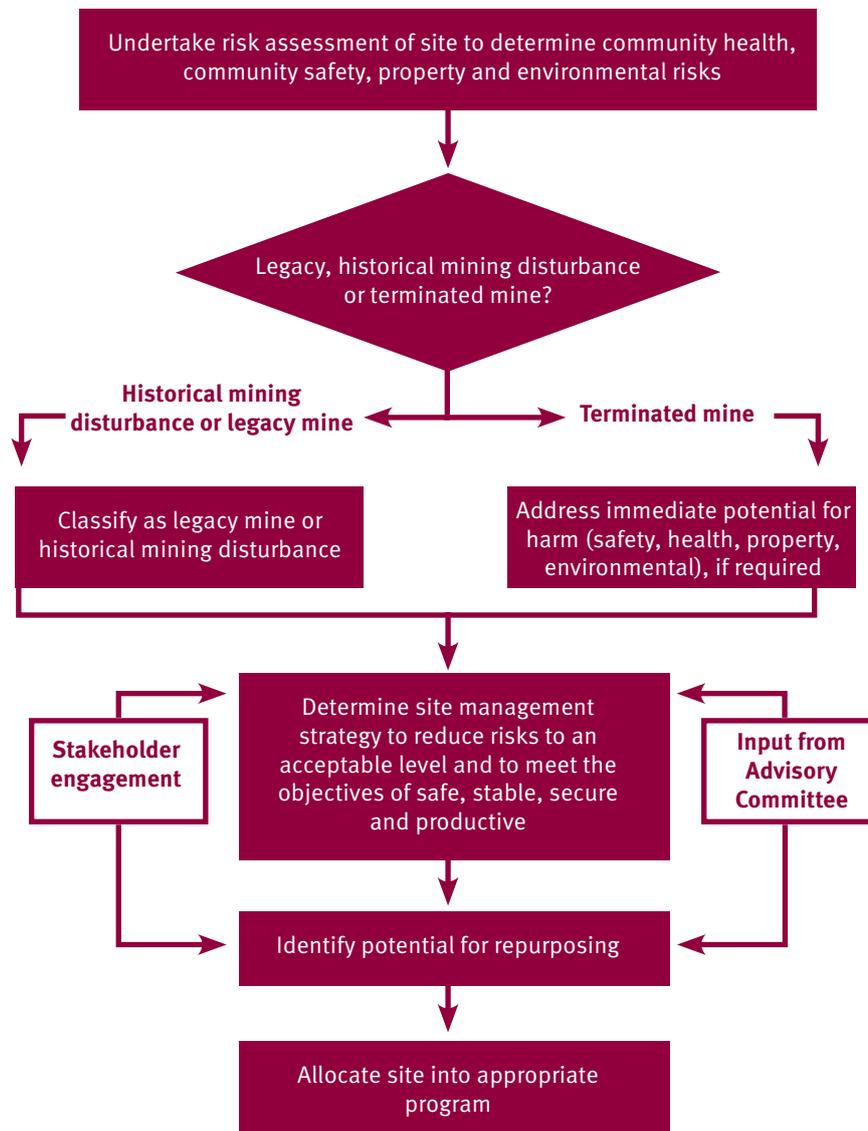
Community safety and health risk	
Criteria	Indicators
Accessibility	<ul style="list-style-type: none"> • Proximity to and size of population centre • Proximity to and class of road
Potential for release of contaminated material from site	<ul style="list-style-type: none"> • Flood likelihood • Proximity to waterways • Unremediated tailings • Unremediated waste rock dumps • Acid mine drainage or contaminated waters
Onsite hazards	<ul style="list-style-type: none"> • Size of mining workings • Open pits or voids
Environmental risk	
Criteria	Indicators
Onsite hazards	<ul style="list-style-type: none"> • Acid mine drainage potential • Hazardous material • Size of mine workings
Potential for release of contaminated material from site	<ul style="list-style-type: none"> • Flood likelihood • Proximity to waterways • Unremediated tailings • Unremediated waste rock dumps • Acid mine drainage or contaminated waters
Impact on environment	<ul style="list-style-type: none"> • Proximity to matters of state environmental significance • Acid mine drainage or contaminated waters • Accessibility of contaminated waters to wildlife • Proximity to occurrence of protected flora and fauna species

Property risk	
Criteria	Indicators
Accessibility	<ul style="list-style-type: none"> • Land tenure • Land use • Proximity to commercial enterprises, including grazing and agriculture • Proximity to and size of population centre • Proximity to and class of road
Potential for property impact	<ul style="list-style-type: none"> • Contaminated lands and water • Proximity to waterways • Acid mine drainage or contaminated waters entering waterways
Onsite hazards	<ul style="list-style-type: none"> • Contaminated land and water • Safety risks associated with remaining mining-related structures • Open pits or voids
Repurposing potential	
Criteria	Indicators
Site potential	<ul style="list-style-type: none"> • Approximate size of deposit • Commodity value • Clustering of sites (proximity of nearby sites)
Existing infrastructure	<ul style="list-style-type: none"> • Proximity to power • Proximity to water
Accessibility	<ul style="list-style-type: none"> • Proximity to roads • Proximity to rail • Land tenure • Accessibility to existing operations and mining/processing infrastructure

QUESTION FOR PUBLIC FEEDBACK

Q: Is the above draft criteria and indicators suitable is there any additional criteria or indicators that should be added?

Appendix 2: High-level framework for responding to and managing priority sites



Appendix 3: Glossary

Abandoned mine	<p>A site:</p> <ul style="list-style-type: none">(a) where mining or mining exploration activities have been carried out(b) for which no current mining lease or mining claim is granted(c) for which no environmental authority is in force for activities mentioned in paragraph (a) that were carried out under a mining lease or mining claim that is no longer in force. <p>The term ‘abandoned mine’ is used to collectively refer to legacy mines, pre-commencement terminated mines and historical mining disturbances.</p>
Environmental authority	<p>An environmental authority issued by the administering authority under Chapter 5 of the Environmental Protection Act.</p>
Historical mining disturbance	<p>An abandoned mine that ceased production prior to the Environmental Protection Act amendments in 2000, and that does not have features in common with a contemporary mine, typically created by non-mechanised mining methods.</p>
Legacy mine	<p>An abandoned mine that ceased production prior to the Environmental Protection Act amendments in 2000, and that has features in common with a contemporary mine, typically created by mechanised mining methods.</p>
Pre-commencement Terminated mine	<p>An abandoned mine that ceased production after the Environmental Protection Act amendments in 2000 but before the commencement of the Financial Provisioning Scheme.</p>

